A NEW SPECIES OF *CYPERUS* SECTION *INCURVI* (CYPERACEAE) FROM VENEZUELA

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ABSTRACT

Cyperus fedoniae is described as a new species. It is known from a single collection from the lowlands of southern Venezuela. It is a member of section *Incurvi*. It is related to *C. dichromeniformis* and *C. inops,* from which it can be distinguished by its smaller size and features of spikelets and achenes. A distinctive feature is the arching culms which take root at the base of the spikelets.

RESUMEN

Cyperus fedoniae es descrito como una nueva especie. Se conoce de una sola muestra de las tierras bajas del sur de Venezuela. Es un miembro de la sección *Incurvi*. Está relacionada con *C. dichromeniformis* y *C. inops*, de la que se distingue por su pequeño tamaño y características de espiguillas y aquenios. Una característica distintiva es el arqueo tallos, que se arraigue en la base de las espiguillas.

KEY WORDS: *Cyperus*, Cyperaceae, Venezuela, Guayana Region

INTRODUCTION

The genus *Cyperus* L. includes about 950 (Laridon et al. 2011) species, occurring worldwide in tropical and warm temperate regions (Tucker 1994, 2014). The distribution of individual species ranges from nearly cosmopolitan (e g , *C. squarrosus* L. and *C. odoratus* L.), to regional and narrow endemics (Kükenthal 1935–36). In the New World, areas of high diversity and endemism include Mexico, the Greater Antilles, and eastern Brazil (Tucker 2007). While examining unidentified South American specimens of Cyperaceae in the U.S. National Herbarium, as well as loans from several other institutions, a new species was noted from Venezuela.

This species finds its place in subgenus *Pycnostachyus* C.B. Clarke sect. *Incurvi* Kük. This pantropical section occurs in wet lowland forests, and comprises about 30 species, 17 of which are found in the New World Tropics (Tucker 2014). The plants are perennial, with branched or unbranched inflorescences, and floral scales that are saccate basally, with a prolonged, incurved apex and straight, wingless rachilla. Most species have a rough, granular or papillose achene surface, and several have pseudopetiolate leaves (Kükenthal 1935–36; Tucker 2007).

Specimens from the following herbaria were studied (for herbarium acronyms, see Thiers 2016+): AAU, AC, ARIZ, ASU, B, BD, BKL, BH, BM, BR, C, CAS, CHAPA, CONN, CORD, CU, DAO, DAV, DS, DUKE, E, ECON, ENCB, EIU, F, FLAS, G, GH, HAL, IBUG, ILL, ILLS, IND, JE, K, LCU, LL, M, MA, MASS, MEXU, MICH, MO, MSC, MT, MTMG, MU, ND, NHA, NY, NYS, P, PENN, PH, PMA, POM, PR, PRC, RDJ, RSA, S, SD, SIU, SMU, SP, TENN, TEX, TRT, UC, UCR, UEC, US, UTEP, VT, WIS, WRSL, WVA, YU, and Z. The current paper represents a contribution toward a taxonomic monograph of the ca. 230 species of *Cyperus* occurring in the New World Tropics.

Cyperus fedoniae G.C. Tucker, sp. nov. (**Fig. 1, 2B**). TYPE: VENEZUELA. BOLÍVAR: Río Paragua, Guaiquinima [6.61°, -63.51°], alt. 285 m, 14–15 Apr 1943, *E.P. Killip 37844* (HOLOTYPE: US).

Caespitose perennials. Rhizome 1–3 mm thick, indurate, producing tufts of 1–3 culms. Culms 0.5–0.7 mm thick, trigonous, smooth; some culms arching, 7–20 cm long, bearing proliferous spikelets. Leaves 1–6, 6–10 cm long, 2.2–5 mm wide, v-shaped, the margins and keel distally scabrellate. Inflorescence bracts 2(–3), 2–5 cm long, 0.5–1 mm wide, linear, v-shaped, the margins and upper and lower surfaces scabrellate, ascendant at

Fig. 1. *Cyperus fedoniae* G.C. Tucker, sp. nov. (holotype).

Fig. 2. Comparison of inflorescences of *Cyperus fedoniae* and related species. A: *C. inops* (Brazil, São Paulo, Campos de Jordão, *Hashimoto 348*, SP); B: *C. fedoniae* (holotype); C: *C. dichromeniformis* (Brazil, Minas Gerais, Fazenda da Libertade, *Heringer 942*, EIU). Scale bar for all specimens = 5 mm.

