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Additions to the Flora of Georgia Vouchered at the University of Georgia (GA) and Valdosta State University (VSC) Herbaria

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ABSTRACT Twenty-seven species, new to the flora of Georgia, are reported here and validated by cited voucher specimens at the University of Georgia (GA) and Valdosta State University (VSC) herbaria, the two largest herbaria in the state. Reassessment and comparison of these collections data have been greatly facilitated by specimen digitization efforts, especially those fostered among herbaria by the GA–VSC Herbaria Collaborative and by the Southeast Regional Network of Expertise and Collections (SERNEC). Four species (*Chelone lyonii*, *Prunus hortulana*, *Sporobolus arcuatus*, and *Symphytotrichum simmondsii*) are likely native to Georgia and represent range extensions from nearby states. *Chelone lyonii* and *Sporobolus arcuatus* are rare and state-ranked critically imperiled (S1) by the Georgia Department of Natural Resources. The 23 exotic species are more or less naturalized or have potential to naturalize in the state. These nonnatives are escapes from cultivation (15 species) or weedy plants (eight species) that are widespread elsewhere and not typically cultivated. Four species (*Cleome monophylla*, *Lobelia pedunculata*, *Quercus myrsinifolia*, and *Sedum emarginatum*) are putative first records for the flora of North America, at least as occasional escapes.

Key words: Floristics, Georgia, herbarium, naturalized plants, range extensions.

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INTRODUCTION At least 4,000 vascular plant species have been documented for Georgia (Zomlefer et al. 2017a), and according to Weakley's (2015) taxonomy, the flora includes 4,214 specific and subspecific (varieties and subspecies) taxa. The state has been ranked seventh nationally for vascular plant diversity (Stein 2002), now a close second to Florida (ca. 4,200 spp.; Wunderlin and Hansen 2011) among the eastern states. Depending on the classification

system, Georgia includes portions of as many as six basic physiographic zones and ecoregions (e.g., Wharton 1978; US EPA 2017) that have substantial floristic overlap with the Atlantic and Gulf Coastal Plains and with subtropical Floridian and Interior Continental systems. Twelve major river systems (e.g., Altamaha, Chattahoochee, and Savannah) extend from the upland physiographic regions to the outer Coastal Plain, representing ancient migration corridors and Pleistocene refugia responsible for complex floristic patterns with admixtures of diverse geographical origin, including exotic elements (Wharton 1978, Edwards et al. 2013).

Through recent herbarium digitization initiatives for Georgia (and elsewhere), collections data are becoming available for comparison and analysis for the first time—both for specimens within a herbarium and also for collections among herbaria (e.g., see SERNEC 2017a). A series of digitization grants for the two major herbaria in the state, the University of Georgia Herbarium (GA; 276,000 specimens) and Valdosta State University Herbarium (VSC; 75,000 specimens) has also instigated crucial re-examination of specimens, including some problematic vouchers for the state flora and evaluation of specimens filed as collected in cultivation.

We here focus on new records that represent species not previously vouchered (or known as vouchered) for the state at GA and VSC Herbaria. This study comprises documentation and discussion of (1) species native to adjacent states with range extensions into Georgia, and (2) exotic species, including occasional escapes from cultivation that might have potential to become a more permanent component of the flora.

MATERIALS AND METHODS During a series of herbarium digitization projects (including the GA–VSC Herbaria Collaborative) funded by the National Science Foundation (see Acknowledgments), Curators Carter (VSC) and Zomlefer (GA) maintained a list of the most likely new records for the flora of Georgia at their respective herbaria. These vouchers were verified as new for the flora with sources such as Weakley (2015), available volumes of the *Flora of North America* (Flora of North America Editorial Committee 1993), and various herbarium specimen databases (e.g., Keener et al. 2017; SERNEC 2017b) or species reports based (at least in part) on herbarium data (e.g., USDA,

NRCS 2017). The list has been updated as realistically as possible concurrently, as vouchers of previously unreported species from Georgia (and elsewhere) have become available via ongoing digitization efforts (especially the SERNEC portal; SERNEC 2017b). Unless otherwise noted, species circumscription, nomenclature, and nativity designation follow Weakley (2015), and authority abbreviations are from *Tropicos*[®] (Missouri Botanical Garden 2017). Metadata for these voucher specimens are available at Carter (2017a, b) and Zomlefer et al. (2017a, b).

RESULTS Table 1 summarizes the 27 species of note for the flora of Georgia, discovered and/or vouchered by the authors (and other collectors cited herein) from 23 counties in the state (Figure 1). Four species (*Chelone lyonii*, *Prunus hortulana*, *Sporobolus arcuatus*, and *Symphytotrichum simmondsii*) are likely native to Georgia and represent newly discovered range extensions from nearby states into Georgia; *Chelone lyonii* and *Sporobolus arcuatus* are rare and state-ranked S1 (critically imperiled) in Georgia (Krakow 2017). Of the 23 exotic species, 15 are documented as escaped from cultivation and more or less naturalized in Georgia (e.g., *Dryopteris erythrosora*) or with potential to naturalize in the state (e.g., *Lobelia pedunculata*). Eight species are weedy (i.e., typically not in cultivation and widespread elsewhere; e.g., *Medicago minima*). Four species (*Cleome monophylla*, *Lobelia pedunculata*, *Quercus myrsinifolia*, and *Sedum emarginatum*) are putative North American records, at least documented as occasional escapes.

DISCUSSION The 27 species new for the flora of Georgia are listed and discussed below in alphabetical order. Voucher label information is restricted to locality and habitat data, collector(s), collector number, and date of collection. Herbarium acronyms follow *Index Herbariorum* (Thiers 2017). Duplicate specimens to be distributed are indicated as “others tbd.”

***Bothriochloa longipaniculata* (Gould) Allred & Gould** (Poaceae)

TURNER COUNTY: Hwy GA 90, W of Rebecca, just W of Double Run Creek bridge, 31.81378°N, 83.50337°W, roadside, 25 Jun 2009, Carter 18905 with Baker (NMCR, VSC).—Longspike Silver Bluestem is native to Texas and

Table 1. Summary of the 27 species for the flora of Georgia documented and discussed in this paper. Nativity status for the southeastern USA from Weakley (2015). EscC = escaped from cultivation, Ex = exotic, not native to the Southeast flora region, NatSE = native to the Southeast flora region, Nz = naturalized, S1 = state-rank, critically imperiled in Georgia (Krakow 2017), UIntro = unintentional introduction (weedy and not an escape from cultivation). See Figure 1 for map of Georgia with counties.

