Public consultation and risk assessment for the proposed introduction of *Uromyces pencanus* as a biological control agent for Chilean Needle Grass

Richard Hill, Richard Hill & Associates, Private Bag 4704, Christchurch 8140

Summary

The steps taken to consult with Maori nationwide about the proposed biological control programme against Chilean needle grass are described, along with the scope of the consultation, and the responses obtained. The issues are either addressed here, or there is a reference to the formal application. The issues raised concerning biological control projects are similar from application to application. Significant relevant issues that have been raised in previous consultations are also presented. A range of other interested organisations were consulted over the proposal. As the current distribution of the weed is limited to four regions, only these councils were consulted. The responses are presented here. The potential beneficial and adverse effects identified in these communications and through formal risk assessment are summarised and assessed. These form the basis for the information provided in Section 4 of the application.

The scope of consultation

The Marlborough District Council is the applicant. It is acting on behalf of a consortium of organisations responsible for biosecurity that comprises the Department of Conservation and all regional councils. This proposal is sanctioned by the Regional Pest Management Strategy for each of those regions. Each RPMS is subject to consultation with local communities as required by the Biosecurity Act 1993.

Chilean needle grass (*Nassella neesiana*) threatens the viability and sustainability of farms in Marlborough and Hawkes Bay that are currently infested, and poses a major future threat to extensive lowland pastoral agriculture and cropping, especially on the east of the country. The first releases for this agent will occur in the Marlborough region. Rust spores are carried long distances by wind, and it is assumed that

Uromyces pencanus will potentially be present wherever Chilean needle grass is present in New Zealand.

Iwi, hapū, and Māori organisations comprising the ERMA Māori National Network were contacted on 20 July 2010 and invited to enter dialogue on the proposal to introduce these two species. A total of 140 were contacted, 18 of which were papatipu rūnanga of Ngāi Tahu. The message described how the applicant intended to assess the risks, costs and benefits surrounding the proposed introductions in the application, and respondents were asked to identify any issues that were inadequately, or not covered in those plans. Recipients were given the option of responding by form letter (a SAE was included), by email, by phone before 27 September.

The responses obtained recently are provided below. Subjects raised in previous consultation regarding biological control of weeds are also reproduced below. The main beneficial and adverse effects raised during consultation are listed in the application form.

Marlborough District Council is the applicant. Six Iwi or Rūnanga in the Marlborough District were visited to discuss this application.

All organisations consulted will be informed when the application has been submitted and is open for public submissions.

Before preparing this application meetings were held to discuss issues with ERMANZ and the Department of Conservation staff. As preparation of the application proceeded, the following organisations were asked to comment on Marlborough District Council's intention to apply for permission to introduce this control agent. Each was asked to raise any issues that should be addressed in the application.

Auckland Regional Council
Hawkes Bay Regional Council
Marlborough District Council
Environment Canterbury
Federated Farmers of New Zealand
ECO
NZ Plant Protection Society
Department of Conservation
New Zealand Association of Agricultural and Horticultural Science

Individuals who responded to previous applications were contacted and invited to participate in early dialogue
Dr Cliff Mason

The responses obtained from these correspondents were either provided to ERMANZ, or are captured amongst the following communications.

Responses from Iwi, Hapū and other Māori organisations

Email or written responses were received from 5 sources including one representing the 18 rūnanga of Ngāi Tahu. The originals of these responses have been supplied to ERMANZ. Two respondents made detailed responses or requested further information. The issues abstracted from those submissions are provided below.

Environment Group, Raukawa Charitable Trust
Tuwharetoa Maori Trust Board
Toitū te Whenua, Te Rūnanga o Ngāi Tahu
Hokonui Rūnanga, Ngāi Tahu
Tanenuiarangi o Manawatu Inc.

The following comments were recorded in these submissions:
'The HSNO committee are in favour of the control and limit of the spread of Chilean needle grass. But request more detail on the host specificity of the rust fungus' (sent)

'Unfortunately, due to capacity issues…unable to engage further on this subject'

'At this point we have no comment to make regarding this matter'

'The runanga leaves all environmental issues to … to deal with…'

'Any comments we have would be similar to those we expressed for the dung beetle application…' (there was further discussion in this submission about the tradescantia application but not CNG).

These issues require no further comment. There may be further input from one respondent at a later date.

