

**Fauna of
New Zealand**
Ko te Aitanga Pepeke
o Aotearoa

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Fauna of New Zealand
Ko te Aitanga Pepeke o Aotearoa

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Diaspididae

(Insecta: Hemiptera: Coccoidea)

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Whenua
P R E S S

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POPULAR SUMMARY

HE WHAKARĀPOPOTOTANGA

Class **Insecta**Order **Hemiptera**Superfamily **Coccoidea**Family **Diaspididae****Armoured scale insects**

The armoured scale insect family Diaspididae is one of ten families of plant-sucking scale insects present in New Zealand. Unlike members of those other nine families, armoured scale insects do not produce the sugary exudate known as honeydew, and so they are not directly associated with the growth of sooty mould fungi in their habitat, nor do they support honeydew feeders such as birds, geckos, bees, and wasps in natural ecosystems. The reason for this lack of honeydew production is the first unique feature of the family – the stomach of armoured scale insects is not directly connected to the hind gut. They avoid the problem of dealing with large volumes of liquid from phloem sap by instead feeding on plant cells or parenchyma.

The second unique feature of the family is their armour or scale cover, in which they incorporate the cast skins of their juvenile moults, cemented together with waxes from various wax-producing ducts and pores. The third unique feature is the fused segments of the posterior part of the abdomen called the pygidium; this has special lobes on the margin that are said to act like trowels and often also brush-like appendages, and that help spread the waxes when the insect twists and turns during scale cover construction. Having a strong protective cover is important because armoured scale insects are legless and sedentary, except for the first crawler stage and the tiny adult males that only live for a few days.

The native (endemic) species are found only on native host plants and none are of economic importance or do any serious damage. Some of the endemic scale insects are quite host specific, for example, the two *Anoplaspis* species found only on rata and pohutukawa (*Metrosideros*), and



Illustration / Whakaahua: *Symeria pyriformis* (Maskell) female and crawler (Illustrator / Kaiwhakaahua: Rosa C. Henderson).

Ngā pepeke unahi whai pākai

Ko tēnei whānau pepeke unahi whai pākai, a Diaspididae, koia tētahi o ngā whānau pepeke unahi ngongo tipu tekau kei Aotearoa e noho ana. Ko tētahi o ōna rerekētanga, kāore ia e whakaputa i te māturinga hāpiapia e kīia nei ko te ‘honeydew’, nō reira ehara nāna i tipu ai te puruhekaheka pango e kitea ana i tōna wāhi noho, ehara rānei i te mea nāna e ora ai ngā manu, ngā mokomoko, ngā pī, ngā wāpu, ko taua waireka tā rātou kai i ngā taiao māori. Ko te take i kore ai ia e hanga i te waireka, koia te āhuratanga ahurei tuatahi o tēnei whānau, arā he wehe motuhake nō te wāhanga tuatahi o te puku me ngā kōpiro o muri. Kāore rātou e kai i te pia mai i te tarikai — ka kai kē rātou i ngā pūtau tipu e kīia nei ko te ‘parenchyma’.

Ko te āhuratanga ahurei tuarua o tēnei whānau, ko te pākai tonu e noho ana hei kahu mōna. Ka hangaia ki ngā ngeti o ngā whakamāunutanga kōhungahunga, he mea whakapiri tahi ki ngā harare ka māturu mai i ōna anō pū, i ōna anō kōputa hanga harare. Ko te āhuratanga ahurei tuatoru, ko te hono tahi o ngā wāhanga whakamuri o te tia, arā, o te pygidium; he pokopoko kei te tapa, me ētahi atu hanga pēnei i te paraihe te āhua, ko te mahi a ēnei hanga, he hora haere, he pani haere i ngā harare ina takaoraora te pepeke ki te hanga pākai mōna. He mea nui kia kaha tonu te kahu o te unahi whai pākai, i te mea he waewae kore, he

(continued overleaf)

(haere tonu)

leptocarpus scale found only on oioi (jointed wire rush). Among others with wider host ranges, *Poliaspis* and *Symeria* are perhaps the most species-rich genera. Oddly, while there are no records of armoured scale insects on southern beech (*Nothofagus*), felt scale insects (eriococcids) in contrast show a remarkable diversification there. Nearly all the endemic armoured scale species belong to the subfamily Diaspidinae, and there is just one species in the other subfamily Aspidiotinae, which is surprising compared with the many more aspidiotine members of the introduced fauna.

Introduced or adventive species arrived accidentally on plants brought by the first European settlers, and by 1879 six species, including greedy scale, oleander scale, and rose scale had established. Since then the adventive species total has reached twenty-one, plus eight Australasian species. A few species still manage to breach the border – most recently zamia (cycad) scale in 2004 and minute cypress scale in 2009. Some of the adventive species are cosmopolitan pests and can be problematic, mainly in citrus, apple, pear, and kiwifruit orchards. Only four of them have invaded natural ecosystems but they seem to do little damage there.



Contributor **Rosa Henderson** graduated from the University of Canterbury, New Zealand, in 1965 and was a Research Fellow investigating chromosome abnormalities in leukaemia at the Cytogenetics Unit, Christchurch Hospital, for 5 years. After a 15 year break from science bringing up her family, she began an entomological career

neke kore, atu i ngā mea kei te tūā tupu ngaoki tuatahi, me ngā kātua toa ririki e ora ana mō ētahi rā ruarua noa iho nei.

Noho tahi ai ngā momo māori taketake ake ki ngā tupu māori anahe. Kāore ngā momo nei e takakino i ngā tupu i noho atu ai rātou, kāore he pānga kino ki te ōhanga. Ko ētahi, ka noho whāiti ki ētahi momo rākau ruarua nei, hei tauira, kitea ai ngā momo *Anoplaspis* e rua i te rātā me te pōhutukawa anahe (*Metrosideros*), ā, ko te unahi leptocarpus kitea ai i te oioi anahe. O ngā mea he maha ake ā rātou rākau noho, ko ngāi *Poliaspis* me ngāi *Symeria* pea ngā puninga e huhua ana ngā momo. Ko tētahi mea āhua korokē, kāore anō i kitea he unahi whai pākai e noho ana ki ngā tawai o te tonga (*Nothofagus*), engari kua kitea te tini noa o ngā momo unahi whātau (ngā eriococcid) e noho tahi ana ki te tawai. Tata tonu ko te katoa o ngā momo māori o ngāi unahi whai pākai, nō te whānau iti Diaspidinae; kotahi noa iho te momo i tērā atu whānui iti, i ngā Aspidiotinae. He hanga āhua rerekē anō tēnei, ina whakaritea ki ngā momo rāwaho kei konei e noho ana — ko te maha tonu o ērā he aspidiotine.

I tau pokerehū mai ngā momo rāwaho i runga i ngā tipu i kawea mai i te oroko taenga mai o tauwiwi ki tēnei whenua noho ai. 1879 rawa ake te tau, e ono ngā momo kua rarau e noho, tae atu ki te unahi pukukai, te unahi oleander, me te unahi rōhi. Mai i tērā wā, kua eke ki te 21 ngā momo, ā, me ētahi momo e 8 o Te Moana-nui-a-Kiwa. Arā tonu ētahi manene ka urutomo mai i ōna wā anō — ko ngā mea o ngā tau tata nei, ko te unahi zamia (he cycad) i te tau 2004, me te unahi cypress tino pakupaku i te tau 2009. Ko ētahi o ngā momo kua tau pokerehū mai, kei ngā wāhi maha o te ao, he whakararu anō tā rātou i ngā māra o te whānau ārani, te āporo, te pea, me te huakiwi, me ētahi atu wāhi. E whā noa iho ngā momo kua urutomo i ngā pūnaha hauropi māori, ā, mokori anō kāore i tino raru aua wāhi i tā rātou noho atu ki reira.

Translation by **H. Jacob**
Ōtaki

in 1985 at DSIR, Mt Albert. When the DISIR was disbanded in 1992, Rosa became a science technician for Landcare Research working on scale insects in the N.Z. Arthropod Collection. She is now a senior science technician and section curator of Sternorrhyncha in NZAC. Rosa is author or co-author of 37 scientific papers, including two previous volumes in the *Fauna of New Zealand* series, both written in collaboration with Chris Hodgson (Wye College and Cardiff, U.K.) on the family Coccidae.

ABSTRACT

The adult females of all 49 species of Diaspididae (Hemiptera: Coccoidea) known from New Zealand, except the tribe Leucaspini, are described and illustrated. The 1st- and 2nd-instar nymphs of all the endemic species and of 4 Australian species that are of systematic interest are also described and illustrated. Four new genera, *Anzaspis*, *Pellucidaspis*, *Pseudodonzaspis*, and *Serenaspis* and seven new species are described. Two genera, *Fusilaspis* and *Symeria*, are reinstated and redescribed. Hence there are twenty endemic species in ten genera and eight Australasian species in six genera. In addition, there are twenty-one cosmopolitan adventive species in fourteen genera. Nomenclatural changes are as follows: *Chionaspis angusta* Green and *Pseudaulacaspis cordylinidis* (Maskell) are transferred to *Anzaspis* n.gen.; *Pseudaulacaspis phymatodidis* (Maskell) is transferred back to an earlier combination as *Fusilaspis phymatodidis* (Maskell) and *Pseudaulacaspis dubia* (Maskell) is a new junior synonym of *F. phymatodidis*; *Pseudaulacaspis epiphytidis* (Maskell) becomes the senior synonym of *Andaspis asteliae* (Green) and is transferred to *Pellucidaspis* n.gen; *Lepidosaphes lactea* (Maskell) is transferred to *Poliaspis* Maskell and *P. argentosis* Brittin becomes a junior synonym of *P. media* Maskell; *Natalaspis leptocarpi* (Brittin) is confirmed as *Poliaspoides leptocarpi* (Brittin); *Trulliflorinia minima* (Maskell) becomes the senior synonym of *Pinnaspis dysoxyli* (Maskell) and is transferred to *Serenaspis* n.gen.; *Scrupulaspis intermedia* (Maskell) and *Eulepidosaphes pyriformis* (Maskell) are transferred to *Symeria* Green. In addition, *Fiorinia drimydis* (Maskell) is considered a nomen dubium because the only specimens available are 2nd-instar male nymphs of an unidentifiable *Leucaspis* species. Keys to allow separation of adult females of all genera and species are included. Earlier work carried out on the Diaspididae in New Zealand is briefly reviewed. Biology and life cycle, scale cover formation, natural enemies, distribution, host plant associations including galls, and economic importance are discussed. Methods are given for slide-mounting Diaspididae as used in the New Zealand Arthropod Collection. Morphology and terms are detailed for adult females, male and female 2nd-instar nymphs, and 1st-instar nymphs. Lists of plant hosts, material examined, and georeferenced collection localities are included as appendices.

Keywords. Insecta, Hemiptera, Coccoidea, Diaspididae, New Zealand, armoured scale insects, classification, distribution, ecology, biology, new species, keys.

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CHECKLIST OF TAXA

Genus <i>Abgrallaspis</i> Balachowsky, 1948	45	Genus <i>Anzaspis</i> Henderson n. gen.	57
<i>cyanophylli</i> (Signoret, 1869)	45	<i>angusta</i> (Green, 1904) new comb.	58
Genus <i>Anoplaspis</i> Leonardi, 1898	47	<i>candida</i> Green, 1905, <i>Chionaspis</i>	
<i>maskelli</i> Morrison, 1922	47	<i>cordylinidis</i> (Maskell, 1879) new comb.	62
<i>metrosideri</i> (Maskell, 1880)	56	<i>gahniae</i> Henderson n. sp.	70

Genus <i>Aonidiella</i> Berlese & Leonardi, 1896	75	Genus <i>Poliaspis</i> Maskell, 1880	128
<i>aurantii</i> (Maskell, 1879)	75	<i>chathamica</i> Henderson n. sp.	129
Genus <i>Aspidioides</i> MacGillivray, 1921	75	<i>floccosa</i> Henderson n. sp.	133
<i>corokiae</i> (Maskell, 1891)	75	<i>lactea</i> (Maskell, 1895) new comb.	134
Genus <i>Aspidiotus</i> Bouché, 1833	77	<i>media</i> Maskell, 1880	144
<i>nerii</i> Bouché, 1833	77	<i>argentosis</i> Brittin, 1915 new syn.	
Genus <i>Aulacaspis</i> Cockerell, 1893	80	<i>raouliae</i> Henderson n. sp.	153
<i>rosae</i> (Bouché, 1833)	81	<i>salicornicola</i> Henderson n. sp.	154
<i>rosarum</i> Borchsenius, 1958	81	Genus <i>Poliaspoides</i> MacGillivray, 1921	161
Genus <i>Carulaspis</i> MacGillivray, 1921	81	<i>Natalaspis</i> MacGillivray, 1921	
<i>juniperi</i> (Bouché, 1851)	81	<i>leptocarpi</i> (Brittin, 1916)	161
<i>minima</i> (Signoret, 1869)	86	Genus <i>Pseudaulacaspis</i> MacGillivray, 1921	165
Genus <i>Diaspidiotus</i> Berlese in: Berlese & Leonardi, 1896	86	<i>brimblecombei</i> Williams, 1973	165
<i>Quadraspidiotus</i> MacGillivray, 1921		<i>eugeniae</i> (Maskell, 1882)	175
<i>ostreaeformis</i> (Curtis, 1843)	87	Genus <i>Pseudodonaspsis</i> Henderson n. gen.	176
<i>perniciosus</i> (Comstock, 1881)	87	<i>mollyae</i> Henderson n. sp.	181
Genus <i>Diaspis</i> Costa, 1828	87	Genus <i>Pseudoparlatoria</i> Cockerell, 1892	182
<i>boisduvalii</i> Signoret, 1869	87	<i>parlatorioides</i> (Comstock, 1883)	182
Genus <i>Furchadaspis</i> MacGillivray, 1921	92	Genus <i>Serenaspis</i> Henderson n. gen.	182
<i>zamia</i> (Morgan, 1890)	92	<i>minima</i> (Maskell, 1884) new comb.	188
Genus <i>Fusilaspis</i> MacGillivray, 1921	92	<i>dysoxyl</i> (Maskell, 1885), <i>Pinnaspis</i> new syn.	
<i>phymatodidis</i> (Maskell, 1880) reinstate comb.	92	Genus <i>Symeria</i> Green, 1929	189
<i>dubia</i> (Maskell, 1882), <i>Pseudaulacaspis</i> new syn.		<i>Eulepidosaphes</i> Borchsenius & Williams, 1963	
Genus <i>Hemiberlesia</i> Cockerell, 1897	99	<i>Scrupulaspis</i> MacGillivray, 1921	
<i>lataniae</i> (Signoret, 1869)	100	<i>intermedia</i> (Maskell, 1891) new comb.	190
<i>rapax</i> (Comstock, 1881)	100	<i>leptospermi</i> (Maskell, 1882) new comb.	204
Genus <i>Kuwanaspis</i> MacGillivray, 1921	101	<i>phyllocladi</i> Henderson n. sp.	205
<i>pseudoleucaspis</i> (Kuwana, 1902)	101	<i>pyriformis</i> (Maskell, 1879) new comb.	206
Genus <i>Lepidosaphes</i> Shimer, 1868	105	Genus <i>Trulliflorinia</i> Leonardi, 1906	208
<i>beckii</i> (Newman, 1869)	105	<i>acaciae</i> (Maskell, 1892)	208
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<i>asteliae</i> Green, 1929 new syn.			
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INTRODUCTION

The armoured scale insects (Sternorrhyncha: Coccoidea: Diaspididae) are sap-sucking hemipterans with some unique features compared with other scale insect family groups. For example, they possess a blind gut with no direct connection between the stomach and the anal opening, and thus they do not produce the sweet exudate known as honeydew. In mitigation, their bacteriomes contain vertically transmitted endosymbionts that aid synthesis of vital dietary components (e.g., amino acids) missing from the plant sap that they ingest (Gruwell *et al.* 2007; Andersen *et al.* 2010). Armoured scale insects are characterised by extremely reduced morphology in the larviform adult females (loss of legs, antennae reduced to unsegmented tubercles) (Balachowsky 1948; Takagi 1993). In their consequent sedentary lifestyle, they are protected by the specialised scale cover which is constructed from the cast nymphal skins combined with waxes produced from ducts and pores on the highly modified posterior abdomen, the pygidium. The Diaspididae is the largest family of the Coccoidea with more than 2460 diaspidid species currently known (Ben-Dov, ScaleNet, 2010; Miller & Gimpel, ScaleNet, 2010), and these are found in all landmasses of the world except the polar regions (Miller & Davidson 2005).

In the classification of the Diaspididae two main subfamilies, the Aspidiotinae (aspidiotines) and Diaspidinae (diaspidines) (see Fig. 2–4) are recognised, and most species can be assigned to one or the other (Miller & Davidson 2005). Subfamily morphological distinctions are useful for diagnosing species, although these assignments may be arbitrary rather than reflecting ancestry because molecular phylogenetic studies show that the subfamilies are not monophyletic: this is more the case with the Aspidiotinae than with the Diaspidinae (Andersen *et al.* 2010).

It seems that parts of the New Zealand fauna may have been lost through recent geological time, because notably just one endemic aspidiotine taxon remains here now (*Aspidioides corokiae* (Maskell)) among all the others which

are diaspidines. By comparison, aspidiotines are relatively common among the adventive fauna (e.g., *Aspidiotus nerii* Bouché, *Hemiberlesia* spp., *Lindingaspis rossi* (Maskell)) (Henderson 2007). Aspidiotine scales were present in New Zealand in the Miocene, as shown by a well-preserved, 20-million-year-old, fossil of an extinct aspidiotine described by Harris *et al.* (2007), when the climate was warmer and plant assemblage more diverse (Gibbs 2006; Mildenhall 1989; Pocknall 1989; Pole 1993; Pole *et al.* 2003). After the Miocene period, plant assemblages changed dramatically in response to tectonic upheaval of the landmass and a cooling climate, while later glacial cycling over the past 5 million years has destroyed the fossil record of the Pleistocene and Pliocene (Gibbs 2006; Henderson 2007). Many of the at least 15 plant families and 36 genera lost from New Zealand since the Miocene are still represented in Australia and New Caledonia (Gibbs 2006; Lee *et al.* 2001). The loss of the wider range of host plants once available may explain why the New Zealand armoured scale insect fauna has become rather depauperate, with a mere 22% generic endemism (Henderson 2007), yet within this fauna are some polyphagous genera with wide host ranges (e.g., *Fusilasps*, *Poliaspis*, and *Symeria*) and, notably, the species-rich *Leucaspis* with a putative 50 (mostly undescribed) species. Then there are surprising gaps: it is interesting to compare the absence of diaspidids on *Nothofagus* with the radiation of *Nothofagus*-feeding Eriococcidae in New Zealand (Hardy *et al.* 2008; Henderson 2007).

As noted in *Fauna of New Zealand* 41 (Hodgson & Henderson 2000), the New Zealand Coccoidea were first studied between 1879 and 1898 by W. M. Maskell who described about 300 species of Sternorrhyncha from around the world. The Diaspididae of New Zealand described by Maskell were a mix of adventive species that had arrived on exotic plants brought by early settlers, and endemic species discovered in the native forests. In 1887 Maskell summarised the Coccoidea in New Zealand as “insects noxious to agriculture and plants” and gave useful advice on their control to help farmers, orchardists, and gardeners defend their plants against the increasing prevalence of exotic pests in the new country (Maskell 1887). There was no mention then of protecting the natural environment for the benefit of the endemic species, none of which has subsequently become a pest of non-native plants.

The family Diaspididae in New Zealand has not received much taxonomic attention since Maskell's time, apart from the following: Morrison redescribed *Anoplaspis metrosideri* (Maskell) and described *A. maskelli* (Morrison & Morrison, 1922); Green (1929) described some species and the genus *Symeria* from material sent to him from New Zealand by J. G. Myers; Borchsenius & Williams (1963)

studied the type species of *Aspidioides* and *Scrupulaspis* and erected 2 new genera, *Eulepidosaphes* and *Labidaspis* (the latter a leucaspidine); further species were described in the tribe Leucaspidini (Brittin 1915, 1937; de Boer & Valentine 1977). More recently Henderson clarified some synonymies in two brief papers (Henderson 2000, 2001), and Charles & Henderson (2002) produced a catalogue of exotic armoured scale insects with an annotated checklist, which usefully expunged 8 erroneous records for pest species. Since then, 2 new exotic species have become established, namely *Carulaspis minima* (Signoret) on conifers and *Furchadaspis zamiae* (Morgan) on cycads.

This revision updates the nomenclature of the Diaspididae (except Leucaspidini) in New Zealand. It has necessitated an overhaul of generic concepts of the endemic species, and introduces new names to reconcile some instances of taxonomic confusion. Molecular data (Andersen *et al.* 2010) show that the northern hemisphere Fioriniina (*Fiorinia* + *Lineaspis* + *Pseudaulacaspis*) is distinct from the southern Fioriniina (*Poliaspis* + southern “*Chionaspis/Pseudaulacaspis*”), hence new genera were required to solve these nomenclatural problems. In addition, *Pinnaspis dysoxyli* is not closely related to other *Pinnaspis* species (Andersen *et al.* 2010, Fig. 1). Descriptions of 4 new genera — *Anzaspis*, *Pellucidaspis*, *Pseudodonaspis*, and *Serenaspis* and 2 reinstated genera *Fusilasps* and *Symeria* — and 7 new species bring the number of endemic species to 20 in 10 genera. In addition, there are 8 Australasian species in 6 genera, and 21 cosmopolitan adventive species in 14 genera, making a total of 49 species. Four of the Australasian species (*Anzaspis angusta* (Green), *Pseudaulacaspis brimblecombei* Williams, *P. eugeniae* (Maskell), and *Trulliflorinia acaciae* (Maskell)) and all the endemic species are provided with descriptions and figures of adult female, male and female 2nd-instar nymphs, and 1st-instar nymphs where available. The treatment of the other 4 Australasian species (*Lepidosaphes multipora* (Leonardi), *Lindingaspis rossi* (Maskell), *Parlatoria fulleri* Morrison, and *P. pittospori* (Maskell)) and all the cosmopolitan adventive species is limited to a diagnosis and figure based on the adult female alone. The tribe Leucaspidini is excluded here and will be revised in a future volume.

Nomenclatural changes

Chionaspis angusta Green and *Pseudaulacaspis cordylinidis* (Maskell) are transferred to *Anzaspis* n.gen.; *Pseudaulacaspis phymatodidis* (Maskell) is transferred back to an earlier combination as *Fusilasps phymatodidis* (Maskell), and *Pseudaulacaspis dubia* (Maskell) is a new

junior synonym of *F. phymatodidis*; *Pseudaulacaspis epiphytidis* (Maskell) becomes the senior synonym of *Andaspis asteliae* (Green) and is transferred to *Pellucidaspis* n.gen.; *Lepidosaphes lactea* (Maskell) is transferred to *Poliaspis* Maskell and *P. argentosis* Brittin becomes a junior synonym of *P. media* Maskell; *Natalaspis leptocarpi* (Brittin) becomes *Poliaspoides leptocarpi* (Brittin), (Miller & Gimpel 2009; for a full discussion on the generic synonymy see Takagi, 1969, p. 58); *Trulliflorinia minima* (Maskell) becomes the senior synonym of *Pinnaspis dysoxyli* (Maskell) and is transferred to *Serenaspis* n.gen.; *Scrupulaspis intermedia* (Maskell) and *Eulepidosaphes pyriformis* (Maskell) are transferred to *Symeria* Green. In addition, *Fiorinia drimydis* (Maskell) is considered a nomen dubium because the only material available is 2nd-instar male nymphs of an unidentifiable *Leucaspis* species.

The adventive cosmopolitan pest species are well documented for purposes of New Zealand phytosanitary regulations. The national catalogue of exotic armoured scale insects (Charles & Henderson 2002) provides information on biosecurity obligations (Biosecurity Act 1993, Hazardous Substances and New Organisms Act 1996, and article 8h of the Convention on Biological Diversity). Heavy emphasis is placed on border control, and all new organisms are assumed to be a threat to native flora and fauna — even those imported as biocontrol agents — until, or if, their host specificity and potential economic benefit can be scientifically demonstrated (Charles & Henderson, 2002).

Natural enemies

Natural enemies of armoured scales already present in New Zealand include hymenopteran parasitoids, Coccinellidae and mites, earwigs, lepidopteran larvae, and entomopathogenic fungi. Information on the parasitoids may be found in Valentine & Walker (1991) and the BCANZ website <http://www.b3nz.org/bcanz/index.php> (Ferguson et al. 2007). Coccinellid beetles in the genus *Chilocorus* were imported as biocontrol agents in tandem with *Hemisarcoptes* mites to control pest armoured scales in kiwifruit orchards, but the beetles failed to establish and without them to distribute the phoretic mites, the *Hemisarcoptes* populations are scarce (Hill et al. 1993; Charles et al. 1995). European earwigs, *Forficula auricularia*, were found to consume large, mature *Hemiberlesia* female scales in kiwifruit orchards but the total impact was low (Logan et al. 2007; Hill et al. 2005; Maher et al. 2006). The two entomopathogenic fungi present in New Zealand, *Cosmopora* (*Nectria*) *aurantiicola* (anamorph *Fusarium larvarum*) and *C. (N.) flammea* (anamorph *F. coccophilum*)

are known to infest and kill populations of native and adventive scales in the wild (Fig. 46) (Tyson et al. 2005; Henderson 2004). In 2002 various samples of infected scales were collected from five localities to develop useful isolates for biocontrol in kiwifruit orchards (Tyson et al. 2005). Larvae of *Batrachedra arenosella* s.l. (Lepidoptera: Batrachedridae) have been reared from *Anzaspis* (as *Pseudaulacaspis cordylinidis* (Maskell) on cabbage tree (R. J. B. Hoare, pers. comm.), and they commonly attack and destroy local populations of the flax scale, *Poliaspis floccosa* n.sp., on *Phormium tenax*.

Miller & Davidson (2005) provided an extensive outline for management of armoured scales and should be referred to for details. They mention an interesting observation in regard to control methods. They had monitored the scale populations on the University of Maryland campus over about 40 years and during the first half of that time, plants were regularly sprayed with insecticides to control various pests. The scale populations were plentiful then, an unintended result of the suppression of their natural enemies. In the later time, they note that those scale populations have practically disappeared since an integrated pest management system (IPM) has been implemented (Miller & Davidson 2005).

Economic importance

None of the endemic or Australasian species are of economic importance in New Zealand. Of the cosmopolitan species, *Aspidiotus nerii*, *Hemiberlesia lataniae* (Signoret), and *H. rapax* (Comstock) are problematic in kiwifruit orchards mainly because of nil-tolerance for export fruit. *Aonidiella aurantii* (Maskell) (California red scale) attacks leaves, fruit, and wood of *Citrus* and is common in the warmer parts of the North Island but is usually only a minor pest (Charles & Henderson 2002). *Diaspidiotus ostreaeformis* (Curtis) (oystershell scale), *D. perniciosus* (Comstock) (San José scale), and *Lepidosaphes ulmi* (Linnaeus) (apple mussel scale) are pests of pip and pome orchards: they are mainly found on the wood but in large populations can move to and damage the fruit (Charles & Henderson 2002). *Lepidosaphes beckii* (Newman) and *L. pinnaeformis* (Bouché) are not the serious pests here in New Zealand as they can be overseas (Charles & Henderson 2002). *Parlatoria pittospori* (mauve pittosporum scale) was a pest of apple orchards in the Nelson area until Timlin (1964a, 1964b) discovered that the commonly planted *Pinus radiata* shelter belts surrounding the affected orchards harboured reservoirs of the scale, from where crawlers were blown to the apple trees. None of the other adventive diaspidids are currently of economic importance.

Host associations

McClure (1990) remarked on the profound effects of host plants on the morphology and phenology of armoured scale insects, noting that this has at times caused much confusion among systematists. One of the classic examples is a species with leaf and bark forms mistakenly described as two species in two different genera, *Chionaspis sylvatica* and *Phenacaspis nyssae*. Although the median lobes of each form are strikingly different, intermediate forms were found within the same colony and the species were synonymised by Takagi & Kawai (1967). Further careful host transfer experiments unconditionally corroborated the finding (Knipscher *et al.* 1976). The evolution of such dimorphism in armoured scale insects with a bark (or winter) form and a leaf (or summer) form is, of course, related to their deciduous host trees, and so is of less consequence in New Zealand's evergreen forests. Bark and leaf forms may be found among some undescribed New Zealand *Leucaspis* species (unpublished data), but as these are on evergreen trees they appear to be unrelated to the deciduous host tree effect.

The speciation process can be considered in regard to distinct host races or demes, which are reproductively isolated in time and space, and the effects of host plants on morphology and phenology (McClure 1990). Where there is uncertainty concerning species boundaries for a polymorphic species on different host plants, that species might represent a number of cryptic species. In this study it has been decided to retain *Poliaspis media* Maskell as a species complex because of these difficulties. Similarly, *Symeria pyriformis* (Maskell) is so polyphagous that it might be in the process of speciation in any number of host plant associations. Where morphological features were found that could be clearly tested in keys, this was considered sufficient distinction to treat an entity as a species, and so far three species closely related to *S. pyriformis* have been described. Often the taxon was associated with a particular host plant. A fourth possible species was investigated in association with the native podocarp, rimu, *Dacrydium cupressinum* (Henderson 2004). When *S. pyriformis* colonises rimu trees, the 1st-instar nymphs develop extraordinary groups of wax-producing head ducts (see Fig. 114–117). It is considered a case of host plant resistance, whereby the plant compounds ingested by the female scale impact directly on embryogenesis to cause the multiplication of head ducts (Henderson 2004). In kiwi-fruit orchards much effort goes into controlling pest scale insects without the use of harmful pesticides, and recent studies have demonstrated host resistance to *H. lataniae* by some cultivars of *Actinidia* species (Hill *et al.* 2009; Hill *et al.* 2010).

Among the few strictly monophagous diaspidid species in New Zealand, a good example is *Poliaspoides leptocarpi* (Brittin) on oioi, *Apodasmia similis* (Restionaceae). Some of the species closely related to *Poliaspis media* and *Symeria pyriformis* have developed specificity on narrow host preferences, e.g., *Poliaspis chathamica* n.sp. on *Olearia traversii*, and further examples named for their respective host plants are *P. salicornicola* n. sp., *P. raouliae* n. sp., *Symeria phyllocladi* n. sp., and *S. leptospermi* (Maskell). *Anzaspis gahniae* n. sp. is restricted to *Gahnia* species (Cyperaceae). *Pseudodonaspis mollyae* n. sp. feeds on *Poa* and *Chionochloa* species (Poaceae). *Anoplaspis maskelli* and *A. metrosideri* are partitioned by their *Metrosideros* host preferences, with *A. maskelli* feeding only on lianes or vine species and *A. metrosideri* only on tree species.

Gall Induction

Gall induction by *Poliaspis media* is prevalent on particular host genera: on *Coprosma* species it induces rosette shoot galls (Fig. 92); on *Hebe* species leaf curling; and on *Myrsine* species leaf roll galls (Henderson & Martin 2006). The galls are formed in plant meristematic tissue (Larew 1990) so that the leaf tip roll on *Myrsine australis* is induced on an actively growing new leaf, later becoming chlorotic as the scale insects develop and feed on plant cells there (Fig. 93). Although not considered separate distinct species, the populations forming galls may be demes or biological races and may be localised to an area (Henderson & Martin 2006). The new species *Symeria phyllocladi* is an inquiline in the tubular pocket galls induced by *Eriococcus arcanus* Hoy, and subsequent feeding by the diaspidid causes chlorosis in those galls compared with the natural green colour of the original eriococcid gall (Fig. 108). Thus, the appearance of the galls can act as a field guide to each of these species (Henderson & Martin 2006).

DISTRIBUTION

The most common and widespread of the endemic scales are *Fusilaspis phymatodidis* (Maskell) (fern scale), *Poliaspis floccosa* (flax scale), *P. media* (poliaspis scale), and *Symeria pyriformis* (pyriform scale). The incidence of flax scale has increased enormously in urban and native restoration areas through the planting of both the natural forms and cultivars of its host *Phormium tenax*, where the leaf blades can appear 'painted' white with their colonies (see Fig. 83). The other three are species of the natural environment, where fern scale is confined to a wide range of ferns. Species of *Poliaspis* are found in the most far reaching and

diverse places of all the endemics, from the Three Kings Islands including the new species *P. salicornicola*, to the Chatham Islands including another new species *P. chathamica*, and poliaspis scale is recorded on both Stewart Island and Big South Cape Island. *Anoplaspis metrosideri* can be found sporadically on leaves of pohutukawa (*Metrosideros excelsa*) in the North Island, and in much more dense populations on rata trees (*M. bullata*, *M. robusta*) in the South Island. No diaspidids are recorded from further north at the Kermadecs (perhaps due to lack of targeted collecting there) or from the subantarctic islands in the deep south.

Most of the adventive, cosmopolitan species are polyphagous and might be expected to invade native habitats, but surprisingly only *H. lataniae*, *H. rapax*, and *A. nerii* do so, yet their impact on native plants is low. *Lindingaspis rossi* also invades native habitats. It is here considered Australasian, but it may also be considered cosmopolitan as it is polyphagous with 106 hosts listed on ScaleNet (Ben-Dov 2010). Oligophagous adventive species in New Zealand are the two *Aulacaspis* species (*Rubus* berry fruits and roses), *Furchadaspis zamiae* (cycads), and *Kuwanaspis pseudoleucaspis* (Kuwana) (bamboos). The two *Carulaspis* species are found only on conifers and *Lepidosaphes pallida* (Maskell) has been collected only from Japanese cedar in Auckland city. Three of the adventive species listed as occurring here have not been seen since their earlier records and may no longer be present: *Lepidosaphes multipora*, *Parlatoria desolator* McKenzie, and *Pseudoparlatoria parlatorioides* (Comstock). Four adventive species that apparently suffer from New Zealand's relatively cool-temperate climate, and are found sporadically on indoor or shade house plants, are *Abgrallaspis cyanophylli* (Signoret) (cacti), *Diaspis boisduvalii* Signoret (bromeliads more commonly than orchids), *Lepidosaphes pinnaeformis* (cymbidium orchids), and *Pinnaspis aspidistrae* (Signoret) (ferns), the latter collected just recently in November 2010 after a gap of 32 years. Apart from *Lepidosaphes multipora*, the Australasian species are reasonably common and widespread.

Symeria (as *Eulepidosaphes*) *pyriformis* is the only endemic non-leucaspidine scale insect species recorded from overseas (on the Isles of Scilly, U.K.) where it was found on a mix of New Zealand native plants and several plants outside its native host range. These were *Pittosporum crassifolium*, *P. bicolor* (not N.Z.), *P. tenuifolium*, *Phormium tenax*, and *Trachycarpus fortunei* (not N.Z.) (Williams 1985). It was collected on the bark of the *Pittosporum* species and this niche may have favoured its successful establishment in the new country if live plants were originally obtained from New Zealand.

Two records of New Zealand species from Fiji are erroneous. The first, *Pseudaulacaspis dubia* (Maskell) (as *Chionaspis dubia* and later as *Phenacaspis dubia*), was mentioned by Williams & Watson (1988) who considered it not the same as *P. dubia* described from New Zealand. It has now been described as *Pseudaulacaspis pyrrosiae* Hodgson & Lagowska (2011) (see under *Fusilaspis phymatodidis*, Remarks, for further details). The second, *Poliaspis media*, was illustrated by Ferris (1938) based on some specimens from Fiji in the Koebele Collection. This material was examined by me recently and it certainly agrees with Ferris's illustration, but is equally certainly not conspecific with *P. media*. Rather, it is close to the Australian species *Poliaspis exocarpi* Maskell.

BIOLOGY AND LIFE CYCLE

Most of the Australasian and endemic species are biparental except that no evidence of males has been found for *Anzaspis angusta* and *Poliaspoides leptocarpi* (Brittin). It is possible that *A. angusta* does have biparental populations in its native homeland of Australia. In the case of the 2nd-instar nymphs of *P. leptocarpi*, they had variable numbers of ducts (see Fig. 203) and some specimens were sufficiently ductiferous to suggest they might be males. But these ductiferous 2nd-instar nymphs and others with the intermediate and lower ranges of nymphal duct numbers, were all represented in a series of slide-mounted pharate adult female specimens, thus they must all be female. In addition, there was no indication of prepupal, pupal, or adult male stages in any of the collections of *P. leptocarpi*.

For some other species, males have not been collected but reasonably could exist because the collections were too small to be sure, e.g., *Aspidioides corokiae* (Maskell), *Poliaspis chathamica* n. sp., *P. salicornicola* n. sp., and *Symeria leptospermi*. Among the adventive cosmopolitan species most are biparental, but *A. nerii* is uniparental except for occasional biparental populations, whereas *H. lataniae* and *H. rapax* are both uniparental.

Male and female diaspidids go through very different post-embryonic development. The female metamorphosis is heterometabolous, they are larviform or neotenic throughout their lives and reach adulthood after two moults. The abdomen of the teneral female is arranged as a concertina that unfolds and expands as she matures to full size. In diaspidines the abdomen then begins to shrink back again during oviposition, leaving space behind the posterior end under the scale cover as a brood chamber for eggs and hatching neonates. Depending on the species and habitat there may be 60–80 eggs in the brood chamber (e.g., Fig. 119) or as few as 6 at a time (e.g., Fig. 50). If the female

body size is constrained by a narrow habitat on leaves or twigs, perhaps the oviposition period is more drawn out. After oviposition the brood chamber contains the empty eggshells (e.g., Fig. 68). The eggs of aspidiotines tend to hatch immediately or very soon after they are laid, and the female abdomen does not shrink as much as female diaspidines. Males develop through a holometabolous kind of metamorphosis with non-feeding prepupal and pupal stages to emerge after 4 moults as tiny winged insects (Fig. 85) or, in a few species, as apterous adult males (Fig. 105).

The main dispersal stage is the newly hatched crawler, when males and females are usually indistinguishable. Crawlers may settle close to their natal site, walk some distance for a short time, or be blown to another site if windy conditions prevail (where chance determines if they land on a suitable host plant). A crawler settles by inserting its stylets into the plant and immediately beginning circular motions around the insertion point while spinning its first scale cover (Fig. 90). Time lapse photography has shown that the body regularly rotates alternately from left to right to a maximum arc of more than 360 degrees (Hill & Holmes 2009; <http://www.youtube.com/watch?v=395XmUkWVBg>).

The 1st-instar nymphs are now sessile, the females remaining in this position for the rest of their lives and the males until emergence as adults. As feeding continues, waxy material is added to the scale cover, generally in a circular fashion by aspidiotine species and asymmetrically towards the posterior forming a more elongate cover in diaspidine species. At the first moult from 1st-instar to 2nd-instar, the nymphs lose their legs and the antennae become unsegmented tubercles with 1 or more setae. Stylets are not withdrawn from the plant tissue and new larger stylets are formed that may follow the same direction within the plant as the 1st stage stylets or change direction. Sometimes stylet tracks can be visible if the damaged plant cells change colour, as in the 2 sizes of red stylet tracks of *Anoplaspis metrosideri* on *Metrosideros* leaves (Fig. 17) and brown stylet tracks of *Lindingaspis rossi* (Fig. 69–70). Sexual dimorphism is now apparent in the 2nd-instar nymphs with the male cover usually smaller and more elongate in shape than the female cover.

Number of generations per year. Adventive species may have 1–3 generations per year (Timlin 1964b; Charles & Henderson 2002; Miller & Davidson 2005). Endemic species are probably mostly univoltine (one generation per year) but are not synchronised to a particular season, so that generations at a location overlap in time, particularly for females that produce their eggs a few at a time. In New Zealand, the influence of evergreen forest with year-round available food source and temperate climate reduces the need to complete reproduction in narrow seasonal time

frames, compared with the habitat constraints of deciduous forests and/or colder climates.

In New Zealand, many of the adult females and their eggs are bright yellow (e.g., *Anzaspis* spp., *A. nerii*, *Hemiberlesia* spp.); pale (e.g., *Diaspis boisduvalii*, *Furchadaspis zamiae*, *Lepidosaphes* spp., *Symeria pyri-formis*); purple-black (*Anoplaspis metrosideri*); pink (*A. maskell*); pink-red to chestnut (e.g., *Aulacaspis rosarum* Borchsenius, *Carulaspis* spp.) or purplish (*L. rossi*, *Parlatoria* spp., *Poliaspoides leptocarpi*). The female body colour may be a useful diagnostic tool for scales with similar covers, e.g., San José scale (dark cover, yellow body, see Fig. 43,) and Ross's black scale (dark cover, red-purple body, see Fig. 68).

Scale cover

The scale cover (see Fig. 1, 2) in diaspidids differs significantly from the waxy coverings of those of other coccoid families in that each cast nymphal skin is retained and incorporated in the cover, along with waxy exudates from the insect's glands (Foldi 1990; Ben-Dov 1990). All 2nd-instar nymphs have the 1st-instar skin or exuvium as part of their cover. At the next moult the male loses his mouthparts and ceases feeding, so remains under the same cover of the 2nd-stage while proceeding through a prepupal and a pupal stage to reach adulthood (Fig. 24–25), the later nymphal skins being shed beneath the cover. In contrast, the female becomes adult at the second moult and continues feeding, while the 2nd-instar nymphal cast skin is retained and incorporated in her cover underneath and slightly behind the 1st-exuvium (Fig. 26–28). The female continues to add a great deal more waxy area to her cover as her body expands to maximum size at maturity, and when that is achieved, an extra crawler flap is added to the posterior end to allow emergence of neonate crawlers.

Aspidiotine scale covers are generally of a round shape with central, subcentral, or lateral exuvia, whereas diaspidine scale covers are generally more elongate and the exuvia are terminal. An exception mentioned here is the Leucaspidini, that are purportedly aspidiotine in the phylogenetic analysis of Andersen *et al.* (2010, Fig. 1, Clade E) but possess diaspidine-shaped elongate scale covers and terminal exuvia.

In pupillarial species the 2nd-instar nymphal skin becomes sclerotised (to various degrees in different species — for example, it is pitch black in *Trulliflorinia acaciae*) and at the moult it detaches from, and completely encloses, the membranous 3rd-instar (adult) female. The 1st-exuvium and wax cover remain. The preferred term for this 2nd-instar nymphal skin is the pupillarium (Henderson *et al.* 2010). As the adult female matures, a slit forms at the posterior end of the pupillarium to allow crawlers to exit.

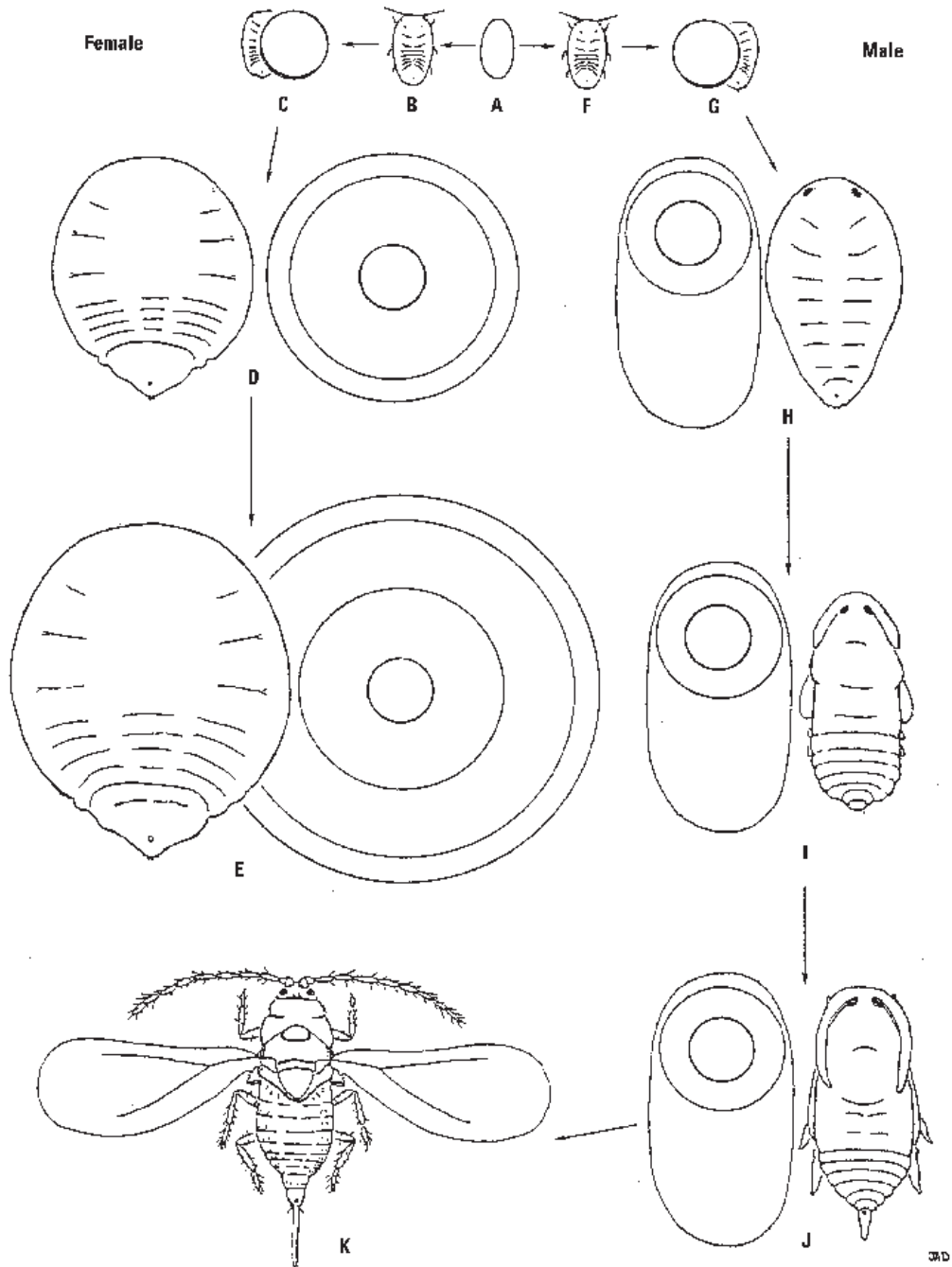


Fig. 1 Aspidiotine life-history chart and scale cover development. Female: A, egg; B, active crawler; C, settled crawler and white cap; D, second-instar female and partially formed cover; E, third-instar (adult) female and partially formed cover. Male: A, egg; F, active crawler; G, settled crawler and white cap; H, second-instar male and cover; I, third-instar (prepupa) male and cover; J, fourth-instar (pupa) male and cover; K, fifth-instar (adult) male (from Miller & Davidson 2005).

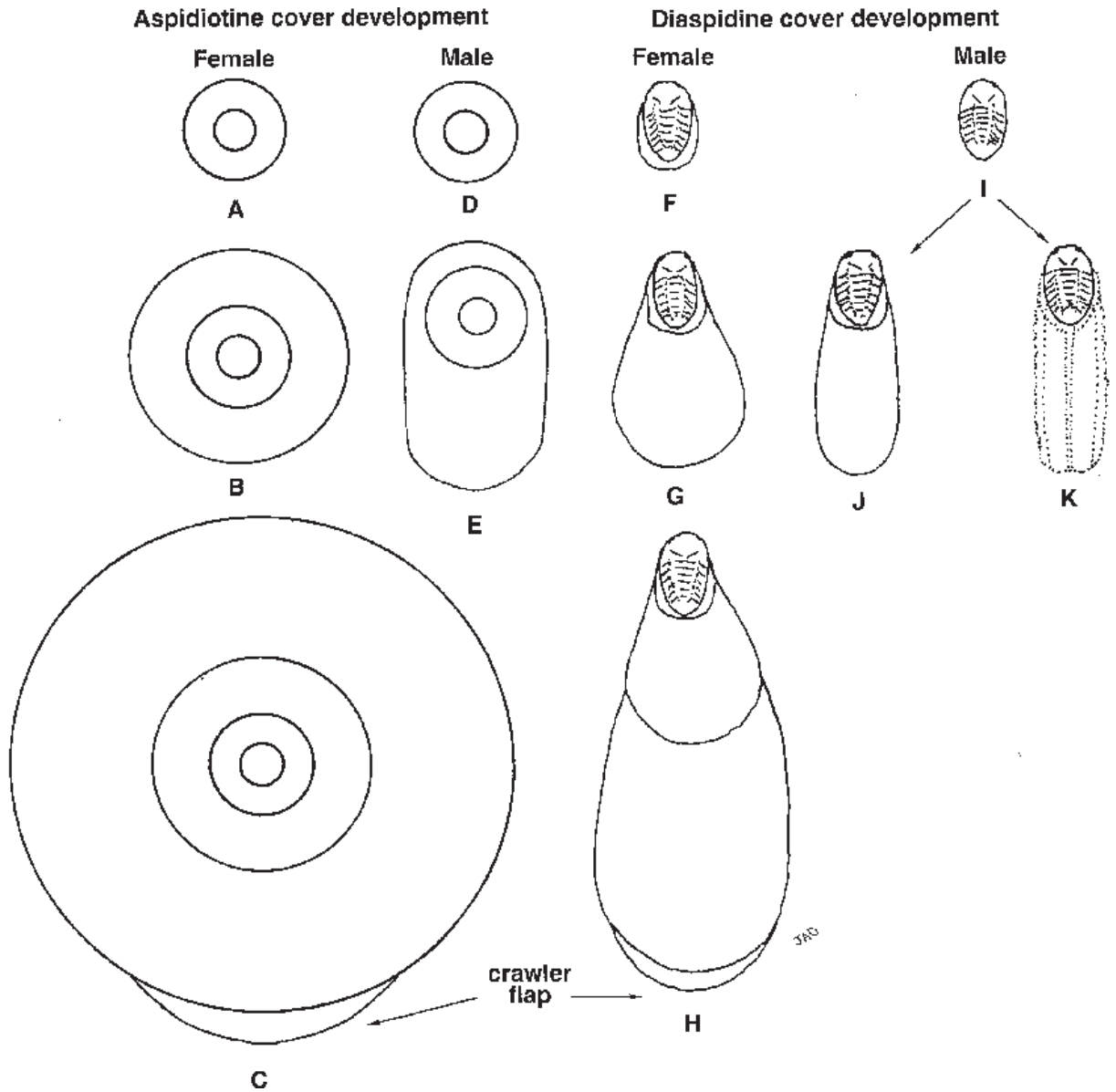


Fig. 2 Scale cover development comparisons. A, aspidiotine female crawler cover with white cap and added wax; B, fully formed aspidiotine second-instar cover; C, fully formed aspidiotine third-instar (adult) cover with crawler flap; D, aspidiotine male crawler cover with white cap and added wax (same appearance as in female); E, fully formed aspidiotine second-instar male cover (note elongate form); F, fully formed diaspidine crawler cover; G, fully formed diaspidine second-instar female cover; H, fully formed diaspidine third-instar (adult) female cover with crawler flap; I, recently settled diaspidine male crawler cover; J, fully formed diaspidine second-instar male cover (not felted and without longitudinal carinae); K, fully formed diaspidine second-instar male cover (felted, with three longitudinal carinae) (from Miller & Davidson 2005).

In aspidiotines the 1st-nymphal skin is shed by rupture around the margin of the body. Features such as the antennae on the ventral portion become part of the ventral scale where they may be overlooked or lost on the substrate, and the dorsal portion above the insect's body is substantially without taxonomic features (MacGillivray 1921). In diaspidines the 1st-exuvium splits at the cephalothorax, with the mouthparts, spiracles, legs, and other parts of the venter bundled together towards the posterior end, leaving the body margins including head, antennae, and pygidium plus all of the dorsum intact. This feature can provide valuable taxonomic information (e.g., Fig. 180, 188, 199, and see species distinctions under *Anzaspis*). The 2nd-exuvia of both aspidiotine and diaspidine taxa are moderately informative and generally indicate a simplified morphology of the adult female to which they are attached (Fig. 201).

SLIDE-MOUNTING METHODS

1. Preparation for maceration. Remove 1 or more specimens from the preserving fluid (e.g., 75% ethanol) and place in a small flat dish; under the binocular microscope:

(a) for **diaspidids in general**, including nymphs, make a pinprick hole at about the mid-metathorax, or if the body contains many eggs, a mid-lateral slit on one side to allow extraction of the body contents.

(b) for **pupillarial female diaspidids**, lay the specimen dorsum down, hold in place with a blunt pin, and with a second pin with sharp hooked tip make a running slit inside the ventral margin of the pupillarium from near the posterior to near the head, being careful to avoid slitting the membranous adult female; just make a pinprick through to the adult female body; excess numbers of eggs/neonates can be removed if present, but leave the adult female in situ.

2. Optional first heat treatment: recommended for samples previously stored dried, for those stored in ethanol for a long time, and generally for any where speed is not critical.

Transfer the scales to a heat resistant glass tube (test tube) that has about 1 cm depth of 95% ethanol in it; put a bung of cotton wool in the top; place the tube in a water bath (about 95°C), and heat for 2 minutes.

3. Hot water bath maceration in 10% KOH. Transfer the scales to a clean heat resistant glass tube (test tube) which has about 1 cm depth of 10% KOH in it; put a bung of cotton wool in the top.

Place the tube in a water bath (about 95°C) and heat for between 3 and 5 minutes, or until the scale body becomes pale/clear.

4. Removing body contents. Tip the scales into a clean small dish, and using bent pins or other flattened tools, carefully pump and tease out the remaining body contents.

For pupillarial diaspidids, gently tease out the membranous female from her pupillarium and straighten if needed.

Note: if a specimen is fatty and difficult to pump, and especially if it folds over, stop and do not try to remedy at this stage. Just carry out the transfers with care and wait until the de-waxing stage when it is easier to fix the problem.

All the next stages are in covered staining wells. With a felt-tip pen, write an identifying code name or sample number on the glass cover.

5. Rinse and staining. Transfer to distilled water in a staining well for about 5–10 minutes; then follow one of staining methods below:

Fuchsin stain: add 1–2 drops of acid fuchsin stain (see below for recipe), leave for about 30 minutes or longer until the specimens are a good bright pink colour, then continue to step 6.

McKenzie's stain: transfer to a staining well containing McKenzie's stain (see below for recipes) leave for about 60 minutes in a warming oven (40°C), or longer if at room temperature, then continue to step 6.

6. Rinse, dewaxing, and dehydration

–Transfer to a clean staining well with 75% ethanol and leave for a few minutes.

–Transfer to 95% ethanol and leave for a few minutes (=dehydration).

–Transfer to a dewaxing mixture for 2–10 minutes, made up fresh as follows:

–in a small measuring cylinder mix (1 : 1) about 0.5 ml xylene and 0.5 ml absolute Isopropanol

–Transfer to straight absolute Isopropanol and leave for 5–10 minutes (= washing and final dehydration)

–Transfer to 1–2 drops of clove oil and leave from 2 minutes up to 2 days (the specimens may become brittle if left longer than this).

7. Slide-mounting

–Take a clean glass slide and put a small drop of clove oil in the centre

–With a pick-up tool, transfer a scale insect from the staining well of clove oil to the drop of oil on the slide

–Under the microscope arrange the specimen

–With a small piece of paper tissue, very carefully blot away the excess clove oil from the specimen

- Add a very small drop of Canada balsam beside the specimen on the slide, and with a pin gently run the balsam over the specimen (this sticks it in place)
- With a felt pen, write the code label or sample number on the slide and put aside lying flat to set for a few minutes
- Add a larger drop of Canada balsam by gently dropping on top of the specimen
- With forceps, carefully place on a clean cover slip, lowering it at one edge first.

Leave the slide to dry in a drying oven at about 40 °C for 2 weeks, or at room temperature for about 6 weeks. It is permissible to take out of the oven sooner for examination, if care is taken and the slide is stored flat.

The slide must be fully dried before storing on its side, or before examination with oil immersion microscopy.

8. Labelling of slides

Add a printed label with full collection details, starting with country (e.g. NEW ZEALAND) in first line.

Add a second identification label with Family, Genus, and species, if determined; it is helpful to include the number of specimens and their life stages present on each slide.

Solutions

1. Acid Fuchsin Stain

To make stain from the powder: add 0.35 g acid fuchsin and 25 ml glacial acetic acid to 75 ml distilled water.

2. The suggested stock staining solution is made up of 30 ml Essigs solution with 60 drops of McKenzie's triple stain added. This has a shelf life of several years under normal storage conditions and with care can be reused many times.

Essig's Solution:

Lactic acid 20 parts
 Phenol ([liquefied]) 2 parts
 Glacial Acetic Acid 4 parts
 Water, distilled 1 part

Mckenzie's triple stain:

Equal parts of
 Acid fuchsin
 Erythrosin
 Lignin pink

Each made up into a 2% aqueous solution.

KEYS

The key to genera in New Zealand doubles as a key to species for those genera with a single species present. Additional keys to species are provided for genera with more than one species present.

ILLUSTRATIONS

The line drawings of 20 cosmopolitan species and the morphology figures 1–5 are reproduced with kind permission from Miller & Davidson (2005). One line drawing (*Poliaspoides leptocarpi* adult female) is reproduced with kind permission from Yair Ben-Dov (1976). All the remaining illustrations were prepared by drawing over montaged images of slide-mounted specimens using the software packages Adobe Illustrator and Photoshop. The figures are presented as a map in the customary manner, with dorsal features on the left-hand half and ventral features on the right-hand half, and with detailed vignettes not to scale. Fig. 6–11 of slide-mounted female pygidia and Fig. 24, 26, and 117 were produced using Automontage and Helicon imaging software.

MORPHOLOGY AND TERMS

Adult female, see Fig. 3, 4, and 5 for general schematic morphology of aspidiotines and diaspidines. The female aspidiotine body is approximately round, ovoid, or turbinate, while that of the diaspidine is often fusiform. Segmentation of the body is not well differentiated, especially the head and thorax (cephalothorax or prosoma), and pygidium (posterior abdomen). The mesothorax is distinguished by the anterior spiracles and the metathorax by the posterior spiracles. Abdominal segments I–IV are the prepygidium (sometimes called free abdominal segments), and V–VIII are the pygidium. Pygidium segmentation is easier to define on the margin by the pair of segmental setae, 1 dorsal, 1 ventral, on each segment (Fig. 5).

Anal opening is on the dorsal surface of the pygidium. The length of the opening and distance from the margin are measured. Length of the anal opening does not include the sclerotised outer ring, and the distance to the pygidium margin is that from the posterior margin of the anal opening to the setae at the base of the median lobes.

Antenna in the 2nd-instar nymphs and adult female is an unsegmented tubercle with 1 or more long setae, short stubs, and coeloconic sensilla. The number and shape of the setae are rather variable in some endemic species (e.g., *Poliaspis* spp.). Antennae of 1st-instar nymphs are 5- or 6-segmented with fine and fleshy setae.

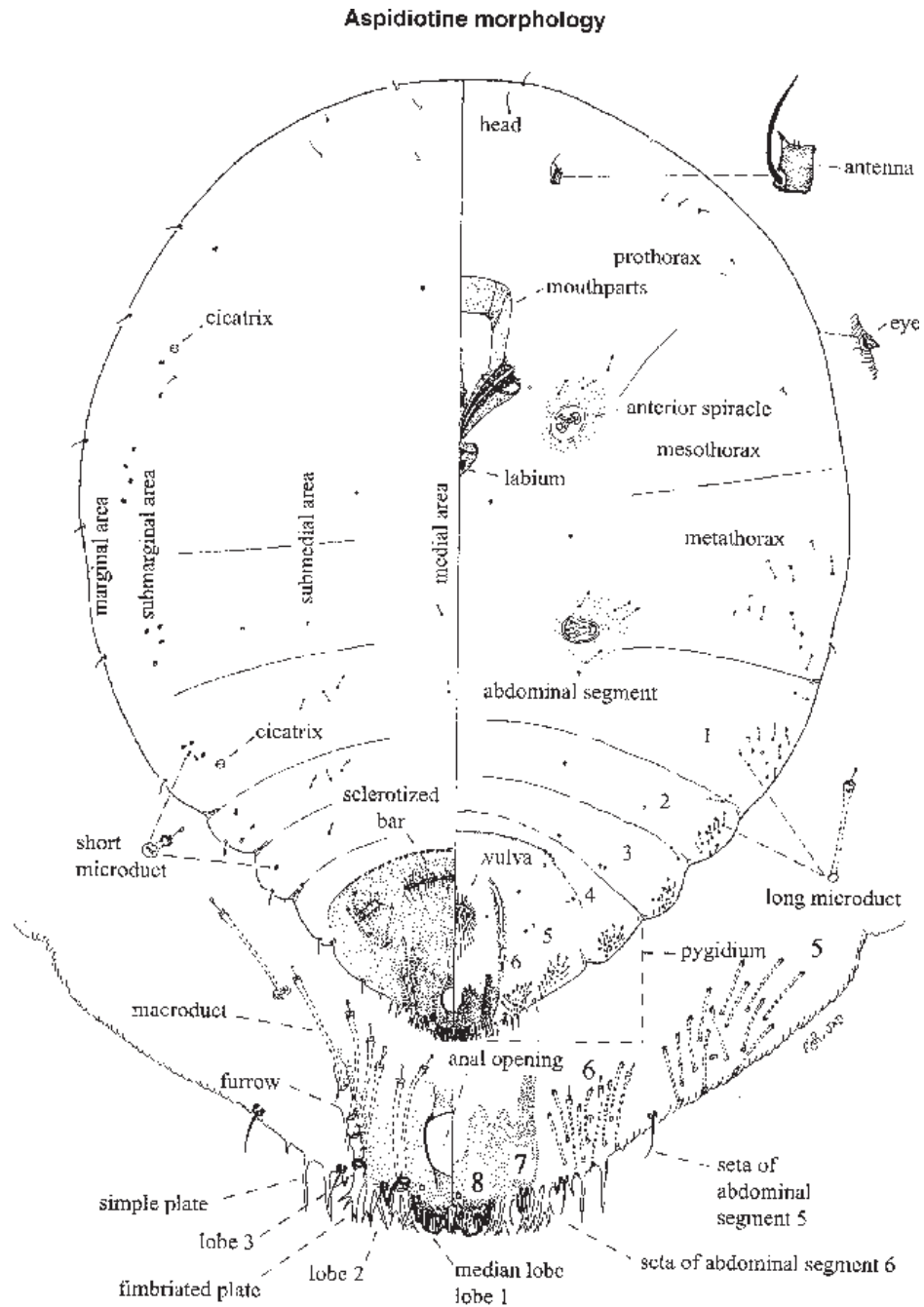


Fig. 3 General morphology of slide-mounted adult female aspidiotine (from Miller & Davidson 2005).

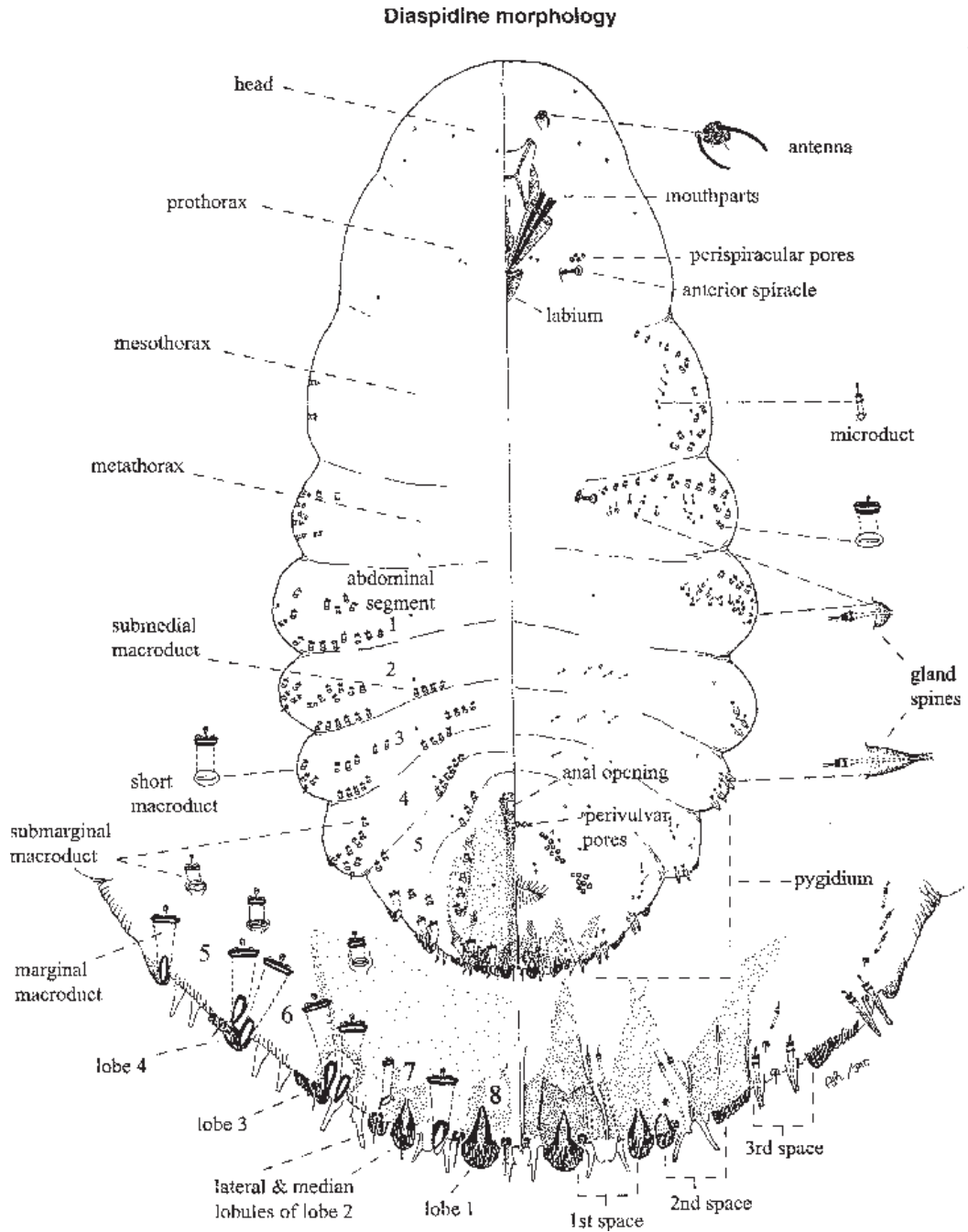


Fig. 4 General morphology of slide-mounted adult female diaspidine (from Miller & Davidson 2005).

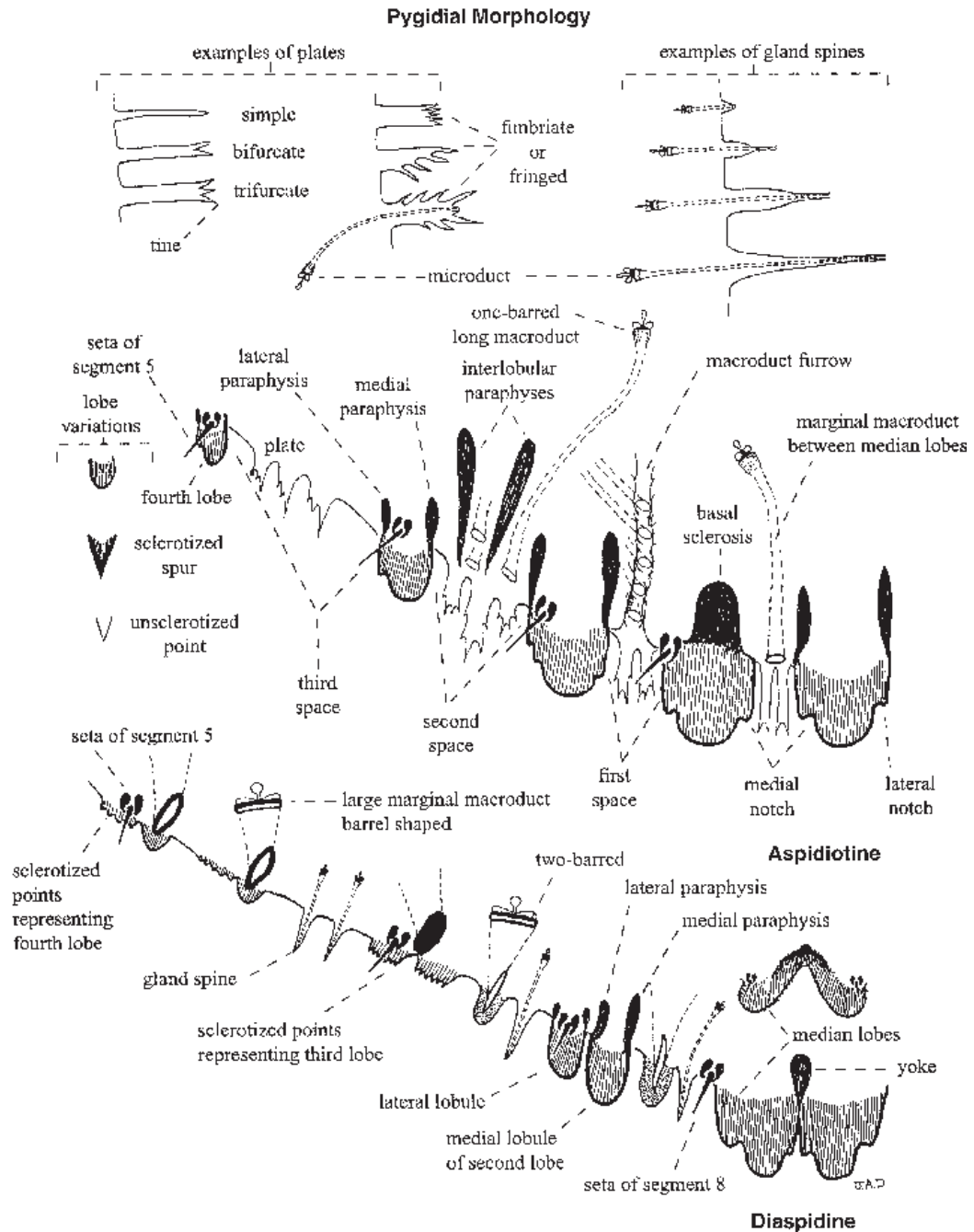


Fig. 5 General morphology of pygidial margin (from Miller & Davidson 2005).

Basal scleroses arise from lobes, usually from L1 (e.g., on *A. nerii* and *Symeria* species), or the medial lobule of L2, (e.g. on *Anzaspis angusta* and *Pseudaulacaspis* species) and are not to be confused with Paraphyses.

Bosses (the term preferred here, cicatrices of some authors) are sclerotised and convex round areas on dorsolateral submargins. These are important taxonomically in *Lepidosaphes* species and are present in nearly all *Poliaspis* species treated here.

Eye, nearly always inconspicuous (except in 1st-instar nymphs) but sometimes modified into a spur, which may point anteriorly or posteriorly (e.g., *Abgrallaspis cyanophylli*, *Lepidosaphes pinnaeformis*).

Exuvium (plural **exuvia**), the cast 1st and 2nd nymphal skins that are incorporated into the diaspidid scale cover with sheets of wax between them. The 1st-exuvium is the skin of the 1st-instar nymph, present on both female and male 2nd-instar nymph covers. The 2nd-exuvium is part of the adult female cover and not present on the male cover. **Note:** the terms exuvium/exuvia follow the precedence set by Takagi (1969), and are preferred to emphasise the distinctions between 1st and 2nd nymphal skins for their taxonomic importance.

Gland spines are usually simple, elongate, marginal projections with an associated microduct (Fig. 5), mostly located on the pygidium, and common in diaspidines.

Gland tubercles are short and broad versions of gland spines that occur on the submargins of prepygidial segments and thoracic areas, always with an associated microduct. It is convenient to distinguish them from gland spines here although some authors consider them one and the same (Miller & Davidson 2005).

Lobes occur on the pygidial margin and are said to act like “trowels” for spreading of wax in scale cover formation. The **median lobes (L1)** may be notched or serrate on their margins: important diagnostic characters are their shape and size, if **yoked** (also known as zygotic, meaning joined at the base, see Fig. 5), and with/without basal scleroses. **Second (L2) and third (L3)** lobes are also diagnostic; they may be single or bilobed (divided), or lacking, or mere points. Length of lobes on the pygidium includes the basal sclerosis when present. Presence/absence of an obvious **pair of setae** between the median lobes is important.

Macroducts or **dorsal ducts** are cylindrical wax glands, either 1-barred or 2-barred (Fig. 5). One-barred ducts may be very long and often their openings are arranged in linear furrows on the pygidium. Two-barred ducts may be barrel-shaped and in the diaspidines are generally arranged in segmental rows on the margins and submargins of the dorsal pygidium and prepygidium, they may, however, be

widely scattered over the dorsum, as well as present on the ventral submargins of the anterior abdomen and thorax. Larger macroducts on the pygidium margin are known as **marginal macroducts**. On 1st-instar nymphs/1st exuvia the presence/ absence of a pair of **dorsal cephalic ducts** (head ducts) is taxonomically important.

Microducts are thin tubular wax glands most often present on the venter, associated with gland spines, gland tubercles, plates, and grouped near the spiracles. Their presence/absence may also be diagnostic on the thoracic dorsum of 1st-instar nymphs/1st-exuvia.

Paraphyses (Fig. 5) are sclerotised rods on the pygidium that usually arise from the lateral margins of the lobes but occasionally also from the interlobular spaces (e.g., *Lindingaspis rossi*). They are thickened areas in interlobular spaces at the ends of duct furrows on *Hemiberlesia* species (Fig. 10–11) and absent there on *Abgrallaspis cyanophylli* and *Aspidiotus nerii* (Fig. 6–7), and thus a useful diagnostic aid. They are a very distinctive shape in *Anoplaspis metrosideri*.

Perispiracular pores are wax discpores grouped by the spiracles; whether present/absent, and the number of pores and loculi are diagnostic. In this volume, *Anoplaspis* and *Parlatoria* species have 5-locular pores, whereas all the rest have 3-locular pores (when present).

Perivulvar pores are 5-locular discpores clustered around the vulva, producing short c-shaped wax strands that adhere to laid eggs and prevent them sticking to surfaces or each other.

Plates are flat dermal projections on the pygidium margin that usually contain microducts and are usually fringed (fimbriate), more so in spaces between the lobes, and become simple anteriorly on the pygidium (further forward on the abdomen in *Parlatoria* species).

Pupillarium (plural **pupillaria**) is the sclerotised 2nd-instar exuvium that completely encloses the membranous 3rd-instar (adult) female in pupillarial species (see Henderson *et al.* 2010, p. 4). As the diminutive adjective pupillarial is the accepted term for this diaspidid lifestyle, the term pupillarium follows logically for this female exuvium. Previous authors have used the term puparia which is common to Lepidoptera and Diptera for the larval moult enclosing a metamorphosing male or female insect before emergence.

Pygidium is the more or less fused and sclerotised posterior abdomen including segments V–VIII. Dorsal features are the anal opening, with presence/absence of dorsal ducts, pre-anal scars, and paraphyses. Ventral features are the vulva, with presence/absence of perivulvar pores and microducts. Marginal features are the lobes, opening of

marginal macroducts, with presence/absence of gland spines and/or plates, and various setae as important features.

Spiracles are not important diagnostically except for their associated perispiracular pores and for defining the mesothorax and metathorax.

Female 2nd-instar nymphs resemble a small adult female of their particular species, except lacking a vulva and perivulvar pores, and with fewer ducts and glands.

Male 2nd-instar nymphs often have a different body shape to the female nymph, either rounder or more elongate, and generally are more glandiferous. Male nymphs may have modified dorsal ducts. For example, *Pseudaulacaspis brimblecombei* (Fig. 207) and *Ps. eugeniae* (Fig. 211) both have remarkable communal duct clusters on the posterior abdomen, whereas *Trulliflorinia acaciae* has so-called 'frame ducts' as marginal macroducts (Fig. 236) (Howell & Tippins 1990). All male 2nd-instar nymphs have a line of 3 pairs of setae on the ventral head between the anterior margin and mouthparts, although these are less obvious on *Symeria* species. Dorsal ducts are often present on both dorsum and venter, and may form a band along the lateral margins where the body is rounded rather than dorsoventrally flattened. Marginal macroducts on the pygidium usually open slightly more ventrally than dorsally. Lobes on the pygidial margin may be digitate and divided or plate-like (e.g., *Poliaspis lactea* (Maskell), fig. 187; *P. media* when on *Hebe*, fig. 194). Marginal gland spines may be present (e.g., in *Anzaspis*, *Fusilasps*) while in other genera they may be plate-like or absent on the pygidium but with gland tubercles present further forward (e.g., in *Poliaspis*). Faint vestigial leg patches may be seen on some *Poliaspis* (Fig. 193, 198) and *Pseudaulacaspis* (Fig. 207) species.

1st-instar nymphs are generally membranous except for appendages, pygidial lobes, and sometimes sclerotisation on the head (e.g., *Poliaspoides*, Fig. 204; *Trulliflorinia*, Fig. 237). They possess 3 pairs of 5-segmented legs where the tarsus is much longer than the tibia, and 5- or 6-segmented antennae. On the pygidium are at least 1 pair of lobes (although barely noticeable in *Symeria*), usually 1 or 2 pairs of gland spines, and a pair of very long apical setae. Always present is a line of 3 pairs of setae on the ventral head between the anterior margin and mouthparts (as on the 2nd-instar male nymphs). There is always a lateral microduct on each side of the abdominal segments, except in *Anoplaspis* species where the posterior 4 pairs are replaced by large macroducts (Fig. 128). Microducts on the dorsal thorax may be diagnostic, as is the presence/absence of a pair of large dorsal cephalic ducts near the anterior head margin (these are not 8-shaped as described by some authors).

CONVENTIONS

Under '**material examined**', the data given for each species are those on the slide label, categorised under the area codes of Crosby *et al.* (1998), followed by the NZAC accession number and the number of slides and specimens studied, including their life stages. For example: #09-073a–e [5]: 3 F, 2 f2nd, 2 m2nd, 4 1st denotes 5 consecutive slides were made (a–e) with a total of 3 adult females, 2 2nd-instar female nymphs, 2 2nd-instar male nymphs, and 4 1st-instar nymphs. Other life stage codes are: fpl (2nd-instar female pupillarium), exuv1 (1st-exuvium), exuv2 (2nd-exuvium), pp (prepupa), p (pupa), M (adult male).

A total of 9782 diaspidid specimens, including type specimens, were examined in this study. The number of NZAC specimens examined in addition to type material is listed under each species and in Appendix A.

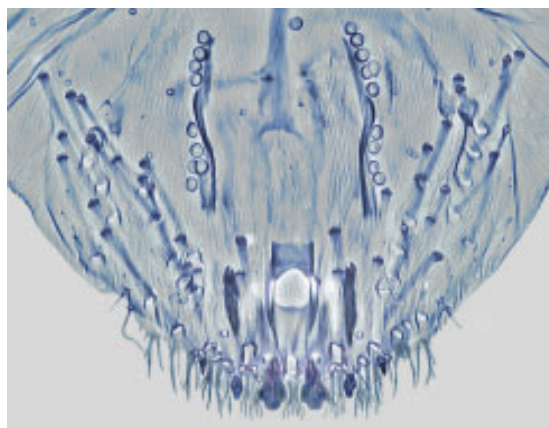
Biota codes: A = adventive (exotic); E = endemic to New Zealand; N = native (Australasian) are indicated in bold font following each valid species name in the taxonomic section.

Type depositories

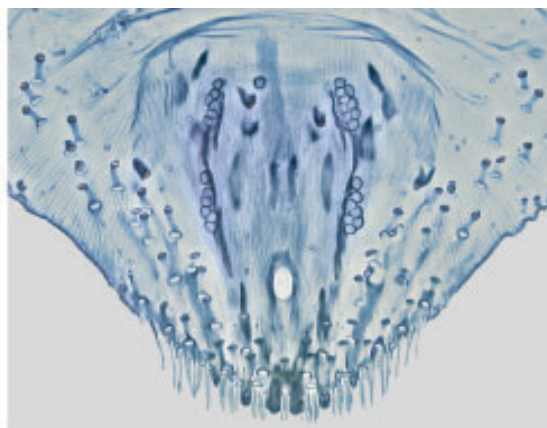
ANIC	Australian National Insect Collection, Canberra
BMNH	The Natural History Museum, London
NZAC	New Zealand Arthropod Collection, Auckland
QMBA	Queensland Museum, Brisbane

(Text continues page 44)

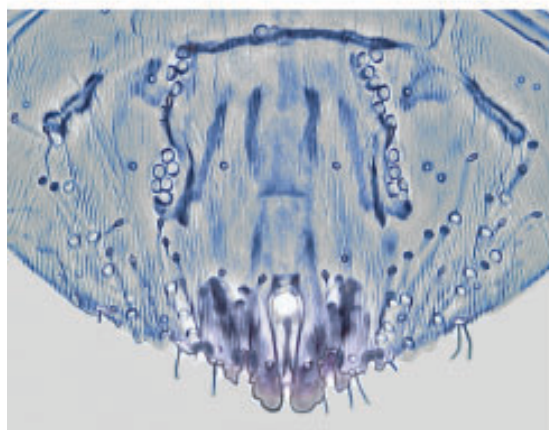
Fig. 6–123. Colour images of New Zealand Diaspididae



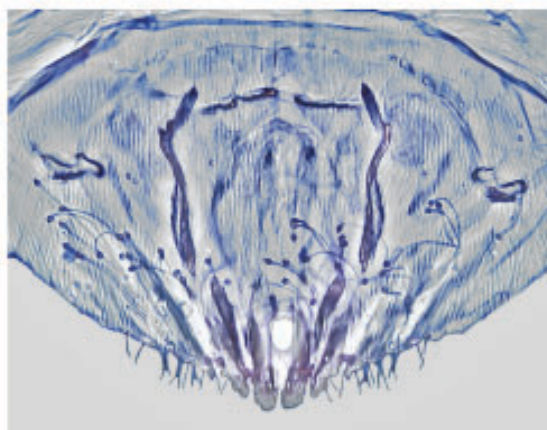
[6] *Abgrallaspis cyanophylli*, female pygidium on slide-mount



[7] *Aspidiotus nerii*, female pygidium on slide-mount



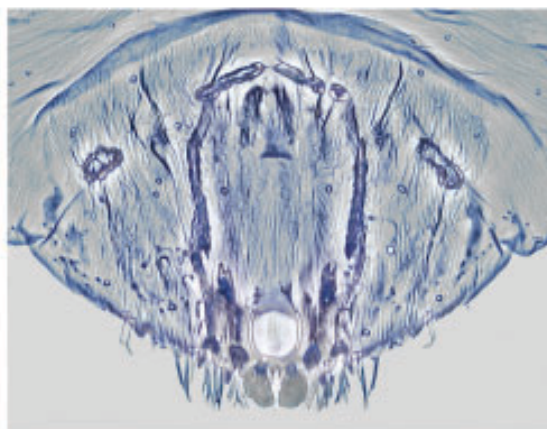
[8] *Diaspidiotus ostreaeformis*, female pygidium on slide-mount



[9] *Diaspidiotus perniciosus*, female pygidium on slide-mount



[10] *Hemiberlesia lataniae*, female pygidium on slide-mount



[11] *Hemiberlesia rapax*, female pygidium on slide-mount



[12] *Abgrallaspis cyanophylli*, female and male scale covers



[13] *Abgrallaspis cyanophylli*, adult female, scale cover removed



[14] *Anoplaspis maskelli*, adult females



[15] *Anoplaspis maskelli*, adult female, scale cover overturned



[16] *Anoplaspis metrosideri*, females (broad covers) and males (narrow covers)



[17] *Anoplaspis metrosideri*, adult females on leaves with red-stained stylet feeding tracks



[18] *Anoplaspis metrosideri*, young adult female, scale cover turned over



[19] *Anoplaspis metrosideri*, mature female with eggs, scale cover turned over



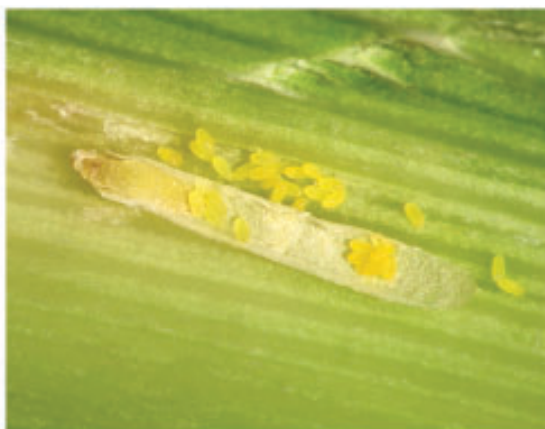
[20] *Anzaspis angusta*, adult females with settled 1st-instar nymphs and one crawler



[21] *Anzaspis angusta*, adult female, scale cover turned over with eggs inside



[22] *Anzaspis cordylinidis*, female and male scale covers, on *Phormium cookianum* leaf



[23] *Anzaspis cordylinidis*, female in overturned scale cover with eggs, on *Cordyline* leaf



[24] *Anzaspis gahniae*, adult male slide-mount in scale cover; size of exuvium1 same as on female



[25] *Anzaspis gahniae*, male scale cover

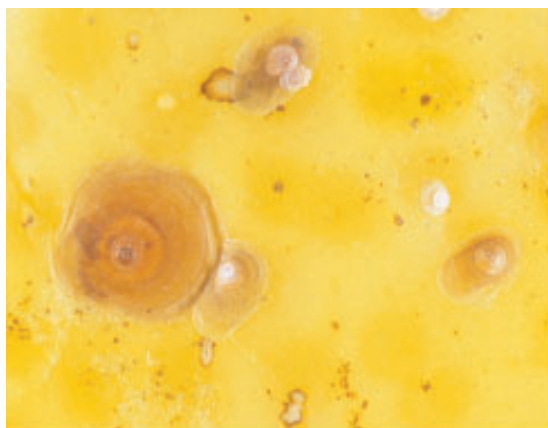


[26, 27 & 28] *Anzaspis gahniae*, adult females:

[26] mature female slide-mount in scale cover with exuvia1 & 2, and eggs in brood chamber;

[27] young female in scale cover;

[28] young female, scale cover overturned



[29] *Aonidiella aurantii*, adult female, males and white cap 1st-instar nymph, on orange fruit



[30] *Aonidiella aurantii*, young adult female with scale cover overturned, on leaf



[31] *Aspidiotus nerii*, adult female and male scale covers, white cap 1st-instar nymphs and one crawler



[32] *Aspidiotus nerii*, adult females, one with scale cover taken off



[33] *Aulacaspis rosarum*, adult females, female and male 2nd-instar nymphs



[34] *Aulacaspis rosarum*, young adult female with scale cover taken off



[35] *Carulaspis juniperi*, females and crawlers



[36] *Carulaspis juniperi*, young adult female with scale cover overturned



[37] *Carulaspis juniperi*, mature female with eggs, scale cover removed



[38] *Carulaspis minima*, adult female and 2nd-instar nymph scale covers



[39] *Carulaspis minima*, adult female



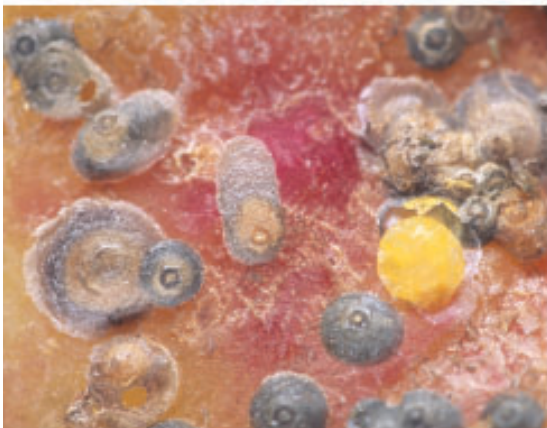
[40] *Carulaspis minima*, mature female with eggs, scale cover removed



[41] *Diaspidiotus ostreaeformis*, dark grey female scale covers with pale crawler flaps, on bark with lichen



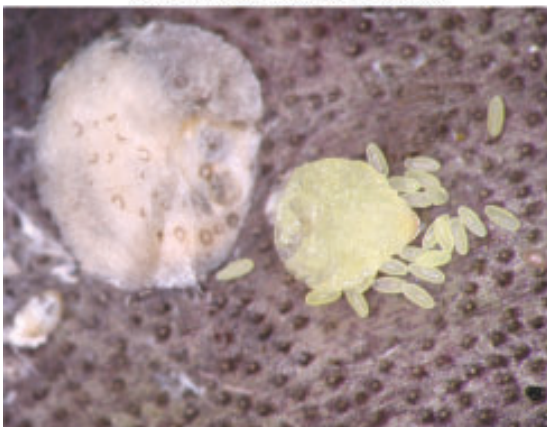
[42] *Diaspidiotus ostreaeformis*, adult female with scale cover overturned



[43] *Diaspidiotus perniciosus*, females, one with scale cover removed, and male scale cover in centre; on apple fruit causing red blemish



[44] *Diaspis boisduvalii*, young adult female with scale cover overturned, male scale cover on left



[45] *Diaspis boisduvalii*, adult female with eggs, scale cover overturned



[46] *Cosmopora* sp., entomopathogenic fungus, with 1st-exuvium of scale insect in centre of ring



[47] *Furchadaspis zamiae*, population on *Cycas revoluta*



[48] *Furchadaspis zamiae*, adult females, one with scale cover removed



[49] *Fusilaspis phymatodidis*, adult females on *Dicksonia*



[50] *Fusilaspis phymatodidis*, adult females, one with eggs, scale cover removed



[51] *Fusilaspis phymatodidis*, adult females on *Sticherus*



[52] *Fusilaspis phymatodidis*, adult females and 2nd-instar nymph, on 'silver fern', *Cyathea dealbata*



[53] *Hemiberlesia lataniae*, adult female and settled 1st-instar nymphs



[54] *Hemiberlesia lataniae*, adult female with scale cover overturned



[55] *Hemiberlesia rapax*, adult female side view on stem



[56] *Hemiberlesia rapax*, adult females, one with crawlers, scale cover removed



[57] *Kuwanaspis pseudoleucaspis*, adult females by node on bamboo stem



[58] *Kuwanaspis pseudoleucaspis*, adult females, one with scale cover taken off



[59] *Lepidosaphes beckii*, adult females by calyx on orange fruit



[60] *Lepidosaphes multipora*, on *Pittosporum undulatum* bark (part of type series)



[61] *Lepidosaphes pallida*, adult females on *Cryptomeria japonica*



[62] *Lepidosaphes pinnaeformis*, adult females



[63] *Lepidosaphes ulmi*, adult females on stems and fruit of *Crataegus monogyna*



[64] *Lepidosaphes ulmi*, young adult female with scale cover overturned



[65] *Lindingspis rossii*, population on leaf underside



[66] *Lindingspis rossii*, bleached scale covers on upperside leaf of *Banksia integrifolia*



[67] *Lindingspis rossii*, adult female with female and male 2nd-instar nymphs



[68] *Lindingspis rossii*, mature female and crawlers from brood chamber, scale cover overturned with eggshells inside



[69] *Lindingspis rossii*, adult female with stylet tracks staining leaf, the one on right from 2nd-instar and larger one on left from adult



[70] *Lindingspis rossii*, young adult female with scale cover overturned, 2nd-instar and adult feeding tracks following same path



[71] *Parlatoria fulleri*, adult females, female and male 2nd-instar nymphs, with surrounding chlorotic feeding areas



[72] *Parlatoria fulleri*, adult females and 2nd-instar nymphs



[73] *Parlatoria fulleri*, young and mature adult females one scale cover overturned with double row of eggs inside



[74] *Parlatoria pittospori*, adult females and 2nd-instar nymphs on pine needles



[75] *Parlatoria pittospori*, young adult females with round dark scale covers, one overturned, and a paler elongate male scale cover



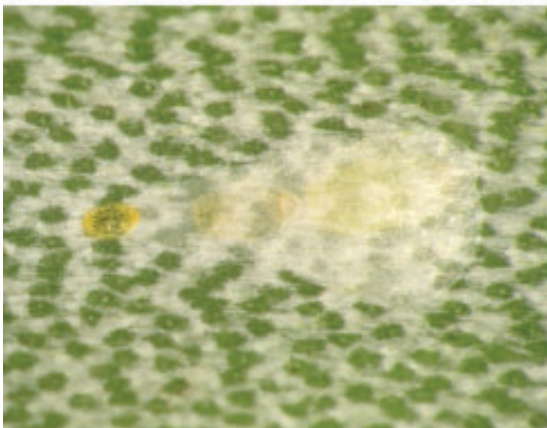
[76] *Parlatoria pittospori*, adult females, one with eggs and scale cover overturned



[77] *Pellucidaspis epiphytidis*, adult females on *Collospermum microspermum*; inset: one female overturned, with eggs



[78] *Pellucidaspis epiphytidis*, on *Astelia banksii*, near naked adult female under plant pellicle



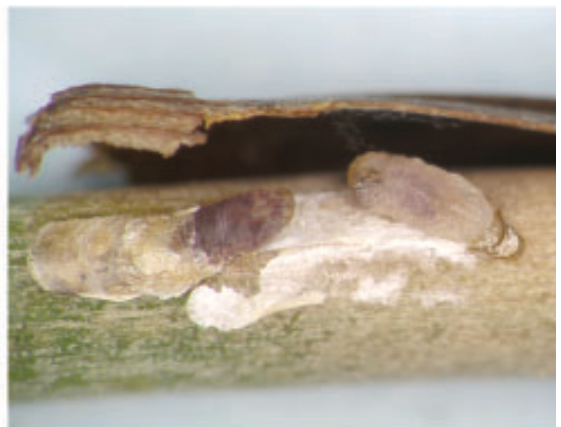
[79] *Pellucidaspis epiphytidis*, on *Collospermum hastatum*, near naked adult female under plant epidermis



[80] *Pellucidaspis epiphytidis*, adult female with plant epidermis peeled off



[81] *Poliaspoides leptocarpi*, two adult female scale covers under leaf sheath at stem node



[82] *Poliaspoides leptocarpi*, adult females, one lying partly out of scale cover (as normal)



[83] *Poliaspis floccosa*, colonies on *Phormium tenax* leaf blades



[84] *Poliaspis floccosa*, adult females, several turned over or scale cover removed



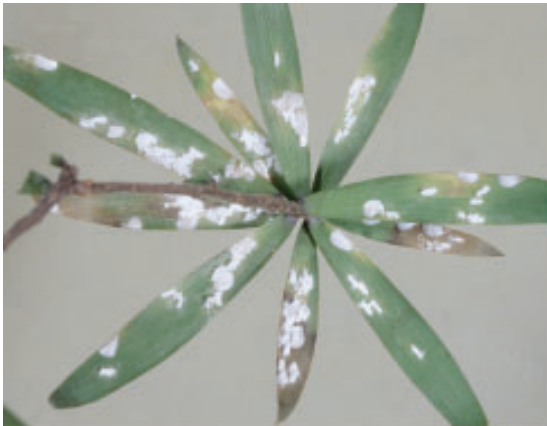
[85] *Poliaspis floccosa*, females and males with one adult male in centre



[86] *Poliaspis lactea*, adult females on bark of *Fuchsia excorticata*



[87] *Poliaspis lactea*, adult females, one with scale cover overturned



[88] *Poliaspis media*, population on *Leuopogon fasciculatus*



[89] *Poliaspis media*, young adult females, one overturned



[90] *Poliaspis media*, crawler settlement and first scale cover construction



[91] *Poliaspis media*, adult females and males on *Hebe subalpina*, inducing bent-over leaf base



[92] *Poliaspis media*, shoot rosette gall and two normal leaves on *Coprosma propinqua*



[93] *Poliaspis media*, leaf tip roll gall on *Myrsine australis*, new gall on left, older gall on right



[94] *Pseudaulacaspis brimblecombei*, population on leaves of *Telopea speciosissima*



[95] *Pseudaulacaspis brimblecombei*, female (broad) and male (narrow) scale covers



[96] *Pseudaulacaspis brimblecombei*, adult female with adult male and two 2nd-instar nymphs



[97] *Pseudaulacaspis eugeniae*, adult females and settled 1st-instar nymphs



[98] *Pseudaulacaspis eugeniae*, adult female overturned (note: very similar appearance to female *P. brimblecombei*).



[99] *Pseudaulacaspis eugeniae*, massed 1st-instar and male 2nd-instar nymphs



[100] *Pseudodonaspis mollyae*, adult females on base of leaf sheath



[101] *Pseudodonaspis mollyae*, adult females with scale covers overturned



[102] *Serenaspis minima*, population on underside of leaves of *Melicytus ramiflorus*



[103] *Serenaspis minima*, females on stem with scale covers more opaque



[104] *Serenaspis minima*, adult females with eggs in broodchambers, and two male nymphs



[105] *Serenaspis minima*, apterous adult male, two male nymphs and a female nymph



[106] *Symeria intermedia*, adult female wrapped round twig of *Kunzea ericoides*



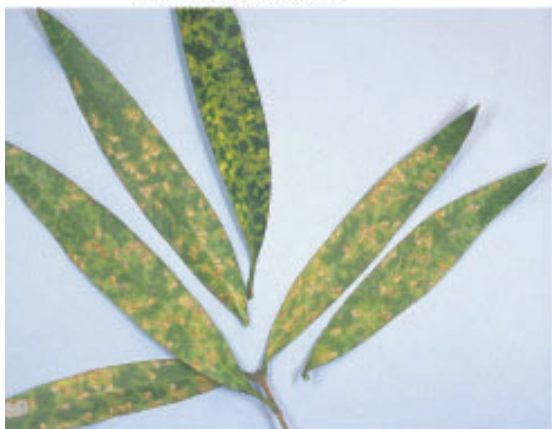
[107] *Symeria intermedia*, male scale cover, cryptic among leaf bud scales of *Kunzea ericoides*



[108] *Symeria phyllocladi*, inquiline in (chlorotic) cladode pocket galls previously induced by *Eriococcus arcanus*



[109] *Symeria phyllocladi*, adult female in base of dissected cladode pocket gall, with several scale covers forming a plug at gall opening



[110] *Symeria pyriformis*, population on leaves of *Nestegis cunninghamii*



[111] *Symeria pyriformis*, mature females, settled 1st-instar nymphs, and one male scale cover (narrow, on right)



[112] *Symeria pyriformis*, adult female with crawlers exiting through crawler flap of scale cover



[113] *Symeria pyriformis*, adult female on bark (camouflaged)



[114] *Symeria pyriformis*, wide view of population on *Dacrydium cupressinum*



[115] *Symeria pyriformis*, close view of wax fluff on scale covers, on *Dacrydium cupressinum*



[116] *Symeria pyriformis*, 1st-instar nymph producing massed wax strands from its head ducts, on *Dacrydium cupressinum*



[117] *Symeria pyriformis*, slide-mounted 1st-instar nymph with multiplied head ducts, from on *Dacrydium cupressinum*



[118] *Symeria pyriformis*, two young adult females with their overturned scale covers, one light and the other dark



[119] *Symeria pyriformis*, mature adult female in overturned scale cover, with massed eggs in broodchamber



[120] *Symeria pyriformis*, on *Prumnopitys taxifolia*; inset: adult females (light) in quilline in leaf roll induced by *Leucaspis* sp. (dark)



[121] *Trulliflorinia acaciae*, adult female and settled 1st-instar nymph on stem; inset: 2nd-instar female nymph on stem



[122] *Trulliflorinia acaciae*, adult female, male 2nd-instar nymph and crawler, on leaf



[123] *Trulliflorinia acaciae*, 2nd-instar male nymph (short one on left) and two further developing male nymphs

KEY TO GENERA OF DIASPIDIDAE IN NEW ZEALAND

- 1 Pygidium of adult female without lobes, plates, or gland spines; anterior spiracles without perispiracular disc pores (p. 161)... *Poliaspoides* MacGillivray
 —Pygidium of adult female with lobes; plates and/or gland spines usually present; anterior spiracles with or without perispiracular disc pores 2
- 2(1) Adult female pupillarial, encased in 2nd-instar pupillarium 3
 —Adult female not pupillarial 4
- 3(2) Membranous adult female with 3 pairs of marginal macroducts on pygidium; venter with numerous microducts on abdomen and thorax; 2nd-instar pupillarium very small, mostly shiny black except membranous pygidium at posterior end; 2nd-instar nymphs without fringed plates (p. 208)... *Trulliflorinia* Leonardi
 —Membranous adult female without marginal macroducts and without ventral microducts as above; 2nd-instar pupillarium of various sizes and shades; 2nd-instar nymphs often with fringed plates
Labidaspis Borchsenius & Williams and *Leucaspis* Signoret = LEUCASPIDINI [not treated here]
- 4(2) Dorsal ducts 1-barred; L2 and L3 never bilobate (divided); anterior spiracles usually without perispiracular disc pores; fringed plates present between pygidial lobes 5
 —Dorsal ducts 2-barred; L2 when present uni- or bilobate (divided); anterior spiracles usually with perispiracular disc pores; gland spines usually present between pygidial lobes, sometimes gland spines absent or replaced by fringed plates 11
- 5(4) With elongate rod-shaped paraphyses on pygidial margin and between poriferous furrows, numerous and diminishing in length on the prepygidial margin (p. 114)... *Lindingaspis* MacGillivray
 —Paraphyses either not as above or absent 6
- 6(5) Paraphyses absent between lobes on pygidium ... 7
 —Paraphyses present by L1, L2, and L3 on pygidium 8
- 7(6) Dorsal ducts relatively short and broad, about 3.5–6× long as wide, scattered submarginally to segment II (p. 77)... *Aspidiotus* Bouché
 —Dorsal ducts long and slender, in a submarginal band from on pygidium to abdominal segment I (p. 75)... *Aspidioides* MacGillivray
- 8(6) Paraphyses short, slender, by lobes 9
 —Paraphyses robust, thickened, by poriferous furrows 10
- 9(8) Prosoma of mature female expanded posterolaterally and often almost enclosing pygidium, body thus becoming kidney-shaped; eye spurs absent (p. 75)... *Aonidiella* Berlese & Leonardi
 —Prosoma not expanding to a kidney-shaped body; with a pair of eye spurs on margin of mid-prosoma (p. 45)... *Abgrallaspis* Balachowsky
- 10(9) Anal opening large, about same width as L1 (p. 99)... *Hemiberlesia* Cockerell
 —Anal opening small, about 1/2 width of L1 (p. 86)... *Diaspidiotus* Berlese
- 11(4) L2 unilobate, sometimes very small or not apparent 12
 —L2 bilobate 19
- 12(11) Unilobate L2 always apparent 13
 —L2 not apparent [not to be confused with the pore prominence], or very small 18
- 13(12) Median space between L1 very wide; L1 not yoked, divergent, each with their inner margins longest; perivulvar pores absent 14
 —Median space not particularly wide; L1 not divergent, or if divergent then yoked; perivulvar pores present 15
- 14(13) L1 rounded apically; with a marginal macroduct and pair of gland spines in medial space; dorsal ducts generally short and broad; on cycads (p. 92)... *Furchadaspis* MacGillivray
 —L1 each with an apical point; without a macroduct or gland spines in medial space; dorsal ducts at least 2× longer than wide; on grasses (p. 176)... *Pseudodonaspis* Henderson n. gen.
- 15(13) Dorsal macroducts and fringed plates present on pygidium and prepygidium; marginal macroducts with axis of orifices parallel to margin, each orifice with a lunate sclerotisation (p. 114)... *Parlatoria* Targioni Tozzetti
 —If marginal macroducts and fringed plates present on pygidium, then absent on prepygidium; axis of orifices of marginal macroducts oblique to margin and lacking lunate sclerotisations parallel to margin 16
- 16(15) Antennae each with normally 1 or 2 long setae; L1 without long basal sclerotisations 17
 —Antennae each with 3 or 4 long setae; L1 each with long basal sclerotisations extending onto submargin (p. 189)... *Symeria* Green
- 17(16) Perivulvar pores in 8 groups; L2 triangular with a pointed apex, much smaller than L1; on *Sarcocornia* ... (p. 154)... *Poliaspis* Maskell [in part, *P. salicornioides*]

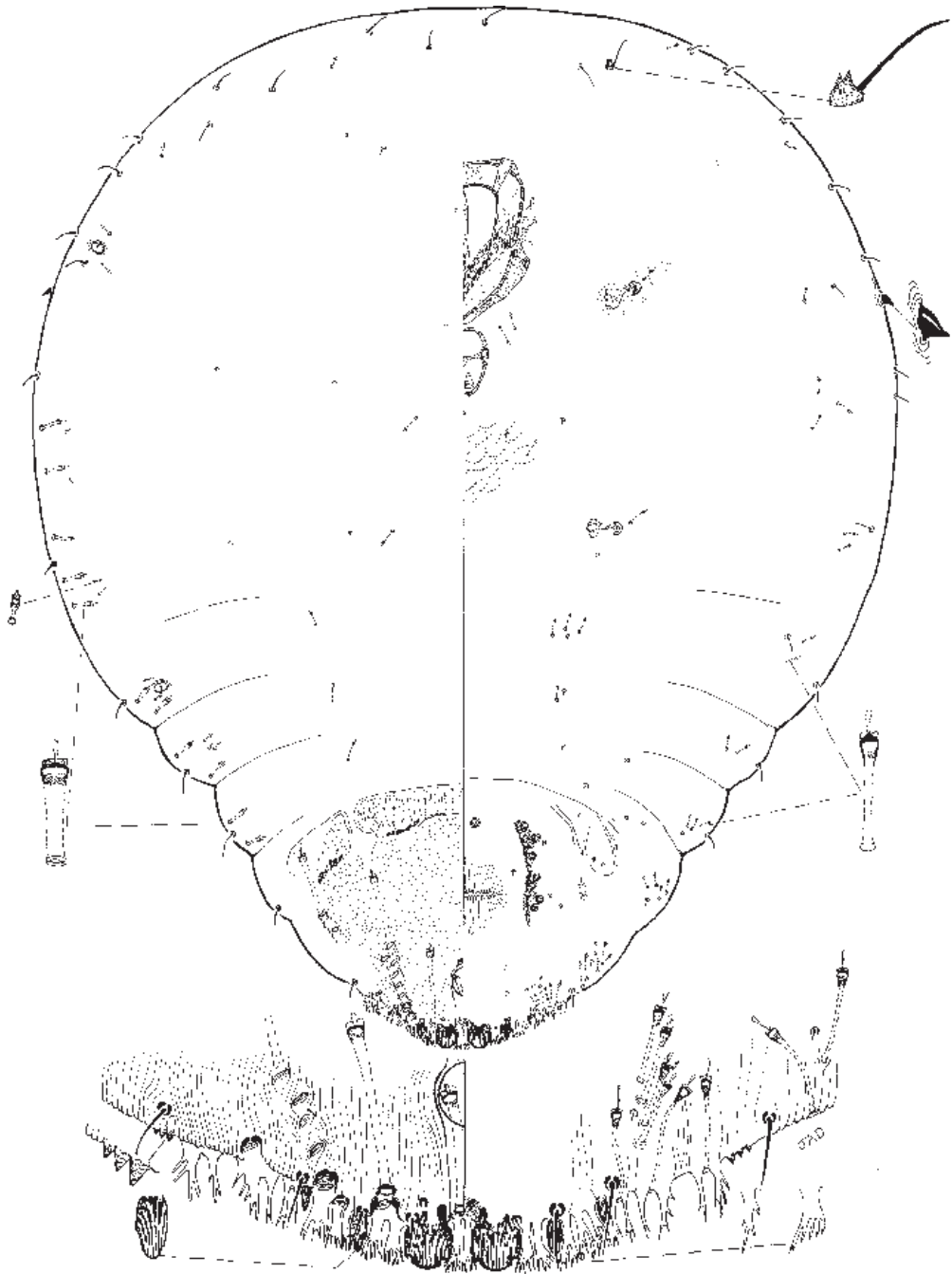


Fig. 124 *Abgrallaspis cyanophylli* (Signoret), adult female (from Miller & Davidson 2005).

0.73–1.1 mm. Pygidium tapering to the prominent median lobes; shape of lobes: L1 narrow at basal sclerotisation, then wide, then squarely notched each side; L2 much smaller than L1, rounded, sometimes with slight notch; L3 a minute point. Fringed plates between lobes to L3, then about 5 slender plates on each side with less fringe.

Pygidial dorsal ducts 1-barred, long and slender, 50–65 μm long, with 1 duct in medial gap, more numerous in pore furrows; prepygidial ducts on abdominal and thoracic submargin each about 22 μm long. Anal opening large, variously 17–22 μm as long as wide and positioned 35–50 μm from posterior margin.

Ventral microducts in submarginal groups on pygidium, scattered on prepygidium and thorax. Perispiracular pores absent. Antenna with 1 long seta and usually 2 short stubs. With a stout eye spur pointing posteriorly each side on margin of prosoma. Perivulvar pores few, 8–10 pores each side along a strongly sclerotised bar, plus sometimes 1 or 2 pores in median position. Vulva positioned about middle of pygidium.

Material examined. See Appendix A (p. 220) for details of 37 specimens examined.

Distribution. AK / NN

Host plants. Arecaceae: palm; Cactaceae: *Cactus* sp., *Consolea rubescens*, *Opuntia* sp.

Remarks. Cyanophyllum scale is similar to latania scale except it lacks strongly sclerotised interlobular paraphyses. It is similar to oleander scale except it has a prominent eye spur, slender and longer macroducts, and the median lobes are broader and squarely notched; note that the lobes shown in Fig. 124 are more rounded than in New Zealand populations. For a comparison with the female pygidia of 5 other common pest species and *A. cyanophylli* see Fig. 6–11.

Genus ANOPLASPIS Leonardi

Anoplaspis Leonardi, 1898: 47.

Type species: *Mytilaspis metrosideri* Maskell, by monotypy. For a discussion of earlier incorrect synonymic treatments see Ferris (1920).

Diagnosis. The 2 species currently known in *Anoplaspis* share some important features and are diverse in other features. Shared features are: (i) 5-locular perispiracular pores present by the anterior spiracles, absent by the posterior spiracles (the only other genera with 5-locular perispiracular pores in New Zealand are *Parlatoria* and the leucaspines *Labidaspis* and *Leucaspis*); (ii) antennae with 1 long seta; (iii) pygidium strongly triangular; (iv) very small or inconspicuous gland spines present on

pygidium only; (v) marginal macroducts and numerous dorsal ducts on pygidium all large and long, with smaller ducts present on dorsal and ventral submargins; (vi) microducts few; (vii) perivulvar pores present in 5 elongate groups; (viii) restricted to *Metrosideros* species.

Key to *Anoplaspis* adult females

- 1 Body shape turbinate, widest at meso- to metathorax; L1 fused at apex into a single broad lobe; L2 absent; with 2 pairs of distinctive hockey stick-shaped paraphyses, each with a rectangular knob at inner end *metrosideri* (Maskell)
- Body shape pyriform, widest at anterior abdomen; L1 each small, rounded, separated by delicate ‘gland spines’; L2 each wider than L1, wedge-shaped; without distinctive knobbed paraphyses *maskelli* Morrison

Anoplaspis maskelli Morrison E pink rata scale

Fig. 14–15, 125–128; Map 2

Anoplaspis maskelli Morrison, 1922: 112; Green, 1929: 380; Borchsenius, 1966: 37; Wise, 1977: 107.

Live appearance and habitat. Scale cover of female white, oval, exuviae golden-brown; the scale often filling area of underside of a small leaf, or at base of leaf by petiole; body of female light pink. Always on leaves of vine species of *Metrosideros* (not on tree species of *Metrosideros*).

Adult female, measurements taken from 10 specimens (Fig. 125). Body shape turbinate when young, expanding to roundly oval at maturity, widest across metathorax; body length 0.9–1.8 mm, width 0.6–1.35 mm. Pygidium tapering to a point, with 2 pairs of undivided lobes, L1 small, rounded, about as wide as long; L2 wedge-shaped, each with their apical margin at about 45 degree angle to the median lobes; each lobe with a small stout seta at its base. With a teardrop-shaped paraphysis at the lateral margin of each median lobe. With very slender, blunt-ended membranes, similar to gland spines, between lobes: 1 pair in median interlobular space, a single ‘gland spine’ in each 2nd interlobular space, and a pair lateral to each 2nd lobe. Pygidial margin to segment V with striated sclerotised blocks between openings of marginal macroducts; macroducts 2-barred, with 8 to 9 pairs, each duct about 3 \times longer than wide and with a sclerotisation at its opening.

Dorsal ducts smaller than marginal macroducts, decreasing in size anteriorly, with 2–4 submarginal ducts each side on segment VII, rows of ducts on VI and V, and submarginal groups as far forward as mesothorax, these groups

wrapping laterally round the body and so appearing also on ventral submargin. Anal opening teardrop-shaped, positioned 100–147 μm from posterior margin. Patterns of pygidial sclerotisation distinctive on both dorsal and ventral surfaces (not figured here to avoid obscuring main features).

Ventral ducts of 3 sizes: (i) those similar to dorsal ducts scattered on prepygidial abdominal submargin and metathorax; (ii) narrow ducts with straight sides and large orifice on submargin of pygidium; (iii) microducts few, on submedian areas of abdomen and submargin of head. Antenna with 1 long seta and 2 coeloconic sensilla. Anterior spiracles each with a group of 6–16 5-locular pores. Perivular pores in 5 groups that tend to run together, total 60–93 pores; vulva anterior to position of anal opening.

2nd-instar female nymph, measurements taken from 2 specimens (Fig. 126). Body shape similar to female but smaller, length 0.59–0.69 mm, width 0.31–0.45 mm; lobes, gland spines, and sclerotised blocks on pygidial margin similar to female but smaller; 6 pairs of marginal macroducts; smaller dorsal ducts few, confined to body margins as far forward as mesothorax with a few extending onto venter. Anal opening about 75 μm from posterior margin.

Ventral microducts of 1 size, few, on submedian abdomen and on head. Antenna as for female. Anterior spiracles each with a group of 3–4 5-locular pores.

2nd-instar male nymph, measurements taken from 5 specimens (Fig. 127). Similar to female nymph, but differing in the following: body shape less rounded than female nymph, length 0.72–1.0 mm, width 0.35–0.45 mm; 6 pairs of marginal macroducts with an additional submarginal duct by 5th and 6th pair.

Smaller dorsal ducts more numerous, on submargin as far forward as mesothorax with a few extending onto venter.

Ventral microducts of 1 size, with 1 each side of pygidium on segment VI, a few on submedian abdomen and on head. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

Remarks. Differences to 2nd-instar female are (i) 2 pairs of submarginal dorsal ducts on pygidium (no submarginal dorsal ducts on female); (ii) 1 pair of ventral microducts present on margin of VI (absent there on female); (iii) 3 pairs of ventral setae between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 3 specimens (Fig. 128). Body shape elongate-oval, length about 0.35 mm, width about 0.18 mm. Pygidium with 1 pair of lobes, slightly notched, each with a basal sclerosis on inner margin; between the lobes a pair of minute setae on sclerotised

protuberances, 1 pair of macroducts and 1 pair of long anal lobe setae; marginal macroducts large, 4 pairs in total including the pair between L1.

Dorsal microducts distributed on submargin and submedian thorax and head with 1 pair of larger microducts positioned above mouthparts.

Ventral microducts with small tubercles on margin of abdominal segments II–IV and metathorax, and with a submarginal microduct each side of meso- and prothorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented, with fine and fleshy setae. Legs and spiracles normal. Eyes on ventral margin.

Remarks. The 1st-instar nymphs of *A. maskelli* and *A. metrosideri* appear so similar that they are not separable. In possessing 4 pairs of large marginal macroducts, the 1st-instar nymphs of both *Anoplaspis* species are unique in the New Zealand non-leucaspidine native fauna.

Type material examined. **HOLOTYPE** female (USNM): NEW ZEALAND, on *Metrosideros*, 1890 or 1891, W.M. Maskell; Cat. No. 24781, U.S.N.M. Morrison (1922, page 113) states he described this species “from 7 specimens as follows: holotype from specimens in the Department of Agriculture Collection received from Maskell directly, paratypes from the same collection, from the Cockerell Collection now included in the National Collection, and from Maskell’s slides, all labelled *M. metrosideri* Maskell.” As the description includes ‘cast skin only’ for the ‘intermediate stage female and larva’ the holotype and paratypes are assumed to be all adult females. **Paratypes** (NZAC): (i) an original Maskell slide, the glass coverslip sealed with his standard red and white rings, labelled: “*Mytilaspis metrosideri* [crossed out], *Anoplaspis maskelli* [in pencil], female and puparium, July 1890, W.M.M.” The female is uncleared and unstained, the ‘puparium’ includes its 1st- and 2nd-exuvia [1]: 1 F. Barcode NZAC02008441. (ii) as above except “adult female, 1891, W.M.M.” This slide is presumed remounted, because the female is cleared and stained and the glass coverslip is sealed with blue and cream rings [1]: 1 F. Barcode NZAC02008438.

Other material examined. See Appendix A (p. 220) for details of 125 specimens examined.

Distribution. AK, WO, HB, WN / SD, NN, BR

Host plants. Myrtaceae: *Metrosideros colensoi*, *M. diffusa*, *M. fulgens*, *M. perforata*, *Metrosideros* sp. [rata].

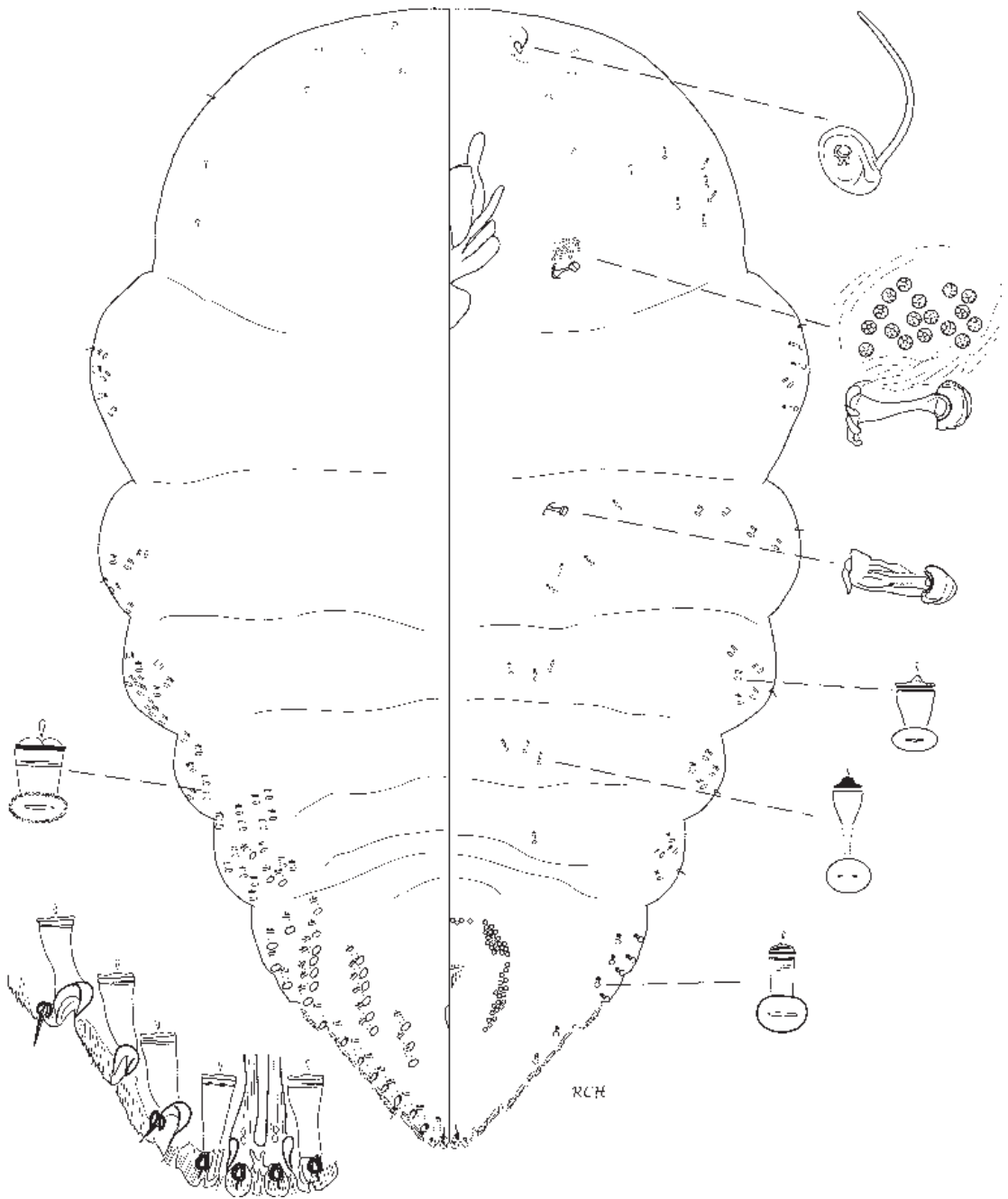


Fig. 125 *Anoplaspis maskelli* Morrison, adult female.

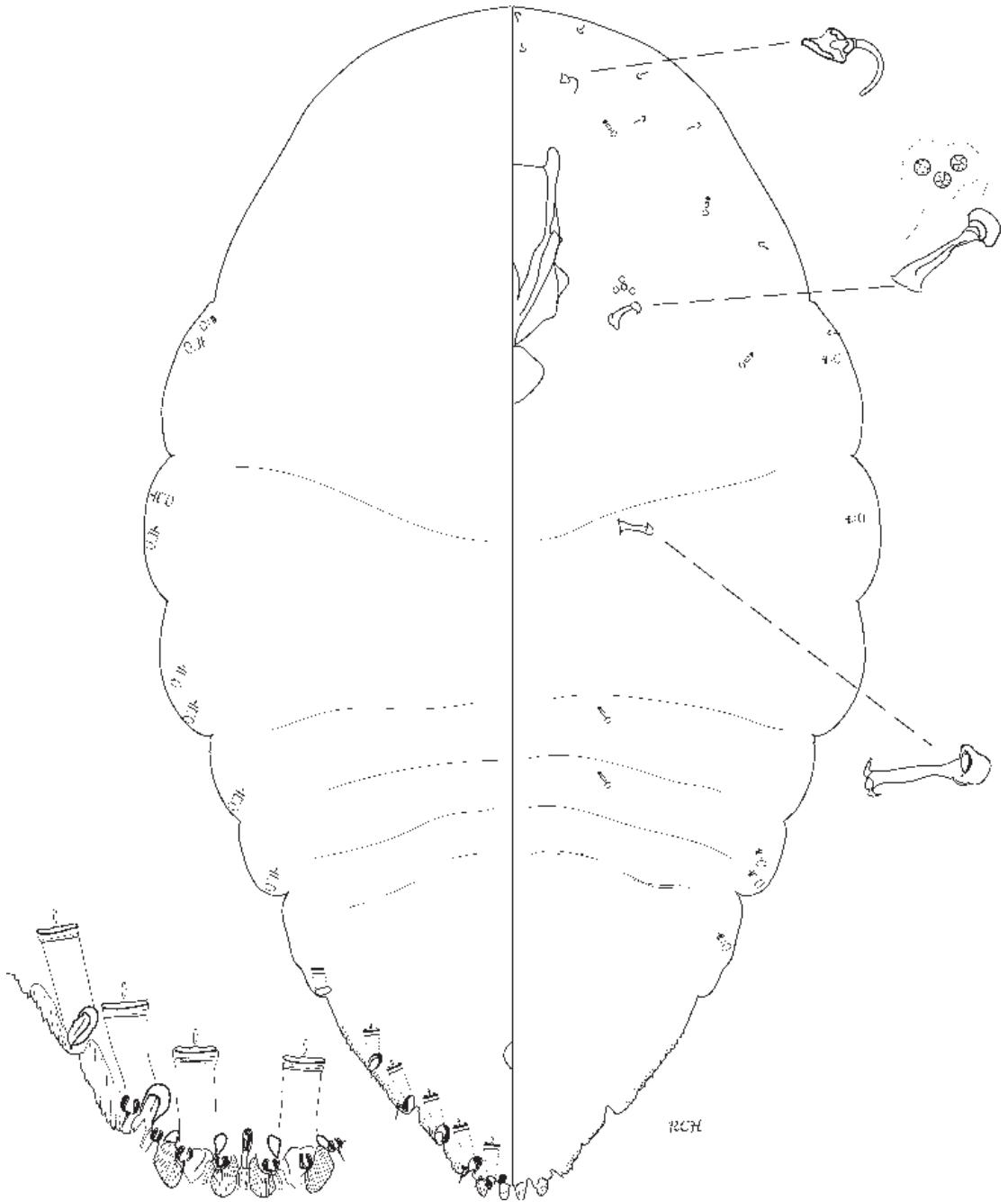


Fig. 126 *Anoplaspis maskelli* Morrison, 2nd-instar female nymph.

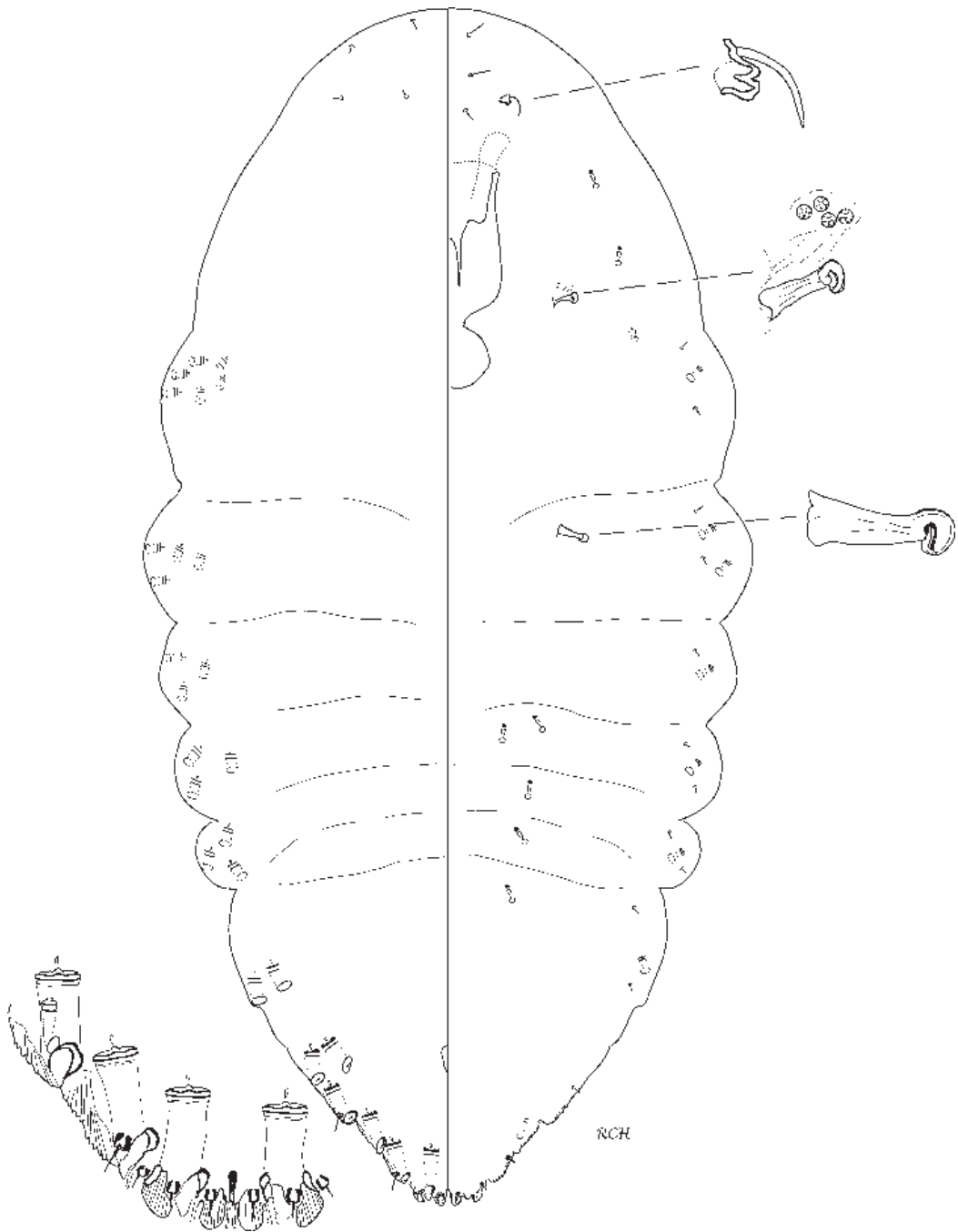


Fig. 127 *Anoplaspis maskelli* Morrison, 2nd-instar male nymph.



Fig. 128 *Anoplaspis maskelli* Morrison, 1st-instar nymph.

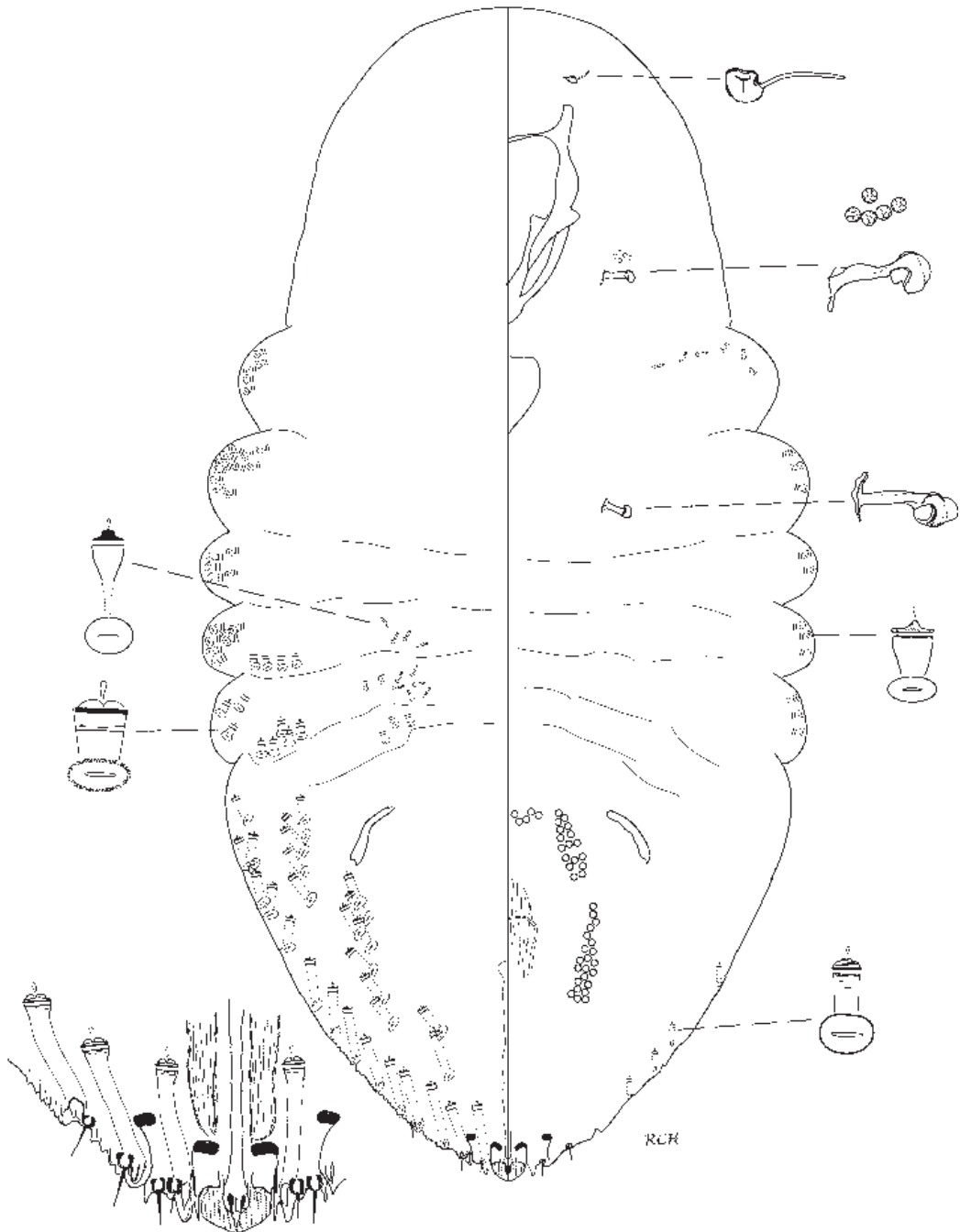


Fig. 129 *Anoplaspis metrosideri* (Maskell), adult female.

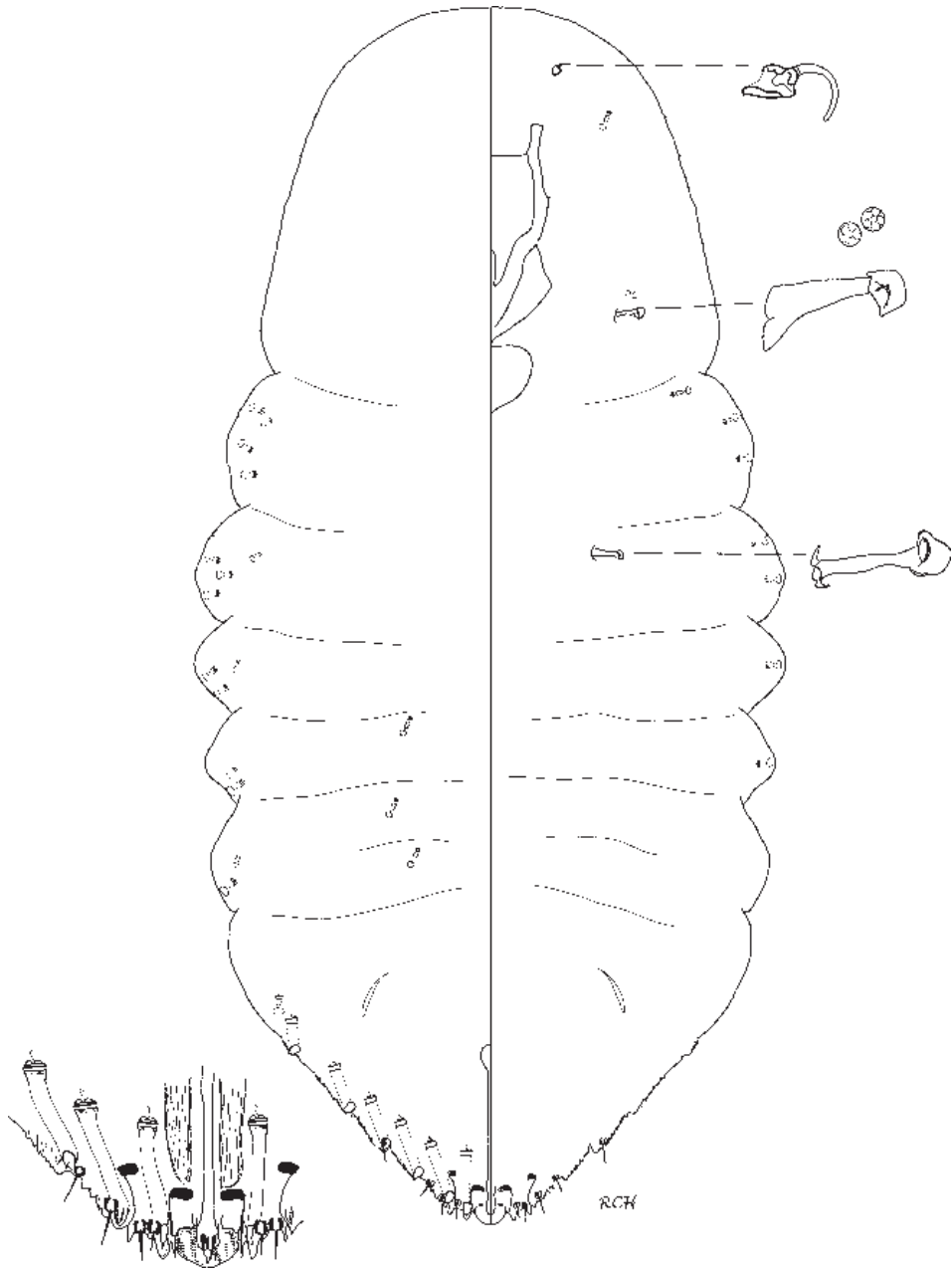


Fig. 130 *Anoplaspis metrosideri* (Maskell), 2nd-instar female nymph.

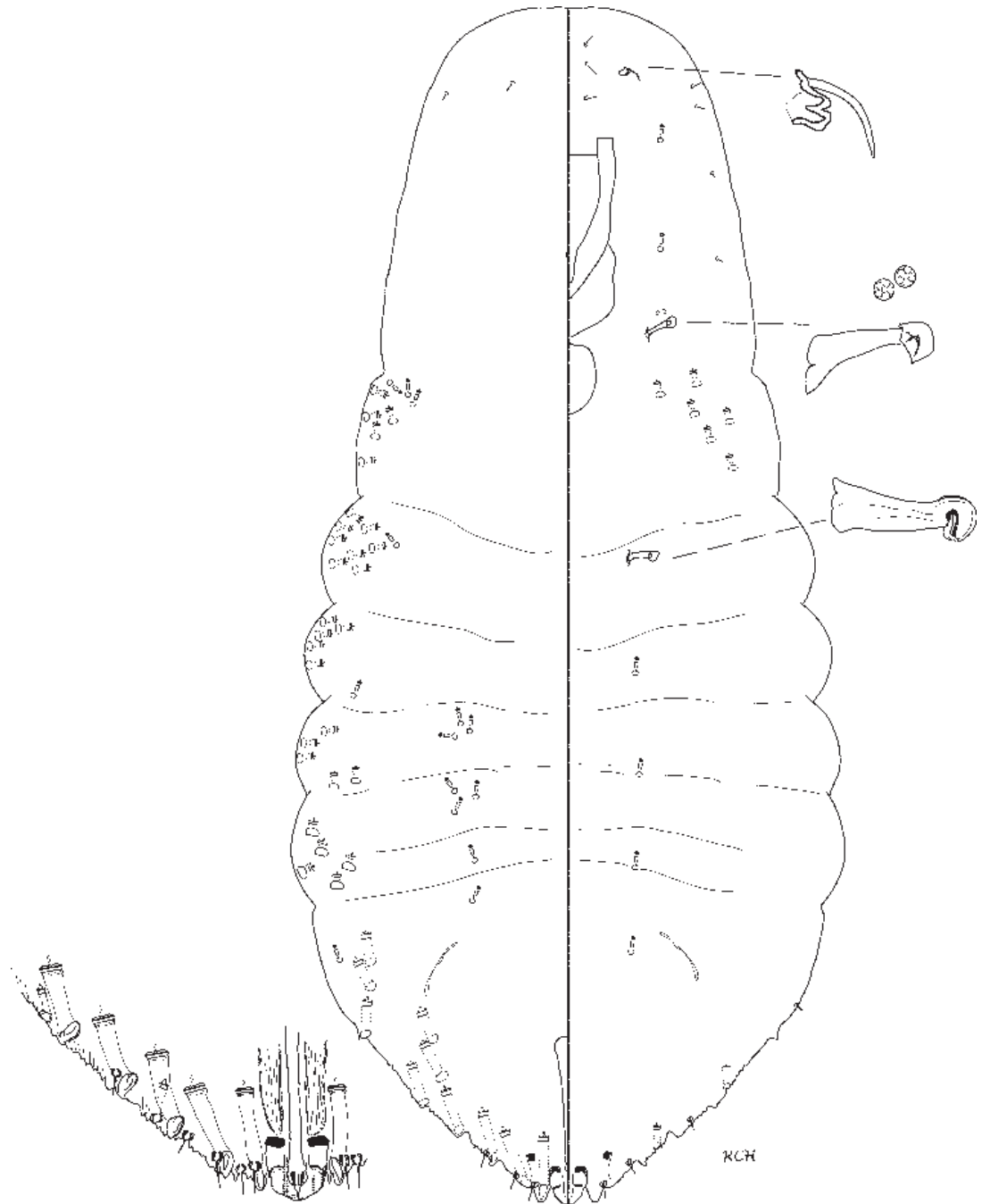


Fig. 131 *Anoplaspis metrosideri* (Maskell), 2nd-instar male nymph.