Scientific Name (common name)	Nativity	Counties in Georgia
<i>Bothriochloa longipaniculata</i> (Longspike Silver Bluestem)	Ex (Texas, Louisiana); UIntro, Nz	Turner
<i>Butia odorata</i> (Pindo Palm)	Ex (Brazil, Uruguay); EscC, Nz?	Camden
<i>Centaurea phrygia</i> (Wig Knapweed)	Ex (Europe); EscC; Nz?	Rockdale
<i>Chelone lyonii</i> (Appalachian Turtlehead)	NatSE (S Appalachians); S1	Walker
<i>Cleome monophylla</i> (Spindlepod)	Ex (Africa, SE Asia); UIntro, Nz	Montgomery
<i>Crotalaria juncea</i> (Sunn Hemp)	Ex (India); UIntro, Nz?	Morgan
<i>Dryopteris erythrosora</i> (Japanese Shield Fern)	Ex (Asia); EscC, Nz	Clarke, Gwinnett, Rockdale
<i>Euphorbia graminea</i> (Grassleaf Spurge)	Ex (Mexico, tropical America); UIntro, Nz	Lowndes
<i>Gladiolus dalenii</i> ssp. <i>dalenii</i> (Parrot Gladiola)	Ex (tropical Africa); EscC, Nz	Bleckley, Tift
<i>Helleborus niger</i> (Christmas-rose)	Ex (Italy, Slovenia); EscC, Nz?	Clarke
<i>Kickxia elatine</i> (Sharp-leaved Fluellen)	Ex (Mediterranean Europe, N Africa, W Asia); UIntro, Nz	Dougherty, Whitfield
<i>Lilium philippinense</i> (Philippine Lily)	Ex (Philippine Islands); EscC, Nz	Coffee, Decatur, Lowndes
<i>Lobelia pedunculata</i> (Blue-star Creeper)	Ex (Australia); EscC	Oglethorpe
<i>Mazus miquelii</i> (Creeping Mazus)	Ex (E Asia); EscC, Nz?	Cobb
<i>Medicago minima</i> (Downy Bur-clover)	Ex (Eurasia); UIntro, Nz	Camden
<i>Nemophila menziesii</i> (Baby Blue-eyes)	Ex (W North America); EscC	Clarke, Sumter
<i>Paspalum quadrifarium</i> (Tussock Paspalum)	Ex (South America); EscC, Nz	Tift
<i>Phyllanthus fraternus</i> (Gulf Leafflower)	Ex (India, Pakistan); UIntro, Nz	Grady
<i>Prunus hortulana</i> (Hortulan Plum)	NatSE + Midwest; EscC?	Walker
<i>Prunus laurocerasus</i> (Common Cherry Laurel)	Ex (Eurasia); EscC, Nz?	Rockdale
<i>Quercus myrsinifolia</i> (Chinese Evergreen Oak)	Ex (China, Japan); EscC, Nz	Rockdale, Dougherty
<i>Ruellia ciliatiflora</i> (Hairyflower Wild Petunia)	Ex (SW US, Mexico, Central and South America); EscC?, Nz	Grady
<i>Sedum emarginatum</i> (Emarginate Stonecrop)	Ex (China); EscC; Nz?	Walton
<i>Sporobolus arcuatus</i> (Cumberland Sandreed)	NatSE + Oklahoma, S1	Walker
<i>Symphotrichum simmondsii</i> (Simmond's Aster)	NatSE + Texas	Camden
<i>Urochloa piligera</i> (Wattle Signalgrass)	Ex (Australia); UIntro, Nz	Lee
<i>Vitex agnus-castus</i> (Chaste-tree)	Ex (S Europe); EscC, Nz	Brooks, Mitchell

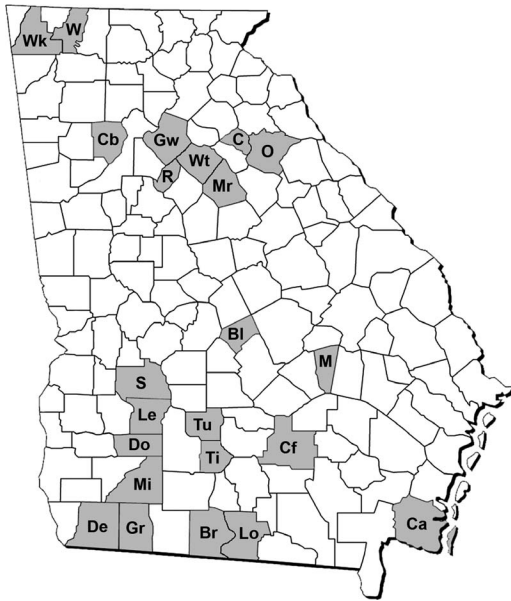


Figure 1. Map of Georgia with outlines of the 155 counties, showing localities of the 27 vouchered species discussed in this paper (23 gray-shaded counties). County abbreviations: Bleckley (Bl), Brooks (Br), Camden (Ca), Clarke (C), Cobb (Cb), Coffee (Cf), Decatur (De), Dougherty (Do), Grady (Gr), Gwinnett (Gw), Lee (Le), Lowndes (Lo), Mitchell (Mi), Montgomery (M), Morgan (Mr), Oglethorpe (O), Rockdale (R), Sumter (S), Tift (Ti), Turner (Tu), Walton (Wt), Walker (Wk), Whitfield (W).

Louisiana, where it grows in the Gulf coastal prairie and along roadsides (and other disturbed sites), generally ranging south to Mexico and Panama (Allred 2003, Weakley 2015). In the Southeast, the species has been vouchered from Arkansas and South Carolina (SERNEC 2017b). This specimen from Georgia was collected from a population of individuals locally common along a highway. Congeners *B. hybrida* (Gould) Gould and *B. ischaemum* (L.) Keng were reported new for Georgia in 2009 (Carter et al. 2009).

***Butia odorata* (Barbosa Rodrigues) Noblick**
[*Butia capitata* (Martius) Beccari] (Arecaceae)

CAMDEN COUNTY: Coleraine, along W bank of Mill Creek, S of Hwy GA 40, 30.83252°N, 81.88355°W, edge of mixed hardwood forest, along woods trail, 17 Nov 2007, *Carter 18302 with Baker* (VSC).—Pindo Palm, a native of Brazil and Uruguay, is widely cultivated as an ornamental along the coast from southeastern

North Carolina through Florida (Weakley 2015). Zona (2000) reports that this species “shows little inclination for escaping,” and it has been previously vouchered in the Southeast as naturalized only in Hernando County, Florida (Wunderlin and Hansen 2011). The fruit of this species has a flavorful edible mesocarp that is made into jams (Dransfield et al. 2008). The young plants collected in Camden County, Georgia, were growing along a trail on the edge of mixed pine–hardwood forest in an area not near human habitation. Because these palms were not planted, they might have originated from seeds dispersed naturally, perhaps by animals attracted to the tasty fruit.

