
A New *Juncus* Sect. *Ozophyllum* (Juncaceae) from Peninsular Florida, U.S.A.

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ABSTRACT. *Juncus paludosus* E. L. Bridges & Orzell is described and illustrated as a new species from peninsular Florida, U.S.A., occurring primarily in hardwood and cypress swamps and adjacent ditches and marshes. Although closest in diagnostic characters to *J. megacephalus* M. A. Curtis, it has been confused with *J. polycephalus* Michaux of section *Iridifolii* Snogerup & Kirschner based on its overall size, gross morphology, and floral characteristics. Differences between *J. paludosus* and other closely related species of section *Ozophyllum* Dumortier are discussed, and a key is provided to the group within section *Ozophyllum* that includes *J. paludosus*.

Key words: Florida, Juncaceae, *Juncus*, *Ozophyllum*.

The genus *Juncus* L. is of almost worldwide distribution and contains about 300 species, with 95 species occurring in North America (Brooks & Clemants, 2000; Kirschner, 2002). Within Florida, the genus is represented by 21 species (Wunderlin & Hansen, 2003), 13 of which are found in central Florida (Wunderlin, 1982). Most of the *Juncus* species of the southeastern U.S.A. are clearly differentiated and not particularly difficult to identify in contrast with the more complex *Juncus* taxonomy of northern climates. Therefore, it was a surprise to the senior author to uncover—in the course of his work on the *Flora of Florida* (Wunderlin et al., 1996; Wunderlin & Hansen, 2008)—a large number of *Juncus* specimens from peninsular Florida. The specimens, which were mostly labeled as *J. polycephalus* Michaux, could not be accommodated within the species concepts of any known Florida species. At first, the author suspected a hybrid origin, perhaps between *J. polycephalus* and *J. megacephalus* M. A. Curtis. Both of these have been reported as growing intermixed in Florida (Godfrey & Wooten, 1979), and the uncovered specimens at first appeared to have some characters of each taxon. However, subsequent

collecting at numerous sites, coupled with detailed study of the variations present within populations, revealed unique characters not present in either of the above species.

***Juncus paludosus* E. L. Bridges & Orzell, sp. nov.**

TYPE: U.S.A. Florida: Highlands Co., moist, sandy stream banks & adjacent overflow ditch on S side of Morgan Hole Creek bridge at Kissimmee Rd., Avon Park Air Force Range, 15 May 2003, S. L. Orzell 26085 (holotype, USF; isotypes, BRIT, FLAS, FSU, GA, MO, NCU, NY, TEX, US). Figure 1.

Juncus megacephalus M. A. Curtis affinis, sed differt culmis 4–8 mm diam. plus quam 80–150 cm altis, foliis amplissimis 3–7(–8) mm diam., (24–)40–80(–108) cm longis, cataphyllis et vaginis foliorum caulinarum tepalisque pigmento roseo-purpureo carentibus, et inflorescentia ex capitulis plus quam 25 composita.

Robust perennial, from short, hard, knotty rhizomes, forming small clumps; culms erect, stiff, terete, 80–150 cm, 4–8 mm diam. near the base, smooth. Cataphylls 1 to 3, straw-colored to dark brown, apex rounded; basal leaves 1 or 2 per culm, cauline leaves 2 to 4 per culm; basal leaf sheaths reddish purple at base, noticeably expanded, with a central spherical septate zone and broad membranaceous margins, all other leaf sheaths and blades green; leaf blades terete, septae drying prominently nodose-septate; leaf sheath with a prominent membranaceous, short, auriculate ligule, 1–3 mm; largest leaves (24–)40–80(–108) cm, 3–7(–8) mm diam., straight, not arcuate. Inflorescence an erect to slightly spreading, terminal, many-branched cyme, from (10–)15–25 cm, primary branches usually ascending at angles of 25°–50°, with (15 to)25 to 55(to 80) heads per inflorescence. Heads 20- to 60-flowered, spherical, 8–12 mm diam., at maturity reddish brown or brown. Tepals 6, 3.0–4.0 mm, lanceolate-subulate, tapering to a stiff acuminate reddish brown tip,



Figure 1. *Juncus paludosus* E. L. Bridges & Orzell. —A. Base of plant. —B. Inflorescence. —C. Perianth and capsule. —D. Seed.

subequal, at anthesis with a green zone on each side of the pale midrib and a hyaline margin, becoming straw-colored to yellowish brown at maturity. Capsule lanceolate to subulate, light yellowish brown, 4–5 mm, tapering gradually to the long subulate beak, the beak exserted from the tepals at maturity, the valves remaining attached at the beak after dehiscence, capsule 1-locular, fertile throughout or only near the base; seeds ellipsoid to ovoid, 0.3–0.5 mm, finely reticulate, with prominent longitudinal ridges and much finer cross-striations, the seed body clear yellowish brown, abruptly tapered at each end to short dark brown tips, not tailed.

