

STUDIES IN THE VASCULAR FLORA OF THE
SOUTHEASTERN UNITED STATES: VI

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ABSTRACT

As part of ongoing efforts to understand, document, and conserve the flora of southeastern North America, we propose a number of taxonomic changes, nomenclatural changes, interpretations of nativity, and distributional accounts. Regarding the Asaroideae (Aristolochiaceae), we support continued recognition of *Hexastylis* (and other segregates of a very broad *Asarum* s.l.) at generic rank and make the necessary combinations to continue the use of *Hexastylis* in southeastern North America floras. In *Conoclinium* (Asteraceae), we present morphological and distributional evidence corroborating the recent suggestion (based on molecular evidence) that Chapman's 1878 *C. dichotomum* is distinct, warrants recognition, and is present as a second *Conoclinium* in the southeastern North American flora. An analysis of historical accounts of *Gaillardia pulchella* (Asteraceae) strongly suggests that its modern occurrence east of Texas is adventive, rather than native. Two rare southeastern United States skullcaps, *Scutellaria mellichampii* and *S. ocmulgee* (Lamiaceae), have been persistently confused with one another and other species; we present a reassessment of the taxonomic distinction between them, best ways to distinguish them and similar species, and their known distributions. A reassessment of the taxonomy, distribution, and ecology of *Linum carteri* (Linaceae), a rare southern Florida endemic, confirms that two species should be recognized by modern species concepts; we make the necessary new combination to effect the recognition of two narrowly endemic species. In *Andropogon* (Poaceae), we propose that *A. virginicus* var. *decipiens* warrants recognition as distinct at species rank from other entities in the *Andropogon virginicus* complex. We also present more comprehensive information on the distributions of four species of "bushy bluestems" (*Andropogon glomeratus* s.l.), their ecology, and their practical recognition. In the Violaceae, modern reassessment of the taxonomy of many species (especially in the genus *Viola*) by H.E. Ballard, Jr. and collaborators have been vexed by uncertain application of many "old" names; we here provide a first installment of typifications and nomenclatural interpretations needed to move forward with a modern treatment of the genus in our region. In *Xyris* (Xyridaceae), we re-establish the generally ignored *X. elliottii* var. *stenotera* based on careful and extensive study of its morphology and ecology in comparison to *X. elliottii* var. *elliottii*,

including a transplant study. English naturalist Mark Catesby (1683–1749) has been honored by having a genus and fifteen species of plants named for him, but most of these honorific names have been constructed in manners contrary to the Shenzhen Code; as these are “errors to be corrected,” we therefore propose to correct and standardize these honorifics by restoring his name “*catesby-*” as the root of the names. Similarly, in seven names (variably formed) employed by W.W. Ashe to honor his cousin and (later) wife Margaret Haywood Henry (Wilcox) (Ashe), we also standardize and correct the root of the names to be accurately based on her name, “*margaret-*” in conformance with the Shenzhen Code.

RESUMEN

Como parte de los esfuerzos en marcha para entender, documentar, y conservar la flora del sudeste de Norte América, proponemos un número de cambios taxonómicos, nomenclaturales, interpretaciones de ser autóctonas, y datos de distribución. En relación con Asaroideae (Aristolochiaceae), continuamos reconociendo en el rango genérico *Hexastylis* (y otros segregados del muy amplio *Asarum* s.l.) y hacemos las combinaciones necesarias para continuar con el uso de *Hexastylis* en la flora del sudeste de Norte América. En *Conoclinium* (Asteraceae), presentamos pruebas morfológicas y de distribución que corroboran la reciente sugestión (basada en pruebas moleculares) que *C. dichotomum* de Chapman 1878 es distinta, merece reconocimiento, y está presente como una segunda *Conoclinium* en la flora del sudeste de Norte América. Un análisis de las citas históricas de *Gaillardia pulchella* (Asteraceae) sugiere fuertemente que su moderna ocurrencia en el este de Texas es adventicia, en vez de nativa. Dos especies raras del sudeste de Estados Unidos, *Scutellaria mellichampii* y *S. ocmulgee* (Lamiaceae), han sido permanentemente confundidas con otra y otras especies; presentamos una reevaluación de la distinción taxonómica entre ellas, el mejor modo de distinguirlas entre ellas y con especies similares, y sus distribuciones conocidas. Una reevaluación de la taxonomía, distribución, y ecología de *Linum carteri* (Linaceae), un endemismo raro del sur de Florida, confirma que deben reconocerse dos especies según los modernos conceptos de especie; hacemos las nuevas combinaciones necesarias para efectuar el reconocimiento de dos especies endémicas restringidas. En *Andropogon* (Poaceae), proponemos que *A. virginicus* var. *decepiens* precisa reconocimiento en el rango de especie como distinta de otras entidades en el complejo *Andropogon virginicus*. También presentamos información más completa de las distribuciones de cuatro especies de “bushy bluestems” (*Andropogon glomeratus* s.l.), su ecología, y su reconocimiento práctico. En la reevaluación moderna de la taxonomía de Violaceae, muchas especies (especialmente en el género *Viola*) por H.E. Ballard, Jr. y colaboradores han sido controvertidas por la aplicación incierta de muchos nombres “viejos”; aquí aportamos una primera entrega de tipificaciones y las interpretaciones nomenclaturales necesarias para avanzar con un tratamiento moderno del género en nuestra región. En *Xyris* (Xyridaceae), reestablecemos la generalmente ignorada *X. elliotii* var. *stenotera* basados en un estudio cuidadoso y extensivo de su morfología y ecología en comparación con *X. elliotii* var. *elliotii*, incluyendo un estudio de trasplantes. El naturalista inglés Mark Catesby (1683–1749) ha sido distinguido por tener un género y quince especies de plantas nombradas por él, pero la mayor parte de estos nombres honoríficos han sido construidos de un modo contrario al Código de Shenzhen; como estos son “errores a ser corregidos,” proponemos por ello corregir y estandarizarlos restaurando su nombre ‘*catesby-*’ como raíz de los nombres. Similarmente, en siete nombres (formados variablemente) empleados por W.W. Ashe para honrar a su prima y (posterior) esposa Margaret Haywood Henry (Wilcox) (Ashe), también estandarizamos y corregimos la raíz de nombres para que estén basados con precisión en su nombre, ‘*margaret-*’, de acuerdo con el Código de Shenzhen.

INTRODUCTION

As part of ongoing work on the *Flora of Southeastern North America* and *Flora of Virginia* (Weakley 2015; Weakley 2020; Weakley et al. [in press]), as well as for general floristic, conservation, and scientific work in eastern North America, it is necessary or desirable to document taxonomic and nomenclatural changes and significant distribution records. In some cases, new combinations are needed to accurately reflect current taxonomic understanding. Some of these are rank changes, whereas others are generic transfers to apply new (or old) generic concepts to taxa that do not have corresponding available names at the specific or infraspecific level. We have also addressed various nomenclatural issues and clarified characters and identification of difficult groups in the regional flora.

We here present a sixth volume of such changes, contributed by 12 authors. It follows similar conventions and philosophical approaches as the earlier volumes in the series (Weakley et al. 2011b, 2017b, 2018a, 2018b, 2019). Primary authorship of the sections in this paper is as follows (and is also indicated at the beginning of each section): *Conoclinium* (HCM, DBP, & ASW), *Gaillardia* (ARF), *Hexastylis* (ASW & DBP), *Scutellaria* (KAB), *Linum* (KAB & ASW), *Andropogon* (ELB & SLO; BAS), Violaceae (HEB, RNB, & SLL), Catesby honorifics (ASW & DBP), and W.W. Ashe honorifics for Margaret (ASW & CAMcC).

ARISTOLOCHIACEAE

Hexastylis: Continued recognition of *Hexastylis*, with two species transferred to *Hexastylis* from *Asarum*

Primary authors: Alan S. Weakley and Derick B. Poindexter

Controversy has been the norm in the generic circumscription of genera in what are now considered the Asaroideae. Major monographic works (Blomquist 1957; Gaddy 1987) in eastern North America have recognized *Hexastylis* Raf. 1825 as separate from *Asarum* L. 1753, while other authors have combined them (Kelly 1997, 1998, 2001; Sinn et al. 2015a 2015b; Sinn 2015, 2017a, 2017b). Internationally (notably in eastern Asia, where the broader group is most diverse), generic circumscription has also been variable and controversial, with probably a greater tendency than in North America to accept a broader *Asarum* s.l., as was done in the *Flora of China* (Huang et al. 2003). Even in Asia, though, many workers have recommended the recognition of narrower and morphologically more homogeneous genera, including (in addition to *Asarum* s.s.) *Heterotropa* C. Morren & Decne. 1834, *Asiasarum* F. Maek. 1936, and *Geotaenium* F. Maek. 1953.

Over the past century, authors of North American regional and state floras have generally separated *Hexastylis* from *Asarum* s.s. (Small 1933; Gleason 1952; Radford et al. 1968; Wofford 1989; Gleason & Cronquist 1991; Whittemore & Gaddy 1997; Weakley et al. 2012; Kartesz 2015; Tennessee Flora Committee 2015; Weakley 2015, 2020). A minority of regional and state floras have preferred to treat *Hexastylis* as a component of *Asarum* s.l. (Fernald 1950; Strausbaugh & Core 1978; Wunderlin & Hansen 2011, 2015).

Recently, phylogenetic studies of the group have provided evidence on the monophyly of clades within *Asarum* s.l. and their evolutionary relationships, but the molecular phylogeny of the group remains unresolved. Ranks are (of course) subjective, and one taxonomist's genus might be another's subgenus or section, so in the following discussion we refer to these clades in single quotes using recognizable names that have been applied at genus, subgenus, or sectional rank (ex. "*Hexastylis*"). Sinn et al. (2015a, 2015b) used seven plastid regions (*rpoB-trnC^{GCA}*, *rps16-trnK*, *trnL^{UAA} exon-trnF^{GAA}*, *trnT^{UGU}-trnL^{UAA}*, *trnL^{UAA}-trnL^{UAA} exon*, *trnS^{UGA}-trnFM^{CAU}*, and *ycf1* 3850-5310) and one nuclear region (ITS1 – partial 26S), coupled with Bayesian, maximum likelihood, and parsimony analytical methods. Their sampling was largely North American, with a total of 58 accessions. They recognized six clades in *Asarum* s.l., which they chose to recognize taxonomically as one genus ("*Asarum*") with three subgenera ("*Geotaenium*," "*Asarum*," and "*Heterotropa*"), with "*Geotaenium*" and "*Asarum*" each containing a single section, and "*Heterotropa*" consisting of four clades recognized as sections ("*Asiasarum*," "*Heterotropa*," "*Longistylis*," and "*Hexastylis*").

One might reasonably (and with phylogenetic support from their findings) recognize one genus with three subgenera and a total of six sections (as they did), or alternatively, three genera (each equivalent in circumscription to their subgenera), or six genera (each equivalent in circumscription to their six sections).

Takahashi and Setoguchi (2018) used a larger sampling of taxa (112), but only one plastid (*matK*) and one nuclear (ITS) marker, which supported some of the results of Sinn et al. (2015a, 2015b), with "*Geotaenium*," "*Asiasarum*," "*Asarum*," and "*Heterotropa*" each monophyletic, but "*Hexastylis*" interestingly divided into two groups, an "*Arifolium* group" ambiguously sister to "*Geotaenium*" and "*Asarum*," and a "*Minus* group" sister to "*Heterotropa*" (see their figures 1 and 2). In addition, they found "*Longistylis*" nested within a strongly supported "*Heterotropa*."

Molecular phylogenetics provides some support for the monophyly of each of the clades that has been recognized at generic or sectional rank, with the possible exception of "*Longistylis*" and "*Hexastylis*," which each had limited support as monophyletic in Sinn et al. (2015a, 2015b) but were suggested as potentially paraphyletic (though topology support is <50%) in Takahashi and Setoguchi (2018). Interestingly, "*Hexastylis*" is strongly supported in all three studies with the exclusion of the likewise strongly supported "*Arifolium* group."

The most striking morphological disparities in "*Asarum*" are between the traditionally recognized *Asarum* s.s. clade (e.g., *A. canadense* L.) and the remainder of the genus. The former is characterized by separate sepals, non-herkogamy, strictly inferior ovaries, creeping rhizomatous habits, and mostly paired (=opposite), pubescent, and non-coriaceous leaves. These character states are indicated as largely ancestral in the aforementioned phylogenetic studies. In the Southeast, these differences are perhaps more pronounced as this ancestral lineage is sympatric with the more derived "*Hexastylis*" (per Sinn et al. 2015a, 2015b), with fused sepals, strict herkogamy, superior to partially superior ovaries, mostly short internodes, and single (=alternate), glabrous, and coriaceous leaves.

One need not look far to find parallel situations to “*Asarum*” within Aristolochiaceae. Zhu et al. (2019) reexamined *Aristolochia* s.l. (comprised of three subgenera) and found support for the recognition of the segregate genus *Isotrema* (and arguably *Endodeca* and *Pararistolochia*, contingent upon one’s comfort with monotypic genera).

While current molecular data approximate traditionally recognized segregate lineages within “*Asarum*,” the lack of congruence between topologies in addition to low or obsolete deep node support suggest a need for greater genomic sampling to clarify relationships with “*Asarum*.”

Until stronger conclusions can be made, we opt to retain the traditionally recognized separate genera, *Asarum* s.s. and *Hexastylis* s.s.

Hexastylis continues to be used in the southeastern United States, with a new combination, *H. harperi* (Gaddy) B.R. Keener & L.J. Davenp., recently made in the genus (Keener & Davenport 2015). At least two putative new species in *Hexastylis* are under critical study (Keener [in prep.], pers. comm., 2020).

In order to have names available in *Hexastylis* in upcoming floras (Weakley et al. [in prep.], Weakley [in prep.]), we provide new combinations in *Hexastylis* for two taxa with names available only in *Asarum*.

Hexastylis chueyi (B.T. Sinn) Weakley & D.B. Poind., **comb. nov.** BASIONYM: *Asarum chueyi* B.T. Sinn. Phytotaxa 224(1):92. TYPE: U.S.A. VIRGINIA. Albemarle Co.: limestone cliffs along Rivanna River at Route 29, 16 Apr 1959, Clyde F. Reed 42803 (HOLOTYPE: MO!).

Hexastylis rosei (B.T. Sinn) Weakley & D.B. Poind., **comb. nov.** BASIONYM: *Asarum rosei* B.T. Sinn. Phytotaxa 319(3):298. TYPE: U.S.A. North Carolina. Caldwell Co.: on the W (E-facing) sloped road bank of Brown Mountain Beach Road (CR 1328), 0.5 km S of the jct. with Harper’s Creek, 35°58.07’N, 81°45.49’W, elevation 445 m, 13 Jun 2016, R. Mark Rose 2016-06-13CA-A (holotype: NY [including spirit-preserved flowers and leaves]; isotypes: NCU, MO, US).

ASTERACEAE

Conoclinium: Morphological analysis of the *Conoclinium* of the southeastern United States

Primary authors: Hannah C. Medford, Derick B. Poindexter, and Alan S. Weakley

Although centered in Mexico, the genus *Conoclinium* occurs broadly throughout eastern and central North America and is most often circumscribed to contain four species (King & Robinson 1970, Patterson & Nesom 2006, Schilling et al. 2019): *C. betonicifolium* (Mill.) R.M. King & H. Rob. (including var. *integrifolium* (A. Gray) T.F. Patt.), *C. coelestinum* (L.) DC, *C. dissectum* A. Gray, and *C. mayfieldii* T.F. Patt.

Recent phylogenetic studies by Schilling et al. (2019) revealed distinct genetic variation, prompting the elevation of *Conoclinium betonicifolium* var. *integrifolium* to species rank (= *C. oligolepis* Kunze), the description of a new species ancestral to the remainder of the genus, *C. gonzaleziae* E.E. Schill. & Panero, and the resurrection of *C. dichotomum* Chapm. Of these taxonomic changes, the latter is the only one pertinent to the southeastern flora; the taxon has long been subsumed within a broad concept of *C. coelestinum* (Small 1933; Patterson & Nesom 2006; Schilling et al. 2019).

Chapman (1878) first described *Conoclinium dichotomum* from populations in southern Florida, primarily based on shorter corollas compared to the widespread *C. coelestinum*. In their molecular phylogenetic study, Schilling et al. (2019) found that specimens from southern Florida with smaller corollas were placed in a single, strongly supported clade independent of the widely distributed *C. coelestinum*. Schilling et al. (2019) subsequently argued for *C. dichotomum* to be reinstated based on these molecular phylogenetic differences, the reliable morphological difference in corolla size, and the historical treatment by Chapman (1878). However, critical morphometric comparisons were not within the scope of their study.

In the study presented here, we examined a small sample of specimens (n=32) from the University of North Carolina at Chapel Hill Herbarium (NCU), the Duke University Herbarium (DUKE), and the North Carolina State Herbarium (NCSC) to provide a more comprehensive assessment of the morphology and ranges of *Conoclinium dichotomum* vs. *C. coelestinum* for inclusion in the flora of the southeastern United States. We examined a series of morphological characters (listed in Table 1), with each represented by the average of three measurements, and performed a principal component analysis (PCA) using JMP® Pro 13 (SAS 2016) (Fig. 1). We used a correlation matrix and distance-based biplot to normalize the data and focused on the three

TABLE 1. List of morphologic characters examined with component loadings for *Conoclinium coelestinum* and *C. dichotomum*. Characters used in the principal component analysis (PCA) are denoted by an asterisk (*).

Characters Examined	Component 1	Component 2
*Corolla Length	0.84037	0.31415
*Pappus Length	0.82937	-0.02199
Outer Phyllary Length	0.22110	0.93853
Inner Phyllary Length	0.87283	0.02086
*Outer/Inner Phyllary Length Ratio	0.66088	-0.71340

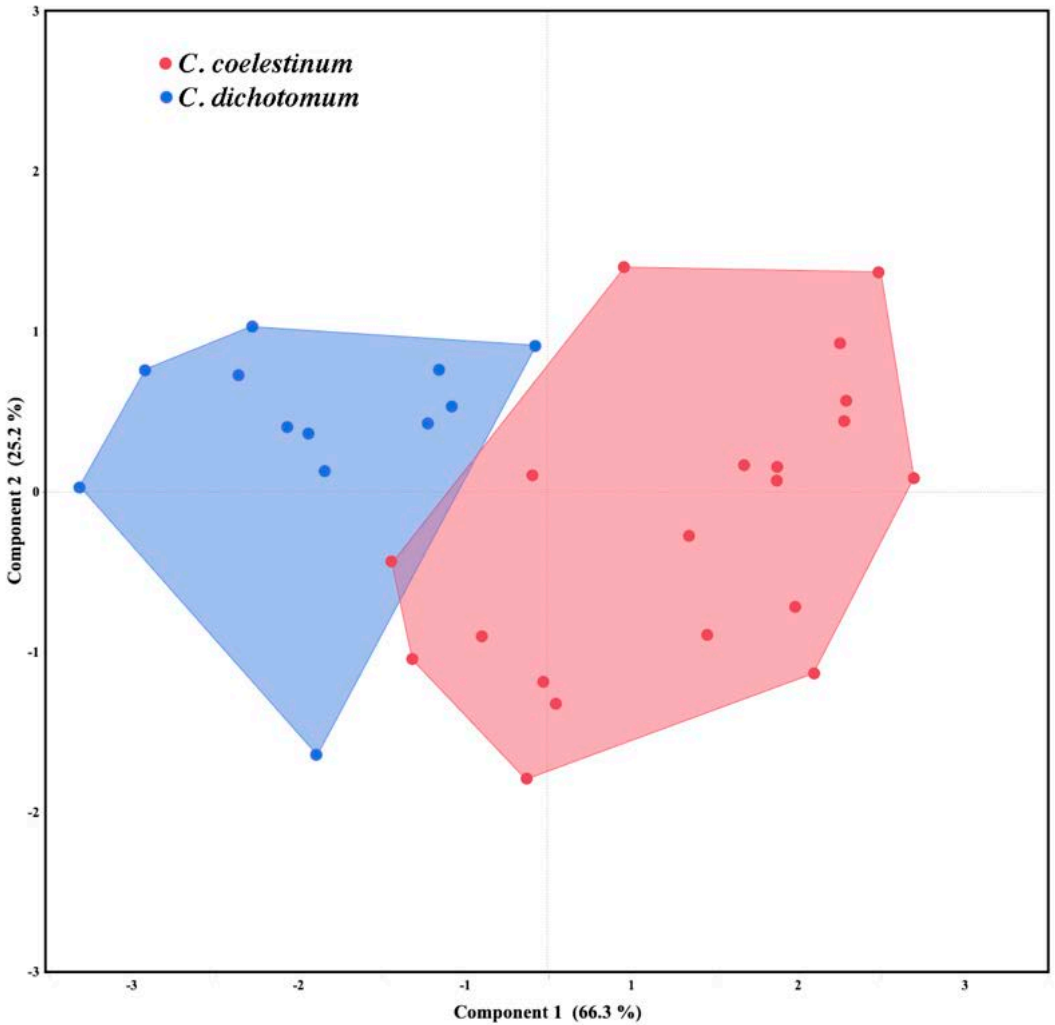


FIG. 1. Principal components analysis of *Conoclinium coelestinum* and *C. dichotomum* based on three variables: pappus length, corolla length, and outer/inner phyllary length ratio.

characters that provided the most separation between the two taxa in ordination space: pappus length, corolla length, and outer/inner phyllary length ratio. Components 1 and 2 of the final PCA accounted for 66.3% and 25.2% of the variation, respectively (91.5% cumulative). We created a geographic range map using the locations provided on herbarium specimens, including a broader range of specimens than were used in the morphometric analysis (n=247) (Fig. 2).