***Centaurea phrygia* L. (Asteraceae)**

ROCKDALE COUNTY: Monastery of the Holy Spirit, ca. 6.0 mi SSW of Conyers, ca. 0.3 mi ESE of central courtyard of abbey: intersection of McClane Creek Rd and Green House Rd, 33.584390°N, 84.062132°W, in wildlife planting, 31 Jul 2012, *Allison 14204* (GA); Scout Project area, in planting for butterflies, 33.58391°N, 84.06164°W, 21 Aug 2012, *Allison 14245* (GA); Scout Project area, opening on S side of Green House Rd just E of jct with McClane Creek Rd, 84.06182°W, 33.58389°W, 5 Aug 2013, *Allison 14397* (GA, VSC, others tbd).—Wig Knapweed, a perennial plant native to Europe, grows in meadows and open woodland habitats and is cultivated as a garden ornamental for its attractive flowers (Huxley et al. 1992). Plants of this species can appear as waifs in disturbed areas and generally are not permanent members of a flora. In North America, *Centaurea phrygia* has been reported as introduced sporadically in the general area ranging from Vermont west to Missouri, and in the Southeast, in West Virginia, Virginia, and Florida (see Keil and Ochsmann 2006; USDA, NRCS 2017). The three Georgia vouchers represent a local and potentially persistent population that was likely introduced via contaminant seeds in wildflower seed mix broadcast for wildlife and butterfly gardens (label for *Allison 14397*, GA).

***Chelone lyonii* Pursh (Plantaginaceae)**

WALKER COUNTY: Lula Land Trust Preserve, east brow of Lookout Mountain, on talus slope at base of Lula Falls along Rock Creek, 34.9332°N, 85.3715°W, partially within spray zone of falls, 25 Sep 2012, *Patrick 19990* (GA [2 sheets]), *Medley*

s.n. (VSC).—Appalachian Turtlehead is endemic to the southeastern USA, ranging from western North Carolina and eastern Tennessee, south to northwestern South Carolina and northeastern Alabama and Mississippi (Weakley 2015; MDWFP 2017; USDA, NRCS 2017), and occurs in cove and spruce–fir forests, gorges, stream-banks, and balds (Tennessee Flora Committee 2015). The species has been reported, but not verified, in Virginia (Weakley et al. 2012), and has likely been extirpated in West Virginia (NatureServe 2017). *Chelone lyonii* is planted in gardens for the attractive flowers arranged on long stiff spikes, and reports of scattered localities outside the southern Appalachian area (e.g., New York, Massachusetts; see USDA, NRCS 2017) represent escapes from cultivation (Weakley 2015). The species is state-ranked critically imperiled (S1) for Alabama and Mississippi (Alabama Natural Heritage Program 2012, MDWFP 2017), and possibly imperiled (S2?), for South Carolina (Boyle 2015). These three herbarium sheets from northwest Georgia voucher the state record discovered by Max Medley, which were collected in a privately owned preserve (Ware and Medley 2011b; see *Sporobolus arcuatus* below). This population comprised vigorous plants ca. 1 m tall (over 100 flowering stems) and was the dominant herb on a moist, sparsely vegetated, northwest-facing slope in sandy soil. The species is now state-ranked S1 in Georgia (Krakow 2017).

***Cleome monophylla* L.** (Clemaceae)

MONTGOMERY COUNTY: 8.58 airmiles N (348.66°) of Mt. Vernon jct Hwy US 280 and Hwy US 221, ca. 0.28 airmile SSE jct Quail Run Rd and Cedar Grove Rd, 32.300354°N, 82.623778°W, 18 Oct 2015, *Miller s.n.* (GA, VSC); 8.72 airmiles N (348.22°) of Mt. Vernon jct Hwy US 280 and Hwy US 221, ca. 0.12 airmile SSE (163.85°) jct Quail Run Rd and Cedar Grove Rd, 32.30219°N, 82.62540°W, cotton field, plants locally abundant but patchy along the edge of field, 10 Aug 2017, *Carter 23062 with Lowe* (GA, VSC).—Spindlepod is widely distributed in Africa and is also known from Madagascar, India, and Ceylon (Codd and Kers 1970). It is a weed of sandy soils in South Africa (Codd and Kers 1970) and fields and waste places in India (Gamble 1915) and is in the horticultural trade (Huxley et al. 1992). The vouchers cited here, from a small area in northwestern Montgomery County, Geor-

gia, apparently comprise the first report of naturalization of this species in North America, because this species is not included in *Flora of North America* (Tucker 2010) nor in the *Plants Database* (USDA, NRCS 2017). The species was initially collected in 2015 after the fruiting plants had lost most of their leaves, and subsequently, plants were grown from seeds in the greenhouse at the University of Georgia Tifton campus to obtain more complete material (*Miller s.n.*) for determination by S.Y.S. Sewell. Spindlepod was found in several fields planted in peanuts (*Miller s.n.*), and later, cotton (*Carter 23062*, Figure 2A). The species occurred with peanuts primarily in patches associated with ends of rows where crop residues accumulate. In the cotton field, spindlepod was spread sporadically throughout, with an infestation level of about 2% (J.T. Miller, pers. obs.). Farmers have reported the plant in their fields for at least 5 yr prior to collection of the first voucher in 2015 (E. Prostko, pers. obs.). With relatively small, pale pink flowers that are not particularly showy (Figure 2B), spindlepod is not likely to have been introduced as an ornamental (but see Huxley et al. 1992) and might have been casually introduced, perhaps as a seed contaminant.

***Crotalaria juncea* L.** (Fabaceae)

MORGAN COUNTY: Pennington community, along S side of Little River Rd (County Rd 213), ca. 4 mi N of Shady Dale center, just across Jasper–Morgan County line, 33.457594°N, 83.548905°W, roadside ditch adjacent to agricultural field, 30 Sep 2016, *Scherm s.n.* (GA [2 sheets]).—Sunn Hemp, a native of India and an important Asian fiber crop, is cultivated in the Southeast as a source of green manure and fodder (Isley 1990). In North America, the species has been vouchered as naturalized in Alabama (five counties; Keener et al. 2017) and Florida (Putnam and Miami–Dade counties; Wunderlin and Hansen 2011, 2017), where it typically forms colonies along roadsides or persists in old fields. The Georgia population flourished along highway ditches bordering fields row-planted with this species, apparently rotated with corn.

