Carex pigra, a New Species of *Carex* Section *Griseae* (Cyperaceae) from the Southeastern United States of America

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ABSTRACT. *Carex pigra* is described as new from Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. Loosely and few-flowered pistillate spikes, long staminate spike peduncles, perigynia usually 3.9–4.5 mm long, and achenes occupying most of the space within the perigynia are among the characters distinguishing *C. pigra* from what are probably its closest relatives, *C. flaccosperma* and *C. glaucodea*. *Carex pigra* occurs mostly in moist to wet deciduous forests.

Carex sect. *Griseae* (L. H. Bailey) Kükenthal is a group of sedges endemic to eastern North America that is most diverse in mesic deciduous forests of the southeastern United States. Numerous (usually 40 or more), longitudinal sclerenchyma traces ("nerves" of earlier authors, e.g., Fernald, 1950; Gleason & Cronquist, 1991) that are impressed in living and dried perigynia are apomorphies diagnosing the section. Additional characters shared by members of section *Griseae*, though not unique to them, include glabrous leaf and bract blades, long-sheathing lower bracts, usually unisexual spikes with only the terminal one staminate, and glabrous perigynia with entire apices. This section (including sect. *Oligocarpae* (Carey) Mackenzie) contains twenty-one species, one of which I describe here as new. This new species is more widespread and frequent than any of the six other species recently described as new in section *Griseae*, which are narrow endemics or rare (Bryson et al., 1987; Kral et al., 1987; Bridges & Orzell, 1989; Naczi, 1989, 1993).

Carex pigra Naczi, sp. nov. TYPE: U.S.A. Mississippi: Lowndes County, 1.8 mi. W of Mayhew, ca. 0.3 mi. E of Oktibbeha County border, ca. 0.5 mi. W of junction of routes 45 Alternate and Old 82, 15 May 1989, *Naczi 2174A & Bryson* (holotype, MICH; isotypes, KNK, NCU, NY, US, herb. Bryson). Figure 1.

A *Carex flaccosperma* spicis femineis angustioribus, perigyniis brevioribus et ascendentioribus, perigyniis (1.7–)1.8–2.0plo longioribus quam corporibus acheniorum, stipitibus acheniorum brevioribus, rostris acheniorum flexis differt; a *Carex glaucodea* perigyniis paucioribus, laxioribus, longioribus, et (1.9–)2.1–2.6(–2.8)plo longioribus quam latioribus differt; a speciebus ambabus pedunculis spicarum terminalium longioribus differt.

Perennial herb, densely caespitose. Rhizomes short, 0.2–6 mm long between shoots or branches of the rhizomes, with internodes 0.2–4.2 mm long, 1.2–2.8 mm thick, covered with cataphylls 2–5 mm long. Shoot bases usually surrounded by cataphylls but not by bases of old leaves, stramineous. Reproductive shoots 10–51 cm tall, erect to spreading, elongating slightly in fruit; culms 0.6–1.3 mm wide at mid-height, smooth throughout, obtusely trigonous. Cataphylls glabrous, stramineous to whitish, multicostate. Leaves of reproductive shoots 2–5, arising in basal 0.004–0.13 of culms, the longest 0.37–0.85 times as long as culms; blades 4.8–20 cm long, 3.8–12.3 mm wide, the widest 6.1–12.3 mm wide, glaucous, flat to barely plicate, margins smooth or antrorsely scaberulous, adaxial surface smooth or sparsely antrorsely scaberulous on main veins, abaxial surface smooth; leaf sheaths 1.7–4.7 cm long, loose, glabrous, glaucous with bases whitish or stramineous; adaxial face of sheaths with hyaline and glabrous band, hyaline band with apex slightly concave to slightly convex; ligules 3.8–6.8 mm long, lingulate with apex obtuse. Vegetative shoots 13–33 cm tall, 0.50–0.82 times as tall as culms; leaves 4–6, similar to those of culms except blades 6.3–27 cm long; pseudoculms 2.1–6.9 cm tall, 3.2–5.2 mm wide, 0.15–0.22 of vegetative shoot height. Infructescences 8.7–47 cm long, 0.71–0.93 of culm height, usually with the upper 2–3 spikes overlapping, rarely with all spikes separate; the uppermost lateral spikes 0.3–11.4 cm distant; the lower spikes separate, 4.0–18 cm distant; lowest bract with blade 6.2–18 cm long and 0.31–0.70 times as long as culm, sheath 0.9–4.7 cm long, adaxial face of sheath with glabrous and hyaline band occupying full length or a portion of sheath, hyaline band with apex slightly convex and elongated 0.2–2.2 mm above sheath apex, sheath glabrous abaxially, ligule (3.0–)5.2–10.2 mm long;

