Rediscovery of a rare species of grass in the genus *Simplicia* in the North Island

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INTRODUCTION

Simplicia is an endemic New Zealand grass genus, with two named species, *S. buchananii* (Zotov) Zotov and *S. laxa* Kirk. Both species are listed with a conservation status of "Nationally Critical" (de Lange et al. 2009), making the genus *Simplicia* also critically threatened. *Simplicia* has been included in national listings of threatened or uncommon plants from as early as 1981 (Given 1981). *Simplicia laxa* was listed as endangered by Williams & Given (1981) and Wilson & Given (1989), although neither mentioned *S. buchananii*. Both species have been in each revision of the New Zealand threatened plant list since 1993 (Cameron et al. 1993; de Lange et al. 2009).

The first collection of *Simplicia* (as *S. laxa*) in the North Island was by Thomas Kirk in January 1880, in the 'Lower Ruamahanga Valley, Dry River Station'. Herbarium specimen WELT SP043022 was previously in Donald Petrie's herbarium but it bears a label in Kirk's hand (Kirk 1897). Until recently, all other records of *S. laxa* came from Otago, where it still grows (Kirk 1897; Wilson & Given 1989; Johnson 1995; Edgar & Connor 2000). Recognition that plants growing in one of the entrances of Honeycomb Cave, North Westland were actually *S. laxa* rather than *S. buchananii* (Peter de Lange, pers. comm.) extended the known range of *S. laxa*. The allied *S. buchananii* is still only known from northwest Nelson. This paper records a series of discoveries between 2005–2008 of *Simplicia* in the North Island.

1. KAWHATAU VALLEY, RANGITIKEI RIVER CATCHMENT

On 29 January 2005, I led a group of the Wanganui Museum Botanical Group to forest and scrub on private land on the true right of the lower Kawhatau Valley, north-east of Mangaweka. The native vegetation remnants occur in grazed pasture on an elevated river terrace of the Kawhatau River. As we approached the forest edge, we thought that our early discovery of species such as *Coprosma rubra, C. virescens, C. crassifolia, Korthalsella lindsayi*, and *Plagianthus regius* made it a very promising area for finding

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something even rarer. Under a small grove of titoki (*Alectryon excelsus*) I found a patch of a grass unfamiliar to me, collected a piece and moved on. At the time, I thought it small and non-descript, but it had diffuse panicles of flowers or fruits. Little did I realise then that this was the 'something even rarer' plant that I had hoped for!

At home, I failed to get anywhere with the grass's identity by using keys in *Flora of NZ Vol.5* (Edgar & Connor 2000), even though I had flowering material and a dissecting microscope. One of the striking features of the one-flowered spikelets were the two tiny glumes (Fig. 1), the lower barely half the length of the upper, and the upper glume only ¼–⅓ of the length of the spikelet. In the *Flora*, use of the key to the Tribes (pp. 16–18) brought me to the Agrostidinae, but that key (p. 224) led to couplet #6, in which neither option applied. I thought that one or more of my assumptions in using the key to Tribes (e.g., that the spikelets were one-flowered or hermaphrodite) must have been in error. I sent part of my collection as Ogle 4734 (now CHR 572277) to staff at the H.H. Allan Herbarium at Lincoln (CHR) but nobody who examined it could come up with a definite answer. They sent part of this material (now AK 289755) to the Auckland War Memorial Museum herbarium (AK) where Peter de Lange and Rhys Gardner determined its identity as a *Simplicia* species.

Figure 1. Leaf and inflorescences of Kawhatau *Simplicia*, December 2009. Parts of newly emerged inflorescence (left); previous summer's inflorescence, with the tiny and unequal glumes indicated (right).

Rhys Gardner pointed out to me (pers. comm. 11 April 2005) that, although it keyed to *S. buchananii* in its narrow panicle and scabrid lemma, the AK specimens of this and *S. laxa* were not very different. Peter de Lange felt that it matched Otago specimens he had collected of *S. laxa*. Disregarding a specific identity, it was clear that the Kawhatau Valley had become the second known site in the North Island for a *Simplicia* species. The news from AK arrived in time for me to include it in the newsletter of the Wanganui Museum Botanical Group (Ogle 2005), in which I wrote that the plant was *S. buchananii*.

