

NOTEWORTHY *CAREX*, *CYPERUS*, *ELEOCHARIS*,  
*KYLLINGA*, AND *OXYCARYUM* (CYPERACEAE)  
FROM ALABAMA, ARKANSAS, GEORGIA,  
LOUISIANA, MISSISSIPPI, NORTH CAROLINA,  
TENNESSEE, AND TEXAS

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ABSTRACT

Field explorations have yielded *Carex austrina* new to North Carolina and Tennessee, *Carex fissa* var. *aristata*, *Cyperus ochraceus*, and *Eleocharis macrostachya* new to Mississippi, *Carex oklabomensis* new to Tennessee, *Cyperus lanceolatus* new to Georgia and Mississippi, *Cyperus difformis*, *C. oxylepis*, and *C. pumilus* new to Georgia, *Cyperus eragrostis* new to Louisiana, *Cyperus surinamensis* new to Tennessee and *Oxycarum cubense* new to Georgia, U.S.A. Additional range extensions are presented for *Carex hyalina*, *C. oklabomensis*, *C. scoparia* var. *scoparia*, *Cyperus aggregatus*, *C. difformis*, *C. lancastriensis*, *C. pilosus*, *Kyllinga brevifolioides* and *Oxycaryum cubense*. Localities, habitat data, lists of associated species, and discussions of weed potential are presented.

RESUMEN

Exploraciones de campo han dado como resultado la aparición de *Carex austrina* nuevo para Carolina del Norte y Tennessee, *Carex fissa* var. *aristata*, *Cyperus ochraceus*, y *Eleocharis macrostachya* nuevos para Mississippi, *Carex oklabomensis* nuevo para Tennessee, *Cyperus lanceolatus* nuevo para Georgia y Mississippi, *Cyperus difformis*, *C. oxylepis*, y *C. pumilus* nuevos para Georgia, *Cyperus eragrostis* nuevo para Louisiana, *Cyperus surinamensis* nuevo Tennessee, y *Oxycarum cubense* nuevo para Georgia, U.S.A. Se presentan extensiones de área

de *Carex hyalina*, *C. oklahomensis*, *C. scoparia* var. *scoparia*, *Cyperus aggregatus*, *C. difformis*, *C. lancastrimensis*, *C. pilosus*, *Kyllinga brevifolioides* y *Oxycaryum cubense*. Se ofrecen localidades, datos del hábitat, listas de especies asociadas, y discusiones de su potencial como malas hierbas.

#### INTRODUCTION

Field work on the *Carex*, *Cyperus*, *Eleocharis*, and *Kyllinga* for the Flora of Mississippi Project during the past few years has resulted in numerous discoveries of species new to Mississippi (Bryson 1984a; Morris & Bryson 1986; Carter et al. 1987; Bryson & Jones 1990; Carter et al. 1990; Naczi & Bryson 1990; Bryson et al. 1991; Bryson et al. 1992; Bryson & Carter 1992; Bryson & Carter 1994; Bryson et al. 1994). Current work has also increased the knowledge of *Carex*, *Cyperus*, *Eleocharis*, and *Kyllinga* species in Mississippi and surrounding states, taxa that are weeds, potential weeds, or are poorly known even elsewhere within their ranges. The flora of Mississippi is still poorly known in comparison to several adjacent states (Bryson & Carter 1994). Lowe's *Plants of Mississippi* (1921) and Small's *Manual of the Southeastern Flora* (1933), although outdated, must continue to serve as the baseline for the general flora of Mississippi.

Terminology of physiographic regions or resource areas in Mississippi follows Lowe (1921) as modified by Morris (1989). Other references dealing exclusively with *Carex*, *Cyperus*, *Eleocharis*, and *Kyllinga*, which we have used as sources for distributional data are Kükenthal (1935–1936), Mackenzie (1931–1935), McGivney (1938), Corcoran (1941), Horvat (1941), and Svenson (1957). Herbarium abbreviations follow Holmgren et al. (1990), except ctb, MMNS, and USMH (pers. herb. of Charles T. Bryson, Mississippi Museum of Natural Science at Jackson, and University of Southern Mississippi, Hattiesburg, respectively).

#### NOTEWORTHY COLLECTIONS

*Carex austrina* (Small) Mackenzie was described from Houston, Harris County, Texas, and is known from Arkansas, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, and Texas (Jones 1994). It is herewith reported new to North Carolina and Tennessee. At the North Carolina site, *C. austrina* grew infrequently along an open roadside where hay was spread for erosion control. It is likely that *C. austrina* was introduced at the North Carolina and Tennessee sites in hay or as contaminates of grass seeds planted for erosion control.

Voucher specimens: U.S.A. NORTH CAROLINA. Stokes Co.: Hanging Rock State Park, Moores Wall Trail, NE of Moores Springs Road, nearest point of the lake and the main road., 11 May 1996, S. and G. Jones 12565 (BRCH, BRIT, ctb, NCU, MICH, VDB). TENNESSEE. Jackson Co.: Open, low field at Gainesboro Park, 3 May 1995, McNeilus 95-214 (TENN); 14 May 1995, McNeilus 95-191 (ctb, TENN).

*Carex fissa* Mackenzie var. *aristata* Hermann is reported new to Mississippi. *Carex fissa* was described by Mackenzie (1931) from specimens collected in eastern Oklahoma. Kolstad (1986) reported *C. fissa* from additional sites in Oklahoma and from eastern Kansas. Hermann (1965) described *C. fissa* var. *aristata* from north central Florida. Jones et al. (1990) reported *C. fissa* var. *fissa* from Texas. When *C. fissa* var. *fissa* was reported new to Mississippi (Bryson & Carter 1994), it was speculated that *C. fissa* var. *aristata* should be in southern Mississippi. The collection of *C. fissa* var. *aristata* was found along a drainage ditch on National Guard Camp Shelby in the Coastal Pine Meadows Region in association with *Carex frankii* Kunth, *C. longii* Mackenzie, *Cyperus compressus* L., *C. iria* L., *C. pilosus* Vahl, *C. strigosus* L., *Cuphea carthagenensis* (Jacq.) Macbr., *Eryngium prostratum* Nutt., *Iva annua* L., *Juncus debilis* Gray, *J. dichotomus* Ell., *J. validus* Cov., *Panicum dichotomiflorum* Michaux, *Paspalum urvillei* Steudel, *Sesbania exaltata* (Raf.) Rydb. ex Hill. Although the time of year for this collection is unusual, it is likely that *C. fissa* var. *aristata* will be found in additional sites in southern Mississippi.