Anoplaspis metrosideri (Maskell) E black rata scale

Fig. 16–19, 129–131; Map 3

Mytilaspis metrosideri Maskell, 1880: 293; 187: 50; Ferris 1936: 35.

Lepidosaphes metrosideri (Maskell); Fernald, 1903: 311.

Anoplaspis metrosideri (Maskell); Morrison & Morrison, 1922: 109; Green, 1929: 380; Hoy, 1958: 185; Borchsenius, 1966: 37; Wise, 1977: 107; Deitz & Tocker, 1980: 39.

Live appearance and habitat. Scale cover of female white, oystershell-shaped, exuvia golden-brown with a dark median area; female body and eggs purple-black. Male scale cover white, fusiform, exuvia without dark median area of female exuvia. Always on leaves of *Metrosideros* tree species (not on *Metrosideros* vine species).

Adult female measurements taken from 13 specimens (Fig. 129). Body shape elongate-oval to roundly oval, widest across free abdominal segments, with rounded lobes; body length 0.8–1.85 mm, width 0.5–1.0 mm. Pygidium rounded, without gland spines or plates; with a single broad, heavily sclerotised lobe comprised of the median lobes fused at their apex, the margin unnotched, smooth, width 22–30 μm , length 15–17 μm . With 1 very slender, gland spine-like extension each side of median lobe. 2 pairs of paraphyses of a distinctive hockey stick-shape, each comprising a slender stalk arising at the margin and terminating at the lateral edge of a rectangular knobbed head, one pair lateral to each median lobe, the 2nd pair at the 2nd-lobular position close to the 2nd macroduct pair; sometimes a 3rd small pair of paraphyses at the 3rd-lobular position; in populations from southern New Zealand the knob of each paraphysis may be enlarged anteriorly. Without noticeably striated and sclerotised blocks on margin between openings of marginal macroducts; with 8–10 pairs of macroducts, each duct about 5–8 \times longer than wide and with a sclerotisation at its opening.

Dorsal ducts smaller than marginal macroducts, decreasing in size anteriorly, with 1–3 submarginal ducts each side on segment VII, submarginal rows of ducts on VI and V, and submarginal groups as far forward as mesothorax, these groups wrapped laterally round the body and so appearing also on ventral submargin; in addition, dorsal submedian groups of very small ducts, more the size of microducts, on abdominal segments II–IV. Anal opening oval, extending into a narrow channel that reaches the median lobe, inclusive length 130–187 μm to posterior margin. Patterns of pygidial sclerotisation distinctive on both dorsal and ventral surfaces (not figured here to avoid obscuring main features), and with a pair of moderately large preanal scars.

Ventral ducts of 3 sizes: (i) those similar to dorsal ducts scattered on prepygidial abdominal submargin and

metathorax; (ii) about 4 pairs of narrow ducts with straight sides and large orifice on submargin of pygidium; (iii) microducts very few on mesothorax. Antenna with 1 long seta. Anterior spiracles each with a group of 2–6 5-locular pores. Perivular pores in 5 groups, total 60–90 pores; vulva anterior to position of anal opening, 0.18–0.23 μm from posterior margin.

2nd-instar female nymph, measurements taken from 5 specimens (Fig. 130). Body shape similar to female but smaller, length 0.66–0.78 mm, width 0.30–0.38 mm; fused median lobe, pygidial margin, paraphyses and preanal scars all similar to female but smaller; 6 pairs of marginal macroducts plus 1 small duct submarginally by 6th macroduct each side.

Other dorsal ducts very small, few, confined to body margins as far forward as mesothorax with some extending onto venter; in addition, very small dorsal ducts, more the size of microducts, 1 pair present on each of abdominal submedian segments II–IV. Anal opening 82–100 μm from posterior margin.

Ventral microducts of 1 size, about 1 each side on mesothorax and on head, none on pygidium. Antenna as for female. Anterior spiracles each with 2 5-locular pores.

2nd-instar male nymph, measurements taken from 8 specimens (Fig. 131). Body shape more broad at abdomen than female nymphs: length 0.69–1.0 mm, width 0.31–0.41 mm; fused median lobe, pygidial margin, paraphyses and preanal scars all similar to adult female but smaller; 6 pairs of marginal macroducts with an additional 2 submarginal ducts by each 5th and 6th pair.

Smaller dorsal ducts more numerous, scattered on submargin as far forward as mesothorax; in addition, dorsal submedian groups of very small ducts, more the size of microducts, on abdominal segments II–V.

Ventral ducts of 3 sizes, (i) the larger size in a submarginal group on mesothorax; (ii) 2 pairs of medium-size, straight-sided ducts on pygidium margin; (iii) with about 1 pair of submedian microducts on each abdominal segment plus about 2 pairs on head. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Anterior spiracular pores as for female nymph.

Remarks. As for *A. maskelli*, the male nymph of *A. metrosideri* has additional submarginal macroducts and ventral microducts compared to the female nymph.

1st-instar nymph, measurements taken from 3 specimens (Fig. 128). Body shape elongate-oval, length about 0.35 mm, width about 0.18 mm as crawlers (2 specimens) reaching length 0.54 mm, width 0.29 mm when moulting to 2nd-instar (1 specimen).

Remarks. Not distinguishable from 1st-instar nymph of *A. maskelli*, above.

Type material examined. LECTOTYPE female, here designated to preserve nomenclatural stability: NEW ZEALAND, on an original slide labelled “*Mytilaspis metrosideri*, adult females, from Rata, Jan 1879, W.M.M.” [1]: 1 F. The lectotype female is 1 of 5 on the slide, and is the middle specimen of 3 in the middle row. Barcode NZAC02008435 (NZAC). **Paralectotypes:** (i) as above, the 4 remaining females on the lectotype slide, [1]: 4 F [same barcode as lectotype]; (ii) as above except “young female”, [1]: 1 2nd [uncertain male or female nymph because uncleaned, unstained] + 1 exuv1. Barcode NZAC02008432 (NZAC).

Other material examined. See Appendix A (p. 220) for details of 253 specimens examined.

Distribution. ND, AK, CL, BP, RI / NN, BR, WD, DN, OL, FD/OL, FD, SL, SI

Host plants. Myrtaceae: *Metrosideros excelsa*, *M. robusta*, *Metrosideros* sp. [rata], *M. umbellata*.

Genus ANZASPIS Henderson new genus

Type species: *Mytilaspis cordylinidis* Maskell, here designated.

Diagnosis. Adult female narrowly fusiform or elongate when young, more compact and contracted at maturity. Pygidium rounded in shape, with 3 pairs of lobes: median lobes yoked, lobes varying in shape according to species and host plant: the most variation in *Anzaspis cordylinidis* (Maskell), from rounded on *Cordyline*, to elongate with a narrow median cleft on *Phormium* and *Uncinia* or delta-shaped and pointed on *Rhopalostylis*; for *A. gahniae* n.sp. on *Gahnia*, narrow and pointed; for *A. angusta* (Green) on myrtaceous adventive plants including *Kunzea*, moderately wide and truncated apically. Median lobes often with small notches; 2nd lobes bilobed, variously small and rounded or pointed, and with or without tiny notches; 3rd lobes bilobed, variously rounded or serrate or broad and toothed, but lateral lobule sometimes a mere point. Occasionally a pair of fine setae discernible between median lobes. Marginal macroducts numbering 6 pairs, each duct 2–3× longer than wide and with a sclerotisation at its opening.

Submedian dorsal ducts smaller than marginal macroducts, distributed 0–3 each side on segment VI lateral to anal opening, in short rows on V and IV, and either of similar size on III and II or changing abruptly to much smaller ducts there; submarginal duct groups decreasing in size anteriorly, present as far forward as mesothorax, these groups actually lateral on the body and so appearing also on ventral submargin. Anal opening round in shape.

Ventral ducts similar to small dorsal ducts scattered on prepygidial abdominal submargin and metathorax; smallest microducts associated with gland spines on pygidium;

larger microducts associated with gland spines on prepygidial segments and on submedian abdomen; small microducts present on thorax and head. Gland spines pointed, present singly on each pygidial segment, then in submarginal groups on free abdominal segments, then becoming gland tubercles further forward. Antenna with 1 long seta and 2 coeloconic sensilla. Anterior spiracles each with a group of 3-locular pores; posterior spiracles with a few microducts associated. Perivulvar pores in 5 moderately elongate groups.

First-instar nymphs oval to lozenge-shaped, with a pair of lobes and a pair of gland spines on pygidium margin. Antennae 5-segmented, with fine and fleshy setae and with a single seta at apex. Differences in distribution of dorsal thoracic microducts and cephalic ducts of 1st-instar nymphs and/or the 1st-exuvia from scale covers are important for species separation.

Etymology: *Anzaspis*: “Anz” alludes to Australia and New Zealand, combined with *-aspis* for shield or scale.

Remarks. This new genus is proposed for 2 endemic New Zealand species, *Anzaspis cordylinidis* (Maskell) **n. comb.** and *A. gahniae* **n. sp.** together with the Australasian *A. angusta* (Green) **n. comb.**. They belong in the Australasian clade of taxa previously placed in *Chionaspis* and *Pseudaulacaspis* (Takagi, 1985). Takagi’s (1985) discussion of the defining characters to separate *Chionaspis* and *Pseudaulacaspis* stated that females of *Chionaspis* species are “never with a pair of remarkable setae arising from their (L1) inner bases (though there may be recognised a pair of minute setae)” (Takagi 1985). *A. angusta* and *A. cordylinidis* females do sometimes have 1 or 2 very fine setae there, and in *A. gahniae* they are nearly always absent. This feature qualifies these species for inclusion in *Chionaspis* sensu Takagi, rather than the most recent combination for *cordylinidis* placed within *Pseudaulacaspis*, the females of the latter defined as having a pair of noticeable setae between the median lobes (Takagi 1967; 1985). However, molecular data (Andersen *et al.* 2010) precludes placement in the northern hemisphere clade of *Chionaspis*, and because that option is no longer reasonable, a new genus is here proposed for nomenclatural stability.

Key to *Anzaspis* adult females, in combination with 1st-instar nymphs /1st-exuvia

- 1 Median lobes of female wide and truncate apically; usually without dorsal submedian ducts on pygidium opposite anal opening; 1st-instar or 1st-exuvium with 1 pair of large dorsal cephalic ducts near anterior margin ***angusta* (Green)**

- Median lobes not truncate, variously apically rounded to more elongate and pointed; usually with dorsal submedian ducts present on pygidium opposite anal opening; 1st-instar or 1st-exuvium without 1 pair of large dorsal cephalic ducts near anterior margin 2
- 2 Submedian dorsal ducts of female slightly smaller than submarginal pygidial ducts in 2–3 rows (normally segments V–VI), then abruptly reduced in size on anterior prepygidial segments (II–IV); even if prepygidial ducts not abruptly reduced in size, 1st-instar nymph or 1st-exuvium always with 2 pairs of submedian dorsal microducts of unequal size, the larger ducts on prothorax and smaller ducts on mesothorax *cordylinidis* (Maskell)
- Submedian dorsal ducts of female all only slightly smaller than submarginal pygidial ducts, never abruptly reduced in size, present in short rows on segments V–VI and either present or absent on II–IV; 1st-instar nymph or 1st-exuvium never with pairs of submedian dorsal microducts *gahniae* Henderson n. sp.

***Anzaspis angusta* (Green) N slender scale**

Fig. 20–21, 132–134; Map 4

Chionaspis angusta Green, 1904: 67 [reinstated by Charles & Henderson 2002: 597].

Chionaspis candida Green, 1905: 6; Charles & Henderson 2002: 597 [synonymy].

Duplachionaspis candida (Green); MacGillivray 1921: 332.

Phenacaspis candida (Green); Ferris, 1956: 68.

Phenacaspis angusta (Green); MacGillivray 1921: 351; Ferris 1955: 45; 1956: 68, 73 [review of genus].

Chionaspis dubia small form Maskell, 1891: 8 [misidentification].

Anzaspis angusta (Green) new combination.

Live appearance and habitat. Female scale cover elongate, white, exuvia terminal, 1st exuvium translucent, 2nd-exuvium pale brown; male scale not observed. Female body with noticeably finger-like produced abdominal lobes. Female, eggs, and crawlers all golden-yellow. On the leaves of host plants.

Adult female measurements taken from 17 specimens (Fig. 132). Body elongate or fusiform; body length 0.85–1.5 mm, width 0.35–0.5 mm. Abdominal prepygidial segments with well developed, finger-like, lateral lobes, each with a concentration of dorsal ducts and gland tubercles near the extremity. Median lobes (L1) yoked, wider than long, serrate, appearing truncated, each lobe with a pair of curved basal scleroses; occasionally a pair of very fine setae discernible between median lobes; L2 bilobed, narrow, without notches, medial lobule with a basal sclerosis about 2× as long as lobule extending onto submargin, the

lateral lobule very small, also with discernible scleroses on either side; L3 barely detectable as crenulations on margin. Marginal macroducts numbering 6 pairs.

Dorsal ducts smaller than marginal macroducts, absent on pygidium lateral to anal opening, present in short rows on submedian and submargin of VI and V, becoming much smaller on IV and III; small dorsal submarginal ducts present as far forward as metathorax. Anal opening round, about 15 µm long as wide, positioned 115–132 µm from posterior margin.

Ventral ducts similar to smaller dorsal ducts submarginally on prepygidial segments and posterior thorax; microducts scattered on submedian abdomen, thorax, and particularly numerous on anterior of head; gland spines reducing to gland tubercles, present on abdomen and a few near posterior spiracle; antenna with 1 long setae and several fleshy stubs. Anterior spiracles each with 1–3 trilocular pores; posterior spiracles with a few microducts associated. Total of 44–77 perivular pores in 5 moderately elongate groups. Vulva position posterior to that of anal opening.

2nd-instar female nymph, measurements taken from 7 specimens (Fig. 133). Body shape fusiform, length 0.41–0.79 mm, width 0.21–0.41 mm; abdominal lobes less well-produced than adult female, pygidium oval. With 2 pairs of lobes, similar to female but smaller; with a pair of minute setae in the medial space (barely discernible). 4 pairs of marginal macroducts.

Smaller dorsal ducts few, confined to submargin as far forward as mesothorax, not extending onto venter. Gland spines slender on pygidium, with slender microducts associated; with a pair of larger gland spines on margins of segments II–IV each with a more robust microduct. Anal opening round, 10–12 µm in diameter, positioned 55–57 µm from posterior margin.

Ventral microducts of 1 size, few, 1 pair on pygidium submargin above 3rd gland spine (segment VI), 2 pairs on submedian abdomen, 1 to 2 pairs near each spiracle, and on head. With 2 pairs submarginal gland tubercles on abdomen I and 1 tubercle between each spiracle and margin. Antenna with 1 long seta. Anterior spiracles each with 1 trilocular pore; posterior spiracles without pores.

2nd-instar male nymph, No males of any life stage have been observed in New Zealand collections of *A. angusta*. It is possible that they do exist in Australia, the country of origin of this species.

1st-instar nymph, measurements taken from 11 specimens (Fig. 134). Body shape elongate-oval, length 0.39–0.41 mm, width 0.21–0.24 mm. Pygidium with 3 pairs of lobes, L1 well sclerotised, notched each side and with a long basal sclerosis on inner margin, L2 and L3 less well

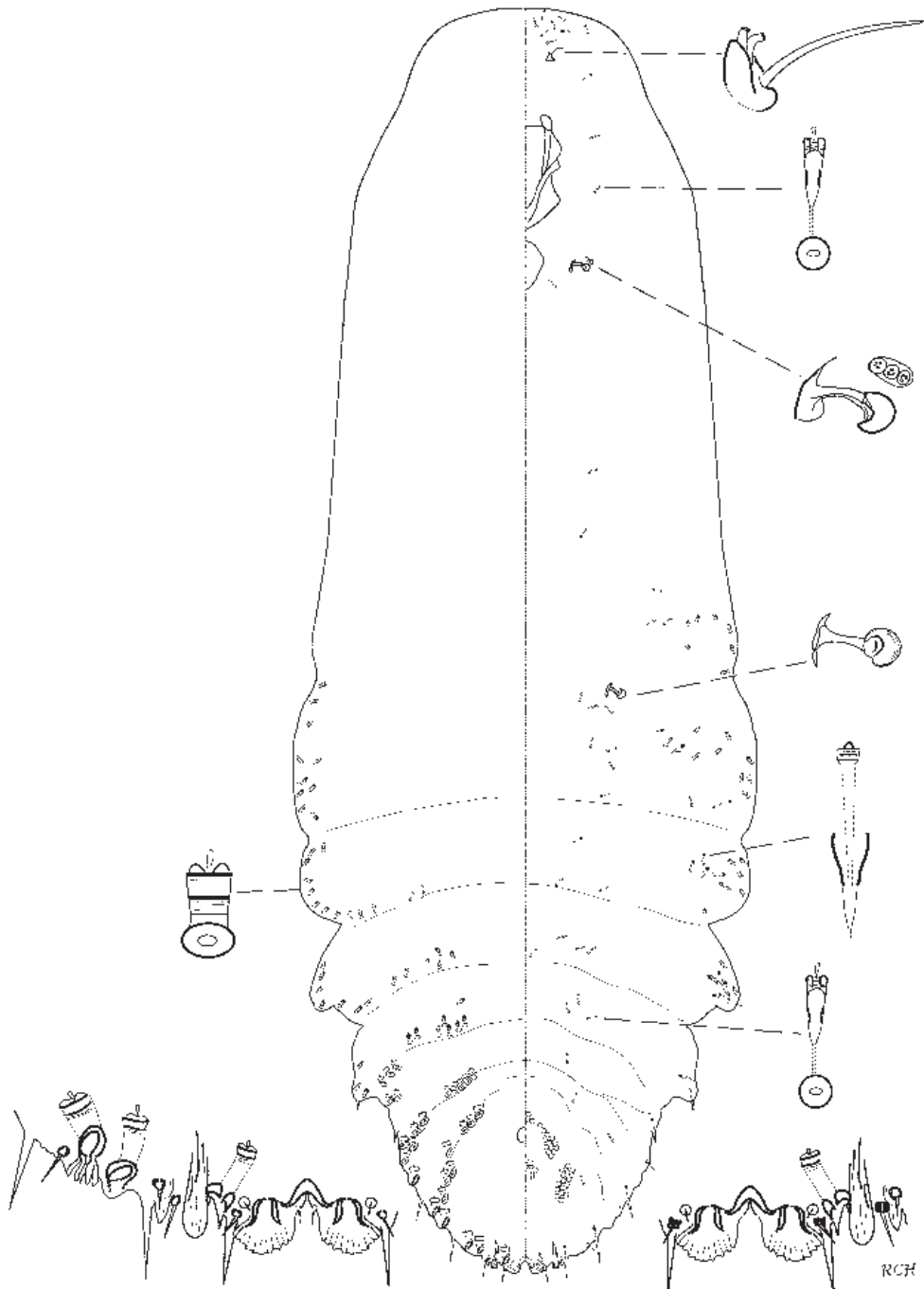


Fig. 132 *Anzaspis angusta* (Green), adult female; pygidium margin with and without medial setae.

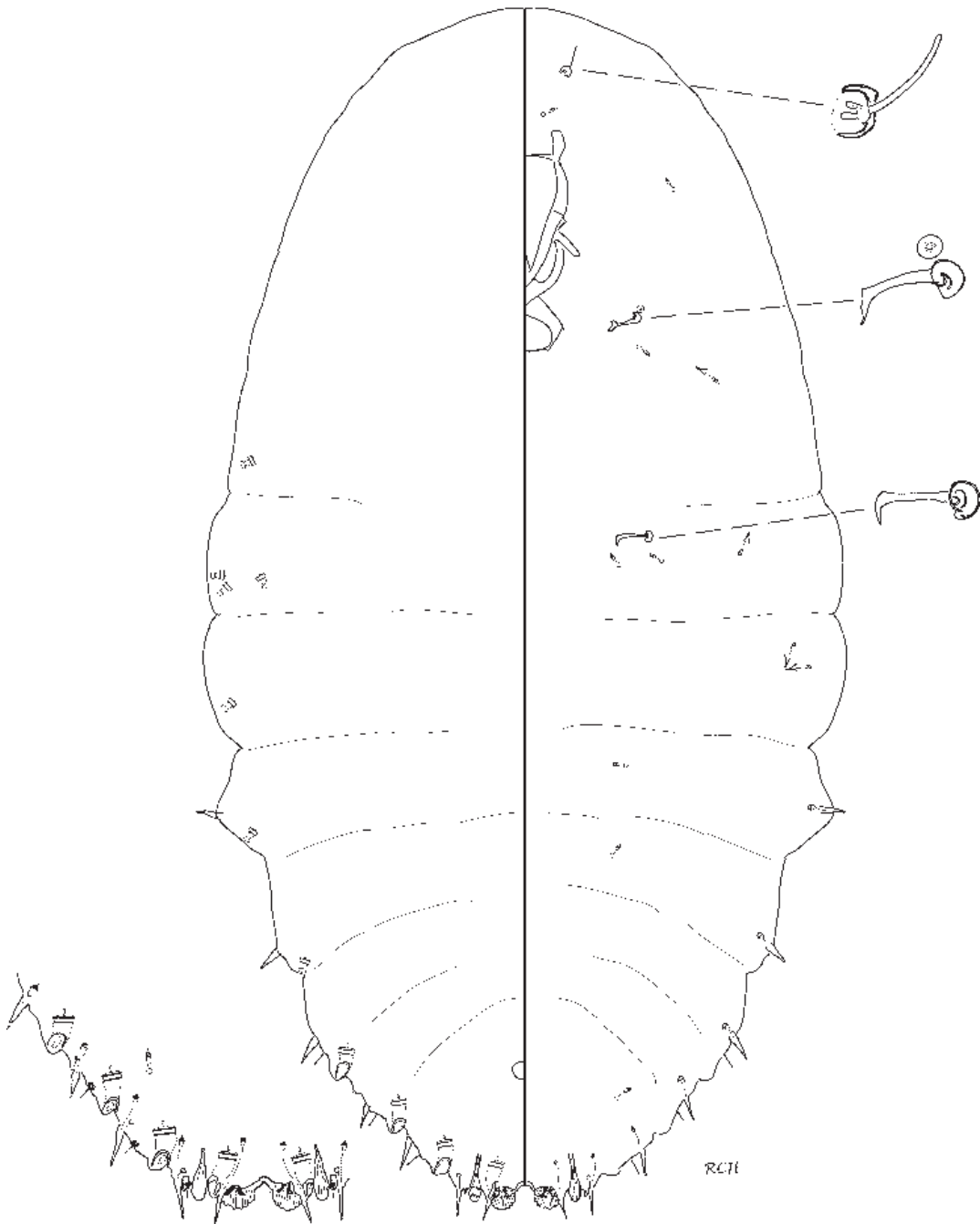


Fig. 133 *Anzaspis angusta* (Green), 2nd-instar female nymph.

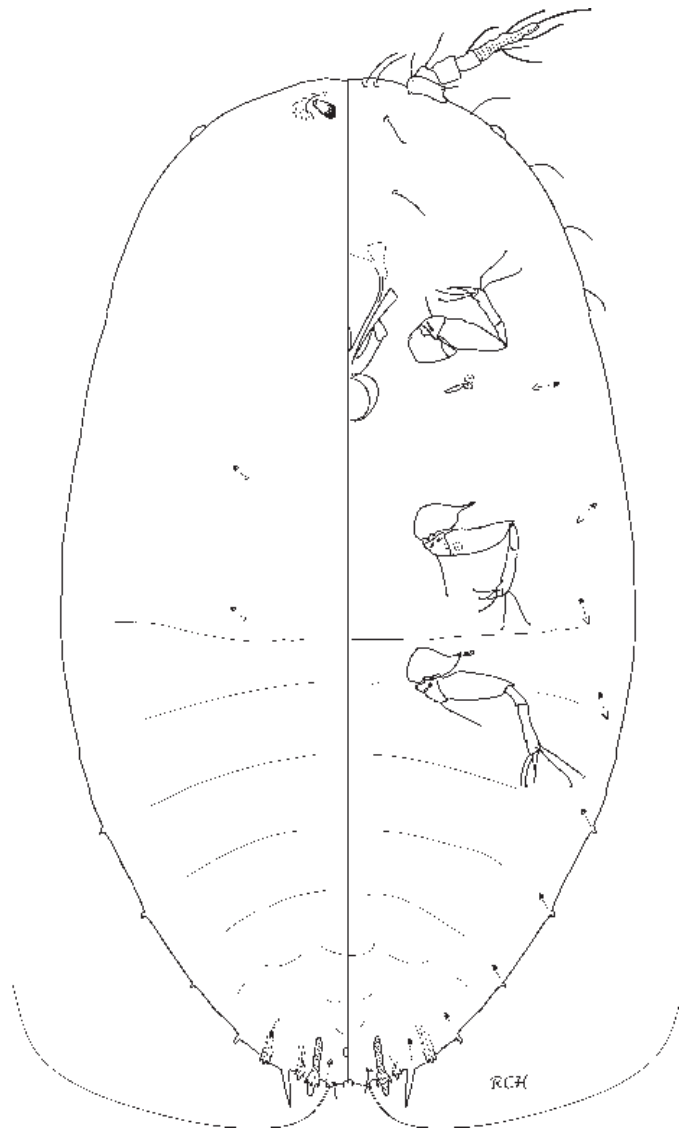


Fig. 134 *Anzaspis angusta* (Green), 1st-instar nymph.

developed; between the lobes 1 pair of fine dorsal setae on the margin, 1 pair of moderately long ventral setae, 1 pair of long anal lobe setae, and 1 pair of dorsal microducts. With 1 pair of long gland spines, proximally thicker and distally fine-pointed, each with a ventral microduct.

With 1 pair of same-sized dorsal microducts each on submedian meso- and metathorax. With 1 pair of large dorsal cephalic ducts on submargin between position of ventral antennal bases.

Ventral microducts with small tubercles on margin of abdominal segments I–IV and thorax. Antennae 5-segmented, length 60–67 μm , with flagellate setae: I:2, II:1, III:0, and fleshy seta: IV:1 V: 4 plus a single terminal seta on apex. Legs and spiracles normal. Eyes on margin. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

Remarks. The 1st-instar nymph of *A. angusta* shares the possession of 1 pair of gland spines on the pygidium that are 2 \times as long as the median lobes with *A. cordylinidis*, *Pellucidaspis epiphytidis* (Maskell), and *Pseudaulacaspis eugeniae* (Maskell); it shares possession of 1 pair of dorsal cephalic ducts with *Poliaspis* spp., *P. eugeniae* (absent in *P. epiphytidis*), *Serenaspis minima* (Maskell), and *Symeria pyriformis* (Maskell), but each of these species differs in the number and distribution of dorsal thoracic microducts. The 1st-instar nymph of *Fusilaspis phymatodidis* (Maskell) also has 1 pair of dorsal cephalic ducts, but differs in having usually 2 pairs of gland spines instead of 1 pair on the pygidium. The 1st-instar nymph of *A. gahniae* described below lacks any kind of dorsal thoracic ducts and its gland spines either do not extend beyond the margin or only at most to 1.5 \times the length of the median lobes.

As for *A. cordylinidis* and *A. gahniae* below, features of the 1st-instar nymph that differentiate it are also present in the 1st-exuvium of the scale covers, which thereby prove a valuable aid to distinguish this species.

Type material examined. All type material is in the Natural History Museum, London (BMNH).

Chionaspis angusta Green. **LECTOTYPE** female, here designated to preserve nomenclatural stability: AUSTRALIA, on an original slide labelled: “*Chionaspis angusta* Green, from *Leptospermum laevigatum*, Victoria, Australia, coll. C. French No. 33”, [1]: 1 F, is one of 5 individuals on the slide and is indicated by a ‘mud map’ on the slide cover that it is #2. (Selected and marked by Jon Martin, BMNH, as requested). **Paralectotypes.** As above, the 4 remaining females on the lectotype slide, [1]: 4 F; a second slide with same data, [1]: 7 F, 1 f2nd (moulting) + a piece of leaf containing scale covers.

Chionaspis candida Green. **LECTOTYPE** female, here designated to preserve nomenclatural stability: AUSTRALIA, on an original slide labelled “Type. *Chionaspis*

(*candida*) Green, = *angusta*, from *Calistemon salignis*, Myrmiong, Victoria, Australia, coll. J. Lidgett, No. 61”, [1]: 1 F, is the shortest one of 5 individuals that are almost touching each other. (Selected by Jon Martin, BMNH, as requested). **Paralectotypes.** As above, the remaining 4 females on the lectotype slide, [1]: 4 F. Note: Green wrote on the type slide “= *angusta*” but did not publish the synonymy (Charles & Henderson 2002).

Other material examined. See Appendix A (p. 221) for details of 141 specimens examined.

Distribution. AK, GB, WN / NN, MB, NC, MC, DN, OL, FD/SL.

Host plants. Myrsinaceae: *Myrsine* sp.; Myrtaceae: *Callistemon* sp., *Kunzea ericoides*, *Leptospermum laevigatum*, *L. scoparium*, *Leptospermum* sp.

***Anzaspis cordylinidis* (Maskell) E cordyline scale**

Fig. 22–23, 135–140; Map 5

Mytilaspis cordylinidis Maskell, 1879: 195; 1887: 48.

Lepidosaphes cordylinidis (Maskell); Fernald 1903: 307; Myers 1927: 690.

Fusilaspis cordylinidis (Maskell); MacGillivray 1921: 289; Borchsenius 1966: 185; Wise 1977: 110.

Pseudaulacaspis cordylinidis (Maskell); Deitz & Tocker 1980: 35 [new comb.].

Anzaspis cordylinidis (Maskell) **new combination.**

Live appearance and habitat. Female scale elongate, more so when on *Cordyline* than on *Freycinetia*, *Phormium*, or *Uncinia*; scale cover white, terminal exuvia pale when on *Cordyline*, dark brown when on *Freycinetia*, *Phormium*, or *Uncinia*. Female body and eggs yellow. Male scale small, elongate, not carinated, white with pale terminal exuvium. On leaves of host plants.

Adult female measurements taken from 15 specimens (Fig. 135, 136). Body length 0.79–1.73 mm, width 0.34–0.63 mm. Median lobes (L1) yoked, most often rounded with small notches either side, more elongate with a narrow median cleft when on *Phormium* and *Uncinia* species; occasionally 1 pair of very fine setae discernible between median lobes; L2 bilobed, rounded, the lateral lobule smallest, L3 bilobed, rounded, or notched, lateral lobule sometimes a point. Marginal macroducts as for genus.

Submedian dorsal ducts smaller than marginal macroducts distributed 0–3 each side on segment VI lateral to anal opening and in short rows on V and IV, then either changing abruptly to much smaller ducts about the size of ventral microducts on anterior margin of IV and on III, or ducts remaining about the same size if present on IV and III. Submarginal ducts as for genus. Anal opening 12–17 μm , as long as wide, positioned 105–142 μm from posterior margin.

Ventral ducts, microducts, gland spines, and antennae as for genus. Anterior spiracles each with a group of 4–14 trilocular pores; posterior spiracles each with a few microducts associated. Perivular pores in 5 moderately elongate groups, a total of 67–95 pores on each female.

2nd-instar female nymph, measurements taken from 22 specimens (Fig. 137, 138). Body shape more oval and smaller than female, length 0.42–0.83 mm, width 0.23–0.4 mm; lobes and gland spines similar to female but smaller; 4 pairs of marginal macroducts.

Smaller dorsal ducts few, confined to body margin as far forward as mesothorax and extending onto venter. Anal opening round, 7–10 μm diameter, positioned about 40–60 μm from posterior margin.

Ventral microducts of 1 size, few, scattered on submedian abdomen, thorax, and on head. Antenna as for female. Anterior spiracles each with a group of 1–4 trilocular pores; posterior spiracles without pores.

2nd-instar male nymph, measurements taken from 14 specimens (Fig. 139). Body shape slightly less rounded than female nymph and head rather square, length 0.42–0.77 mm, width 0.23–0.31 mm; with usually 6 pairs of gland spines; L1 long, leaf-shaped or pointed; 5 pairs of marginal macroducts, smaller than dorsal ducts and actually opening on the ventral margin.

Dorsal ducts distributed submedially with 1 pair on pygidium VI opposite the anal opening and usually 1 pair each abdominal segments II–V, and in groups on submargin as far forward as mesothorax.

Ventral microducts of 1 size, scattered on median, submedian, and submargin of abdomen, near spiracles and on head. With a few gland tubercles on submargins of abdominal I and II, and near anterior spiracles. Antennae with 1 long seta and several short stubs. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

Remarks: The male nymph of *A. cordylinidis* possesses 1 pair of dorsal ducts on pygidium VI, whereas *A. gahniae* has 2 pairs there, a submedian and a submarginal duct each side; in addition, usually the antenna on *A. cordylinidis* has 1 long seta whereas the antenna on *A. gahniae* has 2 divergent long setae.

1st-instar nymph, measurements taken from 6 specimens (Fig. 140). Body shape oval, length 0.28–0.31 mm, width 0.15–0.18 mm. Pygidium with 3 pairs of lobes, each slightly notched, median lobes each with a basal sclerosis on inner margin; between the lobes a pair of setae, a pair of fine sclerotised protuberances, and 1 pair of long anal lobe setae. With 1 pair of long gland spines, extending at least 2 \times length of median lobes from margin.

With 2 pairs of submedian dorsal microducts, a large

pair on prothorax and a slender pair on mesothorax.

Ventral microducts with small tubercles on margin of abdominal segments I–IV and thorax. Antennae 5-segmented, with fine and fleshy setae, with a single terminal seta on apex. Legs and spiracles normal. Eyes on margin. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

Remarks: The 1st-instar nymph of *A. cordylinidis* differs from that of *A. gahniae* described below, in having 1 pair of gland spines 2 \times as long as the median lobes on the pygidium, and 1 pair each of large and small microducts on the dorsal thorax; on *A. gahniae* dorsal submedian ducts are absent and pygidial gland spines either not produced beyond margin or only <1.5 \times as long as the the median lobes. See under *A. angusta* above for comparison with that and 1st-instar nymphs of other species. As for *A. angusta* and *A. gahniae*, features of the 1st-instar nymph that differentiate it are also present in the 1st-exuvium of the scale covers, these proving a valuable aid to distinguish this species.

Type material examined. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, [no locality or date], labelled “*Mytilaspis cordylinidis* Maskell, ex Maskell’s dry material #9, mounted by JdeB, 28 vi 1968; remounted RCH 2009”, [1]: 1 F. Barcode NZAC02008349 (NZAC). **Paralectotypes:** (i) as above, [4]: 4 F; (ii) as above except not remounted by RCH 2009 [3]: 8 F, 6 exuv2, 4 exuv1; (iii) on an original slide labelled “*Mytilaspis cordylinidis*, from *Cordyline*, Puparium and young insect, June 1877, W.M.M.”, [1]: adult female scale cover with intact exuv2 and exuv1, plus 1 1st-instar crawler (NZAC). Note. The female lectotype is selected from material of Maskell’s dry collection #9 subsequently mounted by J. A. de Boer in 1968, because the sole remaining original Maskell slide contains a 1st-instar nymph and a scale cover with its 1st- and 2nd-exuvia, neither of which are considered suitable as the lectotype, although they are valuable for the 1st-instar features described above. Maskell’s introduction to his description of *Mytilaspis cordylinidis* states that “It is perhaps more abundant on the cabbage tree (*Cordyline australis*) than on others; hence I have named it as above”. It is appropriate to honour his intention and reserve the name for the species now understood to prefer feeding on *Cordyline* species. One other Maskell original slide, from *Gahnia*, has been assigned to the new species *A. gahniae* described below.

Other material examined. See Appendix A (p. 221) for details of 352 specimens examined.

Distribution. AK, GB, HB, TO, WN / NN, WD, MC, DN

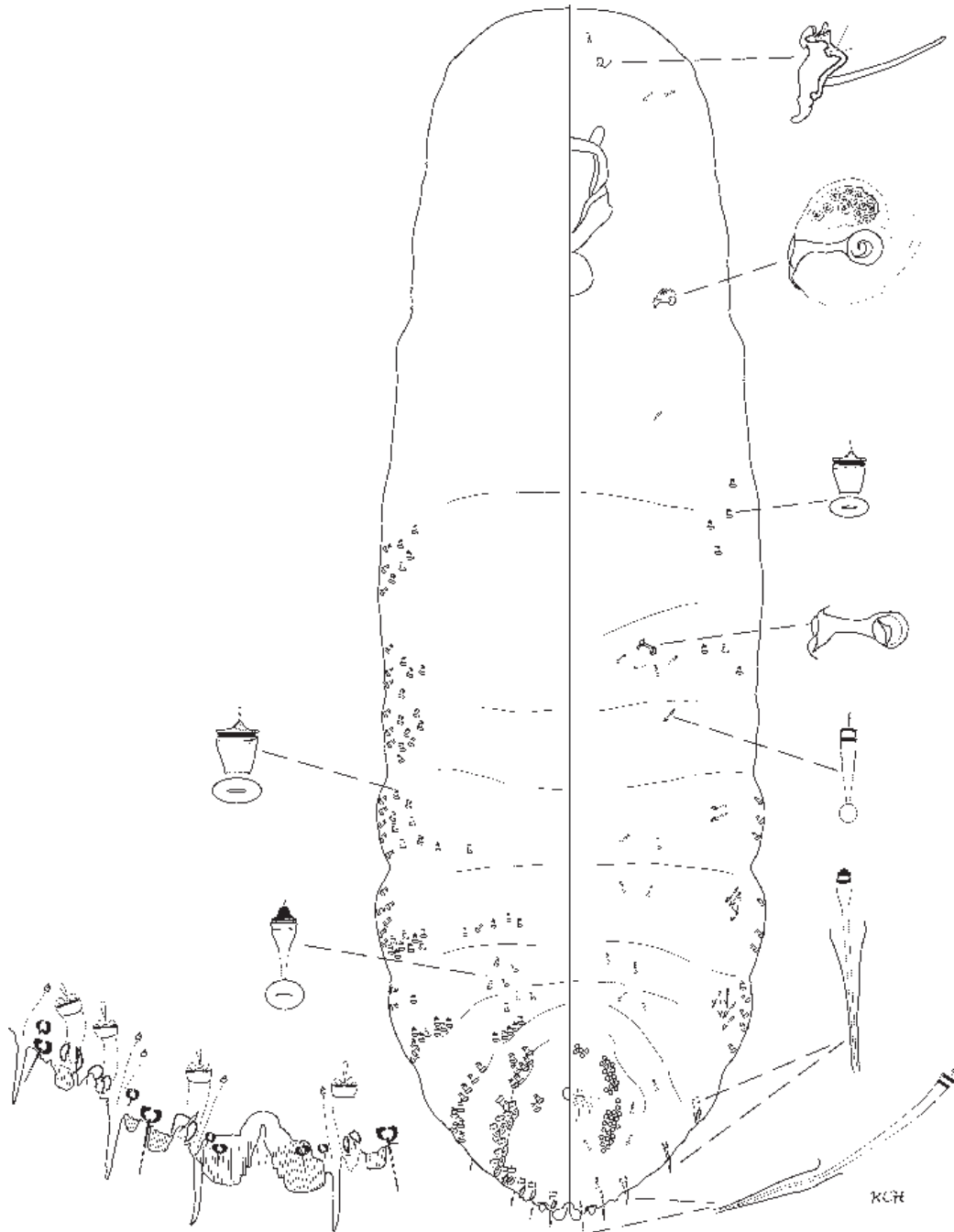


Fig. 135 *Anzaspis cordylinidis* (Maskell), adult female, from type material.

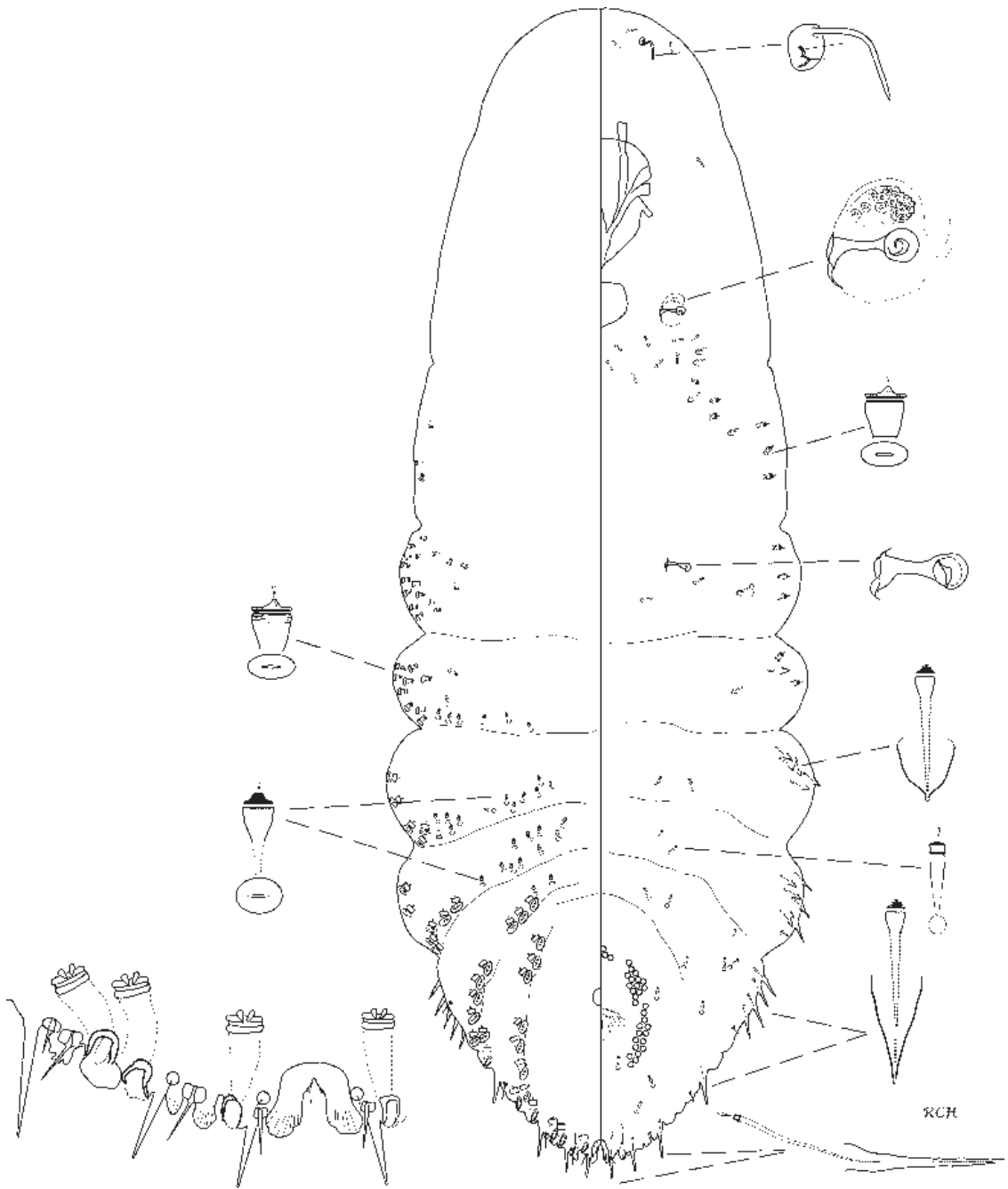


Fig. 136 *Anzaspis cordylinidis* (Maskell), adult female, from on *Uncinia*.

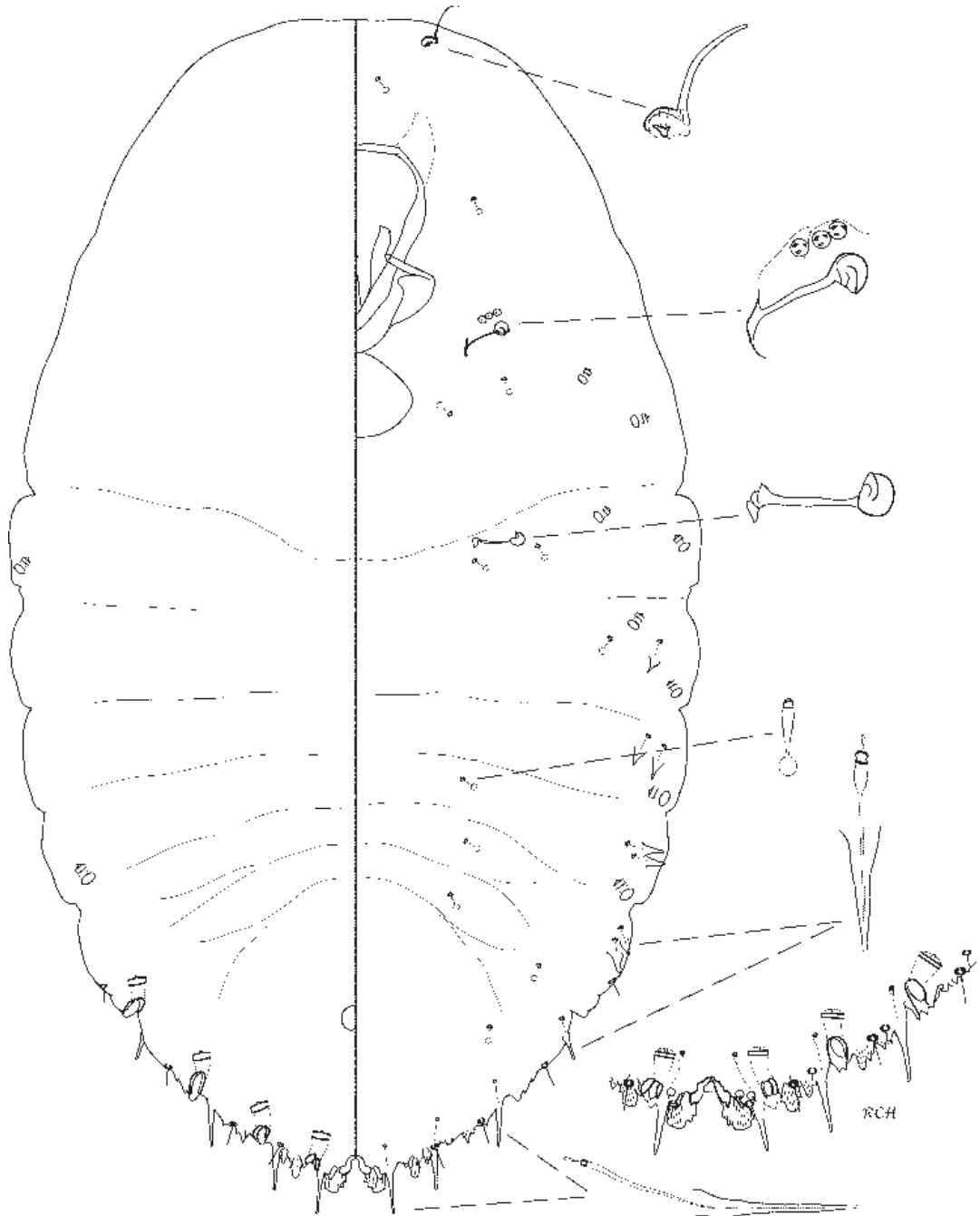


Fig. 137 *Anzaspis cordylinidis* (Maskell), 2nd-instar female nymph, from on *Cordyline*.

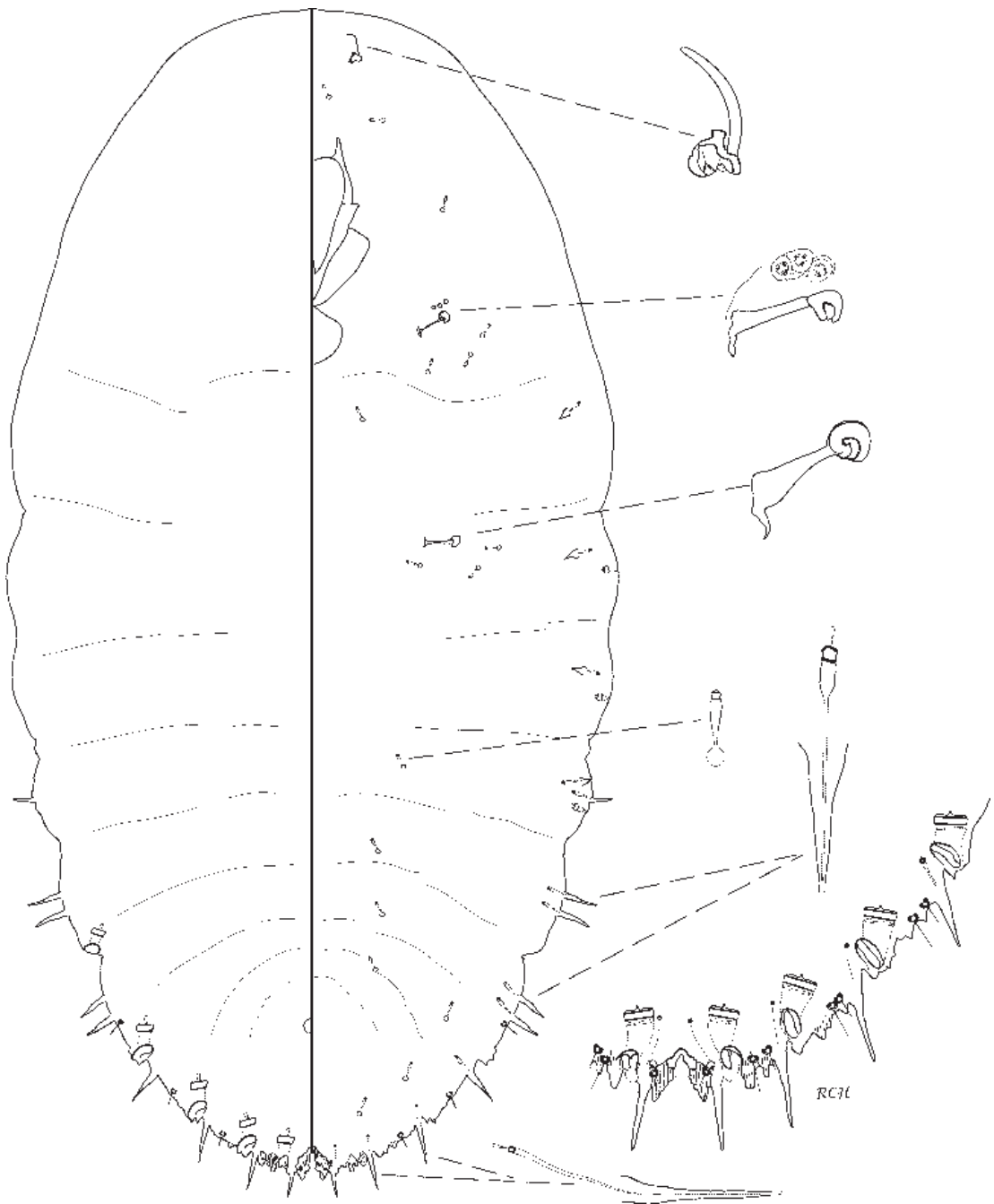


Fig. 138 *Anzaspis cordylinidis* (Maskell), 2nd-instar female nymph, from on *Freycinetia*.

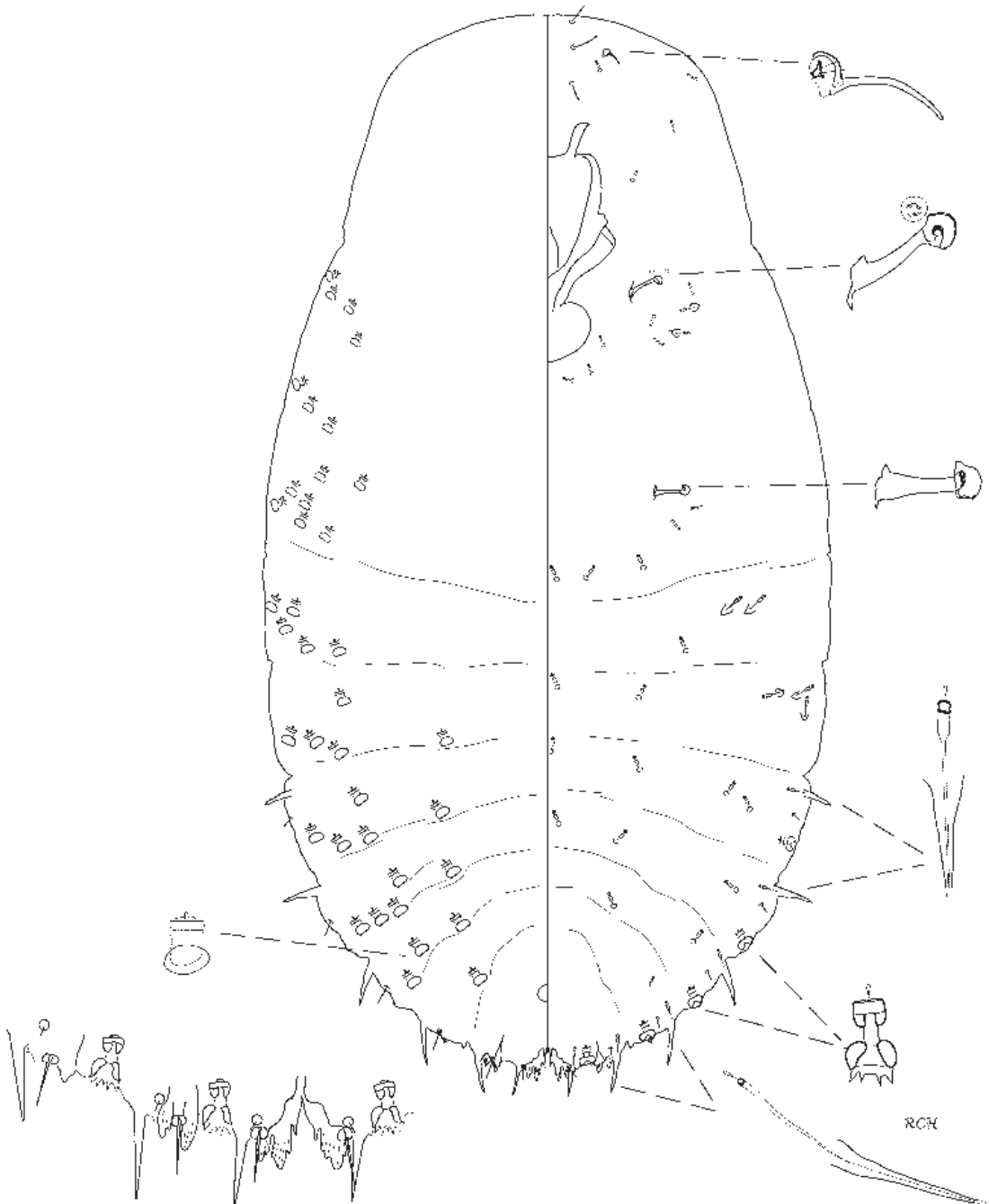


Fig. 139 *Anzaspis cordylinidis* (Maskell), 2nd-instar male nymph.

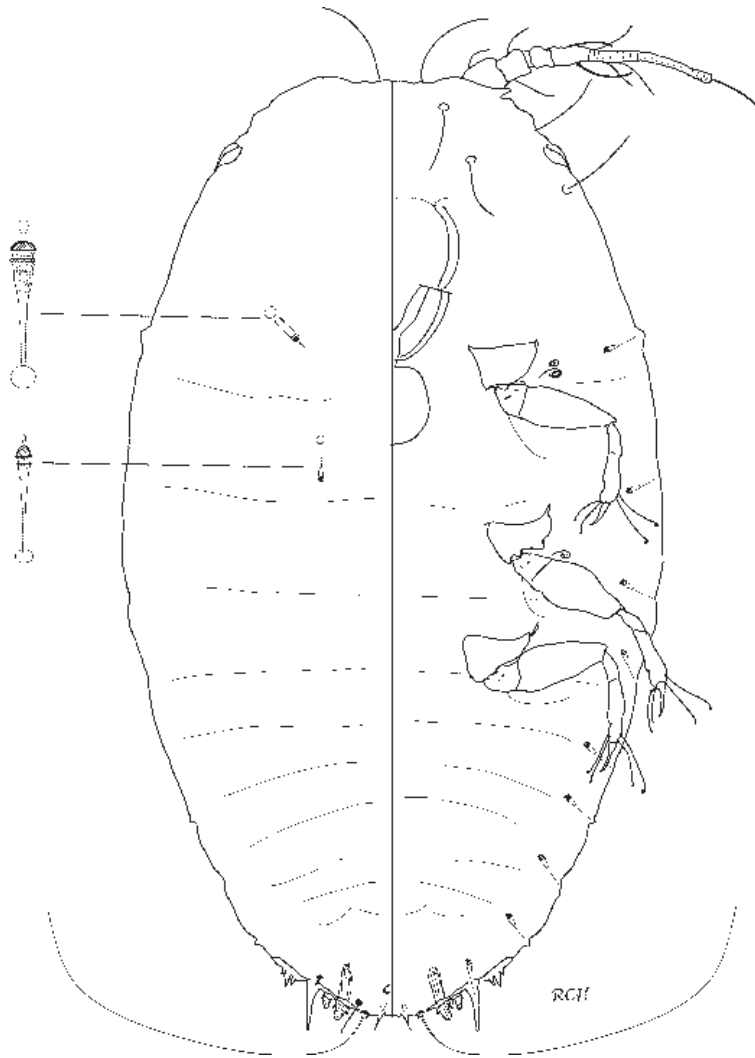


Fig. 140 *Anzaspis cordylinidis* (Maskell), 1st-instar nymph.

Host plants. Agavaceae: *Cordyline australis*, *C. fruticosa*, *C. indivisa*, *C. obtecta* [as *kaspar*], *Cordyline* sp., *Phormium cookianum*, *P. tenax*, *Phormium* sp.?; Arecaceae: palm, *Rhopalostylis sapida*; Cyperaceae: *Uncinia* sp.; Pandanaceae: *Freycinetia banksii*.

Anzaspis gahniae Henderson new species **E gahniae**
scale

Fig. 24–28, 141–144; Map 6

Live appearance and habitat. Similar to *A. cordylinidis*, except not with dark brown exuvia and restricted to the leaves of *Gahnia* species.

Adult female, measurements taken from 22 specimens (Fig. 141). Body length 0.67–1.65 mm, width 0.29–0.58 mm. Median lobes (L1) yoked, small, triangular and pointed, or more elongate, with small notches either side, with a narrow median cleft, without very fine setae discernible between median lobes; L2 and L3 bilobed, pointed, the lateral lobule of each smallest, notched or toothed, L3 lateral lobule sometimes a point. Marginal macroducts as for genus.

Submedian dorsal ducts smaller than marginal macroducts distributed 0–3 each side on segment VI lateral to anal opening and in short rows on V and IV, a few ducts on III and sometimes also on II. Submarginal ducts as for genus. Anal opening 12–17 µm, as long as wide, positioned 115–135 µm from posterior margin.

Ventral ducts, microducts, gland spines, and antennae as for genus. Anterior spiracles each with a group of 7–11 trilocular pores; posterior spiracles with a few associated microducts. Total of 44–91 perivular pores in 5 moderately elongate groups.

2nd-instar female nymph, measurements taken from 6 specimens (Fig. 142). Body shape similar to female but smaller, length 0.45–0.89 mm, width 0.21–0.36 mm; lobes and gland spines similar to female but smaller; 4 pairs of marginal macroducts; without pairs of small ducts on metathorax and abdominal segments I and II. Anal opening 57–65 µm from posterior margin.

Ventral microducts of 3 sizes: (i) smallest very fine, associated with the 3 pairs of pygidial gland spines lateral to median lobes; (ii) intermediate size distributed as 2–3 pairs on submarginal pygidium, segmental submedian abdominal pairs, scattered near each spiracle and on head, and associated with gland tubercles; (iii) larger microducts associated with abdominal gland spines. Antenna as for female. Anterior spiracles each with a group of 2–4 trilocular pores.

2nd-instar male nymph, measurements taken from 7 specimens (Fig. 143). Young male nymph body shape more

rounded than female nymph, but becoming more elongate as it develops, length 0.5–0.76 mm, width 0.28–0.36 mm. Pygidium margin somewhat scalloped, with usually 4 pairs of long gland spines, sometimes with additional short gland spines on abdominal margin; with 2 pairs of lobes, L1 with small notches, L2 bilobed, L3 not produced.

Marginal macroducts numbering 5 pairs, each with a strongly sclerotised opening, actually opening on ventral margin; dorsal ducts distributed submedially with 1 pair on pygidium VI opposite the anal opening and 1–2 pairs on abdominal segments II–V; on submargin, notably 1 pair on pygidium VI, usually 1 pair on segment V, then groups of 3 or more on each side of each segment and decreasing in size to as far forward as mesothorax. Anal opening 30–32 µm from posterior margin.

Ventral microducts of 1 size, associated with gland spines on pygidium and abdomen and with gland tubercles further forward to mesothorax; 1 pair microducts on submargin of abdominal segments III–VI, in a paired submedian line from metathorax to abdomen segment V and singly on median of each segment; with a few microducts scattered near each spiracle, the mouthparts and on head. Antennae with 2 long divergent setae and a complex of short setae or stubs. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Anterior spiracles each with a group of 1–2 trilocular pores.

For differences with *A. cordylinidis* male nymph see *cordylinidis* above..

1st-instar nymph, measurements taken from 5 specimens (Fig. 144). Body shape elongate-oval or lozenge-shaped, length 0.43–0.75 mm, width 0.22–0.35 mm. Pygidium with 1 pair of very short lobes, each with a basal sclerosis on inner margin, and faint representation of 2nd lobes laterally; between the median lobes a pair of minute protuberances and setae, a moderately long dorsal seta, and the pair of long anal lobe setae; gland spines either present as short projections on the margin or <1.5× length of median lobes. Dorsal submedian thoracic microducts absent.

Ventral microducts with small tubercles on margin of abdominal segments II–IV, and with a submarginal microduct each side of meta-, meso- and prothorax; a slightly larger tubercle and microduct lateral to each median lobe on pygidium. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae notably oriented forwards from anterior margin, 5-segmented, with fine and fleshy setae, with a single terminal seta on apex. Legs and spiracles normal. Eyes on margin.

Remarks. For comparison with *A. angusta* and *A. cordylinidis* see *A. angusta* and *A. cordylinidis* above. Features of the 1st-instar nymph that differentiate it from

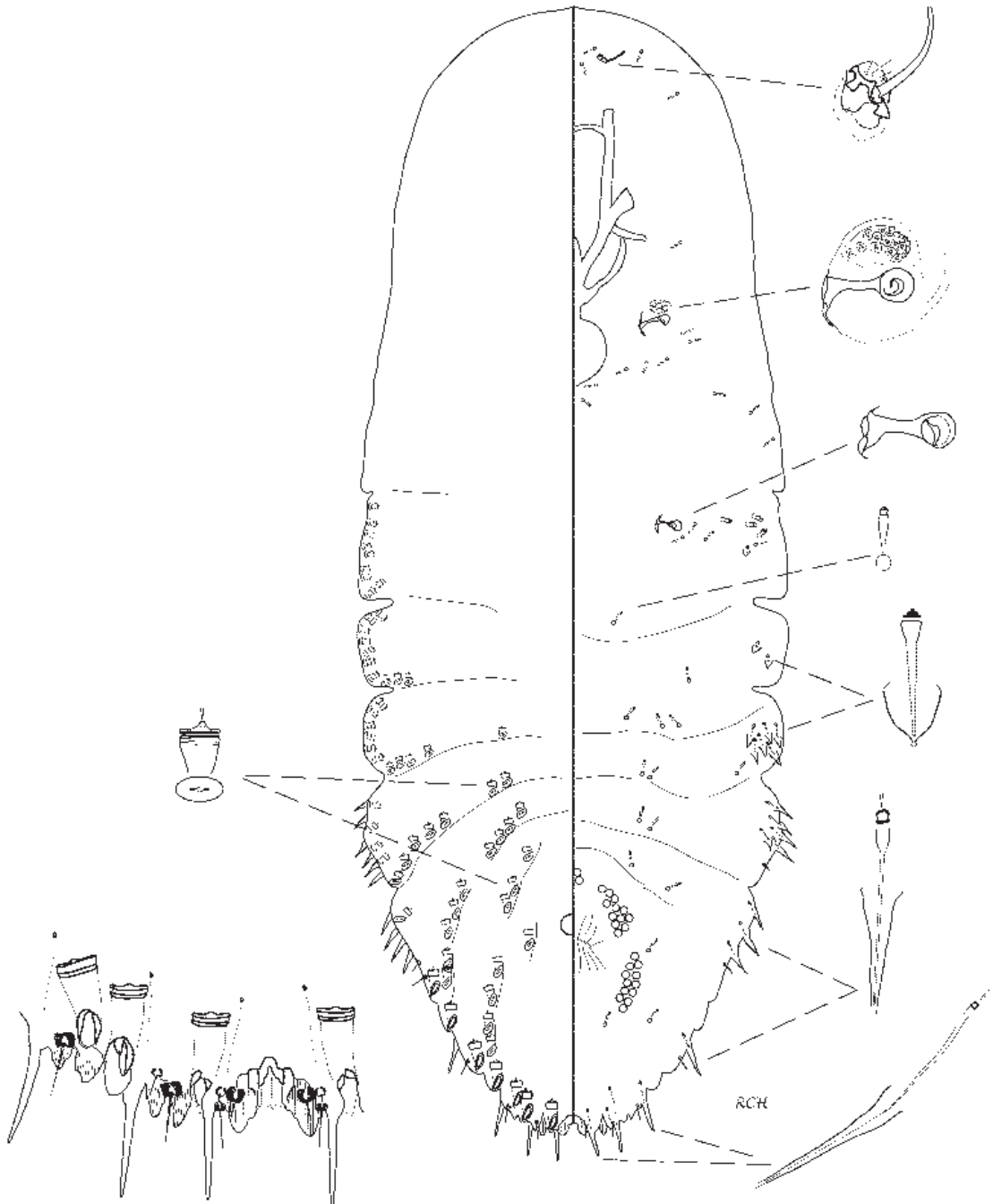


Fig. 141 *Anzaspis gahniae* Henderson n. sp., adult female.

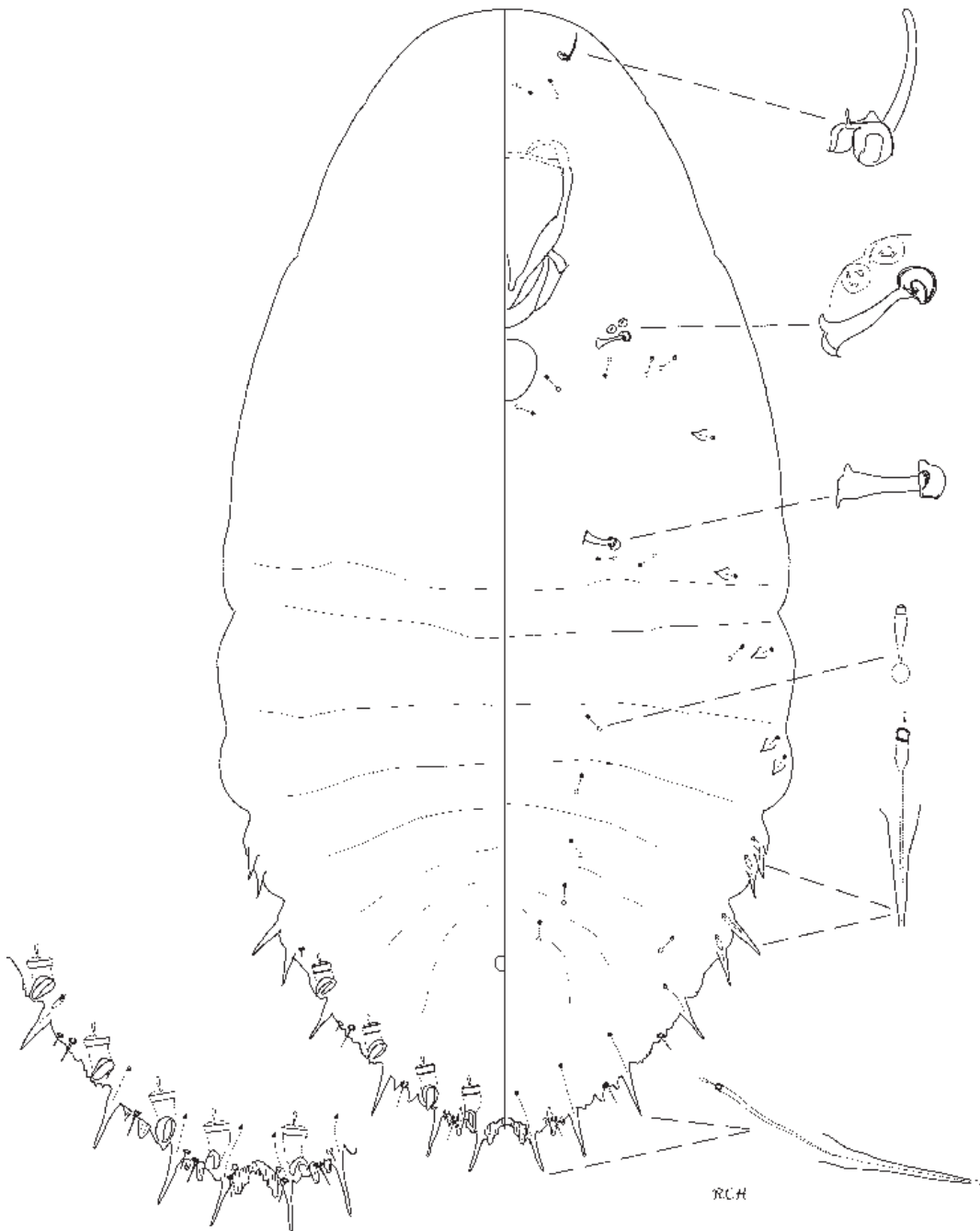


Fig. 142 *Anzaspis gahniae* Henderson n. sp., 2nd-instar female nymph.

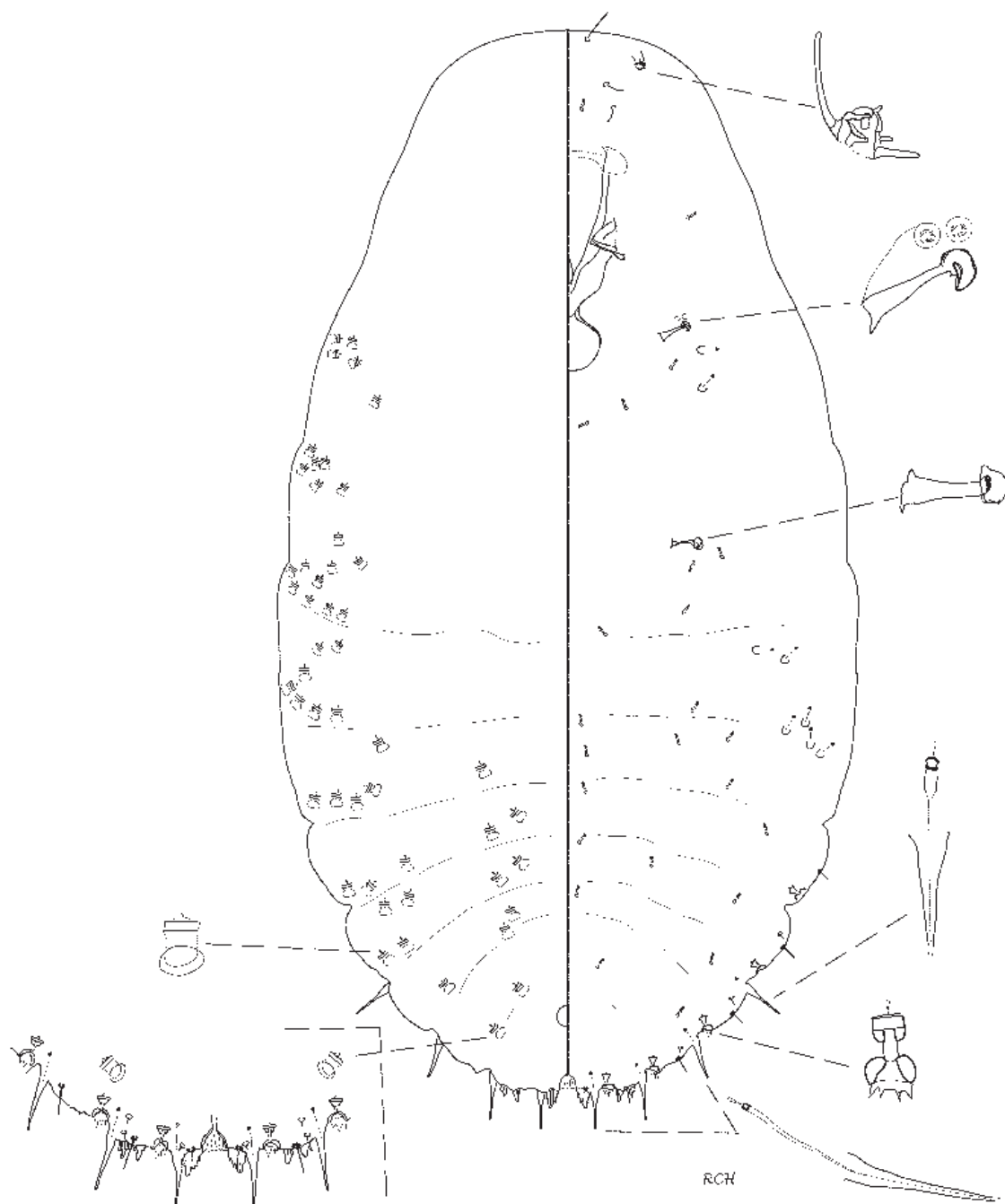


Fig. 143 *Anzaspis gahniae* Henderson n. sp. 2nd-instar male nymph.

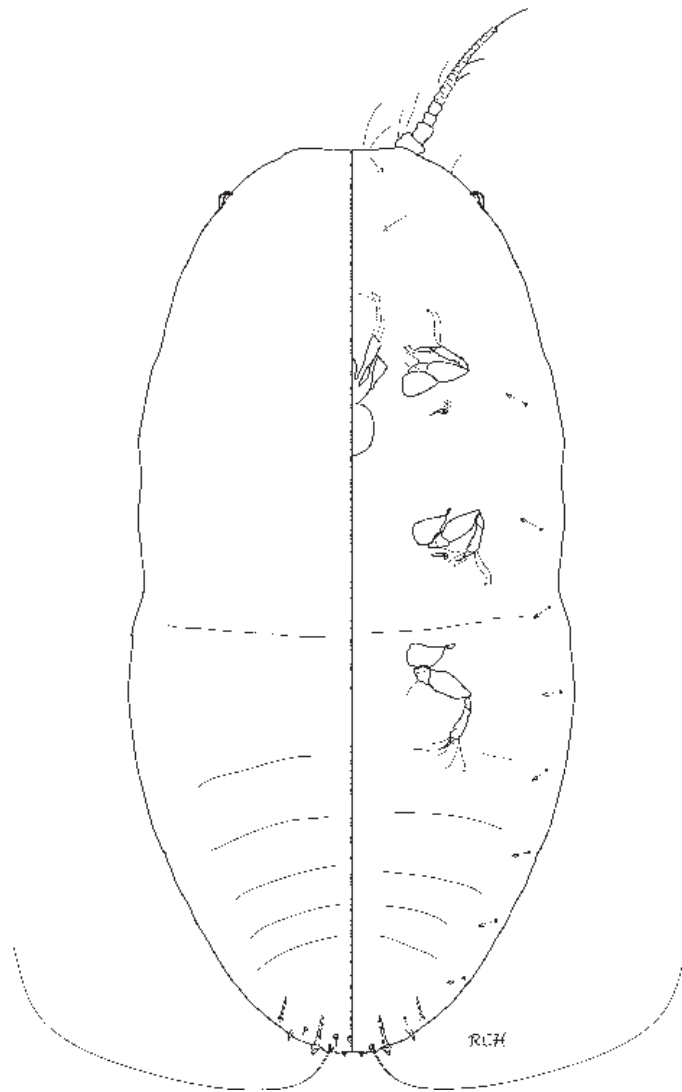


Fig. 144 *Anzaspis gahniae* Henderson n. sp., 1st-instar nymph.

these 2 species are also present in the 1st-exuvium of the scale covers.

Type material examined. HOLOTYPE female: NEW ZEALAND, AK, Muriwai, Houghtons Bush, 16 Aug 2003, RC Henderson, *Gahnia lacera*, underside leaves, #03-111a [1]: 1 F. Barcode NZAC02001927 (NZAC). **Paratypes:** collection data as above, #03-111b–k, [10] 2 M, 2P, 7 F, 7 f2nd, 2m2nd, 2 1sts, 8 exuv1 (NZAC).

Other material examined. See Appendix A (p. 221) for details of 153 specimens examined.

Distribution. ND, AK, BP / BR

Host plants. Cyperaceae: *Gahnia lacera*, *G. pauciflora*, *G. procerata*, *Gahnia* sp.

Etyymology. the species is named after its host plant genus *Gahnia*.

Genus AONIDIELLA Berlese & Leonardi

Aonidiella Berlese & Leonardi, 1896: 77.

Type species: *Aonidiella aurantii* Maskell, by monotypy.

Aonidiella aurantii (Maskell) A California red scale

Fig. 29–30, 145; Map 7

Aspidiotus aurantii Maskell, 1879:199.

Aspidiotus coccineus Gennadius, 1881: 189; Maskell 1884: 120; 1887: 42; Kirk & Cockayne 1909: 276.

Chrysomphalus aurantii (Maskell); Cockerell 1899: 396; Myers 1922: 201.

Aonidiella aurantii (Maskell); Berlese 1895: 83; Fernald 1903: 288; Cottier 1956: 320; Borchsenius 1966: 292; Wise 1977: 113; Deitz & Tocker 1980: 33; Charles & Henderson, 2002: 595; Miller & Davidson 2005: 50.

Live appearance and habitat. Female scale circular, flat, translucent yellow-brown with subcentral exuvia. Male scale smaller, elongate-oval with exuvia near 1 end. Body of young female pale yellow, becoming red-brown with maturity. Settled 1st-instar nymph an aspidiotine ‘white cap’. On all aerial parts of the tree including the fruit.

Diagnosis. Adult female (Fig. 145) with expanded prosoma, giving a reniform shape, and becoming sclerotised when mature. With 3 pairs of lobes, not bilobed, with fringed plates between them and lateral to L3. Ducts 1-barred, long and slender, in pore furrows on pygidium. Prevulvar scars (apophyses and scleroses) present and of distinctive shape. Perivulvar pores absent.

Material examined. See Appendix A (p. 222) for details of 152 specimens examined.

Distribution. ND, AK, BP, GB, HB, WI / NN, DN

Host plants. Actinidiaceae: *Actinidia deliciosa*; Orchidaceae: *Cypripedium* sp.; Rosaceae: *Malus domestica*; Rutaceae:

Citrus x tangelo, *C. grandis*, *C. limon*, *C. paradisi*, *C. reticulata*, *C. sinensis*, *Citrus* sp.; Salicaceae: *Salix humboldtiana*, *S. x reichardtii*; Verbenaceae: *Vitex lucens*.

Remarks. California red scale is a pest of citrus orchards in all major citrus-producing areas of the world (Williams & Watson 1988). In New Zealand it is common in the warmer parts of the North Island, but is usually only a minor pest in well managed orchards (Charles & Henderson 2002).

Genus ASPIDIOIDES MacGillivray

Aspidioides MacGillivray, 1921: 387.

Type species: *Aspidiotus corokiae* Maskell, by original designation.

Aspidioides corokiae (Maskell) E

Fig. 146; Map 8

Aspidiotus corokiae Maskell, 1891: 2; Fernald 1903: 255; Ferris 1937: 50; 1941: 42.

Aspidioides corokiae (Maskell); MacGillivray 1921: 406; Borchsenius & Williams 1963: 385; Borchsenius 1966: 276; Wise 1977: 113; Deitz & Tocker 1980: 35.

Live appearance. “Female puparium [scale cover] circular, rather solid, slightly convex, with the pellicles [exuvia] in the centre; colour varying from yellow to (less frequently) white, pellicles yellow. Male puparium rather more elongated than that of the female, not carinated; texture thinner; colour whitish; pellicle yellow, near the middle” (Maskell 1891).

Adult female, measurements taken from 9 females slide-mounted from Maskell dry material by J.A. de Boer, plus additional material (Fig. 146). Body shape almost circular to roundly ovate, length 0.62–1.05 mm, width 0.52–0.92 mm. Pygidium rounded, the median lobes together forming a pointed apex, not yoked, each median lobe with a well developed basal sclerosis; with fringed plates and 3 pairs of single lobes; L1 almost parallel-sided, the distal margins distinctively notched into a wavy line, L2 with one distal notch, L3 small, ovoid, sometimes notched. With 2 slender plates in medial space, 2 moderately slender plates between L1 and L2, 1 small plate and 2 wider plates between L2 and L3, laterally plates less distinct; each plate with longer tines medially and short tines laterally.

Dorsal ducts numerous, distributed in a broad submarginal band across pygidium, becoming fewer towards anterior abdomen, all of similar size and shape, 1-barred, slender, about 25 µm long, with lunate openings, those on the margin numbering about 8 pairs, each with a small sclerotised lunate opening. Anal opening oval, about 25 µm long and 17.5 µm wide, positioned 40–52 µm from posterior margin.

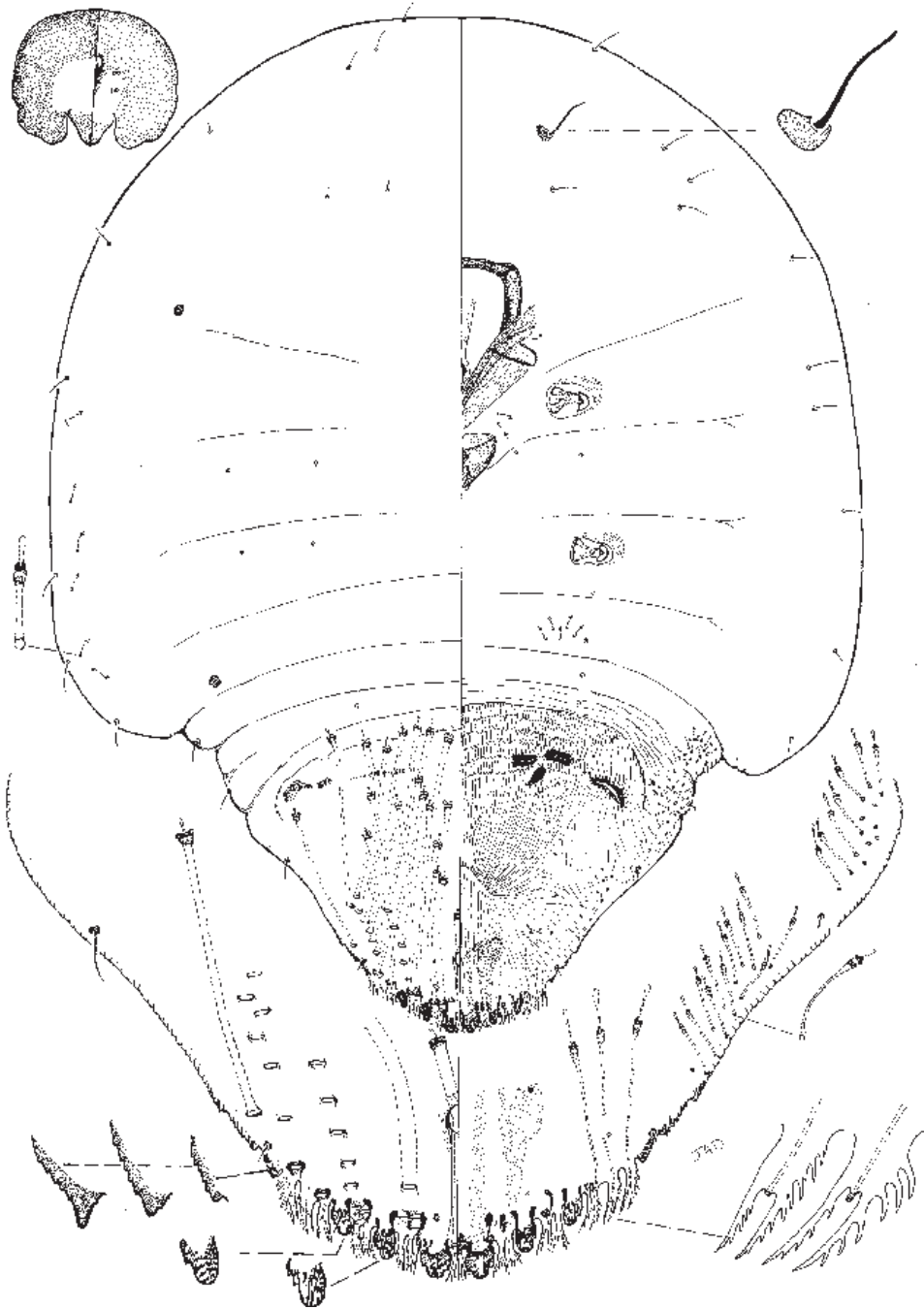


Fig. 145 *Aonidiella aurantii* (Maskell), adult female (from Miller & Davidson 2005).

Ventral microducts <15 µm long on pygidial margin when associated with fringed plates, shorter when on abdominal submargin and scattered on abdomen, thorax, and head. Antennae with a single long seta, sometimes with an additional small seta. Anterior spiracles without pores. Perivular pores very few, a total of 0–8 pores in 2–4 groups, with associated ventral sclerotised bars forming a line each side to near margin of pygidium. Vulva positioned 100–125 µm from margin, anterior to position of dorsal anal opening.

Type material examined. LECTOTYPE female, here designated to preserve nomenclatural stability: NEW ZEALAND, BR, on an original slide labelled “*Aspidiotus corokiae*, male puparium and adult female, Apr. 1890, W.M.M.”, [1]: 1 F, male scale cover. Barcode NZAC02000399. The female is good, unstained, and slightly cleared. The 1st-exuvium on the scale cover lacks detail. (NZAC). **Paralectotypes**, mounted by J.A. de Boer from Maskell dry material of *Aspidiotus corokiae*, [2]: (i) 6 F, (ii) 3 F, m2nd [pale, pharate pp], 1 exuv2, 1 exuv1 (NZAC).

Other material examined. See Appendix A (p. 222) for details of 53 specimens examined.

Distribution. — / NN, BR, MC, MK

Host plants. Cornaceae: *Corokia cotoneaster*; Rubiaceae: *Coprosma cheesemanii*; Scrophulariaceae: *Hebe* sp. [as ‘Veronica’]; Thymeliaceae: *Pimelea prostrata*, *Pimelea* sp.

Remarks. Compared to the type series specimens measured above, in other material examined (Appendix A, p. 222) the number and distribution of perivulvar pores varies widely in different collection localities. Perivulvar pores are totally absent in all of the females from Lake Sylvester on *Coprosma cheesemanii*, but in a second collection from Lake Sylvester where no host was recorded, 1 female has a total of 18 pores in 4 groups whereas the other 3 females each have 16–21 pores in 5 groups; the 15 females from Cass each have a total of 21–36 pores in 5 normal groups, likewise the female from Springfield and the female from between Lakes Pukaki and Tekapo have 25 and 32 pores respectively in 5 groups. In all other respects the female morphology from these various collections agrees with the type material.

Genus *ASPIDIOTUS* Bouché

Aspidiotus Bouché, 1833: 52.

Type species: *Aspidiotus nerii* Bouché; subsequently designated by Leonardi 1897: 285.

Aspidiotus nerii Bouché A oleander scale

Fig. 7, 31–32, 147; Map 9

Chermes hederæ Vallot, 1829: 30; Ben-Dov & Matile-Ferrero 1999 [nomen dubium, erroneous attribution]

Aspidiotus nerii Bouché, 1833: 52; Maskell 1882: 217; 1887: 44; Borchsenius 1966: 261; Wise 1977: 112; Charles & Henderson 2002: 595; Miller & Davidson 2005: 78.

Aspidiotus epidendri Bouché, 1844: 293; Maskell 1879: 197; 1887: 44.

Aspidiotus budleiae Signoret, 1869a: 115; Maskell 1879: 198; 1887: 40; 1895: 2.

Aspidiotus atherospermae Maskell, 1879: 198; Deitz & Tocker 1980:33.

Aspidiotus dysoxyli Maskell, 1879: 198; Henderson 2001: 89.

Aspidiotus sophoræ Maskell, 1884: 121; Deitz & Tocker 1980: 42.

Aspidiotus carpodeti Maskell, 1885: 21; 1887: 41; Lidgett 1902: 44; Deitz & Tocker 1980: 34.

Aspidiotus hederæ (Vallot); Fernald 1903: 260; Ward 1968: 50 [for *A. nerii*].

Live appearance and habitat. Female scale cover approximately circular and exuvia either more or less central or towards one side, the scale cover nearly always translucent with pale yellow female body showing through, but cover may be more opaque beige-brown on different host plants. Male scale cover, when present, elongate oval with pale exuvia towards one end. Settled 1st-instar nymphs are ‘white caps’, this white dot remaining on the exuvia of young adult female scale covers for some time. Most often on leaves and may be found on the trunk, branches, and fruits of host plants. Charles & Henderson (2002) reported *A. nerii* from 19 species of native plants in 16 families, these records dating from the 19th century (Maskell 1879). The updated list below has more than doubled these host plant records.

Diagnosis. Adult female (Fig. 147) body approximately circular with oval, pointed pygidium margin at posterior end; body membranous except for lightly sclerotised pygidium. With 3 pairs of lobes, the median lobes not yoked, each with a distinctive basal sclerosis extending onto venter, at least as long as distal part of lobes; L1 slightly notched either side, with rounded apex, L2 and L3 not bilobed, similar in shape to L1 but much smaller. Without heavily sclerotised paraphyses between L1-L2 and L2-L3. Plates longer than lobes, fimbriate, with about 5 plates lateral to L3, then some smaller, simple projections.

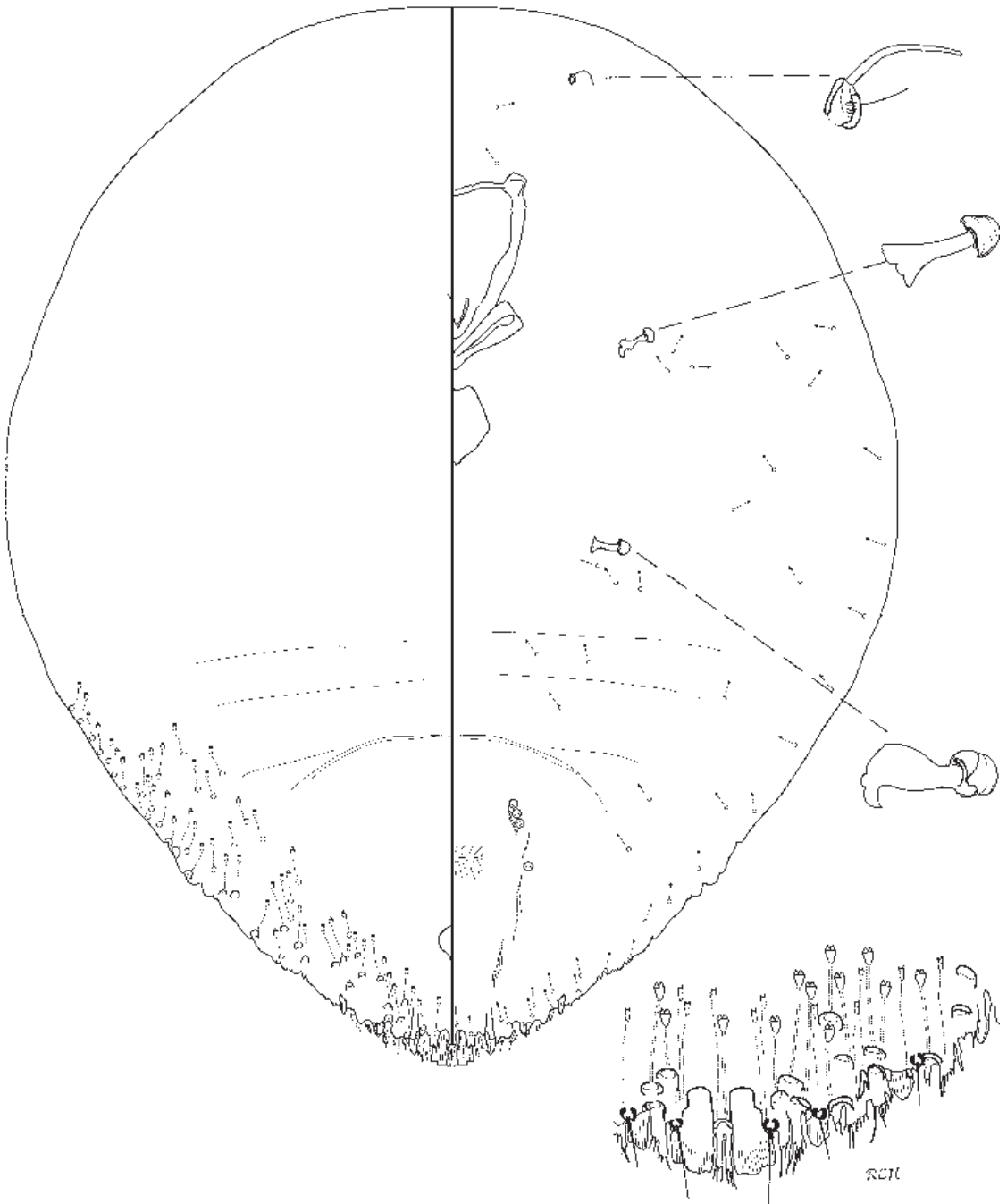


Fig. 146 *Aspidioides corokiae* (Maskell), adult female.

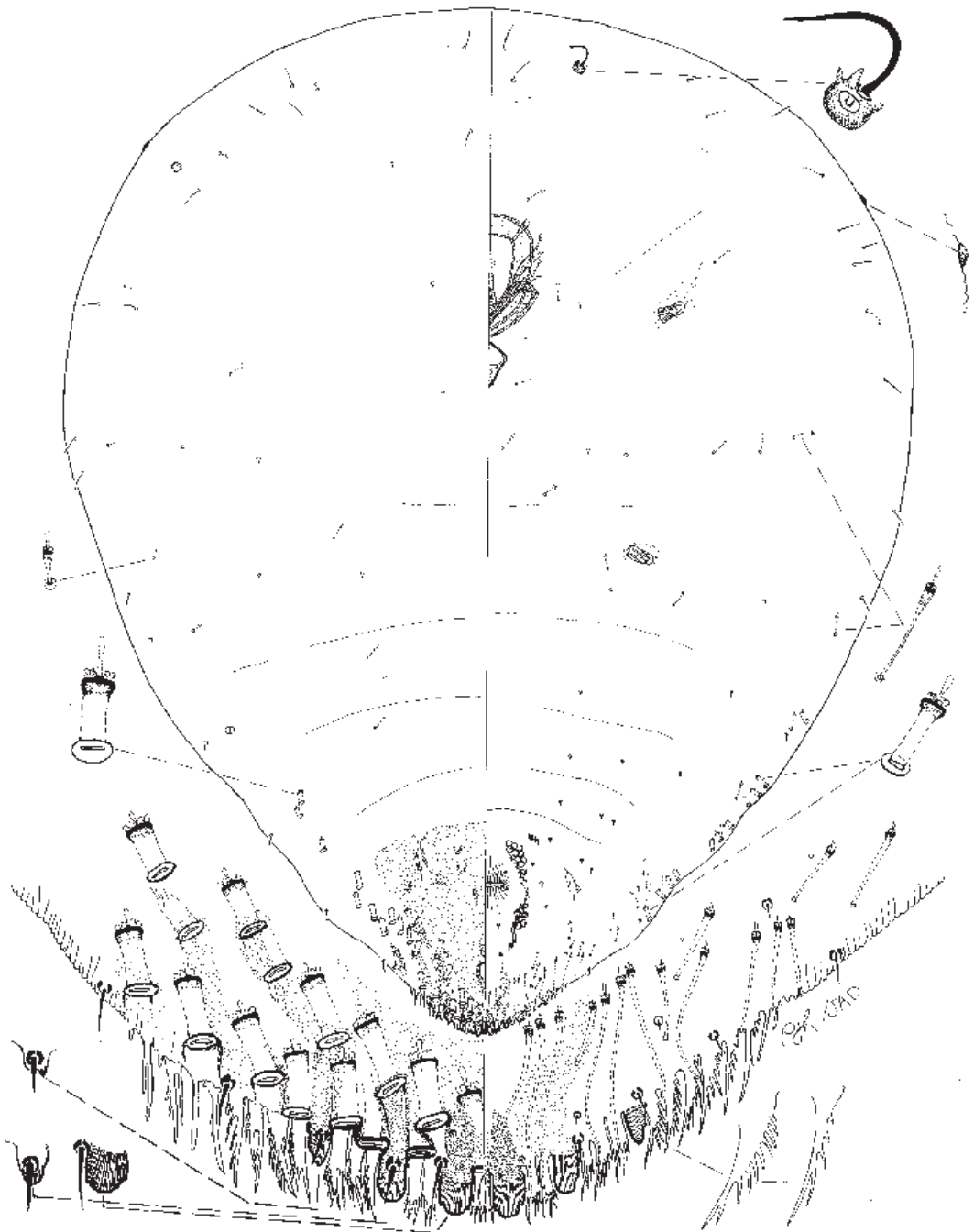


Fig. 147 *Aspidiotus nerii* Bouché, adult female (from Miller & Davidson 2005).

Dorsal macroducts 1-barred, short and wide, present in a band about 2 ducts wide on pygidium margin-submargin, absent submedially; with a few smaller dorsal ducts on prepygidial submargins, and a series of even smaller ducts with their openings aligned to the prepygidial margin present to segment II. Anal opening positioned near posterior 1/3 of pygidium.

Ventral microducts few, scattered, always with 1, sometimes 2, microducts within area of fine dermal granulation by each anterior spiracle. Antenna with 1 seta. Perispiracular pores absent. Perivulvar pores in 4–5 groups, a few pores present or absent in median group, the 2 lateral groups aligned with a strongly sclerotised bar on each side.

Material examined. See Appendix A (p. 222) for details of 569 specimens examined.

Distribution. ND, AK, CL, WO, BP, GB, HB, WI, RI, WA, WN / SD, NN, MB, KA/NC, MC, SC, DN / CH

Host plants. I. on **adventive** plants: Actinidiaceae: *Actinidia deliciosa*; Agavaceae: *Furcraea* sp.; Araliaceae: *Aralia* sp., *Fatsia japonica*, Arecaceae: *Hedyscepe canterburyana*, *Howea forsteriana*, palm, *Phoenix canariensis*, *Seaforthea* sp.; Berberidaceae: *Berberis glaucocarpa*; Buxaceae: *Buxus sempervirens*; Cornaceae: *Aucuba japonica*; Cucurbitaceae: *Cucurbita* sp.; Cycadaceae: cycad; Ebenaceae: *Diospyros kaki*; Ericaceae: *Arbutus menziesii*, *Erica lusitanica*, *Rhododendron* sp.; Fabaceae: *Chamaecytisus palmensis*, *Ulex europaeus*; Fagaceae: *Quercus* sp.; Garryaceae: *Garrya elliptica*; Grossulariaceae: *Ribes nigrum*, *R. rubrum*, *Ribes* sp.; Iridaceae: evergreen iris; Liliaceae: *Aspidistra* sp., *Ophiopogon japonicus*; Malvaceae: *Asterotrichion discolor*; Moraceae: *Ficus benjamina*; Oleaceae: *Osmanthus fortunei*; Orchidaceae: *Cymbidium* sp., *Dendrobium* sp.; Proteaceae: *Grevillea alpina*, *Hakea* sp., *Macadamia* sp.; Rosaceae: *Prunus laurocerasus*; Rutaceae: *Citrus limon*, *Coleonema pulchellum*; Taxaceae: *Taxus baccata*; Vitaceae: *Vitis vinifera*, *Vitis* sp.

II. on **native and endemic** plants: Agavaceae: *Cordyline australis*, *C. banksii*; Agavaceae: *Phormium tenax*; Alseuosmiaceae: *Alseuosmia macrophylla*; Apocynaceae: *Parsonsia* sp.; Araliaceae: *Meryta sinclairii*, *Pseudopanax arboreus*, *P. ferox*, *P. laetus*, *Pseudopanax* sp., *Schefflera digitata*; Arecaceae: *Rhopalostylis baueri*, *R. sapida*; Asteraceae: *Brachyglottis repanda*, *Olearia furfuracea*; Corynocarpaceae: *Corynocarpus laevigatus*; Elaeocarpaceae: *Aristotelia serrata*; Griselinaceae: *Griselinia lucida*; Grossulariaceae: *Carpodetus serratus*; Liliaceae: *Astelia grandis*; Loganiaceae: *Geniostoma rupestre*; Malvaceae: *Hoheria sexstylosa*, *Plagianthus divaricatus*; Meliaceae: *Dodonaea viscosa*, *Dysoxylum spectabile*; Monimiaceae: *Laurelia novae-zelandiae*; Moraceae: *Streblus heterophyllus*, *S. smithii*; Myoporaceae:

Myoporum laetum; Oleaceae: *Nestegis* sp.; Pittosporaceae: *Pittosporum eugenioides*, *Pittosporum* sp.; Podocarpaceae: *Halocarpus kirkii*; Proteaceae: *Knightia excelsa*; Rhamnaceae: *Pomaderris apetala*; Ripogonaceae: *Ripogonum scandens*; Rubiaceae: *Coprosma foetidissima*, *C. grandifolia*, *C. macrocarpa*, *C. robusta*, *C. spathulata*; Rutaceae: *Melicope simplex*; Sapindaceae: *Alectryon excelsus*; Sapotaceae: *Pouteria costata*; Scrophulariaceae: *Hebe* sp.; Urticaceae: *Urtica ferox*; Verbenaceae: *Vitex lucens*; Violaceae: *Melicytus ramiflorus*; Viscaceae: *Korthalsella clavata*, *K. lindsayi*, *K. salicornioides*.

Remarks. Oleander scale is a significant pest of kiwifruit, other fruit crops, and indoor and outdoor ornamental plants (Charles & Henderson 2002). It is mostly uniparental (parthenogenetic) with 2 major overlapping generations a year. Biparental populations are occasionally found (Charles & Henderson 2002). For a comparison of the female pygidia of *A. nerii* and 5 other common pest species see Fig. 6–11.

Genus AULACASPIS Cockerell

Aulacaspis Cockerell, 1893: 180.

Type species: *Aspidiotus rosae* Bouché. Subsequent designation by Newstead, 1901: 168.

The genus in New Zealand includes 2 species, *A. rosae* (Bouché) and *A. rosarum* Borchsenius. Their main features are a swollen prosoma, the median lobes recessed into the pygidium margin forming a notch, without 1 pair of setae in the medial space; L2 and L3 bilobate, with a slender basal sclerosis on each medial lobule of L2. Microducts scattered around submargins of body including head. Dorsal setae 2-barred, arranged in short submedian and submarginal rows. Abdominal lateral lobes produced, with marginal gland spines, but these only as far forward as segment II. Both anterior and posterior spiracles have numerous perispiracular trilocular pores. Antenna with 1 stout seta.

Key to *Aulacaspis* adult females in New Zealand

- 1 Abdomen with 4 rows of submedian dorsal ducts each side *rosae* (Bouché)
—Abdomen with 5 rows of submedian dorsal ducts each side, the 5th row stepped *rosarum* Borchsenius

***Aulacaspis rosae* (Bouché) A** **rose scale**

Fig. 148; Map 10

Aspidiotus rosae Bouché, 1833: 53; 1834: 14.*Diaspis rosae* (Bouché); Signoret 1869b: 441; Maskell 1879: 201; 1887: 47.*Aulacaspis rosae* (Bouché); Cockerell 1896: 259; Fernald 1903: 236; Borchsenius 1966: 139; Charles & Henderson 2002: 596; Miller & Davidson 2005: 86.

Live appearance and habitat. Live appearance not recorded, but probably indistinguishable from Asiatic rose scale. It can be found on leaves as well as stems (Charles & Henderson 2002).

Diagnosis. The key couplet for *Aulacaspis* species above serves to distinguish *A. rosae* (Fig. 148) from *A. rosarum* (Fig. 149) below, by the number of rows of dorsal ducts, and that the 5th submedian abdominal row is stepped in Asiatic rose scale.

Material examined. See Appendix A (p. 224) for details of 40 specimens examined.

Distribution. HB, WA / NN, SC, CO, DN

Host plants. Rosaceae: *Acaena* sp., *Rosa* sp., *Rubus fruticosus*, *R. idaeus*, *R. ursinus*, *Rubus* sp.

Remarks. A Maskell slide in NZAC labelled *Diaspis rosae*, 1891 has been remounted and its identification confirmed.

***Aulacaspis rosarum* Borchsenius A** **Asiatic rose scale**

Fig. 33–34, 149; Map 11

Phenacaspis thoracica Robinson, 1917: 22.*Aulacaspis thoracica* (Robinson); Scott 1952: 36, 41; Tang 1986: 215 [synonymy].*Aulacaspis rosarum* Borchsenius, 1958: 165; Beardsley 1975: 14; Williams & Watson 1988: 72; Danzig & Pellizzari 1998: 200; Charles & Henderson 2002: 597.

Live appearance and habitat. Female scale cover circular, white, with subcentral dark brown exuvia. Female body red. Male scale white, elongate, tricarinate, with terminal mid-brown exuvium; male scales sometimes occurring massed on stems. On stems of host plants.

Diagnosis. The key couplet for *Aulacaspis* species above serves to distinguish *A. rosarum* (Fig. 149) from *A. rosae* (Fig. 148).

Material examined. See Appendix A (p. 224) for details of 83 specimens examined.

Distribution. ND, AK / MC

Host plants. Rosaceae: *Rosa* spp., *Rubus fruticosus* X, *Rubus ursinus*, *Rubus* sp. (berry fruits).

Remarks. The earliest NZAC record is a Maskell slide labelled “*Diaspis rosae*, from Rose, Aug. 1877”. This slide was re-identified as *A. rosarum* by L. L. Deitz. Archibald et

al. (1979) pointed out that this may be a specimen that Maskell (1879) recorded from Governors Bay. Asiatic rose scale is apparently now more common in New Zealand than rose scale. It can cause severe damage to rose bushes.

Genus CARULASPIS MacGillivray*Carulaspis* MacGillivray, 1921: 305.Type species: *Aspidiotus juniperi* Bouché, by original designation.

Species in the genus are found on conifers only. Two species are recorded in New Zealand: *C. juniperi* (Bouché) and *C. minima* (Signoret). The adult females of both species are almost circular to turbinate in shape, with the pygidium slightly pointed at apex, with median lobes small, rounded, separated by a space, L2 bilobate with medial lobule almost as large as L1, lateral lobule very small, L3 very small. With short gland spines between lobes and on abdominal margins. Marginal macroducts barrel-shaped, 4–6 pairs present, with or without a macroduct in medial space. Dorsal ducts arranged in short submedian and submarginal rows, with a few similar ducts on ventral submargin of abdomen. Anal opening a little posterior of mid pygidium. Microducts present on submedian dorsum and venter. Antenna with 1 seta. Anterior spiracles each usually with a trilocular pore, posterior spiracles without pores. Perivulvar pores in 5 well separated, rounded groups.

Key to *Carulaspis* adult females in New Zealand

- 1 With about 20 submedian dorsal macroducts each side of body; with a macroduct between the median lobes ...
..... ***juniperi* (Bouché)**
- With about 10 submedian dorsal macroducts each side of body; without a macroduct between the median lobes
..... ***minima* (Signoret)**

***Carulaspis juniperi* (Bouché) A** **juniper scale**

Fig. 35–37, 150; Map 12

Aspidiotus juniperi Bouché, 1851: 112.*Diaspis juniperi* (Bouché); Signoret 1869b: 437.*Carulaspis visci* (Schrank, 1781); Deitz 1979: 459 [misidentification].*Carulaspis juniperi* (Bouché); Boratynski 1957: 249; Borchsenius 1966: 161; Deitz 1979: 459; Charles & Henderson 2002: 597; Miller & Davidson 2005: 96.

Live appearance and habitat. Female scale cover off-white, oval, with pale gold exuvia subcentral or towards one end; colour of the female body has been described as chestnut (Miller & Davidson 2005) and brown at maturity, with pale pinkish-fawn eggs. In practise, juniper scale

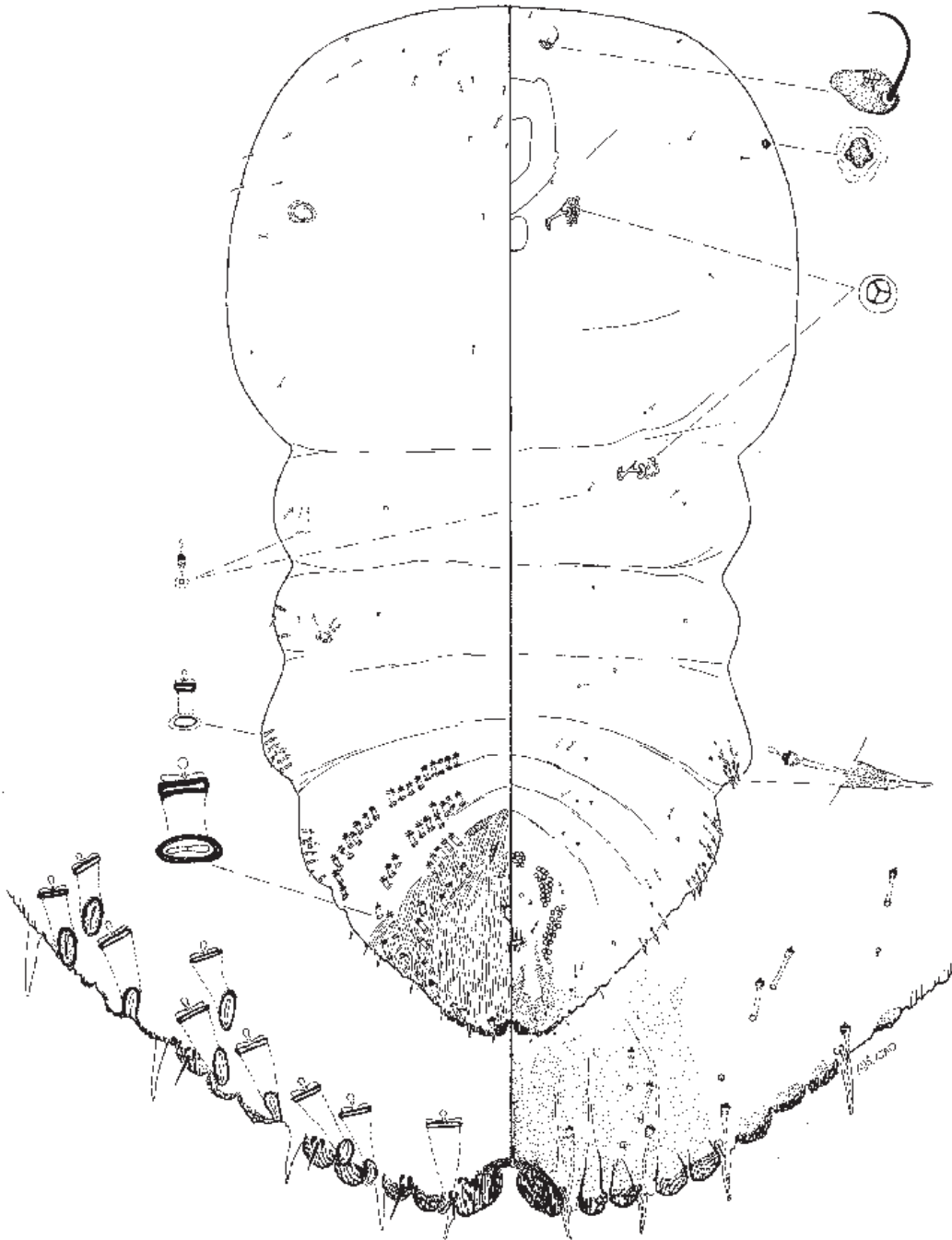


Fig. 148 *Aulacaspis rosae* (Bouché), adult female.

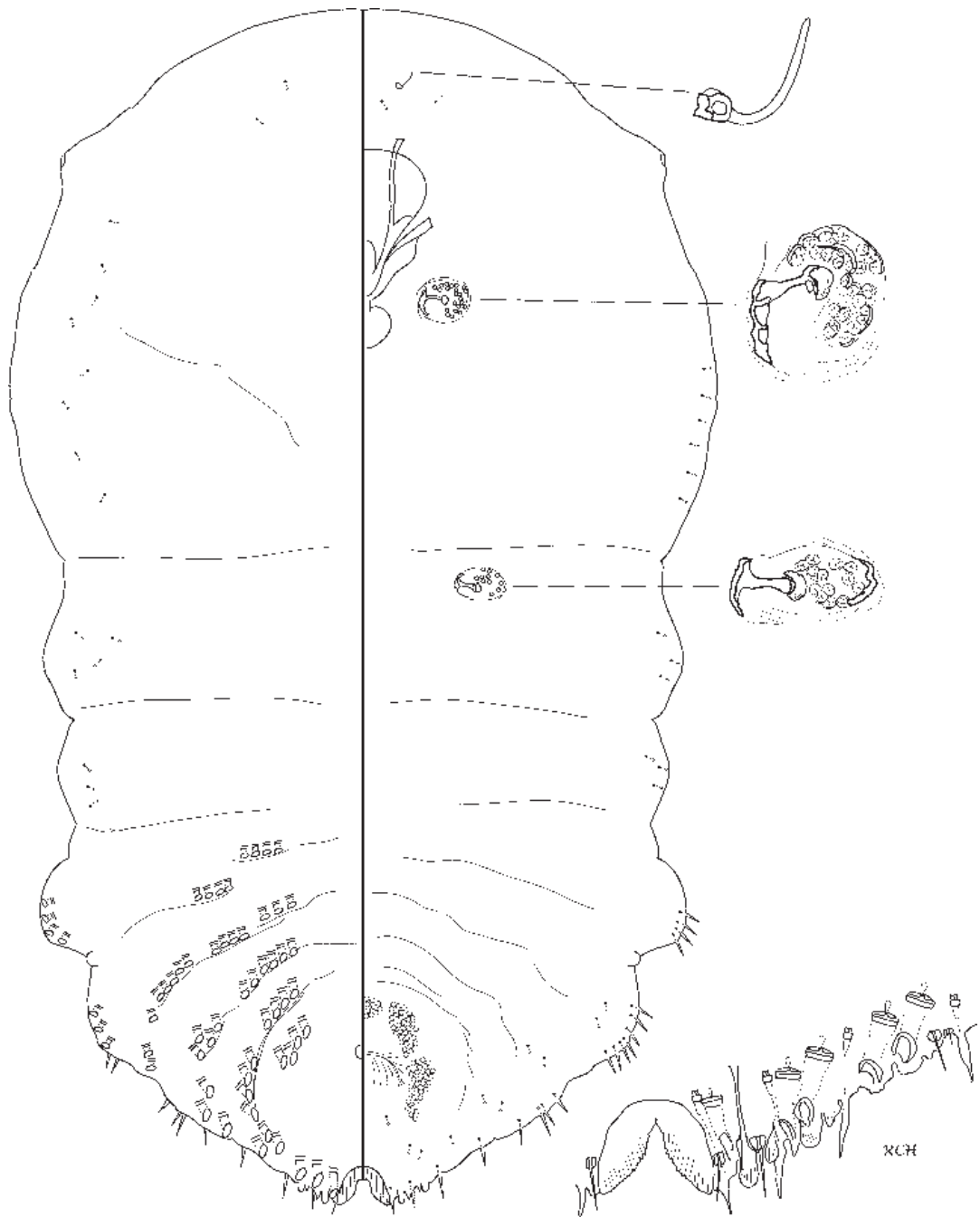


Fig. 149 *Aulacaspis rosarum* Borchsenius, adult female.

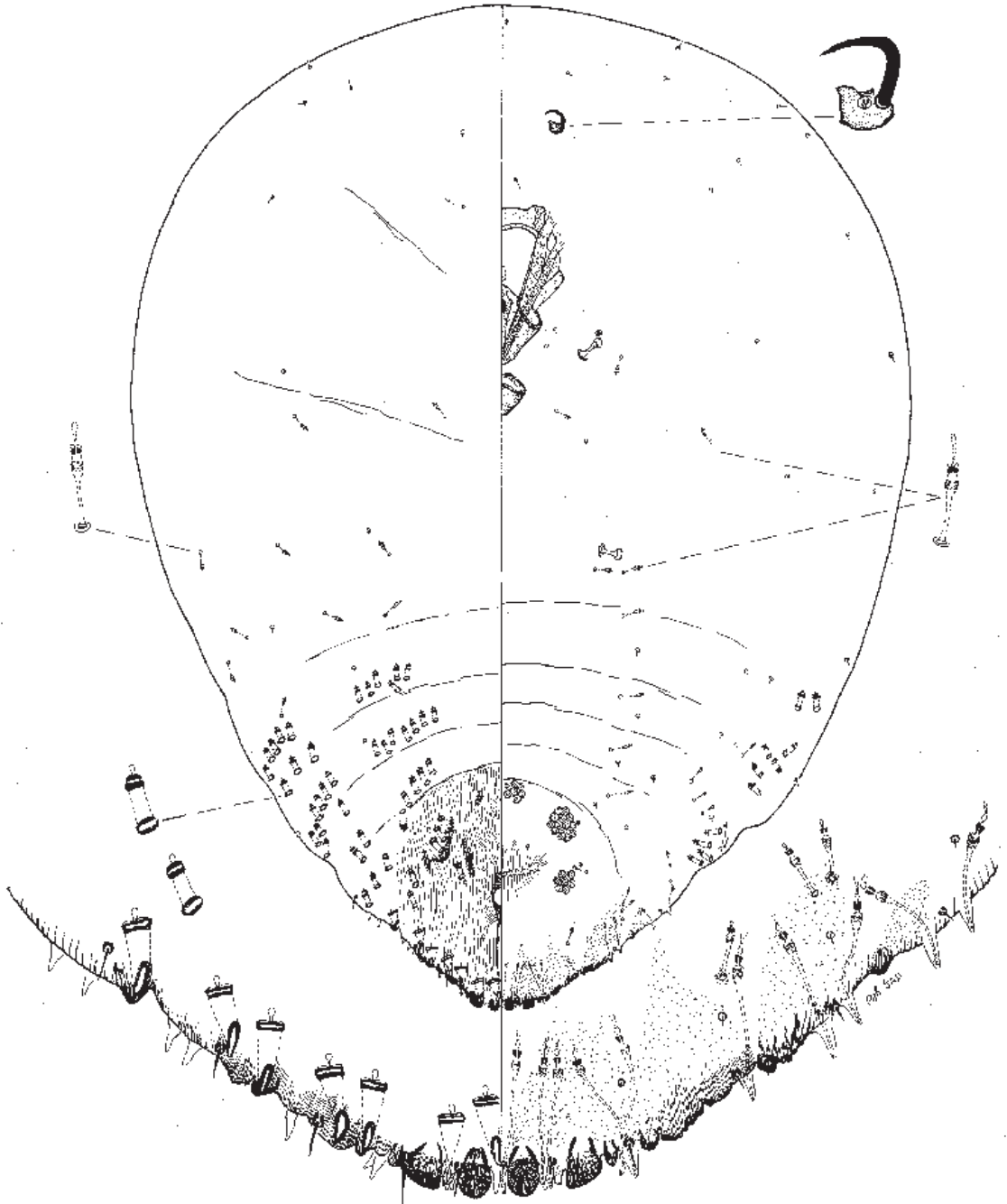


Fig. 150 *Carulaspis juniperi* (Bouché), adult female (from Miller & Davidson 2005).

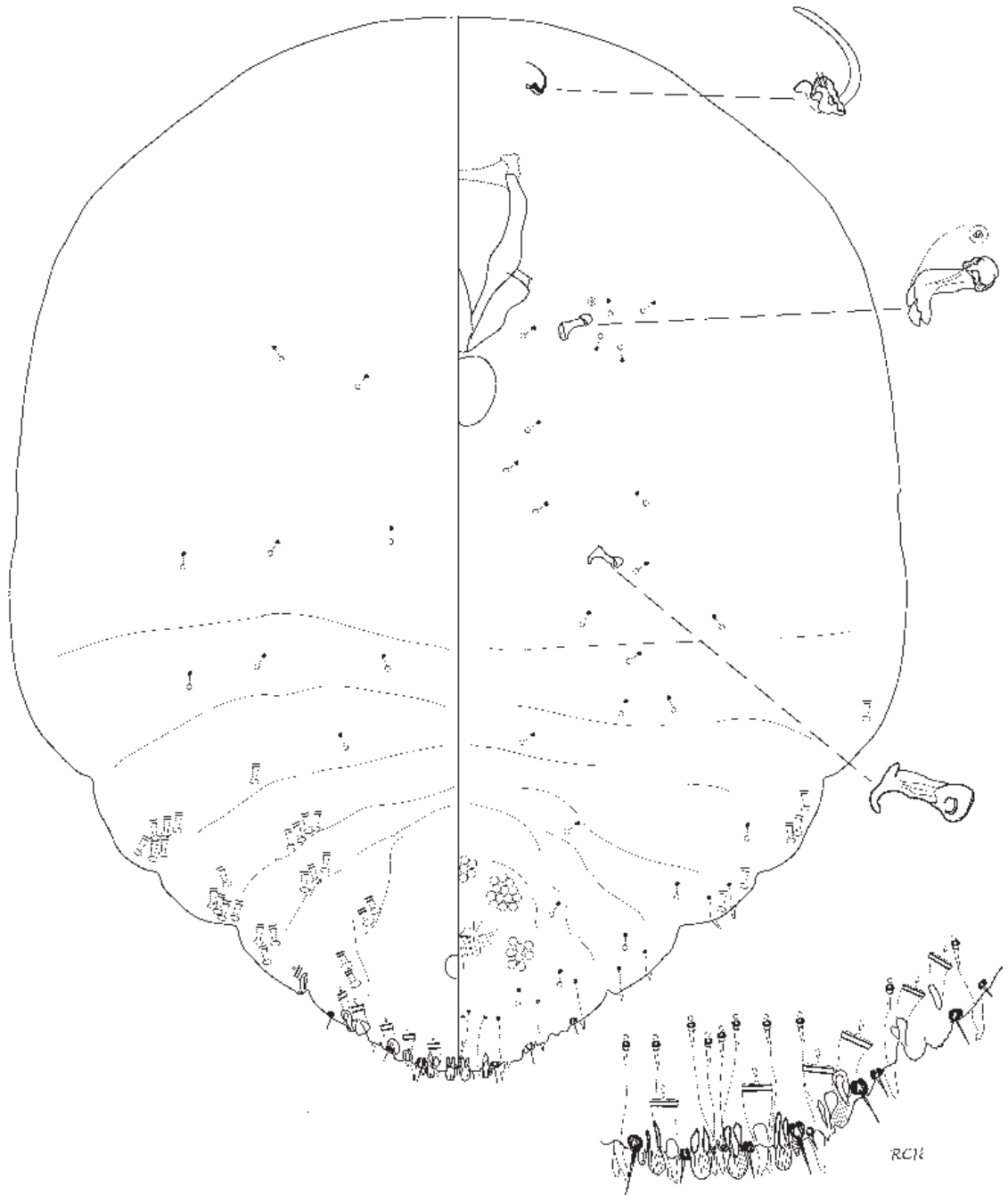


Fig. 151 *Carulaspis minima* (Signoret), adult female.

is indistinguishable in the field from minute cypress scale. On leaves and fruit of many conifer species.

Diagnosis. The key couplet for *Carulaspis* species above serves to distinguish slide-mounted specimens of *C. juniperi* (Fig. 150) from *C. minima* (Fig. 151). *C. juniperi* has comparatively more numerous dorsal ducts with the presence of a marginal macroduct in the medial space, whereas *C. minima* has fewer dorsal ducts and a marginal macroduct is absent in the medial space.

Material examined. See Appendix A (p. 224) for details of 180 specimens examined.

Distribution. AK, BP, WI / NN, MB, NC, MC, CO, OL

Host plants. Cupressaceae: *Chamaecyperus* sp., *Cupressus arizonica*, *C. macrocarpa*, *C. sempervirens*, *Cupressus* sp., *Juniperus chinensis*, *J. procera*, *Juniperus* sp., *Thuja* sp.; Taxodiaceae: *Cryptomeria japonica*, *Sequoiadendron giganteum*.

Remarks. Juniper scale has been recorded in New Zealand since 1942, at first under the name *C. visci*, which Deitz determined was a misidentification because *C. visci* is restricted to the mistletoe *Viscum album* in the Palaearctic, and is not found on conifers (Deitz 1979).

***Carulaspis minima* (Signoret) A minute cypress scale**

Figs. 38–40, 151; Map 13

Diaspis minima Signoret, 1869b: 438–439.

Carulaspis minima (Signoret); Balachowsky 1954: 210; Miller & Davidson 2005: 100.

Live appearance and habitat. Live appearance as above for *C. juniperi* although female body colour of *C. minima* tends to be more brown than chestnut. Effectively indistinguishable from juniper scale in the field.

Diagnosis. The key couplet for *Carulaspis* species above serves to distinguish slide-mounted specimens of *C. juniperi* (Fig. 150) from *C. minima* (Fig. 151).

Material examined. See Appendix A (p. 225) for details of 10 specimens examined.

Distribution. CL, WO / —

Host plants. Cupressaceae: *Cuprocyparis leylandii*, *Juniperus* sp.

Remarks. First recorded in New Zealand in May 2009.

Genus DIASPIDIOTUS Berlese in Berlese & Leonardi

Aspidiotus (*Diaspidiotus*) Berlese in Berlese & Leonardi, 1896: 350.

Type species: *Aspidiotus* (*Diaspidiotus*) *patavinus* Berlese in Berlese & Leonardi, 1896 (= *Aspidiotus pyri* Lichtenstein) by monotypy.

Quadraspidotus MacGillivray, 1921: 388.

Diaspidiotus; MacGillivray 1921: 388; Danzig & Pellizari, 1998: 237 [change of status].

Until the early 1990s, *Quadraspidotus* MacGillivray was accepted as a distinct genus, and the 2 species recorded in New Zealand were known under the combinations *Q. ostreaeformis* and *Q. perniciosus*. When the database ScaleNet was set up, it became clear that there was no good basis to distinguish *Quadraspidotus* from *Diaspidiotus* (Ben-Dov, ScaleNet, 2010) and these combinations reverted to *D. ostreaeformis* and *D. perniciosus*.

Diagnosis. The adult females of both species in New Zealand are turbinate with pointed pygidia, the body membranous except for sclerotised pygidium; the median lobes prominent, broad, slightly notched each side; 2nd and 3rd lobes not divided, very small. Plates small with few tines and not longer than lobes. Dorsal ducts 1-barred, long and slender, grouped in short furrows on pygidium between lobes, with 1 duct in medial space, and with stout parapses present at the base of each duct furrow; additional submarginal ducts laterally on pygidium; submarginal dorsal ducts on prepygidium much smaller or replaced by microducts; microducts quite numerous on dorsum and venter. Anal opening small, positioned in posterior 1/3 of pygidium. Without perispiracular pores. With or without perivulvar pores. Antenna a tall tubercle with stout seta arising near base. For a comparison of female pygidia of 4 other common pest species with *D. ostreaeformis* and *D. perniciosus* see Figs 6–11.

Key to *Diaspidiotus* adult females in New Zealand

- 1 Perivulvar pores present; pygidial gland spines anterior to L1 and L2 slender and fimbriate *ostreaeformis* (Curtis)
- Perivulvar pores absent. pygidial gland spines anterior to L1 and L2 broad and distally bifurcate *perniciosus* (Comstock)

***Diaspidiotus ostreaeformis* (Curtis) A oystershell scale**
[in New Zealand]

Fig. 8, 41–42, 152; Map 14

Aspidiotus ostreaeformis Curtis, 1843: 805; Fernald 1903: 268.

Quadraspidiotus ostreaeformis (Curtis); MacGillivray 1921: 410; Borchsenius 1966: 334; Helson 1952: 5; Richards 1960: 693; 1962: 95.

Diaspidiotus ostreaeformis (Curtis); Danzig 1980: 403; 1993: 182; Danzig & Pellizari 1998: 237–238 [new comb.]; Charles & Henderson 2002: 598; Miller & Davidson 2005: 168.

Live appearance and habitat. Female scale cover dark grey, body and eggs yellow. On stems / bark of trees, or seasonally on fruit.

Diagnosis. The presence of perivulvar pores distinguishes *D. ostreaeformis* (Fig. 152) from *D. perniciosus* (Fig. 153). In addition, the pygidial gland spines of *ostreaeformis* anterior to L1 and L2 are slender and fimbriate.

Material examined. See Appendix A (p. 225) for details of 173 specimens examined.

Distribution. — / NC, MC, CO

Host plants. Rosaceae: *Malus domestica*, *Prunus avium*, *P. domestica*, *Pyrus communis*.

Remarks. First recorded in New Zealand in 1939 (Charles & Henderson 2002).

***Diaspidiotus perniciosus* (Comstock) A San José scale**

Fig. 9, 43, 153; Map 15

Aspidiotus perniciosus Comstock, 1881: 304; Kirk & Cockayne 1909: 276.

Quadraspidiotus perniciosus (Comstock); Ferris 1938: 259; Helson 1952: 4; Cottier 1956: 317; Borchsenius, 1966: 336; Richards 1960: 693.

Diaspidiotus perniciosus (Comstock); Danzig 1980: 405; 1993: 191; Danzig & Pellizari 1998: 238 [new comb.]; Charles & Henderson 2002: 598; Miller & Davidson 2005: 172.

Live appearance and habitat. Female scale cover dark grey with alternating light brown rings, exuvia central, female body and eggs bright yellow; male scale cover smaller, elongate oval with exuvium towards one end, similar colour to female scale. On wood/bark or seasonally on fruit.

Diagnosis. The absence of perivulvar pores distinguishes *D. perniciosus* from *D. ostreaeformis*. In addition, the pygidial gland spines anterior to L1 and L2 are broad and distally bifurcate.

Material examined. See Appendix A (p. 225) for details of 192 specimens examined.

Distribution. ND, AK, GB, HB / NN, MC, CO

Host plants. Actinidiaceae: *Actinidia deliciosa*; Corylaceae: *Corylus avellana*; Rosaceae: *Chaenomeles speciosa*, *Cydonia oblonga*, *Malus domestica*, *Prunus domestica*, *P. persica*, *P. serrulata*, *Prunus* sp., *Pyrus communis*; Salicaceae: *Populus* sp., *Salix* sp.

Remarks. First recorded in New Zealand in 1908 (Kirk & Cockayne 1909; Charles & Henderson 2002).

Genus DIASPIS Costa

Diaspis Costa, 1828: 453.

Type species: *Diaspis calyptroides* Costa. Subsequently designated by Cockerell 1902: 58.

***Diaspis boisduvalii* Signoret A Boisduval scale**

Fig. 44–45, 154; Map 16

Diaspis boisduvalii Signoret, 1869b: 432; Maskell 1879: 200; Ward 1968: 50; Charles & Henderson 2002: 599; Miller & Davidson 2005: 180.

Live appearance and habitat. Female scale cover opaque, circular, flat, exuvia central; male scale cover elongate, carinate with pale terminal exuvium, and associated white woolly wax. Female body creamy with dark pygidium when young, pale yellow when mature, eggs yellow. On leaves of host plants.

Diagnosis. Adult female body turbinate (Fig. 154), prosoma with an ear-like lobe each side (occasionally lacking in some specimens); apex of pygidium with deep notch formed by recessed median lobes; each lobe diverging, serrate, the inner margins longer than outer margins. L2 and L3 rounded, bilobate, the lobules of each about same size, unilobate L4 present. With a pair of setae in medial space. Gland spines present singly lateral to L1 between lobes and more numerous on prepygidial abdominal margins to segment II. Marginal macroducts 2-barred, 6 pairs plus 1 macroduct between median lobes, and 2 pairs of macroducts submarginally by L2 and L3. With a lateral spur on margin at position of each 6th macroduct.

Dorsal ducts becoming smaller anteriorly. Anal opening small, positioned in posterior 1/3 of pygidium. Antenna with 1 seta. Anterior spiracles each with a small group of trilobular pores, absent from posterior spiracles. Perivulvar pores present in 5 compact lozenge-shaped groups.

Material examined. See Appendix A (p. 226) for details of 33 specimens examined.

Distribution. AK, WI / DN

Host plants. Arecaceae: *Chamaedorea siefrizii*; Bromeliaceae: *Vriesea* sp.; Orchidaceae: orchid.

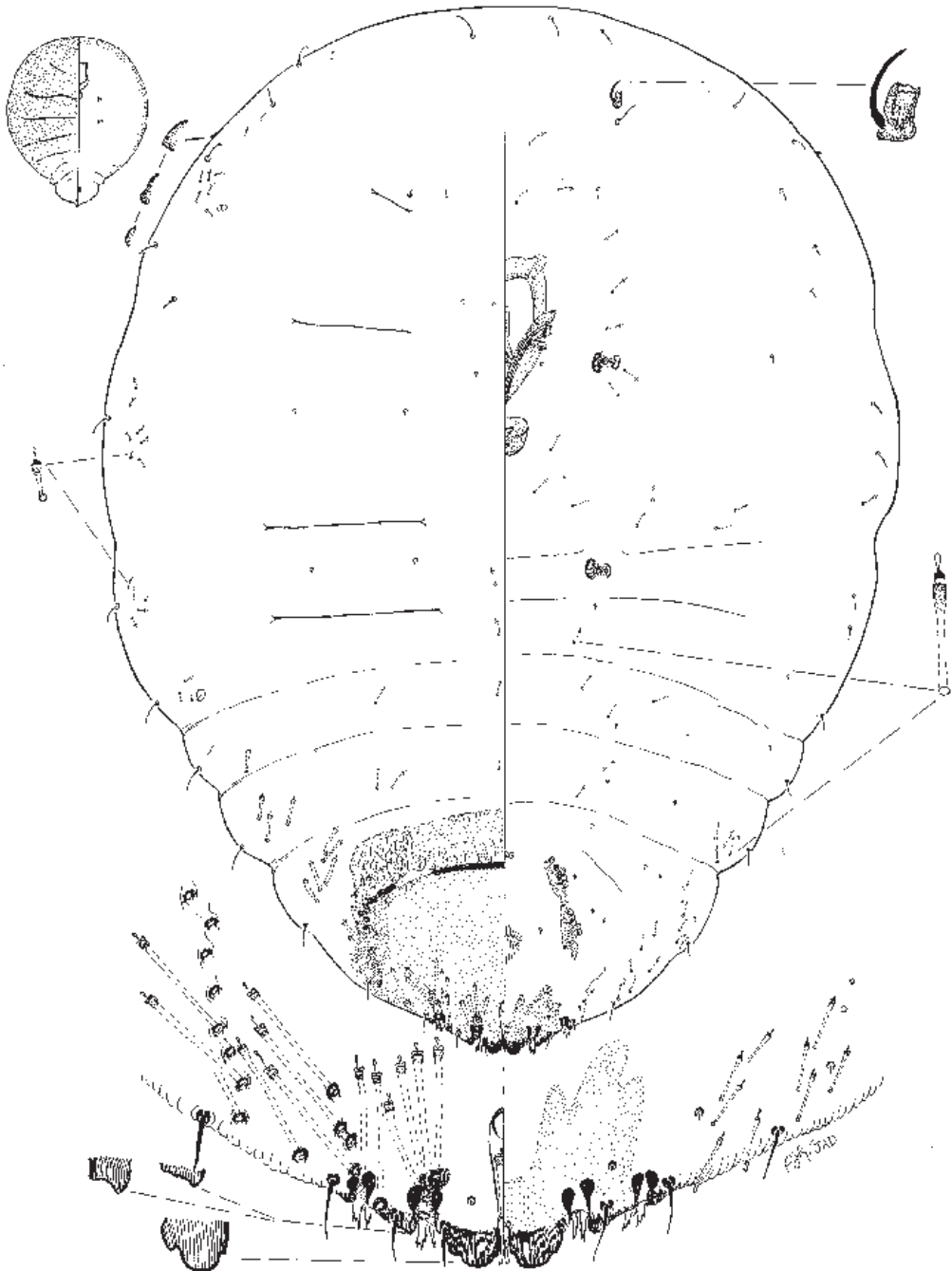


Fig. 152 *Diaspidiotus ostreaeformis* (Curtis), adult female (from Miller & Davidson 2005).

