

THE GENERIC CONCEPT OF *BULBOSTYLIS* KUNTH EX C. B. CL.

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INTRODUCTION

The generic name *Bulbostylis* was first published by STEVEN in Mém. Soc. Nat. Mosc. v. (1814) based on species now referred to the genus *Eleocharis*, while *Bulbostylis* DC., published in Prod. v. 138 (1836) is based on species now referred to *Brickellia* in the Compositae. In Enum. Plant. ii., p. 205 (1837) KUNTH suggested that one of his sections of *Isolepis* could be regarded as a separate genus and mentioned *Bulbostylis* as a suitable name (cf. NELMES 1950). But since KUNTH treated *Bulbostylis* as a synonym in his index by italicizing it, it was not validly published.

Already in 1825 RAFINESQUE in Neogenyt. 4 published a genus *Stenophyllus* based on *Scirpus stenophyllus* ELL. (type-species called *Stenophyllus caespitosus* RAFIN.), and this was the first time a species of the present day *Bulbostylis* was published as a separate genus from *Fimbristylis*. *Oncostylis* NEES in MART. Fl. Brasil. 2 (1): 80 (1842) is another validly published name on a group of species which we nowadays use to call *Bulbostylis* KUNTH. The great diversity in these species is demonstrated by the fact that 5 out of NEES's 15 species, viz. *Oncostylis arenaria* NEES, *O. ciliata* NEES, *O. dubia* NEES, *O. tenuifolia* NEES and *O. truncata* NEES have subsequently been regarded as synonyms of *Bulbostylis capillaris* (L.) C. B. CL. or *Fimbristylis capillaris* (L.) A. GRAY. (cf. Index Kewensis I, 1895). Despite that KUNTH (1837) did not validly publish the genus *Bulbostylis*, it was attributed to him by C. B. CLARKE in HOOK. F. Fl. Brit. Ind. 6: 651 (1894), and this name has been conserved over the older names *Stenophyllus* RAFIN. and *Bulbostylis* STEVEN, and should then be cited *Bulbostylis* KUNTH ex C. B. CL. Type species is *Bulbostylis capillaris* (L.) C. B. CL., syn. *Scirpus capillaris* L.

GENERIC CHARACTERS

It is usually agreed that *Bulbostylis* C. B. CL. is closely related to *Fimbristylis* VAHL in Enum. Plant. ii. p. 285 (1806), and some authors (cf. KOYAMA 1961) have included *Bulbostylis* in *Fimbristylis*, but they have not been



Fig. 1. *Fimbristylis hispidula* s. lat. (typical form). Orig. R. WH. HAINES.

followed by the majority of botanists. The only character separating *Bulbostylis* (in the classical sense) and *Fimbristylis* is the duration of style-bases; they are more or less thick and deciduous in *Fimbristylis*, and persistent in *Bulbostylis*. Otherwise the same types of fruits and inflorescences occur in both genera, but *Bulbostylis* has more frequently a congested inflorescence. They have also the same vegetative characters except that species of *Bulbostylis* with open inflorescence do not have such broad leaves as are common in similar species of *Fimbristylis*. They are also the same cytologically, having same basic number and similar size of chromosomes (KOYAMA 1961), but as yet very few species have been investigated in this respect. As regards embryo-types, the genus *Fimbristylis* s. lat. (including *Bulbostylis*) is heterogeneous, but the two main types of embryos found (cf. VAN DER VEKEN 1965) do not correspond to the genera *Fimbristylis* and *Bulbostylis*. All species of *Bulbostylis* investigated by VAN DER VEKEN were found to have a similar embryo-type, but this same embryo-type was also found in the two investigated species of *Fimbristylis* section *Abildgaardia* (VAHL) BENTH., and in three out of four investigated species of *Fimbristylis* section *Leptoclaeda* OHWI. Other investigated species of *Fimbristylis* had a different embryo-type.

VARIATION IN *FIMBRISTYLIS HISPIDULA*

When studying the variation in the species *Fimbristylis hispidula* (VAHL) KUNTH (syn. *F. exilis* (H. B. K.) ROEM. & SCHULT.) in Uganda we found some interesting characters which are important for the generic concept of *Bulbostylis*. *F. hispidula* is one of the species of *Fimbristylis* which according to VAN DER VEKEN (1965) has a *Bulbostylis*-type of embryo. I shall therefore describe the variation in this species in some detail.