Voucher specimens: U.S.A. MISSISSIPPI. Forrest Co.: Camp Shelby, NE of McLaurin, S of Forrest Ave. on seepage slope to W of Bldg. 3221, 15 Oct 1995, Bryson 14525, MacDonald, Rankin, and Rosso (ctb, MICH, SWSL).

*Carex hyalina* Boott is a member of section *Ovales* Kunth. Until recently, *C. hyalina* was a poorly understood species of the southern United States. Reznicek and Naczi (1993) presented a history of the taxonomic status, ecology, and distribution of *C. hyalina*. *Carex hyalina* is known from Arkansas, Louisiana, Mississippi, Oklahoma, and Texas (Mackenzie 1931; Waterfall 1960; Orzell & Bridges 1987; Naczi & Bryson 1990; Bryson et al. 1992; Reznicek & Naczi 1993; Thomas & Allen 1993b). The following record of *C. hyalina* is from an additional Mississippi county, within several miles of the Mississippi River. At this site, *C. hyalina* was found in an open seasonally wet ditch on a heavy, highly organic clay soil associated with *Carex corrugata* Fernald, *C. leavenworthii* Dewey, and *C. molesta* Mackenzie. This site deviates from other Mississippi *C. hyalina* sites because the plants grew in an open area rather than under a canopy of a typical bottomland hardwoods forest.

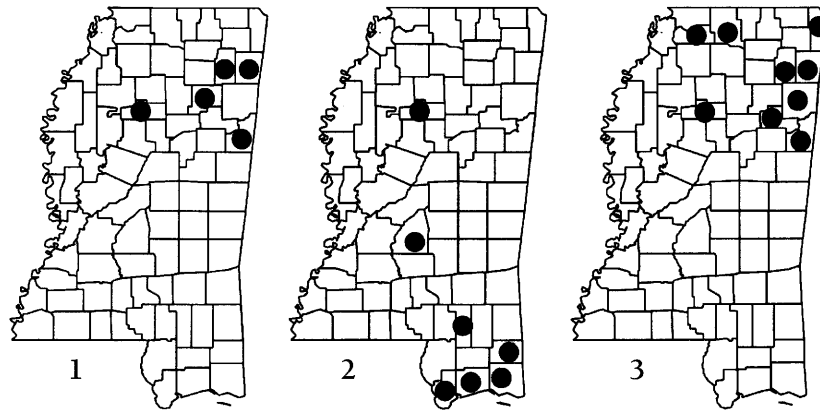
Voucher specimens: U.S.A. MISSISSIPPI. Washington Co.: Greenville, N of jct. Hwy US 82 and S Broadway St., T18N R8W Sect. 21 near center, 6 May 1996, Bryson 15073 (BRCH, BRIT, ctb, DSC, GA, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, NY, NYS, SWSL, TENN, UARK, UNLV, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed).

*Carex oklahomensis* Mackenzie is known from Arkansas, Mississippi, Missouri, North Carolina, Oklahoma, and Texas (Mackenzie 1931; Steyermark 1963; Bryson et al. 1992; Jones et al. 1991, Jones & Reznicek

1995). The first report of *C. oklabomensis* from Mississippi (Bryson et al. 1991) was from a recent roadside construction area near Tupelo, Lee County, and from additional sites in Itawamba, Lee, and Lowndes counties (Bryson et al. 1994). The following are the first report of *C. oklabomensis* for Tennessee and additional county records for Mississippi. Like the other Mississippi records, the following collections of *C. oklabomensis* are from a construction site where hay was blown for erosion control and in an improved, grass-seeded but weedy pasture. At the Chicksaw County location cited below, *C. oklabomensis* grew on a wet heavy clay soil in the Black Prairie Region in association with *Carex frankii*, *C. longii*, *C. triangularis* Boeckeler, *C. vulpinoidea* Michaux. In Grenada County, *C. oklabomensis* grew in association with *Allium canadense* L., *Alopecurus carolinianus* Walt., *Axonopus furcatus* (Fluegge) Hitchc., *Carex longii*, *C. triangularis* Boeckeler, *Festuca elatior* L., *Juncus acuminatus* Michaux, *J. effusus* L., *Krigia cespitosa* (Raf.) Chambers, *K. oppositifolia* Raf., *Panicum scoparium* Lamarck, *Ranunculus platensis* Sprengel, and *R. sardous* Crantz on a silty soil. At the Hunt's Lake site in Grenada County, more than 1,000 large clumps of *C. oklabomensis* were scattered over a 15 ha area. The distribution of *C. oklabomensis* in Mississippi is presented in Fig. 1.

