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To cite this article: P. B. Heenan & L. J. Forester (1997) *Mazus pumilio* (Scrophulariaceae), an addition to the indigenous flora of New Zealand, *New Zealand Journal of Botany*, 35:4, 437-440, DOI: [10.1080/0028825X.1987.10410168](https://doi.org/10.1080/0028825X.1987.10410168)

To link to this article: <http://dx.doi.org/10.1080/0028825X.1987.10410168>



Published online: 10 Feb 2012.



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Mazus pumilio (Scrophulariaceae), an addition to the indigenous flora of New Zealand

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Abstract *Mazus pumilio* is recorded from New Zealand, having recently been considered to be restricted to Australia. The species is accepted as indigenous and is considered a vagrant. A description of *M. pumilio*, based on New Zealand plants, and features that distinguish it from *M. novaezeelandiae* are presented, as are observations on its distribution, habitat, and conservation status.

Keywords Scrophulariaceae; *Mazus*; *M. novaezeelandiae*; *M. pumilio*; new record; New Zealand flora

INTRODUCTION

Three species of *Mazus* Lour. were accepted by Barker (1991) as occurring in Australia and New Zealand. *Mazus pumilio* R.Br. was considered by Barker to be endemic to Australia, and *M. novaezeelandiae* W.R.Barker and *M. radicans* (Hook.f.) Cheeseman to be endemic to New Zealand. *Mazus novaezeelandiae* is a new species name provided by Barker (1991) for New Zealand plants that had traditionally been included in *M. pumilio* (Hooker 1853, 1864; Bentham & Mueller 1869; Cheeseman 1906, 1925; Allan 1961). More recently,

Heenan et al. (1996) described *M. arenarius*, a rare, sand dune species from southern New Zealand.

Here we report the recent discovery of *M. pumilio* from a single population in northern New Zealand.

Mazus pumilio in New Zealand

Mazus pumilio R.Br., *Prod.*, 439 (1810)

LECTOTYPE (Barker 1991, P. 86): *R. Brown*, Iter Australiense 2647, 10 Jan 1804, BM!

DESCRIPTION (based on New Zealand material): Perennial creeping herb. Leaves up to 60 mm long, alternate, in terminal rosettes; hairy on margin and adaxial midrib and lamina (Fig. 1); glabrous on abaxial midrib and lamina; lamina 10–42 × 5–17 mm, elliptic, undulate, midrib and main lateral veins raised on abaxial surface; margin with a brown band, lower half distinctly serrate-dentate; base attenuate. Petiole 3–19 mm long, plano-convex, white, hairy. Inflorescence lateral, with up to six flowers. Peduncle 30–70 mm long, glabrous. Bracteoles 1.5–6.0 × 0.2–0.9 mm, narrow-linear, ciliate, solitary, inserted below calyx. Calyx c. 7.5 mm long, campanulate, green, with a few scattered hairs on margin and lobes; lobes 3.5–5.0 mm long, triangular. Flower bud dark lilac. Corolla c. 16 × c. 17 mm, abaxial surface lilac, adaxial surfaces pale lilac; sparsely placed glandular hairs on abaxial surface. Tube 4–5 mm long. Lower lobes 6.0–7.0 × 6.5–7.0 mm, spreading, apex praemorse; palate with 2 longitudinal elevations, each with several yellow blotches, outer part glabrous or with a few sparse hairs, hairy in the throat. Upper lobes 6.5–7.0 mm long, narrow triangular, apex subacute. Stamens 4, glabrous; filaments 1.5–2.0 mm long, white. Ovary c. 2.0 × c. 1.4 mm, ovoid, glabrous. Style 4.5–5.0 mm long, white. Fruit c. 4.0 × c. 2.5 mm, enclosed within calyx. Seeds 0.6–0.8 × 0.4–0.5 mm. FL Oct?–May; FT Dec–May.

This description based on New Zealand plants is consistent with the descriptions of Australian plants provided by Barker (1991) and Elliot & Jones (1993), with the lectotype from Tasmania (BM), and with other specimens from Tasmania (e.g., CHR 66835, 180200, 485307).

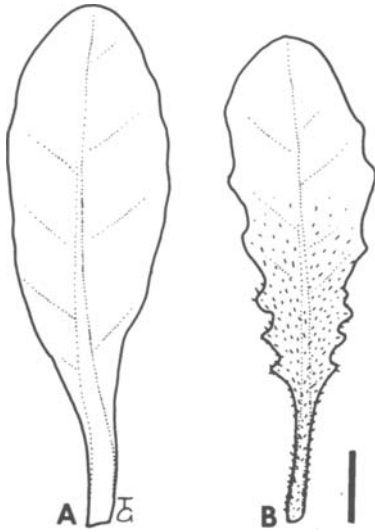


Fig. 1 Adaxial leaf surface (scale bar = 5 mm). *M. novaezeelandiae* (A) and *M. pumilio* (B).

