From rugs to carpet - more records of *Carex inopinata*

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I well recall a highly experienced botanist referring to *Carex inopinata* as being one of New Zealand's rarest plants, but that was around 20 years ago. That assessment would have been based on their personal experience, and on the infrequency of field observations and herbaria records at that time (Jones 2004). However, like many other small and cryptic plants, these very characteristics can easily lead to a paucity of sightings unless field botanists are aware of what to look for, and where to look for it.

The article "The (not quite so) elusive *Carex inopinata*" published in CBS Journal 43 (2012) describes how the species got to be recorded more frequently in North Canterbury, with its discovery in several dryland shrubland QEII covenants (Giller 2012). Some of these sites supported more than one patch of *Carex inopinata,* though there were usually many more potentially suitable habitats that were unoccupied. Despite the species being rhizomatous, most patches were discrete and seldom more than 0.5 m^2 in maximum extent – albeit with rare exceptions of up to 1.5 m^2. Since that article was written a few additional populations of similar abundance and extent have been found in other North Canterbury dryland scrub and shrublands. However, a couple of stand-out finds have been located elsewhere, in North Otago and Marlborough, respectively.

Members of Canterbury Bot Soc visited a range of habitats in the lower Waitaki River area in early 2017. A site near Otematata involved a ramble through some rather austere toe-slope dryland shrublands. One particularly dense thicket of chest-high scrub dominated by *Coprosma propinqua*, *Melicytus alpinus* agg. and *Muehlenbeckia complexa* looked almost impenetrable – just the sort of spot to search for something different. Most attendees inexplicably walked on past – but not everyone. Indeed, a small canopy-gap near the centre revealed what could only be described as lush turf of *Carex inopinata*, about 2 m by 3 m, thus around 6 m^2 in extent. It was unclear whether this was a single plant or a coalesced mat of individuals, but this species was certainly the dominant groundcover (Figure 1, p. 27). Given its rhizomatous potential, this begged the question of just how large a patch *Carex inopinata* might grow to.

In October 2021 Gillian and I were lucky enough to join some friends for a 5-day rafting trip down the Waiau Toa (Clarence) River, starting just north of Hanmer and finishing at the river mouth. As a botanist, being confined to a raft bobbing its way down the centre of the river was very pleasurable, but it could occasionally be rather frustrating. Quite a few rather mysterious looking river-side plants had possible names proposed, but it simply wasn't feasible to stop at each one to verify whether those names were correct or incorrect. Each afternoon, however, we would make camp, first pitching our tents and then fossicking around while our evening meals were being prepared. One campsite was beside a Department of Conservation facility known as Snowgrass Hut, on a riparian terrace where Snowgrass Stream joins the Waiau Toa. The area was almost 10 ha in extent, and appeared to be the only sizeable terrace thereabouts, the Waiau Toa River otherwise being tightly hemmed in by steep, eroding, rocky hillslopes and bluffs (Figure 2, p. 28). There is

Figure 1. Paul Maurice demonstrating the approach that needs to be adopted when searching for flowering material of *Carex inopinata*. Waitaki River, 2017.

no easy access to this site, apart from the river by boat, raft, or kayak, or from the air by helicopter.

Even as we pitched our tents, we (well, a couple of us) could not help but get a just a little excited when we noticed numerous small patches of a fine little sedge rambling about under the monocultural kānuka canopy (Figure 3, p. 28). A closer look soon revealed tell-tale red streaks on the glumes and utricles, confirming *Carex inopinata*. A walk to the nearby hut revealed more patches, few of them somewhat larger. Several sections of the short track between the hut and the long-drop toilet were dominated by a dark green sward of *Carex inopinata*, sometimes measuring several square metres in extent, with successive patches seemingly getting larger and larger, the more we wandered around. An incongruous clearing behind the hut of about 1.5 ha was too open to provide suitable habitat, so we headed back under the kānuka forest again, between the clearing and the river. That is where *Carex inopinata* was at its most luxuriant. In almost all directions it formed a near pure carpet on the forest floor, seemingly only suppressed by occasional fallen branches and ribbons of bark from the overhead kānuka. The largest continuous patch measured an average (allowing for wobbles) of around 6 m across by 35 m long, thus was probably a touch over 200 m^2 in extent. There were similarly near-continuous patches nearby, some of them barely separated from each other (Figure 4). Most of the ground not dominated by *Carex inopinata* was instead occupied by mosses.

