

# THE PLUMBAGINACEAE IN THE FLORA OF THE SOUTHEASTERN UNITED STATES

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## ABSTRACT

The Plumbaginaceae is represented in the native southeastern flora by *Limonium carolinianum*, *Limonium limbatum*, and *Plumbago scandens*. *Plumbago auriculata* is widely cultivated and has become naturalized. This paper describes, illustrates, and maps these species in the southeastern flora.

Las Plumbagináceas están representadas en la flora nativa del sureste por *Limonium carolinianum*, *Limonium limbatum*, y *Plumbago scandens*. *Plumbago auriculata* es cultivado ampliamente y se ha naturalizado. En este papel se describen, ilustran, y presentan mapas de distribución para estas cuatro especies para la flora del sureste.

The Plumbaginaceae contains 12 genera and about 400 species distributed throughout the world. It is best developed in the Mediterranean and the Middle East, mostly in xerophytic situations, on saline and calcareous soils (Luteyn 1990). In the United States, three genera, *Armeria*, *Limonium*, and *Plumbago*, occur naturally. *Limonium* is either a salt marsh plant with one species found along the entire Atlantic and Caribbean seaboard [*L. carolinianum* (Walter) Britton] and another along the Pacific coast from southern California to northern Oregon [*L. californicum* (Boiss.) Heller], or an inland species in salt flat areas in Texas, Oklahoma, New Mexico, Arizona, and northern Mexico (*L. limbatum* Small) (Luteyn 1976). Several species are cultivated and used in dried floral arrangements; two of these have escaped and become naturalized in southern California [viz., *L. perezii* Hubb. and *L. sinuatum* (L.) Miller]. *Plumbago scandens* L. is native to southern Florida, Texas, and Arizona, and ranges south through Central and South America. *Plumbago auriculata* Lam. (= *P. capensis* Thunb.), a native of South Africa, is widely cultivated and has become naturalized locally in Florida. In the United States, *Armeria maritima* Willd. is native on bluffs and sandy places along the Pacific coast as far south as San Luis Obispo County, California. Several other species of *Armeria* are cultivated, mostly as rock garden plants.

This treatment was originally prepared in 1976 (Luteyn, in press) for the "Vascular Flora of the Southeastern United States" (Massey et al., Editorial Board). It follows the basic format for that flora as outlined in Radford et

al. (1967), although herein I have included illustrations and distributional maps. For geographical completeness, I have also included the entire state of Texas within the range of coverage fully realizing that some parts of the state (specifically that west of the 100th meridian) may not be phytogeographically "southeastern."

## TAXONOMY

### PLUMBAGINACEAE. THE LEADWORT FAMILY

Perennial herbs, subshrubs, or climbing plants. Leaves simple, alternate, basal or cauline, entire; petioled with bases persistent and often sheathing the stem; exstipulate. Inflorescence of terminal or axillary racemes or panicles, often spike-like; floral nodes bracteate. Flowers perfect, actinomorphic, 5-merous, hypogynous, bracteate, homostylous or heterostylous; calyx synsepalous, plicate, 5-ribbed, sepals scarious; corolla sympetalous or of nearly distinct petals, marcescent, exerted beyond the calyx, lobes convolute-imbricate; stamens 5, distinct, sometimes epipetalous, then borne on the corolla tube opposite the lobes, anthers introrse; stigmas 5, linear, styles 1 or 5, ovary 5-carpellate, 1-loculed, usually 5-ribbed, ovule solitary, anatropous to circinotropous. Fruit a capsule or utricle, partly or totally enclosed by the persistent calyx. Seed with straight embryo, endosperm white, mealy.

Channell, R.B. & C.E. Wood, Jr. 1959. The genera of Plumbaginaceae of the southeastern United States. *J. Arnold Arbor.* 40:391–397.

