

**Austral Hepaticae 39. *Kurzia moniliformis*,
an interesting new species of Hepaticae
from New Zealand, belonging to a new section,
Kurzia sect. *Moniliformes* Engel**

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Abstract — *Kurzia moniliformis* Engel, a new member of the Lepidoziaceae, is described and illustrated from New Zealand. The species belongs to a new section, *K. sect. Moniliformes* Engel.

Jungermanniaceae / *Kurzia* / New species / New Zealand

INTRODUCTION

During the course of continuing investigations of New Zealand hepatics, an interesting additional species of *Kurzia* came to my attention. It is described and discussed as well as compared to some of the other New Zealand members of the genus below. This paper is dedicated to the memory of Riclef Grolle. His many insightful publications on south temperate and subantarctic hepatics are crucial to our understanding of plants from these areas, and have aided my research immeasurably. Riclef also was instrumental in developing a taxonomy and classification of the genus *Kurzia* (e.g., Grolle, 1964a, 1964b), and it is befitting that the subject matter of this paper should involve not only an unusual species of that genus, but a plant from New Zealand.

DESCRIPTION

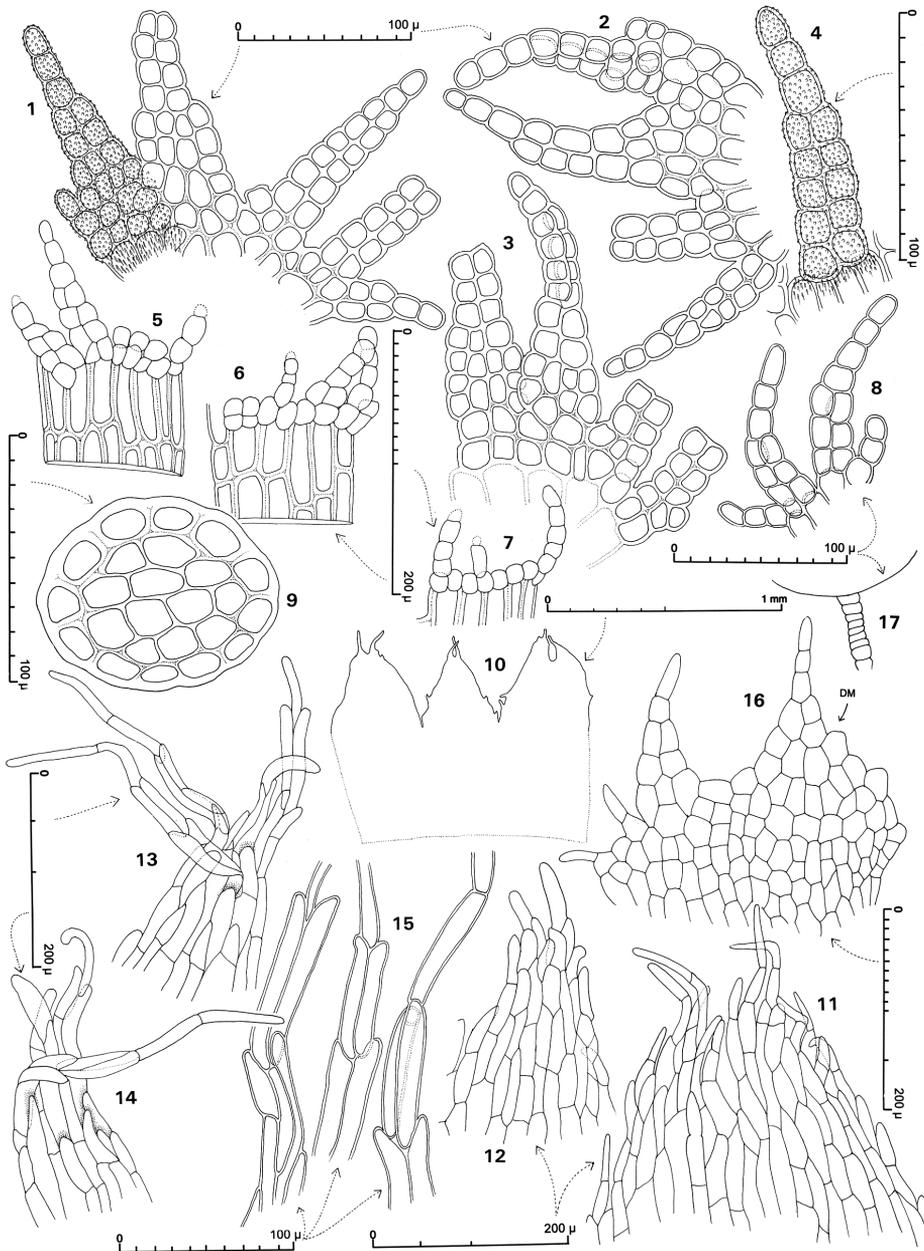
***Kurzia moniliformis* Engel, sp. nov.** (Figs 1-17)

