

MOSSES OF TONGARIRO NATIONAL PARK — A BRYOLOGIST'S VIEW OF THE BOTANICAL SOCIETY TRIP TO MT RUAPEHU, JANUARY 1986

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A quick trip to the top of the Bruce Road on the evening of our arrival (in case the weather was never the same again!) gave a good start to our alpine botanising. Above about 1350 m Racomitrium lanuginosum became a conspicuous part of the vegetation, unable to be completely ignored even by 'higher' botanists. Patches of this grey-white moss, many square metres in extent, enclosed pockets of vascular plants and the much less abundant, dark green, Racomitrium ptychophyllum. These two, together with Dicranum aucklandicum, were the predominant species on exposed soil at the top of the Bruce Road, while in crannies more sheltered from the wind a greater variety of mosses was found, including Philonotis scabrifolia, Ditrichum punctulatum, and two species of Pohlia, P. cruda and P. australis. This last species has only recently been described (Shaw and Fife, 1985) on the basis of South Island collections from Arthurs Pass and from Mt Priestly in the Paparoa Range. Ruapehu is thus a considerable extension northwards of the known range of this moss.

The next morning, with rain threatening, saw us retreat to the southern side of the mountain, and up the Ohakune Mountain Road, surely one of the most splendid 20 km car rides for a botanist anywhere. The comparable ride up Mt Fuji in Japan passes through equally impressive vegetation changes, but the effect of the road on the vegetation has been much more damaging, and the tourist shops festooned with plastic ivy at the top far more nauseous than anything at Turoa - long may our National Parks resist the quick tourist buck. In the fenced-off boggy alpine herb field adjacent to the carpark a number of mosses formed dense carpets. Here was found Bryum laevigatum, Campylium polygamum, a fruiting Philonotis species and a plicate-leaved pleurocarpous moss which I decided was probably Brachythecium paradoxum.

A brief lunch stop back down the road at the Mangawhero Falls gave some more new names for the moss list, including Conostomum pusillum, Dicranoloma plurisetum, and the epiphytes Zygodon menziesii and Z. intermedius.

After lunch we walked at botanists pace along the Blyth Hut Track as far as Waitonga Falls. Initially we were in rather open mountain beech forest with a mossy carpet that included the conspicuous Dendroligotrichum dendroides. Along the overhanging banks at the track edge three species of Ditrichum were found: D. punctulatum, D. difficile and D. cylindricarpum. Common epiphytes in this open forest were species of Macromitrium, especially M. longipes, together with Dicnemon semicryptum, and less commonly Schlotheimia brownii and Holomitrium perichaetiale. The many dead trunks of mountain beech provided a substrate for a number of mosses: Lepyrodon lagurus, Sematophyllum subcylindricum, Sauloma macrospora and Hypnum chrysogaster. On disturbed soil at the base of an upturned tree I was pleased to find the relatively rare Campylopodium lineare. Where the track crossed swampland Racomitrium lanuginosum became a prominent part of the vegetation, forming extensive mats between the vascular plants. Less common, and also forming mats, was Racocarpus purpurascens. On bare

soil at the margin of a fluctuating pond the opportunist Bryum sauteri, with its characteristic underground tubers, was found.

