

Section 6 Report Review

Attachment to letter dated MAR 27 2003

Project: Guide to the Rare Plants of Texas, including Listed, Candidate, and Species of Concern

Final or interim report? Final Report

Job #: WER 71

Grant #: E-1

Reviewer's Station: Austin ES FO and Corpus Christi ES FO

Lead station was contacted and concurs with the following comments:

Yes No Not applicable (reviewer is from lead station)

Interim Report	Final Report
<input type="checkbox"/> is acceptable as is	<input type="checkbox"/> is acceptable as is
<input type="checkbox"/> is acceptable as is, but the comments below need to be addressed in the next report	<input checked="" type="checkbox"/> is acceptable, but needs minor revision (see comments below)
<input type="checkbox"/> needs revision (see comments below)	<input type="checkbox"/> needs major revision (see comments below)

Comments:

1) All photographs should have credits to include both the photographer and the name of the plant species. The captions inside the color photograph are difficult to see and should probably be moved to the outside edge of the image, possibly along the bottom margin of the picture.

2) All illustrations should be labeled with the plant species name.

FINAL REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. E-1-13

Endangered and Threatened Species Conservation

**Project WER71: Guide to the Rare Plants of Texas,
including Listed, Candidate, and Species of Concern**

Prepared by: Jackie Poole
Dana Price and Jason Singhurst



John Herron
Program Director, Wildlife Diversity

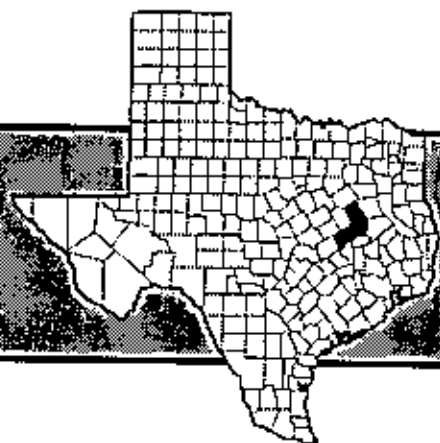
Robert Cook
Executive Director

November 1st, 2002

Federally and State Endangered

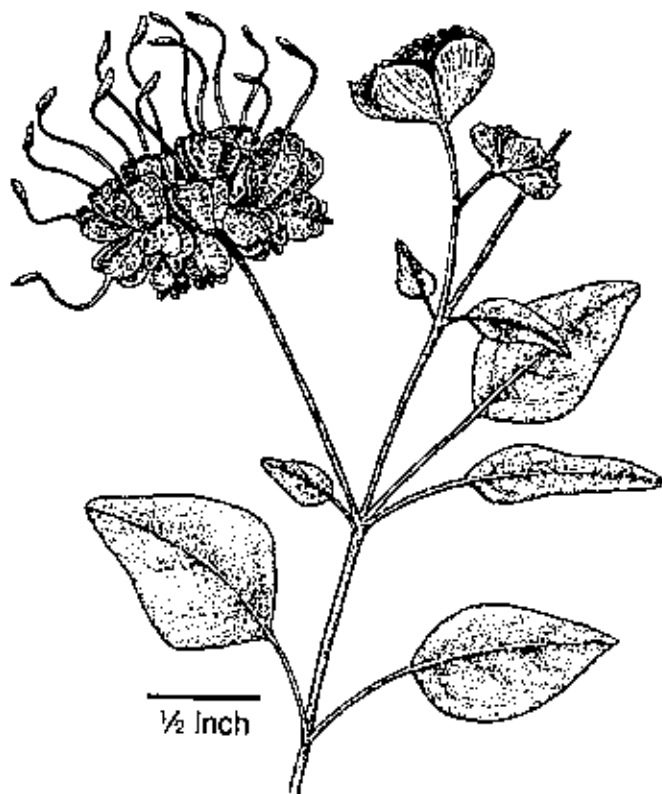
Large-fruited sand verbena

Abronia macrocarpa



The large-fruited sand verbena (*Abronia macrocarpa*) was listed endangered by the U.S. Fish and Wildlife Service (USFWS) in September 1988, and listed as endangered by the State of Texas in December 1988. At the time of listing, only one population was known - from Leon County. Today, there are eight known populations in Leon, Robertson, and Freestone Counties.

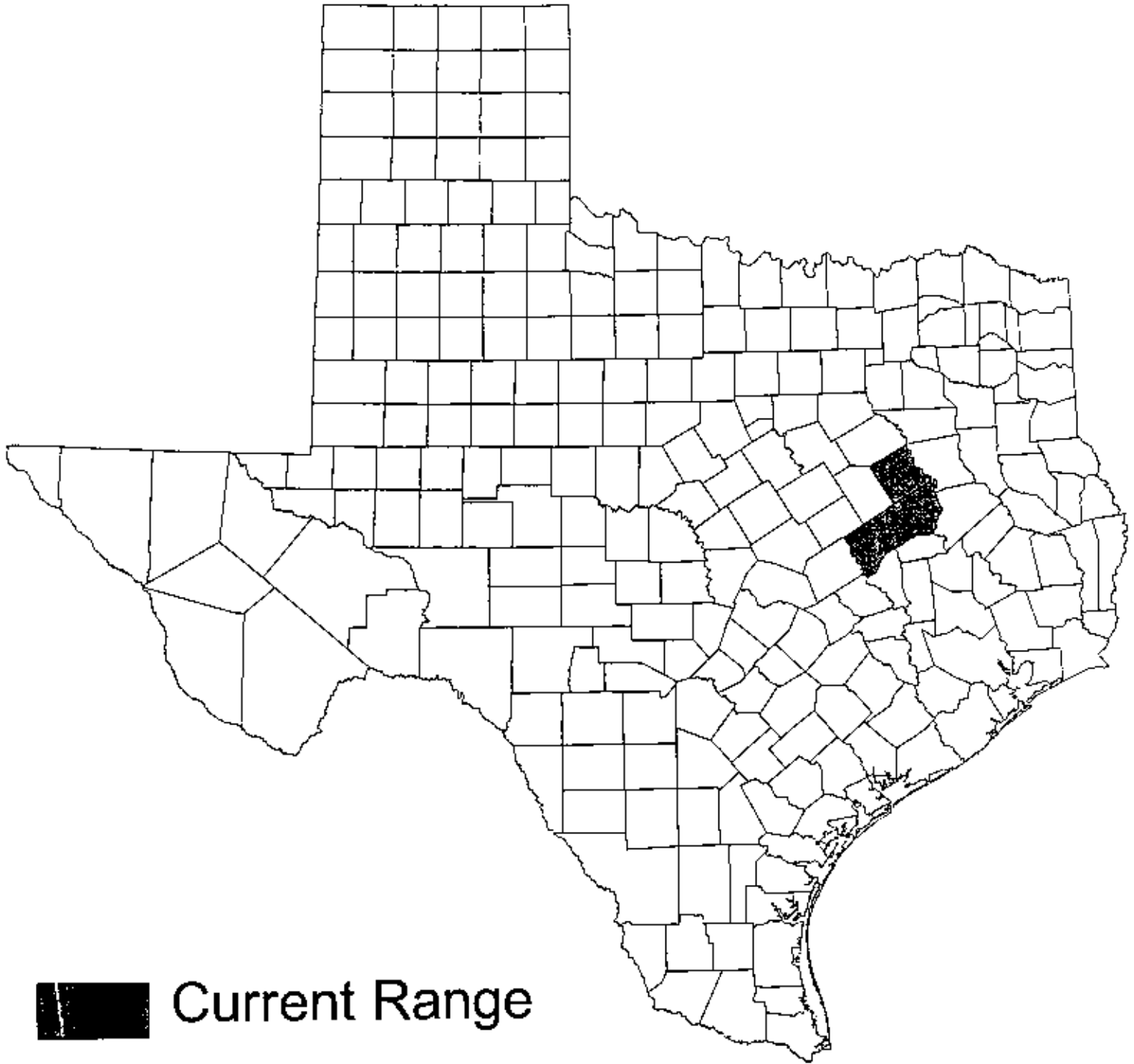
This member of the four o'clock family is a herbaceous perennial that can reach 20 inches in height. The stems arise from a fleshy to semi-woody taproot, and may be erect or spreading. The leaves are opposite, somewhat egg-shaped, and about 2 inches long and 1.5 inches wide. The leaves and stem are covered with sticky glandular hairs. The inflorescences are composed of 20-75 individual flowers clustered into a rounded "head" or "capitulum". These flower heads, which sometimes resemble strawberry snowcones, can be up to 4 inches in diameter. The individual flowers are tubular, up to 1.25 inches long, with 5 lobes which create a ten-petalled appearance. Flower color varies from light pink, to fuschia, to purple. The anthocarps (or fruits) are turbin-shaped, 5-winged, and papery—holding a single, tiny, brownish-black seed. The fruits of *A. macrocarpa* are larger than any of the other species of sand verbena, thereby giving it the common name: Large-fruited sand verbena.



Leaves, buds, and fruits of Large-fruited sand verbena

The large-fruited sand verbena flowers February to June. In May or June, the above-ground parts of the plants often die back, leaving the taproots buried in the sand. The plants remain dormant until October, when basal rosettes are formed. The plants remain in this form until growth begins again in the early spring.

The large-fruited sand verbena is not capable of self pollination, so the presence and abundance of pollinators is crucial to its survival. It has flowers that open late in the afternoon emitting a sweet odor that increases in strength toward evening. The flowers are open all night for pollination. These features are characteristic of moth pollinated flowers. At least two species of moths are known to be pollinators. Yaupon and grape are known to be food sources for the moth larvae, so the presence of these plants in the habitat is significant.



 Current Range

Abronia macrocarpa
(large-fruited sand-verbena)

Scientific Name: *Acleisanthes crassifolia* Gray

Synonyms: None.

Common Name: Texas trumpets

Global/State Ranks: G5S2

Federal Status: SOC

Global Range: Southwest Texas and adjacent Coahuila.

State Range: Kinney, Maverick and Val Verde counties.

Description (adapted from Smith 1976; Poole 1989): Taprooted herbaceous perennial with procumbent to nearly prostrate stems 2-5 dm long. Leaves opposite, the leaves of each pair unequal in size, with petioles 1/3 - 2/3 as long as the blades, which are thick, scabrous, ovate to oblong-ovoid, 1-4.5 cm long and up to 20 (-30) cm wide, of a dark green color with striking white-pubescent veins. Flowers axillary, solitary, sessile or nearly so, cleistogamous or chasmogamous; perianth of cleistogamous flowers green, 2-6 mm long; perianth of chasmogamous flowers elongate-funneliform, white, fragrant, with a long slender tube and a 5-lobed limb 8-25 mm wide, in total 3-5 cm long. Fruit an anthocarp 6-7 mm long, 4 mm wide, tapered at both ends, with 5 faint longitudinal grooves and 5 broad low ribs, covered with short, appressed, white hairs.

Similar Species: Several other species of *Acleisanthes* occur within this general range. *A. crassifolia* can be readily distinguished by its thick green leaves with white-pubescent venation.

Habitat: Shallow, well drained, calcareous gravelly loams over caliche on gentle to moderate slopes, often in sparsely vegetated openings in cenizo (*Leucophyllum frutescens*) shrublands. Other associates include *Acacia berlandieri*, *Krameria ramosissima*, *Prosopis glandulosa*, *Opuntia* spp., *Yucca torreyi*, *Parkinsonia texana*, *Tiquilia canescens*, *Calliandra conferta*, *Acleisanthes longiflora*, *A. anisophylla*, *Melampodium leucanthum*, *Thymophylla pentachaeta*, *T. micropoides* (Poole 1989). Known populations occur on Austin Chalk (Cretaceous) or Uvalde Gravel (Pleistocene).

Phenology: Flowering April-November; fruiting April-December (Poole 1989).

Illustrations: Line drawings appear in Smith (1975).

Selected References:

Poole, J. M. 1989. Status report on *Acleisanthes crassifolia*. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

Smith, J. M. 1975. Taxonomic study of *Acleisanthes* (Nyctaginaceae). M. A. thesis, The University of Texas at Austin.

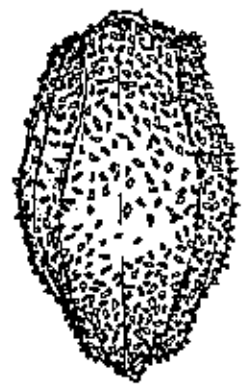
Smith, J. M. 1976. A taxonomic study of *Acleisanthes* (Nyctaginaceae). *Wrightia* 5: 261-276.



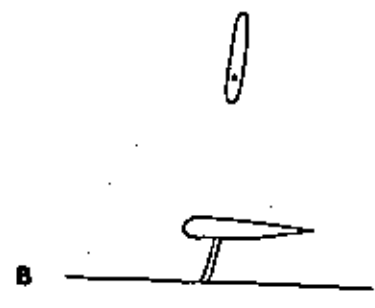
A. crassifolia Z.

♂

39



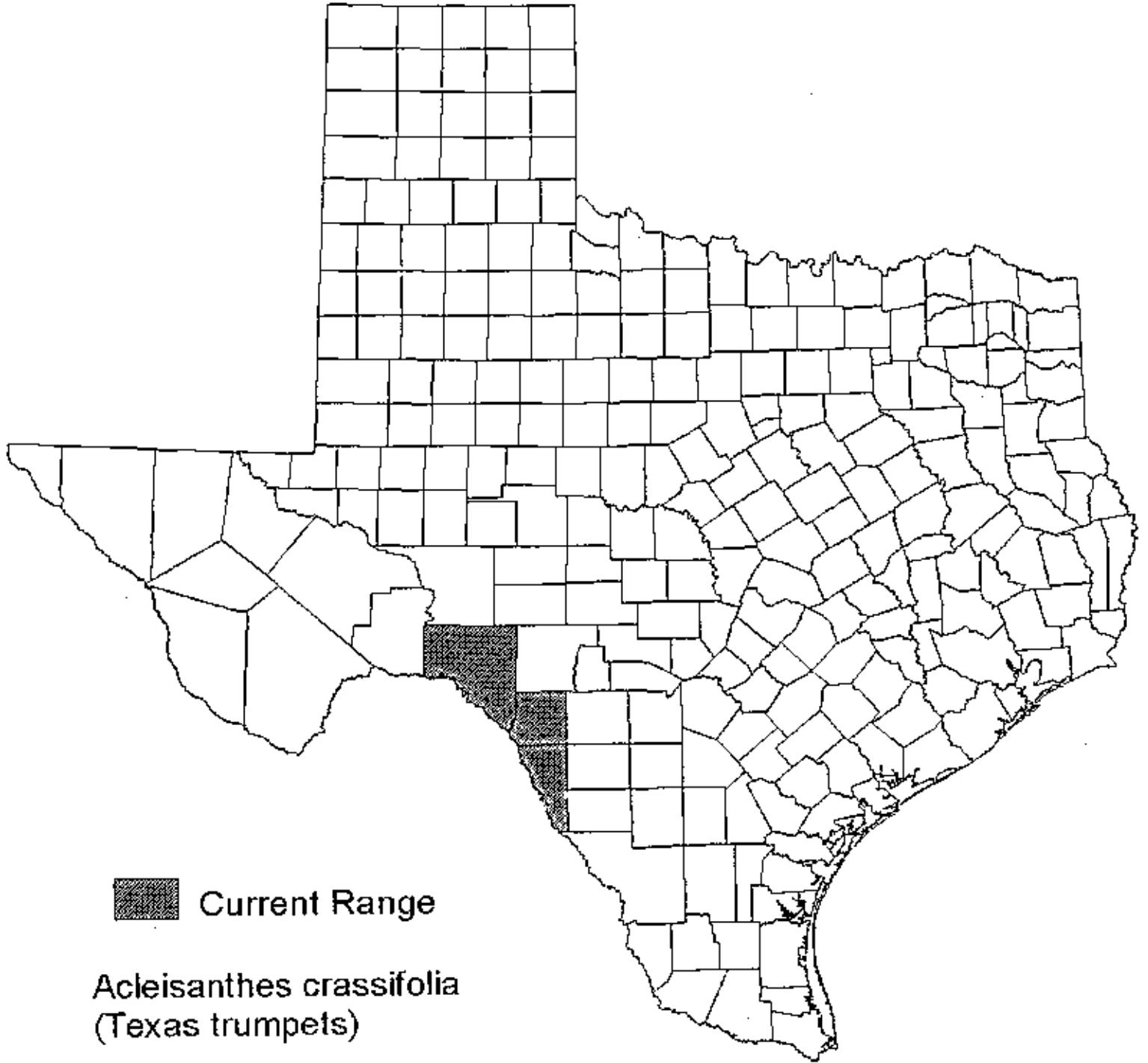
A



B



C



■ Current Range

Acleisanthes crassifolia
(Texas trumpets)

Scientific Name: *Acleisanthes wrightii* (Gray) B. & H.

Synonyms: *Pentacrophys wrightii* Gray

Common Name: Wright's trumpets

Global/State Ranks: G2S2

Federal Status: None

Global Range: Endemic to west Texas.

State Range: Brewster, Pecos, Reeves, Terrell and Val Verde counties.

Description (adapted from Smith 1976; J. Poole in Henrickson & Johnston in prep.): Herbaceous perennial with several erect to ascending or decumbent stems to 4 dm long, multi-branched from base. Leaves opposite, the pair unequal, with petioles half as long as the blades, which are ovate to ovate-lanceolate, 1.5-3.5 cm long and 3-20 mm wide, unequal at the base and apiculate and usually obtuse at the apex, somewhat thick or leathery and puberulent or glandular, dark green on the upper surface and paler on the lower, with crisped margins. Flowers solitary, axillary, sessile or nearly so, usually cleistogamous but occasionally chasmogamous; perianth of cleistogamous flowers 5 mm long, densely but finely glandular-pubescent; perianth of chasmogamous flowers elongate-funneliform, white, fragrant, with a long slender tube and a 5-lobed limb 10-15 mm wide, in total 2.5-5.0 cm long. Fruit a glandular-puberulent anthocarp 6-7 mm long, oblong, truncate at both ends, with 5 longitudinal grooves and 5 broad ribs, the apices of which sport a hemispherical glandular tubercle.

Similar Species: Readily distinguished from other species of *Acleisanthes* by its oblong fruit with a conspicuous tubercle at the apex of each rib (Smith 1976).

Habitat: Open semi-desert grasslands and shrublands on shallow stony soils over limestone on low hills and flats. Associates include *Larrea tridentata*, *Agave lechuguilla* and *Viguiera stenoloba*.

Phenology: Flowering spring-fall, probably opportunistically following rains.

Comments:

Illustrations: Line drawings appear in Smith (1975).

Selected References:

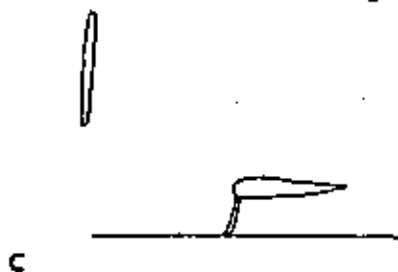
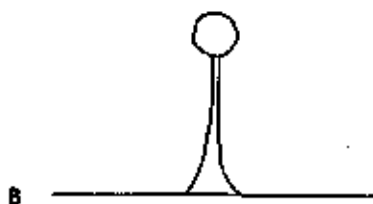
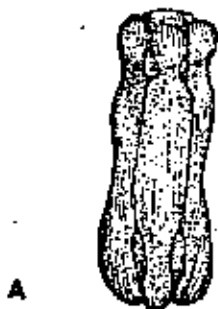
Smith, J. M. 1975. Taxonomic study of *Acleisanthes* (Nyctaginaceae). M. A. thesis, The University of Texas at Austin.

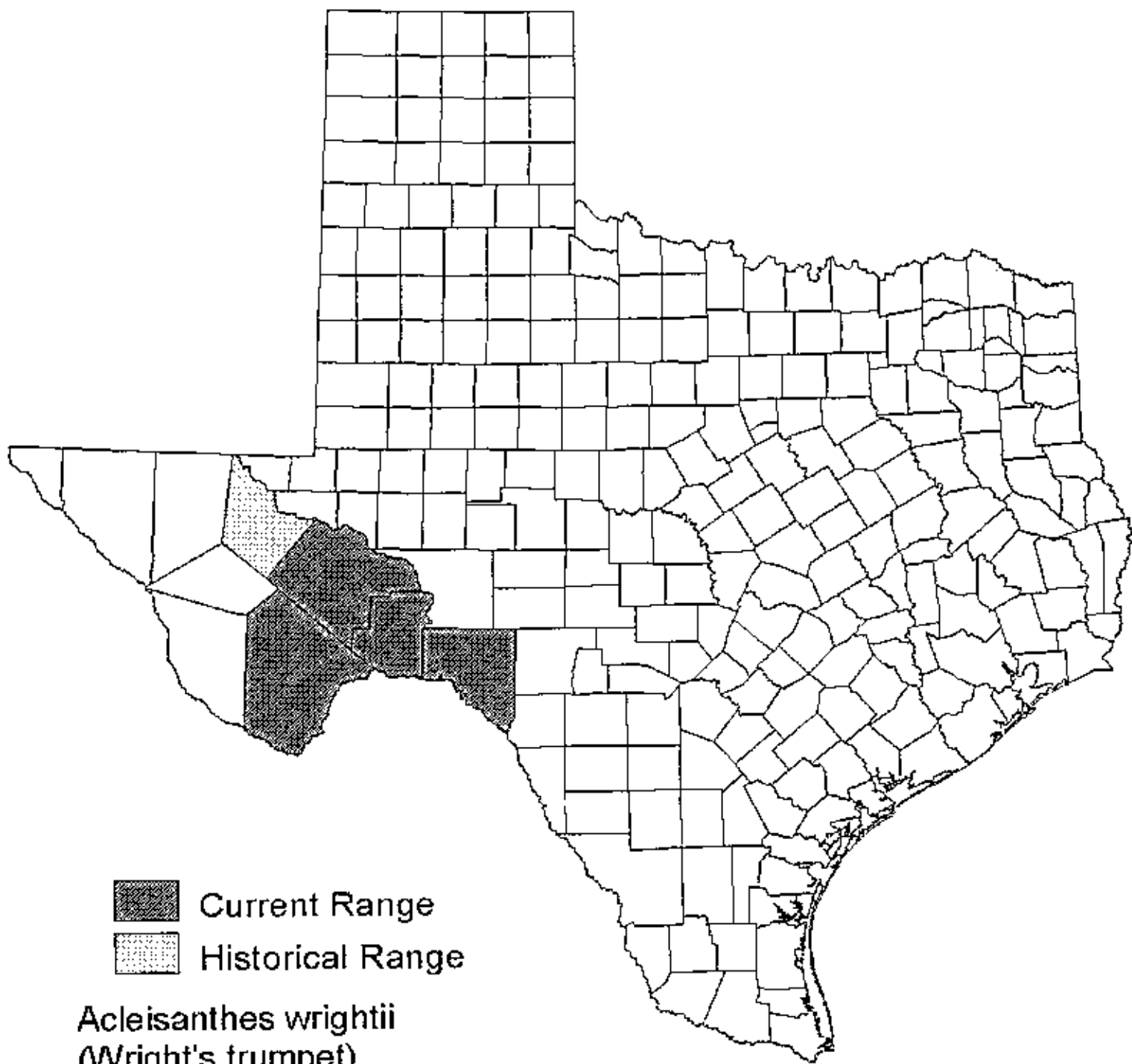
Smith, J. M. 1976. A taxonomic study of *Acleisanthes* (Nyctaginaceae). *Wrightia* 5: 261-276.



A. wrightii

127





Scientific Name: *Adelia vaseyi* (Coulter) Pax & K. Hoffm.

Synonyms: *Euphorbia vaseyi* Coulter.; *Ricinella vaseyi* Coulter. & Fischer

Common Name: Vasey's adelia

Global/State Ranks: G2G3S2S3

Federal Status: None

Global Range: South Texas and Tamaulipas.

State Range: Largely confined to the Lower Rio Grande Valley, with records from Cameron, Hidalgo, Starr and Willacy counties.

Description (adapted from Correll & Johnston 1970): Tall dioecious shrub to 3 m tall, with numerous ascending branches. Leaves simple, alternate or clustered in fascicles, sessile, spatulate or linear-spatulate, pale green, glabrous, entire, 1-4 cm long. Flowers unisexual, short-pedicellate, inconspicuous in the axils of leaves or leaf clusters, with 5-6 linear elliptic sepals 2-3 mm long and no petals; stamens 14-17, conspicuously exerted; styles 3. Fruit a shallowly 3-lobed capsule, 6-7 mm long and 7-8 mm broad, on a pedicel 5-20 mm long, containing 3 seeds.

Similar Species: Since many other South Texas "brush" species have spatulate, entire leaves, *Adelia vaseyi* is difficult to distinguish on the basis of foliar features. It can be recognized in the field by its thornless ascending branches, which are often unbranched and thus rather sticklike, and by its shallowly three-lobed capsular fruit.

Habitat: Mostly in subtropical evergreen/deciduous woodlands on loamy soils of the Rio Grande Delta but occasionally in shrublands on more xeric sandy to gravelly upland sites.

Phenology: Flowering January-June.

Comments: Locally frequent in some remnant brush tracts on the Texas side of the Rio Grande delta, particularly along Arroyo Colorado. Status in Tamaulipas unreported.

Illustrations: A line drawing appears in Vines (1960). Color photographs appear in Everitt & Drawe (1993) and Cheatham, Johnston & Marshall (1995).

Selected References:

- Cheatham, S., M. C. Johnston, and L. Marshall. 1995. The useful wild plants of Texas, the southeastern and southwestern United States, the southern plains, and northern Mexico. Volume 1. Useful Wild Plants, Inc., Austin, Texas. 568 pp.
- Coulter, J. M. 1890. Upon a collection of plants made by Mr. G. C. Nealley, in the region of the Rio Grande, in Texas, from Brazos Santiago to El Paso County. Contributions from the U. S. National Herbarium 1: 29-62.
- Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock. 213 pp.

- Lonard, B. I., J. H. Everitt, and F. W. Judd. 1991. Woody plants of the Lower Rio Grande Valley, Texas. Miscellaneous Publication Number 7, Texas Memorial Museum, The University of Texas at Austin. 179 pp.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the south-west. The University of Texas Press, Austin. 1104 pp.



Vines

EUPHORBIA FAMILY (*Euphorbiaceae*)

VASEY ADELIA

Adelia vaseyi (Coulter) Pax & Hoffm.

FIELD IDENTIFICATION. Shrub attaining a height of 11 ft, with many long, slender upright stems from the base.

FLOWERS. February–April, dioecious; staminate borne in alternate clusters at the tomentose nodes; petals absent; calyx-tube short, spreading into 4–6 (usually 5) lobes, lobes oblong-lanceolate, acute, $\frac{1}{16}$ – $\frac{1}{8}$ in. long, white-hairy; stamens 8–15, exserted, filaments about $\frac{1}{8}$ in. long, translucent-viscid, anthers ovoid-oblong; pistillate flowers terminal or axillary, solitary and long-pedicelled, 3-lobed, capped by the persistent 3-lobed, laciniately cut styles.

FRUIT. Capsule, April–May, borne on long, slender, puberulent, solitary pedicels $\frac{1}{2}$ – $1\frac{1}{4}$ in. long, pendent from the leaf axils at the nodes; body of fruit 3-lobed, depressed, to $\frac{1}{2}$ in. wide and $\frac{1}{4}$ in. high, puberulent and granular, more glabrous later; seeds 3, one in each cavity, round to broad-ovoid.

LEAVES. Scant, alternate or clustered at the remote, short, wart-like nodes; spatulate, cuneate or obovate, $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, $\frac{3}{8}$ – $\frac{1}{2}$ in. wide, entire; apex mostly rounded, some truncate or notched; base gradually narrowed and becoming sessile or very short-petiolate at the tomentose node; medium-green and puberulent above when young, glabrous later; lower surface paler, puberulent, minutely punctate, 3 veins rather conspicuous, the 2 lateral ones close to the margin.

TWIGS. Long, slender, rather rigid, gray, smooth, glabrous or pubescent when young; lateral branches few, mostly set with short, spurlike nodes at intervals.

BARK. Gray to brown, smooth and tight above, sometimes broken into thin, small scales on old stems.

RANGE. In dry soil in Cameron, Willacy, Hidalgo, and Starr counties, Texas. Near the mouth of the Rio

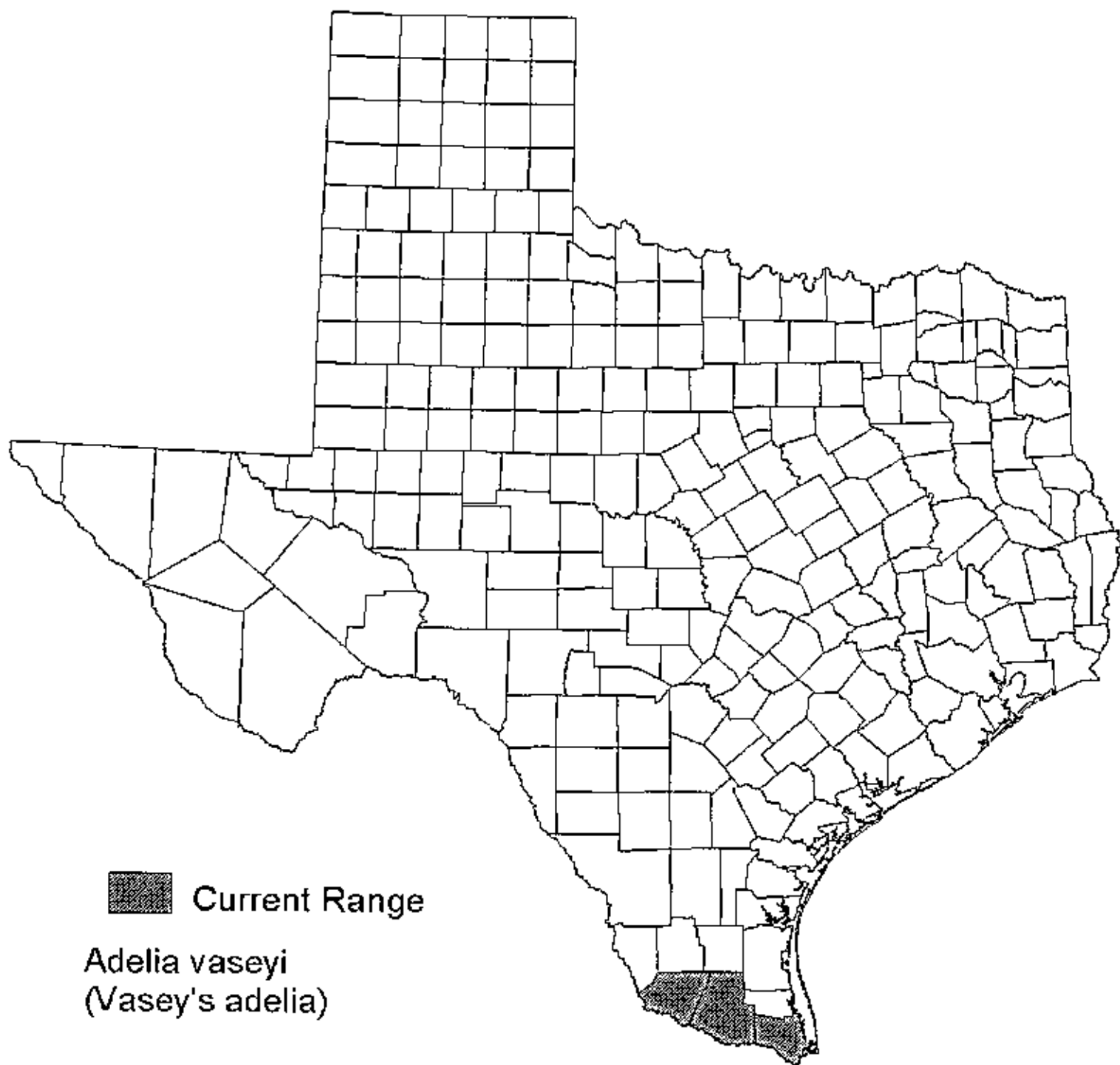


VASEY ADELIA

Adelia vaseyi (Coulter) Pax & Hoffm.

Grande on bluffs at Boca Chica. Near Mission, Texas, on La Lomita Hill. Also in Tamaulipas, Mexico.

REMARKS. The genus name, *Adelia*, is from the Greek and refers to the small, obscure flowers. The species name, *vaseyi*, is in honor of George R. Vasey (1822–1893), botanist for the U.S. Department of Agriculture.



Scientific Name: Agalinis calycina Penn.

Synonymy: Gerardia calycina (Penn.) Penn.

Common Name: Leone false foxglove

Global Range: Texas and Mexico (Coahuila).

State Range: Brewster (?) and Pecos Counties. The type specimen was collected during the Mexican Boundary Survey by J. M. Bigelow at Leone Spring. When Pennell (1929) described the species, he decided that Leone Spring was "probably" Leoncita Springs in Brewster County. However it is equally, if not more likely, that Leone Spring was Leon Spring in Pecos County. The only known location is along Diamond Y Spring which is several miles downstream from Leon Spring.

Current Federal and State Status: Species of special concern.

Global and State Ranks: G1S1

Description (compiled from Pennell 1929 and Correll & Johnston 1970):

Habit: Annual to 4 dm high, with numerous divergent ascending branches, relatively slender, glabrous.

Leaves: Opposite below to somewhat subopposite above, spreading, linear, acuminate, entire, more or less rough on the upper surface, those of the stem 2-4 cm long, 0.8-1.5 mm wide; bracts scarcely reduced.

Flowers: Racemes somewhat irregular, with 4-12 flowers; pedicels ascending, slender, glabrous, 5-7(-13) mm long at flowering, to 8 mm long in fruit, about one-third the length of the bracts; calyx tube 5-6 mm long, campanulate, obscurely veined, not truncate, its nearly linear lobes 5-7(-15) mm long, apex of the tube and lobes within finely granular-puberulent; corolla deep pink, 20-25 mm long, the straight tube 17-21 mm long, the spreading, ciliate, rounded-truncate lobes 3-5 mm long, externally pubescent with ascending hairs, internally nearly glabrous to slightly pubescent in a ring about the base of the filaments, pubescent in a narrow line below the posterior sinus; anther cells 2.5-3 mm long, acuminate-tipped at base.

Fruits: Capsule ?shape? ?dimensions? ?color? ?seeds?

Habitat: Grasslands on moist heavy alkaline/saline calcareous silty clays and loams in and around cienegas (desert springs). Associates in Texas include *Helianthus paradoxus*, *Schoenoplectus americanus*, *Flaveria chlorifolia*, *Limonium limbatum*, *Samolus cuneatus*, *Distichlis spicata*, and *Sporobolus airoides*.

Phenology: Flowering September-October.

Similar Species: There are no other species of *Agalinis* in west Texas.

Comments: Leon false foxglove was only recently relocated in Texas at the Texas Nature Conservancy's Diamond Y Spring Preserve. It occurs with two other rare plants, the puzzle sunflower (*Helianthus paradoxus*) and the longstalk heimia (*Nesaea longipes*).

Additional illustrations: None known.

Selected References:

Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.

Pennell, F. W. 1929. ??????????? Proc. Acad. Nat. Sci. Phil. 81: ?-?.







■ Current Range
□ Historical Range
Agalinis calycina
(Leoncita false foxglove)

Scientific Name: *Agalinis navasotensis* Dubrule & Canne-Hilliker

Synonyms: None.

Common Name: Navasota false-foxglove

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to east-central Texas.

State Range: Known only from Grimes County.

Description (adapted from Canne-Hilliker & Dubrule 1993): Annual with several ascending branches, 3-9 dm tall. Leaves opposite, simple, spreading to ascending or recurved, filiform, acute to acuminate, entire, minutely scabridulous, 1.2-3 (4) cm long and 0.5-1.2 mm wide. Flowers in few-flowered racemes, on spreading to ascending pedicels 6-21 mm long (always longer than the calyx); calyx obconical to somewhat campanulate or funnellform, the tube 2.2-3.7 mm long, the 5 triangular-subulate lobes 0.5-1.5 mm long; corolla lavender to rose-purple, bilaterally symmetrical, (13-) 16-25 (-27) mm long (including lobes), pilose externally, the 5 lobes subequal or the lower somewhat longer, all spreading or spreading-reflexed, 6-9 mm long, ciliate only along margins. Fruit an ovoid or ovoid-oblong capsule, 4-7 mm long and 4-4.5 mm wide, containing numerous small seeds.

Similar Species: Most similar to *A. caddoensis*, which is not definitely known to occur in Texas, but possibly confused with other Texas *Agalinis* species. Characteristic features include filiform leaves mostly 1 mm wide or less; extremely short calyx lobes; and corolla lobes equally spreading (not arching over stamens).

Habitat: Areas of relatively sparse vegetation on shallow sandy soils atop calcareous sandstone outcrops of the Oakville Formation (Miocene). The flora of these outcrops includes several species more typical of the Edwards Plateau than the immediately surrounding Post Oak Savanna and Blackland Prairie, including *Lesquerella densiflora*, *Coryphantha missouriensis* and *Lygodesmia texana* (Canne-Hilliker & Dubrule, 1993).

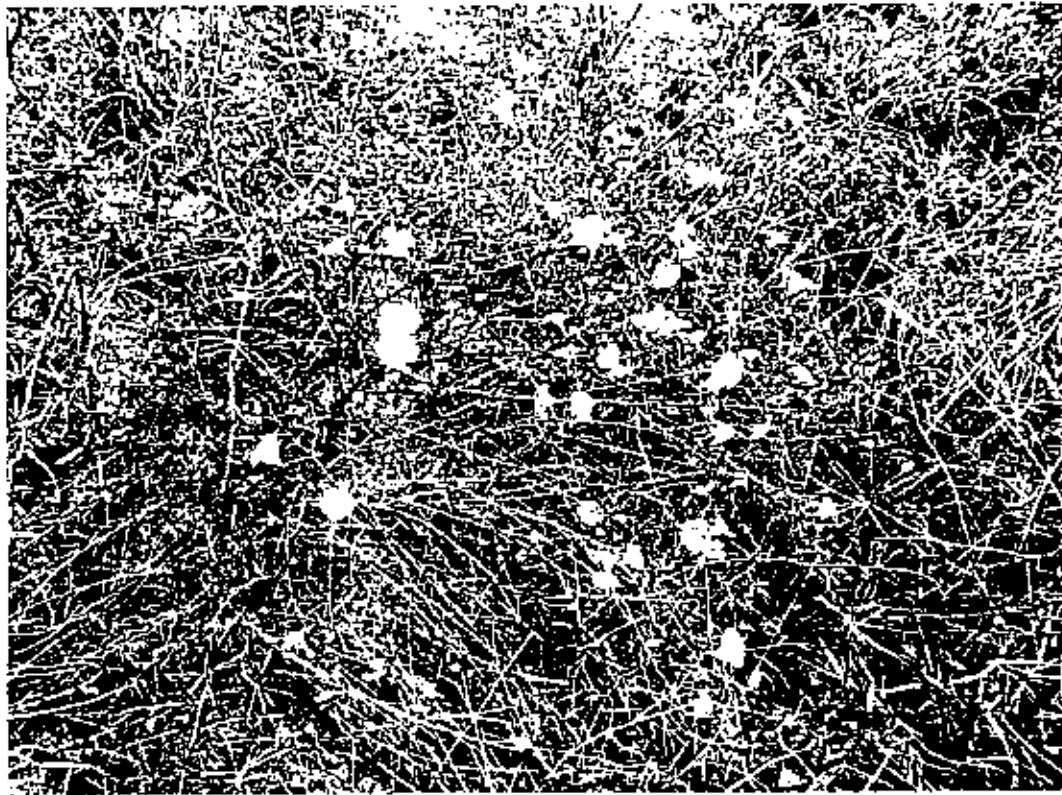
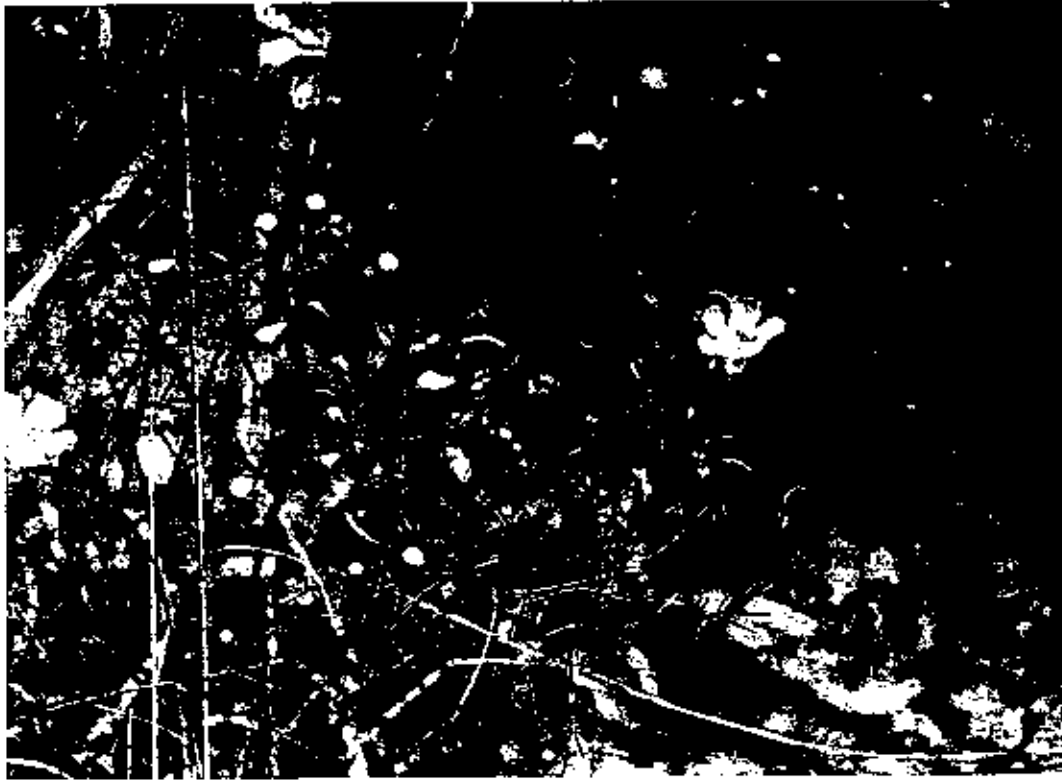
Phenology: Flowering September-October.

Comments: Only recently recognized as distinct and currently thought to be restricted to a small area northeast of Navasota. Additional populations should be sought on calcareous sandstone outcrops elsewhere in the Post Oak Savanna.

Illustrations: Several line drawings appear in Canne-Hilliker & Dubrule (1993).

Selected References:

Canne-Hilliker, J. M. and M. Dubrule. 1993. A new species of *Agalinis* (Scrophulariaceae) from Grimes County, Texas. *Sida* 15(3): 425-440.



County and a visit to the outcrop revealed a population of plants with the same morphology as the Ajilvsgi specimen. These plants, also, could not be identified as belonging to any species listed for Texas. The possibility that the plants were ecotypic variants of some known species was considered. However, plants grown in hydroponic culture from seeds taken from outcrop plants exhibited the same characteristics as those at the collection site.

Subsequent seasons of field work, laboratory investigations, and herbarium study, including examination of type specimens, have convinced us that the Grimes County plants represent a new species of *Agalinis*, hereafter treated under the name *A. navasotensis* Dubrule & Canne-Hilliker.

Agalinis navasotensis Dubrule & Canne-Hilliker, sp. nov. (Figs. 1-7)

Agalinis caddoensis similis sed plantis tenuioribus atque foliis caulium usque 4 cm longis valde recurvatisque; tubo calycis obconico vel infundibulari 2.6-3.7 mm longo; corolla (13)16-21(27) mm longa; thecae antherarum adaxialium in filamentis oblique collocatis et saepe 1-2 appendicibus apicalis sterilibus. In solis non profundis lapis arenariis expositis endemicis.

Similar to *Agalinis caddoensis* but the plant finer and with stem leaves to 4 cm long and often sharply recurved; calyx tube obconic to funnelform, 2.6-3.7 mm long, corolla (13)16-21(27) mm long; thecae of adaxial anthers obliquely placed on the filament and often with 1 or 2 sterile apical appendages; endemic to sandstone outcrops in shallow soil.

DESCRIPTION

Annual herb from a few fibrous roots, 2.8-9.0 dm tall, often tinged with purple, maroon, or bronze, *darkening little if at all on drying* if promptly pressed. Stem erect or sometimes declined, single from the base, divaricately branched above, terete to slightly angled below the branches, quadrangular-striate above, minutely scabridulous below and sparsely to moderately so above along the angles and sides. *Axillary fascicles absent*. Leaves opposite, spreading to ascending or often recurved, *filiform*, narrowly U-shaped in cross-section, 0.5-1(1.2) mm broad, 1.2-3(4) cm long, acute to acuminate, minutely scabrous with silicified hairs on adaxial surface and midvein below, margins silicified and scabrous. Inflorescence racemose or more commonly *paniculate with racemose branches*. Racemes or branches with up to ca. eight floriferous nodes, terminated by leaves or bracts, *no flowers appearing terminal*, flowers solitary or paired at the nodes; if paired, one usually blooming much later than the other. Pedicels slender, terete, spreading or ascending, glabrous to minutely scabridulous with silicified 1- or 2-celled hairs, at anthesis (6)8-21 mm long, usually longer than 10 mm and always longer than the calyx, elongating to ca. 2.5 cm in fruit. Calyx at anthesis *obconical to somewhat campanulate or funnelform, straight-sided*, often appearing truncate with minute teeth; tube 2.2-3.7 mm long, 3-4.4 mm broad, unribbed, exterior glabrous, interior with a narrow band of capitate hairs below the sinuses and lobes;

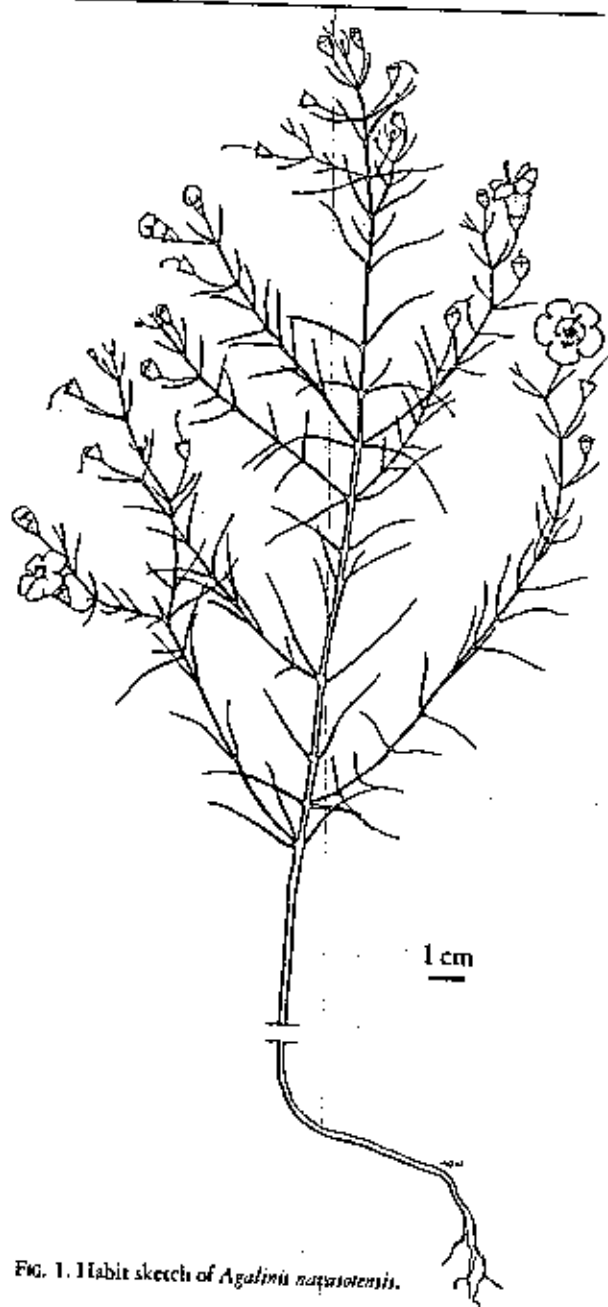
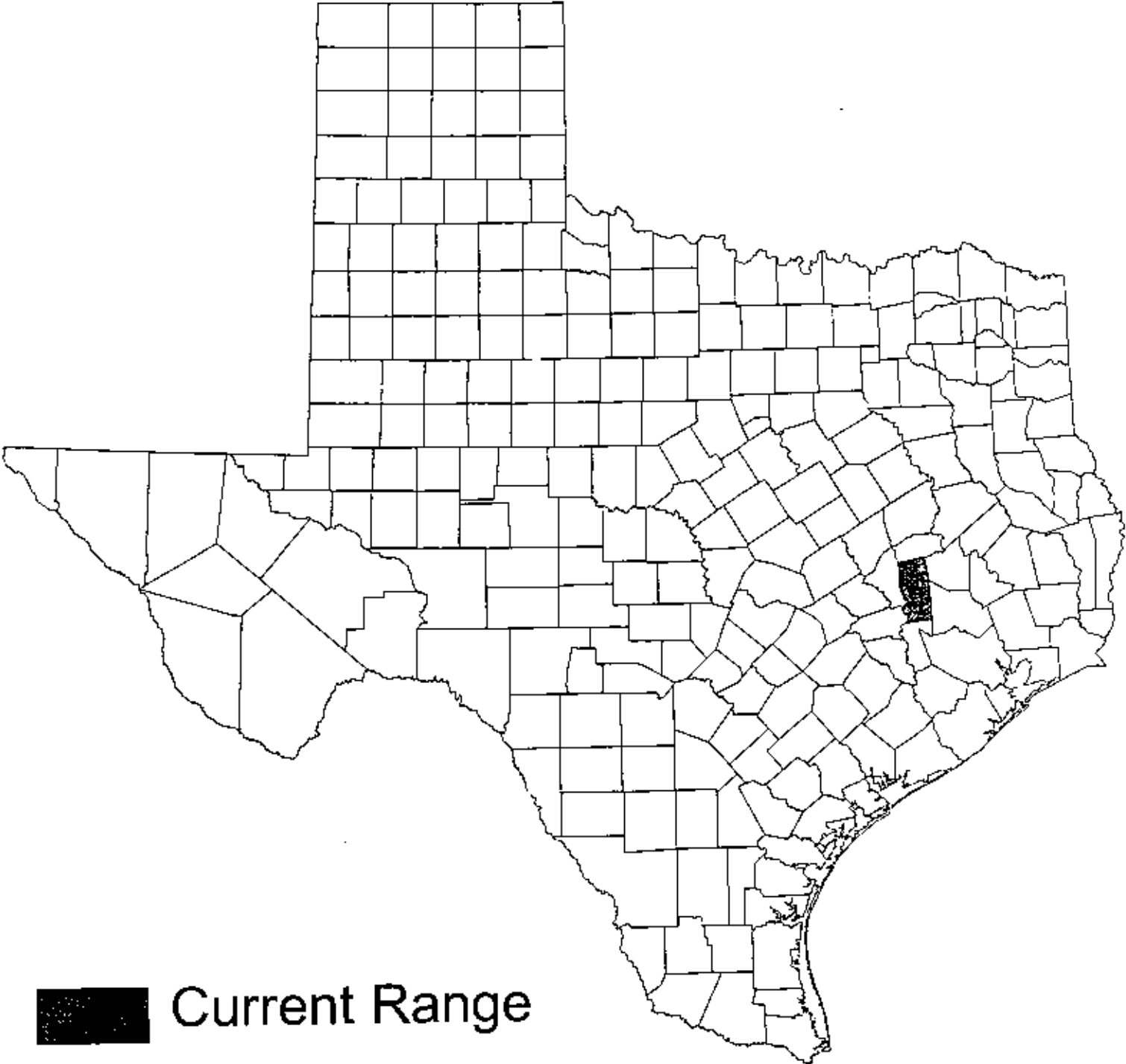


FIG. 1. Habit sketch of *Agalinis navasotensis*.



 Current Range

Agalinis navasotensis
(Navasota false foxglove)

Scientific Name: *Agave glomeruliflora* (Engelm.) Berger

Synonymy: *Agave chisosensis* C. H. Muller; *Agave heteracantha* var. *glomeruliflora* Engelm.; *Agave lechuguilla* f. *glomeruliflora* (Engelm.) Trel.

Common Name: Chisos agave

Global Range: Texas and Mexico (Coahuila)

State Range: Brewster, Culberson and Hudspeth counties

Current Federal Status: Species of special concern.

Global and State Ranks: G2QS2

Description (compiled from Gentry 1982, Powell 1998, Correll and Johnston 1970, and Muller 1939)

Habit: Small to medium-sized, single, clumped, or suckering, few-leaved rosettes, 4-6 dm (15-24 in) tall, 5-8 dm (20-32 in) wide.

Leaves: Variable; linear type 40-55 cm (15-22 in) long, 5-6 cm (2-2 $\frac{3}{8}$ in) wide; lanceolate to deltoid type 36-50 cm (14-20 in) long, 7-10 cm (2 $\frac{3}{4}$ -4 in) wide; fleshy, rigid, thick, spreading, smooth, concave above, convex below, light green (glaucous green according to Correll & Johnston and Muller, dark green to bluish-green according to Powell); apical spine grayish with brown tip, stout, 2.5-5 cm (1-2 in) long, conical to subulate, broadly grooved above, rounded to sharply keeled below, protruding into leaf and contiguous with the narrow horny detachable, straight or wavy border which extends to the leaf base; margin with brown to grayish, generally upwardly curved teeth, teeth 5-15 mm ($\frac{1}{4}$ - $\frac{3}{8}$ in) long, 1-3 cm ($\frac{3}{8}$ -1 $\frac{1}{4}$ in) apart (to 5 cm (2 in) apart according to Muller).

Flowers: Inflorescence racemose, 4-6 m (13-20 ft) tall, stout, peduncle 2-3 m (6-10 ft) long, about equaling the raceme, 6-8 cm (2 $\frac{3}{4}$ -3 $\frac{1}{2}$ in) thick at the base, strongly bracteate with persistent deltoid bracts; flowers ca. 45 mm (1 $\frac{3}{4}$ in) long, yellow, borne on short pedicels 3-7 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, clustered or umbellate in groups of 10 to 12, on stout numerous branches 4-10 cm (1 $\frac{1}{2}$ -4 in) or more long; ovary ca. 15 mm ($\frac{3}{4}$ in) long, tube funnelform, 7-8 mm ($\frac{1}{4}$ in) long; tepals 20-22 mm ($\frac{3}{4}$ - $\frac{7}{8}$ in) long, 6-7 mm ($\frac{1}{4}$ in) wide; filaments 40-50 mm (1 $\frac{1}{2}$ -2 in) long, inserted at bases of tepals.

Fruits: Capsules oblong, 2.7-3.7 cm (1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in) long, 1.3-1.5 cm ($\frac{1}{2}$ - $\frac{3}{8}$ in) wide, thick-walled, short-stalked or sessile, beaked; seeds crescent-shaped to deltoid, 5-6 mm ($\frac{1}{4}$ in) long, 3.5-4.5 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in) wide, glossy black, with a wavy marginal wing.

Habitat: Grasslands or oak-juniper woodlands at elevations of about 1060-1800 m (3500-6000 ft).

Phenology: Flowering July-August.

Similar Species: Although the racemose inflorescence of *A. glomeruliflora* easily distinguishes it from most west Texas agaves, it does somewhat resemble *A. gracilipes*. However the inflorescence of *A. gracilipes* is considered a narrowly, closely branched panicle, and the species flowers in the fall. Also the leaves of *A. glomeruliflora* are 36-55 cm (14-22 in) long and the horny margin is continuous from the terminal spine to the leaf base while the leaves of *A. gracilipes* are less than 30 cm (12 in) long and the terminal spine extends along the margin only to about the middle of the leaf. In its most frequently encountered sterile state, *A. glomeruliflora* is sometimes easily confused with robust specimens of *A. lechuguilla*. Aside from waiting several decades for flowering, a combination of leaf characters separate the two species. The leaves of *A. lechuguilla* are 2-4 cm ($\frac{3}{4}$ -1½ in) wide above the base, the fresh lower surfaces are checked with green lines, and the marginal teeth are downward pointing. In *A. glomeruliflora*, the leaves are 5-10 cm (2-4 in) wide above the base, the lower surfaces are not checked with green lines, and the marginal teeth are usually pointed upward (although some specimens with downward pointing teeth have been observed).

Comments: Gentry (1982) thought that *A. glomeruliflora* represented a case of new species formation by hybridization as some of the populations appear to be seed-viable and self-perpetuating. The intermediate morphological appearance of *A. glomeruliflora* suggests a cross between *A. lechuguilla* and a species in section *Agave* such as *A. gracilipes*, *A. neomexicana*, or *A. havardii*. However until the genetic analysis is done on *A. glomeruliflora* and the potential parental species, no certain identification of the parents is possible.

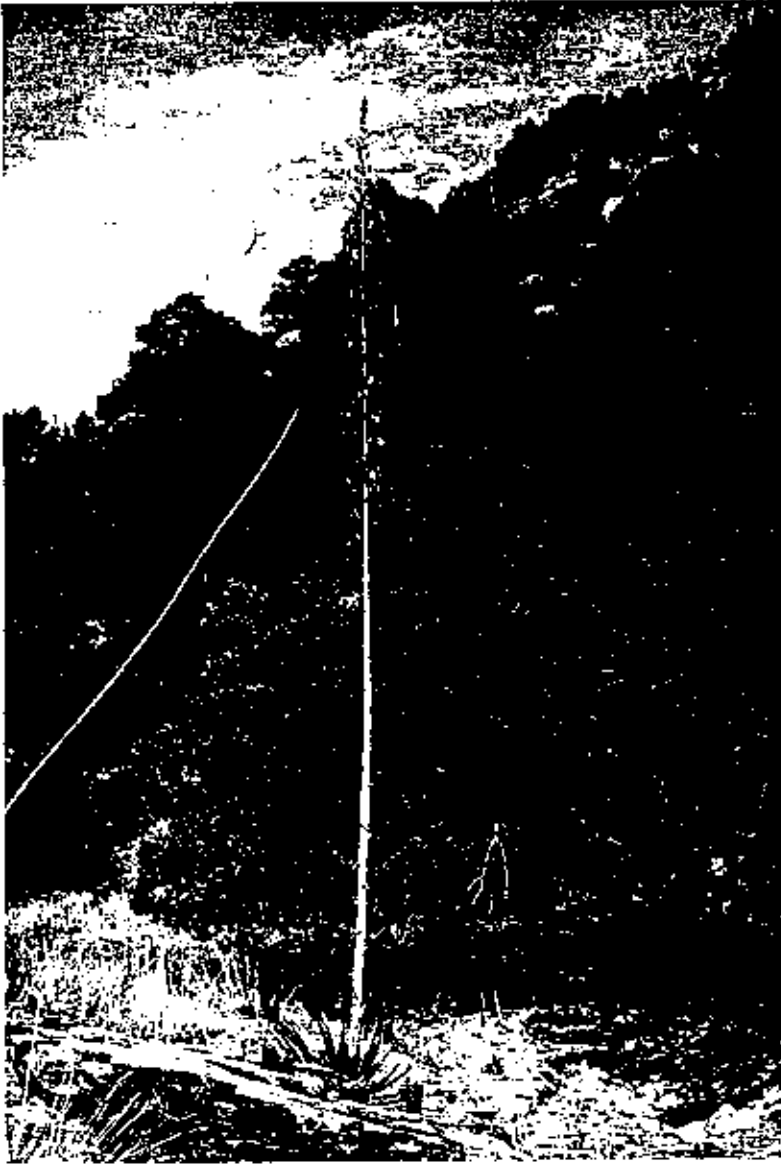
Illustrations: A color photograph appears in Warnock (1977) as *A. chisosensis*.

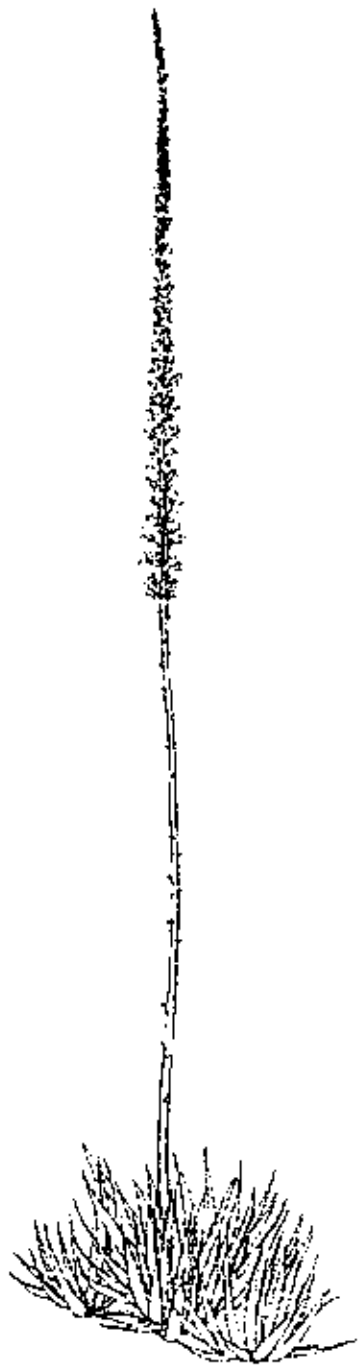
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- Burgess, T. L. 1979. *Agave*-complex of the Guadalupe Mountains National Park; putative hybridization between members of different subgenera. In Genoways, H. H. and R. J. Baker. 1979. Biological investigations in the Guadalupe Mountains National Park. National Park Service, Proceedings and Transactions Series No. Four.
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Agave lectinquilla

PERSONAL PHOTO - MEXICO
 TYPE FROM GUATEMALA
 JAMES H. HENNINGSEN, 1904
 AMERICA



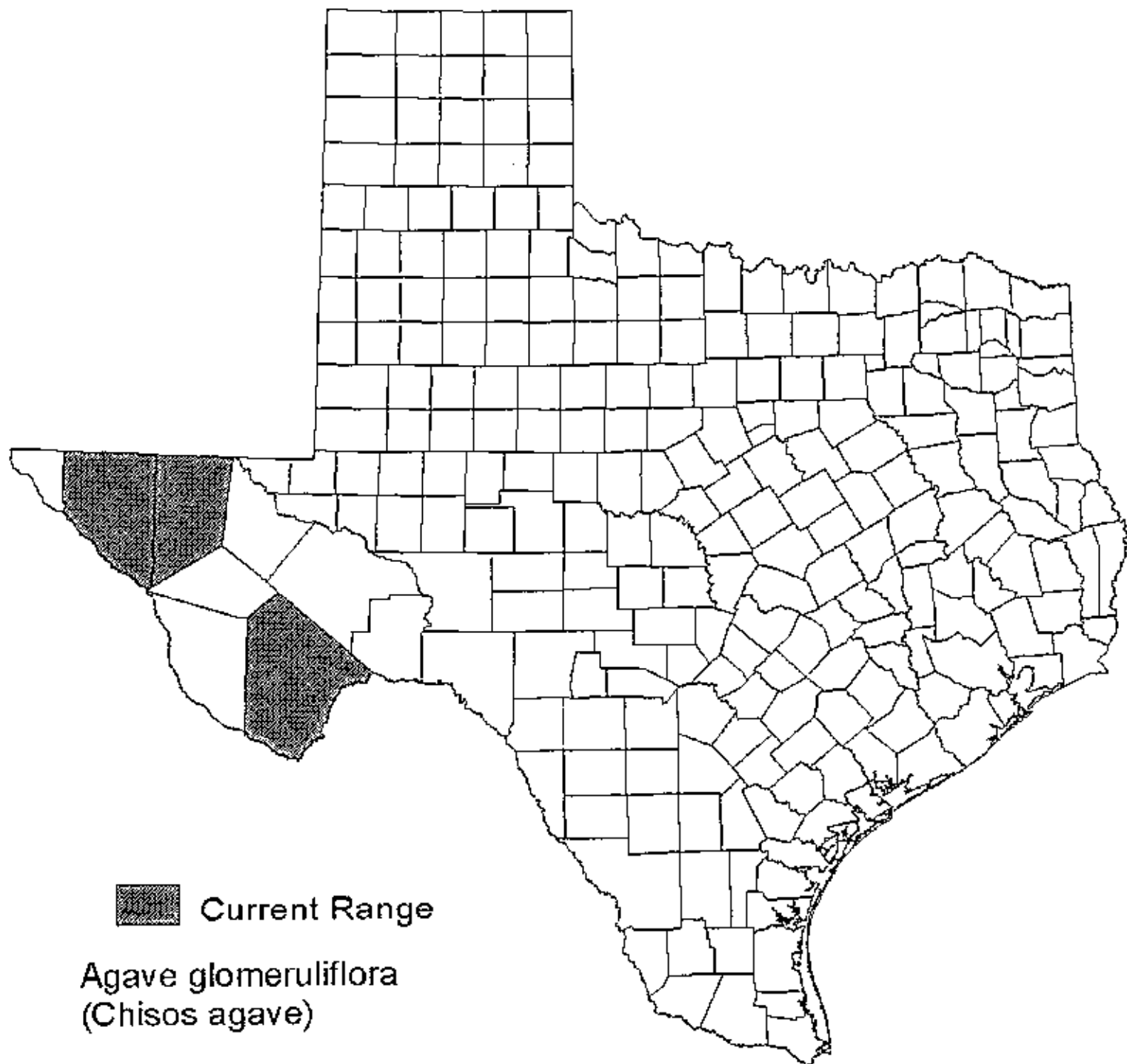
Agave glomerulifera

PERSONAL PHOTO
 TEXAS PARKS & WILDLIFE



Agave havardiana

PERSONAL PHOTO - MEXICO
 QUOTE FROM CHRISTIAN & CHRISTIAN
 "LOCAL WILD PLANTS OF TEXAS"



Scientific Name: *Agrimonia incisa* T. & G.

Synonyms: *Agrimonia parviflora* Ait. var. *incisa* (T. & G.) A. Wood

Common Names: incised groovebur

Global/State Ranks: G3S2

Federal Status: None

Global Range: Patchily distributed across the southeastern US, from North Carolina south through South Carolina and Georgia to Florida, west through Alabama, Mississippi, Louisiana to east Texas.

State Range: Mostly in the longleaf pine belt in East Texas (Angelina, Jasper, Newton and Sabine counties). Also collected but not recently confirmed from Anderson County in the Post Oak Belt (MacRoberts & MacRoberts 1997).

Description (adapted from Kral 1983; Radford, Ahles & Bell 1968): Herbaceous perennial with stems up to 1 m tall, usually shorter. Leaves alternate, pinnately compound, composed of 7-9 principal leaflets and numerous reduced minor leaflets; principal leaflets pubescent on both surfaces, elliptic to oblanceolate, 1-3 cm long and 7-12 mm wide, acute at tip and cuneate at base, the margins each with a few (4-5) large coarse teeth. Flowers numerous in spikelike racemes, the rachises pubescent with nonglandular hairs; hypanthium hemispheric, 1.5-2 mm long, pebbled with resin droplets and rimmed at apex with hooked bristles; sepals 5, triangular-ovate, ca. 2 mm long, glabrous, acute at apex; petals 5, yellow, short-clawed, 1.5-3 mm long. Fruit consisting of 2 nutlets enclosed in a bur-like hypanthium that attaches readily to clothing.

Similar Species: Distinguished from the 3 other Texas *Agrimonia* species by its small leaflets (the largest to 3 cm long), coarse marginal teeth and nonglandular flowering rachis.

Habitat: Well drained sandy soils in longleaf pine or mixed pine-oak forests and forest borders, sometimes in fire-maintained upland longleaf pine savannas but also in more mesic open forests. Consistent associates at sites in the Pineywoods include *Andropogon ternarius*, *Centrosema virginianum*, *Croton argyranthemus*, *Dichantheium aciculare*, *Pityopsis graminifolia*, *Pinus palustris*, *Schizachyrium scoparium* and *Toxicodendron radicans*; other regular associates include *Ambrosia artemisiifolia*, *Aristida purpurascens*, *Aristolochia reticulata*, *Berlandiera pumila*, *Helianthus mollis*, *Paspalum setaceum*, *Rhus copallina*, *Ruellia humilis*, *Sassafras albidum*, *Stillingia sylvatica*, *Tragia urens*, and *T. urticifolia* (MacRoberts & MacRoberts 1997).

Phenology: Flowering (June-?) July-October; basal rosettes present during winter months.

Comments: Although rather wide-ranging in the southeastern United States, *Agrimonia incisa* is very local and is rarely encountered throughout its range. It was only recently discovered in Texas (Mahler 1989) and Louisiana.

Illustrations: None known.

Selected References:

Clewell, A. F. 1985. Guide to the vascular plants of the Florida panhandle. University Presses of Florida, Florida State University Press, Tallahassee. 605 pp.

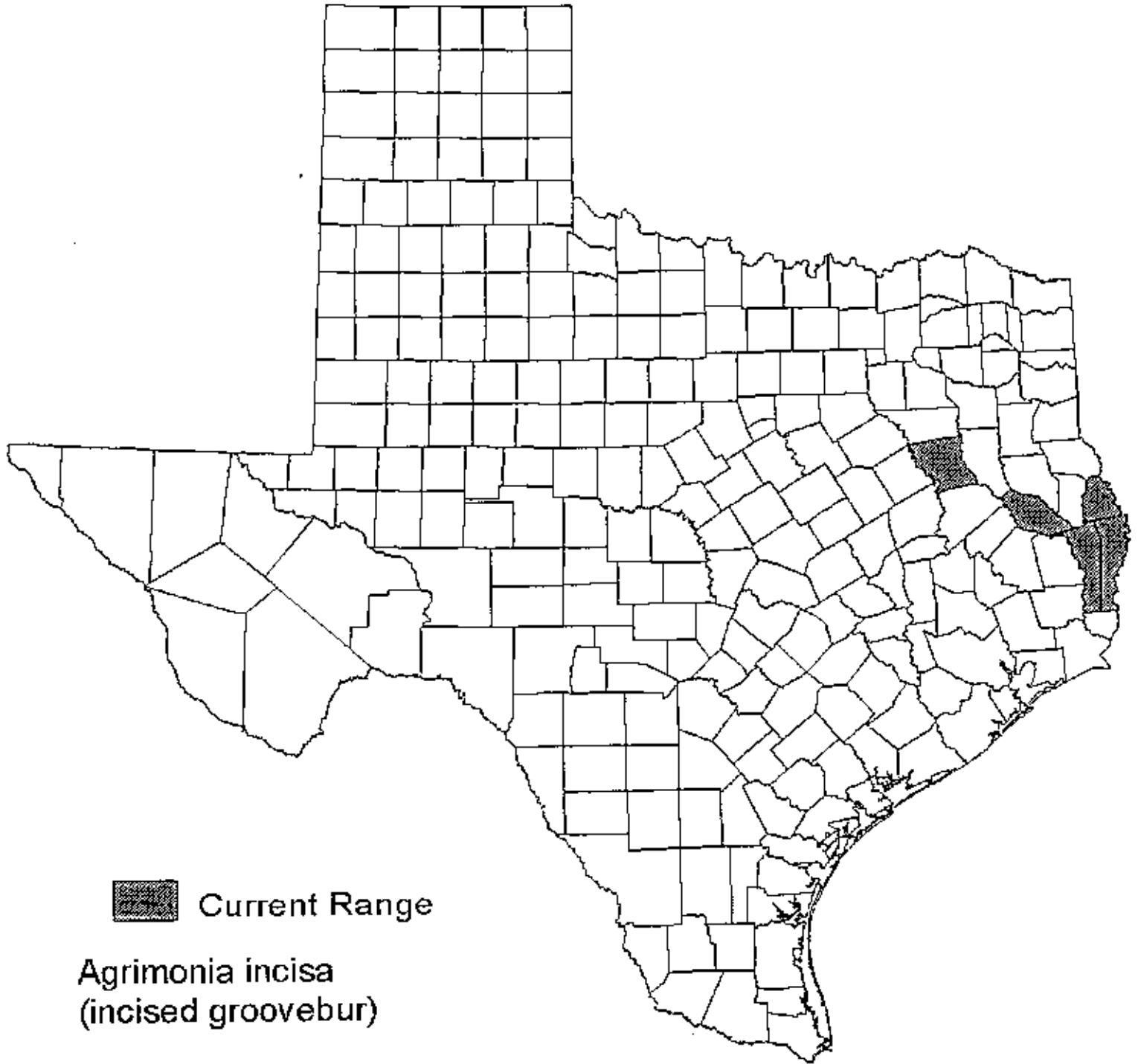
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Seed grove
Michael S. ...
...



Agrimonia tricuspidata
Barbara McRoberts



Scientific Name: *Allium elmendorfii* M. Ownbey

Synonyms: None.

Common Name: Elmendorf's onion

Global/State Ranks: G2S2

Federal Status: None.

Global Range: Endemic to Texas.

State Range: Ranging from the post oak belt on Eocene sands of south-central Texas (Atascosa, Bee, Bexar, Gonzales, Guadalupe and Wilson counties) south to the Pleistocene and Holocene sands of the Coastal Bend (Kenedy, Nueces, Refugio and San Patricio counties). There is one seemingly anomalous collection from Enchanted Rock (Llano County) on the Llano Uplift.

Description (adapted from Correll & Johnston 1970): An onion with numerous small bulblets loosely attached to the main bulb, the white coat of which lacks a cover of brown anastomosing fibers. Leaves 3 or more per bulb, linear, concavo-convex in cross section, 1-2 mm wide and as long as or longer than the flowering stalk, with an onion or garlic fragrance. Flowers in an umbel at the apex of a stalk 1-2 (-4) dm tall; umbel subtended by 3-4 bracts, the bracts hyaline with 3-5 darker veins; perianth campanulate, consisting of 6 white to pinkish tepals about 5 mm long; stamens 6, shorter than the perianth; ovary crestless; style linear, the stigma capitate. Fruit a vaguely 3-lobed globose capsule containing numerous shiny, black, flattened seeds.

Similar Species: Reliably recognized only by the presence of numerous bulblets loosely attached to the base of the principal bulb, a condition found in two other Texas onions, *A. canadense* var. *mobilense* and *A. ranyonii*. In those taxa the bulb coat is covered by brown, anastomosing fibers; in *A. elmendorfii* the fibers are absent, and the bulb coat is simply white.

Habitat: Grassland openings in oak woodlands on deep, loose, well drained sands. In the Coastal Bend, *Allium elmendorfii* occurs on Pleistocene barrier island ridges and on the Holocene Sand Sheet which support coastal live oak (*Quercus virginiana*) woodlands; to the north it occurs in post oak-black (*Quercus stellata*) - black hickory (*Carya texana*) - live oak woodlands over the Queen City and similar Eocene formations. The collection from Enchanted Rock was taken from "wet pockets of granitic loam" (Barkley, Carriker & Tharp 47269, BRIT/SMU). Common associates include *Acalypha radians*, *Cenchrus incertus*, *Chloris cucullata*, *Cnidoscolus texanus*, *Cryptantha texana*, *Descurainia pinnata*, *Galactia canescens*, *Hymenopappus artemisiifolius*, *Lesquerella grandiflora*, *Lupinus subcarneus*, *Phlox drummondii* and *Senecio ampullaceus*.

Phenology: Flowering March through April or May.

Comments:

Illustrations: A color photograph appears in Cheatham, Johnston & Marshall (1995).

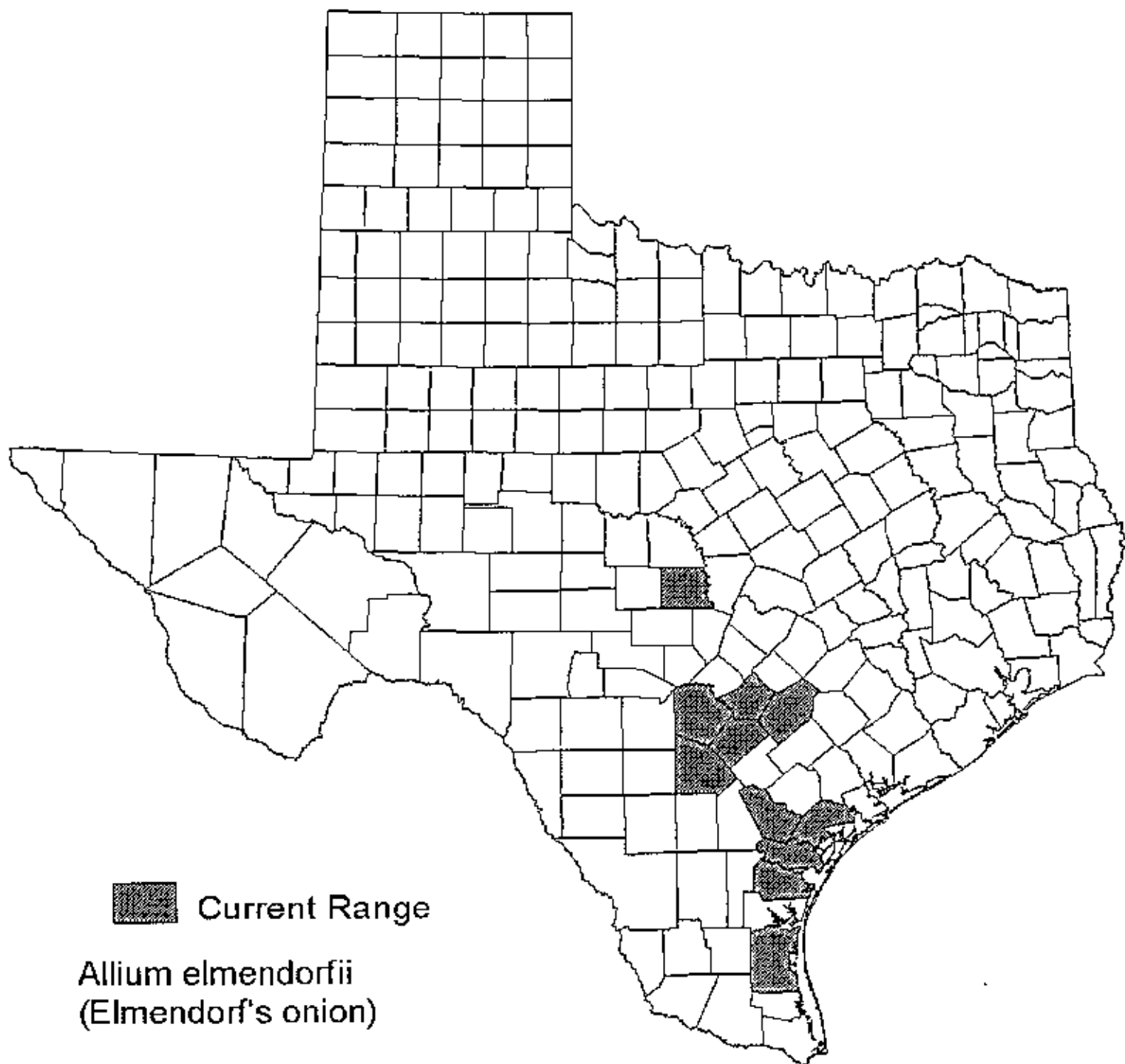
Selected References:

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Plants, Inc., Austin, Texas. 568 pp.

Ownbey, M. 1950. The genus *Allium* in Texas. Research Studies of the State College of Washington 18: 181-22.





Scientific Name: *Allolepis texana* (Vasey) Soderstrom & Decker

Synonyms: *Poa texana* Vasey; *Distichlis texana* (Vasey) Scribn.

Common Name: Texas false saltgrass

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: West Texas south to Chihuahua, Coahuila and Durango (Powell, 1994); perhaps also in Tamaulipas (Henrickson & Johnston, in prep.).

State Range: Brewster, El Paso, Jeff Davis and Presidio counties (Gould 1975; Powell 1994).

Description (adapted from Henrickson & Johnston in prep.): Dioecious stoloniferous perennial grass with glabrous, spreading to ascending culms 24-63 cm long. Leaves with rounded sheaths; ligule a ciliate membrane 0.5-1.4 mm long; blades flat or somewhat folded, 30 cm or more long, 2.5-6 mm wide, scabrous along margins but otherwise glabrous. Flowers in a contracted panicle 5-20 cm long, with appressed branches 1-6 cm long, bearing spikelets to the base; staminate spikelets ovate-lanceolate, shiny, 0.9-2.3 cm long and 3-8 mm wide; glumes ovate, hyaline, the lower 1-nerved and 4-5 mm long, the upper 1-3 nerved and slightly longer; lemmas of lower florets glabrous, shiny, 5-5.5 mm long, 3-nerved; pistillate spikelets 1-2 cm long and 2.3-3.5 mm wide, bearing 8-9 florets; glumes leathery with scarious margins, the lower 7-9 mm long, the upper slightly longer; lemmas of lower florets leathery, broadly ovate, 7.5-10 mm long.

Similar Species: Reminiscent of *Distichlis spicata* but distinguished by its flat (rather than involute), wider, non-distichous leaves.

Habitat: Sandy to silty soils of valley bottoms and river floodplains. Unlike its close relative *Distichlis spicata*, *Allolepis texana* apparently does not normally occupy alkaline or saline sites (Powell 1994).

Phenology: Flowering (June-) July-October (Powell, 1994).

Comments:

Illustrations: Line drawings of panicle and floral parts appear in Powell (1994). A black and white photograph of habit and line drawings of floral parts appear in Silveus (1933). Color photographs appear in Cheatham, Johnston & Marshall (1995).

Selected References:

Cheatham, S., M. C. Johnston, and L. Marshall. 1995. The useful wild plants of Texas, the southeastern and southwestern United States, the southern plains, and northern Mexico. Volume 1. Useful Wild Plants, Inc., Austin, Texas. 568 pp.

Gould, F. W. 1975. The grasses of Texas. Texas A & M University Press, College Station. 653 pp.

Powell, A. M. 1994. Grasses of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 377 pp.

Silveus, W. A. 1933. Texas grasses: classification and description of grasses. Privately published, San Antonio. 782 pp.

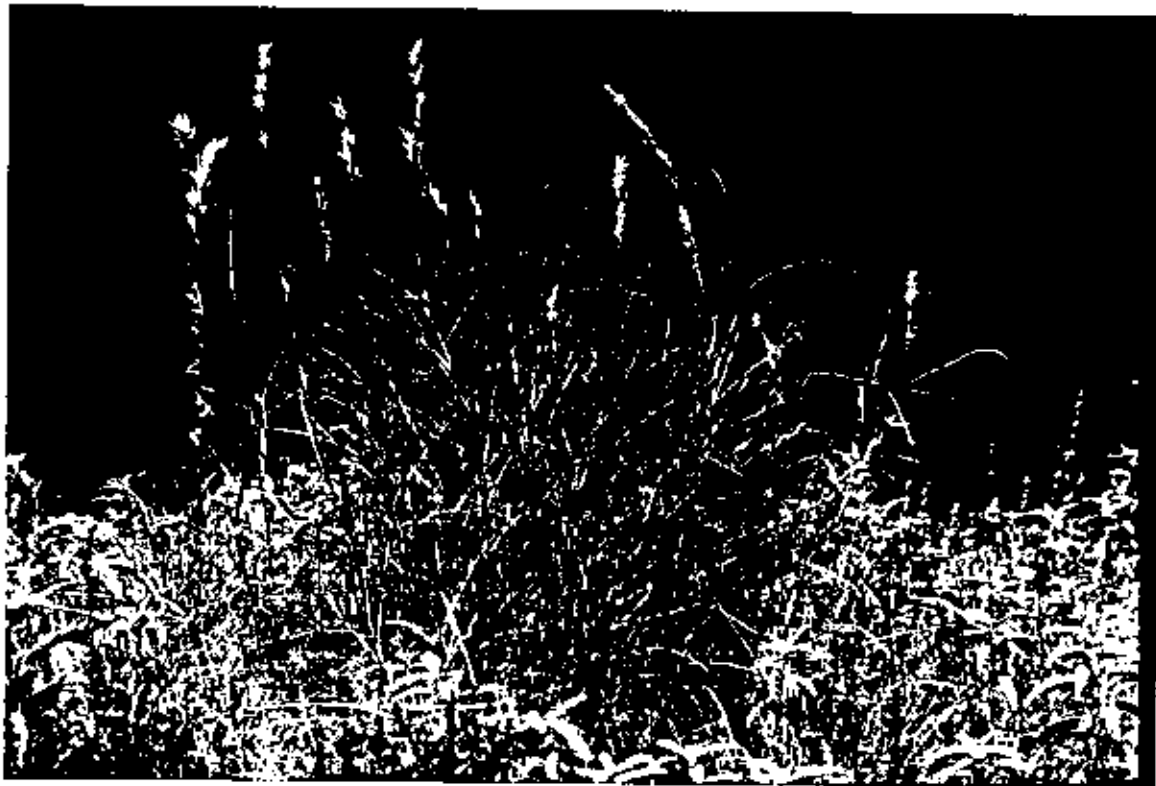




Fig. 197. *Allolepis texana*. Panicle; lemma and palea.

line, glabrous; first glume 1-nerved, 4–5 mm long; second glume 1–3-nerved, slightly longer than first; lemmas of lower florets glabrous, shiny, 3-nerved, 5–5.5 mm long. Spikelets (pistillate) terete or compressed slightly, 1–2 cm long, 2.5–3.5 mm wide, florets 8–9; glumes leathery, with wide scarious margins; first glume 7–9 mm long; second glume slightly longer than first; lemmas of lower florets leathery, broadly ovate, 7.5–10 mm long.

Infrequent and highly localized, deep silty or sandy soil. Presidio Co., along the Rio Grande at Presidio; mouth of Cibolo Creek between Presidio and the international bridge, where abundant. Jeff Davis Co., Davis Mts., Limpia Canyon, 10 mi NE Fort Davis; Wild Rose Pass; 12 mi NE Fort Davis; Limpia Valley, cattle guard to Jeff Ranch, hwy from Fort Davis to Balmorhea. 2,300–4,900 ft. Flowering Jul–Oct. Coahuila, Chihuahua, Durango, Mex.

Allolepis is distinguished from *Distichlis* in habit by its long stolons, leaves that are flat, wider, and not distichous, and non-alkaline habitat. *Distichlis* has scaly rhizomes and involute leaf blades (at maturity), and occurs in alkaline or saline habitats. Additional features serving to delimit these genera are discussed by Soderstrom and Decker (1965). *Allolepis* has been so infrequently collected and observed in the field that more information is needed about its habit and habitat.

Tribe 14. Pappophoreae

With primary distribution in the tropics, tribe Pappophoreae is represented by five genera and about 41 species. Three genera of this tribe occur in Texas, all of them in the Trans-Pecos. The tribe is distinguished by its many-nerved glumes and lemmas with many nerves and awns.

Key to the Genera of Pappophoreae

1. Lemma awns 9, subequal in length, plumose; lemma body with 9 strong nerves, the apex not lobed 60. *Enneapogon*, p. 236
1. Lemma awns 11 or more, unequal in length, scabrous or glabrous; lemma body with 9–11 or more nerves, the apex lobed.
 2. Glumes 1-nerved; florets falling together 59. *Pappophorum*, p. 233
 2. Glumes 7–13-nerved; florets falling separately 61. *Cottea*, p. 237

59. PAPPOPHORUM Schreb. PAPPUSGRASS.

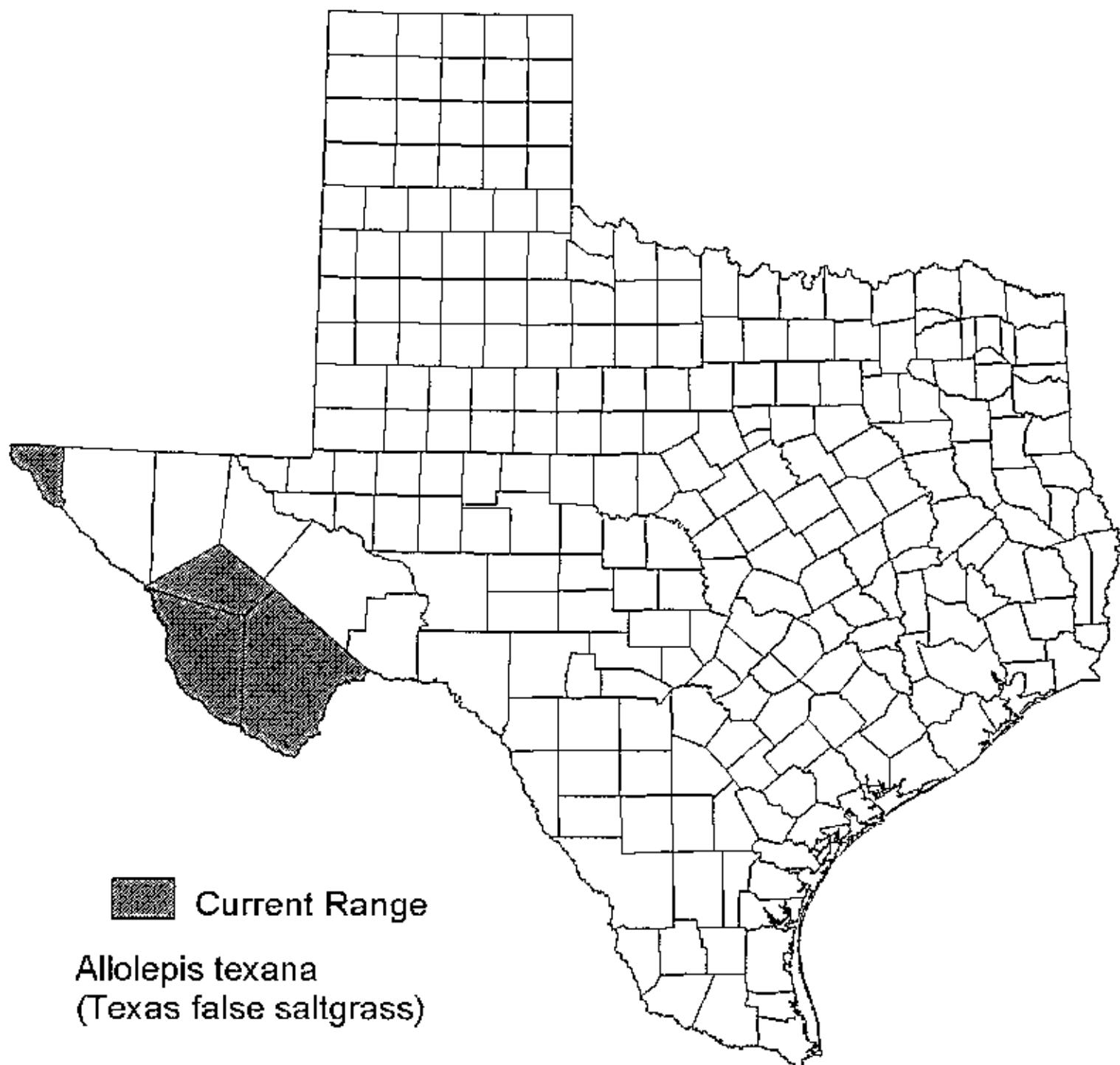
Perennials, caespitose, erect. Culms 0.5–2 m long, glabrous. Leaves with sheaths having a tuft of hairs at sides of collars; ligule a ring of short hairs, but longer hairs (2–4 mm long) at base of leaf blade above ligule; blades flat or involute, 10–30 cm long, 1.5–5 mm wide. Inflorescence of contracted, slender, spike-like panicles, these bristly in aspect because of lemma awns and whitish to purplish. Spikelets 3–6-flowered, 6–8 mm long, with only lower 1–3 spikelets perfect; disarticulation above glumes, florets falling together; glumes subequal, 1-nerved, membranous, usually 3–4 mm long; lemmas rounded on back, many-nerved, these indistinct, pubescent on margins and midnerve from base to middle, the nerves extending to 11–15 awns, these glabrous or scabrous; paleas nearly equal in length to lemma body.

A genus of eight species (Reeder and Toolin, 1989) distributed in North and South America. The genus name is from Greek *pappos*, pappus, and *phoros*, bearing, in reference to the pappuslike awns of the lemma (pappus is a structure characteristic of fruits of the sunflower family). The key to the species is adapted from Reeder and Toolin (1989).

Key to the Species

1. Lemma body 3–4 mm long, oblong; awns usually not more than 1.5 times as long as lemma body, usually not spreading at right angles; inflorescence axis, branchlets, and pedicels perhaps with small sunken glands

1. *P. bicolor*.



Scientific Name: *Ambrosia cheiranthifolia* Gray

Synonyms: None.

Common Name: South Texas ambrosia

Global/State Ranks: G2S2

Federal Status: Endangered

Global Range: South Texas and northern Tamaulipas

State Range: Cameron, Jim Wells, Kleberg and Nueces counties

Description (adapted from Correll & Johnston 1970 and Turner 1983): Herbaceous perennial with erect stems 1-4 dm tall. Leaves of lower stem opposite, those of upper stem alternate, sessile, oblanceolate to oblong-lanceolate, usually 2-4 cm long, usually unlobed and entire, densely gray-strigose on both surfaces. Flower heads containing unisexual florets arranged in raceme-like axillary inflorescences, with staminate heads above and pistillate heads below; staminate involucre saucer-shaped, ca. 4 mm wide, with 4-6 short triangular lobes; pistillate involucre obovoid, ca. 3 mm long, with 4-5 blunt spine-like processes. Fruit an achene concealed within the surrounding nutlike involucre.

Similar Species: Strikingly different from other Texas *Ambrosia* species in having leaves with silky gray pubescence and entire margins. It is not likely to be confused with any other species in its Texas range, although the foliage of *Helianthus ciliaris* is of a similar color and can be momentarily distracting during searches.

Habitat: Grasslands and mesquite-dominated shrublands on various soils, ranging from heavy clays to lighter-textured sandy loams, mostly over the Beaumont Formation (Quaternary) on the coastal plain. Common associates include *Ambrosia psilostachya*, *Bouteloua rigidiseta*, *Buchloe dactyloides*, *Grindelia microcephala*, *Ruellia nudiflora*, *Indigofera miniata*, *Glandularia bipinnatifida*, *Bouchetia erecta*, *Malvastrum coromandelianum*, *Parthenium hysterophorus*, *Setaria leucopila*, *Clematis drummondii*, *Melochia pyramidata*, *Verbesina microptera*. Non-native grasses such as *Cenchrus ciliaris*, *Dichanthium annulatum*, *Dichanthium sericeum* and *Bothriochloa ischaemum* are often present.

Phenology: Flowering July-November. Readily recognized by foliage alone during most of the growing season.

Comments: In most of its range, cultivation of coastal prairie has relegated this species to railroad and highway rights-of-way, cemeteries and other unplowed sites. It was listed as Endangered in 1994.

Illustrations: A line drawing appears in Turner (1983).

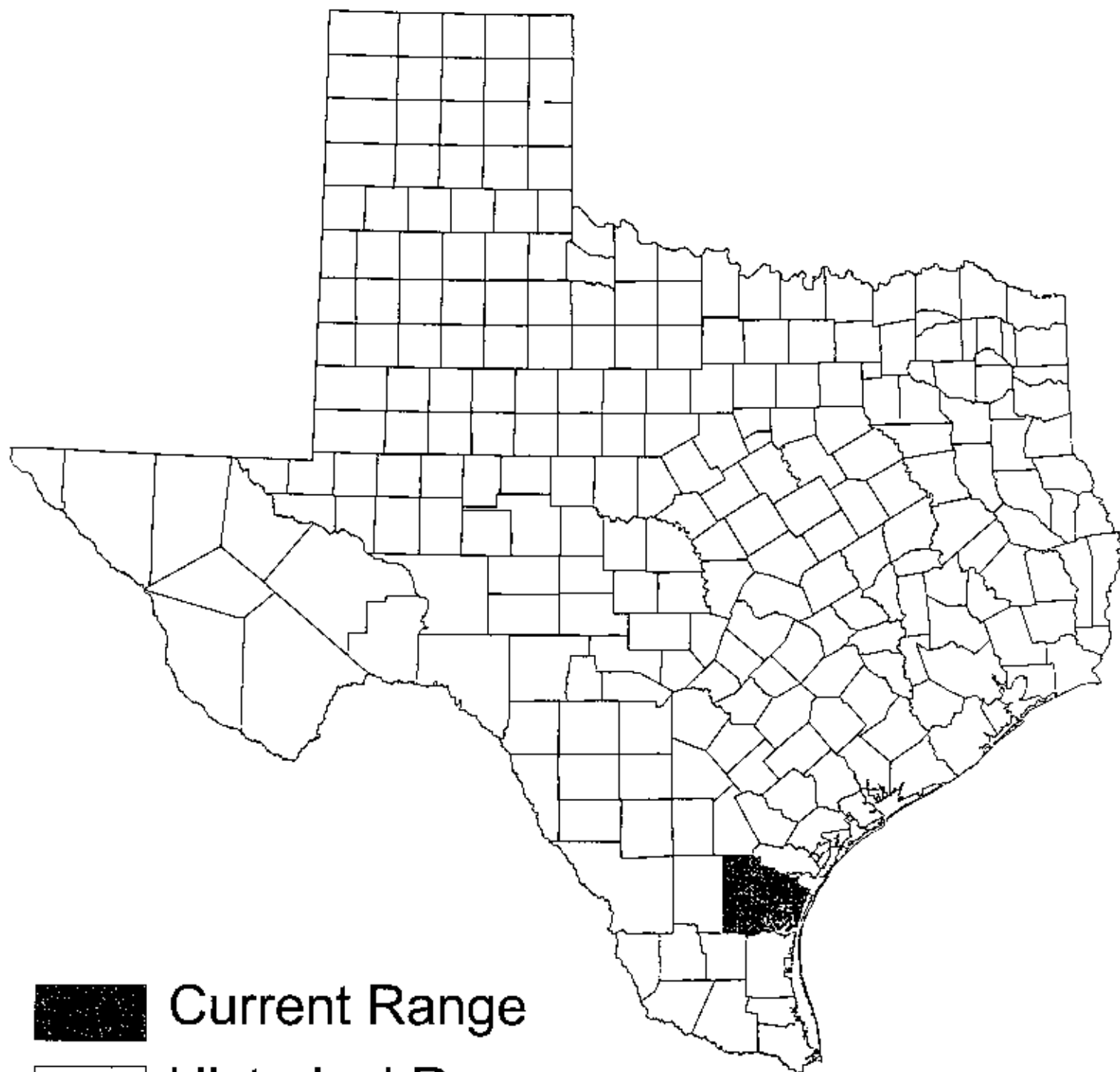
Selected References:

Turner, B. L. 1983. Status report [on *Ambrosia cheiranthifolia*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.





Ambrosia cheiranthifolia (X 1)



■ Current Range
□ Historical Range

Ambrosia cheiranthifolia
(South Texas ambrosia)

Scientific Name: *Amsonia tharpii* Woods.

Synonyms: None.

Common Name: Tharp's bluestar

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: West Texas and southwestern New Mexico.

State Range: Known only from Pecos County.

Description (adapted from Henrickson & Johnston in prep.): Suffrutescent perennial with numerous stems from a woody rootstock, to 2 dm tall. Leaves sessile or nearly so, alternate, crowded, with scattered hairs or essentially glabrous, elliptic-lanceolate on the lower stem and linear to linear-lanceolate on upper stem, acute to acuminate at the apex, to 5 cm long and 1.2 cm wide. Flowers in few-flowered terminal inflorescences, on pedicels about 3 mm long; calyx 5-lobed, ca. 3.5 mm long; corolla pale blue to greenish white, salverform, the tube ca. 15 mm long, somewhat constricted at the orifice, the 5 spreading lobes 6-8 mm long. Fruit a thick, glabrous, subfusiform follicle 25-25 mm long.

Similar Species: Similar in general features to other Texas *Amsonia* species, but distinguished by its dimorphic leaves (those of the lower stem broader than those of the upper stem), constricted corolla tube and more or less glabrous foliage.

Habitat: Open areas in shortgrass grasslands or shrublands in shallow clay soils over limestone. Bedrock at the Pecos County site is mapped as Cretaceous limestone and marl of the Washita Group; soils are mapped as very shallow, well drained, calcareous, moderately alkaline, light brownish gray stony loam of the Lozier-Rock outcrop association, soils with very low available water capacity which developed over fractured caliche-coated limestone. Soils at one Eddy County, New Mexico site are mapped as gravelly loam of the Potter-Simona association, although most plants occur on included outcrops of broken, slightly gypsiferous limestone and in pockets of deeper sandier soil (U. S. Fish & Wildlife Service 1992). Herbaceous associates at the Pecos County site include *Aristida* spp., *Bouteloua curtipendula*, *Erioneuron pilosum*, *Setaria leucopila*, *Acleisanthes longiflora*, *Calylophus hartwegii*, *Tiquilia canescens*, *Croton dioicus*, *Eupatorium greggii*, *Euphorbia acuta*, *Gilia rigidula*, *Hedyotis acerosa*, *Machaeranthera pinnatifida*, *Oenothera brachycarpa*, *Polygala macradenia*, *Thelesperma simplicifolium* and *Zinnia acerosa*. Associates at the Eddy County New Mexico sites include *Bouteloua breviseta*, *Paronychia jamesii*, *Euphorbia acuta*, *Cryptantha palmeri*, *Hymenoxys acaulis*, *Acacia neovernicosa*, *Thymophylla acerosa*, *Tiquilia canescens*, *T. hispidissima*, *Dalea formosa*, *Krameria grayii*, *Zinnia acerosa*, *Condalia spathulata*, *C. ericoides*, *Koebertia spinosa*, *Poliomintha incana*, *Rhus microphylla* and *Juniperus monosperma*.

Phenology: Flowering April-early May, sometimes opportunistically with rain.

Comments: Known from one population in Pecos County, Texas and three populations in Eddy County, New Mexico.

Illustrations: A line drawing of the perianth appears in McLaughlin (1982). A color photograph and a line drawing of a single stem appear in Poole & Riskind (1987). A color photograph of flowers and upper stem appears in Cheatham, Johnston & Marshall (1995).

Selected References:

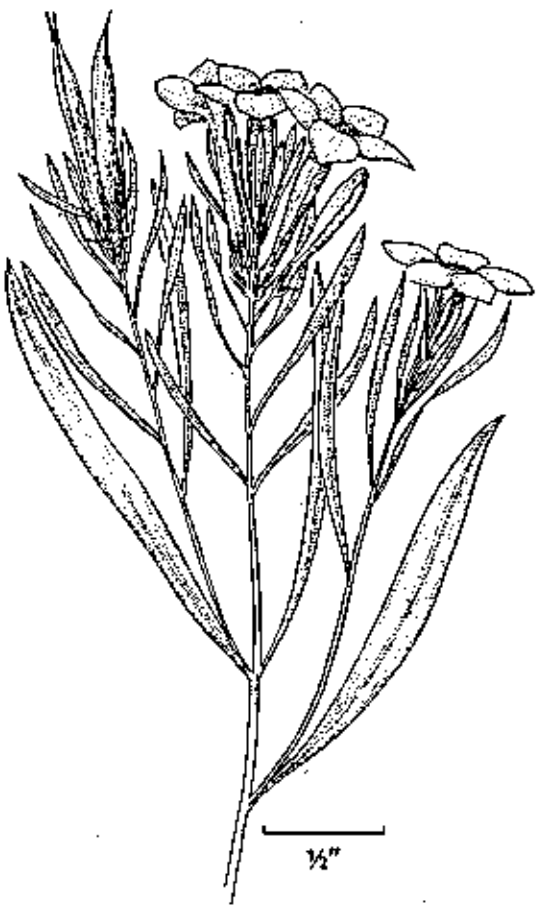
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- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Rowell, C. M., Jr. 1983. Status report [on *Amsonia tharpii*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.
- U. S. Fish & Wildlife Service. 1992. Performance report [on field research into *Amsonia tharpii*.] Unpublished report, U. S. Fish & Wildlife Service, Albuquerque.



Common Name:
Tharp's blue-star
Tharp's slimpod



David Risland



Flowers and fruits of
Tharp's blue-star

Scientific Name: *Amsonia tharpii* Woods.

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: None published.

Description:

Habit: Perennial, 4-12 in. tall, from woody rootstock, covered with minute, rough hairs.

Leaves: Alternate to more or less whorled, crowded, minutely stalked, of two distinct types; lower leaves elliptic to lance-shaped, 3/8-1/2 in. broad; upper leaves linear to linear lance-shaped, with pointed tips, 1/4-1/2 in. wide, up to 2 in. long.

Flowers: Greenish-white to pale blue, at ends of branches, in clusters of 10-15, each flower on a hairy stalk about 1/4 in. long; calyx with 5 narrowly lance- to needle-shaped, abruptly pointed, hairy lobes, 1/16-1/4 in. long; corolla 5-parted, showy, tubular, divided into 5 lobes at the top, noticeably constricted below the lobes, tube 1/2-3/4 in. long, lobes 1/4-3/8 in. long; stamens attached about 1/16 in. below the constriction; flowering March to June, depending on rainfall.

Fruit: Dry, thick, spindle-shaped, opening along one side, 3/4-4/5 in. long; seeds 4-5, cylindrical, blunt at the top, corky, 1/4-3/8 in. long, 1/16-1/8 in. wide.

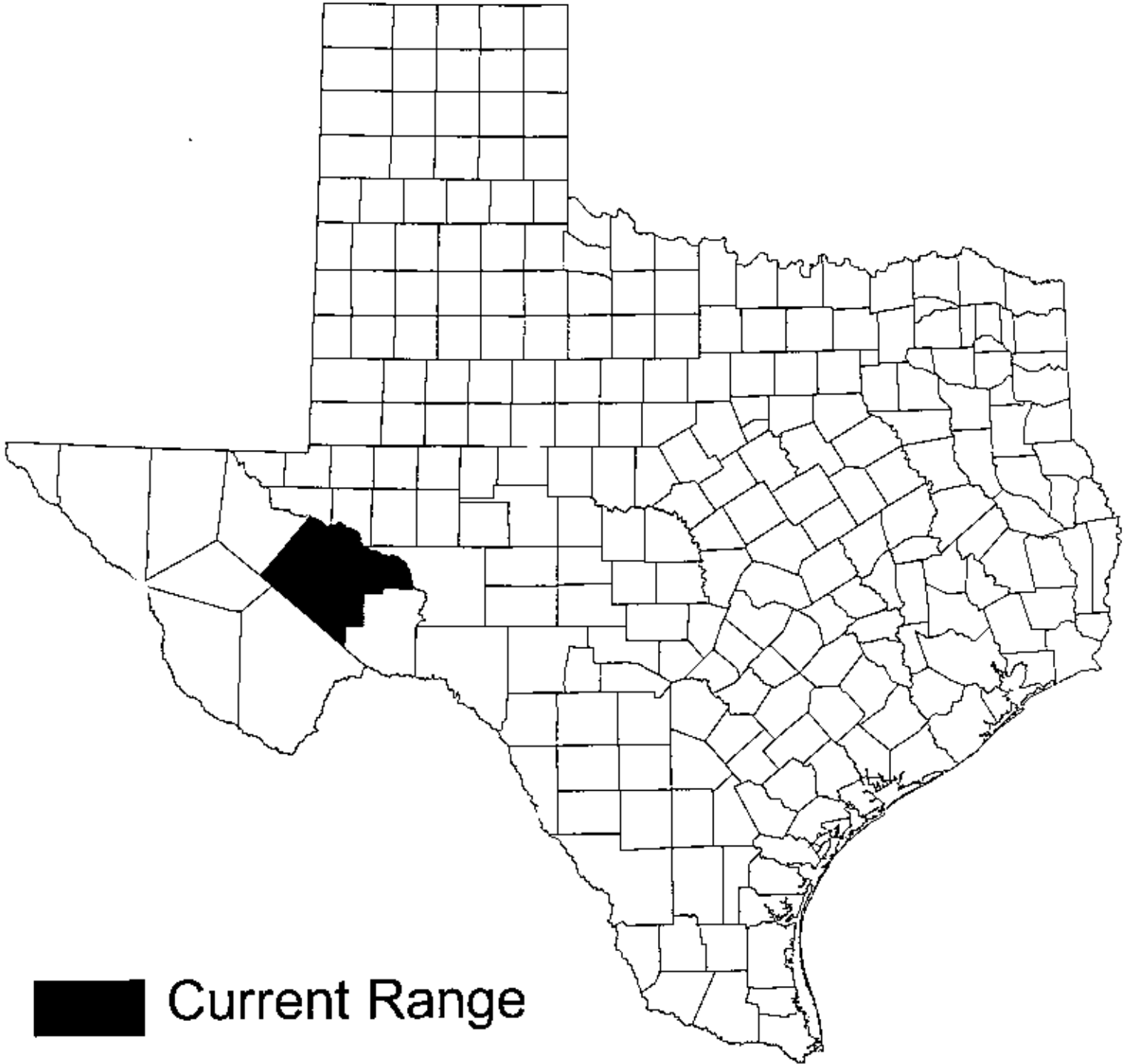
Habitat: Dry, sparsely vegetated, desert shrublands on somewhat eroded, lower slopes of limestone hills; with desert myrtlecroton, creosote bush, red-berry juniper, javelina-brush, mariola, burrograss, and threeawn.

Ownership: University of Texas and Texas Department of Highways and Public Transportation right-of-way.

Similar Species with Key Character Differences:

Stems densely covered with crinkly hairs; fruit stout, resembling a string of beads, 2-3 1/2 in. long; forming dense colonies in sandy soils *A. arenaria*

(continued on back)



■ Current Range

Amsonia tharpia
(Tharp's blue-star)

Scientific Name: *Andrachne arida* (Warnock & M. C. Johnston) G. L. Webster

Synonyms: *Savia arida* Warnock & Johnston

Common Name: Trans-Pecos maidenbush

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Endemic to the Chihuahuan Desert of Trans-Pecos Texas and adjacent northern Chihuahua and Coahuila.

State Range: Brewster County (middle western slopes of the Dead Horse Mountains) and Presidio County (the Solitario).

Description (adapted from Warnock & Johnston 1960; Correll & Johnston 1970; Henrickson & Johnston in prep.): Intricately branched, thornless, dioecious shrub 2.5-7.5 (-10) dm tall with straight twigs less than 10 cm long. Leaves alternate, simple, oval to elliptic-obovate or spatulate, 4-10 mm long (1-2 times long as wide), rounded at base, rounded or apiculate at apex, the margins entire, pubescent on both surface with short, mostly appressed hairs. Flowers unisexual, solitary or in small clusters on short pedicels, with 5 sepals and 5 shorter petals; staminate flowers on pedicels 2-3.2 mm long, the sepals 1.8-2 mm long, green with white margins, the petals 0.9-1.0 mm long, obovate, yellowish-green; stamens 5; pistillate flowers on pedicels 3-4 mm long, the calyx 5-5.5 mm broad, the lobes 1-1.5 mm wide, greenish-yellow on the outer surface; petals reduced, about 1/3 as long as the calyx lobes; styles 3, prominent, spreading. Fruit a pendulous capsule 3.5-4 mm long and ca. 7 mm wide, depressed-globose, somewhat 3-lobed, containing 6 seeds; seeds wedge-shaped, 2.7-3 mm long and 2.0-2.2 mm wide.

Similar Species: *Andrachne phyllanthoides*, which ranges from Alabama west to Val Verde County, Texas, has curving twigs more than 10 cm long and leaves more than 10 mm long. {***WRC, JMP: Vegetatively similar to what other small shrubs?}

Habitat: Crevices in calcareous bedrock exposures on arid mountain slopes, usually with succulents such as *Agave lechuguilla* and *Dasyllirion* spp. Known Texas sites are on Cretaceous limestone; a collection from the eastern foothills of the Sierras de las Cruces in Coahuila (*J. M. Johnston 9402*, TEX-LL) is from calcareous shale.

Phenology: Flowering July-October.

Comments:

Illustrations: A line drawing appears in Powell (1998).

Selected References:

Johnston, M. C. 1962. *Savia arida* in Coahuila, Mexico. *Southwestern Naturalist* 7: 80.

Powell, A. M. 1998. *Trees and shrubs of the Trans-Pecos and adjacent Areas*. University of Texas Press, Austin. 498 pp.

Wamock, B. H. and M. C. Johnston. 1960. The genus *Savia* (Euphorbiaceae) in extreme western Texas. Southwestern Naturalist 5(1): 1-6.





Fig. 194. *Andrachne arida*; F) female branch;
M) male branch

preferred by white-winged dove, at least in Presidio Co. According to Jack Skiles, the seeds of *Jatropha* occurring near Langtry have a taste very similar to pecans and are eaten by some people in that area, although the seeds of some (mostly tropical) *Jatropha* species reportedly are poisonous.

3. ANDRACHNE L.

Shrubs, intricately branched, less than 1 m high; dioecious. Leaves alternate, oval, 1–2 times as long as broad; stipules dark, 1–2 mm long. Flowers in small clusters or solitary; staminate flowers with 5 sepals and petals; stamens 5; ovary vestigial; pistillate flowers with 5 sepals and petals; ovary 3-celled. Fruit a capsule, 3–5 mm long; seeds ca. 3 mm long, wedgeshaped, 2 per cell.

A genus of about 15 species in warm regions of the world. The genus *Savia* to which our species was first assigned, is weakly segregated from *Andrachne*.

1. *Andrachne arida* (Warnock & M. C. Johnst.) G. L. Webst. Fig. 194 [*Savia arida* Warnock & M. C. Johnst.]. Rare low shrubs, rocky limestone slopes, canyons, and crevices. Brewster Co., Dead Horse Mts., mid W slopes near Sue Peaks; above Roy's Peak; Black Gap, lower Maravillas Creek. Presidio Co., Solitario, NW of Solitario Peak, in Glen Rose limestone, 150–200 plants over 1 acre with Hinckley Oak. Jul–Oct. Also Coah., Mex.



Fig. 195. A) *Bernardia obovata*
(Desert Myrtlecroton); B) *B. myricifolia*

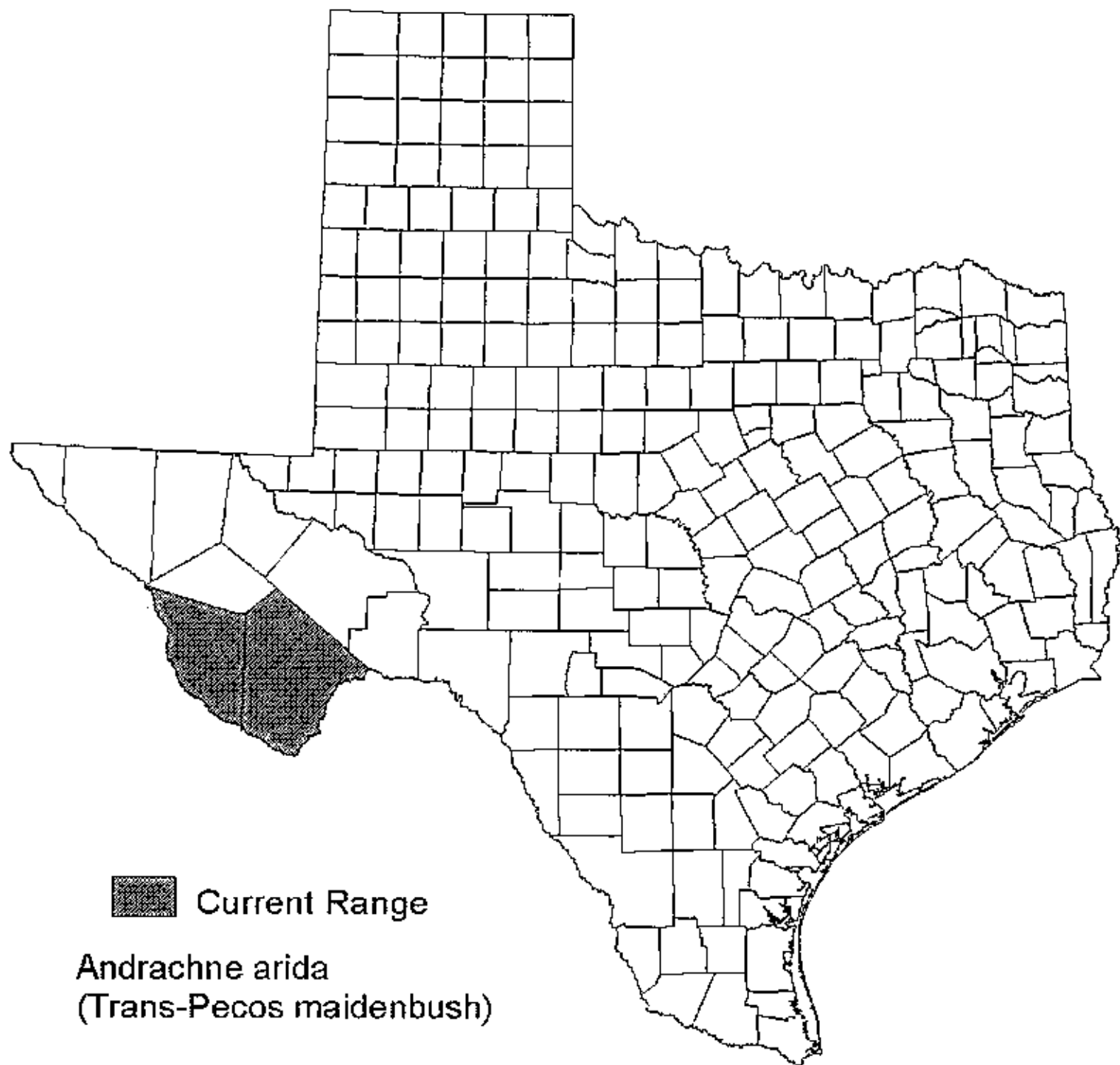
This rare species is distinguished from *Andrachne phyllanthoides* (Nutt.) Coult., which occurs as far west as the Edwards Plateau, by its straight, grayish-white leafy twigs 5–10 cm long, oval leaf blades less than 1 cm long, pistillate flower stalks 3–4 mm long, and staminate flower stalks 2–3.2 mm long.

4. BERNARDIA MILL. BERNARDIA

Shrubs to 2.5 m high; dioecious; branches elongated 5–25 cm long, or short lateral spurs, the latter bearing flowers; leaves and capsules covered with branched hairs. Leaves alternate or clustered on the spur shoots; blades 0.7–3 cm long, margins with rounded teeth. Flowers in small clusters or solitary; staminate flowers with 3 greenish sepals; petals absent; stamens 3–18; pistillate flowers one per spur; sepals 4–5, minute; petals absent; ovary 2–3-celled; styles 2–3, forked or fringed. Fruit a capsule 6–8 mm long and slightly wider, schiscent; seeds 5–6 mm long.

A genus of about 30 species in the Americas, and only two in Texas.

1. *Bernardia obovata* L. M. Johnst. DESERT MYRTLECROTON. Fig. 195. Widespread and locally common, in desert scrub, mostly in limestone habitats. Hayspath, Culberson, Reeves, Jeff Davis, Presidio, Brewster, Pecos, Terrell, and



Scientific Name: *Anulocaulis reflexus* I. M. Johnston

Synonyms: None.

Common Name: Ojinaga ringstem

Global/State Ranks: G2SH

Federal Status: SOC

Global Range: A Chihuahuan Desert endemic known from Trans-Pecos Texas and adjacent northern Chihuahua.

State Range: Jeff Davis and Presidio counties.

Description (adapted from Spellenberg 1993; R. Spellenberg in Henrickson & Johnston in prep.):
Herbaceous perennial with erect or ascending, multi-branched glabrous and glaucous stems 0.3-1.2 m tall. Leaves opposite, simple, few, mostly on lower portion of stem, the uppermost much reduced; larger leaves with petioles up to 8.5 cm long; blades broadly ovate, circular or reniform, 3-12 cm long and 3-14 cm wide, cordate at base and rounded at apex, with irregularly wavy margins, gray-green on both surfaces but lighter on lower, with purple spots bearing pustular hairs. Flowers in a very long, broad, diffuse panicle, solitary along ascending branchlets; perianth green on tube and throat, pink or rose on limb, ca. 9 mm long; tube ca. 8 mm long at anthesis (later doubling in length); throat abruptly reflexed, 7-8 mm wide, 5-lobed, the notches between the lobes about 1 mm deep; stamens and style conspicuously exerted. Fruit a biturbinate anthocarp about 6 mm long, 2.5-3 mm wide, bearing 10 irregular longitudinal ridges and numerous smaller wrinkles, sticky when wet.

Similar Species: None. The reflexed limb of the perianth immediately distinguishes *Anulocaulis reflexus* from its congeners.

Habitat: Primarily on shaly gypseous clays at elevations ranging from 800 to 1150 m (Spellenberg 1993).

Phenology: Flowering mid-May to mid-October (Spellenberg 1993).

Comments:

Illustrations: Line drawings of perianth and anthocarp appear in Spellenberg (1993).

Selected References:

Reed, C. F. 1969. Nyctaginaceae. Pp. 151-220 in Lundell, C. L. 1969. Flora of Texas, volume 2. Texas Research Foundation, Renner. 417 pp.

Spellenberg, R. 1993. Taxonomy of *Anulocaulis* (Nyctaginaceae). Sida 15(3): 373-389.



e recognized *Anulocaulis* as distinct from ; Kearney and Peebles 1960). Authors of all have maintained *Commicarpus* distinct

of the pollen of the Nyctagineae, noted that correspond to generic alignment of species lex nature and to distinguish genera would based solely on numerical measurements." ted. Chromosome number may support the counts for the genus have been $n = 24$; ca. 116 (Federov 1969), $n = 26$ (Fernandez 11); $n = 26$ or 27 (Spellenberg, several been reported as $n = 20, 21$ (Bogle 1974; of the perianth and anthocarp provides few ility within species in this group of four nakes estimation of relationships tenuous.

the key to understanding phylogenetic ng character trends within it. Nyctaginaceae near the turn of the 20th mily in 1934, the genus *Anulocaulis* has not ety, although Reed's (1969) treatment for ion. The genus is readily divisible into two rianth, including the anthocarp. The first istribution may represent a comparatively icted to low, hot elevations in and near and *A. eriosolenus*, which has a bicentric t. They occur on various substrates. Both ca fig. 1, A-D) that are usually non- l collections of the latter from the southern g. 1-DJ). Both also have foliage that bears ith have small perianths with very villous nusual and perhaps unique characteristic wever, differences in anthocarp shape and es between species of the second group, y divergence. *Anulocaulis gypsogenus*, *A. tly knit second group of robust perennials is that are large and without villous hairs rps heavily ridged and wrinkled (Fig. 1, en wetted. All are strongly gypsophilic. eographic proximity on similar substrate n.*

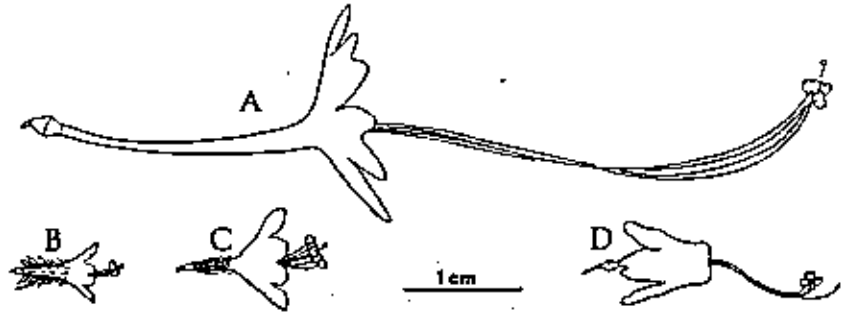


FIG. 2. Perianth form as viewed laterally in various species of *Anulocaulis* (all are drawn from Spellenberg collections, referenced by collection number, and cited in appendix). A. Representative of *A. gypsogenus* and *A. leiaolenus* (3469). B. *A. annulatus* (3149). C. *A. eriosolenus* (9693). D. *A. reflexa* (3698).

MATERIALS AND METHODS

All species were studied in the field, each on several occasions. Reports of insect floral visitors are based on personal observation. Chromosome numbers were determined from bud material examined by standard methods (cf. Spellenberg 1981); camera lucida drawings are filed with vouchers at NMC (see appendix). In all, 303 collections of the genus were examined. Characteristics presented in the following taxonomic descriptions were taken from these specimens except for features of the fragile perianth, which were supplemented by observations made in the field. Gratitude is expressed to curators of ARJZ, ASU, CAS, DUD, F, GH, NMC, NY, POM, RM, RSA, SRSC, TEX, UC, UNLV, UJS, UTEP who lent specimens and/or provided facilities for on site examination of specimens housed in those herbaria.

TAXONOMY

Anulocaulis Standl., Contr. U.S. Nat. Herb. 12: 374. 1909.

Perennials, often stout and robust with gnarled and spongy-woody roots, or of less duration with spongy roots, or occasionally even flowering as an annual. *Stems* usually stout, erect or ascending, divaricately branched, more or less pubescent. *Leaves* opposite, those of a pair slightly to strongly unequal, petiolate, borne in the lower half of the plant, or in one species more or less throughout; blades ovate or round to broadly reniform, leathery-succulent, glandular-denticulate or -crenulate, variously pubescent. *Inflorescence* widely and divaricately branched, with small scarious or coriaceous bracts. *Flowers* opening near sunset or during the night and closing by mid-day, the duration of anthesis a matter of hours, perfect, bracteate, umbellate, in axillary glomerules, or more or less racemose. *Perianth* funnelform, the tube elongate, constricted above the ovary, the

in 1853. Between that date and 1909 two other species were added to this group, also as *Boerhavia*, *B. leiosolena* Torr. (1858) from the Rio Grande Valley in western Texas and *B. annulata* Coville (1893) from Death Valley, California. These three species comprise a well-defined group of robust plants with broadly fusiform, turbinate, or biturbinate anthocarps that was recognized as the section *Solanenthae* by Heimerl (1889); general review by Fosberg (1978).

In 1909 Standley elevated Heimerl's section *Solanenthae* to generic rank, naming it *Anulocaulis*, in reference to the prominent sticky bands that encircle internodes, particularly the upper ones. Standley explained, "There is no good reason why plants which differ so markedly as these from typical *Boerhavia*s should be included in the genus *Boerhavia*. [They]... may be separated at once by their distinct general appearance, due especially to their large, thick leaves [and erect robust habit], the shape of the perianth which has a distinct tube instead of being campanulate, and the 10-ribbed fruit of different shape" (pp. 374-375; comment in brackets mine). Standley (1911, 1918) maintained the genus and Heimerl (1934) adopted Standley's generic disposition of these species. Two species have been added to the genus since that time, both as *Anulocaulis*, *A. reflexus* by I. M. Johnston (1944) and *A. gypsogenus* by Waterfall (1945).

In contrast, Fosberg (1978) maintained that *Anulocaulis* was part of a more inclusive *Boerhavia*, noting the difficulty of circumscribing *Boerhavia*, and discussing the merits of broader versus narrower generic delimitation with group. Nevertheless, he described four easily recognized groups of species within *Boerhavia*, one of which included only species otherwise recognized as *Anulocaulis*. This group was defined by features of habit, perianth limb, and lower portion of the perigone (= perianth), which is persistent around the achene or nut, the entire structure commonly called the anthocarp by most authors (including Cronquist, 1981). It is technically a diclesium as defined by Radford et al. (1974); Bogle (1974) discusses problems with term "anthocarp." The term is entrenched in descriptions of the Nyctaginaceae accessory fruit whereas the use of diclesium is not; I have opted to use the traditional term "anthocarp." In presenting an alternative argument to recognizing a large and diverse genus *Boerhavia*, Fosberg (1978) writes, "Those who find smaller, more coherent, simpler groups easier to remember and understand, to whom relationships are not as important as differences, or who are Nyctaginaceae specialists, may prefer to maintain the four genera" [*Anulocaulis*, *Boerhavia*, *Commicarpus*, *Cyphomeris*].

Authors of California floras (Abrams 1944; Jepson 1925; Munz and Keck 1959) have maintained the single California species of *Anulocaulis* in *Boerhavia*, but Spellenberg (1993) recognized it in *Anulocaulis*. With regard to fruit structure, this species does have an anthocarp of different shape from those of the remaining species of this small genus (Fig. 1-A, B), but it still does not strongly resemble the clavate, prominently 5-ridged anthocarp of *Boerhavia* (*sensu stricto*).

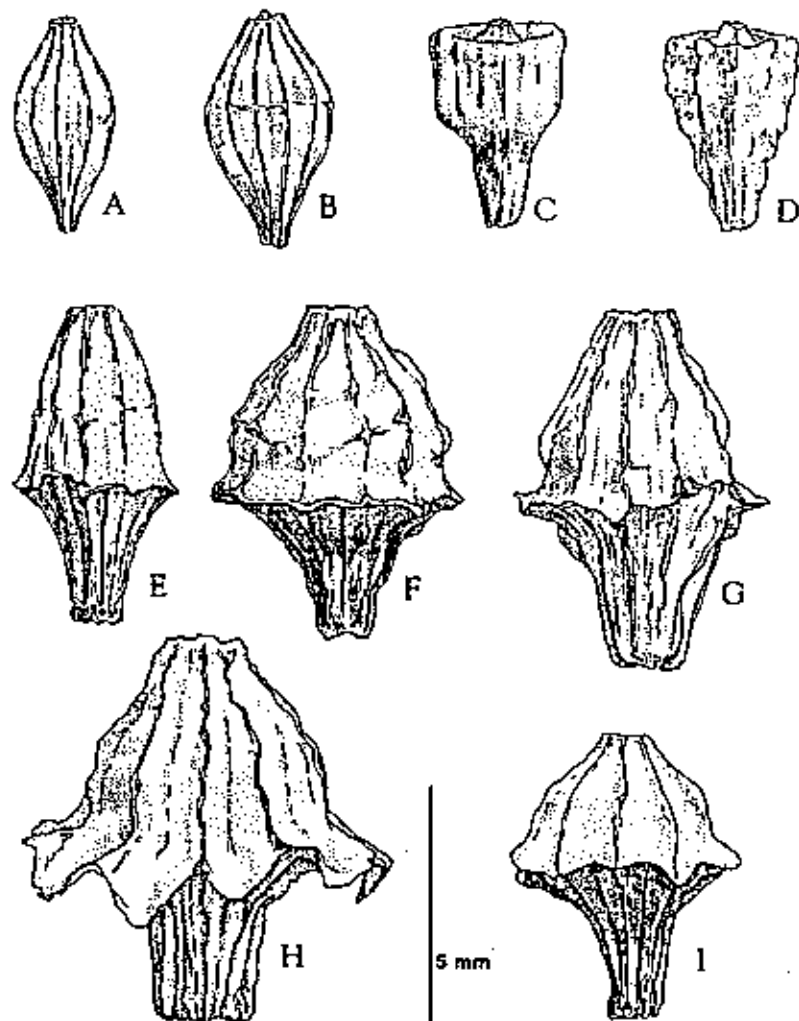
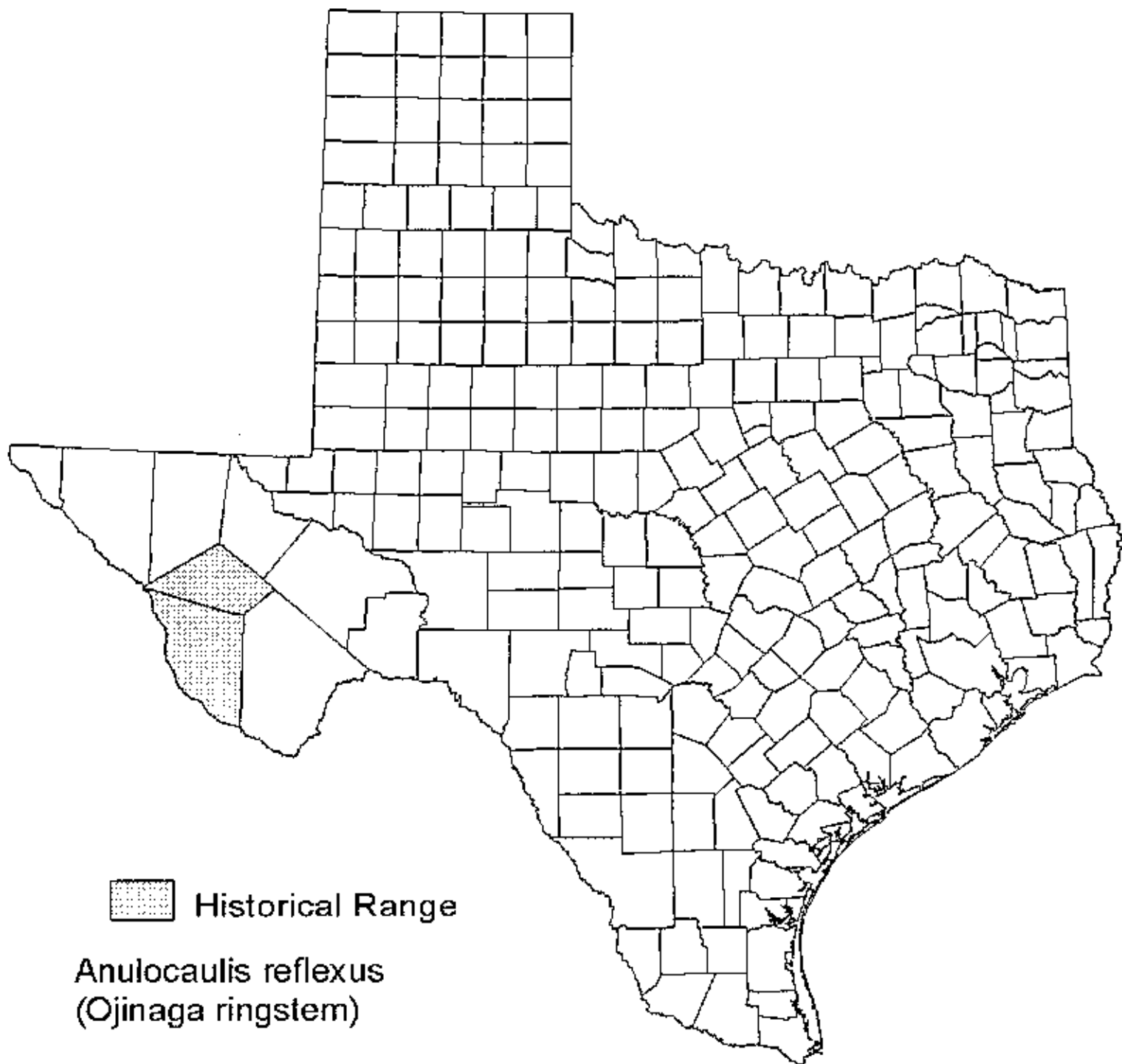


FIG. 1. Anthocarps of taxa of *Anulocaulis*. (A, B) *A. annulata*, without (A) and with (B) equatorial ridge. (C, D) *A. eriosolens* from northern (C) and southern populations (D). (E, F, G) *A. leiosolens*; (E, F) var. *leiosolens* from New Mexico (E) and Texas (F); (G) var. *lasiantha* from Texas. (H) *A. gypsogenus* from New Mexico. (I) *A. reflexus* from Chihuahua. Drawings from Spellenberg collections unless otherwise noted; collection numbers are: A, 3153; B, 3152; C, 9702; D, *Henrickson* 12536; E, 9986; F, 3469; G, 3708; H, 3667; I, 3698; specimens cited in appendix.



Scientific Name: *Aquilegia chrysantha* Gray var. *chaplinae* (Standl. ex Pays.) Lott

Synonyms: *Aquilegia chaplinae* Standl. ex Pays.

Common Name: Guadalupe Mountains columbine

Global/State Ranks: G4T2S2

Federal Status: 3C

Global Range: Mountains of west Texas and southwestern New Mexico.

State Range: Mostly confined to the Guadalupe Mountains of Culberson County. Recent collections from Madrid Falls and Arroyo Segundo in Presidio County have been tentatively identified as this taxon.

Description (adapted from Correll & Johnston 1970 and Lott 1979): Herbaceous perennial with several multi-branched stems 2-5 dm long. Leaves compound, bi-ternate or tri-ternate, glabrous and glaucous, leaflets cuneate-obovate to suborbicular, deeply cleft, 1-1.5 cm long. Flowers on long pedicels to 1 dm long, suberect; sepals 5, ovate lanceolate, 13-16 mm long and 4-6 mm wide; petals 5, yellow, the terminal portion flat, oblong, truncate-rounded at apex, 8-10 mm long, the lower portion forming a long hollow tube 3-4 cm long and about 4 mm wide at base. Fruit a set of 5 slender, several-seeded follicles 18-22 mm long.

Similar Species: Easily confused with three other yellow-flowered *Aquilegia* taxa that also occur in mountains of the Trans-Pecos. *A. chrysantha* var. *hinckleyana*, which occurs in the Sierra Vieja Mountains of Presidio County, has broader sepals (about 17 mm wide) and petals blades about twice as large as those of *A. chrysantha* var. *chaplinae*. *A. chrysantha* var. *chrysantha* (mostly in the Davis Mountains) and *A. longissima* (mostly in the Chisos Mountains) both have longer spurs (4-9 cm long in the former and 10-15 cm long in the latter).

Habitat: Perennially moist to wet limestone canyon walls, moist leaf litter and humus among boulders in wooded mesic canyons. Associates include *Adiantum capillus-veneris*, *Samolus cuneatus*, *Lobelia cardinalis*, *Epipactis gigantea*, *Cladium jamaicense*, *Solidago wrightii*, *Juglans microcarpa*, *Salix gooddingii* (Lott 1979); and *Chaetopappa hersheyi*, *Muhlenbergia pauciflora*, *Pinaropappus parvus*, *Galium microphyllum*, *Hedeoma apiculatum*, *Valeriana texana*, *Petrophytum cespitosum*, *Philadelphus hitchcockianus* and *Polygala rimulicola* (T. Burgess pers. comm.).

Phenology: Flowering April-September; most reliable blooming period may be June-July (Lott 1979).

Comments:

Illustrations: Color photograph appears in Warnock (1974) and Cheatham, Johnston & Marshall (1995); a line drawing appears in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Cheatham, S., M. C. Johnston, and L. Marshall. 1995. The useful wild plants of Texas, the southeastern and southwestern United States, the southern plains, and northern Mexico. Volume 1. Useful Wild Plants, Inc., Austin, Texas. 568 pp.

Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research

Foundation, Renner. 1881 pp.

- Lott, E. J. 1979. Variation and interrelationships of *Aquilegia* populations of Trans-Pecos Texas. M. S. Thesis, Sul Ross State University, Alpine.
- Lott, E. J. 1985. New combinations in Chihuahuan Desert *Aquilegia* (Ranunculaceae). *Phytologia* 58: 488.
- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Payson, E. B. 1918. The North American species of *Aquilegia*. Contributions from the U. S. National Herbarium 20: 123-158.
- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.
- Whittemore, A. T. 1997. *Aquilegia*. Pp. 249-258 in: Flora of North America Committee. 1997. Flora of North America north of Mexico. Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, New York. 590 pp.





17. *AQUILEGIA LONGISSIMA*, the longest-spurred columbine. *AQUILEGIA CHAPLINA* lower left.

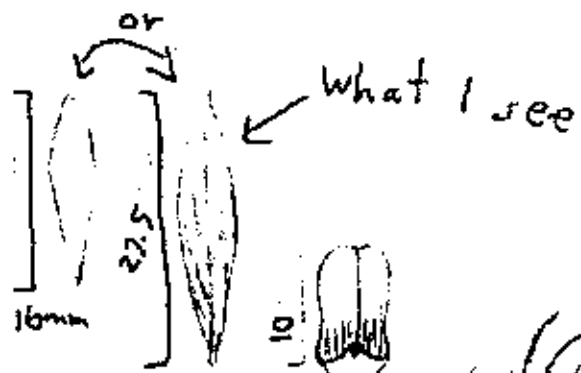
UNIVERSITY OF TEXAS AT AUSTIN
RARE PLANT STUDY CENTER

JUL 15 1977

Munz, P. A.

Gentes herbarum

v. 7, fasc. 1: 139-141. 1946.



Family: RANUNCULACEAE

Scientific Name: *Aquilegia chaplinei* Standl.

Common Name: Chapline's columbine

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: None

Description: Rhizomatous perennial; stems 20–50 cm (8–20 in.) tall; leaves two or three times divided into three parts, 5–12 cm (2.0–4.75 in.) long, slender; leaflets broadly wedge shaped to almost circular, deep green above, lighter beneath, lobed; flowers pale yellow; sepals lance shaped, 13–16 mm (0.5 in.) long, 4–6 mm (0.25 in.) wide; five petals, each with a free oblong portion 8–10 mm (0.4 in.) long, the base prolonged into a spur 3–4 cm (1.25–1.5 in.) long. Flowers from April to October.

Known Distribution: Eddy County, New Mexico, and adjacent Texas

Habitat: Permanently moist areas around springs and seeps, usually on the face of limestone bluffs, 1,400–1,675 m (4,700–5,500 ft.)

Ownership: Forest Service, National Park Service

Threats to Taxon: Water development threatens all populations, at least to some degree.

Similar Species: *Aquilegia chrysantha*, which has spurs longer than 4 cm (1.6 in.)

Remarks: The Sacramento Mountain populations of yellow-flowered columbines are somewhat intermediate between *A. chaplinei* and *A. chrysantha*.

Important Literature:

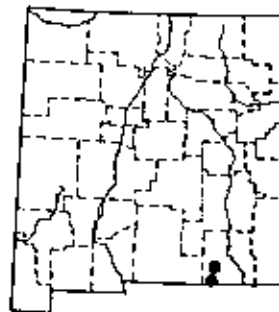
Correll, D. S., and M. C. Johnston. Manual of the vascular plants of Texas. Renner, Tex.: Texas Research Foundation, 1970.

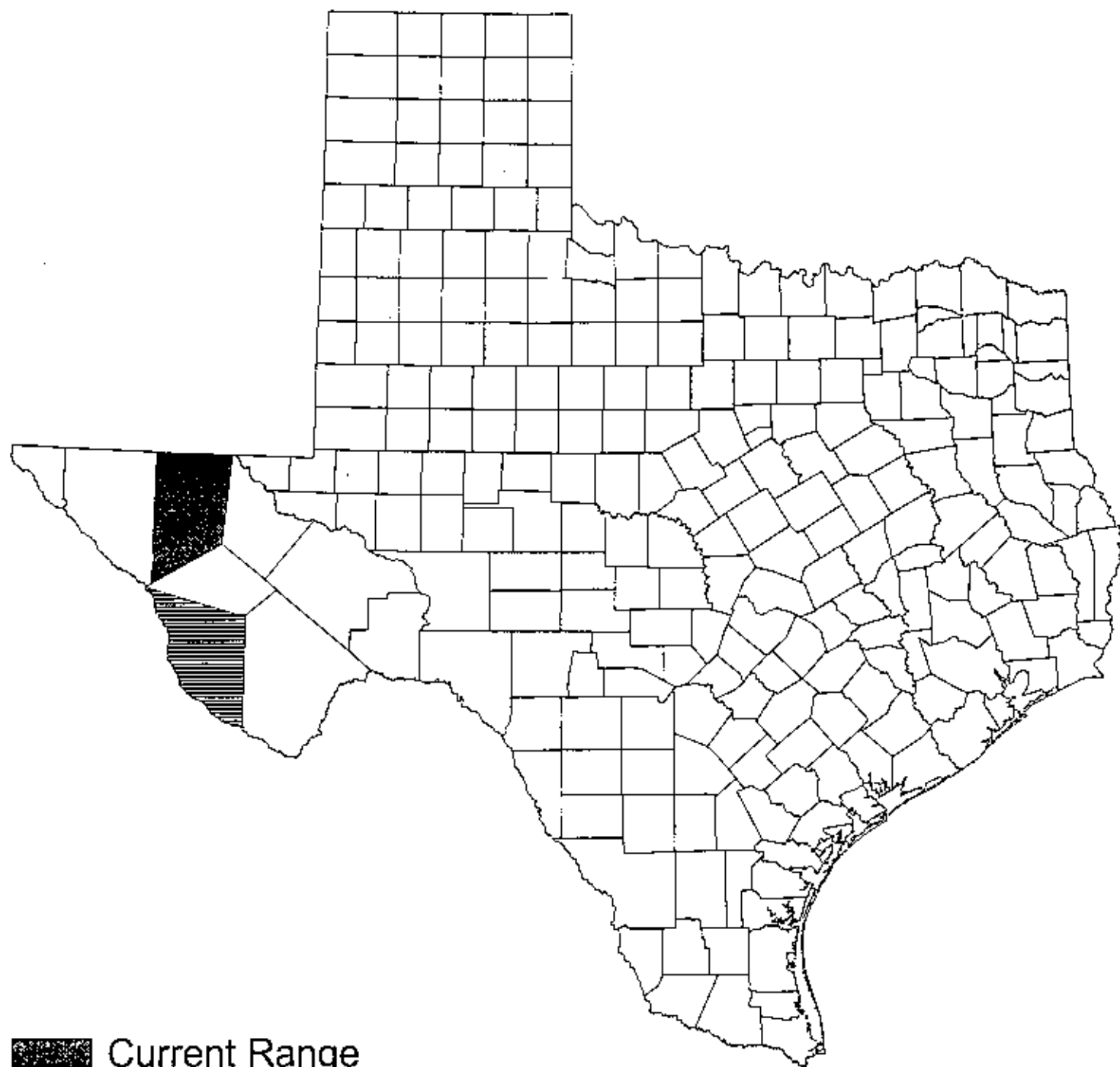
Munz, P. A. *Aquilegia*: The cultivated and wild columbines. In L. H. Bailey, *Gen. Herb.* 7:1–150, 1946.

Payson, E. B. The North American species of *Aquilegia*. *Contr. U.S. Nat. Herb.* 20:133–57, 1918.



Aquilegia chaplinei
general habit





Current Range



Questionable Range

Aquilegia chrysantha var. *chaplinei*
(Guadalupe Mountains columbine)

Scientific Name: *Aquilegia chrysantha* Gray var. *hinckleyana* (Munz) Lott

Synonyms: *Aquilegia hinckleyana* Munz

Common Name: Hinckley's columbine

Global/State Ranks: G4T1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Known only from Presidio County.

Description (adapted from Correll & Johnston 1970 and Lott 1979): Herbaceous perennial with several multi-branched stems 5-7 dm long. Leaves compound, mostly biternate, thin, light green and glabrous on upper surface, strongly glaucous on lower; leaflets suborbicular, thin, deeply cleft, 2-4 cm long. Flowers on long pedicels to 7 cm dm long, suberect; sepals 5, ovate, about 25 mm long and 17 mm wide; petals 5, yellow, the terminal portion flat, spatulate-obovate, about 20 mm long and 16 mm wide, the lower portion forming a long hollow tube about 4 cm long and 5 mm wide at base. Fruit a set of 5 slender, several-seeded follicles 2-2.5 cm long.

Similar Species: Three other yellow-flowered *Aquilegia* taxa occur in the mountains of the Trans-Pecos. *A. chrysantha* var. *hinckleyana* can be distinguished from them by its broad sepals (about 17 mm wide) and short tube (to 4 cm long).

Habitat: Wet areas near waterfalls, perennial seeps, springs, etc. in canyons of desert mountains. Frequently associated species include *Adiantum capillus-veneris*, *Rivina humilis*, *Cladium jamaicense*, *Lobelia cardinalis*, *Perityle parryi*, *Fraxinus velutina* and *Ungnadia speciosa* (Lott 1979).

Phenology: Flowering March-November, heavily during March-April, with trace flowering September-November (Lott 1979).

Comments:

Illustrations: Color photographs appear in Warnock (1977) as *Aquilegia hinckleyana* and in Cheatham, Johnston & Marshall (1995).

Selected References:

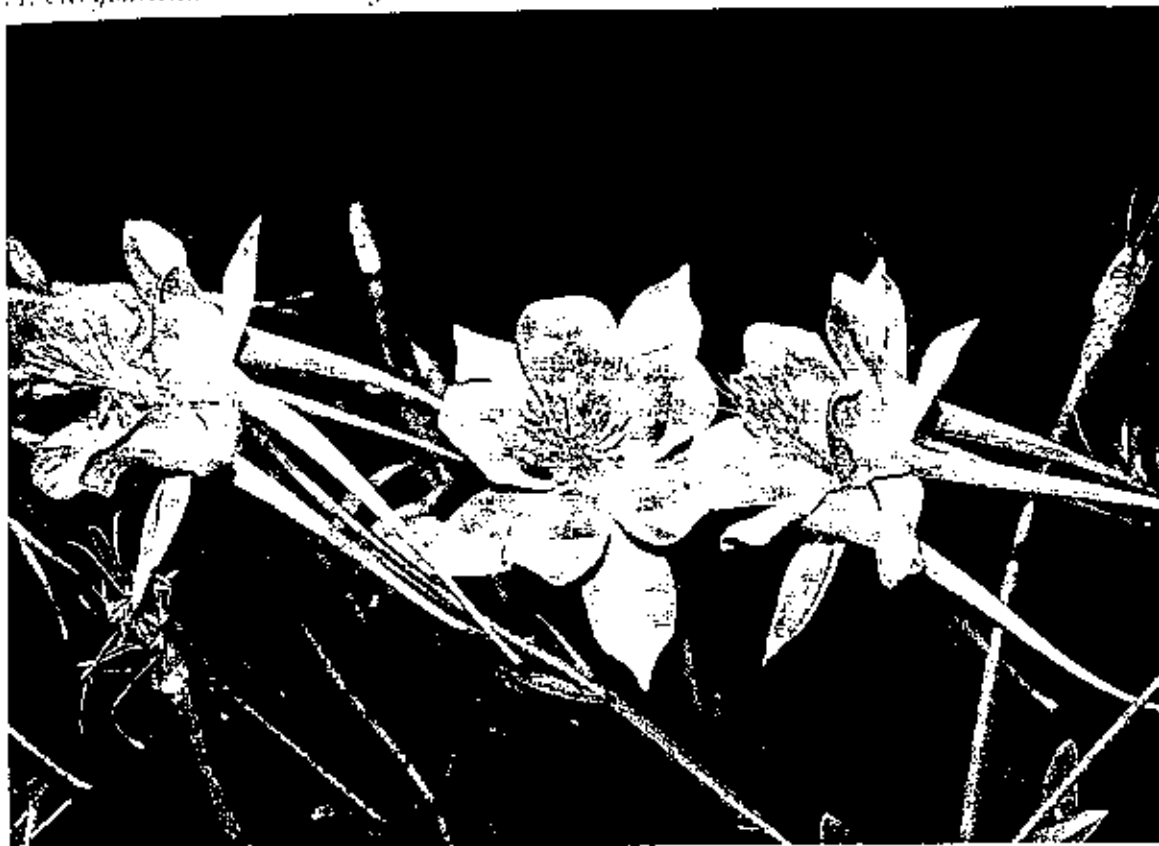
Cheatham, S., M. C. Johnston, and L. Marshall. 1995. The useful wild plants of Texas, the southeastern and southwestern United States, the southern plains, and northern Mexico. Volume 1. Useful Wild Plants, Inc., Austin, Texas. 568 pp.

