

THE *LIATRIS ELEGANS* GROUP (ASTEREAE): TAXONOMIC REVIEW

GUY L. NESOM

Research Associate

Academy of Natural Sciences of Drexel University

Philadelphia, Pennsylvania

guynesom@sbcglobal.net

ABSTRACT

Liatris elegans sensu stricto has been represented by two large and essentially disconnected population systems, one east and one west of the Mississippi River — the western system is recognized here as ***Liatris hesperelegans*** Nesom, **sp. nov.**, characterized by sessile heads, the eastern system as typical *L. elegans*. White-bracted variants have evolved both east and west of the Mississippi River — the western plants (Texas) have a coherent geography and apparently are significantly genetically isolated from *L. hesperelegans* and are treated as ***Liatris bridgesii*** (Mayfield) Nesom, **comb. et stat. nov.** — the eastern plants (Mississippi, Alabama, Florida, Georgia, South Carolina) have a distinct geography but are weakly isolated and intergrade with typical *L. elegans* and are maintained here as *L. elegans* var. *kralii* Mayfield. Populations in the western system with elongate corms are treated as ***Liatris carrizana*** (Gaiser) Nesom, **comb. et stat. nov.**, a Texas endemic allopatric with *L. hesperelegans* and *L. bridgesii*. A detailed distribution map is provided for each taxon and morphological variation in each is shown by a series of specimen images.

Mayfield's overview of the *Liatris elegans* group (2001) recognized one species with four infraspecific taxa — var. *elegans*, var. *carrizana*, var. *bridgesii*, and var. *kralii* — this concept was adopted for the Flora of North America treatment (Nesom 2006). These plants are distinct in the genus because of their petaloid phyllary apices, white corollas, and plumose pappus and have been recognized as sect. *Liatris* ser. *Elegantes* (Nesom 2005). In this view, typical *L. elegans* occurs from South Carolina to northern Florida and in a disjunct system from Texas and Louisiana north through Arkansas (Fig. 1); the segregates have narrower distributions (Figs. 2-6).

Var. *carrizana* is pink-bracted and distinguished by a unique corm morphology and isolated geography. White-bracted plants (var. *bridgesii* in the western system, var. *kralii* in the eastern system) also occur, and Mayfield (2001, p. 598) noted that "The geographic integrity and populational uniformity of [the white-bracted populations] suggests that selection for phyllary color has taken place within [the eastern and western population systems of *L. elegans*]. A recognizable suite of other morphological features supports their recognition but the presence of intergradation of both sets of populations with var. *elegans* further suggests that recognition at an infraspecific rank rather than specific rank is warranted. I have chosen variety to indicate that intermediate populations occur along the margins of these novel taxa."

Since Mayfield's study, additional and more easily available collections provide a better knowledge of the geography and variability of the segregates. The review here is largely in agreement with Mayfield's observations but differs in the assessment of biological status and formal taxonomy.

1. LIATRIS ELEGANS (Walt.) Michx., Fl. Bor.-Amer. 2: 91. 1803. *Stahelina elegans* Walt., Fl. Carol., 202. 1788. Protologue: [no collection data]. **NEOTYPE** (Ward 2008, p. 484): **South Carolina**. Berkeley Co.: WNW of McClellanville, Francis Marion National Forest, Halfway Creek Road (USFS Road 654S), Round Pond in Wambah Swamp, mixed *Quercus-Pinus palustris* forest around pond in sandy soil, 25 Sep 2000, *D.E. Boufford & S.H. Shi* 30292 (A, Fig. 8).

a. ***Liatris elegans* var. *elegans***

Laciniaria flabellata Small, Bull. Torrey Bot. Club 25: 472. 1898. *Liatris flabellata* (Small) K. Schum., Just's Bot. Jahresber. 26: 378. 1900. *Liatris elegans* var. *flabellata* (Small) Gaiser, Rhodora 48: 345. 1946. *Liatris elegans* forma *flabellata* (Small) Mayfield, Sida 20: 603. 2001. **TYPE: South Carolina.** Beaufort Co.: St. Helena Island, dry barrens, Sept 1894, A. Cuthbert *s.n.* (holotype: NY; isotype: NY). Types as cited by Mayfield (2001), not seen.

b. ***Liatris elegans* var. *kralii*** Mayfield, Sida 20: 601. 2001. **TYPE: Alabama.** Lee Co.: 6 mi S of Auburn, locally abundant in open pine woods, 23 Sep 1899, *F.S. and E.S. Earle 94* (holotype: KSC; isotypes: F, GH-Fig. 9, MO!, ND, NY, US image).**2. LIATRIS HESPERELEGANS** Nesom, **sp. nov.** **TYPE: Texas.** Shelby Co.: 12 mi E of Center, roadside near Boles Field, 21 Sep 1978, *J. McGrath 30* (holotype: BRIT, Fig. 19).

Similar to *Liatris elegans* *sensu stricto* in its globose corms and lavender to pink or magenta phyllary apices but distinct in its sessile heads and geographic distribution west of the Mississippi River.

3. LIATRIS BRIDGESII (Mayfield) Nesom, **comb. et stat. nov.** *Liatris elegans* var. *bridgesii* Mayfield, Sida 20: 598. 2001. **TYPE: Texas.** Milam Co.: 2.6 mi W of Rockdale on US 79 from its jct with FM 487, S side of RR track, on sand ridge dominated by *Quercus marilandica*, *Q. stellata*, and *Carya texana*, 505 ft, 6 Sep 1992, *M.H. Mayfield 1549* (holotype: TEX, Fig. 20; isotypes: F, FLAS, GA image, GH image, MO!, NCU!, NY image, US image).

