
Two New Species of *Rhynchospora* sect. *Tenues* (Cyperaceae) from the Guianas, South America

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ABSTRACT. Two new species are described (*R. cordatachenia* and *R. saxisavannicola*) in *Rhynchospora* sect. *Tenues* Kükenthal from northeastern South America (Guianas). A key to the species of *R.* sect. *Tenues* in the Guianas is given, and illustrations are provided for the new species.

Key words: Cyperaceae, French Guiana, Guianas, *Rhynchospora* sect. *Tenues*, South America, Surinam.

Rhynchospora Vahl nom. cons. is a genus of approximately 270 species (Strong, 2004). It is most diverse in the Western Hemisphere, particularly warm-temperate North America and the Neotropics. Eighty taxa (including infraspecific taxa and the two novelties described here) are currently known from the Guianas (Guyana, Surinam, and French Guiana) (Strong, 2001, 2004).

Of the 18 sections of *Rhynchospora* occurring in the Guianas (Strong, 2004), *R.* sect. *Tenues* Kükenthal is the best represented with 14 species and 1 infraspecific taxon. This high number of taxa reflects the center of diversity and speciation of *Rhynchospora* sect. *Tenues* in savanna ecosystems of northern South America, where there are likely many more species still awaiting discovery. *Rhynchospora* sect. *Tenues* is primarily Neotropical in distribution, but has representatives in tropical Africa, Madagascar, and one species in southeast Asia, *R. gracillima* Thwaites. In the Neotropics, species range from the West Indies and Mexico, south through Central America and northern South America to southern Brazil and northern Argentina. Thomas (1998) treated 16 taxa (including several unknowns) for the Venezuelan highland region of South America. Eleven taxa were treated (including 2 newly described) by Rocha and Luceño (2002) in a treatment of *R.* sect. *Tenues* for Brazil.

In habit, species of *Rhynchospora* sect. *Tenues* can be characterized as low annuals or perennials, less than 0.5 m tall, primarily of sandy savanna and grassland habitats. They typically have linear or subterete, often involute leaf blades; an inflorescence composed of a terminal and 1 or 2 corym-

bose, open or contracted, partial panicles from the upper bracts; a 2-branched style; and an achene that is transversely rugose or rugulose with vertically oriented linear cells that have finely sinuous walls, a 2-lobed style base, and bristles wanting. Achenes of some species have cells with strongly convex or swollen periclinal walls at their base characteristic of *Rhynchospora* sect. *Spermodontes* Kükenthal, which can be characterized by the two lateral margins of the achene that are generally prolonged and cusp-like at their apices. Two species that Kükenthal (1949, 1950) placed in section *Spermodontes* (*R. fallax* Uittien and *R. tenerrima* Nees ex Sprengel) are particularly characteristic of species in section *Tenues*. They have the linear, vertically oriented epidermal cells and transversely rugulose surface typical of that section. However, the two species exhibit the cusp-like margins of the achene apex characteristic of section *Spermodontes* and the style base is low and often obtusely triangular, sometimes decurrent on the upturned cusp-like margins. Style bases of *Rhynchospora* sect. *Tenues* are generally 2-lobed at base with lobes that extend along the shoulders of the achene apex. However, in some species the lobes are indistinct, e.g., *R. spruceana* C. B. Clarke and *R. albida* (Nees) Böckeler, or unlobed altogether as in *R. caracasana* (Kunth) Böckeler, *R. hirsuta* (Vahl) Vahl, and *R. tenella* (Nees) Böckeler.

The glossy and transversely rugulose achene surface seen in *Rhynchospora* sect. *Tenues* and other *Rhynchospora* species may help protect the embryo and surrounding tissues from lethal temperatures brought by full sunlight in open habitats such as tropical savannas and grasslands. Like lighter surfaces of objects that reflect sunlight and are internally cooler, glossy epicuticular waxes on the achene surface increase reflection of incoming radiation and aid in regulating internal temperature (Eller, 1979). The surface sculpturing of a seed increases its surface area up to 10 times. The surface irregularity may increase energy exchange with the surrounding cooler air and may increase thermodynamic ex-

change by causing turbulence in laminar air flow around the seed surface (Barthlott, 1981).