Clark, J. J. and A. M. Powell. 1983. Status report [on *Aquilegia chrysantha* var. *hinckleyana*]. Report prepared for US Fish & Wildlife Service, Albuquerque.

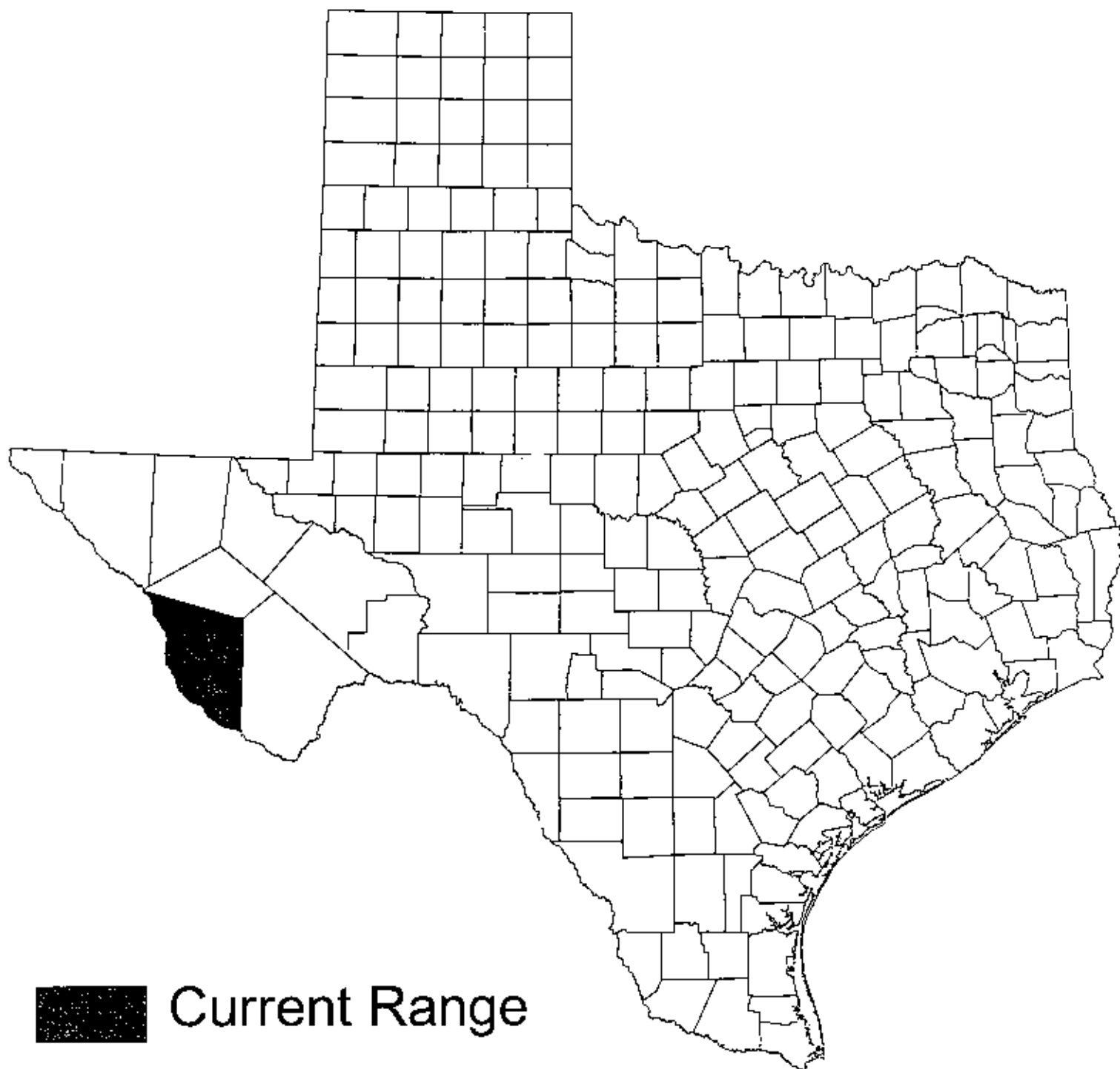
Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.

- Lott, E. J. 1979. Variation and interrelationships of *Aquilegia* populations of Trans-Pecos Texas. M. S. Thesis, Sul Ross State University, Alpine.
- Lott, E. J. 1985. New combinations in Chihuahuan Desert *Aquilegia* (Ranunculaceae). *Phytologia* 58: 488.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine. 274 pp.
- Whittemore, A. T. 1997. *Aquilegia*. Pp. 249-258 in: Flora of North America Committee. 1997. Flora of North America north of Mexico. Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, New York. 590 pp.

A. chrysantha var. *hinkleyana*







■ Current Range

Aquilegia chrysantha var. *hinckleyana*
(Hinckley's columbine)

Scientific Name: *Arenaria livermorensis* Correll

Synonyms: None.

Common Name: Livermore sandwort

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Known only from the Davis Mountains of Jeff Davis County.

Description (adapted from Correll & Johnston 1970 and R. L. Hartman in Henrickson & Johnston in prep.):

Densely matted, mosslike perennial with numerous trailing stems, to 2 cm tall. Leaves alternate, crowded, subulate, 4-6 mm long, pointed at apex, 1-nerved, with thickened, whitish, ciliate margins. Flowers solitary in upper axils; sepals 5, broadly lanceolate, 3-4 mm long, acute to acuminate at apex; petals absent. Fruit an ovoid capsule 2-3 mm long.

Similar Species: Only one other trailing-stemmed perennial *Arenaria* species occurs in mountains of the Chihuahuan Desert region. *Arenaria lycopodioides* has longer (5-9 mm) sepals and five petals about equal to or slightly longer than the sepals (R. L. Hartman in Henrickson & Johnston, in prep.).

Habitat: Igneous rock outcrops at higher elevations (2400-2500 m) in the Davis Mountains. Associates include *Juniperus deppeana*, *Pinus cembroides*, *P. ponderosa*, *Quercus gambelii*, *Q. grisea*, *Muhlenbergia emersleyi* and *Draba standleyi*.

Phenology: Flowering August-October.

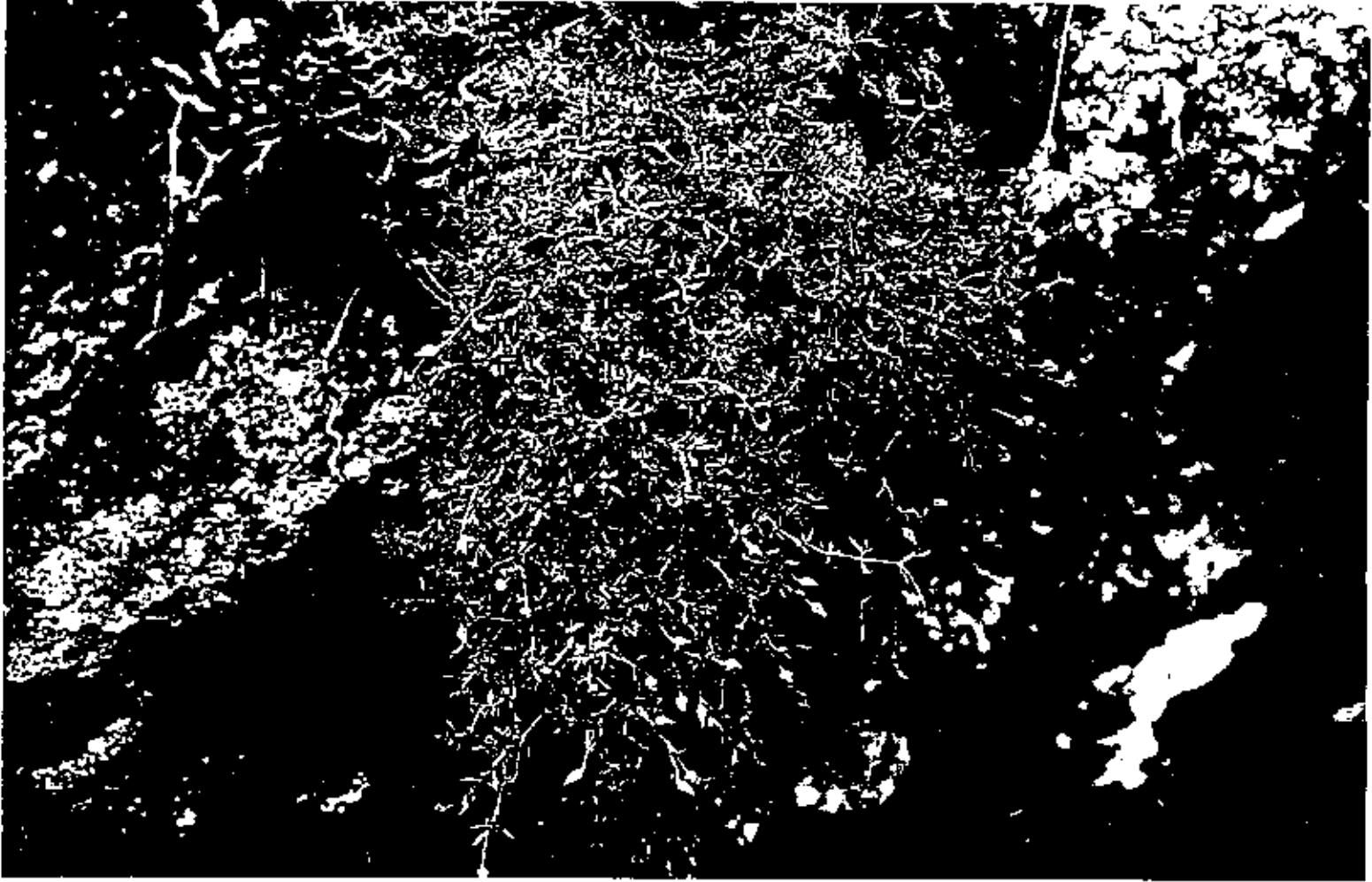
Comments:

Illustrations: None known.

Selected References:

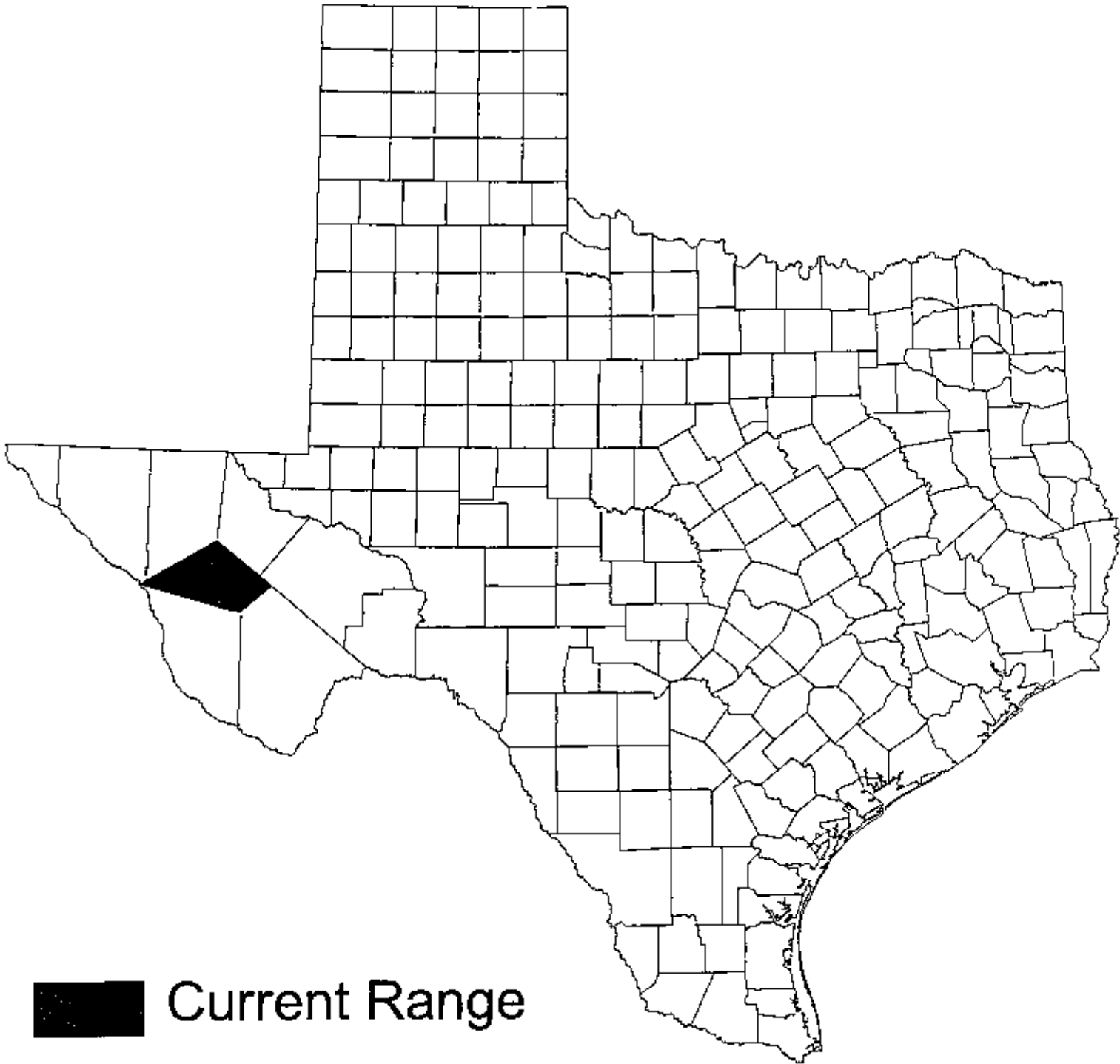
Correll, D. C. 1966. Some additions and corrections to the flora of Texas—II. *Brittonia* 18: 306-310.

Miller, D. J. and A. M. Powell. 1983. Status report [on *Arenaria livermorensis*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.





Caryophyllaceae • *Anemone tennorensis* *Walt.* *Univ. Calif.*
 SPECIMEN FROM THE ROYAL BOTANIC HERBARIUM. 8. 5/25/12
 EARTON H. WARNICK No. 7488. JEFF DAVIS CO., TX.
 L.C. HINCKLEY No. 97. JEFF DAVIS CO., TX.



■ Current Range

Arenaria livermorensis
(Livermore sandwort)

Scientific Name: *Argythamnia aphoroides* Muell. Arg.

Synonyms: *Ditaxis aphoroides* (Muell. Arg.) Pax

Common Name: Hill Country wild-mercury

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Edwards Plateau of central Texas.

State Range: Bandera, Bexar, Blanco, Brown, Comal, Gillespie, Hays, Kendall, Kerr, Kimble, Menard, Mills, Tom Green and Uvalde counties.

Description (adapted from Correll & Johnston 1970): Dioecious herbaceous perennial with 10-100 or more erect to ascending, unbranched pubescent stems from a somewhat woody base, usually 2-5 dm tall. Leaves alternate, simple, sessile, ovate-lanceolate to elliptic, 20-45 mm long and 10-20 mm wide, densely villous with grayish silky hairs, with entire margins. Flowers unisexual, on separate plants, both types in racemes up to 6 cm long borne from the axils of upper leaves; staminate flowers with 5 lanceolate sepals ca. 4 mm long; petal 5, greenish obovate-cuneate, 4-5 mm long; stamens 8-10; pistillate flowers with 5 lanceolate sepals ca. 5 mm long; petals absent; glands at base of ovary square or rectangular in outline. **Fruit** a roughly globose, vaguely 3-lobed, 3-seeded capsule; seeds spherical, 4-5 mm in diameter.

Similar Species: *Argythamnia simulans* and *A. mercurialina* also occur in central Texas and are similar in size and habit. The stems and foliage of both of these species are dark green and more or less glabrous, whereas those of *A. aphoroides* appear grayish due to dense silky pubescence. In addition, *A. simulans* and *A. mercurialina* generally produce few (1-10) stems per root crown, whereas *A. aphoroides* usually produces more than 25 and sometimes more than 100 stems per root crown.

Habitat: Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands. A few occurrences are in partial shade of oak-juniper woodlands on gravelly soils on rocky limestone slopes.

Phenology: Flowering April-May, with fruit persisting until midsummer. Recognizable foliage is present for most of the growing season.

Comments:

Illustrations: Line drawings appear in Diggs, Lipscomb & O'Kennon (1999).

Selected References:

Diggs, G. M., Jr., B. L. Lipscomb and R. J. O'Kennon. 1999. Shinnery and Mahler's illustrated flora of north-central Texas. Botanical Research Institute of Texas, Ft. Worth. 1626 pp.

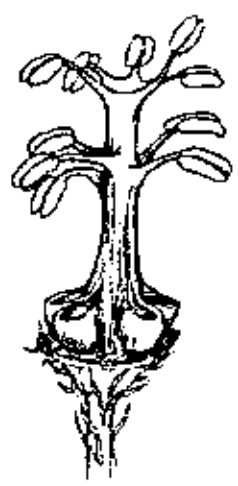
Mahler, W. F. 1981. Status report [on *Argythamnia aphoroides*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.



♀



♂

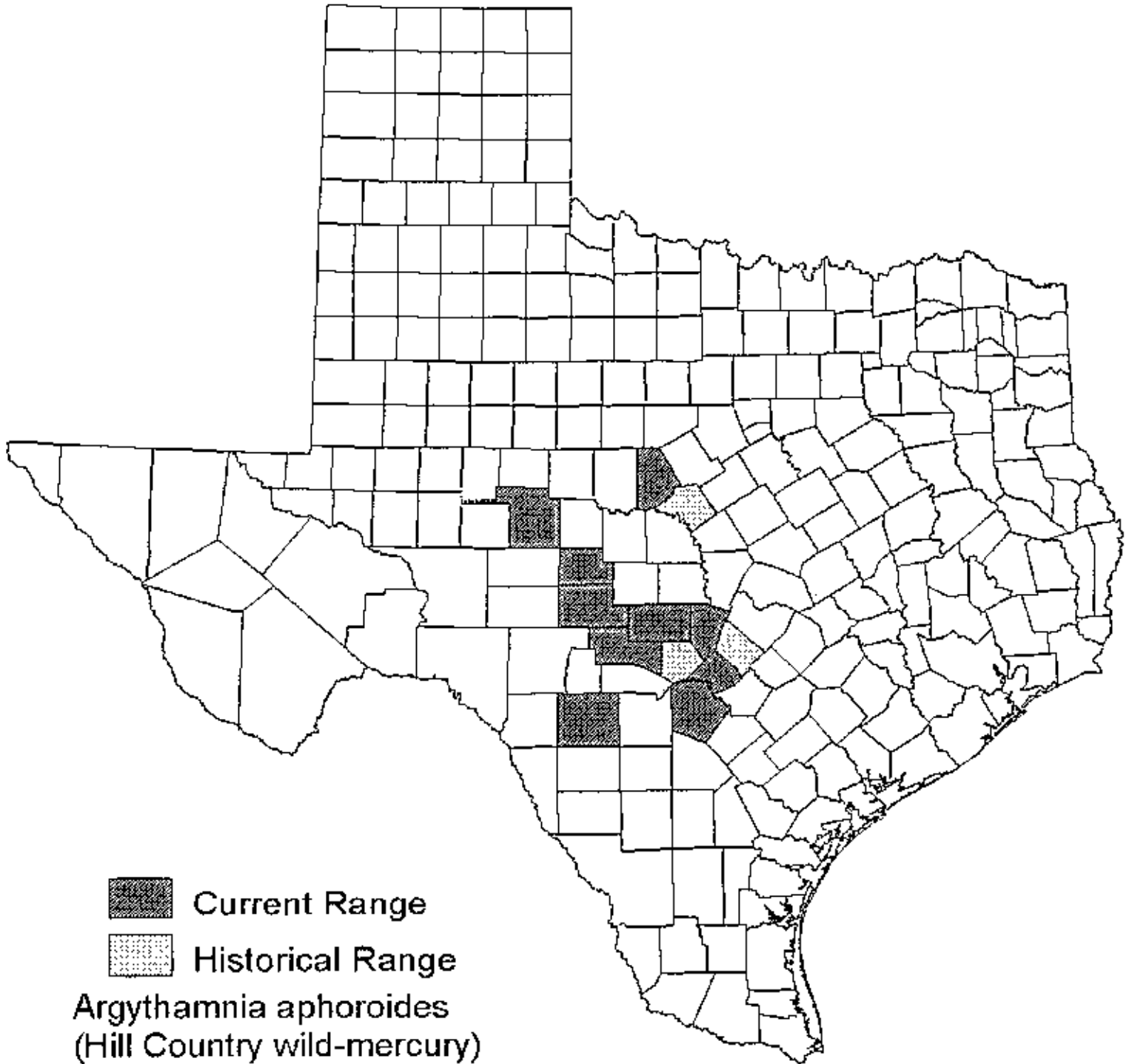


Euphorbiaceae : *Argythamnia aphoroides*

♀ CARRIE KEENEY NO: 1803 GILLESPIE CTY., TX.

♂ TONEY M. KEENEY (CARRIE) NO: 3902 KERR CTY., TX.

Artist: LEON H. HAGY
6/2002



■ Current Range
■ Historical Range
Argythamnia aphoroides
(Hill Country wild-mercury)

Scientific Name: *Argythamnia argyraea* Cory

Synonyms: None.

Common Name: silvery wild-mercury

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to South Texas.

State Range: Kinney, La Salle and Maverick counties; most known sites are in vicinity of Los Angeles in La Salle County.

Description (adapted from Cory 1945; Correll & Johnston 1970): Dioecious (occasionally monoecious) herbaceous perennial with several unbranched to sparingly branched erect stems to 4 dm tall, silvery with appressed hairs. Leaves alternate, simple, lanceolate to elliptic or obovate, obtuse to rounded at apex, 15-40 mm long and 5-10 mm wide. Flowers unisexual, usually on separate plants; staminate flowers in racemes to 2 cm long; sepals and petals 5, greenish, linear-lanceolate, 3-5 mm long; stamens 10, in 2 whorls; pistillate flowers solitary on short axillary peduncles; sepals 5, lance-ovate to ovate, ca. 4 mm long; petals 5, elliptic-ovate, ca. 1 mm long; glands at base of ovary linear; styles bifid 1/4 length or less. Fruit a vaguely 3-lobed, 3-seeded capsule.

Similar Species: This species can be distinguished from other Texas *Argythamnia* by its short inflorescences, silvery stems and foliage, and linear glands and shortly-bifid styles. The similar and widespread *A. humilis* var. *humilis* has a duller (not silvery) pubescence and long-bifid styles.

Habitat: Silvery wild-mercury is found among shortgrasses in grasslands or open shrublands on whitish clay soils, particularly those derived from the Yegua Formation (Eocene). Associated species include *Thymophylla tenuiloba*, *Grindelia microcephala*, *Oenothera kunthiana*, *Evax verna*, *Parthenium confertum*, *Jatropha cathartica*, *Astragalus brazosensis* and *Prosopis glandulosa* (Mahler 1981a).

Phenology: Flowering April-June; fruit may persist until fall.

Comments:

Illustrations: Line drawings appear in Mahler (1981a) and Mahler (1981b).

Selected References:

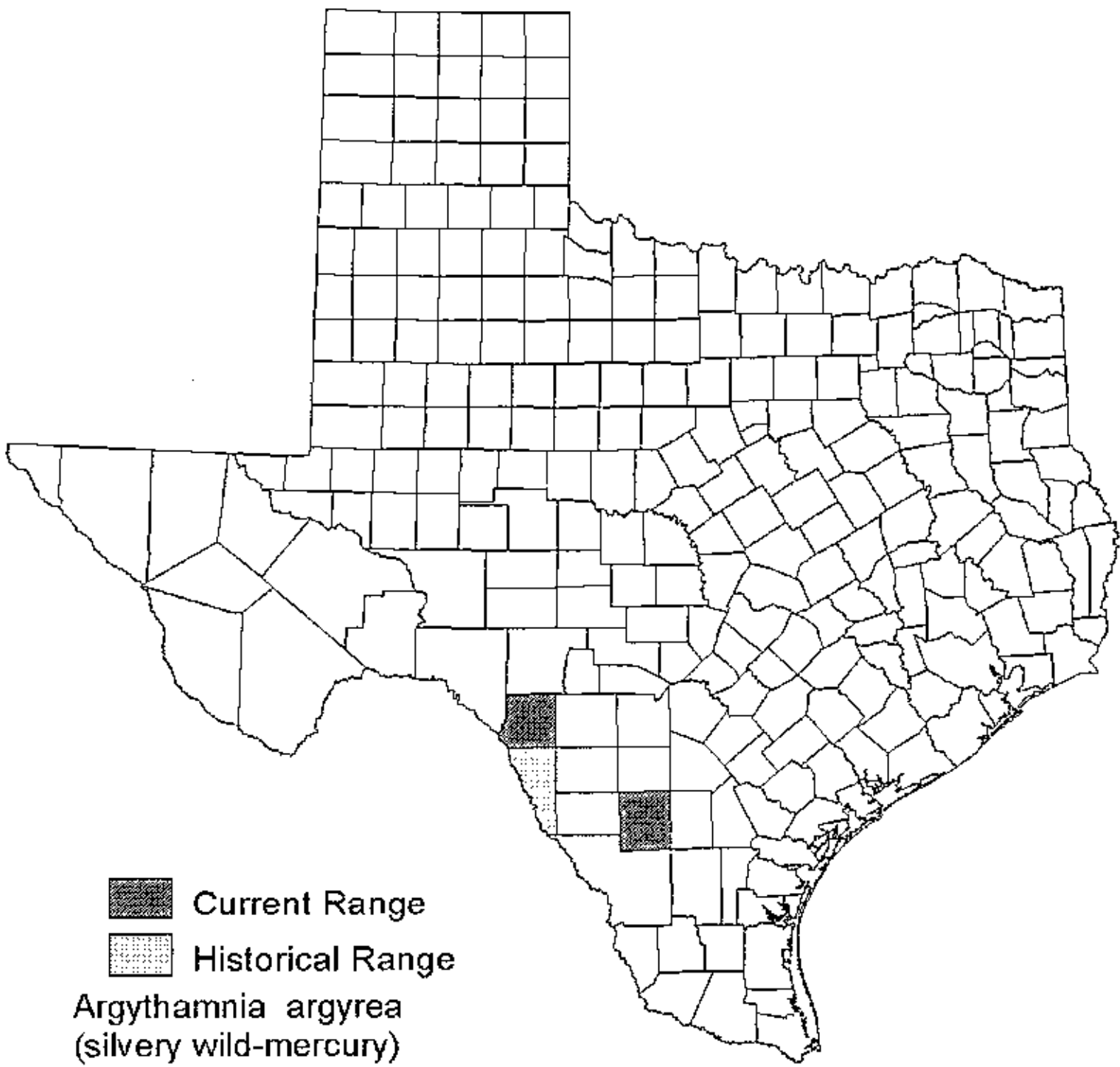
Cory, V. L. 1945. A new *Argythamnia* from Texas. *Madroño* 8: 91-92.

Mahler, W. F. 1981a. Status report [on *Argythamnia argyraea*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Mahler, W. F. 1981b. Field studies on Texas endemics. *Sida* 9(2): 176-181.







Scientific Name: *Asclepias prostrata* Blackwell

Synonyms: None.

Common Name: prostrate milkweed

Global/State Ranks: G1G2S1S2

Federal Status: SOC

Global Range: Endemic to southern Texas and northern Tamaulipas.

State Range: Starr and Zapata counties.

Description (adapted from Blackwell 1964 and Correll & Johnston 1970): Herbaceous perennial with prostrate stems 1-4 dm long, branched near the base or simple, with milky sap. Leaves opposite, appearing 2-ranked due to twisting of stem, short-petiolate, triangular to deltoid-lanceolate, 15-35 mm long and 5-20 mm wide, cordate to truncate at base and acute at the apex, minutely pilose on both surfaces, the margins usually wavy rather than flat. Flowers in few-flowered umbels in axils of upper leaves; calyx 5-lobed, the lobes 4-5 mm long; corolla greenish-white to rose, 5-lobed, the lobes narrowly obovate to broadly oblanceolate, 12-15 mm long, reflexed; sexual parts on a squat tubular structure (gynostegium) bearing near the apex 5 obovate hoods 7-8 mm long, each tipped by an inward-pointing horn. Fruit a follicle about 5.5 cm long and 2 cm thick.

Similar Species: No other prostrate *Asclepias* species occur within the range of *Asclepias prostrata*. According to Damude and Poole (1990), *Acleisanthes longiflora* may superficially resemble *Asclepias prostrata*, but its leaves have a smoother, waxier appearance than those of this rarity, and the sap of the stems is not milky. Prostrate *Matelea* species also present a risk of misidentification when not in bloom, but in most cases the leaves of *Matelea* are not as wavy-margined as those of *Asclepias prostrata*.

Habitat: Grasslands or openings in shrublands on loamy fine sands and fine sandy loams of the Copita, Hebronville and possibly other soil series over the Laredo, Yegua and other Eocene formations. Associates include *Acacia rigidula*, *A. smallii*, *Acleisanthes longiflora*, *Aristida* sp., *Cenchrus ciliaris*, *C. incertus*, *Helianthus annuus*, *Jatropha cathartica*, *Krameria ramosissima*, *Melanpodium cinereum*, *Opuntia lindheimeri*, *Parthenium confertum*, *Prosopis glandulosa* and *Ziziphus obtusifolius* (Damude & Poole 1990).

Phenology: Flowering has been observed April-October but may be sporadic and dependent upon rainfall.

Comments:

Illustrations: Color photographs appears in Cheatham, Johnston & Marshall (2000).

Selected References:

Blackwell, W. H., Jr. 1964. Synopsis of the 23 species of *Asclepias* (Asclepiadaceae) in Tamaulipas and Nuevo León including two new species, *Asclepias bifida* and *Asclepias prostrata*. Southwestern Naturalist 9(3): 171-180.

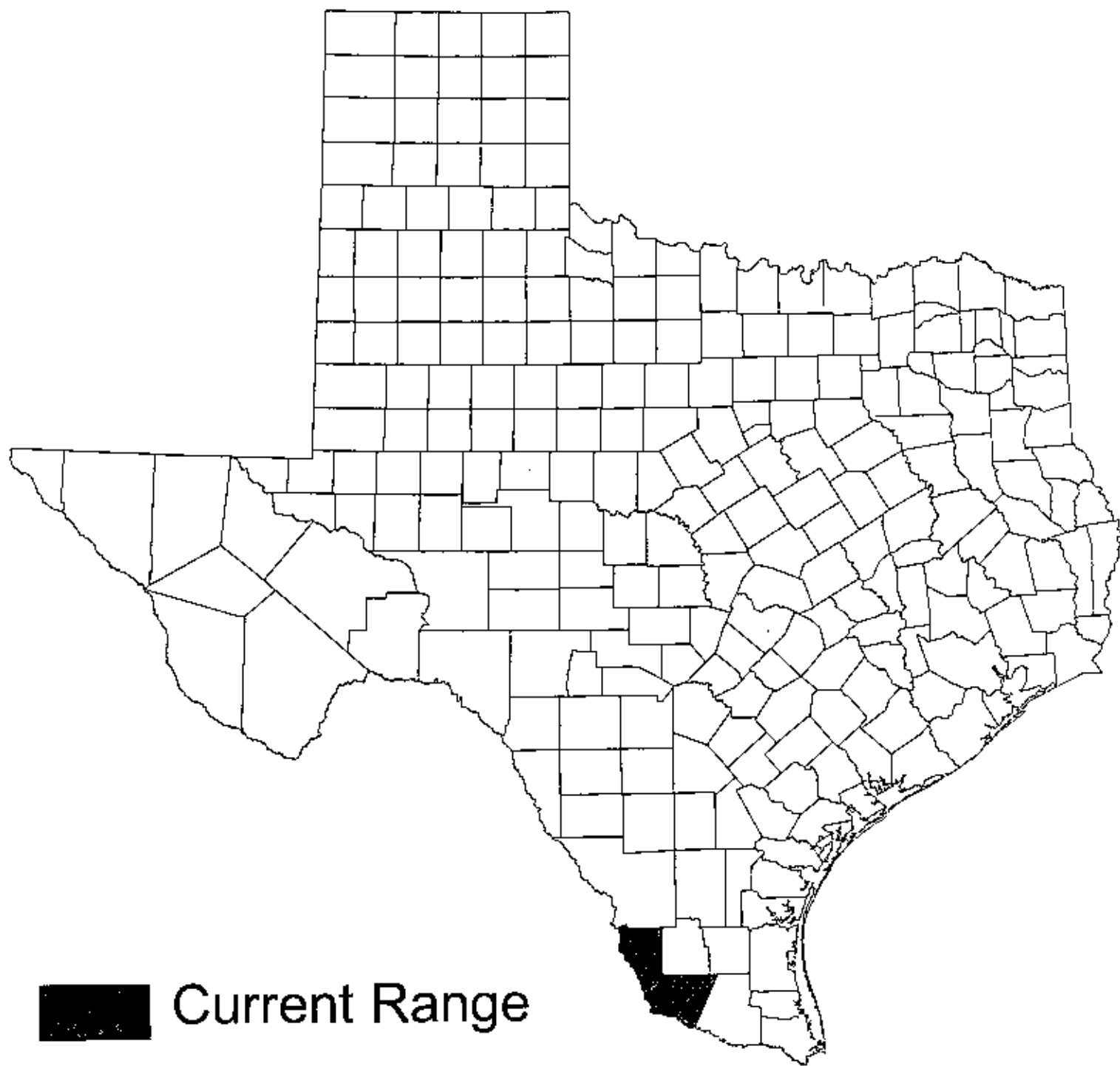
Cheatham, S., M. C. Johnston, and L. Marshall. 2000. The useful wild plants of Texas, the southeastern

and southwestern United States, the southern plains, and northern Mexico. Volume 2. Useful Wild Plants, Inc., Austin, Texas. 599 pp.

Correll, D. S. 1966. Some additions and corrections to the flora of Texas--II. *Brittonia* 18: 306-310.

Damude, N., and Poole, J. M. 1990. Status report on *Asclepias prostrata*. Report prepared for U. S. Fish and Wildlife Service, Albuquerque.





■ Current Range

Asclepias prostrata
(prostrate milkweed)

Scientific Name: *Aster laevis* L. var. *guadalupensis* A. G. Jones

Synonyms: Nesom (1994) submerged this taxon within *Symphotrichum laeve* Löve & Löve var. *geyeri* (A. Gray) Nesom (*Aster laevis* L. var. *geyeri* A. Gray), a common taxon that ranges across much of western North America. This decision was followed by Jones, Wipff & Montgomery (1997).

Common Name: Guadalupe Mountains aster

Global/State Ranks: GST1QS1

Federal Status: None.

Global Range: Apparently endemic to the Guadalupe Mountains of Texas and adjacent New Mexico.

State Range: Culberson County.

Description (adapted from Jones 1981): Herbaceous perennial from stout, short rhizomes; stem and leaves glaucous. Leaves basal and cauline, simple; basal leaves lanceolate, glabrous, glaucous, typically with winged petioles, usually still present at flowering time; cauline leaves alternate, sessile and conspicuously clasping the stem, thick and firm, linear-lanceolate, those of upper stem more or less abruptly reduced and bract-like. Flower heads in terminal panicles; phyllaries indurate at the broad base, the tips with well defined rhombic to rhombic-oblongate herbaceous at the center toward the apex; receptacle bristly; ray flowers bright blue; disk flowers yellow, sometimes with purplish tinges. Achenes glabrous or nearly so. [***WRC: need complete description, but none readily available.]

Similar Species: Specimens would probably key in Correll & Johnston (1970) to *Aster hesperius*. Stems and leaves of *A. laevis* (all varieties) are glaucous, with cauline leaves thick, firm, and conspicuously clasping. Stems and leaves of *A. hesperius* are not glaucous, with cauline leaves thin, flexuous, and not clasping (Jones 1981).

Habitat: Limestone soils along streams and elsewhere in wooded canyons above 5000 feet.

Phenology: Flowering in mid-summer.

Comments: Nesom (1993, 1994) did not agree with Jones's taxonomic opinion and did not recognize this as a variety distinct from *Aster laevis* of the western U.S. and northern Mexico.

Illustrations: A photograph of the holotype appears in Jones (1981).

Selected References:

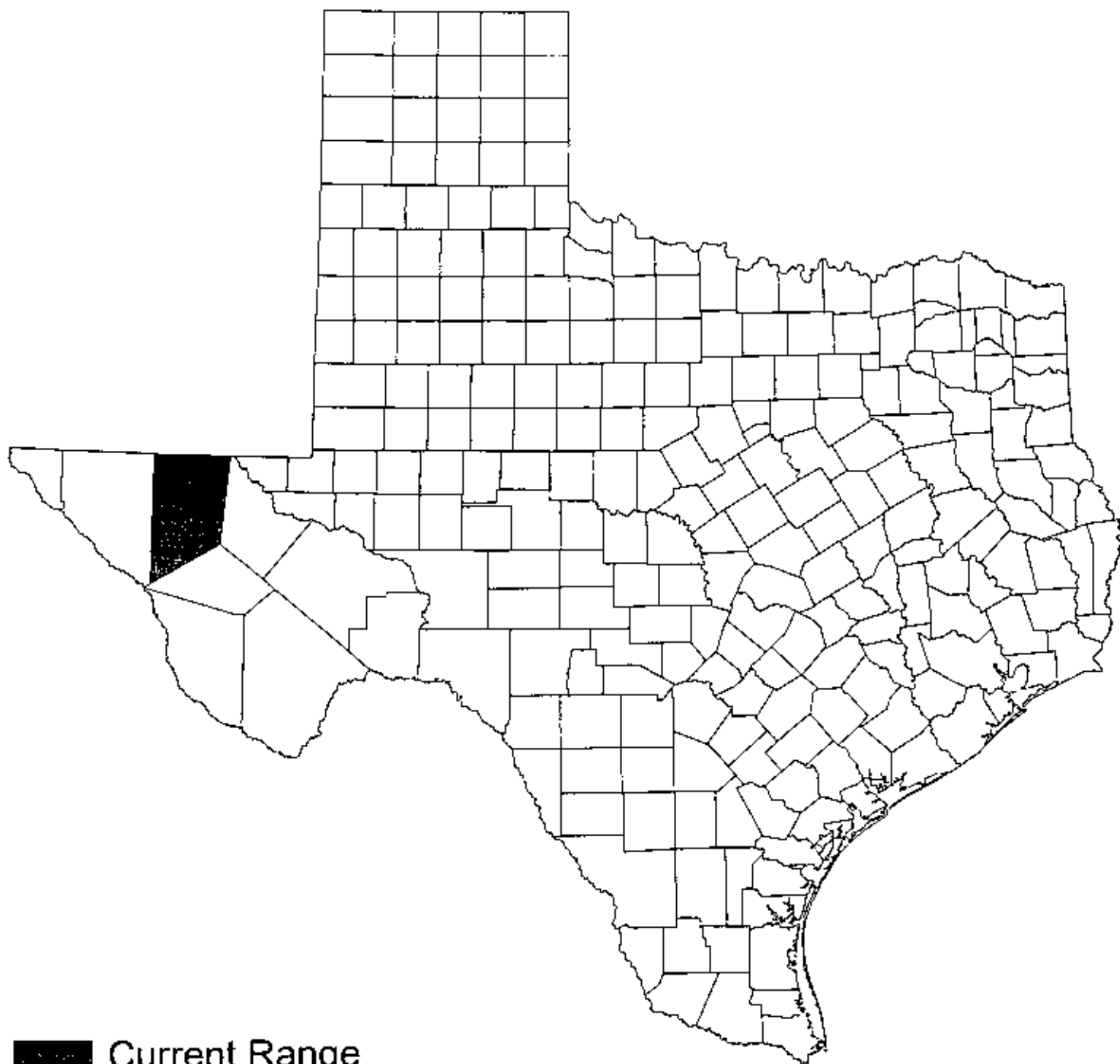
Jones, A. G. 1981. *Aster laevis* (Asteraceae) new for Texas-- a significant range extension and a new variety. *Sida* 9(2): 172-175.

Jones, S. D., J. K. Wipff and P. M. Montgomery. 1997. Vascular plants of Texas: a comprehensive checklist including synonymy, bibliography, and index. University of Texas Press, Austin. 404 pp.

Nesom, G. 1993. Three species of *Aster* (Asteraceae: Astereae) disjunct in northern Coahuila, Mexico. *Phytologia* 74(4): 296-304.

Nesom, G. L. 1994. Review of the taxonomy of *Aster* sensu lato (Asteraceae: Astereae), emphasizing the New World species. *Phytologia* 77(3): 141-297.





■ Current Range

Aster laevis var. *guadalupensis*
(Guadalupe Mountains aster)

Scientific Name: *Aster puniceus* L. var. *scabricaulis* (Shinners) A. G. Jones

Synonyms: *Aster scabricaulis* Shinners; *Aster puniceus* L. subsp. *elliottii* (T. & G.) A. G. Jones var. *scabricaulis* (Shinners) A. G. Jones; *Symphotrichum puniceum* (L.) Löve & Löve var. *scabricaulis* (Shinners) Nesom.

Common Name: roughstem aster

Global/State Ranks: G5T2QS2

Federal Status: SOC

Global Range: Once considered endemic to the Post Oak Belt of northeast Texas, but recently reported from two counties in Mississippi and one parish in Louisiana (Nesom, 1997).

State Range: Anderson, Cherokee, Franklin, Henderson, Hopkins, Smith, Van Zandt and Wood counties.

Description (adapted from Correll & Johnston 1970): Herbaceous perennial from thick rhizomes, with solitary or clustered hispid stems 1-3 m tall, branched above the middle. Leaves alternate, lanceolate to lance-oblong or oblanceolate, (3.5-) 10-13 cm long, auriculate-clasping at the base, minutely scabrous on the upper or both surfaces, the margins serrate. Flower heads in corymbiform clusters near the branch tips, 6-10 mm broad; phyllaries linear, in 4 or 5 series, those of the outer series with tips divergent or recurved; flowers 20-34, blue or purple, 10-12 mm long, 1.0-1.6 mm wide; disk flowers yellow, 4.0-5.5 mm long, the 5 lobes turning purplish at maturity. Achene flattish, 2.1-3.0 mm long, capped by a pappus of 35-48 slender bristles.

Similar Species: There are several other species of blue- or purple-rayed asters in East Texas. However, only *Aster puniceus* var. *scabricaulis* has the following suite of characters: erect to sprawling habit, with scabrous-pubescent stems 1-3 m tall; clasping, auriculate midstem leaves; and phyllaries with recurved tips.

Habitat: Unshaded wet habitats associated with seepage from Carrizo, Sparta, and Queen City Eocene sand formations (Mahler 1981), including sphagnum bogs, marshes, pond margins, open streambanks and roadside ditches. Associated species include *Andropogon glomeratus*, *Baccharis halimifolia*, *Bidens laevis*, *Boehmeria cylindrica*, *Cephalanthus occidentalis*, *Cyperus* spp., *Erianthus* spp., *Conoclinium coelestinum*, *Eupatorium perfoliatum*, *Hydrocotyle verticillata*, *Leersia oryzoides*, *Lobelia cardinalis*, *Lorinseria arcolata*, *Ludwigia alternifolia*, *L. decurrens*, *L. leptocarpa*, *Lycopus rubellus*, *Myrica cerifera*, *Onoclea sensibilis*, *Polygonum punctatum* and *Saururus cernuus*.

Phenology: Flowering in late September through early November.

Comments:

Illustrations: None known.

Selected References:

Jones, A. G. 1980. A classification of the New World species of *Aster* (Asteraceae). *Brittonia* 32(2): 230-239.

Jones, A. G. 1984. Nomenclatural notes on *Aster* (Asteraceae)--II. New combinations and some transfers.

Phytologia 55(6): 373-388.

Mahler, W. F. 1981. Status report [on *Aster puniceus* var. *scabri caulis*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

Nesom, G. L. 1994. Review of the taxonomy of *Aster sensu lato* (Asteraceae: Astereae), emphasizing the New World species. *Phytologia* 77(3): 141-297.

Nesom, G. L. 1997. The status of *Aster scabri caulis* (Asteraceae: Astereae), an endemic of the Gulf Coastal Plain. *Phytologia* 82(4): 300-315.

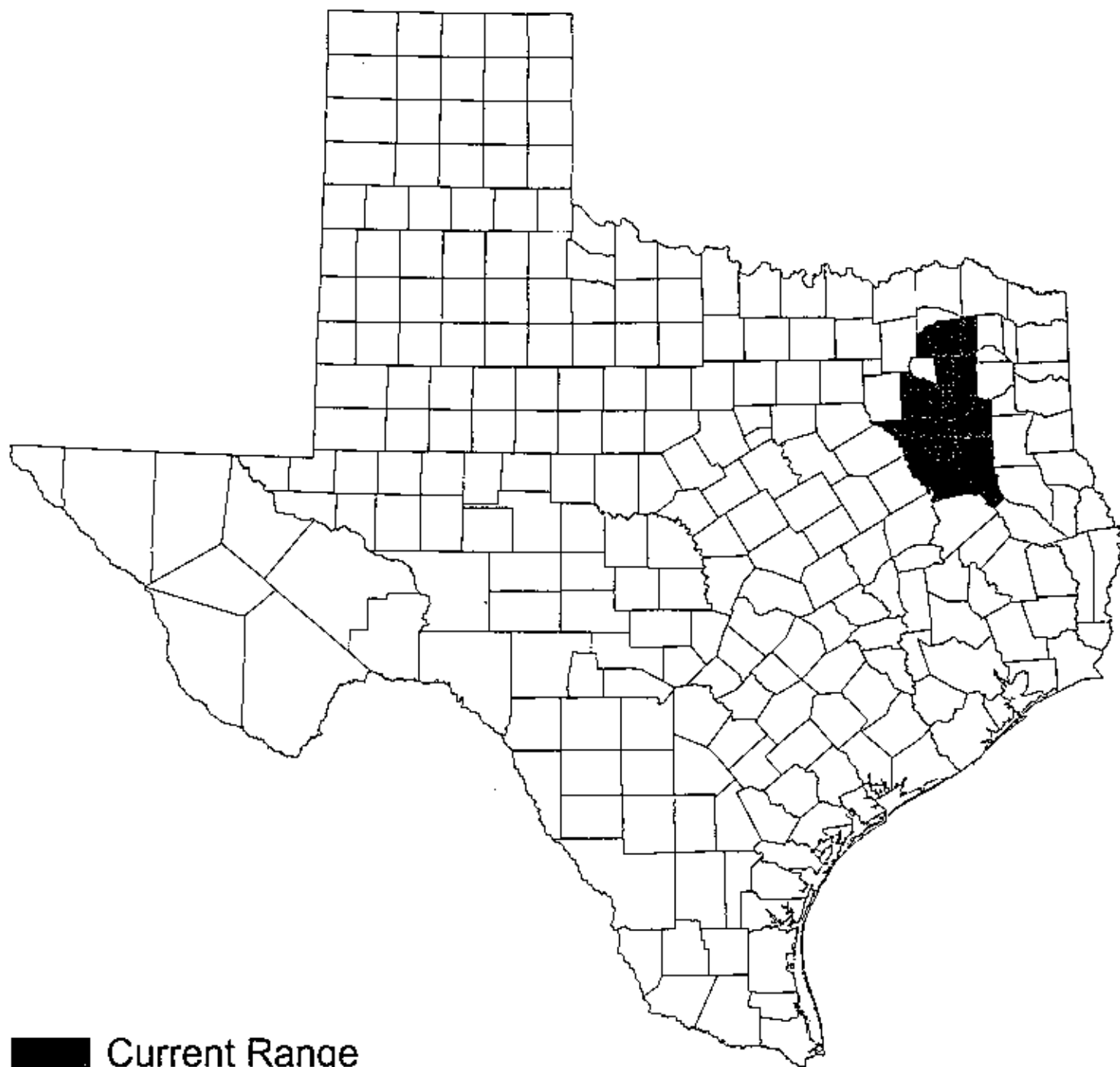
Shinners, L. H. 1953. Notes on Texas Compositae --IX. *Field & Laboratory* 21(4): 155-162.





Asteraceae *Aster puniceus* var. *scabriscandis*

E. S. NISSEN, No. 12661, Anderson Co., Texas
 SPECIMEN FROM THE BRIT. HERBARIUM - Dr. WORTH, TX.
 Collected by Lemmy Hoagley



■ Current Range

Aster puniceus var. *scabricaulis*
(rough stem aster)

Scientific Name: *Astragalus gypsodes* Barneby

Synonyms: None.

Common Name: gyp locoweed; gypsum milk-vetch

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to west Texas and southeastern New Mexico.

State Range: Culberson, Hudspeth and Reeves counties.

Description (adapted from Barneby 1964; Correll & Johnston 1970; Barneby in Henrickson & Johnston in prep.): Herbaceous perennial with numerous simple stems usually 1-3 dm long. Leaves alternate, pinnately compound, 4-18 cm long; leaflets 11-29, silvery or grayish canescent, elliptic to narrowly oblong-lanceolate or rhombic-elliptic, 5-20 mm long; pubescence of hairs are attached at the base rather than at the middle (as in some *Astragalus* species). Flowers in decumbent, peduncled, axillary racemes to 11.5 cm long, 10-30 per raceme, papilionaceous; petals pink-purple, the banner 16-23 mm long and the keel 15.5-19 mm long. Fruit an oblong-cylindric, ellipsoid or clavate-ellipsoid pod 2.5-5 cm long and 1-2.1 cm wide, the walls about 2 mm thick at maturity.

Similar Species: Several other perennial *Astragalus* species occur within the range of *A. gypsodes*. This species is characterized by its silvery or grayish pubescence, decumbent infructescences, and large, 2-loculed, thick-walled fruits that are more than 2 times long as wide.

Habitat: Gypsum or stiff gypseous clay soils on low rolling hills, mostly at low elevations in areas adjacent to the Guadalupe Mountains. Many of the known locations are on the Castile Formation (Permian).

Phenology: Flowering April-June.

Comments: *Astragalus gypsodes* contains nitrotoxins that are poisonous to livestock (Cheatham, Johnston & Marshall 2000).

Illustrations: A color photograph appears in Warnock (1974). A line drawing appears in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Barneby, R. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden 13: 1-1188.

Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.

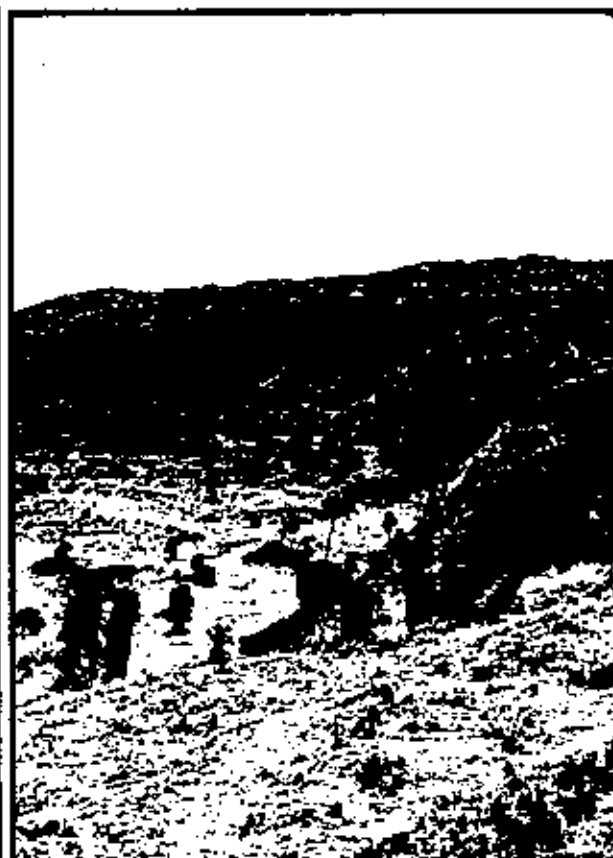
Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant surveys. Report prepared for Guadalupe Mountains National Park.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants

- of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Turner, B. L. 1959. The legumes of Texas. University of Texas Press, Austin. 284 pp.
- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.

Astragalus gypsodes
(Gypsum milkvetch)

[rare plant list] [photos] [distribution map] [line drawing] [taxon report]



Family: FABACEAE [Leguminosae]
 Scientific Name: *Astragalus gypsodes* Barneby
 Common Name: Gypsum milk-vetch
 Classification: State priority 1
 Federal Action: None
 Common Synonyms: None

Description: Perennial, stems stout, spreading upward, grayish, hairy, sometimes purplish, mostly 15–35 cm [6–14 in.] long; leaves 4–18 cm [1.5–7.0 in.] long, pinnately compound, with 11–29 elliptic flat, blunt leaflets, 5–20 mm [0.20–0.75 in.] long, the hairs straight, lying flat against the leaf surface; flowers pealike, 10–30, 16–24 mm [0.6–1.0 in.] long, pinkish purple when fresh, changing to bluish when dry; pods spreading or ascending, oblong, usually straight and plump, 2.5–5.0 mm [1–2 in.] long, two-chambered, the tip forming a small beak, walls green, thick, succulent, becoming spongy when ripe and often wrinkled in age. Flowers from March to May.

Known Distribution: Eddy County, New Mexico, and adjacent Texas

Habitat: Dry flats and slopes, on gypsum soils, 1,050–1,125 m [3,500–4,000 ft.]

Ownership: Bureau of Land Management, private

Threats to Taxon: Gypsum mining could jeopardize this species.

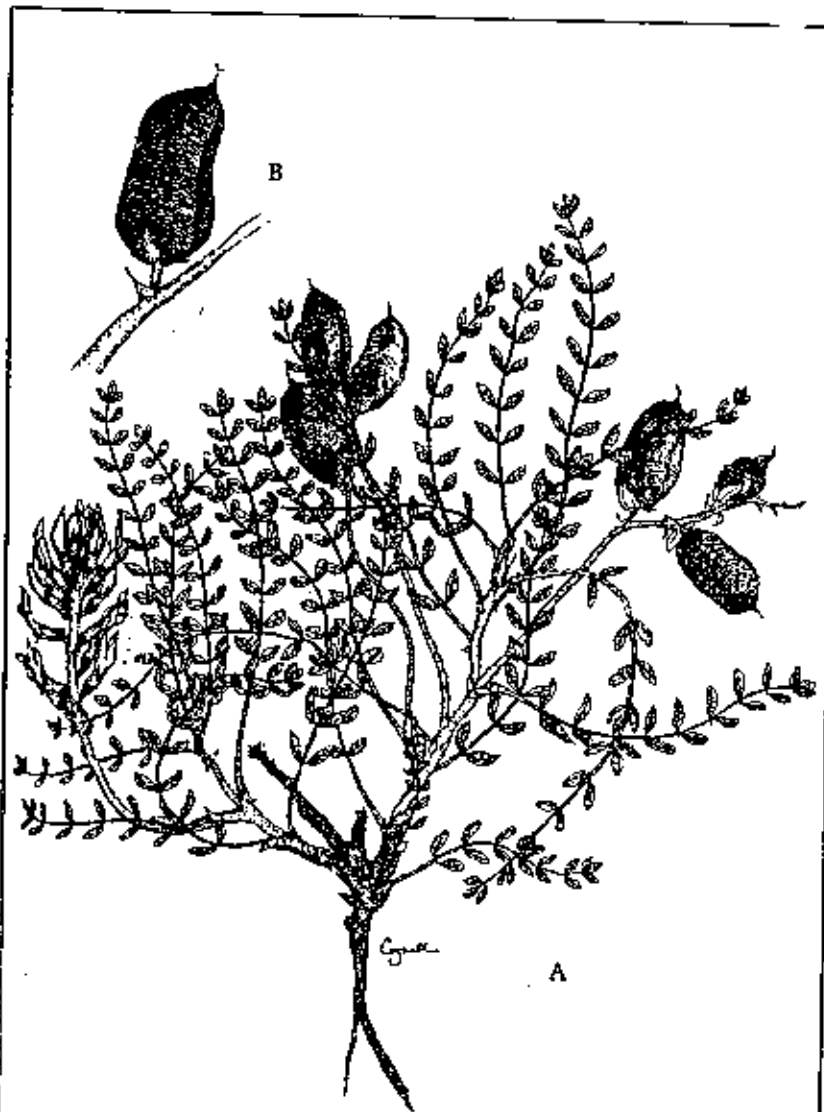
Similar Species: No *Astragalus* in this area has similar pods.

Remarks: This *Astragalus* requires a gypsum substrate.

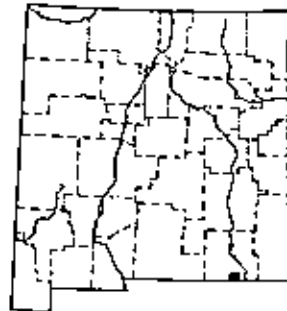
Important Literature:

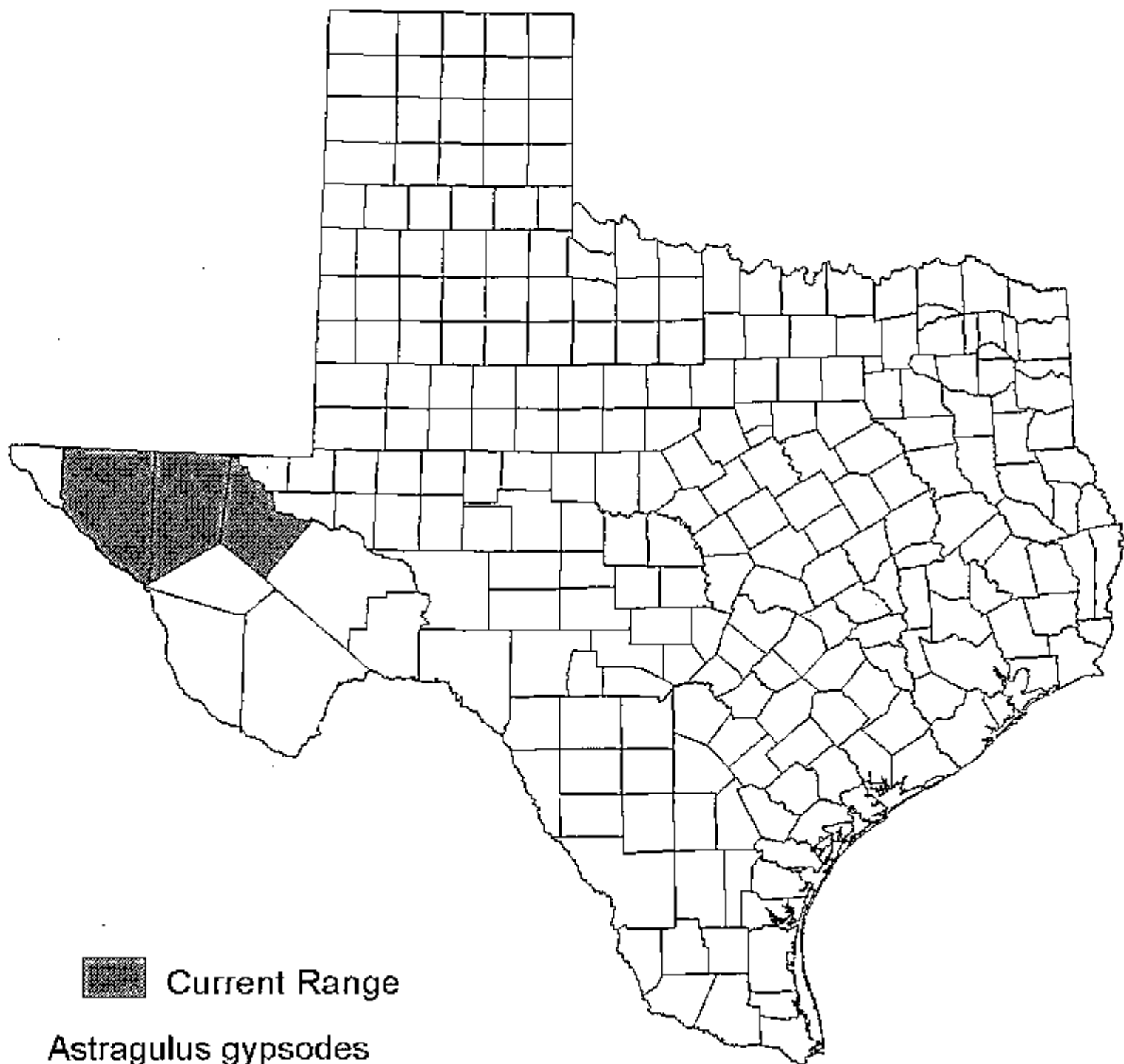
Barneby, R. C. Pugillus Astragalorum XVIII. *Am. Midl. Nat.* 55:499–500, 1956.

Barneby, R. C. Atlas of North American *Astragalus*. *Mem. New York Bot. Gard.* 13:1–1188, 1964.



Astragalus gypsodes
 A. general habit, B. pod





 Current Range

Astragalus gypsoides
(gyp locoweed)

Scientific Name: *Astragalus mollissimus* Torr. var. *marcidus* (Greene ex Rydb.) B. L. Turner

Synonyms: *Astragalus marcidus* Rydb.; *Astragalus bigelovii* Gray var. *marcidus* (Greene ex Rydb.) Barneby

Common Name: withered woolly loco

Global/State Ranks: G5T2S2

Federal Status: SOC

Global Range: Endemic to west Texas.

State Range: Jeff Davis and Presidio counties in the Trans-Pecos, locally abundant in the Marfa Basin. The lone specimen from Dallam County (W. J. Simms 4975, BRIT/SMU), merits critical examination.

Description (adapted from Barneby 1964; Correll & Johnston 1970; Barneby in Henrickson & Johnston in prep.): Tufted perennial with extremely short (to 2 cm long) stems, densely villous with a mixture of short tangled and longer spirally-twisted hairs that are attached at the base (rather than at the middle as in some *Astragalus* species). Leaves pinnately compound, 5-26 cm long, silvery or canescent; leaflets 11-35, suborbicular or ovate to obovate or rhombic-elliptic, 3-45 mm long, the lower considerably longer than the upper. Flowers short-pedicellate in densely flowered racemes 3-17 cm long, 5-45 per raceme, papilionaceous; petals purple or lavender to dark yellow or yellowish-white, with the banner 12-16 mm long and the keel 9-18.5 mm long. Fruit a solid or turgid, 2-loculed legume 6-10 mm long, oblong to somewhat lunate in profile, covered with villous-hirsute pubescence more than 1 mm long.

Similar Species: Several other perennial *Astragalus* taxa occur within the range of *A. mollissimus* var. *marcidus*. The species is characterized by its tufted, stemless habit, curious pubescence, separate stipules and 2-loculed legume. Var. *marcidus* is distinguished from var. *earlei*, which is locally abundant in the Trans-Pecos, by pubescence of the fruit, which is longer than 1 mm in the former and much shorter in the latter. From var. *bigelovii* it is distinguished by its smaller banner (12-16 mm vs. 16-25 mm long) and shorter fruit (6-10 mm vs. 10-15 mm long).

Habitat: Grasslands on gravelly slopes and flats at mid to higher elevations in mountains of the Trans-Pecos, usually on igneous substrates.

Phenology: Flowering April-July.

Comments: Some varieties of *Astragalus mollissimus* contain the alkaloid swainsonine as well as nitrotoxins that are toxic to livestock (Cheatham, Johnston & Marshall 2000). Whether these substances are present in var. *marcidus* has apparently not been reported.

Illustrations: None known.

Selected References:

Barneby, R. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden 13: 1-1188.

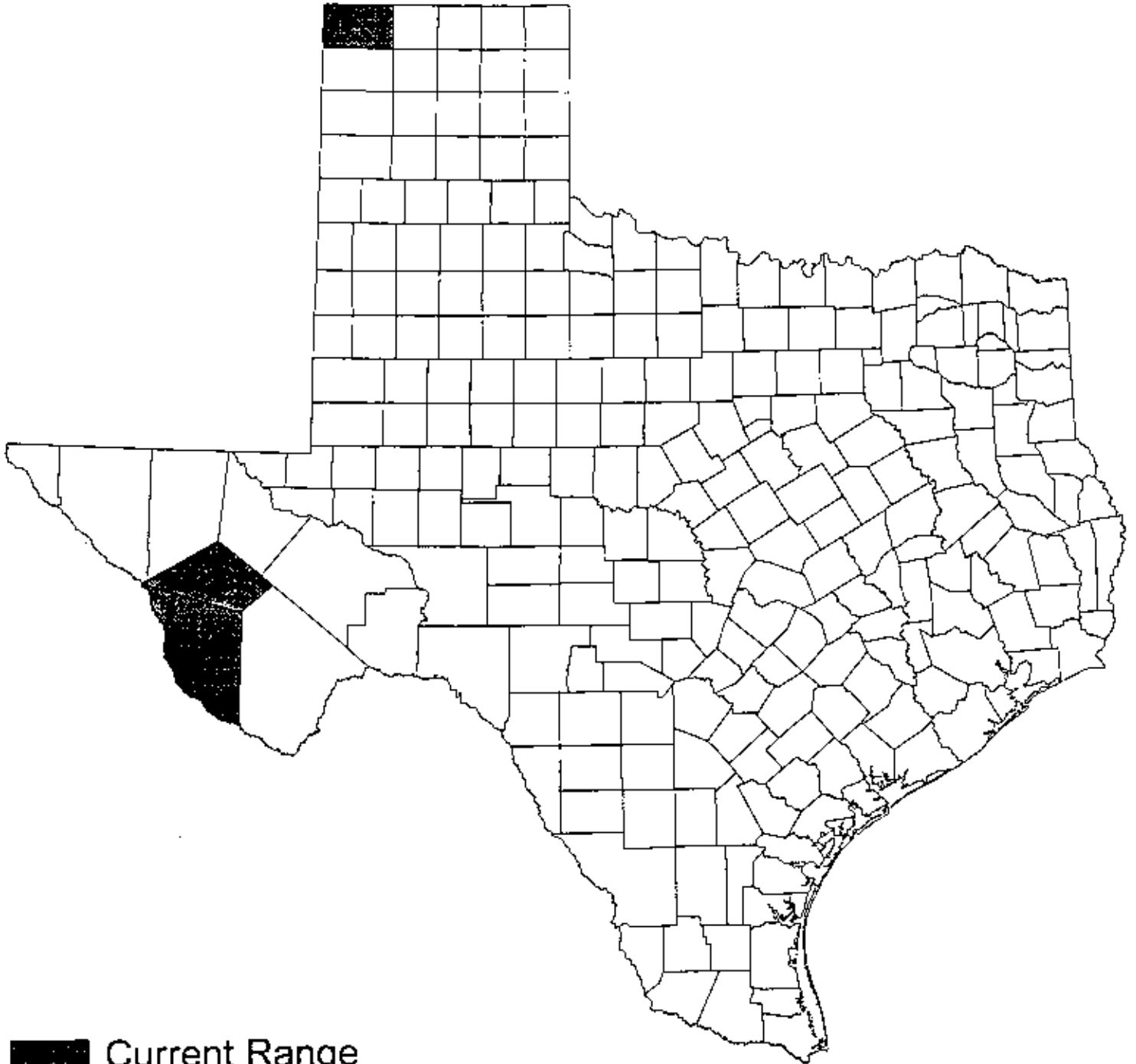
Cheatham, S., M. C. Johnston, and L. Marshall. 2000. The useful wild plants of Texas, the southeastern

and southwestern United States, the southern plains, and northern Mexico. Volume 2. Useful Wild Plants, Inc., Austin, Texas. 599 pp.

Henrickson, J. and M. C. Johnston. In prep. A flora of the Chihuahuan Desert Region. 3 volumes. 1990 draft.

Turner, B. L. 1959. The legumes of Texas. University of Texas Press, Austin. 284 pp.





Astragalus mollissimus var. *marcidus*
(withereed woolly loco)

Scientific Name: *Astrophytum asterias* Lemaire

Synonyms: *Echinocactus asterias* Zucc.

Common Name: star cactus, sea urchin cactus, sand dollar cactus

Global/State Ranks: G1S1 **Federal Status:** Endangered

Global Range: South Texas, and Nuevo Leon and Tamaulipas in Mexico

State Range: Starr County, with historical records from Hidalgo and Cameron counties and a questionable report from Jim Hogg County.

Description: (Compiled from Anderson 2001, Benson 1982, Damude and Poole 1990). **Habit:** Perennial stem succulent; stems usually single (unless damaged), green to grayish-green or goldish-brown, extremely flat, depressed, disk to low dome-shaped, to 7 cm (2¾ in.) tall and 15 cm (6 in.) in diameter in the wild, with a covering of whitish to yellowish circular scales; ribs usually 8, separated by narrow grooves, vaguely triangular in shape; areoles in a central line in the middle of the rib, about 3-5 mm (¼-¼ in.) in diameter, about 6-9 mm (¼-¾ in.) apart, bearing tufts of whitish hairs. **Spines:** none. **Flowers:** pale yellow with orange-red bases, 2-5.3 cm (¾-2 in.) long, 3-5 cm (1¼-2 in.) in diameter, opening widely, externally with long woolly hairs; stamens numerous, yellow; stigmas yellowish-green. **Fruits:** pink or green, fleshy when mature, oval, 15-20 mm (¾-¾ in.) long and about 12 mm (½ in.) in diameter, often obscured by woolly white hairs; seeds brown, shiny, about 2 mm (less than ½ in.) long by 3 mm (¼ in.) broad.

Similar Species: Star cactus is sometimes confused with peyote (*Lophophora williamsii*). Both species are spineless, but peyote is bluish-green, has 5-13, often irregularly shaped ribs, and lacks the tiny whitish scales. Also the flowers of peyote are usually pale pink.

Habitat: Gravelly clays or loams, possibly of the Catarina series (deep, droughty, saline clays), over the Catahoula and Frio Formations, on gentle slopes and flats in sparsely vegetated openings between shrub thickets within mesquite grasslands or mesquite-blackbrush thorn shrublands. Associates include *Varilla texana*, *Billieturnera helleri*, *Isocoma drummondii*, *Bouteloua trifida*, *Monanthochloë littoralis*, *Thymophylla pentachaeta*, *Aristida* spp., *Chloris cucullata*, *Eragrostis curtipedicellata*, *Sporobolus wrightii*, *Hilaria belangeri*, *Prosopis glandulosa*, *P. reptans*, *Atriplex canescens*, *Castela erecta*, *Acacia rigidula*, *Ziziphus obtusifolia*, *Bumelia celastrina*, *Lycium berlandieri*, *Koeberlinia spinosa*, *Forestiera angustifolia*, *Karwinskia humboldtiana*, *Opuntia leptocaulis*, *Echinocactus texensis*, *Mammillaria heyderi*, and *Coryphantha macromeris* var. *runyonii*.

Phenology: Flowering mid-March through May, most reliably in May, although the species may flower at any time after sufficient rainfall.

Comments: Star cactus is an extremely popular collector's item. Even though it is easily grown from seed, plants continue to be taken from the wild.

Illustrations: Line drawings and a black-and-white photograph appear in Benson (1982); color photographs appear in Weniger (1984), Everitt & Drawe (1993), and Anderson 2001.

Selected References:

- Anderson, E. E. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Damude, N. and J. M. Poole. 1990. Status report on *Echinocactus asterias* (*Astrophytum asterias*). Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock. 213 pp.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



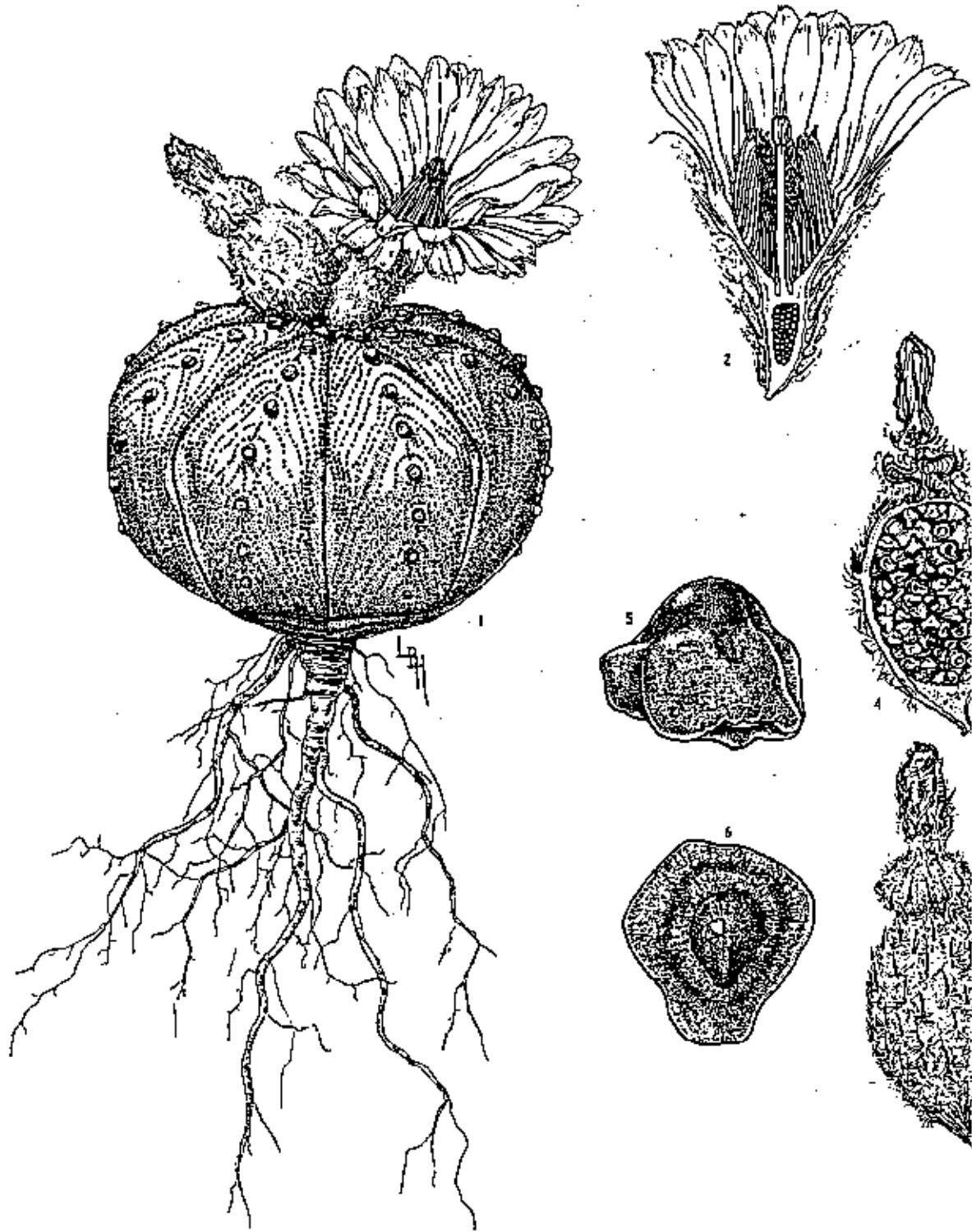
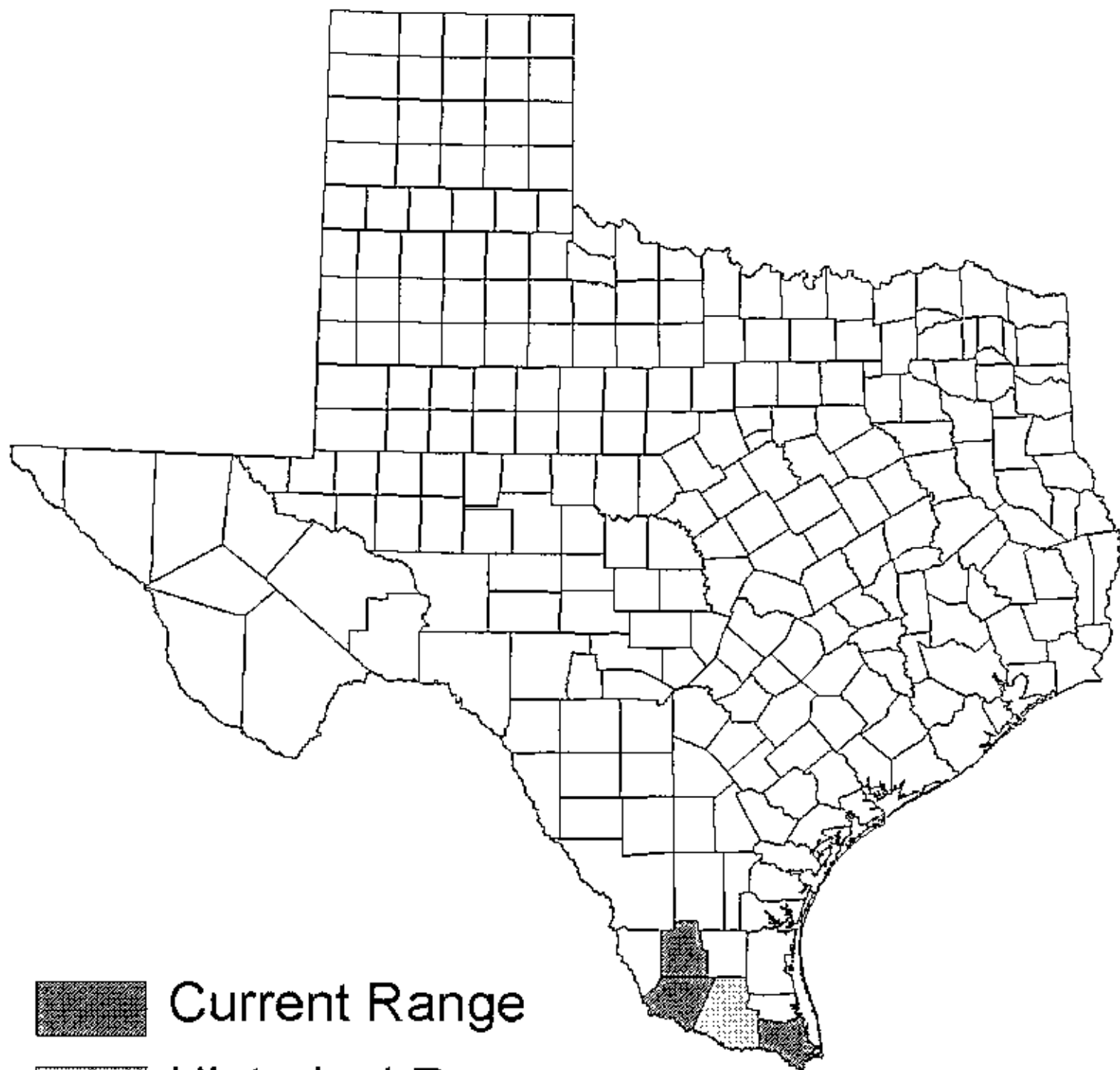


Fig. 761. Star cactus, *Echinocactus asterias*, $\times 1.1$, except as indicated. 1, Plant with a flower and a fruit, showing the spineless areoles and the irregular rows of small scales on the stem-ribs. 2, Flower in longitudinal section. 3, Fruit, green and fleshy at maturity, the surface covered with spinose scale-leaves and woolly hairs. 4, Fruit in longitudinal section. 5, Seed in side view, the lower half a broad collar surrounding a large cavity around the small hilum, $\times 14$. 6, Seed in top view, showing the flaring basal collar, $\times 14$.

Astrophytum



Current Range
Historical Range
Astrophytum asterias
(star cactus)

Scientific Name: *Atriplex klebergorum* M. C. Johnst.

Synonymy: None

Common Name: Kleberg saltbush

Global Range: Texas

State Range: Kleberg, La Salle, Starr and Webb counties.

Current Federal and State Status: No longer under federal review for listing; species of special concern to the state.

Global and State Ranks: G2S2

Description (compiled from Welsh 2000, Johnston 1961, Jones 1977, and Correll & Johnston 1970):

Habit: Annual herb 15-30 cm (6-12 in.) tall, with lignous, vertical, pale-barked, slenderly napiform taproot 5-9 mm ($\frac{1}{4}$ - $\frac{3}{8}$ in.) thick; stems erect, diffuse, branches alternate, numerous 15-40 cm (6-16 in.) long, mostly horizontal or distally ascending, bearing numerous slender ascending secondary branches; stems and branches terete, densely white-farinoso when young, glabrate with age, the bark becoming thin, pale brownish white and flaky, internodes mostly shorter than 1 cm ($\frac{3}{8}$ in.) (1 mm according to Welsh).

Leaves: Alternate, lowermost subopposite, essentially sessile, crowded, without stipules, 0.6-2 cm ($\frac{1}{4}$ - $\frac{3}{4}$ in.) long, 0.5-1.2 cm ($\frac{1}{4}$ - $\frac{1}{2}$ in.) wide, ovate-deltoid, widest at the base, acute at the apex, rounded, truncate or slightly cordate and clasping at the base, margins entire or appearing ragged or toothed primarily due to insect damage, rather firm and flat, very densely canescent farinoso, overall silvery white with a greenish yellow tinge.

Flowers: Unisexual, male and female flowers on same plant, sessile, axillary, very inconspicuous, mostly in leafy lateral branches with very short internodes, arising toward the tips of the secondary branches; male flowers solitary in the most distal axils, about 2 mm (less than $\frac{1}{4}$ in.) across, with 5 curved, elliptic, mucronulate, mostly hyaline sepals, farinoso dorsally, about 1.5 mm (less than $\frac{1}{4}$ in.) long, with 5 large anthers opposite the sepals, anthers almost filling the calyx, on white filiform filaments 1-1.3 mm (less than $\frac{1}{4}$ in.) long; female flowers densely farinoso on the outside, bracts inseparable from the ovary, appearing as a slightly flattened ovoid-elliptic structure about 1.5 mm (less than $\frac{1}{4}$ in.) long, with 2 brown filiform styles about 3 mm ($\frac{1}{4}$ in.) long diverging from an apical depression between four "teeth".

Fruits: indehiscent, nutlike; fruiting bracts densely and coarsely scurfy, ovate-orbicular, 4-7 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in.) in diameter, variably and irregularly 3-7 cleft around the margins, usually somewhat constricted below the apex, the terminal lobes 1.5-2.8 mm (less than $\frac{1}{4}$ in.) long, the faces irregularly and indistinctly doubly cristate or smooth; seeds round-lenticular, about 1.5 mm (less than $\frac{1}{4}$ in.) in diameter, dark shiny reddish brown.

Habitat: Light sandy or clayey loams, usually saline, sparsely vegetated, usually with other halophytes. Associates near the gulf coast include *Distichlis spicata*, *Monanthochloë littoralis*, *Borrchia frutescens*, *Machaeranthera phyllocephala*; at inland sites associates include *Frankenia johnstonii*, *Sporobolus pyramidatus*, *Prosopis reptans*, *Lycium* sp., and other *Atriplex* spp. (Turner 1981).

Phenology: Probably flowering in summer as fruit are usually present in fall. However flowering may vary with rainfall.

Similar Species: Several other annual species of *Atriplex* may also be expected in these habitats; however, *A. klebergorum* differs in having axillary flowers, solitary male flowers, and mealy white, sessile, usually semi-cordate, often clasping leaves. The fruiting bracts are also very distinct. Their overall shape with a subterminal constriction, long marginal teeth, and the tendency to have elongate cristate processes on the faces are unique within section *Argenteae* of *Atriplex* (Welsh 2000).

Comments: Due to its annual nature, populations of *A. klebergorum* may fluctuate widely year to year.

Additional Illustrations: None.

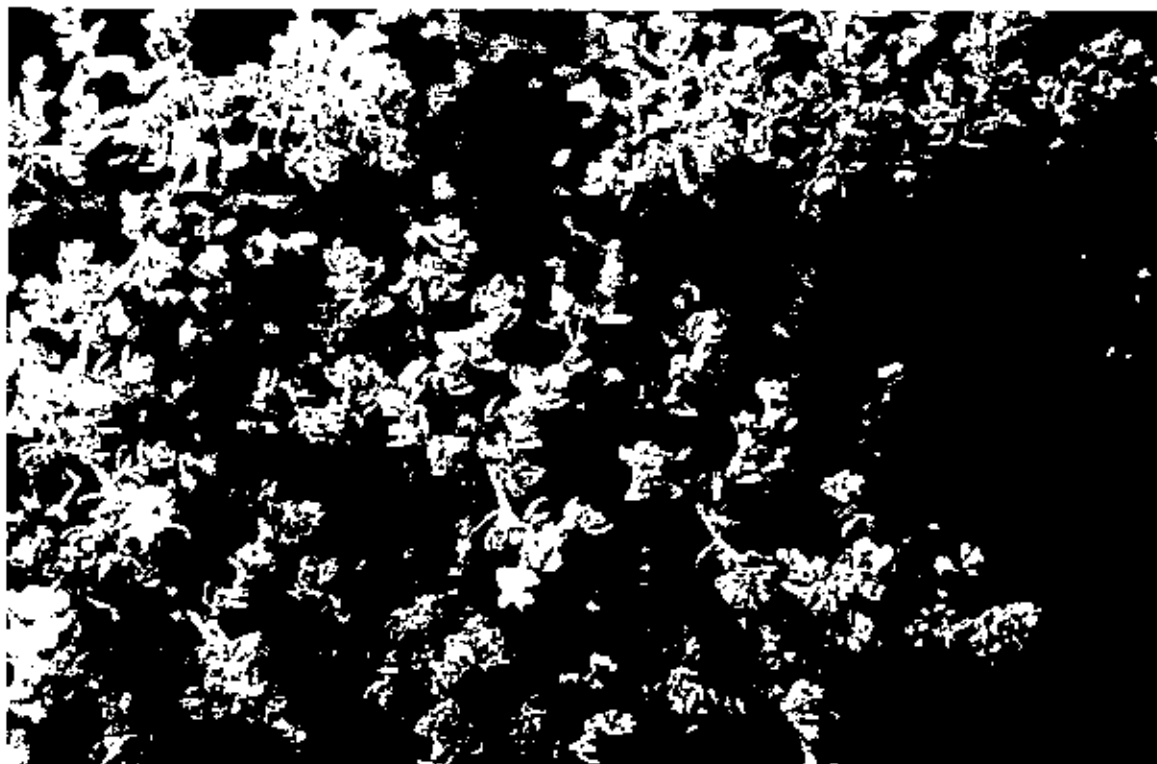
Selected References:

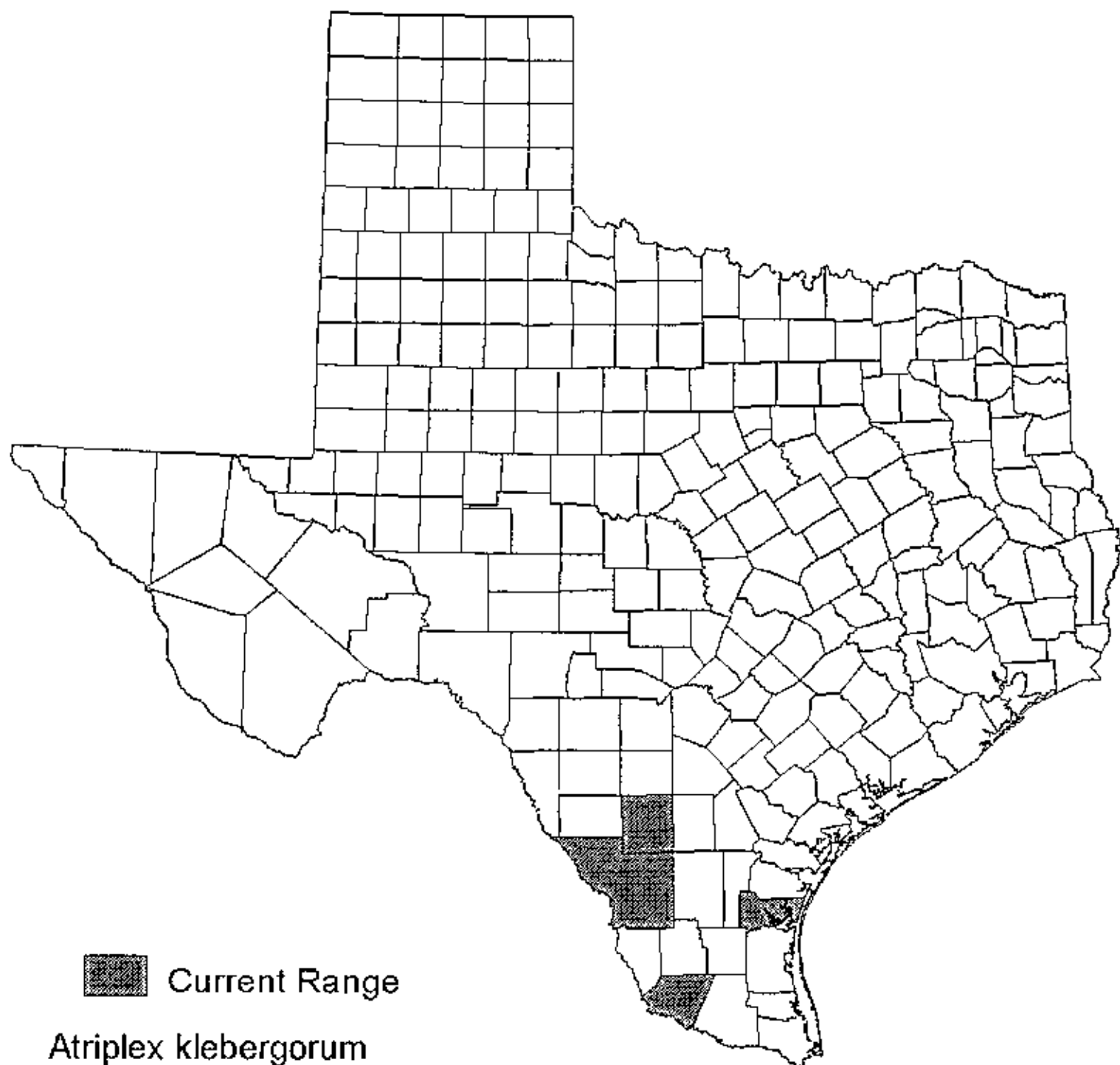
Johnston, M. C. 1961. *Atriplex klebergorum* (Chenopodiaceae), new species. *Southw. Nat.* 6(1): 49-50.

Jones, F. B. 1977. *Flora of the Texas Coastal Bend*. Mission Press, Corpus Christi, Texas. 262 pp.

Turner, B. L. 1981. Status report on *Atriplex klebergorum* M. C. Johnston. Report prepared for U.S. Fish & Wildlife Service, Albuquerque. 6 pp.

Welsh, S. L. 2000. Draft treatment of *Atriplex* for Flora North America, vol. 4. Available on the Web at <<http://hua.huh.harvard.edu/FNA/atriples.ed2.html>>.





■ Current Range

Atriplex klebergorum
(Kleberg saltbush)

Scientific Name: *Ayenia limitaris* Cristóbal

Synonyms: *Nephropetalum pringlei* Robins. Texas material was formerly included in *Ayenia berlandieri* S. Wats., which is now considered to be restricted to tropical Mexico.

Common Name: Texas ayenia; Tamaulipan kidneypetal

State/Global Ranks: G2S1

Federal Status: Endangered

Global Range: South Texas, northern Coahuila and Tamaulipas.

State Range: Cameron, Hidalgo and Willacy counties.

Description (adapted from Correll & Johnston 1970 and Richardson 1995): Thornless shrub to 1.5 m tall. Leaves on petioles to 2.5 cm long, alternate, simple, ovate, cordate at base and acute or acuminate at apex, coarsely serrate along margins, to 7.5 cm long and 3.5 cm broad, pubescent with stellate hairs. Flowers on 3-flowered peduncles from leaf axils; calyx deeply 5-parted, the lobes ovate; petals 5, greenish yellow, about 2.5 mm long, the blade kidney-shaped, narrowed to a claw at base; stamens 5, united into a short cup; staminodes 5, alternate with the stamens, rounded and hooded at the apex; style short, the stigma capitate. Fruit a globose capsule to 8 mm long, covered with pubescent prickles, 5-lobed and breaking into 5 1-seeded segments.

Similar Species: Much like several members of the Malvaceae, from which it is best distinguished on the basis of its prickly, 5-lobed capsule.

Habitat: Subtropical mixed evergreen/deciduous woodlands on alluvial deposits on floodplains and terraces of the Rio Grande delta, in deep shade or in partial shade along woodland margins. Soils at known sites include well drained, calcareous, sandy clay loam (Hidalgo Series) and neutral to moderately alkaline fine sandy loam (Willacy Series). Associated species include *Pithecellobium ebano*, *P. pallens*, *Eupatorium azureum* (*Tamaulipa azurea*), *Ehretia anacua*, *Prosopis glandulosa*, *Celtis pallida*, *C. laevigata*, *Condalia hookeri*, *Cordia boissieri*, *Forestiera angustifolia*, *Diospyros texana*, *Amyris madrensis*, *A. texana*, *Sideroxylon celastrinum* (*Bumelia celastrina*), *Bernardia myricifolia*, *Trixis radialis*, *Randia rhagocarpa* and *Rivina humilis* (Damude & Poole 1990).

Phenology: Flowering throughout the year with sufficient rainfall.

Comments: *Ayenia limitaris* was listed as Endangered in 1994. Extant populations, most of them small, are known only in Hidalgo County and eastern Tamaulipas.

Illustrations: A color photograph appears in Everitt & Drawe (1993). Line drawings appear in Vines (1960, as *A. berlandieri*) and Cristóbal (1960).

Selected References:

- Best, C. 1994. Memorandum of 14 November 1994. U.S. Department of Interior, Fish & Wildlife Service, Santa Ana/Lower Rio Grande Valley National Wildlife Refuge. 6 pp. + maps.
- Cristóbal, C. L. 1960. Revision del género *Ayenia*. Opera Lilloana 4: 1-230.

- Damude, N. and Poole, J. M. 1990. Status report on *Ayenia limitaris*. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Dorr, L. J. and L. C. Barnett. 1986. The identity of *Nephropetalum* (Sterculiaceae). *Taxon* 35: 163-164.
- Dorr, L. J. 1990. A note concerning the typification of two plants described from Texas. *Sida* 14(2): 309.
- Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock. 213 pp.
- Richardson, A. 1995. Plants of the Rio Grande delta [revised edition of "Plants of Southmost Texas"]. University of Texas Press, Austin. 332 pp. + 94 plates.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.

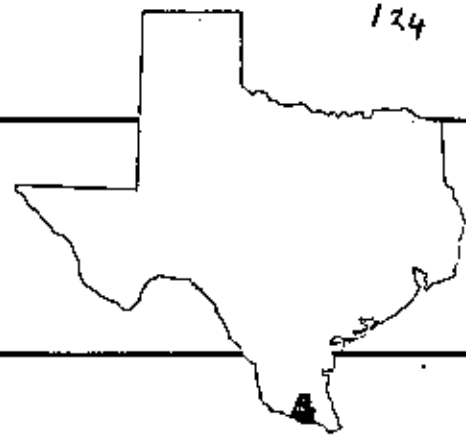


Federally and State Endangered

124

Texas Ayenia

Ayenia limitaris



Texas ayenia (*Ayenia limitaris*) was listed as endangered by the U.S. Fish and Wildlife Service in August 1994. First described in 1960, Texas ayenia once occurred in Cameron and Hidalgo counties in south Texas, and in the states of Coahuila and Tamaulipas in Mexico. Today, Texas ayenia exists in the United States in only one small population of about 20 individuals in Hidalgo county. The species also occurs in the state of Tamaulipas in Mexico.



Texas ayenia is a thornless medium-sized shrub, two to five feet tall. The leaves are 1½-3 inches long, simple, alternate, and hairy. They have toothed margins and are shaped like an inverted teardrop. The flowers are small and clustered in the upper leaves, with five green, pink, or cream colored petals. The fruit is a round, five-celled capsule about ¼ inches in diameter and covered with short, curvy, sharp prickles.

Little is known about the reproductive biology of this species, a member of the chocolate family. Found on terraces and floodplains, Texas ayenia may be dependent on flooding for nutrient deposition and seed dispersal. Propagation techniques are being developed by the U.S. Fish and Wildlife Service at the Lower Rio Grande Valley National Wildlife Refuge.

Habitat

Texas ayenia grows in dense, relatively moist, subtropical riparian woodlands, with an overall canopy cover of about 95%. The population in Hidalgo county occurs on nearly level sandy clay loam soils of the Hidalgo series. Plants growing in association with Texas ayenia include coma, brasil, mesquite, lotebush, granjeno, colima, and snake-eyes. This plant community was once an extensive thicket that covered most of the Rio Grande delta; however, less than 5% of the original acreage remains, mainly along fence rows, highway right-of-way, canals, and ditch banks.

CHOCOLATE FAMILY (*Sterculiaceae*)

BERLANDIER AYENIA

Ayenia berlandieri Wats.

FIELD IDENTIFICATION. Suffrutescent plant, sometimes quite woody below, attaining a height of 2-6 ft.

FLOWERS. Borne on pedicels mostly less than 1 in. long; perianth hardly over $\frac{1}{8}$ in. across; sepals 5, densely white-hairy, oblong to lanceolate, obtuse or acute; petals 5, yellowish green, clawed, crisped, incurved, adnate to the stamen tube; anthers in the sinuses of the stamen tube; carpels 5.

FRUIT. On pedicels $\frac{1}{2}$ - $1\frac{1}{2}$ in. long, capsule 5-lobed, subglobose, somewhat flattened, about $\frac{3}{8}$ in. in diameter, covered with soft spinules and short, stellate hairs, the 5 carpels bivalvate at maturity.

LEAVES. Mostly in clusters at the nodes, 1-3 in. long, $\frac{1}{2}$ - $1\frac{1}{2}$ in. wide, ovate, apex acuminate, base rounded to cordate, margin coarsely serrate; upper surface dark green, puberulent, somewhat papillose; lower surface paler, densely covered with fascicled white hairs; petioles $\frac{1}{4}$ -1 in. long, densely hairy.

TWIGS. Young twigs slender, spreading, green, hairy; older twigs light brown, glabrous, striate.

RANGE. In Texas in the lower Rio Grande area, especially Cameron County. In Mexico from Tamaulipas south to Jalisco, Guerrero, and Morelos.

REMARKS. The genus name, *Ayenia*, is in honor of Duc d'Ayen. The species name, *berlandieri*, is in honor of J. L. Berlandier, a Swiss botanist who collected, 1827-1830, in Mexico.

SMALL-LEAF AYENIA

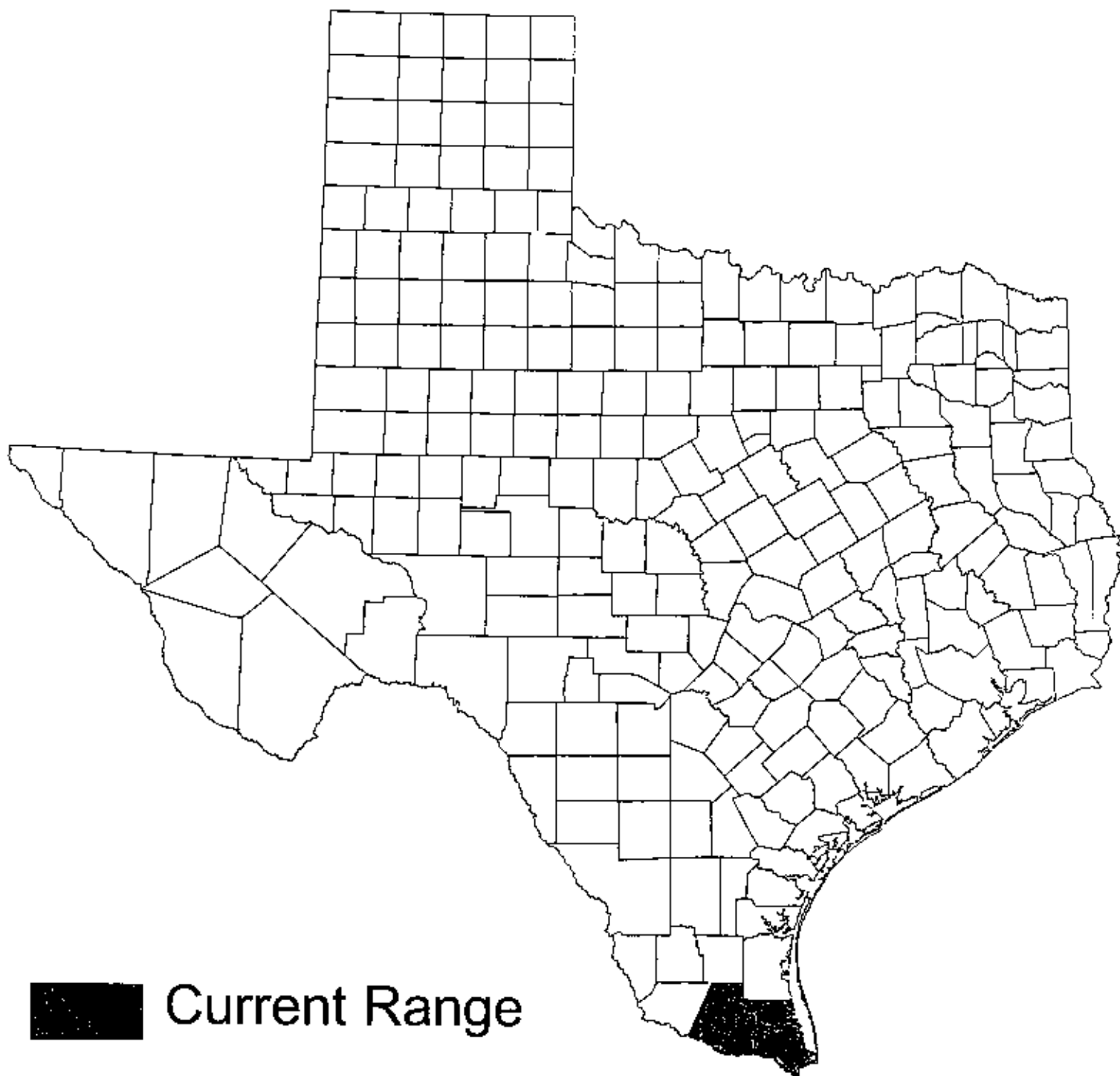
Ayenia microphylla Gray

FIELD IDENTIFICATION. Low densely branched Western subshrub. Usually less than 1 ft high, with densely stellate-tomentose leaves, petioles, and stems.



BERLANDIER AYENIA
Ayenia berlandieri Wats.

FLOWERS. May-July, long-pedicellate, axillary, small, red to purplish; calyx small and inconspicuous, 5-lobed; petals 5, deltoid-reniform, hooded, apex more or less lobed and glandular, claw longer than the blade; stami-



■ Current Range

Ayenia limitaris
(Texas ayenia)

Scientific Name: *Bartonia texana* Correll

Synonyms: None.

Common Name: Texas screwstem

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to east Texas.

State Range: Angelina, Hardin, Jasper, Nacogdoches, Newton, Polk, San Augustine, San Jacinto and Tyler counties. A report from Smith County near Tyler may be erroneous.

Description (adapted from Correll & Johnston 1970): Slender erect glabrous annual to 3 dm tall. Leaves alternate, reduced to scales ca. 1 mm long. Flowers in a slender lax raceme or panicle, on slender ascending pedicels up to 15 mm long; calyx cleft almost to base, 4-lobed, the lobes 1.5-2 mm long, triangular-lanceolate, acute at apex; corolla whitish, 4-lobed, the lobes ca. 2.5 mm long, elliptic to obtuse-apiculate; stamens 4, in sinuses of corolla lobes; style short and stout, ca. 0.5 mm long. Fruit a small, 2-valved, ellipsoidal-subquadrate capsule that is usually longer than the corolla.

Similar Species: Much like other *Bartonia* species, two of which occur in east Texas. *Bartonia paniculata* has larger flowers, with calyx lobes ca. 3 mm long and corolla lobes ca. 5 mm long; its fruit is shorter than the corolla. *Bartonia verna* has even larger flowers, with corolla lobes 5-10 mm long; it reportedly flowers in the spring rather than late summer and fall.

Habitat: In and around acid seeps in pine-oak forests on gentle slopes, often on clumps of bryophytes on tree bases, roots and logs. Commonly associated woody plants include *Magnolia virginiana*, *Nyssa sylvatica*, *Acer rubrum*, *Itea virginica*, *Alnus serrulata*, *Cyrilla racemiflora* and *Ilex coriacea* (Nixon & Ward 1981).

Phenology: Flowering September-November.

Comments:

Illustrations: A line drawing appears in Nixon & Ward (1981). Line drawings of *B. texana* and *B. paniculata* appear in Correll (1966) and are reproduced in Correll & Correll (1975).

Selected References:

Correll, D. S. 1966. Two new plants in Texas. *Wrightia* 3(8): 188-191.

Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. 2 volumes. Stanford University Press, Stanford. 1777 pp.

Nixon, E. S. 1979. Status report on *Bartonia texana* Correll. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Nixon, E. S. and J. R. Ward. 1981. Distribution of *Schoenolirion wrightii* (Liliaceae) and *Bartonia texana* (Gentianaceae). *Sida* 9(1): 64-69.



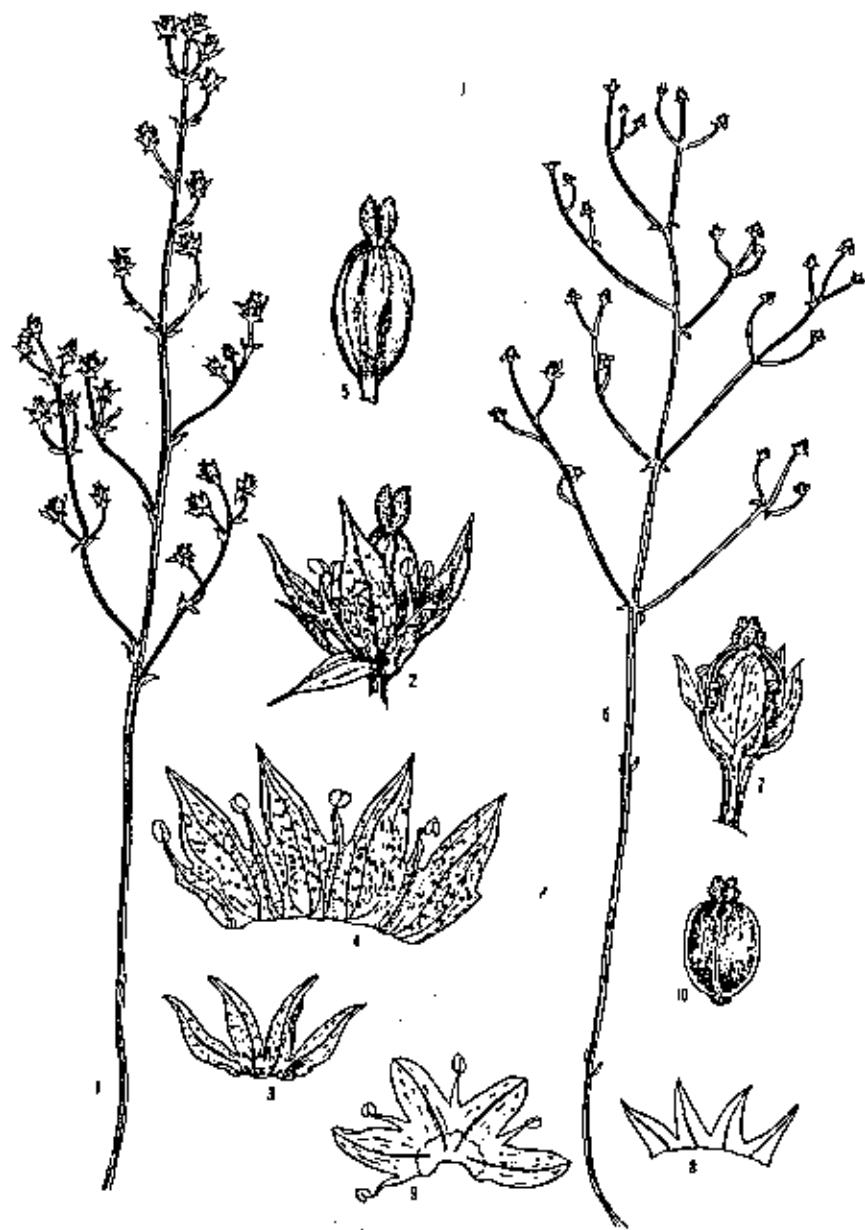


Fig. 630: 1-5. *Bartonia paniculata*: 1, habit, x 1; 2, flower with one sepal spread out, x 5; 3, calyx, spread out, x 5; 4, corolla, spread out, x 5; 5, capsule, x 5. 6-10, *Bartonia texana*: 6, habit, x 1; 7, flower, x 5; 8, calyx, x 5; 9, corolla, x 5; 10, capsule, x 5. (V. F.)

9. *Nymphoides* HILL FLOATING-HERB

Perennial submersed aquatic plants with floating alternate petioles that bear near their summit an umbel of flowers; short spurlike roots; calyx 5-parted; corolla almost rotate bearing a glandular appendage near the base; style short; stigma 2-lobed; capsule few- to many-seeded, at length burrlike papillate, the coat hard.

A genus of about 20 species; in America, Eurasia and Africa; the segregate family Menyanthaceae.

1. Petioles slender, sometimes with clusters of roots just above the leaves mostly basal; flowers white, in clusters.....

1. Petioles rather stout, without clusters of roots; leaves mostly basal; stems; flowers yellow, axillary.....

1. *Nymphoides aquatica* (Gmel.) O. Ktze. Figs. 1 and 631.

Plant coarse; leaves mostly basal, suborbicular to reniform, sinus, heavy in texture, smooth and yellowish green on upper surface, punctate or pitted on lower surface, to 15 cm. wide; petioles bearing a cluster of fleshy roots, purple-glandular, to 25 cm. or more long; calyx to 5 mm. long; corolla white, about 15 mm. long; elongate, to 15 mm. long; seeds glandular-roughened, *Lithospermum* Gray.

In ponds and sluggish streams in e. Tex., May-July; from locally to s. N.J. and Del.

2. *Nymphoides peltata* (Gmel.) O. Ktze. YELLOW FLOATING-HERB

Plant coarse; stem stout, extensively creeping and branching; leaves mostly basal, suborbicular, coarsely undulate-dentate, to about 10 cm. wide; petioles bearing a cluster of fleshy roots, purple-glandular, to 25 cm. or more long; calyx lobes elliptic-lanceolate, to 1 cm. long or more; corolla bright-yellow, 2-3 cm. broad, its lobes fringed; anthers 4-5 mm. long; capsule strongly beaked, to 1 cm. long, narrowly winged, with fringelike margins.

In quiet waters of rivers, lakes and streams, and on wet sand in s.e. Okla. (McCurtain and Bryan cos.), n.-cen. Tex. and N. Mex. (Co.), June-Sept.; introd. from Eur. for cult. but escapes and is established from N.Y. s. to Tex. and Ariz.

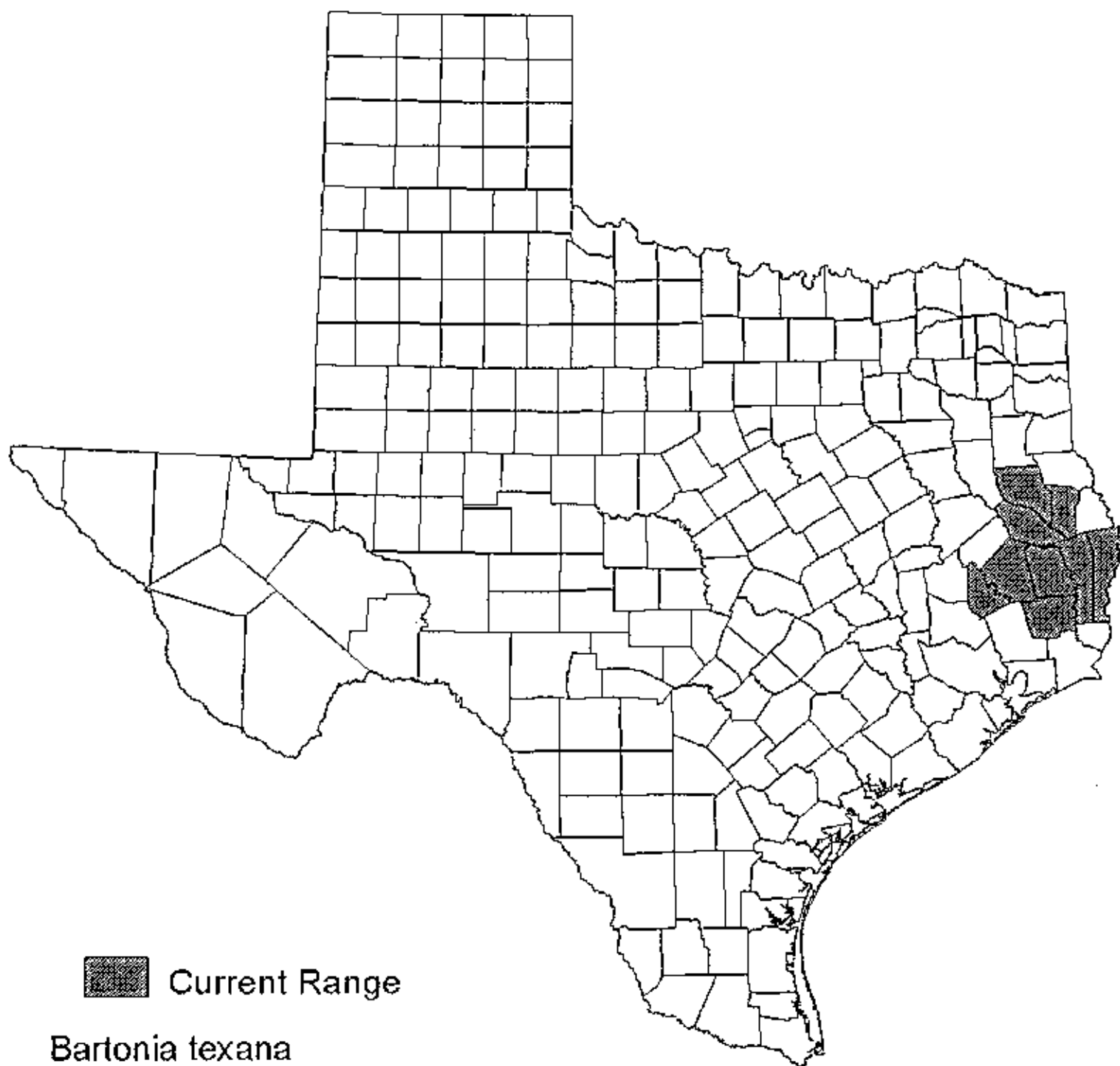
Fam. 109. Apocynaceae JUSS. DOGBANE FAMILY

Trees, shrubs, vines or herbs, often with milky juice; leaves opposite or occasionally verticillate, entire; flowers regular, perfect; calyx the 5 usually imbricate lobes mostly parted nearly to the root, bearing various glandular appendages within; corolla gamopetalous, salverform or infundibuliform to urceolate or campanulate, the lobes bearing somewhat conspicuous faucal appendages within, the lobes sinistrorsely or dextrorsely contorted in aestivation; style with the corolla lobes in the tube, the introrse anthers 4-celled; the single style surmounted by a massive stigma of diversified follicular (in ours); seeds naked or comose.

About 180 genera and 1,500 species of cosmopolitan distribution; contains many ornamental as well as poisonous plants.

1. Leaves alternate.....

1. Leaves opposite or whorled.....



 Current Range

Bartonia texana
(Texas screwstem)

Scientific Name: *Batesimalva violacea* (Rose) Fryxell

Synonyms: *Gaya violacea* Rose

Common Name: purple gay-mallow

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Trans-Pecos Texas, northern Coahuila and central Nuevo León.

State Range: Known in Texas only from the Chisos Mountains of Brewster County.

Description (adopted from Fryxell, 1988): Rather spindly shrub 1.5-2.0 m tall. Stems softly tomentose with a mixture of stellate and simple hairs. Leaves alternate, the blades 4-9 (-11) cm long, 2-5 (-6.5) cm wide, sparingly pubescent on upper surface and densely velvety-pubescent on lower surface, with petioles (1-) 2-7 (-8) cm long. Flowers 1-4 in leaf axils; pedicels 2-5 cm long; calyx 6-8 mm long, the 5 lobes 2-4 mm long; petals 6-8 mm long, blue-violet; staminal column 2-3 mm long; styles 8-10, slender. Fruit a capsule 10-12 mm in diameter, disciform, minutely pubescent, composed of 8-10 single-seeded mericarps.

Similar Species: With its shrubby habit and blue-violet petals, *Batesimalva violacea* is not likely to be confused with any other species in Texas.

Habitat: Among boulders in seasonally moist igneous rock canyons, often under small trees and large shrubs such as *Fraxinus greggii* and *Ungnadia speciosa* (Clark & Powell 1983). Habitat in Mexico is described as dry deciduous forest and matorral (Fryxell 1988).

Phenology: Flowering and fruiting at least October-November in Big Bend NP; possibly flowering throughout the year in Mexico (Fryxell 1988).

Comments:

Illustrations: A line drawing of diagnostic characters appear in Fryxell (1975). Additional line drawings appear in Fryxell (1988) and in Powell (1998).

Selected References:

- Clark, J. J. and A. M. Powell. 1983. Status report [on *Batesimalva violacea*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Correll, D. S. 1966. Some additions and corrections to the flora of Texas—II. *Brittonia* 18: 306-309.
- Fryxell, P. A. 1975. *Batesimalva* y *Meximalva*, dos géneros nuevos de Malváceas Mexicanas. *Boletín de la Sociedad Botánica de México* 35: 23-36.
- Fryxell, P. A. 1988. Malvaceae of Mexico. *Systematic Botany Monographs* 25: 1-522.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.



Fig. 234. *Batesimalva violacea*

4. BATESIMALVA FRYXELL

Shrubs to 2 m high, erect and slender; stems with short dense hairs and longer spreading hairs. Leaves 6–9 cm long, lanceolate to broadly ovate, long-pointed, green above, pale-pubescent underneath, margins with rounded teeth. Flowers blue or violet, in axils; petals ca. 8 mm long; fruit a schizocarp with 9 carpels. [*Gaya* H.B.K.].

A small genus of northern Mexico, barely reaching into the United States (Fryxell, 1975).

1. *Batesimalva violacea* (Rose) Fryxell. Fig. 234. [*Gaya violacea* Juss.]. In Texas known from among boulders below the "Window" near the "jump off falls," Oak Canyon, and moist area at lower-most Window Trail from the Basin, W side of the Chisos Mts., Brewster Co.; Oct–Nov. Also Coahuila and N.L., Mex.

Although rare in Texas this species is somewhat more common in Mexico. The Texas plants are small, bending shrubs to 1.4 m high with blue flowers, evidently restricted to moist, shady habitats in deep canyons.

39. STERCULIACEAE BARTL. CACAO FAMILY

Trees, shrubs, or herbs. Leaves alternate, simple, margins smooth or toothed, rarely deeply lobed, usually with stellate hairs, stipulate. Flowers usually perfect, regular or irregular, less often unisexual, small or large, mostly ciliary; calyx usually with 5 sepals united; petals 5 or absent, separate or united, hypogynous; stamens fused into a tube, at least basally, 5 fertile, 5 infertile, anthers 2–3-celled; ovary superior. Fruit (capsule) usually 5-celled, leathery or rarely fleshy, dehiscent or indehiscent; seeds with much endosperm.

A mostly tropical family of more than 700 species in about 60 genera. One well known member of the family, *Theobroma cacao* L. of the American tropics, is the source of chocolate and cocoa produced from fermented seeds (beans). Species of several genera (including *Firmiana*, *Fremontodendron*, and *Cola*) are cultivated in southern regions of the United States. The Chinese Parasol tree, *Firmiana simplex* W. Wight, is grown in central and south Texas. Five genera of the Cacao family occur in Texas with three of these being represented in the Trans-Pecos.

KEY TO THE GENERA

- 1. Leaf blades usually much less than 3 cm long; petals hoodshaped 1. *Ayenia*.
- 11. Leaf blades exceeding 3 cm long; petals flat.
 - 2. Leaf blades roundish; capsule with dense pubescent processes; seeds many in each cell 2. *Hermannia*.
 - 2. Leaf blades ovate to lanceolate; capsule glabrate or with minute hairs; seeds usually 1 in each cell 3. *Melachia*.

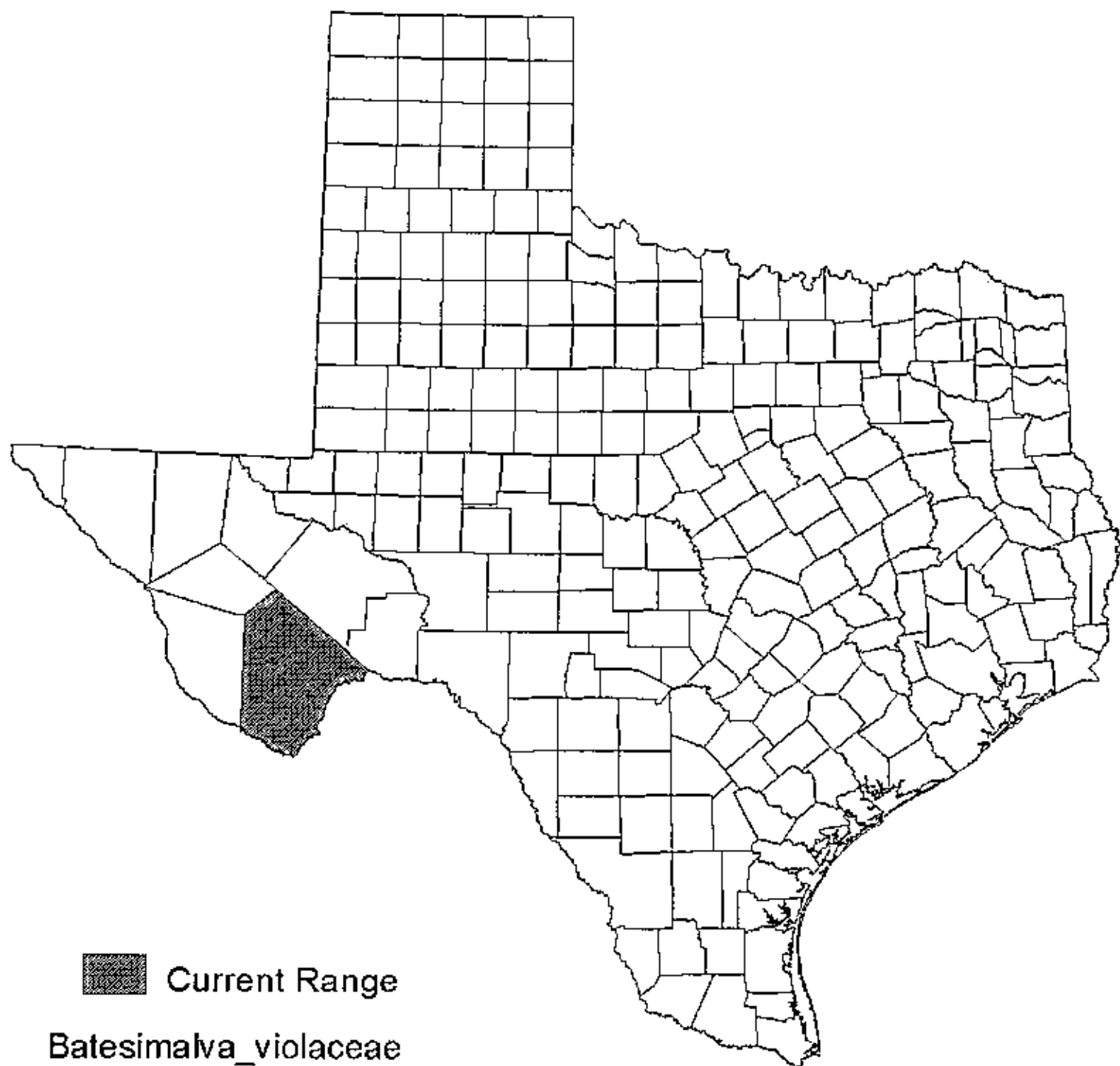
1. AYENIA L.

Shrubs, subshrubs, or herbs. Leaves simple, toothed. Flowers reddish in our species, perfect, small, usually borne singly or in clusters on rather long, slender stalks; sepals and petals 5, the petals hoodshaped (together canopylike) and with slender bases, the top part attached to the stamen tube; stamens 5, alternating with sterile stamens, one anther in each cavity of stamen tube. Fruit a roundish capsule, with a warty or spiny surface, separating into 5 carpels each with one seed.

A genus of about 70 species distributed mostly in warm regions of the Americas. Four species occur in Texas.

KEY TO THE SPECIES

- 1. Blades of upper leaves lanceolate to linear, noticeably narrower than lower leaves 1. *A. filiformis*.



■ Current Range

Batesimalva violaceae
(purple gay-mallow)

Scientific Name: *Bonamia ovalifolia* (Torr.) Hallier f.

Synonyms: *Evolvulus ovalifolius* Torr.; *Breweria ovalifolia* (Torr.) Gray

Common Name: bigpod bonamia; shrub morning-glory

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Trans-Pecos Texas and adjacent northern Coahuila.

State Range: Known only from Boquillas Canyon in Big Bend NP, Brewster County.

Description (adapted from Myint & Ward 1968 and Correll & Johnston 1970): Procumbent perennial with sericeus-tomentose stems 4-8 dm long, 1.2-2.5 mm in diameter. Leaves on petioles 1-3 mm long, the blades suborbicular to oblong-ovate, 13-25 mm long and 9-20 mm wide, obtuse to rounded at apex and truncate to subcordate at base, grayish to green, densely sericeus-tomentose on both surfaces, with entire to undulate margins. Flowers solitary at nodes, on peduncles 2-2.5 mm long and pedicels 2-8 mm long, subtended by 2 linear-lanceolate bracts 4-6 mm long; sepals 5, elliptic-ovate, the outer sepals 10-12 mm long, 6-8 mm wide, sericeus-tomentose, the inner sepals shorter and narrower; corolla funnellform-campanulate, 3.5-5 cm long, blue-purple to light purple; stamens 5, included in corolla tube; styles 1, ca. 15 mm long, bifid in terminal 1/4. Fruit a broadly ovoid capsule ca. 9 mm long and 8 mm wide, containing 2-4 seeds.

Similar Species: None.

Habitat: Alluvial sand among boulders on rocky lower slopes in canyons of the Rio Grande.

Phenology: Flowering (May-) July-November.

Comments: Known in Texas from a single population in Big Bend National Park. The source of a 19th century specimen from Coahuila ("Rio Grande below San Carlos", Parry s.n.) has not been re-located (Austin 1990).

Illustrations: A color photograph, with Dr. Marshall C. Johnston for scale, was published in the November 1985 issue of Texas Highways magazine. Numerous excellent photographs appear in Austin (1988).

Selected References:

Austin, D. F. 1988. The rarest morning glory. Fairchild Tropical Garden Bulletin 43(3): 22-28.

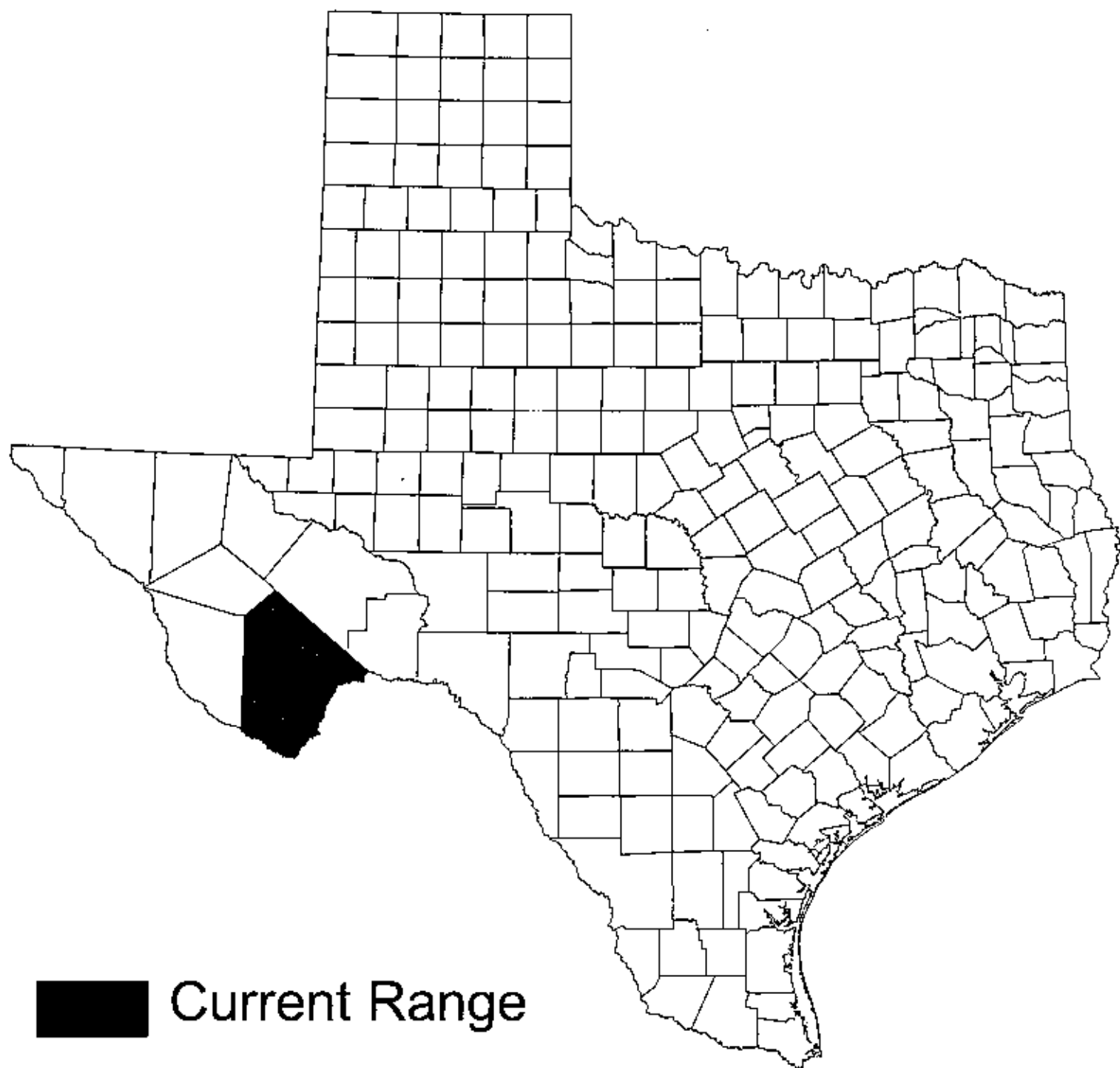
Austin, D. F. 1990. Rare Convolvulaceae in the southwestern United States. Unpublished manuscript, Florida Atlantic University, Boca Raton.

Myint, T. and D. B. Ward. 1968. A taxonomic revision of the genus *Bonamia* (Convolvulaceae).

Phytologia 17: 121-239.

Pinkard, T. and J. Lewis. 1985. Big Bend's blooming desert. *Texas Highways* 32 (11), November 1985: 2-9.





■ Current Range

Bonamia ovalifolia
(bigpod bonamia)

Scientific Name: *Bouteloua kayi* Warnock

Synonyms: *Chondrosum kayi* (Warnock) Clayton

Common Name: Kay's grama

Global/State Ranks: G1QS1

Federal Status: None

Global Range: Endemic to Trans-Pecos Texas.

State Range: Known only from Black Gap WMA in southeastern Brewster County.

Habitat: Gravelly soils on desert flats and on limestone ledges along bluffs.

Phenology: Flowering May-November (Powell 1994).

Description (adapted from Warnock 1955, Gould 1975, Powell 1994, Henrickson & Johnston in prep.):

Tufted perennial with erect culms. Culms 1-5 dm long, erect. Ligule a fringe of hairs ca. 0.5 mm long. Leaf blades involute, 8-20 cm long and 1-1.5 mm wide. Inflorescence axis 8-15 cm long, with 8-20 ascending branches 1.5-3 cm long, the axis not prolonged beyond the terminal spikelet. Spikelets (6-) 7-14 (20), 5-8 mm long; glumes 2.5-4 mm long, the first shorter than the second; body of fertile lemma ca. 3 mm long, deeply bifid at apex, the midvein and two lateral veins excurrent as awns ca. 4.5 mm long; palea reduced to 2 awns ca. 2 mm long; sterile florets 1, ca. 1 mm long, with 3 awns ca. 6 mm long.

Similar Species: According to Gould (1975), *Bouteloua kayi* is closely related to *B. trifida* but differs in several characters. *B. kayi* has stouter, erect culm bases and fewer expanded culm internodes and elevated nodes; the inflorescence branches are usually more numerous and longer; the body of the lemmas is generally longer and the lemma awns are generally shorter.

Comments: Named in honor of Lamar Kay of the Soil Conservation Service in Alpine, collector of the type specimen.

Illustrations: Line drawings and the type description appear in Warnock (1955); line drawings also appear in Powell (1994).

Selected References:

Gould, F. W. 1975. The grasses of Texas. Texas A & M University Press, College Station. 653 pp.

Powell, A. M. 1994. Grasses of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 377 pp.

Warnock, B. H. 1955. *Bouteloua kayi*, a new grama grass from Trans-Pecos Texas. Field & Laboratory 23(1): 15-16.



Fig. 187. *Bouteloua kayi*. Plant; glumes and florets.

Red grama is a relatively small (10–30 cm high) perennial grama, but it is a drought-resistant species that provides fair forage during early season growth.

14. *Bouteloua kayi* Warnock KAY GRAMA. Fig. 187. Known only from the area of the type locality along and near Maravillas Creek, Black Gap Refuge, southern Brewster Co., dry limestone flats, slopes, and rocky ledges. Brewster Co., Cave Hill along Stairstep Mt.; bluffs of Maravillas Creek; Brushy Canyon; flats on Maravillas Creek. 2,200–3,700 ft. Flowering May–Nov.

Bouteloua kayi is closely related to *B. trifida* (Correll and Johnston, 1970; Gould, 1975; 1979) but differs in having stronger, erect culm bases, fewer expanded culm internodes and elevated nodes; the spicate branches of the panicle are more numerous and longer, the lemma awns are somewhat shorter, and the lemma is longer. Kay grama probably is very drought-resistant.

52. CATHESTECUM Presl

A genus of about five species limited to Mexico, with one species also in the United States. The genus name is from Greek *kathestekos*, meaning stationary, but with unknown application.

1. *Cathastecum erectum* Vasey & Hack. FALSE GRAMA. Fig. 188. Perennial, low, tufted. Culms erect and flowering, to 25 cm long, and spread-

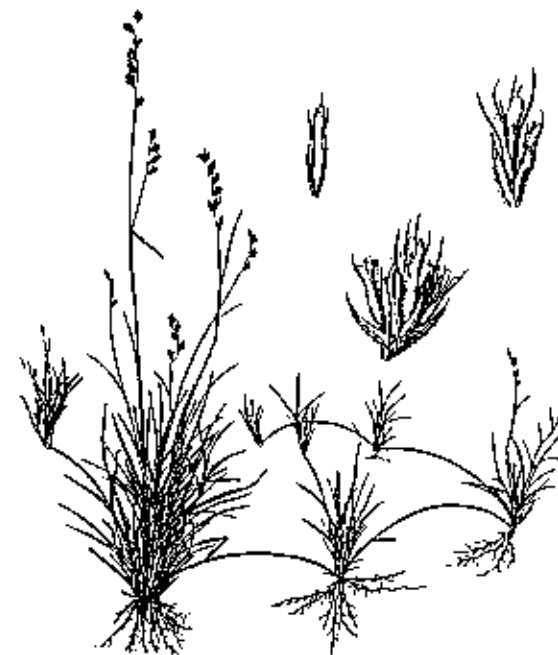
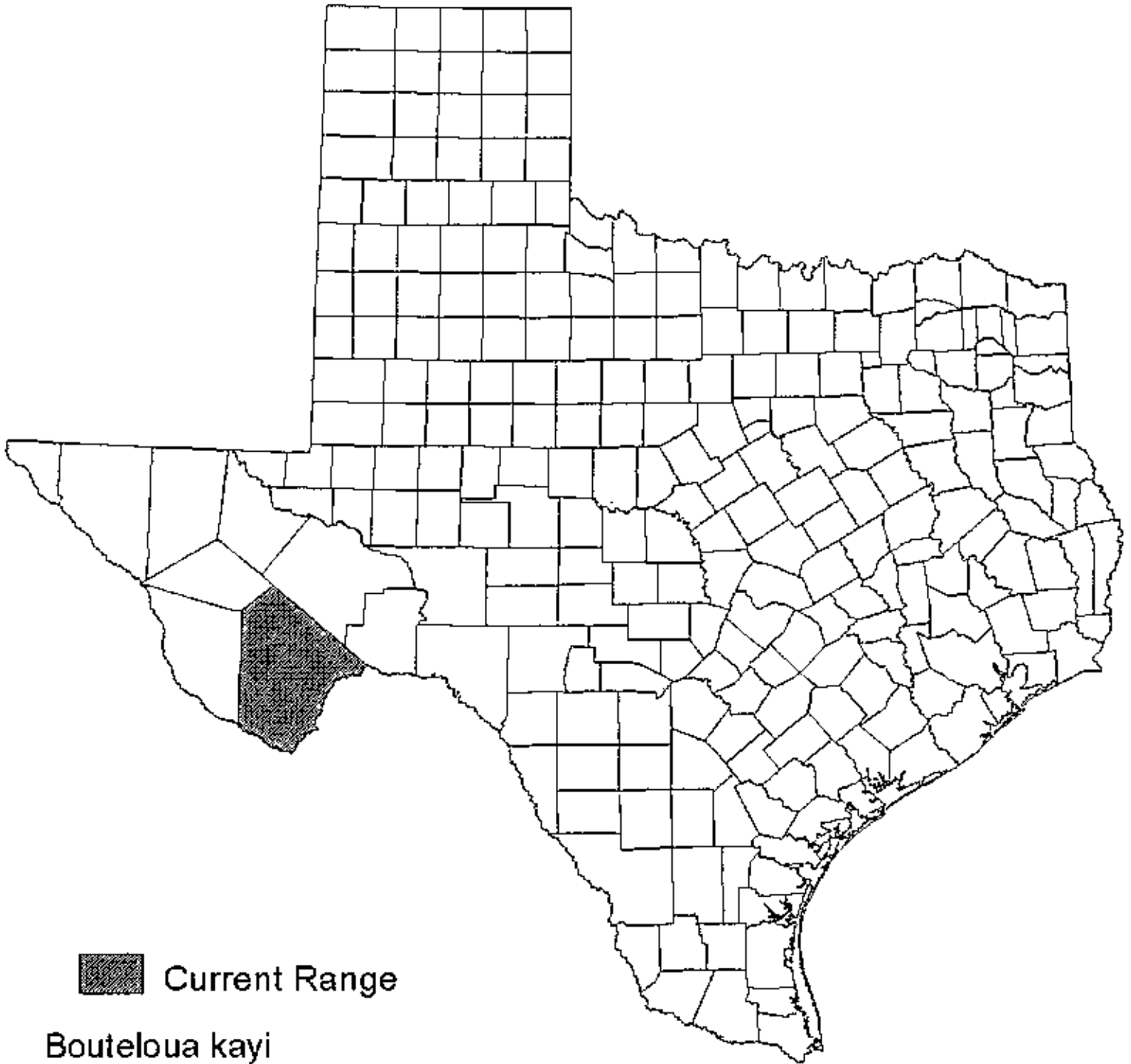


Fig. 188. *Cathastecum erectum*. Plant; group of spikelets, central spikelet, and fertile floret.

ing, wiry-stoloniferous. Leaves with sheaths rounded on back, basal ones papery and somewhat woolly, upper ones mostly glabrous except perhaps for upper margins; ligule a ring of hairs, ca. 0.5 mm long; blades flat or folded, 2–10 cm long, ca. 1.4 mm wide. Inflorescence a panicle, with usually 4–8 spicate branches, the branches 4–7 mm long with a short rachis. Spikelets in tight clusters of 3 on each branch, the upper one with a perfect floret, the lower spikelets with staminate or neuter florets, sometimes a fourth rudimentary spikelet present; disarticulation of branch rachis near base, with a short stem remaining on main axis; upper spikelet with 1 perfect floret and 1 or more reduced florets above; glumes unequal, 1-nerved, the second much the longest; second glume usually hairy on back, apex truncate or notched and with a short awn; lower 2 spikelets of cluster with one large neuter floret below, one small staminate floret above, these 2–3 mm long; lemmas similar in all spikelet somewhat papery, usually 3-nerved, sometimes 5–7-nerved, apex rather deeply lobed, with nerves extending into short awns; paleas somewhat shorter than lemmas, usually short-awned from the 2 nerves. Caryopses (in one plane) lanceolate and flattened, 1.8 mm long.

Infrequent to abundant, lower desert, particularly south of the Chisos Mountains and in Terlingua area, rocky or gravel hills and slopes, gravel and clay mound limestone or igneous alluvium. Presidio Co., Rooney Ranch, 6 mi N Cand-



 Current Range

Bouteloua kayi
(bigpod bonamia)

Scientific Name: Brickellia baccharidea Gray

Synonymy: None

Common Name: resin-leaf brickellbush

Global Range: Texas, Arizona, New Mexico, and Mexico (Sonora; maybe Chihuahua, Coahuila, and San Luis Potosi according to Vines. I'm going to check at TEX).

State Range: Franklin Mountains, El Paso County.

Current Federal and State Status: None.

Global and State Ranks: G2S1

Description (compiled from Correll and Johnston 1970, Vines 1960, and Powell 1998):

Habit: Erect shrub to about 1 m (3 ft) tall; stems slender, mostly ascending, alternately branched, with deciduous papery outer bark.

Leaves: Usually alternate, mostly at branch ends, with petioles about 5-7 mm (ca. ¼ in) long (more than one-fifth as long as the leaf blades); blades 1-4 cm long (¾-1½ in), 1-2 mm (⅜-¾ in) wide, roughly diamond-shaped (rhomboid-ovate), base wedge-shaped (cuneate), apex acute, thick, reticulate-veined, punctate, coarsely toothed.

Flowers: Inflorescence a loose, leafy panicle, heads mostly crowded on terminal 1 dm (4 in) of each branch; involucre about 3 mm (⅓ in) broad, 7 mm (¼ in) high, with about 25 mostly obtuse bracts, outermost bracts very short; flowers all discoid (i.e., no ray florets or "petals"), 15-18, tubular, slender, with 5 inconspicuous teeth at the summit.

Fruits: Seeds (achenes) cylindrical, appressed pubescent, 10-ribbed, pappus of about 20 white minutely scabrous bristles.

Habitat: Mixed desert shrublands on gravelly soils derived from limestone and perhaps also from igneous rocks, on bajada slopes and in arroyos.

Phenology: Flowering late summer-fall.

Similar Species: Resin-leaf brickellbush differs from other brickellbushes in the diamond-shaped leaves with wedge-shaped bases.

Comments: The resin-leaf brickellbush gets its name from the microscopic glands on the leaves that give the leaf a shiny, resin-like coating.

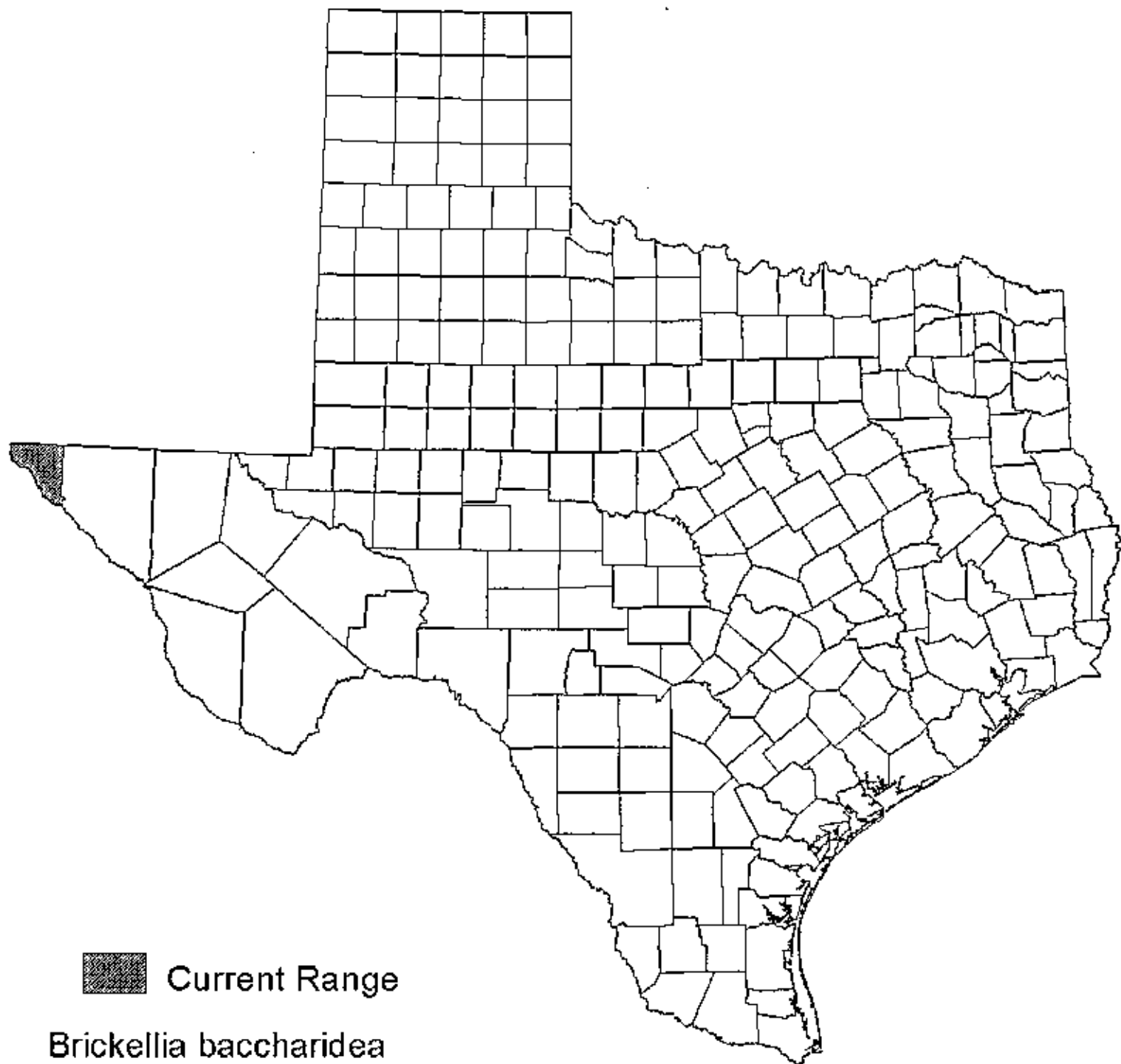
Illustrations: Additional line drawings appear in Powell (1998) and Vines (1960).

Selected References:

- Powell, A. M. 1998. Trees and shrubs of Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. xii + 1104 pp.
- Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. El Paso Southwest Botanical Miscellany No. 1. 56 pp.







Current Range

Brickellia baccharidea
(resin-leaf brickellbush)

Scientific Name: *Brickellia hinckleyi* Standl. var. *hinckleyi*

Synonyms: *Brickellia hinckleyi* Standl.; *Brickellia brachyphylla* (Gray) Gray var. *hinckleyi* (Standl.) Flyr

Common Name: Hinckley's brickellbush

Global/State Ranks: G2T2S2

Federal Status: SOC

Global Range: Known only from Trans-Pecos Texas.

State Range: Brewster and Jeff Davis counties.

Description (adapted from Henrickson & Johnston in prep.): Perennial herb 4-9 dm tall; stems many from the base, moderately branched above; stems scabrous with coarse, dense, rigid-walled, gland-tipped hairs 0.2-0.5 (-0.8) mm long. Leaves alternate to subopposite; petioles 1-5 mm long; blades lance-ovate to lanceolate, (20-) 25-40 mm long and 7-20 mm wide, those in the inflorescence much reduced, attenuate to acute at apex, rounded to broadly cuneate at base, rather thin, with a few scattered stiff stipitate glands. Flower heads discoid (ray flowers absent), on short or long and leafy-bracted axillary shoots, in racemes or when larger in open paniculate or cymose arrangements; peduncles 5-45 mm long; involucre 7-11 mm high; phyllaries 16-20, acute or long attenuate, the medial phyllaries 1.1-1.5 mm broad, with 4-6 (-8) nerves, green-tan and white, occasionally purplish, the outer ones pubescent and ciliate; disk flowers 17-22 (fewer in some recent specimens from the Davis Mountains), the corolla 4.7-6 mm long, yellowish to brownish yellow, the lobes 0.4-0.5 mm long; receptacle glabrous. Achenes 4-5 mm long, silvery-setulose throughout, 10-nerved; pappus dense, white, 4-6 mm long, plumose, the lateral hairs 0.2-0.3 mm long.