The strongest determining morphological feature between the two species was corolla length (measured from the base of the corolla to the lowest sinus). *Conoclinium coelestinum* has corollas 2.1–2.5 mm long, whereas the corollas of *C. dichotomum* are 1.6–2.0 mm long (Fig. 3). Secondly, we found the length of the pappus bristles and inner phyllaries to provide distinction between species, although less discrete; *C. dichotomum* tends to have shorter pappus bristles and inner phyllaries than *C. coelestinum*. Leaf vestiture and density of oil glands may also differentiate the species but were not critically examined here. Within our sample, individuals of *C. dichotomum* and *C. coelestinum* co-occurred throughout Florida (Fig. 2). The co-occurrence of these morphologically distinct taxa further supports their recognition as separate species.

Chapman (1878) and Schilling et al. (2019) both described a difference in flowering times between the two species: *Conoclinium dichotomum* begins flowering earlier (in April), whereas *C. coelestinum* does not begin flowering until July. These putative phenological disparities were not supported in our observations of herbarium specimen data, as both species appear to have a core flowering time from June–November, and both have individuals in bloom as early as April.

In addition, we found evidence that *Conoclinium dichotomum*, considered a south Florida endemic, may in fact have a wider distribution. We identified 12 specimens as *C. dichotomum* (based on characters enumerated in the key below). Geographically, these extend from south Florida (Dade County) into north Florida (Madison County), as well as two from Texas (Newton and Wood Counties) and one from Louisiana (Webster County). It is quite possible that *C. dichotomum* has spread out of southern Florida, especially given its similarities to *C. coelestinum*, which is known to be weedy and has likely spread quickly and recently across North America from Mexico (Shilling et al. 2019). The specimens from Texas and Louisiana indicate that *C. dichotomum* may be more of a Gulf Coast endemic than a strict southern Florida one. However, much as *C. coelestinum* has likely extended its range due in part to cultivation, the same may also be true for *C. dichotomum*. Further sampling is needed to determine the full range of *C. dichotomum*.

KEY TO CONOCLINIUM IN THE SOUTHEASTERN UNITED STATES

1. Corollas 2.1–2.5 mm long; pappus bristles 1.7–3.0 mm long; inner phyllary (2.5–)2.7–4.2 mm long; [widespread] **Conoclinium coelestinum**
 1. Corollas 1.6–2.0 mm long; pappus bristles 1.0–2.9 mm long; inner phyllary 2.0–3.4(–3.6) mm long [primarily peninsular FL] **Conoclinium dichotomum**

Specimens included in morphometric studies:

Conoclinium dichotomum

U.S.A. FLORIDA. Brevard Co.: 3 Jul 1957, Melvin. s.n. (NCU). Citrus Co.: 12 Jul 1962, Lakela 25161 (NCU). Collier Co.: 14 May 1976, Correll 47166 (NCU). Columbia Co.: 1 Oct 1966, D'Arcy 1464 (NCU). Dade Co.: 4 Jun 1978, Correll. 49860 (NCU); 23 Jun 1960, Webster 10099 (DUKE). Glades Co.: 8 Nov 1936, Lovett 193 (DUKE). Madison Co.: 19 Jun 1967, Bozeman 10171 (NCU). **LOUISIANA.** Webster Parish: 14 Aug 1938, Correll 10295 (DUKE). **TEXAS.** Newton Co.: 12 Aug 1968, Demaree 58781 (NCU); Wood, 3 Sep 1942, Lundell 11763 (NCSC).

Conoclinium coelestinum

U.S.A. ALABAMA. Colbert Co.: 31 Aug 1966, Clark 8309 (NCU). Mobile Co.: 4 Nov 1983, Sundberg 221 (NCU); 7 Nov 1968, Lelong 4964 (NCU); 6 Nov 1965, Deramus 799 (NCU). **FLORIDA.** Dade Co.: 1 Feb 1975, Correll 44263 (NCU); 19 Sep 1973, Kral 51880 (NCSC). Leon Co.: 1 Nov 1955, Gillespie G11-55-7 (NCSC), 26 Oct 1956, Gillespie 616 (NCU). Liberty Co.: 18 Sep 1979, Nelson 1353 (NCU). Martin Co.: 27 Jun 1962, Ray 11085 (NCU). Nassau Co.: 31 Oct 1981, Correll 53044 (NCU). Osceola Co.: 16 Jul 1977, Huck 1272 (NCU). Santa Rosa Co.: 26 Aug 1969, Moore 644-69 (NCU). Washington Co.: 23 Sep 1956, Gillespie 522 (NCU). **GEORGIA.** Brooks Co.: 2 Oct 1963, Faircloth 635 (NCU). **LOUISIANA.** Calcasieu Parish: 24 Sep 1976, Vincent 569 (NCU). Evangeline Parish: 24 Nov 1967, Schwab 500 (NCU). Jefferson Parish: 28 Sep 1989, Feibelman 31 (NCU). Plaquemines Parish: 8 Oct 1978, Fleming 424 (NCU); 22 Oct 1978, Fleming 424 (NCU). St. Helena Parish: 12 Jul 1979, Allen 9759 (NCU). St. Landry Parish: 18 Oct 1969, Rogers 1992 (NCU). Tangipahoa Parish: 15 Oct 1978, Darwin 969 (NCU). West Feliciana Parish: 11 Aug 1978, Darwin 829 (NCU). **MISSISSIPPI.** Forrest Co.: 3 Jul 1970, Rogers 3590 (NCU). George Co.: 8 Oct 1966,

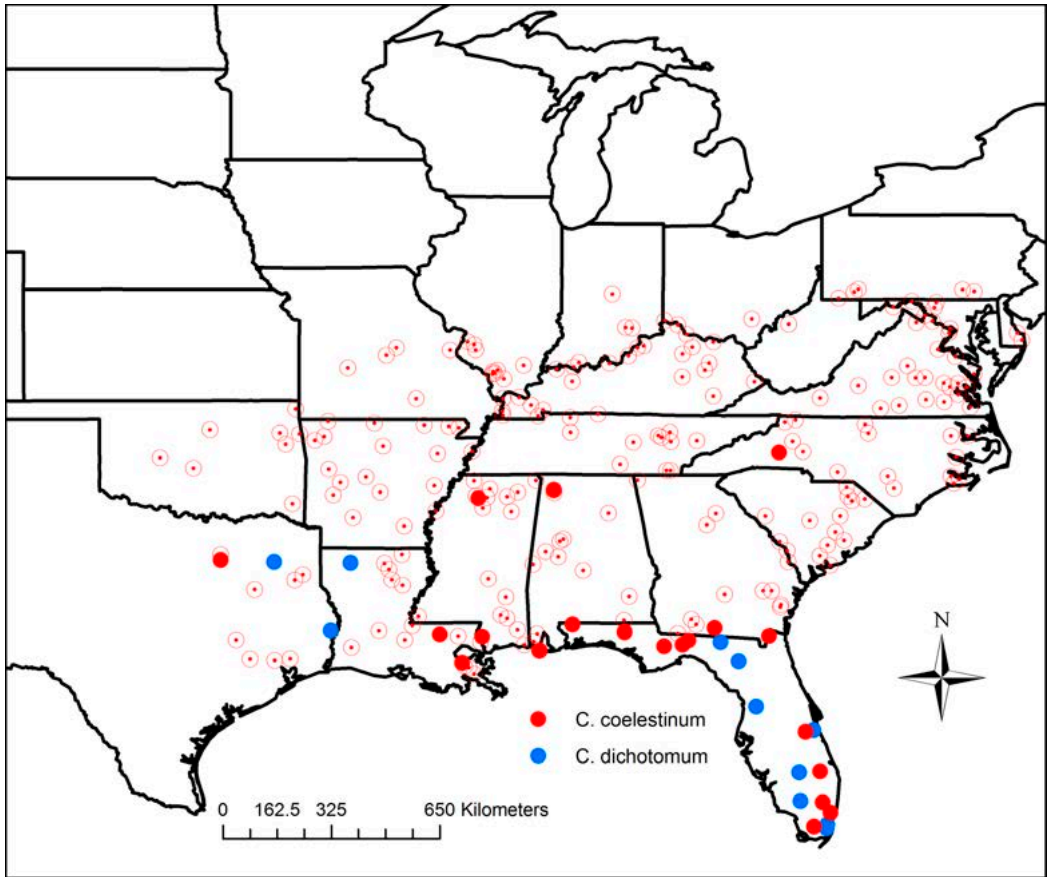


FIG. 2. Range map of *Conoclinium coelestinum* and *C. dichotomum*., based on georeferenced herbarium specimens ((n=247). Open circles represent specimens not included in morphometric analysis

Temple 4462 (NCU). **Jackson Co.:** 27 Sep 1953, Demaree 34360 (NCU). **Panola Co.:** 6 Oct 1966, Temple 4404 (NCU). **Pearl River Co.:** 23 Sep 1989, Feibelman 23 (NCU); 5 Oct 1989, Feibelman 43 (NCU). **NORTH CAROLINA. Burke Co.:** May 1910, Smith 89 (NCSC). **TEXAS. Brazos Co.:** 13 Jun 1963, Massey 217 (NCU); 16 Jul 1963, Massey 303 (NCU). **Dallas Co.:** 25 Apr 1942, Lundell 11652 (NCU). **Harris Co.:** 9 Sep 1926, Tharp 4548 (NCU). **Liberty Co.:** 5 May 1972, Nixon 4509 (NCU). **Waller Co.:** 2 Nov 1983, Sundberg 2173 (NCU).

ASTERACEAE

Gaillardia: *Gaillardia pulchella* is not native to the eastern U.S.A.

Primary author: Alan R. Franck

Gaillardia Foug. contains about 20 species primarily native to northern Mexico and the southwestern USA (Marlowe & Hufford 2007; Turner & Watson 2007). Two species native to Texas and surrounding areas are also recorded from the eastern USA, *G. aestivalis* (Walter) H. Rock (= *G. lanceolata* Michx., = *G. picta* D. Don) and *G. pulchella* Foug. (= *G. bicolor* Lam., nom. illeg.). While there is consensus that *G. aestivalis* is native to the eastern USA, there is conflicting information about the nativity of *G. pulchella* in the eastern USA.

The earliest references to wild plants of *Gaillardia* in the eastern USA pertain only to *G. aestivalis*. Its basionym was published by Walter (1788) and then Michaux (1803) published its later synonym, *G. lanceolata*. Pursh (1814) utilized the name *G. bicolor* for plants distributed from "Carolina to Florida" and listed both *G. lanceolata* and *G. pulchella* in synonymy, conflating two distinct species into one. Nuttall (1818) followed the

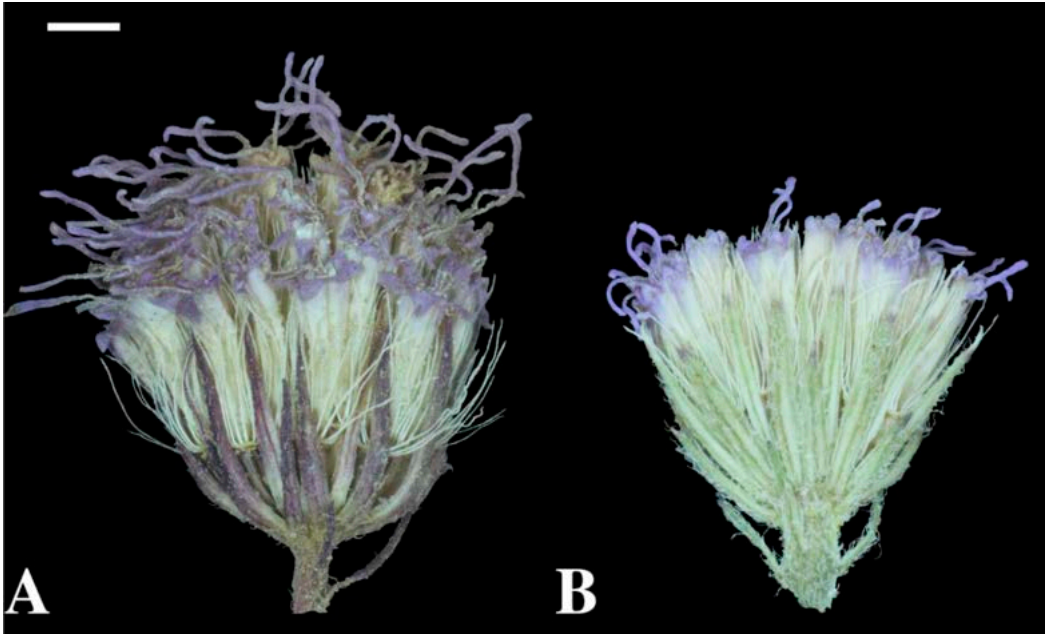


FIG. 3. Capitula of **A)** *Conoclinium coelestinum* (Gillespie 616, Leon County, Florida NCU) and **B)** *C. dichotomum* (Lakela 25161, Citrus County, Florida, NCU). Note the larger flowers and few septate hairs of A compared to B. Scale = 1mm.

use of *G. bicolor*, stating that it occurred in the “open pine forests of Georgia and South Carolina” which, as noted by Stoutamire (1954: 104), is attributable to *G. aestivalis*, not *G. pulchella*. Similarly, Elliott (1824) was certain that his *G. bicolor* was the same as Michaux’s *G. lanceolata*, but doubted that it was the same as *G. bicolor* of Lamarck. Subsequently, Croom (1834) reported a new locality for *G. bicolor* as “Abundant near Fayetteville, N.C.” and gave its distribution as “Florida to North Carolina.” A sheet at PH (barcode 00296639) of collections made by Baldwin from Georgia, Elliott from South Carolina, and Nuttall was annotated by Stoutamire as *G. aestivalis*. Several other authors reported *G. aestivalis* (as *G. lanceolata*) for the eastern USA, but not *G. pulchella* (Chapman 1860, 1897; Wood 1864; Gray 1884; Small 1903, 1913). Consistent with the above observations, Pursh, Nuttall, Elliott, and Croom were all referring to *G. aestivalis* using the misapplied name *G. bicolor*, while later authors used the synonym *G. lanceolata* (the combination *G. aestivalis* was only published in 1956).

Gaillardia pulchella was first described from cultivation in France in the 1780s, probably from seeds collected in Texas (Stoutamire 1954: 9). The coastal form, *G. pulchella* var. *drummondii* (Hook.) B.L. Turner, remains especially common in cultivation, apparently first disseminated by the seed collections of Thomas Drummond in the 1830s (Stoutamire 1954: 97). Shortly thereafter, *G. pulchella* was found at Bartram’s Garden in Philadelphia, PA (Schneider & Potvin 2009) and was listed in other garden catalogues in New York, NY (Thorburn 1844, as *G. bicolor*), Philadelphia, PA (Buist 1846, as *G. bicolor* and *G. picta*), and Pittsburgh, PA (Bennett 1860, as *G. picta*). Wood (1864) gave its distribution as Louisiana and Texas and added it could be found in gardens, similar to Gray (1884) who stated it was “common in gardens.” In the late 1890s, the “double” form (Stoutamire 1954: 102) was offered in Florida garden catalogues (Pike & Ellsworth 1892; Sutton 1893).

The earliest reference to wild plants of *Gaillardia pulchella* in the eastern USA may be that of Mohr (1878), who listed it as a foreign plant “Covering year after year a large part of the ground at Pinto Island” in Alabama (Table 2). In 1896, Pollard (Table 2) considered it escaped in Mississippi. Still, Small (1903, 1913) gave its distribution as “Kansas to Louisiana and Arizona.” In 1902, *G. pulchella* was documented at Sullivan’s Island,

TABLE 2. Historic herbarium specimens of *Gaillardia pulchella* in the eastern USA and Bahamas.

Year	Locality	Label notes	Voucher	Herbarium-barcode
1882	AL, Mobile Co., Pinto Island	Ballast ground, introduced from Texas with ballast, fairly established	Mohr 861	US-01807443
1883	MS, Hancock Co., Bay St. Louis	Sandy borders of gulf	Langlois 45	NY-02873224
1893	AL, Dallas Co., Marion Junction	Borders of fields, adventive from Texas?	Mohr s.n.	US-01807442
1896	MS, Harrison Co., Biloxi	Escaped	Pollard 1151	US-01807624
1902	SC, Charleston Co., Sullivan Island		Palmer s.n.	US-01807630
1904	FL, Brevard Co., Cape Canaveral	Probably escaped	Burgess 663	NY-02872986
1915	FL, Miami-Dade Co., Sykes Hammock	Pinelands	Small 6763	NY-2872991
1917	FL, Volusia Co., Daytona Beach	Dry sand	Francis 159	US-01807444
1920	FL, Taylor Co., Perry	Roadsides	Small 9681	NY-2872988
1923	NC, New Hanover Co., Wilmington	Escaped from cultivation and established at the beach	Churchill s.n.	G (in Buddulph 1944)
1924	FL, Columbia Co., E of Lake City	Swamps	Small 11371	NY-2872984
1935	NC, Brunswick Co., Southport		Knobloch 42	US-01807631
1936	FL, Monroe Co., Big Pine Key	Roadside	Killip 31617	NY-02872983
1940	VA, Henrico Co., Richmond	Waste places and railroad ballast	Fernald 12498	NY-02873117
1948	Bahamas, North Bimini	Now established on sea coast	Howard 10105	NY-1719718

South Carolina, and in 1904 at Cape Canaveral, Florida, on a specimen label, Burgess opined it had “probably escaped” (Table 2). Probably based on these collections, Rydberg (1915) then wrote that it (as *G. picta*) was found on “Sea beaches, Texas to South Carolina and Florida.” Small (1933) wrote that *G. drummondii* occurred in south Florida and Texas in “Dry soil, prairies, open woods, and cult. grounds” and that *G. picta* was found in coastal sands from Florida to Texas and South Carolina. The attribution of the species to swamps and pine-lands in Florida by Small on his specimen labels (Table 2) is probably inaccurate or a vague oversimplification, since *G. pulchella* is not known from swamps nor pine-lands of Florida. In Ohio, *G. pulchella* was recorded as escaped (Schaffner 1934), and similarly so in the Bahamas in 1948 (Table 2). Stoutamire (1954: 105), while conducting field work in North Carolina, South Carolina, and Georgia, found *G. pulchella* “only in disturbed areas” such as vacant lots, roadsides, or disturbed dunes, and was unable to find it in “several areas of uninhabited coast, or along roadsides away from towns.” Based on hybridization studies, almost all naturalized eastern populations were closely related to a coastal population from Norias, Texas (Stoutamire 1954, 1955). Burk (1961) observed that *G. pulchella* was commonly cultivated and escaped from cultivation on Portsmouth Island, North Carolina. Turner & Whalen (1975) stated that *G. pulchella* was “adventive in Florida and the southeastern Atlantic coastal region.” It was treated as non-native in the Dry Tortugas by Stoddart & Fosberg (1981). Some later works, however, considered *G. pulchella* native to the eastern USA (Wunderlin 1998; Diamond, Jr. 2003; Weakley 2015) and it has often been promoted for native wildflower plantings in the region (Hammond et al. 2007).

