
A Revised Taxonomy for Two North American *Rhynchospora* (Cyperaceae) and for Two North American *Xyris* (Xyridaceae)

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ABSTRACT. Changes in taxonomic rank are proposed for two North American *Rhynchospora* (Cyperaceae) and for two *Xyris* (Xyridaceae): *Rhynchospora recognita* (Gale) Kral, *Rhynchospora harveyi* W. Boott var. *culixa* (Gale) Kral, *Xyris laxifolia* Martius var. *iridifolia* (Chapman) Kral, and *Xyris stricta* Chapman var. *obscura* Kral. The morphologic basis for such changes is given.

In the process of preparing treatments of *Rhynchospora* (Cyperaceae) and Xyridaceae for the *Flora of North America*, and for the sake of a consistent taxonomy in both, the following efforts are made.

1. *Rhynchospora recognita* (Gale) Kral, stat. nov. *Rhynchospora globularis* (Chapman) Small var. *recognita* Gale, *Rhodora* 46: 245. 1944. TYPE: U.S.A. Virginia: Sussex Co., dry pine-lands, 4 mi. NW of Waverley, 26 July 1936, *Fernald & Long 6070* (holotype, GH; isotype, PH).

Whatever its name or rank, *Rhynchospora recognita*, as proposed herein, had, from the time of Muhlenberg and Elliott to the Gale and Fernald revisions, been thought to be *R. cymosa*. As carefully pointed out by Gale (1944), the specific epithet "cymosa," based on *Schoenus cymosus* Willdenow (actually a specimen of *Scirpus polyphyllus* Vahl), had been consistently misapplied by authors since Elliott (1821), who used it for the already published *R. glomerata* (L.) Vahl. Thus, it was Gale's decision to solve the problem by utilizing Small's (1933) *R. globularis* (Chapman) Small, itself based on Chapman's description of *R. cymosa* var. *globularis* Chapman (1860: 525). This, in Gale's treatment and in others since, is the shorter, more slender plant that provides a working concept for typical *R. globularis*. Gale also then assigned a new name, "recognita," to the larger, coarser plant previously (and erroneously) named *R. cymosa*, making it a variety of *R. globularis* along with the southeastern U.S. and West Indian plant formerly called *R. pinetorum* Britton & Small. Kükenthal (1950) in his revision of *R. sect. Globulares* adopted the es-

entials of Gale's treatment of *Rhynchospora globularis* varieties, simply adding two more to the list, with *R. obliterated* Gale and *R. saxicola* Small thus becoming *R. globularis* var. *obliterated* (Gale) Kükenthal and *R. globularis* var. *saxicola* (Small) Kükenthal.

After many years of field and herbarium experience with this complex of *Rhynchospora*, and after recent examination of many large loans, I have continued to note that Gale's variety *recognita* is actually a species distinct from *R. globularis* and its varieties. Authors such as Muhlenberg, Torrey, Gray, Chapman, and Small were well aware of it as a species even if they did not realize what the correct name for it was. Also, thanks to Gale and Kükenthal, we have a better idea of what the real *R. globularis* is.

I have: (1) in Table 1 prepared a list of several character states by which *Rhynchospora recognita* is compared with *R. globularis* and its varieties; (2) illustrated an example of *R. recognita* (Fig. 1) and *R. globularis* together with fruits of its varieties (Fig. 2); and (3) shown the eastern North American mapped distributions for the species and varieties in Figure 3A–D (*R. recognita*, *R. globularis* var. *globularis*, *R. globularis* var. *pinetorum*, and *R. globularis* var. *saxicola*, respectively).

From Table 1, it can be seen that *Rhynchospora recognita* is the more robust, taller, stiffer plant, with bracts and bractlets more exerted, with rusted spikelets mostly longer, and with longer fruits than is true for *R. globularis* and its varieties. From the maps in Figure 3 it can be seen that *R. recognita* has the widest range, and that the *R. globularis* varieties are largely nested within it. The maps in Figure 3 do not show total distributions: *R. recognita* and *R. globularis* var. *globularis* have populations in northern California, and the former is well represented in the West Indies, Mexico, and Mesoamerica; *R. globularis* var. *pinetorum* extends south from Florida into the Antilles. However, the area of greatest sympatry is within the Coastal Plain of the eastern U.S., particularly in moist sandy peats or sandy clays of flatwoods, savanna, ditches,

Table 1. Comparison of 11 character states in *Rhynchospora recognita* and *R. globularis*.

	<i>Rhynchospora recognita</i>	<i>Rhynchospora globularis</i> and vars.
Habit	perennial, culms stiff, erect, 6–10 dm	perennial, culms slender, lax to stiff, erect to excurved or spreading, (1–) 2–6(–8) dm
Leaves	blades 2–5 mm wide	blades 1–3 mm wide
Inflorescence compounds, spikelet clusters	compounds of clusters (fascicles) (1–) 2–4(–5), the terminal and the lateral exceeded by subtending bract; spikelet clusters (fascicles) dense, exceeded by involucre bractlets giving them a “bristly” look	compounds of clusters (fascicles) (1–) 2–3(–4), the terminal compound usually exceeding the subtending bract; spikelet clusters of fewer spikelets, arranged in more diffuse compounds, exceeding their subtending bractlets, thus lacking a “bristly” look
Spikelets	ovoid to narrowly ovoid, 3–4 mm, acute to acuminate, red-brown	ovoid to subglobose, 2.5–3(–4) mm, broadly acute to obtuse, brown to deep brown
Fertile scales	ovate, 2.5–3 mm, convex, acute to obtuse or emarginate, midcosta often excurrent as cusp or arista	broadly ovate to orbicular, 1.7–2.3 mm, deeply convex, obtuse to rounded or emarginate, midcosta mostly included, sometimes excurrent as apiculus
Stamens, anthers	2–3, 2 mm	1–3, 1.5(–2) mm
Fruit	body obovoid-lenticular, tumid	body broadly obovoid-lenticular to sub-orbicular-lenticular, tumid
Fruit length (including tubercle)	2–2.3 mm	1.5–2 mm
Tubercle	compressed-conic, (0.4–)0.5–0.6(–0.8) mm	depressed-conic to almost patelliform, never exceeding 0.5 mm
Sculpture of fruit body	transverse rows of vertical, narrowly rectangular cancellae, contiguous endwalls producing sharp, wavy transverse rugosity	transverse rows of vertical, narrowly rectangular cancellae, contiguous endwalls producing sharp, wavy, transverse rugosity, or merely isodiametrically reticulate-cancellate
Perianth	bristles usually 6, extending to fruit midbody	bristles usually 6, various lengths

and shorelines. All of these particular species and varieties are aggressively weedy and are quick to invade timbered lowlands, areas that have undergone mechanical or fire disturbance, low areas in abandoned fields, and sandy shores of artificial impoundments. It is not rare to see a majority of these taxa mingling in the same site; in fact, I have collected all of them together on and around outcroppings of the Altamaha Grit in southern Georgia pinelands. In such cases there are no evidences of intergradation, and *R. recognita*, taller and more robust, puts its bristly-looking rusty spikelet clusters at a level well above the lower, more lax and spreading culms of darker-spikeleted *R. globularis*.

Since the type chosen by Gale is represented by only two specimens, I have distributed two representative sets, namely: U.S.A. **Alabama:** Cullman Co., *R. Kral 84838* (APSC, BM, BRCH, CLEMS, CM, CTB, F, FLAS, FSU, GA, GH, K, KANU,

MICH, MEM, MO, MSC, NCU, NY, OS, TENN, TEX, UNA, USCH, VDB, VSC, WAT, WILLI, WIS); Shelby Co., *R. Kral 80984* (BM, BRCH, CH, CM, CTB, FSU, GH, K, KANU, MICH, MO, MU, M, NCU, PH, SMU, VDB, VPI, VSC, WILLI, WIS).

2. *Rhynchospora harveyi* W. Boott var. *culixa* (Gale) Kral, comb. nov. Basionym: *Rhynchospora culixa* Gale, *Rhodora* 46: 235. 1944. *Rhynchospora grayii* Kunth var. *culixa* Kükenthal, *Bot. Jahrb. Syst.* 75(1): 120. 1950. TYPE: U.S.A. Georgia: Tift Co., Irby, 28 Aug. 1890, *S. M. Tracy 1498* (holotype, US).