Similar Species: Similar to two other herbaceous *Brickellia* taxa of Trans-Pecos Texas. In *B. brachyphylla*, which occurs in Texas in the Guadalupe Mountains, the upper stems and peduncles lack the long, gland-tipped hairs so conspicuous in *B. hinckleyi*. In addition, the heads of *B. brachyphylla* contain only 10-11 flowers, while those of *B. hinckleyi* contain 11-22 flowers. In *B. hinckleyi* var. *terlinguensis*, which occurs on slopes of the Chisos Mountains and vicinity, the midstem leaves are 17-22 (-25) mm long, notably shorter than those of var. *hinckleyi*, which are mostly 25-40 mm long. There are also textural differences in the leaves, with those of var. *terlinguensis* being thick and obviously scabrous and those of var. *hinckleyi* being thin with only a few dispersed glandular hairs.

Habitat: Mixed woodlands or forests on rocky slopes in higher-elevation mountain canyons. Most specimens are from canyons on the north flank of Mt. Livermore in the Davis Mountains, where substrates are igneous. Associates in this area include *Pinus ponderosa*, *Juniperus deppeana*, *Quercus hypoleucoides* and montane herbaceous species such as *Bromus polyanthus*, *Campanula rotundifolia*, *Euphorbia bifurcata*, *Geranium cespitosum*, *Heuchera rubescens*, *Panicum bulbosum*, *Polemonium pauciflorum* subsp. *hinckleyi*, *Salvia arizonica*, *Silene laciniata*, *Solanum fendleri*, *Stellaria cuspidata*, *Thalictrum fendleri* and *Verbesina oreophila*.

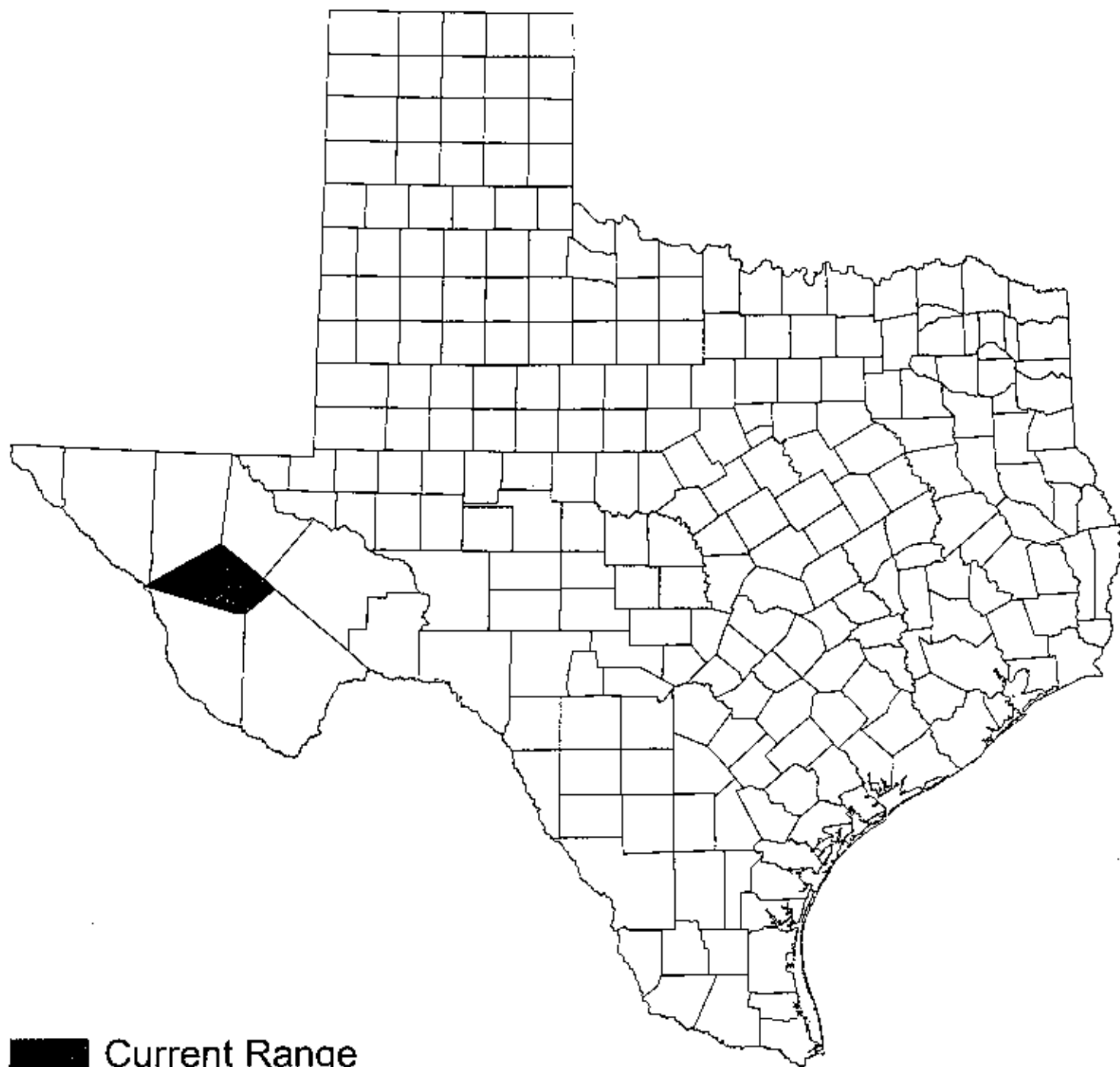
Phenology: Flowering July-October.

Comments: The type specimen was taken by Leon C. Hinckley from upper Madera Canyon on the north side of the Davis Mountains, where the taxon remains locally common.

Illustrations: None known.

Selected References:

- Flyr, D. 1968. New names and records in *Brickellia* (Compositae). *Sida* 3(4): 252-256.
- Standley, P. C. 1940. Studies of American plants—IX. Field Museum of Natural History Botanical Series 22(1): 1-62.
- Turner, B. L. 1997. The comps of Mexico: a systematic treatment of the family Asteraceae. Volume 1: Eupatorieae. *Phytologia Memoirs* Volume 11. 272 pp.



■ Current Range

□ Historical Range

Brickellia brachyphylla var. *hinckleyi*
(Hinckley's brickleebush)

Scientific Name: *Brickellia hinckleyi* Standl. var. *terlinguensis* (Flyr) B. L. Turner

Synonyms: *Brickellia brachyphylla* (Gray) Gray var. *terlinguensis* Flyr

Common Name: Terlingua brickellbush

Global/State Ranks: G2THSH

Federal Status: SOC

Global Range: Known only from Trans-Pecos Texas.

State Range: Brewster and Hudspeth counties.

Description (adapted from Henrickson & Johnston in prep.): Perennial herb 4-9 dm tall; stems many from the base, moderately branched above; stems, peduncles and leaves coarsely hirsute with rigid-walled, gland-tipped hairs 0.3-0.8 mm long. Leaves alternate to subopposite; petioles 1-4 mm long; blades lanceolate, erect, stiff, 15-22 mm long and 4-7 mm wide, those in the inflorescence reduced, sessile to subsessile, roughly scabrous with gland-tipped hairs 0.5 (-0.8) mm long, attenuate at tip, cuneate to rounded at base, the margins weakly serrate-crenate with 2-5 shallow teeth or more or less entire, scabrous, strigulose along the margins or throughout, gland-dotted beneath or throughout. **Flower heads** discoid (ray flowers absent), on short or long and leafy-bracted axillary shoots, in racemes or when larger in open paniculate or cymose arrangements; peduncles 5-45 mm long; involucre 7-11 mm high; phyllaries 16-20, acute or long attenuate, the medial phyllaries 1.1-1.5 mm broad, with 4-6 (-8) nerves, green-tan and white, occasionally purplish, the outer ones pubescent and ciliate; disk flowers 11-15, the corolla 4.7-6 mm long, yellowish to brownish yellow, the lobes 0.4-0.5 mm long; receptacle glabrous. Achenes 4-5 mm long, silvery-setulose throughout, 10-nerved; pappus dense, white, 4-6 mm long, plumose, the lateral hairs 0.2-0.3 mm long.

Similar Species: See *Brickellia hinckleyi* var. *hinckleyi*.

Habitat: Various situations in the Chihuahuan Desert, perhaps at lower elevations than var. *hinckleyi*. The variety takes its name from a specimen collected along a creek bottom north of Terlingua, presumably at one of the lower points on the southern Brewster County landscape, although the type specimen was taken from slopes in the Chisos Mountains.

Phenology: Flowering July-October?

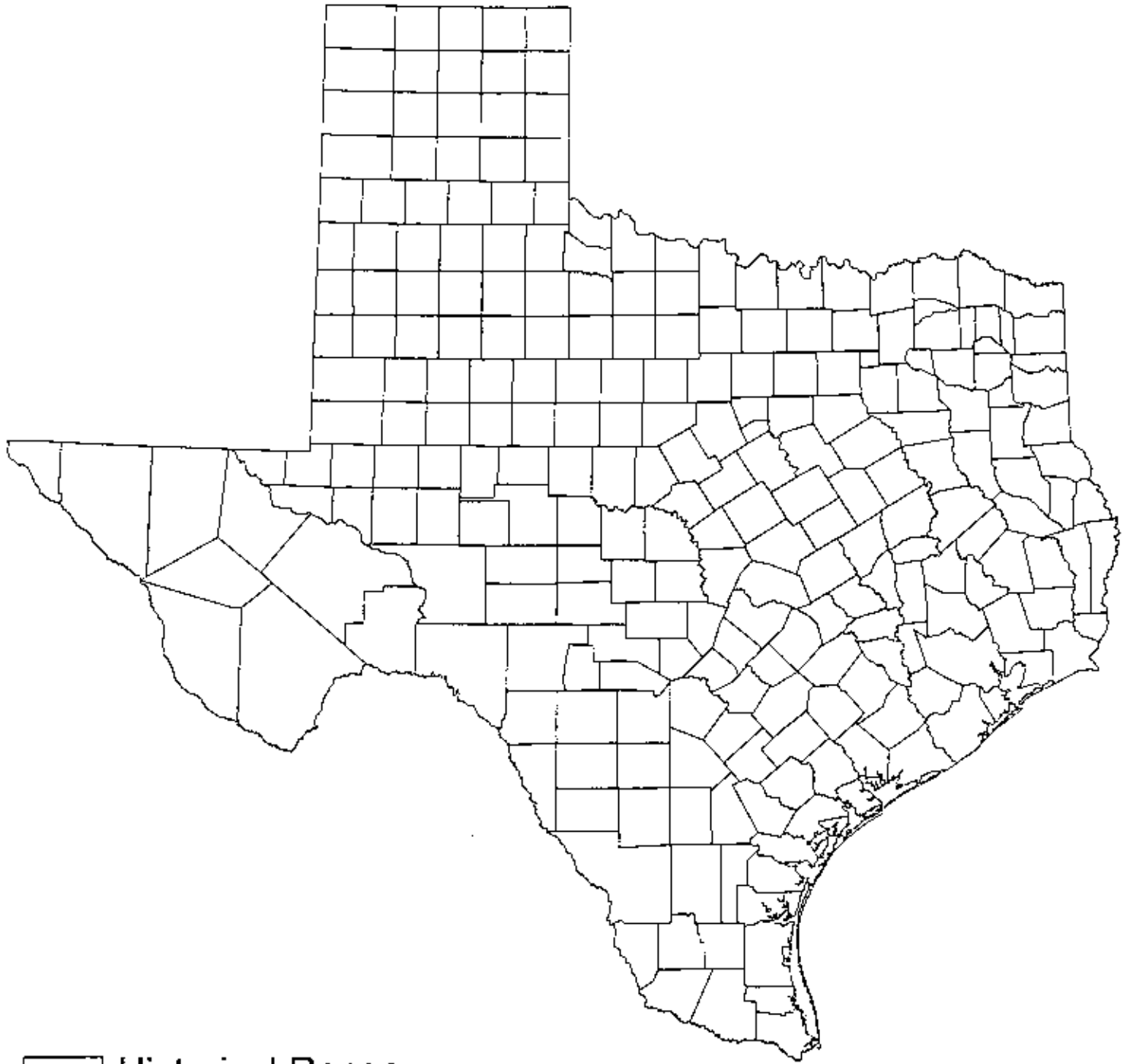
Comments: No recent reports or collections.

Illustrations: None known.

Selected References:

Flyr, D. 1968. New names and records in *Brickellia* (Compositae). *Sida* 3(4): 252-256.

Turner, B. L. 1997. The compositae of Mexico: a systematic treatment of the family Asteraceae. Volume 1: Eupatorieae. *Phytologia Memoirs* Volume 11. 272 pp.



□ Historical Range

Brickellia brachyphylla var. *terlinguensis*
(*Terlingua* brickellbush)

Scientific Name: *Brongniartia minutifolia* Wats.

Synonyms: *Brongniartia shrevei* Wiggins; incl. var. *canescens* S. Wats.

Common Name: littleleaf brongniartia

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Texas, Chihuahua and Sonora.

State Range: Near the Chisos Mountains in southern Brewster County.

Description (adapted from Correll & Johnston 1970 and Powell 1988): Thornless, multibranched shrub with zigzag, green-glaucous stems. Leaves alternate, once odd-pinnately compound, 3-7 cm long; petioles 3-8 mm long; leaflets 19-41, linear, revolute, 2-5 mm long. Flowers solitary in the leaf axils, on pedicels 6-15 mm long; calyx 7-9 mm long, with an obconoid or campanuloid tube and 5 lanceolate, acute lobes; corolla papilionaceous, yellow to yellow-white or yellow-green (pale purplish to cream-colored elsewhere in range), the banner with a nearly orbicular blade 8 mm long and a claw 3 mm long; wings obovate, somewhat falcate, with an auricle near the base of the blade on the upper side; keel petals broadly lunate, coalescent near the apex. Stamens 10, monadelphous. Fruit a flat, glabrous, obovate pod 18-15 mm long, containing a few seeds.

Similar Species: The pinnately compound foliage of *Brongniartia minutifolia* is superficially similar to that of other leguminous shrubs of the Trans-Pecos, but the yellow papilionoid corolla is distinctive.

Habitat: Chihuahuan Desert shrublands at lower elevations (2500-2500 ft.), in blackish sand, gravel, volcanic ash and other substrates, often in or along arroyos or shallow drainages.

Phenology: Flowering June-August.

Comments:

Illustrations: A color photograph appears in Warnock (1977). Line drawings appear in Vines (1960) and Powell (1998).

Selected References:

Miller, D. J. and A. M. Powell. 1983. Status report [on *Brongniartia minutifolia*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.

Turner, R. M., J. E. Bowers and T. L. Burgess. 1995. Sonoran Desert plants: an ecological atlas. The University of Arizona Press, Tucson. 504 pp.

Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.

Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University, Alpine. 276 pp.





Fig. 168. *Brongniartia minutifolia*
(Littleleaf Brongniart)

stalks 6–15 mm long; calyx tube ca. 8 mm long; corolla yellow with a tinge of green in our species, purplish to cream colored elsewhere; banner nearly round, 8 mm long; stamens 10, filaments fused half their length. Fruit a dry, flattened pod, glabrous, dehiscent, 1.8–2.5 cm long.

A genus with about 30 species mostly in the drier parts of tropical America, of little or no economic importance.

1. *Brongniartia minutifolia* S. Wats. LITTLELEAF BRONGNIART. Fig. 168. Uncommon, known in the United States only from Brewster Co., Big Bend Park, arroyos, blackish sandy soil and perhaps also limestone soil, between the old Solis Ranch and Cow Heaven Mt., N around Mariscal Mt., S of Talley Mt.; between San Vicente and the Lindsey Mine; river road, from ca. 6 mi W of Boquillas hwy. to Solis turnoff; between Glenn Springs and San Vicente. 2300–3500 ft.; Jun–Aug. Also adjacent Chih., Mex.

An attractive shrub, more or less one meter high, with numerous, small leaflets and yellow-green flowers.

19. PETERIA GRAY PETERIA

Herbaceous perennials, with slender, pale green, stiff, glabrous stems. Leaves (in *Peteria scoparia*) alternate, once-compound, odd-pinnate, 5–10 cm



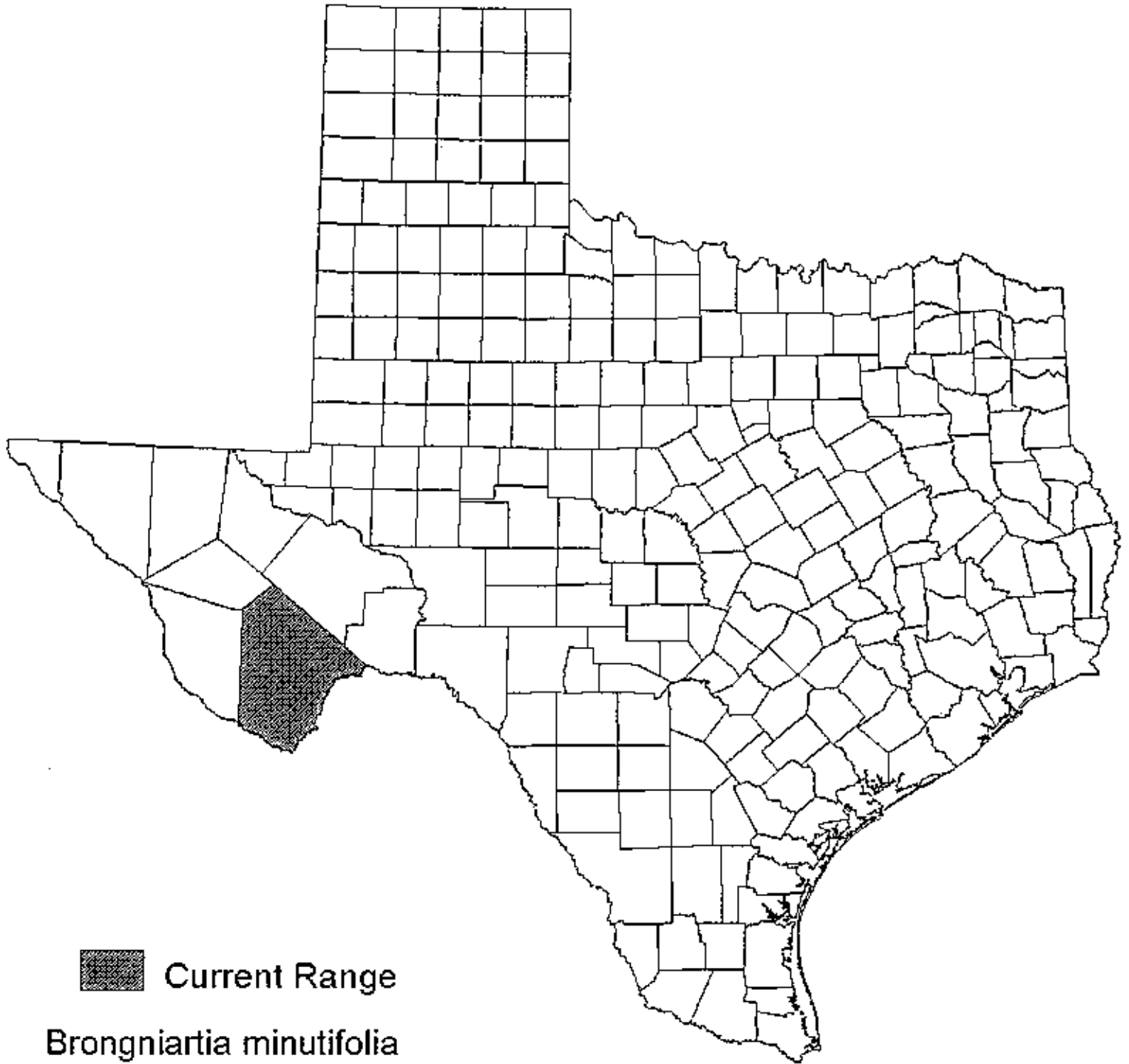
Fig. 169. *Peteria scoparia* (Rush Peteria)

long; stipules spinescent, in pairs, 2–6 mm long; leaflets 9–15, usually falling in dry periods. Flowers in loose clusters; corolla 1.3–1.6 cm long, white (or blue); stamens 10, 9 of the filaments fused, upper one free. Fruit a linear legume, 3.5–6 cm long, 4–5 mm wide, dehiscent.

A genus of only four species, occurring in NV, UT, AZ, NM, and S to cen. Mex.

1. *Peteria scoparia* Gray. RUSH PETERIA, CAMOTE DEL MONTE. Fig. 169. An infrequent species, usually in protected arroyos, lower mountain habitats. El Paso Co., Franklin Mts. Culberson Co., lower Pine Canyon. Presidio Co., 1 mi S and 5 mi E of Marfa; oak-capped hills at S end of Sierra Vieja. Jeff Davis Co., Scenic Loop near Bloys Encampment, Brewster Co. 4000–6000 ft.; Jul–Aug. NM, AZ; Chih., Coah. (Sierra del Carmen), Mex.

The plant with slender, greenish stems is mostly herbaceous but often shrubby in aspect. The plants of Trans-Pecos Texas have whitish flowers with purplish and yellow tinges, although Don Kolle recently located in Jeff Davis Co. a small population with blue flowers. In species related to *Peteria scoparia* the roots are tuberous (meaning of the Spanish name), somewhat like sweet potatoes, and reportedly are edible. *Peteria scoparia* of the Trans-Pecos also forms tuberous roots but the palatability of these tubers is not known.



Current Range

Brongniartia minutifolia
(little-leaf brongniartia)

Scientific Name: *Caesalpinia phyllanthoides* Standl.

Synonyms: None.

Common Name: South Texas rushpea

Global/State Ranks: G2S1

Federal Status: None.

Global Range: Southern Texas and Tamaulipas.

State Range: Jim Wells and Live Oak counties. Isely (1975) indicated that a specimen from Bexar County was taken from cultivated material.

Description (adapted from Correll & Johnston 1970 and Isely 1975): Thornless shrub to 5 dm tall, the branches puberulent when young but glabrous in age. Leaves alternate, bipinnately compound, 5-9 cm long; pinnae 5-9, long-stalked; leaflets 2-3 pairs (terminal leaflet absent), 3-7 (-10) mm long and (2.6-) 3-4.5 mm wide, orbicular to ovate, subcoriaceous, with rather prominent veins beneath, glandless. Flowers 3-10 in short, terminal racemes; pedicels 3-6 mm long, finely puberulent, with scattered stalked glands; sepals 5, subequal, 5-7 mm long, puberulent, glandular or glandular-ciliate; petals 5, yellow, obovate, 9-11 mm long; stamens 10, densely covered with thick hairs at base. Fruit a glabrous pod 25-35 mm long and ca. 13 mm wide, containing 1-2 seeds.

Similar Species: The two to three pair of small ovate glandless leaflets per pinnac serve to separate this species from other *Caesalpinia* species.

Habitat: Tamaulipan thorn shrublands or grasslands on very shallow sandy to clayey soils over calcareous sandstone and caliche. Associates at a site in Live Oak County include *Acacia rigidula*, *Calliandra conferta*, *Chamaecrista greggii*, *Ephedra antisyphilitica*, *Heliotropium torreyi*, *Leucophyllum frutescens*, *Prosopis glandulosa*, *Calylophus hartwegii*, *Galactia heterophylla*, *Galphimia angustifolia*, *Hedyotis nigricans*, *Liatris* sp., *Linum rigidum*, *Melampodium cinereum*, *Polygala alba*, *Simsia calva*, *Thamnosma texana* and *Tiquilia canescens*.

Phenology: Flowering in spring, sometimes later during growing season, perhaps in response to rainfall.

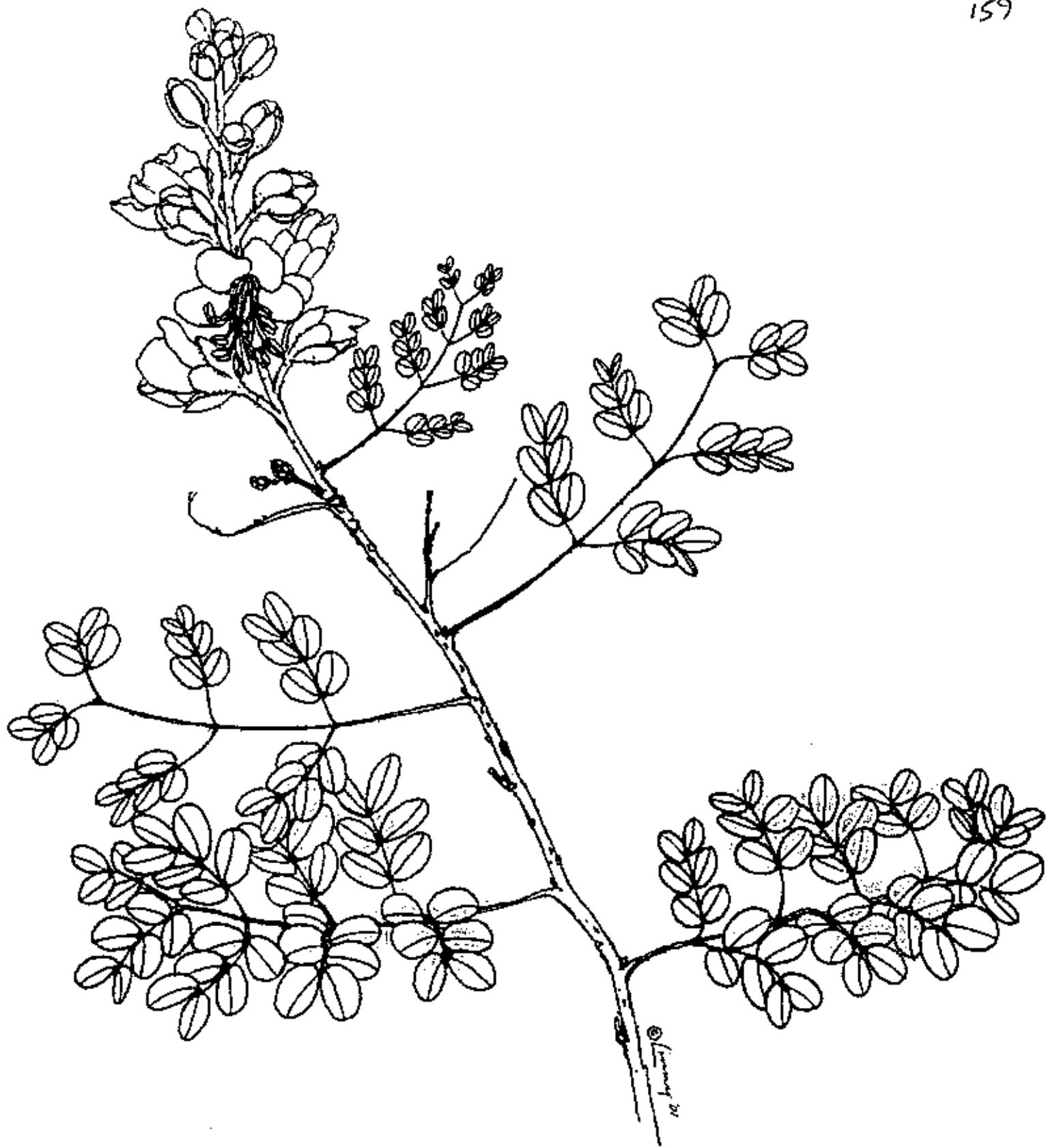
Comments: A component of floristically interesting shrublands on caliche of the Goliad Formation near Lake Corpus Christi in Jim Wells and adjacent Live Oak counties. *Caesalpinia phyllanthoides* and two other components of the local vegetation, *Chamaecrista greggii* and *Manihot subspicata*, occur here considerably disjunct from the nearest populations in northern Mexico.

Illustrations: None known.

Selected References:

Isely, D. 1975. Leguminosae of the United States: II. Subfamily Caesalpinoideae. *Memoirs of the New York Botanical Garden* 25(1): 1-228.

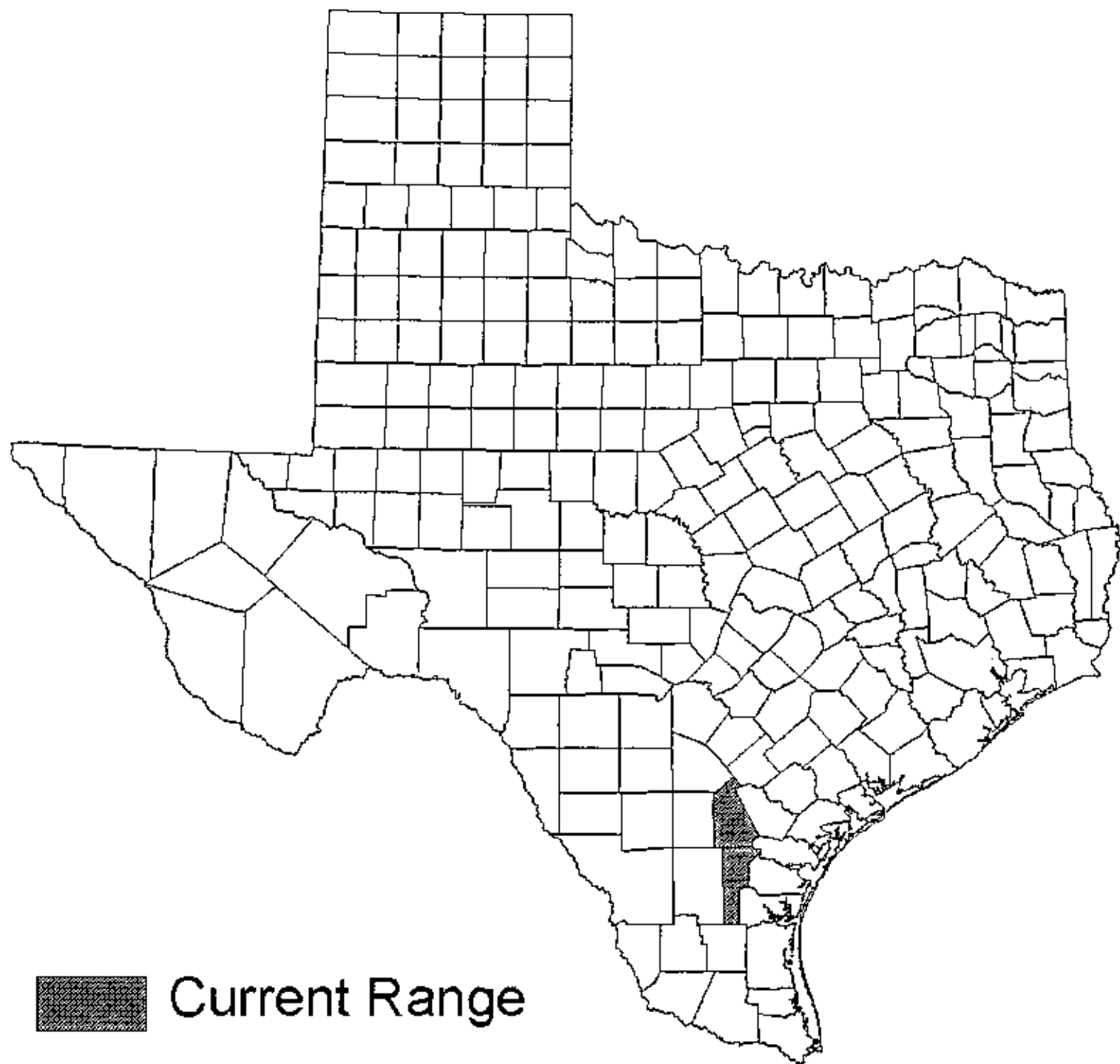




Fabaceae *Caesalpinia phyllanthoides*

artist: Lening Hagy

PHOTOS FROM TX PARKS & WILDLIFE DIVERSITY AND UNMOUNTED SPECIMEN BY
DANA PRICE JIMWELLS CO. TX 6/12/01



 Current Range

Caesalpinia phyllanthoides
(South Texas rushpea)

Scientific Name: *Callirhoe scabriuscula* Robins.

Synonyms: None.

Common Name: Texas poppy-mallow

Global/State Ranks: G2S2

Federal Status: Endangered

Global Range: Endemic to the upper Colorado River watershed in northwest Texas.

State Range: Coke, Mitchell and Runnels counties.

Description: Perennial with stiffly erect stems 3.2-10 dm tall, from a slender unbranched taproot to 1 m long; most green parts (stems, petioles, leaves, pedicels and calyces) densely covered with stellate hairs with (5-) 7-8 (-13) rays. Leaves suborbicular, palmately 3-or 5-cleft, often pedate; lobes oblong to oblanceolate to linear-oblanceolate, the margins entire or few-toothed; basal leaf blades shallowly cleft, 4-6.5 cm long, 3.8-7 cm wide, the petioles (2.5-) 5-9.5 cm long and channeled above; cauline leaves alternate, the blades deeply cleft, 4.2-5 cm long and 5.5-6.2 cm wide, with petioles 1.5-5 (-9.2) cm long; stipules lanceolate-linear, 5.8-8.4 mm long and (0.5-) 1.1-2.9 mm wide, deciduous, acuminate at apex, pubescent on margins with simple hairs to 1 mm long. Flowers in terminal racemes, the pedicels 4-6.5 (-10) cm long in flower, to 14 cm long in fruit, rather rigid, much exceeding the subtending bracts; involucre inserted 1-2 mm below calyx, composed of (1-) 3 linear bracts 5.6-9.8 mm long and 0.7-1.4 mm wide; calyx 5-lobed, the lobes lanceolate, acuminate, 3-nerved, 8.4-10.5 (-13.3) mm long and 3.5-5.6 mm wide; petals 5, vinaceous or deep red, with a deeper red basal spot, forming a "wine cup" 3-3.7 (-4) cm long and 1.4-2 cm wide, erose at the apex; stamen column 14-18.2 mm long, bearing red-purple anthers in the upper 2/3; stigmas red or pink, as many as the mericarps. Fruit a schizocarp composed of 12-17 (-20) indehiscent, single-seeded mericarps, 7-8-11.9 mm in diameter, the individual mericarps subreniform, 4.2-4.9 mm tall and 3.2-3.9 mm wide, 2-keeled, the backs and upper side-margins alveolate, the sides thin, translucent and reticulate; beaks acuminate, 0.7-2 mm long; seeds black, reniform, 2.8-3.1 mm long and 2-2.1 mm wide.

Similar Species: Distinguished from other species of *Callirhoe* on the basis of its stiffly erect habit, extremely long, slender taproot, stellate pubescence, remoteness of the involucre from the base of calyx, and other characters (Dorr 1983). *Callirhoe involucreata* is a much smaller plant with normally trailing, rather than erect, stems. *Callirhoe leiocarpa* has erect stems but lacks both the involucre and the stellate pubescence of *C. scabriuscula* (Amos 1979).

Habitat: Grasslands and open oak or mesquite woodlands on deep loose sands of ancient and contemporary Colorado River terraces. Soils are mostly those of the Tivoli Series. Characteristic associates on these sandy soils include *Aphanostephus skirrhobasis*, *Cnidocolus texanus*, *Oenothera engelmannii*, *O. rhombipetala*, *Phlox drummondii*, *Pediometum rhombifolium*, *Urochloa ciliatissima*, *Cenchrus incertus*, *Chloris cucullata*, *Sporobolus cryptandrus*, *S. giganteus*, *Asclepias latifolia*, *Cryptantha texana*, *Eurytaenia texana*, *Galactia canescens*, *Helianthemum georgianum*, *Heterotheca subaxillaris*, *Hymenopappus flavescens*, *Mirabilis albida* and *Xanthisma texanum*.

Phenology: Flowering (April-) May-June. During the rest of the year the plant is represented only by the basal rosette.

Comments: Listed as Endangered on 6 August 1981.

Illustrations: Line drawings and a color photograph appear in Poole & Riskind (1987).

Selected References:

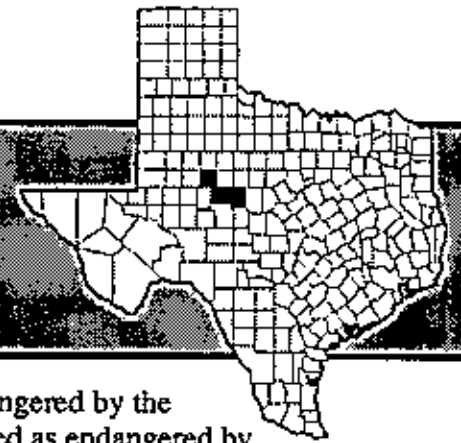
- Amos, B. 1979. Determination of *Callirhoe scabriuscula* Robins. as an endangered species. Report prepared for U.S. Fish & Wildlife Service. 17 pp.
- Cruze, P. B. 1991. Studies of the seed bank and population dynamics of an endangered species, *Callirhoe scabriuscula*. Masters thesis, Angelo State University.
- Dorr, L. J. 1983. The systematics and evolution of the genus *Callirhoe* (Malvaceae). Ph.D. dissertation, The University of Texas at Austin.
- Dorr, L. J. 1990. A revision of the North American genus *Callirhoe*. *Memoirs of the New York Botanical Garden* 56: 1-74.
- Poole, J.M. 1990. Habitat delineation and subsequent searches for *Callirhoe scabriuscula*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque. 80 pp.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- U.S. Fish & Wildlife Service. 1985. Texas poppy-mallow (*Callirhoe scabriuscula*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.



Federally and State Endangered

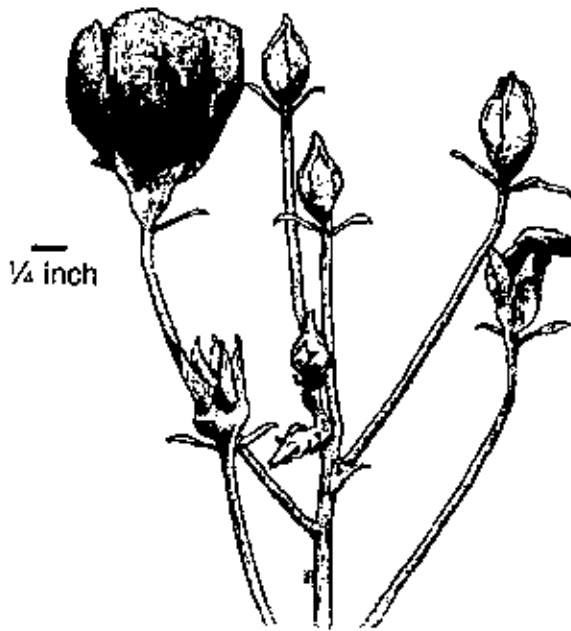
Texas poppy-mallow

Callirhoe scabriuscula



The Texas poppy-mallow (*Callirhoe scabriuscula*) was listed endangered by the U.S. Fish and Wildlife Service (USFWS) in January 1981, and listed as endangered by the State of Texas soon afterwards. At the time of listing, only two populations of this plant were known. Today, there are 10 known populations in Coke, Mitchell, and Runnels Counties.

The Texas poppy-mallow is an erect perennial herb growing up to 4 feet in height. It is covered throughout with tiny, slightly rough, star-shaped hairs. Leaves are alternate with an almost round outline, but are divided into 3-5 lobes, the edges usually smooth or with a few teeth. Flowers are cup-shaped, red to purple, becoming deep red or dark maroon at the base of the petals. The five petals are about 1.5 inches long and 0.75 inches wide and are broadest at the tip. The root system has a fleshy tap root that abruptly narrows and branches after about 1.5 feet. During winter, the plant exists as a small, 3-8 leaved, basal rosette.



The Texas poppy-mallow can be confused with two species of common winecups which have been found growing in similar habitat, *Callirhoe involucrata* and *C. leiocarpa*. However, the flowers of these species are smaller and are white at the base instead of dark red or maroon. They also lack the distinctive star-shaped hairs that cover the leaves and stem of the Texas poppy-mallow. Other differences are that *C. involucrata* has a prostrate habit (sprawling and close to the ground) and *C. leiocarpa* is an annual with a fibrous root system. There are also other technical characters which distinguish the Texas poppy-mallow from other winecups.

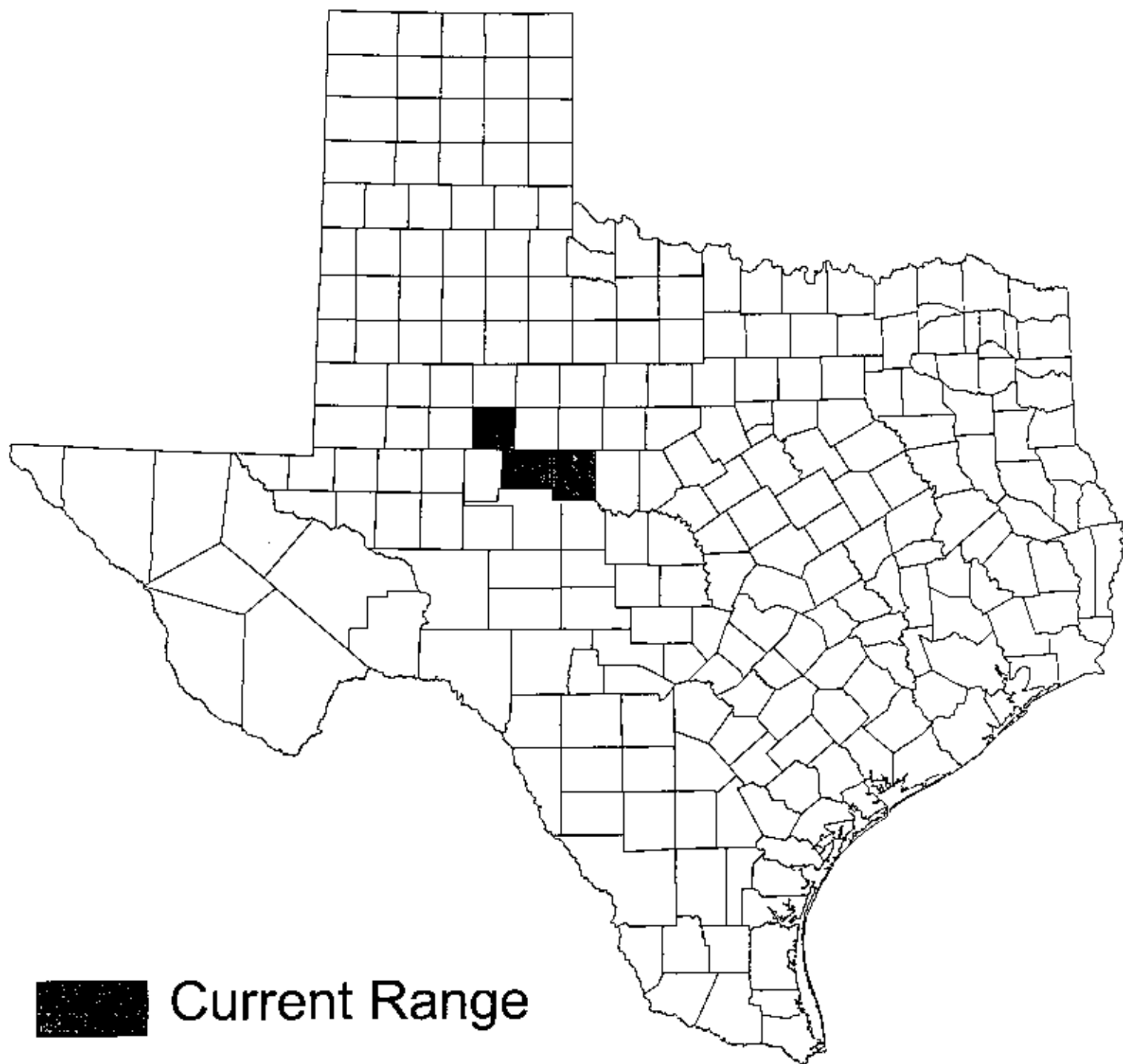
The Texas poppy-mallow flowers from late April to mid-June. The flowers open each morning 2-3 hours after sunrise and close shortly before sunset. Within 30-90 minutes after pollination, the flowers close permanently. If not pollinated, flowers continue to open each morning for 6-8 days.



Leaves and flowering stalk of Texas poppy-mallow

by Patrick Stark

Pollinators such as bees, flies, moths, and beetles are necessary for pollen transfer and development of seeds. Bees, which use the flowers for nectar, pollen, and shelter, are the most important pollinators. Studies have shown that three species of bees forage by landing on and taking off from the stamens, bringing them in contact with the pollen and stigma. Other insects use the petals for entrance and exit.



Current Range

Callirhoe scabriuscula
(Texas poppy-mallow)

Scientific Name: *Campanula reverchonii* Gray

Synonyms: None.

Common Name: Basin bellflower

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to the Central Mineral Basin (Llano Uplift) of central Texas.

State Range: Burnet, Gillespie, Llano and Mason counties of the Central Mineral Basin; known historically from Kendall and Travis counties well outside of that region.

Description (adapted from Correll & Johnston 1970 and Mahler 1982): Annual with slender, mostly glabrous, divaricately-branched stems up to 3 dm tall. Leaves alternate, simple, entire to sparingly dentate, to ca. 15 mm long and 5 mm wide, mostly lanceolate in outline but the basal ones spatulate and the uppermost filiform. Flowers on slender, erect, elongate peduncles; calyx 5-lobed, the lobes narrowly triangular to linear-subulate, glabrous, 2-4.5 mm long, blunt-pointed with the tips slightly thickened; corolla bell-shaped, light blue, 9-13 mm long, consisting of a tube 4-7 mm long and 5 separate lobes, the lobes ovate-lanceolate, shorter than the tube and 6-8 mm wide; stamens 5, separate, the filaments 1.2-1.5 mm long and the anthers 1.6-2.3 mm long; ovary inferior, with 1 style. Fruit a glabrous, ellipsoid or obovoid capsule 3.5-6 mm long, crowned with the erect calyx lobes.

Similar Species: Unlikely to be confused with any other plant species in the Central Mineral Basin.

Habitat: Among scattered vegetation on loose gravel, gravelly sand and rock outcrops on open slopes with exposures of Precambrian igneous and metamorphic rocks. Frequent associates include *Bouteloua hirsuta*, *Bulbostylis capillaris*, *Croptilon divaricatum*, *Eriogonum tenellum* var. *ramosissimum*, *Froelichia gracilis*, *Lotus purshianus*, *Paronychia lindheimeri*, *Polypremum procumbens*, *Selaginella riddellii*, *Tripogon spicatus* and *Xanthisma texanum*. Habitat outside of the Central Mineral Basin is unknown. Labels on historic specimens "frequent along Colorado River near Austin" and "1/4 mi NE of Waring" suggest that *Campanula reverchonii* may also occur on sand bars or other alluvial deposits along major rivers.

Phenology: Flowering May-July.

Comments:

Illustrations: A color photograph appears in Enquist (1987). A line drawing appears in Niehaus, Ripper & Savage (1984).

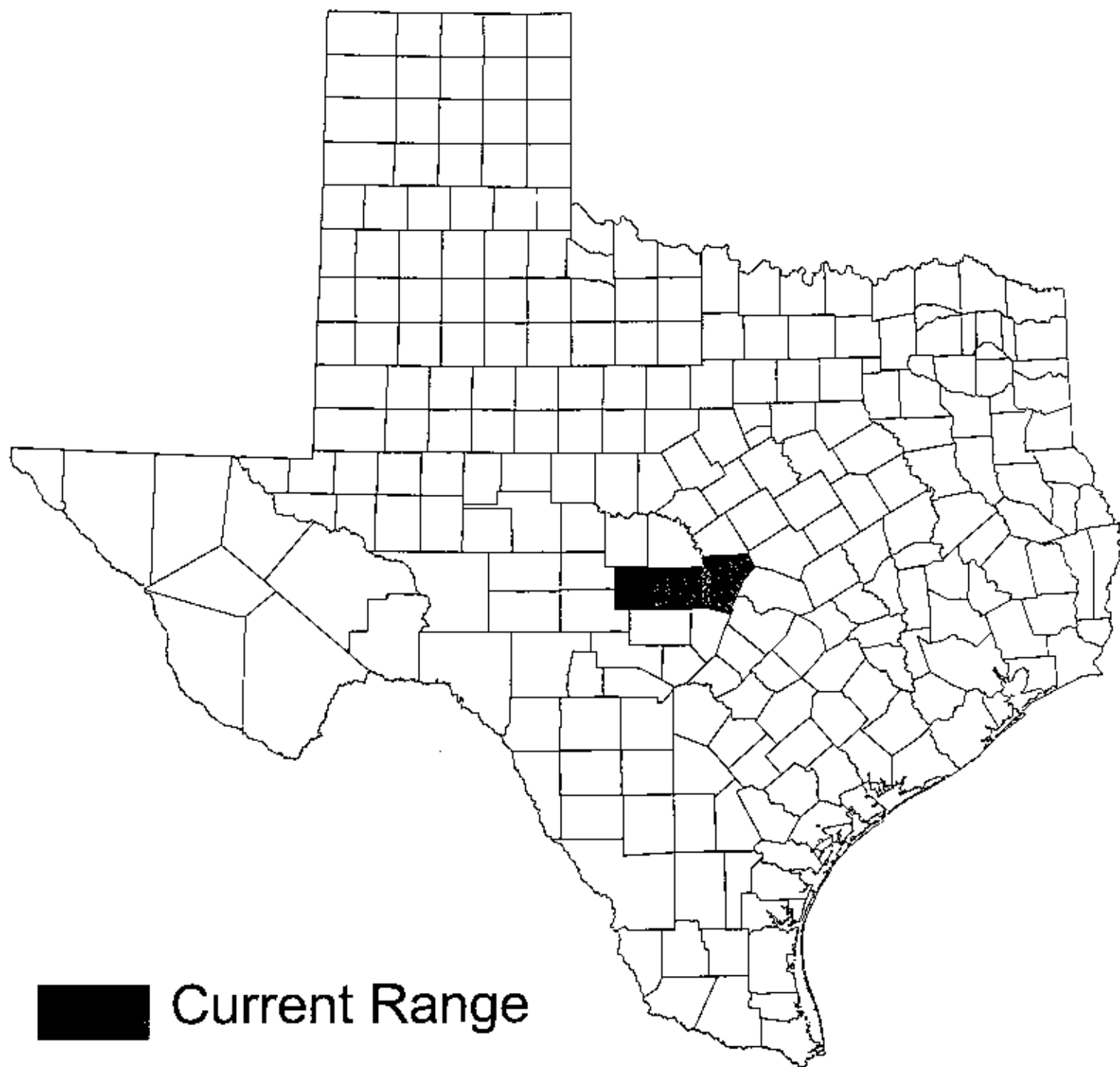
Selected References:

Enquist, M. 1987. Wildflowers of the Texas Hill Country. Lone Star Botanical, Austin. 275 pp.

Mahler, W. F. 1981. Status report [on *Campanula reverchonii*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

- McVaugh, R. 1951. Campanulaceae. Pp. 331-368 in Lundell, C. L. 1961. Flora of Texas, volume 3. Texas Research Foundation, Renner. 433 pp.
- Niehaus, T. F., C. L. Ripper, and V. Savage. 1984. A field guide to southwestern and Texas wildflowers. The Peterson Field Guide Series. Houghton-Mifflin Company, Boston. 449 pp.
- Walters, T. W. and R. Wyatt. 1982. The vascular flora of granite outcrops in the Central Mineral Region of Texas. Bulletin of the Torrey Botanical Club 109: 344-364.





■ Current Range
□ Historical Range
Campanula reverchonii
(Basin bellflower)

Scientific Name: *Cardamine macrocarpa* Brandegees var. *texana* Rollins

Synonyms: None.

Common Name: Texas largeseed bittercress

Global/State Ranks: G3T2S2

Federal Status: None.

Global Range: Texas, Coahuila and Nuevo León.

State Range: Brewster, Kinney and Uvalde counties.

Description (adapted from Correll & Johnston 1970 and R. C. Rollins and E. A. Shaw in Henrickson & Johnston in prep.): Mostly glabrous to minutely puberulent annual with several decumbent or semierect, multi-branched stems from base, 1-4 dm long. Leaves alternate, mostly pinnately compound with (3) 5-9 leaflets; leaflets usually petiolate, coarsely dentate to shallowly lobed; young leaves minutely puberulent, becoming glabrous in age. Flowers in stiffly gyrate racemes or panicles; petals white to greenish-white, strap-shaped, less than 1 mm wide; styles (1-) 1.5-3 mm long. Fruit a straight silique 2.5-4 cm long, 1.5-2 mm wide, on a straight pedicel 5-8 mm long.

Similar Species: The broad pod and upland habitat are distinctive among Texas *Cardamine* species. It is, however, rather weakly distinguished from var. *macrocarpa*, which occurs in Coahuila and Nuevo León but not Texas, by its gyrate inflorescence (rather than straight) and slightly longer styles (R. C. Rollins and E. A. Shaw in Henrickson & Johnston in prep.).

Habitat: Seasonally (hibernally or vernaly) moist loamy soils in pine-oak woodlands at high elevations in the Chisos Mountains; also at moderate elevations in pinyon-oak-juniper woodlands in Kinney and Uvalde Counties. Herbaceous associates at sites in Kickapoo Caverns State Park (Kinney County) include *Arenaria benthamii*, *Carex planostachys*, *Chaetopappa bellidifolia*, *Chaptalia texana*, *Draba cuneifolia*, *Galium virgatum*, *Hedeoma acinoides*, *Parietaria pensylvanica*, *Pinaropappus roseus*, *Poa bigelovii*, *Salvia roemeriana*, *Spermolepis inermis* and *Tinania anomala*.

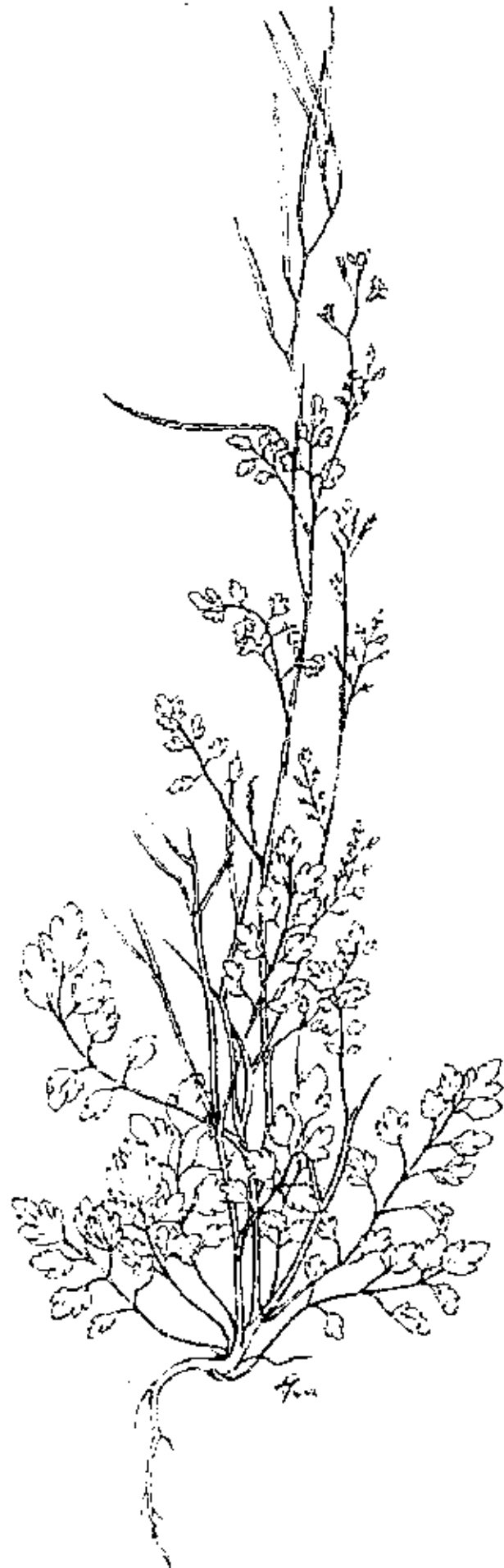
Phenology: Flowering in early spring and usually withering by beginning of summer, sometimes persisting (or flowering again?) through August (R. C. Rollins and E. A. Shaw in Henrickson & Johnston in prep.). It is unknown whether this species, like many other annual crucifers, blooms occasionally in early winter (e.g., December).

Comments:

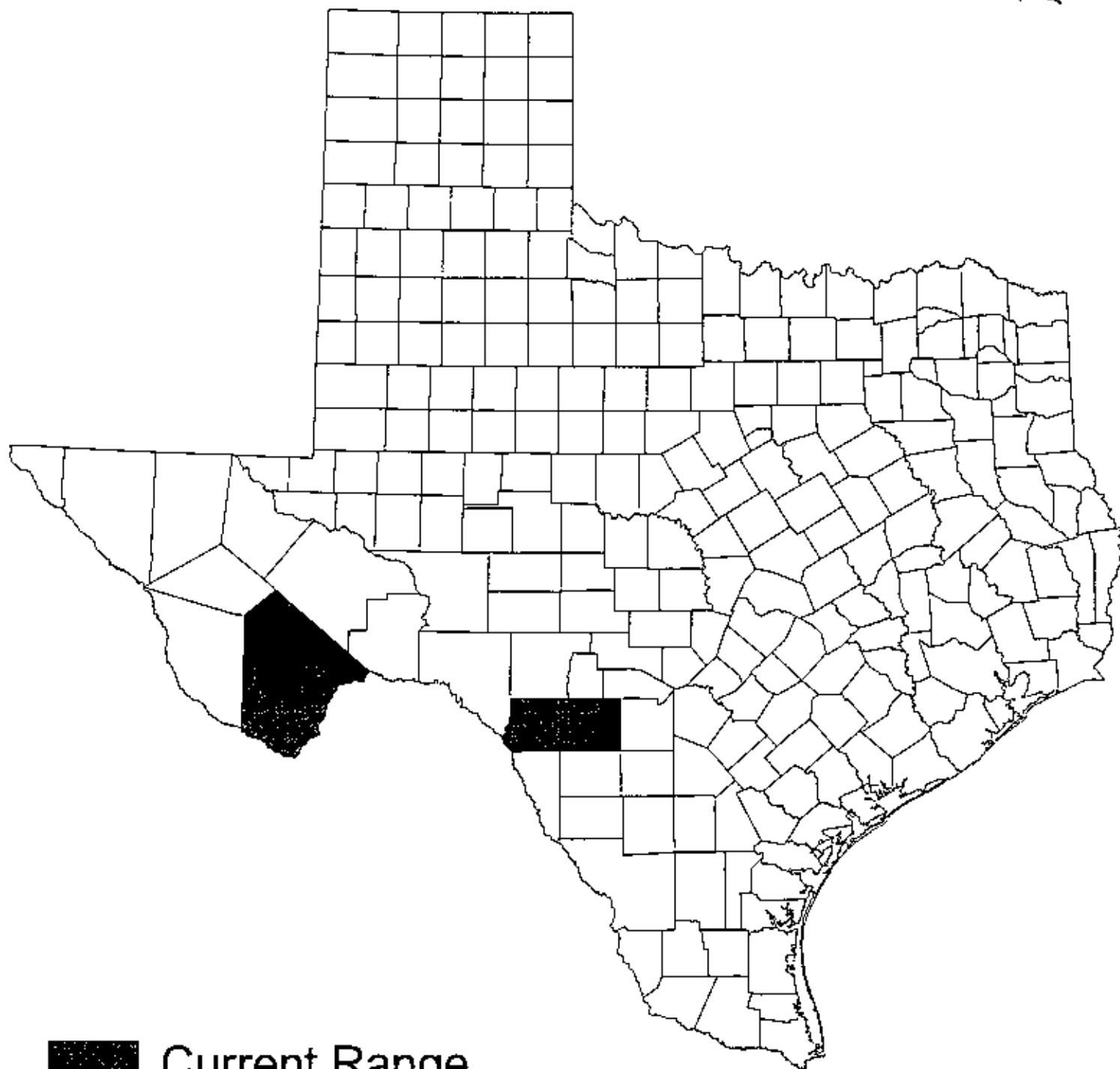
Illustrations: None known.

Selected References:

Rollins, R. C. 1993. The Cruciferae of continental North America. Stanford University Press, Stanford. 976 pp.



Brassicaceae : *Curdamine macrocarpa* var. *terrestris* (L.) Juss. & Trautv. 1825. n. 11
 var. *terrestris* (L.) Trautv. & Juss. 1825. n. 11



■ Current Range

Cardamine macrocarpa var. *texana*
(Texas largeseed bittercress)

Scientific Name: *Cardiospermum dissectum* (Wats.) Radlk.

Synonyms: None.

Common Name: Chihuahua balloonvine; slashleaf heartseed

Global/State Ranks: G2S2

Federal Status: None

Global Range: Southern Texas, Chihuahua, Durango and Tamaulipas.

State Range: Restricted to the Lower Rio Grande Valley, with records from Hidalgo, Starr and Zapata counties.

Description (adapted from Correll & Johnston 1970): Perennial herbaceous vine with slender, wiry, essentially glabrous stems. Leaves alternate, twice-compound and much dissected into very narrow segments, the ultimate segments up to 10 mm long and 4 mm wide, the total blade up to 1 dm long, thinly hispidulous and ciliate, the rachis and petiolules winged. Flowers in a short contracted panicle; calyx puberulent, the elliptic-obovate inner sepals ca. 6.5 mm long and conspicuously long-ciliate on the lower half; petals 4, whitish, elliptic, ca. 5 mm long; stamens 8. Fruit a 3-lobed, 3-celled, inflated pod, membranous, glabrous, lustrous, somewhat quadrangular-obovate in outline, ca. 15 mm long and about twice as wide.

Similar Species: Although the several sapindaceous vines found in the Lower Rio Grande Valley can be confusingly similar, *Cardiospermum dissectum* is rather unique. In *Cardiospermum*, the inflorescence branches are mostly about 1 cm long; in *Serjania* and *Urvillea*, the inflorescence branches are longer than 1 cm. Among Texas *Cardiospermum* species, *C. dissectum* is distinctive in having leaflets dissected into linear-oblong segments that are up to 10 mm long and 4 mm wide; leaflet segments in other species are much longer and broader. During drought conditions, the foliage of this vine turns a deep reddish purple, rendering it more conspicuous than at other times of year.

Habitat: Thorn shrublands or low woodlands on well drained to excessively drained, calcareous, sandy to gravelly soils in drier parts of the "upper" Rio Grande Valley, most often in areas underlain by the Goliad Formation. Frequently associated woody plants include *Acacia berlandieri*, *A. rigidula*, *Cordia boissieri*, *Forestiera angustifolia*, *Helietta parvifolia*, *Karwinskia humboldtiana*, *Leucophyllum frutescens*, *Parkinsonia texana*, *Pithecellobium ebano*, *Prosopis glandulosa*, *Salvia ballotiflora* and *Ziziphus obtusifolius*.

Phenology: Flowering (April-) July-September, probably throughout the growing season in response to rain.

Comments:

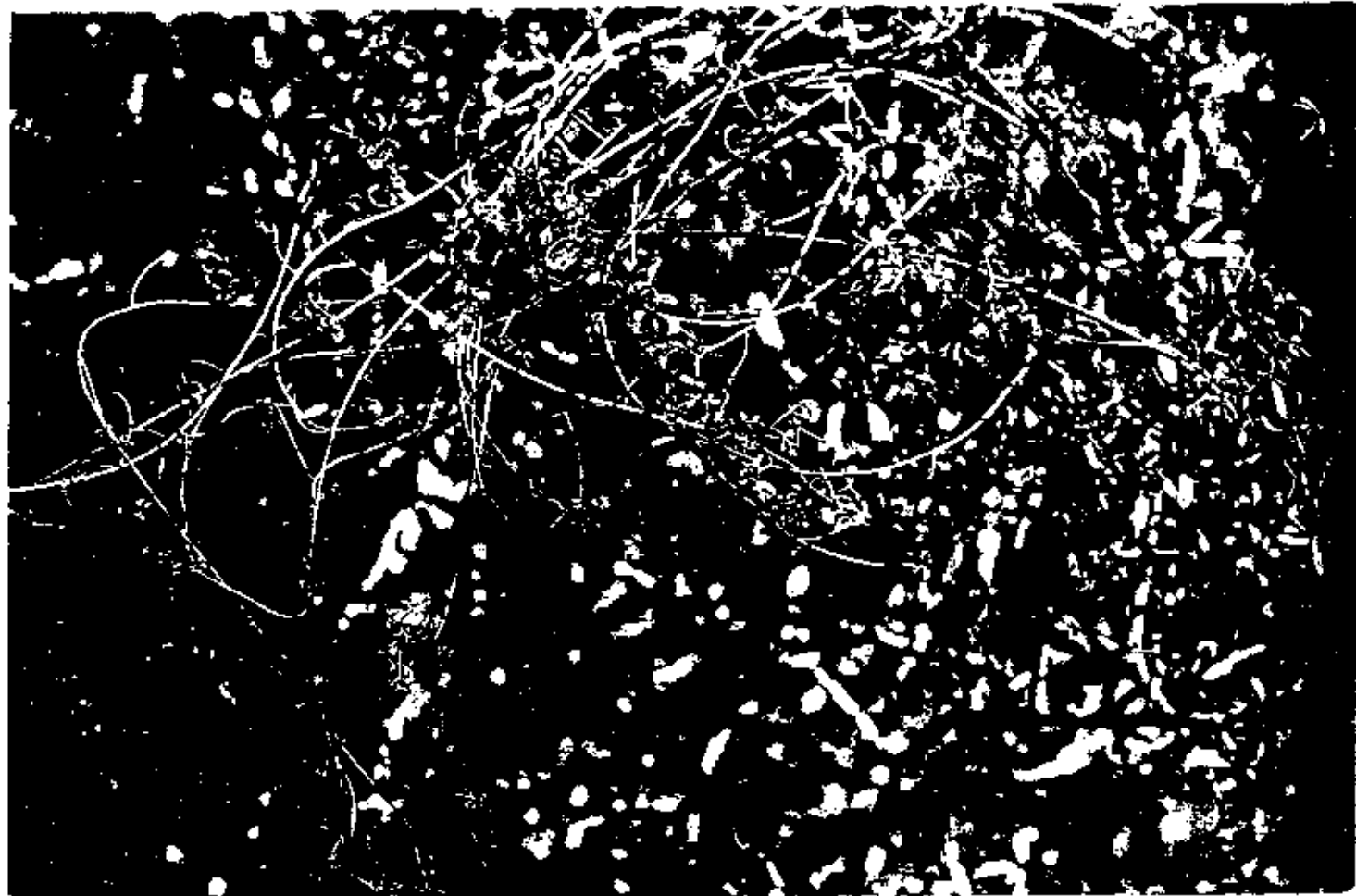
Illustrations: None known.

Selected References:

Correll, D. S. 1965. Some additions and corrections to the flora of Texas. *Wrightia* 3(7): 126-140.

Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research

Foundation, Renner. 1881 pp.

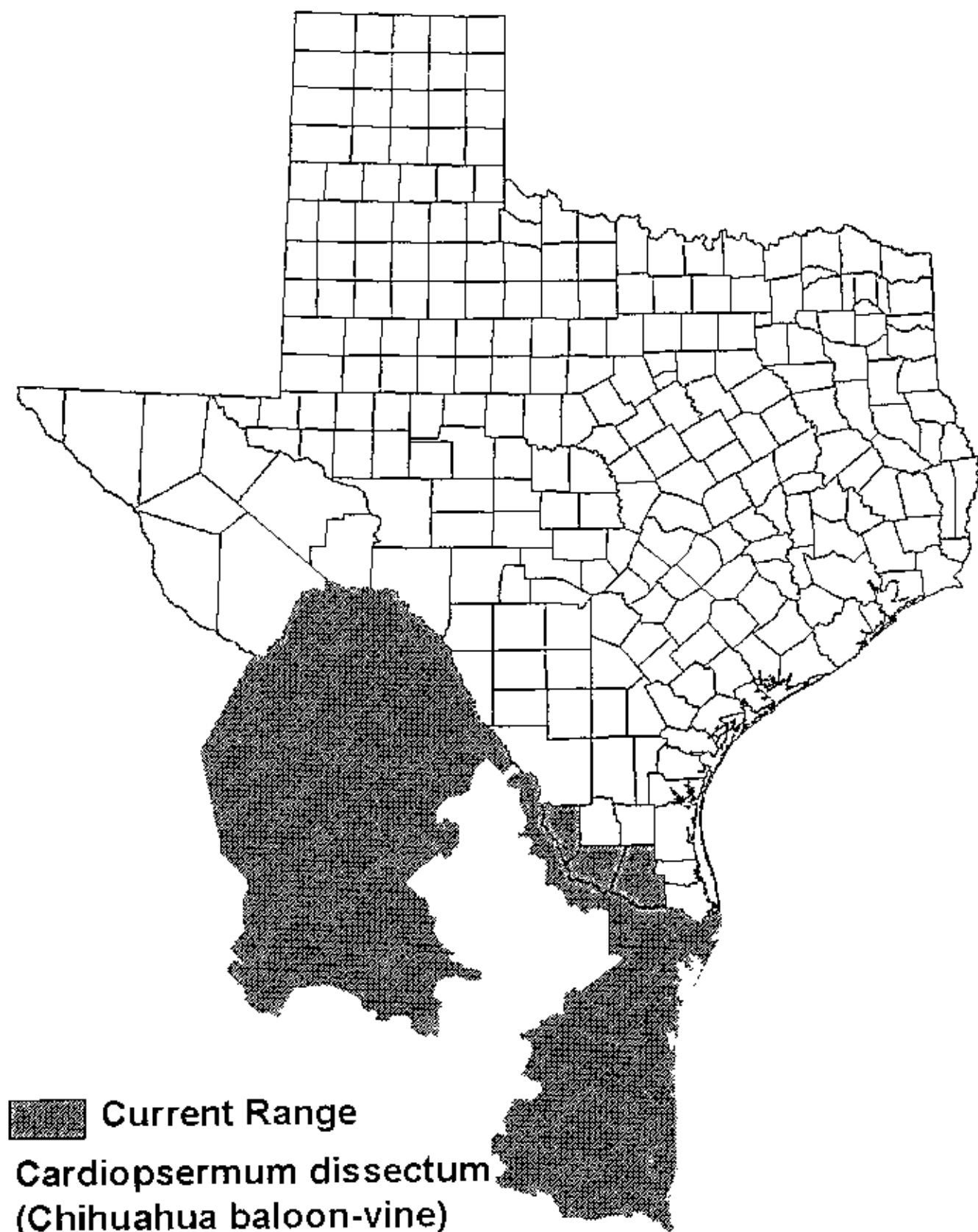




Sapindaceae f. *Cardiospermum dissectum*

ROBERT KUNYON BRIT SPECIMEN No: 4413, CAMERON Co., TX.

ARTIST: LINNY HEAGY



Scientific Name: *Chaetopappa hersheyi* Blake

Synonyms: None.

Common Name: mat lestdaisy

Global/State Ranks: G3S2

Federal Status: SOC

Global Range: Endemic to the Guadalupe Mountains of New Mexico and Texas.

State Range: Culberson and Hudspeth counties.

Description (adapted from Blake 1946 and Correll & Johnston 1970): Mat-forming perennial from a forked woody rootstalk; stems to 5 cm high, unbranched, flexuously ascending, sparsely pubescent with ascending or loosely appressed hairs. Leaves variable, those of basal rosette-like clusters 1-5-6 mm long and 0.3-1 mm wide, spatulate or oblanceolate, apiculate; cauline leaves 4-7, linear-lanceolate to linear, 3.7-5 mm long and 0.4-1 mm wide, acute at apex with a translucent spiny tip, thick, 1-ribbed, sparsely hispid-strigose or glabrous. Flower heads solitary at the end of short peduncles, containing both disk and ray flowers; involucre 4-4.6 mm high, the phyllaries imbricated in ca. 4 series; phyllaries lanceolate, acute or acuminate and spine-tipped, glabrous or sparsely appressed-pubescent on the midrib, the margins white-scarious; ray flowers 6-10, bluish when fresh, fading to white, ca. 5 mm long; disk flowers 5 or 6, yellow, 3-3.4 mm long. Achenes of ray flowers 2- or 3-nerved, 1.3 mm long, those of disk flowers 5-nerved, 0.8-1 mm long; pappus of both ray and disk flowers consisting of ca. 5 awns 3.6-4.2 mm long and ca. 5 very minute ciliate or erose scales ca. 0.1 mm long.

Similar Species: The mosslike, perennial habitat distinguished this species from other *Chaetopappa* species in the Trans-Pecos. *Pinaropappus parvus*, another caespitose, white-rayed composite, grows in the same habitats. The flower heads of *Chaetopappa hersheyi* contain white ray florets and yellow disk florets, while those of *Pinaropappus parvus* lack disk flowers.

Habitat: Dry limestone cliffs and ledges in open pinyon-oak-juniper woodlands at high elevations in the Guadalupe Mountains. Associates include *Acer grandidentatum*, *Arbutus xalapensis*, *Juniperus deppeana*, *Pinus ponderosa*, *Quercus* spp., *Fendlera rupicola*, *Hedeoma apiculatum*, *Petrophytum caespitosum*, *Pinaropappus roseus*, *P. parvus* and *Perityle quinqueflora*.

Phenology: Flowering May-August.

Comments:

Illustrations: A color photograph appears in Warnock (1974). Line drawings appear in Blake (1946) and in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Blake, S. F. 1946. A new *Chaetopappa* from the Guadalupe Mountains of New Mexico and Texas. *Proceedings of the Biological Society of Washington* 59: 47-48.

Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns

National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.

Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant surveys. Report prepared for Guadalupe Mountains National Park.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.

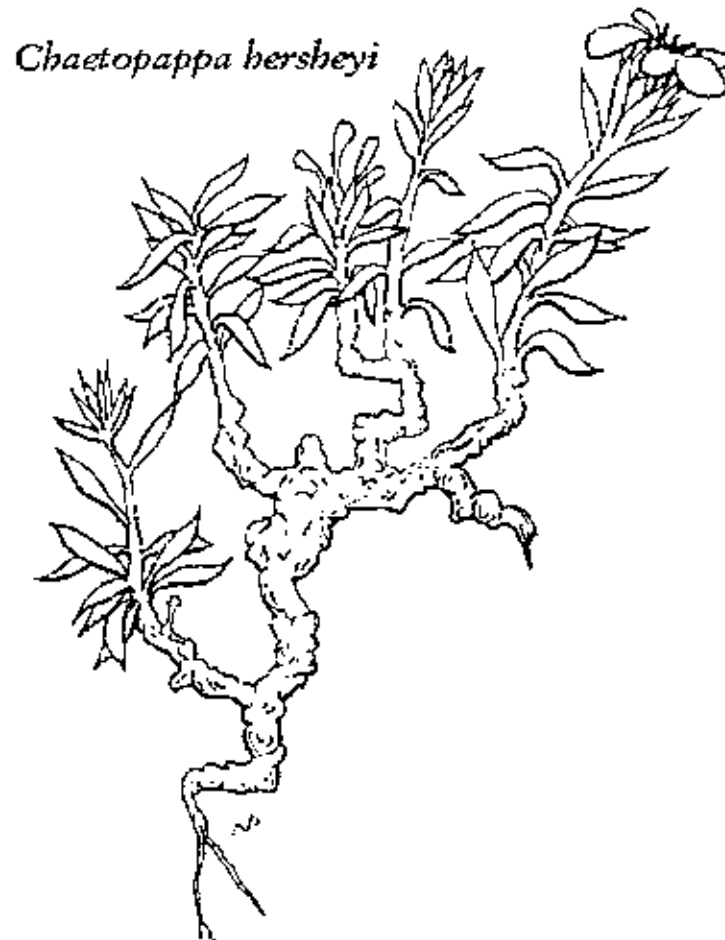
Shinners, L. H. 1946. Revision of the genus *Chaetopappa* DC. *Wrightia* 1: 63-87.

Warneck, B. H. 1974. Wildflowers of the Guadalupe Mountains and the Sand Dune Country, Texas. Sul Ross State University, Alpine. 176 pp.



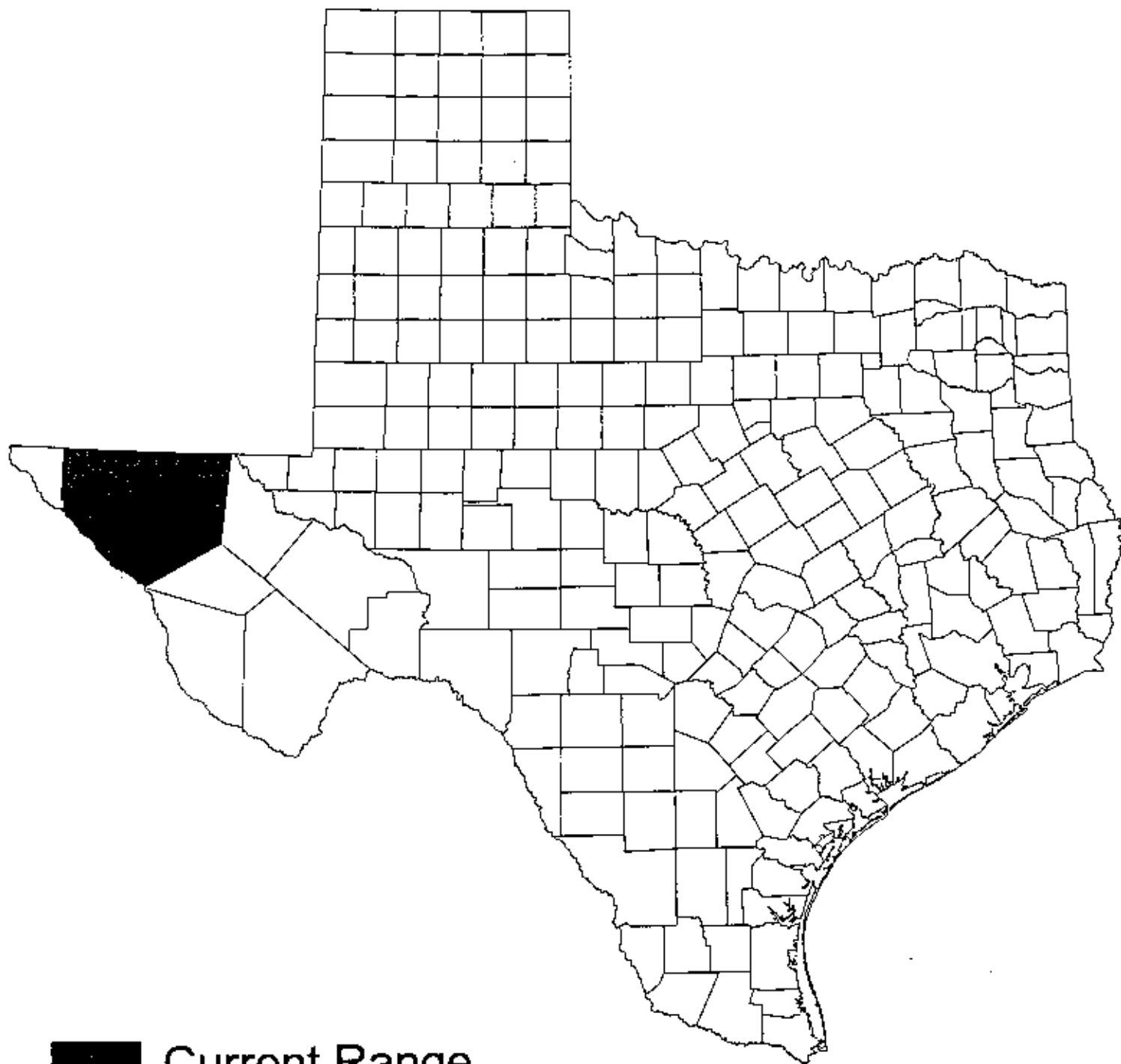
Chaetopappa hersheyi
(Hershey's cliff daisy)

[\[rare plant list\]](#) [\[photos\]](#) [\[distribution map\]](#) [\[line drawing\]](#) [\[taxon report\]](#)



Source: Abraham Plotsky

[HOME](#)



■ Current Range

Chaetopappus hersheyi
(mat leastdaisy)

Scientific Name: *Chamaesyce astyla* (Engelm. ex Boiss.) Millsp.

Synonyms: *Euphorbia astyla* Engelm. ex Boiss.

Common Name: alkali spurge

Global/State Ranks: G2S1

Federal Status: None.

Global Range: Western Texas, Coahuila and Nuevo León; the type specimen was probably collected in 1847 in the state of Durango, from which there are no subsequent records (Henrickson & Johnston in prep.).

State Range: Known only from Pecos County, where a population was recently discovered at The Nature Conservancy's Diamond Y Preserve. The only other Texas record (12 mi N of Fort Stockton, 25 Jun 1954, *B. H. Warnock 11985*) is from the same general area.

Description (adapted from Correll & Johnston 1970): Glabrous low perennial with numerous prostrate stems from a woody crown, the stems 4-23 cm long and 0.7-1.2 mm wide, sometimes ascending at the tips. Leaves opposite, sessile, the blades orbicular-reniform to deltoid-oblong, 2-8 mm long and about as broad, rounded or truncate at apex, inequilateral at base and cordate to clasping, entire, green to somewhat glaucous; stipules on both sides of the stem united into a white scale ca. 0.2 mm long and slightly wider, minutely lacerate or fringed. Cyathia solitary at distal nodes, the involucre hemispheric to broadly campanulate, ca. 1.2 mm long and slightly wider; glands 4, shallowly cupped, oblong, ca. 0.5 mm long; appendages entire, shorter than the gland is wide, forming a narrow margin; styles 3, 0.2-0.3 mm long, entire (not bifid), the ends thickly capitate. Fruit a triangular, plump, ovoid, 3-seeded capsule 1.9-2.6 mm long; seeds oblong-quadrangular, 1.5-1.7 mm long and 0.8-1 mm wide, apically subacute, basally subrounded, with low, irregularly anastomosing, transverse ridges separated by narrow grooves, covered with a thick white coat.

Similar Species: The many prostrate *Chamaesyce* species all appear grossly similar at first glance, but most have strikingly unique characters that, although small, are readily observed in the field. In the case of *C. astyla* these characters are its glabrous, strongly perennial habit; its short, unbranched capitate styles; and its united stipules. Among Texas species, only *C. jejuna*, itself a rare species, shares these features. In *C. jejuna*, the leaves are short-petiolate; they do not appear to clasp the stem as in *C. astyla*. In *C. jejuna*, the gland appendages are deeply dissected and lobed; in *C. astyla* the appendages are entire.

Habitat: In Pecos County, *Chamaesyce astyla* is locally frequent in nearly bare areas within alkali sacaton (*Sporobolus wrightii*) grasslands on alkaline and/or saline silt loam on alluvial flats along a spring-fed desert stream. In Mexico, it occurs on windblown gypsum deposits and gypsum flats (Henrickson & Johnston in prep.).

Phenology: Flowering and fruiting at least March-June and August-September, probably throughout the growing season depending on rainfall.

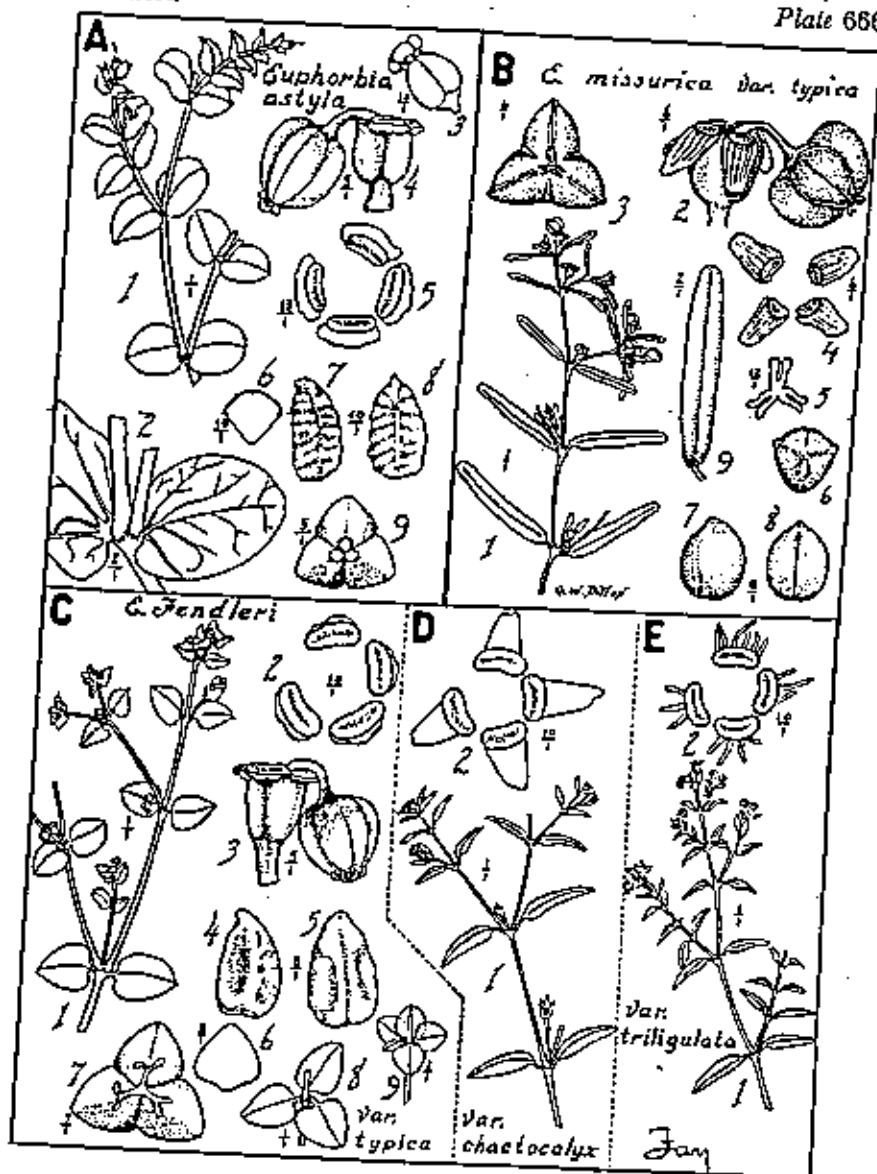
Comments: Rare in Texas but locally abundant in gypsum areas in central Coahuila (Henrickson & Johnston in prep.).

Illustrations: A color photograph appears in Warnock (1974) as *Euphorbia astyla*. Line drawings of a stem

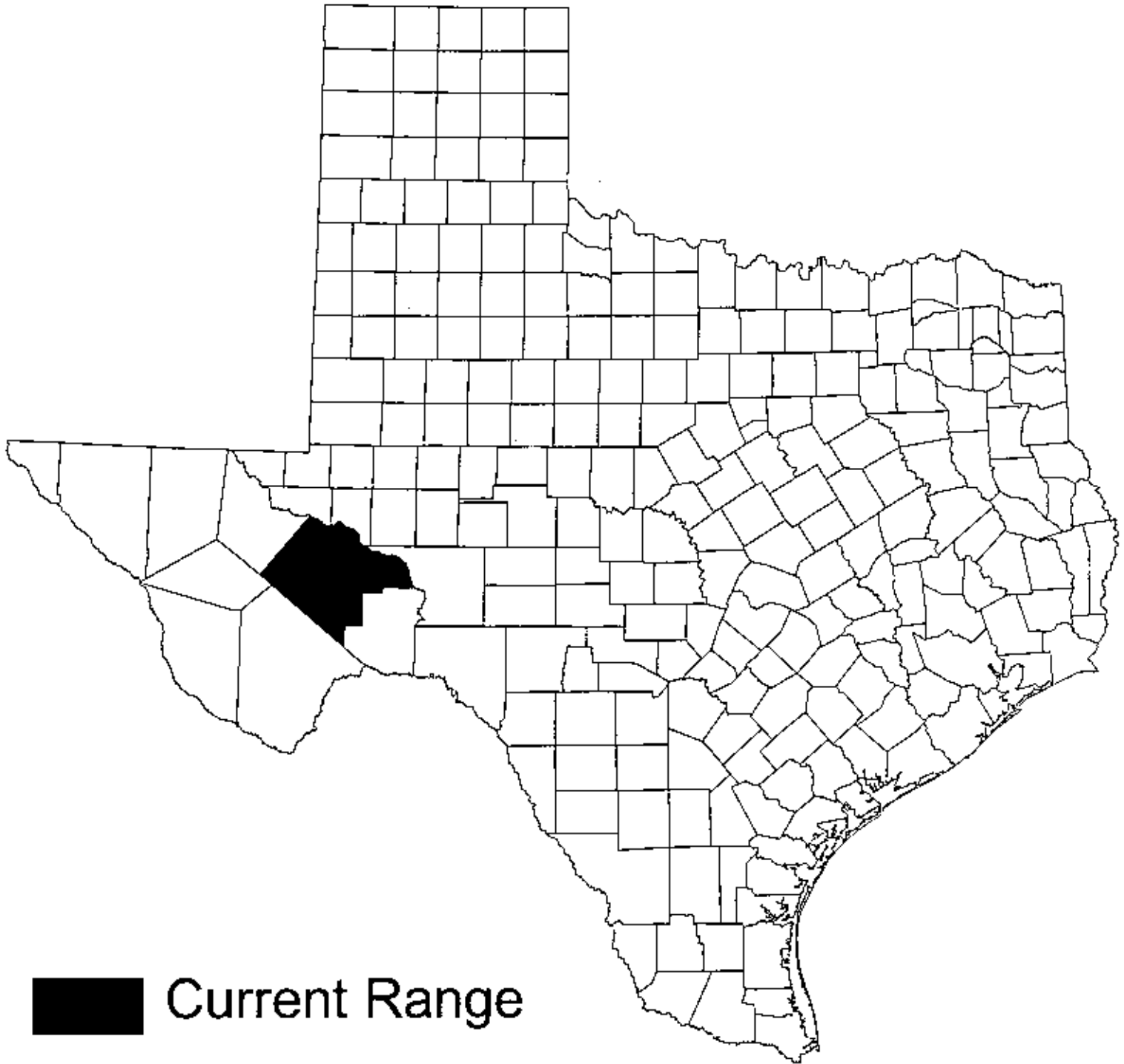
fragment and numerous floral/fructal parts appear in Wheeler (1941), also as *Euphorbia astyla*.

Selected References:

- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.
- Wheeler, L. C. 1941. *Euphorbia* subgenus *Chamaesyce* in Canada and the United States exclusive of southern Florida. *Rhodora* 43: 97-154; 168-205; 223-286.



WHEELER ON EUPHORBIA



■ Current Range

Chamaesyce astyla
(alkali spurge)

Scientific Name: *Chamaesyce chaetocalyx* (Boiss.) Woot. & Standl. var. *triligulata* (Wheeler) Mayfield

Synonyms: *Euphorbia fendleri* T. & G. var. *triligulata* Wheeler; *Chamaesyce fendleri* (T. & G.) Small. var. *triligulata* (Wheeler) Shimmers; *Euphorbia chaetocalyx* (Boiss.) Tidestr. var. *triligulata* (Wheeler) M. C. Johnst.

Common Name: three-tongue spurge

Global/State Ranks: G5T1S1

Federal Status: SOC

Global Range: Trans-Pecos Texas and western Coahuila.

State Range: Brewster County. A report from Buffalo Lakes NWR in Randall County is probably erroneous.

Description (adapted from Correll & Johnston 1970 and Henrickson & Johnston, in prep.): Glabrous perennial from a woody crown (5-) 8-15 mm wide at summit, with ascending stems to about 15 cm tall, often woody at base with gray, longitudinally fissured bark. Leaves opposite, simple, on petioles 1 mm long or less, the blades lanceolate to linear-lanceolate, 3-6 mm long, 3-4 (-6) times long as broad, basally acute to truncate, entire. Cyathia solitary at the nodes or in the forks, the involucre turbinate to campanulate, 1.2-1.8 mm long; glands 4, usually sessile, oblong, 0.4-1 mm long, more or less cupped, bright green; appendages longer than the gland is broad, parted to the base into 3-5 linear-subulate white lobes 0.5-1.5 mm long. Fruit a 3-seeded triangular capsule 1.8-2.1 mm long.

Similar Species: *Chamaesyce chaetocalyx* var. *chaetocalyx* is very similar. It differs in having gland appendages that are sometimes lobed but never parted to the base as in var. *triligulata*.

Habitat: In Texas, *Chamaesyce chaetocalyx* var. *triligulata* has been found in crevices in steep limestone cliffs and on scree and colluvium below. In Coahuila, this taxon has been collected from basalt and tuff cliffs.

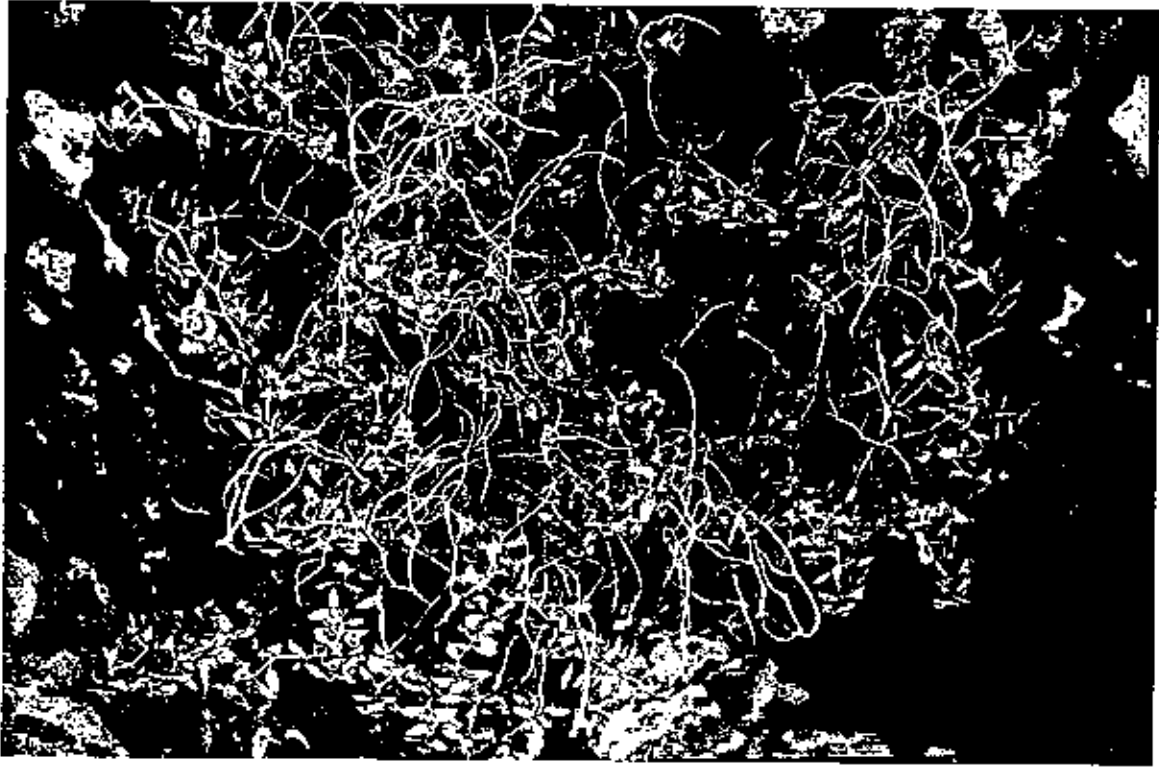
Phenology: Flowering/fruitlet documented July-October but perhaps beginning earlier in growing season.

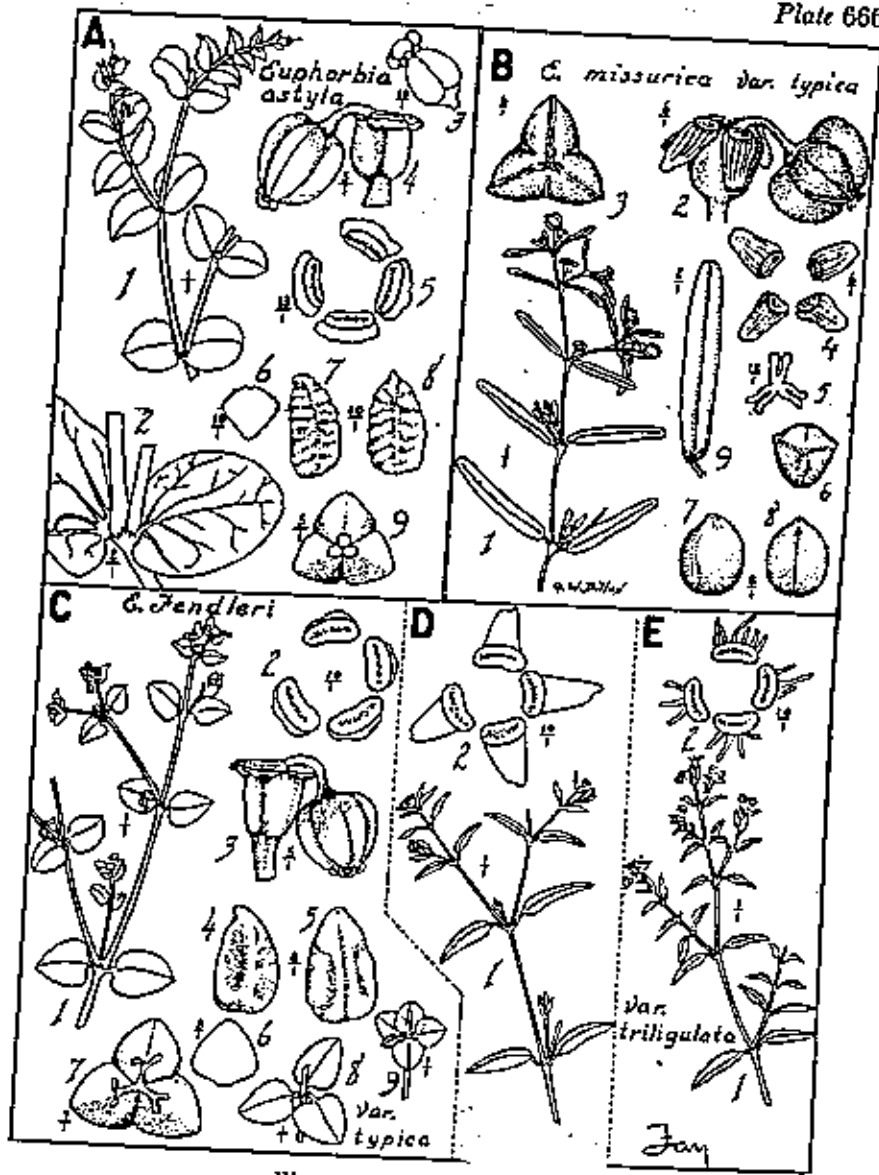
Comments:

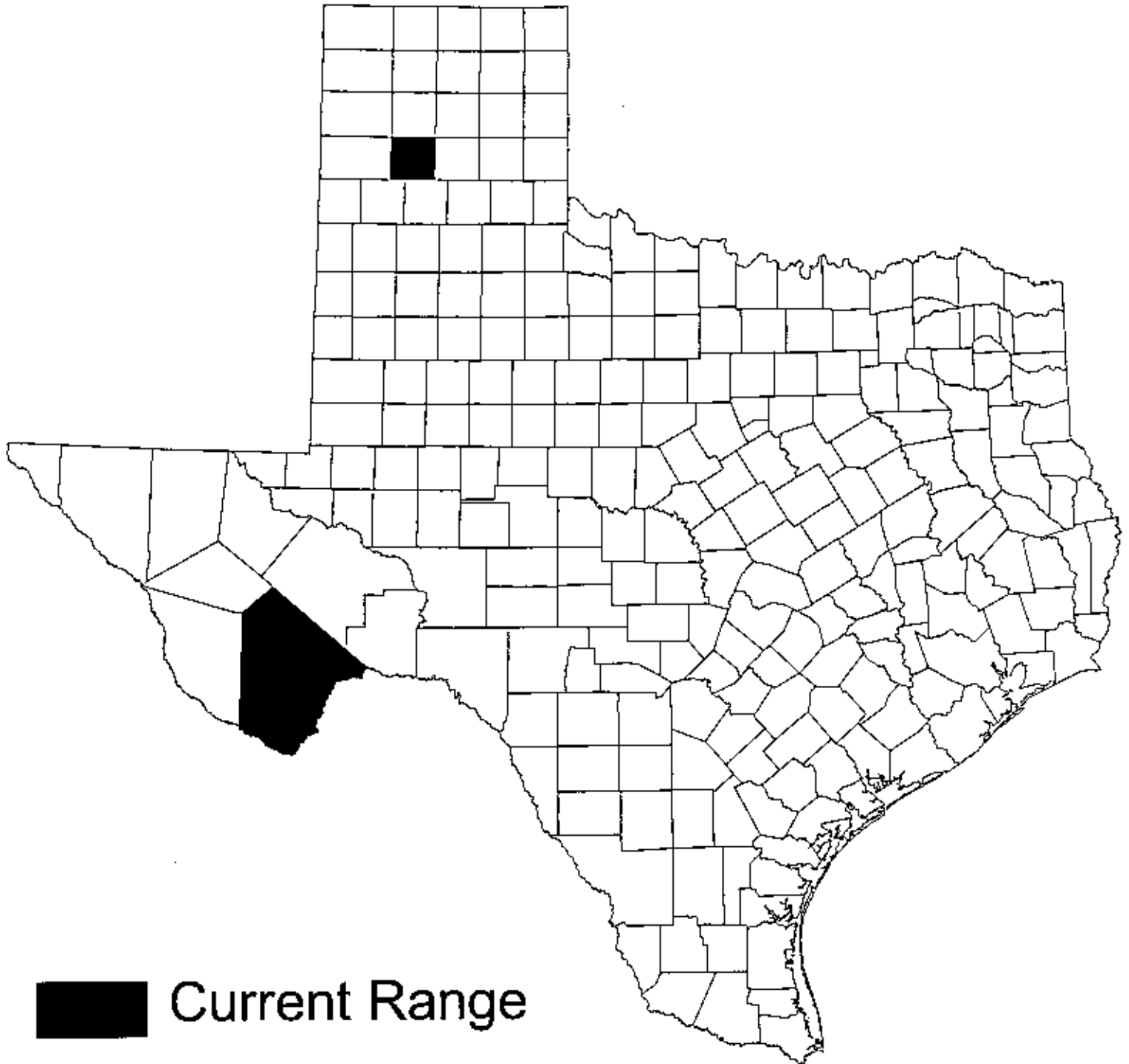
Illustrations: Line drawings of a stem fragment and numerous floral/fructal parts appear in Wheeler (1941) as *Euphorbia fendleri* var. *triligulata*.

Selected References:

- Mayfield, M. H. 1993. New combinations in *Chamaesyce* A. Gray (Euphorbiaceae) from Texas and the Chihuahuan Desert. *Phytologia* 75(2): 178-183.
- Miller, D. J. and A. M. Powell. 1983. Status report [on *Euphorbia fendleri* T. & G. var. *triligulata* Wheeler]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Wheeler, L. C. 1941. *Euphorbia* subgenus *Chamaesyce* in Canada and the United States exclusive of southern Florida. *Rhodora* 43: 97-154; 168-205; 223-286.







■ Current Range

Chamaesyce chaetocalyx var. *triligulata*
(three-tongue spurge)

Scientific Name: *Chamaesyce geyeri* (Engelm.) Small var. *wheeleriana* (Warnock & M. C. Johnston) Mayfield

Synonyms: *Euphorbia geyeri* Engelm. var. *wheeleriana* Warnock & M. C. Johnston

Common Name: Wheeler's spurge

Global/State Ranks: G4T2S1

Federal Status: None

Global Range: All known populations lie within 55 km of El Paso (Henrickson & Johnston in prep.), in extreme west Texas, southern New Mexico and northern Chihuahua.

State Range: El Paso and Hudspeth counties.

Description (adapted from Correll & Johnston 1970 and Henrickson & Johnston in prep.): Glabrous annual with slender prostrate stems 5-45 cm long, 0.4-1.4 mm in diameter; nodes 5-20 (30) mm apart. Leaves opposite, on petioles 1-2 mm long, the blades oblong, oblong-ovate or elliptic-oblong, 4-11 mm long and about half as wide, entire, obtuse to emarginate or mucronate at apex, oblique and obtuse to rounded at base; stipules distinct or the two ventral stipules sometimes united, 1-1.5 mm long, usually trifid into filiform segments. Cyathia solitary in upper stem forks, on peduncles 1-3 mm long, the involucre 0.9-1.5 mm long; glands 4, broadly oval to rotund, 0.2-0.4 (-1.6) mm long, unappendaged; styles 3, more or less erect and rigid, 0.2-0.3 (-0.6) mm long, bifid 1/2 to 1/3 length. **Fruit** a 3-seeded, 3-lobed capsule ca. 2 mm broad, the lobes angular to narrowly rounded; seeds smooth, ovoid, plump, acute at tip, 1.3-1.6 mm long, ca. 1 mm thick, pale reddish brown to whitish.

Habitat: Sparingly vegetated loose eolian quartz sand on reddish sand dunes and coppice mounds.

Phenology: Flowering and fruiting at least August-September, probably earlier and later.

Similar Species: *Chamaesyce geyeri* var. *geyeri* occurs along the northeastern margin of the Chihuahuan Desert (Henrickson & Johnston in prep.) but not within the range of var. *wheeleriana*. In var. *geyeri*, the cyathial glands bear small white glands that are half to twice as long as the gland is wide and are entire to erose along the apical margin.

Comments:

Illustrations: A color photograph appears in Warnock (1974) as *Euphorbia geyeri* var. *wheeleriana*.

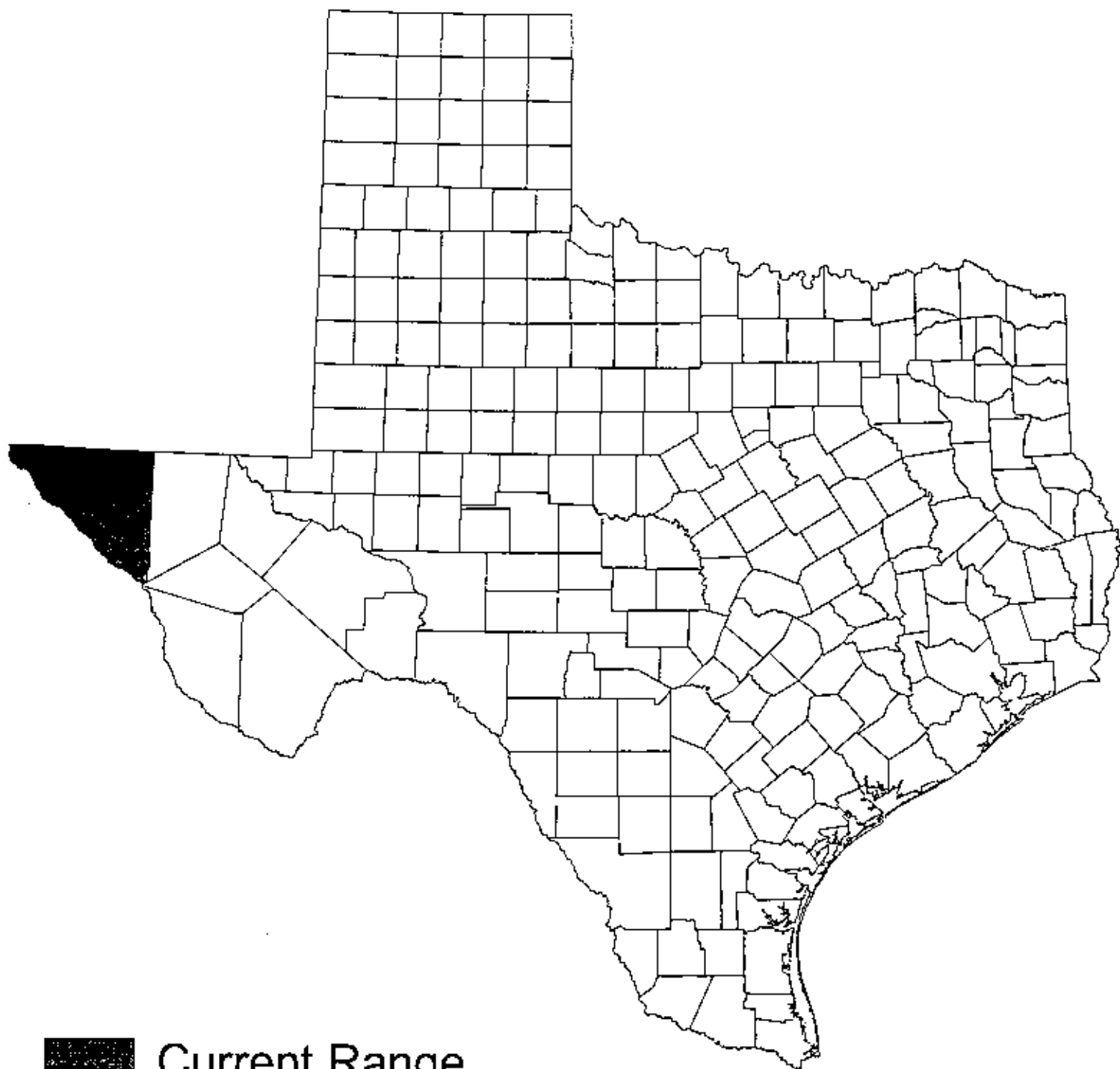
Selected References:

Mayfield, M. H. 1993. New combinations in *Chamaesyce* A. Gray (Euphorbiaceae) from Texas and the Chihuahuan Desert. *Phytologia* 75(2): 178-183.

Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the Sand Dune Country, Texas. Sul Ross State University, Alpine. 176 pp.

Warnock, B. H. and M. C. Johnston. 1969. *Euphorbia exstipulata* var. *lata* and *Euphorbia geyeri* var. *wheeleriana* Warnock & Johnston, new taxa from western Texas. *Southwestern Naturalist* 14(1): 127-128.

Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. El Paso Southwest Botanical Miscellany No. 1. 56 pp.



■ Current Range

Chamaesyce geyeri var. *wheeleriana*
(Wheeler's spurge)

Scientific Name: *Chamaesyce golondrina* (Wheeler) Shinnery

Synonyms: *Euphorbia golondrina* Wheeler

Common Name: swallow spurge

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Chihuahuan Desert of southern Trans-Pecos Texas and adjacent northern Chihuahua and northern Coahuila.

State Range: Brewster, Hudspeth and Presidio counties.

Description (adapted from Wheeler 1940, Correll & Johnston 1970 and Henrickson & Johnston in prep.):

Glabrous annual with slender prostrate stems up to 35 cm long. Leaves opposite, short-petiolate, with oblong to elliptic-oblong blades 5-19 mm long with entire margins and rounded apices; stipules short and subulate, united on the ventral side of the stem into a single bifid structure but separate on the opposite (dorsal) side of the stem. Cyathia solitary at nodes, about 1 mm long, rimmed by 4 erect, round but cupped or concave glands less than 0.5 mm in diameter; appendages white, semilunate, very small or even obsolete; styles stout, 0.2-0.4 mm long; notched or bifid. Fruit a 3-seeded, vaguely 3-angled capsule ca. 2 mm long; seeds 1.7-1.8 mm long, oblong-quadrangular, with a white coat and 6-8 faint transverse wrinkles, sometimes essentially smooth.

Similar Species: The many prostrate *Chamaesyce* species all appear grossly similar at first glance, but most have strikingly unique characters that, although small, are readily observed in the field. This is not the case with *C. golondrina*. In the article containing the type description, Wheeler (1940) admitted that *C. golondrina* "is possessed of no striking characters," but he also stated that "the combination of foliage glabrous save for perhaps occasionally a few hairs on the stipules, glands circular or nearly so yet with evident white appendages, tetragonal seeds, and 39-50 staminate flowers per cyathium, is an exclusive combination of characters."

Habitat: Alluvial or eolian sand along the Rio Grande, occasionally on adjacent shale or limestone slopes.

Phenology: Flowering June-November.

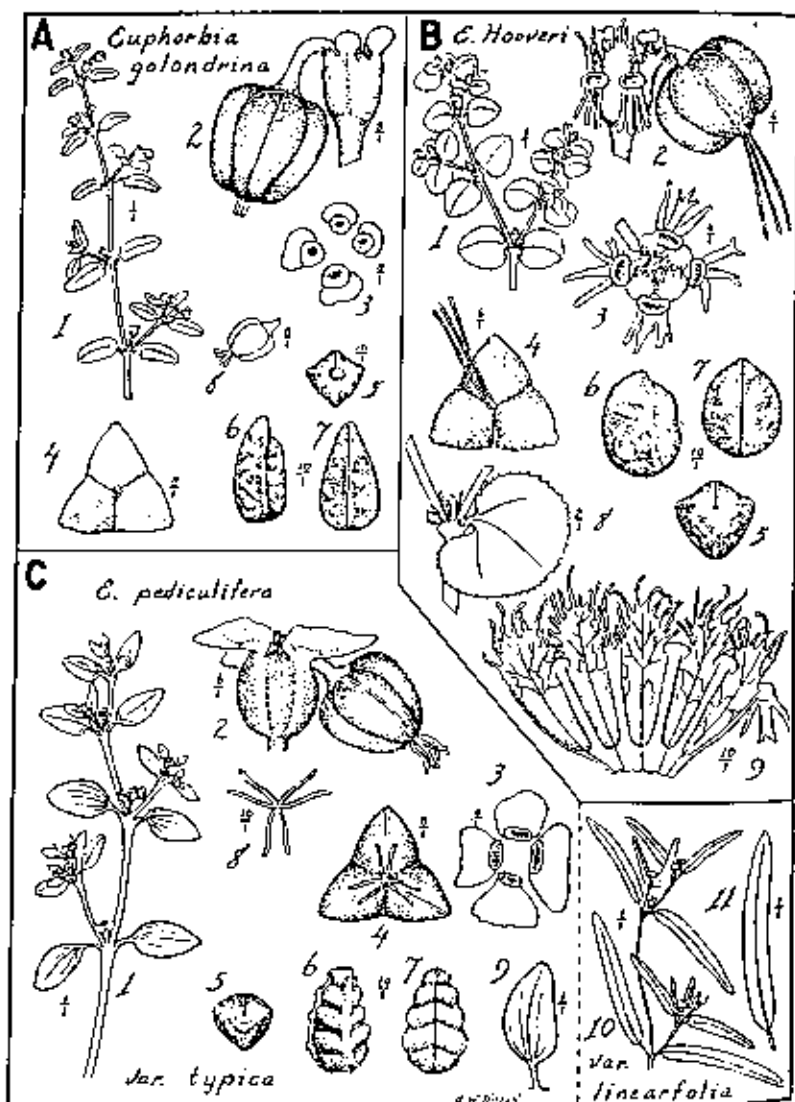
Comments: Wheeler (1940) provided this explanation for the common name: "This seemingly irrelevant appellation is derived, Professor Maximino Martinez informs me, from the popular belief that the swallows [golondrinas] which skim close to the ground upon which these spurges lie are feeding upon the seeds." However, the common name hierba de la golondrina is also applied to many other prostrate *Chamaesyce* species.

Illustrations: A color photograph appears in Warnock (1977) as *Euphorbia golondrina*. Line drawings of a stem fragment and numerous floral/fructal parts appear in Wheeler (1941), also as *Euphorbia golondrina*.

Selected References:

Miller, D. J. and A. M. Powell. 1983. Status report [on *Euphorbia golondrina* Wheeler]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

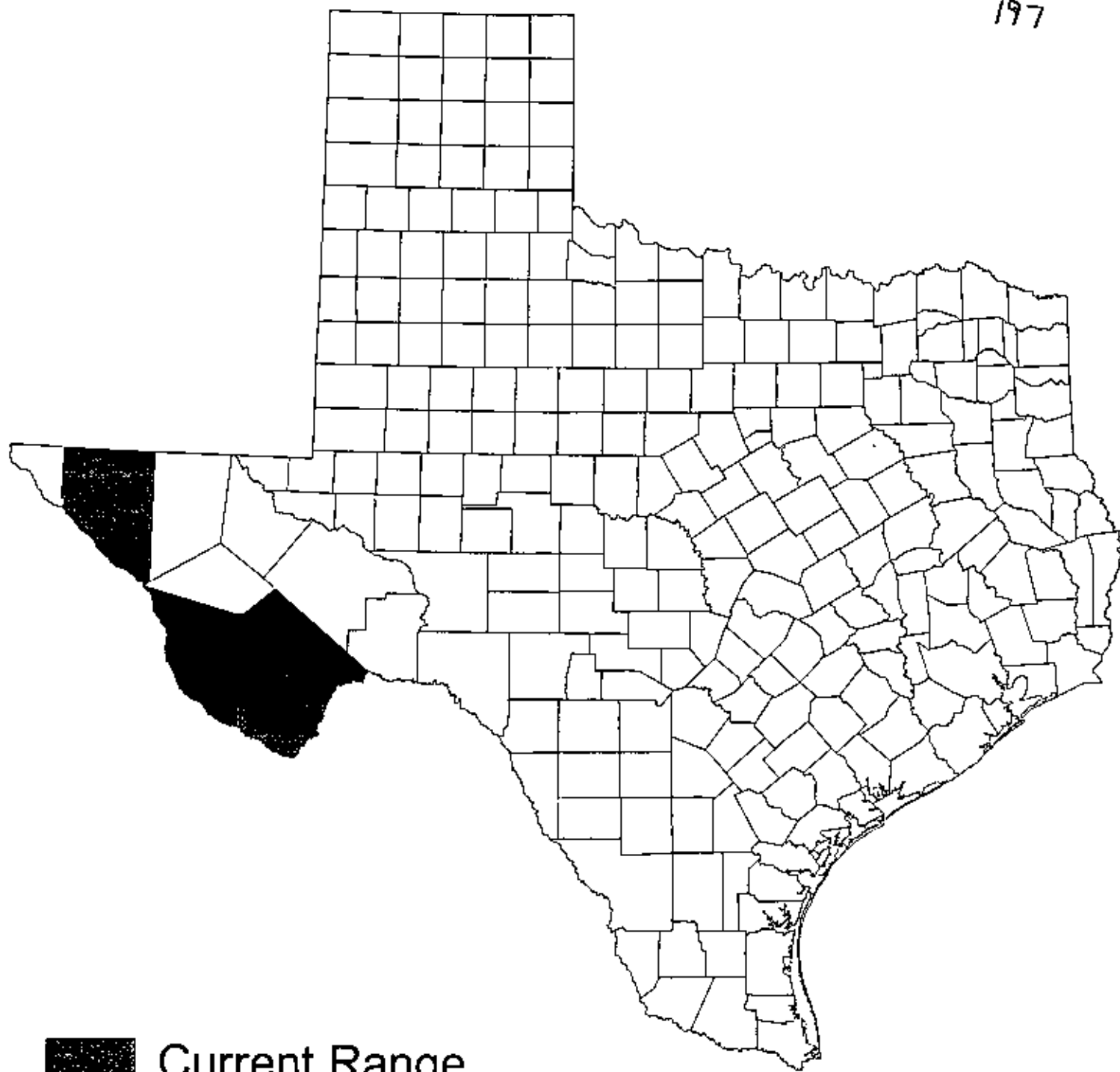
- Shinners, L. H. 1949. New names of Texas Chamaesyces. *Field & Laboratory* 17: 70.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University, Alpine. 276 pp.
- Wheeler, L. C. 1940. *Euphorbia golondrina* sp. nov. *Proceedings of the Biological Society of Washington* 53: 8-9.
- Wheeler, L. C. 1941. *Euphorbia* subgenus *Chamaesyce* in Canada and the United States exclusive of southern Florida. *Rhodora* 43: 97-154; 168-205; 223-286.



WHEELER ON EUPHORBIA

1911 Wheeler,—Euphorbi

Perry Co.: Uniontown, 188
 Mobile, July 14, 1891, Mohr
 Artesia, Tracy 3125 (NY). Io
 Woodbury Co.: Sioux City,
 Jackson Co.: Courtney, Bush
 miles north of Iconium on Oss
 ARKANSAS. Johnson Co.: Pin
 Pulaski Co.: Little Rock, Co.
 Co.: Shreveport, Cocks 3625
 July, 1837, Riddell & Carpenter
 NORTH DAKOTA. Morton Co.
 SOUTH DAKOTA. Mellette Co
 Cheyenne River bottom, July
 Creek, Aug. 1891, Williams
 Niobrara, Clements 2717 (G, I
 Aug., 1898, Williams (Ph).
 1929, Hapeman (Ph). Frank
 Hapeman (Ph). KANSAS. E
 Imler 1193 (NY). Osborne (I
 NY, US). Riley Co.: Norton
 Salina, Mohr (US). Douglas (I
 (US). Miami Co.: Aug. 10, I
 Syracuse, Rose & Fitch 17011
 Sept. 26, 1897, Ward (US). O
 Stevens 1604 (G, NY, US). I
 1863 (G, NY, US). Blaine C
 NY). Cleveland Co.: Norman
 Co.: Industry, 1846, Lindhei
 Co.: near Bracken, Groth 15 (I
 Bush 136 (NY). Cameron Co
 (US): Dallas Co.: Dallas, St
 Hockley, Thuron 4 (US). How
 (Mo, NY, US). Jackson Co.: I
 Potter Co.: Amarillo, Ball 127
 Reed 3005 (US). Nueces Co.:
 US). Red River Co.: Clark
 Starr Co.: 5 miles north of Ri
 Tarrant Co.: Grapeland, Thar
 Tracy 7844 (Mo, NY, US).
 5390 (US). Valverde Co.: ba
 June 13, 1891, Dewey (US).
 Dixon 376 (NY). Waller Co
 Webb Co.: Laredo, Reverch
 Pierce, Tracy 7435 (G, NY,
 Springs, Aug. 22-30, 1879, Ed.
 Cascade Co.: Great Falls, I
 Weld Co.: New Windsor, Au



■ Current Range

Chamaesyce golondrina
(swallow spurge)

Scientific Name: *Chamaesyce jejuna* (M. C. Johnston & Warnock) Shinnery

Synonyms: *Euphorbia jejuna* M. C. Johnston & Warnock; the order of authorship of this binomial is unclear (Shinnery, 1969).

Common Name: dwarf broomspurge

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to limestone areas in the Trans-Pecos and Stockton Plateau of southwestern Texas.

State Range: Brewster, Mitchell, Nolan, Pecos, Terrell, and Val Verde counties.

Description (adapted from Correll & Johnston 1970 and Henrickson & Johnston in prep.): Glabrous low perennial with 20-60 decumbent stems from a woody crown, the stems 1-9 cm long and 0.2-1.1 mm wide, often flexuous, many-branched, the branched pseudodichotomous or even whorled. Leaves opposite, on petioles 0.7-1.0 mm long, the blades obovate or ovate or nearly elliptical, 3-6 (-8) mm long, 1 to 1.5 times long as broad, rounded or angled at apex, inequilaterally rounded or truncate at base, entire, rarely glaucous, occasionally reticulate-veined; stipules on both sides of the stem united into a white, lacerate to lacinate, lanceolate to deltoid scale less than 1 mm long. Cyathia solitary at distal nodes, shortly pedunculate, the involucre hemispheric to broadly campanulate, ca. 1.2-1.5 mm long; glands 4, subequal, oblong, cupped, ca. 1.6 mm long; appendages white, erect or spreading, ca. 0.6 mm long, usually deeply dissected into 4-5 acute to acuminate lobes or even parted to the base into 4-6 distinct segments, rarely entire or merely crenate, this variability sometimes expressed on a single individual; styles 3, ca. 0.5 mm long, entire (not bifid), the ends thickly capitate. Fruit an ovoid, plumply triangular, 3-seeded capsule 1.8-2.2 (-2.7) mm long; seeds oblong, angled, 1.6-2.0 (-2.3) mm long, apically narrowed and acute, with faint irregular transverse wrinkles or with up to 10 or 11 faint low transverse ridges, pale brown and covered with a thick white coat.

Similar Species: Although grossly similar to other glabrous, low-growing, perennial *Chamaesyce* species, three characters clearly distinguish *C. jejuna* from its Texas congeners: shortly petiolate leaves; short (ca. 0.5 mm long), thick, entire (not bifid) styles; and cyathia glands with deeply dissected or lacerate appendages.

Habitat: The type specimen was collected in a grama-grass prairie on caliche uplands with scattered *Dalea* shrubbery (Warnock & Johnston 1960). Other collections are from "dry caliche slopes" and "limestone hills" (Warnock & Johnston 1960).

Phenology: According to Warnock and Johnston (1960), flowering is "strictly vernal". However, specimens have been collected from 30 March to 26 July.

Comments:

Illustrations: Line drawings of a complete plant, including subterranean parts; a lateral view of a cyathium bearing glands, appendages and an exerted immature fruit; and an overhead view of a mature capsule appear in Warnock & Johnston (1960).

Selected References:

- Mayfield, M. H. 1993. New combinations in *Chamaesyce* A. Gray (Euphorbiaceae) from Texas and the Chihuahuan Desert. *Phytologia* 75(2): 178-183.
- Shinners, L. H. 1969. *Chamaesyce jejuna* (Johnston & Warnock) Shinners, comb. nov. *Sida* 3(5): 347.
- Warnock, B. H. and M. C. Johnston. 1960. *Euphorbia jejuna*, new species from western Texas. *Southwestern Naturalist* 5(2): 97-99.

B. H. Warnock & M. C. Johnston

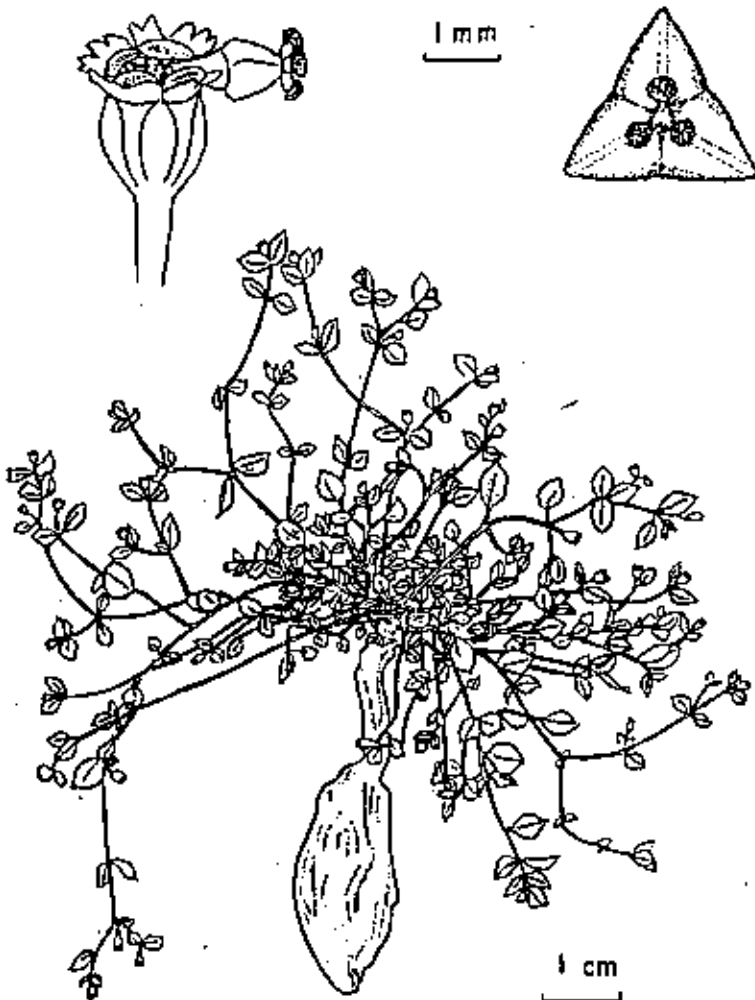
EUPHORBIA JEJUNA, *new species*. Plantae herbaceae perennes humilis, caules multi decumbentes aut ascendentes, breves, stipulis in squamam coalitis; glandes 4, poculiformes; appendiculae perspicuae, erectae aut patentes, plerumque in 4-6 segmentia acuta profunde dissectae aut usque ad basim in 4-6 lobos divisae; flores staminei ca. 12-25; styli 0.5 mm. long, integri, crasse rotundo-capitati; capsula 1.8-2.2 (-2.7) mm. long; semina 1.6-2.0 (-2.3) mm. long.

Glabrous low perennial herbs; taproot woody or somewhat fibrous and fleshy, either slenderly napiform and branched or tuberous, 3-14 mm. thick, dark-barked; stems 20-60, arising from a woody crown, annual, decumbent, 1-9 cm. long, 0.2-1.1 mm. thick, often flexuous, stramineous to brownish to reddish, much-branched, the branching often pseudodichotomous or even whorled with several leaves and branches emerging at a single node; internodes 0.5-2 cm. long. **LEAVES** opposite; blades rotundly obovate or ovate or nearly elliptical, 3-6 (-8) mm. long, 1.0-1.5 times longer than broad, apically rounded or angled (90-180°), basally shortly rounded or truncate and inequilateral, marginally entire, drying dull greenish or brownish, rarely glaucous, occasionally reticulate-veined, rather thin but with no tendency to roll on drying; petioles 0.7-1 mm. long; stipules on both sides of stem united into a very short scale which is lacerate, lacinate or rarely bifid, firm, reddish or purplish or white, lanceolate or muticus-deltoid, less than 1 mm. long, not conspicuous without a strong lens, or at floriferous nodes stipules rarely separate and each lanceolate on the upper side of the stem. **CYATHIA** solitary at the upper nodes in the forks; peduncles relatively long for this subgenus, 0.9-2 mm. long, erect, stramineous to reddish or purplish; involucre hemispheric or broadly campanulate, pubescent inside near the glands, 1.2-1.5 mm. long to the base of the glands, reddish or purplish or greenish with 5 paler or discolored stripes leading to the glands and sinus; glands 4, subequal, oblong, ca. 1.6 mm. long, cupped, yellowish green to olive green to reddish or purplish; appendages conspicuous, erect or spreading, white, ca. 0.6 mm. long, rarely entire or merely crenate, usually deeply dissected into 4-5 acute or acuminate lobes or even nearly parted to the base into 4-6 distinct segments, the form rather variable even on a single individual. **STAMINATE FLOWERS** 12-25 per cyathium. **PISTILLATE FLOWER**: gynophore exerted and reflexed and often bright red; ovary ovoid triangular, drying sordid olive green or brown; styles 3, ca. 0.5 mm. long, entire (not bifid), thickly round capitate, drying dark olive. **CAPSULE** ovoid, plumply triangular, olive-green, 1.8-2.2 (-2.7) mm. long; columella 1.7-2 (-2.3) mm. long, apically narrowed and acute, the facets with faint irregular transverse wrinkles or with up to 10 or 11 faint but definite low rounded transverse ridges, pale brownish or tawny-pink with a thick white coat; ecarunculate.

TYPE: Nolan County, Texas, a few miles west of Sweetwater between Interstate 20 (U.S. 80) and the city dump behind the Midway Motel, altitude 2250 feet, grama prairie on caliche uplands, with scattered *Dalea* shrubbery; growing with but quite distinct from *E. Fendleri* var. *Fendleri*, M. C. Johnston 3967, April 19, 1959 (Holotype SRSC; Isotypes SMU, Tex., etc.).

Other material seen: Mitchell County, N.W. quarter section 31, S. P. R. R. block 17, dry caliche slopes, prostrate, glaucous, Richard W. Pohl 4819, April 16, 1945 (SMU). Terrell County, limestone along highway 10 miles east of Dryden, alt. 2100 ft., Warnock, Turner & Parks 54, April 10, 1949 (SRSC, TEX); Limestone hills 20 miles west of Langtry, alt. 1880 feet, Brown & Warnock 47324, March 30, 1947 (SRSC). Val Verde County, limestone hills 10 miles west of Langtry, alt. 1860 ft. Brown & Warnock 47311, March 30, 1947 (SRSC); Limestone, 7 miles west of Langtry, alt. 1400 ft., Warnock, Turner & Parks 188, April 10, 1949 (SRSC).

The accompanying line sketch was supplied by Joan Axtell, mainly on the basis of Warnock, Turner & Parks 54.—Marshall C. Johnston and Barton H. Warnock, Sul Ross State College, Alpine, Texas.

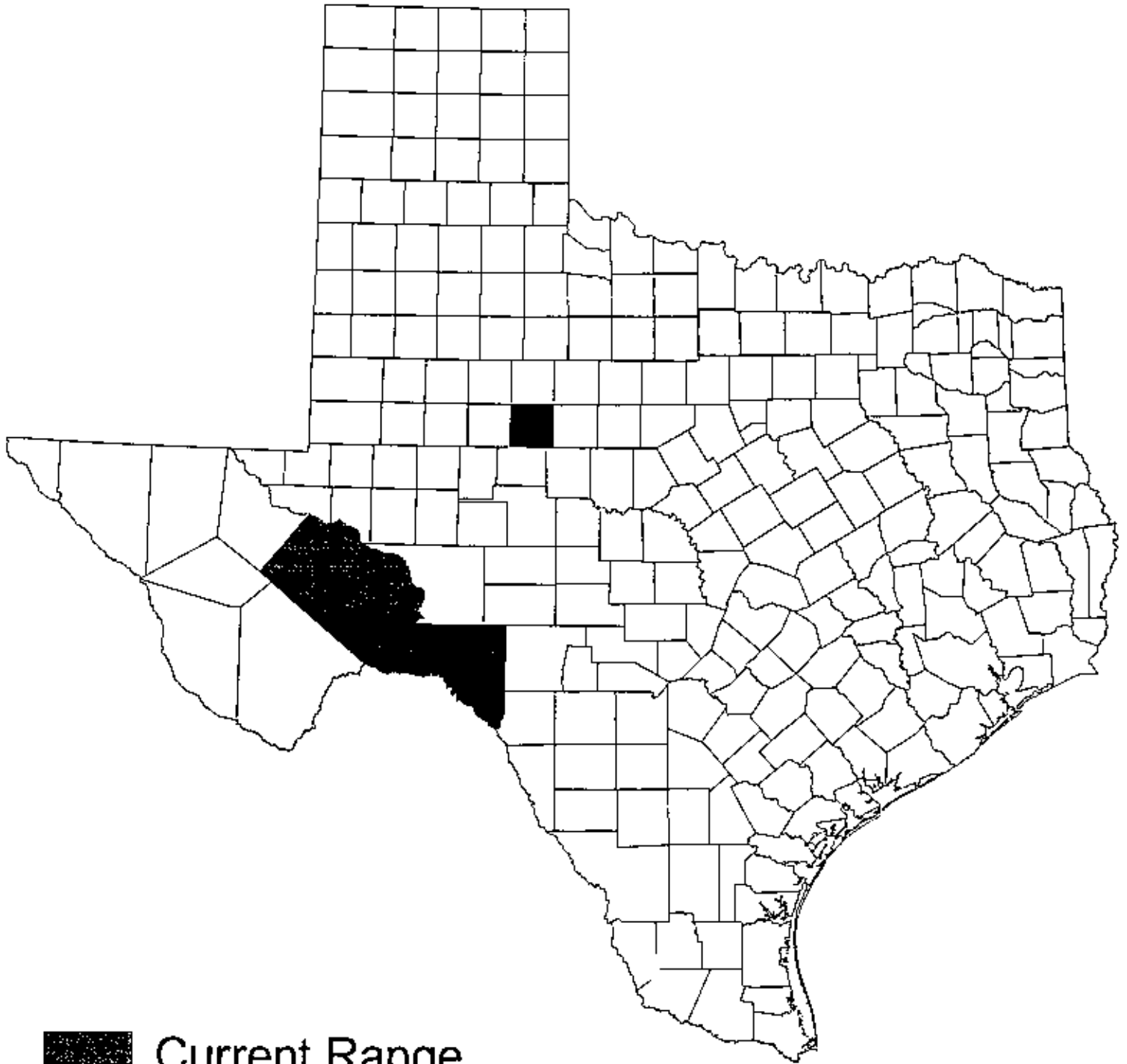


EUPHORBIA JEJUNA Warnock & Johnston

98

Euphorbia jejuna M. C. Johnston & Warnock

Southw. Nat. 5:97, fig. 1960. - Texas.



■ Current Range
□ Historical Range

Chamaesyce jejuna
(dwarf broomspurge)

Scientific Name: *Chloris texensis* Nash

Synonyms: *Chloris nealleyi* Nash

Common Name: Texas windmillgrass

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Gulf Coastal Plain of Texas.

State Range: Brazoria, Chambers, Galveston, Harris, Nueces and Refugio counties. A single specimen from Brazos County (to county only, Oct 1938, *Malone s.n.*), is either erroneous as to location or represents a disjunct population. Reports from Hidalgo County have not been verified.

Description (adapted from Gould 1975): Cespitose perennial with glabrous, erect or reclining culms 30-45 cm tall; leaf sheaths glabrous to sparsely pilose; ligule a low membranous crown. Leaves with slightly scabrous blades to 15 cm long and ca. 4 mm wide. Flowers in terminal panicles with (5-) 8-10 branches up to 20 cm long, the branches radiate, usually in one whorl but occasionally in two, bearing flowers only in the distal 1/2 or 3/4, the lowest cm or so of each branch bare; spikelets widely spaced, mostly 3-4 per cm of rachis, containing 1 fertile floret and 1 sterile floret; glumes lanceolate, glabrous except for the scabrous midnerve, the lower glume 2.7-3 mm long, the upper glume 3.5-3.8 mm long; lemma of lower floret lanceolate, 3.7-4.3 mm long, the upper margins sparsely appressed-ciliate with hairs ca. 0.5 mm long, otherwise glabrous, the awn 7-11 mm long; sterile floret narrowly elliptical, acute, glabrous, 2-2.5 mm long, with an awn 4.5-6.5 mm long.

Similar Species: The absence of spikelets from the basal centimeter or so of the inflorescence branches readily distinguishes this species from other *Chloris* species of the Texas Gulf Coast.

Habitat: Sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes. Sometimes associated with the coastal prairie endemics *Hymenoxys texana* and *Machaeranthera aurea* in slightly saline soils in bare areas around pimple mounds.

Phenology: Flowering in fall.

Comments:

Illustrations: A black-and-white photograph appears in Silveus (1933). A line drawing appears in Gould & Box (1965) and is reprinted in Hatch, Schuster & Drawe (1999).

Selected References:

Gould, F. W. and T. W. Box. 1965. Grasses of the Texas Coastal Bend. Texas A & M University Press, College Station. 186 pp.

Hatch, S. L., J. L. Schuster and D. L. Drawe. 1999. Grasses of the Texas Gulf prairies and marshes. Texas A & M University Press, College Station. 355 pp.

Silveus, W. A. 1933. Texas grasses. Privately published, San Antonio. 782 pp.

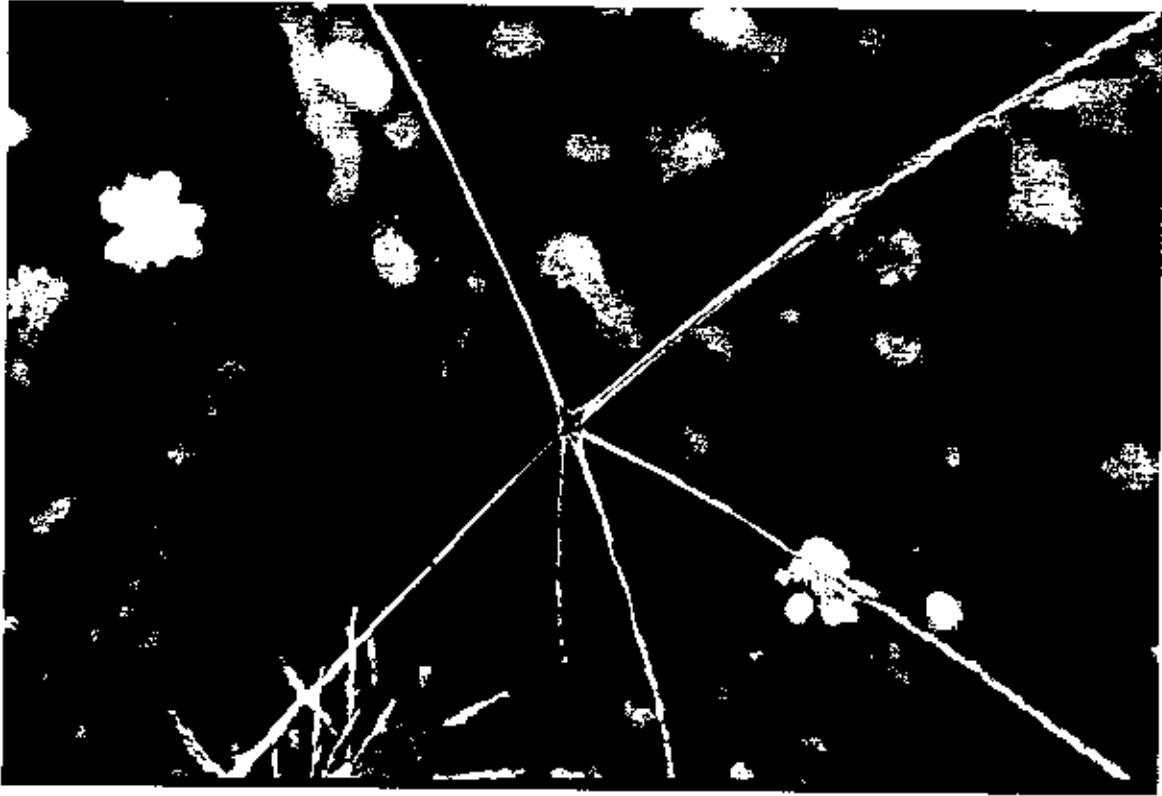
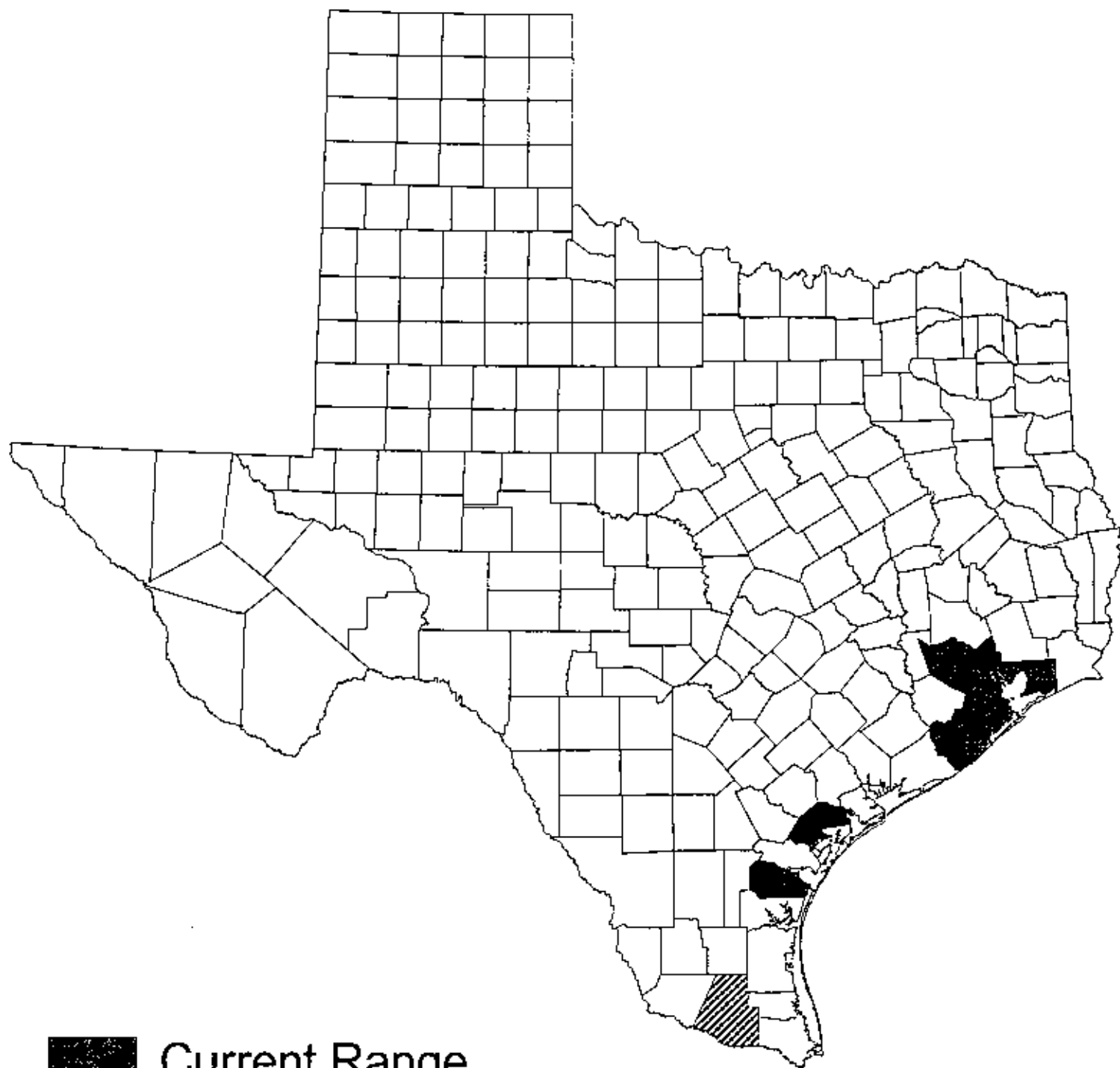

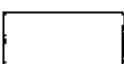





Fig. 48. *Chloris texensis*. Inflorescence and spikelet.



-  Current Range
-  Historical Range
-  Questionable Range

Chloris texensis
(Texas windmill grass)

Scientific Name: *Chrysothamnus nauseosus* (Pallas ex Pursh) Britt. subsp. *texensis* L. C. Anderson

Synonyms: *Ericameria nauseosa* (Pallas ex Pursh) Nesom & Baird var. *texensis* (Anderson) Nesom & Baird; formerly included in *C. nauseosus* (Pallas) Britt. subsp. *bigelovii* (Gray) Hall & Clem.

Common Name: Guadalupe Mountains rabbitbrush

Global/State Ranks: G5T2S1

Federal Status: SOC

Global Range: Endemic to the Guadalupe Mountains of New Mexico and Texas.

State Range: Culberson County.

Description (adapted from Anderson 1980; Anderson in Henrickson & Johnston in prep.): Low, spreading, intricately branched shrub 2-3 (-5) dm tall. Leaves alternate, simple, grayish green, linear, 1.5-3.4 cm long and 1-1.5 mm wide, tomentulose. Flower heads in terminal paniculate cymes, the heads containing only disk flowers (rays absent); involucre 8-9.5 (-11) mm high, the outer phyllaries tomentose and/or ciliate, with prominent brownish costal nerves, ovate, the inner phyllaries glabrous, lanceolate; disk flowers 4-5, yellow, the corolla 8.5-10 (-10.8) mm long, the 5 lobes mostly ca. 1 mm long; stigmatic lines much longer than the style appendages. Achenes cylindric, 4-6 mm long, glabrous; pappus of numerous capillary bristles 5.2-7.4 mm long.

Similar Species: Basically similar to all other subspecies of *Chrysothamnus nauseosus* but unique among them in its long stigmatic areas (more than half the total style length) and short pappus (less than 3/4 the length of the flower). Most closely related to *C. nauseosus* subsp. *graveolens* (Anderson 1980).

Habitat: Limestone ledges and open gravel alluvial slopes at elevations between 1490 and 2130 m (Burgess & Northington 1979; Anderson).

Phenology: Flowering September-October.

Comments: Anderson (1986) recognized 22 subspecies of *Chrysothamnus nauseosus*, all of which were transferred to the genus *Ericameria* by Nesom and Baird (1993).

Illustrations: Line drawings appear in Anderson (1980).

Selected References:

Anderson, L. C. 1978. New taxa in *Chrysothamnus* section *Nauseosi* (Asteraceae). *Phytologia* 38(4): 309-320.

Anderson, L. C. 1980. Morphology and biogeography of *Chrysothamnus nauseosus* ssp. *texensis* (Asteraceae): a new Guadalupe Mountains endemic. *Southwestern Naturalist* 25: 197-206.

Anderson, L. C. 1986. An overview of the genus *Chrysothamnus* (Asteraceae). Pp. 29-45 in McArthur, E. D. and B. L. Welch, compilers. Proceedings-- symposium on the biology of *Artemisia* and *Chrysothamnus*, 1984, Provo, Utah. General Technical Report INT-200. United States Department of Agriculture, Forest Service, Intermountain Research Station.

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Nesom, G. L. and G. I. Baird. 1993. Completion of *Ericameria* (Asteraceae: Astereae), diminution of *Chrysothamnus*. *Phytologia* 75(1): 74-93.



Frutices humiles et diffundentes, usque ad 5 dm alti, ramis contortis; folia glaucoviridia, linearia, 1.5-3.5 cm longa, 1-1.5 mm lata; inflorescentia cyma paniculata, interdum auxiliariis capitulis et singularibus et abortivis sub cyma; capitula 8.0-11.0 mm longa, bracteis exterioribus ovatis, obtusis vel paene acutis, interdum tomento appresso, glabrescentibus, interioribus bracteis lanceolatis, acuminatis, glabris; disci florum 4-5, flavi, corollis 8.5-10.8 mm longis, lobis circa 1 mm longis, lineis stigmaticis multo longioribus quam styli appendicibus; schaeenia glabra, pappo multo brevioribus quam corollis.