Based on the available evidence, *Gaillardia pulchella* is not native to the eastern USA. It is remarkable that *G. aestivalis* is found in many historic floras and ascribed to wild natural areas as far back as Walter (1788; Rock 1956). In contrast, *G. pulchella* is absent from the eastern USA in several historic floras and is only documented in natural areas some time around the 1870s in Alabama, 1883 in Mississippi, 1902 in South Carolina, 1904 in Florida, and 1923 in North Carolina (Table 2). In these states, several authors treated *G. pulchella* as non-native (Mohr 1878; Stoutamire 1954: 41, 104–107, 125; Burk 1961, 1962; Turner & Whalen 1975; Stoddart & Fosberg 1981; Martin et al. 2002; Sorrie et al. 2006) and labels of four early collections indicated that it was non-native (Table 2). If *G. pulchella* were native to coastal dunes or other habitats in the eastern USA, it is extremely doubtful that a very colorful, conspicuous coastal plant would have been overlooked for so long. Its native distribution in nearby Texas and its propensity for inhabiting dunes in the eastern USA has probably given the false impression it is native to the eastern USA. The coastal form naturalized in the eastern USA has been cultivated since the early to mid 1800s (e.g., Gray 1884: “common in gardens”), allowing ample propagule pressure to

establish it in disturbed areas and dunes. The appearance of *G. pulchella* along the east coast also post-dates significant railroad expansion in these areas (Martin 1947; Grinde, Jr. 1976; Doherty, Jr. 1980).

Nativity is an important factor to guide biodiversity conservation (Shackelford et al. 2013). Unquestionably, conservation of native biodiversity should be a priority (Leopold 1949), and non-native species, especially those deemed invasive (Bradley et al. 2019), are often drivers of native biodiversity decline (Beaury et al. 2019; Blackburn et al. 2019). Thus, logically *Gaillardia pulchella* should not be part of restoration plantings in the eastern USA. Still, a non-native species such as *G. pulchella* could provide a range of positive and negative ecosystem services depending on context, and services might more likely be positive in landscaped or ruderal areas already deficient in diversity and resources (Ramírez-Cruz et al. 2019; Salisbury et al. 2020), e.g., *G. pulchella* was visited by a number of native bees in experimental garden plots in Florida (Buckley 2011).

LAMIACEAE

Scutellaria: A reevaluation of *Scutellaria ocmulgee* and *S. mellichampii*

Primary author: Keith A. Bradley

In 2018 I conducted a status survey of *Scutellaria ocmulgee* Small and found that previously reported populations of it and *S. mellichampii* Small were probably often assigned to the wrong species, if indeed they represented distinct species. A morphological study was undertaken to reevaluate the two taxa, find characters useful for identification, and revise existing keys. Clarification of the identification and ranges of the two taxa is critical because both are globally rare and *S. ocmulgee* is being evaluated for listing under the U.S. Endangered Species Act in 2020.

Scutellaria ocmulgee was collected once by J.K. Small in 1895 and named in 1898 (Small 1898). The species was known only from the type specimen until it was rediscovered seven decades later. While botanists had tried to relocate it earlier, based on Small's specimen label, the reported locality was probably in error: "Ocmulgee River Swamp, Below Macon." As discussed by Collins (1976), the specimen label was pre-printed, but Small's publication describes the collection as being "collected by the writer on the banks of the Ocmulgee River above Macon, Georgia" (Small 1898). Students of the genus considered it to be extinct (Leonard 1927; Epling 1942; Collins 1976). These authors based their descriptions and keys only on the holotype and isotype at NY, the only specimens.

Scutellaria mellichampii was described by J.K. Small in 1903, based on specimens collected by Joseph Hinson Mellichamp in 1872 in Bluffton, South Carolina (Small 1903). Its range includes Georgia, South Carolina, and Alabama, and the species is rare throughout. Most authors have treated *S. mellichampii* at the rank of species. Wunderlin et al. (2020) included it as a synonym of *S. incana* Biehler without comment. Their concept of *S. incana* is very broad and also includes lumping *S. incana* var. *australis* (Epling) Collins and *S. incana* var. *punctata* (Chapman) C. Mohr. Penland (1924) included *S. mellichampii* as a synonym of *S. montana* Chapman (as *S. serrata* Andrzedowski var. *montana* (Chapman) Penland) based on seed morphology, a character found to be unreliable by Collins (1976).

In the late 1970s, Steve Bowling relocated *Scutellaria ocmulgee* on the north side of Macon, Georgia, in Bibb County, along the Ocmulgee River (Morris et al. 2000). This may correspond to J.K. Small's collecting locality or is at least very close to it. In 1980, Bowling also discovered a population in Augusta, Georgia, in Columbia County, along the Savannah River (Morris et al. 2000). This discovery represented a major range extension into a new watershed and the second locality ever reported. Both sites are similar geographically and floristically, along large rivers at the fall line where erosion exposes calcareous formations. No specimens were made to document these occurrences. Following these discoveries by Bowling, a series of status surveys were funded by the Georgia Department of Natural Resources (GADNR). As a result, both *S. ocmulgee* and *S. mellichampii* were reported for new localities. In these surveys, populations of *S. ocmulgee* were reported from the Flint, Ocmulgee, Ogeechee, and Savannah rivers or their watersheds (Morris et al. 2000). Unfortunately, no specimens were collected in Georgia until 1988, when James Allison documented Bowling's original site in Bibb County, Georgia (Allison 3612, GA). The authors of the GADNR status surveys acknowledged problems

with identification (Morris 1999; Morris et al. 2000). *Scutellaria ocmulgee* was first collected in South Carolina in 1961 (Ahles 55664, NCU), but the specimen was labeled as *S. ovata* until annotated in 2020. It was also collected in the state in 1979 (Angerman s.n., USCH), but the specimen was labeled as *S. incana* Biehler until I annotated it in 2017. This specimen was labeled from Edgefield County but was probably actually from Aiken County. It was also collected in Aiken County at a different station in 1998 (Pittman 4229807, USCH).

Field surveys conducted in 2018 along the Altamaha, Ocmulgee, Ogeechee, and Savannah rivers found that many of the previously reported populations of *Scutellaria ocmulgee* probably represented *S. mellichampii*. A review of available specimens was made by Tom Patrick, Steve Bowling, and myself, including those deposited at GA, supplemented by undeposited collections made by myself and by Tom Patrick; we were unable to consistently assign collections to species using available keys (Leonard 1927, Epling 1942, Collins 1976, Weakley 2015), so a more careful and quantitative assessment was required.

Herbarium specimens were collected from all field sites visited in 2018 when doing so would not threaten the population. Specimens of *Scutellaria mellichampii* were also collected at several newly discovered South Carolina locations from 2017 to 2018. Specimens of *S. ocmulgee* and *S. mellichampii* from throughout their ranges were also requested on loan from CLEMS, EKY, GAS, NCU, and GA, and were examined with those at USCH. Online specimen images were also examined from APSC, FSU, NY, TENN, UNA, US, and VSC through the SERNEC portal (Data Portal 2018). Measurements were made for each available specimen, either examined in person or available online. Measurements from digital images were made with the software program ImageJ. For each specimen, dimensions of a representative mid-stem leaf were recorded (from only one plant on a sheet, if more than one was present), including blade length, blade width, and petiole length. A representative flower (if present and at anthesis) was measured from each specimen, measuring from the base of the calyx's sinus to the top of the corolla. The distribution of stipitate glands on the stem from the base of the plant to the 2nd internode below the inflorescence, and other patterns of indumentum of the stem, petioles, abaxial and adaxial leaf surfaces, calyx, and corolla were also evaluated. Independent samples t-tests were performed using SPSS v. 20.

Examination of all available specimens and collection of quantitative data from 72 specimens revealed close similarities between *Scutellaria ocmulgee* and *S. mellichampii*. Characters previously used to separate the taxa were found to be unreliable. In context of the history of these species this is understandable: until 1988 no specimens of *S. ocmulgee* were known to be available for study other than the type specimens. Previous monographers, most recently Collins (1976), based their keys on only the holotype and isotype, which I found to represent an extreme end of variation in several characters and therefore did not fully capture the variation in the species. Presence or absence of stipitate glands in the 2nd internode below the inflorescence (Collins 1976, Weakley 2015) is not a consistently useful character because *S. mellichampii* specimens from throughout its range can have stipitate glands at this internode. Additionally, defining the 2nd internode is often complicated by sometimes atypical branching patterns and/or damage, such as by deer herbivory. There is a trend, however, for *S. ocmulgee* to have dense stipitate glands throughout the stem, from the plant base to the inflorescence. In contrast *S. mellichampii* has stipitate glands that are dense to sparse at the bottom of the stem but become much less dense towards the inflorescence (but often still present at the 2nd internode). Young, pre-flowering plants of *S. mellichampii* (e.g., Nelson 28916, USCH) can have dense stipitate glands throughout the stem. These glands become sparser distally as the plant matures to anthesis.

Leaf shape, especially the base, was also found to overlap. Plants of *Scutellaria ocmulgee* tend to have cordate leaf bases, particularly on the lower and middle portions of the stem, while those of *S. mellichampii* tend to have cuneate leaf bases. However, both species often have truncate leaf bases. Within *S. ocmulgee* populations, some plants can have entirely cuneate to truncate leaf bases, and within *S. mellichampii* populations, some plants can have cordate (mainly the lower leaf pair or pairs) to subcordate bases. Young, pre-flowering plants of *S. mellichampii* can have leaves with subcordate bases, mimicking *S. ocmulgee*. Like stipitate glands on the stem, this is another character that is similar on early-season specimens but divergent in maturing plants. T-tests showed statistically significant differences in leaf length ($p=0.002$), leaf width ($p<0.005$), and leaf

TABLE 3: *Scutellaria* specimen measurements, means and ranges.

	<i>S. ocmulgee</i>	<i>S. mellichampii</i>	Significance
Length (L) (cm)	7.4(4.5–10)	6.2(3.8–8.6)	0.002
Width (W) (cm)	5.1(2.5–6.4)	3.9(2.1–5.3)	<0.005
L/W Ratio	1.5(1.2–1.8)	1.6(1.2–2)	0.009
Petiole (cm)	2.2(1.4–3.8)	2.0(1–3.3)	0.334
Corolla* (cm)	1.9(1.5–2.3)	2.1(1.7–2.6)	0.022

*Measured from calyx sinus

length to width ratio ($p=0.009$). No significant difference was found in petiole length ($p=0.334$) (Table 3). *Scutellaria ocmulgee* tends to have larger, wider leaves that have a smaller length to width ratio, whereas *S. mellichampii* tends to have smaller, narrower leaves with a higher length to width ratio.

Characters of hairs on the abaxial leaf surface used by Epling (1942) were also found to be unreliable, i.e., “Lower surface of the leaves evenly pubescent with short curled or spreading hairs” (*Scutellaria ocmulgee*) and “Lower surface of the leaves hirtellous along the veins with curled, more or less appressed hairs, for the rest nearly glabrous” (*S. mellichampii*). Both species have overlapping densities and distributions of mainly straight hairs that can be appressed or erect (orientation often being a factor of leaf age, with mature leaves having more erect hairs). In both taxa, hairs are mainly on veins, but also occur between veins. There is a trend for *S. ocmulgee* to have denser pubescence. There is also a trend in corolla size but this character is also overlapping; *Scutellaria mellichampii* tends to have larger flowers (average 14 mm, range from 17–26 mm), and *S. ocmulgee* smaller flowers (average 19 mm, with a range from 15–23 mm). T-tests showed statistically significant differences in corolla length ($p=0.022$).

Other indumentum patterns proved to be useful in separating *Scutellaria ocmulgee* and *S. mellichampii* in a geographically meaningful way, correlating with trends provided in the keys cited above (i.e., stipitate glands on upper stem, leaf shape, and hairs on abaxial leaf surfaces). *Scutellaria ocmulgee* can also be consistently identified by the presence of stipitate glandular hairs on the leaf margins and the veins across the entire abaxial leaf surface. *Scutellaria mellichampii* may have a few stipitate glandular hairs on the petiole or on the abaxial leaf surface near the petiole, but they are not distributed above this to medial or distal portions of the leaf. While not quantified here, *S. ocmulgee* tends to have lower densities of resin glands on abaxial leaf surfaces and on the calyx, whereas *S. mellichampii* tends to have much more copious resin glands. Pubescence of the stems also differs. *Scutellaria mellichampii* has consistently short, upcurved hairs on the distal portions of the stem (in addition to absent to sparse stipitate glands). These non-glandular hairs become more randomly oriented proximally (towards the base of the plant). In contrast, *S. ocmulgee* has short, randomly oriented hairs the entire length of the stem.

A key is provided for the identification of these two taxa. Use of these characters has provided consistent identification of all available specimens across locations during this study; character states correlated with geographic ranges of the species, which were found to be allopatric.

KEY

1. Stipitate glands absent on leaf margins and veins on underside of leaf blade (sometimes sparse near petiole); upper portions of stem with zero to sparse stipitate glands and shorter, upwardly curled non-glandular hairs, leaves mainly cuneate to truncate (to subcordate) _____ ***Scutellaria mellichampii***
1. Stipitate glands present on leaf margins and on veins throughout underside of leaf blade; upper portion of stem with dense stipitate glands and shorter, randomly spreading non-glandular hairs, leaves mainly cordate to truncate (to cuneate) _____ ***Scutellaria ocmulgee***

Scutellaria ocmulgee was found to occupy only two discrete geographic areas: along the Savannah River from the fall line to Burke County, Georgia, and from the Ocmulgee River from just above the fall line to Bleckley County. Specimens from all other watersheds from South Carolina to Alabama, and from downstream areas of

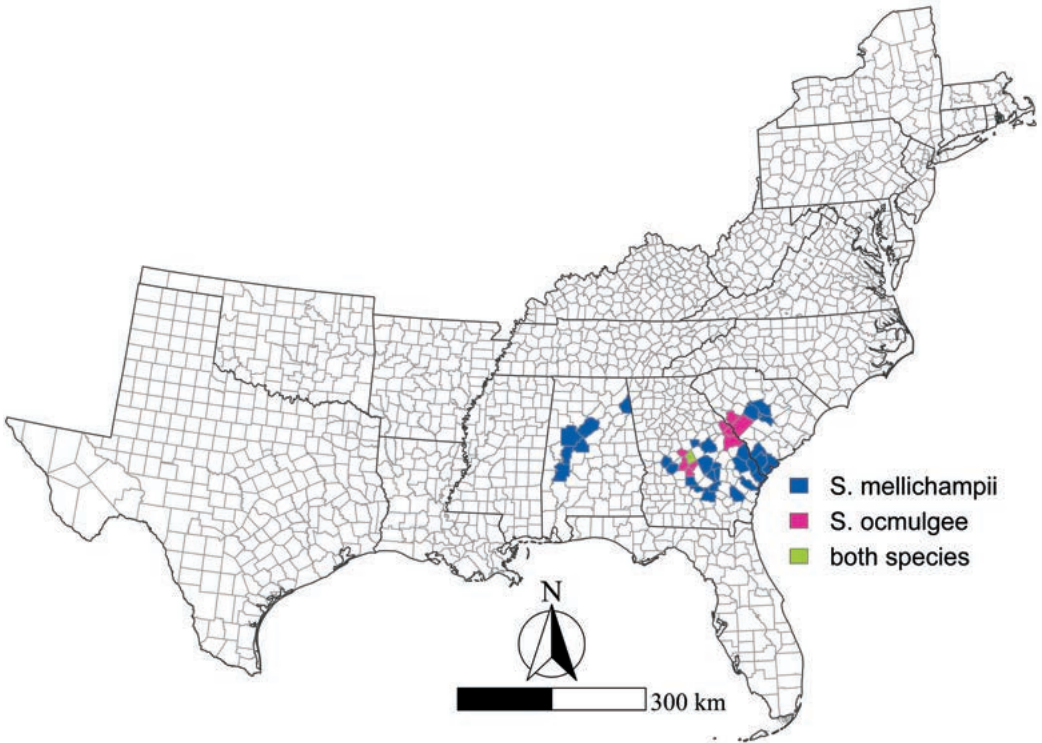


FIG. 4. Documented distribution of *Scutellaria mellichampii* and *S. ocmulgee*.

the Ocmulgee/Altamaha and Savannah rivers, are referred to *S. mellichampii* (Fig. 4). Where the two species occur on the same river systems, the Ocmulgee and Savannah, they are geographically isolated by the Tifton Uplands region. *Scutellaria ocmulgee* is endemic from at or just above the fall line on these rivers and barely penetrates the Tifton Uplands. Downstream of the Tifton Uplands are populations of *S. mellichampii*.

LINACEAE

Linum: A new combination for *Linum carteri* var. *smallii* at species rank

Primary authors: Keith A. Bradley & Alan S. Weakley

There are two *Linum* taxa in southern peninsular Florida in section *Linopsis* (Rchb.) Engelm., subsection *Rigida* (Small) C.M. Rogers, series *Rigida* (Small) C.M. Rogers (Rogers 1982). These have been treated at the varietal rank by modern authors: *Linum carteri* Small var. *carteri*, and *Linum carteri* var. *smallii* C.M. Rogers (Long & Lakela 1971; Robertson 1971; Wunderlin & Hansen 2011; Wunderlin & Hansen 2015; Morin 2016). They are allied to *L. rigidum* Pursh and relatives that range widely in the United States, mainly west of the Mississippi River, southeast to Arkansas. Members of ser. *Rigida* are distinctive among Florida's yellow-flowered species by having styles partially united more than halfway to the apex. Florida plants are distinct from *L. rigidum* and its midwestern allies by having pure yellow flowers, shorter styles, and short-awned sepal apices, and they are tetraploids instead of diploids (Morin 2016; Mosquin & Hayley 1967).

Small (1905) named *Linum carteri* Small based on material collected in Miami-Dade County in pine rockland habitat on the Miami Rock Ridge, a 70 km long formation of Miami Oolitic limestone dominated by fire-dependent *Pinus densa* (Little & K.W. Dorman) de Laub. & Silba savanna. Rogers (1963) determined that there were two "well marked varieties" of the *L. rigidum* complex in southern Florida and included pubescent plants

restricted to pine rocklands of Miami-Dade County in *L. rigidum* var. *carteri* (Small) C.M. Rogers, and glabrous plants from a variety of habitats but with a wider geographic range, at the time known to include Miami-Dade, Collier, and the mainland portion of Monroe counties, as highly disjunct populations of *L. rigidum* var. *rigidum*.

Mosquin and Hayley (1967) found that Florida populations were tetraploid ($n=30$) in contrast to midwestern populations of *Linum rigidum* that were diploid ($n=15$). They also detailed morphological differences and found that plants of the two Florida varieties grown under identical greenhouse conditions “retained to a remarkable degree the morphological features of their wild parents.” They found the two varieties to have a high degree of fertility, yet because of floral morphology, hypothesized var. *carteri* to be more frequently self-pollinated than var. *rigidum*.

In a reevaluation of these taxa following Mosquin and Hayley’s findings, Rogers (1968) recognized these taxa as distinct from *Linum rigidum* as *L. carteri* var. *carteri* and *L. carteri* var. *smallii* C.M. Rogers, writing “The similarity of chromosome complements and the high degree of fertility in greenhouse crosses (Mosquin & Hayley 1967) indicate that the glabrous and pubescent populations must be considered conspecific.” Subsequent authors have followed this 1968 treatment, including Long and Lakela (1971), Robertson (1971), Wunderlin and Hansen (2011, 2015), and Morin (2016).

Since the 1968 treatment by Rogers, much more material of *Linum carteri* has become available. *Linum carteri* var. *smallii* is more widespread than was formerly known. It has been documented in seven counties, ranging northward to Charlotte and Glades counties, but limited on the east coast to southern Miami-Dade County. Populations are associated primarily with moist soils, including short-hydroperiod pine rocklands, marl prairies, pine flatwoods, pastures, moist road shoulders, and canal banks. In contrast, *L. carteri* var. *carteri* is endemic to a small portion of Miami-Dade County, restricted to fewer than eight sites covering a range of less than 40 km along the Miami Rock Ridge. It is listed as Endangered under the U.S. Endangered Species Act.