The next morning was spent on the eastern boundary of the park, at Erua. Here the moist podocarp forest provided a wealth of mosses which had not been seen higher on the mountain. We were all impressed by the luxuriant stands of Dawsonia superba, several square metres in extent. Exposed tree roots were covered with fruiting Dicranoloma menziesii, together with Camptochaete arbuscula and Wijkia extenuata. On rotting logs Rhizogonium distichum and R. bifarium were common, along with Ptychomnion aciculare and Hypnodendron comatum. Epiphytes on tree trunks included Lopidium concinnum and Weymouthia cochlearifolia, with W. mollis as a pendant epiphyte festooning divaricating shrubs. The minute Ephemeropsis trentepohlioides, revealed only by its tiny capsules protruding from alga-like protonemal filaments, was found on twigs of Melicope simplex. A stream had incised its bed some 2 m into the forest floor, and along its dark damp walls a number of mosses were found: Fissidens pallidus, Mittenia plumula and a large palmate umbrella moss which was probably an extreme shade form of Hypnodendron kerrii. We then left the National Park, and inspected the colony of Pittosporum turneri on the bank of the Waimarino Stream. Here moss epiphytes were plentiful, the divaricating shrubs in this swampland providing sites with high light and high humidity. Eleven species of moss were recorded epiphytic on Pittosporum turneri: Ulota laticiliata, Zygodon intermedius, Calyptopogon mnioides, Leptostomum inclinans, Holomitrium perichaetiale, Papillaria flexicaulis, Dicnemon calycinum, Macrocoma tenue and three species of Macromitrium, M. helmsii, M. gracile and M. prorepens.

The track to Ketetahi Hot Springs on the northern flank of Mt Tongariro provided some more records on the last day, and the springs themselves proved very therapeutic to tired feet after the 600 m ascent. The track passed first through a modified Hall's totara forest with associated manuka. Here on a shaded soil bank at the track edge was found Trichostomum tenuirostre. This moss is widespread in the Northern Hemisphere. Although there are several South Island collections of this moss in the Botany Division herbarium, to my knowledge it has not previously been recorded in the North Island. It can be distinguished from Trichostomum brachydontium, which is common in the northern North Island, by its irregularly toothed leaf margins. As the track rose through a totara-dominated podocarp forest we found an abundance of moss epiphytes, including Cladomnion ericoides, Weymouthia cochlearifolia, Macromitrium longipes, M. ligulare and the two species of Dicnemon, D. calycinum and D. semicryptum. On the forest floor Hypopterygium rotulatum and Rhizogonium mnioides were common, while on soil banks at the track margin were growing Fissidens asplenioides and Weissia controversa. Where the track passed through rather open forest, and over large blocks of scoria, Racomitrium lanuginosum and Barbula calycina were found together, an association also found on the lava fields of Rangitoto Island in the Waitemata Harbour, suggesting that substrate, rather than macro-climate, is an important factor controlling distribution of these mosses.

At just over 1000 m altitude the vegetation changed abruptly from the forest of the steep lower slopes, to a shrubland on more gently sloping ground. Here manuka, Olearia nummularifolia, and Dracophyllum longifolium were the dominant shrubs, with scattered Phormium cookianum

and *Chionochoa rubra*. *Racomitrium lanuginosum* was here abundant, forming patches between the shrubs, with *Hypnum cupressiforme* and *Thuidium furfurosum* as less common mat formers. On bare soil at the track edge *Campylopus clavatus*, *Polytrichum juniperinum*, *Cheilothela chilense* and *Conostomum pusillum* with many old capsules were seen. The *Olearia nummularifolia* stems provided a substrate for a number of moss epiphytes: *Leptostomum inclinans*, *Macromitrium microstomum*, *Ulota laticiliata*, as well as *Hypnum cupressiforme*. As the track ascended fewer shrubs were seen and above about 1200 m the vegetation became more or less pure tussockland. Here mosses were rare, except on exposed boulders, where *Andreaea acutifolia* and *Racomitrium crispulum* were common. At Ketetahi Springs (which are actually not included in the National Park) most of the thermal area was completely bare of bryophytes and vascular plants. In one area of seepage, however, mats of a stunted form of the thermophilic moss *Campylopus holomitrium* and of a species of *Bryum* were present. The temperature inside the mats of the two species was 24°C and 21°C respectively, while the air temperature was 17°C.