Liatris elegans forma *fisheri* Steyermark, Field Mus. Nat. Hist., Bot. Ser. 11: 275. 1936. **TYPE: Texas.** Coryell Co.: 4 mi S of Copperas Cove, near and on the hwy, hillsides, 400 ft, 26 Aug 1934, *G.L. Fisher s.n.* (holotype: F image; isotype: F image).

Mayfield (2001) noted that the label data probably are wrong — he found no plants of the *Liatris elegans* group or suitable habitat in the vicinity of Copperas Cove, nor has there been a subsequent collection of *L. elegans* from Coryell County. Fisher's plants clearly represent the same entity as *L. bridgesii*.

Laciniaria flabellata Small, Bull. Torrey Bot. Club 25: 472. 1898. *Liatris flabellata* (Small) K. Schum., Just's Bot. Jahresber. 26: 378. 1900. *Liatris elegans* var. *flabellata* (Small) Gaiser, Rhodora 48: 345. 1946. *Liatris elegans* var. *elegans* forma *flabellata* (Small) Mayfield, Sida 20: 603. 2001. **TYPE: South Carolina.** Beaufort Co.: St. Helena Island, dry barrens, Sept 1894, A. Cuthbert *s.n.* (holotype: NY; isotype: NY).

Mayfield (2001, p. 603): "The only feature separating this plant from var. *elegans* is its emarginate to truncate, relatively broadened (flabellate) phyllary apices. From the same locality (St. Helena Island, S.C.) numerous other specimens collected by Cuthbert at NY and FLAS have phyllary morphology as is typical for the var. *elegans*. Thus, I view the type specimen as consisting of a single plant from a locality with plants otherwise identical to the var. *elegans*."

4. LIATRIS CARRIZANA (Gaiser) Nesom, **comb. et stat. nov.** *Liatris elegans* var. *carrizana* Gaiser, Rhodora 48: 344. 1946. **TYPE: Texas.** Medina Co.: 3 mi SW of Devine, 12 Oct 1934, *V.L. Cory 11726* (holotype: GH, Fig. 21).***Liatris hesperelegans***

Liatris hesperelegans is differentiated by its geography (Fig. 2) and morphology. Sessile heads also are produced by *L. bridgesii* and *L. carrizana*, indicating that the western plants form a single clade (Fig. 1). Plants east of the Mississippi River have pedunculate heads. Peduncle length seems a subtle distinction, but even though variants occur (see notes in Figs. 10, 21, 28, 29, and 30) the difference is consistent and the hypothesized phylogeny of *L. hesperelegans* — closer to the other two western species than to *L. elegans sensu stricto* — supports its recognition at specific rank.

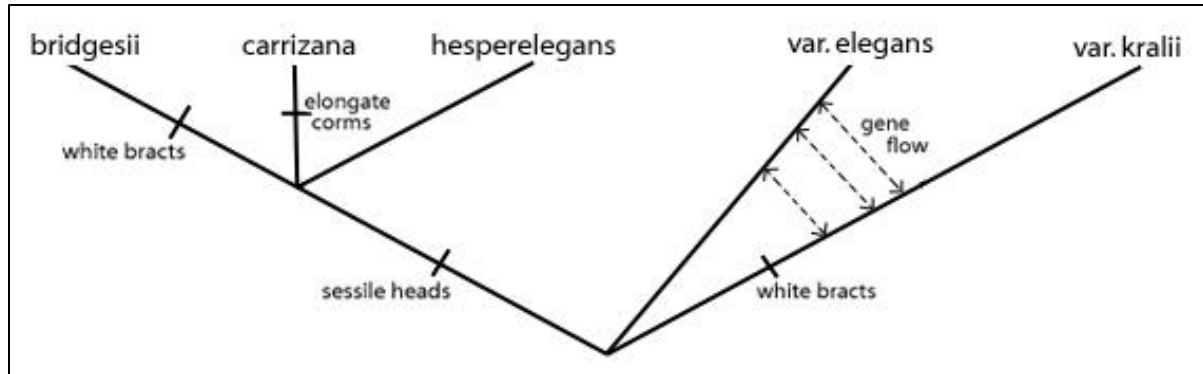


Figure 1. Hypothetical phylogeny of the *Liatris elegans* group. Globose corms, pedunculate heads, and pink bracts are primitive conditions in this analysis.

Liatris elegans* var. *elegans* and var. *kralii

The white-bracted plants identified as *Liatris elegans* var. *kralii* apparently originated in parallel with of the white-bracted *L. bridgesii*, in agreement with Mayfield's observation.

Var. *kralii* has a distinct geography, completely within the range of typical *Liatris elegans* (Fig. 3), but intermediacy between the two suggests that genetic isolation is weaker than between *L. bridgesii* and *L. hesperelegans* — hybridization and introgression appear to have been significant after the evolutionary divergence of "kralii." Mayfield (2001) observed that some populations of var. *kralii* are consistent in bract color, but infrapopulation variation in some regions is enough to make identifications arbitrary. Field observations are needed in a further and more critical assessment of the biological status of var. *kralii*.

Figures 10-18 show variation in *Liatris elegans* sensu stricto in counties across its range. Var. *kralii* occurs in sympatry with the typical expression in some counties but intermediates occur and without field observations (or indication on the collection labels), population structure is unknown.

