

## Neolepidozia samoensis – a new Neolepidozia species from the Southern Pacific

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**Abstract:** UWE SCHWARZ, ALFONS SCHÄFER-VERWIMP, JAMES R. SHEVOCK (2026): *Neolepidozia samoensis* – a new *Neolepidozia* species from the Southern Pacific. *Frahmia* 50:1-13<sup>1</sup>.

Two *Neolepidozia* specimens collected by SCHULTZE-MOTEL in Samoa were determined to be new to science. They are described as *N. samoensis* and illustrated below. Previous identifications of *Neolepidozia* species from the Southern Pacific are doubtful, except for *N. heterotexta* from Vanuatu. A comparison plate is provided for all species reported from the Pacific Islands.

### 1. Introduction

Among the specimens identified as *Neolepidozia* and housed at the Hausknecht Herbarium (JE), there are two that were collected by SCHULTZE-MOTEL from Samoa in 1972. As with most *Neolepidozia* specimens from this region, they were identified as *N. wallichiana*.

The earliest record of *N. wallichiana* in the Pacific region dates back to 1898, when BESCHERELLE (1898) listed *Lepidozia wallichiana* from Tahiti (Vesco). STEPHANI (1906–1909) mentions a collection of *Lepidozia massartiana* from Tahiti, collected by NADEAUD, and depicts it in his Icones no. 5252. He also stated that *L. wallichiana* is widely distributed and not uncommon in tropical and subtropical Asia and Oceania.

HERZOG (1952) described *Lepidozia complanata* from Western Australia and *L. pruinosa* from the Fiji Islands. His comments on *L. pruinosa* read: ‘It also shows a close relationship with *L. wallichiana*, which is widely distributed across the Pacific Islands. However, it differs by its long leaf lobes and low leaf disc, and is altogether more delicate’. *L. complanata* was synonymised with *Telaranea claritexta* by ENGEL & MERRILL (2004). Both *T. claritexta* and *L. pruinosa* were later transferred to the genus *Ceramanus* by COOPER et al. (2013).

CAMPBELL (1971) provided another record of *Neolepidozia*, listing *Lepidozia tenera* from Fiji (Viti Levu) based on a 1947 collection by A.C. SMITH. GROLLE & SCHULTZE-MOTEL (1972) did not mention any *Neolepidozia* from Samoa. The Samoan material collected by SCHULTZE-MOTEL was identified as *N. wallichiana* by GROLLE in 1977.

MILLER collected a considerable number of *Neolepidozia* specimens together with LEE S. DUTTON, ERNANI MENEZ and HENRY O. WHITTIER in the 1960s. Based on information from the Consortium of Bryophyte Herbaria, the specimens were identified as *N. wallichiana*. In his Prodrumus Florae Hepaticarum Polynesia (MILLER et al. [1983]), he only listed *N. wallichiana*, with records from the Caroline Islands (Kusaie, Palau and Ponape) and the Society Islands (Tahiti).

HÜRLIMANN (1985) reported the presence of *Lepidozia heterotexta* in the New Hebrides (now Vanuatu) and of *L. wallichiana* in Tahiti. He considered the latter species to be widespread in the Pacific region. Previous records of *L. wallichiana* from the Society Islands were also referenced by WHITTIER & WHITTIER (1987).

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ENGEL & MERRILL (2004) treated the plants of *L. massartiana*, depicted in Stephani (1985), as being synonymous with *Telaranea cuneifolia*. They therefore extended the distribution range of *T. cuneifolia* to Tahiti.

SÖDERSTRÖM et al. (2011) provided a checklist of the hornworts and liverworts of Fiji, including records of *Neolepidozia*. They referred to records of *L. tenera* in CAMPBELL (1971) and *L. wallichiana* in MILLER et al. (1983), but rated these as doubtful for Fiji. Proven *Neolepidozia* collections from Fiji were recently reported by VON KONRAT et al. (2014), who considered *N. cuneifolia* and *N. wallichiana* to be new species to the island.

BARDAT et al. (2021) compiled a list of hornworts and liverworts found in French Polynesia. They refer to existing literature for the records of *N. cuneifolia* and *N. wallichiana*. Furthermore, GAME et al. (2023) mention *N. wallichiana* as a new record for the Cook Islands.

Based on the above literature, the following species have been reported in the Pacific region:

- *Neolepidozia cuneifolia* (Fiji; Society Islands – Tahiti)
- *Neolepidozia heterotexta* (Vanuatu)
- *Neolepidozia massartiana* (Society Islands – Tahiti)
- *Neolepidozia tenera* (Fiji)
- *Neolepidozia wallichiana* (Caroline Islands – Kusaie, Palau, Ponape; Cook Islands; Fiji; Society Islands – Tahiti; Samoa)

These species, as well as the *Neolepidozia* species collected in Samoa are depicted on Comparison plate 1 .

As stated by SCHWARZ et al. (2026), *N. wallichiana* is most likely endemic to Nepal. Its presence in the Pacific region is highly improbable.

The figures of *N. wallichiana* in VON KONRAT et al. (2014) do not depict plants similar to the studied isotype of this species. The plants from Fiji are more similar to those collected by SCHULTZE-MOTEL in Samoa. The same applies to *N. cuneifolia*. The figures in VON KONRAT et al. (2014) show narrow branch leaf lobes that are only two cells wide at the base; these are unlike those found in the isotype of *N. cuneifolia*, which have broader leaf lobes that are more than two cells wide at the base.

Regarding *N. massartiana*, we agree with KITAGAWA (1973). The species was originally collected by Massart in Java. Similar plants from the region differ from those depicted by STEPHANI (1985) from Tahiti. As far as we are aware, there is no validly published name for the Tahitian plants.

As most *Neolepidozia* species have a rather small distribution area, it is also highly doubtful that *N. tenera*, mentioned by CAMPBELL (1971), appears in the Pacific region. According to our current knowledge, its distribution is limited to Java, Borneo, and Mindanao. At least, the plants from Samoa are not identical to *N. tenera*.