Gale described this plant as a species most closely resembling *Rhynchospora harveyi*, differing from it mostly in its more slender, shorter-leaved culms, its smaller, more compact spikelet clusters, and its fruits tending to be obovoid rather than el-

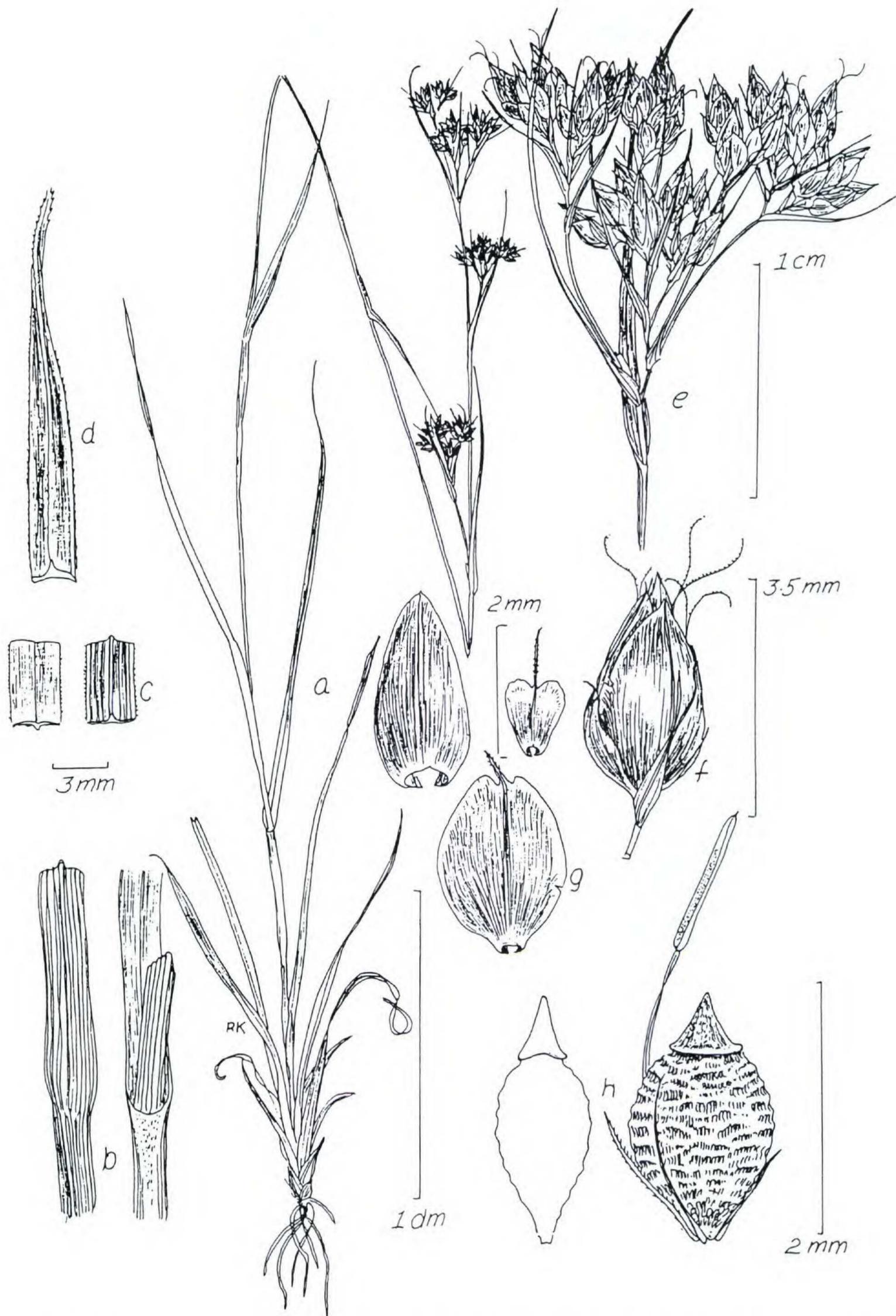


Figure 1. *Rhynchospora recognita* (Kral 84838). —a. Habit sketch. —b. Leaf at sheath-blade junction, abaxial (left), adaxial (right). —c. Leaf midblade, adaxial (left), abaxial (right). —d. Leaf apex. —e. Inflorescence, apical compound. —f. Spikelet. —g. Lowest sterile scale (upper right); upper sterile scale (lower right); fertile scale (upper left). —h. Fruit, achene showing perianth, tubercle, hypogynous stamen (right); fruit outline (left).

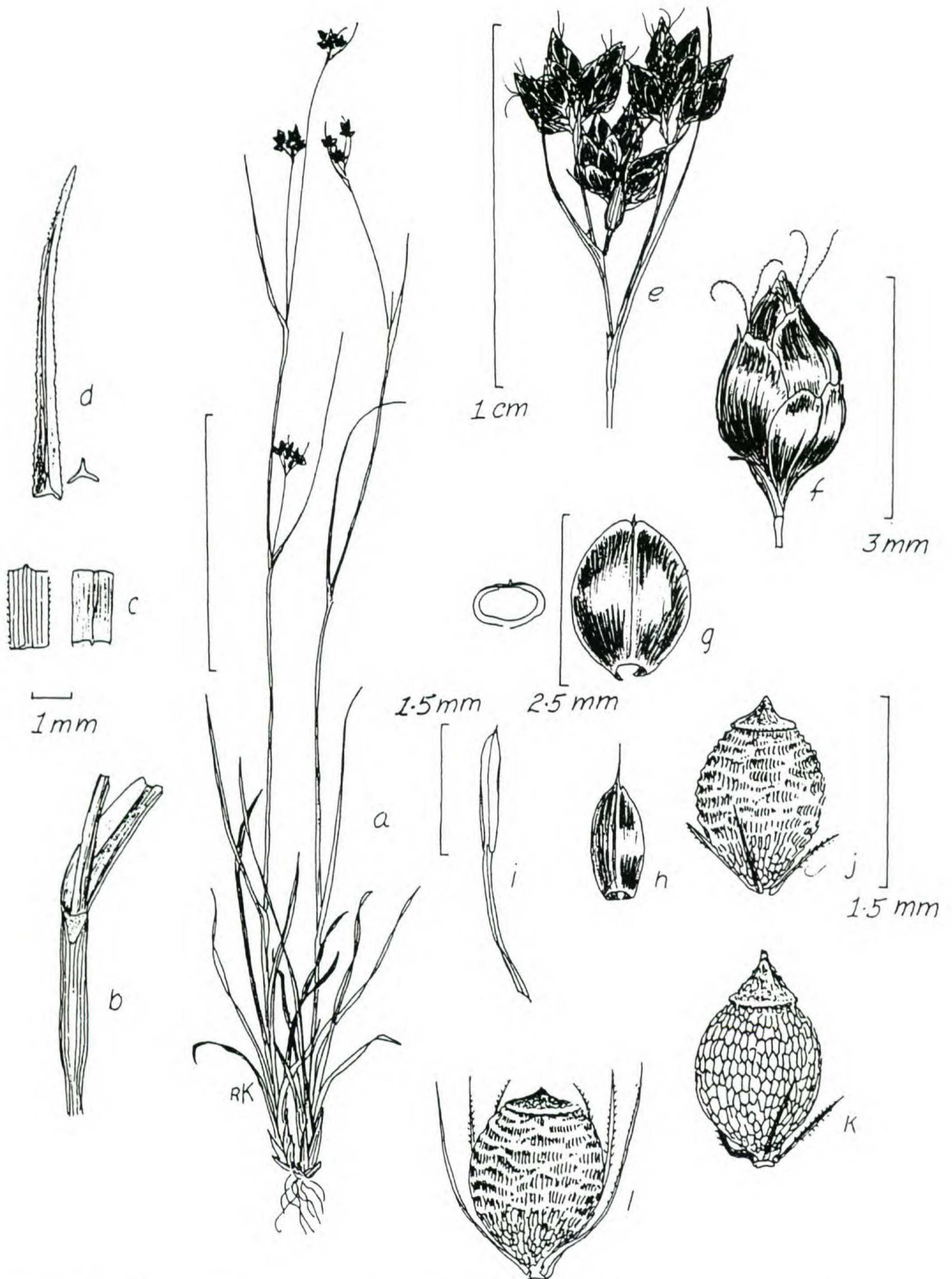


Figure 2. *Rhynchospora globularis* var. *globularis* (Kral 84527). —a. Habit sketch; scale bar = 1 dm. —b. Leaf blade, sheath junction. —c. Leaf midblade, abaxial (left), adaxial (right). —d. Leaf apex. —e. Inflorescence, apical compound. —f. Spikelet. —g. Fertile scale, adaxial view (right), cross section with enclosed fruit, sketch (left). —h. Lowest sterile scale. —i. Distal part of filament, with anther. —j. Fruit. —k. Fruit of *R. globularis* var. *pinetorum* (Kral 7031). —l. Fruit of *R. globularis* var. *saxicola* (Kral 80854).