Liatris bridgesii

Liatris bridgesii in the eastern counties of its range is sympatric with *L. hesperelegans* (Fig. 7) and occurs in similar habitats; in its western counties, *L. bridgesii* occurs alone among the 'elegans' entities. In sympatry with *L. hesperelegans*, some intermediates (mostly in phyllary color) are encountered, but *L. bridgesii* mostly maintains its typical morphology, suggesting that significant isolation is in effect. Collections identified here as *L. bridgesii* from along the southern extremity of its range, perhaps introgressants, produce long, recurving phyllary apices that are pinkish or otherwise lightly anthocyanic (e.g., Fig. 34; see map in Fig. 4). Similar *L. bridgesii* variants do not occur elsewhere in the range of *L. hesperelegans*.

Plants from Vernon Par., Louisiana (Fig. 30), have phyllary morphology of *Liatris hesperelegans*, but some have phyllaries mostly green-herbaceous to the very tip, with very narrow, white margins (see contrasts in Fig. 31), suggesting influence from *L. bridgesii*. All seem best identified as *L. hesperelegans*, with the acknowledgment that IDs of putative introgressants may be arbitrary.

Liatris carrizana

Liatris carrizana does not occur in sympatry with *L. hesperelegans* or with *L. bridgesii*. Both *L. carrizana* and *L. bridgesii* occur abundantly in Bastrop County, where they are divided in geography (Figs. 6, 7) and morphology.

As noted by Mayfield, the elongate corm shape of *Liatris carrizana* is encountered in populational variants in some contiguous populations of otherwise typical *L. bridgesii*. Border populations of *L. carrizana* (Bastrop and Fayette cos.) with typically colored phyllaries sometimes produce near-globose corms (infrapopulational variation, e.g., Figs. 38-40).

Key to the taxa of ser. *Elegantes*

1. Involucres pedunculate.
2. Phyllary apices mostly lavender to pink or magenta ***Liatris elegans* var. *elegans***
2. Phyllary apices white to cream or light yellow ***Liatris elegans* var. *kralii***
1. Involucres sessile.
3. Corms elongate and tapering; phyllary apices lavender to pink or magenta ***Liatris carrizana***
3. Corms depressed-globose; phyllary apices either white to cream or light yellow or lavender to pink or magenta.
4. Phyllary apices white to cream or light yellow, elongate, stiffly recurving ***Liatris bridgesii***
4. Phyllary apices lavender to pink or magenta, relatively short, loosely erect . ***Liatris hesperelegans***

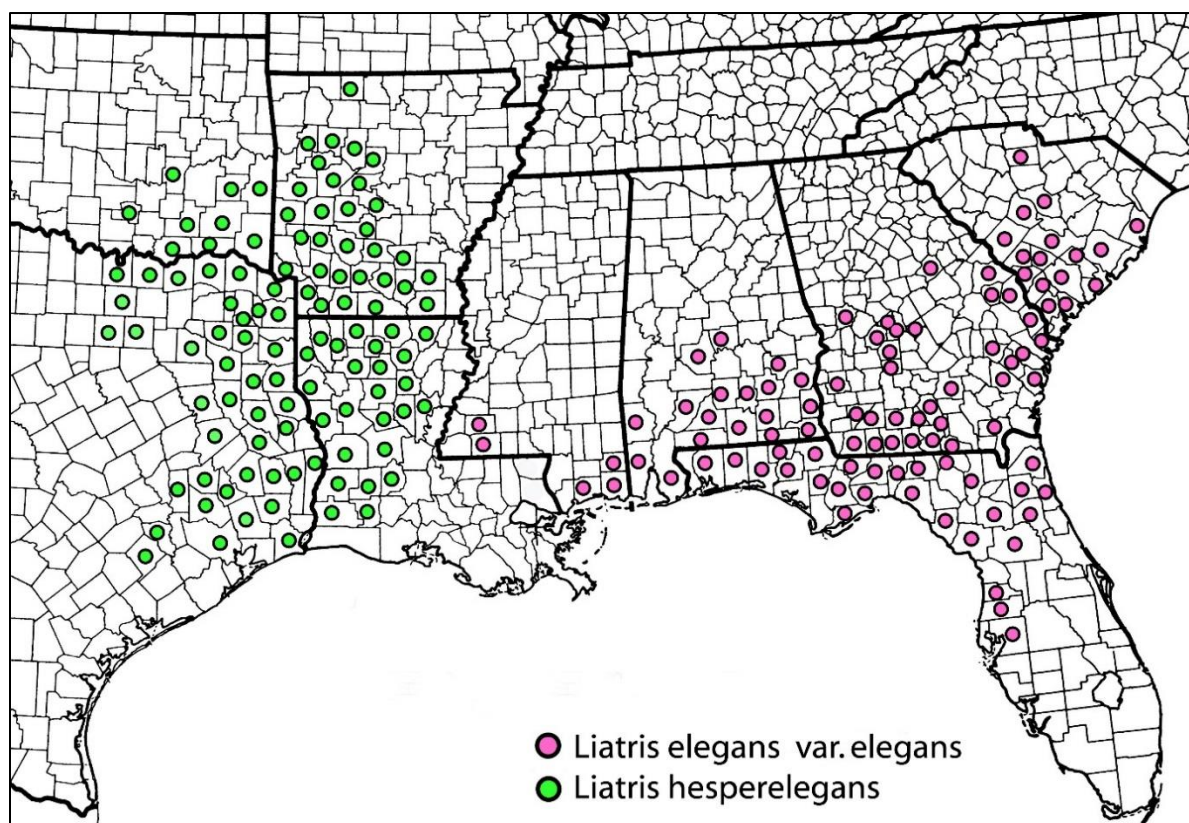


Figure 2. Distribution of *Liatris elegans* var. *elegans* and *L. hesperelegans*. Records are from various herbaria, mostly as compiled in SERNEC.