KEY TO THE SPECIES OF *RYNCHOSPORA* SECT. *TENUES* IN THE GUIANAS

- 1. Achene body appearing essentially smooth, at most faintly transversely rugulose 2
- 1'. Achene body distinctly transversely rugulose, rugose, or pitted-reticulate 3
- 2(1). Achene body thickly biconvex, tumid, broadly obovate to subrounded, abruptly narrowed to short-stipitate base; style base triangular, blunt at apex; sheaths becoming fibrillose, the base of plant clothed with rusty brown fibers; plant of upland savanna or shrub savanna habitats *R. caracasana* (Kunth) Böckeler
- 2'. Achene body thinly biconvex, not tumid, narrowly obovate, rounded-cuneate at base, estipitate; style base triangular with acute to short-acuminate apex; sheaths not fibrillose; plant of high-elevation tepui habitats *R. roraimae* Kükenthal
- 3(1). Achene body with two oval to rounded protuberances on either side of the base, appearing as though there is a style base on both ends *R. riparia* (Nees) Böckeler
- 3'. Achene body lacking protuberances at base 4
- 4(3). Leaf blades and sheaths uniformly pubescent *R. hirsuta* (Vahl) Vahl
- 4'. Leaf blades and sheaths glabrous, at most leaf blades ciliate on margins and midveins 5
- 5(4). Spikelets 1.5–2 mm long; style base forming 2 strap-like lobes proximally, which are decurrent on shoulders of achene body to about the middle, abruptly contracted distally into a short triangular-lanceolate tip *R. contracta* (Nees) Raynal
- 5'. Spikelets 2.5–11 mm long; style base not strap-like proximally, trigonous, depressed-trigonous, cap-like, or subdiscoid, not abruptly contracted distally except for *R. saxisavannicola* 6
- 6(5). Spikelets 6–11 mm long 7
- 6'. Spikelets 2.5–5.5 mm long 8
- 7(6). Achene asymmetrically biconvex, thicker near apex, obovate to narrowly obovate, widest at apex, estipitate at base; style base depressed-triangular, entire or scarcely 2-lobed *R. spruceana* C. B. Clarke
- 7'. Achene biconvex, turgid medially, transversely oblong or quadrate, widest at middle, with short-stipitate base; style base triangular, 2-lobed or shallowly 2-lobed *R. emaciata* (Nees) Böckeler
- 8(6). Spikelet scales dark brown on sides; achenes broadly biconvex to nearly globular; style base depressed-trigonous or narrowly discoid, not lobed basally, elliptic as seen from above *R. tenella* (Nees) Böckeler
- 8'. Spikelet scales light brown to stramineous or whitened; achenes biconvex, obovate, obpyriform, subrounded, oblate, or widely transversely oblong (squarish); style base often 2-lobed basally 9
- 9(8). Achene cordate or rounded-cordate at base; style base narrowly triangular-lanceolate with

- a flaring, 2-lobed base (shaped like a witch's hat) *R. cordatachenia* M. T. Strong
- 9'. Achenes narrowed or subrounded at base; style base triangular or depressed-triangular 10
- 10(9). Achenes subrounded, oblate, widely transversely oblong, or quadrate, narrowed abruptly to a stipitate base, often with a longitudinal dark gray band or patch medially on each side 11
- 10'. Achenes obovate, obpyriform, or subrounded, gradually narrowed to base, brown, pale brown, or flecked with gray 12
- 11(10). Achenes rounded to oblate; style base triangular, shallowly and shortly 2-lobed, 0.1–0.2 mm wide at base . . . *R. junciformis* (Kunth) Böckeler
- 11'. Achenes transversely oblong or quadrate; style base depressed-trigonous, broadly 2-lobed, 0.6–0.9 mm wide at base . . . *R. emaciata* (Nees) Böckeler
- 12(10). Achene narrowly obovate, coarsely rugose with 5 to 6 rugae per face *R. sanariapensis* Steyermark
- 12'. Achene obovate or elliptic, rugulose with 7 to 12 rugae per face 13
- 13(12). Roots often golden yellow; scales stramineous to whitened; achene obpyriform, cuneate at base, short-stipitate; style base cap-like, indistinctly 2-lobed, the lobes not extending along shoulders of achene body *R. albida* (Nees) Böckeler
- 13'. Roots brown; scales light brown; achene obovate, broadly obovate, broadly elliptic, or subrounded, estipitate; style base distinctly 2-lobed, the lobes extending along shoulders of achene body 14
- 14(13). Spikelet rachilla strongly flexuose at maturity; achenes 0.5–0.7 mm wide; base of style base 0.2–0.3 mm wide; only known from French Guiana and Surinam in rock savanna and seeps on granitic outcrops (inselbergs) *R. saxisavannicola* M. T. Strong
- 14'. Spikelet rachilla not strongly flexuose; achenes 0.8–1 mm wide; base of style base 0.5–0.7 mm wide; wide-ranging savanna species 15
- 15(14). Corymb rays elongate; spikelets straight or nearly so, 4–5 mm long; anthers 2–3 mm long; achenes obovate, 1–1.4 mm long *R. tenuis* Willdenow ex Link subsp. *tenuis*
- 15'. Corymb rays short; spikelets falcate, 2–4 mm long; anthers 0.8–1 mm long; achenes subrounded-obovate, 0.6–0.9 mm long *R. tenuis* subsp. *austrorabasiensis* T. Koyama