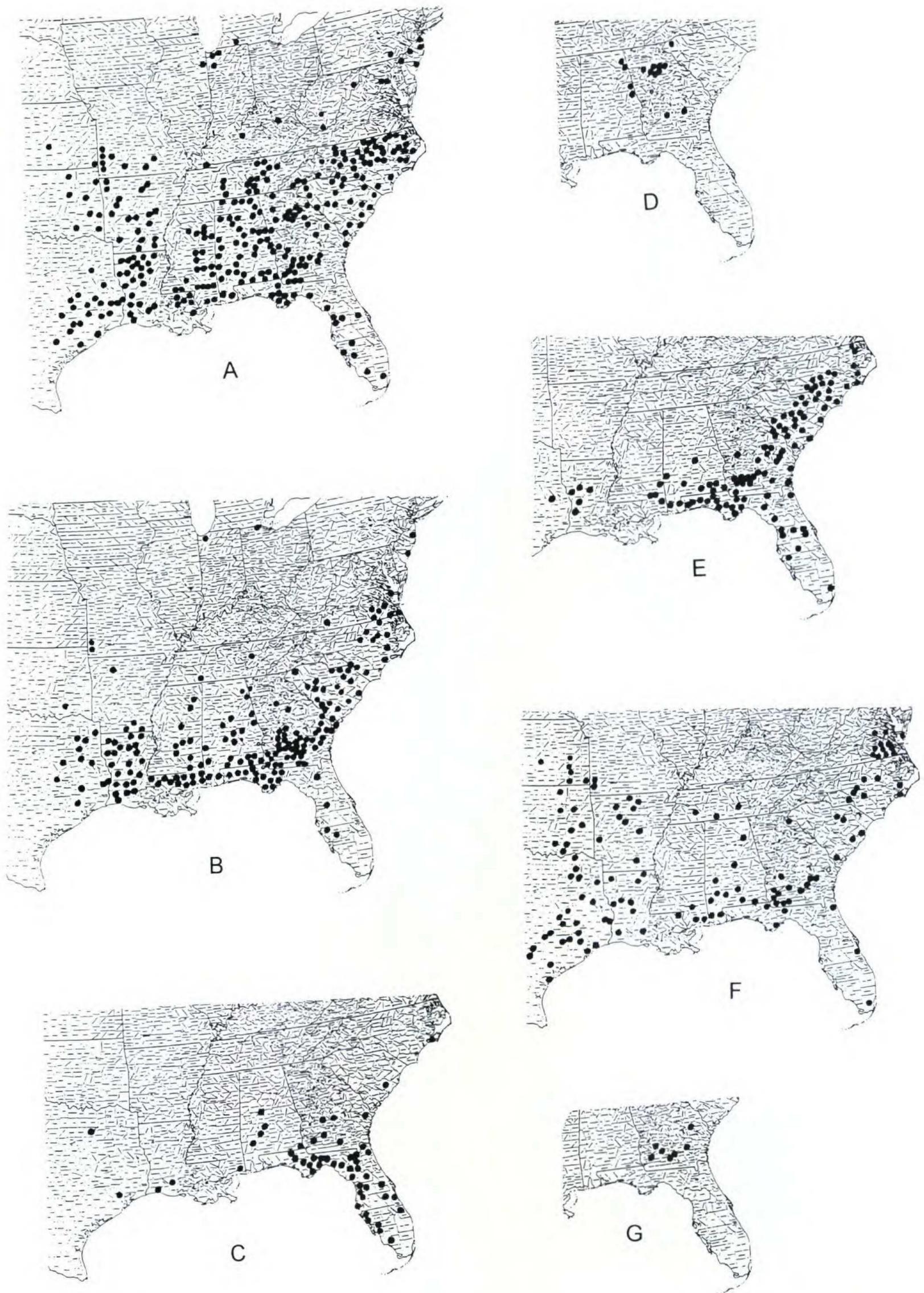


Figure 3. Distribution maps. Dots indicate taxa occurrence by county in eastern North America. —A. *Rhynchospora recognita* (Gale) Kral. —B. *Rhynchospora globularis* (Chapman) Small var. *globularis*. —C. *Rhynchospora globularis* var. *pinetorum* (Britton & Small) Gale. —D. *Rhynchospora globularis* var. *saxicola* (Small) Kükenthal. —E. *Rhynchospora grayii* Kunth. —F. *Rhynchospora harveyi* W. Boott var. *harveyi*. —G. *Rhynchospora harveyi* var. *culixa* (Gale) Kral.

Table 2. Comparison of 10 character states in three *Rhynchospora* taxa

	<i>Rhynchospora grayii</i>	<i>Rhynchospora harveyi</i> var. <i>culixa</i>	<i>Rhynchospora harveyi</i>
Plant height	5–13 dm	5–7 cm	5–11 dm
Principal leaves, length × width	2–4 dm × (1–)1.5–3 mm	1.5–3 dm × 1.5–2 mm	1.5–3 dm × 1.8–3 mm
Spikelet clusters	1–4, turbinate to hemispheric, uppermost exceeding or exceeded by subtending setaceous bract	2–4, turbinate to hemispheric, uppermost sparse, exceeding subtending setaceous bract	2–4, turbinate to hemispheric, uppermost dense, exceeded by 1 or more subtending bracts
Spikelet shape, dimensions, color	ovoid to lanceolate-ovoid, 5–6(–7.5) mm narrowly acute, mostly dull pale brown	narrowly ovoid, 5–6 mm acute, pale brown	ovoid to broadly ovoid, 3–3.5(–4) mm, broadly acute, pale brown to red-brown
Fertile scales	broadly elliptic to ovate or orbiculate, 4–5 mm	broadly ovate to suborbiculate, 2.5–3.5 mm	broadly ovate to suborbiculate, 2.5–3.5 mm
Stamen number, anther length	3(–6), ca. 3 mm	3, 2–2.2 mm	3, 1.5–2 mm
Fruit body	broadly obovoid to subglobose or broadly ellipsoid, 2–2.5 mm, mostly tumidly lenticular to nearly round in cross section	obovoid, ca. 1.5–1.6 mm lenticular distally	obovoid to broadly ellipsoid, 1.5–1.7 mm, nearly round in cross section
Fruit surface	dark brown, with transverse wavy lines of tiny, raised or pitlike cancellae	brown, with transverse wavy lines of small vertical, short-rectangular pits alternating with low, smooth wavy ridges	dark brown to brown, with undulant-transverse lines of small, pitlike or raised cancellae, alternating with narrow low ridges, or very finely cancellate
Tubercle	buttressed, depressed-conic, 0.3–0.5(–0.7) mm high	buttressed, conic, 0.3 mm high	buttressed, conic, 0.3–0.5(–0.7) mm high
Perianth bristles	mostly 6, reaching at least to tubercle base	6, none reaching past fruit midbody	(1–)3–6, 3 usually rudimentary, none reaching past fruit midbody

lipoid, less swollen distally, and with a broader, paler transverse rugosity.

Six years later, Kükenthal took a much more conservative approach, reducing the four taxa treated by Gale in her series *Harveyae* to two species, *Rhynchospora megalocarpa* A. Gray and *R. grayii* Kunth, placing both *R. harveyi* and *R. culixa* under the latter as varieties.