Figure 2. The Waiau Toa River and surrounding hills near Snowgrass Hut – habitat for several species of botanical intrigue.

Figure 3. Small patches of *Carex inopinata* created serious distractions when erecting our tent.

Emerging beside the hut again, relatively bare open ground also revealed the tiny herb *Myosurus minimus* subsp. *novae-zelandiae* (Nationally Vulnerable) – also known as New

Zealand mousetail, a member of the Ranunculaceae family. Whilst peering at this, we came across yet another tiny hideaway, *Myosotis brevis* (Nationally Vulnerable) (de Lange et al. 2018).

One of the more obvious features of the locality was the relative lack of exotic species, especially exotic grasses, resulting in extensive moss fields and frequent areas of almost bare ground, especially on steeper slopes (Figure 2, p. 28). The site's sheer isolation, probably coupled with the stress induced by the low rainfall and a lack of moisture-retentive soils, are likely to be among the most significant constraints at work. The dryness of the site must also contribute towards keeping the kānuka canopy and the relatively vacant understorey open enough to provide the dappled light needed for the groundcover species. Occasional browsing by the local goat and deer populations may even contribute by further restricting the overhead shading. The limited quantity of fine kānuka leaves that falls from this sparse overhead canopy appears to filter down among the sedge leaves without forming a deep litter layer. Small groundcover species like *Carex inopinata* are thus less likely to be physically smothered than might be the case under a larger-leaved or more prolific leaf fall. It is probably this serendipitous combination of several features at this particular site that provides such excellent habitat opportunity for these cryptic little curiosities.

As for the sheer size of the Snowgrass Hut population, this is probably because *Carex inopinata* occurs there under an extensive and near-continuous forest canopy. In contrast, most North Canterbury patches occur under individual shrubs that collectively form a discontinuous canopy, thus the habitat opportunities for *Carex inopinata* are small and fragmented. A couple of North Canterbury populations do occur under a forest canopy, possibly providing an opportunity for patches to become more extensive – provided other constraints do not come into play.

The current threat ranking of *Carex inopinata* is Nationally Vulnerable, reflecting its generally limited abundance and the vulnerability of populations at some sites to decline or loss. Changes in patch-size have been observed in some North Canterbury sites, due particularly to severe droughts, habitat modification, and changes in shading by both native and exotic species. As discovered with several other uncommon species, changes in habitat management can sometimes be beneficial, but can sometimes be unexpectedly detrimental. Simply fencing and de-stocking is not necessarily in every species' best interests. One solution for those North Canterbury on-farm sites might be the application of a gradation in grazing management, in the expectation that at least one regime might suit a particular species (Meurk et al. 2003). The shading requirements for *Carex inopinata* are apparently quite specific, and not always easy to maintain (Norton & Morgan 1992).

The isolation and habitat characters of the Marlborough site described above hopefully provide the more significant species there with a degree of security. However, its proximity to a large river in a region vulnerable to earthquakes means that even such an exceptional site carries some vulnerability to catastrophic loss. On the flip side, the scattered east-coast South Island distribution of *Carex inopinata*, ranging from Marlborough to Southland, hopefully provides some security against simultaneous losses at all sites.

I very much doubt I will ever see a larger patch of *Carex inopinata*, but there are lots of other species that continue to provide surprises. That's one of the great pleasures of botanising.

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