1. Leaves basal; corolla of nearly distinct petals, less than 1 cm long; styles 5, distinct to base ..... 1. *Limonium*
1. Leaves cauline; corolla salverform, more than 1 cm long; style 1, with 5 stigmas ..... 2. *Plumbago*

#### 1. *LIMONIUM* Miller SEA-LAVENDER

Scapose, acaulescent, vegetatively glabrous herbs, with short to elongate, thick taproots. Leaves basal, equitant, coriaceous, long attenuate. Inflorescence of terminal panicles or corymbs, with the ultimate branch tips bearing secund, solitary or usually few-flowered spikelets. Flowers homostylous, hypogenous, sessile or nearly so, subtended by 3 (or more) sheathing bracts; calyx tubular-funnelform, 5-ribbed, limb plicate, lobes oblong to triangular, usually with smaller intervening lobes or dentate-erose sinuses; corolla with petals nearly distinct, long-clawed; stamens adnate to the base of the corolla, included; styles 5, distinct to the base, with 5 linear-clavate, papillate stigmas. Fruit a brownish-green utricle, usually exerted from the persistent calyx, usually capped by the marcescent corolla and style bases.



Luteyn, J. L. 1976. Revision of *Limonium* (Plumbaginaceae) in eastern North America. *Brittonia* 28: 303–317.

1. Calyx limb erect at maturity; spikelets loosely to moderately or even densely aggregated; plants of coastal salt marshes or flats . . . . . 1. *L. carolinianum*
1. Calyx limb wide-spreading or flaring at maturity; spikelets always densely aggregated; plants of inland alkaline areas . . . . . 2. *L. limbatum*

1. *L. CAROLINIANUM* (Walter) Britton. — Stems 1–9.5 dm tall. Leaves elliptic, spatulate, obovate to oblanceolate, rarely linear or semiorbicular, 5–15 (30) cm long, 0.8–4 (7.5) cm wide, apex rounded or acute to retuse, deciduously cuspidate. Inflorescence with spikelets loosely to moderately densely aggregated, the floral internodes 0.5–10 mm long. Flowers perfect, rarely male-sterile, solitary or 2–3 (5) clustered, bracts 3–6 mm long; calyx obconic to funnelform, (3.8) 4.5–6.5 (7.5) mm long, tube glabrous to densely pilose along 1–5 ribs, limb erect at maturity, lobes oblong to narrowly triangular, 0.4–1.5 (2) mm long; petals lavender, rarely white. Fruit 3–5.5 mm long. (n = unreported) Spring, summer, early fall. Salt marshes and salt-flats along Atlantic and Gulf seacoasts. Figs. 1 and 2. Incl. *Limonium angustatum* (Gray) Small; *L. obtusilobum* Blake; *L. nashii* Small; *L. n.* var. *trichogonum* Blake; *L. n.* var. *t. f. albiflorum* (Raf.) House; *L. carolinianum* var. *angustatum* (Gray) Blake; *L. c.* var. *obtusilobum* (Blake) Ahles; *L. n.* var. *angustatum* (Gray) Ahles.

My studies (Luteyn 1972, 1976) including field observations from much of its extensive geographical range (Labrador and Bermuda to Tamaulipas, Mexico), indicate that numerous local populations have resulted in a polymorphic species. Morphological variation is almost continuous throughout the range, and therefore, the recognition of several taxa is unjustified. Elaboration of the different morphologies is unnecessary; however, a word about the reproductive biology is in order and may shed light on community structure. *Limonium carolinianum* reproduces sexually and is self-compatible (Baker 1953). Its seeds are dispersed by birds and ocean currents. However, seedlings are very rare, and the spread of populations is vegetative from the horizontal rhizomes and short laterals of the branched woody stock (pers. observ.). With time, extensive clones (each possibly with distinctive morphologies) may spread and coalesce within the community.

2. *L. LIMBATUM* Small. — Stems to 6 (10) dm tall. Leaves spatulate, oblong-spatulate, obovate to elliptic, 4–16 cm long, 1.5–6.5 cm wide, apex rounded or retuse, shortly mucronate. Inflorescence with spikelets distichously and densely aggregated, the floral internodes 0.5–3 mm long; calyx funnelform to salverform, 3.3–5 mm long, tube glabrous to