Distribution and habitat. *Juncus paludosus* occurs nearly throughout peninsular Florida south to Monroe

and Broward counties, north to Nassau County, and west near the coast to Franklin County in the eastern Florida Panhandle. It is common in forested wetlands (hardwood swamps, cypress swamps, and hydric hardwood-palm hammocks) and occasionally in roadside ditches and freshwater marshes adjacent to these habitats. While *J. paludosus* seems to favor seasonally flowing water and cypress-dominated strand swamps or sloughs, it is noticeably absent from still-water, cypress dome depressions. The lack of collections from the Florida Everglades region is likely explained by the absence of acidic forested wetlands, in contrast to the Big Cypress region of southwestern Florida, where such habitats are prevalent and *J. paludosus* has been collected. *Juncus paludosus* is apparently endemic to Florida. The authors have not seen or collected any specimens from outside of Florida, although it is expected in adjacent southeast Georgia.

IUCN Red List category. Our preliminary conservation assessment is based on the abundance, distribution, and habitat preference of *Juncus paludosus*. We recommend that *J. paludosus* be classified as a taxon of Least Concern (LC) as set forth in the IUCN Red List Categories and Criteria (IUCN, 2001). *Juncus paludosus* is widespread and is currently known from 29 Florida counties. It is often locally abundant and displays considerable habitat breadth, occurring in both natural and human-altered (roadside ditches, drainageways, etc.) wetlands.

Phenology. In south and south-central Florida, *Juncus paludosus* typically reaches anthesis from April to May between the winter dry season and the onset of the summer wet season. Mature capsules can be found from May to July, but fruiting is somewhat sensitive to changes in El Niño-Southern Oscillation (ENSO) since ENSO influences winter and spring rainfall in peninsular Florida (Beckage et al., 2003). During the La Niña phase of ENSO, the dry conditions make it more difficult to locate fruiting plants, and capsules may abort or fail to reach maturity.

Relationships. *Juncus paludosus*, a species of section *Ozophyllum* Dumortier, has flowers borne in heads and leaves that are terete and completely septate. It is therefore notable that many south Florida specimens (Austin et al., 1990; Huffman & Judd, 1998; Muss et al., 2003) have been previously identified as *J. polycephalus*. *Juncus polycephalus* is a member of section *Iridifolii* Snogerup & Kirschner, a group characterized by flattened leaves with incomplete septae. In general inflorescence morphology, *J. paludosus* does resemble *J. polycephalus*, and many floral and fruit characters are similar between the two species. However, *J. polycephalus* has laterally

flattened, slightly arcuate, incompletely septate leaf blades and lacks a membranaceous ligule at the apex of the leaf sheath. In contrast, *J. paludosus* has terete, stiff and straight, strongly completely septate leaf blades and a prominent 1–3 mm long membranaceous auriculate ligule. In fact, the leaf blades of *J. paludosus* are among the most strongly nodose-septate in the genus, with the septae evident on dried leaves as hardened, ring-like bands. In central Florida and northward, both species are known to occur, although there are very few specimens of *J. polycephalus* south of Gainesville, Florida. This is reflected in the distribution map in Brooks and Clemants (2000), with the dot in peninsular Florida representing a Polk County record.

Within section *Ozophyllum*, *Juncus paludosus* falls within a small group having many-flowered spherical heads, capsules exserted beyond the perianth, and seeds without membranaceous tails. This group consists of *J. validus* Coville, *J. nodatus* Coville, *J. scirpoides* Lamarck, and *J. megacephalus*. *Juncus validus* has leaves that are often laterally compressed (as in *J. polycephalus*) but with complete septae. It further differs from *J. paludosus* in its widely spreading, relatively few-headed inflorescence, lack of basal cataphylls, and capsules with valves usually separating at dehiscence. *Juncus nodatus*, a much smaller plant of northern and western North America, does not occur in Florida. *Juncus scirpoides* is a smaller plant than *J. paludosus*, with shorter leaves and a more compact inflorescence of fewer heads, which are usually lobed rather than spherical.