Voucher specimens: U.S.A. MISSISSIPPI. Chickasaw Co.: W of Houston, 2 mi W of jct. Hwys. MS 8 and MS 15, at jct. of bypass construction of Hwys. MS 8 and MS 15, 22 Jun 1995, Bryson 14834 and MacDonald (ctb, SWSL); 20 May 1996, Bryson 15237 (ctb, IBE, MICH, MISS, MMNS, MO, SWSL, USMH, VDB, VSC, additional specimens to be distributed). Grenada Co.: Camp McCain, ca. 1.5 mi SSW of jct. of Firetower Rd. and Grant Rd., T21N R5E Sect. 1 W/4 of NE/4, above lake on old Hunt property, 14 May 1996, MacDonald 9400 (BRCH, BRIT, ctb, DSC, GA, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, SWSL, TENN, UARK, UNLV, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed); 20 May 1996, Bryson 15190 and MacDonald (BRCH, ctb, IBE, MICH, NLU, VDB, VSC, additional specimens to be distributed); Camp McCain, edge of Quartermaster Rd. at 0.25 mi S of jct. with Squadron Rd., T21N R6E Sect. 11 W/4, 28 May 1996, MacDonald 9480 (BRCH, ctb, IBE, MICH, SWSL, additional specimens to be distributed). TENNESSEE. Haywood Co.: Hatchie, 5 mi S Brownsville, exposed edge of Big Lake, 28 May 1996, McNeilus s.n. (ctb, additional specimens to be distributed). Morgan Co.: Exposed edge of farm pond, about 0.5 mi N of Cumberland Co. line along Rt. 299, 19 Jun 1996, McNeilus s.n. (ctb, TENN).

*Carex scoparia* Willd. *scoparia* is known from Newfoundland to British Columbia, south to South Carolina, Tennessee, Mississippi, Arkansas, Oklahoma, New Mexico, and Oregon (Bryson et al. 1994; Kolstad 1986; Mackenzie 1931; Radford et al. 1964; Steyermark 1963). The following data are the second report of *C. scoparia* var. *scoparia* from Mississippi, the first from the Longleaf Pine Belt Region, and a range extension southward by about 170 mi (272 km). At this site, it grew on logs and stumps in and along the edges of Simpson Legion Lake in association with *Carex atlantica* Bailey and *C. leptalea* Wahl.



FIGS. 1–3. Fig. 1. Documented distribution of *Carex oklabomensis* in Mississippi. Fig. 2. Documented distribution of *Cyperus difformis* in Mississippi. Fig. 3. Documented distribution of *Cyperus lancastrimensis* in Mississippi.

Voucher specimens: U.S.A. MISSISSIPPI. Simpson Co.: SE side of Simpson Legion Lake, N of Hwy. US 49, T1N R5E Sect. 21 NE/4, 30 Apr 1996, *Bryson 15064* (ctb, IBE, MICH, MO, SWSL).

*Cyperus aggregatus* (Willd.) Endl. is a neotropical perennial weed, apparently introduced into the southeastern United States. It is known from Florida (Kral 1966; Clewell 1985), Louisiana (Horvat 1941), Texas (Correll & Johnston 1970), and Mississippi (Bryson & Carter 1992). Although it has been reported as *C. cayennensis* (Lam.) Britton, *C. flavus* (Vahl) Nees, and *C. huarmensis* (H.B.K.) M.C. Johnston, Tucker (1985) determined *C. aggregatus* to be the correct name for this taxon. The following are the first records of *C. aggregatus* from Pearl River County where, like the other reported sites in Mississippi, it is an aggressive weed of open sandy hilltops and roadsides of the Longleaf Pine Region in association with *Cyperus compressus*, *C. croceus* Vahl, *C. echinatus* (L.) Wood, *C. esculentus* L., *C. retrorsus* Chapman, and *C. rotundus* L.

Voucher specimens: U.S.A. MISSISSIPPI. Pearl River Co.: Poplarville, 0.2 mi W of jct. Hwys. MS 26 and MS 53, 0.5 mi E of jct. Hwys. US 11 and MS 26, S of Hwy. MS 26, T2S R15W Sect. 20, 15 Aug 1994, *Bryson 14190* (BRCH, BRIT, ctb, DSC, GA, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, NY, NYS, SWSL, TENN, UARK, UNLV, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed); 8.6 mi W jct. Hwys. US 11 and MS 26, S of Hwy. MS 26, W of Poplarville, T3S R17W Sect. 11, SW/4 of SW/4, 15 Aug 1994, *Bryson 14197* (BRCH, ctb, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, SWSL, TENN, UARK, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed).

*Cyperus difformis* L., smallflower umbrella sedge, is considered the

thirty-second world's worst weed (Holm et al. 1977). It is a particularly pernicious weed because of its rapid generation time and high reproductive potential. *Cyperus difformis* has the capability of producing several generations per year (seed to seed in 4 to 6 weeks) and can reach 60% of the total biomass in rice production in Asia (Holm et al. 1977). In the United States, *C. difformis* was first collected from Butte County, California in 1915 (Lipscomb 1980), but the first published report of this species was based on a 1921 collection from Butte County, California (Howell 1934). In the eastern United States, *C. difformis* has been known since 1934 from Virginia, where the source of introduction was probably rice-straw used in packing (Fernald 1935).

More recently, *C. difformis* was reported from New Mexico (McGivney 1938), Arizona (Kearney & Peebles 1942), Louisiana (Thieret 1964), Nebraska (Lemaire 1970), Alabama (Kral 1973), North Carolina (Tyndall et al. 1977; Tyndall 1983), Texas (Lipscomb 1980; Carr 1988), Florida (Burkhalter 1985), Tennessee (Webb & Dennis 1981), Pennsylvania (Smith 1986), Mississippi (Bryson & Carter 1992), and Kentucky (Mears & Libby 1995). The occurrence, range expansion, and habitat requirements for *C. difformis* in the United States are discussed by Lipscomb (1980) and Tyndall (1983).

Since its introduction, *C. difformis* has become a troublesome weed of rice in California (Bryson 1984b; Hill et al. 1994). During the past five years, populations of *C. difformis* have become resistant to bensulfuron, a sulfonylurea herbicide, at 72 sites in California (Pappas-Fader et al. 1993; Pappas-Fader 1994; Hill et al. 1994). In the future, *C. difformis* may threaten rice production in the Mississippi River alluvial flood plain and its tributaries. Currently, the Mississippi populations of *C. difformis* are restricted to roadside ditches or other low, wet, disturbed areas often near ports of entry or heavily utilized truck and railroad routes, but *C. difformis* seems to be spreading. Associates of *C. difformis* at the Mississippi sites include *Cyperus erythrorhizos* Muhl., *C. iria*, *C. odoratus* L., *Eleocharis obtusa* (Willd.) Schultes, *Fimbristylis miliacea* (L.) Vahl, *Kyllinga brevifolia* Rottb., *Ludwigia decurrens* Walter, and *Polygonum hydropiperoides* Michaux.