In my opinion, this shared not just by Gale but by most of those who have field experience with these plants, *Rhynchospora harveyi* is a well-recognized, wide-ranging, and distinctive species. It is frequent to abundant over many physiographic provinces in North America, from the Great Plains eastward through much of the Gulf and Atlantic Coastal Plain, inland through some Appalachian provinces into the Central Plains (see Fig. 3F). Therefore, it is well represented in systematics collections and exhibits considerable variation. One of these variants, consisting of two collections, one

from Georgia the other from northern Florida, was noted by Gale as specifically distinct.

Some realignments appear to be in order. The relationships of taxa within Gale's series *Harveyae* appear, on a basis of comparisons of dried specimens and of living plants, to be much as she had them, and *Rhynchospora harveyi* should be extricated from *R. grayii*. The only change from Gale's work would be simply to show a closer taxonomic relationship of *R. culixa* to *R. harveyi* than she proposed, namely that its relationship be varietal.

In Table 2, *Rhynchospora grayii*, *R. harveyi* var. *culixa*, and *R. harveyi* var. *harveyi* are compared morphometrically, and all three are illustrated in Figures 4, 5, and 6, respectively. Data in Table 2 suggest that (1) *Rhynchospora harveyi* stands distinctly apart from *R. grayii* as a species and (2) *R. culixa* overlaps too much in character with *R. harveyi* to be considered as more than a variety of it.

Gale based *Rhynchospora culixa* upon only two

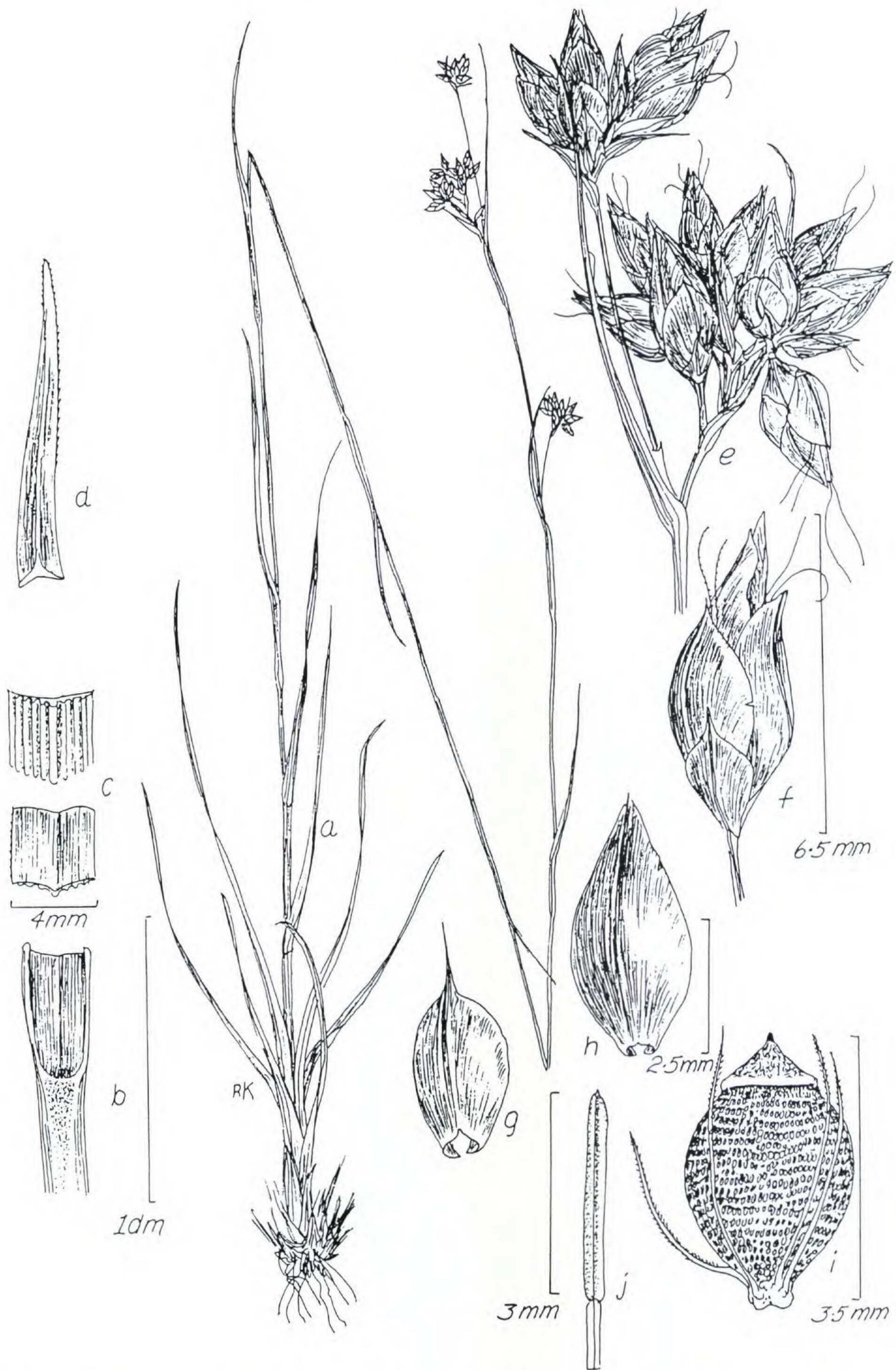


Figure 4. *Rhynchospora grayii* Kunth (Kral 39617, 84512). —a. Habit sketch. —b. Leaf sheath-blade junction. —c. Leaf midblade, abaxial (above), adaxial (below). —d. Leaf apex. —e. Upper portion of inflorescence. —f. Spikelet. —g. Sterile scale. —h. Fertile scale. —i. Fruit. —j. Distal part of filament with attached anther.