The senior author has had the opportunity to study specimens and examine all extant populations of var. *carteri* (and several that have been extirpated) and examine populations of var. *smallii* throughout its range. Despite the increase in known range and number of specimens, all morphological characters reported by Rogers (1963, 1968) and Mosquin and Hayley (1967) are consistent and without intermediates. The two taxa are entirely allopatric. Within Miami-Dade County, var. *carteri* is restricted to the more northward and central, well drained portions of the Miami-Rock Rock Ridge, while var. *smallii* is restricted to the moister southern portion of the ridge, especially Long Pine Key in Everglades National Park.

The two taxa are readily distinguished based on multiple characters, including height, branching, stem pubescence, stipular glands, petal size, styles, and anther position relative to the stigma. *Linum carteri* var. *carteri* occupies drier, calcareous habitats in a small geographic area, is a smaller, pubescent plant, with smaller petals and shorter styles. *Linum carteri* var. *smallii* is a widespread plant that occupies primarily moist habitats (acidic or calcareous), and is taller, glabrous, lacking stipular glands, and with larger petals and longer styles. These characters are detailed in Table 4.

We propose the elevation of *Linum carteri* var. *smallii* to species rank. The two taxa have non-overlapping morphological characters including petal size, stem pubescence, and presence/absence of stipular glands, have different statures and branching patterns, and these differences are maintained when grown under identical conditions. They are allopatric; var. *carteri* occurs northward of any known collection of var. *smallii* in Miami-Dade County. While the species cross readily by hand pollination, floral morphology indicates different breeding systems that may have prevented crossing where their ranges overlapped; no evidence exists of interfertility in the wild or intermediate or hybrid populations or individuals. Despite Rogers’ (1968) reluctance to treat these entities as separate species, the data indicate that the two taxa should be treated at specific rank based on modern species concepts.

Linum smallii (C.M. Rogers) Bradley & Weakley, **comb. et stat. nov.** BASIONYM: *Linum carteri* Small var. *smallii* C.M. Rogers, Sida 3:210. 1968. TYPE: U.S.A. FLORIDA. Collier Co.: between Everglade and Deep Lake, 19 Apr 1921, J.K. Small & J.B. DeWinkler 9936 (HOLOTYPE: US; ISOTYPES: DUKE, FLAS, GH, IND, MO, NCSC, NCU).

TABLE 4. Comparison of *Linum carteri* varieties based on Rogers (1963, 1968) and Mosquin and Hayley (1967).

	" <i>carteri</i> "	" <i>smallii</i> "
Height	(11–)17–28(–33) cm	(17–)28–45(–64) cm
Branching	strong, throughout	only in upper portion
Stem Pubescence (upper)	puberulent or scabrous	glabrous
Stipular Glands	present	absent
Petal Length	9–11 mm	11.5–17 mm
Petal Width	~8 mm	~12 mm
Style Length	4.4–6.1 mm	5.1–9.1 mm
Anthers Relative to Stigma	very near	strongly divergent
Range	Miami-Dade County	widespread
Habitat	exclusively well drained	moist to well drained

POACEAE

Andropogon: *Andropogon decipiens*, a distinctive grass of southeastern United States pine savannas

Primary authors: Edwin L. Bridges & Steve L. Orzell

The center of diversity for the genus *Andropogon* in North America is in the state of Florida and parts of adjacent states. The genus is most diverse within central peninsular Florida, where at least 18 species can occur in a single natural area, with high species turnover along ecological gradients. For decades until the careful study by Campbell (1983, 1986) these seemed to be a confusing jumble of intergrading variants, with little taxonomic clarity. The definition of many finely divided character states by Campbell (1983) brought some order to this chaos. However, he based taxonomic rank for the entities he recognized on their calculated morphological distance, such that species typically had a distance of 9 or more (character state differences), varieties had between 3 and 9, and "variants" had 3 or fewer. Since that study provided the framework for further analysis of this group, more study has raised or reinstated some of the varieties and variants in Campbell (1983) to variety or species rank. In fact, Campbell (1986) did this for two variants from the 1983 study, the "southwestern variant" of *Andropogon glomeratus* var. *glomeratus*, and the variant of concern here, the "deceptive variant" of *Andropogon virginicus* var. *virginicus*, based on cladistic analysis of morphological characters.

A series of publications by Weakley and his collaborators (Weakley et al. 2011a, 2018; Bridges & Orzell 2018; Weakley 2020) has further resolved the taxonomy of many of these taxa, leaving only a few that require further study. Most of those still unresolved are in the complex of variants currently treated as *Andropogon virginicus*. Several of the wetland entities in this group are still under study, but to simplify that process we here discuss the distinctive species of mesic longleaf pine savannas, *Andropogon decipiens*.

Andropogon decipiens is the most common species of *Andropogon* in most mesic pine savannas in peninsular Florida, where it often co-occurs with *A. brachystachyus*, *A. cabanisii*, *A. capillipes*, and *A. subtenuis* (= the "tenuous variant" of *A. gyrans* var. *gyrans* of Campbell [1983]). It rapidly resprouts after fire, with leaves averaging 40 cm long in as little as 50 days post-burn (Bridges et al., unpublished data), and typically flowers and fruits in October and November regardless of season of burn. By the end of the first growing season post-fire, it forms small, tight clumps with many orange-brown older leaves curling and often reflexed towards the ground. It never has the tawny to light brown appearance of the "old-field variant" of *A. virginicus*, which is the only other upland variant of this group in central Florida. Where they occur in close proximity, *A. decipiens* is restricted to relatively undisturbed natural groundcover, and the "old field variant" is restricted to roadsides and disturbed sites. In early vegetative growth, the only species with which *A. decipiens* might be confused is *A. brachystachyus*. but the leaves of *A. brachystachyus* are typically stiffer and more abruptly tapered at the tip, and its leaf bases soon form semi-circular cup-shaped structures that can be easily seen by pulling up a tiller, and in time it forms much larger diffuse clumps. Although *A. decipiens* does differ in several raceme characters from *A. virginicus*, we seem to be able to consistently recognize *A. decipiens* in all seasons without reliance on

inflorescence characters. This leads us to believe that it is more distinct from *A. virginicus* than the relatively small differences in quantitative characters and its treatment as a variety imply. Existing keys in Campbell (1983, 2003) and Weakley (2015, 2020) work well for this species.

Andropogon decipiens (Campbell) E. Bridges & Orzell, **comb. & stat. nov.** BASIONYM: *Andropogon virginicus* L. var. *decipiens* Campbell, Syst. Bot. 11:290. 1986. TYPE: U.S.A. FLORIDA. Martin Co.: Jonathan Dickinson State Park, more or less open pine flatwoods, 16 Oct 1977, *Campbell 3870* (HOLOTYPE: GH; ISOTYPES: DUKE, FLAS, FSU, GA, MAINE, MISSA, MISSI, TAES, TENN, USF, VDB).

POACEAE

Andropogon: Distribution and habitats of the *Andropogon glomeratus* group

Primary author: Bruce A. Sorrie

Historically, one of the most taxonomically challenging species groups within the “*Andropogon virginicus* complex” of Campbell (1983) was the “bushy bluestem” group composed of *A. glomeratus* (Walter) B.S.P. and its varieties as recognized by Campbell: var. *glomeratus*, var. *hirsutior* (Hackel) Mohr, var. *glaucoopsis* (Elliott) Mohr, and var. *pumilus* Vasey, robust variant. As discussed in Weakley et al. (2011a), field and herbarium work throughout the ranges of these taxa during recent decades has clarified their relationships and status as full species. Thus, today we recognize *Andropogon glomeratus* sensu stricto, *A. hirsutior* (Hackel) Weakley & LeBlond, *A. cretaceus* Weakley & Schori [see Weakley et al. 2018a; replacing the preoccupied name *A. glaucoopsis*], and *A. tenuispathus* (Nash) Nash.

In this paper, I provide county-level distribution maps for each species, a key, and a discussion of the habitats occupied. My aim is to update the maps in Campbell (1983) and to clarify the distribution and habitats in which these species occur. To create the range maps, I first collated specimen data cited in Campbell’s monograph (1983). To those data I added records from the SERNEC portal (Data Portal 2018), but only after inspecting each specimen image. Personal knowledge of the species’ field characteristics, coupled with herbarium study, provided a basis for determining whether a given specimen was correctly identified. No SERNEC record was accepted unless accompanied by a digital image. To the specimen records of *Andropogon tenuispathus*, I added personal sight records from roadsides throughout the Southeast. Once learned, *A. tenuispathus* can be readily distinguished from *A. glomeratus* s.s. from a car moving at speed.

I have omitted discussion of the “Southwestern variant” of *Andropogon glomeratus*, described by Campbell (1986) as var. *scabriglumis* C.S. Campbell. It now would be treated as a variety under *A. tenuispathus*, or as the species *A. eremicus* Wipff & Shaw (Wipff & Shaw 2018). Habitat descriptors are taken from notes taken in the field, augmented by specimen label data.

Distribution

The distribution of *Andropogon glomeratus* sensu stricto is endemic to the eastern United States. Its distribution (Fig. 5) falls into two regions: the Atlantic and Gulf Coastal Plains, and low mountains of the central and southern Appalachians and Interior Plateaus. It is endemic to the eastern United States. It should be sought in southeastern Louisiana. *Andropogon tenuispathus* (Fig. 6) is widespread across the southeastern United States, from southeastern Virginia to central Oklahoma, south to southern Florida, central and southern Texas. It also occurs in the West Indies, Mexico, and Central America. See Habitats section for distinctions between natural and non-natural occurrences. The distribution of *A. cretaceus* (Fig. 7) is almost entirely restricted to the Atlantic and Gulf Coastal Plains, reaching just into eastern Texas (Singhurst et al. 2012). There are disjunct outliers in the southern Appalachians of northwestern Georgia and northeastern Alabama. The species is endemic to the eastern United States. *Andropogon hirsutior* (Fig. 8) is restricted to the Atlantic and Gulf Coastal Plains, from southeastern Maryland to central Florida and southeastern Louisiana; ambiguous material from west of the Mississippi River (including in the Interior Highlands) is omitted while additional study is conducted. It is endemic to the eastern United States.

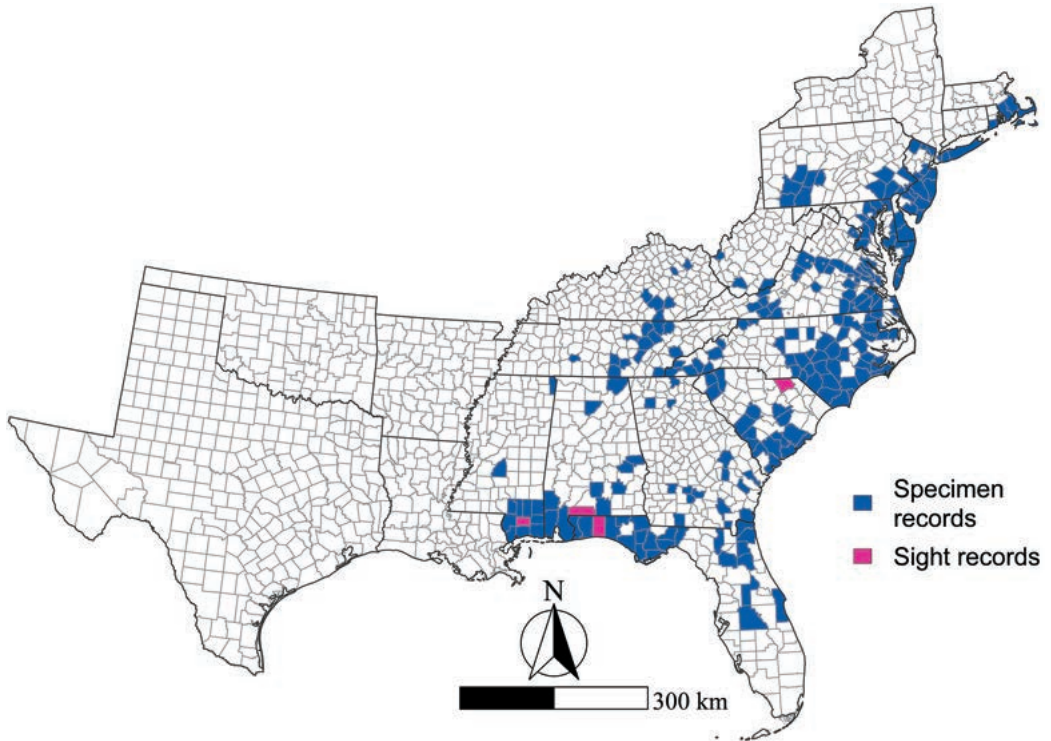


FIG. 5. Known distribution of *Andropogon glomeratus* s.s.

Habitats

***Andropogon glomeratus*.** In general, *Andropogon glomeratus* sensu stricto inhabits areas with active seepage, such as streamhead seepages and ecotones, pitcher-plant bogs, montane seepage bogs, and seepage bogs on the Cumberland Plateau. It also occurs in wet pine savannas and flatwoods on the Coastal Plains, moist “barrens” in central Tennessee, margins of montane sinkhole ponds in Virginia, and sinkhole ponds on the East Gulf Coastal Plain. Powerlines that intersect these habitats also support populations. From Virginia northward *A. glomeratus* also occurs in maritime interdune swales, including natural cranberry bogs.

***Andropogon tenuispathus*.** Natural habitats of *Andropogon tenuispathus* include maritime and inland components. On the Atlantic and Gulf coasts, it occurs in margins of brackish marshes, margins of fresh tidal marshes, maritime wet grasslands, interdune swales, openings in maritime forests, and, in Texas, coastal prairies and marshes. On the West Gulf Coastal Plain and southward to the Rio Grande, it is also found in wet pine savannas and coastal prairies. I am unaware of any specific locus where this species and *A. glomeratus* are syntopic. Inland, *A. tenuispathus* occurs in prairies and savannas in Florida, prairie grasslands and prairie bluffs of the Black Belt and Jackson formations in Alabama and Mississippi, as well as several prairie types and post oak savannas in Louisiana, Arkansas, Oklahoma, and Texas. Also inland, populations of *A. tenuispathus* that I have observed personally, or that have been documented via herbarium specimens, occur in disturbed soils of roadsides, abandoned fields, fallow cropfields, powerlines, and shores of impoundments. These appear to be non-natural occurrences in areas where dispersal has been aided by the treatment of roads with brine or salt solutions. In my experience, interstate and other major highways may support large numbers of plants, often growing with *Baccharis halimifolia* L. Other dispersal factors may be at play (other than normal,

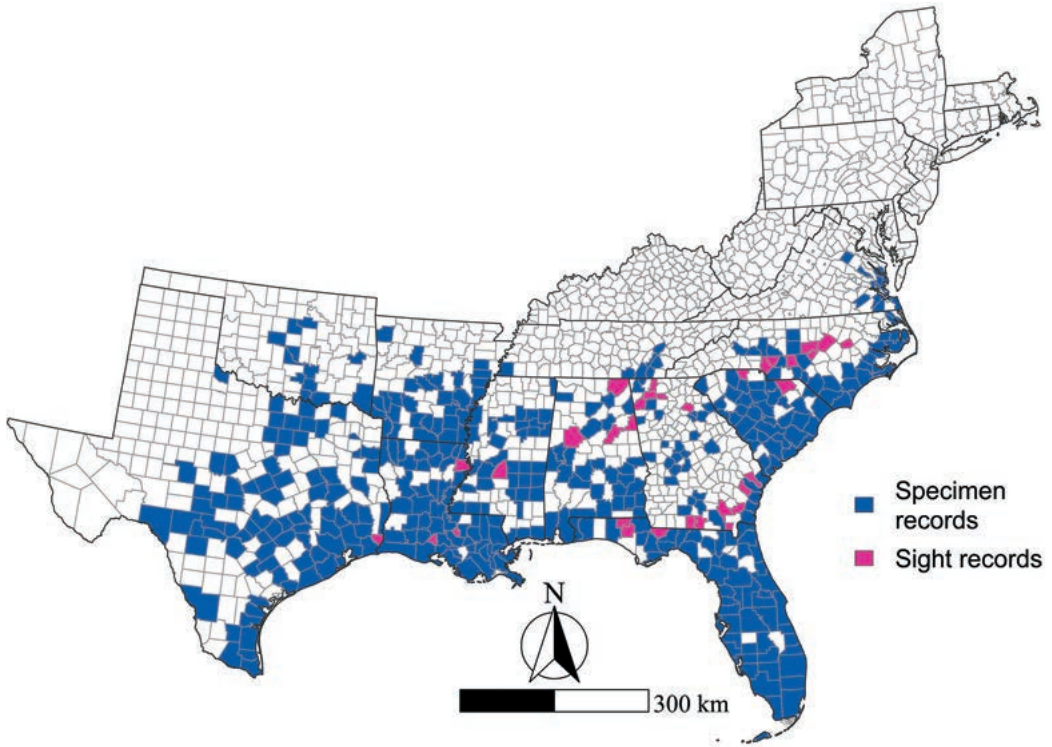


FIG. 6. Known distribution of *Andropogon tenuispathus*.

wind-dispersed propagules), but specimen data provide little help. These non-natural occurrences include non-maritime areas of Virginia, North Carolina, South Carolina, Georgia, Tennessee, the northern half of Alabama, and non-prairie regions of Mississippi. In Louisiana, Arkansas, Oklahoma, and Texas, it is more difficult to distinguish between natural and non-natural populations based on herbarium specimens, due to sparse habitat data.

***Andropogon cretaceus*.** *Andropogon cretaceus* inhabits areas with active seepage, such as streamhead seepages, ecotones, and pitcher-plant bogs, but it also inhabits areas without obvious seepage. The latter include wet pine savannas and flatwoods, outer coastal plain shrub-switchcane-pond pine pocosins, boggy “prairies” in Okefenokee Swamp of Georgia, and maritime interdune marshes. Powerlines that intersect the above habitats also support populations.

***Andropogon hirsutior*.** *Andropogon hirsutior* occupies the same habitats as *A. cretaceus*, minus the Okefenokee “prairies” and the interdune marshes. In addition, it inhabits clay-based Carolina Bays, and, in Maryland and Virginia, margins of brackish marshes.

KEY ADAPTED FROM WEAKLEY (2015); TERMINOLOGY EXPLAINED THERE

- 1. Leaves, leaf sheaths, and culm bases glaucous or glaucescent; inflorescences not densely glomerate (not bushy) _____ ***Andropogon cretaceus***
- 1. Leaves, leaf sheaths, and culm bases not glaucous or glaucescent; inflorescences densely glomerate (bushy) or not.
- 2. Postflowering peduncles (at least some of them) > 15 mm long.
- 3. Culm sheaths not scabrous (may be hirsute) _____ ***Andropogon tenuispathus***
- 3. Culm sheaths antrorsely scabrous or scabridulous (often hirsute also).
- 4. Ligules (1.0–)1.2(–2.0) mm long (usually > 1 mm), with cilia 0–0.3 mm long; keels of first glumes scabrous only above middle _____ ***Andropogon glomeratus***

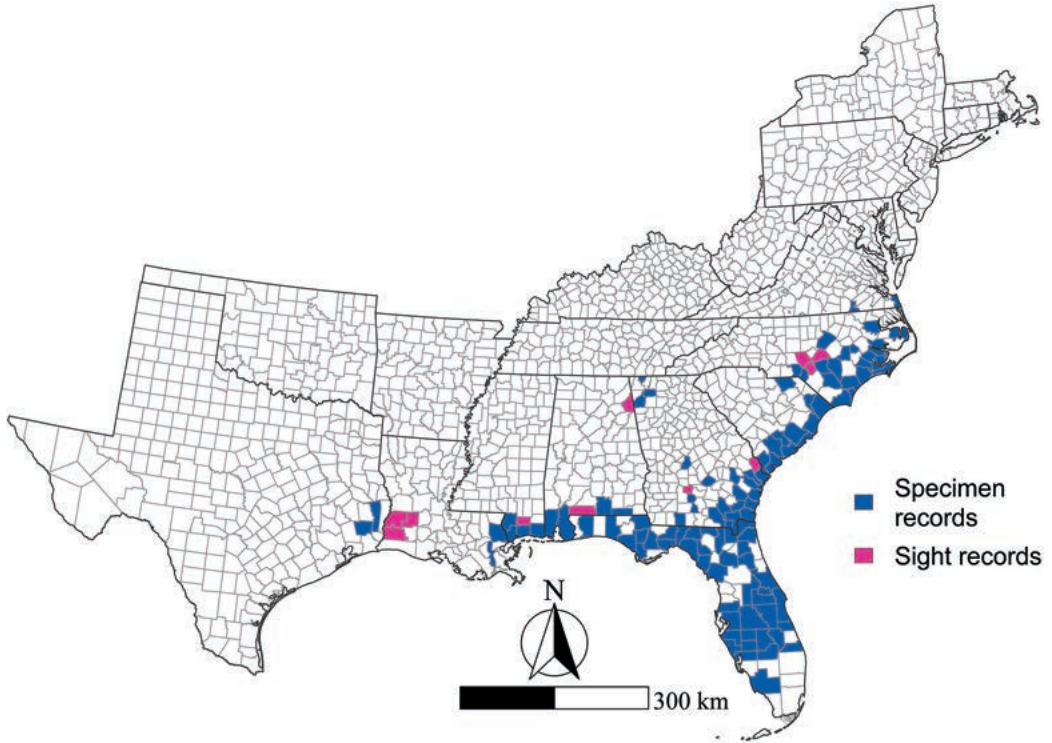


FIG. 7. Known distribution of *Andropogon cretaceus*.