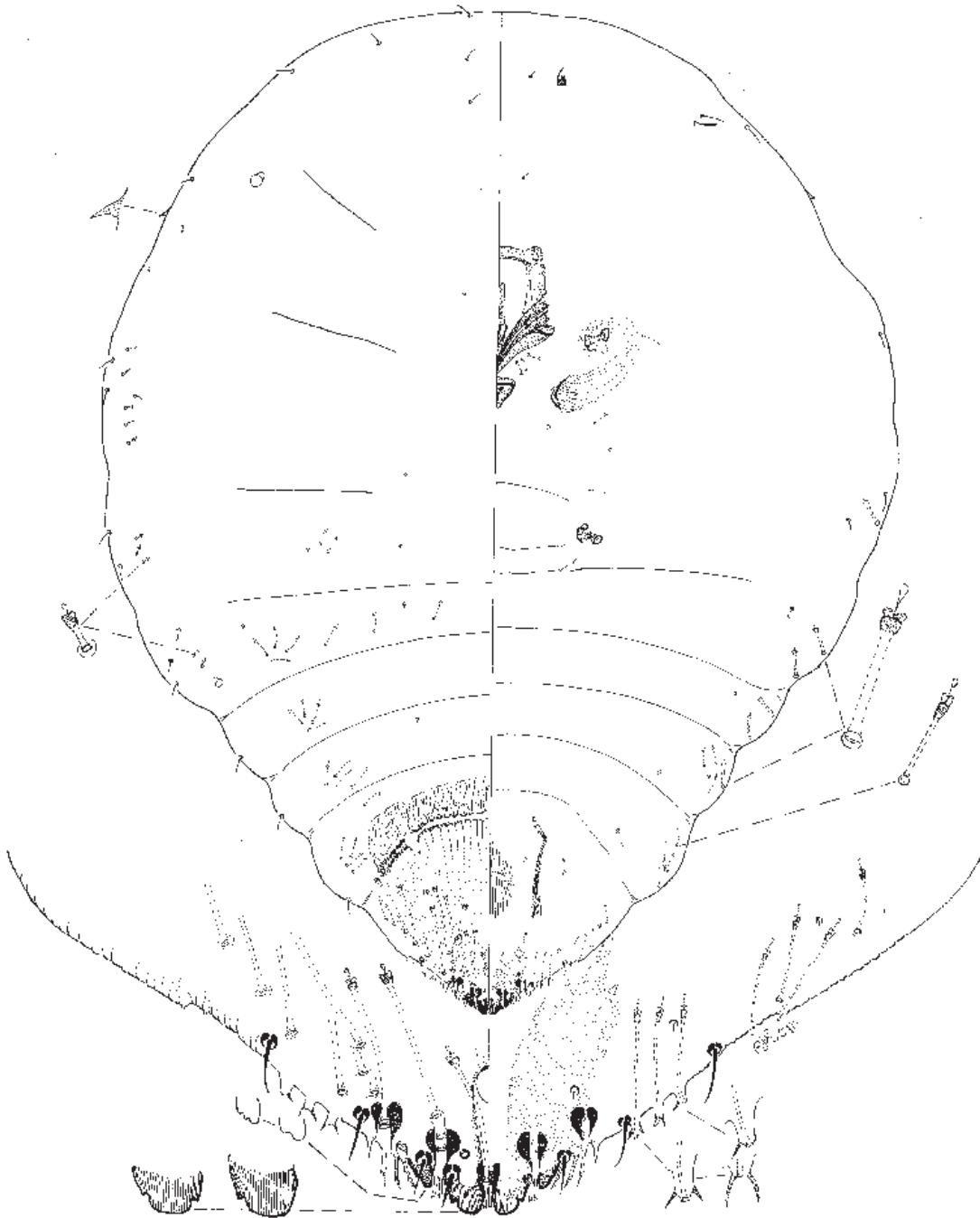


Fig. 153 *Diaspidiotus perniciosus* (Comstock), adult female (from Miller & Davidson 2005).

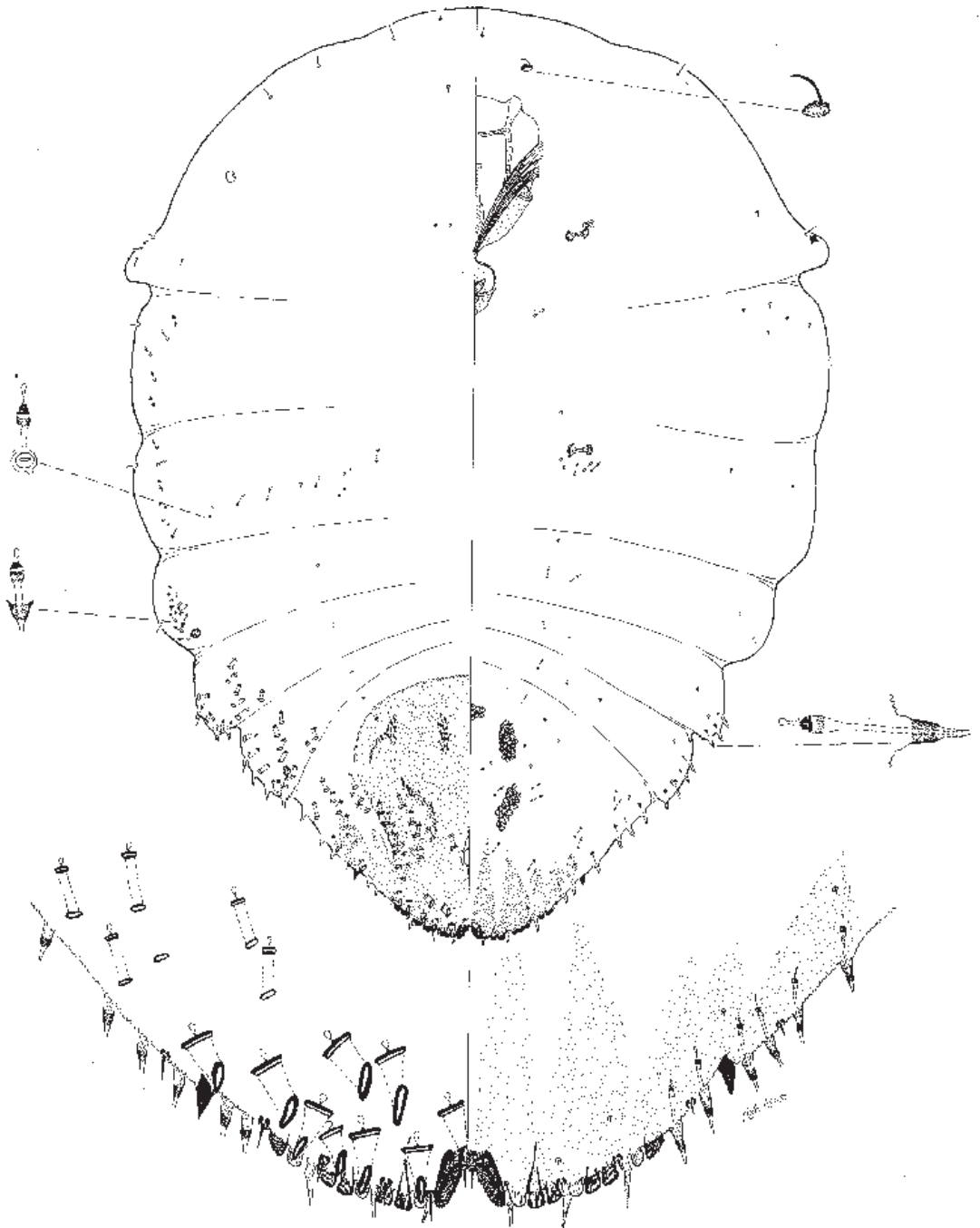


Fig. 154 *Diaspis boisduvalii* Signoret, adult female (from Miller & Davidson 2005).

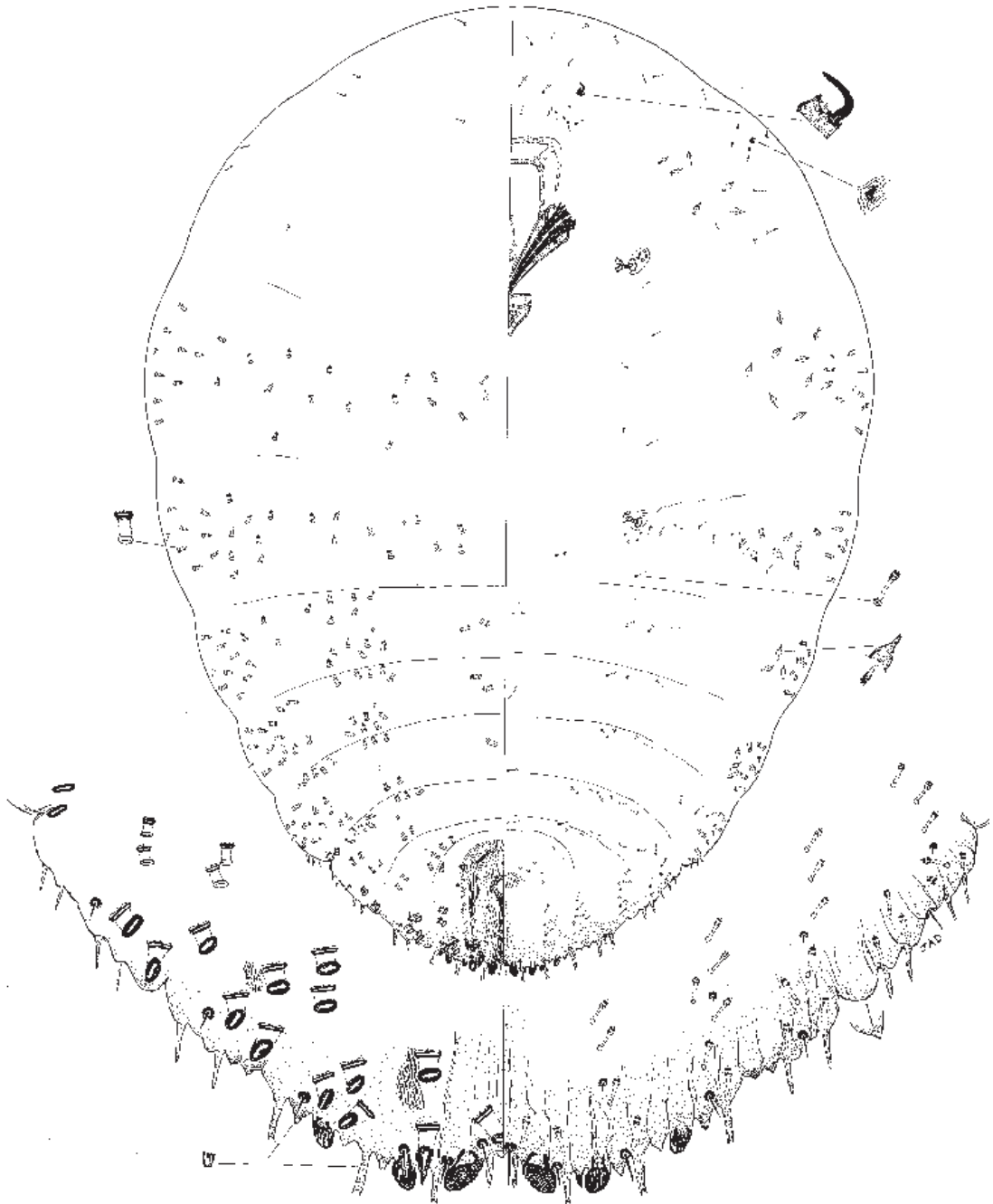


Fig. 155 *Furchadaspis zamiae* (Morgan), adult female (from Miller & Davidson 2005).

Remarks. Although polyphagous, Boisduval scale was previously known in New Zealand mainly from orchids in hothouses, Maskell having reported it as a pest as early as 1879 (Maskell 1879). More recently it was recorded on a bromeliad in June 2007 in Auckland, when the collector (B.E. Rhode) commented that it is common on these plants because they are often overwintered in greenhouses.

D. boisduvalii is close to *Diaspis bromeliae* (Kerner), which is not present in New Zealand, but can be distinguished by the number of large submedian macroducts on the pygidium: 2 pairs on *D. boisduvalii* and 3 or more pairs on *D. bromeliae*.

Genus *FURCHADASPIS* MacGillivray

Furchadaspis MacGillivray, 1921: 310.

Type species: *Diaspis zamiae* Morgan, by monotypy & original designation.

***Furchadaspis zamiae* (Morgan) A zamia scale** [preferred], cycad scale [but also used for *Aulacaspis yasumatsui* Takagi]

Fig. 47–48, 155; Map 17

Diaspis zamiae Morgan, 1890: 44–45.

Furchadaspis zamiae (Morgan); MacGillivray 1921: 358 [change combination]; Gill 1997: 150; Miller & Davidson 2005: 218.

Live appearance and habitat. Female scale cover oval, moderately convex, white to off-white with cream to beige coloured exuvia at one end, often with associated fine waxy threads; female body pale lemon with darker pygidium. Males unknown in New Zealand, but it is reportedly parthenogenetic in California, Turkey, and Russia (Miller & Davidson 2005). On underside of leaves of Cycadaceae.

Diagnosis. Adult female body turbinate (Fig. 155), pygidium broadly rounded with a notch, with a pair of gland spines in medial space. Median lobes widely separated, each lobe divergent with inner margin serrate and longer than lateral margin; L2 and L3 rounded, unilobate. Gland spines straight with 2 tines on apex when on pygidium, becoming simple, pointed on prepygidium. Marginal macroducts not much larger than other dorsal ducts, with 1 duct between median lobes.

Dorsal ducts 2-barred, short, numerous, arranged in medial, submedial, and submarginal groups on abdomen, then as broad bands on meso- and metathorax. Anal opening in anterior 1/3 of pygidium.

Perivulvar pores absent. With a few perispiracular pores by each spiracle. Antenna with 1 stout seta. Microducts and gland tubercles numerous on venter.

Material examined. See Appendix A (p. 226) for details of 32 specimens examined.

Distribution. AK, HB / —

Host plants. Cycadaceae: *Cycas revoluta*, *Encephalartos longifolius*.

Remarks. First record in New Zealand, April 2004.

Genus *FUSILASPIS* MacGillivray

Fusilaspis MacGillivray, 1921: 275.

Type species: *Mytilaspis phymatodidis* Maskell, by original designation.

Redescription of genus, based on its type species, with differences to *Pseudaulacaspis pentagona* (Targioni Tozzetti) — the type species of *Pseudaulacaspis* — noted in parentheses and which were taken from Williams & Watson 1988: 233.

Adult female body shape ovate to fusiform (broadly turbinate), lateral lobes of prepygidial segments weakly developed (well-developed); median lobes yoked, recessed, dentate on long free medial margins (median lobes prominent with medial and lateral margins notched more than once or serrate), with a pair of setae in medial space, 2nd lobes bilobed, 3rd lobes insignificant. Marginal gland spines on pygidium pointed (branched apically), single, each with a single microduct (with 2 or 3 microducts); with 2 or 3 gland spines on either side of 4th segment and reducing in size to become gland tubercles anteriorly; with a group of gland tubercles laterad to each anterior spiracle (absent there). Pygidium with macroducts on margin and in well-defined submarginal and submedian rows on abdominal segments III to VI, with a few smaller ducts present submarginally on segment I to metathorax. Microducts present in all ventral submedian areas including head. Perispiracular disc pores present near both anterior and posterior spiracles (absent by posterior spiracles). Antennae each with 1 long seta. Perivulvar pores in 5 distinctly well-separated, often rounded groups (groups more elongate and less distinctly separate).

***Fusilaspis phymatodidis* (Maskell) E fern scale** [New Zealand]

Fig. 49–50, 156–160; Map 18

Mytilaspis phymatodidis Maskell, 1880: 292.

Fusilaspis phymatodidis (Maskell); MacGillivray 1921: 289; Borchsenius 1966: 185; Wise 1977: 111.

Lepidosaphes phymatodidis (Maskell); Fernald 1903: 313; Myers 1922: 201.

Pseudaulacaspis phymatodidis (Maskell); Deitz & Tocker 1980: 41[desig. lectotype; new comb. + new synonymy]

Fusilaspis with *Pseudaulacaspis*].

Chionaspis dubia Maskell, 1882: 216; Myers 1922: 200.

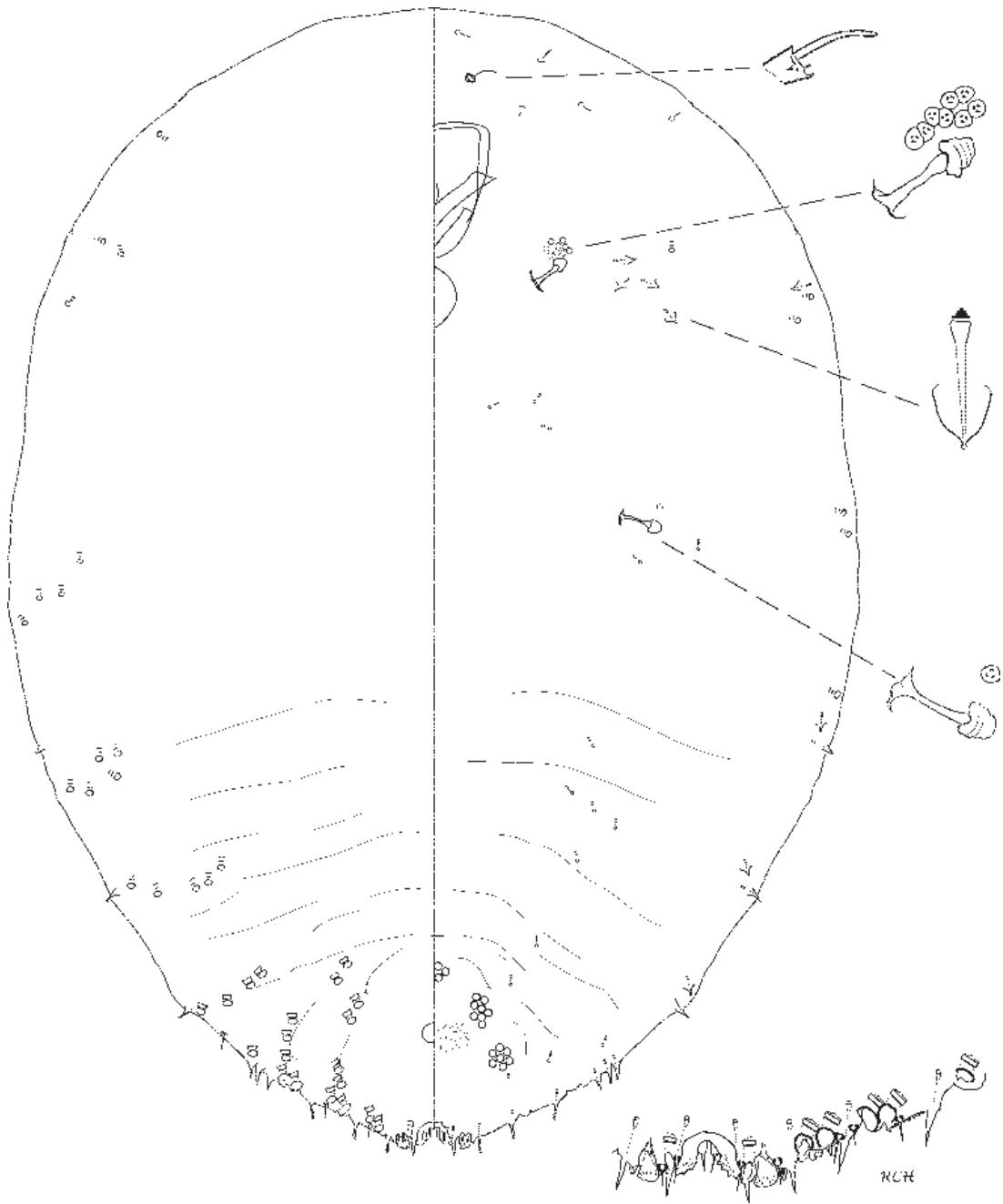


Fig. 156 *Fusilaspis phymatodidis* (Maskell), adult female.

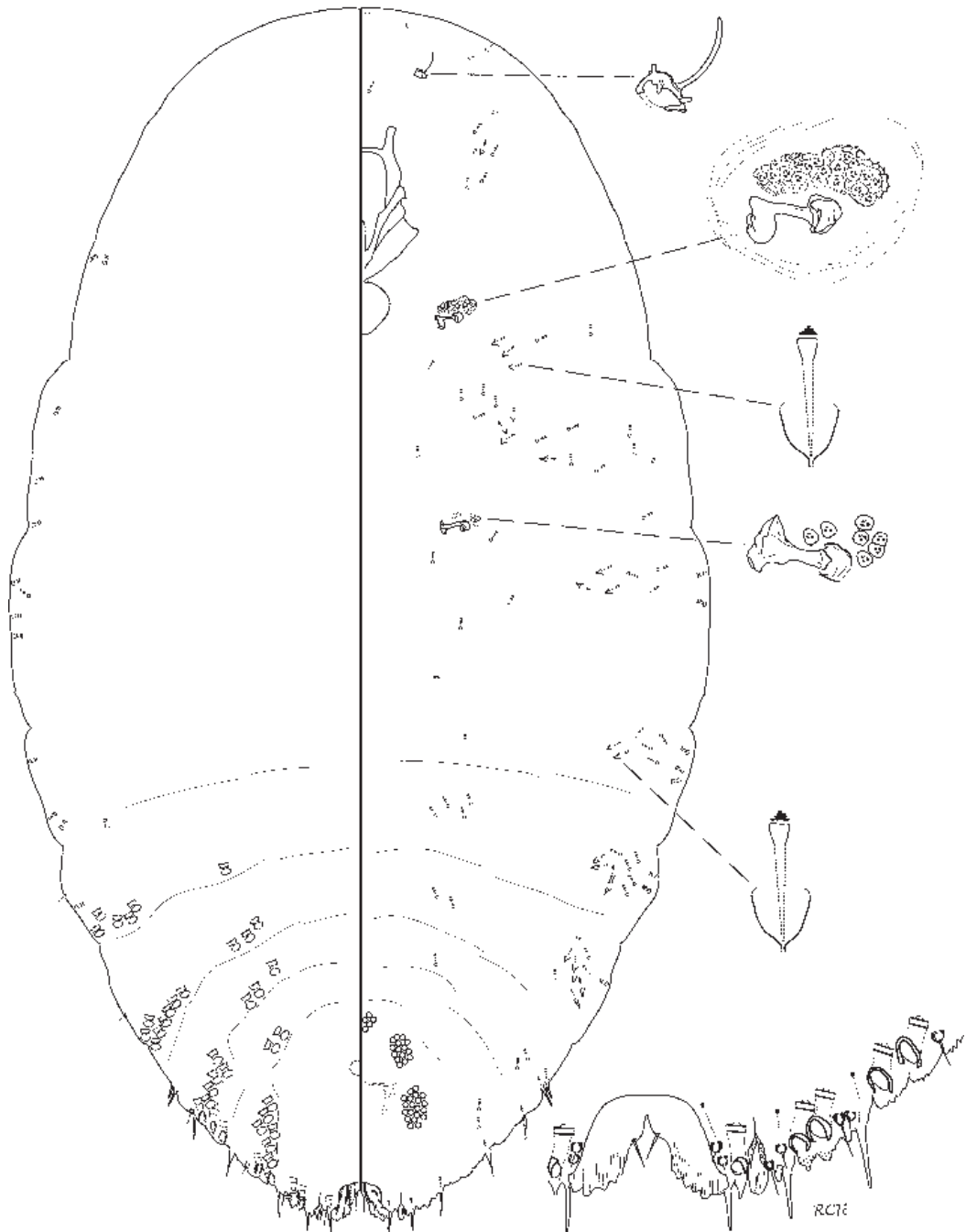


Fig. 157 *Fusilaspis phymatodidis* (Maskell), adult female (long form).

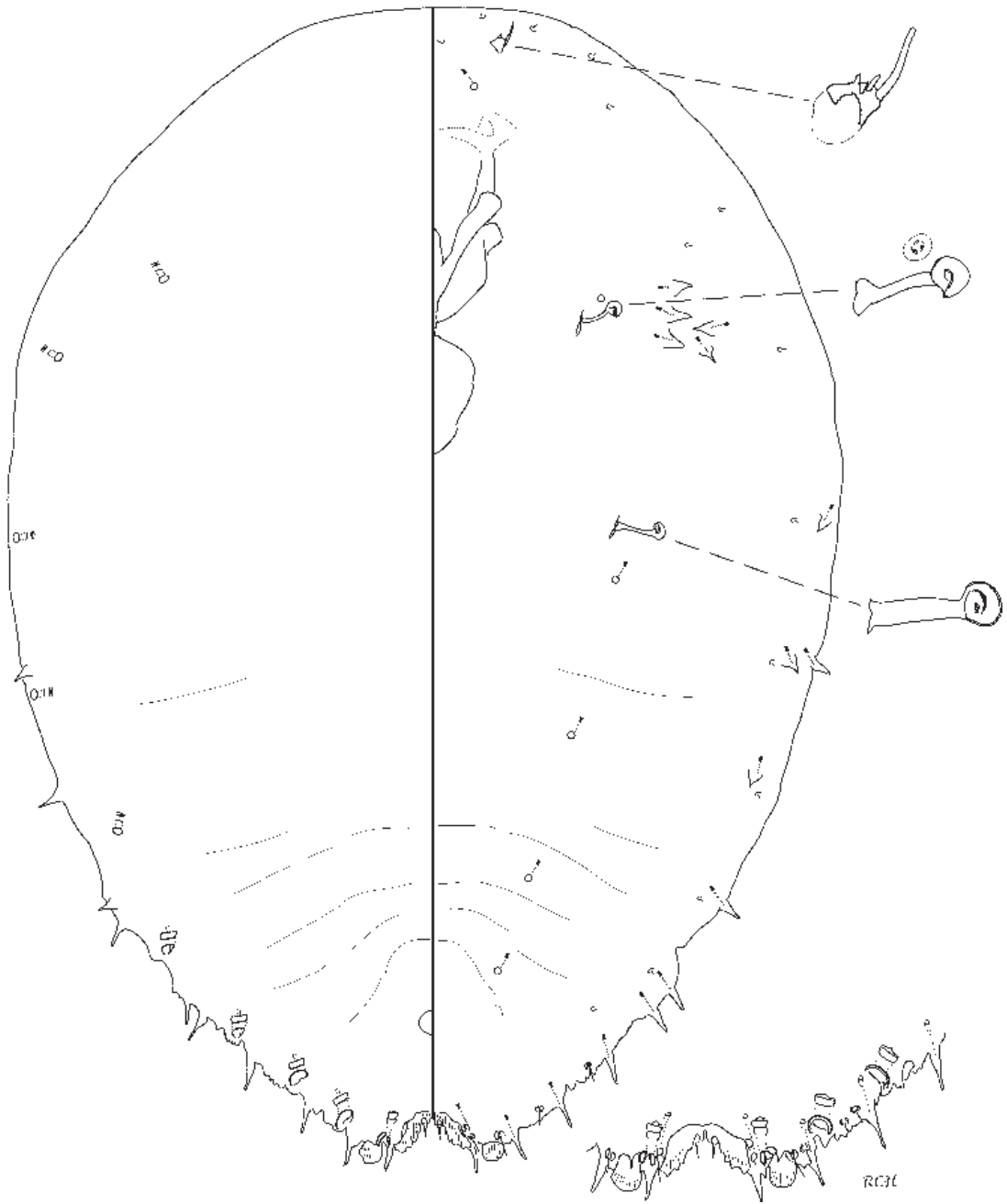


Fig. 158 *Fusilaspis phymatodidis* (Maskell), 2nd-instar female nymph.

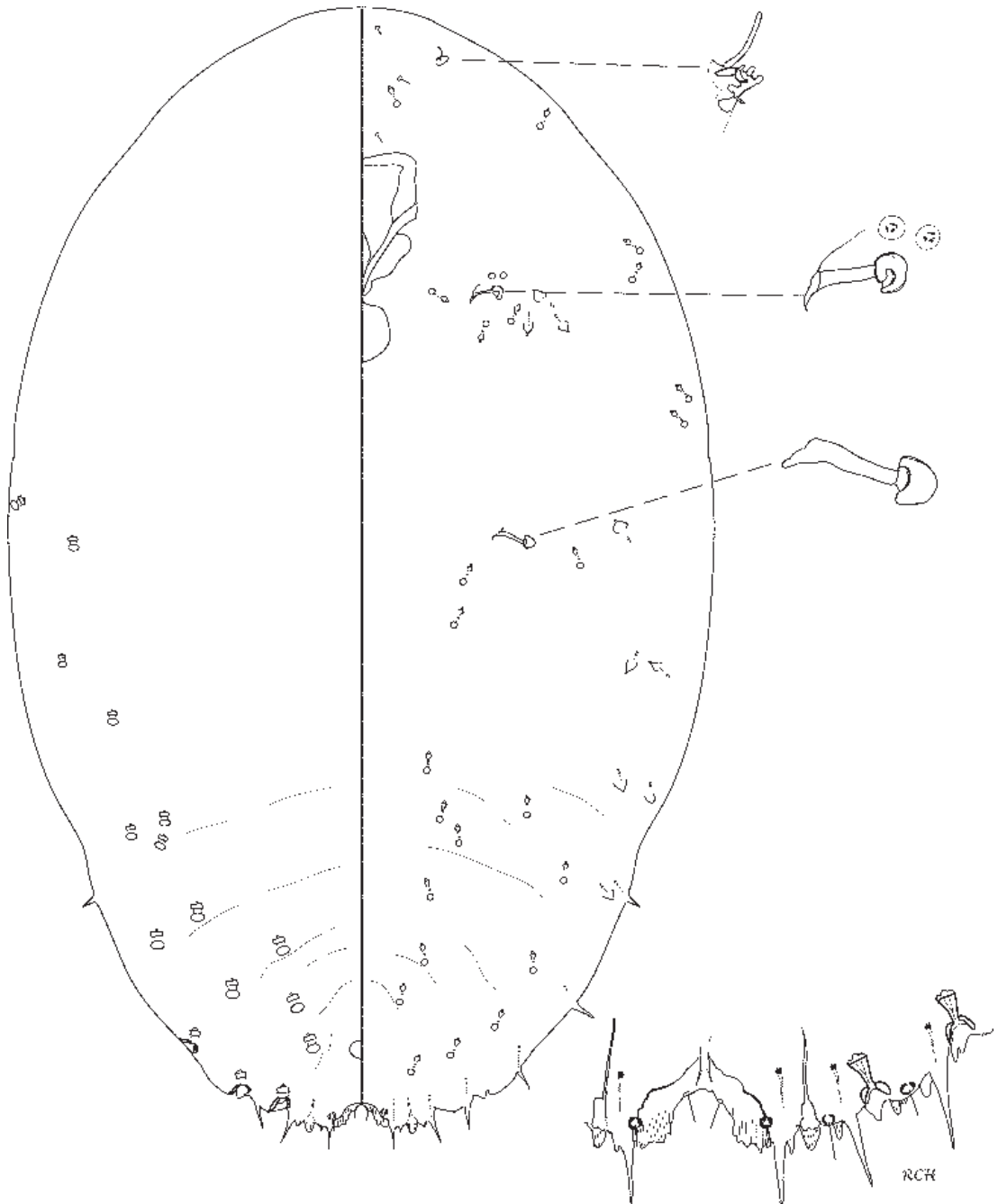


Fig. 159 *Fusilaspis phymatodidis* (Maskell), 2nd-instar male nymph.

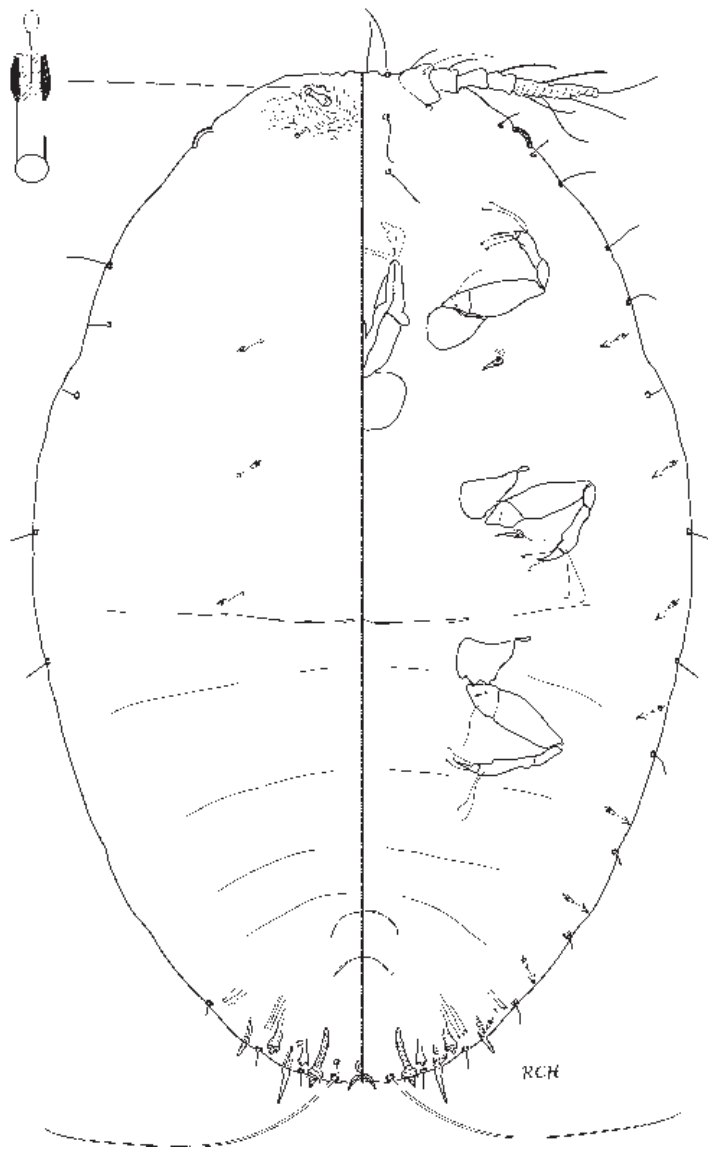


Fig. 160 *Fusilaspis phymatodidis* (Maskell), 1st-instar nymph.

Phenacaspis dubia (Maskell); Ferris 1956: 36 [description + fig. of 1 specimen]; Borchsenius 1966: 120; Wise 1977: 109.

Pseudaulacaspis dubia (Maskell); Deitz & Tocker 1980: 35 [new comb.; lectotype desig.]; Takagi 1985: 45 **new synonymy**.

Fusilaspis phymatodidis (Maskell) **generic combination reinstated**.

Live appearance and habitat. Female scale cover pyriform, white to creamy white, with golden brown terminal exuvia; when on underside of fronds of silver fern (*Cyathea dealbata*) the scale covers are more silver-grey and blend with the colour of the substrate; female body bright yellow, eggs pale yellow. Male scale covers are similar but smaller, not carinated. On underside of fronds of its fern host.

Adult female, measurements taken from 30 specimens (Figs 156, 157). Body oval to fusiform, length 0.56–1.25 mm, width 0.34–0.67 mm, widest at about abdomen I, lateral abdominal lobes weakly developed; pygidium shape oval, median deeply notched. L1 yoked, free margin always dentate, median cleft usually wide, sometimes more narrow; with a pair of setae in medial space; L2 bilobed, rounded, the medial lobule with fine basal scleroses extending onto venter, the lateral lobule smallest, sometimes dentate or notched, L3 bilobed, rounded, or notched, lateral lobule sometimes a point, L4 a marginal serration. Pygidium gland spines long, pointed, 1 pair on each segment. Marginal macroducts barrel-shaped, 7 pairs, their openings oval and slightly asymmetric to margin.

Submedian and submarginal pygidial dorsal ducts about same size as marginal macroducts, in 2–4 short rows of 1–4 ducts each side usually on segments IV–VI; prepygidial dorsal ducts small, about 1/2 size of pygidial macroducts, distributed mostly on dorsal submargins and occasionally present on ventral submargins. Anal opening round, about 12.5–17.5 μm , positioned 60–100 μm from posterior margin.

Ventral ducts, microducts, and gland tubercles as for genus. Antenna with 1 long seta and usually 2 or more short stubs. Anterior spiracles each with a group of 7–22 trilocular pores; posterior spiracles each with 0–12 trilocular pores. Perivulvar pores in 5 distinctly well separated, often rounded groups, a total of 55–82 pores on each female. Vulva positioned beneath level of anal opening.

Remarks. Diagnostic features for the female are the recessed median lobes with dentate free margins, groups of gland tubercles near the anterior spiracles, perivulvar pores in distinctly separated groups, and free abdominal lobes weakly developed without groups of marginal gland spines. New Zealand species of *Anzaspis*, *Pellucidaspis*, and *Pseudaulacaspis* have more prominent, finely serrate median lobes. *Poliaspis* species also have dentate lobes and

gland tubercles near the anterior spiracles but can be immediately separated by having 8 groups of perivulvar pores. *Pseudaulacaspis brimblecombei* and *Ps. eugeniae* have well developed free abdominal lobes with groups of gland spines. *F. phymatodidis* has been misidentified as *Pseudaulacaspis cockerelli* (Cooley), but that species lacks perispiracular pores by the posterior spiracle and gland tubercles near the anterior spiracle. *F. phymatodidis* is also easily distinguished by its host preference for ferns in New Zealand, a niche not occupied by any other diaspidid species here.

2nd-instar female nymph, measurements taken from 6 specimens (Fig. 158). Body shape similar to female but smaller, length 0.4–0.72 mm, width 0.21–0.45 mm; lobes and gland spines similar to female but smaller, L3 a serration on margin.

5 pairs of marginal macroducts, with 1 pair of smaller dorsal ducts present submarginally on each prepygidial segment as far forward as mesothorax, these not extending onto venter. Anal opening about 25–42 μm from posterior margin.

Ventral microducts few, distributed on submedian abdomen and on head. Gland tubercles present on submargins of abdomen I, metathorax, and with a group of 2–6 gland tubercles near each anterior spiracle. Antenna as for female. Anterior spiracles each with a group of 1–5 trilocular pores, posterior spiracles without pores.

2nd-instar male nymph, measurements taken from 9 specimens (Fig. 159). Similar to female nymph, differing in the following: body shape less rounded than female nymph, length 0.43–0.75 mm, width 0.29–0.44 mm.

3 pairs marginal macroducts, smaller dorsal ducts more numerous, distributed on submedian pygidium and on submargin as far forward as mesothorax, these not extending onto venter.

Ventral microducts more numerous than on female nymph, with a pair on submedian and submargin of segments VI–II, also a few near each spiracle and on head. Gland tubercles present on submargins of abdomen I–II, metathorax, and a group of 3–4 duct tubercles near each anterior spiracle. Antenna as for female. Anterior spiracles each with a group of 1–4 trilocular pores, posterior spiracles without pores. With 3 pairs of short setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 10 specimens (Fig. 160). Body shape oval to fusiform, length 0.26–0.38 mm, width 0.15–0.27 mm. Pygidium with 2 pairs of lobes, notched, each with a basal sclerosis on inner margin; between the median lobes 2 pairs of minute setae and 1 pair of long anal lobe setae; with 2 pairs of stout, pointed gland spines.

Dorsal microducts on submargin and submedian thorax. With or without a pair of dorsal cephalic ducts, these

set in a patterned sclerotised dermal area (7 specimens possessed ducts and 3 did not; of 3 1st-exuvia of female nymphs, 2 possessed these ducts and 1 did not. In addition, some specimens possessed a single duct instead of a pair). Anal opening close to margin.

Ventral microducts with small tubercles on margin of abdominal segments II–IV and metathorax, and with a submarginal microduct, 1 each side of meso- and prothorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented, 72–80 µm long, with fine and fleshy setae. Legs and spiracles normal. Eyes on ventral margin.

Type material examined. *Mytilaspis phymatodidis* Maskell. **LECTOTYPE** female, subsequent designation by Deitz & Tocker (1980: 35): NEW ZEALAND, the smaller and younger of 2 adult females on an original slide labelled “*Mytilaspis phymatodidis*, females, from *Phym. Billardieri* Feb. 1879, W.M.M.”. [1]: 1 F, slightly cleared, unstained. Barcode NZAC02008433. [‘*Phym. Billardieri*’ = *Grammitis billardieri*] (NZAC). **Paralectotypes:** (i) as above, the 2nd female, larger of the 2 on the lectotype slide; (ii) labelled “*Mytilaspis phymatodidis* Mask., #11 NZ, [mounted by] JA de Boer, 9 July 1968”, [1]: 4 exuv1, 5 exuv2 (NZAC).

Chionaspis dubia Maskell. **LECTOTYPE** female, subsequent designation by Deitz & Tocker (1980: 36): NEW ZEALAND, on an original slide labelled “*Chionaspis dubia*, from *Coprosma*, Female, May 1881, W.M.M.”. [1]: 1 F, cleared, unstained. Barcode NZAC02008430 (NZAC).

Paralectotypes: with same collection data as above: (i) labelled “*Chionaspis dubia*, Female and Puparium”, [1]: 1 F, uncleared and unstained, female body elongate, female cover with 1st- and 2nd-exuvia attached; (ii) labelled “*Chionaspis dubia*, male puparia and three males”, [1]: 3 M, uncleared and unstained, male cover with 1st-exuvium attached; (iii) labelled “*Chionaspis dubia* Maskell, ex Maskell’s dry material #30, [mounted by] JA de Boer, 5 August 1968”, [1]: 1 F, 1 exuv1, 1 exuv2 (NZAC).

Other material examined. See Appendix A (p. 226) for details of 457 specimens examined.

Distribution. TH / ND, AK, CL, WO, BP, GB, HB, TO, WI, WN / SD, NN, BR, DN, SL / CH, SN

Host plants. I. **adventive fern:** Pteridaceae: *Pteris cretica*.

II. **native ferns:** 33 species in 18 genera recorded in NZAC + *Coprosma* sp. (Maskell 1880) [it is uncertain whether the latter was from a mixed or mislabelled collection]. Aspleniaceae: *Asplenium bulbiferum*, *A. flaccidum*, *A. oblongifolium*, *A. polyodon*, *Asplenium* sp.; Blechnaceae: *Blechnum discolor*, *B. filiforme*, *B. fraseri*, *B. membranaceum*, *Blechnum* sp., *Doodia media*; Cyathaceae: *Cyathea dealbata*, *C. medullaris*, *Cyathea* sp.;

Dicksoniaceae: *Dicksonia fibrosa*, *D. squarrosa*, Dryopteridaceae: *Lastreopsis glabella*, *Polystichum neozelandicum*, *P. vestitum*; Gleicheniaceae: *Gleichenia dicarpa*, *Gleichenia* sp., *Sticherus cunninghamii*; Grammitidaceae: *Grammitis billardierei*, Hymenophyllaceae: *Hymenophyllum atrovirens*, *H. demissum*, *H. dilatatum*, *H. pulcherrimum*, *Hymenophyllum* sp., *Trichomanes reniforme*; Marattiaceae: *Marattia salicina*; Oleandraceae: *Arthropteris tenella*; Polypodiaceae: *Microsorium pustulatum*, *M. scandens*, *Microsorium* sp.; Pteridaceae: *Adiantum cunninghamii*, *A. fulvum*, *A. viridescens*, *Adiantum* sp., *Pellaea rotundifolia*; Shizaeaceae: *Lygodium articulatum*,

Remarks. The reasons for reinstatement of the MacGillivray combination are (i) that this species is not congeneric with the type species of *Pseudaulacaspis*, namely *Ps. pentagona* (Targioni Tozzetti), as described above, and (ii) molecular data place it in a southern clade distinct from northern hemisphere species of *Pseudaulacaspis* (Andersen *et al.* 2010). It is restricted to ferns in New Zealand.

As noted in the Introduction, the Fijian fern species mentioned by Williams & Watson (1988) has now been described as *Pseudaulacaspis pyrrosiae* Hodgson & Lagowska, 2011. It differs from *F. phymatodidis* as follows: (i) the perivulvar pores are in closely adjoining long groups, with the anterior and posterior lateral groups on one side coalesced; (ii) perispiracular pores absent by posterior spiracle; (iii) only 5 pairs of marginal macroducts (iv) gland spines on the margins of abdominal segments more numerous.

Genus *HEMIBERLESIA* Cockerell

Hemiberlesia Cockerell, 1897: 12.

Type species: *Aspidiotus rapax* Comstock, by original designation.

The genus is closely related to *Abgrallaspis*, but the the 2 species of *Hemiberlesia* present in New Zealand are easily separable from *Abgrallaspis cyanophylli*, the only species in that genus present here. Both *H. lataniae* and *H. rapax* are characterised by having a large anal opening that is either close (*H. lataniae*), or extremely close (*H. rapax*) to the posterior margin at the base of the median lobes, whereas on *A. cyanophylli* the distance to the margin of the anal opening is longer than its diameter. Body shape of adult female *Hemiberlesia* is roundly oval with pygidium more oval. Median lobes prominent, set quite close together, not yoked, notched subequally on inner and lateral margins and rounded apically; 2nd and 3rd lobes mere points or unrecognisable. With a pair of slender plates in medial space, laterally plates longer than median lobes, fimbriate

on their lateral margins, then becoming a few pairs of simple gland spines beyond position of L3. Dorsal ducts 1-barred, very long and slender, arranged in short poriferous furrows on pygidium with very strongly sclerotised marginal paraphyses on each furrow. Pygidium with a pair of pre-anal bars. Perispircular pores absent. Antenna with 1 seta. Ventral microducts numerous submarginally. For a comparison of the female pygidia of 4 other common pest species with *H. lataniae* and *H. rapax* see Fig. 6–11.

Key to *Hemiberlesia* adult females in New Zealand

- 1 Perivulvar pores present *lataniae* (Signoret)
 —Perivulvar pores absent *rapax* (Comstock)

Hemiberlesia lataniae (Signoret) A *latania* scale

Fig. 10, 53–54, 161; Map 19

Aspidiotus lataniae Signoret, 1869a: 124.

Aspidiotus cydoniae var. *tecta* Maskell, 1897a: 240; Maskell 1898: 224 [Hawaii]; Borchsenius 1966: 306

Hemiberlesia lataniae (Signoret); Cockerell 1905: 202; Danzig 1993: 174; Gill 1997: 156; Charles & Henderson 2002: 600; Miller & Davidson 2005: 224.

Live appearance and habitat. Female scale cover subcircular, pale beige or tan with light brown exuvia usually subcentral, moderately convex. Body deep yellow with dark ‘V’ shape on posterior pygidium, eggs and crawlers yellow (usually produces eggs that hatch into crawlers under the scale cover). Usually on leaves or petioles, fruit, and sometimes on stems. Life-cycle in New Zealand is uniparental with 2 overlapping generations a year.

Diagnosis. Adult female (Fig. 161) with perivulvar pores present; with a slender dorsal duct between median lobes.

Material examined. See Appendix A (p. 227) for details of 400 specimens examined.

Distribution. ND, AK, CL, WO, BP, GB, HB, TK, WN / —

Host plants. I. on **adventive** plants: Actinidiaceae: *Actinidia arguta*, *A. chinensis*, *A. deliciosa*; Agavaceae: *Furcraea* sp.; Araliaceae: *Cussonia spicata*; Arecaceae: *Philodendron* sp.; Buxaceae: *Buxus sempervirens*; Celastraceae: *Euonymus* sp.; Clusiaceae: *Hypericum* sp.; Cupressaceae: *Cuprocyparis leylandii*; Cycadaceae: *Cycas revoluta*; Fabaceae: *Ulex europaeus*; Iridaceae: evergreen iris; Lauraceae: *Persea americana*; Mimosaceae: *Acacia* sp.; Moraceae: *Ficus benjamina*, *F. pumila*; Myrtaceae: *Eucalyptus* sp.; Proteaceae: *Macadamia* sp.; Rosaceae: *Crataegus monogyna*; Rutaceae: *Citrus limon*; Salicaceae: *Populus* sp.; Sapindaceae: *Litchi chinensis*; Solanaceae: *Solanum linnaeanum*, *S. mauritianum*; Strelitziaceae:

Strelitzia reginae; Ulmaceae: *Zelkova serrata*; Vitaceae: *Vitis vinifera*.

II. on **native and endemic** plants: Araliaceae: *Pseudopanax crassifolius*; Arecaceae: *Rhopalostylis baueri*; Asteraceae: *Ozothamnus leptophyllus*; Asteraceae: *Pachystegia insignis*; Epacridaceae: *Leucopogon fasciculatus*; Grossulariaceae: *Carpodetus serratus*; Iridaceae: *Libertia ixioides*; Malvaceae: *Hoheria populnea*, *Plagianthus divaricatus*; Meliaceae: *Dysoxylum spectabile*; Moraceae: *Streblus heterophyllus*; Myrsinaceae: *Myrsine australis*; Piperaceae: *Macropiper excelsum*; Podocarpaceae: *Dacrycarpus dacrydioides*; Rosaceae: *Rubus australis*; Rubiaceae: *Coprosma areolata*; Sapindaceae: *Alectryon excelsus*; Scrophulariaceae: *Hebe ligustrifolia*; Tiliaceae: *Entelea arborescens*; Verbenaceae: *Vitex lucens*; Viscaceae: *Korthalsella salicornioides*.

Remarks. *Latania* scale was regularly intercepted by quarantine officials on imported plants from at least 1951. First record of establishment in New Zealand: 1979 (Morales 1988).

The species is found throughout the North Island on a wide variety of fruit crops on wood, leaves, and fruits. It is likely to be an increasing pest of fruit crops such as kiwifruit, avocado, and mandarins. It was first recorded on native plants in unmodified forests in 1998 (Charles & Henderson 2002).

Hemiberlesia rapax (Comstock) A *greedy* scale

Fig. 11, 55–56, 162; Map 20

Aspidiotus camelliae Signoret, 1869b: 117 [not Boisduval, 1867]; Comstock 1883: 56, 67; Maskell 1879: 200; Fernald 1903: 276 [preoccupied].

Aspidiotus rapax Comstock, 1881: 307; Maskell 1891: 3; Fernald 1903: 276.

Diaspis santali Maskell, 1884: 122; 1885: 23; 1890: 135; Myers 1922: 201 [synonymy, as *Aspidiotus rapax*].

Hemiberlesia camelliae (Signoret); MacGillivray 1921: 435. *Aspidiotus* (*Hemiberlesia*) *camelliae* (Signoret); Green 1929: 377.

Hemiberlesia rapax (Comstock); Danzig 1993: 172; Gill 1997: 157; Charles & Henderson 2002: 600; Miller & Davidson 2005: 232.

Live appearance and habitat. Female scale cover oval, darker beige than that of *latania* scale, convex, higher at one end and tilted over at site of exuvia, 1st and 2nd exuvia together dark brown-black, this being distinctive. Body deep yellow, crawlers yellow (usually produces crawlers rather than having eggs that hatch under the scale cover). On leaves, fruit, stems, and bark of trees.

Diagnosis. Adult female (Fig. 162): The enormous anal opening very close to the pygidium margin, combined with the absence of perivulvar pores, are diagnostic.

Material examined. See Appendix A (p. 228) for details of 612 specimens examined.

Distribution. TH / ND, AK, CL, WO, BP, GB, HB, TK, TO, WI, WA, WN / SD, NN, KA, NC, MC.

Host plants. I. on **adventive** plants: Actinidiaceae: *Actinidia arguta*, *A. deliciosa*; Aquifoliaceae: *Ilex* sp.; Araliaceae: *Hedera* sp.; Arecaceae: *Howea forsteriana*, *Phoenix roebelenii*; Buxaceae: *Buxus sempervirens*; Cactaceae: *Cactus* sp.; Clusiaceae: *Hypericum* sp.; Crassulaceae: *Sedum rubrotinctum*; Cucurbitaceae: *Cucurbita* sp.; Ericaceae: *Vaccinium corymbosum*, *V. virgatum*; Fabaceae: *Paraserianthes lophantha*, *Ulex europaeus*, *Virgilia* sp.; Grossulariaceae: *Ribes nigrum*; Juglandaceae: *Carya illinoensis*; Lauraceae: *Laurus nobilis*; Malvaceae: *Asterotrichion discolor*; Mimosaceae: *Acacia verticillata*, *Acacia* sp.; Musaceae: *Musa* sp.; Myrtaceae: *Eucalyptus* sp., *Metrosideros collina*, *Myrtus communis*, *Myrtus* sp.; Oleaceae: *Ligustrum ovalifolium*, *Ligustrum* sp.; Proteaceae: *Banksia integrifolia*, *Hakea* sp.; Rhamnaceae: *Ceanothus papillosus*, *Ceanothus* sp.; Rosaceae: *Malus domestica*, *Pyrus communis*; Rutaceae: *Citrus limon*, *Coleonema pulchellum*, *Nematolepis squameum*, *Poncirus trifoliata*; Salicaceae: *Salix discolor*, *Salix* sp.; Sapindaceae: *Litchi chinensis*; Theaceae: *Camellia tsaii*, *Camellia* sp.

II. on **native and endemic** plants: Agavaceae: *Cordyline* sp., *Phormium tenax*; Araliaceae: *Pseudopanax ferox*, *P. laetus*, *Raukawa anomalus*, *Schefflera digitata*; Asteraceae: *Brachyglottis repanda*, *Olearia albida*, *O. rani*, *O. solandri*, *Ozothamnus leptophyllus*, *Pachystegia insignis*; Cornaceae: *Corkia cotoneaster*; Corynocarpaceae: *Corynocarpus laevigatus*; Cunoniaceae: *Weinmannia silvicola*; Elaeocarpaceae: *Aristotelia serrata*, *Elaeocarpus hookerianus*; Fabaceae: *Carmichaelia australis*, *Sophora tetraptera*; Griseliniaceae: *Griselinia lucida*; Grossulariaceae: *Carpodetus serratus*; Lauraceae: *Beilschmiedia tawa*, *B. tawaroa*; Liliaceae: *Astelia* sp.; Malvaceae: *Hoheria angustifolia*, *H. populnea*, *H. sexstylosa*, *Hoheria* sp., *Plagianthus divaricatus*; Meliaceae: *Dodonaea viscosa*, *Dysoxylum spectabile*; Monimiaceae: *Laurelia novae-zelandiae*; Moraceae: *Streblus heterophyllus*, *S. smithii*; Myoporaceae: *Myoporum laetum*; Myrsinaceae: *Myrsine australis*; Myrtaceae: *Kunzea ericoides*, *Leptospermum scoparium*, *Leptospermum* sp., *Lophomyrtus obcordata*, *Metrosideros fulgens*, *Syzygium maire*; Oleaceae: *Nestegis lanceolata*, *N. montana*; Onagraceae: *Fuchsia excorticata*; Piperaceae: *Macropiper excelsum*; Pittosporaceae: *Pittosporum tenuifolium*, *Pittosporum* sp.; Podocarpaceae: *Halocarpus bidwillii*, *Prumnopitys taxifolia*; Proteaceae: *Knightia excelsa*; Restionaceae: *Empodisma minus*; Rhamnaceae: *Pomaderris apetala*, *P. phyllicifolia*; Ripogonaceae: *Ripogonum scandens*; Rubiaceae: *Coprosma*

grandifolia, *C. propinqua*, *C. rhamnoides*, *C. robusta*, *C. rotundifolia*, *Coprosma* sp.; Rutaceae: *Leionema nudum*; Santalaceae: *Mida salicifolia*; Sapindaceae: *Alectryon excelsus*; Sapotaceae: *Pouteria* sp.; Scrophulariaceae: *Hebe topiara*, *Hebe* sp.; Solanaceae: *Solanum aviculare*; Urticaceae: *Urtica ferox*; Verbenaceae: *Vitex lucens*; Viscaceae: *Korthalsella lindsayi*, *K. salicornioides*; Winteraceae: *Pseudowintera colorata*.

Remarks. The first record in New Zealand was 1879 as *Aspidiotus camelliae* (Maskell 1879). It was already feeding on native plants by 1884 when Maskell described it as a new 'native' species, *Diaspis santali*, from on *Nestegis cunninghamii* (as *Santalum cunninghamii*). A year later it was reported as a pest of pear, plum, and other fruit trees (Maskell 1885). Greedy scale is now a significant pest of subtropical fruit crops in the North Island (Charles & Henderson 2002). The list of records on native plants continues to expand, although greedy scale does not seem to cause much damage to them.

Genus KUWANASPIS MacGillivray

Kuwanaspis MacGillivray, 1921: 311.

Type species: *Chionaspis hikosani* Kuwana, by monotypy & original designation.

Kuwanaspis pseudoleucaspis (Kuwana) A bamboo scale

Fig. 57–58, 163; Map 21

Leucaspis bambusae Kuwana, 1902: 74; Fernald 1903: 244. *Chionaspis pseudoleucaspis* Kuwana, 1923: 323 [replacement name]; Takagi 1985: 48.

Tsukushiaspis pseudoleucaspis (Kuwana); Kuwana 1928: 31. *Kuwanaspis pseudoleucaspis* (Kuwana); Lindinger 1935: 139; Dekle 1976: 98; Gill 1997: 165; Charles & Henderson 2002: 601; Miller & Davidson 2005: 240.

Live appearance and habitat. Female scale cover elongate, white (sometimes splotted grey with sooty mould if aphid species co-exist on the bamboo), light brown exuvia terminal; body bright yellow. Usually on stem nodes of bamboo canes under bud scales, sometimes spreading away from nodes if canes in a well-sheltered position.

Diagnosis. Adult female (Fig. 163) body shape fusiform but unusually narrow at prosoma and head rather pointed; body membranous except for pygidium. Pygidium broad, rounded, with 2 pairs of lobes, L2 bilobate; L1 well separated, each notched once medially and laterally and with 1 pair of long basal paraphyses; L2 similar in shape and paraphyses, smaller than L1, the medial lobule larger than lateral lobule. With 1 pair of short plates in medial space, a

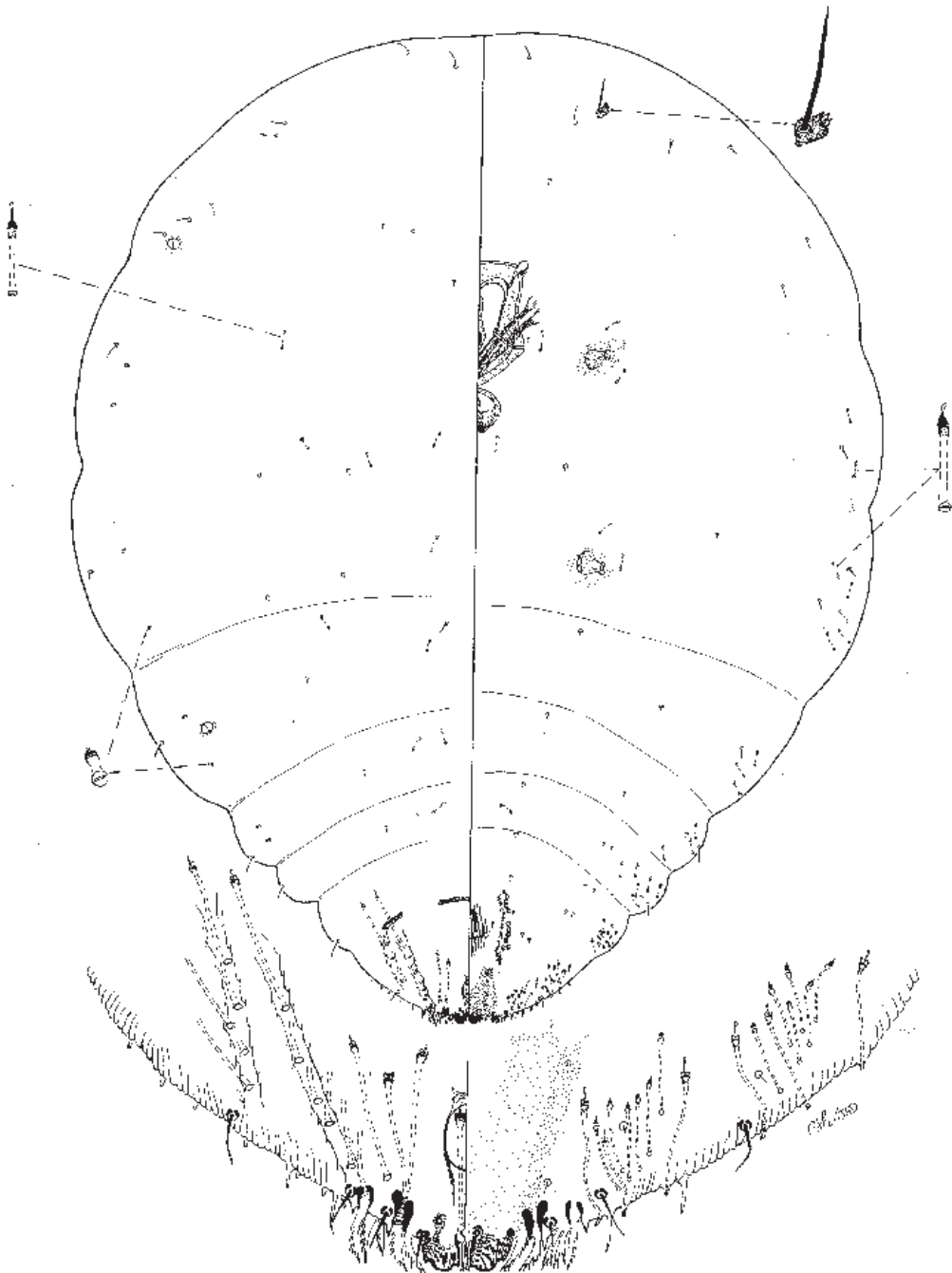


Fig. 161 *Hemiberlesia lataniae* (Signoret), adult female (from Miller & Davidson 2005).

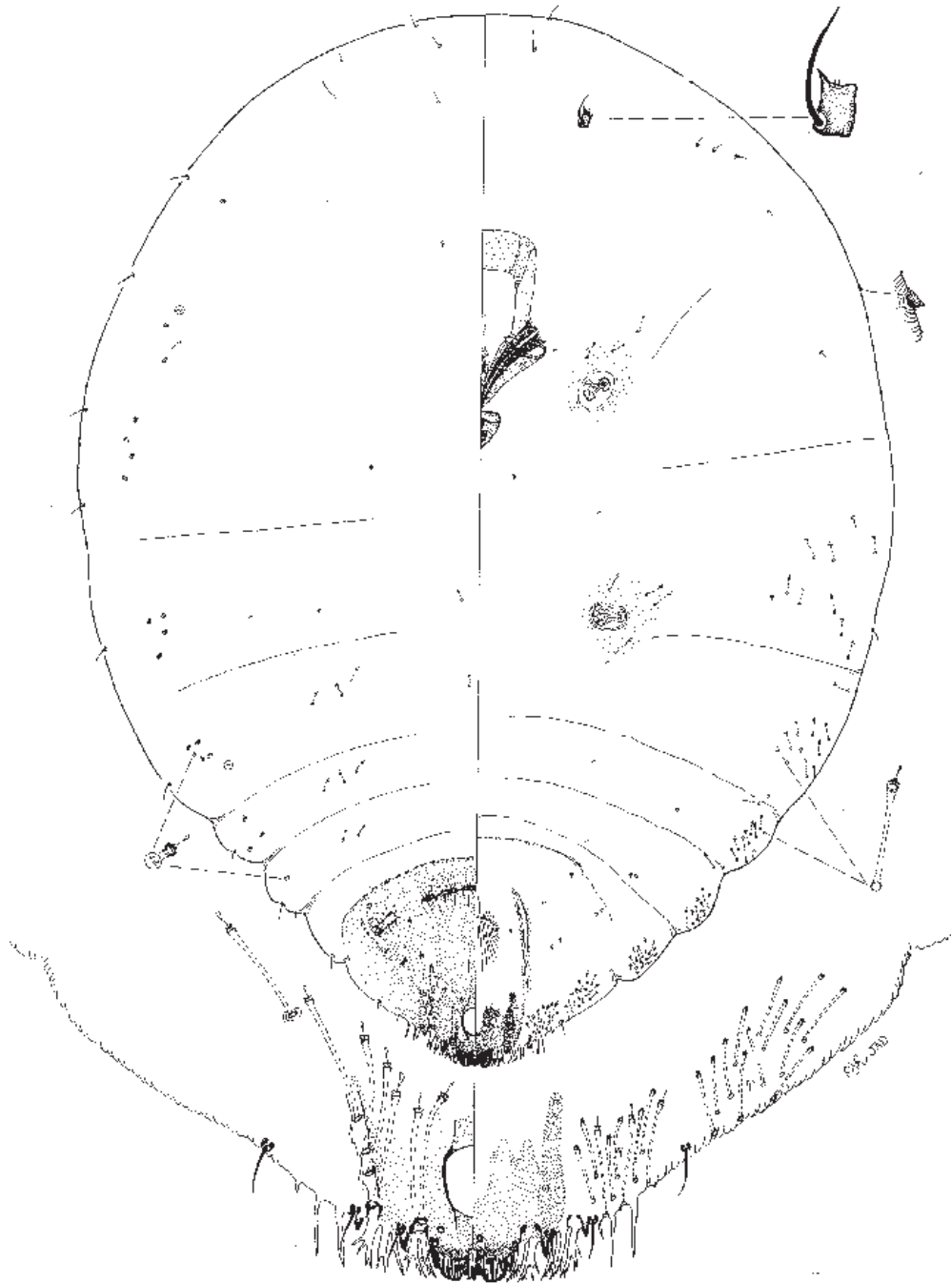


Fig. 162 *Hemiberlesia rapax* (Comstock), adult female (from Miller & Davidson 2005).

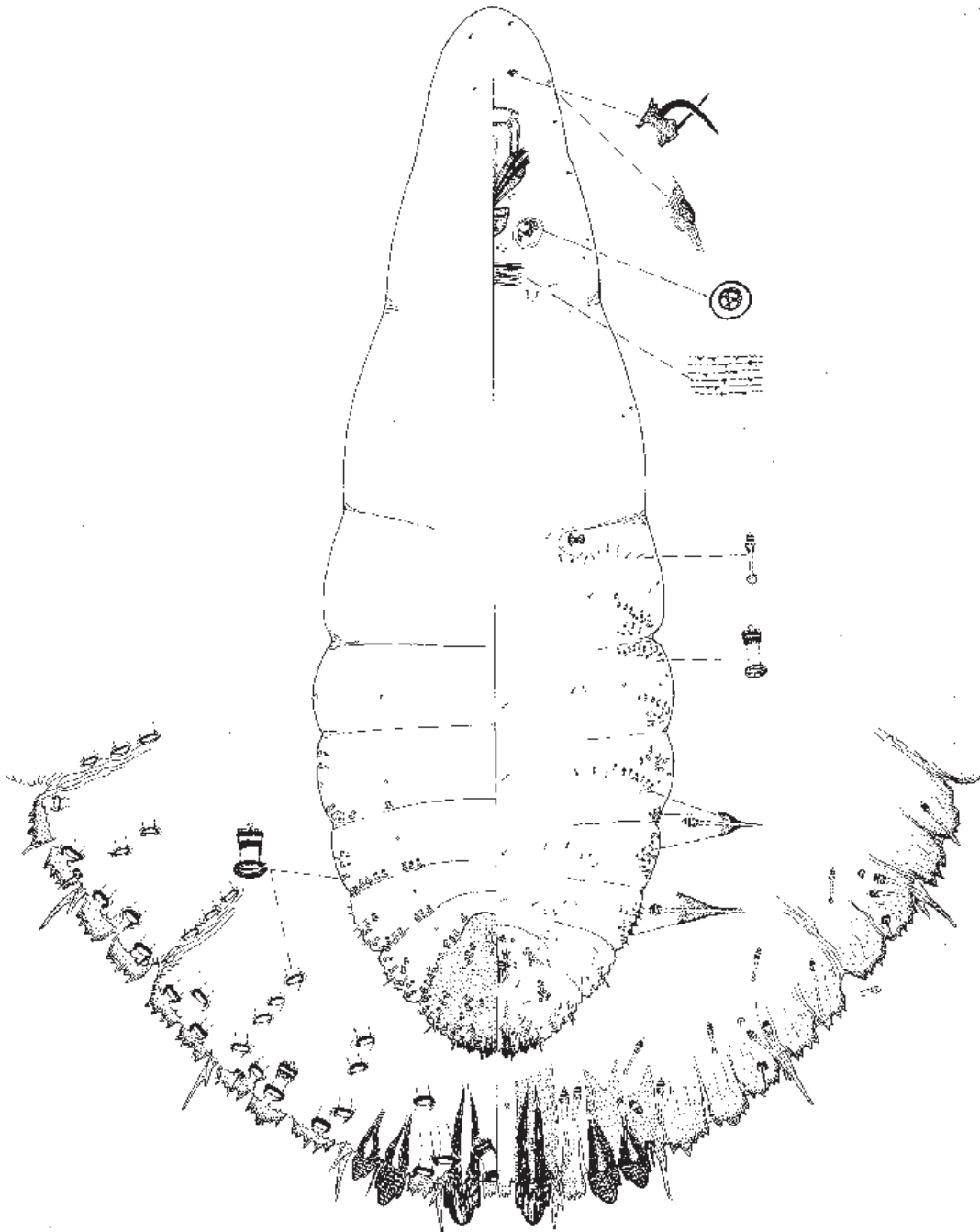


Fig. 163 *Kuwanaspis pseudoleucaspis* (Kuwana), adult female (from Miller & Davidson 2005).

double gland spine, and short plate between L1 and L2, then 3 pairs of double gland spines alternating with a series of plates to segment IV.

Dorsal ducts 2-barred, in short rows on submedian pygidium and prepygidium, with groups on submargin to segment III. Anal opening near anterior of pygidium. Microducts scattered on venter, more numerous near posterior spiracle. Ducts smaller than dorsal ducts, and gland tubercles on ventral submargin to metathorax. With a small group of pores by anterior spiracles, absent by posterior spiracles. Antenna with 1 stout and 1 fine seta.

Material examined. See Appendix A (p. 230) for details of 64 specimens examined.

Distribution. AK / —

Host plants. Poaceae: *Bambusa multiplex* var., *Bambusa multiplex*, var. 'Alphonse Karr', bamboo, *Phyllostachys aurea*.

Remarks. The first record in New Zealand was 1976. It is known only from the Auckland region.

Genus *LEPIDOSAPHES* Shimer

Lepidosaphes Shimer, 1868: 373.

Type species: *Lepidosaphes conchiformis* Shimer, by monotypy.

Diagnosis. The genus currently contains 165 species (Miller & Gimpel, ScaleNet, 2010), 5 of which are present in New Zealand. Female body fusiform, usually with well developed lateral abdominal lobes, these with marginal gland spines, or gland tubercles further forward. Median lobes (L1) not yoked, separated, with 1 pair of gland spines in medial space, L2 bilobed, paraphyses if present short, L3 insignificant.

Dorsal ducts 2-barred, usually 6 pairs of marginal macroducts, ducts on submargin and submedian abdomen often numerous, with similar ducts also on submargins of anterior abdomen and thorax. Dorsal submarginal bosses often present. Lateral tubercles or spurs often present between some abdominal segments. Perivulvar pores present in 5 groups.

Key to *Lepidosaphes* adult females in New Zealand

- 1 Numerous dorsal ducts present on submedial segments VI and VII of pygidium; on various hosts except conifers 2
—A few dorsal ducts present on submedial segment VI of pygidium, absent on VII; on conifers
..... *pallida* (Maskell)

- 2(1) With a dorsal boss on submargin of most prepygidial abdominal segments; larger ventral ducts (not including microducts) forming a continuous band across body at level of posterior spiracles 3
—Without bosses on submargin of abdomen; larger ventral ducts not in a continuous band between posterior spiracles 4
3(2) With a stout spine on margin at angle between prepygidial abdominal segments; without a double boss on submargin of prothorax *ulmi* (Linnaeus)
—Without a lateral spine or spur at angle between prepygidial abdominal segments; with a double boss present on dorsal submargin each side of prothorax, slightly forward of level of anterior spiracle
..... *beckii* (Newman)
4(2) Eye present as a stout spine on each side of head; without a large group of submedian microducts posterior to mouthparts *pinnaeformis* (Bouché)
—Eye not a stout spine; submedian microducts in a large group posterior to mouthparts. *multipora* (Leonardi)

Lepidosaphes beckii (Newman) A purple scale

Fig. 59, 164; Map 22

Coccus beckii Newman, 1869: 217.

Aspidiotus citricola Packard, 1869: 257.

Mytilaspis citricola (Packard); Maskell 1890: 135; 1895: 48; Thomson 1922:332.

Cornuaspis beckii (Newman); Borchsenius 1963: 1168; 1966: 57; Williams & Watson 1988: 146 [synonymy].

Lepidosaphes beckii (Newman); Fernald 1903: 305; Myers 1922: 201; Danzig 1993: 279; Gill 1997: 169; Charles & Henderson 2002: 601; Miller & Davidson 2005: 244.

Live appearance and habitat. Elongate mussel shell-shaped, often curved to fit with other nearby scales in a crowded population, light to medium brown colour. Habitat leaves, bark, and fruit.

Adult female, measurements taken from 7 specimens (Fig. 164). Body elongate, widest at abdomen with well developed prepygidial lobes; length 0.78–1.56 mm, width 0.44–0.76 mm. Median lobes (L1) about as wide as long, either notched each side or serrate; 1 pair of setae and 1 pair of gland spines in medial space; L2 bilobed, medial lobule 2× as wide as lateral lobule and with a small notch; L3 as crenulations on margin. 6 pairs of marginal macroducts.

Dorsal ducts of 1 size, smaller than marginal macroducts, numerous on submedial pygidium VI (and VII), present in submedian rows and numerous on submargin as far forward as metathorax. Dorsal boss present on each side of abdomen I, II, and IV; a double boss present

laterally each side of head. Anal opening round, 12–15 µm, as long as wide, positioned near anterior of pygidium, 137–162 µm from posterior margin.

Ventral ducts similar to dorsal ducts present submarginally on prepygidial segment I and most numerous on meso- and metathorax, with a band extending across body between posterior spiracles; microducts scattered on submargins of body and on submedian abdomen; gland spines prominent on margins of free abdominal lobes, reducing to gland tubercles anteriorly, and a few near posterior spiracles; antenna usually with 2 long setae. Anterior spiracles each with 8–10 trilocular pores; posterior spiracles without pores. Perivular pores in 5 moderately elongate groups. Vulva position posterior to that of anal opening, about 85 µm from posterior margin.

Material examined. See Appendix A (p. 230) for details of 22 specimens examined.

Distribution. AK, GB / NN

Host plants. Rutaceae: *Citrus paradisi*, *C. sinensis*.

Remarks. The presence of lateral double dorsal bosses on the head distinguishes *L. beckii* from other *Lepidosaphes* species in New Zealand. *L. beckii* is most similar to *L. ulmi* in possessing a ventral band of ducts between the posterior spiracles, and dorsal abdominal bosses, but lacks the lateral abdominal spinose spurs of *L. ulmi*. *L. beckii* shares prominent groups of gland spines on the free abdominal segments with *L. pinnaeformis*, but lacks its spinose eye.

Lepidosaphes multipora (Leonardi) A eucalyptus mussel scale

Fig. 60, 165; Map 23

Mytilaspides multipora Leonardi, 1904: 87; Green, 1905: 6. *Lepidosaphes multipora* (Leonardi); Sanders 1906: 17; MacGillivray 1921: 285; 36; Thomson 1922: 332 [as *Lepidosaphes nullipora*; cited by Wise 1977: 108]; Laing 1929: Borchsenius 1966: 50; Charles & Henderson 2002: 602.

Mytilaspis eucalypti Froggatt, 1914: 610; Froggatt 1915: 39; Charles & Henderson 2002: 602 [synonymy].

Lepidosaphes eucalypti (Froggatt); Myers 1922: 201; Green 1929: 377; Wise 1977: 107.

Lepidosaphes ulmi var. *novozealandica* Green, 1929: 378; Charles & Henderson 2002: 602 [synonymy].

Lepidosaphes novozealandica Green; Borchsenius 1966: 50.

Live appearance and habitat. The photographed dry material of massed scale covers on bark (Fig. 60) is part of the original syntype collection obtained from the BMNH. Female scale covers appear medium brown with a pale posterior section and gold-brown terminal exuvia. No other material was available.

Adult female measurements taken from 10 specimens mounted from the syntype dry material now designated as lectotype and paralectotypes (Fig. 165). Body elongate, widest at abdomen with well developed prepygidial lobes; length 0.71–1.02 mm, width 0.37–0.45 mm. Median lobes (L1) about as wide as long, either notched each side or serrate, with paraphyses each side extending onto submargin; 1 pair of setae and 1 pair of gland spines in medial space; L2 bilobed, medial lobule 2× as wide as lateral lobule and with a small notch; L3 short, wide, dentate. Gland spines present between lobes. 6 pairs of marginal macroducts.

Dorsal ducts of 1 size, smaller than marginal macroducts, numerous on submedian pygidium VI and VII and usually with several ducts extending anterior to anal opening, numerous on submedian-submargin of V and IV, then on submargin as far forward as metathorax. Dorsal bosses absent. Usually with 1 long seta present on dorsal cephalothorax. Anal opening margin thick, with a sclerotised ‘tail’ extending posteriorly, opening round, 15–20 µm long as wide, positioned near anterior of pygidium, 137–165 µm from posterior margin.

Ventral ducts similar to dorsal ducts present submarginally on prepygidial segment III to I and more numerous on metathorax near posterior spiracle, without a band extending across body between posterior spiracles. Microducts scattered on submargins of abdomen and head, numerous on submedian abdomen and noticeably numerous on submedian mesothorax. Gland spines on margins of free abdominal lobes few, reducing to gland tubercles anteriorly. Antenna with 2 or 3 long setae. Anterior spiracles each with 9–16 trilocular pores; posterior spiracles without pores. Perivular pores in 5 moderately elongate groups. Vulva position posterior to that of anal opening, about middle of pygidium, 100–120 µm from posterior margin.

Material examined. *Mytilaspides multipora* Leonardi. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, Auckland, ca.1903-1904, J. Lidgett, *Pittosporum undulatum* stem/bark, #07-093b, [1]: 1 F. Barcode NZAC02005957 (NZAC). **Paralectotypes**, collection data as above, #07-093a, c–g, [6]: 9F, 3 f2nd, 3 exuv2, 1 exuv1. All the above slides mounted (by RCH 2007) from part of the original syntype dry material collection obtained from the BMNH. (BMNH and NZAC). **Other female syntypes** (not examined, not obtained): Portici: Dipartimento de Entomologia e Zoologia Agraria di Portici, Università di Napoli Federico II, Italy.

Lepidosaphes ulmi var. *novozealandica* Green. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, MC, slide labelled “from apricot, Governor’s Bay, N.Z. 1922. Coll.

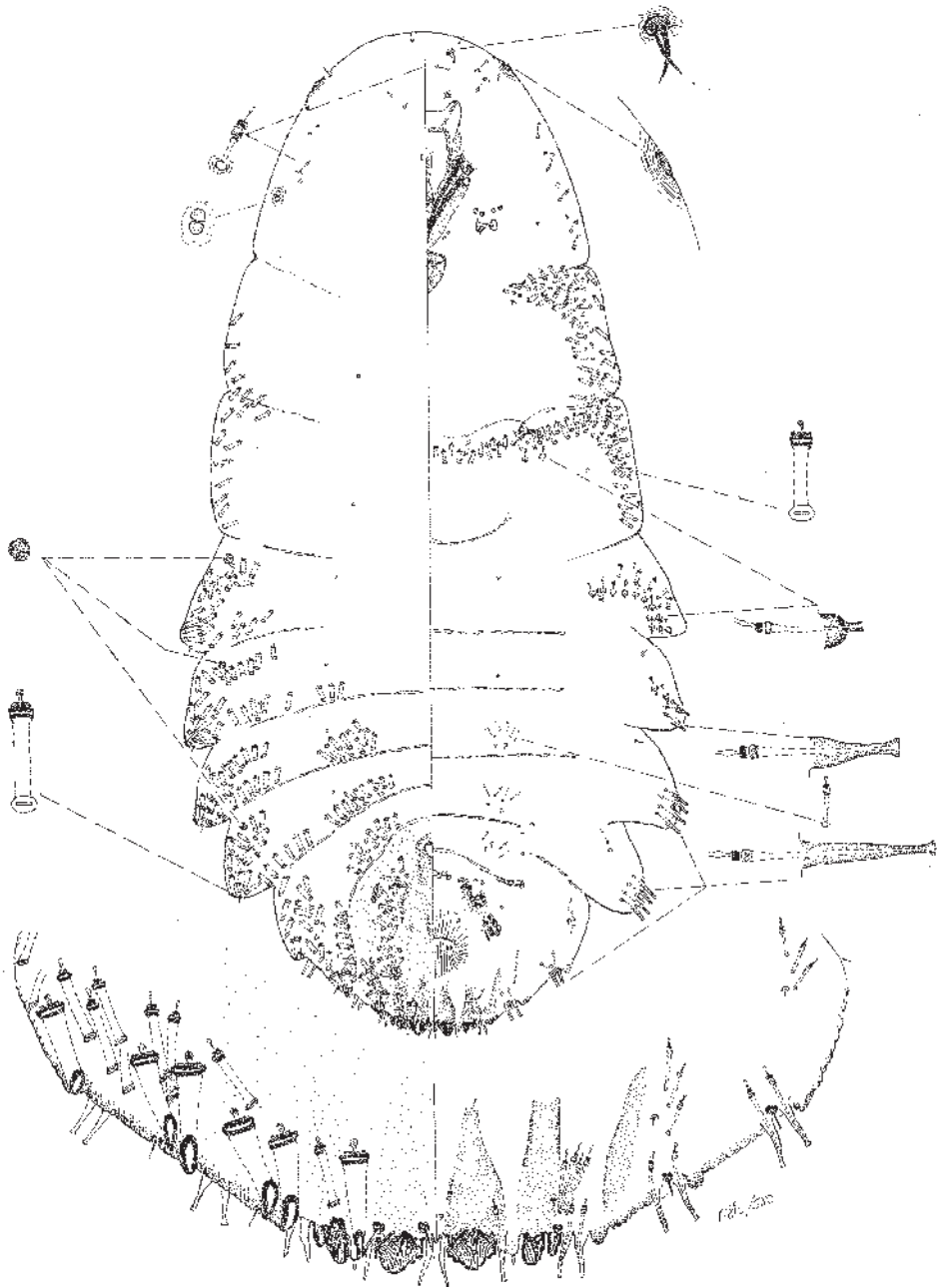


Fig. 164 *Lepidosaphes beckii* (Newman), adult female (after Miller & Davidson, 2005).



Fig. 165 *Lepidosaphes multipora* (Leonardi), adult female.

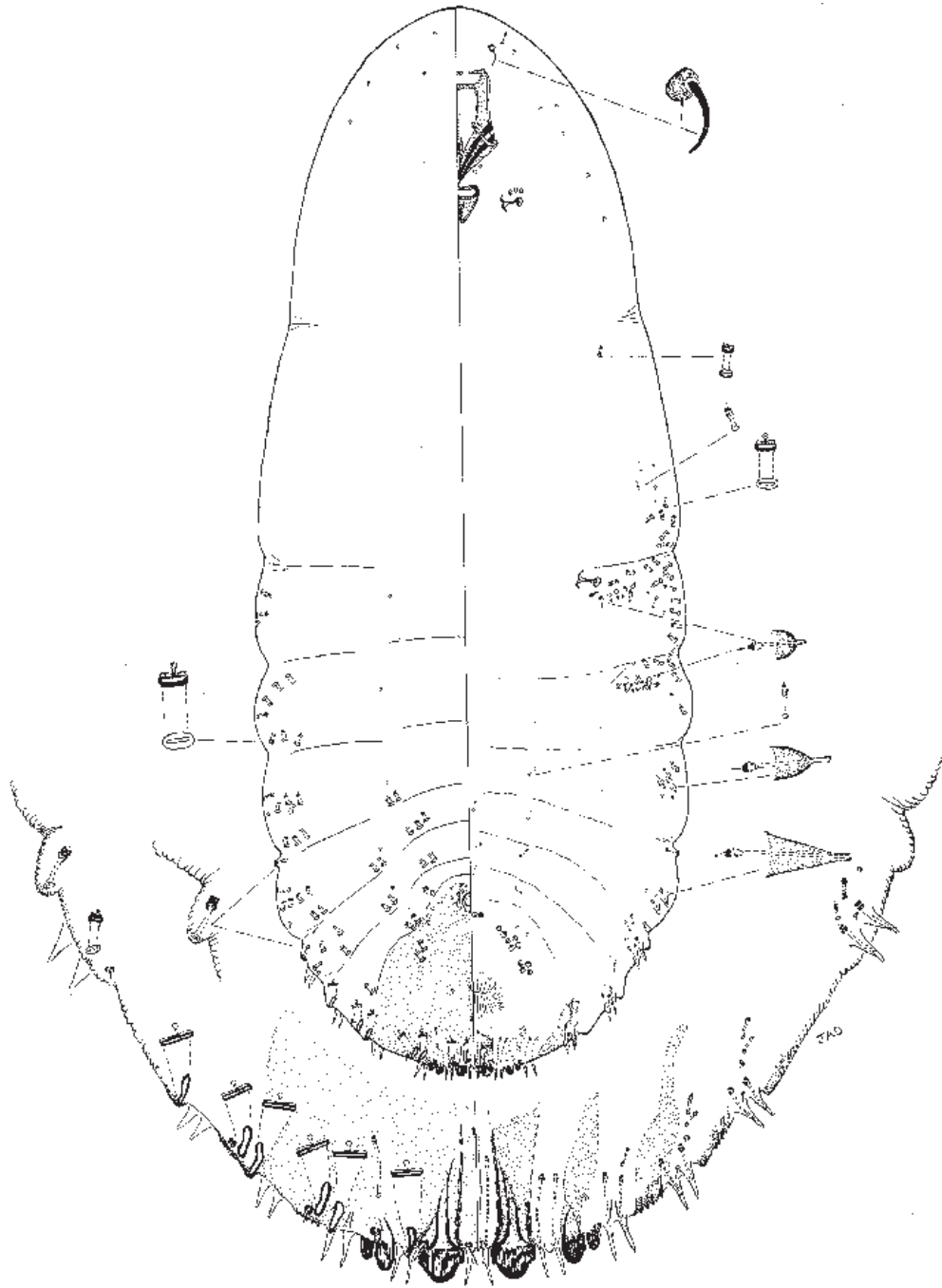


Fig. 166 *Lepidosaphes pallida* (Maskell), adult female (from Miller & Davidson 2005).

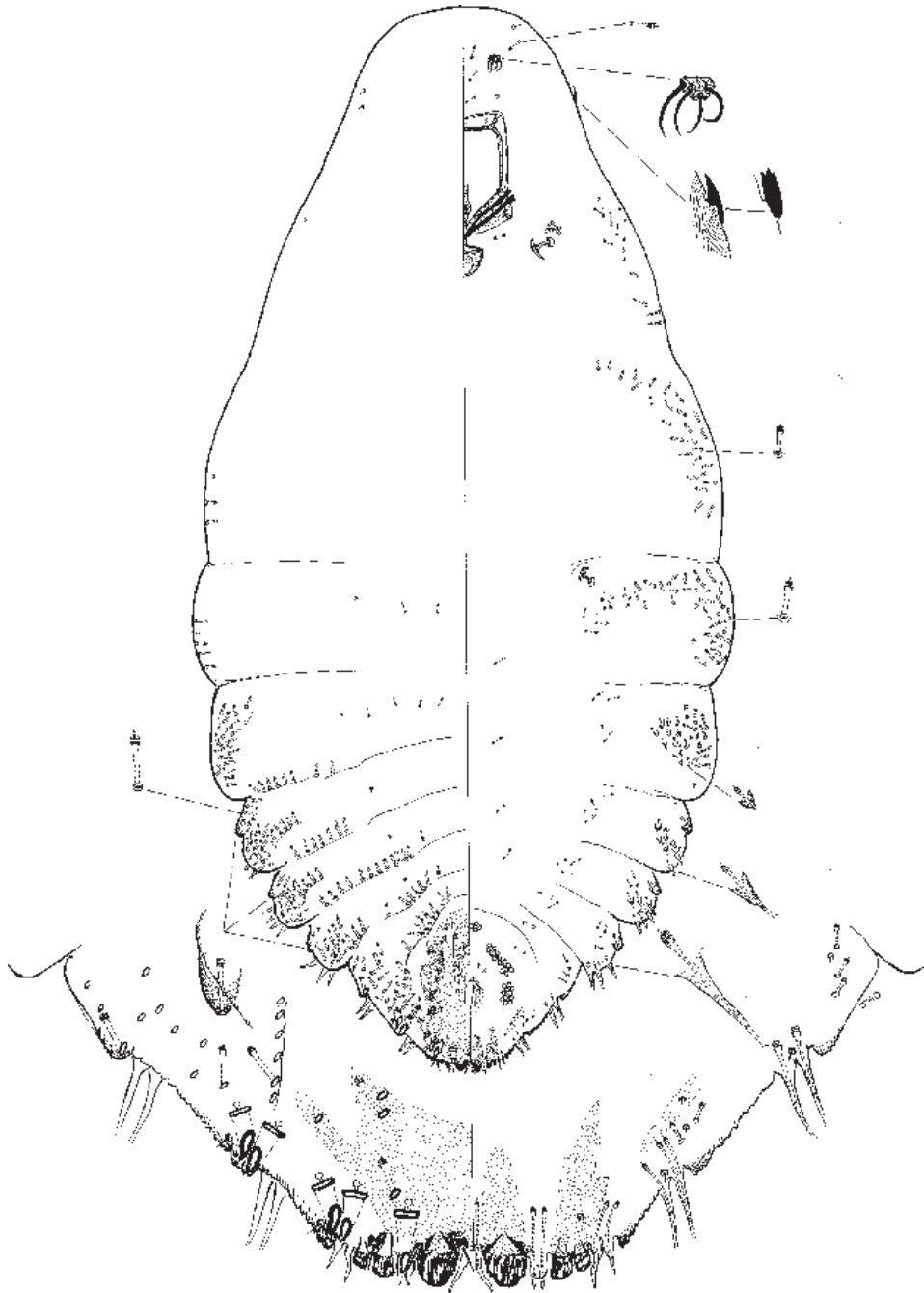


Fig. 167 *Lepidosaphes pinnaeformis* (Bouché), adult female (from Miller & Davidson 2005).

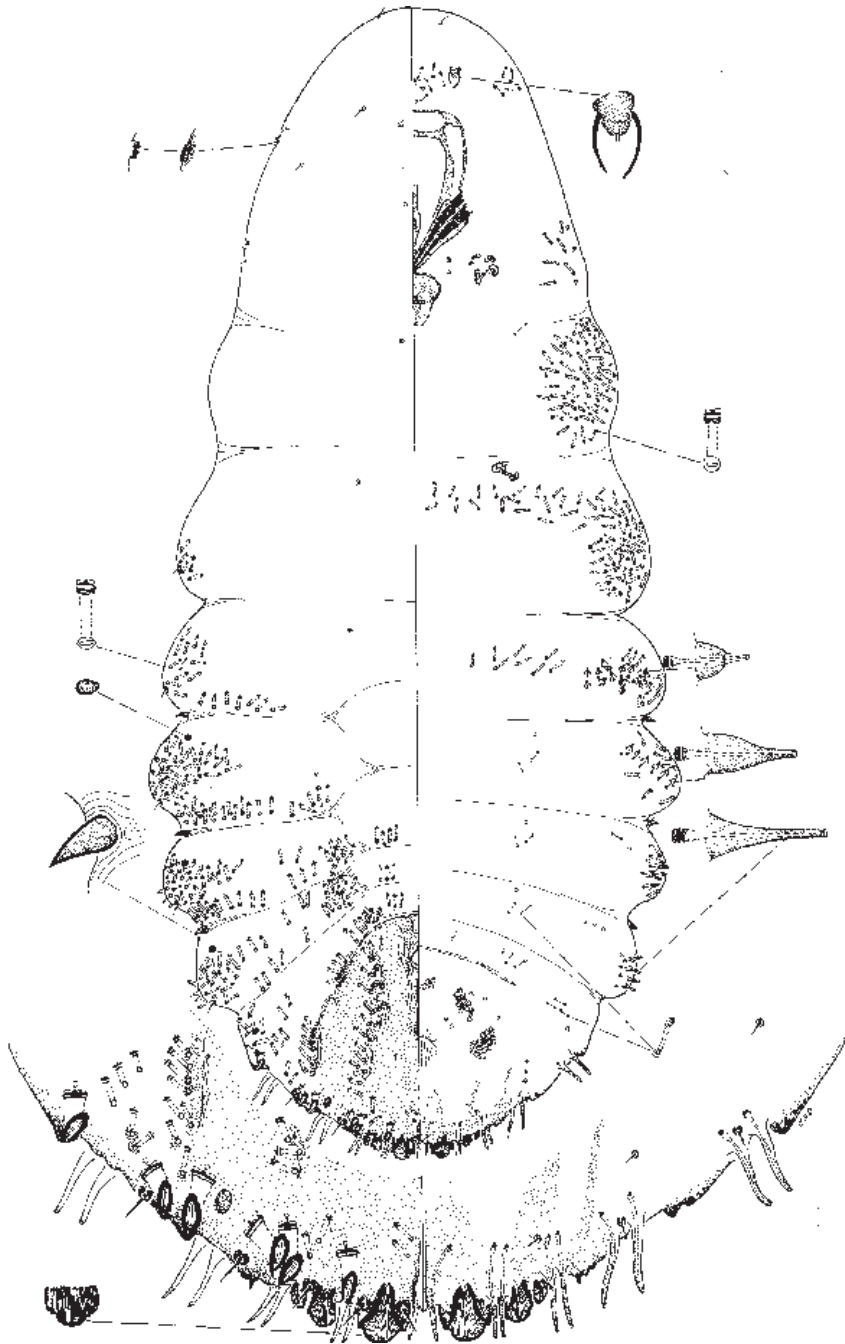


Fig. 168 *Lepidosaphes ulmi* (Linnaeus), adult female (from Miller & Davidson 2005).

Myers 255." The lectotype was selected by me in 2001 and is the female on the end of the outer row, nearest "TYPE" label [1]: 1 F (BMNH). **Paralectotypes**, on the same slide as the lectotype [1]: 8 F, 4 exuv2 + 3 scale covers glued separately.

Other material examined. See Appendix A (p. 231) for details of 6 specimens examined.

Distribution. AK / NN, DN

Host plants. Brassicaceae: *Capsella bursa-pastoris*; Myrtaceae: *Eucalyptus regnans*, *Eucalyptus* sp., Pittosporaceae: *Pittosporum undulatum*.

Remarks. The presence of numerous submedian microducts on the mesothorax distinguishes *L. multipora* from other *Lepidosaphes* species in New Zealand. *L. multipora* is most similar to *L. ulmi* in possessing numerous dorsal ducts but lacks the ventral band of ducts between the posterior spiracles, the lateral abdominal spinose spurs, and dorsal abdominal bosses of *L. ulmi*. *L. multipora* differs from *L. beckii* by lacking lateral double bosses, and from *L. pinnaeformis* by lacking eye spurs.

***Lepidosaphes pallida* (Maskell) A Maskell scale**

Fig. 61, 166; Map 24

Mytilaspis pallida var.? Maskell, 1895: 46.

Mytilaspis pallida var. *maskelli* Cockerell, 1897b: 704; Borchsenius 1937: 77 [unjustified replacement name].

Lepidosaphes maskelli (Cockerell); Balachowsky 1954: 87; McKenzie 1956: 123.

Insulaspis pallida (Maskell); Williams 1969a: 60; 1969b: 114.

Lepidosaphes pallida (Maskell); Zimmerman 1948: 418; Danzig 1993: 265; Charles & Henderson 2002: 602; Miller & Davidson 2005: 256.

Live appearance and habitat. Female scale cover light yellow-brown or tan, with pale, slender, terminal exuvia lying further forward from position of female body, which is pale, eggs pale. On leaves or base of leaves of its coniferous hosts.

Adult female, measurements taken from 5 specimens (Fig. 166). Body elongate, fusiform, slightly wider at abdomen, prepygidial lobes not particularly developed; length 0.7–1.2 mm, width 0.28–0.47 mm. Median lobes (L1) small, rounded, about as wide as long, notched each side, with slender paraphyses each side extending onto submargin; medial space same width as one median lobe, with 1 pair of setae and 1 pair of gland spines; L2 bilobed, medial lobule 2× as wide as lateral lobule and with a small notch; L3 crenulations on margin. Gland spines between lobes. 6 pairs of marginal macroducts.

Dorsal ducts of 1 size, smaller than marginal macroducts, few distributed on submedian pygidium VI and on submedian to segment II, with a gap to submarginal ducts on V to as far forward as metathorax. Dorsal bosses absent. Anal opening small, oval, 10–12 µm, positioned near anterior of pygidium, 115–125 µm from posterior margin.

Ventral ducts similar to dorsal ducts but smaller, present submarginally on prepygidial segment I and metathorax near posterior spiracle with a few on mesothorax, without a band extending across body between posterior spiracles. Microducts few, scattered on submargins of abdomen and head, and on submedian abdomen. Gland spines on margins of free abdominal lobes few, reducing to fairly numerous gland tubercles anteriorly. Antenna with 1 or 2 long setae. Anterior spiracles each with 2–5 trilocular pores; posterior spiracles without pores. Perivular pores in 5 moderately elongate groups, with a total 21–24 pores on each female which is fewer than on other species in New Zealand. Vulva position posterior to that of anal opening, at about 1/3 or 62–67 µm from posterior margin.

Material examined. See Appendix A (p. 231) for details of 51 specimens examined.

Distribution AK / —

Host plants. Taxodiaceae: *Cryptomeria japonica* (in New Zealand).

Remarks. First record in New Zealand: March 2001.

The relatively small number of ducts and the gap between submedian and submarginal duct series distinguishes *L. pallida* from other *Lepidosaphes* species in New Zealand. *L. pallida* also lacks distinguishing features of the other species, e.g., *L. beckii*, lateral double bosses on head; *L. multipora*, numerous microducts on submedian mesothorax; *L. pinnaeformis*, eye spurs; and *L. ulmi*, lateral spinose spurs and bosses on abdomen.

***Lepidosaphes pinnaeformis* (Bouché) A cymbidium scale**

Fig. 62, 167; Map 25

Aspidiotus pinnaeformis Bouché, 1851: 111.

Mytilaspis pinnaeformis (Bouché); Signoret 1870: 97.

Mytilaspis machili Maskell, 1898: 230; Borchsenius 1966: 58.

Eucornuaspis pinnaeformis (Bouché); Borchsenius 1966: 58.

Lepidosaphes machili (Maskell); Ward 1968: 50; Takagi 1970: 13; Dekle 1976: 102; Deitz & Tocker 1980: 39; Gill 1997: 174.

Cornimytis pinnaeformis; Dymock & Holder 1996: 251 [unjustified combination].

Lepidosaphes pinnaeformis (Bouché); Kirkaldy 1902: 110; Fernald 1903: 313; Danzig 1993: 256; Charles & Henderson 2002: 603; 262; Miller & Davidson 2005: 262.

Live appearance and habitat. Female scale cover mussel shell shaped, shades of medium and light brown arranged in concentric rings; 1st-exuvium small and translucent, 2nd exuvium light brown, short and broad. On leaves (mainly) and stems.

Adult female, measurements taken from 7 specimens (Fig. 167). Body elongate, widest at abdomen with well developed prepygidial lobes; length 0.97–1.75 mm, width 0.5–1.0 mm. Median lobes (L1) about as wide as long, notched each side, with paraphyses each side small; 1 pair of setae and 1 pair of gland spines in medial space; L2 bilobed, medial lobule 2× as wide as lateral lobule and with a small notch; L3 short, wide, dentate. Gland spines between lobes. 6 pairs of marginal macroducts.

Dorsal ducts of 1 size, smaller than marginal macroducts, numerous on submedial pygidium VI and VII, numerous on submedian-submargin of V and IV, then on submargin as far forward as II with a few on I and metathorax. Without dorsal bosses; with rounded spurs at angle between prepygidial abdominal segments. Anal opening round, about 17 µm, as long as wide, positioned near anterior of pygidium, 140–155 µm from posterior margin.

Ventral ducts similar to dorsal ducts present submarginally on prepygidial segment I and more numerous on thorax, without a band extending across body between posterior spiracles. Microducts scattered on submargins of abdomen and head, few on submedian abdomen and in a line between posterior spiracle and segment IV. Gland spines on margins of free abdominal lobes moderately numerous, reducing to more numerous gland tubercles on segments III to mesothorax. Antenna with 2–4 long setae. Eye present as a stout spine pointing anteriorly on each side of head. Anterior spiracles each with 10–12 trilocular pores; posterior spiracles without pores. Perivular pores in 5 moderately elongate groups, total about 90. Vulva position posterior to that of anal opening, about middle of pygidium, 100 µm from posterior margin.

Material examined. See Appendix A (p. 231) for details of 37 specimens examined.

Distribution. AK / —

Host plants. Agavaceae: *Cordyline* sp.; Orchidaceae: *Cymbidium* sp., orchid.

Remarks. The presence of modified eyes as a stout spine on each side of the head distinguishes *L. pinnaeformis* from other *Lepidosaphes* species in New Zealand.

***Lepidosaphes ulmi* (Linnaeus) A apple mussel scale**
[oystershell scale in United States]

Fig. 63–64, 168; Map 26

Coccus ulmi Linnaeus, 1758: 69.

Aspidiotus pomorum Bouché, 1851: 110.

Mytilaspis pomorum (Bouché); Signoret 1870: 98; Maskell 1879: 192; 1887: 51; Fernald 1903: 314.

Fiorinia grossulariae Maskell, 1884: 123; Charles & Henderson 2002: 603 [synonymy].

Lepidosaphes ulmi (Linnaeus); Fernald 1903: 314; Cottier 1956: 319; Danzig 1993: 251; Gill 1997: 175; Charles & Henderson 2002: 603; Miller & Davidson 2005: 266.

Live appearance and habitat. Female scale cover elongate mussel shell-shaped, rich mahogany brown with a pale section at posterior end, terminal exuvia more golden-brown; female body pale with yellow pygidium, eggs white. On stems, leaves, and fruit of host plants, often in massed populations.

Adult female, measurements taken from 4 specimens (Fig. 168). Body elongate, widest at abdomen with well developed prepygidial lobes; length 0.32–1.42 mm, width 0.5–0.69 mm. Median lobes (L1) about as wide as long, notched each side, with short paraphyses each side; 1 pair of setae and 1 pair of gland spines in medial space; L2 bilobed, medial lobule 2× as wide as lateral lobule and with a small notch; L3 short, wide, dentate. Gland spines between lobes. 6 pairs of marginal macroducts.

Dorsal ducts of 1 size, smaller than marginal macroducts, numerous on submedial pygidium VI and VII and numerous on submedian-submargin of V to III then on submargin as far forward as metathorax. With small dorsal bosses on submedian abdomen II to VI. With a stout spine on margin at angle between abdominal segments II to IV. Anal opening round, 15 µm, as long as wide, positioned near anterior of pygidium, 180–195 µm from posterior margin.

Ventral ducts similar to dorsal ducts present submarginally on prepygidial segment III–I and more numerous on thorax, with a band extending across body between posterior spiracles. Microducts scattered on submargins and submedian of abdomen and head. Gland spines on margins of free abdominal lobes reducing to gland tubercles to segment I. Antenna with 1 or 2 long setae. Anterior spiracles each with 5–6 trilocular pores; posterior spiracles without pores. Perivulvar pores in 5 moderately elongate groups. Vulva position posterior to that of anal opening, about middle of pygidium, 100–115 µm from posterior margin.

Material examined. See Appendix A (p. 231) for details of 46 specimens examined.

Distribution. AK, WI, WN / NN, NC, DN, CO

Host plants. Rosaceae: *Crataegus monogyna*, *Malus domestica*, *Prunus domestica*, *P. salicina*, *Rosa* sp.

Remarks. The presence of abdominal dorsal bosses and spinose spurs distinguishes *L. ulmi* from other *Lepidosaphes* species in New Zealand. *L. ulmi* is most similar to *L. beckii* in possessing numerous dorsal ducts and the ventral band of ducts between the posterior spiracles, but *L. beckii* has the lateral double head bosses (absent on *L. ulmi*).

Genus *LINDINGASPIS* MacGillivray

Lindingaspis MacGillivray, 1921: 388.

Type species: *Melanaspis samoana* Lindinger, by monotypy and original designation.

Lindingaspis rossi (Maskell) A Ross's black scale, circular black scale

Fig. 65–70, 169; Map 27

Aspidiotus rossi Maskell, 1891: 3; 1892: 11; 1897a: 296.

Chrysomphalus rossi (Maskell); Fernald 1903: 293.

Aspidiotus (Chrysomphalus) rossi (Maskell); Green 1929: 377.

Lindingaspis rossi (Maskell); Ferris 1938: 246; Borchsenius 1966: 344; Takagi 1970: 138; Deitz & Tocker 1980: 42; Charles & Henderson 2002: 604; Miller & Davidson 2005: 272.

Live appearance and habitat. Female scale cover flat, subcircular with exuvia subcentral, usually black with lighter concentric rings of 1st- and 2nd-exuvia, overall more grey coloured when on exposed leaves in full sun. Male scale cover smaller, oval with exuvia towards one end. Young female pale pinkish becoming red-brown, with pale yellow pygidium; mature female and crawlers dark red-brown. On either upperside or underside of leaves, not stems or bark.

Diagnosis. Adult female (Fig. 169) body shape turbinate with narrow, elongate pygidium, margin of pygidium appearing fringed with numerous slender paraphyses that decrease in size laterally to segment IV, longest by the lobes. With 3 pairs of lobes, each rather hoof-shaped, wider than long, notched laterally, with rounded apex, not bilobed, each with 1 pair of paraphyses.

Dorsal ducts 1-barred, arranged in furrows on pygidium, of 2 sizes, (i) the larger arising either side of L2; (ii) the long and slender arising further forward. Plates fringed between lobes, then less obviously divided between L3 and the tooth-like points of L4.

Ventral marginal-submarginal microducts in a band from pygidium to metathorax as far forward as dome-shaped eye spur, laterad of posterior spiracle. Antenna with 1 seta and small stubs. Spiracles without pores. Perivulvar pores present in 5 small groups.

Material examined. See Appendix A (p. 231) for details of 284 specimens examined.

Distribution. ND, AK, CL, WO, BP, GB, HB, WN / NN, SD, MB

Host plants. I. on **adventive** plants: Araliaceae: *Fatsia japonica*, *Hedera* sp.; Araucariaceae: *Araucaria heterophylla*; Arecaceae: *Phoenix canariensis*, palm; Elaeagnaceae: *Elaeagnus* sp.; Garryaceae: *Garrya elliptica*; Hamamelidaceae: *Liquidambar styraciflua*; Lauraceae: *Laurus nobilis*; Myrtaceae: *Eucalyptus* sp.; Oleaceae: *Ligustrum lucidum*; Oleaceae: *Olea europaea*; Pinaceae: *Pinus mugo*, *Pseudotsuga menziesii*; Proteaceae: *Banksia integrifolia*; Rutaceae: *Citrus grandis*, *C. sinensis*, *Nematolepis squamea* [was *Phebalium*]; Taxodiaceae: *Sequoia sempervirens*; Theaceae: *Camellia* sp.

II. on **endemic and native** plants: Alseuosmiaceae: *Alseuosmia macrophylla*; Araliaceae: *Meryta sinclairii*; Arecaceae: *Rhopalostylis sapida*; Asteraceae: *Olearia furfuracea*; Cornaceae: *Corokia buddleioides*, *C. cotoneaster*; Elaeocarpaceae: *Aristolelia serrata*; Fabaceae: *Carmichaelia australis*; Griseliniaceae: *Griselinia littoralis*; Loganiaceae: *Geniostoma* sp.; Malvaceae: *Hoheria* sp.; Monimiaceae: *Laurelia novae-zelandiae*; Myrtaceae: *Leptospermum laevigatum*, *Lophomyrtus* cv.; Ripogonaceae: *Ripogonum scandens*; Rubiaceae: *Coprosma grandifolia*, *C. lucida*, *C. robusta*, *Coprosma* sp.; Rutaceae: *Leionema nudum*; Sapotaceae: *Pouteria costata*.

Remarks. Ross's black scale is easily identified in the field by its black circular scale covers, found on leaves of its host plants. It is becoming more common in natural native habitats with 20 native host plants recorded so far (see list above). It is not of economic importance.

Genus *PARLATORIA* Targioni Tozzetti

Parlatoria Targioni Tozzetti, 1868: 735.

Type species: *Parlatoria orbicularis* Targioni Tozzetti, subsequently designated by Leonardi, 1899: 208

Diagnosis. Female body circular to oval, abdomen contracting and becoming wrinkled post oviproduction, membranous with sclerotised pygidium. The 3 pairs of lobes unilobate, usually notched, median lobes not yoked. With a marginal macroduct present in each space between lobes including the medial space. With 2 or 3 fimbriate plates between lobes, then continuous on margin to about abdominal segment II, of various shapes from narrow to broad and each with 1 microduct; these becoming gland tubercles on abdomen I and thorax. Dorsal ducts 2-barred, barrel-shaped, largest on pygidium margin, becoming progressively smaller towards anterior abdomen; each marginal

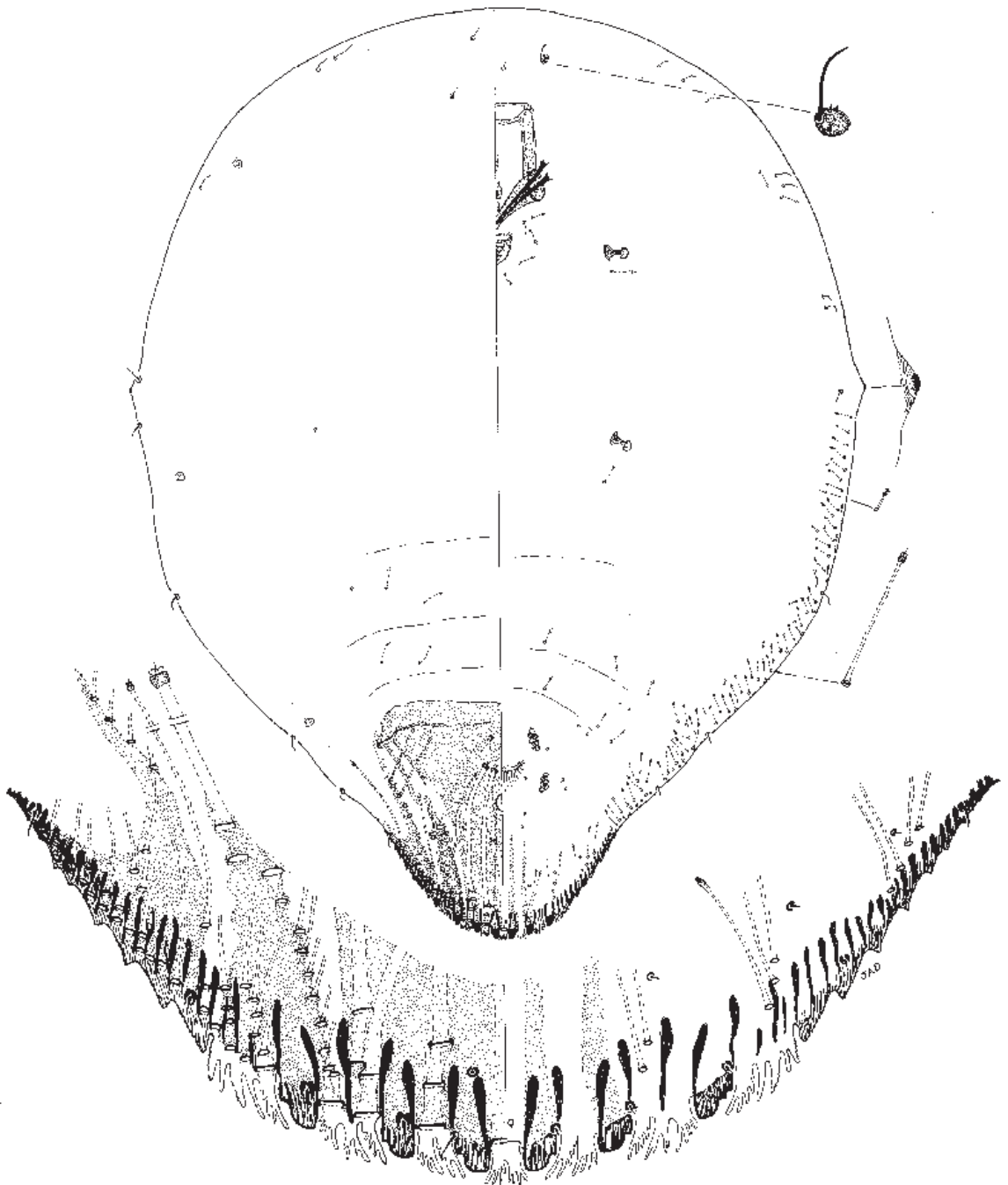


Fig. 169 *Lindingaspis rossi* (Maskell), adult female (from Miller & Davidson 2005).



Fig. 170 *Parlatoria desolator* McKenzie, adult female.

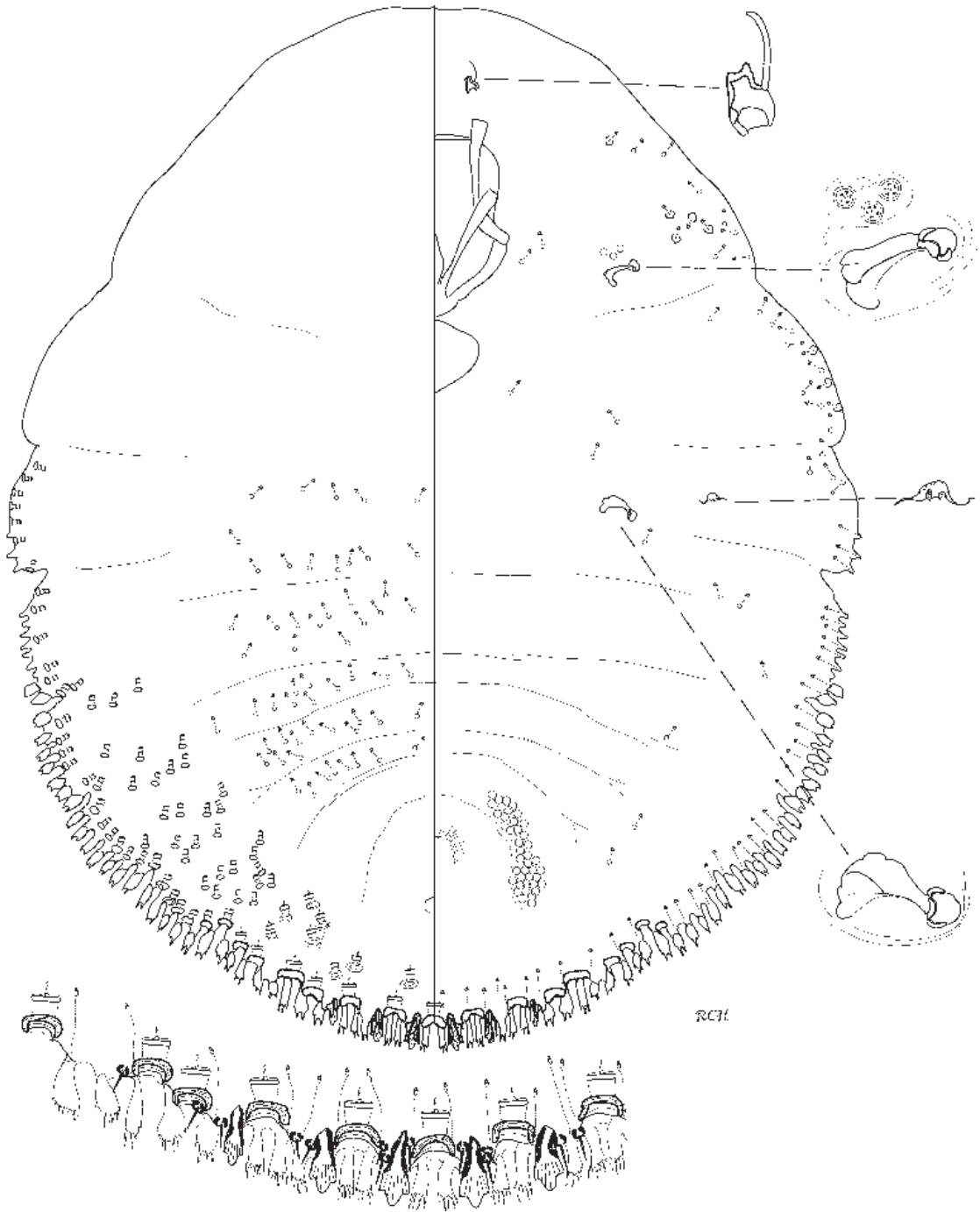


Fig. 171 *Parlatoria fulleri* Morrison, adult female.

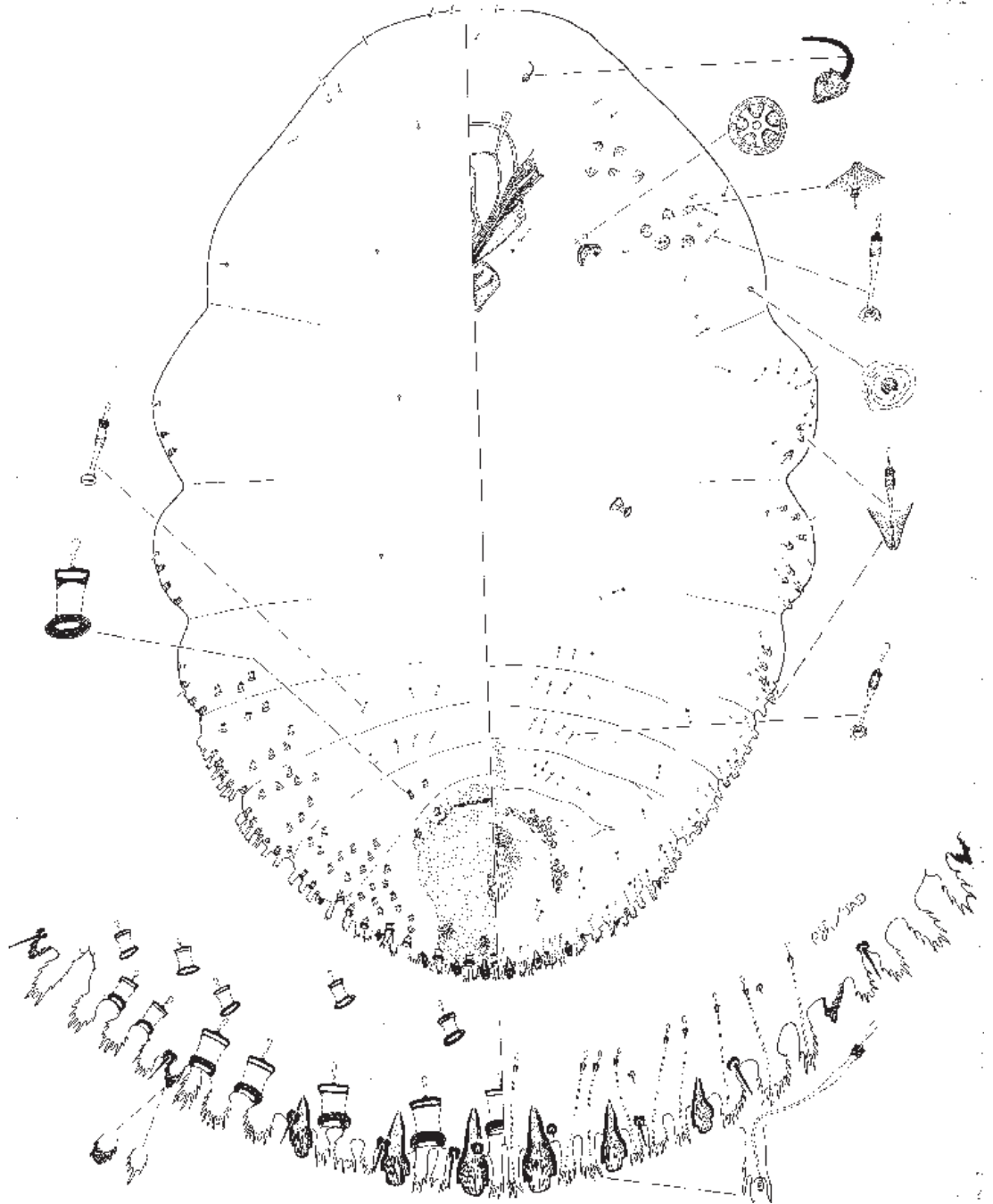


Fig. 172 *Parlatoria pittospori* Maskell, adult female (from Miller & Davidson 2005).

duct with a sclerotised, lunate opening transverse to margin; submarginal ducts usually present as 2 pairs on pygidium, then in a band on prepygidium; submedian ducts present or absent. Anterior spiracles each with a small group of 5-locular pores, these absent by posterior spiracles. With or without derm pocket between each posterior spiracle and margin. Perivulvar pores often in 2 or 4 lateral groups. Antenna with 1 seta. Anal opening positioned about mid-pygidium. Vulva positioned in anterior 1/3 of pygidium.

Remarks. Three species are recorded in New Zealand: *P. desolator* McKenzie, *P. fulleri* Morrison and *P. pittospori* Maskell.

Key to *Parlatoria* adult females in New Zealand

- 1 With submedian dorsal ducts present on at least segments IV and V, these similar in size to submarginal dorsal ducts *pittospori* Maskell
 —Never with dorsal submedian ducts as above 2
 2(1) L1 and L2 with 1 notch on each lateral margin; with a ventral derm pocket present each side of metathorax between posterior spiracle and margin; dorsal microducts numerous *fulleri* Morrison
 —L1 and L2 with 2 or 3 notches on each lateral margin; derm pockets absent; dorsal microducts few
 *desolator* McKenzie

Parlatoria desolator McKenzie A

Fig. 170; Map 28

Parlatoria pergandii Comstock, 1881: 327; Morrison 1939: 19 [doubtful record]; Borchsenius 1966: 196 [doubtful record].

Parlatoria camelliae Comstock, 1883: 114; McKenzie 1960: 206 [senior synonym of *Parlatoria virescens* Maskell].

Parlatoria proteus var. *virescens* Maskell, 1897: 300.

Parlatoria virescens Maskell; McKenzie 1945: 75; Richards 1960: 694.

Parlatoria desolator McKenzie, 1960: 206; Borchsenius 1966: 191; Henderson 2000: 51; Charles & Henderson 2002: 605.

Live appearance not known.

Adult female measurements taken from 12 specimens (Fig. 170). As for genus except: body oval to circular with a slightly pointed pygidium, with prominent median lobes, each with 1 notch on medial margin and with 2 to 4 (usually 3) notches on longer lateral margin, apically rounded, L2 and L3 similar in shape and smaller, with lateral notches only; body length 0.61–0.9 mm, width 0.57–0.82 mm. Submarginal ducts on prepygidium few. Submedian ducts

absent. Anal opening diameter 12–15 µm, positioned 75–95 µm from posterior margin.

Ventral microducts few, about 1 pair per each abdominal segment, scattered on pygidium, by spiracles and on head. Derm pocket absent. Anterior spiracles each with a group of 3–5 5-locular pores. Total of 39–45 perivulvar pores in 4 moderately elongate groups.

Material examined. See Appendix A (p. 232) for details of 21 specimens examined.

Distribution. AK, BP / —

Host plants. Rosaceae: *Malus domestica*, *Prunus* sp., *Pyrus communis*.

Remarks. This species has not been collected since the 1950s and may no longer be present in New Zealand. It was first misidentified as *Parlatoria pergandii* Comstock, or *P. virescens* Maskell (a junior synonym of *P. camelliae* Comstock) (Charles & Henderson 2002). It is easily distinguished from those species by the shape of the lobes, which are closer to those of *Parlatoria cinerea* Hadden, but *P. cinerea* has a series of submedian ducts on the pygidium, lacking in *P. desolator*.

Parlatoria fulleri Morrison A

Fuller scale

Fig. 71–73, 171; Map 29

Parlatoria viridis Fuller, 1897: 1344 [nomen nudum]; Fuller 1899: 467; Fernald 1903: 322.

Parlatoria fulleri; Morrison 1939: 13 [replacement name for *viridis*, preoccupied]; McKenzie 1945: 64; 1952: 15; Henderson 2000: 52; Charles & Henderson 2002: 605.

Live appearance and habitat. Female scale cover almost circular when newly moulted female under the 2nd-exuvium, cover extending to a tapered, elongate shape when mature, the waxy part serving to harbour a double row of eggs; terminal exuvia usually in shades of green with caramel lateral margins, 1st-exuvium either dark olive green or charcoal; female body pale with red markings at first, becoming purple, eggs purple, crawlers dark red-brown. Male scale cover smaller and narrower than female cover, the terminal exuvium dark green/grey, the elongate waxy part lighter shades. On leaves of host plants.

Adult female measurements taken from 21 specimens (Fig. 171). As for genus except: body oval to circular with a wide, rounded pygidium, with median lobes (L1) each with 1 notch on each side and apically pointed, L2 and L3 similar in shape and smaller; body length 0.58–0.92 mm, width 0.51–0.67 mm. Submarginal ducts on prepygidium numerous, 25–46 ducts each side. Submedian ducts absent.

With numerous dorsal microducts on prepygidium abdomen and metathorax. Anal opening diameter 12–15 µm, positioned 75–95 µm from posterior margin.

Ventral microducts few on abdomen, scattered by spiracles, more numerous on submargin of thorax. Derm pocket present, of variable shape (through being squashed) on slide-mounted specimens. Antennal tubercle tall, with 1 seta set near basal 1/3. Anterior spiracles each with a group of 2–4 5-locular pores. Total of 48–83 perivulvar pores in 2 elongate lateral groups.

Material examined. See Appendix A (p. 232) for details of 114 specimens examined.

Distribution. AK, BP, HB / —

Host plants. I. on **adventive** plants: Arecaceae: *Phoenix canariensis*; Buxaceae: *Buxus sempervirens*; Cunoniaceae: *Ceratopetalum gummiferum*; Elaeagnaceae: *Elaeagnus* sp.; Myrtaceae: *Callistemon citrinus*, *Callistemon* sp., *Leptospermum* sp., *Lophostemon confertus*, *Melaleuca hypericifolia*, *Tristaniopsis laurina*; Pinaceae: pine; Proteaceae: *Banksia integrifolia*, *Macadamia* sp.

II. on **endemic and native** plants: Griseliniaceae: *Griselinia littoralis*; Proteaceae: *Knightsia excelsa*.

Remarks. *P. fulleri* is of Australian origin and was first recorded in New Zealand in 1956 (Henderson 2000). It cannot be reliably distinguished from *P. pittospori* in the field, but is easily separated on a stained slide-mount by the absence of submedian dorsal ducts and the presence of a pair of ventral derm pockets, plus the arrangement of perivulvar pores in a single lateral group each side.

Parlatoria pittospori Maskell A mauve pittosporum scale

Fig. 74–76, 172; Map 30

Parlatoria pittospori Maskell, 1891: 11.

Parlatoria myrtus Maskell, 1891: 12; Borchsenius 1966: 196.

Parlatoria pittospori Maskell; McKenzie 1945: 71; Borchsenius 1966: 196; Henderson 2000: 52; Charles & Henderson 2002: 605; Miller & Davidson 2005: 328.

Live appearance and habitat. Female and male scale covers similar to that of *P. fulleri* above, tending to more grey shades at times; young female tending more beige than with red markings, mature female and eggs purple. On leaves and stems of host plants.

Adult female measurements taken from 15 specimens (Fig. 172). As for genus except: body oval to circular with a wide, rounded pygidium, with median lobes (L1) each with 1 notch on each side and apically rounded, L2 and L3 similar in shape and smaller; body length 0.56–0.95 mm, width 0.48–0.63 mm. Submarginal duct band on

prepygidium about 5–8 ducts wide. Submedian ducts present 1–3 pairs on V, 1–5 pairs on IV, smaller ducts or microducts present or absent on III. Anal opening diameter 10–12 µm, positioned 22–90 µm from posterior margin.

Ventral microducts relatively numerous on abdominal segments, scattered on pygidium, by spiracles and on submargins of thorax. Derm pocket absent. Anterior spiracles each with a group of 2–4 5-locular pores. 34–57 perivulvar pores in total

Material examined. See Appendix A (p. 232) for details of 99 specimens examined.

Distribution. AK, BP, HB, WN / NN, MB, KA, MC

Host plants. I. on **adventive** plants: Cupressaceae: *Callitris oblonga*, *Callitris rhomboidea*, *Chamaecyperus lawsoniana*; Elaeagnaceae: *Elaeagnus* sp.; Pinaceae: *Cedrus atlantica*, *Pinus nigra*, *P. radiata*; Proteaceae: *Banksia integrifolia*, *Grevillea alpina*, *Leucospermum bolusii* [as *L. album*]; Rosaceae: *Malus domestica*; Rutaceae: *Nematolepis squamea*, [was *Phebalium*].

II. on **endemic and native** plants: Asteraceae: *Pachystegia insignis*; Cornaceae: *Corokia cotoneaster*; Epacridaceae: *Epacris pauciflora*.

Remarks. *P. pittospori* is Australian in origin and has been recorded from California and South Africa, as well as New Zealand where the first record was 1921 (Charles & Henderson 2002). It cannot be reliably distinguished from *P. fulleri* in the field, but is easily separated on a stained slide-mount by the presence of submedian dorsal ducts and the absence of a pair of ventral derm pockets. *P. pittospori* was previously a pest in Nelson and Marlborough orchards when its crawlers were blown from *Pinus radiata* shelter belt trees onto apple trees (Timlin 1964b, Charles & Henderson 2002).

Genus *PELLUCIDASPIS* Henderson new genus

Type species: *Mytilaspis epiphytidis* Maskell, here designated.

Diagnosis. Body fusiform, pygidium a narrow oval, with median lobes forming a point, body membranous except for sclerotised pygidium, lateral abdominal lobes moderately developed. Median lobes (L1) yoked, prominent, with basal paraphyses not extending onto venter; with 1 pair of small setae between median lobes, but these may be difficult to see; L2 usually not apparent, or as very small points, L3 not apparent or a serration on the margin. Pygidium gland spines long, pointed, 1 pair on each segment of pygidium then about 4 pairs on prepygidial segments. 6–7 pairs of small marginal macroducts.

Submedian dorsal ducts tending larger than marginal ducts, few; submarginal dorsal ducts extending to metathorax and present on ventral submargins.



Fig. 173 *Pellucidaspis epiphytidis* (Maskell), adult female.

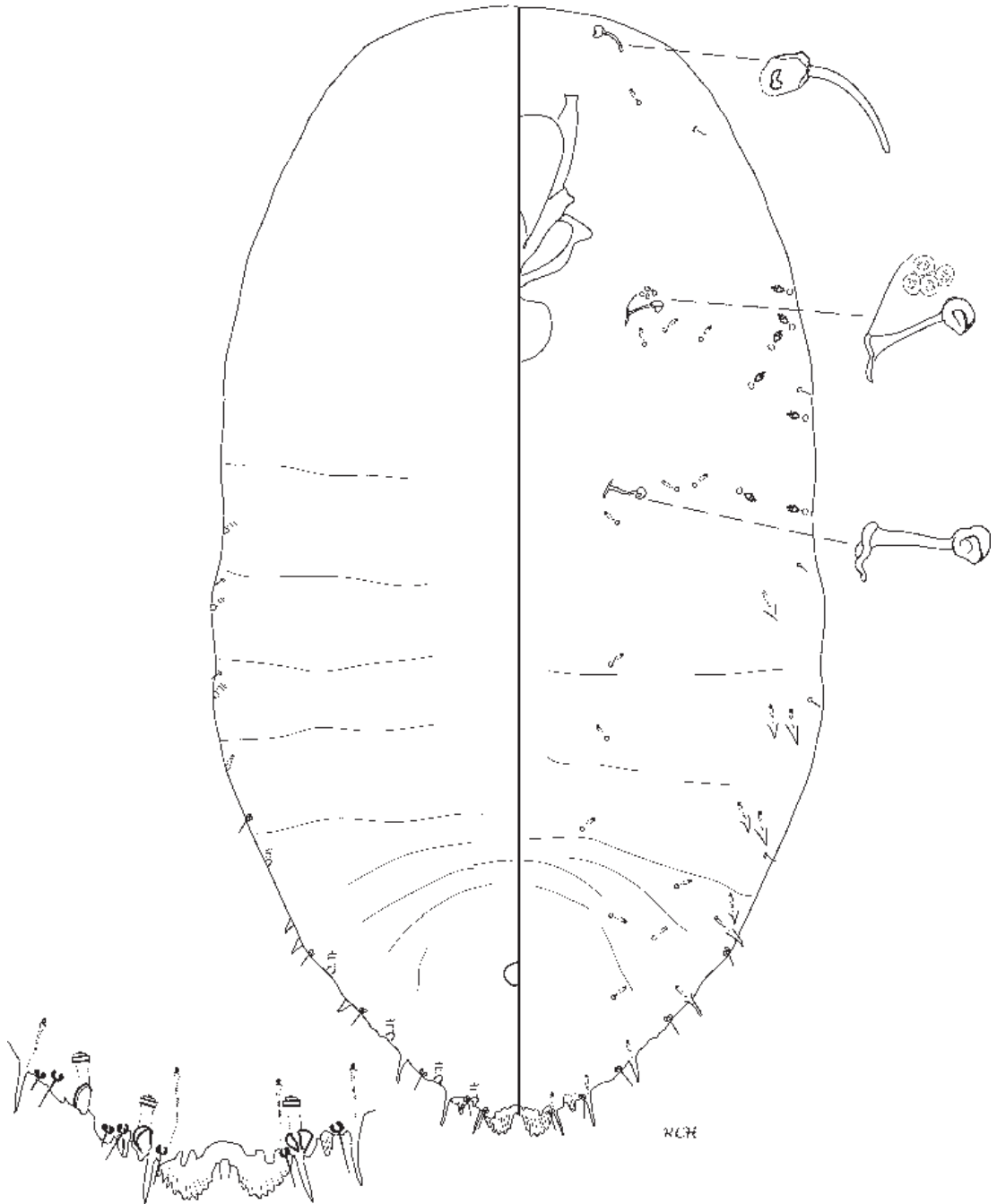


Fig. 174 *Pellucidaspis epiphytidis* (Maskell), 2nd-instar female nymph.

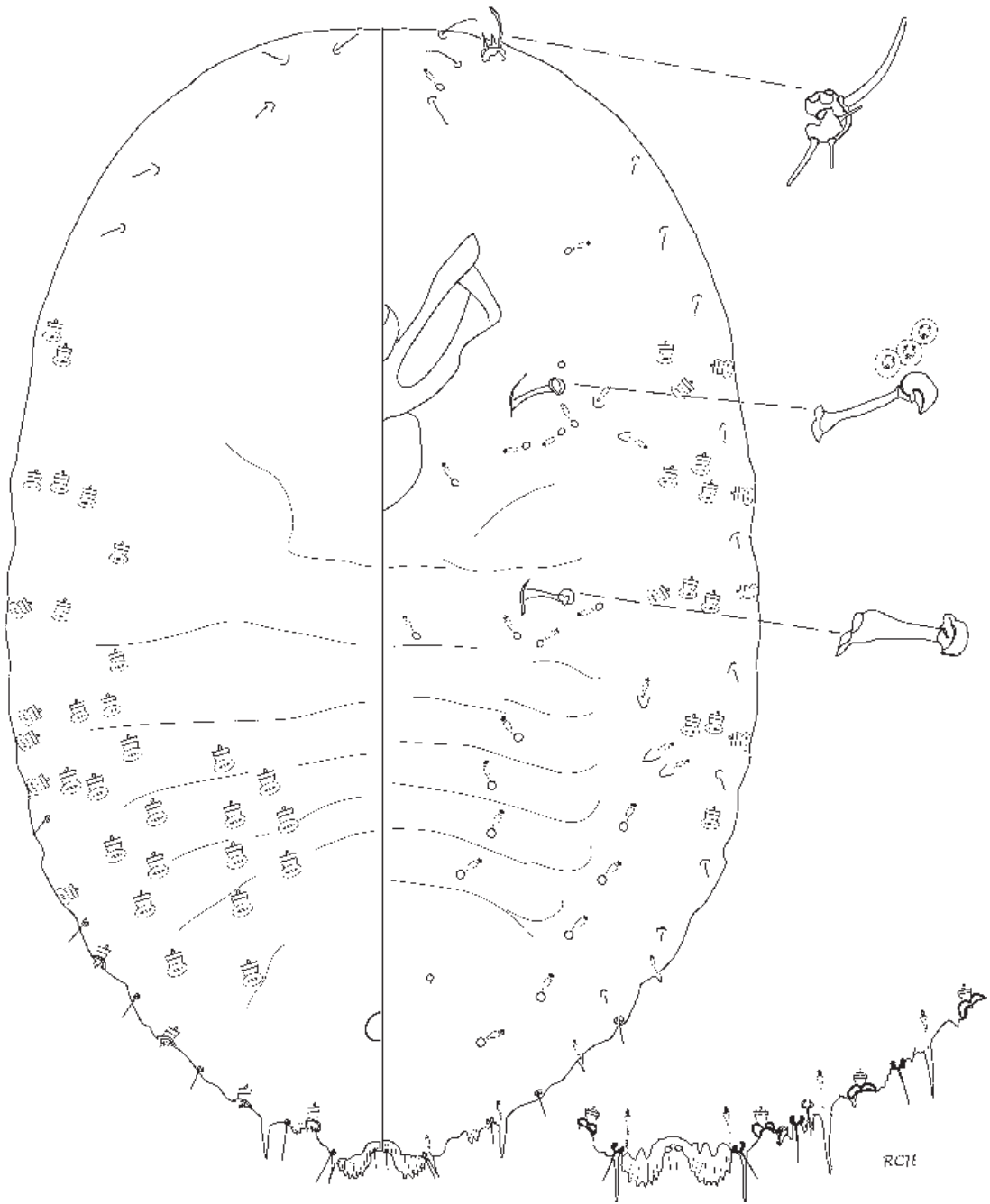


Fig. 175 *Pellucidaspis epiphytidis* (Maskell), 2nd-instar male nymph.

