



## Notes on Early Land Plants Today. 29. A new combination in *Radula* (Radulaceae, Marchantiophyta)

MATT A. M. RENNER<sup>1</sup>, LARS SÖDERSTRÖM<sup>2</sup>, ANDERS HAGBORG<sup>3</sup> & MATT VON KONRAT<sup>3</sup>

<sup>1</sup>Botanic Gardens and Domain Trust, Royal Botanic Gardens Sydney, Mrs Macquaries Road, Sydney NSW2000, Australia; [matt.renner@rbgsyd.nsw.gov.au](mailto:matt.renner@rbgsyd.nsw.gov.au)

<sup>2</sup>Department of Biology, Norwegian University of Science and Technology, N-7491 Trondheim, Norway; [lars.soderstrom@bio.ntnu.no](mailto:lars.soderstrom@bio.ntnu.no)

<sup>3</sup>Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605–2496, USA; [hagborg@pobox.com](mailto:hagborg@pobox.com), [mvonkonrat@fieldmuseum.org](mailto:mvonkonrat@fieldmuseum.org)

*Radula javanica* Gottsche *et al.* (1845: 257) was described with many syntypes. Castle (1966) lectotypified it with a specimen from Caroline Islands. This is appropriate in spite of the name indicating it is from Java as it is the only syntype that bears perianths and these were described in the protologue. The plant in Castle's lectotype turns out to be the same entity as *Radula cordiloba* Taylor (1846: 375) which was, we believe correctly, synonymized with *R. javanica* by So (2005).

*Radula cordiloba* subsp. *erigens* was proposed as a synonym of *Radula longispica* Stephani (1910: 183) by So (2006). This synonymization avoided the creation of an orphaned subspecific taxon. However, on the basis of comparison of types, we have reason to believe this synonymy is incorrect. Although many details of morphology cannot be assessed from the existing, fragmentary type material, it can be established that *Radula longispica* differs from *R. erigens* in details of lobule shape. Specifically, the lobules are not ampliate over the ventral stem surface, the lobule apex is acute, and lies well above the top of the lobe-stem insertion (conceptual reorientation granted for ease of description), the overall lobule shape is trapezoid. As indicated by the name, the male branches are unusually long. The male bracts are also unusual, in that the bract lobe is caducous, as is the apex of the bract lobule. The specimen in FH ex herb Stephani comprises three pieces, two comprised almost exclusively of long male branches attached to old leading axes whose leaf lobes have fragmented off. The third piece comprises the youngest portion of a sterile leading shoot with several branches, and has all leaf lobes and lobules intact. The lectotype Geneva is the same entity. If these four pieces represent the same plant, and they probably do given similarities in branch lobule morphology, then *Radula cordiloba* subsp. *erigens* is not a synonym of *R. longispica*.

We believe differences in lobule morphology are substantial, and warrant the recognition of *R. cordiloba* subsp. *erigens* as distinct from both *R. javanica* and *R. longispica*. However, *Radula cordiloba* subsp. *erigens* would be orphaned unless combined as a full species. We publish this combination below.

### Formal treatment

The format of this note follows what is outlined in Söderström *et al.* (2012).

***Radula erigens* (M.A.M.Renner et Braggins) M.A.M.Renner, *comb. et stat. nov.***

Basionym:—*Radula cordiloba* subsp. *erigens* M.A.M.Renner et Braggins, *J. Hattori Bot. Lab.* 97: 45, 2005 (Renner 2005).

Type: NEW ZEALAND. Kermadec Is.: Raoul Island, 1956 *R. Cooper* (holotype AK 44347 ex AKU063120!).

Representative specimens examined:—NEW ZEALAND. Kermadec Is.: Raoul Island, Denham Bay Track, above Orange Cove, 29°14'556.9"S 177°55'54.1"W, 208 m, 18 May 2011, *P.J. de Lange K742* (AK325678); Raoul Island, Moumoukai Track, 29°16'0"S 177°54'0"W, 384 m, 8 May 2009, *P.J. de Lange K224 & D.C. Havell* (AK313206); Raoul Island, Moumoukai Track, 29°16'0"S 177°54'0"W, 336 m, 15 May 2011, *P.J. de Lange K741* (AK325676); Raoul Island, Denham Bay Track, 29°15'39.5"S 177°56'15.7"W, 271 m, 18 May 2011, *P.J. de Lange K744* (AK325681); Raoul Island, 1956, *R.C. Cooper 44350* (CHR558807).

Notes:—To date known with certainty only from Raoul Island in the Kermadec Group, the northern most outlier of the New Zealand Botanical Region. On Raoul Island *R. erigens* grows in sheltered ravines, typically as a saxicol on exposed basalt on ravine walls, but also as an epiphyte on the bases of palm trunks. *Radula erigens* co-occurs with *Lejeunea anisophylla* Montagne (1843: 263), *L. exilis* (Reinwardt *et al.* 1824: 227) Grolle (1979: 353), *L. gracilipes* (Taylor 1846: 385) Spruce (1884: 213), *Lopholejeunea* sp. and *Plagiochila pacifica* Mitten (1873: 407), *Papillaria crocea* (Hampe 1853: 715) Jäger & Sauerbeck (1877: 267) and *Echinodium umbrosum* (Mitten 1859: 92) Jäger & Sauerbeck (1877: 314). Occurrence on islands elsewhere throughout the Pacific would not be unexpected, but to date examination of herbarium material and recent collecting activities in the Cook Islands (Rarotonga) and Fiji (Viti Levu, Kadavu, Taveuni) have failed to locate this species.