As both named species of *Simplicia* had been recognised as threatened or uncommon for many years (Given 1981, Cameron et al. 1993), and because the Wanganui Museum Botanical Group had not assessed the abundance or range of this grass at the Kawhatau site on our first visit, we scheduled a return trip to the site for the February the following year. However, before that trip, I contacted the landowners and arranged for a reconnaissance on 13 December 2005 with Viv McGlynn and Graeme La Cock of the Department of Conservation's (DOC's) Wanganui Conservancy. It proved difficult to count plants. *Simplicia* plants have decumbent stems that root at their nodes and individuals merged into each other to form straggling loose mats. We found up to eight plants under titoki trees in the grazed-out forest, growing between tree roots in loamy clay with scattered river stones. Here they seemed to get some protection from grazing and trampling sheep. Light shade provided by the broken canopy of titoki also prevented the growth of potentially competing pasture grasses (Fig. 2). Growing with the *Simplicia* were scattered plants of *Cardamine debilis* agg. (*C.* "narrow petal" of Pritchard 1957), *Poa annua, Oxalis exilis, Hydrocotyle elongata* and *H. microphylla.* Later that day we found several more patches of *Simplicia* among river stones under similar forest, where Viv McGlynn added *Schizeilema trifoliolata* to the list of plants growing with *Simplicia*. We explored a fenced area of forest adjoining the grazed area and failed to find any plant that we could be sure was *Simplicia* although, in small canopy gaps, there were fine grasses lacking inflorescences that we could not identify for certain. The canopy of the fenced forest was more intact and provided heavier shade.

Material from this visit (C. C. Ogle 4893, V. McGlynn, G. La Cock) on 13 December 2005 was sent live to Peter de Lange at Auckland. Some of it became AK 297353. My notes on this specimen for AK, from observations of the live material, included "Leaves finely scabrid on margins, ligule membranous with lacerate edge; panicle varies—some contracted with erect branches, some with spreading branches. Glumes minute—outer c. 0.5 mm, inner c. 1 mm. Lemmas hispid (not ciliate)."

Figure 2. Viv McGlynn and Colin Ogle in *Simplicia* habitat at Kawhatau, 28 February 2008. Photo: Peter de Lange.

The third collection of *Simplicia* from this site was almost two months later, on 4 February 2006, during the second trip of the Wanganui Museum Botanical Group. The voucher specimen was Ogle 4927 (= CHR 580850). In the newsletter report of that trip (Ogle 2006) I wrote "Although there is still no agreement among grass experts about what species we have of the endemic NZ genus, *Simplicia*, in the Kawhatau Valley, we all soon got our eye in for it—a fine wispy grass, growing in grazed-out scraps of forest, and very difficult to spot unless it had flower heads… we estimated several hundred 'patches' [of *Simplicia*]. After an hour or so in the grazed area, we traversed adjoining fenced forest and found some larger patches of *Simplicia* in light wells on the forest floor."

By now I had convinced myself that *Simplicia* should occur elsewhere in the Rangitikei district (i.e., the Rangitikei River and its tributaries) because grazed forest occurs there widely.

2. NORTH OF TAIHAPE

A Taihape resident, Phyllis Leigh, had reported to me that there were probably *Olearia gardneri* and *Tupeia* on private land just south of Paengaroa Road, which is north of Taihape and east of SH1. On 17 Feb

2006, I went there with her and DOC staff. While the others looked for the shrubs, I made two collections of *Simplicia*, (Ogle 4954, 4955 that became AK 295627 and AK 295628, respectively). Both were in grazed pasture with scattered groves of native trees and shrubs dominated by kowhai (*Sophora godleyi*) on mudstone slopes. One (AK 295628) was at the base of a kowhai tree, under *Coprosma propinqua, C. rubra* and *Myrsine divaricata* and sparse pasture grasses, including *Microlaena stipoides*. The other (AK 295627), about 100 m distant, grew at the base of a sapling totara (*Podocarpus totara*) where it grew among *Hydrocotyle elongata* and *Poa matthewsii*. A hectare or more of potentially similar habitat for *Simplicia* occurred here. We began thinking of more potential sites to explore for it. In passing, we found three shrubs of *O. gardneri* and four large shrubs of *Tupeia antarctica*.

3. TAIHAPE

Partly surrounded by urban development and badly damaged by weed invasions, especially *Clematis vitalba* (Ogle et al. 2000), Taihape Scenic Reserve comprises opened-up forest where sheep are still being grazed to suppress the regrowth of *C. vitalba*. It lies about halfway between the Kawhatau River and Paengaroa Road sites. I went there with Viv McGlynn and Graeme La Cock on 7 March 2006 where Viv was the first to spot *Simplicia* (V. McGlynn, C. C. Ogle 4858 = AK 297357, and V. McGlynn, C. C. Ogle 5011 = CHR 585566). It was growing under totara and divaricating shrubs, including *Myrsine divaricata* and *Melicytus micranthus*, on an elevated dry mudstone terrace edge of the Hautapu River, a tributary of the Rangitikei River (Fig. 3). Other indigenous grasses, *Echinopogon ovatus, Poa matthewsii* and *P. imbecilla*, were growing close by. Later that day we also searched potential *Simplicia* habitat in Paengaroa Scenic Reserve at Mataroa and adjoining Tranzrail land, with no success.