In southern Georgia *C. difformis* was a locally common emergent at the margin of a shallow artificial pond where it was associated with *Axonopus affinis* Chase, *Cyperus erythrorhizos* Muhl., *C. haspan* L., *C. polystachyos* Rottb., *Eclipta alba* (L.) Hassk., *Eleocharis tuberculosa* (Michx.) R. & S., *Hydrochloa caroliniensis* Beauv., *Juncus* spp., *Lipocarpus maculata* (Michx.) Torr., *Ludwigia* spp., *Pontederia lanceolata* Nutt., *Rhynchospora corniculata* (Lam.) Gray, *Sagittaria graminea* Michx., *Salix nigra* Marsh., *Typha latifolia* L., and *Xyris* spp. In Texas *C. difformis* grew in wet, deep alluvial sand where it was associated with *Acer saccharinum* L., *Betula nigra* L., *Campsis radicans* (L.)

Seem. ex Bureau, *Cyperus croceus*, *C. retrorsus*, *Echinochloa walteri* (Pursh) Heller, *Eleocharis obtusa*, *Eragrostis glomerata* (Walt.) Dewey, *E. hypnoides* (Lam.) Britt., *E. secundiflora* Presl, *Eupatorium* sp., *Fimbristylis vablii* (Lam.) Link, *Juncus diffusissimus* Buckley, *Panicum acuminatum* Sw., *P. commutatum* Schultes, *P. rigidulum* Bosc ex Nees, *Populus deltoides* Marsh., *Salix nigra* Marsh., and *Vitis* sp.. Following are the first report of *Cyperus difformis* from Georgia; the first report from southern Alabama, the species previously having been reported from Limestone County in northern Alabama (Kral 1973); the first report from peninsular Florida (Wunderlin 1982), the species having been previously reported only from the Florida panhandle (Burkhalter 1985); the first report from eastern Texas, the species having been previously reported only from the Edwards Plateau Plateau (Lipscomb 1980; Carr 1988); and additional records from three Mississippi counties in the North Central Plateau, the Longleaf Pine Belt, and Coastal Pine Meadows physiographic regions (Fig. 2).

Voucher specimens: U.S.A. ALABAMA. Mobile Co.: Mobile, 0.95 mi W jct. Hwys. US 90 and AL 163 south, concrete storm drain along Commercial Blvd., S of Hwy. US 90, adjacent to bus terminal, 12 Sep 1995, *Carter 12711* (VSC, additional specimens to be distributed). FLORIDA. Orange Co.: Orlando, jct. Hwy. I-4 and Florida Turnpike, barrow pit and adjacent disturbed bayswamp near toll gate, 15 Apr 1994, *Carter 11769* (VSC, additional specimens to be distributed). GEORGIA. Lanier Co.: Moody Air Force Base, Winnersville Bombing Range, shallow artificial ponds near NE corner of range, vicinity of observation tower, 27 Aug 1994, *Carter 11899* (VSC, additional specimens to be distributed). MISSISSIPPI. Forrest Co.: Camp Shelby, NE of McLaurin, potable water station on Forest Ave., 15 Oct 1995, *Bryson 14517*, *MacDonald, Rankin, and Rosso* (ctb, SWSL, VSC). Grenada Co.: Camp McCain, Area 2, T21N R6E Sect. 7 NW/4, 12 Jul 1994, *MacDonald 7335* (BRCH, ctb, IBE, SWSL, VDB, VSC). Rankin Co.: Richland, 3.6 mi S of jct. Hwys. I-20 and US 49, 19 Oct 1994, *Bryson 14651* (BRCH, ctb, IBE, MICH, MISS, MMNS, MO, NLU, SWSL, TENN, UNLV, USMH, VDB, VSC); 2.9 mi S of jct. Hwys. I-20 and US 49, 19 Oct 1994, *Bryson 14652* (ctb, GH, SWSL, VSC). TEXAS. Newton Co.: 0.1 mi E on TX 190 from its jct. with FR 1416 in Bon Weir, then 0.6 mi on an un-named paved road, then 1.6 mi E on another un-named paved road to the W-bank of the Sabine River, S of Bon Weir, open to partially wooded riverine habitat with alluvial, deep sands, occasional, 27 Jul 1990, *S. and G. Jones 5614 and J. Wipff* (MICH).

*Cyperus eragrostis* Lamarck is known from California, Oregon, Washington, Texas, and British Columbia in North America; Argentina, Bolivia, Brazil, Chile, Peru, Surinam and Uruguay in South America; Easter and Juan Fernandez Islands in the Pacific (Denton 1978; Tucker 1987; Tucker 1994). *Cyperus eragrostis* has been reported as a waif in South Carolina (Tucker 1987), and it was first reported from Mississippi by Bryson and Carter (1994). Tucker (1987) reported that it has become naturalized in southern Europe and southeastern Texas. This weedy perennial seems to be spreading in Mississippi and should be expected in other southeastern states. It was not reported in the Atlas of the Vascular Flora of Louisiana

(Thomas and Allen 1993a). The following data are for the first report of *C. eragrostis* from Louisiana, where it grew in open wet areas on clay soil in association with *C. difformis*, *C. elegans*, *C. iria*, *C. ochraceus*, *C. odoratus*, *C. oxylepis*, *C. squarrosus*, and *C. surinamensis*. Additional records from the Coastal Pine Meadows and the Longleaf Pine Belt regions of Mississippi are presented.