***Dryopteris erythrosora* (D.C. Eaton) Kunze** (Dryopteridaceae)

CLARKE COUNTY: Athens, University of Georgia, Tanyard Branch, just W of Lumpkin

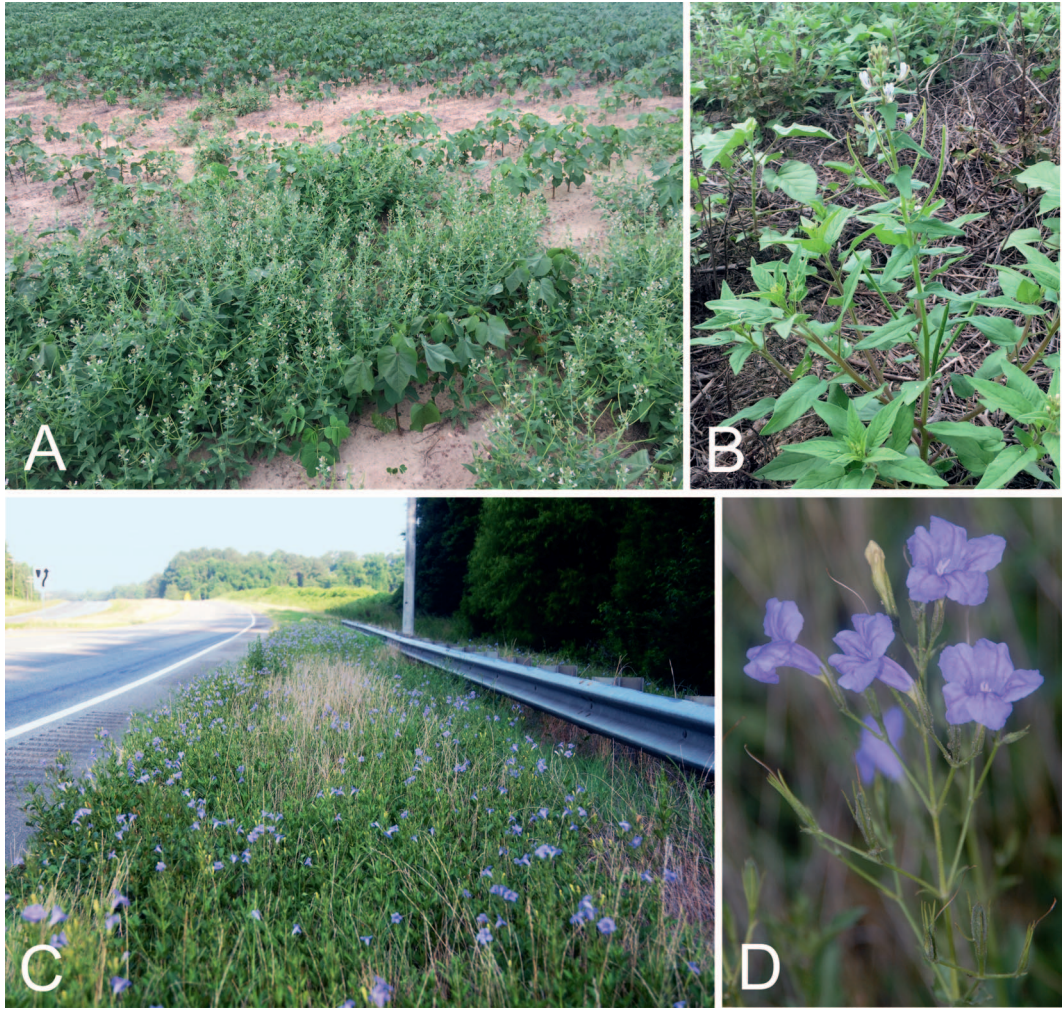


Figure 2. Field photographs of *Cleome monophylla* and *Ruellia ciliatifolia*, new for the flora of Georgia. A–B, *Cleome monophylla*, Montgomery County, Georgia, 10 August 2017 (Carter 23062; GA, VSC): A, population growing in field row-planted with cotton; B, flowering plant with pale pink flowers and immature fruit. C–D, *Ruellia ciliatifolia*, Grady County, Georgia, 18 June 2010 (Carter 19805; CAS, GA, VSC): C, population established along highway margin guardrail; D, close-up of showy lavender-blue flowers. Photo credit: J. Richard Carter.

Street, in soil on banks of stream, just above rock-lined channel, 11 Mar 2014, *Wyatt 1881* (GA [2 sheets]). GWINNETT COUNTY: ca. 8.6 mi SSW of Lawrenceville, ca. 1.7 mi SSE of Snellville, E bank of No Business Creek, just S of Springdale Dr at edge of sewer line crossing, 33.83321°N, 84.01319°W, sandy soil of creek bank, 23 May 2014, *Allison 14418* (GA, VSC, others tbd); ca. 8.75 mi SSW of Lawrenceville, ca. 1.7 mi SSE of Snellville, E bank of No Business

Creek where crossed by sewer line, just S of Springdale Dr, 33.833065°N, 84.013130°W, sandy loam, 28 Mar 2012, *Allison 14008* (GA, VSC, others tbd); Lilburn, 801 Tom Smith Rd, stream-bank along edge of lower parking lot, 17 Mar 2017, *Trentin s.n.* (GA, VSC, others tbd). ROCKDALE COUNTY: Monastery of the Holy Spirit, ca. 6.0 mi SSW of Conyers, ca. 0.3 mi N of central courtyard of abbey, weed in shade of old shed near organic farm, 33.59071°N, 84.06637°W, 28

Jul 2012, *Allison 14194* (GA, VSC, others tbd), weed inside old shed near organic farm, 33.59077°N, 84.06637°W, 29 Sep 2013, *Allison 14403* (GA, VSC, others tbd).—Japanese Shield Fern, native to China, Japan, and Korea, is a common ornamental in the Southeast and has escaped from cultivation to become established in some disturbed suburban woodlands (Peck 2011, Rothfels et al. 2012). The species has been vouchered from many of the southeastern states, and label data indicate naturalization in at least seven of those states (see SERNEC 2017b). These six recent collections from three counties in Georgia (four from creek/steam banks) verify the naturalization of the species in the state, at least in the north-central region (Figure 1).