Of the list of mosses which follows (all recorded within the Tongariro National Park boundary), 116 taxa were recorded during the Botanical Society visit. The remaining 17 taxa (marked #) were not seen on this visit, but were recorded by myself and Dr Helen Ramsay of the University of New South Wales during a brief visit to the Park in December 1984. Vouchers for all species are lodged in the Herbarium of Botany Division DSIR. I am very grateful to Allan Fife for identifying several specimens and for information on Botany Division holdings, and to Jan-Peter Frahm for identifying *Campylopus holomitrium*.

Achrophyllum dentatum (Hook.f. & Wils.) Vitt & Crosby
A. quadrifarium (Hook.) Vitt & Crosby
Acrocladium chlamydophyllum (Hook.f. & Wils.) C.Muell. & Broth.
Andreaea acutifolia (Hook.f. & Wils.) ssp. *acutifolia*
#*A. mutabilis* Hook.f. & Wils.
Atrichum androgynum (C.Muell.) Jaeg.
Barbula calycina Schwaegr.
Bartramia hallerana Hedw.
B. papillata Hook.f. & Wils.
?*Brachythecium paradoxum* (Hook.f. & Wils.) Jaeg.
Breutelia elongata (Hook.f. & Wils.) Mitt.
B. pendula (Smith) Mitt.
Bryum billardieri Schwaegr. var. *platyloma* Mohamed
B. blandum Hook.f. & Wils.
B. campylothecium Tayl.
B. dichotomum Hedw.
B. laevigatum Hook.f. & Wils.
B. sauteri B.S.G.
Calomnion laetum Hook.f. Wils.
Camptochaete arbuscula (Smith) Reichdt.
C. gracilis (Hook.f. & Wils.) Par.
Campylium polygamum (B.S.G.) C.Jens
Campylopodium lineare (Mitt.) Dix.
Campylopus clavatus (R.Br.) Wils.
C. introflexus (Hedw.) Brid.
Catagonium politum (Hook.f. & Wils.) Dus. ex Broth.

#*Catharomnion ciliatum* (Hedw.) Hook.f. & Wils.
Ceratodon purpureus (Hedw.) Brid.
Cheilothela chilensis (Mont.) Broth.
Cladomnion ericoides (Hook.) Hook.f. & Wils.
 #*Conostomum pentastichum* (Brid.) Lindb.
C. pusillum Hook.f. & Wils.
Cratoneuroopsis relaxa (Hook.f. & Wils.) Fleisch. in Broth.
Crosbya straminea (Mitt. ex Beck.) Vitt
 #*Cryphaea tasmanica* Mitt. in Hook.f. & Wils.
Cryptopodium bartramoides (Hook.) Brid.
Cyathophorum bulbosum (Hedw.) C.Muell.
Dawsonia superba Grev.
Dendroligotrichum dendroides (Hedw.) Broth.
Dicnemon calycinum (Hook.) Schwaegr.
D. semicryptum C.Muell., Hedw.
Dicranoloma billardieri (Brid.) Par.
D. menziesii (Tayl.) Par.
D. plurisetum (C.Muell.) Dix.
D. setosum (Hook.f. & Wils.) Par.
Dicranum aucklandicum Dix.
Distichophyllum pulchellum (Hampe) Mitt.
Ditrichum cylindricarpum (C.Muell.) F.Muell.
D. difficile (Dub.) Fleisch.
D. punctulatum Mitt.
Drepanocladus uncinatus (Hedw.) Warnst.
Echinodium hispidum (Hook.f. & Wils.) Reichdt.
Entosthodon laxus (Wils. & Hook.f.) Mitt.
Ephemeropsis trentepohlioides (Renn.) Sainsb.
 #*Eriodon cylindritheca* (Dix.) Dix. & Sainsb.
Eriopus flexicollis (Mitt.) Jaeg.
Fissidens asplenioides Hedw.
F. pallidus Hook.f. & Wils.
F. pungens C.Muell & Hampe
F. rigidulus Hook.f. & Wils.
F. tenellus Hook.f. & Wils.
Funaria hygrometrica Hedw.
Grimmia pulvinata (Hedw.) Smith
 #*Gymnostomum calcareum* Nees Hornsch
Holomitrium perchaetiale (Hook.) Brid.
 #*Hypnodendron colensoi* (Hook.f. & Wils.) Mitt.
H. comatum (C.Muell.) Mitt. ex Touw
H. kerrii (Mitt.) Paris
H. menziesii (Hook.) Par.
Hypnum chrysogaster C.Muell.
H. cupressiforme Hedw. var. *cupressiforme*
H. cupressiforme Hedw. var. *mossmaniarum* (C.Muell.) Ando
Hypopterygium rotulatum (Hedw.) Brid.
Isopterygium limatum (Hook.f. & Wils.) Broth.
Lembophyllum divulgum (Hook.f. & Wils.) Par.
Leptostomum inclinans R.Br.
Leptotheca gaudichaudii Schwaegr.
 #*Lepyrodon australis* Hampe
L. lagurus (Hook.) Mitt.
Leucobryum candidum (P.Beauv.) Wils.

