

STUDIES ON TASMANIAN HEPATICAE. I. THE GENUS *ADELANTHUS*

by J.J. Engel

(with four text-figures)

Adelanthus is represented in Tasmania by four species: *A. bisetulus*, *A. falcatus*, *A. gemmiparus* and *A. occlusus*. A key is presented to distinguish these species of liverworts, and comments are provided on taxonomic characters and ecology. *Adelanthus gemmiparus* is recorded from Tasmania for the first time.

Key Words: *Adelanthus*, liverworts, Tasmania.

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INTRODUCTION

The Adelanthaceae have two genera. *Adelanthus*, with 12 species, is well represented in southern temperate and neotropical regions. Two species occur in Europe, and one is known only from Borneo. *Wettsteinia* has four species and is known from southern South America,

Juan Fernández, the Falkland Islands, New Zealand and the Indomalayan region.

Four species of *Adelanthus* occur in Tasmania, one of which has not previously been recorded from the state; all of them also occur in New Zealand. The four species may be distinguished by the following key.

KEY TO THE TASMANIAN SPECIES OF *ADELANTHUS*

1. Leaf insertion in dorsal half succubously decurrent; leaf apex (on vigorous shoots) with 2 teeth or awns, rarely without armature; leaf cells relatively thin walled, trigones medium to large; subapical leaf cells 24–35 mm wide and long. Leaves with dorsal and ventral margins entire. Plants commonly corticolous *A. bisetulus*
1. Leaf insertion in dorsal half nearly transverse, not or feebly decurrent; leaf apex entire or variously dentate, but not consistently with 2 teeth or awns; leaf cells \pm uniformly thick walled, trigones absent or nearly so; subapical leaf cells 16–26 m wide and long. Plants on soil, rock or bryophyte covered logs 2
2. Median leaves of vigorous shoots longer than wide, symmetric and not ampliate ventrally; leaves laterally spreading to suberect; shoot tips straight, rigid. Leaves without distinct differentiation of a vitta of strongly elongate cells *A. gemmiparus*
2. Median leaves of vigorous shoots wider than long, strongly asymmetric, the ventral portion distinctly ampliate; leaves erect or suberect, decurved-homomallous; shoot tips often recurved 3
3. Leaves, at least in distal sectors of shoots, sharply and irregularly toothed (only rarely weakly toothed); distal leaves becoming progressively smaller, often becoming longer than broad; leafy, erect shoots commonly branched, the branching sometimes dendroid *A. falcatus*
3. Leaves usually completely entire; leaves \pm similar in size and form throughout, the shoot apices not smaller leaved; leafy, erect shoots nearly always unbranched *A. occlusus*

***Adelanthus bisetulus* (Steph.) Grolle**
(fig. 1)

Synonyms

Tylimanthus bisetulus Steph., Spec. Hep. 6 (1922) 246;
Adelanthus bisetulus (Steph.) Grolle, J. Hattori bot.
Lab. 35 (1972) 359. Lectotype (*vide* Grolle, 1972):
New Caledonia, in jugo Dogny, 1040 m, Lerat 361
(*non vidi*).
Marsupidium piliferum Steph., Bull. Herb. Boissier

8(8) (1908, 602. (= Spec. Hep. 3: 386), *syn. fide*
Grolle (1972); *Pseudomarsupidium piliferum*
(Steph.) Herz. in Grolle, Trans. Br. bryol. Soc. 4 (1963)
443. [Non *Adelanthus piliferus* Horik., J. Sci.
Hiroshima Univ., Ser. B, Div. 2, bot. 2 (1934) 184.]
Lectotypes: Australia, New South Wales, Ferd. von
Müller (*non vidi*).

Adelanthus humilis Steph., Spec. Hep. 6 (1924) 446.
syn. fide Grolle (1972). Original material: New
Caledonia, 1909, Lerat 207 (*non vidi*).