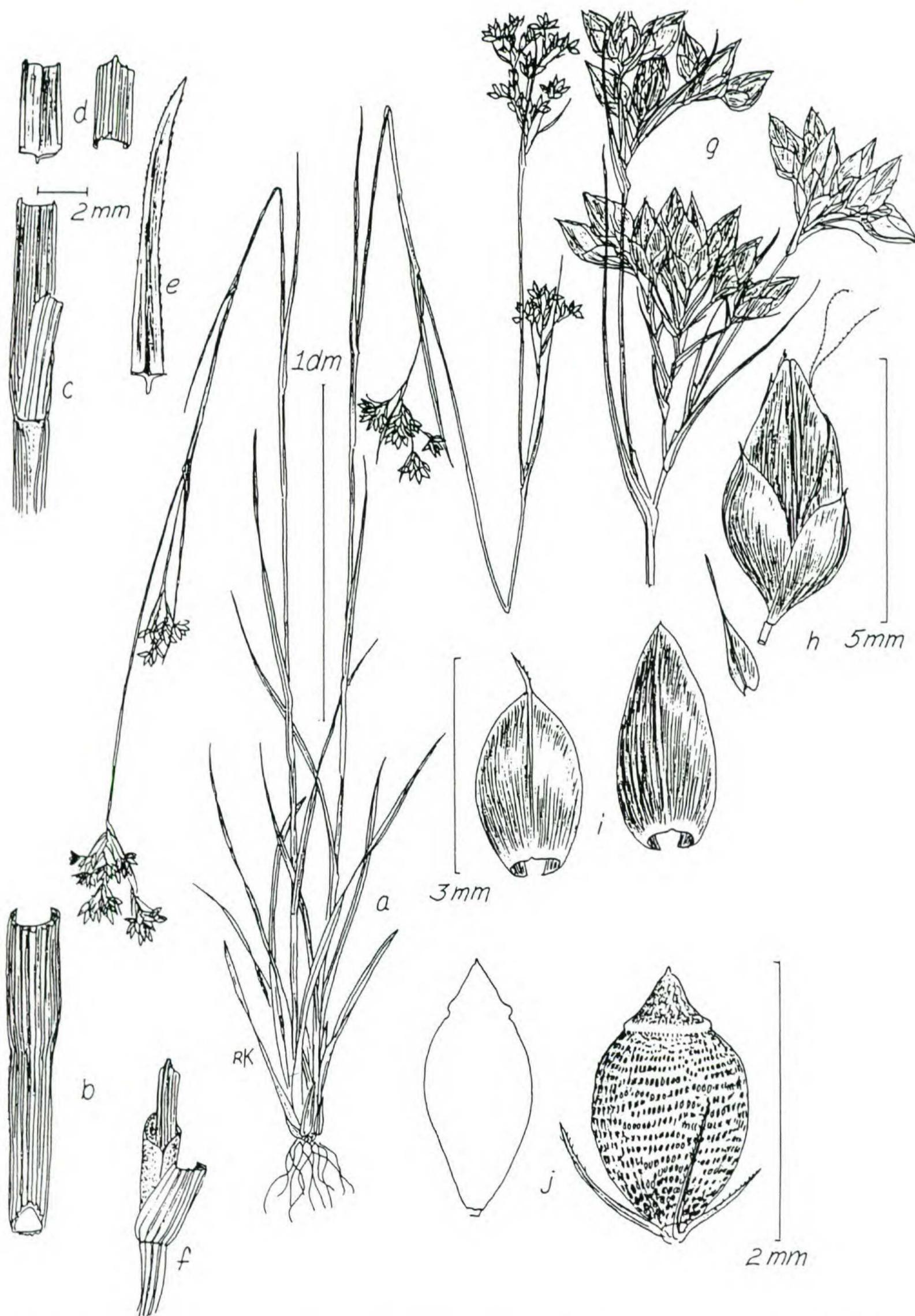


Figure 5. *Rhynchospora harveyi* var. *culixa* (Kral 80621, 80654). —a. Habit sketch. —b. Leaf sheath-blade junction, abaxial view. —c. Leaf sheath-blade junction, adaxial view. —d. Leaf midblade, adaxial (left), abaxial (right). —e. Leaf apex. —f. Inflorescence branch, showing bract base and prophyll. —g. Apical inflorescence group. —h. Spikelet (right), lowest sterile bract (left). —i. Upper sterile bract (left), fertile bract (right). —j. Fruit, face view (right), fruit outline (left).

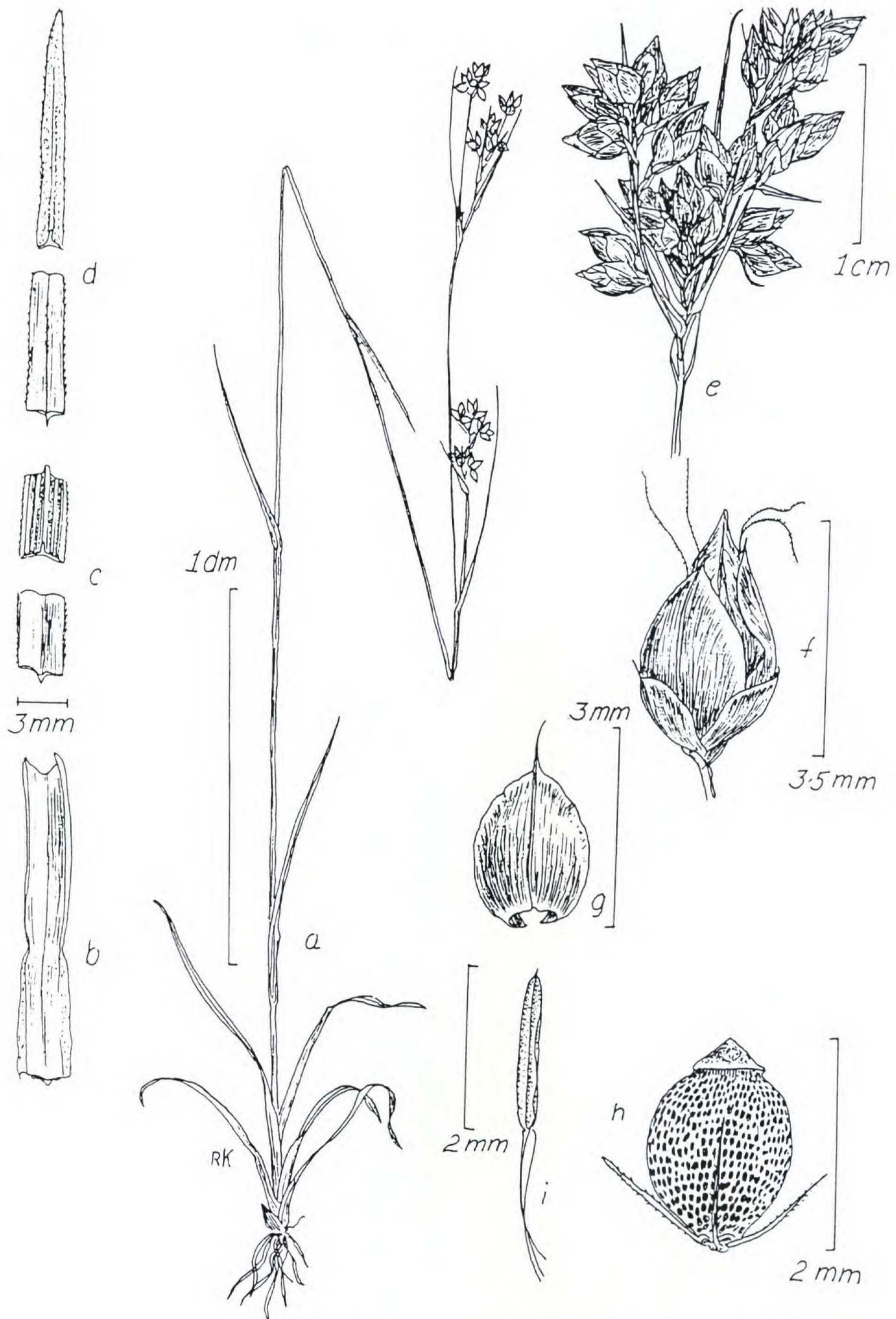


Figure 6. *Rhynchospora harveyi* var. *harveyi* (Kral 35104, 53164). —a. Habit sketch. —b. Leaf sheath-blade junction, adaxial view. —c. Sectors of leaf midblade, adaxial (below), abaxial (above). —d. Leaf apex, adaxial sector (below), abaxial sector with tip (above). —e. Upper part of inflorescence, apical compound. —f. Spikelet. —g. Fertile scale. —h. Fruit. —i. Distal part of filament, with attached anther.

Table 3. Comparison of 11 character states of three *Xyris* taxa.

	<i>Xyris ambigua</i>	<i>Xyris stricta</i> var. <i>obscura</i>	<i>Xyris stricta</i> var. <i>stricta</i>
Plant height	3–10 dm	2–9(–10) dm	5–9(–10.4) dm
Leaf orientation	in wide fans	in narrow fans	in narrow fans
Leaf length; blade width	(5–)10–40(–50) cm; (2–)3–7(–10) mm	(15–)20–40(–44) cm; (2–)2.5–3(–5) mm	20–60 cm; 3–8 mm
Leaf sheath color; leaf blade color	stramineous to pale brown; olive or yellow green	purplish to reddish; deep green	purplish to reddish; deep green
Leaf blade margins; distal scape costae	scabro-ciliolate; tuberculate-scabridulous	strongly papillate; densely papillate	smooth to low papillate; low papillate to smooth
Spike symmetry; spike length, apex	commonly ovoid to ellipsoid, rarely short cylindrical; 1–2(–3) cm, acute	commonly ovoid to ellipsoid-cylindrical, rarely cylindrical; 1–2(–2.7) cm, blunt	lanceolate-cylindrical to cylindrical; (1.5–)2–3(–3.5) cm, blunt
Fertile bracts; outline, length	broadly obovate, rarely suborbicular; 5–8 mm	suborbicular, rarely broadly obovate; 5–6.5(–7) mm	suborbicular, rarely broadly obovate; (5.5–)6–7(–7.5) mm
Fertile bracts, color	matrix lustrous, base deep brown shading distally to pale brown or stramineous	matrix lustrous, base castaneous, shading distally to brown	matrix lustrous, base castaneous, shading distally to brown
Lateral sepals	lanceolate-curved, 4–7 mm, acuminate, keel equaling wing	lanceolate-curved, (4.5–)5–6(–7) mm, acute, keel wider than wing	lanceolate-curved, 5–6.5 mm, keel wider than wing
Petal blades	obovate, 8–10 mm	obtriangular, ca. 5 mm	obtriangular, ca. 5 mm
Seeds	ovoid to broadly ellipsoid, 0.5(–0.6) mm, translucent	narrowly ellipsoid to cylindrical, 0.6–0.7(–0.8) mm farinose	narrowly ellipsoid to cylindrical, (0.55–)0.6–0.8 mm, farinose