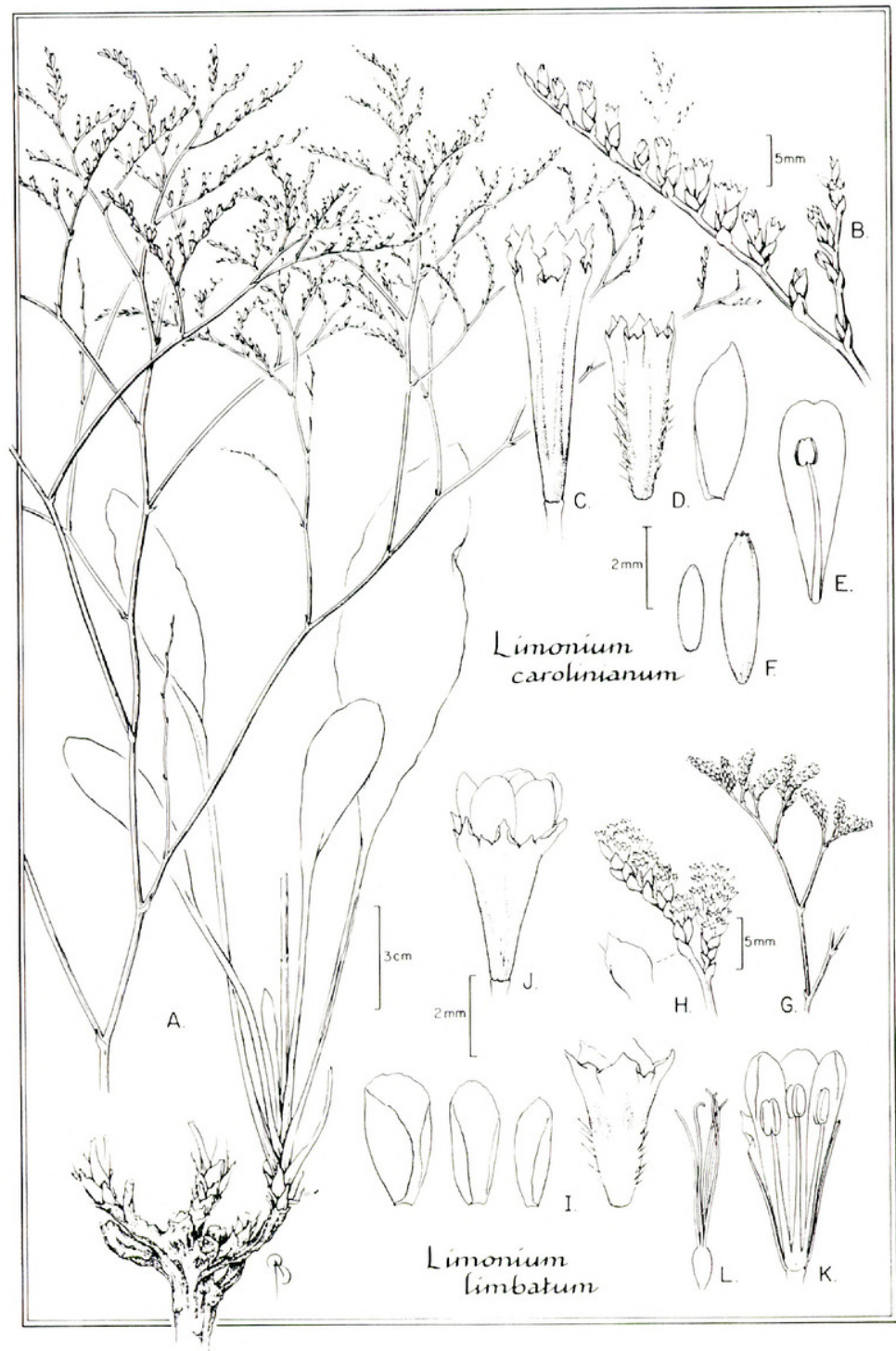


FIG. 1. *Limonium carolinianum* and *Limonium limbatum*. A–F, *Limonium carolinianum*. A. Habit. B. Portion of inflorescence. C. Calyx, glabrous. D. Calyx, pubescent, and floral bract. E. Petal with adnate stamen. F. Fruit (right) and seed (left). G–L, *Limonium limbatum*. G. Portion of inflorescence. H. Close-up of flowering spikelets and floral bract. I. Floral bracts. J. Flower. K. Longitudinal section of flower with pistil removed. L. Pistil. (A drawn from Luteyn 2703 and 2820, both NY; B from Luteyn 2820; C and F from Luteyn 2733, NY; D and E from Luteyn 2777, NY; G–I from Ferris & Duncan 3446, NY; and J–L from Higgins 17938, NY.)