- Lopidium concinnum* (Hook.) Wils.
Macrocoma tenue (Hook. & Grev.) Vitt
Macromitrium gracile (Hook.) Schwaegr.
 #*M. helmsii* Par.
M. ligulare Mitt.
M. longipes (Hook.) Schwaegr.
M. microstomum (Hook. & Grev.) Schwaegr.
M. prorepens (Hook.) Schwaegr.
Mesotus celatus Mitt.
Mittenia plumula (Mitt.) Lindb.
Mnium rostratum Schrad.
Neckera pennata Hedw.
 #*Orthodontium lineare* Schwaegr.
Philonotis pyriformis (R.Br.ter.) Wijk & Marg.
P. scabrifolia (Hook.f. & Wils.) Braithw.
 ?*P. tenuis* Tayl. (Reichdt.)
Pohlia australis Shaw & Fife
P. cruda (Hedw.) Lindb.
 #*P. ochii* Vitt
Polytrichadelphus magellanicus (Hedw.) Mitt.
 #*Polytrichum alpinum* Hedw.
P. juniperinum Hedw.
 #*Psilopilum australe* (Hook.f. & Wils.) Mitt.
P. crispulum (Hook.f. & Wils.) Mitt.
Ptychomnion aciculare (Brid.) Mitt.
Racomitrium crispulum (Hook.f. & Wils.) Dix.
R. lanuginosum (Hedw.) Brid. var. *pruinatum* Wils.
R. ptychophyllum Mitt.
Racopilum convolutaceum (C.Muell.) Reichdt.
Rhacocarpus purpurascens (Brid.) Par.
Rhizogonium bifarium (Hook.) Schimp.
R. distichum (Sw.) Brid.
R. mnioides (Hook.) Wils.
Sauloma macrospora Sainsb.
Schlotheimia brownii Brid.
Sematophyllum leucocytus (C.Muell.) Sainsb.
S. subcylindricum (Broth.) Sainsb.
S. uncinatum Stone & Scott
 #*Tayloria octoblepharis* (Hook.) Mitt.
 #*Tetraphidopsis pusilla* (Hook.f. & Wils.) Dix.
Thuidium furfurosum (Hook.f. & Wils.) Reichdt.
T. laeviusculum (Mitt.) Jaeg.
 #*Tortella knightii* (Mitt.) Broth.
Tortula princeps De Not
Trachyloma planifolium (Hedw.) Brid.
 #*Trichostomum brachydontium* Bruch
T. tenuirostre (Hook. & Tayl.) Lindb.
Weissia controversa Hedw.
Weymouthia cochlearifolia (Schwaegr.) Dix.
W. mollis (Hedw.) Broth.
Wijkia extenuata (Brid.) Crum
Zygodon intermedius B.S.G.
Z. menziesii (Schwaegr.) Arnott