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## The inflorescence of *Cyperus giganteus* VAHL (Cyperaceae)

With 2 Figures

### Summary

The inflorescence of *Cyperus giganteus* VAHL is characterized considering its typological features, and compared with the structural patterns described for other Cyperaceae inflorescences.

### Zusammenfassung

Die Infloreszenzen von *Cyperus giganteus* VAHL (Cyperaceae)

Der Infloreszenzaufbau von *Cyperus giganteus* VAHL wird analysiert und unter Berücksichtigung der typologischen Übereinstimmungen mit den für andere Cyperaceen beschriebenen Infloreszenzstrukturen verglichen.

### 1 Introduction

The Cyperaceae inflorescences have been characterized by several authors (MORA-OSEJO 1960; KUKKONEN 1984, 1986; VEGETTI & TIVANO 1991; VEGETTI 1992, 1994; HEINZEN & VEGETTI 1994; GOETHGEBEUR 1998) as comprising a variable number of branches of acropetal development, followed by several branches being reduced to a spikelet which altogether are placed on a main axis ending in a spikelet. This general pattern for Cyperaceae is not present in the inflorescence of *Cyperus papyrus* L., which according to MORA-OSEJO (1960), does not have a terminal spikelet.

*Cyperus giganteus* VAHL is a south american species that grows in Argentina, Bolivia, Brazil, Paraguay and Uruguay (BARROS 1947) and it belongs to the *Papyrus* section of *Cyperus* L. (KÜKENTHAL 1936).

The aim of this work is to study the inflorescence of *C. giganteus* from the typological point of view.

### 2 Observations

The flowering plant of *C. giganteus* (Fig. 1 A) is composed by a group of shoots of consecu-

tive ramification order. Each of these shoots which normally terminates in an inflorescence has to be considered as a synflorescence.

The proximal portion of this inflorescence shows reddish coriaceous cataphylls, reduced to the sheath, except for the upper two that bear a 25–30 mm lamina. An axillary bud was observed at the axil of the basal proximal cataphylls. The axillar buds of these cataphylls generate lateral shoots during the same (syleptic ramification) as the next (cataleptic ramification) growth period. These shoots have the same structure of the main axis. Consequently, this zone is denominated the innovation zone.

Above the insertion of the distal cataphyll, the internode gets longer and forms a floral scape of 1.0–1.5(2) m high, terete in the base and trigonal in the upper portion. The distal cataphylls without an axilar bud, along with the floral scape constitute the inhibition zone (Fig. 1 A).

In the distal end of the scape, involucre bracts, diminishing acropetally, are arranged. The lower ones are 15–35 cm long, and 16–18 mm wide in their base, as well as erected and rough on borders and keels. In bract axils, floriferous shoots (paracladia) are formed. Bracts and paracladia are arranged

