

An account of the liverwort genera *Lepidozia* and *Neolepidozia* (Jungermanniales: Lepidoziaceae) in Thailand, with five new records

PHIANGPHAK SUKKHARAK^{1,*}

ABSTRACT

With the taxonomic changes in *Lepidozia* and the recent revision of *Neolepidozia* in Asia, the account of *Lepidozia* and *Neolepidozia* taxa in Thailand has been updated based on detailed morphological studies, including five taxa of *Lepidozia*: *L. cladorhiza*, *L. flexuosa*, *L. holorrhiza*, *L. reptans*, *L. trichodes*, and eleven taxa of *Neolepidozia*: *N. bickeri*, *N. cameronensis*, *N. cuneifolia* f. *biloba*, *N. katrinae*, *N. massartiana*, *N. papulosa*, *N. parvula*, *N. richardsii*, *N. schaefer-verwimpai*, *N. shevockii*, *N. variifolia*. Of these, *N. cuneifolia* f. *biloba*, *N. katrinae*, *N. massartiana*, *N. richardsii*, and *N. variifolia* are newly reported for Thailand.

KEYWORDS: Bryophyte, Marchantiophyta, non-vascular plant, revision, taxonomy.

Accepted for publication: 8 September 2026. Published online: 14 September 2026

INTRODUCTION

Lepidozia (Dumort.) Dumort. and *Neolepidozia* Fulford & J. Taylor are members of Lepidoziaceae. The first record of *Lepidozia* in Thailand dates back to 1973, when Kitagawa reported *L. papulosa* Steph. from Trang Province (Kitagawa, 1973). However, this species had already been treated as *N. papulosa* (Steph.) Fulford & J. Taylor by Fulford and Taylor (1959), together with 15 other species characterized by (1) a limited number of large cortical cells in the stem forming a hyalodermis (the stem has numerous cortical cells with thick walls that are not much larger than those of the medulla in *Lepidozia*); (2) entire leaf margins without auricles at the base (the leaf margins are toothed or ciliate, and the leaf bases are semicordate, cordate, or auriculate in *Lepidozia*); and (3) greater uniformity in leaf-cell size (generally less pronounced in *Lepidozia*) (Fulford & Taylor, 1959). In addition, *N. papulosa* was recognized in the worldwide checklist of hornworts and liverworts by Söderström *et al.* (2016). Therefore, *N. papulosa* is the only species of *Neolepidozia* reported from Thailand (Sukkharak, 2022).

In 1978, Kitagawa studied collections made by Touw during an expedition conducted by the Rijksherbarium, Leiden (L), and the Forest Herbarium, Bangkok (BKF), in 1965–1966. He reported six species of *Lepidozia*: *L. flexuosa* Mitt., *L. himalayensis* Steph., *L. holorrhiza* (Reinw., Blume & Nees) Nees, *L. papulosa* Steph., *L. parvula* N. Kitag., and *L. trichodes* (Reinw., Blume & Nees) Nees (Kitagawa, 1978). Of these, *L. parvula* was newly described as a species. Later, Kitagawa (1981) reduced *L. himalayensis* to synonymy under *L. reptans* (L.) Dumort. In addition, Bapna and Kachroo (2000) treated *L. parvula* as a synonym of *L. robusta* Steph. Consequently, five species were reported from Thailand: *L. flexuosa*, *L. holorrhiza*, *L. reptans*, *L. robusta*, and *L. trichodes* (Sukkharak, 2022). Later, Hagborg and Söderström (2023) resurrected *L. parvula* as a distinct species from *L. robusta*. Recently, Schwarz *et al.* (2026) published a revision of Asian *Neolepidozia*, in which eight species previously assigned to *Lepidozia* were transferred to *Neolepidozia*. These include *L. parvula*, which is now recognized as *N. parvula* (N. Kitag.)

¹ Department of Biology, Faculty of Science, Burapha University, Chonburi 20131, Thailand.

* Corresponding author: phiangphak@buu.ac.th

U.Schwarz, Schäf.-Verw. & Shevock. In Thailand, Schwarz *et al.* (l.c.) reported five species of *Neolepidozia*: *N. bickeri* U.Schwarz, Schäf.-Verw. & Shevock, *N. cameronensis* U.Schwarz, Schäf.-Verw. & Shevock, *N. parvula*, *N. schaefer-verwimpii* U.Schwarz & Shevock, and *N. shevockii* U.Schwarz & Schäf.-Verw.

With the taxonomic changes in *Lepidozia* and the recent revision of the *Neolepidozia* in Asia (Schwarz *et al.*, 2026), a reinvestigation and update of these two genera in Thailand are necessary. In this paper, a revision of *Lepidozia* and *Neolepidozia* in Thailand based on detailed morphological studies is presented.

MATERIALS AND METHODS

Herbarium specimens from Chulalongkorn University Herbarium (BCU), Burapha University Herbarium (BUU), Bangkok Forest Herbarium (BKF), Herbarium of Department of Biology, Faculty of Science, Chiang Mai University (CMUB) and Prince of Songkla University Herbarium (PSU) were examined. Morphological details were studied, measured, and illustrated by Olympus CX31 light microscope with Olympus U-DA drawing tube and Olympus SZX7 stereo microscope with Olympus SZX-DA drawing tube. For taxa for which no holotype was indicated, no lectotype has been designated in this study, as the original material has not been personally examined by the author.

TAXONOMIC TREATMENT

In Thailand, five species of *Lepidozia* and eleven taxa of *Neolepidozia* are currently reported. Of these, *N. cuneifolia* f. *biloba*, *N. katrinae*, *N. massartiana*, *N. richardsii*, and *N. variifolia* are new to the country.

Lepidozia (Dumort.) Dumort., Recueil Observ. Jungerm.: 19. 1835.—*Pleuroschisma* sect. *Lepidozia* Dumort., Syll. Jungerm. Europ.: 69. 1831. Type

species: *Lepidozia reptans* (L.) Dumort., Recueil Observ. Jungerm.: 19. 1835.

Plants leafy. *Rhizoids* few. *Scales* absent. *Stems* slender; creeping or pendent; branches unipinnate-tripinnate; *Frullania*-type with first branch underleaf 2-lobed; in cross section epidermal cells as large as medullary cells; flagelliform branches present; stolons present or absent. *Leaves* incubous; obliquely attached; erect, appressed, parallel to stem or concave; distant, contiguous, or imbricate; cordate, ovate, quadrate, or rectangular; apex 2–4-lobed, symmetric or asymmetric; margins entire or ciliate; bases auriculate; cells thick-walled; trigones absent or inconspicuous; cuticle smooth or verruculose; oil bodies finely segmented globules. *Underleaves* distant or imbricate; rounded; apex bifid-trifid; margins entire; first branch underleaf 2-lobed. Monoicous (Autoicous) or Dioicous. *Gynoecea* on ventral branches. *Perianths* cylindrical; plicate. *Androecea* on main shoots or on ventral branches. *Asexual reproduction* by caducous leaves (Description based on Sukkharak, 2022 and this study).

1. *Lepidozia cladorrhiza* (Reinw., Blume & Nees) Nees, Syn. Hepat. 2: 210. 1845.—*Jungermannia cladorrhiza* Reinw., Blume & Nees, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 12(1): 203. 1824.—*Mastigophora cladorrhiza* (Reinw., Blume et Nees) Trevis., Mem. Reale Ist. Lombardo Sci., Ser. 3, Cl. Sci. Mat. 4(13): 416. 1877. Specimen cited in the protologue as “Habitat in terra nuda Iavae insulae. Blume. V. s. fr.”. Type: Indonesia, Java, without date, collector unknown (specimen without a type designation **G** [G00115391] photo seen). Fig. 1.

—*Lepidozia cladorrhiza* var. *macgregorii* (Steph.) Herzog, Trans. Brit. Bryol. Soc. 1: 312. 1950 (fide Piippo, 1984).—*Lepidozia macgregorii* Steph., Sp. Hepat. 3: 613. 1909.

Stems with leaves 1–1.3 mm wide. *Stem leaves* obliquely attached, erect, appressed, parallel to stem, strongly concave; imbricate; broadly ovate,

KEY TO *LEPIDOZIA* AND *NEOLEPIDOZIA*

Stems in cross section with a hyalodermis, epidermal cells larger than medullary cells. First branch underleaf 1-lobed

Neolepidozia

Stems in cross section without hyalodermis, epidermal cells as large as medullary cells. First branch underleaf 2-lobed

Lepidozia

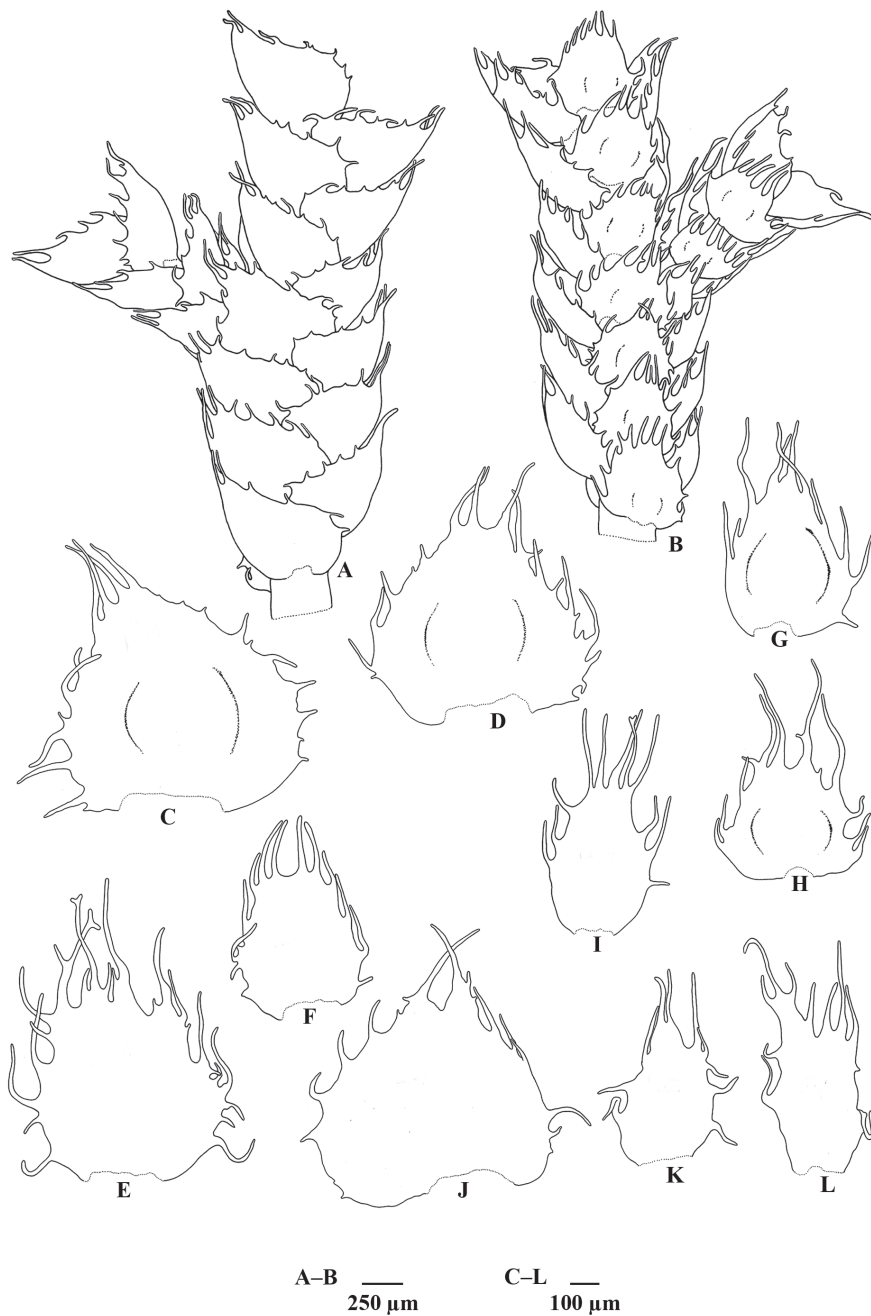


Figure 1. *Lepidozia cladorhiza* (Reinw., Blume & Nees) Nees: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.–F. Stem underleaves; G. Left-hand side branch leaf lobe, dorsal view; H. Right-hand side branch leaf lobe, dorsal view; I. Branch underleaf; J. Bilobate half stem leaf, dorsal view; K.–L. First branch underleaves, ventral view. All from *Sukkharak 283 (BCU)*. Drawn by Sukkharak.

KEY TO THE SPECIES OF *LEPIDOZIA* IN THAILAND

- | | |
|---|--------------------------------|
| 1. Leaves imbricate, leaf apex unlobed, margins ciliate to laciniate | |
| 2. Leaves ovate, margins ciliate | 1. <i>L. cladorhiza</i> |
| 2. Leaves orbicular-reniform, margins laciniate | 3. <i>L. holorrhiza</i> |
| 1. Leaves distant, leaf apex 3–4-lobed, margins entire | |
| 3. Leaf apex 3-lobed | 4. <i>L. reptans</i> |
| 3. Leaf apex 4-lobed | |
| 4. Stem leaves symmetrical quadrate, lobed 1/2 of leaf length. Cell surface smooth | 2. <i>L. flexuosa</i> |
| 4. Stem leaves asymmetrical rectangular, lobed 1/4 of leaf length. Cell surface verrucose | 5. <i>L. trichodes</i> |

symmetrical, 0.7–0.8 × 0.7–0.9 mm, margins ciliate; cells smooth. *Stem underleaves* strongly concave; imbricate; broadly ovate, 0.4–0.8 × 0.4–0.6 mm, margins ciliate. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, erect, appressed, parallel to stem, strongly concave; imbricate; broadly ovate, symmetrical, 0.3–0.6 × 0.4–0.5 mm, margins ciliate; cells smooth. *First branch underleaves* 2 lobed. *Branch underleaves* strongly concave; imbricate; broadly ovate, 0.5–0.7 × 0.3–0.4 mm, margins ciliate. *Gynoechia* not seen. *Androeia* not seen. *Asexual reproduction* not seen.

Specimens examined.—PENINSULAR: Nakhon Si Thammarat [Khao Nan Yai, 8°52.5664' N, 99°41.3151' E, alt. 1,270 m, 14 Mar. 2006, Sukkharak 283 (BCU); *ibid.*, 8°52.9671' N, 99°41.8300' E, alt. 1,362 m, 27 Jan. 2007, Sukkharak 525 (BCU); San Yen, 8°45.3278' N, 99°31.7857' E, alt. 1,264 m, 19 Apr. 2007, Sukkharak & Seelanan 35 (BCU); *ibid.*, 8°45.4796' N, 99°31.8114' E, alt. 1,272 m, 19 Apr. 2007, Sukkharak & Seelanan 80 (BCU)].

Additional illustrations.—Sukkharak (2007: 132, Fig. 4.68; 192, Fig. 4.114); Gradstein (2011: 129, Fig. 12. 28a).

Distribution.—Thailand, Indonesia (Sukkharak, 2007; Gradstein, 2011).

Ecology.—*Lepidozia cladorhiza* was found on tree trunks and rotten logs at about 1,250–1,400 m elevation.

Notes.—*Lepidozia cladorhiza* was reported from Thailand by Sukkharak (2007) and Sukkharak *et al.* (2008), but these records were inadvertently omitted from the subsequent treatments by Lai *et al.* (2008) and Sukkharak (2022). The species is morphologically similar to *L. holorrhiza* in having imbricate leaves; however, the two species differ in leaf shape and margin. *Lepidozia holorrhiza* has orbicular-reniform leaves with laciniate margins, whereas *L. cladorhiza* has ovate leaves with ciliate margins.

2. *Lepidozia flexuosa* Mitt., J. Proc. Linn. Soc., Bot. 5 (18): 103. 1860. Type: India, Sikkim [West Bengal], Sinchul [Senchal], 7,000 ft., J.D. Hooker 1411 (lectotype NY, designated by Majumdar, 2022). Figs. 2–3.

