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# Lectotypifications of Central European *Grimmia* species (Musci, Grimmiaceae)

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## ABSTRACT

GEISSLER, P. & E. MAIER (1995). Lectotypifications of Central European *Grimmia* species (Musci, Grimmiaceae). *Candollea* 50: 495-514. In English, English and German abstracts.

The type specimens of 20 species of the 29 *Grimmia* species occurring in Central Europe are described and illustrated. 11 are new lectotypifications. References to correct lectotypifications are given for the remaining taxa. Nomenclatural novelties concern *Grimmia sudetica* Schwägr., an earlier name for *G. alpestris* DC., nom. illeg., *G. torquata* Drumm. 1825 (not Grev. 1826) and *G. elongata* Kaulf. 1812 (not 1816).

## ZUSAMMENFASSUNG

GEISSLER, P. & E. MAIER (1995). Lektotypisierungen der mitteleuropäischen *Grimmia*-Arten (Musci, Grimmiaceae). *Candollea* 50: 495-514. Englisch, englische und deutsche Zusammenfassungen.

Die Typusbelege von 20 der 29 in Mitteleuropa vorkommenden *Grimmia*-Arten werden beschrieben und gezeichnet. 11 sind neue Lektotypisierungen. Für die gut ausgewählten Lektotypen der restlichen Arten wird auf die Literatur verwiesen. Für *Grimmia alpestris* DC., nom. illeg., muss der ältere Name *G. sudetica* Schwägr. verwendet, bei *G. torquata* Drumm. 1825 (nicht Grev. 1826) und *G. elongata* Kaulf. 1812 (nicht 1816) zitiert werden.

**KEY-WORDS:** *Grimmia* — Lectotypification — Bryophytes — Central Europe — *Grimmia alpestris* — *Grimmia sudetica*.

## Introduction

Many field bryologists in Europe and probably also outside Europe consider the genus *Grimmia* as a nightmare because many easily recognized characters proved to be dependent on growth conditions, a point also stressed in LOESKE's (1913, 1930) monographs. The second author studied many thousand specimens from Central Europe, in great part her own collections but also from G, Z/ZT, NMLU and many private collections, with the scope to elaborate an identification key for Central European members of the genus *Grimmia* s. str. (MAIER & GEISSLER, in press). The species concept as used by LIMPRICHT (1889) is still the most adequate in most cases, based on anatomical characters considered to be the most stable. However, the different keys used by European bryologists during this century (MÖNKEMEYER, 1927; GAMS, 1974; FREY & al., 1995; NYHOLM, 1956; SMITH, 1978; FRAHM & FREY, 1992) present also different taxonomic treatments. Furthermore, WIJK & al. (1962) applied to their taxonomic validations the treatment by HABEEB (1950), lumping *G. alpestris* and *G. montana* in *G. donniana*.

29 species of *Grimmia* s. str. are nowadays recognized in Central Europe; 17 were correctly typified by DEGUCHI (1979) and CAO & VITT (1986) in monographs from Eastern Asia. In order to corroborate our taxonomic view, we considered it as an urgent need to typify the remaining taxa.

#### *Nomenclatural and taxonomic comments*

In the beginning we thought to follow the taxonomy and nomenclature as presented in CORLEY & al. (1982). However, the checking of the original literature, careful selection of type specimens and strict application of the Code (GREUTER & al., 1994) made some changes necessary. The most important is certainly the discovery of *Grimmia sudetica* Schwägr. as older, valid and legitimate name for *G. alpestris* DC. We are aware of the fact that this sudden name change will upset field (and herbarium) bryologists. The alternative would have been to prepare a conservation proposal. Conservation of species names without restrictions has become possible since the 14th International Botanical Congress at Berlin in 1987. Very few species names to be conserved were proposed since. The authors of the early 19th century did not have a clear species concept particularly within the group of *G. affinis* and *G. ovalis* (SAYRE, 1951) nor with the complex of *G. caespiticia*, *G. donniana*, *G. sessitana* and *G. sudetica*, as is seen on Table 1 (the attribution of these old citations to the names retained nowadays was done through literature references). On the one hand, the quality of microscopes allowed only towards the end of the 19th century to study carefully the distinctive characters in leaf anatomy. On the other hand, unfortunately too often earlier descriptions and specimens were overlooked. 10 specimens labelled *G. sudetica* in G collected before 1820 were identified. The greater part represents '*G. alpestris*', others *G. donniana*, *G. sessitana* and *G. caespiticia*. *G. sudetica* was distributed by Hoppe & Hornschuch in the second century of their "Cryptogamae selectae" in 1818 from Heiligenblut in Austria. Two specimens of this Exsiccata series are in G: one is indeed *G. sudetica*, the other *G. donniana*. Thus the name *Grimmia alpestris* is in current use only since the second half of the last century, replacing the older names which were put into synonymy to various taxa and forgotten this century. *G. sudetica* is often confused with *G. sessitana*. It is rare outside the Alps, occurring also in North-West America. CRUM & ANDERSON (1981) took *G. tenerrima* Renauld & Cardot as the next available synonym. However, described as having recurved leaf margins, LAWTON (1971) considers this as a doubtful synonymy. '*G. alpestris*' is also reported from the Altai (IGNATOV & CAO, 1994), but it is not clear from the illustrations whether these plants belong to *G. sudetica* or *G. sessitana*. *G. sudetica* has never been used for *Racomitrium sudeticum* (Funck) Bruch & Schimp. With these considerations we came to the conclusion that the use of the name '*G. alpestris*' has not been sufficiently stable to justify the exception of the application of the rules by conservation.

It was a great surprise to discover the identity of the original material of *G. obtusa* Schwägr. 1811, conspecific with *G. sessitana* De Not. 1869. An annotation label by J. Muñoz from 1994 indicated the presence of both *G. donniana* and *G. sessitana*. But we were not able to detect any stem of the former species published earlier. The Schwägrichen specimens of *G. obtusa* contain *G. sessitana*, but other specimens filed with that name (leg. Hornschuch 1819, leg. Funck) *G. donniana*. Fortunately, *G. obtusa* Schwägr. is a later homonym of *G. obtusa* Brid.

A taxonomic decision had to be taken with respect to *Dryptodon patens*. As reported by many authors, e. g. CRUNDWELL (1971), this taxon has a somewhat intermediate position between *Grimmia* and *Racomitrium* and has therefore been kept in the genus *Dryptodon*. However, the sinistrorse and curved seta as well as the peristome teeth divided only to below the middle, are characters in favour of the attribution to the genus *Grimmia*.

Other changes concern the more precise citation of *G. elongata* and *G. torquata*.

#### *Typifications*

In the following part all Central European *Grimmia* species (Central Europe here defined roughly as extending from the Alps, not considering its southernmost part due to lack of intensive collecting, to the South of Scandinavia) recognized in MAIER & GEISSLER are listed and typified, or with reference to earlier typifications. 12 names of the 29 taxa treated here have never been



typified. For 11 species lectotypes were selected and for *Grimmia teretinervis* authentic material could be studied. We had the possibility to reexamine 8 other type specimens. As anatomical characters are of prime importance we took off 1 or 2 leaves of the type specimen to be able to illustrate their shape, sequence of cross-sections and cells at leaf base. The slides are mounted as permanent preparations and joined to the type specimens.

Following the colon after the bibliographical reference of the protologue the citation of the localities of potential type specimens is given in quotation marks, whereas the data from the label are reported with the lectotypification. Synonyms in brackets and inverted commas are those given in the original publication.

**Grimmia affinis** Hornsch., Flora 2: "85" [description applies to *G. apiculata*], 443. 1819: "auf Felsenblöcken der Tauernkette..".

**Type: Austria:** «Windischmattreyer Tauern», B (DEGUCHI, 1979).

**Grimmia anodon** Bruch & Schimp. in Bruch & al., Bryol. Eur. 25-28: 8 (repr. 1971, 3: 110). 1845: "In muris et ad rupes calcareas, prope Heidelberg ad arcem (A. Braun)".

**Type: Germany:** «prope Heidelberg, A. Braun», BM (CAO & VITT, 1986).

**Grimmia anomala** Hampe ex Schimp., Syn. Musc. Eur. (ed. 2): 270. 1876: "ad rupes prope Zermatt Valesiae rever. Bertram legit".

**Type: Switzerland:** «..prope Zermatt..», BM (DEGUCHI, 1979).

**Grimmia apiculata** Hornsch., Flora 2: 443 [description on p. 85 (sub *G. affinis*)]. 1819: "an etwas feuchten Felswänden der Messerlingwand auf dem Windischmattreyer Tauern".