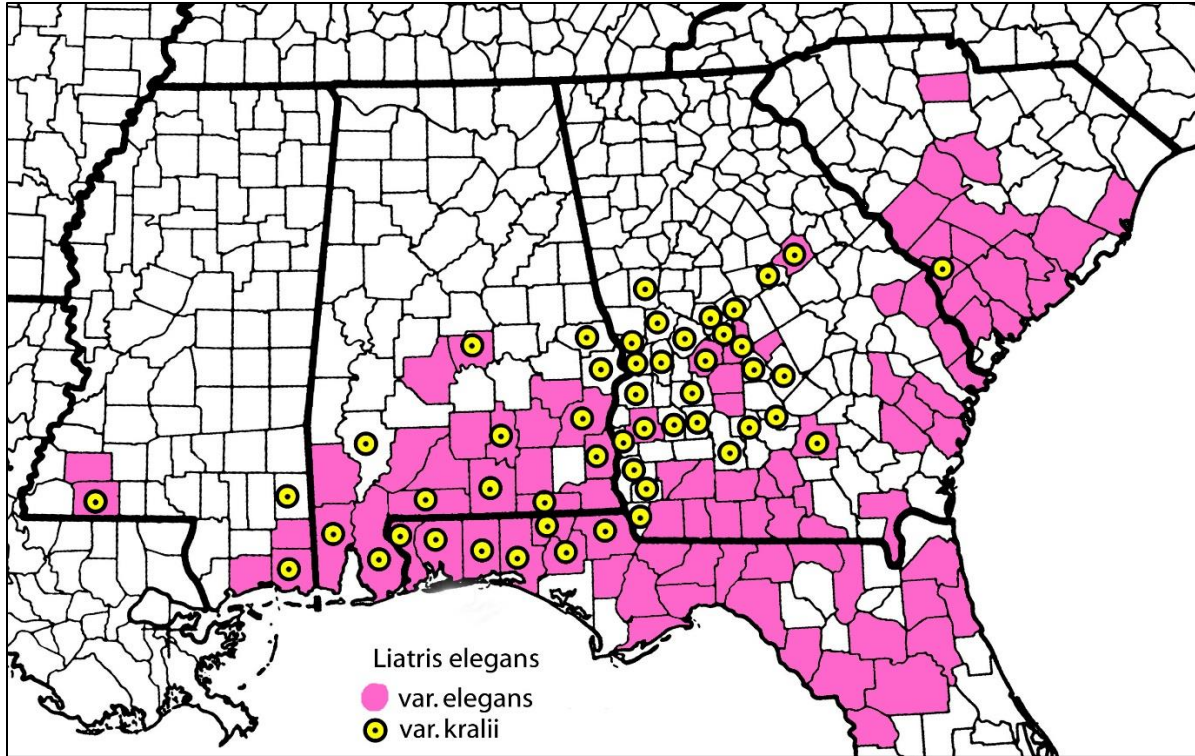


Figure 3. Distribution of *Liatris elegans* var. *elegans* and var. *kralii*.

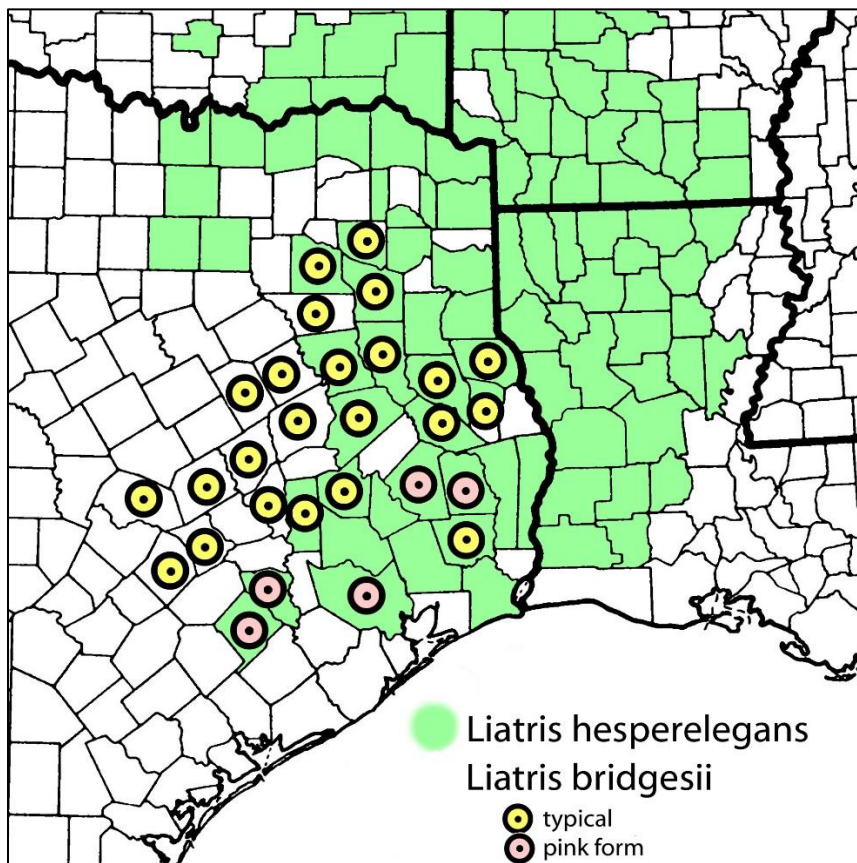


Figure 4. Distribution of *Liatris hesperalegans* (in part) and *L. bridgesii*.