As Marlborough District Council is the applicant, and the first releases of *Uromyces pencanus* would be made in these takiwa, discussions were held with representatives of the following Marlborough Iwi:
Ngāti Apa
Ngāti Toa
Rangitaane o Wairau
Ngāti Rarua
Ngāti Kuia
Kaikoura Rūnanga, Ngāi Tahu

The risk posed by CNG was acknowledged, and in most conversations, biological control was seen as a valid approach to minimise the economic, social and environmental threat of CNG. However, a general distrust of new organisms was expressed. Some noted reservations about the introduction of new organisms for

any purpose. One group advocated more and earlier effort in containment or eradication of new pests such as this to avoid the introduction of new organisms, and greater contribution by farmer organisations. One group stated that biological control was only acceptable as long as there were no adverse effects on native flora and fauna or habitat important to Māori (see Section 4 & 5). At the same time, one respondent noted that as kaitiaki, Māori needed to consider all tools, even if these were not ideal. There was a query as to whether CNG is a problem in Argentina dairy farms. Dairy land appears to be managed differently in Argentina, and is often ploughed. CNG is not a generally acknowledged issue.

All requested more information about the weed, and about the safety of the agents. The application and Barton et al. (2011) were sent.

Relevant responses from Māori organisations to previous new organism applications

"As you stated in your letter, we are not 100% happy with the introduction of non-native species to Aotearoa. We will consult our kaumatua who have knowledge of rongoa area and will submit our findings…" (Noted)

'We are looking for further information on what tests have been accomplished to confirm that the biological control will in no manner impact on our native species…" (see Barton et al. 2011)

"Will this insect actually eradicate the weed.. ..are we just inviting it for a feed?" "Can control in this way be justified?" (History shows that biological control of weeds can succeed in New Zealand. The level of control that will be achieved will depend on the population levels that these beetles will achieve once released in New Zealand. Although it is known that they will be introduced to Aotearoa-New Zealand without the natural enemies that limit their numbers in Brazil, we cannot be certain what mortality factors will apply in New Zealand until the insects are released).

"Does the insect have flying capabilities (to take it) to restricted areas…with rare indigenous plant life?" (Yes, rust spores will move on the wind, but the rust will be host specific wherever it occurs; see Barton et al. 2011)

"Everything…has a tapu… What then do we do about the tapu of the insect world…? / What protocols… to relocate the mauri of this insect?" (Release of agents will be conducted in collaboration with tangata whenua).

"At this stage we would like to discuss the proposal…At this stage we are taking a precautionary approach until we are satisfied that all checks and balances are in place" (noted)

"What plans to reverse this….?" (see section 5).

Many submissions on previous applications to introduce new insects to Aotearoa-New Zealand are also relevant. Some recognised benefits for ecological webs, native animals and nutrient cycling (mahinga kai), and employment. The benefit for land and waterways of potential reduction in herbicide applications (and other human health issues) is a frequent comment.

Many past submissions stress the role of Māori as kaitiaki, both of taonga, and of tapu, mauri and whakapapa. As a result, these submissions seek reassurance that control agents are, and will remain safe for taonga species following release. Similarly, indirect adverse effects on non-target species, ecological relationships and landscapes are a common area of concern. The need for meaningful post-release monitoring of non-target effects and impact on the target weed is also a consistent theme.

Other key potential adverse effects of specific interest to tangata whenua but not raised in consultation with the general public were inadequate protocol and other Māori participation around introduction and release.

Responses from Department of Conservation staff

Phil Bell, Department of Conservation

I've asked around a couple of people here and we have no worries about the work being done on a rust for Chilean needle grass. My understanding is that Chilean needle grass is not a major concern for DOC, and that it is the regional councils that are the ones really battling it. Of course, I appreciate it has the ability to spread to a far wider range than it's currently in and that will be of concern. However, it is too big and too difficult a question to answer what threat it may pose to the DOC estate

Responses from Regional Council staff

Ben Minehan, Senior Biosecurity Officer (Plants), Marlborough District Council

Q: What other, perhaps worse weed could replace CNG if its incidence in pastures declined?
A: If CNG was removed, the only other bad weed in that area is nassella which is already being controlled under the RPMS. There is a wide range of pasture species that will colonise these areas where the CNG hopefully disappears from.

Q: How much CNG is sprayed in your region currently? Do you see it as feasible for occupiers to use herbicides for CNG management if it becomes widespread?
A: There is a lot of CNG spraying done annually for CNG but it would be difficult to quantify. It will always be feasible for farmers to spray CNG but as it becomes more and more widespread, the costs will begin to outweigh the benefits.

Q: How compromised are farm values by CNG infestation? What would reduction of the adverse effects of CNG to barely significant levels have on farm values?
A: Farm values decrease as the infestation of CNG increases. Making a living from farming is hard enough at present without dealing with the financial implications of CNG. If CNG was controlled, Farm values would definitely increase.