**Type: Austria:** «Windischmattreyer Tauern, Hornschuch misit 1819. Nr. 144», B (DEGUCHI, 1979; CAO & VITT, 1986).

**Grimmia atrata** Miel. ex Hoppe & Hornsch., Flora 2: 85. 1819: "Wir sammelten diese sehr ausgezeichnete Species nach Angabe des Hrn. Commiss. Mielichhofer in Salzburg, an Felsen bei der Grube Schwarzwand in der Grosarl".

**Type: Austria:** «Salzburg...», B (DEGUCHI, 1979).

**Grimmia caespiticia** (Brid.) Jur., Laubm.-Fl. Oesterr.-Ung.: 172. 1882.

≡ *Campylopus caespiticius* Brid., Muscol. Recent. Suppl. 4: 77. 1818: "In monte sancti Bernardi Helvetiae..".

**Type: Switzerland:** «St. Bernard», B! (CAO & VITT, 1986).

In the Bridel herbarium filed under *Dryptodon caespiticius* Brid., Bryol. Univ. 1: 220. 1826.

*Description of the type specimen (fig. 1 a-c):* 4 small groups of individual plants glued to the sheet. Stems about 1 cm long, branched in upper part, leaves broken off below. Two setae (2 mm) still present, without capsules. Leaves plicate, sometimes with costa-like elongated cells reaching leaf base, margin incurved. Only few leaves with rather short hair-points. Leaves in cross-section above bistratose, lamina cells strongly bulging on the outer wall.

**Grimmia crinita** Brid., Muscol. Recent. Suppl. 1: 95. 1806: “in pago vaudensi ad muros Lausannae legi, Roger Neoduni, ... in Valle-Clausa Gallo-Provinciae, Massiliae, in Occitania et Catalonia...”.

**Lectotype** (selected here): **Switzerland:** «avril 02. Roger», B!

12 collections are glued on three sheets. We follow the lectotypification by Heyn and Herrnstadt done in 1980 in the Bridel herbarium as the best choice within the 3 specimens dated before 1806. It was collected by Roger near Nyon in the canton Vaud, probably on stone walls in vineyards where the species is still found nowadays.

*Description of the type specimen (fig. 2 a-f):* 10 groups of individuals with stems about 4 mm long glued on the sheet. Nearly all stems with immersed, opening capsules. Leaves spatulate, unistratose with hair-points almost as long as the leaves.

**Grimmia curvata** (Brid.) De Sloover, Bull. Jard. Bot. Natl. Belgique 37: 445. 1967.

≡ *Orthotrichum curvatum* Brid., Bryol. Univ. 1: 791. 1826: “In insula Terre Neuve habitat. ... Ex herbario Pylaesiano [Bachelot de la Pylaie] fructu destitutum habemus”.

**Type:** **Canada:** B (DEGUCHI, 1979).

= *Grimmia patens* (Hedw.) Bruch & Schimp. in Bruch & al., Bryol. Eur. 25-28: 18 (repr. 1971, 3: 120). 1845 [non *G. patens* Hornsch., Flora 2: 84. 1819].

≡ *Bryum patens* Dicks. ex Hedw., Sp. Musc. Frond.: 86. 1801: “in rivulis alpinis Scotiae. Ben Nevis”.

≡ *Dryptodon patens* (Hedw.) Brid., Bryol. Univ. 1: 192. 1826.

**Lectotype** (selected here): **Great Britain:** s. l. c. herb. Dickson, BM!

**Isolectotype:** herb. Hooker, BM! (2 stems).

*Description of the type (fig. 3 a-g):* Sterile. 3 slightly curved stems, branched below. Leaves without hyaline hair-points, slightly toothed at apex. Costa in cross-section winged at back.

No specimen of *D. patens* seen by Hedwig is kept in G.

*Grimmia patens* Hornsch. is, according to HÜBENER (1833) and BRUCH & SCHIMPER (1845), *Grimmia affinis*. The earliest available epithet in the genus *Grimmia* for the taxon based on *Bryum patens* is *curvatum*.

**Grimmia decipiens** (K. F. Schultz) Lindb. in Hartm., Handb. Skand. Fl. (ed. 8): 386. 1861.

≡ *Trichostomum decipiens* K. F. Schultz, Fl. Starg. 70. 1819: “..ad pagum Gevezien an der Landstrasse..”.

**Lectotype** (selected here): **Germany:** «Trichostomum decipiens (mihi). 24 Jan [1]811 [date added by Schwägrichen] Tr. pulvinatum subdecumbens fastigiato-ramosum; foliis recurvato-patentibus lanceolatis complicatis acutis, acumine piliformi (breviore); sporangio e seta arcuata (brevis) immersa. ad saxa granitosa Duc. Megapol. Stargard. Junio c. caps. oper. ad deoperculat. [manu C. F. Schultz in herb. Schwägrichen]», G! (CAO & VITT (1986): type not found).

*Description of the type specimen (fig. 4 a-f):* 7 populations glued on the sheet, 4 with open capsules on an arcuate seta 4 mm long. Stems 1-1.6 cm long, branched. Hair-point denticulate, decurrent. Costa very broad below with up to four guide-cells. Basal cells beside costa elongate, nodulose, with thin transverse walls; at the margin several rows of quadrate to short rectangular cells. Upper cells elongate, sinuose.

**Grimmia donniana** Sm., Engl. Bot. 18: 1259. 1804: "... Mr. George Donn ... gathered it on large stones near a water-fall on a mountain in Angusshire, 18 miles to the north of Forfar. Mr. Turner has also found it on old pales at Beddgelart, North Wales, and from his specimens we have delineated it".

**Type: Great Britain** (DEGUCHI, 1979: LINN, not seen, isosyntype in PC; CAO & VITT, 1986: Syntype LINN, Xerox seen; BM).

**Grimmia elatior** Bruch ex Balsamo & De Not., Mem. Reale Accad. Sci. Torino 40: 340. 1838: "ad .. viam Spelugae supra Chiavennam; in alpihus Penninis COMBA". ('*Trichostomum incurvum* Hornsch., *Dryptodon incurvus* Brid., *Racomitrium incurvum* Huben. [sic]').

**Type: Austria:** «auf kahlen Felsblöcken bey Heiligenblut, mit vollkommenen Früchten im Juni, im Nassfelde und am Wege von Mattrey nach Defferegen ohne Früchte», GZU.

CAO & VITT (1986) decided to lectotypify with one of the synonyms listed in Balsamo & De Notaris. However, the citation from Hornschuch, Flora 2: 89 (1819) includes three syntypes from different places in Carinthia.

**Grimmia elongata** Kaulf. in Sturm, Deutschl. Fl. ii, Cryptogamie, Heft 13, t. 24. 1812: "auf der Seethaler Alpe in Steyermark...".

**Lectotype** (selected here): **Austria:** «In Styria alpihus Kaulfuss 1824», B!, herb. Bridel.

*Description of the type (fig. 5 a-h):* a single stem, 15 mm long, with several short branches and an open emergent capsule on a straight 1 mm long seta. Long hair-points present only in the uppermost leaves. Leaf tip carinate. Margin flat.

The bibliographical reference of the description of this species is given in WIJK & al. (1962) with Sturm, Deutschl. Fl. 2(15): 14 ic. 1816. By the courtesy of H. M. Burdet, head of the library of the Conservatoire botanique, Geneva, and currently working on the publication dates of the voluminous Sturm Flora, we have been informed that the description of *G. elongata* has already been published in 1812. According to this information several different editions with different ways of binding are known.

DEGUCHI (1979) looked invain at S for the type, probably because of a confusion between G. F. Kaulfuss and J. S. Kaulfuss. CAO & VITT (1986) indicated too that they didn't find the type. Therefore, we were very happy to receive on loan from B the specimen described above. Although the date '1824' on a herbarium label normally refers to the year of collection, it could here also be interpreted as date of accession in the Bridel herbarium. As the — poor — specimen corresponds to the current use of this name, we decided to choose it as the lectotype.

**Grimmia funalis** (Schwägr.) Bruch & Schimp. in Bruch & al., Bryol. Eur. 25-28: 17 (repr. 1971, 3: 119). 1845.

≡ *Trichostomum funale* Schwägr., Sp. Musc. Frond. Suppl. 1(1): 150. 1811: "legit in subalpinibus Sudeticis C. Ludwig".

**Lectotype** (selected here): **Poland/Czech Republic:** «Um die Schneekoppe L[udwig] ex parte», G!

*Description of the type (fig. 6 a-g):* 6 parts with stems 25-30 mm long glued to the sheet, 3 with open emergent capsules on 1-2 mm long seta. Old stems with spirally curved asymmetric leaves bearing long almost smooth hair-points. String-like young shoots with carinate leaves without hair-points present.

