



# Wise Up To Weeds!



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## Wise Up to Banana Passionfruit

### Wild New Zealand invaded by banana passionfruit

A number of species of banana passionfruit (*Passiflora* spp.), belonging to the subgenus *Tacsonia*, have been grown in New Zealand as garden plants for their wonderful flowers and edible fruit. Originally from Central and South America some of these species have subsequently taken a liking to our wild open spaces. Over a relatively short period they have become serious weeds of native bush (particularly forest margins and gaps), roadsides and waterways, in moist, frost-free, lowland and coastal areas throughout New Zealand. None of the species of banana passionfruit that now occur in the wild in New Zealand were listed by H. H. Allan in *A handbook of the naturalised flora of New Zealand*, which was published in 1940. *Passiflora mollissima* was the first species recorded

as naturalised in New Zealand, being found in Nelson in 1947, and in Wellington in 1949 and 1952. *P. mixta* was recorded in 1970, *P. pinnatistipula* in 1982, and *P. antioquiensis* and *P. × rosea* in 1988.

### Taxonomic problems

There have been considerable difficulties with the classification and identification of banana passionfruit species naturalised in New Zealand, particularly with plants previously referred to as *P. mixta*. To iron out these difficulties, Peter Heenan and Bill Sykes from the Allan Herbarium, Landcare Research, Lincoln, have recently undertaken a taxonomic review of the *Passiflora* species belonging to the

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*Banana passionfruit*

subgenus *Tacsonia* present in New Zealand (see Heenan & Sykes 2003). Their work was based on a recent taxonomic study of banana passionfruit indigenous to South America (see Coppens d'Eeckenbrugge et al. 2001). This study resulted in the description of a new species, *P. tarminiana*, and also greatly improved the understanding of the relationships between species. Using this new information, Peter and Bill have been able to rename New Zealand species of banana passionfruit and resolve the past confusion surrounding plants formerly recorded as *P. mixta*. A thorough study of herbarium records from New Zealand, along with field-collected material, has allowed them to apply the names *P. tarminiana*, *P. tripartita* var. *azuayensis*, and *P. tripartita* var. *mollissima* to New Zealand banana passionfruit. The major differences between the species have been summarised below, but more information is available in Heenan and Sykes (2003). (Refer to the glossary text box for the meanings of the taxonomic terms.)

### Distinguishing *P. tarminiana* and *P. mixta*

*Passiflora tarminiana* is most readily distinguished from other New Zealand species of *Passiflora* by its small and deciduous stipules, shorter floral tube (hypanthium), prominent nectary chamber, and fusiform fruit (see Figures 1–4). True *P. mixta* differs from *P. tarminiana* in having densely hairy (pubescent) elongated bracts, a hairy floral tube, a narrow nectary chamber, and salmon-pink flowers.



**Fig. 1a** *Passiflora tarminiana*. Stipules have fallen off from the base of the leaf petiole.



**Fig. 1b** *Passiflora tripartita* var. *mollissima*. Large and persistent stipules at the base of the leaf petiole.

### Distinguishing *P. tripartita* var. *mollissima* and *P. tripartita* var. *azuayensis*

Two varieties of *P. tripartita* occur in New Zealand: *P. tripartita* var. *mollissima* and *P. tripartita* var. *azuayensis*. These can be distinguished from other species by their large and persistent stipules, narrow nectary chamber, long floral tube, and obovoid to oblong fruit (see Figs 1–4). They can also be distinguished from each other by the upper leaf surface, which is more or less without hairs (glabrous to glabrate) in var. *azuayensis* and moderately to densely hairy (pubescent) in var. *mollissima*. Plants now referred to as *P. tripartita* var. *azuayensis* were previously confused with *P. mixta*, most probably because of their relatively hairless (glabrous or glabrate) leaves. Morphological and molecular data have shown plants previously known as

*P. mollissima* fit within the natural variation of *P. tripartita* and should now be known as *P. tripartita* var.



**Fig. 2a** *Passiflora tarminiana*. Short floral tube (hypanthium). Sepals and petals are relatively long in comparison to the floral tube length.