The only plausible record from the Pacific Islands is that of *N. heterotexta* from Vanuatu, as HÜRLIMANN (1985) mentions that the species cannot be found west of New Caledonia.

None of the aforementioned species match the plants from Samoa. Therefore, we are convinced that we are dealing with an undescribed species.

## 2. Treatment of *Neolepidozia samoensis*

*Neolepidozia samoensis* U. SCHWARZ, SCHÄF.-VERW. & SHEVOCK spec. nov.

Holotype:

**Samoa:** Upolu, Wald nordwestlich der Straße bei Tiavi, an Bäumen, 750 m, leg. SCHULTZE-MOTEL 3130, 1972 (JE!), det. R. GROLLE 1977, as *Lepidozia wallichiana*).

Figures:

Plate 1, Plate 2, Plate 3, Plate 4, Plate 5, Plate 6.

Description

**Plants** pale yellowish green, small, up to 1.5 cm long, stem with leaves up to 0.6 mm wide, leaves not fragile. **Branching** 1-pinnate, of Frullania-type, often with ventral intercalary stem innovations. **Branches** up to 3 mm long, not flagelliform at the end. **Flagelliform branches** scattered, up to 3 mm long. **Rhizoids** originating from the dorsal side of underleaf

cells. **Stem** in cross section 150 µm wide and 115 µm high, cortical cells 12, 20 – 49 × 19 – 35 µm, cell walls moderately thickened, medullary cells up to 20, 15 – 27 × 18 – 24 µm, cell walls moderately thickened, trigones small, dorsal cortical cells elongated polygonal, 32 – 41 × 63 – 82 µm, 1.8 – 2.3 as long as wide, cell walls moderately thickened, trigones small, cuticle smooth. **Stem leaves** distant to approximate, longitudinally inserted, spreading at an angle of 40° – 70°, leaves square to trapezoid, weakly asymmetric, flat, 230 – 310 µm wide, 260 – 310 µm long, 1 – 1.3 as long as wide, divided by 0.3 – 0.5 of the leaf length, margin entire, disc 8 cells wide, 3.5 – 4.5 cells long, 170 – 220 µm wide, 120 – 190 µm long, 0.6 – 1 as long as wide, median cells isodiametric to shortly elongated polygonal, 26 – 42 × 36 – 47 µm, 1.1 – 1.6 as long as wide, cell walls moderately thickened, trigones small, cuticle with striate papillae, basal cells elongated polygonal, 31 – 36 × 38 – 56 µm, 1.1 – 1.6 as long as wide, leaf lobes 4, upright to divergent, 3.5 – 4.5 cells long, straight to weakly falcate, 2 cells wide at base, multiseriate part 2– 3 cells long, uniseriate part 1 – 3 cells long, cells ovate to elongated polygonal, not constricted at the transversal walls, 21 – 28 × 29 – 39 µm, 1.3 – 1.7 as long as wide, cell walls moderately thickened, trigones small, cuticle with ovate papillae, half stem leaf near branch base 2-lobate, otherwise similar to the stem leaves. **Stem underleaves** distant, transversely attached, appressed to the stem, 1.1 – 1.2 times as wide as the stem, underleaves transversely rectangular to trapezoid, 150 – 185 µm wide, 140 – 160 µm long, 0.8 – 1 as long as wide, divided by 0.2 – 0.4 of the leaf length, disc 8 cells wide, 2.5 cells long, 130 – 155 µm wide, 90 – 110 µm long, 0.6 – 0.8 as long as wide, median cells elongated polygonal, 18 – 24 × 27 – 35 µm, 1.3 – 1.8 as long as wide, cell walls moderately thickened, trigones small, cuticle with striate papillae, basal cells elongated polygonal, 16 – 25 × 30 – 41 µm, 1.3 – 2 as long as wide, leaf lobes 4, upright to weakly divergent, 1.5 – 2.5 cells long, 2 (-3) cells wide at base, multiseriate part 1 cells long, uniseriate part 1 – 2 cells long, cells 11 – 19 × 17 – 31 µm, 1.3 – 2.1 as long as wide, cell walls moderately thickened, trigones small, cuticle with round papillae. **Branch leaves** imbricate, longitudinally inserted, spreading at an angle of 60° – 80°, leaves rectangular to trapezoid, weakly to moderately asymmetric, flat, 160 – 195 µm wide, 235 – 315 µm long, 1.4 – 1.8 as long as wide, divided by 0.3 – 0.6 of the leaf length, divided by 0.3 – 0.4 on the ventral side, margin entire, disc 6 – 7 cells wide, 3.5 – 5.5 cells long, 105 – 160 µm wide, 105 – 220 µm long, 0.7 – 1.6 as long as wide, median cells isodiametric to shortly elongated polygonal, 26 – 30 × 31 – 43 µm, 1.1 – 1.6 as long as wide, cell walls moderately thickened, trigones small, cuticle with striate papillae, basal cells elongated polygonal, 25 – 37 × 35 – 49 µm, 0.9 – 1.8 as long as wide, leaf lobes 3, upright to divergent, 3.5 – 4.5 cells long, 2 (-3) cells wide at base, multiseriate part 2 – 3 cells long, uniseriate part 2 – 3 cells long, cells ovate to elongated polygonal, not constricted at the transversal walls, cells 20 – 27 × 27 – 43 µm, 1.2 – 1.6 as long as wide, cell walls moderately thickened, trigones small, cuticle with ovate papillae. **Branch underleaves** approximate to distant, transversely attached, upright, 1.2 – 1.4 times as wide as the branch, underleaves square to rectangular, 75 – 100 µm wide, 100 – 140 µm long, 1.2 – 1.4 as long as wide, divided by 0.4 – 0.5 of the leaf length, disc 4 cells wide, 1.5 – 2.5 cells long, 65 – 95 µm wide, 55 – 75 µm long, 0.7 – 1 as long as wide, median cells isodiametric polygonal, 21 – 29 × 20 – 28 µm, 0.8 – 1.1 as long as wide, cell walls moderately thickened, trigones small, cuticle with striate papillae, basal cells elongated polygonal, 20 – 27 × 23 – 43 µm, 1.2 – 1.8 as long as wide, leaf lobes 2, upright to weakly divergent, 1.5 – 2.5 cells long, 2 cells wide at base, multiseriate part 1 – 2 cells long, uniseriate part 1 – 2 cells long, cells 15 – 19 × 20 – 30 µm, 1.3 – 1.8 as long as wide, cell walls moderately thickened, trigones small, cuticle with ovate papillae.

