

CALYPTROCHAETA¹

Heinar Streimann†

Calyptrochaeta Desv., *Mém. Soc. Linn. Paris* 3: 226 (1825); derived from the Greek *kalyptos* (covered), and *chaite* (a bristle or long hair), in reference to the generally long-haired calyptra.

Type: *C. cristata* (Hedw.) Desv.

Autoicous or dioicous. Plants slender or robust, often rigid, loosely tufted, variously green. Stems suberect, flattened, simple or dichotomously branched. Leaves 6-rowed, asymmetrical, short-acuminate, dentate above to ±entire; dorsal and ventral leaves appressed; smaller lateral leaves ±spreading; costa short, often weak, unevenly forked, rarely absent. Laminal cells moderately thick-walled, hexagonal, epapillose; basal cells longer and more variable; marginal cells elongate; border generally prominent, 1–7 cells wide, yellowish. Rhizoids mainly at leaf bases, few in leaf axils.

Perigonia and perichaetia lateral. Calyptra usually mitrate, rarely campanulate; base fringed, smooth or with sinuose hairs. Seta thick, fleshy, densely hairy or papillose. Capsules small, oval, with a narrowed mouth; operculum conical, with an erect rostrum; annulus lost with the operculum. Peristome: exostome teeth lanceolate, furrowed, bordered, with high ventral lamellae projecting laterally; endostome segments narrower; basal membrane high; cilia rudimentary or absent. Spores smooth to slightly papillose.

This genus of about 30 species is especially well represented in South America, the Pacific through to SE Asia and in Madagascar. Six species are known from eastern and south-eastern Australia; found on moist soil, rotting wood, rock, fern pinnae and tree bases.

Calyptrochaeta is characterised by the often strong leaf border and the short and unevenly divided leaf costa.

References

- Lin, P.-J. & Tan, B.C. (1995), Contributions to the bryoflora of China (12): A taxonomic revision of Chinese Hookeriaceae (Musci), *Harvard Pap. Bot.* 7: 25–68.
- Streimann, H. (2000), Taxonomic studies on Australian Hookeriaceae (Musci). 3. The genera *Calyptrochaeta*, *Daltonia*, *Hookeriopsis* and *Sauloma*, *J. Hattori Bot. Lab.* 88: 101–138.
- Tan, B.C. & Robinson, H. (1990), A review of Philippine hookeriaceous taxa, *Smithsonian Contrib. Bot.* 75: 1–41.

Key

- | | | |
|----|--|---------------------------|
| 1 | Leaf border 1 or 2 cells wide; apiculus 30–50 µm long | 3. <i>C. brownii</i> |
| 1: | Leaf border 3–7 cells wide; apiculus (50–) 100–300 µm long | 2 |
| 2 | Leaf border 5–7 cells wide; apiculus stout; leaves crisped or curled, often yellowish ... | 1 <i>C. apiculata</i> |
| 2: | Leaves border (2–) 3–4 (–5) cells wide; apiculus narrow; leaves ±straight, green to dark green | 3 |
| 3 | Leaves orbicular..... | 6. <i>C. rotundifolia</i> |
| 3: | Leaves oblong to ovate | 4 |
| 4 | Apiculus 50–60 (–120) µm long; denticulations absent or very weak | 5. <i>C. otwayensis</i> |
| 4: | Apiculus 200–300 µm long; denticulations weak or prominent | 5 |

¹ Now in the family Daltoniaceae [Goffinet, B., Buck, W.R. & Shaw, A.J. (2012), *Classification of the Bryophyta*. <http://www.eeb.uconn.edu/people/goffinet/Classificationmosses.html>].

Cite as: H.Streimann, *Australian Mosses Online. 11. Hookeriaceae: Calyptrochaeta*. http://www.anbg.gov.au/abrs/Mosses_Online/Calyptrochaeta.pdf (2012)

- 5 Leaf margin prominently denticulate; border 3–5 cells and 18–35 µm wide.....4. **C. flexicollis**
 5: Leaf margin weakly denticulate, rarely entire; border 2 or 3 cells and 12–25 µm wide.....2. **C. brassii**

1. **Calypstrochaeta apiculata** (Hook.f. & Wilson) Vitt, *Canad. J. Bot.* 57: 2251 (1979)

Hookeria apiculata Hook.f. & Wilson, *London J. Bot.* 3: 549 (1844); *Distichophyllum apiculatum* (Hook.f. & Wilson) Mitt., *Trans. & Proc. Roy. Soc. Victoria* 19: 77 (1882); *Eriopus apiculatus* (Hook.f. & Wilson) Mitt., *J. Linn. Soc., Bot.* 12: 393 (1869); *Pterygophyllum apiculatum* (Hook.f. & Wilson) A.Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1875–76: 342 (1877) [Ad. 2: 246]. T: Hermite Is, Cape Horn, Chile, J.D.Hooker; holo: BM; iso: BM.