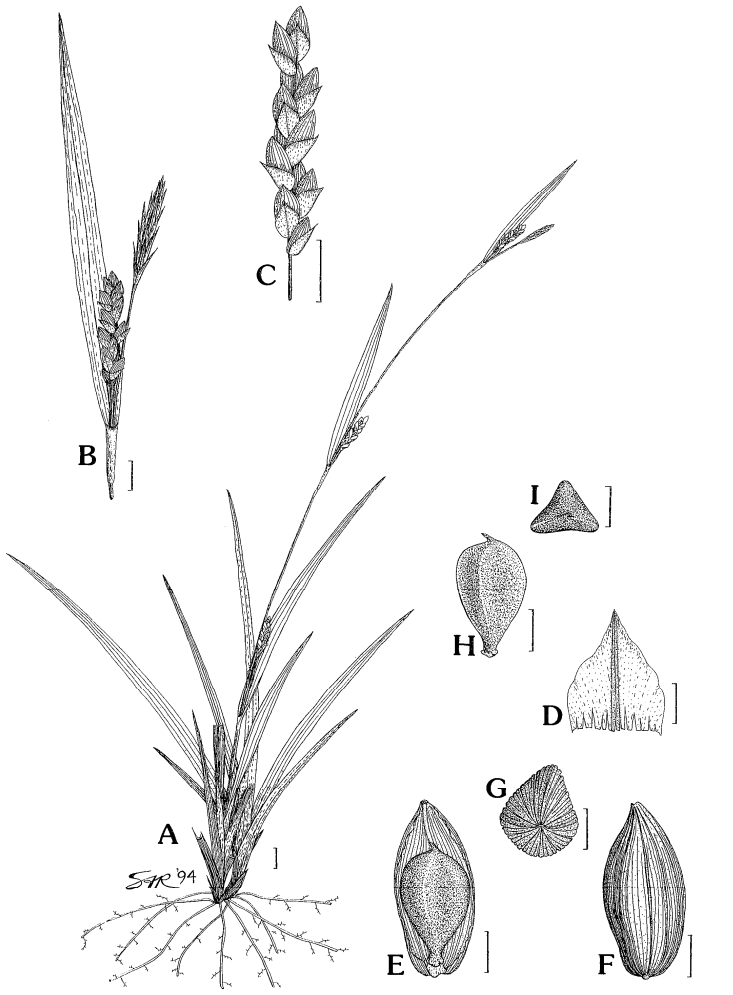

Figure 1. *Carex pigra* Naczi. —A. Habit. —B. Upper portion of infructescence. —C. Pistillate spike. —D. Pistillate scale. —E. Perigynium, side view, dissected to reveal achene. —F. Perigynium, side view. —G. Perigynium, top view. —H. Achene, side view. —I. Achene, top view. Bar equals 1 cm in A, 5 mm in B–C, and 1 mm in D–I. Drawn from the holotype.

