

EX-SITU CONSERVATION OF THE DWARF BUTTON DAISY
LEPTINELLA NANA

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Leptinella nana (D.G. Lloyd) D.G. Lloyd and C.J. Webb (Asteraceae, Anthemideae) was described and named (as *Cotula nana*) by David Lloyd and placed in his Series Radiata, Section Leptinella of the genus *Cotula* L. (Lloyd 1972). Later, David Lloyd and Colin Webb reinstated Cassini's genus *Leptinella* and transferred New Zealand and other species of *Cotula* to it. *Leptinella nana* was placed in their subgenus Radiata along with other species such as the look-alikes *L. filiformis* and *L. minor* (Lloyd & Webb 1987).

Leptinella nana, as its name suggests, is a very small perennial creeping herb with very slender roots and rhizomes, small green pinnatifid leaves, and tiny yellow-green flowers. The species is monoecious, flowers in November and December, and appears to be self-compatible. Its achenes germinate readily, judging by the large number of seedlings I have observed. *Leptinella nana* is known only from three sites in the wild; at Titahi Bay, Wellington; at the Rai River, Marlborough; and in the Lyttelton Reserve, Mt Pleasant, Port Hills, Christchurch (Type locality). I am familiar with the Lyttelton Reserve subpopulation but not the other two. At present, *L. nana* is acknowledged to be one of New Zealand's Acutely Threatened plants, is ranked as Nationally Endangered, and is considered to be subject to extreme fluctuations and conservation dependent (de Lange et al. 2004). Three other leptinellas are also recognised as Acutely Threatened; *L. filiformis* (Nationally Critical), discussed in Number 38 of this Journal (Heads et al. 2004); *L. rotundata* (Nationally Vulnerable); and *L. featherstonii* (Nationally Vulnerable) (de Lange et al. 2004).

Here, I record the persistence and behaviour of *L. nana* in one of my lawns in Riccarton over a period of about 30 years as an example of unplanned but successful ex-situ conservation. In No. 10 of this Journal I recorded the flowering times of 78 native species, varieties, hybrids, and cultivars grown in a rock garden I established in 1970 (Molloy 1977). The records included four leptinellas (as cotulas), *L. pectinata*, *L. serrulata*, *L. squalida*, and *L. pusilla*. In No. 12 of the Journal (Molloy 1978) a further 20 native species were added, including *L. rotundata*. At that time, small plants of *L. calcarea* and *L. nana* transplanted into the rock garden in 1975 had not flowered but

did so subsequently. Both came from the experimental garden at Botany Division D.S.I.R., Lincoln, with *L. nana* originally derived from the Lyttelton Reserve subpopulation*.

In 1982 I converted the rock garden to a border garden of ornamental exotic trees and shrubs. Unbeknown to me *L. nana* had spread by seed into the adjacent lawn before the rock garden was dismantled. I first noticed its presence there in 1985 when it covered about a third of the lawn as scattered individuals and small patches. Since then it has spread across three-quarters of the lawn, which covers c.10 x 8m in area, but has not crossed a concrete driveway into a nearby well-lit and densely grassed lawn.

What factors have been conducive to its spread, establishment, and persistence? Two grafted deciduous flowering cherries about 7m tall, one at each end of the lawn, have spreading canopies that meet in the middle of the lawn. In the border garden on the south side there are a tall evergreen magnolia, a deciduous chestnut and several smaller evergreen shrubs. A well-lit concrete driveway forms the northern boundary. Year-round, vehicles frequently park on the lawn, which over the years has become very depleted and is no longer mown regularly.