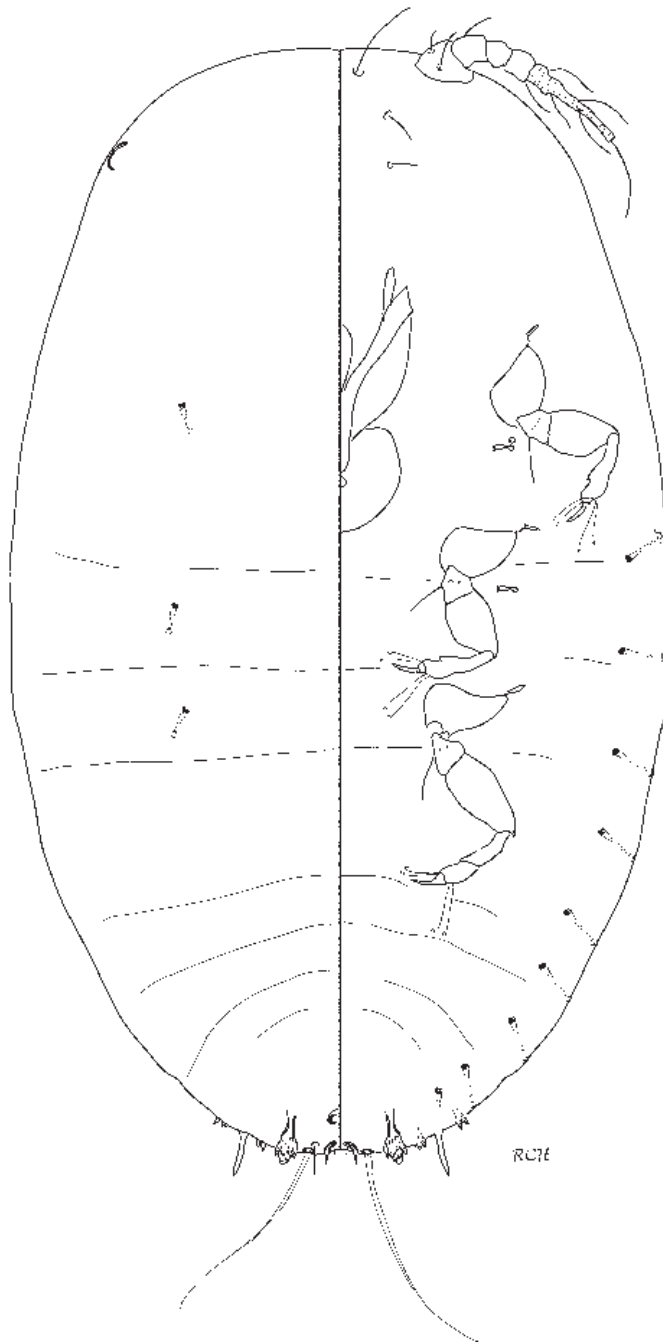


Fig. 176 *Pellucidaspis epiphytidis* (Maskell), 1st-instar nymph.

Ventral microducts of 2 sizes, (i) those associated with pygidial gland spines slender, and (ii) larger ones associated with prepygidial gland spines and scattered on submedian abdomen, by spiracles and on head; gland tubercles few on abdomen submargins, absent from thorax. Antenna with 1 long seta. Anterior spiracles each with a group of trilocular pores; posterior spiracles without pores. Perivulvar pores in 5 fairly elongate groups.

Etymology. From *pellucidus* meaning transparent, combined with *-aspis* for shield, alluding to the female's habit of burrowing under a thin layer of plant material (botanically the pellicle of *Astelia* species) and the apparent lack of an adult female scale cover particularly when on *Astelia banksii*.

Remarks. The new monotypic genus is erected for *Pellucidaspis epiphytidis* (Maskell) to preserve nomenclatural stability. Study of original and recent material in regard to placement in *Andaspis* shows it is not congeneric; the main distinction is that *Andaspis* has gland spines between closely set median lobes, whereas this taxon *asteliae* / *epiphytidis* (non *Symeria epiphytidis/zealandicus*) normally has 1 pair of setae visible between yoked median lobes, and no microducts leading to glandiferous points there. See under *Symeria pyriformis* for further discussion and for comment on its related taxonomic history.

Pellucidaspis comes nearest to *Pinnaspis* which has closely spaced or contiguous yoked lobes, but *Pinnaspis* differs in having definite 2nd lobes that are as long as the median lobes, (*Pinnaspis aspidistrae* (Signoret) is the only member recorded in New Zealand). *Serenaspis minima* (Maskell) also has contiguous median lobes but differs in always having a group of 3 ducts each side of pygidium VI by the margin. The median lobes on *Pellucidaspis epiphytidis* diverge distally and the 2nd lobes are extremely small in comparison.

***Pellucidaspis epiphytidis* (Maskell) E *astelia* scale**

Fig. 77–80, 173–176; Map 31

Mytilaspis epiphytidis Maskell, 1885: 21.

Lepidosaphes asteliae Green, 1929: 377.

Andaspis asteliae (Green); Borchsenius 1966: 70; Tagaki 1985: 43 **new synonymy.**

Symeria epiphytidis; Green 1929: 379 **misidentification.**

Pellucidaspis epiphytidis (Maskell) **new combination**

Live appearance and habitat. Body colour of female is yellow with dark pygidium, the median lobes forming a point; eggs yellow. Scale cover of varying translucence; (a) when on *Astelia* species: botanically, leaves of *Astelia* species have a pellicle of fused scales that can lift off in long sheets (see *Flora of New Zealand II*, p. 32). *P. epiphytidis*

utilises this semi-attached plant pellicle as an additional cover for the 1st and 2nd stadia, and as a substitute cover for the adult female. 1st- and 2nd-exuvia are present, but are often separated from the anterior end of the female's body, which is clearly visible under the translucent plant pellicle (Fig. 78), as are the eggs when they are produced; (b) when on *Collospermum* species: the adult female cover appears more opaque because the plant pellicle is more dense and there may be some wax added to it, however, this cover is effectively a pocket in the plant epidermis and not easily lifted off the body of the underlying scale insect (see dissected females on *Collospermum hastatum* from Waitakere Ranges (Fig. 80) and on *C. microsperrum* from Ruahine Range, an apparently more waxy scale cover produced in a colder climate (Fig. 77).

Adult female, measurements taken from 20 specimens (Fig. 173). As for genus, except length 0.89–1.16 mm, width 0.4–0.61 mm. L1 prominent, strongly yoked, serrate, lateral margins either longer than medial margins or lobes more rounded and subequal; with 1 pair of setae between median lobes, (these sometimes difficult to see without high magnification); with 2 pairs of setae at lateral bases of lobes; L2 very small, not obviously bilobed or 2 lobules present but not clearly divided; 6–7 pairs of small marginal macroducts, their openings sclerotised.

Submedian dorsal ducts tending larger than marginal ducts, few, on III and IV; submarginal dorsal ducts shorter than marginal macroducts, extending to metathorax and present on ventral submargins. Anal opening usually round, about 10–15 µm in diameter, positioned 115–150 µm from posterior margin.

Ventral microducts and gland tubercles as for genus. Antenna with 1 long seta and sensory pores. Anterior spiracles each with a group of 3–11 trilocular pores; posterior spiracles without pores. Total of 44–103 perivulvar pores in 5 fairly elongate groups. Vulva positioned beneath level of anal opening.

2nd-instar female nymph, measurements taken from 5 specimens (Fig. 174). Body shape more oval than female, length 0.5–0.7 mm, width 0.22–0.35 mm; L1 prominent, rounded, serrate, with basal scleroses; L2 bilobate, very small; with 1 pair of setae in medial space; gland spines similar to female but changing to gland tubercles on prepygidium; 4 or 5 pairs marginal macroducts,

1 pair smaller dorsal ducts submarginal on each prepygidial segment, as far forward as metathorax.

Ventral microducts few, on submedian abdomen and on head. With a few submarginal ducts on thorax different to small dorsal ducts, appearing larger and more sclerotised. Antenna as for female. Anterior spiracles each with a group of 2–4 trilocular pores, posterior spiracles without pores.

2nd-instar male nymph, measurements taken from 3 specimens (Fig. 175). Similar to female nymph, differing in the following: body shape more rounded than female nymph, length 0.33–0.57 mm, width 0.2–0.32 mm; 5 pairs of marginal macroducts.

Dorsal ducts more numerous, 1 to 2 pairs on submedian segments V–II and in band on submargin as far forward as mesothorax, laterally wrapped round body and extending onto ventral submargin from abdomen III to mesothorax.

Ventral microducts more numerous than on female nymph, a pair on submedian and submargin of segments VI–II, a few near each spiracle and on head. Gland tubercles present on submargins of abdomen I–II, and near each anterior spiracle. Antenna more complex than female with 1 long seta and several short setae. Anterior spiracles each with a group of 1–3 trilocular pores, posterior spiracles without pores. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 8 specimens (Fig. 176). Body shape roundly oval, length 0.26–0.39 mm, width 0.15–0.42 mm. Pygidium with 3 pairs of lobes, L1 relatively broad, notched, each with a basal sclerosis on inner margin, L2 and L3 minute; between the lobes 1 pair of minute setae, 1 pair moderately long setae, and 1 pair of long anal lobe setae; with 1 pair of stout, pointed gland spines between L2 and L3.

With 3 pairs of dorsal microducts on submedian thorax. Without a pair of dorsal cephalic ducts. Anal opening close to margin.

Ventral microducts on margin of abdominal segments I–V, meta- and mesothorax. Marginal setae around body long and with 3 pairs of long setae on head between antennae and towards frontal margin. Antennae 5-segmented, 72–80 µm long, with fine and fleshy setae, terminal segment V long, with a single apical seta. Legs and spiracles normal. Eyes on dorsal margin.

Type material examined. *Mytilaspis epiphytidis* Maskell. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, labelled “*Mytilaspis epiphytidis*, Female and puparium, from *Astelia*, Aug 1884, W.M.M.” [1]: 1 F. Barcode NZAC02001934. Remounted by RCH 2001. Maskell (1885) gave the host plant as *Astelia cunninghamii* [= *Astelia solandri*] (NZAC).

Lepidosaphes asteliae Green. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, WN, slide labelled “from *Astelia solandri*, York Bay, Wellington, New Zealand. Coll. J. G. Myers”. “**TYPE**”: [1]: 1 F (BMNH), and is the female on the end of the outer row nearest **TYPE** label, and indicated by a map on the slide cover. **Paralectotypes**: the remaining 3 females on the lectotype slide [1]: 3F (BMNH).

Other material examined. See Appendix A (p. 232) for details of 131 specimens examined.

Distribution. AK, RI, WN / NN, BR

Host plants. Liliaceae: *Astelia banksii*, *Astelia solandri* [as *cunninghamii*], *Astelia* sp., *Collospermum hastatum*, *Collospermum microspermum*.

Remarks. Synonymy is based on examination of the Maskell original slide (a good, uncleared female specimen) and a subsequent slide containing 2 females mounted in 1968 by J. A. de Boer from Maskell dry collection #10 of *M. epiphytidis* (good, well stained). There is no further Maskell dry material remaining.

The statement by Green (1929) that *Lepidosaphes asteliae* was similar to *Mytilaspis epiphytidis* but that the latter had median lobes separated by an appreciable gap whereas in *L. asteliae* they were firmly fused together, pertains to the misidentifications of these species at that time. *L. asteliae* with yoked median lobes (firmly fused at the base only) is a junior synonym of *P. epiphytidis* while the other taxon with median lobes separated by an appreciable gap is in fact *Symeria pyriformis*.

For a full discussion of the past taxonomic confusion and related synonymy of these species, see under the genus *Symeria* below.

Genus PINNASPIS Cockerell

Pinnaspis Cockerell, 1892: 136.

Type species: *Mytilaspis pandani* Comstock (= *Aspidiotus buxi* Bouché). Subsequently designated by Fernald 1903: 242.

***Pinnaspis aspidistrae* (Signoret) A fern scale [world]**
Fig. 177; Map 32

Chionaspis aspidistrae Signoret, 1869b: 443 [Type data: France].

Chionaspis brasiliensis Signoret, 1869b: 444 [Type data: Brazil]; Cooley 1899: 45–49.

Pinnaspis brasiliensis (Signoret); Ferris & Rao 1947: 29.

Hemichionaspis aspidistrae (Signoret); Cooley 1899: 45.

Pinnaspis aspidistrae (Signoret); Lindinger 1912: 79; Ferris & Rao 1947: 30; Balachowsky 1954: 281; Williams & Watson 1988: 212; Charles & Henderson 2002: 606; Miller & Davidson 2005: 340.

Live appearance and habitat. Female scale cover light to dark brown, pyriform to oyster-shell shaped, with lighter terminal exuvia; female body yellow-brown. Male scale cover elongate, white, carinated, with terminal exuvium. On [fronds and leaves] of host plants.

Diagnosis. Adult female (Fig. 177). The most distinctive feature is the pair of median lobes, which are united at the base by a more or less elongate zygois; the inner edges of

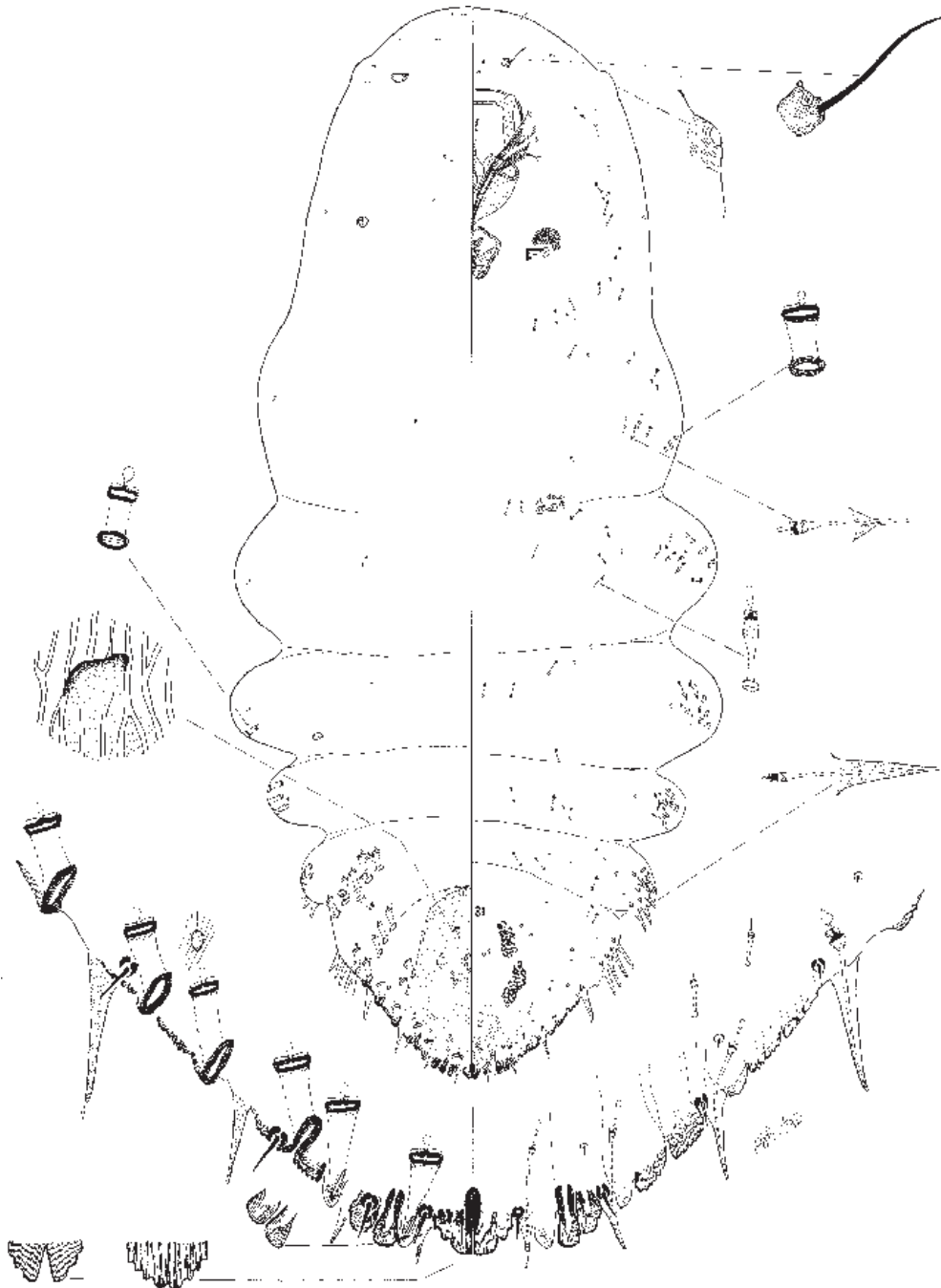


Fig. 177 *Pinnaspis aspidistrae* (Signoret), adult female (from Miller & Davidson 2005).

the lobes are parallel and very close together to the apices, appearing to be fused (Williams & Watson 1988); L2 small, bilobate. Body shape elongate-fusiform, with well developed abdominal lobes, the prepygidial lobe margins with stout, pointed gland spines, these becoming slender gland tubercles anteriorly from abdomen I to thorax, whereas on the pygidium the gland spines are slender. Preanal scar absent or represented by a light sclerotised area (definite preanal scars present in closely allied *Pinnaspis strachani* (Cooley)).

Dorsal ducts 2-barred, not much smaller than marginal macroducts, present in short submarginal rows; ducts then much decreased in size on margins of anterior abdomen, with some extending onto submargin of ventral abdomen and thorax. Microducts moderately numerous, scattered, largest associated with the large prepygidial gland spines. Antenna with 1 seta. Anterior and posterior spiracles each with a group of trilocular pores. Perivulvar pores present in 5 groups.

Material examined. See Appendix A (p. 233) for details of 19 specimens examined.

Distribution. HB, WI, WN / NN, MC

Host plants. Arecaceae: *Rhapis excelsa*; fern; Musaceae: banana.

Remarks. *Pinnaspis aspidistrae* was recorded several times in New Zealand up to 1978, then again recently in November 2010, either in glasshouses or in protected growing conditions. Note that the banana in Christchurch on which the species was recorded would not have been growing outdoors. See Charles & Henderson (2002) for further discussion.

Genus *POLIASPIS* Maskell

Poliaspis Maskell, 1880: 293.

Type species *Poliaspis media* Maskell, by monotypy.

Diagnosis. The genus is redefined here to include 6 species in New Zealand: *Poliaspis media* Maskell (the genotype), *P. lactea* (Maskell), and 4 new species described below: *P. chathamica*, *P. floccosa*, *P. raouliae*, and *P. salicornicola*.

Female scale cover generally white, with or without flocculent wax, shape broadly rounded to elongate-ovate, exuvia terminal; male scale cover white, exuvium at one end, non-carinated, often with a coating of flocculent wax.

Female body ovate to fusiform, derm membranous except for the pygidium. Dorsal ducts 2-barred, arranged in regimented rows on the abdomen of *P. media* and *P. floccosa* n.sp., though in less regimented rows on the other species. Total number of dorsal ducts variable. Submedian ducts present on segment VI. Marginal macroducts variable ac-

ording to species, from a normal arrangement (*P. media*), to an extreme proliferation of marginal pygidial ducts (*P. floccosa*). Submarginal ducts present to metathorax and extending onto venter. 1 pair of dorsal bosses present on submargin of abdominal segments I and III (on most species), or absent. Anal opening approximately circular, positioned nearer anterior edge than apex of pygidium.

Median lobes yoked, variable in shape and size, often divergent and forming a notch in the pygidium apex, or prominent (e.g., *P. chathamica*, *P. lactea*); with 1 pair of setae in the medial space; 2nd lobes bilobular, or fused into a single lobe (*P. salicornicola*), 3rd lobes may appear as 3 points. With slender, pointed gland spines on pygidium, either long (most species) or much reduced (*P. salicornicola*).

Perivulvar pores present in 8 groups, 5 groups in the normal position plus 3 smaller groups on the preceding segment. Small macroducts, gland tubercles, and microducts distributed on ventral submargins. Anterior and posterior spiracles each with a group of trilocular pores. Antennae with 1 or 2 long setae.

2nd-instar male nymphs. Known for *P. floccosa*, *P. lactea*, *P. media*, and *P. raouliae*. Body shape rounded oval with larger (dorsal) ducts wrapped around margins of abdomen and thorax onto venter; dorsal ducts often crowded near the pygidial margin, and numerous on median/submedian areas of dorsum and venter; median lobes bilobate with a small pointed lobule medial to each main lobe, all lobes variously notched and subdivided. Without gland spines on pygidium. With gland tubercles near spiracles and on Abdomen I.

1st-instar nymphs. 1 pair of dorsal cephalic ducts nearly always present, except on *P. chathamica* n.sp.; antennae 5-segmented, the terminal segment short, not annulated, with 1 apical seta; pygidium with 1 median pair of sharply pointed protuberances between the long anal setae, median lobes notched each side, 2nd lobes often insignificant, and with variably produced gland spines.

Remarks. The genus appears to be an evolving complex and includes many varied forms, some of which may be host plant phenotypes, or other cryptic species that are not separable at present. An attempt was made to assess the 1st-instar morphology by slide-mounting 1st-exuvia from many collections, to detect if there were any specific differences such as those found between *Anzaspis cordylinidis* and *A. gahnnae* above. This proved mostly non-informative, except for *P. chathamica* n.sp. where the absence of dorsal cephalic ducts near the anterior margin was found to distinguish this species from all other *Poliaspis* species sampled.

Key to *Poliaspis* adult females in combination with 1st-instar nymphs/exuvia in New Zealand

- 1 L1 prominent, with more than 1/2 total lobe length extending beyond margin; 1st-instar or 1st-exuvium with or without 1 pair of large dorsal cephalic ducts near anterior margin 2
- Distal part of L1 extending less than 1/2 total lobe length beyond margin; 1st-instar or 1st-exuvium with 1 pair of large dorsal cephalic ducts near anterior margin . 4
- 2(1) With 1 pair of marginal macroducts on segment VI; the lobules of L2 fused into a single triangular-shaped lobe; L1 prominence, distal lobe length 70–90% total lobe length *salicornicola* Henderson n. sp.
- With 2 or more pairs of marginal macroducts on segment VI; L2 bilobular, even if 2nd lobule insignificant; L1 prominence, distal lobe length 50–70% total lobe length 3
- 3(2) Shape of median lobe yoke a broad band; 1st-instar or 1st-exuvium with 1 pair of large dorsal cephalic ducts near anterior margin *lactea* Maskell
- Shape of median lobe yoke convex; large dorsal cephalic ducts absent near anterior margin on 1st-instar or 1st-exuvium; restricted to *Olearia traversii* on the Chatham Islands *chathamica* Henderson n. sp.
- 4(1) Always with numerous macroducts crowded along the pygidium margin and submargin, without a clear gap between those on each pygidium segment *floccosa* Henderson n. sp.
- Marginal macroducts not so numerous and crowded along pygidium margin, and always with a clear gap between those on each pygidium segment 5
- 5(4) With 1 marginal macroduct on segment VII each side of L1, and usually 2 pairs on VI *media* Maskell
- With a group of 2–4 marginal macroducts on segment VII each side of L1, and with a group of 3–6 macroducts on margin-submargin each side of segment VI *raouliae* Henderson n. sp.

***Poliaspis chathamica* Henderson new species E**
Chathams olearia scale

Fig. 178–180; Map 33

Live appearance and habitat. Female scale cover white, exuvia terminal; female body colour and eggs not recorded; male scales not available. On stems.

Adult female, measurements taken from 11 specimens (Fig. 178). Body shape fusiform with lateral abdominal lobes produced, rounded, length 0.8–1.35 mm, width 0.45–

0.82 mm. Median lobes (L1) prominent, extending 50–70% beyond margin (length from a horizontal line at lateral body margin to lobe apex relative to total lobe length measured from exterior margin of yoke to lobe apex); L1 with a convex-shaped yoke, divergent, slightly serrate, apex slightly pointed, with 1 pair of setae between them; L2 bilobed, rounded, much smaller than L1 lobes, lateral lobule very small, L3 as points. Marginal macroducts: with 1 each side of L1 on segment VI and a group of 2–5 ducts on each side of margin/submargin of segment VII. Paraphyses absent. Gland spines rather stout, tapering, present singly on VII–VI lateral to L1 and L2, then with 2–3 each side on V–IV.

Dorsal ducts barrel-shaped, distributed as 2–4 pairs of ducts on submedian pygidium VI, 4 rows on submedian and submarginal ducts each side of abdomen, then on submargin becoming smaller as far forward as thorax, and wrapping round on to ventral margin. 1 pair of dorsal bosses present on submedian segments I and III. Anal opening 12.5–15 μm , as long as wide, positioned 51–105 μm from posterior margin.

Ventral ducts similar to smaller dorsal ducts distributed on abdominal submargins II–I, and on margins / submargins of thorax. Gland tubercles in groups submarginally on abdominal segments IV–I, with a band near each posterior spiracle and scattered near each anterior spiracle. Microducts of 2 sizes, (i) more robust, in small groups on pygidium submargin and associated with gland tubercles, and (ii) more slender, scattered on submedian abdomen, near spiracles, and on head. Antennae each with 1 notably long seta or sometimes with 2 long setae. Anterior spiracles each with a group of 10–31 trilocular pores; posterior spiracles each with a group of 2–8 trilocular pores. Total of 87–125 perivulvar pores in 8 groups, as for genus, Vulva situated about 95–105 μm from posterior margin.

2nd-instar female nymph, measurements taken from 5 specimens (Fig. 179). Body shape ovate, length 0.73–0.76 mm, width 0.38–0.54 mm. L1 prominent as in adult female, L2 very small, gland spines as for adult female.

Dorsal ducts slightly larger than pygidial margin ducts (which are on venter), 1 submedian pair on each of segments V–III with 1–2 pairs submarginally on each segment as far forward as thorax. Anal opening 55–65 μm from posterior margin.

Ventral marginal ducts similar to dorsal ducts present segmentally from pygidium to metathorax. Microducts of 2 sizes, few, distributed as for female. With 1–2 gland tubercles on abdomen I and by each spiracle. Antennae each with 1 short and 1 small seta. Anterior spiracles each with a group of 3–5 trilocular pores, posterior spiracles without pores. Anal opening about 10 μm long as wide, positioned about 58 μm from posterior margin.

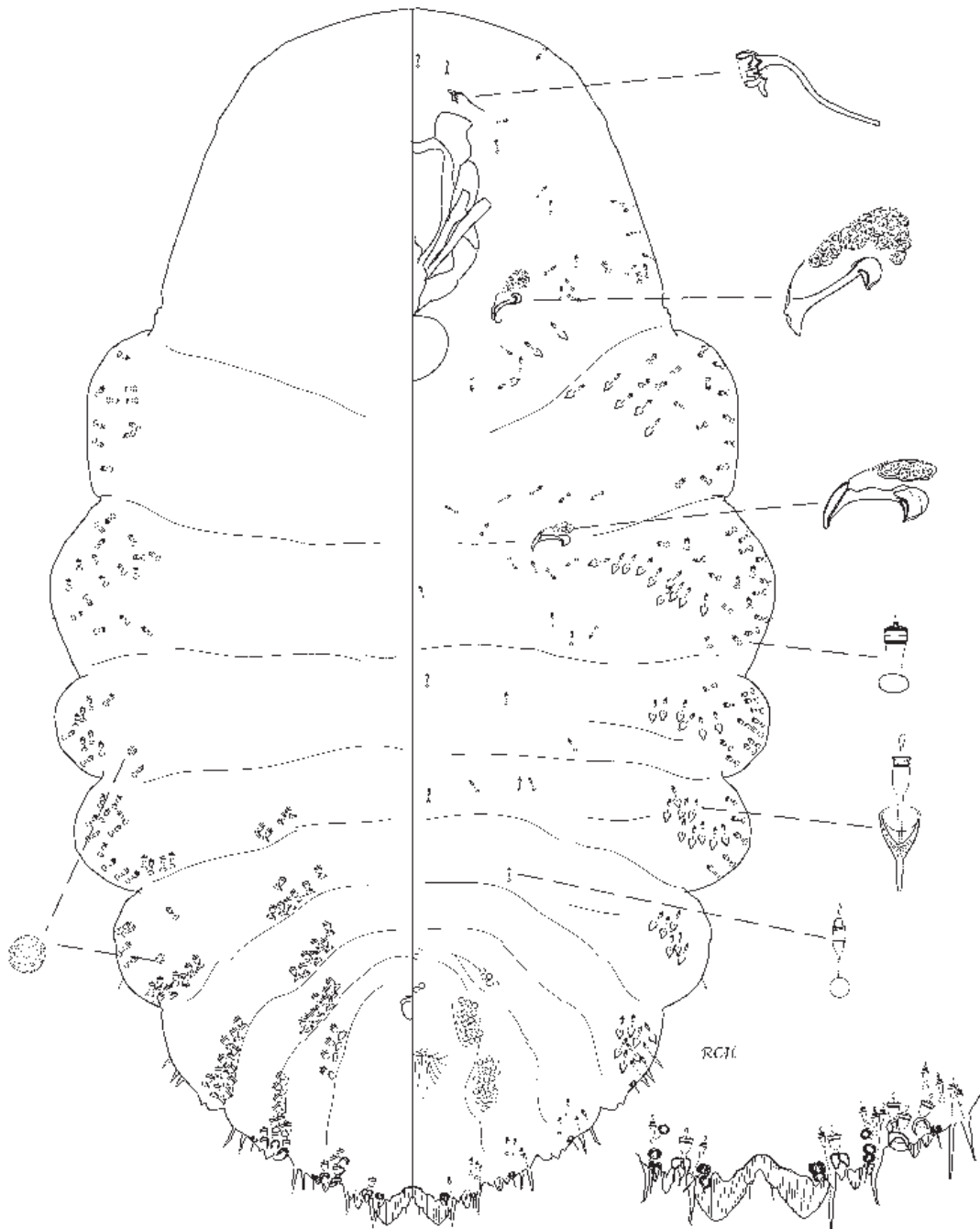


Fig. 178 *Poliaspis chathamica* Henderson n.sp., adult female.

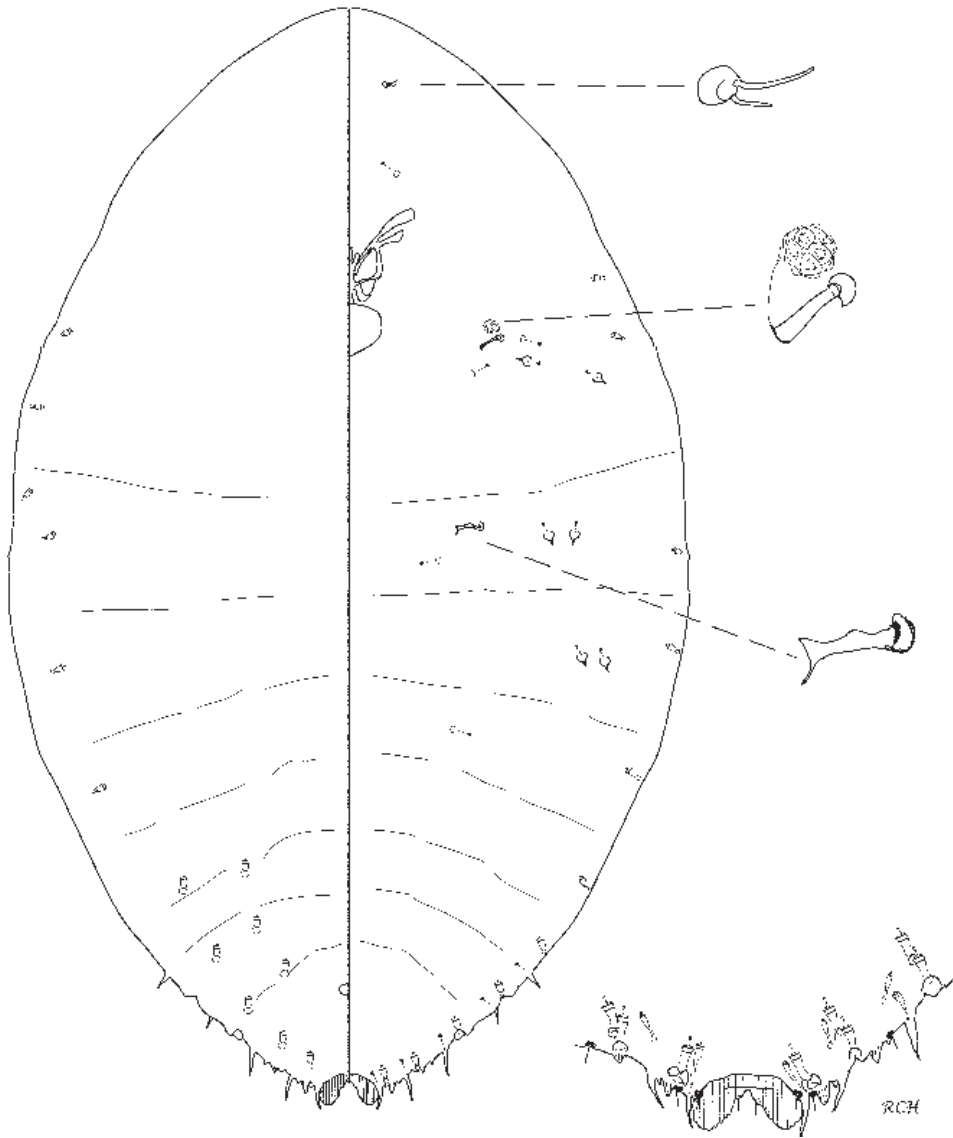


Fig. 179 *Poliaspis chathamica* Henderson **n.sp.**, 2nd-instar female nymph.

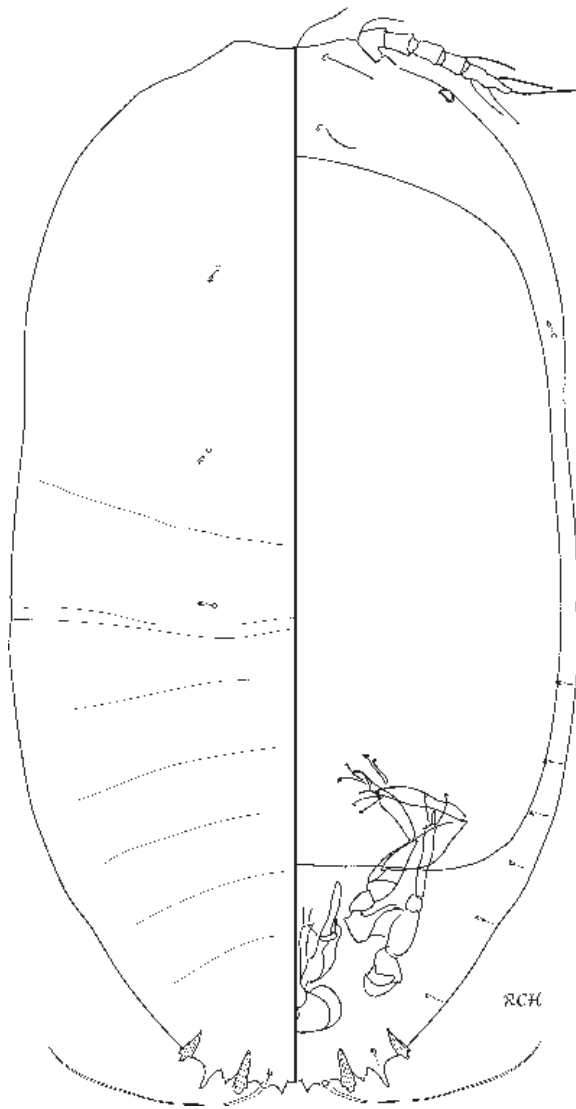


Fig. 180 *Poliaspis chathamica* Henderson n.sp., 1st-exuvium.

2nd-instar male nymph, no specimens available.

1st-instar exuvium, measurements taken from 5 specimens (Fig. 180). Body shape fusiform, length 0.39–0.43 mm, width 0.24–0.29 mm. Pygidium with 2 pairs of lobes, notched each side at body margin, pointed distally, and with a basal sclerosis; between L1 and L2 1 pair of gland spines each with a microduct; with 1 pair of pointed protuberances on margin near median and between the pair of long anal lobe setae.

Dorsum: with 3 pairs of dorsal thoracic submedian microducts 1 pair on each segment; large cephalic ducts absent; eyes on margin.

Venter: With 6 pairs of microducts on submargin of abdomen, and 3 pairs on submargin of thorax (2 pairs lost at ecdysis). With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented as for genus, 63–70 μm long, with fine and fleshy setae.

Remarks. The absence of large dorsal cephalic ducts on the 1st-instar / 1st-exuvium distinguishes *P. chathamica* from all the other *Poliaspis* species described here.

Type material examined. HOLOTYPE female: NEW ZEALAND, CH, Chatham I, Long Beach, near Henga Reserve, 20 May 2007, BJ Rogan, *Olearia traversii* stems, #07-083d, [1]: 1 F. Barcode NZAC02008422 (NZAC). **Paratypes:** collection data as for holotype female above, #07-083a–c, e–k [10]: 12 F, 4 exuv2, 6 exuv1 (NZAC).

Other material examined. See Appendix A (p. 233) for details of 20 specimens examined.

Distribution. — / — / CH [Chatham Island, South East Island]

Host plant. Asteraceae: *Olearia traversii*.

Etymology. The species is named after its geographic location, the Chatham Islands.

***Poliaspis floccosa* Henderson new species E flax scale**

Fig. 83–85, 181–184; Map 34

Live appearance and habitat. Female scale cover white, often with a coating of flocculent wax when immature, terminal exuvia pale to light gold; female body and eggs bright yellow; male scale cover always with a coating of flocculent wax, adult male body red. On leaves, usually in massed groups.

Adult female, measurements taken from 13 specimens (Fig. 181). Body shape ovate-pyriform, widest at abdomen I, length 0.4–1.38 mm, width 0.42–0.94 mm. Median lobes (L1) yoked, widely divergent, small, rounded and slightly serrate, with 1 pair of setae between them; L2 bilobed, rounded, median lobule often larger than L1 lobes,

lateral lobule smallest, L3 appearing as a pore prominence. Marginal macroducts not differentiated, forming part of a substantial massed band of ducts on the pygidium margin/submargin, sometimes with small gaps between groups of ducts, other times forming a continuous band across the median yoke of L1 and to pygidium segment V or IV, the crowded openings of these ducts forming a sclerotised ridge on parts of pygidium margin.

Dorsal ducts all similar, short and barrel-shaped, distributed as 3–8 pairs of ducts on submedian pygidium VI, 4 rows on submedian and submargin each side of abdomen, then on submargin becoming smaller towards abdomen I. Anal opening 12.5–17.5 μm long as wide, positioned 115–155 μm from posterior margin.

Ventral ducts similar to smaller dorsal ducts distributed on abdominal submargins II–I, more numerous extending in a band towards each posterior spiracle and scattered from margin towards each anterior spiracle. Gland tubercles in groups submarginally on abdominal segments IV–I, with a few near each spiracle. Microducts few, scattered on submedian abdomen, near spiracles and on head. Antennae with 1 or 2 stout setae or with 1 seta and several short stubs. Anterior spiracles each with a group of 8–14 trilocular pores (1 specimen with 23 pores); posterior spiracles each with a group of 3–10 trilocular pores (1 specimen with 15 pores). Total of 77–148 perivulvar pores in 8 groups, as for genus. Vulva situated about 100–120 μm from posterior margin.

2nd-instar female nymph, measurements taken from 6 specimens (Fig. 182). Body shape more roundly ovate than adult female and smaller, length 0.56–0.77 mm, width 0.38–0.52 mm; lobes, gland spines, and sclerotised pygidial margin similar to adult female but smaller; marginal macroducts small, barrel-shaped, fewer than adult female, about 3 ducts distributed across center of pygidial margin, then in groups of 2–3 ducts over L1–L3.

Dorsal ducts slightly larger than pygidial ducts, 1 submedian pair and a few submarginal ducts on segments III to V, then 1 or 2 each segment confined to body margin as far forward as mesothorax, with a few extending onto venter. Anal opening 55–65 μm from posterior margin.

Ventral ducts similar to dorsal ducts, in a short line between each spiracle and body margin. Microducts of 1 size, few on submedian abdomen, thorax, and head, and in a submarginal line each side of abdomen. Gland tubercles few on abdomen submargins, grouped submedially on abdomen I and by each spiracle. Antenna with 1 or 2 stout setae. Anterior spiracles each with a group of 2–3 trilocular pores, posterior spiracles each with 0–1 trilocular pore.

2nd-instar male nymph, measurements taken from 11 specimens (Fig. 183). Similar to female nymph, differing in

the following: length 0.4–0.69 mm, width 0.26–0.46 mm; with 4 pairs lobes, L1 small, L2 largest, dentate or crenate, L3 and L4 smaller, dentate but often appearing retracted into body margin; body outline less rounded than female nymph but more rounded dorsoventrally, so that abdominal marginal ducts appear mostly on dorsum and partly on venter of slide-mounted specimens; marginal macroducts more numerous, 30–40 each side, except none on centre of pygidial margin.

With 2 pairs of submedian dorsal ducts on abdominal segments II–V; submarginal dorsal and ventral ducts more numerous as far forward as mesothorax. Anal opening closer to posterior margin at 30–37 im distance.

Ventral microducts of 2 sizes, (i) smaller microducts in a longitudinal line on median abdomen, and scattered on submedian abdomen, near spiracles, and on head; (ii) 1 pair of larger microducts submarginally on each abdominal segment. Gland tubercles as for female nymph but slightly more numerous. Anterior spiracles each with a group of 2–3 trilocular pores, posterior spiracles each with 0–1 trilocular pore. Antennae cone-shaped, each with 2 stout setae near the base, offset one at either side. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 5 specimens (Fig. 184). Body shape elongate-oval, length 0.32–0.42 mm, width 0.2–0.29 mm. Pygidium with 1 pair of lobes, notched each side at body margin, pointed distally and with a basal sclerosis, with 1 pair of minute pointed processes on margin near median, and between these 1 pair of minute setae, and submarginally 1 longer pair of setae, and 1 pair of long anal lobe setae on the margin. Macroducts absent.

Dorsum: 1–3 pairs of submedian thoracic microducts present or absent (3 pairs present on type locality samples); with 1 pair of large cephalic ducts near anterior margin of head; eyes dorsad on margin.

Venter: Dorsal thoracic submedian microducts of variable distribution: in the type series there is 1 pair on metathorax only, whereas in other collections there may be 1 pair on each segment (3 pairs present), or none. With 6 pairs of microducts on submargin of abdomen, and 3 pairs on submargin of thorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented, 60–62 µm long, with fine and fleshy setae. Legs and spiracles normal.

Type material examined. HOLOTYPE female, here designated: NEW ZEALAND, AK, Auckland, Glen Eden, 23 Nov 2009, RC Henderson, *Phormium tenax* underside leaves, #09-435d [1]: 1 F. Barcode NZAC02008306 (NZAC). **Paratypes:** (i) collection data as for holotype

female above, #09-435a–c, e–o [14]: 10 F, 6 f2nd, 4 m2nd, 2 exuv2, 6 exuv1; (ii) as previous except 16 Apr 2003, #03-033a–d [4]: 12 f2nd, 11 m2nd; (iii) as previous except 16 June 2004, #04-116a–b [2]: 3 F, 4 1st (NZAC).

Other material examined. See Appendix A (p. 233) for details of 366 specimens examined.

Distribution. TH / ND, AK, CL, WO, BP, GB, HB, WN / SD, NN, MC

Host plants. Agavaceae: *Cordyline australis*, *C. obtecta*, *Cordyline* sp., *Furcraea* sp., *Phormium cookianum*, *P. tenax*; Iridaceae: *Libertia ixioides*, *L. peregrinans*; Liliaceae: *Arthropodium cirratum*, *Dianella* sp.

Etymology. –‘floccosa’ describes the flocculent white wax coating especially on the male scale covers.

Poliaspis lactea (Maskell) E

fuchsia scale

Fig. 86–87, 185–188; Map 35

Mytilaspis lactea Maskell, 1895: 48; Myers 1922: 201.

Fusilaspis lactea (Maskell); MacGillivray 1921: 290.

Phenacaspis lactea (Maskell); Lindinger 1932: 203; Takagi 1985: 47 [uncertain genus].

Lepidosaphes lactea (Maskell); Fernald 1903: 308; Borchsenius 1966: 49; Wise 1977: 107. Deitz & Tocker 1980: 38.

Poliaspis lactea (Maskell), **new combination.**

Live appearance and habitat. Female scale cover shiny white, frequently covered with a thin layer of bark cells from the host plant, with light yellow terminal exuvia; female body dark caramel colour; Maskell described the female body as dull pink turning to brown, and the male scale cover as small, snowy white, semi-cylindrical, not carinated (Maskell 1895). On stems.

Adult female, measurements taken from 29 specimens (Fig. 185). Body shape fusiform with lateral abdominal lobes produced, rounded, length 0.59–1.82 mm, width 0.35–1.1 mm. Median lobes (L1) prominent, extending 50% beyond margin (length from a horizontal line at lateral body margin to lobe apex relative to total lobe length measured from anterior margin of yoke to lobe apex); L1 with a broad band-shaped yoke, lobes divergent, not serrate, apex rounded, with 1 pair of setae between them; L2 bilobed, rounded, much smaller than L1 lobes, lateral lobule very small, L3 as points. Marginal macroducts: with 1 each side of L1 on segment VI and usually 2 (sometimes 3 or 4) ducts on each side of margin (submargin) of segment VII. Paraphyses absent. Gland spines slender, tapering, most often present singly on each pygidium segment.

Dorsal ducts barrel-shaped, distributed as 1–9 pairs of ducts on submedian pygidium VI, 4 rows on submedian and submargin each side of abdomen, then on submargin

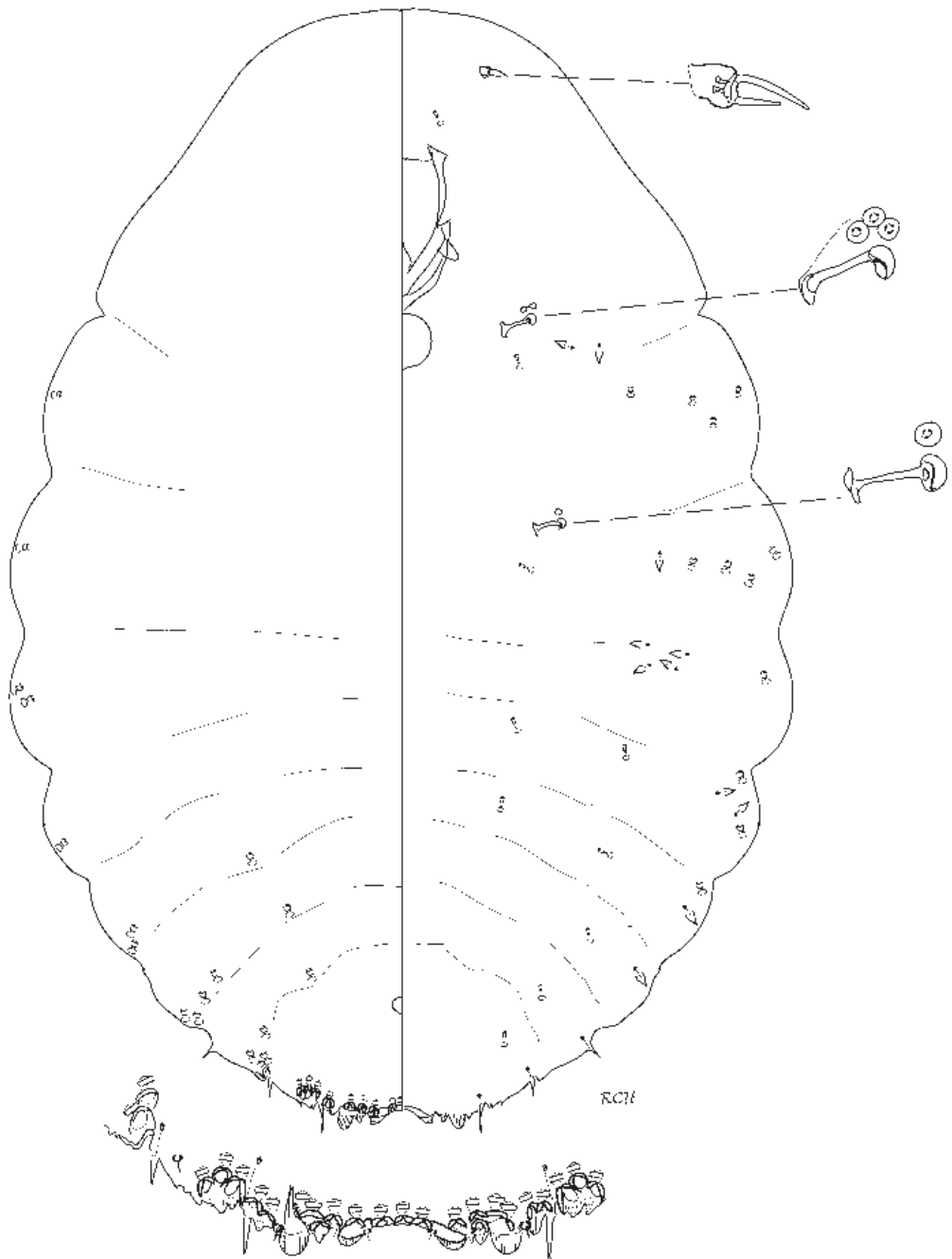


Fig. 182 *Poliaspis floccosa* Henderson n.sp., 2nd-instar female nymph.

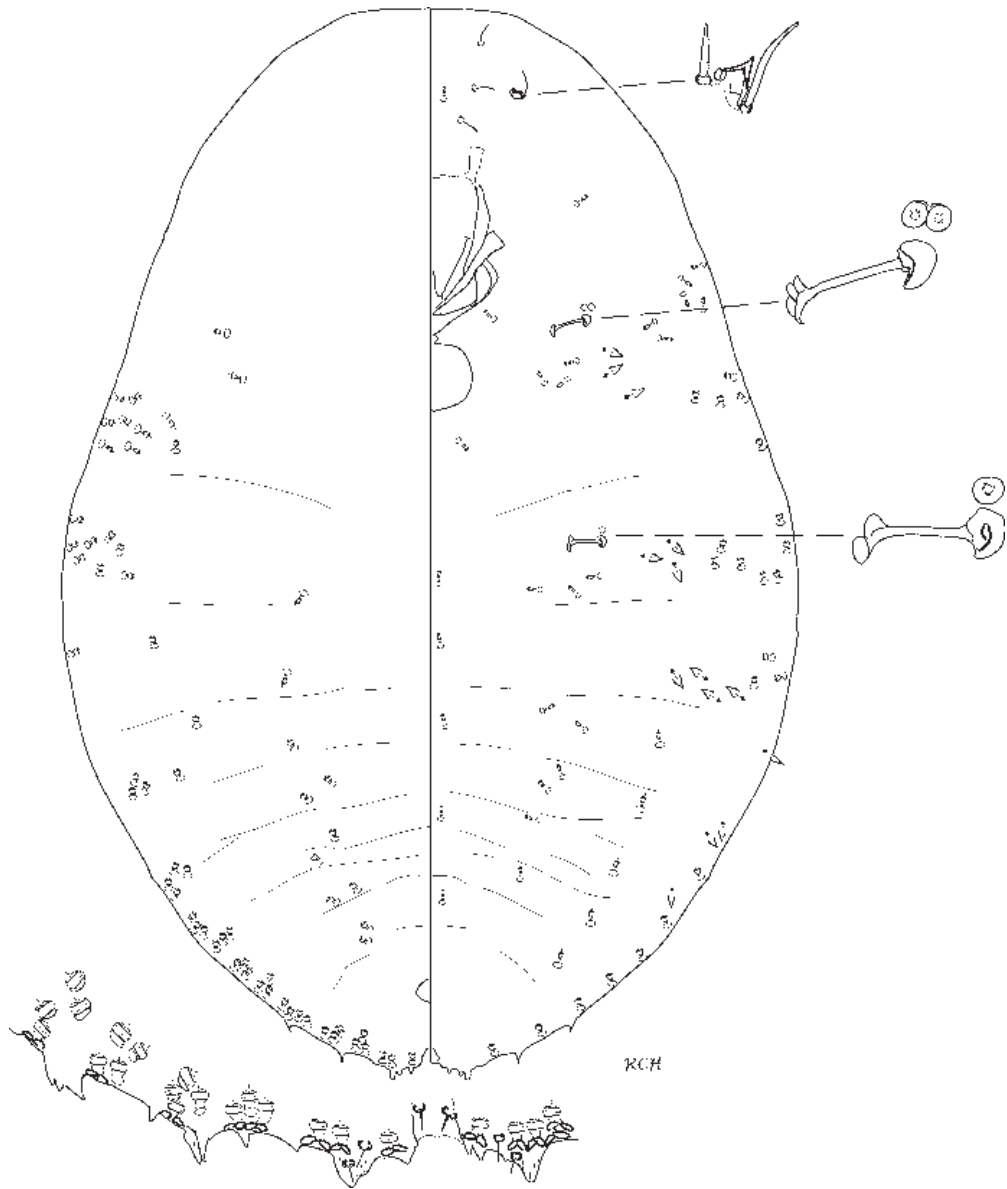


Fig. 183 *Poliaspis floccosa* Henderson n.sp., 2nd-instar male nymph.

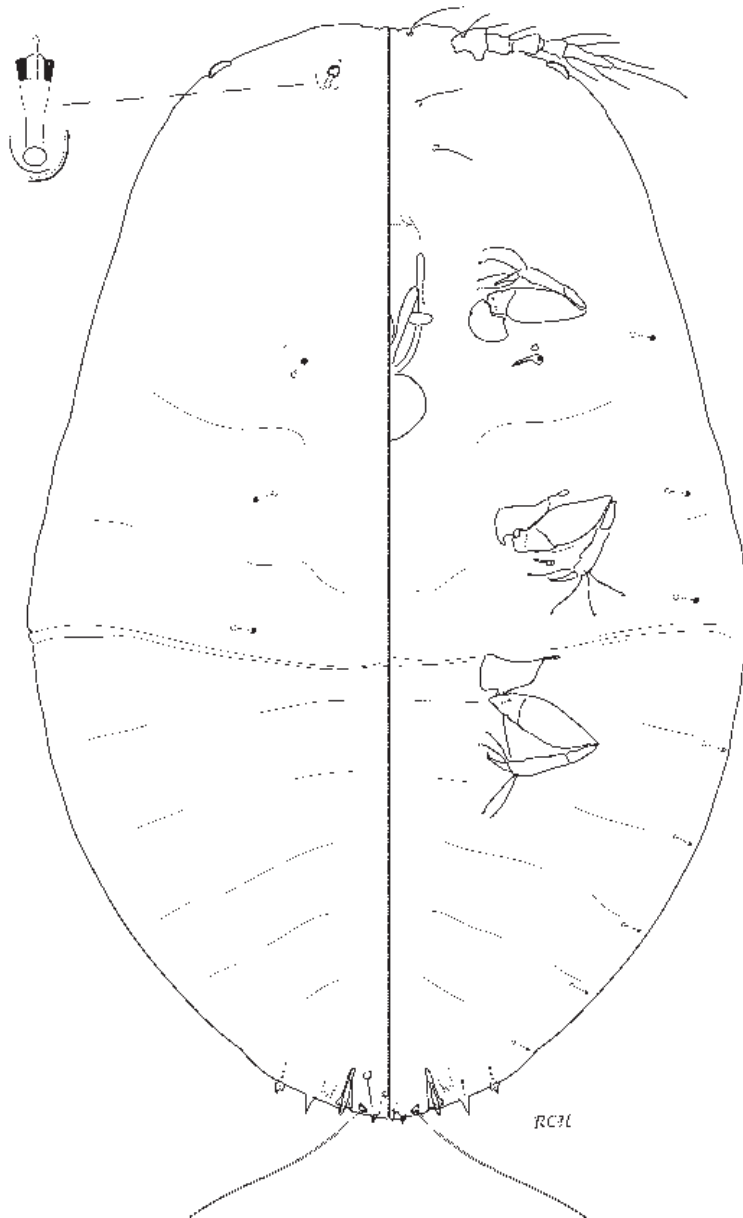


Fig. 184 *Poliaspis floccosa* Henderson n.sp., 1st-instar nymph.

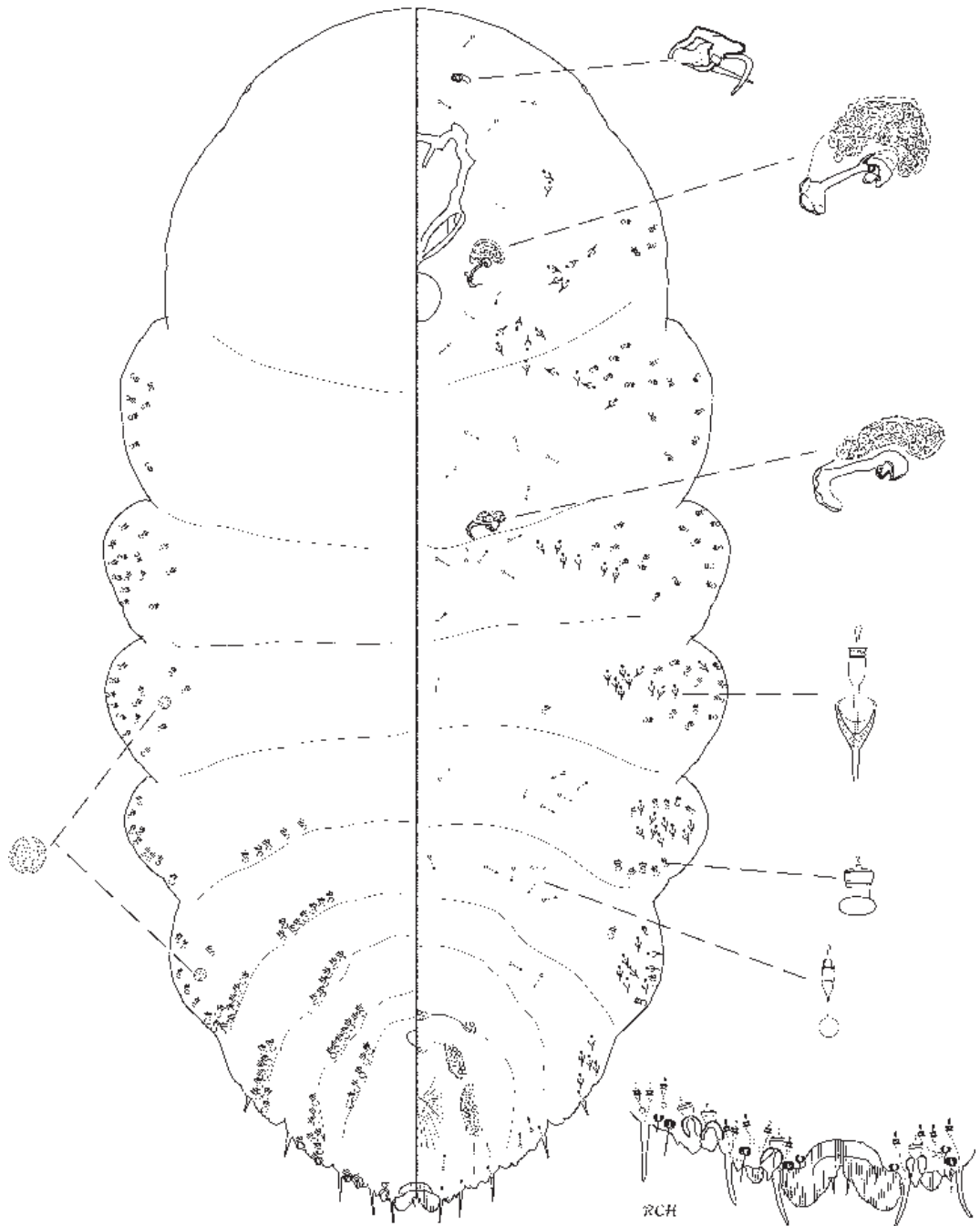


Fig. 185 *Poliaspis lactea* (Maskell), adult female.

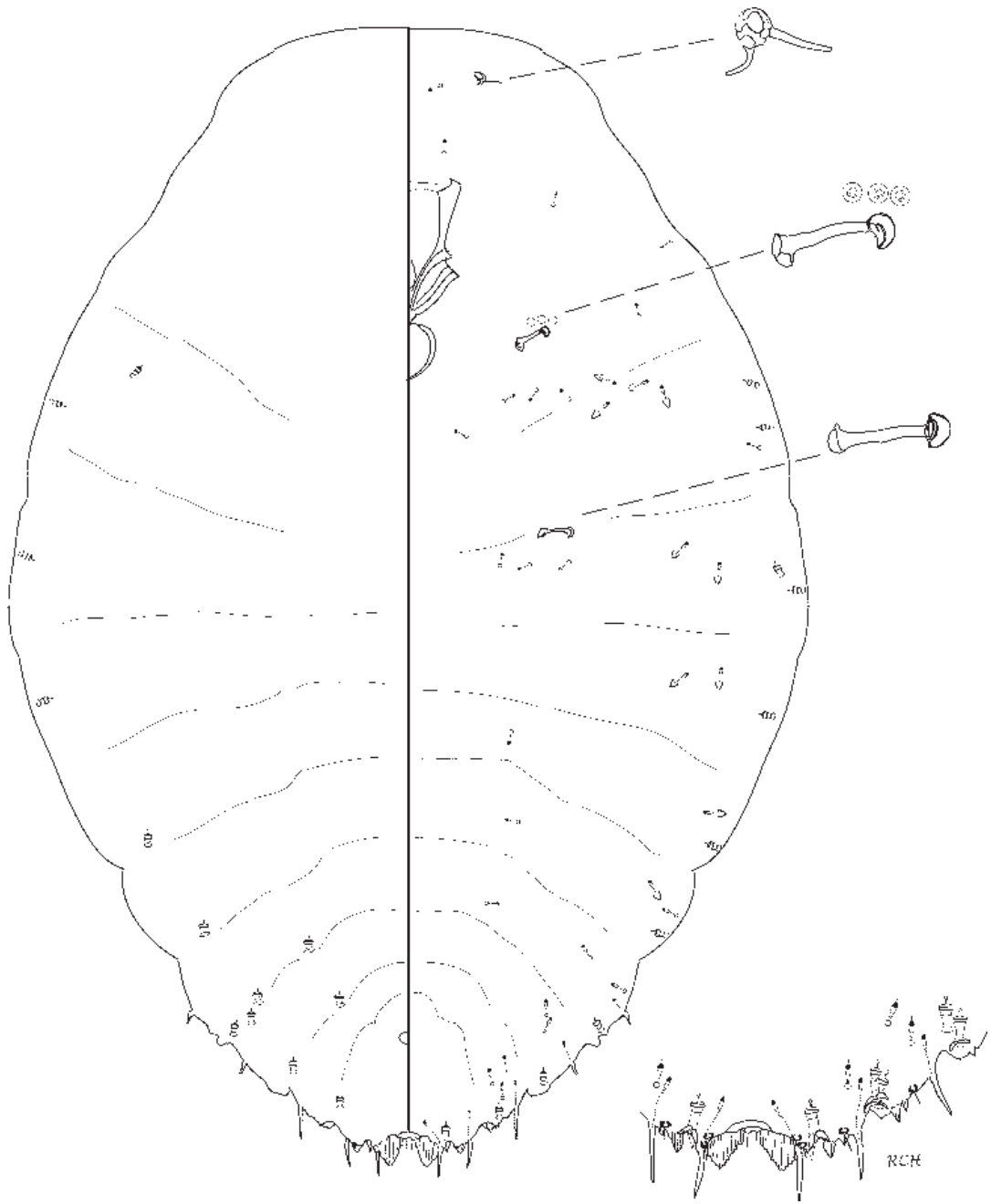


Fig. 186 *Poliaspis lactea* (Maskell), 2nd-instar female nymph.

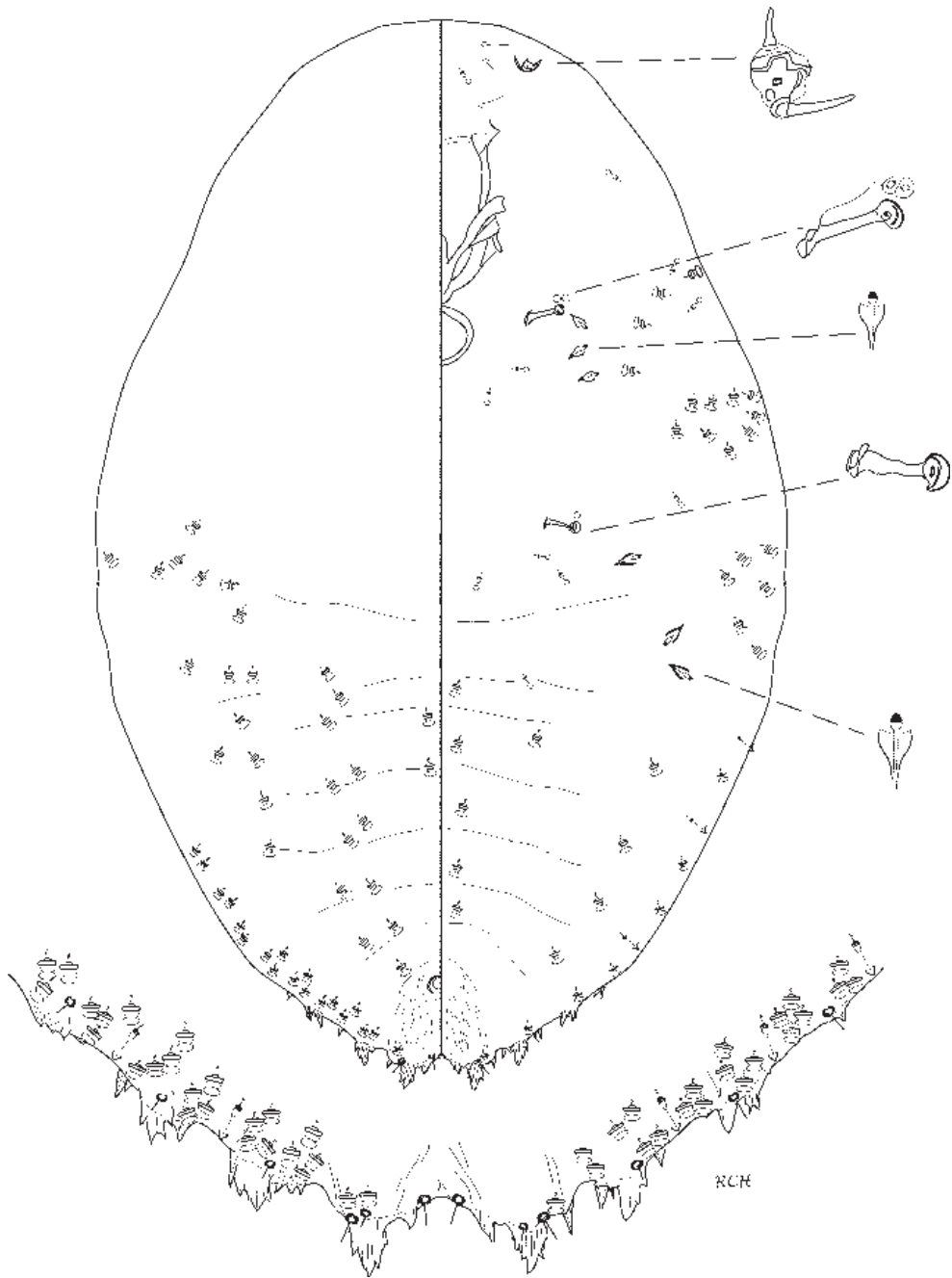


Fig. 187 *Poliaspis lactea* (Maskell), 2nd-instar male nymph.

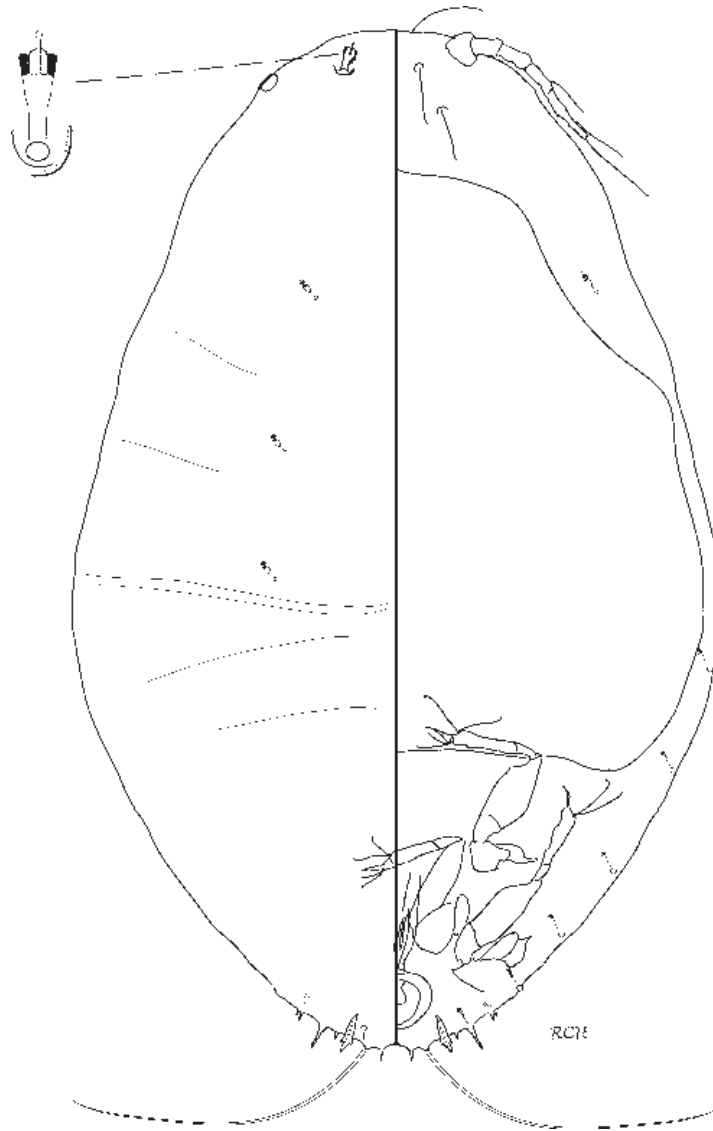


Fig. 188 *Poliaspis lactea* (Maskell), 1st-exuvium.

becoming smaller as far forward as thorax, and wrapping round on to ventral margin. 1 pair of large dorsal bosses present on submedian segments I and III. Anal opening 10–20 μm , as long as wide, positioned 120–170 μm from posterior margin.

Ventral ducts similar to smaller dorsal ducts distributed on abdominal submargins II–I, and on margins/submargins of thorax. Gland tubercles in groups submarginally on abdominal segments IV–I, with a band near each posterior spiracle and scattered near each anterior spiracle. Microducts of 2 sizes, (i) more robust in small groups on pygidium submargin and associated with gland tubercles, and (ii) more slender scattered on submedian abdomen, near spiracles and often numerous on head. Antennae each with 1 long seta or with 1 long and 1 medium size seta. Anterior spiracles each with a group of 8–>150 trilocular pores; posterior spiracles each with a group of 2–>35 trilocular pores (spiracular pores more numerous on specimens from *Fuchsia excorticata*). Total of 74–187 perivulvar pores in 8 groups as for genus. Vulva situated about 82–132 μm from posterior margin.

2nd-instar female nymph, measurements taken from 2 specimens (Fig. 186). Body shape ovate, length about 0.53 mm, width 0.38–0.39 mm. L1 prominent as in adult female, L2 small, L3 pointed; gland spines as for adult female.

Dorsal ducts slightly larger than pygidial margin ducts (which are on venter), 1 submedian pair on segment V and 1 extra duct on segment IV on 1 specimen, with 1–2 pairs submarginally on each segment as far forward as thorax. Anal opening about 7.5–10 μm , as long as wide, positioned 62–65 μm from posterior margin.

Ventral marginal ducts similar to dorsal ducts present segmentally from pygidium to metathorax. Microducts of 2 sizes, few, distributed as for female. With 1 gland tubercle on each side of abdomen IV and III, 2 pairs on I and 2–4 pairs by each spiracle. Antennae each with 2 medium long setae. Anterior spiracles each with a group of 3 trilocular pores, posterior spiracles without pores.

2nd-instar male nymph, measurements taken from 2 specimens (Fig. 187) (but 1 broken in half). Body roundly ovate, length 0.56 mm, width 0.39 mm; with 4 pairs of complex notched and divided lobes, L1 with a small pointed lobule medially then an irregular notched lobe each side, with 1 pair of medial setae; L2 similarly irregular in shape, L3 and L4 progressively smaller. Marginal macroducts small, numerous, in small groups each side, with actual marginal ducts on venter and others dorsad.

With 1 pair of submedian dorsal ducts on abdominal segments VI and 2–3 pairs on segments II–V with 1 or 2 ducts near median; submarginal dorsal ducts in band from abdominal segment III to metathorax. Anal opening about

7.5 μm , as long as wide, positioned 22–40 μm from posterior margin.

Ventral microducts few, on abdomen submargin, near spiracles, and on head. Ducts similar to dorsal ducts distributed in a submedian line and a submarginal line each side on abdomen and in submarginal groups on thorax. Notably large gland tubercles present on abdomen I and near posterior spiracle; with a group of smaller gland tubercles near anterior spiracle. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae each with 2 stout setae and complex sensory pores inbetween them. Anterior spiracles each with a group of 2–3 trilocular pores, posterior spiracles without pores.

1st-instar exuvium, measurements taken from 13 specimens (Fig. 188). Body shape ovate, length 0.35–0.46 mm, width 0.22–0.27 mm. Pygidium with 2 pairs of lobes, notched each side at body margin, pointed distally and with a basal sclerosis; between L1 and L2 1 pair of gland spines each with 1 microduct; with 1 pair of pointed protuberances on margin near median, and between 1 pair of long anal lobe setae.

Dorsum: with 3 pairs of dorsal thoracic submedian microducts, 1 pair on each segment; with 1 pair of large cephalic ducts present near anterior margin of head; eyes on margin.

Venter: With 6 pairs of microducts on submargin of abdomen, and 2 pairs on submargin of thorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented as for genus, 55–75 μm long, with fine and fleshy setae.

Type material examined. LECTOTYPE female, here designated to preserve nomenclatural stability: NEW ZEALAND, on an original slide labelled “*Mytilaspis lactea*, adult female, 1894, W.M.M.”, [1]: 1 F, cleared and lightly stained. Barcode NZAC02008413 (NZAC).

Paralectotypes. (i) on an original slide labelled as above except “female puparium”, [1]: a whole scale cover with its 1st- and 2nd-exuvia. Barcode NZAC02007965. (ii) “from Maskell dry material #416, mounted by JA de Boer, 28 vi 1968”, [2]: 7 F, 9 exuv2, 3 exuv1 (NZAC).

Other material examined. See Appendix A (p. 233) for details of 129 specimens examined.

Distribution. ND, WO, BP, HB, TO, WI / NN, MC, SC, DN, SL

Host plants. Asteraceae: *Olearia arborescens*, *Olearia* sp., *Olearia* x *macrodonata*, *Ozothamnus leptophyllus*; Epacridaceae: *Epacris pauciflora*; Liliaceae: *Astelia* sp.; Myrsinaceae: *Myrsine australis*; Onagraceae: *Fuchsia excorticata*; Pittosporaceae: *Pittosporum tenuifolium*; Rubiaceae: *Coprosma* sp.

Remarks. Maskell (1895) mistakenly described this species as having 5 groups of perivulvar pores instead of the 8 groups clearly present on the lectotype slide, hence its erroneous placement by earlier workers outside the appropriate genus *Poliaspis*.

***Poliaspis media* Maskell E poliaspis scale**

Fig. 88–93, 189–195; Map 36

Poliaspis media Maskell, 1880: 293; Morrison & Morrison 1922: 86 [description]; Myers 1922: 200; Borchsenius 1966: 134; Wise 1977: 109; Deitz & Tocker 1980: 39.

Poliaspis media Maskell; Ferris 1938: 37, 42
misidentification.

Poliaspis argentosis Brittin, 1915: 150; 1926: 287; Green 1920: 128; MacGillivray 1921: 356; Morrison & Morrison 1922: 88; Myers 1922: 200; Borchsenius 1966: 133; Wise 1977: 109. **new synonymy.**

Live appearance and habitat. Female scale cover shiny white with pale terminal exuvia, female body and eggs pale to dark yellow; male scale cover small, white, coated with some flocculent wax. Normally on underside of leaves of host plants, less often on stems; in addition, inducing various galls on certain host plants, for example, leaf tip rolls on *Myrsine australis* (Fig. 93), and leaf rosette galls on *Coprosma* spp. (Fig. 92) (see Henderson & Martin (2006) for more details).

Adult female measurements taken from 15 specimens (Fig. 189–191). Body ovate to fusiform; length 0.39–1.8 mm, width 0.24–0.58 mm. L1 yoked, with or without a notch in the pygidium apex, lobes often divergent with fine serrations on the mesal margin, or more prominent and bulky with a rounded apex; always with 1 pair of setae between median lobes; L2 bilobed, rounded, the inner lobule largest, sometimes appearing longer than L1, and often with a basal sclerosis extending anteriorly from the proximal margin, the lateral lobule small, sometimes indistinct; L3 rounded or notched, more often as 3 points, the inner lobule associated with an overlying macroduct pore prominence, middle lobule largest. Marginal macroducts distributed 1 each side on segment VII, 2 on VI, 1 on V, each macroduct with a sclerotised opening.

Submedian dorsal ducts slightly smaller than marginal macroducts, distributed in regimented rows on VI–II, with only occasional ducts between rows. Submarginal ducts as for genus. Anal opening average diameter $15 \times 15 \mu\text{m}$, range 12.5–20 μm , positioned 95–167 μm from posterior margin. With a boss nearly always present on dorsal submargin of each side of abdominal segments III and I.

Ventral ducts and gland tubercles present on submargins of prepygidial abdomen, more numerous and extending towards submedian on meta- and mesothorax; microducts

scattered on pygidium, abdomen, thorax, and head; gland spines as for genus. Antennae with 1 or 2 long setae. Anterior spiracles each with a group of 7–45+ trilocular pores; posterior spiracles each with 1–30+ trilocular pores. Total of 55–178 perivulvar pores in 5 moderately elongate groups plus 3 smaller groups.

2nd-instar female nymph, measurements taken from 18 specimens (Fig. 192). Body shape similar to female but smaller, tending towards oval in pre-moult-to-adult stage, length 0.39–0.81 mm, width 0.24–0.58 mm; L1 widely spaced and yoked, L2 bilobed without scleroses, L3 barely apparent as points; gland spines similar to female; 4 pairs marginal macroducts.

Dorsal ducts becoming smaller towards thorax, with additional 1 pair of ducts on submargin of segments V–III, and on submedian of segments V and IV. Anal opening 42–72 μm from posterior margin.

Ventral microducts of 1 size, scattered on abdomen and on head; gland tubercles distributed as 1–2 pairs on prepygidial submargins and on thorax. Antenna with 1 or 2 setae as for female. Anterior spiracles each with a group of 0–4 trilocular pores, posterior spiracles with 0–2 trilocular pores.

2nd-instar male nymph, measurements taken from 19 specimens (Fig. 193, 194). Body shape similar to female nymph except tending elongate in pre-moult-to-prepupal stage, length 0.4–0.7 mm, width 0.26–0.5 mm; with 4 pairs of complex notched and divided lobes, L1 not yoked, divergent, with a small pointed lobule medially then an irregular notched lobe each side, with a pair of medial setae; L2 similarly irregular in shape, L3 and L4 progressively smaller.

Marginal macroducts relatively small compared with other dorsal ducts, numerous each side in a distinct band of 9 groups each of 2–6 pairs of ducts, thereafter dorsal ducts scattered on submargin as far forward as metathorax; submedian ducts largest, with 2 pairs each side of abdominal segments plus 2 pairs on median of anterior abdomen.

Ventral microducts of 2 sizes, largest few, 1 pair per segment on abdominal submargin, smaller microducts associated with gland tubercles, near each spiracle and scattered on head; ventral macroducts numerous, on the abdomen in a median row of single ducts and in submedian pairs, also a few on submargins of anterior abdomen and in submarginal groups on meso- and metathorax. Notably large gland tubercles present on abdomen I and near posterior spiracle; with a group of smaller gland tubercles near anterior spiracle. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antenna with variable numbers of setae, usually at least 1 long and 1 short seta plus a stub(s). Anterior spiracles each with a group of 1–4 trilocular pores, posterior spiracles

with 0–1 trilocular pores. With 3 pairs of faint vestigial leg patches present on submedian, 1 anterior to each spiracle, and 3rd on abdomen I.

Remarks. Vestigial leg patches were also detected on the 2nd-instar male nymphs of *Poliaspis raouliae* and *Pseudaulacaspis brimblecombei* (below). Male 2nd-instar nymphs on *Hebe* spp. tend towards more ornate and numerous pygidial appendages, the lobes broad and dissected forming a complex, frilled margin (Fig. 194).

1st-instar nymph, measurements taken from 7 specimens (Fig. 195). Body shape tending oval, length 0.36–0.42 mm, width 0.24–0.27 mm. Pygidium with 1 pair of lobes, slightly notched, each with a basal sclerosis on submargin; between the lobes 1 pair of minute setae and 1 pair of protuberances, and 1 pair of long anal lobe setae; 1 pair of gland spines normally short but sometimes longer.

With a pair of large dorsal cephalic macroducts. Dorsal submedian thoracic microducts present or absent.

Ventral microducts with small tubercles on margin of abdominal segments II–IV and metathorax, with a submarginal pair of microducts on both pro- and mesothorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented, 55–67 µm long, with fine and fleshy setae. Legs and spiracles normal. Eyes on margin.

Type material examined. *Poliaspis media* Maskell. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, labelled “*Poliaspis media*, females, from *Leucopogon Fraseri* (epacrid), June 1878 W.M.M.”, [1]: 1 F. Barcode NZAC02008420 (NZAC). This is one of 3 slides remounted from 1 original Maskell slide by RC Henderson, 2001. **Paralectotypes:** (i) collection data as above (the remaining 2 slides from remounting), [2]: 2 F; (ii) labelled “*Poliaspis media*, females, 2 stages, from *Veronica*, Jan 1879 W.M.M.”, [3]: 2 F [1 pharate], 1 f2nd; these are 3 slides remounted from 1 original Maskell slide by RC Henderson, 2001 (NZAC).

Poliaspis argentosis Brittin. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, on an original slide labelled “*Poliaspis argentosis*, (Type) (1.), No. 47, On *Coprosma*, Crushington, 11 Dec 1913, G. Brittin”, [1]: 1 F. Barcode NZAC02008423 (NZAC). Of 2 slides with the same label data as above and outlined in red by Brittin, the chosen lectotype is in better condition than the other female, which becomes a **paralectotype**. A 3rd slide with the same collection data but not outlined in red or labelled type is also a **paralectotype** (NZAC).

Remarks. Maskell gave 2 host plants in his description of *P. media* (Maskell 1880): *Veronica* (= *Hebe*) and

Leucopogon fraseri. Brittin gave *Coprosma* sp. as the host plant for *P. argentosis* (Brittin 1915). The lectotype females of *P. media* and *P. argentosis* appear extremely similar, plus the absence of submedian dorsal thoracic microducts on 1st-instar nymphs/exuvia on both *Coprosma* and *Leucopogon* indicate that *P. media* Maskell is the senior synonym. But the other Maskell host plant *Hebe* represents a group of taxa with 3 pairs of submedian dorsal thoracic microducts present on 1st-instar nymphs/exuvia, and in addition there is great variability among collections from many other host plants, thus it is considered best to treat *P. media* as a species complex for now. In addition, Brittin seemed unaware of Maskell’s *P. media* when writing the description of *P. argentosis*, and compared it to an exotic species, *P. cycadis* (Brittin 1915).

Other material examined. See Appendix A (p. 234) for details of 1153 specimens examined.

Distribution. TH / ND, AK, WO, BP, GB, TK, TO, RI, WA, WN / SD, NN, BR, WD, MB, KA, NC, MC, CO, SI / CH

Host plants. Aizoaceae: *Disphyma australe*; Araliaceae: *Raukaua anomalus*; Asteraceae: *Craspedia* sp., *Ozothamnus leptophyllus*; Sonchus sp.; Chenopodiaceae: *Chenopodium* sp.; Epacridaceae: *Acrothamnus colensoi*, *Cyathodes* sp., *Dracophyllum latifolium*, *D. lessonianum*, *D. oliveri*, *D. recurvum*, *D. traversii*, *Dracophyllum* sp., *Leptecophylla juniperina*, *Leucopogon fasciculatus*, *L. fraseri*, *Pentachondra pumila*; Ericaceae: *Gaultheria depressa*, *Gaultheria* sp.; Liliaceae: *Astelia fragrans*; Myrsinaceae: *Myrsine australis*, *M. divaricata*, *M. salicina*; Orchidaceae: orchid; Podocarpaceae: *Lepidothamnus laxifolius*; Primulaceae: *Samolus repens*; Ranunculaceae: *Clematis afoliata*; Restionaceae: *Empodisma minus*; Rubiaceae: *Coprosma arborea*, *C. chathamica*, *C. cheesemanii*, *C. depressa*, *C. propinqua*, *C. pumila*, *C. rhamnoides*, *C. robusta*, *C. rubra*, *C. spathulata*, *C. tenuifolia*, *C. virescens*, *Coprosma* sp.; Rutaceae: *Leionema nudum*; Santalaceae: *Exocarpos bidwillii*; Scrophulariaceae: *Hebe decumbens*, *H. elliptica*, *H. macrantha*, *H. odora*, *H. subalpina*, *H. venustula*, *Hebe* sp., *Heliohebe pentasepala*; Thymeliaceae: *Pimelea* nr *aridula*, *Pimelea prostrata*, *Pimelea urvilleana*; Violaceae: *Melicytus alpinus*.

Remarks: Adult females show a wide range of numbers of ducts and pores, being somewhat more poriferous in harsh environments (both warm as on the Three Kings Islands and cold in the far south of the South Island, e.g., a collection on *Hebe venustula* (Fig. 190), and less poriferous in some collections, e.g., from one on *Dracophyllum* (Fig. 191). No defining pattern has emerged from the analysis of duct distribution to suggest there are distinct species of *Poliaspis* at either end of the continuum from low to high

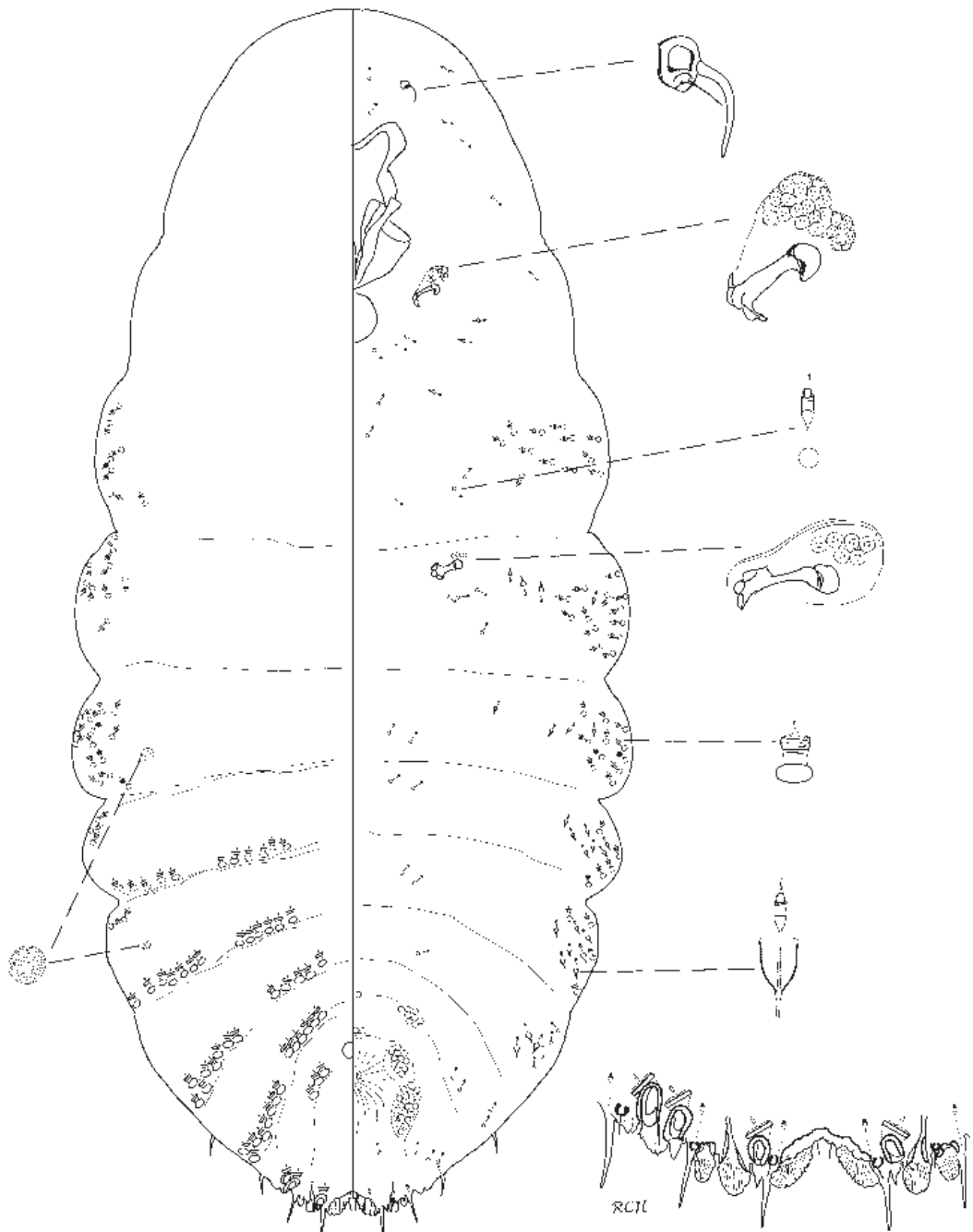


Fig. 189 *Poliaspis media* Maskell, adult female, from type material on *Leucopogon*.

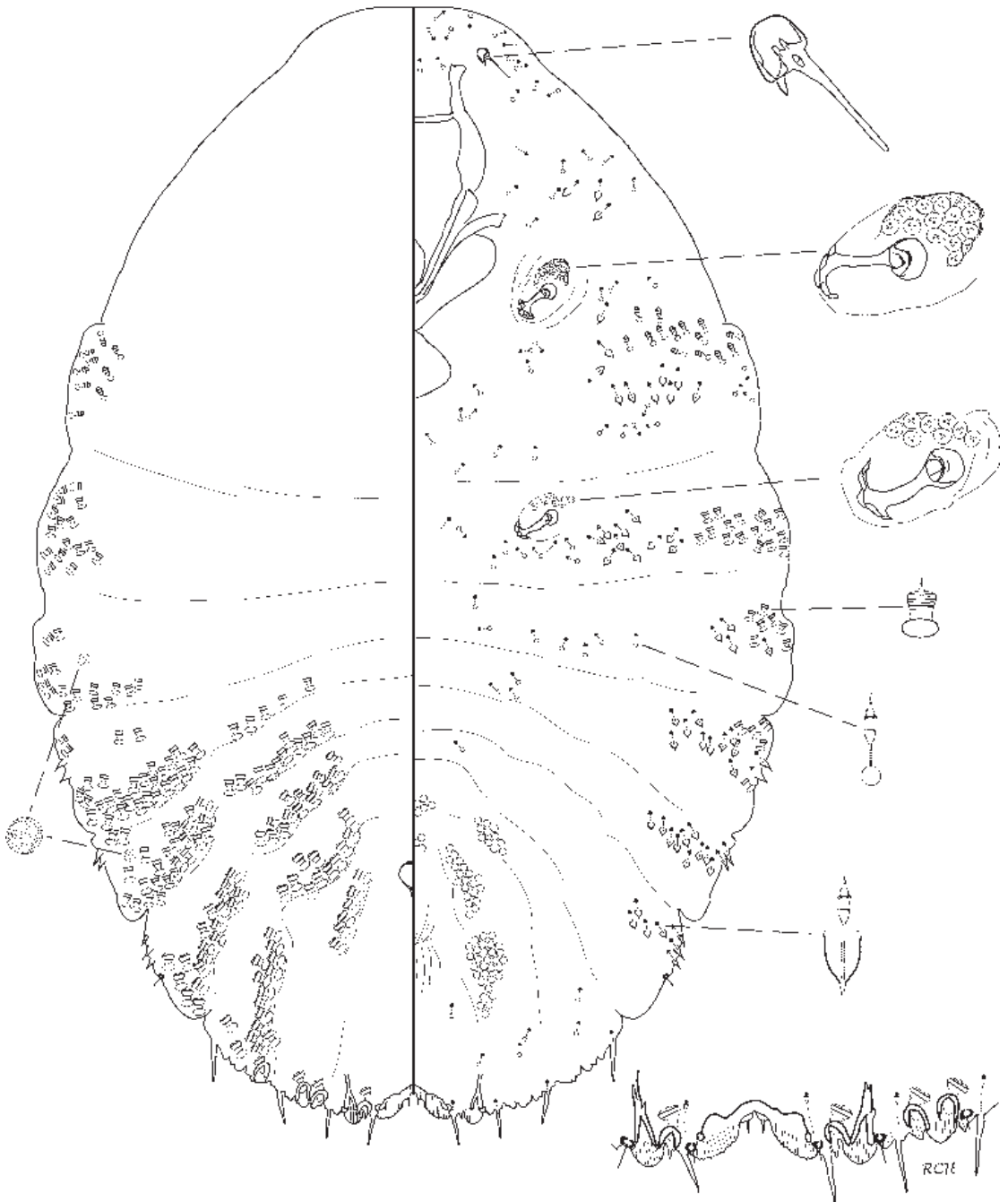


Fig. 190 *Poliaspis media* Maskell, adult female, on *Hebe*.

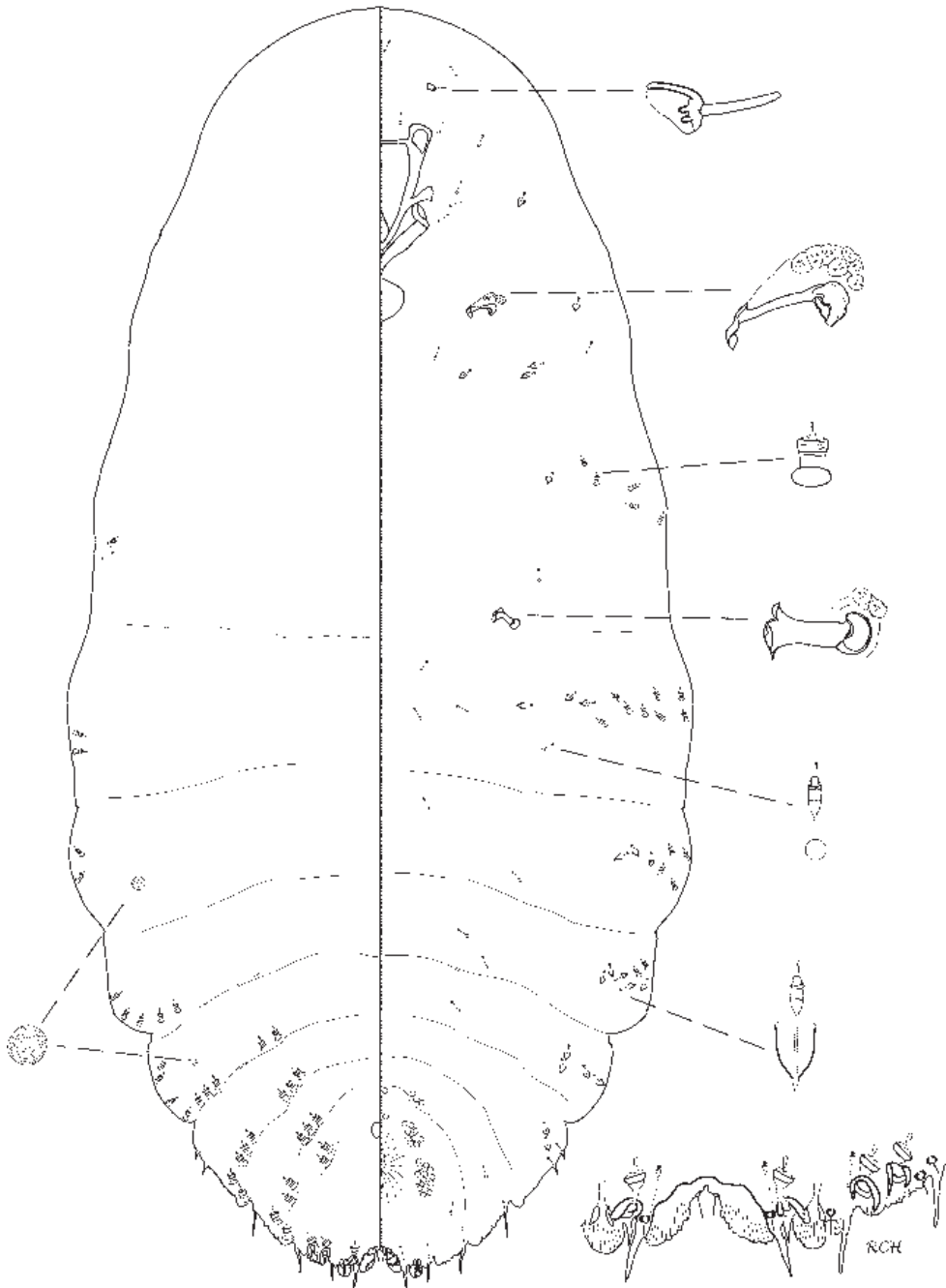


Fig. 191 *Poliaspis media* Maskell, adult female, on *Dracophyllum*.

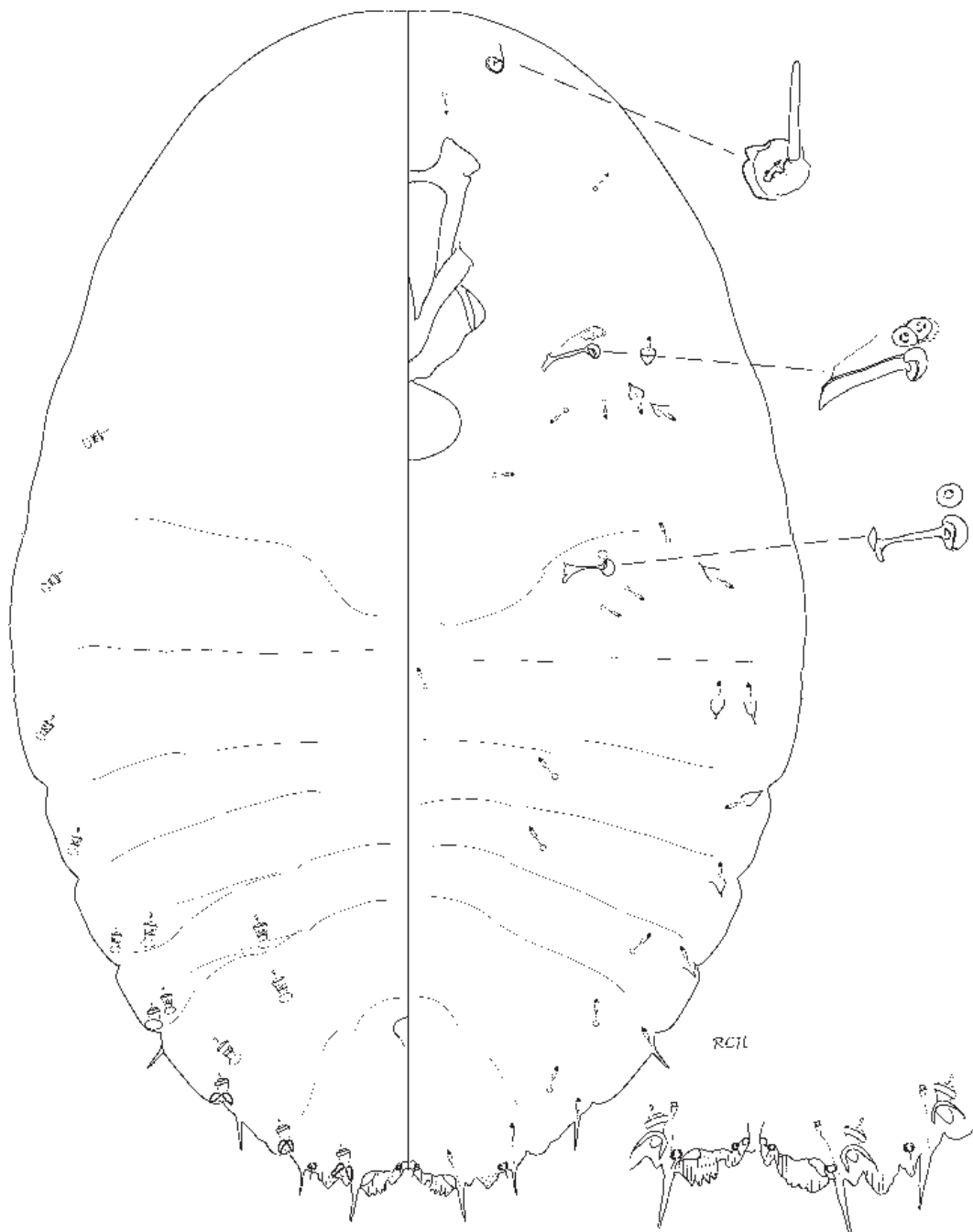


Fig. 192 *Poliaspis media* Maskell, 2nd-instar female nymph.

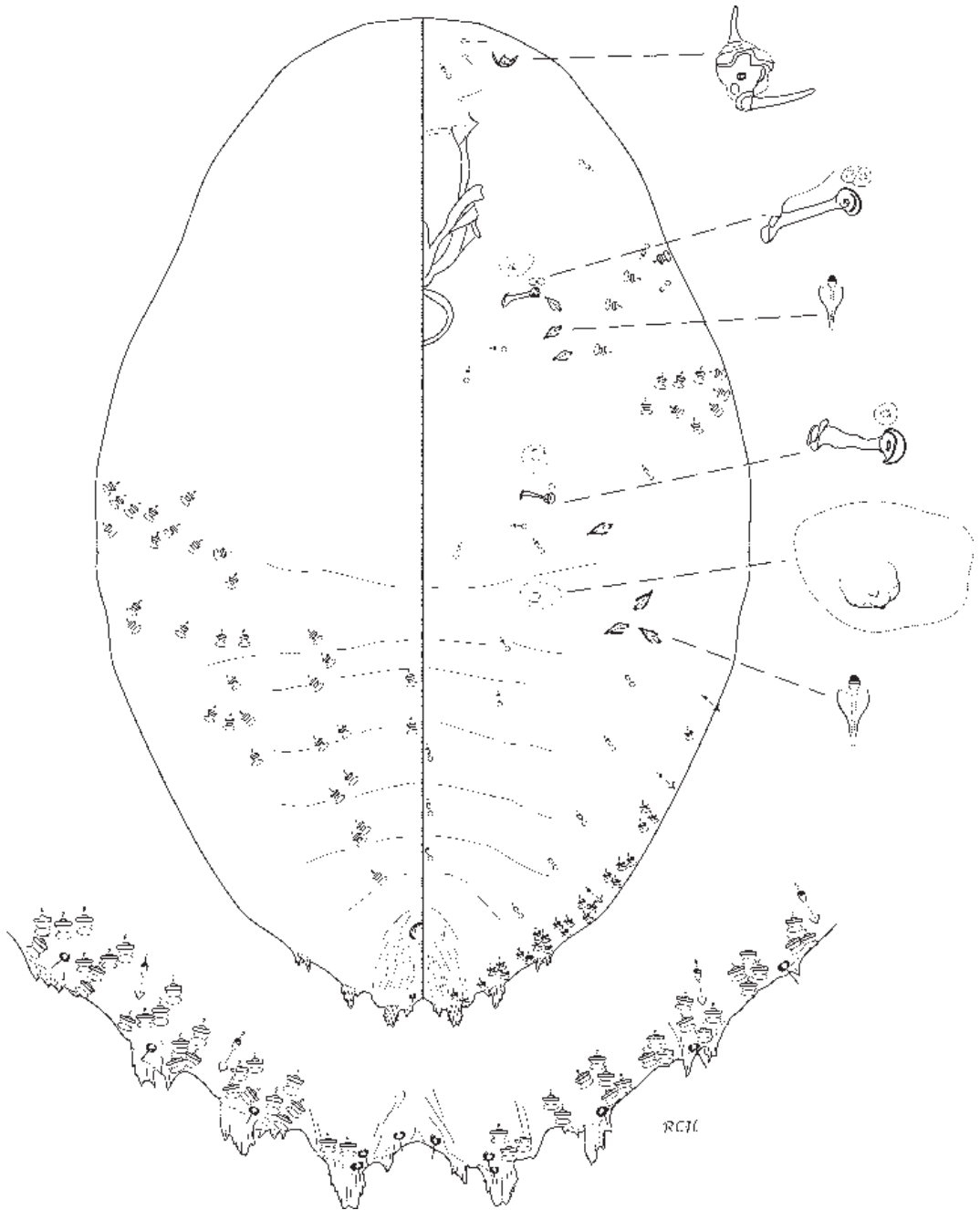


Fig. 193 *Poliaspis media* Maskell, 2nd-instar male nymph on *Leucopogon*.

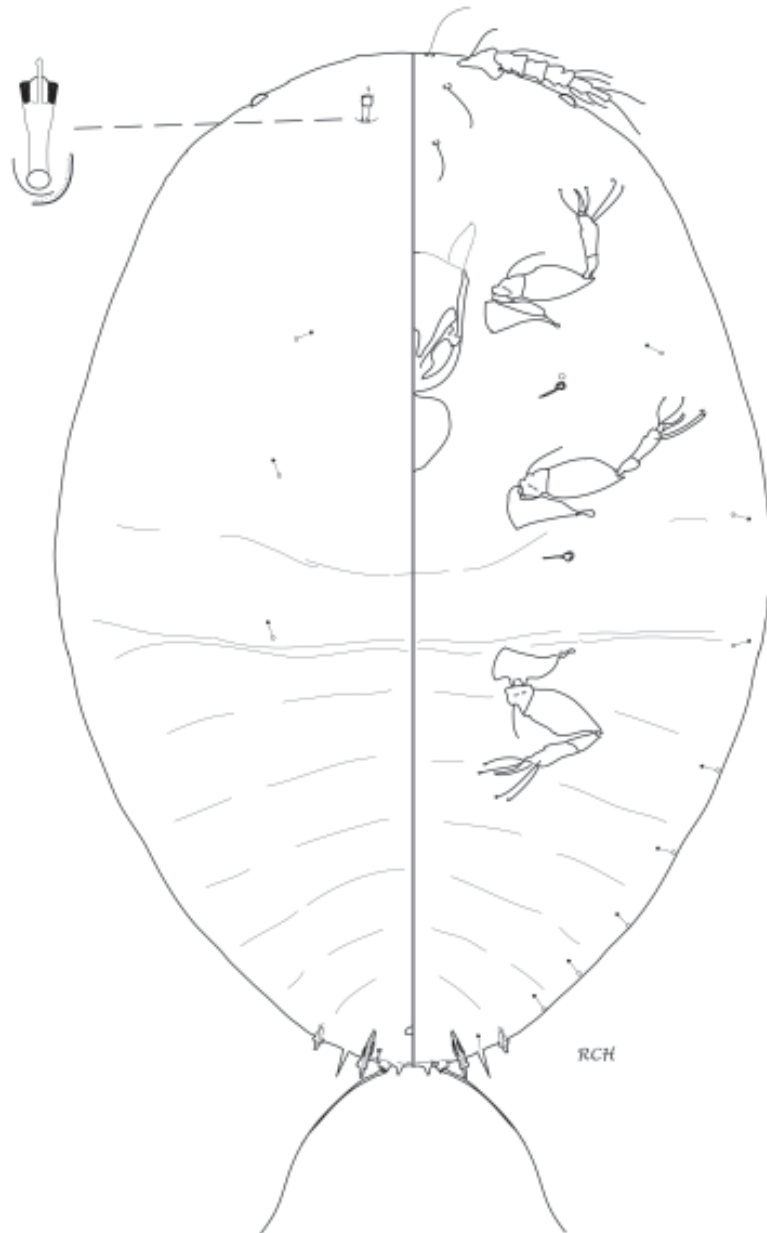


Fig. 195 *Poliaspis media* Maskell, 1st-instar nymph.

numbers present. In addition, poriferous variability can be present among females with shared collection data, e.g., NZAC #04-080 on *Myrsine australis* from Dingle Dell Reserve, Auckland.

***Poliaspis raouliae* Henderson new species E raoulia scale**

Fig. 196–199; Map 37

Live appearance and habitat. Female scale cover white, with terminal exuvia; colour of female body and eggs not recorded; male scales small, white, not coated in flocculent wax or carinated. The type series was in a riparian habitat, on stems of the host plant that were partly submerged at the edge of the riverbed.

Adult female, measurements taken from 18 specimens (Fig. 196). Body shape fusiform with lateral abdominal lobes produced, rounded, length 0.66–1.36 mm, width 0.43–1.02 mm. Median lobes (L1) not prominent, extension beyond margin 30% of total lobe length, convex-shaped yoke forming notch on median pygidium margin, lobes divergent, slightly serrate, with 1 pair of setae between them; L2 bilobed, rounded to pointed, much smaller than L1, lateral lobule very small, L3 as points. Marginal macroducts: with 2–4 ducts each side of L1 on segment VII and 3–6 ducts grouped on each side of margin/submargin of segment VI. Paraphyses absent. Gland spines slender, pointed, present singly on each pygidium segment.

Dorsal ducts barrel-shaped, distributed as 2–5 pairs of ducts on submedian pygidium VI, 4 rows on submedian and submarginal ducts each side of abdomen, then on submargin becoming smaller as far forward as thorax, and wrapping round on to ventral margin. A pair of large dorsal bosses present on submedian segments I and III. Anal opening 120–17 μm long as wide, positioned 107–125 μm from posterior margin.

Ventral ducts similar to smaller dorsal ducts distributed on abdominal submargins II–I, and numerous on margins and submargins of thorax. Gland tubercles in groups submarginally on abdominal segments IV–I, with a band near each posterior spiracle and scattered near each anterior spiracle and on head. Microducts of 2 sizes, (i) more robust in large groups on pygidium submargin and associated with gland tubercles, and (ii) more slender scattered on submedian abdomen, numerous near spiracles and on head. Antennae each with 1–2 long setae or with 1 long and 1 medium-sized seta. Anterior spiracles each with a group of 26–38 trilocular pores; posterior spiracles each with a group of 14–26 trilocular pores. Total of 66–107 perivulvar pores in 8 groups as for genus. Vulva situated about 92–102 μm from posterior margin.

2nd-instar female nymph, measurements taken from 5 specimens (Fig. 197). Body shape ovate, length 0.62–0.66 mm, width 0.41–0.46 mm. L1 moderately large, serrate and divergent as for female, L2 small, L3 pointed; pygidium margin sclerotised; gland spines as for adult female.

Dorsal ducts slightly larger than pygidial margin ducts (which open on venter), 1 submedian pair on segments V–III, with 2–4 pairs submarginally on each segment as far forward as thorax. Anal opening about 7.5 μm , as long as wide, positioned 37–52 μm from posterior margin.

Ventral marginal ducts similar to dorsal ducts present segmentally from pygidium to mesothorax. Microducts of 2 sizes, few, distributed as for female. With 1 small gland tubercle on each side of abdomen IV–III, 2 pairs on I and 1 pair by each spiracle. Antennae each with several medium to short setae. Anterior spiracles each with a group of 5–7 trilocular pores, posterior spiracles each with a group of 2–4 trilocular pores.

2nd-instar male nymph, measurements taken from 4 specimens (Fig. 198). Body roundly ovate, length 0.53–0.68 mm, width 0.32–0.39 mm; with 4 pairs of small complex notched and divided lobes, L1 with a small pointed lobule medially then an irregular notched lobe each side, widely divergent, with 1 pair of medial setae; L2 similarly irregular in shape, L3 and L4 progressively smaller. Marginal macroducts relatively large, with actual marginal ducts on venter; with 1 pair of submedian dorsal ducts on abdominal segments VII–VI and 2 pairs on segments V–II, with 1 or 2 ducts near median.

Submarginal dorsal ducts in a band from abdominal segment VI to mesothorax. Anal opening 10–12 μm , as long as wide, positioned 22–30 μm from posterior margin.

Ventral microducts few, near spiracles and on head. Ducts similar to dorsal ducts, distributed in a submedian line and a submarginal line each side on abdomen, and in submarginal groups on thorax. Small gland tubercles present on abdomen I, near each spiracle, and on head. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae cone-shaped, each with 2 stout setae near the base, offset 1 at either side. Anterior spiracles each with a group of 4–7 trilocular pores, posterior spiracles each with a group of 2–4 trilocular pores. With 3 pairs of faint vestigial leg patches present on submedian, 1 anterior to each spiracle and 3rd on abdomen I.

Remarks. Vestigial leg patches were also detected on the 2nd-instar male nymphs of *Poliaspis media* (above) and *Pseudaulacaspis brimblecombei* (below).

1st-instar exuvium, measurements taken from 8 specimens (Fig. 199). Body shape ovate, length 0.36–0.42 mm, width 0.22–0.29 mm. Pygidium with 2 pairs of lobes, notched each side near body margin, pointed distally and

with a basal sclerosis; between L1 and L2 1 pair of gland spines each with a microduct; with 1 pair of pointed protuberances on margin near median and between 1 pair of long anal lobe setae.

Dorsum: with 2 or 3 pairs of dorsal thoracic submedian microducts, 1 pair each on meta- and mesothorax, present/absent on prothorax; with 1 pair of large cephalic ducts present near anterior margin of head; eyes on margin.

Venter: With 6 pairs of microducts on submargin of abdomen, and 2 pairs on submargin of thorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 5-segmented as for genus, 60–80 µm long, with fine and fleshy setae.

Type material examined. **HOLOTYPE** female: NEW ZEALAND, BP, Pukeamaru, Karakatuwhero Valley, riverbed in shallows, 3 Mar 1993, JS Dugdale, *Raoulia* sp. stems, #93-201g, [1]: 1 F. Barcode NZAC02008811 (NZAC). **Paratypes:** collection data as for holotype above, #93-201a–f, h–r, [17]: 29 F, 5 f2nd, 4 m2nd, 1 pp, 1p, 16 exuv2, 11 exuv1 (NZAC).

Other material examined. See Appendix A (p. 236) for details of 6 specimens examined.

Distribution. BP / NN

Host plant. Asteraceae: *Raoulia* sp.

Etymology. The species is named after its host plant genus *Raoulia*.

Remarks. This species is known from only 2 collections with a disjunct distribution: on the Karakatuwhero River near East Cape, North Island, and Whangapeka in North-west Nelson.

Poliaspis salicornicola Henderson new species E glasswort scale

Fig. 200–201; Map 38

Live appearance and habitat. Not recorded.

Adult female, measurements taken from 7 specimens (Fig. 200). Body shape on slide roundly oval with prominent median lobes (L1) at apex; on more mature specimens the distal pygidium appears folded over towards the mid-pygidium. Body length 0.57–1.08 mm, width 0.48–0.92 mm. L1 yoked with a small semicircular sclerotisation, lobes broad, lateral margin longer than medial margin, rounded with small notches; with 1 pair of setae between median lobes; each L2 lobe coalesced into a single, triangular-shaped lobe, L3 not discernible. Without paraphyses on lobes but with a submarginal sclerotised strip between pygidial macroducts; 2 pairs of setae with stout setal bases at base of median lobes. 3 pairs of marginal macroducts only (a single macroduct each side on segment VI).

Submedian dorsal ducts smaller than marginal macroducts, distributed in loosely arranged rows on segments VI–III, the ducts less well-aligned in these rows than on *P. floccosa* and *P. media* females; submarginal dorsal ducts grouped on segments V–II, occasionally present on ventral abdominal margins, not present on thorax. Abdominal bosses absent. With a few microducts scattered on dorsal submargins of cephalothorax and a group of microducts on submargin of metathorax. Anal opening 7.5–10 µm long and 12.5–15 µm wide, positioned 115–145 µm from posterior margin. Pygidial gland spines delicate and much reduced, not readily discernible in the median lobe-2nd lobe interlobular space, 2 pairs present lateral to the 2nd lobes, 3rd lateral pair usually the most easily discernable.

Ventral ducts more elongate than small dorsal ducts, present in groups on submargins of prepygidial segments and thorax; smaller microducts numerous on margins of pygidium in groups of 2–3, on submargins of abdomen, near each spiracle, and in a particular submarginal group of 6–12 ducts on each side of the head, also scattered on submedian abdomen; a few gland tubercles distributed on submargins of prepygidial segments, more numerous associated with spiracles. Antennae with 1 or 2 long setae. Anterior spiracles each with a group of 6–13 trilobular pores; posterior spiracles each with a group of 5–11 trilobular pores. Total of 46–78 perivulvar pores in 8 groups as for genus. Vulva difficult to discern on most specimens, positioned about middle of pygidium, about 85–105 µm from posterior margin.

2nd-instar female nymph, measurements taken from 2 exuvia, therefore incomplete for most of anterior part of body (Fig. 201). Body shape similar to female but smaller, length 0.57–0.69 mm, width 0.48–0.53 mm; prominent median lobes, associated setae, reduced gland spines, and pygidial margin similar in shape to female.

Marginal macroducts absent, dorsal ducts present in 4 submarginal rows of 3–4 ducts each side of abdomen on segments II–V, with an additional submedian duct on III–V, and probably with 1 or 2 ducts confined to body margin of each segment as far forward as mesothorax. Anal opening about 60–72 µm from posterior margin.

Ventral microducts in groups of 2 to 3 on submargin of pygidium, replacing marginal macroducts there, and on prepygidium abdomen. Antenna as for female. Spiracles simple, each with a group of 1–2 trilobular pores, but omitted from illustration as displaced.

Type material examined. **HOLOTYPE** female: NEW ZEALAND, TH, Three Kings Is, South West I, 26 Nov 1983, C.F. Butcher, *Salicornia* sp. [= *Sarcocornia quinqueflora*], #83-349f-2, [1]: 1 F. Barcode NZAC02008425 (NZAC). **Paratypes:** (i) collection data

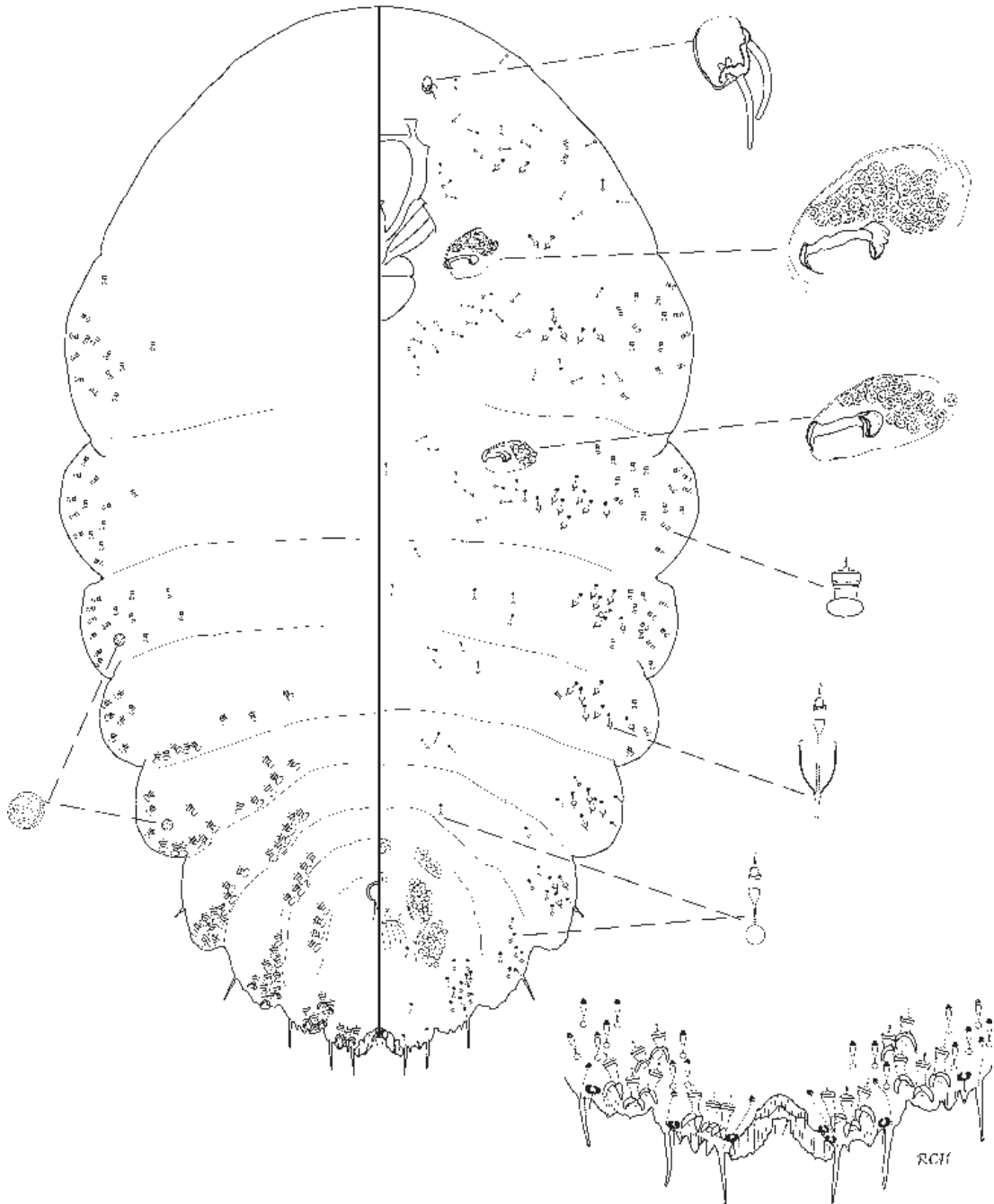


Fig. 196 *Poliaspis raouliae* Henderson n.sp., adult female.

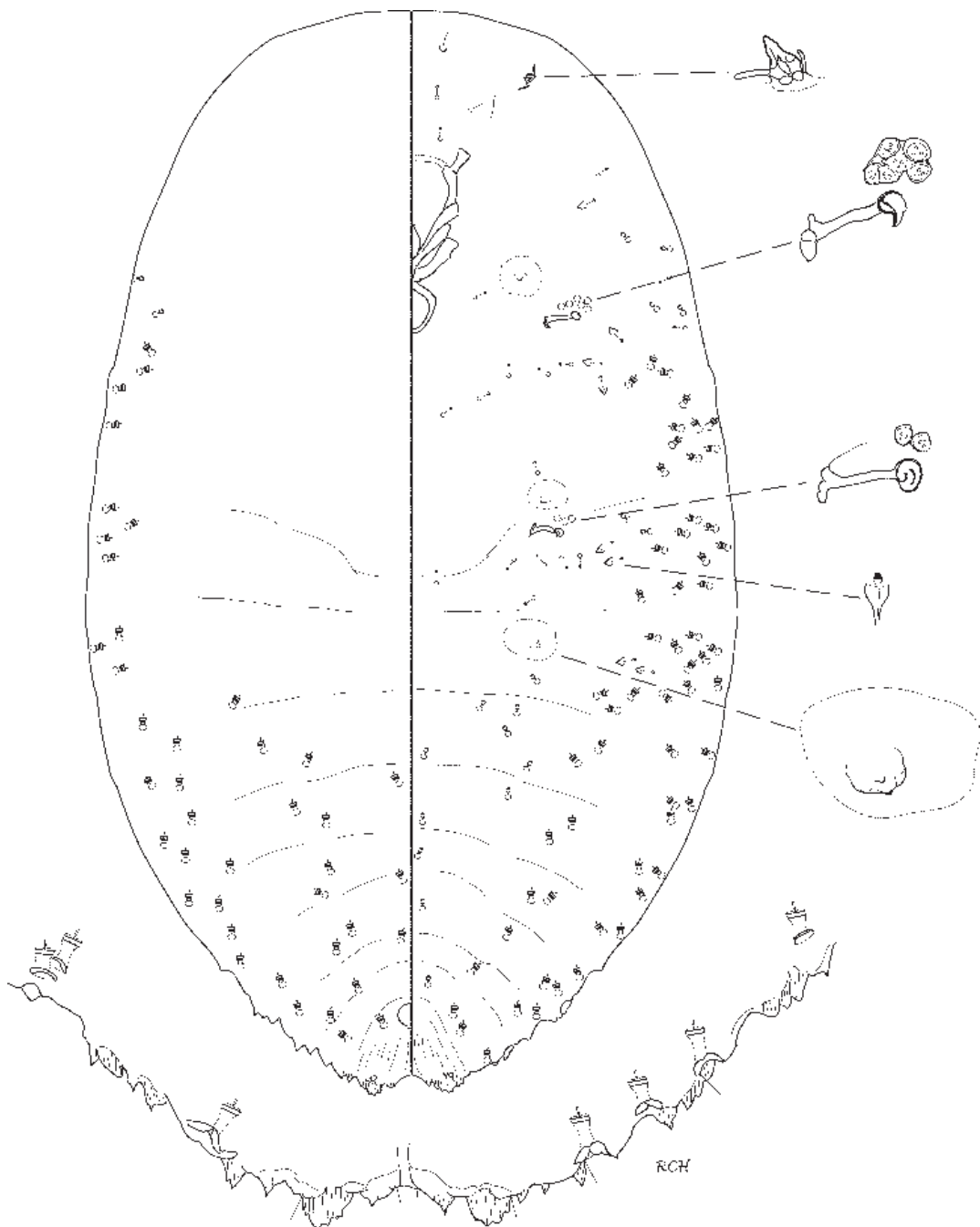


Fig. 198 *Poliaspis raouliae* Henderson n.sp., 2nd-instar male nymph.

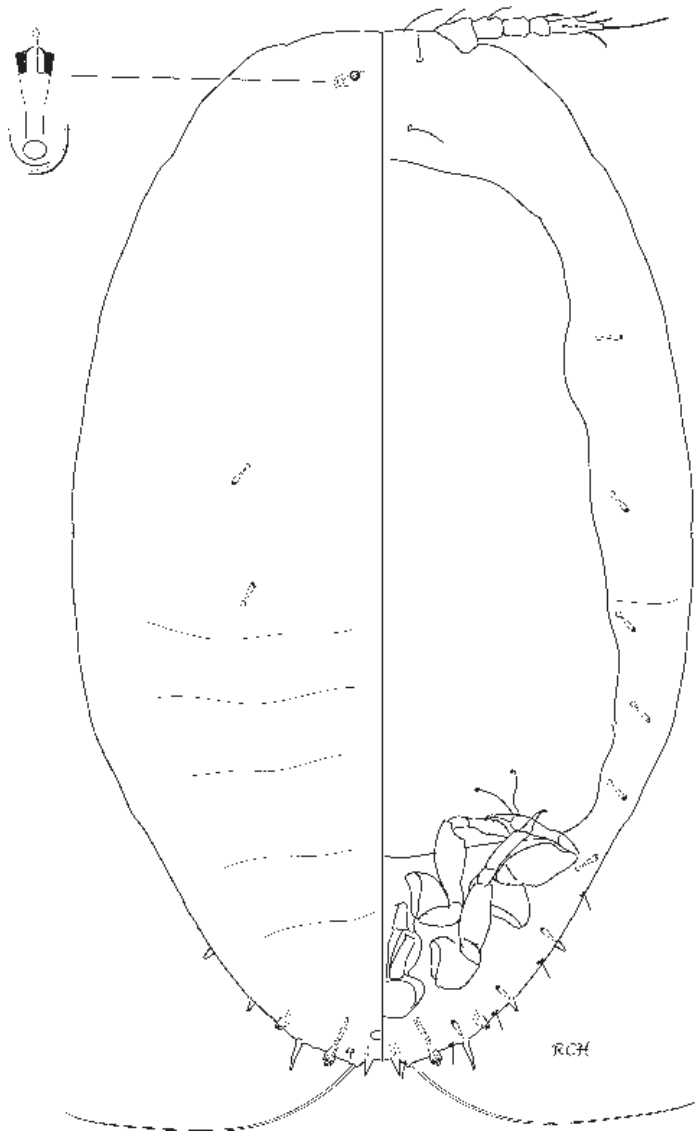


Fig. 199 *Poliaspis raouliae* Henderson n.sp., 1st-exuvium.

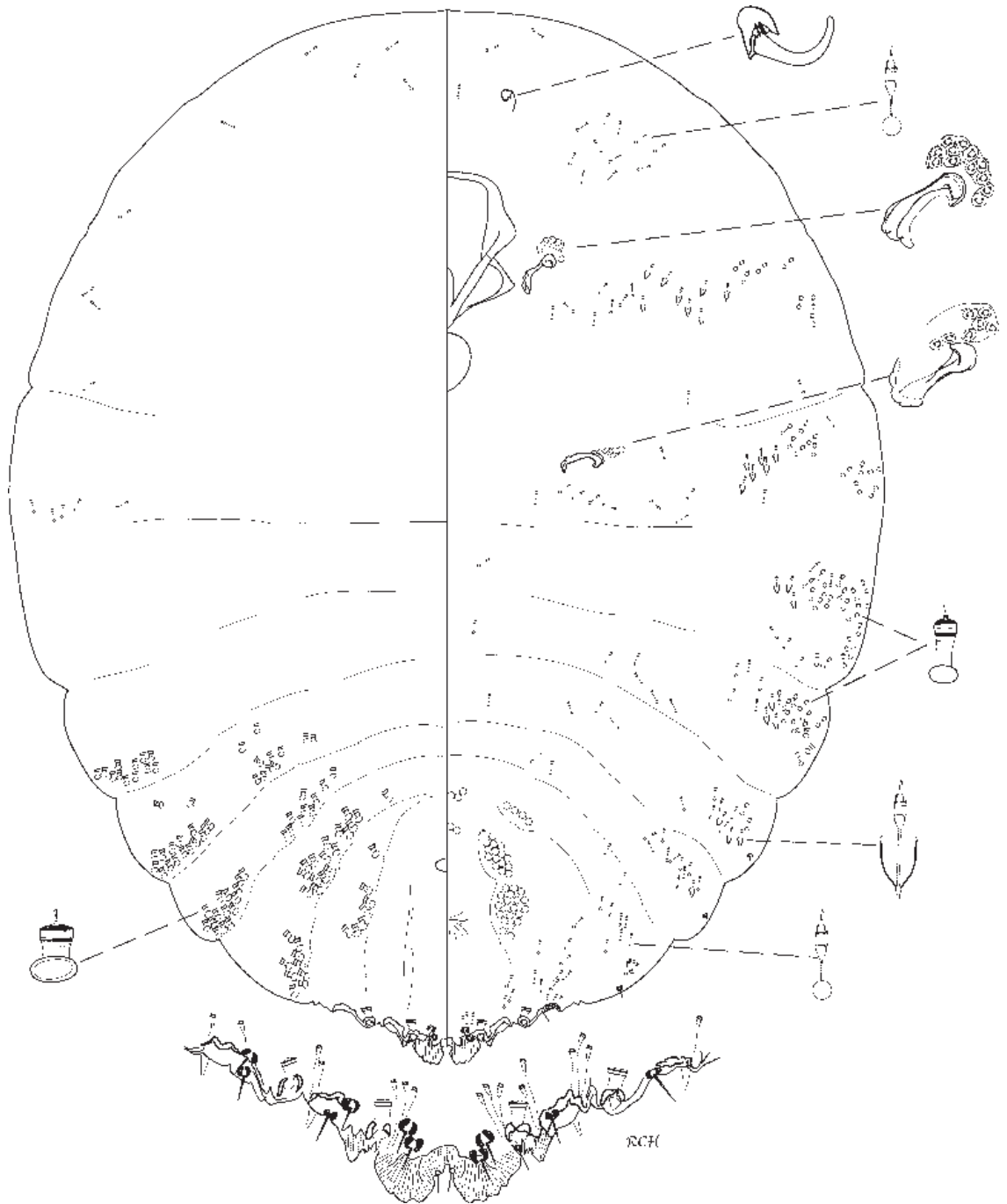


Fig. 200 *Poliaspis salicornicola* Henderson n.sp., adult female.

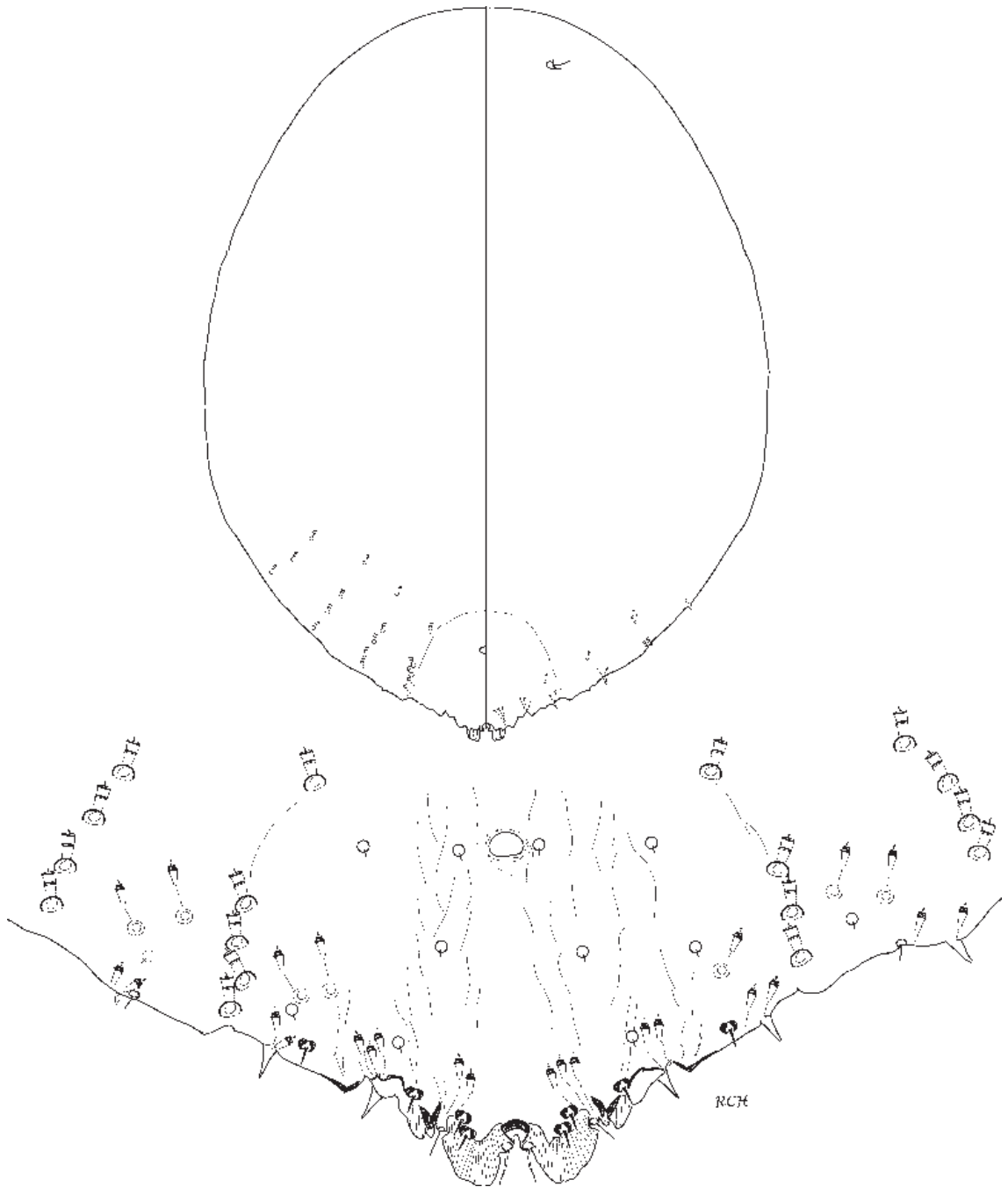


Fig. 201 *Poliaspis salicornicola* Henderson n.sp., female 2nd-exuvium.

as for holotype, [3]: 3 F; (ii) as previous except West I, 26 Nov 1983, #83-346a [5]: 8 F [1 pharate], 1 exuv2 (NZAC).

Other material. Only the type series listed above is known.

Distribution. TH / — / —

Host plant. Chenopodiaceae: *Sarcocornia quinqueflora* [as *Salicornia* sp.].

Etymology. The specific epithet is from the earlier host plant name, *Salicornia*, as recorded with the type collection data, combined with ‘-cola’ meaning ‘having a liking for’.

Remarks. The adult female of *P. salicornicola* can be distinguished from adult female *P. floccosa* and *P. media* by having only 2 pairs of marginal macroducts on the pygidium, i.e., a single duct each side on the margin of segment VI instead of 2 or more ducts there, and by the much reduced pygidial gland spines. In addition, each L2 is coalesced into a single lobe instead of being bilobed. The female 2nd-instar nymph of *P. salicornicola* can immediately be distinguished from those of *P. media* and *P. floccosa* by the absence of marginal macroducts on the pygidium, and by the much reduced pygidial gland spines.

Genus *POLIASPOIDES* MacGillivray

Poliaspoides MacGillivray, 1921: 309.

Type species: *Odonaspis simplex formosana* Takahashi.

Poliaspoides leptocarpi (Brittin) E **leptocarpus scale** Fig. 81–82, 202–204; Map 39

Odonaspis ? *leptocarpi* Brittin, 1916: 425.

Odonaspis leptocarpi Brittin; Borchsenius 1966: 224.

Natalaspis leptocarpi (Brittin); Ben-Dov, 1976: 27
[redescription, illustration]; Wise 1977: 110.

Poliaspoides leptocarpi (Brittin); Miller & Gimpel 2009: 722.

Live appearance and habitat. The adult female and eggs are dark grey-purple. The adult female produces a thick white, open-ended cover into which eggs are laid in 2 rows, thus forming an ovisac, with just her posterior covered while she lies mostly naked further in under the leaf sheath. Groups of up to 8 females with ‘ovisacs’ may be packed together under one sheath. No males have been observed. Habitat beneath the leaf sheath on stem nodes, with usually a tell-tale portion of white scale cover(s) visible at the sheath margin, or the sheath appears more swollen than normal; 1st-instar nymphs settle under the lip of the sheath at a previously unoccupied node, the 1st and 2nd scale covers are pale to translucent except that before each moult a sclerotised band forms around the head (absent on the

adult female); development time from settled 1st-instar to adult female is apparently fast and the greatest size increase is in the adult stage.

Adult female, measurements taken from 12 specimens (Fig. 202). Body fusiform, rounded at both ends and approximately parallel sided with slight curves segmentally on margin; length 0.73–1.42 mm, width 0.4–0.63 mm. Pygidium margin serrated without lobes, plates, gland spines, or marginal macroducts.

Dorsal macroducts numerous, distributed over pygidium in semi-lines, then in more definite rows 1 to several ducts wide near posterior edges of prepygidial segments, becoming less numerous dorsally further forward but extending onto venter in larger submedian groups on anterior abdomen and thorax to opposite anterior spiracles. Anal opening relatively small, situated about middle of pygidium. Dorsal derm textured similar to venter but without crenulae, with some sclerotisation on body margins.