**Grimmia hartmanii** Schimp., Syn. Musc. Eur.: 214. 1860: "... per Vogesum sylvaticum praepremis superiorem, etiam in Helvetia [sic, i. e. Sabaudia] prope Mornai ad latus meridionale m. Salève..., in Suecia copiosissime prope Holmiam atque Upsaliam provenit". ('*Gr. incurva* (Schwgr.) C. Hartman').

**Lectotype** (selected here): **Sweden:** «*Grimmia incurva* Schw. Circa Holmiam vulgaris, in Werm-landia rarus. 1854, leg. S. O. Lindberg», BM!

*Description of the type (fig. 7 a-f):* Sterile, yellow-brown lax patches, stems 5-6 cm long, leaves plicate on one side, at stem tip with clusters of multicellular gemmae. Length of hair-point variable, up to 1/3 of leaf length. Midrib in cross-section with stereid cells in the lower part.

From the syntypes mentioned in the protologue only the Swedish specimens are present in the Schimper herbarium at BM; besides our lectotype another Lindberg collection from Upsala 1855 and one leg. Kindberg also from Upsala.

**Grimmia incurva** Schwägr., Sp. Musc. Suppl. 1(1): 90. 1811: "in summibus albis Carinthiae, Glockner aliisque similibus primaevis, in Sudetum fossis nivalibus sterilem observavit C. Ludwig".

**Type: Austria:** «Glockner», G! (DEGUCHI, 1979).

*Description of the type (fig. 8 a-f):* One dense sterile blackish cushion with  $\pm$  straight leaves and hair-points very short or broken off, 15 mm high, and three groups of stems with open capsules on straight to slightly curved seta, 1 mm long. Leaves of capsule-bearing stems crispate, costa excurrent in a denticulate hair-point. Dorsal costa cells in surface view up to twice as long as the lamina cells.

**Grimmia laevigata** (Brid.) Brid., Bryol. Univ. 1: 183. 1826.

$\equiv$  *Campylopus laevigatus* Brid., Muscol. Recent. Suppl. 4: 76. 1818: "In Tyrole Italico, item circa Romam, Neapolin et in insula Ischia in rupibus apricis 1806 abunde legi".

**Type: Italy:** B! (CAO & VITT, 1986).

Three sheets of *G. laevigata* are present in the Bridel herbarium, the one selected for lectotypification by CAO & VITT labelled «Italia. Roma. Napoli. Ischia 1806». The specimens are glued in three rows, probably each corresponding to one collection place.

*Description of the type (fig. 9 a-d):* The uppermost row (lectotype) consists of three small, 8 mm long capsule-bearing plants, one deoperculate, two still operculate, beak 0.4 mm, seta straight, 2 mm. Leaves ovate, in the upper part of the stem with long denticulate hyaline hair-point, bistratose except at margin; cross-section semicircular. Most basal lamina cells wider than long. The lower rows from Naples and Ischia represent sterile plants.

**Grimmia montana** Bruch & Schimp. in Bruch & al., Bryol. Eur. 25-28: 26 (repr. 1971, 3: 128). 1845: "prope Angers Galliae (Guépin), in valle badensi Murgthal dicta (Alex. Braun), in Hassia superiore prope Biedenkopf (Bruch), in Vogesi monte Donnersberg (Gümbel), prope Christianiam (Blytt), in alpe Dovrefjeld Norvegiae (W. P. Sch.)".

**Type: Germany:** «Felsen auf dem Donnersberg, Gümbel, April 1843», BM! (CAO & VITT, 1986).

*Description of the type (fig. 10 a-h):* Three dense fertile cushions, 15-20 mm high, 3.5-4.5 cm diameter, two glued, the third broken off. The big central cushion has been chosen as lectotype by CAO & VITT. Capsules deoperculate on a straight, 2 mm long seta. Leaves with distinct



shoulder, hair-point denticulate, margin incurved, lamina above bistratose, becoming unistratose below. Basal cells quadrate to short rectangular with thickened transverse walls. Lamina cells in cross-section higher than wide.

The German and French syntypes are also present at BM.

**Grimmia muehlenbeckii** Schimp., Syn. Eur. Musc.: 212. 1860: "Prope Trafoi Tyrol. merid. .. 1840 .. cum beat. Mühlenbeck reperi". ('*Gr. incurva* Schwaegr. Br. et Schpr.').

**Type: Italy:** «Trafoi. Jul. 40», BM! (DEGUCHI 1979).

*Description of the type (fig. 11 a-g):* 6 cushions, 1 cm high and 2-3 cm large, glued, all with open capsules on a slightly curved 1 mm long seta. Leaves with strongly dentate hair-points. Costa angulate on back.

**Grimmia orbicularis** Bruch ex Wilson, Engl. Bot. Suppl. 4: n° 2888. 1844: "Found on Ormeshead in 1826 by the writer [W. Wilson], ... by F. K. Eagle, Esq., on St. Vincent's Rock, ... from the latter place ... Mr. Thwaites ... in March 1843".

**Lectotype** (selected here): **Great Britain:** «*Grimmia africana*, *Fissidens africanus* Hedw. Sp. M. St. Vincents Rock near Bristol (Mr. Stephens) discovered by Mr. Eagle in 1837. W. W.», BM!, herb. W. Wilson.

*Description of the type (fig. 12 a-g):* A dense cushion and several individual stems, 5-8 mm long, glued to the sheet. Some old capsules on an arcuate 1 mm long seta present. Leaves unistratose, carinate, with long almost smooth hair-points. Costa becoming narrower towards the base.

**Grimmia ovalis** (Hedw.) Lindb., Acta Soc. Sci. Fenn. 10: 75. 1871.

≡ *Dicranum ovale* Hedw., Sp. Musc. Frond.: 140. 1801: "...Saxoniae, (Thuringiae prope Isenacum, in granite montis piniferi Franconiae, Austriae prope Engelhardzell" [Pre-starting point reference: Hedwig, Descr. Micr.-Anal. Musc. Frond. (= Stirp. Crypt.) 3: 81, t. 34. 1792. "Zschopenthal, Augustusberg Saxoniae superioris."].

**Type: Germany:** «*Grimmia commutata* B & S Specimina ab Hedw. ad iconem Dicrani ovali adhibita [manu Schwägrichen]», G!

9 individual stems are glued in one row. We selected the second specimen from the left (n. 2) as lectotype, corresponding to T. 34A, 2 in Hedwig (1792). N. 4 is *Racomitrium* sp., all other stems represent *Grimmia ovalis*. As there isn't any other Hedwig specimen conserved in G, CAO & VITT (1986) lectotypified with the iconotype.

*Description of the type (fig. 13 a-e):* Stem 1.5 cm high, branched, with two sporophytes, one open, the other still with the lid and oblique beak. Seta straight, 3 mm. Upper leaves with denticulate hair-points nearly as long as the lamina, bistratose above. Costa with guide cells and hydroids.

**Grimmia plagiopodia** Hedw., Sp. Musc. Frond.: 78. 1801: "In Saxoniae rupibus detexit Cl. Flügge".

**Type** of the genus. All other taxa listed in Hedwig (1801) belong today to other genera.

**Type: [Germany]:** «a H[edwi]g s. n.», G! (DEGUCHI, 1984).

The label is partly written by Schwägrichen ('*Grimmia*' from an unknown hand). 8 individual parts were glued in an upper row of which 4 still stick well, the rest is fallen off and partly preserved in small packets. A small tuft 'b', 'a Flörkio' added below later.

*Description of the type (fig. 14 a-e):* Stems 1 cm high with immersed capsules. Leaves imbricate, concave, ovate, hair-point denticulate with often decurrent hyaline part. Lower leaves smaller, without hair-points. Costa ending below apex. Leaves unistratose except sometimes at margins.

**Grimmia pulvinata** (Hedw.) Sm., Engl. Bot. 24: 1728. 1807.

≡ *Fissidens pulvinatus* Hedw., Sp. Musc. Frond.: 158. 1801: "In tectis et muris vulgaris, vere maturans".

**Typus:** [Germany], G! (CAO & VITT, 1986).

The type label mentions references to Linné, Sp. Pl., Dillenius, Hist. Musc. and Sp. M[usc] written by Hedwig, but no locality indicated.