Also examined:—*Radula longispica* Steph. INSULA WALLIS. Unea, 1902, *Joly*, herb Corbière 113. (Lectotype *vide* Yamada 1979, G-42698! [=G-15438!]<sup>1</sup>); INSULA WALLIS. Unea, 1902, *Joly* (Isolectotype, FH!). The specimen identified as lectotype is cited as a holotype by So (2006). As no specific collection was indicated in the protologue, and there is more than one duplicate, it must be regarded as a lectotype instead.

## Acknowledgement

We thank Dr. Peter de Lange for collecting *Radula* on the Kermadec and Cook Islands, and for his valuable observations of the ecology of this species on Raoul. The Early Land Plants Today project (ELPT) has been generously supported in part by the Global Biological Information Facility (GBIF) Seed Money Award No.2007-41, activities facilitated in part by funding from the Biodiversity Synthesis Center of the Encyclopedia of Life (BioSynC), partial funding from the National Science Foundation (Award No's 0749762, 1115002), the Warwick Foundation, and the Negaunee Foundation.

## References

- Castle, H. (1966) A revision of the genus *Radula*. Part II. Subgenus *Acroradula*. Section 10. *Ampliatae*. *Revue Bryologique et Lichénologique* 34: 1–81.
- Gottsche, C.M., Lindenberg, J.B.G. & Nees von Esenbeck, S.G. (1845) *Synopsis Hepaticarum, fasc. 2*. Meissner, Hamburg, pp. 145–304.
- Grolle, R. (1979) Miscellanea Hepaticologica 191–200. *Journal of the Hattori Botanical Laboratory* 46: 337–355.
- Hampe, E. (1853) Musci. *Linnaea* 25: 713–715.
- Jäger, A. & Sauerbeck, F. (1877) Adumbratio flore muscorum totius orbis terrarum. Part 7. *Bericht über die Thätigkeit der St. Gallischen Naturwissenschaftlichen Gesellschaft 1875–1876*: 201–371
- Mitten, W. (1859) Descriptions of some new species of Musci from New Zealand and other parts of the Southern Hemisphere, together with an enumeration of the species collected in Tasmania by William Archer, arranged upon the plan proposed in the Musci Indiae Orientalis. *Journal of the Proceedings of the Linnean Society: Botany* 4: 64–100. <http://dx.doi.org/10.1111/j.1095-8312.1859.tb01021.x>
- Mitten, W. (1873) *Jungermannia* and *Marchantia*. In: Seemann, B. (Ed), *Flora vitiensis*. Reeve, London, pp. 325–453.
- Montagne, J.F.C. (1843) Quatrième centurie de plantes cellulaires exotiques nouvelles, décades I–VI. *Annales des Sciences Naturelles, Botanique, ser. 2* 19: 238–266.

1. Citation of specimens in G should preferably use the barcode (M. Price, pers. comm.) but for comparability the numbers printed on the specimen, which have often been cited by previous authors, are also given here in square brackets.

- Reinwardt, C.G.C., Blume, C.L. & Nees von Esenbeck, C.G. (1824 “1825”) Hepaticae Iavanicae, editae coniunctis studiis et opera. *Nova Acta Physico-medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum Exhibentia Ephemerides sive Observationes Historias et Experimenta* 12: 181–238.
- Renner, M.A.M. (2005) Additions to the *Radula* (Radulaceae: Hepaticae) floras of the New Zealand and Tasmania. *Journal of the Hattori Botanical Laboratory* 97: 39–79.
- So, M.L. (2005) *Radula* (Radulaceae, Marchantiophyta) in Hawaii. *Journal of the Hattori Botanical Laboratory* 98: 175–191.
- So, M.L. (2006) *Radula* (Radulaceae, Marchantiophyta) in the South Pacific. *Journal of the Hattori Botanical Laboratory* 99: 207–232.
- Söderström, L., Hagborg, A. & von Konrat, M. (2012) Notes on Early Land Plants Today. *Phytotaxa* 65: 41–42.
- Spruce, R. (1884) Hepaticae Amazonica et Andinae. *Transactions and Proceedings of the Botanical Society. Edinburgh* 15: 1–308.
- Stephani, F. (1910) *Species Hepaticarum* 4. George & Cie, Genève & Bale, pp. 97–464.
- Taylor, T. (1846) New Hepaticae. *London Journal of Botany* 5: 365–417.
- Yamada, K. (1979) A revision of Asian taxa of *Radula*, Hepaticae. *Journal of the Hattori Botanical Laboratory* 45: 201–322.