Ventral microducts numerous, similar in shape but smaller than dorsal ducts, distributed in bands on pygidium and abdomen and in large groups as far forward as level of antennae, normally absent on head. Antennae with 3–4 long setae. Anterior and posterior spiracles stout, each situated in heavily textured circum-spiracular area, and without perispiracular pores. Ventral derm textured overall in swirling lines and with crenulae on median/submedian areas. Total of 68–120 perivulvar pores usually in 2 elongate lateral groups and a median group. Vulva slightly posterior to level of anal opening.

Polymorphic 2nd-instar female nymph, measurements taken from 12 specimens (Fig. 203). Body shape similar to female, tending to be wider on prothorax and narrower at level of anterior spiracles when in pre-moult-to-adult stage, when a sclerotised dorsal rim or band forms around head; length 0.44–0.78 mm, width 0.25–0.4 mm.

Pygidium without lobes, plates or gland spines; pygidium polymorphic in number of dorsal macroducts, from none to 27, when present these variously arranged in no particular pattern, and present/absent on either side. Anal opening small, positioned about middle of pygidium.

Ventral ducts of 2 sizes: (i) microducts present on submargins of abdomen and thorax, fewer in total when dorsal ducts few or absent; (ii) larger ventral ducts similar to dorsal ducts on pygidium but smaller, present on submargins of anterior abdomen and on thorax, these variable in number as for dorsal ducts. Antenna with about 6 setae, 2 stout, 2 medium, and 2 shorter, finer setae. Anterior and posterior spiracles as for adult female.

Remarks. The presence of numerous dorsal ducts would normally signify a male nymph, however all the slide-mounted ductiferous 2nd-instar nymphs and many of those with fewer ducts or without any dorsal ducts are

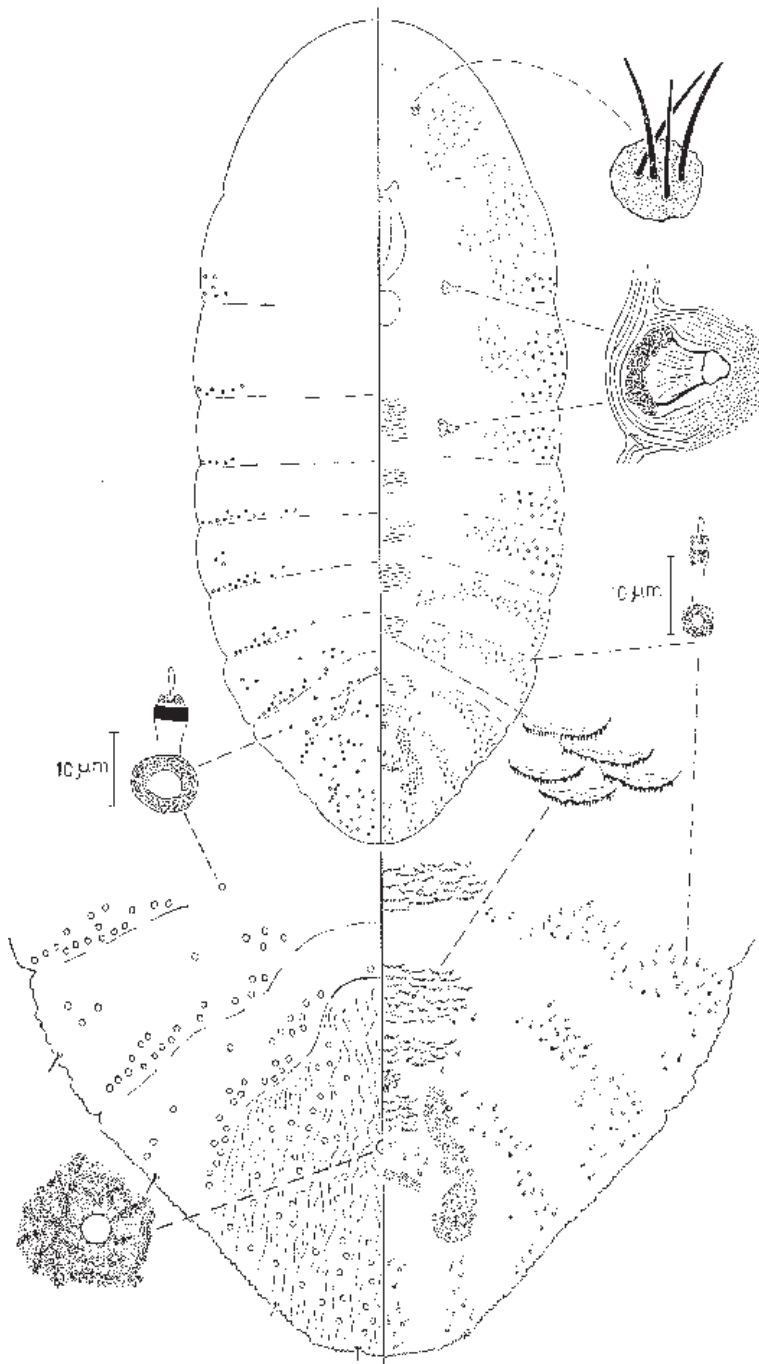


Fig. 202 *Poliaspoides leptocarpi* (Brittin), adult female (from Ben-Dov 1976).

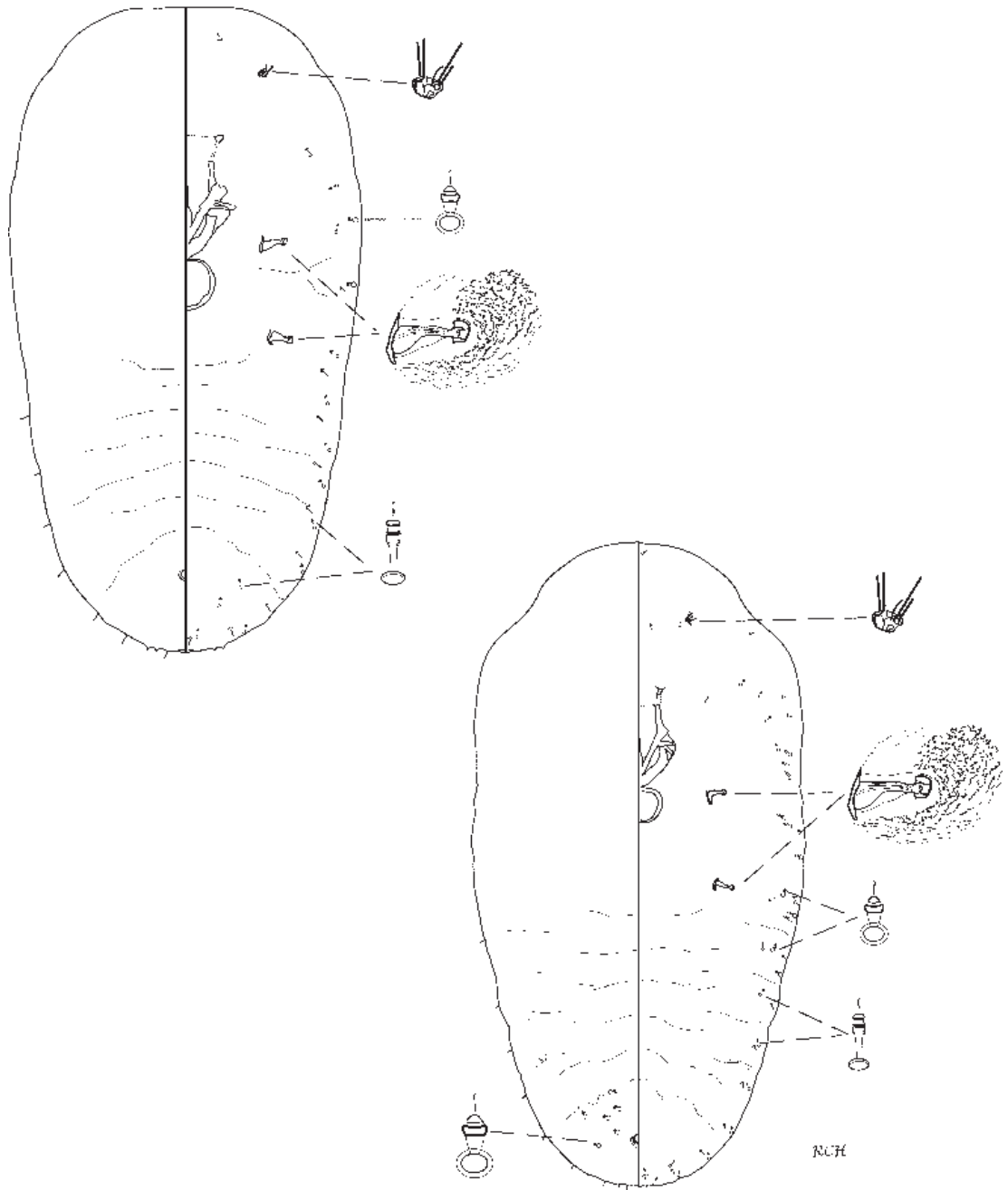


Fig. 203 *Poliaspoides leptocarpi* (Brittin), two polymorphic, 2nd-instar female nymphs.

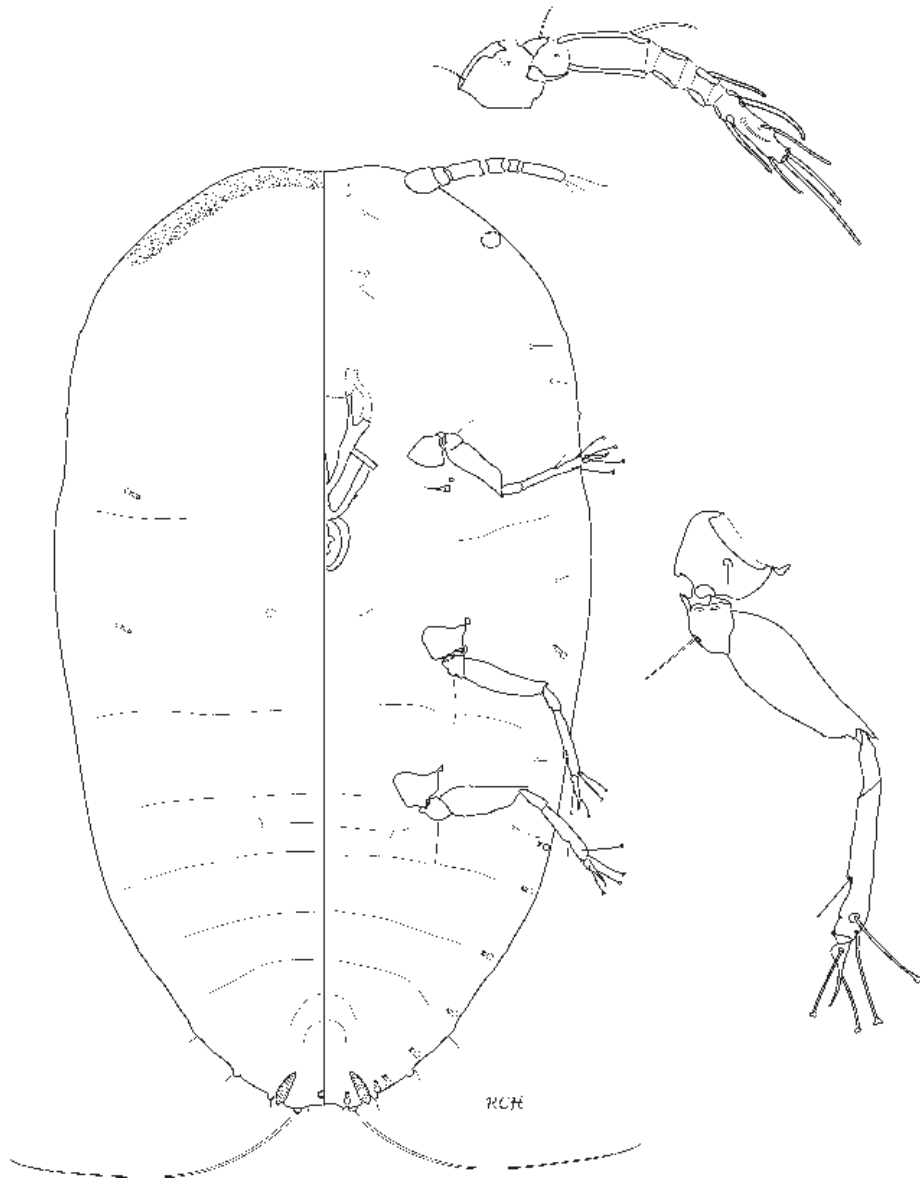


Fig. 204 *Poliaspoides leptocarpus* (Brittin), 1st-instar nymph.

recorded containing incipient or pharate adult females, not male prepupae. Therefore they are all considered female, and males are absent.

1st-instar nymph, measurements taken from 10 specimens (Fig. 204). Body shape oval, slightly wider at head than at pygidium; length 0.4–0.47 mm, width 0.2–0.25 mm.

A dorsal sclerotised rim or band forms on the margin of the head prior to moulting to 2nd-instar. Pygidium with 1 pair of lobes, barely notched, each with a basal sclerosis on submargin; between the lobes 1 pair of minute setae, 1 pair of microducts, and 1 pair of long anal lobe setae. Without dorsal cephalic macroducts. 2 pairs of dorsal microducts present on thorax. Anal opening small, near to posterior margin.

Ventral microducts without tubercles on margin of abdominal segments and metathorax, with 1 submarginal pair of microducts on mesothorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 6-segmented, 65–75 µm long, with fine and fleshy setae. Legs with few setae, digitules relatively stout, and claw long and fine. Spiracles normal. Eyes on margin.

Type material examined LECTOTYPE female, subsequent designation by Ben-Dov (1976: 27): NEW ZEALAND, MC, New Brighton, 26 May 1915, G. Brittin, No. 88; *Odonaspis* ? *leptocarpi* Brittin, [1]: 1 F. Barcode NZAC02008892 (NZAC). **Paralectotypes**: collection data as above, [2]: 2 F. Barcodes NZAC02008429 and NZAC02008426 (NZAC).

Other material examined. See Appendix A (p. 236) for details of 49 specimens examined.

Distribution. AK, WO / MC

With probably a wider distribution in estuarine and near-seashore habitats throughout New Zealand.

Host plant. Restionaceae: *Apodasmia similis* (syn. *Leptocarpus similis*), common names: jointed wire rush, oioi.

Remarks. In lacking lobes, plates, gland spines, and marginal macroducts on the pygidium, plus its monophagous habit on jointed wire rush, *P. leptocarpi* cannot be confused with any other diaspidid scale in New Zealand.

Genus *PSEUDAULACASPIS* MacGillivray

Pseudaulacaspis MacGillivray, 1921: 305.

Type species: *Diaspis pentagona* Targioni Tozzetti, by original designation.

The 2 species treated here, *Pseudaulacaspis brimblecombei* Williams and *P. eugeniae* (Maskell), are Australian in origin. Their generic placement is unchanged here because they will more properly be part of an Australian Diaspididae revision.

Key to *Pseudaulacaspis* adult females in New Zealand

- 1 Submedian dorsal ducts present in 5 rows anterior to pygidium, to segment I; perispiracular pores present by posterior spiracles; ventral derm spines absent ...
..... *brimblecombei* Williams
- Submedian dorsal ducts present in 4 rows anterior to pygidium, to segment II; perispiracular pores absent by posterior spiracles; ventral derm spines nearly always present *eugeniae* (Maskell)

Pseudaulacaspis brimblecombei Williams A waratah scale (New Zealand), macadamia white scale (Australia)

Fig. 94–96, 205–208; Map 40

Pseudaulacaspis brimblecombei Williams, 1973: 89; Charles & Henderson 2002: 606.

Live appearance and habitat. Female scale cover oyster-shell shaped, white with light brown terminal exuvia; female body and eggs yellow. Male scale cover elongate, white with pale brown terminal exuvium; adult male orange-brown colour. Prefers the underside of leaves of its host plants.

Adult female, measurements taken from 15 specimens (Fig. 205). Body shape fusiform, normally widest at mesothorax-metathorax, lateral abdominal lobes well developed with large gland spines grouped on prepygidial margins, pygidium oval and notched at apex with recessed, yoked median lobes. Body length 0.8–1.68 mm, width 0.5–0.85 mm. With 3 pairs of lobes: L1 serrate, with 1 pair of setae at base of moderately wide median space and 2 pairs of setae lateral to lobes; L2 bilobate, rounded shape, medial lobule with a basal sclerosis extending on to venter, lateral lobule much smaller; L3 bilobate, the lobules subequal, both slightly smaller than L2. Gland spines slender and pointed on pygidium with associated microducts small and slender, gland spines becoming large on prepygidial margins with much larger associated microducts. Marginal macroducts large, barrel-shaped, 6–7 pairs, each duct about 20 µm long and 10 µm wide.

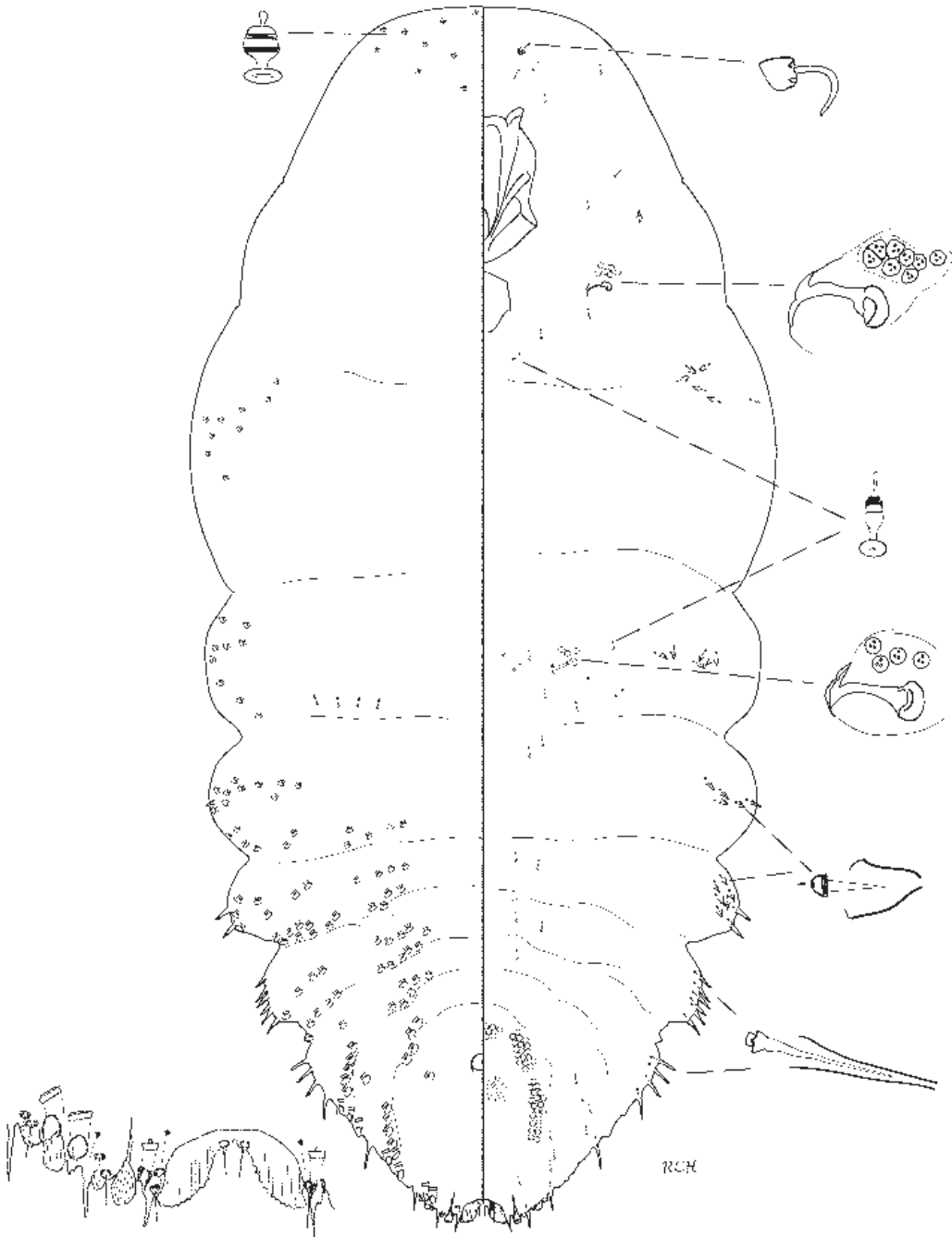


Fig. 205 *Pseudaulacaspis brimblecombei* Williams, adult female.

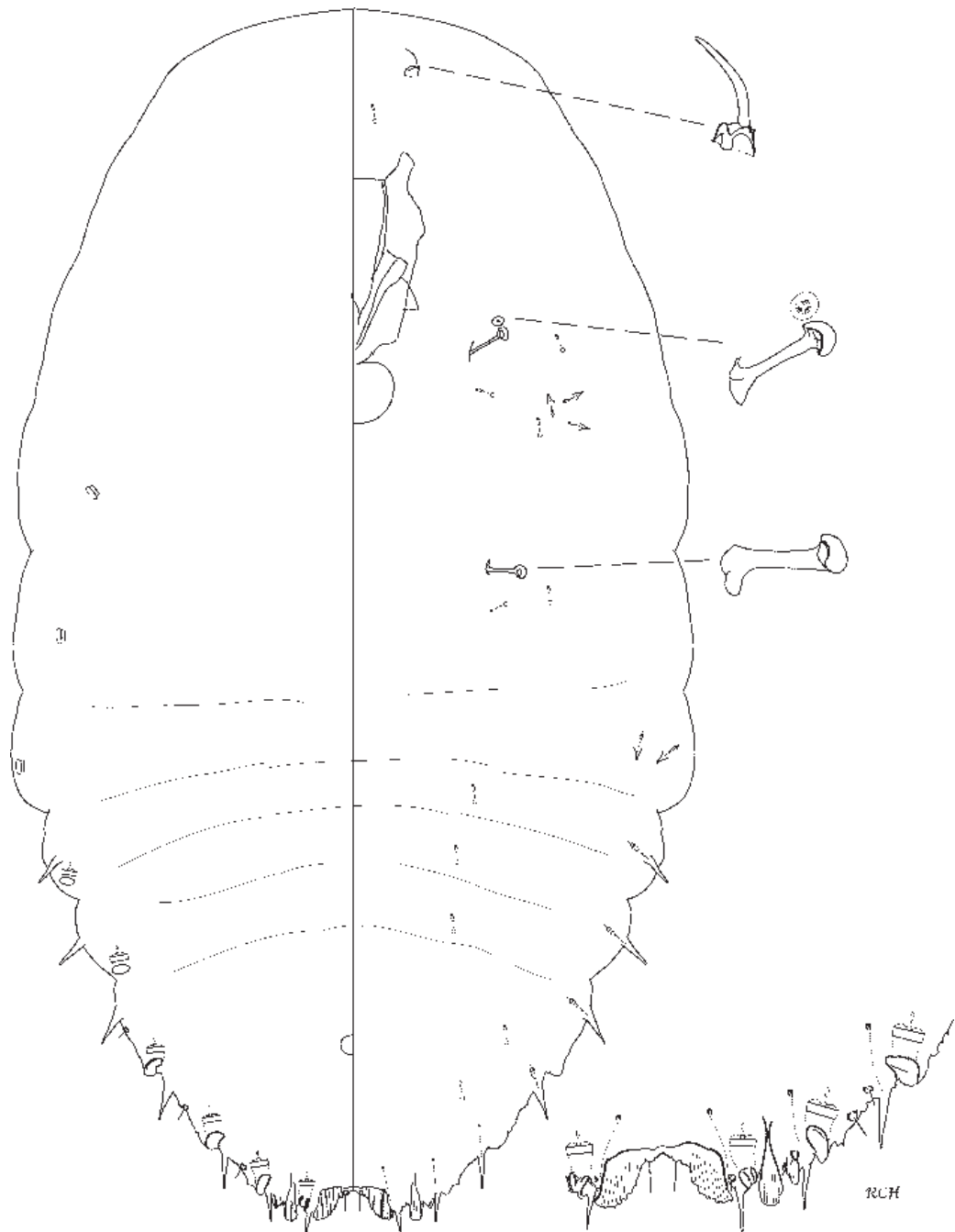


Fig. 206 *Pseudaulacaspis brimblecombei* Williams, 2nd-instar female nymph.

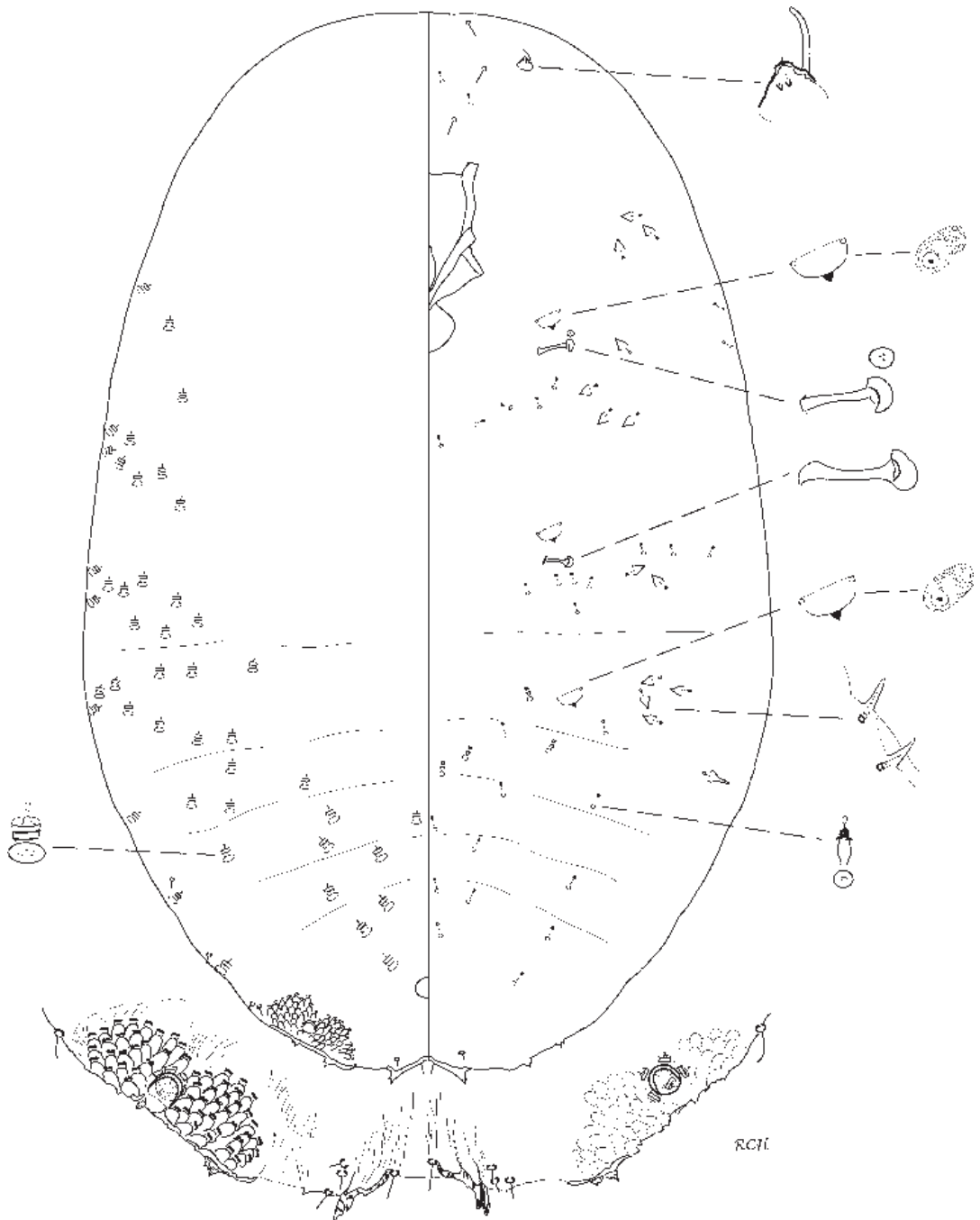


Fig. 207 *Pseudaulacaspis brimblecombei* Williams, 2nd-instar male nymph.

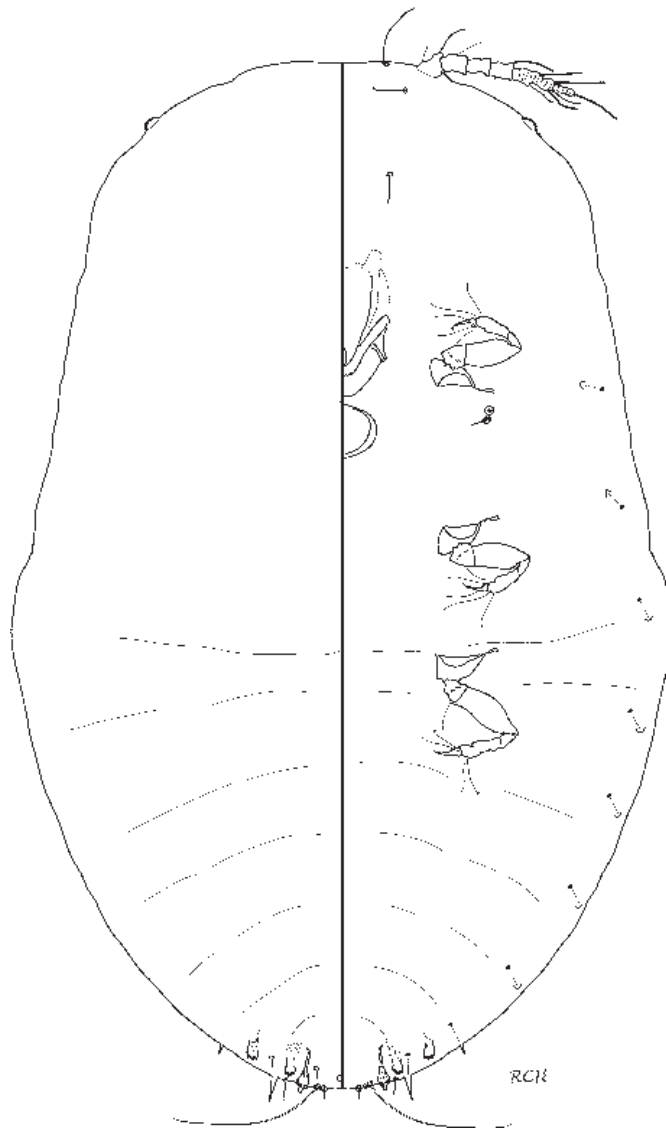


Fig. 208 *Pseudaulacaspis brimblecombei* Williams, 1st-instar nymph.

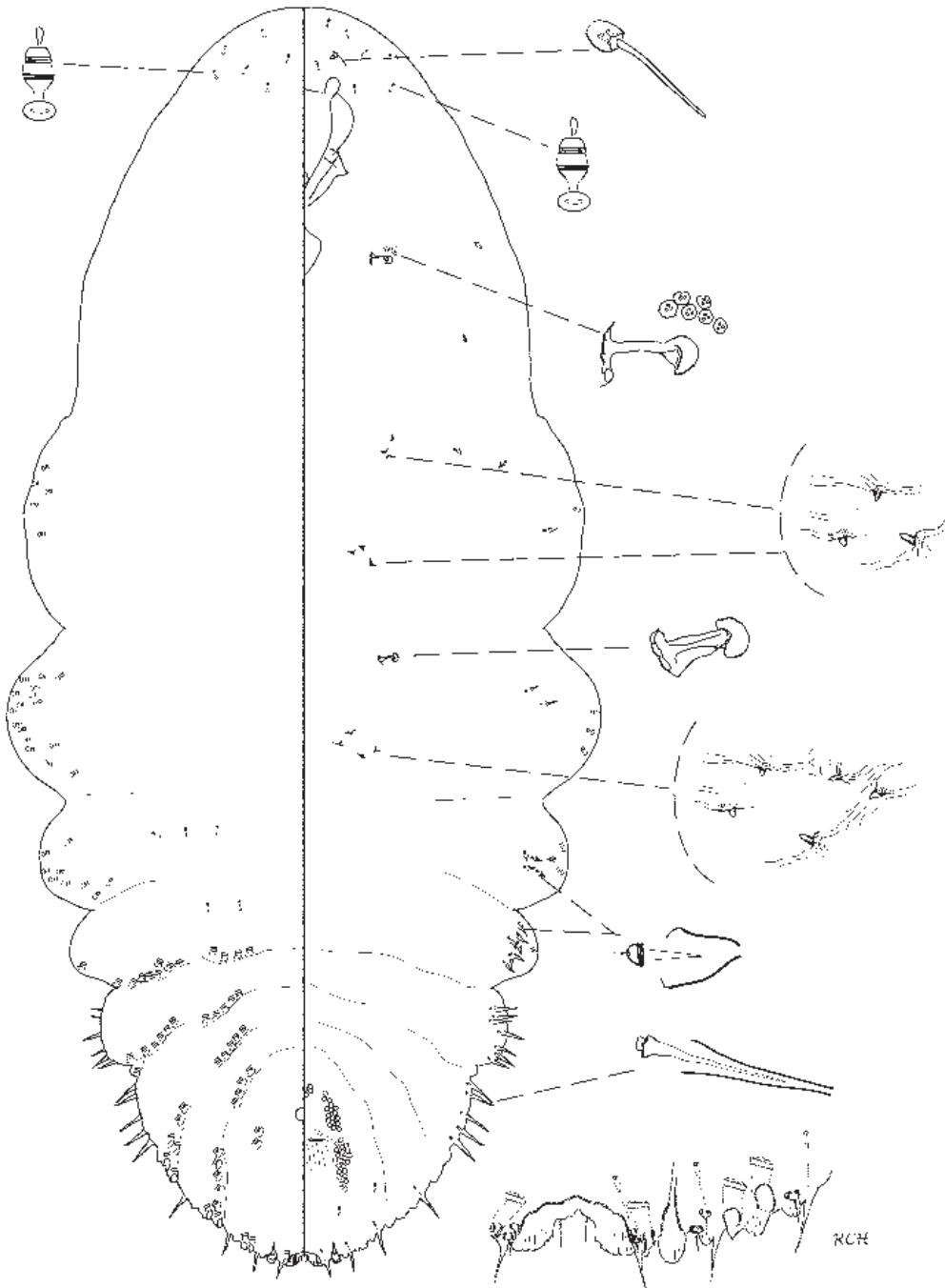


Fig. 209 *Pseudaulacaspis eugeniae* (Maskell), adult female.

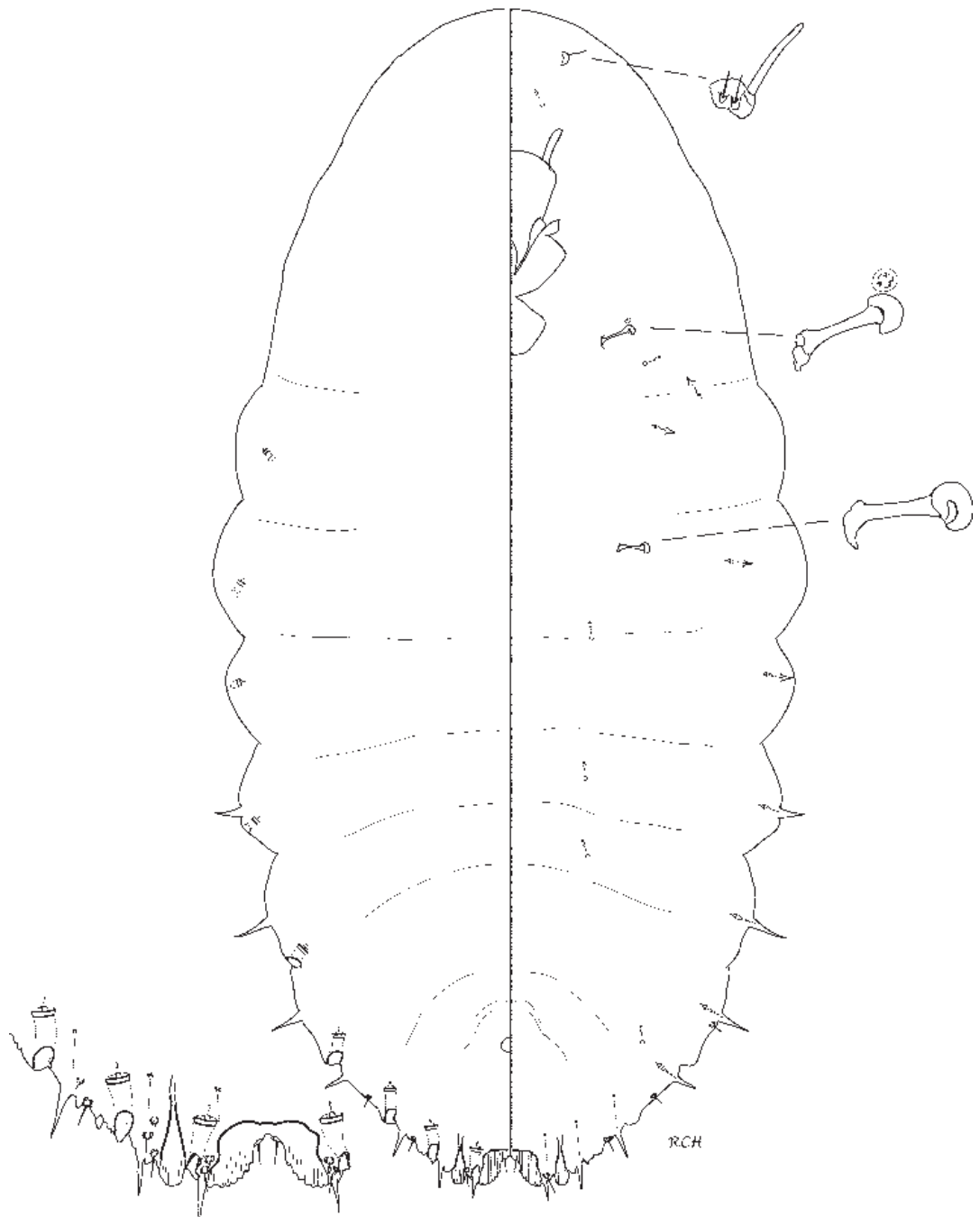


Fig. 210 *Pseudaulacaspis eugeniae* (Maskell), 2nd-instar female nymph.

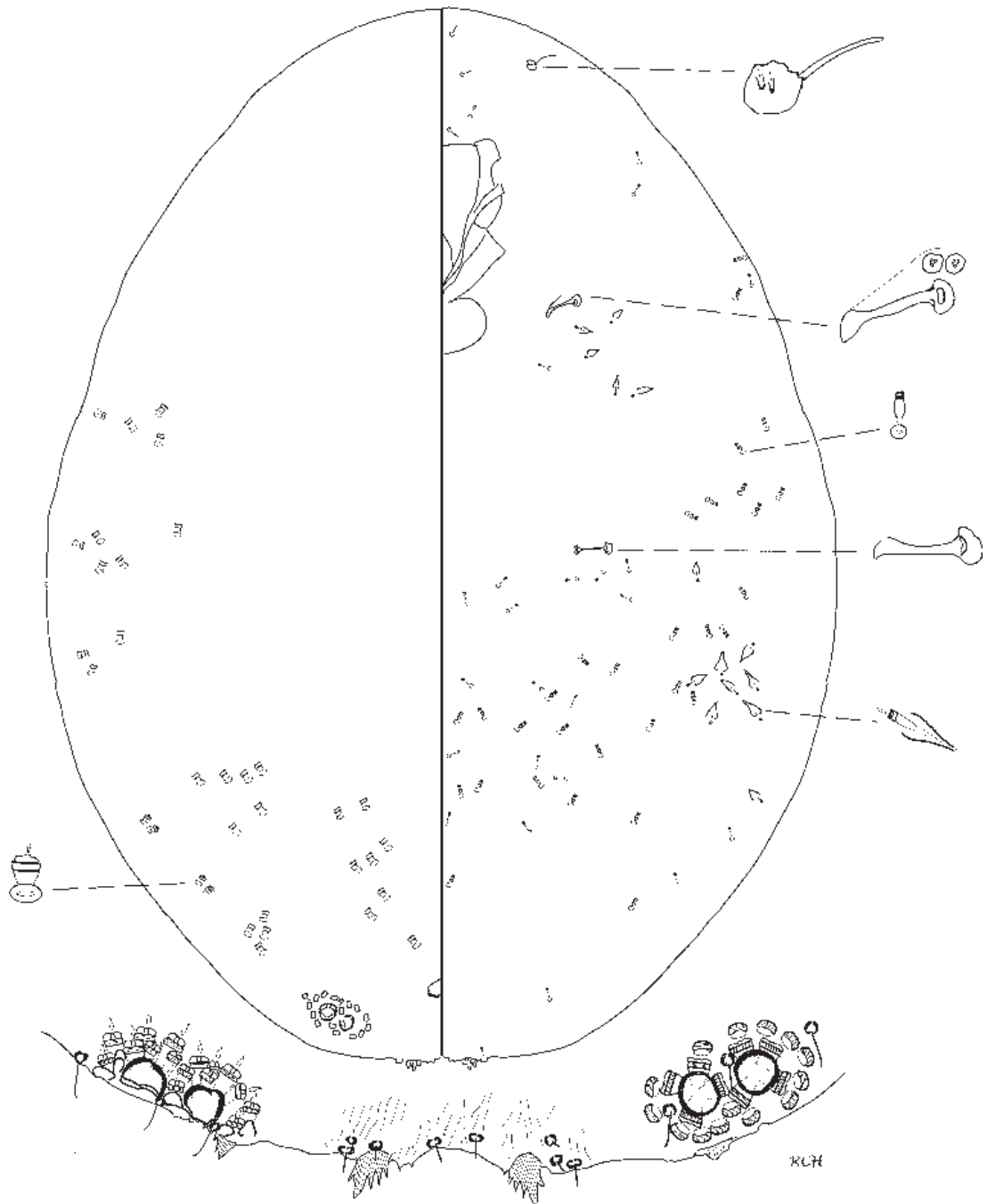


Fig. 211 *Pseudaulacaspis eugeniae* (Maskell), 2nd-instar male nymph.

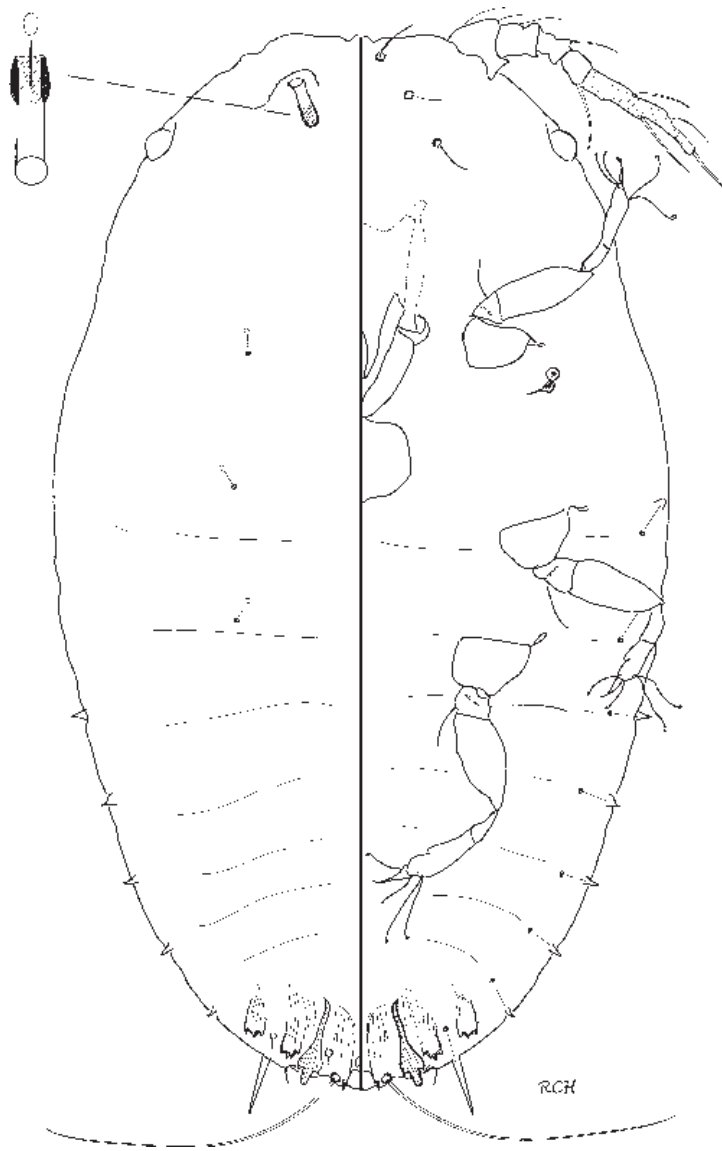


Fig. 212 *Pseudaulacaspis eugeniae* (Maskell), 1st-instar nymph.

Dorsal ducts on pygidium about same size as marginal macroducts, becoming slightly smaller on anterior abdomen, then very small on submargins of thorax and quite numerous on head; with 2 or 3 pairs present on submedian VI, then in irregular submedian rows to abdomen I, submarginal rows becoming groups, these not wrapping round body to appear also on venter. Anal opening 17–20 µm, as long as wide, positioned 130–167 µm from posterior margin.

Ventral gland tubercles present submarginally from abdomen III to meta- and mesothorax, becoming smaller anteriorly. With several microducts on submargins of pygidium segments, submedially on abdomen, scattered near spiracles and on head posterior to antennae. Antenna with 1 seta. Anterior spiracles each with a group of 5–12 trilocular pores, and posterior spiracles each with 3–10 trilocular pores. Total of 97–130 perivulvar pores in 5 elongate groups. Vulva situated 127–135 µm from posterior margin.

2nd-instar female nymph, measurements taken from 6 specimens (Fig. 206). Body shape ovate-fusiform, lateral abdominal lobes less well-developed than on female; body length 0.41–0.6 mm, width 0.25–0.35 mm; with 2 pairs of lobes, L1 yoked as in female and with 1 pair of setae in medial space, L2 bilobate with scleroses on medial lobule, lateral lobule much smaller, L3 sometimes present as a serration on the margin; gland spines as for female except single on margins of prepygidial lobes; with 4 pairs of large, barrel-shaped, marginal macroducts.

Dorsal ducts on submargin of III and II slightly smaller than macroduct, then 1–2 pairs of much smaller submarginal ducts as far forward as mesothorax, absent from submedian, not extending onto venter. Anal opening about 10 µm, as long as wide and 55–65 µm from posterior margin.

Ventral microducts few, in addition to those with gland spines, about 3 pairs of submedian abdominal microducts, 2–3 pairs near each spiracle, and 1 pair on head. Gland tubercles few, on submargin of abdomen I and near anterior spiracles. Antenna with 1 seta. Anterior spiracles each with a group of 1–2 trilocular pores.

2nd-instar male nymph, measurements taken from 17 specimens (Fig. 207). Body shape roundly oval with somewhat squared off anterior and posterior ends, length 0.4–0.73 mm, width 0.26–0.3 mm; with 1 pair of lobes and laterally some points that may represent 2nd lobes; L1 divergent, not yoked, medial space wide, with a ventral channel replacing position of yoke in female instars; lobes elongate, notched medially, smooth laterally, apically pointed, each lobe with 1 seta at its base and 3 pairs of small setae laterally. Marginal macroducts very numerous in a communal group each side on pygidium, composed of 2 subgroups close together, the anterior subgroup with

15–20 ducts and the posterior subgroup with 25–30 ducts, packed around a central group of about 5 cluster ducts each opening into a shared orifice.

Dorsal ducts, with 3 pairs on submedian pygidium and 1 or 2 pairs on abdomen II–IV; prepygidium margin with 1 or 2 pairs of dorsal ducts; submarginal dorsal ducts becoming more numerous on anterior abdomen and extending as far forward as mesothorax, not wrapping round onto ventral margins. Anal opening 10–12 µm, as long as wide and 37–47 µm from posterior margin.

Ventral microducts distribution: 2–3 pairs on submedian abdominal segments, in groups by each spiracle and a few on head; gland tubercles in small groups on submargin of anterior abdomen, by each spiracle, and opposite mouthparts. Anterior spiracles each with 1 trilocular pore. Antenna with 1 seta. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Notably, with 3 pairs of vestigial leg patches or tubercles, the 1st and 2nd pairs positioned close to and slightly anterior to the anterior and posterior spiracles respectively, the 3rd pair apparently positioned on abdomen I but the segmentation is difficult to determine; in lateral view each vestigial leg patch is a convex pouch with a minute pore each side of its base and a medial spine, in dorsal view the spine is less noticeable but examination on high power reveals 3 semi-concentric levels around it, each with a pair of minute pores, and for this reason this structure is considered to be a vestigial leg.

Remarks. Vestigial leg patches were also detected on the 2nd-instar male nymphs of *Poliaspis media* and *Poliaspis raouliae* (above). Apart from those 2, vestigial leg patches such as these are not known on any other species in the New Zealand fauna. They are apparently not homologous with the derm spines on the adult female *Pseudaulacaspis eugeniae* (Maskell) described below.

Howell (1980) illustrated communal ducts and cluster ducts similar to those above but in separate groups, on the 2nd-instar male pygidium of *Fiorinia theae* Green. Takagi (1967) illustrated an arrangement of communal ducts and duct clusters on the 2nd-instar male pygidium of *Pseudaulacaspis pentagona* (genotype of *Pseudaulacaspis*) and *P. celtis*. These species all have 1 pair of cluster duct orifices whereas in *P. eugeniae* (see below) there are 2 cluster duct orifices each side of the pygidium.

1st-instar nymph, measurements taken from 3 specimens (Fig. 208). As for 1st-instar nymph of *P. eugeniae* below except: dorsal cephalic ducts and dorsal submedian microducts absent, body length 0.29–0.42 mm, width 0.15–0.28 mm.

Type material (not examined). **HOLOTYPE** female: AUSTRALIA, Queensland, Baffle Creek, on *Macadamia* sp., 1969, D.A. Ironside; deposited in the Queensland

Museum (QM) (Williams, 1973).

Material examined. See Appendix A (p. 236) for details of 253 specimens examined.

Distribution. AK, WO, BP, TK, TO, WI / MC, DN, FD/OL

Host plants. I. on **adventive** plants: Proteaceae: *Telopea oreades*, *T. speciosissima*, *Telopea* sp., *Embothrium coccineum*, *Lomatia myricoides*, *Protea nerifolia*.

II. on **endemic and native** plants: Agavaceae: *Cordyline australis*, *C. indivisa*; Iridaceae: *Libertia ixioides*, *Libertia* sp.; Rutaceae: *Melicope ternata*.

Remarks. Williams (1973) noted that Froggatt (1914) mentioned this species under the name *Chionaspis eugeniae* var. *major* but without description (a nomen nudum), and that Froggatt's specimens were found on *Telopea speciosissima* (waratah).

***Pseudaulacaspis eugeniae* (Maskell) A white palm scale**

Fig. 97–99, 209–212; Map 41

Chionaspis eugeniae Maskell, 1892: 14; Green 1929: 382.
Chionaspis xerotidis Maskell, 1895: 50; Froggatt 1915: 63;
Ferris 1955: 54; Charles & Henderson, 2002: 607 [synonymy].

Phenacaspis xerotidis (Maskell); Fernald 1903: 239.

Pseudaulacaspis xerotidis (Maskell); Deitz & Tocker 1980: 44; Takagi 1985: 50.

Phenacaspis eugeniae (Maskell); Cockerell 1899: 398; Cottier 1956: 322 [misidentification].

Pseudaulacaspis eugeniae (Maskell); Deitz & Tocker 1980: 36; Takagi 1985: 45; Charles & Henderson 2002: 607.

Live appearance and habitat. Female scale cover oyster-shaped, white, the terminal 2nd-exuvium medium-dark brown, the terminal 1st-exuvium translucent; female body bright yellow and eggs yellow; settled 1st- and 2nd-instars pale yellow. Male scale cover moderately elongate, white, associated with waxy fibres and some flocculent wax, with pale yellow exuvium. Prefers the underside of leaves of its host plants.

Adult female, measurements taken from 21 specimens (Fig. 209). Body shape fusiform, normally widest at metathorax, lateral abdominal lobes well developed with large gland spines grouped on prepygidial margins, pygidium oval and notched at apex with recessed, yoked median lobes. Body length 0.83–1.7 mm, width 0.45–0.86 mm. With 3 pairs of lobes: L1 serrate, with 1 pair of setae at base of moderately wide median space and 2 pairs of setae lateral to lobes; L2 bilobate, rounded shape, medial lobule with a basal sclerosis extending on to venter, lateral lobule much smaller; L3 bilobate, smaller than L2. Gland spines slender and pointed on pygidium with associated

microducts small and slender, gland spines becoming large on prepygidial margins with much larger associated microducts. Marginal macroducts large, barrel-shaped, usually 7 pairs, each duct about 20 µm long and 10 µm wide.

Dorsal ducts on pygidium about same size as marginal macroducts, becoming slightly smaller on anterior abdomen, then very small on submargins of thorax and quite numerous on head; with 2 or 3 pairs present on submedian VI, then in fairly regular submedian rows to abdomen II with some very small ducts on I, submarginal rows becoming groups, these not wrapping round body to appear also on venter. Anal opening 15–17 µm, as long as wide, positioned 105–157 µm from posterior margin.

Ventral gland tubercles present submarginally from abdomen III to meta- and mesothorax, becoming much smaller anteriorly. Microducts sparse, scattered; with numerous ducts present on head similar to dorsal ducts. With groups of derm spines on each side of submedian thorax: 1 group on anterior and 1 group on posterior mesothorax, and 1 group near posterior margin of metathorax; number of spines in each group variable, 0–6 spines per group, commonly 3 or 4, these arranged in an approximate circle generally pointing towards centre. Antenna with 1 seta. Anterior spiracles each with a group of 2–6 trilocular pores, pores absent by posterior spiracles. Total of 52–84 perivulvar pores in 5 elongate groups. Vulva situated 107–130 µm from posterior margin.

Remarks. The unusual groups of derm spines on the venter are distinctive for this species.

2nd-instar female nymph, measurements taken from 8 specimens (Fig. 210). Body shape fusiform when young and membranous, when more mature and sclerotised, ovate with a narrow pointed pygidium, deeply notched on median, lateral abdominal lobes less well-developed than on female; body length 0.59–0.75 mm, width 0.31–0.48 mm; with 2 pairs of lobes, L1 yoked as in female and with 1 pair of setae in medial space, L2 bilobate with scleroses on medial lobule, lateral lobule a point, L3 sometimes present as a serration on the margin; gland spines as for female except single on margins of prepygidial lobes; with 4 pairs of large, barrel-shaped, marginal macroducts.

Dorsal ducts on submargin of prepygidium becoming smaller as far forward as mesothorax, absent from submedian, not extending onto venter. Anal opening about 10 µm long as wide and 55–65 µm from posterior margin.

Ventral microducts few, in addition to those with gland spines, about 1–3 pairs on submedian abdomen near each spiracle, and on head. Gland tubercles few, on submargin near spiracles. Antenna with 1 seta. Anterior spiracles each with a 1 trilocular pore.

2nd-instar male nymph, measurements taken from 26 specimens (Fig. 211). Body shape roundly oval, length

0.48–0.86 mm, width 0.35–0.56 mm; with 1 pair of lobes and laterally some points that represent 2nd lobes, L1 divergent, not yoked, medial space wide, lobes elongate, digitate but less so on lateral margins, apically pointed, each lobe with 1 seta at its base and 3 pairs of small setae laterally. Marginal macroducts very numerous in a communal group each side on pygidium, this group composed of 2 cluster duct subgroups each of 4 larger ducts opening into a shared orifice, thus 2 large orifices in the centre side by side and these surrounded by 10–12 communal ducts each with their own individual opening.

Dorsal ducts: with 1 or 2 pairs on submedian pygidium and mid abdomen, perhaps to segment III; prepygidium margin with groups of 2–5 ducts each side, extending as far forward as mesothorax, some may wrap round onto ventral margins. Anal opening 7–10 µm, as long as wide and 20–35 µm from posterior margin.

Ventral ducts and microducts scattered on abdomen, a group of microducts by each posterior spiracle and a few further forward to head; a group of large gland tubercles on submargin of anterior abdomen, then becoming about 1/2 size in a group by anterior spiracles with a few elsewhere. Anterior spiracles each with 1 or 2 trilocular pores. Antenna with 1 seta. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

Remarks. See under *P. brimblecombei* 2nd-instar male nymph (above) for discussion about communal ducts. Other differences not mentioned above are: (i) the shape of the median lobes, digitatae or notched both sides in *P. eugeniae* (smooth laterally in *P. brimblecombei*); (ii) ventral gland tubercles of 2 sizes, particularly large on abdomen, small on thorax in *P. eugeniae* (all about same smaller size on *P. brimblecombei*). Vestigial leg patches not detected.

1st-instar nymph, measurements taken from 4 specimens (Fig. 212). Body shape roundly oval, length 0.25 (neonates)–0.4 mm, width 0.15 (neonates)–0.26 mm; with 3 pairs of lobes, sometimes but not always all 3 pairs extending beyond margin, otherwise L1 extending to a rounded point with a notch each side by margin and with a long basal sclerosis; with 1 pair of long pointed gland spines between L2 and L3, each with an associated microduct; long apical setae medial to L1. Dorsally with 3 pairs of submedian microducts, and with 1 pair of large cephalic ducts close together on submargin of head, positioned at a level between the antennal bases. Abdominal microducts each opening into a small tubercle on the margin. Antenna 72–75 µm long with 5 segments, segment V annulated and with 1 apical seta.

Type material examined. *Chionaspis eugeniae* Maskell. **LECTOTYPE** female, subsequent designation by Deitz & Tocker (1980: 36): AUSTRALIA, on an original slide labelled “*Chionaspis eugeniae*, adult female, 1891, W.M.M.”, [1]: 1 F (ANIC).

Chionaspis xerotidis Maskell **LECTOTYPE** female, subsequent designation by Deitz & Tocker (1980: 44): AUSTRALIA, Sydney, on an original slide labelled “*Chionaspis xerotidis*, Female and puparium, 1894, W.M.M.”, [1]: 1 F (ANIC).

Remarks. Maskell’s dry material of *Chionaspis eugeniae* in NZAC is a collection of mixed species (including one species off stem(s) that is obviously not a *Pseudaulacaspis*); various selections have been slide-mounted in the past by W. Cottier, J. A. de Boer, and L. L. Deitz.

Other material examined. See Appendix A (p. 236) for details of 221 specimens examined.

Distribution. AK, GB, HB, WI / —

Host plants I. on adventive plants: Arecaceae: *Phoenix canariensis*; Asteraceae: *Chrysanthemoides monolifera*; Lomandraceae: *Lomandra longifolia*; Magnoliaceae: *Magnolia grandiflora*; Moraceae: *Ficus elastica*, *F. rubiginosa*; Myrtaceae: *Agonis flexuosa*, *Agonis* sp., *Callistemon salignus*, *Corymbia ficifolia*, *Corymbia* sp., *Eucalyptus microcorys*, *Eugenia elliptica*, *Feijoa sellowiana*, *Lophostemon confertus*, *Melaleuca hypericifolia*, *Melaleuca* sp., *Metrosideros kermadecensis*.

II. on endemic and native plants: Agavaceae: *Cordylina australis*; Asteraceae: *Pachystegia insignis*; Lauraceae: *Beilschmiedia tawa*; Liliaceae: *Astelia* sp.

Genus *PSEUDODONASPIS* Henderson new genus

Type species: *Pseudodonaspsis mollyae* n. sp., here designated.

Diagnosis. Female scale cover thick dorsally and ventrally, white; male scale cover white, non-carinated, exuvium on 1 side.

Female body roundly ovate to fusiform, derm membranous except for strongly sclerotised margins of the pygidium.

Dorsal ducts 2-barred, numerous, with sclerotised openings; marginal macroducts not much different in size to submarginal ducts on pygidium; submedian ducts present on segments VI–IV; submarginal dorsal ducts present as far forward as head, not extending onto venter. Dorsal bosses absent. Anal opening approximately circular, positioned nearer anterior edge than apex of pygidium.

Median lobes widely separated by a deep median cleft and with long basal scleroses forming sides of a ventral channel at base of medial cleft; lobes divergent, prominent, with several pairs of associated setae; 2nd lobes small, unilobular, 3rd lobes not visible. Gland spines absent. Stout segmental setae present (these could be mistaken for gland spines because their sockets apparently blend in with the sclerotised margin).

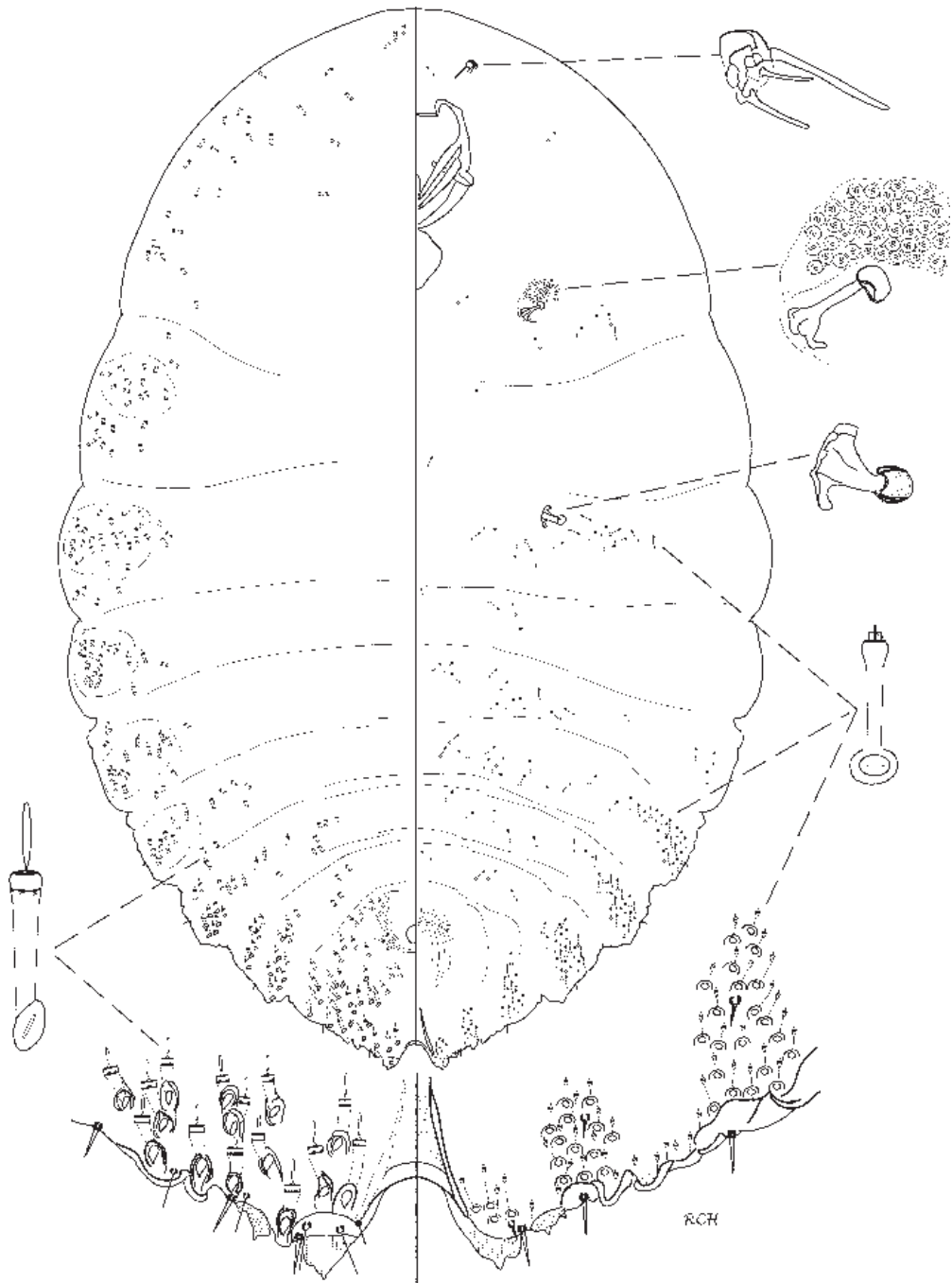


Fig. 213 *Pseudodonaspis mollyae* Henderson n.gen et n.sp., adult female.

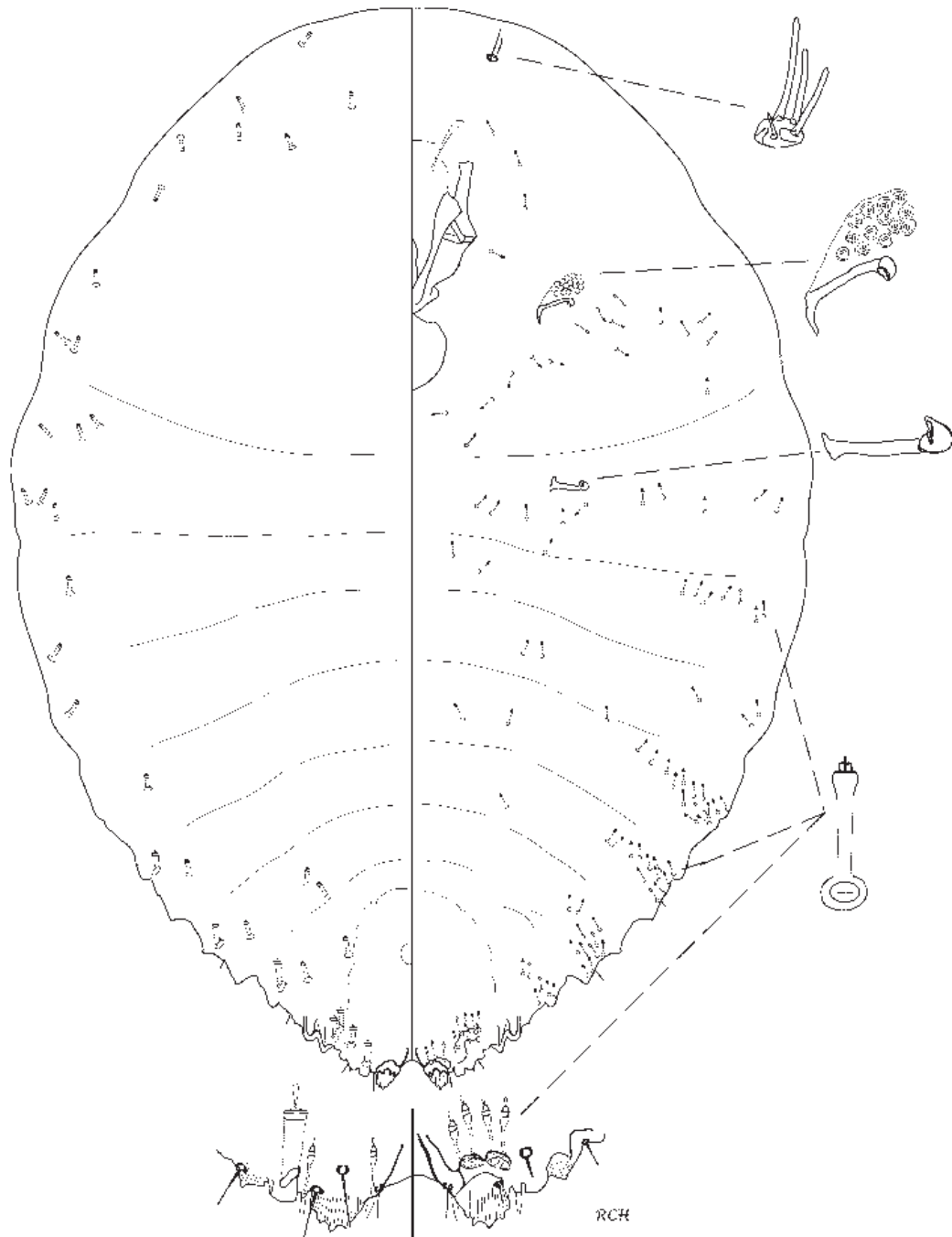


Fig. 214 *Pseudodonaspis mollyae* Henderson n.gen et n.sp., 2nd-instar female nymph.

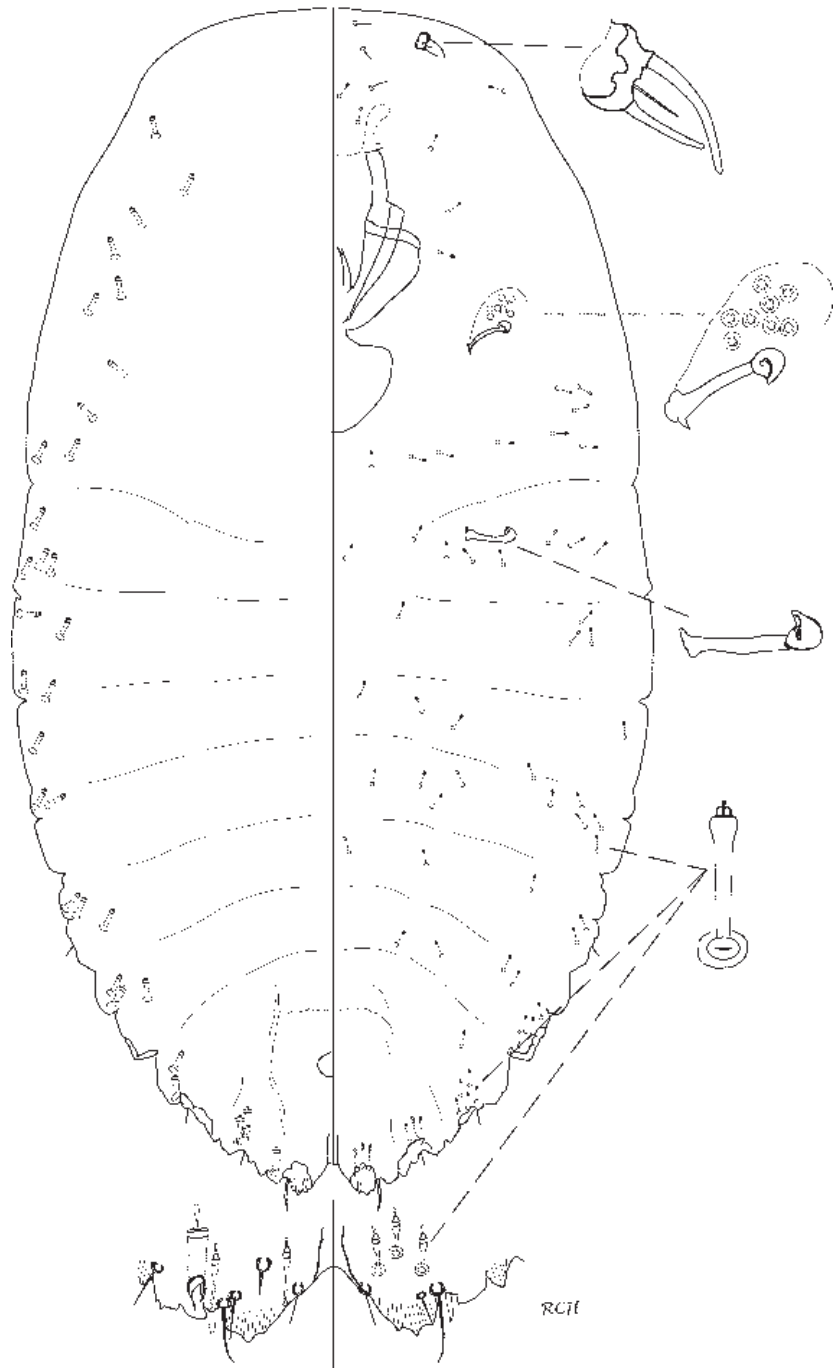


Fig. 215 *Pseudodonaspis mollyae* Henderson n.gen et n.sp., 2nd-instar male nymph.

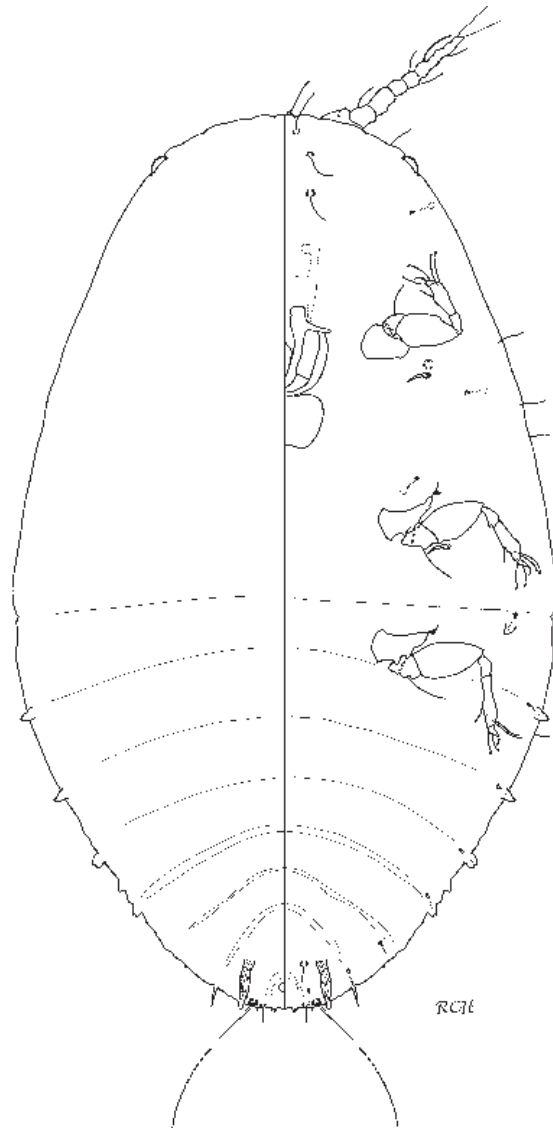


Fig. 216 *Pseudodonaspis mollyae* Henderson n.gen et n.sp., 1st-instar nymph.

Perivulvar pores, small ventral ducts, and gland tubercles absent. Microducts numerous, with sclerotised openings, distributed as large groups on submargin of abdominal segments, numerous microducts scattered on submedian abdomen, metathorax, and a few further anteriorly. Anterior spiracles each with a group of trilocular pores, pores absent by posterior spiracles. Antenna with 2 or 3 long setae.

Remarks. This monotypic genus demonstrates convergent evolution, induced by the grass-feeding habit shared with *Odonaspis* species; however, molecular evidence places *P. mollyae* n.sp., described below, closer to *Symeria pyriformis* (Maskell) (B. Normark, pers. comm.).

Etymology. The new genus is named for its superficial resemblance to *Odonaspis*.

Pseudodonaspsis mollyae Henderson new species E

Molly's grass scale

Fig. 100–101, 213–216; Map 42

Live appearance and habitat. Both upper and basal female scale covers tough, white, terminal exuvia fawn, shape of covers broad, nearly round; female body colour pale with darker pygidium margin. Hidden under leaf sheaths at base of grasses.

Adult female, measurements taken from 19 specimens (Fig. 213). Body shape roundly oval, lateral abdominal lobes moderately produced, more delta-shaped posteriorly, length 0.78–1.9 mm, width 0.5–1.05 mm. Pygidium margin strongly sclerotised, with a deep median cleft, and widely separated, prominent median lobes (L1); L1 rounded with an apical digitate point and lateral points, medial margin longer than lateral margin, with a long basal sclerosis on medial margin of each L1 together forming sides of a channel at base of medial cleft; L2 similar to L1 except much smaller, without basal scleroses; L3 perhaps embedded in part of sclerotised margin. Pairs of long setae variously positioned over and beside lobes, in addition to stout segmental setae. Gland spines absent, but with a small pore prominence between L1 and L2. Probably 4 or 5 pairs of marginal macroducts, with numerous dorsal ducts of similar size in submarginal groups on segments IV–VII.

Dorsal ducts narrow with sclerotised openings; becoming smaller when distributed submedially on III–VII and in large groups submarginally as far forward as head. Anal opening 17–22 μm , as long as wide, positioned 80–120 μm from posterior margin.

Ventral microducts numerous, similar in shape but smaller than dorsal ducts, also with sclerotised openings especially when on pygidium segments; distributed in clus-

ters on submargins and with a few on sclerotised margins of segments IV–VII, more scattered and numerous on submedian abdomen and near posterior spiracles, with a few near anterior spiracles and on head. Antenna with 2–3 setae. Anterior spiracles each with 28–40 trilocular pores, posterior spiracles without pores. Perivulvar pores absent. Vulva positioned about 90–100 μm from posterior margin.

2nd-instar female nymph, measurements taken from 10 specimens (Fig. 214). Body shape ovate, smaller than female, length 0.58–0.84 mm, width 0.37–0.55 mm; with 2 pairs of lobes, as for female; with 4 pairs of marginal macroducts, not much larger than dorsal ducts.

Dorsal ducts smaller than macroducts, absent from submedian VII, with 1–2 pairs submedian ducts on VI–V and submarginally as far forward as head. Anal opening 10–12 μm , as long as wide and 40–45 μm from posterior margin.

Microducts less numerous but in similar distribution pattern to female. Antenna with 1–3 setae. Anterior spiracles each with a group of 7–18 trilocular pores.

2nd-instar male nymph, measurements taken from 2 specimens (Fig. 215). Body shape fusiform, length 0.48–0.6 mm, width 0.26–0.38 mm; in other respects similar to female nymph, except with slightly less numerous microducts, and with 3 pairs of small setae on head mesad to antennae.

Remarks. The male and female 2nd-instar nymphs are difficult to separate on the available material, but 1 male 2nd-instar contained an incipient prepupa, and additional prepupae and pupae were collected, thus confirming the existence of male stages. The presence of dorsal submedian ducts on the female 2nd-instar nymph can be compared to the other 'grass'-feeding species in New Zealand, *Poliaspoides leptocarpi*, that appears to have polymorphic 2nd-instar nymphs and no males at all. This suggests that being more ductiferous, the normal clue to male nymphs, does not apply here in these particular habitats.

1st-instar nymph, measurements taken from 7 specimens (Fig. 216). Body shape oval, length 0.4–0.47 mm, width 0.23–0.28 mm; pygidium with 1 pair of lobes, each with a basal sclerosis on submargin; 1 pair of small gland spines lateral to lobes, 1 microduct medial to lobes, and 1 pair of long anal lobe setae.

Dorsal microducts absent.

Ventral microducts small, with small tubercles, on margin of abdominal segments I–V and metathorax, with 1 submarginal and 1 submedian pair of microducts on both meso- and prothorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

Antennae 6-segmented, 30–34 µm long, with fine and fleshy setae. Legs and spiracles normal. Eyes on margin.

Remarks. The 1st-instar nymph of *P. mollyae* is similar to that of *A. gahniae* but the body shape is more oval and it has 6- instead of 5-segmented antennae.

Type material examined. **HOLOTYPE** female: NEW ZEALAND, NN, Lake Sylvester, ~1300 m, road below hut (site 2), 10 Jan 2005, GL & RC Henderson, *Chionochloa australis* base stems under sheath, #05-003c, [1]: 1 F. Barcode NZAC02003541 (NZAC). **Paratypes:** collection data as for holotype, #05-003a–b, d–n, [23]: 14 F (2 containing embryos), 6 f2nd, 2 m2nd (1 with incipient pp), 1 pp, 3 1sts (NZAC).

Other material examined. See Appendix A (p. 237) for details of 53 specimens examined.

Distribution. — / NN, BR, SC

Note disjunct distribution records: Ashburton racecourse and montane Northwest Nelson.

Host plants. Poaceae: *Agrostis capillaris*, ‘brown top’ = *Agrostis* spp., *Chionochloa australis*.

Etymology. The species is named in honour of Molly Sheldon who helped me collect it when we visited Lake Sylvester in 2003. Sadly, Molly passed away unexpectedly on 20 March 2011.

Genus *PSEUDOPARLATORIA* Cockerell

Pseudoparlatoria Cockerell, 1892: 136.

Type species: *Pseudoparlatoria ostreata* Cockerell. Subsequently designated by Fernald, 1903: 300.

Pseudoparlatoria parlatorioides (Comstock) A false parlatoria scale

Fig. 217; Map 43

Aspidiotus parlatorioides Comstock, 1883: 64.

Pseudoparlatoria parlatorioides (Comstock); Cockerell 1897c: 383; Borchsenius 1966: 164; Ward 1968:50; Gill 1997: 243; Charles & Henderson 2002: 607; Miller & Davidson 2005: 374.

Live appearance and habitat. Female scale cover circular, thin and translucent, with female body showing through; exuvia marginal. Male scale cover similar but more oval-elongate and smaller. On bark and leaves (Miller & Davidson 2005).

Diagnosis. Adult female (Fig. 217) with 3 pairs of lobes, the median lobes well separated, each with 1 conspicuous notch each side then triangular to apex, with a long ventral basal sclerotisation arising from the point of each notch; 2nd and 3rd lobes bilobate, with rounded lobules and ventral sclerotisations. With 1 pair of ‘fish-tail’ gland spines in

medial space, lateral gland spines normal, then becoming very short on prepygidium. Marginal macroducts and dorsal ducts 2-barred, decreasing in size from largest on VII and present submarginally to segment V. Antenna with 1 stout seta and 1 or more fine setae. Pores absent by spiracles. Perivulvar pores present in 5 groups. Microducts scattered on dorsum and venter.

Material examined. See Appendix A (p. 237) for details of 6 specimens examined.

Distribution. AK, TK / —

Host plants. Begoniaceae: *Begonia* sp.; Orchidaceae: *Cypripedium* sp.

Remarks. Collection records are from 1962 and 1965. Charles & Henderson (2002) remarked that the New Zealand collections were from glasshouses and these habitats are quite ephemeral, leading to the conclusion that *P. parlatorioides* may no longer be present in New Zealand.

Genus *SERENASPIS* Henderson new genus

Type species: *Fiorinia minima* Maskell, here designated.

Diagnosis. Unmounted material: Scale cover of female translucent on leaves, to off white opaque on stems, exuviae light beige; body of female pale when on leaves, pinkish colour when on stems. Male nymph scale covers carinate, felted. Adult males apterous.

Slide-mounted **adult female** fusiform with slightly produced lateral lobes. Pygidium broadly rounded in shape, with 3 pairs of lobes: median lobes yoked and close together, rectilinear or rounded, smooth or with small serrations; 2nd lobes bilobed, rounded; 3rd lobes apparently trilobed as the pore prominence medial to the main lobule appears to be combined with lobular material, lobules rounded. 3–4 pairs marginal macroducts, barrel-shaped, 2-barred, with an additional macroduct submarginally on segment VI thus forming a characteristic group of 3 (occasionally 4) ducts each side.

Submedian dorsal ducts slightly smaller than marginal macroducts, distributed in 4 short rows each side; submarginal duct groups decreasing in size anteriorly, present as far forward as metathorax, these groups actually lateral on the body and so appearing also on ventral submargin. Anal opening round in shape.

Ventral ducts similar to small dorsal ducts scattered on prepygidial abdominal submargin and metathorax; microducts associated with gland spines and gland tubercles all of similar size, other microducts slightly smaller, present on submargins of pygidium and abdomen, a few scattered on prepygidial submedian segments, numerous on thorax and head, often with a group of either microducts alone, or

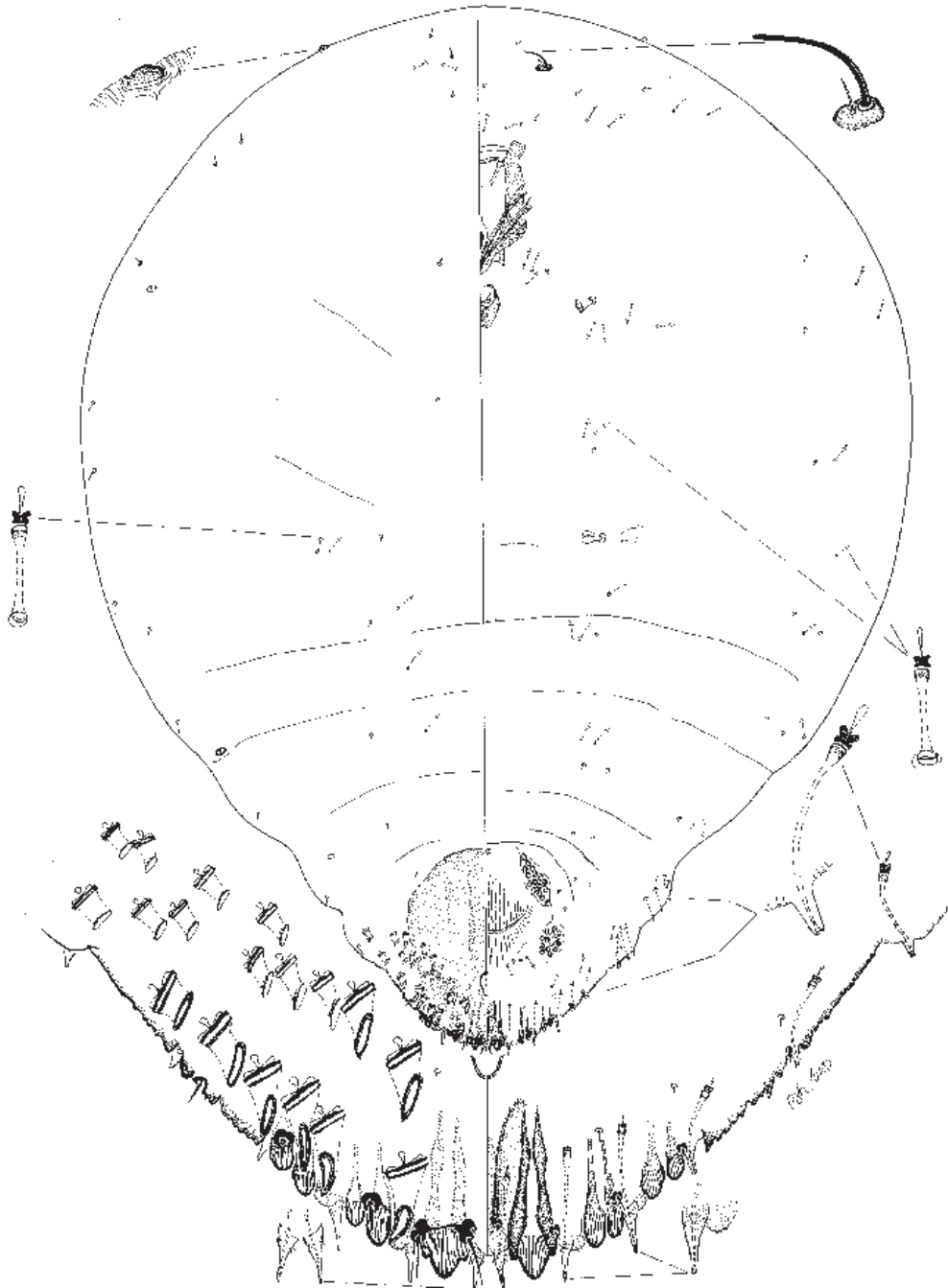


Fig. 217 *Pseudoparlatoria parlatorioides* (Comstock), adult female (from Miller & Davidson 2005).

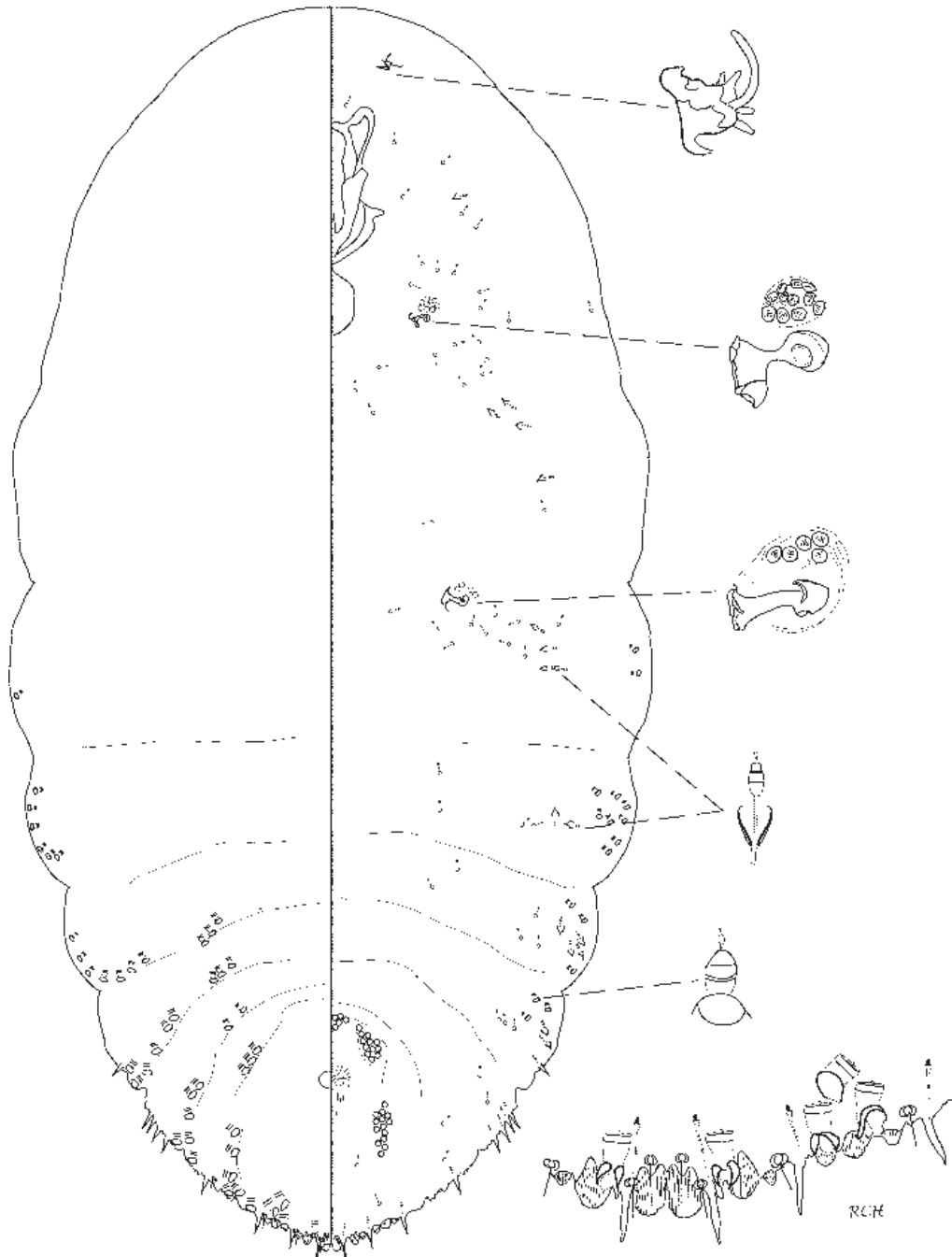


Fig. 218 *Serenaspis minima* (Maskell), adult female.

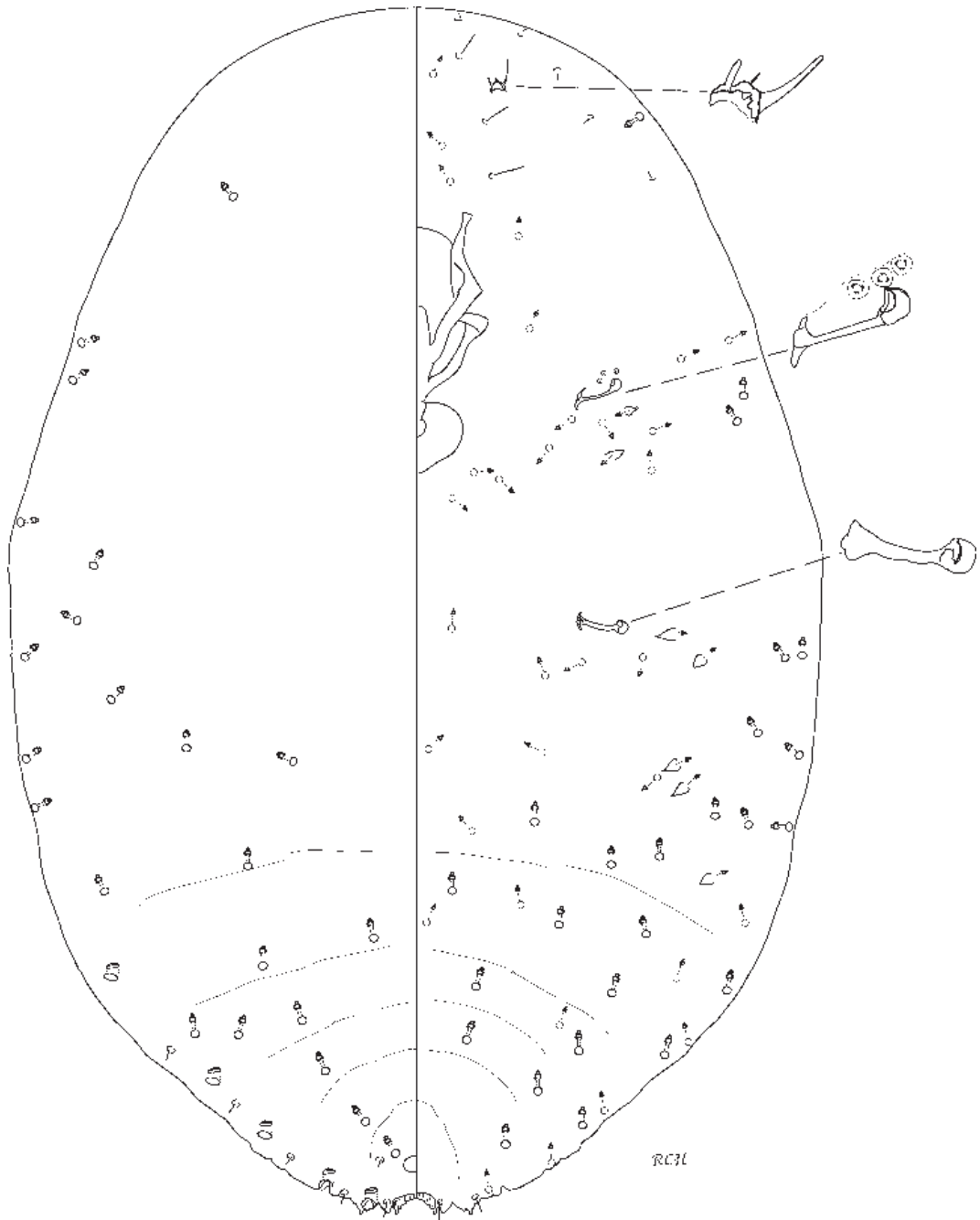


Fig. 220 *Serenaspis minima* (Maskell), 2nd-instar male nymph.

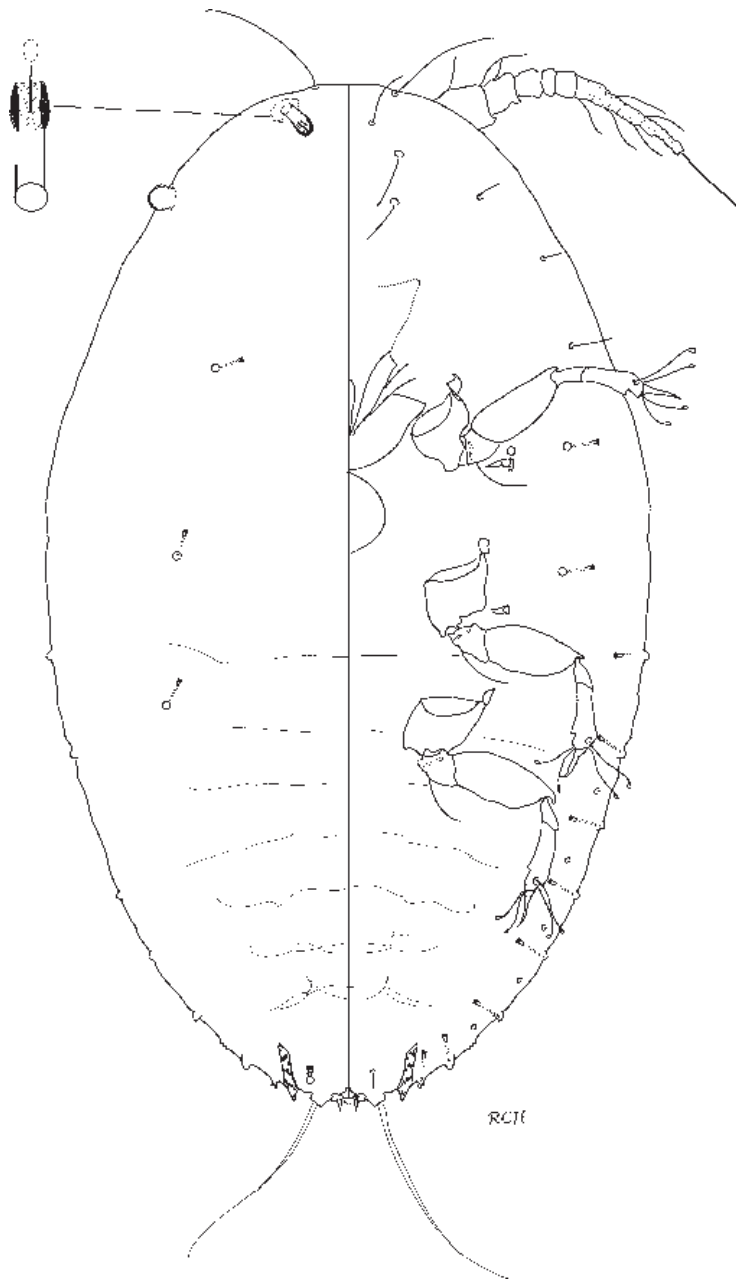


Fig. 221 *Serenaspis minima* (Maskell), 1st-instar nymph.

microducts and gland tubercles, about halfway between each anterior spiracle and the margin. Gland spines pointed, present singly on each pygidial segment, then becoming gland tubercles that may or may not extend beyond the margin on prepygidial segments; smaller gland tubercles present as far forward as mesothorax. Antenna with 1 long seta, several stubs and 2 coeloconic sensilla. Anterior and posterior spiracles each with a group of trilocular pores. Perivulvar pores in 5 moderately elongate groups. Vulva not obvious, positioned at about the level of the anal opening in anterior 1/3 of pygidium.

Remarks. The identity and generic placement of this taxon has had a checkered history. The type species, *Fiorinia minima*, was subsequently assigned to the pupillarial genus *Trulliflorinia* in which it clearly cannot remain. Maskell redescribed the taxon as *Chionaspis dysoxylis* and *Chionaspis minor*, in a rather astounding sequence one after the other on the same page, a year after describing it as *F. minima*. *C. dysoxylis* and its later combination *Pinnaspis dysoxylis* became the name of preferred usage until now. But it does not fit in *Pinnaspis* or *Chionaspis*, mainly because molecular data shows it is widely divergent from clades containing either *Pinnaspis* or *Chionaspis* (Andersen *et al.* 2010). The species name *minima* has priority and the new genus *Serenaspis* is erected here to resolve and maintain nomenclatural stability.

Etymology. The new genus name is derived from *serenus* meaning clear, combined with *-aspis* for shield, alluding to the delicate scale cover of the leaf form of this insect.

***Serenaspis minima* (Maskell) E** **serene scale**

Fig. 102–105, 218–221; Map 44

Fiorinia minima Maskell, 1884: 122.

Fiorinia (*Trulliflorinia*) *minima*; Leonardi 1906: 42 [change comb.].

Trulliflorinia minima (Maskell, 1884); MacGillivray 1921: 376 [change comb.].

Chionaspis dysoxylis Maskell, 1885: 22; Myers 1922: 200 **new synonymy**.

Pinnaspis dysoxylis (Maskell); Deitz & Tocker 1980: 36 [change comb.]; Takagi 1985: 45.

Chionaspis minor Maskell, 1885: 22; Henderson 2001: 89 [synonymy].

Serenaspis minima (Maskell, 1884) **new combination**.

Live appearance and habitat. Female scale covers may be almost transparent allowing pale yellow female body and eggs to be visible through cover, or opaque and covering pinkish female bodies. Male scale covers tricarinate, white, with yellowish exuvia. When on stems, the scale covers are thicker, opaque, and an off-white colour. Most commonly on underside of leaves and often in preference along veins.

Adult female, measurements taken from 28 specimens (Fig. 218). Body length 0.69–1.3 mm, width 0.45–0.85 mm. Median lobes (L1) as for genus, more elongate when on stems (15–17.5 μm long) than when on leaves (7.5–10 μm long) of host plant; with 1 pair of setae at their base and 1 long seta lateral to each lobe, also longest when material from on stems rather than leaves of host plants; L2 and L3 as for genus, often shorter when on leaves than stems and sometimes apparently rolled under the pygidial margin in slide-mounted specimens.

Marginal macroducts, submedian, and submarginal dorsal ducts as for genus. Anal opening 15 μm , as long as wide, positioned 115–150 μm from posterior margin.

Ventral ducts, microducts, gland spines, and antennae as for genus. Anterior spiracles each with a group of 7–20 trilocular pores; posterior spiracles each with 0–6 trilocular pores. Total of 45–96 perivulvar pores in 5 moderately elongate groups.

2nd-instar female nymph, measurements taken from 6 specimens (Fig. 219). Body shape more oval than adult female, length 0.57–0.69 mm, width 0.39–0.45 mm; with 2 pairs of lobes, L1 pointed and notched or slightly rounded and serrate, L2 bilobed, small; with 4 pairs of gland spines on pygidium, then 0–2 pairs of short gland spines or tubercles. 5 pairs of marginal macroducts, other dorsal ducts absent. Anal opening about 62 μm from posterior margin.

Ventral microducts of 1 size, singly each side of submarginal abdomen, very few on submedian, scattered on thorax near spiracles and on head. Gland tubercles few on submargin abdomen and between each spiracle and margin. Antenna with 1 long seta and sometimes also 1 short seta. Anterior spiracles each with a group of 2–3 trilocular pores, none by posterior spiracles.

2nd-instar male nymph, measurements taken from 6 specimens (Fig. 220). Body shape more rounded than female nymph, length 0.51–0.60 mm, width 0.34–0.38 mm; L1 pointed at lateral ends of a widespread yoke, other lobes not obvious, L2 represented by a point; 5 or 6 pairs of marginal macroducts, these appearing more on submargin of segments III–V due to rounded body.

Smaller dorsal ducts more numerous, in a line on submedian abdomen and more widely scattered on thorax. Anal opening relatively close to posterior, 12–30 μm from margin.

Ventral ducts of 2 sizes; (i) similar to smaller dorsal ducts, numerous, scattered over abdomen, also submarginally on thorax; (ii) microducts, few on submargin and submedian abdomen, more numerous near spiracles and on head; gland tubercles in small groups on thorax, notably near spiracles. Anterior spiracles each with a group of 1–3 trilocular pores, none by posterior spiracles. With 3

pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 4 specimens (Fig. 221). Body shape elongate-oval, length 0.27–0.29 mm, width 0.16–0.18 mm. Pygidium with 1 pair of lobes, slightly notched, each with a basal scleriosis; between the lobes 1 pair of minute setae, 1 pair of sharply pointed protuberances, and 1 pair of long anal lobe setae. Lateral to each median lobe, 1 very short gland spine with a microduct.

With 1 pair of large dorsal cephalic ducts positioned above antennal bases and near anterior margin of head. 3 pairs of dorsal microducts on submedian thorax.

Ventral microducts with small tubercles on margin of abdominal segments II–VII and metathorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 6-segmented, each 65–72 µm long, with fine and fleshy setae, apex of terminal segment with 1 seta. Legs and spiracles normal. Eyes on dorsal margin.

Type material examined. *Fiorinia minima* Maskell. **LECTOTYPE** female, here designated to preserve nomenclatural stability: NEW ZEALAND, on an original slide labelled “*Fiorinia minima*, from ‘Panax’ [= *Pseudopanax*], female in puparium, Dec. 1882, W.M.M.”, [1]: 1 F, pharate and with 1st-exuvium attached, good, cleared, unstained. Barcode NZAC02008427 (NZAC).

Chionaspis dysoxyl Maskell. **LECTOTYPE** female, subsequent designation by Deitz & Tocker (1980: 36): NEW ZEALAND, on an original slide labelled: “*Chionaspis dysoxyl*, puparium and females, from *Dysoxylum*, Aug. 1884, W.M.M.”, [1]: 1 F, the smaller and clearer of 2 adult females on the slide. Barcode NZAC02008424 (NZAC).

Paralectotype: the 2nd female on the above lectotype slide [1]: 1 F (NZAC).

Chionaspis minor Maskell. **LECTOTYPE** female, subsequent designation by Henderson (2001: 89): NEW ZEALAND, on an original slide labelled: “*Chionaspis minor*, adult female, from *Parsonia*, Dec. 1884, W.M.M.”, [1]: 1 F. Barcode NZAC02008421 (NZAC).

Other material examined. See Appendix A (p. 237) for details of 221 specimens examined.

Distribution. ND, AK, WO, BP, GB, HB, TK, TO / SD, NN

Host plants. Apocynaceae: *Parsonia* sp.; Araliaceae: *Pseudopanax arboreus*; Meliaceae: *Dysoxylum spectabile*; Passifloraceae: *Passiflora tetrandia*; Violaceae: *Meliclytus macrophyllus*, *M. micranthus*, *M. obovatus*, *M. ramiflorus*.

Genus SYMERIA Green

Type species: *Mytilaspis pyriformis* Maskell, here formally designated.

Symeria zealandica Morrison & Morrison, 1966: 190 [designated for *Lepidosaphes epiphytidis* sensu Green, 1929]; **nomen nudum**.

Lepidosaphes pyriformis (Maskell); Fernald 1903: 313 [replacement combination for preoccupied *Mytilaspis*].

Eulepidosaphes Borchsenius & Williams, 1963: 364; type species *Lepidosaphes marshalli* Laing, 1925: 64; Williams 1985: 138 [synonymy with *E. pyriformis*, lectotype designated]; *Eulepidosaphes pyriformis* (Maskell); Deitz & Tocker 1980: 42 [synonymy]. **new synonymy**.

Scrupulaspis MacGillivray, 1921:274; type species *Mytilaspis intermedia* (Maskell, 1891) **new synonymy**.

Discussion. E. E. Green (1929) erected the genus *Symeria* to take what he thought was *Lepidosaphes epiphytidis* (Maskell, 1885) (the new combination for *Mytilaspis pyriformis* by Fernald 1903), but it was actually *Mytilaspis pyriformis* Maskell, 1879 he redescribed.

Green stated that he did not see the type material, but relied on the determination by J. G. Myers who sent a collection of scale insects to him from New Zealand. Maskell’s original description of *Mytilaspis epiphytidis*, quoted by Green (1929), appears to be a description of *M. pyriformis* and includes descriptions of the female and male scale covers of *M. pyriformis*. However, Maskell’s syntype slides of *M. epiphytidis* do not match this description and are clearly not *M. pyriformis*, so if Myers, too, had not seen the type material, then that confused description probably formed the basis for his erroneous identification. Thus Green in effect redescribed *M. pyriformis* as *Symeria epiphytidis*.

I examined a slide in the Natural History Museum (BMNH), London, in August 2001 which was labelled “*Symeria* [*Lepidosaphes* crossed out] *epiphytidis* (Mask.), from *Astelia cunninghamii*, NZ (Wellington) coll. J.G. Myers, 7.ix.1921”. This was part of the material studied by Green, and it contained 6 adult females and 4 2nd-instar nymphs of *M. pyriformis*. Ferris (1936: 89, fig. 69) illustrated the genotype of *Symeria* from material of ‘*Symeria epiphytidis*’ that he apparently received from Green’s collection and this also is clearly *M. pyriformis*. In addition, Ferris sent part of this lot back to NZAC. A further 2 slides were made by J. A. de Boer in 1968, NZAC labelled ‘no. 228, collected at Days Bay, 7 Sep 1921, E.H.A., on *Astelia cunninghami*.’ These 2 slides are also labelled “dry material det. Ferris” as *Lepidosaphes epiphytidis* and contain the following: (1) 1 female? of *M. epiphytidis* sensu Maskell, 1885 (referred here to *Pellucidaspis epiphytidis*, new comb.) + 8 female *M. pyriformis*; a 3rd label in de Boer’s writing “*Symeria zealandica* Morr.&Morr.”; (2) *M. pyriformis*: 6 adult females + 6 2nd-instar female nymphs.

Symeria zealandica Morrison & Morrison, 1966: 190. A new species name *zealandica* was designated by Morrison & Morrison because Green's description and figure did not agree with type specimens of Maskell's *epiphytidis*, and because a genus should have for its type a species that represents that generic description. *L. epiphytidis* (Maskell) could not be that type, but the genus *Symeria* remains valid and needed a type. Morrison & Morrison provided a name without a specimen, but must have concluded that Green was looking at a specimen when he wrote the description of *Symeria*. As shown from my examination that specimen was undoubtedly *M. pyriformis*, and therefore it is the type species of *Symeria*.

Eulepidosaphes: the type species *Lepidosaphes marshalli* Laing was synonymised with *M. pyriformis* by Williams (1985). Deitz & Tocker (1980) made the combination *Eulepidosaphes pyriformis*, but the genus *Eulepidosaphes* is here sunk to preserve nomenclatural stability, because *Symeria* takes precedence. No other species have been assigned to *Eulepidosaphes*.

Prior to Green's (1929) introduction of the name *Symeria*, *Scrupulaspis* was erected by MacGillivray in 1921. The type species was given as *Scrupulaspis intermedia* (Maskell), but it fails as a valid combination because MacGillivray gave erroneous key characters for it. In addition, not enough is known about '*Scrupulaspis victoriae*' (Green) (from Australia) and its placement is uncertain.

Diagnosis. Similar to *Lepidosaphes* species (differences in parentheses): L2 and L3 unilobate (L2 bilobate, L3 a serration on margin); with well-separated median lobes; each median lobe ventral basal scleriosis solid and as large as the lobe (separate short lateral basal paraphyses on each median lobe); pygidium gland spines lightly fringed with a central tine (elongate and pointed); abdomen without spurs or bosses (spurs and bosses present on several species); submedian dorsal ducts present or absent from pygidium VII; abdominal lateral lobes often produced with groups of gland spines on their margins.

Antennae with 3 or 4 long setae (more often with 1 or 2 long setae except *L. pinnaeformis*); perivulvar pores in 5 elongate groups that may partly coalesce; a group of pores present by anterior spiracle, absent by posterior spiracle; microducts and gland tubercles present on venter.

Key to *Symeria* adult females in combination with 1st-instars/1st-exuvia

- 1 With 4 or more microducts in medial space between L1 2
 - With 2 (rarely 3) microducts in medial space between L1 3
- 2(1) Lateral abdominal lobes not strongly produced; on *Kunzea* ***intermedia* (Maskell)**
 - Lateral abdominal lobes strongly produced; on *Beilschmiedia* ***pyriformis* (Maskell)** [in part]
- 3(1) Dorsal ducts present in a line on each side of pygidium VII from near anal opening to submargin 4
 - Dorsal ducts not as above 5
- 4(3) Dorsal cephalic ducts absent from on 1st-instar nymphs and 1st-exuvia; on *Phyllocladus* ***phyllocladi* Henderson n. sp.**
 - Dorsal cephalic ducts multiplied into groups on each side of head on 1st-instar nymphs and 1st-exuvia; on *Dacrydium cupressinum* ***pyriformis* (Maskell)** [in part]
- 5(3) Dorsal ducts present only on submargin of pygidium VII, not in a line from near anal opening; on many different hosts ***pyriformis* (Maskell)** [in part]
 - Dorsal ducts absent from pygidium VII; on *Leptospermum* ***leptospermi* (Maskell)**

Symeria intermedia (Maskell) E *kunzea diaspidid*

Fig. 106–107, 222–224; Map 45

Mytilaspis intermedia Maskell, 1891: 7; Froggatt 1915: 42. *Lepidosaphes intermedia* (Maskell); Fernald 1903: 310; Myers 1922: 201.

Scrupulaspis intermedia (Maskell); MacGillivray 1921: 287; Borchsenius & Williams 1963: 370; Borchsenius 1966: 73; **new synonymy.**

Symeria intermedia (Maskell); **new comb.**

Live appearance and habitat (Maskell). "Female puparium yellowish-brown, the posterior end usually exhibiting a narrow border of white. Being placed transversely on small twigs of the plant, and coiling round them, it frequently appears very convex, the two ends meeting; the proper shape would probably be flat and pyriform." ... and ... "Male puparium of similar colour to that of the female, elongated, without carinations. It also is placed on small twigs, but longitudinally so that the form is not affected: it usually is placed amongst loose bud scales which it much resembles in colour and size." (Maskell, 1891). Maskell also noted that the small terminal twigs were affected by the insect (i.e., becoming stunted with shortened

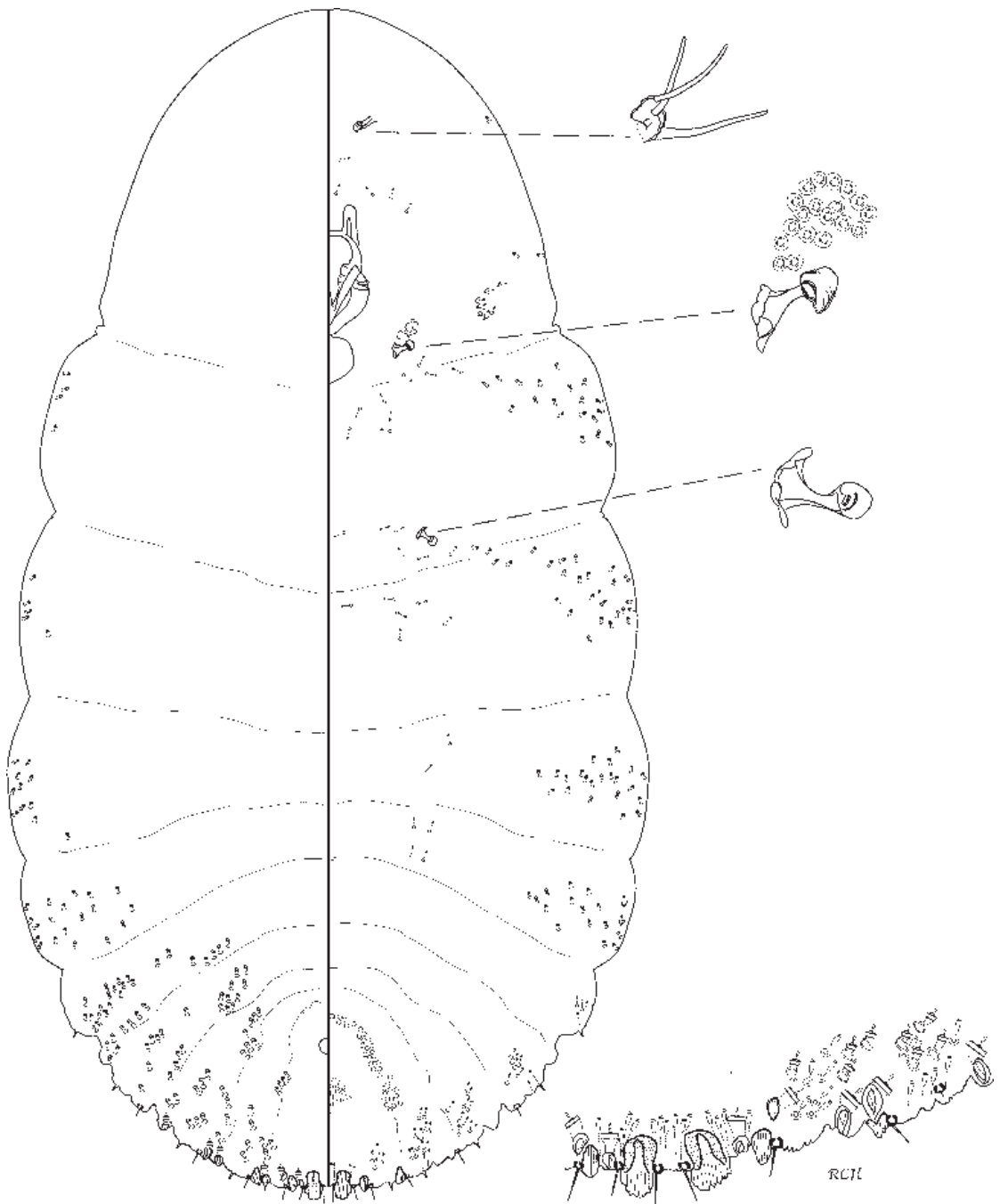


Fig. 222 *Symeria intermedia* (Maskell), adult female.

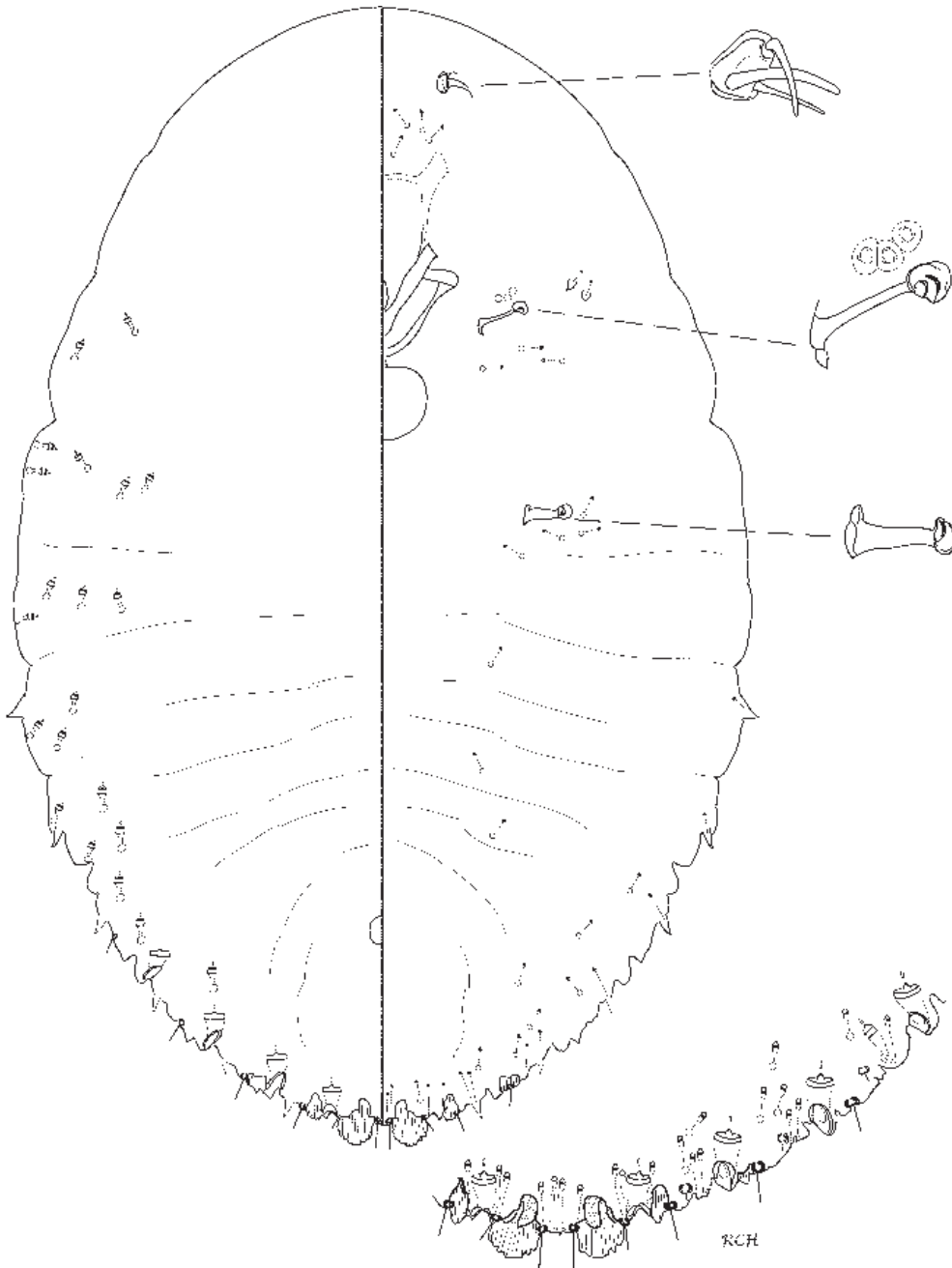


Fig. 223 *Symeria intermedia* (Maskell), 2nd-instar female nymph.

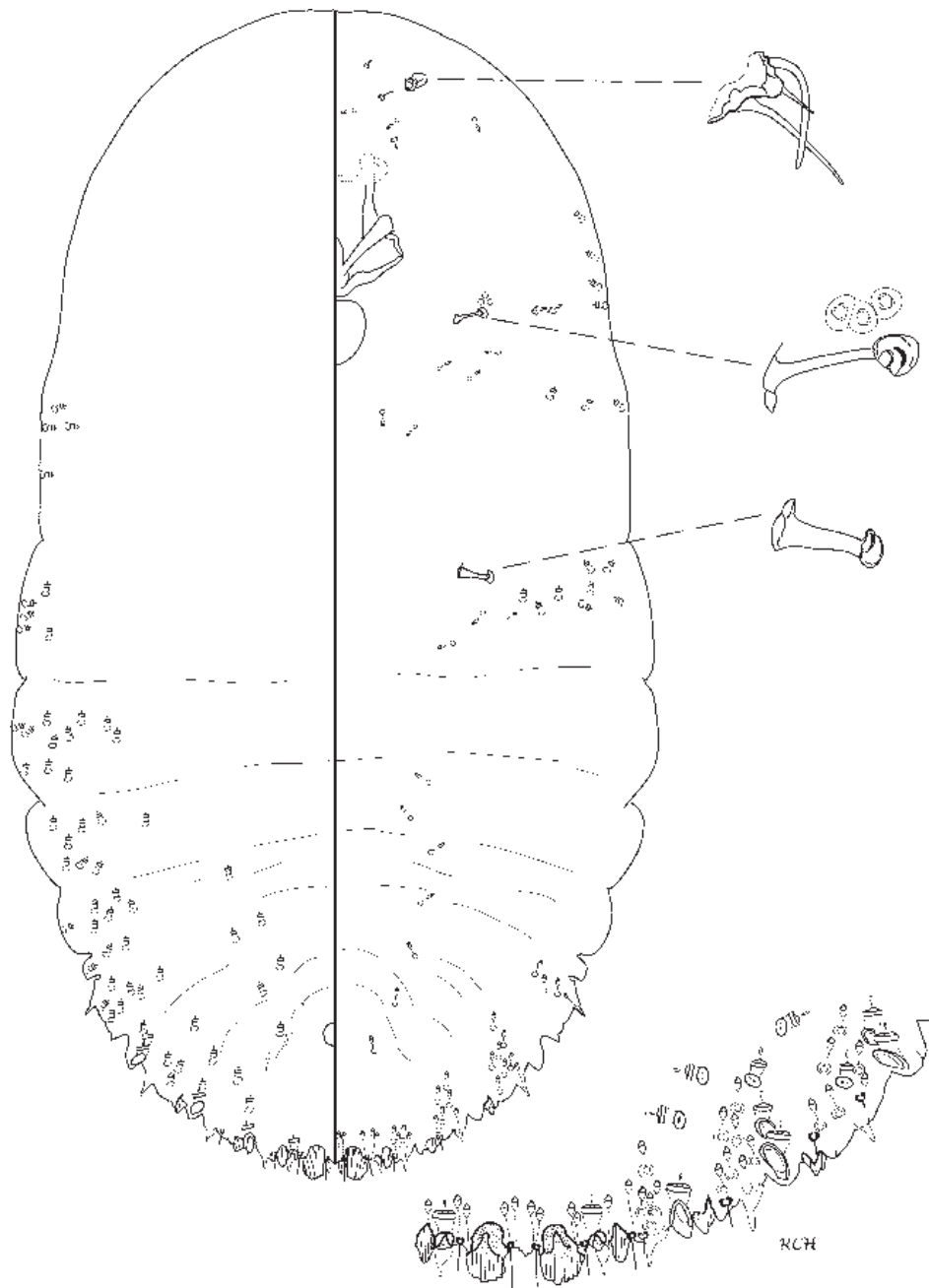


Fig. 224 *Symeria intermedia* (Maskell), 2nd-instar male nymph.

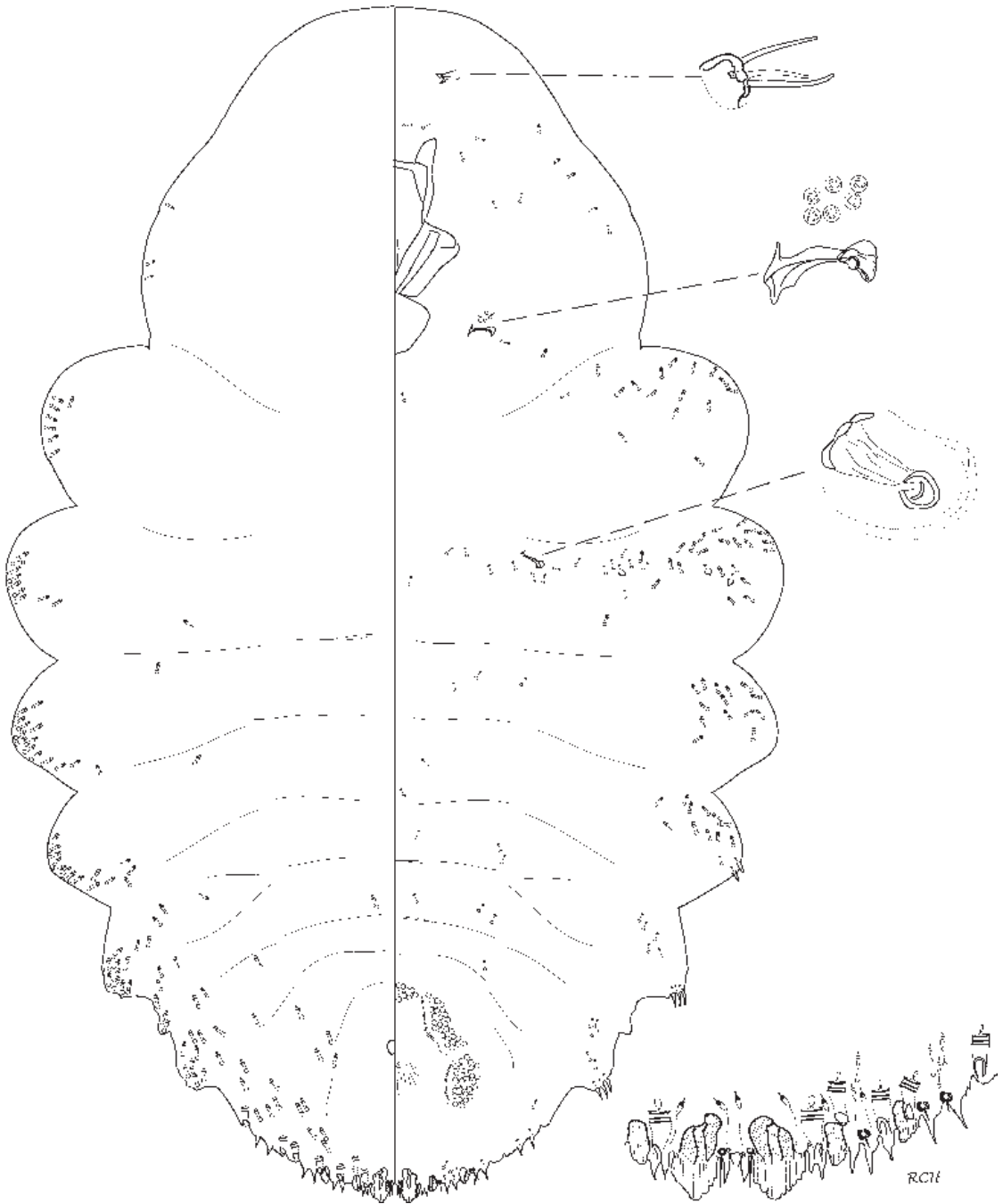


Fig. 225 *Symeria leptospermi* (Maskell), adult female.

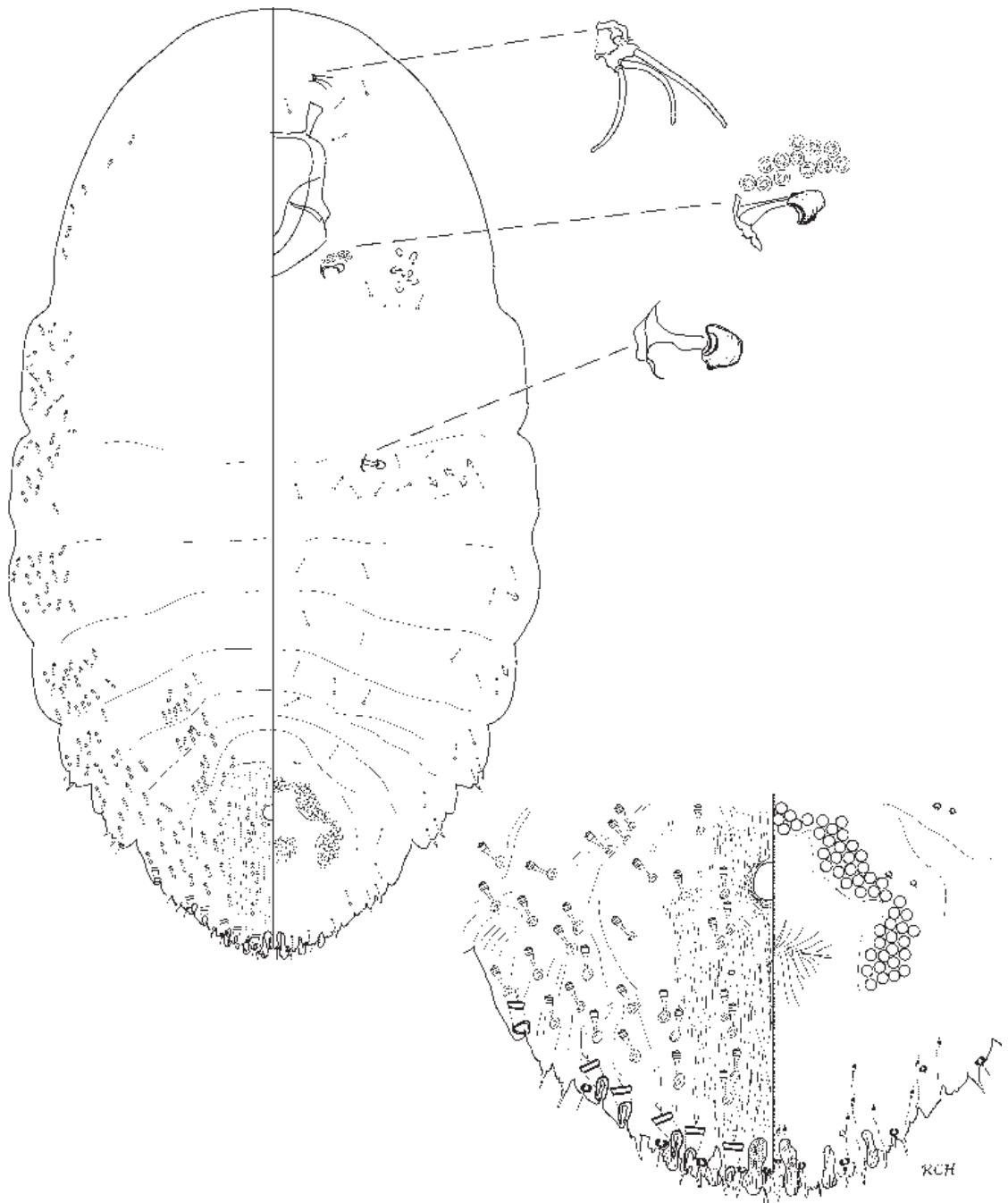


Fig. 226 *Symeria phyllocladi* Henderson n.sp., adult female.

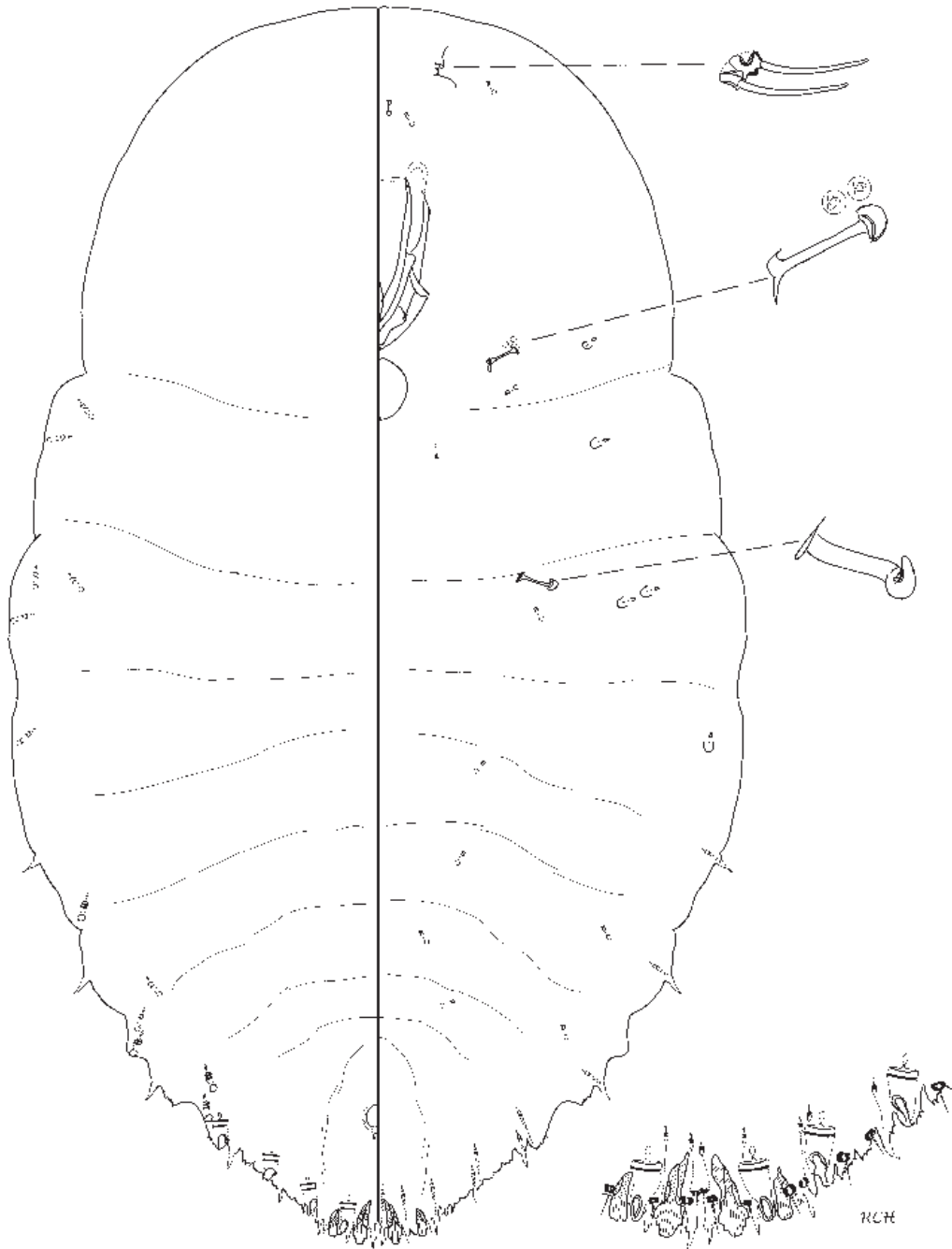


Fig. 227 *Symeria phyllocladi* Henderson n.sp., 2nd-instar female nymph.

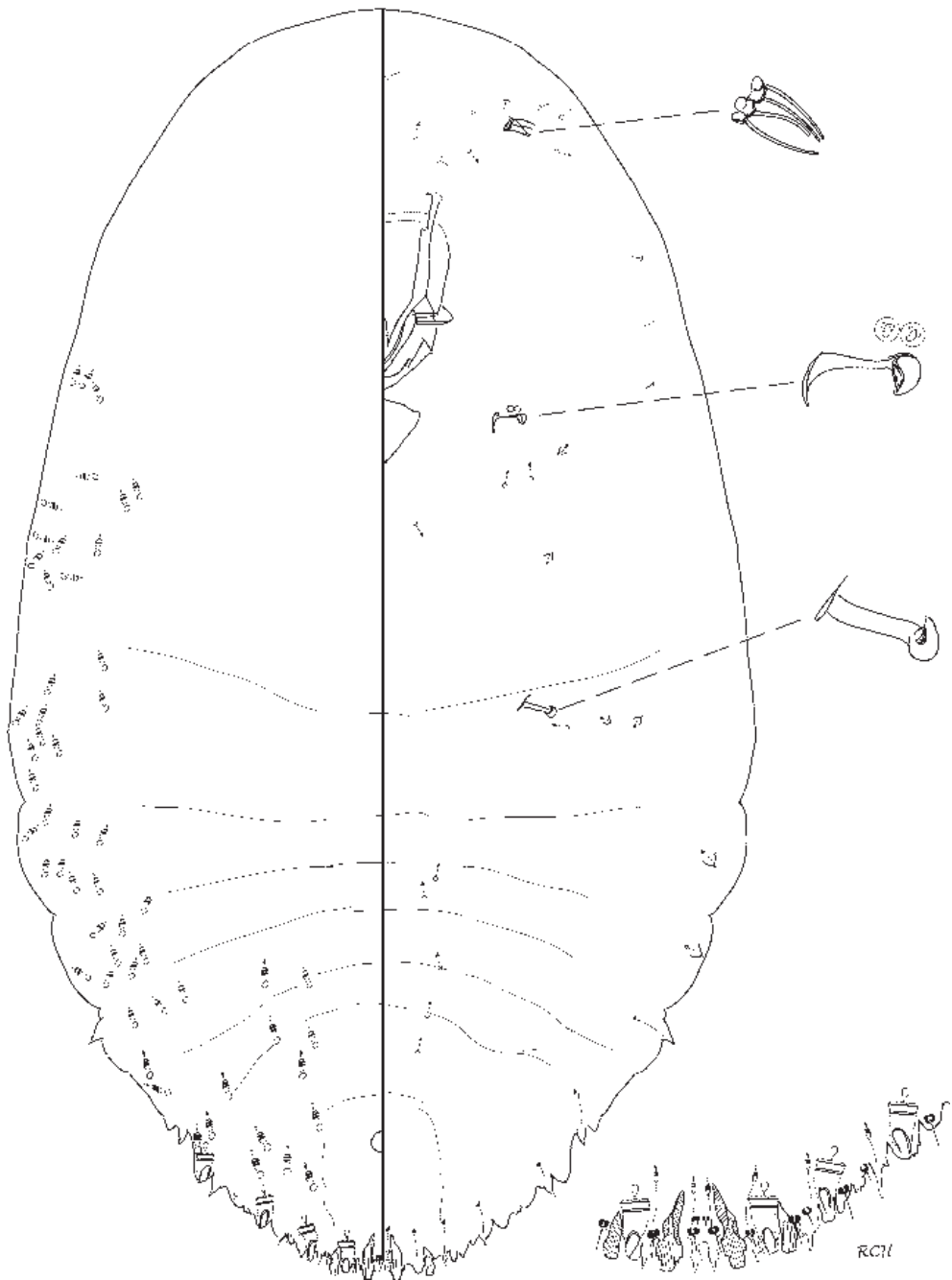


Fig. 228 *Symeria phyllocladi* Henderson n.sp., 2nd-instar male nymph.