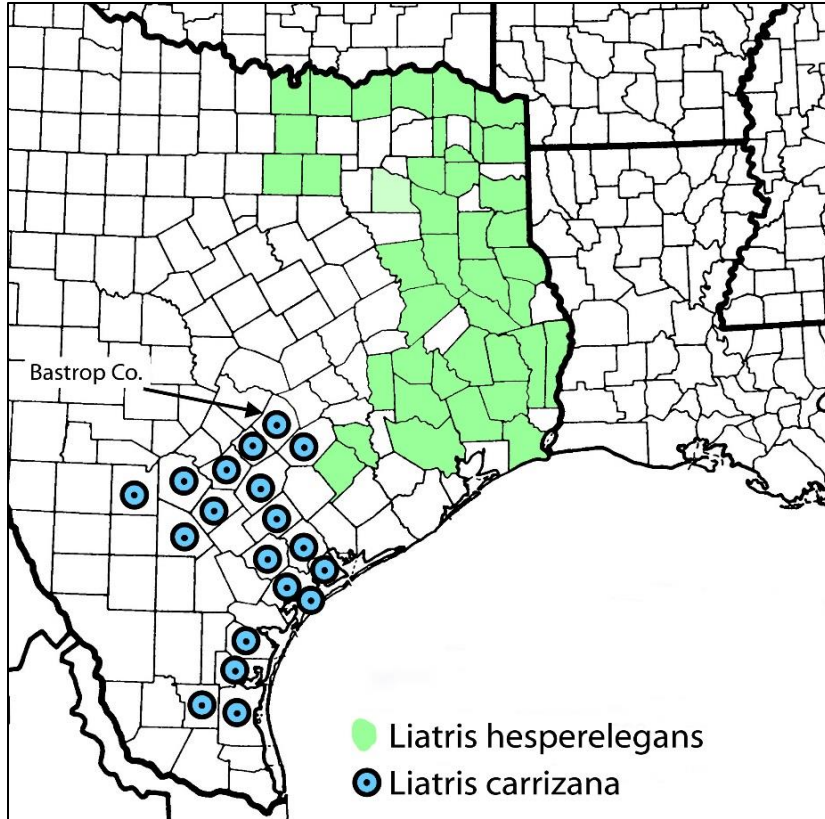


Figure 5. Distribution of *Liatris hesperelegans* in Texas and *L. carrizana*.

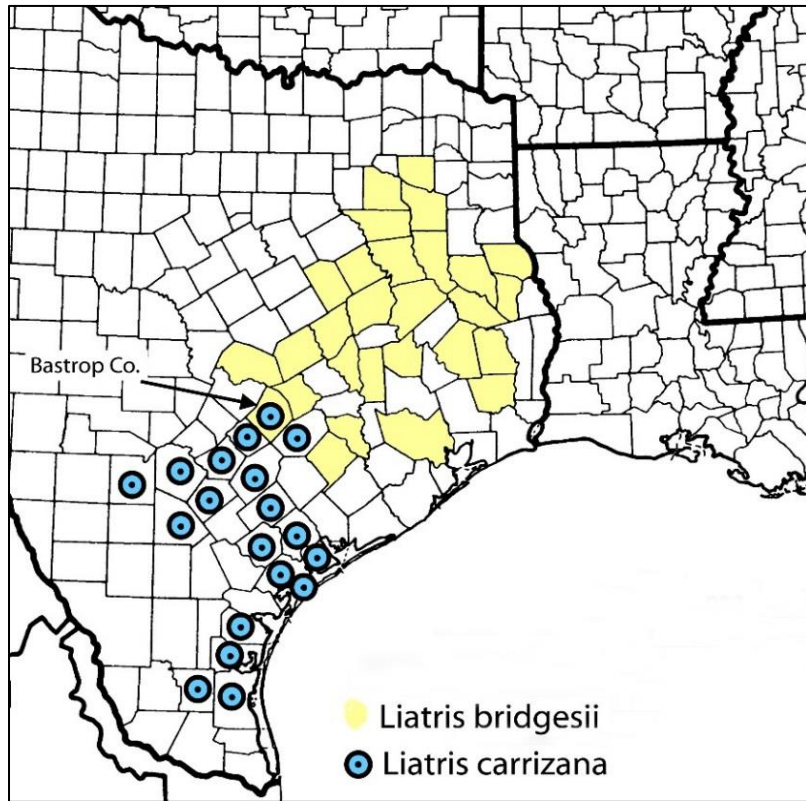


Figure 6. Distribution of *Liatris carrizana* and *L. bridgesii*. Details of sympatry are in Figure 7.