RECOGNITION: *Mazus pumilio* and *M. novaezeelandiae* are distinguished from *M. radicans* and *M. arenarius* by their slender calyx, horizontal rhizomes without distinct nodes, leaves in close packed terminal rosettes, and narrow fruit. *Mazus novaezeelandiae* and New Zealand material of *M. pumilio* are similar in that the leaves often have a narrow and brown marginal band, but there are several obvious differences. *Mazus pumilio* has leaves with hairs on the upper lamina, midrib, and petiole, the leaf margin is distinctly serrate-dentate at the base (Fig. 1), the corolla is in the colour range of lavender to lilac, and the capsule measures c. 4 × c. 2.5 mm and is enclosed within, and hidden by, the calyx. *Mazus novaezeelandiae* has a glabrous lamina and midrib, the margin is glabrous or hairy and entire or weakly dentate at the base (Fig. 1), the corolla is white, and the capsule is large and always protrudes beyond the calyx lobes. The mature capsules of *M. pumilio* are notably smaller than those of *M. novaezeelandiae* and they have been described by Barker (1991) as being "included to slightly exerted from green enlarged calyx" and by Elliot & Jones (1993) as being "enclosed in persistent green calyx".

New Zealand plants of *M. pumilio* have numerous hairs on the adaxial surface of the leaves as they emerge from the bud. Many of these hairs soon fall off the upper and middle parts of the lamina, but they persist on the midrib and lower portion of the leaf

and the species can therefore still be reliably distinguished from *M. novaezeelandiae*.

REPRESENTATIVE SPECIMENS: Whananaki, Northland, L. J. Forester & N. Miller, 1 May 1996, CHR 507546; cultivated, ex Whananaki, P. B. Heenan 47/96, 29 Oct 1996, CHR 510594; cultivated, ex Whananaki, P. B. Heenan, 26 May 1997, AK 232087.

DISTRIBUTION: *Mazus pumilio* is known in New Zealand from a single site to the south of Whananaki, near Pitokuku Point, Sandy Bay, eastern Northland (Eastern Northland Ecological Region). The site is about 20 m a.s.l. and measures approximately 20 m × 30 m. Within this area the leafy rosettes of *M. pumilio* number in the thousands, and provide a sparse to dense ground cover.

We consider *M. pumilio* to be an addition to the native flora rather than being a new naturalised plant record. The site at which it occurs is a considerable distance from any significant settlement or gardens. Furthermore, *M. pumilio* is unlikely to have been cultivated in New Zealand as it is not on the Landcare Research database of vascular plant species in New Zealand (E. Nicol pers. comm.). For these reasons it is very unlikely to be a garden escape. It is also improbable that *M. pumilio* was inadvertently introduced by users of a nearby walking track as this is infrequently used and does not pass directly through the *Mazus* site.

Mazus pumilio is most likely to be a recent arrival from Australia where it occurs in coastal and lowland parts of Tasmania, and the southern and eastern states of New South Wales, Victoria, South Australia, and Queensland (Barker 1991). Support for *M. pumilio* being a new arrival to New Zealand is provided by the presence of only a single population and its very recent discovery. If it had been in New Zealand for a longer period of time it could be expected to occur in other parts of Northland given that it sets seed and has aggressive vegetative growth. Furthermore, Northland has been well botanised in recent years, in particular by J. K. Bartlett and A. E. Wright, and its distinctive lilac flowers and serrated leaves are unlikely to have gone unnoticed. Other species such as *Plectranthus parviflorus* (Sykes & de Lange 1993) and *Wilsonia backhousei* (Jane & Sykes 1995) are also considered to be recent arrivals from Australia and, as would be expected, these too have a remarkably restricted distribution.

Northland, and in particular the Te Aupouri Ecological District, is known as an area to be colonised

Fig. 2 Habitat of *M. pumilio*.

by migrant plant species from Australia. Notable examples include *Cryptostylis subulata* (Graham 1976), *Thelymitra malvina* (Clements et al. 1991), and *Gratiola pedunculata* (de Lange 1997). Four species of vagrant Australian wading birds that occur in Northland would be suitable seed vectors for *Gratiola pedunculata* (de Lange 1997). Each of these birds would also be a suitable seed vector for *M. pumilio*, which occurs in eastern Australia on the margins of swamps and in boggy sites (Barker 1991). Fresh seeds of *M. pumilio*, like those of *G. pedunculata* (de Lange 1997), are very small and mucilaginous when slightly wet, and would easily adhere to the feet or feathers of a bird.