Eriopus tasmanicus Broth., *Öfvers. Förh. Finska Vetensk.-Soc.* 42: 109 (1900); *Calypstrochaete apiculata* (Hook.f. & Wilson) Vitt var. *tasmanica* (Broth.) Fife, *Bryologist* 98: 315 (1995). T: waterworks, Hobart, Tas., W.A.Weymouth; holo: H; iso: HO 79473.

Illustrations: A.J.E.Smith, *The Moss Flora of Britain and Ireland* 515 (1978), as *Eriopus apiculatus*; H.Streimann, *op. cit.* 106, fig. 2; D.Meagher & B.Fuhrer, *A Field Guide to the Mosses and Allied Plants of Southern Australia* 33 (2003); R.D.Seppelt, *The Moss Flora of Macquarie Island* 176, fig. 70 (2004).

Dioicous. Plants medium-sized, slender, rigid, pale to dark green, glossy, erect or ascending, 15–30 mm tall, branched or not. Leaves complanate, asymmetrical, undulate, crisped when dry, straight when moist, in 2 rows of large lateral leaves, 2 dorsal rows and 2 ventral rows. Lateral leaves ovate to oblong, 2.0–2.7 mm long, 1.2–1.5 mm wide; apex stout, abruptly apiculate, (200–) 240–300 µm long; base narrowed; margin plane, ±entire or distantly denticulate near the apex, crenulate below; costa weak, short, forked, c. 125 µm wide at the base. Upper and median laminal cells darker, hexagonal to isodiametric, (25–) 45–60 (–80) × 22–38 µm; basal cells oblong-hexagonal, c. 125 × 25 (–45) µm; border stout, wide, porose, 5–7 (–8) thick-walled cells and 50–100 µm wide. Dorsal and ventral leaves smaller. Rhizoids dark reddish, often abundant, to 2.5 mm long, 18–30 µm wide; cells c. 180 µm long; immature rhizoids richly branched, shorter and narrower; cells to 50 µm long.

Perigonia numerous, yellowish; perigonial leaves tightly imbricate. Perichaetial leaves lanceolate to ovate-lanceolate, often developing shoulders, 1.1–1.4 mm long, 0.22–0.60 mm wide, acuminate, ecostate. Laminal cells narrowly hexagonal, 45–138 × 25 µm, smaller and narrower towards the margin; border inconspicuous, formed of 1 row of cells c. 3 µm wide. Archegonia 320–350 µm long, 5–14 per perichaetium; paraphyses absent or rare and c. 250 µm long. Calyptra smooth above. Seta 5–8 mm long, papillose. Capsules 1.0–1.5 mm long, erect or inclined; operculum 0.5–0.7 mm long. Peristome: exostome teeth joined and orange to reddish at the base, yellowish above, narrowly furrowed, transversely striolate; basal membrane c. half the height of the teeth; endostome segments c. as long as the teeth; cilia rudimentary. Spores 16–24 µm diam.

Occurs in S.A., north-eastern Qld, N.S.W., Vic. and Tas.; especially common in coastal and hinterland sites and found on various substrata in many vegetation types. Also in New Zealand, southern South America and the Falkland Islands; introduced into Ireland and southern Britain.

S.A.: Hindmarsh Valley Falls, *L.D.Williams 2860a* (AD). Qld: Mt Bellenden Ker, *I.G.Stone 16770, 16799, 16862* (MELU). N.S.W.: Stanwell Park, *W.W.Watts 8428* (NSW). Vic.: Mossy Cave, Glenelg R., *F.W.Aslin 1551* (AD). Tas.: Basket Ck, 20 km SSW of Eaglehawk Neck, *H.Streimann 40068* (CANB, H, NY).

The undulate and crisped leaves can mask the complanate leaf arrangement, so that this species can be mistaken for *Distichophyllum*, especially *D. Pulchellum*. However, the latter has smaller and more delicate leaves.

Although fertile collections were not plentiful, most capsules were seen between October and February.

2. **Calypstrochaeta brassii** (E.B.Bartram) Streimann, *J. Hattori Bot. Lab.* 88: 108 (2000)

Eriopus brassii E.B.Bartram, *Farlowia* 4: 246 (1952). T: Mt Finnigan, Qld, alt. c. 1040 m, 7 Sept. 1948, *L.J.Brass 20097*; holo: FH.