*Description of the type (fig. 15 a-e):* The type sheet presents an upper row of two branched capsule-bearing stems and a larger round patch, diameter 2 cm, selected as lectotype by Cao, a middle row with 4 specimens and a lowermost row with small plants 'b *Grimmia gracilis*...' added afterwards by Schwägrihen. Many capsules present on arcuate 1 mm long seta, lid with long beak. Leaves oblong-lanceolate with long hyaline hair-points.

**Grimmia sessitana** De Not., Atti Univ. Genova 1: 704. 1869: "In praeruptis infra Hospitium della Valdobbia, in valle Sessitana, legit Carestia".

**Type:** RO (cf. CAO & VITT, 1986).

= *Grimmia obtusa* Schwägr., Sp. Musc. Frond. Suppl. 1(1): 88, t. 25. 1811 [non Brid., J. Bot. Schrader 1(2): 276. 1801, = *G. plagiopodia*, cf. Bridel, 1806, p. 94] *syn. nov.*: "Legi in alpe Carinthiae Brennkogel summo monti Glockner vicina".

No locality is given on the two Schwägrihen specimens in G, being *G. sessitana*, and therefore no lectotype was chosen.

**Grimmia sudetica** Schwägr., Sp. Musc. Frond. Suppl. 1(1): 87, t. 24. June-July 1811: "lecta a Ludwigo in granite Sudetum (in der grossen Schneeegrube, et circa die Schneekoppe) et in monte Silvio Helvetiae a Schleichero". ('*G. donniana* F. Web. & D. Mohr. *G. alpestris* Schleich.').

non *Grimmia sudetica* Spreng. ex Schkuhr, Deutschl. Krypt. Gew. 2(2): 46. 20 July 1811, *nom. illeg.*

**Lectotype** (selected here): **Switzerland:** «13 *Grimmia alpestris* S. In M. Sylvio [= Matterhorn, Cervin] ad rupes [printed label]. Originaux utilisés par A.-P. de Candolle pour la rédaction de la Flore française (Schleicher, Plant. Crypt. Helv. ..., Cent. 2, n. 13)», G!

*G. sudetica* could have been typified either with a specimen from the Schwägrihen herbarium (leg. Ludwig) or with the Schleicher exsiccatum from Switzerland. No specimen collected by Ludwig «in der grossen Schneeegrube» or on the «Schneekoppe» is present in G. The Schwägrihen herbarium includes five original specimens labelled *G. sudetica* without any indication of collecting locality, two containing what was traditionally named *G. alpestris*, one *G. donniana*, one *G. sessitana* and one with specimens of *G. sessitana* and *G. caespiticia* glued together on the same sheet. It is difficult to interpret Schwägrihen's illustration on t. 24 but it represents rather *G. donniana* than '*G. alpestris*'. As all these Schwägrihen elements are heterogenous, we preferred to typify with '*Grimmia alpestris*' Schleich.

On the type sheet there is another Schleicher specimen with a handwritten label, without indication of locality, containing *Grimmia sessitana*. Schleicher wrote on the label of the sheet with 20 cushions in the Schleicher herbarium at LAU the following indications: «*Grimmia alpestris* ~ *sudetica* Schw. Ad rupes in alpibus Vall: St. Nicolai».

*Description of the type specimen (Fig. 16 a-g):* Small, dense cushion (diameter 1.3 cm) with old sporophytes without stomata. Seta straight, 2mm. Stems 4 mm high. Leaves plicate with nearly smooth hair-point, margin incurved in the upper part. Costa becoming narrower towards the base. Lamina in upper part bi- (3-)stratose, unistratose below. Basal cells quadrate to short-rectangular. Transverse walls of basal cells thickened. Upper laminal cells isodiametric, cell walls slightly sinuose, in cross-section quadrate, the outer walls slightly bulging.

- ≡ *Grimmia alpestris* Schleich., Plant. Crypt. Helv. Cent. 2: n° 13. 1805, *nom. inval.*; J. Bot. Schrader 1(2): 196. nov. 1805, *nom. inval.*
- ≡ *Trichostomum pulvinatum* α *alpestre* F. Web. & D. Mohr, Bot. Taschenb.: 110. 1807: "Grimmia alpestris Schleich. Cent. 2. n. 13 (in monte Sylvio ad rupes a Schleichero lecta) et Dicr. piliferum ej. l. c. c. 4. n. 12 (in calidiorr. Vallesiae ad saxa inventum... In subalp., in rup. (in summo Bruct. ipsi legimus)".
- ≡ *Grimmia alpestris* Schleich. ex DC. in Lam. & DC., Fl. Franç. 5: 213. 1815, *nom. illeg.* ('*G. alpestris* Schleich. *G. donniana* sensu F. Web. & D. Mohr. *Grimmia sudetica* Schwägr.').
- ≡ *Grimmia alpestris* (F. Web. & D. Mohr) Sommerf., Suppl. Fl. Lapp. 49. 1826, *nom. illeg.* [WIJK & al. (1962) legitimate as *nom. nov.*, overlooking *G. alpestris* DC.; WIJK & al. (1969) legitimate as cited above].
- ≡ *Grimmia alpestris* Nees & al., Bryol. Germ. 2(1): 139. 1827 (citing Schleicher, Pl. Crypt. Helv.; not Web. et Mohr) *nom. illeg.* [WIJK & al., 1962: hom. illeg. (*G. alpestris* Sommerf.)].

Unfortunately DE CANDOLLE (1815) cites the legitimate name *Grimmia sudetica* Schwägr. in the synonymy of *G. alpestris*, thus rendering it nomenclaturally superfluous according to Art. 52.1 of the ICBN (GREUTER & al., 1994). Both SCHWÄGRICHEN and DE CANDOLLE list *G. donniana* Sm. as a doubtful synonym. They refer to the specimen of *G. donniana* mentioned by WEBER & MOHR (1807) 'Asciburgo' [Aschaffenburg] as being different from *G. donniana* Sm. from Britain. Therefore, *G. donniana* can be excluded from the synonymy.

***Grimmia teretinervis*** Limpr., Jahresber. Schles. Ges. Vaterl. Cultur 61: 216. 1884: "...im «Chalchstein» bei Innervillgraten in Tirol vom Pfarrer Hieronymus Gander am 27. Juli 1882 gesammelt. J. Breidler sammelte diese Art ... bereits am 25. Juli 1874 am Gaistrumer Ofen bei Oberwölz in Ober-Steiermark; ... am Humburg bei Tüffer am 30. Mai 1879; am Jauerberg bei Weitenstein am 25. Mai 1879; bei Nikolaiberg bei Cilli am 27. Mai 1879".

**Type: Austria:** Not seen. Probably present at BP (herbarium Limpricht) or GZU (herbarium Breidler).

However, authentic material, four specimens from the above mentioned localities, two leg. Gander from the first place (27. IV. 1884 'com. Limpricht', 22. VII. 1884), ... Humburg bei Tüffer' leg. Breidler, 25. 4. 1884; 'Südseite des Gaistrumerofen..' leg. Breidler, 18. VIII. 1888 is present at G!

*Description of the specimen 'Gander 22/7/1884' (fig. 17 a-e):* Several sterile turfs present in the packet. Stems 10-14 mm long. Stems with appressed leaves giving them a string-like appearance, and small-leaved innovations. Hair-point finely denticulate. Costa in cross-section biconvex, with guide-cells and hydroids.

**Grimmia tergestina** Tomm. ex Bruch & Schimp. in Bruch & al., Bryol. Eur. 25-28: 24 (repr. 1971, 3: 126). 1845: “In rupibus calcareis umbrosis loco «Bosco di Melara» prope Tergestum, sociis *Grimmia pulvinata* et *Barbula rurali* clar. Tommasini detexit atque benevole communicavit”.

**Type:** BM (CAO & VITT, 1986).

**Grimmia torquata** Hook. ex Drummond., Musci Scot. [Exsicc.] 2, n° 28. 1825: “Rocks among the Clova mountains, always without fruit”.

**Lectotype** (selected here): **Great Britain:** «...Clova mountains... Drummond, Musci Scot. [Exsicc.] 2, n° 28», E!

*Description of the type (fig. 18 a-e):* Three flattened portions of olive-brown sterile 4 cm high cushions. Leaves twisted, crispate, increasing in size toward stem tip, asymmetric, with short, smooth hair-point, margin flat. Three-seriate spiral leaf insertion visible. Costa narrow, in cross-section with stereid cells. Lamina cell walls thickened, lumen narrow. Brood-bodies present on some stems.