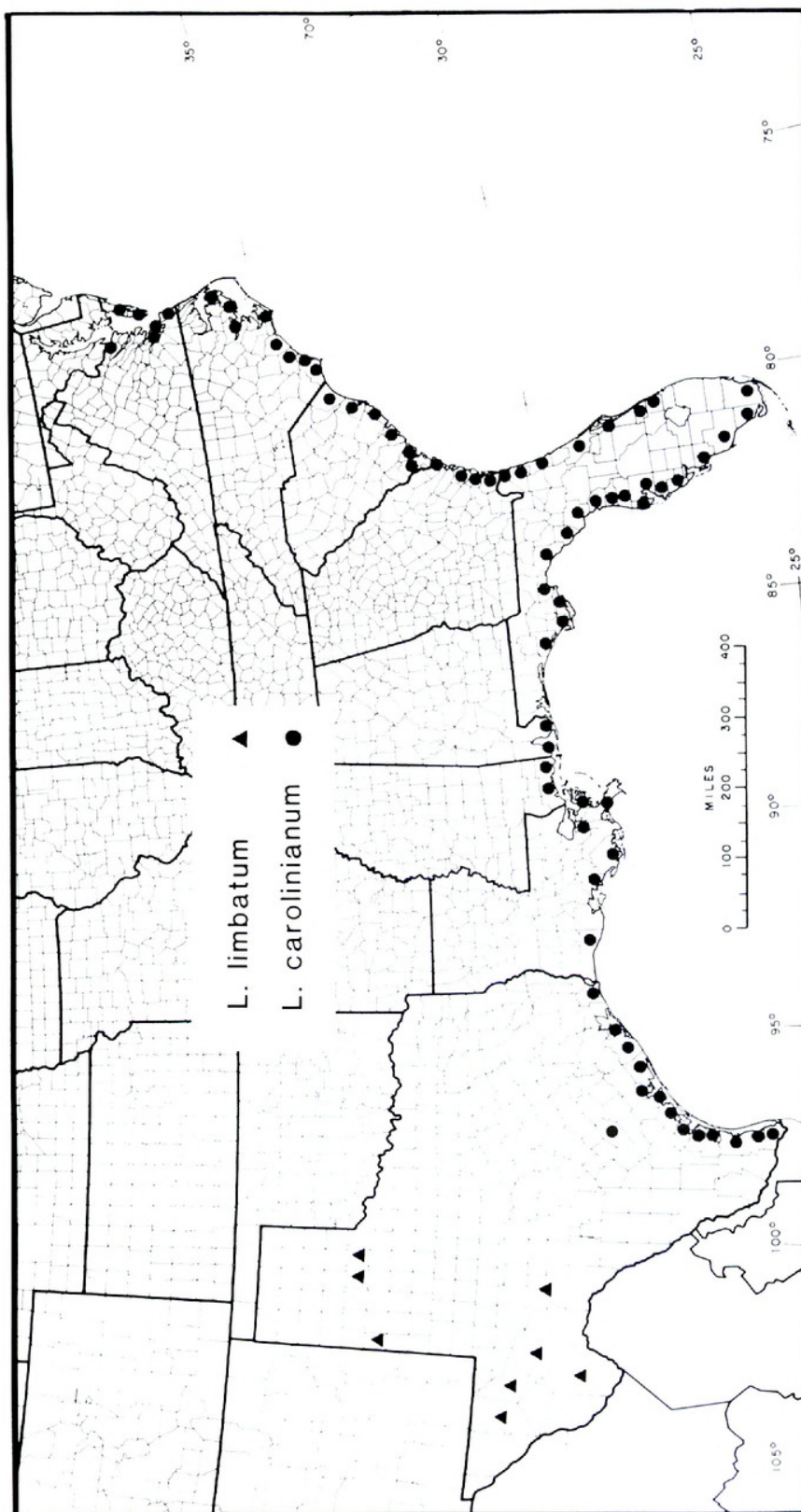


FIG. 2. Distribution of *Limonium limbatum* and *Limonium carolinianum* in the southeastern United States.