Illustration: H.Streimann, *op. cit.* 109, fig. 3.

Plants medium-sized and medium to dark green, 10–22 mm long, rarely branched. Leaves weakly crisped or curled when dry, \pm straight when moist (lateral leaves occasionally asymmetrical), rounded-ovate to broadly oblong, 2.3–2.8 mm long, 1.3–1.7 mm wide, ecostate, or the costa very weakly developed; apiculus long and narrow, (150–) 200–300 μ m long; base generally narrowed; margin plane, distantly weakly to moderately dentate above. Laminal cells rhomboidal to rounded-rhomboidal; upper cells $20\text{--}37 \times 13\text{--}20 \mu\text{m}$; median cells $37\text{--}50 \times 20\text{--}40 \mu\text{m}$; cells near the border more irregular and smaller; basal cells similar, but slightly larger in smaller leaves; border weak, 2 or 3 cells wide (12–25 μ m), narrower near the apex, the cells (88–) $100\text{--}150 \times 5\text{--}8 \mu\text{m}$. Rhizoids uncommon, smooth, reddish brown, to 0.9 mm long, 25–32 μ m wide; cells 60–88 μ m long.

Sporogone not seen.

Known from a tree trunk and a moist rock in well-developed, tropical, montane forest in north-eastern Qld.

Qld: summit E of Atherton, alt. 1250 m, *B.O. van Zanten 681267* (CANB, GRO).

Whereas the leaves of the broadly similar *C. flexicollis* are markedly denticulate, leaf denticulations are absent, weak or distant in *C. brassii*.

3. *Calypstrochaeta brownii* (Dixon) J.K.Bartlett, *Bull. Auckland Bot. Soc.* 15: 15 (1985)

Eriopus brownii Dixon, *Bull. New Zealand Inst.* 3: 286 (1927). T: Kennedys Bush, Port Lyttelton Hills, Christchurch, New Zealand, *R.Brown*; holotype: BM.

Illustrations: G.O.K.Sainsbury, *Bull. Roy. Soc. New Zealand* 5: 396 (1955), as *Eriopus brownii*; H.Streimann, *op. cit.* 112, fig. 5.

Dioicous. Plants medium-sized, soft, slender, dull dark green; stems 8–15 mm long, prostrate to suberect, simple or branched. Leaves complanate, flexuose or \pm straight when dry, straight when moist. Lateral leaves asymmetrical; spatulate to obovate, 2.0–2.7 mm long, 0.9–1.5 mm wide; apiculus short, 30–50 (–70) μ m long; base slender; margin plane, entire; costa very weak or absent. Upper laminal cells \pm rounded to oblong-hexagonal, $25\text{--}40$ (–50) $\times 20\text{--}30 \mu\text{m}$; median cells slightly larger; basal cells rhomboid-hexagonal, $60\text{--}75 \times 15\text{--}25 \mu\text{m}$; border weak, 1 or 2 rows (10–12 μ m) wide, the cells c. $40 \times 3 \mu\text{m}$. Rhizoids dense, branched, reddish, becoming reddish brown, \pm weakly papillose, to 2.5 mm long, 23–27 μ m wide; cells 150–200 μ m long. Perichaetial leaves ovate-lanceolate, shouldered, c. 2.4 mm long and 0.45 mm wide, acuminate, ecostate. Laminal cells hexagonal, $35\text{--}75 \times 12\text{--}17 \mu\text{m}$; basal cells long-hexagonal, c. $125 \times 20 \mu\text{m}$; border 1 cell wide, inconspicuous.

Archegonia 310–360 μ m long; paraphyses sparse, hyaline, c. 125 μ m long. Perigonial leaves similar to perichaetial leaves but not shouldered. Antheria few, 350–400 μ m long; paraphyses not seen. Calyptra c. 1 mm long, conical to campanulate; apex smooth. Seta 2–6 mm long, \pm stout, flexuose, cygneous, slightly papillose. Capsules 0.6–1.2 mm long, horizontal or subpendulous; operculum c. 0.6 mm long. Peristome: exostome teeth joined at the base, paler above, broadly furrowed; basal membrane half the height of the teeth; endostome segments narrowly lanceolate, widely perforated, slightly papillose; cilia absent. Spores smooth to slightly papillose, 10–16 μ m diam.