—*Lepidozia squamulifolia* Steph., Sp. Hepat. 3: 608. 1909 (fide Sharma & Srivastava, 1993).

Stems with leaves 0.4–0.6 mm wide. *Stem leaves* obliquely attached, erect, appressed, parallel to stem; distant; quadrate, symmetrical, 0.2–0.4 × 0.1–0.3 mm; 4 lobed, 1/2 leaf length, lobes 2–3 cells wide at base, biseriate part 1–4 cells long, uniseriate part 1–3 cells long, margins entire; cells smooth. *Stem underleaves* distant; quadrate-suborbicular, 0.1–0.2 × 0.1–0.2 mm; 4 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 0–1 cell long, uniseriate part 1–3 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, spreading, plane; distant; rectangular, symmetrical, 0.2–0.3 × 0.1–0.2 mm; 4 lobed, 1/4–1/3 leaf length, lobes 2 cells wide at base, biseriate part 1–3 cells long, uniseriate part 1–2 cells long, margins entire; cells smooth. *First branch underleaves* 2 lobed. *Branch underleaves* distant; quadrate; 0.1 × 0.1–0.2 mm; 3–4 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 1–2 cells long, margins entire. *Perianths* oblong, narrowed towards the mouth, 4–5 × 0.9–1.1 mm, 2–3-plicate in the uppermost part. *Perianth mouth* ciliate, mouth cells linear. *Gynoeceium* not seen. *Androeia* not seen. *Asexual reproduction* not seen.

Specimens examined.—NORTHERN: Chiang Mai [Doi Inthanon, 18°35' N, 99°30' E, alt. 2,150–2,250 m, 20 Dec. 1965, Touw 10239a (BKF); *ibid.*, 18°34.133' N, 98°29.083' E, alt. 2,300 m, 11 Jan. 2010, Akiyama *et al.* 1074 (BKF); *ibid.*, alt. 2,529 m, 7 Nov. 2016, Chantanaorrapint & Suwanmala 524 (PSU); *ibid.*, alt. 2,300, 14 Jan. 2010, Printarakul 2660 (CMUB); *ibid.*, alt. 2,300 m, 15 July 2012, Printarakul 5405 (CMUB); 2–3 Nov. 2003, “Biology

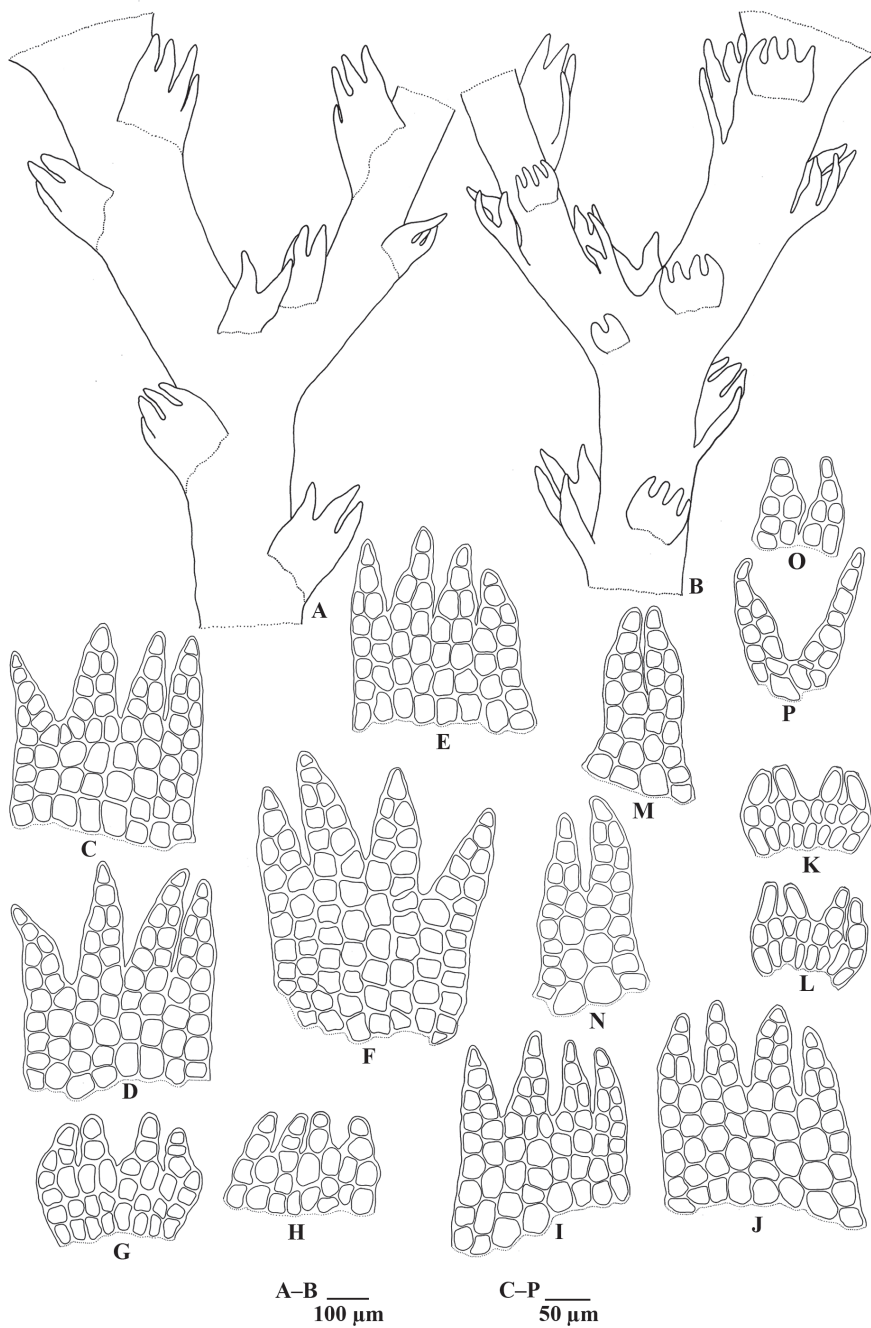


Figure 2. *Lepidozia flexuosa* Mitt.: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C.–D. Left-hand side stem leaf lobes, dorsal view; E.–F. Right-hand side stem leaf lobes, dorsal view; G.–H. Stem underleaves; I. Left-hand side branch leaf lobe, dorsal view; J. Right-hand side branch leaf lobe, dorsal view; K.–L. Branch underleaves; M.–N. Bilobate half stem leaves, dorsal view; O.–P. First branch underleaves, ventral view. All from *Touw 10239a* (BKF). Drawn by Sukkharak.

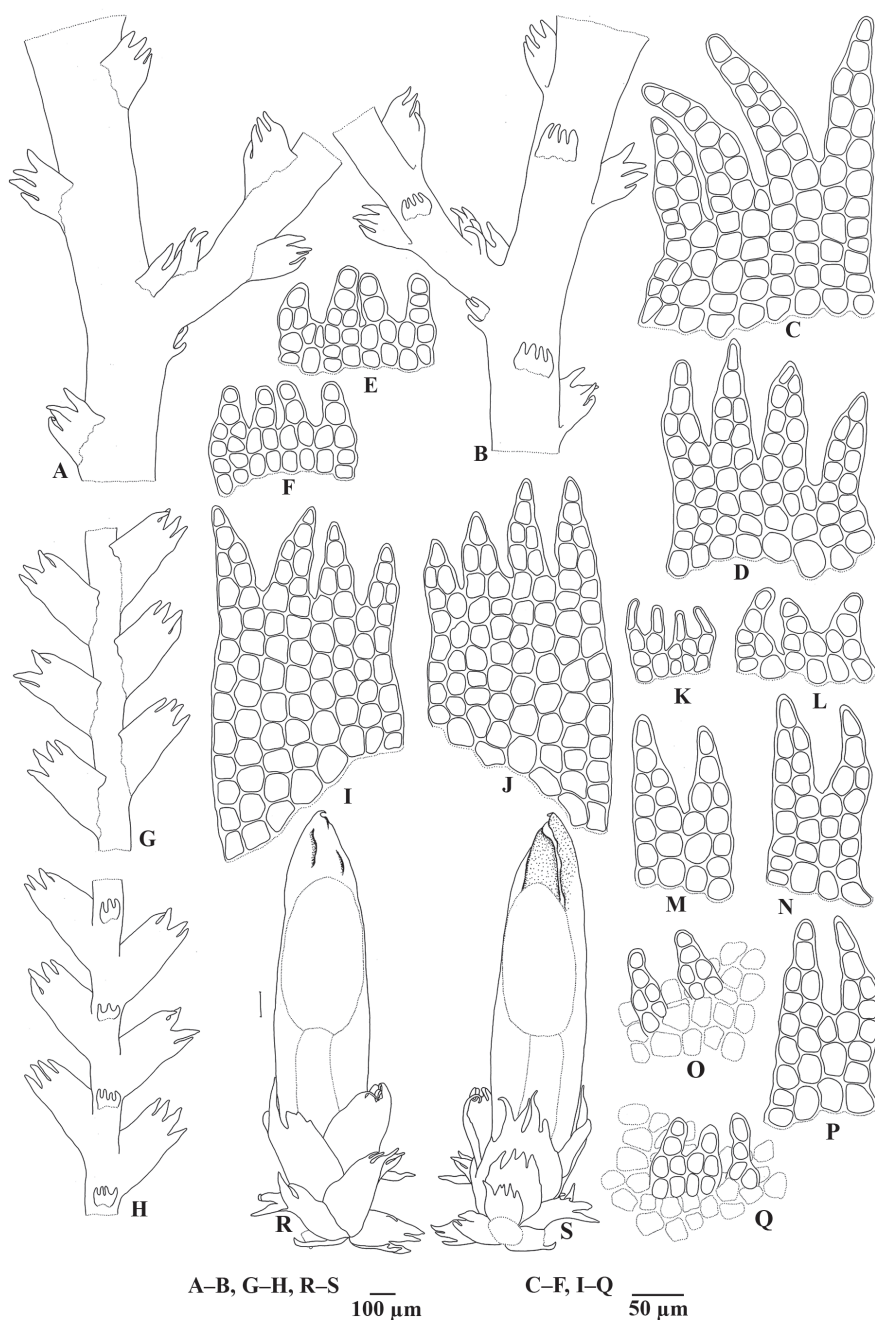


Figure 3. *Lepidozia flexuosa* Mitt.: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-F. Stem underleaves; G. Portion of branch, dorsal view; H. Portion of branch, ventral view; I. Left-hand side branch leaf lobe, dorsal view; J. Right-hand side branch leaf lobe, dorsal view; K.-L. Branch underleaves; M.-N. Bilobate half stem leaves, dorsal view; O.-Q. First branch underleaves, ventral view; R. Perianth, dorsal view; S. Perianth, ventral view; All from *Nathi 434* (BCU). Drawn by Sukkharak.

Student" (CMUB); *ibid.*, alt. 2,300 m, 15 Jan. 2010, *Printarakul 2781* (CMUB); *ibid.*, *Printarakul 2782* (CMUB); Ang Ka, 30 Nov. 2007, *Nathi 1013* (BCU); *ibid.*, 18°35.326' N, 98°29.053' E, alt. 2,511 m, 23 July 2007, *Nathi 1242* (BCU); Kew Mae Pan, 18°33.487' N, 98°28.886' E, alt. 2,205 m, 24 July 2007, *Nathi 253* (BCU); *ibid.*, 18°33.467' N, 98°28.855' E, alt. 2,234 m, 24 July 2007, *Nathi 260* (BCU); *ibid.*, 18°33.379' N, 98°28.823' E, alt. 2,138 m, 8 Oct. 2007, *Nathi 434* (BCU); *ibid.*, 8 Oct. 2007, *Nathi 479* (BCU); *ibid.*, 18°33.487' N, 98°28.865' E, alt. 2,173 m, 13 May 2007, *Nathi 1269* (BCU); *ibid.*, 18°33.707' N, 98°28.578' E, alt. 2,310 m, 24 July 2007, *Nathi 1288* (BCU); 18°35.327' N, 98°29.147' E, alt. 2,113 m, 3 Dec. 2007, *Nathi 821* (BCU); *ibid.*, *Nathi 1335* [BCU]; *ibid.*, 1 Dec. 2007, *Nathi 1360* (BCU)]. NORTH-EASTERN: Loei [Phu Luang, 17°16.815' N, 101°31.102' E, alt. 1,337 m, 20 Feb. 2016, *Sukkharak 4552* (BUU)]. PENINSULAR: Nakhon Si Thammarat [Khao Luang, 8°30' N, 99°45' E, alt. 1,650–1,740 m, 5 Feb. 1966, *Touw 11740* (BKF); *ibid.*, alt. 1,700 m, 26 June 1953, *Phloenchit 613* (BKF); *ibid.*, alt. 1,000 m, 20 Apr. 1952, *Smitinand 1294* (BKF); *ibid.*, alt. 1,345 m, 3 July 2017, *Chantanaorrapint & Suwanmala 1459* (PSU); *ibid.*, alt. 1,433 m, 3 July 2017, *Chantanaorrapint & Suwanmala 1503* (PSU); alt. 1,371 m, 4 July 2017, *Chantanaorrapint & Suwanmala 1611* (PSU)]; Phatthalung [Khao Sa, 7°12.766' N, 99°59.481' E, alt. 995 m, 1 July 2016, *Chantanaorrapint & Suwanmala 482* (PSU); Khao Loan, alt. 916 m, 27 May 2017, *Chantanaorrapint & Suwanmala 995* (PSU); *ibid.*, alt. 916 m, 27 May 2017, *Chantanaorrapint & Suwanmala 1055* (PSU); *ibid.*, alt. 942 m, 28 May 2017, *Chantanaorrapint & Suwanmala 1075* (PSU); *ibid.*, alt. 1,234 m, 29 May 2017, *Chantanaorrapint & Suwanmala 1144* (PSU)].

Additional illustrations.— Thouvenot & Bardat (2013: 45, Figs. 6–8).

Distribution.— Indomalaysia region, New Caledonia (Thouvenot & Bardat, 2013).

Ecology.— Thai *Lepidozia flexuosa* were found on tree trunks, rotten logs and rocks in evergreen forest, at about 900–2,550 m elevation.

Notes.— The typification of *Lepidozia flexuosa* was investigated by Majumdar (2022). Mitten (1861) described *L. flexuosa* based on five specimens: two from Sikkim, collected by *J.D. Hooker* (1411 and

1411b); two from Khasia mountains, collected by *J.D. Hooker & T. Thomson* (1415 and 1456); and one from Assam, collected by *W. Griffith* (s.n.), without designating a type. Therefore, all five specimens are considered syntypes as they were distributed among several institutions, including BM, G and NY (see Majumdar, 2022). On the collecting packets, Hooker annotated *J.D. Hooker 1411* and *J.D. Hooker 1411b* with different localities and elevations: Tonglo [=Tonglu] at 10,000 ft. and Sinchul [=Senchal] at 7,000 ft. In addition, when Mitten (1861) first described *L. flexuosa*, he cited the locality and elevation as “Sikkim, 7–10,000 ft., *J.D. Hooker 1411*”. Therefore, Majumdar (2022) selected the specimen collected by *J.D. Hooker 1411* as the lectotype of the species because it provides good material for identification.

Lepidozia flexuosa and *L. trichodes* are characterized by the presence of a 4-lobed stem and branch leaves. *Lepidozia flexuosa* differs, however, by 1) symmetrical quadrate leaves (asymmetrical rectangular in *L. trichodes*), 2) lobed 1/2 of leaf length (1/4 in *L. trichodes*), and 3) smooth cell surface (verrucose in *L. trichodes*).

3. *Lepidozia holorrhiza* (Reinw., Blume & Nees) Nees, Syn. Hepat. 2: 210. 1845.— *Jungermannia holorrhiza* Reinw., Blume & Nees, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 12(1): 204. 1824. Specimen cited in the protologue as “Habitat inter muscos Iavae insulae. Cum Hypno spirali invenit Blume. V. s. fr.”. Type: Indonesia, Java, without date, collector unknown (specimen without a type designation G [G00064833] photo seen). Fig. 3.