Kurziae hippuroidi similis, sed lobis serie uniseriata submoniformi praeditis, cellulis turgidis doliiformibusque, superficie folii distincte papillosa differt.

Holotype: New Zealand, North Island, South Auckland Prov., Kaimai Mamaku Forest Park, Kaimai Range, spur ESE of Ngatamahinerua, headwaters of Poupou Stream, ca 2 km W of North-South Track, 405 m, *Engel and von Konrat 23600* (F); isotype: (AK).

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Plants with a prickly appearance, wiry, pure green to pale olive green, the stems golden brown, forming interwoven, compact, felt-like mats, the shoots tiny for genus, to 3 mm wide including branches, the main shoot often becoming flagelliform, pale, microphyllous and appearing similar to stolons. **Branching** basically 1-2(3) pinnate, with suberect, pinnate terminal branches (both *Frullania* and *Microlepidozia* types), produced at \pm regular intervals from a horizontal, indeterminate, leafy axis which becomes denuded with age, the branching frequently subopposite, the branches dorsally ascending and at right angles to the main shoot, the ultimate ones somewhat dorsiventrally flattened, the erect leafy branches not becoming flagelliform; branch half-leaf divided to the base into two halves, each half variously inserted in relation to the other, each similar to a leaf lobe, the margins each with a lateral spur, or entire; first underleaf of *Frullania*-type branch asymmetrically or (sporadically) symmetrically 3-lobed, inserted on the ventral lateral side of base of branch. **Ventral-intercalary branches** from the horizontal axis, becoming erect and leafy, or geotropic and stoloniform, often long and whip-like. **Lateral-intercalary branches** occasional, from flagelliform sectors in distal portion of plant, the branches pinnate and similar to those that are terminal in origin. **Stems** stiff and wiry, the cortical cells in surface view elongate, distinctly thick-walled (esp. the radial longitudinal walls), the walls golden brown, the cortical cells in cross section in 12 rows, in a single layer of very thick-walled, pigmented cells slightly larger than the firm-walled, colorless, medullary cells; cortical cells 3-4 intervening between successive leaves on each side of stem. **Rhizoids** sparsely developed, from cells of underleaf disc. **Leaves** brittle, rigid, firmly attached, concave to canaliculate, distant on prostrate leading axes, but rather densely imbricate on ultimate branches, the disc widely spreading to squarrose, the lobes abruptly suberect and parallel with stem, or with lobe tips arched toward the stem, the dorsal-most lobes somewhat more stiffly erect on leaves of the main shoot but markedly so on the branches, the branch leaves appearing as if “brushed” forward; leaves 120-145 μm broad \times 125-170 μm long, the insertion transverse, the leaves somewhat asymmetric due to differing size and form of lobes, \pm equally 4-fid nearly to the base. **Lobes** easily fragmenting, with varying portions of the lobes at times caducous, the leaves sometimes lacking the entire lobe, at times just the uniseriate sector, the lobes narrowly attenuate to narrow-sublinear, 2-4 cells broad at base and with up to 6 biseriate tiers and in that sector hardly tapering, terminating in a uniseriate row of 2-3 cells that are distinctly constricted at the septa, the lobe margins entire; lobe cells comprised of small, quadrate to short-oblong cells, turgid and barrel-shaped lending the uniseriate portion submoniliform, the cells of uniseriate row subsodiametric to at most slightly elongated (to ca. 1.3:1), the terminal cell rounded at the tip. **Disc** 1(2) cells high; sinus bases and abaxial face of the disc without appendages; disc often with a single tooth on dorsal margin, the ventral margin entire or sporadically with a small tooth; disc of primary branch leaves sporadically with a tooth on dorsal margin, the leaves of the ultimate branches typically with disc margins entire. Cells of disc and lobes evenly rather thick-walled and without trigones, subquadrate to short oblong, small, those in basal half of lobe 10-17 \times 16-22 μm , those of disc 15-18 μm \times 12-20(24) μm ; surface of lobes distinctly papillose on both abaxial and adaxial faces, the papillae crowded, the surface of disc striate. **Underleaves** usually asymmetrically (3)4-fid to near the base, the lobes 2 cells wide at the base followed by 0-3 biseriate tiers and a uniseriate row of 2-5 cells, the cells of uniseriate row mostly similar in appearance to those of leaves; fully developed lobes typically more persistent, with a uniseriate row of up to 5 subsodiametric cells and with a terminal cell lacking a slime papilla; aborted lobes weaker in appearance, thinner walled, often readily