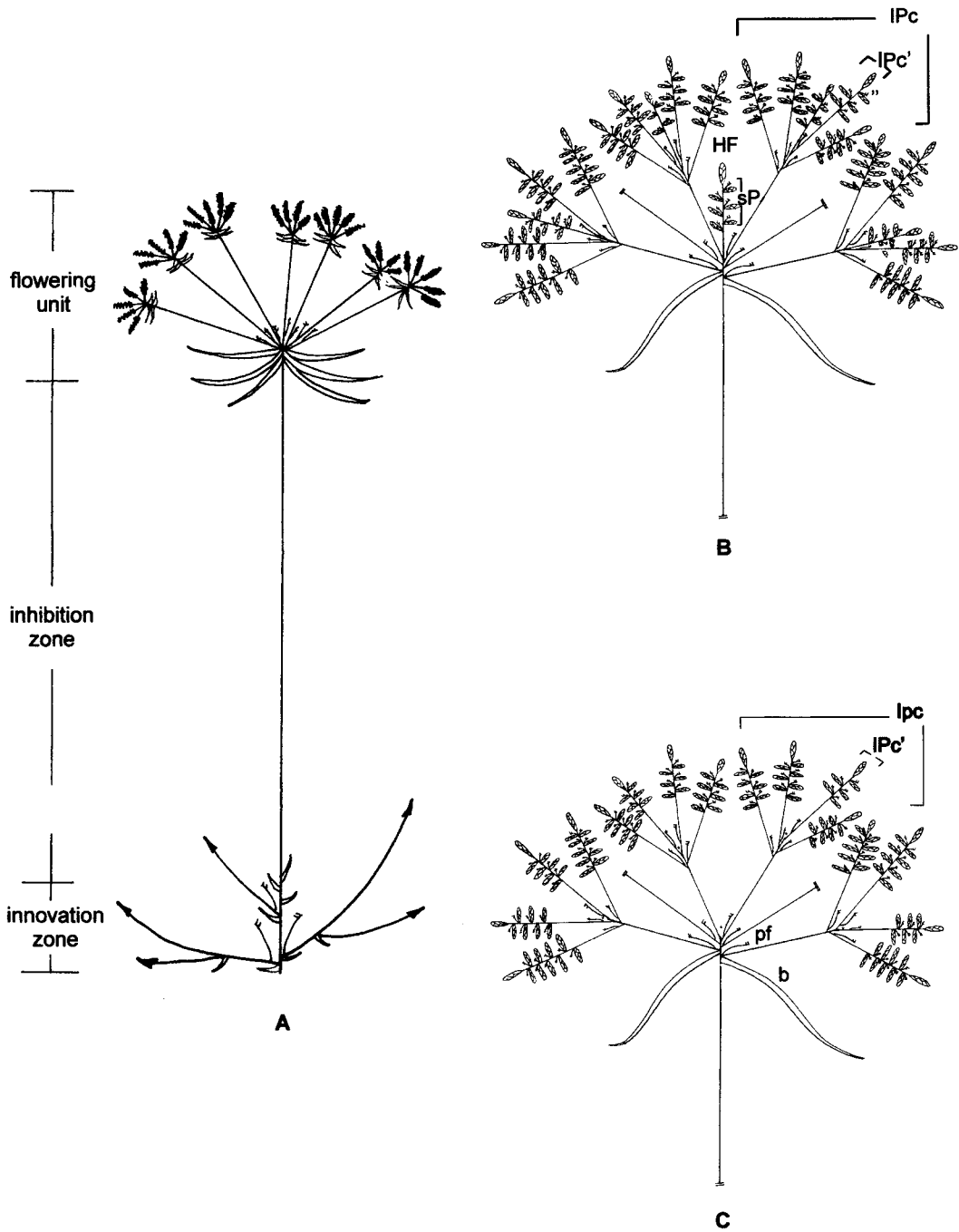


Fig. 1  
 A — structural plan of the plant of *Cyperus giganteus* VAHL; B — common inflorescence in species of *Cyperus* L.; C — inflorescence of *Cyperus giganteus*  
 HF — main florescence; sP — subzone of short paracladia; IPc, IPc' — long paracladia; b — bract; pf — prophyll