Voucher specimens: U.S.A. LOUISIANA. St. Bernard Parish: Chalmette, St. Bernard Port area to W of Chalmette National Historical Park, 28 Jul 1994, *Bryson 14012* (ctb, NLU, SWSL, VSC). MISSISSIPPI. Hancock Co.: N of Waveland, ca. 2 mi N of jct. Hwys. US 90 and MS 43, E of Hwy. MS 43, 17 Oct 1994, *Bryson 14576 and MacDonald* (ctb, VSC). Hinds Co.: Jackson, jct. I-55 and High Street, 28 Jun 1995, *Bryson 14866* (BRCH, ctb, IBE, MICH, SWSL, VDB, VSC). Perry Co.: New Augusta, NE of jct. and Hwys. US 98 and MS 29, 7 Sep 1994, *Bryson 14344* (ctb, DSC, GA, GH, IBE, MICH, MISS, MMNS, MO, NLU, NY, NYS, SWSL, TENN, USMH, VDB, VPI, VSC, WIS); 19 Oct 1994, *Bryson 14641* (ctb, IBE, MICH, MISS, USMH, VSC). Rankin Co.: Flowood, 1.1 mi W of jct. Hwys. MS 25 and MS 475, 28 Jun 1995, *Bryson 14867* (BRCH, ctb, IBE, MICH, MISS, MMNS, MO, NLU, SWSL, VDB, VSC).

*Cyperus lancastricensis* Porter in Gray was first reported from Mississippi by Morris (1988) from Grenada County in the North Central Plateau Region. Subsequently, it was reported from Itawamba, Lee, and Tishomingo counties in the Tennessee River Hills Region and from Tate and Marshall County in the North Central Plateau Region (Bryson & Carter 1992; Bryson & Carter 1994). The following additional county records for *C. lancastricensis* in Mississippi are from the Black Prairie Region (Clay County), the transition from the Black Prairie and Tennessee River Hills regions (Lowndes County), and the Tennessee River Hills (Monroe County). As previously reported (Bryson & Carter 1992; 1994), *C. lancastricensis* was growing in association with *C. echinatus* and *C. strigosus*. The distribution of *C. lancastricensis* in Mississippi is presented in Fig. 3.

Voucher specimens: U.S.A. MISSISSIPPI. Clay Co.: West Point, W of Hwy. US 45 Alt.; 0.5 mi S of jct. Hwys. US 45 Alt. and MS 50, 10 Aug 1994, *Bryson 14169 and Byrd* (BRCH, ctb, IBE, NLU, SWSL, TENN, USMH, VSC, additional specimens to be distributed). Monroe Co.: N of Monroe-Lowndes Co. line, where US Hwy. 45 crosses Buttahatchee River, 4 Sep 1994, *MacDonald 7584* (ctb). Lowndes Co.: Dewayne Hayes Recreational Area on Tennessee Tombigbee Waterway, T17S R18W Sect. 7 NW/4 of NW/4, 10 Jul 1994, *MacDonald 7308 and Warren* (ctb).

*Cyperus lanceolatus* Poiret is a pantropical weed (Kükenthal 1935-1936) known from northern Florida, where it occurs in marshy and boggy shorelines, seepage slopes, mucky ditches, wet sandy alluvial soils, wet clearings, and ditches (Godfrey & Wooten 1979). In the field, *C. lanceolatus* is similar in appearance, habit, and habitat to *C. flavescens* L., but it is readily distinguished by scales that are more golden yellow in color, by achenes that are orange-brown to brownish rather than black, and by narrower leaves. The habitat of *C. lanceolatus* in Mississippi is similar to and in some cases



the same as that for *Sacciolepis indica* (L.) Chase and *Cyperus louisianensis* Thieret, as recently reported from Mississippi (Bryson & Lockley 1993; Bryson & Carter 1994). At the following sites, *C. lanceolatus* grew on mucky sandy or clayey soils of the Coastal Plain in association with *Carex longii* Mackenzie, *Cyperus haspan*, *C. odoratus*, *C. polystachyos* Rottb., *C. pseudovegetus* Steudel, *C. strigosus* L., *C. surinamensis* Rottb., *Fimbristylis autumnalis* (L.) R. & S., *Fuirena breviseta* (Coville) Coville in Harper, *Kyllinga brevifolia*, *K. odorata* Vahl, *Lipocarpa maculata* (Michx.) Torr., *Eleocharis* sp., *Juncus* sp., *Rhynchospora glomerata* Vahl, *Sacciolepis indica*, *Xyris* sp., and in one site *Cyperus louisianensis* Thieret. Slopes above included *Cyperus ovatus* Baldwin and *C. retrorsus*. *Cyperus lanceolatus* is not included in Jones and Coile (1988). The following citations are the first reports of *C. lanceolatus* from Mississippi and Georgia.