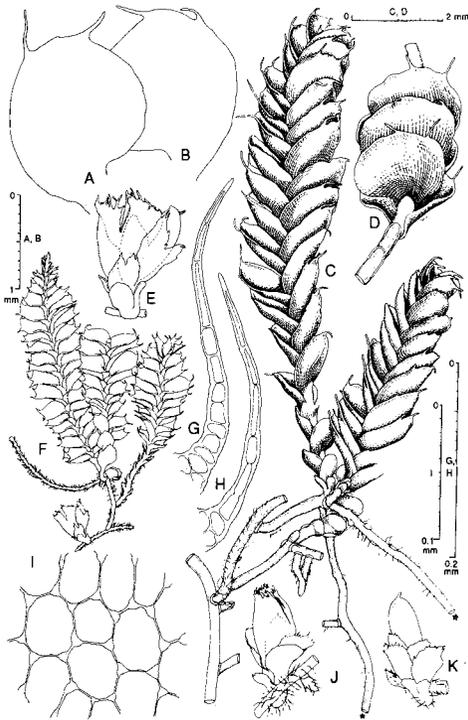


FIG. 1 — *Adelanthus bisetulus* (Steph.) Grolle: (A, B) leaves, (C) portion of plant showing system of copiously branched, prostrate stolons and erect leafy shoots (★ = shoots severed), (D) sector of leafy shoot (note leaf insertion), lateral view, (F) plant with leaves widely spreading, (E, J, K) gynoecial branches, (G, H) awns of same leaf apex, (I) median leaf cells. (A–D — from Engel 14024, Tasmania, Cradle Mountain–Lake St Clair National Park, Balbroom Forest; E, F, J, K — after Grolle (1972); G, H — from Engel 13798, Tasmania, near Scotts Peak road; I — from Norris 26966, Tasmania, trail to Adamsons Peak.)

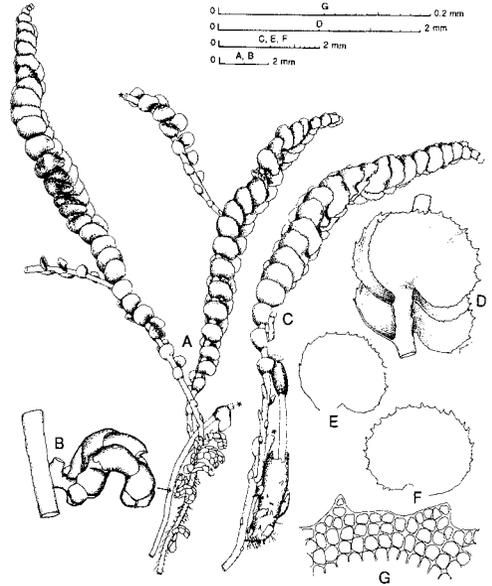


FIG. 2 — *Adelanthus falcatus* (Hook.) Mitt.: (A) plant with numerous basal androecia (★ = shoots severed), (B) detail of the androecial branch indicated by arrow on (A), (C) sporophyte-bearing plant (★ = shoot severed), (D) sector of erect leafy branch, lateral view, (E, F) leaves, (G) portion of leaf apex. (A, B — from Engel 14135A, Tasmania, just west of Watersmeet, west of southwest end of Lake St Clair; C — from Norris 27836, Tasmania, between Lake Solitude and Little Hugel, Cradle Mountain–Lake St Clair National Park; D, F — from Engel 13904, Tasmania, Weindorfers Forest; E, G — from Engel 15366, Tasmania, Mt Arthur, Pipers River.)

Comments

The conspicuous pair of stiff, bristly, often clawlike, usually hyaline teeth or awns at the leaf apex (fig. 1A–D) will identify the species in the field. The awns are composed of elongate, very thick-walled cells (fig. 1G,H).

Shoots with erect leaves appear quite different from those on which the leaves are spreading (e.g. fig. 1C,F).

Ecology

Adelanthus bisetulus is usually corticolous in a variety of forest types between 500 and 1050 m a.s.l. (e.g. *Nothofagus-Eucalyptus*, *Nothofagus-Eucalyptus-Atherosperma*, *Nothofagus-Athrotaxis*). It is rarely non-corticolous, and then occurs over a thin layer of soil on a cliff face in a mosaic of *Gymnoschoenus*, subalpine shrubs, *Nothofagus cunninghamii* and rocky outcrops (1000 m).