4. Ligules (0.6–)0.8(–1.3) mm long (usually < 1 mm), with cilia 0.2–0.9 mm long; keels of first glumes often scabrous below middle _____ **Andropogon tenuispathus**
2. Postflowering peduncles < 10 mm long.
5. Culm sheaths not scabrous or scabridulous (may be hirsute); leaf blades usually > 35 mm long, rarely shorter _____ **Andropogon tenuispathus**
5. Culm sheaths antrorsely scabrous or scabridulous (often hirsute also); leaf blades usually > 35 mm long.
6. Ligules (0.6–)0.8(–1.3) mm long (usually < 1 mm), with cilia 0.2–0.9 mm long; keels of first glumes often scabrous below middle _____ **Andropogon tenuispathus**
6. Ligules (1.0–)1.2(–2.0) mm long (usually > 1 mm), with cilia 0–0.3 mm long; keels of first glumes scabrous only above middle.
7. Inflorescences obpyramidal to oblong, densely glomerate (bushy); spikelets (3.8–)4.1–4.4(–5.0) mm long; anthers usually not marcescent within spikelet; mature peduncles (4–)11–35(–60) mm long _____ **Andropogon glomeratus**
7. Inflorescences linear to linear-oblong, not densely glomerate (not bushy); spikelets (3.4–)3.6–3.8(–4.6) mm long; anthers usually marcescent within spikelet; mature peduncles (2–)3–5(–8) mm long _____ **Andropogon hirsutior**

Additional characters that help to separate *Andropogon glomeratus* from *A. tenuispathus* are presented in Table 5. Most of them originally appeared in Campbell's Table 4 (1983), with modifications based on my own field and herbarium research.

VIOLACEAE

Violaceae: Typifications and clarifications of names

Primary authors: Harvey E. Ballard, Jr., Remington N. Burwell, and Samuel L. Lockhart

The names of accepted taxa of Violaceae in floristic treatments and regional manuals in North America have remained largely stable for most of a century. Nevertheless, in spite of taxonomic revisions of the acaulescent white violets and two revisions of the acaulescent blue violets, many names have never been typified or have

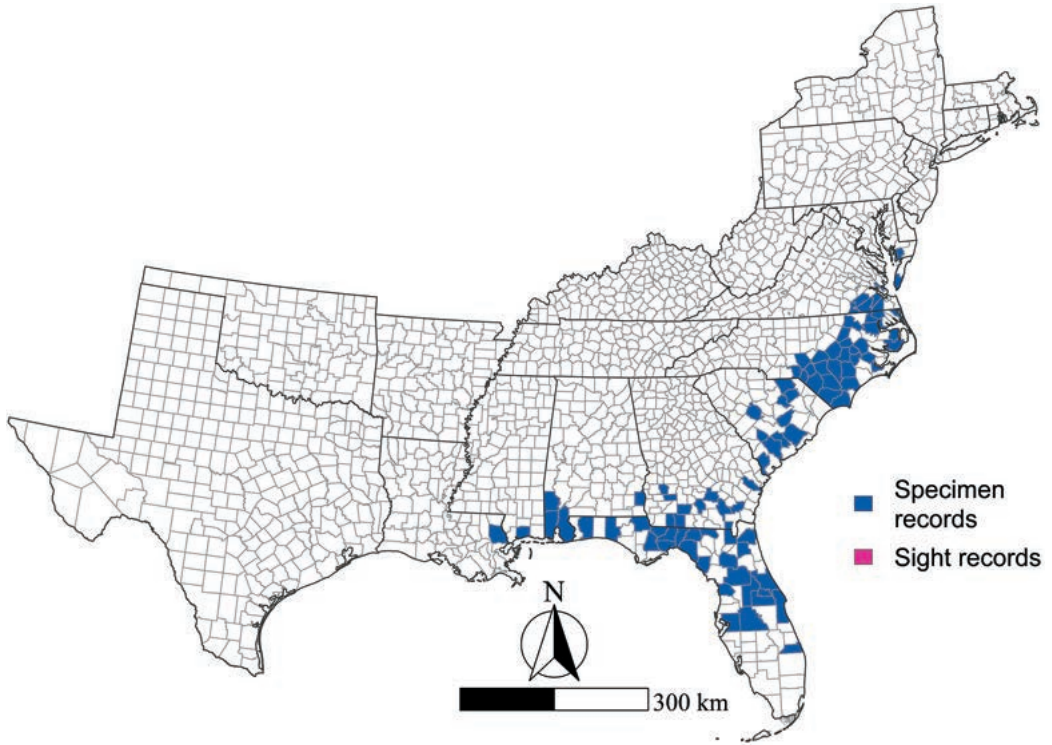


FIG. 8. Known distribution of *Andropogon hirsutior*.

been typified incorrectly. During preparation of new taxonomic treatments of the *Violaceae* for the “Flora of southeastern North America” (Weakley [in prep.]) as well as taxonomic research on acaulescent blue violets, we have identified names or their basionyms requiring proper typification, as well as a few names resurrected from obscurity for taxa we accept that are not widely known. Here we propose lecto- or neotypifications or corrections, and justifications for selection of types, for 25 names and basionyms representing accepted taxa in the southeastern U.S. in forthcoming treatments. In addition, we introduce and provide brief clarifications for six unfamiliar names that have not been previously used or accepted in other floristic or taxonomic treatments.

Typifications

Cubelium concolor (T.F. Forst.) Raf. ex Britton & A. Br., *Ill. Fl. N. U.S.* 2:456. 1897. *Calceolaria concolor* (T.F. Forst.) Kuntze, *Revis. gen. pl.* 1:41. 1891. *Ionidium concolor* (T.F. Forst.) Benth. & Hook.f. ex S.Watson, *Bibl. index N. Amer. bot.* 81. 1878. *Hybanthus concolor* (T.F. Forst.) Spreng., *Syst. veg.* 1:805. 1825 [1824]. *Solea concolor* (T.F. Forst.) Ging. ex DC., *Prodr.* 1:306. 1824. *Cubelium concolor* (T.F. Forst.) Raf., *First cat. gard. Transylv. Univ.* 13. 1824 [nom. inval.]. **BASIONYM:** *Viola concolor* T.F. Forst., *Trans. Linn. Soc. London* 6:309. 1802. **TYPE:** ENGLAND: Mr. Forster’s garden from N. America, 1791, [sin collector]. [**LECTOTYPE, here designated:** LINN (LINN-HS1380-26, internet image!).]

Forster did not cite a type specimen, but he noted that he had grown a living plant in the garden at the Royal Botanic Garden at Kew for more than 14 years, and later stated that his observations were made on living material and specimens in the Banks Herbarium. He provided a detailed plate with structures illustrated to accompany the description. The 1791 specimen at LINN (LINN-HS1380-26) has the handwritten notation, “Mr. Forster’s garden from N. America,” indicating that it is original material. The LINN specimen is designated as lectotype.

TABLE 5. Additional character states to separate *Andropogon tenuispatheus* from *A. glomeratus*.

	<i>A. tenuispatheus</i>	<i>A. glomeratus</i>
Plant Height	mean 1.4 m; max 2.5 m	mean 1.0 m; max 1.6 m
Inflorescence Overall Shape	cylindrical; without major gaps; rarely with only a single "head" that is rounded distally	broadly obtriangular, singular "head"; or 2–4 narrowly obtriangular, interrupted "heads"
Inflorescence Distal End Shape	rounded	± truncate
Raceme Divergence from Stem	obviously divergent, often with outward curve	± erect or slightly divergent, but not curved
Number of Inflorescence Main Branches	3–11; thus usually very dense looking	2–4, thus much less dense (except for terminal "head")
Ligule Length	usually < 1 mm (max 1.3 mm)	usually > 1 mm (max 2 mm)
Ligules Ciliate?	yes, ligular cilia up to 3 mm; also with short cilia < 1 mm	no, or only short cilia < 1 mm
Anthers Marcescent?	yes, obscure	no, prominent

Recent comprehensive phylogenetic investigations of the Violaceae have demonstrated that broadly circumscribed *Hybanthus* Jacq. is extensively polyphyletic and that the sole trait of a bottom petal that is saccate at base has failed to delineate natural evolutionary groups (Feng 2005; Tokuoka 2008; Wahlert et al. 2014). The majority of New World hybanthoids are gradually being segregated into separate genera, including the resurrected genera *Cubelium* Raf. ex Britton & A. Br. and *Pombalia* Vand. (de Paula-Souza & Ballard 2014). Our temperate eastern North American native hybanthoid now belongs to the resurrected monotypic genus *Cubelium*, with the genus and species first validly published by Britton and Brown (1897). It is sister to the very small genus *Hybanthus* sensu stricto from Mesoamerica and the West Indies, which consists of three species of shrubs and treelets. Our Eastern Green Violet differs from *Hybanthus* sensu stricto in herbaceous habit, highly reduced cymose inflorescence, and several unique floral, fruit, seed, and anatomical features. Two other species formerly treated under *Hybanthus* have been removed to the genus *Pombalia*. Both are primarily native to Latin America, and *P. attenuata* (Humb. & Bonpl. ex Willd.) Paula-Souza extends into southern Arizona, but they have been introduced into the eastern United States. They have been correctly typified but are noted under "Clarifications of Names" as different names from those used in the literature.

Viola baxteri House, Bull. New York State Mus. Nat. Hist. 254:500. 1924 [replacement name for *Viola perpensa* sensu House non Greene]. *Viola perpensa* House, Bull. New York State Mus. Nat. Hist. 197:58. 1918. TYPE: U.S.A. NEW YORK. Ontario Co.: Fishers, 3 Jun 1916, H.D. House and M. Baxter s.n. [LECTOTYPE, **here designated**: NY (NYS33489, image (physical copy)!). SYNTYPES: U.S.A. NEW YORK. Ontario Co.: Fishers (Sullivans), dry hills and wood roads, 10 Sep 1916, M.S. Baxter s.n. (NYS, image!; ROCH, image!)].

In 1918, House originally attributed plants from the Rochester area of northern New York to *Viola perpensa* Greene and cited two separate collections. In 1924, he reported that that name was reserved for midwestern hybrids of *V. pedatifida* G. Don and *V. sororia* Willd. and provided the replacement name *V. baxteri* for the eastern Great Lakes taxon. Later, House inexplicably cited an earlier article (Bull. NY State Mus. 243–244:11. 1921), but that actually concerned his new *Veronica baxteri*, not *Viola baxteri*. In the 1924 article, House did refer back to the 1918 publication of *V. perpensa*, providing a clear reference to his previously published description and types, in spite of the incorrect 1921 literature reference. McKinney incorrectly annotated sheet NY97505 (2 June 1916) as holotype, but House stated the date as June 3 for the chasmogamous flowering collection. NY97505 is probably original material but is not considered a type. The NYS33489 sheet is selected as lectotype, being the most fully representative of the taxon in terms of morphological condition.

This is an eastern Great Lakes endemic subsumed in a broadly delimited *Viola palmata* by Brainerd (1921) until McKinney (1992); this *Viola palmata* auct. non L. was later referred to *V. subsinuata* (Greene) Greene by McKinney (1992) and others including Little and McKinney (2015). *Viola baxteri* is distinct from the latter, widely distributed species by its more prominently biternately dissected leaf blades with conspicuous, often

divergent, medial teeth or short lobes on the secondary divisions, paler seeds with obsolete or very weak streaks or blotches, and preference for limestone substrates.

Viola chalcosperma Brainerd, Bull. Torrey Bot. Club 37:523. 1910. TYPE: U.S.A. FLORIDA. [Duval Co.]: Jacksonville, wet shady borders of slow streams, 21 Mar 1909 and 9 Apr 1909, *E. Brainerd* 25 [LECTOTYPE, **here designated**: later chasmogamous flowering and fruiting plants collected on 9 Apr 1909: PH (PH00029057[b], internet image!); ISOLECTOTYPES: GH (GH00067119[b], internet image!), NO (NO0109930[b], internet image!), NY (NY01404605!, internet image!)]. SYNTYPES: U.S.A. FLORIDA. [Duval Co.]: Jacksonville, wet shady borders of slow streams, 21 Mar 1909, *E. Brainerd* 25 [ISOSYNTYPES: K (K000327867, internet image!), NY (NY00097518!, internet image), VT!].

Brainerd stated in his protologue, "In wet soil in a wooded ravine, Jacksonville, Florida; the only known station....On a trip to Florida in March 1909, guided by Mrs. Comstock's precise directions, I readily found her station. The plants were abundant, and collections were made on March 21 and on April 9, which will soon be distributed." Although three sets of collections were mentioned in the protologue, and earlier plants grown by Brainerd are original material from which he surely described fruiting traits, he apparently intended the distributed specimens from his visit in March 21 and April 9 to serve as types. These are represented by *Brainerd* 25 and constitute syntypes. The most representative specimen expressing chasmogamous flowering and fruiting traits, PH00029057, is selected here, specifically the robust upper-left plant producing chasmogamous capsules that is presumed to have been collected on April 9 and denoted here by "[b]." All other isolectotypes listed are those larger plants bearing chasmogamous fruits that belong to the 9 April collection date. McKinney erroneously annotated NY00097518 as a holotype, but he did not mention the name in his 1992 publication.

Current taxonomic studies of the *Edulis* species group of acaulescent blue violets by Remington Burwell indicate that *Viola chalcosperma* is probably a distinct species, and it is presented here as such.

Viola domestica E.P. Bicknell, Britton & Brown, Illust. Fl. US & Canada 3 [Appendix]: 519. 1898. TYPE: U.S.A. NEW YORK. [New York Co.]: Fort Washington, 7 Aug 1897, *E.P. Bicknell* s.n. [LECTOTYPE, **here designated**: NY (NY00097529!, internet image!).

Bicknell published the name in the Appendix and provided a broad geographic range and habitat, stating that it was "Apparently always in cultivated soil, especially about buildings, southern New York, New Jersey and Pennsylvania." Bicknell designated no types and cited no herbaria. According to Stafleu and Cowan (1976), Bicknell's herbarium and types are at NY. The NY00097529 sheet constitutes original material. McKinney annotated this sheet incorrectly as a holotype, but in his 1992 publication he designated a different sheet (USA, New York, Manhattan Island, 11 Jun 1993, *T. Maring* s. n., NY) that does not appear to be original material. Sheet NY00097529 is representative of the taxon based on Bicknell's description and is selected as the lectotype.

This name was referred to early in the last century but has since been ignored or synonymized under the name *Viola sororia* Willd., which recently has been treated in a very broad sense. However, the morphological features of leaves, cleistogamous capsules, and seeds are not identical with *V. sororia* sensu stricto, or other taxa with strictly or essentially glabrous foliage in the *Viola sororia* species complex. To better understand the status and distribution of this taxon, we have lectotypified it here.

Viola egglestonii Brainerd, Bull. Torrey Bot. Club 37:526, pl. 34, 35. 1910. *Viola septemloba* Leconte subsp. *egglestonii* (Brainerd) L.E. McKinney, Sida, Bot. Misc. 7:33. 1992. TYPE: U.S.A. TENNESSEE. [Davidson Co.]: West Nashville, limestone barrens, 23 May 1909, *W.W. Eggleston* 4421 [HOLOTYPE: VT (UVMVT024585!, internet image!).

Brainerd cited one specific collection as the type but made no reference to a particular sheet. As pointed out by Gil-ad (1995, 1997), Brainerd noted at the end of his publication that he intended to supply types to NY, but specimens have not been found at that herbarium, either by Director Barbara Thiers, McKinney, Gil-ad, or Harvey Ballard. Gil-ad attributed the sole specimen to an isotype, based on Brainerd's statement. Because there is no indication that Brainerd ultimately distributed other specimens elsewhere and only the UVMVT024585 sheet exists, it is accepted here as holotype.

Viola emarginata (Nutt.) Leconte, Ann. Lyceum Nat. Hist. New York 2:142. 1828 [1826]. BASIONYM: *Viola sagittata* Aiton var. *emarginata* Nutt., Gen. N. Amer. Pl. 147. 1818. TYPE: U.S.A.: “*Viola sagittata* β *emarginata*,” [s. d.], [T. Nuttall s.n.] [LECTO-TYPE, **here designated**: PH (PH00029288, internet image!).

In describing the basionym, Nuttall's protologue notes the taxon was found “In the sandy fields of New Jersey near Philadelphia, and also on the banks of the Schuylkill [in Pennsylvania]” [this phrase appears to refer collectively to *V. sagittata*, not just to var. *emarginata*]. Nuttall cited no specific type specimens. Stafleu and Cowan (1981) noted that Nuttall's collections leading up to the 1818 publication of his “Genera of North American Plants” were presented to PH. Two sheets in the JSTOR Global Plants database, one at BM and one at PH, are labeled as types of *Viola sagittata* var. *emarginata* and are attributed to Nuttall. The BM000617507 sheet has only plants of *V. sagittata* sensu stricto on it and was collected in New York, a state not mentioned in Nuttall's protologue; it is excluded as type material. The PH sheet bears two collections barcoded separately, PH00029287 and PH00029288. The PH00029297 plants are typical *Viola sagittata* and do not match the protologue description, and the label is not in Nuttall's handwriting. The flowering plant of PH00029288, excluding the large leaf of *V. sagittata* inserted next to it, does match the morphological features which Nuttall described for var. *emarginata*. McKinney (1992) incorrectly annotated the whole PH sheet and designated both collections as the holotype. Given that only PH00029288 (excluding the leaf of *V. sagittata*) matches the protologue, McKinney's designation is corrected and restricted in a second-stage lectotypification here.

Brainerd (1921) and several subsequent taxonomists accepted *Viola emarginata* (Nutt.) Leconte as a distinct species. Russell and Risser (1960) and Russell (1965) misapplied the name to hybrids between *V. affinis* and *V. sagittata*. Gil-ad (1995, 1997) also dismissed it as a hybrid derivative based on Russell and Risser's interpretation and the reported absence of unique traits. Our recent studies have revealed several diagnostic features in foliage, chasmogamous flowers and cleistogamous seeds for the taxon, determined that it is fully fertile and not of de novo hybrid origin as proposed, and documented that it occupies a consistently drier modal habitat than *V. sagittata*. We have detected other phenotypes that comprise an entire *Viola emarginata* species complex and have resurrected the name here.

Viola floridana Brainerd, Bull. Torrey Bot. Club 37:524. 1910. TYPE: U.S.A. FLORIDA. [Duval Co.]: Jacksonville, In moist rich woodland, 13 Mar and 22 Mar 1907, *E. Brainerd 60* [LECTOTYPE incorrectly designated as holotype by Landon McKinney, Sida, Bot. Misc. 7:36. 1992; LECTOTYPE, **here corrected** and second-stage LECTOTYPE, **here designated**: plants past chasmogamous flower or with cleistogamous capsules collected on 22 Mar 1907: NY (NY00097533[b], internet image!); ISOLECTOTYPES: GH (GH00067129[a], GH00067129[b]!), internet images!), K (K000327839[a], K000327839[b], internet images!), NO (NO0109932[a], NO0109932[b], internet images!) PH (PH00029089[a], PH00029089[b], internet images!). SYNTYPES: plants cited in the type above in chasmogamous flower collected on 13 Mar 1907: NY (NY00097533[a], internet image!).