Figs 1-17. *Kurzia moniliformis* Engel. **1-3.** Leaves of main axis, the cuticle shown in part at left in Fig. 1; stipple at base of Fig. 3 indicates stem cells (all drawn to same scale). **4.** Lobe of leaf from main axis, adaxial view (note papillose surface, but basal half of disc cells is smooth). **5-7.** Underleaves of main shoot (all drawn to same scale). **8.** Half-leaf. **9.** Stem of prostrate main shoot, cross section. **10.** ♀ Bracts and bracteole; note fusion of basal half. **11.** Portion of apex of ♀ bract. **12.** Lobe of ♀ bract. **13-14.** Portions of perianth mouth; note articulated cilia and prorate cells below. **15.** Basal portion of 3 cilia of perianth mouth showing articulated cells. **16.** ♂ Bract (dm = dorsal margin). **17.** Antheridial stalk. (All from type).

caducous, consisting of (1)2 cells that are either subisodiametric or at times 2:1 or a little more, the terminal cell often with a slime papilla; disc 1-2 cells high, the cells subisodiametric, thick walled, the margins entire; underleaves of older shoot sectors often consisting solely of the disc + paired cells of lobe bases. Asexual reproduction via fragmenting leaves.

Androecia on short, determinate, spicate, ventral-intercalary branches from leading leafy shoots, on both ventral- and lateral-intercalary branches in flagelliform sectors; bracts in up to 6 pairs, strongly ventricose-cucullate, leptodermous throughout, bilobed to *ca* 0.4 by acuminate segments that terminate in a uniseriate row of 2-3 cells; dorsal and ventral margins of disc similar, the ventral with 1-2, few-celled teeth, the dorsal with smaller, delicate cells in basal sector, often with a tooth just below level of lobe; antheridia 1 per bract, large for bract size, the stalk uniseriate; bracteolar antheridia lacking. **Gynoecia** on abbreviated ventral-intercalary branches issuing from main stem, the gynoecium base swollen and densely rhizoidous; bracts and bracteole of first series small and scale-like, those of second series tightly appressed to those of innermost series; bracts and bracteole of innermost series erect and closely ensheathing the perianth, identical, markedly membranous, fused and tubular in basal half, the free portion of bracts and bracteole each concave, shallowly bilobed, the lobules broad at base, terminating in an elongate process comprised of 1-2 elongate, papillose cells, the lobule margin crenate-denticulate by projecting distal ends of cells; free sector of lamina composed of regularly short to long rectangular to 5-angled cells, the margin irregularly crenate-dentate. **Perianth** straight to curved, fusiform, terete in basal half, stipitate at the base, the distal half obscurely trigonous and pluriplicate, narrowing to a distinct, rather elongate contracted sector at the mouth, the mouth fringed with cilia, the cilia composed of 1-2 biseriate tiers of elongate cells each free distally and forming a "shoulder-like" projection and terminating in a single, thin-walled, elongate cell or a uniseriate row of 2 such cells (to *ca* 7:1), the perianth surface directly below scabrous by free distal ends of cells (prorate).

Sporophyte not seen.