Descriptions and illustrations.— Reinwardt *et al.* (1824: 204–205); Gottsche *et al.* (1845: 210); Gradstein (2011: 129, Fig. 12. 28b); Lee & Gradstein (2021: 180, Fig. 24C, L).

Specimens reported from Thailand.— NORTH-EASTERN: Loei [Phu Kradueng, alt. 1,250 m, *Touw 11009* (Kitagawa, 1978)].

Distribution.— Thailand, Malaysia, Indonesia, Hawaii (Kitagawa, 1978).

Notes.— In the protologue, when Reinwardt *et al.* (1824) first described *Jungermannia holorrhiza*, they cited “Habitat inter muscos Iavae insulae. Cum Hypno spirali invenit Blume. V. s. fr.”. However,

the herbarium housing the type specimen could not be located. An image of a specimen available online from G, bearing label information referring to “Syn. Hepat. 210”, may represent original material of *Lepidozia holorrhiza*. However, it remains uncertain whether this specimen corresponds to the original material cited in the protologue, as the label only indicates Java (= Iavae). The specimen should therefore be examined in person before it can be formally designated as the lectotype.

Lepidozia holorrhiza was previously reported from Thailand by Kitagawa (1978). Although no specimen attributable to *L. holorrhiza* was confirmed during this present study, its occurrence in Thailand is considered geographically and ecologically plausible, as the species is widely distributed in Hawaii and Malesia. However, because no authenticated Thai specimen was located in the present study, its occurrence in Thailand should be regarded as requiring confirmation based on additional field collections and examination of historical specimens.

The unique character of *Lepidozia holorrhiza* is its strongly concave and broadly rounded-reniform leaves with lacinate margins (Gottsche *et al.*, 1845; Gradstein, 2011). *Lepidozia holorrhiza* may be confused with *L. cladorhiza*; for differences see the former species.

4. *Lepidozia reptans* (L.) Dumort., Recueil Observ. Jungerm.: 19. 1835.— *Jungermannia reptans* L., Sp. Pl. 1: 1133. 1753.— *Pleuroschisma reptans* (L.) Dumort., Syll. Jungerm. Europ.: 69. 1831.— *Herpetium reptans* (L.) Nees, Naturgesch. Eur. Leberm. 3: 31. 1838.— *Mastigophora reptans* (L.) Trevis., Herb. Crypt. Trevis. 2: 30. 1853. Type: [Icon] “Lichenastrum multifidum exiguum, ad basim florens, per siccitatem imbricatum” in Dillenius, Hist. Musc.: 494, t. 71, f. 24. 1741. (lectotype OXF, designated by Isoviita, 1970). Fig. 4.

— *Lepidozia chinensis* Steph., Sp. Hepat. 3: 622. 1909 (fide Piippo, 1990).

— *Lepidozia himalayensis* Steph., Sp. Hepat. 3: 617. 1909 (fide Kitagawa, 1981).

— *Lepidozia hokinensis* Steph., Mém. Soc. Sci. Nat. Math. Cherbourg 29: 216. 1894 (fide Mizutani & Chang, 1986).

— *Lepidozia liebmanniana* Steph., Sp. Hepat. 3: 574. 1909 (fide Fulford, 1966).

— *Lepidozia macrocalyx* Steph., Mém. Soc. Sci. Nat. Math. Cherbourg 29: 216. 1894 (fide Mizutani & Chang, 1986).

— *Lepidozia macropatens* Herzog, Rev. Bryol. Lichénol. 11(1): 20. 1938[1939] (fide Fulford, 1966).

— *Lepidozia obliqua* Steph., Bull. Herb. Boissier 5(2): 94. 1897 (fide Schuster, 1969).

— *Lepidozia reptans* var. *australis* (Lehm. & Lindenb.) Lindenb., Syn. Hepat. 205. 1845 (fide Fulford & Sharp, 1990).— *Jungermannia australis* Lehm. & Lindenb., Nov. Stirp. Pug. 6: 28. 1834.

— *Lepidozia reptans* var. *julacea* (Nees) Lindenb., Syn. Hepat. 205. 1845 (fide Paton, 1999). — *Herpetium reptans* f. *julaceum* Nees, Naturgesch. Eur. Leberm. 3: 33. 1838 (fide Nees, 1838).

— *Lepidozia reptans* var. *tenera* (Huebener) Lindenb., Syn. Hepat. 205. 1845 (fide Damsholt, 2002).— *Jungermannia reptans* var. *tenera* Huebener, Hepaticol. Germ.: 216. 1834.

— *Lepidozia subalpina* S.Hatt., J. Hattori Bot. Lab. 2: 24. 1947[1948] (fide Schuster, 1969).

— *Lepidozia tridens* Steph., Sp. Hepat. 3: 616. 1909 (fide Mizutani & Chang, 1986).

Stems with leaves 0.5–0.6 mm wide. *Stem leaves* obliquely attached, erect, appressed, parallel to stem; distant; obliquely quadrate, asymmetrical, partially with falcate leaf lobes, 0.3–0.4 × 0.2–0.4 mm; 3 lobed, 1/2 leaf length, lobes 3–6 cells wide at base, multiseriate part 1–7 cells long, biseriate part 1–2 cells long, uniseriate part 1–2 cells long, margins entire; cells smooth. *Stem underleaves* distant; quadrate, 0.1–0.3 × 0.2–0.4 mm; 4 lobed, 1/2 leaf length, lobes 4–5 cells wide at base, biseriate part 1–2 cells long, uniseriate part 1–2 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, erect, appressed, parallel to branch; distant; obliquely quadrate, asymmetrical, partially with falcate leaf lobes, 0.2–0.3 × 0.2–0.3 mm; 3 lobed, 1/2 leaf length, lobes 3–5 cells wide at base, multiseriate part 1–2 cells long, biseriate part 1–2 cells long, uniseriate part 1–2 cells long, margins entire; cells smooth. *First branch underleaves* 2 lobed. *Branch underleaves* distant; quadrate, 0.1–0.2 × 0.1–0.2 mm;

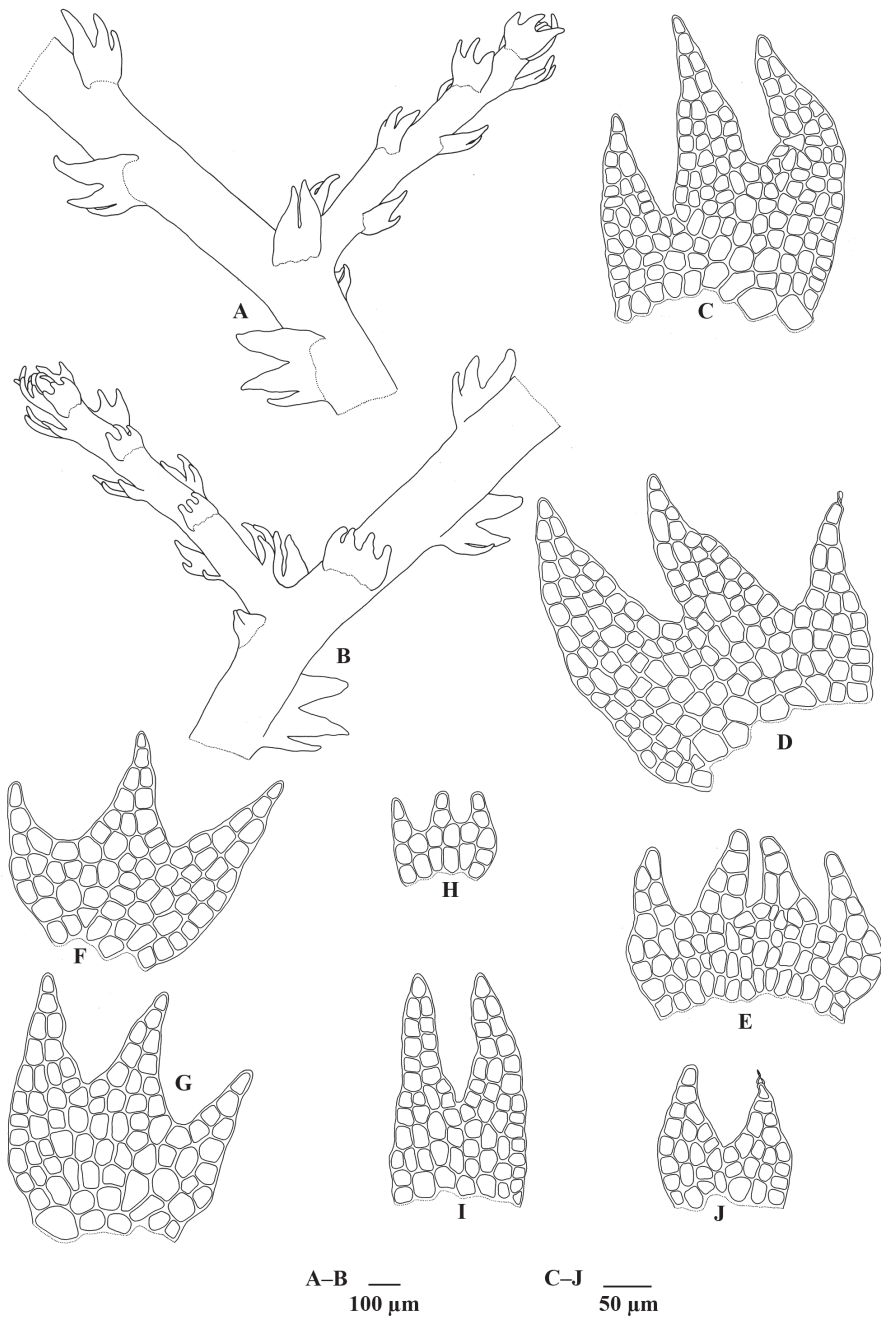


Figure 4. *Lepidozia reptans* (L.) Dumort.: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E. Stem underleaf; F. Left-hand side branch leaf lobe, dorsal view; G. Right-hand side branch leaf lobe, dorsal view; H. Branch underleaf; I. Bilobate half stem leaf, dorsal view; J. First branch underleaf, ventral view. All from *Nathi 1263* (BCU). Drawn by Sukkharak.

3 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 2 cells long, margins entire. *Gynoeceia* not seen. *Androeceia* not seen. *Asexual reproduction* not seen.

Specimens examined.—NORTHERN: Chiang Mai [Ang Ka, 18°35.290' N, 98°29.208' E, alt. 2,565 m, 22 July 2007, *Nathi 1263* (BCU); Kew Mae Pan, 1 Dec. 2007, *Nathi 791* (BCU)].

Additional illustrations.—Gradstein (2021: 216, Fig. 22R); Bakalin and Klimova (2024: B60, Fig. 3; B61, Fig. 4).

Distribution.—Temperate region and tropical Asia (Gradstein, 2021).

Ecology.—Thai *Lepidozia reptans* were found on tree trunks and rotten logs, at about 2,565 m elevation.

Notes.—The distant leaves with entire margins in *Lepidozia reptans* resemble those of *L. flexuosa* and *L. trichodes*. However, *L. reptans* has 3-lobed stem and branch leaves, whereas *L. flexuosa* and *L. trichodes* have 4-lobed stem and branch leaves.

5. *Lepidozia trichodes* (Reinw., Blume & Nees) Nees, Syn. Hepat. 2: 203. 1845.—*Jungermannia trichodes* Reinw., Blume & Nees, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 12 (1): 199. 1824.—*Mastigophora trichodes* (Reinw., Blume & Nees) Nees ex Mont., Voy. Amér. Mér. 7(2): 73. 1839. Specimen cited in the protologue as “Habitat in montosis Provinciae Bantam Iavae insulae, ad tumulos sacros Baduorum circa Rawayan. V. c. cal. mense Decembri et Januario. Blume.” (isotypes **E** [E00002691] photo seen, **G** [G00051520, G00281366] photo seen). Fig. 5.

—*Lepidozia remotifolia* Horik., J. Sci. Hiroshima Univ., Ser. B, Div. 2, Bot. 2: 202. 1934 (fide Mizutani & Chang, 1986).

—*Lepidozia tenuissima* Steph., Leaffl. Philipp. Bot. 6: 2288. 1914 (Rosario, 1975).

Stems with leaves 0.2–0.3 mm wide. *Stem leaves* obliquely attached, erect, appressed, parallel to stem; distant; rectangular, asymmetrical, partially with falcate leaf lobes, 0.2–0.4 × 0.1–0.2 mm; 4 lobed, 1/4 leaf length, lobes 2 cells wide at base, biseriate part 1–3 cells long, uniseriate part 1–2 cells long, margins entire; cells verrucose. *Stem*

underleaves distant; subrectangular, 0.1–0.2 × 0.1–0.2 mm; 4 lobed, 1/4–1/3 leaf length, lobes 1–2 cells wide at base, uniseriate part 1–3 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, erect, appressed, parallel to branch; distant; rectangular, asymmetrical, partially with falcate leaf lobes, 0.1–0.2 × 0.1–0.2 mm; 4 lobed, 1/3 leaf length, lobes 2 cells wide at base, biseriate part 1 cell long, uniseriate part 1–2 cells long, margins entire; cells verrucose. *First branch underleaves* 2 lobed. *Branch underleaves* distant; rectangular, 0.1–0.2 × 0.1 mm; 4 lobed, 1/4–1/3 leaf length, lobes 1–2 cells wide at base, uniseriate part 1–2 cells long, margins entire. *Gynoeceia* not seen. *Androeceia* not seen. *Asexual reproduction* not seen.

Specimens examined.—PENINSULAR: Nakhon Si Thammarat [Khao Luang, 8°30' N, 99°45' E, alt. 1,740 m, 5 Feb. 1966, *Touw 11760* (BKF); *ibid.*, 8°30.304' N, 99°44.630' E, alt. 1,342 m, 3 July 2017, *Chantanaorrapint & Suwanmala 1467* (PSU)]; Phatthalung [Khao Sam Pu, alt. 885 m, 1 July 2016, *Chantanaorrapint & Suwanmala 441* (PSU); Khao Loan, alt. 984 m, 28 May 2017, *Chantanaorrapint & Suwanmala 1122* (PSU); Khao Sa, alt. 966 m, 1 July 2016, *Chantanaorrapint & Suwanmala 453* (PSU)].

Additional illustrations.—Gradstein (2011: 129, Fig. 12. 27a–b); Lee & Gradstein (2021: 221, Fig. 65C).

Distribution.—Tropical Asia, Tahiti (Kitagawa, 1978).

Ecology.—*Lepidozia trichodes* in Thailand was found on tree trunks in mossy forest, at about 850–1,750 m elevation.

Notes.—There are three specimens that could potentially represent the type, as they bear Blume’s name on the labels. One is held at **E** and is annotated as an isotype by D.G. Long (in sched.), while the other two are deposited at **G**.

Lepidozia trichodes is distinguished by its verrucose cell surface.

Neolepidozia Fulford & J.Taylor, Brittonia 11(2): 81. 1959. Type species: *Neolepidozia wallichiana* (Gottsche) Fulford & J.Taylor, Brittonia 11 (2): 84, 1959.