***Adelanthus falcatus* (Hook.) Mitt.**
(fig. 2)

Synonyms

Jungermannia falcata Hook., Musci Exot. 1 (1818) tab. 89 [non *J. falcata* Raddi, Jungermannogr. Etrusca 22 (1818) (= *Diplophyllum albicans* (L.) Dum.)]. *Plagiochila falcata* (Hook.) G.L. & N., Syn. Hep. (1847) 649. [non *P. falcata* Steph., Bull. Herb. Boissier 2(10) (1902) 879 (= Spec. Hep. 2: 248)]. *Adelanthus falcatus* (Hook.) Mitt., J. Proc. Linn. Soc., bot. 7 (1864) 243. *Odontoschisma falcata* (Hook.) Trev., Memorie Ist. lomb. Sci. lett. III(4) (1877) 419. *Calypstrocolea falcata* (Hook.) Schust., Revue bryol. lichén. 34 (1966[1967]) 689. Original material: New Zealand, South Island, Dusky Bay, 1791, Menzies (*non vidi*).

Plagiochila pusilla Mont., Anns Sci. nat. bot. II(19) (1843) 246, *syn. fide* Inoue & Schuster (1971). *Jungermannia pusilla* (Mont.) Hook. f. & Tayl., London J. Bot. 3 (1844) 578. non *J. pusilla* L., Spec. Pl. ed. 1. (1753) 1136. Original material: “Nova-Hollandia (Van Diemen),” *sin. coll.* (*non vidi*).

Plagiochila intermixta Col., Trans. Proc. N.Z. Inst. 21 (1888[1889]) 49, *syn. fide* Stephani (1892). Original material: New Zealand, Dannevirke, 1888, *Colenso* (*non vidi*).

Plagiochila subpetiolata Col., Trans. Proc. N.Z. Inst. 21(1888[1889]) 49, *syn. fide* Stephani (1892). Original material: New Zealand, Whakatane Co., near L. Waikare, 1887, Hamilton (*non vidi*).

Marsupidium capillare Berggr., New Zealand Hep. (1898) 36 f. 25, *syn. fide* Hodgson (1970).

Plagiochila capillaris (Berggr.) Hodgson, Trans. R.

Soc. N.Z. 85 (1958) 581 [non *P. capillare* Schffn. in Stephani, Spec. Hep. 6 (1918) 137]. *Adelanthus capillaris* (Berggr.) Hodgson, Trans. R. Soc. N.Z., bot. 3 (1965) 77. Holotype: New Zealand, South Island, Canterbury Prov., Castle Hill, Berggren 3156 (*non vidi*).

Plagiochila appressifolia Steph., Spec. Hep. 6 (1917) 124, *syn. fide* Grolle (1972). Holotype: New Zealand, Mamaku, 600 m, Fleischer (*non vidi*).

Plagiochila inaequalis Steph., Spec. Hep. 6 (1918) 169, *syn. fide* Inoue & Schuster (1971). Holotype: New Zealand, Mt Winterslow, Beckett (*non vidi*).

Comments

In keying plants of this species, the leaf armature on more distal leaves should be carefully examined. The leaves toward the shoot base are frequently entire, with armature becoming progressively more abundant and larger distally. The leaves are armed at the apex and ventral margin, but the armature stature is quite variable. Typically the leaves are coarsely and sharply serrate (fig. 2D–F) but, in some plants, leaf dentition is quite small. Further, some plants, while having a few branches with leaf armature typical of this species, possess some leafy branches with completely entire leaves.

There is a rather common phase of the species in which plants are smaller and leaves more sparingly armed. In this form there is a distinct proportion of lower leaves which are completely entire. As mentioned above, the distal portions of leafy shoots should be carefully checked, since the upper leaves usually bear serration typical of the species.

Schuster (1966: 689), in his key to the New Zealand species of “*Calypstrocolea*”, states for “*C.*” *falcata*, “upper leaves progressively smaller, becoming as long or longer than broad.” While this is a useful feature, included in the present key, the character is not always expressed. Exceptions sometimes may be found on shoots which are erect throughout, i.e. not cernuous to subcircinnate; on these plants the leaves remain wider than long and do not markedly decrease in size toward the shoot apex.