#### Distinguishing characters:

*N. samoensis* is characterised by (1) the asymmetric branch leaves with two-cell-wide lobes at the base, (2) the rather remotely positioned stem leaves, (3) the rather thin to moderately thickened cell walls, (4) the isodiametric to shortly elongated disc cells in the branch and stem leaves, (5) the few and thin-walled medullary cells of the stem, and (6) the papillose cuticle of the cells of the stem and branch leaves, as well as the respective underleaves.

#### Similar species:

*N. samoensis* bears some resemblance to *Neolepidozia disparata* (J.J. ENGEL & G.L. MERRILL) E.D. COOPER, which was originally described as *Telaranea disparata* by ENGEL & MERRILL (2004). However, it differs in the more numerous and thick-walled medullary cells of the stem, the rather imbricate stem leaves, and the thick-walled, less papillose cuticle of the cells of the branch and stem leaf disc.

Weakly asymmetric branch leaves can also be found in *N. zantenii* from New Guinea; however, this species has larger branch leaf disc cells, a smooth cuticle and thinner cell walls.

#### Distribution:

Samoa (Upolu).

#### Etymology:

The species is named after Samoa where it was discovered.

Specimen studied:

**Samoa:** Upolu, Bergwald westlich Tiavi, an Bäumen, 700 m, leg. SCHULTZE-MOTEL 3605, 1972 (JE!, det. R. GROLLE 1977, as *Lepidozia wallichiana*).

Remark:

The plants identified as *Neolepidozia wallichiana* in VON KONRAT et al. (2014) are most likely identical to *N. samoensis*. The two species share weakly asymmetric branch leaves (Fig. 4–2) and rather isodiametric, papillose stem leaf disc cells (Fig. 4–4). It is advisable to restudy and compare them with *N. samoensis*.

**3. Conclusion**

Records from Vanuatu to French Polynesia indicate that the genus *Neolepidozia* is widely distributed throughout the Pacific Islands. It is highly probable that it also occurs on other volcanic islands in the region that have not yet been thoroughly explored.

Most of the previous species identifications of *Neolepidozia* from this Pacific region are highly questionable due to the lack of sufficient identification literature coupled with the widespread misapplication of *Neolepidozia wallichiana*. In particular, the larger collections of MILLER from the Pacific region must be re-studied. The same applies to the specimens collected by SMITH and identified as *Lepidozia tenera* and *Neolepidozia cuneifolia* from Fiji, as reported in VON KONRAT et al. (2014). Based on the information provided, the latter species is likely to be new to science. Given the rather small distribution areas of *Neolepidozia* species in Asia, it is also possible that several new *Neolepidozia* species remain to be discovered in the region.

**4. New Taxa and Combinations**

- *Neolepidozia samoensis* U. SCHWARZ, SCHÄF.-VERW. & SHEVOCK *spec. nov.*

**5. Acknowledgments**

We want to thank JÖRN HENTSCHEL (JE) and KARL HEYDE (NML) for the support in loaning herbarium specimens.

**6. Further specimens used in this article**

*Neolepidozia cuneifolia* (STEPH.) FULFORD & J. TAYLOR. *Brittonia*. 11(2): 85. 1959.

[Papua New Guinea]: SO - Neuguinea, Moroka, 1300 m, leg. LORIA, det. STEPHANI (JE 0401678!, JE-H1251 ex FI, isotype, det. R. GROLLE 1974 as *Lepidozia wallichiana*).

*Neolepidozia heterotexta* (STEPH.) E.D. COOPER. *Phytotaxa*. 97(2): 55. 2013.

New Caledonia: Montagnes des Sources, 800 m, humid *Araucaria muelleri* forest, leg. OLAF SELLING 118, 1949 (JE!, identified by HERZOG as *Lepidozia wallichiana* var. *theriotii* [STEPH.] HERZ.).

*Neolepidozia massartiana* (SCHIFFN. ex STEPH.) U. SCHWARZ, SCHÄF.-VERW. & SHEVOCK *Frahmia*. 49:65. 2026.

Indonesia: Sumatra, North Sumatra, Hochland von Brastagi, Westaufstieg zum Gunung Sibayak, 3° 14' 12.2" N, 98° 29' 54.3" E, 1820 m, Strauchvegetation mit reichlich *Pandanus*, on volcanic rock wall in filtered light, leg. SCHÄFER-VERWIMP & VERWIMP, 16 May 2005 (herbarium SCHÄFER-VERWIMP 24810a!).

*Neolepidozia tenera* (STEPH.) U. SCHWARZ, SCHÄF.-VERW. & SHEVOCK *Frahmia*. 49:107. 2026.

Philippines: Mindanao Island, Misamis Oriental Province, Barangay Lunutan, Mt. Lumot, southwest of Gingoog City, 8° 42' 30.6" N, 125° 1' 14.44" E, on rotten wood, 1670 m, leg. FELIX SCHUMM & UWE SCHWARZ, 24 August 1999 (herbarium UWE SCHWARZ No. 4735!).

*Neolepidozia wallichiana* (GOTTSCHE, LINDENB. & NEES) FULFORD & J. TAYLOR. *Brittonia*. 11(2): 84. 1959.

Nepal: Nepal. Ex Herb. Lehmannianum. 1853 (Isotype *L. wallichiana*, GLM-B-0006484!).