15–30°; secondary bracts absent. Rays absent. Inflorescence a single digitate cluster of spikelets, 7–10 mm wide. Spikelets 3–5, 4–8 mm long, 1.8–2 mm wide, elliptic, ellipsoid in cross-section; rachilla persistent, 0.2 mm wide, 0.15–0.2 mm thick, straight to slightly zig-zag, light brown, successive scale scars 1.0–1.1 mm apart, wingless. Scales deciduous, 6–10, 1.7 mm long, 1.4 mm wide, ovate-deltate, obtuse, laterally weakly 1–2 nerved, light reddish brown, smooth, the medial part of the scale 3 nerved, scabrellate. Stamen 1; filament 1.7–1.8 mm long (capillary, 0.05 mm wide); anther not observed. Styles 0.5 mm long; stigmas 3, 0.5mm long. Achenes 1.0–1.1 mm long, 0.65 mm wide, trigonous, obovoid, the apex obtuse, apiculate, stipitate (the stipe 0.15 mm long), the faces slightly convex, papillose, medium brown.

Distribution.—Known only from Guayana Region of Venezuela. The type locality for *Cyperus fedoniae* is on the Río Paragua, north of Cerro Guaiquinima, at the edge of the tepui region of the Guiana Highlands (Veblen et al. 2007), and about 30 km north of Angel Falls.

Habitat and ecology.—Tropical lowland forests; ca. 285 m. Edge of river, near forest margin; in sandy soil.

Etymology.—This new species is named for Irene Carolina Fedón, botanist and curator at the Herbario Nacional in Caracas, and specialist on the Cyperaceae of Venezuela.

Proposed IUCN status.—*Cyperus fedoniae* appears to be genuinely rare. So far, only one collection has been found. Following IUCN (2016) guidelines, a status of VU D2 is proposed, because the new species is "known to exist at less than five locations." I have examined about 250 specimens of this section from northern South America from numerous herbaria, without locating other material of this new species.

Discussion.—*Cyperus fedoniae* is one of the smallest perennial species of the genus in the New World tropics, only about 20 cm tall, with slender arching culms. Proliferous spikelets, such as occur in *C. fedoniae*, are also found in two other species of the section, *C. simplex* Kunth and *C. conservator-davidii* G.C. Tucker. However, *Cyperus fedoniae* is most similar to *C. inops* C.B. Clarke and *C. dichromeniformis* C.B. Clarke. These three species are allopatric, and are distinguishable as shown in Table 1. It can be noted in passing that many specimens identified as *C. dichromeniformis* from Amazonian Brazil and the Guiana Shield Region turned out to be *C. lacustris* (cf. Tucker 2014).

A total of 61 species of *Cyperus* have been reported from Venezuela (Strong et al. 2008; Fedón 2012). In the key provided by Fedón (2012), the new species would key to *C. simplex*, from which it can be distinguished by the elongate rays (longer than the culm) in *C. simplex*. In the account provided for the flora of the Venezuelan Guayana (Tucker 1998), which includes the type locality of this new species, *C. fedoniae* would key to *C. reflexus*, which is taller than *C. fedoniae* (30–80 cm), with an erect inflorescence bract and elongate rays. A key is provided below for all the species of section *Incurvi* in the Neotropical region.

Table 1. Comparison of *Cyperus fedoniae* with probable relatives. All these species lack rays in the inflorescence.

Species Character	*C. fedoniae*	*C. dichromeniformis*	*C. inops*
Distribution: Countries: states	Venezuela: Bolívar	Brazil: Bahia, Pará, Rio de Janeiro	Brazil: Minas Gerais, São Paulo, Santa Catarina, Paraná
Culm length (cm)	7–20	10–30	45–80
Culms, habit	Arching, proliferous	Erect, non proliferous	Erect, non proliferous
Leaves length (cm)	6–10	3–8	5–25
Bracts Length (cm) / width (mm)	2–5 / 0.5–1	3–6 / 2–4	2–4 / 1–2
Bracts orientation	Ascendant at 15–30	horizontal	reflexed
Bracts shape	linear	lanceolate	linear
Spikelet shape	elliptic	linear-oblong	ovate-orbiculate
Rachilla width / thickness (mm)	0.2 / 0.15–0.2	0.4–0.5 / 0.2–0.3	0.25 / 0.1–0.2
Scales separation (mm)	1–1.1	1.7	0.2
Scales per spikelet	6–10	8–12	3–8
Scale color	Light reddish brown	white	Dull white
Scales length / width (mm)	1.7 / 1.4	2.7–3 / 3	1.7–1.8 / 0.8
Filament length (mm)	1.7–1.8	2.5	0.7–1.6
Achenes length / width (mm)	1.0–1.1 / 0.65	1.0 / 0.8	1.2 / 0.6–0.7
Achenes surface	papillose	coarsely punctate	smooth