In preparing *Rhynchospora* for the *Flora of the Guianas*, I noted two novelties, which are here described and validated.

***Rhynchospora cordatachenia* M. T. Strong, sp. nov.** TYPE: French Guiana. Environs de Cayenne, Savane du Gallion, 9 Sep. 1979, A. Raynal-Roques 21566A (holotype, US-3464701) [originally mixed with *Rhynchospora tenerima* Nees ex Sprengel; distributed as *A. Raynal-Roques* 21566]. Figure 1.

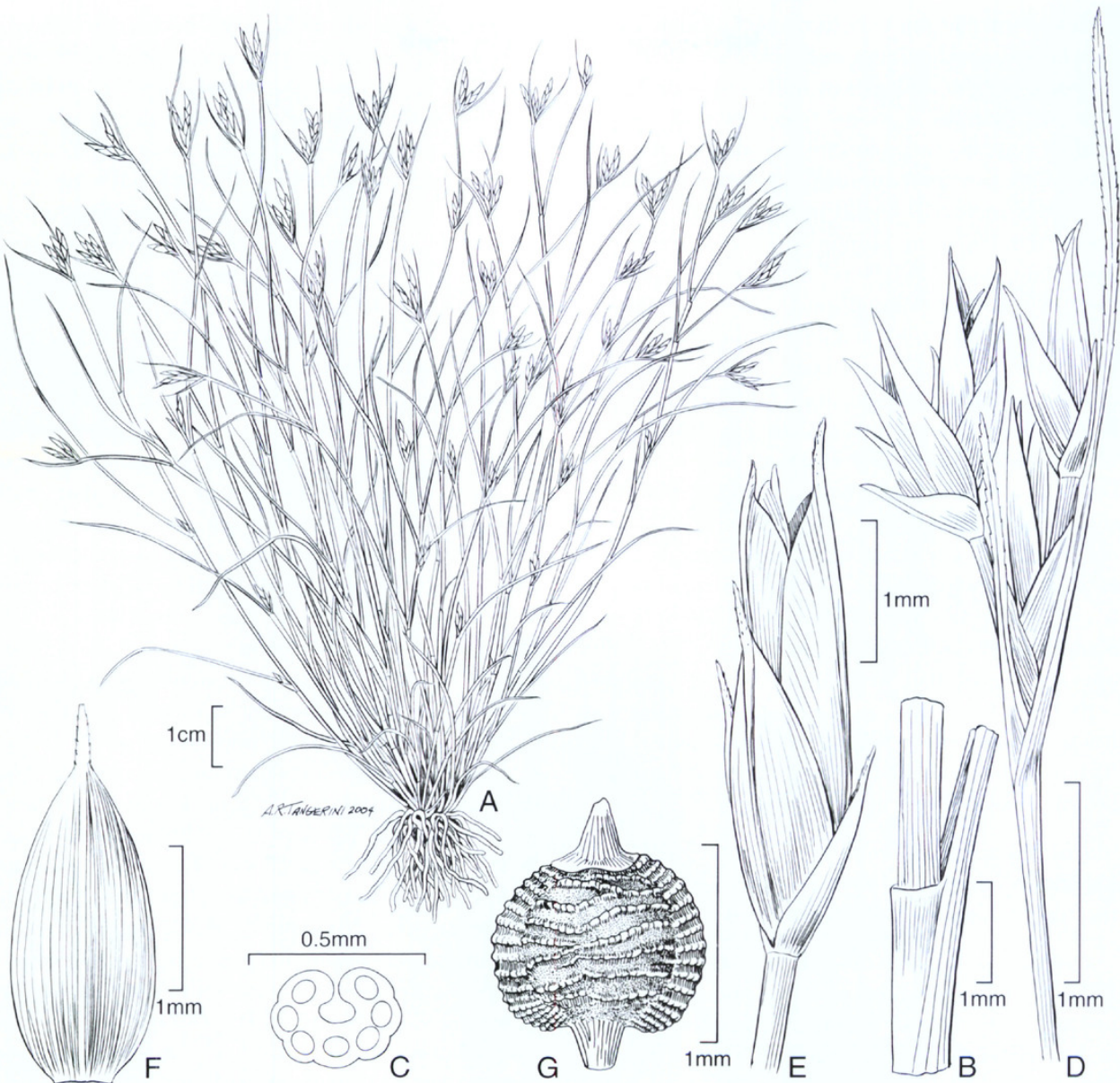


Figure 1. *Rhynchospora cordatachenia* M. T. Strong. —A. Habit. —B. Detail of junction of sheath and leaf blade. —C. Cross section of leaf blade. —D. Detail of inflorescence. —E. Spikelet. —F. Spikelet scale. —G. Achene. Drawn from the holotype, A. Raynal-Roques 21566A (US).

A ceteris speciebus sectionis *Tenuium*, achenio ad basin cordato, rostro simili petaso venificae ad basin dilatato differt.

Caespitose perennial, 7–13 cm tall; rhizome short; roots fine, light brown; culms spreading-ascending, 0.3–0.6 mm wide, filiform, obtusely trigonous to terete or nearly so, soft, flexuous, finely ribbed, pale green to stramineous, glabrous. Leaves 1 to 3 per culm, ascending, basal and lower cauline, 0.1–10 cm long; sheaths short, closely clasping culm, ligulate with a narrow band of tissue present at adaxial junction of sheath and blade, herbaceous, finely ribbed, light brown to stramineous distally, glabrous, the inner band membranous, truncate at apex, brown, tinged with red; blades filiform, 0.2–

0.4 mm wide, involute to crescentiform-capillary, herbaceous, cellular-reticulate adaxially, finely veined abaxially, green, glabrous, margins smooth proximally, antrorsely scabrous toward apex, attenuate to subflattened tip. Inflorescence a terminal and 1 or 2 lateral corymbose partial panicles from the upper bracts, the terminal panicle 4–9 × 2–5 mm, with 3 to 6 spikelets; bracts leaf-like, 1–7 cm long, the axillary one elongate