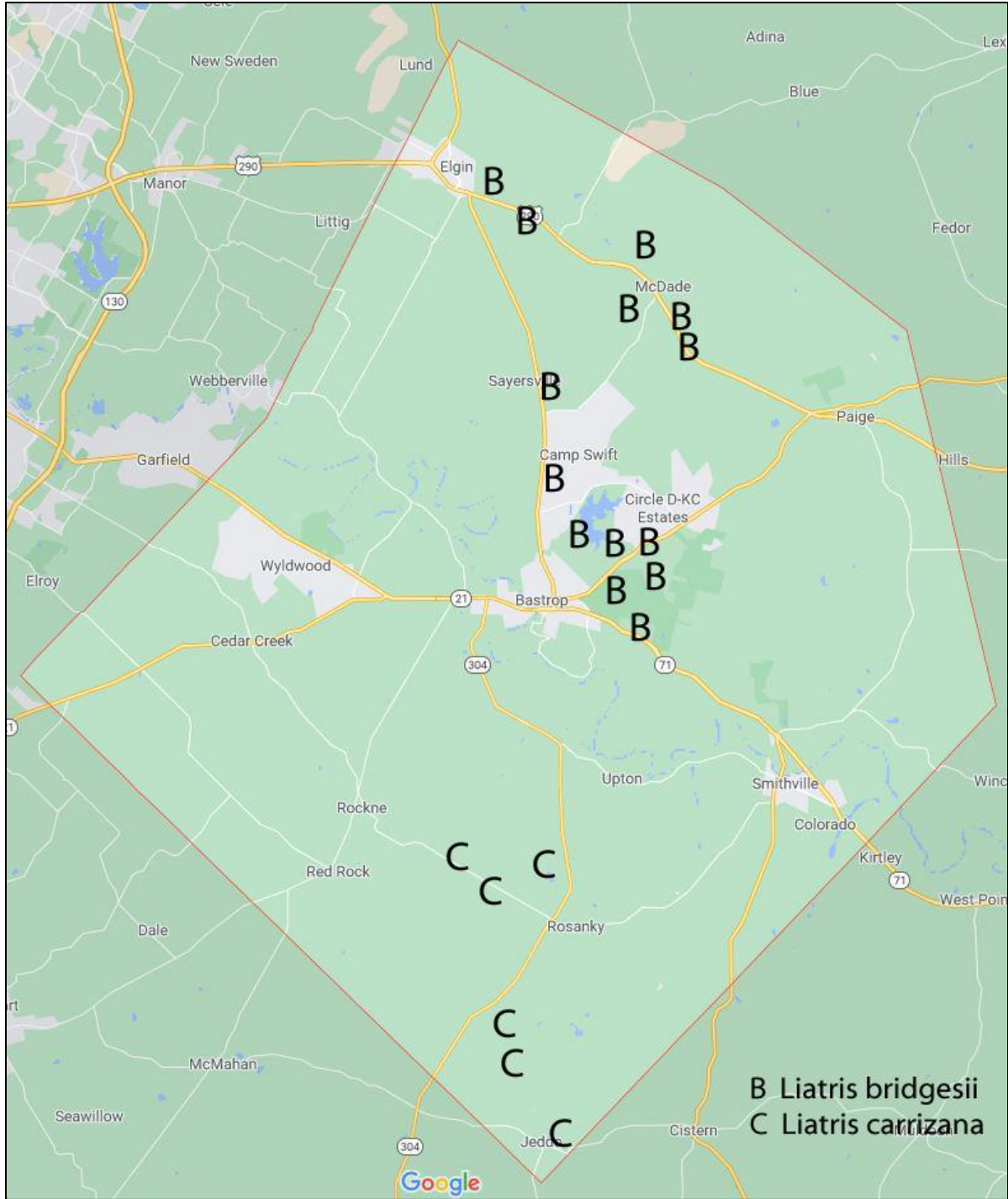


Figure 7. Distribution of *Liatrix carrizana* and *L. bridgesii* in Bastrop Co., Texas.

Map points are based on vouchers at TEX-LL and SMU-BRIT — *L. bridgesii*: Carr 31591, 34146; Correll 36369; Correll & Johnston 19596; Duval 266; Folsom 7711; Lipscomb 2636; Lodwick 362; Lott 4338; Mayfield 1160, 1116, 1486, 1585; Nesom 7498; Taylor 2816; Tharp 44503; Turner 94-119; Wheeler 679. *L. carrizana*: Mahler 8688; Mayfield 1501, 1504, 1510, 1511; Tharp & Graham s.n.



Figure 8. *Liatris elegans* var. *elegans*. Berkeley Co., South Carolina. Neotype (A) of *Staehelina elegans*.



Figure 9. *Liatris elegans* var. *kralii*. Lee Co., Alabama. From GH isotype.



Figure 10. *Liatris elegans*. Berkeley Co., South Carolina, variation among collections. Heads on left are nearly sessile.



Figure 11. *Liatis elegans*. Allendale Co., South Carolina, variation among collections. Center has white bracts of var. *kralii*.



Figure 12. *Liatris elegans*. Leon Co., Florida, variation among collections. Left has bracts of intermediate color.



Figure 13. *Liatris elegans*. Talbot Co., Georgia, variation among collections. Each has white bracts of var. *kralii*. Right has unusually short peduncles.



Figure 14. *Liatis elegans*. Jackson Co., Florida, variation among collections. Center has white bracts of var. *kralii*; left and right are intermediate in bract color.



Figure 15. *Liatris elegans*. Covington Co., Alabama, variation among collections. Each is intermediate in bract color.



Figure 16. *Liatis elegans*. Escambia Co., Florida, variation among collections. Middle has white bracts of var. *kralii*.



Figure 17. *Liatris elegans*. Jackson Co., Mississippi, variation among collections. Left has white bracts of var. *kralii*.



Figure 18. *Liatris elegans*. Amite/Franklin cos., Mississippi, variation among collections. Left has white bracts of var. *kralii*.



Figure 19. *Liatris hesperelegans*. Shelby Co., Texas, McGrath 30 (BRIT). Holotype.



Figure 20. *Liatris bridgesii*. Milam Co., Texas, Mayfield 1549 (TEX). Holotype of *L. elegans* var. *bridgesii*.