Alternatively, but less likely, *M. pumilio* may have been in New Zealand for a longer time but either it has not become established over a wider area, its range has contracted due to habitat destruction, or the full extent of its distribution is not known.

Mazus novaezeelandiae also occurs in Northland, and has been collected from North Cape (CHR 178276), Kaitaia (CHR 328096), Waionui Inlet (AKU 20457), Moerewa Point (AKU 19093), and near Hokianga Harbour (AK 143684).

HABITAT: *Mazus pumilio* grows on a damp, hummocky, 15–20° slope with a south-east aspect (Fig. 2). This site has been intensively grazed and is dominated by a 2–4 m tall, pole-like, even-sized stand of *Coprosma areolata**. *Mazus pumilio* is associated with a suite of herbs including *Galium propinquum*,

Conyza albida, *Oplismenus hirtellus*, and introduced grasses. Immediately behind the *M. pumilio* site is a small forest remnant which includes *Dysoxylum spectabile*, *Metrosideros excelsa*, *Vitex lucens*, and *Dacrycarpus dacrydioides*.

In Australia, *M. pumilio* occurs in predominantly coastal and lowland areas where it grows in or on the margins of swamps and boggy sites (Barker 1991).

REPRODUCTION: *Mazus pumilio* at Whananaki sets seed (e.g., CHR 507546) and, therefore, appears to have no reproductive constraints such as the possible absence of a pollinator. It is not known whether the Whananaki population comprises a single clone that is self-compatible, or whether the population comprises individual plants that are obligate outcrossers. The single plant of *M. pumilio* in cultivation at Lincoln has flowered prolifically but it has not developed fruit and set seed. The lack of fruit does not mean the plant is self-incompatible as it has a long style and the stigma is held well in front of the dehiscent anthers; self-pollination is therefore virtually impossible. Barker (1991) considered *M. pumilio* to be an obligate outcrosser after observing a lack of fruit development on one cultivated plant.

Mazus pumilio readily propagates by pieces of the rhizome and in cultivation is a vigorous growing perennial herb.

CONSERVATION: In New Zealand the single population of *M. pumilio* fits within the category of critical; that is, a species with an extremely high probability of extinction in the wild within the immediate future (Cameron et al. 1995; P. J. de Lange pers. comm.). However, as has been advocated for

* Nomenclature follows Allan (1961), Connor & Edgar (1987), and Webb et al. (1988).

migrant orchid species (de Lange & Molloy 1995) and *Gratiola pedunculata* (de Lange 1997) which are common in Australia and vagrant in New Zealand, the conservation status of *M. pumilio* should be considered in relation to its total distribution, and not the small and isolated New Zealand population. In Australia, *M. pumilio* is known from mostly old collections and habitat disturbance is considered to have caused a decline of the species (Barker 1991). Barker suggested the species should have a status of at least 3R, which is a rare species with a wide distribution, generally small populations, and a specific habitat (Briggs & Leigh 1988). Based on this assessment, *M. pumilio* in New Zealand should be given a moderate conservation priority and management practices should definitely enhance, rather than hinder, its survival opportunities.

The site at which *M. pumilio* occurs is likely to be secured as a Private Covenant by the Whangarei District Council and will probably be fenced. This latter action is likely to create new management challenges. An immediate threat is mist flower (*Ageratina riparia*) which is encroaching onto the site from nearby. Excluding stock will allow *A. riparia* to spread into the covenant unhindered, with the likely outcome that it will smother *M. pumilio*. Hand weeding of mist flower will be needed to maintain habitat stability. The removal of stock from the site will also enable the herbs and grasses associated with the *Mazus* to grow unhindered, with the potential outcome of shading out *M. pumilio*.

ACKNOWLEDGMENTS

We thank Nigel Miller for the original collection of *M. pumilio*, Tim Galloway for Fig. 1, Peter Bellingham, Peter de Lange, and Brian Molloy for discussion and comments on the draft manuscript, the British Museum for sending the lectotype of *M. pumilio*, and Peter Bellingham and Ewen Cameron for information on collections of *M. novaezeelandiae* from Northland. Funds were provided to P.B.H. by the Foundation for Research, Science and Technology under contract C09310.

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