

## *Neckera hymenodonta* (Neckeraceae, Bryopsida) reinstated, with an emended description

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*Neckera hymenodonta* Müll. Hal. is reinstated from the synonymy of *N. pennata* Hedw. and treated as a distinct species. The morphological differences between the two are elaborated and *N. hymenodonta* is illustrated in line drawings. It is known from New Zealand and Australia. *Neckera pennata* var. *tasmanica* Hampe, *N. aurescens* Hampe and *N. leptotheca* Mitt. are synonymized with *N. hymenodonta*. *Neckera pennata* is excluded from the New Zealand flora.

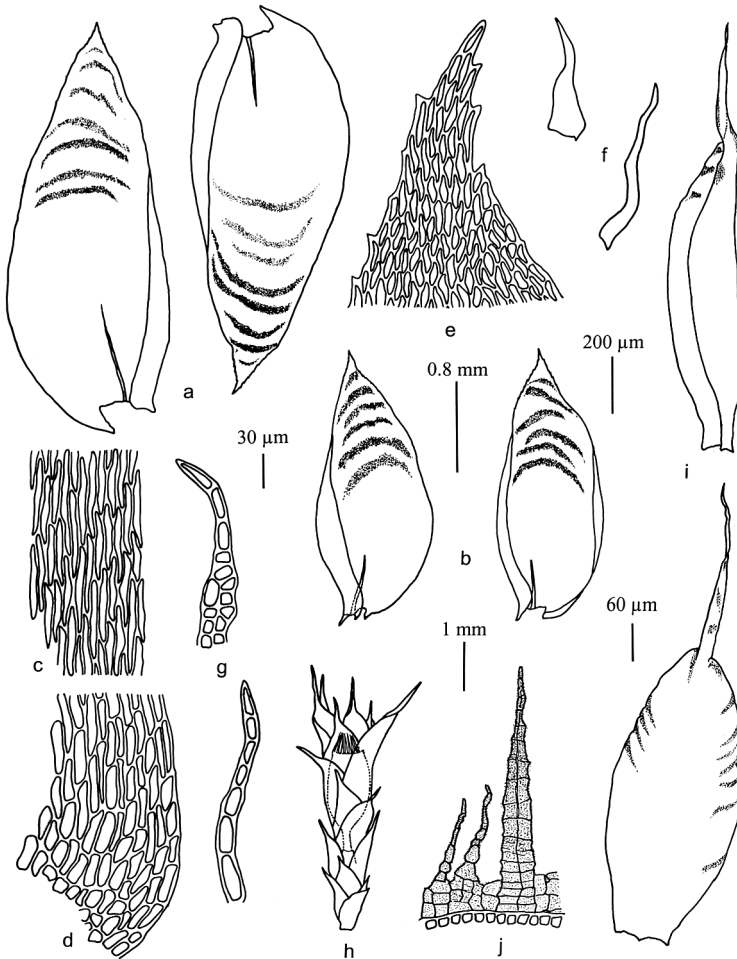
Key words: *Neckera hymenodonta*, *N. pennata*, New Zealand moss flora, nomenclature, taxonomy

The present report is an outcome of the first author's ongoing Ph.D. project, a revision of the Asian and Australasian taxa of the moss genus *Neckera* (Neckeraceae). So far the project has produced descriptions of two new species from the Himalayan region (Nepal and China) and one new generic placement (Ji *et al.* 2005, Ji & Enroth 2006, Enroth & Ji 2007).

*Neckera hymenodonta* was described by Müller (1851) from Tasmania. The name was synonymized with *N. pennata* by Sainsbury (1952), and that notion was followed by Beaver *et al.* (1992), Fife (1995) and Streimann and Klazenga (2002). We examined numerous older specimens from Tasmania and New Zealand identified as *N. hymenodonta*, as well as specimens bearing the name *N. pennata* from New Zealand and elsewhere. It became clear that there are several clear differences between the

two species (Table 1), one of the most striking being the consistent presence of paraphyllia in *N. hymenodonta* and their consistent absence in *N. pennata*. All specimens from New Zealand examined by us and named either *N. pennata* or *N. hymenodonta* represent the latter taxon, and thus *N. pennata* is excluded from the New Zealand moss flora.

Although we have not been able to locate and examine the type specimen (cited below) of *N. hymenodonta* we feel confident with the taxonomic conclusion presented here. Fife (1995) listed only two species of *Neckera* from New Zealand, *viz.* *N. pennata* and *N. laevigata*. The latter differs from *N. hymenodonta* in several characters, such as the non-undulate leaves with rounded or obtuse leaf apices, and by the absence of paraphyllia. *Neckera hymenodonta* is fairly common in New Zealand; Sainsbury (1955) said



**Fig. 1.** *Neckera hymenodonta*. — **a:** Stem leaves. — **b:** Branch leaves. — **e:** Stem leaf apex. — **c:** Median laminal cells. — **d:** Alar region. — **f:** Pseudoparaphyllium. — **g:** Paraphyllium. — **h:** Sporophyte. — **i:** Prefertilization inner perichaetial leaves. — **j:** Peristome teeth. — Scale bars: 0.5 mm for **a** and **b**, 30 µm for **c**, **d** and **g**, 200 µm for **f**, 0.6 mm for **i**, 1 mm for **h**, 60 µm for **j**.

it was “abundant” there. The specimens of *N. hymenodonta* examined by us agree with the descriptions by Müller (1851) and Sainsbury (1952, as *N. pennata*) although both of those authors failed to mention the paraphyllia. Also, there is a specimen in H-BR (2880 026) from “Hb. C. Müll.,” and the label with the name *Neckera hymenodonta* is written by C. Müller’s own hand.