Type.—TEXAS: Culberson Co.: Guadalupe Mountains, Smith Spring Canyon at 6400 ft, 5 Oct 1978, L. C. Anderson 4767 (holotype: UCI; isotypes: BRYI, FSU, MO, TEX!).

Low, spreading shrubs 2-3(5) dm tall, intricately branched; leaves grayish-green alternate, entire, linear, 1.5-3.5 cm long, 1(1.5) mm wide, tomentulose, tips mucronate; inflorescence a paniculate cyme, occasionally with single, abortive, axillary heads along the stem below the main inflorescence; heads (8)8.7-9.5(11) mm long, 1.8-2.1 mm wide, phyllaries (16)17-19(22), outer ones sometimes tomentose and/or ciliate, becoming glabrous, with prominent (often brownish) costal nerves, ovate with obtuse to acute tips, inner bracts glabrous, costal nerves less prominent, lanceolate with acuminate tips; disk flowers (4)5, yellow, corollas (8.5) 9-9.5(10.8) mm long, lobes (0.6)1(1.3) mm long, lanceolate, erect-ascending; stigmatic lines much longer than style appendages; achenes cylindrical, 4-6 mm long, glabrous, pappus 5.2-7.4 mm long; $n = 9$ (Figs. 1 and 2). Infrequent in crevices on faces of limestone cliffs and huge boulders of canyon woodlands, less frequently in open gravel alluvium of stream beds, 4,900-7,000 ft, Guadalupe Mountains of Texas and adjacent New Mexico, more frequent on east escarpment. September-November.

Additional specimens examined (all in Guadalupe Mountains); those used in Table 1, in addition to type collection, are indicated by asterisk: NEW MEXICO: Eddy Co.: Dark Canyon, Van Devender in 1977 (ARIZ), W. Slaughter Canyon, Burgess 4696 (ARIZ); Otero Co.: N. McKittrick Canyon, Burgess 1605 (ARIZ), Patterson 521 (LL). TEXAS: Culberson Co.: S. McKittrick Canyon, Anderson 4651 (FSU), Burgess 1705* (ARIZ), 4032* (FSU, TTC), Correll 26074 (LL), Hinckley 4495 (SRSC), Warnock 9458* (LL, SRSC), 20363 (SRSC), 23368 (SRSC), Smith Spring Canyon, Anderson 4656 (FSU), Turner & Warnock 130 (GH, FSU, SRSC), Rowlett & Oatman in 1963* (TEX), Pine Springs, Whitehouse 8470 (TEX), Barlett Peak, Van Devender & Spaulding in 1974 (ARIZ), canyon [Bone Spring?] west of highest peak, Pittsby in 1922 (PHIL). 005

This Guadalupe rabbitbrush has been poorly understood for some time. It had been treated tentatively as an aberrant form of *C. nauseosus* ssp. *bigelovii* (Gray) Hall & Clem. (Anderson, 1970b). Additional (and better) material has allowed a more complete understanding of the Guadalupe populations of *C. nauseosus*; they definitely constitute a distinct subspecies, whose closest affinity is with *C. nauseosus* ssp. *graveolens* (Nutt.) Piper, not ssp. *bigelovii*. The latter relationship was considered mainly through their common feature of glabrous achenes.

The new subspecies is more like *C. nauseosus* ssp. *graveolens* in its

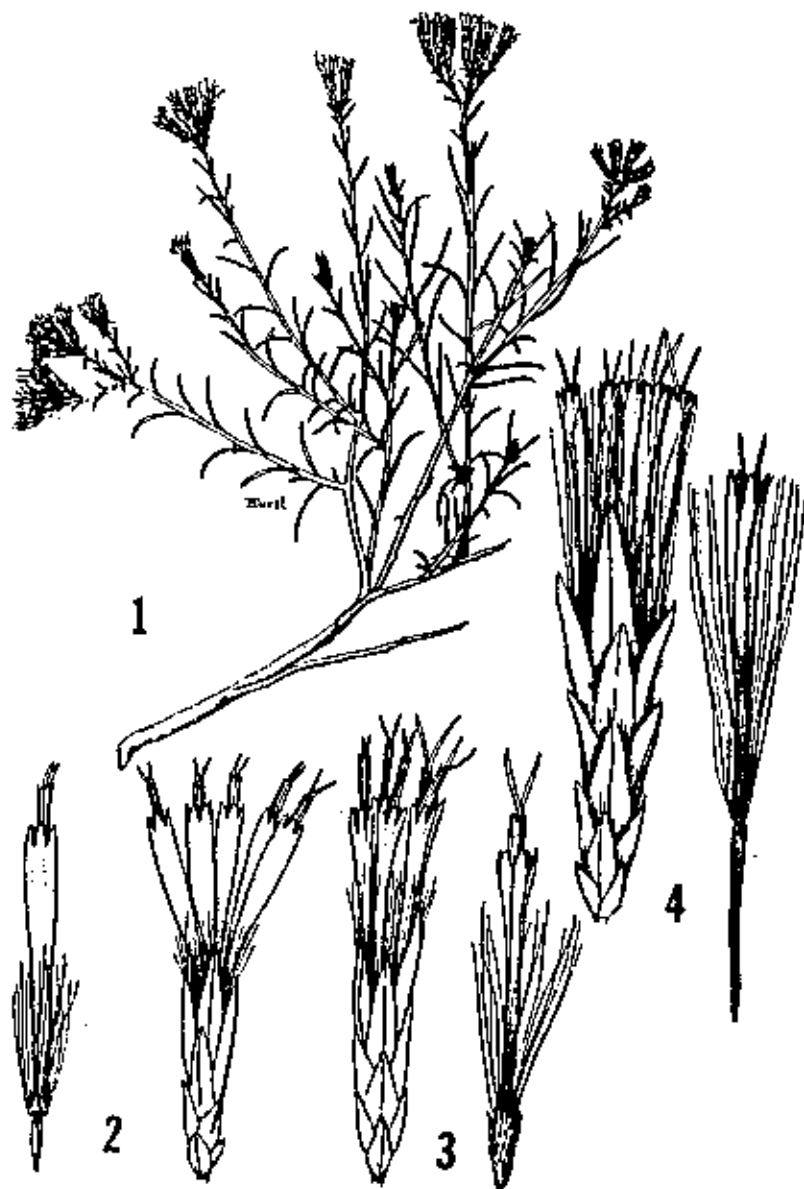
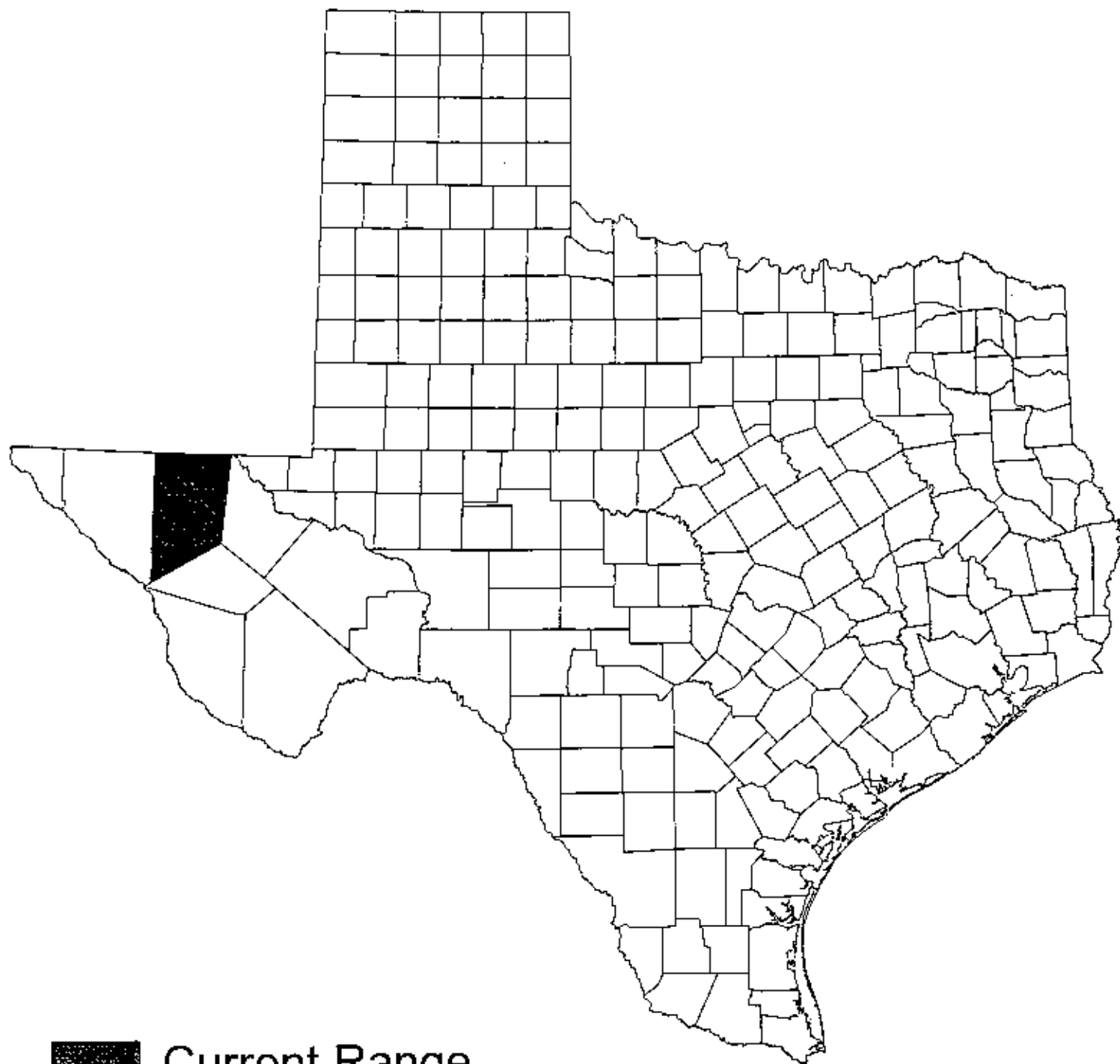


Fig. 1. Flowering twig of *Chrysothamnus taxaensis* ssp. *taxaensis*; holotype—Anderson 4767 (X = .5). Figs. 2-4. Representative heads and individual flowers (a8, X = ca. 4.5). Fig. 2. *C. nauseosus* ssp. *taxaensis* (Anderson 4767); note glabrous achenes, short pappus. Fig. 3. *C. nauseosus* ssp. *graveolens*, Texan population (Anderson 4762); note similarity of involucre to that of ssp. *taxaensis*, but pubescent achenes. Fig. 4. *C. nauseosus* ssp. *bigelovii*, holotype (Bigelow in 1853); note larger involucre, glabrous achenes, and long pappus.



■ Current Range

Chrysothamnus nauseosus *ssp texensis*
(Guadalupe Mountains rabbitbrush)

Scientific Name: *Cleome multicaulis* DC.

Synonyms: *Cleome sonorae* Gray; *Peritoma sonorae* (Gray) Rydb.

Common Name: manystem spiderflower

Global/State Ranks: G2G3SH

Federal Status: SOC

Global Range: Widespread but rare throughout range, with scattered records from the western US (Arizona, Colorado, New Mexico, Texas and Wyoming) and the northern 2/3 of México (Chihuahua, Durango, Jalisco, México D. F., and Michoacán).

State Range: Known only from Presidio County.

Description (adapted from Ilitis 1958; H. Ilitis in Henrickson & Johnston in prep.): Glabrous unbranched or sparingly-branched annual with stems 2-7 dm tall. Leaves alternate, palmately 3-foliolate, on petioles 1-7 mm long, the leaflets linear, 1-3 cm long and 1-3 mm wide, strongly folded. Flowers solitary from leaf axils, on pedicels 15-22 mm long in fruit, the inflorescence very open; flowers zygomorphic, the 4 petals erect, the stamens and ovaries horizontal or deflexed; sepals 4, united for a short distance at base, lanceolate to obovate, acute to obtuse and usually mucronate at apex, 1.2-2.5 mm long and ca. 1 mm long; petals 4, subequal, spatulate, pink to purple, 4-7 mm long; nectary disk small, bulbous, strongly expanded adaxially; stamen number not reported, the filaments 4-7 mm long, the anthers 2-2.5 mm long; style 0.25-0.5 mm long, the stigma very slightly capitate. Fruit a silique-like capsule, linear-cylindric to obovoid, 9-18 mm long and 2-4 mm thick, deflexed (relative to the subtending pedicel) on a stipe 3-10 mm long; seeds subglobose, pale brown, 1.8-2.5 mm long, smooth.

Habitat: Known in Texas from a big sacaton (*Sporobolus wrightii*) flat at the edge of a cienega (desert spring), in soil developed over volcanic ash (Johnston & Warnock 1959). In New Mexico, *Cleome multicaulis* occurs in alkaline sinks and saline playa lake beds; and in Colorado it has been found in "wet meadows and alkaline flats" (Weber 1990). Associates include *Distichlis stricta*, *Sarcobatus vermiculatus*, *Triglochin palustre*, *Scirpus* spp., *Eleocharis* spp., *Chenopodium* spp.

Phenology: Flowering/fruitlet June-September.

Similar Species:

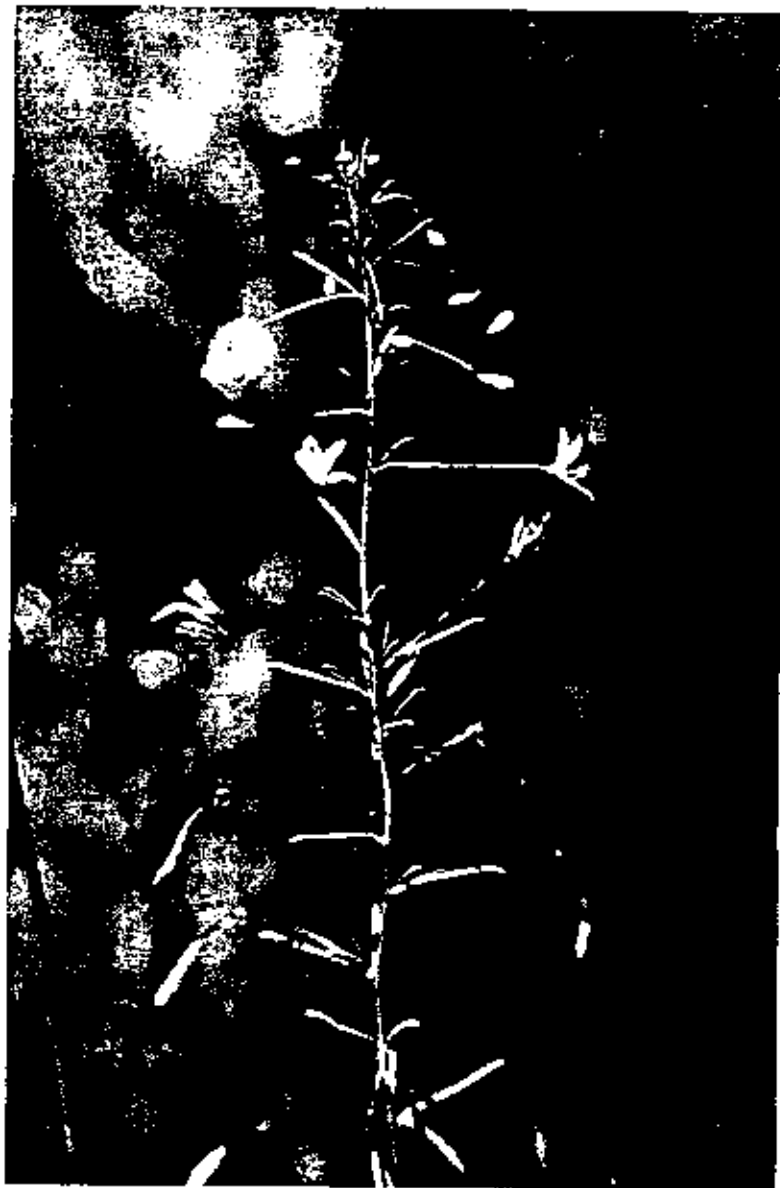
Comments: According to Weber (1990), *C. multicaulis* is "a species widely distributed in Mexico and probably brought to Colorado by the early Spanish settlers."

Illustrations: A line drawing appears in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

- Johnston, M. C. and B. Warnock. 1959. *Cleome multicaulis* (Capparidaceae) in western Texas. *Southwestern Naturalist* 4: 110.
- Ilitis, H. 1958. Studies in the Capparidaceae. V. Capparidaceae of New Mexico. *Southwestern Naturalist* 3: 133-144.

- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Spellenberg, R. 1978. Review of federally threatened or endangered plant species in the Las Cruces District of the Bureau of Land Management, U.S. Department of the Interior. Report prepared for Bureau of Land Management, Las Cruces.
- Weber, W. A. 1990. Colorado flora-- eastern slope. University Press of Colorado, Denver. 395 pp.



Family: CAPPARIDACEAE

Scientific Name: *Cleome multicaulis* DC.

Common Name: Slender spiderflower

Classification: State priority 1

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: *Cleome sonorae* Gray

Peritoma sonorae (Gray) Rydb.

Description: Plants annual, the stems slender, erect, to about 60 cm (24 in.) tall; leaves sessile or with short stalks, compound, the leaflets digitately arranged, slender, folded, 1-2 cm (0.4-0.75 in.) long; flowers in the axils of the stem leaves, the petals pink or white, 4-6 mm (to 0.25 in.) long; pods elongate, to about 20 mm (8 in.) long and 4 mm (0.12 in.) wide, smooth, circular in cross section, bent abruptly downward. Flowers in August and September.

Known Distribution: Grant County, New Mexico; south-central Colorado to southeastern Arizona, western Texas, and Mexico; 1,200-2,100 m (4,000-7,000 ft.)

Habitat: Saline or alkaline soils, often in and around alkali sinks, or in alkaline meadows or old lake beds

Ownership: Private

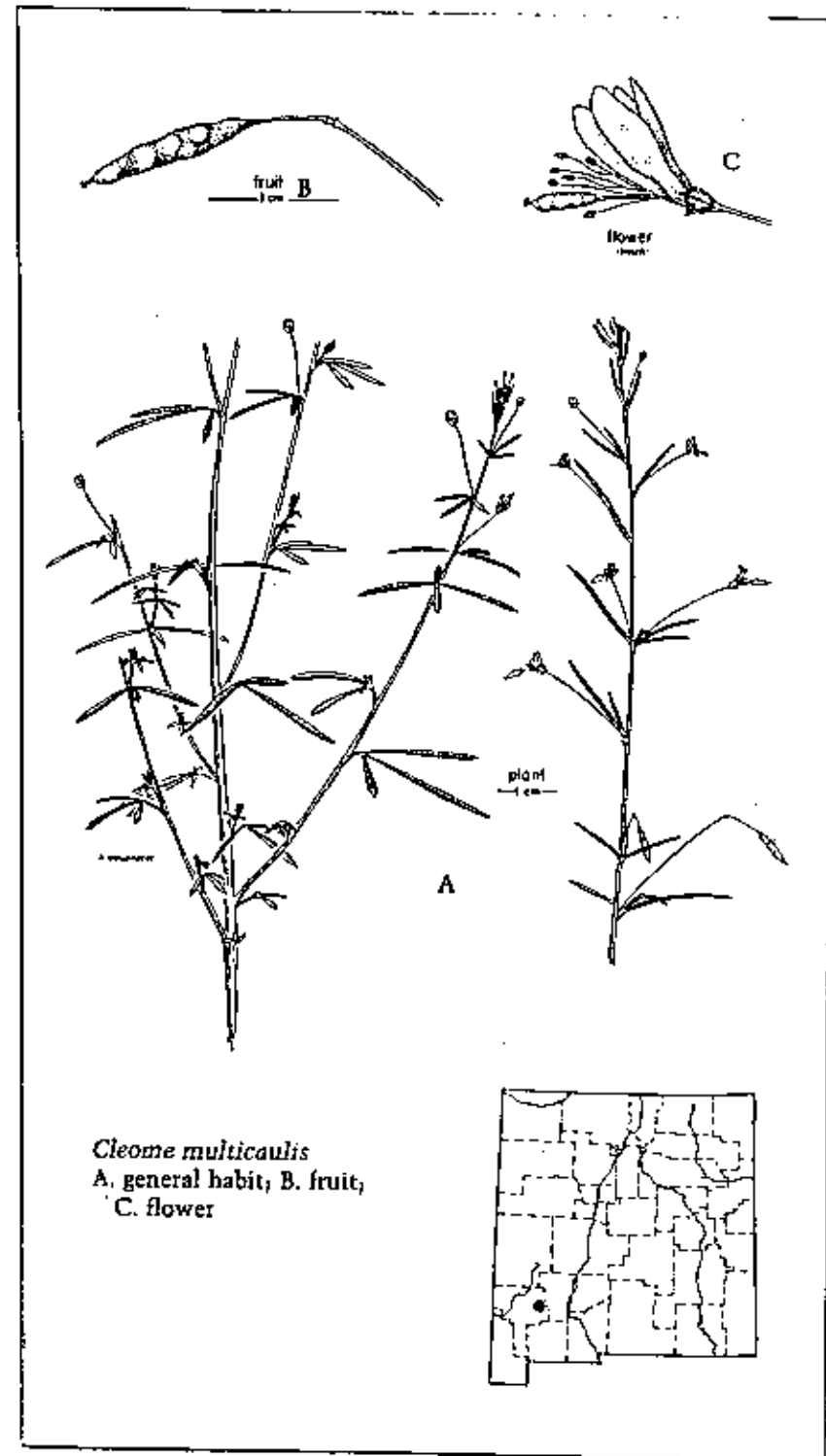
Threats to Taxon: None known

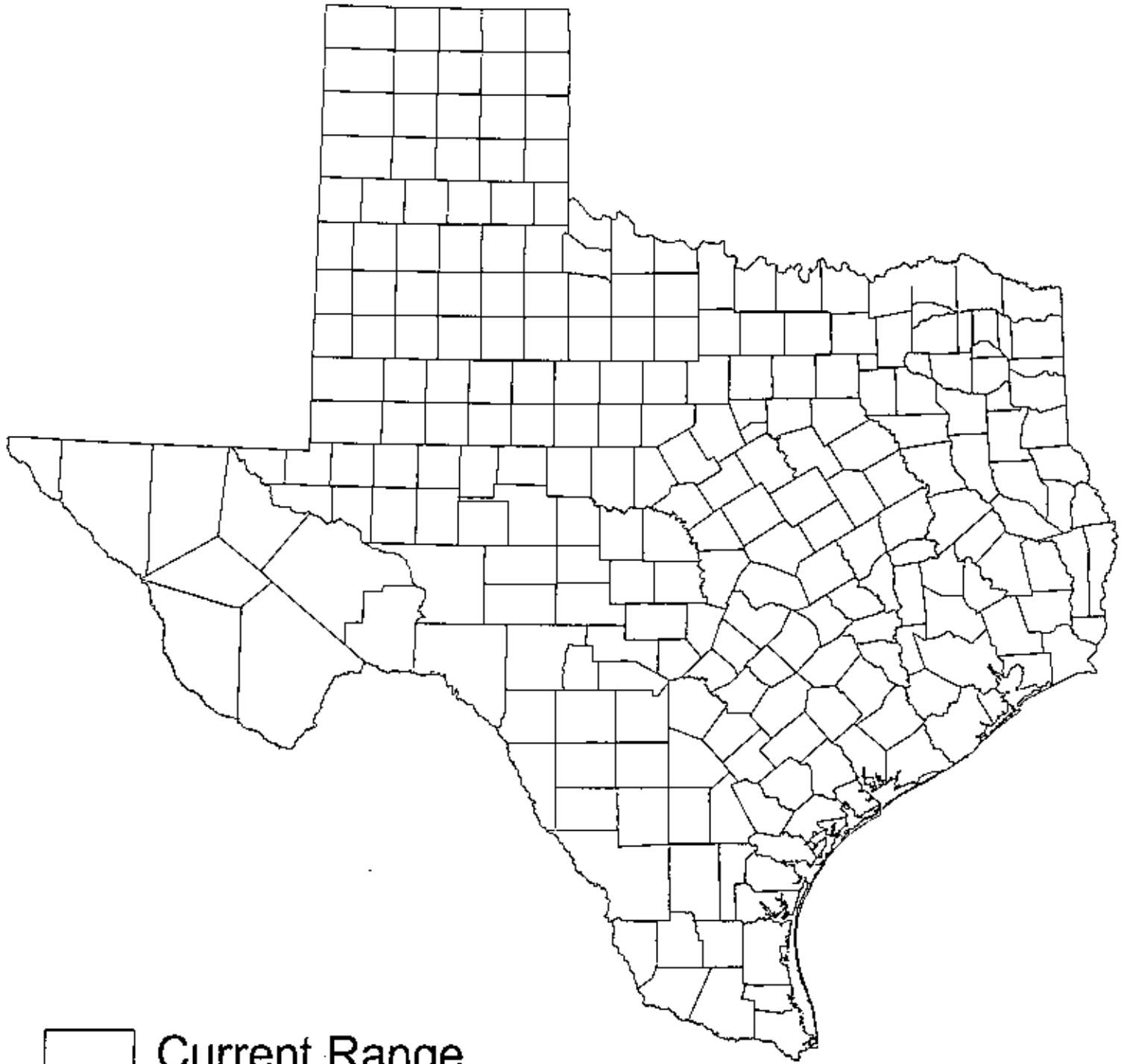
Similar Species: None

Remarks: The species is known in New Mexico from only one collection made in 1851 and may be extinct in the state. Extensive use of mesic, alkaline land may have altered much of its formerly suitable habitat.

Important Literature:

Ilitis, H. Studies in the Capparidaceae V. Capparidaceae of New Mexico. Southw. Nat. 3:133-44, 1958.





□ Current Range

Cleome multicaulis
(manystem spiderflower)

Scientific Name: *Colubrina stricta* Engelm. ex M. C. Johnston

Synonyms: None.

Common Name: Comal snakewood

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Widely scattered locations in Coahuila, Nuevo León and Texas.

State Range: Comal and El Paso counties. The Comal County record is based on several specimens collected by Ferdinand Lindheimer during 1849-1851. The location provided on the printed herbarium labels is the same that appears on most of Lindheimer's specimen from that period: "Comanche Springs, New Braunfels, etc." The source of these specimens is lost to antiquity. The El Paso record is from Hueco Tanks SHP, where a small population is extant.

Description (adapted from Johnston 1971 and Henrickson & Johnston in prep.): Shrub 1-4 m tall, the branches virgate, straight or only slightly zigzag; internodes 7-30 mm long, the younger ones with dense, appressed pubescence of buffy, silky hairs. Leaves alternate, simple, the blade ovate, 3-6 cm long and 2-4 cm wide, 1.1-1.5 times long as wide, membranous, with three principal veins from base and 40-60 minute glandular teeth on each margin, the apex round to acute (angle ca. 80°), minutely strigose to glabrate on the upper surface, the lower surface with a fairly dense but loose pubescence of appressed, buffy, silky hairs; petioles 3-11 mm long; stipules subulate, 2-3 mm long. Flowers in 6-15-flowered thyrses 10-13 mm long; peduncle below the thyrses 2-8 mm long; pedicels below the flowers ca. 2 mm long, elongating in age to 5-6 mm; floral cup ca. 2.5 mm broad; sepals and petals present, small, greenish yellow; style deeply 3-parted, the divisions slender. Fruit a hard, 3-seeded capsule ca. 7-8 mm long, 8-9 mm wide, shallowly 3-lobed, with a fairly thick wall, tardily dehiscent; seeds very turgidly biconvex, ca. 5.5 mm long and 4.5-5 mm wide, black, shining.

Similar Species: Two other *Colubrina* species occur in Texas. *C. greggii*, a large-leaved tropical species, has been found in Texas only in sabal palm groves along the Rio Grande near Brownsville. The range of *C. texensis* overlaps that of *C. stricta*. Its leaves (1-3 cm long) are much shorter than those of *C. stricta* (3-8 cm long).

Habitat: The population at Hueco Tanks SHP lies in a patch of thorny shrubs on colluvial deposits and sandy soils at the base of an igneous rock outcrop. Associates include *Acacia constricta*, *A. greggii*, *Aloysia wrightii*, *Larrea tridentata*, *Mimosa aculeaticarpa* var. *biuncifera*, *Opuntia engelmannii*, *O. leptocaulis*, *Prosopis glandulosa*, *Ungnadia speciosa* and *Ziziphus obtusifolius* (Hedges & Poole 2000). In Mexico the species has been found in shrublands and grasslands on calcareous, gravelly, clay soils.

Phenology: Flowering late spring or early summer.

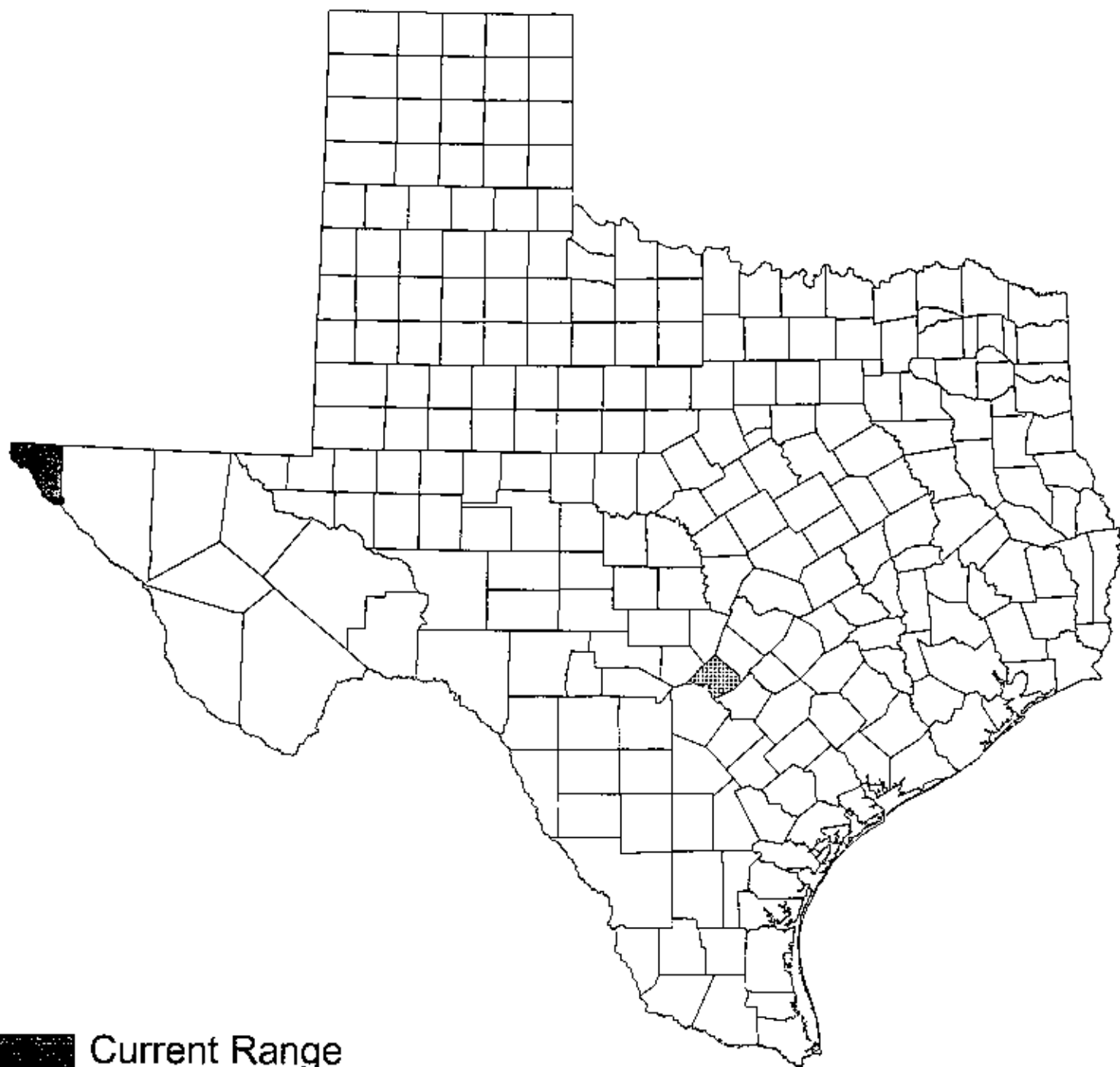
Comments: Johnston (1969) speculated that this species may be a hybrid between *C. texensis* and *C. greggii*, or perhaps a xeromorphic derivative of the latter.

Illustrations: None known.

Selected References:

- Hedges, L. K. and J. M. Poole. 2000. *Colubrina stricta* baseline assessment [regarding population at Hueco Tanks SHP]. Unpublished report, Texas Parks & Wildlife Department Region 1 Natural Resources Program, Ft. Davis.
- Johnston, M. C. 1969. *Colubrina stricta* Engelmann ex M. C. Johnston (Rhamnaceae), new species from Texas, Nuevo Leon, and Coahuila. *Southwestern Naturalist* 14(2): 257.
- Johnston, M. C. and L. A. Johnston. 1969. Rhamnaceae. Pp. 357-392 in Lundell, C. L. 1969. *Flora of Texas*, volume 2. Texas Research Foundation, Renner. 417 pp.
- Johnston, M. C. 1971. Revision of *Colubrina* (Rhamnaceae). *Brittonia* 23(1): 2-53.
- Powell, A. M. 1998. *Trees and shrubs of the Trans-Pecos and adjacent areas*. University of Texas Press, Austin. 498 pp.
- Van Devender, T. R. and D. H. Riskind. 1979. Late Pleistocene and early Holocene plant remains from Hueco Tanks Historical Park: the development of a refugium. *Southwestern Naturalist* 24: 127-140.
- Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. *El Paso Southwest Botanical Miscellany* No. 1. 56 pp.





■ Current Range

▣ Questionable Range

Colubrina stricta
(Comal snakewood)

Scientific Name: *Coryphantha macromeris* (Engelm.) Britt. & Rose var. *runyonii*
(Britt. & Rose) L. Benson

Synonymy: *Mammillaria runyonii* Britt. & Rose

Common Name: Runyon's corycactus

Global Range: South TX; apparently not reported from adjacent Mexico.

State Range: Cameron and Starr Counties

Current Federal Status: None.

Habitat: Low gravel hills and flats in nearly white silty soil, mostly at low elevations along the Rio Grande.

Phenology: Flowering in spring.

Similar Species:

Comments:

Illustrations: A black and white photograph appears in Benson (1982); color photographs appears in Weniger (1984) and Everitt & Drawe as *Mammillaria runyonii*.

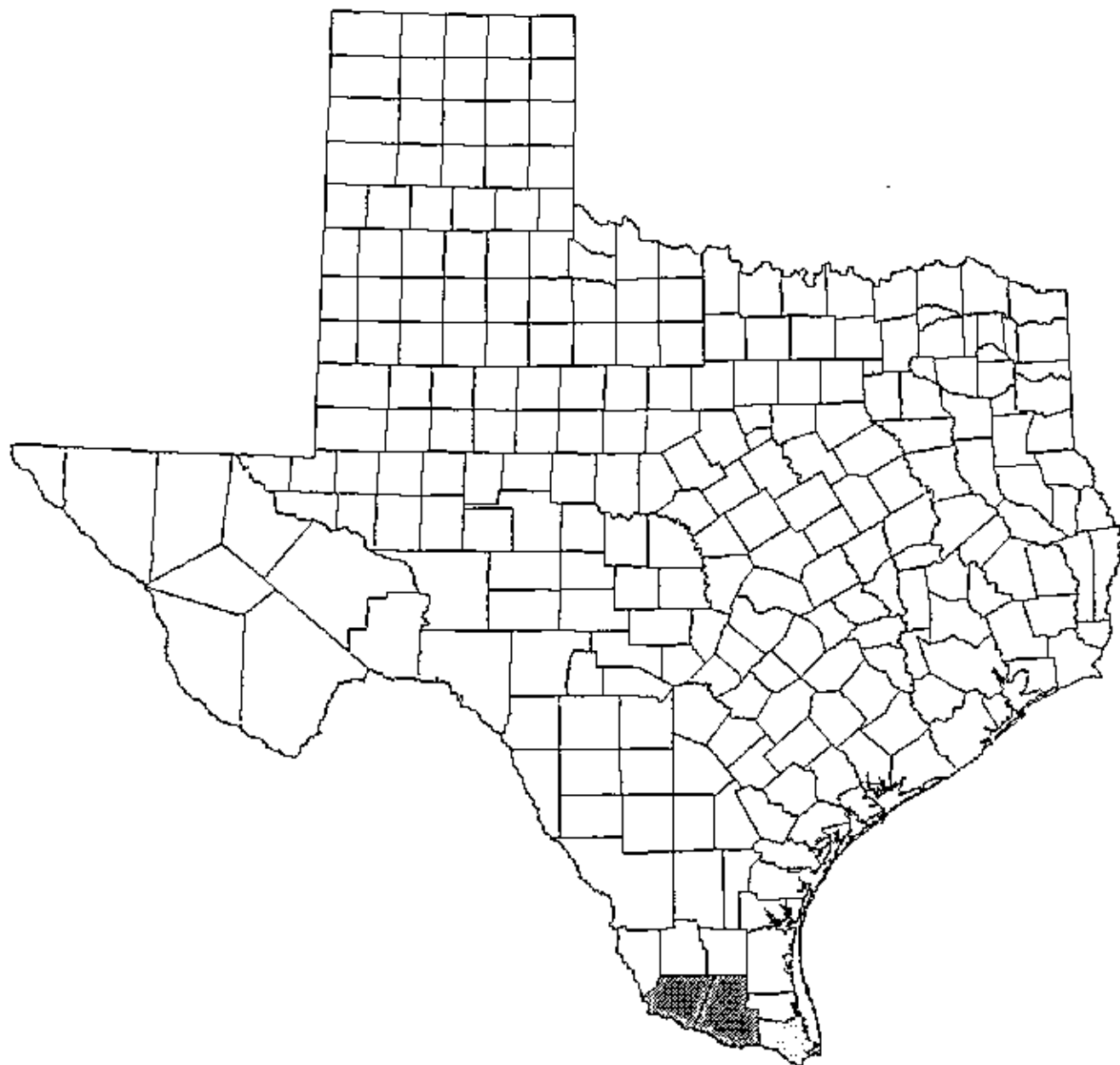
Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock. 213 pp.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.





 Current Range

 Historical Range

Coryphantha macromeris var. *runyonii*
(Runyon's cory cactus)

Scientific Name: *Coryphantha ramillosa* Cutak

Synonymy: *Mammillaria ramillosa* (Cutak) Weniger

Common Name: bunched cory cactus, Big Bend cory cactus

Global/State Ranks: G1S1 **Federal Status:** Threatened

Global Range: west Texas and Coahuila, Mexico.

State Range: Brewster and Terrell counties.

Description: (Compiled from USFWS 1989, Benson 1982, Weniger 1984, Anderson 2001, Poole and Riskind 1987). **Habit:** Perennial stem succulent; stems usually solitary, 6-9 cm (2 $\frac{3}{8}$ -3 $\frac{1}{2}$ in.) long, 6-10 cm (2 $\frac{3}{8}$ -3 $\frac{7}{8}$ in.) in diameter, rounded, dark grayish-green; tubercles separate, firm, cone-shaped, pointed, 6-20 mm ($\frac{1}{4}$ - $\frac{3}{4}$ in.) long, 12-15 mm ($\frac{1}{2}$ - $\frac{3}{8}$ in.) wide, protruding 8-20 mm ($\frac{3}{8}$ - $\frac{3}{4}$ in.) from stem; areoles becoming linear and extending as grooves to the axil of the tubercle. **Spines:** numerous, needlelike, not or only partially obscuring stem; central spines 3-6, straight or somewhat curved, upper ones white with some brown, pointing upward, 17-38.5 mm ($\frac{3}{4}$ -1 $\frac{1}{2}$ in.) long, the lower one dark brown, projecting outward from the stem, 25-43 mm (1- $\frac{3}{4}$ in.) long; radial spines dull white to pale gray, 9-20 per areole, irregularly spreading, almost straight, 12-30 mm ($\frac{1}{2}$ -1 $\frac{1}{4}$ in.) long. **Flowers:** pink to rose purple, glossy, funnel shaped, 35-65 mm (1 $\frac{3}{8}$ -2 $\frac{5}{8}$ in.) long, 30-50 mm (1 $\frac{1}{4}$ -2 in.) in diameter, outer petals entire; filaments white, anthers yellow to pale orange; stigma white. **Fruits:** green, fleshy, egg-shaped, 10-25 mm ($\frac{3}{8}$ -1 in.) long; seeds brown, kidney-shaped, 1.4-1.5 mm (less than $\frac{1}{8}$ in.) long.

Similar Species: Often difficult to distinguish from *Coryphantha macromeris* in the field, *C. ramillosa* has a groove the full length of the tubercle, entire outer petals, and egg-shaped fruits less than 2 cm long. *C. macromeris* has a groove only half the length of the tubercle, frilled outer petals, and elongate fruits more than 3 cm long (Heil et al. 1985).

Habitat: Rocky slopes, ledges, and flats in the Chihuahuan Desert, most frequently on exposures of Santa Elena Limestone or the Boquillas Formation between 2500-3500 feet elevation (Heil et al 1985). Associated species include *Acacia constricta*, *Bouteloua breviseta*, *Agave lechuguilla*, *Larrea tridentata*, *Leucophyllum candidum*, *Euphorbia antisiphilitica*, *Jatropha dioica*, *Selaginella* sp., *Krameria glandulosa*, *Fouquieria splendens*, and numerous other cacti (Heil et al 1985).

Phenology: Flowering July-August (Heil et al. 1985); perhaps as early as April according to Weniger (1984).

Comments: Recent surveys have shown this species to be more common than originally thought.

Illustrations: A line drawing appears on the cover of the recovery plan (USFWS 1989); a black and white photograph appears in Benson (1982) and Heil and Brack (1988); color photographs appear in Weniger (1984) as *Mammillaria ramillosa*, in Warnock (1970) and in Anderson (2001); line drawings of spine characters and a color photograph appear in Poole & Riskind (1987).

Selected References:

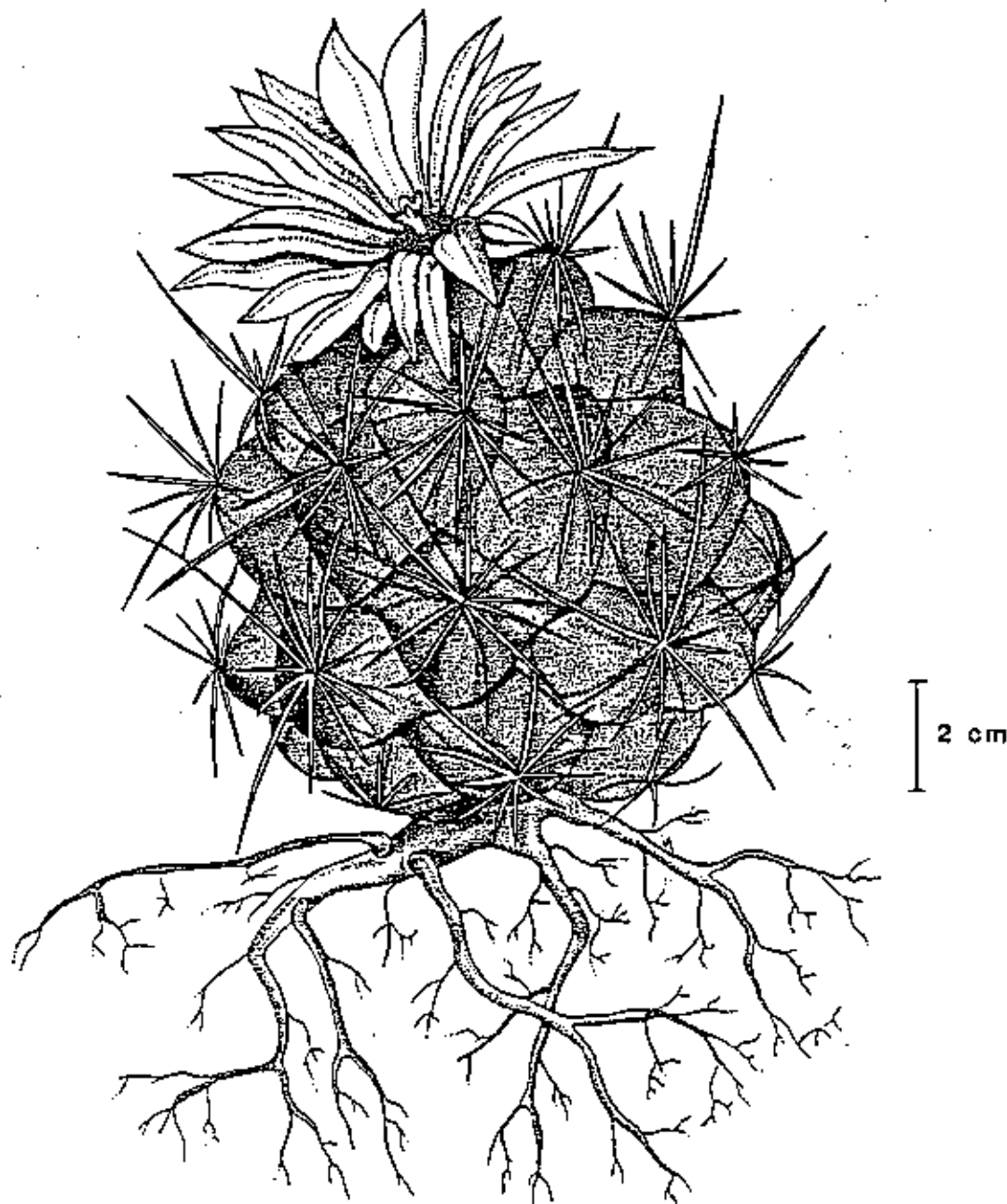
- Anderson, E. E. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Heil, K. D., S. Brack, and J. M. Porter. 1985. The rare and sensitive cacti of Big Bend National Park. Report prepared for Big Bend National Park, Texas. 41 pp.
- Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder, no pagination.
- U.S. Fish & Wildlife Service. 1989. Bunched cory cactus (*Coryphantha ramillosa*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.
- Warnock, B. H. 1970. Wildflowers of the Big Bend country, Texas. Sul Ross State University, Alpine, Texas. 157 pp.
- Weniger, D. 1979. Status report on *Coryphantha ramillosa*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



BUNCHED CORY CACTUS

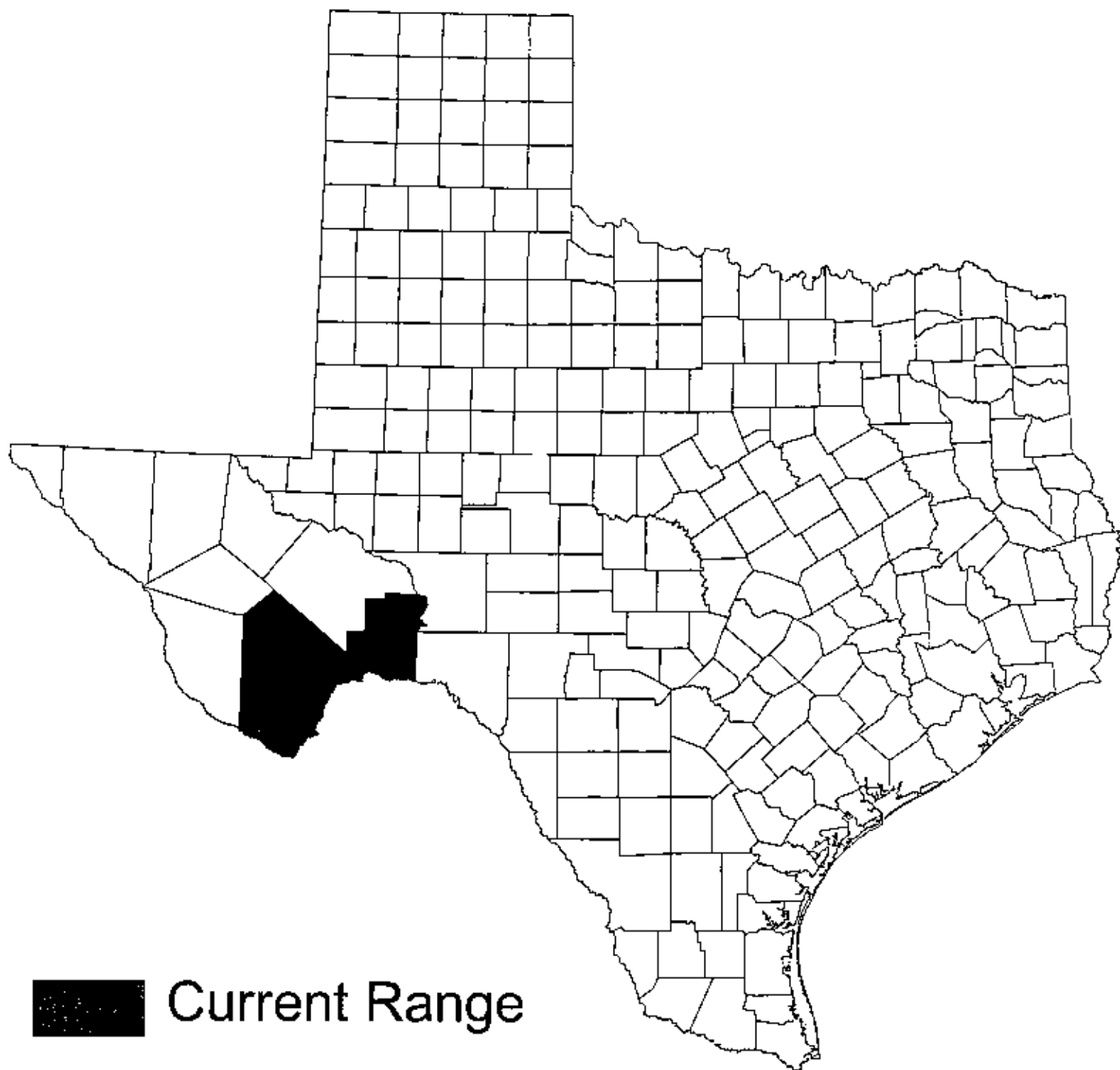
(*Coryphantha ramillosa*)

RECOVERY PLAN



U.S. Fish and Wildlife Service
Albuquerque, New Mexico

1989



■ Current Range

Coryphantha ramillosa
(bunched cory cactus)

Scientific Name: Coryphantha sulcata (Engelm.) Britt. & Rose var. nickelsiae (K. Brandeg.) L. Benson

Synonymy: Mammillaria nickelsiae K. Brandege

Common Name: Nickel's corycactus

Global Range: Coahuila, Nuevo León, Tamaulipas, and perhaps TX.

State Range: Webb County? A 1906 specimen with locational information "Laredo" might, according to Benson (1982) have been collected near Mt. La Mita in Nuevo León. Not presently known to occur in Texas.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Alluvial gravels (?) or low hills along Rio Grande.

Phenology:

Similar Species:

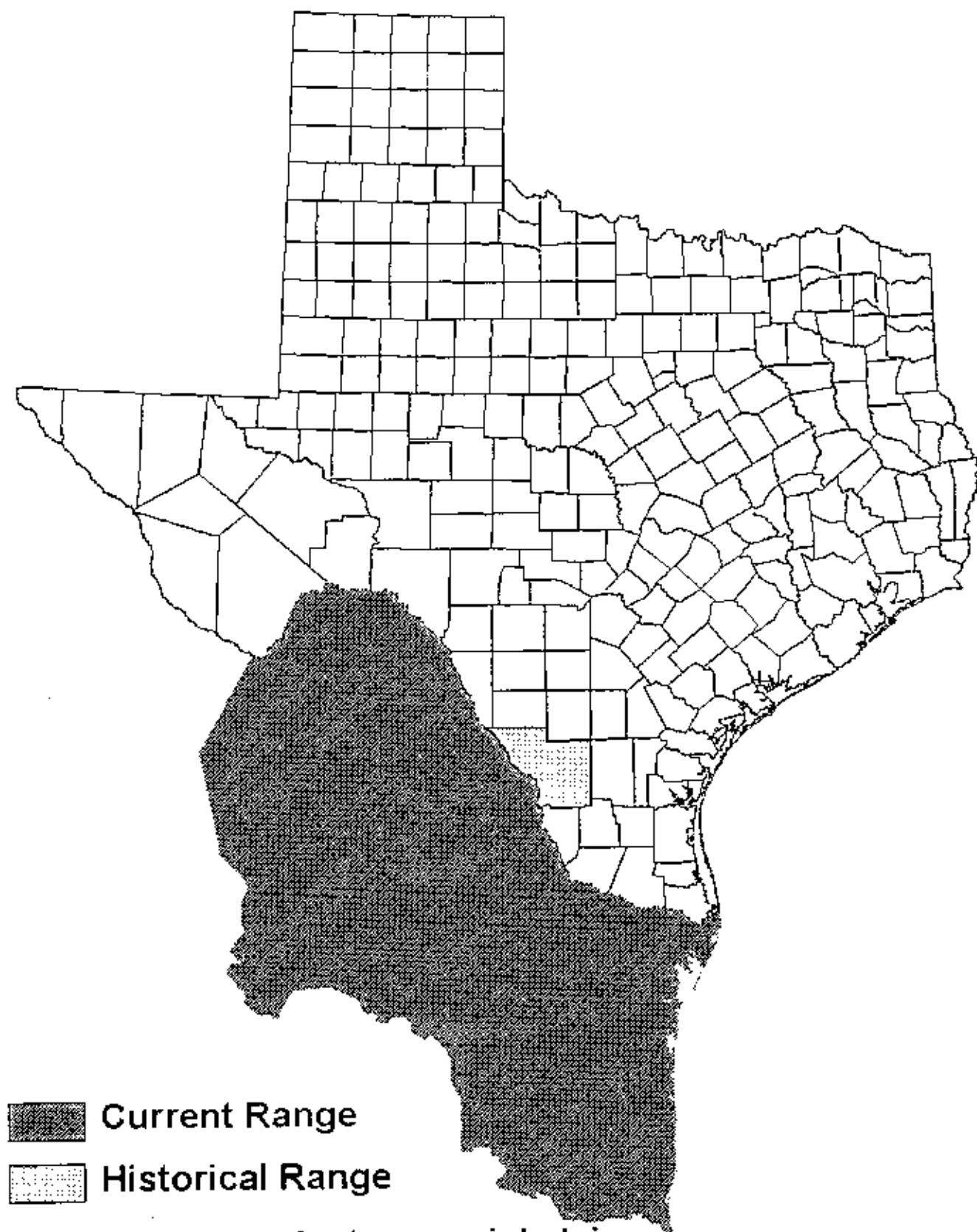
Comments:

Illustrations: Unlike other cacti of Texas no photograph of this entity is readily available.

Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.





Coryphantha sulcata var. *nickelsiae*
(Nickel's cory cactus)

Scientific Name: *Croton alabamensis* E. A. Smith ex Chapman var. *texensis* Ginzburg

Synonyms: None.

Common Name: Texabama croton

Global/State Ranks: G3T2S2

Federal Status: SOC

Global Range: Endemic to the eastern Balcones Escarpment of central Texas.

State Range: Bell, Coryell and Travis counties.

Description (adapted from Ginzburg 1992): Shrub mostly 1-2 (-3) m tall, branched from base, the lower branches sometimes declining and rooting; stems with thin gray bark, leafy only near the tips; indument a mixture of pigmented and unpigmented scales, the pigmented scales with dark reddish-brown centers and reddish-amber rays, giving a coppery appearance to new stems, petioles, lower leaf surfaces, inflorescences and various floral parts. Leaves alternate, simple, the petiole 0.6-1.9 mm long; blades ovate to elliptic, 3.8-9.0 cm long and 1.5-4.0 cm wide, entire, the apex acute, rounded or emarginate, the base obtuse to slightly cordate, the upper surface dark green with scattered scales, the lower surface with abundant scales and a prominent midvein and lower lateral veins. Flowers unisexual, in terminal racemes 1.9-3.3 cm long, containing 0-6 pistillate flowers below and 4-12 staminate flowers above. Staminate flowers on pedicels 2.2-4.0 mm long, subtended by bracts 1.1-3.0 mm long, the flowers broadly cup-shaped, 5.0-8.1 mm wide; calyx lobes 5, spreading, triangular, 1.1-2.9 mm long and 1.5-3.0 mm wide; petals 5, oblong-ovate, stellate-ciliate, 2.0-3.1 mm long and 1.1-2.1 mm wide; stamens (11-) 14-18 (-21). Pistillate flowers on pedicels 2.2-7.4 mm long, subtended by spatulate bracts 1.6-6.0 mm long; sepals 5, closely enveloping the ovary, ascending, 2.0-4.5 mm long and 2.0-3.1 mm wide; petals 5, stellate-ciliate, ovate from a narrow base, 2.0-3.0 mm long and 1.1-1.9 mm wide; ovary depressed-spheroidal, capped by 3 styles that are branched at least once and sometimes twice. Fruit a capsule on a pedicel 7.0-10.6 mm long, depressed-spheroidal in outline, vaguely triangular in cross-section, the surface light brown and scaly; seeds 3.

Similar Species: The foliage of this large shrub is shiny silvery- to coppery-scaly on the lower surface and is strikingly different from any other plant species of the Edwards Plateau. The only other woody croton in the area, *Croton fruticosus*, is a much smaller shrub, usually less than 1 m tall, with correspondingly smaller leaves that are covered on the lower surface with dull stellate hairs rather than shiny silvery to coppery scales. Var. *texensis* is quite similar to var. *alabamensis*, which occurs in a very few locations in central Alabama and south-central Tennessee. According to Ginzburg (1992), the two varieties differ mostly in the pigmentation of the scales.

Habitat: At Balcones Canyonlands NWR (Travis County), Texabama croton occurs mostly in duff-covered loamy clay soils on rocky slopes in forested mesic limestone canyons, in the shade of *Quercus buckleyi*, *Fraxinus texensis*, *Juglans major*, *Prunus serotina* subsp. *eximia* and other deciduous trees. The habitat is similar at Fort Hood Military Installation (Bell and Coryell counties), where additional tree associates include *Acer grandidentatum* and *Quercus muhlenbergii*. At both sites, Texabama croton is locally abundant on deeper soils on small terraces in canyon bottoms, often forming large colonies and dominating the shrub layer; scattered individuals are occasionally found on sunny margins of such forests. The habitat at Pace Bend Park is much different. Here the shrubs occur on deep friable soils of a limestone upland, mostly in the shade of evergreen woodland mottes

dominated by *Quercus fusiformis*.

Phenology: Flowering late February-March; fruit maturing and dehiscing by early June. Readily recognized by foliage alone throughout the growing season, particularly in autumn when that foliage turns a bright orange color.

Comments: A conspicuous shrub that escaped detection until 1989, when it was almost simultaneously discovered at Fort Hood and on the Balcones Canyonlands NWR. The status of var. *alabamensis*, rare in its own right, is discussed in some detail by Farmer & Thomas (1969) and Ginzburg (1992).

Illustrations: Black and white photographs appear in Ginzburg (1992). Line drawings appear in Aplet et al. (1994) and Diggs, Lipscomb & O'Kennon (1999).

Selected References:

- Aplet, G. H., R. D. Laven, M. B. Falkner, and R. B. Shaw. 1994. Population and site characteristics of a recently discovered disjunct population of *Croton alabamensis* (Euphorbiaceae). *Sida* 16(1): 37-55.
- Diggs, G. M., Jr., B. L. Lipscomb and R. J. O'Kennon. 1999. Shinnery and Mahler's illustrated flora of North-central Texas. Botanical Research Institute of Texas, Ft. Worth. 1626 pp.
- Farmer, J. A. 1962. An ecological life history of *Croton alabamensis* E. A. Smith ex Chapman. Ph.D. dissertation, University of Alabama. 91 pp.
- Farmer, J. A. and J. L. Thomas. 1969. Disjunction and endemism in *Croton alabamensis*. *Rhodora* 71: 94-103.
- Ginzburg, S. 1992. A new disjunct variety of *Croton alabamensis* (Euphorbiaceae) from Texas. *Sida* 15(1): 41-52.
- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. United States Department of Agriculture, Forest Service, Technical Publications R8-TP2. 1305 pp.



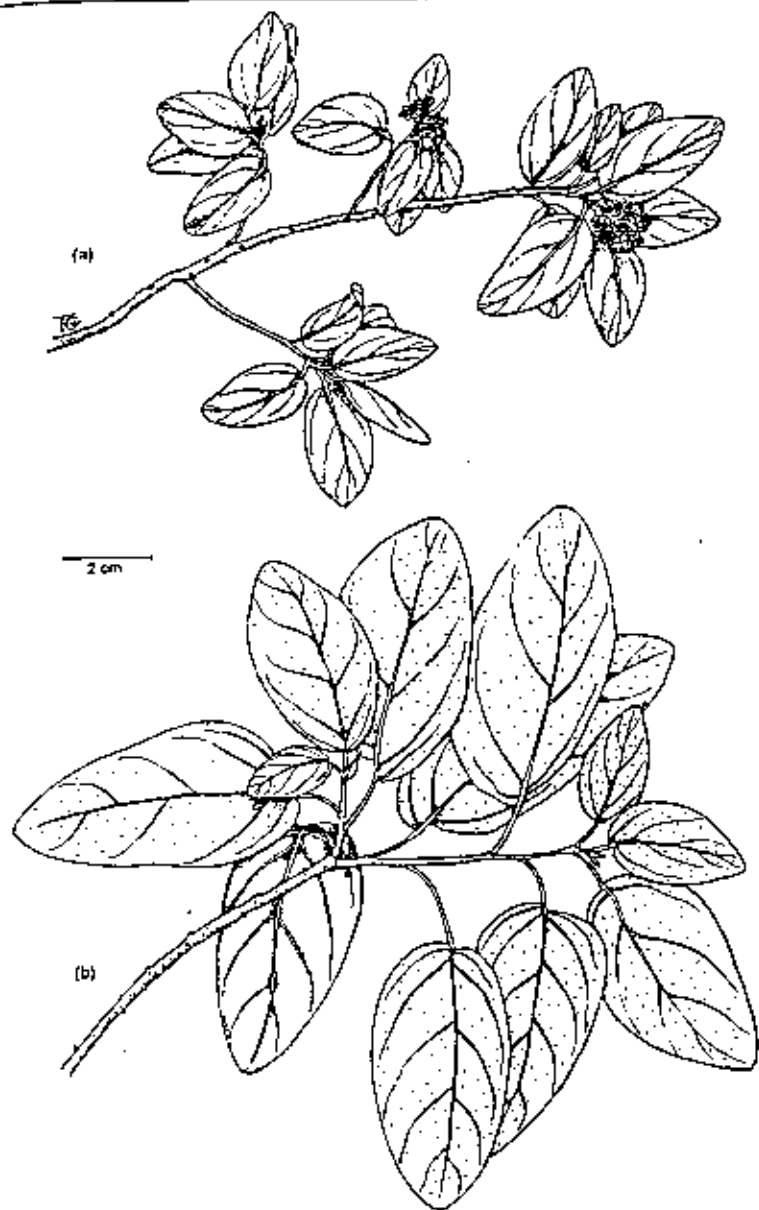
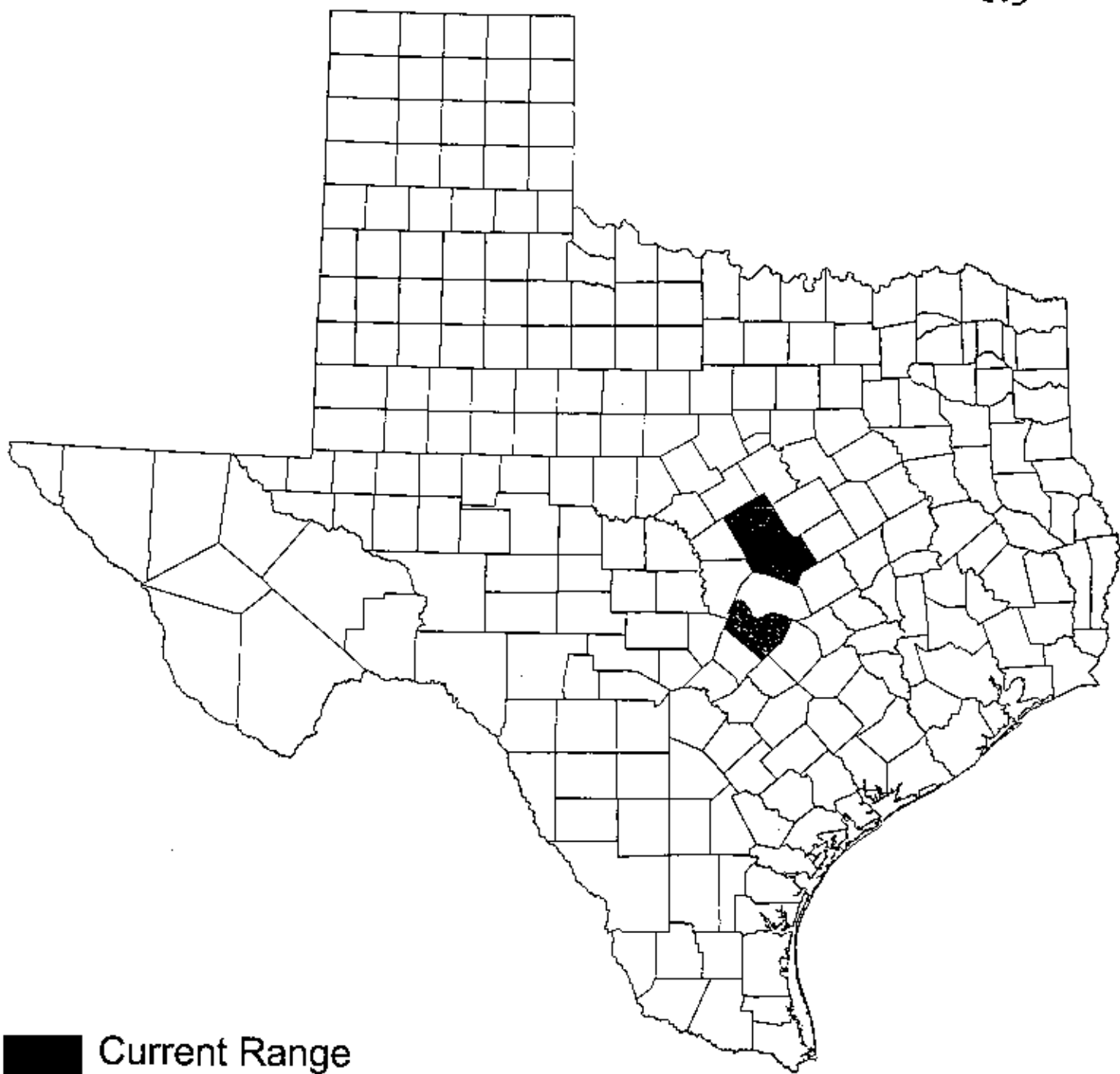


FIG. 1. *Croton alabamensis* var. *texensis*: (a) stem with flowers clustered at the apex of primary and secondary branches (flowers open before leaves are fully expanded), (b) stem showing fully developed leaves.



■ Current Range

Croton alabamensis var. *texensis*
(Texabama croton)

Scientific Name: *Croton pottsii* (Kl.) Muell. Arg. var. *thermophilus* (M. C. Johnston) M. C. Johnston

Synonyms: *Croton corymbulosus* Engelm. var. *thermophilus* M. C. Johnston

Common Name: leatherweed croton

Global/State Ranks: G5T2S1

Federal Status: None.

Global Range: Endemic to a small portion of the Chihuahuan Desert along the Rio Grande in west Texas and northern Coahuila.

State Range: Southern Brewster County.

Description (adapted from Johnston 1958; Correll & Johnston 1970; Henrickson & Johnston in prep.): Suffrutescent perennial with several stems from a woody crown, the stems 1-4 dm tall, much branched from the base and above, the entire plant shaggy canescent stellate-tomentose. Leaves alternate, simple, the blades ovate, 8-15 mm long, the apex acute or rounded, the base rounded, the margins entire; petioles of lower leaves 0.5-1.5 times as long as the blade, those of upper leaves shorter. Flowers in numerous terminal racemes ca. 1 cm long with sessile staminate flowers at the apex and short-pedicelled pistillate flowers at the base; staminate calyx 2-2.8 mm in diameter, composed of 5 free sepals; petals 5, slightly longer than the sepals; stamens 11-15 (-18); pistillate calyx with 5 free sepals; petals absent; styles 3, bifid to base, ca. 1 mm long. Fruit a 3-loculed, 3-seeded capsule ca. 4 mm long and about as wide; columnella 2.9-3.1 mm long; seeds 3-3.2 mm long excluding the caruncle.

Similar Species: Leatherweed croton is much like the wide-ranging and often weedily abundant *Croton pottsii* var. *pottsii* which, in the Big Bend area, occurs in grama grasslands at moderate elevations. Var. *thermophilus* tends to occupy the lowest, hottest parts of the desert landscape. Its branches are strongly spreading-divergent and often have a zigzag appearance; the leaf blades are 15 mm long or less, the inflorescences are ca. 1 cm long, and the styles are ca. 1 mm long. In var. *pottsii*, the branches are not strongly spreading, the leaf blades are mostly 20 mm long or longer, the inflorescences are longer than 1 cm, and the styles are longer than 1 mm (Johnston 1958).

Habitat: Sparingly vegetated desert grasslands on extremely xeric sites at low elevations (500-800 meters), on substrates ranging from sand to limestone and basalt (Johnston 1958; Henrickson & Johnston in prep.).

Phenology: Flowering spring-fall.

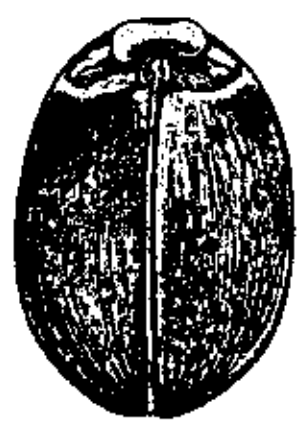
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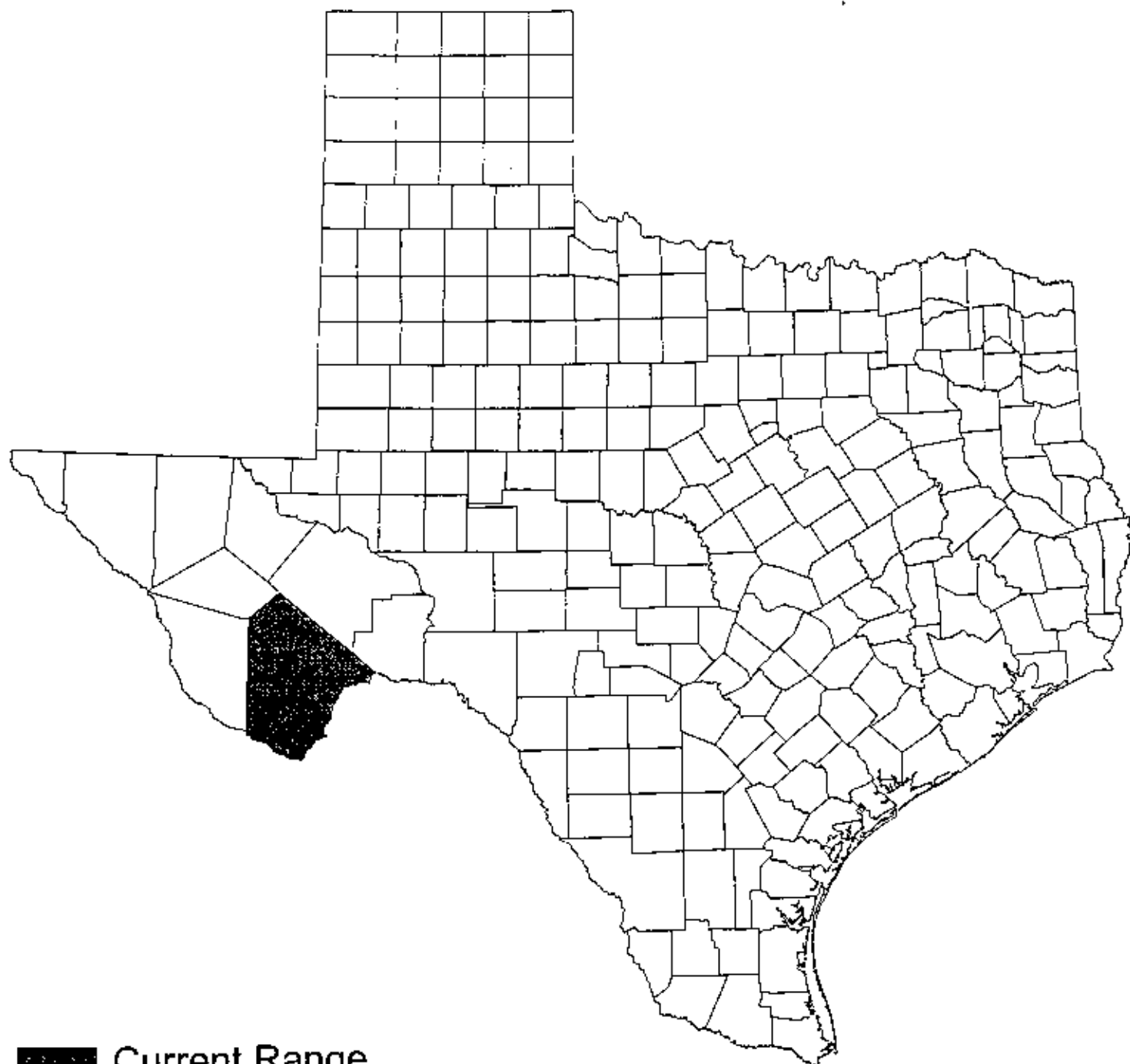
Illustrations: None known.

Selected References:

Johnston, M. C. 1958. The Texas species of *Croton* (Euphorbiaceae). *Southwestern Naturalist* 3: 175-203.

Johnston, M. C. 1960. *Croton pottsii*, earlier name for *C. corymbulosus*. *Southwestern Naturalist* 5(1): 171.





■ Current Range

Croton pottsii var. *thermophilus*
(leatherweed croton)

Scientific Name: *Cryptantha crassipes* I. M. Johnston

Synonyms: None.

Common Name: Terlingua Creek cats-eye

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: Endemic to the Chihuahuan Desert of Trans-Pecos Texas.

State Range: Southern Brewster County. All known occurrences are in the Terlingua Creek watershed just north of Big Bend National Park.

Description (adapted from Higgins 1971 and Poole 1989): Strong, silvery or cinereous perennial with 1-several stems from a high-domed caudex, the stems 15-25 cm tall and 1-2.5 mm thick, with minute appressed hairs and less numerous spreading bristles. Leaves alternate, simple, linear-lanceolate, obtuse to acute, mostly basal, reduced upward, 3-6 cm long and 2-7 mm wide, with a dense white indument of minute hairs and intermixed bristles or with bristles and spreading hairs only on the margins, also setose-pustulate on the dorsal surface. Flowers heterostylous, in capitate clusters 1-2.5 cm wide at anthesis, 3-4 cm wide in fruit; floral bracts inconspicuous; calyx 5-lobed, the segments linear-lanceolate, densely and minutely appressed-hairy with intermixed spreading bristles, 6-9 mm long at anthesis, 8-11 mm long in fruit; corolla white with a yellow throat, salverform, the tube 8-9 mm long, barely surpassing the calyx; faucal appendages yellow, rounded, ca. 1 mm long; limb 8-11 mm wide, with 5 orbicular lobes 2.5-3.5 mm wide; style exceeding mature fruit 4-7 mm, the stigma capitate; stamens 5. Fruit a set of 4 separate mericarps (nutlets), the mericarps ovate or triangular-ovate, 3.3-3.8 mm long, 2.5-3 mm wide, the dorsal surface finely rugulose, the ventral surface smooth or only slightly uneven, the margin acute or narrowly winged, the scar closed and without an elevated margin.

Similar Species: Closely related to *Cryptantha palmeri* (*C. coryi*) and *C. paysonii*, both of which occur in west Texas. In *C. palmeri*, the inflorescence (at maturity) is an open thyse composed of 3-4 scorpioid cymes, whereas in *C. crassipes* the inflorescence is capitate. Separation from *C. paysonii* is more difficult. In that species the capitate inflorescence is 2-3 cm wide at anthesis, while in *C. crassipes* the heads are 1-2.3 cm wide at anthesis. There are also differences in the length of the corolla tube and shape of the mericarps, but these differences are minor and difficult to discern in the field.

Habitat: *Cryptantha crassipes* is a member of a unique community of sparse vegetation that develops on low, seemingly barren, xeric hills of gypscous clay and chalky shales of the Boquillas Formation. Other components of this community include *Eriogonum havardii*, *E. suffruticosum*, *Chamaesyce pereunans*, *Acacia schottii*, *Anulocaulis* sp., *Tiquilia hispidissimum*, *Xylorhiza wrightii* (*Machaeranthera wrightii*), *Thelesperma longipes*, *Amsonia longiflora*, *Stenandrium barbatum*, *Larrea tridentata*, *Dalea formosa*, *Krameria glandulosa* and *Chrysactinia mexicana* (Poole 1989).

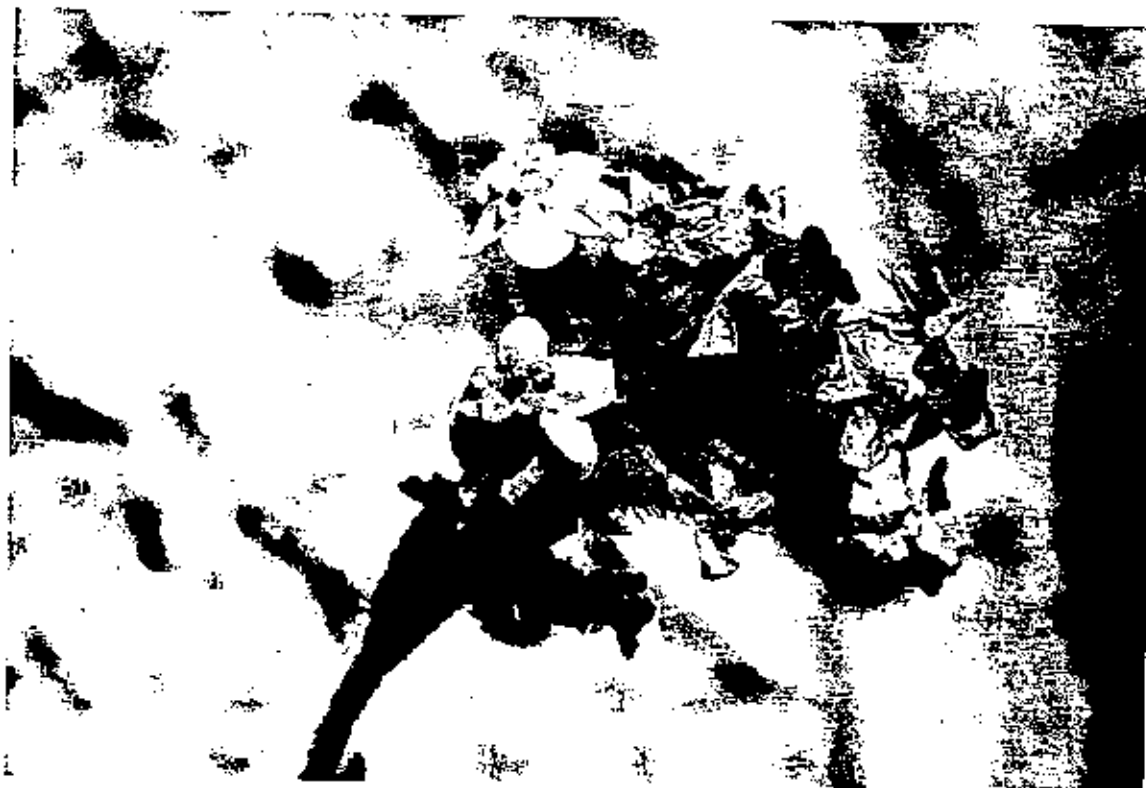
Phenology: Flowering late March - early June; fruiting April-July (Poole 1989).

Comments: Listed as Endangered on 30 September 1991.

Illustrations: Line drawings and a color photograph appear in Poole & Riskind (1987, updated).

Selected References:

- Higgins, L. C. 1971. A revision of *Cryptantha* subgenus *Oreocarya*. Brigham Young University Science Bulletin Biological Series 13(4): 1-63.
- Johnston, I. M. 1961. Notes on some Texas borages. *Wrightia* 2(3): 158-162.
- Johnston, I. M. 1964. Boraginaceae. Pp. 123-222 in Lundell, C. L. 1966. Flora of Texas, volume 1. Texas Research Foundation, Renner. 407 pp.
- Payson, E. B. 1927. A monograph of the section *Oreocarya* of *Cryptantha*. *Annals of the Missouri Botanical Garden* 14: 211-358.
- Poole, J. M. 1989. Status report on *Cryptantha crassipes*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.



Common Name:

Terlingua Creek cat's-eye

Terlingua Creek cryptantha



Paul Montgomery

Scientific Name: *Cryptantha crassipes* I.M. Johnston

Other Scientific Names: None

Federal Status:

State Status: Federally & State endangered

Photographs and Drawings: None published.

Description:

Habit: Erect perennial to 2 ft. tall, covered with silvery hairs, developing a dense mound of leaves at the plant's base, with few to many, erect, unbranched, 4-12 in. long, hairy flowering stalks arising from the mound of leaves.

Leaves: Many crowded at the plant's base, narrowly lance-shaped, to 3 in. long and $\frac{1}{4}$ in. wide; stem leaves several, becoming smaller up the stem; all leaves densely covered with white hairs.

Flowers: Clustered on the ends of stems, clusters $\frac{3}{4}$ -1 in. in diameter, occasionally groups of a few flowers among the uppermost leaves; calyx about $\frac{1}{2}$ in. long, hairy and bristly; flower white, with yellow knobs rising above the laid-back white petals; flowering March to May.

Fruit: Composed of four thick-walled seeds; each seed egg- or pyramid-shaped, gray, about $\frac{1}{4}$ in. long and wide, shiny at maturity, surface obscurely wrinkled to almost smooth.

Habitat: On dry, barren, gentle hills composed of small platelets of yellowish rock; with Havard wildbuck-wheat, rough coldenia, Wright's machaeranthera, and ringstem.

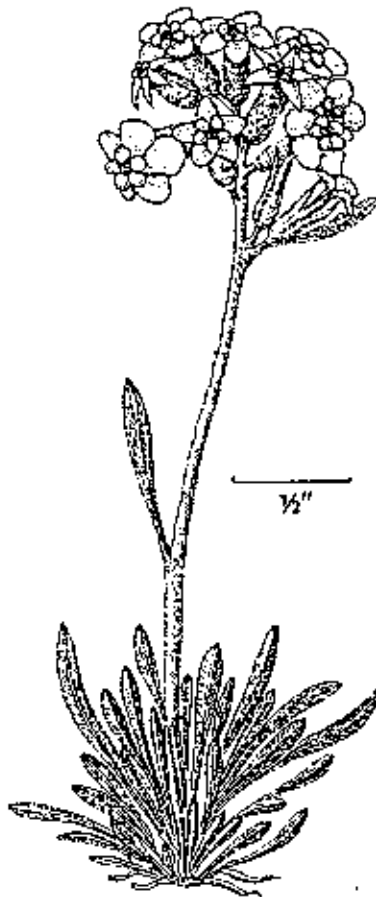
Ownership: Private.

Similar Species with Key Character Differences:

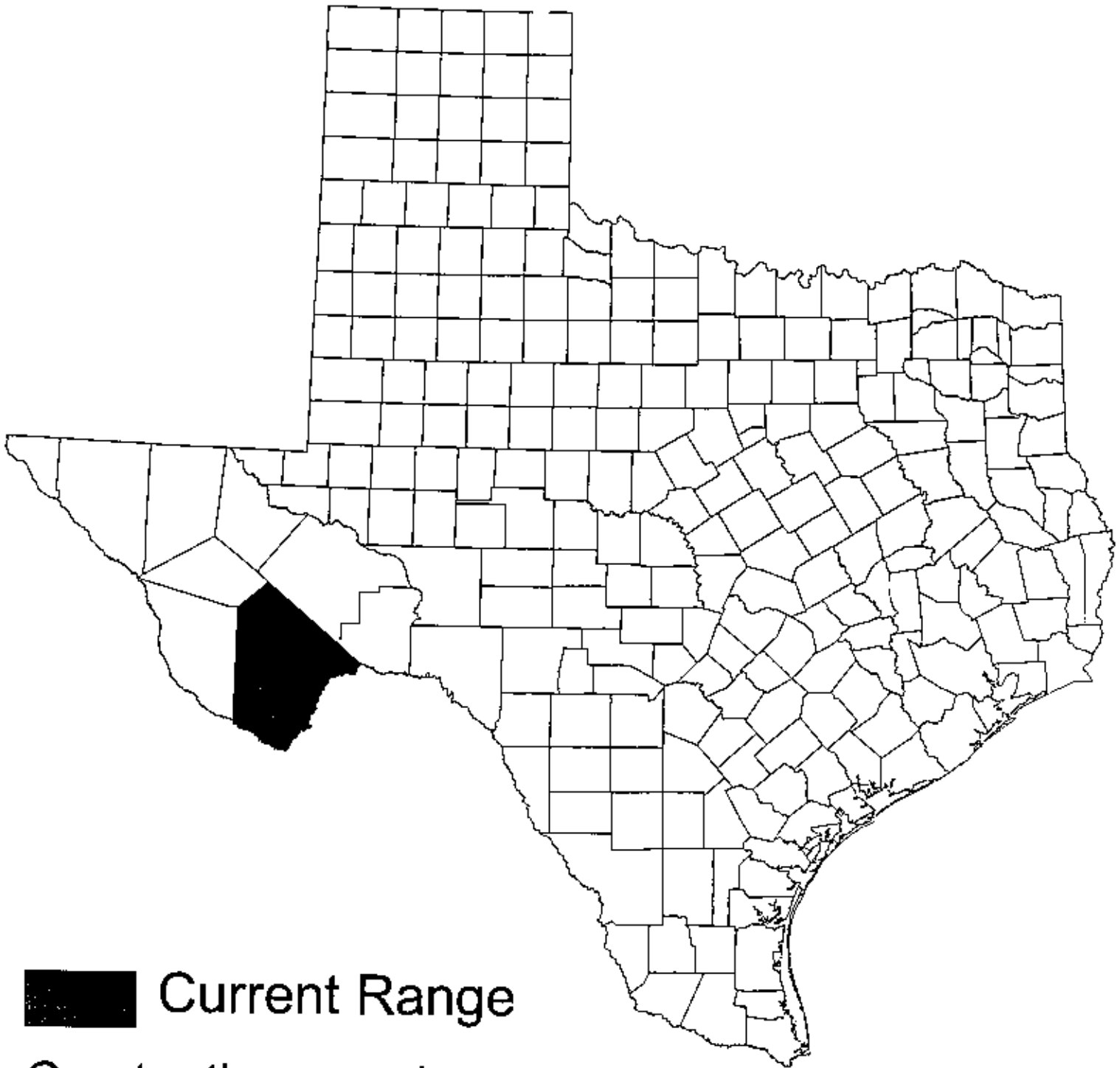
Seeds with small but distinct bumps or wrinkles; flower clusters $\frac{3}{4}$ -1 $\frac{1}{4}$ in. in diameter; occurring in Guadalupe and Apache Mountains of Culberson and Hudspeth Counties *C. paysonii*

Flowers white, clustered at first but becoming scattered along the stem with age *C. oblata*

Flowers clustered at first but becoming scattered along the stem with age; fruit smooth *C. palmeri*



Entire plant of
Terlingua Creek cat's-eye



Current Range

Cryptantha crassipes
(Terlingua Creek cat's-eye)

Scientific Name: *Cyperus cephalanthus* T. & H.

Synonyms: *Cyperus rigens* Presl subsp. *cephalanthus* (T. & H.) Pedersen. See also Carter & McInnis (1993).

Common Name: giant sharpstem umbrellasedge

Global/State Ranks: G2QS1

Federal Status: None

Global Range: Primarily in South America (Argentina, Uruguay, Paraguay and Brazil); disjunct in southeastern Oklahoma and on the coastal plain of eastern Louisiana and southeast Texas (Tucker, Marcks & Carter 1998).

State Range: Long known in Texas solely from a specimen collected by Thomas Drummond in 1835 in the Galveston Bay area, but recently re-discovered in Harris County by Larry Brown.

Description (adapted from Tucker, Marcks & Carter 1998 [***WRC: re-find Carter & McInnis 1993 and compare their description]): Rhizomatous perennial with culms 40-70 (-100) cm tall; culms sharply 3-angled, 2-3 mm thick, scabrous or hirtellate on upper half of stem or at least near the apex. Leaves flat, 30-80 mm long and 4-10 mm wide, scabrous on margins. Flowers in 3-6 dense, bracted, ovoid head-like spikes on long peduncles (rays) from the bracted apex of the culm; bracts 3-5, more or less horizontal to reflexed, 3-12 (-36) cm long and 0.4-3 (-5) mm wide, scabrous like the leaves; rays 3-6, 4-10 (-16) cm long, smooth; spikes ovoid, 1-20 mm long and 13-18 mm wide; spikelets 25-50 (-80) per spike, quadrate-compressed, 5-10 mm long and 2.5-3.5 mm wide, the rachilla essentially wingless; scales 4-10 (-14) per spikelet, deciduous, light brown or reddish brown, clear on margins, ovate-lanceolate, blunt [***WRC-- what does this mean? Blunt at apex? If so, Linny's illustration is of a different species, one in which the apex of the scale is more or less acute and the midvein is excurrent as a short mucro.], with 3-4 nerves on each side, 2.5-3 mm long and (1.2-) 1.4-2 mm wide, often erose at the tip; [***WRC: stamens how many? 3?], the anthers 0.4-0.6 mm long; styles 0.8-1.2 mm long; stigmas 3, ca. 2 mm long. Achenes brown to reddish-brown, 3-angled, ellipsoid, ca. 1.2 mm long and 0.5-0.6 mm wide, the base +/- stipitate, the apex obtuse, scarcely to distinctly apiculate, punctulate.

Similar Species: Frequently occurring with *C. virens* var. *drummondii*, another species with sharply-angled culms (Carter & McInnis 1993). *C. virens* has pale greenish-brown to buff-colored, bicarinate scales and two stamens per floret, while *C. cephalanthus* has larger, stramineous to brownish, unicarinate scales and three stamens per floret (Carter & McInnis 1993).

Habitat: Plants at the one known Texas site occur in a depression area within a coastal prairie remnant on heavy black clay (Larry Brown, pers. comm.). In Louisiana, *C. cephalanthus* is most numerous in coastal prairie on poorly drained sites, sometimes on slightly elevated areas surrounded by standing shallow water. It also occurs in coastal prairie on moderately drained sites (Carter & McInnis 1993). Soils at Louisiana locations include very strongly

acid to moderately alkaline silt loams and silty clay loams of the Crowley, Midland, and Patoutville series. Common associates include *Paspalum plicatulum*, *Panicum virgatum*, *Gaura lindheimeri*, *Schizachyrium tenerum*, *S. scoparium*, *Andropogon gerardii*, *Cyperus drummondii*, *C. strigosus*, *C. haspan*, *C. pseudovegetus* and *Eleocharis montana* (Carter & McInnis 1993).

Phenology: Flowering/fruitleting May-June and again August-September, or perhaps sporadically throughout growing season depending on availability of moisture (Carter & McInnis 1993).

Comments: A technical description is provided in Carter & McInnis (1993). Field characters include perennial habit; short thick rhizomes; sharply-angled stems that are scabrid above; sparse foliage leaves and bracts; dense capitate spikes; ascending uncarinate scales; and long, linear-aristate bracteoles.

Illustrations: None known.

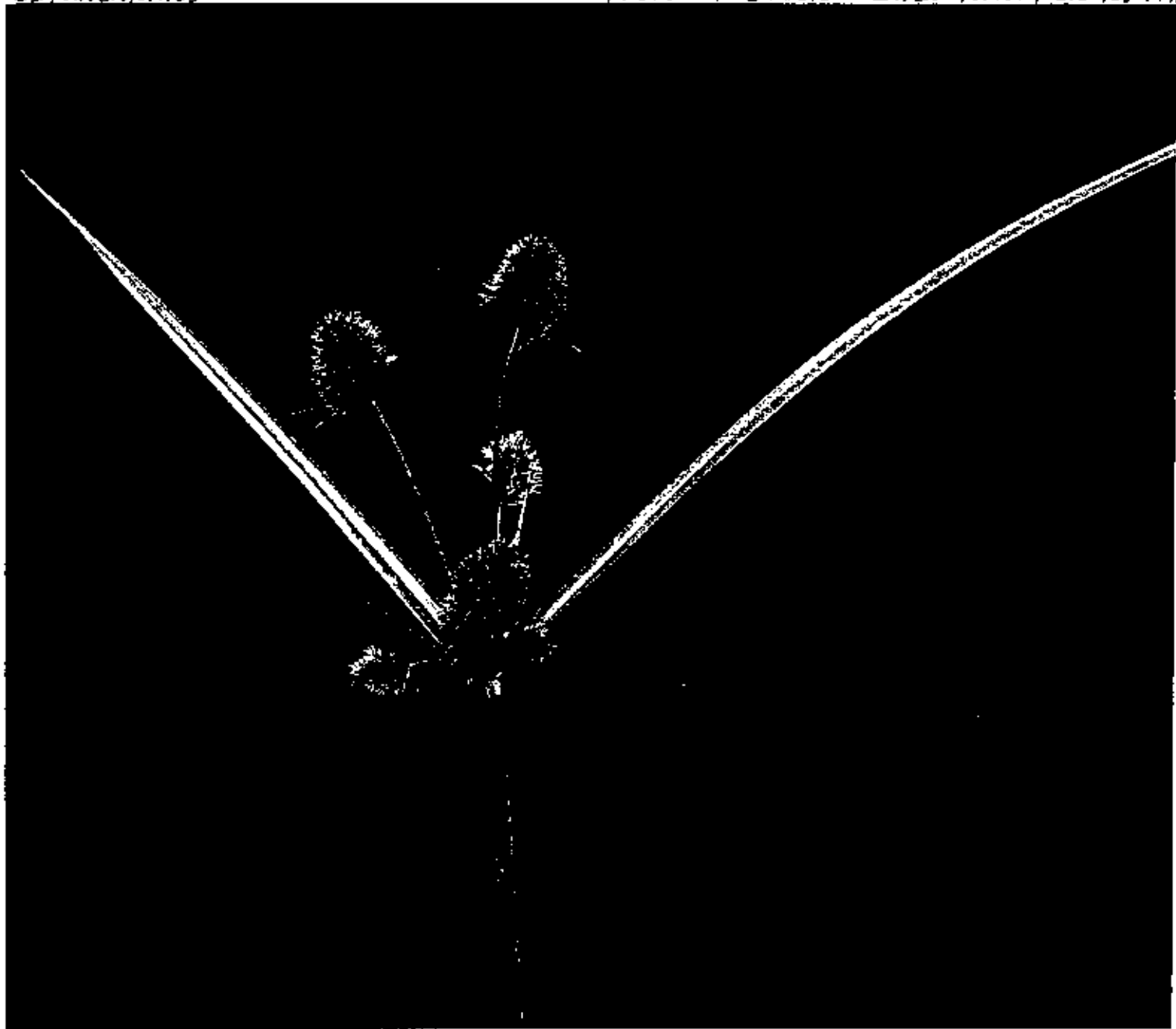
Selected References:

Carter, R. and N. McInnis. 1993. Status report [on *Cyperus cephalanthus*]. Report submitted to U.S. Fish & Wildlife Service, Jackson, Mississippi.

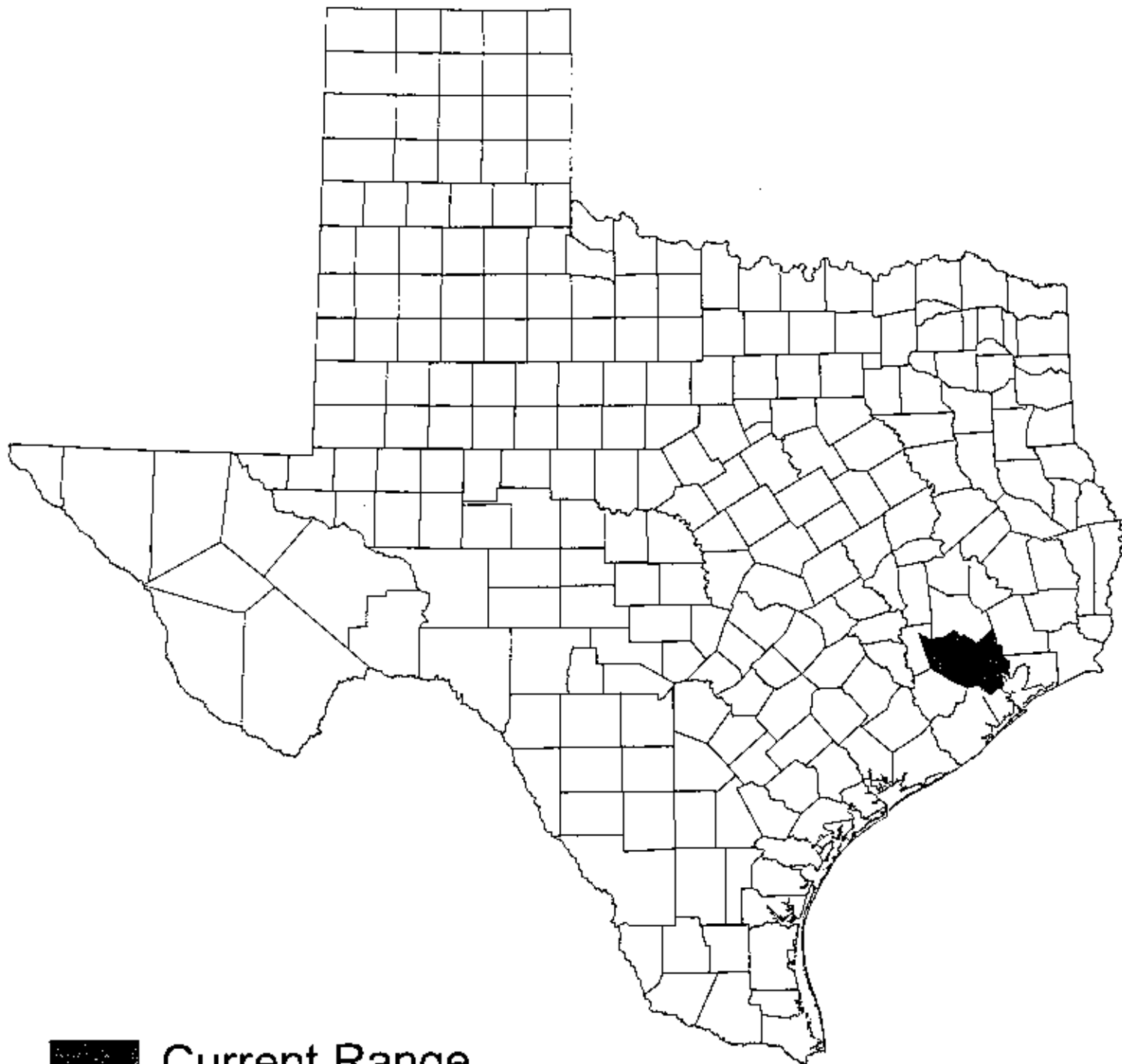
Tucker, G. C., B. G. Marks and R. Carter. 1998. Draft treatment of the genus *Cyperus* for Volume 23 of the Flora of North America.

CEPHALANTHUS

PHOTO BY SCOTTER CHEATHAM 572-928-4441







■ Current Range

Cyperus cephalanthus
(giant sharpstem umbrella-sedge)

Scientific Name: *Cyperus onerosus* M. C. Johnston

Synonyms: None.

Common Name: dune flatsedge

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to a Pleistocene sand sheet in Trans-Pecos Texas. Not yet reported from adjacent New Mexico.

State Range: Andrews, Ward and Winkler counties.

Description (adapted from Johnston 1964 and Correll & Johnston 1970): Glabrous, yellowish-green perennial with scaly rhizomes 5-80 mm long and 1-2 mm thick; culms erect, triquetrous, essentially smooth, basally leafy, 2-5 dm tall, 2-4 mm thick near the base to 1.5-2 mm thick near just below the inflorescence. Leaves mostly crowded near the base, 15-40 cm long; sheaths not sharply differentiated, 6-14 mm wide, often brownish basally, tapering upward; blades 6-8 mm wide at base, yellowish green, long-tapering to a narrow point. Flowers in a compound terminal inflorescence subtended by ca. 4 bracts; bracts leaf-life, the lowest one 11-22 cm long, longer than the inflorescence, the others much-reduced; inflorescence branches 7-15, 2-11 cm long, the shorter of these bearing 3-5 head-like glomerules of spikelets or the longer bearing 2-12 branchlets 2-25 mm long and these bearing 3-5 head-like glomerules of spikelets; glomerules with 8-16 spikelets; spikelets linear, with (10-) 16-26 (-42) flowers; rachilla wingless; scales distichous, much overlapping, ovate-elliptic, slightly acuminate, 2-3-2.9 mm long and 1.2-1.4 mm wide (when unfolded), medially strongly green-ribbed, laterally thin, colorless and translucent, eventually in a narrow zone near the midrib becoming brown or reddish-brown, on each side with 2 (-3) nerves; stamens 3, the anthers 1.2-1.5 mm long; style 0.8-1 mm long, with 3 filiform branches ca. 2 mm long. Achene elliptic to narrowly elliptic, acuminate at both ends, 0.7-0.8 mm long and 0.25-0.3 mm thick, trigonous, whitish or eventually turning pale brown, shiny.

Habitat: Moist to wet sand in swales and other depressions among active or partially stabilized sand dunes. Associates include *Polypogon viridis*, *P. monspeliensis*, *Cynodon dactylon*, *Cyperus odoratus*, *Echinochloa* sp., *Eleocharis montividentis*, *Schoenoplectus pungens* var. *longispicatus*, *S. tabernaemontani*, *Bulboschoenus maritimus*, *Juncus marginatus*, *Phyla nodiflora*, *Xanthium strumarium*, *Baccharis* sp., *Populus* sp. and *Salix* sp.

Phenology: Flowering/fruiting late summer-fall.

Similar Species: The short (less than 1 mm long) achenes readily separate dune flatsedge from the few other *Cyperus* species that occur in the region.

Comments:

Illustrations: A color photograph appears in Warnock (1974).

Selected References:

Carr, W. R. 1991. Status report on *Cyperus onerosus*. Report prepared for U.S. Fish & Wildlife Service,

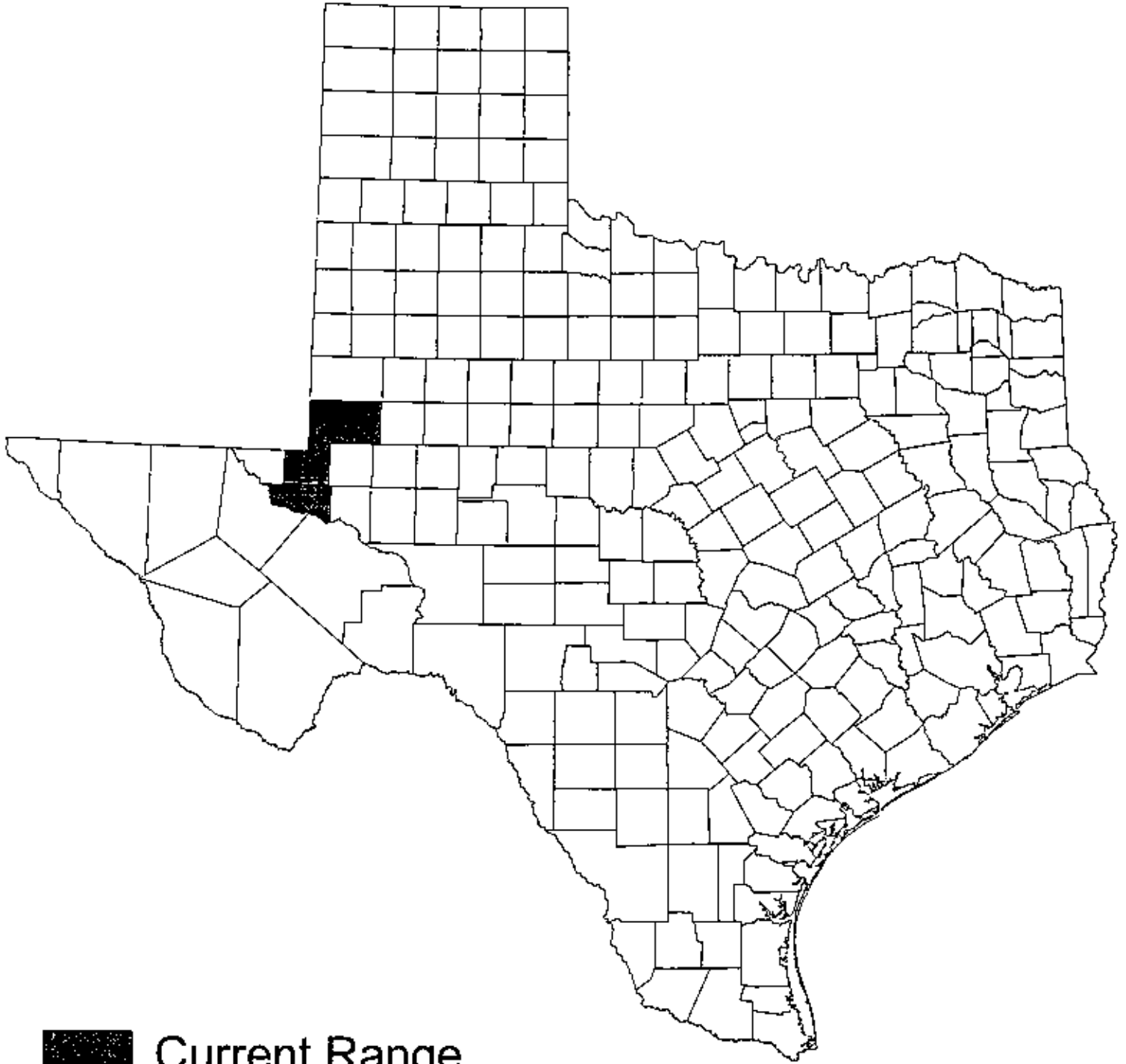
Albuquerque.

Johnston, M. C. 1964. *Cyperus onerosus* M. C. Johnston, sp. nov. Southwestern Naturalist 9: 308-310.

Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.







■ Current Range

Cyperus onerosus
(dune umbrella-sedge)

Scientific Name: *Cypripedium kentuckiense* C. L. Reed

Synonyms: Treated in Correll & Johnston (1970) as *Cypripedium calceolus* L. var. *pubescens* (Willd.) Correll (*Cypripedium parviflorum* var. *pubescens* (Willd.) Knight).

Common Name: southern lady's-slipper

Global/State Ranks: G3S1

Federal Status: SOC

Global Range: Scattered small populations in Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas and Virginia (Medley, 1985; Weldy et al., 1996; Cammack & Patrick 2000).

State Range: Cass, Harrison, Nacogdoches, Newton, Red River, Sabine, Shelby, San Augustine and Tyler counties (Orzell, 1990; Liggio & Liggio, 1999).

Description (adapted from Reed 1981; Medley 1985; Liggio & Liggio 1999; Correll & Johnston 1970): Perennial 3.5-9.7 dm tall; stems usually 1. Leaves alternate, simple, ovate, (2-) 3-6 (-9) per stem, 14-20 (-24) cm long and 6-10 (-15) cm wide, plicate, with 9-14 conspicuous parallel veins, somewhat pubescent along the veins. Flowers 1 or 2, terminal, large (up to 13 cm across including sepals) and showy (a mix of pale yellow and maroon), subtended by foliaceous bracts; sepals 3, varying in color from maroon to yellow-green with maroon spots or mottling; upper sepal longer and broader than the others, leaflike, arching over the lip, ca. 61-126 mm long and 24-64 mm wide; lower 2 sepals fused into a synsepal positioned below the corolla, 55-103 mm long and 12-40 mm wide; corolla with three petals; 2 lateral petals yellow-green, heavily striped or spotted with maroon (sometimes entirely maroon), spirally twisted, 84-156 mm long and ca. 7 mm wide; lip petal large, inflated, elongate and open on the dorsal side (top) at one end like a slipper, cream-colored, rarely white or yellow, 41-65 mm long and 30-52 mm deep; stamens and pistil united into a column that curves downward onto the uppermost part of the lip; non-functional stamen (positioned on top of the column) petal-like, ovate, 17-24 mm long and 10-18 mm wide. Fruit an ovoid to ellipsoid capsule ca. 6 cm long and 1.3 cm wide, containing abundant but minute seeds.

Similar Species: Kentucky lady's-slipper is the only *Cypripedium* in east Texas and as such cannot be mistaken for any other species. Details of the relationship between *C. kentuckiense* and *C. parviflorum* var. *pubescens*, a species of the eastern deciduous and boreal forests and northern prairies, has been a topic of considerable research (Case et al. 1998; Liggio & Liggio 1999).

Habitat: A denizen of mostly deciduous forests of floodplains, seepage slopes and mesic ravines. Canopy components of most sites in East Texas include *Fagus grandifolia*, *Fraxinus americana*, *Nyssa sylvatica* and *Magnolia grandiflora*. Understory and shrub layer associates include *Cornus florida*, *Acer rubrum*, *A. leucoderme*, *Styrax grandifolius*, *Carpinus caroliniana*, *Viburnum acerifolium*, *V. dentatum*. Ground layer associates include *Tipularia discolor*, *Viola walteri*, *Solidago auriculata*, *Thelypteris hexagonoptera* and *Trillium gracile* (Orzell 1990).

Phenology: Flowering April-June.

Comments: Known in Texas, as in most of the other states within its range, from a few, very small populations.

Illustrations: Color photographs appear in Liggio & Liggio (1999) and Weldy et al. (1996); and, as *Cypripedium calceolus*, in Ajilvsgi (1979) and Loughmiller & Loughmiller (1984). A line drawing appears in Medley (1985).

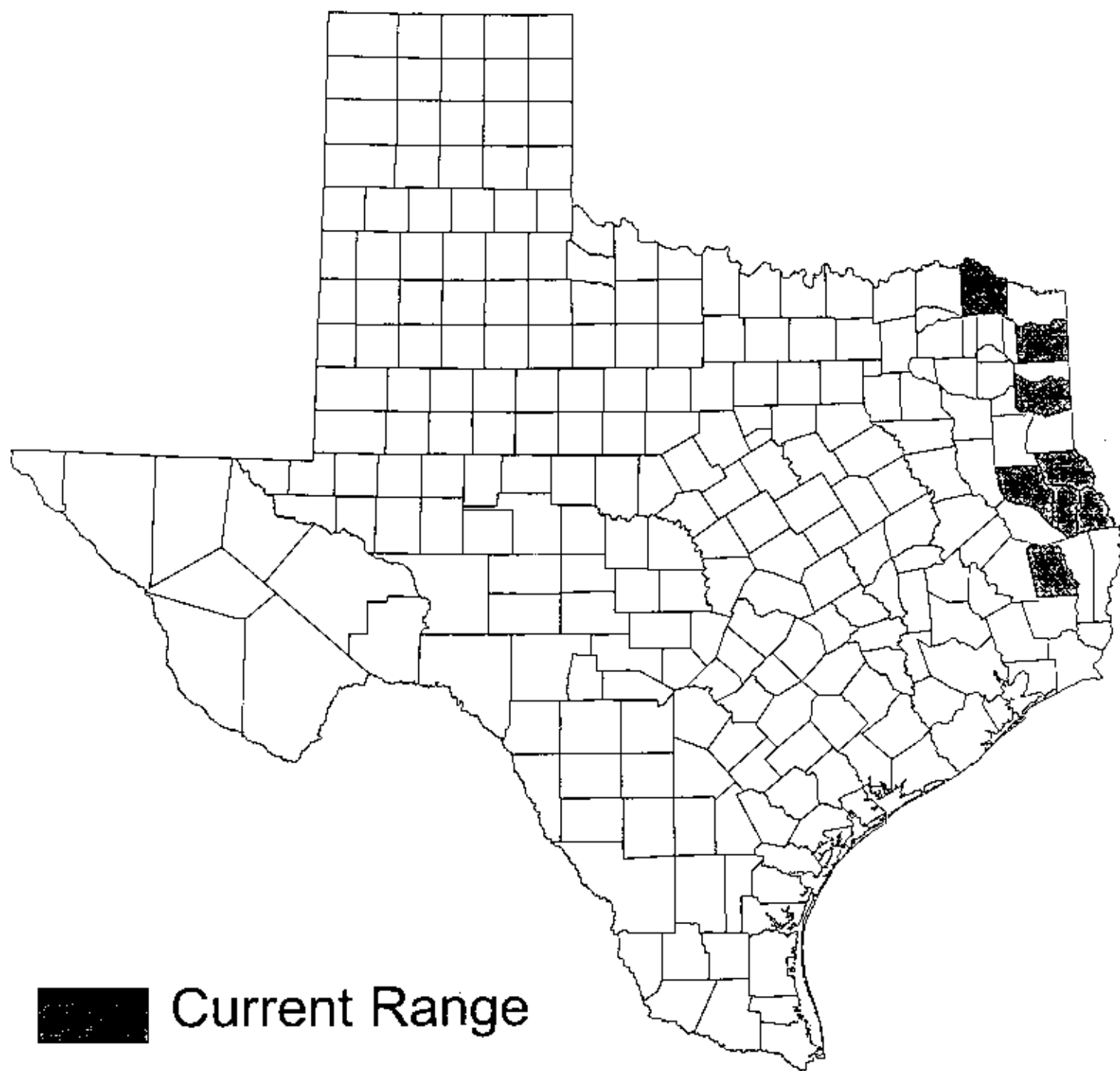
Selected References:

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- Cammack, S and T. Patrick. 2000. A Kentucky find: the Georgia discovery of the Kentucky lady'slipper (*Cypripedium kentuckiense*). *Tipularia* 15: 17-22.
- Case, M. A., H. T. Mlodozienec, L. E. Wallace and T. W. Weldy. 1998. Conservation genetics and taxonomic status of the rare Kentucky lady's slipper: *Cypripedium kentuckiense* (Orchidaceae).
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- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Liggio, J. and A. O. Liggio. 1999. Wild orchids of Texas. University of Texas Press, Austin. 228 pp.
- Loughmiller, C. and L. Loughmiller. 1984. Texas wildflowers: a field guide. University of Texas Press, Austin. 271 pp.
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- Orzell, S. L. and E. L. Bridges. 1987. Further additions and noteworthy collections in the flora of Arkansas, with historical, ecological, and phytogeographical notes. *Phytologia* 64: 81-144.
- Orzell, S. L. 1990. Inventory of National Forests and National Grasslands in Texas. Report submitted in fulfillment of agreement between the Texas Natural Heritage Program of Texas Parks and Wildlife Department and the U. S. Forest Service in Lufkin, Texas. 526 pp.
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- Reed, C. F. 1982. Additional notes on *Cypripedium kentuckiense* Reed. *Phytologia* 50: 286-288.
- Weldy, T. W., H. T. Mlodozienec, L. E. Wallace and M. A. Case. 1996. The current status of *Cypripedium kentuckiense* (Orchidaceae) including a morphological analysis of a newly discovered population in eastern Virginia. *Sida* 17(2): 423-435.





Figure 10: Cyripedium kentuckiense, southern lady's-slipper.
a) habit; b) fruiting capsule; c) upper flowering part of plant;
from Medley 1985.



Current Range
Historical Range
Cyripedium kentuckiense
(southern lady's-slipper)

Scientific Name: *Dalea bartonii* Barneby

Synonyms: None.

Common Name: Cox's dalea

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Brewster County. Known only from specimens collected by Barton Warnock on the C. F. Cox Ranch near Longfellow on 31 July 1953.

Description (adapted from Barneby 1977): Dwarf tufted perennial with a large knotty caudex up to 3 cm in diameter from which emanate numerous slender glabrous stems 1.2-3.5 dm long. Leaves alternate, pinnately compound, mostly 8-20 (-23) mm long (those of uppermost stem shorter), with a ventrally-grooved rachis and 5-9 leaflets, pale green or yellowish green; leaflets oblanceolate to obovate-cuneate, glabrous on both surfaces but multipunctate on the lower surface, emarginate at apex, somewhat folded and backwardly arched, 2.5-7.5 mm long. Flowers clustered in solitary, terminal, headlike subglobose spikes 3-14 mm long and ca. 8 mm wide excluding corollas; calyx 3.8-4.3 mm long, the tube 2.8-3.5 mm long, dotted with prominent yellow glands, oblique at orifice, the 5 teeth of varied lengths but all less than 1 mm long; petals 5, white, the banner ca. 5.4 mm long including claw, the deltate-obcordate blade ca. 3 mm wide, the other petals ca. obcordate 3.7 mm long and ca. 1.5 mm wide; stamen column ca. 4 mm long, the free filaments up to 4.5 mm long. Fruit a single-seeded pod ca. 2.8 mm long. An exceptionally detailed description, based on the scant available material, is provided in Barneby (1977).

Similar Species: Vegetatively similar to many *Dalea* species. The large gnarly caudex, one-headed stems less than 2.5 dm long, small heads with 5-30 flowers, and white petals serve to distinguish this species from others in the area (Howell 1986).

Habitat: Semi-desert shortgrass grasslands with scattered pinyon pine and juniper in gravelly soils on limestone hills; the one known location reportedly lies at an altitude of ca. 3600 ft. (Howell 1986).

Phenology: Probably flowering in June, fruiting in July.

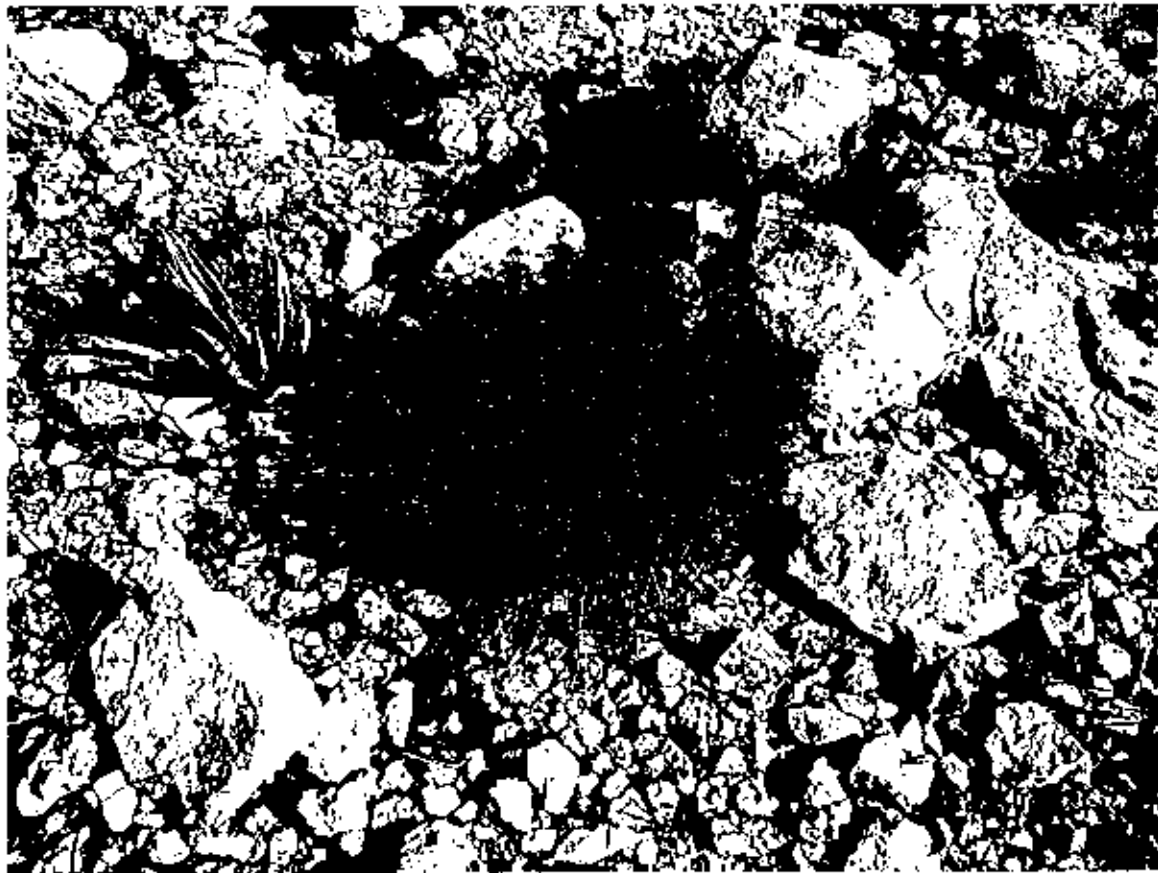
Comments: Described by Rupert Barneby in 1977; not in Correll & Johnston (1970).

Illustrations: Line drawings appear in Barneby (1977).

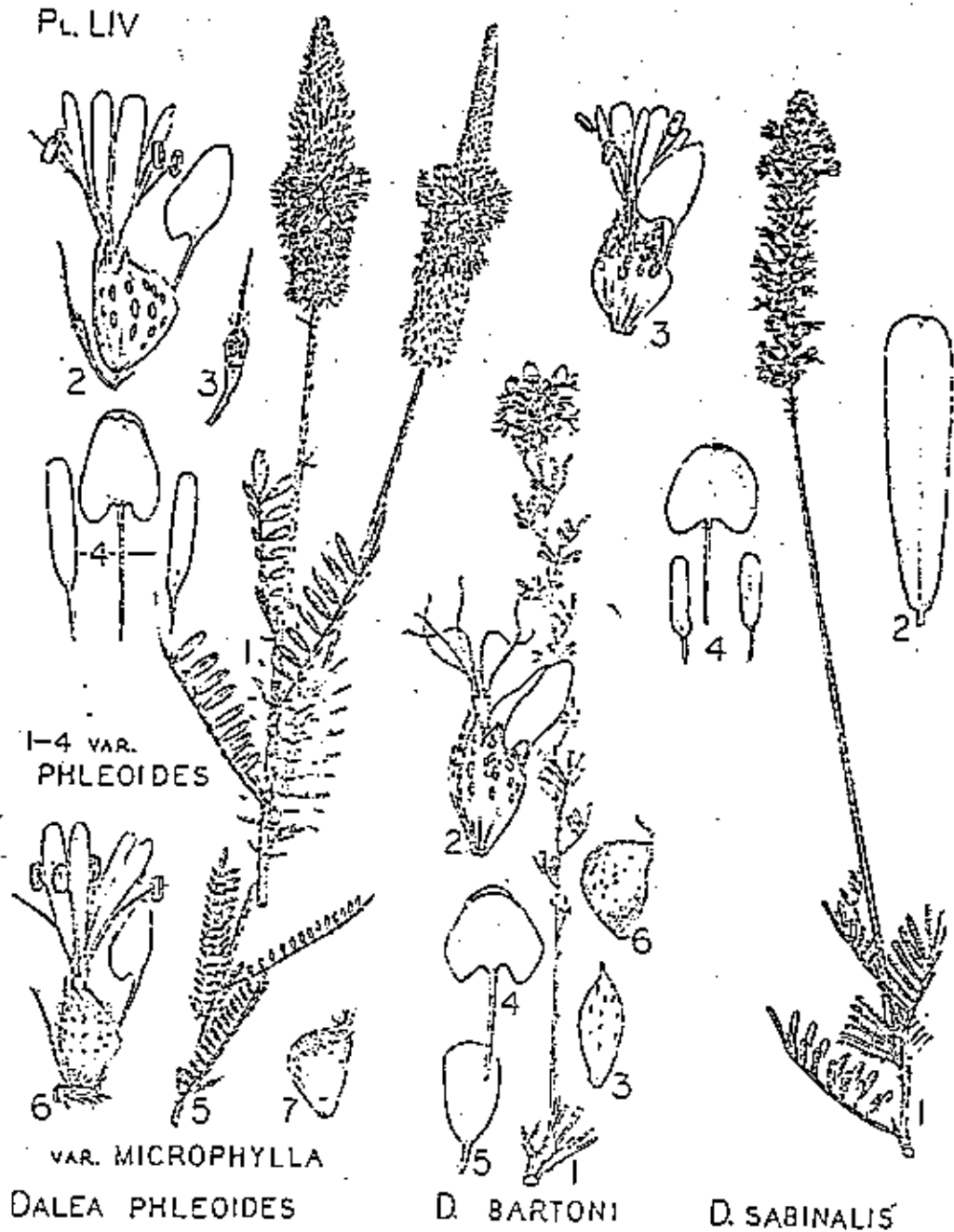
Selected References:

Barneby, R. C. 1977. *Daleae imagines*. *Memoirs of the New York Botanical Garden* 27: 1-891.

Howell, D. J. 1986. Status report [on *Dalea bartonii*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.



PL. LIV





■ Current Range

Dalea bartonii
(Cox's dalea)

Scientific Name: *Dalea reverchonii* (Wats.) Shinnery

Synonymy: *Petalostemum reverchonii* Wats.

Common Name: Comanche Peak prairie-clover

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to north-central Texas.

State Range: Hood, Parker and Wise counties.

Description (adapted from Correll & Johnston 1970, Barneby 1977 and Mahler 1984): perennial with numerous spreading-decumbent stems forming a loose to rather dense mat 2-4 dm in diameter, glabrous to finely pubescent. Leaves alternate, pinnately compound, glabrous, 2-3 cm long; leaflets 5-11, linear to linear-oblongate, 5-10 mm long, somewhat involute. Flowers in spikes on short peduncles, ca. 1 cm wide, a few cm long at onset of anthesis but up to 8 cm long in fruit; calyx ca. 4 mm long, with appressed silky pubescence, the 5 lobes deltoid to acuminate, about equalling the tube; corolla with 5 unequal lobes of a color variously described as deep pink, rose, red or magenta-purple color; the last adjective couplet, chosen by the ever-articulate Rupert Barneby, is probably most accurate. Fruit a single-seeded silky pod 3.1-3.5 mm long. An exceptionally detailed description is provided in Barneby (1977).

Similar Species: In leaf and floral characters, *Dalea reverchonii* resembles many other *Dalea* species and in fact is often associated with several. However, it is distinguished at a glance by its mat-forming habit alone, which is more reminiscent of *Glandularia (Verbena) bipinnatifida* than of most other *Dalea* species. Its glabrous foliage, thick spikes and appressed-pubescent calyces also serve to identify this species.

Habitat: Shallow calcareous clay to sandy clay soils over limestone in grasslands or openings in post oak woodlands, often among sparse vegetation in barren exposed sites. Most known sites are underlain by Goodland Limestone, a Cretaceous formation. Associates include *Aristida* spp., *Bouteloua rigidiseta*, *Arenaria stricta*, *Dalea aurea*, *D. enneandra*, *D. tenuis*, *Evolvulus nuttallianus*, *Hedeoma drummondii*, *Hedyotis nigricans*, *Heliotropium tenellum*, *Indigofera miniata* var. *leptosepala*, *Paronychia virginica*, *Pediomelum reverchonii*, *Salvia texana* and *Thelesperma filifolium*.

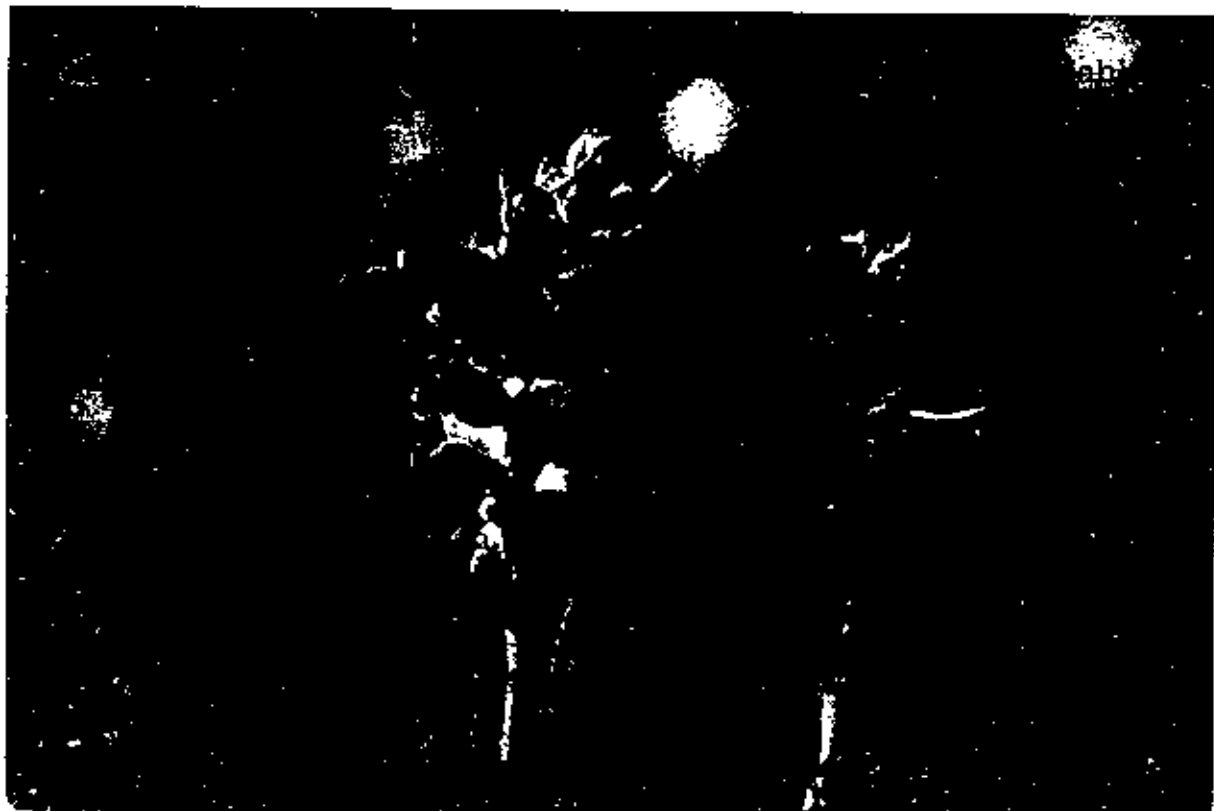
Phenology: Usually flowering in May, reportedly before other species of *Dalea* or *Petalostemum*, and continuing through June. Barneby (1977) collected the species "sparsely flowering, perhaps unseasonably" in October 1964.

Comments: According to Mahler (1984), the type specimen was collected in June 1882 by Julien Reverchon from "the rocky top of Comanche Peak," just southwest of Granbury in Hood County. Although surveys in 1984, 1987 and 2000 failed to re-locate that particular population, the common name remains appropriate.

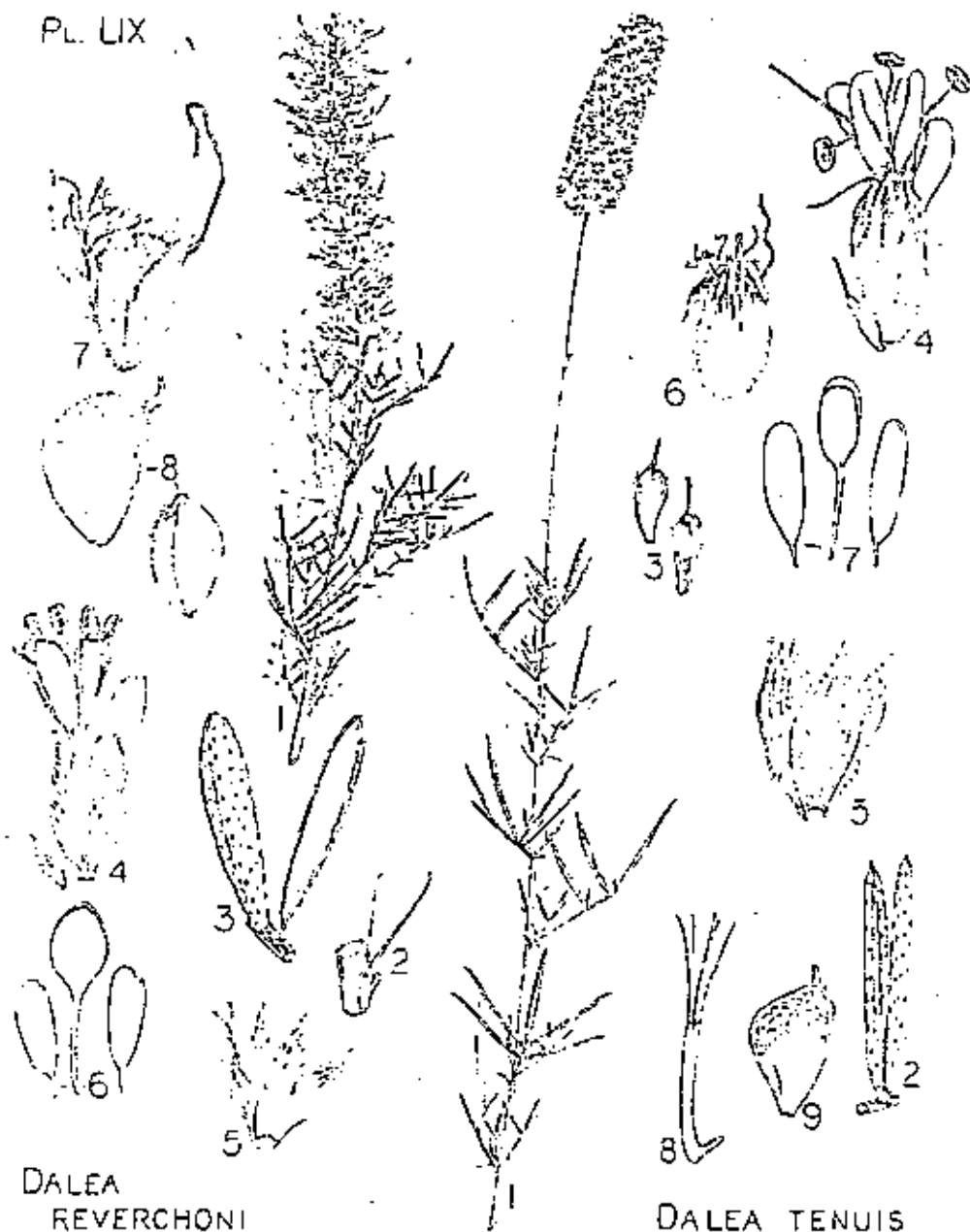
Illustrations: Line drawings appear in Barneby (1977) and Diggs, Lipscomb & O'Kennon (1999); a black-and-white photograph is featured on the cover of Mahler (1988).

Selected References:

- Barneby, R. C. 1977. *Daleae imagines*. *Memoirs of the New York Botanical Garden* 27: 1-891.
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- Mahler, W. F. 1984. Status report [on *Dalea reverchonii*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Mahler, W. F. 1988. *Shinners's manual of the north central Texas flora*. Sida Botanical Miscellany Number 3. Botanical Research Institute of Texas, Fort Worth. 313 pp.

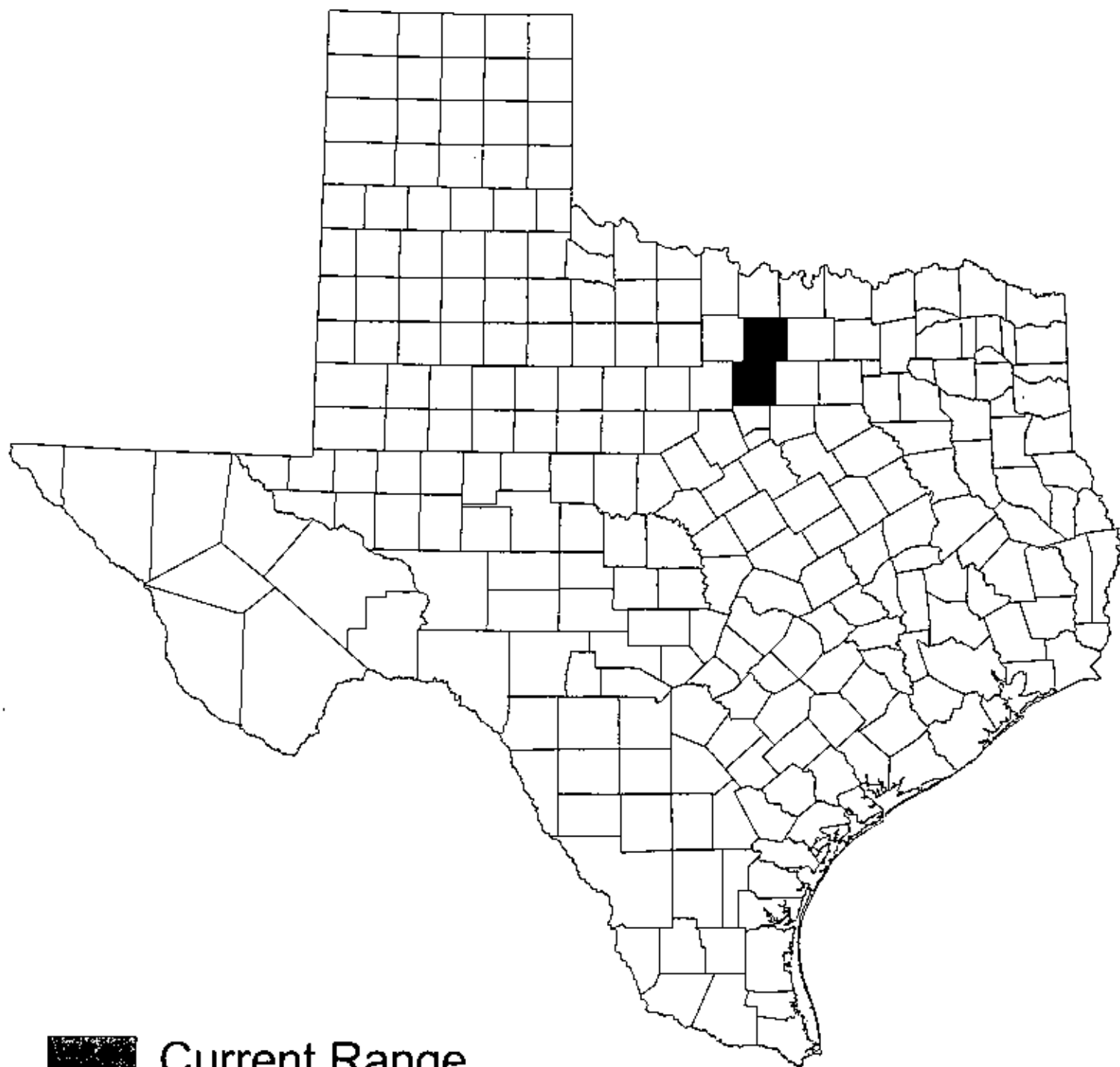


PL. LIX



DALEA REVERCHONI

DALEA TENUIS



■ Current Range
□ Historical Range

Dalea reverchonii

(Comanche Peak prairie-clover)

Scientific Name: *Dalea sabinalis* (Wats.) Shinnery

Synonyms: *Petalostemum sabinale* Wats.

Common Name: Sabinal prairie-clover

Global/State Ranks: GSH

Federal Status: SOC

Global Range: Endemic to the Edwards Plateau of central Texas.

State Range: Known historically from Bandera, Uvalde and Val Verde counties; not collected or reported since the 1950's.

Description (adapted from Correll & Johnston 1970, Barneby 1977 and Mahler 1985): Perennial of unknown habit, the stems presumed to be ascending, 2-4 dm tall, glabrous. Leaves alternate, pinnately compound, yellowish-green, ca. 3 cm long; leaflets 11-15, linear to linear oblanceolate, 10-15 mm long, glabrous, gland-dotted on lower surface. Flowers in terminal many-flowered spikes 6.5-8 mm wide (excluding petals) and 4-9 cm long; calyx 3 mm long, 5-lobed, 10-ribbed, with conspicuous yellow glands, the lobes short, triangular, ciliolate but otherwise glabrous; petals 5, pink (Barneby 1977) or rose-colored (Correll & Johnston 1970); banner petal with blade ca. 2 mm long, 3 mm wide, notched at apex, the claw ca. 2 mm long; other petals with oblong-lanceolate blades ca. 2.5 mm long and shorter claws; stamen column ca. 5-6 mm long, the free filaments of subequal length. Fruit a single-seeded glabrous, obliquely obovoid pod ca. 3 mm long.

Similar Species: Correll & Johnston (1970) considered *Dalea sabinalis* to be closely related to *Dalea tenuis*; Barneby (1977) saw closer alliances to *Dalea bartonii* of Trans-Pecos Texas, *Dalea scariosa* of New Mexico and the wide-ranging *Dalea phleoides*. A combination of technical characters is needed to distinguish this from other "petalostemum-style" *Dalea* species: glabrous stems and foliage, slender spikes, glabrate or merely marginally-ciliate calyx lobes and pink or rose (i.e., not white) corollas.

Habitat: Information sketchy; probably in rocky soils or on limestone outcrops in sparse grassland openings in juniper-oak woodlands.

Phenology: Flowering April-May (Barneby 1977) or May-July (Correll & Johnston 1970).

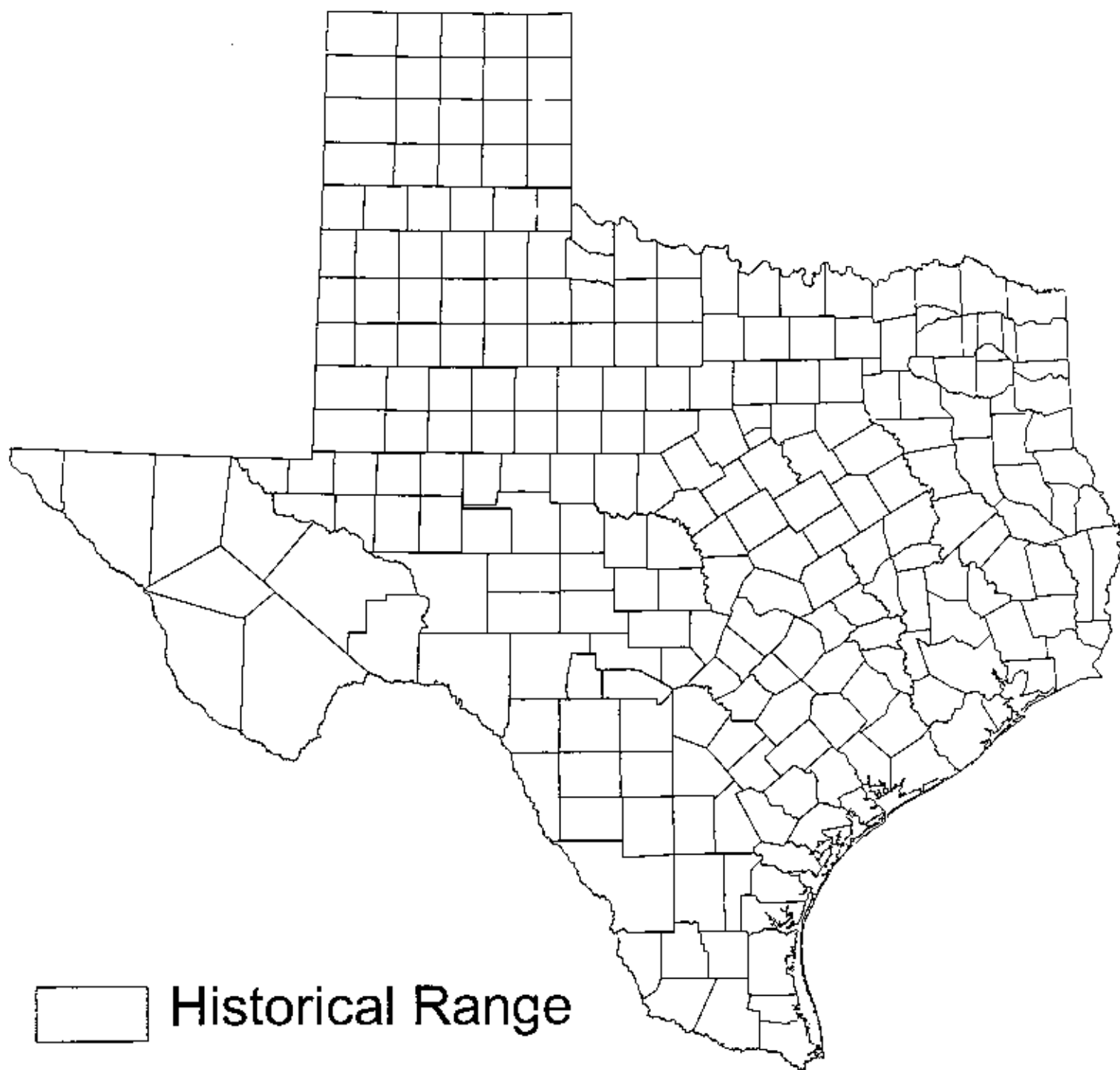
Comments: The type specimen was collected in June 1885 by Julien Reverchon from the "entrance to Sabinal Canyon," a vague location that lent its name to the specific epithet. There are three collections from the first half of the 20th Century: Uvalde Co.: Chalk Bluffs, [date unknown, probably 1918], *E. J. Palmer 13337* (US); Val Verde Co.: 8 2/3 mi S of Loma Alta (date unknown, probably early 1940's), *V. L. Cory 41658* (GH); 12 3/4 mi S of Loma Alta, 3 Jun 1944, *V. L. Cory 44424* (TEX-LL).

Illustrations: Line drawings of stem, leaflet and both petal types appear in Barneby (1977).

Selected References:

Barneby, R. C. 1977. *Daleae imagines*. *Memoirs of the New York Botanical Garden* 27: 1-891.

Mahler, W. F. 1985. Status report [on *Dalea sabinalis*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.



Dalea sabinalis
(Sabinal prairie-clover)

Scientific Name: *Desmodium lindheimeri* Vail

Synonymy: *Meibomia lindheimeri* (Vail) Vail

Common Name: Lindheimer's burelover, Lindheimer's tickseed

Global/State Ranks: G3S1

Federal Status: None

Global Range: Coahuila, Nuevo León, San Luis Potosí, and Tamaulipas; disjunct on the Edwards Plateau of central Texas (Nesom 1993; Enquist 1995).

State Range: Comal and Uvalde counties.

Description (adapted from Enquist 1995 and Vail 1891): Perennial, the stems mostly erect, 4-15 (-18) dm tall, conspicuously angled and channeled, uncinulate-puberulent and uncinulate-pubescent, also sparsely scattered-pilose with slender white trichomes. Leaves alternate, trifoliolate; stipules ovate, long-attenuate, 6.5-8 mm long and 1.5-2 mm wide, densely pilose on the outer surface with long white trichomes, reflexed at maturity, not long persistent; stipels slenderly lance-attenuate, 1.5-2 mm long; petioles densely uncinulate-puberulent and uncinulate-pubescent and somewhat long spreading-pilose, 14-35 (-45) mm long; leaf rachis similar, 6-15 (-19) mm long; leaflets acute at the apex, cuneate to obtuse at the base, uncinulate-puberulent and more or less soft white-pilose on upper surface, densely long and soft white-pilose or tomentose on lower surface with prominent veins; terminal leaflet ovate to mostly rhombic in outline, 5-9 (-10.5) cm long and 3-5.8 (-7) cm wide; lateral leaflets more nearly ovate or elliptic, somewhat asymmetrical, 4.3-6 (-7) cm long and 2-4 cm wide. Flowers in a terminal panicle, the rachis ridged and grooved, uncinulate-puberulent and uncinulate-pubescent; primary bracts ovate-attenuate, striate, long appressed-pilose on outer surface, ciliate, glabrous on inner surface, 4.5-9 mm long and 2-3 mm wide, not long persistent; secondary bracts essentially glabrous by ciliate, 0.8-3 mm long and 0.8-1 mm wide; pedicels rather finely pilose with multicellular trichomes which are glandular at base; calyx finely puberulent, somewhat ciliate, 5-lobed, the lobes subequal; corolla papilionaceous, whitish to pale pink, rose-pink or purple, to 7 mm long. Fruit a stipitate loment 2-5 cm long, composed of 4-7 flattened segments, the segments 7-11 (-13) mm long and 5-8 mm wide, obliquely subrhombic to semi-ovate oval, the surfaces glabrous, reticulate at maturity, the suture densely uncinulate-puberulent.

Similar Species: Not likely to be confused with any of the very few other *Desmodium* species that occur in central Texas. *D. lindheimeri* is unique in that the segments (articles) of the mature fruit are glabrous on the flat surfaces, with uncinulate hairs restricted to the margins. The terminal leaflet of *D. lindheimeri* is also considerably larger (5-9 cm long and 3-5.8 cm wide) than that of most of the regional congeners except particularly robust specimens of *D. paniculatum*.

Habitat: In the heart of its Mexican range, *Desmodium lindheimeri* occurs mostly in pine, oak or pine-oak forests at elevations between 1000 and 2000 meters, where associates include *Quercus muhlenbergii*, *Q. gravesii*, *Q. glaucoides*, *Acer grandidentatum*, *Colubrina greggii*, *Ungnadia speciosa*, *Fraxinus cuspidata*, *Ostrya virginiana*, *Juglans major* and *Carya ovata* (Enquist 1995). In Texas it has been found in live oak-juniper woodlands on slopes in limestone ravines, in creekbeds and on partially shaded adjacent roadsides (Enquist 1995).

Phenology: Flowering and fruiting mostly August-November.