The remaining species in this group, *Juncus megacephalus*, is perhaps the closest to *J. paludosus* in overall morphology, but with many important differences. It is typically a smaller-statured plant, rarely to 1 m tall, with culms 3–4 mm wide, leaf blades less than 25 cm long, and rather compact inflorescences, usually with fewer than 20 heads. *Juncus megacephalus* is suffused with more reddish purple pigment than *J. paludosus*, particularly in the cataphylls, leaf sheaths, and tepals. Live material of *J. megacephalus* is easily recognized by its deep wine-red lower leaf sheaths and cataphylls, the bluish cast of the culms and leaf blades, and dark reddish black flowering heads. In contrast, the prominent hues in *J. paludosus* are yellowish green and stramineous to light brown, with little reddish purple pigment.

Paratypes. U.S.A. **Florida:** Brevard Co., 27 Jan. 1992, Grey s.n. (USF), open roadside, US 192, 12 mi. W of Melbourne, Baltzell 8053 (FLAS); Broward Co., Hwy. 441 W of Deerfield Beach, Atwater #GS-42 (FLAS); Charlotte Co., dry cypress swamp, 7 May 1947, Frye s.n. (FLAS); Citrus Co., Withlacoochee River, Hartman 72A (FLAS), Woodward Park

Inlet, Kings Bay, Crystal River, Hartman 42 (FLAS); Collier Co., trailside swamp, Big Cypress, W of FL 29, Lakela & Almeda 29960 (USF), Scenic Dr., vic. Fakahatchee, Lakela & Almeda 30007, 30740 (USF), Everglades, along Rte. 94, 21 Apr. 1936, McDaniel s.n. (FSU), cypress swamp, bridge 121, 6 Apr. 1942, Davis s.n. (FLAS), ditch beside Janes Hwy., Fakahatchee Strand, Avery & Churchill 2058 (FLAS), swamp forest E of Janes Mem. Scenic Dr., Fakahatchee Strand St. Pres., Bridges 23510 (BRIT, FLAS, FSU, GA, NCU, NY, USF), 23511 (FLAS, USF); Dixie Co., 15 mi. NW of Cross City, Kral & Redfearn 2677 (FSU); Duval Co., Jacksonville, Curtiss 2981 (FLAS); Franklin Co., Apalachicola River, NW of Apalachicola, Kral & Redfearn 2741 (FSU); Gilchrist Co., 4 mi. E of Trenton, 5 Oct. 1940, West & Arnold s.n. (FLAS); Hendry Co., Big Cypress Indian Reservation, 8 May 1961, Jennings s.n. (FLAS); Highlands Co., natural drainage E side of Morgan Hole Rd., Avon Park Air Force Range (hereafter APAFR), Orzell 25278 (BRIT, FLAS, FSU, GA, NCU, NY, USF), Orzell 25280 (BRIT, FLAS, FSU, GA, NCU, NY, USF), N side of Morgan Hole Creek bridge, APAFR, Orzell 25281 (BRIT, FLAS, FSU, GA, NCU, NY, USF); Hillsborough Co., N of Tampa, Crews 1590, 1600 (USF), along Morris Bridge Rd., Burch 6827 (USF), Morris bridge wellfield, 29 May 1985, Lopez s.n. (USF), bank of Cypress Creek, Lakela 26057 (USF); Jefferson Co., ca. 4 mi. E of Newport, Godfrey 75147 (FSU); Lee Co., swamp edges W of headwaters of Halfway Creek, ca. 1 air mi. NE of Coconut on Estero Bay, Orzell & Bridges 19385 (FLAS, USF); Levy Co., both sides of FL 24 at E end of Waccasassa River bridge, Cochran 8883 (USF), N side of rd., Otter Creek, Gunter & Horsburgh 45 (FLAS), 6 mi. W of Otter Creek, Dunevitz 38 (FLAS); Manatee Co., along FL 70, 6 mi. E of the Braden River, 12 Mar. 1969, Burgis s.n. (FLAS); Monroe Co., FL Rte. 94, SE of Monroe Station, Godfrey, Ward & Burch 63552 (FLAS, FSU); Nassau Co., vic. of O'Neil, Godfrey 64113 (FSU); Orange Co., ca. 2.5 mi. N of FL 50 at Christmas, Orlando Wild. Park, Orzell & Bridges 21681 (FLAS, FSU, USF), Tosohatchee St. Reserve, Bridges 24520 (BRIT, FLAS, FSU, GA, NCU, NY, US, USF); Osceola Co., along US 192, 13.4 mi. SE of Holopaw, Baltzell 8055 (FLAS), Crabgrass Creek, Bull Creek WMA, Hall 567 (FLAS); Pasco Co., pond S of SR 54, Genelle & Fleming 99 (USF), 9 June 1961, Riegler s.n. (USF); Pinellas Co., Brooker Creek Preserve, Hansen, Wunderlin & Douris 12081 (USF); Polk Co., Hard Luck Hammock, APAFR, Lindsey & Upchurch 778 (USF), N of Tick Island, APAFR, Orzell 23713 (USF), Tick Island Slough, APAFR, Orzell 25285 (FLAS, FSU, USF), SE of sewage disposal plant, APAFR, Orzell 25287 (BRIT, FLAS, FSU, GA, NCU, NY, US, USF), 12 mi. NNW of Lakeland, Kral 7282 (FLAS, FSU, USF); Putnam Co., Sweetwater Creek, Martin & Cooper 624 (FLAS, FSU); Seminole Co., near Little Wekiva River, 2 mi. W of Altamonte Springs, Baltzell 3924 (FLAS), Wekiva River at FL 46, Myint 941 (FLAS); Sumter Co., 0.5 mi. W of Tarrytown, Kral 6860 (FLAS, FSU, USF); Taylor Co., 4 mi. S of Salem, Kral & Redfearn 2683 (FSU); Volusia Co., E side of Rte. 3, 24 May 1975, Poppleton & Shuey s.n. (USF), Maytown Rd., 1.9 mi. W of Cow Creek, Robinson & Hansen 189 (USF); Wakulla Co., ca. 5.5 mi. WSW of Newport US 98 at bridge across Wakulla River, Hansen & Richardson 5865 (USF), along US Hwy. 98, 1 mi. E of Newport, Wiggins 20034 (FLAS).