***Euphorbia graminea* Jacq.** (Euphorbiaceae)

LOWNDES COUNTY: NW Valdosta, 2418 Winding Way, 30.866300°N, 83.313685°W, residential yard, weed in outdoor potted plant of *Zamia furfuracea* Aiton, purchased April 2011 from Home Depot, Valdosta, plant persisting in pot but not naturalized in yard, 08 Aug 2011, *Carter 20310* (GA, VDB, VSC); Valdosta, Valdosta State University campus, 30.84891°N, 83.29017°W, weed in landscape plantings, 25 Mar 2015, *Carter 22313* (GA, VDB, VSC).—Grassleaf Spurge is native to Mexico and tropical America and is reportedly naturalized in urban weedy areas in California, Alabama, Arkansas, Florida, Missouri, and South Carolina (Wunderlin and Hansen 2011, Peirson et al. 2016, SERNEC 2017b). The species was first observed in Valdosta, Lowndes County, Georgia, growing as a weed in a potted plant of *Zamia furfuracea* Aiton in April 2011 (*Carter 20310*). The plants persisted outdoors in the pot until August 2011 when they were harvested (to prevent local naturalization) and pressed for vouchers. Subsequently, Grassleaf Spurge was found growing as a weed in landscape plantings on the Valdosta State University campus (*Carter 22313*), where it has apparently naturalized.

Gladiolus dalenii* Van Geel ssp. *dalenii (Iridaceae)

BLECKLEY COUNTY: Ocmulgee Wildlife Management Area, USGS 7.5 minute Westlake Quadrangle, 32.4658222° (32°27'56.9592") N, 83.5599° (83°33'35.6394") W, disturbed area (roadside), elev 240 ft, Rains Sandy Loam over Stream Alluvium and Undifferentiated Terrace

Deposits, 29 May 2009, *Lynch 325* (GA, VSC). TIFT COUNTY: Tifton, Ty Ty Rd., 0.4 mi from intersection of Upper Ty Ty Rd and Whidden Mill Rd, wet ditch, 19 May 1984, *Hines s.n.* (GA).—Parrot Gladiola, native to tropical Africa, is sometimes cultivated in the Southeast but rarely escapes or persists (Weakley 2015): the species had previously been documented only for Alabama and Louisiana (Goldblatt 2002). These two central Georgia vouchers were collected along roadsides. The more recent collection from 2009 (*Lynch 325*) was discovered during a floristic survey of the South Atlantic Coastal Plain Limestone Forest Association (Lynch and Zomlefer 2016), and these plants were infrequently naturalized near the study site in Ocmulgee Wildlife Management Area.

***Helleborus niger* L.** (Ranunculaceae)

CLARKE COUNTY: Athens, State Botanical Garden of Georgia, floodplain SW of parking lot for native plant garden, W of powerline right-of-way, 33.90137°N, 83.38772°W, 7 Apr 2017, *Zomlefer 3927* (GA) and *Barrios 113* (VSC).—Christmas-rose, with showy, white to pink-tinged flowers, is a popular ornamental and is native to the general region including northern Italy and Slovenia (Huxley et al. 1992). The species apparently does not persist out of cultivation and is not, therefore, formally included in the *Flora of North America*, although Ford (1997) mentions two old specimens as escapes (New York in 1880 and Michigan in 1919). The Georgia vouchers represent at least two large, dense, and well-established tufts growing in the State Botanical Garden of Georgia preserve (unplanted) area in a fertile floodplain. The plants were likely seeded from plantings elsewhere in the garden and have the potential to spread to other areas due their proximity to the Middle Oconee River.

***Kickxia elatine* (L.) Dumort.** (Plantaginaceae)

DOUGHERTY COUNTY: Mud Creek Farm, 0.60 airmile SE (124.94°) jct Gillionville Rd (Hwy GA 234) and Mud Creek Rd, W of Mud Creek Rd, S of Gillionville Rd, 31.57227°N, 84.36039°W, food plot clearing along edge of hammock, loamy clay soil, 27 Apr 2017, *Carter 22855 with Baker* (VSC), 19 Jun 2017, *Carter 23033 with Baker* (GA, VSC, others tbd). WHITFIELD COUNTY: Rocky Face Mountain, dry

roadside at western base of mountain, 800 ft, 21 Jul 1930, *Wilson 97* (MO).—Sharp-leaved *Fluellen* is native to Mediterranean Europe, northern Africa and western Asia (Weakley 2015) and is naturalized in western and eastern North America (see USDA, NRCS 2017) where it inhabits disturbed areas. The species occurs sporadically throughout the southeastern USA (see SERNEC 2017b), and the vouchers cited here document its presence in Georgia. The 1930 voucher from Whitfield County (*Wilson 97*), previously overlooked as a state record, was discovered via the SERNEC portal (SERNEC 2017b). Two subspecies are sometimes recognized, distinguished by characters such as the amount of branching and pubescence type of the stem and pedicels (see Weakley 2015); the recent voucher (*Carter 23033*) is the nominal subspecies.

***Lilium philippinense* Baker** (Liliaceae)

COFFEE COUNTY: NW edge of Broxton, near jct Ocmulgee St (Hwy GA 268) and Reynolds Ave, along E side of Ocmulgee St, 31.62931°N, 82.88493°W, edge of wooded drain, 3 Aug 2017, *Carter 23052 with Snow* (GA, VSC). DECATUR COUNTY: ca. 17.8 mi SW of Bainbridge, ca. 1.8 mi NE of Jinks, on banks of Co Rd 252, ca. 1 mi by car NW of jct Co Rd 189, 5 Aug 1988, *Allison 3373* (GA). LOWNDES COUNTY: Madison Hwy (Hwy GA 31) south of Clyattville, 30.68959°N, 83.31679°W, growing on sandy bank of roadside ditch, 5 Sep 2013, *Lowe s.n.* (VSC).—Philippine Lily, native to the Philippine Islands, is one of the commonly cultivated white-flowered Asian lilies (Huxley et al. 1992). This species is sometimes confused with *L. longiflorum* Thunb. (Easter Lily), a shorter plant (<1 m tall) with pure white tepals, whereas *L. philippinense* is a taller plant (to ca. 2 m) with tepals suffused with reddish purple (see Skinner 2002). Philippine Lily was not formally included in the *Flora of North America* (Skinner 2002). However, the species has been vouchered throughout the southeastern states (see SERNEC 2017b), sometimes as persisting at old homesteads (e.g., *Nelson 27878*, USCH), and has been reported as naturalized in Alabama, Florida, Kentucky, Louisiana, and North Carolina (Skinner 2002, Weakley 2015, Keener et al. 2017). Here three naturalized populations of Philippine Lily from Georgia are documented, all locally common to occasional along roadsides from the southern

part of the state (Figure 1). Additional naturalized populations might likely be located here, because the species is commonly planted in gardens in this area.

