

CHIONOCHLOA SPIRALIS

Fiordland's Forgotten Tussock

by Bill Lee and Roger Lavers

The bluffs overlooking Takahe Valley in the eastern Murchison mountains support a plant species that is as rare and threatened as the more familiar takahe which lives in the adjoining alpine grasslands.

*Both species are listed as "endangered" in the IUCN Red Data Book for New Zealand but to date the tall snowgrass *Chionochloa spiralis* has received little of the attention given to its famous neighbour. Bill Lee and Roger Lavers highlight the importance of this neglected and vulnerable species in Fiordland National Park.*

CHIONOCHLOA SPIRALIS, so named because of the characteristic spiral curling of the dry, old attached leaf sheaths, was first collected from Takahe Valley in 1955 by Ken Miers while he was studying the newly rediscovered takahe. Some five years later, Margaret Bulfin collected the tussock at the "Head of Lake Monk Valley" in the Cameron Mountains in southern Fiordland, and it was these specimens that were used in the formal description of the new species by Victor Zotov in 1963. For the next two decades no new sites were discovered, and only one field collection was made, in 1974, from plants in Takahe Valley, for biochemical analyses of leaf waxes. These three collections of *Chionochloa spiralis* are the only ones known, and all are in the Botany Division, DSIR Plant Herbarium, at Lincoln.

However, recently, one of us (Roger Lavers) discovered plants of *Chionochloa spiralis* growing at the entrance to one of the Luxmore caves, on the basin below Mount Luxmore. This new site, and an examination of the plants in Takahe Valley, have provided more detailed information on the species' ecology.

Chionochloa spiralis is an erect, tall tussock grass with sharp, richly-green, narrow, drooping leaves up to a metre long. Its most distinctive feature is the old leaf bases which fracture to produce a pile of chaff at the foot of the tussock. In wet conditions the leaf bases appear little different from most other tussock grasses, but when dry, they become tightly curled, forming a frizzy mat around the emergent leaves.

In the Murchison Mountains, *Chionochloa spiralis* is restricted to narrow ledges on bluffs in the subalpine beech forest that border the Point Burn and Takahe Valleys. These bluffs are formed of limestone that was deposited 30 million years ago in the Upper Oligocene. The tussock occurs as either scattered plants or in clusters of several plants, that grow on a rich, black, friable soil with a pH around 7. Chemical analyses of plants collected in the field show extremely high concentrations of calcium in both seeds and leaves.

Little is known about the soil conditions at the Lake Monk site. However, it is possible that *C. spiralis* is growing on calcareous soils

there, since the plants were collected from rocky outcrops, and units of thinly bedded, metamorphosed, impure limestone and marl are found in the area, surrounded by the more widespread granite and other igneous rocks of the region. Although of greater antiquity (320 million years – Lower Paleozoic) than the limestone further north on Mount Luxmore and in the Murchison Mountains, these rocks could also produce highly calcareous soils.

At present we suspect that *Chionochloa spiralis* is the only plant species restricted to calcareous soils in eastern Fiordland, and together with *Celmisia inaccessa*, may represent the full calcicole (limestone-loving) flora in Fiordland. Why *Chionochloa spiralis* should have a strong association with these soils is unknown, although it is unlikely that it has a special requirement for some feature of calcareous soils as it will grow in garden loam. It is probable that *Chionochloa spiralis* is unable to compete with the fast growing tussock species which grow on other fertile soils in Fiordland.

While it is possible that *Chionochloa spiralis* will be discovered at other localities in eastern Fiordland on calcareous soil, it is unlikely that it will be widespread. Tertiary limestone outcrops within the altitudinal range of *Chionochloa spiralis*, occur intermittently for around 80 km from the Kaherekoau Range in the south to the Murchison Mountains in the north, with sizable bluffs on Mount Titiroa and Mount Luxmore. The extent of the Paleozoic calc-sediments is far greater, and offers the possibility of as yet undiscovered populations of *Chionochloa spiralis* in areas west of the Cameron Mountains in southern Fiordland.

Fiordland is a major centre for *Chionochloa* snowgrasses, having over half the 20 currently described species, and with four species largely restricted to the region (*Chionochloa spiralis*, *Chionochloa acicularis*, *Chionochloa ovata*, *Chionochloa teretifolia*). There are no major threats to *Chionochloa acicularis* and *Chionochloa teretifolia*, which are extensive and largely unpalatable to deer. *Chionochloa ovata*, a species of alpine bluffs in western regions, which is highly palatable, is currently showing a marked recovery following the reduction in deer in alpine

C. spiralis survives only on inaccessible bluffs such as these in Takahe Valley. Elsewhere deer (inset) have eaten the palatable species out. Photos: Roger Lavers