***Neckera hymenodonta* Müll. Hal. (Fig. 1)**

Bot. Zeit. 9: 564. 1851. — TYPE: Australia. Tasmania, “Van Diemen’s Land, ad truncos arborum fruticeti densi infra Bek-river prope Launceston” 1850 *Mossman 746* (not seen).

*Neckera pennata* Hedw. var. *tasmanica* Hampe, Linnaea 25: 715. 1853, *syn. nov.* — TYPE: Australia. Tasmania (“Van Diemen’s Land”), 1850 *Stuart C. s.n.* (isotype MEL!).

*Neckera aurescens* Hampe, Linnaea 28: 212. 1856, *syn. nov.* — TYPE: Australia. Broadribbriver, 1854 *F. Mueller* (iso-

**Table 1.** Main morphological differences between *Neckera hymenodonta* and *N. pennata*.

Characters	<i>N. hymenodonta</i>	<i>N. pennata</i>
Stem leaf shape	ovate to broadly ovate	narrowly oblong to lingulate
Leaf margins above	strongly denticulate	serrulate
Paraphyllia	uniseriate to biseriate	absent
Exostome teeth	420–500 µm long	610–650 µm long
Endostome membrane	55–65 µm high	absent
Spores	(30–)35–40 µm	(15–)20–25 µm

types MEL!, L 0629420!; probable isotype BM 000667817!, same collector but without locality).

*Neckera leptotheca* Mitt., Hooker's J. Bot. Kew Gard. Misc. 8:263. 1856, *syn. nov.* — TYPE: Australia. Victoria, East Gippsland, Cabbage Tree River, 37°43'S, 148°40'E (Vic. Grid Ref.: Z37), 1855 *F. Mueller 93* (syntypes BM 000858631!, MEL!). — Synonymized with *N. aurescens* Hampe by Mitten (1882).

Plants gregarious, glossy, green, spreading horizontally from stolons, sparingly or densely branched. Stems to ca. 15 cm long, ca. 4–5 mm wide with leaves, densely leaved; branches complanate, 1–3 cm long, acute at apex. Stem leaves ovate to broadly ovate, usually  $3.0\text{--}3.3 \times 1.1\text{--}1.4$  mm, decurrent, decurrencies to ca.  $230 \mu\text{m}$  long, deeply and regularly undulate above, acuminate, asymmetric; leaf margins distinctly denticulate above, partly incurved on one side below. Costa weak, single or double, from 1/4 to nearly 1/3 of leaf length, rarely over 1/2 of leaf length. Leaf cells smooth, walls thin; apical laminal cells elongate-rhomboidal to oblong-rhomboidal, ca.  $25\text{--}35 \times 5\text{--}8 \mu\text{m}$ ; median laminal cells oblong-rhomboidal to linear, ca.  $55\text{--}75 \times 5\text{--}6 \mu\text{m}$ ; basal laminal cells elongate-rhomboidal to elongate-rectangular, ca.  $40\text{--}50 \times 7\text{--}10 \mu\text{m}$ ; alar cells (sub)rectangular to quadrate, ca.  $15\text{--}25 \times 8\text{--}12 \mu\text{m}$ . Branch leaves similar to stem leaves in shape but smaller, ca.  $2.0\text{--}2.6 \times 0.9\text{--}1.1$  mm. Paraphyllia present on stems and branches, to ca.  $180 \mu\text{m}$  long, uniseriate throughout or biseriate below, cells rectangular or subquadrate; pseudoparaphyllia numerous, broadly lanceolate, ca.  $200\text{--}500 \mu\text{m}$  long. Autoicous. Perichaetia on secondary stems or on branches; inner perichaetial leaves oblong, acutely tapering to a long subulate acumen,  $3.5\text{--}4.0 \times 1.0\text{--}1.2$  mm.; costa absent; paraphyses numerous. Seta 0.3 mm long. Capsule immersed, oblong,  $2.6 \times 0.9$  mm; apophysal stomata absent; exothecial cells fairly thin-walled, mostly elongate and subrectangular,  $30\text{--}60 \times 15\text{--}25 \mu\text{m}$ , suboral cells smaller, often transverse; annulus absent. Exostome teeth lanceolate-subulate, yellow, opaque,  $420\text{--}500 \mu\text{m}$  long, minutely and densely papillose throughout; endostome segments moniliform-articulate, ca.  $130\text{--}160 \mu\text{m}$ , placed on a fairly high, delicate, translucent membrane ca.  $55\text{--}65 \mu\text{m}$  high. Operculum obliquely rostrate from conic base. Calyptra cucullate, glossy, smooth. Spores coarsely papillose, ca.  $(30\text{--})35\text{--}40 \mu\text{m}$  diameter.