The following key (modified from Brooks & Clemants, 2000) distinguishes *Juncus paludosus* from other members of section *Ozophyllum* (subgenus *Septati* Buchenau, as used in Brooks & Clemants,

2000) with three stamens, flowers borne in more or less spherical heads of usually more than 15 flowers, and without tailed seeds. This key should be inserted at couplet 16 in Brooks and Clemants (2000: 241). Of

the species included in this key, only *J. acuminatus* Michaux, *J. scirpoides*, *J. megacephalus*, and *J. validus* var. *validus* are found within any part of the known range of *J. paludosus*.

SUPPLEMENTAL KEY TO PART OF *JUNCUS* SECTION *OZOPHYLLUM* (SUBGENUS *SEPTATI*, SENSU BROOKS & CLEMANTS, 2000) IN NORTH AMERICA

- 1a. Plants strictly caespitose, without any short, hard, knotty rhizomes; tepals lanceolate *J. acuminatus* Michaux
- 1b. Plants with at least some short, hard, knotty rhizomes, but sometimes appearing nearly caespitose due to very short rhizome internodes; tepals lanceolate-subulate. 2
- 2a. Capsules shorter than the tepals, and clearly included within the tepals at maturity. . . *J. brachycarpus* Engelman
- 2b. Capsules equaling or exceeding the tepals, exerted from or only slightly included within the tepals at maturity . . . 3
- 3a. Capsule valves remaining united at the apex after dehiscence 4
- 4a. Leaves laterally compressed; heads 6- to 15-flowered *J. validus* var. *fasciatus* M. C. Johnston
- 4b. Leaves strictly terete; heads 20- to 60-flowered 5
- 5a. Culms 4–8 mm in diam. near the base, usually more than 80 cm tall; inflorescence usually more than 15 cm tall, with more than 25 heads; largest leaf blades more than 25 cm long and 3 mm in diam. *J. paludosus* E. L. Bridges & Orzell
- 5b. Culms 1–3 mm in diam. near the base, usually less than 80 cm tall; inflorescence usually less than 10 cm tall, with less than 25 heads; largest leaf blades less than 25 cm long and 1–2 mm in diam. 6
- 6a. Heads usually at least somewhat lobed; tepals green to straw-colored, nearly equal in length; basal leaf sheaths and cataphylls straw-colored to brown *J. scirpoides* Lamarck
- 6b. Heads strictly spherical; tepals \pm reddish brown to purplish, the inner tepals somewhat shorter than the outer; basal leaf sheaths and cataphylls deep reddish purple
. *J. megacephalus* M. A. Curtis
- 3b. Capsule valves separating at the apex during dehiscence 7
- 7a. Tepals 4–5 mm long; leaves laterally compressed. *J. validus* Coville var. *validus*
- 7b. Tepals 2.9–4.0 mm long; leaves terete 8
- 8a. Capsules 3.5–5.0 mm long, exerted; culms 0.4–3 dm tall. *J. nodosus* L.
- 8b. Capsules 3.0–3.5 mm long, equaling perianth or slightly included; culms 2.5–8.5 dm tall . . .
. *J. bolanderi* Engelman

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