Q: Would areas currently infested with CNG be subject to wind or water erosion if control of CNG suddenly bared ground?
A: No. Other more desirable pasture species would quickly colonise the areas where the CNG disappeared from.

Q: Is conversion of CNG-infested land to dairy an option in your region? This has been presented as a benefit of BC (CNG currently stifling development) and as a cost (CNG protects environmental values by not allowing dairying).
A: Not really - It is one of the driest areas in NZ - It is not the CNG that is stifling development as it is so dry that nodding thistle has failed to colonise there

Q: what would it mean for farms, farming families and communities in your region if CNG was no longer a problem?
A: Less conflict in November and December, no more CNG depression, an increase in production, more opportunities for the farming community in the area and a much brighter outlook for this whole community

Darin Underhill, Biosecurity Team Leader – Plant Pest, Hawkes Bay Regional Council
Chilean needle grass is a major problem for landowners in Hawke's Bay, not only for the harm it causes to farm animals (including dogs), but also for the decrease in productivity of infested land in the late spring/summer periods. It also cuts down on options the landowner can use their land for, for example hay can not be made from CNG infested paddocks due to the risk of spreading it.

The cost of control is also a burden on landowners and Councils, either through time spent on surveillance and control or money spent on chemicals or spray contractors.

CNG is very difficult to control due to our current control tools being less than adequate, therefore any new potential product or organism will be extremely important in the fight to at least contain this plant pest.

Even though the CNG that grows in Hawke's Bay is resistant to *Uromyces pencanus*, there may be infestations in Hawke's Bay that have originated in Marlborough. Stock from Marlborough, in a drought year, is often shipped around the country in December/January which will always carry the risk of spreading CNG to new areas. The introduction of the above fungus may therefore possibly have the potential of affecting some CNG populations in Hawke's Bay.

Laurence Smith, Environment Canterbury

Chilean needle grass occurs over approximately 80 hectares at Spotswood, in North Canterbury. This is the only known occurrence in Canterbury at this time. Despite extensive publicity and searches of land thought to be susceptible to the occurrence of CNG, no further sites have been located. The known site was found in November 2008 and through an intense control programme and surveillance of surrounding land is thought to have been contained. An ongoing programme to prevent CNG from seeding (panicle seed) is planned for coming years to contain the population and reduce the population density.

The adverse effects of CNG are well known. If left to spread CNG would have serious consequences for the Canterbury region, particularly sheep and crop farming. Competition with desirable pasture species, damage to stock, wool, pelts and meat. The potential distribution for CNG in Canterbury is also documented in a climax model. Large tracks of Canterbury pastoral land are susceptible to invasion.

In my view there is a good likelihood of finding more CNG in Canterbury. While the current infestation can be controlled annually using herbicides, grazing, mowing and mulching there is still potential for spread, although much reduced. Because CNG is not recognised by many people in Canterbury there may well be new sites discovered in the future that are beyond the scope of annual control. The fall back position in this case would be mainly containing the problem. Biocontrol would become a viable option for dense areas in this scenario.

Ray Maw, Environment Canterbury
See attached

Responses from other organisations and individuals

Wayne Yates, Chairman, Spotswood Chilean Needle Grass Action Group
Chilean Needle Grass (CNG) Action Group fully supports the Landcare Research application to ERMA to introduce *Uromyces pencanus,* the rust fungus for CNG. If our worst fears are met and CNG is found on other properties this would be devastating not only to the sheep industry through the lamb kill but also to the small seed and cereal industry in Canterbury. Graeme Bourdot has done extensive computer modelling on the spread of CNG and has found suitable growing conditions in 40% of the South Island. The weeds potential distribution in NZ is large. (15 million hectares is climatically suitable) but less than 1% of this is currently invaded). In Canterbury 1.2 million hectares of pasture land is suitable including over 1 million hectares of high producing pasture. Under global warming this is predicted to get worse in NZ.

Peter Jerram, Marlborough District Councillor and vet, Blenheim
(in response to the question whether veterinary incomes would be put at risk by successful biological control)
An interesting and incorrect slant on a pest, Richard.

Barley Grass in particular is a major cause of problems in dogs, and to a lesser amount in sheep. But vets don't see that pest as a source of income, and neither will they wrt CNG. CNG has the potential to make the high country, and even low hill country, unfarmable, and any vet would see that as a far greater threat, than any small benefit gained from taking seeds out of dogs. After all, financially healthy farmers are what all country vets desire, both philosophically, and also as clients who will employ vets in preventative health programmes, and to do routine jobs such as pregnancy testing cows, ram testing, and the many other contacts vets and farmers have.

