

Kohsaku YAMADA*: ***Radula* collection made
by Dr. H. Inoue in Ceylon**

山田耕作*: セイロンで採集されたケビラゴケ属植物

The 9 species of *Radula* have been reported by Gottsche et al. (1845), Stephani (1910, 1924), Castle (1950, 1959, 1965, 1966), and Abeywickrama (1959) from Ceylon. They are: *Radula colliculosa* Mitt., *R. cordata* Mitt., *R. formosa* (Meiss.) Nees, *R. javanica* Gott., *R. nietneri* Steph. (now a synonym of *R. sandei* Steph.), *R. speciosa* Gott. ex Steph. (now a synonym of *R. Kurzii* Steph.), *R. subpallens* Steph., and *R. ventricosa* Steph. However, *Radula* taxa of Ceylon do not seem to be adequately known till now. In March of 1966, Dr. H. Inoue made an extensive bryological collection in Ceylon. Recently, I studied the *Radula* specimens in this collection, and recognized 10 species (among them one seems to be new to science). An asterisk (*) indicates the taxon newly found in the present area.

All the specimens examined are deposited in the herbarium of the National Science Museum (TNS), Tokyo. I thank Dr. S. Hattori for critical advices, and Dr. H. Inoue for the loan of *Radula* specimens.

****Radula amentulosa*** Mitt., *Bonplandia* 9: 367 (1861).

Syn. nov.: *Radula caledonica* Steph., *Spec. Hepat.* 4: 232 (1910).

Specim. exam.: Moon Plane, Nuwara Eliya, around glassland, 6100 ft, on bark (12425, 12694). Range: Ceylon, Java, Sumatra, New Caledonia, Fiji.

Castle (1950) reduced *R. caledonica* and *R. spicata* to a synonym of *R. formosa* (Meissn.) Nees. However, both species are different from *R. formosa* by the obovate leaf-lobule with rounded apex. Stephani's original description and drawings of *R. caledonica* suggest that it is identical with *R. amentulosa*. Moreover, Castle (1950) reduced *R. brunnea* Steph. to a synonym of *R. amentulosa*. However, the Fijian *R. amentulosa* is not conspecific with *R. brunnea*. The differences between these two taxa were given by Kitagawa (1973).

* Ujijamada High School, Uraguchi, Ise-shi, Mie-ken; also The Hattori Botanical Laboratory, Honmachi, Nichinan-shi, Miyazaki-ken. 伊勢市, 宇治山田高校.

The characteristics for the present species are 1) the pale brown to yellowish-brown plants, 2) the obovate leaf-lobule with a rounded apex, and 3) the almost flat leaf-lobe with the apex not involute.

***Radula assamica** Steph., Hedwigia 23: 151 (1884).

Specim. exam.: West Word-Ho, Nuwara Eliya, ca. 6000 ft, on living leaves (12846, 12866). Range: Ceylon, Assam, Burma, Viet-Num.

The above-cited two specimens have numerous gemmae on the ventral margin of leaf-lobes. This species is easily distinguished from other members of sect. Epiphyllae of southeastern Asia by the lingulate leaf-lobule and the presence of numerous gammae on the ventral margin of leaf-lobes.

Radula ceylanica K. Yamada, sp. nov. (Fig. 1).

Planta mediocris, rigida, corticola; flavo-brunnea—olivaceo-viridis; caulis ca. 10 mm (vel plus) longus, plumosus, irregulariter pinnatim ramosus, lobi foliorum caulinarum dense imbricati, late patuli, falcato-ovati, valde convexi, apice late rotundato, plerumque incurvo; lobuli ovati, valde inflati secundum carinam, margine arcuato (\pm involuto), basi late rotundata, recte inserta, brevis. Dioica (androecia non vidi)? Gynoecia in caule terminalia; folia floralia oblongo-ovata; Perianthia cylindrica, plana.

Plants medium-sized, rigid, forming compact mats on bark, yellow-brown to olive-green in herbaria. Stem about 10 mm (or more) long, 0.11–0.13 mm in diameter, with leaves 1.4–1.6 mm wide, plumose, irregularly pinnately branched or rarely bipinnately, branches about 2–6 mm long, with leaves 1.0–1.3 mm wide; stem 7–8 cells thick, cortical cells smaller than medullary cells, both cortical and medullary cells with somewhat thickened-walls and large trigones, pale yellow. Leaf-lobes densely imbricate, widely spreading, strongly convex, when flat falcate-ovate, about 0.9 mm long and 0.6–0.7 mm wide, apex broadly rounded, usually incurved, margin entire, the dorsal base rounded (but not auriculate), fully covering the stem, the line of insertion vertically straight, long; marginal cells 7–10 \times 7–8 μ , median cells 16–22 \times 12–15 μ , walls somewhat thickened, trigones large, intermediate thickenings not developed, basal cells 20–23 \times 10–12 μ ; cuticle smooth; leaf-lobules ovate, about 1/2 the length of the lobe, 0.40–0.52 mm long and 0.38–0.43 mm wide, apex obtuse, free margin usually arched (often \pm involute), base broadly rounded (but not auriculate), usually covering 2/3 or more the width of stem (often \pm extending the farther edge of stem), the line