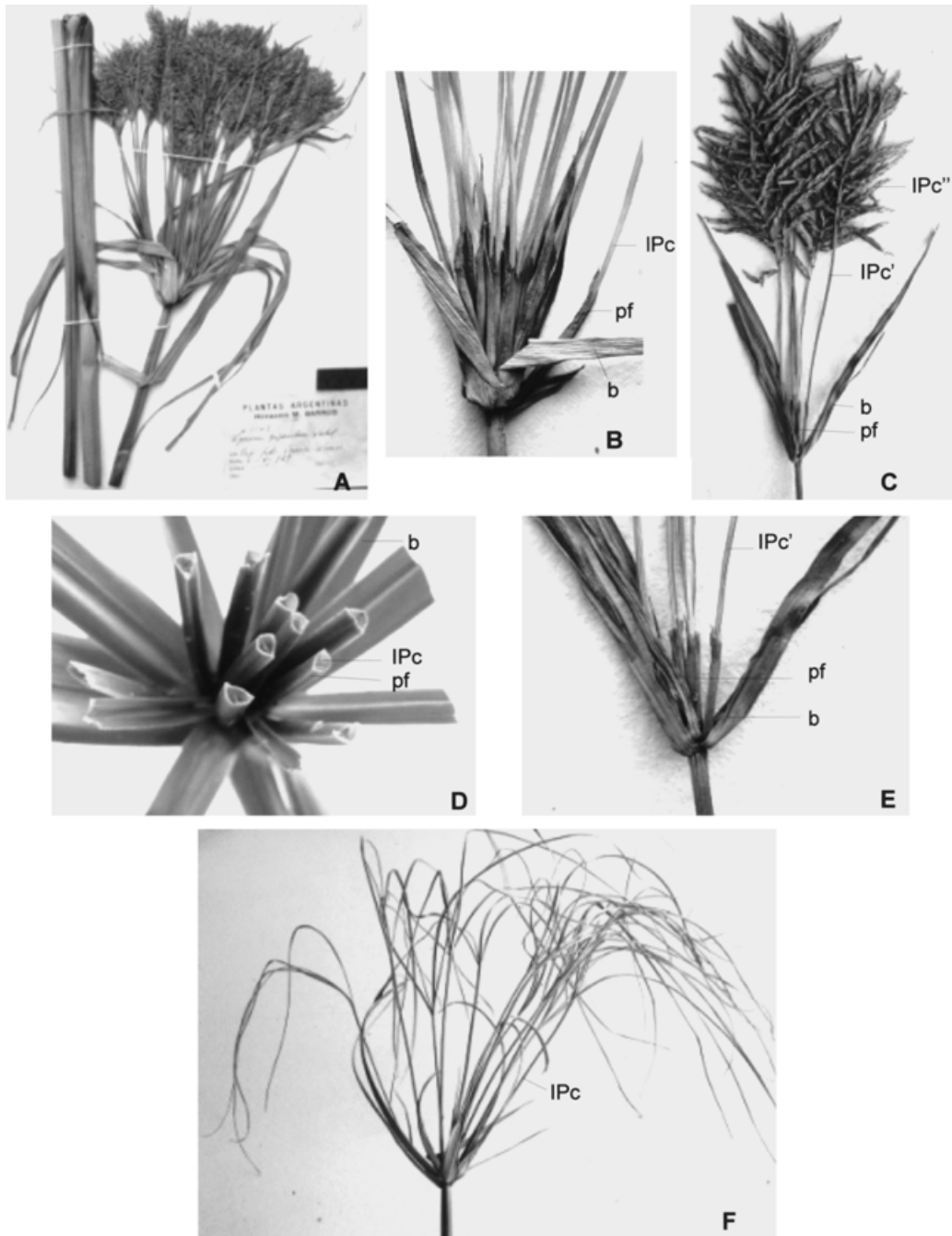


Fig. 2

*Cyperus giganteus* VAHL

A — inflorescence; B — proximal part of the inflorescence with primary long paracladia; C — primary long paracladia; D — cross section of the proximal part of the inflorescence; E — proximal part of the primary long paracladium with secondary long paracladia; F — sterile inflorescence

b — bract; IPc, IPc', IPc'' — long paracladia; pf — prophyll

very densely. This region constitutes the paracladial zone (Fig. 1; Fig. 2A, B).

The terminal spikelet is not developed, consequently this inflorescence (flowering unit) lacks a main florescence (Fig. 1C).

The paracladial zone (Fig. 1C; Fig. 2A, B) is exclusively composed of 11–23 ramified primary paracladia (= long paracladia) on which next order paracladia are arranged. Above distal long primary paracladia the main axis stops its growth, without having developed any short paracladia, reduced to their terminal spikelet (coflorescence), as in other members of the family. It is important to point out that above the distal long paracladia, no sterile prolongation of the main rhachis is observed (Fig. 1C; Fig. 2B, D).

Primary long paracladia (Fig. 1C; Fig. 2B, C) have a similar structure (15–25 cm long, trigonal-like). Each of them consists of a short hypopodium (virtual), a prophyll (cladoprophyll), a long epipodium and (4–)5–7 secondary long paracladia. Each primary long paracladium producing the long distal secondary paracladia and does not have either short secondary paracladia or terminal spikelet (coflorescence). Primary long paracladia have a 25–35 mm long prophyll, which is bikeeled, reddish and has an oblique mouth.