Following the first finding of *Simplicia* at Taihape, almost two years passed before another expedition was mounted to find *Simplicia* in the district. Peter de Lange had initiated research on the taxonomy of the genus that included looking at the DNA profiles of as many different populations of *Simplicia* as he could. On 28–29 February 2008, DOC staff and I took him to our three known, geographically separated, sites in the Rangitikei where he collected fresh samples. Using our collective 'feelings' for what constitutes *Simplicia* habitat in the district, we also visited another potential site on the north side of Paengaroa Road, on a mudstone slope above Ngawaka Stream, a tributary of the Hautapu River—and found *Simplicia* under grazed open forest (P J de Lange 7834, C C Ogle = AK 304807).

Figure 3. Viv McGlynn in *Simplicia* habitat within Taihape Scenic Reserve, 7 March 2006.

The northern part of Taihape Scenic Reserve straddles the deeply incised Oraukura Stream which also joins the Hautapu River. The Wanganui Museum Botanical Group explored this sub-catchment on 6 April 2008, in conjunction with adjoining landowners. In dry, grazed-out forest on the rim of mudstone cliffs I found a small amount of *Simplicia* growing with *P. matthewsii* under tall totara and kowhai with understorey *Melicope simplex* and *Coprosma rigida* (Ogle 5625 = AK 306012). It was estimated to be 800 m from the previous finding in this reserve, on 7 March 2006. Being late in the season, the inflorescences were broken with few fruits remaining and it seemed unproductive to search more widely here for *Simplicia* at that time.

DISCUSSION

Finding *Simplicia*

Simplicia is scattered and sometimes locally common in the Taihape district of the Rangitikei catchment. Because much similar habitat has yet to be searched, it seems likely that the species is more common than is known at present. The grass is small with few obvious distinguishing features to the naked eye, especially when it has no inflorescences. Inflorescences have been found on wild plants around Taihape from about December to early April. A good hand lens will show the very small and unequal glumes and relatively large lemma on the spikelets of flowering or fruiting plants.

The five known sites of *Simplicia* in the Rangitikei catchment have the following habitat features:

1. very well-drained—gravel river terraces, or close to edges of mudstone cliffs, or sunny sides of seasonally dry mudstone valleys;
2. lightly shaded—over-topping trees that cast dappled shade, such as kowhai, or low stature forest with a very broken canopy, or treeland;
3. divaricating shrubs scattered in understorey;
4. sparse ground cover, mostly of native grasses (including *Micolaena stipoides, Poa matthewsii, Echinopogon ovatus*) and small, often creeping, dicot herbs (*Hydrocotyle* spp., *Cardamine* sp.);
5. stock grazing (usually sheep rather than cattle);
6. high fertility soils from alluvium or well-drained mudstone, plus livestock use.

Various people have searched for *Simplicia laxa* in the Ruamahanga area in the Wairarapa where Thomas Kirk, in 1880, first collected it in the North Island, without success (Johnson 1995; A.P. Druce, pers. comm.). I suggest that these searches might have been in the wrong kinds of habitat, because people have been influenced by written accounts of the habitat of *S. laxa* in Otago[2]. Johnson (1995) stated that "the common factors of the three currently known *Simplicia laxa* sites make it clear that this is a species of relatively sheltered, mainly east- or south-aspect rock outcrops where the specific micro-site is the immediate base of the rock outcrop or the floor of small caves." No known Rangitikei site has *Simplicia* growing with rocks or caves. However, the co-occurrence of *Simplicia* in Otago and Rangitikei sites with *Poa matthewsii, P. imbecilla, P. annua, Echinopogon ovatus, Oxalis exilis* and *Cardamine debilis* agg. is noted. If a new search were to be undertaken for *Simplicia* in the Wairarapa, places with sites that meet the six points above are recommended for survey.

PLANT BIOGEOGRAPHY IN THE RANGITIKEI

Although it is not certain that the Rangitikei plants are *Simplicia laxa*, biogeographic considerations make this the more likely species. Already we know a suite of 10–12 shrub and herbaceous plant species that occur in the Taihape district and which otherwise are largely found in eastern New Zealand. These include *Coprosma obconica, C. virescens, C. wallii,*

2 In a personal note to me 5 October 2009, Peter de Lange said "The Kirk gatherings are covered in fine calcareous silt – this suggests to me that they were collected from a flood prone habitat. I think it most likely they came from a river terrace in the papa country of the eastern Wairarapa, of which there is plenty such habitat in the upper Ruamahanga and the Dry Creek area."

Korthalsella clavata, Brachyglottis sciadophila, Acaena juvenca, Trisetum drucei, Olearia gardneri and *Melicytus flexuosus* (mostly discussed by Ogle & Barkla 1995; Ogle et al. 2000), and *Polystichum oculatum* (Perrie 2004). The list can be extended if several species of Northland, then disjunct to the Rangitikei and eastern New Zealand are considered. These include *Pittosporum obcordatum, Coprosma rubra, Pseudopanax ferox* and *Hoheria angustifolia*. If the Rangitikei plants are *Simplicia laxa*, they would 'fit' this group of disjunct species between the Rangitikei and eastern New Zealand.

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