densely pubescent along 2–3 ribs, the other 2 ribs moderately pubescent, pubescent only at base or glabrous, limb wide-spreading or flaring at maturity, lobes broadly triangular-ovate, 0.5–1.2 mm long; petals blue to nearly white. Fruit 2.5–3 mm long. (n = unreported) Summer, early fall. Wet meadows, gypsum soils, salt-flats and alkaline depressions in the interior, 1400–5800 ft elevation. Figs. 1 and 2. Incl. *Limonium limbatum* var. *glabrescens* Correll.

Although *L. limbatum*, from the Trans-Pecos and Panhandle regions of Texas, is very distinct from *L. carolinianum* in its inland, higher elevation habitat, morphologically they are quite similar. The type and degree of variation within *L. limbatum* is exactly similar to that in *L. carolinianum*; therefore, no infraspecific taxa are recognized.

## 2. PLUMBAGO L. LEADWORT

Perennial shrubs or suffrutescent herbs; stem ribbed, often elongate and climbing. Leaves cauline, alternate, membranaceous. Inflorescence of terminal or axillary, spike-like racemes or panicles. Flowers sometimes heterostylous, hypogenous, short pedicellate, pedicels bibracteolate; calyx tubular, capitate-glandular along the 5 ribs, lobes triangular, 1–2 mm long; corolla salverform, lobes obovate, rounded or truncate, mucronate; stamens free from the corolla, included or exerted; style 1, included or exerted, with 5 linear stigmas. Fruit a capsule, included, long-beaked, the valves coherent at apex.

1. Corolla white, tube mostly less than twice the length of the calyx; calyx with glandular hairs only; inflorescence elongate, 3–11 (30) cm long; plants native . . . . . 1. *P. scandens*
1. Corolla pale blue, tube twice or more than twice the length of the calyx; calyx with glandular and eglandular hairs; inflorescence compact, 2.5–3 (5) cm long; plants cultivated and naturalized locally in Florida . . . . 2. *P. auriculata*

1. *P. SCANDENS* Linnaeus. — Erect, prostrate or climbing suffrutescent herbs; stems glabrous. Leaves ovate, lance-elliptic, spatulate to oblanceolate, (3) 5–9 (13) cm long, (1) 2.5–3.5 (5) cm wide, apex acute, acuminate or obtuse, base attenuate. Inflorescence elongate, leafy, 3–11 (30) cm long, rachis glabrous but glandular and viscid, floral bracts lanceolate, 3–6.5 mm long. Flowers heterostylous; calyx 7–11 (13) mm long, tube glabrous but with glandular hairs along length of ribs; corolla white, 17–33 mm long, tube 12.5–28 mm long, lobes 5–12 mm long, 3–3.5 mm wide; stamens included. Capsule 7.5–8 mm long. Seed reddish- or dark brown, 5–6 mm long. (n = unreported) All year. Palm groves, thickets, shady hammocks, shell mounds, and rocky places in open areas. Figs. 3 and 4.