Figure 21. *Liatris carrizana*. Medina Co., Texas, Cory 11726 (GH). Holotype of *L. elegans* var. *carrizana*. Pedunculate heads on a damaged stem.



Figure 22. *Liatris hesperiegans*. Austin Co., Texas, Mayfield 1493 (NY).



Figure 23. *Liatris hesperelegans*. Colorado Co., Texas, Pickens 62 (BRIT).



Figure 24. *Liatris hesperiegans*. Bowie Co., Texas, Shinners 31023 (SMU).



Figure 25. *Liatris hesperiegans*. Bowie Co., Texas, Correll 33575 (NY).



Figure 26. *Liatris hesperelegans*. Shelby Co., Texas, Massey 3359 (VSC).



Figure 27. *Liatris hesperelegans*. Smith Co., Texas, Cory 56839 (SMU).



Figure 28. *Liatris hesperelegans*. Hardin Co., Texas, Atha 12885 (NY). Perhaps with influence of *L. bridgesii*. Peduncles are sometimes produced on damaged stems or (like this plant) recumbent stems.



Figure 29. *Liatris hesperiegans*. Jasper Co., Texas, Carr 11367 (TEX). Perhaps with influence of *L. bridgesii*. Some heads on this abnormal inflorescence are short-pedunculate.



Figure 30. *Liatris hesperelegans*. Vernon Par., Louisiana, Urbatsch 6003 (LSU). Variant with short peduncles, but see others from Vernon Parish with sessile heads in Fig. 31.

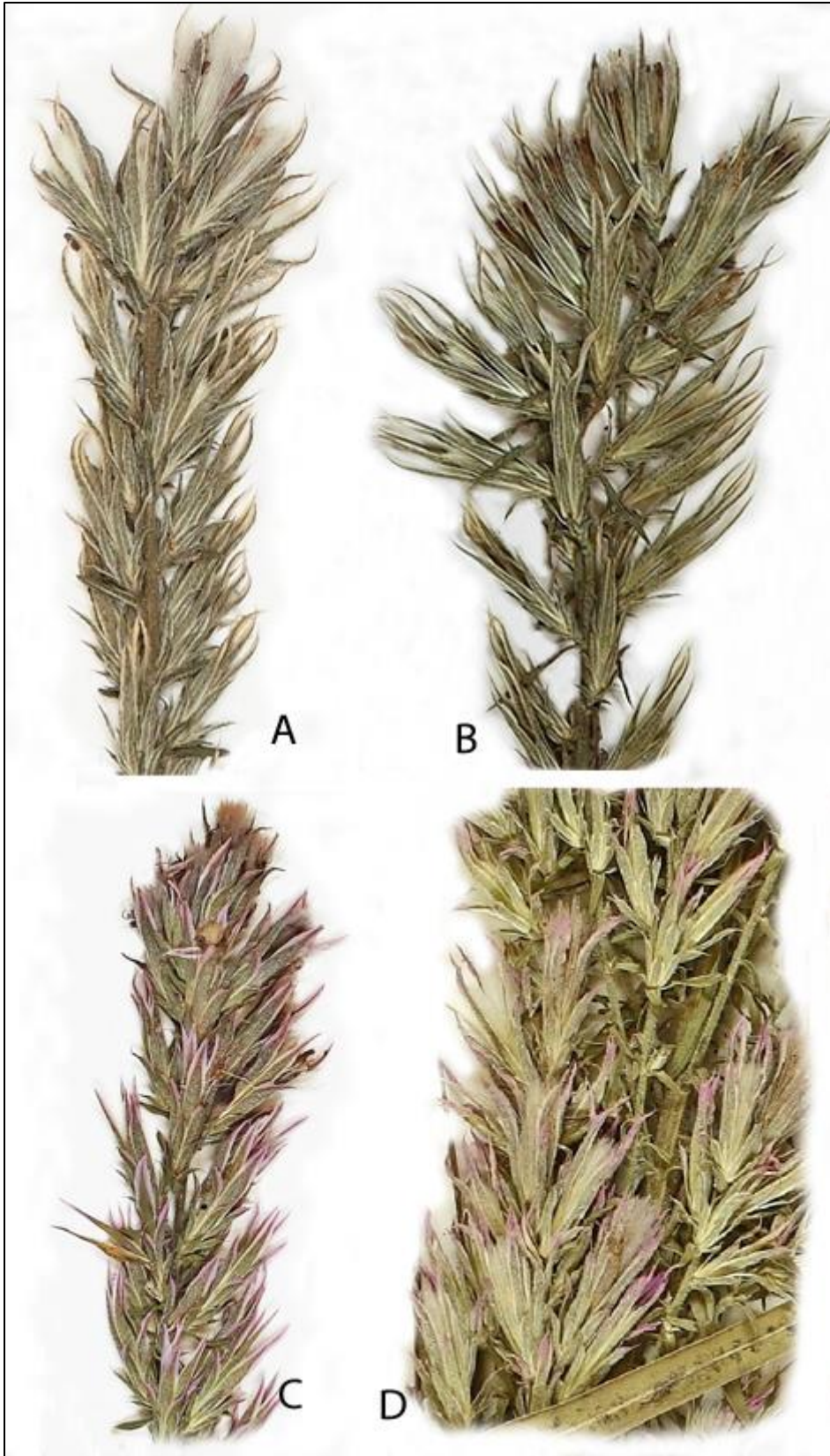


Figure 31. *Liatris hesperelegans*. Vernon Par., Louisiana. A. Olson 282 (LSU). B. Olson 328 (LSU). C. Urbatsch 5987 (LSU). D. Thomas 101,335 (NLU). A and B perhaps with influence of *L. bridgesii*.