Fig. 1. *Radula ceylanica* K. Yamada. *a.* Portion of stem, ventral view. $\times 23$. *b.* Do., with perianth, ventral view. $\times 23$. *c.* Portion of cross-section of stem. $\times 480$. *d.* Leaf on stem, dorsal view. $\times 23$. *e-g.* Cells of lobe of stem-leaf, *e.* from margin, *f.* from middle, *g.* from base. All $\times 480$. Drawn from type, coll. H. Inoue 12476 (TNS).

of insertion short (0.10–0.17 mm long) and vertically straight; sinus between ventral margin of leaf-lobe and keel obtuse, keel spreading at angles of about 50° with the stem, 0.43–0.48 mm long, straight to slightly arched, not de-

current, carinal region strongly inflated, rhizoid-initial area slightly convex, rhizoids few, pale brown. Dioicous (male inflorescence not seen)? Female inflorescence terminal on stem, usually with two subfloral innovations; bract-lobes divergent, larger than cauline leaf-lobes, oblong-ovate, 0.76–1.1 mm long and 0.7–0.9 mm wide, rounded at apex, \pm incurved along margin; bract-lobule oblong-ovate, keel sinuose; perianth cylindrical flat, about 2.2 mm long and 1.2 mm wide at middle, mouth truncate, usually bent when dry.

Specim. exam.: Ceylon. Horton Planes, Nuwara Eliya; tropical mossy forests and highland glassland, 7700 ft, leg. H. Inoue 12476 (Holotype in herb. TNS).

This new species belongs to sect. *Saccatae* of subgenus *Acroradula*. The distinguishing characteristics of this species are 1) the rigid and compact plants, 2) the densely imbricate, widely spreading leaf-lobes with a strongly incurved apex, 3) the ovate leaf-lobules with a strongly inflated carinal region, 4) the strongly convex, ovate leaf-lobes, and 5) the thickened walls with large trigones of cells of leaf-lobes.

This new species is closely related to *Radula compacta* Castle, a member of sect. *Saccatae*, but *R. compacta* is easily distinguished by 1) the quadrate leaf-lobules, 2) the leaf-lobules with an incurved outer margin and a small base, and 3) the uniformly thickened cell-walls of leaf-lobes, lacking trigones.

Radula cordata Mitt., Seemann, Flora Vitiensis: 410 (1865–73).

Specim. exam.: between Rangala and Corbet's Gap, Central Province, reserved forest, ca. 4000 ft, on rock (13090). Range: Ceylon, Hawaii.

I compared the Ceylon materials with four specimens of Hawaiian *Radula cordata* loaned from herb. G, and did not find any taxonomical difference between these specimens.

The characteristics for this species are 1) the large leaf-lobules with an arched free margin, 2) the acute sinus, 3) the cell-walls of leaf-lobes with large trigones, and 4) the slightly decurrent keel. Stephani (1910) reported *Radula cordata* from Hawaii, Caroline Is., Samoa, and Ceylon. However, Castle (1965) did not cited Samoa, Caroline Is., and Ceylon, for the range of this species.

Radula formosa (Meiss.) Nees in Gott. et al., Syn. Hepat.: 258 (1845).

Specim. exam.: Nuwara Eliya, tropical mossy forests and highland glassland, 7700 ft, on bark (12677, 12678, 12688, 12689); between Rangala and

Corbet's Gap, Central Prov., reserved forest, ca. 4000 ft, on rocks with soil (13010, 13239, 13250, 13260). Range: Ceylon, Java, Thailand, Sumatra, Borneo, Celebes, New Guinea, Philippines, Japan.

This species is the commonest *Radula* in Nuwara Eliya. It is easily distinguished from other members of sect. Amentulosae by 1) the reddish-brown plants, 2) the densely imbricated, broadly falcate-ovate leaf-lobes with a strongly incurved apex, and 3) the ovate leaf-lobules with a strongly arched free margin, and a broadly rounded base.

In the present species, the lobule form is highly variable in the stem-leaves and those of the first and second branches, even in the same plant. Castle (1950) reported this species from Java, Celebes, Sumatra, Ceylon, Amboina, Samoa, Tahiti, New Caledonia, and Fiji. However, the records of Samoa, Tahiti, New Caledonia, and Fiji are doubtful.

Radula javanica Gott. in Gott. et al., Syn. Hepat.: 257 (1845).

Specim. exam.: between Broolside and Mahauva; along roadside, 4500-5500 ft, on bark (12649). Range: Ceylon, Philippines, Japan, Mariana Is., Caroline Is., Borneo, Australia, Samoa, Cook Is., Tahiti.

This is a polymorphic species, varying strongly in shape and size.

Radula Kurzii Steph., Hedwigia 23: 153 (1884).

