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## Taxonomic Results of the Bryotrop Expedition to Rwanda and Zaire

### 25. Hypnum

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Abbreviations::

\* New record for Rwanda viz. Zaire

**KB:** Kahuzi-Biega (Zaire)

**Ka:** Karisimbi (Rwanda)

**Ny:** Nyungwe Forest (Rwanda)

**Ak:** Akagera region (Rwanda)

**Ki:** Kigali region (Rwanda)

100-171, number of collecting site.

For locality data and a description of the collecting sites see the contribution by E. Fischer on the vegetation of the study area in this volume (*Tropical Bryology* 8: 13-37, 1993). The specimens are deposited at the Botanical Museum Berlin as well as in the herbarium of the author (except for unicates).

#### *Hypnum cupressiforme* Hedw.

Twenty-five specimens (sterile except one with young sporophyte) of *Hypnum* collected during the BRYOTROP expedition to Rwanda and Zaire were studied and all were recognized to be placed in the scope of *Hypnum cupressiforme*. This well-known cosmopolitan moss is even when without sporophyte, diagnosed by the subentire

to weakly serrulate leaves with well-delimited alar parts consisting of many rather homogeneous, subquadrate to rectangular cells. Because of the exceedingly variable character of *H. cupressiforme*, more than 60 varietal taxa were described in the world. As a result of my study of this complicated species complex, however, 9 varietal forms were recognized as good except the following 4 taxa which had been treated by some authors as a variety of *H. cupressiforme* but should be regarded as independent species: *H. imponens* Hedw., *H. jutlandicum* Holm. et Warncke (= *H. cupressiforme* var. *ericetorum* B.S.G.), *H. mammillatum* (Brid.) Loeske and *H. uncinulatum* Jur. (= *H. canariense* (Mitt) Jaeg., *H. cupressiforme* var. *lauri* Brid.) (Ando 1985, 1989). Of the 25 specimens studied 19 have been identified as var. *cupressiforme*, one as var. *lacunosum*, one as var. *mossmanianum* and 4 as var. *townsendii*, the last being an undescribed taxon.

#### Key to the varieties

- 1 Plants flagelliform and slender almost throughout; alar cells of branch leaf 5-7 along the margin. ....var. *mossmanianum*
- 1\* Plants much larger and thicker, sometimes

partly flagelliform; alar cells of branch leaf (5-) 7-13(-15) along the margin.....2  
 2 Plants rather complanate; leaves falcate, gradually narrowed to a slender acumen .....  
 .....var.*cupressiforme*  
 2\* Plants thick-complanate to subjulaceous; leaves almost straight or slightly falcate, abruptly narrowed to a rather short acumen.....3  
 3 Branches frequently flagelliform.....  
 .....var.*townsendii*  
 3\* Branches not flagelliform .....  
 .....var.*lacunosum*

**1. *H. cupressiforme* Hedw. var. *cupressiforme*** (*H. cupressiforme* var. *aduncooides* Brid., *H. cupressiforme* var. *integrifolium* Ther., *H. multiflorum* Schwaegr., *H. semi-revolutum* C. Muell., *H. subcompressulum* Par.= *H. compressulum* Besch. hom. illeg.; *H. afro-cupressiforme* C. Muell. nom. nud., *H. afro-purum* Rehm. nom. nud.). The synonymy includes only those described from Africa. For other synonyms see Ando (1989). For worldwide treatment of this variety see Ando (1989, p. 270, Figs. 52: A-O, 53-55, 56: H-P).

Among the variety aggregate of this species complex, the typical var. *cupressiforme* is most widely distributed in the world. In plants assignable to the concept "var. *cupressiforme*" several different forms are further recognized and I tentatively distinguished 12 forms based upon the size of plants, patterns of branching and foliation, shapes of branches and leaves, and length of lamina cells (Ando 1989). These forms are, however, not always distinctive, being connected with each other by intergrading subforms. The 19 specimens observed here include the typical form and the typical "*aduncooides*" transitional form, and in most of the specimens branches sometimes become flagelliform. The "*aduncooides*" form (Ando 1989, p. 275, Figs. 52:J-K, 54, 55) is a large form usually showing strongly curved shoot tips and with narrowly ovate- or oblong-lanceolate leaves, which simulates *Drepanocladus aduncus* or *D. fluitans* in general appearance. It is represented by *H.*

*cupressiforme* var. *aduncooides* Brid. (= *H. aduncooides* (Brid.) C. Muell.) described from Bourbon Isl. of Mascarene.

"*Stereodon aduncooides* (C. Muell.) Broth. (= *H. aduncooides* C. Muell. = *H. Stereodon cupressiforme* var. *aduncooides* Brid.)" mentioned by Sim (1926) with illustration in his "The Bryophyta of South Africa" is not the true *H. cupressiforme* var. *aduncooides*, but is a different undescribed species which is closely related or possibly identical with the Himalayan species, *Hypnum* (sect. *Curvifolia*) *macrogyne* Besch. (syn. *H. flaccens* Besch., *H. zickendrathii* Ren. et Card.) (Ando 1968, 1971, 1982, 1989).

Sim's so-called "*Hypnum aduncooides*" is known in Madagascar and its neighboring islands and opposite coastal region of continental Africa, but has never been found in inland areas of Africa as far as my study is concerned. Specimens of "*Hypnum aduncooides* (Brid.) C. Muell." which have so far been recorded by several authors from continental Africa, Madagascar and other islands of southwestern Indian Ocean need reexamination to decide their true identity.