Larger plants with decidedly sparse leaf armature should be treated with special care to avoid possible confusion with *A. oclusus*. Examples of this facies are Engel 13829 (Gordon River just east of confluence with Serpentine River, westnorthwest of Strathgordon, 350 m a.s.l.) and Engel 13991 (Cradle Mountain–Lake St Clair National Park, Ballroom Forest, southwest side of Lake Dove, 950–1050 m a.s.l.).

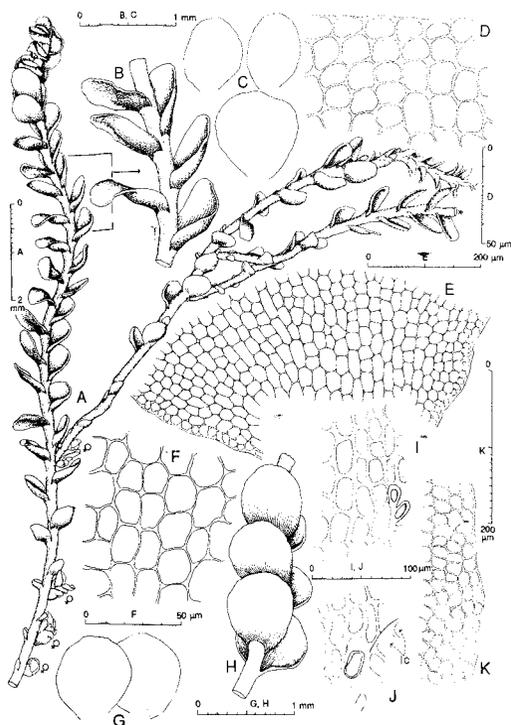


FIG. 3 — *Adelanthus gemmiparus* (Schust.) Hodgs.: (A) erect leafy shoot with basal gynoecia, dorsal view, (B) sector (indicated by bracket) of shoot shown in (A), dorsal view, (C) three leaves to one scale, (D) portion of leaf apex, (E) leaf base, (F) median leaf cells, (G) leaves, (H) sector of leafy shoot, lateral view, (I, J) stem cells and underleaves, (I) the underleaf consisting of a pair of laterally juxtaposed cells and associated slime papillae, (J) one cell and slime papillae (lc = leaf cell), (K) median sector of leaf margin. (All from Norris 28517, Tasmania.)

Ecology

Adelanthus falcatus is rather common in medium to upper-level forests, between 300 and 1100 m a.s.l., where it commonly occurs on rocks and both boulder faces and crevices, particularly where a thin layer of soil has accumulated. The species is rare below 300 m. In wetter sites it occurs on rocks and boulders of stream banks and beds as well as cliff faces near waterfalls. *Adelanthus falcatus* less frequently occurs on logs, and then usually only when they are nearly or totally covered

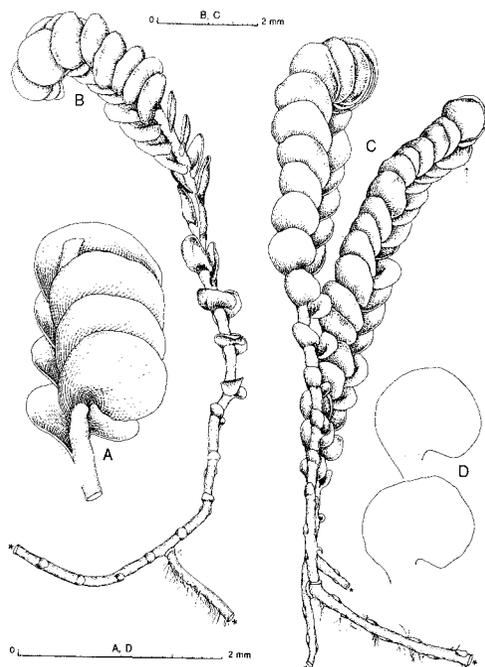


FIG. 4 — *Adelanthus occlusus* (Hook. f. & Tayl.) Carringt.: (A) sector of leafy shoot, lateral view, (B, C) erect leafy shoots and, at base, stolons, lateral-dorsal views (★ = shoots severed; note sparsely denticulate leaf at arrow), (D) leaves. (All from Engel 16257, Tasmania, southeast of Black Bluff.)

by bryophytes. In subalpine situations the species occurs over soil of moist, shaded boulder crevices (1050–1175 m a.s.l.).