Specim. exam.: West Word-Ho, Nuwara Eliya, ca. 6000 ft, on bark (12872); Pidurutaragara, Nuwara Eliya, reserved forest, ca. 6100 ft, on soil and bark (13485, 13841, 13847); between Pusellawa and Ramboda, Central province, tea plantation district, 3000-3200 ft, on rocks (13078, 13336, 13340, 13341); Hortone Planes, Nuwara Eliya, tropical mossy forest and high glassland, 7700 ft, on bark (12661, 13442, 13457, 13477); Moon Plane, Nuwara Eliya, around glassland, ca. 6100 ft, on bark and branches (12817, 12941, 13305, 13482, 13491, 13492, 13589). Range: Andaman Is., Ceylon.

Stephani (1884) recorded *Radula speciosa* Gottsche from Ceylon, based on the determination by Gottsche. In 1965, Castle reduced *R. speciosa* to a synonym of *R. Kurzii* which was described from Andaman Islands. This species is one of the commonest species in Nuwara Eliya area. The diagnostic characteristics for this species are 1) the yellowish-brown to green plants, 2) the obliquely spreading leaf-lobes with an incurved ventral margin, 3) the large trigones of cell-walls of cauline leaf-lobes, and 4) the rounded base of leaf-lobules for extending the farther edge of stem.

***Radula madagascariensis** Gott., Abhandl. Naturwis. Verein Bremen 7: 349 (1882).

Specim. exam.: Horton Planes, Nuwara Eliya, tropical mossy forest and highland glassland, 7700 ft, on bark (12596); Pidurutaragara, Nuwara Eliya, reserved forest, ca. 6100 ft, on bark (13433, 13483). Range: Ceylon, Madagascar, Mascarene Is.

A discussion was given by Yamada (1975) concerning the type specimens with male inflorescences.

***Radula obscura** Mitt., Journ. Proc. Linn. Soc. Bot. 5: 107 (1861).

Specim. exam.: West Word-Ho, Nuwara Eliya, ca. 6000 ft, on bark (13398). Range: Ceylon, India, Borneo, Philippines, China.

***Radula retroflexa** Tayl., London Journ. Botany 5: 378 (1846).

Specim. exam.: between Rangala and Corbet's Gap, ca. 4000 ft, on rock (12934). Range: Ceylon, Sumatra, Java, New Guinea, New Caledonia, Tahiti, Samoa, Philippines, Japan.

In the above-cited specimens, the leaf-lobes are caducous and often bear the rhizoid-like cilia on the margin. In 1973, I reported *Radula miqueliana* Tayl. from Borneo, the Philippines, and Japan. However, *R. miqueliana* had been reduced to a synonym of *R. retroflexa* by Stephani (1910), and this treatment was adopted by Grolle (1970).

R. retroflexa is a highly variable species, especially in the form of leaf-lobules. The distinguishing characteristics of the species are 1) the golden-brown to pale brown plants in herbaria, 2) the loosely imbricate, narrowly ovate, and caducous leaf-lobes whose margin is weakly crenate and often bearing rhizoid-like cilia, 3) the subrhombic leaf-lobules with an apex frequently turning out from the stem, 4) the thin cell-walls of leaf-lobes with triradiately thickened trigones and intermediate thickenings. *R. retroflexa* is closely related to *R. fauciloba* Steph., but the latter is different from the former by 1) the densely pinnately branched plants, 2) the quadrate leaf-lobules, and 3) the leaf-lobules with an apex always strongly turned out from the stem.

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国立科学博物館の井上浩氏が1966年にセイロン島で蘚苔類調査をおこなった際に採集された資料の中、ケビラゴケ属 *Radula* について研究した。10種を検出したが、このうち1種 *Radula ceylanica* は新種と考えられるものであり、5種がセイロン新産である。従来、セイロンからは9種が記録されていたが、各種類についての検討は極めて不十分で、将来の研究にまっところが多い。

今回検出された9種は新種の1種を除き、7種がインドネシアから太平洋諸島に分布するもので、1種がマダガスカル、マスカレン諸島と共通である。このことはセイロンの本属が強く太平洋諸島のフロラの影響を受けていることを示している。

□小林義雄：菌類の世界 ブルーバックス 270. pp. 252, 講談社, 東京 (1975, VII) ¥500, 「驚異の生命力と生態を見る」と副題にあるとおり、種々のキノコの生態と形態とをじつにたくさんに述べてあって、それが次から次と登場してくる。その面白さに一気に読んでしまった。はしがきに「彼等に愛着を感じる境地に達した」とあるが、随処にそれが現われており、それを自分の業績と、世界中の研究とうまく合せている。いろいろな環境と菌、動物に関係する菌、植物に関係する菌、特殊な菌群、特殊な栄養を摂る菌、特殊な生態の6章から成り、この表題だけみると全くつまらなく見えるが、内容がまるで違って、人を惹きつけるのは一貫した研究態度が導き出した深みであろう。一読をすすめたい。

(前川文夫)