F. hispidula usually grows in small annual or perennial tussocks, either with a short creeping rhizome or with a very slender short-lived root-system (cf. Fig. 2). However, on some sandy raised beaches by Lake Nabugabo in south-west Uganda forms with fairly long, slender, erect rhizomes were found (cf. Fig. 1). It is possible that this form represents a distinct species or variety, but it is equally possible that the root-system in *Fimbristylis hispidula* is very adaptable to environmental changes, and these long and erect rhizomes may have developed because of an unusual wet environment.

Also the degree of hairiness in these plants is exceedingly variable. While most plants especially from the drier regions are densely hairy both on culms and leaves, some plants from high-rainfall regions have entirely glabrous culms, and leaves with short spine-like hairs on the ridges only.

Similarly the achene is variable in size, shape, colour, surface-pattern and persistence of style-base. It is usually about 1 mm long and 1 mm wide, but forms from Karamoja (the dry north-eastern part of Uganda) has achenes about 1.3 mm long and with a longer and distinctly cuneate base (cf. Fig. 3). The surface of the achene is nearly always strongly or weakly trans-



Fig. 2. *Fimbristylis hispidula* s. lat. ("glabrous" form with erect rhizome). Orig. R. WH. HAINES.

versely wrinkled, rarely entirely smooth (but even in plants with apparently mature smooth achenes, some achenes with obscure transverse wrinkles can be found). The colour varies from white, grey or pale grey to dark brown, but mature achenes are generally darker than unripe ones.

Of more taxonomic interest, however, is the variability in the persistence of the style-base. In most plants the swollen base of the style falls off with the style, but forms where the swollen style-base is persistent on the mature achene are by no means rare (cf. Fig. 4), and a gathering from western Uganda even had some fruits with persistent style-bases and others with deciduous ones on the same specimen. Forms of *F. hispidula* with persistent style-bases have frequently been identified as *Bulbostylis holotricha* A. PETER or *B. congolensis* DE WILD. Similarly *Bulbostylis filiformis* C. B. CL. is only a poorly developed form of *F. hispidula*.

Studies in the other species of *Fimbristylis* and *Bulbostylis* in Uganda has shown that *Fimbristylis hispidula* has its nearest relatives in a group of species centred around *Bulbostylis densa* (WALL.) HAND.-MAZZ., including *B. pusilla* (A. RICH.) C. B. CL., *B. glaberrima* KÜKENTH., *B. abortiva* (STEUD.) C. B. CL. and *B. coleotricha* (A. RICH.) C. B. CL., some of which may be intraspecific taxa of *Bulbostylis capillaris* (L.) C. B. CL., which is the type-species of the genus *Bulbostylis*. These species differ from *Fimbristylis hispidula* in the tuberculate rather than transversely wrinkled fruit, but even smooth fruits occur in this group.

DISCUSSION

Judging from this extreme variation in Ugandan forms of *Fimbristylis hispidula*, I have come to the conclusion that *Bulbostylis* KUNTH ex C. B. CL. (as previously defined) has to be included in *Fimbristylis* VAHL. This because the persistent swollen style-base, which has been the only separating character between the genera *Bulbostylis* and *Fimbristylis*, was found to be of little or no taxonomic value within this group of species, and especially since *F. hispidula* on the same plant can have fruits with or without persistent style-base. At any rate *Fimbristylis hispidula* and related species have to be included in the same genus as *Bulbostylis capillaris*, the type-species of *Bulbostylis*.

The embryographical studies by VAN DER VEKEN (1965) may, however, indicate that if a "new" genus *Bulbostylis* is erected and made to include the *Fimbristylis hispidula* complex, and other species hitherto placed in *Fimbristylis* but with a *Bulbostylis*-type embryo, a natural genus may result. This requires embryographical studies in all "suspect" *Fimbristylis*-species, especially in those with narrow leaves and/or congested inflorescence. *Fimbristylis nelmesii* KERN from S. E. Asia (KERN 1958) is another species in which the swollen style-base may be persistent or deciduous on the same plant, but this species has a *Fimbristylis*-embryo. After a new circumscrip-