Figure 32. *Liatris bridgesii*. Lee Co., Texas, Mayfield 1118 (TEX).



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HERBARIUM OF SOUTHERN METHODIST UNIVERSITY

Liatris elegans (Walt.) Michx.

Smith County, Tyler State Park, in sandy field
near office.

R. J. Fleetwood #12518

Sept. 25, 1977

Det.: B. Lipscomb Aug 1978

Figure 33. *Liatris bridgesii*. Smith Co., Texas, Fleetwood 12518 (BRIT).

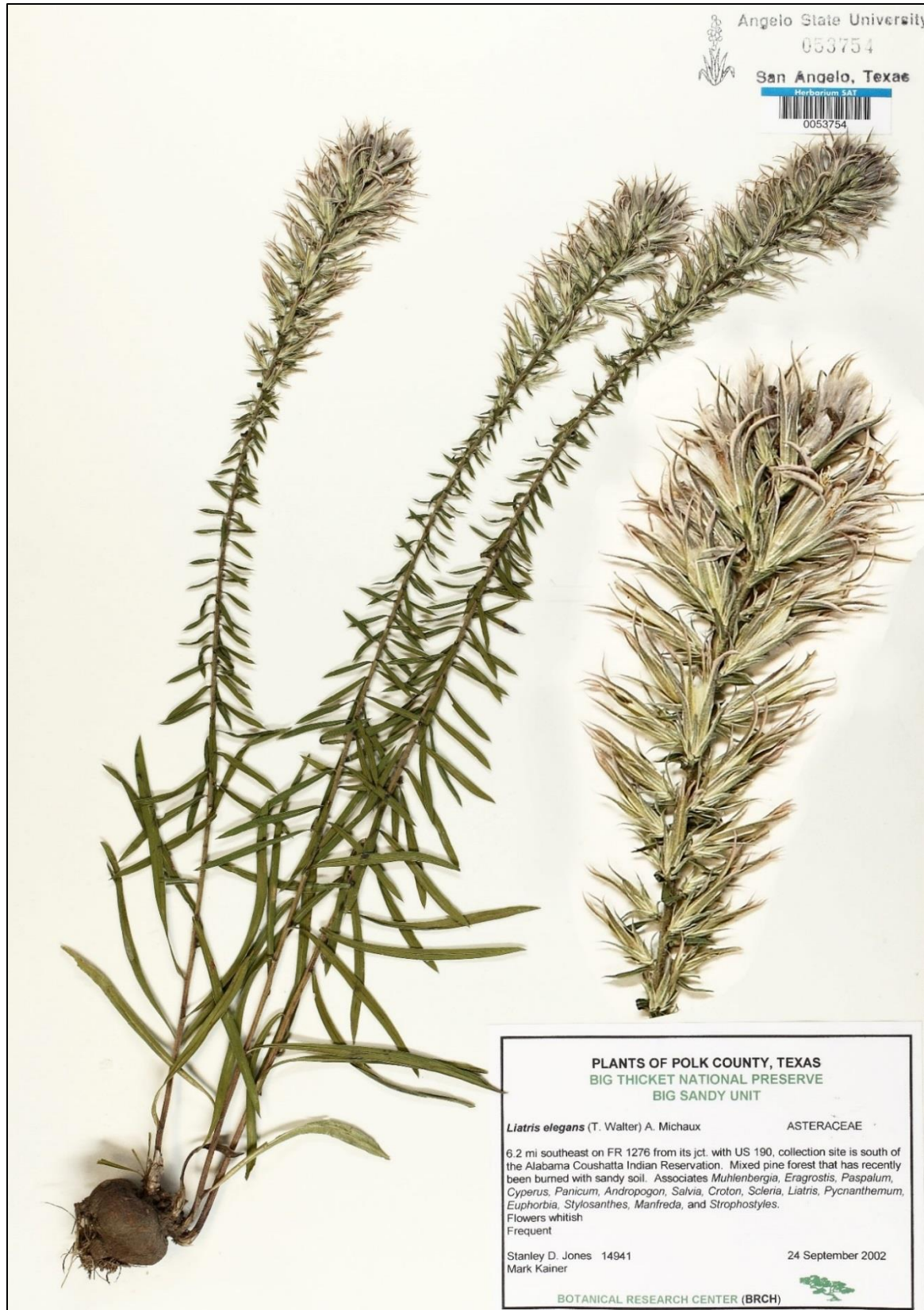


Figure 34. *Liatris bridgesii*. Polk Co., Texas, Jones 14941 (SAT). Perhaps with influence of *L. hesperelegans*.



Figure 35. *Liatris bridgesii*. Bastrop Co., Texas, Lott 4338 (TEX). Typical globose corm.



Figure 36. *Liatris bridgesii*. Bastrop Co., Texas, *Lodwick* 362 (BRIT). Elongate corms are unusual in *L. bridgesii* and probably reflect genetic influence of *L. carrizana*.



Figure 37. *Liatris carrizana*. Bastrop Co., Texas, Mayfield 1511 (TEX). Collection labels for Figs. 37, 38, and 39 note that corm shape varies within the population.



Figure 38. *Liatris carrizana*. Bastrop Co., Texas, Mayfield 1510 (TEX).



Figure 39. *Liatris carrizana*. Fayette Co., Texas, Mayfield 1500 (NY).

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