bract blade of uppermost lateral spike 1.3–9.1 cm long and slightly shorter than terminal spike to much exceeding terminal spike, sheath 1.4–8.8 mm long and glabrous; uppermost bract scale-like, sheathless, body 3.2–6.7 mm long and awn 0–13.6 mm long. Spikes (3–)4–6, simple, single at nodes, erect; terminal spike 0.6–3.2 cm long, the longest 0.9–3.2 cm long, 1.8–3.3 mm wide, entirely staminate, 8–93-flowered, on erect and smooth peduncle 1.5–37(–62) mm long, usually overlapping uppermost lateral spike and slightly exceeding it or slightly exceeded by it, rarely exceeding uppermost lateral spike and separate from it; lowest spike 0.8–2.3 cm long, 3.3–4.6 mm wide, entirely pistillate, 5–16-flowered, the perigynia spirally and loosely imbricate, the internode between the lowest perigynia 0.6–3.3 mm long, on erect, smooth peduncle 1.8–11 cm long; upper lateral spikes 0.8–3.2 cm long, 4.0–6.1(–6.8) mm wide, entirely pistillate and 9–25(–28)-flowered, the perigynia spirally and loosely imbricate, spike length (in mm)/number of flowers ratio (0.97–)1.0–1.3(–1.6), on erect and smooth peduncles 0.4–8.4 cm long. Staminate scales (3.9–)4.5–5.3 mm long, 1.6–2.0 mm wide, narrowly elliptic to elliptic, acute to acuminate, awnless, center green and 1-nerved, margins hyaline and whitish or whitish with ferrugineous speckles and streaks. Pistillate scales 1.9–3.2(–4.5) mm long, 1.3–2.2 mm wide; body (1.7–)1.9–2.4(–2.6) mm long, (0.40–)0.45–0.59(–0.67) times as long as perigynium, broadly ovate or ovate, awnless or with midrib prolonged as sparsely antrorsely scaberulous awn 0.1–0.9(–1.9) mm long, center green and 1–3(–6)-nerved, margins entire, hyaline, pale ferrugineous to whitish. Anthers 3, 1.6–2.6 mm long. Styles jointed with achenes, portion distal to achene withering with age, portion proximal to achene persistent and becoming achene beak; base 0.15–0.20 mm wide. Stigmas 3, 1.0–1.6 mm long, withering with age. Perigynia (3.7–)3.9–4.5(–4.7) mm long, 1.5–2.2 mm wide, (1.9–)2.1–2.6(–2.8) times as long as wide, (1.7–)1.8–2.0 times as long as achene bodies, ascending, obtusely triangular in cross section, faces slightly convex to flat, nerves shallowly impressed and 42–56, glabrous, glaucous to red-brown, narrowly ovoid or lance-ovoid, very gradually tapered from widest point to broad and truncate base, gradually tapered to straight and subacute or acute apex, beakless or with minute beak; beaks 0–0.2(–0.4) mm long, 0–0.05(–0.11) of perigynium length, straight, smooth, entire. Achenes 2.6–3.1 mm long, (1.3–)1.4–1.6 mm wide, loosely enveloped by perigynia, obovoid, obtusely trigonous, faces slightly concave to flat, brown, basally abruptly contracted to stipe, apically abruptly contracted to beak; stipe 0.1–0.3(–0.5) mm long, usually vertical; body (2.0–)2.1–2.4(–2.5) mm long, with widest point 0.7–1.1 mm from body apex; beak (0.1–)0.2–0.4(–0.5) mm long, bent (0–)30–90° from vertical.

Carex pigra appears to be most closely related to *C. flaccosperma* Dewey and *C. glaucodea* Tuckerman. All of these species share glaucous and relatively wide foliage (widest leaf (5.1–)6.2–11.1(–13.5) mm wide), as well as awnless or short-awned pistillate scales (awn 0–0.9(–1.9) mm long). The rest of the species of *Carex* sect. *Griseae* have foliage that is green (except *C. brysonii* Naczi, which has glaucescent foliage) and narrower (widest leaf 2.0–6.8(–9.1) mm wide), as well as long-awned pistillate scales (awn (0.2–)1.1–8.3(–13.7) mm long).

Carex pigra differs from *C. flaccosperma* in having narrower pistillate spikes, shorter perigynia that spread less in the spikes, achene bodies that occupy more of the space within the perigynia, shorter achene stipes, and bent achene beaks. Relative to *C. glaucodea, C. pigra* has fewer and longer perigynia with higher length/width ratios that are more loosely overlapping in each spike. In addition, *C. pigra* has longer staminate spike peduncles than either *C. flaccosperma* or *C. glaucodea.* The key below highlights the distinctive features of *C. pigra.* Mature, complete, and ample specimens are necessary for identification. Depauperate specimens are difficult to identify. Because ranges of measurements of key characters overlap somewhat among the species, often one must consider all key characters when attempting to identify *C. pigra, C. flaccosperma,* and *C. glaucodea.* Despite this overlap, I have seen no specimens that simultaneously overlap in more than one or two key characters between *C. pigra* and *C. flaccosperma* or *C. pigra* and *C. glaucodea.*