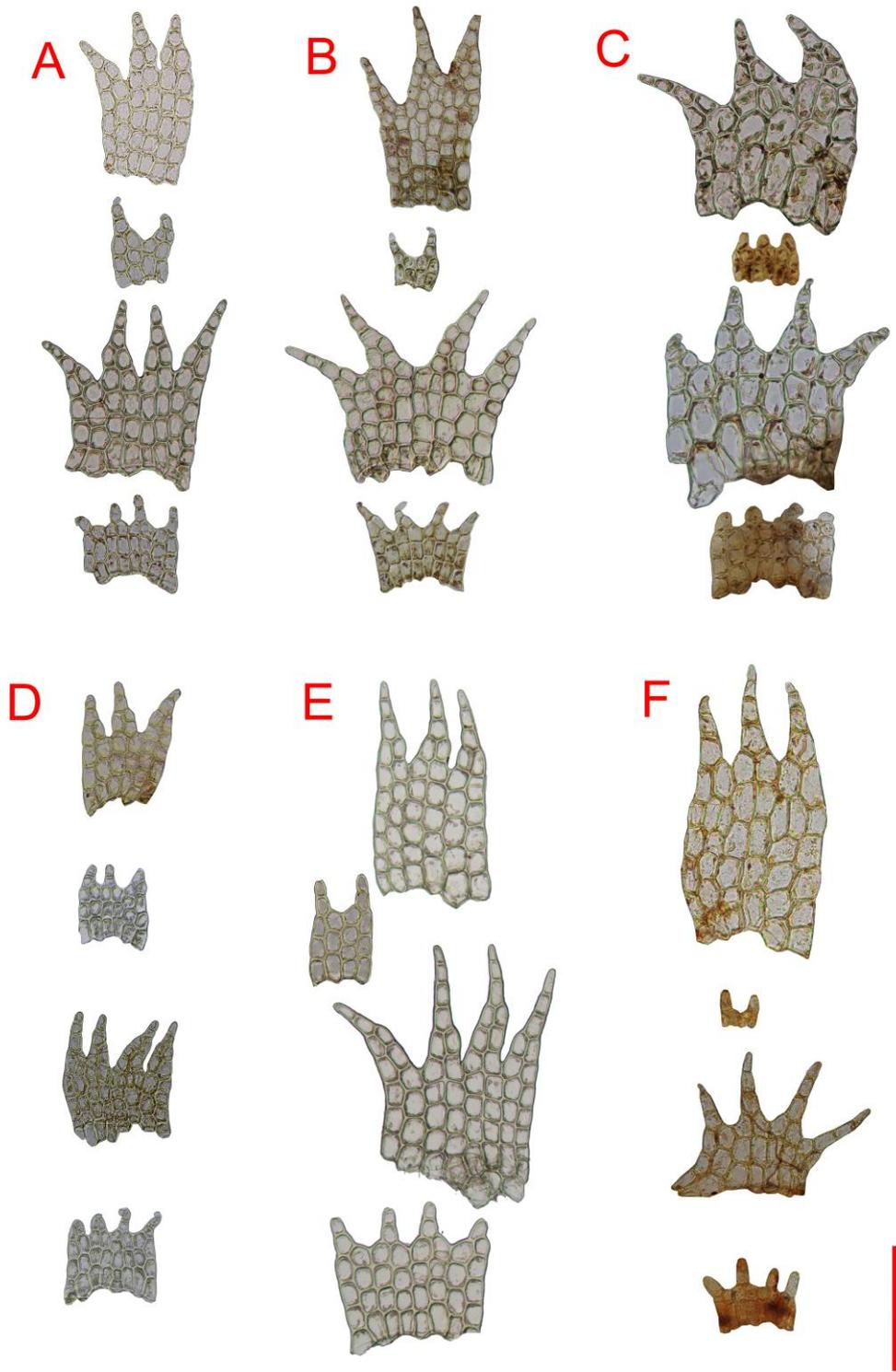
**7. Bibliography**

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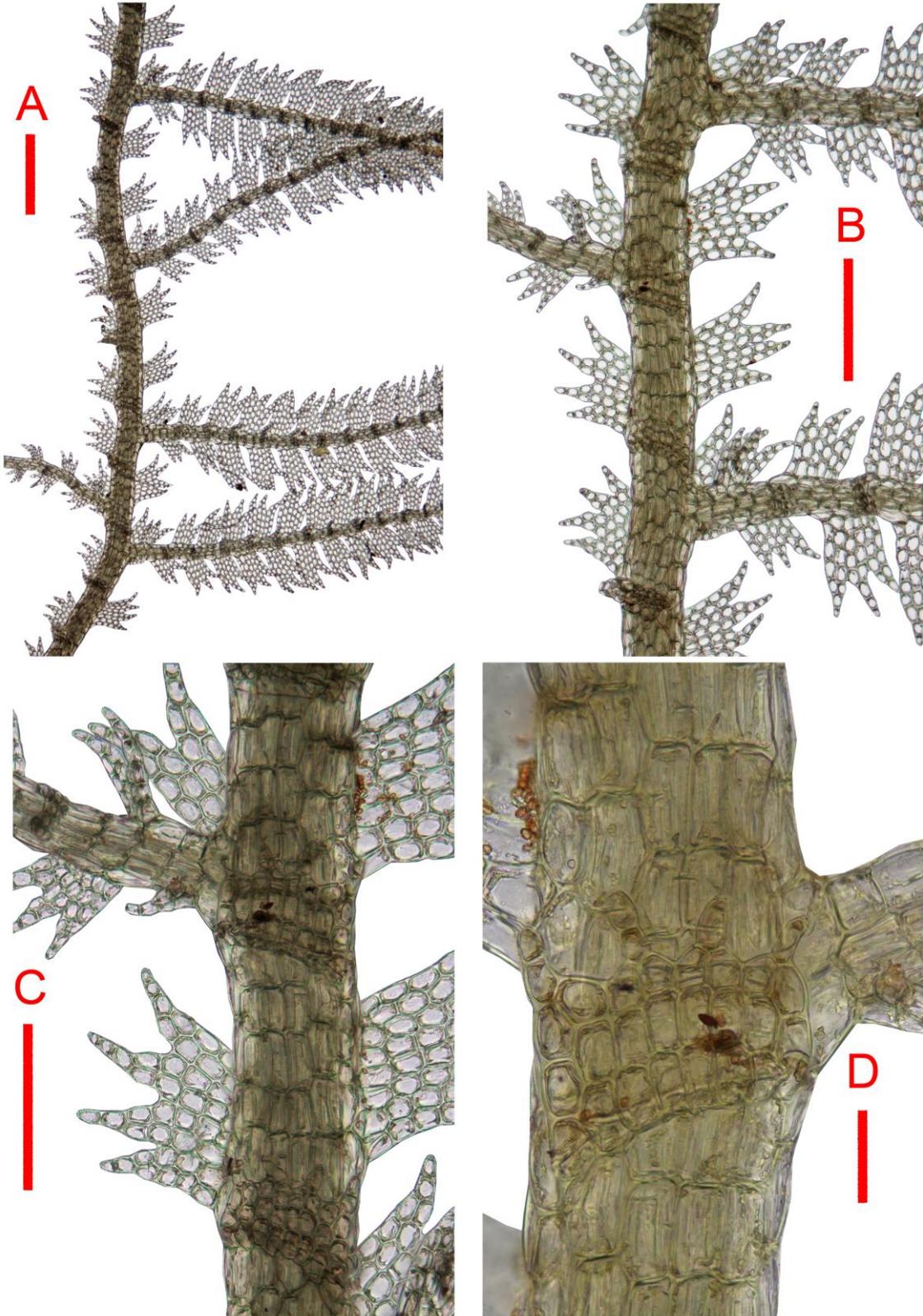
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# Plates