So in answer, the idea that vets would see eradication of CNG as a negative because of less work for vets, is a cynical and very incorrect one.

Eradication of CNG will allow more land to be farmed, and that's good for farmers and everyone associated with them. Any vet I know will be delighted when flupropanate is released for use.

Identification of positive and adverse effects of the proposed introduction

The potential risks, costs and benefits of the proposed introduction of *Uromyces pencanus* to New Zealand were identified by literature review, by public consultation and by formal brainstorming.

Beneficial effects on the environment

Source of potential benefit	Comments
Ecosystem processes	
Successful control of CNG leads to reduced herbicide use, and maintenance of the nature and biomass of soil microflora	Any effects on soil microflora are likely to be transient and insignificant at normal rates of application (Wardle 1990).
Successful control of CNG leads to reduced herbicide use resulting in reduced contamination of air, soil, water and waterways.	The area currently treated with herbicide annually is thought to be small, and though real, benefits will be localised and consequently small. Successful biocontrol could limit the growth in herbicide use as the weed spreads.
Sustainability of flora and fauna	
Damage to CNG by the rust increases the amount of dead plant material available to native saprobic organisms	Any such effects will be limited to CNG infestations, and likely to be small in relation to other causes of necrosis in grasslands such as grazing, drought etc.
Establishment of *U. pencanus* provides a novel host for native mycoparasites	Any benefit to native fungi will be limited to the vicinity of CNG infestations; establishment of *U. pencanus* will not greatly increase the pool of host rusts available to parasites in NZ.
Reduced cover of CNG leads to reduced competition with native grassland plant species, and improved bird habitat	CNG is known from only one reserve and the threat to high country grasslands is small (Bourdôt 2010). CNG currently occupies only 0.52% of its potential ecoclimatic range, and so the quantum of future benefits is uncertain.
Maintenance of habitats	
Successful biocontrol reduces the	A major potential benefit. In the absence

projected rate of spread of CNG from existing infestations.	of biocontrol, CNG is spreading slowly in Marlborough and threatens Canterbury, (Bourdôt 2010).
Successful biocontrol breaks up existing CNG monocultures, improving floral and faunal diversity on infested land.	CNG currently infests 'high-versatility' exotic grassland, and any biodiversity benefits will largely accrue there. Future distribution is likely to follow a similar pattern (Bourdôt 2010). Biological control is likely to mitigate future biodiversity losses as CNG spreads.
Intrinsic value of ecosystems	
Improvements in biodiversity associated with successful control increase the inherent genetic diversity of semi-native grasslands.	CNG not currently a pest of native grasslands, and the threat to high country grasslands is small (Bourdôt 2010). Currently occupies only 0.52% of its potential ecoclimatic range, and so the quantum of future environmental benefits is uncertain.

Beneficial effects on human health and safety

Source of potential benefit	Comments
Successful biocontrol leads to reduced use of herbicides that are toxic or allergenic to farmers, and lower occupational risk to applicators	The area currently treated annually is thought to be small, and so any benefits will be localized; magnitude of risk avoidance would be small if herbicide is applied in accordance with the label; biocontrol could limit growth in herbicide use as the weed spreads.

Beneficial effects on the relationship of Māori and their culture and traditions with the environment

No benefits were identified additional to those stated above

Beneficial effects on society and communities

Source of potential benefit	Comments
Successful control reduces cng seeding, limiting physical damage to, and blindness in grazing animals, wild animals, working dogs and pets	Reduced seed production resulting from rust damage would lead to a significant improvement in animal welfare in infested areas, and mitigation of future risk as CNG inhabits its potential range
Reduction in the adverse effects of CNG reduces stress for occupiers and livestock managers by improving financial security and animal welfare.	Reducing the importance of CNG would transform farming practice across infested areas, improving profitability, sustainability, feasibility, and family well-being on individual farms and in communities; a likely but intangible benefit.
Successful control of CNG increases farmer confidence and morale on the 100+ infested properties in Marlborough	Ditto
Successful control of CNG reduces contention in farming communities over decisions by occupiers to control or not	Ditto
Successful control of CNG improves the sustainability of affected communities by retaining pastoral agriculture as a viable land use.	Ditto
Successful biocontrol of CNG frees up farmer resources currently committed to conventional control	Ditto
Reduced abundance of CNG improves perception of animal welfare in farming communities, by reducing adverse effects on grazing animals.	Ditto
Successful control provides reputational benefit to the science community	A minor benefit