and often exceeding subtending panicle; branches short, very slender and filiform, flattened-trigonous or subterete in cross section; spikelets slenderly ellipsoid-lanceoloid, 3–4 × 0.6–1 mm, straight, acuminate to apex, narrowly cuneate at base; rachilla strongly flexuose at maturity; scales dorsally obtuse to rounded, herbaceous, distal

scales of spikelet thinly herbaceous to submembranous, brown, proximal and medial scales thickly herbaceous, smooth and glossy, uniformly pale brown, glabrous, margins scarious, midcosta very fine, indistinct proximally, prolonged beyond the obtuse to acute apex as a short antrorsely scabrous awn, which is slightly recurved, lateral nerves indistinct; fertile scales 5 to 6, ovate-elliptic to ovate-lanceolate or lanceolate, $2\text{--}2.7 \times 0.9\text{--}1.2$ mm; sterile scales 2 at base of spikelet, ovate-elliptic, $1.2\text{--}1.5 \times 0.5\text{--}0.8$ mm. Flowers bisexual; stamens 1, the anthers $0.6\text{--}0.8$ mm long, apiculate at apex, minutely papillose at base, basifixed, thecae parallel, longitudinally dehiscent; style 2-branched, equaling to $2/3$ length of unbranched portion, long-exserted from subtending scale. Achene unequally biconvex, ovate-rounded or somewhat ovate-quadrate, $0.8\text{--}0.9 \times 0.7\text{--}0.8$ mm, obtuse to subtruncate at apex, cordate to slightly so at base, narrowly stipitate, transversely rugulose with 6 to 7 rugae per face, narrowly cellular-reticulate along margins and at base, shiny with a crystalline appearance, whitish tinged with brown; epidermal cells linear, vertically oriented; style base narrowly triangular-lanceolate with a flaring, 2-lobed base, flattened, $0.4 \times 0.3\text{--}0.4$ mm, attenuate to apex, brown to dark brown; bristles absent.

Distribution and habitat. Endemic to French Guiana in coastal plain savanna. Known only from the type collection (see citation above).