DIFFERENTIATION

This is a distinctive species, and, at first glance, plants are noteworthy because they are markedly tiny for the genus and have a prickly appearance. Plants basically have a "ground plan" similar to that of *K. hippuroides*, *i.e.*, branching 1-2(3) pinnate, with terminal branches of the *Frullania* type on one side of the axis and *Microlepidozia* type on the other. Also as in *K. hippuroides* the "fronds" are produced at \pm regular intervals from a horizontal, indeterminate, leafy axis that with age has only the remnant leaf discs, or the axis is completely devoid of leaves. The "fronds" are stiffly dorsally ascending, frequently subopposite, the ultimate ones somewhat dorsiventrally flattened, and the primary branches do not become flagelliform as they sporadically do in *K. hippuroides*.

The main shoot and branches are quite different in appearance. The main shoot has leaves distant, inconspicuous and often in part or entirely falling away, and the leaves, when complete, have the dorsalmost 1-2 lobes only feebly erect. The primary and secondary branches, on the other hand, have leaves rather densely imbricate, are normally intact, and the dorsalmost (1)2 lobes are stiffly

erect and oriented toward the shoot apex, with the leaves appearing “brushed” forward.

The leading shoot may give rise to a few other leading shoots via terminal or ventral-intercalary branches, the “new” leading shoots producing the bipinnate “fronds,” terminal in origin, that are typical of the species, and the new leading axis often becomes, in turn, flagelliform distally. The main shoot in *K. moniliformis* often becomes flagelliform, and the flagella are pale, whitish green, up to 11 mm or more and similar in appearance to stolons. The flagelliform shoots of *K. hippuroides* differ in being brownish and often markedly nitid. Flagelliform shoots in *K. moniliformis* grow horizontally for some distance and are devoid of branches or have them at irregular intervals. Branches from this sector of the shoot may at times be lateral-intercalary, with branches pinnate and similar to those that are terminal in origin. This is the first instance of lateral-intercalary branching for the genus. Androecia may be produced in the flagelliform sector of the shoot.

Leaf lobes are distinctive in having up to 6 biseriate tiers and in that sector hardly taper (Figs 1, 4). Lobes terminate in a uniseriate row of 2-3 cells that are turgid, barrel-shaped and distinctly constricted at the septa, which lends the uniseriate portion submoniliform (Figs 1-4). The lobe cells below the level of the uniseriate row also notably bulge (Figs 1, 3). The leaves are comprised of small, quadrate to short-oblong cells that do not much differ from leaf apex to base (Figs 1-3). Cells are evenly thick walled, and the surface of the entire leaf is distinctly papillose except for the striate disc (Figs 1, 4). These features will distinguish the species from all other New Zealand members of the genus.

Several other features are notable and are unique to the genus. The innermost gynoeical bracts and bracteole are fused to *ca* 0.5 to form a tube (Fig. 10) that ensheathes the lower sector of the perianth. The cells of the cilia at the perianth mouth are articulated in a unique and interesting way. The cilia are comprised of a) 1-2 biseriate tiers of elongate cells each free distally forming a “shoulder-like” projection; and b) the uniseriate distal portion that appears wedged in the “cleft” between the “shoulders” (Figs 13-15). Also, the distal sector of the perianth is scabrous by the free distal ends of cells (prorate; Figs 13, 14).

These features further isolate the species within the genus, and a new section is described for it as follows.

***Kurzia* sect. *Moniliformes* Engel, sect. nov.**

Plantae ramulis laterali-intercalaribus praeditae; bracteae gynoeicales basaliter in tubum usque ad 0.5 longitudinis connatae; cilia oris perianthici cellulis articulatis praedita.

Type: *Kurzia moniliformis* Engel

DISTRIBUTION AND ECOLOGY

Known only from the type, which occurred under the shade of a *Blechnum* colony in a stream valley under an open canopy of *Beilschmedia tawa* and *Weinmannia silvicola*; the subcanopy dominants were *Schefflera digitata*, *Cyathea dealbata* and *C. smithii*, and shrub layer of *Freycinetia baueriana* and *Cortaderia*.

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REFERENCES

- GROLLE R., 1964a (1963) — Über *Kurzia* v. Martens. *Revue Bryologique et Lichénologique* 32: 166-180, pl. 1-2.
- GROLLE R., 1964b — Notulae hepaticologicae. XV. Neue Notizen über *Kurzia* v. Mart. und Verwandte. *Journal of Japanese Botany* 39: 79-81.