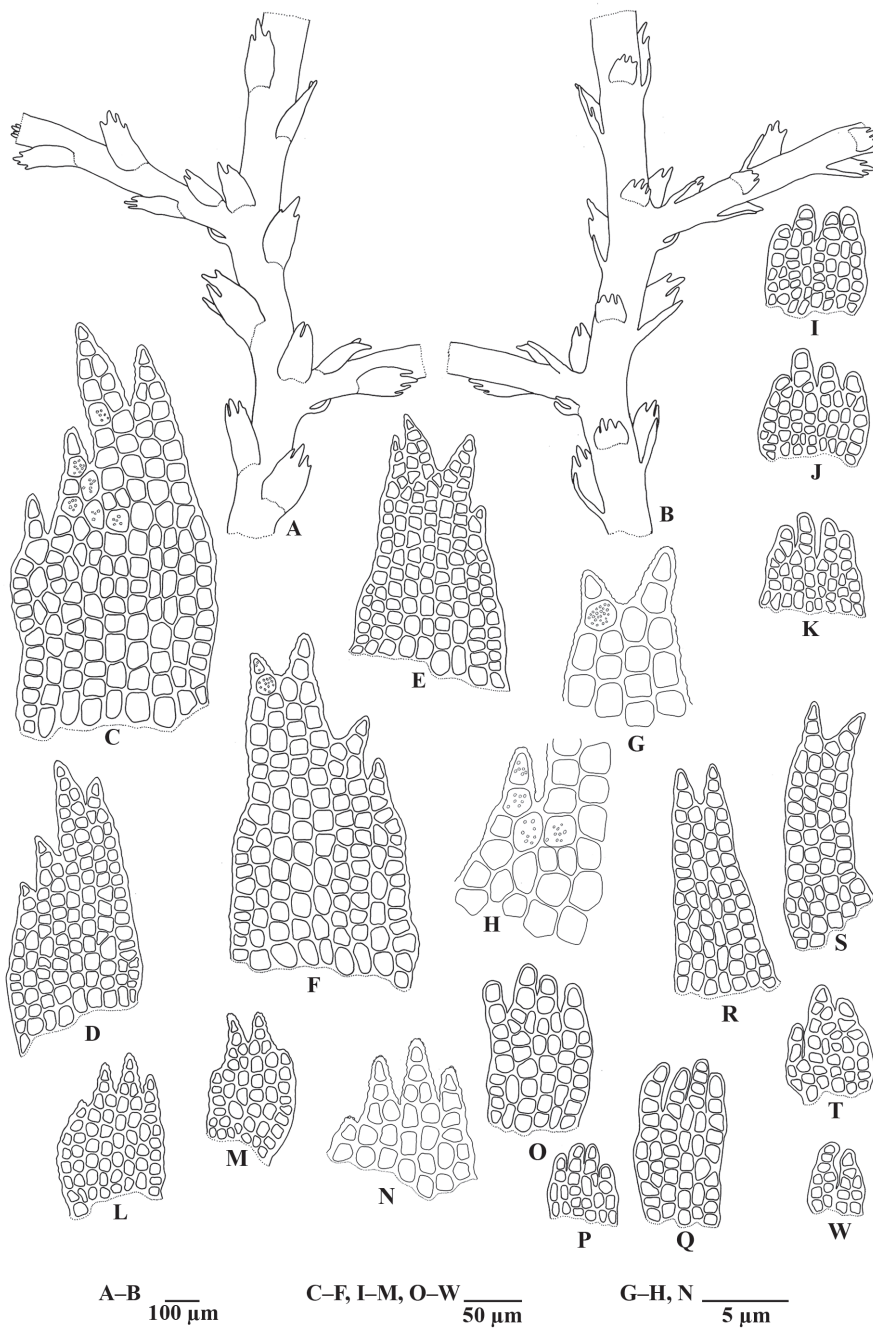


Figure 5. *Lepidozia trichodes* (Reinw., Blume & Nees) Nees: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C.-D. Left-hand side stem leaf lobes, dorsal view; E.-F. Right-hand side stem leaf lobes, dorsal view; G.-H. Stem leaf cell surface with verrucose, dorsal view; I.-K. Stem underleaves; L. Left-hand side branch leaf lobe, dorsal view; M. Right-hand side branch leaf lobe, dorsal view; N. Branch leaf cell surface with verrucose, dorsal view; O.-Q. Branch underleaves; R.-S. Bilobate half stem leaves, dorsal view; T.-W. First branch underleaves, ventral view. All from *Chantanaorrapint & Suwanmala 1467 (PSU)*. Drawn by Sukkharak.

Plants leafy. *Rhizoids* few. *Scales* absent. *Stems* creeping or erect; branches unipinnate-bipinnate; *Frullania*-type, with first branch underleaf 1-lobed; in cross section epidermal cells larger than medullary cells; flagelliform branches present. *Leaves* incubous; obliquely attached; spreading or *Kurzia*-like appearance; distant, contiguous, or imbricate; quadrate or rectangular; apex 4–6-lobed; margins entire, straight or concave; cells quadrate-hexagonal or rectangular; oil bodies segmented globules. *Underleaves* distant; cuneate, quadrate, or rectangular; apex 2–4-lobed; margins entire; first branch underleaf 1-lobed. Dioicous. *Gynoecea* innovations absent; bracts and bracteoles in 3–4 series. *Perianths* mouth contracted, with cilia. *Androecea* curved. *Asexual reproduction* not seen (Description based on Sukkharak, 2022 and this study).

1. *Neolepidozia bickeri* U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 36. 2026. Type: Malaysia, Pahang, Frasers Hill, Parklandschaft im Ort, Regenwald-Rand, 3°42.658' N, 101°44.190' E, 1,300 m, 20 May 1997, *A. Schäfer-Verwimp* & *M. Verwimp* 18594/A (holotype **JE**).

Descriptions and illustrations.— Schwarz *et al.* (2026: 28–29, 36–38, 135, 155–161, Figs. 136, 140, Plates 5B, 25–31).

Specimens reported from Thailand.— PENINSULAR: Nakhon Si Thammarat [Khao (Mt.) Luang, evergreen forest near Camp II, 8°30' N, 99°45' E, 1,000 m, 4 Feb. 1966, *Touw* 11580 as *Lepidozia papulosa* (L.) (Schwarz *et al.*, 2026)].

Distribution.— Thailand, Malaysia (Schwarz *et al.*, 2026).

Notes.— *Neolepidozia bickeri* was previously reported from Thailand by Kitagawa (1978) as *Lepidozia papulosa*. Schwarz *et al.* (2026) examined a specimen from Thailand deposited at L and identified it as *N. bickeri*, a species also represented by two specimens collected in Malaysia. Although the specimens were not examined in the present study, the occurrence of *N. bickeri* in Thailand is included here under its current name.

The unique characters of *Neolepidozia bickeri* are its uniseriate stem lobes and hooked lobes of both stem and branch leaves (Schwarz *et al.*, 2026).

2. *Neolepidozia cameronensis* U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 38. 2026. Type: Malaysia, Pahang, Cameron Highlands, Nebelwald im Gipfelbereich des Gunung Brinchang, 4°31.093' N, 101°22.960' E, 2,000 m, 22 May 1997, *Schäfer-Verwimp* & *Verwimp* 18705b (holotype **JE**).

KEY TO THE SPECIES OF *NEOLEPIDOZIA* IN THAILAND

1. Plants with a *Kurzia*-like appearance. Leaf lobes pointed towards the end of stem or branch
 2. Leaf lobes entirely uniseriate 4. *N. katrinae*
 2. Leaf lobes uniseriate above biseriate in lower part
 3. Uniseriate cells of leaf lobes up to 4 cells long, cells up to 3 times as long as wide 7. *N. parvula*
 3. Uniseriate cells of leaf lobes up to 8 cells long, cells more than 3 times as long as wide 8. *N. richardsii*
1. Plants with a spreading appearance. Leaf lobes pointed at an angle of 45° or more of stem or branch
 4. Stem leaves 3-lobed
 5. Leaf lobes entirely uniseriate, branch leaves symmetrical bilobed 2. *N. cameronensis*
 5. Leaf lobes uniseriate above biseriate in lower part, branch leaves asymmetrical bilobed 3. *N. cuneifolia* f. *biloba*
 4. Stem leaves 4-lobed
 6. Leaf lobes hooked, entirely uniseriate 1. *N. bickeri*
 6. Leaf lobes straight, uniseriate above biseriate in lower part
 7. Leaf lobes incurved, cells isodiametric 5. *N. massartiana*
 7. Leaf lobes plane, cells quadrate or rectangular
 8. Leaves symmetrical
 9. Branch leaf lobes 1/4 of leaf length 6. *N. papulosa*
 9. Branch leaf lobes 1/3 of leaf length 9. *N. schaefer-verwimp*
 8. Leaves asymmetrical
 10. Leaves distant, cell surface smooth 10. *N. shevockii*
 10. Leaves imbricate, cell surface verrucose 11. *N. variifolia*

Descriptions and illustrations.— Schwarz *et al.* (2026: 5, 8–9, 21, 38–40, 134, 162–166, Figs. 3, 12P, 13G, 74, 77, 79–81, Plates 4C, 32–36).

Specimens reported from Thailand.— PENINSULAR: Nakhon Si Thammarat [Khao (Mt.) Luang, summit region, 8°30' N, 99°45' E, 1,740 m, 5 Feb. 1966, *Touw 11808/B (L)* (Schwarz *et al.*, 2026)].

Distribution.— Thailand, Malaysia (Schwarz *et al.*, 2026).

Notes.— Schwarz *et al.* (2026) reported *Neolepidozia cameronensis* based on a specimen collected by Touw in Nakhon Si Thammarat Province in 1966, which had previously been identified as *Lepidozia parvula*. Thus, this specimen represents two species of *Neolepidozia*: *N. parvula*, designated as *11808/A*, and *N. cameronensis*, designated as *11808/B*. Although the specimen was not available for examination in the present study, the occurrence of *N. cameronensis* in Thailand is included here under its current name.

According to Schwarz *et al.* (2026), *Neolepidozia cameronensis* is mainly characterized by symmetrical, bilobed branch leaves and isodiametric cells in the branch leaves. Bilobed branch leaves are also found in *N. cuneifolia* f. *biloba*; however, the branch leaves in the latter are asymmetrical.

3. *Neolepidozia cuneifolia* f. *biloba* (Herzog) U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 42. 2026.— *Lepidozia biloba* Herzog, *Ann. Bryol.* 4: 83. 1931. Type: Philippines, Luzon Island, Laguna Province, Mt. Makiling, 14°08.117' N, 122°11.583' E, 19 Jan. 1914, *C.J. Baker 7020* (holotype **JE**). Fig. 6.

Stems with leaves 0.3–0.5 mm wide. *Stem leaves* obliquely attached, spreading, plane; distant; quadrate, symmetrical, 0.1–0.2 × 0.1–0.2 mm; 3 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 1–1.5 cell long, uniseriate part 2–3 cells long, margins entire; cells smooth. *Stem underleaves* distant; rectangular, 0.1–0.2 × 0.1 mm; 3–4 lobed, 1/3–1/2 leaf length, lobes 2 cells wide at base, uniseriate part 1–2 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length or lanceolate. *Branch leaves* obliquely attached, spreading,

plane; distant to contiguous; quadrate-rectangular, asymmetrical, 0.1–0.3 × 0.1–0.2 mm; 2–3 lobed, 1/3 leaf length, lobes 2 cells wide at base, biseriate part 1–1.5 cell long, uniseriate part 2–3 cells long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; quadrate, 0.1 × 0.1 mm; 2 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 1–2 cells long, margins entire. *Gynoeceia* not seen. *Androeceia* not seen. *Asexual reproduction* not seen.

Specimens examined.— NORTHERN: Chiang Mai [Kew Mae Pan, 18°33.262' N, 98°28.733' E, alt. 2,189 m, 8 Oct. 2007, *Nathi 478 (BCU)*]. PENINSULAR: Phatthalung [Khao Loan, alt. 916 m, 27 May 2017, *Chantanaorrapint & Suwanmala 992 (PSU)*].

Additional illustration.— Herzog (1931: 83–84, Fig. 1a–b); Schwarz *et al.* (2026: 16–17, 21, 42–43, 132–134, 173–178, Figs. 36, 38, 46, 49, 72, Plates 2P, 3I, 4A, 43–48).

Distribution.— Thailand, Philippines (Schwarz *et al.*, 2026; this study).

Ecology.— The species was found on rotten logs in montane forest, at about 900–2,200 m elevation.

Notes.— This taxon is newly recorded for Thailand. It is recognized by symmetrical trilobate stem leaves but asymmetrical branch leaves. Bilobed branch leaves in *Neolepidozia cuneifolia* f. *biloba* resemble those of *N. cameronensis*. However, *N. cuneifolia* f. *biloba* has asymmetrical branch leaves, whereas *N. cameronensis* has symmetrical branch leaves.

4. *Neolepidozia katrinae* U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 54. 2026. Type: Malaysia, State Pahang, Genting Highlands, 2,200 m, *W.C. Pang s.n.* (holotype **JE**). Fig. 7.

Stems with leaves 0.4–0.6 mm wide. *Stem leaves* obliquely attached, *Kurzia*-like appearance, leaf lobes pointed towards end of stem; imbricate; quadrate, symmetrical, 0.2–0.3 × 0.1–0.2 mm; 4 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 3–4 cells long, margins entire; cells smooth. *Stem underleaves* distant; quadrate-rectangular, 0.1–0.2 × 0.1–0.2 mm; 3–4 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 2–4

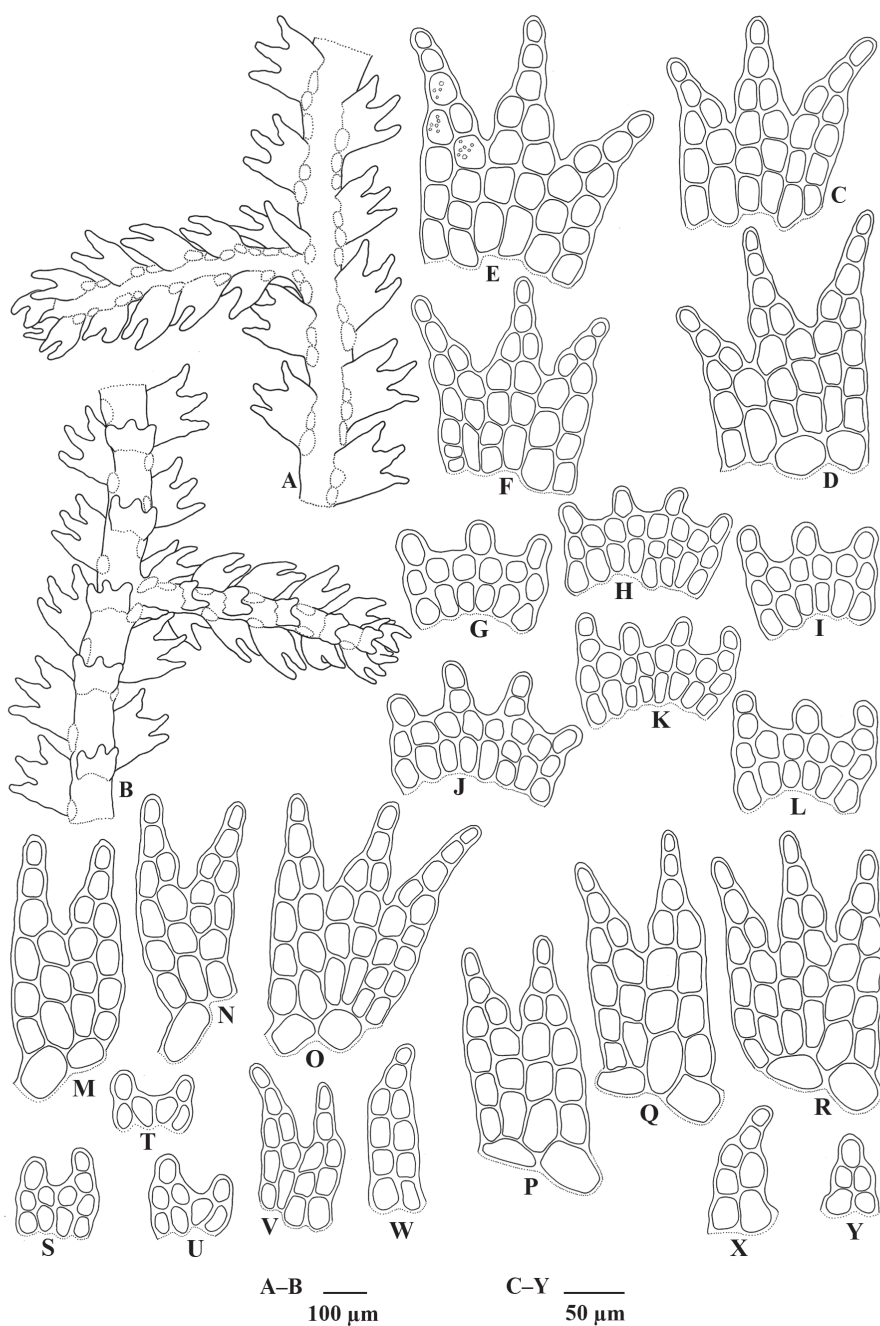


Figure 6. *Neolepidozia cuneifolia* f. *biloba* (Herzog) U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C.–D. Left-hand side stem leaf lobes, dorsal view; E.–F. Right-hand side stem leaf lobes, dorsal view; G.–L. Stem underleaves; M.–O. Left-hand side branch leaf lobes, dorsal view; P.–R. Right-hand side branch leaf lobes, dorsal view; S.–U. Branch underleaves; V.–W. Bilobate and lanceolate half stem leaves, dorsal view; X.–Y. First branch underleaves, ventral view. All from *Chantanaorrapint & Suwanmala* 992 (PSU). Drawn by Sukkharak.