Voucher specimens: U.S.A. **GEORGIA**. Brantley Co.: ditch by Hwy. US 82, 6 mi W of Hwy. US 301 in Nahunta, locally common, 21 Sep 1991, *Carter* 9229 (GA, IBE, MICH, NLU, NY, US, VDB, VSC). Camden Co.: Kings Bay Submarine Base, along unmarked paved road by west end dredge disposal area, ca. 700 m N of U.S.S. Mariano Vellajo Avenue, open seepy slope along ditch, 9 Jul 1996, *Carter* 13180 (VSC, additional specimens to be distributed). Charlton Co.: Along road to Folkston Airport, 17 Aug 1980, *McNeilus* 20 (ctb); mucky seepage slope along Hwy. GA 121, 10.7 mi N of Hwy. GA 94 in St. George, 9 Jul 1991, *Carter & Jones* 8855 (VSC, etc.); seepage slope along Hwy. GA 252, just N of Mays Bluff Branch, ca. 6 mi N of Folkston, 9 Jul 1991, *Carter & Jones* 8859 (VSC, etc.). Clinch Co.: 12.2 mi S of Homerville, sandy ditch bottom in flatwoods beside Hwy. GA 187, 2 Sep 1987, *Carter* 6313 (FLAS, GA, IBE, MO, NLU, NY, SWSL, US, VDB, VSC). Echols Co.: cut-over flatwoods, edge of shallow pond, S of Hwy. GA 94, 9.6 mi E of Hwy. US 129 in Statenville, 9 Jul 1991, *Carter & Jones* 8815 (FLAS, GA, IBE, MICH, MISSA, MO, NLU, NY, NYS, TAES, US, VDB, VSC). Lowndes Co.: 1.5 mi E of Valdosta jct. Hwys. US 41 and US 221, disturbed sandy loam along S side of Hwy. US 221, 27 Aug 1994, *Carter* 11900 (VSC, additional specimens to be distributed); jct. Rts. 94 and 135, exposed roadside, 5 Sep 1991, *McNeilus* 91-1167 (ctb). **MISSISSIPPI**. Hancock Co.: Mississippi Welcome Center, SW of jct. Hwys. I-10 and MS 607, 17 Oct 1994, *Bryson* 14566 and *MacDonald* (ctb, NLU, SWSL, VDB, VSC); *MacDonald* 8062 and *Bryson* (IBE). Pearl River Co.: Picayune, 0.1 mi W jct. Hwys. I-59 and MS 43; between I-59 and Cooper St., N of Hwy. MS 43, 27 Jul 1994, *Bryson* 14005 (BRCH, ctb, DSC, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, SWSL, UNLV, USMH, VDB, VSC, additional specimens to be distributed); 16 Aug 1994, *Bryson* 14250 (BRCH, BRIT, ctb, DSC, GA, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, NY, NYS, SWSL, TENN, UARK, UNLV, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed); Picayune, along old Hwy. MS 43 S, W of of Hwy. jct. Hwys. I-59 and MS 43, 16 Aug 1994, *Bryson* 14245 (BRCH, ctb, IBE, SWSL, VSC, additional specimens to be distributed); Picayune, E of jct. Hwys. I-59 and MS 43 along both sides of Sycamore Rd. at jct. with George Mitchell Rd., 16 Aug 1994, *Bryson* 14252 (BRCH, ctb, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, SWSL, TENN, UARK, USMH, VDB, VPI, VSC, additional specimens to be distributed); Picayune, NE of Picayune by Sycamore Rd. at jct. with Hwy. I-59, 7 Sep 1994, *Bryson* 14350 (ctb, IBE, NLU, SWSL, VSC, additional specimens to be distributed).

*Cyperus ochraceus* Vahl is a tufted perennial known from the Antilles and from Louisiana and Texas south through Mexico and Central America, and in Columbia, Venezuela, and Argentina (Denton 1978). Throughout its range, *C. ochraceus* occurs in open sandy, silty, or clayey soils of ditches, fields, pastures, swamps, lava flows, cleared depressions in pine-oak forests or subtropical forests, and near lakes or streams from sea level up to 2350 meters elevation (Denton 1978). In Mississippi, *C. ochraceus* grew on a clay soil with fragments of oyster shells, similar to the areas where the authors have observed this species near New Orleans, Louisiana. At the following site *C. ochraceus* grew in association with *Cyperus difformis*, *C. elegans* L., *C. entrerianus* Boeckeler, *C. esculentus*, *C. iria*, *C. oxylepis* Nees in Steudel, *C. pseudovegetus* Steudel, *C. surinamensis* Rottb., *C. virens* Michaux, *Eleocharis obtusa*, *Fimbristylis autumnalis* (L.) R. & S., *Kyllinga brevifolia*, and *Panicum repens* L. The following is the first report of this species from Mississippi.

Voucher specimens: U.S.A. MISSISSIPPI. Jackson Co.: Pascagoula, Bayou Cassotte Industrial Park Area, S of City Animal Shelter at end of Louise St., 0.4 mi S of Washington Ave., 28 Jul 1994, Bryson 14025 (ctb, IBE, MICH, MO, SWSL, VSC, additional specimens to be distributed).

*Cyperus oxylepis* Steudel is known from South America, the Caribbean (Kükenthal 1936), and coastal areas of the southeastern United States where it has been reported from southeastern Texas (O'Neill 1938), Louisiana (Thieret 1964), Mississippi (Bryson & Carter 1992), and South Carolina (Tucker 1987). Recently, *C. oxylepis* has been found in Georgia in highly disturbed coastal, dredge-filled sites with grayish-black soil, similar to sites in Mississippi. It was associated with *Atriplex arenaria* Nutt., *Batis maritima* L., *Chenopodium ambrosioides* L., *Conyza bonariensis* (L.) Cronq., *Heliotropium curassavicum* L., *Mollugo verticillata* L., *Phyla nodiflora* (L.) Greene, *Salsola kali* L., *Sarcocornia perennis* (Mill.) A.J. Scott, *Suaeda linearis* (Ell.) Moq., *Tamarix* sp. Following are the first records of this taxon from Georgia.

Voucher specimens. U.S.A. GEORGIA. Camden Co.: Kings Bay Submarine Base, dredge disposal area, 0.88 mi (air) WNW Warrior Wharf, open fill site with grayish black clay, between 30°47'11"N 81°30'52"W and 30°47'20"N 81°30'45"W, 8 Jul 1996, Carter 13100 (VSC, additional specimens to be distributed); dredge disposal area N of USS Mariano Vellajo Avenue, 1 mi (air) W Kings Bay, 9 Jul 1996, Carter 13152 (VSC, additional specimens to be distributed).

*Cyperus pilosus* Vahl is a weedy introduction into the United States from tropical and subtropical regions, possibly Asia. It is known from Asia, Australia, and West Africa (Kükenthal 1935-1936) and in the United States from Louisiana (O'Neill 1938), Florida (Burkhalter 1985), and Mississippi (Bryson & Carter 1992). Like *C. difformis*, *C. pilosus* is a common rice weed in Asia, and it is a threat to rice production in the United States (McGivney 1938). *Cyperus pilosus* is easily identified in the field (see Bryson & Carter

1992). The following data are the first reports of *C. pilosus* from Forrest County in the Longleaf Pine Belt Region of Mississippi.