The soil has become compacted and exposed through a combination of seasonal and diurnal shade, continued mowing, and vehicle use. There is now much bare soil which is moist in the winter and dry in the summer, and plants other than *L. nana* are widely dispersed. These include *Poa annua*, *Festuca rubra*, *Prunella vulgaris*, *Cotula australis*, *Cardamine hirsuta*, *Taraxacum officinale*, *Trifolium repens*, *T. dubium*, *Bellis perennis*, *Stellaria media*, *Cerastium vulgatum*, *Sagina procumbens*, *Crepis capillaris*, *Dichondra brevifolia*, *Hydrocotyle moschata*, *H. heteromeria*, and *Juncus distegus*. Especially in spring, the mosses *Eurhynchium praelongum*, *Bryum* aff. *billardieri* and *Fissidens leptocladus*, and the hepatics *Chiloscyphus lentus* and *Marchantia foliacea* are prominent and provide favoured microsites for *Leptinella nana*, as do are the areas of bare soil where numerous seedlings and small patches of *L. nana* are established. Autumn appears to be the optimum time for seedling establishment, and plants flower at a very young stage of growth.

* *Subpopulations* are "Geographically or otherwise distinct groups in the population between which there is little exchange." (Department of Conservation Threatened Species Occasional Publication 22: 2002).

In December 2002, I attempted to count the number of plants of *L. nana* using a gridded frame. A total of 615 plants was recorded, ranging from single rosettes, many in flower, to patches of various sizes, including a large pure patch 50 x 30cm in area. If anything the total figure is conservative as it was not always possible to distinguish one patch from another. Since then the number of young plants has visibly increased, whereas the larger patches have declined in some areas and increased in others.

The habitat of *L. nana* in the Lyttelton Reserve is not too dissimilar. There the species occurs over a short distance along a popular and well-trodden walking track on shaded south-facing slopes. Seedlings and patches of *L. nana*, one c. 1m x 0.5m in area, occur along the dripline of basalt overhangs on one side of the track, and along the slightly drier bush margin on the other side. In both cases, *L. nana* grows in bare compacted soil, or amongst mosses, liverworts, and scattered plants of *Lolium perenne*, *Hydrocotyle moschata*, *H. heteromera*, *Cardamine* cf. *debilis*, *Sagina procumbens*, and *Australina pusilla*. In December 2002, I counted 132 plants of *L. nana* there; again a conservative estimate.

According to Shannel Courtney (pers. comm. 2002) *L. nana* has been found at around 100 localities along the Rai River, mostly in small patches, but in one case scattered along a 200 m strip of the river bank. The combination of light shade from willows, regular siltation from floods, and turf maintenance by sheep grazing allows *L. nana* to persist.

In summary, it seems that partial shade, bare seasonally moist compacted soils, and a sparse cover of competing plants are important factors defining the optimum habitat for *L. nana*. To these may be added the relatively high levels of soil fertility characteristic of sites favoured by *L. nana* and several other species of *Leptinella*, e.g. *L. serrulata*, *L. calcarea*, and *L. rotundata*.

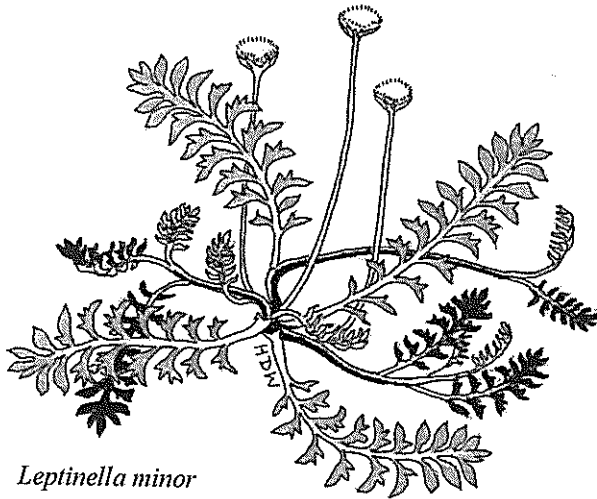
I have little doubt that *L. nana* will persist in large numbers and thrive in my so-called lawn as long as the prevailing conditions described above remain. As for its ex-situ conservation elsewhere, one novel avenue that has been suggested is its possible inclusion, along with other leptinellas, in turf mixtures for bowling greens (e.g. Johnson & Rogers 2003). Whether this is feasible or not for *L. nana* time alone will tell.

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Leptinella minor