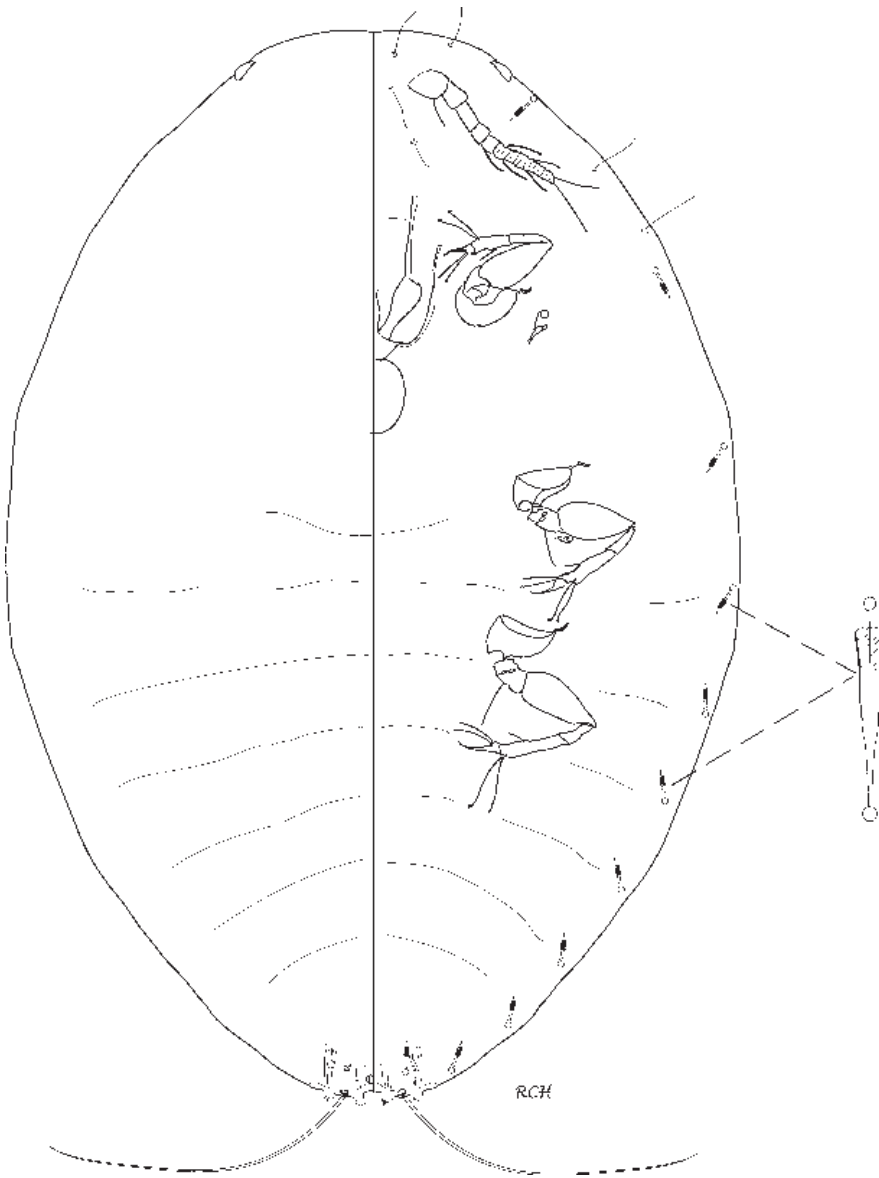


Fig. 229 *Symeria phyllocladi* Henderson n.sp., 1st-instar nymph.

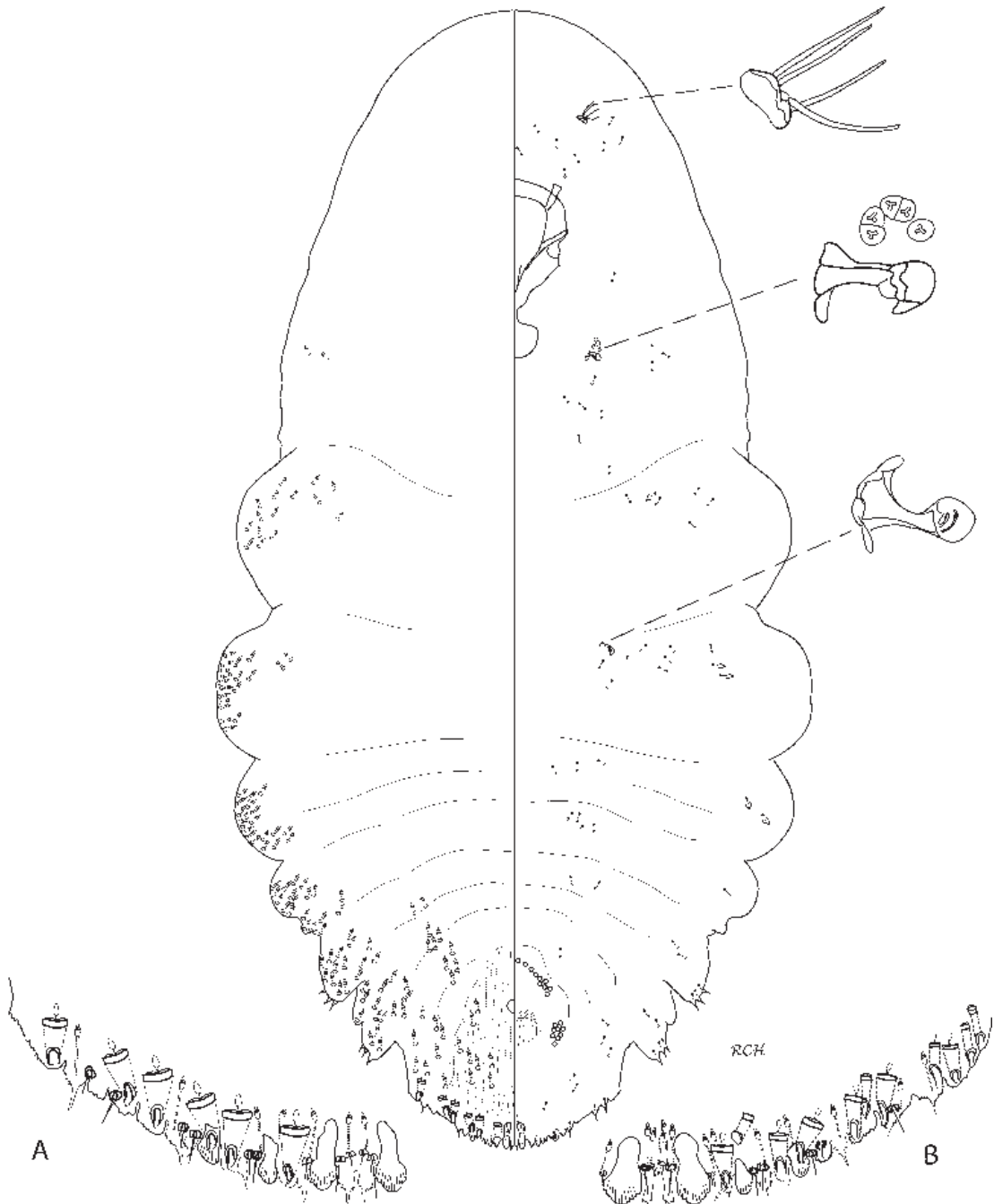


Fig. 230 *Symeria pyriformis* (Maskell), adult female; pygidium margins: A, normal; B, *Beilschmiedia* variant.

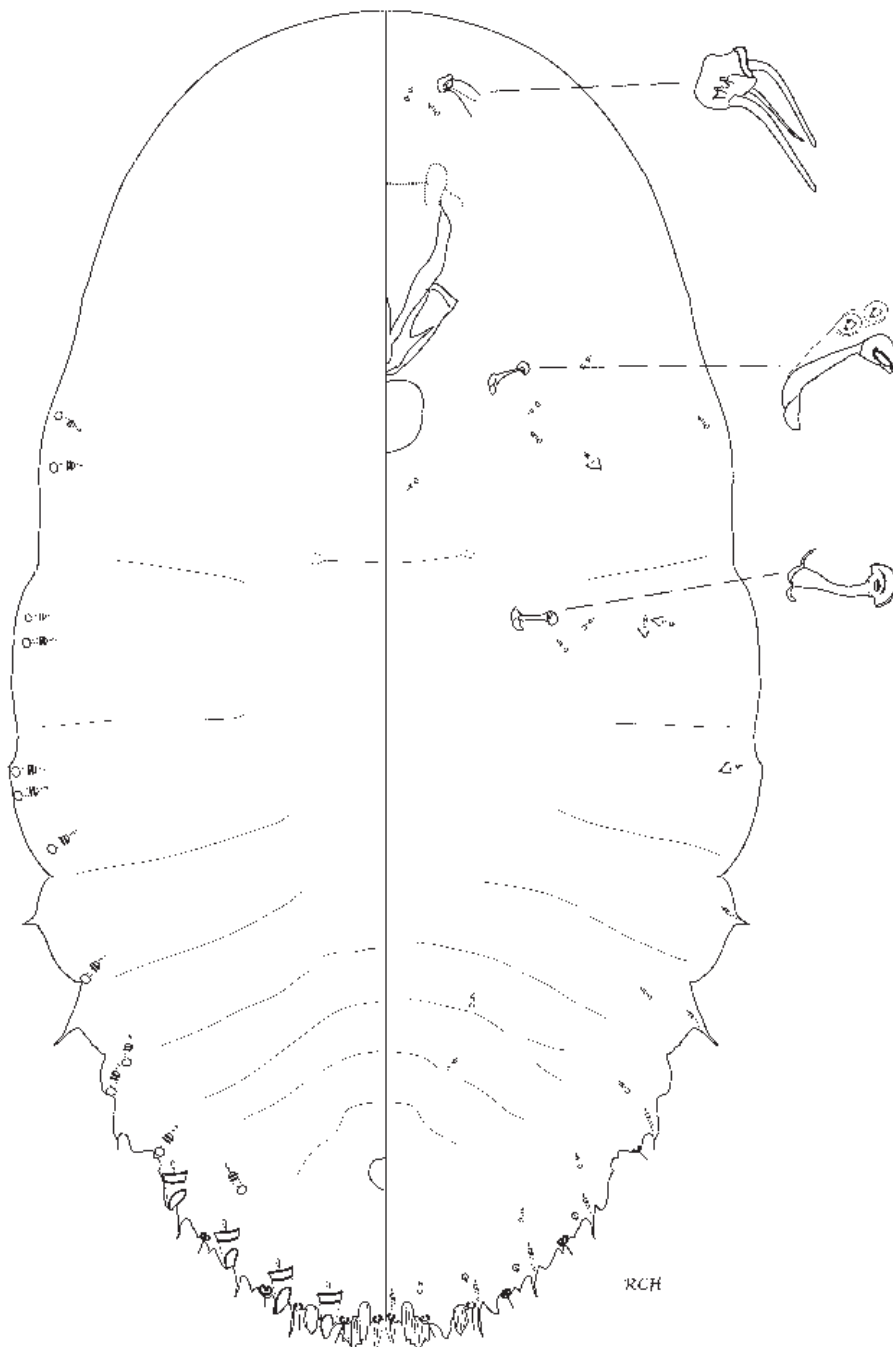


Fig. 231 *Symeria pyriformis* (Maskell), 2nd-instar female nymph.

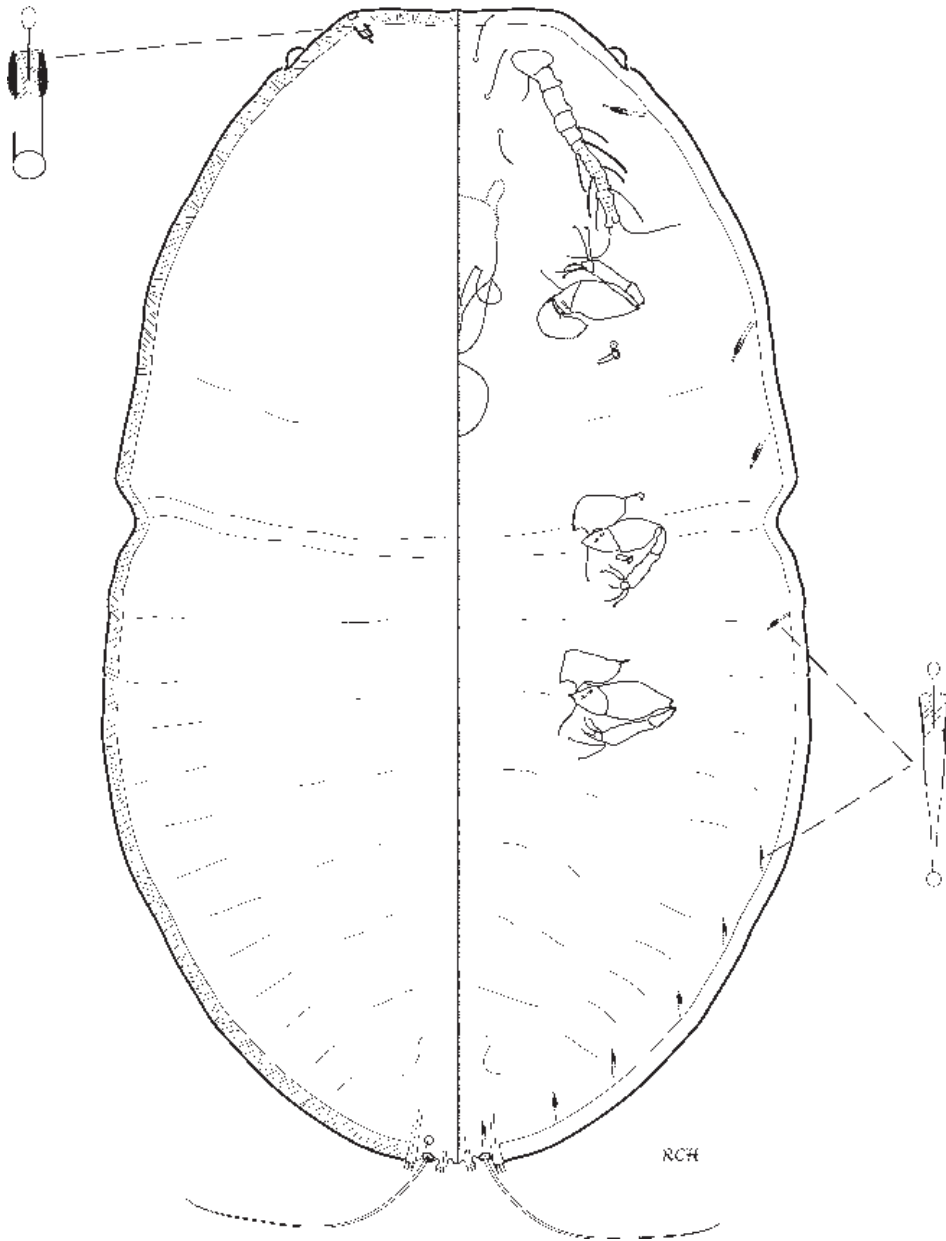


Fig. 233 *Symeria pyriformis* (Maskell), 1st-instar nymph.

internodes). This description of the insect and observation of its habit are still valid.

Adult female, measurements taken from 14 specimens (Fig. 222). Body shape rotund, to oval or fusiform, lateral abdominal lobes not well developed, length 0.92–1.56 mm, width 0.58–0.87 mm. With 3 pairs of lobes on broad, curved pygidium: median lobes (L1) well separated, broad, serrate, with 1 pair of moderately long setae between them; scleroses on each L1 well developed, appearing solid, extending from base of lobe for about 1/3 as long as free part of lobe; L2 unilobate, smaller than L1, wedge-shaped, L3 slightly smaller, wedge-shaped. Gland spines when apparent broad, fringed near apices, and either with a central tine or tapering to a tine on 1 side, but more often retracted into margin. Usually 6 pairs (sometimes 5 pairs) of marginal macroducts, not much larger than dorsal ducts, barrel-shaped.

Dorsal ducts all similar, but becoming smaller towards thorax, absent from submedium pygidium VII, sometimes 1–2 pairs on submargin VII, with short submedian rows on each side of VI to III on abdomen, and in a wide submarginal band extending to thorax, from abdomen II–I and to mesothorax these wrapping round body and appearing also on venter. Anal opening 15–20 μm long and 12–17 μm wide, positioned 115–155 μm from posterior margin.

Ventral ducts similar to smaller dorsal ducts distributed on abdominal submargins II–I, extending in a band towards each posterior spiracle and scattered from margin towards each anterior spiracle. Gland tubercles few submarginally on abdominal segments, often with a group between each anterior spiracle and margin. With 4–7 microducts in medial space, microducts numerous on submargins of pygidium and to abdomen IV, scattered submedially on anterior abdomen, near spiracles, and on head. Antenna with 3 or 4 stout setae. Anterior spiracles each with a group of 6–13 trilocular pores; posterior spiracles without perispiracular pores but with a few associated microducts. Total of 59–91 perivulvar pores in 5 groups, usually these merging to form an almost continuous arc. Vulva situated about 115–130 μm from posterior margin.

2nd-instar female nymph, measurements taken from 5 specimens (Fig. 223). Body shape ovate, smaller than adult female, length 0.38–0.46 mm, width 0.3–0.34 mm; lobes, (gland spines usually not apparent), and pygidial margin similar to adult female but smaller; with 4 pairs of large, barrel-shaped, marginal macroducts; dorsal ducts smaller than macroducts, absent from submedian, a few submarginal ducts from on segment V to as far forward as mesothorax, not extending onto venter. Anal opening about 7–10 μm long as wide and 70–72 μm from posterior margin.

Microducts of 1 size, 4 or 5 present in medial space and on submargin of pygidium segments, with few on submedian abdomen, near each spiracle, and on head. Gland tubercles few, in a small group near each anterior spiracle. Antenna with 2–3 setae. Anterior spiracles each with a group of 3 trilocular pores.

2nd-instar male nymph, measurements taken from 9 specimens (Fig. 224). Body shape oval to fusiform, length 0.4–0.59 mm, width 0.29–0.35 mm; with 3 pairs of lobes, L1 with basal scleroses extending onto venter, L2 and L3 wedge-shaped; with 4 pairs of barrel-shaped marginal macroducts.

With 1 or 2 pairs of submedian dorsal ducts on abdominal segments III to VI; submarginal dorsal ducts in a band 3–6 ducts wide on each side of abdomen and extending as far forward as mesothorax. Anal opening about 12 μm , as long as wide and 65–70 μm from posterior margin.

Ventral ducts similar to dorsal ducts present in a line between posterior spiracle and margin, and on mesothorax submargin. Ventral microducts more numerous than on female nymph, otherwise similar in distribution; gland tubercles as for female nymph. Anterior spiracles each with 2 or 3 trilocular pores. Antenna with 3–4 setae of variable sizes. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 11 exuvia (not figured, similar to Fig. 229, see comment below). Body shape oval, with sclerotised margin; length 0.36–0.43 mm, width 0.22–0.3 mm. Pygidium margin features not observed. Macroducts absent. Without 1 pair of large cephalic ducts; eyes dorsad on margin.

Venter: with 1 pair of microducts in medial space, 5 pairs on submargin of abdomen and 3 pairs on submargin of thorax. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 6-segmented, 62–70 μm long, with fine and fleshy setae, 2 setae apical. Legs and spiracles not observed.

Type material examined. LECTOTYPE female, here designated to preserve nomenclatural stability: NEW ZEALAND, “*Mytilaspis intermedia*, adult female, 1890, W.M.M.”, [1]: 1 F, stained & remounted RC Henderson 2001 (label on back of slide). Barcode NZAC02000289 (NZAC). **Paralectotypes:** labelled “ex Maskell’s dried material labelled *Mytilaspis intermedia*, JA de Boer 1968”, [3]: 12 F, 4 exuv2 (NZAC).

Other material examined. See Appendix A (p. 237) for details of 102 specimens examined.

Distribution. AK, GB / NN, BR, DN, SL

Maskell’s description gives Reefton as the type locality.

Host plants. Myrtaceae: *Kunzea ericoides*, *Leptospermum scoparium*.

Remarks. Maskell stated that "I look upon this insect as a link between *M. pyriformis* and *M. leptospermi*; and indeed it is possibly rather a variety of this last than really distinct." (Maskell 1891). He noted further "that it lacks the bark cells on the puparium, so characteristic of *M. leptospermi*" (Maskell 1891).

S. intermedia is closest to *S. phyllocladi*, sharing slightly developed abdominal lobes, and a group of duct tubercles near each anterior spiracle, but differs in usually lacking dorsal ducts on pygidium VII, in possessing more numerous microducts, especially between the medial lobes, and its host preference for *Kunzea ericoides*.

MacGillivray (1921) in the key to his genus *Scrupulaspis* on page 274 erroneously characterised *Mytilaspis intermedia* Maskell under "Pygidium of adult female always without plates in median incisura." By plates he meant gland spines. Because *Mytilaspis intermedia* does have gland spines in the medial space (although not always extending much beyond the margin on slide-mounted specimens), the conclusion here is to ignore MacGillivray's combination of *Scrupulaspis intermedia*.

The 1st-instar nymph of *S. intermedia* is similar to that of *S. phyllocladi* in lacking the pair of large dorsal cephalic ducts that are present on the 1st-instar nymph of *S. pyriformis*.

***Symeria leptospermi* (Maskell) E**

Fig. 225; Map 46

Mytilaspis leptospermi Maskell, 1882: 215.

Lepidosaphes leptospermi (Maskell); Fernald 1903: 310; Myers 1922: 201; Borchsenius 1966: 49.

Symeria leptospermi (Maskell); Deitz & Tocker 1980: 38 [change comb.].

Live appearance and habitat. Not recorded, except female scale cover clothed in bark scales of its host plant, *Leptospermum*.

Adult female, measurements taken from 11 specimens (Fig. 225). Body shape oval or fusiform, widest at metathorax, lateral abdominal lobes usually strongly developed. Body length 1.17–1.76 mm, width 0.72–1.2 mm. With 3 pairs of lobes: median lobes (L1) well separated, crenate to serrate, delta or wedge-shaped, with 1 pair of moderately long dorsal setae and 1 pair of very small ventral setae between them; basal scleroses on each L1 well developed, appearing solid, extending from base of lobe; L2 unilobate, smaller than L1, wedge-shaped with basal scleroses, L3 slightly smaller than L2, wedge-shaped. Gland spines broad, fringed near apices, tapering to a point, on

pygidium and on prepygidial lobe margins. 6 pairs of marginal macroducts large, barrel-shaped, with a more slender duct on submargin just above each L2.

Dorsal ducts about same length as macroducts but narrower, becoming slightly smaller towards thorax, absent on pygidium VII, then with 1–6 pairs on submedian and in a moderately wide submarginal band from VI–II on abdomen (least numerous on type material), with groups of ducts on submargin extending to thorax, wrapping round body and appearing also on venter. Anal opening 12–17 µm, as long as wide, positioned 125–160 µm from posterior margin.

Ventral ducts similar to smaller dorsal ducts distributed on abdominal submargins II–I, and submargins of thorax. Gland tubercles distributed submarginally between ventral ducts and posterior spiracles on metathorax, with sometimes 1–3 near each anterior spiracle. With 2 microducts in medial space, several microducts on submargins of pygidium segments to abdomen IV, scattered submedially on abdomen, in groups near spiracles and on head posterior to antennae. Antenna with 2–4 stout setae. Anterior spiracles each with a group of 6–13 trilocular pores; posterior spiracles without perispiracular pores but with numerous associated microducts. Total of 69–134 perivulvar pores in 5 groups, sometimes the median group merged with the 2 anteriolateral groups. Vulva situated 102–145 µm from posterior margin.

Material examined. LECTOTYPE female, subsequent designation by Deitz & Tocker (1980: 38): NEW ZEALAND: "*Mytilaspis leptospermi*, From Manuka tree, Puparium and female, April 1881, W.M.M.", [1]: 1 F, stained & remounted RC Henderson 2001 (label on back of slide). Barcode NZAC02000319 (NZAC).

Paralectotypes. (i) labelled as above except June 1881, [1] 1 F, remounted as above. Barcode NZAC02000313; (ii) "ex Maskell's dried material labelled *Mytilaspis leptospermi*. JA de Boer 1968", [1]: 4 F, 4 exuv2, 1 exuv1 (NZAC).

Other material examined. See Appendix A (p. 238) for details of 40 specimens examined.

Distribution. GB, WI, WA / MC, SL

Host plants. Myrtaceae: *Leptospermum scoparium*, *Leptospermum* sp. (Maskell, 1882).

Remarks. See *S. intermedia* for remarks by Maskell (1891). *S. leptospermi* is closest to *S. pyriformis* but differs in the absence of dorsal ducts on the pygidium, the presence of dorsal ducts wrapped around body on to venter, and the median lobes more broad and prominent.

***Symeria phyllocladi* Henderson new species E
phyllocladus gall diaspidid**

Fig. 108–109, 226–229; Map 47

Live appearance and habitat. Scales are normally inquiline in cladode galls previously induced by *Eriococcus arcanus* Hoy (Eriococcidae) on *Phyllocladus trichomanoides* and *P. alpinus*, either in the gall of the male nymph, that is available sooner because of the shorter duration male life cycle, or the gall of the female after she has died. Original galls inhabited by the eriococcid are invariably green, whereas those galls subsequently inhabited by the diaspidid become chlorotic at the base (Fig. 108) (Henderson & Martin 2006). Sometimes *S. phyllocladi* scales are found on cladode surfaces, as well as within galls. Scale covers are pale and narrow when inquiline in galls (Fig 109), and often the detached covers of several females plus some exuvia form a loose plug at the gall entrance, while naked females lie near the base of the gall. Female body and eggs pale pinkish-brown. More than 1 generation of *S. phyllocladi* has been observed in a gall with males and females developing there.

Adult female, measurements taken from 14 specimens (Fig. 226). Body shape oval to fusiform, lateral abdominal lobes generally slightly developed, length 0.76–1.47 mm, width 0.43–0.66 mm. Median lobes (L1) well separated, notched each side, rounded at apex, with 1 pair of moderately long dorsal setae and 1 pair of very small ventral setae between them; basal scleroses on each L1 well developed, appearing solid, extending from base of lobe for about as long as free part of lobe; L2 unilobate, smaller than L1, wedge-shaped with basal scleroses, L3 slightly smaller than L2, wedge-shaped. Gland spines broad, fringed near apices and either with a central tine or tapering to a tine on one side. Marginal macroducts large, barrel-shaped, usually 6 pairs (sometimes 5 pairs).

Dorsal ducts all similar, moderately slender, distributed as 5–7 pairs of ducts in a line from opposite anal opening on submedian pygidium VII to submargin, with short submedian rows on each side of VI–III or II on abdomen, and in a wide submarginal band extending to thorax. Anal opening 15 μm , as long as wide, positioned 100–120 μm from posterior margin.

No ventral ducts similar to smaller dorsal ducts. Gland tubercles few, distributed submarginally on abdominal segments II–I, and with groups near each spiracle. Microducts few, with 2 in medial space and scattered on submedian abdomen, near spiracles, and on head. Antennae each with 3–6 setae of variable thicknesses. Anterior spiracles each with a group of 6–12 trilocular pores; posterior spiracles without perispiracular pores, but with a few associated microducts. Total of 59–108 perivulvar pores in 5 groups,

but often these merging with each other. Vulva situated about 110–120 μm from posterior margin.

2nd-instar female nymph, measurements taken from 4 specimens (Fig. 227). Body shape similar to adult female but smaller, length 0.67–0.8 mm, width 0.34–0.43 mm; with 2 pairs of lobes, L1 notched, with long basal scleroses extending on to venter, longer on medial than lateral aspect of each lobe, these more slender than on female; L2 wedge-shaped, L3 hardly discernible; gland spines on pygidium as for genus, becoming straight and pointed on prepygidium with 1 pair per segment; with 4 pairs of large, barrel-shaped marginal macroducts.

Dorsal ducts few, 1 or 2 each segment confined to body margin as far forward as mesothorax. Anal opening 10–12 μm , as long as wide, positioned 45–62 μm from posterior margin.

Ventral microducts and gland tubercles few, on abdomen, near spiracles and on head. Anterior spiracles each with 1 or 2 trilocular pores. Antennae each with 2–4 setae.

2nd-instar male nymph, measurements taken from 4 specimens (Fig. 228). Similar to male nymph of *S. pyri-formis* except: length 0.66–0.76 mm, width 0.23–0.36 mm; with 3 pairs lobes, L1 with basal scleroses extending onto venter, longer on medial than lateral aspect of each lobe, these slender as in female nymph; L2 wedge-shaped, L3 a point; body outline less rounded than female nymph; with 4 pairs of large barrel-shaped marginal macroducts.

With 1 or 2 pairs of submedian dorsal ducts on abdominal segments III–VI; submarginal dorsal ducts in a band 3–6 ducts wide on each side of abdomen and extending as far forward as mesothorax. Anal opening about 55 μm from posterior margin.

Ventral microducts and gland tubercles few, on abdomen, near spiracles and on head. Anterior spiracles each with 2 trilocular pores. Antenna with 4 setae. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 5 specimens (Fig. 229). Body shape oval, with slightly sclerotised margin; length 0.37–0.4 mm, width 0.23–0.26 mm. Pygidium without definite lobes, these replaced with small plate-like appendages with minute tines, 1 pair lateral to long anal lobe setae, and 1 minute pair medially; without gland spines. Macroducts absent; large cephalic ducts absent. Eyes on margin.

Ventral microducts distributed as 1 pair on post occipital margin, submarginally on pro-, meso-, and metathorax, 6 pairs on abdomen and 1 pair present or absent between pygidium plates. With 3 pairs of moderately long setae on head between antennae and towards frontal margin. Antennae 6-segmented, 65–77 μm long, with fine and

fleshy setae, 2 setae apical. Legs and spiracles normal.

Type material examined. HOLOTYPE female: NEW ZEALAND, AK, Waitakere Ra, Destruction Gully Track, 21 Apr 2002, N.A. Martin, in galls on *Phyllocladus trichomanoides* cladodes, #02-086a, [1]: 1 F, 1 of 3 females on the slide, the holotype is the female nearest to the locality label. Barcode NZAC02000203 (NZAC). **Paratypes.** As above, the remaining 2 females on the holotype slide, [1]: 2 F; also with same collection data, #02-086b–c, [2]: 1 F (very young), 1 M (pre-emergent) (NZAC).

Other material examined. See Appendix A (p. 238) for details of 148 specimens examined.

Distribution: AK, CL, BP, TO / NN

Host plants. Phyllocladaceae: *Phyllocladus trichomanoides*, *P. alpinus*.

Remarks. *S. phyllocladi* is closest to *S. pyriformis* but can be separated by the line of submedian-submarginal ducts on pygidium VII and by its host preference for *Phyllocladus* spp.

The 1st-instar nymph of *S. phyllocladi* is probably most similar to that of *S. intermedia*, but only 1st-exuvia were available for that species, and similar to *S. pyriformis* except it lacks the pair of large dorsal cephalic ducts and the heavily sclerotised body margin of the latter species.

Etymology: the species name '*phyllocladi*' is derived from the host plant genus.

Symeria pyriformis (Maskell) E pyriform scale

Fig. 110–119, 230–233; Map 48

Mytilaspis pyriformis Maskell, 1879: 194.

Lepidosaphes marshalli Laing, 1925: 64; Williams 1985: 138 [synonymy, lectotype designated].

Eulepidosaphes marshalli (Laing, 1925); Borchsenius & Williams 1963: 364.

Pinnaspis nitidus Brittin, 1915: 151; 1915: 156. Green 1916: 51 [synonymy].

Lepidosaphes pyriformis (Maskell); Fernald 1903: 313; Myers 1922: 201; Borchsenius 1966: 51; Wise 1977: 108.

Eulepidosaphes pyriformis (Maskell); Deitz & Tocker 1980: 42 [change comb.]; Williams 1985: 137 [description, illustration].

Symeria epiphytidis (Maskell); Green 1929: 380; Ferris 1936: 89 [misidentification of *M. pyriformis* Maskell].

Symeria zealandica Morrison, 1966: 190 [nomen nudum].

Symeria pyriformis (Maskell) **new comb.**

Live appearance and habitat. Scale cover normally pyriform (pear-shaped), except the width is constrained when on stems or narrow leaves; colour variable from light brown when on underside of leaves to orange-brown or medium

brown when on upperside of leaves, to very dark brown when on stems or leaf midribs of some tree species. With an exceptional amount of fluffy wax produced by 1st-instar nymphs when on rimu (*Dacrydium cupressinum*) (see Fig. 114–117). Female body generally pale with lemon yellow pygidium and pale eggs, or on various host plants such as podocarps the body is pinkish with pinkish eggs; body colour not related to colour of scale cover (see Fig. 118, with 2 pale bodies, 1 each from beneath a light and a dark cover).

Adult female, measurements taken from 24 specimens (Fig. 230). Body shape pyriform or fusiform, widest at metathorax, lateral abdominal lobes usually strongly developed, lateral margin of segment IV incised on posterior edge forming a deep notch with broad, rounded pygidium (unless width and margin of insect constrained by a narrow habitat). Body length 0.92–1.77 mm, width 0.56–1.12 mm. With 3 pairs of lobes: median lobes (L1) well separated, slightly serrate, rounded at apex, with 1 pair of moderately long dorsal setae and 1 pair of very small ventral setae between them; basal scleroses on each L1 well developed, appearing solid, extending from base of lobe for about as long as free part of lobe; L2 unilobate, smaller than L1, wedge-shaped with basal scleroses, L3 slightly smaller than L2, wedge-shaped. Gland spines broad, fringed near apices and either with a central tine or tapering to a tine on one side, becoming pointed without fringes on prepygidial margins. Marginal macroducts large, barrel-shaped, usually 6 pairs (sometimes 7 pairs).

Dorsal ducts about same length as macroducts but narrower, becoming smaller towards thorax, several pairs present on submargin pygidium VII, but absent from submedium pygidium VII, with short submedian rows on each side of VI–III on abdomen, and in a wide submarginal band extending to thorax, from abdomen II–I, and to mesothorax these not wrapping round body to appear also on venter. Anal opening 15–20 µm long and 12–17 µm wide, positioned 100–155 µm from posterior margin.

Venter. Gland tubercles few, present submarginally on anterior abdomen and post- and mesothorax, sometimes present in a group near each anterior spiracle. With 2 microducts in medial space (<4 microducts on some specimens on *Beilschmiedia* spp., see fig. 230, pygidium margin B), several microducts on submargins of pygidium segments to abdomen IV, scattered submedially on abdomen, in groups near spiracles and on head posterior to antennae. Antenna with 3 or 4 stout setae. Anterior spiracles each with a group of 3–19 trilocular pores; posterior spiracles without perispiracular pores but with a few associated microducts. Total of 48–82 perivulvar pores in 5 groups, sometimes the median group merged with the 2 anteriolateral

groups. Vulva situated 125–150 µm from posterior margin.

2nd-instar female nymph, measurements taken from 13 specimens (Fig. 231). Body shape ovate, smaller than female, length 0.4–0.72 mm, width 0.24–0.42 mm; with 2 pairs of lobes, L1 with well developed basal scleroses and with 2 pairs of setae in medial space, L2 small, basal scleroses short, L3 sometimes present as a point; gland spines as for female except single on margins of prepygidial lobes; with 4 pairs of large, barrel-shaped, marginal macroducts.

Dorsal ducts much smaller than macroducts, absent from submedian, with 1–2 pairs submarginal ducts on each of segments V to as far forward as mesothorax, not extending onto venter. Anal opening about 7–12 µm, as long as wide and 32–57 µm from posterior margin.

Microducts of 1 size, 2 present in medial space, 1 microduct on submargin of each abdominal segment in addition to those with gland spines, 2 pairs of submedian abdominal microducts, 2–3 pairs near each spiracle, and on head. Gland tubercles, few near each spiracle. Antenna with 2–3 setae. Anterior spiracles each with a group of 1–3 trilocular pores.

2nd-instar male nymph, measurements taken from 15 specimens (Fig. 232). Body shape oval to fusiform, length 0.4–0.96 mm, width 0.22–0.52 mm; with 2–3 pairs lobes, L1 with well developed basal 1 scleroses extending onto venter, L2 small, with basal 1 scleroses; L3 very small; with 4 pairs of barrel-shaped marginal macroducts.

With 1 or 2 pairs of submedian dorsal ducts on abdominal segments III to VI; submarginal dorsal ducts in a band 3–6 ducts wide on each side of abdomen and extending as far forward as mesothorax, sometimes wrapping round onto ventral margins. Anal opening 10–12 µm, as long as wide and 37–60 µm from posterior margin.

Ventral microducts less numerous than on female nymph, otherwise in a similar distribution; gland tubercles as for female nymph. Anterior spiracles each with 1–3 trilocular pores. Antennae each with 2–4 setae of variable sizes. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 15 specimens (Fig. 233). As for 1st-instar nymph of *S. phyllocladi* above except: body margin noticeably sclerotised on venter and with fine ribbing on dorsal margin, where openings of microducts are obscured. Body length 0.36–0.42 mm, width 0.22–0.28 mm; 1 pair of dorsal cephalic ducts present; 1 pair of microducts always present in pygidium medial space; antennae 62–75 µm long.

Type material examined. LECTOTYPE female, subsequent designation by Deitz & Tocker (1980: 42): NEW ZEALAND “*Mytilaspis pyriformis*, From *Freycinetia*,

Puparium and three females, July 1877, W.M.M.”, [1]: 1 F + scale cover glued to 2nd label; stained & remounted on 1 new slide by RC Henderson, 2001. Barcode NZAC02000110 (NZAC). **Paralectotypes.** (i) as above, [2]: 2 F, the 2 remaining females from the original slide, each stained and mounted separately by RC Henderson, 2001; (ii) “*Mytilaspis pyriformis*, Female and puparium, from *Dysoxylon*, Oct 1884, W.M.M.”, [1]: 1 F; (iii) “*Mytilaspis pyriformis*, from *Drinys*, Male, Jan 1880, W.M.M.”, [1]: 1 M; (iv) “ex Maskell’s dried material labelled *Mytilaspis pyriformis*, J.A. de B., ‘68”, [2]: 13 F, 13 exuv2, 6 exuv1 (NZAC).

Other material examined. See Appendix A (p. 238) for details of 1430 specimens examined.

Distribution. TH / ND, AK, CL, WO, BP, GB, HB, TK, TO, WI, RI, WN / SD, NN, BR, WD, MB, NC, MC, SL, FD, SI

UK [Scilly Isles].

Host plants. highly polyphagous; **all New Zealand records are from native and/or endemic plants** in 28 families.

Agavaceae: *Cordyline banksii*, *C. obtecta*; Araliaceae: *Meryta sinclairii*, *Raukaua anomalus*, *Schefflera digitata*; Arecaceae: *Rhopalostylis sapida*; Asteraceae: *Olearia rani*; Cunoniaceae: *Ackama rosifolia*, *Weinmannia racemosa*, *Weinmannia* sp.; Cupressaceae: *Libocedrus bidwillii*; Cyperaceae: *Carex* sp., *Gahnia* sp.; Elaeocarpaceae: *Elaeocarpus hookerianus*; Epacridaceae: *Dracophyllum latifolium*; Escalloniaceae: *Ixerba brexioides*, *Quintinnia serrata*; Lauraceae: *Beilschmiedia tarairi*, *B. tawa*, *B. tawaroa*, *Litsea calicaris*; Liliaceae: *Asteliasolandri*, *Asteliasolandra* sp.; Collospermum [*solandri*]?; Loganiaceae: *Geniostoma rupestre*; Malvaceae: *Hoheria* sp.; Meliaceae: *Dysoxylum spectabile*; Monimiaceae: *Hedycarya arborea*, *Laurelia novae-zelandiae*; Myrsinaceae: *Elingamita johnsonii*, *Myrsine australis*; Oleaceae: *Nestegis cunninghamii*, *N. lanceolata*, *Nestegis* sp.; Pandanaceae: *Freycinetia banksii*; Pittosporaceae: *Pittosporum* sp.; Podocarpaceae: *Dacrydium dacrydioides*, *Dacrydium cupressinum*, *Halocarpus bififormis*, *Manoao colensoi*, *Podocarpus hallii*, *P. totara*, *Pumnopitys ferruginea*, *P. taxifolia*; Proteaceae: *Knightia excelsa*, *Toronia toru*; Ripogonaceae: *Ripogonum scandens*; Rubiaceae: *Coprosma arborea*, *C. foetidissima*, *C. macrocarpa*, *C. rhamnoides*, *C. rotundifolia*; Scrophulariaceae: *Hebe* sp.; Verbenaceae: *Vitex lucens*; Winteraceae: *Pseudowintera axillaris*, *P. colorata*.

Remarks. Williams (1985) noted considerable variation in all the material he examined (nearly 30 records), including specimens from on *Phyllocladus* (here considered a distinct species, *S. phyllocladi*) and *Beilschmiedia* (variability noted above for microduct numbers, Fig. 230, pygidium

margin B). This variation is undoubtedly due to the very wide host range of *S. pyriformis*. Perhaps cryptic species are included that are unable to be reliably separated for now, e.g., the variable morphology of populations on *Dacrydium cupressinum* with the multiplied cephalic ducts of 1st-instar nymphs (Henderson 2004).

The 1st-instar nymph of *S. pyriformis* is similar to that of *S. intermedia* and *S. phyllocladi*, but differs in possessing the pair of large dorsal cephalic ducts (nymphs of *S. leptospermi* not known).

A documented exception to the above is the proliferation of cephalic ducts, from which are produced masses of fine strands of white wax, when *S. pyriformis* feeds on *Dacrydium cupressinum* (Fig. 114–117; see also Henderson 2004). There is much variation in the effect of the host plant resistance. The populations on *D. cupressinum* appear to be unstable, being susceptible to fungal disease, and when so infected they may die out at any one site.

Genus *TRULLIFIORINIA* Leonardi

Fiorinia (*Trullifiorinia*) Leonardi, 1906: 41.

Trullifiorinia; Ferris 1936: 23, 26. Change of status.

Type species: *Fiorinia acaciae* Maskell. Subsequently designated by MacGillivray 1921: 372.

Trullifiorinia acaciae (Maskell) A wattle black scale

Fig. 121–123, 234–237 (New Zealand material); Map 49 *Fiorinia acaciae* Maskell, 1892: 16; Fernald 1903: 246; Green 1916: 62–63 [figures variability of median lobes]; Ferris 1936 1(2): 26, 88 [fig. 70].

Trullifiorinia acaciae (Maskell); Leonardi 1906: 43; Borchsenius 1966: 148; Charles & Henderson 2002: 608.

Live appearance and habitat. Membranous female enclosed in small, pitch black, elongate pupillarium that has a membranous pygidium at posterior end with 4 pairs of sclerotised gland spines on abdominal margin; 1st-exuvium either black or translucent. Female 2nd-instar scale cover fawn-coloured, not carinated, with terminal exuvium. Male scale cover white, tricarinate, composed of somewhat loose wax, with grey-brown to dark brown or black terminal exuvium; the white part is short when over a 2nd-instar male, then becomes elongate during the following developmental stages. 1st-instar crawler light orange or apricot colour. On petioles, stems or leaves, usually aligned lengthwise along grooves on the plant stem or petiole.

Adult female, measurements taken from 18 specimens (Fig. 234). Body membranous except for pygidium. Body shape elongate fusiform, lateral abdominal lobes not developed; pygidium oval, narrow, pointed; with pairs of long (17–20 μ m) and medium length (10–12 μ m) setae on

pygidium margin. Body length 0.5–0.83 mm, width 0.25–0.3 mm. With 1 pair of prominent, contiguous median lobes, rounded at apex, variably notched or dentate, smooth or slightly serrate; with 1 pair of short setae and 1 pair of very small setae on either side of lobes; lobes yoked by a median paraphysis that is often arched onto venter. Gland spines and plates absent. 3 pairs of marginal macroducts about 17–22 μ m long and 5–6 μ m wide.

Dorsal ducts absent. Anal opening 10–12 μ m long as wide, positioned 87–102 μ m from posterior margin.

Venter. Gland tubercles absent. Microducts of 1 size, in pairs on pygidium segments, numerous in a band on submargin of abdomen, and across meso- and metathorax, distribution more scattered on submedian abdomen and prothorax. Antennae each with 1 seta. Anterior spiracles each with a group of 2–6 trilocular pores; posterior spiracles occasionally with 1 pore. Total of 22–29 perivulvar pores in 5 small rounded groups. Vulva positioned 70–82 μ m from posterior margin.

Pupillarium, measurements taken from 6 specimens, including 4 from type material (Fig. 235 inset). Length 0.9–1.0 mm, width 0.3–0.36 mm. Elongate and heavily sclerotised except for membranous pygidium: length 0.09–0.11 mm, width 0.12–0.13 mm, with median lobes, 2 pairs of marginal macroducts and 3 pairs of gland spines plus 2 pairs of marginal setae. Note, the area outlined as pygidium in Fig. 235 is the area remaining membranous in the pupillarium.

2nd-instar female nymph, measurements taken from 3 specimens (Fig. 235). Body shape similar to female, length 0.56–0.92 mm, width 0.21–0.31 mm; with 1 pair of lobes similar to female, serrate or notched; pygidium margin with long and medium pairs of setae similar to female, longest about 15 μ m long; gland spines broad, pointed, 1 pair small and lateral to L1, then 6 large pairs on abdominal margins, posterior 3 pairs each with a fine microduct, anterior 4 pairs each with a more robust microduct; with 4 pairs of large marginal macroducts.

Dorsal ducts absent. Anal opening about 7 μ m long as wide and 65 μ m from posterior margin.

Venter. Microducts few, on submargin and submedian abdomen near each spiracle, and on head. Antenna with 1 seta. Anterior spiracles each with 1 or 2 trilocular pores, pores absent by posterior spiracles.

2nd-instar male nymph, measurements taken from 11 specimens (Fig. 236). Body shape pyriform, widest at metathorax-abdomen I, abdomen rounded and somewhat truncate at pygidium; body length 0.34–0.6 mm, width 0.23–0.35 mm. Without normal lobes, instead, medial space occupied by about 4 irregular projections and a row of 4 minute setae, with 1 pair of longer setae laterally; pygidium

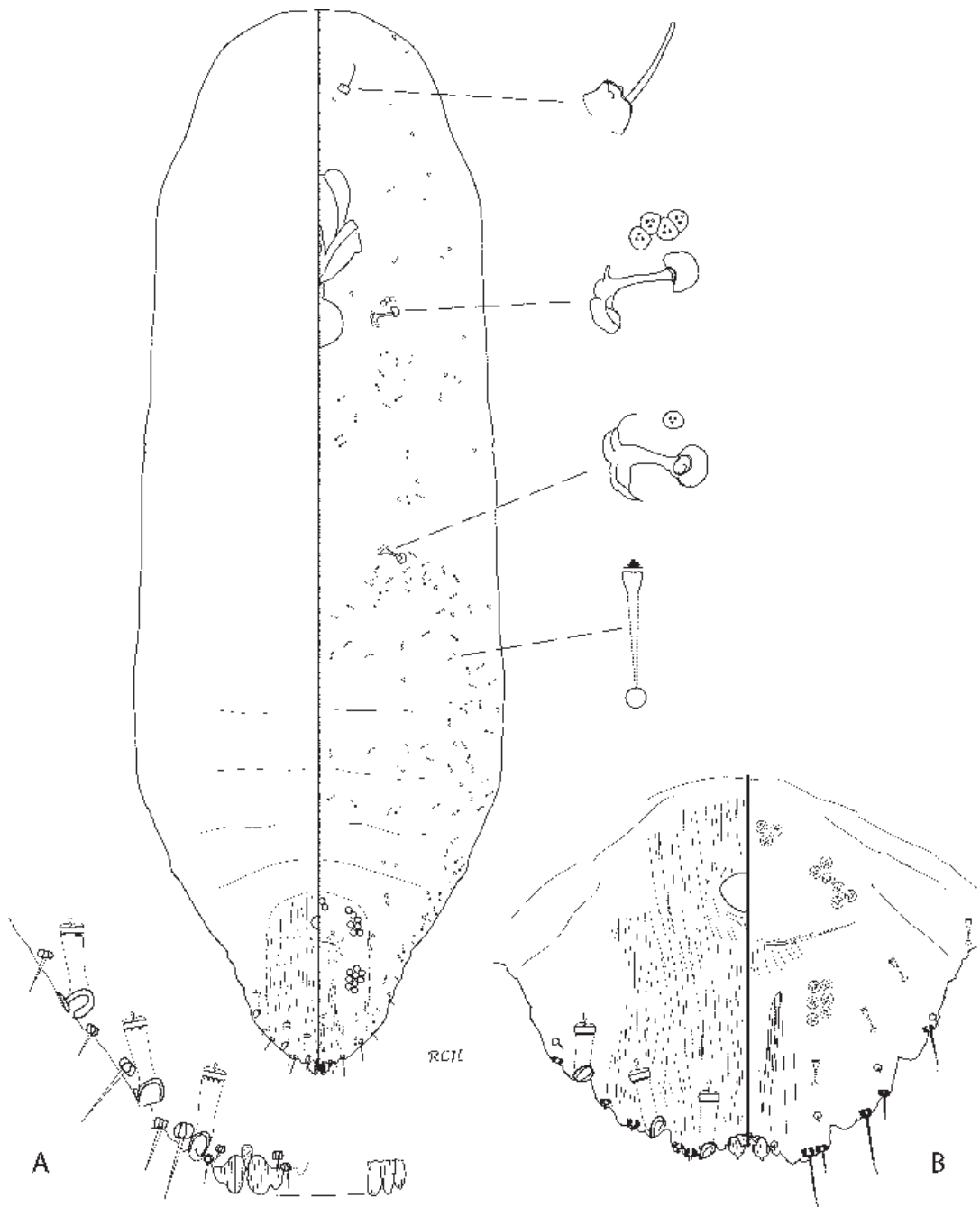


Fig. 234 *Trulliflorinia acaciae* (Maskell), adult female; A, N.Z. form; B, Maskell type (Australian) form.

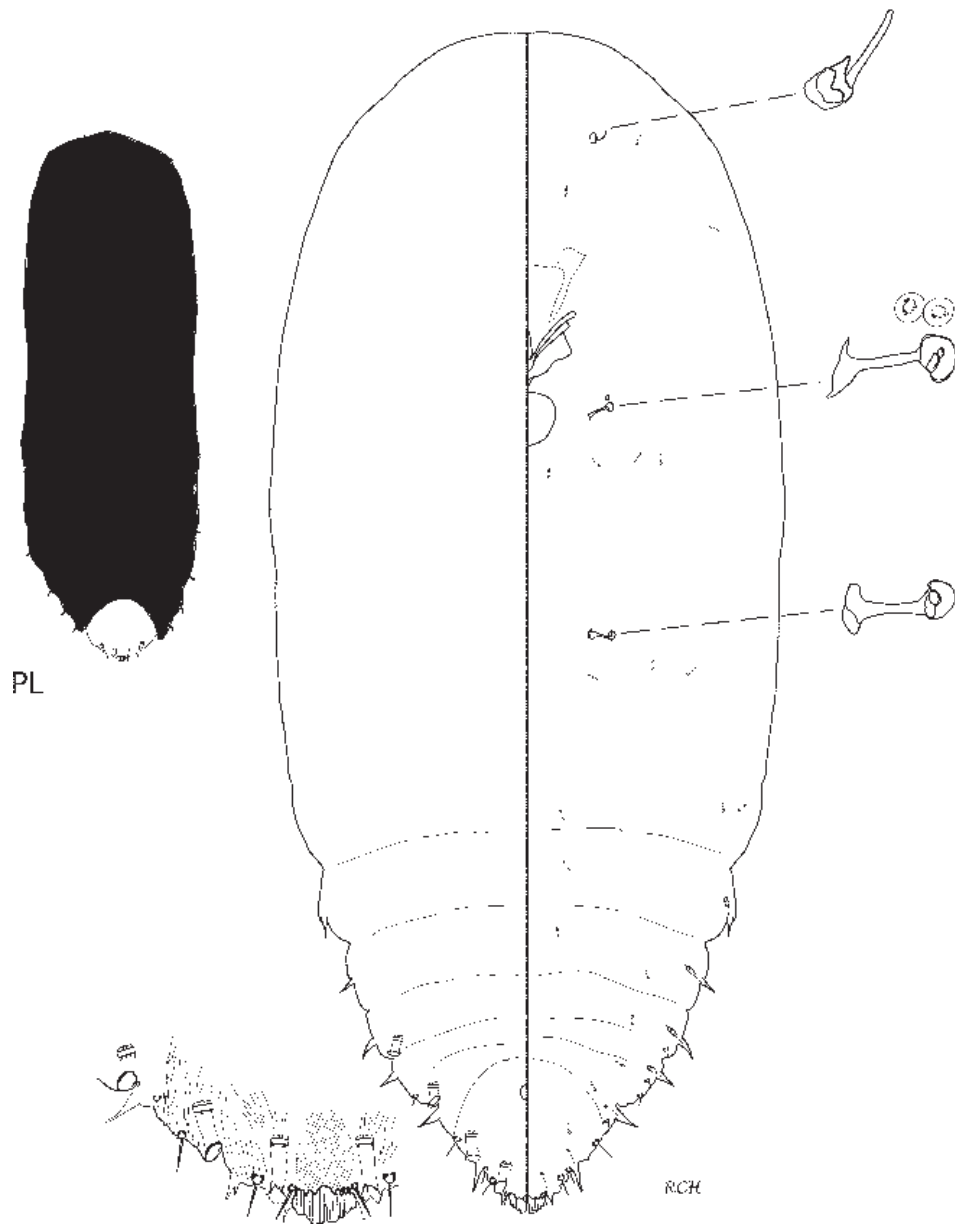


Fig. 235 *Trulliflorinia acaciae* (Maskell), 2nd-instar female nymph; inset pupillarium.

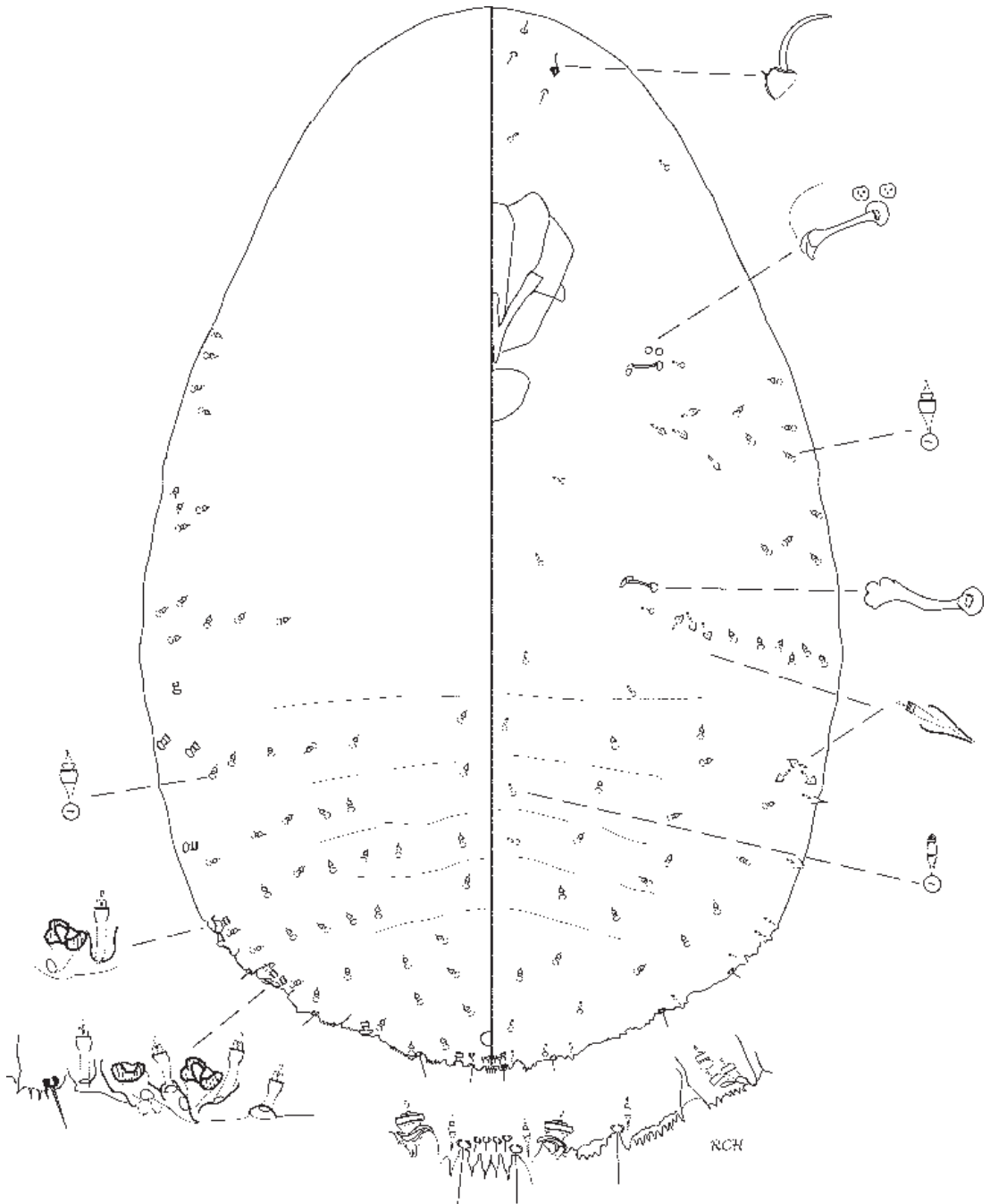


Fig. 236 *Trulliflorinia acaciae* (Maskell), 2nd-instar male nymph.

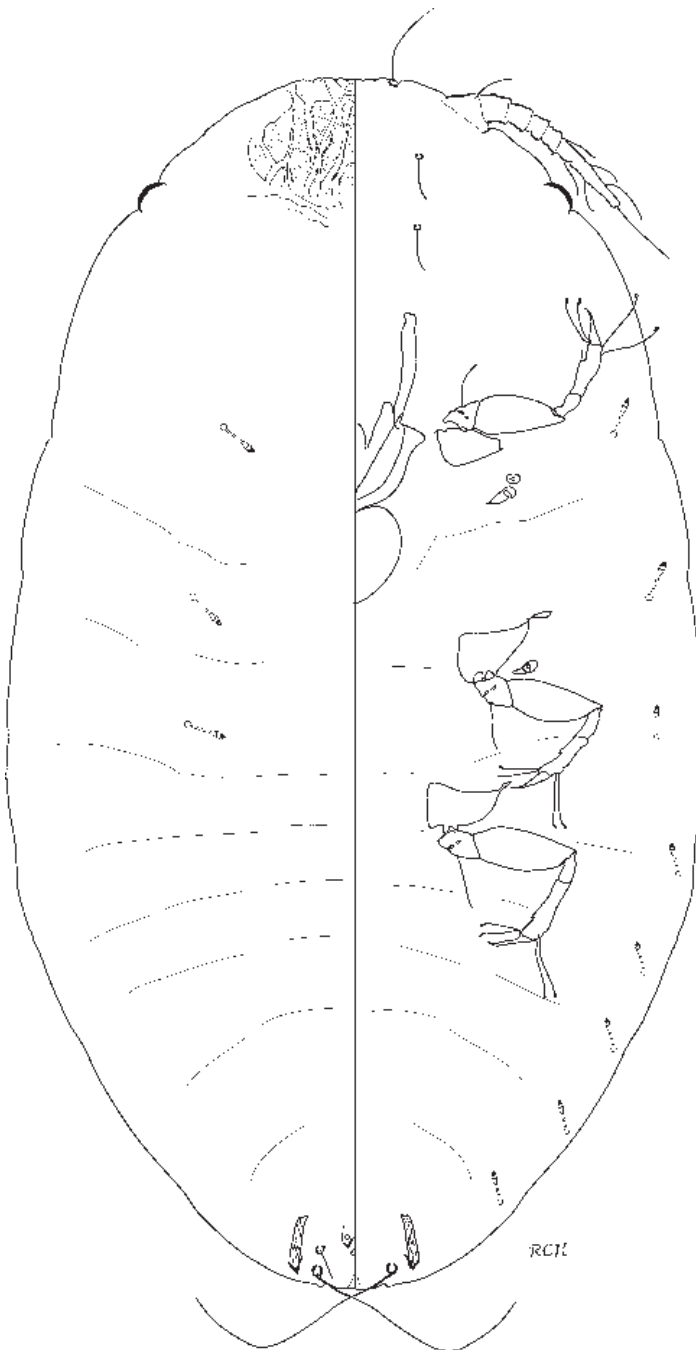


Fig. 237 *Trulliflorinia acaciae* (Maskell), 1st-instar nymph.

margin incised into blocks with serrate margins. With 5 or 6 pairs of marginal macroducts of peculiar shape, apparently the so-called ‘frame ducts’ of Howell (1980), they appear to be heavily sclerotised and squashed dorsally in slide-mounted specimens, these ducts present either singly each side or 2 together and grouped with smaller ducts that are slightly ventral on the margin, thus 1 small duct with each single macroduct and 3 small ducts with each 2 macroducts, the marginal openings of each group sclerotised.

Other dorsal ducts of 2 sizes, a few present on submargins of prepygidium slightly larger than the numerous ducts arranged in rows across the abdomen, and grouped on submargins of thorax, these wrapping round onto ventral margins. Anal opening about 9 μm long as wide and 30 μm from posterior margin.

Ventral ducts similar to dorsal ducts, slightly less numerous on abdomen, and also present in submarginal groups on thorax; microducts less numerous than on female nymph; gland tubercles present on submargin of prepygidium and in groups near each spiracle. Anterior spiracles each with 2 trilocular pores. Antenna with 1 seta. With 3 pairs of moderately long setae on head between antennae and towards frontal margin.

1st-instar nymph, measurements taken from 4 specimens (Fig. 237). Body shape oval, length 0.28–0.37 mm, width 0.17–0.24 mm, derm membranous at first, then sclerotisation starting on head and eventually dorsum becoming sclerotised in an overall pattern of dark brown with a lighter brown longitudinal median band and segmental dashed lines, with an unsclerotised transverse band between the thorax and abdomen. Pygidium with 1 pair of slender lobes with basal scleroses, not extending beyond margin; gland spines absent; microducts absent from medial space. With 3 pairs of dorsal microducts submedially on thorax, and with 8 pairs of ventral microducts distributed submarginally on abdomen and thorax. Antennae 6-segmented, 52–57 μm long, with 1 long apical seta, apical segment not annulated. With 3 pairs of long setae on head between antennae and towards frontal margin. Dorsal cephalic ducts absent.

Australian material. Adult female, measurements taken from 7 specimens, all part of Maskell’s dry collection of *Fiorinia acaciae*. Body membranous except for pygidium, shape fusiform, lateral abdominal lobes not developed, pygidium narrow then truncate at apex with pairs of long (17–20 μm) and medium length (10–12 μm) setae on pygidium margin (many of these broken off short on the type material). Body length 0.49–0.6 mm, width 0.28–0.3 mm. With 1 pair of yoked lobes, recessed in a median concavity of pygidium margin, each lobe round, thorn-like with an apical point. Gland spines and plates absent. 3 pairs of marginal macroducts about 22 μm long and 7 μm wide.

Dorsal ducts absent. Anal opening 10–15 μm long as wide, positioned 77–90 μm from posterior margin.

Venter. Gland tubercles absent. Microducts of 1 size, in pairs on pygidium segments, numerous in a band on submargin of abdomen, and across meso- and metathorax, distribution more scattered on submedian abdomen and prothorax, (overall slightly less numerous than on New Zealand material). Antenna with 1 seta. Anterior spiracles each with a group of 1–3 trilocular pores; pores absent by posterior spiracles. Total of 22–31 perivulvar pores in 5 small discrete groups. Vulva positioned 67–100 μm from posterior margin.

Type material examined. LECTOTYPE female, here designated to preserve nomenclatural stability: AUSTRALIA, on an original slide labelled “*Fiorinia acaciae*, adult female, Australia, 1890, W.M.M.”, [1]: 1 F, uncleared and unstained mature female, with some embryos squashed out from body. Barcode NZAC02008250 (NZAC).

Paralectotypes: (i) on 1 original slide labelled as above except “Puparia [female sign] and [male sign], [1]: female and male scale covers including their exuvia. Barcode NZAC02008253. (ii) labelled “*Fiorinia acaciae*, males, 1892, W.M.M.”, [1]: 2 M, uncleared and unstained. Barcode NZAC02008256 (NZAC) (iii) labelled “*Fiorinia acaciae* Mask., Mounted ex Maskell dried material No. 150 by W. Cottier, October 1939”, [4]: 6 F, 1 broken piece of pygidium. (iv) labelled “*Fiorinia acaciae* Maskell, from Maskell’s type material, mounted 1939 by G.F. Ferris”, [1]: 7 F, 7 fpl, 2 1st, 2 exuv1 (NZAC).

Other material examined. See Appendix A (p. 241) for details of 99 specimens examined.

Distribution. AK, BP / NN

Australia

Host plants. Fabaceae: *Paraserianthes lophantha*; Mimosaceae: *Acacia floribunda*, *Acacia verticillata*, *Acacia* sp.

Remarks. Green (1916) documented and figured the wide range of pygidium apices and lobe shapes of *T. acaciae* from collections he made in the area around Darwin. Ferris (1936) illustrated 2 of the variant shapes, one with recessed thorn-like lobes and the other with prominent, contiguous, rounded lobes. Specimens of Maskell’s material held in NZAC are all of the recessed, thorn-like lobes variant. Collections of the New Zealand naturalised population are all basically the second variant with prominent median lobes, although these may be less contiguous and sometimes apically notched as if nearly subdivided (Fig. 234). Molecular data does not support the existence of more than one species as the New Zealand *T. acaciae* is nested deep inside a cluster of Australian *T. acaciae* samples (Andersen *et al.* 2010).

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APPENDIX A. Material examined.

See main text under each species for type material examined. All records are derived from slide-mounted specimens held in NZAC as at December 2010. Slide label data given for each species are categorised under the area codes of Crosby et al. (1998), followed by the NZAC accession number, the number of slides and specimens studied, including their life stages. For example: #09-073a-e [5]: 3 F, 2 f2nd, 2 m2nd, 4 1st denotes 5 consecutive slides were made (a-e) with a total of 3 adult females, 2 2nd-instar female nymphs, 2 2nd-instar male nymphs, and 4 1st-instar nymphs. Other life stage codes are: fpl (2nd-instar female pupillarium), exuv1 (1st-exuvium), exuv2 (2nd-exuvium), pp (prepupa), p (pupa), M (adult male). Site on host plant omitted if "leaf", "leaves" or not recorded.

Abgrallaspis cyanophylli (Signoret) total 37 (30 F, 7 exuv2)

North Island. AK: Auckland, cactus [*Howorthia filifeva*], 21 May 1953, Hewitt, [1]: 2 F. Auckland, Tamaki Campus, Landcare Research, *Consolea rubescens*, 23 Apr 2009, RC Henderson, #09-099a-c, [3]: 3 F. Auckland, Tamaki Campus, Landcare Research, *Consolea rubescens*, 2 July 2009, RC Henderson, #09-305, [1]: 4 F. West Auckland, Hobsonville, palm, 8 Jul 1981, B Hill, #81-197, [1]: 2 F. **South Island. NN:** Nelson, Cactus, 13 Jun 1969, JA de Boer, #544, [1]: 6 F, 2 exuv2. Nelson, Cactus, 17 Aug 1969, JA de Boer, #548, [2]: 10 F, 5 exuv2. Ruby Bay, *Opuntia* sp., 22 Apr 1973, EW Valentine, #1005: 2 F. Motueka, Cactus, 14 Aug 1934, G Brittin, [1]: 1 F.

Anoplaspis maskelli Morrison total 125 (17 1st, 2 2ndf, 58 F, 17 2ndm, 5 pp, 2 p, 12 exuv1, 12 exuv2)

North Island. AK: Auckland, Manurewa, Olive Davis S.R., *Metrosideros diffusa*, underside leaf by petiole, 3 Oct 2002, RC Henderson, #02-225a-b, [2]: 1 F, 4 1st, 1 exuv2. Hunua Ra, Massey Track, *Metrosideros* sp. [rata], 6 Feb 2005, RC Henderson, #05-111a-b: 2 f2nd, 8 m2nd. North Shore, Chatswood Reserve, *Metrosideros perforata*, 27 Mar 2005, NA Martin, #05-153, [1]: 4 F. South Auckland, Mt William, main track, *Metrosideros perforata*, leaves by petiole, 1 Jan 2002, NA Martin, #02-003a-b, [2]: 1 F, 4 m2nd, 2 p. Waitakere Ra, Fairy Falls Track, *Metrosideros perforata*, 10 Aug 2003, RC Henderson, #03-123a-c, [3]: 5 F, 3 exuv1, 2 exuv2. Waitakere Ra, Huia, *Metrosideros diffusa*, 1 Nov 1973, JA de Boer, #1093: 1 F. Wellsford, Logues Bush, Tomarata Valley Rd & Day Rd, *Metrosideros diffusa*, 29 Jul 2001, NA Martin, #01-175, [1]: 2 F. Whitford, Waikopua Road, Claude Strm Valley, *Metrosideros fulgens*, leaves & petioles, 21 May 2005, RC Henderson, #05-191, [1]: 3 F. **WO:** Raglan, *Metrosideros* sp. [rata], 19 Oct 1981, CF Butcher, #81-282g, [2]: 9 F. Raglan, Bridal Veil Falls, *Metrosideros* sp [rata], 19 Sep 1981, CF Butcher, #81-282c, [1]: 1 F. Raglan, Bridal Veil Falls, by top, *Metrosideros* sp. [rata], upperside leaves, 14 May 2000, RC Henderson, #00-094a-

b, [2]: 2 F. **HB:** Kaweka Ra [South], Blowhard Bush, *Metrosideros* sp. [rata], 7 Nov 2002, RC Henderson, #03-122a-c, [3]: 5 m2nd, 5 pp, 4 exuv1. **WN:** Wellington, *Metrosideros* sp. [rata], G Brittin, #129, [1]: 1 F. Wellington, *Metrosideros fulgens*, 30 Jun 1917, G Brittin, #129, [1]: 1 F. **South Island. SD:** D'Urville I, *Metrosideros perforata*, 16 Feb 1971, JA de Boer, #697, [1]: 4 F, 1 exuv1, 4 exuv2. **NN:** Karamea, Heaphy Track, *Metrosideros perforata*, underside leaves, 8 Dec 2005, K Affeld, #05-324, [1]: 2 F. Nelson, Maitai R Valley, *Metrosideros colensoi*, 19 Dec 1967, JA de Boer, #306, [1]: 1 F, 1 1st, 1 exuv2. Wairoa R, *Metrosideros colensoi*, 5 Mar 1969, JA de Boer, #499, [1]: 8 F. **BR:** Buller Gorge, *Metrosideros diffusa*, 17 Mar 1971, JA de Boer, #717, [1]: 5 F, 4 exuv1, 4 exuv2. Punakaiki, Bullock Creek, *Metrosideros diffusa*, 7 Dec 2005, RC Henderson, #06-054a-c, [3]: 6 F, 1 M.

Anoplaspis metrosideri (Maskell) total 253 (16 1st, 13 2ndf, 181 F, 18 2ndm, 1 pp, 5 p, 6 exuv1, 13 exuv2)

North Island. ND: North Cape, Rangiora Bay [Maukims Nook], *Metrosideros excelsa*, 15 Jan 1980, R Sunde, #80-39e, [2]: 7 F. Poor Knights I, Tawhiti Rahi I, *Metrosideros excelsa*, 6 Dec 1980, CF Butcher, #81-134a, [3]: 5 F, 1 m2nd. **AK:** Hauraki Gulf, Noises I, Motuhoropapa I, NE face, *Metrosideros excelsa*, 2 Nov 1977, LL Deitz, #77-329e, [1]: 4 F. Hauraki Gulf, Noises I, Motuhoropapa I, North summit, *Metrosideros excelsa*, 2 Nov 1977, LL Deitz, #78-152e, [2]: 4 F. Hauraki Gulf, Noises Is, Otata I, East track, *Metrosideros excelsa*, 1 Nov 1977, LL Deitz, #78-152f, [2]: 3 F. Hauraki Gulf, Rangitoto I, *Metrosideros excelsa*, 12 Sep 1976, J Cox, 3 F. Hauraki Gulf, Rangitoto I, *Metrosideros excelsa*, 19 Dec 1990, CF Morales, #90-356: 2 F, 1 exuv2. Manukau Harbour, South Heads, Wattle Bay, *Metrosideros excelsa*, 1 Jan 2007, RC Henderson, #07-004: 2 F. West Auckland coast, Karekare, The Tunnel (Tunnel Point), *Metrosideros excelsa*, 1 May 2005, RC Henderson, #05-154a-d, [4]: 1 F, 3 f2nd, 1 m2nd, 1 exuv1, 1 p, 3 M. West Auckland coast, Karekare Beach, *Metrosideros excelsa*, 22 Oct 2000, NA Martin, #00-130, [1]: 1 F. West Auckland coast, North Piha, beach by cliffs, *Metrosideros excelsa*, 24 Apr 2000, RC Henderson, #00-079, [1]: 4 F. West Auckland coast, North Piha, beach by cliffs, *Metrosideros excelsa*, upperside 24 July 2005, GL & RC Henderson, #05-203a-k, [11]: 12F, 3 f2nd, 16 m2nd, 1 pp, 2 p, 2 1st, 1 M, 1 exuv1. **CL:** Coromandels, Colville Hill, *Metrosideros robusta*, 4 Aug 1957, JM Hoy, [1]: 8 F. **BP:** Lottin Point, Otanga, *Metrosideros excelsa*, 3 Nov 1993, RC Henderson & KL Senner, #93-352 [1]: 2 F, 1 M. **RI:** Pohangina V, Totara Reserve, *Metrosideros* sp. [rata], 7 Apr 1955, [JM Hoy], [2]: 11 F, 2 p, 2 M. **South Island. NN:** Karamea, Heaphy Track, *Metrosideros robusta*, both sides leaves, 8 Dec 2005, GL & RC Henderson, #06-055, [1]: 5 F. Motueka, Sth of Takaka Hill, *Metrosideros* sp. [rata], 6 Jul 1960, N Stewart, [4]: 6 F, 1 f2nd. Motueka, Takaka Road, *Metrosideros* sp. [rata], 8 Feb 1920, G Brittin, #143, [2]: 2 F. Nelson, Mt Peel, *Metrosideros umbellata*, 2 Nov 1966, P Wardle, #188, [2]: 5 F. Takaka Hill, *Metrosideros umbellata*, 20 Oct 1969, JA de Boer, #565, [1]: 4 F, 4 f2nd, 3 exuv2. **BR:** Paparoa Ra, nr Blackball, *Metrosideros* sp. [rata], 31 Dec 1942, E Smellie, [4]: 8 F. Punakaiki, Bullock Creek, litter, Rata 4, 13 Jan 2005, K Affeld, #06-075 [1]: 1 1st. Reefton, Mawhera S.F., *Metrosideros umbellata*, 19 Apr 1972, JA de Boer, #851 [1]:

3 F. **WD:** Cascade, Teer Plateau, *Metrosideros umbellata*, 23 Aug 2000, B Brown, #00-121a-b, [2]: 3 F, 4 exuv1, 3 exuv2. Fox Glacier, Cook Saddle, *Metrosideros* sp. [rata], [no date], [JM Hoy], [1]: 4 F, 1 exuv2. Franz Josef, Fanz Josef Glacier, *Metrosideros* sp. [rata], [no date], [JM Hoy], [1]: 4 F, 1 f2nd, 1 exuv2. **DN:** Dunedin, *Metrosideros* sp. [rata], 22 Sep 1942, WG Crawford, [2]: 4 F. Dunedin, St Clair Golf Course, *Metrosideros* sp. [rata], both sides leaves, 12 Jan 2009, RF Thum, #09-007a-c, [3]: 2 F, 13 1st. **OL:** Lake Wanaka, *Metrosideros* sp. [rata], 17 May 1950, TN Flint, [2]: 5 F. **FD/OL:** L Te Anau, L Te Anau, *Metrosideros* sp. [rata], May 1961, WM Hamilton, [5]: 10 F. L Te Anau, L Te Anau, *Metrosideros umbellata*, 21 Aug 1970, MJ Gardiner, #637, [1]: 3 F, 2 exuv2. **FD:** Breaksea Sound, Breaksea I, *Metrosideros umbellata*, 29 Jan 1996, RC Henderson, #96-076 [1]: 3 F. Breaksea Sound, Gilbert Island No 6, *Metrosideros* sp. [rata], 25 May 1982, CF Butcher, #82-175d, [2]: 3 F. Dusky Sound, Resolution I, Disappointment Cove, *Metrosideros* sp. [rata], 22 May 1982, CF Butcher, #83-342b. [2]: 4 F. Dusky Sound, Seal I, *Metrosideros umbellata*, 6 Mar 1983, CF Butcher, #83-332c, [1]: 2 F. Te Wae Wae Bay, Rowallan, *Metrosideros* sp. [rata], 10 Oct 1955, NZ Forest Service, [1]: 5 F, 2 M. **SL:** Southland, Longwood, S.F. 10, *Metrosideros robusta*, 29 Jun 1956, Forest Research Institute, [1]: 23 F, 1 f2nd. **SI:** Stewart I, NE Big South Cape I, *Metrosideros* sp. [rata], 11 Feb 1969, BA Kuschel, #505, [1]: 4 F, 2 exuv2.

Anzaspis angusta (Green) total 141 (13 1st, 8 2ndf, 114 F, 6 exuv1, 8 exuv2)

AUS: Australia, ex Maskell's dry material, *Chionaspis eugeniae* #177, *Leptospermum laevigatum*, WM Maskell, 1 F.

North Island. AK: Auckland, Mt Albert, New North Rd, *Callistemon* sp., 9 Jun 2000, RC Henderson, #00-100a-d, [4]: 15 F, 3 exuv1, 3 exuv2. Auckland, Mt Albert, New North Rd cnr Lloyd Ave, *Callistemon* sp., 31 Aug 2000, RC Henderson, #00-118a-i: 17 F, 7 f2nd, 12 1st, 3 exuv1, 1 exuv2. **GB:** Te Araroa, Paoneone, *Kunzea ericoides*, underside leaves, 4 Nov 1993, RC Henderson, #00-070c-d, [2]: 2 F. Te Araroa, Paoneone, *Kunzea ericoides*, underside leaves, 15 Mar 1994, RC Henderson, #00-069a-d, [4]: 12 F. **WN:** Palmerston North, Aokautere Rd, *Kunzea ericoides*, 13 Jun 1956, JM Hoy, [2]: ~24 F. **South Island. NN:** Gardens Valley, *Kunzea ericoides*, 19 Dec 1968, JA de Boer, #469, [1]: 7 F1. Nelson, *Kunzea ericoides*, 29 Sep 1968, EW Valentine, #440, [1]: 5 F, 2 exuv2. **MB:** Blenheim, Onamalutu River, Onamalutu Reserve [Domain], *Myrsine* sp., 21 Feb 1983, CF Butcher, #83-320f, [1]: 1 F. **NC:** Waipara, *Leptospermum* sp., 1915, G Brittin, [1]: 1 F. **MC:** Christchurch, Chaney's [Corner], *Leptospermum scoparium*, 20 Feb 1915, G Brittin, [1]: 1 F. Banks Peninsula, Menzies Bay, *Kunzea ericoides*, 16 Jan 1994, RC Henderson, #99-017, [1]: 5 F. **DN:** Dunedin, *Callistemon* sp., 3 Aug 1958, K Prior, [3]: 7 F. **OL:** L Wanaka, Glendhu Bay, *Leptospermum scoparium*, 19 Aug 1948, TG Sewell, [4]: 4 F. L Wanaka, Glendhu Bay, *Kunzea ericoides*, 19 Aug 1948, TG Sewell, #83, [2]: 2 F. L Wanaka, Mt Burke, *Leptospermum scoparium*, 19 Aug 1948, TG Sewell, #82, [2]: 1 F, 1 exuv2. L Wanaka, Mt Burke, *Kunzea ericoides*, 19 Aug 1948, TG Sewell, #81, [2]: 1 F, 1 exuv2. **FD/SL:** Manapouri, Nth of Manapouri, *Leptospermum scoparium*, 16 Sep 2004, G Hill, M Gutsell & H Edmonds, #04-201, [1]: 4 F, 1 f2nd, 1 1st.

Anzaspis cordylinididis (Maskell) total 352 (14 1st, 28 2ndf, 124 F, 17 2ndm, 2 pp, 8 p, 78 exuv1, 81 exuv2)

North Island. AK: Auckland, palm, 31 May 1923, JG Myers, #31: 1 F. Auckland, Mt Albert Research Centre, *Cordylina obtecta*, 3 Dec 1991, RC Henderson, #91-343a-c, [3]: 4 F, 3 f2nd. Dairy Flat, *Cordylina australis*, 9 Feb 1990, JS Dugdale & G Robertson, #90-046a-b, [2]: 7 F. Hunua Ra, Massey Track, *Freycinetia banksii*, underside leaf, 6 Feb 2005, RC Henderson, #05-129, [1]: 1 F, 2 f2nd, 1 1st. Waitakere Ra, Destruction Gully Track, *Cordylina banksii*, underside leaves, 4 Sep 1999, RC Henderson, #00-050, [1]: 2 F. Waitakere Ra, Huia, *Freycinetia banksii*, 30 Aug 1977, LL Deitz, #77-251c, [1]: 2 F. Waitakere Ra, Twin Peaks Track, *Freycinetia banksii*, 25 Apr 2001, NA Martin, #01-046a-c: 2 F, 5 exuv1, 5 exuv2. Waitakere Ra, Walker Bush Track, *Freycinetia banksii*, 5 Nov 1976, MF Tocker, #76-316e, [1]: 1 F. Warkworth, Avic Miller S.R., *Rhopalostylis sapida*, 15 Sep 1999, RC Henderson, #99-132, [1]: 4 F, 1 p. West Auckland coast, Muriwai, Houghtons Bush, *Rhopalostylis sapida*, 16 Aug 2003, RC Henderson, #03-109, [1]: 3 F, 3 exuv2. West Auckland coast, North Piha, Laird Thomson Track, *Uncinia* sp., 9 Aug 2003, RC Henderson, #03-086a-j, [10]: 10 F, 17 f2nd, 13 m2nd, 1 1st, 9 exuv1, 7 exuv2, 5 p, 1 M. West Auckland coast, North Piha, Laird Thomson Track, *Uncinia* sp., 9 Aug 2003, RC Henderson, #10-016a-c, [3]: 2 F, 5 exuv1, 4 exuv2. West Auckland coast, North Piha, Laird Thomson Track, *Phormium tenax*, 26 Jan 2004, NA Martin, #04-026a-d, [4]: 4 F, 3 1st, 9 exuv1, 7 exuv2. West Auckland coast, North Piha, Laird Thomson Track, *Phormium tenax*, 11 July 2004, RC Henderson, #04-118, [1]: 6 F, 1 m2nd. West Auckland coast, North Piha, Laird Thomson Track, *Uncinia* sp., 11 July 2004, RC Henderson, #04-119a-c, [3]: 10 F, 2 f2nd, 2 m2nd, 2 exuv2, 1 M. **GB:** Te Araroa, Kakanui, coastal cliff, *Uncinia* sp., 22 Sep 1992, RC Henderson, #92-325a-b, [2]: 2 F, 1 f2nd, 2 pp, 1 M. Te Araroa, Kakanui, coastal cliff, *Uncinia* sp., 1 Feb 1993, RC Henderson, #93-257a-d, [4]: 6 F, 2 p, 6 exuv1, 3 exuv2. **HB:** Elsthorpe S.R., *Cordylina australis*, 6 Nov 2002, RC Henderson, #07-138a-d, [4]: 3 F, 1 f2nd, 7 exuv1, 4 exuv2. **TO:** National Park, Erua Forest, Fisher Track, *Cordylina indivisa*, both sides leaves, 9 Dec 2005, NA Martin, #06-060a-c, [3]: 2 F, 7 exuv1, 6 exuv2. **WN:** Lower Hutt, *Cordylina fruticosa*, 20 Jan 2009, BJ Rogan, #09-013, [1]: 1 F. Makara Beach, 1 km south, coastal cliffs, *Phormium cookianum*, 11 Oct 1995, P Simpson, #95-097a-c, [3]: 4 F, 1 f2nd, 1 m2nd, 9 exuv1, 1 exuv2. **South Island. NN:** Motueka, Umukuri, *Carex* sp., 7 Apr 1918, G Brittin, #61, [1]: 1 F. **MC:** Christchurch, Riccarton Road [upper], *Cordylina australis*, 2 Nov 2005, NA Martin, #05-245a-c, [3]: 6 F, 3 f2nd, 5 exuv1, 4 exuv2. **DN:** Ardgowan, *Cordylina australis*, 15 Oct 1912, G Brittin, #23, [2]: 2 F. Dunedin, *Phormium tenax*, 18 Sep 1939, JW Woodcock, [2]: 5 F. Dunedin, *Phormium tenax*, 27 Sep 1951, RC Campbell, [3]: 5 F, 2 exuv1. Oamaru, *Cordylina australis*, 12 Nov 1912, G Brittin, #23, [1]: 9 1st. **WD:** Ships Cove, Tauperikaka Point, *Phormium* sp.[?], 9 Jan 1998, CJ Hodgson, #02-182a-e, [5]: 7 F, 9 exuv1, 9 exuv2.

Anzaspis gahniae Henderson n. sp. total 153 (5 1st, 4 2ndf, 65 F, 13 2ndm, 1 pp, 2 p, 39 exuv1, 22 exuv2)

North Island. ND: Tutukaka, *Gahnia* sp., 25 Oct 1992, RC Henderson, #92-303, [1]: 2 F1. **AK:** Waitakere Ra, Huia,

Gahnia lacera, 1 Nov 1973, JA de Boer, #1089, [1]: 2 F. Waitakere Ra, Parau Track, *Gahnia lacera*, underside leaves, 10 Aug 2003, RC Henderson, #03-088a-c, [3]: 2 F, 1 f2nd, 3 exuv1, 2 exuv2. Wellsford, Logues Bush, Tomarata V Rd & Day Rd, *Gahnia* sp., 15 Sep 1999, RC Henderson, #99-140, [1]: 2 F. West Auckland coast, Bethells, Matuku Reserve, *Gahnia* sp., 18 Oct 1992, RC Henderson, #92-292a-b, [2]: 5 F. West Auckland coast, Bethells, Matuku Reserve, *Gahnia* sp., underside leaves, 4 Mar 2010, NA Martin, #10-060a-b, [2]: 7 F, 1 1st, 3 exuv1, 2 exuv2. West Auckland coast, Muriwai, Houghtons Bush, *Gahnia lacera*, underside leaves, 16 Aug 2003, RC Henderson, #03-111a-k, [11]: 8 F, 7 f2nd, 2 m2nd, 2 1st, 8 exuv1, 2 p, 2 M. West Auckland coast, Piha, *Gahnia* sp., underside leaves, 22 Mar 2009, RC Henderson, #09-078, [1]: 2 F. Whitford, Waikopua Road, Claude Strm Valley, *Gahnia pauciflora*, underside leaves, 21 May 2005, RC Henderson, #05-189a-b, [2]: 3 F, 2 exuv1, 2 exuv2. **BP**: East Cape, Rereauria Swamp, beech ridge, *Gahnia* sp., 26 Jan 1993, RC Henderson, #93-261a-g, [7]: 8 F, 2 f2nd, 9 m2nd, 2 1st, 6 exuv1, 1 exuv2, 3 p, 7 M. East Cape, Rereauria Swamp, beech ridge, *Gahnia lacera*, 29 Jan 1993, RC Henderson, #93-262a-b, [2]: 3 F, 1 f2nd, 2 1st, 4 exuv1. Hicks Bay, Te Koau, *Gahnia lacera*, 23 Sep 1992, RC Henderson, #92-248a-e, [5]: 8 F, 2 exuv1, 4 exuv2, 3 M. Hicks Bay, Te Koau, *Gahnia procera*, 13 Mar 1993, JS Dugdale, #93-260a-e, [5]: 6 F, 1 m2nd, 8 exuv1, 5 exuv2, 1 pp, 1 M. Karangahake Gorge, Karangahake Gorge Walkway, *Gahnia lacera*, underside leaves, 15 Apr 2000, RC Henderson, #00-077a-b, [2]: 1 F, 5 exuv1, 3 exuv2. Lottin Point, Otanga, *Gahnia lacera*, 27 Jan 1993, RC Henderson, #93-259a-c: 4 F, 3 m2nd, 1 p, 4 exuv1, 1 exuv2. **South Island. BR**: Charleston, Charleston- Addison Flat, *Gahnia* sp., 7 Nov 1972, JA de Boer, #941, [1]: 5 F.

Aonidiella aurantii (Maskell) total 152 (3 1st, 10 2ndf, 136 F, 3 exuv2)

North Island. ND: Opononi, *Vitex lucens*, Sep 1964, WM Hamilton, [1]: 9 F. Te Hapua, Mary Noho's orchard, *Citrus paradisi*, 3 Dec 1977, LL Deitz & AK Walker, #343g, [2]: 4 F. **AK**: Auckland, *Citrus sinensis*, 4 Oct 1938, G Brittin, #25, [1]: 4 F, 2 exuv2. Auckland, *Citrus grandis*, 7 Aug 1975, #3810, [1]: 2 F. Auckland, Avondale, *Cyripedium* sp., 21 May 1952, F Wilkin, [4]: 7 F. Auckland, Mt Albert, *Citrus limon*, 24 Apr 1938, D.S., [10]: 11 F, 1 M. Auckland, Mt Eden, *Citrus* sp., 22 Nov 1993, JG Charles, #93-328, [1]: 2 F. Auckland, Oratia, *Citrus limon*, 19 May 1959, AM Richards, [3]: 3 F. Auckland, Oratia, *Citrus grandis*, 8 Oct 1973, EW Valentine, #1081, [1]: 3 F, 2 f2nd, 2 m2nd. Auckland, Oratia Research Orchard, *Citrus x tangelo*, fruit, 5 Oct 1977, MK York, #77-280a-b, [2]: 5 F. Auckland, Otahuhu, *Citrus limon*, 28 Jun 1979, J Crumme, #8043, [1]: 1 F. West Auckland, Huapai, *Citrus grandis*, 27 Apr 1970, #377, 2]: 3 F, 2 f2nd, 2 1st. **BP**: Tauranga, *Citrus* sp., Nov 1934, AR Grainger, [2]: 8 F. Tauranga, Cambridge Rd, *Actinidia deliciosa*, fruit, 18 Apr 1978, I Craig, #78-146b, [1]: 1 F. Te Puke, *Citrus sinensis*, 25 Jun 1960, Dept of Agriculture, [1]: 2 F. Te Puke, *Citrus sinensis*, 8 Jul 1969, Dept of Agriculture, [1]: 3 F. Te Puke, *Citrus* sp., 7 Dec 1982, U Gerson, #83-06a, [1]: 2 F. Te Puke, *Citrus* sp., 9 Nov 1982, U Gerson, #83-293d, [1]: 1 F. **GB**: Gisborne, *Citrus limon*, 16 May 1933, P Everett, [4]: 12 F. Gisborne, Gisborne, *Salix X reichardtii*, 6 Sep 1972, HS Gardiner, #1607, [1]: 9 F. Gisborne, *Salix humboldtiana*, 7

Oct 1982, U Gerson, #82-293a, [3]: 8 F. Gisborne, *Salix humboldtiana*, 8 Mar 1984, D Steven, #84-085b, [1]: 1 F. Gisborne, Manutuke, *Malus domestica*, calyx end of apple fruit, 27 Apr 1972, HS Gardiner, #1466, [1]: 1 1st. **HB**: Hastings, *Citrus* sp., 2 Sep 1987, B Harris, [3]: 4 F, 2 f2nd. **WI**: Palmerston North, *Citrus limon*, 15 Jul 1960, Dept. of Agriculture, [2]: 5 F. **South Island. NN**: Nelson, *Citrus limon*, May 1969, JA de Boer, #542, [1]: 2 F, 1 f2nd. Nelson, *Citrus limon*, 10 Dec 1975, P Raaijen, [3]: 4 F, 2 f2nd. Nelson, *Citrus limon*, Nov 1975, P Raaijen, [1]: 1 F. **DN**: Oamaru, *Citrus reticulata*, 5 Jul 1913, G Brittin, #25, [2]: 1 F, 1 exuv2

Aspidioides corokiae (Maskell) total 53 (4 2ndf, 48 F, 3 exuv1, 3 exuv2)

South Island. NN: Cobb V, L Sylvester, *Coprosma cheesemani*, 29 Apr 1969, JS Dugdale, #522, [1]: 6 F, 1 f2nd, 2 exuv1, 1 exuv2. **NC**: Waipara, *Hebe* sp., 18 Jul 1915, G Brittin, #70, [1]: 1 F. **MC**: Cass, *Pimelea* sp., 3 Apr 1957, CJ Burrows, [2]: 15 F. Springfield, *Hebe* sp., 27 Dec 1914, G Brittin, #70, [1]: 1 F. **MK**: McKenzie Basin, between L Pukaki - L Tekapo, *Pimelea prostrata*, 22 Mar 1960, C Vucetich, [3]: 6 F.

Aspidiotus nerii Bouché total 569 (2 1st, 30 2ndf, 506 F, 6 2ndm, 2 pp, 4 p, 8 exuv1, 11 exuv2)

North Island. ND: Kerikeri, Kwan Holdings, citrus orchard, *Ulex europaeus*, bark, 26 Nov 2002, LE Jamieson, #02-308, [1]: 1 F. Opononi, *Vitex lucens*, Sep 1964, WM Hamilton, [1]: 3 F. Poor Knights I, Tawhiti Rahi I, *Dysoxylum spectabile*, 2 Dec 1980, CF Butcher, #81-50c, [2]: 3 F. Waimate North, *Hakea* sp., 2 Sep 2005, C Inglis, #06-121, [1]: 1 F, 1 f2nd. Waipoua, Prof. WR McGregor Reserve, *Aristotelia serrata*, bark, 26 Nov 2002, RC Henderson & KJ Froud, #02-311, [1]: 1 F. Waipoua, Prof. WR McGregor Reserve, *Rhopaloslylis sapida*, underside leaves, 26 Nov 2002, RC Henderson, #02-326, [1]: 2 F. Whangaroa, *Corynocarpus laevigatus*, 12 Sep 1960, RA Cumber, #1606, [1]: 1 F. **AK**: Auckland, *Vitex lucens*, 0 Mar 1940, D Spiller, [2]: 4 F. Auckland, *Vitis* sp., 27 May 1945, W Cottier, [6]: 6 F. Auckland, *Diospyros kaki*, 29 Apr 1949, A Farmer, [2]: 2 F. Auckland, *Ribes nigrum*, Jul 1949, B Farmer, [1]: 3 F. Auckland, *Diospyros kaki*, 14 Jun 1950, A Farmer, [3]: 3 F. Auckland, *Phoenix canariensis*, 4 Sep 1950, Wilkin, [2]: 2 F. Auckland, *Vitis vinifera*, 27 Mar 1951, W Cottier, [1]: 2 F. Auckland, *Cymbidium* sp., 28 Jun 1965, Dept of Agriculture, [2]: 3 F, 2 f2nd. Auckland, *Aucuba japonica*, 12 Jul 1977, R Cox, #77-206b, [1]: 5 F. Auckland, *Fatsia japonica*, Oct 1982, U. Gerson, #82-314c, [1]: 1 F. Auckland, cycad, 10 Oct 1991, JG Charles, #91-289, [1]: 2 F. Auckland, *Dendrobium* sp., both sides leaves, 26 Feb 2007, R Kleinpaste, #07-021, [1]: 4 F. Auckland, Auckland Airport, *Meryta sinclairii*, 15 Mar 2007, C Inglis, #07-032, [1]: 5 F. Auckland, Birkenhead, Kauri Park, *Coprosma spatulata*, 8 Oct 2002, KJ Froud & RC Henderson, #02-264, [1]: 3 F, 1 1st. Auckland, Devonport, *Cymbidium* sp., 14 Sep 1979, WS Aldridge, #6951, [1]: 1 F. Auckland, East Tamaki, *Coleonema pulchellum*, 9 Sep 2008, C Inglis, #08-424b, [1]: 1 F. Auckland, Glen Eden, *Aspidistra* sp., underside leaves, 4 Mar 1993, NA Martin, #93-069a-b, [2]: 2 F, 5 M [biparental population]. Auckland, Glen Eden, 44C Pleasant Road, *Ophiopogon japonicus*, 17 Feb 2002, FL Henderson, #02-031a-b, [2]: 8 F. Auckland, Grafton, *Corynocarpus laevigatus*, Aug 1994, A

- Flynn, #94-090, [1]: 2 F. Auckland, Henderson, Corbans Estate-Opanuku Strm, *Streblus heterophyllus*, 25 Mar 2006, RC Henderson, #06-256, [1]: 2 F. Auckland, Lynfield, Boundary Rd/MAF grounds, *Furcraea* sp., 13 Jun 1997, K Chadfield, #97-078, [1]: 2 F. Auckland, Mangere, *Vitis* sp., trunk, unsprayed, Jul 1982, A Clark, #82-200e, [4]: 13 F. Auckland, Manurewa, Olive Davis S.R., *Coprosma grandifolia*, 30 Oct 1999, RC Henderson, #00-017, [1]: 3 F. Auckland, Manurewa, Olive Davis S.R., *Dysoxylum spectabile*, 30 Oct 1999, RC Henderson, #00-014, [1]: 4 F. Auckland, Mt Albert, *Hedyscepe canterburyana*, 16 Aug 1977, AR Ferguson, #77-280a, [1]: 2 F. Auckland, Mt Albert, *Diospyros kaki*, 24 Jun 1977, LL Deitz, #79-145d, [2]: 4 F. Auckland, Mt Albert, *Streblus smithii*, stems & leaves, 14 Feb 2001, G Hall, #01-030, [1]: 2 F. Auckland, Mt Albert Research Centre, *Macadamia* sp., green nuts, 12 Oct 1979, D Steven, #79-292a, [2]: 2 F. Auckland, Mt Albert Research Centre, *Aralia* sp., 23 Mar 1983, G Grandison, #83-088d, [3]: 21 F. Auckland, Mt Albert Research Centre, *Ficus benjamina*, underside leaves, 11 Aug 1998, P Workman, #98-096, [1]: 2 F. Auckland, Mt Albert Research Centre, *Rhopalostylis baueri*, by leaf veins, 17 May 2010, NA Martin, #10-085, [1]: 1 F. Auckland, Mt Eden, *Cymbidium* sp., 11 Nov 1981, #11243, [1]: 3 F. Auckland, North Shore, evergreen iris, 1 Aug 2001, D Steven, #01-130, [1]: 1 F. Auckland, Northcote, Smiths Bush, *Dysoxylum spectabile*, underside leaf, 4 Apr 2008, NA Martin, #08-364b, [1]: 4 F. Auckland, nr Titirangi, Ian Gordon's property, *Macadamia* sp., 7 Feb 1983, LV Martin & MF Tocker, #83-042c, [2]: 7 F. Auckland, One Tree Hill, *Dysoxylum spectabile*, 1 Jun 1982, PA Maddison, #82-162b, [3]: 10 F. Auckland, Oratia, *Cymbidium* sp., 10 Mar 1988, P Workman, [2]: 2 F. Auckland, Oratia Research Orchard, *Actinidia deliciosa*, twig, 5 Oct 1978, MK York, #78-285b, [2]: 3 F. Auckland, Parnell, palm, 9 May 1982, CF Butcher, #82-132b, [1]: 2 F. Auckland, Parnell, Alberon Reserve, palm, 1 Aug 2004, RC Henderson, #04-153, [1]: 1 F. Auckland, Pollen I, *Plagianthus divaricatus*, 11 Jan 1991, G Hall, #91-016a, [1]: 2 F. Auckland, St Lukes Rd, shopping centre, *Phoenix canariensis*, 6 Sep 2000, RC Henderson, #00-122c, [1]: 2 F. Auckland, Tamaki Campus, Landcare Research, *Cordylina australis*, leaves of potted plants, 31 Jan 2005, RC Henderson, #06-122a-b, [2]: 8 F. Auckland, Tamaki Campus, Landcare Research, *Coprosma macrocarpa*, inside domatia, 8 Jun 2007, RC Henderson, #07-085, [1]: 3 F. Auckland, Te Atatu South, *Pseudopanax* sp., stem, 8 Sep 1980, MF Tocker, #80-263h, [2]: 2 F. Auckland, Titirangi, *Cucurbita* sp., fruit / butternut, 29 Jun 1979, PA Maddison, #79-198a, [4]: 16 F, 1 f2nd. Auckland, Wiri, *Buxus sempervirens*, both sides leaves, 25 Sep 2008, C Inglis, #08-436, [1]: 3 F. Dairy Flat, Durey Rd, property Froud, *Carpodetus serratus*, underside leaves, 8 Oct 2002, RC Henderson, #02-216, [1]: 1 f2nd. Hauraki Gulf, Noises I, Motuhoropapa I, SW Face, *Dysoxylum spectabile*, 2 Nov 1977, LL Deitz, #78-111c, [1]: 1 F. Hauraki Gulf, Noises Is, Maria I, *Pouteria costata*, twigs & leaves, 25 Oct 1979, MF Tocker, #79-305g, [2]: 8 F. Hauraki Gulf, Noises Is, Motuhoropapa I, *Parsonsia* sp., 18 Feb 1978, JS Dugdale, #78-102a, [2]: 4 F. Hauraki Gulf, Noises Is, Otata I, *Olearia furfuracea*, 27 Aug 1979, G Hall & C Butcher, #79-256f, [2]: 8 F. Hauraki Gulf, Noises Is, Otata I, Wainhouse's Cottage, *Phoenix canariensis*, 1 Nov 1977, LL Deitz, #77-329h, [2]: 7 F. Kaipara, Omeru S.R., Omeru Falls, *Ripogonum scandens*, 15 Sep 1999, RC Henderson, #00-056, [1]: 1 F. Silverdale, *Astelia grandis*, underside leaves, 16 May 1977, AE Esler, #77-153a, [2]: 3 F. South Auckland, Awhitu, Brook Rd, *Citrus limon*, fruit, 4 Jun 1991, C & M Henry, #91-157a-c, [3]: 3 F. Tawharanui, Takatu Pt, *Phormium tenax*, 7 Feb 1977, B Taylor, #77/35bii, [1]: 1 F. Waitakere Ra, Goodfellow Track, *Alseuosmia macrophylla*, underside leaves, 12 Mar 2006, NA Martin, #06-248, [1]: 2 F. Waitakere Ra, Huia, *Vitex lucens*, 15 Nov 1973, JA de Boer, #1104, [1]: 1 F. Waitakere Ra, Huia, Ocean View Rd, *Geniostoma* sp., 31 Oct 1980, CF Butcher, #80-311c, [1]: 1 F. Waitakere Ra, Huia Dam, *Corynocarpus laevigatus*, 26 Sep 1980, G Hall, #80-282i, [1]: 3 F. Waitakere Ra, Huia Dam, *Cordylina banksii*, 10 Aug 2003, RC Henderson, #03-096a-b, [2]: 3 F, 10 f2nd, 1 1st, 1 exuv1, 1 exuv2. Waitakere Ranges, *Dysoxylum spectabile*, Dec 1979, PA Maddison, #79-347a, [1]: 1 F. Parkworth, Avic Miller S.R., *Coprosma grandifolia*, 15 Sep 1999, RC Henderson, #99-133, [1]: 1 F. Parkworth, Avic Miller S.R., *Rhopalostylis sapida*, 15 Sep 1999, RC Henderson, #99-131, [1]: 2 F. Wellsford, Highway 16, Flexman S.R., *Corynocarpus laevigatus*, 15 Sep 1999, RC Henderson, #99-181, [1]: 2 F. Wellsford, Logues Bush, Tomarata V Rd & Day Rd, *Vitex lucens*, 15 Sep 1999, RC Henderson, #99-142, [1]: 3 F. **CL**: Coromandels, Thames, *Phoenix canariensis*, 8 Aug 1968, RA Cumber, #No. 421, [1]: 3 F. Coromandels, Tapu-Coroglen Rd, *Coprosma grandifolia*, 25 Mar 1977, LL Deitz, #77-270d, [1]: 1 F. Coromandels, Whitianga, *Macadamia* sp., twig, 1 Aug 1991, A Brickell, #91-231, [1]: 5 F. Little Barrier I, Hamilton Track, *Pseudopanax arboreus*, underside leaves, 17 Sep 1994, RC Henderson, #94-074, [1]: 2 F. Little Barrier I, Te Maraeroa, *Dysoxylum spectabile*, underside leaves, 17 Sep 1994, RC Henderson, #94-075, [1]: 2 F. Little Barrier I, Valley Track, *Rhopalostylis sapida*, 17 Sep 1994, RC Henderson, #94-072, [1]: 1 F. **WO**: Matamata, *Cymbidium* sp., 25 Aug 1981, RM Ward, #81-240, [2]: 9 F. **BP**: East Cape, Papatea [Bay], roadside opp. Callaghan's gate, *Corynocarpus laevigatus*, 15 Sep 1992, RC Henderson, #92-301b, [1]: 1 F. East Cape, Waiaroho, *Laurelia novae-zelandiae*, 29 Sep 1993, RC Henderson, #01-200, [1]: 1 F. Hicks Bay, Wharekahika R, *Dysoxylum spectabile*, 20 Sep 1992, RC Henderson, #92-268b, [1]: 4 F. Kaimai Ra, McLaren Falls, *Meliccytus ramiflorus*, trunk/bark, 24 Oct 2002, MG Hill, #02-239, [1]: 1 F. Kaimai Ra, McLaren Falls Park, entrance to Waterfall Bush Walk, *Vitex lucens*, branches, 24 Oct 2002, MG Hill & NA Mauchline, #02-240, [1]: 1 F. Opotiki, *Pouteria costata*, Jul 1973, A Lowe, #1033, [1]: 3 F. Opotiki, Torere, Torere Macadamia Nuts, *Macadamia* sp., 23 Oct 2002, KJ Froud, #02-236, [1]: 3 F. Tauranga, *Actinidia deliciosa*, twig, 1978, MK York, #78-250c, [1]: 1 F. Tauranga, *Actinidia deliciosa*, twig, 25 Jul 1979, P O'Kane, #79-220b, [1]: 1 F. Tauranga, *Macadamia* sp., in association with fungus, 23 Aug 1981, S Dawes, #81-248, [3]: 3 F, 2 f2nd, 1 exuv1, 6 exuv2. Tauranga, *Actinidia deliciosa*, fruit, May 1982, D Steven, #82-181b, [2]: 2 F. Tauranga, Pyes Pa, *Ribes rubrum*, 0 Aug 1937, AR Grainger, [2]: 4 F. Te Puke, HortResearch, 412, No 1 Line Road, lab colony, 1 July 2008, N Mauchline, #08-361, [1]: 6 F. **GB**: East Cape, *Pouteria costata*, 20 Sep 1992, RC Henderson, #92-306b, [1]: 1 F. East Cape, Rangiatia, *Pouteria costata*, 17 Mar 1993, RC Henderson, #93-123, [1]: 2 F. Gisborne, 55 Winter St, *Cordylina australis*, 5 Dec 1991, G Shone, #91-345, [1]: 1 F. Gisborne, Greys Bush, Back Ormond Road, *Dysoxylum spectabile*, 20 May 1993, JG Charles, #93-160, [1]: 4 F. Te Araroa, Kakanui, *Cordylina banksii*, 22 Sep 1992, RC Henderson, #92-249, [1]: 3 F. Wairoa, *Diospyros kaki*, Apr

1982, JG Charles, #82-133a-b, [1]: 6 F, 1 f2nd. **HB**: Elsthorpe S.R., *Alectryon excelsus*, 6 Nov 2002, KJ Froud, #02-275, [1]: 1 F. Maraetotara, Maraetotara Gorge S.R., *Brachyglottis repanda*, bark, 6 Nov 2002, P Lo & KJ Froud, #02-271, [1]: 2 F, 1 exuv2. Maraetotara, Mohi Bush, *Aristolelia serrata*, branch, under bark, 6 Nov 2002, KJ Froud & RC Henderson, #02-268, [1]: 2 F. Maraetotara, Mohi Bush, *Urtica ferox*, stems/bark, 6 Nov 2002, P Lo, #02-297a, [1]: 3 F. **WI**: Hunterville, Bruce Park S.R., *Hoheria sexstylosa*, 10 Mar 1978, JS Dugdale, #78-76a, [1]: 1 f2nd. Palmerston North, *Pittosporum eugeniooides*, 14 Apr 1958, JI Townsend, [1]: 1 F. Palmerston North, *Howea forsteriana*, 6 Oct 1960, Harrison, [3]: 4 F. Palmerston North, Bledisloe Park, *Schefflera digitata*, underside leaves, 21 Aug 1957, JI Townsend, [1]: 1 F. Palmerston North, Bledisloe Park, *Pittosporum* sp., 21 Aug 1957, JI Townsend, [1]: 1 F. Palmerston North, Bledisloe Park, *Coprosma grandifolia*, upperside leaves, 21 Aug 1957, JI Townsend, [1]: 2 F. Palmerston North, Bledisloe Park, *Knightia excelsa*, 21 Aug 1957, JI Townsend, [1]: 1 F. Palmerston Nth, Massey University, *Halocarpus kirkii*, juvenile leaves, 2 Nov 2003, BJ Rogan, #03-203, [1]: 1 F. Palmerston Nth, Massey University, *Griselinia lucida*, 4 Feb 2009, NA Martin, #09-031, [1]: 1 F. **RI**: Mangaweka, Mangaweka Scenic Reserve, *Korthalsella salicornioides*, 8 May 2010, A Sultan, #10-076: 3 F. Pohangina V, Totara Reserve, *Nestegis* sp., 15 Apr 1955, JM Hoy, [1]: 9 F. **WA**: Masterton, *Korthalsella salicornioides*, parasitic on *Leptospermum*, 15 Oct 1945, JO Anderson, [3]: 5 F. Lake Wairarapa, Oporua, *Korthalsella clavata*, 27 Feb 2010, A. Sultan, #10-044, [1]: 1 F. **WN**: Lower Hutt, *Pomaderris apetala*, upperside leaves, 5 Nov 2008, BJ Rogan, #08-485, [1]: 2 F. **South Island. SD**: Queen Charlotte Sd, *Erica lusitanica*, 30 Jun 1953, JP Beggs, [4]: 8 F. Rai Valley, Opouri River, Opouri Valley, *Coprosma foetidissima*, 15 Oct 1968, JA de Boer, #No. 450, [1]: 3 F. **NN**: 88 Valley, *Prunus laurocerasus*, 21 Aug 1968, JA de Boer, #425, [1]: 2 F. 88 Valley, *Osmanthus fortunei*, 21 Aug 1968, JA de Boer, #428, [1]: 7 F. Eves Bush, Eves Bush, *Alectryon excelsus*, trunk/bark, 10 Feb 2003, RC Henderson, #03-008a-b, #03-009, [3]: 4 F, 4 exuv1, 3 exuv2. Eves Valley, Eves Bush, *Pseudopanax arboreum*, trunk/bark, 10 Feb 2003, RC Henderson, #03-013, [1]: 2 exuv1. Gardens V, *Pseudopanax ferox*, 8 Aug 1968, JA de Boer, #408, [1]: 3 F. Motueka, *Dodonaea viscosa*, 6 Jul 1917, G Brittin, #16, [1]: 1 F. Motueka, *Pittosporum* sp., 17 Nov 1918, G Brittin, #16, [1]: 1 F. Motueka, *Vitis vinifera*, 16-17 Apr 1938, G Brittin, #293, [2]: 4 F. Nelson, *Ribes* sp., 17 Jul 1953, L Nicholas, [1]: 3 F. Nelson, *Quercus* sp., 4 Oct 1968, D., #No. 442, [1]: 2 F. Nelson, *Ulex europaeus*, 17 Mar 1969, E Collyer, #No. 492, [1]: 3 F. Nelson, *Grevillea alpina*, 13 Oct 2008, BJ Rogan, #08-465, [1]: 2 F. Takaka, Paynes Ford S.R., *Berberis glaucocarpa*, branch/bark, 13 Feb 2003, MJ Sheldon & RC Henderson, #03-012a-b, [2]: 2 F, 3 f2nd. **MB**: Blenheim, Woodbourne Military Base, *Garrya elliptica*, underside leaves, 14 Oct 2008, J Bartram, #08-461, [1]: 3 F. **KA/NC**: Marble Point, Highway 7, *Korthalsella lindsayi*, Feb 2010, AW Robertson, #10-070, [1]: 1 F. **NC**: Rangiora, Matawai Park, *Coprosma robusta*, 12 Feb 2009, E Hume, #09-314, -315, -317, -319, [4]: 4 f2nd. **MC**: Banks Peninsula, Prices Valley Reserve, *Melicope simplex*, 17 Aug 2005, NA Martin, #05-219, [1]: 1 F. Banks Peninsula, Prices Valley Reserve, *Melicope simplex*, underside leaves, 3 Nov 2005, NA Martin, #05-244a-d, [4]: 3 F, 1 f2nd, 2 m2nd, 2 pp, 4 p, 1 M [biparental

population]. Canterbury, *Korthalsella lindsayi*, Oct 1968, BPJ Molloy, #454, [1]: 1 F. Christchurch, Botanic Gardens, *Asterotrichion discolor*, stems & leaves, 15 Dec 2004, BH Doherty, #04-282a, [1]: 1 F. Christchurch, Botanic Gardens, *Pseudopanax laetus*, 7 Nov 2007, NA Martin, #07-131, [1]: 3 F. Christchurch, cnr Marshlands & New Brighton Rds, *Seaforthia* sp., 11 Mar 1998, D Hitchen, #JS Kim, [1]: 2 F. Christchurch, Hillmorton Hospital, *Arbutus menziesii*, 31 Oct 2007, BH Doherty, #07-129, [1]: 3 F. Lyttelton, Coastguard, *Taxus baccata*, underside leaves, 25 Mar 2006, BH Doherty, #06-202a-b, [2]: 1 F, 4 m2nd [biparental population]. **SC**: Peel Forest, Te Wānahu Flat, *Korthalsella lindsayi*, parasitic on *Lophomyrtus obcordata*, 5 Jan 2010, A. Sultan, #10-010, [1]: 1 F. **DN**: Oamaru, *Myoporum laetum*, 7 Aug 1913, G Brittin, #16, [1]: 1 F. Oamaru, *Pittosporum* sp., 8 Jul 1913, G Brittin, #16, [1]: 1 F. Oamaru, *Hebe* sp., 20 May 1913, G Brittin, #16, [1]: 1 F. **Offshore islands. CH**: Chatham Island, Whanga Lagoon, Nikau Reserve, *Rhopalostylis sapida*, underside leaves, 17 June 2010, P. Bradbury, #10-117, [1]: 4 F. Chatham I, Taiko Camp, *Ripogonum scandens*, 5 Mar 1991, CF Morales, #91-109, [1]: 1 F.

Aulacaspis rosae (Bouché) total 40 (40 F)

North Island. HB: Hastings, *Rubus fruticosus*, 5 Jul 1937, RP Hill, [1]: 3 F. **WA**: Dannevirke, *Rubus idaeus*, 2 Jun 1937, W Cottier, [2]: 6 F. Masterton, *Rubus ursinus*, 18 Jan 1945, JO Anderson, [2]: 5 F. **South Island. NN**: Motueka, *Rubus fruticosus*, 23 Mar 1918, G Brittin, #31, [1]: 1 F. Motueka, *Acaena* sp., 2 Apr 1933, G Brittin, #228, [1]: 2 F. **SC**: Waimate, *Rubus fruticosus*, 23 Dec 1937, R McGillivray, [3]: 8 F. **CO**: Alexandra, Old DSIR Research Orchard, *Rubus* sp., 21 Aug 1952, TW Flint, [3]: 9 F. **DN**: Oamaru, *Rosa* sp., 10 Aug 1913, G Brittin, #31, [2]: 2 F.

Aulacaspis rosarum Borchsenius total 83 (74 F, 8 2ndm, 1 p)

North Island. ND: Whangarei, *Rubus ursinus*, 26 Aug 1970, W Stacey, #595, [1]: 5 F. **AK**: Auckland, *Rosa* sp., 19 Mar 1940, M Ashcroft, [1]: 3 F. Auckland, *Rosa* sp., 12 Aug 1975, #3822, [1]: 5 F. Auckland, *Rosa* sp., 6 Mar 2002, FL Henderson, #02-049a-b, [2]: 11 F. Auckland, Epsom, *Rosa* sp., 16 July 2004, FL Henderson, #04-127a-d, [4]: 8 F, 8 m2nd, 1 p, 1 M. Auckland, Glen Eden, 44C Pleasant Road, *Rubus fruticosus* X, stems, 17 Oct 2000, RC Henderson, #00-131, [1]: 4 F. Auckland, Glen Eden, 44C Pleasant Road, *Rubus fruticosus* X, 5 Dec 2001, RC Henderson, #01-195, [1]: 4 F. Auckland, Mt Albert, *Rosa* sp., 2 Oct 1978, AR Ferguson, #78-285c, [4]: 16 F. Auckland, Mt Roskill, *Rosa* sp., 24 Feb 2005, RE Beever, #05-080, [1]: 3 F. Pukekohe, *Rosa* sp., 6 Aug 1991, P Wright, #91-224, [1]: 3 F. **BP**: Tauranga, *Rosa* sp., 16 Apr 1969, AMW Grieg, [1]: 2 F. **South Island. MC**: Christchurch, Spreydon, *Rosa* sp., 9 Jun 1997, M Newfield, #00-14a-b: 6 F.

Carulaspis juniperi (Bouché) total 180 (4 2ndf, 158 F, 2 2ndm, 1 p, 11 exuv1, 4 exuv2)

North Island. AK: Auckland, St Johns, *Cupressus macrocarpa*, 2 Sep 2009, C Inglis, #09-390a-e, [5]: 5 F. **BP**: Tauranga, Mt Maunganui, Blake Park, *Cupressus*

sempervirens, 26 June 2003, BJ Rogan, #03-077a-d, [4]: 4 F, 3 exuv1, 4 exuv2. Tauranga, Mt Maunganui, Blake Park, *Cupressus sempervirens*, 27 Sep 2009, BJ Rogan, #09-415, [1]: 5 F. **WI**: Wanganui, Heads Road Cemetery, *Cupressus sempervirens*, young cones, 12 Jan 2004, BJ Rogan, #04-010a-c, [3]: 1 F, 4 f2nd, 2 m2nd, 1 p, 8 exuv1. **South Island**. **NN**: Nelson, *Juniperus chinensis*, 13 Oct 2008, BJ Rogan, #08-462, [1]: 2 F. Nelson, Queen's Gardens, *Cupressus* sp., nuts, 15 Oct 2008, RF Thum, #08-463, [1]: 2 F. **MB**: Blenheim, *Sequoiadendron giganteum*, 6 Aug 1959, BB Given, #78-250e, [3]: 10 F. Blenheim, Woodbourne Military Base, *Cupressus arizonica*, nuts, 14 Oct 2008, J Bartram, #08-459, [1]: 3 F. **NC**: Canterbury, Balmoral State Forest, *Cupressus macrocarpa*, 17 Aug 1956, KW Prior, [1]: 9 F. Canterbury, Balmoral State Forest, *Sequoiadendron giganteum*, 10 Feb 1959, KW Prior, [4]: 8 F. Okuku R, Panhandle Stream, Seagull Gully, *Cryptomeria japonica*, 19 Jun 1956, KW Prior, [1]: 7 F. **MC**: Ashburton, Millichamps Nursery, *Thuja* sp., 10 Jun 1976, [1]: 2 F. Christchurch, *Cupressus macrocarpa*, 10 Sep 1964, Dept of Agriculture, #R283, [1]: 4 F. Christchurch, Riccarton, *Cupressus* sp., 5 Oct 1954, AJ Healy, #78-250d, [3]: 9 F. Christchurch, Victoria St, *Juniperus* sp., 0 Oct 1970, KH Marcussen, #679: 7 F. Lincoln, *Cupressus arizonica*, Aug 1960, Nicholls, [5]: 9 F. Lincoln, *Cupressus macrocarpa*, 27 Sep 1960, Nicholls, [4]: 4 F. Lincoln, *Cupressus macrocarpa*, 21 Oct 1969, AD Lowe, #575, [1]: 5 F. Lincoln, *Juniperus procera*, 20 Nov 1970, C Allen, #665, [2]: 10 F. Lincoln College, *Chamaecyperus* sp., 27 Aug 1968, NH Hyde, #A230, [1]: 3 F. Lyttelton, Lyttelton Marina, Sports Ground, *Cupressus* sp., 3 Nov 2004, BH Doherty, #04-266, [1]: 5 F. Springston, *Cupressus macrocarpa*, 17 Nov 1942, AR Grainger, [2]: 4 F. **OL**: L Wanaka, *Cupressus arizonica*, 14 Nov 1972, M Nuttall, #956, [1]: 5 F. L Wanaka, *Cupressus macrocarpa*, 14 Nov 1972, M Nuttall, #957, [1]: 4 F. **CO**: Alexandra, Old DSIR Research Orchard, *Juniperus* sp., twigs, 25 Oct 1960, Dept of Agriculture, [1]: 12 F. Alexandra, Old DSIR Research Orchard, *Cupressus macrocarpa*, cones, stems & leaves, 18 Sep 1972, PR Burrell, #1614, [1]: 8 F.

Carulaspis minima (Signoret) total 10 (10 F)

North Island. **CL**: Coromandels, Kopu Mill, *Cupressus x leylandii*, 24 Aug 2009, RF Thum, #09-387a-e, [5]: 6 F. **WO**: Hamilton, St Andrews Golf Course, *Juniperus* sp., 15 May 2009, JA Bartram, #09-295, [1]: 4 F.

Diaspidiotus ostreaeformis (Curtis) total 173 (26 2ndf, 147 F)

South Island. **NC**: Fernside, *Malus domestica*, 20 Jan 1960, Dept of Agriculture, [2]: 7 F. Rangiora, *Malus domestica*, 20 Jan 1960, Dept of Agriculture, [2]: 9 F. **MC**: Christchurch, *Malus domestica*, 17 May 1939, RG Hamilton, [4]: 7 F. Christchurch, *Malus domestica*, bark, 23 Dec 1960, Dept of Agriculture, [1]: 1 F, 6 f2nd. Christchurch, *Malus domestica*, 7 Sep 1960, Dept of Agriculture, [1]: 1 M. Christchurch, *Malus domestica*, 23 Sep 1960, Dept of Agriculture, [1]: 10 f2nd. Christchurch, Dept. Agriculture, *Malus domestica*, 11 Oct 1961, #03-137a-d, [4]: 15 F, 2 f2nd. Christchurch, Harewood, *Malus domestica*, 13 Jul 1953, RA Harrison, [2]: 4 F. Christchurch, Papanui, *Prunus domestica*, [no date], [1]: 2 F. Christchurch, Papanui, *Prunus domestica*, 20 Jan 1960,

Dept of Agriculture, [2]: 11 F. Christchurch, Papanui, *Malus domestica*, 20 Jan 1960, Dept of Agriculture, [2]: 11 F. Christchurch, Riccarton, *Malus domestica*, 20 Jan 1960, Dept of Agriculture, [2]: 8 F. Christchurch, Spreydon, *Prunus avium*, 20 Jan 1960, Dept of Agriculture, [1]: 6 F. Christchurch, Woolston, *Malus domestica*, 20 Jan 1960, Dept of Agriculture, [2]: 17 F. Christchurch, Woolston, *Prunus domestica*, 20 Jan 1960, Dept of Agriculture, [1]: 6 F. Christchurch, Woolston, *Malus domestica*, 22 Nov 1962, Dept of Agriculture, [1]: 6 F, 5 f2nd. Lincoln, *Malus domestica*, 27 Oct 1994, G Burnip, #94-096, [1]: 3 F, 1 M. **CO**: Alexandra, Old DSIR Research Orchard, *Prunus domestica*, bark, 29 Apr 1981, G McLaren, #81-127e, [2]: 8 F. Clyde, *Malus domestica*, 19 Apr 1961, Dept of Agriculture, [1]: 3 f2nd. Earnsclough, *Malus domestica*, 15 Jan 1960, Dept of Agriculture, [2]: 4 F. Roxburgh, *Prunus avium*, 22 Oct 1942, JE Hume, [2]: 5 F. Roxburgh, *Prunus domestica*, 23 Sep 1942, JE Hume, [3]: 7 F. Roxburgh, Coal Creek, *Pyrus communis*, 22 Aug 1952, I Mayo, [5]: 5 F. Roxburgh, Coal Creek, *Prunus domestica*, 27 Aug 1952, I Mayo, [2]: 4 F.

Diaspidiotus perniciosus (Comstock) total 192 (4 1st, 28 2ndf, 153 F, 2 pp, 1 exuv1, 3 exuv2)

North Island. **ND**: Kerikeri, *Chaenomeles speciosa*, 11 Feb 1971, Anderson, #894, [1]: 1 F, 1 p, 1 1st. **AK**: Auckland, *Prunus persica*, 15 Sep 1939, J Hume, [1]: 2 F. Auckland, Henderson, *Pyrus communis*, 11 Feb 1960, Dept of Agriculture, [1]: 2 F. Auckland, Henderson, *Pyrus communis*, 29 Apr 1970, [1]: 3 f2nd, 1 1st. West Auckland, Huapai, *Prunus persica*, 21 Apr 1972, A Farmer, #1453, [1]: 5 F. **GB**: Gisborne, *Pyrus communis*, 26 Mar 1979, MC Thompson, #7651, [1]: 1 F. **HB**: Hastings, *Populus* sp., 30 Oct 1939, Orchard Instructor, [1]: 1 F. Hastings, *Malus domestica*, 25 Jul 1946, W Cottier, [2]: 3 F, 1 f2nd, 2 pp. Hastings, *Prunus persica*, 16 Mar 1970, Fry [P.D.D.], #292, [1]: 6 F. Hastings, *Corylus avellana*, 31 Jul 1974, Ryan, #2784, [1]: 1 f2nd. Hastings, *Populus* sp., bark, 9 Oct 1974, Horne, #2929, [1]: 2 F. Hastings, *Malus domestica*, 28 Apr 1976, #4527, [1]: 1 F. Havelock North, *Malus domestica*, wood, 13 Jun 1952, RE Robbins, [3]: 3 F. Havelock North, *Malus domestica*, 13 Oct 1960, D McKenzie, [1]: ~10 F. Napier, Pakowhai District, *Pyrus communis*, 11 Apr 1950, RI June, [2]: 2 F. **South Island**. **NN**: Motueka, *Cydonia oblonga*, wood, 3 Jun 1960, [1]: 3 F. Motueka, *Prunus* sp., wood, 7 Jun 1960, [1]: 3 F. Motueka, Kina, *Malus domestica*, 25 Jan 1960, AMR, [1]: 3 F. Motueka, Mariri, *Malus domestica*, 20 Jan 1960, [1]: 3 F. Motueka, Riwaka, *Prunus domestica*, 29 Jan 1920, G Brittin, #126, [1]: 1 F. Motueka, Riwaka, *Pyrus communis*, 9 May 1920, G Brittin, #126, [1]: 1 F. Motueka, Riwaka, *Pyrus communis*, 26 Mar 1925, G Brittin, [1]: 1 F. Motueka, Umukuri, *Prunus persica*, 17 Sep 1917, G Brittin, #126, [1]: 1 F. Nelson, *Prunus serrulata*, bark, 9 Feb 1979, PH Rajeh, #79-46c, [1]: 5 F. Nelson, Allandale, *Malus domestica*, [no date], [2]: 5 F. Nelson, Appleby Research Orchard, *Malus domestica*, 29 Jun 1968, JA de Boer, [3]: 5 F, 2 M. Nelson, Appleby Research Orchard, *Malus domestica*, 29 Mar 1971, H Wearing, #729, [1]: 2 F, 1 exuv1, 1 exuv2. Nelson, Appleby Research Orchard, *Salix* sp., 7 Oct 1971, JA de Boer, #764, [1]: 8 F. Nelson, Appleby Research Orchard, *Malus domestica*, 27 Mar 1976, H Wearing, #76-123a, [1]: 4 F. Nelson, Appleby Research Orchard, *Populus* sp., bark, 9 Oct 1980, H Wearing, #80-296c, [2]: 2 F, 1 1st. Nelson, Appleby Research

Orchard, *Populus* sp., bark, 31 Oct 1980, H Wearing, #80-311d, [1]: 3 F. Nelson, Appleby Research Orchard, *Actinidia deliciosa*, 25 Feb 1988, P Shaw, [1]: 5 F. Stoke, *Prunus persica*, Jan 1960, Dept of Agriculture, [1]: 4 F. **MC**: Christchurch, *Malus domestica*, 28 Dec 1972, AD Lowe, #972, [1]: 6 F, 1 exuv2. **CO**: Alexandra, Ashton & Richardson's Orchard, *Pyrus communis*, fruit, 13 Apr 1981, G McLaren, #LINC. 2333, [1]: 3 F. Alexandra, Ashton & Richardson's Orchard, *Pyrus communis*, 29 Apr 1981, G McLaren, #81-127d, [3]: 8 F, 1 M. Bannockburn, *Malus domestica*, 5 May 1950, WS Kemp, [2]: 3 F, 3 f2nd. Roxburgh, Coal Creek, *Prunus domestica*, 22 Aug 1952, I Mayo, [4]: 3 F, 6 f2nd.

Diaspis boisduvalii Signoret total 33 (1 2ndf, 23 F, 4 2ndm, 3 p, 1 exuv1, 1 exuv2)

North Island. AK: Auckland, Birkenhead, orchid, 14 Sep 1978, JR Brljevich, #6950, [1]: 2 F. Auckland, Mangere, orchid, 7 Jun 1984, P Workman, #84-164, [6]: 9 F, 2 m2nd, 3 p, 3 M. Auckland, Mt Albert, *Vriesea* sp., 4 Jun 2007, BE Rhode, #07-082a-d, [4]: 3 F, 2 m2nd, 1 exuv1. **WI**: Palmerston North, orchid, 6 Oct 1960, Harrison, [5]: 8 F, 1 f2nd, 1 exuv2. **South Island. DN**: Dunedin, Otago Museum, Tropical House, *Chamaedorea siefrizii*, 29 Dec 2008, M Shields, #09-002b, [1]: 1 F.

Furchadaspis zamiae (Morgan) total 32 (6 1st, 4 2ndf, 18 F, 3 exuv1, 1 exuv2)

North Island. AK: Auckland, Glen Eden, Palmers Garden Centre, *Cycas revoluta*, 22 Aug 2004, RC Henderson, #04-164a-b, [2]: 5 F, 1 1st. Auckland, Glen Eden, Palmers Garden Centre, *Cycas revoluta*, 18 July 2004, FL & RC Henderson, #04-129a-b, [2]: 6 F. West Auckland, Kumeu, *Cycas revoluta*, 2 Apr 2004, R Baker, #04-072a-f, [6]: 5 F, 4 f2nd, 6 exuv2, 3 exuv1. **HB**: Napier, *Encephalartos longifolius*, 23 Oct 2008, BJ Rogan, #08-475, [1]: 3 F.

Fusilaspis phymatodidis (Maskell) total 457 (11 1st, 12 2ndf, 358 F, 18 2ndm, 3 pp, 9 p, 22 exuv1, 24 exuv2)

North Island. ND: Kerikeri, *Cyathea medullaris*, underside fronds, 20 Oct 1982, U Gerson, #82-314n, [3]: 14 F. Kerikeri, Skinners organic orchard, *Cyathea medullaris*, 26 Nov 2002, RC Henderson, #02-314a-b, [2]: 5 F, 4 exuv1, 4 exuv2. Omahuta S.F., *Dicksonia squarrosa*, 23 Apr 1975, LL Deitz, #76-282c, [1]: 1 F. Omahuta S.F., fern, 23 Apr 1975, LL Deitz, #76-282d: 1 pp, 3 exuv1. Omahuta S.F., *Blechnum fraseri*, 23 Apr 1975, JS Dugdale, #76-282f, [1]: 1 m2nd. Omahuta S.F., *Grammitis billardierei*, 23 Apr 1975, LL Deitz, #76-282e, [1]: 6 F. Paihia, *Cyathea dealbata*, 28 Aug 1968, RA Cumber, #1589, [1]: 1 F. Waipoua, Prof. WR McGregor Reserve, *Hymenophyllum dilatatum*, underside fronds, 26 Nov 2002, RC Henderson, #02-324, [1]: 3 F. Waipoua Forest, *Cyathea dealbata*, base of frond, 7 Apr 1983, U Gerson, #83-119a, [1]: 4 F. Waipoua Forest, Te Matua Ngahere, fern, 19 Sep 1977, LL Deitz, #77-270b, [1]: 1 F. **AK**: Auckland, fern, 10 Apr 1956, D Spiller, [2]: 5 F. Auckland, *Blechnum fraseri*, 21 Sep 1982, CF Butcher, #83-298h, [4]: 5 F, 4 exuv2. Auckland, Captains Bush, *Doodia media*, 28 Jan 1991, PA Maddison, #91-030a-b, [2]: 3 F, 2 M. Auckland, Epsom, *Cyathea* sp., 9 Oct 1932, RP Bell, [1]: 4 F. Auckland, Glen Eden, 44C Pleasant Road, *Cyathea dealbata*, stipe, 22 Mar

2008, RC Henderson, #08-172a-b, [2]: 6 F, 1 f2nd, 4 exuv2. Auckland, Manurewa, Olive Davis S.R., *Microsorium scandens*, underside leaves, 30 Oct 1999, RC Henderson, #00-012, [1]: 5 F. Auckland, Manurewa, Olive Davis S.R., *Microsorium scandens*, underside leaves, 16 Mar 2000, NA Martin, #00-044, [1]: 3 F. Auckland, Manurewa, Olive Davis S.R., *Marattia salicina*, underside leaves, 9 Sep 2009, NA Martin, #09-398, [1]: 3 F. Auckland, Mt Eden, fern, 22 Nov 1993, JG Charles, #94-005, [1]: 1 3 F, f2nd. Auckland, St Heliers, Dingle Dell Reserve, *Pteris cretica*, underside frond, 24 July 2010, NA Martin, #10-118, [1]: 1 F. Hauraki Gulf, Noises Is, Otata I, *Blechnum* sp., 27 Aug 1979, CF Butcher, #79-256b, [1]: 2 F. Hauraki Gulf, Noises Is, Otata I, East track, *Doodia media*, 1 Nov 1977, LL Deitz, #77-343f, [1]: 3 F. Hauraki Gulf, Noises Is, Otata I, NE summit track, *Doodia media*, 2 Nov 1977, LL Deitz, #77-343e, [1]: 4 F. Hauraki Gulf, Rangitoto I, *Cyathea medullaris*, underside fronds, 1 Oct 2008, NA Martin, #08-441a-c, [3]: 6 F, 1 f2nd, 10 1st, 1 exuv1. Hunua Ra, Cosseys Dam Road, *Blechnum fraseri*, upperside fertile fronds, 26 Feb 2006, RC Henderson, #06-163, [1]: 5 F. Hunua Ra, Te Morehu Reserve, *Lygodium articulatum*, 3 Nov 1980, BM May, #81-022g, [2]: 4 F. Hunua Ra, Te Morehu Reserve, *Cyathea dealbata*, 11 Nov 1982, CF Butcher, #84-014g, [1]: 1 f2nd, 1 exuv1. Waitakere Ra, Christies Track, *Asplenium bulbiferum*, underside fronds, 7 June 1999, NA Martin, #99-076a-b, [2]: 2 F, 1 f2nd, 1 p, 1 M. Waitakere Ra, Fairy Falls Track, *Dicksonia squarrosa*, 21 Sep 1982, CF Butcher, #82-267b, [3]: 8 F. Waitakere Ra, Fairy Falls Track, *Blechnum fraseri*, 21 Sep 1982, CF Butcher, #82-267d, [1]: 5 F. Waitakere Ra, Huia, *Cyathea dealbata*, 28 Jan 1982, BM May, #84-018a, [2]: 4 F. Waitakere Ra, Huia Dam, *Cyathea* sp., 19 Mar 1981, CF Butcher, #81-93c, [1]: 1 F. Waitakere Ra, Nihotupu Ridge Track, *Sticherus cunninghamii*, underside fronds, 20 Feb 2000, NA Martin, #00-032a-b, [2]: 6 F. Waitakere Ra, Omanawanui Track, *Adiantum viridescens*, underside fronds, 6 Dec 2003, NA Martin, #03-220a-b, [2]: 4 F, 1 m2nd. Waitakere Ra, Sharps Bush, *Cyathea dealbata*, underside fronds, 1 Aug 1999, RC Henderson, #99-094a-b, [2]: 4 F. West Auckland coast, Bethells, Matuku Reserve, *Adiantum cunninghamii*, 18 Oct 1992, RC Henderson, #92-291b, [1]: 2 F. West Auckland coast, Karekare, Cave Rock Track, *Polystichum neozelandicum*, underside fronds, 25 Mar 2000, NA Martin, #00-078a-d, [4]: 6 F, 6 m2nd, 1 pp, 6 p. West Auckland coast, Muriwai, Houghtons Bush, *Blechnum filiforme*, underside pinnules, 16 Aug 2003, RC Henderson, #03-110, [1]: 3 F. West Auckland coast, Piha, *Asplenium polyodon*, 16 June 2000, PA Maddison, #00-014, [1]: 2 F. Whitford, Waikopua Road, Claude Strm Valley, *Microsorium pustulatum*, leaves & petioles, 21 May 2005, RC Henderson, #05-193, [1]: 2 F, 1 f2nd. **CL**: Coromandels, Tapu-Coroglen Rd, *Gleichenia* sp., 1 Mar 1983, U Gerson, #83-067i, [2]: 4 F. Coromandels, Whangamata, *Cyathea medullaris*, 7 Jan 1983, U Gerson, #83-21d, [1]: 2 F. **WO**: Hauraki Plains, Awaiti Canal Road, end, Kopuatai Peat Dome, *Gleichenia dicarpa*, underside fronds, 18 Oct 2004, RC Henderson, #04-227, [1]: 3 F, 1 f2nd, 1 m2nd. Herangi Ra, *Cyathea medullaris*, 19 Sep 1982, U Gerson, #82-267k, [2]: 6 F. Raglan, Bridal Veil Falls, *Microsorium* sp., 19 Sep 1981, CF Butcher, #84-013f, [2]: 3 F. **BP**: East Cape, Rereauria Swamp, beech ridge, *Hymenophyllum demissum*, 17 Sep 1992, RC Henderson, #92-283a-b, [2]: 9 F. East Cape, Waiaroho, *Asplenium* sp., 28 Jan 1993, RC Henderson, #93-255, [1]: 5 F, 1 f2nd. East Cape, Waiaroho, *Hymenophyllum* sp., 28 Jan 1993, RC

Henderson, #93-258, [1]: 3 F. Hicks Bay, Te Koau, *Asplenium oblongifolium*, 23 Sep 1992, RC Henderson, #92-256a-b, [2]: 6 F. Hicks Bay, Wharekahika R, *Adiantum fulvum*, 20 Sep 1992, RC Henderson, #92-326a-c, [3]: 8 F, 1 m2nd. Lottin Point Rd, Waenga Bush, *Asplenium* sp., 27 Jan 1993, RC Henderson, #93-251, [1]: 2 F, 1 f2nd. **GB:** Morere, Morere Springs SR, *Adiantum* sp., Sep 1982, CF Butcher, #82-280g, [1]: 1 F. **HB:** Maraetotara, Maraetotara Gorge S.R., *Blechnum membranaceum*, 16 Oct 1999, RE Beever, #00-054, [1]: 1 F. Maraetotara, Mohi Bush, *Asplenium flaccidum*, both sides fronds, 18 Oct 2009, RE Beever, #09-431, [1]: 3 F. **TO:** Pureora, Rangitoto Station, Mangatutu, *Hymenophyllum pulcherrimum*, 9 Nov 1996, RC Henderson, #96-235, [1]: 4 F. Waituhi Saddle Rd, Moerangi, *Polystichum vestitum*, 9 Oct 1979, JS Dugdale, #79-292c, [2]: 8 F. **WI:** Palmerston North, Bledisloe Park, *Asplenium bulbiferum*, 21 Aug 1957, JI Townsend, [2]: 10 F, 6 m2nd. Palmerston North, Bledisloe Park, *Microsorium pustulatum*, 21 Aug 1957, JI Townsend, [2]: 7 F, 3 f2nd. Palmerston North, Bledisloe Park, *Lastreopsis glabella*, 21 Aug 1957, JI Townsend, [1]: 1 F, 1 m2nd. Palmerston North, Bledisloe Park, *Polystichum neozelandicum*, 21 Aug 1957, JI Townsend, [1]: 14 F, 1 m2nd. Palmerston North, Bledisloe Park, *Pellaea rotundifolia*, 21 Aug 1957, JI Townsend, [1]: 4 F, 2 p, 1 M. Wanganui, fern, 1927, Davey, [2]: 6 F. **WN:** Levin, Kimberley Reserve, fern, 6 Nov 1980, CF Butcher, #81-40f, [2]: 3 F. Wellington, fern, Feb 1934, W Cottier, [1]: 1 F. **South Island. SD:** D'Urville I, *Microsorium scandens*, 17 Feb 1971, JA de Boer, #696, [2]: 7 F, 1 exuv1, 1 M. Opouri V, *Blechnum discolor*, 15 Oct 1968, JA de Boer, #451, [1]: 3 F. Opouri V, *Cyathea* sp., 29 Oct 1968, JA de Boer, #459, [2]: 4 F, 1 exuv1, 1 exuv2, **NN:** Eves Valley, Eves Bush, *Hymenophyllum atrovirens*, 9 Dec 1970, JA de Boer, #672, [1]: 5 F. Golden Bay, Clifton, *Arthropteris tenella*, underside fronds, 17 Dec 2007, NA Martin, #08-039, [1]: 4 F. Golden Bay, Pupu Walkway, *Gleichenia dicarpa*, 15 May 2001, NA Martin, #01-109a-b: 11 F. Golden Bay, Pupu Walkway, *Gleichenia dicarpa*, underside fronds, 5 Jan 2006, EK Cameron, #06-169, [1]: 1 F. Karamea, Heaphy Track, *Trichomanes reniforme*, 8 Dec 2005, K Affeld, #06-046, [1]: 4 F. Motueka, Riwaka, fern, 28 Aug 920, G Brittin, #60, [1]: 1 F. Motueka, Umukuri, tree fern, 3 Nov 1918, G Brittin, #60, [1]: 1 F. **BR:** Punakaiki, Bullock Creek, *Hymenophyllum* sp., underside fronds, 7 Dec 2005, RC Henderson, #06-059: 7 F. **DN:** Dunedin, Woodhaugh Gardens, *Microsorium pustulatum*, underside fronds, 5 Apr 2002, RC Henderson, #02-093a-c, [3]: 7 F, 10 exuv1, 9 exuv2. **SL:** Bluff, *Asplenium* sp., 12 Apr 1914, G Brittin, #60, [2]: 2 F. **Offshore Islands. TH:** Three Kings Is, Great I, Tasman Valley, *Blechnum* sp., 30 Nov 1983, CF Butcher, #84-018i, [1]: 2 F. Three Kings Is, Great I, Tasman Valley, *Adiantum* sp., 30 Nov 1983, CF Butcher, #84-018h, [1]: 1 F. **CH:** Chatham I, Owenga, Rangaika Reserve, *Blechnum* sp., 3 Mar 1991, CF Butcher, #91-109a-b, [2]: 4 F. Chatham I, Owenga, Rangaika Reserve, *Blechnum* sp., 5 Mar 1991, CF Butcher, #91-108a-b, [2]: 4 F, 1 1st. Chatham Is, Pitt I, Ellen E. Preece Covenant, *Dicksonia fibrosa*, 8 Jan 2007, RE Beever, #07-006, [1]: 5 F. Chatham Is, Pitt I, Ellen E. Preece Covenant, *Dicksonia squarrosa*, 8 Jan 2007, RE Beever, #07-007, [1]: 4 F. Chatham Is, Pitt I, Ellen E. Preece Covenant, *Polystichum vestitum*, 8 Jan 2007, RE Beever, #07-008, [1]: 3 F. **SN:** Snares Is, *Polystichum vestitum*, 7 Feb 1972, DS Horning, #873, [1]: 6 F, 1 exuv2.