Distinguishing features. Among the species of *Rhynchospora* sect. *Tenuis*, *R. cordatachenia* is unique in having an achene with a cordate base and a style base that is narrowly triangular-lanceolate with a flaring, 2-lobed base (shaped like a witch's hat).

Rhynchospora saxisavannicola M. T. Strong, sp. nov. TYPE: French Guiana. Mont Saint-Marcel, zone sud-est du massif, mares gravillonnaires de savane-roche, 300 m, $02^{\circ}23'00''\text{N}$, $53^{\circ}00'20''\text{W}$, 18 July 2002, J. J. DeGranville, L. Alier & C. Sarthou 15283 (holotype, US-3451946; isotypes, CAY, NY, P). Figure 2.

A ceteris speciebus sectionis *Tenuium*, achenio late elliptico, rostro non profunde triangulari ad apicem abrupte brevi-attenuato differt.

Caespitose perennial, 3–10 cm long; rhizome short; roots fine, light brown; culms erect, $0.2\text{--}0.5$ mm wide, filiform, flattened-trigonal or subterete, soft, flexuous, finely ribbed, pale green, glabrous. Leaves 1 to 3, ascending, primarily basal, 2–5 cm long; sheaths short, closely clasping culm, ligulate with a narrow band of tissue present at adaxial

junction of sheath and blade, herbaceous, finely ribbed, pale brown to stramineous proximally, glabrous, the inner band membranous distally on basal sheaths, herbaceous on upper cauline sheaths except for membranous orifice, truncate at apex; blades compressed-filiform, $0.2\text{--}0.3$ mm wide, herbaceous, finely veined, glabrous, the apex often curving. Inflorescence 1 to 3 corymbose, lax, partial panicles from the upper bracts, the terminal panicle $5\text{--}10 \times 3\text{--}15$ mm, with 1 to 5 spikelets; bracts leaf-like, to 3 cm long; branches very slender and filiform, flattened-trigonal or subterete in cross section; spikelets slenderly ovoid-lanceoloid, $3\text{--}4.5 \times 0.5\text{--}0.9$ mm, straight, acuminate to attenuate at apex, cuneate at base; rachilla strongly flexuose at maturity; scales dorsally obtuse to rounded, herbaceous, distal scales of spikelet thinly herbaceous to submembranous, minutely cellular-striate, semiglossy, reddish brown with slightly darker brown lineations, glabrous, margins narrowly scarious, midcosta very fine, indistinct except at apex, prolonged beyond the narrowly acute to acuminate apex as a short antrorsely scabrous awn that is slightly recurved, lateral nerves indistinct; fertile scales 3 to 4, ovate-lanceolate to lanceolate, $2\text{--}3 \times 0.9\text{--}1.3$ mm; sterile scales 2 or 3 at base of spikelet, ovate-elliptic, $1\text{--}2 \times 0.3\text{--}1.2$ mm. Flowers bisexual; stamens 3, the anthers ca. 1 mm long, apiculate at apex, basifixed, thecae parallel, longitudinally dehiscent; style 2-branched, equaling to $2/3$ length of unbranched portion, long-exserted from subtending scale. Achene biconvex, elliptic to broadly so or subrounded, $0.6\text{--}0.8 \times 0.5\text{--}0.7$ mm, rounded at apex, obtuse at base, transversely rugulose with 5 or 6 rugae per face, narrowly cellular-reticulate along margins and at base, shining, glossy, stramineous to brown, often with a longitudinal gray stripe medially; epidermal cells linear, vertically oriented; style base shallowly triangular, $0.1 \times 0.2\text{--}0.3$ mm, abruptly short-attenuate at apex, shallowly 2-lobed at base, or indistinctly so, the ends of the lobes often slightly upturned, brown or blackish; bristles absent.

Distribution and habitat. French Guiana and Surinam. Seeps and pools in savane-roche (rock savanna) and granitic outcrops, 280–450 m.

Distinguishing features. Among the species of *Rhynchospora* sect. *Tenuis*, *R. saxisavannicola* can be distinguished by the combination of a strongly flexuose spikelet rachilla, elliptic to broadly elliptic achene body, and shallowly triangular, abruptly short-attenuate style base.