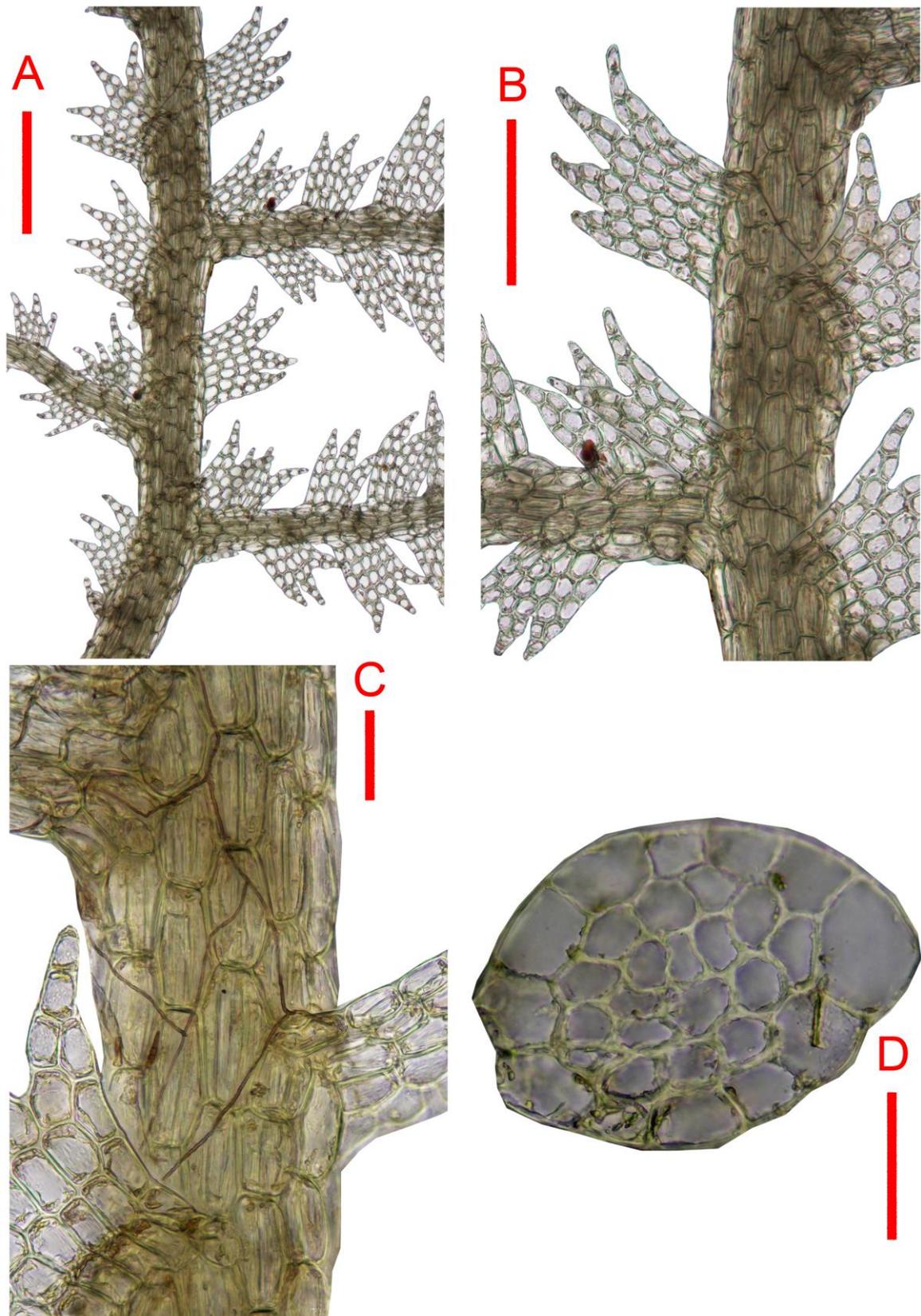
**Comparison of *Neolepidozia* species reported from the Pacific Islands**