***Lobelia pedunculata* R. Br.** [*Isotoma fluviatilis* (R. Br.) F. Muell. ex Benth., *Pratia pedunculata* (R. Br.) Benth.] (Campanulaceae)

OGLETHORPE COUNTY: Arnoldsville, 147 Timberland Trail, in neglected yard, 13 May 2010, *Hughes s.n.* (GA).—The preferred name for the species cited here follows *The Plant List* (Royal Botanic Gardens and Missouri Botanical Garden 2013). Blue-star Creeper is a creeping, stoloniferous, perennial herb native to Australia and is cultivated as a dense ground cover, and in a garden setting, its ability to spread can be a nuisance (Huxley et al. 1992). This species does not typically thrive in areas with long and hot summers: in the USA; it would most likely grow best (and possibly naturalize) in the Pacific Northwest (Huxley et al. 1992). According to the label data, the Georgia voucher represents a population growing in a weedy area [with *Oxalis* sp. and *Potentilla indica* (Andrews) Th. Wolf], and the mulch (applied 6 yr previously) is a possible seed source. This specimen is listed here because the species could appear as an occasional escape in our flora.

***Mazus miquelii* Makino** (Mazaceae)

COBB COUNTY: Marietta, 4696 Chimney Sweep Lane, growing in grass near deciduous forest, 13 Apr 2014, *Nuttall & Kraus 97* (GA).—Creeping *Mazus*, native to eastern Asia (Hong et al. 1998), is cultivated for its attractive periwinkle flowers and as a mat-forming, perennial ground cover that spreads by rooting stolons. The species occasionally escapes from cultivation and then becomes a lawn and garden weed; it has also been reported in alluvial forests (e.g., *Bradley 7430*, GMUF), sidewalk cracks (*Cusick 37143* and *37184*, CM), and open fields (*Cusick 38188*, CM). In the USA, *Mazus miquelii* has been previously vouchered as naturalized in at least 13 states, all north of Georgia: from along the east coast (Maine to North Carolina) and west to Kentucky–Tennessee and Michigan (SERNEC 2017b; USDA, NRCS 2017). The Georgia collection, from the greater Atlanta metropolitan area, was well established in a grassy zone bordering woodland in a suburban development.

***Medicago minima* (L.) Bartal.** (Fabaceae)

CAMDEN COUNTY: Cumberland Island National Seashore, SW Cumberland Island, E side of Dungeness mansion ruins, 30°44.92'N, 81°28.23'W, elev 5 m, disturbed area, seep near mansion entrance, 26 Apr 2004, *Giannasi & Zomlefer 780* (GA).—Downy Bur-clover, native to Eurasia (Mediterranean basin), has been recorded in North America as a weed in sandy soil of ruderal areas (e.g., fields, roadsides), ranging from Massachusetts–New York through the South, west through the lower Midwest (Missouri, Kansas) to the Pacific coast states (SERNEC 2017b; USDA, NRCS 2017). The species is reportedly most common in the Texas–Oklahoma area and sparingly introduced elsewhere (Isely 1990). *Medicago minima* is superficially very similar to *M. polymorpha* L., a common exotic weed in the Southeast; for example, both species have characteristic bur-like (spiny and coiled) legumes. However, *M. minima* has entire (to slightly toothed) stipules, spreading pilose hairs on stems and adaxial leaf surfaces, and a densely pilose calyx, versus the deeply lacerate stipules and glabrous to short pubescent stems, leaves, and calyx in *M. polymorpha* (Radford et al. 1968, Isely 1990). This record was collected during a survey of the Cumberland Island, the southernmost barrier island off the coast of Georgia (Zomlefer et al. 2008). The plants were infrequent and growing in a disturbed seepy area with other weedy species, *Bidens alba* (L.) DC., *Festuca octoflora* Walter, *Medicago lupulina* L., *Poa annua* L., and *Sphenopholis obtusata* (Michx.) Scribn.

***Nemophila menziesii* Hook. & Arn.** (Hydrophyllaceae)

CLARKE COUNTY: Athens, University of Georgia campus, along East Campus Rd, 12 May 1992, *Trapnell 108* (GA); 6 Apr 1993, *Cantrell 15* (GA). SUMTER COUNTY: Ca. 6.5 mi WNW of Americus, N side of State Hwy 30, extensive, open meadowy flat near a long driveway, Red Bay sandy loam, elev 500 ft, 19 Apr 1992, *Norris 6412* (GSW).—*Nemophila menziessi* s.l. is native to western North America (British Columbia to California, east to Wyoming) where it generally occurs on slopes in various types of woodlands and scrub habitat (Patterson and Halse 2012). The species is highly variable, and varieties intergrade. Several varieties and cultivars of Baby Blue-eyes are planted

as border edges or in window boxes due to the procumbent spreading habit and attractive bright blue flowers (Huxley et al. 1992). *Nemophila menziesii* has been recorded as escaped from cultivation in various states, such as Indiana (*Reicha & Wilhelm 1010*, MOR), Alaska (*Duffy & Reynolds 95-878*, ALA), and in the Southeast, Mississippi (*Bryson 4656*, SWSL; Bryson and Skojac 2011) and western North Carolina (J. Shaw, pers. comm.). The species has been vouchered twice (*Trapnell 108*, *Cantrell 12*) as escaped on the University of Georgia campus, associated with roadside weedy species such as *Viola arvensis* Murray and *Lamium amplexicaule* L. The additional record from Georgia Southwestern State University (GSW) Herbarium comprises two plants along a state highway in Sumter County, Georgia, that might have been broadcast from a commercial wildflower seed mix of species from the western USA (label for *Norris 6412*). These Georgia records further support the potential of this species to naturalize elsewhere in the state and the Southeast.

***Paspalum quadrifarium* Lam.** (Poaceae)

TIFT COUNTY: Tifton, jct Hwy US 41 and 20th St, 31.47332°N, 83.51998°W, disturbed ground along channelized headwaters of New River, 7 Jun 2005, *Carter 15977* (GA, VSC).—Tussock Paspalum, native to South America, has been cultivated as an ornamental in Florida and is listed as a noxious weed for New South Wales, Australia (Allen and Hall 2003). The species reportedly has become established in the southeastern USA in disturbed sites (see Allen and Hall 2003) but has been vouchered (SERNEC 2017b) and mapped (Allen and Hall 2003; USDA, NRCS 2017) only from southern Mississippi. The voucher cited here, documenting Tussock Paspalum naturalized in Georgia, was collected only a few hundred meters from the horticultural trial garden at the University of Georgia Tifton Campus. The plants were locally abundant with spreading to reclining stems forming large tufts.