KEY TO SPECIES OF *CYPERUS* SECTION *INCURVI* IN THE NEOTROPICS

1. Inflorescence expanded, with primary and sometimes secondary rays; spikelets solitary or digitate in groups of 2–6; anther apex setose.
   2. Leaves linear-lanceolate, 10–25 mm wide.
      3. Leaves 10–14 mm wide, with pseudo-petiolate base; spikelets 4–6 mm wide ____ **C. altsonii** (**C. hoppiifolius**)
      3. Leaves without pseudo-petiolate base; spikelets 2–3 mm wide ____ **C. miliifolius**
   2. Leaves linear, (0.7–)2–6(–8.5) mm wide.
      4. Longest ray longer than culm; inflorescence often proliferous ____ **C. simplex**
      4. Longest ray shorter than the culm; inflorescence rarely proliferous.
         5 Scales ovate-lanceolate, ovate, or suborbiculate; stamens 3 per flower.
            6. Culms 1.7–4.0 mm thick; successive scales 0.6 mm apart; anthers 0.4–0.5 mm long; achenes trigonous but dorsiventrally flattened ____ **C. lundellii**
            6. Culms 0.5–1.2(–2) mm thick; successive scales 0.7–1.5 mm apart; anthers 0.9–2.2 mm long; achenes trigonous, not compressed.
               7. Successive scales 0.7–0.9 mm apart; anthers ca. 0.9 mm long; achenes ellipsoid, 0.4–0.5 mm wide ____ **C. almensis**
               7. Successive scales 1.1–1.5 mm apart; anthers 1.5–2.2 mm long; achenes obovoid, 0.7–0.8 mm wide ____ **C. subcastaneus**
         5. Scales ovate; stamen 1 per flower.
            8. Rays compressed-quadrate in cross-section.
               9. Culms scabrous on angles just below bracts; anthers 1.2 mm long; achenes ellipsoid ____ **C. conservator-davidii**
               9. Culms smooth; anthers 0.6–0.8 mm long; achenes broadly obovoid ____ **C. grandisimplex**
            8. Rays trigonous in cross-section.
               10. Spikelets 2–3 mm wide; achenes ovoid, 0.9–1.2 mm long ____ **C. lacustris**
               10. Spikelets 2–2.5 mm wide; achenes ovoid-ellipsoid, 1.2–1.6 mm long.
                  11. Spikelets oblong-ovate, 4–6 mm long, with 10–12 scales; scales deep brown, 3-nerved medially, laxly imbricated ____ **C. anisitsii**
                  11. Spikelets linear, linear oblong to slightly linear-lanceolate, 12–24 mm long, with 12–30 scales, scales densely imbricate, 9–11 nerved medially and laterally, closely imbricate ____ **C. pearcei**

1. Inflorescence capitate-contracted (sometimes 1 short ray present); anther apex smooth
   12. Spikelets and scales dull white.
      13. Bracts lanceolate, horizontal ____ **C. dichromeniformis**
      13. Bracts linear, reflexed ____ **C. inops**
   12. Spikelets light to dark reddish or purplish brown.
      14. Culms arching; spikelets 4–8 mm long ____ **C. fedoniae**
      14. Culms erect, spikelets 5–17 mm long.
         15. Leaves 4–8.5 mm wide; inflorescence bracts 1–2, strongly reflexed; achenes lance-ellipsoid; eastern Brazil ____ **C. consors**
         15. Leaves 1–4 mm wide; inflorescence bracts 3–6, ascendent; achenes ovoid to obovoid; Guianas and Amazonia ____ **C. lacustris**

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