The specimens of var. *cupressiforme* from Zaire were collected on rock or bark at 2100-2700 m altitude, and those from Rwanda were in Nyungwe on soil or bark at 2300-2500 m altitude and in Karisimbi all on *Senecio* at 3570-3900 m altitude. General distribution. Cosmopolitan.

**KB:** 132, *Frahm* 6932, *Pócs* 7117, *Frey & Kürschner* 6906a; 135, *Frey & Kürschner* 6991a; 142, *Pócs* 7364; 143, *Frey & Kürschner* 7416; 144, *Frahm* 7575, 7671, *Frey & Kürschner* 7514. **Ka:** 162, *Frahm* 8107, 8199, *Pócs* 8092, 8220. **Ny:** 102, *Frahm* 6103, *Pócs* 6072, 6093; 103, *Frahm* 6180; 105, *Frahm* 6211; 111, *Frahm* 6428.

**2. *H. cupressiforme* var. *lacunosum* Brid.** (*H. lacunosum* (Brid.) Hoffm., *H. cupressiforme* var. *elatum* B.S.G., *H. cupressiforme* var. *imbricatum* Boul., *H. cupressiforme* var. *tectorum* Brid., *H. cupressiforme* fo. *elato-imbricatum* Ther., *H. basaltinum* (C. Muell.) Par., *Cupressina basaltina* C. Muell., *H. latifolium* Herz., *H. mirabile* Bartr.) For worldwide treatment of this variety see Ando (1989, p. 282, Figs. 52: P-T, 57, 58, 59: A-I).

This varietal form is distinct in the larger plants with thick-complanate to subjulaceous leafy stems and branches, and the almost straight to only weakly falcate leaves with short acumen. Among the synonymous taxa listed above, *H. cupressiforme* fo. *elato-imbricatum* was described by a specimen collected at 4200 m altitude of Mt. Karisimbi, just north of Goma in Zaire. It is an erect-growing form of var. *lacunosum* with a few or no branches (Ando 1989, Fig. 52:T). The specimen listed below from Zaire, which is a normal prostrate form, was collected on soil at the summit region (3307 m alt., with dwarf *Erica*) of Mt. Kahuzi. General distribution. Western Asia, Europe, Africa (Macaronesia, Ethiopia, Kenya, Zaire, Swaziland, Lesotho, South Africa), Australia, New Zealand, North to South America. In tropical regions in lat. 0-20° N and S, this moss has been found at high altitudes, ca. 3000-4500 m.

**KB:** 150, *Frahm* 7660.

**3.\**H. cupressiforme* var. *mossmanianum*** (C. Muell.) Ando (*H. mossmanianum* C. Muell., *Stereodon cupressiformis* (Hedw.) Brid. ex Mitt. var. *mossmanii* Mitt., *Drepanohypnum walterianum* Hampe) For a survey of this variety see Ando (1982, p. 95, Figs. 1, 2; 1992, p. 117, Figs. 66-68).

This varietal form is closely similar to *H. cupressiforme* var. *filiforme* Brid. and has been confused with it, but is distinguished from the latter by: (1) leaves usually more or less falcate, margins more frequently recurved below (straight or only weakly falcate, with usually plane margins in var. *filiforme*) and (2) alar parts of the leaf more strikingly excavated, often pigmented yellowish-brown, consisting of fewer subquadrate cells, 5-7 along the margin in branch leaves (7-10 in var. *filiforme*).

*Hypnum cupressiforme* var. *mossmanianum* is a typical moss example of circum-subantarctic distribution, being ranged south of lat. 30° S, in southern Africa, Australasia and southern Pacific coast of South America. In Africa it has been recorded only from Cape Province of South Africa

(200-900 m alt.) (Ando 1992). It is noteworthy that this moss was found at 3200 m altitude in Zaire situated within the tropical zone north of lat. 10° S. The specimen observed here is almost completely flagelliform in both stems and branches. It seems to have been growing on raw humus with fallen twigs over rock (labeled as "on rock below overhang").

General distribution. South Africa, Australia (southeastern states), New Zealand, Chile, Argentina.

**KB:** 148, *Pócs* 7872.

**4.\**H. cupressiforme* var. *townsendii*** Ando (ms.)

This new varietal form has already been recognized by the specimens with sporophytes collected by C.C. Townsend in Kenya (2900-3500 m alt.) and is ready to be described in next report of Ando's "Studies on the genus *Hypnum* Hedw." The var. *townsendii* is closely related to var. *lacunosum* in having tumid habit with wide, less-falcate leaves abruptly narrowed into a short acumen, but is separated from it by the distinct character that branches are frequently flagelliform. According to the fruiting specimens of Kenya, sporophytes are larger than those of var. *lacunosum*, namely, seta 2 cm long, capsule 2-2.5 mm long, 0.7 mm thick as opposed to seta 1-1.8 cm long, capsule 1.5-2 mm long, (0.5-)0.6-0.8 mm thick in var. *lacunosum*.

Three specimens of var. *townsendii* were collected in Zaire from stems of *Senecio* in open scattered *Erica* heath at 3200 m altitude, and one in Rwanda from stem of *Senecio* at 3900 m altitude.

**KB:** 149, *Pócs* 7736, 7741, *Frey & Kürschner* 7430. **Ka:** 162, *Frahm* 8240.

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