***Phyllanthus fraternus* G.L. Webster** (Phyllanthaceae)

GRADY COUNTY: 2.7 mi NW of Calvary, Herring tobacco farm, weedy fencerow, 1 Sep 1969, *Faircloth 6035* (GA, VSC).—Gulf Leaf-flower, native to India and Pakistan, has been

previously vouchered in the USA from disturbed sites in Texas and most of the southeastern states (Weakley 2015, Levin 2016, SERNEC 2017b). This 1969 collection (*Faircloth 6035*), initially misidentified as *P. urinaria* L., is the basis for the first report of this weed from Georgia in the *Flora of North America* (Levin 2016). The specimen was reevaluated and identified by J.R. Carter during the review process for the FNA *Phyllanthus* treatment and was brought to the attention of the regional reviewer. The voucher information is included here to provide documentation of the occurrence of this species in the state because specimens were not cited for the distributions in *Flora of North America*, and no other records of *P. fraternus* from Georgia have yet been discovered.

***Prunus hortulana* L. H. Bailey** (Rosaceae)

WALKER COUNTY: W side of Pigeon Mountain, along E edge of Pocket Rd, 0.8 mi E of junction with Hog Jowl Rd, 34°43'0.5"N, 85°23'6.4"W, in edge of brushy old field at small creek, 10 May 2014, *Lance 3776* (GA [2 sheets]); W side of Pigeon Mountain, ca. 0.2 mi E of junction of GA hwy 341 and 193, in SE wooded edge of field diagonal from waypoint 34°45'9.4"N, 85°21'37.2"W, 10 May 2014, *Lance 3778* (GA).—Hortulan Plum has been mapped generally from Oklahoma–Kansas–Nebraska east to Virginia and Maryland (also Massachusetts) and occurs in floodplains, successional forests, fields, fencerows, and along roadsides (see Rohrer 2014, Weakley 2015). This mainly Midwestern species is not common in the Southeast (Lance 2004). Several cultivars are available in the horticultural trade, and populations east of the Appalachians likely represent naturalization from cultivated escapes (Huxley et al. 1992). The two fruiting collections from Walker County in northeast Georgia (Figure 1) were from populations ca. 5 km apart, growing in an overgrown pasture lot and in a wooded area bordering a field. These populations were likely not planted (R. Lance, pers. obs.) and represent either an extension of the endemic range of the species or escapes from cultivation.

***Prunus laurocerasus* L.** (Rosaceae)

ROCKDALE COUNTY: Monastery of the Holy Spirit, ca. 6.3 mi SSW of Conyers, ca. 0.6 mi SE of central courtyard of abbey, just N of “Green

House Rd,” 33.53156°N, 84.05778°W, 15 Mar 2014, *Allison 14415* (GA).—Common Cherry Laurel is native to Eurasia (southeastern Europe and Asia Minor) and is widely cultivated in temperate regions throughout the world for hedges or as a shrubby landscape tree (Huxley et al. 1992). The species has become widely naturalized in these areas and has been verified as established in the flora of western North America (British Columbia to California) in habitats such as alluvial thickets, ravines, and urban and second-growth forests (Rohrer 2014). The Georgia voucher represents an escape from cultivation, which likely spread to this location by birds consuming the fruit (label of *Allison 14415*), indicating the potential of this species to become part of the Southeast flora.

***Quercus myrsinifolia* Blume** [*Cyclobalanopsis myrsinifolia* (Blume) Oerst.] (Fagaceae)

ROCKDALE COUNTY: Monastery of the Holy Spirit, ca. 6.0 mi SSW of Conyers, ca. 0.4 mi W of central courtyard of abbey, N side of GA Hwy 212, near Historic Entrance, 33.58586°N, 84.07259°W, 14 Aug 2012, *Allison 14224* (GA, VSC, others tbd), 33.58665°N, 84.07267°W, 14 Aug 2012, *Allison 14227* (GA, VSC). DOUGHERTY COUNTY: Mud Creek Farm, 0.92 airmile SSE (174.04°) jct Gillionville Rd (Hwy GA 234) and Mud Creek Rd, W of Mud Creek Rd, 31.56388°N, 84.36712°W, yard of main residence and in an overgrown clear-cut, 27 Apr 2017, *Carter 22850 with Baker* (GA, VSC, others tbd), 26 Sep 2017, *Carter 23106 with Baker* (GA, VSC, others tbd).—The preferred name for this species cited here follows *The Plant List* (Royal Botanic Gardens and Missouri Botanical Garden 2013). Chinese Evergreen Oak is native to forested mountain valleys in Asia (Huang et al. 1999). The species is not commonly cultivated in the USA (Huxley et al. 1992, Dirr 2011) and has not been previously reported as a naturalized component of the flora (e.g., in Nixon 1997). The vouchers cited here indicate naturalization of Chinese Evergreen Oak in Georgia. A seedling is included in the collections from Rockdale County (*Allison 14227*), and plant recruitment was also evident at the Dougherty County site (*Carter 22850, 23106*).

***Ruellia ciliatiflora* Hook.** [*R. nudiflora* (Engelm. & A. Gray) Urb., *R. lorentziana* Griseb.] (Acanthaceae)

GRADY COUNTY: 3.16 mi W Cairo jct Hwy GA 112 and Hwy US 84, ca. 0.15 mi W Tired Creek,

30.90082°N, 84.27051°W, road shoulder along N side of Hwy US 84, 08 Jul 2009, *Carter 19009 with Baker* (CAS, GA, VSC, others tbd); 1.0 mi W Cairo jct Hwy GA 112 and Hwy US 84, ca. 0.35 mi E jct Upper Hawthorne Trail and Hwy US 84, 30.90367°N, 84.23260°W, road shoulder along N side of Hwy US 84, locally abundant in 30 × 10 m strip on both sides of guard rail, 18 Jun 2010, *Carter 19805 with Baker* (CAS, GA, VSC, others tbd).—Hairyflower Wild Petunia, as treated by Daniel (2013), is a widespread species, with its native range extending from Arizona–Texas through Mexico and Central America and South America. The species has long been known from Florida (as *R. lorentziana* Griseb.; see Long 1966), Louisiana, and Mississippi as an introduction (Daniel 2013). The vouchers cited herein comprise the first records from Georgia of this showy wild petunia. The well-established populations were very conspicuous along the roadside in the early morning before the blue flowers abscised (Figure 2C and D).