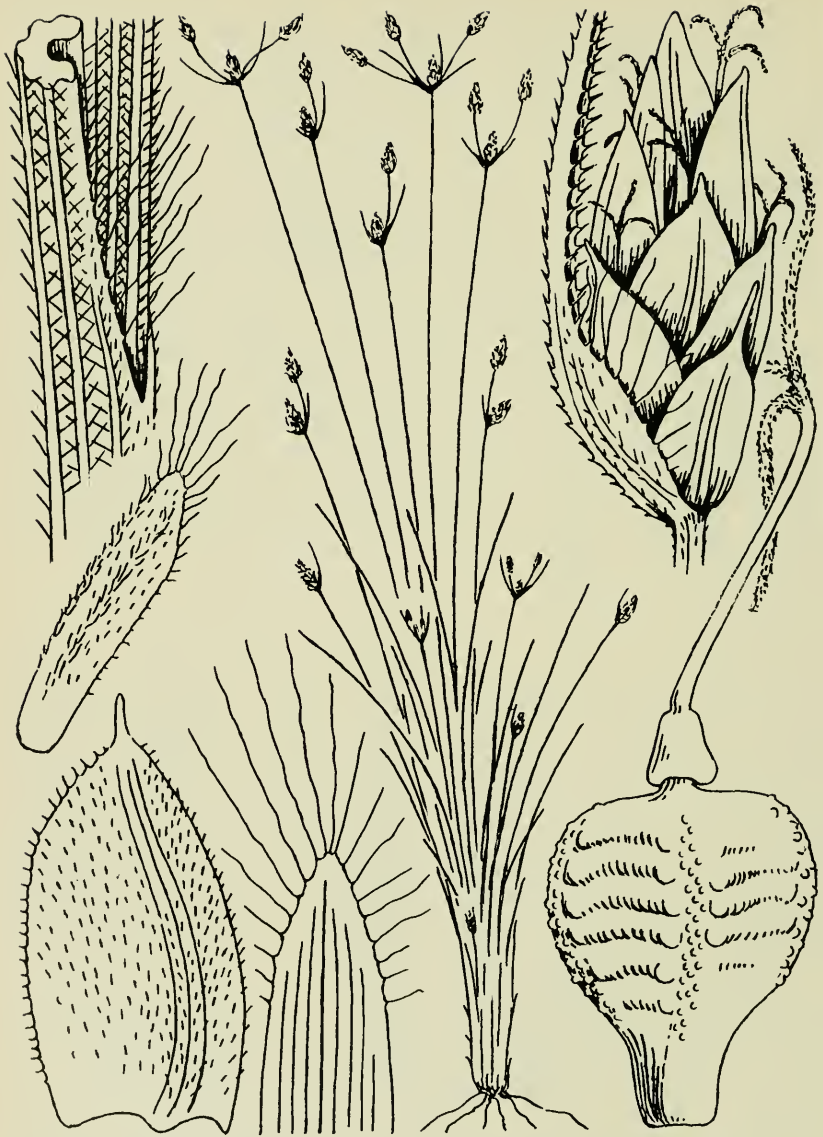


Fig. 3. *Fimbristylis hispidula* s. lat. (dry country form). Orig. R. WH. HAINES.

tion of the genera *Fimbristylis* and *Bulbostylis*, species with "*Bulbostylis*"- and "*Fimbristylis*"-styles will consequently be found in both emended genera.

This does not necessarily mean that *Bulbostylis* can be so defined that it can be retained as a "good" genus. The embryo-type of *Bulbostylis* is very similar to that of *Abildgaardia*. *Abildgaardia* is a genus described by VAHL in Enum. Plant. ii. p. 296 (1806), and it has generally been regarded as being closely allied to *Fimbristylis* and therefore frequently included in that genus. Although *Abildgaardia* now can be separated from an emended genus *Fimbristylis* on its embryo-type, it is not at all easily separated from *Bulbostylis*. The "old" separating characters were that *Bulbostylis* has a persistent style-base and all glumes spirally arranged, while *Abildgaardia* has deciduous style-base and at least the lower glumes distichously arranged. As shown above the "new" *Bulbostylis* contains numerous species with deciduous style-base, and several species of the "old" *Bulbostylis* have distichously arranged glumes, viz. *Bulbostylis aphyllanthoides* (RIDL.) C. B. CL. (nowadays often called *B. pilosa* (WILLD.) CHERM.), *B. parvinox* C. B. CL. and *B. renschii* (BOECK.) C. B. CL.

If these three species are included in *Abildgaardia*, that genus can be separated from *Bulbostylis* on a single character, viz. some glumes distichous in *Abildgaardia*, all glumes spirally arranged in *Bulbostylis*. If the three above-mentioned species are not included in *Abildgaardia*, it is virtually impossible to separate the two genera. If future research will prove that *Abildgaardia* and *Bulbostylis* have to be united, *Abildgaardia* takes priority, and the name *Bulbostylis* has to be rejected. Although *Bulbostylis* is a conserved genus, it is not conserved over *Abildgaardia*.

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APPENDIX

New combination for African members of *Abildgaardia* and *Bulbostylis*:

1. *Abildgaardia parvinox* (C. B. CL.) K. LYE comb. nov., syn. *Bulbostylis parvinox* C. B. CL., in DYER, Fl. Cap. 7 : 207 (1898).