Validation of this species has up till now been attributed to Greville: *Grimmia torquata* Hornsch. ex Grev., Scott. Crypt. Fl. 4: 199. 1826. «...Breadalbane, on Ben Lawers, Craig Chailleoch, Mealgreatha, &c. Dr Hooker, Mr Arnott, Dr Greville. Clova Mountains, Mr Drummond». However, the protologue cites Drummond's Exsiccata. A description of the new species is printed on the label and therefore Drummond's description has priority over Greville. Although SAYRE (1971) reports the Musci Scotici to be in G, no isotype could be found in our herbarium.

**Grimmia trichophylla** Grev., Fl. Edin.: 235. 1824: “On stone walls about Edinburgh. On Arthur's Seat, and coast of Fife, Mr. Arnott. Lanark road ..., between Colinton and the Pentland Hills..”.

**Lectotype** (selected here): **Great Britain:** «near Edinburgh. 1821», E!, herb. Greville.

This is the only specimen at E corresponding to one of the 5 syntypes listed in the protologue (DEGUCCI, 1984, 1987). G holds two specimens received by Schwägrichen from Greville, with reference to the publication in Flora Edinensis.

*Description of the type (fig. 19 a-h):* Three flattened parts of loose tufts, 3-4 cm diameter, full of capsules with 8 ribs, mostly still operculate with an up-right beak, on an arcuate seta 3-4 mm long. Anulus of several rows of narrow, thick-walled cells with a narrow lumen, covering the peristome teeth for half of their length. Leaves carinate, hair-points mostly smooth very long in upper leaves. Costa of equal width from base to tip. Basal cells rectangular with smooth or slightly nodulose walls. Lamina cells above rounded to transversely ovate.

**Grimmia unicolor** Hook. in Grev., Scott. Crypt. Fl. 3: 123. 1825: “Rocks near Bachnagairn, the Honourable D. Ogilvie's hunting lodge at the head of Clova; not rare, Mr. Drummond”.

**Lectotype** (selected here): **Great Britain:** «Clova Mountains. Drummond 1824», E!, Herb. Greville.

*Description of the type (fig. 20 a-e):* Several parts of loose turfs and single stems, 1-2.5 cm long, glued on the upper row. (The lower row consists of three dense patches 'Clova Mountains. July 1824'. It is not evident whether these two collections are identical). Capsules frequent, on a straight 4 mm long seta. Leaf tip rounded to cucullate, no hair-points. Costa ending below apex, in cross-section with guide cells without hydroids.

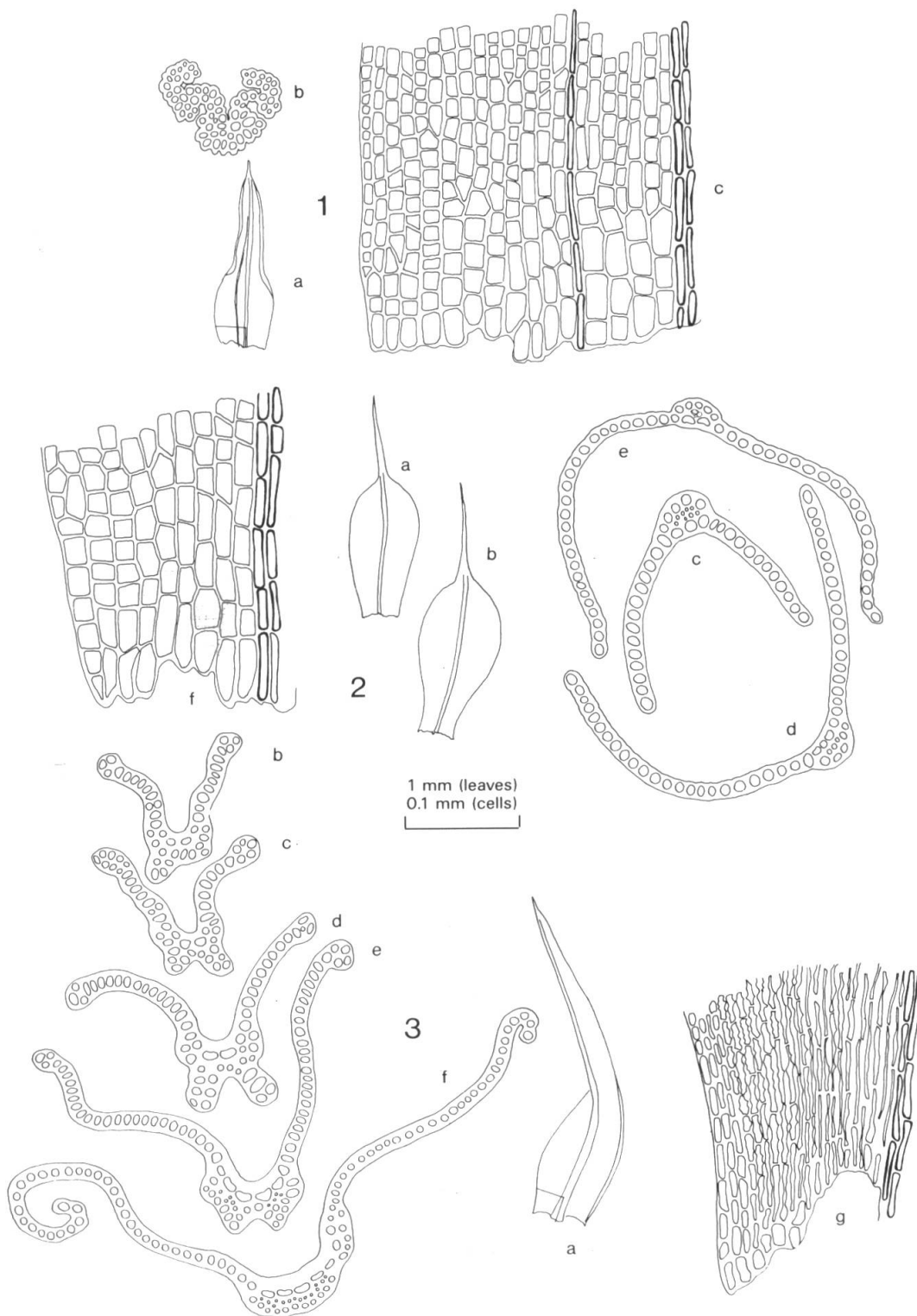


Fig. 1. — *Grimmia caespiticia*. a: leaf shape; b: cross-section of leaf; c: leaf base.

Fig. 2. — *Grimmia crinita*. a, b: leaf shape; c-e: cross-sections of leaf; f: leaf base.

Fig. 3. — *Grimmia curvata* (Type of *Bryum patens*). a: leaf shape; b-f: cross-sections of leaf; g: leaf base.

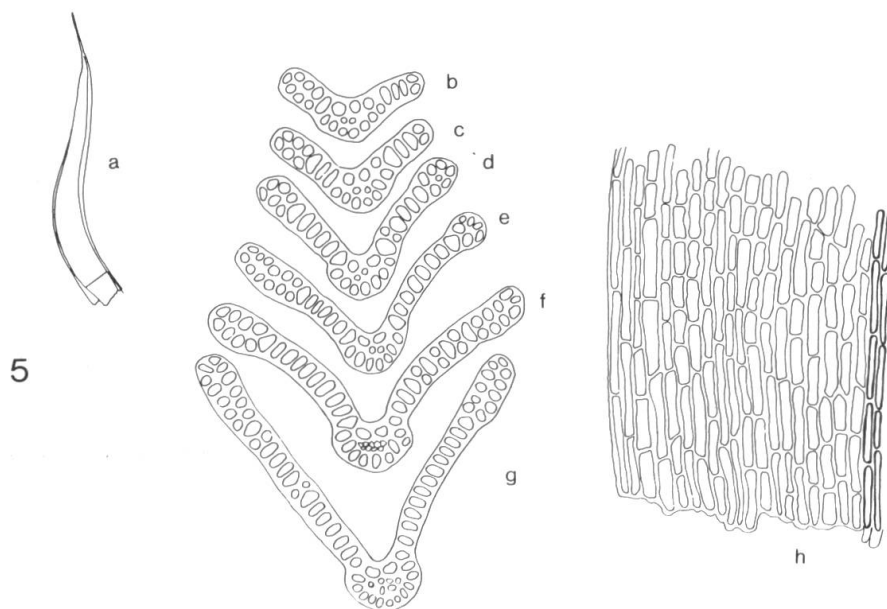
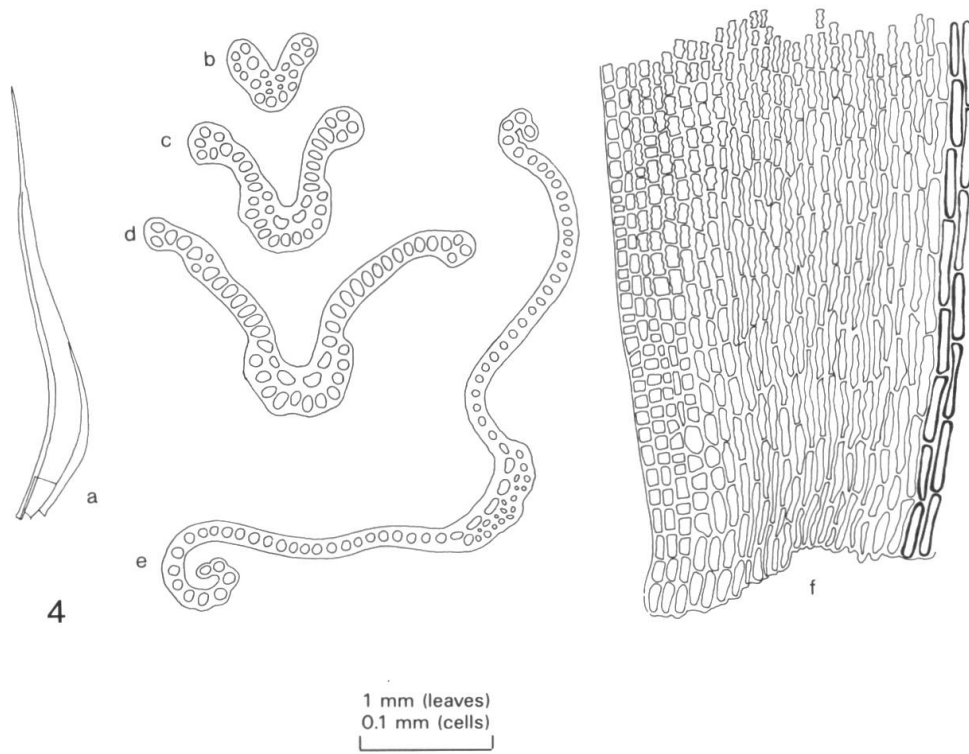