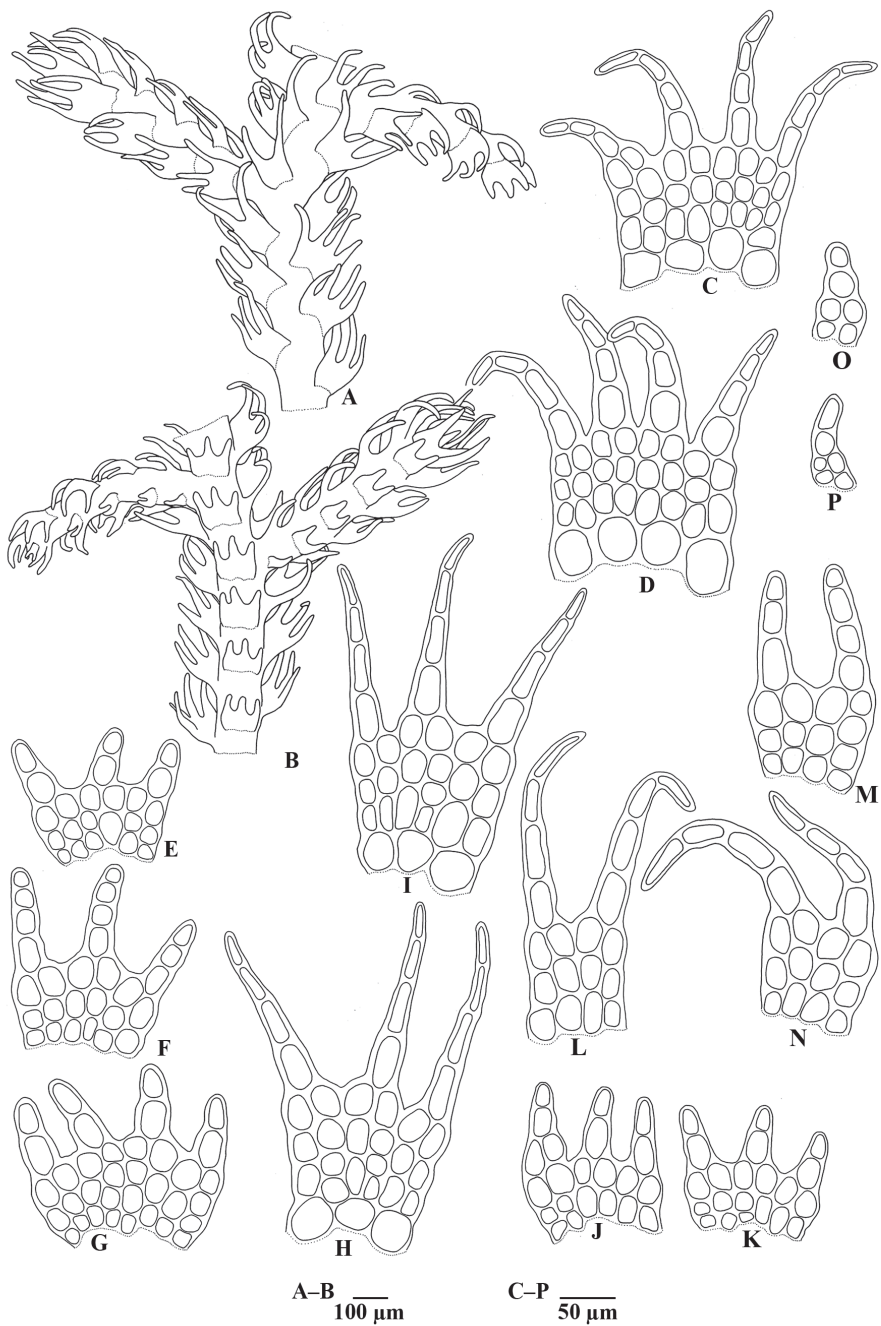


Figure 7. *Neolepidozia katrinae* U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-G. Stem underleaves; H. Left-hand side branch leaf lobe, dorsal view; I. Right-hand side branch leaf lobe, dorsal view; J.-K. Branch underleaves; L.-N. Bilobate half stem leaves, dorsal view; O.-P. First branch underleaves, ventral view. All from *Chantanaorrapint & Suwanmala 4278* (PSU). Drawn by Sukkharak.

cells long, margins entire. *Half stem leaves* bilobate, 2/3 leaf length. *Branch leaves* obliquely attached, *Kurzia*-like appearance, leaf lobes pointed towards end of branch; imbricate; quadrate, symmetrical, $0.2\text{--}0.3 \times 0.1\text{--}0.2$ mm; 3 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 3–4 cells long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; quadrate, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 3 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 0–1 cell long, uniseriate part 2 cells long, margins entire. *Gynoeceia* not seen. *Androeceia* not seen. *Asexual reproduction* not seen.

Specimens examined.— PENINSULAR: Narathiwat [Hala Bala Wildlife Sanctuary, alt. 1,376 m, 23 May 2022, *Chantanaorrapint & Suwanmala 4278* (PSU)].

Additional illustrations.— Schwarz *et al.* (2026: 8–9, 14–15, 54–55, 132, 228–232, Figs. 12L, 13K, 28, 33–34, Plates 2B, 98–102).

Distribution.— Thailand, Malaysia (Schwarz *et al.*, 2026; this study).

Ecology.— The species was found on soil in lower montane forest, at about 1,340 m elevation.

Notes.— This species is newly recorded for Thailand. *Neolepidozia katrinae* can be distinguished from the *Kurzia*-like *N. parvula* and *N. richardsii* by its uniseriate leaf lobes, whereas the lower parts of the leaf lobes are biseriate in *N. parvula* and *N. richardsii*.

5. *Neolepidozia massartiana* (Schiffn. ex Steph.) U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 65. 2026.— *Lepidozia massartiana* Schiffn. ex Steph., Sp. Hepat. 3: 611. 1909. Specimen cited in the protologue as “Hab. Amboina (Karsten); Tahiti (Nadeaud): N. Caledonia (Elesse)”. Type: Indonesia, Java, without date, *G. Karsten s.n.* (specimen without a type designation **G** [G00280930] photo seen). Fig. 8.

— *Lepidozia expansa* Steph., Sp. Hepat. 6: 346. 1922 (fide Kitagawa, 1973).

— *Lepidozia tenera* Steph., Sp. Hepat. 3: 608. 1909 (fide Kitagawa, 1973).

Stems with leaves 0.4–0.5 mm wide. *Stem leaves* obliquely attached, spreading, incurved; imbricate; quadrate, asymmetrical, $0.1\text{--}0.3 \times 0.2\text{--}0.3$

mm; 4 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 0–1 cell long, uniseriate part 3 cells long, margins entire; cells smooth. *Stem underleaves* distant; quadrate-rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 4 lobed, 1/3 leaf length, lobes 2 cells wide at base, uniseriate part 1–2 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, spreading, incurved; imbricate; quadrate-rectangular, symmetrical, $0.2\text{--}0.3 \times 0.1\text{--}0.2$ mm; 3 lobed, 1/3 leaf length, lobes 2 cells wide at base, biseriate part 0–1 cell long, uniseriate part 2–3 cells long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; quadrate-rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 2–3 lobed, 1/3–1/2 leaf length, lobes 2 cells wide at base, biseriate part 0–1 cell long, uniseriate part 1–2 cells long, margins entire. *Gynoeceia* not seen. *Androeceia* not seen. *Asexual reproduction* not seen.

Specimens examined.— NORTHERN: Chiang Mai [Doi Inthanon, 18°35' N, 99°30' E, alt. 2,150–2,250 m, 20 Dec. 1965, *Touw 10239b* (BKF)].

Additional illustrations.— Stephani (1985: Icon. no. 5252); Sukkharak (2022: 102, Fig. 35D–G as *L. flexuosa*); Schwarz *et al.* (2026: 9, 21, 134, 210–215, Figs. 13E, 73, 78, 81, Plates 4B, 80–85).

Distribution.— Taiwan, Thailand, Malaysia, Indonesia, Philippines (Schwarz *et al.*, 2026; this study).

Ecology.— The species was found on tree trunks in evergreen forest, at about 2,150–2,250 m elevation.

Notes.— In the protologue, the habitat is given as “Hab. Amboina (Karsten); Tahiti (Nadeaud); N. Caledonia (Elesse),” and no holotype was indicated. Among the specimens available online, only one in **G**, labelled “Amboina G. Karsten” appears to correspond to the information given in the protologue.

Schwarz *et al.* (2026) noted that Stephani’s (1985) Icon. no. 5252 was drawn from material from Amboina and Tahiti, but considered that these plants do not belong to *Neolepidozia massartiana*. They were certain that Stephani’s drawings represent different species. However, Schwarz *et al.* (2026) did not examine the type specimen, and their understanding of *N. massartiana* was based on the remarks of Kitagawa (1973).

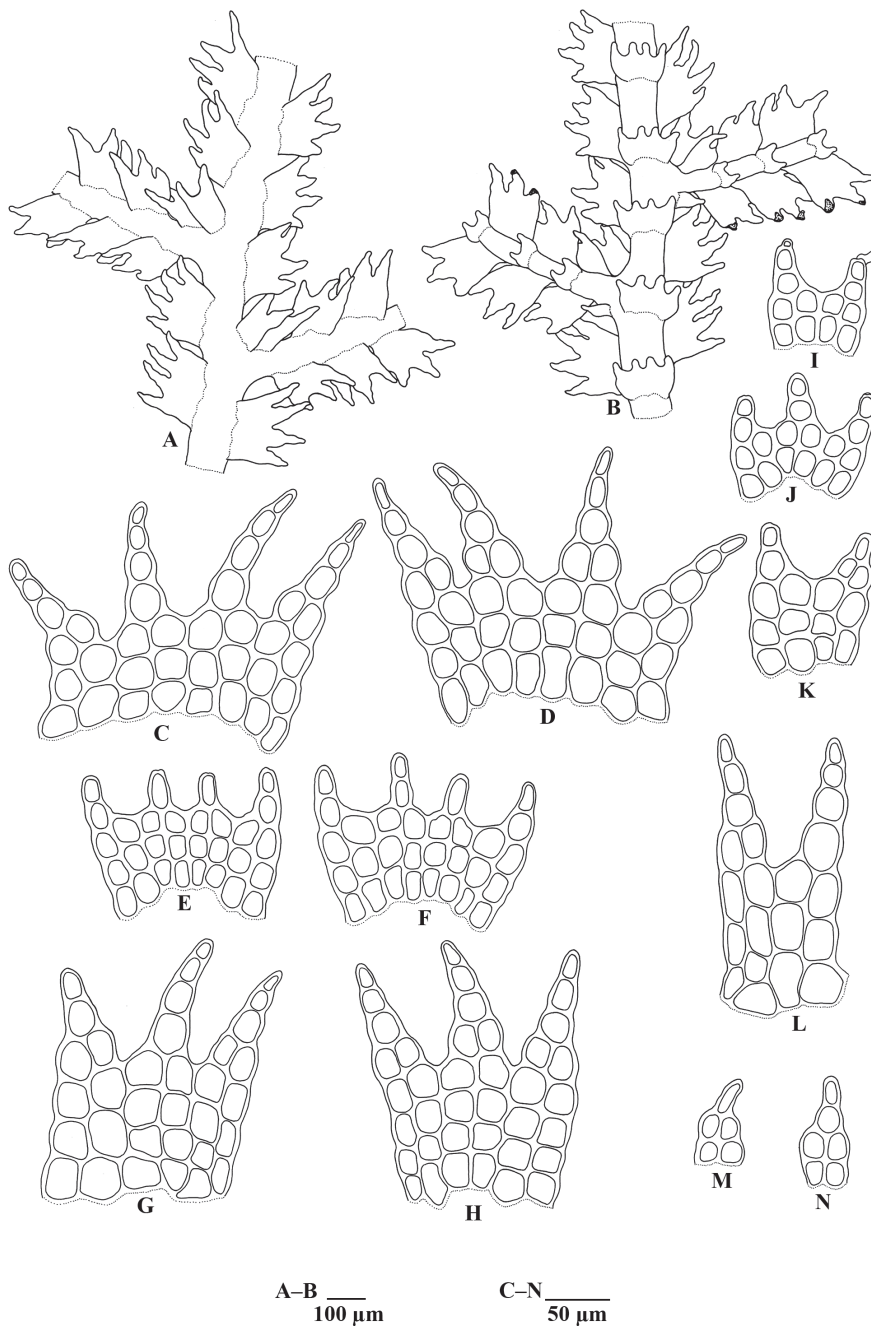


Figure 8. *Neolepidozia massartiana* (Schiffn. & Steph.) U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-F. Stem underleaves; G. Left-hand side branch leaf lobe, dorsal view; H. Right-hand side branch leaf lobe, dorsal view; I.-K. Branch underleaves; L. Bilobate half stem leaf, dorsal view; M.-N. First branch underleaves, ventral view. All from *Touw 10239b* (BKF). Drawn by Sukkharak.

This species is newly recorded for Thailand. *Neolepidozia massartiana* is distinctive in having incurved leaves and isodiametric leaf cells. It is closely similar to *N. papulosa*, but differs in having more incurved lateral leaves (lateral leaves less incurved to plane in *N. papulosa*) and isodiametric leaf cells (quadrate to rectangular in *N. papulosa*).

6. *Neolepidozia papulosa* (Steph.) Fulford & J. Taylor, *Brittonia* 11: 85. 1959.— *Lepidozia papulosa* Steph., *Sp. Hepat.* 3: 609. 1909. Specimen cited in the protologue as “Hab. Sumatra (Modigliani) Luzon (Merrill.)”. Type: Indonesia, Sumatra, 1891, *E. Modigliani s.n.* (isotypes **P** [PC0102357] photo seen, **G** [G00112640, G00112641] photo seen). Figs. 9–10.

Stems with leaves 0.6–0.8 mm wide. *Stem leaves* obliquely attached, spreading, plane; distant; rectangular, symmetrical, $0.2\text{--}0.4 \times 0.1\text{--}0.3$ mm; 4 lobed, $1/3$ leaf length, lobes 2 cells wide at base, biseriate part 0.5 cell long, uniseriate part 3–4 cells long, margin entire; cells smooth. *Stem underleaves* distant; rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.3$ mm; 4 lobed, $1/2$ leaf length, lobes 2 cells wide at base, uniseriate part 1–2(–4) cells long, margin entire. *Half stem leaves* bilobate, $1/3\text{--}2/3$ leaf length. *Branch leaves* obliquely attached, spreading, plane; distant; rectangular, symmetrical, $0.4\text{--}0.5 \times 0.1\text{--}0.2$ mm; 2–3 lobed, $1/4$ leaf length, lobes 2 cells wide at base, biseriate part 0.5–1 cell long, uniseriate part 3–4 cells long, margin entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; quadrate-rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 4 lobed, $1/2$ leaf length, lobes 2 cells wide at base, uniseriate part 1–2 cells long, margin entire. *Gynoecea* not seen. *Androecea* not seen. *Asexual reproduction* not seen.