Comments: Recent collections have demonstrated that *Desmodium lindheimeri* is rather common in northern Mexico. The disjunct occurrences in Texas are interesting from a floristics standpoint, but the species cannot be considered globally rare.

Illustrations: None known.

Selected References:

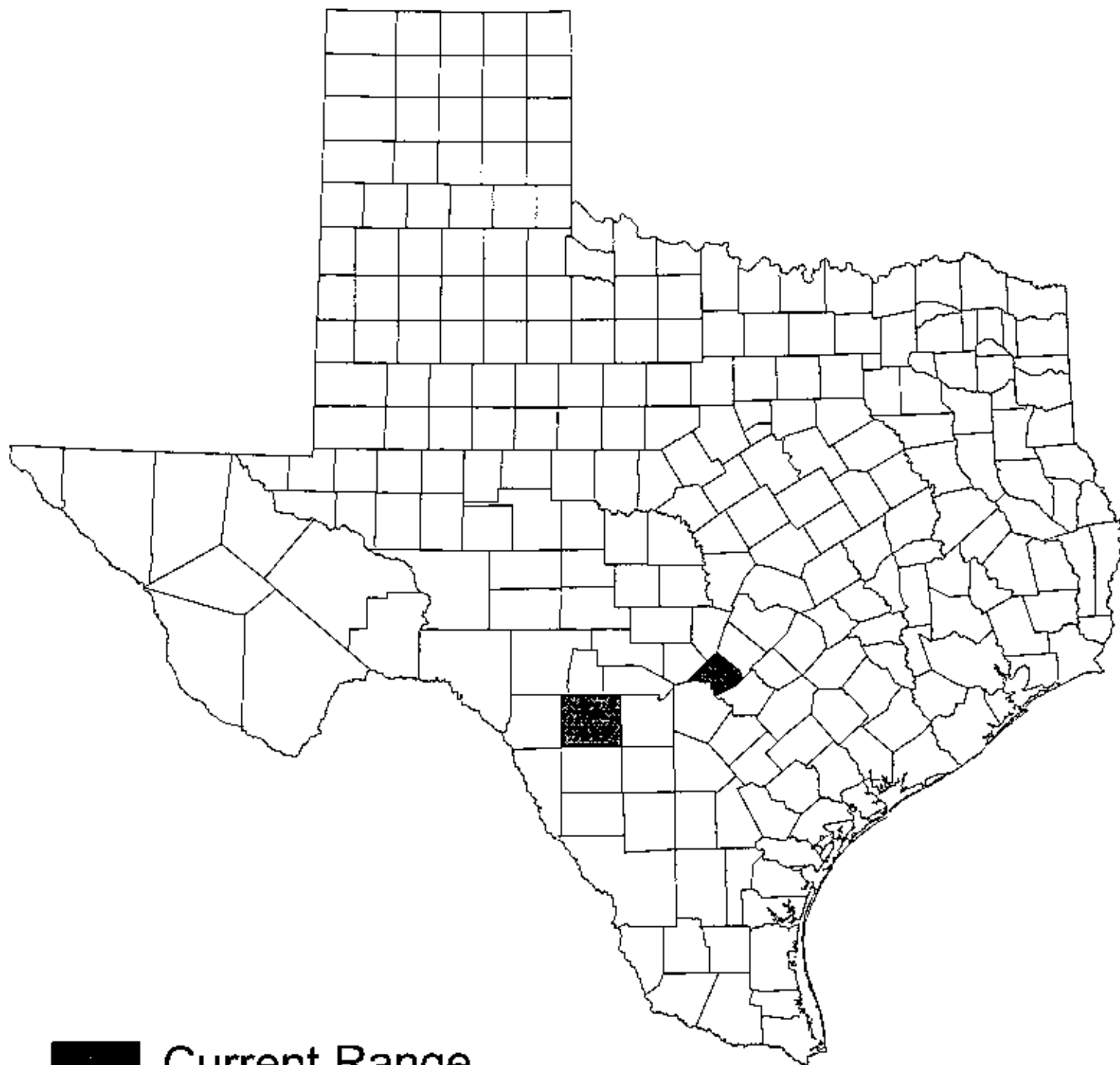
Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.

Enquist, M. 1995. *Desmodium lindheimeri* (Leguminosae) in Mexico and Texas. Sida 16(4): 781-786.

Nesom, G. L. 1993. A new species of *Desmodium* (Fabaceae) from northeastern Mexico, with comments on the genus in Nuevo Leon. Phytologia 75(5): 385-390.

Vail, A. M. 1891. An undescribed *Desmodium* from Texas and Mexico. Bulletin of the Torrey Botanical Club 18: 120.





■ Current Range

Desmodium lindheimeri
(Lindheimers's tickseed)

Scientific Name: *Draba standleyi* Macbr. & Pays.

Synonyms: *Draba chrysantha* Wats., in part; *Draba gilgiana* Woot. & Standl. but not *Draba gilgiana* Muschler.

Common Name: Standley's whitlow-wort

Global/State Ranks: G2G3S1

Federal Status: SOC

Global Range: Isolated populations at high elevations in the mountains of southeastern Arizona, southern New Mexico, west Texas and northwestern Coahuila.

State Range: Known only from the Davis Mountains of Jeff Davis County.

Description (adapted from Correll & Johnston 1970 and R. C. Rollins & E. A. Shaw in Henrickson & Johnston in prep.): Perennial herb with few stems from a somewhat woody caudex, to 2 dm long, sparingly covered with mostly simple trichomes. Leaves mostly basal, those of stem relatively few; basal leaves to 8 cm long, narrowly oblanceolate, the margins ciliate with simple trichomes; cauline leaves alternate, simple, also ciliate with simple trichomes. Flowers on slender, spreading pedicels in rather compact terminal racemes; sepals 4, 2-3 mm long; petals 4, yellow, 4-6 mm long; stamens 6; stigmas small, capitate. Fruit a flattened to slightly twisted silicle, 8-12 mm long, elliptic to linear-elliptic, glabrous.

Similar Species: This is the only yellow-petaled *Draba* in Texas. The flattened, elliptical fruits would serve to separate it from yellow-petaled *Lesquerella* species, which have plumply inflated, spherical fruits.

Habitat: Crevices in sparsely vegetated igneous boulders and rock outcrops at high elevations in the Davis Mountains.

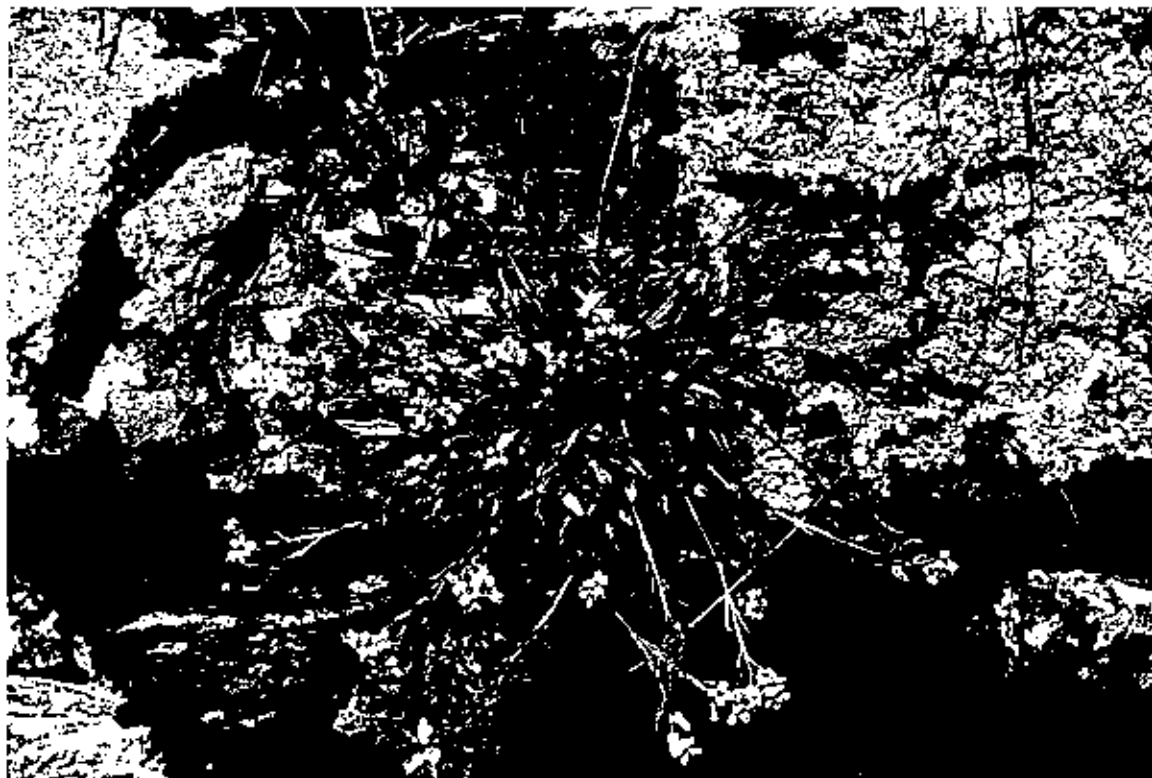
Phenology: Flowering June-October.

Comments:

Illustrations: Color photographs appear in Rickett (1970) and Warnock (1977).

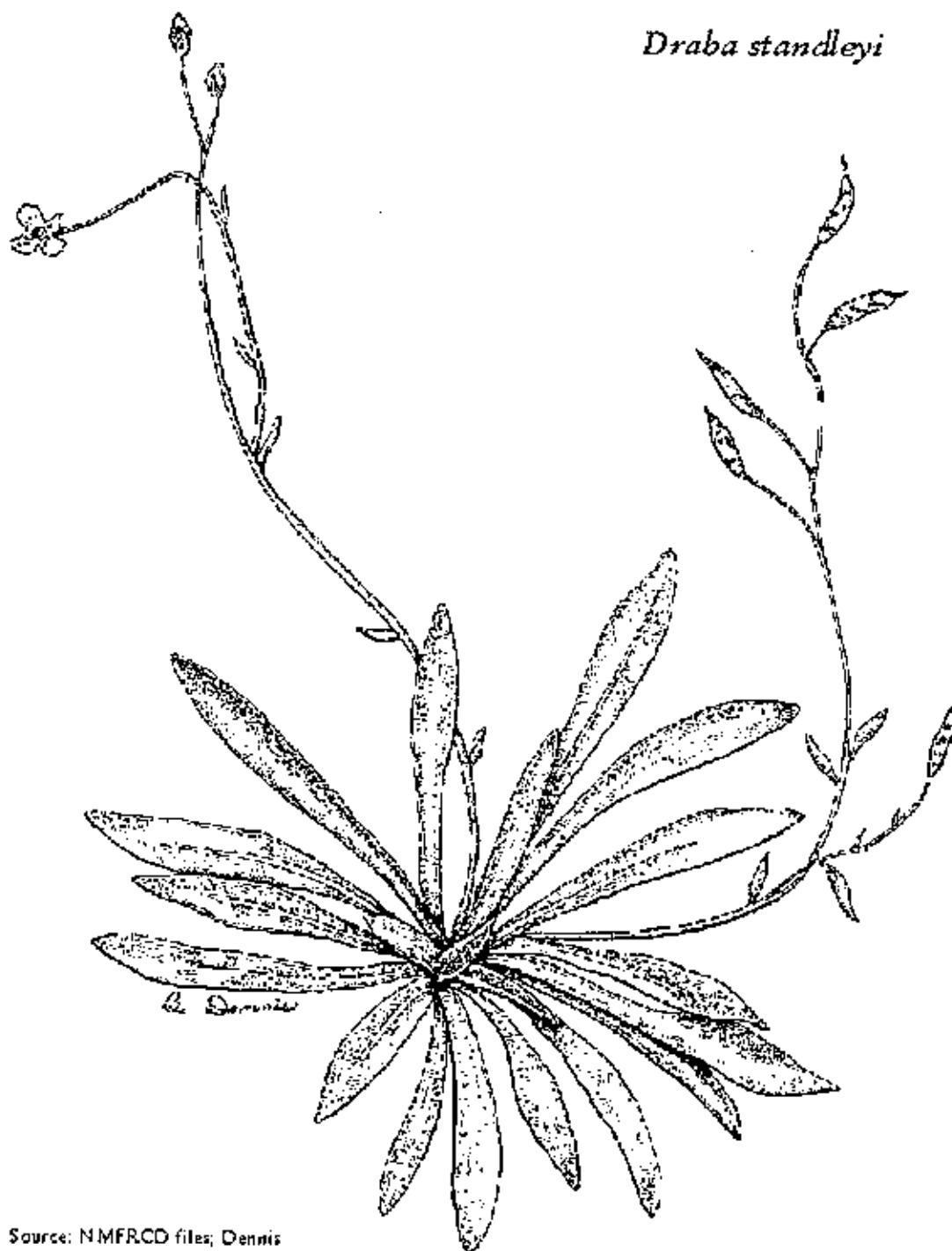
Selected References:

- Rickett, H. W. 1970. Wild flowers of the United States: Texas. Volume 3, Parts 1 and 2. McGraw-Hill, New York City.
- Rollins, R. C. 1993. The Cruciferae of continental North America. Stanford University Press, Stanford. 976 pp.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University, Alpine. 276 pp.



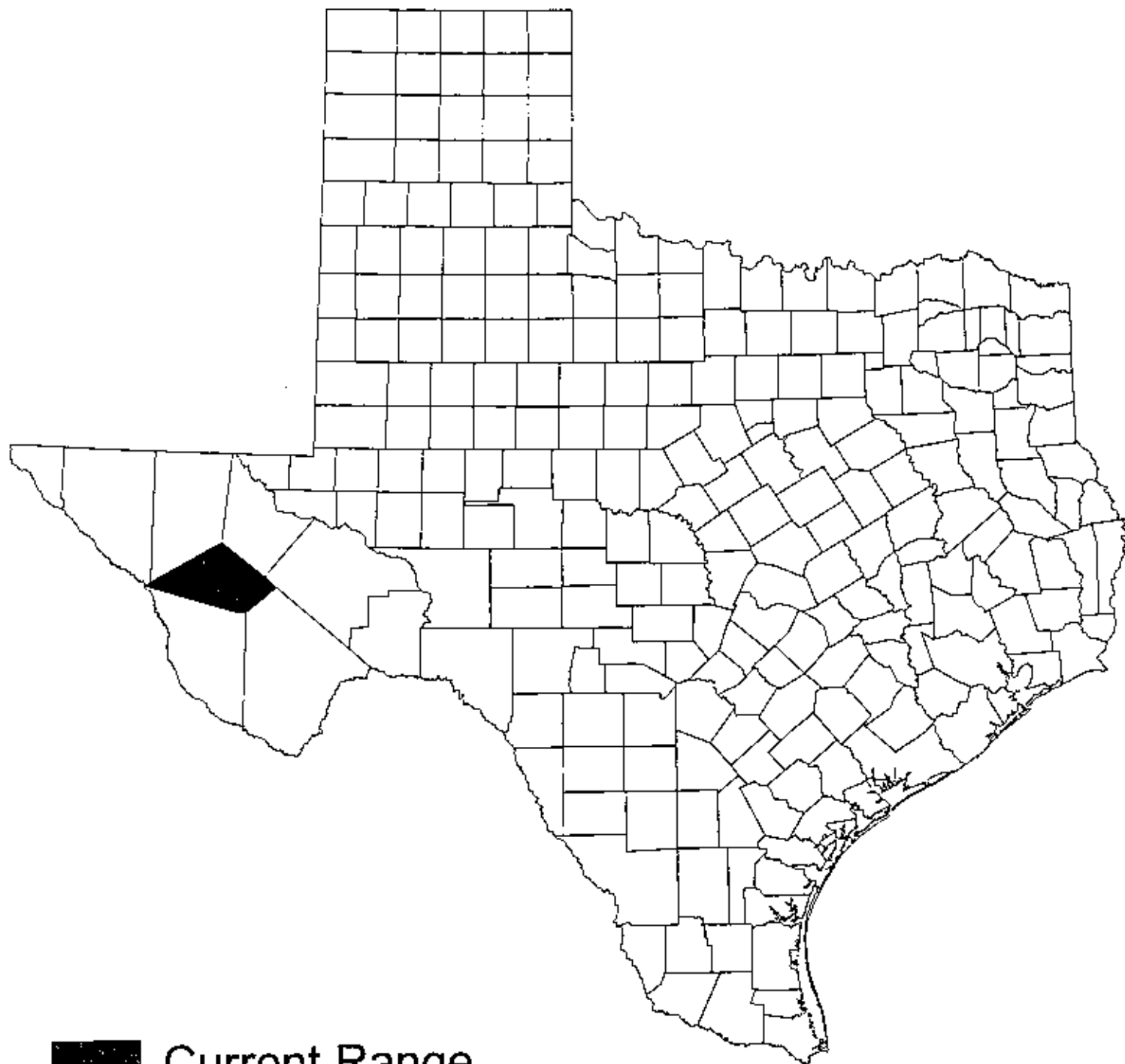
Draba standleyi
(Standley's whitlowgrass)

[\[rare plant list\]](#) [\[photos\]](#) [\[distribution map\]](#) [\[line drawing\]](#) [\[taxon report\]](#)



Source: NMFRCD files; Dennis

[HOME](#)



■ Current Range

Draba standleyi
(Stadley's draba)

Scientific Name: *Echeandia chandleri* (Greenm. & Thoms.) M. C. Johnst.

Synonyms: *Anthericum chandleri* Greenm. & Thoms. Note that the combination *Echeandia chandleri* has been published twice, first by M. C. Johnston (1990) and later by R. W. Cruden (1993).

Common Name: lila de los llanos

Global/State Ranks: G3S3

Federal Status: SOC

Global Range: Long thought to be endemic to coastal south Texas and Tamaulipas but recently reported from San Luis Potosí (R. W. Cruden pers. comm.) and the mountains of Coahuila (Villareal Q. 1994).

State Range: Cameron, Kleberg and Nueces counties. However, some or many records from some of these counties may be based on the recently-described *Echeandia texensis*.

Description (adapted from Correll & Johnston 1970; Cruden (FNA treatment, in press [**need permission to use!]): Perennial herb from a large corm and larger storage roots. Leaves basal and cauline, grasslike; basal leaves (2-) 5-12, narrowly linear to narrowly elliptic, 15-50 cm long and 4-12 (-16) mm wide, the margins entire, often short-ciliate; cauline leaves 1-5, long-acuminate, 6.5-27 cm long, the proximal usually longer than the next node. Flowers on jointed pedicels in a bracted terminal raceme or panicle, facing outward or somewhat declinate, with six yellow tepals 10-20 mm long, the inner 3 elliptic, 4.5-8 mm wide, the outer 3 also elliptic, 2.5-4.5 mm wide; stamens 6, narrowly cylindrical, (4-) 5-9.5 mm long, the anthers separate, usually twisted or reflexed but not connate, 2-3 mm long; ovary 2-5 mm long. Fruit an oblong to broadly oblong capsule 8-14 mm long and 5-7 mm wide.

Similar Species: At one time, *Echeandia chandleri* was the "only" *Echeandia* in southern coastal Texas and thus impossible to confuse with any other species. However, the recent description of *Echeandia texensis* (Cruden, 1999), from the same region and habitats, significantly complicated the situation. The two can be separated on the basis of stamen characters: in *E. chandleri*, the anthers are distinct and shorter than 4 mm long, while in *E. texensis*, the anthers are connate and 4 mm long or longer. Differences in vegetative characters, unknown at present, may come to light with additional field research.

Habitat: Most commonly encountered among shrubs or in grassy openings in subtropical thorn shrublands on somewhat saline clay of lomas along the Gulf Coast near the mouth of the Rio Grande. *Echeandia chandleri* also occurs in a few upland coastal prairie remnants on clay soils over the Beaumont Formation at inland sites well to the north.

Phenology: Flowering (May-) September-December; fruiting October-December. Flowers open in the morning and close by mid-day. When flowering stalks are absent, the flat grass-like leaves are easily overlooked.

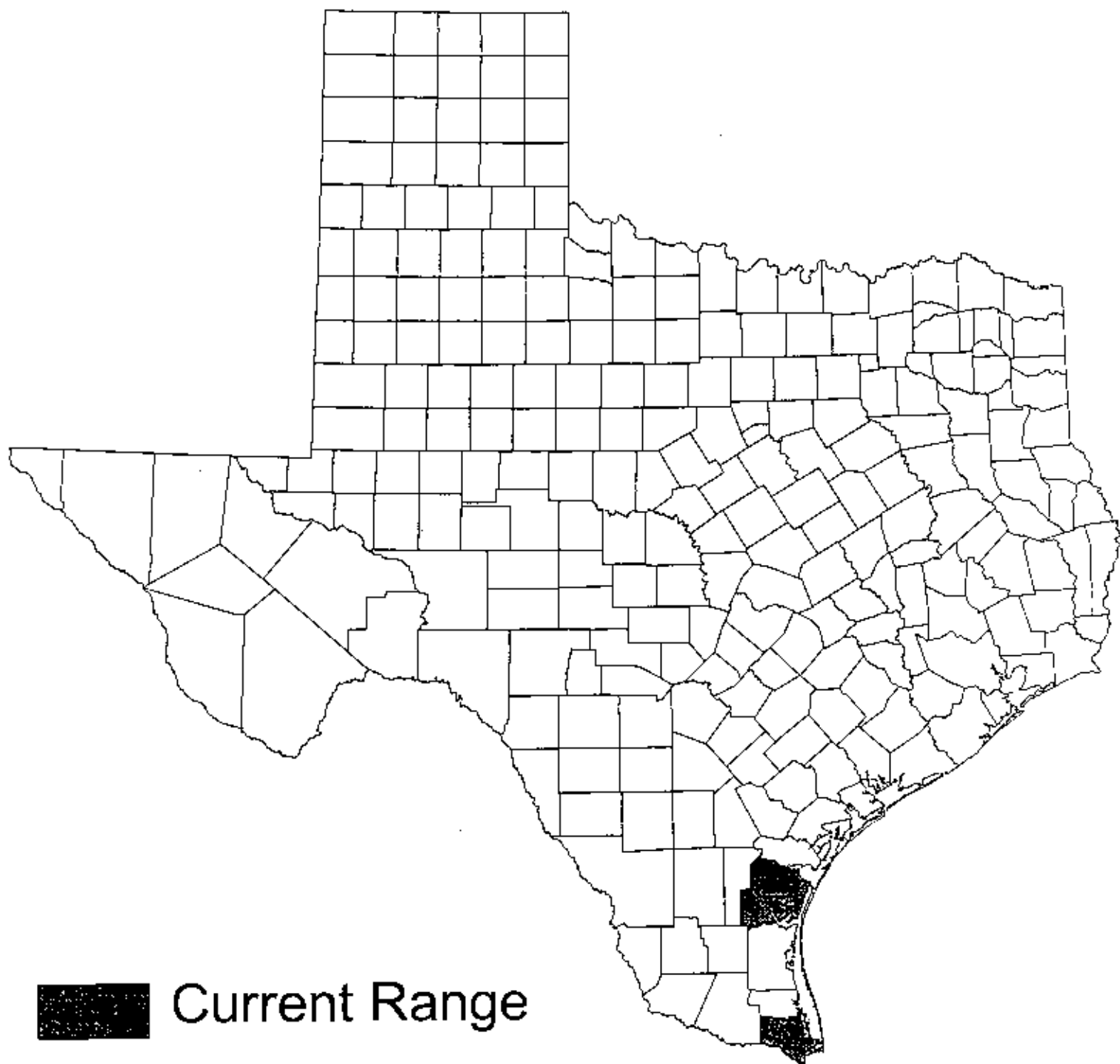
Comments: There are records of *Echeandia chandleri* from dozens of lomas and other sites in coastal south Texas. However, at least four of these records are now known to be based on specimens of the recently described *E. texensis*. Additional field work is needed to determine the true status of both species in south Texas.

Illustrations: A color photograph appears in Richardson (1995).

Selected References:

- Cruden, R. W. 1981. New *Echeandia* (Liliaceae) from Mexico. *Sida* 9: 139-146.
- Cruden, R. W. 1993. New species of *Echeandia* (Liliaceae) from Oaxaca. *Sida* 9: 139-146.
- Cruden, R. W. 1999. A new subgenus and fifteen new species of *Echeandia* (Anthericaceae) from Mexico and the United States. *Novon* 9: 325-338.
- Johnston, M. C. 1990. The vascular plants of Texas: a list, updating the manual of the vascular plants of Texas. 2nd edition. Privately published, Austin. 107 pp.
- Poole, J. M. 1985. Status report on *Anthericum chandleri* Greenm. & Thoms. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Richardson, A. 1995. Plants of the Rio Grande delta [revised edition of "Plants of Southmost Texas"]. University of Texas Press, Austin. 332 pp. + 94 plates.
- Villareal Q., José A. 1994. Flora vascular de la Sierra de la Paila, Coahuila, México. *Sida* 16(1): 109-138.





■ Current Range

Echeandia chandleri
(lila de los llanos)

Scientific Name: *Echeandia texensis* R. W. Cruden

Synonyms: None.

Common Name: Green Island echeandia

Global/State Ranks: G1S1

Federal Status: None.

Global Range: Apparently endemic to southern coastal Texas.

State Range: Known only from Cameron County.

Description (adapted from Cruden 1999): Perennial herb from a corm and larger storage roots, with glabrous, unbranched flowering stems 56-105 cm tall. Leaves basal and cauline, grasslike; basal leaves 4-9, 33-60 cm long, 10-20 mm wide, linear to narrowly elliptic, sometimes weakly falcate, the margins minutely denticulate to denticulate; cauline leaves 4-5, (4.3-) 10-20 cm long, the lowest frequently exceeding the next node. Flowers on jointed pedicels in a bracted terminal raceme or panicle, nodding, with six yellow tepals 12-19 mm long, the inner 3 broadly elliptic, 6-8.5 mm wide, the outer 3 elliptic, 2.5-3.5 mm wide; stamens 6, the filaments scaled, narrowly clavate, 5-9 mm long, the anthers connate, 4-5.5 mm long, the cones 2-3 mm wide, usually shorter than the filaments, weakly to strongly tapered, the apex 1-1.5 mm wide, deeply and broadly lobed; ovaries 2-3.5 mm long. Fruit an oblong capsule 9-13 mm long and 4-6 mm wide.

Similar Species: Very similar to *Echeandia chandleri*, which occupies the same habitats in the same region. In *E. chandleri*, the anthers are distinct and shorter than 4 mm long; in *E. texensis*, the anthers are connate and 4 mm long or longer.

Habitat: Apparently like that of *Echeandia chandleri*, i.e., among shrubs or in grassy openings in subtropical thorn shrublands on somewhat saline clay of lomas along the Gulf Coast near the mouth of the Rio Grande.

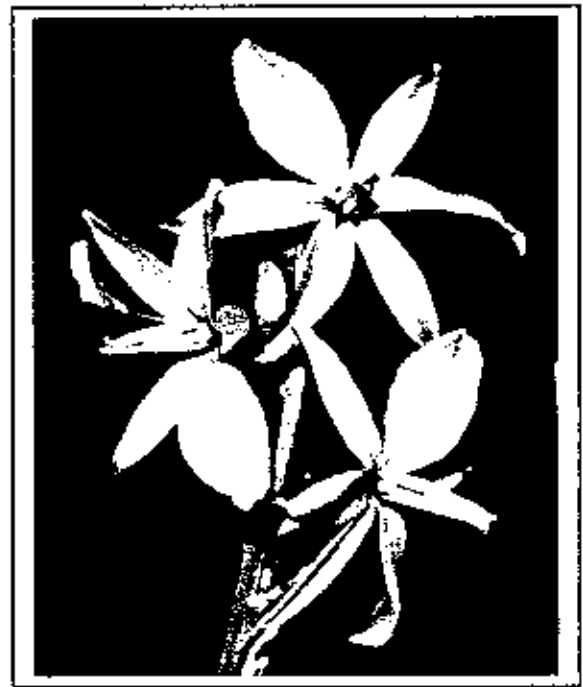
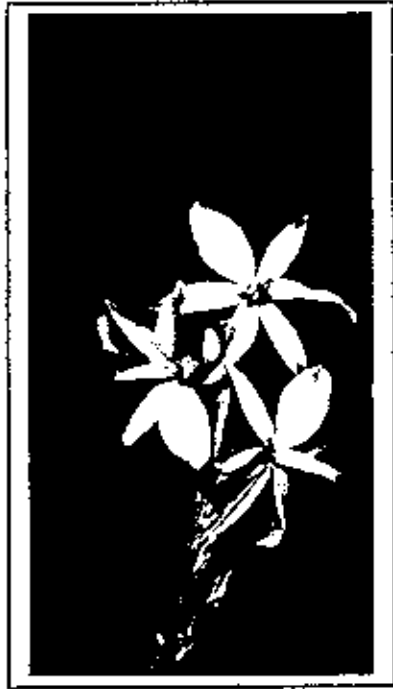
Phenology: Known to flower during April, June and November (Cruden 1999), doubtless in other months as well. As with other *Echeandia* species, *E. texensis* is probably easily overlooked when the flowering stalks are absent.

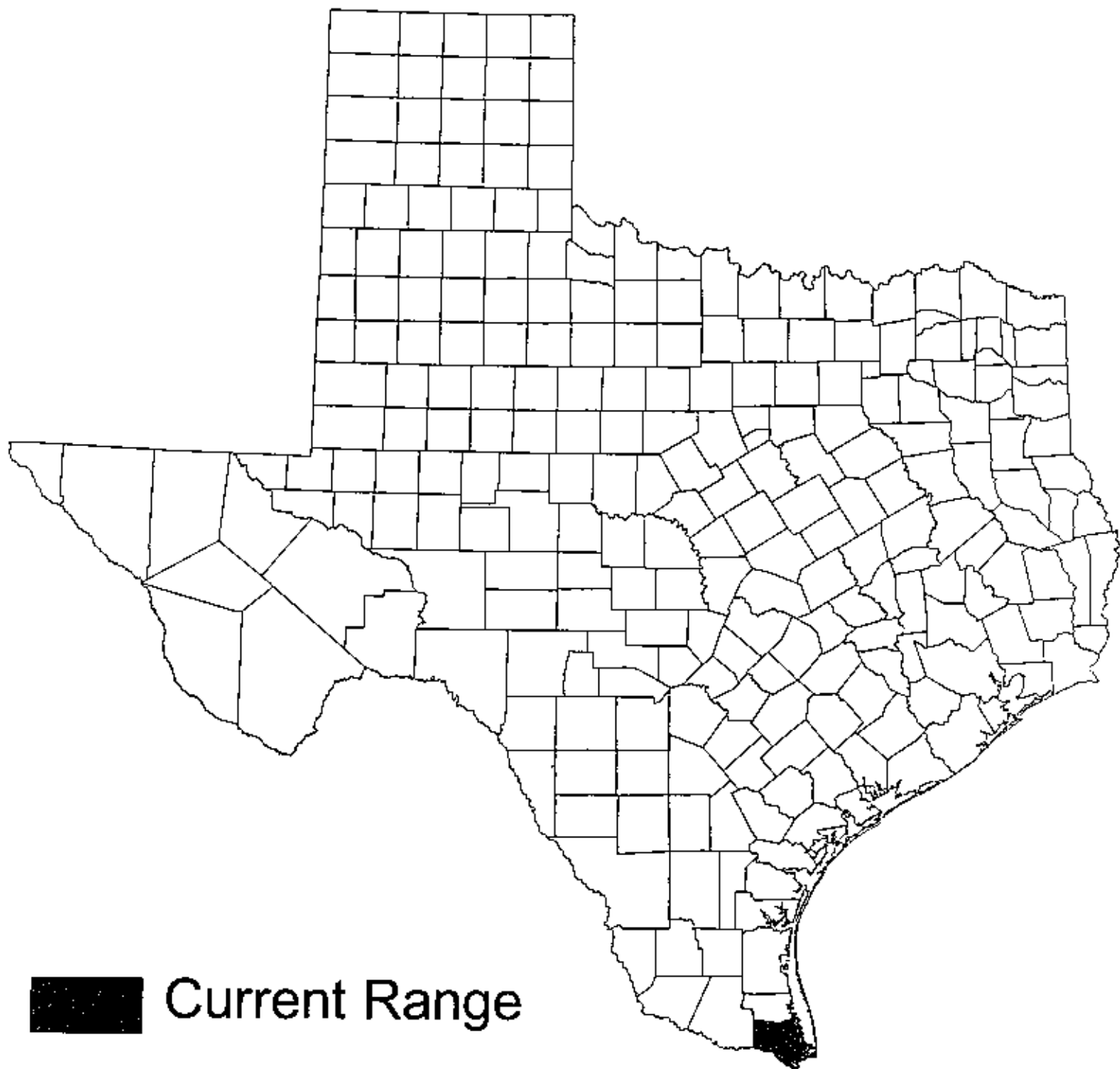
Comments: The common name is taken from the loma island from which the type specimen (B. C. Tharp 1922) was collected.

Illustrations: None known.

Selected References:

Cruden, R. W. 1999. A new subgenus and fifteen new species of *Echeandia* (Anthericaceae) from Mexico and the United States. *Novon* 9: 325-338.





■ Current Range

Echeandia texensis
(Green Island echeandia)

Scientific Name: *Echinocereus chisoensis* W. T. Marshall var. *chisoensis*

Synonymy: *Echinocereus reichenbachii* (Terscheck) Haage f. var. *chisoensis* (W. T. Marshall) L. Benson; epithet sometimes spelled "chisosensis".

Common Name: Chisos Mountains hedgehog cactus; Chisos pitaya

Global/State Ranks: G2T1S1

Federal Status: Threatened

Global Range: southern Trans-Pecos, Texas

State Range: Brewster County.

Description: (compiled from Benson 1982, Weniger 1984, Taylor 1985, Blum et al. 1998, Evans 1998,): Perennial stem succulent; stems usually solitary, often branched, cylindrical, green to reddish-maroon, 5-25 cm (2-10 in.) tall, 3-5 cm (1½-2 in.) in diameter; ribs 13-16, distinctly tuberculate, areoles 2 mm (≤¼ in.) long, circular and woolly when young, becoming elliptic and bare with age. **Spines** not obscuring the stem; central spines 1-4, straight, dark brown to black with whitish bases, largest lowermost, perpendicular to stem, to 6-25 mm (¼-1 in.) long; radials 10-15, whitish or ashy to pinkish gray, with brown to maroon tips, slender, uppermost bristle-like, 1.6-3.2 mm (≤⅙ in.) long, laterals to 9.5 mm (⅜ in.), and lowermost to 6-20 mm (¼-¾ in.) long. **Flowers:** pinkish to magenta, with white throats and dark crimson centers, funnelform, 6-6.4 cm (2⅜-2½ in.) long, 2.5-7 cm (1-2¾ in.) in diameter, not opening widely; floral tube greenish, woolly, with clusters of hairy or bristly, brown-tipped spines; petals pointed, remaining upright. **Fruits:** greenish-red to red, club-shaped, fleshy, 2.5-3.5 cm (1-1⅜ in.) long, 1.0-1.5 cm (⅜-⅝ in.) in diameter, with bristly or hairlike spines in the woolly areoles; seeds oval, 1-1.2 mm (<¼ in.) in diameter, dark brown to black, warty.

Habitat: Desert grasslands or open shrublands on unconsolidated gravelly fan and terrace deposits on desert flats and low hills at moderate elevations (2000-2500 feet) in the Chihuahuan Desert. Associated species include *Larrea tridentata*, *Fouquieria splendens*, *Jatropha dioica*, *Yucca torreyii*, *Leucophyllum frutescens*, *Acacia constricta*, *Agave lechuguilla*, *Opuntia rufida*, *O. violacea*, *O. leptocaulis*, *O. engelmannii*, *O. schottii*, *Echinocereus stramineus*, *E. pectinatus*, *Echinocactus horizonthalonius*, *Neolloydia warnockii*, *Coryphantha macromeris*, and *C. echinus* (Heil & Anderson 1982).

Phenology: Flowering March-early June (Heil & Anderson 1982) or April-July (Heil et al. 1985); fruit maturing May-August (Heil & Anderson 1982).

Similar Species: *E. chisoensis* var. *chisoensis* is easily distinguished from other species by the usually solitary, large, ribbed, tuberculate stems; the number and length of radial spines; its large, pink flowers; and the floral tube with its covering of wool and bristly, hairlike spines. No other species in Texas present this combination of characters.

Comments: The other variety of *chisoensis*, var. *fobeanus*, occurs in Coahuila and Durango in Mexico. It differs in flower color (centers pale green or light brown), flower length (to 9.5 cm (3¾in.) long), and development of annual growth segments (Anderson 2001).

Illustrations: Line drawings of spine characters and a color photograph appear in Poole & Riskind (1987); a black and white photograph appears in Heil and Brack 1988; color photographs appear in Benson (1982), Weniger (1984), Loughmiller & Loughmiller (1984), Blum et al. (1998), Evans (1998), and Anderson (2001).

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Blum, W., M. Lange, W. Rischer, and J. Rutow. 1998. *Echinocereus*. Publisher not stated. 496 pp.
- Evans, D. B., 1986. Survey of Chisos pitaya (*Echinocereus reichenbachii* var. *chisoensis*). U. S. National Park Service, Big Bend National Park. 18 pp.
- Evans, D. B. 1998. Cactuses of Big Bend National Park. University of Texas Press, Austin. 83 pp.
- Heil, K. D. and E. F. Anderson. 1982. Status report [on *Echinocereus chisoensis*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque, New Mexico.
- Heil, K. D., S. Brack, and J. M. Porter. 1985. The rare and sensitive cacti of Big Bend National Park. Report prepared for Big Bend National Park, Texas. 41 pp.
- Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.

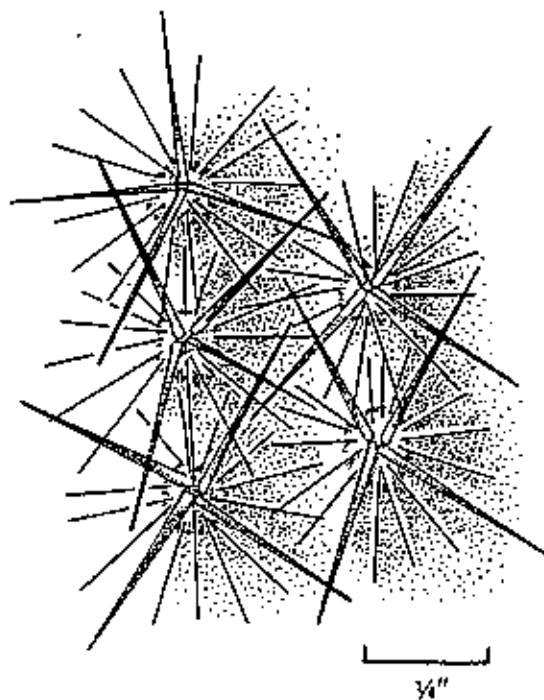
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder, no pagination.
- Taylor, N. P. 1985. The genus *Echinocereus*. Timber Press, Portland, OR. 160 pp.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.
- U.S. Fish & Wildlife Service. 1993. *Echinocereus chisoensis* var. *chisoensis* (Chisos Mountain hedgehog cactus) recovery plan. U.S. Fish & Wildlife Service, Albuquerque, New Mexico. 60 pp.



Common Name:

Chisos hedgehog cactus**Chisos Mountain hedgehog,
Chisos pitaya, Chisos hedgehog**

Paul Montgomery

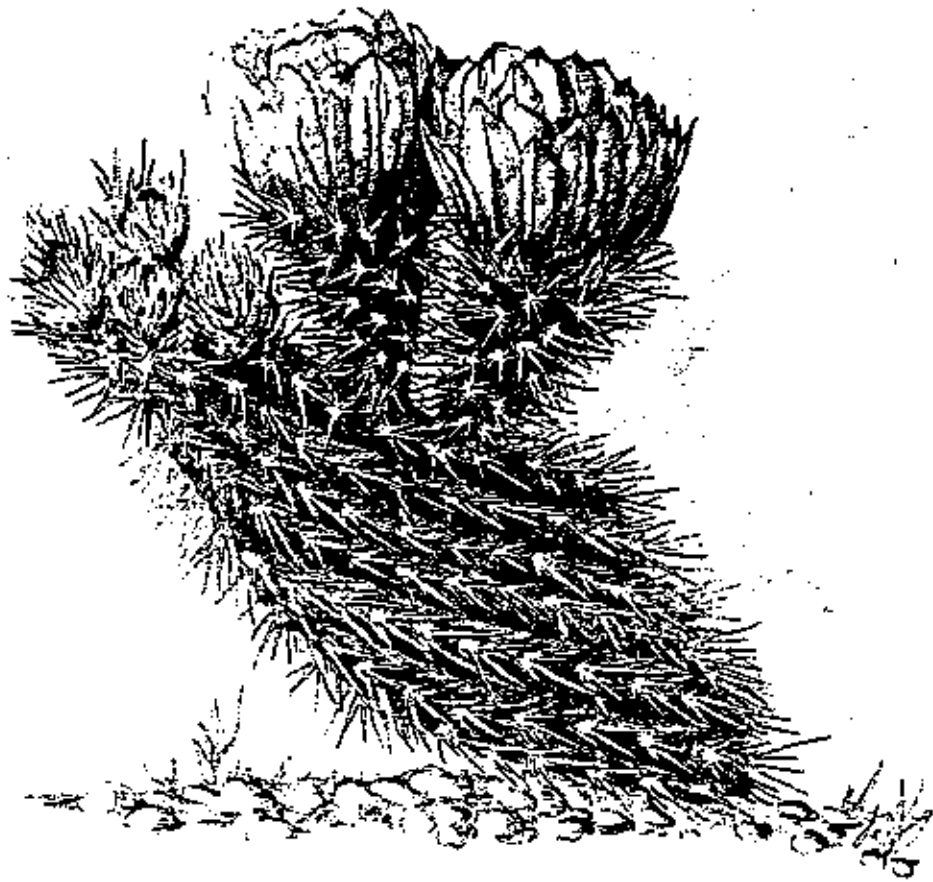
**Scientific Name:** *Echinocereus chisoensis* W.T. Marshall
var. *chisoensis***Other Scientific Names:** *Echinocereus reichenbachii*
(Terscheck) Haage f. ex Britt. & Rose var. *chisoensis*
(W.T. Marshall) L. Benson; *Echinocereus chisosensis*, a
misspelling.**Federal Status:** Listed as Threatened, September 30, 1988**State Status:** Listed as Threatened, December 30, 1988**Photographs and Drawings:** Benson, 1982, plate 113;
Warnock, 1970, p. 88; Weniger, 1970, plate 7;
Weniger, 1984, p. 41.**Description:****Habit:** Stems single, rarely branching with age or
injury, cylindrical, to 8 in. tall, slender, to 2 in.
in diameter, deep green to blue- to yellowish-green,
with 13-16 ribs composed of distinct tubercles sep-
arated by broad valleys; areoles circular and wooly
at first, becoming oval and bare with age, $\frac{1}{8}$ in. or
less across, about $\frac{1}{4}$ in. apart.**Spines:** Sparse, not covering stems, slender, straight,
whitish overall; central spines black to dark brown,
usually with whitish bases, 1-4, one pointed out-
ward, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, the others shorter and spread-
ing; outer spines white or gray below and red-
brown or maroon above, 10-15, bristle-like, evenly
spaced, parallel to the stem, upper ones $\frac{1}{4}$ - $\frac{1}{2}$ in.
long, progressively longer toward the bottom,
lower ones $\frac{1}{4}$ - $\frac{1}{2}$ in. long.**Flowers:** Rose with reddish centers, to $2\frac{1}{2}$ in. long, $\frac{1}{2}$
in. in diameter, never opening widely; "petals"
upright, oblong, to 2 in. long, with entire, pointed
tips; style short, white, with 10 small, dark green
stigma lobes; flowering April to July.**Fruit:** Club-shaped, red and fleshy when ripe, 1-1 $\frac{1}{4}$ in.
long, about $\frac{1}{4}$ in. in diameter, covered with wool
and bristle-like spines, becoming dry and splitting
open with age; seeds egg-shaped, about $\frac{1}{4}$ in.
long, black, warty.**Habitat:** Desert grasslands and shrublands at low eleva-
tion; with dog cholla, creosote bush, lechuguilla,
ocotillo, and leatherstem.**Typical spine clusters of
Chisos hedgehog cactus**

(continued on back)

**CHISOS MOUNTAIN
HEDGEHOG CACTUS**

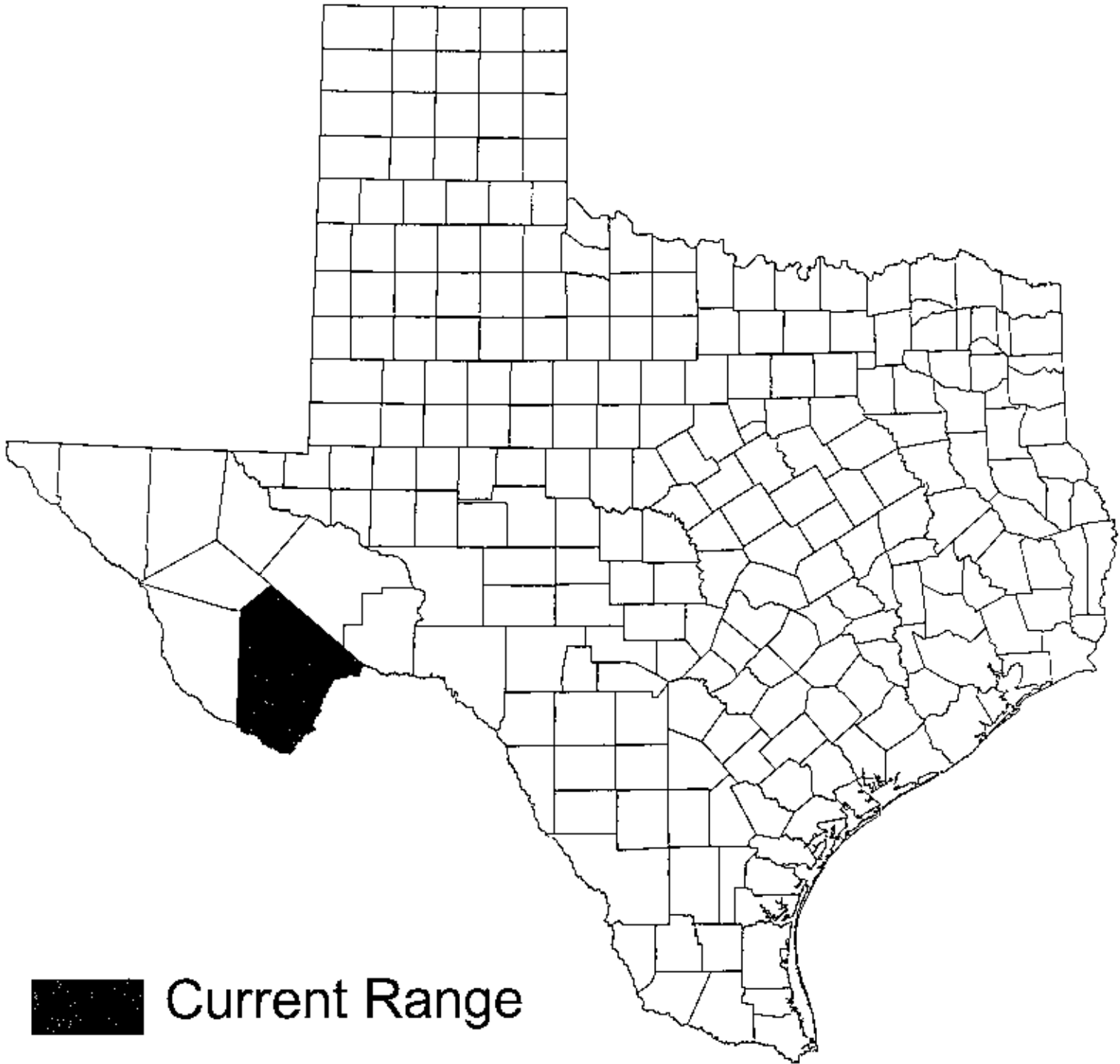
(Echinocereus chisoensis var. chisoensis)

RECOVERY PLAN



**U.S. Fish and Wildlife Service
Albuquerque, New Mexico**

1993



■ Current Range

Echinocereus chisoensis var. *chisoensis*
(Chisos Mountains hedgehog cactus)

Scientific Name: *Echinocereus chloranthus* Engelm. var. *neocapillus* Weniger

Synonymy: *Echinocereus neocapillus* (Weniger) Blum and Lange; *E. chloranthus* ssp. *neocapillus* (Weniger) Fürsch

Common Name: golden-spine hedgehog cactus; long-haired green-flowered pitaya

Global/State Ranks: G4T1S1

Federal Status: SOC

Global Range: Trans-Pecos, Texas.

State Range: Brewster and Presidio counties.

Description: (compiled from Weniger 1984, Taylor 1985, Blum et al. 1998):

Perennial stem succulent. **Stems** usually solitary, occasionally branched above, cylindrical, erect, pale to yellowish green, to 25 cm (10 in.) tall, 3-6.35 cm (1½-2½ in.) in diameter; ribs 12-18, tuberculate; areoles oval to round, 3-5 mm (⅙-¼ in.) long, covered with whitish to yellowish wool when young, becoming bare with age except for a very small tuft near where the flower is produced. **Spines** needle-like except juvenile spines (or on new branches) flexible and hair-like, white, 6-15 mm (¼-⅝ in.) long, about 40 per areole, persisting at base of old stems, normal spines appearing when stem is 2.5-5 cm (1-2 in.) tall; radial spines 26-40, straight, slender, radiating evenly around areole, clear translucent yellow to light brown or chalk-white, upper ones very slender, about 3 mm (⅙ in.) long, laterals and lower ones 6-13 mm (¼-½ in.) long; central spines 5-11, straight, heavier than radials, spreading in all directions from center of areole, translucent yellow or white or light brown, often with reddish tip, or occasionally all reddish, uppermost slender, 3-6 mm (⅙-¼ in.) long, rest heavier 6-20 mm (¼-¾ in.) long. **Flowers** dark green to yellowish green or greenish brown, funnel-shaped, not opening widely, 25-32 mm (1-1¼ in.) long, 15-25 mm (⅝-1 in.) in diameter; petals linear, edges entire, sharply pointed. **Fruits** dry, greenish, spiny, round to oval, 12-14 mm (½ in.) long, 7-10 mm (¼-⅜ in.) in diameter; seeds black, warty, 0.9-1.2 mm (<⅙ in.) long and wide.

Habitat: Sparsely vegetated desert grasslands over novaculite outcrops.

Associates include *Larrea tridentata*, *Agave lechuguilla*, *Dasyllirion leiophyllum*, *Viguiera stenoloba*, *Selaginella peruviana*, *Acacia constricta*, *Bouteloua breviseta*, *Erioneuron pulchellum*, *Yucca elata*, *Y. torreyana*, *Nolina texana*, *Opuntia violacea*, *Echinocereus stramineus*, *Escobaria hesteri*, *Thelocactus bicolor* var. *flavidispinus*, *Mammillaria gummiifera*, *Zinnia pumila*, and *Thymophylla pentachaeta*.

Phenology: Probably spring (not recorded in the literature).

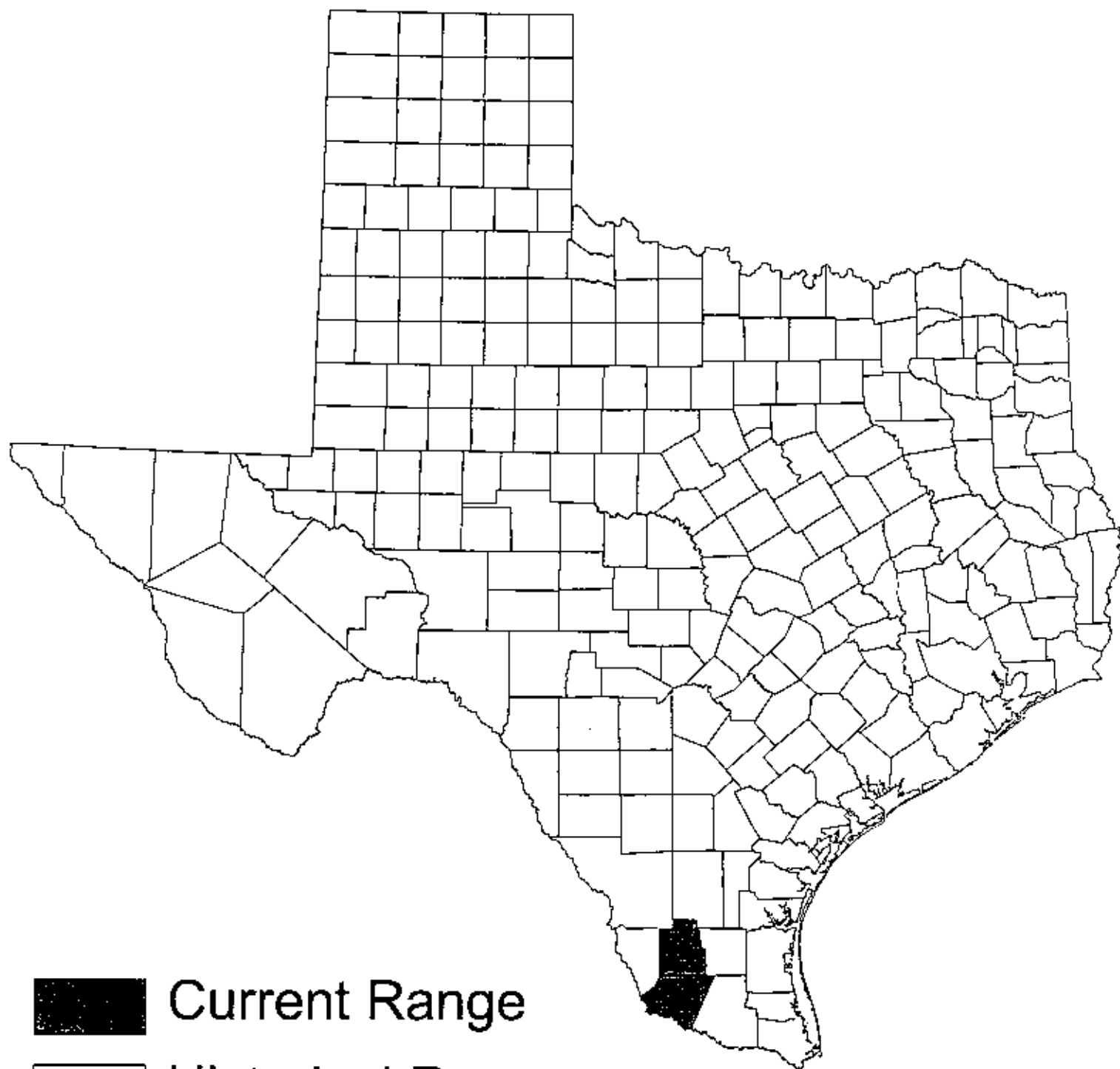
Similar Species: The juvenile stage, with long, white, hairlike spines, is considered characteristic although other species have been found to have hairy juvenile forms (Blum et al. 1998). *Neocapillus* is distinguished from *chloranthus* by the 26-40 radial spines per areole vs. 15-20 (Benson 1982). *Echinocereus rusanthus* differs in flower color, with rusty red flowers. *Echinocereus viridiflorus* (including var. *cylindricus* and var. *correllii*) differs in having 0-3 central spines.

Comments: Blum et al. (1998) recognize *neocapillus* as a full species, and more closely allied to *E. rusanthus* than *E. chloranthus*. Anderson (2001) questions the validity of this taxon, but allies it with *E. viridiflorus*.

Illustrations: Black and white photographs appear in Benson (1982); color photographs appear in Warnock (1977), Weniger (1984), and Blum et al. (1998).

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Blum, W., M. Lange, W. Rischer, and J. Rutow. 1998. *Echinocereus*. Publisher not stated. 496 pp.
- Taylor, N. P. 1985. The genus *Echinocereus*. Timber Press, Portland, OR. 160 pp.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University, Alpine. 276 pp.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



Current Range



Historical Range

Echinocereus chloranthus var. *neocapillus*
(golden-spine hedgehog cactus)

Scientific Name: *Echinocereus papillosus* Linke var. *angusticeps* (Clover) W. T. Marshall

Synonymy: *Echinocereus angusticeps* Clover; *Echinocereus blanckii* (Polseger) F. Palmer var. *angusticeps* (Clover) L. Benson (this includes both var. *angusticeps* and var. *papillosus*); *Echinocereus berlandieri* (Engelm.) Engelm. var. *angusticeps* (Clover) L. Benson

Common Name: small papillosus; small yellow-flowered alicoche

Global/State Ranks: G3T1S1 **Federal Status:** SOC

Global Range: South Texas.

State Range: Hidalgo, Jim Hogg and Starr Counties.

Description: (Compiled from Clover 1935, Benson 1982, Weniger 1984, and Taylor 1985): Perennial stem succulent; stems sprawling to upright, 5-95, green, 3.8-8 cm (1½-3¼ in.; 3-4 in. according to Weniger) long, 2-3 cm (¾-2¼ in.) in diameter, forming clumps to about 30 cm (12 in.) in diameter, ribs 6-8, tuberculate, tubercles projecting 3-9 mm (¼-¾ in.), areoles circular. **Spines** not obscuring the stem, straight; central spine solitary, brown to yellow, needle-like, erect, 7-8 mm (¼ in., to ¾ in. according to Weniger) long; radial spines 7-9, white to yellow, needle-like, upper ones smaller, about 4 mm (¼ in.) long. **Flowers** yellow with reddish to drab purplish centers, 6.2-9 cm (2½-3½ in.) in diameter, 6.2-8 cm (2½-3¼ in.) long, inner petals slightly abruptly pointed or rounded. **Fruits** greenish, with numerous deciduous spines, globose, to 1.5 cm (½ in.) in diameter.

Habitat: Open shrublands and mesquite woodlands on light to dark sandy loam. With *Ziziphus obtusifolia*, *Aloysia gratissima*, *Karwinskia humboltiana*, *Jatropha dioica*, *Mammillaria sphaerica*, *M. heyderi* var. *hemisphaerica*, and *Ferocactus setispinus*. One site was observed with red sandy loam over calcareous sandstone and caliche of the Goliad Formation ("Bill, where did this info come from").

Phenology: Flowering in April to May (Clover 1935 and field observations of Carr) or early spring (Everitt & Drawe 1993).

Similar Species: Variety *papillosus* has larger stems: 10-17.5 cm (4-6¾ in., to 10 in. according to Weniger) long and 3-7 cm (1¼-2¾ in.) in diameter. However the clumps formed by var. *papillosus* contain only 1-12 stems. The petals of var. *papillosus* are acuminate as compared to the abruptly pointed or rounded ones of var. *angusticeps*. Also the bases of the petals of var. *angusticeps* are not as bright a shade of red as those of var.

papillosus. All other species of *Echinocereus* from south Texas have flowers in shades of red to purple and much larger stems.

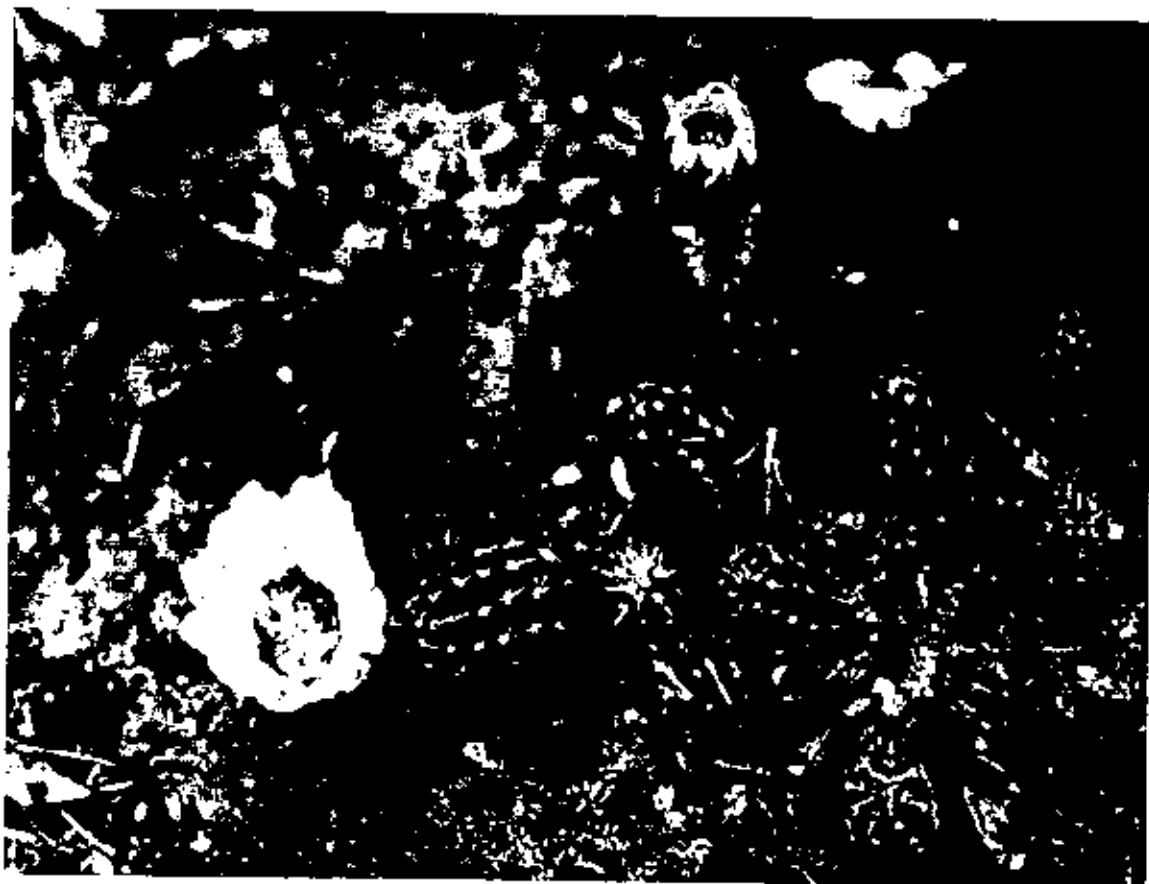
Comments: First described as a full species by Clover (1935), *Echinocereus angusticeps* was reduced to a variety of *E. papillosus* by Marshall (1941). Benson in his treatments in the Flora of Texas (Benson 1966) and the Manual of the Vascular Plants of Texas (Benson 1970) combined both varieties of *E. papillosus* into *E. blanckii* var. *angusticeps*. Later Benson (1982) recognized *papillosus* and *angusticeps* as separate varieties, but within the species *berlandieri*. Thus in the most recent works on the genus or family, Taylor (1985) and Weniger (1984) recognize *angusticeps* as a variety of *E. papillosus* while Benson (1982) recognizes *angusticeps* as a variety of *E. berlandieri*. However Anderson (2001) and Blum et al. (1998) do not recognize *angusticeps*, and place it in synonymy with *E. papillosus*. Specimens have been seen by Bill Carr that possessed characters of both varieties. Obviously additional taxonomic work is needed to determine if *E. papillosus* var. *angusticeps* is a distinct entity from var. *papillosus*.

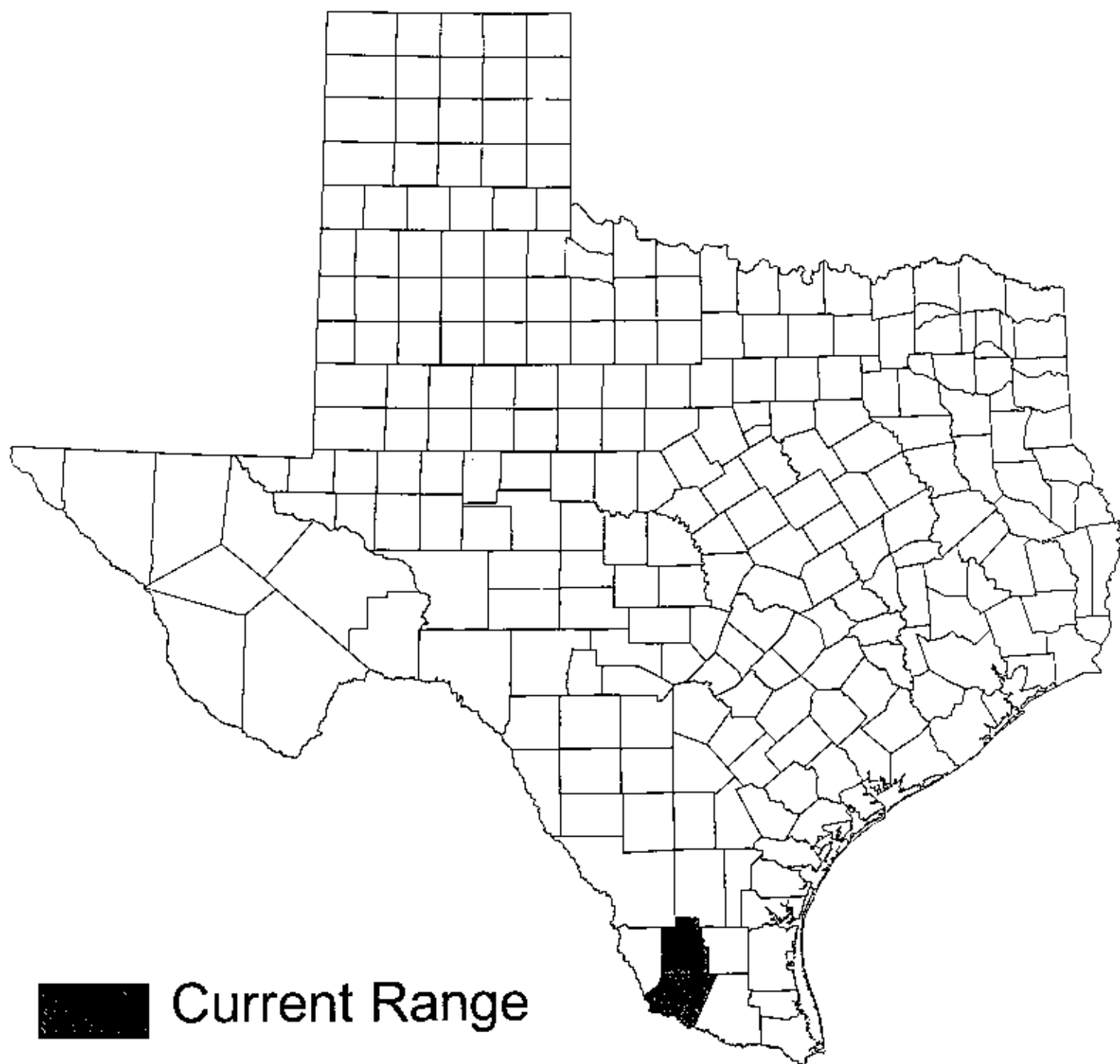
Illustrations: Color photographs appear in Weniger (1984) and Everitt & Drawe (1993). A black and white photograph, contrasting *E. angusticeps* and *E. papillosus* appears in Clover's original description in *Rhodora* (Clover 1935).

Selected References:

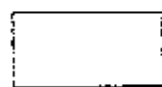
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- Benson, L. 1966. Cactaceae (pp. 221-317, pls. 1-14) in Lundell, C. L. and collaborators, Flora of Texas, vol. 2., Texas Research Foundation, Renner. 415 pp.
- Benson, L. 1970. Cactaceae (pp. 1087-1113) in Correll, D. S. and M. C. Johnston, The Manual of the Vascular Plants of Texas, Texas Research Foundation, Renner. 1881 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Blum, W., M. Lange, W. Rischer, and J. Rutow. 1998. *Echinocereus*. Publisher not stated. 496 pp.
- Clover, E. U. 1935. *Echinocereus angusticeps*, a new species from the Lower Rio Grande Valley, Texas. *Rhodora* 37:77-80, plate 327.

- Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock. 213 pp.
- Marshall, W. T. and T. M. Bock. 1941. Cactaceae. Abbey Garden Press, Pasadena, California.
- Taylor, N. P. 1985. The genus *Echinocereus*. Timber Press, Portland, Oregon. 160 pp.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.





Current Range



Historical Range

Echinocereus papillosus var. *angusticeps*
(small papillosus cactus)

Scientific Name: *Echinocereus reichenbachii* (Terscheck) Haage f. var. *albertii*
L. Benson

Synonymy: *Echinocereus melanocentrus* Lowry; *E. fitchii* Britton and Rose ssp.
albertii (L. Benson) Blum and Lange

Common Name: black lace cactus

Global/State Ranks: G5T1QS1

Federal Status: Endangered

Global Range: South Texas.

State Range: Jim Wells, Kleberg and Refugio counties.

Description (compiled from Benson 1982, Weniger 1984, Blum et al. 1998):

Perennial stem succulent. **Stems** solitary, sometimes with 2-3 side branches with age, dark green, cylindrical, to 20 cm (7 $\frac{7}{8}$ in.) tall, 4-5 cm (1 $\frac{5}{8}$ -2 in.) in diameter, ribs 10-13, tuberculate; areoles oval to elliptic, 1.5-4 mm (\leq $\frac{1}{8}$ in.) long, woolly on new growth. **Spines:** radials 14-20, pectinate, 3-6 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) long, white to pink with dark purple tips; centrals 0-1, 2-15 mm ($<$ $\frac{1}{8}$ - $\frac{5}{8}$ in.) long, very dark purple, mahogany, or black, projecting outward or slightly upward. **Flowers** purplish-pink with crimson center, funnel-shaped, 5-7.5 cm (2-3 in.) tall and in diameter, petals almost linear or slightly broader in upper part, ends more or less ragged, greatly recurving with age. **Fruits** oval, dark green, 15-20 mm ($\frac{5}{8}$ - $\frac{3}{4}$ in.) long, 10-15 ($\frac{3}{8}$ - $\frac{5}{8}$ in.) in diameter; seeds black, 0.8-1.1 mm ($<$ $\frac{1}{8}$ in.) long and in diameter.

Habitat: Grasslands, thorn shrublands, mesquite woodlands on sandy, possibly somewhat saline soils on coastal prairie; within these communities it may occur most frequently in natural open areas sparsely covered with brush of a low stature not resulting from disturbance (USFWS 1986); sometimes growing at the ecotone between this upland type and lower areas dominated by halophytic grasses and forbs. Frequently associated species include *Acacia rigidula*, *A. smallii*, *Celtis pallida*, *Condalia hookeri*, *Lantana horrida*, *Prosopis glandulosa*, *Yucca torreyi*, *Zanthoxylum fagara*, *Ziziphus obtusifolius*, *Lycium berlandieri*, *Guaiacum angustifolium*, *Rivina humilis*, *Echinocactus texensis*, *Ferocactus setispinus*, *Mammillaria heyderi* var. *hemisphaerica*, *Opuntia leptocaulis*, *O. lindheimeri*, *Gutierrezia glutinosa*, *Digitaria californica*, *Setaria leucopila*, and *Sporobolus pyramidatus* (USFWS 1986).

Phenology: Flowering April-June.

Similar Species: Black lace cactus is similar to *E. fitchii* (*E. fitchii* ssp. *fitchii*, *E. reichenbachii* var. *fitchii*) as is evidenced by several cactologists either

sinking var. *albertii* in *fitchii* (Taylor 1986; Anderson 2001) or making it a subspecies of *fitchii* (*E. fitchii* ssp. *albertii*, Blum et al. 1998). However *fitchii* has 4-7 central spines. Also the overall color of the plant from a distance is rusty brownish-red as opposed to the blackish color of *albertii* due to spine color. The two taxa are also separated geographically and ecologically. *Fitchii* occurs in thorn shrublands on gravelly limestone soils, calcareous sandy loams, or somewhat saline clays in the western part of southmost Texas in Jim Hogg, Starr, Zapata, and Webb Counties as well as adjacent Mexico. *Albertii* grows in grasslands, thorn shrublands, and mesquite woodlands on sandy, possibly somewhat saline soils, sometimes growing at ecotone between this upland type and lower areas dominated by halophytic grasses and forbs in the south Texas coastal counties of Refugio, Jim Wells, and Kleberg.

Comments: Anderson (2001) states that *E. reichenbachii* spp. *fitchii* is listed as endangered due to his belief that *E. reichenbachii* var. *albertii* is a synonym. However federal and state agencies continue to recognize *E. reichenbachii* var. *albertii* as a valid entity.

Illustrations: Black-and-white and color photographs appear in Benson (1982); line drawings of spine characters and a color photograph appear in Poole & Riskind (1987); a color photograph appears in Blum et al. (1998) and in Weniger (1984) as *E. melanocentrus*.

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Blum, W., M. Lange, W. Rischer, and J. Rutow. 1998. *Echinocereus*. Publisher not stated. 496 pp.
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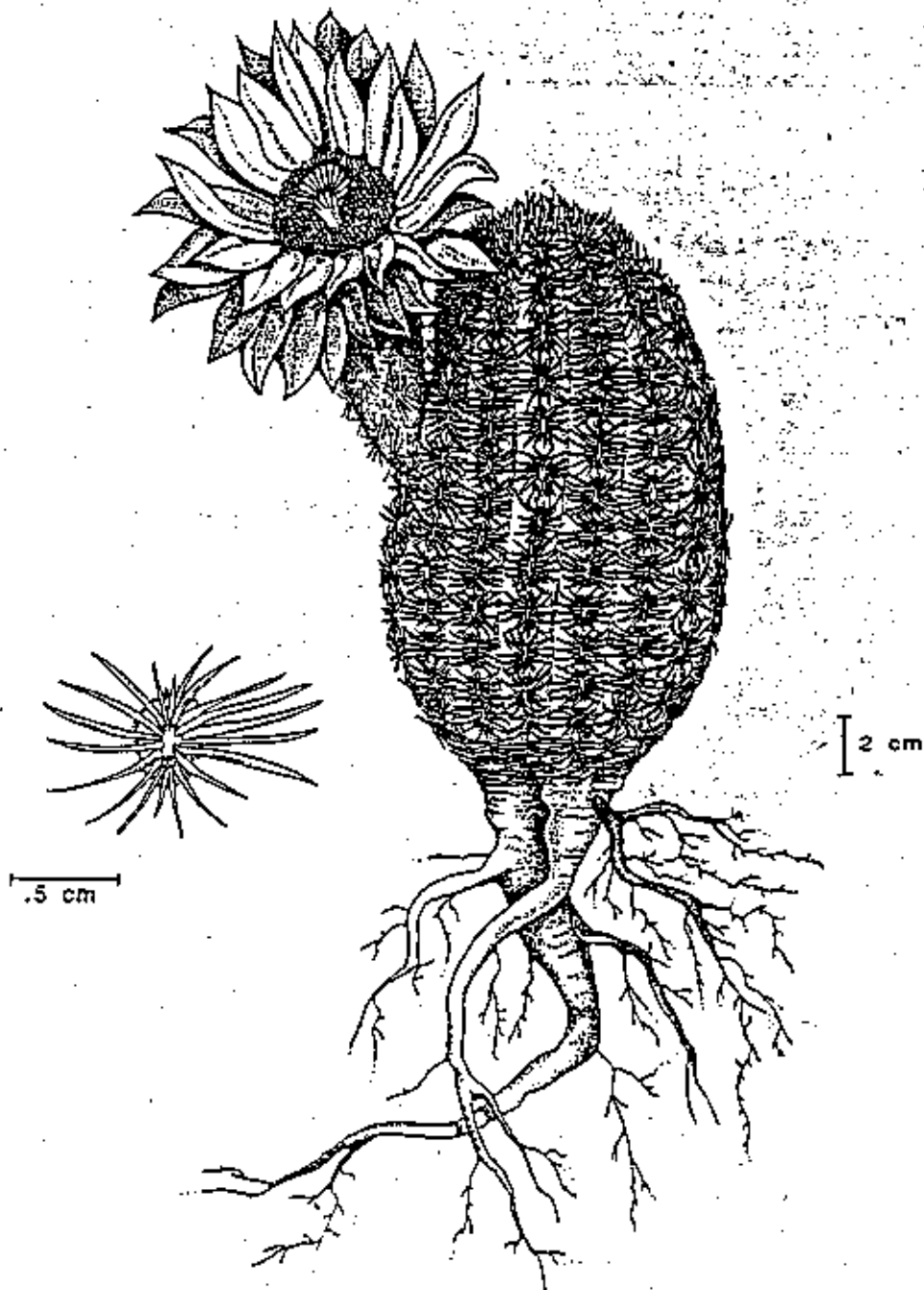
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- Weniger, D. 1979. Status report on *Echinocereus reichenbachii* [var.] *albertii*. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



BLACK LACE CACTUS

(*Echinocereus reichenbachii* var. *albertii*)

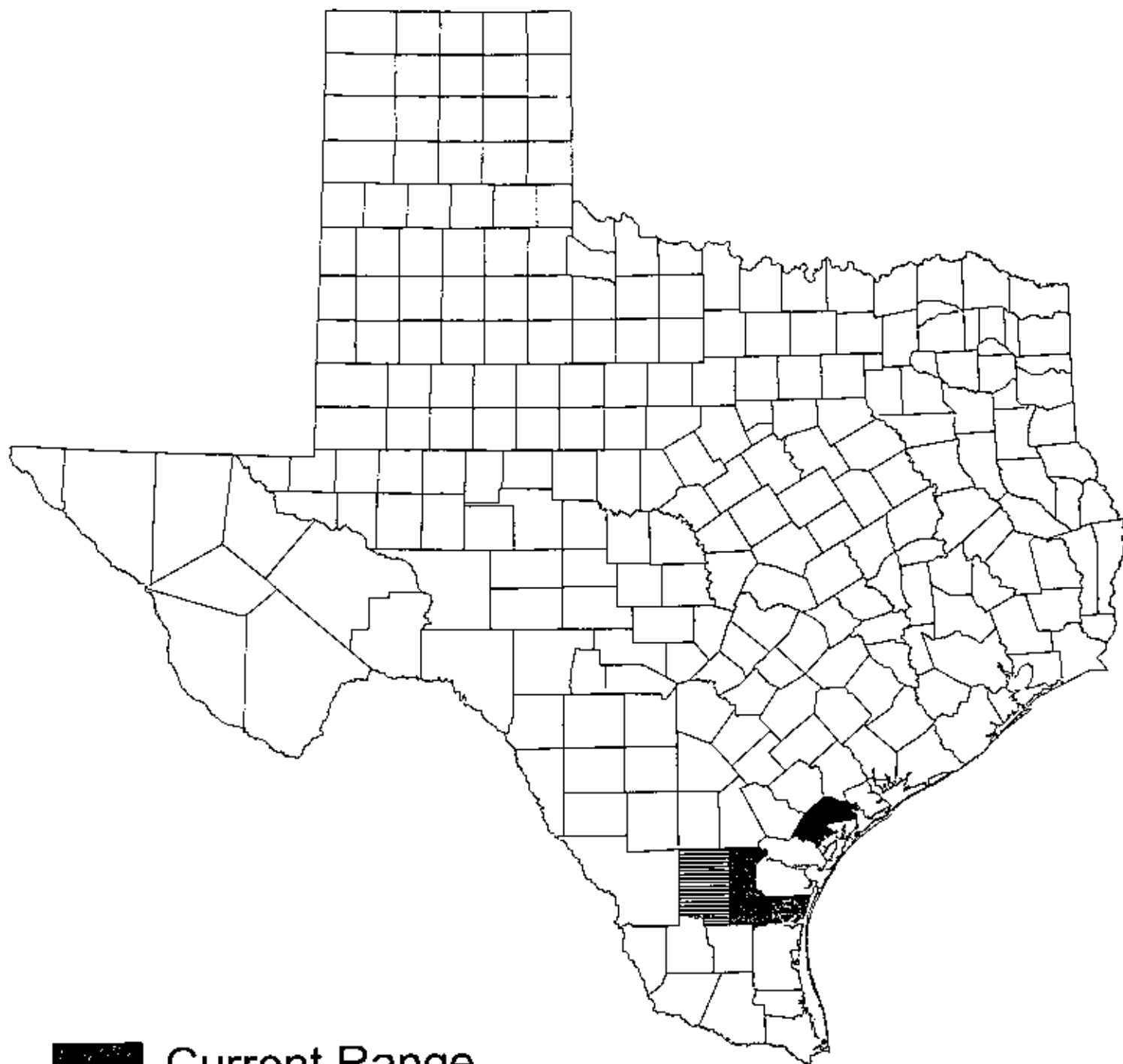
RECOVERY PLAN



U.S. Fish and Wildlife Service

Albuquerque, New Mexico

1987



■ Current Range

▨ Introduced

Echinocereus reichenbachii var. *albertii*
(black lace cactus)

Scientific Name: *Echinocereus viridiflorus* Engelm. var. *correllii* L. Benson

Synonymy: Weniger (1984) indicated that the entity he treated as "*Echinocereus viridiflorus* Engelm. var. *standleyi* (R. & B.) Orcutt" was synonymous with what Benson (1982) referred to as *Echinocereus viridiflorus* Engelm. var. *correllii* L. Benson. However, Benson (1982) mentioned *E. viridiflorus* var. *standleyi* as a nomen nudum in synonymy under *E. viridiflorus* var. *viridiflorus*.

Common Name: Correll's green pitaya

Global Range: West TX

State Range: Brewster, Coke, and Pecos counties

Current Federal Status: none (3C)

Habitat: among grasses on rock crevices on low hills in desert or semi-desert grassland, occasionally on novaculite. Associates in reddish brown clay on a level alluvial/colluvial plain in Brewster County include *Dalea greggii*, *Eriogonum tenellum*, *Polygala alba*, *Krameria lanceolata*, *Acleisanthes longiflora*, *Melampodium leucanthum*, *Senecio longilobus*, *Croton* sp., *Aristida* spp., *Coryphantha hesteri*, *Opuntia discata*, *Echinocereus viridiflorus* var. *cylindricus*, *Echinocactus horzonthalonius*.

Phenology:

Similar Species:

Comments:

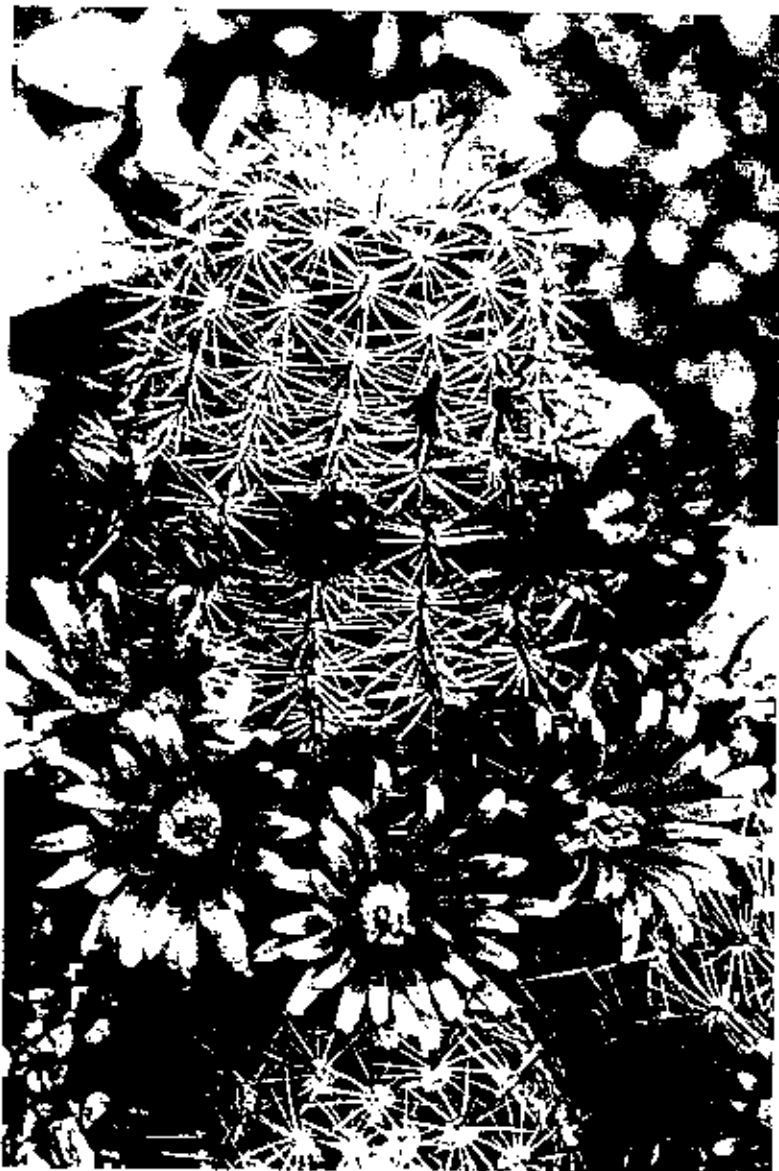
Illustrations: the illustration in Weniger (1984), p. 20 (as *E. viridiflorus* var. *standleyi*), may or may not be referable to *E. viridiflorus* var. *correllii*. Benson (1982) provided a chart outlining the distinctive characters of (his concept of) varieties of *E. viridiflorus*, but provided no illustration of var. *correllii*.

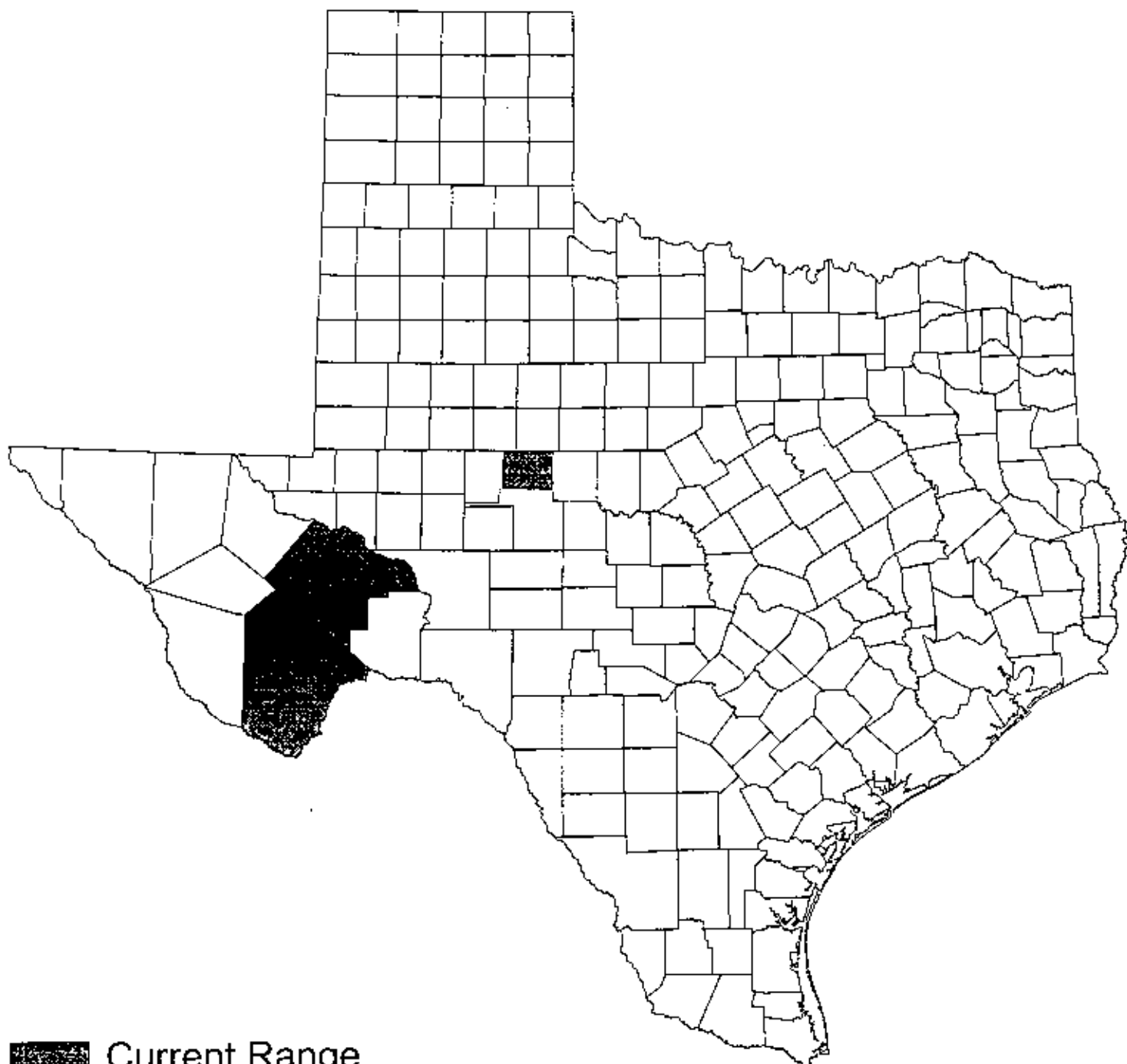
Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Taylor, N. P. 1985. The genus *Echinocereus*. Timber Press, Portland, OR. 160 pp.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide.
University of Texas Press, Austin. 356 pp.





Current Range

Echinocereus viridiflorus var. *correllii*
(Correll's green pitaya)

Scientific Name: *Echinocereus viridiflorus* Engelm. var. *davisii* (A. D. Houghton) W. T. Marshall

Synonymy: *Echinocereus davisii* A. D. Houghton; *E. viridiflorus* ssp. *davisii* (A. D. Houghton) N. P. Taylor

Common Name: Davis' green pitaya, Davis hedgehog cactus

Global/State Ranks: G5T1S1

Federal Status: Endangered

Global Range: Trans-Pecos, Texas.

State Range: Endemic to a few low mountain ranges in Brewster County.

Description (compiled from Benson 1982, USFWS 1984, Weniger 1984, Taylor 1985, Blum et al. 1998): Perennial stem succulent. **Stems** dwarf, usually solitary, dark green, spherical to ovoid or top-shaped, 1-3 cm ($\frac{3}{8}$ -1 $\frac{1}{2}$ in.) tall, 0.9-2.5 cm ($\frac{1}{4}$ -1 in.) in diameter; ribs 6-9. **Spines** needle-like, arranged on either side of the areole pectinately, all radial, 8-14, black then gray to white or with red or dark brown tips, upper ones slender, round, 4-7 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) long, lateral ones stouter, usually flattened, 11-15 mm ($\frac{3}{8}$ - $\frac{5}{8}$ in.) long, straight or somewhat curved or recurved against stem. **Flowers** yellow-green to straw-yellow, funnel-shaped, 1.5-2.5 cm ($\frac{3}{8}$ -1 in.) long, 1.5-2 cm ($\frac{3}{8}$ - $\frac{3}{4}$ in.) in diameter. **Fruits** green with reddish tinge, oval, 8-11 mm ($\frac{1}{4}$ - $\frac{3}{8}$ in.) long, 4-8 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) in diameter; seeds black, warty, 0.9-1 mm ($<\frac{1}{8}$ in.) long.

Habitat: Novaculite outcrops in full sun among sparse Chihuahuan Desert scrub, usually hidden in mats of *Selaginella*; associated with other rare plant species such as *Thelocactus bicolor* var. *flavidispinus*, *Echinocereus viridiflorus* var. *correllii*, *Paronychia wilkinsonii*, *Escobaria hesteri*, and *Escobaria minima*. Other associated species include *Bouteloua breviseta*, *Erioneuron pulchellum*, *Selaginella peruviana*, *Larrea tridentata*, *Agave lechuguilla*, *Dasyllirion leiophyllum*, *Viguiera stenoloba*, *Acacia constricta*, *Yucca elata*, *Y. torreyana*, *Nolina texana*, *Opuntia violacea*, *Echinocereus stramineus*, *Mammillaria gummifera*, *Zinnia pumila*, and *Thymophylla pentachaeta*.

Phenology: Flowering late March-April (-May).

Similar Species: The dwarf habit and the number of ribs (6-9) distinguishes *davisii* from the other varieties of *viridiflorus* (Benson 1982).

Comments: *Echinocereus viridiflorus* var. *davisii* pulls down into the mats of *Selginella* during dry weather, becoming almost invisible.

Illustrations: Line drawings of spine characters and a color photograph appear in Poole & Riskind (1987); color photographs appear in Warnock (1977), Weniger (1984), Blum et al. (1998), and Anderson (2001).

Selected References:

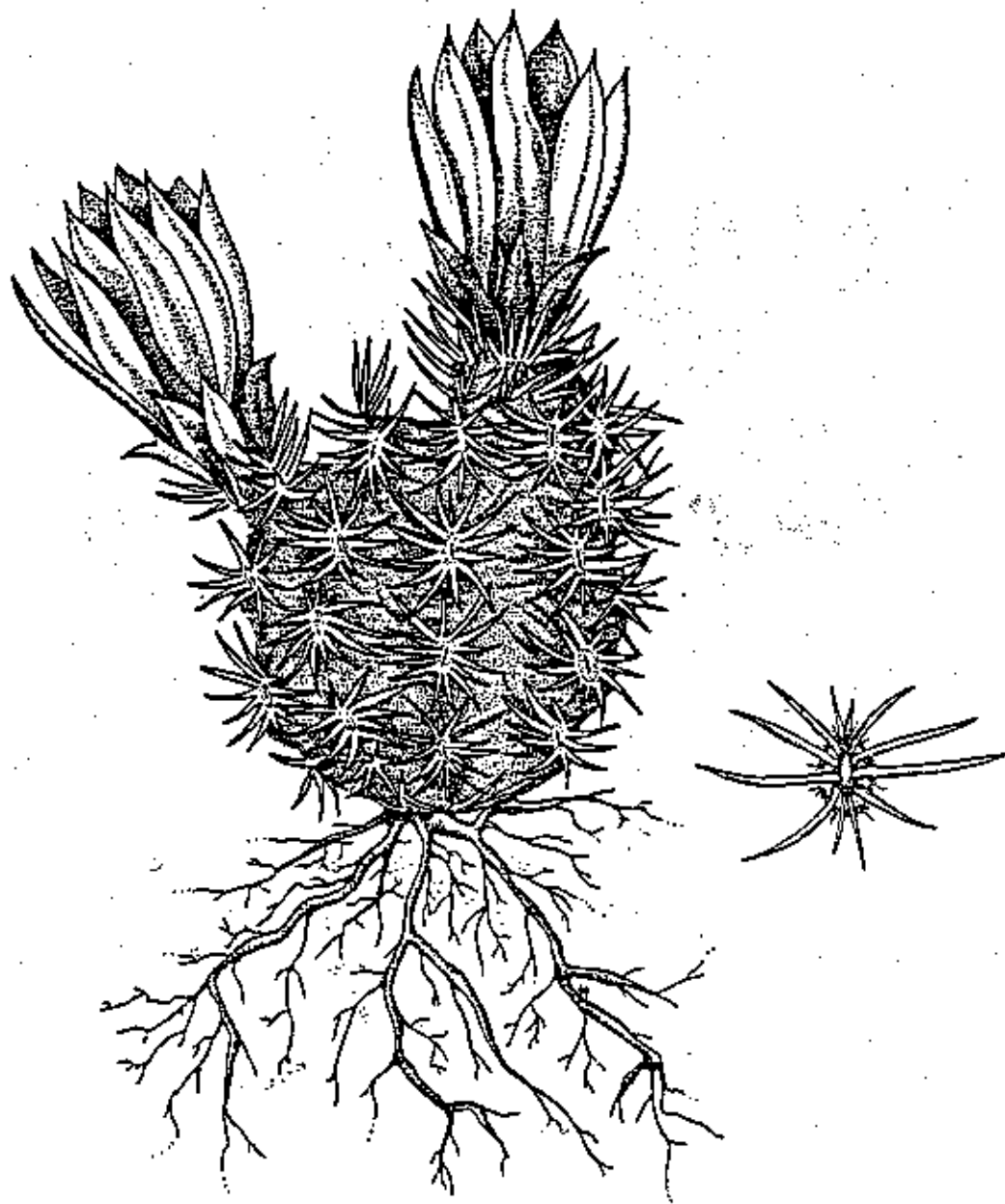
- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
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- Taylor, N. P. 1985. The genus *Echinocereus*. Timber Press, Portland, OR. 160 pp.
- U. S. Fish & Wildlife Service. 1984. Davis' green pitaya cactus *Echinocereus viridiflorus* var. *davisii* recovery plan. U.S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1979. Status report on *Echinocereus viridiflorus* var. *davisii*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



DAVIS' GREEN PITAYA CACTUS

(*Echinocereus viridiflorus* var. *davisii*)

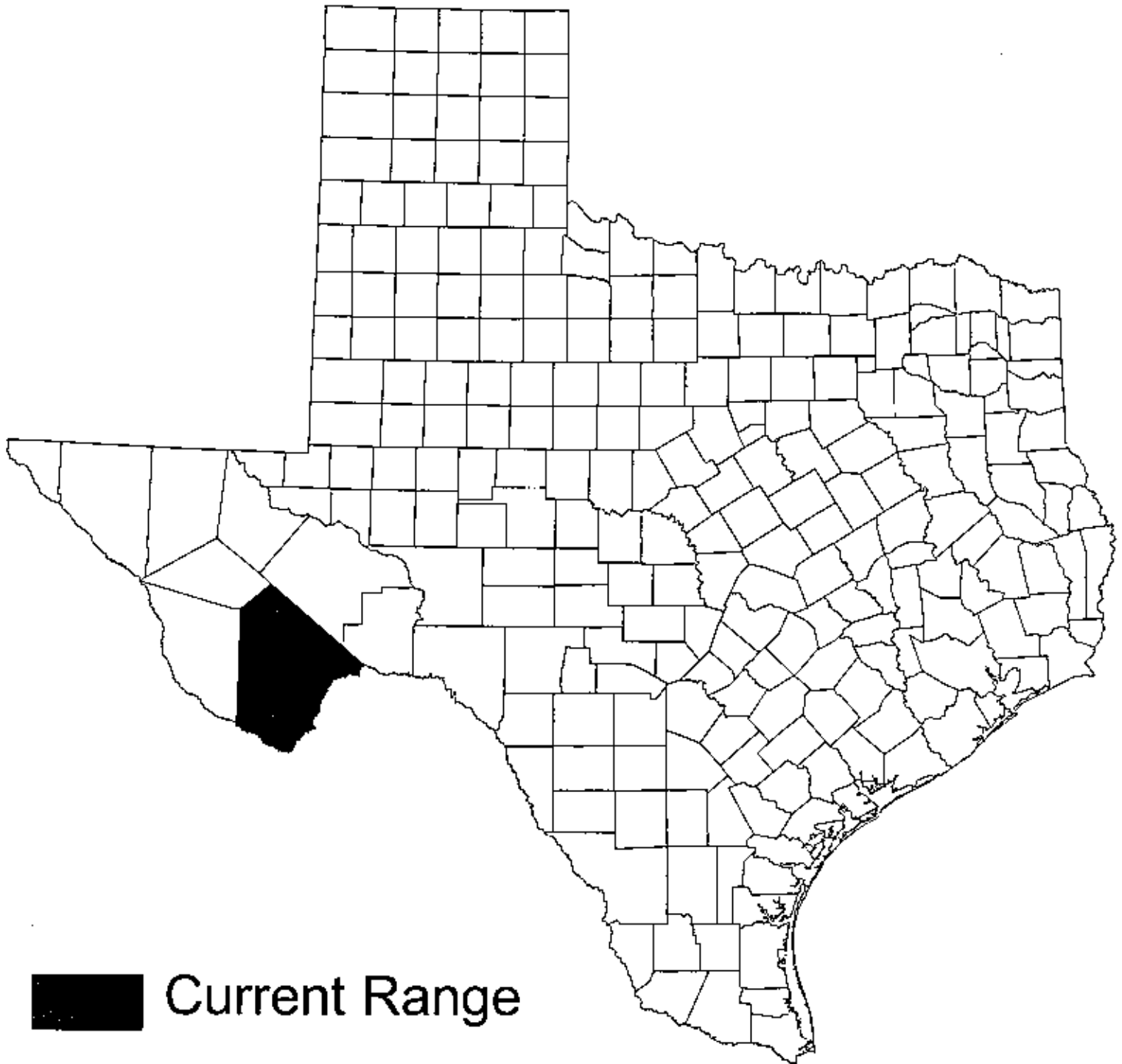
RECOVERY PLAN



U.S. Fish and Wildlife Service

Albuquerque, New Mexico

1984



■ Current Range

Echinocereus viridiflorus var. *davisii*
(Davis' green pitaya)

Scientific Name: *Eleocharis brachycarpa* Svens.

Synonyms: None.

Common Name: short-fruit spikesedge

Global/State Ranks: G1SH

Federal Status: SOC

Global Range: South Texas and Tamaulipas.

State Range: Known in Texas only from a specimen collected by Jean Louis Berlandier in 1834 "between Matamoros and Nueces".

Description (adapted from Correll & Johnston 1970): Tiny tufted annual with flexuous, capillary culms 1-7 cm long. Leaves absent (or reduced to bladeless sheaths?) as in all *Eleocharis*. Flowers in solitary terminal spikes 2-4 mm long, containing only a few flowers; scales lanceolate, striate, apically scarious, green or streaked with brown; bristles absent; styles 3-branched. Achene obovoid, nearly terete, covered with horizontally elongate cells arranged in several longitudinal rows, each row containing about 15 such cells; tubercle conic, much narrower than body of achene, basally constricted; achene (body plus tubercle) only 0.4-0.5 mm long.

Similar Species: *Eleocharis brachycarpa* belongs to a group of species in which the achene surfaces are covered with elongate cells neatly arranged in about 6 longitudinal rows. In the other three Texas species of this group, *E. acicularis*, *E. radicans* and *E. wolfii*, those rows contain more than 15 cells, and the total length of the achene normally exceeds 0.5 mm. In addition, all 3 related species are perennial rather than annual, although in the case of *Eleocharis acicularis* this is not always easy to ascertain in the field.

Habitat: Unknown, but presumably a wet spot of some description.

Phenology: Collected (presumably with mature achenes) in April.

Comments: Geiser (1948) summarized the activities of Berlandier in Texas and Mexico in 1834, but little specific information about the routes Berlandier followed is available. This sedge should be sought throughout South Texas, where perhaps it has simply been overlooked for the last 150+ years.

Illustrations: Very small line drawings, including a habit sketch and an achene, appear in Svenson (1929).

Selected References:

- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Geiser, S. W. 1948. Naturalists of the frontier. Second edition. Southern Methodist University Press, Dallas. 296 pp.
- Svenson, H. K. 1929. Monographic studies in the genus *Eleocharis*. Rhodora 31: 121-135; 152-163; 167-191; 199-219; 224-242.



■ South Coastal Texas (county unknown)

Eleocharis brachycarpa
(short-fruited spikeseed)

Scientific Name: *Eriocaulon körnickianum* Van Heurck & Muell. Arg.

Synonyms: None.

Common Name: smallhead pipewort, dwarf pipewort

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Scattered locations in Arkansas, Georgia, Oklahoma and Texas.

State Range: Known from a few locations in Anderson, Brazos, Henderson and Limestone counties in east Texas and from Gillespie County in the Llano Uplift of central Texas. Reported erroneously over the years from numerous other counties, a persistent problem finally clarified by MacRoberts & MacRoberts (1999). A report from Freestone County is based on specimens collected from a site actually in Limestone County. A report from Hardin County was based on specimens of *Lachnocaulon anceps*. A report from Leon County is presumed erroneous as no voucher specimens have been located. Polk County appears on dot maps in various published and gray literature, but again no voucher specimens have been located. A report from Tyler County is based on unwarranted attribution of a specimen collected somewhere in east Texas by Charles Wright between 1837 and 1852.

Description (adapted from Kral 1966 and Godfrey & Wooten 1979): Perennial with short stems and tufted leaves, reproducing vegetatively via short lateral shoots. Leaves linear, spirally arranged at the top of a very short stem, pale green, glabrous, very thin, linear, 3-nerved, 1-5 cm long. Flowers unisexual, much reduced, clustered in solitary, terminal, subglobose or short-oblong heads at the end of naked peduncles, the peduncles to 1 dm tall, ca. 0.5 mm wide, twisted, 3- or 4-ridged, the heads 3-4 mm in diameter, dark gray or olivaceous except for the pale rims of the white-ciliate perianth parts and the scarious outer bracts; outer involucre bracts broadly oblong to suborbicular, reflexed at maturity, 1.0-1.25 mm long, smooth, very thin, stramineous, translucent, the apex rounded; receptacular bractlet oblong to cuneate, ca. 1.5 mm long, gray or gray-green, acute to obtusely angled, translucent, concave and inequilaterally keeled, smooth except for a few white trichomes along the erose upper margin; surface of the receptacle smooth; sepals 2, linear-curved, ca. 1 mm long, with white trichomes at the apex; petals 2, fused to the stamen column and inconspicuous in staminate flowers but free and relatively conspicuous in the pistillate flowers, ca. 1 mm long, spatulate, the blade portion broadly rhombic, yellowish, with white trichomes at the apex; style 2-branched. Fruit a minute, 2-loculed capsule containing two reddish-brown seeds ca. 0.5 mm long.

Similar Species: Dwarf pipewort is easily confused with other *Eriocaulon* species as well as members of the genus *Lachnocaulon*. In *Eriocaulon* the airspaces in the leaves are visible to the naked eye and the perianth parts are in 2's, whereas in *Lachnocaulon* the airspaces in the leaves are not evident to the naked eye and the perianth parts are in 3's. The mature heads of *E. körnickianum* are glabrous and olivaceous, whereas the mature heads of all other *Eriocaulon* species in Texas are white-villous at the summit.

Habitat: In east Texas, *E. körnickianum* is found in permanently wet acid sands of upland seeps and hillside seepage bogs, usually in patches of bare sand rather than among dense vegetation or on muck. Components of these bogs include *Sarracenia alata*, *Eriocaulon decangulare*, *Drosera capillaris* and various species of *Rhynchospora*, *Xyris*, *Utricularia*, *Juncus* and *Eleocharis*. These wetlands

are located in a landscape of post oak woodlands and xeric sandhill openings. The Gillespie County site is a permanently wet or moist hillside seep on decomposing granite gravel and sand among granite outcrops. Associates at this site include *Utricularia cornuta*, *Hypericum mutilum*, *Scleria verticillata*, *Cyperus haspan* and annual *Coreopsis* species (MacRoberts & MacRoberts 1999).

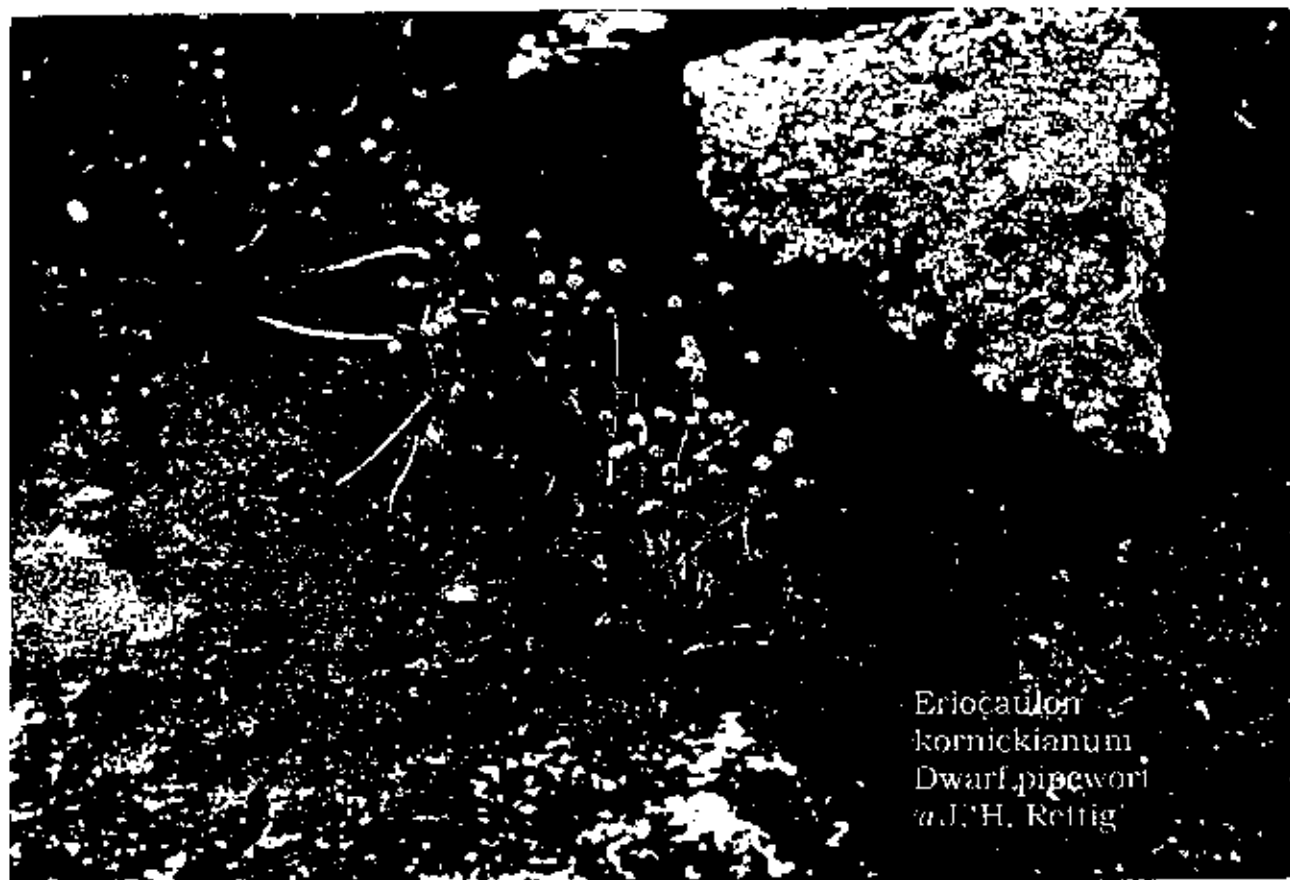
Phenology: Flowering/fruiting late May-late June.

Comments: According to Bob O'Kennon, these plants are especially fragrant. [**WRC e-mailed Bob on 13 Dec 2001 for details; no response yet.]

Illustrations: Line drawings appear in Kral (1966), Godfrey & Wooten (1979), and Tucker (1983).

Selected References:

- Gentry, J. L., R. L. Tyrl, P. G. Risser, and J. J. Crockett. 1978. Status report [on *Eriocaulon körnickianum*]. Report prepared for U.S. Fish & Wildlife Service, Tulsa.
- Godfrey, R. K. and J. W. Wooten. 1979. Aquatic and wetland plants of the southeastern United States. Monocotyledons. The University of Georgia Press, Athens. 712 pp.
- Kral, R. 1966. Eriocaulaceae of continental North America north of Mexico. *Sida* 2: 285-332.
- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA, Forest Service, Technical Publications R8-TP2. 1305 pp.
- MacRoberts, M. H. and B. H. MacRoberts. 1999. Status report on *Eriocaulon körnickianum* (dwarf pipewort) in Texas. Report prepared for U. S. Fish and Wildlife Service, Albuquerque.
- Tucker, G. E. 1983. Status report on *Eriocaulon körnickianum* Van Heurck & Muell. Arg. [in Arkansas]. Report prepared for U.S. Fish & Wildlife Service, Tulsa.
- Watson, L. E. 1989. Status survey of *Eriocaulon körnickianum*, dwarf pipewort, in Oklahoma. Report prepared for U.S. Fish & Wildlife Service, Tulsa.
- Watson, L. E. and D. E. Uno. 1991. Population biology and reproductive ecology of *Eriocaulon körnickianum*, dwarf pipewort, in Oklahoma. Report prepared for U.S. Fish & Wildlife Service, Tulsa.
- Watson, L. E. 1992. Divergence among disjunct populations of *Eriocaulon körnickianum*, dwarf pipewort. 1. Morphology. Report submitted to U. S. Fish & Wildlife Service, Albuquerque.

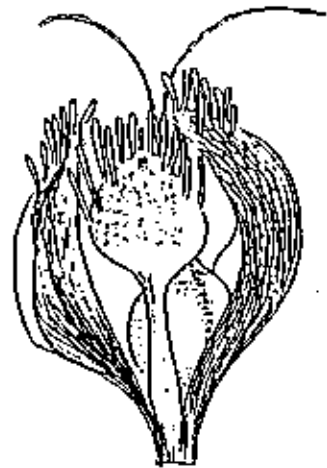
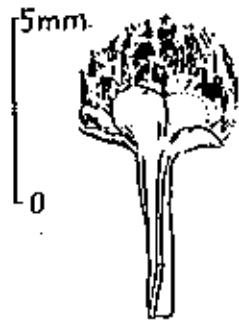


Eriocaulon
kornickianum
 Dwarf pipewort
 © J. H. Rettig



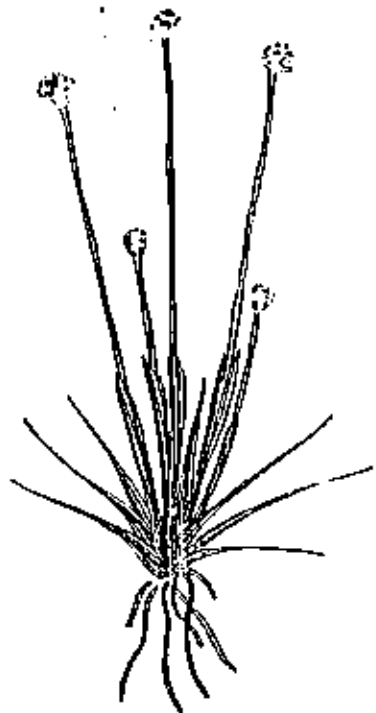
Eriocaulon kornickianum
 Dwarf pipewort
 © J. H. Rettig

Stebson (1992)
Herbar Report No. E-20

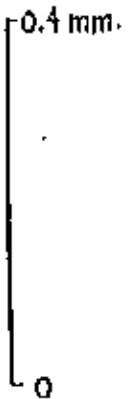


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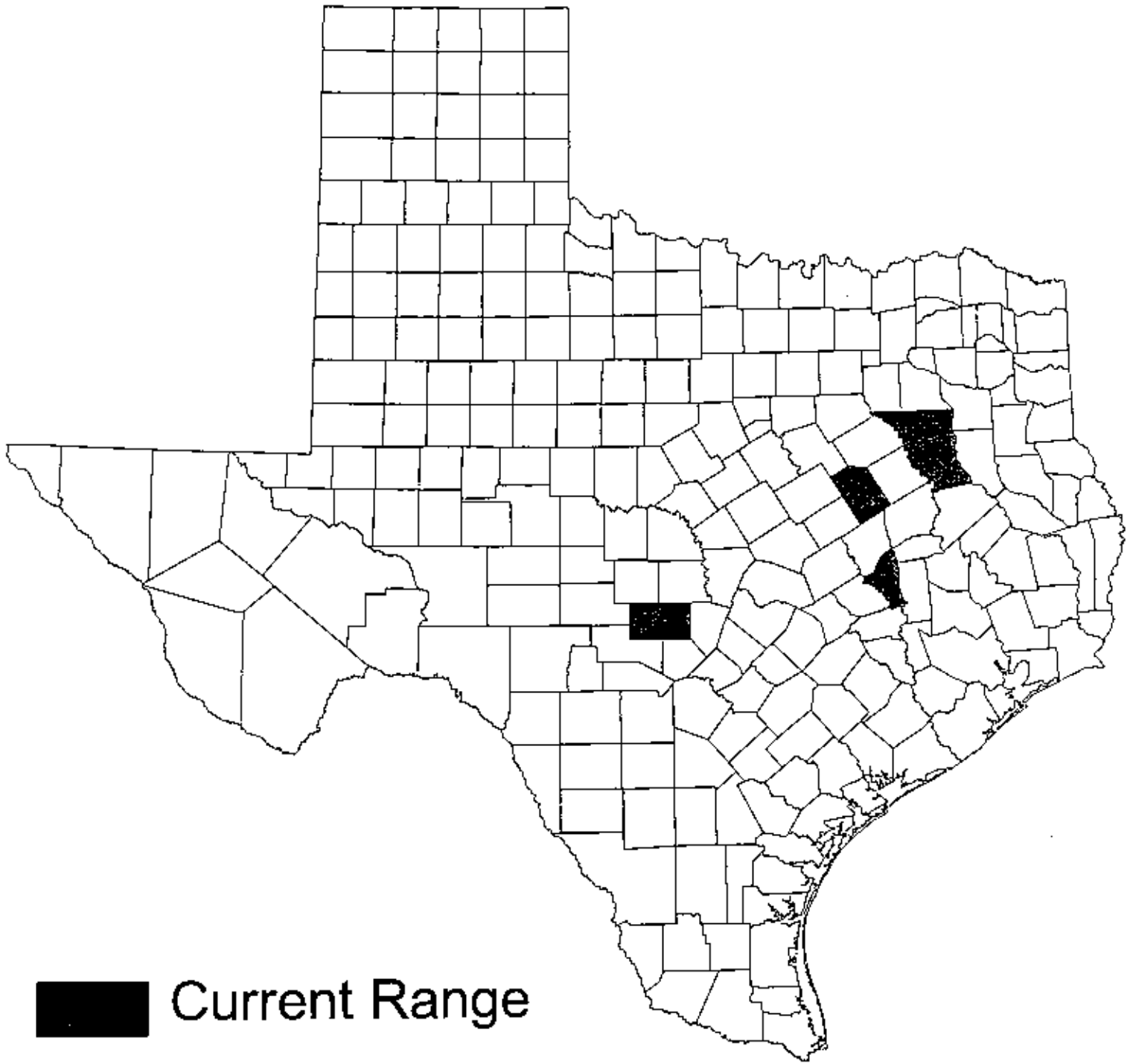
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Eriocaulon kornickianum
(Kral, 1966)



■ Current Range

Eriocaulon körnickianum
(small-headed pipewort)

Scientific Name: *Eriogonum greggii* T. & G.

Synonyms: None.

Common Name: Gregg's wildbuckwheat

Global/State Ranks: G2S1

Federal Status: None

Global Range: Coahuila, Nuevo León and south Texas.

State Range: Hidalgo and Starr counties.

Description (adapted from J. L. Reveal in Correll & Johnston 1970): Erect perennial 1-4 dm tall, from a branched caudex, pubescent with tack-shaped glands scattered among the hirsute hairs nearly throughout. Leaves mostly basal but also at the relatively few nodes; basal leaves broadly spatulate, glabrous except for ciliate margins and midribs or uniformly stipitate-glandular, to 1 dm long and 5-20 mm wide, gradually tapering to a broad petiole; cauline leaves oblanceolate to obovate or spatulate, 3-10 per node, 5-40 mm long and 2-15 mm wide. Flowers in involucrate clusters arranged in a multiply-branched terminal cyme, one side of which is sometimes suppressed; peduncles 1-7 cm long, erect or ascending; involucre broadly campanulate, 1.5-3 mm long and 3-5 mm wide, strigose and glandular; perianth consisting solely of a calyx (corolla absent), the sepals reddish to reddish-brown, strigose externally, oblong to lanceolate, 1.5-2 mm long in anthesis, becoming 2.5-3.5 mm long in fruit. Fruit a reddish-brown, 3-angled achene 3-4 mm long, exerted from the involucre.

Similar Species: *Eriogonum multiflorum* also occurs in the Lower Rio Grande Valley. It is an annual, whereas *E. greggii* is a perennial. The stems of *E. multiflorum* are 5-20 dm tall; those of *E. greggii* are 1-4 dm tall. Vegetative parts of *E. multiflorum* are floccose or very tomentose; those of *E. greggii* are usually have at least some glandular hairs. The perianth of *E. multiflorum* is glabrous externally; that *E. greggii* is strigose externally.

Habitat: Sparingly vegetated openings in thorn shrublands in shallow soils on xeric ridges along the Rio Grande. One Starr County site lies on excessively drained, sandy soil over caliche and calcareous sandstone of the Goliad Formation; another lies on a "gypsum capped hill" (*M. Butterwick 1313*). Described by Reveal (1968) as "locally common on the high plains and grasslands of Nuevo León and Coahuila."

Phenology: Flowering February-July, probably opportunistically at various times during the growing season.

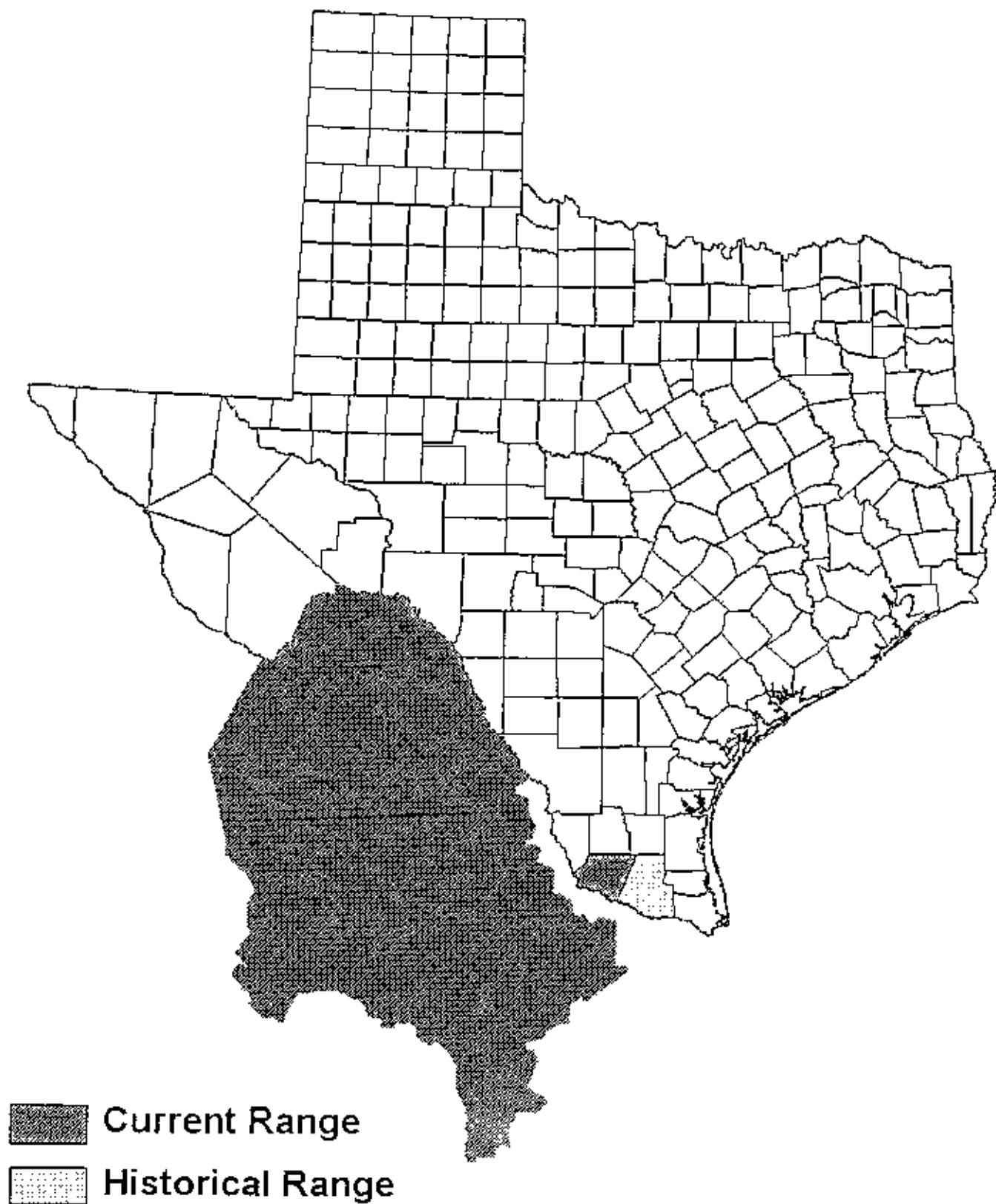
Comments:

Illustrations: None known.

Selected References:

Reveal, J. L. 1968. Notes on the Texas Eriogonums. *Sida* 3(4): 195-205.





Eriogonum greggii
(Gregg's wild-buckwheat)

Scientific Name: *Eriogonum nealleyi* Coult.

Synonyms: None.

Common Name: Nealley's wildbuckwheat; Irion County wildbuckwheat

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to the northwestern portion of the Edwards Plateau of north-central Texas.

State Range: Coke, Howard, Irion, Pecos, Reagan, Runnels and Sterling counties.

Description (adapted from J. L. Reveal in Correll & Johnston 1970): Erect perennial 5-12 dm tall, from a branched caudex, glabrous nearly throughout. Leaves basal and cauline; basal leaves oblanceolate to spatulate, strigose on both surfaces, to 8 cm long and 5-15 mm wide, the petioles slightly winged and 1-2.5 cm long; cauline leaves few and highly reduced or even absent, oblanceolate, to 4 cm long and 3-8 mm wide. Flowers in involucrate clusters arranged in an open paniculated cyme; peduncles 1-8 cm long, erect or ascending; involucre broadly turbinate to campanulate, 2-3 mm long and 2-4 mm wide; perianth consisting solely of a calyx (corolla absent), 1.5-2 mm long in anthesis, about 1 mm longer in fruit, glabrous or sparsely strigose externally, white in anthesis but becoming pink or reddish in fruit. Fruit a reddish-brown, 3-angled achene 4-6 mm long, winged at the apex, exerted from the involucre.

Similar Species: Sometimes occurs with *Eriogonum longifolium*, from which it can be distinguished by its glabrous stems and inflorescences and its strigose leaves.

Habitat: Grasslands in shallow stony soils over limestone and indurated caliche, often collected from ungrazed but sparsely vegetated roadsides, particularly where limestone or caliche is exposed on hilltops. Associates at some Irion County sites include *Berberis trifoliolata*, *Condalia ericoides*, *Juniperus pinchotii*, *Nolina texana*, *Prosopis glandulosa*, *Prunus minutiflora*, *Rhus microphylla*, *Bouteloua curtipendula*, *Elymus canadensis*, *Erioneuron pilosum*, *Tridens muticus*, *Artemisia ludoviciana*, *Calylophus hartwegii*, *Chamaesyce acuta*, *Croton dioicus*, *Dalea aurea*, *D. tenuis*, *Dyschoriste linearis*, *Engelmannia pinnatifida*, *Eriogonum longifolium*, *Euphorbia wrightii*, *Houstonia acerosa*, *Stenaria nigricans*, *Krameria lanceolata*, *Liatris mucronata*, *Matelea biflora*, *Paronychia jamesii*, *Psilostrophe tagetina*, *Simsia calva*, *Thelesperma longipes*, *T. simplicifolium* and *Zinnia grandiflora*.

Phenology: Flowering August-September.

Comments:

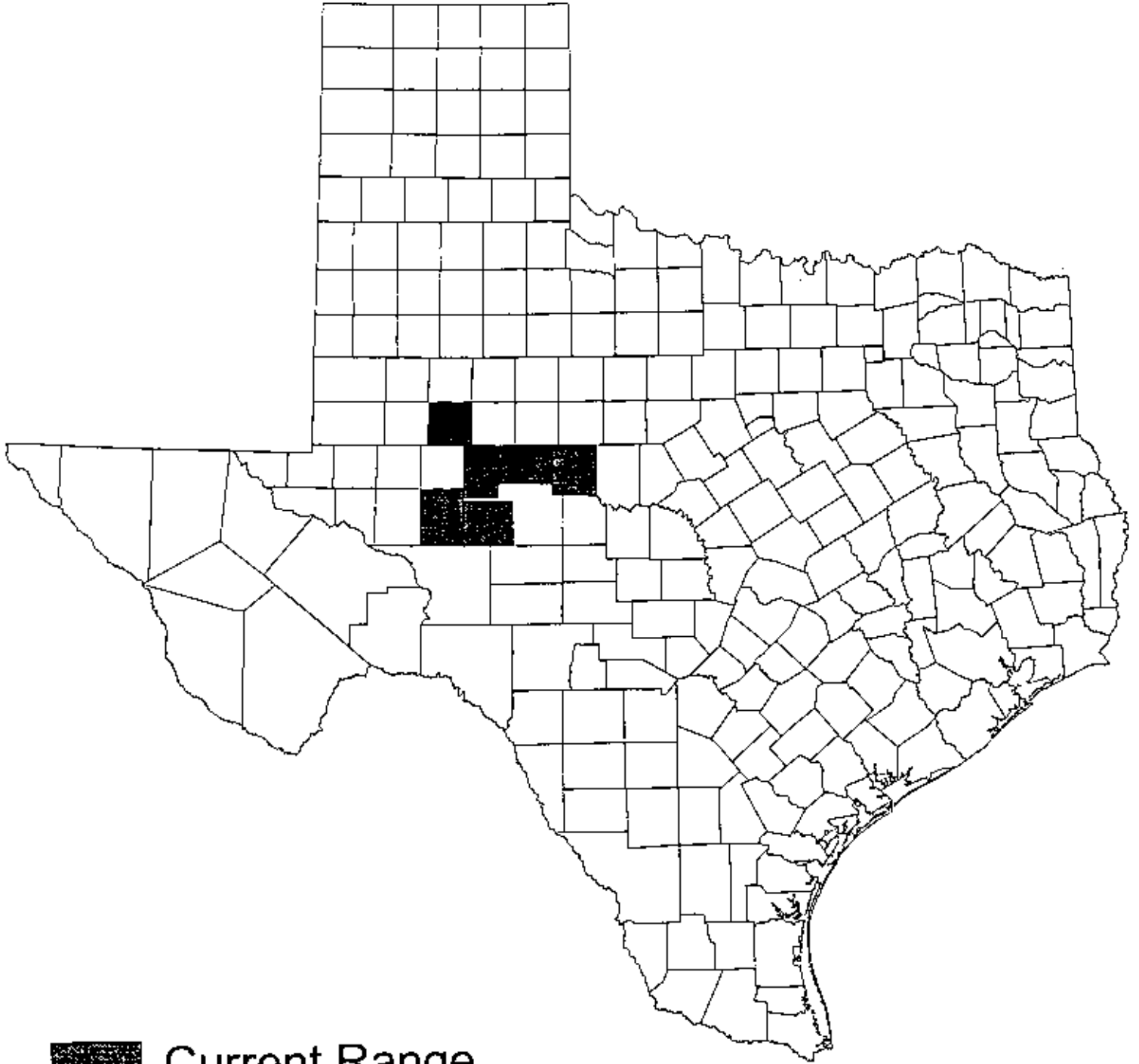
Illustrations: None known.

Selected References:

Reveal, J. L. 1968. Notes on the Texas Eriogonums. *Sida* 3(4): 195-205.

Rowell, C. M. 1983. Status report [on *Eriogonum nealleyi*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.





-  Current Range
-  Historical Range

Eriogonum nealleyi
(Irion County wild-buckwheat)

Scientific Name: *Eriogonum suffruticosum* Wats.

Synonyms: None.

Common Name: bushy wildbuckwheat

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to low mountains in Trans-Pecos Texas.

State Range: Brewster, Pecos and Presidio counties.

Description (adapted from J. L. Reveal in Correll & Johnston 1970 and J. L. Reveal in Henrickson & Johnston in prep.): Low, spreading, multi-branched subshrub from a branching woody caudex, 1-2 dm tall, the individual stems as much as 3 dm long. Leaves tufted at the ends of branches, elliptic, revolute, 5-8 mm long, 1-2.5 mm wide, silky tomentose, on petioles 1-2 mm long. Flowers in involucrate clusters arranged in an cymes up to 1 cm long; involucre campanulate, 2-3 mm long, tomentose, the 6 deeply divided lobes 1-1.5 mm long and spreading outward to become reflexed; perianth consisting solely of a calyx (corolla absent), white to yellowish-white with large reddish to maroon midribs, glabrous; segments dissimilar, those of the outer whorl fan-shaped and 2-4 mm long and wide, those of the inner whorl 1.5-2 mm long oblanceolate and 3.5-6 mm long, becoming reflexed (Henrickson & Johnston, in prep.) in fruit. (Reveal (1968) described changes in the orientation of the two whorls during the maturation process.) Fruit a light brown, 3-angled achene 3-3.5 mm long.

Habitat: Sparsely vegetated rocky limestone slopes, low hills, and clay flats, often with *Larrea tridentata*, *Dalea formosa*, and *Acacia* spp; also a component of interesting edaphic climax communities on gypsum or bentonite-influenced soils. Associates include *Xylorhiza wrightii*, *Cryptantha crassipes*, *Tiquilia hispida*, *Chrysactinia mexicana* and *Eriogonum havardii*.

Phenology: Flowering late March-April; in full fruit by May (Reveal 1968).

Similar Species: Occasionally occurs with *Eriogonum havardii*. In *E. suffruticosum* the stems are 1-2 dm high, the leaves are tufted at the ends of branches, and the inflorescence is tomentose. In *E. havardii* the stems are 3-6 dm high, the leaves are mostly basal, and the inflorescence is glabrous.

Comments:

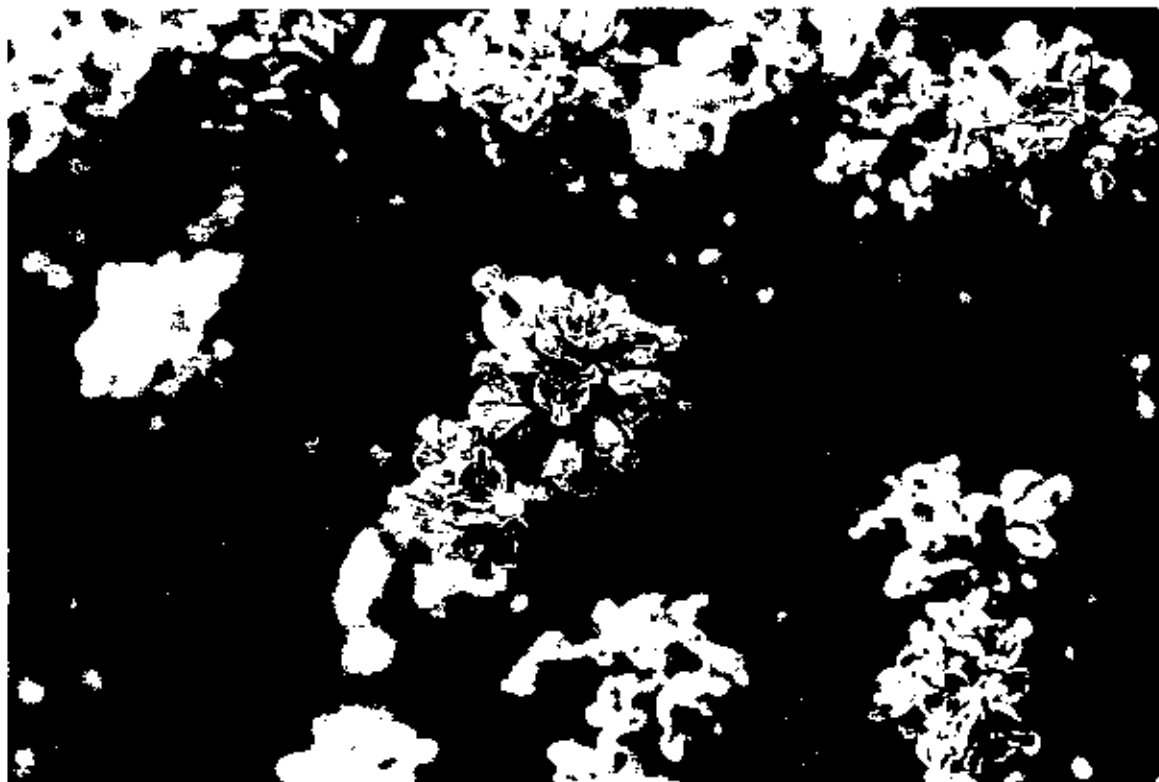
Illustrations: A line drawing appears in Powell (1998).

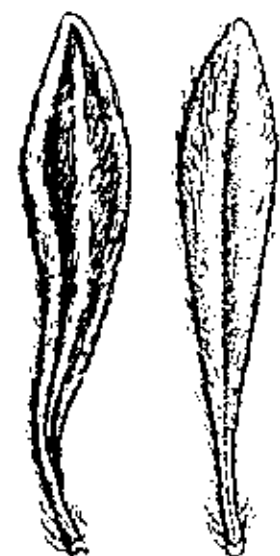
Selected References:

Clark, J. J. and A. M. Powell. 1983. Status report [on *Eriogonum suffruticosum*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.

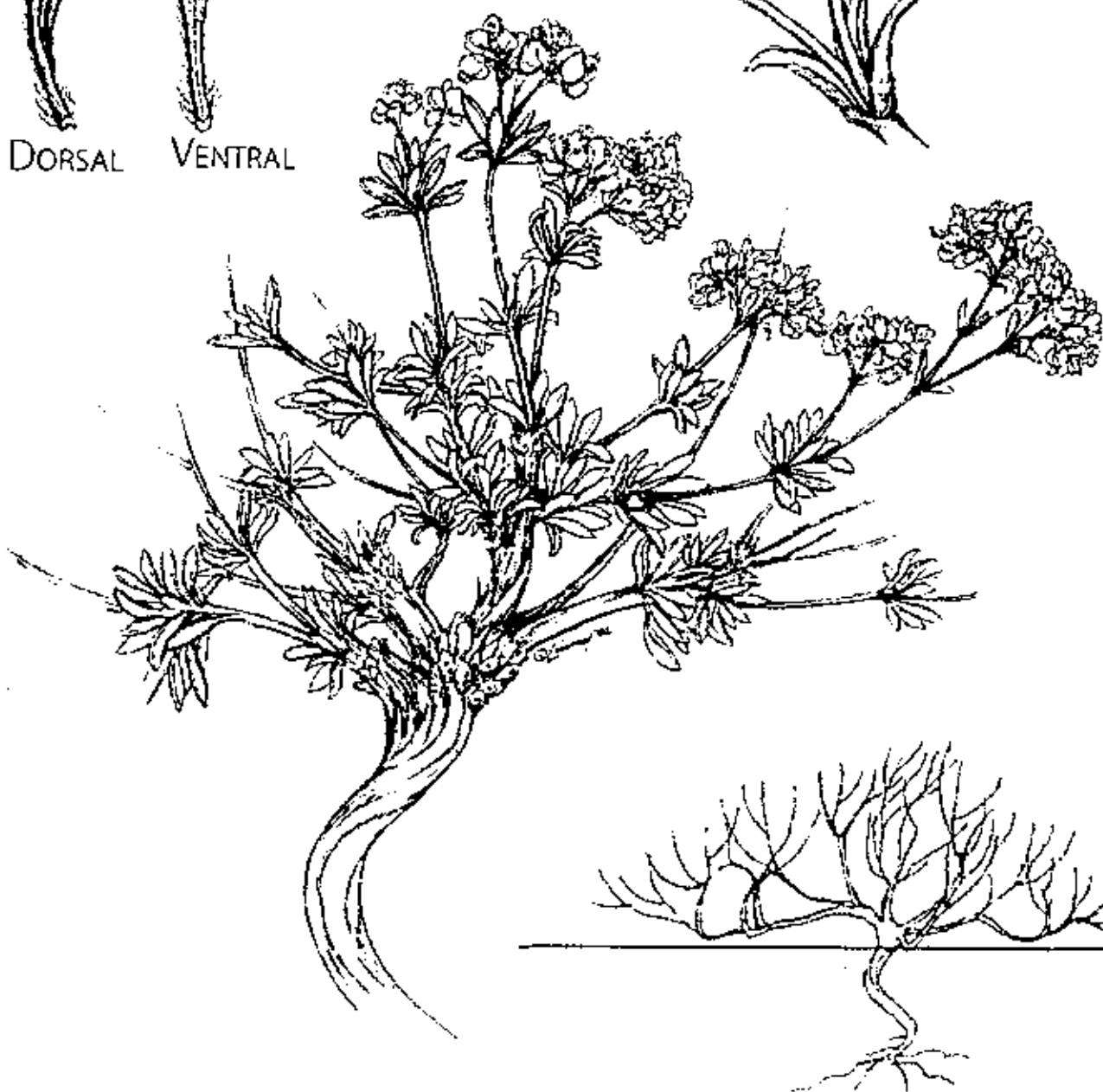
Reveal, J. L. 1968. Notes on the Texas Eriogonums. *Sida* 3(4): 195-205.





DORSAL

VENTRAL

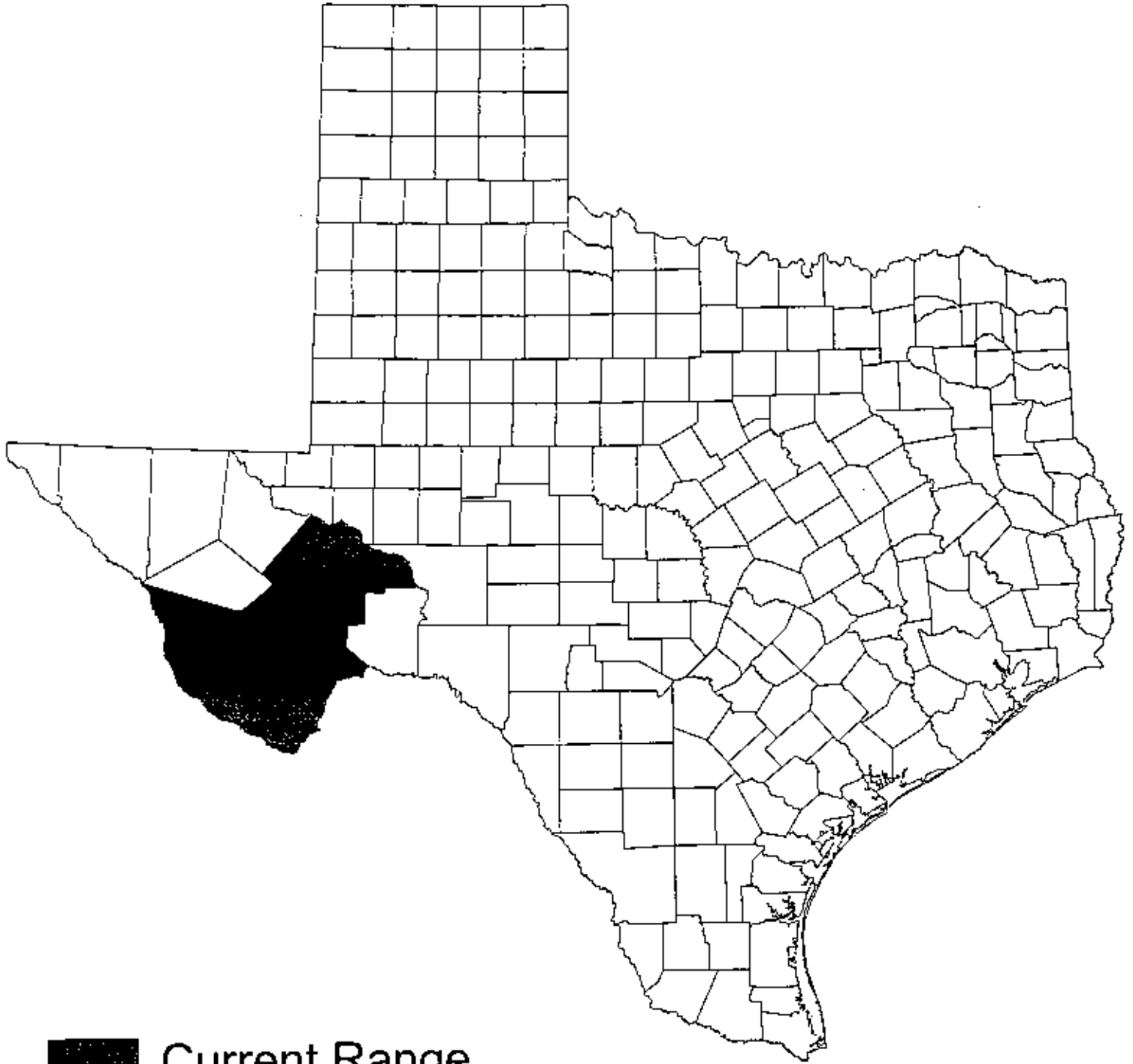


Polygonaceae; *Eriogonum suffruticosum*

CNS TEXAS/ALSTIN HERBARIUM

AKNE TULE No. 2644

FRESH SPEC. 11. 74



■ Current Range

Eriogonum suffruticosum
(bushy wild-buckwheat)

Scientific Name: *Coryphantha albicolumnaria* (Hester) D. A. Zimmerman

Synonymy: *Coryphantha strobiliformis* (Polseger) Moran var. *durispina* (Quehl) L. Benson; *Coryphantha sneedii* (Britton & Rose) Berger var. *albicolumnaria* (Hester) A. Zimmerman nov. in edit.

Common Name: white column cactus

Global Range: TX and Chihuahua, Mexico.

State Range: Brewster, Pecos, and Presidio counties.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Succulent shrublands on rocky hills or limestone outcrops at lower elevations (ca. 2000-4000 feet) in the Chihuahuan Desert.

Phenology: Flowering early March-May.

Similar Species:

Comments:

Illustrations: Benson (1982) provided a table of distinctive characters of the varieties of *Coryphantha strobiliformis* but did not illustrate *C. albicolumnaria* (*C. strobiliformis* var. *durispina*). A black and white photograph appears in Heil and Brack (1988).

Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.

Howell, D. J. 1986. Status report [on *Coryphantha strobiliformis* var. *durispina*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Worthington, R. D. 1993. Status report [on *Coryphantha albicolumnaria*]. Report prepared for Office of Endangered Species, U. S. Fish & Wildlife Service, Austin, Texas. 21 pp. + figures and maps.