Beneficial effects on the market economy

Source of potential benefit	Comments
Successful biocontrol of CNG improves the profitability of affected farms by reducing control costs and improving productivity.	A significant benefit (Harris 2006, Bourdôt 2010).
Successful biocontrol of CNG increases the value of affected land.	Effect is unquantified, but movement controls currently hamper farm practices in infested areas.
Biocontrol reduces seed production by CNG, decreasing the incidence of pelt and carcass damage by seeds, increasing farmer income.	A significant benefit (Hunter 2001, Harris 2006).
Reduced cover of CNG will improve animal health and productivity by allowing the establishment of alternative vegetation of higher, season-long palatability.	CNG is unpalatable for part of the year. Successful control would allow replacement with more useful forage and limit the initial displacement of useful forage as CNG spreads
Biocontrol reduces seed production by CNG , decreasing the trade risk of transporting seeds on raw products.	Although real, this effect is not significant because of the current limited distribution of cng and movement controls.
Successful long-term control of CNG opens some opportunities for conversion to dairy production.	A speculative and unquantified benefit
Successful control of CNG in Marlborough leads to related revenue-earning opportunities for Landcare Research.	Revenue opportunities are not significant in relation to LR's overall budget.

Adverse effects on the environment and New Zealand's inherent genetic diversity including any displacement of native species and deterioration of natural habitats

Source of potential adverse effect	Comments
Ecosystem processes	
Catastrophic reduction in the density of CNG leads to baring of the ground and rapid soil erosion	The areas currently infested with cng are not prone to serious erosion. Biotrophic rusts debilitate hosts, reducing ability to compete with other vegetation (Morin et al. 2006). Progressive replacement of cng is predicted, not rapid death of CNG and

	baring of soil.
Successful long-term control of CNG opens some opportunities for conversion to dairy production, with adverse environmental consequences.	Wholesale farm conversion is speculative. Management of effects is an issue for the RMA.
Sustainability of flora and fauna	
Establishment of *Uromyces pencanus* leads to significant adverse effects to non-target native plants.	This rust fungus is highly host-specific . Colonisation of native plants is highly improbable.
Changes in grazing regimes and competition between plants resulting from successful control of CNG leads to significant adverse effects on populations of valued non-target species	Reducing the invasiveness and competitive ability of CNG would return vegetation composition and land management practices towards the pre-invasion state. Heavy infestations of CNG currently displace other plants of infested pastoral habitats, along with associated flora and fauna. Successful biological control would mitigate future impacts as CNG spreads .
Establishment of *Uromyces pencanus* provides a host for mycoparasites, with downstream adverse effects for native rust fungi.	No mycoparasites will be introduced with the rust (Barton et al. 2011) Because the rust is specific to CNG, any effects will be limited to the vicinity of significant CNG infestations (Barton et al. 2011)
Successful control of CNG reduces the food supply of seed-eating native birds	Predation of seed by birds has not been frequently observed
Successful control of CNG removes a useful nurse crop for other plants in semi-native grassland	All evidence suggests that CNG is a competitor with other plant species in infested areas. Currently only known from one DoC reserve
Maintenance of habitats	
Intrinsic value of ecosystems	
Establishment of *U. pencanus* displaces or causes extinction of another fungus.	

Adverse effects on human health and safety

Source of potential adverse effect	Comments
No significant effects associated with the introduction of the rust or the reduction of CNG by biological control have been identified	

On the relationship of Māori and their culture and traditions with the environment

Discussed elsewhere in this report

Adverse effects on society and communities

Source of potential adverse effect	Comments
No significant effects associated with the introduction of the rust or the reduction of CNG by biological control have been identified	
Successful biocontrol of CNG reduces the need for conventional control, displacing workers and spray contractors.	Unlikely to be a critical revenue source of many contractors
Public fear of introducing new organisms	Not a widely held concern

Adverse effects on the market economy

Source of potential adverse effect	Comments
Establishment of *Uromyces pencanus* leads to significant adverse effects to non-target forage plants	This rust fungus is highly host-specific (see Barton et al. 2011). Colonisation of forage or crop plants is highly improbable.
Successful control of CNG reduces availability of this plant for grazing in early spring, when it is palatable and before seeds are produced.	If biological control is successful, CNG will be replaced by pasture species of equivalent or greater palatability and forage value.
Successful control of CNG by biocontrol leads to its replacement by a weed which causes worse adverse effects.	No more damaging weed likely to replace CNG is known in infested areas.
Successful control of CNG by biocontrol leads to a reduction in herbicide sales, and possibly a loss of a herbicide product from the market.	Currently a very small market
Successful control of CNG by biocontrol leads to reduced income for vets and for workers currently involved in conventional control.	This view would be perverse