Specimens examined.— SOUTH-EASTERN: Chanthaburi [Khao Soi Dao Wildlife Sanctuary, 9 Apr. 2012, Sukkharak *et al.* 356 (**BUU**)]. PENINSULAR: Phang Nga [Si Phang Nga National Park, Khao Dan trail, alt. 666 m, 20 Jan. 2018, Chantanaorrapint & Suwanmala 2537 (**PSU**)]; Nakhon Si Thammarat [San Yen, $8^{\circ}45.453' \text{N}$, $99^{\circ}31.811' \text{E}$, alt. 1,264 m, 19 Apr. 2007, Sukkharak 67 (**BCU**)]; Khao Ramrom, 928 m, 7 Mar. 2016, Chantanaorrapint *et al.* 164 (**PSU**); Khao Luang, alt. 1,201 m, 3 July 2017, Chantanaorrapint & Suwanmala 1408 (**PSU**); *ibid.*, Chantanaorrapint & Suwanmala 1409 (**PSU**)]. Phatthalung [Khao Loan, alt. 813 m, 27 May 2017,

Chantanaorrapint & Suwanmala 947 (**PSU**); *ibid.*, alt. 984 m, 28 May 2017, Chantanaorrapint & Suwanmala 1110 (**PSU**)]; Narathiwat [Hala Bala Wildlife Sanctuary, alt. 1,440 m, 25 May 2022, Chantanaorrapint & Suwanmala 4393 (**PSU**)].

Additional illustrations.— Stephani (1985: Icon. no. 5261); Sukkharak (2022: 106, Fig. 37 as *Lepidozia papulosa*); Schwarz *et al.* (2026: 22–23, 86–87, 132, 357–362, Figs. 86, 93–94, Plates 2H, 227–232).

Distribution.— Thailand, Indonesia, Philippines (Schwarz *et al.*, 2026; this study).

Ecology.— The species was found on tree trunks, tree ferns, rotten logs, soil and rock, at about 650–1,450 m elevation.

Notes.— Several images of potential type specimens are available online. Although no holotype was indicated in the protologue, the habitat was given as “Sumatra (Modigliani), Luzon (Merrill),” corresponding to specimens deposited at **P** and identified as isotypes, as well as two specimens held at **G**. All three specimens bear the same information on the label, “Sumatra, Modigliani, 1891”. A lectotype still has to be designated from the original material examined.

Neolepidozia papulosa is similar to *N. massartiana*. The differences between the two species are discussed under the latter species.

7. *Neolepidozia parvula* (N. Kitag.) U. Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 87. 2026.— *Lepidozia parvula* N. Kitag., *Acta Phytotax. Geobot.* 29: 60. 1978. Type: Thailand, Nakhon Sri Thammarat, at the summit of Mt. Khao Luang, 1,780 m, 21 Jan. 1966, M. Tagawa & N. Kitagawa T4897 (holotype **KYO**; isotypes **NICH**, **L**).

Descriptions and illustrations.— Kitagawa (1978: 60–61, Fig. 6); Schwarz *et al.* (2026: 15, 87–88, 132, 363–368, Figs. 31–32, Plates 2A, 233–238).

Specimens reported from Thailand.— PENINSULAR: Nakhon Si Thammarat [Khao (Mt.) Luang, $8^{\circ}30' \text{N}$, $99^{\circ}45' \text{E}$, 1,740 m, 5 Feb. 1966, *Touw 11808/A* (**L**) (Schwarz *et al.*, 2026); *ibid.*, *Touw 11808* (Kitagawa, 1978)].

Distribution.— Thailand (Schwarz *et al.*, 2026).

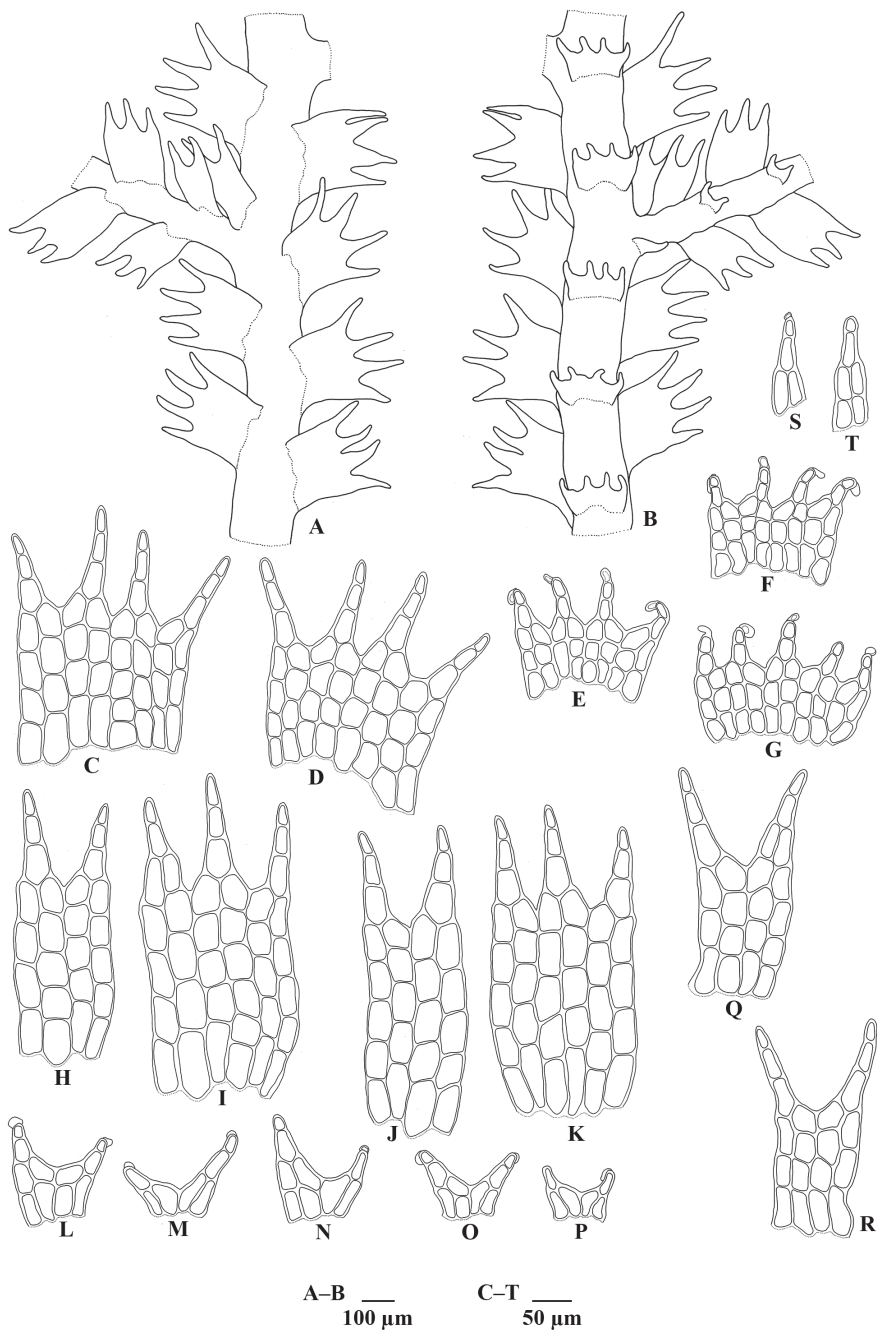


Figure 9. *Neolepidozia papulosa* (Steph.) Fulford & J.Taylor: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-G. Stem underleaves; H.-I. Left-hand side branch leaf lobes, dorsal view; J.-K. Right-hand side branch leaf lobes, dorsal view; L.-P. Branch underleaves; Q.-R. Bilobate half stem leaves, dorsal view; S.-T. First branch underleaves, ventral view. All from *Chantanaorrapint & Suwannmala 2537* (PSU). Drawn by Sukkharak.

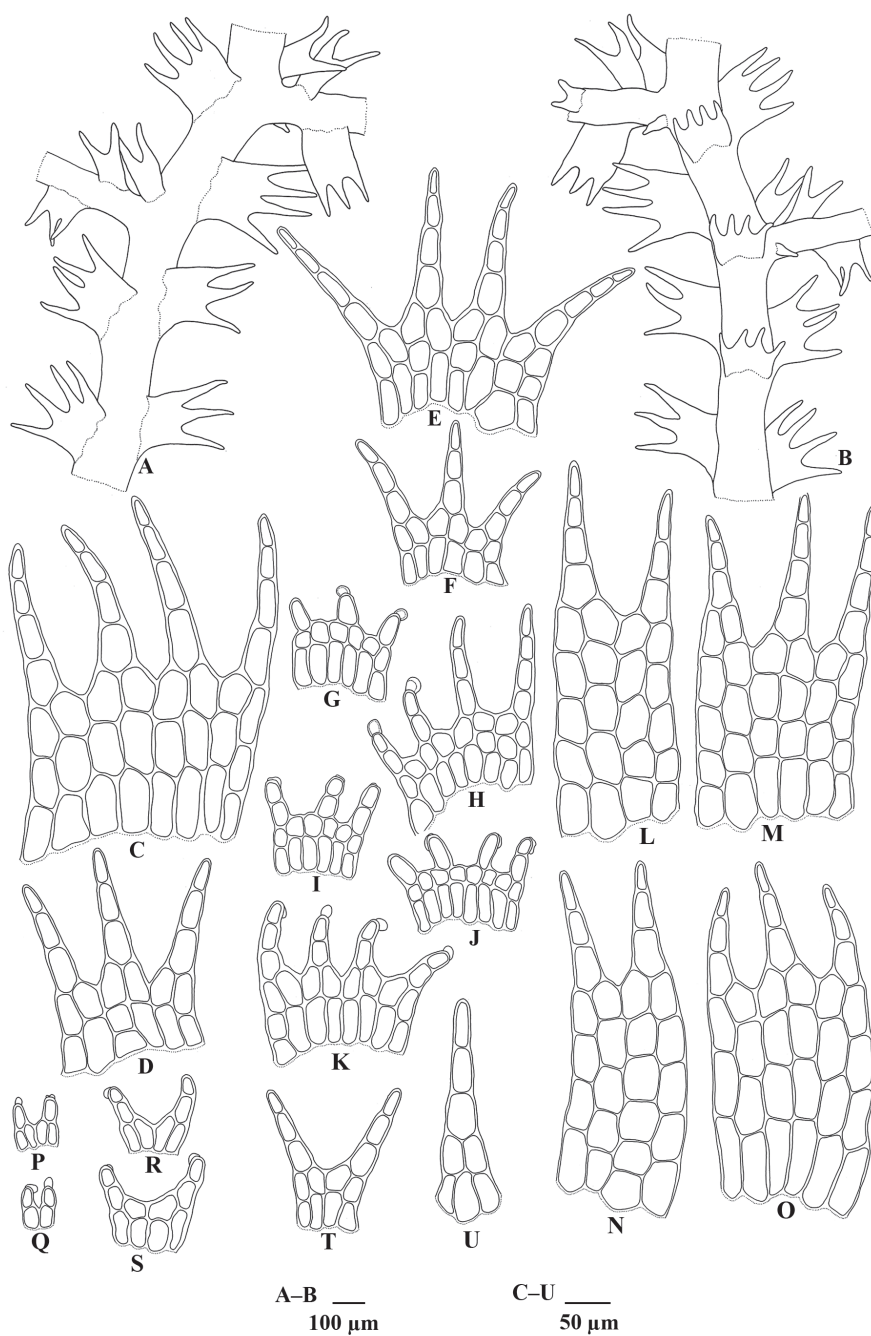


Figure 10. *Neolepidozia papulosa* (Steph.) Fulford & J.Taylor: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C.–D. Left-hand side stem leaf lobes, dorsal view; E.–F. Right-hand side stem leaf lobes, dorsal view; G.–K. Stem underleaves; L.–M. Left-hand side branch leaf lobes, dorsal view; N.–O. Right-hand side branch leaf lobes, dorsal view; P.–S. Branch underleaves; T. Bilobate half stem leaf, dorsal view; U. First branch underleaf, ventral view. All from *Chantanaorrapint & Suwanmala 1110 (PSU)*. Drawn by Sukkharak.

Notes.— According to Hagborg and Söderström (2023), *Lepidozia parvula*, which was previously erroneously treated as a synonym of *L. robusta* by Bapna and Kachroo (2000), was resurrected as a distinct species. These two species are morphologically distinct, particularly in their leaf lobes: the leaf lobes are uniseriate (except at the base) in *L. parvula*, whereas they are narrowly triangular in *L. robusta*. Furthermore, *L. parvula* is currently known only from Thailand, whereas *L. robusta* has been reported from China, Nepal, Bhutan, and India. Therefore, *L. robusta* is excluded from the flora of Thailand. Recently, Schwarz *et al.* (2026) likewise recognized the morphological distinctness of *L. parvula* and *L. robusta* and transferred the former to *Neolepidozia*. Although the specimen was not available for examination in the present study, *L. parvula* is included in the flora of Thailand under the new combination *N. parvula*, following Schwarz *et al.* (l.c.).

Neolepidozia parvula is characterized by a *Kurzia*-like appearance, deeply 4-divided leaves, and biseriate branch-leaf lobes above the basal lobe cells, with uniseriate portions up to four cells long. The cells in these uniseriate portions are up to three times as long as wide (Kitagawa, 1978; Schwarz *et al.*, 2026).

8. *Neolepidozia richardsii* (Herzog) U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 90. 2026.— *Lepidozia richardsii* Herzog, *Trans. Brit. Bryol. Soc.* 1(4): 313. 1950. Type: Malaysia, Sarawak, Dulit Ridge, alt. c. 1,230 m, 1 Aug. 1932, *P.W. Richards 1068* (lectotype **JE**, designated by Schwarz *et al.*, 2026). Fig. 11.

Stems with leaves 0.8–1.1 mm wide. *Stem leaves* obliquely attached, *Kurzia*-like appearance, leaf lobes pointed towards end of stem; imbricate; rectangular, symmetrical, $0.6\text{--}0.7 \times 0.2\text{--}0.4$ mm; 4–6 lobed, 3/4–4/5 leaf length, lobes 2 cells wide at base, biseriate part 0.5 cell long, uniseriate part 6–8 cells long, margins entire; cells smooth. *Stem underleaves* distant; rectangular, $0.3\text{--}0.4 \times 0.2\text{--}0.4$ mm; 4 lobed, 3/4–4/5 leaf length, biseriate part 0.5 cell long, uniseriate part 4–5 cells long, margins entire. *Half stem leaves* bilobate, 1/5–1/4 leaf length. *Branch leaves* obliquely attached, *Kurzia*-like appearance, leaf lobes pointed towards end of

branch; distant; rectangular, symmetrical, $0.4\text{--}0.6 \times 0.1\text{--}0.3$ mm; 3–4 lobed, 3/4–4/5 leaf length, lobes 2 cells wide at base, biseriate part 0.5 cell long, uniseriate part 5–6 cells long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; rectangular, $0.2\text{--}0.4 \times 0.1\text{--}0.3$ mm; 2–3 lobed, 3/4–4/5 leaf length, biseriate part 0.5 cell long, uniseriate part 4 cells long, margins entire. *Gynoecia* not seen. *Androecia* not seen. *Asexual reproduction* not seen.

Specimens examined.— PENINSULAR: Nakhon Si Thammarat [Khao Nan Yai, alt. 1,356 m, 13 Mar. 2006, *Sukkharak 188* (**BCU**); *ibid.*, alt. 1,278 m, 14 Mar. 2006, *Sukkharak 222* (**BCU**); San Yen, $8^{\circ}44.947' \text{ N}$, $99^{\circ}32.049' \text{ E}$, alt. 1,297 m, 20 Apr. 2007, *Sukkharak & Seelanan 118* (**BCU**); *ibid.*, $8^{\circ}46.023' \text{ N}$, $99^{\circ}32.301' \text{ E}$, alt. 1,118 m, 22 Apr. 2007, *Sukkharak & Seelanan 163* (**BCU**)]; Narathiwat [Hala Bala Wildlife Sanctuary, alt. 1,440 m, 25 May 2022, *Chantanaorrapint & Suwanmala 4390* (**PSU**)].