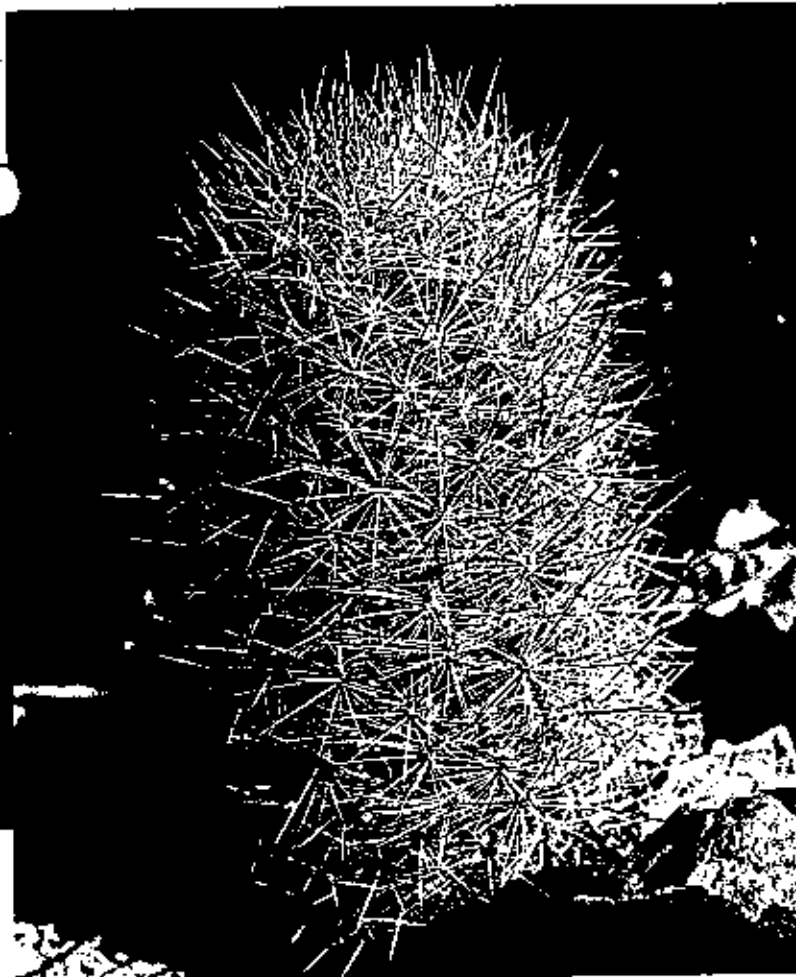
E. albostomana

Common Name:

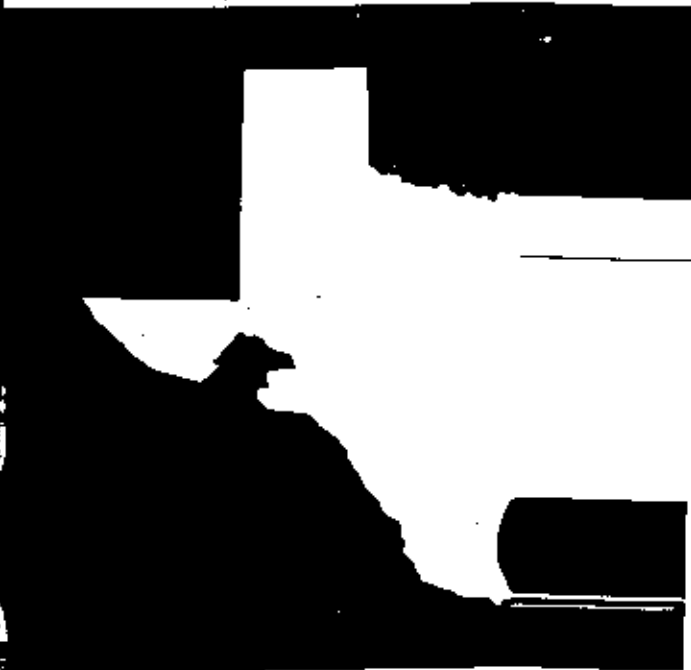
Silverlace cactus 335

Hard spined cob cory ca

White column



Paul Montgomery



Scientific Name: *Coryphantha strobilifera* Moran var. *durispina* (Quehl) L. Benson

Other Scientific Names: *Coryphantha* (Rose) Berger var. *albicolumnaria* (Herman) (not published); *Coryphantha* (Hester) D. Zimmerman; *Mammillaria columnaria* (Hester) Weniger (invalid); *Mammillaria albicolumnaria* Hester; *Escobesia naria* Hester ex L. Benson; *Coryphantha* (Poselger) Orcutt var. *durispina* (Quehl); *Mammillaria strobiliformis* Scheer; *Mammillaria strobiliformis* Schelle; *Escobaria tuberculosa* (Engelm.) var. *durispina* (Quehl) Borg

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

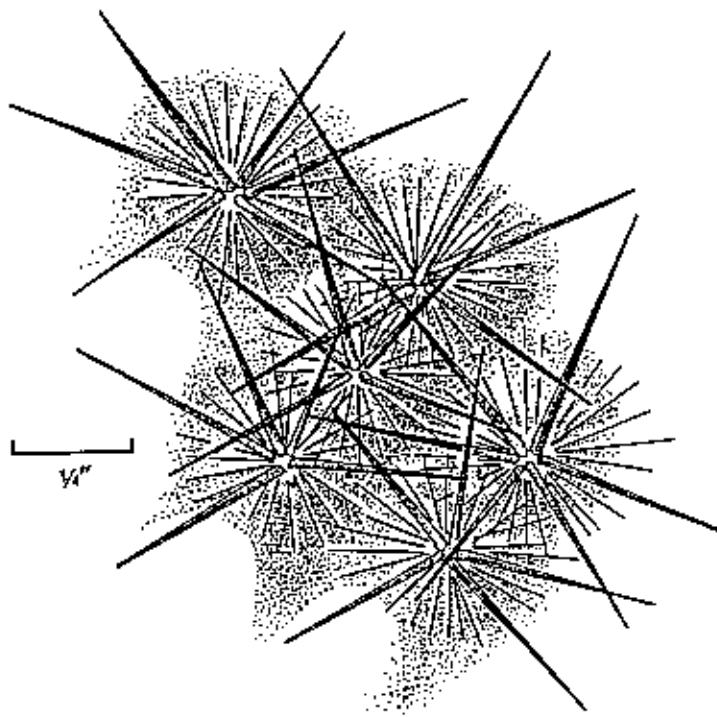
Photographs and Drawings: Weniger, Benson, 1982, plate 176 (misidentified as *dasyacantha* var. *dasyacantha*); Weniger

Description:

Habit: Stems cylindrical, erect, single, loose clumps in old age, 3-10 in. in diameter, with aggregations of cylindrical or egg-shaped tubercles cylindrical or egg-shaped, 1/4-1/2 in. in diameter; areoles all at

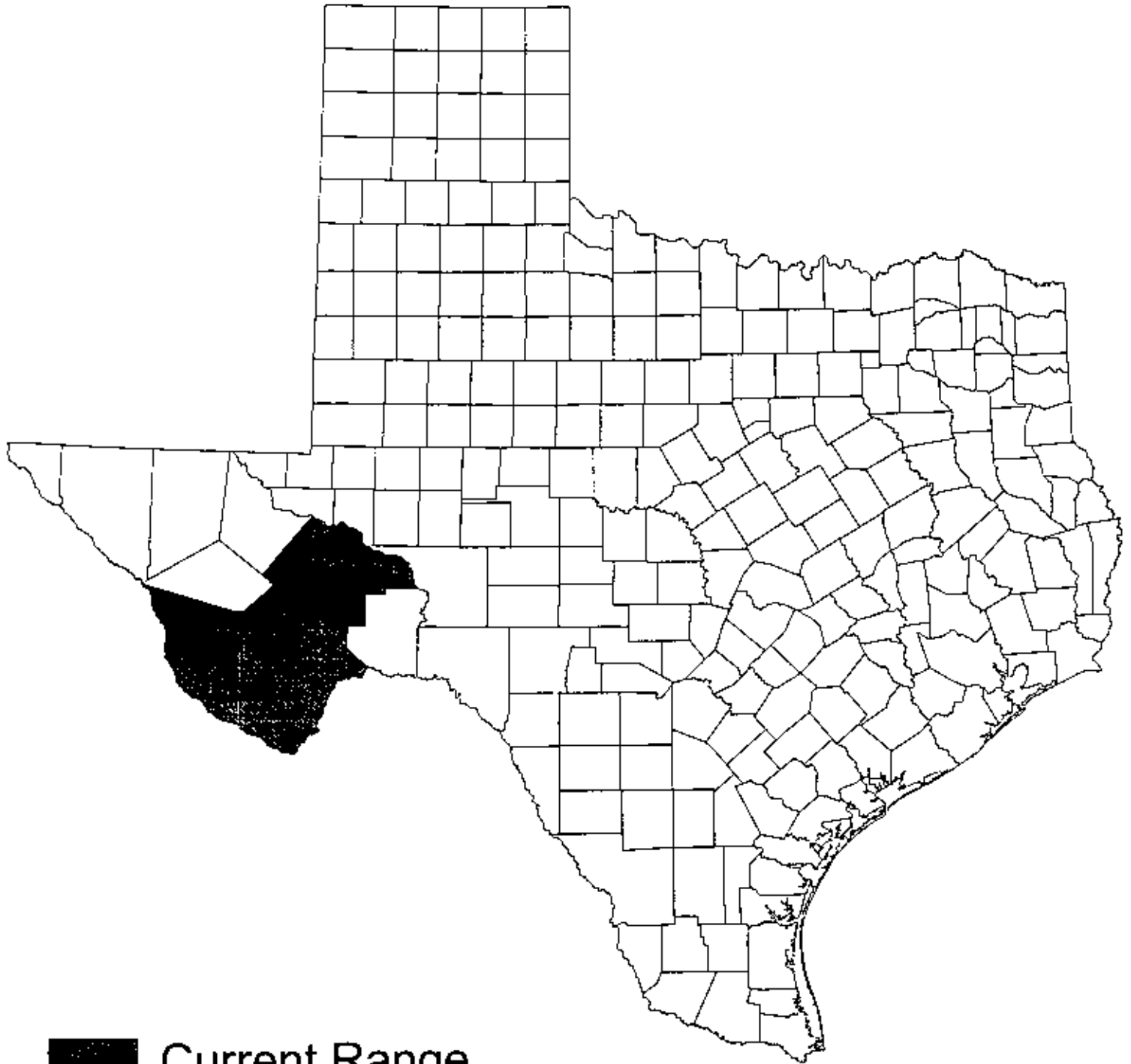
Spines: Hiding the stem, more or less straight, very rigid and brittle; spreading in all directions, pink when young, turning translucent brown tips with age, 11-17, with 1 spines, 3/8-1/2 in. long, surrounding central spines, 3/8-1/2 in. long; outer white, fine, some almost bristle-like in long.

Flowers: Pale rose pink to bright magenta, small, not opening widely, funnel-shaped, top of the stem, 3/8-1/2 in. wide, 3/4 lobes white; anthers bright yellow; March to May, according to rain the afternoon.



Typical spine clusters of Silverlace cactus

(continued on back)



■ Current Range

Escobaria albicolumnaria
(white column cactus)

Scientific Name: *Coryphantha chaffeyi* (Britt. & Rose) ??

Synonymy: *Escobaria chaffeyi* Britt. & Rose; *Escobaria dasyacantha* (Engelm.) Britt. & Rose var. *chaffeyi* (Britt. & Rose) N. P. Taylor

Common Name: Chaffey's corycactus

Global Range: TX, Coahuila, San Luis Potosí and Zacatecas

State Range: Brewster County

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Evergreen woodlands on rocky limestone soils at ca. 5800-7000 ft.; associated plants include *Juniperus pinchotii*, *J. flaccida*, *Pinus cembroides*, *Berberis* sp., and *Arbutus xalapensis* (Heil et al. 1985).

Phenology: Flowering April-May; fruiting June-September (Heil et al. 1985)

Similar Species:

Comments: Not included in treatment of cacti by Benson (1982). According to Anderson (2001), var. *chaffeyi* only occurs in the state of Zacatecas in Mexico. However Zimmerman (1985) and Heil et al. (1985) state that it occurs in the Chisos Mountains. According to Zimmerman (1985), plants reported from the Chisos Mountains by Benson (1982) and Wauer (1980) as *Coryphantha vivipara* var. *radiosa* are *E. chaffeyi*.

Illustrations: A black and white photograph appears in Heil and Brack (1988).

Selected References:

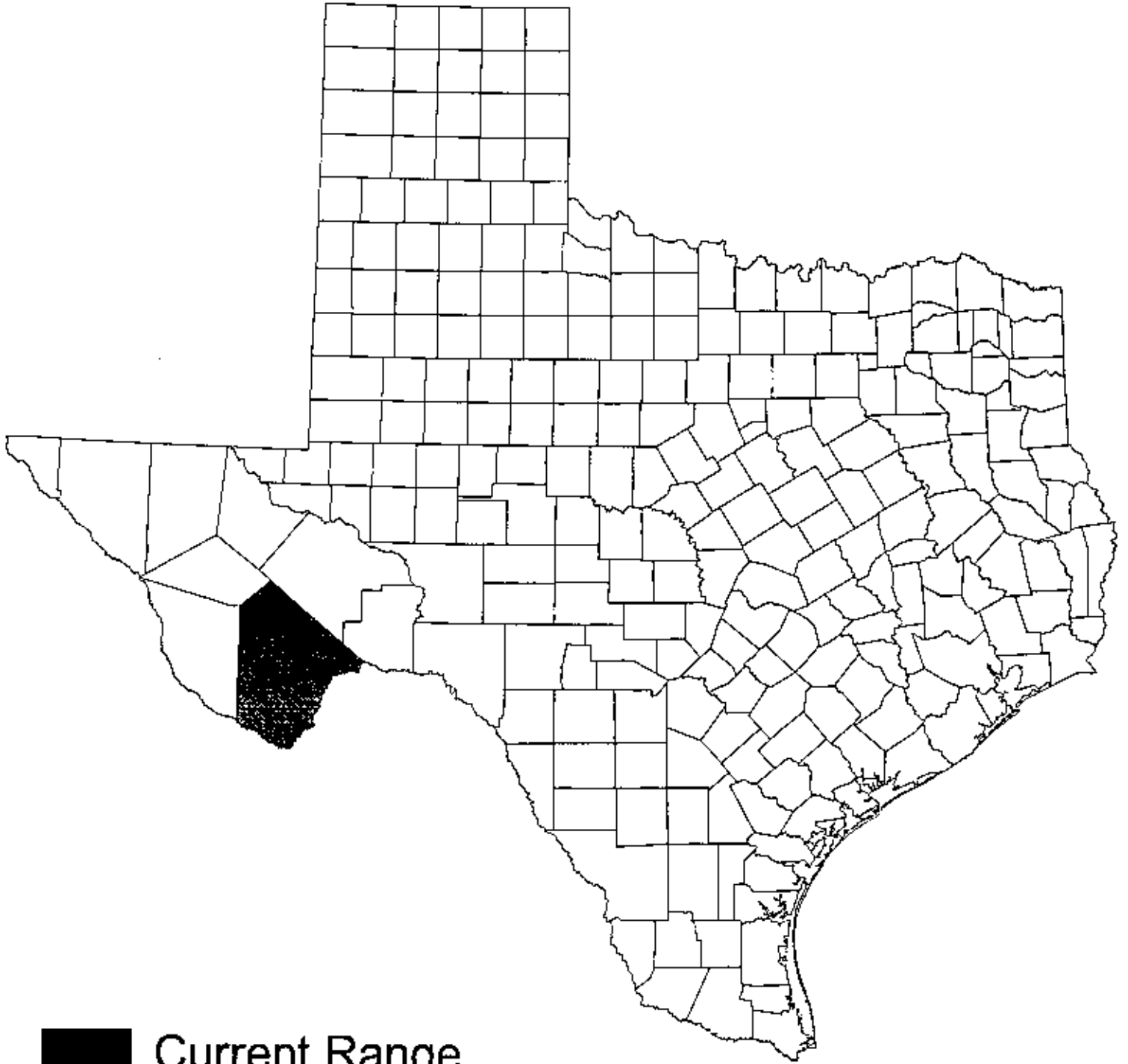
Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Heil, K. D., S. Brack, and J. M. Porter. 1985. The rare and sensitive cacti of Big Bend National Park. Report prepared for Big Bend National Park, Texas. 41 pp.

Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.

Taylor, N. 1986. The identification of Escobarias (Cactaceae). *Brit. Cactus & Succ. J.* 4(2): 36-44.





■ Current Range

Escobaria dasyacantha var. *chaffeyi*
(Chaffey' cory cactus)

Scientific Name: *Escobaria dasyacantha* (Engelm.) Britt. & Rose var. *dasyacantha*

Synonymy: *Escobaria dasyacantha* (Engelm.) Britt. & Rose; *Mammillaria dasyacantha* Engelm.; *Coryphantha dasyacantha* (Engelm.) Orcutt. var. *dasyacantha*

Common Name: dense corycactus

Global/State Ranks: G3T3S2

Federal Status: SOC

Global Range: west Texas; southern New Mexico, Chihuahua and Coahuila (Anderson 2001)

State Range: Brewster, El Paso, Hudspeth, Jeff Davis, and Pecos Counties.

Description (compiled from Benson 1982, Weniger 1984, Zimmerman 1985, Anderson 2001): Perennial stem succulent. **Stems** usually solitary, green, almost spherical when young, to elongated and cylindrical when older, 7.5-20.5 cm (3-8 in.) long, 5-7.5 cm (2-3 in.) in diameter; tubercles cylindrical, flattened, somewhat overlapping, grooved to base, 9.5-13 mm ($\frac{3}{8}$ - $\frac{1}{2}$ in.) long on older plants, oldest tubercles at plant base devoid of spines, discolored, dead looking; areoles bearing spines at tubercle tips. **Spines** relatively dense, obscuring stem; radials 24-35+, white, not brittle, very slender, upper ones almost bristle-like, 7.5-25 mm ($\frac{1}{4}$ -1 in.) long; centrals 7-17, needlelike, spreading irregularly, 9.5-25 mm ($\frac{3}{8}$ -1 in.) long, white below, tips reddish-brown. **Flowers** borne in tubercle axils, whitish to pale pink, not opening widely, 2-2.5 cm ($\frac{3}{4}$ -1 in.) long, 1.3-2.5 cm ($\frac{1}{2}$ -1 in.) in diameter, rarely opening fully due to stiff, dense spines; stigma lobes green. **Fruits** egg- to club-shaped, dark red or scarlet, fleshy, 12-20 mm ($\frac{1}{2}$ - $\frac{3}{4}$ in.) long, 4.5-6 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) in diameter; seeds jet black, obovoid, shiny, deeply pitted, 1 mm ($<\frac{1}{8}$ in.) long.

Habitat: Grasslands and open oak woodlands over igneous soils and perhaps limestone at moderate elevations (2500-6000 ft.) in Chihuahuan Desert Mountains. In Big Bend National Park associated species include *Bouteloua breviseta*, *Agave lechuguilla*, *Acacia* spp., *Krameria glandulosa*, *Condalia ericoides*, *Fouquieria splendens*, *Larrea tridentata*, and numerous other cacti (Heil et al. 1985).

Phenology: Flowering April-July; fruit maturing June-October (Heil et al. 1985)

Similar Species: Often confused with *Escobaria albicolumnaria*, *E. dasyacantha* var. *dasyacantha* has green stigma lobes, black seeds, and lacks giant lenticular druses. The variety *chaffeyi* has pinkish or brownish, occasionally greenish, flowers that are 1.5 cm ($\frac{3}{8}$ in.) long, and spines that

are not as stout. Variety *duncanii* is typically a much smaller plant with stems less than 5 cm (2 in.) tall and tubercles less than 7.5 mm (¼ in.) long. It also has bright yellow stigmas. *Escobaria tuberculosa* (*Coryphantha strobiliformis* of Benson and others) differs in the usually fewer central spines (4-8) with one prominent in the center and the white stigmas. *E. guadalupensis* has shorter stems at 3-5 cm (1½-2 in.) long, pale yellow stigma lobes, and a green fruit that dries to tan.

Comments: In his dissertation (Zimmerman 1985), Zimmerman recognized the entities (*duncanii*, *chaffeyi*) often assigned to *E. dasyacantha* as full species, thus eliminating the need for varietal status within the species.

Illustrations: Line drawings and a black and white photograph appear in Benson (1982). According to Zimmerman (1985) the color photograph in Benson (plate 176) is *E. dasyacantha* var. *albicolumnaria*. A black and white photograph appears in Heil and Brack (1988). Color photographs appear in Warnock (1977) and Weniger (1984) as *Mammillaria dasyacantha*.

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Heil, K. D., S. Brack, and J. M. Porter. 1985. The rare and sensitive cacti of Big Bend National Park. Report prepared for Big Bend National Park, Texas. 41 pp.
- Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine. 274 pp.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.
- Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. *El Paso Southwest Botanical Miscellany* No. 1. 56 pp.
- Zimmerman, A. D. 1985. Systematics of the genus *Coryphantha* (Cactaceae). Ph.D. dissertation, University of Texas, Austin.



The stems are white cylinders of dense spines occurring among rocks, under bushes, or among grasses. The plants are not quickly distinguishable from *C. strobiliformis* unless the seeds are examined; these are not at all alike.

12b. *Coryphantha dasyacantha* var. *varicolor* (Tiegel) L. Benson. Hills of igneous rocks, limestone, or novaculite in grasslands at 1,080-1,440 m (3,600-4,800 ft). Desert Grassland. Texas in Presidio, s Jeff Davis, and N Brewster Cos.

The green cylinders are recognizable from several meters away.



Fig. 891. Comparison of seeds: *Coryphantha strobiliformis* and *C. dasyacantha* var. *dasyacantha*. Left, *C. strobiliformis*, the hilum appearing "lateral," the seed being actually merely broader than long and the hilum being *per se* basal. Right, *C. dasyacantha*, the hilum being obviously basal, because the seed is longer than broad. (Paulus Roetter in Engelman/Emory, pl. 12, f. 15b, 21)

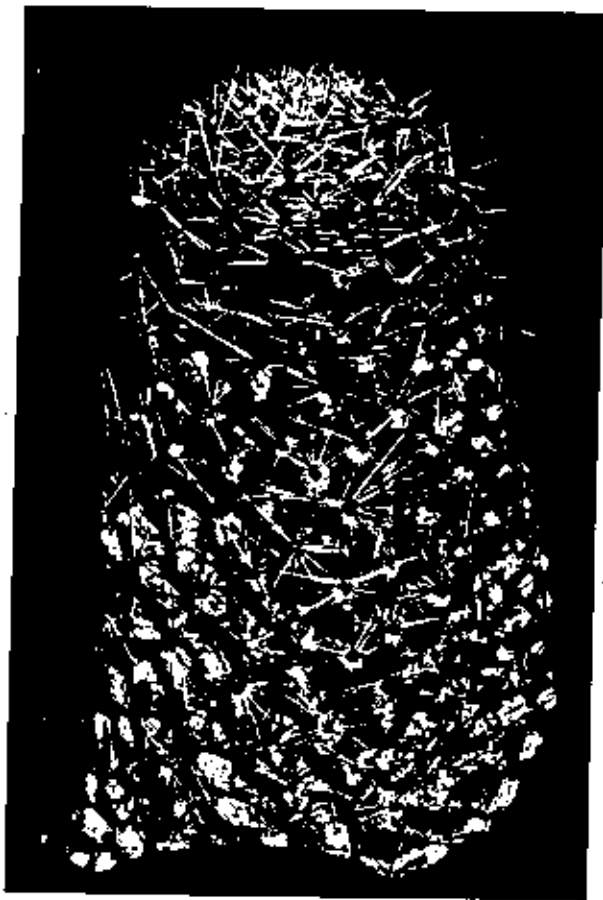


Fig. 892. *Coryphantha dasyacantha* var. *varicolor*, stem showing the relatively light covering of spines, as opposed to the dense covering in var. *dasyacantha*.

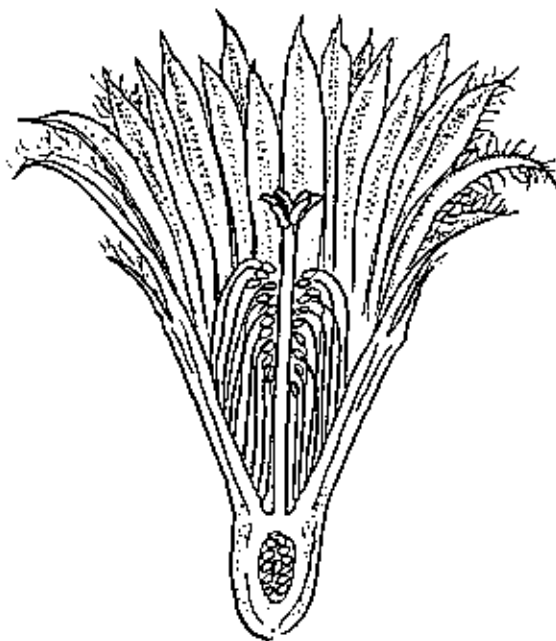
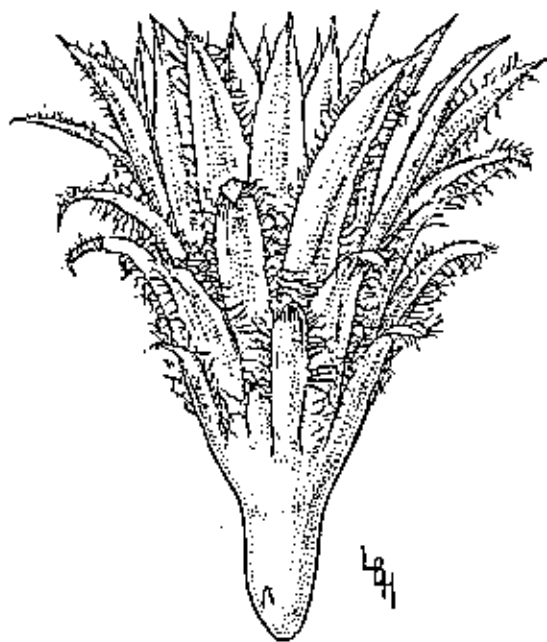
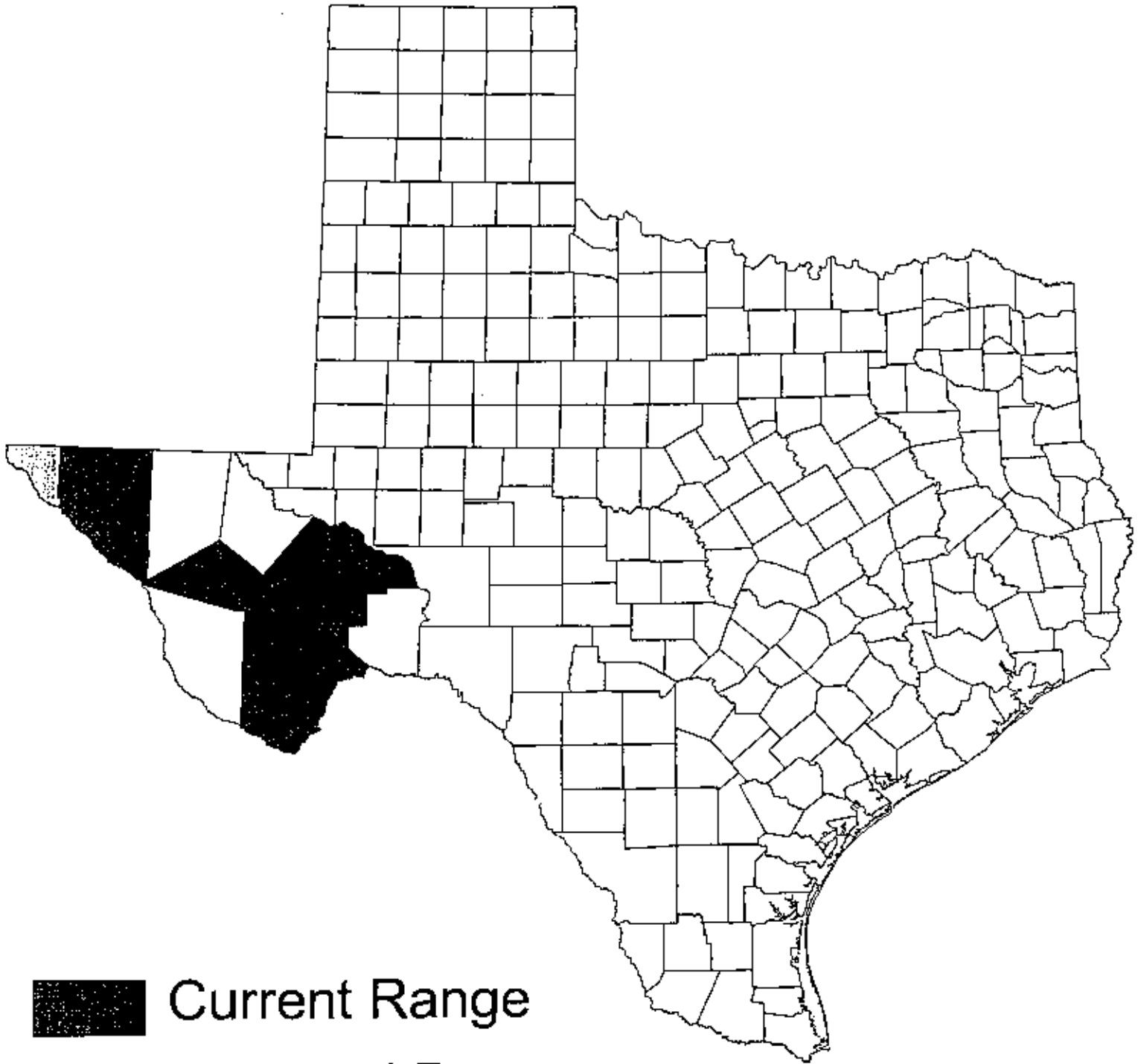


Fig. 890. *Coryphantha dasyacantha* var. *dasyacantha*, flowers. 1, Flower, $\times 3$. 2, Flower in longitudinal section, $\times 3$.



 Current Range

 Historical Range

Escobaria dasyacantha var. *dasyacantha*
(dense cory cactus)

Scientific Name: *Coryphantha duncanii* (Hester) L. Benson

Synonymy: *Mammillaria duncanii* (Hester) Weniger; *Escobaria duncanii*
Backeberg

Common Name:

Global Range: NM and TX.

State Range: Brewster and Presidio counties.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Low to moderate elevation limestone hills in Chihuahuan Desert, in Texas on outcrops of Boquillas Formation limestone (Heil & Anderson 1982).

Phenology: Flowering mid April to early May; fruits mature late May to early June (Heil & Anderson 1982).

Similar Species:

Comments:

Illustrations: A black and white photograph appears in Benson (1982) and Heil and Brack (1988); a color photograph appears in Weniger (1984) as *Mammillaria duncanii*; line drawings of various parts appear in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Heil, K. D. and E. F. Anderson. 1982. Status report [on *Coryphantha duncanii*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.

Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide.

University of Texas Press, Austin. 356 pp.



Family: CACTACEAE

Scientific Name: *Coryphantha duncanii* (Hester) L. Benson

Common Name: Duncan's pincushion cactus

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: *Escobaria duncanii* (Hester) L. Benson

Escobesseyia duncanii Hester

Description: Stems solitary or rarely two to three together, to about 6 cm (2.4 in.) high and about as wide; spines very numerous, completely obscuring the stem; not clearly differentiated into radials and centrals, 30-75 per areole, to about 20 mm (0.75 in.) long, white; flowers about 1.5 cm (0.4 in.) long, the petaloid parts pink; fruits red; seeds black. Flowers from May to July.

Known Distribution: Sierra County, New Mexico, and adjacent Texas

Habitat: Limestone hills, 900-1,500 m (3,000-5,000 ft.)

Ownership: Bureau of Land Management

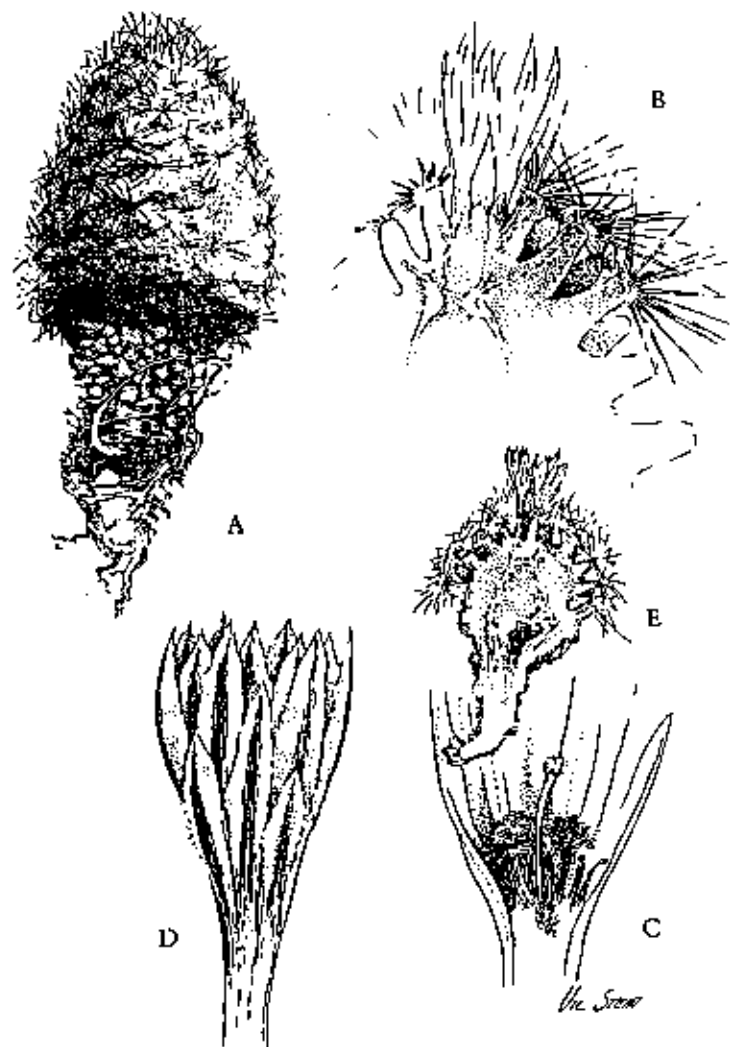
Threats to Taxon: Overcollecting is the primary factor affecting all of the state's rarer cacti.

Similar Species: Further study is needed in order to understand more fully the relationship of southern New Mexico's limestone inhabiting members of the genus *Coryphantha*, all of which are closely related and are difficult to differentiate based on the current literature.

Remarks: Future investigation may reveal new locations for *C. duncanii* in the southern portion of New Mexico.

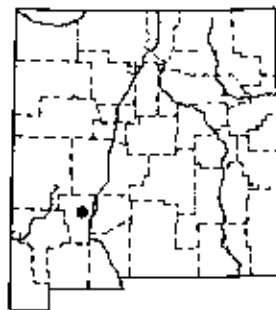
Important Literature:

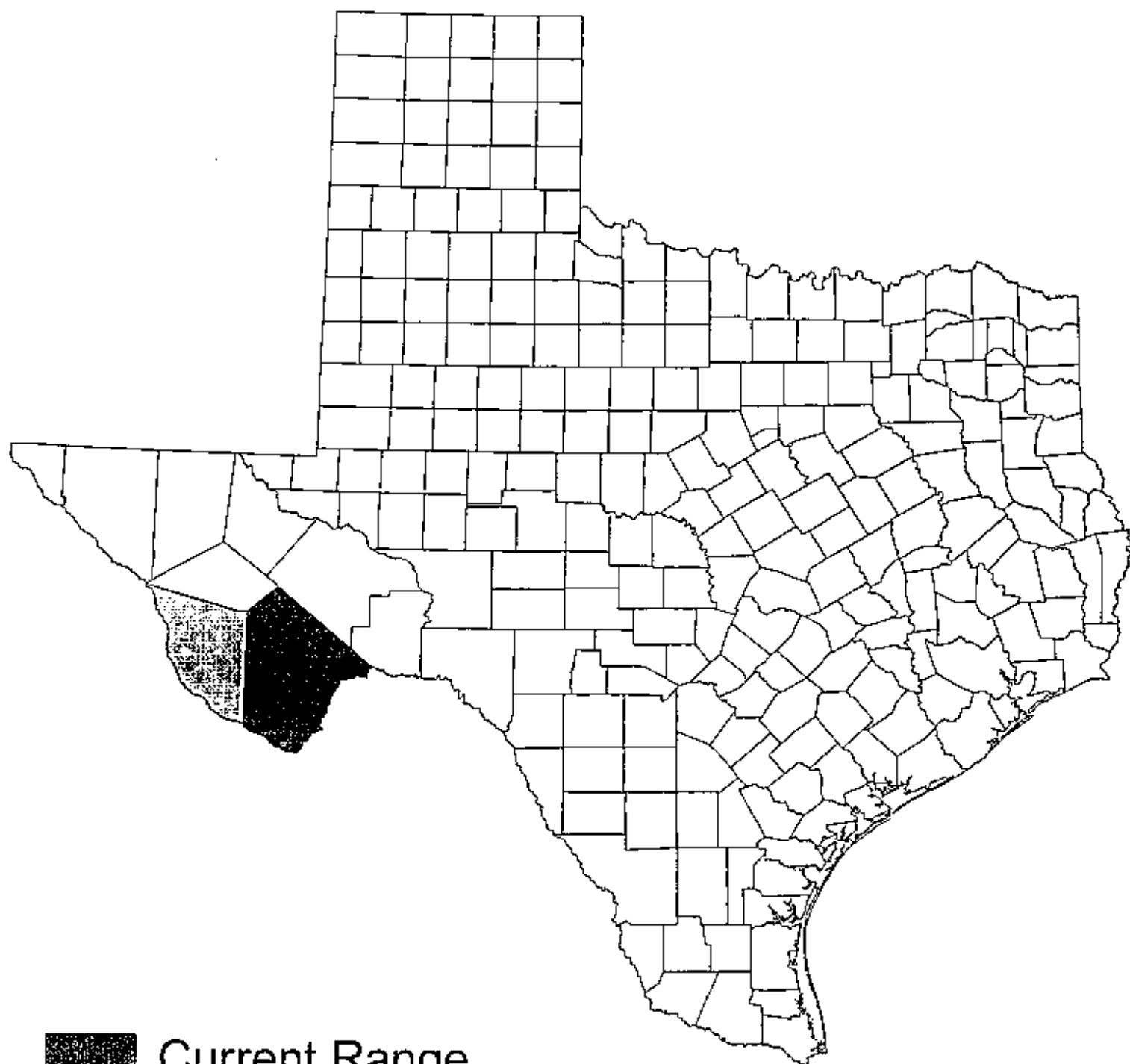
Correll, D. S., and M. C. Johnston. Manual of the vascular plants of Texas. Renner, Texas: Texas Research Foundation, 1970.



Coryphantha duncanii

A. general habit; B. close up of areole; C. flower in cross section; D. calyx; E. stem in longitudinal section





■ Current Range
□ Historical Range

Escobaria dasyacantha var. *duncanii*
(Duncan's cory cactus)

Scientific Name: *Escobaria guadalupensis* Brack & Heil

Synonymy: None.

Common Name: Guadalupe Mountain pincushion cactus

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to the Guadalupe Mountains of Texas and New Mexico.

State Range: Culberson County.

Description (adapted from Heil and Brack 1985): Perennial stem succulent.

Stems usually solitary, sometimes up to 5, globose to obovoid, mostly 3-5 cm (1½-2 in.) long, 4-10 cm (1½-4 in.) in diameter; tubercles cylindric, 10 mm (¾ in.) long, 3 mm (¼ in.) in diameter; areoles up to 3 mm (¼ in.) across, with fine wool when young, naked on older plants, spines persistent. **Spines** needlelike, densely covering stem; radials 36, 7-12 mm (¼-½ in.) long, white, slender, sometimes bristle-like; centrals 17, 8-14 mm (¼-½ in.) long, white with brown tips, in several whorls, thicker than radials. **Flowers** pale yellow, cream, or pink, up to 2.5 cm (1 in.) long; stigma lobes pale yellow. **Fruits** green when ripe, drying to tan, 15 mm (¾ in.) long, 5 mm (¼ in.) in diameter; seeds brown, 1.2 mm (<¼ in.) long.

Habitat: On exposed slabs and fractured limestone rock on steep, mostly south-facing slopes, open coniferous woodlands above 6500 ft. elevation in Guadalupe Mountains; often associated with *Petrophytum caespitosum*. Other associates include *Cercocarpus montanus*, *Pinus ponderosa*, *P. cembroides*, *Juniperus deppeana*, *Quercus muhlenbergii*, *Q. mohriana*, *Q. vaseyana*, *Amelanchier utahensis*, *Berberis haematocarpa*, *Rhamnus betulifolia*, *Ceanothus greggii*, *Dasyliirion leiophyllum*, *Polygala rimulicola*, *Chaetopappa hersheyi*, *Echinocereus triglochidiatus* var. *gurneyi*, *E. viridiflorus* var. *cylindricus*, *Agave neomexicana*, *Nolina microcarpa*, *Fendlera rupicola*, *Garrya ovata*.

Phenology: Blooming April-May, fruit maturing October-November.

Similar Species: For years this species was thought to be *Escobaria sneedii* var. *sneedii*. It differs from *E. sneedii* var. *sneedii* in having solitary to few stems that are similar in size. *Escobaria sneedii* var. *sneedii* has clusters of usually 10-100 stems, with many of the stems being very small in diameter. *Escobaria tuberculosa* (formerly known as *Coryphantha strobiliformis*) occurs in the Guadalupe Mountains, and can be distinguished by its scarlet fruits, smaller seeds (0.8 mm (<¼ in.) long, somewhat larger flowers (2-3 cm (¾-1½ in.) long), later flowering season, a lack of giant lenticular druses, usually fewer spines per areole (6-8

centrals and 20-30 radials), and spines not as white. *Escobaria vivipara* is also found in the Guadalupe Mountains, and differs in its much larger (2.5-6.7 cm (1-2 $\frac{5}{8}$ in.) wide and 2.3-5 cm (1-2 in.) long), brilliant magenta flowers, fewer central spines (5-15), and larger fruits (16-42 mm ($\frac{5}{8}$ -1 $\frac{5}{8}$ in.) long). Although *E. sneedii* var. *leei* does not occur in the Guadalupe Mountains, it does occur close by in Carlsbad Caverns National Park in New Mexico. It is similar to *E. sneedii* var. *sneedii* in number and dimorphism of stems, plus the spines are reflexed rather than spreading as they are in *E. guadalupensis* and *E. sneedii* var. *sneedii*.

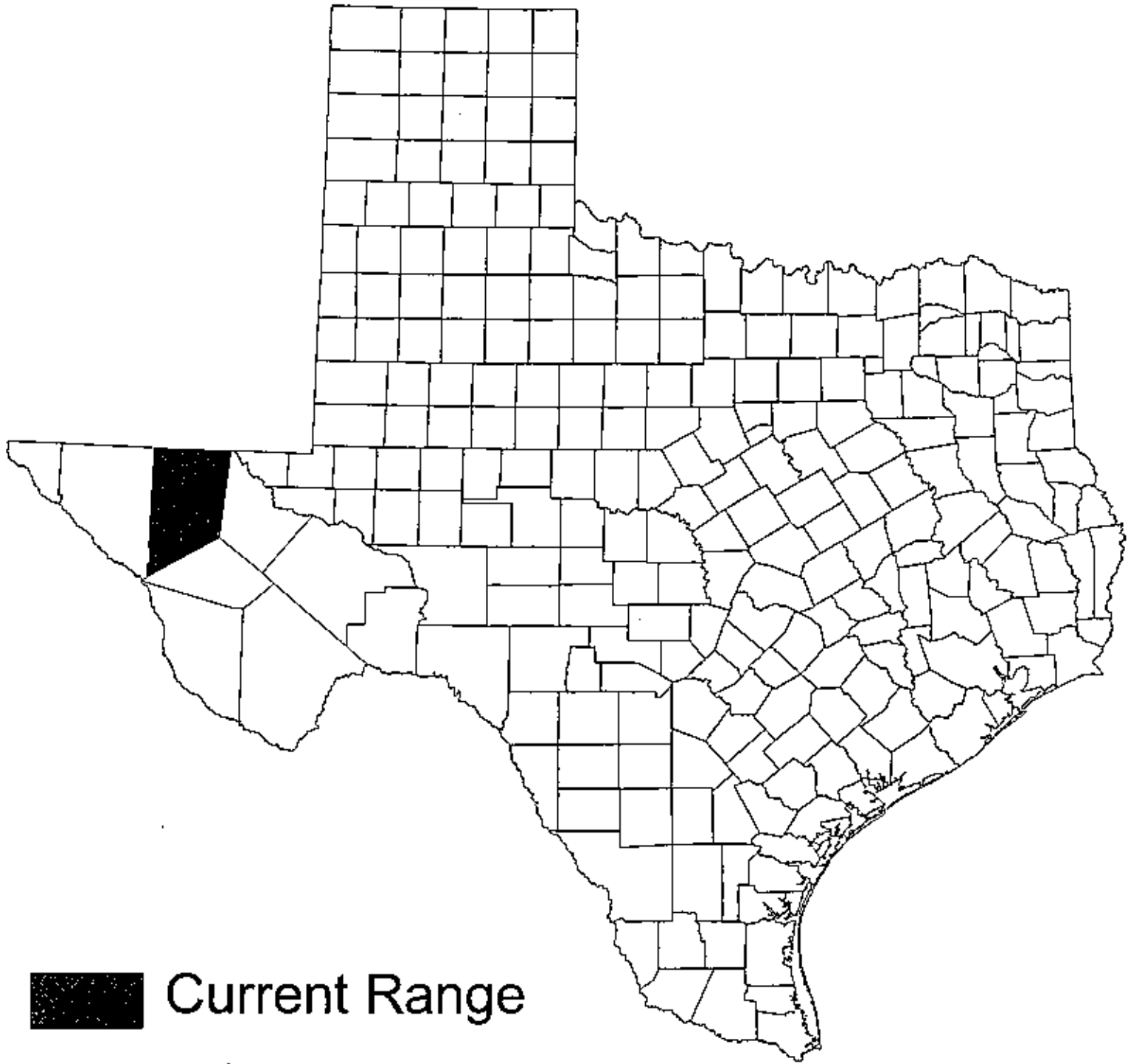
Comments: As this species was recently described and after the genus name *Escobaria* was widely accepted once again, it has never been placed in the genus *Coryphantha*. The species is recognized by Anderson (2001). Zimmerman did not recognize *E. guadalupensis* as such in his dissertation. However he thought that the entity might be distinct. In an addendum to his dissertation (Zimmerman 1987), he includes *E. guadalupensis*, but states that it is "less distinctive than most of the other...geographical races of *C. sneedii*."

Illustrations: Photographs of cacti and habitat appear in Heil & Brack (1986).

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Heil, K. D. and S. Brack. 1984. Rare and sensitive cacti of Guadalupe Mountains National Park. Report prepared for Guadalupe Mountains National Park. 13 pp.
- Heil, K. D. and S. Brack. 1986. The cacti of Guadalupe Mountains National Park. *Cactus & Succ. J. (U.S.)* Vol 58: 165-177.
- Zimmerman, A. D. 1985. Systematics of the genus *Coryphantha* (Cactaceae). Ph.D. dissertation, University of Texas, Austin.
- Zimmerman, A. D. 1987. Systematics of *Coryphantha*: Addenda et corrigenda. Unpublished supplement. 5 pp.





 Current Range

Escobaria guadalupensis
(Guadalupe Mountains pincushion cactus)

Scientific Name: *Coryphantha hesteri* Y. Wright

Synonymy: *Mammillaria hesteri* (Y. Wright) Weniger

Common Name: Hester's corycactus

Global Range: West TX.

State Range: Brewster, Pecos and Terrell Counties.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Grasslands on dry gravelly limestone hills and alluvial fans at ca. 4000-5000 feet; often on novaculite. Associates in reddish brown clay on a level alluvial/colluvial plain in Brewster County include *Dalea greggii*, *Eriogonum tenellum*, *Polygala alba*, *Krameria lanceolata*, *Acleisanthes longiflora*, *Melampodium leucanthum*, *Senecio longilobus*, *Croton* sp., *Aristida* spp., *Opuntia discata*, *Echinocereus viridiflorus* var. *correllii*, *E. viridiflorus* var. *cylindricus*, *Echinocactus horizonthalonius*.

Phenology: Flowering May-early June; fruiting June-July

Similar Species:

Comments:

Illustrations: A black and white photograph appears in Benson (1982); a color photograph appears in Weniger (1984) as *Mammillaria hesteri*.

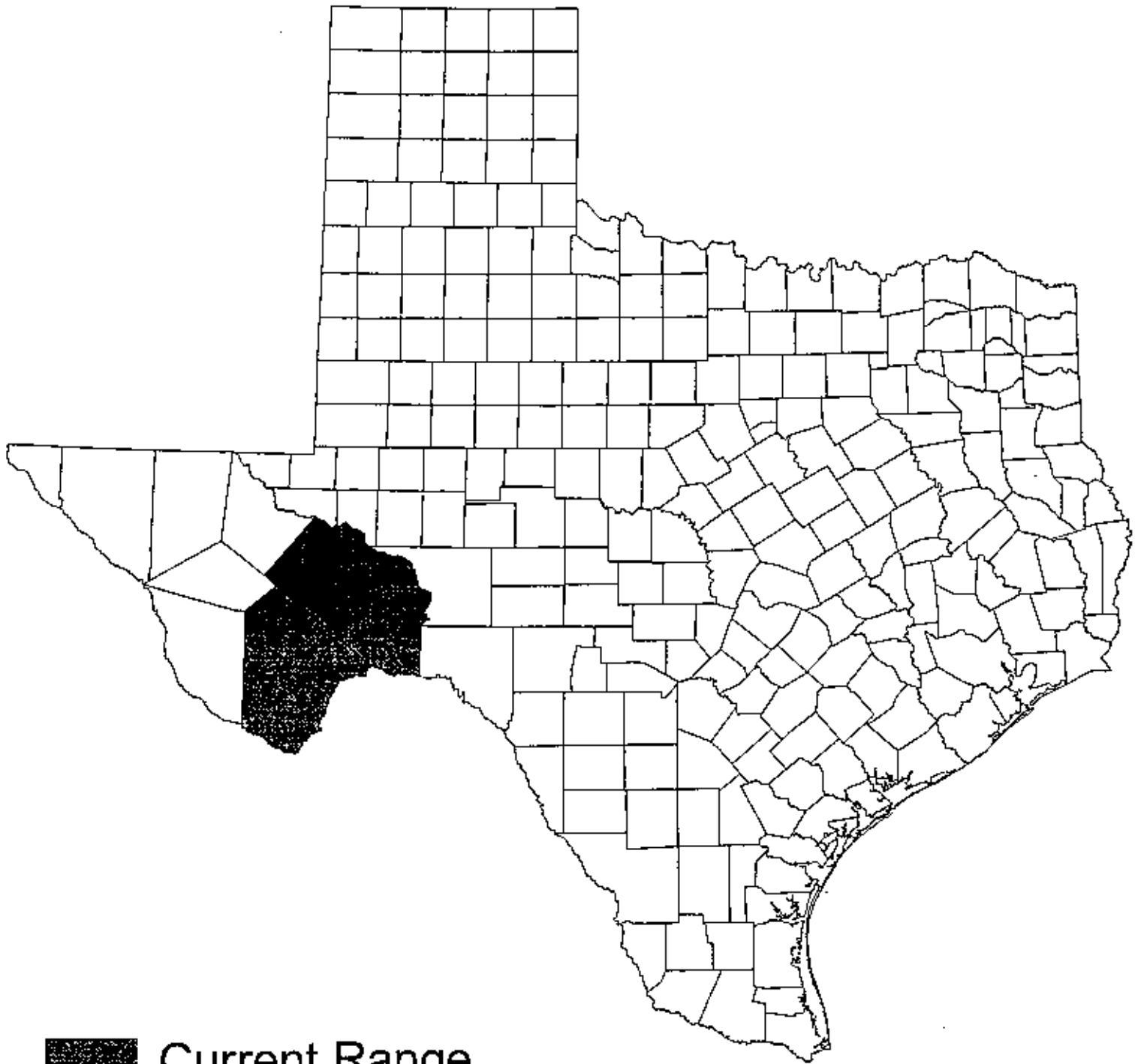
Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Heil, K. D. and E. F. Anderson. 1982. Status report [on *Coryphantha hesteri*]. Report prepared for US Fish and Wildlife Service, Albuquerque.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.





■ Current Range

Escobaria hesteri
(Hester's cory cactus)

Scientific Name: *Escobaria minima* (Baird) D. Hunt

Synonymy: *Coryphantha minima* Baird; *Mammillaria nelliae* (Croizat) Croizat; *Coryphantha nelliae* Croizat; *Escobaria nelliae* (Croizat) Backeberg;

Common Name: Nellie cory cactus

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: Trans Pecos Texas.

State Range: Endemic to a few low mountain ranges in Brewster County.

Description (compiled from Benson 1982, USFWS 1984, Weniger 1984, Anderson 2001): Perennial stem succulent. **Stems** solitary, occasionally branched, egg-shaped to short-cylindrical, very small in the wild, 1.2-2.5 cm ($\frac{1}{2}$ -1 in.) long, 1-2 cm ($\frac{3}{8}$ - $\frac{3}{4}$ in.) in diameter, tubercles subcylindroid, to 3 mm ($\frac{1}{8}$ in.) long; areoles somewhat woolly, 1 mm ($<\frac{1}{8}$ in.) in diameter. **Spines** dense, obscuring and strongly flattened against the stem, centrals and radials not distinguishable, 20-25, gray, yellow or pinkish, 3-8 mm ($\frac{1}{8}$ - $\frac{3}{8}$ in.) long, cylindroid with abruptly acute tips, those of the inner series longer and thicker with bulbous bases. **Flowers** bright pink to reddish purple, 2 cm ($\frac{3}{4}$ in.) long, up to 2.5 cm (1 in.) in diameter. **Fruits** ovoid, green, to 7 mm ($\frac{1}{4}$ in.) long; seeds black. 0.5 mm ($<\frac{1}{8}$ in.) long.

Habitat: Novaculite outcrops in full sun among sparse Chihuahuan Desert scrub, usually among chips of novaculite; associated with other rare plant species such as *Echinocereus viridiflorus* var. *davisii*, *Thelocactus bicolor* var. *flavidispinus*, *Echinocereus viridiflorus* var. *correllii*, *Paronychia wilkinsonii*, and *Escobaria hesteri*. Other associated species include *Bouteloua breviseta*, *Erioneuron pulchellum*, *Selaginella peruviana*, *Larrea tridentata*, *Agave lechuguilla*, *Dasyllirion leiophyllum*, *Viguiera stenoloba*, *Acacia constricta*, *Yucca elata*, *Y. torreyana*, *Nolina texana*, *Opuntia violacea*, *Echinocereus stramineus*, *Mammillaria gummiifera*, *Zinnia pumila*, and *Thymophylla pentachaeta*.

Phenology: Flowering March-June, probably most consistently in May; fruiting June-October.

Similar Species: The unusual spines, dwarf size, and narrow edaphic and geographic range distinguish *Escobaria minima* from all other cacti in Texas. What it most resembles in the wild is a desiccated deer dropping.

Comments: A highly prized collector's item, *Escobaria minima* often becomes much larger in cultivation.

Illustrations: Line drawings and a black and white photograph appear in Benson (1982); color photographs appear in Weniger (1984) as *Mammillaria nelliae* and in Warnock (1977); line drawings of spine characters and a color photograph appear in Poole & Riskind (1987); a line drawing appears on the cover of the Recovery Plan (USFWS 1984).

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks and Wildlife Department, Austin. Looseleaf binder, no pagination.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine, Texas. 274 pp.
- U.S. Fish & Wildlife Service. 1984. Nellie cory cactus (*Coryphantha minima*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1979. Status report on *Coryphantha minima*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



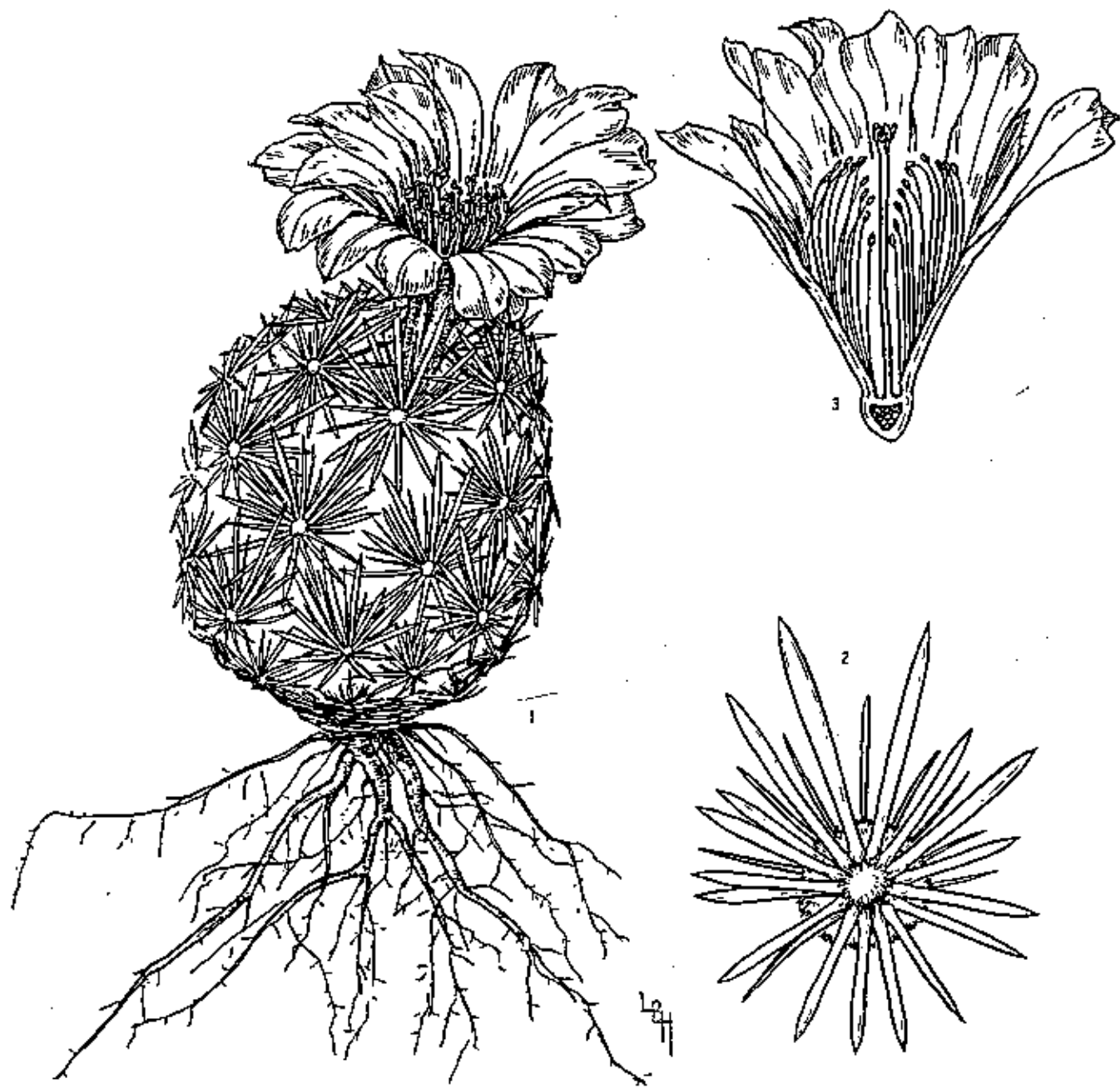
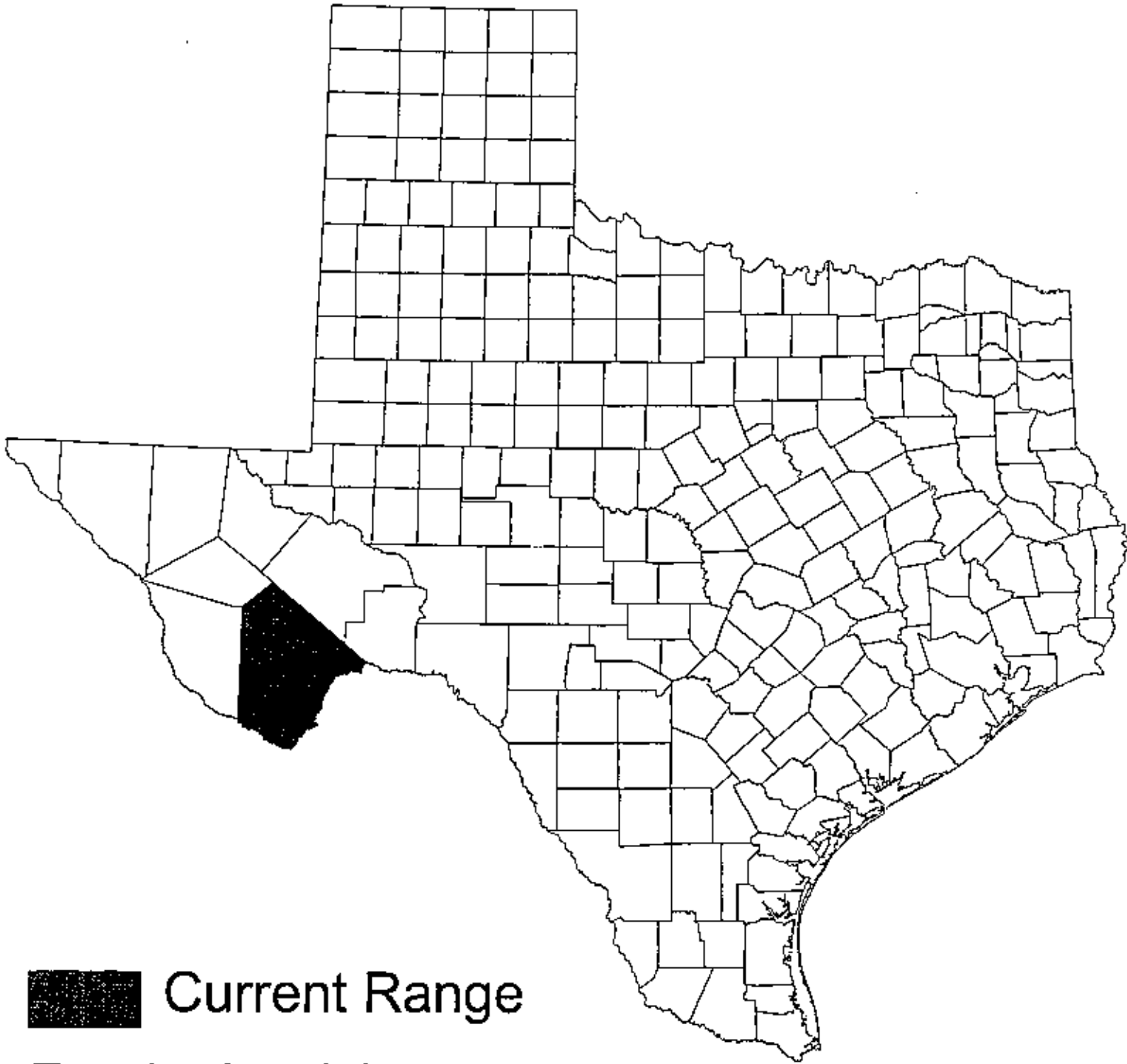


Fig. 850. *Coryphantha minima*. 1, Plant in flower, $\times 5$. 2, Areole, showing the spines and hairs, the spines narrowed abruptly at the apices, $\times 14$. 3, Flower in longitudinal section, $\times 7$.

broad, apically fimbriate-ciliate; petaloids reddish-purple to rose, the largest narrowly oblanceolate, to 30 mm long, $\pm 6-9$ mm broad, minutely fimbriate; filaments reddish-purple to rose, to 12 mm long; anthers yellow, oblong, ± 1 mm long; style yellow, ± 20 mm long, 1.5 mm greatest diam; stigmas 7 or 8, ± 4.5 mm long, slender; ovary in anthesis ± 7.5 mm long, 4.5 mm diam,

with a few fimbriate scales; fruit green at maturity, the fimbriate scales with woolly axils, 16-25 mm long, 6-9 mm diam; seeds golden brown, reticulate, broader than long, ± 1.25 mm long, 2 mm broad, ± 1 mm thick; hilum appearing "lateral."

Reference: Hodgkins, Brown, & Massingill, 1967. (Alkaloids found in this species.)



 Current Range

Escobaria minima
(Nellie's cory cactus)

Scientific Name: *Escobaria sneedii* Britt. & Rose var. *sneedii*

Synonymy: *Coryphantha sneedii* (Britt. and Rose) Berger; *Mammillaria sneedii* (Britt. & Rose) Cory; *Escobaria sneedii* Britt. & Rose var. *sneedii*

Common Name: Sneed's pincushion cactus; Sneed's cory cactus

Global/State Ranks: G2T2S2

Federal Status: Endangered

Global Range: Franklin Mountains of Texas and New Mexico.

State Range: Franklin Mountains of El Paso County.

Description (compiled from Benson 1982, Weniger 1984, Zimmerman 1985, Van Devender 1992): Perennial stem succulent. **Stems** much branched, forming clumps 30+ cm (12+ in.) in diameter, composed of 10-100+ stems, many of the stems immature and quite small; larger stems green, cylindroid, 2.5-13.5 cm (1-5¼ in.) long, 1.2-4.5 cm (½-1¾ in.) in diameter, with giant lenticular druses; tubercles protruding 4-9 mm (⅙-⅜ in.), persistent, hard and spineless with age; areoles 1.5 mm (<⅙ in.) in diameter. **Spines** needlelike, very dense, obscuring stem, spreading parallel to stem surface; radials white, 24-46, 3-12 mm (⅙-½ in.) long; centrals white with pink or lavender tips, 5-18, 2-16.5 mm (<⅙-⅝ in.) long. **Flowers** pink to pale rose, 1.1-2.5 cm (½-1 in.) long and in diameter; stigmas white or with pinkish or yellowish tinge. **Fruits** green, eventually turning brownish pink, club-shaped, 6.5-15.5 mm (¼-⅝ in.) long, 2.5-6 mm (<⅙-¼ in.) in diameter; seeds more or less comma-shaped, reddish-brown, 1.1-1.3 mm (<⅙ in.) long.

Habitat: Dry limestone outcrops on rocky, usually steep, slopes in desert mountains, in Chihuahuan Desert succulent shrublands or grassland, with *Agave lechuguilla*, *Dasylinion wheeleri*, *Rhus virens*, *Fouquieria splendens*, *Yucca torreyi*, *Viguiera stenoloba*, *Escobaria tuberculosa*, *Parthenium incanum*, and *Dalea formosa*.

Phenology: Flowering April-September; peak season usually in April, sometimes followed by opportunistic flowering after summer rains. Worthington (1986) reported consistent flowering of one clump for 3 to 14 days between 5 April and 16 May.

Similar Species: *Escobaria tuberculosa* (formerly known as *Coryphantha strobiliformis*) occurs with, and is often mistaken for, *E. sneedii* var. *sneedii*. However *E. tuberculosa* has scarlet fruits, smaller seeds (0.8 mm (<⅙ in.) long, somewhat larger flowers (2-3 cm (¾-1 ⅙ in.) long, a flowering time predominantly in May, a lack of giant lenticular druses, usually fewer spines per areole (6-8 centrals and 20-30 radials), spines

not as white, several rows of naked tubercles at the base, and clumps composed of fewer and larger stems. Although *E. sneedii* var. *leei* does not occur within the range of *E. sneedii* var. *sneedii*, it can be distinguished its reflexed and more numerous spines (62-95), and its smaller (3.5-10 cm (1½-4 in.) long and 1.3-3 cm (½-1½ in.) in diameter) and more numerous (up to 250) stems.

Comments: Zimmerman (1985) considers *Escobaria sneedii* to be a very polymorphic species, consisting of nine geographic races, including var. *sneedii*.

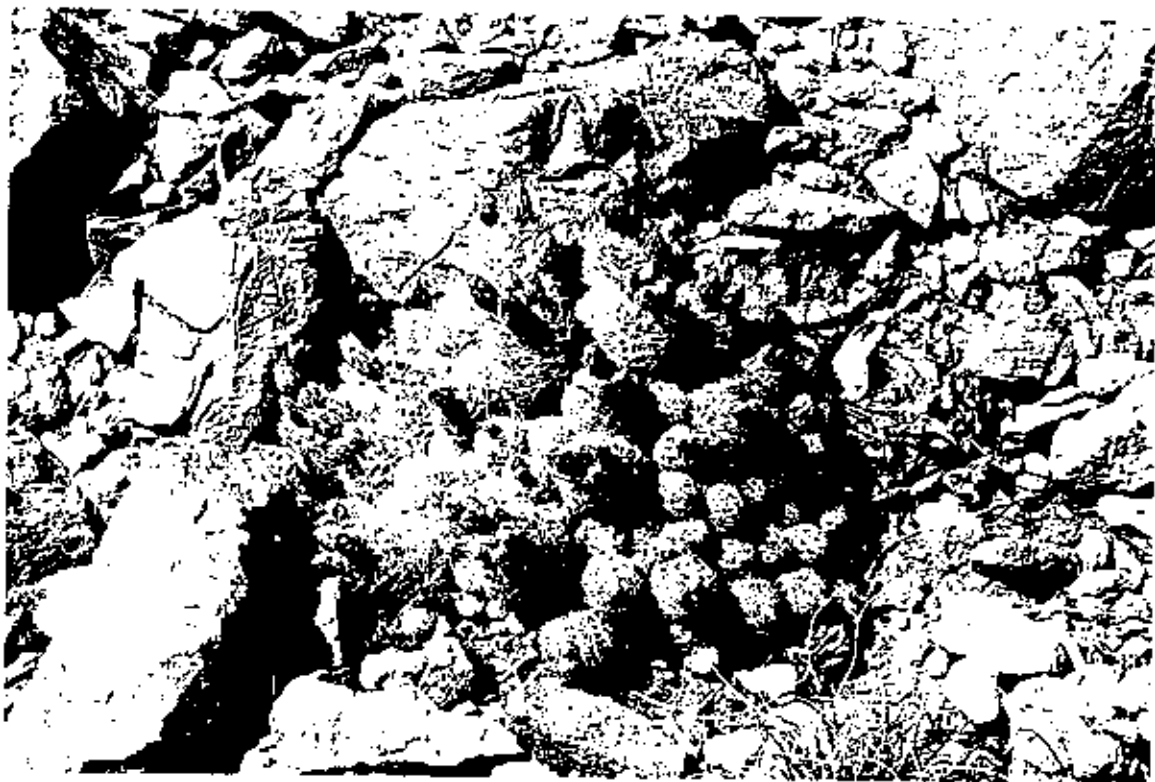
Illustrations: Line drawings and a black and white photograph appear in Benson (1982); a color photograph appears in Worthington (1986) and in Weniger (1984) as *Mammillaria sneedii*; line drawing appear in New Mexico Native Plant Protection Advisory Committee (1984); line drawings of spine characters and a color photograph appear in Poole & Riskind (1987)

Selected References:

- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.
- Champie, C. 1960. *Escobaria sneedii* further described. Cactus and Succulent Journal 32: 138-140.
- Champie, C. 1973. Strangers in the Franklins. Privately published, El Paso. 77 pp.
- Heil, K. D. and S. Brack. 1986. Sneed and Lee pincushion cacti (*Coryphantha sneedii* var. *sneedii* and *Coryphantha sneedii* var. *leei*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.
- New Mexico Native Plants Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder, no pagination.
- Van Devender, R. 1992. The status of Sneed's pincushion cactus (*Coryphantha sneedii* var. *sneedii*) in Texas. Report prepared for U.S. Fish and Wildlife Service, Albuquerque. 20 pp.
- Wagner, W. L. and D. G. Sabo. Undated. Status report for *Escobaria sneedii* var. *sneedii*. Report prepared for U.S. Fish & Wildlife Service,

Albuquerque.

- Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.
- Worthington, R. D. 1986. Observations on the flowering of cacti from the vicinity of El Paso, Texas. *Cactus & Succ. J.* 58: 213-217.
- Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. *El Paso Southwest Botanical Miscellany* No. 1. 56 pp.
- Zimmerman, A. D. 1985. Systematics of the genus *Coryphantha* (Cactaceae). Ph.D. dissertation, University of Texas, Austin.





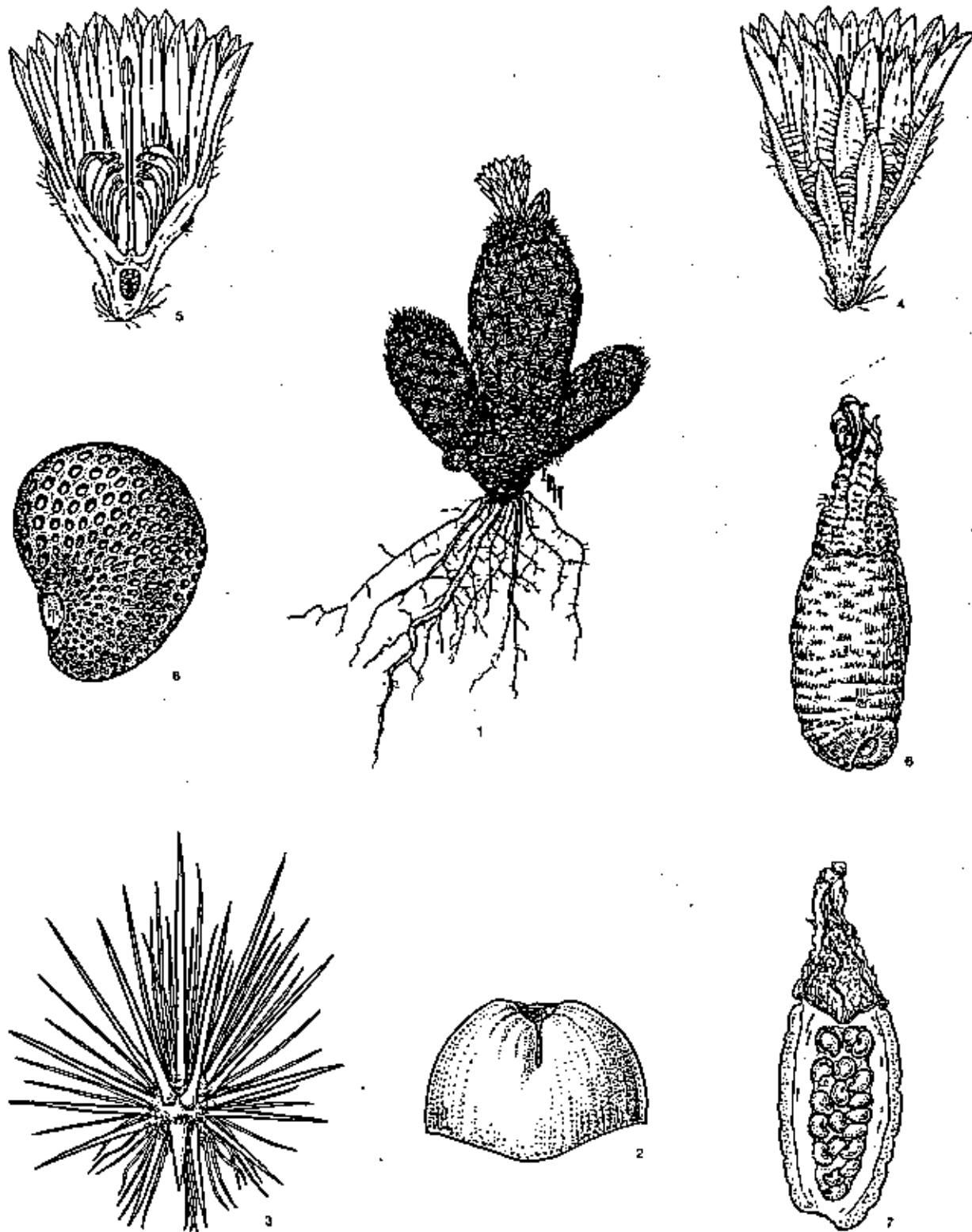
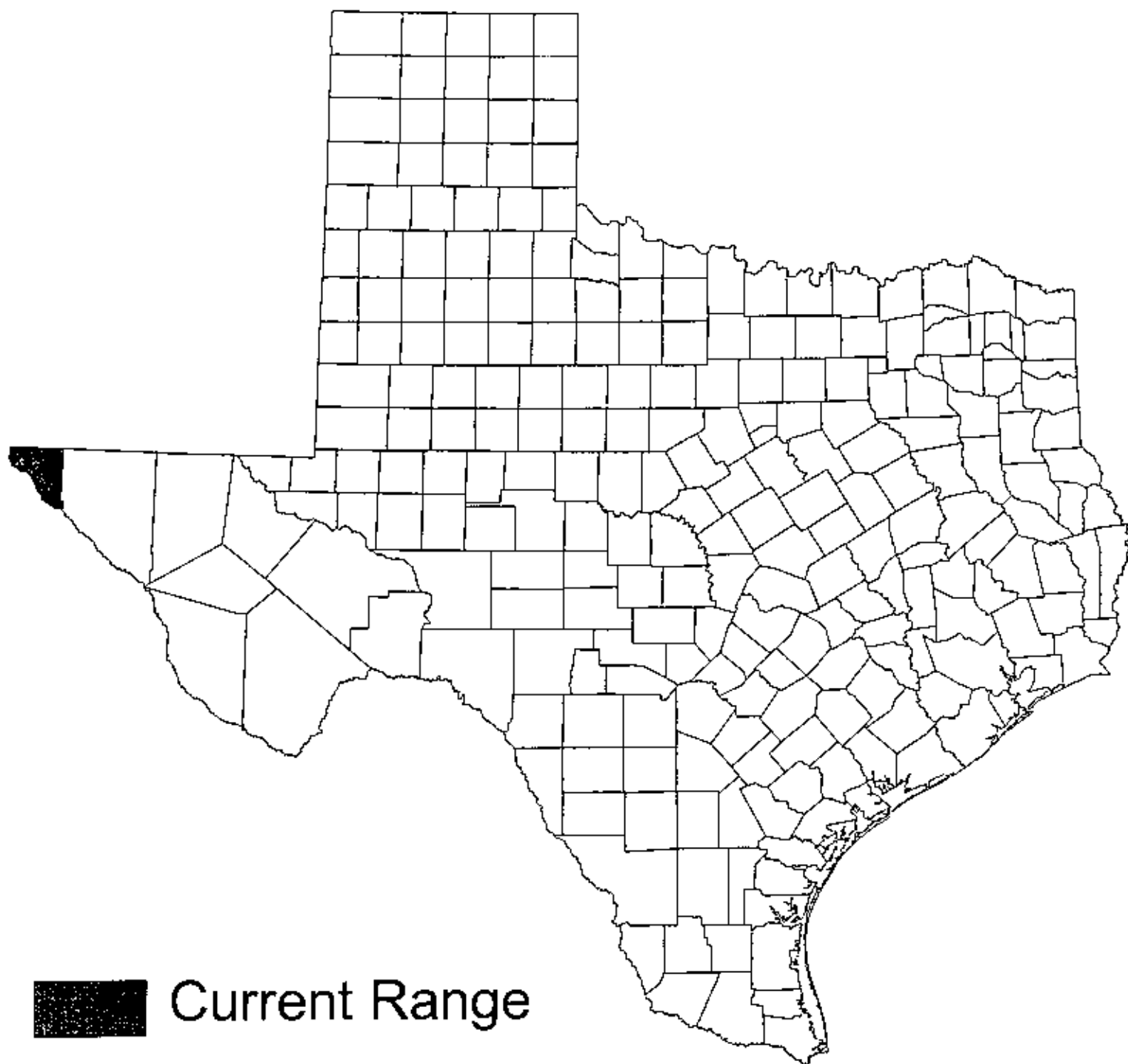


Fig. 887. *Coryphantha sneedii* var. *sneedii*. 1, Relatively young plant with only a few branches, in flower, $\times 9$. 2, Apex of a tubercle with the spines removed, $\times 17$; the scar of flower attachment very short, as in young plants still in the stage of juvenile development. 3, Areole with stouter central spines and more slender radial spines, the latter in several series, $\times 4.5$. 4, Flower, $\times 3.5$. 5, Flower in longitudinal section, $\times 3.5$. 6, Fruit, $\times 4.5$. 7, Fruit in longitudinal section, $\times 4.5$. 8, Seed, the hilum appearing "lateral," but the seed merely broader than long, $\times 28$.

Escobaria



■ Current Range

Escobaria sneedii var. *sneedii*
(Sneed's pincushion cactus)

Scientific Name: *Eysenhardtia spinosa* Gray

Synonyms: None.

Common Name: spiny kidneywood

Global/State Ranks: G2S2

Federal Status: None

Global Range: Mostly in the Sierra Madre Occidental in Chihuahua and extreme northern Durango; apparently disjunct in west Texas (R. Barneby in Henrickson & Johnston in prep.).

State Range: Presidio County.

Description (adapted from R. Barneby in Henrickson & Johnston in prep. and Powell 1998): Intricately branched, small shrub mostly 3-10 dm tall, the branches stiff and sharp but not truly spinose. Leaves alternate, odd-pinnately compound, 1-2.5 cm long; leaflets (9-) 11-17 (-19), ovate to obovate, emarginate to obtuse at apex, mucronulate at the tip, gland-dotted, (1-) 3-4 mm long. Flowers in spikelike racemes at the ends of branch tips; racemes with 6-20 flowers, the axis 0.5-3 cm long; calyx 2.1-3.8 mm long, with 5 deltoid to rounded teeth; corolla somewhat regular (not papilionaceous); petals 5, white to purplish, connate for 1/4 to 1/3 their length, 4.5-6 mm long. Fruit a 1-seeded, gland-dotted indehiscent pod, elliptic to ovate elliptic, 5-5.5 (-10 mm) long and (1.6-) 2-3 mm wide, stoutly 2-keeled by the sutures, the sides ridged by 1-2 coarse veins.

Similar Species: Much like the widespread *Eysenhardtia texana*, which has leaves 3-9 cm long composed of 15-47 leaflets and racemes 3-9 cm long (Powell 1998).

Habitat: Grasslands or shrublands on igneous outcrops or limestone hills in and around the Sierra Vieja Mountains.

Phenology: Flowering in August.

Comments:

Illustrations: A color photograph appears in Warnock (1977). A line drawing appears in Powell (1998).

Selected References:

- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University, Alpine. 276 pp.





Fig. 160. *Genistidium dumosum*
(Johnston Genistidium)

streams in the Trans-Pecos, Presidio Co., near the Rio Grande, Val Verde Co., near Dolan Falls, Devils River. 2200–2500 ft.; spring. A shrub 2–3 m tall with oval or oblong gland-dotted leaflets, and prominent, mostly solitary, purplish spikes of flowers with one petal. NM, AZ, CA, WY; also N Mex.

15. EYSENHARDTIA KUNTH KIDNEYWOOD

Shrubs to 3.5 m high, much branched, usually unarmed, herbage and flowers gland-dotted and aromatic. Leaves alternate, deciduous, once-compound odd-pinnate, 1–9 cm long; leaflets 13–47, 3–12 mm long, narrow; stipules short, awl-shaped; stipels minute. Flowers white or purplish, in spike-like racemes 1–11 cm long; calyx irregularly lobed; corolla somewhat regular, petals 4–5 mm long; stamens 10, 9 partially fused, the uppermost one free. Fruit a small pod, 5–10 mm long, 1.6–2.5 mm wide, gland-dotted, mostly indehiscent, flattened, with only 1 mature seed.

A genus with about 12 species in the semidesert areas of North America from the southwestern United States to Guatemala. The species are not often grazed by cattle and otherwise are not of much economic value, although the name Kidneywood comes from the use of some Mexican species in the treatment of renal disorders.

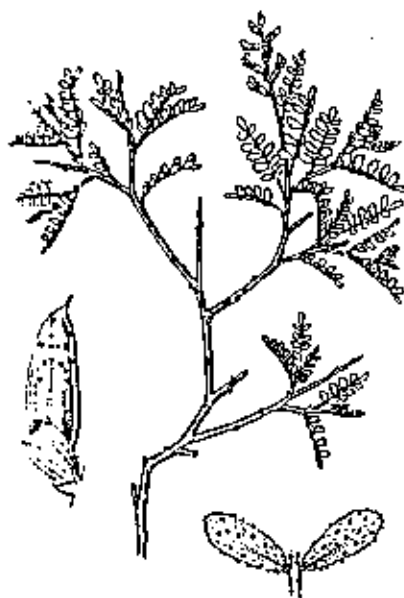


Fig. 161. *Eysenhardtia spinosa*
(Spiny Kidneywood)



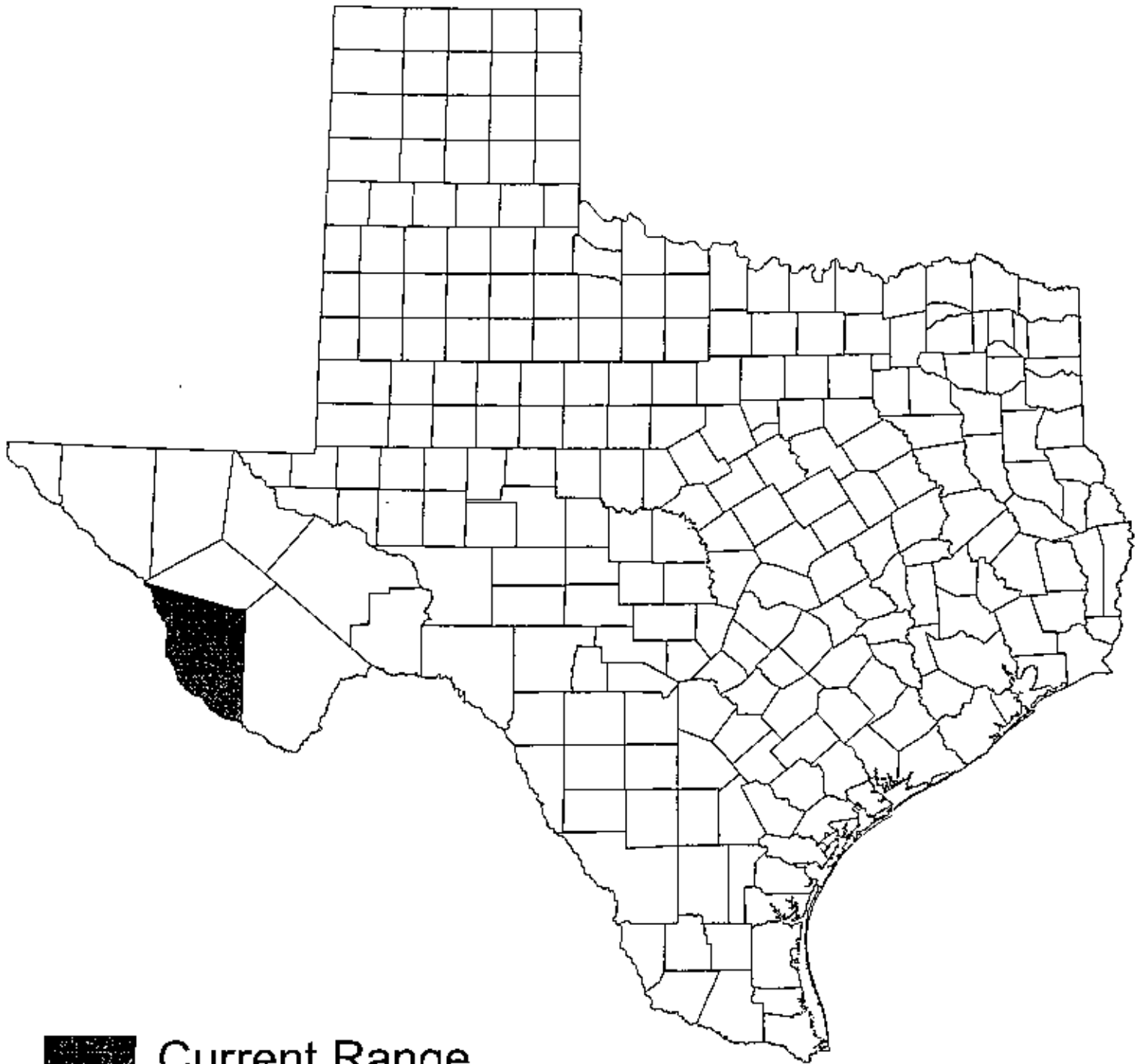
Fig. 162. *Eysenhardtia texana*
(Texas Kidneywood)

KEY TO THE SPECIES

- b. leaflets 13–17, 3–4 mm long; leaves 1–3 cm long; shrub less than 1 m high; flowers white or purplish, racemes usually 3 cm or less 1. *E. spinosa*.
c. leaflets 15–47, 5–12 mm long; leaves 3–9 cm long; shrub 2–3 m high; flowers white, racemes 3–11 cm long 2. *E. texana*.

1. *Eysenhardtia spinosa* Engelm. SPINY KIDNEYWOOD. Fig. 161. A rare, small shrub, originally known in Texas only by a Hinckley collection from the west end of Capote Peak in Presidio Co., and recently reported also from a small population above the head of Pinto Canyon, and at the top of the Frenchman Hills south of Marfa, Presidio Co. (Warnock, 1977); first collected in Chih. Mex. 5000 ft.; Jul–Oct. The smallish shrubs are about two feet high, and not actually spiny as the species name would imply, but have rather stiff and sharp branches.

2. *Eysenhardtia texana* Scheele. TEXAS KIDNEYWOOD, VARA DULCE. Fig. 162. [*Eysenhardtia angustifolia* Penn.]. A scattered to common shrub, usually in brushy vegetation and along arroyos in limestone regions. Brewster Co., Green Gulch in the Chisos Mts., at ca. 5000 ft.; widespread at lower elevations in the E Trans-Pecos; reported from Fern Canyon, Jeff Davis Co. Apr–



 Current Range

Eysenhardtia spinosa
(spiny kidney-wood)

Scientific Name: *Festuca ligulata* Swallen

Synonyms: None.

Common Name: Guadalupe fescue

Global/State Ranks: G1S1

Federal Status: C1

Global Range: West Texas and southern and northern Coahuila.

State Range: Chisos Mountains of Brewster County and Guadalupe Mountains of Culberson County.

Description (adapted from Henrickson & Johnston in prep.; Swallen 1932; Poole 1989): Tufted perennial, the culms 4.5-8 dm tall and 1-2 mm wide, usually briefly decumbent at base, scabrous below the panicle but otherwise glabrous or nearly so. Leaves linear, the blades involute, less commonly flat, 6-30 cm long and 1-2 mm wide, strongly parallel-veined on upper surface, scabrous on both surfaces; ligule a hyaline scale 3-4 mm long; sheaths smooth or scaberulous. Flowers in more or less nodding spike-like panicles 6-16 cm long, narrow, the branches stiffly ascending or spreading, often naked near the base. Spikelets on appressed pedicels to 2 mm long, turgid, ca. 6 mm long, with 2-3 (-4) florets; glumes acute or subobtusate, scabrous especially on the midnerve, the lower 3.5 mm long, 1-nerved, the upper ca. 4 mm long, 3-nerved; lemmas 4-6 mm long, elliptic, U-shaped (not keeled) in cross-section, thin, revolute, faintly nerved, acute at the tip but more or less blunt; palea equal to or slightly longer than the palea; awns absent.

Habitat: Woodlands on mesic slopes and in creekbottoms above 6000 feet. Substrates in the Chisos Mountains are gravelly and sandy loams derived from igneous materials; substrates in Guadalupe Mountains are unknown but are presumed to be loamy soils over limestone. Associates in the Chisos Mountains include *Pinus ponderosa*, *P. cembroides*, *Pseudotsuga menziesii*, *Quercus gravesii*, *Q. pungens*, *Q. grisea*, *Juniperus deppeana*, *J. flaccida*, *Acer grandidentatum*, *Piptochaetium fimbriatum*, *Sphenopholis obtusata* and *Muhlenbergia* spp.; associates in the Sierra de la Madera of northern Coahuila include *Quercus glaucooides*, *Q. gravesii*, *Cupressus arizonica*, *Pinus arizonica* and *P. strobiformis* (Poole 1989).

Phenology: Flowering August-September.

Similar Species: There are several festucoid grasses in the region, but only *Festuca ligulata* has long (3-4 mm) ligules, few-flowered panicles, and awnless spikelets.

Comments: Originally described from a specimen collected in the Guadalupe Mountains, the northern limit of its known range. Reports from Franklin Mountains of El Paso County are probably based on *Poa fendleriana* (R. D. Worthington, pers. comm.).

Illustrations: Line drawings appear in Swallen (1932), Silveus (1933), Hitchcock (1950) and Powell (1994).

Selected References:

Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number

107.

- Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant surveys. Report prepared for Guadalupe Mountains National Park.
- Hitchcock, A. S. 1950. Manual of the grasses of the United States. Second edition, revised by A. Chase. 2 volumes. 1971 Dover reprint edition, New York. 1051 pp.
- Poole, J. M. 1989. Status report on *Festuca ligulata*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Powell, A. M. 1994. Grasses of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 377 pp.
- Silveus, W. A. 1933. Texas grasses: classification and description of grasses. Privately published, San Antonio. 782 pp.
- Swallen, J. R. 1932. Five new grasses from Texas. American Journal of Botany 19: 436-440.





Fig. 43. *Festuca ligulata*. Partial plant; ligule (arrow); floret.



Fig. 44. *Festuca arizonica*. Panicle; floret and spikelet.

Guadalupe fescue is one of the truly rare species in the Trans-Pecos, occurring in both the Guadalupe and Chisos mountains, but apparently not in the Davis Mountains. Reportedly this perennial may produce rhizomes.

2. *Festuca arizonica* Vasey ARIZONA FESCUE. Fig. 44. Locally common at higher elevations. Culberson Co., McKittrick Canyon; South McKittrick Canyon, near the top; Bowl, Jeff Davis Co., Tobe's Gap; higher slopes of Mt. Livermore, W ridge, near the top. 4,700-8,250 ft. Flowering Jun-Sep. Also NM, AZ, CO, NV.

Arizona fescue is relatively abundant in protected areas and on some open slopes near the top (7,200-8,250 ft.) of Mt. Livermore in Jeff Davis County, and apparently it is also reasonably common on top of the Guadalupe Mountains. This fescue is not accessible to livestock, but probably provides some forage and cover for wildlife.

3. *Festuca rubra* L. RED FESCUE. Fig. 45. Reported (Gould, 1975) to be infrequent in moist, shaded places, highest slopes of the Davis Mts. No collections of red fescue were identified among the Davis Mts. collections of



Fig. 45. *Festuca rubra*. Plant and separate panicle; spikelet and floret (above).



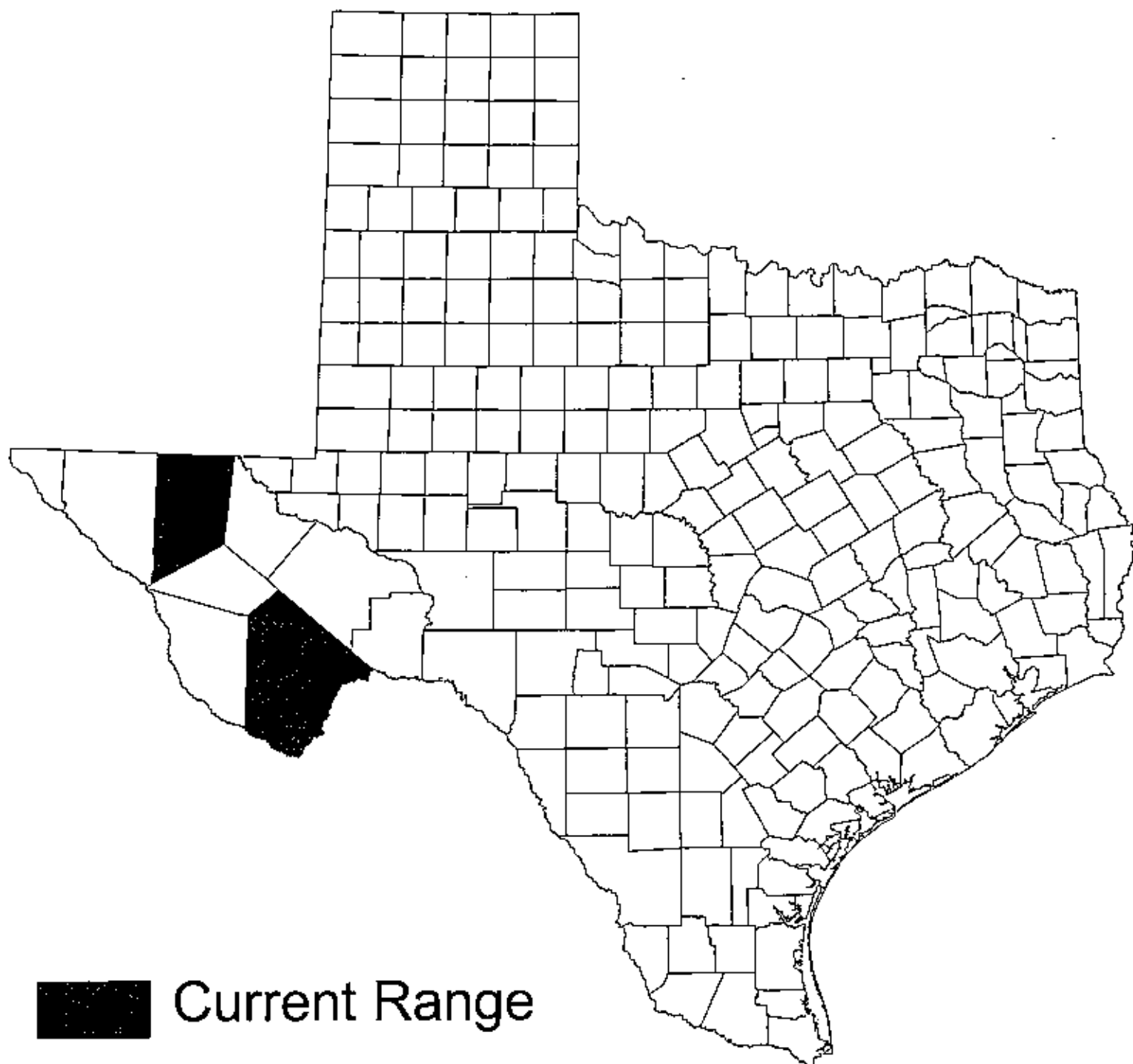
Fig. 46. (A) *Lolium perenne*; inflorescence. (B) Awned form of *L. perenne*; plant; spikelet and floret (above).

Festuca. Northern U.S., E to GA, W to AZ, CA. Mountains of Mex. Also widespread in the cooler regions of the world, mostly Northern Hemisphere.

13. LOLIUM L. RYEGRASS.

A genus of about eight species native to the temperate regions of Eurasia, but introduced and cultivated over much of the world with temperate climate. Two species are reported for Texas (Gould, 1975). Some species, including *L. perenne*, are among the most important forage grasses in Europe. The genus name, *Lolium*, is an old Latin name for darnel (darnel, *L. temulentum* L., is a true species).

1. *Lolium perenne* L. RYEGRASS. Fig. 46. Annual or short-lived perennial. Culms glabrous, 22-65 cm long, fleshy when green. Leaves glabrous, dull green; sheaths with membranous, hyaline upper margins, these often turning auricles; ligules membranous; blades 2-10 mm wide, flat or folded, thin when dry. Inflorescence a spike, these 10-25 cm long. Spikelets usually 1-10-flowered, borne singly at nodes, oriented with edge toward rachis;



■ Current Range

Festuca ligulata
(Guadalupe Mountains fescue)

Scientific Name: *Forsellesia texensis* Ensign

Synonyms: *Glossopetalon texense* (Ensign) St. John

Common Name: Texas greasebush

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to the southwestern Edwards Plateau.

State Range: Uvalde and Val Verde counties.

Description (adapted from Ensign 1942, Correll & Johnston 1970 and Vines 1960): Deciduous shrub to 2 m tall (or more?) with numerous spineless (sometimes spinescent according to Vines 1960) branches, the young branches greenish and the older branches dark gray. Leaves alternate, simple, entire, the petiole ca. 1 mm long, the blade oblanceolate, acute to mucronate at apex, the margins thickened, glabrous, 1-2 cm long and 3-5 mm wide; stipules reportedly absent. Flowers regular, on slender axillary pedicels ca. 5 mm long, with 4 or 5 scarious bracts at base; sepals 5, entire, ovate, the margins hyaline, ca. 2 mm wide; petals lanceolate, 5-7 mm long, ca. 1.5 mm wide, quickly deciduous, color not reported (perhaps white); stamens 7-9, equal in length; carpel solitary. Fruit a very broadly ovoid, asymmetrical, striate follicle 4-5 mm long.

Habitat: Dry limestone ledges and chalk bluffs. One population lies on an extremely steep slope inaccessible to most herbivores, in a dense thicket of *Acacia berlandieri*, *Bernardia myricifolia*, *Ptelea trifoliata*, *Yeatesia platystegia*, *Forestiera reticulata*, *Guaiacum angustifolium* and *Salvia ballotiflora*.

Phenology: Flowering period uncertain, including at least June and December.

Similar Species: Unlike most shrubs in its range, *Forsellesia spinescens* occurs just to the west, from Brewster and Culberson counties west to California and south into Chihuahua. Its branches are spine tipped; those of *F. texensis* are spineless. The leaves of *F. spinescens* are 5-11 mm long and 1-2.5 mm wide, whereas those of *F. texensis* are longer (1-2 cm) and wider (3-5 mm).

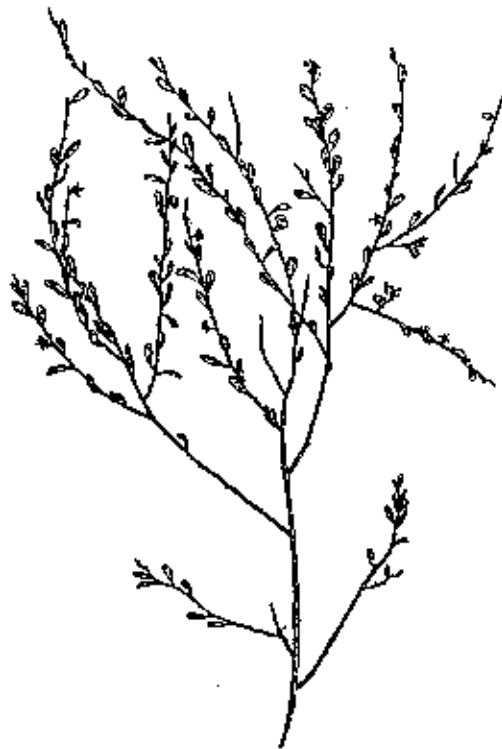
Comments: Possibly a favorite browse plant of goats.

Illustrations: A line drawing appears in Vines (1960).

Selected References:

- Ensign, M. 1942. A revision of the Celastraceous genus *Forsellesia* (*Glossopetalon*). *American Midland Naturalist* 27: 501-511.
- Lundell, C. L. 1969. Celastraceae. Pp. 339-356 in Lundell, C. L. 1969. *Flora of Texas*, volume 2. Texas Research Foundation, Renner. 417 pp.
- Vines, R. A. 1960. *Trees, shrubs and woody vines of the southwest*. The University of Texas Press, Austin. 1104 pp.

SAPOTACEAE FAMILY



TEXAS GREASE-BUSH
Forsellesia texensis Ensign

RANGE. On rocky slopes of dry limestone hills in the pinyon-juniper belts of the West. In Texas in the Trans-Pecos and Panhandle areas. The type specimen from near Frontera, Texas. In New Mexico in the San Andres and the Organ mountains, and on the Llano Estacado. Westward in Arizona and California, and northward to Colorado, Utah, Washington, and Oregon. In Mexico in northern Chihuahua.

REMARKS. The genus name, *Forsellesia*, is in honor of James Henry Forselles, a Swedish mining engineer and botanical writer of the last century. The species name, *spinescens*, refers to the spinescent twigs. The plant is known to be browsed by sheep and mule deer.

TEXAS GREASE-BUSH
Forsellesia texensis Ensign

FIELD IDENTIFICATION. Low to medium-sized, intricately branched, somewhat spinescent or spineless shrub. Branches angled, light to dark gray.

FLOWERS. Axillary, bisexual, regular, borne on slender pedicels with small scarious bracts at the base; sepals 5, entire, ovate, hyaline-margined, about $\frac{1}{2}$ in. wide; stamens 7-9, equal; petals 5, white, narrowly oblanceolate, distinct, much longer than the sepals, in-

serted under the edges of a crenate-lobed disk; ovary superior, 1-celled, 1-2-ovuled, attenuate to the stigma.

FRUIT. Mature follicle broadly ovoid, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, asymmetrical, leathery, striate, dehiscent at the ventral suture.

LEAVES. Simple, alternate, deciduous, broadly oblanceolate, apex acute and mucronate, margins entire and thickened, length of blades $\frac{3}{8}$ - $\frac{1}{2}$ in., width $\frac{1}{8}$ - $\frac{1}{4}$ in., surfaces pubescent to glabrous, veins thickened below; petioles about $\frac{1}{2}$ in.

TWIGS. Slender, greenish, angled, often with decurrent lines at the nodes, spinescent or spineless.

RANGE. Dry limestone soils. Known from a chalk bluff on the Nueces River, near Montell, Uvalde County, Texas.

REMARKS. The genus name, *Forsellesia*, is in honor of James Henry Forselles, a Swedish mining engineer and botanical writer of the last century. The species name, *texensis*, is for the state of Texas where it grows. Texas Grease-bush is distinguished from the other species by the broad oblanceolate leaves with thickened margins and lack of stipules.

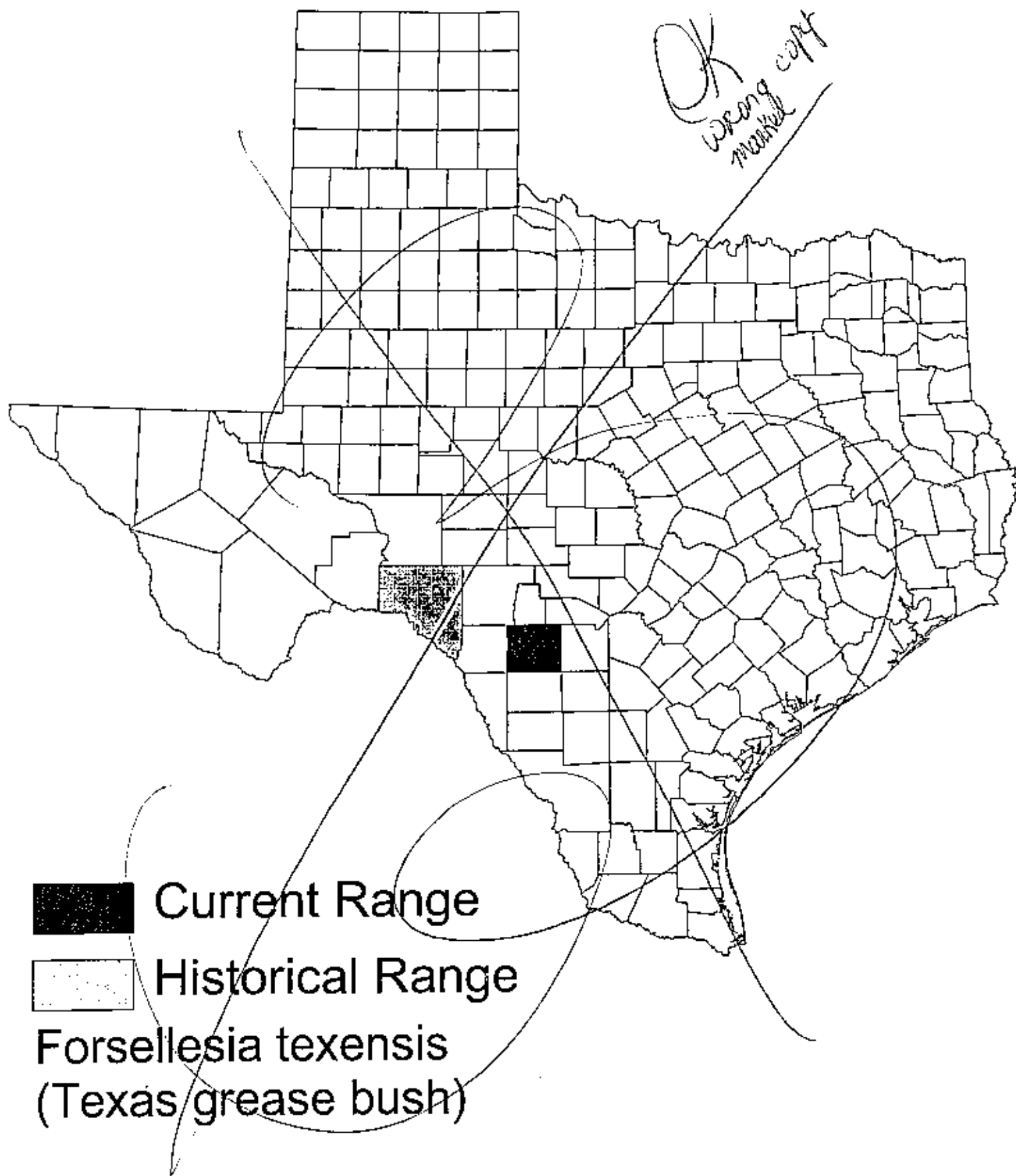
GUTTAPERCHA MAYTEN
Maytenus phyllanthoides Benth.

FIELD IDENTIFICATION. Creeping evergreen shrub or a small crooked tree rarely over 20 ft.

FLOWERS. Axillary, solitary or fascicled, peduncles $\frac{1}{16}$ - $\frac{1}{8}$ in. long, hardly over $\frac{1}{10}$ in. across; petals 5, green to white, triangular, apex obtuse or acute; stamens 5, alternate with the petals, borne under the margin of a 5-angled viscid disk, shorter than the petals, filaments about $\frac{1}{8}$ in. long, anthers ovoid-ovate; pistil thick, short, immersed in the disk; stigmas 3-4, sessile or nearly so, ovary 3-4-celled; calyx of 5 persistent sepals, apex obtuse or rounded, reddish, shorter than the petals.

FRUIT. Ripening in November in Texas, capsules on short axillary peduncles $\frac{1}{16}$ - $\frac{1}{8}$ in. long, ovoid to ellipsoid, $\frac{3}{8}$ - $\frac{1}{2}$ in. long and about $\frac{1}{4}$ in. broad, abruptly mucronulate at apex, base abruptly narrowed, 3-4-angled; dehiscent into 2-4 thin, elliptic to oval, recurved valves at maturity; seeds 2-4, bony, white to brown, ellipsoid to oblong, apices acute; dorsal face rounded, ventral face plane, about $\frac{1}{10}$ in. long, covered with a conspicuous, red, loose, fleshy aril, calyx-lobes 4-5, minute, acute, about $\frac{1}{16}$ in. long, pointed downward.

LEAVES. Alternate, simple, persistent, stiff, leathery, oval to oblong or elliptic, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, $\frac{1}{2}$ -1 in. wide; apex rounded, obtuse, or notched; base rounded to cuneate; margin entire or undulate; surfaces dull grayish green and glabrous with obscure veins; petioles stout, short, mostly less than $\frac{1}{4}$ in. long; stipules very small, caducous.



Scientific Name: *Frankenia johnstonii* Correll

Synonyms: *Frankenia leverichii* B. L. Turner

Common Name: Johnston's frankenia

Global/State Ranks: G3S3

Federal Status: Endangered

Global Range: South Texas, Nuevo León and Tamaulipas

State Range: Starr, Webb and Zapata counties

Description (adapted from Correll 1966; Whalen 1980): Shrub to 3 dm tall, the woody base supported by dark wiry roots and giving rise to several or many elongate, arching, or strongly recurved stems, the entire plant grayish or bluish green during most of the growing season but turning crimson red in late fall and winter, forming clumps 1.6-6 dm across; stems 0.4-5 mm in diameter, sparsely pilose with short whitish appressed or incurved hairs 0.3 mm long or less. Leaves opposite, shortly but distinctly petiolate, usually diverging at angles of 30°-45°, oblanceolate to oblong-elliptic, rounded at base, minutely apiculate at the rounded apex, up to 13 mm long and 4 mm wide, the margins revolute, the upper surface sparsely short-pilose or thin-canescens with appressed hairs less than 0.2 mm long, the lower surface farinose and hoary to shortly pilose with antrorsely appressed or incurved hairs 0.4 mm long or less; petioles 1-2 mm long, slightly winged with the wings united around the node. Flowers sessile and usually solitary at the apex of short axillary branchlets; calyx 3.8-6.5 mm long and 1.2-2 mm wide, moderately to densely short-pilose with hairs less than 0.2 mm long, the tube strongly ribbed, ca. 4 mm long, the 5 triangular lobes ca. 2 mm long; petals 5 (-6), spatulate, 6-10 mm long (usually about twice as long as the calyx), white, the claw linear, 3-4 mm long and 0.4-0.5 mm wide, the limb elliptic-oblanceolate, 2.4-4.5 mm long and 2.1-2.5 mm wide, erose at the apex; stamens (5-) 6 (-12), in 2 subequal whorls, included within tube; style 3-5-6 mm long, exerted, 3-branched. Fruit a narrowly ovoid capsule 2.3-3.5 mm long and 1.2-1.4 mm wide, golden brown, closely enveloping a single seed.

Similar Species: None. Johnston's frankenia is the only small shrub in South Texas with narrow opposite leaves and white flowers. It is conspicuous throughout the year, perhaps more in winter when the plants commonly turn a reddish color.

Habitat: Dwarf shrublands on strongly saline, highly alkaline, calcareous, clayey to sandy soils of valley flats or rocky slopes. Mapped soils at many sites are of the Catarina and/or Maverick series; other mapped series include Copita, Brennan, Zapata and Montell (Janssen 1999). Most sites are underlain by Eocene sandstones and clays of the Jackson Group or the Yegua and Laredo formations; a few are underlain by El Pico Clay or the Catahoula and Frío formations (Janssen 1999). Where present, *Frankenia johnstonii* is generally common, often sharing dominance with *Varilla texana* and *Prosopis reptans* to form a unique assemblage. Other common associates in Texas include *Thymophylla pentachaeta*, *Opuntia leptocaulis*, *O. engelmannii*, *Prosopis glandulosa*, *Suaeda* sp., *Isocoma coronopifolia*, *Billieturmera helleri*, *Hilaria belangeri* and *Sporobolus pyramidatus* (Janssen 1999). Associates in Nuevo León include such halophytes as *Sesuvium verrucosum*, *Atriplex canescens*, *Suaeda* sp., *Allenrolfea* sp., *Sartwellia* sp., *Dicranocarpus* sp., *Selinocarpus* sp., *Nerisyrenia gracilis* and *Machaeranthera johnstonii* (Whalen 1980; USF&WS 1988).

Phenology: Flowering throughout the growing season depending upon rainfall.

Comments: Johnston's frankenia was listed as Endangered on 7 August 1984, at a time when the species was thought to be limited to only a few small populations. Since then, the diligent efforts of Gena Janssen, working in cooperation with many private landowners, have revealed many more large populations, resulting in a much clearer and more optimistic picture of the species' conservation status.

Illustrations: Line drawings and a color photograph appear in Poole & Riskind (1987). A color photograph appears in Everitt & Drawe (1993).

Selected References:

Correll, D. S. 1966. Some additions and corrections to the flora of Texas--III. *Rhodora* 68: 420-428.

Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock. 213 pp.

Janssen, G. K. 1999. Site characteristics and management of Johnston's frankenia (*Frankenia johnstonii*). Texas Parks & Wildlife Department, Austin.

Poole, J. M. 1986. Endangered species information system species workbook [for *Frankenia johnstonii*]. Report prepared for U.S. Fish and Wildlife Service Region 2.

Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.

Shelley, F. M. and M. E. Pulich. 2000. A geographic analysis of threats to *Frankenia johnstonii* Correll (Frankeniaceae). Report prepared for U.S. Fish and Wildlife Service, Corpus Christi, Texas. 13 pp. + maps.

Turner, B. L. 1980. Status report on *Frankenia johnstonii* Correll. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

U.S. Fish and Wildlife Service. 1988. Johnston's frankenia (*Frankenia johnstonii*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.

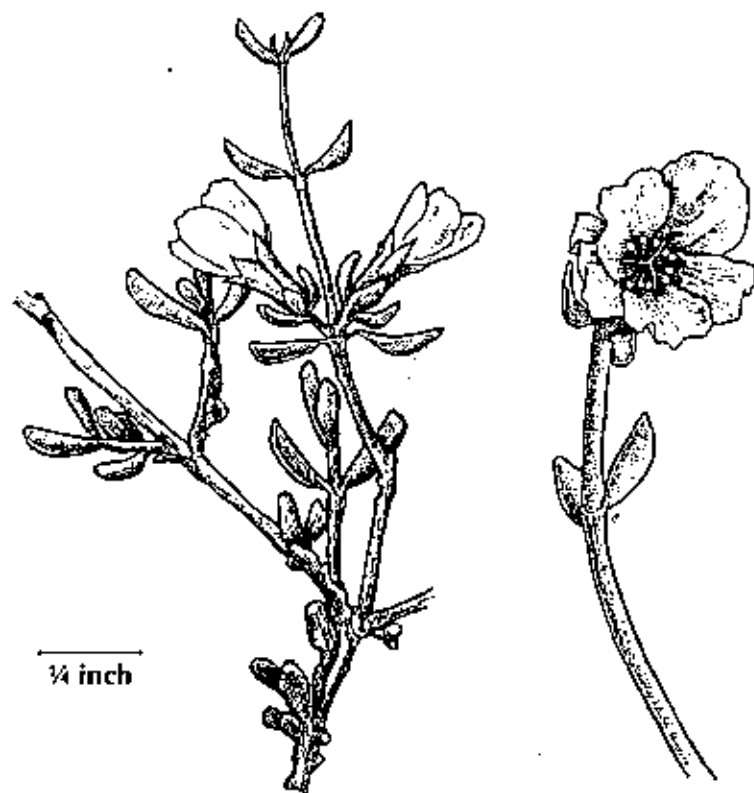
Whalen, M. A. 1980. A systematic revision of the New World species of *Frankenia* (Frankeniaceae). Ph.D. dissertation, The University of Texas at Austin.



Common Name:

Johnston's frankenia

Paul Montgomery

Leaves and flower of
Johnston's frankeniaScientific name: *Frankenia johnstonii* CorrellOther Scientific Names: *Frankenia leverichii* B.L. Turner

Federal Status: Listed as Endangered, August 7, 1984

State Status: Listed as Endangered, January 23, 1987

Photographs and Drawings: None published.

Description:

Habits: Sprawling shrub, grayish or bluish-green, woody at base, to 2 ft. tall, with dark brown wiry roots; stems several to many, wiry, slightly woody, with scattered small white hairs.

Leaves: Opposite, gray-green, slightly hairy, oblong to lance-shaped, broader at the tip, rounded at the base and tip, leaf margins slightly inrolled, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, $\frac{1}{8}$ - $\frac{1}{4}$ in. wide; leaf stalks brownish-green, slightly winged, $\frac{1}{32}$ - $\frac{1}{8}$ in. long.

Flowers: White, usually borne singly at tips of small branches; calyx tubular, with 5 small, triangular lobes, ribbed, hard, hairy, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, $\frac{1}{8}$ - $\frac{1}{4}$ in. wide; petals 5-6, spoon-shaped, edges wavy, $\frac{1}{4}$ - $\frac{1}{2}$ in. long; stamens 5-12, usually 6, extending past petals; style 3-branched, extending past petals; flowering November to April.

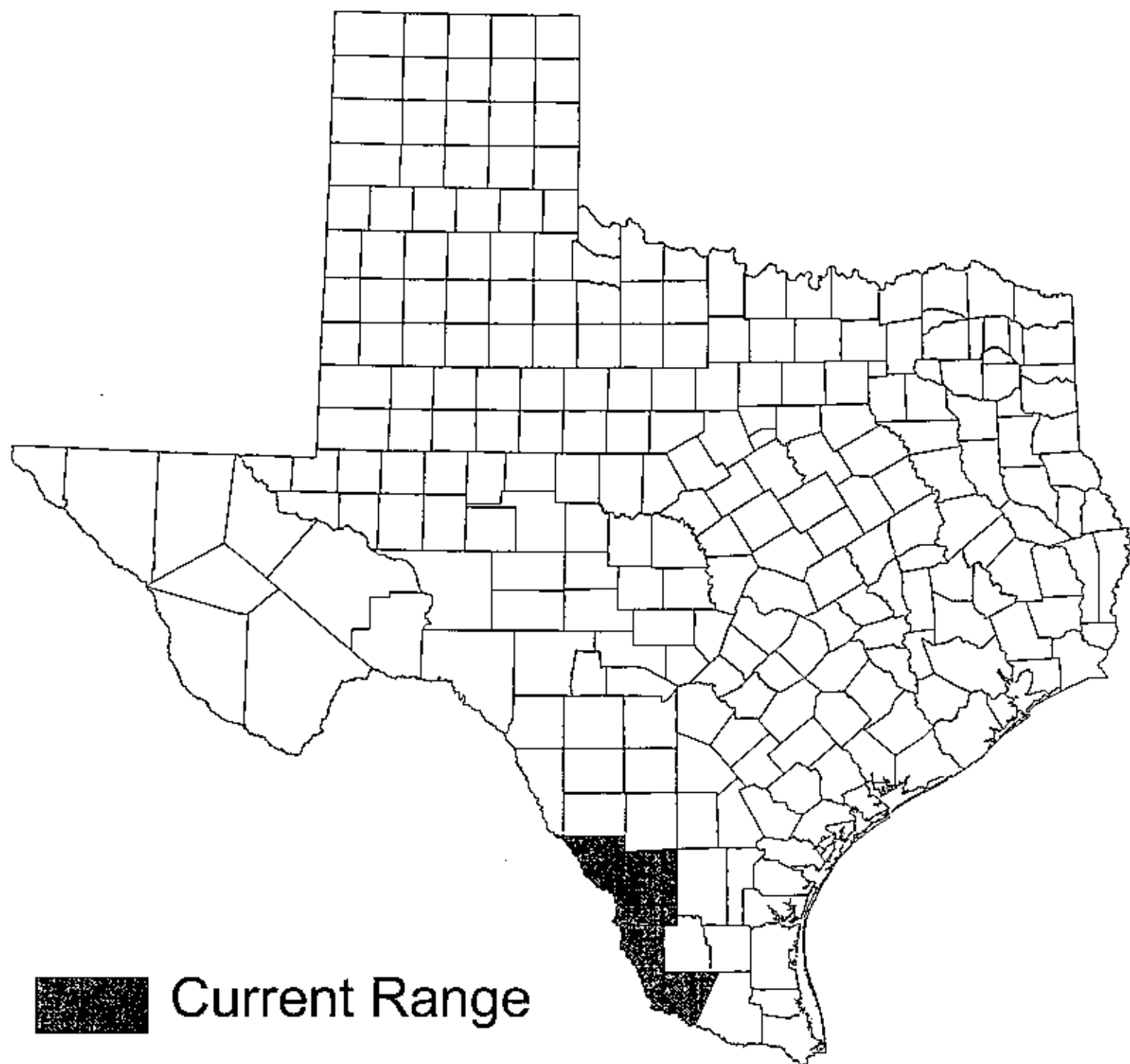
Fruit: Golden-brown, narrowly egg-shaped, single-seeded, dry, $\frac{1}{6}$ - $\frac{1}{4}$ in. long, maturing December to May; seeds pale yellow with golden brown tip, narrowly egg-shaped, $\frac{1}{6}$ - $\frac{1}{8}$ in. long, $\frac{1}{32}$ - $\frac{1}{6}$ in. wide.

Habitat: Rocky gypseous hillsides or saline flats in brushlands, with saladillo, seepweed, coldenia, and isocoma.

Ownership: Private.

Similar Species with Key Character Differences:

- Leaves not stalked, smaller
and hairless beneath *Frankenia jamesii*
- Petals joined, not separate Borage family
- Petals joined, not separate Madder family



■ Current Range

Frankenia johnstonii
(Johnston's frankenia)

Scientific Name: *Fryxellia pygmaea* (Correll) Bates

Synonyms: *Anoda pygmaea* Correll

Common Name: small Fryxell-wort

Global/State Ranks: G1SH

Federal Status: None

Global Range: Presently known from a single population near Puerto del Aire at the southern end of the Sierra de la Encantada in northwestern Coahuila; known historically from Texas.

State Range: Uncertain. Originally described from a collection made by Captain John Pope in 1854 during surveys of possible sites for railroad lines. Pope's specimen label reads only "Texas"; his route was from Preston in Grayson County southwest to the Pecos River and then west nearly to El Paso (Bates 1974). Presumably Pope collected the only known Texas specimen somewhere west of the Pecos River.

Description (adapted from Bates 1974 and Fryxell & Valdés 1991): Cespitose perennial forming rosettes ca. 15 cm in diameter. Leaves stipulate, petiolate, the blades up to 37 mm long and 20 mm wide, ovate to oblong or oblong-lanceolate, unlobed but the margin serrate to crenate-serrate, the apex obtuse to acute, the base subcordate to obtuse, the major veins palmate, impressed on upper surface, raised on lower surface; petioles mostly 15-25 mm long, shorter than the blades; stipules filiform to linear, up to 8 mm long. Flowers solitary in the leaf axils, shorter than the subtending leaves; pedicels 10-20 mm long; calyx inflated, subrotate, ca. 12 mm long in flower and up to 17 mm long and reddish in fruit, the 5 lobes broadly triangular, acute, to 7 mm long and 8 (-10) mm wide, papery, with several parallel veins, folded and slightly keeled along the midvein, puberulent within; petals 5, orange, to 15 mm long and 8 mm wide, obovate, the claw slender, marginally puberulent; stamens ca. 30, united in a column ca. 4 mm long, included within the flower; stigmas not exceeding the anthers. Fruit a pale brown flattened disk 9-10 mm in diameter, closely invested by the calyx, composed of ca. 12 mericarps, the mericarps up to 3 mm high and 5 mm wide exclusive of the spines, the upper portion smooth-walled, stellate-pubescent and bearing a pair of spines ca. 2 mm long, the indehiscent lower portion glabrous, strongly reticulate, containing a single reniform-orbicular seed ca. 2 mm long and wide.

Similar Species: None. *Fryxellia pygmaea* is the sole member of its genus and is not particularly closely related to other mallows (Bates 1974; Fryxell & Valdés 1991).

Habitat: The one known extant site (in Coahuila) is described as a dry, open, Chihuahuan Desert hillside at an elevation of about 1250 meters (Fryxell & Valdés 1991).

Phenology: Probably flowering during the summer and fall, perhaps in response to rainfall. The population near the Sierra de la Encantada was found fruiting in early September 1990, with flowers and buds still developing (Fryxell & Valdés 1991).

Comments:

Illustrations: A color photograph appears in Fryxell & Valdés (1991); line drawings appear in Bates (1974).

Selected References:

Bates, D. M. 1974. *Fryxellia*, a new genus of North American Malvaceae. *Brittonia* 26: 95-100.

Fryxell, P. A. and J. Valdés R. 1991. Observations on *Fryxellia pygmaea* (Malvaceae). *Sida* 14(3): 399-404.

Fryxell, P. A. 1988. Malvaceae of Mexico. *Systematic Botany Monographs* 25: 1-522.



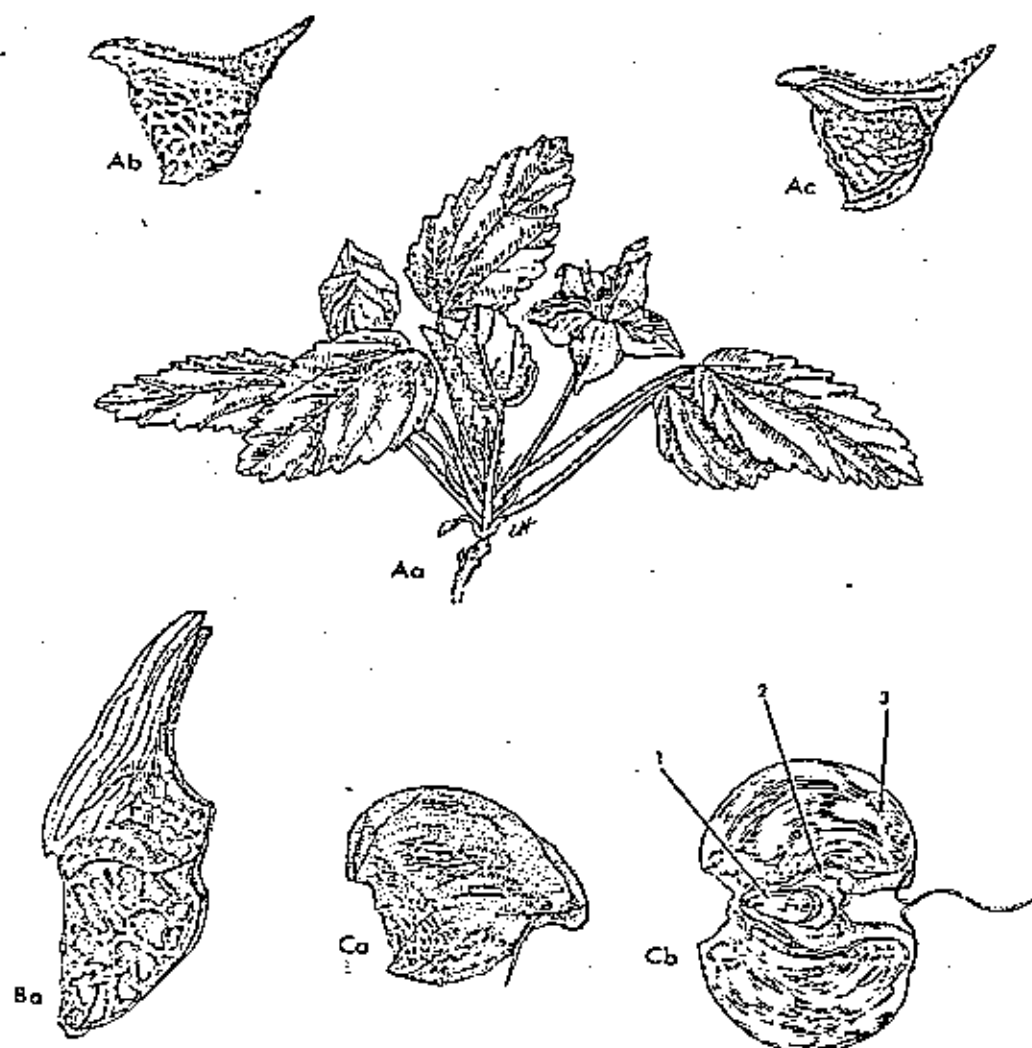



FIG. 1. A, *Fryxellia pygmaea* (Pope, s.n., GH): a, habit; b, mericarp, lateral view; because the paired dorsal spines lie in close juxtaposition, they appear as a single spine in this view; c, mericarp, lateral view, split longitudinally to show the position of the endoglossum and the inner face of the second spine. B, *Horsfordia rotundifolia* (Palmer 351, BM): a, mericarp, lateral view. C, *Gaya violacea* (Fryxell & Bates 827, BH): a, mericarp, lateral view; b, mericarp, top view, showing (1) the apical portion of the seed, (2) the endoglossum, and (3) the walls of the upper cell fully spread after dehiscence. Habit $\times 1$, mericarps $\times 5$.

in fruit to 17 mm long with lobes to 10 mm or more broad, the lobes papery, veined with several parallel nerves, folded and slightly keeled along the commissural nerve, puberulent within; nectaries poorly developed. Petals apparently yellowish, to 15 mm long, ca. 8 mm broad, obovate, the claw slender, marginally puberulent. Staminal column included, to ca. 4 mm long, terminated by ca. 30 anthers on filaments to 1.5 mm long. Stigmas not exceeding the anthers. Fruit 9-10 mm in diam., closely invested by the calyx tube; mericarps pale brown, up to 3 mm high, 5 mm broad (exclusive of the dorsal spines), differentiated into a smooth-walled, stellate-pubescent, loculicidally dehiscent upper portion bearing a pair of suberect, dorsal spines up to 2 mm long, and a glabrous, reticulate-fenestrate, indehiscent lower portion; within



 WestTexas (county unknown)

Fryxellia pygmaea
(small Fryxell wort)

Scientific Name: *Gaillardia aestivalis* (Walt.) Rock. var. *winkleri* (Cory) Turner

Synonyms: *Gaillardia lutea* Greene var. *winkleri* Cory

Common Name: white firewheel, Winkler's gaillardia, Winkler's firewheel

Global/State Ranks: G5T2S2

Federal Status: SOC

Global Range: Endemic to the West Gulf Coastal Plain of east Texas.

State Range: Apparently restricted to the Village Creek watershed of Hardin County.

Description: Perennial from a taproot with slender rhizomes; stems 2-7 dm tall, erect to sprawling, striate or shallowly sulcate, sparingly to densely pubescent with flattened ascending hairs, with scattered sessile glands, the branches slender and spreading. Leaves alternate, simple, glandular-punctate and with short hairs on both surfaces and along the margins, leaves of lower stem 3-7 (-10) cm long, oblanceolate, petioled, those of upper stem 1-4 (-5) cm long, sessile, linear or oblanceolate, entire or more commonly remotely and shallowly toothed. Flower heads solitary on peduncles from the branch tips; peduncles 4-20 cm long; phyllaries 8-10 mm long, lanceolate, acute, covered with very short moniliform hairs but not ciliate; receptacle convex, bristly, the setae short and weak; ray flowers 12 to 18, white or rarely pink, shallowly three-lobed at the apex, glandular-punctate; disk ca. 2 cm wide; disk corollas glandular-punctate, with 5 equal lobes, the lobes white, caudate-acuminate with long moniliform hairs. Achenes obpyramidal, 2 mm long, the body concealed under stiff ascending hairs; pappus scales lanceolate, tapering to an awn twice the length of the body.

Similar Species: Readily distinguished from other Texas *Gaillardia* taxa by its white to pinkish ray and disk flowers. No other variety of *Gaillardia aestivalis* occurs in the immediate area, although both var. *aestivalis* and var. *flavovirens* are known from southeast Texas (Turner 1979).

Habitat: Open pine-oak woodlands and margins on deep, loose, well drained, whitish sands. Herbaceous associates include *Berlandiera X betonicifolia*, *Chamaecrista fasciculata*, *Cnidioscolus texanus*, *Croton capitatus*, *C. glandulosus*, *Croptilon* sp., *Diodia teres*, *Chamaesyce cordifolia*, *Euphorbia corollata*, *Froelichia floridana*, *Heterotheca pilosa*, *H. subaxillaris*, *Lechea mucronata*, *Liatris elegans*, *Monarda punctata*, *Panicum brachyanthum*, *Silene subciliata*, *Solidago nitida*, *Stylosanthes biflora*, *Tradescantia reverchonii* and *Trichostema dichotomum*.

Phenology: Flowering in late spring (May-June) and sporadically through early fall.

Comments:

Illustrations: Color photographs appear in Ajilvsgi (1979) and Loughmiller & Loughmiller (1984).

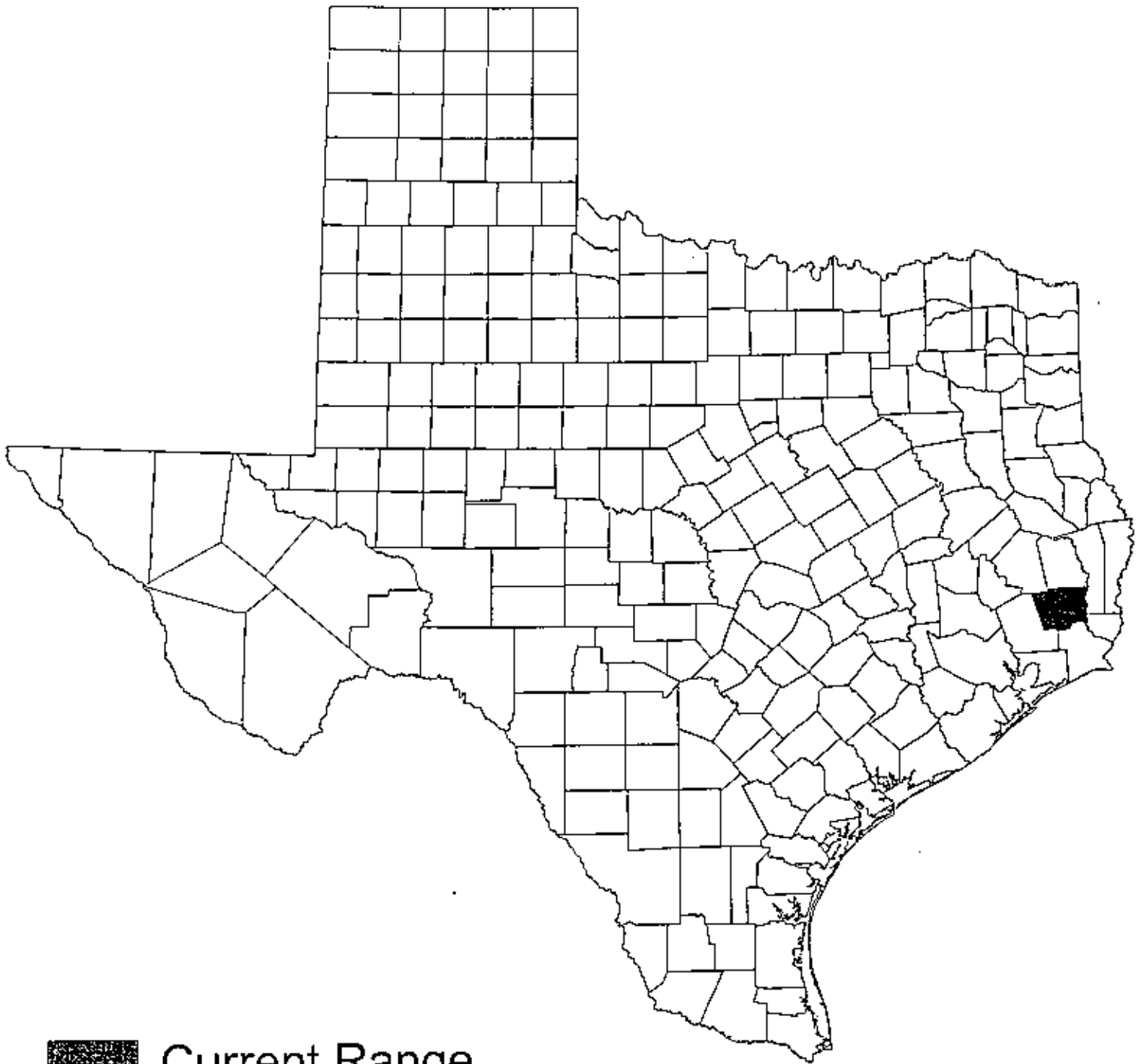
Selected References:

Ajilvsgi, G. 1979. Wild flowers of the Big Thicket, east Texas and western Louisiana. Texas A & M University Press, College Station. 360 pp.

Cory, V. L. 1946. A white *Gaillardia* in Texas. *Madroño* 8(8): 263-264.

- Loughmiller, C. and L. Loughmiller. 1984. Texas wildflowers: a field guide. University of Texas Press, Austin. 271 pp.
- Singhurst, J. R. 1996. The status of nine endangered plants of East Texas: Historical, ecological and phytogeographical notes. M. S. Thesis, Stephen F. Austin University, Nacogdoches, Texas. 278 pp.
- Turner, B. L. 1979. *Gaillardia aestivalis* var. *winkleri* (Asteraceae), a white-flowered tetraploid taxon endemic to southeastern Texas. *Southwestern Naturalist* 24(4): 621-624.





Current Range

Gaillardia aestivalis var. *winkleri*
(white firewheel)

Scientific Name: *Galium correllii* Dempst.

Synonyms: None.

Common Name: cliff bedstraw

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: West Texas and northern Coahuila.

State Range: Brewster and Val Verde counties.

Description (adapted from Dempster 1968, Dempster 1978): Small, gray-green perennial forming dense mats that are sometimes pendulous from cliff faces, densely covered with long, coarse, spreading hairs; nodes about as long as leaves. Leaves in a whorl of 4 at each node, sessile, broadly lanceolate, 1-nerved, 4-6 mm long, apiculate, the 2 true leaves longer than the 2 leaflike stipular appendages. Flowers mostly solitary on short branches from the leaf axils, very short-pedunculate above a pair of bracts; corolla campanulate, creamy white, tinged with purple, the tube ca. 1 mm long, the lobes a little longer, papillose especially at tips. Fruit somewhat fleshy, glabrous, ellipsoidal, maroon, ca. 2.5 mm long, separating at maturity into 2 slender black mericarps.

Habitat: Dry, steep or vertical limestone cliff faces of various exposures in Chihuahuan Desert along Rio Grande and tributaries, at elevations between 450 and 500 meters. Frequent associates include *Agave lechuguilla*, *Cirsium turneri*, *Dasytirion leiophyllum*, *Hechtia scariosa*, *Karwinskia humboldtiana*, *Leucophyllum frutescens*, *Penstemon baccharifolius* and *Selaginella lepidophylla* (Poole 1985).

Phenology: Flowering April-November; fruiting May-December.

Similar Species: Quite distinct from other West Texas species of *Galium* in having a compact, tufted habit and smooth, fleshy (rather than dry) fruits.

Comments:

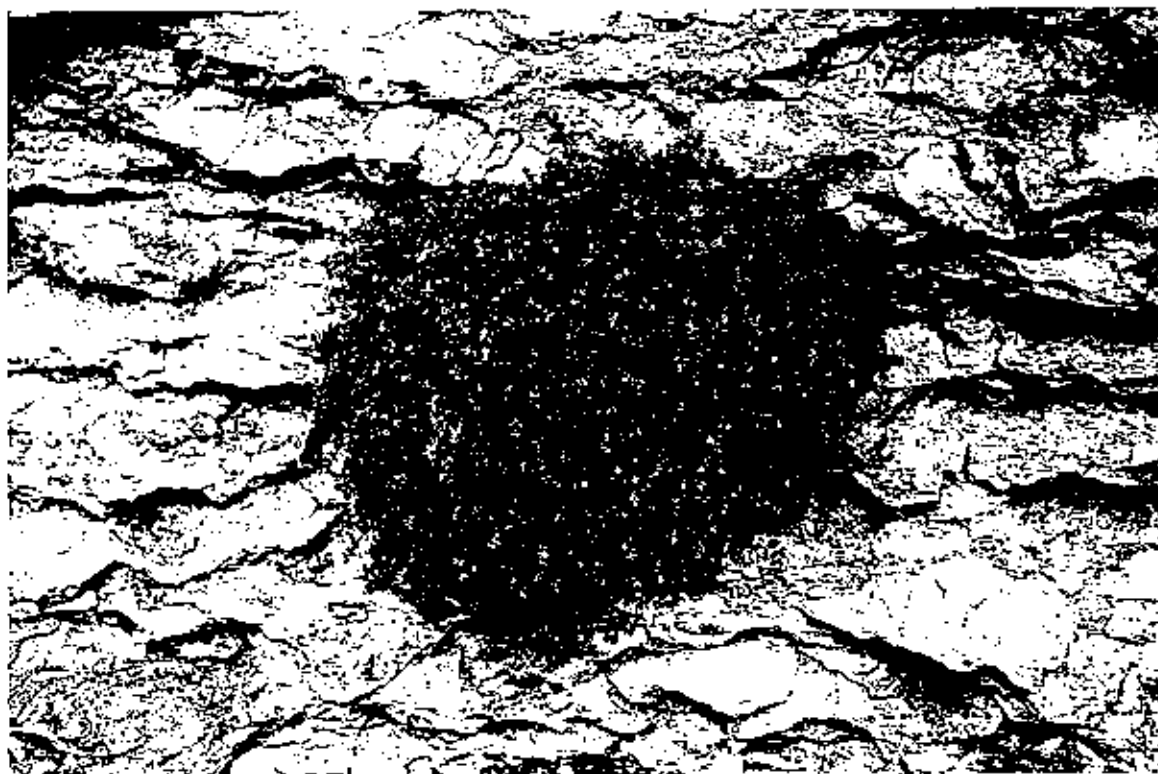
Illustrations: Line drawings of various parts appear in Dempster (1968).

Selected References:

Dempster, L. T. 1968. *Galium correllii* (Rubiaceae), a new species from Val Verde County, Texas. *Sida* 3(4): 249-251.

Dempster, L. T. 1978. The genus *Galium* (Rubiaceae) in Mexico and Central America. University of California Publications in Botany 73: 1-33.

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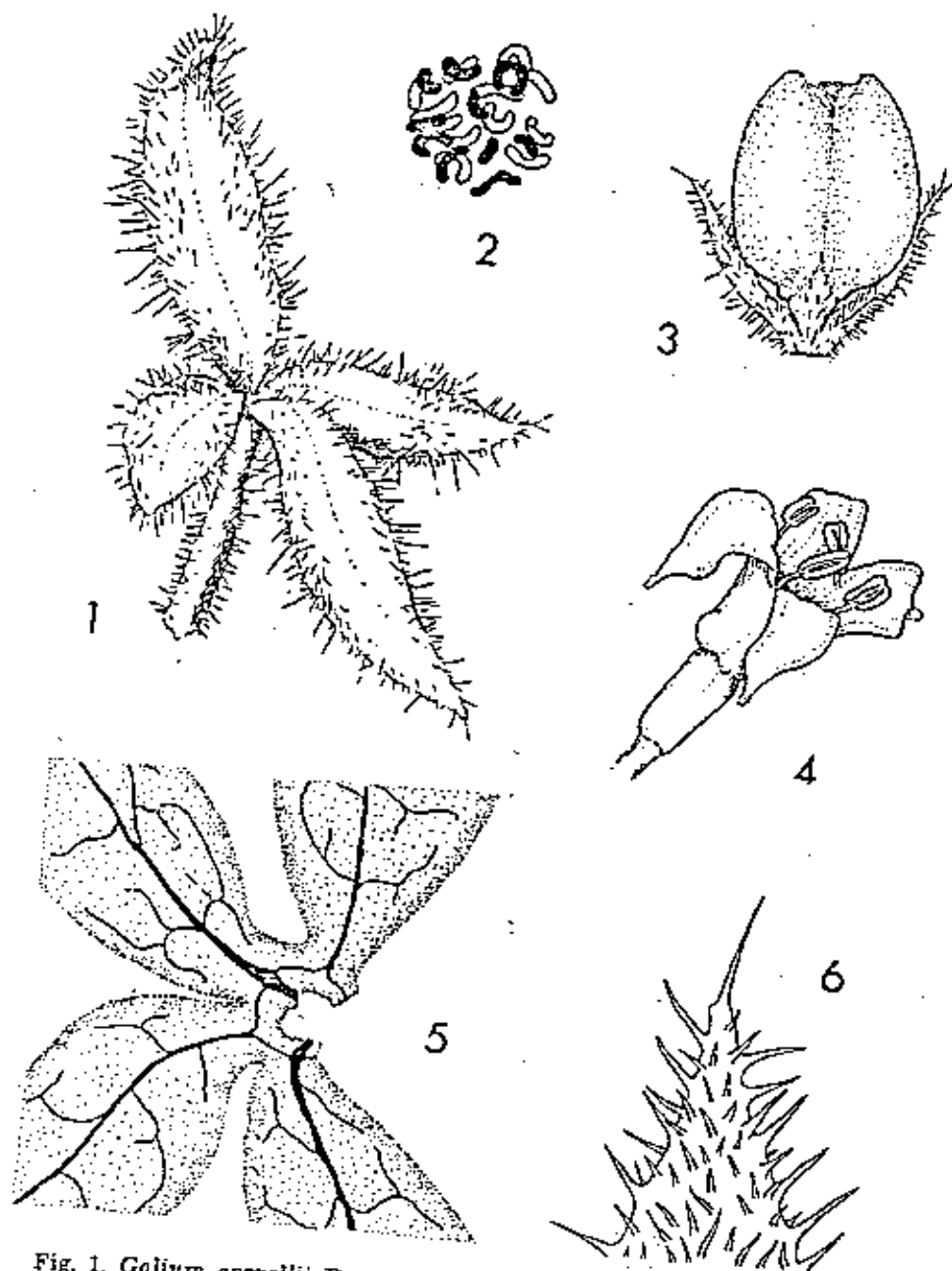
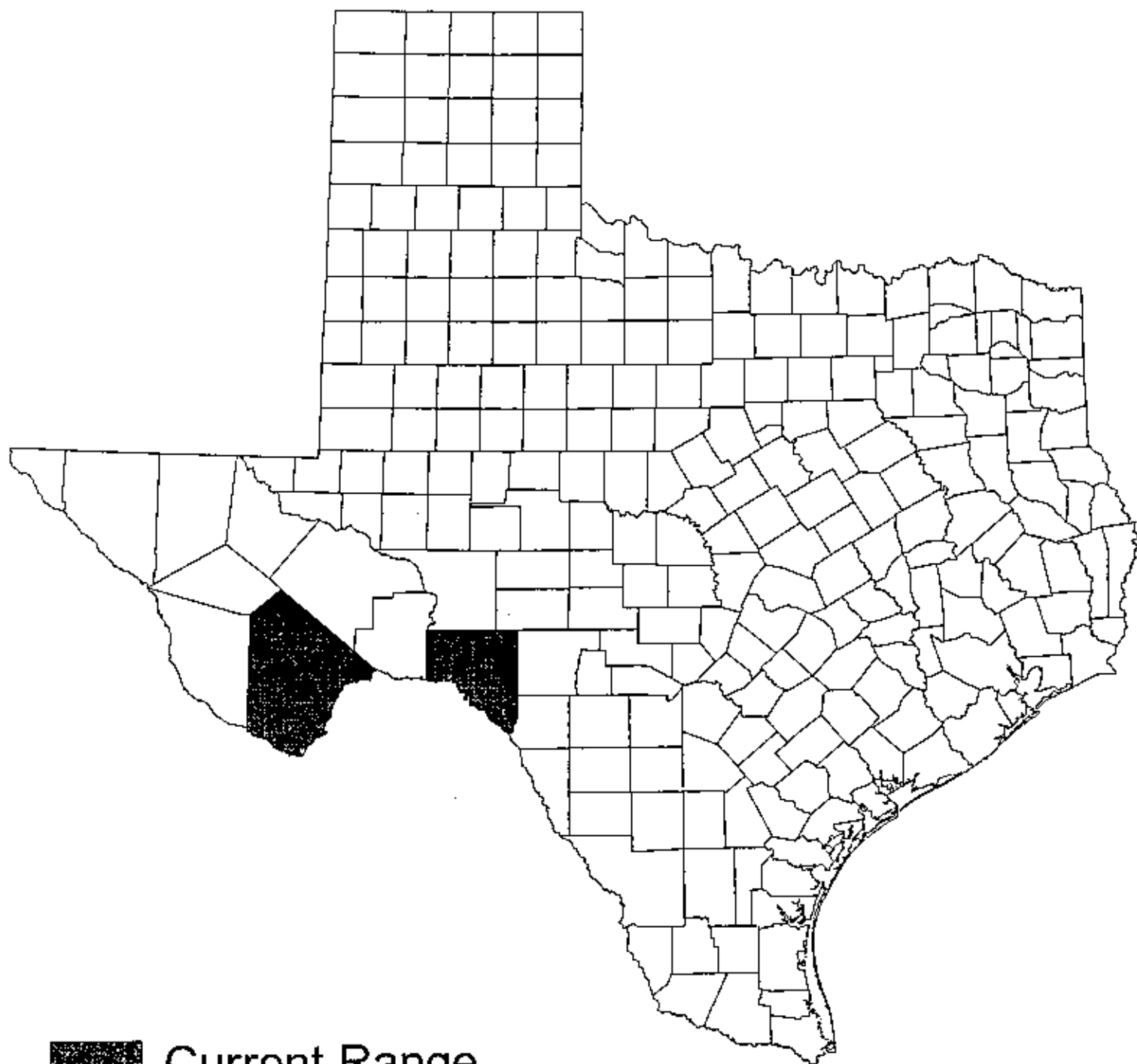


Fig. 1. *Galium correllii* Dempster sp. nov. 1) Node showing 2 leaves and 2 smaller stipular appendages $\times 14$. 2) Somatic prophase $\times 3400$. 3) Fruit $\times 14$. 4) Flower $\times 14$. 5) Cleared leaf bases to show single nerves and connections to basal vascular ring, $\times 20$. 6) Leaf apex $\times 32$.

Asperula, were it from the *G.* not longer than those of *G.* of the *G. multiflorum* complex *G. multiflorum* sensu stricto has further discussion on this point Ehrendorfer 1963, pp. 294-295

DEMPSTER, L. T. AND F. *Galium multiflorum* complex Taxonomic Revision. Brittoni



■ Current Range

Galium correllii
(cliff bedstraw)

Scientific Name: *Gaura boquillensis* Raven & Gregory

Synonyms: None.

Common Name: Boquillas lizardtail

Global/State Ranks: G2S2

Federal Status: None.

Global Range: West Texas, Chihuahua, Coahuila and Nuevo León

State Range: Brewster and Presidio counties.