Uncommon in south-eastern Qld, N.S.W., Vic. and Tas.; collected from wet-sclerophyll and temperate rainforest on substrata such as rock, lower tree trunks, rotting logs and stump, tree fern stem and exposed tree roots. Also in New Zealand.

Qld: Gambubal S.F., *T.Pederson s.n.* (CANB). N.S.W.: Mount Hyland S.F., 33 km NW of Dorrig, *H.Streimann 60613* (CANB, NY); Monga S.F., 24 km SE of Braidwood, *H.Streimann 48932* (CANB, NY). Vic.: Fernshaw, 1884, *S.Berggren* (BM). Tas.: Notley Fern Gorge, near Launceston, *M.Tindale s.n.* (BM).

Only two fertile specimens were observed, both collected in September.

4. *Calypstrochaeta flexicollis* (Mitt.) Vitt, *Canad. J. Bot.* 57: 2251 (1979)

Hookeria flexicollis Mitt., *Handb. New Zealand Fl.* 2: 496 (1867); *Eriopus flexicollis* (Mitt.) A.Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges.* 1875–76: 338 (1877) [Ad. 2: 242]. T: Canterbury Alps, New Zealand, 1860–61, A.Sinclair & J.F.J. von Haast; Dunedin, Otago, New Zealand, Hector & Buchanan; syn: NY n.v.

Illustration: H.Streimann, *op. cit.* 117, fig. 7.

Dioicous. Plants medium-sized, robust, yellowish to dark green. Stems 12–30 mm long, flattened, simple or branched. Leaves slightly undulate when dry, erect when moist, slightly asymmetrical, oblong to broadly oblong-lanceolate, 2.3–2.6 mm long, 1.0–1.5 mm wide; apiculus narrow, moderately long (150–200 µm), prominent; base narrowed; margin plane, prominently irregularly dentate above; costa weak, very short, forked. Upper laminal cells oblong-hexagonal, 25–50 × 12–25 µm; median cells 25–62 × 15–30 µm; basal cells 63–85 × 10–15 µm; border 3–5 cells [28–35 (–50) µm] wide, the cells linear, very narrow, 100–125 × 2–4 µm. Rhizoids reddish brown, paler when immature, branched, weakly papillose, to 5 mm long, c. 30 µm wide; cells c. 140 µm long.

Perigonial leaves similar to perichaetial leaves; antheridia 600–700 × 65–70 µm; paraphyses not seen. Outer perichaetial leaves broadly linear, shouldered, 1.7–2.3 × 0.4–0.6 mm; inner leaves 1.4–1.7 × 0.2–0.4 mm, not prominently shouldered, weakly and distantly denticulate. Apical laminal cells elongate-rhomboidal, 125–200 × 10–20 µm; upper cells rhomboidal, (35–) 63–85 × 15–20 µm; median cells (35–) 125–150 × 12–20 µm; basal cells longer; cells shorter on outer leaves; border not prominent, absent in the distal half, 3 cells wide near the base, the cells linear, c. 125 × 4 µm. Archegonia c. 5 per perichaetium, 380–450 µm long; paraphyses few, c. 1 mm long and 8–14 µm wide; cells 35–60 µm long. Calyptra c. 0.8 mm long, smooth; thickly fringed below, the fringe c. 0.8 mm long, black above. Seta 3–7 mm long, reflexed below the capsule, prominently spiny, the spines longest below the capsule, c. 100 µm long, with 2 cells. Capsules ovoid, 1.0–1.5 mm long; operculum 0.4–0.6 mm long. Peristome teeth yellowish brown, c. 250 µm long, 50–62 µm wide at the base; endostome segments clear, ±same length as the teeth, narrower; cilia absent. Spores round to ovoid, slightly papillose, 12–20 µm diam.

Uncommon in eastern Vic. and in Tas.; also in New Zealand where it is far more common and widespread.

Vic.: Mt Erica, I.G.Stone 7150 (MELU). Tas.: Mt Wellington, L.Rodway s.n. (HO 79431).

This species is similar to *C. apiculata*, but the seta is crested with bristles that can be quite long under the capsule. However, the leaves are also not as noticeably curled, and the leaf margins are denticulate and narrower.

The only fertile collection (Vic.) bore capsules in March.

5. *Calypstrochaeta otwayensis* Streimann, *J. Hattori Bot. Lab.* 88: 116 (2000)

T: Lavers Hill, Melba State Park, 26 km WNW of Apollo Bay, Vic., alt. 380 m, on a *Nothofagus* base, Dec. 1996, H.Streimann 58384; holo: CANB.