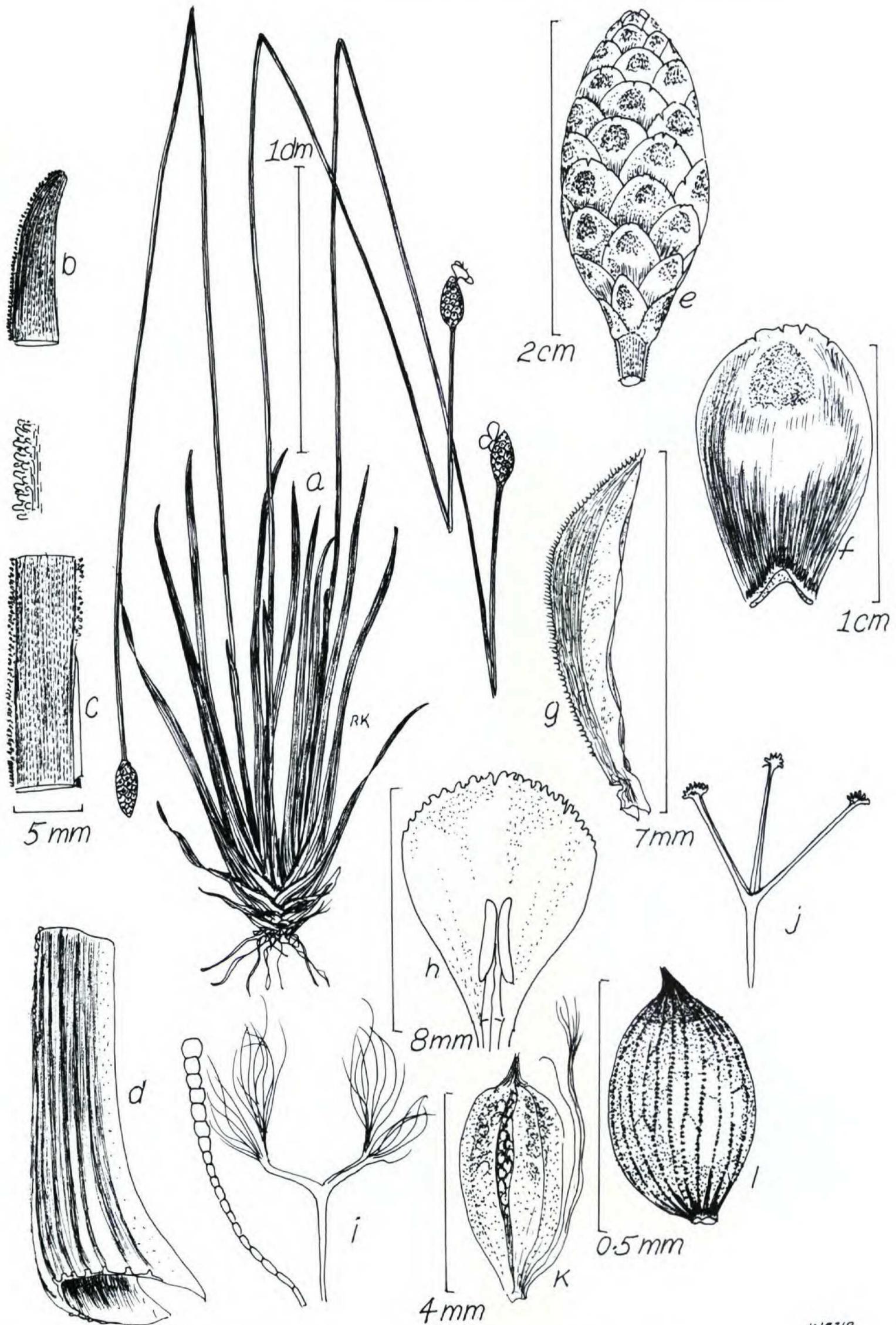
specimens. I have now discovered seven Georgia populations, confirming Gale's species. These, all represented by mounted duplicates in VDB at BRIT, are: Berrien Co. (*Kral* 24255), Colquitt Co. (*Kral* 80599, 80621), Cook Co. (*Kral* 80652), Lee Co. (*Kral* 65385), Worth Co. (*Kral* 80769, 80780); see Figure 3G. Ranges for *R. grayii* and *R. harveyi* var. *harveyi* are given in Figure 3E and F.

Rhynchospora grayii differs also in its ecology from *R. harveyi*, being an inhabitant of droughty sandhills, mostly in the longleaf pine-deciduous scrub oak systems. *Rhynchospora harveyi* var. *harveyi* frequents a wide variety of ecological systems so long as they are at least seasonally moist, from basic prairie soils to upland oak-pine sands and clays, pine savanna or flatwoods, occasionally also in sandy ecotones between sandhills and boggy slopes and bottoms. These last systems are the ones in which I have encountered *R. harveyi* var. *culixa*.

3. *Xyris laxifolia* C. Martius var. *iridifolia* (Chapman) Kral, stat. nov. *Xyris iridifolia* Chapman, Fl. S. U.S. 501. 1860. TYPE: U.S.A. Florida: Franklin Co., "Apalachicola," A. W. Chapman s.n. (holotype, NY).

Those who have seen living or preserved speci-

mens of the neotropical *Xyris laxifolia* C. Martius [1841: 58; TYPE: Brazil. Mart. Herb. no. 540 (holotype, M)] and the mostly North American *X. iridifolia* Chapman are struck by how similar the two are. In fact, Malme, long the authority on Xyridaceae, made such observations years ago (Malme, 1913, 1937). Both are robust plants with leaf blades at least 1 cm wide, with leaf sheaths strongly tinged with red or purple; both have broad, somewhat compressed or even acipital, smooth scapes and large (1–4 cm) multiflowered brownish spikes, with contrasting paler greenish dorsal areas. The lateral sepals of both taxa are free, of comparable color and length, oblanceolate, included, mostly elliptic-oblanceolate, with thin, narrow, lacerate-ciliate or lacerate-fimbriate keels. Flowers of both taxa are small and open early in the morning. Seeds of both taxa are opaque, mostly farinose. Thus, when the two are compared, one sees that overlapping limits of variation are significantly many. The features that distinguish the two, for example, spike outline, seed outline and degree of opacity, relative widths of sepal keels, and location of fimbriae and/or ciliae along the keel, are such as to make varieties in a genus such as *Xyris*. What has been called *X. iridifolia* ranges through the Coastal Plain



K19318

Figure 7. *Xyris ambigua* (Kral 19318). —a. Habit. —b. Leaf apex. —c. Leaf blade-sheath junction (below), enlarged leaf blade margin (above). —d. Base of leaf sheath. —e. Spike. —f. Fertile bract. —g. Lateral sepal. —h. Petal blade, stamen. —i. Staminiodium (right); enlarged view of beard hair apex (left). —j. Stylar apex. —k. Capsule. —l. Seed.