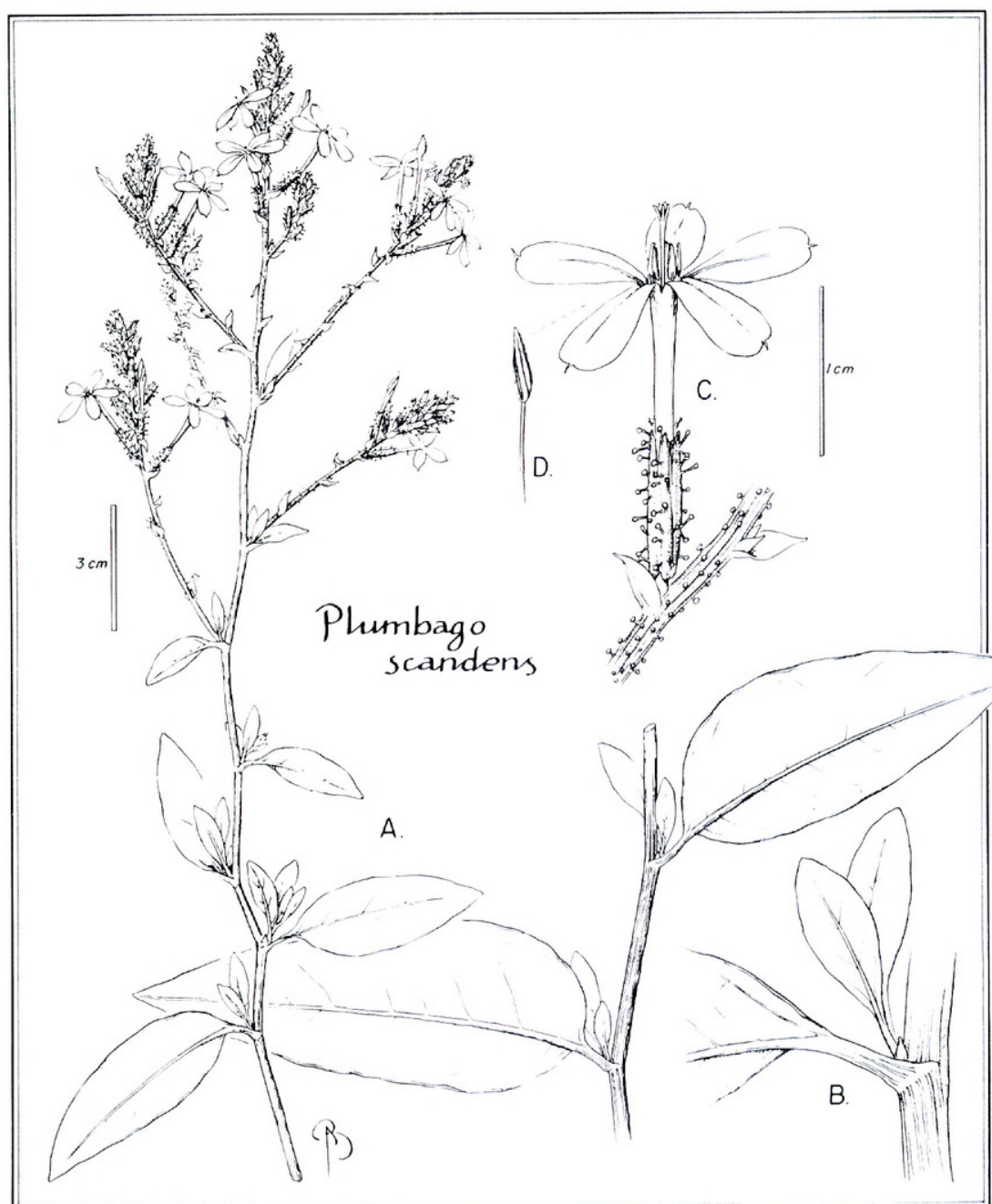


FIG. 3. *Plumbago scandens*. A. Habit. B. Close-up of leaves and leaf bases. C. Portion of inflorescence showing glandular rachis, floral bracts, and flower. D. Distal portion of stamen. (Drawn from Hudson 745, MO.)

*Plumbago scandens* is a widespread, tropical American species which reaches its northern distribution in Florida, southern Texas, and Arizona. It is morphologically quite stable throughout its geographical range.