**Fig. 2b** *Passiflora tripartita* var. *azuayensis*. Long floral tube. Sepals and petals are relatively short in comparison to the floral tube length.

*mollissima*. Generally, New Zealand plants of *P. tripartita* have at most a slightly toothed corona rim, but some plants of *P. tripartita* var. *azuayensis* have their corona with short (2–6 mm long) filaments. These specimens of *P. tripartita* var. *azuayensis* are easily distinguished from *P. pinnatistipula* and *P. x rosea*, which also have long corona filaments (> 7 mm long), by other morphological characters. (See Key.)



Fig. 3 *Passiflora tarminiana*. Large and prominent nectary chamber.



Fig. 4 Slender and fusiform fruit of *Passiflora tarminiana* (left) and the obovoid fruit of *P. tripartita* var. *mollissima* (right).

## Key to *Passiflora* in New Zealand

- |   |   |                                |
|---|---|--------------------------------|
| 1 | Hypanthium (floral tube) cylindrical and strongly elongated   | 2                              |
|   | Hypanthium (floral tube) absent or saucer-shaped and inconspicuous  | 7                              |
| 2 | Corolla bright crimson; hypanthium 2–3 cm long; peduncle 14–40 cm long, < 1.5 mm diam.; ovary glabrous  | <i>antioquiensis</i>           |
|   | Corolla pink or shades of pink, to salmon-pink; hypanthium > 4 cm long; peduncle 2–7 cm long, > 2 mm diam.; ovary white villous   | 3                              |
| 3 | Bracts free or occasionally connate < 1/4 of their length; stipules pinnate and with filiform segments; corona filamentous, filaments > 7 mm long; fruit length < 1.7x fruit width  | 4                              |
|   | Bracts connate > 1/3 of their length; stipules simple, ovate and toothed, often deciduous; corona reduced to teeth, rarely filamentous and then filaments < 6 mm long; fruit length > (1.8–)2x fruit width  | 5                              |
| 4 | Stipules pinnatisect, pinnae filiform to narrow-linear, dark red; stamens normally developed; corona filaments 14–20 mm long; androgynophore extending to ovary base; bracts free, margins irregularly serrate and with prominent filamentous apices; fruit globose to depressed globose, abundantly produced                                   | <i>pinnatistipula</i>          |
|   | Stipules lanceolate, pinnae of small marginal teeth, green; stamens usually abnormal and ± petaloid; corona filaments 5–12 mm long; androgynophore terminating > 4 mm below ovary base; bracts free or occasionally connate < 1/4 of their length, margins uniformly serrulate and with subacute apices; fruit broad ellipsoid, rarely produced | <i>x rosea</i>                 |
| 5 | Leaves glabrous to glabrate on upper surface; stipules 4–7 x 2–3 mm, early deciduous; nectary chamber 1.4–2.0 cm wide; hypanthium/sepals length ratio 1.3–1.6; fruit fusiform   | <i>tarminiana</i>              |
|   | Leaves glabrous to densely pubescent on upper surface; stipules 6–20 x 12–30 mm, persistent; nectary chamber < 1.4 cm wide; hypanthium/sepals length ratio > 1.6; fruit obovoid to oblong   | 6                              |
| 6 | Leaves glabrous to glabrate or moderately to densely pubescent on upper surface; petiole with 6–14 glands; bracts connate for 1/3–2/3 length, sparsely to moderately pubescent, with the hairs inconspicuous; flowers pink; hypanthium glabrous, hypanthium/sepals length ratio (c. 2.0–)2.4–3.2  | <i>tripartita</i>              |
|   | Leaves glabrous to glabrate on upper surface  | var. <i>azuayensis</i>         |
|   | Leaves moderately to densely pubescent on upper surface   | var. <i>mollissima</i>         |
|   | Leaves glabrous to glabrate on upper surface; petiole with 4–10 glands; bracts usually connate for > 3/4 length, densely pubescent with the hairs conspicuous; flowers salmon-pink; hypanthium moderately to densely pubescent, hypanthium/sepals length ratio 1.6–2.6  | <i>mixta</i>                   |
| 7 | Plants dioecious; leaves entire, coriaceous; perianth, 4-merous, < 2 cm diam. when fresh; fruit < 3 cm diam., orange  | <i>tetrandra</i>               |
|   | Plants with hermaphroditic flowers; leaves 3- or 5-lobed on adult shoots, membranous or submembranous; perianth 5-merous, > 4 cm diam. when fresh; fruit > 3 cm diam., yellow or purple   | 8                              |
| 8 | Leaves dull above, 5-lobed on adult shoots; stipules broad and subreniform; bracts entire; fruit yellow when ripe, 3.0–4.5 cm diam.   | <i>caerulea</i>                |
|   | Leaves shining above, 3-lobed on adult shoots; stipules linear-subulate; bracts serrate; fruit dull or dark purple when ripe, > 4.5 cm diam.  | <i>edulis</i> f. <i>edulis</i> |