Fig. 4. — *Grimmia decipiens*. a: leaf shape; b-e: cross-sections of leaf; f: leaf base.  
Fig. 5. — *Grimmia elongata*. a: leaf shape; b-g: cross-sections of leaf; h: leaf base.

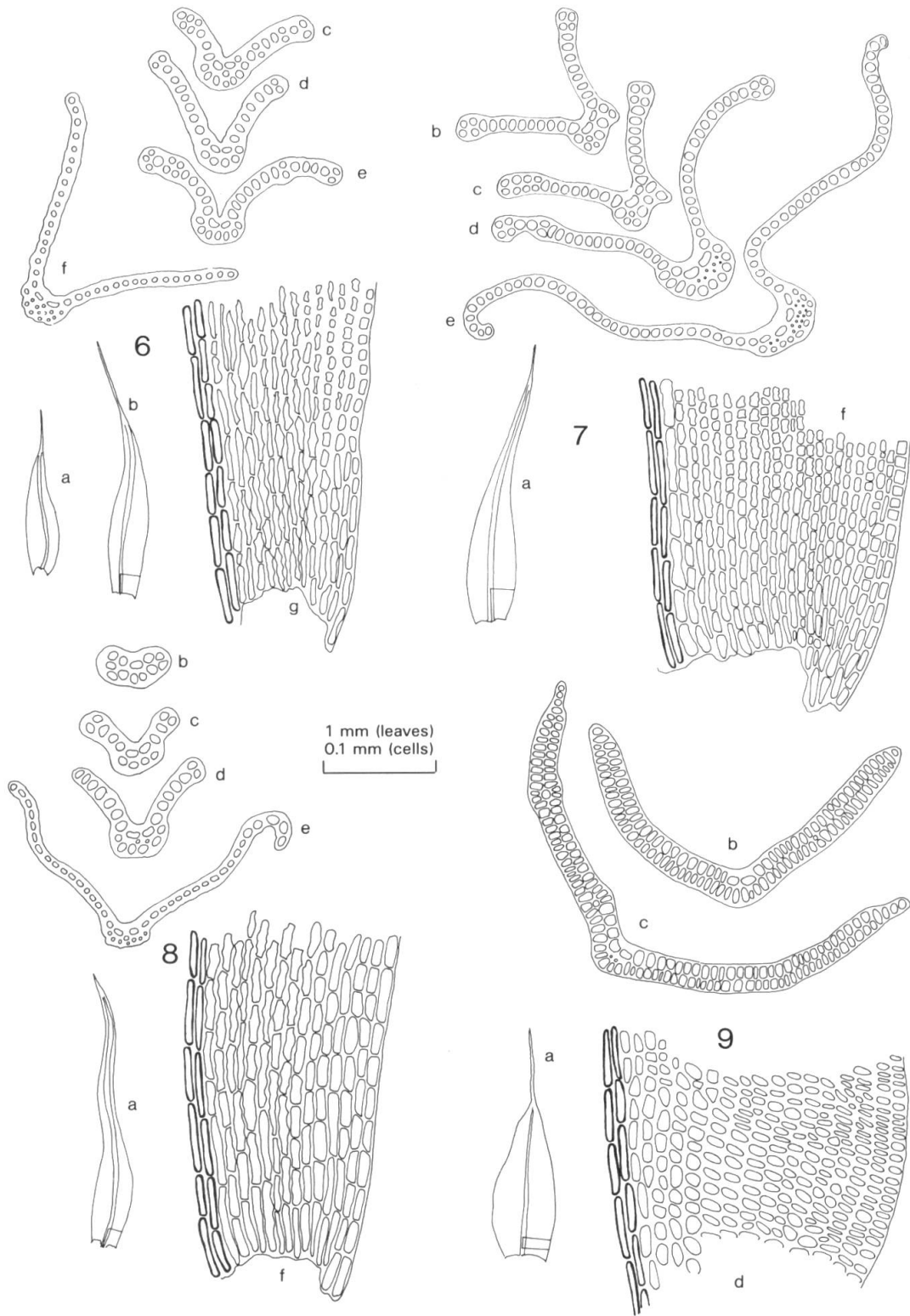


Fig. 6. — *Grimmia funalis*. a, b: leaf shape; c-f: cross-sections of leaf; g: leaf base.  
 Fig. 7. — *Grimmia hartmanii*. a: leaf shape; b-e: cross-sections of leaf; f: leaf base.  
 Fig. 8. — *Grimmia incurva*. a: leaf shape; b-e: cross-sections of leaf; f: leaf base.  
 Fig. 9. — *Grimmia laevigata*. a: leaf shape; b, c: cross-section of leaf; d: leaf base.

