MUEHLENBECKIA ASTONII AT KAITORETE BARRIER

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Kaitorete Barrier is a special place for the genus *Muehlenbeckia*, with all five species occurring there. The barrier itself comprises the 28 km long narrow stretch of land that separates the lagoon of Te Waihora (Lake Ellesmere) from the Pacific Ocean, immediately to the south of Banks Peninsula. It is widest at the peninsula end, and gradually narrows to the artificial opening to Te Waihora at Taumutu. On its seaward side are gravel beaches and sand dunes dominated by pingao (*Desmoschoenus spiralis*), while the Te Waihora side has brackish saltmarsh dominated by sea rush (*Juncus maritimus*). In between are terraces of stony and sandy soils that support pasture dominated by dryland grasses (*Stipa* spp., *Rytidosperma* spp., *Lagurus ovatus*) and scattered shrubs.

This variety of habitat provides ideal conditions for the species of *Muehlenbeckia*. *M. australis* occurs on the cliffs where the barrier joins the peninsula, and *M. complexa* is common on both the backdunes and on the terraces. *M. ephedroides* occurs on gravel beaches, and *M. axillaris* is confined to the gravel ridge that separates the upper seaward terrace from the lower lakeside terrace (known locally as the Speight Ridge). Most remarkable however, is the restricted occurrence of *M. astonii* on a short segment of the seaward terrace.

Muehlenbeckia astonii is a priority threatened plant for New Zealand, and is the subject of a concerted recovery plan. It occurs in scattered dryland locations from the south coast of Wellington to Canterbury, both inland and coastal. Virtually all populations are very small and restricted, comprising only a few plants each. The population at Kaitorete Barrier is remarkable as it is both the southern limit, and by far the largest known population, containing over a thousand plants. It holds over 95% of the known plants in the wild, and is therefore of special interest and value. The plants occur as scattered individuals in a grassland matrix along with *M. complexa* and occasional other shrubs.

The population of *M. astonii* is, however extremely vulnerable. The most obvious feature, especially to those who are used to seeing plants elsewhere, is the tiny size of most of the individuals. Elsewhere in New Zealand, they are up to 2 m tall and large shrubs, but at Kaitorete Barrier, most are less than 0.5 m tall and 0.5 m diameter. Very peculiar, however, is the existence of one plant of greater than 2 m height and 4 m diameter at the back of the sand dunes, and another of slightly smaller dimensions, indicating that the plants on the grassland terrace are well below their size potential. Those taller plants (and some that have recently disappeared from the same backdune area) do occur in a different habitat, suggesting that the main population on the pasture-dominated flats may be growing in sub-optimal conditions.

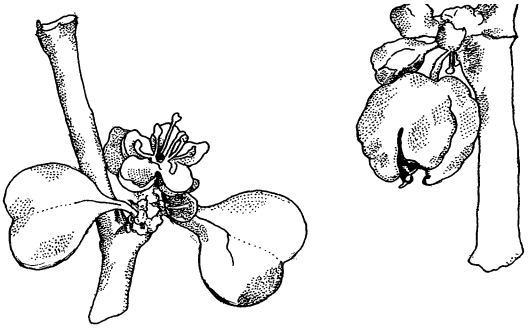
The terrace pastures occur the entire length of Kaitorete Barrier, but the *M. astonii* is restricted to about a tenth of this length, that is about 3 km, and to about 500 m in width. Two major farms occur on the barrier, and all plants occur on only one of these. Fortunately they are on the farm that is grazed by sheep only, as the other

carries cattle as well, but the population is vulnerable as it occurs in only a small number of paddocks. Fortunately, the current landowner understands the value of this population and has no plans to do anything different with the land.

There are signs of grazing damage however. The plants have many dead branches and the shoots that grow well are quickly eaten back. It is unsure whether this is caused by the sheep, or the hares that occur in large numbers at Kaitorete, or a combination of both. To determine the effects of grazing, an area containing approximately 60 plants of *M. astonii* has been fenced with hare- and sheep-proof fencing, and plants both inside and around the margin are being monitored. After one year, the plants inside the exclosure already have shoot growth that is much greater than those outside.

Seedlings of *M. astonii* have never been observed at the site, yet the plants produce abundant good seed each year. It is suspected that grazing may inhibit seedling establishment, so the exclosure plot will serve to answer that question as well. Of concern however, is the potential for herbaceous species to become too competitive for the seedlings once grazing is removed. In ungrazed shelterbelts that have been recently established, these herbs have become especially vigorous, and there are no seedlings there. Differences in composition and structure of the associated vegetation are also being monitored, to see if such inhibition occurs in the open. In the first year, there are obvious differences, but these are mostly the result of the grasses inside the exclosure having flowered successfully, whereas most of the flower heads in the grazed paddock have been eaten.

It is important that the population of *M. astonii* at Kaitorete Barrier is maintained in a viable state for the future. Currently, the plants already there seem to be in decline and there is no recruitment. Hopefully, the information obtained from monitoring, and especially the exclosure plot, will provide answers so that future management can be undertaken to ensure its survival. It has been described there as a "living fossil", which means that unless some action is taken, it will eventually become less of the "living" and more of the "fossil".



Male flower (l.) and fruit (r.) of *Muehlenbeckia astonii*. (del. Emily S. Harris).