## Distribution of banana passionfruit in New Zealand

*Passiflora tarminiana*, *P. tripartita* var. *azuayensis*, and *P. tripartita* var. *mollissima* are the three most common banana passionfruits in New Zealand, but it is difficult to be sure of the full extent of their distributions due to a lack of herbarium collections and the past confusion with the application of names. However, some of the recently collected specimens of banana passionfruit, provided to Alison Gianotti by staff from regional councils and the Department of Conservation and by members of botanical societies, will be deposited in the Allan Herbarium, thus helping to fill some of the gaps in our knowledge. The present somewhat limited information indicates that while these three taxa occur throughout New Zealand, there are some distribution patterns that most probably reflect their cultivation

history. *Passiflora tarminiana* appears to be most common in the northern North Island, *P. tripartita* var. *mollissima* in Wellington, Nelson and Marlborough, and *P. tripartita* var. *azuayensis* in Wellington, Canterbury and Otago. *Passiflora mixta* was previously considered to be one of the most common species in New Zealand, but it is now only known in the wild from the Waitakere Ranges, Auckland, and in a recent collection from roadside bush near Portage, Kenepuru Sound, Marlborough. Records indicate that some of the other less widespread species may be beginning to invade new areas. Recent collections of *P. pinnatistipula* indicate this species is more common in Canterbury and Otago than previously thought, whereas *P. x rosea* still appears to be restricted to Banks Peninsula. *Passiflora antioquiensis* is now known from additional sites in North Auckland and Endeavour Inlet, Queen Charlotte Sound, Marlborough.

## Glossary

**Corolla** The inner, often showy, whorl of floral parts, consisting of free or united petals

**Corona** Hair-like appendage around the rim of the corolla, usually crown-like

**Filament** Thread-like organ

**Fusiform** Spindle shaped, swollen in the centre and narrowed at both ends

**Glabrate** Almost glabrous

**Glabrous** Without hairs of any sort

**Hypanthium** Floral tube, a cup-like structure produced by the fusion of the bases of the floral envelopes and androecium

**Nectary chamber** An area at the base of the hypanthium

**Obovoid** A solid body that is egg shaped, attached at the narrow end

**Petiole** The stalk of a leaf

**Pubescent** Clad in short soft hairs

**Sepal** Petal-shaped structure, often green, covering or on the outside of the other floral parts

**Stipule** One of a pair of scale-like or leaf-like appendages at the base of the petiole

**NOTE:** For the meaning of additional terms appearing in the Key, refer to the glossary in the *Flora of New Zealand*, vol. IV, p. 1291.

## For more information see:

Heenan, P. B.; Sykes, W. R. 2003: ***Passiflora* (Passifloraceae) in New Zealand: a revised key with notes on distribution.** *New Zealand Journal of Botany* 41: 217–221.

Coppens d'Eeckenbrugge, G.; Barney, V. E.; Jørgensen, P. M.; MacDougal, J. M. 2001: ***Passiflora tarminiana*, a new cultivated species of *Passiflora* subgenus *Tacsonia* (Passifloraceae).** *Novon* 11: 8–15.

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