Hemiberlesia lataniae (Signoret) total 400 (74 1st, 9 2ndf, 303 F, 7 exuv1, 7 exuv2)

North Island. ND: Hokianga Harbour, South Head, Arai te Uru Walkway, *Leucopogon fasciculatus*, stem, 26 Nov 2002, RC Henderson, #02-338, [1]: 1 F. Kerikeri, Kwan Holdings, citrus orchard, *Cupressus x leylandii*, 26 Nov 2002, RC Henderson, #02-309, [1]: 3 F. Kerikeri, Skinners organic orchard, *Ulex europaeus*, bark, 26 Nov 2002, LE Jamieson, #02-310a-b, [2]: 2 F, 1 f2nd. Kerikeri, Smiths Nursery, *Acacia* sp., 21 Jan 1988, G Hill & U Gerson, [2]: 4 F. Kerikeri, Smiths Nursery, *Solanum mauritianum*, 21 Jan 1988, G Hill & U Gerson, [2]: 5 F. North Cape, Tapotupu Bay, track, east side stream, *Rubus australis*, petiole, 25 Feb 2002, RC Henderson, #02-033, [1]: 2 F. Paihia, *Hebe ligustrifolia*, 10 Aug 2008, NA Martin, #08-427, [1]: 1 F. **AK:** Auckland, Albert Park, *Pachystegia insignis*, upperside leaves, 13 May 2010, J Goodenough, #10-081, [1]: 5 F. Auckland, Auckland Domain, *Eucalyptus* sp., bark, 3 Mar 2001, RC Henderson, #01-035, [1]: 3 F. Auckland, Auckland University grounds, city campus, *Ficus pumila*, fruit, 14 June 2004, C Inglis, #04-092, [1]: 1 F. Auckland, Birkenhead, Kauri Park, *Myrsine australis*, trunk, 8 Oct 2002, KJ Froud & RC Henderson, #02-263, [1]: 2 F. Auckland, Browns Bay, *Cussonia spicata*, leaf petiole, 5 Dec 2007, C Inglis, #07-140a-b, [2]: 11 F. Auckland, Cornwall Park, *Alectryon excelsus*, fruit, 3 Sep 2003, C Inglis, #03-134, [1]: 1 F. Auckland, Henderson, Corbans Estate-Opanuku Strm, *Streblus heterophyllus*, stems, 25 Mar 2006, RC Henderson, #06-257, [1]: 1 F. Auckland, Henderson, Opanuku Strm Walkway, *Hoheria populnea*, trunk 26 Aug 2006, RC Henderson, #06-304, [1]: 4 F. Auckland, Lynfield, Boundary Rd/MAF grounds, *Furcraea* sp., 13 Jun 1997, K Chadfield, #97-078, [1]: 3 F. Auckland, Mangere, *Libertia ixioides*, both sides leaves, 2 Nov 2007, C Inglis, #07-128, [1]: 3 F. Auckland, Manurewa, Olive Davis S.R., *Vitex lucens*, branch, 3 Oct 2002, KJ Froud, #02-212, [1]: 1 F. Auckland, Manurewa, Olive Davis S.R., *Carpodetus serratus*, trunk/bark, 3 Oct 2002, KJ Froud, #02-213, [1]: 1 F. Auckland, Manurewa, Olive Davis S.R., *Myrsine australis*, trunk/bark, 3 Oct 2002, RC Henderson, #02-261, [1]: 3 F. Auckland, Mt Albert, *Strelitzia reginae*, 18 Jul 1999, RC Henderson, #99-099, [1]: 1 F. Auckland, Mt Albert, *Cycas revoluta*, upperside leaves, 3 Feb 2005, JA Berry, #05-027a-b, [2]: 3 F, 8 1st. Auckland, Mt Albert Research Centre, *Persea americana*, stem, 3 Nov 1981, D Steven, #80-310a, [2]: 9 F. Auckland, Mt Albert Research Centre, *Litchi chinensis*, 12 Nov 1981, D Steven, #81-317b, [2]: 5 F. Auckland, Mt Albert Research Centre, *Persea americana*, 22 Jan 1985, M Uiterdyk, #85-024a, [2]: 4 F. Auckland, Mt Albert Research Centre, *Persea americana*, 29 Jan 1985, M Uiterdyk, #85-030, [1]: 4 F. Auckland, Mt Albert Research Centre, *Ficus benjamina*, petioles, 11 Aug 1998, P Workman, #98-095, [1]: 3 F. Auckland, Mt Albert Research Centre, *Libertia ixioides*, 21 June 2010, NA Martin, #10-122, [1]: 1 F. Auckland, Mt Albert Research Centre, *Rhopalostylis baueri*, by leaf veins, 147 May 2010, NA Martin, #10-084, [1]: 2 F. Auckland, Mt St Johns, *Solanum linnaeanum*, fruits, 21 Mar 2006, C Inglis, #06-194, [1]: 3 F. Auckland, New Lynn, succulent, 12 Dec 2000, NA Martin, #00-146, [1]: 3 F. Auckland, North Shore, evergreen iris, 1 Aug 2001, D Steven, #01-130a-c, [3]: 6 F. Auckland, Northcote, Smiths Bush, *Macropiper excelsum*, underside leaves, 4 Apr 2008, NA Martin, #08-421a-b, [2]: 9 F, 4 exuv2. Auckland, Papatoetoe, *Hypericum* sp., 8 Oct 1979, NA Martin, #79-285e, [1]: 1 F.

Auckland, Parnell, *Buxus sempervirens*, stems & leaves, 17 Apr 2003, FL Henderson, #03-029a-b, [2]: 8 F. Auckland, Royal Oak, 7 Dec 2010, JE Beever, *Entelea arborescens* branch, #10-155 [1]: 4 F. Auckland, Waikowhai Park, *Myrsine australis*, trunk/bark scrapings, 4 Aug 2006, RC Henderson, #06-293, [1]: 2 F. Auckland, Western Springs, *Solanum mauritianum*, stems, 19 Oct 2000, CJ Winks, #00-129, [1]: 2 F. Auckland, Whenuapai Air Base, Tokomaru St, *Zelkova serrata*, branch/bark, 28 May 2003, C Inglis, #03-073, [1]: 2 F. Clevedon, 60 Creightons Rd, pty Jones, citrus orchard, *Solanum mauritianum*, bark, 3 Oct 2002, KJ Froud, #02-220, [1]: 5 F. Clevedon, 60 Creightons Rd, pty Jones, citrus orchard, *Crataegus monogyna*, trunk/bark, 3 Oct 2002, KJ Froud, #02-219, [1]: 4 F. Clevedon, 60 Creightons Rd, pty Jones, citrus orchard, *Citrus limon*, trunk, 3 Oct 2002, KJ Froud, #02-218, [1]: 1 F. Clevedon-Kawakawa Rd, Polo Grounds Gates, *Streblus heterophyllus*, twigs, 3 Oct 2002, RC Henderson, #02-221a, [1]: 4 F. Clevedon-Kawakawa Rd, Polo Grounds Gates, *Coprosma areolata*, trunk/bark, 3 Oct 2002, RC Henderson, #02-222, [1]: 2 F. Dairy Flat, Durey Rd, property Froud, *Ulex europaeus*, bark, 8 Oct 2002, RC Henderson, #02-217, [1]: 1 F. Hauraki Gulf, Noises Is, Motuhoropapa I, Main Track, *Dysoxylum spectabile*, 26 Feb 1979, MF Tocker, #79-183a, [1]: 1 F. Kaipara, Omeru S.R., Omeru Falls, *Dacrydium dactyloides*, 26 Sep 1999, RC Henderson, #00-058, [1]: 2 F. North Shore, Okura Walkway, *Carpodetus serratus*, stems, 16 Dec 2000, NA Martin, #01-013, [1]: 2 F. Waitakere Ra, Kakamatua Beach Walk, carpark, *Myrsine australis*, 19 June 2004, RC Henderson, #04-101, [1]: 1 F. Waitakere Ra, Little Muddy Creek, *Plagianthus divaricatus*, stems, 4 Nov 2008, NA Martin, #08-488, [1]: 1 F. West Auckland, Kumeu Research Orchard, *Actinidia deliciosa*, Jan 1991, P Stevens, #91-066a, [1]: 4 F. West Auckland coast, Bethells, Matuku Reserve, *Coprosma areolata*, stems, 15 Oct 2005, NA Martin, #06-170, [1]: 1 F. West Auckland coast, Karekare Beach, *Ozothamnus leptophyllus*, stems, 25 Mar 2000, NA Martin, #00-063, [1]: 2 F. Whangaparaoa, Manly, *Euonymus* sp., twigs, 10 Oct 1981, D Steven, #81-289, [5]: 21 F. **CL**: Coromandels, Black Jack Road, *Korthalsella salicornioides*, 11 Apr 2010, A Sultan, #10-066, [1]: 1 F. **WO**: Morrinsville, *Fatsia japonica*, 9 June 2010, NA Martin, #10-119, [1]: 3 F, 3 f2nd. **BP**: Opotiki, Torere, Torere Macadamia Nuts, *Macadamia* sp., trunk/bark, 23 Oct 2002, KJ Froud, #02-225, [1]: 1 F. Tauranga, *Hoheria populnea*, 1 Dec 2005, BJ Rogan, #05-328, [1]: 3 F. Tauranga, Matakana I, *Vitis vinifera*, 28 Jun 1998, G Grandison, #98-071a-b, [2]: 5 F. Te Puke, HortResearch, 412, No 1 Line Road, *Actinidia arguta*, 2 Mar 2007, C McKenna, #07-039, -041, -042, -043, 044, -045, -046, [7]: 9 F, 2 f2nd, 1 exuv1. Te Puke, HortResearch, 412, No 1 Line Road, lab colony, 1 July 2008, N Mauchline, #08-362, [1]: 6 F. Te Puke, HortResearch, 412, No 1 Line Road, *Actinidia deliciosa*, Nov 2008, MG Hill, #08-494a-m, [13]: 35 F, 2 f2nd, 36 1st, 4 exuv1, 1 exuv2. Te Puke, HortResearch, 412, No 1 Line Road, *Actinidia chinensis*, Nov 2008, MG Hill, #08-493a-k, [11]: 43 F, 1 f2nd, 25 1st, 2 exuv1, 2 exuv2. **GB**: Gisborne, Kaiaponi Farm, *Actinidia deliciosa*, 17 Jun 987, T Lupton, [4]: 7 F. Gisborne, Manutuke, *Actinidia deliciosa*, 26 May 1987, DCM Manson, [1]: 1 F. **HB**: Napier, Andersons Nurseries, *Philodendron* sp., 15 Dec 1977, J Dann, #5701, [1]: 2 F. **TK**: New Plymouth, Te Henui Cemetery, *Pseudopanax crassifolius*, stem, 12 May 2004, L Renney, #04-094, [1]: 1 F. **WN**: Upper Hutt, *Cycas revoluta*, 11 Apr 2009, BJ Rogan, #09-089, [1]: 3 F.

Hemiberlesia rapax (Comstock) total 612 (10 1st, 27 2ndf, 561 F, 2 exuv1, 12 exuv2)

North Island. ND: Kerikeri, *Citrus limon*, Sep 1982, U Gerson, #82-252c, [1]: 1 F. Kerikeri, *Actinidia deliciosa*, 4 Nov 1984, RH Blank, #84-313a, [3]: 3 F. Kerikeri, Golf Course, *Virgilia* sp, 17 Oct 2003, C Inglis, #03-209, [1]: 2 F. Kerikeri, Kerikeri Rd, *Eucalyptus* sp., 13 Mar 1990, N Cates, #90-078, [1]: 7 F. Mangamuka Valley, *Weinmannia silvicola*, 1 Oct 1959, RA Cumber, [1]: 1 f2nd. Ngaiotonga Saddle, *Nestegis montana*, 29 Feb 1960, RA Cumber, [1]: 1 F. North Cape, Tapotupotu Bay, west bank stream, *Plagianthus divaricatus*, stems at nodes, 25 Feb 2002, RC Henderson, #02-034, [1]: 3 F. Paihia, Haruru Falls, *Coprosma rhomnoides*, on small bud galls, 15 Aug 2008, NA Martin, #08-426, [1]: 4 F. Poor Knights I, Tawhiti Rahi I, *Pouteria* sp., 2 Dec 1980, CF Butcher, #81-58e, [1]: 2 F. Puketia Forest, Puketia Mokau Reserve, *Coprosma grandifolia*, trunk/bark, 25 Nov 2002, RC Henderson, #02-306, [1]: 2 F. Waimate North, *Hakea* sp., stem & petiole, 2 Sep 2005, C Inglis, #06-120, [1]: 2 F. Waipoua, Prof. WR McGregor Reserve, *Griselinia lucida*, leaf petiole, 26 Nov 2002, KJ Froud, #02-331, [1]: 1 F. Whangaroa, *Schefflera digitata*, 12 Sep 1968, RA Cumber, #1610, [1]: 3 F. **AK**: Auckland, *Camellia* sp, 25 Oct 973, #2157, [1]: 5 F. Auckland, *Pyrus communis*, 4 May 1949, I Nottage, [5]: 7 F. Auckland, *Pyrus communis*, Apr 1956, D Spiller, [2]: 2 F. Auckland, *Cucurbita* sp., 9 Jul 1979, P Maddison, #8073, [1]: 1 F. Auckland, Albany, *Malus domestica*, 22 Feb 1981, G Husband, #81-062, [1]: 3 F. Auckland, Albert Park, *Pachystegia insignis*, upperside leaves, 13 May 2010, J Goodenough, #10-079, [1]: 3 F. Auckland, Birkenhead, Kauri Pt Centennial Park, *Leonema nudum*, stems, 2 Nov 2003, RE Beever, #03-206, [1]: 2 F. Auckland, East Tamaki, *Coleonema pulchellum*, twigs, 9 Sep 2008, C Inglis, #08-424a, [1]: 2 F, 1 exuv2. Auckland, Eastern Beach, *Paraserianthes lophantha*, stems, 1 July 2009, NA Martin, #09-308, [1]: 1 F1. Auckland, Glen Eden, *Sedum rubrotinctum*, stems, 18 Jan 1991, NA Martin, #91-023, [1]: 2 F. Auckland, Glenfield, *Musa* sp., 1 Jul 1979, D Steven, #79-186, [4]: 7 F. Auckland, Henderson, *Carmichaelia australis*, 11 Jun 1978, JS Dugdale, #78-167c, [1]: 1 F. Auckland, Henderson, *Malus domestica*, 2 Jul 1980, MF Tocker, #80-191, [3]: 5 F, 1 f2nd. Auckland, Henderson, Bruce McLaren Rd, *Pyrus communis*, twig, 13 Oct 1978, MF Tocker, #78-291, [4]: 7 F. Auckland, Mangere Mountain, *Pittosporum tenuifolium*, trunk/bark, 21 Mar 2006, C Inglis & RC Henderson, #06-211, [1]: 2 F. Auckland, Manurewa, *Hebe* sp., 5 Oct 2005, S Lewthwaite, #05-241, [1]: 4 F. Auckland, Manurewa, Olive Davis S.R., *Olearia rani*, stems & leaf midribs, 30 Oct 1999, RC Henderson, #00-011, [1]: 5 F. Auckland, Mt Albert, *Phoenix roebelenii*, 1 Dec 1977, AR Ferguson, #77-343a, [1]: 2 F. Auckland, Mt Albert, *Carya illinoensis*, 9 Sep 1982, PA Maddison, #82-260a, [1]: 1 F. Auckland, Mt Albert, *Corynocarpus laevigatus*, 11 Jun 1992, RC Henderson, #92-188c, [1]: 3 F. Auckland, Mt Albert Research Centre, *Hedera* sp., 26 May 1975, BA Holloway, #76-309b, [2]: 8 F. Auckland, Mt Albert Research Centre, *Cordyline* sp., 10 Sep 1980, CF Butcher, #80-263f, [1]: 1 F. Auckland, Mt Albert Research Centre, *Litchi chinensis*, base of leaf, 12 Nov 1981, D Steven, #81-317a, [1]: 1 F. Auckland, Mt Albert Research Centre, *Vaccinium corymbosum*, 1 Jul 1982, M Uiterdyke, #82-183, [2]: 9 F. Auckland, Mt Albert Research Centre, *Pyrus communis*, 29 Sep 1988, G Wood, [3]: 6 F. Auckland, Mt Albert Research Centre, *Libertia ixioides*, 21

- June 2010, NA Martin, #10-121, [1]: 4 F. Auckland, Newmarket, *Camellia tsaii*, 6 Mar 2008, C Inglis, #08-173, [1]: 2 F. Auckland, Northcote, Smiths Bush, *Macropiper excelsum*, underside leaves, 4 Apr 2008, NA Martin, #08-422, [1]: 1 F, 1 exuv2. Auckland, Northcote, Smiths Bush, *Dysoxylum spectabile*, underside leaves, 4 Apr 2008, NA Martin, #08-364a, [1]: 2 F. Auckland, Papakura, *Actinidia deliciosa*, 29 Apr 1970, #385, [1]: 1 F, 2 f2nd. Auckland, Sandringham, *Corokia cotoneaster*, 6 Dec 2000, RC Henderson, #01-011, [1]: 3 F. Auckland, Takapuna, *Pittosporum* sp., 24 Oct 1981, D Steven, #81-301, [3]: 5 F. Auckland, Traherne I, *Ozothamnus leptophyllus*, 17 Sep 1977, JS Dugdale, #77-278, [2]: 1 F, 1 st. Auckland, Wiri, *Buxus sempervirens*, 25 Sep 2008, C Inglis, #08-435, [1]: 3 F. Clevedon-Kawakawa Rd, Polo Grounds Gates, *Streblus heterophyllus*, twigs, 3 Oct 2002, RC Henderson, #02-221b, [1]: 5 F. Hauraki Gulf, Noises Is, Otata I, *Brachyglottis repanda*, 27 Aug 1979, G Hall & CF Butcher, #79-256c, [1]: 1 F. Hauraki Gulf, Noises Is, Otata I, NE summit track, *Pomaderris phyllicifolia*, 1 Nov 1977, LL Deitz, #78-124d, [1]: 1 f2nd. Hunua Ra, Cosseys Creek, *Carmichaelia australis*, 26 Feb 2006, RC Henderson, #06-155, [1]: 1 F. Kaipara Harbour, Waioneke, estuary, *Olearia solandri*, stems, 21 Dec 2000, NA Martin, #01-009, [1]: 5 F. Kaipara Harbour, Waioneke, estuary, *Olearia solandri*, stems, 25 Feb 2007, RC Henderson, #07-020, [1]: 3 F. Orere Point, *Olearia albida*, 11 Nov 1982, CF Butcher, #83-328c, [1]: 1 F. South Auckland, Mt William, main track, *Coprosma rotundifolia*, stems, 1 Jan 2002, NA Martin, #02-006, [1]: 2 F. Waimauku, Kerr-Taylor Reserve, *Coprosma rhamnoides*, 14 Aug 2005, NA Martin, #06-175, [1]: 1 F. Waitakere Ra, Buck Taylor Track, *Myoporum laetum*, stems, 22 Oct 2000, NA Martin, #00-143, [1]: 1 F. Waitakere Ra, Destruction Gully Track, *Carmichaelia australis*, 30 Apr 2000, RC Henderson, #00-086, [1]: 1 F. Waitakere Ra, Huia, *Coprosma robusta*, 27 Aug 1987, Alo F, [1]: 1 F. Waitakere Ra, Huia Dam, *Corynocarpus laevigatus*, 26 Sep 1980, G Hall, #80-2821: 1 F. Waitakere Ra, Huia Dam, *Carmichaelia australis*, 28 Mar 1981, BG Bennett, #81-100d, [2]: 2 F. Waitakere Ra, Huia Dam, *Kunzea ericoides*, stems, 10 Aug 2003, RC Henderson, #03-097, [1]: 2 F, 1 f2nd, 1 st. Waitakere Ra, Sharps Bush, *Mida salicifolia*, leaf petiole, 31 Oct 1999, RC Henderson, #00-047, [1]: 1 F. Waitakere Ra, Upper Nihotupu Dam Road, *Leionema nudum*, stems, 13 Apr 2001, NA Martin, #01-124, [1]: 3 F. Waitakere Ra, Upper Nihotupu Dam Road, *Leionema nudum*, 13 June 2008, NA Martin, #08-414, [1]: 2 F. Waiuku, Glenbrook Steel Mill, *Acacia verticillata*, stems, 30 July 2004, C Inglis, #04-149, [1]: 3 F. Whitford, Waikopua Road, Claude Strm Valley, *Metrosideros fulgens*, leaves & petioles, 21 May 2005, RC Henderson, #05-192, [1]: 3 F. CL: Coromandels, Kopu-Hikuai Rd, *Alectryon excelsus*, 1 Aug 1968, RA Cumber, #1583, [1]: 4 F, 3 exuv2. Coromandels, Tapu Hill, *Brachyglottis repanda*, 5 Sep 1968, RA Cumber, #1597, [1]: 1 F, 1 exuv2. Coromandels, Waiomu Bay, *Vitex lucens*, 8 Aug 1968, RA Cumber, #1587, [1]: 1 F. Little Barrier I, Te Maraeroa, *Kunzea ericoides*, 17 Sep 1994, RC Henderson, #94-073, [1]: 1 F. WO: Hamilton, Franckton Junction, *Howea forsteriana*, 2 Sep 1951, FE Wilkin, [2]: 4 F. Hamilton, MAF Moana Tua Tua Research Area, *Vaccinium corymbosum*, 30 Oct 1980, H Wearing, #80-312b, [2]: 3 F. Raglan, *Brachyglottis repanda*, 19 Sep 1981, CF Butcher, #81-282h, [1]: 1 F. Raglan, Bridal Veil Falls, *Schefflera digitata*, 19 Sep 1981, CF Butcher, #81-282j, [1]: 2 F. Te Awamutu, *Acacia* sp., 20 Nov 1973, F Hill, [1]: 2 F. BP: East Cape, Rereauira Swamp, beech ridge, *Olearia rani*, 17 Sep 1992, RC Henderson, #92-286, [1]: 2 F. East Cape, Waiaroho, *Laurelia novae-zelandiae*, 29 Sep 1993, RC Henderson, #01-199, [1]: 2 F. Hicks Bay, Wharekahika R, *Beilschmiedia tawaroa*, 2 May 1993, RC Henderson, #93-237, [1]: 2 F. Kaimai Ra, McLaren Falls, *Brachyglottis repanda*, trunk/bark, 24 Oct 2002, RC Henderson, #02-237, [1]: 2 F. Kaimai Ra, McLaren Falls, *Knightia excelsa*, leaf petiole, 24 Oct 2002, MG Hill, #02-248, [1]: 1 F. Kaimai Ra, McLaren Falls, *Olearia solandri*, leaf petiole, 24 Oct 2002, MG Hill, #02-249, [1]: 2 F. Kaimai Ra, McLaren Falls Park, entrance to Waterfall Bush Walk, *Hoheria populnea*, trunk, 24 Oct 2002, MG Hill & NA Mauchline, #02-241, [1]: 2 F. Lottin Point, Otanga, *Vitex lucens*, 27 Jan 1993, RC Henderson, #93-229, [1]: 2 F. Rotorua, L Rotoehu, *Fuchsia excorticata*, Jun 1951, JM Dingley, [1]: 2 F. Tauranga, *Actinidia deliciosa*, 19 Nov 1971, P Sale, #1255, [1]: 7 F. Tauranga, *Metrosideros collina*, leaves & stem, 2 Dec 2005, BJ Rogan, #05-327, [1]: 4 F. Tauranga, Mt Maunganui, *Banksia integrifolia*, upperside leaves, 28 Jan 2004, BJ Rogan, #04-024b, [1]: 1 F. Te Puke, *Actinidia deliciosa*, 6 Nov 1969, #E494, [2]: 10 F. Te Puke, *Hypericum* sp., 8 Oct 1979, NA Martin, #79-285c, [3]: 6 F, 5 f2nd. Te Puke, HortResearch, 412, No 1 Line Road, *Actinidia arguta*, 2 Mar 2007, C McKenna, #07-040, [1]: 1 f2nd. Te Puke, HortResearch, 412, No 1 Line Road, lab colony, 1 July 2008, N Mauchline, #08-363, [1]: 6 F. Te Puke, Kaiate Falls, *Macropiper excelsum*, trunk/bark, 24 Oct 2002, NA Mauchline, #02-242, [1]: 2 F. Waioeka Gorge, Nature Walk, 5 km S of Aro Aro Bridge, *Coprosma grandifolia*, trunk/bark, 23 Oct 2002, KJ Froud & RC Henderson, #02-243, -245, [2]: 3 F. Waioeka Gorge, Nature Walk, 5 km S of Aro Aro Bridge, *Alectryon excelsus*, trunk/bark, 23 Oct 2002, KJ Froud, #02-246, [1]: 1 F. Waioeka Gorge, Nature Walk, 5 km S of Aro Aro Bridge, *Myrsine australis*, trunk/bark, 23 Oct 2002, KJ Froud, #02-244, [1]: 1 F. Whakatane, Kohi Point Walkway, *Korthalsella salicornioides*, 10 Apr 2010, A Sultan, #10-067, [1]: 1 F, 1 exuv1, 1 exuv2. GB: Gisborne, *Poncirus trifoliata*, fruits, 29 Apr 1971, GP Pollock, #1079, [2]: 3 F, 3 f2nd, 1 exuv2. Gisborne, *Salix humboldtiana*, stems & petioles, 8 Mar 1984, D Steven, #84-085c, [4]: 11 F. Te Araroa, Kakanui, W-E, head of Waipohatuhatu Stm, *Ripogonum scandens*, 22 Sep 1992, RC Henderson, #92-281, [1]: 1 F. HB: Flaxmere, Gourmet Blueberries, *Vaccinium virgatum*, 23 Feb 2006, R Durrant, #06-154, [1]: 1 F, 1 f2nd. Hastings, *Malus domestica*, 29 Apr 1974, RM Findlay, #2645, [1]: 2 F. Hastings, *Salix* sp., 24 Jul 1974, Ryan, #2784, [1]: 1 f2nd. Hastings, *Salix discolor*, 27 Jun 1974, Taylor, #2751, [1]: 3 F. Hastings, *Malus domestica*, 23 Mar 1976, #4424, [1]: 1 F. Maraetotara Gorge S.R., *Brachyglottis repanda*, stems & underside leaves, 6 Nov 2002, P Lo & KJ Froud, #02-272, [1]: 3 F. Maraetotara, Mohi Bush, *Aristotelia serrata*, branches, 6 Nov 2002, KJ Froud & RC Henderson, #02-269, [1]: 3 F. Maraetotara, Mohi Bush, *Solanum aviculare*, bark, 6 Nov 2002, KJ Froud & P Lo, #02-296, [1]: 3 F. Maraetotara, Mohi Bush, *Urtica ferox*, stems/bark., 6 Nov 2002, P Lo, #02-297b, [1]: 2 F. TK: New Plymouth, *Alectryon excelsus*, 26 Jul 1973, B Hill, #2028, [1]: 10 F. New Plymouth, Hookner Park, 885 Carrington Road, *Beilschmiedia tawa*, stems, 30 May 2005, RC Henderson, #05-182, [1]: 3 F. Waitara, *Solanum aviculare*, 22 Mar 1979, NA Martin, #79-92, [2]: 3 F, 5 f2nd. Waitara, *Solanum aviculare*, bark, 14 Oct 1980, NA Martin, #80-296f, [1]: 1 F. TO: Turangi, Motuoaapa, *Korthalsella salicornioides*, 19 Mar 2009, A. Sultan, #09-075, [1]: 1 F.

WI: Foxton, nr Foxton, swamp forest, *Syzygium maire*, 14 Apr 1932, VD Zotov, #77-301b, [2]: 8 F. Hunterville, Bruce Park S.R., *Hoheria sexstylosa*, stem, 10 Mar 1978, JS Dugdale, #78-76b, [3]: 2 F, 1 f2nd. 1st. Palmerston North, *Ligustrum* sp., Aug 1932, EE Chamberlain, [2]: 4 F. Palmerston North, *Pyrus communis*, 11 Sep 1939, LR Renouf, [1]: 4 F. Palmerston North, *Ribes nigrum*, 27 Jul 1950, JN Broad, [3]: 7 F. Palmerston North, Bledisloe Park, *Alectryon excelsus*, 21 Aug 1957, JI Townsend, [2]: 6 F. Palmerston North, Bledisloe Park, *Schefflera digitata*, leaflet axils, 21 Aug 1957, JI Townsend, [1]: 1 F. Palmerston North, Bledisloe Park, *Knightia excelsa*, 21 Aug 1957, JI Townsend, [1]: 3 F. Palmerston Nth, Massey University, *Phormium tenax*, 3 Aug 1972, Christie, #1563, [1]: 3 F. Rongotea, Coles Bush, *Korthalsella lindsayi*, internodes, 7 Aug 2008, A Sultan, #08-417, [1]: 1 F, 1 exuv2. Wanganui, Arun Park, property Holmes, *Actinidia deliciosa*, 20 Jun 1991, #91-199, [1]: 3 F. **WA:** Gladstone, Longbush Road, Mangahua Stream Bush, *Korthalsella lindsayi*, 26 Feb 2010, A. Sultan, #10-049, [1]: 2 F, 1 f2nd. **WN:** Levin, *Nematolepis* sp. [as *Phebalium*], 28 May 1956, D Spiller, [1]: 2 F. Lower Hutt, *Pomaderris apetala*, upperside leaves, 5 Nov 2008, BJ Rogan, #08-484, [1]: 3 F. Lower Hutt, *Hebe topiara*, stems, 29 Jan 2009, BJ Rogan, #09-027, [1]: 1 F, 1 f2nd. Orongorongo Valley, *Coprosma* sp., 21 May 1969, JS Dugdale, #539, [1]: 3 F. Waikanae, *Korthalsella salicornioides*, 1 May 2010, A Sultan, #10-072, [1]: 2 F. Wellington, *Dodonaea viscosa*, 31 Jun 1917, G Brittin, [1]: 1 F. Wellington, *Camellia* sp, 6 Jul 1951, KM Barnett, [3]: 7 F. Wellington, Cummings Park, *Knightia excelsa*, stem & petiole, 18 Aug 2003, C Inglis, #03-106, [1]: 3 F. Wellington, Otari Native Botanic Garden, *Halocarpus bidwillii*, juvenile & adult leaves & stems, 19 Feb 2009, BJ Rogan, #09-040 [1]: 2 F, 1 f2nd. **South Island.** **SD:** Opouri Valley, *Metrosideros fulgens*, 15 Oct 1968, JA de Boer, #449, [1]: 5 F. **NN:** Aorere Valley, start of Heaphy Track, *Coprosma propinqua*, stems, 17 May 2001, NA Martin, #01-111, [1]: 5 F. Cobb Valley, Lake Sylvester Track, *Empodisma minus*, stem node under sheath, 10 Jan 2005, GL & RC Henderson, #05-007, [1]: 3 F. Gardens Valley, *Prumnopitys taxifolia*, 8 Aug 1968, JA de Boer, #404, [1]: 1 F. Golden Bay, Kaihoka Lakes, *Brachyglottis repanda*, branch/bark, 12 Feb 2003, RC Henderson, #03-011, [1]: 1 F. Kaiteriteri, Seacliffs, *Dodonaea viscosa*, 4 Apr 1959, JI Townsend, [3]: 4 F. Karamea, Heaphy Track, *Astelia* sp., 8 Dec 2005, K Affeld, #06-052, [1]: 1 F. Lee Valley, *Lophomyrtus obcordata*, 14 Aug 1960, JI Townsend, [6]: 8 F. Motueka, *Malus domestica*, 25 Jul 1947, AH Eddie, [2]: 4 F. Motueka, *Actinidia arguta*, Feb 2002, P Shaw, #02-030, [1]: 1 F. Motueka, Umukuri, *Leptospermum* sp., 29 Jul 1917, G Brittin, #64, [1]: 1 F. Nelson, *Alectryon excelsus*, 1 Dec 1967, E Valentine, #287, [2]: 4 F, 1 exuv1, 1 exuv2. Nelson, Reservoir Reserve, *Dodonaea viscosa*, 5 Oct 1958, JI Townsend, [2]: 3 F. Nelson, Reservoir Reserve, *Dodonaea viscosa*, 11 Aug 1959, ES Gourlay, [4]: 4 F. Nelson, Reservoir Reserve, *Dodonaea viscosa*, 11 Aug 1959, JI Townsend, [1]: 6 F, 1 exuv2. Wairoa R, *Nestegis lanceolata*, 5 Mar 1969, JA de Boer, #496, [1]: 1 F. **KA:** Ward, upper Flaxbourne R, *Korthalsella salicornioides*, 1 Jan 2010, A Sultan, #10-062, [1]: 3 F. **NC:** Rangiora, *Ligustrum ovalifolium*, 2 Aug 1971, A Brown, #754, [1]: 5 F. Rangiora, Matawai Park, *Lophomyrtus obcordata*, 12 Feb 2009, E Hume, #09-320, [1]: 2 F. Rangiora, Matawai Park, *Coprosma robusta*, 12 Feb 2009, E Hume, #09-316, [1]: 1 f2nd. **MC:** Banks Peninsula, Le Bons Bay, *Ulex europaeus*, 5 Dec 1962, LJ Dumbleton,

[1]: 4 F. Banks Peninsula, Prices Valley Reserve, *Coprosma rotundifolia*, stem, 17 Aug 2005, NA Martin, #06-174, [1]: 2 F, 1 1st. Banks Peninsula, Prices Valley Reserve, *Raukawa anomalus*, twig nodes, 4 Dec 2005, GL & RC Henderson, #06-056, [1]: 1 F. Banks Peninsula, Prices Valley Reserve, *Elaeocarpus hookerianus*, stem, 4 Dec 2005, GL & RC Henderson, #06-048, [1]: 1 F. Banks Peninsula, Prices Valley Reserve, *Hoheria angustifolia*, 3 Nov 2005, NA Martin, #06-173, [1]: 1 F. Christchurch, *Myrtus* sp., 25 Apr 1915, G Brittin, #64, [1]: 1 F. Christchurch, *Myrtus communis*, 25 Jan 1915, G Brittin, #64, [1]: 1 F. Christchurch, *Ilex* sp., Oct 1949, J Hume, [4]: 12 F. Christchurch, *Ilex* sp., 20 Oct 1960, AJ Healy, [3]: 6 F. Christchurch, *Ceanothus papillosus*, 29 May 1977, RLC Pilgrim, #77-180a, [4]: 23 F. Christchurch, Botanic Gardens, *Hoheria* sp., 25 Jul 1939, RG Hamilton, [1]: 5 F. Christchurch, Botanic Gardens, *Pseudowintera colorata*, 4 Oct 1968, AJ Healy, #445, [1]: 1 F, 1 exuv2. Christchurch, Botanic Gardens, *Asterotrichon discolor*, stems & leaves, 15 Dec 2004, BH Doherty, #04-282b, [1]: 5 F. Christchurch, Botanic Gardens, *Elaeocarpus hookerianus*, underside leaves, 7 Nov 2007, NA Martin, #07-130, [1]: 3 F. Christchurch, Botanic Gardens, *Pseudopanax ferox*, juvenile leaves, 7 Nov 2007, S Bithel, #07-133, [1]: 3 F. Christchurch, Botanic Gardens, *Pseudopanax laetus*, underside leaves, 7 Nov 2007, NA Martin, #07-132, [1]: 2 F. Christchurch, Linwood Ave, *Laurus nobilis*, 3 Jun 1976, [1]: 4 F. Christchurch, Riccarton, *Ceanothus* sp., Sep 1960, M Driver, [3]: 4 F. Lincoln, *Sophora tetraptera*, 25 Sep 1969, JM Welsey, #560, [1]: 1 F. Lincoln, Canterbury Agricultural Research Centre, *Carpodetus serratus*, 13 Aug 2004, NA Martin, #04-161, [1]: 2 F. **Offshore Islands.** **TH:** Three Kings Is, Great I, *Streblus smithii*, 23 Jan 1952, EE Chamberlain, [1]: 1 F.

Kuwanaspis pseudoleucaspis (Kuwana) total 64 (1 1st, 6 2ndf, 46 F, 8 exuv1, 3 exuv2)

North Island. **AK:** Auckland, bamboo cane, 28 May 1976, J Cox, [5]: 5 F. Auckland, Glen Eden, 44C Pleasant Road, *Phyllostachys aurea*, small stems at nodes, 17 Apr 2003, RC Henderson, #03-031a-g, [7]: 5 F, 5 f2nd, 1 1st, 6 exuv1, 2 exuv2. Auckland, Glen Eden, 44C Pleasant Road, *Phyllostachys aurea*, stem nodes under dry bud scales, 25 July 2004, RC Henderson, #04-134a-c, [3]: 8 F, 1 f2nd, 2 exuv1. Auckland, Glen Eden, 44C Pleasant Road, *Phyllostachys aurea*, stems at nodes, 19 Sep 2004, RC Henderson, #04-214a-b, [2]: 5 F. Auckland, Glen Eden, 44C Pleasant Road, *Phyllostachys aurea*, stems at nodes, 21 Sep 2008, RC Henderson, #08-439, [1]: 2 F. Auckland, Glen Eden, 44C Pleasant Road, *Bambusa multiplex* var. 'Alphonse Karr', culms, 24 May 2009, RC Henderson, #09-292a-c, [3]: 12 F. Auckland, Mt Albert, bamboo, stems, 6 May 1996, TK Crosby, #96-124, [1]: 4 F, 1 exuv2. Auckland, Parnell, *Bambusa multiplex*, under leaf sheaths at stem nodes, 6 Oct 2008, C Inglis, #08-468, [1]: 3 F.

Lepidosaphes beckii (Newman) total 22 (19 F, 2 exuv1, 1 exuv2)

North Island AK: Auckland, Blockhouse Bay, "Foodtown", *Citrus sinensis*, fruit by calyx, 18 Oct 2002, LH Clunie, #02-229a-c, [3]: 7 F, 2 p, 2 exuv1. **GB:** Gisborne, Gisborne, *Citrus sinensis*, stems, 4 Nov 2002, W Hall, #02-301, [1]: 4 F. **South Island.** **NN:** Nelson, *Citrus paradisi*, Mar 1968, R Abbott, #380, [1]: 5 F, 1 exuv2.

Lepidosaphes multipora (Leonardi) total 6 (1 2ndf, 5 F)

South Island. NN: Motueka, *Eucalyptus* sp., 22 Jan 1922, G Brittin, #7, [3]: 3 F. DN: Oamaru, *Eucalyptus* sp., 10 Aug 1913, G Brittin, #7, [2]: 1 F, 1 f2nd. Oamaru, *Capsella bursa-pastoris*, 22 Sep 1913, G Brittin, #42, [1]: 1 F.

Lepidosaphes pallida (Maskell) total 51 (8 2ndf, 19 F, 12 2ndm, 3 pp, 4 p, 3 exuv1, 2 exuv2)

North Island. AK: Auckland, Avondale, *Cryptomeria japonica*, 30 Mar 1998, G Hall, [1]: 1 F. Auckland, Mt Albert summit, *Cryptomeria japonica*, 20 Mar 2001, RC Henderson, #01-042a, [1]: 4 F. Auckland, Mt Albert summit, *Cryptomeria japonica*, 27 Mar 2001, RC Henderson, #01-128a-d: 3 F, 2 m2nd, 1 p. Auckland, Mt Albert summit, *Cryptomeria japonica*, 24 July 2004, RC Henderson, #04-133a-f, [6]: 2 F, 5 f2nd, 7 m2nd, 3 exuv1, 2 pp. Auckland, Mt Albert summit, *Cryptomeria japonica*, base of leaves, 11 Aug 2005, RC Henderson, #05-210a-g, [7]: 9 F, 3 f2nd, 3 m2nd, 1 pp, 3 p, 1 M, 2 exuv2.

Lepidosaphes pinnaeformis (Bouché) total 37 (1 2ndf, 36 F)

North Island. AK: Auckland, orchid, in glasshouse, May 1952, P Fry, [3]: 6 F. Auckland, orchid, 22 May 1952, F Wilkin, [4]: 8 F. Auckland, *Cymbidium* sp., 15 Jun 1971, F Muir, #7993, [1]: 1 F, 1 M. Auckland, Ellerslie, *Cymbidium* sp., 3 Aug 2008, NA Martin, #08-410a-b, [2]: 7 F. Auckland, Glenfield, *Cymbidium* sp., leaf bases, 12 Apr 1993, D Steven, #93-104, [1]: 3 F. Auckland, Mangere, *Cymbidium* sp., in glasshouse, 13 Feb 1984, P Workman, #84-060d, [1]: 1 F. Auckland, Mt Albert, *Cordyline* sp., 23 Mar 1981, R Sunde, #81-121e, [1]: 5 F. Helensville, *Cymbidium* sp., 13 Feb 1984, P Workman, #84-060d, [1]: 1 f2nd.

Lepidosaphes ulmi (Linnaeus) total 46 (1 2ndf, 36 F, 5 exuv1, 4 exuv2)

North Island. AK: Auckland, *Malus domestica*, 15 Sep 1939, J Hume, [1]: 3 F. West Auckland, Riverhead, *Malus domestica*, 9 Sep 1968, RA Cumber, #1605, [1]: 5 F, 3 exuv2. WI: Feilding, Awahuri, *Crataegus monogyna*, 17 Apr 1937, W Cottier, [2]: 6 F. Palmerston North, Glen Oroua, *Malus domestica*, bark, 28 Jul 1953, CR Thomas, [2]: 5 F. WN: Porirua, Porirua Hospital, *Crataegus monogyna*, stems & fruit by calyx, 16 Feb 2009, BJ Rogan, #09-038a-b: 4 F, 1 f2nd, 5 exuv1. **South Island.** NN: Nelson, Appleby Research Orchard, *Malus domestica*, 29 Mar 1971, H Wearing, #729, [1]: 4 F, 1 exuv2. NC: Waipara, tree in bush, Oct 1915, G Brittin, #20, [1]: 1 F. CO: Roxburgh, *Prunus salicina*, 29 Jul 1952, I Mayo, [5]: 5 F. DN: Oamaru, *Rosa* sp., 11 Aug 1913, G Brittin, #20, [1]: 1 F.

Lindingaspis rossi (Maskell) total 284 (8 1st, 18 2ndf, 232 F, 3 pp, 15 p, 5 exuv1, 3 exuv2)

North Island. ND: Hen & Chickens Is, Lady Alice I, *Meryta sinclairii*, 31 Dec 1980, RE Beever, #80-14, -15, [4]: 4 F, 1 pp, 2 p, 2 M. Hen & Chickens Is, Whatupuke I, *Meryta sinclairii*, 1 Jan 1982, RE Beever, #82-14a, [2]: 4 F. Omahuta S.F., Kauri Sanctuary, *Coprosma* sp., 6 Oct 1980, JS Noyes, #81-40b, [2]: 2 F. Poor Knights I, Tawhiti Rahi I, *Geniostoma*

sp., 5 Dec 1980, CF Butcher, #81-42e, [2]: 2 F. Waipoua, Waipoua Forest, *Coprosma* sp., 2 Oct 1980, JS Noyes, #81-022d: 1 F. AK: Auckland, *Nematolepis squamea*, 27 Apr 1956, D Spiller, [1]: 2 F. Auckland, Birkenhead, Kauri Pt Centennial Park, *Olearia furfuracea*, upperside leaves, 2 Nov 2003, RE Beever, #03-205, [1]: 2 F. Auckland, Titirangi, *Araucaria heterophylla*, 31 Jan 1992, #92-034, [1]: 4 F, 1 f2nd. Hunua Ra, Workman Track, *Coprosma grandifolia*, both sides leaves, 13 Sep 2003, RE Beever, #03-197a-b, [2]: 3 F, 1 f2nd, 2 p. Waitakere Ra, Arataki Nature Trail, *Coprosma lucida*, 26 July 2003, NA Martin, #04-131, [1]: 2 F, 3 f2nd. Waitakere Ra, Destruction Gully Track, *Leonema nudum*, 28 Aug 1999, R Hoare, #99-128, [1]: 5 F, 1 f2nd. Waitakere Ra, Goodfellow Track, *Alseuosmia macrophylla*, underside leaves, 12 Mar 2006, NA Martin, #06-249, [1]: 3 f2nd, 1 p. Waitakere Ra, Huia, *Coprosma* sp., 12 Sep 1980, CF Butcher, #80-291f, [1]: 4 F. Waitakere Ra, Huia, Ocean View Rd, *Geniostoma* sp., 26 Sep 1980, CF Butcher, #80-282v, [1]: 3 F. Waitakere Ra, Huia, Ocean View Rd, *Coprosma robusta*, 26 Sep 1980, CF Butcher, #80-282u, [1]: 3 F. Waitakere Ra, Huia Dam, *Aristololia serrata*, 28 Mar 1981, BG Bennett, #81-100c, [1]: 1 f2nd. Waitakere Ra, Kakamatua Ridge Track, *Carmichaelia australis*, 10 Aug 2003, NA Martin, #03-135, [1]: 1 F. Waitakere Ra, Parau Track, *Rhopalostylis sapida*, 15 Mar 2000, RC Henderson, #00-042, [1]: 1 F, 2 p, 1 M. WO: Te Kauwhata, *Ligustrum lucidum*, 1 July 2009, CJ Winks, #09-309, [1]: 3 F. Waikato, Waerenga, Reed Road, *Ligustrum lucidum*, 19 May 2003, C. Inglis, #03-068, [1]: 2 F. BP: East Cape, Waiaroho, *Laurelia novae-zelandiae*, 29 Sep 1993, RC Henderson, #01-201, [1]: 1 f2nd. Kawerau, public carpark behind Road Services Depot, *Banksia integrifolia*, upperside leaves, 25 Sep 2003, L Renney, #03-157, [1]: 5 F. Rotorua, *Nematolepis squamea*, 27 Jul 1979, T Heymann, #8128, [1]: 1 F. Rotorua, Whakarewarewa, *Nematolepis squamea*, 14 Jul 1960, R Zondag, [6]: 6 F. Tauranga, *Citrus sinensis*, Jun 1935, W Cottier, [2]: 8 F. Tauranga, *Citrus sinensis*, May 1936, W Cottier, [1]: 3 F. Tauranga, Pyes Pa, *Nematolepis squamea*, 6 Oct 1978, T Caines, #78-285a, [2]: 3 F, 1 M. Te Puke, *Nematolepis squamea*, 3 Apr 1980, D Steven, #80-123, [3]: 13 F. Whakatane, Otakiri, *Elaeagnus* sp., 24 Oct 1934, Dir. Hort. Div., [2]: 6 F. CL: Coromandels, Thames, *Citrus sinensis*, Feb 1933, Orchard Instructor, [2]: 4 F. GB: East Cape, *Pouteria costata*, 20 Sep 1992, RC Henderson, #92-306a, [1]: 1 F. Te Araroa, Kakanui, W-E, head of Waipohatuhatu Stm, *Ripogonum scandens*, 22 Sep 1992, RC Henderson, #92-280, [1]: 3 F, 1 p, 1 M. HB: Hastings, *Pseudotsuga menziesii*, 22 Mar 1930, LJ Dumbleton, [1]: 10 F. Hastings, palm, Nov 1944, W Cottier, [2]: 8 F. Hastings, palm, 28 Nov 1944, T Conway, [1]: 3 F. Hawkes Bay, *Citrus sinensis*, G Brittin, #4, [1]: 1 F. Hawkes Bay, *Citrus sinensis*, 1912, G Brittin, #4, [1]: 1 F. Hawkes Bay, *Citrus sinensis*, 24 Jul 1913, G Brittin, #4, [1]: 1 exuv1, 1 exuv2. WN: Wellington, *Corokia buddleioides*, Jul 1977, T Stewart, #77-206c, [5]: 7 F, 1 p, 2 M. Wellington, *Phoenix canariensis*, 19 Nov 2007, BJ Rogan, #07-135, [1]: 2 F. Wellington, Central Park, *Laurus nobilis*, 24 Mar 2005, L Renney, #05-164, [1]: 3 F. Wellington, Central Park, *Fatsia japonica*, 24 Mar 2005, L Renney, #05-163a-b, [2]: 1 F, 3 f2nd, 4 p. Wellington, Otari Native Botanic Garden, *Alseuosmia macrophylla*, 1 Sep 2003, E Burton, #03-133: 2 F. **South Island.** SD: Queen Charlotte Sd, Resolution Bay, *Citrus grandis*, 23 Jan 1991, DJ Allan, #91-030, [1]: 2 F, 2 f2nd, 3 1st. NN: Nelson, *Camellia* sp., 12 Aug 1930, LJ

Dumbleton, [1]: 4 F. Nelson, *Hoheria* sp., 24 Nov 1938, G Brittin, #4, [1]: 3 F. Nelson, *Eucalyptus* sp., 27 Aug 1952, L Saxton, [6]: 19 F. Nelson, *Liquidambar styraciflua*, 14 Jul 1955, T Christie, [1]: 3 F. Nelson, *Sequoia sempervirens*, Sep 1959, BB Given, #78-251b, [4]: 9 F, 2 M. Nelson, *Hedera* sp., 31 Jan 1983, U Gerson, #83-042b, [2]: 6 F. Nelson, Anzac Park, *Griselinia littoralis*, 6 Jan 1948, LJ Dumbleton, [1]: 5 F. Nelson, Anzac Park, *Pinus mugo*, needles, 16 Nov 2006, R Baigent, #06-326, [1]: 2 F. Nelson, Queen's Gardens, palm, 10 Sep 1968, JA de Boer, #430, [3]: 6 F, 1 M, 4 exuv1, 2 exuv2. Nelson, Tahunanui Beach Reserve, *Leptospermum laevigatum*, 2 May 2003, CA Scott, #03-057, [1]: 4 F. Waimea, *Olea europaea*, leaves + young fruit, 16 Mar 1999, G Burnip, #99-012, [1]: 3 F, 1 f2nd. **MB**: Blenheim, *Corokia cotoneaster*, upperside leaves, 3 Jul 2001, R Kleinpaste, #01-030, [1]: 2 F. Blenheim, *Lophomyrtus* cv., both sides leaves, 9 Aug 2006, NA Martin, #06-296a-d, 4 F, 4 1st, 2 pp, 11 M. Blenheim, Renwick, *Olea europaea*, 15 Mar 1999, G Burnip, #99-014, [1]: 1 F, 1 p. Blenheim, Spring Creek, *Pseudotsuga menziesii*, 14 Sep 2000, B Doherty, #00-128a-b, [2]: 5 F. Blenheim, Woodbourne Military Base, *Garrya elliptica*, upperside leaves, 14 Oct 2008, J Bartram, #08-460, [1]: 2 F.

***Parlatoria desolator* McKenzie** total 21 (21 F)

North Island. AK: Auckland, *Pyrus communis*, 4 May 1949, I Nottage, [3]: 3 F. Auckland, *Pyrus communis*, 20 Mar 1956, D Spiller, [2]: 7 F. Auckland, *Prunus* sp., Aug 1958, HG King, [1]: 1 F. Auckland, Henderson, *Malus domestica*, 5 May 1950, HG King, [1]: 1 F. Auckland, Henderson, *Pyrus communis*, 9 Aug 1951, H Taylor, [2]: 4 F. **BP**: Tauranga, *Prunus* sp., 28 Aug 1936, AR Grainger, [2]: 5 F.

***Parlatoria fulleri* Morrison** total 114 (1 1st, 4 2ndf, 89 F, 5 2ndm, 3 pp, 5 p, 5 exuv1, 2 exuv2)

North Island. AK: Auckland, Avondale, 54 Patiki Road, *Griselinia littoralis*, 15 Sep 2003, RC Henderson, #03-143a-c, [3]: 2 F, 1 f2nd, 1 m2nd, 2 exuv1, 1 exuv2, 3 M. Auckland, Avondale, 54 Patiki Road, *Griselinia littoralis*, 19 July 2004, RC Henderson, #04-130a-e, [5]: 2 F, 2 f2nd, 2 m2nd, 3 pp, 3 p, 4 M. Auckland, Ellerslie, *Leptospermum* sp., 29 June 2009, NA Martin, #09-306, [1]: 3 F. Auckland, Henderson, *Elaeagnus* sp., Aug 1956, HG King, [3]: 3 F. Auckland, Mangere, James Fletcher Drive (Favona), *Tristaniopsis laurina*, underside leaves, 16 Apr 2009, C Inglis, #09-221, [1]: 4 F. Auckland, Mt Albert, New North Rd, *Callistemon* sp., both sides leaves, 8 June 2000, RC Henderson, #00-099, [1]: 2 F. Auckland, Mt Albert Research Centre, *Pinus radiata*, 1 Aug 1957, W Cottier, [7]: 7 F. Auckland, Mt Albert Road, *Callistemon* sp., 10 June 1999, RC Henderson, #99-075a-d, [4]: 12 F. Auckland, Onehunga, *Lophostemon confertus*, 16 Apr 2009, C Inglis, #09-088, [1]: 3 F, 1 m2nd. Auckland, Onehunga, *Macadamia* sp., 31 Mar 2009, C Inglis, #09-079, [1]: 4 F. Auckland, Otahuhu, *Banksia integrifolia*, upperside leaves, 1 May 2009, C Inglis, #09-294, [1]: 3 F. Auckland, St Johns, *Knightsia excelsa*, underside leaves, 31 Aug 2009, C Inglis, #09-391, [1]: 5 F. Auckland, St Lukes Rd, shopping centre, *Phoenix canariensis*, 6 Sep 2000, RC Henderson, #00-011a, [1]: 3 F. Auckland, Wiri, *Buxus sempervirens*, both sides leaves, 25 Sep 2008, C Inglis, #08-434, [1]: 5 F. Waiuku, Glenbrook Steel Mill, *Griselinia littoralis*, 27 Oct

2004, CA Scott, #04-252, [1]: 8 F. **BP**: Tauranga, *Griselinia littoralis*, both sides leaves, 14 May 2007, DL Brunt, #07-081, [1]: 5 F. Tauranga, Mt Maunganui, Blake Park, *Ceratopetalum gummiferum*, upperside leaves, 24 Mar 2009, BJ Rogan, #09-077, [1]: 4 F. **HB**: Napier, *Callistemon citrinus*, 13 Nov 2008, JA Bartram, #08-491, [1]: 5 F. Napier, Breakwater Rd, port area, *Melaleuca hypericifolia*, 28 June 2003, C Inglis, #03-076a-g, [7]: 7 F, 1 f2nd, 1 m2nd, 2 p, 1 1st, 3 exuv1, 1 exuv2.

***Parlatoria pittospori* (Maskell)** total 99 (6 2ndf, 79 F, 6 exuv1, 8 exuv2)

North Island. AK: Auckland, Henderson, *Elaeagnus* sp., Aug 1956, HG King, [1]: 1 F. Auckland, Henderson, *Malus domestica*, fruit, May 1959, HG King, [2]: 1 F, 1 f2nd. Auckland, Mt Albert, *Leucospermum bolusii*, 19 Oct 1977, LL Deitz, #77-301e, [2]: 4 F. Auckland, Mt Albert, *Chamaecyperus lawsoniana*, 17 Nov 1978, LL Deitz, #78-334, [3]: 6 F. Auckland, Onehunga, *Corokia cotoneaster*, 20 Aug 2004, C Inglis, #04-190, [1]: 4 F. **BP**: Tauranga, Mt Maunganui, *Banksia integrifolia*, upperside leaves, 28 Jan 2004, BJ Rogan, #04-024a, [1]: 3 F, 1 f2nd. **HB**: Havelock North, *Malus domestica*, fruit, 18 May 1933, Director Horticulture Division, [2]: 2 F. Hawkes Bay, *Malus domestica*, 1933, Director Horticulture Division, [1]: 1 F. Hawkes Bay, *Malus domestica*, fruit, Mar 1993, JG Charles, #93-085a-b, [2]: 1 F, 1 f2nd. **WN**: Wellington, Bolton Street Cemetery, *Abies grandis*, needles, 4 May 2009, BJ Rogan, #09-291, [1]: 4 F. **South Island. NN**: Nelson, *Pinus radiata*, 4 July 1917, G Brittin, #139, [1]: 1 F. Nelson, *Pinus nigra*, 7 Sep 1959, R Zondag, [1]: 1 F. Nelson, *Grevillea alpina*, 13 Oct 2008, BJ Rogan, #08-464, [1]: 2 F. Nelson, *Callitris rhomboidea*, 16 Oct 2008, BJ Rogan, #08-466, [1]: 3 F. **MB**: Blenheim, *Pinus radiata*, 17 June 1952, D McCallum, [3]: 6 F. Blenheim, Fairhall, *Malus domestica*, fruit, 8 Apr 1944, T Conway, [2]: 2 F. Blenheim, Omaka, *Pinus radiata*, 29 Nov 1956, JS Timlin, [6]: 11 F. **KA**: Kekerengu, *Pachystegia insignis*, 21 Feb 1982, CF Butcher, #83-327b, [1]: 1 F. **MC**: Christchurch, *Malus domestica*, fruit, 21 May 1952, JD Galletely, [4]: 3 F, 5 exuv1, 5 exuv2. Christchurch, Hagley Park, *Callitris oblonga*, 11 Sep 2003, PM Bradley, #03-151, [1]: 4 F. Christchurch, Hillmorton Hospital, *Nematolepis squamea*, upperside leaves, 21 Mar 2006, BH Doherty, #06-201, [1]: 5 F. Lincoln, HortResearch, *Malus domestica*, 22 May 1996, G Burnip, #98-065a-d, [4]: 4 F. Lincoln University, *Cedrus atlantica*, 29 Sep 2009, M Hansen, #09-417, [1]: 4 F.

***Pellucidaspis epiphytidis* (Maskell)** total 131 (8 1st, 6 2ndf, 79 F, 3 2ndm, 3 pp, 2 p, 17 exuv1, 13 exuv2)

North Island. AK: Waitakere Ra, Fairy Falls Track, *Collosporum hastatum*, 16 May 2004, RC Henderson, #04-085, [1]: 3 F. Waitakere Ra, Fairy Falls Track, *Collosporum hastatum*, 30 July 2005, RC Henderson, #05-208, [1]: 5 F. Waitakere Ra, Fairy Falls Track, *Collosporum hastatum*, 5 July 2009, CJ Hodgson & RC Henderson, #09-302a-d, [4]: 3 F, 3 pp, 1 p. 1 M. Waitakere Ra, Huia, *Astelia banksii*, 1 Nov 1973, JA de Boer, #1095, [1]: 1 F. Waitakere Ra, Twin Peaks Ridge, *Astelia banksii*, 15 Dec 1972, BM May, #966, [1]: 4 F, 1 f2nd. West Auckland coast, Bethells, Matuku Reserve, *Collosporum hastatum*, 18 Oct 1992, RC Henderson, #92-293, [1]: 3 F. West Auckland coast, North Piha, Laird

Thomson Track, *Astelia banksii*, underside leaves, 24 Apr 2000, RC Henderson, #00-081a-f, [6]: 10 F, 8 exuv1, 7 exuv2. West Auckland coast, North Piha, Laird Thomson Track, *Astelia banksii*, 9 Aug 2003, RC Henderson, #03-085a-k, [11]: 14 F, 5 f2nd, 3 m2nd, 1 p, 1 1st, 7 exuv1, 4 exuv2. Whitford, Waikopua Road, Claude Strm Valley, *Collospermum hastatum*, 21 May 2005, RC Henderson, #05-188, [1]: 1 F. **RI**: Ruahine Forest Park, Umutoi North Road end, Shorts Track, *Collospermum microspermum*, both sides leaves, 17 Jan 2009, RE Beever, #09-011a-c, [3]: 9 F, 7 1st. **WN**: Orongorongo Valley, *Collospermum [solandri]?*, 23 Sep 1969, DJ Campbell, #554, [1]: 4 F. **South Island**. **NN**: Abel Tasman NP, Bark Bay, *Astelia* sp., Jan 1924, G Brittin, #54, [2]: 1 F. Westport, *Astelia* sp., May 1926, G Brittin, #54, [2]: 5 F. **BR**: Punakaiki, Bullock Creek, *Astelia* sp., 7 Dec 2005, RC Henderson, #05-348 & #08-433, [2]: 9 F, 2 exuv1, 2 exuv2.

***Pinnaspis aspidistrae* (Signoret)** total 19 (2 2ndf, 14 F, 1 exuv1, 2 exuv2)

North Island. **HB**: Hastings, fern, in glasshouse, 12 Dec 1978, RA Ward, #7254, [2]: 2 F. **WI**: Wanganui, fern, May 1935, W Cottier, [1]: 3 F. **WN**: Wellington, Botanic gardens, Lady Norward Hothouse, 22 Nov 2010, BJ Rogan, *Rhapis excelsa* fronds, #10-152 [1]: 5 F, 2 f2nd, 1 exuv1, 1 exuv2. **South Island**. **NN**: Nelson, fern, pot plant, May 1968, Mr Miller, Dep. Of Agr., #No. 388, [2]: 3 F, 1 exuv. **MC**: Christchurch, banana, 2 Dec 1916, G Brittin, #101, [1]: 1 F.

***Poliaspis chathamica* Henderson n. sp.** total 20 (1 2ndf, 19 F)

Offshore Islands **CH**: Chatham I, Mananea, nr Pakauwera, *Olearia traversii*, 5 Mar 1991, CF Morales, #91-114a-b, [2]: 2 F, 1 f2nd. Chatham I, Waitangi, *Olearia traversii*, 5 Mar 1991, CF Morales, #91-106b, [1]: 2 F. Chatham Is, South East I, Nth Landing, *Olearia traversii*, stems, 9 Dec 1987, JS Dugdale, #90-219a-h: 15 F.

***Poliaspis floccosa* Henderson n. sp.** total 366 (1 1st, 8 2ndf, 279 F, 12 2ndm, 1 p, 36 exuv1, 29 exuv2)

North Island. **ND**: Cavalli Is, Hamaruru I, *Phormium tenax*, 1 Jan 1979, L Roberts, #79-201c, [2]: 3 F. Cavalli Is, Motumuka I, *Phormium tenax*, 29 Dec 1978, L Roberts, #79-201d, [2]: 7 F. Poor Knights I, Tawhiti Rahi I, *Phormium tenax*, 11 Dec 1980, CF Butcher, #81-50d, [3]: 7 F. **AK**: Auckland, *Phormium tenax*, 23 Jan 1974, M Moore, #no. 1119, [1]: 3 F, 1 M. Auckland, *Phormium tenax*, 15 June 1979, Pickering, #7994, [1]: 1 F. Auckland, *Phormium tenax*, 2 Feb 1980, Anderson, #8660, [1]: 3 F. Auckland, Eden Garden, *Phormium tenax*, 25 Aug 1972, #1590, [1]: 3 F. Auckland, Hillsborough, *Phormium tenax*, 10 Dec 1979, L Pickering, #79-348g, [2]: 7 F. Auckland, Lynfield, Boundary Rd / MAF grounds, *Furcraea* sp., 13 June 1997, K. Chadfield, #97-077, [1]: 3 F. Auckland, Mt Albert, *Phormium tenax*, 2 Mar 1981, S Pennycook, #81-64a, [5]: 7 F, 3 M 1 exuv2. Auckland, Mt Albert Research Centre, *Phormium tenax*, 2 Feb 1992, RC Henderson, #92-041a-b, -042a-b, -043a-d, [9]: 36 F. Auckland, Mt Albert Research Centre, *Phormium tenax*, 6 Mar 1997, RC Henderson, #97-044a-e, [5]: 13 F. Auckland, Mt Albert Research Centre, *Cordylina obtecta*, 24

Apr 2008, NA Martin, #08-415a-c, [3]: 6 F, 1 f2nd, 1 m2nd, 6 exuv1, 1 exuv2. Auckland, Mt Albert Research Centre, *Libertia ixioides*, 21 June 2010, NA Martin, #10-120a-b, [2]: 4 F, 1 f2nd. Auckland, New Lynn, Lynnall, *Cordylina* sp., 5 July 2004, NA Martin, #04-124a-c, [3]: 13 F, 1 f2nd, 2 exuv2, 5 m2nd. Auckland, Pollen I, *Ozothamnus leptophyllus*, 7 Oct 1982, CF Butcher, #84-011f, [1]: 3 F. Auckland, St Heliers, Dingle Dell Reserve, *Phormium tenax*, 30 Apr 2004, NA Martin, #04-082, [1]: 3 F. Auckland, Titirangi, Smith garden, *Phormium tenax*, 3 Dec 1976, MK Maloney, #76-351, [2]: 11 F. Auckland, Traherne I, *Phormium tenax*, 7 Oct 1980, CF Butcher, #80-291h, [4]: 5 F, 2 M. Mathesons Bay, *Dianella* sp., 27 June 2010, NA Martin, #10-123a-c, [3]: 4 F, 2 exuv1, 2 exuv2. North Shore, Torbay, *Libertia peregrinans*, 22 Dec 2008, FL Henderson, #08-510a-b, [2]: 4 F, 1 f2nd, 3 m2nd, 1 1st. Waitakere Ra, Whatipu, *Phormium tenax*, 29 Nov 1978, MF Tocker, #78-346a, [2]: 6 F. West Auckland coast, Piha, *Phormium cookianum*, 8 Sep 1968, R Sunde, #no. 1601, [2]: 8 F, 2 exuv1, 6 exuv2. **CL**: Waihi, *Cordylina* sp., May 1934, RP Bell, #232, [1]: 1 F. **WO**: Hauraki Plains, Elstow Canal, Kopuatai wetland, *Dianella* sp., underside leaves, 12 Feb 1998, GW Barker, #10-030a-b, [2]: 5 F, 1 f2nd, 2 m2nd, 3 exuv1, 3 exuv2. Hauraki Plains, Ngatea, *Cordylina australis*, 21 Oct 1933, RP Bell, #232, [1]: 1 F. **BP**: East Cape, Rereauria Swamp, *Phormium tenax*, 19 Sep 1992, RC Henderson, #92-250, [1]: 3 F. East Cape, Rereauria Swamp, beech ridge, *Phormium tenax*, 26 Jan 1993, RC Henderson, #93-256a, [1]: 2 F. Hicks Bay, Motel, walk to Onepoto Bay, *Arthropodium cirratum*, underside leaves, 15 Mar 1994, RC Henderson, #10-031a-c, [3]: 10 F, 1 m2nd, 1 p, 3 exuv1, 2 exuv2. Hicks Bay, Te Koau, *Cordylina banksii*, 23 Sep 1992, RC Henderson, #92-245a-b, [2]: 9 F. **GB**: East Cape, *Phormium tenax*, 20 Sep 1992, RC Henderson, #92-295a-c, [3]: 9 F, 4 exuv1, 2 exuv2. Gisborne, *Cordylina australis*, 5 Dec 1991, G. Shone, #91-344a-b, [2]: 4 F. Te Araroa, Kakanui, coastal cliff, *Phormium tenax*, 22 Sep 1992, RC Henderson, #92-316a-b, [2]: 11 F. **HB**: Maraetotara, Maraetotara Falls, *Phormium tenax*, 6 Nov 2002, RC Henderson, #02-292a-e, [5]: 14 F, 13 exuv1, 12 exuv2. **WN**: Paraparaumu, *Phormium tenax*, 28 Feb 1946, PG Lee, [1]: 3 F. **South Island**. **SD**: D'Urville I, *Phormium tenax*, 17 Feb 1971, JA de Boer, #no. 702: 6 F, 3 exuv1, 3 exuv2, **NN**: Motueka, Tasman, *Phormium tenax*, 20 Oct 1937, G Brittin, #232, [2]: 3 F, 3 exuv2. **MC**: Christchurch, Botanic Gardens, *Phormium tenax*, 25 July 1939, RG Hamilton, [1]: 3 F. Christchurch, Botanic Gardens, *Phormium tenax*, 6 July 1977, LM Emms, [1]: 2 F. Christchurch, Riccarton Bush, *Phormium cookianum*, 26 Sep 1997, RC Henderson, #97-137, [1]: 2 F. Christchurch, Rockinghorse Rd, *Phormium tenax*, 17 Apr 1978, P Jones, #LLINC.633, [1]: 4 F. **Offshore islands**. **TH**: Three Kings Is, Great I, Bald Hill, *Phormium tenax*, 14 Apr 1999, JJ Dymock, #99-035, [1]: 5 F. Three Kings Is, Great I, NW Bay landing track, *Phormium tenax*, 16 Oct 1991, PG Simpson, #91-308a-e, [5]: 9 F.

***Poliaspis lactea* (Maskell)** total 129 (2 1st, 3 2ndf, 88 F, 18 exuv1, 18 exuv2)

North Island. **ND**: Waipoua, Waimatenui, *Fuchsia excorticata*, 24 Feb 1960, RA Cumber, [3]: 7 F. **WO**: Hauraki Plains, Awaiti Canal Road, end, Kopuatai Peat Dome, *Epacris pauciflora*, stems & axils, 18 Oct 2004, RC Henderson, #04-231, [1]: 5 F. Hauraki Plains, Torehape peat mine, *Epacris*

pauciflora, stems, 30 Oct 2001, RE Beever, #01-165a-i, [9]: 15 F, 2 m2nd 5 exuv1, 6 exuv2. **BP**: Rotorua, L Rotoehu, *Fuchsia excorticata*, June 1951, JM Dingley, [2]: 3 F. **HB**: Maraetotara, Mohi Bush, *Fuchsia excorticata*, trunk/bark, 6 Nov 2002, KJ Froud & RC Henderson, #02-294a-f, [6]: 11 F, 1 1st, 4 exuv1, 5 exuv2. **TO**: Ohakune, *Fuchsia excorticata*, 12 June 1924, G Brittin, [1]: 1 F. **WI**: Turakina Beach, *Ozothamnus leptophyllus*, 13 Apr 1958, JI Townsend, [1]: 2 F. **South Island**. **NN**: Motueka, Riwaka, *Fuchsia excorticata*, 18 May 1922, G Brittin, [2]: 2 F. Motueka, Riwaka, *Coprosma* sp., 15 Mar 1925, G Brittin, [1]: 1 F. Mt Arthur Tableland, Mt Arthur, *Astelia* sp., 24 Mar 1971, JS Dugdale, #no.726, [1]: 4 F, 1 exuv1, 1 exuv2. Nelson, *Olearia arborescens*, 6 Jan 1969, JS Dugdale, #no. 476, [1]: 3 F. **MC**: Christchurch, Botanic Gardens, *Olearia x macrodonta*, 25 Apr 1915, G Brittin, [1]: 1 F. Lincoln, Canterbury Agricultural Research Centre, *Olearia* sp., stems, 13 Aug 2004, NA Martin, #04-158a-m: 19 F, 3 f2nd, 1 1st, 7 exuv1, exuv2. **SC**: Peel Forest, *Pittosporum tenuifolium*, 24 Nov 1956, JM Hoy, #03-052a-b, [2]: 3 F, 1 F, 2 exuv2. **DN**: Oamaru, Oamaru Gardens, *Olearia x macrodonta*, 6 May 1913, G Brittin, [2]: 2 F. **SL**: Catlins, Picnic Point, *Myrsine australis*, 6 Oct 1955, JM Hoy, [1]: 7 F.

***Poliaspis media* Maskell** total 1153 (18 1st, 45 2nd, 730 F, 75 2ndm, 3 pp, 29 p, 120 exuv1, 133 exuv2)

North Island. **ND**: Brynderwyn, *Leucopogon fasciculatus*, 9 Oct 1968, RA Cumber, #1640, [1]: 3 F, 2 exuv2. Hokianga Harbour, South Head, Arai te Uru Walkway, *Leucopogon fasciculatus*, stems & leaves, 26 Nov 2002, RC Henderson, #10-027a-b, [2]: 3 F, 2 exuv1, 5 exuv2. North Cape, Surville Cliffs, rock face, *Pimelea prostrata*, 8 Feb 1975, AK Walker, #76-303a, [2]: 10 F, 2 exuv2. Poor Knights I, Tawhiti Rahi I, *Samolus repens*, 2 Dec 1980, CF Butcher, #81-022k, [1]: 2 F. Poor Knights I, Tawhiti Rahi I, *Cyathodes* sp., 2 & 4 Dec 1980, CF Butcher, #84-011g, #81-121b, [4]: 13 F. Tangihua, Tangihua Lodge, *Leucopogon fasciculatus*, 6 Apr 1993, RC Henderson, #93-105a-b, [2]: 5 F, 1 m2nd, 2 exuv2. Waipoua, Waipoua Forest, *Leucopogon fasciculatus*, 17 Aug 1958, JM Hoy, [1]: 3 F, 1 p. **AK**: Auckland, Glen Innes, Waiotaihi Bay, *Myrsine australis*, leaf tip curls [chlorotic], 13 Jan 2002, NA Martin, #02-009, [1]: 8 F. Auckland, Henderson, Corbans Estate-Opanuku Strm, *Myrsine australis*, leaf tip rolls, 24 Mar 2006, RC Henderson, #06-255, [1]: 5 F. Auckland, Manurewa, Olive Davis S.R., *Leucopogon fasciculatus*, 30 Oct 1999, RC Henderson, #00-013a-b, [2]: 3 F, 3 m2nd. Auckland, St Heliers, Dingle Dell Reserve, *Myrsine australis*, leaf tip curls, 30 Apr 2004, NA Martin, #04-080, [1]: 5 F. Hauraki Gulf, Rangitoto I, *Myrsine australis*, leaf tip curls, 17 Dec 2002, RC Henderson, #03-004, [1]: 6 F. Hauraki Gulf, Rangitoto I, *Coprosma robusta*, leaf distortions & rosette galls, 17 Dec 2002, RC Henderson, #03-005, [1]: 3 F. Hunua Ra, Omana Regional Park, *Myrsine australis*, leaf tip curl galls, 1 Apr 2002, NA Martin, #02-083a-d: 12 F, 5 M. Hunua Ra, Workman Track, *Leucopogon fasciculatus*, underside leaves, 17 May 2003, RC Henderson, #03-071a-e, [5]: 4 F, 1 f2nd, 6 m2nd, 6 p, 1 1st, 5 exuv1. Kaipara, Omeru S.R., Omeru Falls, *Myrsine australis*, leaf tip curl galls, 26 Sep 1999, NA Martin, #99-146a-c, [3]: 6 F. Orewa, Hatfields Beach, nth end headland, *Myrsine australis*, leaf tip curl galls, 28 Sep 2002, RC Henderson, #02-227a-g, [7]: 2 F, 13 f2nd, 9 m2nd, 10 1st, 17 exuv1. Orewa, Hatfields Beach, nth end

headland, *Leucopogon fasciculatus*, underside leaves, 28 Sep 2002, RC Henderson, #02-256a-b, [2]: 3 F, 3 exuv1, 4 exuv2. Orewa, Hatfields Beach, nth end headland, *Leptecophylla juniperina*, underside leaves, 28 Sep 2002, RC Henderson, #02-257a-d, [4]: 4 F, 8 exuv1, 7 exuv2. Puhoi, Dunns Bush, *Myrsine australis*, leaf tip curls, 5 Aug 2001, NA Martin, #01-178a-d: 20 F. Waitakere Ra, Cornwallis, *Cyathodes* sp.[*Leptecophylla*] 28 May 1983, P Dale, #83-168c, [2]: 6 F. Waitakere Ra, Destruction Gully Track, *Coprosma arborea*, in bud galls, 29 Oct 1977, BM May, #77-318b, [2]: 7 F. Waitakere Ra, Destruction Gully Track, *Leonema nudum*, 28 Aug 1999, R. Hoare, #99-127a-c, [3]: 3 F. Waitakere Ra, Destruction Gully Track, *Coprosma robusta*, leaf rosette galls, 30 Apr 2000, RC Henderson, #00-087a-c, [3]: 9 F. Waitakere Ra, Destruction Gully Track, *Coprosma arborea*, leaf rosette galls, 21 Apr 2002, NA Martin, #02-085a-c, [3]: 12 F, 2 p, 1 M. Waitakere Ra, Destruction Gully Track, *Coprosma robusta*, leaf rosette galls, 12 Jan 2003, NA Martin, #03-007, [1]: 4 F. Waitakere Ra, Fletcher Track, *Leucopogon fasciculatus*, underside leaves, 11 May 2002, FL & RC Henderson, #02-104a-c, [3]: 7 F, 1 M, 5 exuv1, 3 exuv2. Waitakere Ra, Goodfellow Track, *Dracophyllum latifolium*, leaf bases, 14 Mar 2006, NA Martin, #06-252, [1]: 5 F. Waitakere Ra, Huia, *Coprosma spathulata*, rosette bud galls, 12 Aug 1968, BM May, #1585, [1]: 3 F. Waitakere Ra, Huia, *Coprosma arborea*, 29 Jan 1978, BM May, #78-45a, [2]: 5 F. Waitakere Ra, Huia, *Leucopogon fasciculatus*, 29 Aug 1980, CF Butcher, #80-247b, [1]: 2 F. Waitakere Ra, Huia, *Leucopogon fasciculatus*, 12 Sep 1980, CF Butcher, #80-282g, [1]: 2 F. Waitakere Ra, Huia, Ocean View Rd, *Coprosma propinqua*, 4 June 1980, CF Butcher, #80-163d, [1]: 1 F. Waitakere Ra, Huia, Ocean View Rd, *Leucopogon fasciculatus*, 10 Oct 1980, ME Tocker, #80-291d, [1]: 1 F. Waitakere Ra, Karamatura Track, *Myrsine salicina*, curled leaf margins, 21 Sep 1997, NA Martin, #97-132a-b, [2]: 8 F. Waitakere Ra, Mt Donald McLean, *Myrsine salicina*, rolled leaves, 13 Apr 1998, NA Martin, [1]: 2 F. Waitakere Ra, Sharps Bush, *Leucopogon fasciculatus*, 1 Aug 1999, RC Henderson, #99-098a-c, [3]: 5 F, 2 f2nd, 1 p, 1 M, 8 exuv1, 6 exuv2. Waitakere Ra, Whatipu, Kura Track, *Coprosma arborea*, leaf rosette galls, 28 Sep 2002, NA Martin, #03-006, [1]: 4 F. Waitakere Ranges, *Leucopogon fasciculatus*, 4 Sep 1968, RA Cumber, #1595, [1]: 5 F, 3 exuv2. Waitakere Ranges, *Leucopogon fasciculatus*, 12 Aug 1975, [2]: 4 F. Waitakere Ranges, *Leucopogon fasciculatus*, 1 Sep 1975, JM Johannesson, [9]: 9 F. West Auckland coast, Muriwai, Houghtons Bush, *Leucopogon fasciculatus*, leaves & flower buds, 16 Aug 2003, RC Henderson, #03-136a-e, [5]: 4 F, 3 f2nd, 4 m2nd, 2 1st, 7 exuv1, 5 exuv2. **WO**: Hauraki Plains, Awaitei Canal Road, Kopuatai Peat Dome, *Dracophyllum lessonianum*, 16 Oct 2004, RC Henderson, #04-226, [1]: 6 F. Hauraki Plains, Ngatea, *Myrsine australis*, 14 Nov 1933, R.P. Bell [for G. Brittin], #47, [3]: 19 F, 4 exuv1, 10 exuv2 [from Brittin's dry material of *Poliaspis argentosis*]. **BP**: East Cape, Rereauria Swamp, *Coprosma* sp., 17 Sep 1992, RC Henderson, #92-285, [1]: 2 F. East Cape, Rereauria Swamp, *Coprosma* sp., curled leaf edges, 26 Jan 1993, RC Henderson, #94-020, [1]: 3 F. Edgcombe, orchid, 22 July 1944, [2]: 7 F. Motu R, Motu Falls Road [end], Paparangi, *Leucopogon fasciculatus*, 27 Dec 2007, RC Henderson, #08-041, [1]: 1 F. **GB**: Te Araroa, Kakanui, *Leucopogon fasciculatus*, 1 Feb 1993, RC Henderson, #93-209a-b, [2]: 1 F, 3 m2nd, 1 p, 4 exuv1, 3 exuv2. Te Araroa,

- Kakanui, *Dracophyllum latifolium*, leaf bases, 1 Feb 1993, RC Henderson, #93-199b-c, #93-200a-b, [4]: 7F, 1 m2nd, 2 exuv1, 1 exuv2. Te Araroa, Kakanui, *Leucopogon fasciculatus*, bark, 16 Mar 1993, RC Henderson, #93-207a-b, [2]: 3 F, 3 m2nd, 2 p, 1 M. Te Araroa, Paoneone, *Leucopogon fasciculatus*, leaves & bark, 2 May 1993, RC Henderson, #93-208, [1]: 5 F. Te Araroa, Pohutu, Awatere R bridge, *Myrsine australis*, curled leaves, 30 Jan 1993, RC Henderson, #93-203a-e, [5]: 10 F, 1 m2nd, 6 exuv1, 6 exuv2. **TK**: Egmont NP, Pouakai Hut, *Hebe odora*, 2 Dec 1975, AK Walker, #76-334e, [2]: 10 F. Mt Taranaki, [as Mt Egmont], *Coprosma* sp., 24 Feb 1983, CF Butcher, #83-067g, [4]: 21 F. Mt Taranaki [as Mt Egmont], *Gaultheria* sp., 24 Feb 1983, CF Butcher, #83-067e, [2]: 9 F. **TO**: Napier-Taupo Rd, Okoeke Stream, bridge rest area, *Coprosma tenuifolia*, curled leaves, 21 Apr 2005, NA Martin, #05-158, [1]: 3 F. Pureora, Pureora Forest Park, Bog Inn Track, *Coprosma* sp., underside leaf, 11 Jan 1995, RC Henderson, #95-010, [1]: 1 F. Tongariro N.P., Mangatepopo Hut, *Lepidothamnus laxifolius*, 27 Sep 1973, JA de Boer, #1075, [1]: 3 F, 2 exuv2. Tongariro N.P., Mangatepopo Hut, *Pentachondra pumila*, 27 Sep 1973, JA de Boer, #1072, [1]: 3 F, 1 exuv1, 2 exuv2. Tongariro N.P., Mangatepopo Hut, *Dracophyllum recurvum*, 27 Sep 1973, JA de Boer, #1076, [1]: 7 F. Waiouru, *Leucopogon fraseri*, 9 Mar 1958, JI Townsend, [1]: 1 F, 3 M. Waituhi Saddle Rd, Moerangi, *Astelia fragrans*, 9 Oct 1979, JS Dugdale, #79-292b, [5]: 10 F, 8 M. **WI**: Foxton, Foxton, swamp, *Coprosma propinqua*, 17 Nov 930, V.D.T., [1]: 1 F. **RI**: Ruahine Ra, Triplex Creek, *Leptecophylla juniperina*, 9 Feb 1980, CF Butcher, #80-242a, [1]: 1 m2nd. Ruahine Ra, Triplex Creek, *Coprosma propinqua*, 9 Feb 1980, CF Butcher, #80-65c,e, [4]: 1 F, 3 m2nd. Taihapa, Mataroa, Paengaroa Scenic Reserve, *Coprosma tenuifolia*, leaf rosette galls, 31 Jan 2004, NA Martin, #04-059a-c, [3]: 4 F, 2 f2nd, 5 m2nd, 1 pp, 3 exuv1, 2 exuv2. Taihapa, Mataroa, Paengaroa Scenic Reserve, *Coprosma rubra*, 31 Jan 2004, NA Martin, #04-058a-e, [5]: 1 F, 7 f2nd, 4 m2nd, 1 pp, 2 p. **WA**: Masterton, Mahunga Golf Course, *Myrsine divaricata*, 17 Feb 2010, BJ Rogan, #10-026a-b, [2]: 5 F, 5 exuv1, 4 exuv2, **WN**: Orongorongo V, Field Station, *Coprosma* sp., 21 May 1969, JS Dugdale, #539, [1]: 6 F, 1 exuv1, 3 exuv2. **South Island**. **SD**: D'Urville I., *Leucopogon fasciculatus*, 17 Feb 1971, JA de Boer, #699, [1]: 4 F, 1 exuv1, 2 exuv2. Rarangi, foreshore, *Pimelea urvilleana*, stems beneath surface sandy soil, 14 Jan 1999, JS Dugdale, #99-003a-f, [6]: 12 F. **NN**: Cobb Valley, Cobb Ridge, *Gaultheria depressa*, 15 Jan 1971, JA de Boer, #685, [1]: 9 F. Cobb Valley, Cobb Ridge, *Exocarpos bidwillii*, 15 Jan 1971, JA de Boer, #690, [1]: 5 F, 1 exuv2. Cobb Valley, Lake Sylvester, *Coprosma cheesemani*, 29 Apr 1969, JA de Boer, #520, [1]: 5 F, 2 exuv2. Cobb Valley, Lake Sylvester, *Hebe macrantha*, 29 Apr 1969, JA de Boer, #537, [1]: 7 F. Cobb Valley, Lake Sylvester, *Acrothamnus colensoi*, 29 Apr 1969, JA de Boer, #523, [1]: 5 F, 3 exuv2. Cobb Valley, Lake Sylvester Track, *Empodisma minus*, stem at node, 10 Jan 2005, GL & RC Henderson, #05-006, [1]: 1 F. Cobb Valley, Lake Sylvester Track, *Pentachondra pumila*, stems & leaves, 10 Jan 2005, GL & RC Henderson, #05-004, [1]: 4 F. Cobb Valley, Lake Sylvester, *Acrothamnus colensoi*, 14 Feb 1973, R Power, #986, [1]: 4 F, 2 exuv2. Cobb Valley, Lake Sylvester, *Coprosma* sp., 14 Feb 1973, JA de Boer, #984: 5 F. Eves Valley, Eves Bush, *Leucopogon fasciculatus*, 29 Feb 1972, JA de Boer, #no. 801: 4 F, 2 exuv2. Eves Valley, Eves Bush, *Leucopogon fasciculatus*, 10 May 1973, JA de Boer, #1019A, [1]: 3 F. Golden Bay, Mt Stevens Track, *Coprosma rhamnoides*, curled leaves, 6 Feb 2003, NA Martin, #03-016a-e, [5]: 2 F, 4 f2nd, 10 m2nd, 1 pp, 1 p, 4 exuv1. Golden Bay, Wharariki Beach, rocky islet, *Hebe elliptica*, underside curled leaves, 6 Feb 2010, NA Martin, #10-029a-c, [3]: 4 F, 3 1st, 3 M, 4 exuv1, 2 exuv2. Motueka, *Craspedia* sp., July 1917, G Brittin, #47, [1]: 1 F. Motueka, *Leucopogon fraseri*, 14 Aug 1935, G Brittin, #47, [1]: 1 F. Mt Arthur Tableland, Mt Arthur, *Coprosma pumila*, 19 Nov 1969, JA de Boer, #612, [1]: 6 F. Mt Arthur Tableland, Mt Arthur, *Leucopogon fraseri*, 19 Nov 1969, JA de Boer, #617, [2]: 5 F, Mt Arthur Tableland, Mt Lodestone, *Dracophyllum traversii*, 17 Nov 1969, JA de Boer, #605, [2]: 6 F, 2 exuv2. Nelson, *Leucopogon fasciculatus*, 19 Dec 1967, JA de Boer, #312, [1]: 2 F. Ruby Bay, *Leucopogon fasciculatus*, 14 Dec 1931, G Brittin, #47, [1]: 1 M. Wairoa Gorge, *Myrsine divaricata*, 13 Dec 1967, JA de Boer, #no. 289, [2]: 7 F. Whangamoia Saddle, *Leucopogon fasciculatus*, 26 Aug 1971, JA de Boer, #748, [1]: 4 F. **BR**: Charleston, Charleston-Addison Flat, *Leucopogon fasciculatus*, 7 Nov 1972, JA de Boer, #940, [1]: 5 F, 1 exuv1, 5 exuv2. Charleston, Charleston-Addison Flat, *Dracophyllum* sp., 7 Nov 1972, JA de Boer, #935, [1]: 4 F, 2 exuv2. Lake Rotoiti, Mt Robert, *Cyathodes* sp., 2 June 1968, JA de Boer, #391, [1]: 6 F. Lake Rotoiti, Mt Robert, *Acrothamnus colensoi*, [as *Cyathodes colensoi*], 7 Mar 1972, JA de Boer, #813, [1]: 4 F. **WD**: Big Bay, Pyke R Camp, *Hebe venustula*, curled leaves, 8 Feb 1999, B Brown, #99-005a-g, [7]: 10 F, 3 p, 2 M. **MB**: Marlborough, Black Birch Ra, *Pimelea nr aridula*, 21 Oct 1970, JS Dugdale, #643, [2]: 4 F, 2f2nd, 4 exuv1, 3 exuv2. Molesworth, *Heliohebe pentasepala*, 26 Dec 1977, BB Given, [3]: 13 F. Molesworth, Acheron R, hills above, *Hebe decumbens*, 16 Nov 1944, [1]: 3 F. Wairau, Red Hill, *Cyathodes* sp., 23 Mar 1972, JA de Boer, #825, [1]: 4 F, 2 exuv2. **KA**: Kaikoura, Grange Rd, *Myrsine australis*, 10 July 1977, LM Emms, [1]: 3 F. **NC**: Arthurs Pass, Devils Punchbowl Track, *Coprosma depressa*, leaves, many curled, 26 Oct 2004, NA Martin, #04-261a-c, [3]: 4 F, 1 f2nd, 6 m2nd, 3 p. Arthurs Pass, Dobsons Nature Trail, *Hebe subalpina*, underside galled leaves, 11 May 2005, NA Martin, #05-165a-d, [4]: 3 F, 4f2nd, 2 m2nd, 11 exuv1. Oxford Forest, Coopers Creek, Falls Track, *Coprosma propinqua*, leaf rosette galls, 18 Jan 2004, NA Martin, #04-057a-b, [2]: 3 F, 2 m2nd, 1 exuv1, 2 exuv2. Waipara, *Clematis afoliata*, 7 Nov 1915, G Brittin, #47, [1]: 1 F. **MC**: Banks Peninsula, Hinewai Reserve, *Coprosma rhamnoides*, 21 Aug 2001, NA Martin, #01-156a-d, [4]: 17 F. Banks Peninsula, Hinewai Reserve, *Coprosma rhamnoides*, leaf rosette galls, 22 July 2002, NA Martin, #02-072a-c, [3]: 18 F, 1 1st, 8 exuv1, 10 exuv2. Banks Peninsula, Menzies Bay, *Coprosma propinqua*, leaf rosette galls, 4 Jan 2005, RC Henderson, #05-016a-c, [3]: 7F, 1 f2nd, 2 m2nd, 1 exuv1, 1 exuv2. Banks Peninsula, Menzies Bay, *Coprosma virescens*, leaf rosette galls, 3 Jan 2009, RC Henderson, #09-006a-f, [6]: 16 F, 6 p, 6 M. Birdlings Flat, *Coprosma propinqua*, leaf rosette galls, 5 Nov 2002, NA Martin, #02-302a-c, [3]: 7 F, 2 F, 1 f2nd, 3 m2nd, 1 1st, 1 exuv1, 3 exuv2. Birdlings Flat, *Coprosma propinqua*, leaf rosette galls, 17 Aug 2005, NA Martin, #05-227, [1]: 3 F. Cass, *Acrothamnus colensoi*, [as *Leucopogon colensoi*], 8 Apr 1999, RC Henderson, #99-038a-b: 8 F. Cass, *Dracophyllum oliveri*, leaf axils, 8 Apr 1999, RC Henderson, #99-039a-b, [2]: 7 F. Christchurch, *Ozothamnus leptophyllus*, 7 Aug 1982, C. Barr, [1]: 7 F. Lake Pearson,

Highway 73, *Coprosma propinqua*, 11 May 2005, NA Martin, #05-173, [1]: 6 F. Porters Pass, *Gaultheria* sp., 7 Feb 1982, CF Butcher, #83-320c, [2]: 2 F. **CO**: Cromwell, Dunstan Ra, *Melicactus alpinus*, 10 Sep 1968, JS Dugdale, #432, [1]: 1 F. **FD**: Breaksea Sound, Breaksea I, *Hebe* sp., 26 May 1982, CF Butcher, #83-333e, [1]: 3 F. **SL**: Bluff, *Leucopogon fraseri*, 10 Apr 1914, G Brittin, #47, [1]: 1 F. Catlins, Macleennan, *Coprosma* sp., 6 Oct 1965, JM Hoy, #03-053, [1]: 3 F. Invercargill, *Leucopogon fraseri*, 12 Apr 1914, G Brittin, #47, [1]: 1 F. Southland, Longwood Ra, *Hebe odora*, 1 Feb 1976, JS Dugdale, #76-162a, [2]: 19 F. **SI**: Stewart I, NE Big South Cape I, *Hebe odora*, 13 Jan 1968, JC Watt, #464, [1]: 8 F. Stewart I, Waterfall Creek, *Raukaua anomalus*, 19 Feb 1968, EW Valentine, #374, [1]: 1 F, 3 p, 2 exuv2. **Offshore islands**. **TH**: Three Kings Is, Great I, Bald Hill, *Leucopogon fraseri*, 14 Apr 1999, TK Crosby, #99-031a-d, [4]: 3 F, 1 m2nd. Three Kings Is, Great I, Tasman Stm, track to sea, *Disphyma australe*, 14 Apr 1999, TK Crosby, #99-030a-d, [4]: 6 F. Three Kings Is, South West I, *Chenopodium* sp., 26 Nov 1983, CF Butcher, #83-349c, [3]: 8 F. Three Kings Is, South West I, *Sonchus* sp., roots, 26 Nov 1983, CF Butcher, #83-349b, [1]: 1 F. **CH**: Chatham I, Port Hutt Road, *Coprosma chathamica*, underside leaves [curling], 6 Apr 2006, BJ Rogan, #06-246a-b, [2]: 7 F. Chatham I, Kaingaroa, Weisner's old garden, [no host], 3 Mar 1991, CF Morales, #91-105, [1]: 3 F, 2 f2nd.

***Poliaspis raouliae* Henderson n. sp.** total 6 (4 F, 2 exuv2)

South Island. **NN**: Wangapeka, *Raoulia* sp., 15 Aug 1988, JS Dugdale, #423, [1]: 4 F, 2 exuv2.

***Poliaspoides leptocarpi* (Brittin)** total 49 (12 1st, 35 2ndf, 1 exuv1, 1 exuv2)

North Island. **AK**: Auckland, Glendowie, Tahuna Torea Nature Reserve, *Apodasmia similis*, stem nodes under leaf sheath, 7 Sep 2009, RC Henderson, #09-392a-o, [15]: 28 F, 11 f2nd, 11 1st. Auckland, Glendowie, Tahuna Torea Nature Reserve, *Apodasmia similis*, stem nodes under leaf sheath, 29 Sep 2009, RC Henderson, #09-414a-e, [5]: 7 F, 12 f2nd, 1 1st, 1 exuv1, 1 exuv2. Auckland, Glendowie, Tahuna Torea Nature Reserve, *Apodasmia similis*, stem nodes under leaf sheath, 13 Nov 2009, RC Henderson, #09-433a-e, [5]: 18 F, 11 f2nd. **WO**: Raglan, Ngarunui Beach, *Apodasmia similis*, stem nodes under leaf sheath, 27 Jan 2010, NA Martin, #10-014, [1]: 4 F. **South Island**. **MC**: Christchurch, New Brighton, *Apodasmia similis*, 26 May 1915, G Brittin, [1]: 1 F. Christchurch, New Brighton, Bridge Street Reserve, *Apodasmia similis*, stem nodes under leaf sheath, Oct 2009, RP Macfarlane, #10-015, [1]: 5 F.

***Pseudaulacaspis brimblecombei* Williams** total 253 (3 1st, 8 2ndf, 179 F, 30 2ndm, 1 pp, 9 p, 16 exuv1, 17 exuv2)

North Island. **AK**: Auckland, *Teloepa* sp., 14 Apr 1977, J Cox, [7]: 14 F. Auckland, Epsom, *Teloepa* sp., 19 July 1944, SJ Kendack, [2]: 6 F. Auckland, Glen Eden, 44A Pleasant Road, *Teloepa speciosissima*, 22 Aug 1999, RC Henderson, #99-126a-c, [3]: 6 F. Auckland, Glen Eden, 44A Pleasant Road, *Teloepa speciosissima*, underside leaves, 17 July 2004, RC Henderson, #04-128a-d, [4]: 2 F, 5 f2nd, 13 m2nd, 1 1st, 1

exuv1. Auckland, Henderson, *Teloepa* sp., 17 Sep 1979, JS Dugdale, #79-264c, [4]: 9 F, 1 f2nd. Auckland, Henderson, *Libertia ixioides*, 5 Jan 2008, RC Henderson, #08-001a-b, [2]: 7 F. Auckland, Mt Albert, *Teloepa* sp., 25 Apr 1978, AR Ferguson, #78-124e, [4]: 18 F, 1 exuv1, 1 exuv2. Auckland, Mt Albert Research Centre, *Melicope ternata*, 16 Nov 2004, NA Martin, #04-268a-f, [6]: 7 F, 8 m2nd, 2 1st, 1 exuv1, 3 p, 3 M, 2 exuv1, 1 exuv2. Auckland, Papakura, *Teloepa* sp., 12 Aug 1975, [1]: 3 F, 1 f2nd. **WO**: Hamilton, *Cordylina australis*, 11 Jan 1977, McKenzie, #5110, [1]: 2 F. Hamilton, Ruakura Agriculture Centre, *Cordylina indivisa*, 8 Feb 1977, HA Oliver, #77-35c, [11]: 40 F, 3 p, 4 M. **BP**: Rotorua, *Teloepa* sp., 2 May 1938, Gibson, [3]: 6 F. Rotorua, *Teloepa* sp., 22 Aug 1977, PM Cranswick, #77-251b, [5]: 14 F, 1 M. Tauranga, *Embothrium coccineum*, 15 Dec 1939, IL Nottage, [2]: 4 F. Tauranga, *Libertia* sp., 9 Mar 1977, JA Bradley, [1]: 1 F. Te Puke, No 3 Road, *Teloepa* sp., 17 Sep 1979, M York, #79-281, [4]: 15 F, 2 M. **TK**: New Plymouth, New Plymouth, Doone Street, *Protea nerifolia*, 30 June 2004, L Renney, #04-137a-b, [2]: 1 F, 1 f2nd, 2 m2nd, 1 exuv1. **TO**: Kinleith, Jim Currie Reserve, *Teloepa oreades*, underside leaves, 28 July 2003, L Renney, #03-080a-I, [9]: 7 F, 6 m2nd, 1 pp, 3 p, 2 M, 10 exuv1, 3 exuv2. **WI**: Palmerston North, *Teloepa* sp., 27 July 1950, J Broad, [2]: 7 F. **South Island**. **MC**: Christchurch, Botanic Gardens, *Lomatia myricoides*, 6 July 1977, LM Emms, [1]: 2 F. **DN**: Dunedin, Fisher & Paykel, *Teloepa* sp., underside leaves, 12 Dec 2003, RF Thum, #03-215a-b, [2]: 5 F, 1 m2nd, 2 exuv2. **FD/OL**: Lake Te Anau, *Teloepa* sp., 8 Feb 1991, G Ottosson, #91-282, [1]: 4 F.

***Pseudaulacaspis eugeniae* (Maskell)** total 221 (9 1st, 9 2ndf, 118 F, 55 2ndm, 2 p, 17 exuv1, 11 exuv2)

Australia. **AUS**: ex Maskell's dry material, *Chionaspis eugeniae* #177, *Eugenia elliptica*, WM Maskell, [4]: 5 F. Sydney, ex Maskell's dry material, *Chionaspis xerotidis*, *Lomandra longifolia*, WM Maskell, #00-105a-f, [6]: 6 F.

New Zealand. **North Island**. **AK**: Auckland, *Ficus elastica*, 20 June 1979, Houlgrave, #8015, [1]: 1 F. Auckland, Albert Park, *Pachystegia insignis*, upperside leaves, 13 May 2010, J Goodenough, #10-080, [1]: 4 F. Auckland, Auckland Domain, *Eucalyptus microcorys*, 11 June 2003, C Inglis, #03-072a-d, [4]: 2 F, 1 f2nd, 9 m2nd, 2 exuv1. Auckland, Auckland University grounds, city campus, *Beilschmiedia tawa*, 28 Mar 1984, C West, #84-109c, [1]: 2 F. Auckland, Cornwall Park, *Ficus rubiginosa*, underside leaves, 4 Feb 1981, EW Valentine, #81-50g, [2]: 7 F. Auckland, East Tamaki, *Magnolia grandiflora*, upperside leaves, 22 Jan 2007, J Goodenough & C Scott, #07-011, [1]: 4 F. Auckland, Grafton Cemetery, *Ficus rubiginosa*, 29 Jan 2005, C Inglis, #05-023a-b, [2]: 4 F, 1 m2nd. Auckland, Mangere, James Fletcher Drive (Favona), *Lophostemon confertus*, both sides leaves, 16 Nov 2004, C Inglis, #04-273a-e, [5]: 7 F, 11 m2nd, 3 1st, 1 p, 1 exuv1. Auckland, Mangere, James Fletcher Drive (Favona), *Corymbia* sp., 17 Apr 2009, C Inglis, #09-090, [1]: 3 F, 1 f2nd. Auckland, Mechanics Bay, Teal Park, *Callistemon salignus*, underside leaves, 29 Jan 2005, C Inglis, #05-022a-d, [4]: 3 F, 2 m2nd, 4 1st, 1 M. Auckland, Mechanics Bay, Teal Park, *Melaleuca hypericifolia*, both sides leaves, underside leaves, 6 May 2010, C. Inglis, #10-077a-b, [2]: 3 F, 2 m2nd, 1 1st, 2 exuv1. Auckland, Mt Albert, *Agonis* sp., 14 Apr 1999, RC Henderson, #99-037a-c, [3]: 4 F, 5 exuv1, 6 exuv2. Auckland, Mt Albert, *Melaleuca* sp., 12 Aug

1999, RC Henderson, #99-125a-e, [5]: 4 F, 3 exuv1, 3 exuv2. Auckland, Mt Albert, *Agonis* sp., 27 July 1999, RC Henderson, #99-124, [1]: 2 F. Auckland, Mt Albert Research Centre, *Feijoa sellowiana*, upperside leaves, 7 Nov 1997, KJ Froud, #97-150, [1]: 3 F. Auckland, Mt Albert Research Centre, *Feijoa sellowiana*, upperside leaves, 15 Feb 2000, RC Henderson, #00-033, [1]: 3 F. Auckland, Mt Albert Research Centre, *Feijoa sellowiana*, upperside leaves, 10 Apr 2003, RC Henderson, #03-034a-g, [7]: 5 F, 3 f2nd, 14 m2nd, 1 exuv2. Auckland, Mt Albert Research Centre, *Feijoa sellowiana*, 30 Jul 2004, RC Henderson, #04-140a-c, [3]: 3 F, 1 f2nd, 6 m2nd. Auckland, Mt Albert Road, *Feijoa sellowiana*, upperside leaves, 4 Mar 1999, RC Henderson, #99-007a-e, [5]: 5 F. Auckland, Mt Wellington, *Agonis flexuosa*, both sides leaves, 27 June 2009, NA Martin, #09-296, [1]: 5 F. Auckland, Mt Wellington, *Agonis flexuosa*, underside leaf, 8 Mar 2010, NA Martin, #10-061a-b, [2]: 1 F, 1 p, 3 M. Auckland, Onehunga, *Lophostemon confertus*, 16 Apr 2009, C Inglis, #09-087a-b, [2]: 3 F, 3 m2nd. Auckland, Parnell, *Astelia* sp., 17 Apr 2003, FL Henderson, #03-030a-c, [3]: 2 F, 2 f2nd, 2 m2nd. Auckland, St Lukes Rd, shopping centre, *Phoenix canariensis*, underside leaf, 6 Sep 2000, RC Henderson, #00-122b, [1]: 3 F. Auckland, St Lukes Rd, shopping centre, *Phoenix canariensis*, 19 Feb 2001, RC Henderson, #01-127, [1]: 2 F. **GB**: Gisborne, Poverty Bay Golf Course, *Metrosideros kermadecensis*, 16 Nov 2006, J Goodenough & C Scott, #06-328a-b, [2]: 5 F, 1 f2nd. **HB**: Havelock North, *Feijoa sellowiana*, 31 July 1991, D Steven, #91-244b-d, [3]: 6 F. Havelock North, *Feijoa sellowiana*, Jan 1992, TJB Herman, #92-033, [1]: 1 F. Napier, Breakwater Rd, port area, *Chrysanthemoides monolifera*, 21 Oct 2008, BJ Rogan, #08-474, [1]: 1 F. **WI**: Wanganui, Virginia Lake, *Corymbia ficifolia*, underside leaves, 10 Dec 2003, BH Doherty, #03-221, [1]: 1 F, 2 m2nd.

Pseudodonaspis mollyae Henderson n. sp. total 53 (7 1st, 11 2ndf, 29 F, 1 2ndm, 2 pp, 3 p, 1 exuv1)

South Island. **NN**: Cobb Valley, Lake Sylvester Track, *Chionochoa australis*, base of stems, 14 Feb 2003, RC Henderson & MJ Sheldon, #03-015a-m, [13]: 15 F, 8 f2nd, 3 1st. Cobb Valley, Lake Sylvester Track, *Chionochoa australis*, base stems under leaf sheaths, 10 Jan 2005, GL & RC Henderson, #05-002a-f, [6]: 2 F, 3 f2nd, 1 m2nd, 1 pp, 3 p, 4 1st, 1 exuv1. **BR**: L Rototiti, Mt Robert, *Chionochoa australis*, 12 Sep 1973, JA de Boer, #1053, [1]: 6 F. **MC**: Ashburton, *Agrostis capillaris*, roots, 29 Sep 1966, J Wood, #896, [2]: 6 F.

Pseudoparlatoria parlatorioides (Comstock) total 6 (6 F)

North Island. **AK**: Auckland, Mt Eden, *Cypridium* sp., 17 Oct 1962, JA Hunter, [4]: 4 F. **TK**: New Plymouth, *Begonia* sp., 15 Oct 1962, JA Hunter, [2]: 2 F.

Serenaspis minima (Maskell) total 221 (12 1st, 9 2ndf, 151 F, 9 2ndm, 3 p, 16 exuv1, 21 exuv2)

North Island. **ND**: Puketi Forest, Puketi Mokau Reserve, *Meliclytus ramiflorus*, trunk/bark, 25 Nov 2002, LE Jamieson, #02-305, [1]: 4 F. **AK**: Auckland, Manurewa, Murphys Bush, *Meliclytus micranthus*, 28 Feb 1999, NA Martin, #99-006, [1]: 1 F. Auckland, Manurewa, Olive Davis S.R., *Meliclytus*

ramiflorus, underside leaves, 10 Mar 2000, NA Martin, #00-043, [1]: 2 F, 2 f2nd. Auckland, Manurewa, Olive Davis S.R., *Meliclytus ramiflorus*, 9 Sep 2009, NA Martin, #09-397a-b, [2]: 3 f2nd, 1 m2nd, 1 exuv1, 3 m2nd, 1 1st. Dome Valley, Dome Valley State Forest, *Dysoxylum spectabile*, 29 Apr 1975, LL Deitz, #76-282b, [1]: 1 F. Waitakere Ra, Ferndown Track, upper end, *Meliclytus ramiflorus*, stems & petioles, 14 Nov 1999, RC Henderson, #99-176a-f, [6]: 6 F. Waitakere Ra, Goldies Bush, *Meliclytus ramiflorus*, 25 Feb 1978, BM May, #78-67b, [5]: 13 F, 3 exuv2. Waitakere Ra, Panto Track, *Meliclytus ramiflorus*, stems & leaves, 23 Mar 2003, NA Martin, #03-032a-e, [5]: 7 F, 3 f2nd, 6 m2nd, 3 p, 3 M, 6 exuv1, 3 exuv2. Waitakere Ra, Rangemore Track, *Meliclytus macrophyllus*, 1 Sep 2002, NA Martin, #02-203a-d, [4]: 5 F, 10 1st, 6 exuv1, 6 exuv2. Waitakere Ra, Waitatarua, *Meliclytus ramiflorus*, 18 Feb 1991, MG Hill, #91-052a-e, [5]: 13 F. Waitakere Ra, Walker Bush Track, *Meliclytus macrophyllus*, 5 Nov 1976, MF Tocker, #76-316b, [2]: 6 F. Waitakere Ranges, *Meliclytus ramiflorus*, 21 Nov 1976, [4]: 16 F. Wellsford, Logues Bush, Tomarata Valley Rd & Day Rd, *Meliclytus micranthus*, 15 Sep 1999, RC Henderson, #99-141, [1]: 4 F. Wenderholm, Wenderholm Regional Park, *Meliclytus ramiflorus*, 4 Sep 2009, NA Martin, #09-395a-b: 4 F, 4 M. **WO**: Raglan, Bridal Veil Falls, *Pseudopanax arboreus*, 19 Sep 1981, CF Butcher, #84-013a, [1]: 2 F. **BP**: Hicks Bay, Te Koau, *Dysoxylum spectabile*, 23 Sep 1992, RC Henderson, #92-259, [1]: 2 F. Hicks Bay, Te Koau, *Meliclytus ramiflorus*, 23 Sep 1992, RC Henderson, #92-246a-l, [9]: 23 F. Hicks Bay, Te Koau, *Meliclytus ramiflorus*, leaf ribs & veins, 31 Jan 1993, RC Henderson, #93-221a-b, [2]: 4 F, 2M. Hicks Bay, Te Koau, bush walk, *Dysoxylum spectabile*, 15 Mar 1993, RC Henderson, #93-231, [1]: 3 F. Mt Te Aroha, *Dysoxylum spectabile*, 27 Feb 1992, RC Henderson, #92-062b, [1]: 2 F, 1 M. **GB**: Te Araroa, Kakanui, *Meliclytus ramiflorus*, 1 Feb 1993, RC Henderson, #93-223: 1 F, 1 f2nd. **HB**: Elsthorpe S.R., *Parsonia* sp., stems, 6 Nov 2002, P Lo & RC Henderson, #02-300a-c, [3]: 4 F, 5 M. Maraetotara, Mohi Bush, *Parsonia* sp., 6 Nov 2002, P Lo, #02-295a-b, [2]: 3 F, 2 exuv1, 3 exuv2. **TK**: Mt Messenger, *Dysoxylum spectabile*, 6 Sep 1981, JS Dugdale, #81-253b, [2]: 8 F. **TO**: Ohakune, *Passiflora tetrandra*, 11 Mar 1958, JM Hoy, [1]: 1 F, 1 M, 1 exuv2. **South Island.** **SD**: D'Urville I, *Dysoxylum spectabile*, 16 Feb 1971, JA de Boer, #692, [4]: 7 F, 3 M, 1 exuv1, 3 exuv2. French Pass, *Dysoxylum spectabile*, 15 Feb 1971, JA de Boer, #703, [2]: 1 F, 1 M, 1 1st, 2 exuv2. **NN**: Golden Bay, Tarakohe, *Meliclytus obovatus*, stems, 19 May 2001, NA Martin, #01-070a-d, [4]: 7 F.

Symeria intermedia (Maskell) total 102 (4 1st, 5 2ndf, 33 F, 21 2ndm, 28 exuv1, 11 exuv2)

North Island. **AK**: Hunua Ra, Hunua Falls, *Kunzea ericoides*, wrapped around node, 26 Feb 2006, RC Henderson, #06-159, [1]: 1 F. Waitakere Ra, Destruction Gully Track, *Kunzea ericoides*, stems, 30 Apr 2000, RC Henderson, #00-083, [1]: 1 F. Waitakere Ra, Destruction Gully Track, *Kunzea ericoides*, stems, in leaf bud scales, 4 May 2000, RC Henderson, #00-092b: Waitakere Ra, Destruction Gully Track, *Kunzea ericoides*, 4 May 2000, RC Henderson, #00-092a-f, [6]: 3 F, 5 exuv1, 4 exuv2. Waitakere Ra, Destruction Gully Track, *Kunzea ericoides*, under leaf bud scales, 20 Dec 2003, RC Henderson, #03-219a-e, [5]: 5 f2nd, 6 m2nd, 15 m2nd, 1 1st, 11 exuv1. Waitakere Ra, Destruction Gully Track, by

turnoff to lookout, *Kunzea ericoides*, twigs, 20 July 2003, RC Henderson, #03-116, [1]: 1 F. Waitakere Ra, Destruction Gully Track, by turnoff to lookout, *Kunzea ericoides*, 7 June 2003, RC Henderson, #03-078a-e, [5]: 3 F, 6 exuv1, 3 exuv2. Waitakere Ra, Huia Dam, *Kunzea ericoides*, twigs, 10 Aug 2003, RC Henderson, #03-198, [1]: 1 F, 1 exuv1. Waitakere Ra, Manukau Bar View Walk, carpark, *Kunzea ericoides*, twigs, 19 June 2004, RC Henderson, #04-115, [1]: 3 F. **GB**: Te Araroa, Paoneone, *Kunzea ericoides*, stem, 4 Nov 1993, RC Henderson, #00-070a-b, e, [3]: 3 F, 3 exuv1. **South Island**. **NN**: Golden Bay, Collingwood, *Kunzea ericoides*, 4 Aug 1948, TG Sewell, #60, [1]: 1 F. Ruby Bay, *Kunzea ericoides*, 14 Dec 1931, G Brittin, #89, [1]: 1 F. **DN**: Otago Peninsula, Papanui Inlet Road, *Kunzea ericoides*, 6 Oct 2003, M Parker, #03-208, [1]: 1 F, 2 exuv1. **SL**: Southland, Pebbly Hills, *Leptospermum scoparium*, 25 Mar 1960, RF Cormack, [1]: 1 F.

Symeria leptospermi (Maskell) total 40 (7 2ndf, 29 F, 1 exuv1, 3 exuv2)

North Island. **WO**: Masterton, Ngaumu Road, scattered over 200 acres, *Leptospermum scoparium*, 16 May 1956, FC Spite, #03-038a-c, [3]: 9 F. **GB**: Lake Waikaremoana, *Leptospermum scoparium*, 18 June 1957, JM Hoy, #03-043, [1]: 3 F. **WI**: Palmerston North, *Leptospermum scoparium*, 5 Dec 1955, JM Hoy, [1]: 7 f2nd. **South Island**. **MC**: Christchurch, New Brighton, *Leptospermum* sp., 26 May 1915, G Brittin, [2]: 2 F. **DN**: Waitati, *Leptospermum scoparium*, 4 Oct 1955, JM Hoy, [1]: 3 F. **SL**: Tautuku Beach, *Leptospermum scoparium*, 4 Oct 1955, JM Hoy, #03-050, [1]: 1 F. MacLennan, *Leptospermum scoparium*, 4 Oct 1955, JM Hoy, #03-039, [1]: 1 F. Colac Bay, *Leptospermum scoparium*, 7 Oct 1955, JM Hoy, #03-040, [1]: 2 F. N of Alton Stream bridge, *Leptospermum scoparium*, 7 Oct 1955, JM Hoy, #03-044, [1]: 3 F. Pebbly Hills, *Leptospermum scoparium*, 25 Mar 1960, RF McCormack, #03-041, [1]: 1 F.

Symeria phyllocladi Henderson n. sp. total 148 (7 1st, 8 2ndf, 84 F, 10 2ndm, 1 p, 27 exuv1, 11 exuv2)

North Island. **ND**: Tangihua, Tangihua Lodge, *Phyllocladus trichomanoides*, 6 Apr 1993, RC Henderson, #93-108, [1]: 4 F. **AK**: Auckland, Glen Eden, 46B Pleasant Road, *Phyllocladus trichomanoides*, in cladode galls, 24 Dec 2005, RC Henderson, #06-006, [1]: 3 m2nd, 1 exuv1. Auckland, Mt Albert Research Centre, *Phyllocladus trichomanoides*, cladode galls, 4 Apr 2000, RC Henderson, #02-076a-d, [4]: 8 F, 1 M, 2 1st, 10 exuv1, 3 exuv2. Auckland, Mt Albert Research Centre, *Phyllocladus trichomanoides*, cladode galls, 15 Apr 2002, RC Henderson, #02-070a-d, [4]: 6 F. Auckland, Mt Albert Research Centre, *Phyllocladus trichomanoides*, cladode galls, 7 Oct 2002, RC Henderson, #02-224b-d: 2 F, 2 m2nd, 1 p, 2 1st, 4 exuv1. Hunua Ra, Workman Track, *Phyllocladus trichomanoides*, in galls, 2 Jan 2006, RC Henderson, #06-004, [1]: 3 F, 1 f2nd, 1 exuv1, 2 exuv2. Orewa, Hatfields Beach, nth end headland, *Phyllocladus trichomanoides*, underside leaves, 28 Sep 2002, RC Henderson, #02-258a-c, [3]: 9 F, 5 1st, 5 exuv1, 5 exuv2. Waitakere Ra, Fletcher Track, *Phyllocladus trichomanoides*, cladode galls, 11 May 2002, FL & RC Henderson, #02-100a-b & #02-103a-b, [4]: 14 F. Waitakere Ra, Kakamatua Beach Walk, *Phyllocladus*

trichomanoides, cladode galls, 5 May 2002, NA Martin, #02-099, [1]: 1 F, 1 f2nd. Whitford, Waikopua Road, Claude Strm Valley, *Phyllocladus trichomanoides*, cladode galls, 21 May 2005, RC Henderson, #05-186, [1]: 2 F. **CL**: Coromandels, Waionu Bay, *Phyllocladus trichomanoides*, 8 Aug 1968, RA Cumber, #422, [1]: 4 F. **BP**: East Cape, Waiaroho, *Phyllocladus trichomanoides*, 26 Apr 1993, RC Henderson, #93-253, [1]: 5 F. East Cape, Waiaroho, *Phyllocladus trichomanoides*, cladode galls, 28 Jan 1993, RC Henderson, #93-072, [1]: 5 F. Kaimai Ra, McLaren Falls, *Phyllocladus trichomanoides*, cladode galls, 24 Oct 2002, RC Henderson, #02-260a-c, [3]: 3 F, 4 exuv1, 1 exuv2. **TO**: Pureora, Pureora Forest, *Phyllocladus alpinus*, 21 Mar 1960, JM Hoy, #60/47, [2]: 4 F, 1? m2nd, 1 exuv1. Taupo, Taupo Botanic Gardens, *Phyllocladus trichomanoides*, cladode galls, 17 Apr 2005, NA Martin, #05-159a-b, [2]: 3 F, 2 m2nd. Tongariro N.P., *Phyllocladus alpinus*, cladode galls, 25 Sep 1973, JA de Boer, #1035, [2]: 2 F, 1 f2nd. **South Island**. **NN**: Anniseed Valley, *Phyllocladus trichomanoides*, 21 Jan 1969, JA de Boer, #481, [1]: 6 F. Nelson, Maitai R Valley, *Phyllocladus trichomanoides*, 22 Aug 1966, E. Collyer, #147, [3]: 2 F, 4 f2nd, 3 m2nd. **BR**: Inangahua, West Inangahua S.F., *Phyllocladus alpinus*, cladode galls, 20 Sep 1972, JS Dugdale, #914, [1]: 2 F, 1 f2nd, 1 exuv1.