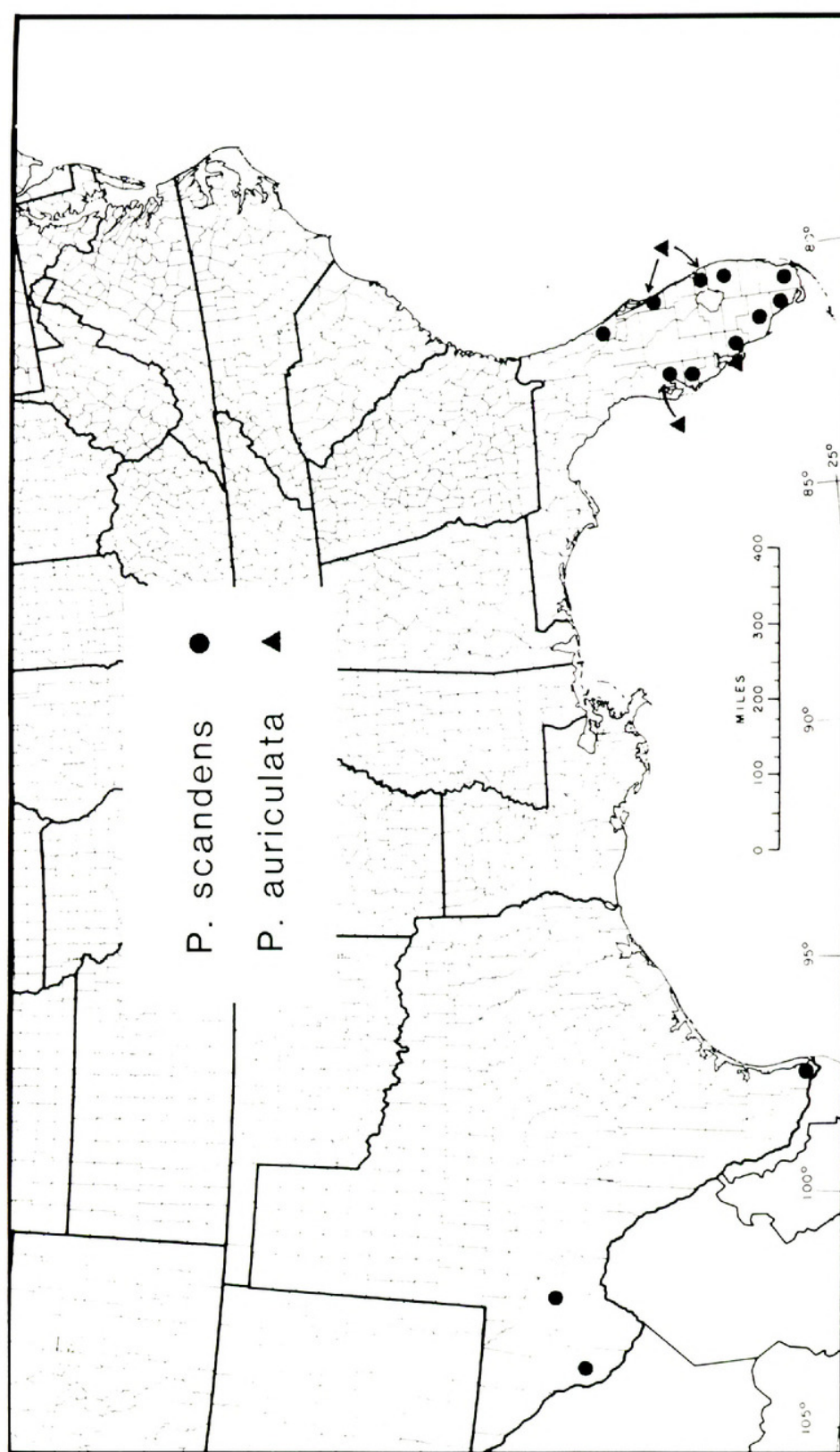


FIG. 4. Distribution of *Plumbago scandens* and *Plumbago auriculata*.