*Neckera hymenodonta* has a wide distribution in New Zealand, both in North Island and South Island, the altitudinal amplitude ranging from 40 m to 1745 m above sea level. It thrives in moist forests, where it grows on trunks and upper branches of large trees and vines, and also on dead or rotten tree trunks. Occasionally it can be found on rock surfaces. Outside of New Zealand we here verify specimens from Australia (Tasmania, Victoria, New South Wales), but its exact distribution in that country remains to be elaborated.

SELECTED SPECIMENS EXAMINED: *Neckera hymenodonta*. **New Zealand.** — *South Island.* Southland Land District: Eastern Fiordland, Bonland River, *Tangney 2424* (OTA). Otago Land District: Tahakopa Bay Scenic Reserve, *Schofield 48679* (NICH, OTA); Makarora Ranger Station, *Schofield 48945*, (H, NICH, OTA); Outram, Woodside Glen, *Schofield & Child 50048* (H, NICH, OTA); Dunedin, Little River, 1874 *Berggren* (H, 4 specimens); Dunedin, Fraser's Gully, 4.VIII.1965 *Wells* (OTA); Dunedin, Leith Saddle, VIII.1971 *Johnson* (OTA); Dunedin, Leith Valley, Morrison's Creek, *Schofield 49459* (NICH, OTA). Westland Land District: Kellys Range, below Jackson, *Beckett 991* (FH). Canterbury Land District: Canterbury, Waimate, 13.V.1898 *Beckett* (FH); Banks Peninsula, Montgomery Park Scenic Reserve near hilltop, *Kantak, Churchill & Fife 223* (CANB). Nelson Land District: Nelson, Cobb Valley, Thorns Creek, Slopes to Mt. Mytton, *Macmillan & Fife 8850* (CBG); Lewis Pass Scenic Reserve, Speargrass Flat, 3.5 km W. of Maruia Springs, *Buck 7089* (CANB, NY). Marlborough Land District: Marlborough, *McMahon s.n.* (OTA). — *North Island.* Hawke's Bay Land District: Wairoa, Waiaki Valley, 27.V.1933 *Sainsbury* (CANB). South Auckland Land District: Northern end of Awakino Canyon, *Schofield 47800* (NICH, OTA); Te Kauri Reserve, Tainui Ecological Region, Kawhia Ecological District, 27.X.1989 *Campbell* (MPN). Taranaki Land District: Totara Reserve, Pohangina, Rangitikei Ecological Region and District, *Hodgson M816* (MPN). Wellington Land District: Maungakotukutuku Valley, 3.V.1968 *Braggins* (AK). North Auckland Land District: Waipapa Ecological Region, Pureora State Forest Park, 26.VI.1982 *Braggins et al.* (AK). Wellington Land District: West of Tongariro National Park, V.1972 *Braggins* (AK). — **Australia.** Tasmania. Deloraine Municipality, *D. H. Norris 32689* (H 3097616); Portland Municipality, *D. H. Norris 32211* (H 3212008); Sandy Bay Rivulet, near Hobart, 22.X.1910 *W. A. Weymouth* (H-BR 2880004); St. Mary's Pass, Glen, *W. A. Weymouth* (H-BR 2880 030); Sassafras Gully, Mt. Wellington, *W. A. Weymouth* (H-BR 2880 029). Victoria. Mitchell River Nat. Park, *H. Streimann 50203* (H 3097621); without locality, *Flora M. Martin* (H-BR 2880 034). New South Wales. New England Nat. Park, *H. Streimann 47748* (H 3097620); Head of Oulla Creek, *H. Streimann 7337* (H 3097619); Moodong Creek, *H. Streimann 5512* (H 3097618); Cambewarra, *J. Whitelegge* (H-BR 2880006); Upper Hunter River, *Miss H. Carter* (H-BR 2880 026, "Hb. C. Müll.").

*Neckera pennata*. **Finland**. Uusimaa (*Nylandia*), Nuuk-sio, A. Juslén 110 (H). **Estonia**. Viljandi Distr., I. Kytövuori 89-335 (H 3097386). **Poland**. Sokółka Distr., S. Lisowski (H 3097418). **Germany**. Baier, Fr. Arnold (H 3097446). **Russia**. Vetluga Distr., S. Sokolov (H 3097394). **China**. Yunnan, Lushui Co., Gaoligong Shan Range, J. R. Shevock 26710 (H). **Canada**. British Columbia, W. B. Schofield 82282 (H 3097554). **USA**. North Carolina, McDowell Co., D. H. Norris 68951 (H 3212147).

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