Illustration: H.Streimann, *op. cit.* 117, fig. 9.

Dioicous. Plants medium-sized, yellowish green to dark green; stems 12–30 mm long, flattened, simple or branched. Leaves slightly undulate when dry, erect when moist, slightly asymmetrical, oblong to broadly oblong-lanceolate, 2–3 mm long, 0.8–1.5 mm wide; apiculus rather short, 100–150 µm long, slender or stout; leaf base narrowed; margin plane, weakly and distantly dentate above; costa absent or very short and weak. Upper laminal cells oblong-hexagonal to isodiametric, 25–50 × 20–40 µm; median cells 38–62 × 20–40 µm; basal cells 50–120 × 25–40 µm; border 3 or 4 cells wide, 20–36 µm; border cells 80–120 × 3–4 µm. Rhizoids becoming reddish brown (immature rhizoids paler), branched, ±weakly papillose, to 5 mm long, c. 30 µm wide; cells 150–180 µm long.

Perigonial leaves similar to perichaetial leaves; antheridia 600–700 × 65–70 µm; paraphyses not seen. Inner perichaetial leaves often shouldered; laminal cells elongate-rhomboidal, 80–160 × 20–34 µm. Archegonia 400–500 µm; paraphyses few, short, 10–14 µm wide, the cells

c. 60 µm long. Calyptra c. 0.8 mm long, thickly fringed below, smooth, black above. Seta ±smooth to weakly papillose (either spiny or flat), 4.0–5.2 mm long. Capsules ovoid, c. 1.5 mm long; operculum 0.4–0.5 mm long. Peristome: exostome teeth yellowish brown, c. 350 µm long, c. 50 µm wide at the base; endostome segments hyaline, narrower than the teeth; cilia absent. Spores slightly papillose, 15–20 (–25) µm diam.

Forms rather large, scattered colonies in the Otway Ranges, southern Vic.; also in King Island, Tas. Grows on rotting logs, exposed rocks, lower tree trunks (*Nothofagus*) and roots (*Acacia*); endemic.

Vic.: near Apollo Bay, *P.M. Michell* M8 (AD); type locality, *H. Streimann* 58390 (CANB). Tas.: Yarra Ck, King Is., *A. Moscal* 27770 (HO).

6. *Calypstrochaeta rotundifolia* (Nog. & Z.Iwats.) Touw, *J. Hattori Bot. Lab.* 44: 150 (1978)

Eriopus rotundifolius Nog. & Z.Iwats., *J. Hattori Bot. Lab.* 36: 480 (1972). T: below Paka Cave, Mt Kinabalu, Sabah, Malaysia, alt. 2850–3000 m, 21 May 1963, *Z. Iwatsuki* 1058; holo: NICH *n.v.*

Illustrations: A. Noguchi & Z. Iwatsuki, *J. Hattori Bot. Lab.* 36: 479 (1972); H. Streimann *op. cit.* 120, fig. 11.

Dioicous. Plants medium-sized, pale to medium green; stems to 15 mm long, probably unbranched. Leaves undulate when dry, ±erect when moist, complanate; lateral leaves 2.0–2.5 mm long, 1.3–1.7 mm wide; apiculus short, pointed; leaf base rounded to broadly narrowed; margin variably dentate in the distal half; costa short and indistinct. Laminar cells hexagonal to hexagonal-rounded, thin-walled; upper laminar cells (27–) 37–50 × 20–28 µm; median cells 40–63 × (20–) 25–33 µm; basal cells oblong-hexagonal, 85–112 × 20–35 µm; border distinct, c. 3 cells (45–60 µm) wide, the cells elongate, 112–125 × 7–13 µm. Rhizoids axillary and on stems, in neatly arranged bunches, reddish, branched, smooth, to 2.5 mm long, c. 44 µm wide; cells c. 135 µm long.

Perigonia axillary. Outer perigonial leaves lanceolate to linear, 1.0–1.2 mm long, 0.20–0.37 mm wide, ecostate; laminar cells 75–100 × 12–14 µm; border weak. Inner perigonial leaves broad, sharply narrowed to an apiculus, c. 1.2 mm long and 0.65 mm wide, with a very faint costa; laminar cells 75–85 × 10–13 µm; border weak. Antheridia c. 10 per perigonium, 275–300 µm long. Perichaetia and capsules not known.

Known from a moist rockface in montane rainforest in north-eastern Qld at an altitude of c. 1500 m. Also in Malaysia (Sabah).

Qld.: Mt Bartle Frere, *B.O. van Zanten* 681499 (CANB, GRO).