Brainerd described in his protologue “Moist rich woodland, northern and central Florida. This I first collected March 13, 1907, near Jacksonville, Fla., on an embankment for a street railway across a little marsh near Woodlawn Cemetery. Plants sent home at that time, or their offspring, have since been growing in the Middlebury garden. In March and April, 1909, I found the plant in several other stations near Jacksonville, and at stations widely separated in Volusia County near the famous DeLeon Spring, on the shores of Lake Beresford, in an orange grove on a shell island near the outlet of this lake, on the edge of a tilled field near Lake Munroe, and in moist woodland near Deep Creek.” He did not specify a particular collection as representing a type and did not mention an herbarium. Two sets of specimens have been identified that comprise original material from which a lectotype may be selected. McKinney incorrectly annotated NY00097533 as holotype and designated it as such in his 1992 publication, but he did not specify which collection date. On that sheet, the upper right plant with chasmogamous and cleistogamous capsules is presumed to represent the 22 March collection date. That particular collection is denoted here by “[b],” as it is in the isolectotypes. Chasmogamous flowering specimens from the 13 March collection date remain syntypes. A correction and second-stage lectotypification is accomplished here.

Current taxonomic studies of the Affinis species group of acaulescent blue violets by Remington Burwell indicate that *Viola floridana* is probably a distinct species, and it is presented here as such.

Viola hirsutula Brainerd, *Rhodora* 9:98. 1907 [replacement name for *Viola villosa* Nutt.]. *Viola ciliata* Willd. ex Schult., *Syst. veg.* 5:360. 1819 [this name requires a proposal for rejection]. BASIONYM: *Viola villosa* Nutt. non Walter, Gen. N. Amer. Pl.: 148. 1818. TYPE: U.S.A. NORTH CAROLINA. [Polk Co.]: Tryon, rich open woodland, 14 Apr 1909, E. Brainerd 64 [NEOTYPE, **here designated**: GH (GH00067133!, internet image!); ISONEOTYPE: NO (NO0109933, internet image!).]

Brainerd cited no type in the protologue. Following publication of the name of the violet, he distributed specimens under his No. 64. No earlier collections named by him have been found at VT or other herbaria known to house his duplicates. McKinney incorrectly annotated the GH00067133 sheet as the holotype but later stated that the type was “unknown” (McKinney 1992). JSTOR Global Plants includes the GH sheet and a NO sheet of *Brainerd 64*, but the collection dates are after Brainerd’s publication and cannot be construed as original material. In the absence of original material from which to select a lectotype, the GH sheet is designated as a neotype.

Viola incognita Brainerd, *Rhodora* 7:248. 1905. TYPE: U.S.A. VERMONT. [Addison Co.]: Salisbury, forest at base of Moosalamoo Mt., pubescent form [originally identified as *Viola blanda*], 5 May 1903, E. Brainerd s.n. [LECTOTYPE, **here designated**: GH (GH00067134!, internet image!).]

Brainerd stated “Type in Hb. Gray from wooded slopes of Moosalamoo Mountain, Salisbury, Vermont, May 5, 1903, and August 14, 1905.” He gave specific information to indicate a unique collection locality and cited an herbarium but included two collecting dates. A specimen representing the May flowering collection referenced has been located, but specimens of the August fruiting collection have not. Since the protologue cites two collections, one of them must be designated as a lectotype. Although Brainerd did not annotate the GH00067134 sheet as a type, his second handwritten label states “*Viola incognita*, Brainerd, n. sp.,” indicating that the sheet was intended as a type. The GH sheet is designated here as a lectotype.

Although treatments of this taxon and *V. blanda* Willd. in past decades have merged them, our reevaluation of variation patterns and distinctions have moved us to reinstate them as distinct species.

Viola langloisii Greene, *Pittonia* 3:87. 1896. TYPE: U.S.A. LOUISIANA. [Plaquemines Parish]: (St. Martinsville), Pointe à la Hache, in woods, Mar 1879, A.B. Langlois s.n. (LECTOTYPE, **here designated**: UV (UVMVT024589, internet image!).) SYNTYPE: U.S.A. LOUISIANA. [Plaquemines Parish]: near St. Martinsville, Borders of woods, 5 Mar 1893, A. B. Langlois s.n.: NDG (NDG32846!, internet image!).]

Greene’s brief protologue reference, “Borders of moist woods in southwestern Louisiana, Rev. Fr. Langlois,” merely mentions a region of Louisiana (incorrectly specifying southwestern rather than southeastern Louisiana) and cites Langlois as collector. Two collections match the vague protologue information and are presumed to be original material, but neither has an indication by Greene regarding type status. Sheet UVMVT024589 is particularly representative of the chasmogamous flowering habit typical of this taxon and is selected as the lectotype. Two other collections bear mention. One Langlois collection (Louisiana, St. Landry Co., West La, Apr 1880, *A.B. Langlois s.n.*, NDG32850!, internet image!) does not morphologically match the protologue and has been identified as young *Viola septemloba* Leconte. It has been excluded from consideration here. A second collection, NDG32847, made by Langlois on 15 Mar 1897, postdates the publication of the name and cannot be considered original material and has also been excluded.

Taxonomists and specialists have been divided as to the status of this violet. Ongoing studies by Remington Burwell indicate that it is morphologically different in various characteristics from other recognized species and should be maintained as a distinct species.

Viola langloisii Greene var. ***pedatiloba*** Brainerd, *Bull. Torrey Bot. Club* 38:2. 1911. TYPE: U.S.A. LOUISIANA. [Acadia Parish]: Crowley, along shady bayous, 25 Mar 1910, E. Brainerd 74 [LECTOTYPE, **here designated**: PH (PH00029100, internet image!); ISOLECTOTYPES: NY!, UV (UVMVT024565!, internet image!).]

In 1911, Brainerd mentioned that “the southern plant [*Viola langloisii*] develops a variety with lobed leaves, such as is never found in connection with its northern relative [*V. affinis*]. This in my recent distribution of the violets of eastern North America I have named: *Viola Langloisii* Greene, var. ***pedatiloba***, var. nov. As in *V. esculenta*, the lobed leaves are preceded in early spring and followed in late summer by the ordinary uncut leaves.” Later, Brainerd (1921) evidently changed his mind in recognizing the taxon at all, merely noting that *V.*

langloisii “often exhibits a form with 3–5 pedately lobed leaves.” Brainerd cited no type collection and noted no herbarium in his original publication of the name, but his distribution No. 74 represents the taxon in question and constitutes original material. Other original material besides that number includes a specimen from Crowley at VT. Landon McKinney annotated the UVMVT024565 and PH00029100 sheets but did not mention the taxon in his 1992 treatment. The PH00029100 sheet is particularly representative of the unusual leaf blade division and marginal dentition of the taxon, and it is selected as the lectotype.

Despite Brainerd’s eventual abandonment of this taxon as a mere leaf phenotype, studies by Remington Burwell have revealed distinctions from *Viola langloisii* in cleistogamous capsule color and seed color. The taxon is retained here as distinct, pending completion of his studies.

***Viola latiuscula* Greene, Pittonia 5:93. 1902.** TYPE: U.S.A. VERMONT. [Rutland Co.]: Twin Mountains, West Rutland, 24 May, 15 Jul 1902, W.W. Eggleston 2648, 2867 [LECTOTYPE, **here designated**: specifically the chasmogamous flowering material of 24 May, Eggleston 2648, denoted by “[a]”: NDG (NDG32742[a]!, internet image!); ISOLECTOTYPES: CM (CM1457[a], CM [barcode] 107917[a], internet image!), CM (CM1458[a], CM [barcode] 107918[a], internet image!), GH (GH00067135[a]!, internet image!), ILL (ILL00006622[a], internet image!), MIN (MIN1002774[a], internet image!), MU (MU000000218[a], internet image!), NY (NY00097537[a]!, internet image!), NY (NY00097538! [a], internet image!), NY (NY00097539[a]!, internet image!), PH (PH00029251[a], internet image!), PH (PH00029252[a], internet image!), PH (PH00029253[a], internet image!), RSA (RSA0006446[a], internet image!), S (S-G-6375[a], internet image!), VT (UVMVT080304!, internet image!), VT (UVMVT083115!, internet image!), and YU (YU069971[a], internet image!). SYNTYPE: vegetative plants or those in fruit cited in the type above for the 15 July collection date, Eggleston 2867, denoted by “[b]”: NDG (NDG32742[b]!, internet image!).

Greene provided very specific information in his protologue, stating “This very satisfactory new violet is from Twin Mountains, West Rutland, Vermont, and was collected May 24 and July 15 of 1902, by Mr. W.W. Eggleston, who writes that it grows in open shady well drained soil.” He cited two separate collections, did not indicate which sheets may be types, and mentioned no herbarium. Several sheets are in the JSTOR Global Plants database, and sheets vary as to collection date and collector number, all of them including 24 May 1902 and 14 Jul 1902 on the printed labels, while only the NDG32742 sheet also includes 15 July 1902 on its hand-written label. The NDG sheet also has “*Viola latiuscula*, Green, type” written in Greene’s hand across the top of the label. McKinney incorrectly designated the May 1902 collection of NY00097537 as holotype. The three flowering plants from the 24 May 1902 collection (Eggleston 2648) on the NDG32742 sheet (denoted by “[a]”) are selected as the lectotype, being most representative of the species. Other specimens of Eggleston 2648 are treated as isolectotypes. The sterile or fruiting specimens collected on 15 July 1902 (Eggleston 2867) on the NDG32742 sheet (denoted by “[b]”) are a syntype, while specimens with a 14 July 1902 collection date are original material.

Several authors from Brainerd (1921) to Alexander (1963) accepted this species, whereas Russell (1965) and subsequent taxonomists synonymized it under *Viola affinis* or *V. sororia*. Nevertheless, recent studies have revealed that the virtually glabrous foliage, very broad deltate-reniform summer leaf blades, densely bearded spurred petal, broad eciliate sepals, and purple-brown seeds distinguish this narrow regional endemic from other taxa. It is accepted here as a distinct species.

***Viola lovelliana* Brainerd, Bull. Torrey Bot. Club 37:526. 1910.** TYPE: U.S.A. LOUISIANA. [Acadia Parish]: Crowley, Hillslocks under young pines, 25 Mar 1910, E. Brainerd 77 [LECTOTYPE incorrectly designated as holotype by Landon McKinney, Sida, Bot. Misc. 7:13. 1992; LECTOTYPE, **here corrected**: NY (NY00097544!, internet image!); ISOLECTOTYPES: K (K000327843, internet image!), PH (PH00029256, internet image!), VT (UVMVT024562!, internet image!), VT (UVMVT024563!, internet image!).

Brainerd mentioned multiple collections in his prolonged protologue. “Live plants of this, as an unknown species, were sent me in March, 1906, by Mrs. Phoebe Lovell, of Crowley, La. The plants did well in the garden; and mature leaves and fruit from cleistogamous flowers were obtained the following August, and petaliferous flowers in the spring of 1907. On my southern journey in March, 1908, I visited the station, a recent pine-chopping on loamy clay, more or less broken by low ravines. Four additional live plants were shipped home, and from each of these, and from their seedlings in 1909, many specimens were made of the mature plant. The species turns out to be a common one in the western portion of the territory covered by Dr. Small’s Flora. In April, 1908, I collected it in open woodlands near Muskogee, Okla., a mile from the Arkansas River; also, in the same

state, under dwarf oaks on the slopes of a rocky hill at Eufaula, and in the vicinity of Stigler. In March, 1910, I obtained beautiful specimens at Mansfield, La., in a piece of woodland cut up by deep ravines; and also at Mena, Ark. I have in addition to these specimens one from Texarkana, Ark., ‘Pine woods, April 6, 1905, B. F. Bush, no. 2237.’” He did not specify a particular collection as a type or mention an herbarium. However, in 1921 he stated that “The type, in the Bronx Park Herbarium [=NY] is from Crowley, La., March 25, 1910, and is from a large collection sent out that year as No. 77 of my Distribution of Eastern North American Violets.” He mentioned that Nos. 79 and 80 were collections from Mansfield, Louisiana, and Muskogee, Oklahoma, respectively, and that No. 78 represented plants grown from seeds at his Middlebury, Vermont, garden. McKinney incorrectly designated NY00097544 as the holotype; the lectotypification is corrected here.

Viola nephrophylla Greene, *Pittonia* 3:144. 1896. TYPE: U.S.A. COLORADO: Cimarron River, 29 Aug 1896, E.L. Greene s.n. [LECTOTYPE incorrectly designated as holotype by Landon McKinney, *Sida*, Bot. Misc. 7:34. 1992; LECTOTYPE, **here corrected**: NDG (NDG34250, internet image!); ISOLECTOTYPE: NDG (NDG34249, internet image!).

Greene cited one specific collection in the protologue; however, he made no mention that this constituted a single sheet, and he cited no herbarium. The two sheets cited above at NDG bear the same label data and match the protologue information, and neither has any indication by Greene as to type status. In their publications, McKinney (1992) apparently arbitrarily designated NDG34250 as the holotype and NDG34249 as an isotype, and Gil-ad (1995, 1997) concurred. However, the fact that two identical sheets are deposited at NDG with no distinction between them renders them syntypes, making correction of McKinney’s type designation necessary. We correct the lectotypification here.

Viola palmata L., *Sp. pl.*, ed. 1, 2:933. 1753. TYPE: U.S.A. “Habitat in Virginia:” [s. d.], [J. Clayton] 468 in Herb. Jacquin [LECTOTYPE incorrectly designated as holotype by Landon McKinney, *Sida*, Bot. Misc. 7:12. 1992; LECTOTYPE, **here corrected**: LINN (Herb. Linn. No. 1052.1, internet image!). SYNTYPE: U.S.A. Virginia, [s. d.], [J. F.] Gronovius s. n. [specimen is referred to in the JSTOR Global Plants database as *Gronovius* 468/793]: BM (BM000042617, internet image!).

Linnaeus provided his own terse description, then cited the description of Gronovius (1739) verbatim, as well as Gronovius’s verbatim description from Plukenet’s (1700) “Mantissa” and a somewhat altered description from Plukenet’s (1705) “Amaltheum.” However, Reveal (1983) noted that Linnaeus examined the collections of John Clayton from Virginia sent to Johan Gronovius in The Netherlands, worked closely with Gronovius on the production of the latter’s “Flora Virginica” based on Clayton’s collections, also received some duplicates of Clayton collections which became part of the Linnaean Herbarium. Therefore, there is a very strong likelihood that the two specimens of *Viola palmata* L. housed in the Linnaean Herbarium and cited above represent original material used by Linnaeus in his description of the species. The LINN1052.1 and BM000042617 sheets are thus tentatively accepted as original material, as is the illustration in Plukenet’s “Amaltheum.” Plukenet’s herbarium, according to Stafleu and Cowan (1983), was eventually acquired by Hans Sloane, and is now part of BM. The specimen that very closely matches the illustration in the “Amaltheum” (HS 92, f. 125 *Viola palmata* t. 114, f. 7), although reversed, may also constitute original material. McKinney (1992) incorrectly designated the LINN sheet as holotype; we correct the lectotypification here. McKinney argued that the name *Viola palmata* L. was misapplied by Brainerd and subsequent taxonomists to a homophyllous cut-leaved Appalachian taxon but clearly referred to the heterophyllous violet widely treated under the name *Viola triloba* Schwein. Gil-ad (1995, 1997) proposed that the dissection of the leaf blades in the LINN sheet suggested a hybrid between a heterophyllous and a homophyllous cut-leaved violet, and he also rejected McKinney’s argument. We see no evidence whatever that the LINN specimen represents a hybrid; rather the plant is typical of one of the many leaf variations to be found on the Piedmont and Coastal Plain of the eastern and southeastern U.S. Moreover, the Plukenet specimen and the illustration on which it is based is an individual with a small undivided leaf blade, and Linnaeus’s own description notes both divided and undivided leaves. The evidence is overwhelmingly in favor of Linnaeus’s name applying to a heterophyllous violet with pubescent foliage, specifically that long known as *V. triloba* Schwein. The earliest correct name for the homophyllous Appalachian violet, as suggested by McKinney, is *Viola subsinuata* (Greene) Greene.

Viola pedata L. var. **flabellata** D. Don, in Sweet, Brit. fl. gard., ser. 2, 3:pl. 247. 1837. TYPE: (LECTOTYPE, here designated: plate 247 of above reference).

Don observed in the protologue that “It was introduced by Mr. Drummond from Georgia into the Botanic Garden, Glasgow, from whence it was sent to the Botanic Garden, Edinburgh, in 1832, and there it first produced a succession of flowers in the Greenhouse in the beginning of October, 1833.” No mention of herbarium specimens was made, nor have any been discovered. In the absence of specimens, the illustration in Sweet is designated here as the lectotype.

McKinney and Russell (2002) and Little and McKinney (2015) recognized this regional endemic of the Sandhills region of the Carolinas and Georgia but applied the name var. *ranunculifolia* (Juss. ex Poir.) Ging. ex DC. The protologue, type material and herbarium specimens representative of var. *ranunculifolia* do not adequately match the morphological extreme represented by var. *flabellata*, and the *ranunculifolia* phenotype is not geographically restricted to the Sandhills region. The present name matches the morphological expression of the regional Sandhills endemic.

Viola pratincola Greene, Pittonia 4:64. 1899. TYPE: U.S.A. MINNESOTA: Windom, 1 Jul 1898, *E.L. Greene s.n.* (LECTOTYPE incorrectly designated as holotype by Landon McKinney, Sida, Bot. Misc. 7:36. 1992; LECTOTYPE, here corrected: NDG32745; ISOLECTOTYPE: NDG32746 [both JSTOR Global Plants images!]).

Greene’s protologue states “I collected this plant in its summer condition, on the first of July, 1898, in a low meadow of natural vegetation (the land never having been ploughed) near the banks of the Des Moines River, at Windom, Minnesota. It was growing in great abundance in the rich black prairie soil among grasses and lilies (*Lilium umbellatum*). Copious living specimens of the plant in full vernal flower were sent me this season, from the same spot, by my niece, Miss Nellie C. Greene, so that I have now all needful data from which to determine its rank.” Greene described one quite specific collection, but he made no reference to a single sheet and did not mention an herbarium. The JSTOR Global Plants database has three NDG sheets, all with identical label information and no indication by Greene regarding type status. Sheet NDG32749 diverges morphologically from the other sheets in multiple traits of leaves and cleistogamous fruits and does not match the protologue description; it is excluded from consideration. McKinney apparently arbitrarily selected the NDG32745 sheet, incorrectly designating it as holotype, and Gil-ad concurred. The lectotypification is corrected here.

As with *Viola domestica* E.P. Bicknell, we are attempting to resolve the taxa with strictly or essentially glabrous foliage and eciliate sepals in the *Viola sororia* species complex, which also includes this name. Lectotypification of *V. pratincola* Greene is a step in that process.

Viola rafinesquei Greene, Pittonia 4:9. 1899 [replacement name for *V. bicolor* Pursh]. *Viola kitaibeliana* Schult. var. *rafinesquii* (Greene) Fernald, Rhodora 40:443. 1938; *Mnemon rafinesquii* (Greene) Nieuwl., Amer. Midl. Naturalist 3:217. 1914; *Viola bicolor* Pursh, Fl. Amer. sept. 1:175. 1813 [illegimate homonym of *Viola bicolor* Hoffm. (1804)]. TYPE: U.S.A. [PENNSYLVANIA]. [Cumberland Co.: Carlisle], Connedagwinit Cave [now Conodoguinet Cave, at Cave Hill Park and Nature Center], [s. d.], [*F. Pursh s.n.*] [LECTOTYPE, here designated: K (K000651424, internet image!)].