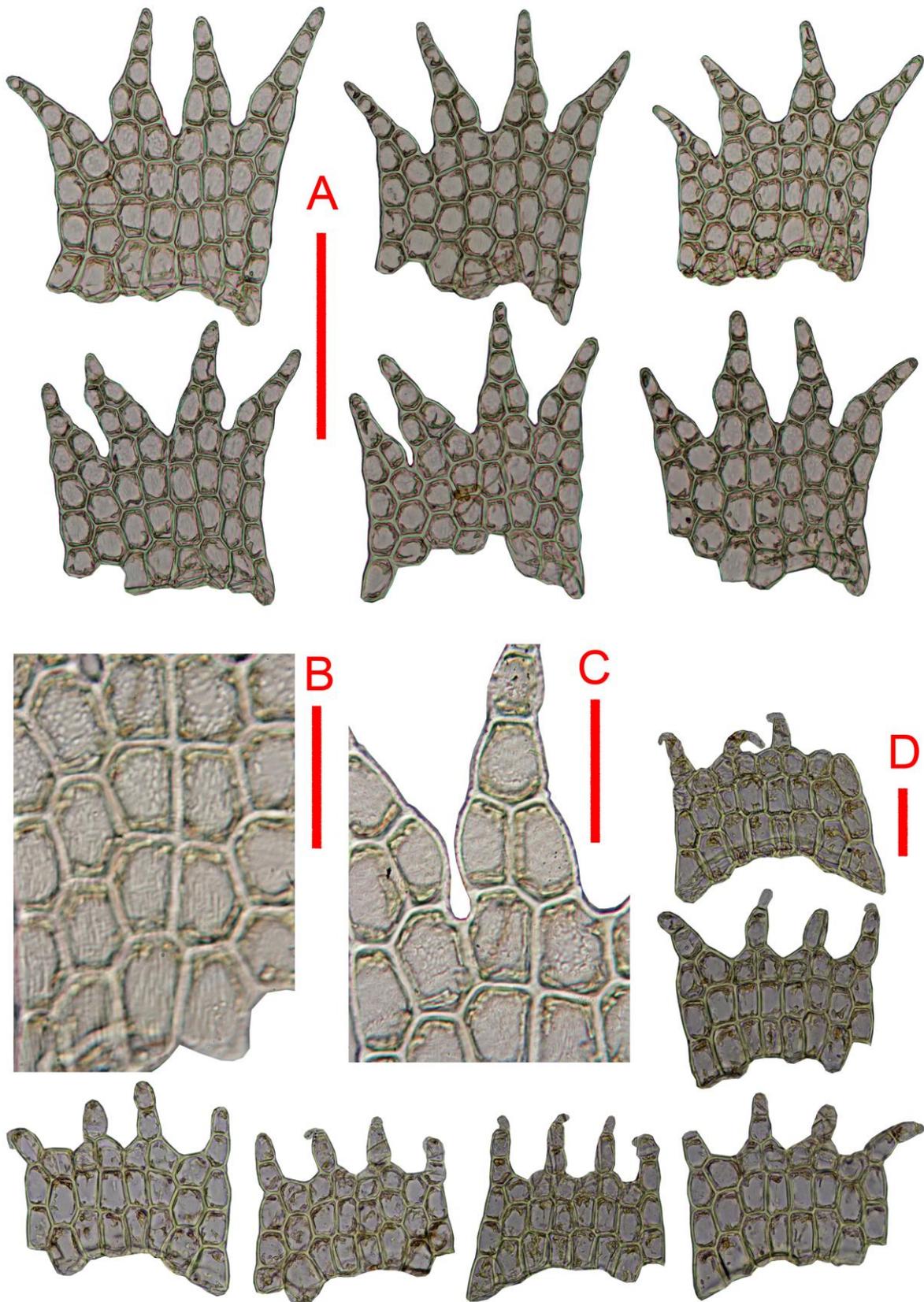
**Comparison plate 1:** From top to bottom – branch leaf, branch underleaf, stem leaf, stem underleaf of A – *Neolepidozia samoensis* (SCHULTZE-MOTEL 3130), B – *Neolepidozia cuneifolia* (LORIA, isotype in JE), C – *Neolepidozia heterotexta* (SELLING 118), D – *Neolepidozia massartiana* (SCHÄFER-VERWIMP 24810a), E – *Neolepidozia tenera* (SCHWARZ 4735), F – *Neolepidozia wallichiana* (isotype in GLM-B); Scale: 0.2 mm (for all leaves)