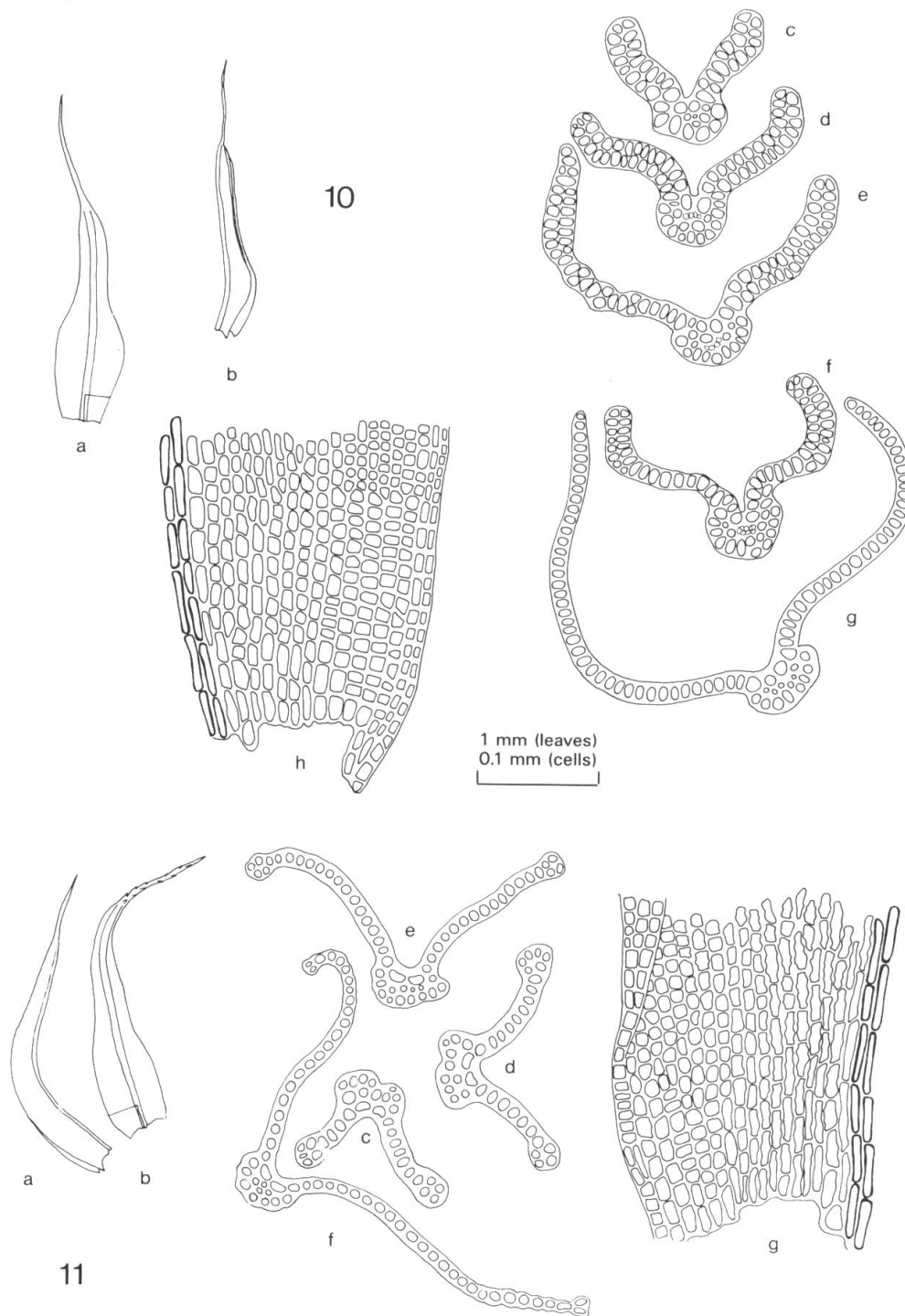


Fig. 10. — *Grimmia montana*. **a, b**: leaf shape; **c-f**: cross-sections of leaf; **g**: cross-section from an above partly unistratose leaf; **h**: leaf base.

Fig. 11. — *Grimmia muehlenbeckii*. **a, b**: leaf shape; **c-f**: cross-sections of leaf. **g**: leaf base.



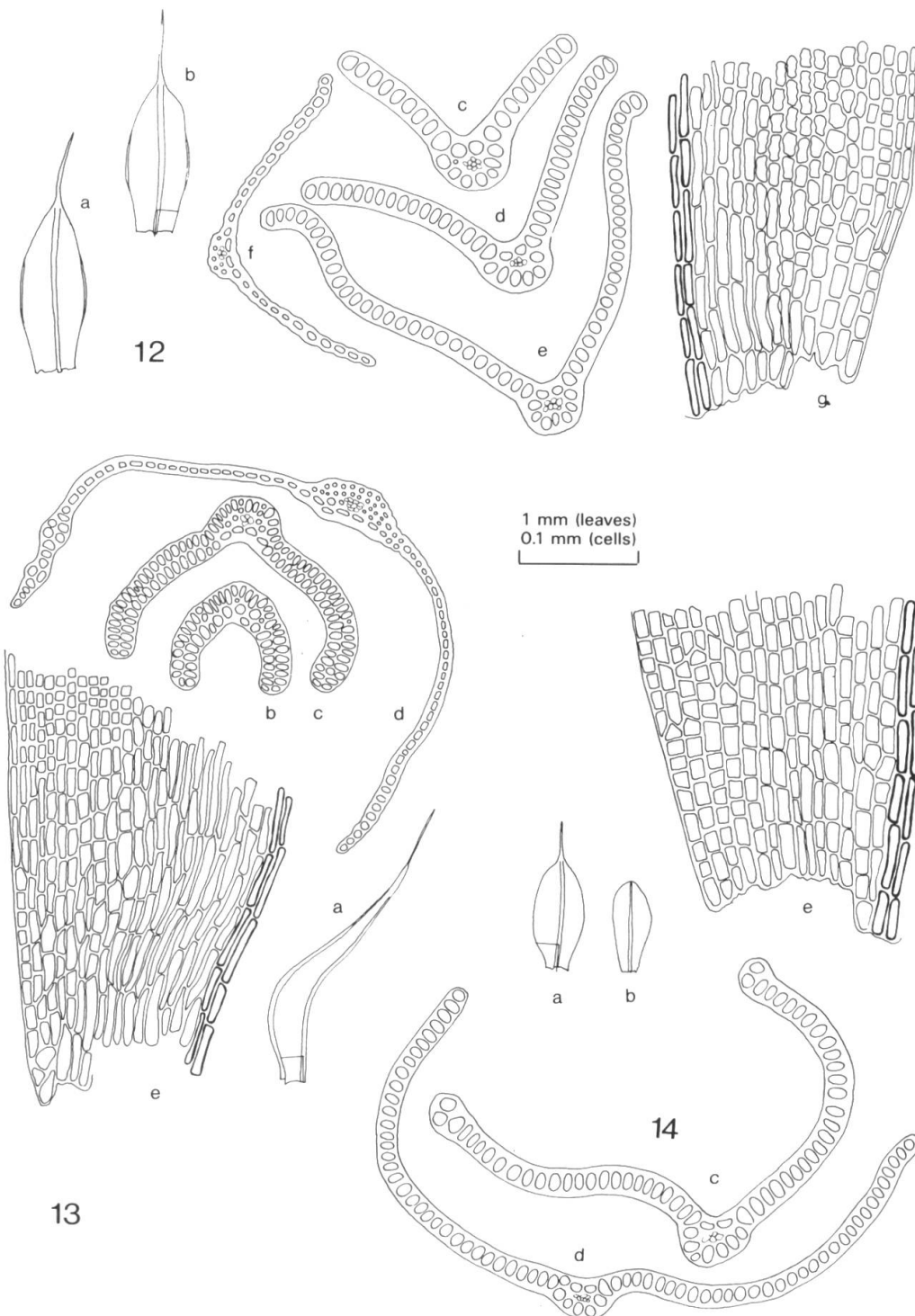


Fig. 12. — *Grimmia orbicularis*. a, b: leaf shape; c-f: cross-sections of leaf; g: leaf base.

Fig. 13. — *Grimmia ovalis*. a: leaf shape; b-d: cross-sections of leaf; e: leaf base.

Fig. 14. — *Grimmia plagiopodia*. a, b: leaf shape; c-d: cross-sections of leaf; e: leaf base.