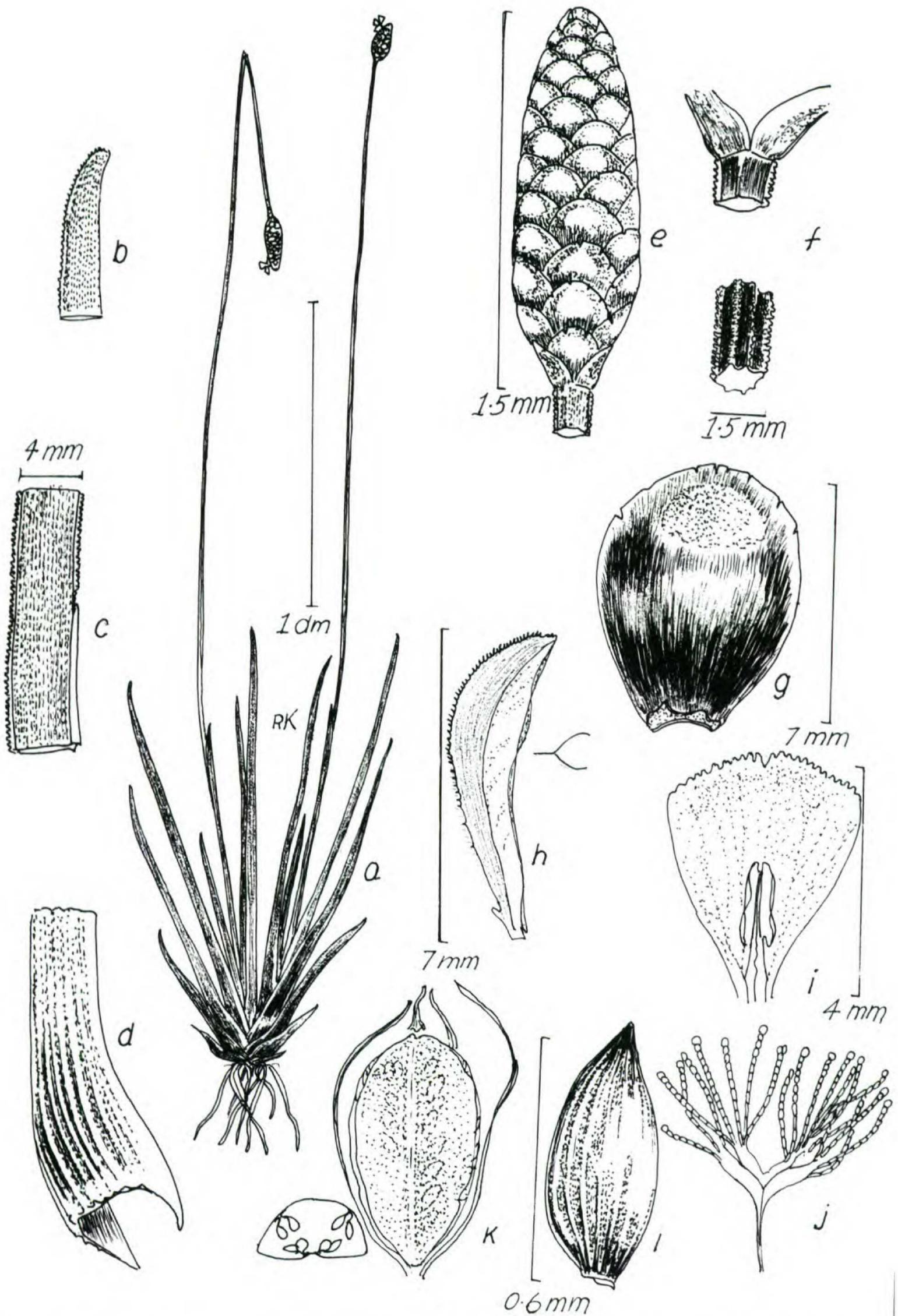
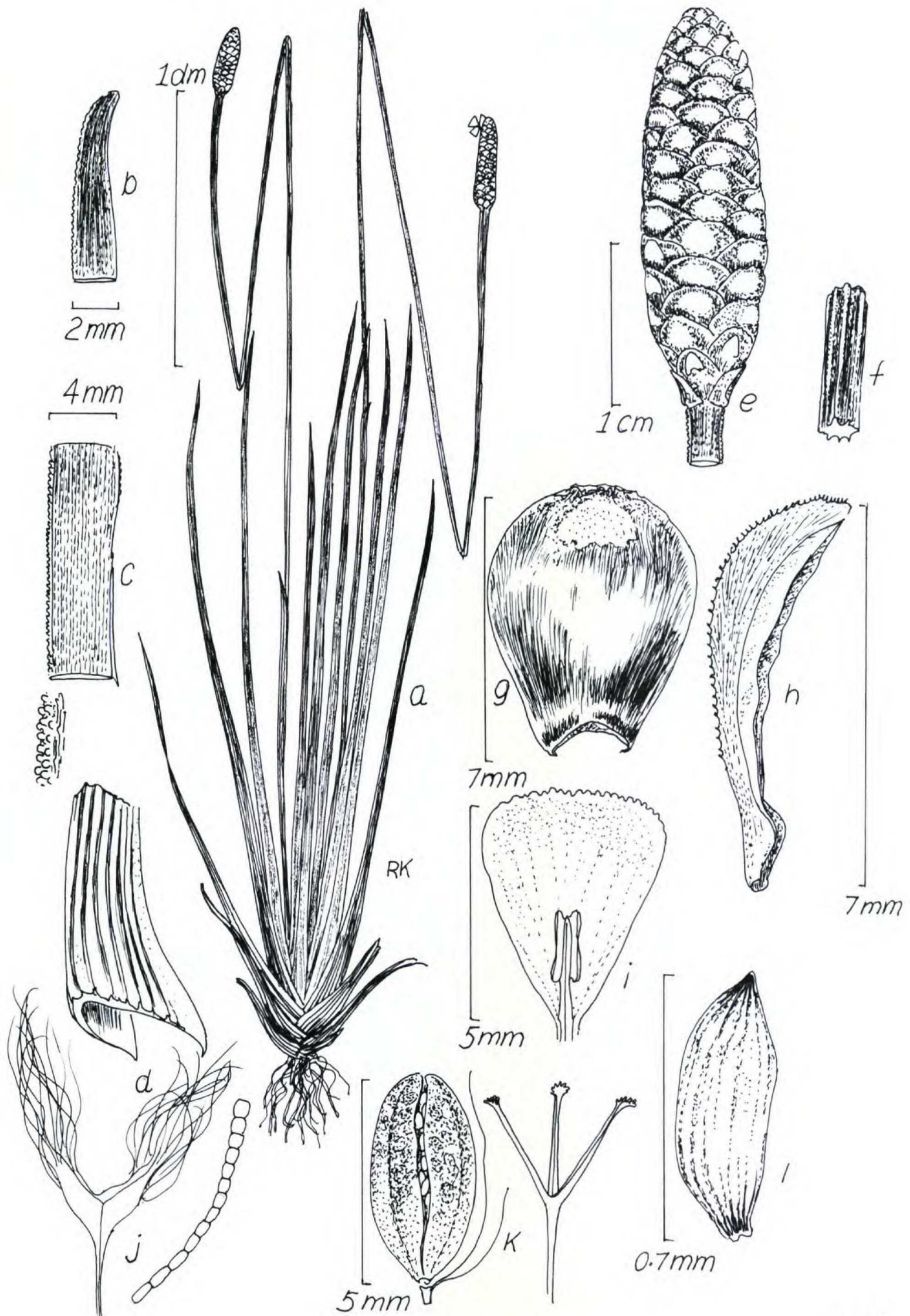


Figure 8. *Xyris stricta* var. *obscura* (Kral 87830). —a. Habit sketch. —b. Leaf apex. —c. Leaf blade-sheath junction. —d. Leaf sheath base. —e. Spike. —f. Scape apex, basal spike bracts (above); sector of scape at midscape (below). —g. Fertile bract. —h. Lateral sepal. —i. Petal, stamen. —j. Staminiodium. —k. Capsule, adaxial view. —l. Seed.



85336

Figure 9. *Xyris stricta* var. *stricta* (Kral 85336). —a. Habit sketch. —b. Leaf apex. —c. Leaf blade-sheath junction (above); small sector of leaf blade margin (below). —d. Leaf sheath base. —e. Spike. —f. Sector of midscape. —g. Fertile bract. —h. Lateral sepal. —i. Petal, stamen. —j. Staminodium (left); enlarged beard hair apex (right). —k. Capsule (left); stylar apex (right). —l. Seed.

of the southeastern U.S. from North Carolina to northern Florida, west into eastern Texas, disjunctly in contiguous physiography inland to Oklahoma, Arkansas, Tennessee, and locally in the Piedmont of Georgia and the Carolinas. It reaches the Neotropics in the states of Tobasco and Veracruz, Mexico, and has some recorded stations in Costa Rica and Honduras. Plants identified as *X. laxifolia* overlap *X. iridifolia* types only in Costa Rica, becoming increasingly common southward in Panama, thence southward through most of lowland South America. The two have a similar habitat, namely acidic wet sands and peats of sour swamps and bogs, seeps, shallows, and banks of ponds and disturbed sandy wetlands.