Voucher specimens: U.S.A. MISSISSIPPI. Forrest Co.: Camp Shelby, potable water station on Forrest Ave., 21 Sep 1994, *MacDonald 7706 and Wyrick* (ctb, IBE, SWSL); Camp Shelby, NE of McLaurin, along Hartfield Creek, 15 Oct 1995, *Bryson 14509, MacDonald, Rankin, and Rosso* (ctb, IBE, SWSL, VSC, additional specimens to be distributed); Camp Shelby, NE of McLaurin, potable water station on Forrest Ave., 2.9 mi E of Warehouse Rd., 15 Oct 1995, *Bryson 14513 and MacDonald, Rankin, and Rosso* (ctb, additional specimens to be distributed); Camp Shelby, NE of McLaurin, S of Forrest Ave., 15 Oct 1995, *Bryson 14521, MacDonald, Rankin, and Rosso* (BRCH, ctb, IBE, MICH, MISS, NLU, USMH, VDB, VSC, additional specimens to be distributed).

*Cyperus pumilus* L. is widespread in the Old World, and in the New World is known from the West Indies and the United States (Kükenthal 1936). In the United States it is known only from Florida (Chapman 1889: as *Cyperus divergens* Kunth; Small 1933; Kükenthal 1936; Long & Lakela 1971; Godfrey & Wooten 1979; Wunderlin 1982; Clewell 1985). It is a diminutive, densely tufted annual of disturbed sandy loams. Following are collection data for *C. pumilus* in Georgia where it grew in association with *Cyperus croceus*, *C. compressus*, *C. esculentus*, *C. retrorsus*, *C. rotundus*, *C. surinamensis*, *Fimbristylis autumnalis*, *Kyllinga brevifolia*, *Eleocharis obtusa*, *Echinochloa crus-galli* (L.) Beauv., and *Juncus* spp.

Voucher specimens. U.S.A. GEORGIA. Clinch Co.: along railroad tracks in Fargo off Hwy. GA 94, just W of Hwy. US 441, 21 Sep 1982, *Gary F. Joye s.n.* (NLU-mixed with *Cyperus compressus* L., fragment and photocopy at VSC); 22 Oct 1994, *Carter 12373* (ctb, SWSL, VDB, VSC).

*Cyperus surinamensis* Rottb. is widespread and weedy in sandy coastal areas of the southeastern United States and has been reported inland in Arkansas, Oklahoma, and Kansas (Denton 1978). Smith (1978) reported *C. surinamensis* from Arkansas based on a report by Lipscomb (1978). This specimen later determined to be *C. acuminatus* Torrey & Hooker (E. B. Smith, person communication). Although these specimens, [*Locke s.n.* (UARK)] cited by Lipscomb (1978) and [*Harvey 4* (GH)] cited by Denton (1978), are immature both were verified as *C. surinamensis* by the authors. *Cyperus surinamensis* is not included in the *Checklist of the Vascular Plants of Tennessee* (Wofford & Kral 1993). The following data are the first reports of *C. surinamensis* from Tennessee and an additional county record for Arkansas. In Arkansas, *C. surinamensis* grew in association with *C. esculentus*, *C. erythrorhizos*, *C. iria*, *C. odoratus*, *C. polystachyos* Rottb., *C. pseudovegetus*, *C. rotundus*, *C. strigosus*, *Fimbristylis autumnalis*, *F. vahlia* (Lam.) Link, and *Lipocarpus micrantha* (Vahl) Tucker. In Tennessee, it grew in association with *C. acuminatus*, *C. compressus*, *C. croceus*, *C. echinatus*, *C. esculentus*, *C. flavicomis* Michaux, *C. iria*, *C. odoratus*, *C. rotundus*, *C. strigosus*, *Echinochloa crus-galli*, *Fimbristylis autumnalis*, and *F. miliacea*.

Voucher specimens: U.S.A. ARKANSAS. Chicot Co.: Lake Chicot, along shoreline across from jct. of Hwys. AR 144 and AR 257, 19 Sep 1994, *Bryson 14415 and Tidwell* (BRCH, BRIT, ctb, DSC, GA, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, NY, NYS, SWSL, TENN, UARK, UNLV, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed). TENNESSEE. Shelby Co.: Memphis, S of Perkins Road at Mall of Memphis, 13 Sep 1993, *Bryson 13022 and Bryson* (ctb, VDB); Memphis, SW of jct. Perkins Road and American Way, NE of Mall of Memphis, 13 Oct 1993, *Bryson 13118* (ctb).

*Eleocharis macrostachya* Britton is essentially a western species, ranging from Saskatchewan, Alberta, and British Columbia southward to Louisiana, Texas, California, and into Mexico, and eastward into Illinois (Svenson 1957; Correll & Johnston 1970; Kolstad 1986; Cranfill 1993). It is a member of the *Palustres* complex and can be distinguished from related *E. smallii* Britton and *E. erythropoda* Steudel, by its conical tubercles, rigid compressed culms, and truncate sheaths (Svenson 1957; Harms 1968; Kolstad 1986). In Mississippi, *E. macrostachya* was locally abundant in roadside ditches on high hydroperiod clay soil in the Delta Region where it was associated with *Carex molesta* Mackenzie, *Echinochloa colonum* (L.) Link, *Juncus effusus* L., and *Sagittaria* spp. Following are the first records of *Eleocharis macrostachya* from Mississippi.

Voucher specimens: U.S.A. MISSISSIPPI. Washington Co.: Greenville, SW of jct. Hwy. US 82 with Raceway Road, ditch by Hwy. US 82, 9 May 1994, *Bryson 13435* (BRCH, ctb, IBE, MMNS, MO, SWSL, USMH, VDB, VSC, additional specimens to be distributed); 17 Jun 1996, *Bryson 15346 and Carter* (ctb, SWSL); *Carter 12940 and Bryson* (VSC, additional specimens to be distributed); Leland, NE of jct. Hwy. US 82 with California Ave., T18N R7W Sect. 22 NE/4, 12 May 1994, *Bryson 13437* (BRCH, BRIT, ctb, DSC, GH, IBE, KNK, MICH, MISS, MMNS, MO, NLU, NY, SWSL, TENN, USMH, VDB, VSC, WIS, additional specimens to be distributed); 29 May 1994, *Bryson 13918* (BRCH, BRIT, ctb, DSC, GA, GH, IBE, KNK, MICH, MISS, MMNS, MO, NY, SWSL, TENN, UARK, UNLV, USMH, VDB, VPI, VSC, WIS, additional specimens to be distributed).