Additional illustrations.— Sukkharak (2007: 133, Fig. 4.69 as *Lepidozia parvula*); Schwarz *et al.* (2026: 5, 8–10, 15, 90–91, 132, 374–385, Figs. 2A, 12V, 13W, 15A, 29–30, Plates 2C, 244–255).

Distribution.— Thailand, Malaysia, Philippines (Schwarz *et al.*, 2026; this study).

Ecology.— *Neolepidozia richardsii* was found on roots, tree ferns, rotten logs and rocks in lower montane forest, at about 1,100–1,450 m elevation.

Notes.— This species is newly recorded for Thailand. *Neolepidozia richardsii* and *N. parvula* have a *Kurzia*-like appearance and biseriate branch leaf lobes above the basal lobe cells. However, the former differs from *N. parvula* by having uniseriate portions up to 8 cells long, with the cells more than 3 times as long as wide.

9. *Neolepidozia schaefer-verwimp* U.Schwarz & Shevock in U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 97. 2026. Type: Taiwan, County Taipei, New Taipei City, Manyueyuan National Forest Recreation area, mixed hardwood coniferous forest, $24^{\circ}49.400' \text{ N}$, $121^{\circ}26.900' \text{ E}$, 525 m, 11 Oct. 2016, *A. Schäfer-Verwimp TP-35 (37449)*, with *Y.-C. Hsu & G. Winter* (holotype **JE**; isotype **TAIM**). Fig. 12.

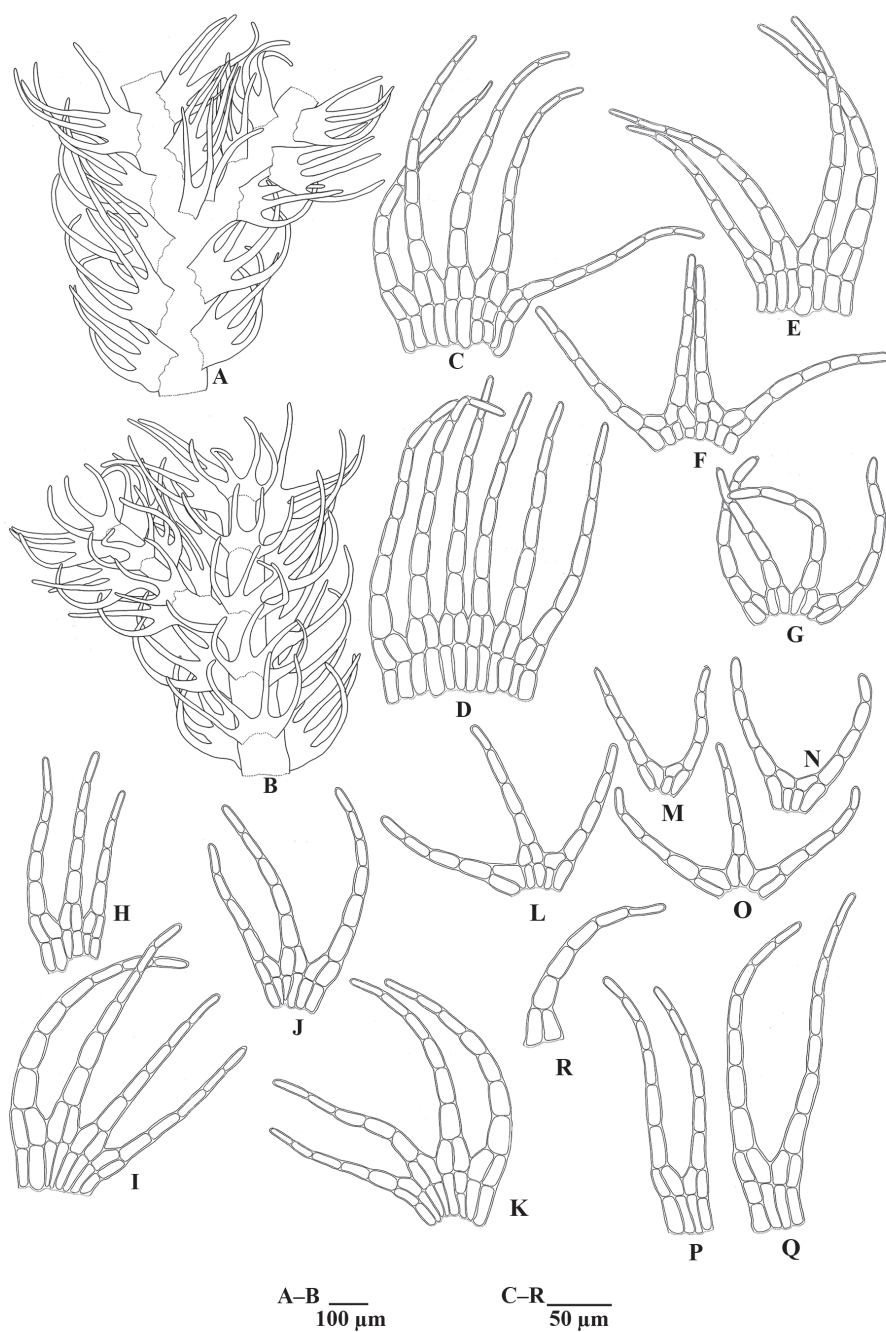


Figure 11. *Neolepidozia richardsii* (Herzog) U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C.–D. Left-hand side stem leaf lobes, dorsal view; E. Right-hand side stem leaf lobe, dorsal view; F.–G. Stem underleaves; H.–I. Left-hand side branch leaf lobes, dorsal view; J.–K. Right-hand side branch leaf lobes, dorsal view; L.–O. Branch underleaves; P.–Q. Bilobate half stem leaf, dorsal view; R. First branch underleaf, ventral view. All from *Chantanaorrapint & Suwanmala 4390 (PSU)*. Drawn by Sukkharak.

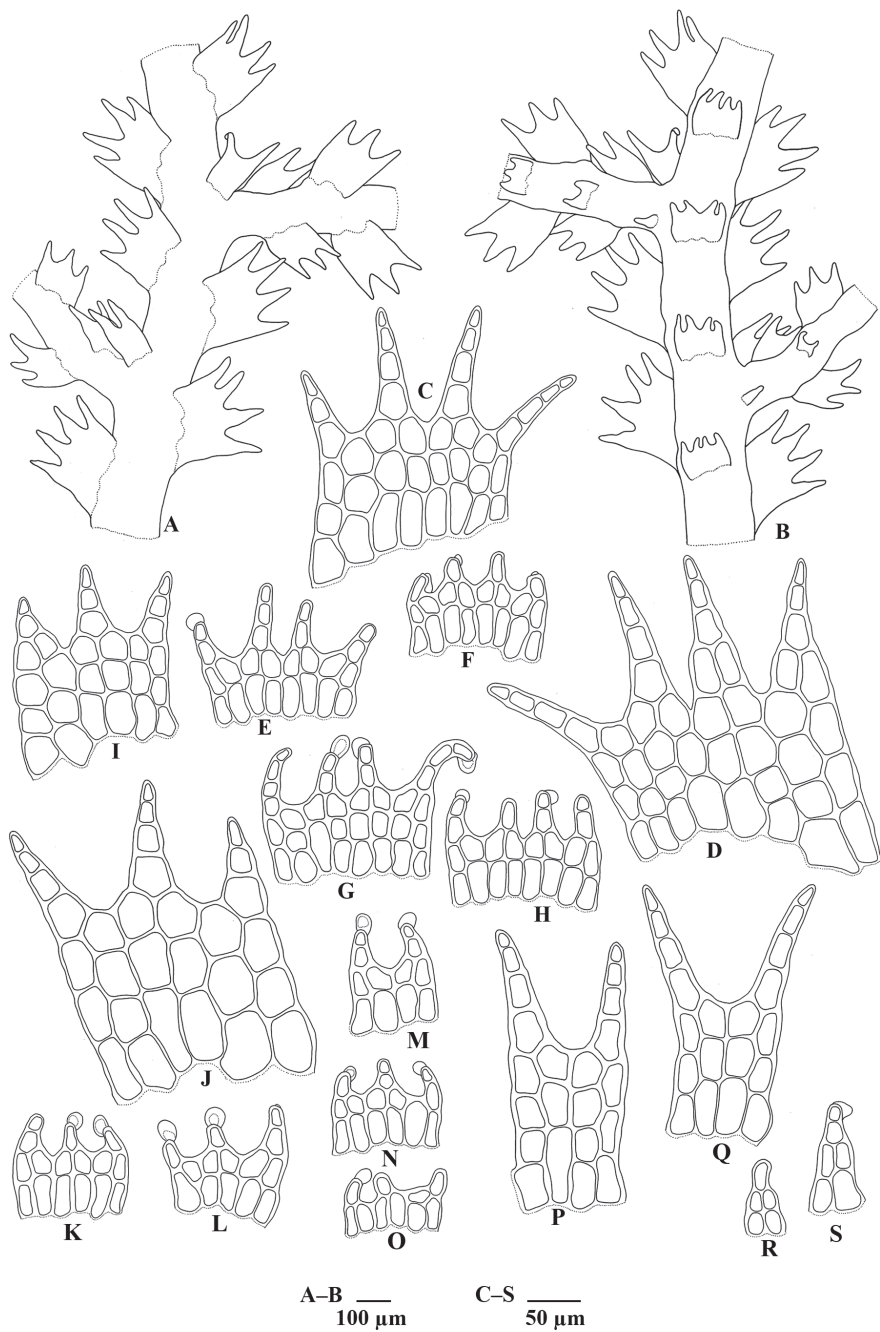


Figure 12. *Neolepidozia schaefer-verwimpai* U.Schwarz & Shevock in U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-H. Stem underleaves; I. Left-hand side branch leaf lobe, dorsal view; J. Right-hand side branch leaf lobe, dorsal view; K.-O. Branch underleaves; P.-Q. Bilobate half stem leaves, dorsal view; R.-S. First branch underleaves, ventral view. All from *Chantanaorrapint & Suwanmala 4350 (PSU)*. Drawn by Sukkharak.

Stems with leaves 0.6–0.8 mm wide. *Stem leaves* obliquely attached, spreading, plane; distant; quadrate, symmetrical, $0.2\text{--}0.3 \times 0.2\text{--}0.3$ mm; 4 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 0.5–1.5 cell long, uniseriate part 3–4 cells long, margins entire; cells smooth. *Stem underleaves* distant; rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 4 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 1–4 cells long, margins entire. *Half stem leaves* bilobate, 1/3–1/2 leaf length. *Branch leaves* obliquely attached, spreading, plane; distant; rectangular, symmetrical, $0.1\text{--}0.3 \times 0.1\text{--}0.2$ mm; 3 lobed, 1/3 leaf length, lobes 2 cells wide at base, biseriate part 0.5–1 cell long, uniseriate part 2–4 cells long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; quadrate-rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 2–3 lobed, 1/2 leaf length, lobes 2 cells wide at base, uniseriate part 1–2 cells long, margins entire. *Gynoecia* not seen. *Androecia* not seen. *Asexual reproduction* not seen.

Specimens examined.— PENINSULAR: Phatthalung [Khao Loan, alt. 1,472 m, 25 May 2022, *Chantanaorrapint & Suwanmala 4350 (PSU)*].

Additional illustrations.— Schwarz *et al.* (2026: 6, 8–10, 17, 29, 97–99, 133, 135, 412–422, Figs. 8B, 12M, 13P, 16E, 43–44, 144, Plates 3M, 5E, 282–292).

Distribution.— Japan, Taiwan, Thailand (Schwarz *et al.*, 2026).

Ecology.— The species was found on rotten logs in lower montane forest, at about 1,500 m elevation.

Notes.— With its symmetrical leaves, the species is similar to *Neolepidozia papulosa*. However, the branch-leaf lobes of *N. schaefer-verwimpii* are 1/3 of leaf length, whereas those of *N. papulosa* are 1/4 of leaf length.

10. *Neolepidozia shevockii* U.Schwarz & Schäf.-Verw. in U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 101. 2026. Type: Philippines, Mindanao Island, Davao del Sur Province, Along Santa Cruz Trail to Mt. Apo at Rock E-Camp, $6^{\circ}58.562' \text{N}$, $125^{\circ}17.658' \text{E}$, 1890 m, 4 Aug. 2022, *J.R. Shevock 60200*, with *L.C. Lubos*, *A. Yorong* & *R. Patano* (holotype **JE**; isotypes **BRIT**, **BUKH**, **CAS**, **CMUH**, **MO**, **PNH**). Fig. 13.

Stems with leaves 1–1.1 mm wide. *Stem leaves* obliquely attached, spreading, plane; distant; rectangular, asymmetrical, partially with falcate leaf lobes, $0.5\text{--}0.6 \times 0.2\text{--}0.4$ mm; 4 lobed, 1/2 leaf length, lobes 2–4 cells wide at base, biseriate part 2–3 cells long, uniseriate part 3–4 cells long, margins entire; cells smooth. *Stem underleaves* distant; rectangular, $0.1\text{--}0.2 \times 0.1\text{--}0.2$ mm; 4–5 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 0.5 cell long, uniseriate part 2–3 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, spreading, plane; distant; rectangular, asymmetrical, partially with falcate leaf lobes, $0.5\text{--}0.6 \times 0.2\text{--}0.3$ mm; 3 lobed, 1/3 leaf length, lobes 2–4 cells wide at base, multiseriate part 1–2 cells long, biseriate part (2–)3–4 cell long, uniseriate part 2–3 cells long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; rectangular, $0.1\text{--}0.3 \times 0.1\text{--}0.2$ mm; 2–3 lobed, 1/2–2/3 leaf length, lobes 2 cells wide at base, uniseriate part 2–4 cells long, margins entire. *Gynoecia* not seen. *Androecia* not seen. *Asexual reproduction* not seen.

Specimens examined.— EASTERN: Ubon Ratchathani [Phu Chong Na Yai, Gang Gala, alt. 357 m, 18 July 2016, *Chantanaorrapint et al. 353 (PSU)*].

Additional illustrations.— Schwarz *et al.* (2026: 8–9, 24, 101–103, 132, 134, 430–436, Figs. 12X, 13Y, 99, 105, Plates 2M, 4G, 300–306).

Distribution.— Thailand, Malaysia, Indonesia, Philippines (Schwarz *et al.*, 2026).

Ecology.— The species was found on sandy soil, at about 350 m elevation.

Notes.— Asymmetrical leaves, as in *Neolepidozia shevockii*, are also found in *N. variifolia*. However, *N. shevockii* differs from *N. variifolia* in having (1) distant leaves, which are imbricate in *N. variifolia*, and (2) a smooth cell surface, which is verrucose in *N. variifolia*.

11. *Neolepidozia variifolia* (Steph. in Geheeb) U.Schwarz, Schäf.-Verw. & Shevock, *Frahmia* 49: 109. 2026.— *Lepidozia variifolia* Steph. in Geheeb, *Biblioth. Bot.* 8. Heft 44: 29. 1898. Type: Indonesia, Illa. Blitoeng in Mte. Sagem., *J.E. Teysman No. 11137* (holotype **G** [G00128053] photo seen, det. J.J.Engel 2001 as *Telaranea wallichiana*). Fig. 14.