The secondary long paracladia (5–10 cm long) also present a very similar architecture (Fig. 2C, E). Each of them consists of a short hypopodium (virtual), a cladoprophyll, an epipodium of variable length and (15–)30–50 tertiary paracladia reduced to a spikelet (short paracladia). It ends in a terminal spikelet. In these secondary long paracladia the cladoprophyll is bikeeled, truncated in a straight line and reddish.

Thus, the inflorescence of *C. giganteus* (Fig. 1C; Fig. 2A, B, D) exclusively consists of a paracladial zone. In the latter, only primary and secondary long paracladia are developed. Neither short paracladia reduced to a spikelet nor a terminal spikelet are observed on the main axis or on primary long paracladia. Only in secondary long paracladia (Fig. 2C, E), the coflorescence and tertiary paracladia reduced to a spikelet are observed.

Often the completely sterile inflorescences, i.e. without any spikelets, are observed (Fig. 2F). These show involucre bracts and

primary long paracladia. The latter consist of bracts and 3–5 short bracteiform axis with rough 4–7-cm-long borders without spikelets. In these inflorescences, reductive processes have affected the development of secondary long paracladia also.

### 3 Discussion

In *Cyperus giganteus* the inflorescence is polytelic, as it has been described for Cyperaceae genera (MORA-OSEJO 1960; KUKKONEN 1984, 1986; VEGETTI & TIVANO 1991; VEGETTI 1992, 1994). In this species the polytelic inflorescence is truncated (TROLL 1964; WEBERLING 1985, 1989). In addition, in *C. giganteus* truncation of the short paracladia subzone has taken place. Both truncation processes have affected the main axis and the primary long paracladia. The same situation can also be seen in other Monocotyledonae (VEGETTI 1991; VEGETTI & ANTON 1995, 2000).

The structural pattern observed in *C. giganteus* is unusual in the genera of the Cyperaceae (MORA-OSEJO 1960; KUKKONEN 1984, 1986; VEGETTI & TIVANO 1991; VEGETTI 1992, 1994; BROWNING & GORDON-GRAY 1999), in which the inflorescences (Fig. 1B) usually consist of a long paracladia subzone, a short paracladia subzone and a terminal spikelet (main florescence). A similar situation occurs in *Cyperus papyrus* (MORA-OSEJO 1960; RAYNAL 1971; HAINES & LYE 1983) and *Cyperus prolifer* LAM. (RAYNAL 1971; HAINES & LYE 1983).

Although in *C. giganteus* truncation processes are similar to those observed in *C. papyrus*, but collateral buds generating a fascicle of long paracladia as in the case of *C. papyrus* (MORA-OSEJO 1960; RAYNAL 1971), are missing.

It is interesting to point out that even though in *C. giganteus* reduction of distal parts in the main axis and in long primary paracladia have occurred, the inflorescence is richly branched. In Cyperaceae there are cases of inflorescences made up of a few or one spikelet. Here the reduction has affected the paracladial zone, which sometimes can be completely suppressed, and consequently, the inflorescence then consisting of the main flo-

rescence exclusively (VEGETTI 1992, 1994; BROWNING & GORDON-GRAY 1999).

Furthermore, it is evident that the reductive processes do not always affect equivalent areas. Indeed, in some cases, it is the proximal part of the inflorescence the one whose extension is reduced; in extreme cases, the result is the survival of the main florescence only, at it is the case in *Eleocharis* R.BR. inflorescences, in some specimen of *Isolepis* R.BR. (VEGETTI 1994) and of *Bolboschoenus* (L.) PALLA (BROWNING & GORDON-GRAY 1999). In the other cases, it is the distal part of the inflorescence which is reduced; this reduction can affect both the main florescence and the subzone of short paracladia. Thus, in this latter case the inflorescence is composed of long paracladia, as in the inflorescence of *C. giganteus*.

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 SI 8720  
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 RAGONESE 3161(SF)  
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