*Kyllinga brevifolioides* (Delahoussaye & Thieret) Tucker was described based on specimens from Connecticut, North Carolina, Pennsylvania, and Virginia (Delahoussaye & Thieret 1967; Tucker 1984, 1987). Subsequently, *K. brevifolioides* has been reported from Maryland (Sipple 1978; Naczi et al. 1986), Tennessee (Kral 1981; Webb et al. 1981), Alabama and Georgia (Webb et al. 1981), New Jersey (Snyder 1983; 1984), Delaware (Naczi 1984; Naczi et al. 1986), Arkansas (Sundell & Thomas 1988), Mississippi (Bryson & Carter 1994), and Kentucky (Mears & Libby 1995). Like *K. brevifolia*, *K. brevifolioides* is an aggressive, troublesome perennial weed of lawns, turf, wet roadsides, ditches, cemeteries, and flowerbeds (Bryson & Carter 1994). Ferren & Schuyler (1980) and Webb & Dennis (1981) suggest that, like *K. brevifolia* and *K. odorata*, *K. brevifolioides* was possibly introduced from Asia. This collection reported herewith is the first report for

Monroe County in the Tennessee River Hills Region of Mississippi. This site is unique because *K. brevifoloides* grew on the bases and stumps of *Taxodium distichum* (L.) Rich. at or just above water and was associated with *Bidens discoidea* (Torr. & Gray) Britt., *Cyperus odoratus*, *Hypericum walteri* J.G. Gmel., and *Ludwigia leptocarpa* (Nutt.) Hara.

Voucher specimens: U.S.A. MISSISSIPPI. Monroe Co.: vicinity of Aberdeen, Aberdeen Lake Section of Tennessee-Tombigbee Waterway, T13S R7E Sect. 33 NW/4, 4 Nov 1995, MacDonald 9265, Warren, and Hartley (crb, IBE, SWSL, VDB, VSC, additional specimens to be distributed).

*Oxycaryum cubense* (Poepp. & Kunth in Kunth) Lye {=*Scirpus cubensis* Poepp. & Kunth in Kunth, *O. schomburgkianum* Nees in Martius} is widely distributed, occurring in the West Indies (Kunth 1837), South and Central America (Nees von Esenbeck 1842; Adams 1994), the southeastern United States (Chapman 1889; Small 1933; Godfrey & Wooten 1979; Tucker 1987), and tropical Africa (Lye 1971; Haines & Lye 1983). In the southeastern United States, it is known from Florida (Chapman 1889; Wunderlin 1982; Clewell 1985), southern Alabama (Mohr 1901; Lelong 1988), Louisiana (Thomas & Allen 1993), and coastal Texas (Correll & Johnston 1970; Hatch, Gandhi & Brown 1990).

In habit and inflorescence morphology *O. cubense* resembles a *Cyperus*. It has spiral scale arrangement, a *Cyperus*-type embryo (van der Veken 1965; Lye 1971), and has been classified in both Cyperaceae (Lye 1971) and Scirpaeae (Bruhl 1995). Inflorescence morphology varies in *O. cubense*, with specimens from peninsular Florida having umbellate inflorescences and those from Alabama, Louisiana, and Georgia consistently having capitate inflorescences. So far as we are able to determine, inflorescence form in *O. cubense* correlates with no other characters.

*Oxycaryum cubense* has been observed by Carter in peninsular Florida, southern Georgia, and southern Alabama, where it forms extensive floating mats in ponds, ditches, or impounded bayswamps. In Georgia and Alabama, *O. cubense* is apparently aggressive and invasive, forming monotypic floating batteries that may cover large areas of ponds to the exclusion of other aquatic plants. The following taxa were associated with *O. cubense* at the Baldwin County, Alabama, site: *Cyrilla racemiflora* L., *Hydrochloa caroliniensis* Beauv., *Liriodendron tulipifera* L., *Ludwigia* spp., *Hypericum* spp., *Magnolia virginiana* L., *Mayaca fluviatilis* Aubl., *Mikania scandens* (L. f.) Willd., *Myrica cerifera* L., *Nyssa biflora* Walt., *Salix nigra* Marsh., *Sambucus canadensis* L., *Sapium sebiferum* (L.) Roxb., *Typha latifolia* L., and *Utricularia* sp. At this site large specimens of *Nyssa biflora* in standing water were dying, indicating recent impoundment of the bayswamp or at least a recent increase in water-level, either, the likely result of beaver activity.

In Alabama, *O. cubense* was reported long ago from Mobile County (Chapman 1889, p. 660; Mohr 1901) and apparently was not seen again until 1976 when it was found in Baldwin County (Lelong 1988). Thus, the Alabama collection reported herein is apparently only the second collection from Alabama this century. The Georgia record cited below is the first from the state.

Voucher specimens. U.S.A. ALABAMA. Baldwin Co.: 0.17 mi W jct. Hwy. US 90 and county rd. 62, impounded bayswamp (beaver pond?) along N side Hwy. US 90, locally abundant, 10 Sep 1995, *Carter 12655* (ctb, SWSL, VDB, VSC). GEORGIA. Lowndes Co.: 5.3 miles E of Valdosta city center (courthouse), impounded bayswamp and ditch along N side Hwy. US 84, 26 Apr 1994, *Carter 11816* (ctb, SWSL, VDB, VSC); 18 May 1994, *Carter 11818* (ctb, SWSL, VDB, VSC); 9 Aug 1994, *Carter 11847* (ctb, SWSL, VDB, VSC).

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