In his protologue, Pursh provided the brief and generalized statement, “In fields of Pennsylvania and Virginia.” Pursh cited no specific collections or types. According to Stafleu and Cowan (1983), Pursh’s herbarium was dispersed to several institutions including BM, K, OXF, and PH. Besides the Pennsylvania collection cited above, two Maryland specimens attributed to Pursh are likely duplicates and probably constitute original material: U.S.A. [Maryland]. Antietam, Wet ground, similar to the one from Carlisle Cave, 1806, [*F. Pursh s.n.*] (PH00039358, internet image!); and U.S.A. [Maryland]. Antietam, [no date], [*F. Pursh s.n.*] (K00032789, internet image!). The only specimen from a state cited by Pursh is selected as the lectotype here.

For some years, this violet has been referred to as *Viola bicolor* Pursh. Unfortunately, an earlier valid publication of that name (cited above) was recently discovered by Thomas Marcussen (pers. comm.), requiring a return to Greene’s replacement name of *V. rafinesquei*. Alan Weakley (pers. comm.) pointed out the correct ending to the specific epithet.

Viola retusa Greene, Pittonia 4:6. 1899. TYPE: U.S.A. COLORADO: Fort Collins, 5000 ft, 2 May 1896, *C.F. Baker s.n.* [LECTOTYPE, here

designated: NDG (NDG033232, internet image!); ISOLECTOTYPES: NY (NY00097585, internet image!), NY (NY00097586, internet image!).

Greene's protologue offers "Plains of northern Colorado, toward the foothills; the best specimens from Carl F. Baker, collected at Fort Collins, 2 May, 1896, and named by me *V. cognata* at the time. . . ." He cited one specific collection but did not identify a single sheet, did not reference a type, and made no mention of an herbarium. Three sheets in the JSTOR Global Plants database match the protologue and generally have the same information. However, the NDG033232 sheet has the original identification of "*Viola cucullata* Gray" and the revised identification of "*Viola cognata*" above it both struck out and replaced by "*retusa*," possibly in Greene's hand. The two NY sheets retain the original identification of "*Viola cucullata* Gray." The NDG sheet also bears the most luxuriant chasmogamous flowering specimens that well represent the taxon, and it is selected here as lectotype.

This regionally endemic species of gravel stream- and riverbanks in the Great Plains was described by Greene in 1899 and immediately passed into obscurity. Then it was momentarily resurrected by Brainerd (1913) in his *Violaceae* treatment in Britton and Brown's "Illustrated Flora," followed once again by complete abandonment to the present time. Our studies have revealed that the taxon is uniformly distinct from *Viola nephrophylla* and other undivided-leaved species in its strictly glabrous foliage; deltate, abruptly acute to acuminate leaf blades; narrow, acuminate sepals; green, unspotted, cleistogamous capsule on commonly erect peduncle; and larger medium brown seeds with small raised black spots. It is accepted as a distinct species here.

Viola rosacea Brainerd, Bull. Torrey Bot. Club 37:525. 1910. TYPE: U.S.A. MISSISSIPPI. [Harrison Co.]: near Biloxi, well drained open woodland, 19 Mar 1910, *E. Brainerd* 132 [LECTOTYPE incorrectly designated as holotype by Landon McKinney, Sida, Bot. Misc. 7:36. 1992; LECTOTYPE, **here corrected:** NY (NY00097587!, internet image!); ISOLECTOTYPES: K (K000327847, internet image!), P (PH00029285, internet image!). SYNTYPES: U.S.A. Mississippi. [Harrison Co.]: Transplanted from near Biloxi, Mar 1920, 24 Aug 1910, ex horto *E. Brainerd* 133 [K (K000327846, internet image!), PH (PH00029284, internet image!); U.S.A. Louisiana. [Acadia Parish]: well drained open woodland near Fair-ground, Crowley, 21 Mar 1908 [an additional date added in pencil, "March 25, 1910"], *E. Brainerd* 134 [NY (NY01404603, image!)]].

In his protologue, Brainerd reported the taxon from "Dry open woodland, Point St. Martin, near Biloxi, Mississippi; well drained borders of bayous, Crowley, Louisiana." He mentioned two separate localities but cited no types or specific collections or a reference to any herbaria. In 1921, he noted three separate localities represented by Nos. 132 and 133 from Biloxi, Mississippi, and No. 134 from Crowley, Louisiana. These constitute original material as their collection date precedes the publication date of his new species. McKinney (1992) incorrectly designated sheet NY00097587 as holotype; the correction to lectotype is accomplished here.

This taxon has been disregarded for more than half a century. Remington Burwell has been studying populations matching Brainerd's description and finding additional distinctions besides the rose-colored corolla emphasized by Brainerd, including more darkly colored foliage and a weeks-earlier phenological shift in chasmogamous flowering. At present, the taxon is retained as a distinct species, pending completion of his studies.

Viola rostrata Pursh, Fl. Amer. sept. 1:174. 1813. *Lophion rostratum* (Pursh) Nieuwl. & Kaczem., Amer. Midl. Naturalist 3:216. 1914. TYPE: U.S.A. PENNSYLVANIA. [Northampton Co.]: Easton, [s. d.], [*F. Pursh* s. n.] [NEOTYPE, **here designated:** K (K000327818!, internet image!).

Pursh's protologue stated the violet was found "On shady rocks: near Easttown [= Easton], Pennsylvania." According to Stafleu and Cowan (1983), Pursh's herbarium was dispersed to several herbaria, including BM, K, OXF, and PH. Pursh cited no types and did not mention an herbarium, but he stated a single area, suggestive of one collection. One sheet at K matches the protologue, with the handwritten statement "Herb. Pursh propr." at the bottom. Harvey Ballard incorrectly annotated this sheet as holotype in 1995. Because we cannot be certain that the sheet was actually used by Pursh, we conservatively designate the sheet here as neotype.

Viola rotundifolia Michx., Fl. bor.-amer., ed. 1, 2:150. 1803. TYPE: "*Viola rotundifolia* Mich.-Poir. Encycl. no. 9," Amériq. Sept., [A.] Michaux [s. n.] [LECTOTYPE, **here designated:** P (MNHN-P-P04641469, image!).

Michaux's terse protologue states "Hab. in excelsis montibus Carolinae." Michaux cited no specific specimens or types. Per Stafleu and Cowan (1981), Michaux's North American herbarium is at P, kept in a separate historical collection, with some duplicates in Herb. Richard. A search of the herbarium database at P revealed three sheets of presumed original material, all of which match the minimal protologue information and the description. Sheet P04641469, cited above, with a healthy plant showing the prostrate summer stem and a three-fruited cyme, is selected as the lectotype. Two other sheets are "*Viola rotundifolia*," Amériq: Sept: (Mr LeConte [s. n.]) ["Herbarium Richard" written in different hand and ink] P (MNHN-P-P04641484, image!); and "*Viola rotundifolia* Michaux," fl. luteus, in altis montib. Carol., [A. Michaux s. n.?] ["Herbarium Richard" written in different hand and ink] P (MNHN-P-P04641488, image!). The latter is a mixed collection with three species, the upper right plant representing *V. rotundifolia*.

Viola sagittata Aiton, Hort. kew., ed. 1, 3:287. 1789. TYPE: ENGLAND: Hort. Fothergill (ex America Pennsylvania), [s. d.], [J. Fothergill s.n.] [LECTOTYPE designated incorrectly as holotype by Nir Gil-ad, Boissiera 53:75. 1997; LECTOTYPE, **here corrected**: BM (BM001122805), internet image!, MICH-photo). SYNTYPE: ENGLAND: Hort. Kew, 1778, [J. Fothergill s. n.] [BM (BM000617472), internet image!].

Aiton's brief protologue states the plant described in Hortus Kewensis was "Nat. of Pennsylvania. Introd. 1775, by John Fothergill, M.D." The protologue appears to indicate a single collection introduced to the garden at the Royal Botanic Garden at Kew. However, Stafleu and Cowan (1976) noted that collections from Fothergill's garden were deposited at both BM and LINN. The sheet at BM has two collections on it, separately barcoded: BM001122805 matches "1" of the handwritten note on the back with the statement "Hort. Fothergill (ex America Pennsylvania)"; BM000617472 matches "2" of the note, "Hort. Kew 1778." Both are presumably original material. Harvey Ballard incorrectly annotated the sheet as holotype. Gil-ad also annotated the sheet as the holotype but later restricted his holotype designation to the three leaves and cleistogamous material of BM001122805 (Gil-ad 1995, 1997). Gil-ad's designation is corrected to lectotype here.

Viola striata Aiton, Hort. kew., ed. 1, 3:290. 1789. *Lophion striatum* (Aiton) Nieuwl. & Kacz., Amer. Midl. Naturalist 3:216. 1914. TYPE: ENGLAND: Kew Garden, 1783 [LECTOTYPE, **here designated**: LINN (LINN-HS1380-31-2, internet image!)].

Aiton provided the information "Nat. of North America. Introd. 1772, by Mr. William Young, Fl. June and July" in his protologue. He cited no types, but Stafleu and Cowan (1976) noted that virtually all types for Hortus Kewensis are deposited at BM. Nevertheless, a sheet in the JSTOR Global Plants database is likely original material, in Herb. Sloane (cited above), from Kew Garden in 1783, some years following Young's introduction of the plant into the garden at Kew. A second specimen in the database is interpreted not to be original material: U.S.A. America sept. prope Ohio, 1764, J. Bartram [s. n.] (BM000617517!), although Harvey Ballard incorrectly annotated it in 1995 as holotype. The LINN sheet is designated here as lectotype.

Viola subsinuata (Greene) Greene, Pittonia 4:4. 1899. BASIONYM: *Viola emarginata* (Nutt.) Leconte var. *subsinuata* Greene, Pittonia 3:313. 1898. TYPE: U.S.A. TENNESSEE. Cocke Co.: collected within 3 mi of Wolf Creek Station, 11 Sep 1897, [T.H.] Kearney 615 [LECTOTYPE incorrectly designated as holotype by Landon McKinney, Sida, Bot. Misc. 7:45. 1992; LECTOTYPE, **here corrected**: NDG (NDG33272!, internet image!)].

Greene states in his protologue, "The only specimens seen are in the herbarium of my friend T. H. Kearney, Jr. The autumnal specimens were collected by himself in September, 1897." This suggests two collections and does not specify either as the type, nor does he indicate a single specimen. Only one sheet is in the JSTOR Global Plants database, and it has one chasmogamous flowering plant (referred to by the handwritten addition "fls. Apr. 2" to the label) and two cleistogamous fruiting specimens presumably collected on the autumn date. The sheet has written at the bottom "*V. subsinuata* Greene Type!" in Greene's hand. McKinney incorrectly declared the sheet as a holotype. McKinney did not include the handwritten portion specifying the flowering plants, so his selection of type material serendipitously refers only to the cleistogamous fruiting plants. His typification is corrected here.

Viola viarum Pollard, in Britton, Man. fl. n. states, ed. 1:635. 1901. TYPE: U.S.A. MISSOURI: St. Louis, along railroads in dry

soil, 15 Jul 1899, *J.B.S. Norton* 32 [LECTOTYPE, **here designated**: PH (PH00029301, internet image!); ISOLECTOTYPES: MO, NDG (NDG33192, internet image!), NEB (NEB-V-0000594, internet image!), OS (OS0000376, internet image!), RM (RM0004526, internet image!), RM (RM0004527, internet image!), and RSA (RSA0006465, internet image!).

Pollard's protologue states "Type collected by J. B. S. Norton at Valley Park, Mo., July 15, 1899." He cited a single collection but did not identify a particular specimen as holotype and did not mention an herbarium. Stafleu and Cowan (1983) noted that Pollard's herbarium and types are at US, with duplicates at several other herbaria, whereas Norton's herbarium and types during the time period of his 1899 collections are at MO. Several specimens with the same label data can be found in the JSTOR Global Plants database, and all of them bear a label incorrectly naming them as paratypes (they are syntypes). Sheet US03017761 in the JSTOR Global Plants database has a label with the above locality and collector but has the date "Apr. 29 '99," disqualifying it as a syntype. Sheet PH00029301 is particularly representative of the species, with diagnostic features of leaves and cleistogamous fruits, and is chosen here as lectotype.

CLARIFICATIONS OF NAMES

Following the explanation under "TYPIFICATIONS," given for the transfer of *Hybanthus concolor* (T.F. Forst.) Sprengel to the now accepted name *Cubelium concolor* (T.F. Forst.) Raf. ex Britton & A.Br., the first two names below have been transferred to the genus *Pombalia* Vand., which now encompasses the majority of New World hybanthoids. A few other Mexican and Central American lineages have yet to be described. The remaining unfamiliar names have been resurrected owing to recently discovered misapplication of names or based on taxonomic research revealing additional diversity deserving of recognition.

Pombalia attenuata (Humb. & Bonpl. ex Willd.) Paula-Souza, in Paula-Souza & H.E. Ballard, *Phytotaxa* 183(1):6. 2014. *Hybanthus attenuatus* (Humb. & Bonpl.) Schulze-Menz, *Notizbl. Bot. Gart. Berlin-Dahlem* 12:114. 1934; *Ionidium attenuatum* Humb. & Bonpl., in Roem. & Schult., *Syst. veg.* 5:402. 1819. TYPE: COLUMBIA: Angostura, [no date], *Humboldt & Bonpland* 1643 (HOLOTYPE: B-W!; ISOTYPE: P00604176!).

This species ranges up into southern Arizona as a native, but it has been introduced relatively recently to citrus groves and roadsides in Miami-Dade County, Florida.

Pombalia parviflora (Mutis ex L.f.) Paula-Souza, in Paula-Souza & H.E. Ballard, *Phytotaxa* 183(1):10. 2014. *Calceolaria parviflora* (Mutis ex L.f.) Kuntze, *Revis. gen. pl.* 3(2):8. 1898; *Ionidium glutinosum* Vent. var. *parviflorum* (Mutis ex L.f.) Eichler, *Fl. bras.* 13(1):374. 1871; *Solea parviflora* (Mutis ex L.f.) Spreng., *Syst. veg.* 1:804. 1825 [1824]; *Ionidium parviflorum* (Mutis ex L.f.) Vent., in Vent. & Redouté, *Jard. Malmaison* 1(5):pl. 27. 1803; *Viola parviflora* Mutis ex L.f., *Suppl. pl.* 360. 1782 [1781]. TYPE (protologue): "Habitat in Americae meridionalis calidioribus regionibus," [no date], *Mutis s.n.* (HOLOTYPE: LINN 1052-25!).

This native of South America evidently disperses readily, being found as an introduction in New Jersey, North Carolina, and Georgia (Wofford et al. 2004).

Viola communis Pollard, *Bot. Gaz.* 26:336. 1898. *Viola domestica* E.P. Bicknell var. *communis* (Pollard) Farw., *Pap. Michigan Acad. Sci.* 2:30. 1923 [1922]. *Viola familiaris* Greene, *Cybele* Columb. 1:14. 1914.

Continuing taxonomic studies of the *Viola sororia* complex and related taxa have recently supported recognition of a component of what was previously called *Viola papilionacea* Pursh by Brainerd (1921) and other taxonomists. This taxon differs from the rest of the *Viola sororia* complex in several consistent morphological features of foliage pigmentation, leaf blade shape and marginal dentition, sepal shape, cleistogamous capsule color and peduncle orientation, and seed dimensions and color pattern. It has a preference for thickets, meadows, forest/floodplain transitions, and is often found in lawns. It is widely distributed across eastern North America. The name *Viola papilionacea* Pursh is not available for multiple reasons. The next available name is *Viola communis* Pollard. Typification will require a trip to US to identify possible original material for Pollard's name or specimens for neotypification. Nevertheless, his description and the emendation and amplification provided by Greene (with whom he consulted) leave no doubt as to the application of the name.

Viola edulis Spach, *Hist. Nat. Vég. (Spach)* 5:508. 1836 [replacement name at species rank for *V. palmata* L. var. *heterophylla* Elliott]. *Viola palmata* L. var. *esculenta* Elliott ex D.B. Ward, *Phytologia* 88:244. 2006 [nomen superfluum]. *Viola*

esculenta Elliott ex Greene, Pittonia 3:314. 1898 [replacement name at species rank for *V. palmata* L. var. *heterophylla* Elliott]. *Viola heterophylla* Leconte, Ann. Lyceum Nat. Hist. New York 2:139. 1828 [1826] [illegitimate homonym of *Viola heterophylla* (Vent.) Poir., 1808 and of *Viola heterophylla* Bertol., 1810]. BASIONYM: *Viola palmata* L. var. *heterophylla* Elliott, Sketch bot. S. Carolina 1(3): 300. 1817. TYPE: U.S.A. [GEORGIA]: Ogeechee river in udis etian in Pennsylv. Flor., Apr [no year], [S. Elliott s. n.] (HOLOTYPE: CHARL., internet image!).

Taxonomists since Brainerd (1921) have applied the name *Viola esculenta* Elliott ex Greene at species rank. Nevertheless, the earliest available name (recently discovered) is *Viola edulis* Spach.

Viola minuscula Greene, Leaflet bot. observ. 1(4):247. 1906.

Brainerd (1905) was first to create a new combination, *Viola pallens*, based on the basionym *Viola rotundifolia* Michx. var. *pallens* Banks ex Ging., after Fernald reported that the specimens referred to in the Banks Herbarium applied to the acaulescent white violet in question. Ballard et al. (2001) detected that the sheet represented two separate collections and lectotypified the Banks specimens from Labrador as matching the protologue most closely. Recent close reexamination of the lectotype (and remaining syntype) has shown that the name *Viola rotundifolia* var. *pallens* is based on specimens of the *Viola palustris* complex, with creeping rhizomes and broadly reniform leaves inserted individually along the rhizome. The next available, albeit obscure, name for this acaulescent white violet is *Viola minuscula* Greene. Despite currently being without typification, Greene's detailed and precise description, and later collections made by William Limberger from the same boggy areas in New York as Greene mentioned in his protologue, are unambiguously attributable to the violet formerly known as *Viola pallens* (or a variety or subspecies of *V. macloskeyi* F.E.Lloyd).

Viola tenuipes Pollard, Proc. Biol. Soc. Washington 15:201. 1902. TYPE: U.S.A. FLORIDA. [Gadsden Co.]: Chattahoochee, Mar 1897 [A. Chapman s n.] (HOLOTYPE: US; ISOTYPE: MO!).

This name has resided in obscurity since Pollard described it. Morphometric studies of the *Viola tripartita* complex by undergraduate Nick Chilson have recently distinguished both *V. glaberrima* (Ging.) House and *Viola tenuipes* Pollard as sharply distinct morphological and geographic taxa that will be recognized as species. The name is properly typified, but it will undoubtedly be unfamiliar to taxonomists, given its total absence in the literature. The violet represents the bulk of collections of plants with wholly undivided, rhombic-lanceolate leaf blades and minutely puberulent foliage in the southeastern U.S. south of the northern boundaries of North Carolina and Tennessee.

XYRIDACEAE

Xyris: *Xyris stenotera*, a restricted species of sandy depression marshes and pond shores in peninsular Florida
Primary authors: Edwin L. Bridges and Steve L. Orzell

Xyris stenotera (Malme) E. Bridges & Orzell, **comb. et stat. nov.** BASIONYM: *Xyris elliottii* Chapman var. *stenotera* Malme, Bull. Torrey Bot. Club 64:45. 1937. TYPE: U.S.A. FLORIDA. Lake Co.: without data, Nash 443 (HOLOTYPE: ?, not found). NEOTYPE, **here designated:** U.S.A. FLORIDA. Polk Co.: margin of sandhill upland lake in sand pine [*Pinus clausa*] scrub, Saddle Blanket Lakes Scrub, on S side of Avon Park cut-off road, ca. 1.3 mi W of intersection with Alt 27, S of Lake Streeby, ca. 16 air mi S of downtown Lake Wales. T32S, R27E, Sec. 25, SE¼ of NW¼. 27°40'14"N, 81°34'33"W. Soils - Basinger (Spodic Psammaquents), 11 May 1990, Orzell & Bridges 13488 (NEOTYPE: USF).