Description (adapted from Raven & Gregory 1972; Henrickson & Johnston in prep.): Clumped perennial with a narrow, woody rootstalk; stems well branched at the base and above, becoming globose-bushy in appearance, 2.5-10 dm tall; pubescence variable, of 3 types, including short, erect glandular hairs, strigulose pubescence and short scabrous hairs. Leaves alternate, simple, those of lower parts of the stems usually narrowly oblanceolate, those of middle and upper stems very narrowly elliptic, narrowly lanceolate or linear, 0.5-6.5 (-13) cm long and 1-10 mm wide, sinuate-dentate to subentire. Flowers zygomorphic, in axils of reduced leaves or bracts along distal ends of branches; bracts lanceolate to linear, 1.5-3.5 mm long and 0.25-0.5 mm wide; hypanthium 3-8.5 mm long; sepals 4, 3-9 mm long and 1-2.5 mm wide; petals 4, 4-10 mm long and 2-4.5 mm wide, appearing crowded around top of flower rather than equally spaced; stamens 8, the filaments 2-4.5 mm long, the anthers 2-4 mm long; style 1, 6-15 mm long, the stigma 4-lobed. Fruit a 4-loculed indehiscent capsule 5.5-13 mm long and 1-2.5 mm thick, fusiform, tapering at both ends, sometimes additionally narrowed in the lower third and thus appearing stipitate.

Habitat: Mostly in sandy soils in desert canyons and arroyos, occasionally in gravelly limestone soils in Chihuahuan Desert scrub at low elevations.

Phenology: Flowering March-August.

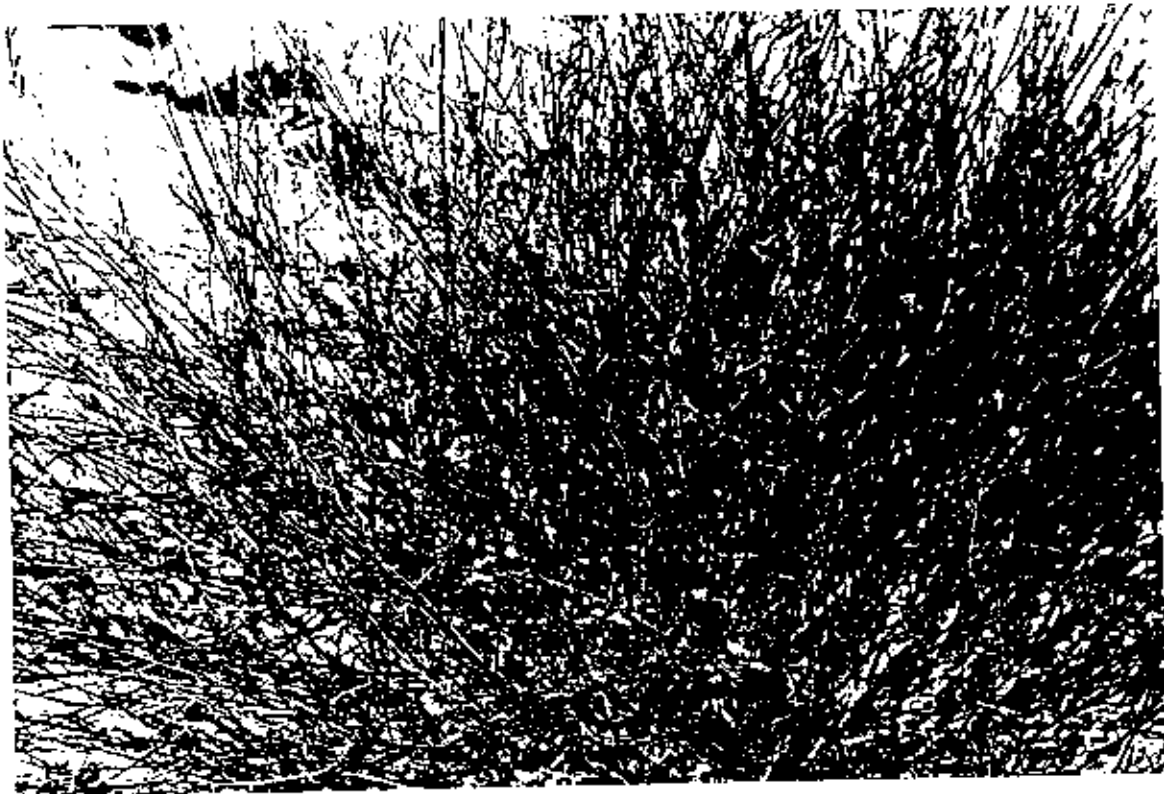
Similar Species: Confused in the past with *Gaura macrocarpa*, from which *G. boquillensis* differs in having conspicuously zygomorphic rather than radially-symmetric flowers. The flowers are also smaller, with the hypanthium of *G. macrocarpa* 9-13 mm long and that of *G. boquillensis* 3-8.5 mm long. The fruits of the two are similar, but those of *G. boquillensis* are slightly shorter and somewhat stipitate. Both species are endemic to the Chihuahuan Desert and may occur in close proximity in some areas.

Comments:

Illustrations: A line drawing of a fruit appears in Raven & Gregory (1972).

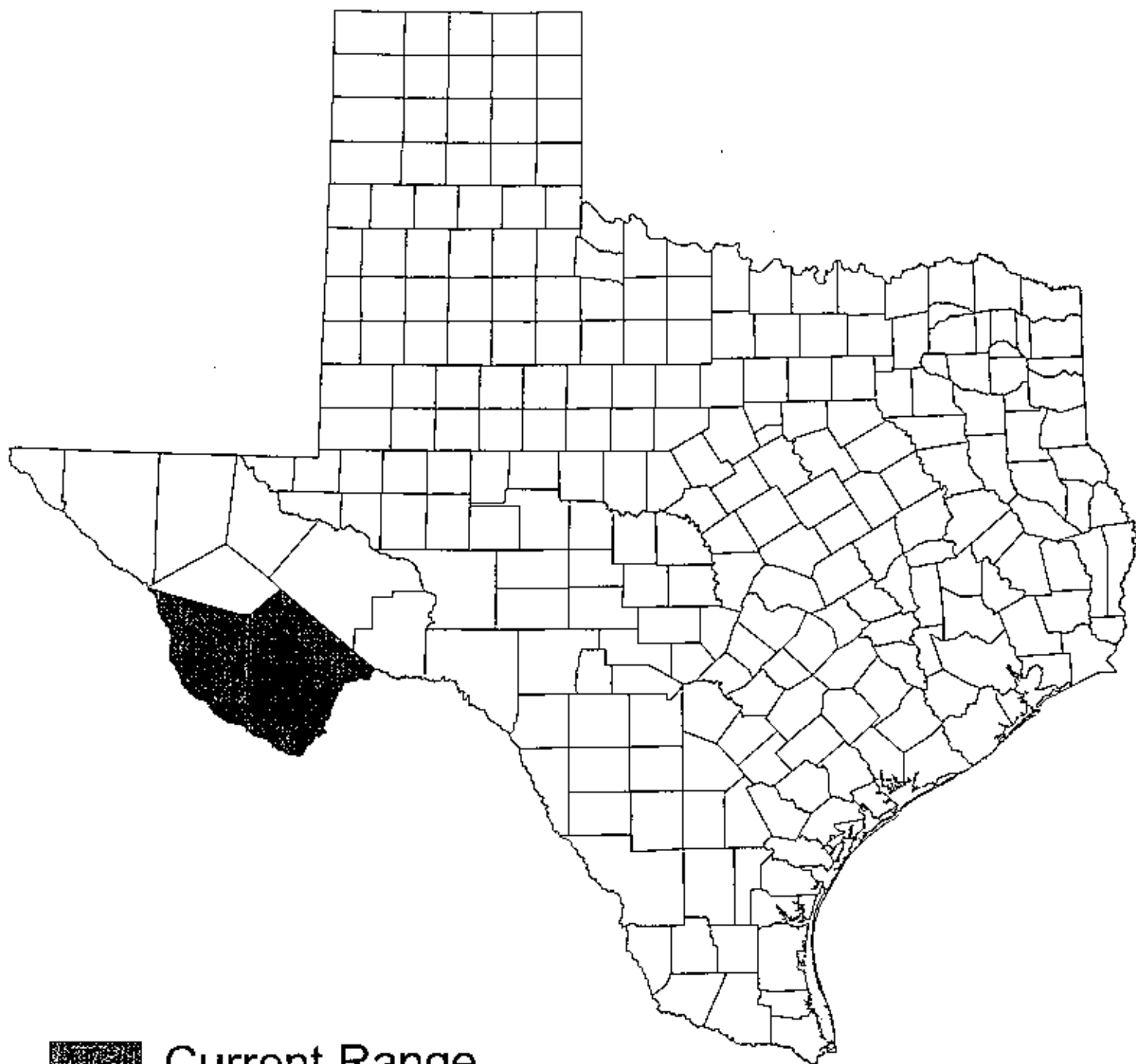
Selected References:

- Carr, B. L., J. V. Crisci, and P. C. Hoch. 1990. A cladistic analysis of the genus *Gaura* (Onagraceae). *Systematic Botany* 15(3): 454-461.
- Raven, P. H. and D. P. Gregory. 1972. A revision of the genus *Gaura*. *Memoirs of the Torrey Botanical Club* 23: 1-96.





Leguminosae • *Cassia torquillensis* Wats. *Limnol. Zool.* 1871: 102
 FOR SEEDS: LINA. BY HERBARIUM OF MICHIGAN. DR. CORNELL & MRS. H. CARROLL. NO. 25780. MICHIGAN, BY
 FOR FLOWERS: MICHIGAN IN THE TREE TRUNKS. CLUB VIA 25780.
 FOR LEAF & HOAR: BELL. MICHIGAN. LEAF: MICHIGAN. NO. 25780. PREDOMINANT...



 Current Range

Guafra boquillensis
(Boquillas lizardtail)

Scientific Name: *Genistidium dumosum* I. M. Johnst.

Synonyms: None.

Common Name: brush pea

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: West Texas and central and western Coahuila.

State Range: Brewster County.

Description (adapted from Henrickson & Johnston in prep.; Powell 1998): intricately-branched, unarmed shrub 2.5-10 dm tall; younger stems gray-green with minute white pubescence, distinctly 8-15-ribbed, older stems olive-green and glabrate. Leaves alternate, pinnately trifoliolate (the uppermost simple), the petiole 1-4 mm long; leaflets 3, entire, elongate, oblanceolate, firm, 5-18 (-25) mm long, covered with short, appressed hairs, the terminal leaflet petiolulate, longer and larger than the lateral 2; stipules rigid, subulate, 1-1.5 mm long; stipels absent. Flowers solitary or in pairs in the axils of the upper leaves, papilionaceous, ca. 1 cm long, on pedicels 2-3 mm long; calyx campanulate, the lobes elongate, longer than the tube, the upper 2 lobes connate; petals 5, yellow (reddish in age?), long-clawed; banner more or less orbicular, with a greenish eyespot; wings lunate-oblong, broadly auriculate; keel petals bluntly lunate, connate for about 1/3 their length; stamens 10, 9 of the filaments connate and the upper free. Fruit a linear, laterally-compressed, straight, somewhat leathery legume 20-25 mm long and ca. 4 mm wide, containing 4-6 flattened, orbicular seeds.

Similar Species: None. The combination of wiry, grayish or greenish thornless stems, trifoliolate leaves, small yellow flowers and linear pods distinguishes *Genistidium dumosum* from other small shrubs in the Chihuahuan Desert region (Poole 1992).

Habitat: Chihuahuan desert scrub on rocky limestone hills at lower elevations. Associates at a site between Lajitas and Study Butte include *Agave lechuguilla*, *Bouteloua eriopoda*, *Hecttia scariosa*, *Larrea tridentata*, *Selinocarpus* sp. and *Tiquilia greggii*; other associates are listed in Poole 1992. In Coahuila the species also occurs on calcareous volcanic tuff.

Phenology: Flowering June-September.

Comments:

Illustrations: Line drawings appear in Vines (1960), Powell (1998), and Poole & Riskind (1987). Color photographs appear in Warnock (1977) and Poole & Riskind (1987).

Selected References:

Clark, J. J. and A. M. Powell. 1983. Status report [on *Genistidium dumosum*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.

Johnston, I. M. 1941. New phanerogams from Mexico, IV. *Journal of the Arnold Arboretum* 22: 110-124.

- Poole, J. M. 1992. Status report on *Genistidium dumosum*. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine. 274 pp.



Vines

LEGUME FAMILY

LEAVES. Alternate, 3-foliate, 6-12 in. long (including the petiole); leaflets 2-5 1/2 in. long, blades elliptic to oval or ovate, margin entire, apex acute or obtuse, base rounded or broadly cuneate, blade often partly folded, surfaces dull green and glabrous; petioles slender, somewhat angular and finely grooved, often spiny, green to reddish brown; petiolules of terminal leaflet of 2 divisions; distal part down to the glandular stipules green, thickened, shorter than the proximal portion; petiolules of the lateral leaflets 1/4-3/8 in. long, about the same length as the distal portion of the terminal petiolule.

TWIGS. Elongate, stout, usually unbranched, green to reddish brown, glabrous, angled and finely grooved; spines 1/4-1/2 in. long, green to brown, stout, flat, straight or slightly curved, at the petiole bases or scattered.

BARK. Green on young branches, older ones tan to brown or gray with narrow fissures and rather wide flat ridges.

WOOD. Soft, light, used for corks or carvings.

RANGE. A native of Brazil, cultivated and occasionally escaping in the Gulf states. In coastal Texas and Louisiana, east to Florida.

MEDICINAL USES. All species of *Erythrina* beans possess a number of powerful alkaloids. These include erythramine, erythraline, ersodine, erysopine, erysoccine, and erysovine, according to Folkers and Koniuszy (1940). Certain of these alkaloids produce a curare-like paralyzing action when administered intravenously. No clinical use has been made of them, but further study is needed since their properties are remarkably similar to those of curare. The sap of this and other species is used in tropical countries as a fish poison.

PROPAGATION. Cockspur Coral Bean is fairly hardy in the Gulf states if grown in a protected situation. In northern areas the thick roots are taken up and stored during the winter. It is a very handsome and desirable ornamental plant. About 50 species of *Erythrina* are known, most from tropical regions. The herbaceous species are propagated by root divisions and woody ones from cuttings of growing wood. Older plants sprout readily when cut back. Plants may be successfully started from seeds also. The plants are often used to shade young coffee trees in South America.

FORM. *E. crista-galli* forma *compacta* Bull. is a form with rich crimson flowers and a more compact habit. Some forms have variegated leaves.

REMARKS. The genus name, *Erythrina*, is the Greek name for red, referring to the flowers, and the species name, *crista-galli*, is the Latin for cockspur, referring to the spines of the plant. It is sometimes listed in the literature under the name of *Micropteryx crista-galli* (L.) Walp. Some of the vernacular names in use are Fireman's Cap, Common Coral-tree, Crybaby-tree, Dragon's Teeth, and Immortelle. The seeds are sometimes made into necklaces. The wood is carved into small objects. The flowers seem to vary considerably in shades of red and density of the racemes.

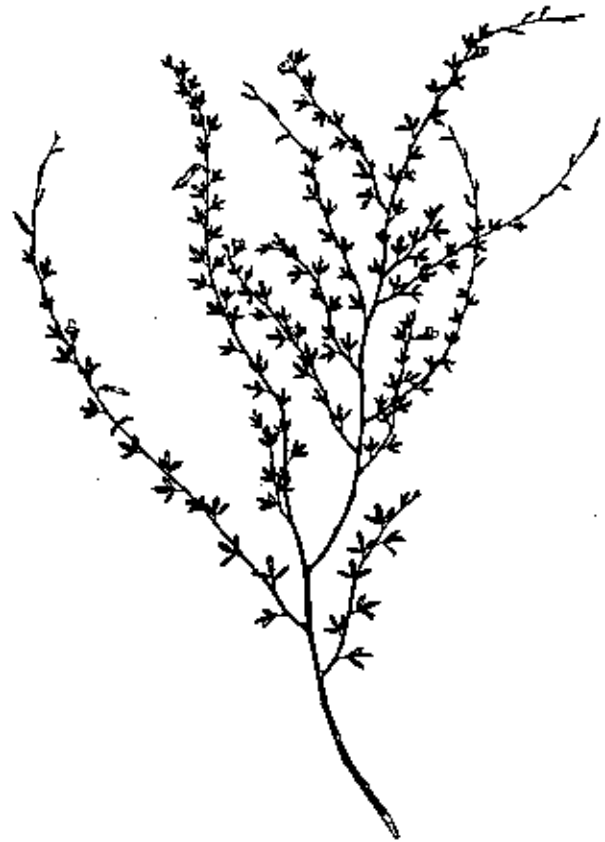
JOHNSTON GENISTIDIUM

Genistidium dumosa I. M. Johnston

FIELD IDENTIFICATION. Shrubby plant to 2 ft. Branches numerous from the base, dense and intricate, ascending or erect, slender and rigid.

FLOWERS. Usually solitary and axillary toward the upper part of the branches, or racemose and loosely flowered; peduncles 1/25-1/8 in. long with 2 subulate bracts 1/10-1/2 in. long; corolla papilionaceous, 1/8-3/16 in. long, yellow, sometimes with greenish spots; standard petal suborbicular, reflexed, clawed, slightly puberulent along the median line or glabrous; wings yellow, oblong-lunate, glabrous, about 1/8 in. long and 1/8 in. broad, base auricled; keel petals 1/20-1/2 in. long, yellowish to white, lunate, obtuse, base auricled; stamens 1/8-1/4 in. long, somewhat hairy below, the vexillum stamen free; ovary hairy, sessile, 4-6-ovulate; style incurved, hairy, subulate, the stigma capitate and minute; calyx campanulate, tube 1/2-1/8 in. long, slightly oblique, lobes cuneate and subulate.

FRUIT. Legume 1/4-1 in. long, about 1/8 in. wide, linear, straight, apex rounded or obtuse, often abruptly apicu-



JOHNSTON GENISTIDIUM

Genistidium dumosa I. M. Johnston



Fig. 160. *Genistidium dumosum*
(Johnston Genistidium)

streams in the Trans-Pecos. Presidio Co., near the Rio Grande. Val Verde Co., near Dolan Falls, Devils River. 2200–2500 ft.; spring. A shrub 2–3 m tall with oval or oblong gland-dotted leaflets, and prominent, mostly solitary, purplish spikes of flowers with one petal. NM, AZ, CA, WY; also N Mex.

15. EYSENHARDTIA KUNTH KIDNEYWOOD

Shrubs to 3.5 m high, much branched, usually unarmed, herbage and flowers gland-dotted and aromatic. Leaves alternate, deciduous, once-compound, odd-pinnate, 1–9 cm long; leaflets 13–47, 3–12 mm long, narrow; stipules short, awl-shaped; stipels minute. Flowers white or purplish, in spike-like racemes 1–11 cm long; calyx irregularly lobed; corolla somewhat regular, petals 4–5 mm long; stamens 10, 9 partially fused, the uppermost one free. Fruit a small pod, 5–10 mm long, 1.6–2.5 mm wide, gland-dotted, mostly indurated, flattened, with only 1 mature seed.

A genus with about 12 species in the semidesert areas of North America from the southwestern United States to Guatemala. The species are not often grazed by cattle and otherwise are not of much economic value, although the name Kidneywood comes from the use of some Mexican species in the treatment of renal disorders.

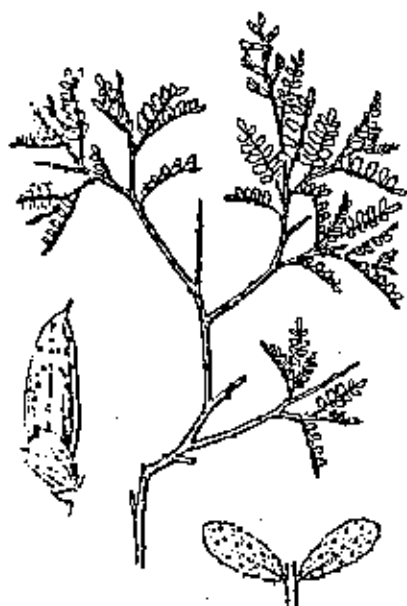


Fig. 161. *Eysenhardtia spinosa*
(Spiny Kidneywood)



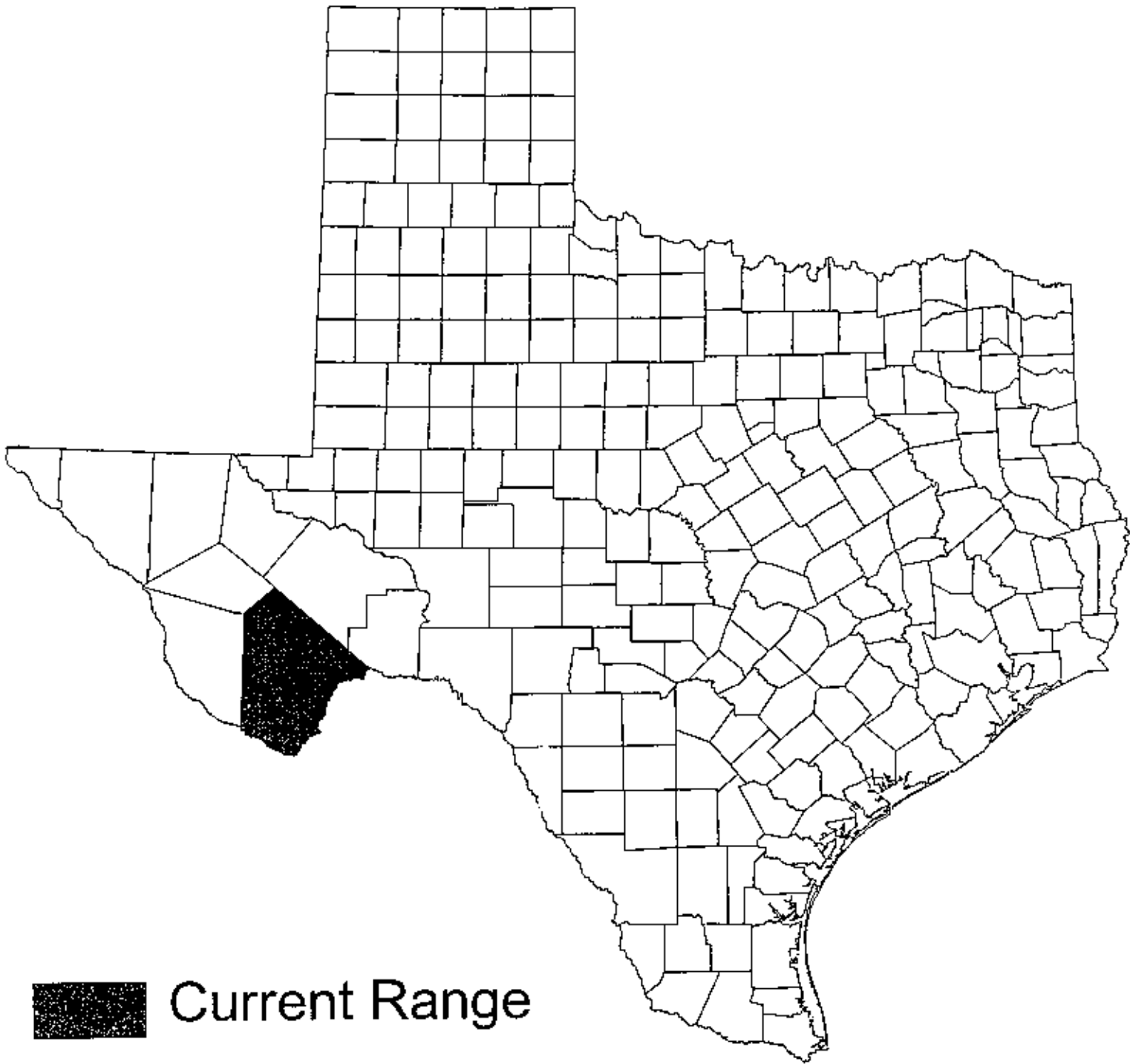
Fig. 162. *Eysenhardtia texana*
(Texas Kidneywood)

KEY TO THE SPECIES

1. Leaflets 13–17, 3–4 mm long; leaves 1–3 cm long; shrub less than 1 m high; flowers white or purplish, racemes usually 3 cm or less 1. *E. spinosa*.
1. Leaflets 15–47, 5–12 mm long; leaves 3–9 cm long; shrub 2–3 m high; flowers white, racemes 3–11 cm long 2. *E. texana*.

1. *Eysenhardtia spinosa* Engelm. SPINY KIDNEYWOOD. Fig. 161. A rare, small shrub, originally known in Texas only by a Hinckley collection from the west end of Capote Peak in Presidio Co., and recently reported also from a small population above the head of Pinto Canyon, and at the top of the Frenchman Hills south of Marfa, Presidio Co. (Warnock, 1977); first collected in Chih. Mex. 5000 ft.; Jul–Oct. The smallish shrubs are about two feet high, and are not actually spiny as the species name would imply, but have rather stiff and sharp branches.

2. *Eysenhardtia texana* Scheele. TEXAS KIDNEYWOOD, VARA DULCE. Fig. 162. [*Eysenhardtia angustifolia* Penn.], A scattered to common shrub, usually in brushy vegetation and along arroyos in limestone regions. Brewster Co., Green Gulch in the Chisos Mts., at ca. 5000 ft.; widespread at lower elevations in the E Trans-Pecos; reported from Fern Canyon, Jeff Davis Co. Apr–



Current Range

Genistidium dumosum
(brush-pea)

Scientific Name: *Grindelia oolepis* Blake

Synonyms: None.

Common Name: plains gumweed

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to the Gulf Coastal Plain of southern Texas.

State Range: Bee, Cameron, Jim Wells, Nueces, Refugio and San Patricio counties.

Description (adapted from Blake 1928; Correll & Johnston 1970; Steyermark 1934): Rhizomatous, clump-forming perennial with ascending, mostly unbranched stems 1-4 dm long. Leaves alternate, simple, membranous, mostly oblanceolate (the lower ones occasionally pinnately lobed), those of midstem 2-6 cm long, linear to linear-lanceolate, 15-45 mm long and 2-4.5 mm wide, nearly entire or occasionally with ca. 6-8 small appressed teeth on each side. Flower heads solitary, remote from each other, ca. 6-10 mm long and 9-14 mm wide, containing only disk flowers (ray flowers absent); phyllaries erect, appressed, with broadly deltoid tips, the outer ones ca. 1 mm wide and the inner 1.5-2 mm wide; disk flowers several, 4-4.8 mm long, the lobes yellow. Achenes oblong, ca. 2.5-3 mm long and 1-1.5 mm wide, yellowish brown, truncate at the apex; pappus awns 1-2, smooth, straightish, caducous, ca. 4 mm long, slightly longer than the achene.

Similar Species: Plains gumweed is a striking species, quite distinct from other species of *Grindelia* in Texas. The stem, leaves and flower heads of other species are very sticky-resinous, a trait to which the common name gumweed refers. *Grindelia oolepis*, however, is only sparingly resinous on some of the phyllaries and flowers. It also has mostly entire leaves and lacks ray flowers, a combination not found in other *Grindelia* species in the region.

Habitat: Early successional patches in coastal prairies on heavy clay soils, often in depressional areas. Several collections were taken from mechanically disturbed habitats along highways and railroads or from vacant lots in urban areas. Robert Runyon collected the species from "crawfish lands" in Cameron County in 1923.

Phenology: Flowering May-December.

Comments: It appears that *Grindelia oolepis* does not persist on the landscape as natural succession brings competition from other plant species. Recent attempts to locate plants at sites reported by Mahler (1980) have been largely unsuccessful, although the species has materialized at a few new locations.

Illustrations: A line drawing appears in Mahler (1981).

Selected References:

- Blake, S. F. 1928. A new *Grindelia* from Texas. Proceedings of the Biological Society of Washington 41: 139-140.
- Mahler, W. F. 1980. Status report [on *Grindelia oolepis*]. Report prepared for U.S. Fish and Wildlife

Service, Albuquerque.

Mahler, W. F. 1981. Notes on rare Texas and Oklahoma plants. *Sida* 9(1): 76-86.

Steyermark, J. A. 1934. Studies in *Grindelia*. II. A monograph of the North American species of *Grindelia*. *Annals of the Missouri Botanical Garden* 21: 433-608.



Grindelia oolepis at Welder Wildlife Refuge, Sinton. 30 November 2000. Dana Price

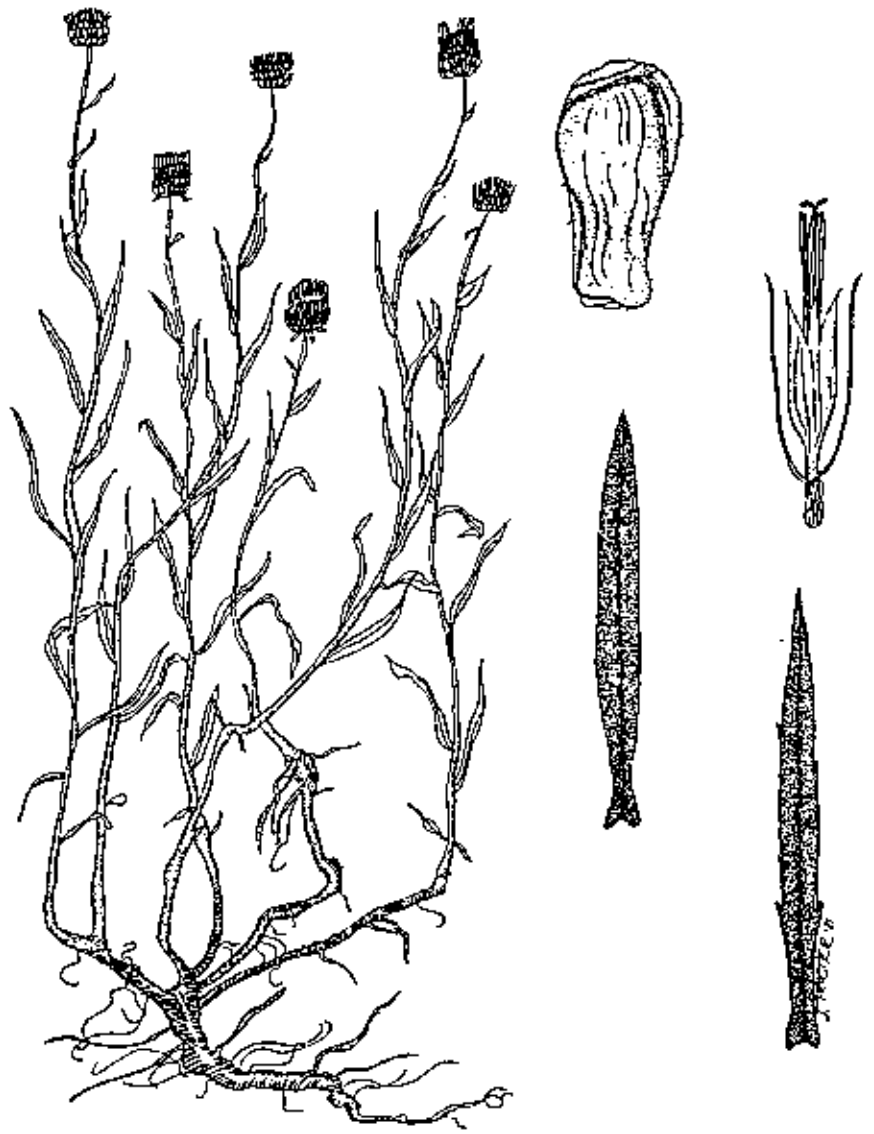
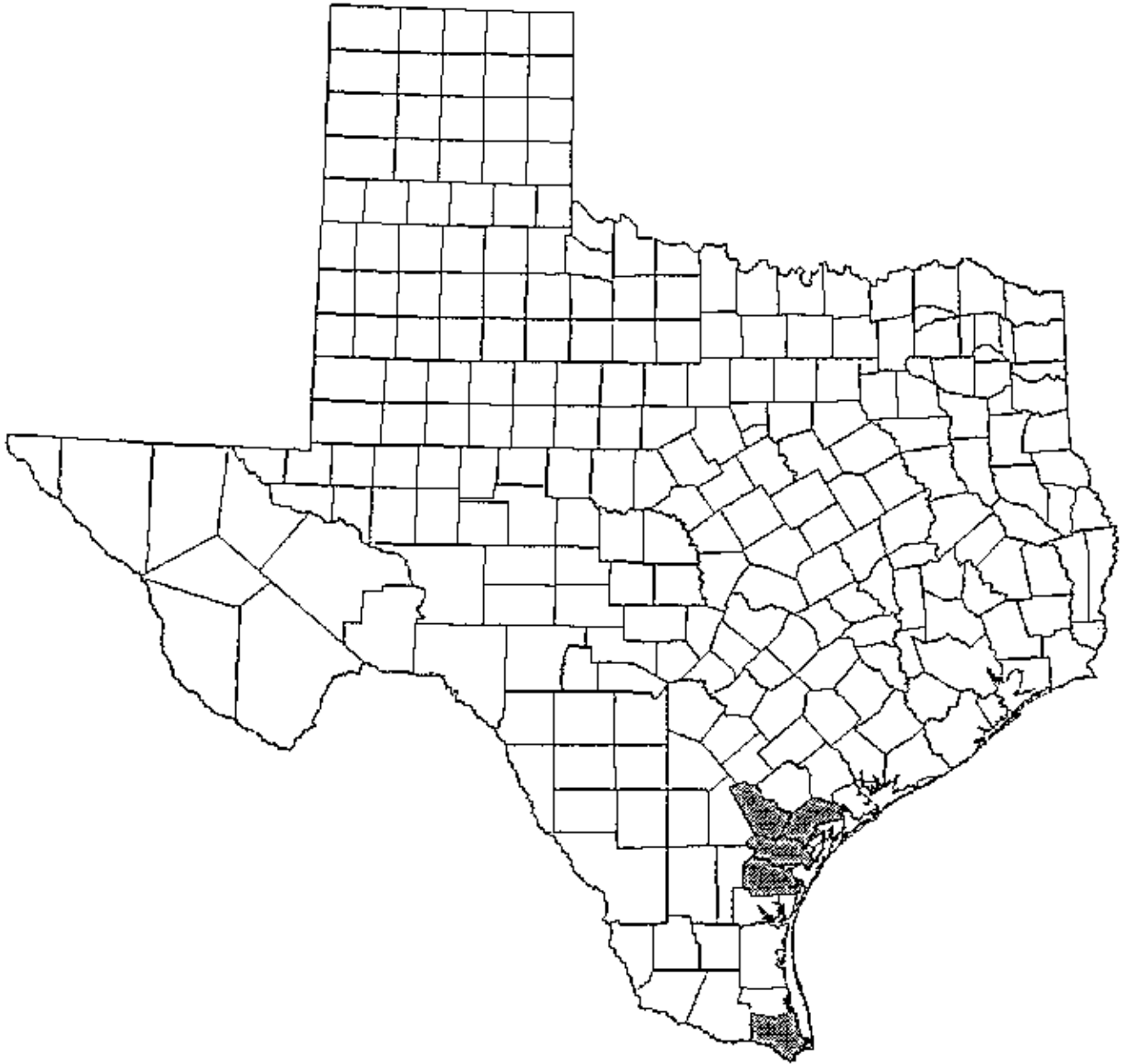


Fig. 3. *Grindelia oolepis* Blake



 Current Range

Grindalia_oolepis
(Plains gumweed)

Scientific Name: *Hedeoma apiculatum* W. S. Stewart

Synonyms: None.

Common Name: McKittrick pennyroyal

Global/State Ranks: G3S2

Federal Status: Delisted

Global Range: Endemic to the Guadalupe Mountains of New Mexico and Texas.

State Range: Culberson County.

Description (adapted from Irving 1980): Small suffrutescent perennial 10-15 cm tall, forming dense tufts; stems numerous, unbranched, densely clothed in minute, retrorsely curling hairs. Leaves opposite, simple, coriaceous, 7-15 mm long and 1.5-3.5 mm wide, somewhat folded upon drying, lanceolate-elliptic, occasionally ovate on lower stem, entire, sessile, tapering to a short but conspicuous apiculate apex, sparsely hispidulose-tuberculate on veins and margins, the upper surface otherwise smooth, the lower surface rugose and punctate. Flowers solitary or 2-3 in axillary cymes, crowded toward the apex; peduncles short; calyx 2-lipped, 8.5-9 mm long, chartaceous, the tube tubular-funnelform, flaring above, 5.5-6.5 mm long and 1.5-1.8 mm wide toward base and 2-3 mm wide toward apex, minutely hispidulose-tuberculate, the upper teeth connate for 1/4 their length or less, forming an upper lip 2.0-2.2 mm long, the lobes broadly triangular or deltoid, apiculate at their apices, ca. 1.0-1.5 mm long, the lower 3 teeth ascending, broadly to narrowly triangular-aristate, ca. 1.2 mm wide; annulus ca. 1.5 mm below juncture of upper and lower lips; corolla pink, showy, 2-lipped, 19-20 mm long, pubescent in the throat, sparsely pubescent within the tube, the tube ca. 10 mm long and 4 mm wide above, the upper lip broadly obovate, ca. 5 mm wide and long, the lower lip broad, ca. 8.5 mm long and 9-10 mm wide; fertile stamens 2. Fruit a set of 4 separate nutlets, somewhat pointed at their apices, ca. 2 mm long and 0.7-0.9 mm wide.

Similar Species: Distinguished from other *Hedeoma* species on the basis of its tufted habit, thick pointed entire leaves, and showy pink corolla (Irving 1980).

Habitat: Boulders, cliffs, ledges and other exposed Permian limestone surfaces in higher mountain canyons, usually on north-facing slopes or similarly sheltered, relatively mesic sites, but occasionally in more nondescript soil pockets (Sivinski & Lightfoot 1992). Associated petrophytes include *Aquilegia chrysantha* var. *chaplinei*, *Chaetopappus hersheyi*, *Nama xylopodum*, *Perityle quinqueflora*, *Petrophytum cespitosum*, *Philadelphus hitchcockianus* and *Pinaropappus parvus* (Irving 1980). The surrounding vegetation is oak-maple woodland composed of *Acer grandidentatum*, *Quercus gumbelii*, *Q. muhlenbergii*, *Ostrya knowltonii* and other trees and shrubs (Irving 1980; Sivinski & Lightfoot 1992).

Phenology: Flowering July-September.

Comments: *Hedeoma apiculatum* was listed as Threatened on 13 July 1982. It was delisted on 22 September 1993 after discovery of additional populations in areas remote from possible human impact.

Illustrations: Line drawings appear in Poole & Riskind (1987) and in New Mexico Native Plant Protection Advisory Committee (1984). Color photographs appear in Warnock (1977) and Poole & Riskind

(1987).

Selected References:

- Irving, R. S. 1980. Status report [on *Hedeoma apiculatum*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Knight, P. J. and A. C. Cully. 1988. Endangered plant study: monitoring endangered plants, Project No. E-9-1. *Hedeoma apiculatum*. U. S. Fish & Wildlife Service, Division of Endangered Species, Albuquerque, New Mexico. 9 pp.
- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Pooler, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Sivinski, R. and K. Lightfoot. 1992. Status summary for the McKittrick pennyroyal (*Hedeoma apiculatum*). U. S. Fish & Wildlife Service, Ecological Services Field Office, Albuquerque, New Mexico. 31 pp.
- U.S. Fish & Wildlife Service. 1985. McKittrick Canyon pennyroyal (*Hedeoma apiculatum*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque. 46 pp.
- U.S. Fish & Wildlife Service. 1993. Final rule to delist the plant *Hedeoma apiculatum* (McKittrick Pennyroyal) and remove critical habitat designation. Federal Register 58 (182): 49244-49247.
- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine. 274 pp.



Family: LAMIACEAE (Labiatae)

Scientific Name: *Hedeoma apiculatum* Stewart

Common Name: McKittrick pennyroyal

Classification: Biologically threatened

Federal Action: Federal Register, 13 July 1982, federally threatened

Common Synonyms: None

Description: Low-growing, tufted perennial from a woody base; herbaceous stems bearing numerous small curled hairs; leaves opposite, crowded, to about 15 mm (0.6 in.) long, the margins without teeth, pointed at the tip; flowers 1-3 in the axils of leaves toward the summit of the stem, about 20 mm (0.8 in.) long, the lower lobe enlarged, about 10 mm (0.4 in.) wide. Flowers from July to August.

Known Distribution: Eddy County, New Mexico, and adjacent Texas

Habitat: Limestone crevices of canyon walls, and among rocks along watercourses and ridges, at about 1,825 m (6,000 ft.)

Ownership: Forest Service, National Park Service

Threats to Taxon: None known except possibly by trail use and development

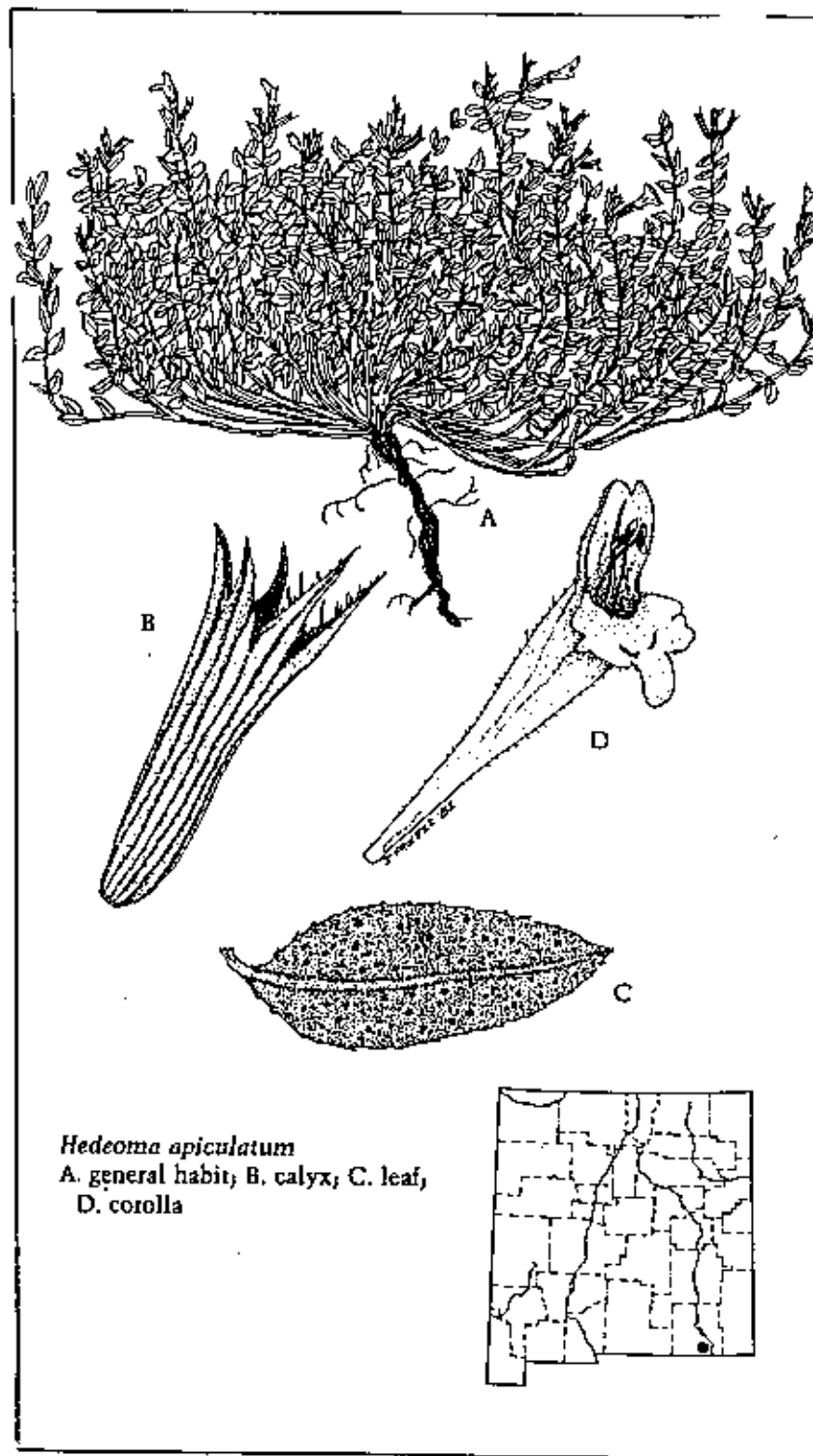
Similar Species: None

Remarks: This unique pennyroyal is endemic to the Guadalupe Mountains.

Important Literature:

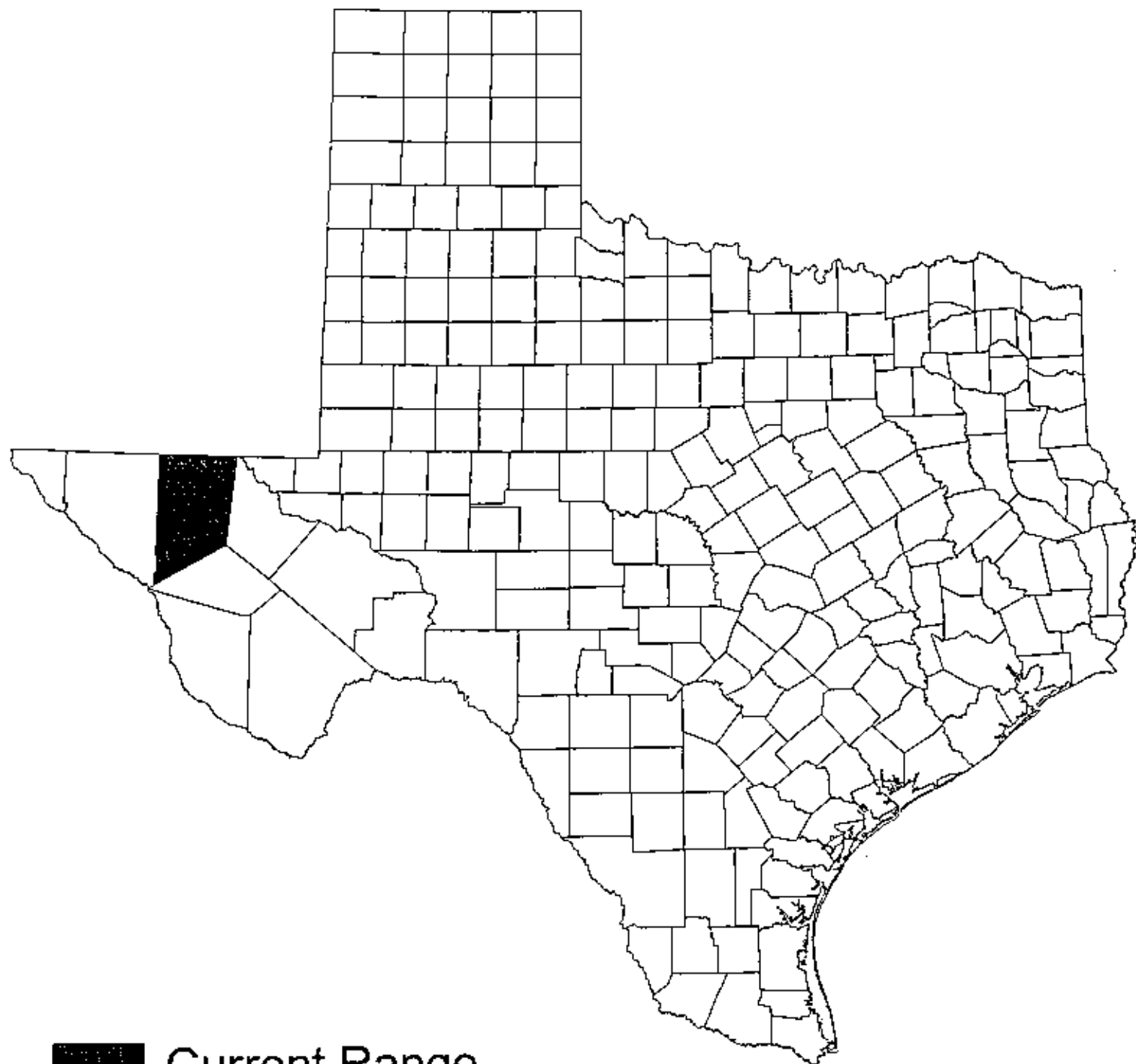
Correll, D., and M. Johnston. Manual of the vascular plants of Texas.

Renner, Tex.: Texas Research Foundation, 1970.



Hedeoma apiculatum

A. general habit, B. calyx, C. leaf,
D. corolla



 Current Range

Hedeoma apiculatum
(McKittrick pennyroyal)

Scientific Name: *Hedeoma pilosum* Irving

Synonyms: None.

Common Name: Old Blue pennyroyal

Global/State Ranks: GSHH

Federal Status: SOC

Global Range: Mountains of Trans-Pecos Texas.

State Range: Known only from the type specimen, which was collected by Barton Warnock in July 1940 from Old Blue (Baldy) Mountain in the Glass Mountains of Brewster County.

Description (adapted from Irving 1970; Correll & Johnston 1970; Poole 1992): Cespitose perennial probably forming mats ca. 4 cm tall; stems very short, profusely branched below but unbranched above, pubescent with short spreading hairs. Leaves opposite, sessile, crowded (internodes only 1.5 mm long), ascending and appressed to stem, the blades coriaceous, ovate, entire, ca. 5 mm long and 2.5-3 mm wide, tapered to a narrowly obtuse or acutish apex, glabrous on both surfaces but the margins pilose-ciliate. Flowers solitary in axils of upper leaves; primary peduncles short; pedicels 1-2 mm long, retrorsely canescent, bracteoles short, oblong, ciliate; calyx ca. 7.5 mm long, somewhat coriaceous, the tube tubular-funnelform, not gibbous below, dilated upward, ca. 5 mm long, pilose with long spreading hairs; upper calyx teeth connate for about half length to form a broad upper lip ca. 2.5 mm long, the lobes ca. 1.2 mm long and 0.5 mm wide at base; slightly laterally spreading and reflexed, pilose-ciliate; lower calyx teeth narrowly triangular-lanceolate, ascending, ca. 2.5 mm long, pilose-ciliate; annulus dense, ca. 1 mm wide, seated ca. 2 mm below calyx lobes (i.e., deep within calyx tube); corolla absent from type specimen, not described. Fruit absent from type specimen, not described, presumably consisting of four separate small nutlets a few mm long.

Similar Species: The Texas flora includes only one other *Hedeoma* species with coriaceous leaves and a mat-forming habit. That species, *Hedeoma apiculatum*, is known only from the Guadalupe Mountains. It is larger than *H. pilosum*, forming clumps 10-15 cm tall, has longer (ca. 10 cm) leaves, and hispidulose rather than pilose calyces.

Habitat: Open exposed limestone (Irving 1970).

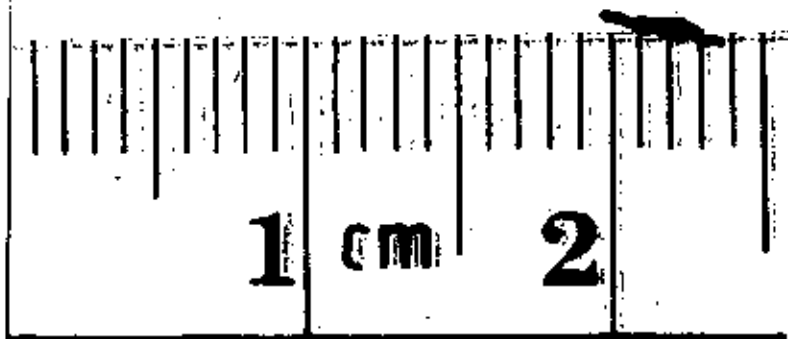
Phenology: Unknown. The lone specimen was collected on 13 July 1940; it bears neither flowers nor nutlets.

Comments: Numerous efforts to re-locate *Hedeoma pilosum* in the Glass Mountains have all been unsuccessful.

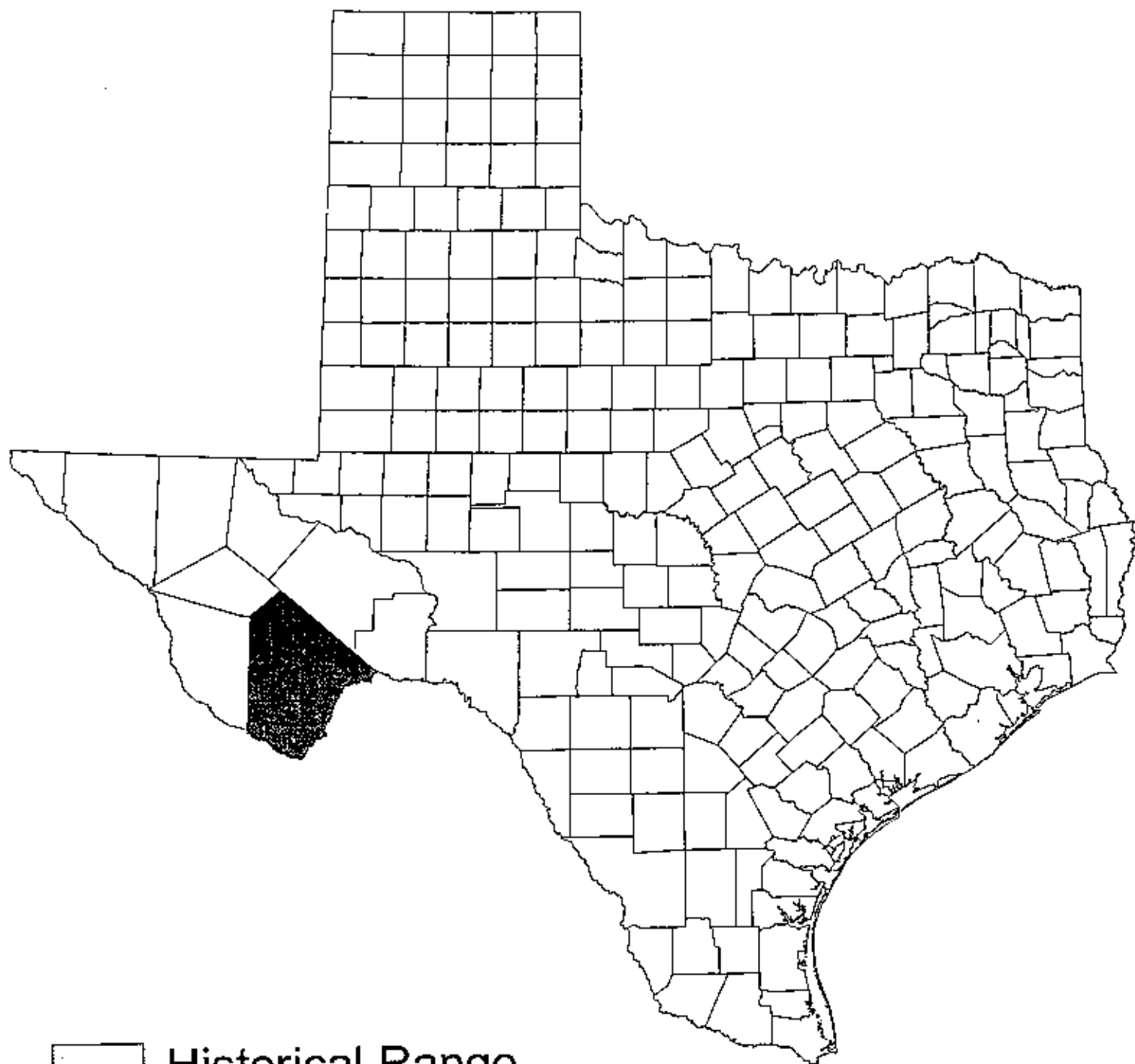
Illustrations: None known.

Selected References:

- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Irving, R. S. 1970. Novelties in *Hedeoma* (Labiatae). Brittonia 22: 338-345.
- Miller, D. J. 1984. Status report [on *Hedeoma pilosum*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Poole, J. M. 1992. Status report on *Hedeoma pilosum*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.



C. F. ...
4 BRITTON DRIVE
BLOOMFIELD CONN. U.S.A.



 Historical Range

Hedeoma pilosum
(Old Blue pennyroyal)

Scientific Name: *Helianthus neglectus* Heiser

Synonyms: None.

Common Name: neglected sunflower

Global/State Ranks: G2QS2

Federal Status: None.

Global Range: West Texas and southeastern New Mexico.

State Range: Ector, Loving, Ward and Winkler counties.

Description (adapted from Correll & Johnston 1970; Henrickson & Johnston in prep.): Taprooted annual 8-20 dm tall, strigose with mostly thick-based or slender, tapering hairs 0.2-0.5 mm long, also hispid with thick, tapering hairs 0.5-2 mm long; stems strongly hispid and strigose at the base, often more or less glabrate above, much-branched. Leaves alternate, simple, the petioles 9-11 mm long, strigose, the blades ovate to deltoid-ovate, 7-14 cm long and 5-12 cm wide, strigose, mostly cordate at the base, acute at the apex, margins subentire to remotely serrulate; upper leaves reduced, lanceolate. Flower heads on long peduncles at the ends of branchlets, containing both disk and ray flowers; peduncles 10-40 cm long, sparsely strigose; phyllaries 25-35, in 2-3 series, strigulose, 15-30 mm long and 2-4 mm wide, lanceolate, long-attenuate and caudate with threadlike tips; ray flowers 21-31, yellow, 3-4 cm long and 7-14 mm wide; disk ca. 23-33 mm wide; disk flowers 4.5-5.5 mm long, the 5 lobes red-purple; receptacle chaffy, the pales 6-8 mm long, stramineous throughout, 3-lobed at the tips, those in the center of the head hispid or hirsute with white hairs 1-2 mm long. Achenes ca. 4 mm long, mottled black-brown-gray, with appressed slender hairs 0.5-1 mm long, capped by a pappus of scales 2-3 mm long.

Similar Species: [***WRC: save this for JMP!]

Habitat: Deep sands on rolling hills and dunes of a Pleistocene sand sheet, often associated with Havard oak (*Quercus havardii*) dwarf woodlands.

Phenology: Flowering July-September (Martin and Hutchins 1981).

Comments: According to Correll & Johnston, *Helianthus neglectus* is closely related to *H. petiolaris* and has probably hybridized to some extent with *H. annuus*.

Illustrations: Photographs of a plant in habitat and of a single flower head appear in Rogers, Thompson & Seiler (1982).

Selected References:

Heiser, C. B., Jr. 1958. Three new annual sunflowers (*Helianthus*) from the southwestern United States. *Rhodora* 60: 272-283.

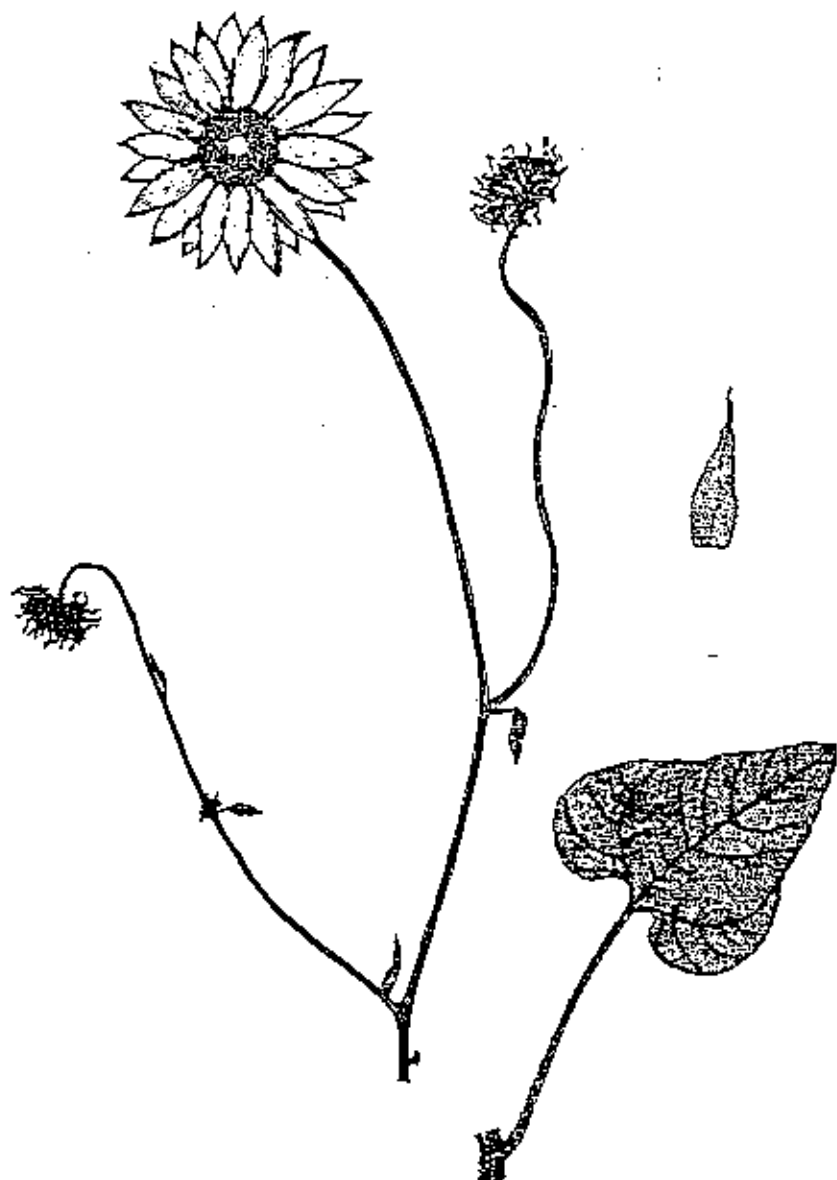
Heiser, C. B., Jr. 1969. The North American sunflowers (*Helianthus*). *Memoirs of the Torrey Botanical Club* 22(3): 1-218.

Martin, W. C. and C. R. Hutchins. 1981. A flora of New Mexico. Two volumes. A. R. Gantner Verlag,

Germany. 2591 pp.

Riesenberg, L. H., R. Carter, and S. Zona. 1990. Molecular tests of the hypothesized origin of two diploid *Helianthus* species (Asteraceae). *Evolution* 44(6): 1498-1511.

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Fig. 6. *Helianthus neglectus*

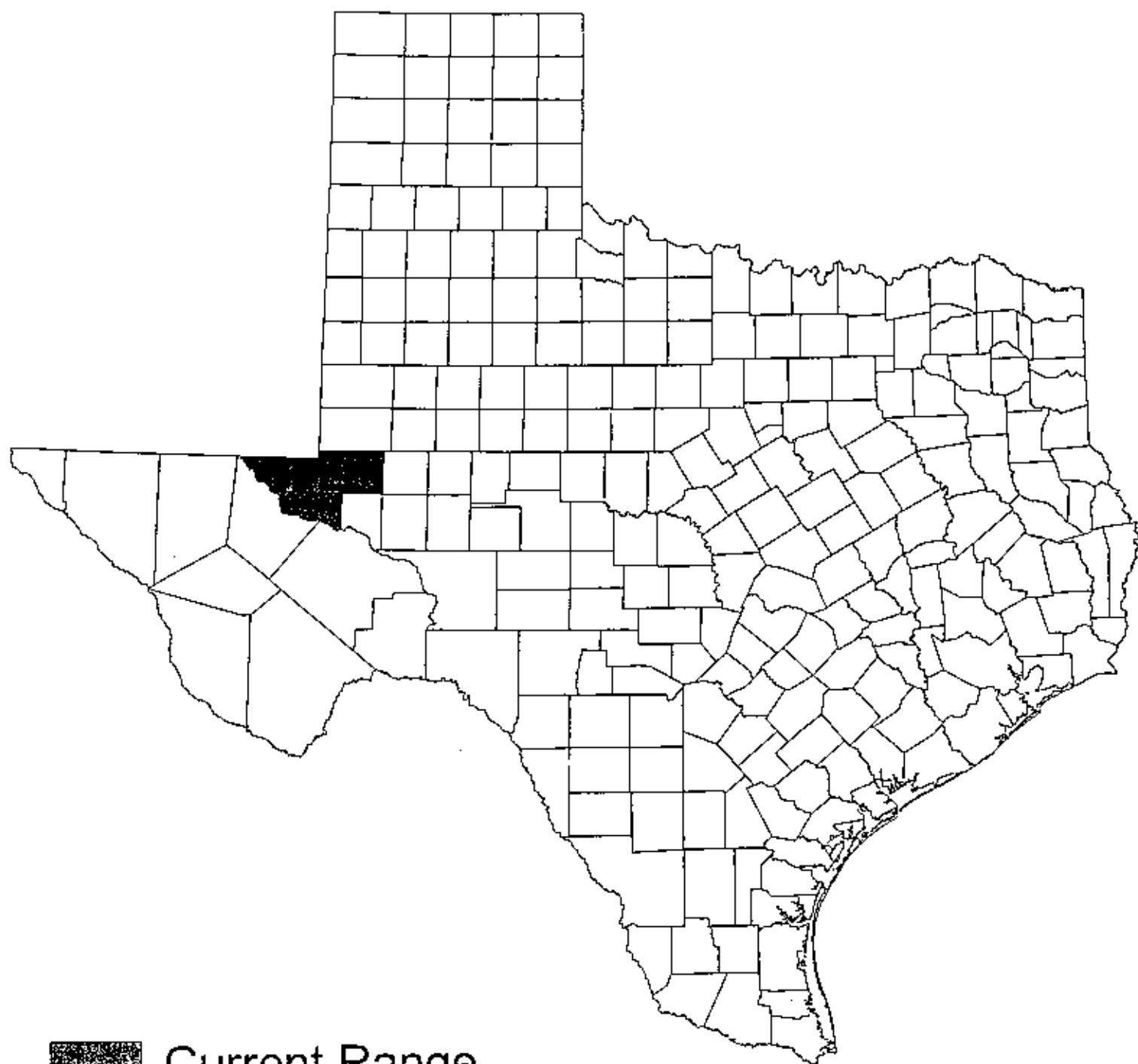
Artesia in New Mexico.
of Highway 83 for over

In the original description of *H. neglectus* as a new species from *H. annuus*, it differs from *H. petiolaris* by its close similarity to this species in its pale pubescence, and its difference from *H. annuus* by several characters, number of phyllaries, etc. The stem of *H. annuus*. The stem characters are somewhat unique feature is the very acute angle greater than 45°. Since *H. annuus* is a stable, fertile type in a number of areas, it seems possible that these features could have developed in the species or through the process of hybridization. On the other hand, an original hybrid, for example, the morphological characters might be explained by a cross between *H. annuus* and *H. petiolaris* which gave rise to *H. neglectus* as a new form from a common ancestor. The range of the species and its population might be used to test the theory of hybridization.

The fertility and cytology of *H. annuus*, *H. debilis*, *H. niveus*, etc. in the original account of the species were secured with *H. argophyllus*. A considerable reduction in fertility was observed with *H. petiolaris* have been observed. The barium specimens were not available.

Gray (1884) mentions a glabrous form of *H. strumosus*, but never validly published it.

7. *Helianthus annuus* L.
H. indicus L. Mant. 1:
H. tubaeformis Nutt. C:
H. platycephalus Cass.



 Current Range

Helianthus negelctus
(negelcted sunflower)

Scientific Name: *Helianthus paradoxus* Heiser

Synonyms: None.

Common Name: Pecos sunflower, puzzle sunflower

Global/State Ranks: G2S1

Federal Status: Threatened

Global Range: New Mexico and west Texas.

State Range: Pecos and Reeves Counties.

Description (adapted from Heiser 1969; Henrickson & Johnston in prep.; Ladyman & Poole 1998): Annual 13-20 (-occasionally to what? Taller than 2 m at Diamond Y in 2001) m tall; stems mostly glabrous but occasionally hispid and strigose with mostly very broad, tuberculate-based, short, tapering hairs 0.1-0.3 mm long. Leaves opposite below, alternate above, simple, with petioles 1-4.5 cm long; blades lanceolate to ovate-lanceolate, 8-15 (-25) cm long and 2-5 (-10) cm wide, reduced in the upper stem, tapering to a narrowly acute apex, broadly cuneate to more or less rounded, strongly 3-nerved at the base, entire or the lower leaves remotely serrulate-serrate, roughly scabrous or hispid with thick-based hairs. Flower heads 3-50 per stem, on peduncles from upper branches, containing both disk and ray flowers; peduncles 12-18 (-25) cm long; phyllaries 15-25, in 2-3 series, lanceolate to ovate-lanceolate, 8-10 mm long and 2-4.5 mm wide, tapering to a narrowly acute, spreading-recurved, more or less strigose and often tuberculate tip, hispid to stipitate-glandular at the margins; ray flowers 12-20, the blade yellow, 17-22 mm long and 5-7 mm wide; disk 14-20 mm wide; disk flowers 4-5.5 mm long, the 5 lobes red-purple; receptacle chaffy, the pales 5.5-7.5 mm long, 3-toothed at the apex, glabrous, purplish at the tips. Achenes 3-4 mm long, glabrous; pappus of scales 2-3 mm long.

Similar Species: Pecos sunflower is superficially similar to several other sunflower species, but the combination of mostly glabrous stems, strongly three-nerved lanceolate leaves and lanceolate to ovate-lanceolate phyllaries, along with its fall flowering period, distinguish it.

Habitat: Pecos sunflower is restricted to saline, calcareous, heavy-textured soils in and around cienegas and other desert wetlands. In such landscapes it is usually most abundant on subirrigated terraces just above the wettest sites, which are generally dominated by *Scirpus olneyi*, and below the driest sites, which usually support *Sporobolus airoides*. Associates in this distinct zone include *Distichlis spicata*, *Flaveria chlorifolia*, *Muhlenbergia asperifolia*, *Limonium limbatum* and *Samolus ebracteatus* (Ladyman & Poole 1998).

Phenology: Flowering August-November.

Comments:

Illustrations: Color photographs appear in Warnock (1974) and Poole & Riskind (1987). Detailed line drawings appear in New Mexico Native Plant Protection Advisory Committee (1984) and Poole & Riskind (1987). Other drawings are provided in Heiser (1969).

Selected References:

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- Ladyman, J. A. R. and J. M. Poole. 1998. Element Stewardship Abstract template for *Helianthus paradoxus*. Report prepared for The Nature Conservancy, Arlington, Virginia.
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- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Poole, J. M. 1992. Puzzle sunflower (*Helianthus paradoxus*): a status report update. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.
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- Reisenberg, L. H. 1991. Hybridization in rare plants: insights from case studies in *Cercocarpus* and *Helianthus*. In Falk, D. E., and K. E. Holsinger, eds., *Genetics and Conservation of Rare Plants*. Oxford University Press.
- Seiler, G. J., L. Cuk, and C. E. Rogers. 1981. New and interesting distribution records for *Helianthus paradoxus* (Heiser) Asteraceae. *Southwestern Naturalist* 26(4): 431-432.
- Sivinski, R. 1996. Performance report on endangered plant study. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Add additional Van Auken citations**
- Wagner, W. and D. Sabo. 1977. Status report for *Helianthus paradoxus*. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.



Fig. 12. *Helianthus paradoxus*

much reduced, those of spreading or slightly re-
scabrous or hispid, nu-
equalling disk, 3-4 mm
glabrous at tips; achen-

Chromosome number:

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(Heiser, 1965a) one oth
has been seen which is

13. *Helianthus agre-*
(T.: Volusia C

Family: ASTERACEAE (Compositae)
Scientific Name: *Helianthus paradoxus* Heiser
Common Name: Pecos sunflower
Classification: Biologically endangered
Federal Action: Federal Register, 15 December 1980, candidate for federal protection
Common Synonyms: None

Description: Annual; stems 1-2 m (40-80 in.) tall, short branched above; leaves three veined, lanceolate, tapering to a short stalk, mostly without teeth on the margins but lower leaves sometimes remotely toothed; flower heads, including ray flowers 3-5 cm (1.2-2.0 in.) across, the subtending ring of bracts 15-20, narrow acuminate; 12-20 ray flowers, yellow; achenes hairless or nearly so, with two short scales at the summit, these readily dropping off. Flowers from July to October.
Known Distribution: Cibola and Chaves counties, New Mexico, and western Texas

Habitat: Marshes and moist open areas; 1,250-1,800 m (4,000-6,000 ft.)

Ownership: Laguna Indian Pueblo, private

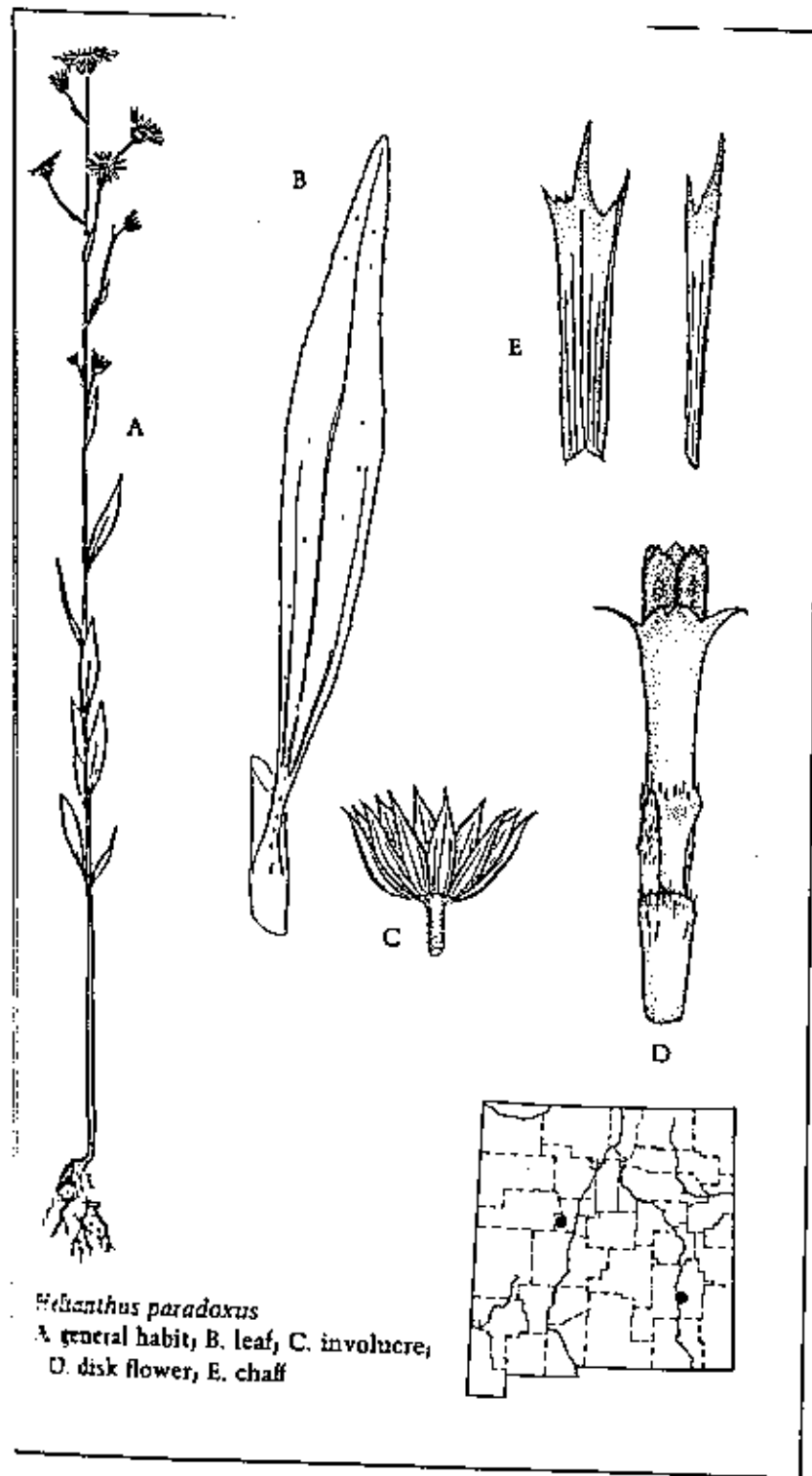
Threats to Taxon: Development of natural water sources and the alteration of habitat by the introduction and spread of salt cedar
Similar Species: Other small annual sunflowers may be mistaken for this, but they either have broader leaves, toothed leaves, or ciliate bracts around the head.

Remarks: This little-known sunflower has not been seen at the Laguna Indian Reservation for over a century and is probably extinct there. It has recently been discovered near Roswell.

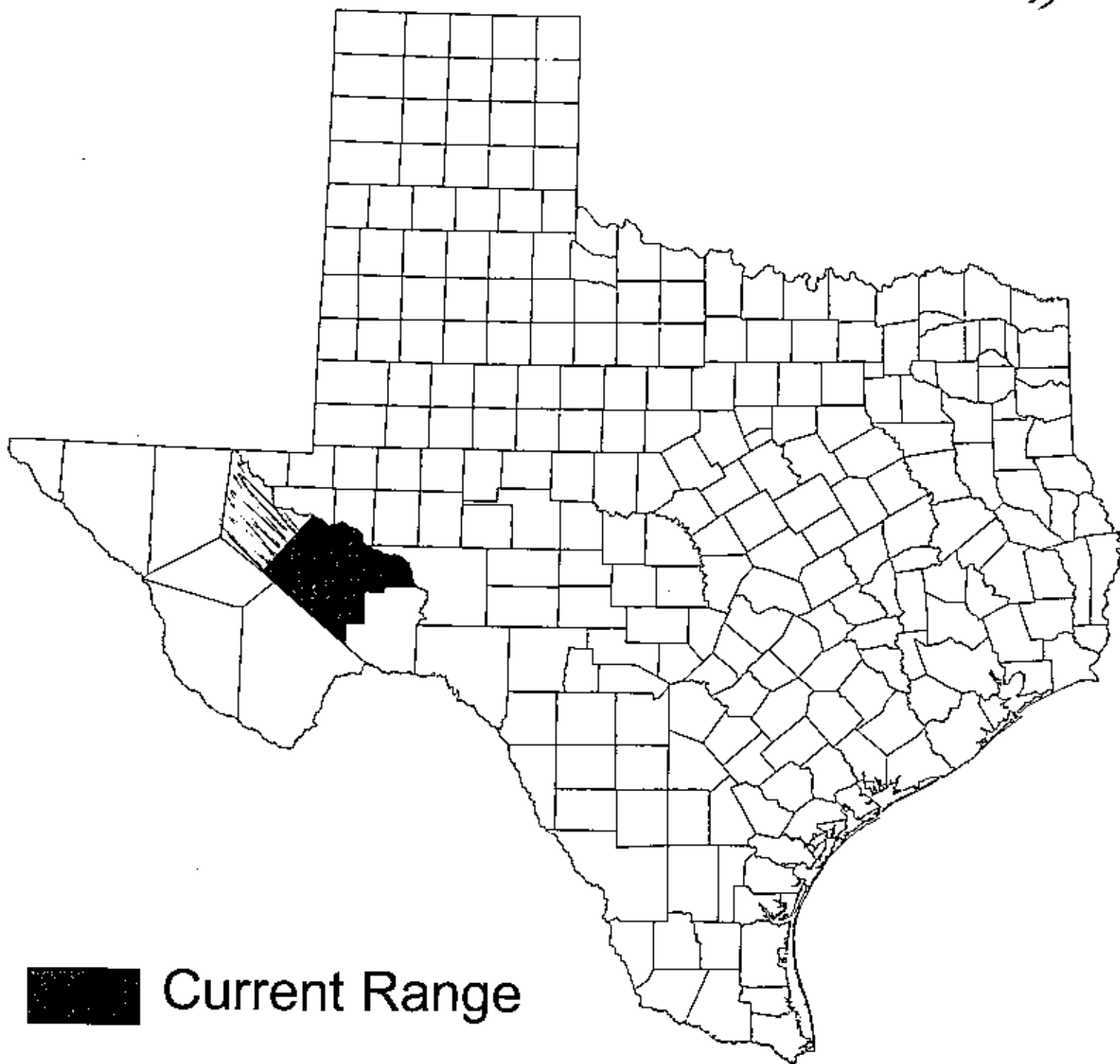
Important Literature:

Heiser, C. B., jr. The North American Sunflowers (*Helianthus*) Mem. Torr. Bot. Club 22:1-218, 1969.

Siler, G. J., Iuka Cuk, and Charlie E. Rogers. New and interesting distribution records for *Helianthus paradoxus*. Southw. Nat. 26(4):431. 1981.



Helianthus paradoxus
 A. general habit, B. leaf, C. involucre,
 D. disk flower, E. chaff



 Current Range

Helianthus paradoxus
(Pecos sunflower)

Scientific Name: *Helianthus praecox* Engelm. & Gray subsp. *hirtus* (Heiser) Heiser

Synonyms: *Helianthus debilis* Nutt. subsp. *hirtus* Heiser

Common Name: Dimmit sunflower

Global/State Ranks: G4T2QS2

Federal Status: SOC

Global Range: Endemic to South Texas.

State Range: Known only from Dimmit County.

Description (adapted from Heiser 1956; Heiser 1969; Sanders 1996): Erect annual to 7 dm tall, ascendingly branched from below the middle, the stems stramineous or purple-mottled, densely hirsute or hispid-hirsute, especially on lower portions, the hairs spreading, ca. 1.5-3 mm long. Leaves alternate, simple, petiolate, the blades mostly 2-6 cm long, deltate-ovoid, usually with a slight constriction near the middle, hirsute, undulate, the base subcordate to truncate and abruptly cuneate onto the petiole, the apex acute to shortly attenuate, the margins serrate. Flower heads solitary and pedunculate at the ends of branch tips, several to numerous per plant, containing both disk and ray flowers; peduncles usually 30-40 cm long; phyllaries 3-4 mm wide, elliptic-lanceolate, constricted to a prolonged, attenuate, awn-like tip 2-5 mm long, the main portion hispid and usually marginally ciliate; ray flowers 14-16, yellow, 21-27 mm long and 7-13 mm wide; disk 1.5-1.7 cm in diameter; receptacle chaffy, the pales 3-cusped, the middle cusp prolonged and often bearded at the tip with short, stout, whitish hairs; disk flowers purplish brown. Achenes 2.5-3 mm long, shortly villous.

Similar Species: Very difficult to distinguish from *Helianthus praecox* subsp. *runyonii*, the common sunflower of the South Texas Sand Sheet in Kenedy, Brooks and adjacent counties, and from *H. debilis* subsp. *cucumerifolius*, which ranges over much of South Texas and occurs no more than 30 miles to the northeast of known Dimmit sunflower sites (Sanders 1996). According to Heiser (1956), this subspecies is most strikingly different from the others in its striking hirsute pubescence. Other differences were discussed in detail by Sanders (1996).

Habitat: Bluestem midgrass grasslands with scattered mesquite and live oak on loose, well drained, slightly acid sandy soils, mostly of the Antosa-Bobilla association and the Poteet series (Sanders 1996). Known sites are underlain by the Carrizo Sand (Eocene).

Phenology: Flowering late summer-fall?

Comments: In his draft treatment of the Asteraceae of Texas, B. L. Turner places Dimmit sunflower in synonymy under *Helianthus debilis* var. *cucumerifolius*.

Illustrations: None known.

Selected References:

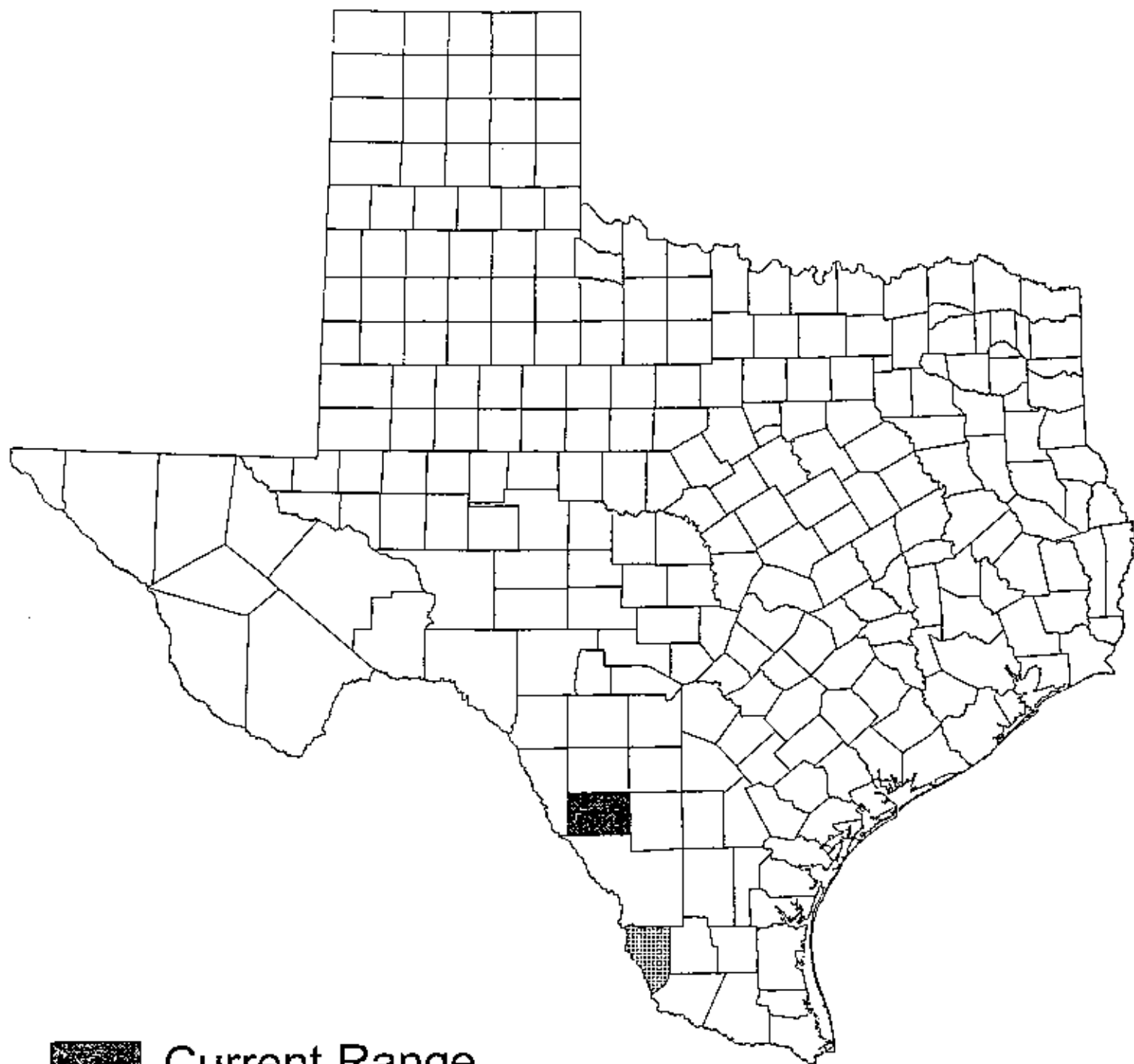
Heiser, C. B., Jr. 1956. Biosystematics of *Helianthus debilis*. Madroño 13: 145-167.

Heiser, C. B., Jr. 1969. The North American sunflowers (*Helianthus*). Memoirs of the Torrey Botanical Club 22(3): 1-218.

- Rieseberg, L. H. and M. F. Doyle. 1989. Allozyme variation in *Helianthus praecox* ssp. *hirtus*, a rare sunflower from southern Texas. *Aliso* 12: 379-386.
- Sanders, R. W. 1996. Status report on *Helianthus praecox* ssp. *hirtus*. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.







Current Range



Misidentification Range

Helianthus praecox ssp. *hirtus*
(Dimmit sunflower)

Scientific Name: *Heteranthera mexicana* Wats.

Synonyms: *Eurystemon mexicanum* (Wats.) Alex.

Common Name: Mexican mud-plantain

Global/State Ranks: G3S2

Federal Status: None

Global Range: Quintana Roo, Yucatán, Coahuila, Nuevo León and Tamaulipas (Lot, Novelo y Ramírez-García, 1986) north to south Texas; disjunct on the Texas Panhandle.

State Range: Of bimodal distribution, known from Cameron, Dimmit, Hidalgo and Nueces counties in South Texas and Carson, Hockley, Reagan, and two unspecified counties ("east of Amarillo" and "south of Happy" on the Texas Panhandle).

Description (adapted from Correll & Johnston 1970): Erect annual herb, rooted in mud; stems to 4 dm tall, noticeably glandular-pubescent above. Leaves few, simple, alternate, sessile, conspicuously sheathing the stem, parallel-veined, broadly linear, to 15 cm long and a few cm wide. Flowers in terminal, several- (usually 12-) flowered spikes, each flower subtended by a leaf-like spathe; perianth pale blue to indigo, salverform, fused below, the 6 free lobes arranged in a conspicuously zygomorphic fashion; stamens 3, strikingly dissimilar; anthers basifixed, that on the longest filament bluish and much larger than those on the two shorter inflated filaments. Fruit a 3-celled, many-seeded capsule.

Similar Species: None. With its erect habit and long terminal spikes of blue flowers, *H. mexicana* is quite unlike any *Heteranthera* in Texas, and indeed quite unlike any other mudflat-dwelling species in the state.

Habitat: Wet clayey soils of resacas and ephemeral wetlands in south Texas and along margins of playas on the Panhandle.

Phenology: Flowering June-August.

Comments:

Illustrations: A line drawing appears in Correll & Correll (1975).

Selected References:

- Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. 2 volumes. Stanford University Press, Stanford. 1777 pp.
- Lot, A., A. Novelo y P. Ramírez-García. 1986. Listados florísticos de México V. Angiospermas acuáticas mexicanas 1. Universidad Nacional Autónoma de México.



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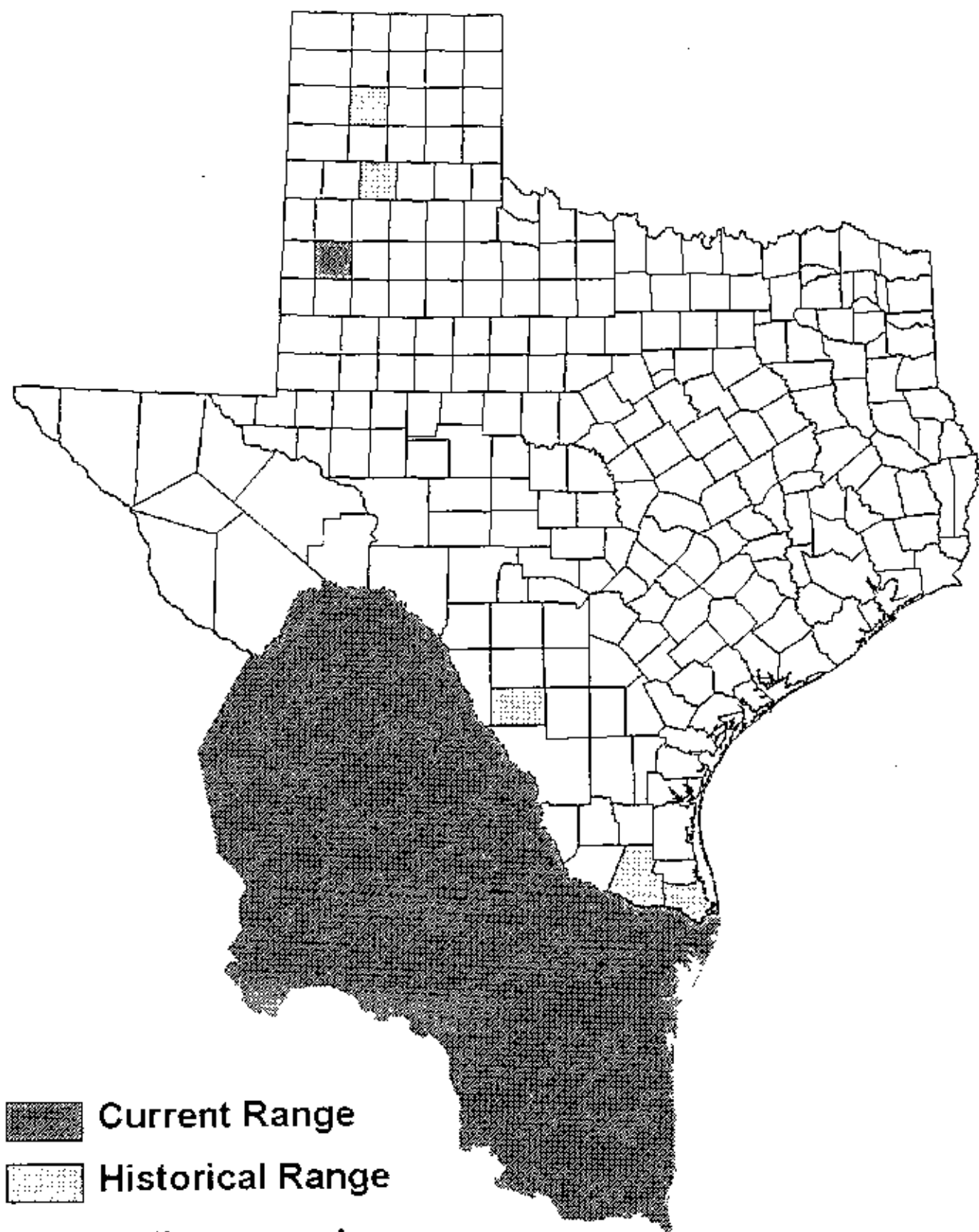
ug.; also n. Mex.

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Fig. 309: a-d, *Eurystemon mexicanum*: a, habit, X $\frac{1}{2}$; b, flower, X $2\frac{1}{2}$; c, stamens, X $2\frac{1}{2}$; d, capsule, X 1 and enlarged, X $2\frac{1}{2}$. e-g, *Heteranthera reniformis*: e, habit, X 1; f, flowers, X $2\frac{1}{2}$; g, seed, X 10. (V. F.).

Heteranthera mexicana



Heteranthera mexicana
(Mexican mud-plantain)

Scientific Name: *Hexalectris revoluta* Correll

Synonyms: None.

Common Name: curly coral-root, Chisos coral-root

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Mountains of west Texas, Arizona and the Sierra Madre Oriental in Nuevo León and San Luis Potosí (Liggio & Liggio 1999).

State Range: Brewster and Culberson counties.

Description (adapted from Correll 1978; Liggio & Liggio 1999; Luer 1975): Perennial saprophyte from a fleshy rhizome, with erect aerial stems 3-5 dm tall; stem stout, glabrous, brownish-purple or purplish-brown, unbranched, leafless but with a few short broad clasping sheaths. Flowers in a few- (up to 15-) flowered terminal raceme up to 20 cm long, subtended by ovate, acute, concave bracts 1-1.4 cm long; pedicels stout, ca. 1.5 cm long; sepals and petals 3, purplish, all revolute toward apex; dorsal sepal oblong or oblong-elliptic, bluntly obtuse, concave, 1.6-2.1 mm long and 3-7 mm wide; lateral sepals oblique, elliptic to elliptic lanceolate, obtuse to sub-acute or rarely minutely retuse at the apex, 1.5-2 cm long and 3.5-7.5 mm wide; petals oblique, elliptic to elliptic-obovate, bluntly obtuse at apex, 1.5-1.9 cm long and 4.5-7.5 mm wide; lip (labellum) concave in natural position, broadly elliptic in outline, deeply 3-lobed, broadly cuneate at base, 1.4-1.8 cm long and 9-13 mm wide across the lateral lobes when expanded; lateral lobes (of lip) white with crimson veins, oblong, obtuse, with the free part 3-6 mm long and 3.3-4.5 mm wide; midlobe (of lip) bright purple, obovate-cuneate, truncate or retuse at apex, undulate on upper margin, with 3 conspicuously white nerves, 7-8.5 mm long and 5-6 mm wide across the apex; lamina prominently nervose, with all the nerves more or less raised and thickened, adorned with 4 or 5 subequal lamellae at the base of the midlobe; column clavate, arcuate, ca. 1.5 cm long. Fruit a pendent, ellipsoid capsule ca. 2 cm long and 0.5 cm wide.

Similar Species: The purplish to purplish-brown leafless stem is shared by most *Hexalectris* and some *Corallorhiza* species in Texas. Curly coral-root is readily distinguished only in flower, when the revolute (curly) tips of the sepals and petals render it unmistakable.

Habitat: In the Chisos Mountains, *Hexalectris revoluta* occurs in humus in oak groves along rocky creekbeds at higher elevations, reportedly in association with *Quercus gravesii*. In the Glass Mountains, it has been found "among lechuguilla and shinnery oak on the sunny slopes and ridges" (Warnock 1977).

Phenology: Usually flowering June-July, sometimes in May when spring rains are abundant (Liggio & Liggio 1999).

Comments: Detection of many *Hexalectris* species requires considerable diligence and a bit of serendipity. The purplish or brownish color of the aerial stems provides surprising effective camouflage from human observers. Moreover, aerial stems are probably not produced every year; individual plants may undergo a year or two of dormancy between flowering episodes.

Illustrations: Line drawings appear in Correll (1978). Color photographs appear in Warnock (1977) and

Luer (1975).

Selected References:

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- Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross State University, Alpine. 276 pp.



Plant saprophytic, erect from a fleshy rhizome, 3-4.5 dm. tall. Stem stout, simple, aphyllous, provided with several short broad clasping sheaths, apparently purplish. Raceme few-

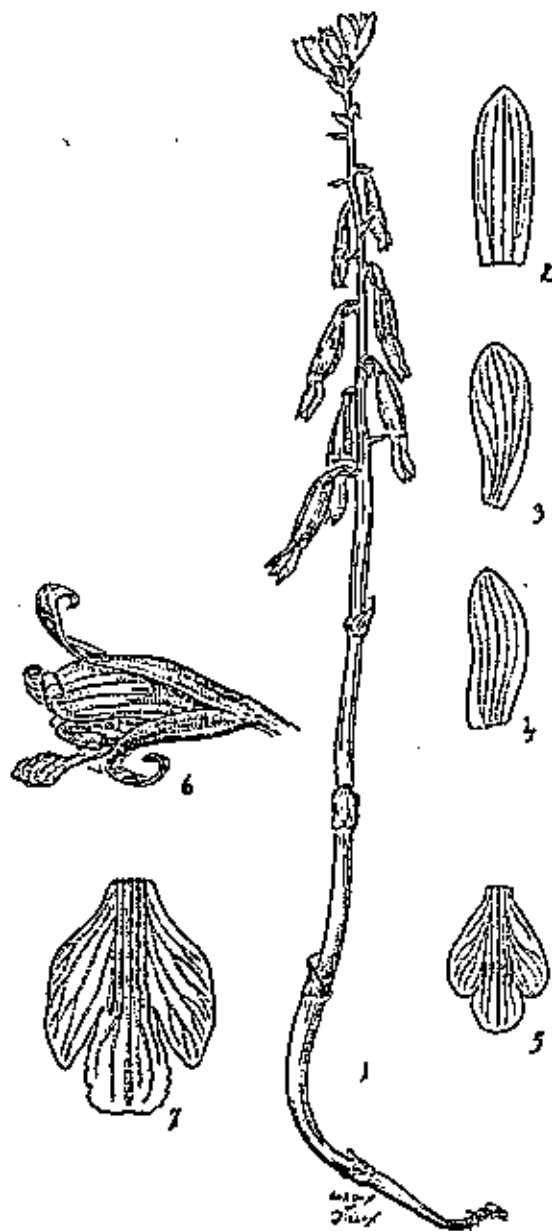
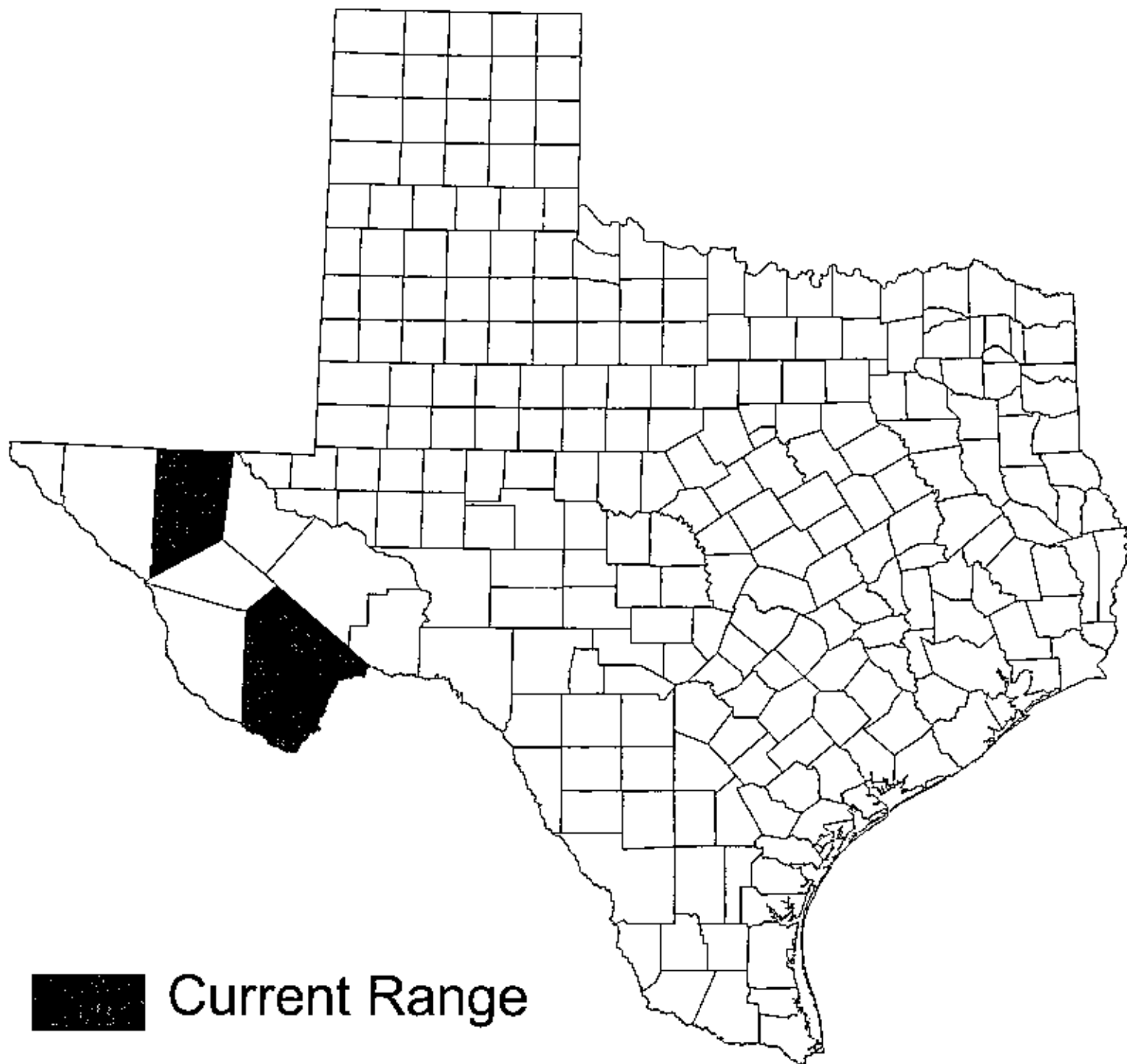


PLATE 125.—*Hexalectris nitida*. 1, plant, two thirds natural size. 2, dorsal sepal, twice natural size. 3, petal, twice natural size. 4, lateral sepal, twice natural size. 5, lip, spread out, twice natural size.

→ *Hexalectris revoluta*. 6, flower, front-side view, in natural position, twice natural size. 7, lip, spread out, twice natural size. Drawn by Gordon W. Dillon.

flowered, up to 12-flowered, 20 cm. or less long. Floral bracts broadly ovate, acute, concave, 1-1.4 cm. long. Flowers with the rather stout pedicellate ovaries about 1.5 cm. long. Sepals and petals usually conspicuously revolute toward the apex, probably purplish (no color notes available). Dorsal sepal oblong-elliptic, bluntly obtuse, concave, 1.6-2.1 cm. long, 3-7 mm. wide.



 Current Range

Hexalectris revoluta
(Chisos coral-root)

Scientific Name: *Hexalectris warnockii* Ames & Correll

Synonyms: None.

Common Name: Warnock's coral-root; Texas purple-spike

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Mountains of northern Coahuila, Baja California, southern Arizona, New Mexico and Trans-Pecos Texas east across the Edwards Plateau to the Dallas area.

State Range: Brewster, Dallas, Gillespie, Hays, Jeff Davis, Presidio, Real, Taylor and Terrell counties.

Description (adapted from Correll 1978; Liggio & Liggio 1999; Luer 1975): Perennial saprophyte from a slender rhizome, with erect aerial stems 1.5-3 dm tall; stem slender, glabrous, maroon to brownish-purple, usually unbranched, leafless but with a few short tubular sheaths. Flowers 8-12 in a terminal raceme up to 12 cm long, subtended by ovate to elliptic, acute, concave bracts 5-9 mm long; pedicels slender, ca. 7 mm long; sepals and petals 3, maroon or purplish, rather shiny; sepals linear-elliptic to linear-oblongate, obtuse to subacuminate, 1.5-1.8 cm long and 3.8-4.5 mm wide at the widest point, the dorsal sepal channeled, the lateral sepals more or less falcate; petals oblongate to linear-spatulate, obtuse to subacute, falcate, 1.6-2.0 cm long, 2.8-3.8 mm wide above the middle; lip (labellum) concave, prominently or shallowly 3-lobed above the middle, suborbicular to broadly cuneate-obovate in outline when expanded, rounded to broadly cuneate at the base, 1.5-1.8 cm long and 1.5-1.6 cm wide across the lateral lobes when spread out, white with the lateral lobes veined with purple, the middle lobe purple at the apex and bearing five parallel longitudinal, ruffled lamellae (ridges), the middle three very conspicuously orange-yellow; lateral lobes obtuse to broadly rounded, upcurved in natural position, the free part up to 4.5 mm long; middle lobe variable, broadly obovate to subquadrate, somewhat emarginate, with the margins crenulate-dentate, 4-6 mm long, 6-11 mm wide. Fruit a pendent, ellipsoid capsule ca. 1.5 cm long.

Similar Species: When in flower this orchid can be distinguished from other Texas *Hexalectris* species by the three prominent lamellae or ridges that run down the center of the middle lobe of the lip.

Habitat: In the mountains of the Trans-Pecos, Warnock's coral-root is found in leaf litter and humus in oak-pinyon-juniper woodlands in higher mesic canyons (up to 6500 ft.), primarily on igneous substrates. Associates in that region include *Quercus gravesii* and other *Quercus* spp., *Arbutus xalapensis*, *Pinus cembroides*, and *Juniperus* spp. In Terrell County it occurs in leaf litter under mottes of *Quercus fusiformis* on terraces of spring-fed perennial streams draining an otherwise rather xeric limestone landscape. On the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County) and on the Edwards Plateau, Warnock's coral-root is found under *Quercus buckleyi*, *Juniperus ashei* and other trees in woodlands on limestone slopes. There is also one record from igneous substrates in the Llano Uplift (northern Gillespie County).

Phenology: Flowering June-August.

Comments: Said by Luer (1975) to be the most frequent and widespread *Hexalectris* species in the Chisos Mountains, a view echoed by Liggio & Liggio (1999).

Illustrations: Line drawings appear in Correll (1978) and Diggs, Lipscomb & O'Kennon (1999). Color

photographs appear in Luer (1975), Rickett (1970), Warnock (1970), Liggio & Liggio (1999), and Diggs, Lipscomb & O'Kennon (1999).

Selected References:

- Correll, D. S. 1978. Native orchids of North America north of Mexico. Stanford University Press, Stanford. 399 pp.
- Diggs, G. M., Jr., B. L. Lipscomb and R. J. O'Kennon. 1999. Shinnery and Mahler's illustrated flora of North-central Texas. Botanical Research Institute of Texas, Ft. Worth. 1626 pp.
- Engel, V. S. 1987. Saprophytic orchids of Dallas. American Orchid Society Bulletin 56(8): 831-835.
- Liggio, J. and A. O. Liggio. 1999. Wild orchids of Texas. University of Texas Press, Austin. 228 pp.
- Luer, C. A. 1975. The native orchids of the United States and Canada excluding Florida. The New York Botanical Garden. 361 pp.
- Rickett, H. W. 1970. Wild flowers of the United States: Texas. Volume 3, parts 1 and 2. McGraw-Hill, New York City.
- Warnock, B. H. 1970. Wildflowers of the Big Bend Country, Texas. Sul Ross State University, Alpine. 157 pp.



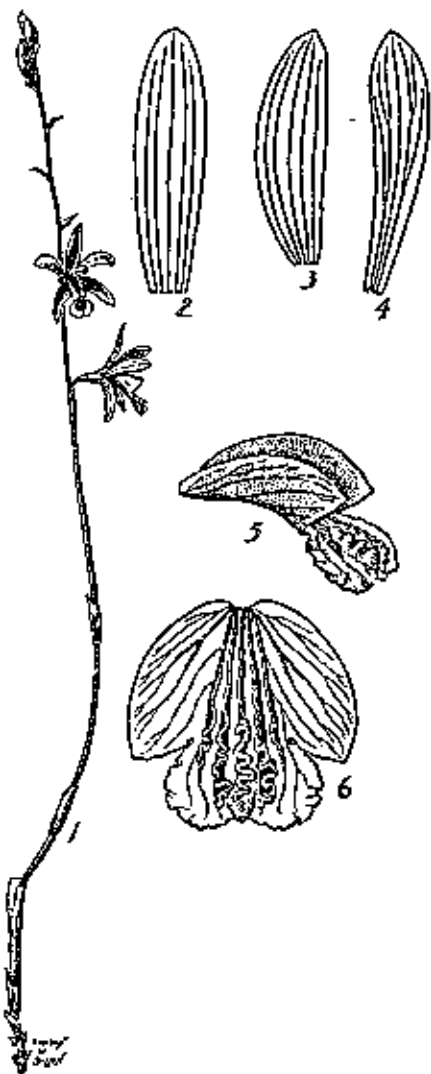
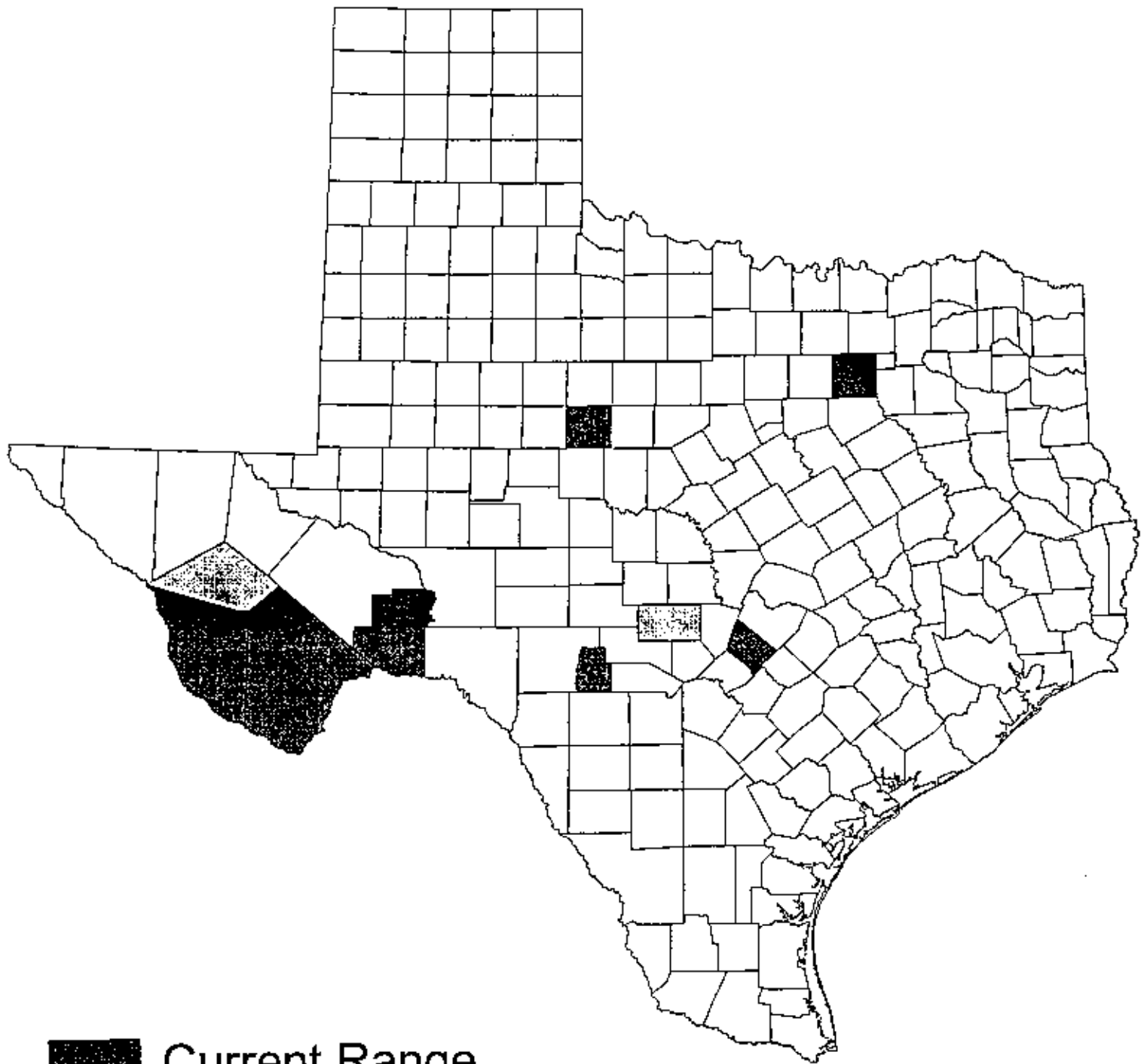


fig. 3,
x2.

possibly not under copyright... but ~~see next slide - Wardell 1931~~ ^{see next!} ~~see next slide - Wardell 1931~~



- Current Range
□ Historical Range
Hexalectris warnockii
(Warnock's coral-root)

Scientific Name: *Hibiscus dasycalyx* Blake & Shiller

Synonyms: None.

Common Name: Neches River rosemallow

Global/State Ranks: G1S1

Federal Status: C1

Global Range: Endemic to east Texas.

State Range: Cherokee, Harrison, Houston and Trinity counties.

Description (adapted from Blanchard 1976 and Warnock 1993): Herbaceous perennial to 0.6-2.3 m tall, with 1-several erect or ascending stems, the stems often strongly branched below, greenish to reddish, glabrous. Leaves alternate, deeply 3-5 lobed, narrowly to broadly triangular in outline, (2-) 3-20 (-12) cm long and 2-11 cm wide, the lobes 3-8 mm wide; middle (terminal) lobe linear to linear-lanceolate, the apex long-acuminate, the margin coarsely and remotely serrate, often with a pair of small lobes at base; lateral lobes similar but shorter, usually with a small secondary lobe near the base on the outer edge; base of the blade cordate to truncate; petiole 3-7 cm long, 1/2 - 3/4 the length of the blade; stipules linear-subulate, 1.5-5 mm long. Flowers solitary in the axils of the upper leaves; peduncles 1-3 cm long, 1/3 - 2/3 the length of the subtending petiole and free from it; involucre bracts 8-14, 16-25 mm long, linear-subulate, 1/2 to slightly exceeding the length of the calyx, with simple erect hairs dorsally and marginally; sepals 5, 2-4 cm long, fused below into a broadly cylindrical-campanulate tube, hispid with long simple hairs, accrescent in fruit, the lobes very broadly triangular, apiculate; petals 5, creamy white with a deep rose spot at the base, ca. 5-9 cm long and 3.5-6 cm wide near the tips, spreading, obliquely obovate or obdektoid, the apex rounded; stamen column included within flower, 25-30 mm long; filaments numerous, 1-2 mm long, the pinkish anthers ca. 1.5 mm long; ovary truncate-conoid, the branched style exceeding the stamen column by 4-10 mm. Fruit a 5-loculed capsule 1.6-2.8 cm long, largely enclosed within calyx prior to dehiscence, the apex rounded-truncate and apiculate, pubescent with simple hairs and shorter stellate and glandular hairs; seeds numerous, globose-reniform, ca. 3.5 mm long, densely stellate-pubescent.

Similar Species: Two other "swamp-mallows", *Hibiscus moscheutos* and *H. laevis* (*H. militaris*), occur in east Texas. *H. moscheutos* has unlobed leaves and is thus not likely to be confused with *H. dasycalyx*. *H. laevis* has deeply 3-lobed leaves, but its lobes are broader (8-50 mm wide) than those of *H. dasycalyx* (3-8 mm wide). The calyx of *H. laevis* is glabrous or nearly so, while that of *H. dasycalyx* is consistently hirsute (Warnock 1993).

Habitat: Usually in alluvial soils in swamps or margins of riparian woodlands, most often near standing rather than flowing water, in soils that are usually wet in winter and surficially dry in summer (Warnock 1993).

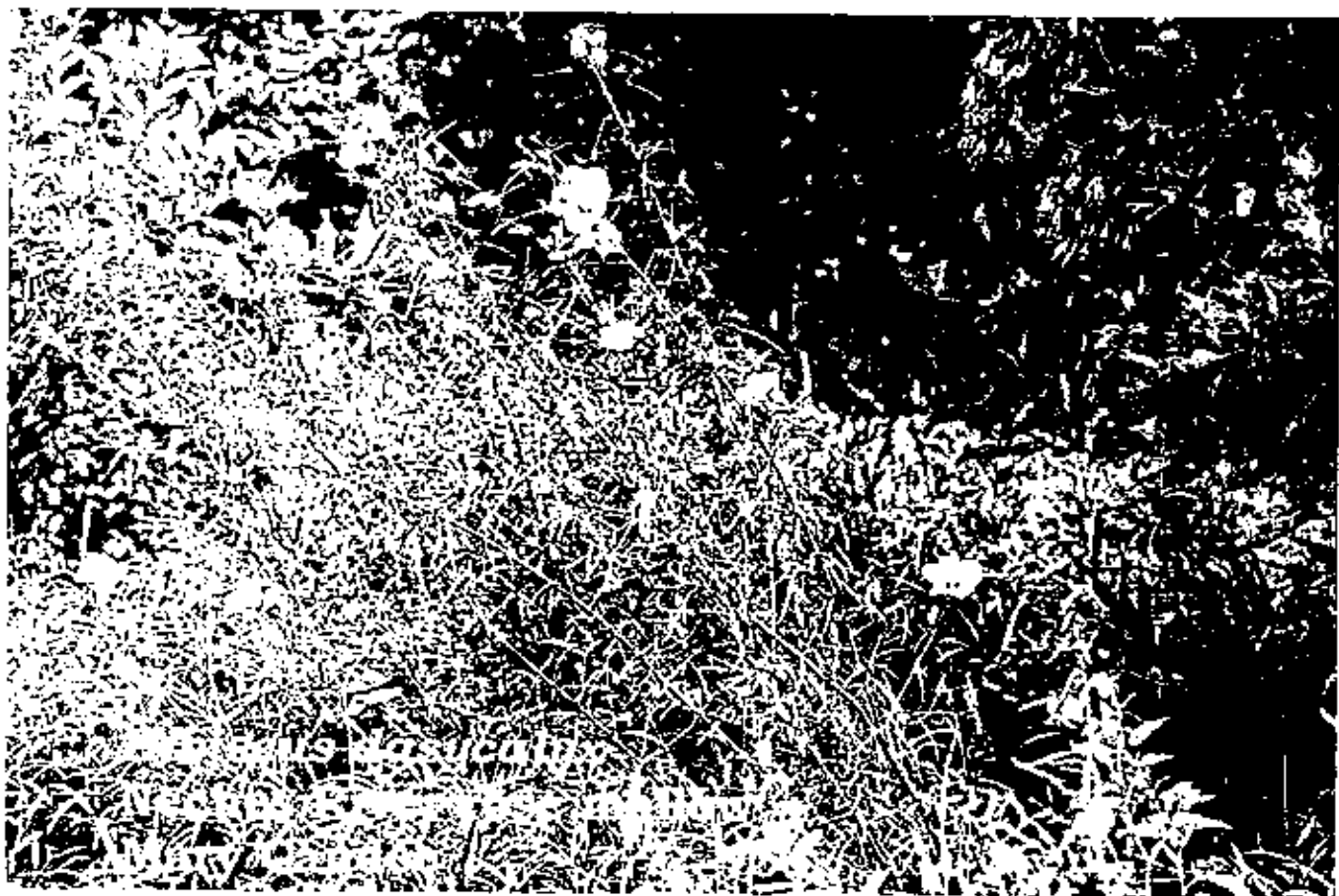
Phenology: Flowering June-August.

Comments:

Illustrations: Line drawings appear in Blake (1958), Correll & Correll (1975) and Nixon & Cunningham (1985).

Selected References:

- Blake, S. F. 1958. Two species of *Hibiscus* from Texas. *Journal of the Washington Academy of Sciences* 48(9): 277-278.
- Blanchard, O. J., Jr. 1976. A revision of species segregated from *Hibiscus* sect. *Trionum* (Medicus) de Candolle *sensu lato* (Malvaceae). Ph.D. dissertation, Cornell University, Ithaca.
- Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. Stanford University Press, Stanford. 2 volumes. 1777 pp.
- Kennedy, K. L. and J. M. Poole. 1990. Status report on *Hibiscus dasycalyx* (Neches River rose-mallow). Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Nixon, E. S. and B. L. Cunningham. 1985. Trees, shrubs, and woody vines of East Texas. B. L. Cunningham Productions, Nacogdoches. 240 pp.
- Warnock, M. J. 1993. Draft status report on *Hibiscus dasycalyx*. Report prepared for U. S. Fish and Wildlife Service, Albuquerque.



Hibiscus dasycalyx
Mary Candee

Neches River rose mallow



-1. *H. dasycalyx*.
2. *H. militaris*.

cuneate at apex; capsules
 le tawny hairs.....

-3. *H. cubensis*.
 = at apex; capsules short

7 cuneate to rounded at
 us above, gray-pannose
4. *H. Moscheutos*.
 ate at base, permanently
 or less pubescent (5)

subsimpl hairs; bractlets
 addition to being shortly
 y villous-hirsute.....

-5. *H. lasiocarpus*.
 (late pubescence; bractlets
 ally glabrescent.....
6. *H. leucophyllus*.

terete, glabrous, about 3
 ves with slender petioles
 3, 3-10 cm. wide at base
 6 m. wide) and usually
 pper. at axils; peduncles
 ng hairs above; bractles
 d margins densely hirsute,
 .5 mm. wide; calyx about
 sute on outside, densely
 the lobes deltoid-apiculate
 hen dry about 6 cm. long,
 llowish-pilose; styles free

Tex., May-July; endemic.
 RD-LEAVED ROSE-MALLOW.

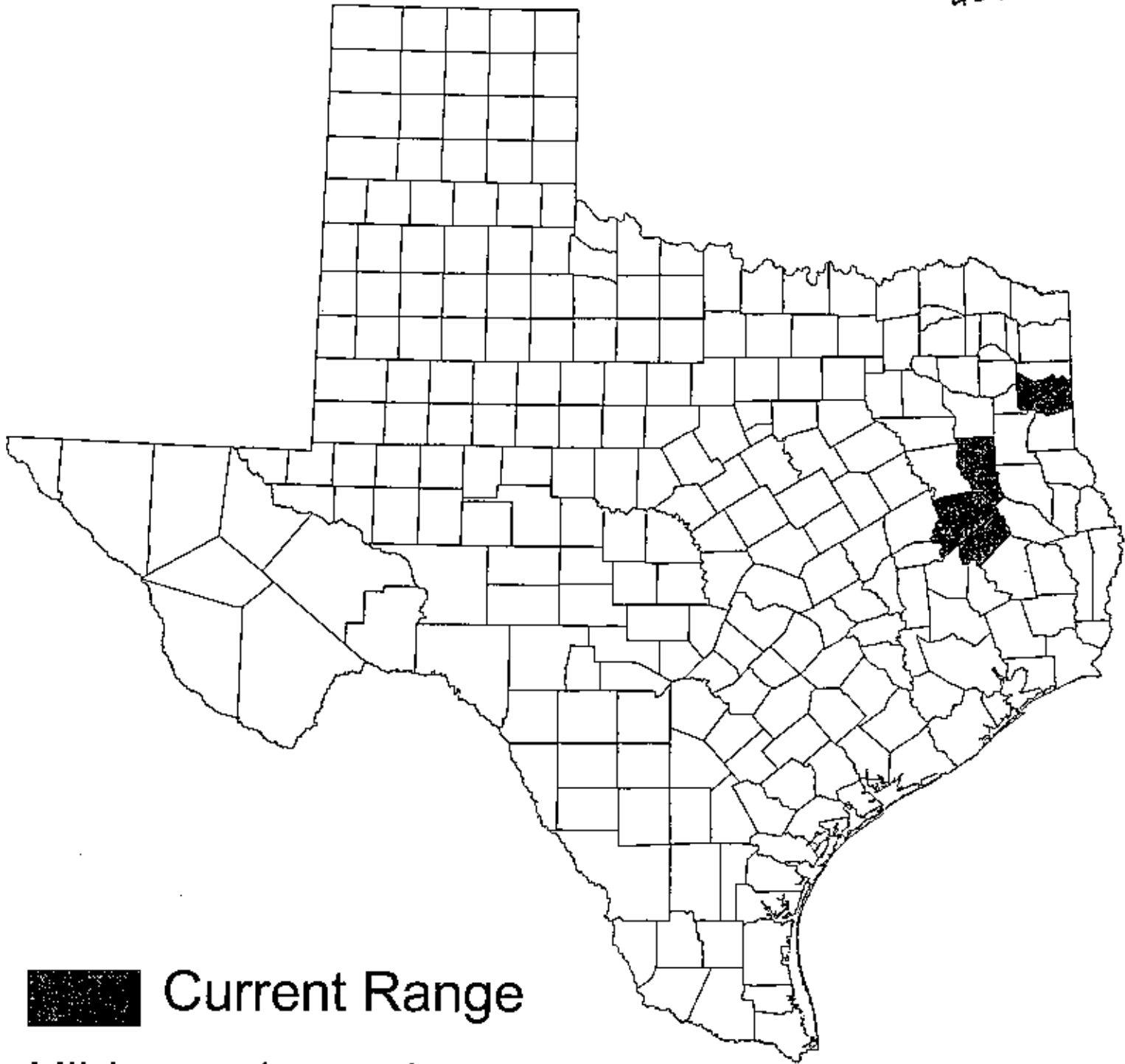
25 dm. high, essentially
 nore, triangular-hastate in
 d) widely divergent, the
 e body of the leaf; bract-
 1. long; calyx glabrous or
 plish base, 6-8 cm. long;
 reddish-brown hairs.

ms in e. and n.-cen. Tex.
 lle, May-Nov.; from Fla.

linous throughout (except
 o the petioles and pedun-
 eading (at length) corky-



Fig. 521: *Hibiscus dasycalyx*: a, top of plant, x 1/6; b, corolla, x 1/6; c, calyx spread out, inner view, x 1/6; d, calyx, x 1/6. (From Blake & Schiller in *Jour. Wash. Acad. Sci.* 48: 278. 1958).



■ Current Range

Hibiscus dasycalyx
(Neches River rose-mallow)

Scientific Name: *Hoffmannseggia tenella* Tharp & L. O. Williams

Synonyms: None.

Common Name: slender rushpea

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: Endemic to South Texas.

State Range: Kleberg and Nueces counties.

Description (adapted from Correll & Johnston 1970 and Isely 1975): Glandless herbaceous perennial with several spreading to stems from a woody taproot, 8-15 cm tall. Leaves alternate, bipinnately compound, with 3-7 pinnae on a short rachis at the end of a petiole 5-13 cm long, the pinnae composed of 5-6 pairs of leaflets, the terminal leaflet absent; leaflets elliptic or oblong, 2-4 mm long and 1-2 mm wide, glabrous on upper surface, sparingly soft-pubescent on lower surface; stipules ovate, ca. 2 mm long. Flowers 3-6 in a small terminal raceme; pedicels 2-3 mm long; calyx 3-4 mm long, the 5 subequal lobes linear-oblong, finely but densely pubescent; petals 5, yellow-orange to reddish-orange, obovate, with a very short claw, 3-4 mm long and 1.5-2 mm wide; stamens 10, free. Fruit a flattened pod 12-15 mm long and 4-6 mm wide, finely and rather densely pubescent, apiculate, containing 2-4 seeds.

Similar Species: Several other legumes in the Coastal Bend area have evenly bipinnate leaves that might be confused with those of *Hoffmannseggia tenella*. *Caesalpinia drummondii* has a lunate rather than straight pod. *Hoffmannseggia glauca* is similar but has a very glandular calyx. Several *Desmanthus* species occur in the area, often with *H. tenella*, but all have tiny white flowers arranged in globose heads. Even *Prosopis reptans* can send up a false alarm until one noticed that its stem bears paired straight spines.

Habitat: Coastal prairie grasslands on level uplands and on gentle slopes along drainages, usually in areas of shorter or sparser vegetation. Soils at known sites are often described as "blackland clay," but at some sites, particularly those on somewhat eroded slopes, the soil is of a coarser texture and lighter color than the typical heavy dark clay of some regional coastal prairies. Associates include native shortgrasses such as *Buchloe dactyloides*, *Bouteloua rigidisetata* and *Aristida* spp. and taller native grasses such as *Trichloris pluriflora* and *Stipa leucotricha*. The endangered South Texas ambrosia (*Ambrosia cheiranthifolia*) is present at several sites. Exotic perennial midgrasses, most notably *Dichanthium annulatum* and *Pennisetum ciliare*, are a threat to some populations.

Phenology: Flowering April-November.

Comments: Listed as Endangered on 1 November 1985.

Illustrations: Line drawings appear in Mahler (1982) and Poole & Riskind (1987). A color photograph appears in Poole & Riskind (1987).

Selected References:

Isely, D. 1975. Leguminosae of the United States: II. Subfamily Caesalpinoideae. *Memoirs of the New*

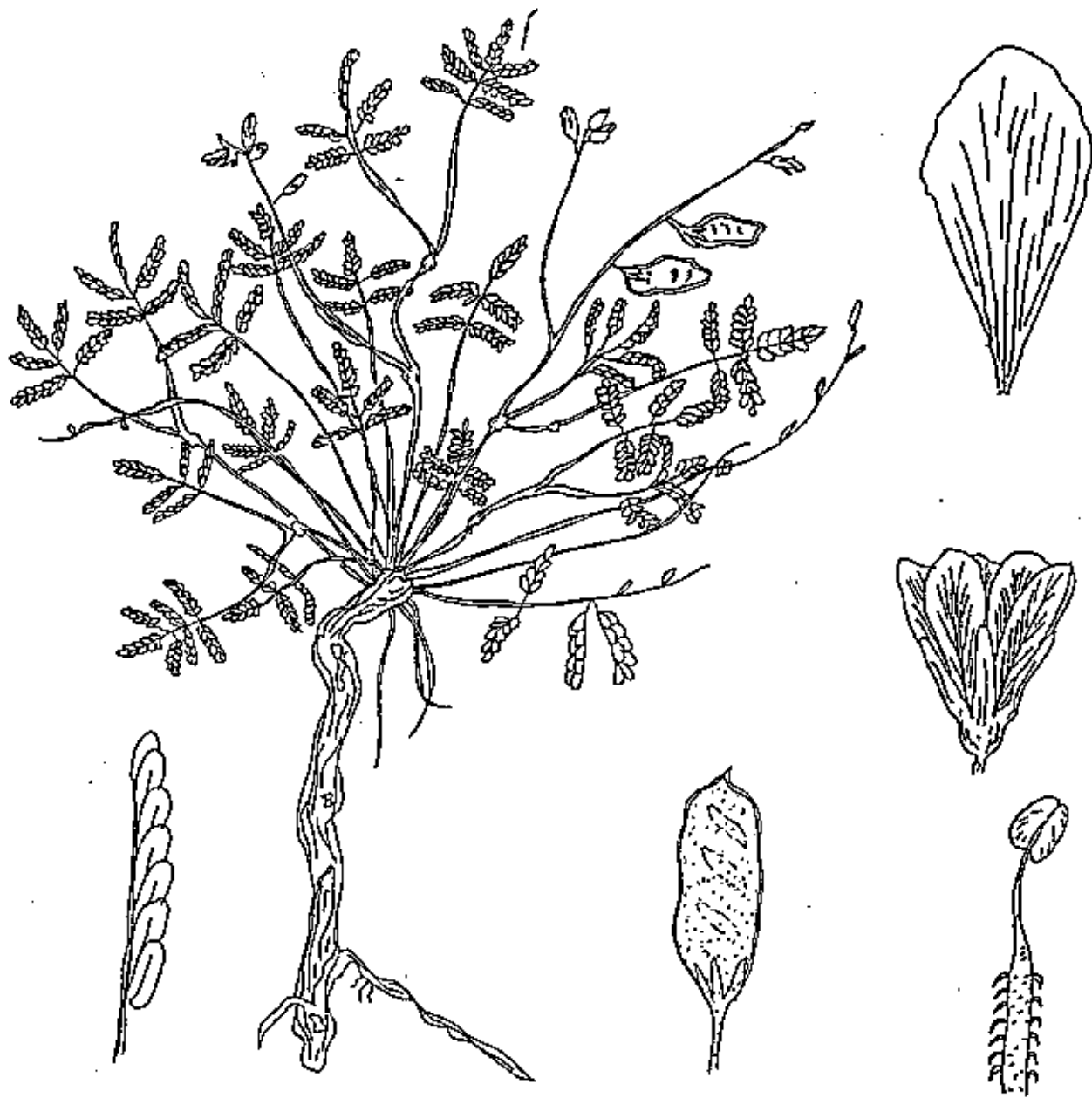
York Botanical Garden 25: 1-228.

Mahler, W. F. 1982. Status report [on *Hoffmanseggia tenella*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

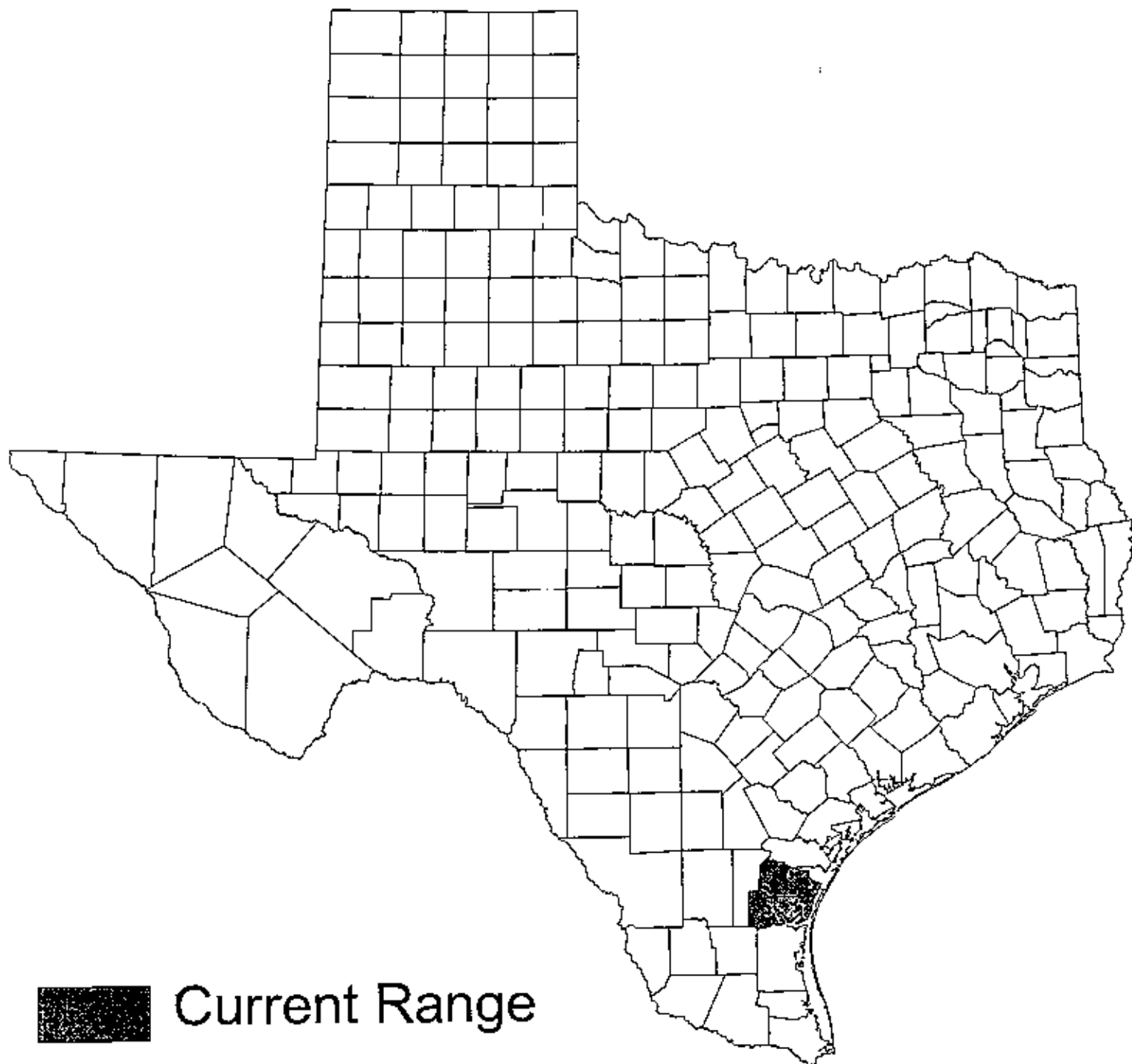
Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.

U.S. Fish & Wildlife Service. 1988. Slender rush-pea (*Hoffmannseggia tenella*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.





Hoffmannseggia tinella
Muhl. Status report



 Current Range

Hoffmannseggia tenella
(slender rush-pea)

Scientific Name: *Houstonia correllii* (W. H. Lewis) Terrell

Synonyms: *Hedyotis correllii* W. H. Lewis

Common Name: Correll's bluet

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to south Texas.

State Range: Known only from Zapata County.

Description (adapted from Lewis 1972; Terrell 1996): Annual with prostrate stems up to 12 cm long, forming mats up to 13 cm wide; dichotomously branched, somewhat scabrous, from a slender taproot. Leaves basal and cauline; basal and lower cauline leaves thin, narrowly spatulate, to 35 cm long and 3 mm wide, slightly mucronate or scaberulous; median and upper cauline leaves opposite, simple, linear, to 12 mm long and 1 mm wide, mucronate or scaberulous, apiculate at apex; stipules (1-) 1.5-2 mm long, 2-3.5 mm wide, white, broadly sheathing, entire or the margins irregularly dentate with a few stalked glands. Flowers 1-3 at most nodes, on peduncles to 6 mm long; calyx fused below, glabrous or scaberulous, the 4 lobes narrow, 1-1.5 mm long, glabrous or scaberulous, persistent; corolla white, funnellform to more or less rotate, papillose within, the tube ca. 1 mm long and the 4 lobes 3-4 mm long; stamens 4, adnate to corolla, of differing lengths, 0.5 mm long and included within corolla tube on long-styled "pin" flowers but 1-1.5 mm long and exerted on short-styled "thrum" flowers; ovary inferior in flower but elongating and becoming mostly superior in fruit; styles of differing lengths, either 1.5-2 mm long (in "pin" flowers) or less than 1 mm long (in "thrum" flowers), the stigma bifurcate. Fruit a pedicellate two-lobed capsule 1.0-2.6 mm long and 1.5-3.0 mm wide, densely puberulent, notched at the apex between the lobes, each lobe usually containing 3 seeds; pedicel often recurved; seeds 1-1.3 mm long and 0.5 mm wide.

Similar Species: *Houstonia humifusa* (*Hedyotis humifusa*) is the only other annual, heterostylous (flowers of two types, with styles of 2 different lengths) *Houstonia* species in Texas. In *H. humifusa*, the calyx lobes are 1.0-1.7 mm long; the corolla is 3.5-10.0 mm long, with the tube and lobes more or less equal in length. In *H. correllii*, the calyx lobes are 0.5-2.5 mm long; the corolla is 1.5-4.0 mm long, with the lobes 2-4 times longer than the tube (Terrell 1996).

Habitat: Sandy soils in openings in mesquite woodlands or thorn shrublands.

Phenology: Collections by Edward Terrell on 14 March 1990 were of flowering material. The only other known collection, the type specimen (Correll 32250), was collected 16 March 1966.

Comments: A recently described, very poorly known ephemeral annual that should be sought in early March in sandy soils elsewhere in southern Texas.

Illustrations: Line drawings appear in Lewis (1972).

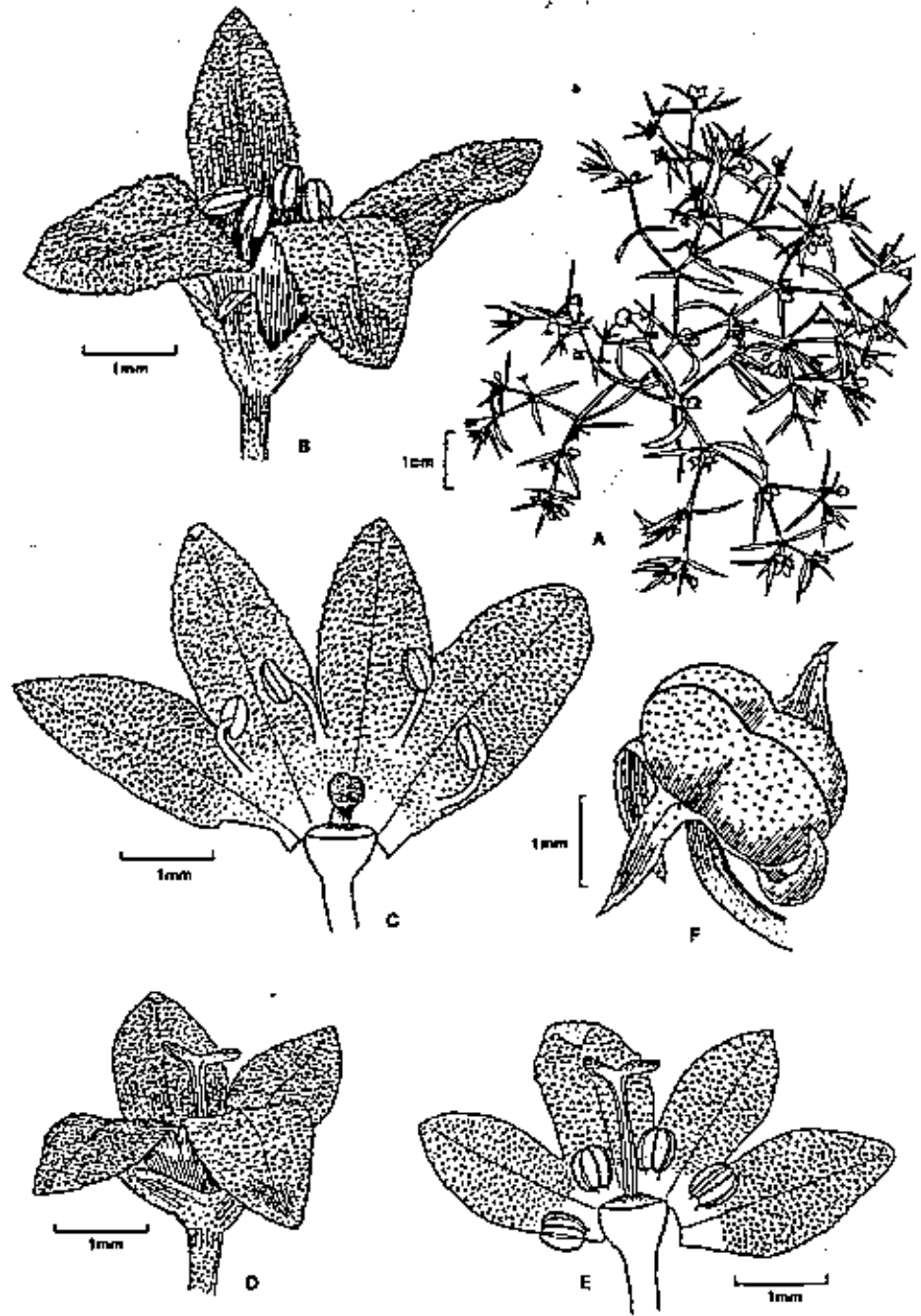
Selected References:

Lewis, W. H. 1972. *Hedyotis correllii* (Rubiaceae), a new Texas species. *Brittonia* 24: 395-397.

Terrell, E. E. 1975. New combinations in *Houstonia* (Rubiaceae). *Phytologia* 31: 425-426.

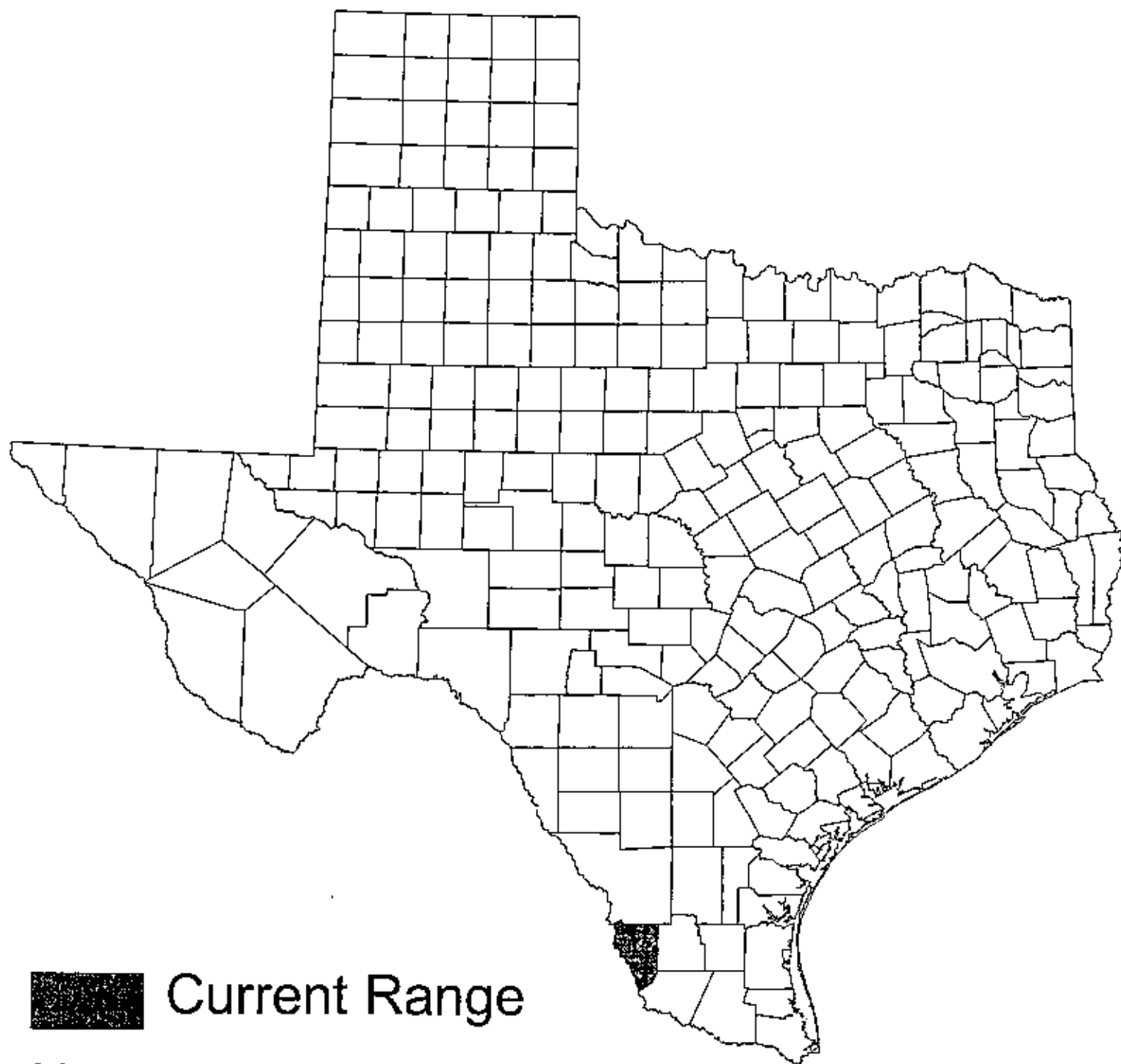
Terrell, E. E. 1996. Revision of *Houstonia* (Rubiaceae-Hedyotideae). *Systematic Botany Monographs* 48: 1-118.





Cathy Pasquale

FIG. 31. *Houstonia correllii*. A. Habit. B. Thrum flower. C. Thrum flower, part of the corolla tube removed. D. Pin flower. E. Pin flower, part of the corolla tube removed. F. Capsule. (Based on Terrell & Terrell 5535.) Drawing by Cathy Pasquale.



■ Current Range

Houstonia correllii
(Correll's bluet)

Scientific Name: *Hymenopappus biennis* B. L. Turner

Synonyms: None.

Common Name: biennial woollywhite

Global/State Ranks: G3S2

Federal Status: None.

Global Range: Mountains of New Mexico and west Texas.

State Range: Known in Texas only from the Guadalupe Mountains of Culberson County.

Description (adapted from Correll & Johnston 1970): Biennial 6-10 dm tall; stems single from a taproot, much-branched and leafy, tomentose to nearly glabrate. Leaves basal and cauline; basal rosette leaves 6-16 cm long and 3-6 cm wide, bipinnately dissected into linear, mostly flattened ultimate segments 6-20 mm long and 1-3 mm wide, sparsely tomentose to nearly glabrate, conspicuously impressed-punctate; cauline leaves 10-40, gradually reduced upward, the upper leaves only once-pinnately dissected into linear segments. Flower heads in a large, much-branched cymose aggregation, 20-40 per stem, 4-60 flowered, on ultimate peduncles 1-6 cm long; principal phyllaries 5-8 mm long and 3-5 mm wide, sparsely tomentose to glabrate, yellow-membranous for 1-2 mm from the acute to obtuse tip; ray flowers 8, pistillate and fertile, tubular at the base for about 2 mm, extending into a conspicuous white ray 14-16 mm long and 6-8 mm wide, not cleft at the apex or only slightly so; disk flowers yellow, 3-3.5 mm long, the tube densely glandular and 1.5 mm long, the throat campanulate and 1.5-2 mm long, the 5 lobes reflexed. Achenes black, glabrous or with a few sessile glands near the apex, 4 mm long, obpyramidal, 4-sided, those along the periphery of the head somewhat incurved; pappus absent or of minute scales up to 0.2 mm long.