Carex pigra usually inhabits moist to wet deciduous forests, forest openings, and forest edges. Occasionally, it grows in seasonally moist to wet prairies, especially in the western part of its range. Its substrates are acidic to slightly alkaline clays and loams. *Carex pigra* ranges from southeastern Virginia west to eastern and southern Tennessee and south to northern Florida, southern Alabama, and northeastern Mississippi. It occurs in several physiographic provinces, but most of its range lies in the Piedmont and the Coastal Plain. Range-wide, it is an infrequent species. It appears to be most common in central North Carolina. The paratypes cited below are a representative sample of 170 records (about 250 total specimens) I have studied. Flowering plant species that frequently associate with *C. pigra* include *Acer rubrum* L., *C. blanda* Dewey,

C. amphibola var. *amphibola* sensu Fernald (1950), *Cornus florida* L., and *Liquidambar styraciflua* L. Nearly throughout its range, *Carex pigra* is sympatric with *C. flaccosperma*. *Carex pigra* tends to grow in slightly drier soils than *C. flaccosperma*. Nevertheless, plants of the two species occasionally grow syntopically. In such situations, *C. flaccosperma* usually grows low on a floodplain, with *C. pigra* low on a slope adjacent to the floodplain or on the upper portion of the floodplain. I have never detected intermediates or hybrids between *C. pigra* and *C. flaccosperma*. *Carex pigra* is sympatric with *C. glaucodea* only at the northern and western edges of the range of the former, the bulk of the range of *C. pigra* being more southeastern than that of *C. glaucodea*. Rarely, plants of these two species do grow syntopically. In localities of syntopy, *C. pigra* tends to grow in moister soils than *C. glaucodea*. As with *C. flaccosperma*, I have seen neither intermediates nor hybrids between *C. pigra* and *C. glaucodea*.

Botanists have collected *C. pigra* since 1868 (*Mohr s.n.* in Montgomery County, Alabama), usually identifying it as *C. flaccosperma*. The fact that *C. pigra* is intermediate in perigynium length between *C. flaccosperma* and *C. glaucodea* probably accounts for why earlier botanists did not recognize the uniqueness of *C. pigra*. This intermediacy probably also accounts for earlier confusion between *C. flaccosperma* and *C. glaucodea*, which often resulted in lumping of the two species (e.g., Radford et al., 1968; Godfrey & Wooten, 1979; Gleason & Cronquist, 1991). Evidence from morphology, ecology, geography, natural hybridization, and cytology suggests that both *C. flaccosperma* and *C. glaucodea* deserve specific status (Naczi, 1991).

Because *Carex pigra* produces fewer pistillate flowers per spike and more loosely flowered spikes than *C. glaucodea*, I have named it *pigra*, meaning "lazy" or "slow."

KEY TO *CAREX PIGRA* AND RELATED SPECIES

1a. Perigynia (4.0–)4.2–5.5(–6.0) mm long, (2.0–)2.1–2.7 times as long as achene bodies, spreading to ascending; achene stipes (0.2–)0.3–0.5(–0.6) mm long; pistillate spikes (5.0–)5.9–8.0(–9.6) mm wide; achene beaks vertical to bent slightly, usually bent 0–30° from vertical . . . . . *C. flaccosperma*

1b. Perigynia 3.2–4.5(–4.7) mm long, 1.6–2.0 times as long as achene bodies, usually ascending; achene stipes 0.05–0.3(–0.5) mm long; pistillate spikes (3.3–)4.2–6.1(–7.3) mm wide; achene beaks bent slightly to recurved, usually bent 30–90° from vertical.

2a. Perigynia 3.2–4.0(–4.1) mm long, (1.5–)1.8–2.3(–2.5) times as long as wide; longest pistillate spike (14–)19–45(–65)-flowered, densely flowered with spike length (in mm)/number of flowers ratio (0.56–)0.67–1.1(–1.3); longest peduncle of staminate spike 0.5–15(–31) mm long . . . . . *C. glaucodea*

2b. Perigynia (3.7–)3.9–4.5(–4.7) mm long, (1.9–)2.1–2.6(–2.8) times as long as wide; longest pistillate spike 11–25(–28)-flowered, rather loosely flowered with spike length (in mm)/number of flowers ratio (0.97–)1.0–1.3(–1.6); longest peduncle of staminate spike (1.5–)7.5–37(–62) mm long . . . . . *C. pigra*