Xyris elliottii var. *stenotera* was described as a new variety in 1937 by the Xyridaceae expert Gustaf Oskar Andersson Malme (1864–1937), based on a specimen collected by George Valentine Nash (1864–1921) from Lake County, Florida (Malme 1937). However, the digital image of the cited type specimen (Nash 443) at NY is actually a specimen of *Betula populifolia* from New York. There is no digital image of a Nash specimen of *X. elliottii* var. *stenotera* at GH, US, or S, and the other Nash specimens of *Xyris elliottii* (including potential var. *stenotera* specimens) at NY and US bear no annotations by Malme. Malme also studied specimens from W, which included some Nash specimens. However, the Xyridaceae was among the families lost in the World War II bombing, and if the type was at W, it was destroyed. After checking extensively to see if the type specimen citation could have been a transcription error of another Nash specimen number, we found no likely candidates. Since it is clear that Malme's description of var. *stenotera* represents the same species we are commonly

seeing in central Florida, and the actual type specimen has not been relocated, we are designating a neotype for this name.

Variety *stenotera* has since been relegated to synonymy under *Xyris elliotii* in taxonomic studies (Kral 1960, 1966, 2000) and floras, as we also did until we consistently noted a distinct *Xyris* that was mostly or totally restricted to the margins of sandhill upland lakes and large sandhill upland depression ponds in central Florida, particularly those located on the central Florida sand ridges, such as the Lake Wales Ridge. It has extremely narrow leaves (up to 1 mm wide, the same width as those of *X. baldwiniana*, but sometimes ellipsoid rather than terete in cross section), and small, more lanceolate spikes, as compared to the ovate, acutely pointed spikes of *X. elliotii*. Even in areas where typical *X. elliotii* occurs within a few hundred meters, there is a clear break in habitat and no morphological intermediates. These plants clearly fit the description of *X. elliotii* var. *stenotera* Malme. Over the past several decades, collectors have often identified specimens of *X. stenotera* as *X. baldwiniana*, and its similarity in vegetative characters was discussed in detail in a recent floristic study in Highlands County, Florida, where the collectors noted it as an unusual form (Wilder et al. 2019).

To determine if its distinctive morphology was merely a response to habitat conditions, we did a transplant experiment, in September 2008, planting 14 clumps of *Xyris stenotera* in a hyperseasonal subtropical wet-mesic grassland where *X. elliotii* was abundant, while removing all *X. elliotii* plants from the immediate transplant area. We did not do the reverse transplant experiment, since not knowing what the survival might be; we feared we could contaminate the *X. stenotera* gene pool. Both species flowered profusely at the transplant site in April and May 2009, and we made detailed comparisons of characters (Table 6). We continued to follow these plants until all the *X. stenotera* plants had died by 2012. During this period, the distinct morphological characters of *X. stenotera* did not change, and all seedlings noted were pure *X. elliotii*, which was still abundant within a short distance. No seedlings demonstrated intermediate morphology, suggesting that these were not merely intergrading forms of the same species.

Xyris stenotera can be distinguished from *X. elliotii* by its narrow leaves (0.5–1 mm wide vs. 1–2.5 mm wide), generally smaller spikes (6–7 mm long, 4 mm wide vs. 7–11 mm × 4.5–6 mm), slightly smaller and narrower petal blades, scapes generally only about twice the length of the longest leaves, and its distinctive habitat (Fig. 9). Other uncommon species often found with or near *X. stenotera* include *Lachnocaulon engleri* Ruhland, *Rhexia cubensis* Griseb., *Eleocharis elongata* Chapm., *Sagittaria isoetiformis* J.G. Sm., *Rhynchospora pleiantha* (Kük.) Gale, and *Eupatorium leptophyllum* DC. At some sites, *X. stenotera* only appears during the spring of extreme drought years, being under a meter or more of water in other years. At other sites, particularly those located within a matrix of deep sand ridges, it dominates shallow sandy depressions that are only inundated in extremely wet years. We have never found *X. elliotii* in these sandy depression marsh or pond margins, and its typical wetland pine savanna habitat is uncommon to absent on the Lake Wales Ridge and other Central Florida sand ridges where *X. stenotera* is common.

Because it was considered as a synonym for so long, it is difficult to determine the total range of this taxon, but it is common and abundant in Polk and Highlands counties on the Lake Wales Ridge, and rare on the Bombing Range Ridge. It is also a common *Xyris* of the large open sandy depression ponds of the Ocala National Forest in Marion County, and plants that seem to fit this have also been found southwest of Tallahassee in the sandhill depression ponds of Leon County. Most locations are in peninsular Florida from Clay County south to Highlands County.

This modified key to *Xyris* species with lacerate lateral sepal keels and narrowly linear to filiform leaves with expanded, lustrous, hard, tan to brown bases can serve to distinguish *Xyris stenotera* from both *X. baldwiniana* and *X. elliotii* (Bridges & Orzell 2003).

1. Leaves narrowly linear to filiform, 0.5–2.0(–2.5) mm wide, not twisted (or scarcely so); leaf bases expanded, lustrous, hard, tan to brown, neither bulbous nor deeply set in the substrate; spikes ovoid or ellipsoid, 4–15 mm long.
2. Bract tips smooth-edged to denticulate, not curled away from the spike, the spike thus appearing smooth; staminodia beardless _____ ***Xyris baldwiniana***
2. Bract tips ragged-lacerate, the tips curling away from the head, giving it a ragged appearance; staminodia bearded.
3. Leaves linear, flattened in cross-section, 1.0–2.0(–2.5) mm wide, with a pale, hardened margin; scape usually narrower than the leaf blades; [e. SC south to s. FL, west to s. MS] _____ ***Xyris elliotii***

TABLE 6. Comparison of field characters of *Xyris elliottii* and *X. stenotera* in field transplant experiment plants – April 28, 2009.

<i>Xyris elliottii</i>	<i>Xyris stenotera</i>
Leaves mostly spreading and diffuse Leaf blades flattened in cross-section	Leaves mostly upright and compact Leaf blades terete in cross-section
Petal blades broadly obovate Petal blade apex finely toothed Petal blades almost touching at apex when in full flower Petal blades 8–9 mm wide	Petal blades narrowly cuneate-obovate Petal blade apex erose to toothed Petal blades clearly separated, never touching when in full flower Petal blades 7–8mm wide
Denser fringed staminodia Most scapes 3–4× leaf length	Sparser fringed staminodia Most scapes < 2× leaf length
Previous year fruiting scapes not persistent Spikes 7–11 mm long, 4.5–6 mm wide	Previous year fruiting scapes persistent Spikes 6–7 mm long, 4 mm wide

3. Leaves filiform, terete or elliptic in cross-section, 0.5–1.0 mm wide, without a paler, hardened margin; scape as broad as or broader than the leaf blades, usually less than twice the length of the longest leaves; [FL, perhaps elsewhere] _____ ***Xyris stenotera***

1. Leaves broader, (1.5–)2.0–25 mm wide, strongly twisted to straight, the leaf bases either not expanded, lustrous, hard, and tan to brown, or, if so, then the base also either bulbous and/or deeply seated in the substrate; spikes narrowly lanceolate, ellipsoid, to broadly ovoid, 4–40 mm long _____ **[numerous other species]**

VARIOUS FAMILIES

Previous and variable alterations of Mark Catesby's name in honorific epithets are not sanctioned in the Code and are here (re)corrected, standardized, and simplified

Primary authors: Alan S. Weakley and Derick B. Poindexter

Gronovius (Sp. Pl. 1:109, 1753) was the first author to pay homage to Mark Catesby (1683–1749) with the description of the genus *Catesbaea* in his treatment of the genus in Linnaeus' *Species Plantarum*. (Linnaeus cited Gronovius in Gen. Pl. as the author of the treatment of *Catesbaea*). Since then, fifteen plants have been named from various genera in honor of Mark Catesby at species rank, but most in forms that contradict the Shenzhen Code (Turland et al. 2018). Basionyms (some with additional later combinations) honoring Catesby are diverse in their formation, with two forms of substantival epithets ("*catesbei*" and "*catesbaei*") and three forms of adjectival epithets ("*catesbeiana*," "*catesbyana*," and "*catesbianum*"), essentially because authors have either left the last vowel of his name unmodified ("y"), or variously altered it to "ae," "ei," "e," or "i," before adding the appropriate inflection. These alterations were based on the concept (in this older era of botanical nomenclature) of the necessity or desirability of "latinizing" letters not used in classical Latin (in this case "y")—but this concept is not sanctioned in the modern Code (Turland et al. 2018).

A counter argument is that Catesby's name exists in a "well-established latinized form" since Gronovius's original publication of *Catesbaea* (as *Catesbaea*), a derivative of the implicit latinization of surname "Catesby" as "Catesbaeus." However, according to Art. 60.9: "When changes in spelling by authors who adopt personal, geographical, or vernacular names in nomenclature are intentional latinizations, they are to be preserved, **except**, in epithets formed from personal names, when they concern (a) only a termination to which Art. 60.8 applies, or (b) **personal names in which the changes involve only (1) omission of the terminal vowel or terminal consonant or (2) conversion of the terminal vowel to a different vowel, for which the omitted or converted letter is to be restored**" [emphasis here is our own]. Furthermore, Art. 60.9 Ex. 31 includes an example similar to that of Catesby, where the implicit latinization of S.B. Buckley as "Buckleius" is "not acceptable under Art. 60.9" and is correctly cited with restoration of the "y" as in *Hypericum buckleyi* M.A. Curtis.

Though generic epithets are not as constrained by rules of substantival or adjectival agreement (discussed below), the genus name *Catesbaea* has not been conserved and should be corrected per Art. 60.9 to *Catesbya*.

Specific epithets based on Catesby include adjectival epithets and substantival epithets.

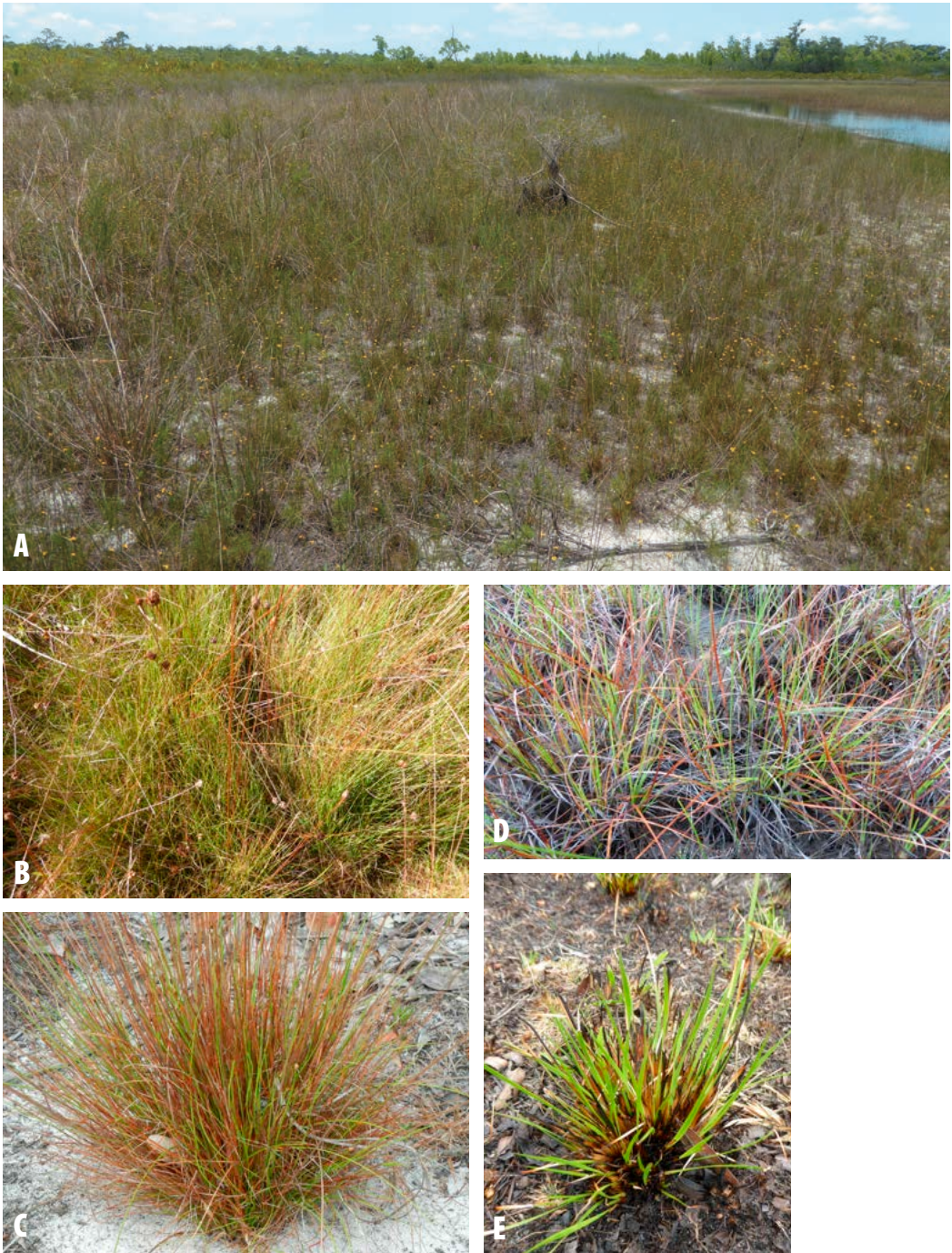


FIG. 9. *Xyris stenotera* and *Xyris elliotii* in natural habitat. **A.** *Xyris stenotera* zone of sandy fluctuating pond margin, Polk County, FL, 31 May 2020. Note that *Xyris stenotera* extends waterward past the last *Hypericum fasciculatum*, with adventitious rooting to 50 cm above the surface. **B.** *Xyris stenotera* dominant in unburned, small, sandy depression marsh within deep xeric oak scrub, Highlands County, FL, 15 Jan 2020. **C.** *Xyris stenotera* clump in broad, shallow, sandy depression marsh in the Ocala National Forest, Marion County, FL, 14 Jun 2011. **D.** *Xyris elliotii* in unburned wet-mesic longleaf pine savanna, Highlands County, FL, 27 Feb 2018. **E.** *Xyris elliotii* clump, 21 days post burn in wet-mesic longleaf pine savanna, Polk County, FL, 19 May 2020.

Adjectival epithets:

Calystegia catesbeiana Pursh
Clematis catesbyana Pursh
Laurus catesbyana Michx.
Zanthoxylum catesbianum Raf.

Substantival epithets:

Andromeda catesbaei Walter
Cuttera catesbei Raf.
Echites catesbaei G. Don
Ficus catesbaei Steud.
Gentiana catesbaei Walter
Lilium catesbaei Walter
Lyonia catesbaei K. Koch
Quercus catesbaei Michx.
Sarracenia catesbaei Elliott
Silene catesbaei Walter
Trillium catesbaei Elliott

Under Art. 60.8.(c), adjectival epithets based on “Catesby” should be formed “by adding -an- plus the nominative singular inflection appropriate to the gender of the generic name.” Further, “terminations contrary to the above standards are treated as errors to be corrected to -[i]i, -[i]ae, -[i]ana, -[i]anus, -[i]anum, -[i]arum, or -[i]orum, as appropriate (see also Art. 32.2). However, epithets formed in accordance with Rec. 60C.1 are not correctable (see also Art. 60.9).” Rec. 60C.1 provides for the non-correction of epithets “that possess a well-established latinized form,” but the diverse modifications of the ending of “Catesby” undermine the suggestion that any of the latinized forms was “well-established.”

The diversity of forms of the specific epithets is necessarily corrected under the Code following Art. 60.8. “[S]ubstantival epithets are formed by adding the genitive inflection appropriate to the gender and number of the person(s) honoured,” thus “*catesbei*” and “*catesbaei*” are corrected to “*catesbyi*.” “[A]djectival epithets are formed by adding -an- plus the nominative singular inflection appropriate to the gender of the generic name,” thus “*catesbeiana*” is corrected to “*catesbyana*” and “*catesbianum*” is corrected to “*catesbyanum*.”

The effect of the correction of these basionyms on names currently in wide use are listed here:

Calystegia catesbeiana Pursh or *Convolvulus catesbeianus* (Pursh) Elliott → *Calystegia catesbyana* Pursh or *Convolvulus catesbyanus* (Pursh) Elliott
Clematis catesbyana Pursh → no change
Gentiana catesbaei Walter → *Gentiana catesbyi* Walter
Lilium catesbaei Walter → *Lilium catesbyi* Walter
Sarracenia × *catesbaei* Walter (pro species) → *Sarracenia* × *catesbyi* Walter (pro species)
Silene catesbaei Walter → *Silene catesbyi* Walter
Trillium catesbaei Elliott → *Trillium catesbyi* Elliott

VARIOUS FAMILIES

The correct spelling for the epithets “*margaretta*” and “*margarettae*” used by W.W. Ashe honoring Margaret Haywood Henry (Wilcox) (Ashe) in the genera *Castanea*, *Crataegus*, *Quercus*, *Rhododendron*, *Robinia*, *Vaccinium*, and *Viburnum*

Primary authors: Alan S. Weakley and Carol Ann McCormick

William Willard Ashe (1872–1932) named seven taxa in honor of his cousin, Margaret Haywood Henry (Wilcox) (Ashe) (1856–1939), who later became his fiancée and then his wife; as Fernald (1950) rather archly put it about the *Quercus*, “chivarously named for Margaret Henry Wilcox, who two years later became Mrs. Ashe.” The basionym epithets and their year of publication are as follows (several of the basionyms have been subsequently recombined): *Quercus minor* var. *margaretta* W.W. Ashe 1894, *Crataegus margaretta* W.W. Ashe 1899 [1900], *Vaccinium margarettae* W.W. Ashe 1918, *Rhododendron carolinianum* var. *margarettae* W.W. Ashe 1921, *Castanea pumila* var. *margaretta* W.W. Ashe 1922, *Robinia margaretta* Ashe 1922, and *Viburnum rufidulum*

var. *margarettae* W.W. Ashe 1924. Following their publication, some of these epithets have been variously corrected in subsequent publications, nomenclators, and webpages to “*margarettae*” or “*margarettiae*.”

Ashe used variable construction, capitalization, and orthography in these epithets presumed to honor Margaret. He usually (in five cases) used the spelling “*margaretta*,” while in two cases he used “*margarettae*.” In four cases, he capitalized the epithet and in three he used a lower case “m.” He invariably added an extra “-t-” to the root, most likely to assure that the “e” in the last syllable of Margaret would retain a “short e” sound when pronounced with the following vowel(s) “a” or “ae.” There seems no basis to consider that Ashe was using “*Margaretta*” as a noun in apposition, particularly as in a minority of cases he used the spelling “*margarettae*,” apparently intended as an adjectival form (genitive inflection with -ae ending for a singular female honoree), and a standard Latinization of the English name Margaret would be Margarita. Other honorifics for women in his extensive list of species named all use an “-ae” genitive form (though those honoring Ms. Caroline Dormon are wrongly formed under the provisions of the Code, lacking the -i- stem augmentation): *Crataegus mcgeae* W.W. Ashe 1902, *Castanea margarettae* f. *dormonae* W.W. Ashe 1927, and *Crataegus aestivalis* var. *dormonae* W.W. Ashe 1928. We can thus conclude with some certainty that Ashe intended to make substantival epithets based on a personal name in the genitive inflection.

Article 60.8. of the Shenzhen Code (Turland et al. 2018) addresses the proper derivation of epithets derived from personal names: “60.8(b). If the personal name ends with a consonant (but not in -er), substantival epithets are formed by adding -i- (stem augmentation) plus the genitive inflection appropriate to the gender and number of the person(s) honoured (e.g., *lecard-ii* for Lecard (m), *wilson-iae* for Wilson (f), *verlot-iorum* for the Verlot brothers, *braun-iarum* for the Braun sisters, *mason-iorum* for Mason, father and daughter).” Article 60.8. goes on to state that “terminations contrary to the above standards are treated as errors to be corrected to -[i]i, -[i]iae, -[i]ana, -[i]anus, -[i]anum, -[i]arum, or -[i]orum, as appropriate (see also Art. 32.2).”

Under these provisions of the Code, these seven epithets and later combinations based on them should be corrected and standardized to “*margaretiae*.” The epithets that have the most important current consequence are *Quercus margaretiae* (W.W. Ashe) Small, *Crataegus margaretiae* W.W. Ashe, and *Robinia xmargaretiae* W.W. Ashe (pro sp.), which are all in current usage for plants of eastern North America—though others of the names could come back into use in the future.

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