***Sedum emarginatum* Migo** [*Sedum makinoi* Maxim. var. *emarginatum* (Migo) S.H. Fu] (Crassulaceae)

WALTON COUNTY: ca. 1.5 mi ENE of Walnut Grove, S side of GA Hwy 138, 33.74984°N, 83.8281°W, large granitic outcrop (Lithonia gneiss), sterile material gathered 22 Aug 2012 and cultivated near Charlottesville, VA, cultivated plants pressed 1 Jun 2015, *Allison 14248-L[a]* (GA), 24 May 2016, *Allison 14248-L[b]* (GA, others tbd), 1 Jun 2016, *Allison 14248-L[c]* (GA), 9 June 2016, *Allison 14248-L[d]* (GA, VSC, others tbd).—Emarginate Stonecrop is native to China (Fu and Ohba 2001) and was introduced to the horticultural trade in the USA as *Sedum emarginatum* ‘Eco-Mt. Emei’ by Eco-Gardens nursery in Decatur, GA (Horvath 2014). The mat-forming plants are easily propagated by cuttings and are typically grown as a ground cover. This series of pressed vouchers apparently comprises the first report of naturalization of this species in North America, because Emarginate Stonecrop is not included in *Flora of North America* (Ohba 2009) nor in the *Plants Database* (USDA, NRCS 2017). Living nonreproductive plants collected in August 2012 at a rock outcrop in north-central Georgia (Figure 1) were subsequently cultivated (in Virginia) until they bloomed ca. 9 mo later (and in late May–mid-June subsequent years as well; label for *Allison 14148-L*). The reproduc-

tive material, which facilitated identification, was pressed for vouchers in 2015 and 2016. This species, which might be restricted to this site in Georgia, has potential to spread vegetatively.

***Sporobolus arcuatus* (K.E. Rogers) P.M. Peterson** [*Calamovilfa arcuata* K.E. Rogers] (Poaceae)

WALKER COUNTY: Lula Lake Land Trust Preserve, east brow of Lookout Mountain, just downstream from trail ford across Rock Creek, 34.92644°N, 85.3783°W, scoured bouldery gravel bar, 4 Sep 2010, *Patrick 18989* (GA [2 sheets], VSC).—Cumberland Sandreed, a rare grass, has been previously documented from a few scattered localities of open gravel/cobble bars maintained by river scour in five south-central states (Thieret 2003, Tennessee Flora Committee 2015, Weakley 2015) and is state-ranked critically imperiled (S1) in Alabama, Arkansas, and Kentucky (Alabama Natural Heritage Program 2012, Kentucky State Nature Preserves Commission 2013, Arkansas Natural Heritage Commission 2016), and imperiled (S2), in Oklahoma and Tennessee (Oklahoma Natural Heritage Inventory 2017, Tennessee Department of Environment and Conservation 2017). This voucher from northwest Georgia from a privately owned preserve was collected by Tom Patrick, Botanist for the Georgia Department of Natural Resources, and is the first site documented for the state (Ware and Medley 2011a). The plants were locally common as well-anchored, dense tufts in a scoured gravel bar, growing in association with *Alnus serrulata* (Aiton) Willd., *Cornus amomum* Mill., *Eutrochium fistulosum* (Barratt) E.E. Lemont, *Solidago erecta* Banks ex Pursh, *Spiraea virginiana* Britton, and *Symphotrichum dumosum* (L.) G.L. Nesom. The species is now state-ranked S1 in Georgia (Krakow 2017).

***Symphotrichum simmondsii* (Small) Nesom** (Asteraceae)

CAMDEN COUNTY: 0.3 mi N Waverly jct Hwy US 17 and Hwy GA 110, by Hwy US 17, 31.09827°N, 81.72343°W, bisected wetland, with *Nyssa biflora* Walter, *Acer rubrum* L., *Cephalanthus*, *Sagittaria latifolia* Willd., *Polygonum*, *Eleocharis*, 26 Oct 2006, *Carter 17344 with W. Baker* (VSC); 3.1 mi NE of Magnolia Bluff jct Hwy GA 252 and Bailey Mill Rd, by Hwy GA 252, 30.97583°N, 81.85679°W, edge of flatwoods de-

pression, with *Nyssa biflora*, *Acer rubrum*, *Cephalanthus occidentalis* L., 8 Nov 2007, *Carter 18284* (GA, VSC).—Simmond's Aster ranges from North Carolina and South Carolina in the coastal plain to southern Florida and westward into Louisiana and Texas (Brouillet et al. 2006, Weakley 2015, SERNEC 2017b). Cronquist (1980) did not include a formal treatment of this distinct species in his treatise of southeastern Asteraceae, because he suspected a hybrid origin. Simmond's Aster, characterized by relatively large heads and conspicuous blue rays, prefers wet habitats such as ditches and pond margins (Wunderlin and Hansen 2011). The two collections cited here comprise the first report of this showy aster from Georgia.

***Urochloa piligera* (F. Muell. ex Benth.) R.D. Webster** (Poaceae)

LEE COUNTY: NE quadrant jct Hwy US 19 and Century Rd, 31.67984°N, 84.17216°W, convenience store, edge of parking lot, ruderal, plant apparently local, 16 Sep 2014, *Carter 22260 with Baker* (VSC).—Wattle Signalgrass is native to Australia, and in North America, was previously reported only from Florida (Wipff and Thompson 2003; USDA, NRCS 2017), where it grows in disturbed areas. The SERNEC portal (SERNEC 2017b) includes specimens that expand the range in the Southeast to Arkansas, Alabama, and South Carolina. This first voucher for Georgia is from Lee County in the southwestern part of the state (Figure 1). The specimen has pubescent leaf sheaths, but otherwise matches the description in Wipff and Thompson (2003): spikelets 3.7–3.9 mm long and in two rows, and upper glume and lower lemma pubescence short proximally and becoming longer distally.

***Vitex agnus-castus* L.** (Lamiaceae)

BROOKS COUNTY: 3.0 mi W Quitman jct Hwy US 84 and Hwy GA 76, along Hwy US 84, 30.78507°N, 83.61088°W, along road shoulder, plants local, escaped and persisting, 19 Jun 2009, *Carter 18887* (VSC). MITCHELL COUNTY: 3.2 mi NNE of Meigs, mixed hardwoods adjacent to cultivated field and highway, 18 Jul 1968, *Faircloth 5307* (GA, VSC).—Chaste-tree, native to southern Europe, is a commonly cultivated shrubby tree in the USA and is known to naturalize readily in tropical regions (Huxley et al. 1992). The species is reportedly well-established

in North America in the general area from Pennsylvania south to Florida and West to Texas and the west coast (see USDA, NRCS 2017), and inhabits disturbed areas such as pastures and suburban woodlands (Weakley 2015). The vouchers cited here provide evidence for the naturalization of Chaste-tree in Georgia. Other specimens from the state have ambiguous data (e.g., the mixed collection of *Curtiss 6813*, GA) or were collected from plants in cultivation (e.g., *Ford and Thorne s.n.*, TENN) or persisting at old homesteads (e.g., *Carter 7312*, GA, VSC).

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