Paratypes. U.S.A. **Alabama:** Bibb County, 6 mi. SE of Centerville, 3 May 1988, *Bryson 8523* (herb. Bryson); Dallas County, ca. 3 mi. SW of Carlowville, 25 Apr. 1927, *Harper 12* (NY, US); Franklin County, ca. 2 mi. N of Russellville, 17 May 1968, *Kral 30580* (SMU, VDB); Lawrence County, ca. 10 mi. SW of Wren, along Borden Creek, 25 May 1993, *Naczi 3109 et al.* (AUA, KNK, MICH, NCU, NY, UNA, US, VDB, herb. Bryson); Madison County, E of Huntsville, Monte Sano Mtn., 25 May 1986, *Bryson 4390* (herb. Bryson); Marengo County, ca. 9 mi. SE of Demopolis, 17 May 1989, *Naczi 2189A* (MICH); Montgomery County, Pintlalla Creek, 1 May 1868, *Mohr s.n.* (ALU); Morgan County, 2 mi. N of Falkville, 5 May 1971, *Kral 42583* (VDB); St. Clair County, S side of Ashville, 29 Apr. 1972, *Kral 45889B* (VDB); Sumter County, near Emelle, 26 Apr. 1934, *Harper 3187* (BH, GH, MO, NY, US). **Florida:** Gadsden County, Chattahoochee, Apalachicola River landing, 14 Apr. 1982, *Gholson 9535 & Manhart* (FLAS); Jackson County, Three Rivers State Park, near Lake Seminole, 30 Apr. 1980, *Gholson 8284* (FLAS). **Georgia:** Baker County, along Flint River, Ichauway Plantation, 4 Apr. 1986, *Gholson 11587 & Jackson* (FLAS, herb. Bryson); Catoosa County, 1.9 mi. E of Ft. Oglethorpe, 19 May 1951, *Duncan 12427* (GA, NY, TENN, UNA); Decatur County, 1 mi. N of Chattahoochee, along Flint River, 14 Apr. 1947, *Thorne 3095 & Muenscher* (CU, F, GA, GEO, GH, NY, US); Elbert County, near Anthony Shoals of Broad River, 25 Apr. 1981, *Manhart 231* (herb. Bryson); Floyd County, Mount Berry, 27 Apr. 1938, *Jones 503* (VDB); Johnson County, N of Wrightsville, along Cedar Creek, 16 June 1902, *Harper 1337* (GH, MO, NY, US). **Mississippi:** Benton County, 0.1 mi. W of Benton/Union County line, N of US Hwy. 78, 18 May 1990, *Bryson 9972* (MICH, herb. Bryson); Chickasaw County, ca. 3 mi. N of Houston, along Houlka Creek, 23 Apr. 1971, *McDaniel 15005 & Childress* (herb. Bryson); Clay County, 3 mi. SW of Montpelier, 5 May 1955, *Ray 4424* (USF); Kemper County, ca. 4 mi. N of Scooba, 15 May 1989, *Naczi 2184 & Bryson* (MICH); Lee County, 5 mi. SW of Tupelo, 1 May 1982, *Bryson 3228* (TENN, WARM, herb. Bryson); Monroe County, W of Amory, 17 May 1990, *Bryson 9883 et al.* (herb. Bryson); Oktibbeha County, near Starkville, 30 Apr. 1898, *Tracy 32* (BH); Pontotoc County, ca. 10 mi. E of Pontotoc, 19 May 1990, *Naczi 2436* (KNK, MICH, US, herb. Bryson); Winston County, 2.5 mi. N of Louisville, 3 May 1973, *Bryson 146* (herb. Bryson). **North Carolina:** [no locality data other than state], 12 May 1874, *Canby s.n.* (CM); Alamance County, Saxapahaw, near Haw River, 27 May 1960, *Radford 43046* (NCU); Bertie County, WNW of Woodard, 29 May 1958, *Ahles 41320 & Duke* (FLAS); Caswell County, 1 mi. N of Frogsboro, 4 June 1960, *Radford 43257* (NCU); Chatham County, near Mt. Carmel Church-Farrington Road, along Fox Creek, 7 May 1949, *Radford 4058* (NCU); Chowan Coun-