Adelanthus gemmiparus (Schust.) Hodgs. (fig. 3)

Synonyms

Calyptrocolea gemmipara Schust., Revue bryol. lichén. 34 (1966[1967]) 695. *Adelanthus gemmiparus* (Schust.) Hodgs., Trans. R. Soc. N.Z., biol. Sci. 11 (1970) 241. Holotype: New Zealand, South Island, Westland, approximately 1 km below Haast Pass, Schuster 53384 (hb. Schuster!).

Comments

Well-developed plants of this species have been confused with *Hepatostolonophora rotata* (Hook. f. & Tayl.) Engel, due to resemblance in appearance and colour.

Well-developed shoots have many leaves inserted and oriented exactly as described in Schuster (1966: 696), i.e. "succubously inserted except dorsally, where

virtually transversely inserted (as a consequence, the dorsal base of leaf elevated sharply and strongly above stem, standing stiffly erect)". Mature leaves are almost transversely oriented (fig. 3B,H). The leaf insertion and orientation, coupled with general similarity in leaf shape, in particular lend the *Hepatostolonophora* aspect to the plants.

As previously mentioned (Engel 1979: 102),

"The presence of inconspicuous but distinct underleaves will immediately distinguish *H. rotata*. I have also utilized gynoecial position to confirm the disposition of specimens, i.e. gynoecia are restricted to short, abbreviated ventral-intercalary branches in *A. gemmiparus*."

Since several genera contain *A. gemmiparus* "look-alikes", a careful search for gynoecia or androecia should be made for generic confirmation.

Hodgson (1970), when making the combination in *Adelanthus*, cites the complete pagination for the Schuster paper in which the basionym appeared, rather than the specific page.

Ecology

The species, which has not previously been recorded in Tasmania, is rare, occurring on a moist, diffusely lit rock outcrop in a low *Eucalyptus coccifera* forest on a scree slope at 900 m a.s.l.

Specimens Examined

Tasmania: north side of Lake Fenton, Mt Field National Park, Norris 28517 (F).

Adelanthus occlusus (Hook. f. & Tayl.) Carring. (fig. 4)

Synonyms

Jungermannia occlusa Hook. f. & Tayl., London J. Bot. 3 (1844) 369. *Alicularia occlusa* (Hook. f. & Tayl.) G.L. & N., Syn. Hep. (1846) 619. *Adelanthus occlusus* (Hook. f. & Tayl.) Carring., Trans. bot. Soc. Edinb. 10 (1870) 381. *Odontoschisma occlusum* (Hook. f. & Tayl.) Trev., Memorie Ist. lomb. Sci. lett. III(4) (1877) 419. *Jamesoniella occlusa* (Hook. f. & Tayl.) Steph., Bull. Herb. Boissier 1(1) (1901) 1039 (= Spec. Hep. 2: 102). *Calyptrocolea occlusa* (Hook. f. & Tayl.) Schust., Revue bryol. lichén. 34 (1966[1967]) 692. Original material: Campbell Is., Hooker (*non vidi*).

Plagiochila orbiculata Col., Trans. Proc. N.Z. Inst. 21 (1888[1889]) 48, *syn. fide* Hodgson (1970). Original material: New Zealand, East Taupo Co., Mt Tongariro, 1887, Hill (*non vidi*).

Comments

The leaves of this species normally are completely entire. Occasionally, sporadic leaves toward the shoot apex have a few isolated small teeth (fig. 4C, arrow).

Ecology

Rare in Tasmania, occurring at 1000 m a.s.l. in a mosaic of *Gymnoschoenus*, subalpine shrubs, *Nothofagus cunninghamii* and rocky outcrops.

Specimens Examined

Tasmania: ridge southeast of Black Bluff near junction of access road to plateau area and road to Devonport gold mines, south of Burnie, Engel 16257 (F).

ADELANTHUS SPECIES EXCLUDED FROM TASMANIA

Plagiochila magellanica Lindenb. ≡ *Adelanthus magellanicus* (Lindenb.) Mitt. (= *Adelanthus lindenbergianus* (Lehm.) Mitt.). According to Grolle (1972) the Australasian records of *A. magellanicus* are actually *A. occlusus*.

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