*Neolepidozia samoensis* U. SCHWARZ, SCHÄF.-VERW. & SHEVOCK

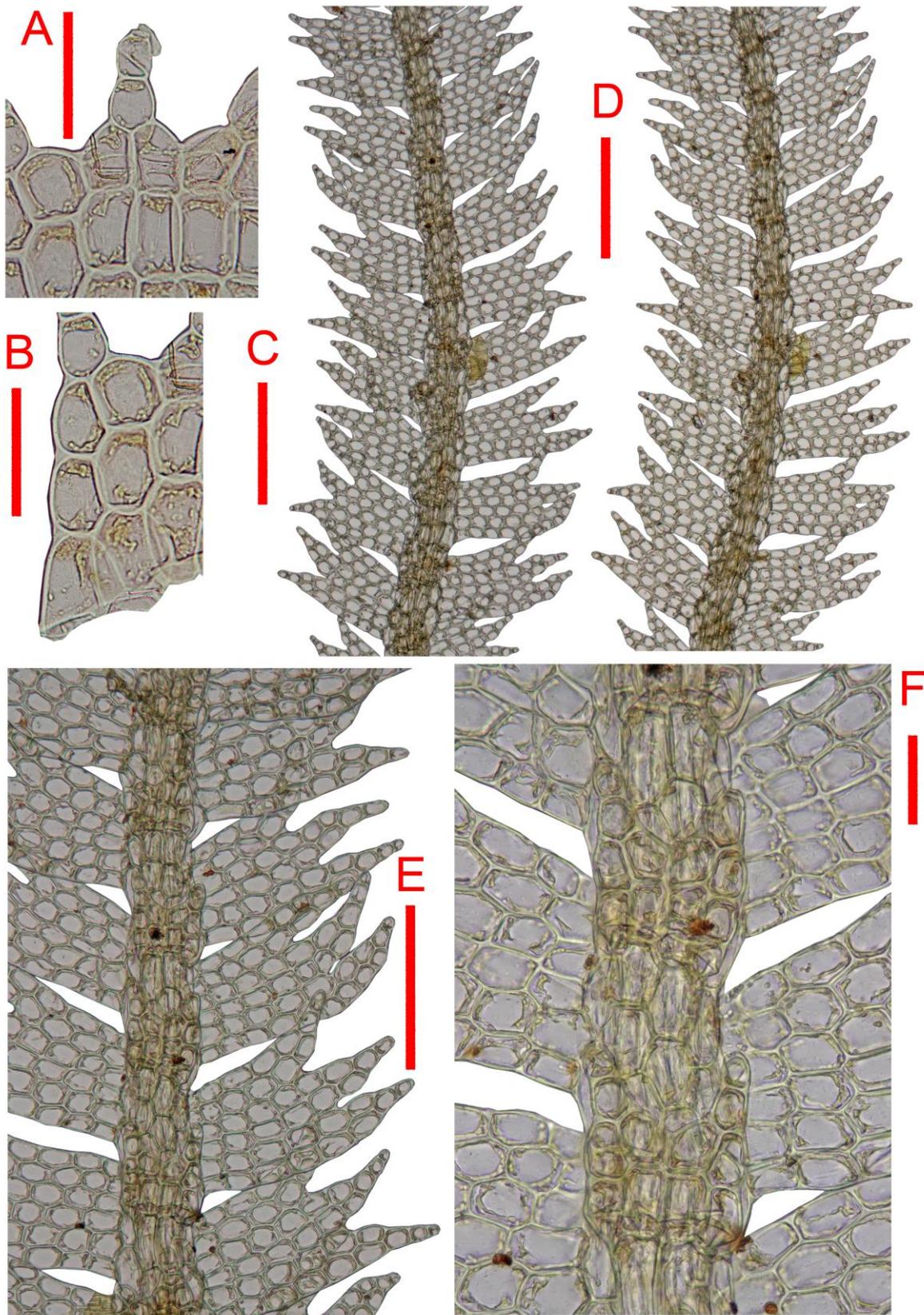
**Plate 1:** *Neolepidozia samoensis*: A, B, C, D – Plant ventral; Scales: A – 0.5 mm; B – 0.3 mm; C – 0.2 mm; D – 50 µm (from SCHULTZE-MOTEL 3130 – holotype)



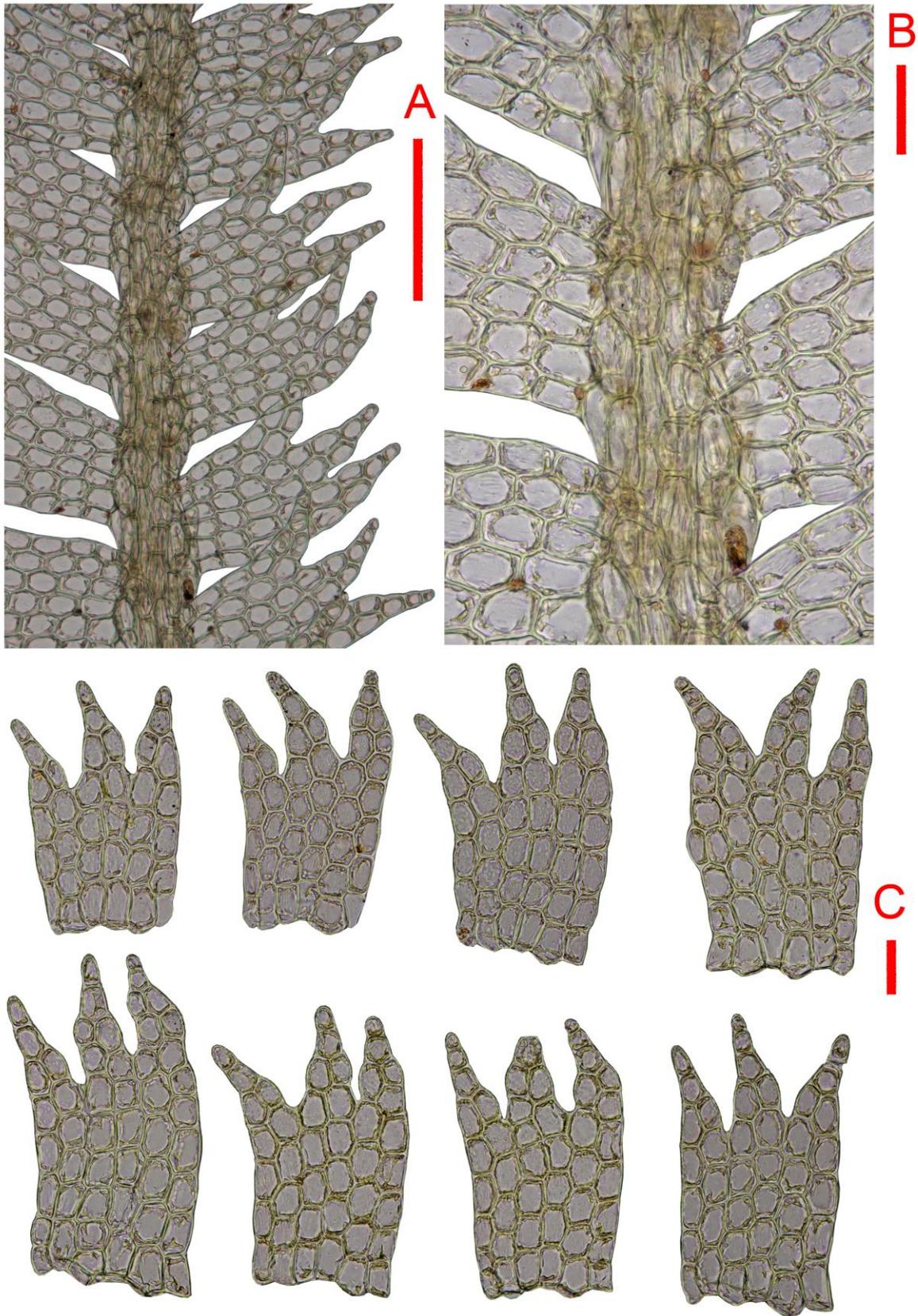
**Plate 2:** *Neolepidozia samoensis*: A, B, C – Plant dorsal, D – Stem cross section; Scales: A – 0.3 mm; B – 0.2 mm; C, D – 50  $\mu$ m (from SCHULTZE-MOTEL 3130 – holotype)