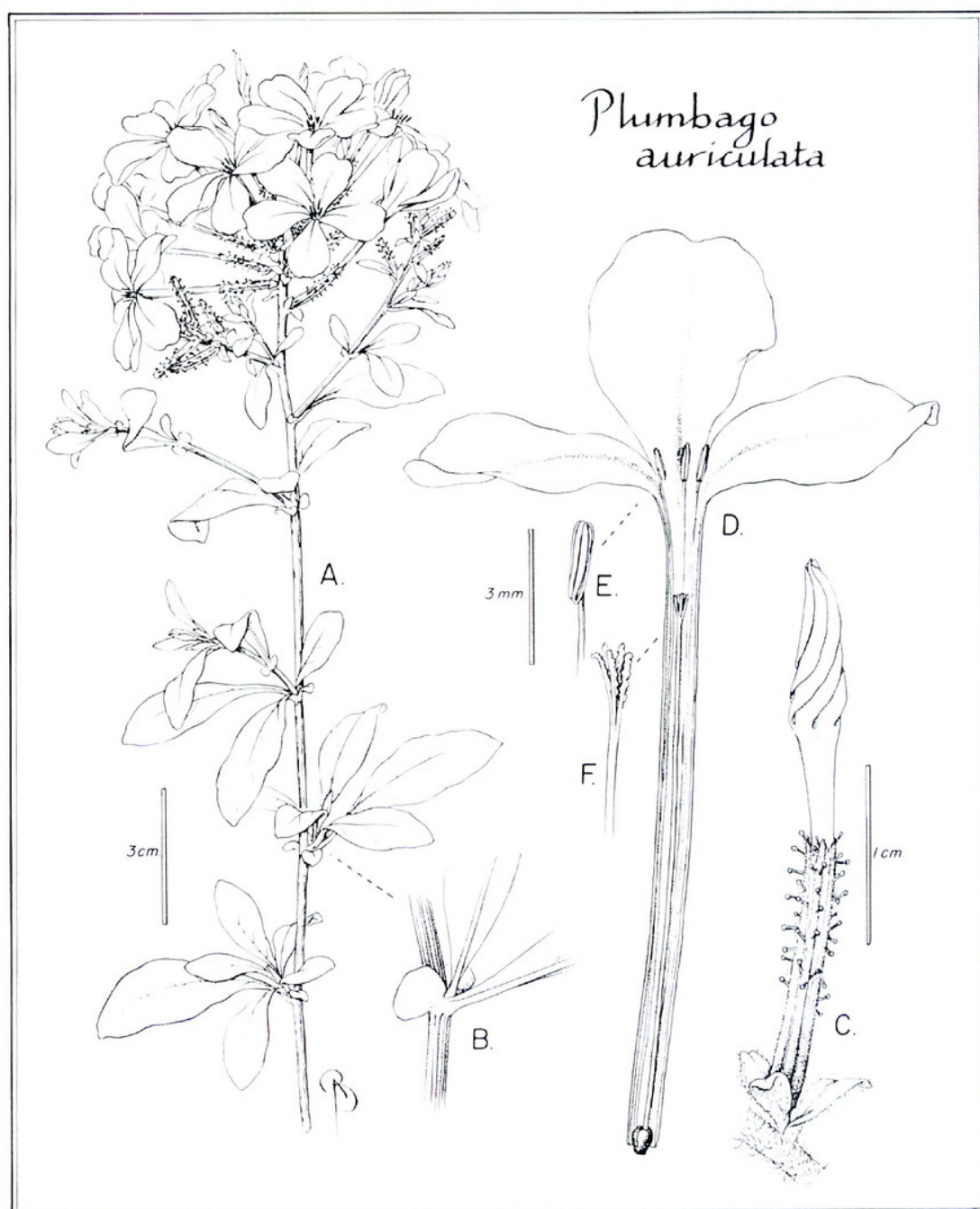


FIG. 5. *Plumbago auriculata*. A. Habit. B. Close-up of leaf bases. C. Portion of inflorescence showing pubescent rachis, floral bracts, and flower in bud. D. Longitudinal section of corolla. E. Distal portion of stamen. F. Distal portion of style. (Original illustration drawn from living material cultivated at the New York Botanical Garden.)

2. *P. auriculata* Lam. — Perennial shrub, erect, trailing or climbing; stems glabrous below becoming pubescent above. Leaves elliptic, oblanceolate, obovate to spatulate, 2.5–9 cm long, 1–2.5 cm wide, apex acute or obtuse, mucronate, base long attenuate or sometimes auriculate. Inflorescence compact, 2.5–3 (5) cm long, rachis short pilose, eglandular, floral bracts lanceolate, 4–9 mm long. Flowers tristylous; calyx 10–13 mm long, tube usually short pilose and also with glandular hairs along upper  $1/2 - 3/4$  length of ribs; corolla pale blue, 37–53 mm long, tube 28–40 mm long, lobes 10–16 mm long, 6–15 mm wide; stamens included or exserted. Capsule 8 mm long. Seed brown, 7 mm long. ( $2n = 14, 16, 28$ ) All year. Escaped from cultivation and naturalized in Florida in hammocks, thickets, and disturbed sites in dry soil. Figs. 4 and 5. *P. capensis* Thunb.

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