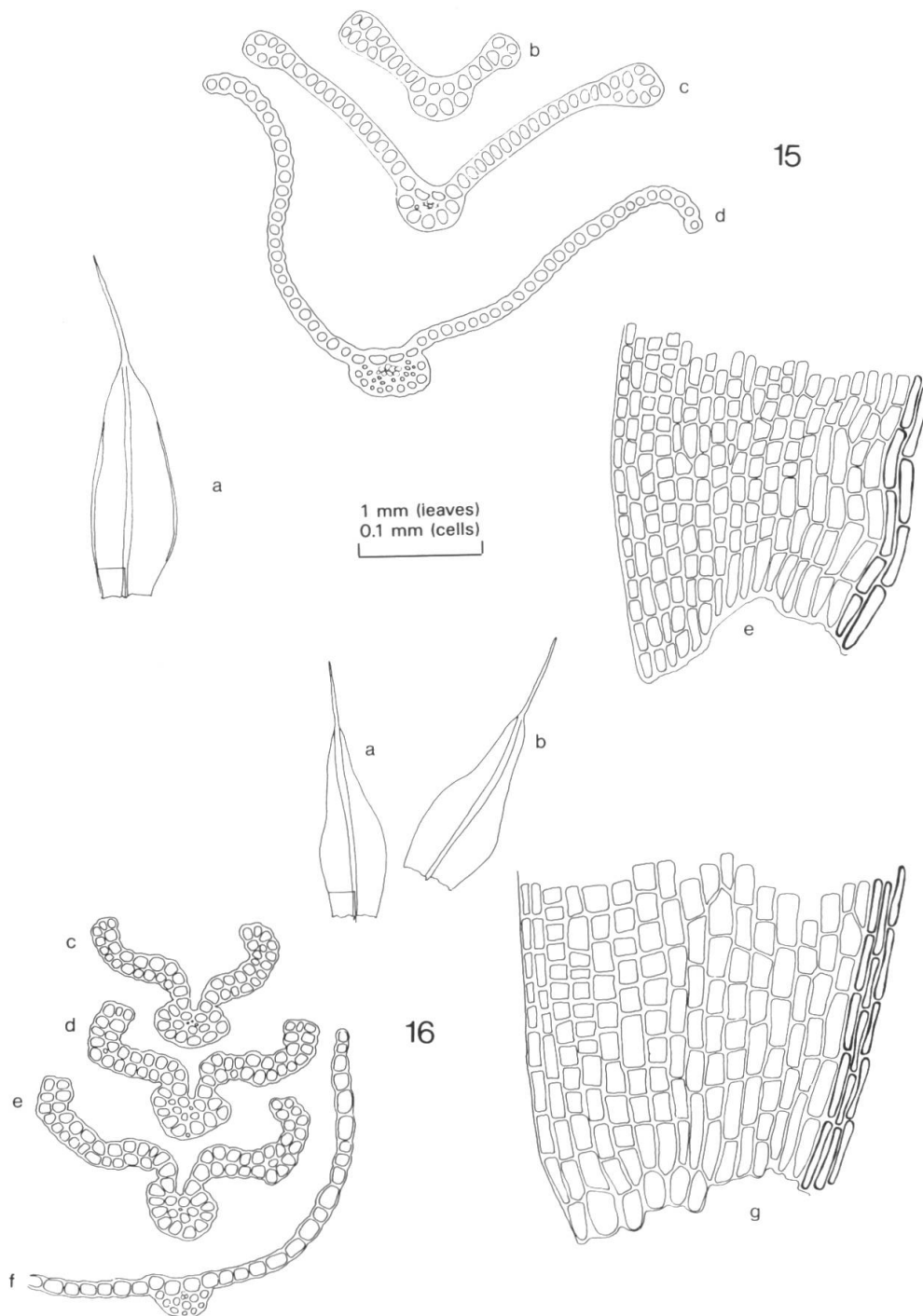


Fig. 15. — *Grimmia pulvinata*. a: leaf shape; b-d: cross-sections of leaf; e: leaf base.  
 Fig. 16. — *Grimmia sudetica*. a, b: leaf shape; c-f: cross-sections of leaf. g: leaf base.

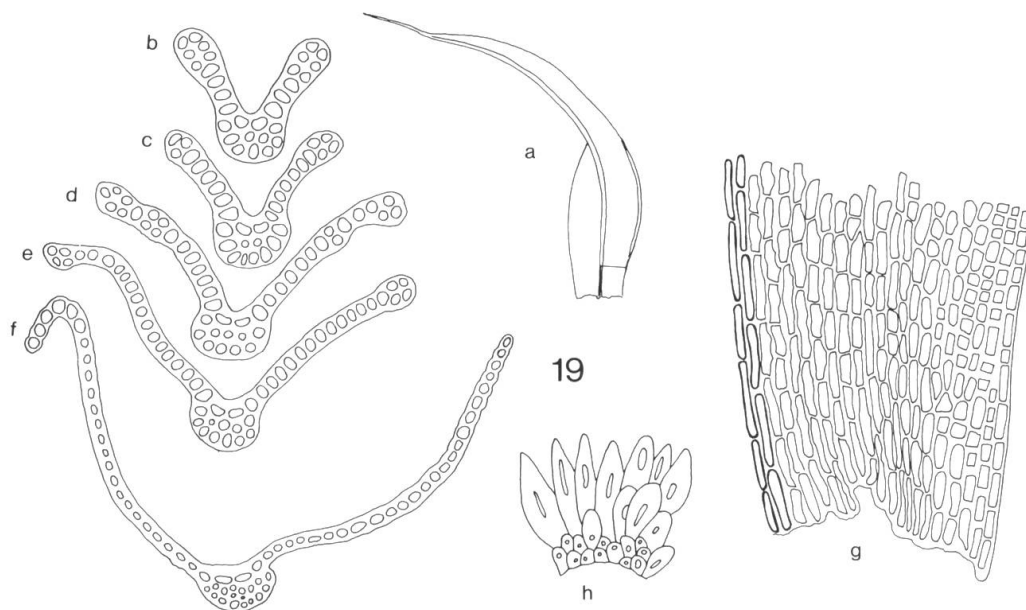
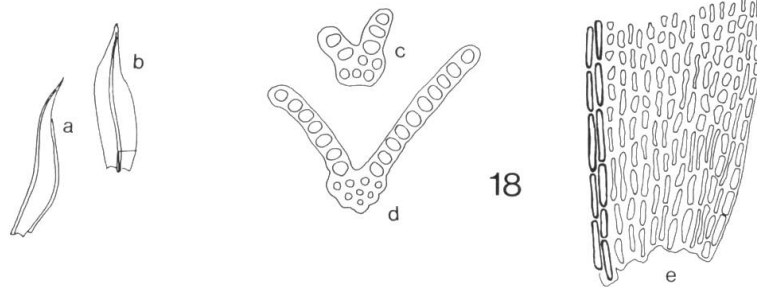
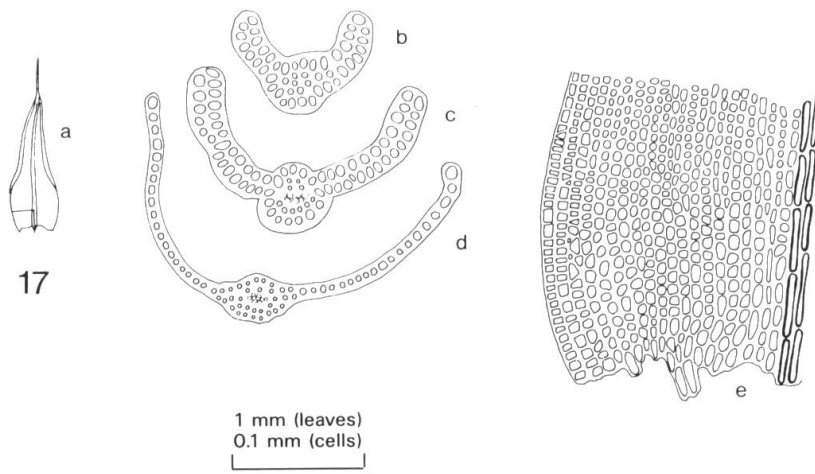


Fig. 17. — *Grimmia teretinervis*. **a**: leaf shape; **b-d**: cross-sections of leaf; **e**: leaf base.

Fig. 18. — *Grimmia torquata*. **a, b**: leaf shape; **c, d**: cross-sections of leaf; **e**: leaf base.

Fig. 19. — *Grimmia trichophylla*. **a**: leaf shape; **b-f**: cross-sections of leaf; **g**: leaf base; **h**: part of anulus.

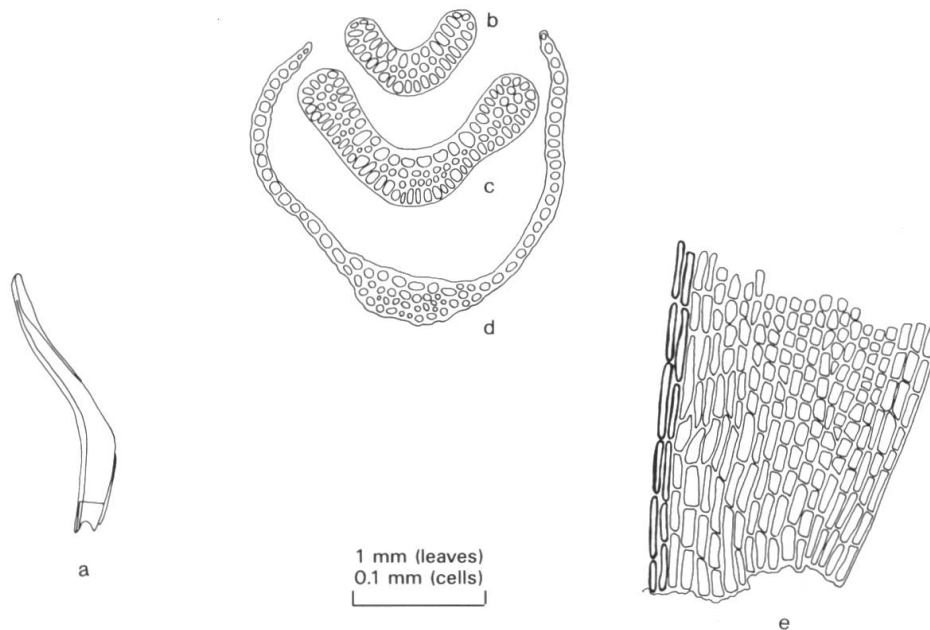


Fig. 20. — *Grimmia unicolor*. **a**: leaf shape; **b-d**: cross-sections of leaf; **e**: leaf base.

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