Symeria pyriformis (Maskell) total 1430 (139 1st, 48 2ndf, 618 F, 77 2ndm, 3 pp, 6 p, 360 exuv1, 179 exuv2)

North Island. **ND**: Kaeo, *Rhopalostylis sapida*, 12 Sep 1968, RA Cumber, #1608, [1]: 3 F, 2 exuv2. Kaeo, Kaeo Hill, *Podocarpus totara*, 22 Feb 1960, RA Cumber, [1]: 1 F. Kamo, *Podocarpus totara*, 9 Oct 1968, RA Cumber, #1642, [1]: 3 F. Kerikeri, *Beilschmiedia tarairi*, 4 Nov 1984, RH Blank, #84-313c, [1]: 1 F. Tangihua, Horokaka, *Dacrydium cupressinum*, 6 Apr 1993, RC Henderson, #93-103a-b, [2]: 2 F, 2 f2nd, 6 exuv1, 3 exuv2. Waipoua, Prof. WR McGregor Reserve, *Podocarpus totara*, underside leaves, 26 Nov 2002, RC Henderson, #02-329, [1]: 1 F, 1 exuv1, 1 exuv2. Waipoua Forest, Tane Mahuta Track, carpark, *Ackama rosifolia*, underside leaf, 26 Oct 2005, NA Martin, #05-237, [1]: 1 F. Whangarei, Glenberrie, *Dacrydium cupressinum*, 31 Aug 1955, D Ogle, [1]: 8 F, 1 exuv2. Whangarei, Maunu, Millington Rd., *Vitex lucens*, 30 Apr 1990, DJ Allan, #90-123, [1]: 3 f2nd. **AK**: Auckland, Manurewa, Auckland Regional Botanic Gardens, *Dysoxylum spectabile*, 23 Jan 2009, NA Martin, #09-018, [1]: 1 F. Auckland, Manurewa, Auckland Regional Botanic Gardens, *Dacrydium cupressinum*, base leaves with fluffy white wax, 23 Jan 2009, NA Martin, #09-019a-b, [2]: 2 f2nd, 4 m2nd, 7 exuv1. Auckland, Manurewa, David Nathan Park, *Rhopalostylis sapida*, underside leaf, 5 May 2010, NA Martin, #10-087, [1]: 6 F. Auckland, Manurewa, Murphys Bush, *Dacrydium cupressinum*, base leaves with fluffy white wax, 6 Jun 1999, NA Martin, #99-082b, [1]: 3 F. Auckland, Manurewa, Olive Davis S.R., *Dysoxylum spectabile*, underside leaves, 30 Oct 1999, RC Henderson, #00-018, [1]: 5 F. Auckland, Manurewa, Olive Davis S.R., *Dysoxylum spectabile*, 3 Oct 2002, RC Henderson, #04-032a-b, [2]: 1 F, 5 exuv1, 3 exuv2. Auckland, Titirangi, *Dacrydium cupressinum*, May 1952, JH Holt, [4]: 7 F, 6 exuv1, 6 exuv2. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, 20 Dec 2003, RC Henderson, #04-006 & #04-007, [2]: 4 F, 1 m2nd, 3 1st, 2 exuv1. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, stems +

- fluffy white wax, 13 Sep 2003, RC Henderson, #03-144a-b & #03-145, [3]: 1 F, 3 m2nd, 12 1st, 2 exuv1, 1 exuv2. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, 27 Aug 2004, RC Henderson, #04-182, [1]: 1 F, 1 exuv1, 1 exuv2. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, 15 Feb 2004, RC Henderson, #04-041, [1]: 10 1st. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, 26 Jan 2004, RC Henderson, #04-020a-c, [3]: 6 F, 1 m2nd, 4 exuv1, 5 exuv2. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, stems + fluffy white wax, 13 June 2004, RC Henderson, #04-096a-b, [2]: 14 1st. Auckland, Titirangi, 21 Ngaio Road, *Dacrydium cupressinum*, 17 Oct 2004, RC Henderson, #04-242a-d, [4]: 1 F, 7 f2nd, 4 m2nd, 14 exuv1, 1 exuv2. Clevedon-Kawakawa Rd, Polo Grounds Gates, *Prumnopitys taxifolia*, in leaf fold galls, 5 Sep 2004, GL & RC Henderson, #04-212a-b, [2]: 3 F, 2 f2nd, 2 m2nd. Hauraki Gulf, Noises Is, Motuhoropapa I, *Geniostoma rupestre*, 16 Apr 1978, BM May, #78-146d, [4]: 9 F, 1 m2nd, 1 exuv1. Helensville, *Dacrycarpus dacrydioides*, 30 Jul 1968, RA Cumber, #1581, [1]: 5 F. Hunua Ra, Paparata, pty P Dale, *Dacrydium cupressinum*, 26 Mar 2000, NA Martin, #00-051, [1]: 1 F. Hunua Ra, Workman Track, *Dacrydium cupressinum*, base leaves with fluffy white wax, 18 May 2002, RC Henderson, #02-139a-j, [10]: 7 F, 6 1st, 21 exuv1, 2 exuv2. Hunua Ra, Workman Track, *Dacrydium cupressinum*, base leaves with fluffy white wax, 17 May 2003, RC Henderson, #03-058a-f, [4]: 2F, 24 1st, 4 exuv1, 2 exuv2. Hunua Ra, Workman Track, *Dacrydium cupressinum*, 17 May 2003, RC Henderson, #03-059a-d, [4]: 4 F, 3 exuv1, 4 exuv2. Pukekohe, 78 Jericho Road, Joy Plants Nursery, *Dacrydium cupressinum*, base leaves with fluffy white wax, 16 Dec 2006, RC Henderson, #06-339a-b, [2]: 5 F, 13 exuv1. Waitakere Ra, Crusher Pipe Track, *Dacrydium cupressinum*, 23 Jun 2002, NA Martin, #02-132, [1]: 9 1st. Waitakere Ra, Cutty Grass Track, *Ixerba brexioides*, underside leaves, 23 Aug 2003, RC Henderson, #03-126, [1]: 3 F, 3 exuv1, 3 exuv2. Waitakere Ra, Destruction Gully Track, *Nestegis lanceolata*, 29 Jan 1978, BM May, #78-45b, [2]: 5 F. Waitakere Ra, Destruction Gully Track, *Nestegis cunninghamii*, both sides leaves, 4 Sep 1999, RC Henderson, #04-035a-d, [4]: 3 F, 2 f2nd, 12 1st, 2 exuv1. Waitakere Ra, Destruction Gully Track, *Dacrydium cupressinum*, base leaves with fluffy white wax, 7 June 2003, RC Henderson, #03-075a-f, [6]: 4 F, 4 1st, 14 exuv1, 4 exuv2. Waitakere Ra, Destruction Gully Track, *Toronia toru*, 4 Sep 1999, RC Henderson, #00-049, [1]: 1 F. Waitakere Ra, Fairy Falls Track, *Ripogonum scandens*, both sides leaves, 10 Aug 2003, RC Henderson, #03-125, [1]: 4 F, 6 exuv1, 3 exuv2. Waitakere Ra, Fairy Falls Track, *Gahnia* sp., Dec 1981, CF Butcher, #83-314f, [1]: 1 exuv2. Waitakere Ra, Farley Track, *Coprosma rhamnoides*, leaves + chlorotic spots, 10 Aug 2003, NA Martin, #03-124, [1]: 4 F, 1 f2nd, 4 exuv1, 3 exuv2. Waitakere Ra, Ferndown Track, upper end, *Dacrydium cupressinum*, base leaves with fluffy white wax, 21 Jul 2002, NA Martin, #02-160a-c & #02-161a-d & #02-162a-k, [18]: 23 F, 34 exuv1, 12 exuv2. Waitakere Ra, Ferndown Track, upper end, *Dacrydium cupressinum*, 30 Aug 2003, RC Henderson, #03-113, [1]: 3 F, 5 exuv1, 4 exuv2. Waitakere Ra, Ferndown Track, upper end, *Dacrydium cupressinum*, 14 Dec 2003, RC Henderson, #04-040 & #04-043, [2]: 24 exuv1. Waitakere Ra, Ferndown Track, upper end, *Dacrydium cupressinum*, base leaves with fluffy white wax, 2 June 2003, RC Henderson, #03-070a-f, [6]: 3 F, 1 m2nd, 1 M, 12 exuv1, 3 exuv2. Waitakere Ra, Ferndown Track, upper end, *Dacrydium cupressinum*, 22 Feb 2004, RC Henderson, #04-042a-c, [3]: 2 f2nd, 2 m2nd, 9 1st, 10 exuv1. Waitakere Ra, Goodfellow Track, *Dracophyllum latifolium*, 14 Mar 2006, NA Martin, #06-251, [1]: 2 F. Waitakere Ra, Huia, *Freycinetia banksii*, 30 Aug 1977, LL Deitz, #77-251c, [1]: 1 F. Waitakere Ra, Huia, *Geniostoma* sp., 19 Sep 1980, CF Butcher, #80-269e-g, [4]: 1 F, 1 f2nd, 1 m2nd, 1 p. Waitakere Ra, Laingholm, *Dysoxylum spectabile*, 14 Jan 1979, W Park, #79-022d, [3]: 5 F. Waitakere Ra, Manukau Bar View Walk, carpark, *Geniostoma rupestre*, 13 Sep 2003, RC Henderson, #04-012a-e, [5]: 3 F, 9 m2nd, 2 M, 1 exuv1, 1 exuv2. Waitakere Ra, Mill Bay, Huia Rd, *Dacrycarpus dacrydioides*, 17 Oct 1977, BM May, #77-301c, [2]: 4 F. Waitakere Ra, Mt Donald McLean, *Freycinetia banksii*, 20 July 2003, RC Henderson, #03-120, [1]: 3 F, 3 exuv1, 2 exuv2. Waitakere Ra, Old Coach Road, *Prumnopitys ferruginea*, 6 Sep 2004, S Joshee, #04-193, [1]: 1 F, 1 exuv1, 1 exuv2. Waitakere Ra, Parau Track, *Coprosma arborea*, leaves with chlorotic spots, 10 Aug 2003, NA Martin, #03-090a-c, [3]: 9 F, 10 f2nd, 1 m2nd, 8 exuv1, 2 exuv2. Waitakere Ra, Sharps Bush, *Nestegis* sp., 1 Dec 1994, RC Henderson, #no number, [1]: 2 F. Waitakere Ra, Sharps Bush, *Freycinetia banksii*, 1 Aug 1999, RC Henderson, #99-100a-b, [2]: 3 F. Waitakere Ra, Sharps Bush, *Prumnopitys ferruginea*, 1 Aug 1999, RC Henderson, #99-096a-c, [3]: 4 F, 3 F, 1 m2nd, 4 exuv1, 6 exuv2. Waitakere Ra, Sharps Bush, *Prumnopitys ferruginea*, underside leaves, 27 July 2003, RC Henderson, #03-121a-b, [2]: 1 F, 2 f2nd, 3 m2nd, 3 exuv1, 1 exuv2. Waitakere Ra, Spraggs Bush, 23 Turanga Road, *Dacrydium cupressinum*, leaves with not much fluffy white wax, 9 June 2004, S Joshee, #04-097a-c, [3]: 2 F, 8 exuv1, 3 exuv2. Waitakere Ra, Taumata Track, off Ferndown Track, *Dacrydium cupressinum*, base leaves with fluffy white wax, 31 Dec 2000, NA Martin, #01-002b, [1]: 6 1st, 3 exuv1. Waitakere Ra, Waitakere Filter Station, behind Filter Station, *Dacrydium cupressinum*, base leaves with fluffy white wax, 2 June 2003, NA Martin, #03-069a-f, [6]: 3 F, 7 1st, 1 M, 9 exuv1, 4 exuv2. Waitakere Ra, Waitakere Filter Station, behind Filter Station, *Dacrydium cupressinum*, base leaves with fluffy white wax, 23 Sep 2004, RC Henderson, #04-204, [1]: 2 m2nd, 5 1st, 2 exuv1. Waitakere Ra, Waitakere Filter Station, Christian Rd end, *Dacrydium cupressinum*, base leaves with fluffy white wax, 31 Aug 2002, NA Martin, #02-211a-f, [6]: 2 F, 2 f2nd, 7 m2nd, 6 1st, 12 exuv1, 3 exuv2. Waitakere Ra, Waitakere Filter Station, Christian Rd end, *Dacrydium cupressinum*, base leaves with fluffy white wax, 29 Oct 2009, RC Henderson, #09-426a-i, [9]: 36 F, 3 exuv1, 4 exuv2. Waitakere Ranges, *Dysoxylum spectabile*, 4 Sep 1968, RA Cumber, #1591, [1]: 3 F. Warkworth, Avicé Miller S.R., *Hedycarya arborea*, 15 Sep 1999, RC Henderson, #99-134, [1]: 2 F. Wenderholm, Wenderholm Regional Park, *Myrsine australis*, 27 Oct 2002, NA Martin, #04-034, [1]: 2 F, 1.5 exuv1, 2 exuv2. Wenderholm, Wenderholm Regional Park, *Coprosma macrocarpa*, 6 Sep 2008, NA Martin, #08-428, [1]: 3 F. West Auckland, Riverhead Forest, Barlow Rd Reserve, *Podocarpus totara*, 25 Jul 1999, RC Henderson, #99-089, [1]: 1 F. West Auckland Coast, Karekare, *Dysoxylum spectabile*, 4 Dec 1973, JA de Boer, #1118, [1]: 7 F, 1 exuv1, 3 exuv2. West Auckland Coast, Karekare, *Vitex lucens*, 4 Dec 1973, JA de Boer, #1112, [1]: 3 F. West Auckland Coast, Karekare, *Vitex lucens*, 13 Oct 1973, PS Dale, #1084, [1]: 2 F. Whitford, Waikopua Road, Claude Strm Valley, *Freycinetia*

- banksii*, 21 May 2005, RC Henderson, #05-190, [1]: 1 F. **CL**: Coromandels, Kopu-Hikuai Rd, *Beilschmiedia tawa*, 1 Aug 1968, RA Cumber, #1582, [1]: 5 F. Coromandels, Manaia, *Dysoxylum spectabile*, 24 Sep 1968, RA Cumber, #1629, [1]: 2 F. Great Barrier I, Mt Hobson, *Quintinia serrata*, 29 Jan 2002, RE Beever, #02-032a-f, [6]: 6 F, 1 f2nd, 2 m2nd, 11 exuv1, 4 exuv2. **WO**: Hamilton, *Dacrydium cupressinum*, 20 Jan 1987, K Davies, [1]: 5 F. Raglan, *Prunnopitys ferruginea*, 19 Sep 1981, CF Butcher, #81-282i, [1]: 3 F. Raglan, *Nestegis* sp., 19 Sep 1981, CF Butcher, #81-282b, [1]: 1 F. **BP**: East Cape, Rereauria Swamp, beech ridge, *Beilschmiedia tawaroa*, 17 Sep 1992, RC Henderson, #92-298, [1]: 2 F. East Cape, Rereauria Swamp, beech ridge, *Weinmannia racemosa*, 17 Sep 1992, RC Henderson, #92-311, [1]: 2 F. East Cape, Rereauria Swamp, beech ridge, *Cordyline banksii*, 26 Jan 1993, RC Henderson, #93-217, [1]: 3 F. East Cape, Waiaroho, *Dacrydium cupressinum*, 26 Apr 1993, RC Henderson, #93-191a, [1]: 6 F. Hicks Bay, Te Koau, *Knightia excelsa*, 23 Sep 1992, RC Henderson, #92-254, [1]: 4 F. Hicks Bay, Te Koau, *Beilschmiedia tawaroa*, 23 Sep 1992, RC Henderson, #92-264, [1]: 2 F. Hicks Bay, Te Koau, *Dysoxylum spectabile*, 23 Sep 1992, RC Henderson, #92-262, [1]: 2 F. Hicks Bay, Te Koau, *Hedycarya arborea*, 23 Sep 1992, RC Henderson, #92-267, [1]: 1 F. Hicks Bay, Te Koau, *Dysoxylum spectabile*, 31 Jan 1993, RC Henderson, #93-222, [1]: 2 F. Hicks Bay, Te Koau, *Toronia toru*, 15 Mar 1993, JS Dugdale, #93-213, [1]: Hicks Bay, Wharekahika R, *Dysoxylum spectabile*, 20 Sep 1992, RC Henderson, #92-269 & #92-273, [2]: 2 F. Hicks Bay, Wharekahika R, *Beilschmiedia tawaroa*, 20 Sep 1992, RC Henderson, #92-330a-b, [2]: 2 F, 3 M. Kaimai Ra, McLaren Falls, *Prunnopitys ferruginea*, leaf tips, 24 Oct 2002, RC Henderson, #04-036, [1]: 2 F, 2 exuv1, 2 exuv2. Lottin Point, Otanga, *Dysoxylum spectabile*, 27 Jan 1993, RC Henderson, #93-227, [1]: 1 F. Lottin Point, Otanga, *Prunnopitys taxifolia*, curled leaves, 12 Mar 1993, JS Dugdale, #93-228, [1]: 3 F, 1 f2nd. Lottin Point Rd, Waenga Bush, *Ripogonum scandens*, 16 Sep 1992, RC Henderson, #92-307, [1]: 1 F. Lottin Point Rd, Waenga Bush, *Beilschmiedia tawaroa*, 27 Apr 1993, RC Henderson, #93-196, [1]: 3 F. Motu R, Motu Falls Road [end], Paparangi, *Beilschmiedia tawa*, underside leaves, 24 Dec 2007, RC Henderson, #08-006, [1]: 1 F. Motu R, Motu Falls Road [end], Paparangi, *Astelia solandri*, 27 Dec 2007, RC Henderson, #08-011, [1]: 2 F. Mt Te Aroha, *Litsea calicaris*, 19 Feb 1993, RC Henderson, #93-050, [1]: 1 F. Orete Forest, Te Puia Hut, *Beilschmiedia tawaroa*, 26 Apr 1993, RC Henderson, #93-198a-f, [6]: 5 F, 1 p, 9 exuv1, 7 exuv2. Orete Forest, Te Puia Hut, *Nestegis* sp., 26 Apr 1993, RC Henderson, #93-192, [1]: 2 F. Orete Forest, Te Puia Hut, *Prunnopitys ferruginea*, 25 Jan 1993, RC Henderson, #04-037a-c, [3]: 3 F, 1 f2nd, 2 m2nd, 1 1st, 3 exuv1. Rotorua, F.R.I. [Forest Research Insitute], Whakarewarewa, *Podocarpus hallii*, [1]: 12 F, 1 m2nd, 1 pp, 1 p, 2 M, 1 exuv2. Rotorua, Rotoehu Forest, *Nestegis lanceolata*, 30 Jun 1968, P Cameron, [1]: 1 F. Waihoek Saddle, Traffords Hill, 6.5 km W of Matawai, *Ixerba brexioides*, 8 Apr 1976, JS Dugdale, #76-128a, [1]: 1 F, 4 f2nd. **GB**: East Cape, *Rhopalostylis sapida*, 20 Sep 1992, GM Barker, #92-338, [1]: 2 F. Te Araroa, Kakanui, *Olearia rani*, 22 Sep 1992, RC Henderson, #92-317, [1]: 3 F. Te Araroa, Kakanui, *Knightia excelsa*, 22 Sep 1992, RC Henderson, #92-321, [1]: 2 F. Te Araroa, Kakanui, *Beilschmiedia tawaroa*, 22 Sep 1992, RC Henderson, #92-323, [1]: 7 F. Te Araroa, Kakanui, West plateau, *Dracophyllum latifolium*, leaf bases, 22 Sep 1992, JS Dugdale, #92-251a-b: 4 F, 3 F. Te Araroa, Kakanui, W-E, head of Waipohatuhatu Stm, *Ripogonum scandens*, 22 Sep 1992, RC Henderson, #92-314, [1]: 1 F. **HB**: Kaweka Ra [South], Blowhard Bush, *Prunnopitys taxifolia*, trunk/bark, 7 Nov 2002, KJ Froud & RC Henderson, #02-278a-b, [2]: 4 F, 2 exuv1, 2 exuv2. Kaweka Ra [South], Blowhard Bush, *Raukaua anomalus*, trunk/bark, 7 Nov 2002, KJ Froud, #02-277, [1]: 1 F, 2 exuv1, 2 exuv2. Maraetotara, Mohi Bush, *Beilschmiedia tawa*, underside leaves, 18 Oct 2009, RE Beever, #09-427a-b: 3 F, 3 F. **TK**: Hawera, *Podocarpus totara*, 25 Sep 1978, JJ Pease, #6985, [1]: 2 F. New Plymouth, Burgess Park, *Hedycarya arborea*, underside leaves, 28 May 2005, RC Henderson, #05-178: 2 F. New Plymouth, Hookner Park, 885 Carrington Road, *Beilschmiedia tawa*, underside leaves, 30 May 2005, RC Henderson, #05-184 & #05-185, [2]: 6 F. Waitaanga Saddle, *Laurelia novae-zelandiae*, July 1982, JS Dugdale, 82-201e, [2]: 2 F. **TO**: Atiamuri, Maroa [SH 1], *Podocarpus totara*, 7 Jun 1972, RJ McKenzie, #894, [1]: 3 F. Ohakune, *Dacrydium cupressinum*, 9 Jun 1924, G Brittin, #140, [1]: 1 F. Ohakune, Waitonga Falls Track, *Halocarpus biformis*, 8 Dec 2005, NA Martin, #06-047, [1]: 2 m2nd, 2 p, 1 M. Ohakune, Waitonga Falls Track, *Libocedrus bidwillii*, 8 Dec 2005, NA Martin, #06-045, [1]: 1 F, 2 f2nd, 3 m2nd. Pureora, Waituhi Saddle, *Weinmannia racemosa*, 8 Aug 1957, JM Hoy, [2]: 6 F. Turangi, Mt Pihanga, *Weinmannia racemosa*, 13 Dec 1992, RC Henderson, #92-353, [1]: 3 F, 2 m2nd. **WI**: Palmerston North, Bledisloe Park, *Schefflera digitata*, 21 Aug 1957, JI Townsend, [1]: 7 F. Palmerston North, Esplanade, *Podocarpus totara*, [1]: 1 F. **RI**: Ruahine Ra, Triplex Creek, *Pseudowintera colorata*, 9 Feb 1980, CF Butcher, #80-65g, [1]: 2 f2nd, 1 m2nd. **WN**: Orongorongo V, *Collospermum [solandri]?*, 23 Sep 1969, DJ Campbell, #555, [1]: 5 F, 2 exuv1, 2 exuv2. Otaki, 6 km SSE, *Freycinetia banksii*, 7 Mar 1978, LL Deitz, #80-273d, [1]: 1 F. Tokomaru, *Ripogonum scandens*, 11 Oct 1931, W Cottier, [2]: 6 F. Wellington, *Dysoxylum spectabile*, Aug 1994, A. Flynn, #94-091, [1]: 2 F. Wellington, Days Bay, *Astelia solandri*, 7 Sep 1921, E.H.A. / JG Myers, #228, [2]: 13 F, 7 exuv2. Otaki Forks, *Podocarpus totara*, 5 Nov 1980, CF Butcher, #81-50k, [1]: 2 F. **South Island**. **SD**: D'Urville I, Mt Maud, *Freycinetia banksii*, 17 Jan 1988, RE Beever, [4]: 7 F. Pelorus Sd, Tennyson Inlet, *Pittosporum* sp., 28 Dec 1972, JA de Boer, #969, [1]: 2 F, 1 exuv1, 1 exuv2. Pelorus Sd, Tennyson Inlet, *Freycinetia banksii*, 28 Dec 1972, JA de Boer, #968, [1]: 3 F. **NN**: Cobb Valley, Cobb Village, *Pseudowintera axillaris*, 14 Feb 1973, JA de Boer, #989, [1]: 3 F, 2 exuv1, 1 exuv2. Eves Valley, Eves Bush, *Astelia* sp., 15 Sep 1967, E Collyer, #1349, [1]: 2 F, 2 exuv2. Eves Valley, Eves Bush, *Podocarpus totara*, 240 Apr 1973, JA de Boer, #1007, [1]: 1 F, 1 exuv1, 1 exuv2. Gardens Valley, *Podocarpus totara*, 8 Aug 1968, JA de Boer, #414, [3]: 4 F, 1 exuv2, 3 M. Gardens Valley, *Dacrydium cupressinum*, 8 Aug 1968, JA de Boer, #413, [2]: 1 F, 1 M. Golden Bay, Anatori R, *Freycinetia banksii*, 28 Nov 1977, BM May, #80-269d, [3]: 5 F. Golden Bay, Kaihoka Lakes, *Freycinetia banksii*, 14 Apr 1968, E. Collyer, #393, [3]: 14 F, 1 1st, 3 exuv1, 9 exuv2. Motueka, *Prunnopitys ferruginea*, 26 Nov 1922, G Brittin, #140, [1]: 1 F. Motueka, Umukuri, *Freycinetia banksii*, 1912, G Brittin, #140, [1]: 1 F. Motueka, Umukuri, *Carex* sp., 1918, G Brittin, #140, [1]: 1 F. Motueka, Umukuri, *Astelia* sp., 28 Oct 1918, G Brittin, [1]: 3 F. Nelson, Cemetery Reserve, *Podocarpus totara*, Jun 1959, JI Townsend, [6]: 10 F, 2 M. Nelson, Maitai

R, Smiths Ford, *Dacrycarpus dacrydioides*, 29 Jun 1972, JAK Farrell, #900, [1]: 3 F, 2 exuv2. Wairoa Gorge, *Podocarpus totara*, 13 Dec 1967, JA de Boer, #300, [2]: 7 F, 1 exuv2. Wairoa R, *Dacrycarpus dacrydioides*, 5 Mar 1969, JA de Boer, #503, [1]: 4 F, 1 exuv2. Whangamoia Saddle, *Weinmannia racemosa*, 25 Nov 1970, JA de Boer, #666, [1]: 2 F, 1 exuv2. **BR**: Inangahua, Tewharu (Larrys Creek), *Dacrycarpus dacrydioides*, 20 Aug 1972, JAK Farrell, #909, [1]: 1 F. Punakaiki, Bullock Creek, *Freycinetia banksii*, 7 Dec 2005, RC Henderson, #06-053, [1]: 4 F. Reefton, Giles Creek, *Halocarpus bififormis*, juvenile foliage, 4 Nov 1993, JS Dugdale, #04-033a-b, [2]: 5 F, 4 exuv1, 4 exuv2. Reefton, Hochstetter Forest, *Prumnopitys ferruginea*, 9 Nov 1972, JA de Boer, #946b, [1]: 1 F. Reefton, Mawhera S.F., *Elaeocarpus hookerianus*, 9 Nov 1972, JA de Boer, #933, [1]: 5 F, 1 exuv2. **WD**: Cascade, Teer Plateau, *Weinmannia* sp., 23 Aug 2000, B Brown, #00-120a-c, [3]: 6 F, 6 F, 7 exuv1, 8 exuv2. Haast V, Roaring Billy Falls, *Coprosma rotundifolia*, underside leaves, 26 Jan 2000, PJ Gullan, #02-228a-c, [3]: 5 m2nd, 2 pp, 7 exuv1. Homminy Cove, *Freycinetia banksii*, 20 Aug 2000, B Brown, #02-140a-b: 2 F, 6 exuv1, 4 exuv2. Open Bay Is, Taumaka, *Freycinetia banksii*, in axils, 20 Aug 1970, DS Horning, #642, [2]: 10 F, 2 exuv1, 1 exuv2. Westland, Okarito Forest, Okarito Rd, *Manoao colensoi*, 3 Nov 1992, E Wood, #92-333a-b, [2]: 5 F. **MB**: Rai V, Pelorus Bridge S.R., *Prumnopitys taxifolia*, 12 Aug 1959, JI Townsend, [2]: 5 F. **NC**: Arthurs Pass, Devils Punchbowl Track, *Halocarpus bififormis*, 26 Oct 2004, NA Martin, #04-263, [1]: 2 F, 1 exuv1. **MC**: Banks Peninsula, Akaroa, Grehan V, *Dacrycarpus dacrydioides*, 14 Sep 1993, RC Henderson, #93-260, [1]: 3 F. Banks Peninsula, Hinewai Reserve, *Podocarpus totara*, underside leaves, 22 Jul 2002, NA Martin, #02-163a-c, [3]: 1 F, 4 m2nd, 1 1st, 6 exuv1, 1 exuv2. Christchurch, Cashmere Hills, *Hoheria* sp., Feb 1915, G Brittin, #21, [1]: 1 F. Port Hills, Kennedys Bush, *Astelia* sp., 10 May 2001, RC Henderson, #01-122, [1]: 3 F. **FD**: Breaksea Sound, Gilbert Island 6, grass, May 1982, CF Butcher, #84-012e, [2]: 3 F, 3 exuv2. Breaksea Island, *Podocarpus hallii*, May 1982, CF Butcher, #84-012a, [1]: 1 F, 1 exuv1. Breaksea Island, *Coprosma foetidissima*, May 1982, CF Butcher, #84-012h, [3]: 5 F. Breaksea Island, *Astelia* sp., 24 May 1982, CF Butcher, #82-181f, [1]: 1 F. Breaksea Island, *Weinmannia racemosa*, 24 May 1982, CF Butcher, #84-181c, [1]: 1 F. Secretary I, *Ripogonum scandens*, May 1982, CF Butcher, #84-012b, [1]: 1 F. **SL**: Bluff, *Hebe* sp., 12 Apr 1914, G Brittin, #4, [1]: 1 F. **SI**: Stewart I, Half Moon Bay, *Weinmannia racemosa*, 15 Feb 2004, R Close, #04-056a-c, [3]: 1 f2nd, 12 m2nd, 10 exuv1. **Offshore Islands**. **TH**: Three Kings Is, Great I, Castaway Valley, *Cordyline obtecta*, leaf bases, 18 Oct 1991, PG Simpson, #91-303a-b, [2]: 3 F. Three Kings Is, West I, *Elingamita johnsonii*, 27 Nov 1983, R McDonald, #83-346f, [2]: 1 F, 1 exuv1, 1 exuv2. Three Kings Is, West I, *Meryta sinclairii*, 29 Nov 1983, CF Butcher, #83-347b, [1]: 2 F.

Trulliflorinia acaciae (Maskell) total 99 (6 1st, 6 2ndf, 38 F, 15 2ndm, 5 p, 9 exuv1, 20 exuv2)

North Island. **AK**: Auckland, Eastern Beach, *Paraserianthes lophantha*, leaflets, 1 July 2009, NA Martin, #09-307, [1]: 1 F, 2 fpl. Auckland, Glendene, *Paraserianthes lophantha*, petioles, 6 May 1999, R Hoare, #99-055a-c, [3]: 3 F, 3 fpl. Auckland, Glendene, *Paraserianthes lophantha*, petioles of

pinnate leaves, 26 Jan 2001, DJ Allan, #01-043a-e, [5]: 4 F, 2 fpl, 2 m2nd, 1 p, 2 M. Waiuku, Glenbrook Steel Mill, *Acacia verticillata*, stems & leaves, 30 July 2004, C Inglis, #04-151a-d, [4]: 4 F, 4 fpl, 3 f2nd, 4 m2nd, 1 p, 1 1st, 2 exuv1. Auckland, Panmure, *Paraserianthes lophantha*, leaflets, 29 Apr 2008, C Inglis, #08-412b: 2 F, 2 fpl, 2 f2nd, 2 m2nd, 1 p. **South Island**. **NN**: Nelson, *Acacia* sp., 10 March 1922, G Brittin, #no. 148, [1]: 1 F. Nelson, Tasman, wattle wood, 30 June 1960, Dept. of Agric., [1]: 1 m2nd. Nelson, Tahumanui Beach Reserve, *Acacia floribunda*, stems & both sides leaves, 12 May 2004, BH Doherty, #04-083a-I, [9]: 8 F, 1 f2nd, 6 m2nd, 4 1st, 2 p, 5 exuv1.

**Appendix B. Alphabetical listing of host plants,
including family, with their associated armoured
scale species in New Zealand.**

Plant names and authors sourced from Landcare Research database Nga Tipu o Aotearoa – New Zealand Plants, <http://nzflora.landcareresearch.co.nz/default.aspx>, or from authoritative on-line databases such as GRIN Taxonomy for Plants, <http://www.ars-grin.gov/cgi-bin/npgs/html/taxgenform.pl?language=en>.

A, adventive, cultivated and/or naturalised; **E**, endemic; **N**, native but not endemic. Similarly for scale insect names in lower case: a, adventive; e, endemic; n, native but not endemic.

- Abies grandis* (Douglas ex D.Don) Lindl., Pinaceae, A
Parlatoria pittospori, n
Acacia floribunda (Vent.) Willd., Mimosaceae, A
Trulliflorinia acaciae, n
Acacia sp., Mimosaceae, A
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Trulliflorinia acaciae, n
Acacia verticillata (L'Hér.) Willd., Mimosaceae, A
Hemiberlesia rapax, a
Trulliflorinia acaciae, n
Acaena sp., Rosaceae, E
Aulacaspis rosae, a
Ackama rosifolia A.Cunn., Cunoniaceae, E
Symeria pyriformis, e
Acrothamnus colensoi (Hook.f.) Quinn, Epacridaceae, E
Poliaspis media, e
Actinidia arguta (Siebold & Zucc.) Planch. ex Miq., Actinidiaceae, A
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Actinidia chinensis Planch., Actinidiaceae, A
Hemiberlesia lataniae, a
Actinidia deliciosa (A. Chev.) C. F. Liang & A. R. Ferguson, Actinidiaceae, A
Aonidiella aurantii, a
Aspidiotus nerii, a
Diaspidiotus perniciosus, A
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Adiantum cunninghamii Hook., Pteridaceae, E
Fusilaspis phymatodidis, e
Adiantum fulvum Raoul, Pteridaceae, E
Fusilaspis phymatodidis, e
Adiantum viridescens Colenso, Pteridaceae, E
Fusilaspis phymatodidis, e
Agonis flexuosa (Willd.) Sweet, Myrtaceae, A
Pseudaulacaspis eugeniae, n
Agrostis capillaris L., Poaceae, A
Pseudodonaspidis mollyae, e
Alectryon excelsus Gaertn., Sapindaceae, E
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Alseuosmia macrophylla A. Cunn., Alseuosmiaceae, E
Aspidiotus nerii, a
Lindingaspis rossi, n
Apodasmia similis (Edgar) B.G.Briggs & L.A.S.Johnson, Restionaceae, E
Poliaspoides leptocarpi, e
Aralia sp., Araliaceae, A
Aspidiotus nerii, a
Araucaria heterophylla (Salisb.) Franco, Araucariaceae, A
Lindingaspis rossi, n
Arbutus menziesii Pursh, Ericaceae, A
Aspidiotus nerii, a
Aristotelia serrata (J.R.Forst. & G.Forst.) W.R.B.Oliv., Elaeocarpaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Lindingaspis rossi, n
Arthropodium cirratum (G.Forst.) R.Br. Liliaceae E
Poliaspis floccosa e
Arthropteris tenella (G.Forst.) J.Sm. ex Hook.f., Oleandraceae, E
Fusilaspis phymatodidis, e
Aspidistra sp., Liliaceae, A
Aspidiotus nerii, a
Asplenium bulbiferum G.Forst., Aspleniaceae, E
Fusilaspis phymatodidis, e
Asplenium flaccidum G.Forst., Aspleniaceae, E
Fusilaspis phymatodidis, e
Asplenium oblongifolium Colenso, Aspleniaceae, E
Fusilaspis phymatodidis, e
Asplenium polyodon G.Forst., Aspleniaceae, E
Fusilaspis phymatodidis, e
Astelia banksii A.Cunn., Liliaceae, E
Pellucidaspis epiphytidis, e
Astelia fragrans Colenso, Liliaceae, E
Poliaspis media, e
Astelia grandis Hook.f. ex Kirk, Liliaceae, E
Aspidiotus nerii, a
Astelia solandri A.Cunn., Liliaceae, E
Symeria pyriformis, e
Astelia sp., Liliaceae, E
Hemiberlesia rapax, a
Pellucidaspis epiphytidis, e
Poliaspis lactea, e
Pseudaulacaspis eugeniae, n
Symeria pyriformis, e
Asterotrichion discolor (Hook.) Melville, Malvaceae, A
Aspidiotus nerii, a
Hemiberlesia rapax, a
Aucuba japonica Thunb., Cornaceae, A
Aspidiotus nerii, a
bamboo, Poaceae, A
Kuwanaspis pseudoleucaspis, a
Bambusa multiplex (Lour.) Raeusch. ex Schult. & Schult. f., Poaceae, A
Kuwanaspis pseudoleucaspis, a
Bambusa multiplex var. 'Alphonse Karr' (Lour.) Raeusch. ex Schult. & Schult. f., Poaceae, A
Kuwanaspis pseudoleucaspis, a
banana, Musaceae, A
Pinnaspis aspidistrae, a

- Banksia integrifolia* L. f., Proteaceae, A
Hemiberlesia rapax, a
Lindingaspis rossi, n
Parlatoria fulleri, n
Parlatoria pittospori, n
Begonia sp., Begoniaceae, A
Pseudoparlatoria parlatorioides, a
Beilschmiedia tarairi (A.Cunn.) Benth. & Hook.f. ex Kirk,
 Lauraceae, E
Symeria pyriformis, e
Beilschmiedia tawa (A.Cunn.) Benth. & Hook.f. ex Kirk,
 Lauraceae, E
Hemiberlesia rapax, a
Pseudaulacaspis eugeniae, n
Symeria pyriformis, e
Beilschmiedia tawaroa A.E.Wright, Lauraceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
Berberis glaucocarpa Stapf, Berberidaceae, A
Aspidiotus nerii, a
Blechnum discolor (G.Forst.) Keyserl., Blechnaceae, E
Fusilaspis phymatodidis, e
Blechnum filiforme (A.Cunn.) Ettingsh., Blechnaceae, E
Fusilaspis phymatodidis, e
Blechnum fraseri (A.Cunn.) Luer., Blechnaceae, E
Fusilaspis phymatodidis, e
Blechnum membranaceum (Colenso ex Hook.) Mett. ex
 Diels, Blechnaceae, E
Fusilaspis phymatodidis, e
Brachyglottis repanda J.R.Forst. & G.Forst., Asteraceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Buxus sempervirens L., Buxaceae, A
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Parlatoria fulleri, n

Cactus sp., Cactaceae, A
Abgrallaspis cyanophylli, a
Hemiberlesia rapax, a
Callistemon citrinus (Curtis) Skeels, Myrtaceae, A
Parlatoria fulleri, n
Callistemon salignus (Sm.) Colvill ex Sweet, Myrtaceae, A
Pseudaulacaspis eugeniae, n
Callistemon sp., Myrtaceae, A
Anzaspis angusta, n
Parlatoria fulleri, n
Callitris oblonga Rich., Cupressaceae, A
Parlatoria pittospori, n
Callitris rhomboidea R. Br. ex Rich., Cupressaceae, A
Parlatoria pittospori, n
Camellia sp., Theaceae, A
Hemiberlesia rapax, a
Lindingaspis rossi, n
Camellia tsaii Hu, Theaceae, A
Hemiberlesia rapax, a
Capsella bursa-pastoris (L.) Medik., Brassicaceae, A
Lepidosaphes multipora, n
Carex sp., Cyperaceae, A
Anzaspis gahniae, e
Symeria pyriformis, e

Carmichaelia australis R.Br., Fabaceae, E
Hemiberlesia rapax, a
Lindingaspis rossi, n
Carpodetus serratus J.R.Forst. & G.Forst.,
 Grossulariaceae, E
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Carya illinoensis (Wangenh.) K.Koch, Juglandaceae, A
Hemiberlesia rapax, a
Ceanothus papillosus (McMinn) Munz, Rhamnaceae, A
Hemiberlesia rapax, a
Ceanothus sp., Rhamnaceae, A
Hemiberlesia rapax, a
Cedrus atlantica (Endl.) G. Manetti ex Carrière, Pinaceae, A
Parlatoria pittospori, n
Ceratopetalum gummiferum Sm., Cunoniaceae, A
Parlatoria fulleri, n
Chaenomeles speciosa (Sweet) Nakai, Rosaceae, A
Diaspidiotus perniciosus, A
Chamaecyperus lawsoniana (A.Murray) Parl.,
 Cupressaceae, A
Parlatoria pittospori, n
Chamaecyperus sp., Cupressaceae, A
Carulaspis juniperi, a
Chamaecytisus palmensis (H.Christ) F.A.Bisby & K.W.
 Nicholls, Fabaceae, A
Aspidiotus nerii, a
Chamaedorea siefritzii Burret, Arecaceae, A
Diaspis boisduvalii, a
Chenopodium sp., Chenopodiaceae, A
Poliaspis media, e
Chionochloa australis (Buchanan) Zotov, Poaceae, E
Pseudodonaspis mollyae, e
Chrysanthemoides monolifera (L.) Norl., Asteraceae, A
Pseudaulacaspis eugeniae, n
Citrus grandis (L.) Osbeck, Rutaceae, A
Aonidiella aurantii, a
Lindingaspis rossi, n
Citrus limon (L.) Burm.f., Rutaceae, A
Aonidiella aurantii, a
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Citrus paradisi Macfad., Rutaceae, A
Aonidiella aurantii, a
Lepidosaphes beckii, a
Citrus reticulata Blanco, Rutaceae, A
Aonidiella aurantii, a
Citrus sinensis (L.) Osbeck, Rutaceae, A
Aonidiella aurantii, a
Lepidosaphes beckii, a
Lindingaspis rossi, n
Citrus x tangelo J.W.Ingram & H.E.Moore, Rutaceae, A
Aonidiella aurantii, a
Clematis afoliata Buchanan, Ranunculaceae, E
Poliaspis media, e
Coleonema pulchellum I.Williams, Rutaceae, A
Aspidiotus nerii, a
Hemiberlesia rapax, a
Collospermum [solandri]?, Liliaceae, E
Pellucidaspis epiphytidis, e
Symeria pyriformis, e

- Collospermum hastatum* (Colenso) Skottsbl., Liliaceae, E
Pellucidaspis epiphytidis, e
Collospermum microspermum (Colenso) Skottsbl., Liliaceae, E
Pellucidaspis epiphytidis, e
Consolea rubescens (Salm-Dyck ex DC.) Lem., Cactaceae, A
Abgrallaspis cyanophylli, a
Coprosma arborea Kirk, Rubiaceae, E
Poliaspis media, e
Symeria pyriformis, e
Coprosma areolata Cheeseman, Rubiaceae, E
Hemiberlesia lataniae, a
Coprosma chathamica Cockayne, Rubiaceae, E
Poliaspis media, e
Coprosma cheesemanii W.R.B.Oliv., Rubiaceae, E
Aspidioides corokiae, e
Poliaspis media, e
Coprosma foetidissima J.R.Forst. & G.Forst., Rubiaceae, E
Aspidiotus nerii, a
Symeria pyriformis, e
Coprosma grandifolia Hook.f., Rubiaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Lindingaspis rossi, n
Coprosma lucida J.R.Forst. & G.Forst., Rubiaceae, E
Lindingaspis rossi, n
Coprosma macrocarpa Cheeseman, Rubiaceae, E
Aspidiotus nerii, a
Symeria pyriformis, e
Coprosma propinqua A.Cunn., Rubiaceae, E
Hemiberlesia rapax, a
Poliaspis media, e
Coprosma pumila Hook.f., Rubiaceae, E
Poliaspis media, e
Coprosma rhamnoides A.Cunn., Rubiaceae, E
Hemiberlesia rapax, a
Poliaspis media, e
Symeria pyriformis, e
Coprosma robusta Raoul, Rubiaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Lindingaspis rossi, n
Poliaspis media, e
Coprosma rotundifolia A.Cunn., Rubiaceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
Coprosma rubra Petrie, Rubiaceae, E
Poliaspis media, e
Coprosma serrulata Hook.f. ex Buchanan, Rubiaceae, E
Poliaspis media, e
Coprosma sp., Rubiaceae, E
Hemiberlesia rapax, a
Lindingaspis rossi, n
Poliaspis lactea, e
Poliaspis media, e
Coprosma spatulata A.Cunn., Rubiaceae, E
Aspidiotus nerii, a
Poliaspis media, e
Coprosma tenuifolia Cheeseman, Rubiaceae, E
Poliaspis media, e
Coprosma virescens Petrie, Rubiaceae, E
Poliaspis media, e
Cordyline australis (G.Forst.) Endl., Agavaceae, E
Anzaspis cordylinidis, e
Aspidiotus nerii, a
Pseudaulacaspis brimblecombei, n
Pseudaulacaspis eugeniae, n
Cordyline banksii Hook.f., Agavaceae, E
Anzaspis gahniae, e
Aspidiotus nerii, a
Symeria pyriformis, e
Cordyline fruticosa (L.) A.Chev., Agavaceae, A
Anzaspis cordylinidis, e
Cordyline indivisa (G.Forst.) Endl., Agavaceae, E
Anzaspis cordylinidis, e
Pseudaulacaspis brimblecombei, n
Cordyline obtecta (Graham) Baker, Agavaceae, E
Anzaspis cordylinidis, e
Poliaspis floccosa, e
Symeria pyriformis, e
Cordyline sp., Agavaceae, E
Anzaspis cordylinidis, e
Hemiberlesia rapax, a
Lepidosaphes pinnaeformis, a
Corokia buddleioides A.Cunn., Cornaceae, E
Lindingaspis rossi, n
Corokia cotoneaster Raoul, Cornaceae, E
Aspidioides corokiae, e
Hemiberlesia rapax, a
Lindingaspis rossi, n
Parlatoria pittospori, n
Corylus avellana L., Corylaceae, A
Diaspidiotus perniciosus, A
Corymbia ficifolia (F. Muell.) K. D. Hill & L. A. S. Johnson, Myrtaceae, A
Pseudaulacaspis eugeniae, n
Corymbia sp., Myrtaceae, A
Pseudaulacaspis eugeniae, n
Corynocarpus laevigatus J.R.Forst. & G.Forst., Corynocarpaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Craspedia sp., Asteraceae, E
Poliaspis media, e
Crataegus monogyna Jacq., Rosaceae, A
Hemiberlesia lataniae, a
Lepidosaphes ulmi, a
Cryptomeria japonica (L.f.) D.Don., Taxodiaceae, A
Carulaspis juniperi, a
Lepidosaphes pallida, a
Cucurbita sp., Cucurbitaceae, A
Aspidiotus nerii, a
Hemiberlesia rapax, a
Cupressus arizonica Greene, Cupressaceae, A
Carulaspis juniperi, a
Cupressus macrocarpa Hartw., Cupressaceae, A
Carulaspis juniperi, a
Cupressus sempervirens L., Cupressaceae, A
Carulaspis juniperi, a
Cupressus sp., Cupressaceae, A
Carulaspis juniperi, a
Cuprocyparis leylandii (A.B.Jacks. & Dallim.) Farjon, Cupressaceae, A
Carulaspis minima, a
Hemiberlesia lataniae, a

- Cussonia spicata* Thunb., Araliaceae, A
Hemiberlesia lataniae, a
Cyathea dealbata (G.Forst.) Sw., Cyathaceae, E
Fusilaspis phymatodidis, e
Cyathea medullaris (G.Forst.) Sw., Cyathaceae, E
Fusilaspis phymatodidis, e
Cyathea sp., Cyathaceae, E
Fusilaspis phymatodidis, e
'Cyathodes' sp., Epacridaceae, E
Poliaspis media, e
Cycas revoluta Thunb., Cycadaceae, A
Furchadaspis zamiae, a
Hemiberlesia lataniae, a
Cydonia oblonga Mill., Rosaceae, A
Diaspidiotus perniciosus, a
Cymbidium sp., Orchidaceae, A
Aspidiotus nerii, a
Lepidosaphes pinnaeformis, a
Cypripedium sp., Orchidaceae, A
Aonidiella aurantii, a
Pseudoparlatoria parlatorioides, a

Dacrycarpus dacrydioides (A.Rich.) de Laub.,
Podocarpaceae, E
Hemiberlesia lataniae, a
Symeria pyriformis, e
Dacrydium cupressinum Lamb., Podocarpaceae, E
Symeria pyriformis, e
Dendrobium sp., Orchidaceae, A
Aspidiotus nerii, a
Dianella sp., Liliaceae, E/A
Poliaspis floccosa, e
Dicksonia fibrosa Colenso, Dicksoniaceae, E
Fusilaspis phymatodidis, e
Dicksonia squarrosa (G.Forst.) Sw., Dicksoniaceae, E
Fusilaspis phymatodidis, e
Diospyros kaki Thunb., Ebenaceae, A
Aspidiotus nerii, a
Disphyma australe (W.T.Aiton) N.E.Br., Aizoaceae, E
Poliaspis media, e
Dodonaea viscosa Jacq., Meliaceae, N
Aspidiotus nerii, a
Hemiberlesia rapax, a
Doodia media R.Br., Blechnaceae, E
Fusilaspis phymatodidis, e
Dracophyllum latifolium A.Cunn., Epacridaceae, E
Poliaspis media, e
Symeria pyriformis, e
Dracophyllum lessonianum A.Rich., Epacridaceae, E
Poliaspis media, e
Dracophyllum oliveri Du Rietz, Epacridaceae, E
Poliaspis media, e
Dracophyllum recurvum Hook.f., Epacridaceae, E
Poliaspis media, e
Dracophyllum sp., Epacridaceae, E
Poliaspis media, e
Dracophyllum traversii Hook.f., Epacridaceae, E
Poliaspis media, e
Dysoxylum spectabile (G.Forst.) Hook.f., Meliaceae, E
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Serenaspis minima, e
Symeria pyriformis, e

Elaeagnus sp., Elaeagnaceae, A
Lindingaspis rossi, n
Parlatoria fulleri, n
Parlatoria pittospori, n
Elaeocarpus hookerianus Raoul, Elaeocarpaceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
Elingamita johnsonii G.T.S. Baylis, Myrsinaceae, E
Symeria pyriformis, e
Embothrium coccineum J.R.Forst. & G.Forst., Proteaceae, A
Pseudaulacaspis brimblecombei, n
Empodisma minus (Hook.f.) L.A.S.Johnson & D.F.Cutler,
Restionaceae, E
Hemiberlesia rapax, a
Poliaspis media, e
Encephalartos longifolius (Jacq.) Lehm., Cycadaceae, A
Furchadaspis zamiae, a
Entelea arborescens R.Br., Tiliaceae, E
Hemiberlesia lataniae, a
Epacris pauciflora A.Rich., Epacridaceae, E
Poliaspis lactea, e
Erica lusitanica Rudolphi, Ericaceae, A
Aspidiotus nerii, a
Eucalyptus microcorys F.Muell., Myrtaceae, A
Pseudaulacaspis eugeniae, n
Eucalyptus regnans F. Muell., Myrtaceae, A
Lepidosaphes multipora, n
Eucalyptus sp., Myrtaceae, A
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Lepidosaphes multipora, n
Lindingaspis rossi, n
Eugenia elliptica Lam., Myrtaceae, A
Pseudaulacaspis eugeniae, n
Euonymus sp., Celastraceae, A
Hemiberlesia lataniae, a
'evergreen iris', Iridaceae, A
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Exocarpos bidwillii Hook.f., Santalaceae, E
Poliaspis media, e

Fatsia japonica (Thunb.) Decne. & Planch., Araliaceae, A
Aspidiotus nerii, a
Lindingaspis rossi, n
Feijoa sellowiana (O.Berg.) O.Berg., Myrtaceae, A
Pseudaulacaspis eugeniae, n
Ficus benjamina L., Moraceae, A
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Ficus elastica Roxb. ex Hornem., Moraceae, A
Pseudaulacaspis eugeniae, n
Ficus pumila L., Moraceae, A
Hemiberlesia lataniae, a
Ficus rubiginosa Desf. ex Vent., Moraceae, A
Pseudaulacaspis eugeniae, n
Freycinetia banksii A.Cunn., Pandanaceae, E
Anzaspis cordylinidis, e
Anzaspis gahniae, e
Symeria pyriformis, e
Fuchsia excorticata (J.R.Forst. & G.Forst.) L.f.,
Onagraceae, E
Hemiberlesia rapax, a
Poliaspis lactea, e

- Furcraea* sp., Agavaceae, A
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Gahnia lacera (A.Rich.) Steud., Cyperaceae, E
Anzaspis gahniae, e
Gahnia pauciflora Kirk, Cyperaceae, E
Anzaspis gahniae, e
Gahnia procera J.R.Forst. & G.Forst., Cyperaceae, E
Anzaspis gahniae, e
Gahnia sp., Cyperaceae, E
Anzaspis gahniae, e
Garrya elliptica Douglas ex Lindl., Garryaceae, A
Aspidiotus nerii, a
Lindingaspis rossi, n
Gaultheria depressa Hook.f., Ericaceae, E
Poliaspis media, e
Gaultheria sp., Ericaceae, E
Poliaspis media, e
Geniostoma rupestre J.R.Forst. & G.Forst. Loganaceae, E
Aspidiotus nerii, a
Lindingaspis rossi, n
Symeria pyriformis, e
Gleichenia dicarpa R.Br., Gleicheniaceae, E
Fusilaspis phymatodidis, e
Gleichenia sp., Gleicheniaceae, E
Fusilaspis phymatodidis, e
'grass', Poaceae, A
Symeria pyriformis, e
Grevillea alpina Lindl., Proteaceae, A
Aspidiotus nerii, a
Parlatoria pittospori, n
Griselinia littoralis Raoul, Griselinaceae, E
Lindingaspis rossi, n
Parlatoria fulleri, n
Griselinia lucida G.Forst., Griselinaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a

Hakea sp., Proteaceae, A
Aspidiotus nerii, a
Hemiberlesia rapax, a
Halocarpus bidwillii (Kirk) Quinn, Podocarpaceae, E
Hemiberlesia rapax, a
Halocarpus biformis (Hook.) Quinn, Podocarpaceae, E
Symeria pyriformis, e
Halocarpus kirkii (Parl.) Quinn, Podocarpaceae, E
Aspidiotus nerii, a
Hebe decumbens (J.B.Armstr.) Cockayne & Allan,
Scrophulariaceae, E
Poliaspis media, e
Hebe elliptica (G.Forst.) Pennell, Scrophulariaceae, E
Poliaspis media, e
Hebe ligustrifolia (A.Cunn. Cockayne & Allan,
Scrophulariaceae, E
Hemiberlesia lataniae, a
Hebe macrantha (Hook.f.) Cockayne & Allan,
Scrophulariaceae, E
Poliaspis media, e
Hebe odora (Hook.f.) Cockayne, Scrophulariaceae, E
Poliaspis media, e
Hebe sp., Scrophulariaceae, E
Aspidioides corokiae, e
Aspidiotus nerii, a
Hemiberlesia rapax, a

Poliaspis media, e
Symeria pyriformis, e
Hebe subalpina (Cockayne) Andersen,
Scrophulariaceae, E
Poliaspis media, e
Hebe topiara L.B.Moore, Scrophulariaceae, E
Hemiberlesia rapax, a
Hebe venustula (Colenso) L.B.Moore, Scrophulariaceae, E
Poliaspis media, e
Hedera sp., Araliaceae, A
Hemiberlesia rapax, a
Lindingaspis rossi, n
Hedycarya arborea J.R.Forst. & G.Forst., Monimiaceae, E
Symeria pyriformis, e
Hedyscepe canterburyana (C.Moore & F.Muell.) H.Wendl.,
Arecaceae, A
Aspidiotus nerii, a
Heliohebe pentasepala (L.B.Moore) Garn.-Jones,
Scrophulariaceae, E
Poliaspis media, e
Hoheria angustifolia Raoul, Malvaceae, E
Hemiberlesia rapax, a
Hoheria populnea A.Cunn., Malvaceae, E
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Hoheria sextylosa Colenso, Malvaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Hoheria sp., Malvaceae, E
Hemiberlesia rapax, a
Lindingaspis rossi, n
Symeria pyriformis, e
Howea forsteriana Becc., Arecaceae, A
Aspidiotus nerii, a
Hemiberlesia rapax, a
Hymenophyllum atrovirens Colenso, Hymenophyllaceae, E
Fusilaspis phymatodidis, e
Hymenophyllum demissum (G.Forst.) Sw.,
Hymenophyllaceae, E
Fusilaspis phymatodidis, e
Hymenophyllum dilatatum (G.Forst.) Sw.,
Hymenophyllaceae, E
Fusilaspis phymatodidis, e
Hymenophyllum pulcherrimum Colenso,
Hymenophyllaceae, E
Fusilaspis phymatodidis, e
Hymenophyllum sp., Hymenophyllaceae, E
Fusilaspis phymatodidis, e
Hypericum sp., Clusiaceae, A
Hemiberlesia lataniae, a
Hemiberlesia rapax, a

Ilex sp., Aquifoliaceae, A
Hemiberlesia rapax, a
Ixerba brexioides A.Cunn., Escalloniaceae, E
Symeria pyriformis, e

Juniperus chinensis L., Cupressaceae, A
Carulaspis juniperi, a
Juniperus procera Hochst. ex Endl., Cupressaceae, A
Carulaspis juniperi, a
Juniperus sp., Cupressaceae, A
Carulaspis juniperi, a
Carulaspis minima, a

- Knightia excelsa* R.Br., Proteaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Parlatoria fulleri, n
Symeria pyriformis, e
Korthalsella clavata (Kirk) Cheeseman, Viscaceae, E
Aspidiotus nerii, a
Korthalsella lindsayi (Oliv.) Engl., Viscaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Korthalsella salicornioides (A.Cunn.) Tiegh., Viscaceae, E
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Kunzea ericoides (A.Rich.) Joy Thomps., Myrtaceae, N
Anzaspis angusta, n
Hemiberlesia rapax, a
Symeria intermedia, e

Lastreopsis glabella (A.Cunn.) Tindale, Dryopteridaceae, E
Fusilaspis phymatodidis, e
Laurelia novae-zelandiae A.Cunn., Monimiaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Lindingaspis rossi, n
Symeria pyriformis, e
Laurus nobilis L., Lauraceae, A
Hemiberlesia rapax, a
Lindingaspis rossi, n
Leionema nudum (Hook.) Paul G.Wilson, Rutaceae, E
Hemiberlesia rapax, a
Lindingaspis rossi, n
Poliaspis media, e
Lepidothamnus laxifolius (Hook.f.) Quinn,
Podocarpaceae, E
Poliaspis media, e
Leptecophylla juniperina (J.R.Forst. & G.Forst)
C.M.Weiller, Epacridaceae, E
Poliaspis media, e
Leptospermum laevigatum (Gaertn.) F.Muell., Myrtaceae, A
Anzaspis angusta, n
Lindingaspis rossi, n
Leptospermum scoparium J.R.Forst. & G.Forst.,
Myrtaceae, N
Anzaspis angusta, n
Hemiberlesia rapax, a
Symeria intermedia, e
Symeria leptospermi, e
Leptospermum sp., Myrtaceae, N
Anzaspis angusta, n
Hemiberlesia rapax, a
Parlatoria fulleri, n
Symeria leptospermi, e
Leucopogon fasciculatus (G.Forst.) A.Rich.,
Epacridaceae, E
Hemiberlesia lataniae, a
Poliaspis media, e
Leucopogon fraseri A.Cunn., Epacridaceae, E
Poliaspis media, e
Leucospermum bolusii Gand., Proteaceae, A
Parlatoria pittospori, n
Libertia ixioides (G.Forst.) Spreng., Iridaceae, E
Hemiberlesia lataniae, a
Hemiberlesia rapax, a

Poliaspis floccosa, e
Pseudaulacaspis brimblecombei, n
Libertia peregrinans Cockayne & Allan, Iridaceae, E
Poliaspis floccosa, e
Libertia sp., Iridaceae, E
Pseudaulacaspis brimblecombei, n
Libocedrus bidwillii Hook.f., Cupressaceae, E
Symeria pyriformis, e
Ligustrum lucidum W.T.Aiton, Oleaceae, A
Lindingaspis rossi, n
Ligustrum ovalifolium Hassk., Oleaceae, A
Hemiberlesia rapax, a
Ligustrum sp., Oleaceae, A
Hemiberlesia rapax, a
Liquidambar styraciflua L., Hamamelidaceae, A
Lindingaspis rossi, n
Litchi chinensis Sonn., Sapindaceae, A
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Litsea calicaris (Sol. ex A.Cunn.) Benth. & Hook.f. ex
Kirk, Lauraceae, E
Symeria pyriformis, e
Lomandra longifolia Labill., Lomandraceae, A
Pseudaulacaspis eugeniae, n
Lomatia myricoides (C.F.Gaertn.) Domin, Proteaceae, A
Pseudaulacaspis brimblecombei, n
Lophomyrtus cv., Myrtaceae, E
Lindingaspis rossi, n
Lophomyrtus obcordata (Raoul) Burret, Myrtaceae, E
Hemiberlesia rapax, a
Lophostemon confertus (R. Br.) Peter G Wilson & J. T.
Waterh., Myrtaceae, A
Parlatoria fulleri, n
Pseudaulacaspis eugeniae, n
Lygodium articulatum A.Rich., Shizaeaceae, E
Fusilaspis phymatodidis, e

Macadamia sp., Proteaceae, A
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Parlatoria fulleri, n
Macropiper excelsum (G.Forst.) Miq., Piperaceae, E
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Magnolia grandiflora L., Magnoliaceae, A
Pseudaulacaspis eugeniae, n
Malus domestica Borkh., Rosaceae, A
Aonidiella aurantii, a
Diaspidiotus ostreaeformis, a
Diaspidiotus perniciosus, a
Hemiberlesia rapax, a
Lepidosaphes ulmi, a
Parlatoria desolator, a
Parlatoria pittospori, n
Manoao colensoi (Hook.) Molloy, Podocarpaceae, E
Symeria pyriformis, e
Marattia salicina Sm. in Rees, Marattiaceae, E
Fusilaspis phymatodidis, e
Melaleuca hypericifolia Sm., Myrtaceae, A
Parlatoria fulleri, n
Pseudaulacaspis eugeniae, n
Melaleuca sp., Myrtaceae, A
Pseudaulacaspis eugeniae, n

- Melicope simplex* A.Cunn., Rutaceae, E
Aspidiotus nerii, a
Melicope ternata J.R.Forst. & G.Forst., Rutaceae, E
Pseudaulacaspis brimblecombei, n
Melicytus alpinus (Kirk) Garn-Jones, Violaceae, E
Poliaspis media, e
Melicytus macrophyllus A.Cunn., Violaceae, E
Serenaspis minima, e
Melicytus micranthus (Hook.f.) Hook.f., Violaceae, E
Serenaspis minima, e
Melicytus obovatus (Kirk) Garn-Jones, Violaceae, E
Serenaspis minima, e
Melicytus ramiflorus J.R.Forst. & G.Forst., Violaceae, E
Aspidiotus nerii, a
Serenaspis minima, e
Meryta sinclairii (Hook.f.) Seem., Araliaceae, E
Aspidiotus nerii, a
Lindingaspis rossi, n
Symeria pyriformis, e
Metrosideros bartlettii J.W.Dawson, Myrtaceae, E
Hemiberlesia rapax (Comstock) a
Metrosideros colensoi Hook.f., Myrtaceae, E
Anoplaspis maskelli, e
Metrosideros collina A.Gray, Myrtaceae, A
Hemiberlesia rapax, a
Metrosideros diffusa (G.Forst.) Sm., Myrtaceae, E
Anoplaspis maskelli, e
Metrosideros excelsa Sol. ex Gaertn., Myrtaceae, E
Anoplaspis metrosideri, e
Metrosideros fulgens Sol. ex Gaertn., Myrtaceae, E
Anoplaspis maskelli, e
Hemiberlesia rapax, a
Metrosideros kermadecensis W.R.B.Oliv., Myrtaceae, E
Pseudaulacaspis eugeniae, n
Metrosideros perforata (Forster et Forster f.) A. Rich., Myrtaceae, E
Anoplaspis maskelli, e
Metrosideros robusta A.Cunn., Myrtaceae, E
Anoplaspis metrosideri, e
Metrosideros sp. [rata], Myrtaceae, E
Anoplaspis maskelli, e
Anoplaspis metrosideri, e
Metrosideros umbellata Cav., Myrtaceae, E
Anoplaspis metrosideri, e
Microsorium pustulatum (G.Forst.) Copel., Polypodiaceae, E
Fusilaspis phymatodidis, e
Microsorium pustulatum (G.Forst.) Copel., Polypodiaceae, E
Fusilaspis phymatodidis, e
Microsorium pustulatum (G.Forst.) Copel., Polypodiaceae, E
Fusilaspis phymatodidis, e
Mida salicifolia A.Cunn., Santalaceae, E
Hemiberlesia rapax, a
Musa sp., Musaceae, E
Hemiberlesia rapax, a
Myoporum laetum G.Forst., Myoporaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Myrsine australis (A.Rich.) Allan, Myrsinaceae, E
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Poliaspis argentosis, e
Poliaspis lactea, e
Poliaspis media, e
Symeria pyriformis, e
Myrsine divaricata A.Cunn., Myrsinaceae, E
Poliaspis media, e
Myrsine salicina Heward ex Hook.f., Myrsinaceae, E
Poliaspis media, e
Myrsine sp., Myrsinaceae, E
Anzaspis angusta, n
Myrtus communis L., Myrtaceae, A
Hemiberlesia rapax, a
Myrtus sp., Myrtaceae, A
Hemiberlesia rapax, a
Nematolepis squamea (Labill.) Paul G. Wilson, Rutaceae, A
Hemiberlesia rapax, a
Lindingaspis rossi, n
Parlatoria pittospori, n
Nestegis cunninghamii (Hook.f.) L.A.S.Johnson, Oleaceae, E
Symeria pyriformis, e
Nestegis lanceolata (Hook.f.) L.A.S.Johnson, Oleaceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
Nestegis montana (Hook.f.) L.A.S.Johnson, Oleaceae, E
Hemiberlesia rapax, a
Nestegis sp., Oleaceae, E
Aspidiotus nerii, a
Symeria pyriformis, e
Olea europaea L., Oleaceae, A
Lindingaspis rossi, n
Olearia albida (Hook.f.) Hook.f., Asteraceae, E
Hemiberlesia rapax, a
Olearia arborescens (G.Forst.) Cockayne & Laing, Asteraceae, E
Poliaspis lactea, e
Olearia furfuracea (A.Rich.) Hook.f., Asteraceae, E
Aspidiotus nerii, a
Lindingaspis rossi, n
Olearia rani (A.Cunn.) Druce, Asteraceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
Olearia solandri (Hook.f.) Hook.f., Asteraceae, E
Hemiberlesia rapax, a
Olearia sp., Asteraceae, E
Poliaspis lactea, e
Olearia traversii (F.Muell.) Hook.f., Asteraceae, E
Poliaspis chathamica, e
Olearia x macrodonta Baker, Asteraceae, E
Poliaspis lactea, e
Ophiopogon japonicus (Thunb.) Ker Gawl., Liliaceae, A
Aspidiotus nerii, a
Opuntia sp., Cactaceae, A
Abgrallaspis cyanophylli, a
'orchid', Orchidaceae, A
Diaspis boisduvalii, a
Lepidosaphes pinnaeformis, a
Poliaspis media, e
Osmanthus fortunei Carriere, Oleaceae, A
Aspidiotus nerii, a

- Ozothamnus leptophyllus* (G.Forst.) Breitw. & J.M.Ward,
Asteraceae, E
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Poliaspis floccosa, e
Poliaspis lactea, e
Poliaspis media, e
- Pachystegia insignis* (Hook.f.) Cheeseman, Asteraceae, E
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
Parlatoria pittospori, n
Pseudaulacaspis eugeniae, n
'palm', Arecaceae, A
Abgrallaspis cyanophylli, a
Anzaspis cordylinidis, e
Aspidiotus nerii, a
Lindingaspis rossi, n
- Paraserianthes lophantha* (Willd.) I.C.Neilson, Fabaceae, A
Hemiberlesia rapax, a
Trulliflorinia acaciae, n
- Parsonsia* sp., Apocynaceae, E
Aspidiotus nerii, a
Serenaspis minima, e
- Passiflora tetrandra* Banks ex DC., Passifloraceae, E
Serenaspis minima, e
- Pellaea rotundifolia* (G.Forst.) Hook., Pteridaceae, E
Fusilaspis phymatodidis, e
- Pentachondra pumila* (J.R.Forst. & G.Forst.) R.Br.,
Epacridaceae, E
Poliaspis media, e
- Persea americana* Mill., Lauraceae, A
Hemiberlesia lataniae, a
- Philodendron* sp., Arecaceae, A
Hemiberlesia lataniae, a
- Phoenix canariensis* hort. ex Chabaud, Arecaceae, A
Aspidiotus nerii, a
Lindingaspis rossi, n
Parlatoria fulleri, n
Pseudaulacaspis eugeniae, n
- Phoenix roebelenii* O'Brien, Arecaceae, A
Hemiberlesia rapax, a
- Phormium cookianum* Le Jol., Agavaceae, E
Anzaspis cordylinidis, e
Poliaspis floccosa, e
- Phormium* sp.[?], Agavaceae, E
Anzaspis cordylinidis, e
- Phormium tenax* J.R.Forst. & G.Forst., Agavaceae, E
Anzaspis cordylinidis, e
Aspidiotus nerii, a
Hemiberlesia rapax, a
Poliaspis floccosa, e
- Phyllocladus alpinus* Hook.f., Phyllocladaceae, E
Symeria phyllocladi, e
- Phyllocladus trichomanoides* D.Don, Phyllocladaceae, E
Symeria phyllocladi, e
- Phyllostachys aurea* Riviere & C.Riviere, Poaceae, A
Kuwanaspis pseudoleucaspis, a
- Pimelea* nr *aridula*, Thymeliaceae, E
Poliaspis media, e
- Pimelea prostrata* (J.R.Forst. & G.Forst.) Willd.,
Thymeliaceae, E
Aspidioides corokiae, e
Poliaspis media, e
- Pimelea* sp., Thymeliaceae, E
Aspidioides corokiae, e
- Pimelea urvilleana* A.Rich., Thymeliaceae, E
Poliaspis media, e
- Pinus mugo* Turra, Pinaceae, A
Lindingaspis rossi, n
- Pinus nigra laricio* Maire, Pinaceae, A
Parlatoria pittospori, n
- Pinus radiata* D.Don, Pinaceae, A
Parlatoria fulleri, n
Parlatoria pittospori, n
- Pittosporum eugenioides* A.Cunn., Pittosporaceae, E
Aspidiotus nerii, a
- Pittosporum* sp., Pittosporaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Symeria pyriformis, e
- Pittosporum tenuifolium* Sol. ex Gaertn., Pittosporaceae, E
Hemiberlesia rapax, a
Poliaspis lactea, e
- Pittosporum undulatum* Vent., Pittosporaceae, E
Lepidosaphes multipora, n
- Plagianthus divaricatus* J.R.Forst. & G.Forst., Malvaceae, E
Aspidiotus nerii, a
Hemiberlesia lataniae, a
Hemiberlesia rapax, a
- Podocarpus hallii* Kirk, Podocarpaceae, E
Symeria pyriformis, e
- Podocarpus totara* G.Benn. ex D.Don, Podocarpaceae, E
Symeria pyriformis, e
- Polystichum neozelandicum* Fee, Dryopteridaceae, E
Fusilaspis phymatodidis, e
- Polystichum vestitum* (G.Forst.) C.Presl,
Dryopteridaceae, E
Fusilaspis phymatodidis, e
- Pomaderris apetala* Labill., Rhamnaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
- Pomaderris phyllicifolia* Lodd. ex Link, Rhamnaceae, E
Hemiberlesia rapax, a
- Poncirus trifoliata* (L.) Raf., Rutaceae, A
Hemiberlesia rapax, a
- Populus* sp., Salicaceae, A
Diaspidiotus perniciosus, a
Hemiberlesia lataniae, a
- Pouteria costata* (Endl.) Baehni, Sapotaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Lindingaspis rossi, n
- Protea nerifolia* R.Br., Proteaceae, A
Pseudaulacaspis brimblecombei, n
- Prunnopitys ferruginea* (D.Don) de Laub.,
Podocarpaceae, E
Symeria pyriformis, e
- Prunnopitys taxifolia* (D.Don) de Laub., Podocarpaceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
- Prunus avium* (L.) L., Rosaceae, A
Diaspidiotus ostreaeformis, a
- Prunus domestica* L., Rosaceae, A
Diaspidiotus ostreaeformis, a
Diaspidiotus perniciosus, a
Lepidosaphes ulmi, a

- Prunus domestica italica* (Borkh.) Gams ex Hegi,
Rosaceae, A
Diaspidiotus ostreaeformis, a
Diaspidiotus perniciosus, a
Prunus laurocerasus L., Rosaceae, A
Aspidiotus nerii, a
Prunus persica (L.) Batsch, Rosaceae, A
Diaspidiotus perniciosus, a
Prunus salicina Lindl., Rosaceae, A
Lepidosaphes ulmi, a
Prunus serrulata Lindl., Rosaceae, A
Diaspidiotus perniciosus, a
Prunus sp., Rosaceae, A
Diaspidiotus perniciosus, a
Parlatoria desolator, a
Pseudopanax arboreus (Murray) Philipson, Araliaceae, E
Aspidiotus nerii, a
Serenaspis minima, e
Pseudopanax crassifolius (Sol. ex A.Cunn.) K.Koch.,
Araliaceae, E
Hemiberlesia lataniae, a
Pseudopanax ferox Kirk, Araliaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Pseudopanax laetus (Kirk) Philipson, Araliaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Pseudopanax sp., Araliaceae, E
Aspidiotus nerii, a
Pseudotsuga menziesii (Mirb.) Franco, Pinaceae, A
Lindingaspis rossi, n
Pseudowintera axillaris (J.R.Forst. & G.Forst.) Dandy,
Winteraceae, E
Symeria pyriformis, e
Pseudowintera colorata (Raoul) Dandy, Winteraceae, E
Hemiberlesia rapax, a
Symeria pyriformis, e
Pteris cretica L., Pteridaceae, A
Fusilaspis phymatodidis, e
Pyrus communis L., Rosaceae, A
Diaspidiotus ostreaeformis, a
Diaspidiotus perniciosus, a
Hemiberlesia rapax, a
Parlatoria desolator, a
- Quercus* sp., Fagaceae, A
Aspidiotus nerii, a
Quintinia serrata A.Cunn., Escalloniaceae, E
Symeria pyriformis, e
- Raoulia* sp., Asteraceae, E
Poliaspis raouliae, e
Raukaua anomalus (Hook.) A.D.Mitch., Frodin & Heads,
Araliaceae, E
Hemiberlesia rapax, a
Poliaspis media, e
Symeria pyriformis, e
Rhapis excelsa (Thun.) A.Henry ex Rehder, Arecaceae, A
Pinnaspis aspidistrae, a
Rhododendron sp., Ericaceae, A
Aspidiotus nerii, a
Rhopalostylis baueri H.Wendl. & Drude, Arecaceae, E
Aspidiotus nerii, a
Hemiberlesia lataniae, a
- Rhopalostylis sapida* H.Wendl. & Drude, Arecaceae, E
Anzaspis cordylinidis, e
Aspidiotus nerii, a
Lindingaspis rossi, n
Symeria pyriformis, e
Ribes nigrum L., Grossulariaceae, A
Aspidiotus nerii, a
Hemiberlesia rapax, a
Ribes rubrum L., Grossulariaceae, A
Aspidiotus nerii, a
Ripogonum scandens J.R.Forst. & G.Forst.,
Ripogonaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Lindingaspis rossi, n
Symeria pyriformis, e
Rosa sp., Rosaceae, A
Aulacaspis rosae, a
Aulacaspis rosarum, a
Lepidosaphes ulmi, a
Rubus australis G.Forst., Rosaceae, E
Hemiberlesia lataniae, a
Rubus fruticosus, Rosaceae, A
Aulacaspis rosae, a
Rubus fruticosus x, Rosaceae, A
Aulacaspis rosarum, a
Rubus idaeus L., Rosaceae, A
Aulacaspis rosae, a
Rubus ursinus Cham. & Schltdl., Rosaceae, A
Aulacaspis rosae, a
Aulacaspis rosarum, a
- Salix discolor* Muhl., Salicaceae, A
Hemiberlesia rapax, a
Salix humboldtiana Willd., Salicaceae, A
Aonidiella aurantii, a
Hemiberlesia rapax, a
Salix sp., Salicaceae, A
Diaspidiotus perniciosus, a
Hemiberlesia rapax, a
Salix x reichardtii A.Kern., Salicaceae, A
Aonidiella aurantii, a
Samolus repens (J.R.Forst. & G.Forst.) Pers.,
Primulaceae, E
Poliaspis media, e
Sarcocornia quinqueflora (Bunge ex Ung.-Sternb.)
A.J.Scott, Chenopodiaceae, N
Poliaspis salicornicola, e
Schefflera digitata J.R.Forst. & G.Forst., Araliaceae, E
Aspidiotus nerii, a
Hemiberlesia rapax, a
Symeria pyriformis, e
Seaforthia sp., Arecaceae, A
Aspidiotus nerii, a
Sedum rubrotinctum R.T.Clausen, Crassulaceae, A
Hemiberlesia rapax, a
Sequoia sempervirens (D.Don. Endl., Taxodiaceae, A
Lindingaspis rossi, n
Sequoiadendron giganteum (Lindl.) J.Buchholz,
Taxodiaceae, A
Carulaspis juniperi, a
Solanum aviculare G.Forst., Solanaceae, E
Hemiberlesia rapax, a

- Solanum linnaeanum* Hepper & P.-M.L.Jaeger,
 Solanaceae, A
 Hemiberlesia lataniae, a
Solanum mauritianum Scop., Solanaceae, A
 Hemiberlesia lataniae, a
Sonchus sp., Asteraceae, A
 Poliaspis media, e
Sophora tetraptera J.S.Mill, Fabaceae, E
 Hemiberlesia rapax, a
Sticherus cunninghamii (Hook.) Ching, Gleicheniaceae, E
 Fusilaspis phymatodidis, e
Streblus heterophyllus (Blume) Corner, Moraceae, E
 Aspidiotus nerii, a
 Hemiberlesia lataniae, a
 Hemiberlesia rapax, a
Streblus smithii (Cheeseman) Corner, Moraceae, E
 Aspidiotus nerii, a
 Hemiberlesia rapax, a
Strelitzia reginae Aiton, Strelitziaceae, A
 Hemiberlesia lataniae, a
Syzygium maire (A.Cunn.) Sykes & Garn.-Jones,
 Myrtaceae, E
 Hemiberlesia rapax, a

Taxus baccata L., Taxaceae, A
 Aspidiotus nerii, a
Telopea oreades F.Muell., Protaceae, A
 Pseudaulacaspis brimblecombei, n
Telopea sp., Proteaceae, A
 Pseudaulacaspis brimblecombei, n
Telopea speciosissima (Sm.) R.Br., Protaceae, A
 Pseudaulacaspis brimblecombei, n
Thuja sp., Cupressaceae, A
 Carulaspis juniperi, a
Toronia toru (A.Cunn.) L.A.S.Johnson & B.G.Briggs,
 Proteaceae, E
 Symeria pyriformis, e
Trichomanes reniforme G.Forst., Hymenophyllaceae, E
 Fusilaspis phymatodidis, e
Tristaniopsis laurina (Sm.) Peter G. Wilson & J. T. Waterh.,
 Myrtaceae, A
 Parlatoria fulleri, n

Ulex europaeus L., Fabaceae, A
 Aspidiotus nerii, a
 Hemiberlesia lataniae, a
 Hemiberlesia rapax, a
Uncinia sp., Cyperaceae, E
 Anzaspis cordylinidis, e
Urtica ferox G.Forst., Urticaceae, E
 Aspidiotus nerii, a
 Hemiberlesia rapax, a

Vaccinium corymbosum L., Ericaceae, A
 Hemiberlesia rapax, a
Vaccinium virgatum Aiton, Ericaceae, A
 Hemiberlesia rapax, a
Virgilia sp., Fabaceae, A
 Hemiberlesia rapax, a
Vitex lucens Kirk, Verbenaceae, E
 Aonidiella aurantii, a
 Aspidiotus nerii, a
 Hemiberlesia lataniae, a

 Hemiberlesia rapax, a
 Symeria pyriformis, e
Vitis vinifera Linnaeus, Vitaceae, A
 Aspidiotus nerii, a
 Hemiberlesia lataniae, a
Vitis sp., Vitaceae, A
 Aspidiotus nerii, a
Vriesea sp., Bromeliaceae, A
 Diaspis boisduvalii, a

Weinmannia racemosa L.f., Cunoniaceae, E
 Symeria pyriformis, e
Weinmannia silvicola Sol. ex A.Cunn., Cunoniaceae, E
 Hemiberlesia rapax, a

Zelkova serrata (Thunb.) Makino, Ulmaceae, A
 Hemiberlesia lataniae, a

Appendix C. Geographical coordinates of collection localities.

Coordinates should be read as 00°00'S / 000°00'E, and as W for the Chatham Islands (CH). The two-letter area codes follow Crosby *et al.* (1998).

88 Valley, NN	4126 / 17301	Auckland, Henderson, Corbans Estate-Opanuku Strm, AK	3652 / 17437
Abel Tasman NP, Bark Bay, NN	4055 / 17303	Auckland, Henderson, Opanuku Strm Walkway, AK	3652 / 17437
Alexandra, Ashton & Richardson's Orchard, CO	4515 / 16923	Auckland, Hillsborough, AK	3655 / 17445
Alexandra, Old DSIR Research Orchard, CO	4515 / 16923	Auckland, Lynfield, Boundary Rd / MAF grounds, AK ...	3655 / 17442
Anniseed Valley, NN	4123 / 17309	Auckland, Mangere, AK	3658 / 17448
Aorere Valley, Heaphy Track, start of Heaphy Track, NN	4051 / 17226	Auckland, Mangere, James Fletcher Drive (Favona), AK	3656 / 17449
Ardgowan, DN	4504 / 17057	Auckland, Mangere, Otaua Stonefields, AK	3659 / 17445
Arthurs Pass, Devils Punchbowl Track, NC4255 / 17134	4254 / 17133	Auckland, Mangere Mountain, AK	3656 / 17446
Arthurs Pass, Dobsons Nature Trail, NC	4254 / 17133	Auckland, Manurewa, AK	3701 / 17452
Ashburton, MC	4353 / 17145	Auckland, Manurewa, Auckland Regional Botanic Gardens, AK	3700 / 17454
Ashburton, Millichamps Nursery, MC	4353 / 17145	Auckland, Manurewa, David Nathan Park, AK	3700 / 17454
Ashburton, Tinwald, MC	4355 / 17143	Auckland, Manurewa, Murphys Bush, AK	3658 / 17455
Atiamuri, Maroa [SH 1], TO	3829 / 17602	Auckland, Manurewa, Olive Davis S.R., AK	3700 / 17456
Auckland, AK	3651 / 17445	Auckland, Mechanics Bay, Teal Park, AK ...	3650 / 17446
Auckland, Albany, AK	3644 / 17442	Auckland, Mt Albert, AK	3653 / 17443
Auckland, Albert Park, AK	3651 / 17446	Auckland, Mt Albert, New North Rd, AK	3652 / 17443
Auckland, Auckland Airport, AK	3700 / 17446	Auckland, Mt Albert, New North Rd cnr Lloyd Ave, AK	3652 / 17443
Auckland, Auckland Domain, AK	3651 / 17446	Auckland, Mt Albert, summit of Mt Albert, AK	3653 / 17443
Auckland, Auckland University grounds, city campus, AK	3650 / 17446	Auckland, Mt Albert Research Centre, AK	3653 / 17443
Auckland, Avondale, AK	3653 / 17441	Auckland, Mt Albert Road, AK	3653 / 17443
Auckland, Avondale, 54 Patiki Road, AK ...	3652 / 17439	Auckland, Mt Eden, AK	3652 / 17445
Auckland, Birkenhead, AK	3648 / 17443	Auckland, Mt Roskill, AK	3654 / 17444
Auckland, Birkenhead, Kauri Park, AK	3648 / 17442	Auckland, Mt St Johns, AK	3652 / 17446
Auckland, Birkenhead, Kauri Pt Centennial Park, AK	3649 / 17442	Auckland, Mt Wellington, AK	3653 / 17450
Auckland, Blockhouse Bay, "Foodtown", AK	3655 / 17439	Auckland, New Lynn, AK	3654 / 17441
Auckland, Browns Bay, AK	3643 / 17445	Auckland, New Lynn, Lynmall, AK	3654 / 17441
Auckland, Captains Bush, AK	3656 / 17443	Auckland, Newmarket, AK	3651 / 17446
Auckland, Cornwall Park, AK	3653 / 17446	Auckland, North Shore, AK	3648 / 17446
Auckland, Devonport, AK	3649 / 17447	Auckland, Northcote, Smiths Bush, AK	3647 / 17445
Auckland, East Tamaki, AK	3657 / 17452	Auckland, nr Titirangi, Ian Gordon's property, AK	3656 / 17439
Auckland, Eastern Beach, AK	3652 / 17454	Auckland, Royal Oak, AK	3654 / 17446
Auckland, Eden Garden, AK	3652 / 17446	Auckland, One Tree Hill, AK	3653 / 17446
Auckland, Ellerslie, AK	3653 / 17448	Auckland, Onehunga, AK	3654 / 17447
Auckland, Epsom, AK	3653 / 17446	Auckland, Oratia, AK	3655 / 17437
Auckland, Glen Eden, AK	3654 / 17438	Auckland, Oratia Research Orchard, AK ...	3655 / 17437
Auckland, Glen Eden, 44C Pleasant Road, AK	3655 / 17439	Auckland, Otahuhu, AK	3656 / 17450
Auckland, Glen Eden, Palmers Garden Centre, AK	3653 / 17439	Auckland, Panmure, AK	3654 / 17451
Auckland, Glen Innes, Waitaiki Bay, AK ...	3652 / 17452	Auckland, Papakura, AK	3704 / 17456
Auckland, Glendene, AK	3653 / 17439	Auckland, Papatoetoe, AK	3658 / 17450
Auckland, Glendowie, Tahuna Torea Nature Reserve, AK	3653 / 17453	Auckland, Parnell, AK	3651 / 17446
Auckland, Glenfield, AK	3646 / 17442	Auckland, Parnell, Alberon Reserve, AK ...	3651 / 17446
Auckland, Grafton, AK	3651 / 17446	Auckland, Pollen I, AK	3651 / 17440
Auckland, Grafton Cemetery, AK	3651 / 17445	Auckland, Sandringham, AK	3653 / 17443
Auckland, Henderson, AK	3652 / 17437	Auckland, St Heliers, Dingle Dell Reserve, AK	3651 / 17451
Auckland, Henderson, Bruce McLaren Rd, AK	3653 / 17437	Auckland, St Johns, AK	3652 / 17450
		Auckland, St Lukes Rd, shopping centre, AK	3652 / 17443
		Auckland, Takapuna, AK	3647 / 17446
		Auckland, Tamaki Campus, Landcare Research, AK	3653 / 17450
		Auckland, Te Atatu South, AK	3652 / 17438
		Auckland, The Domain, Nursery glasshouse, AK	3651 / 17446

Auckland, Titirangi, AK	3656 / 17439	Christchurch, cnr Marshlands & New Brighton Rds, MC	4330 / 17239
Auckland, Titirangi, 21 Ngaio Road, AK	3656 / 17438	Christchurch, Hagley Park, MC	4332 / 17236
Auckland, Titirangi, Smith garden, AK	3656 / 17439	Christchurch, Harewood, MC	4328 / 17233
Auckland, Traherne I, AK	3652 / 17440	Christchurch, Hillmorton Hospital, MC	4333 / 17235
Auckland, Waikowhai Park, AK	3656 / 17443	Christchurch, Linwood Ave, MC	4331 / 17240
Auckland, Western Springs, AK	3651 / 17443	Christchurch, New Brighton, MC	4330 / 17243
Auckland, Whenuapai Air Base, Tokomaru St, AK	3647 / 17437	Christchurch, New Brighton, Bridge Street Reserve, MC	4331 / 17243
Auckland, Wiri, AK	3700 / 17452	Christchurch, Papanui, MC	4329 / 17235
Banks Peninsula, Akaroa, Grehan V, MC	4346 / 17258	Christchurch, Riccarton, MC	4332 / 17235
Banks Peninsula, Hinewai Reserve, MC	4348 / 17301	Christchurch, Riccarton Bush, MC	4331 / 17235
Banks Peninsula, Le Bons Bay, MC	4345 / 17303	Christchurch, Riccarton House, MC	4331 / 17235
Banks Peninsula, Menzies Bay, MC	4338 / 17257	Christchurch, Riccarton Road [upper], MC	4331 / 17234
Banks Peninsula, Prices Valley Reserve, MC	4345 / 17242	Christchurch, Rockinghorse Rd, MC	4333 / 17244
Bannockburn, CO	4505 / 16909	Christchurch, Spreydon, MC	4333 / 17236
Big Bay, Pyke R Camp, WD	4426 / 16812	Christchurch, Victoria St, MC	4331 / 17238
Birdlings Flat, MC	4349 / 17242	Christchurch, Woolston, MC	4333 / 17240
Blenheim, MB	4130 / 17357	Clevedon, 60 Creightons Rd, pty Jones, citrus orchard, AK	3701 / 17501
Blenheim, Fairhall, MB	4151 / 17353	Clevedon-Kawakawa Rd, Polo Grounds Gates, AK	3659 / 17502
Blenheim, Omaka, MB	4132 / 17355	Clyde, CO	4511 / 16919
Blenheim, Onamalutu River, Onamalutu Reserve [Domain], MB	4127 / 17342	Cobb Valley, Cobb Ridge, NN	4103 / 17230
Blenheim, Renwick, MB	4130 / 17349	Cobb Valley, Lake Sylvester, NN	4106 / 17237
Blenheim, Spring Creek, MB	4127 / 17357	Cobb Valley, Lake Sylvester, NN	4106 / 17237
Blenheim, Woodbourne Military Base, MB	4130 / 17351	Cobb Valley, Lake Sylvester Track, NN	4106 / 17239
Bluff, SL	4636 / 16820	Colac Bay, SL	4622 / 16752
Breaksea Sound, Breaksea I, FD	4534 / 16638	Coromandels, Black Jack Road, CL	3642 / 17545
Breaksea Sound, Gilbert Island No 6, FD	4535 / 16639	Coromandels, Colville Hill, CL	3640 / 17528
Brynderwyn, ND	3605 / 17425	Coromandels, Kennedy Bay, CL	3640 / 17533
Buller Gorge, BR	4150 / 17144	Coromandels, Kopu Mill, CL	3711 / 17535
Canterbury, MC	4331 / 17210	Coromandels, Kopu-Hikuai Rd, CL	3710 / 17536
Canterbury, Balmoral State Forest, NC	4249 / 17243	Coromandels, Manaia, CL	3650 / 17528
Cascade, Teer Plateau, WD	4401 / 16831	Coromandels, Tapu Hill, CL	3658 / 17530
Cass, MC	4302 / 17145	Coromandels, Tapu-Coroglen Rd, CL	3659 / 17535
Catlins, Maclellan, SL	4632 / 16929	Coromandels, Thames, CL	3709 / 17533
Catlins, Picnic Point, SL	4634 / 16928	Coromandels, Waionu Bay, CL	3701 / 17530
Catlins, Tautuku Beach, SL	4635 / 16925	Coromandels, Whangamata, CL	3712 / 17552
Cavalli Is, Hamaruru I, ND	3458 / 17356	Coromandels, Whitianga, CL	3649 / 17541
Cavalli Is, Motumuka I, ND	3501 / 17356	Cromwell, CO	4502 / 16911
Chaham Island, Whanga Lagoon, Nikau Reserve, CH	4346 / 17534	Cromwell, Dunstan Ra, CO	4436 / 16941
Charleston, Charleston-Addison Flat, BR	4148 / 17130	Dairy Flat, AK	3640 / 17437
Chatham I, Kaingaroa, Weisners old garden, CH	4344 / 17616	Dairy Flat, Durey Rd, property Froud, AK	3641 / 17440
Chatham I, Long Beach, nr Henga Reserve, CH	4351 / 17633	Dannevirke, WA	4012 / 17606
Chatham I, Mananea, nr Pakauwera, CH	4345 / 17628	Dome Valley, Dome Valley State Forest, AK	3621 / 17437
Chatham I, Owenga, Rangaika Reserve, CH	4401 / 17621	Dunedin, DN	4552 / 17030
Chatham I, Port Hutt Road, CH	4349 / 17634	Dunedin, Fisher & Paykel, DN	4552 / 17030
Chatham I, Taiko Camp, CH	4404 / 17638	Dunedin, Otago Museum, Tropical House, DN	4552 / 17030
Chatham I, Waitangi, CH	4355 / 17634	Dunedin, St Clair Golf Course, DN	4554 / 17028
Chatham Is, Pitt I, Ellen E. Preece Covenant, CH	4417 / 17611	Dunedin, Waitati, DN	4545 / 17034
Chatham Is, South East I, Nth Landing, CH	4421 / 17610	Dunedin, Woodhaugh Gardens, DN	4551 / 17030
Christchurch, MC	4332 / 17238	D'Urville I, SD	4049 / 17352
Christchurch, Botanic Gardens, MC	4331 / 17237	Dusky Sound, Resolution I, Disappointment Cove, FD	4714 / 16737
Christchurch, Cashmere Hills, MC	4335 / 17238	Dusky Sound, Seal I, FD	4546 / 16628
Christchurch, Chaney's [Corner], MC	4325 / 17239	Earnsclough, CO	4513 / 16918
		East Cape, GB	3741 / 17832
		East Cape, Papatea [Bay], roadside opp. Callaghan's gate, BP	3740 / 17752

East Cape, Rangiatea, GB	3741 / 17832	Hauraki Gulf, Noises Is, Otata I, NE summit track, AK	3641 / 17458
East Cape, Rereauria Swamp, BP	3734 / 17803	.....	3641 / 17458
East Cape, Rereauria Swamp, beech ridge, BP	3734 / 17803	Hauraki Gulf, Noises Is, Otata I, Wainhouse's Cottage, AK	3641 / 17458
East Cape, Waiaroho, BP	3736 / 17809	.....	3647 / 17451
Edgecumbe, BP	3658 / 17648	Hauraki Plains, Awaiti Canal Road, end, Kopuatai Peat Dome, WO	3723 / 17534
Egmont NP, Pouakai Hut, TK	3914 / 17402	Hauraki Plains, Elstow Canal, Kopuatai wetland, WO	3720 / 17533
Elsthorpe S.R., HB	3954 / 17649	.....	3716 / 17529
Eves Valley, Eves Bush, NN	4120 / 17303	Hauraki Plains, Ngatea, WO	3718 / 17526
Feilding, Awahuri, WI	4017 / 17531	Hauraki Plains, Torehape peat mine, WO	3940 / 17652
Fernside, NC	4318 / 17231	Havelock North, HB	3935 / 17417
Flaxmere, Gourmet Blueberries, HB	3936 / 17646	Hawera, TK	3926 / 17651
Fox Glacier, Cook Saddle, WD	4326 / 17003	Hawkes Bay, HB	3640 / 17427
Foxton, Foxton, swamp, WI	4028 / 17517	Helensville, Helensville, AK	3553 / 17443
Franz Josef, Fanz Josef Glacier, WD	4323 / 17010	Hen & Chickens Is, Lady Alice I, ND	3553 / 17445
French Pass, SD	4055 / 17350	Hen & Chickens Is, Whatupuke I, ND	3825 / 17445
Gardens Valley, NN	4125 / 17307	Herangi Ra, WO	3735 / 17819
Gisborne, 55 Winter St, GB	3839 / 17801	Hicks Bay, Motel, walk to Onepoto Bay, BP	3735 / 17819
Gisborne, Gisborne, GB	3839 / 17801	Hicks Bay, Te Koau, BP	3735 / 17819
Gisborne, Greys Bush, Back Ormond Road, GB	3835 / 17757	Hicks Bay, Te Koau, bush walk, BP	3734 / 17815
.....	3840 / 17754	Hicks Bay, Wharekahika R, BP	3734 / 17815
Gisborne, Manutuke, GB	3840 / 17754	Hokianga Harbour, South Head, Arai te Uru Walkway, ND	3532 / 17322
Gisborne, Poverty Bay Golf Course, GB ...	3839 / 17759	.....	4358 / 16834
Gladstone, Longbush Road, Mangahua Stream Bush, WA	4107 / 17537	Huntermville, Bruce Park S.R., WI	3957 / 17531
.....	4042 / 17221	Hunua Ra, Cosseys Creek, AK	3703 / 17505
Golden Bay, Anatori R, NN	4042 / 17221	Hunua Ra, Cosseys Dam Road, AK	3703 / 17506
Golden Bay, Clifton, NN	4050 / 17252	Hunua Ra, Hunua Falls, AK	3704 / 17505
Golden Bay, Collingwood, NN	4040 / 17241	Hunua Ra, Massey Track, AK	3704 / 17505
Golden Bay, Kaihoka Lakes, NN	4033 / 17235	Hunua Ra, Omana Regional Park, AK	3652 / 17501
Golden Bay, Mt Stevens Track, NN	4047 / 17227	Hunua Ra, Papatata, pty P Dale, AK	3709 / 17503
Golden Bay, Pupu Walkway, NN	4050 / 17246	Hunua Ra, Paparata, pty P Dale, AK	3658 / 17510
Golden Bay, Tarakohe, NN	4049 / 17253	Hunua Ra, Te Morehu Reserve, AK	3658 / 17510
Golden Bay, Wharariki Beach, rocky islet, NN	4030 / 17240	Hunua Ra, Workman Track, AK	3706 / 17513
.....	3611 / 17524	Inangahua, Tewharu (Larrys Creek), BR ...	4200 / 17153
Great Barrier I, Mt Hobson, CL	3611 / 17524	Inangahua, West Inangahua S.F., BR	4156 / 17150
Haast Valley, Roaring Billy Falls, WD	4356 / 16917	Invercargill, SL	4624 / 16820
Hamilton, WO	3746 / 17516	Kaeo, ND	3505 / 17346
Hamilton, Franckton Junction, WO	3747 / 17516	Kaeo, Kaeo Hill, ND	3505 / 17346
Hamilton, MAF Moana Tua Tua Research Area, WO	3750 / 17519	Kaikoura, Grange Rd, KA	4217 / 17341
.....	3746 / 17518	Kaimai Ra, McLaren Falls, BP	3748 / 17602
Hamilton, Ruakura Agriculture Centre, WO	3746 / 17518	Kaimai Ra, McLaren Falls Park, entrance to Waterfall Bush Walk, BP	3748 / 17602
Hamilton, St Andrews Golf Course, WO	3745 / 17515	Kaipara, Omeru S.R., Omeru Falls, AK	3633 / 17428
Hastings, HB	3938 / 17649	Kaipara Harbour, Waioneke, estuary, AK ...	3632 / 17417
Hauraki Gulf, Noises I, Motuoropapa I, NE face, AK	3641 / 17457	Kaiteriteri, Seacliffs, NN	4102 / 17301
.....	3641 / 17457	Kamo, ND	3503 / 17323
Hauraki Gulf, Noises I, Motuoropapa I, North summit, AK	3641 / 17457	Karamea, Heaphy Track, NN	4106 / 17206
.....	3641 / 17457	Karangahake Gorge, Karangahake Gorge Walkway, BP	3725 / 17543
Hauraki Gulf, Noises I, Motuoropapa I, SW Face, AK ...	3641 / 17457	.....	3725 / 17543
.....	3642 / 17500	Katikati, R Calver Orchard, BP	3733 / 17555
Hauraki Gulf, Noises Is, Maria I, AK	3642 / 17500	Kaweka Ra [South], Blowhard Bush, HB ...	3924 / 17624
Hauraki Gulf, Noises Is, Motuoropapa I, AK	3641 / 17457	Kawerau, public carpark behind Road Services Depot, BP	3805 / 17642
.....	3641 / 17457	.....	4200 / 17400
Hauraki Gulf, Noises Is, Motuoropapa I, Main Track, AK	3641 / 17457	Kekerengu, KA	3513 / 17357
.....	3641 / 17458	Kerikeri, ND	3513 / 17356
Hauraki Gulf, Noises Is, Otata I, AK	3641 / 17458	Kerikeri, Golf Course, ND	3514 / 17356
Hauraki Gulf, Noises Is, Otata I, Audrey's Track, AK	3641 / 17458	Kerikeri, Kerikeri Rd, ND	3514 / 17356
.....	3641 / 17458	Kerikeri, Kwan Holdings, citrus orchard, ND	3514 / 17356
Hauraki Gulf, Noises Is, Otata I, East track, AK	3641 / 17458	.....	3514 / 17356
.....	3641 / 17458		

Kerikeri, Skinners organic orchard, ND	3514 / 17356	Motueka, NN	4106 / 17301
Kerikeri, Smiths Nursery, ND	3514 / 17356	Motueka, Kina, NN	4110 / 17303
Kinleith, Jim Currie Reserve, TO	3816 / 17553	Motueka, Mariri, NN	4109 / 17303
Lake Pearson, Highway 73, Forest by road, MC	4306 / 17146	Motueka, Riwaka, NN	4104 / 17259
Lake Rotoiti, Mt Robert, BR	4149 / 17248	Motueka, Sth of Takaka Hill, NN	4103 / 17259
Lake Te Anau FD/OL	4520 / 16742	Motueka, Takaka Road, NN	4101 / 17249
Lake Wairarapa, Oporua, WA	4115 / 17516	Motueka, Tasman, NN	4111 / 17303
Lake Wanaka, OL	4442 / 16907	Motueka, Umukuri, NN	4106 / 17258
Lake Wanaka, Glendhu Bay, OL	4440 / 16900	Mt Arthur Tableland, Mt Arthur, NN	4113 / 17240
Lake Wanaka, Mt Burke, OL	4433 / 16910	Mt Arthur Tableland, Mt Lodestone, NN	4110 / 17244
Lee Valley, NN	4125 / 17308	Mt Messenger, TK	3853 / 17435
Levin, WN	4037 / 17517	Mt Taranaki, as Mt Egmont, TK	3917 / 17403
Levin, Kimberley Reserve, WN	4040 / 17518	Mt Te Aroha, BP	3732 / 17544
Lincoln, MC	4338 / 17229	Napier, HB	3930 / 17654
Lincoln, Canterbury Agricultural Research Centre, MC	4338 / 17229	Napier, Andersons Nurseries, HB	3930 / 17654
Lincoln, HortResearch, MC	4338 / 17229	Napier, Breakwater Rd, port area, HB	3928 / 17653
Lincoln College, MC	4338 / 17229	Napier, Pakowhai District, HB	3935 / 17651
Lincoln University, MC	4338 / 17229	Napier-Taupo Rd, Okoeke Stream, bridge rest area, TO	3858 / 17631
Little Barrier I, Hamilton Track, CL	3612 / 17503	National Park, Erua Forest, Fisher Track, TO	3910 / 17523
Little Barrier I, Te Maraeroa, CL	3613 / 17503	Nelson, NN	4116 / 17316
Little Barrier I, Valley Track, CL	3612 / 17504	Nelson, Anzac Park, NN	4116 / 17316
Lottin Point, Otanga, BP	3733 / 17809	Nelson, Appleby Research Orchard, NN	4118 / 17306
Lottin Point Rd, Waenga Bush, BP	3734 / 17808	Nelson, Cemetery Reserve, NN	4116 / 17316
Lower Hutt, WN	4111 / 17456	Nelson, Maitai R, Smiths Ford, NN	4116 / 17319
Lyttelton, Coastguard, MC	4336 / 17243	Nelson, Maitai R Valley, NN	4117 / 17320
Lyttelton, Lyttelton Marina, Sports Ground, MC	4336 / 17242	Nelson, Mt Peel, NN	4108 / 17235
Mahoenui, 10 miles along Gribbons Rd, WO	3833 / 17449	Nelson, Queen's Gardens, NN	4116 / 17316
Mahoenui, Gribbons Rd, WO	3834 / 17450	Nelson, Reservoir Reserve, NN	4121 / 17312
Makara Beach, 1 km south, coastal cliffs, WN	4113 / 17442	Nelson, Tahunanui Beach Reserve, NN	4116 / 17314
Manapouri, Nth of Manapouri, FD/SL	4532 / 16738	New Plymouth, TK	3903 / 17404
Mangamuka V, ND	3512 / 17330	New Plymouth, Burgess Park, TK	3905 / 17406
Mangaweka, Mangaweka Scenic Reserve, RI	3948 / 17547	New Plymouth, Hookner Park, 885 Carrington Road, TK	3907 / 17404
Manukau Harbour, South Heads, Wattle Bay, AK	3702 / 17434	New Plymouth, New Plymouth, Doone Street, TK	3904 / 17402
Maraetotara, Maraetotara Falls, HB	3944 / 17656	New Plymouth, Te Henui Cemetery, TK	3903 / 17405
Maraetotara, Maraetotara Gorge S.R., HB	3949 / 17653	Ngaiotonga Saddle, ND	3518 / 17415
Maraetotara, Mohi Bush, HB	3951 / 17653	North Cape, Rangiora Bay [Maukins Nook], ND	3428 / 17300
Marble Point, Highway 7, KA/NC	4237 / 17246	North Cape, Surville Cliffs, rock face, ND	3423 / 17300
Marlborough, Black Birch Ra, MB	4145 / 17346	North Cape, Tapotupotu Bay, track, east side stream, ND	3426 / 17243
Masterton, WA	4056 / 17539	North Cape, Tapotupotu Bay, west bank stream, ND	3426 / 17243
Masterton, Mahunga Golf Course, WA	4055 / 17539	North Shore, Chatswood Reserve, AK	3748 / 17442
Masterton, Ngaumu Rd, WA	4103 / 17549	North Shore, Coatesville, AK	3642 / 17438
Matamata, WO	3748 / 17546	North Shore, Okura Walkway, AK	3640 / 17443
Mathesons Bay, Dormer Bush, AK	3618 / 17447	North Shore, Torbay, AK	3642 / 17445
McKenzie Basin, between L Pukaki - L Tekapo, MK	4409 / 17019	Oamaru, DN	4505 / 17058
Molesworth, MB	4205 / 17315	Oamaru, Oamaru Gardens, DN	4505 / 17058
Molesworth, Acheron R, hills above, MB	4211 / 17304	Ohakune, TO	3924 / 17524
Molesworth, Upper Awatere, tussock land, MB	4101 / 17325	Ohakune, Waitonga Falls Track, TO	3919 / 17530
Morere, Morere Springs SR, GB	3858 / 17747	Okuku R, Panhandle Stream, Seagull Gully, NC	4257 / 17214
Morrinsville, WO	3739 / 17530	Omahuta S.F., ND	3514 / 17337
Motu R, Motu Falls Road [end], Paparangi, BP	3812 / 17736	Omahuta S.F., Kauri Sanctuary, ND	3514 / 17337
		Open Bay Is, Taumaka, WD	4352 / 16853
		Opononi, ND	3513 / 17338

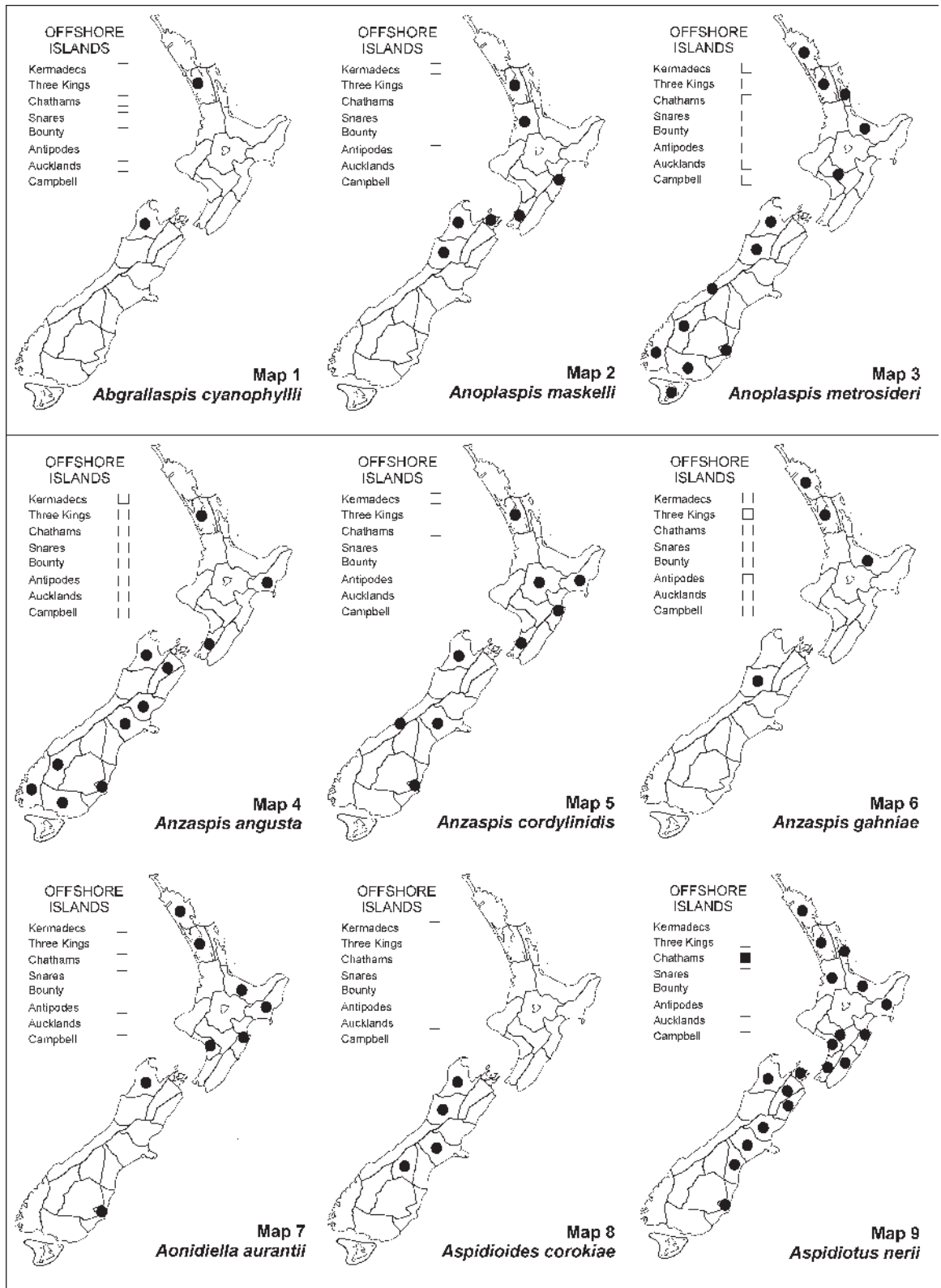
Opotiki, Opotiki, BP	3800 / 17717	Reefton, Crushington, BR	4208 / 17153
Opotiki, Torere, Torere Macadamia Nuts, BP	3757 / 17729	Reefton, Giles Creek, BR	4203 / 17145
Opouri Valley, SD	4112 / 17339	Reefton, Hochstetter Forest, BR	4224 / 17135
Orere Point, AK	3657 / 17515	Reefton, Mawhera S.F., BR	4229 / 17130
Orete Forest, Te Puia Hut, BP	3739 / 17755	Rongotea, Coles Bush, WI	4017 / 17527
Orewa, Hatfields Beach, nth end headland, AK	3634 / 17440	Rotorua, BP	3807 / 17614
Orongorongo Valley, WN	4123 / 17455	Rotorua, F.R.I. [Forest Research Insitute], Whakarewarewa, BP	3809 / 17615
Orongorongo Valley, WN	4123 / 17455	Rotorua, L Rotoehu, BP	3802 / 17631
Orongorongo Valley, Field Station, WN	4120 / 17458	Rotorua, Rotoehu Forest, BP	3802 / 17631
Otago Peninsula, Papanui Inlet Road, DN ...	4550 / 17041	Rotorua, Whakarewarewa, BP	3809 / 17615
Otaki, 6 km SSE, WN	4045 / 17508	Roxburgh, CO	4532 / 16918
Otaki Forks, WN	4052 / 17513	Roxburgh, Coal Creek, CO	4529 / 16919
Oxford Forest, Coopers Creek, Falls Track, NC	4314 / 17203	Ruahine Forest Park, Umutoi North Road end, Shorts Track, RI	3959 / 17601
Paihia, ND	3517 / 17405	Ruahine Ra, Shuteye Shack, RI	3947 / 17610
Paihia, Haruru Falls, ND	3516 / 17403	Ruahine Ra, Triplex Creek, RI	3947 / 17611
Palmerston North, WI	4021 / 17536	Ruby Bay, NN	4113 / 17305
Palmerston North, Aokautere Rd, WN	4022 / 17539	Secretary I, FD	4513 / 16655
Palmerston North, Bledisloe Park, WI	4023 / 17537	Seddon, KA	4140 / 17405
Palmerston North, Esplanade, WI	4022 / 17536	Ships Cove, Tauperikaka Point, WD	4345 / 16908
Palmerston North, Glen Oroua, WI	4019 / 17524	Silverdale, AK	3637 / 17440
Palmerston North, S, Turitea, WN	4024 / 17539	Snares Is, SN	4801 / 16636
Palmerston Nth, Massey University, WI	4023 / 17537	South Auckland, Awhitu, Brook Rd, AK	3705 / 17438
Paparoa Ra, nr Blackball, BR	4221 / 17121	South Auckland, Mt William, main track, AK	3712 / 17501
Paraparaumu, WN	4055 / 17501	Southland, Longwood, S.F. 10, SL	4616 / 16750
Peel Forest, SC	4354 / 17115	Southland, Longwood Ra, SL	4616 / 16750
Peel Forest, Te Wanahu Flat, SC	4354 / 17115	Southland, Pebbly Hills, SL	4612 / 16835
Pelorus Sd, Tennyson Inlet, SD	4104 / 17347	Springfield, MC	4320 / 17155
Pohangina V, Totara Reserve, RI	4007 / 17550	Springston, MC	4338 / 17225
Poor Knights I, Tawhiti Rahi I, ND	3527 / 17444	Stewart I, Half Moon Bay, SI	4653 / 16808
Porirua, Porirua Hospital, WN	4108 / 17450	Stewart I, NE Big South Cape I, SI	4714 / 16726
Port Hills, Kennedys Bush, MC	4337 / 17236	Stewart I, Waterfall Creek, SI	4700 / 16752
Porters Pass, MC	4317 / 17144	Stoke, NN	4118 / 17313
Puhoi, Dunns Bush, AK	3629 / 17436	Taihape, Mataroa, Paengaroa Scenic Reserve, RI	3938 / 17543
Pukeamaru, Karakatuwhero Valley, shallow riverbed, BP	3739 / 17818	Takaka, Paynes Ford S.R., NN	4053 / 17248
Pukekohe, AK	3712 / 17453	Takaka Hill, NN	4101 / 17253
Pukekohe, 78 Jericho Road, Joy Plants Nursery, AK	3712 / 17457	Tangihua, Horokaka, ND	3552 / 17408
Puketi Forest, Puketi Mokau Reserve, ND ...	3510 / 17344	Tangihua, Tangihua Lodge, ND	3553 / 17407
Punakaiki, Bullock Creek, BR	4206 / 17121	Taupo, Taupo Botanic Gardens, TO	3842 / 17606
Pureora, Pureora Forest, TO	3831 / 17533	Tauranga, BP	3740 / 17609
Pureora, Pureora Forest Park, Bog Inn Track, TO	3834 / 17538	Tauranga, Matakana I, BP	3735 / 17605
Pureora, Rangitoto Station, Mangatutu, TO	3820 / 17527	Tauranga, Mt Maunganui, BP	3737 / 17610
Pureora, Waituhi Saddle, TO	3852 / 17532	Tauranga, Mt Maunganui, Blake Park, BP ...	3739 / 17611
Queen Charlotte Sd, SD	4114 / 17401	Tauranga, Pyes Pa, BP	3749 / 17607
Queen Charlotte Sd, Resolution Bay, SD ...	4106 / 17412	Tauranga, Tauranga city, Cambridge Rd, BP	3740 / 17609
Raglan, WO	3748 / 17452	Tawharanui, Takatu Pt, AK	3621 / 17452
Raglan, Bridal Veil Falls, WO	3790 / 17489	Te Araroa, Kakanui, GB	3738 / 17824
Raglan, Bridal Veil Falls, by top, WO	3790 / 17489	Te Araroa, Kakanui, coastal cliff, GB	3737 / 17824
Raglan, Ngarunui Beach, WO	3748 / 17449	Te Araroa, Kakanui, West plateau, GB	3738 / 17824
Rai V, Pelorus Bridge S.R., MB	4118 / 17333	Te Araroa, Kakanui, W-E, head of Waipohatuhatu Stm, GB	3739 / 17824
Rai Valley, Opouri River, Opouri Valley, SD	4112 / 17339	Te Araroa, Paoneone, GB	3739 / 17820
Rangiora, NC	4318 / 17235	Te Araroa, Pohutu, Awatere R bridge, GB	3740 / 17820
Rangiora, Matawai Park, NC	4318 / 17235	Te Awamutu, WO	3800 / 17519
Rarangi, foreshore, SD	4123 / 17402	Te Hapua, Mary Noho's orchard, ND	3430 / 17253
		Te Kauwhata, WO	3723 / 17508
		Te Puke, BP	3747 / 17618

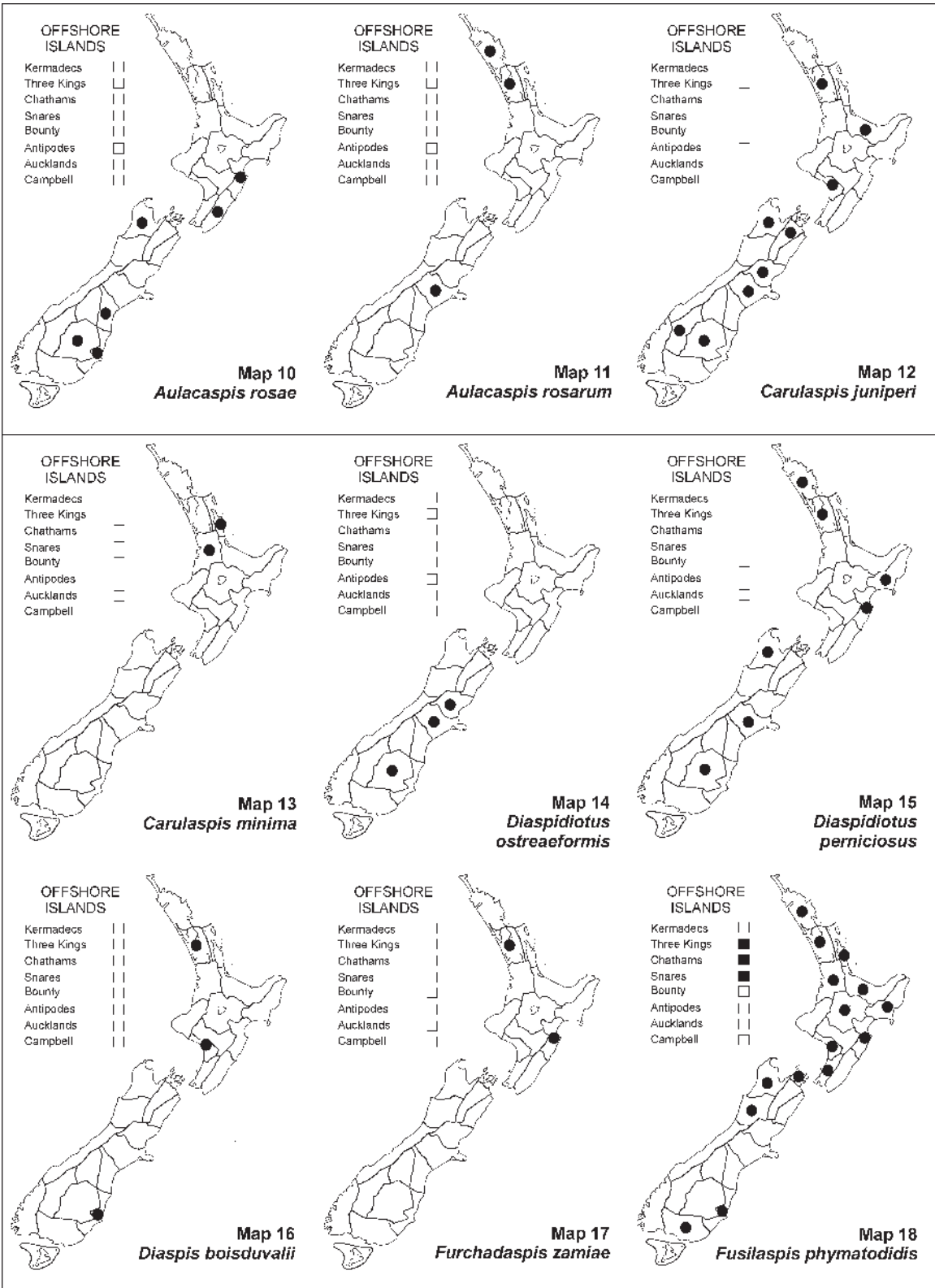
Te Puke, HortResearch, 412, No 1 Line Road, BP	3749 / 17618	Waitakere Ra, Destruction Gully Track, by turnoff to lookout, AK	3701 / 17431
Te Puke, Kaiate Falls, BP	3745 / 17614	Waitakere Ra, Fairy Falls Track, AK	3654 / 17433
Te Puke, No 3 Road, BP	3748 / 17616	Waitakere Ra, Farley Track, AK	3659 / 17435
Te Wae Wae Bay, Rowallan, FD	4613 / 16739	Waitakere Ra, Ferndown Track, upper end, AK	3655 / 17434
Three Kings Is, Great I, TH	3409 / 17207	Waitakere Ra, Fletcher Track, AK	3700 / 17432
Three Kings Is, Great I, Bald Hill, TH	3409 / 17207	Waitakere Ra, Goldies Bush, AK	3650 / 17428
Three Kings Is, Great I, Castaway Valley, TH	3409 / 17209	Waitakere Ra, Goodfellow Track, AK	3654 / 17433
Three Kings Is, Great I, NW Bay landing track, top of, TH	3409 / 17207	Waitakere Ra, Huia, AK	3659 / 17434
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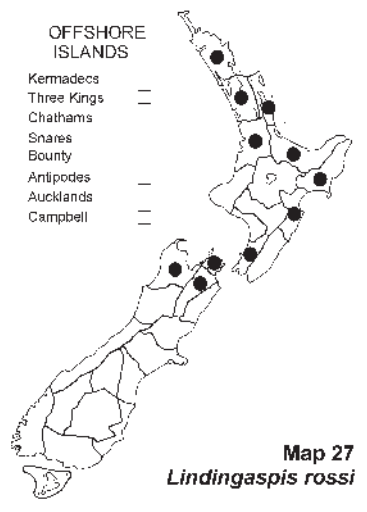
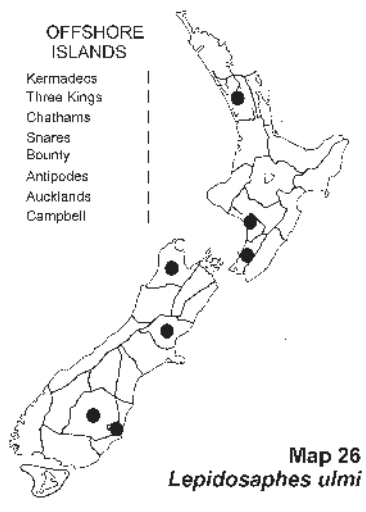
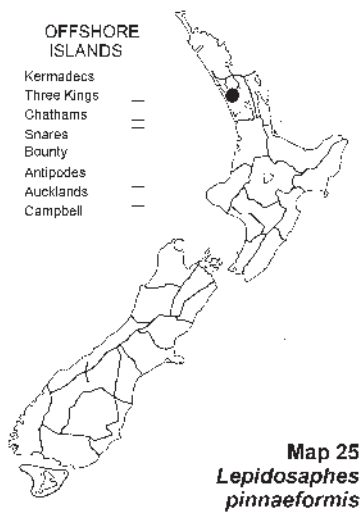
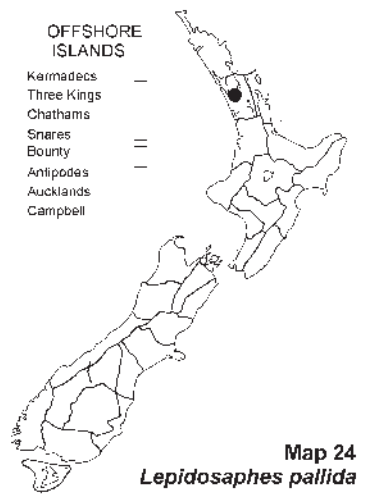
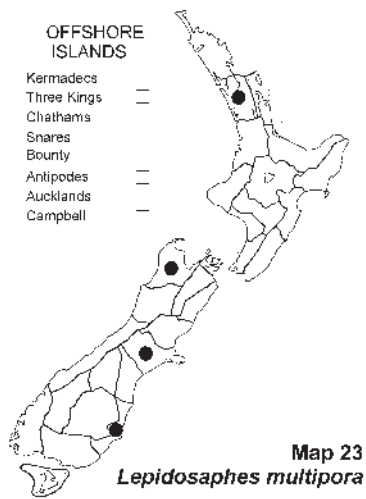
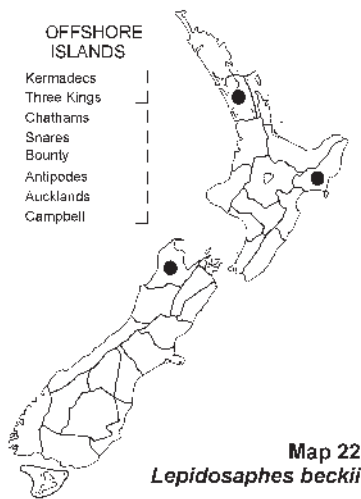
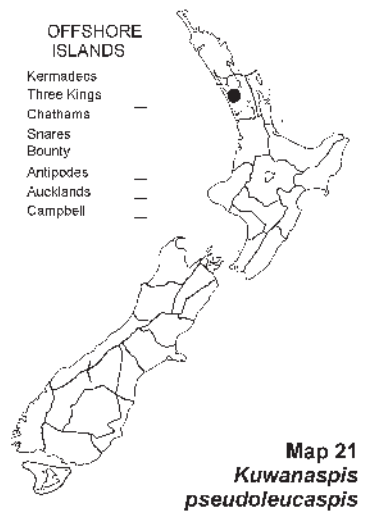
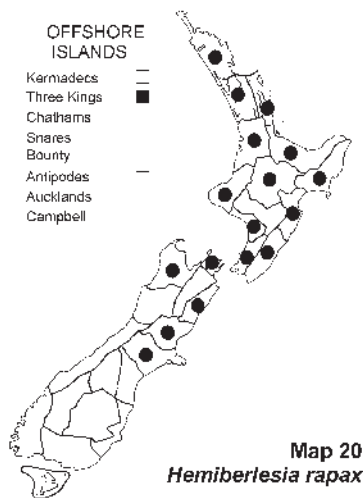
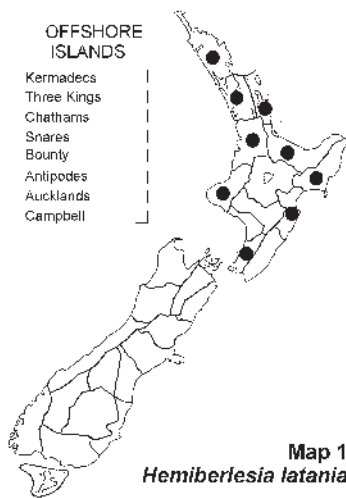
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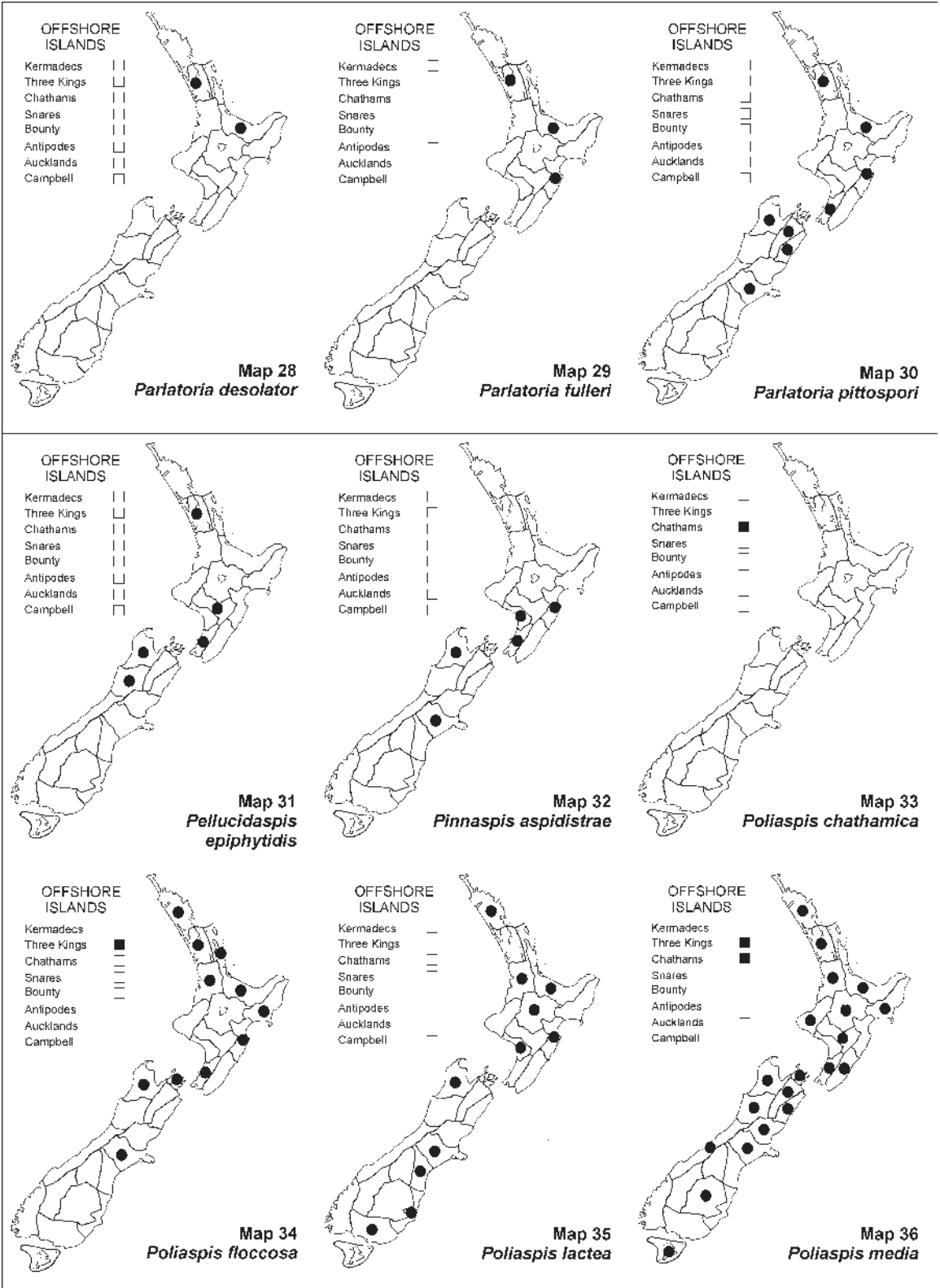
Appendix D. Common names of armoured scale insects in New Zealand. Note: an asterisk (*) denotes a common name suggested in this volume.

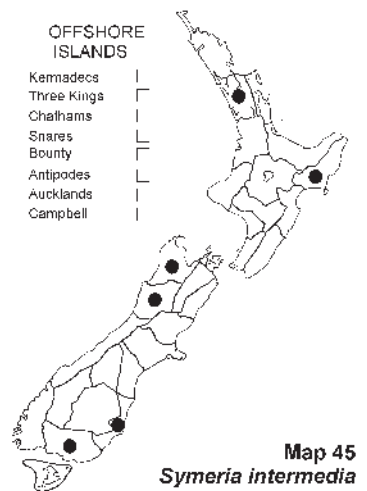
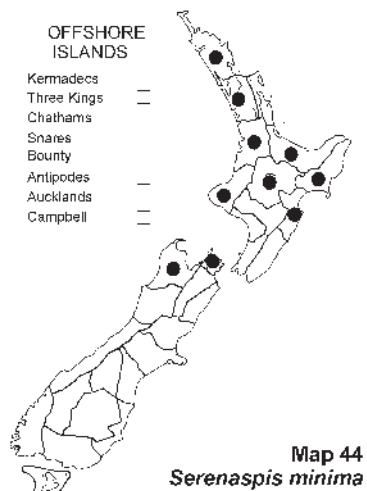
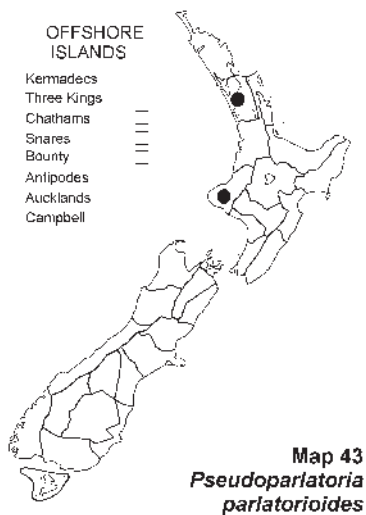
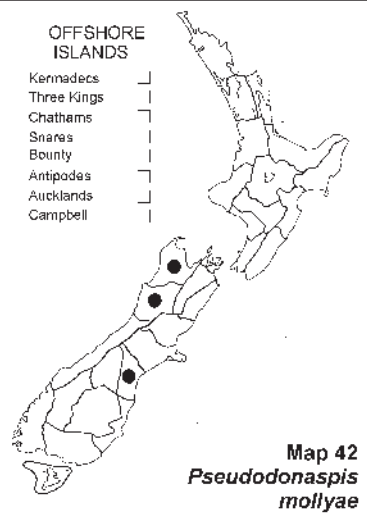
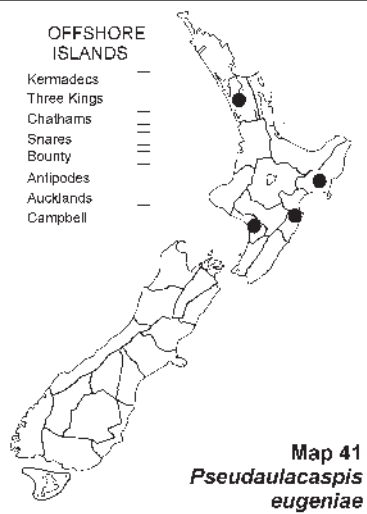
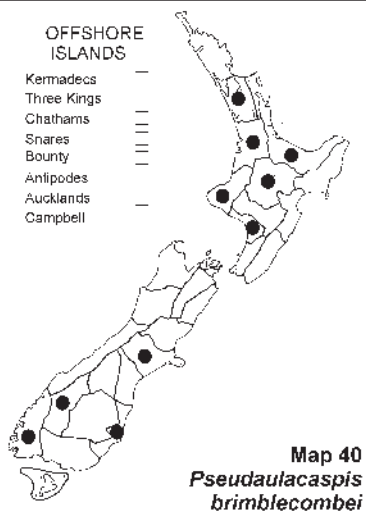
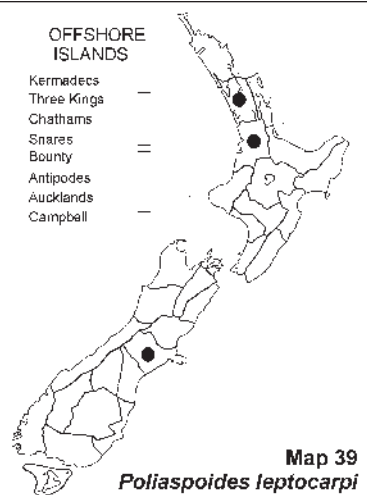
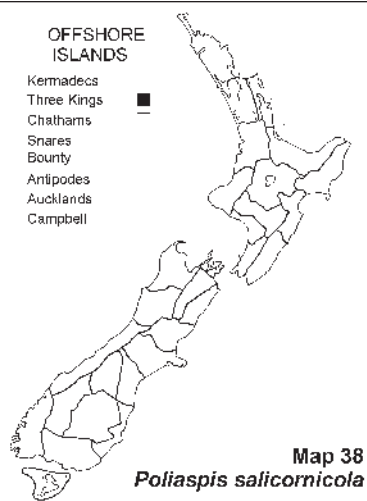
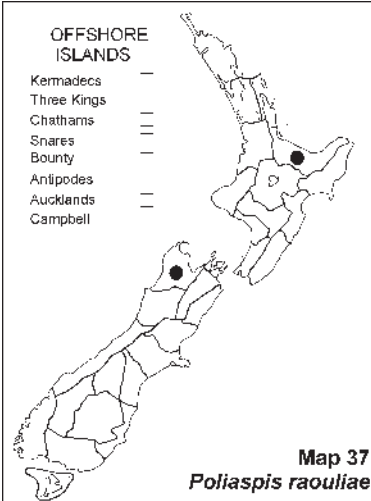
apple mussel scale [N.Z.]	<i>Lepidosaphes ulmi</i>
Asiatic rose scale	<i>Aulacaspis rosarum</i>
astelia scale*	<i>Pellucidaspis epiphytidis</i>
bamboo scale	<i>Kuwanaspis pseudoleucaspis</i>
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Boisduval scale	<i>Diaspis boisduvalii</i>
California red scale	<i>Aonidiella aurantii</i>
Chatham's olearia scale*	<i>Poliaspis chathamica</i>
circular black scale	<i>Lindingaspis rossi</i>
cordyline scale	<i>Anzaspis cordylinidis</i>
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cycad scale [also used for <i>Aulacaspis yasumatsui</i>]	<i>Furchadaspis zamiae</i>
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fuchsia scale*	<i>Poliaspis lactea</i>
Fuller scale*	<i>Parlatoria fulleri</i>
gahnna scale*	<i>Anzaspis gahnnae</i>
glasswort scale*	<i>Poliaspis salicornicola</i>
greedy scale	<i>Hemiberlesia rapax</i>
juniper scale	<i>Carulaspis juniperi</i>
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latania scale	<i>Hemiberlesia lataniae</i>
leptocarpus scale*	<i>Poliaspoides leptocarpi</i>
macadamia white scale [Australia]	<i>Pseudaulacaspis brimblecombei</i>
Maskell scale	<i>Lepidosaphes pallida</i>
mauve pittosporum scale	<i>Parlatoria pittospori</i>
minute cypress scale	<i>Carulaspis minima</i>
Molly's grass scale*	<i>Pseudodonaspis mollyae</i>
oleander scale	<i>Aspidiotus nerii</i>
oystershell scale [N.Z.]	<i>Diaspidiotus ostreaeformis</i>
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pink rata scale*	<i>Anoplaspis maskelli</i>
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purple scale	<i>Lepidosaphes beckii</i>
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raoulia scale*	<i>Poliaspis raouliae</i>
rose scale	<i>Aulacaspis rosae</i>
Ross's black scale	<i>Lindingaspis rossi</i>
San José scale	<i>Diaspidiotus perniciosus</i>
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slender scale*	<i>Anzaspis angusta</i>
waratah scale [N.Z.]	<i>Pseudaulacaspis brimblecombei</i>
wattle black scale*	<i>Trulliflorinia acaciae</i>
white palm scale	<i>Pseudaulacaspis eugeniae</i>
zamia scale [preferred name]	<i>Furchadaspis zamiae</i>

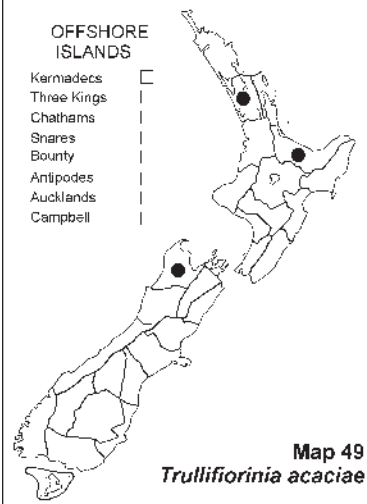
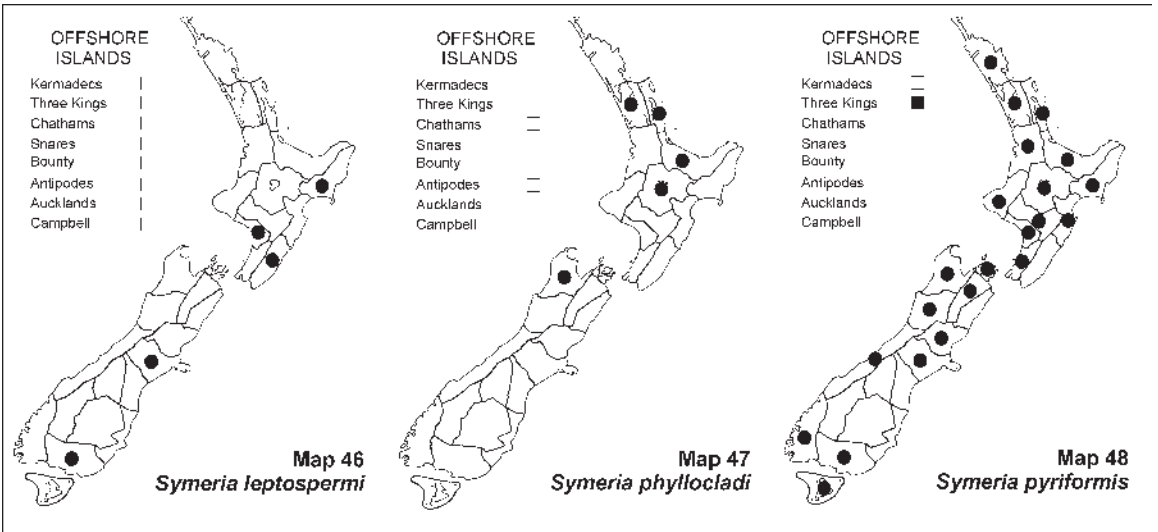












Taxonomic index

This index covers the nominal invertebrate and fungal taxa mentioned in the text, regardless of their current status in taxonomy. Taxa in Appendix B, pages 242–251, are not included (host plants and associated armoured scale insect species).

Taxa in **bold** are those included in the checklist. Taxa other than Diaspididae are listed in the order Genus / species. Page numbers in **bold** indicate main entries. Page numbers in *italics* indicate figures. The letter “p” after a page indicates **photographs**, the letter “k” indicates a **key**, and the letter “m” indicates a **distribution map**.

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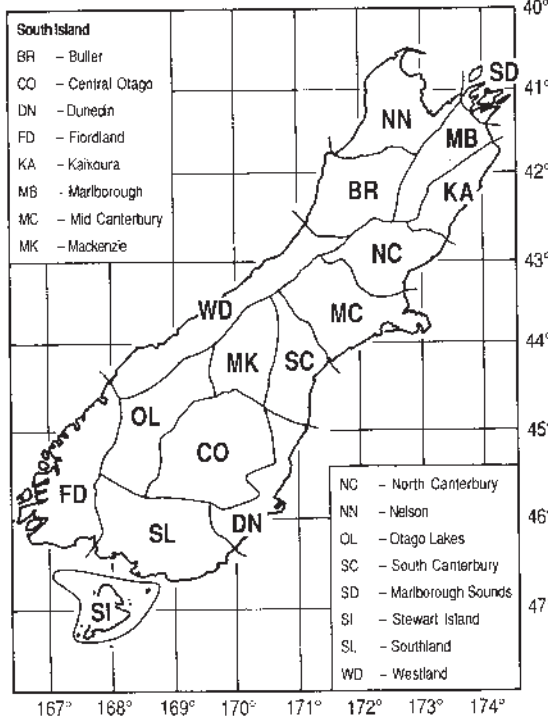
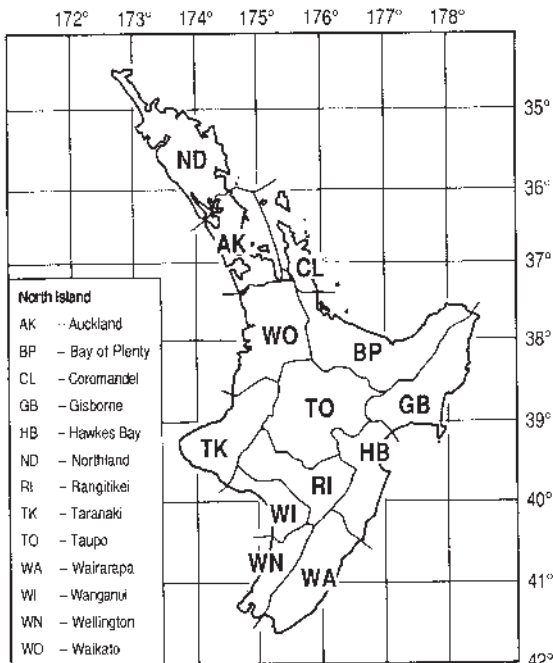
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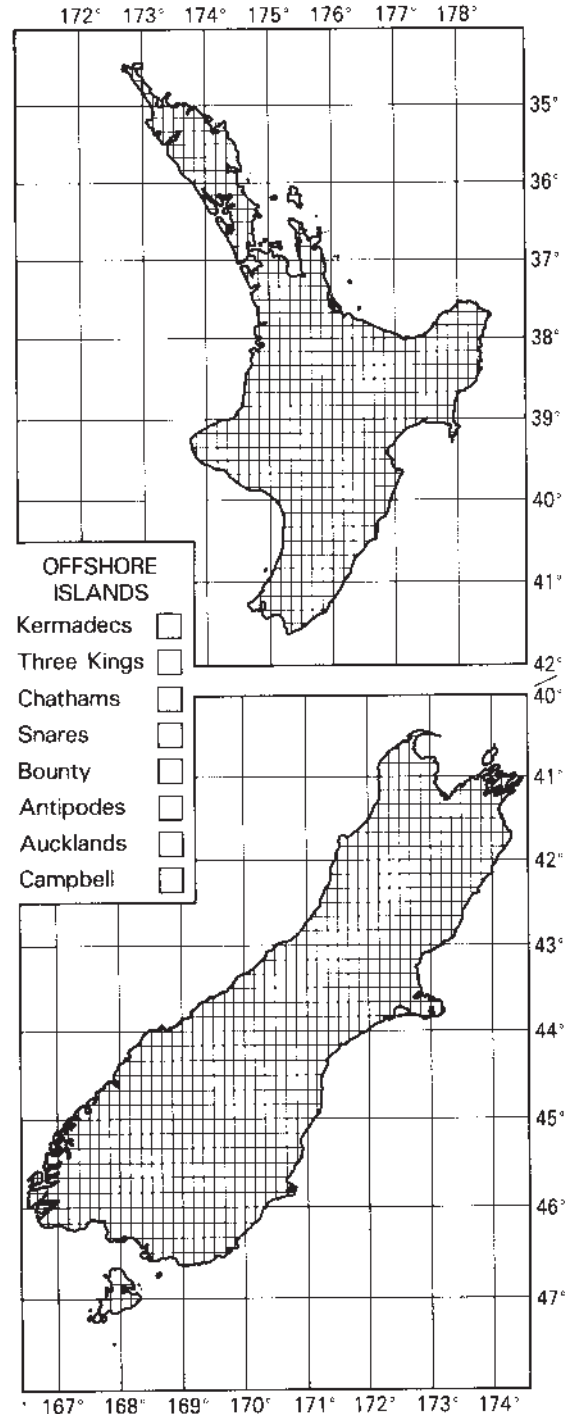
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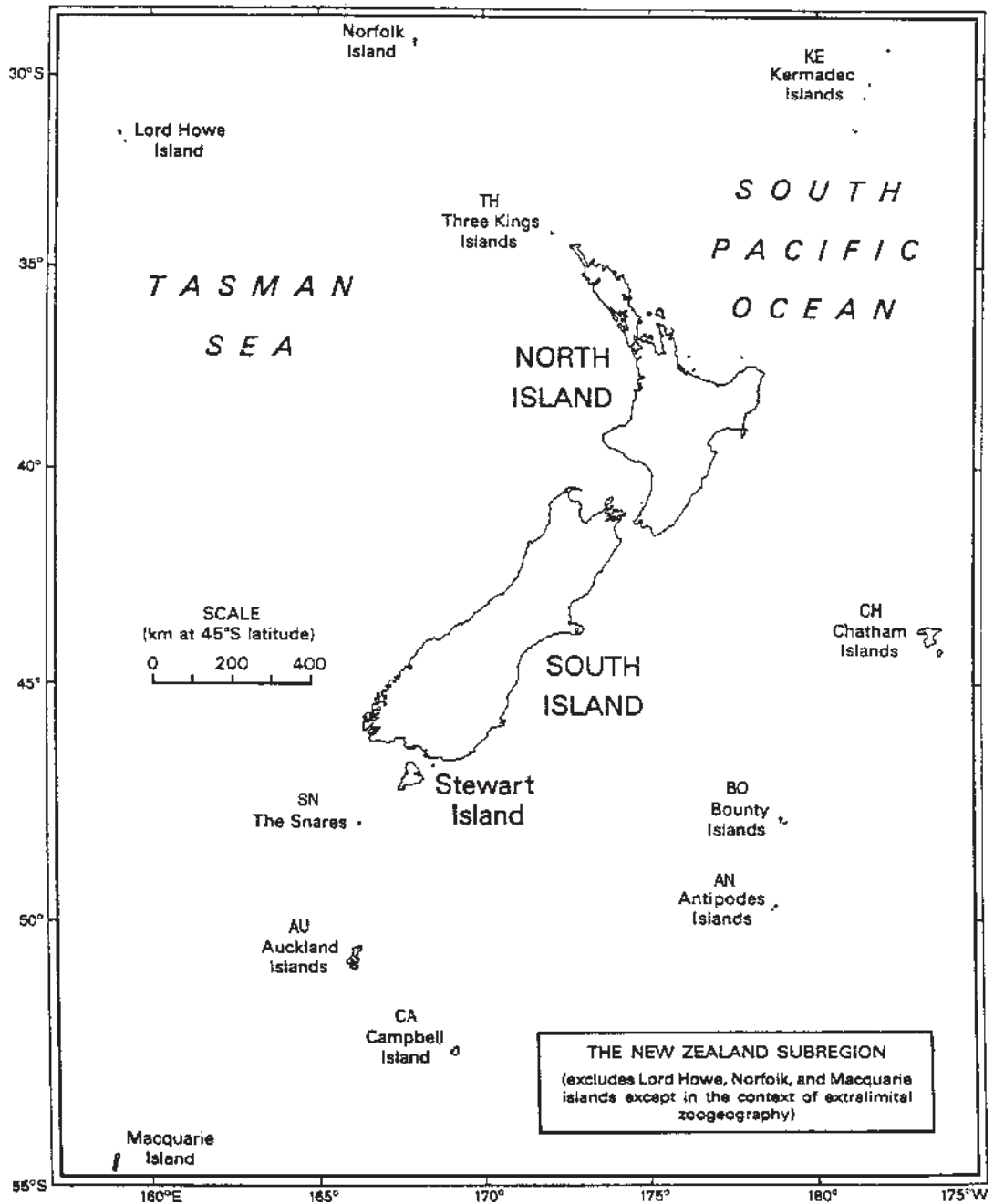
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Area codes and boundaries used to categorise specimen locality data (after Crosby *et al.* 1976)



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The New Zealand subregion with area codes (from Crosby *et al.* 1998).

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E rua ngā tūmomo kaihoko: “A” – kaihoko tūmau, ka tukua ia pukapuka, ia pukapuka, me te nama, i muri tonu i te tānga; “B” – ka tukua ngā pānuī whakatairanga me ngā puka tono i ōna wā anō.

Te utu (tirohia “Titles in print”, whārangi 272). Ko te kōpaki me te pane kuini kei roto i te utu. Me utu te hunga e noho ana i Aotearoa me Ahitereiria ki ngā tāra o Aotearoa. Ko ētahi atu me utu te moni kua tohua, ki ngā tāra Merikana, ki te nui o te moni rānei e rite ana.

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