Paratypes. SURINAM. Sipaliwini Savanna area on Brazilian frontier, in valley on saddle betw. two "4-Gebroeders" mtn. tops, in trickling zone at edge of sloping

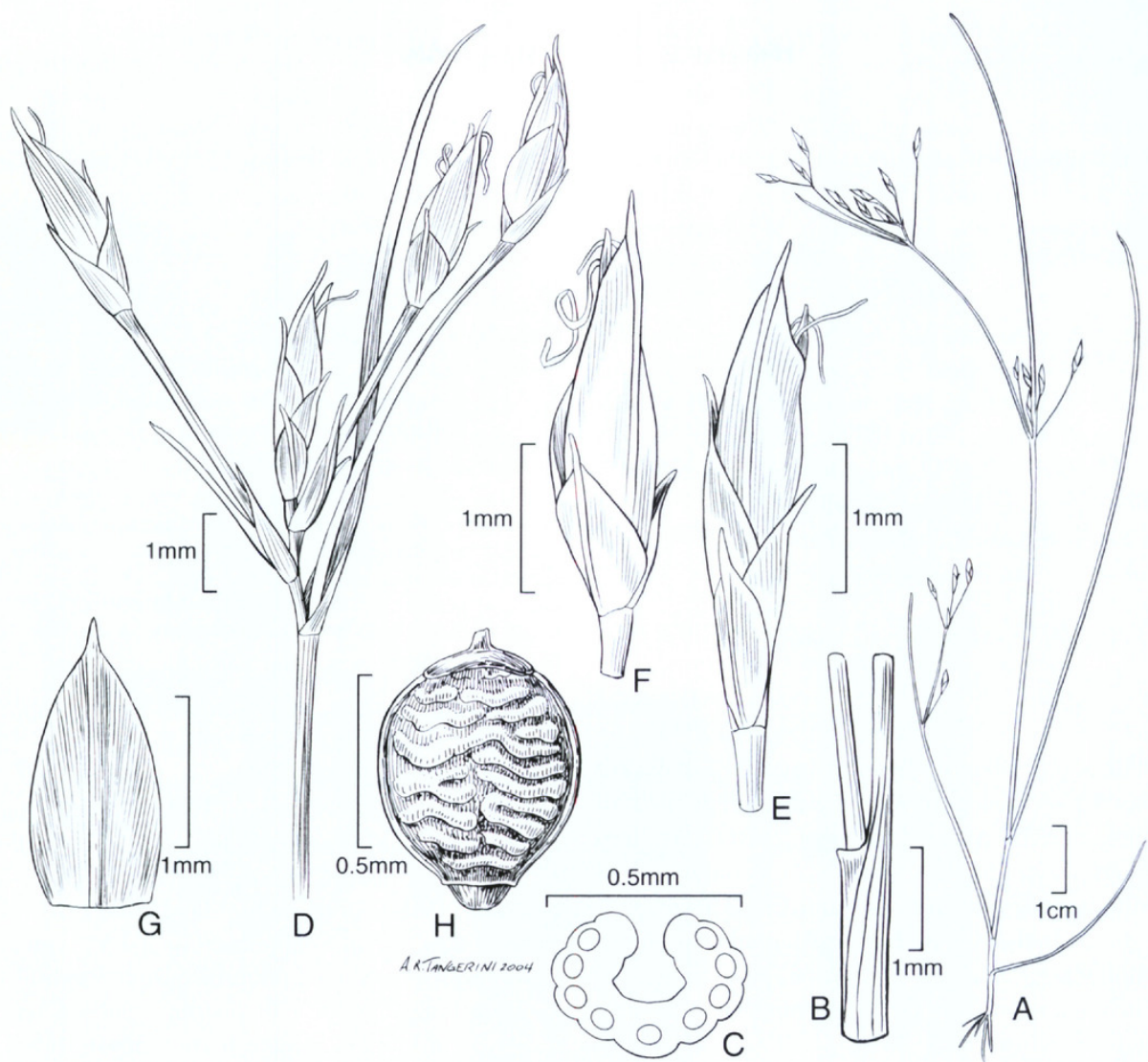


Figure 2. *Rhynchospora saxisavannicola* M. T. Strong. —A. Habit. —B. Detail of junction of sheath and leaf blade. —C. Cross section of leaf blade. —D. Detail of inflorescence. —E, F. Spikelets. —G. Spikelet scale. —H. Achene. Drawn from the holotype, J. J. DeGranville, L. Alier & C. Sarthou 15283 (US).

granitic outcrop, 450 m, 10 Oct. 1968, F. H. F. Oldenburger, R. Norde & J. P. Schulz 254 (U); Sipaliwini Savanna area on Brazilian frontier, 280 m, 24 Jan. 1969, F. H. F. Oldenburger, R. Norde & J. P. Schulz 986 (U).

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