There are a few constant differences, insufficient to distinguish two species but adequate in light of distributional information to propose them as geographic co-varieties.

4. ***Xyris stricta*** Chapman var. ***obscura*** Kral, var. nov. TYPE: U.S.A. Alabama: Washington Co., 12.2 mi. NNW of Citronelle, E side of US 45, fine sandy peat of pine-Willow oak-*Nyssa biflora* flat adjacent to Longleaf pine-evergreen scrub flats, 6 Sep. 1998, R. Kral 87830 (holotype, VDB; isotypes, BAYLU, BM, BRCH, CLEMS, CM, CTB, DUKE, FLAS, FSU, GA, GH, JSU, KANU, LSU, MICH, MO, NLU, NY, OS, OSC, OSH, PH, TENN, TEX, US, USCH, VSC, WILLI, WIS). Figure 8.

Xyris louisianica Bridges & Orzell, Phytologia 64: 56. 1987. TYPE: U.S.A. Louisiana: Calcasieu Parish, swales and depressions of cutover wetland pine savannah on N side of paved road, ca. 1.3 mi. NW of Edgerly, elev. 23 ft., 24 Sep. 1987, Orzell & Bridges 5800 (holotype, TEX not seen; isotypes, FSU, GH, LSU, MISSA, MO, NCU, NLU, NY, SMU, TEX, TAMU, VDB).

Differt a *Xyris stricta* var. *stricta* statura minore, laminis foliorum brevioribus, angustioribus, margine scabridioribus, costis scaporum plus scabridis, sepalis lateralibus et seminis brevioribus.

Slender but stiff, solitary to caespitose perennial 30–80(–90) cm high, with base slightly dilated, enfolded in chaffy or fibrous brownish bases of older leaves. Principal leaves ascending in narrow fans, (15–)20–35(–40) cm, longer than the scape sheaths; sheaths entire, $\frac{1}{4}$ – $\frac{1}{3}$ as long as blades, gradually narrowing from broad, brown to red-brown bases to blade, eligulate; blades narrowly gladiate-linear or linear, 2–5(–7) mm wide, narrowing above middle to an incurved-acute, slightly calused tip, the margins a narrow, pale, and scabridulous band, surfaces faintly multinerved, dull

green shading to reddish brown or purplish. Scape sheaths loosely tubular, with narrow, sharp costae abaxially, adaxially scarious, pale, the open oblique orifice narrowed to a short, flattened, blunt cusplike blade. Scapes slightly compressed distally, 1.5–2(–2.4) mm wide, often ancipital with two flattened scabridulous costae making edges, and often with additional low, papillate costae, medially and proximally subterete or angulate, 1–1.5 mm thick, generally multicostate, the costae usually papillate. Spikes mostly ovoid to ellipsoid to cylindric, 1–2(–2.5) cm long, mostly blunt of many, tightly spirally imbricate bracts, the sterile ones few, keeled, ca. 2–4 mm, grading larger into broadly obovate to suborbicular or reniform, convex fertile ones (4–)4.5–6(–7) mm, with entire margins lacerate in age, surfaces castaneous proximally, tan distally, and with subapical ovate to triangular or reniform green dorsal areas. Lateral sepals subequilateral, oblanceolate, (4–)4.5–6 mm, acute. Petal blades obtriangular, 3–4 mm, the very shallowly rounded apex erose. Stamens with anthers broadly oblong, ca. 1 mm, deeply emarginate and sagittate on stubby filaments ca. 0.5 mm; staminodia birachiate, densely bearded. Capsule gray, broadly obovoid, ca. 4 mm, planoconvex; placentation marginal; seeds narrowly ovoid to ellipsoid-cylindric, 0.5(0.6–0.7)–0.8 mm, opaque or yellow-farinous.

Moist fine sandy peats or organic sandy clay, Atlantic and Gulf Coastal Plains, from south Georgia and panhandle Florida west across Alabama to eastern Texas. Flowering from late June to October or until frost.

During *Xyris*-related fieldwork in the late 1950s and early 1960s, I encountered what then appeared to be two forms of *X. ambigua* Beyrich ex Kunth growing in mixed populations in the flatwoods and savannas of the Gulf Coastal Plain in Mississippi, Louisiana, and eastern Texas. One, a taller plant with more spreading, linear-gladiate leaves of a yellow-green color and with tan or brown bases, had broadly obovate petal blades unfolding in early morning that were nearly 1 cm long. The other form was a shorter plant, with narrower, more ascending leaves red or purplish-tinged at base, and its blooms, opening later in the morning, were broadly obtriangular and only 4–5 mm long. Yet, in my treatment (Kral, 1966: 230) I still treated the two as forms of *X. ambigua*.

During fieldwork in Alabama in the 1970s, I again saw the same variation, noting that, in reddish pigmentation, in corolla size and shape, and particularly in the farinose and narrower seed, affinities of this smaller plant with smaller flowers

actually were more with *Xyris stricta*, a plant often in the same general areas but much more robust and in much wetter habitats. In the 1980s I began using the herbarium name "X. obscura" with colleagues and assigned this nomen nudum to material sent to me for identification. Concomitantly, two other biologists published this plant as *X. louisianica* Bridges & Orzell (1987).

Xyris ambigua and the two proposed varieties of *X. stricta* are compared in Table 3; the three taxa are illustrated in Figures 7, 8, and 9. By its morphology, *X. ambigua* is clearly distinguished. There is considerable character overlap between the two *X. stricta* varieties: these differences are consistently quantitative but at the varietal level.

It is perhaps unusual for the two varieties in *Xyris stricta* to have such different habitats. *Xyris stricta* var. *obscura* always appears upslope or in drier habitat than *X. stricta* var. *stricta*, and thus invariably shares its habitat with *X. ambigua*.

Both varieties nest well within the geographic range of *Xyris ambigua*, which is found on moist sandy or peaty sites in flatwoods, seeps, bogs, and moist open areas of Coastal Plain from Virginia to south Florida, west into eastern Texas, inland to Oklahoma, Arkansas, middle Tennessee, and the Piedmont eastward. It is the only one of the three to be found outside the United States, occurring in the Antilles, Mexico, and Central America. *Xyris stricta* var. *stricta* is found in acid swamps, deep wet bogs, edges of *Taxodium ascendens* Brongniart–*Ilex myrtifolia* Walter–*Nyssa biflora* Walter domes, wet savannas, and flatwoods potholes, mostly on peat-muck substrates, from Louisiana east to northern Florida, north in the South Carolina Coastal

Plain. Intermediate examples between *X. stricta* var. *stricta* and variety *obscura* are to be found in ecotonal and disturbed sites in southern Georgia, at or near the eastern boundary of the latter.

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Literature Cited

- Bridges, E. L. & S. L. Orzell. 1987. A new species of *Xyris* (sect. *Xyris*) from the Gulf Coastal Plain. *Phytologia* 64: 56–61.
- Chapman, A. W. 1860. *Flora of the Southern United States*. Cambridge, Massachusetts.
- Elliott, S. 1821. *A Sketch of the Botany of South Carolina and Georgia*, vol. 1. J. R. Schenck, Charleston, South Carolina.
- Gale, S. 1944. *Rhynchospora*, section *Eurhynchospora*, in Canada, the United States and the West Indies. *Rhodora* 46: 227–249.
- Kral, R. 1966. *Xyris* (Xyridaceae) of the Continental United States and Canada. *Sida* 1: 177–260.
- Kükenthal, G. 1950. Vorarbeiten zu einer Monographie der Rhynchosporideae. *Bot. Jahrb. Syst.* 75(1): 119–121; 75(2): 156–161.
- Malme, G. O. K. 1913. Die Amerikanischen Spezies der Gattung *Xyris* L. Untergattung *Euxyris* (Endlicher). *Ark. Bot.* 13(8): 1–32.
- . 1937. Xyridaceae in *N. American Flora* 19(1): 3–15.
- Martius, C. F. P. von. 1841. Xyridaceae. *Herb. Fl. Bras.* 34(2): 56, 58.
- Small, J. K. 1933. *Manual of the Southeastern Flora*. New York.