ty, 2.5 mi. SE of Edenton, *Ahles 39790 & Ashworth* (NCU); Cumberland County, 1 mi. NW of Wade, Cape Fear River, 26 May 1961, *Radford 43688* (DUR, NCU); Davidson County, S side Yadkin River at rte. 49, 5 May 1950, *Blomquist 14916 et al.* (DUKE); Durham County, 7 mi. S of Durham, 22 May 1956, *Bell 2714* (CM, NCU, SMU); Gates County, NW of Roduco, 2.8 mi. NNE of jct. US 13-158 on US 13, 9 May 1958, *Ahles 40402 & Ashworth* (NY, VDB); Granville County, along Tar River, 16 May 1935, *Correll 608* (GA); Guilford County, N of Gibsonville, 3 June 1958, *Bell 12459* (VDB); Hyde County, 4.5 mi. N of Scranton, 18 May 1958, *Radford 33683* (MIN, SIU); Lee County, ca. 4 mi. NE of Colon, 20 May 1989, *Naczi 2207* (KNK, MICH, herb. Bryson); Montgomery County, Abner, 26 May 1988, *Naczi 1979* (KNK, MICH); Moore County, 2 mi. SSE of Glendon, near McLendons Creek, 11 June 1960, *Radford 43367* (NCU); Orange County, Chapel Hill, 7 May 1897, *Ashe 2107* (NCU); Randolph County, Liberty, 27 May 1958, *Bell 12001* (NCU); Rowan County, near Faith, 27 May 1911, *Heller 10272* (MO); Stanly County, 2.9 mi. ENE of Albemarle, 3 May 1956, *Ahles 11865 & Radford* (NCU); Stokes County, 4 mi. W of Walnut Cove, 4 June 1958, *Radford 34710* (NCU). **South Carolina:** Barnwell County, Savannah River Operations Area of Atomic Energy Commission, 4 May 1953, *Batson s.n. & Kelley* (NCU); Berkeley County, ca. 2 mi. SE of Witherbee, Francis Marion Natl. Forest, Santee Experimental Forest, 25 Apr. 1992, *Hill 22985 & Meyers* (MICH); Cherokee County, 3.8 mi. SW of Blacksburg, 26 May 1977, *Kral 60154* (VDB); Greenwood County, ca. 0.4 mi. E of Abbeville County line, along rte. 284, 16 May 1986, *Nelson 4711* (FLAS); Kershaw County, ca. 8 mi. NW of Camden, 19 May 1989, *Naczi 2202* (KNK, MICH, herb. Bryson); McCormick County, ca. 11 mi. ESE of McCormick, 13 May 1992, *Horn 5138 & Bouknight* (MICH); Newberry County, 1.3 mi. SW of Chappells, 11 May 1957, *Bell 6979* (NCU); York County, ca. 3 mi. NW of Bethany, 3 May 1989, *Naczi 2079* (MICH). **Tennessee:** Anderson County, 0.5 mi. E of Oliver Springs, 15 May 1966, *Rogers 44744 & Rogers* (SMU, TENN, VDB); Franklin County, Huntland, 3 May 1939, *Svenson 10037* (BH, GH, MO, NY, TENN); Knox County, 4 mi. SE of Knoxville, 31 May 1980, *DeSelm s.n.* (herb. Bryson); McNairy County, N of Middleton, along Porters Creek, 23 Apr. 1949, *Sharp 10240 et al.* (TENN); Sevier County, W of Sevierville, 28 Apr. 1946, *Shanks 1864* (GH, NLU, TENN). **Virginia:** Charles City County, 3 mi. S of Cherry Hill, 14 June 1950, *Mikula 4944* (FARM); Greensville County, E of Emporia, by Metcalf Branch, 11 June 1938, *Fernald & Long 8157* (GH); Nottoway County, 4 mi. SE of Blackstone, 20 May 1975, *Harvill & Harvill 32999* (FARM); Prince George County, SE of Prince George, 20 June 1936, *Fernald et al. 5683* (GH); Princess Anne County, Little Neck, 17 June 1935, *Fernald et al. 4591* (GH, PENN); Sussex County, E of Stony Creek, near Nottoway River, 9 June 1938, *Fernald & Long 8156* (GH).

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