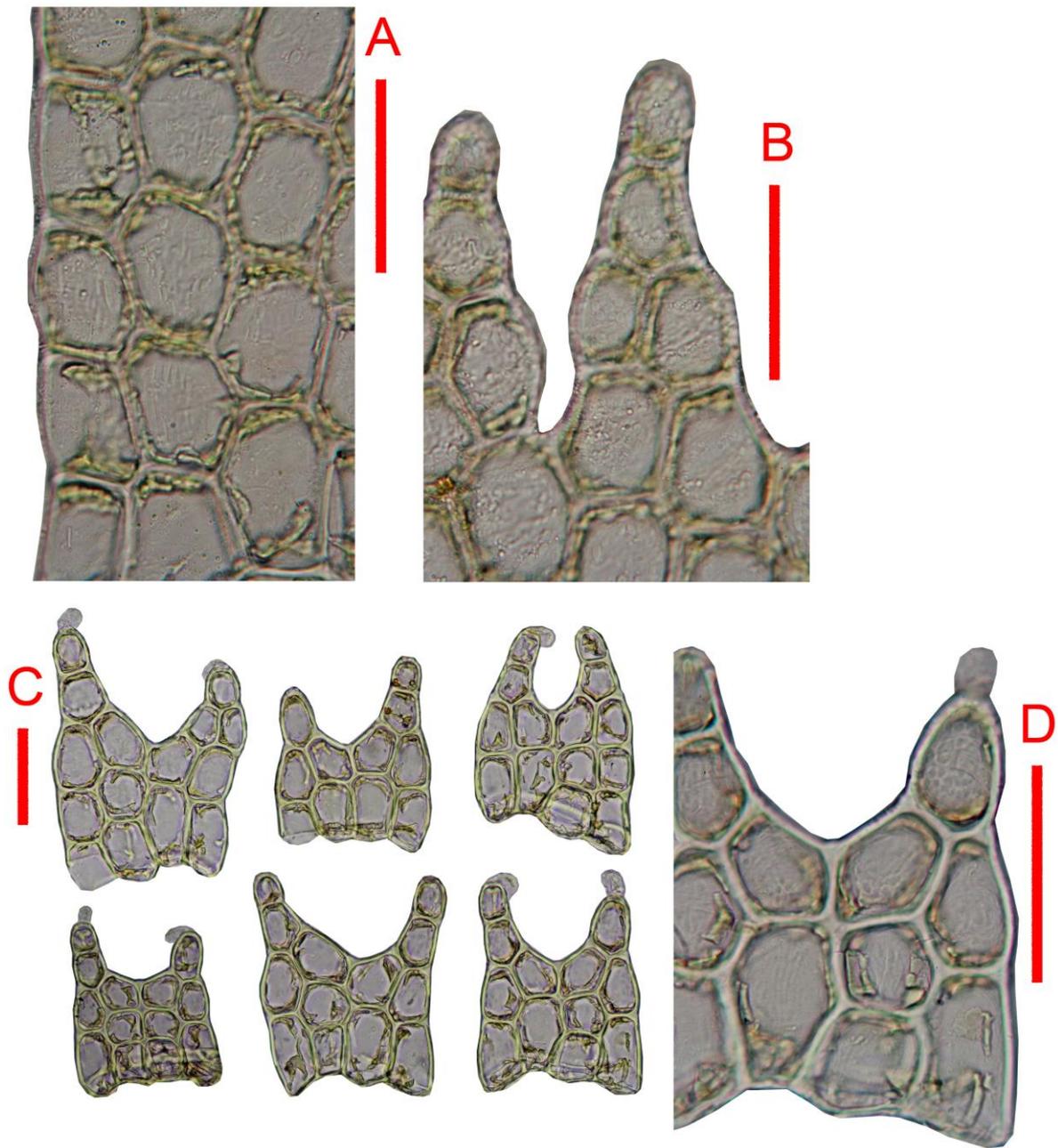
**Plate 3:** *Neolepidozia samoensis*: A – Stem leaves, B – Stem leaf disc, C – Stem leaf lobes, D – Stem underleaves; Scales: A – 0.2 mm; B, C, D – 50  $\mu$ m (from SCHULTZE-MOTEL 3130 – holotype)



**Plate 4:** *Neolepidozia samoensis*: A – Stem underleaf lobes, B – Stem underleaf disc, C, E, F – Branch ventral, D – Branch dorsal; Scales: C, D – 0.3 mm; E – 0.2 mm; A, B, F – 50 µm (from SCHULTZE-MOTEL 3130 – holotype)



**Plate 5:** *Neolepidozia samoensis*: A, B – Branch dorsal, C – Branch leaves; Scales: A, B, C – 50  $\mu\text{m}$  (from SCHULTZEMOTEL 3130 – holotype)



**Plate 6:** *Neolepidozia samoensis*: A – Branch leaf disc, B – Branch leaf lobes, C, D – Branch underleaves; Scales: A, B, C, D – 50  $\mu$ m (from SCHULTZE-MOTEL 3130 – holotype)