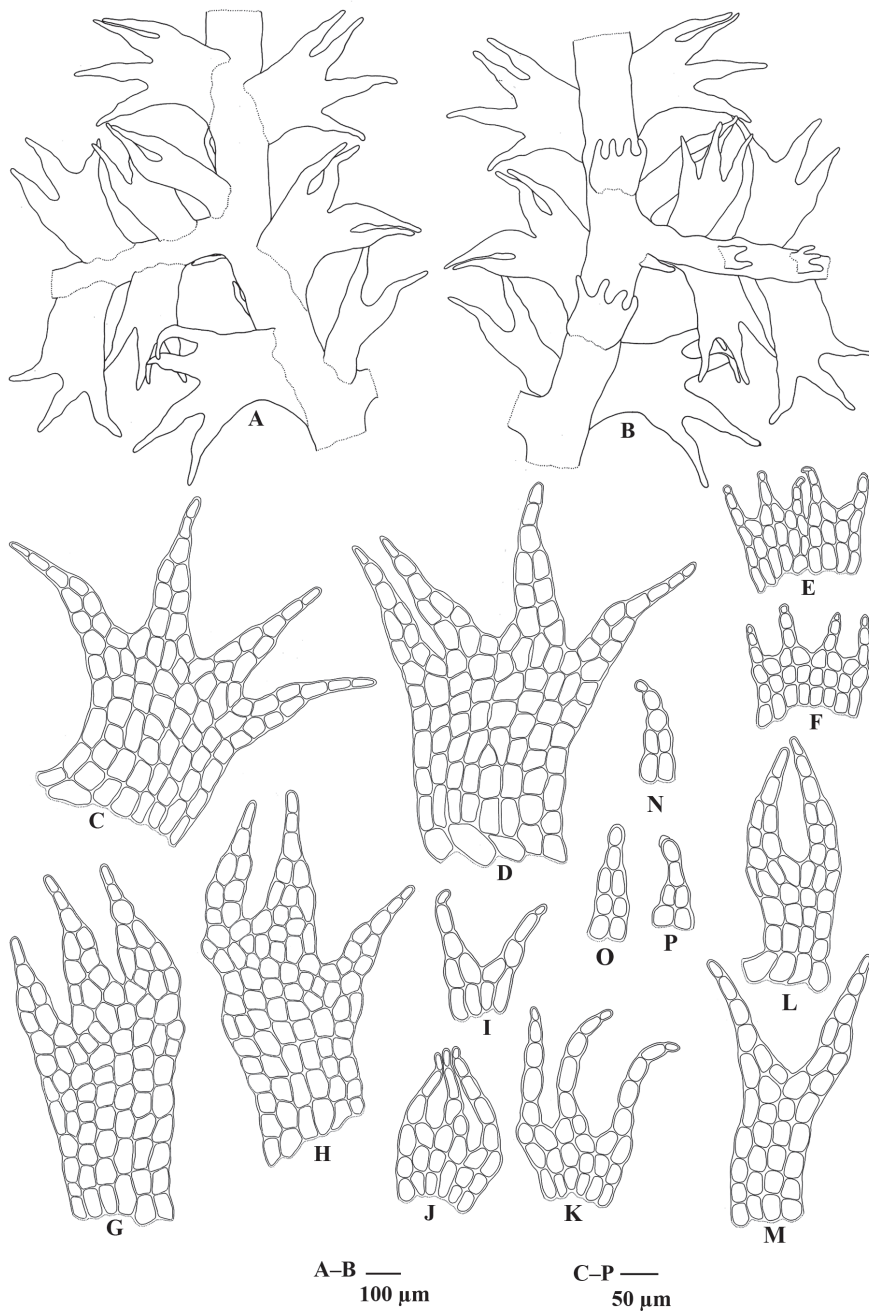


Figure 13. *Neolepidozia shevockii* U.Schwarz & Schäf.-Verw. in U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-F. Stem underleaves; G. Left-hand side branch leaf lobe, dorsal view; H. Right-hand side branch leaf lobe, dorsal view; I.-K. Branch underleaves; L.-M. Bilobate half stem leaf, dorsal view; N.-P. First branch underleaves, ventral view. All from *Sukkharak 431 (PSU)*. Drawn by Sukkharak.



Figure 14. *Neolepidozia variifolia* (Steph. in Geheeb) U.Schwarz, Schäf.-Verw. & Shevock: A. Portion of shoot, dorsal view; B. Portion of shoot, ventral view; C. Left-hand side stem leaf lobe, dorsal view; D. Right-hand side stem leaf lobe, dorsal view; E.-H. Stem underleaves; I. Left-hand side branch leaf lobe, dorsal view; J. Branch leaf cell surface with verrucose; K. Right-hand side branch leaf lobe, dorsal view; L.-O. Branch underleaves; P.-Q. Bilobate half stem leaves, dorsal view; R.-U. First branch underleaves, ventral view; V. Perianth, dorsal view; W. Perianth, ventral view. All from *Chantanaorrapint et al.* 353 (PSU). Drawn by Sukkharak.

Stems with leaves 0.5–0.8 mm wide. *Stem leaves* obliquely attached, spreading, plane; contiguous to imbricate; quadrate, asymmetrical, partially with falcate leaf lobes, 0.2–0.4 × 0.2–0.3 mm; 4 lobed, 1/2 leaf length, lobes 2 cells wide at base, biseriate part 1.5 cell long, uniseriate part 2–4 cell long, margins entire; cells verrucose. *Stem underleaves* distant; quadrate, 0.1–0.2 × 0.1–0.2 mm; 3–4 lobed, 1/4–1/3 leaf length, lobes 2(–3) cells wide at base, uniseriate part 1–2 cells long, margins entire. *Half stem leaves* bilobate, 1/2 leaf length. *Branch leaves* obliquely attached, spreading, plane; contiguous to imbricate; rectangular, asymmetrical, partially with falcate leaf lobes, 0.3–0.4 × 0.2–0.3 mm; lobed, 1/3 leaf length, lobes 2–3 cells wide at base, multiseriate part 1 cell long, biseriate part 1.5–3 cells long, uniseriate part 2–3 cell long, margins entire; cells smooth. *First branch underleaves* 1 lobed. *Branch underleaves* distant; rectangular, 0.1–0.2 × 0.1–0.2 mm; 2–3 lobed, 1/3 leaf length, lobes 2 cells wide at base, biseriate part 0.5–2 cells long, uniseriate part 1–2 cell long, margins entire. *Perianths* originating ventrally, oblong, narrowed towards the mouth, 0.2–0.3 mm × 0.1 mm, 5-plicate in the uppermost part. *Perianth mouth* ciliate, mouth cells linear. *Androecia* not seen. *Asexual reproduction* not seen.

Specimens examined.— NORTH-EASTERN: Loei [Phu Hin Rong Kla, Mun Daeng Waterfall, alt. 1,612 m, 29 May 2018, *Chantanaorrapint & Suwanmala 2682 (PSU)*]. PENINSULAR: Nakhon Si Thammarat [San Yen, 8°45.388' N, 99°31.794' E, alt. 1,268 m, 19 Apr. 2007, *Sukkharak & Seelanan 54 (BCU)*; Khao Nan Yai, 8°52.551' N, 99°41.593' E, alt. 1,270 m, 12 Aug. 2006, *Sukkharak 431 (BCU)*; *ibid.*, alt. 1,055 m, 10 May 2006, *Sukkharak 345 (BCU)*. Khao Luang, 8°30' N, 99°45' E, alt. 1,000, 6 Feb. 1966, *Touw 11933 (BKF)*; *ibid.*, 8°30.300' N, 99°44.684' E, alt. 1,334 m, 3 July 2017, *Chantanaorrapint & Suwanmala 1442 (PSU)*; Phatthalung [Khao Loan, 7°26.616' N, 99°53.207' E, alt. 859 m, 27 May 2017, *Chantanaorrapint & Suwanmala 948 (PSU)*; *ibid.*, alt. 916 m, 27 May 2017, *Chantanaorrapint & Suwanmala 996 (PSU)*. Yala. Piyamit, alt. 944 m, 26 Dec. 2016, *Chantanaorrapint et al. 759 (PSU)*; Narathiwat [Hala Bala Wildlife Sanctuary, alt. 950 m, 22 May 2022, *Chantanaorrapint & Suwanmala 4184 (PSU)*; *ibid.*, alt. 1,422 m, 24 May 2022, *Chantanaorrapint & Suwanmala 4292 (PSU)*; *ibid.*, *Chantanaorrapint & Suwanmala 4297 (PSU)*].

Additional illustrations.— Sukkharak (2007: 134, Fig. 4.70 as *Lepidozia* sp.); Schwarz *et al.* (2026: 7, 18–19, 109–112, 133, 460–465, Figs. 11, 53, 63, 67, Plates 3D, 330–335).

Distribution.— Thailand, Malaysia, Indonesia, Philippines (Schwarz *et al.*, 2026; this study).

Ecology.— The species was found on tree trunks, branches and twigs, rotten logs and wet rocks in evergreen forest, at about 850–1,650 m elevation.

Notes.— This species is newly recorded for Thailand. The species is distinguished by imbricate leaves with verrucose cell surface. *Neolepidozia variifolia* somewhat resembles *N. shevockii*, and both are characterized by asymmetrical leaves; differences between the two taxa are discussed under the latter species.

ACKNOWLEDGEMENTS

I would like to express my gratitude to the curators and the staff of BCU, BKF, CMUB, and PSU for their hospitality and making the specimens available upon my visits. I also extend my gratitude to Boon-Chuan Ho for providing useful information and to the institutions maintaining virtual herbarium databases, including E, G, and P, as well as Global Plants on JSTOR, for providing access to valuable specimen data. I would also like to thank the anonymous reviewers for their constructive comments and valuable suggestions, which helped improve the manuscript.

REFERENCES

- Bapna, K.R. & Kachroo, P. (2000). Hepaticology in India—II. Himanshu Publ., Udaipur.
- Bakalin, V.A. & Klimova, K.G. (2024) A revision of Lepidoziaceae (Hepaticae) in the Russian Far East II. *Lepidozia* and *Kurzia*. *Novosti sistematiki nizshikh rastenii* 58(2): B51–B69.
- Damsholt, K. (2002). Illustrated Flora of Nordic Liverworts and Hornworts. Kleinstüber, Lund.
- Fulford, M.H. (1966). Manual of the leafy Hepaticae of Latin America. Part II. *Memoirs of The New York Botanical Garden* 11(2): 173–276.
- Fulford, M.H. & Sharp, A.J. (1990). The leafy Hepaticae of Mexico one hundred and twenty-seven years after C.M. Gottsche. *Memoirs of The New York Botanical Garden* 63: 1–86.

- Fulford, M.H. & Taylor, J. (1959). The segregate genera of the *Lepidozia* complex (Hepaticae). Part 1. *Sprucella* Steph. and *Neolepidozia* gen. nov. *Brittonia* 11: 77–85.
- Gottsche, C.M., Lindenberg, J.B.W. & Nees, C.G. (1845). Synopsis hepaticarum, fasc. 2. Meissner, Hamburg, 145–304.
- Gradstein, S.R. (2011). Guide to the liverworts and hornworts of Java. Biotrop Scientific Publications, Bogor.
- _____. (2021). The liverworts and hornworts of Colombia and Ecuador. Springer Nature, New York Botanical Garden, New York.
- Hagborg, A. & Söderström L. (2023). Notes on early land plants today 89. Resurrection of *Lepidozia parvula* (Lepidoziaceae, Marchantiophyta). *Acta Biologica Plantarum Agriensis* 11: 145–146.
- Herzog, T. (1931). Hepaticae philippinenses a Cl. C. Baker lectae. *Annales Bryologici*. 4: 79–94.
- Isoviita, P. (1970). Dillenius's "Historia muscorum" as the basis of hepatic nomenclature, and S.O. Lindberg's collection of Dillanian bryophytes. *Acta Botanica Fennica* 89: 1–28.
- Kitagawa, N. (1973). Miscellaneous notes on little-known species of Hepaticae, 26–50. *Journal of the Hattori Botanical Laboratory* 37: 263–273.
- _____. (1978). The Hepaticae of Thailand collected by Dr. A. Touw. (I). *Acta Phytotaxonomica et Geobotanica* 29: 47–64.
- _____. (1981). Miscellaneous notes on little known species of Hepaticae, 51–70. *Hikobia Supplement* 1: 67–72.
- Lai, M.-J., Zhu, R.-L. & Chantanaorrapint, S. (2008). Liverworts and hornworts of Thailand: an updated checklist and bryofloristic accounts. *Annales Botanici Fennici* 45: 321–341.
- Lee, G.E. & Gradstein, S.R. (2021). Guide to the genera of liverworts and hornworts of Malaysia. Hattori Botanical Laboratory, Nichinan.
- Majumdar, S. (2022). Unearthing a lectotype for *Lepidozia flexuosa* with a note on the type of *Lepidozia brevifolia* (Lepidoziaceae: Marchantiophyta). *Phytotaxa* 552(3): 217–220.
- Mitten, W. (1861). Hepaticae Indiae Orientalis. *Journal of the Proceedings of the Linnean Society. Botany* 5: 89–128.
- Mizutani, M. & Chang, K.-C. (1986). A preliminary study of Chinese Lepidoziaceae flora. *Journal of the Hattori Botanical Laboratory* 60: 419–437.
- Nees von Esenbeck, C.G.D. (1838). *Naturgeschichte der Europäischen Lebermoose* 3. August Rücker, Breslau.
- Paton, J.A. (1999). The Liverwort Flora of the British Isles. Harley Books, Martins.
- Piippo, S. (1984). Bryophyte flora of the Huon Peninsula, Papua New Guinea. VI. Cephaloziaceae subfam. Cephalozioideae and subfam. Odontoschismatoideae and Jubulaceae (Hepaticae). *Annales Botanici Fennici* 21: 309–335.
- _____. (1990). Annotated catalogue of Chinese Hepaticae and Anthocerotae. *Journal of the Hattori Botanical Laboratory* 68: 1–192.
- Reinwardt, C.G.C., Blume, C.L. & Nees von Esenbeck, C.G. (1824). Hepaticae iavanicae. *Nova Acta Physico-Medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum* 12(1): 181–238.
- Rosario, R.M.D. (1975). Philippine liverworts, III Calobryales and Herbertales of the Philippines II. *Philippine Journal of Science* 104: 93–209.
- Schuster, R. M. (1969). The Hepaticae and Anthocerotae of North America 2. Columbia University Press, New York.
- Sharma, D. & Srivastava, S.C. (1993). Indian Lepidoziineae (a taxonomic revision). *Bryophytorum Bibliotheca* 47: [i–xii] 1–353.
- Söderström, L., Hagborg, A., von Konrat, M., Bartholomew-Began, S., Bell, D., Briscoe, L., Brown, E., Cargill, D.C., Costa, D.P., Crandall-Stotler, B.J., Cooper, E.D., Dauphin, G., Engel, J.J., Feldberg, K., Glenney, D., Gradstein, S.R., He, X., Heinrichs, J., Hentschel, J., Ilkiu-Borges, A.L., Katagiri, T., Konstantinova, N.A., Larraín, J., Long, D.G., Nebel, M., Pócs, T., Puche, F., Reiner-Drehwald, E., Renner, M.A.M., Sass-Gyarmati, A., Schafer-Verwimp, A., Moragues, J.G.S., Stotler, R.E., Sukkharak, P., Thiers, B.M., Uribe, J., Vána, J., Villarreal, J.C., Wigginton, M., Zhang, L. & Zhu, R.-L. (2016). World checklist of hornworts and liverworts. *PhytoKeys* 59: 1–828.

- Schwarz, U., Schäfer-Verwimp, A. & Shevock, J.R. (2026). On Asian *Neolepidozia*. *Frahmia* 49: 1–497.
- Stephani, F. (1985). *Icones Hepaticarum*. Microfiche Collection. Conservatoire et Jardin botaniques de la Ville de Genève, Chambesy.
- Sukkharak, P. (2007). Liverwort diversity at Khao Nan National Park, Nakhon Si Thammarat Province. Master's Thesis, Chulalongkorn University, Thailand.
- Sukkharak, P., Seelanan, T. & Lai, M.-J. (2008). Liverwort diversity at the summit of Khao Nan, Khao Nan National Park, Nakhon Si Thammarat Province. In: H. Mohamed, B.B. Baker, A.N. Boyce & P.K.Y. Lee (eds), *Bryology in the new millennium*, pp. 49–55. University of Malaya, Kuala Lumpur.
- Sukkharak, P. (2022). *Liverwort Genera of Thailand*. Chiang Mai University Press, Chiang Mai.
- Thouvenot, L. & Bardat, J. (2013). Contribution to the bryophyte flora of New Caledonia. I. New taxa and amendments. *Cryptogamie, Bryologie* 34(1): 37–47.