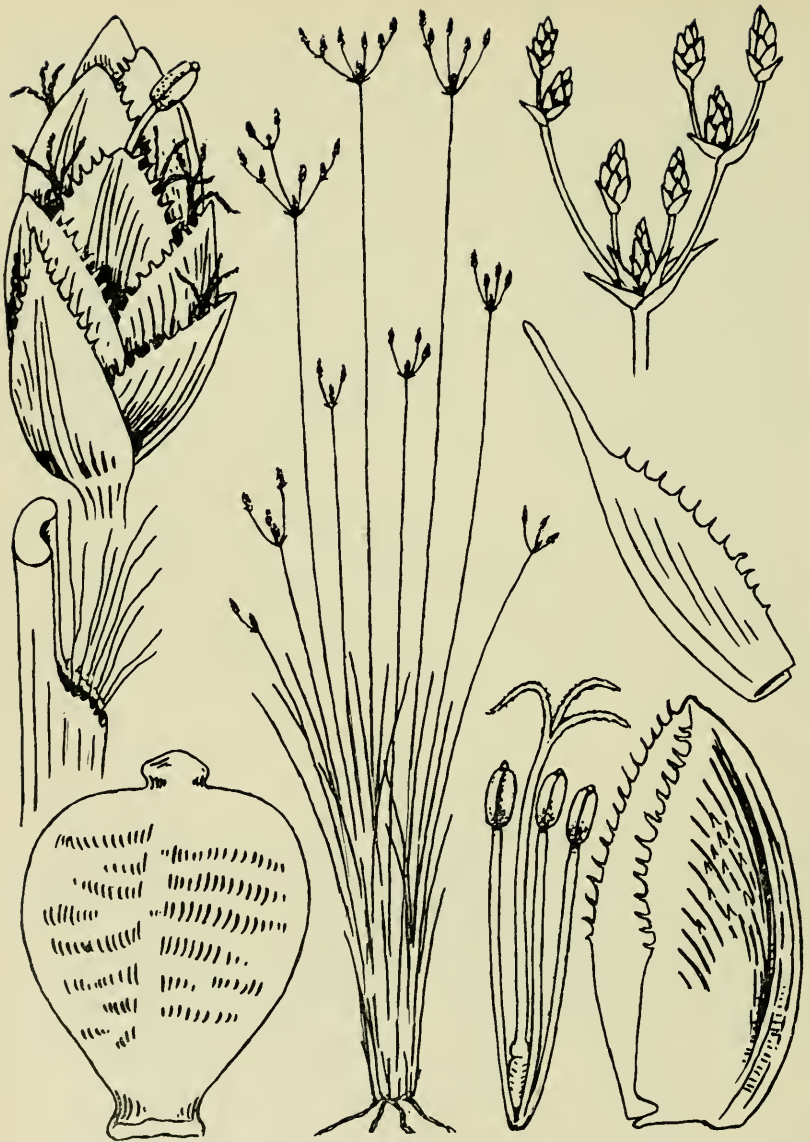


Fig. 4. *Fimbristylis hispidula* s. lat. (form with "Bulbostylis"-stylebase). Often named *Bulbostylis congolensis* DE WILD. Orig. R. WH. HAINES.

2. *Abildgaardia renschii* (BOECK.) K. LYE comb. nov., syn. *Scirpus renschii* BOECK., Bot. Jahrb. 5: 504 (1884).
3. *Abildgaardia hygrophila* (GORDON-GRAY) K. LYE comb. nov., syn. *Fimbristylis hygrophila* GORDON-GRAY, Journ. South Afr. Bot. 32: 129 (1966).
4. *Abildgaardia variegata* (GORDON-GRAY) K. LYE comb. nov., syn. *Fimbristylis variegata* GORDON-GRAY, Journ. South Afr. Bot. 32: 134 (1966).
5. *Bulbostylis exilis* (H. B. & K.) K. LYE comb. nov., syn. *Isolepis exilis* H. B. & K., Nov. Gen. et Sp. i: 224.
6. *Bulbostylis cioniana* (SAVI) K. LYE comb. nov., syn. *Fimbristylis Cioniana* SAVI, Mem. Valdarnes 3: 98 (1842).
7. *Bulbostylis tisserantii* (CHERM.) K. LYE comb. nov., syn. *Fimbristylis Tisseranti* CHERM., Arch. Bot. Caen. IV, Mém., No. 7: 32 (1931).
8. *Bulbostylis oligostachys* (A. RICH.) K. LYE comb. nov., syn. *Fimbristylis oligostachys* HOCHST. ex A. RICH., Tent. Fl. Abyss. 2: 503 (1851).

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