Similar Species: None. This is the only *Hymenopappus* species in Texas with ray flowers.

Habitat: Grasslands and open pine-juniper-oak woodlands on rocky calcareous soils above 6000 feet. Associates include *Acer grandidentatum*, *Arbutus xalapensis*, *Berlandiera lyrata* var. *macrophylla*, *Juniperus deppeana*, *Pinus cembroides*, *P. ponderosa*, *Piptochaetium fimbriatum*, *Pseudotsuga menziesii*, and *Quercus gambelii*.

Phenology: Flowering July-October.

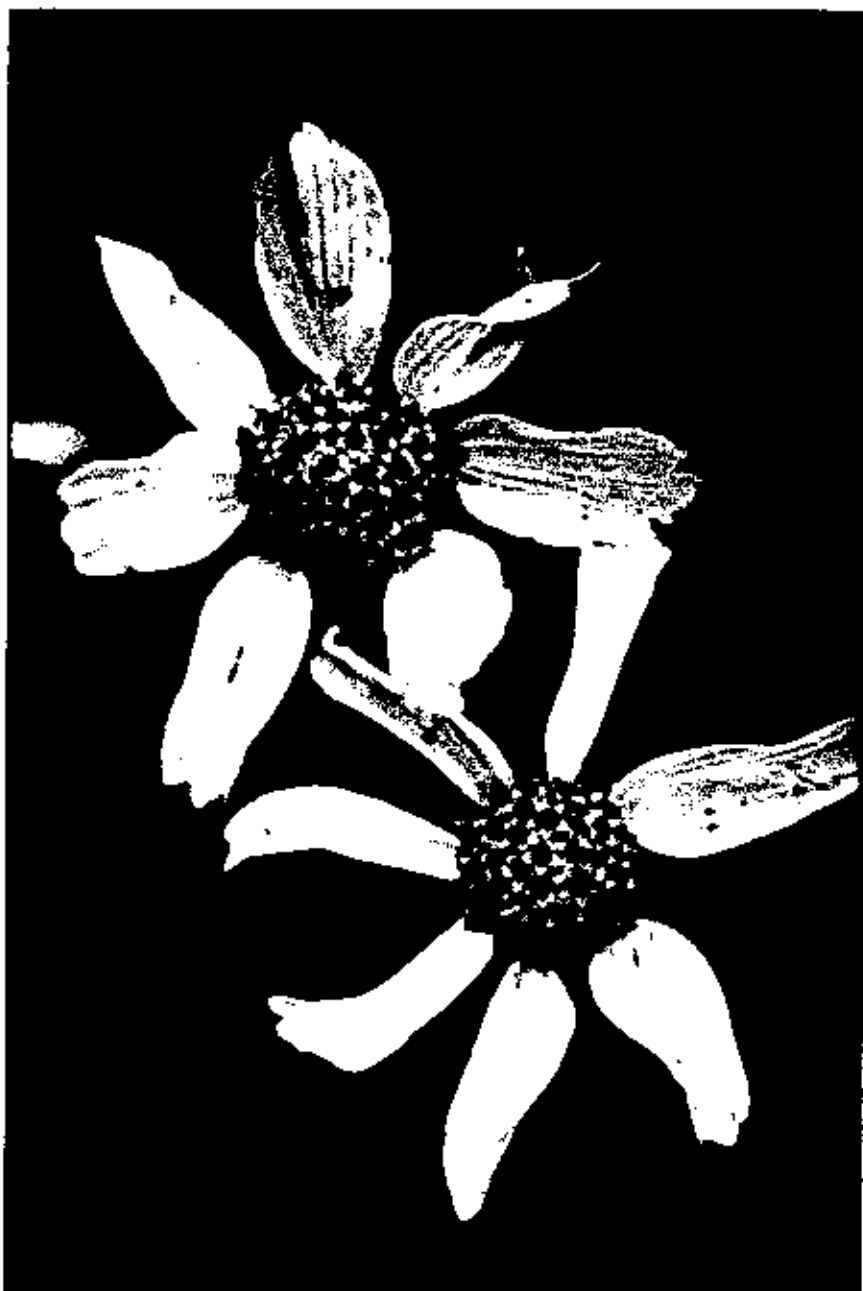
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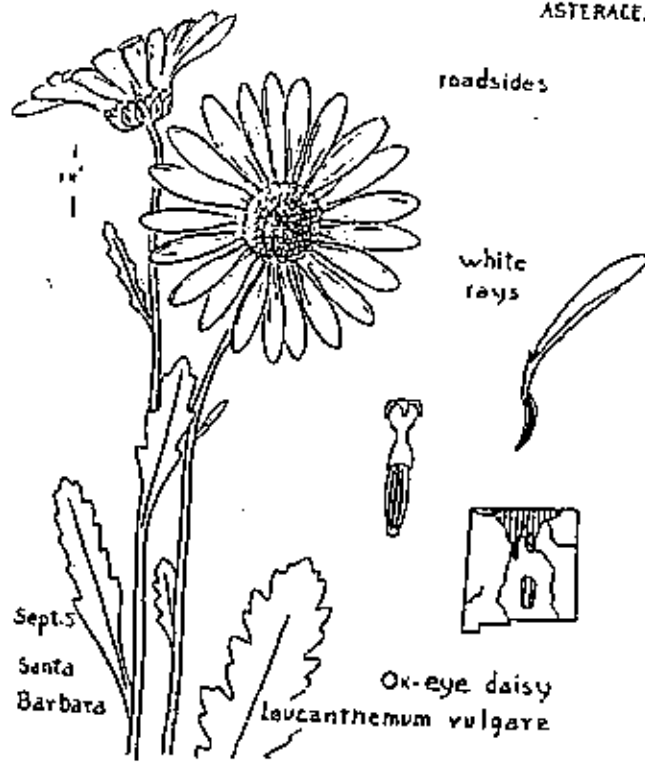
Illustrations: A color photograph appears in Warnock (1974). A line drawing appears in Ivey (1995).

Selected References:

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Ivey, R. D. 1995. Flowering plants of New Mexico. Third edition. Published by the author, Albuquerque, New Mexico.

- Turner, B. L. 1956. A cytotaxonomic study of the genus *Hymenopappus* (Compositae). *Rhodora* 58: 163-186; 208-242; 251-269; 295-308.
- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.





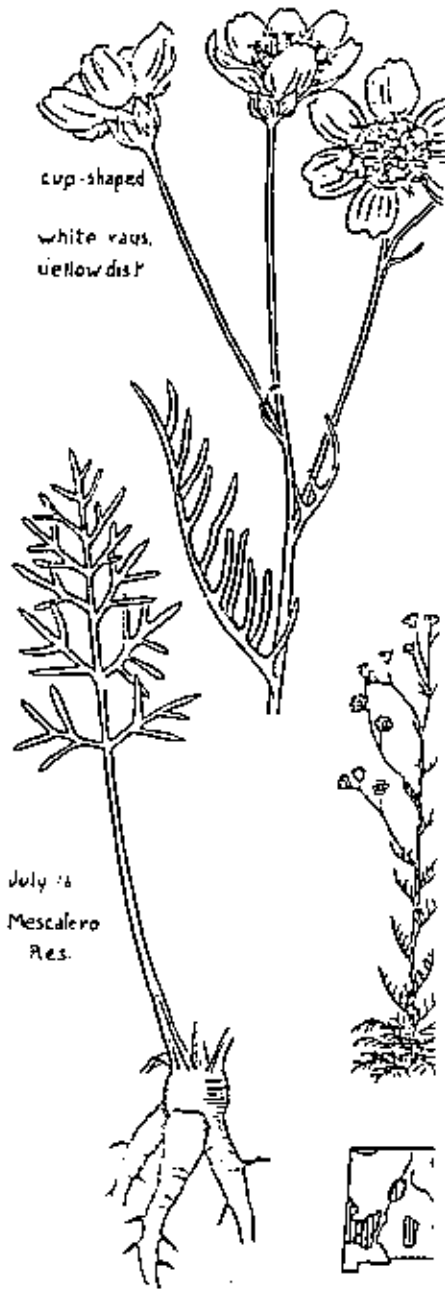
Sept. 5
Santa
Barbara

roadsides

white
rays



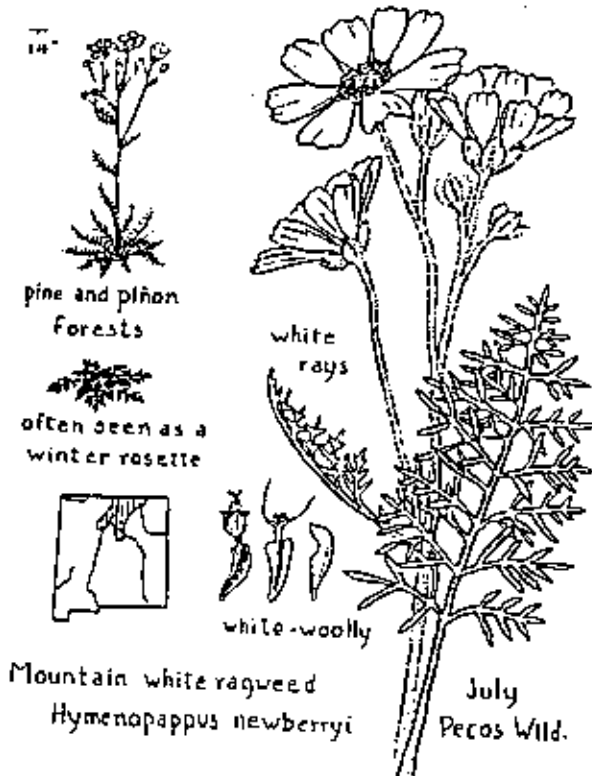
Ox-eye daisy
Leucanthemum vulgare



cup-shaped
white rays,
yellow disk

July 16
Mescalero
Res.

Biennial white ragweed
Hymenopappus biennis



pine and piñon
forests

often seen as a
winter rosette



white
rays

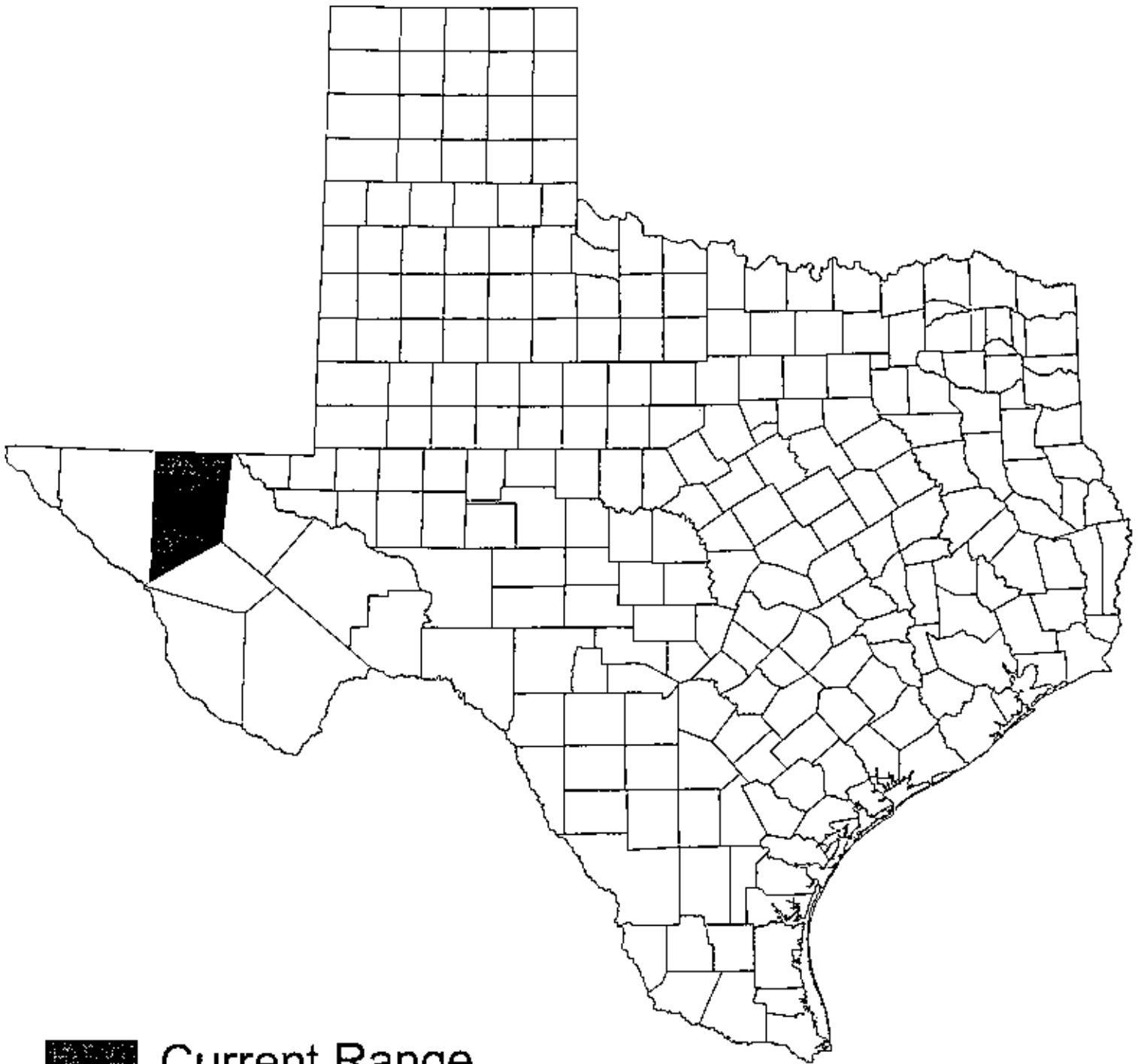


white-woolly

Mountain white ragweed
Hymenopappus newberryi

July
Pecos Wild.

From Ivey, R.D. Flowering Plants of New Mexico, 3rd ed. Published by the author. Albuquerque, NM 1995



■ Current Range

Hymenopappus biennis
(biennial woollywhite)

Scientific Name: *Hymenopappus carrizoanus* B. L. Turner

Synonyms: None.

Common Name: sandhill woollywhite

Global/State Ranks: G2S2

Federal Status: None.

Global Range: Endemic to the post oak belt of central and southern Texas.

State Range: Anderson, Atascosa, Bexar, Caldwell, Frio, Guadalupe, Leon, Medina and Robertson counties.

Description (adapted from Turner 1989): Stiffly erect biennial with stems up to 1.5 m tall, the stems about equally leafy throughout. Leaves finely bipinnately dissected, the ultimate segments mostly 0.4-1.0 mm wide, the total length at midstem 6-12 cm long, becoming gradually smaller upward along stem. Flower heads discoid (ray florets absent), numerous in terminal bractless corymbose panicles 15-30 cm across, the ultimate peduncles mostly 2-5 cm long; involucre campanulate, 6-7 mm high, the phyllaries subequal, broadly obovate with scarious margins apically, the outer faces tomentulose, the vestiture concealing short glands; receptacle naked; disc florets 20-40, the corolla white, 3-4 mm long. Achenes narrowly obpyramidal, ca. 4 mm long and 1 mm wide, pubescent with spreading hairs 0.4-0.8 mm long; pappus of ca. 20 obovate scales 1.0-1.5 mm long.

Similar Species: *Hymenopappus tenuifolius* is very similar and can be distinguished from *H. carrizoanus* by characters provided by Turner (1989). In *H. carrizoanus*, the stems are about equally leafy throughout, and the leaves are not much reduced upward; the involucre is tomentulose throughout, and the corolla throat is funnelliform. In *H. tenuifolius*, the stems are leafy below, but the leaves are much reduced upward; the involucre is variously pubescent to glabrate, not tomentulose throughout, and the corolla throat is campanulate.

Habitat: Disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations.

Phenology: Flowering late spring-early summer.

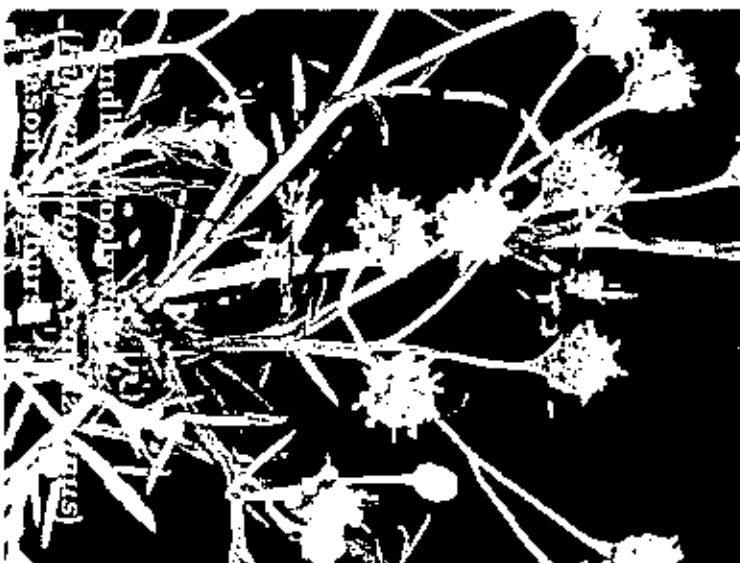
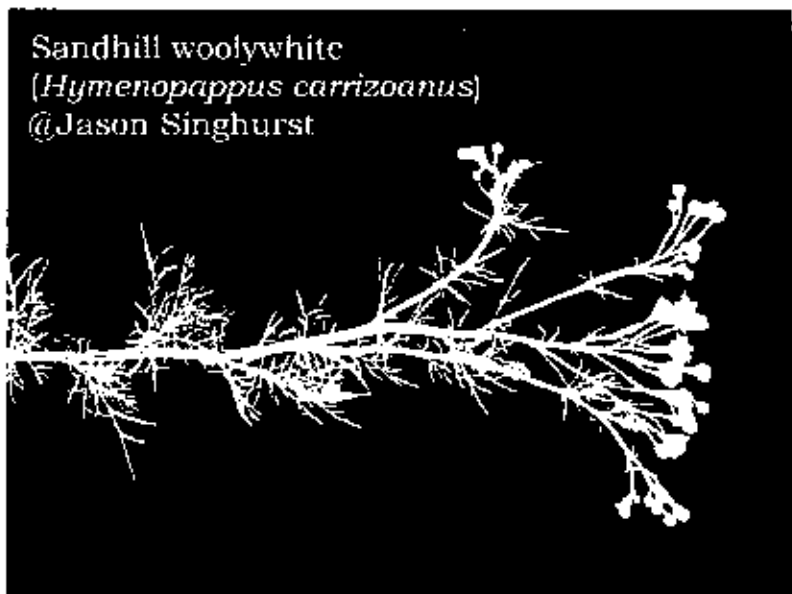
Comments: Known to hybridize with *H. artemisiifolius* (Turner 1989).

Illustrations: None known.

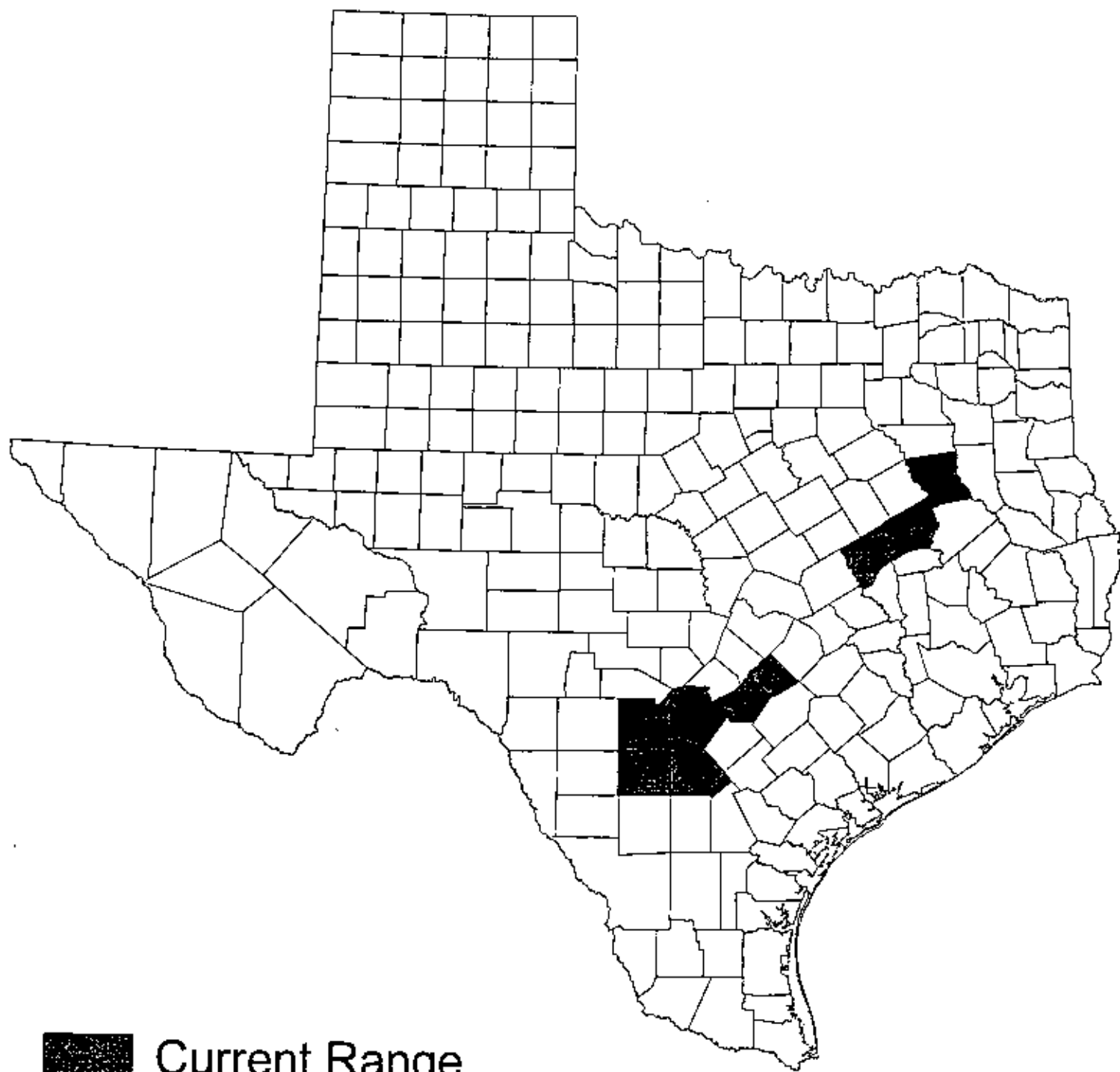
Selected References:

- Turner, B. L. 1956. A cytotaxonomic study of the genus *Hymenopappus* (Compositae). *Rhodora* 58: 163-186; 208-242; 250-269; 295-308.
- Turner, B. L. 1989. *Hymenopappus carrizoanus* (Asteraceae-Helenieae), a new species from the Carrizo Sands of central Texas. *Phytologia* 67(4): 293-296.

Sandhill woollywhite
(*Hymenopappus carrizoanus*)
@Jason Singhurst



Sandhill woollywhite
(*Hymenopappus carrizoanus*)
@Jason Singhurst



■ Current Range

Hymmenoppus carizoanus
(sandhill woollywhite)

Scientific Name: *Hymenoxys texana* (Coul. & Rose) Cockerell

Synonyms: *Actinella texana* Coul. & Rose; *Picradenia texana* (Coul. & Rose) Greene; *Actinea texana* (Coul. & Rose) Cory

Common Name: prairie dawn, Texas bitterweed

Global/State Ranks: G2S2

Federal Status: Endangered

Global Range: Endemic to the Gulf Coastal Plain of southeast Texas.

State Range: Fort Bend and Harris counties. A specimen collected in 1830 (Palmer 742) has been attributed to La Salle County but is probably erroneous as to location.

Description (adapted from Bridges 1988): Tiny taprooted annual; stems 1-5, 2.5-18 cm tall, erect to spreading, branching distally, arising from a rosette of somewhat fleshy leaves; stems and leaves slightly to moderately densely pubescent with scale-like trichomes. Leaves mostly basal, those of stem relatively few; rosette leaves spatulate, 3-nerved on lower surface, to 4 cm long and 1-15 mm wide; margins pinnately lobed in the upper half, the lobes blunt, 1-4 mm long, larger lobes sometimes with secondary lobes; cauline leaves few, remote, much smaller than basal leaves, the larger ones with 1-4 marginal teeth, the upper ones usually entire; both surfaces glandular-punctate. Flower heads terminal at the end of branches, containing both disk and ray flowers; involucre 5-6 mm long, the phyllaries in 2 series; outer phyllaries 8, 4-5 mm long, united at base, free for most of length, a pale, broad medial rib extending to ca. 1 mm below the apex; inner phyllaries 8, free, 5-6 mm long, acuminate, often with a small purple spot at the apex; receptacle high-conical; ray flowers minute, pistillate, mostly shorter than the phyllaries and concealed by them; the tube yellow, 1.5-2 mm long, the blade 0.8-1 mm long, white to yellow, shallowly 3-lobed; disk flowers 3-4 mm long; the tube pale yellow, the 5 lobes deep yellow, glabrous. Achenes ca. 2 mm long, compressed to quadrate or somewhat terete, with ascending trichomes; pappus of 5 scales 1-2 (-2.4) mm long, glabrous, broadly to narrowly obovate, the apex aristate.

Similar Species: None. Texas prairie dawn bears no resemblance to weedy *Hymenoxys* species.

Habitat: Poorly drained sparsely vegetated areas ("slick spots") at the base of mima (pinple) mounds in open grassland or almost barren areas on slightly saline soils which are sticky when wet and powdery when dry. Typical or interesting associates include *Agrostis elliotiana*, *Centunculus minimus*, *Chaetopappa asteroides*, *Crassula aquatica*, *Evax verna*, *Gratiola flava*, *Guilleminea lanuginosa*, *Hordeum pusillum*, *Krigia occidentalis*, *Limnoscium pinnatum*, *Plantago aristata*, *P. hybrida*, *Schedonnardus paniculatus*, *Sida ciliaris*, *Spartina spartinae*, and *Willkommia texana*, as well as the rare coastal plain endemics *Chloris texensis*, *Machaeranthera aurea* and *Thurovia triflora* (Bridges 1988).

Phenology: Flowering March-early April. In late winter and early spring, *Hymenoxys texana* is often the visual dominant of its microhabitat, with most associates being diminutive winter annuals. By summer, most of these species are senescent, and low, prostrate, xeric-adapted perennials are conspicuous (Bridges 1988).

Comments: Listed as Endangered on 13 March 1986.

Illustrations: Line drawings appear in Mahler (1983) and Poole & Riskind (1987). Color photographs appear in Poole & Riskind (1987) and Tveten and Tveten (1993).

Selected References:

- Bridges, E. L. 1988. Endangered species information system species workbook for *Hymenoxys texana*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Mahler, W. F. 1982. Status report [on *Hymenoxys texana*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Mahler, W. F. 1983. Rediscovery of *Hymenoxys texana* and notes on two other Texas endemics. *Sida* 10(1): 87-91.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Tveten, J. L. and G. A. Tveten. 1993. Wildflowers of Houston. Rice University Press, Houston. 309 pp.
- U.S. Fish & Wildlife Service. 1989. *Hymenoxys texana* recovery plan. U.S. Fish & Wildlife Service, Albuquerque.



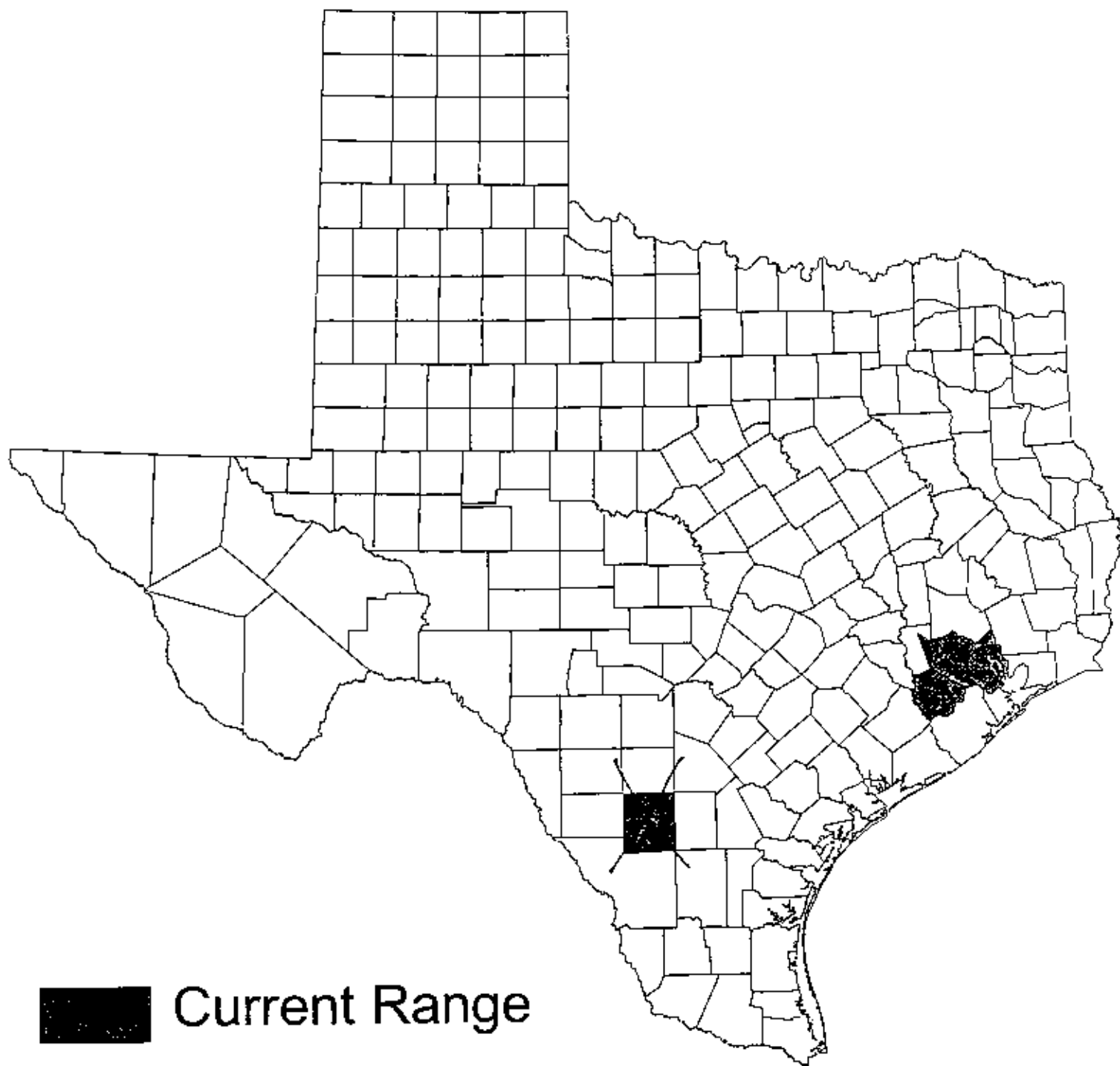
Hymenoxys texana (Texas prairie daisy) Harris County. By Jackie M. Poole



Hymenoxys texana (Texas prairie daisy) Harris County. By Jackie M. Poole



Hymenocys flexuosus
 Muell. - Status Recept.



■ Current Range

Hymenoxys texana
(Texas prairie dawn)

Scientific Name: *Isoetes lithophila* Pfeiffer

Synonyms: None. The epithet is frequently but erroneously spelled "lithophylla."

Common Name: rock quillwort

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Central Mineral Basin (Llano Uplift) of central Texas.

State Range: Burnet, Gillespie, Llano and Mason counties.

Description (adapted from Correll & Correll 1975; Pfeiffer 1922; Taylor et al. 1993): Plants perennial, stemless, consisting of a tuft of quill-like leaves emerging from a globose corm-like rootstalk, the leaf bases concealing the sporangia. Leaves drought-deciduous, bright green, light brownish toward base, spirally arranged, linear, reminiscent of the culms of small *Eleocharis* species, usually 8-10 (-12) cm long, very rarely up to 20 cm long, ca. 1 mm in diameter. Sporangium in a cavity on the inner surface of the leaf base, 2.5-4.0 mm long, orbicular to oblong, the cavity completely covered by a thin hyaline velum; megaspores light gray to gray-brown, 290-360 microns in diameter, obscurely wrinkled with low ridges, the girdle obscure; microspores brown in mass, 30-33 microns in diameter, tuberculate to spinose.

Similar Species: *Isoetes melanopoda* also occurs in wet areas of various descriptions over igneous or metamorphic rock in the Central Mineral Basin. The leaves of *I. lithophila* are generally under 12 cm long and come from a light brown base, whereas those of *I. melanopoda* are usually more much than 15 cm long and come from a blackish brown base. *I. butleri* was recently reported from the Central Mineral Basin (Lott, Boom, & Chiang 1982) but is thought to occur in calcareous situations rather than in vernal pools over granite or gneiss. In *I. butleri* the velum covers less than 1/4 of the sporangium, whereas in *I. lithophila* the velum covers the sporangium completely.

Habitat: Rooted in sand and gravel under shallow water of seasonal pools that develop during rainy seasons in small, shallow, unshaded basins on barren outcrops of granite and gneiss. Such "vernal pools" are home to several tiny hydrophytic species that, like rock quillwort, are generally absent from the comparatively xeric surrounding landscape, including *Elatine brachysperma*, *Lepuropetalon spathulatum*, *Plantago hybrida* and *Crassula aquatica*. Where present, rock quillwort is usually the seasonal dominant, often occupying the entirety of the wettest center of the pool. *Allium canadense* var. *canadense* is often common and conspicuous along the moist margins of such pools, and *Helenium amarum* var. *amarum* is usually present along drier margins, sometimes abundantly invading desiccated pools during dry seasons.

Phenology: Sporulating in late winter and spring and opportunistically at other seasons following heavy rainfall; shrivelling to the ground and undetectable during periods when pools are dry.

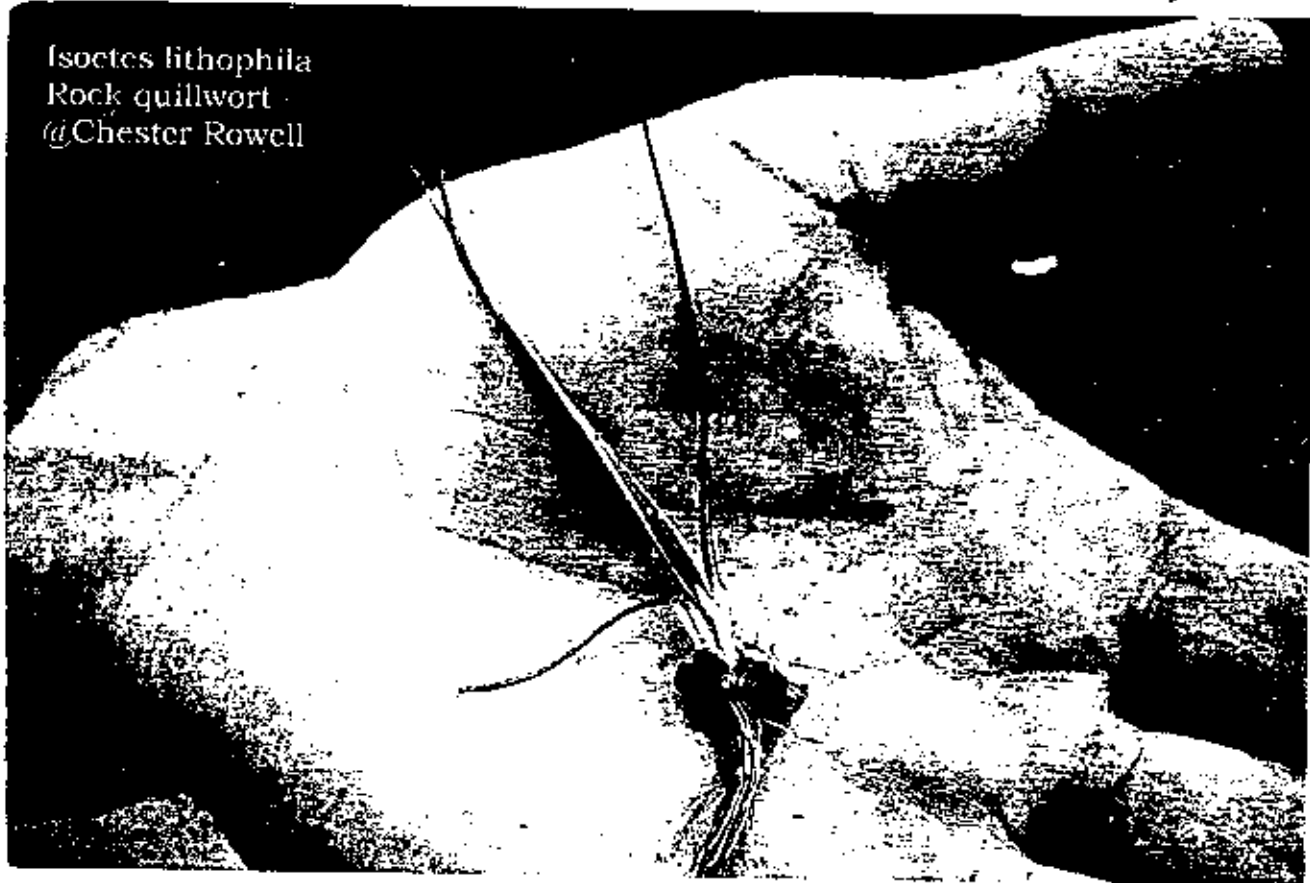
Comments: The type specimen was collected in 1914 from Granite Mountain on the western outskirts of Marble Falls (Pfeiffer 1922).

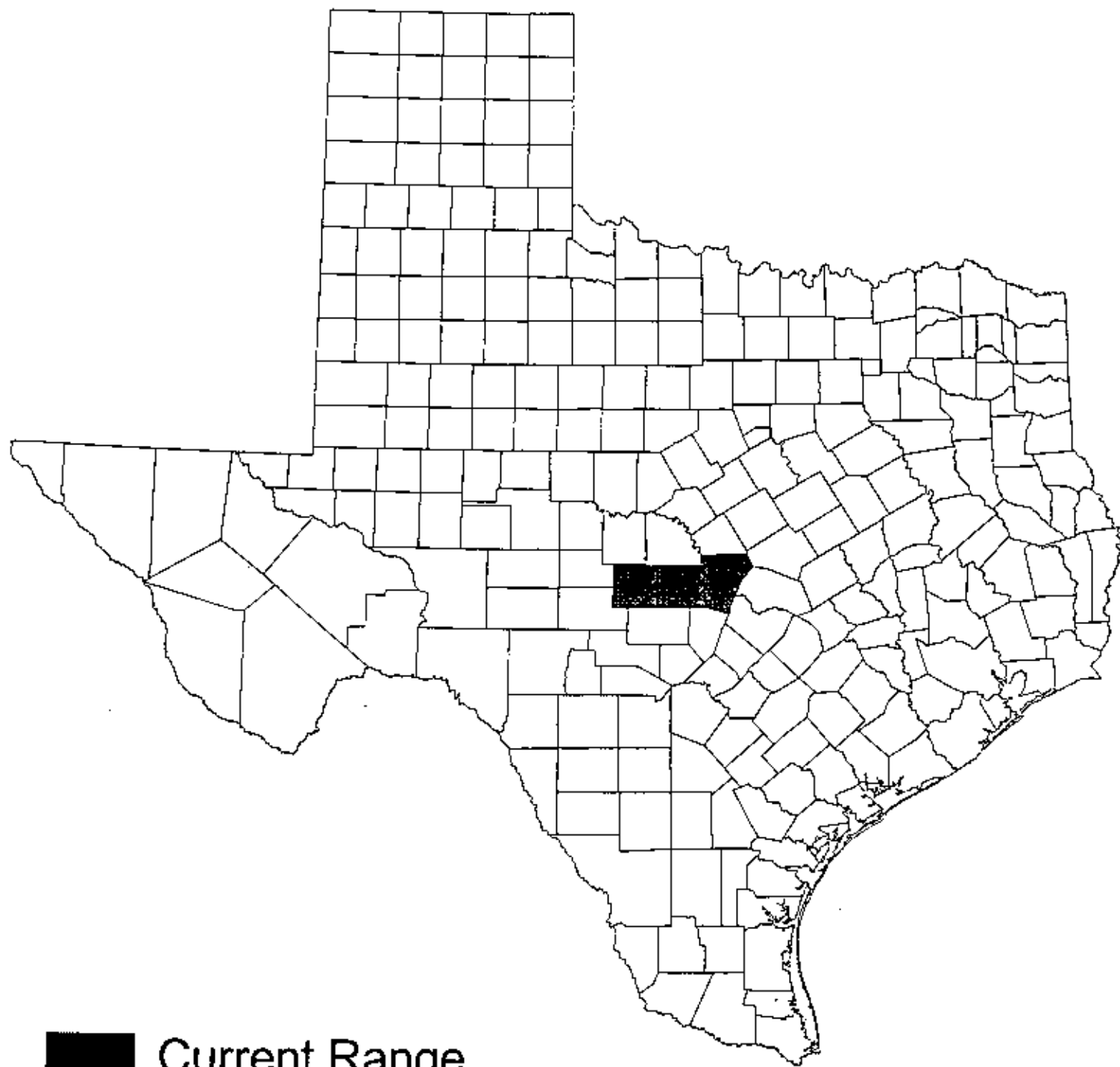
Illustrations: Line drawings appear in Correll (1956) and Correll & Correll (1975).

Selected References:

- Correll, D. S. 1956. Ferns and fern allies of Texas. Texas Research Foundation, Renner. 188 pp.
- Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. 2 volumes. Stanford University Press, Stanford. 1777 pp.
- Lott, E. J., B. M. Boom, and F. Chiang. 1982. *Isoetes butleri* (Isoetaceae) in Texas. *Sida* 9(3): 264.
- Pfeiffer, N. E. 1922. Monograph of the Isoetaceae. *Annals of the Missouri Botanical Garden* 9: 79-233.
- Rowell, C. M., Jr. 1983. Status report [on *Isoetes lithophylla*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Taylor, W. C., N. T. Luebke, D. M. Britton, R. J. Hickey, and D. F. Brunton. Isoetaceae. Pp. 64-75 in *Flora of North America Committee. 1993. Flora of North America north of Mexico. Volume 2. Pteridophytes and Gymnosperms. Oxford University Press, New York. 475 pp.*
- Taylor, W. C., R. H. Mohlenbrock, and J. M. Murphy. 1975. The spores and taxonomy of *Isoetes butleri* and *I. melanopoda*. *American Fern Journal* 65: 33-38.
- *Walters, T. W. and R. Wyatt. 1982. The vascular flora of granite outcrops in the Central Mineral Region of Texas. *Bulletin of the Torrey Botanical Club* 109: 344-364.

Isoetes lithophila
Rock quillwort
@Chester Rowell





■ Current Range

Isoetes lithophila
(rock quilwort)

Scientific Name: *Justicia runyonii* Small

Synonyms: None.

Common Name: Runyon's water-willow

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Lower Rio Grande Valley of South Texas to southern Tamaulipas and southeastern San Luis Potosí.

State Range: Cameron, Hidalgo and Willacy counties. Records from Brazoria and Goliad counties are questionable.

Description (adapted from Correll & Johnston 1970; Wasshausen 1966; Small 1930): Perennial with several stems from base; stems irregularly sparingly branched, usually 2-5 dm long, spreading-ascending to reclining, rooting at the slightly enlarged nodes when in contact with ground. Leaves opposite, simple, to 11.5 cm long, spreading to more or less reflexed, lanceolate to linear-lanceolate or almost linear, somewhat cuneately narrowed into a petiole-like base, acuminate at apex, minutely pubescent near the entire margins and on the prominent veins, dark green on upper surface, pale green on lower surface. Flowers zygomorphic, clustered in upper leaf axils, subtended by narrow ciliate bracts and bractlets less than 13 mm long; sepals 5, acuminate, ca. 1 cm long, with white ciliate margins; corolla 2-lipped, purple or reddish-purple and striped, ca. 25 mm long; upper lip narrowed to a 2-lobed or notched apex, minutely glandular pubescent, with revolute margins; lower lip broadly 3-lobed, the 2 lateral lobes reddish-violet and the middle lobe deeper purple with white veins concentrated around a central set of folds; stamens 2, arching up under the upper corolla lip; style filiform, the wide stigma obscurely 2-lobed. Fruit a clavate capsule ca. 17 mm long, white-puberulent, acutish at the tip, containing 4 globose-reniform seeds ca. 4 mm long.

Similar Species: With its large, axillary flowers and purple, decidedly 2-lipped corolla, *Justicia runyonii* is quite different from all other Acanthaceae in the Lower Rio Grande Valley.

Habitat: Margins of and openings within subtropical woodlands or thorn shrublands on calcareous alluvial clayey soils of the Rio Grande delta. Runyon's water-willow is often common in narrow openings provided by foot-paths through dense ebony woodlands and is sometimes locally restricted to microdepressions. Most sites in Texas lie at elevations well below 100 feet. In Tamaulipas, *Justicia runyonii* has been collected from various woodlands types, including those on clays derived from basalt, at altitudes up to 2000 feet.

Phenology: Flowering (July-) September-November.

Comments:

Illustrations: Line drawings appear in Small (1930). A color photograph appears in Richardson (1995).

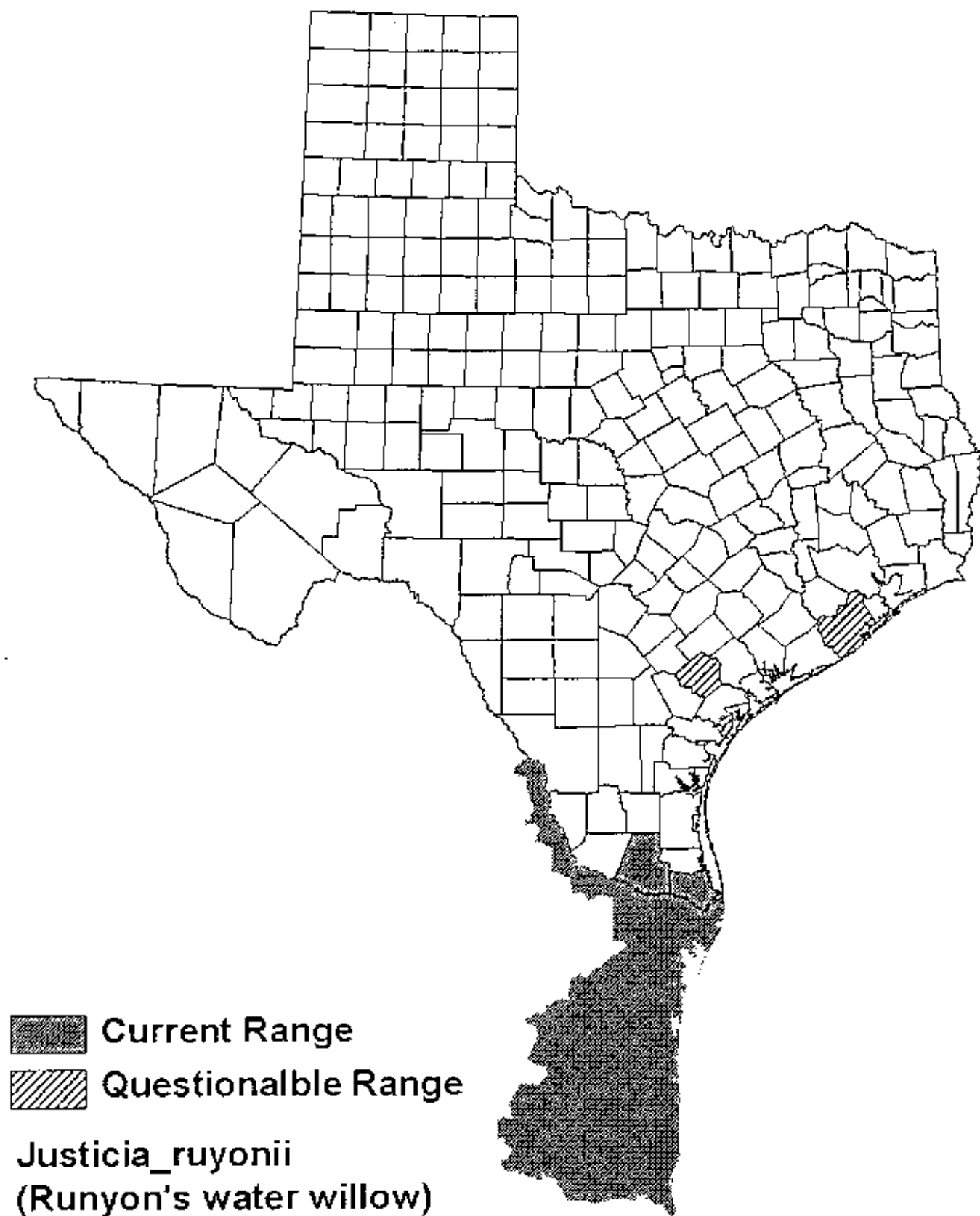
Selected References:

Poole, J. M. 1989. Status report on *Justicia runyonii*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

- Richardson, A. 1995. Plants of the Rio Grande delta [revised edition of "Plants of Southmost Texas"]. University of Texas Press, Austin. 332 pp. + 94 plates.
- Small, J. K. 1930. *Justicia runyonii* (Runyon's willow-herb), native of the Rio Grande Delta. *Addisonia* 15: 29-30.
- Wasshausen, D. C. 1966. Acanthaceae. Pp. 223-282 in Lundell, C. L. 1966. *Flora of Texas*, Volume 1. Texas Research Foundation, Renner. 407 pp.







Scientific Name: *Justicia wrightii* A. Gray

Synonymy: *Ecbolium wrightii* (A. Gray) O. Ktze.

Common Name: Wright's water-willow, Wright's justicia

Global Range: Texas and New Mexico

State Range: Pecos and Val Verde Counties. A specimen from the Tracy Herbarium at Texas A&M University was collected at Castolon in Brewster County. However the identification is suspect as the specimen consists of bare branches with no identifiable parts.

Current Federal and State Status: Species of special concern.

Global and State Ranks: G2S2

Description (compiled from Daniel 1984, Daniel 1980, Wasshausen 1966, and Correll and Johnston 1970):

Habit: Much-branched herbaceous perennial to 2 dm (8 in) tall; stems erect, arising from a woody base; younger stems lined with green grooves and brownish ridges, and covered with minute sharp, stiff, recurved, appressed hairs; older stems whitish-gray or brown, lined, usually hairless.

Leaves: Sessile, opposite, lower leaves obovate, upper ones linear-lanceolate, 5-15 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, 1.5-4 mm (ca. $\frac{1}{4}$ in) wide, reduced in size up the stem, acute to rounded at the tip, sometimes mucronate, margins flat, with hairs like those of the young stems.

Flowers: Solitary, sessile in leaf axils, with two small bracts; bracts linear-subulate to oblanceolate, 2.5-11 mm (less than $\frac{1}{4}$ - $\frac{1}{2}$ in) long, 0.5-2 mm (less than $\frac{1}{4}$ in) wide, with hairs like the leaves. Calyx deeply 4-lobed (5-parted according to Wasshausen and Correll & Johnston), 2.5-4.5 mm (ca. $\frac{1}{4}$ in) long. Corolla purplish, 8.5-12 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, hairy on the outer surface, somewhat bell-shaped, with a short tube and rather dilated throat, with an upper and lower lip; upper lip minutely 2-lobed, the lobes 0.3-0.7 mm (less than $\frac{1}{4}$ in) long, the entire lip 4.5-6.5 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, 2.8-3 mm (ca. $\frac{1}{4}$ in) wide at base; lower lip with three oval-obovate lobes, 4-6 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long with lobes 3-4 mm (ca. $\frac{1}{4}$ in) long, 1.5-3.5 mm (ca. $\frac{1}{4}$ in) wide, central lobe larger than outer lobes. Stamens 2, 3-5 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, more or less appressed to the upper corolla lip, slightly exerted; anther 2-celled, the cells unequally inserted on the filament, upper cell 0.6-0.9 (less than $\frac{1}{4}$ in) mm long, lower cell 1-1.3 mm (less than $\frac{1}{4}$ in) long with a 0.2 mm (less than $\frac{1}{4}$ in) long spur. Style 4.5-6 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, stigma more or less capitate.

Fruits: Capsule 7-8 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in) long, hairless or with a few hairs at the apex, on a short stalk about 2 mm (less than $\frac{1}{4}$ in) long. Seeds four, subcircular or oval to elliptic, 2.5-3.5 mm (ca. $\frac{1}{4}$ in) long, pointed at the tip, with a scattering of minute apically barbed hairs.

Habitat: Shortgrass grasslands and/or shrublands, dry gravelly clay soils over limestone on flats and low hills at elevations of 900-1500 m (3000-5000 ft).

Phenology: Flowering April-August, or perhaps after periods of sufficient rainfall.

Similar Species: Only two other species of *Justicia* occur within the range of *J. wrightii*. American water-willow, *J. americana*, is easily distinguished from *J. wrightii* by its aquatic to wetland habitat, and flowers borne on long stems. Warnock's water-willow, *J. warnockii*, has hairless, more narrow (0.4-2 mm (less than $\frac{1}{4}$ in) wide) leaves, and young stems with hairs in vertical lines. *Justicia* can be differentiated from other acanthus family members in the Chihuahuan Desert by the following combination of characters: two stamens, unequally inserted anther cells, the lower anther cell with a short spur, and the bell-shaped corolla with a rather dilated throat (Daniel 1980).

Comments: Wright's water-willow is named after Charles Wright, a famous botanical collector in Texas in the mid-1800s. The common name water-willow comes from the more aquatic nature of some members of the genus *Justicia* whose leaves resembles those of willows. Wright's water-willow

occurs in quite xeric habitats, and looks nothing like a willow. Wright's water-willow has not been collected in Texas since 1955.

Illustrations: There is a line drawing of *Justicia wrightii* by Beth Dennis in Tonne's status report (Tonne 2000).

Selected References:

Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner, Texas. 1881 pp.

Daniel, T. F. 1980. The genus *Justicia* (Acanthaceae) in the Chihuahuan Desert. Contributions from the University of Michigan Herbarium 14:61-67.

Daniel, T. F. 1984. The Acanthaceae of the southwestern United States. Desert Plants 5(4):162-179.

Tonne, P. 2000. Status report for Wright's justicia (*Justicia wrightii*; Acanthaceae). Unpublished report for U. S. Fish and Wildlife Service, Albuquerque, New Mexico. 14 pp.

Wasshausen, D. C. 1966. Acanthaceae. Pp. 223-282 in Lundell, C. L. 1966. Flora of Texas, volume I. Texas Research Foundation, Renner. 407 pp.





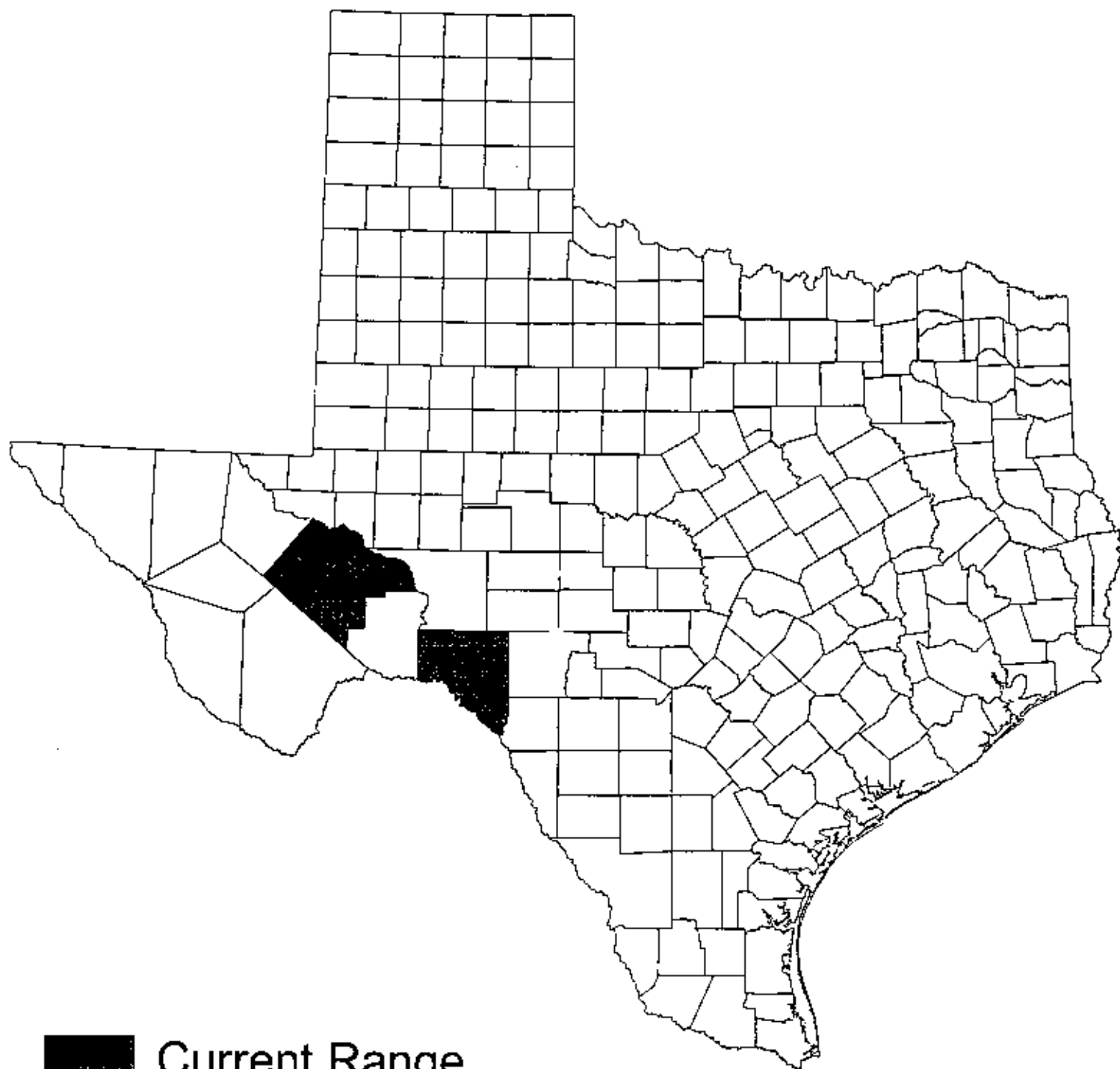
Compositae - *Justicia wrightii*

SEEDMAN FROM UNAM & LLITEX UNANNOUNCED SEEDMAN COLLECTED BY PHIL TONNE No. # 03-25

EDDY CO., NEW MEXICO (NE SIDE OF CARLSBAD, NM)

ALSO REFERENCE PHOTO BY PHIL TONNE

Artist: [unclear] 7/26/01



- Current Range
□ Historical Range
Justicia wrightii
(Wright's water-willow)

Scientific Name: *Kallstroemia perennans* B. L. Turner

Synonyms: *Kallstroemia hirsuta* L. Williams; not *Kallstroemia hirsuta* (Benth.) Engler & Prantl

Common Name: perennial caltrop

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to west Texas.

State Range: Brewster, Presidio and Val Verde counties.

Description (adapted from Correll & Johnston 1970; Turner 1950; Williams 1935): Prostrate to ascending perennial (per Turner 1950; not annual as originally described by Williams 1935) from a thick, almost woody root; stems 1-several from base, 1-2 dm long, densely hirsute and strigose-pubescent, the hirsute hairs with pustulate bases. Leaves alternate, pinnately compound, 2-5.5 cm long, elliptical to oblong or ovate-oblong, the petiole about as long as the lowest pair of leaflets, densely appressed-hirsute and strigose pubescent on both surfaces; leaflets of an even number (terminal leaflet absent), (3-) 4-5 (-6) pairs, sessile, obliquely oblong or ovate, 7-14 mm long and 3-8 mm wide (Williams 1935) or 13-18 mm long and 6-10 mm wide (Correll & Johnson 1970), obtuse or acute at apex, about equal in size, the terminal more oblique; stipules lance-oblong, 3-4 mm long and 1-1.5 mm wide. Flowers solitary at the end of axillary pedicels that, while quite long, are shorter than the subtending leaves; sepals 5, linear to linear-lanceolate, (10-) 13-15 mm long and 1.5-2.5 mm wide, hirsute and strigose pubescent on the outer surface, the chartaceous margins inrolled in fruit; petals 5, orange (described by Williams (1935) as "probably white or yellowish"), deltoid-ovate, 18-23 mm long and ca. 10 mm wide, not marcescent; stamens 10, in 2 whorls of 5 each, ca. 2/3 as long as style. Fruit compressed-oval in outline, 10-loculed, 8-10 mm wide and 5-6 mm high; outer surfaces of carpels not tuberculate but the median portion and the two edges prominent and connected by transverse ridges, densely hirsute, particularly on the raised portions; beak 8-10 mm long, hirsute at the base.

Similar Species: Closely related to *Kallstroemia grandiflora*, from which it differs in a long list of characters elucidated by Williams (1935). Correll & Johnston (1970) compressed that list to a few crucial items. In *K. grandiflora*, the floral peduncles are longer than the subtending leaves and the stamens are as long as the style. In *K. perennans*, the peduncles are slightly shorter than the leaves, and the stamens are only 2/3 as long as the style. In addition, *K. grandiflora* is annual, while *K. perennans* is perennial (although originally described, on the basis of fragmentary material, as an annual). According to Turner (1950), this is the only perennial *Kallstroemia* found in North America.

Habitat: Somewhat barren gypseous clays or limestone soils at low elevations in the Chihuahuan Desert.

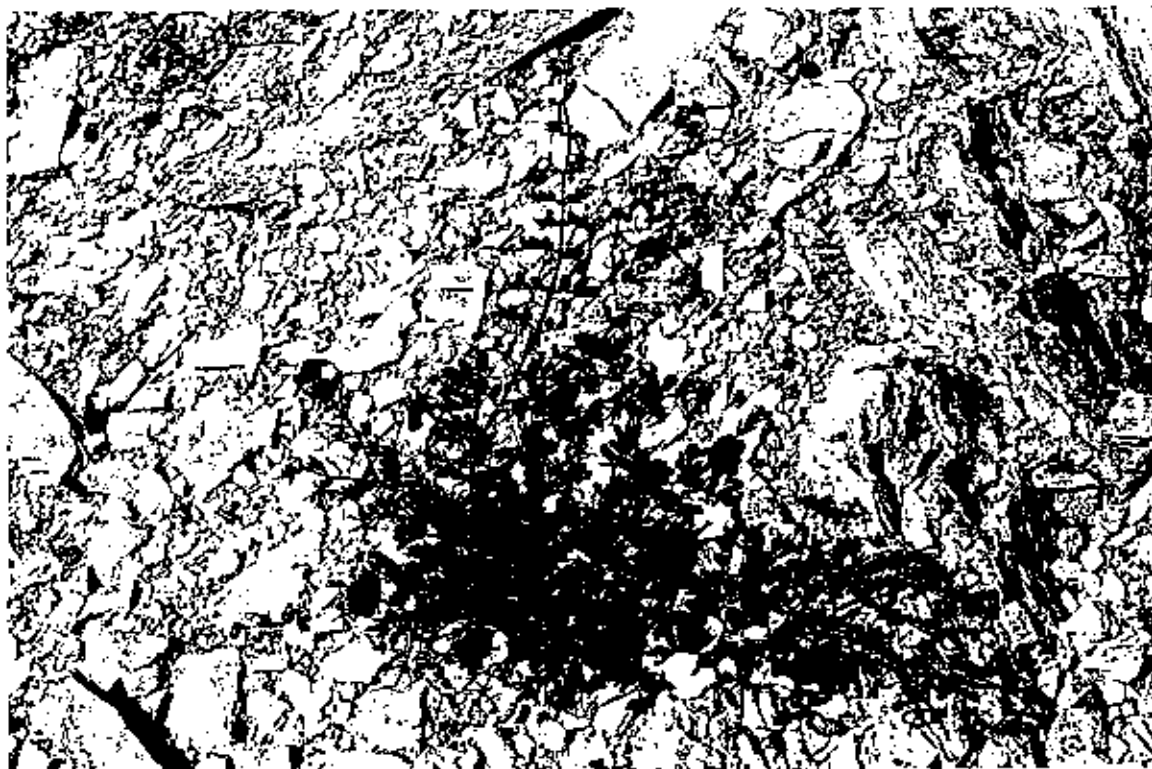
Phenology: Flowering late spring-early fall.

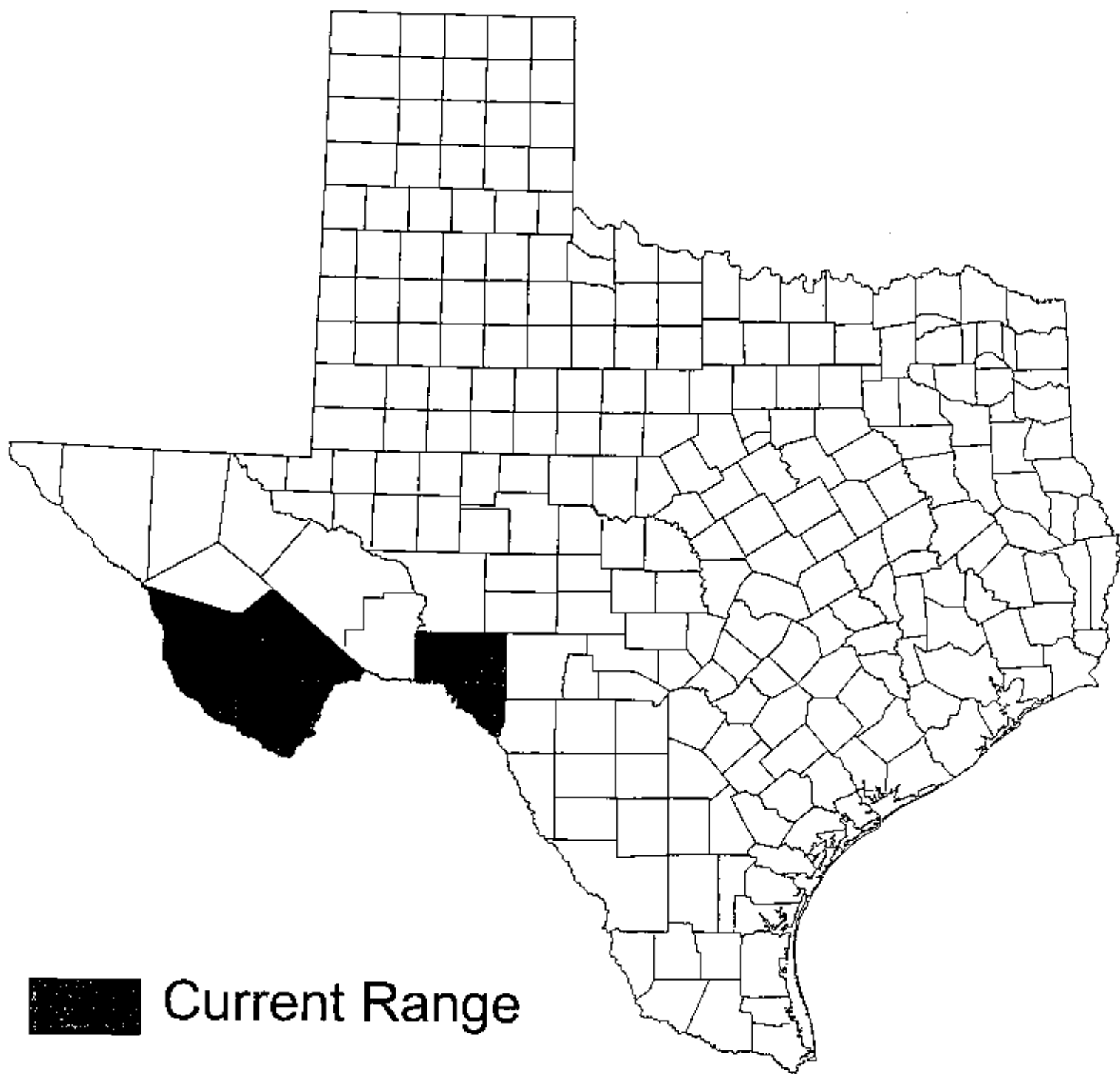
Comments:

Illustrations: A photograph of the type specimen appears in Williams (1935).

Selected References:

- Turner, B. L. 1950. *Kallstroemia perennans* Turner, nom. nov. Field & Laboratory 18: 155.
- Williams, L. 1935. A new *Kallstroemia* from Texas. Annals of the Missouri Botanical Garden 22: 49-51.





Current Range

Kallstroemia perennans
(perennial caltrop)

Scientific Name: *Lachnocaulon digynum* Körn.

Synonyms: None.

Common Name: tiny bog buttons

Global/State Ranks: G3S1

Federal Status: SOC

Global Range: Gulf Coastal Plain of the Florida panhandle, southern Alabama, southern Mississippi, Louisiana and east Texas.

State Range: Jasper and Newton counties.

Description (adapted from Kral 1966): Tiny tufted perennial from slender rhizomes. Leaves in a few rosettes, linear-acute, 6-10 (-20) cm long, bright yellowish-green, narrowing from a clasping base 1.0-2.5 mm broad, almost smooth or with a scattering of multicellular trichomes that are usually most abundant toward margins. Flowers tiny, reduced, unisexual, aggregated in heads at the tip of slender scapes; scape 5-10 cm tall, naked except for a basal sheath, slightly twisted, 3-ridged, smooth or with a few trichomes; sheath acute or bifid at the apex, longer than the leaves, smooth or sparingly ciliate toward the apex; head grayish or dull gray-brown, globose or hemispheric, 2.0-3.5 mm wide; involucre bracts several, the longer triangular, ca. 1 mm long; receptacular bracts spatulate, 1-1.3 mm long, acute or obtusely angled, rich brown, sparingly clavate-hairy on the back apically; surface of receptacle densely short hairy; sepals of male flowers 1.0 mm long, linear-spatulate, curvate, rich brown, sparingly clavate-hairy on the back apically, androphore smooth, obpyramidal, about as long as the sepals; anthers 3, slightly exerted; sepals of female flowers broadly spatulate top narrowly obovate, ca. 1 mm long, keeled and curvate, connivent over the ovulary, whitish-yellow, smooth or with a few marginal hairs distally; styles 2, bifid. Fruit a minute, 2-loculed capsule containing two ovoid to ellipsoidal, trabeculate seeds ca. 0.5 mm long.

Similar Species: Tiny bog-buttons might be confused with *Lachnocaulon anceps* or various *Eriocaulon* species. In *Eriocaulon* the airspaces in the leaves are visible to the naked eye and the perianth parts are in 2's, whereas in *Lachnocaulon* the airspaces in the leaves are not evident to the naked eye and the perianth parts are in 3's. In *L. anceps*, the scapes are 15-40 cm long, and the heads are 4-7 mm wide and of a pale gray or white color due to the presence of a milk-white substance among the trichomes; in *L. digynum*, the scapes are 5-10 cm long and the heads are 2-3.5 mm wide and of a brown color.

Habitat: Wet acid exposed sands or sphagnum mats of hillside seepage bogs, primarily on the Catahoula Formation, usually among other low-growing graminoids; occasionally in wetland pine savannahs. Associates include *Rhynchospora oligantha*, *R. gracilentia*, *Eriocaulon texense*, *E. decangulare*, *Scleria reticularis*, *Xyris difformis* var. *curtissii*, *X. scabrifolia*, *Rhexia petiolata*, *Myrica heterophylla*, *Sarracenia alata* and *Drosera capillaris*.

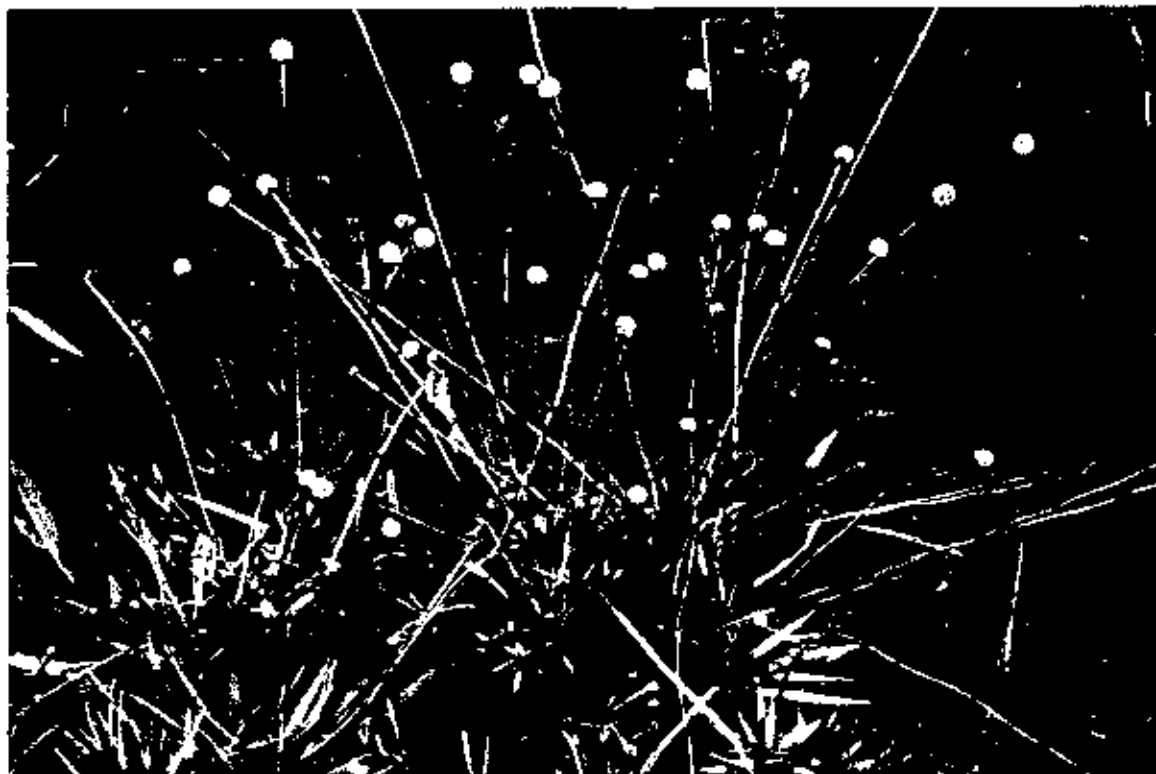
Phenology: Flowering/fruitlet late summer-fall.

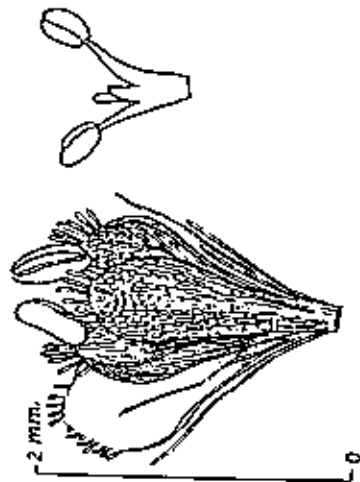
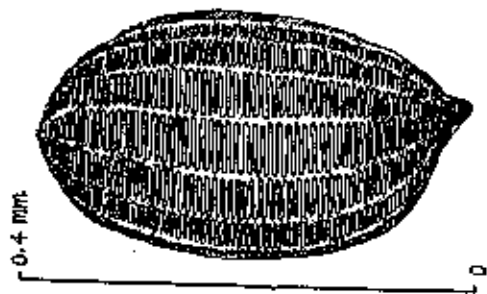
Comments: Rare in Texas but known from more than 50 bogs in western Louisiana (MacRoberts & MacRoberts 1993).

Illustrations: Line drawings appear in Kral (1966) and Godfrey & Wooten (1979).

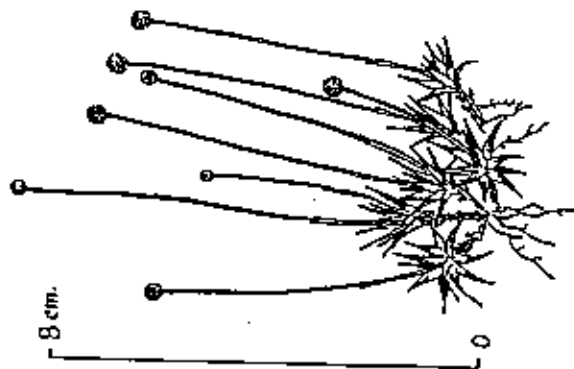
Selected References:

- Bridges, E. 1986. TNC element stewardship abstract: *Lachnocaulon digynum*. Report prepared for The Nature Conservancy, Arlington, Virginia.
- Godfrey, R. K. and J. W. Wooten. 1979. Aquatic and wetland plants of the southeastern United States. Monocotyledons. The University of Georgia Press, Athens. 712 pp.
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Lachnocaulon digynum



of the scape acute, or bifid, longer than the leaves, smooth or sparingly ciliate toward the orifice. Scape 5.0-10.0 cm. long, slightly twisted, 3-ridged, smooth or with a distant scattering of filiform, multicellular trichomes. Head grayish or dull gray-brown, globose, or hemisphaeric, 2.0-3.5 mm. broad. The longer of the involucral bracts triangular, ca. 1.0 mm. long, brownish, with translucent clavate trichomes on the backs distally. Receptacular bracts spatulate, 1.0-1.3 mm. long, acute or obtusely angled, a rich brown, clavate-hairy on the backs apically. Receptacular surface densely hairy, but the hairs not so long as to obscure the female sepals. Male flower: sepals linear-spatulate, ca. 1.0 mm. long, curvate, a rich brown, sparingly clavate-hairy on the backs apically; receptacle hairy; androphore smooth, obpyramidal, about the length of the sepals, the apices oblique; anthers 3, yellowish, oblong, slightly exerted on filaments about as long as themselves. Female flower: sepals broadly spatulate to narrowly obovate, ca. 1.0 mm. long, keeled, and curvate, hence connivent over the ovary, whitish-yellow, smooth or with a few marginal hairs distally; receptacle and short gynophore copiously pilose with pale, translucent, multicellular, slightly clavate, trichomes; gynoeceum 2-carpellate, 2-locular, 2-ovulate, the styles 2, bifid. Seeds ovoid to ellipsoidal, about 0.5 mm. long, longitudinally striate, the connecting striae finer, almost obscure.

Wet acid exposed sands and sandy peats or seepage bogs, pineland pond margins, ditches and roadbanks, coastal plain, northwestern Florida west to southern Mississippi.

Type: Alabama.

This species, which is particularly abundant in the wet pine flatwoods country about Pensacola, Florida, has the smallest leaves of all the *Lachnocaulon* of the United States. The small rosettes, densely aggregated on slender ascending rhizomes into bright green, convex tufts of sometimes hundreds of individuals, remind one of some of the larger *Polytrichums*. The 2-carpellate condition of the gynoeceum is consistent throughout all samples of this species so far examined, there being no evidence at all of any aborted third carpel either in the ovary or in the style branching. The only other species of *Lachnocaulon* which I have found in association with this one is *L. anceps*, from which it is readily distinguished in the field by its glabrous or almost glabrous scapes, its shorter stature, and its darker, smaller heads.

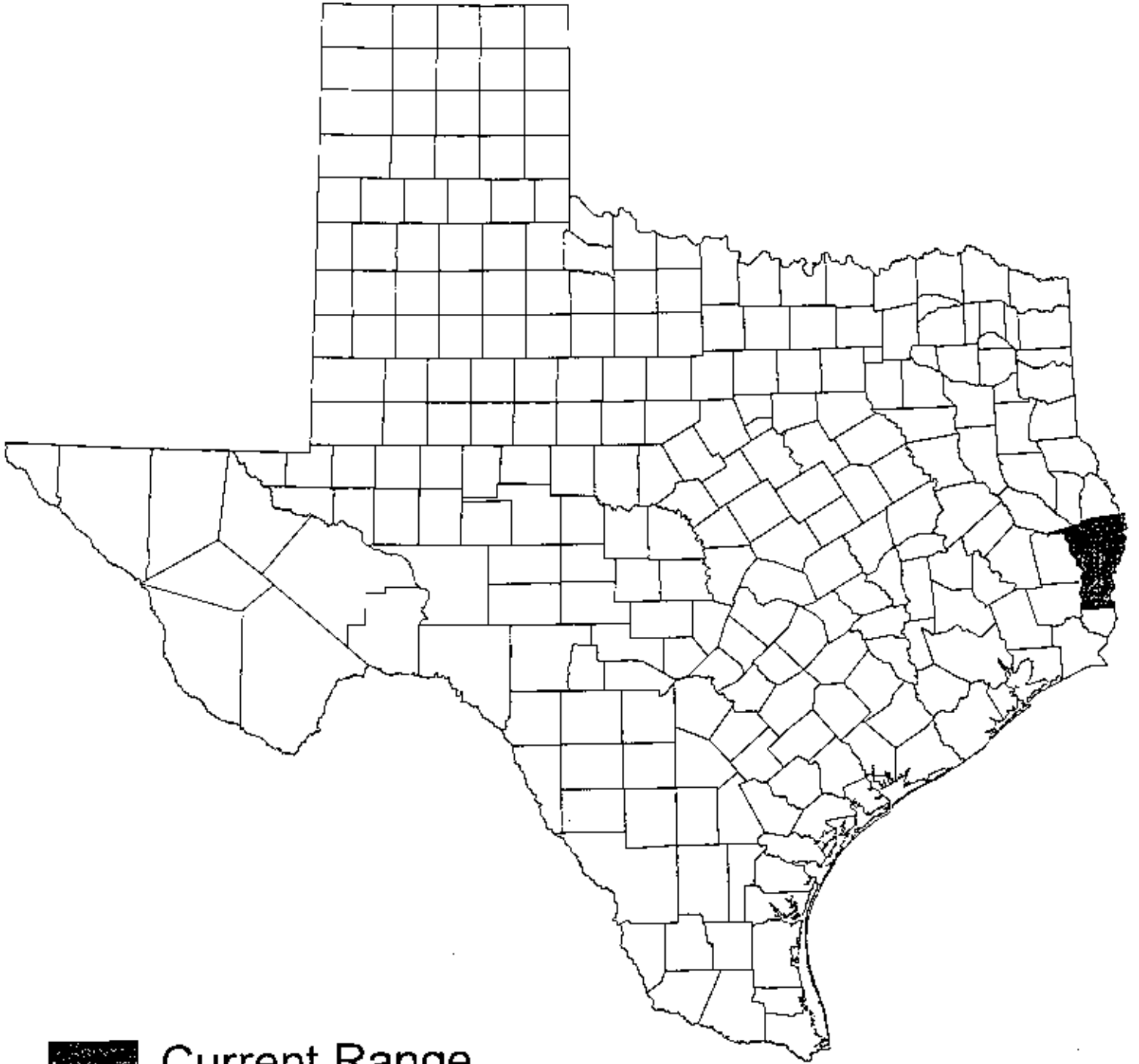
SYNGONANTHUS Ruhl, in Urb., Symb. Ant. 1: 487. 1900

1. SYNGONANTHUS FLAVIDULUS (Michx.) Ruhl., in Engler, Pflanzenreich IV. 30: 256. 1903.

Eriocaulon flavidulum Michx., Fl. Bor. Am. 2: 166. 1803.

Paepalanthus flavidulus Kunth, Enum. Pl. 3:532. 1841.

A clump former or solitary, the dense, recurved-leaved, rosettes of



Current Range

Lachnocaulon digynum
(tiny bog buttons)

Scientific Name: *Leavenworthia aurea* Torr. var. *texana* (Mahler) Rollins

Synonyms: *Leavenworthia texana* Mahler; treated in Correll & Johnston (1970) as *Leavenworthia aurea* Torr.

Common Name: Texas golden glade cress

Global/State Ranks: G2T1S1

Federal Status: C1

Global Range: Endemic to east Texas.

State Range: Sabine and San Augustine counties; experimentally introduced to one site in Nacogdoches County. The one known sites in Sabine County was bulldozed and perhaps destroyed in fall 1999.

Description (adapted from Correll & Johnston 1970; Mahler 1987): Winter annual less than 1 dm tall. Leaves in a basal rosette, lyrate-lyobed with a large terminal lobe and several smaller lateral lobes, to about 5 cm long, glabrous, the terminal lobe usually wider than long, the margin irregularly undulate. Flowers borne on scapes 3-9 cm long or, later in the season, in racemes on lateral decumbent branches; sepals 4, 4-5 mm long; petals 4, bright golden-yellow with a slightly darker base, narrowly obovate, 7-10 mm long, emarginate at the apex; stamens 6; style 2-3.5 mm long. Fruit a silique flattened parallel to the septum, erect, 1.5-3 cm long and about 5 mm wide, with sinuous rather than straight margins (somewhat constricted between the seeds), containing several orbicular seeds 3-5-4.5 mm in diameter.

Similar Species: Not likely to be confused with any other species. The basal rosette, yellow petals and erect, elongate fruit are a unique combination among Texas mustards. *Leavenworthia aurea* var. *aurea* is restricted to southeastern Oklahoma. In that variety, the terminal lobe of the leaf is round and essentially unlobed, and the petals are obovate and paler in color (Mahler 1987).

Habitat: Edaphically influenced herbaceous communities on shallow calcareous soils in vernal moist to wet glades on ironstone outcrops of the Weches Formation (Eocene). Characteristic species of such sites include *Sedum pulchellum*, *Calamintha arkansana*, and *Opuntia stricta*; other commonly associated species include *Minuartia drummondii*, *M. patula*, *Thelesperma filifolium*, *Valerianella radiata*, *Eleocharis compressa*, *Viola rafinesquii*, *Hedyotis crassifolia* and algae of the genus *Nostoc*. *Lesquerella pallida*, another species endemic to Weches Formation outcrops in the same region, occurs at several glade cress sites.

Phenology: Flowering and fruiting late February to April or May.

Comments: A very narrow endemic known from only a few sites. Threats to known sites include pasture improvement, encroachment of woody exotics, road construction and maintenance, herbicide use, residential development, and open-pit mining of Weches glauconite ("greenrock") for use as roadbase material.

Illustrations: A line drawing appears in Mahler (1981) as *Leavenworthia aurea*; black and white photographs of *L. texana* and *L. aurea* appear in Mahler (1987).

Selected References:

- George, R. J. 1987. The herbaceous flora of three Weches Formation outcrops in eastern Texas. M. S. thesis, Stephen F. Austin State University, Nacogdoches. 61 pp.
- George, R. J. and E. S. Nixon. 1990. The herbaceous flora of three Weches Formation outcrops in eastern Texas. *Sida* 14(1): 117-127.
- Mahler, W. F. 1981. Notes on rare Texas and Oklahoma plants. *Sida* 9(1): 76-86.
- Mahler, W. F. 1987. *Leavenworthia texana* (Brassicaceae), a new species from Texas. *Sida* 12(1): 239-242.
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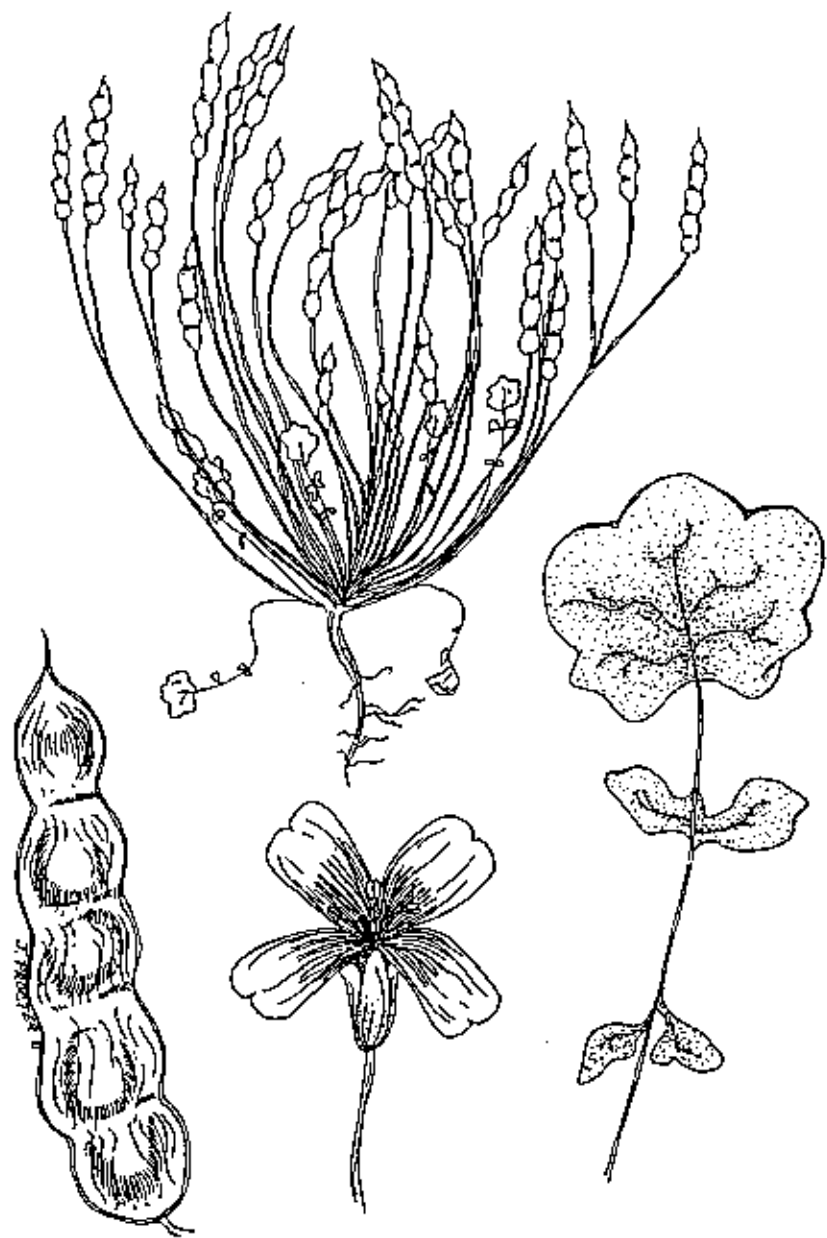
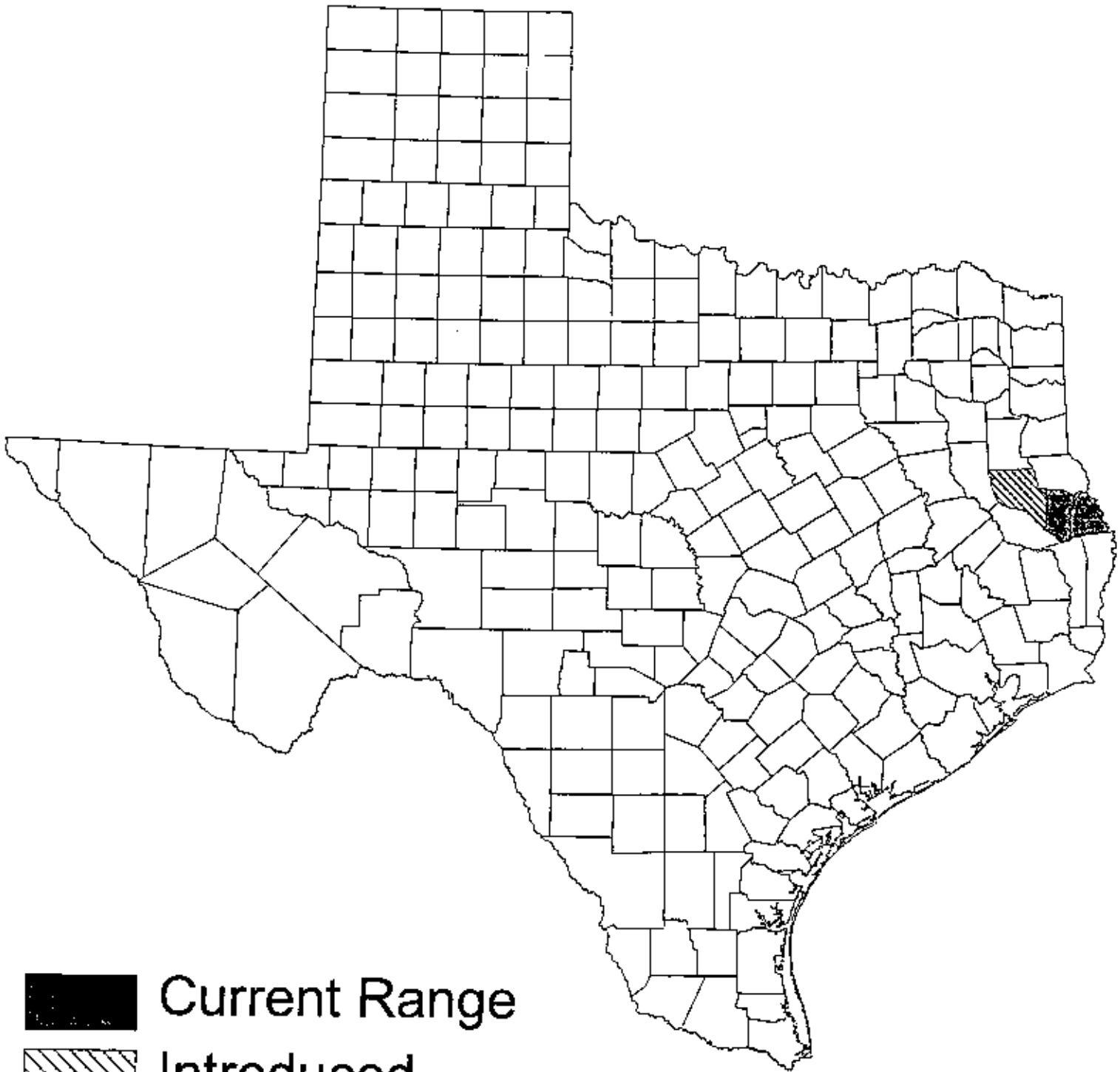


Fig. 6. *Leavenworthia aursa* Torrey



■ Current Range

▨ Introduced

Leavenworthia aurea var *texana*
(Texas golden glade cress)

Scientific Name: *Lechea mensalis* Hodgk.

Synonyms: None.

Common Name: Chisos pinweed

Global/State Ranks: G1QS1

Federal Status: SOC

Global Range: Chisos Mountains of Brewster County, Texas and Sierra del Carmen in adjacent northern Coahuila.

State Range: Brewster County.

Description (adapted from Correll & Johnston 1970; Henrickson & Johnston in prep.): Perennial 1.5-2.5 dm tall, moderately appressed pilose throughout with ascending simple white hairs 0.3-1.0 mm long; main stems often naked in lower portion and multi-branched in upper. Leaves alternate, simple, narrowly linear (3-) 7-16 mm long, (0.4-) 0.6-1.6 mm wide, acute to rounded at apex, cuneate at base, entire, more or less revolute at margins, moderately appressed-pilose mainly along the midvein and margins beneath. Flowers numerous, mostly cleistogamous, in leafy panicles of lateral racemes that compose much of the upper part of the plant; pedicels 0.6-1.5 mm long; sepals 5, in 2 series, the 2 outer sepals linear, green, equal to or shorter than the 3 inner sepals, which are ovate, cupped, not keeled, 1.5-1.7 mm long and 1.1-1.3 mm wide, pilose; petals 3, dark red, oblong, 1.1-1.4 mm long and 0.5-0.7 mm wide; stamens 3-5; stigmas 3. Fruit an ovoid 3-valved, papery-walled capsule 1.4-1.7 mm long and 1.2-1.3 mm wide, slightly shorter than or not much exceeding sepals, containing 1-2 small seeds.

Similar Species: Very similar to and perhaps not distinct from *Lechea tenuifolia*, which ranges across much of eastern North America and as far west as the post oak belt of east-central Texas. The two differ in a numerous of rather minor characters which may or may not prove consistent as additional material becomes available.

Habitat: Open pine-oak woodlands over igneous rock outcrops at high elevations in mountains of the Trans-Pecos. *Lechea mensalis* is known in Texas from a single specimen collected on slopes of Ward Mountain in Chisos Mountains (28 Jul 1931, C. H. Muller 8102). In the Sierra de Carmen, it has been collected from gravelly soil over igneous rocks and on alternating limestone and rhyolite substrates, in association with *Pinus cembroides*, *Quercus* sp., *Juniperus* sp., *Arbutus xalapensis*, *Dasyllirion* sp., *Nolina* sp., *Cercocarpus* sp.

Phenology: All observed specimens were collected in July; presumably flowering June-August.

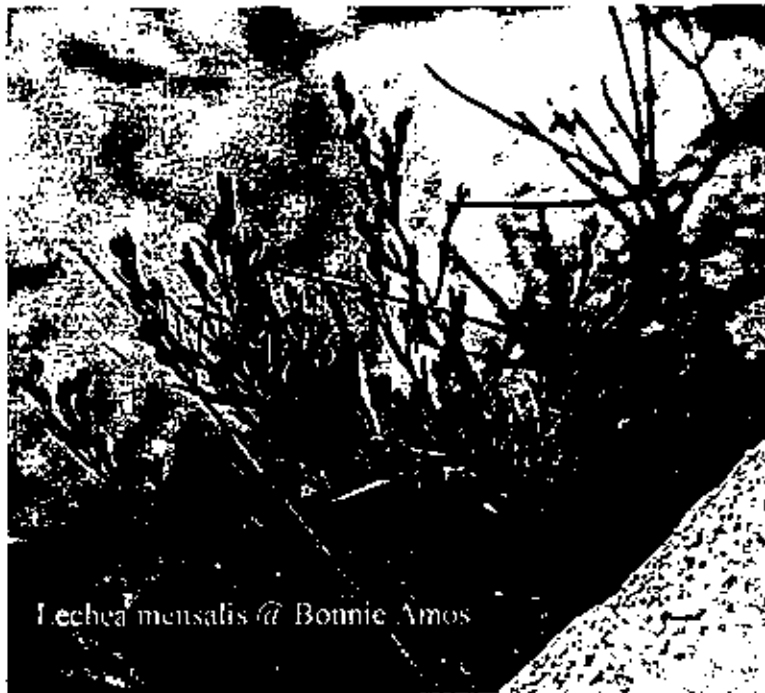
Comments: A population in the Chisos Mountains was recently re-discovered (Kennedy, 1997), but details are not yet available.

Illustrations: Illustrations of an entire plant, capsules and seeds appear in Hodgdon (1938).

Selected References:

Hodgdon, A. R. 1938. A taxonomic study of *Lechea*. *Rhodora* 40: 121: 29-131.

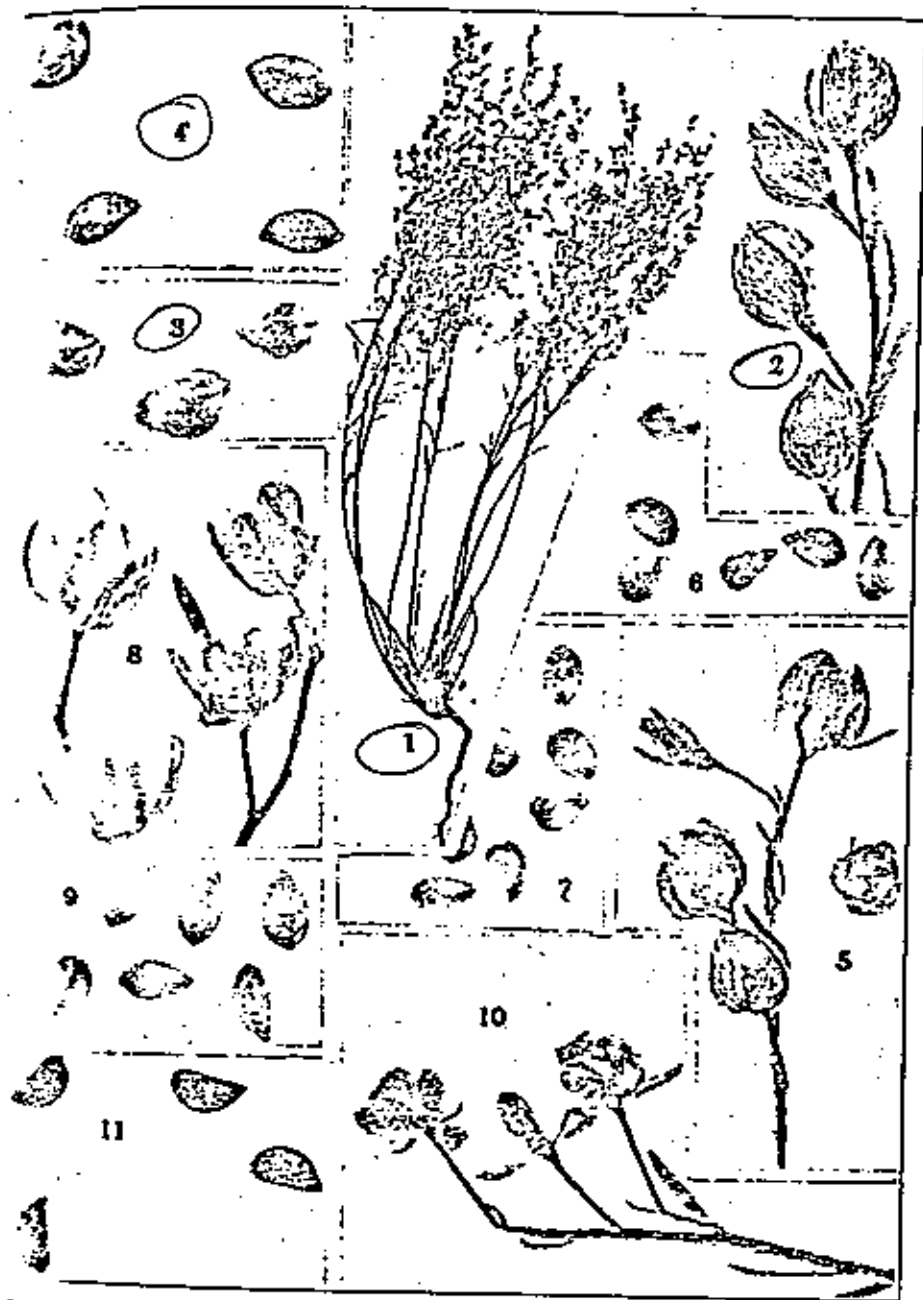
Kennedy, K. 1997. Memo to Bill Carr dated 3 October 1997. U. S. Fish & Wildlife Service, Ecological Services Field Office, Austin, Texas.



Lechea mensalis @ Bonnie Amos

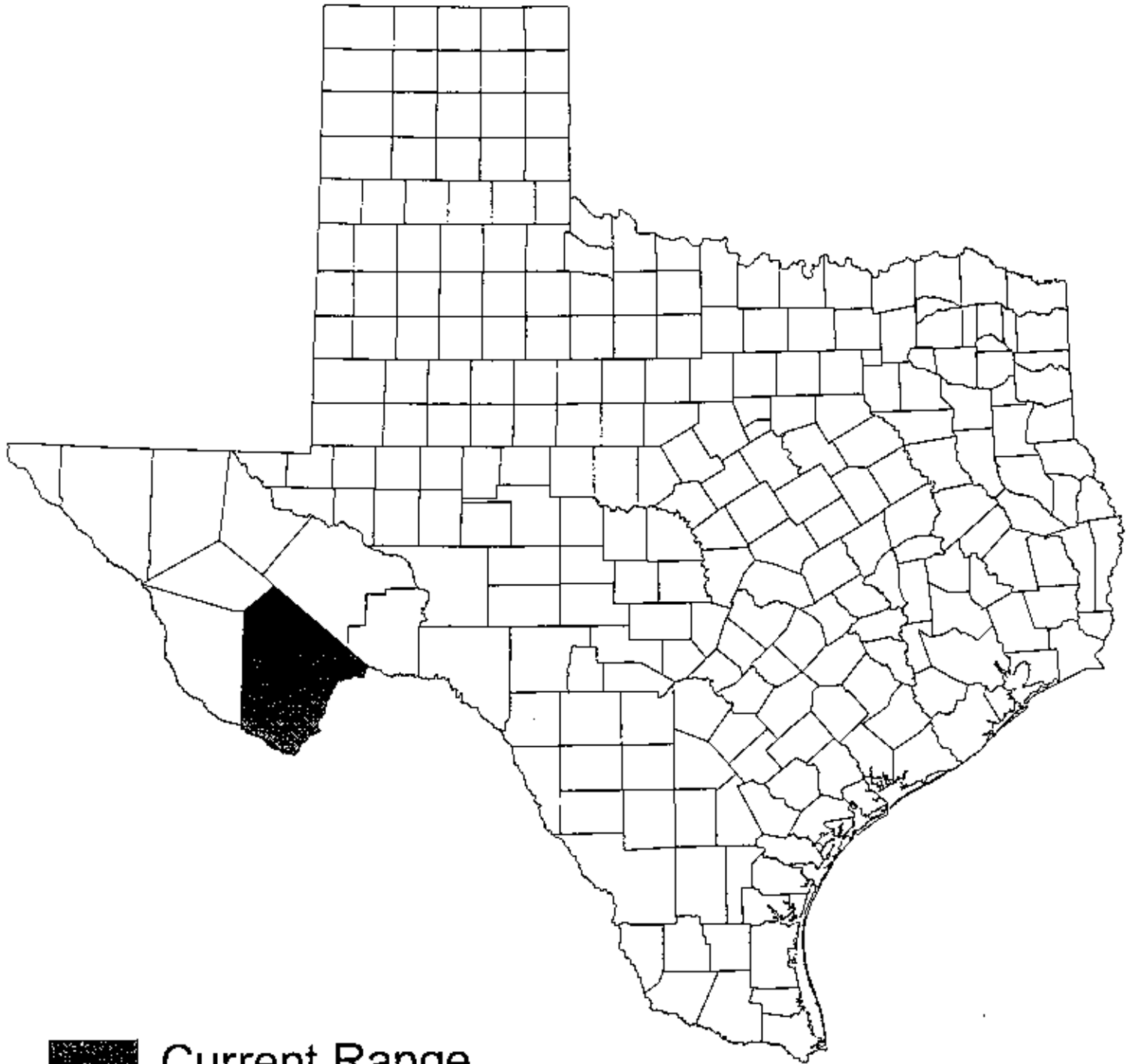


Lechea @ Bonnie Amos



Lechea TEXENSIS: FIG. 1, TYPE, $\times \frac{2}{3}$; FIG. 2, fruits, $\times 8$; FIG. 3, capsules, $\times 8$; FIG. 4, seeds, $\times 10$.
TEXENSIS: FIG. 5, fruits and separated capsule, $\times 8$; FIGS. 6 and 7, seeds, $\times 10$.
TEXENSIS, var. occidentalis: FIG. 8, fruits and capsule, $\times 8$; FIG. 9, seeds, $\times 10$.
occidentalis: FIG. 10, fruits, $\times 8$, from TYPE.
triplicata: FIG. 11, seeds, $\times 10$.

JUL 5 1977



 Current Range

Lechea mensalis
(Chisos pinweed)

Scientific Name: *Leitneria floridana* Chapm.

Synonyms: None.

Common Name: corkwood

Global/State Ranks: G3S1

Federal Status: SOC

Global Range: Scattered locations in Arkansas, Florida, Georgia, Missouri, Mississippi and Texas.

State Range: Brazoria, Chambers, Fort Bend and Jefferson counties. Introduced and persistent at Galveston Island State Park, Galveston County.

Description (adapted from Godfrey & Wooten 1981; Correll & Johnston 1970; Vines 1960): Wandlike or treelike shrub to 6 m tall (Texas specimens mostly 1-2 m tall), spreading by shoots from the extensive roots; bark reddish-brown, smooth, with buff-colored lenticels; twigs at first densely pubescent, becoming glabrous in age. Leaves alternate, simple, with petioles 2-4 cm long, the blades elliptic to lanceolate-elliptic, 5-17 cm long and 2-5 cm wide, pinnately veined, margins entire, bases and apices acute; emerging leaves white to silvery pubescent. Flowers borne in catkins produced from the previous season's wood before the leaves emerge, staminate and pistillate flowers usually on separate plants; staminate catkins erect to spreading, flexuous, often nodding distally, brownish, 2-5 cm long and 1-1.5 cm wide; pistillate catkins stiffly erect, much less conspicuous than the staminate, reddish, mostly 1-2 cm long and ca. 1 cm wide; stamens free, mostly in clusters of 10-12 in the axils of deltoid-ovate scales, the perianth absent; pistillate flowers sessile, usually solitary in the axils of spirally-arranged primary bracts, each with 2 bractlets at the base and surrounded by a perianth-like structure of (3-) 4 (-8) segments, 2 often larger than the others. Fruit an erect, smooth, leathery, long-elliptic or oblong-elliptic drupe, usually brownish at maturity, up to 25 mm long, in clusters of 2-4.

Similar Species: None. The sticklike habit, very lightweight wood and foliage are unique among Texas species. Corkwood has no close relatives, being the sole member of its genus, family and order.

Habitat: Wet or saturated silty soils along brackish or freshwater swamps and ponds, sometimes along railroad embankments. The largest known Texas population occurs in the understory of a deciduous forest along the margin of a natural pond, in the shade of a broken canopy of *Carya aquatica* and *Fraxinus pennsylvanica*, along with scattered *Sabal minor* and a dense ground layer of *Panicum gymnocarpon*. Corkwood plants here are mostly sticklike and 1-2 m tall, although a few reach a height of 3 m.

Phenology: Flowering in spring; fruiting as early as May.

Comments: The exceedingly light wood was used in the past as floats on fishing nets (Vines 1960).

Illustrations: Line drawings appear in Godfrey & Wooten (1981) and are reproduced in Correll & Correll (1975) and Godfrey (1988); other line drawings appear in Vines (1960). A color photograph appears in Hunter (1989).

Selected References:

- Bogle, A. L. 1997. Leitneriaceae. Pp. 414-415 in: Flora of North America Committee. 1997. Flora of North America north of Mexico. Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, New York. 590 pp.
- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. 2 volumes. Stanford University Press, Stanford. 1777 pp.
- Godfrey, R. K. 1988. Trees, shrubs, and woody vines of northern Florida and adjacent Georgia and Alabama. The University of Georgia Press, Athens. 734 pp.
- Godfrey, R. K. and A. F. Clewell. 1965. Polygamodioecious *Leitneria floridana* (Leitneriaceae). Sida 2: 172-173.
- Godfrey, R. K. and J. W. Wooten. 1979. Aquatic and wetland plants of the southeastern United States. Monocotyledons. The University of Georgia Press, Athens. 712 pp.
- Hunter, C. G. 1989. Trees, shrubs, and vines of Arkansas. Ozark Society Foundation, Little Rock. 207 pp.
- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA, Forest Service, Technical Publication R8-TP2. 1305 pp.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.



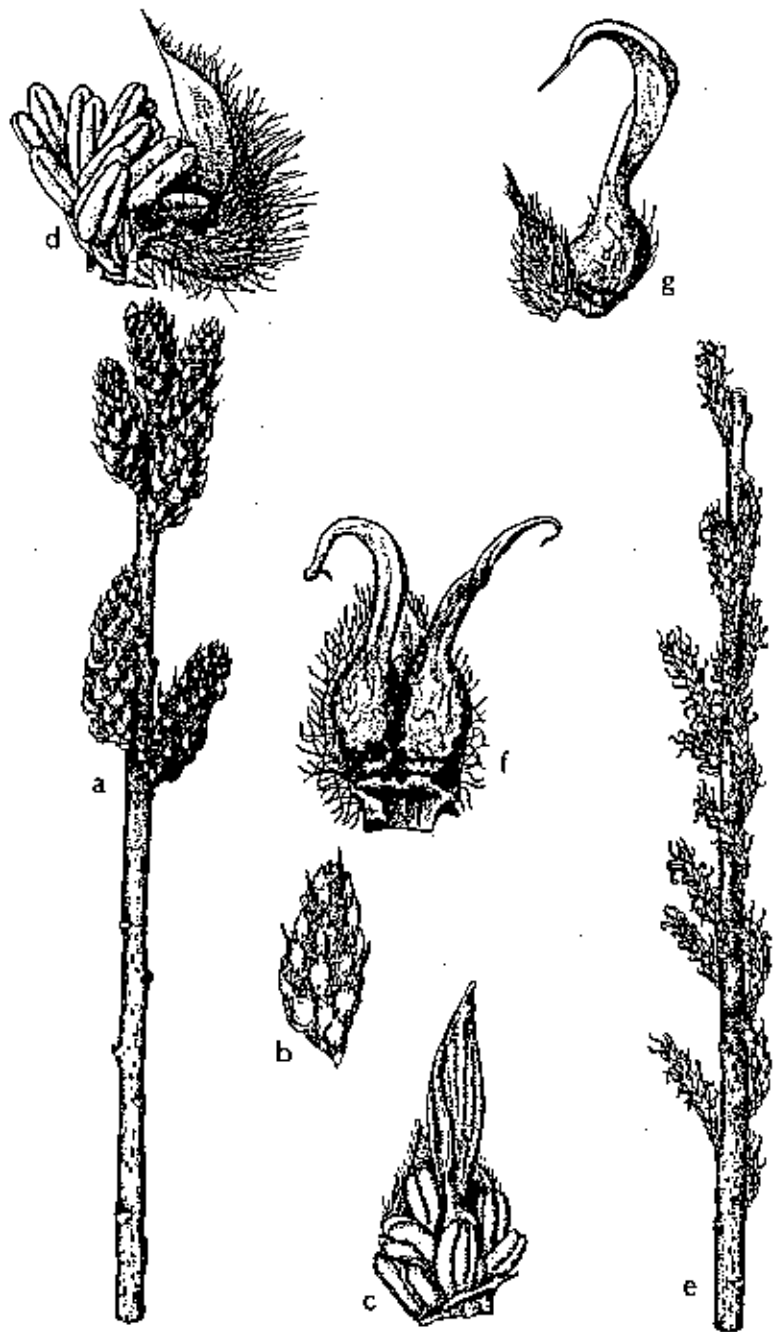
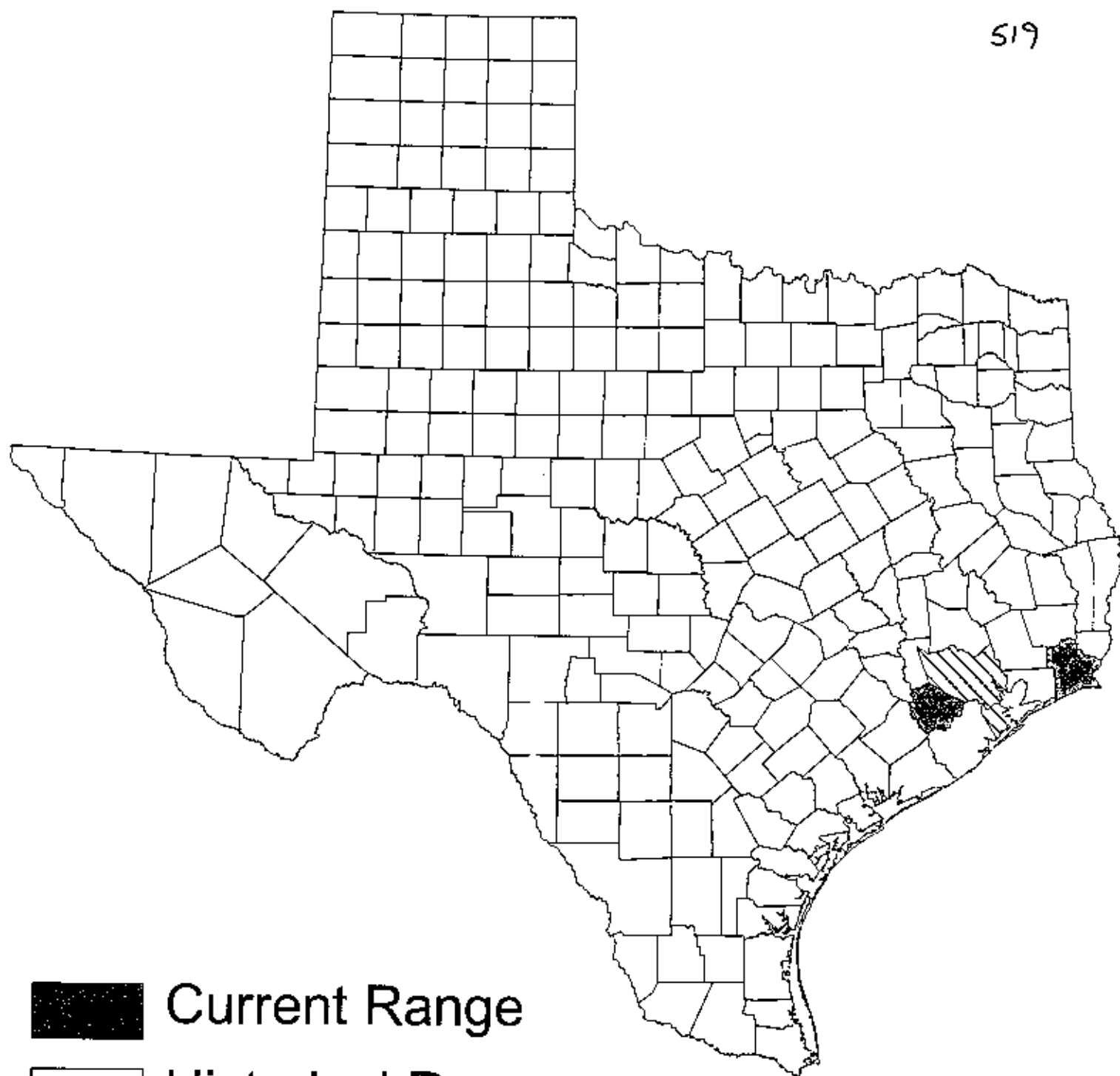


Fig. 390: *Lettneria floridana*: a, staminate twig, $\times \frac{1}{2}$; b, staminate catkin, about $\times 1$; c, staminate flower, $\times 5$; d, staminate flower, $\times 7$; e, pistillate twig, $\times \frac{1}{2}$; f, two fruits together, g, single fruit, $\times 6$. (Courtesy of R. K. Godfrey).



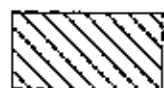
Fig. 391: *Lettneria floridana*: a, fruiting branch, $\times \frac{1}{8}$; b, section of branch, leaf with section enlarged to show venation. (Courtesy of R. K. Godfrey).



Current Range



Historical Range



Introduced

Leitneria floridana
(corkwood)

Scientific Name: *Lepidospartum burgessii* B. L. Turner

Synonyms: None.

Common Name: gypsum scalebroom, Burgess broomshrub

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Near the Guadalupe Mountains in Texas and the Brokeoff Mountains of Otero County, New Mexico.

State Range: Northern Hudspeith County.

Description (adapted from Henrickson & Johnston in prep.; Powell 1998; Turner 1977): Broom-like shrubs 3-7 dm tall; stems white-pannose or tomentose, with many yellow, oil-bearing glandular blisters 0.5-1 mm long. Leaves alternate, simple, linear-filiform to acerose, 5-15 (-20) mm long, 0.5-0.7 mm wide, tomentose-canescens to more or less glabrate, deciduous, leaving swollen nodes. Flower heads short-pedunculate to sessile in clusters of 2-5 at the stem tips; involucre cylindrical to narrowly turbinate, 9-10.5 mm long; phyllaries 10 or so, white-pannose, the 3 innermost 8-9 mm long and seeming to clasp a disk flower, the other phyllaries only 1-4 mm long; ray flowers absent; disc flowers 3, the corolla 10-11 mm long, the lobes 3-3.5 mm long; anthers 3-4 mm long. Achene fusiform, ca. 4 mm long, with dense straight to curly white hairs 3-5 mm long, capped by a pappus of ca. 150 yellowish-tawny bristles (5-) 8-9 mm long.

Similar Species: None. Gypsum scalebroom is easily recognized by the matted white hairs and the oil-bearing pustules on its stems, its 3-flowered heads and white-pubescent achenes (Turner 1977).

Habitat: Gypsum dunes system in the salt basin west of the Guadalupe Mountains, east of Dell City. Some plants occur on and around shifting, unstabilized dunes; others occur in stabilized gypseous soils with a microbiotic crust. Vegetative cover in both situations is sparse; common associates include *Atriplex canescens*, *Sporobolus airoides*, *Poliomintha incana* and *Tiquilia hispidissima* (Rowell 1983; Ladyman & Gegick 2001).

Phenology: Flowering May-late summer.

Comments:

Illustrations: Line drawings appear in New Mexico Native Plant Protection Advisory Committee (1984) and Powell (1998).

Selected References:

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant surveys. Report prepared for Guadalupe Mountains National Park.

- Ladyman, J. A. R., L. DeLay, P. Gegick and M. A. Bogan. 1999. Status and reproductive biology of *Lepidospartum burgessii* (Burgess broomshrub or gypsum broomscale). New Mexico Natural Heritage Program and United States Geological Survey, University of New Mexico, Albuquerque. 108 pp.
- Ladyman, J. A. R. and P. Gegick. 2001. The status of *Lepidospartum burgessii* (Burgess broomshrub or gypsum broomscale). Pp. 116-127 in: Maschinski, J. and L. Holter, eds. 2001. Southwestern rare and endangered plants: proceedings of the third conference, 2000 September 25-28, Flagstaff, AZ. Proceedings RMRS-P-23. U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO. 250 pp.
- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Rowell, C. M., Jr. 1983. Status report [on *Lepidospartum burgessii*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Turner, B. L. 1977. *Lepidospartum burgessii*, (Asteraceae, Senecioneae), a remarkable new gypsophilic species from Trans-Pecos Texas. *Wrightia* 5(9): 354-355.
- Worthington, R. D. and W. H. Reid. 1985. Vegetation of the gypsum dune habitat, Hudspeth County, Texas. Report prepared for the Texas Nature Conservancy, San Antonio.



Family: ASTERACEAE (Compositae)
Scientific Name: *Lepidospartum burgessii* Turner
Common Name: Gypsum scalebroom
Classification: Biologically threatened
Federal Action: Federal Register, 15 December 1980, candidate for federal protection
Common Synonyms: None

Description: Silvery white shrub up to 70 cm (28 in.) tall, the stems many times branched and covered with silvery, matted, feltlike hairs out of which protrude numerous small oil blisters, leaves needlelike, alternate, 5–12 mm (0.25–0.5 in.) long, 1–4 heads, terminal or axillary near the ends of broomlike branches, each head about 1 cm (0.4 in.) long, narrow, with about 10 bracts, but the lower six or seven reduced, the upper three long, about equal in length, blunt or rounded at the tip and conspicuously thickened along the center, flowers only three per head, all of the tube type, yellow; achenes densely covered with white, bristly hairs and topped by a pappus of numerous slender bristles. Flowers in July and August.

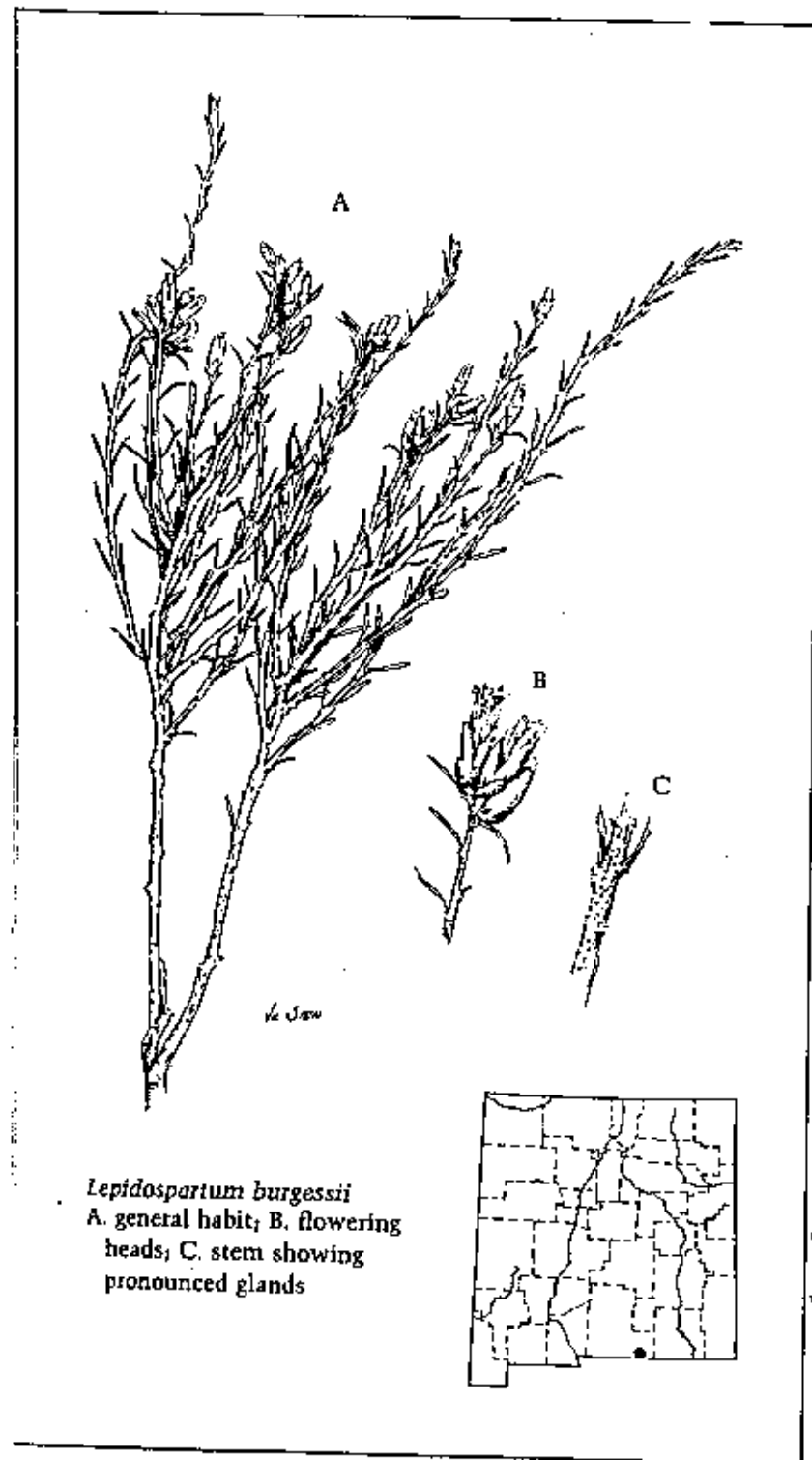
Known Distribution: Otero County, New Mexico, and adjacent Texas
Habitat: Gypseous ridges and flats, at about 1,250 m (4,000 ft.)
Ownership: Bureau of Land Management, private
Threats to Taxon: None known

Similar Species: The closest relatives of this species are shrubs in southern California. In New Mexico, it may be mistaken for a *Chrysothamnus* because of its narrow heads and matted hairs, but the three rounded bracts of the involucre on the heads distinguish it from that genus.

Remarks: This species was formerly considered to be a local endemic in extreme western Texas; it was first described and said to be rare in 1977. It was discovered in New Mexico in 1982, where it is locally abundant on a few small alkaline playas.

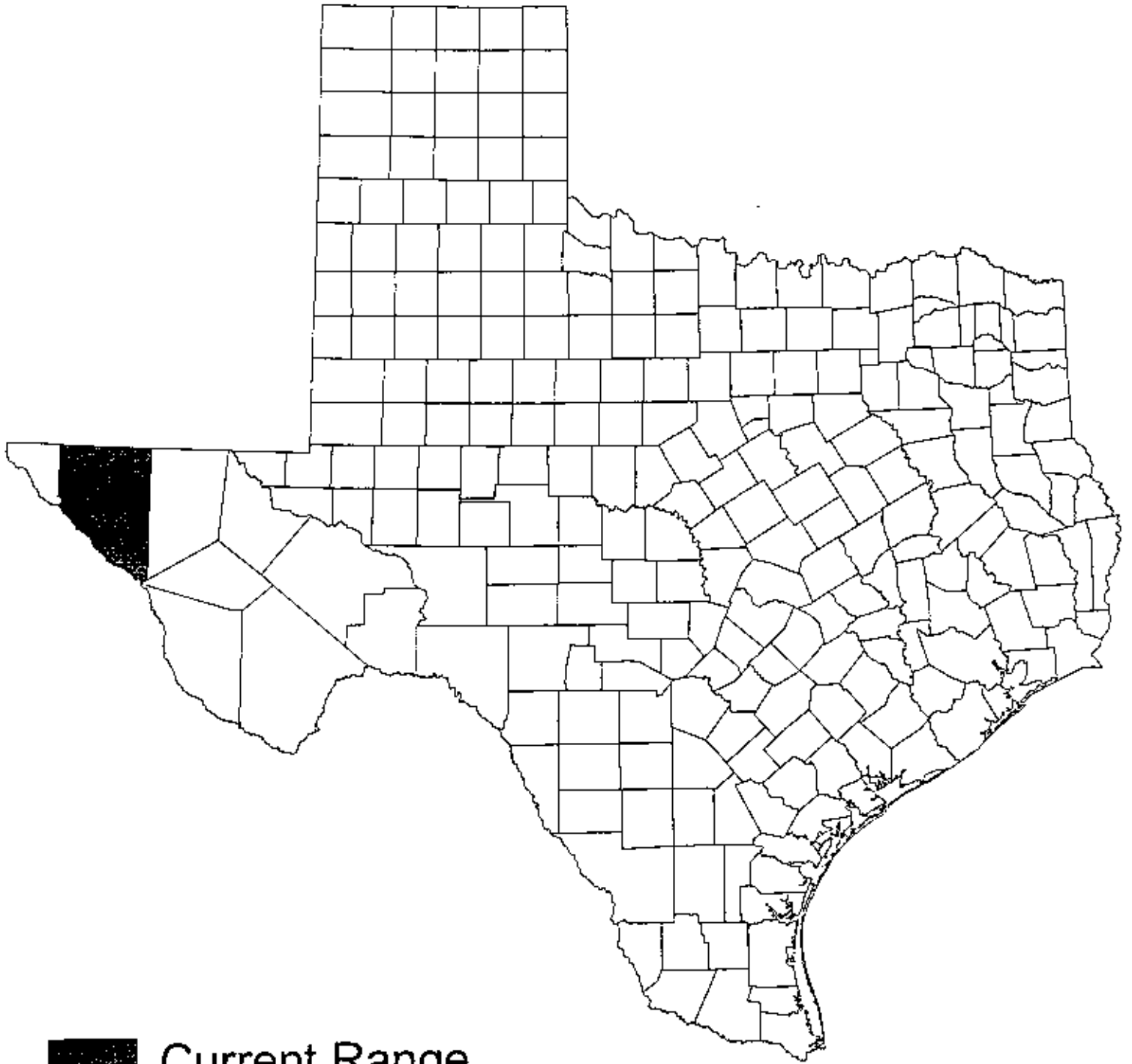
Important Literature:

Turner, B. L. *Lepidospartum burgessii* (Asteraceae, Senecioneae), a remarkable new gypsophilic species from Trans-Pecos Texas. *Wrightia* 5:354–55, 1977.



Lepidospartum burgessii
 A. general habit; B. flowering heads; C. stem showing pronounced glands

523



Current Range

Lepidospartum burgessii
(gypsum scalebroom)

Scientific Name: *Lesquerella pallida* (T. & G.) Wats.

Synonyms: *Vesicaria grandiflora* Hook. var. *pallida* T. & G.; *Vesicaria pallida* (T. & G.) O. Ktze.; *Alyssum pallidum* (T. & G.) O. Ktze.

Common Name: white bladderpod

Global/State Ranks: GIS1

Federal Status: Endangered

Global Range: Endemic to east Texas.

State Range: Known only from San Augustine County.

Description (adapted from Nixon, Ward & Lipscomb 1983; Rollins 1993): Annual(?), usually branching at the base and/or in the upper parts; stems slender, to 5 mm wide at base, decumbent to erect, yellowish green to grayish green, pubescent with small stellate trichomes, the rays simple or more often forked, sometimes trifurcate; stems slender and decumbent, much-branched, to 3 (-6) dm long. Leaves basal and cauline, stellate-pubescent on both surfaces; basal leaves to 10 cm long and 2 cm wide, with petioles to 4 cm long, sometimes pinnately lobed; cauline leaves alternate, simple, yellowish green to grayish green, stellate-pubescent on both surfaces, linear to oblong to lanceolate, entire to rather coarsely dentate, sometimes undulate, gradually reduced upward. Flowers in terminal racemes, the pedicels up to 18 mm long, slightly recurved at maturity; sepals 4, greenish in bud, becoming cream to yellowish-orange at maturity, with stellate hairs and hyaline margins, oblong to narrowly ovate, acute, to 5 mm long and 2 mm wide; petals 4, white with a yellow base and brownish to olive veins, glabrous, broadly ovate, narrowing abruptly to base, to 12 mm long and 8.5 mm wide; stamens 6, tetradynamous, the filaments to 4.8 mm long, the anthers bright yellow, to 2 mm long; pistils at anthesis to 5 mm long and 1.5 mm wide, the styles to 3.1 mm long with very short stigmas. Fruit a glabrous, globose to ellipsoid silique 5-6 mm in diameter and about as long, on a stipe to 1.2 mm long, the style persistent; seeds usually 4-6 in both of the 2 locules, ca. 2 mm long and 1.6 mm wide, flattened.

Similar Species: Other Texas species of *Lesquerella* with white petals occur only in the arid western portion of the state.

Habitat: Natural openings or glades within pine-oak forests on calcareous sandy loam or sandy clay loam over ironstone / glauconite of the Weches Formation. These glades are seep-moistened during the winter and spring but become desiccated during the summer. Associates include *Allium drummondii*, *Astranthium integrifolium*, *Bouteloua curtipendula*, *Cacalia plantaginea*, *Eleocharis compressa*, *Minuartia drummondii*, *M. paula*, *Phalaris caroliniana*, *Calamintha arkansana*, *Sedum pulchellum*, *Sporobolus vaginiflorus* and *Valerianella radiata* (Bridges 1988; George 1987). *Leavenworthia aurea* var. *texana*, another rare Weches outcrop endemic, occurs at several sites.

Phenology: Flowering April-May.

Comments: Listed as Endangered on 11 March 1987.

Illustrations: Line drawings and a color photograph appear in Poole & Riskind (1987); line drawings also appear in Nixon et al. (1983).

Selected References:

- Bridges, E. L. 1988. Endangered species information system species workbook [for] *Lesquerella pallida*. Report prepared for U.S. Fish & Wildlife Service Region 2.
- George, R. J. 1987. The herbaceous flora of three Weches Formation outcrops in eastern Texas. M. S. thesis, Stephen F. Austin State University, Nacogdoches. 61 pp.
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- Nixon, E. S. 1984. Status report [on *Lesquerella pallida*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
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- Rollins, R. C. 1993. The Cruciferae of continental North America. Stanford University Press, Stanford. 976 pp.

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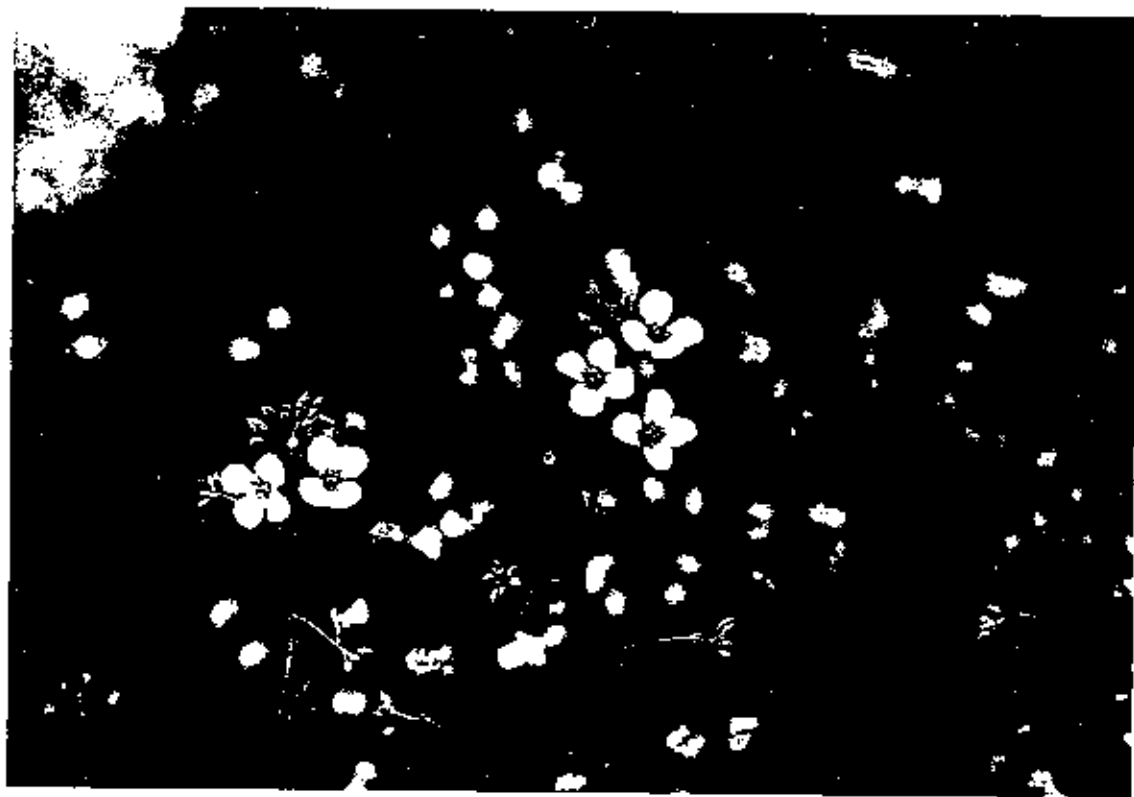


TABLE 1. Physical and chemical properties of Weches and adjacent pasture soils.

Location	Sand	TEXTURE (%)			TEXTURAL Class	pH
		Silt	Clay			
Weches	78	8	14		Sandy loam	7.1
Pasture	51	27	22		Sandy clay loam	7.2

	EXCHANGEABLE IONS (PPM)						
	P	K	Ca	Mg	Fe	Mn	Zn
Weches	13	170	>6000	>400	>10	3	0.2
Pasture	12	230	4900	>400	>10	>5	0.4

and adjacent pasture areas because they are treeless. Weches outcrops are naturally treeless in forested eastern Texas, providing habitat for shade intolerant species. Forests, in contrast, are migration barriers in these circumstances and may be the prime factor causing the limited distribution of *L. pallida*. Some migration has occurred into adjacent cleared pastureland. This pastureland, however, appears to have soil characteristics similar to those of the Weches outcrop (Table 1).

POPULATION SIZE

Because the Weches Formation is a rather narrow layer, *L. pallida* is distributed as a band of plants covering approximately 2.02 ha (5 acres). We counted 3,319 plants in this area. We searched other Weches outcrops for the occurrence of *L. pallida* but other populations have not been found.

LESQUERELLA PALLIDA vs. LESQUERELLA GRACILIS

Lesquerella pallida was first recognized as a variety in 1838 by Torrey & Gray. It was, however, described as a variety of *Vesicaria grandiflora*, an auriculate species of loose sandy soils in southern and central Texas. In 1840 Torrey & Gray elevated *V. pallida* to a species of *Vesicaria*. Watson (1888) erected the genus *Lesquerella* and at the same time transferred *pallida* from *Vesicaria*, an old world genus, to *Lesquerella*. Rollins & Shaw recognized *L. pallida* as a good species in their treatment of *Lesquerella* in Correll & Johnston (1970).

Flower color is a distinguishing characteristic: *L. pallida* has white petals with a yellow base (Fig. 1), and *L. gracilis* has yellow petals. The two species have also been separated based on pedicel features: *L. pallida* has recurved

pedicels, and *L. gracilis* has ascending to spreading, straight pedicels (Correll & Johnston, 1970). Although useful, this character does not appear to be constant. The upward curvature of the stipe of *L. gracilis* is a more con-

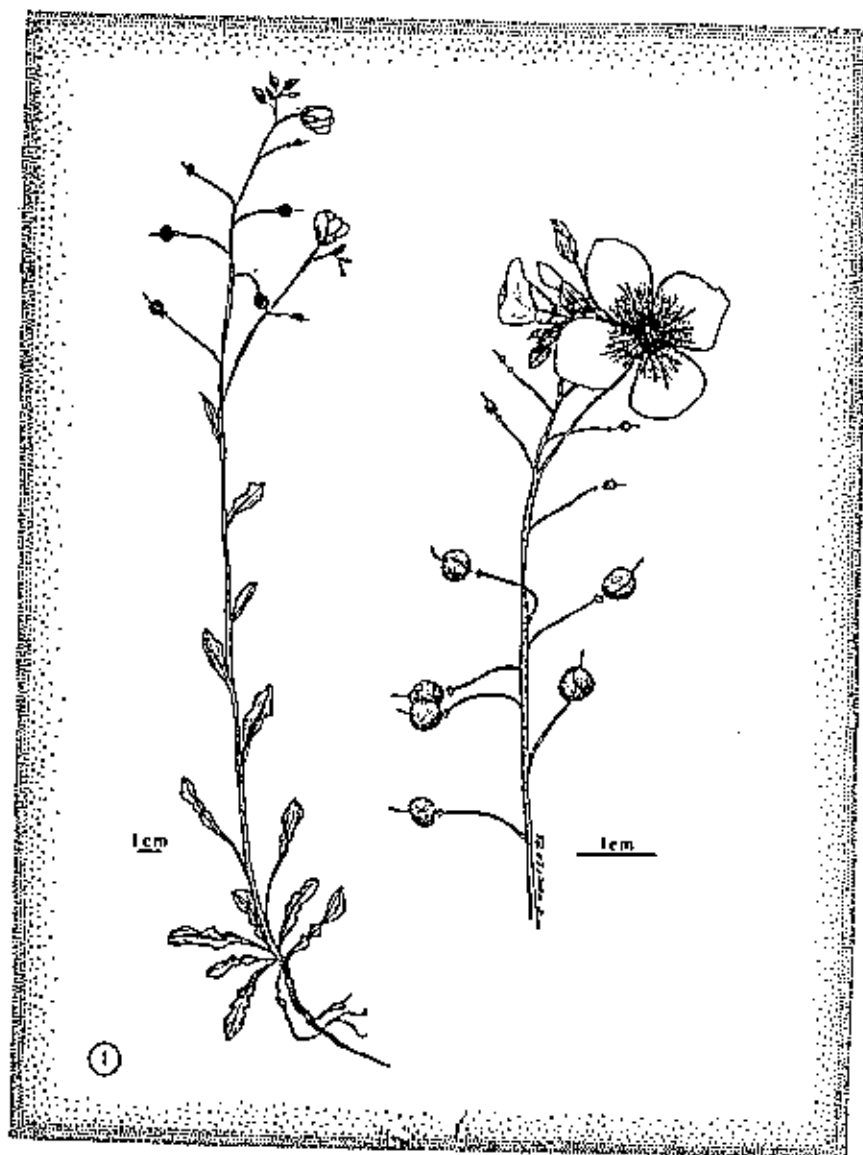
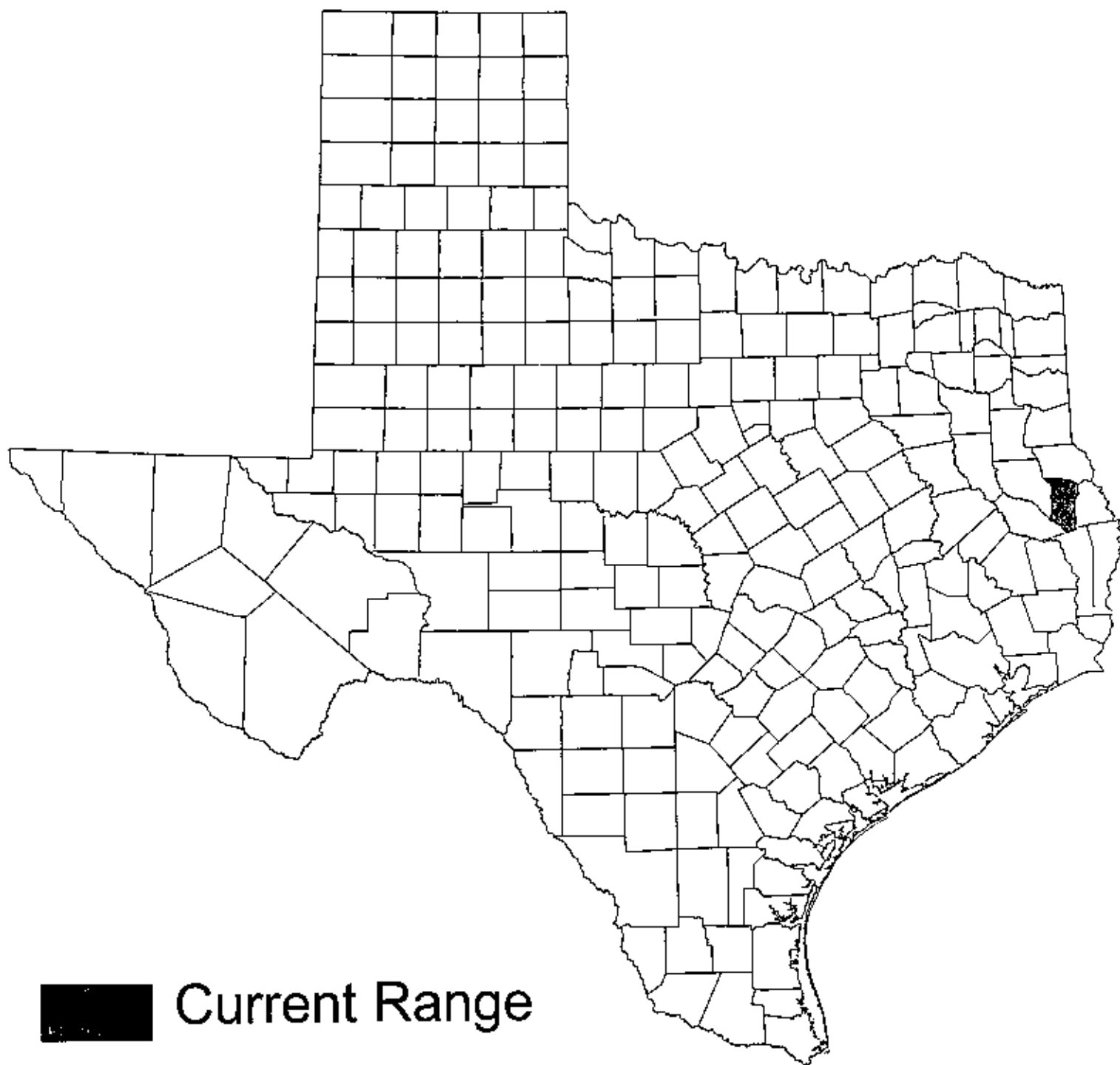


Figure 1. *Lesquerella pallida* (from Nixon & Ward, 1966; Nixon et al. 1978, and photographs).



■ Current Range

Lesquerella pallida
(white bladderpod)

Scientific Name: *Lesquerella thamnophila* Roll. & Shaw

Synonyms: None.

Common Name: Zapata bladderpod

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: South Texas and Tamaulipas.

State Range: Starr and Zapata counties.

Description (adapted from Rollins 1973): Perennial with one or several flexuous, sprawling to ascending stems from the base, to 8 dm long but often much shorter during dry years; vegetative parts covered with short-stalked trichomes stellate trichomes with 4-6 rays that are distinct or slightly fused at the base and forked or bifurcate distally. Leaves basal and cauline, usually silvery- or gray-green; basal leaves 4-12 cm long and 7-15 mm wide, the blade narrowly elliptic and acute, entire to sinuate to shallowly dentate, very rarely pinnatifid, narrowly gradually to a slender petiole 1-2 times the length of the blade; cauline leaves alternate, simple, 3-4 cm long and 2-8 mm wide, linear to elliptic, acute and entire to sinuate or remotely dentate, sessile or the lower ones on a short petiole. Flowers in loose terminal racemes lengthening to 30 cm long and becoming strongly secund in fruit; pedicels 15-20 (-25) mm long, curved-horizontal or recurved but not S-shaped; sepals 4, 3.5-4 mm long, elliptic; petals 4, yellow, 4-5 mm long and 3.4-4.5 mm wide, broadly obovate, sometimes with a short broad claw; stamens 6; style single, 1.5-2 mm long. Fruit a sessile or subsessile, subglobose to broadly ovoid, glabrous silique 4.5-6.5 mm long, sometimes capped by the usually deciduous style, containing 4 seeds in both of its 2 chambers.

Similar Species: At least 4 other *Lesquerella* species occur in the general range of Zapata bladderpod. Features that set this species apart from its relatives include its perennial habit, 4-6 rayed trichomes, non-auriculate leaves, recurved pedicels and relatively long style.

Habitat: Open, mostly evergreen thorn shrublands on shallow, well drained, gravelly to sandy loams derived from Eocene strata including the Jackson Group and the Yegua and Laredo formations. Soils at known sites are of the Zapata, Maverick, Catarina and Copita series. Frequent associates include *Acacia rigidula*, *A. smallii*, *A. berlandieri*, *Prosopis glandulosa*, *Leucophyllum frutescens*, *Opuntia engelmannii* var. *lindheimeri*, *Yucca treculeana*, *Guaiacum angustifolium*, *Celtis pallida*, *Dyssodia pentachaeta*, *Dalea nana*, *Melampodium cinereum* and *Nama hispidum* (Poole 1989).

Phenology: Usually flowering in the spring (March-April), but sometimes later in the year depending upon rainfall.

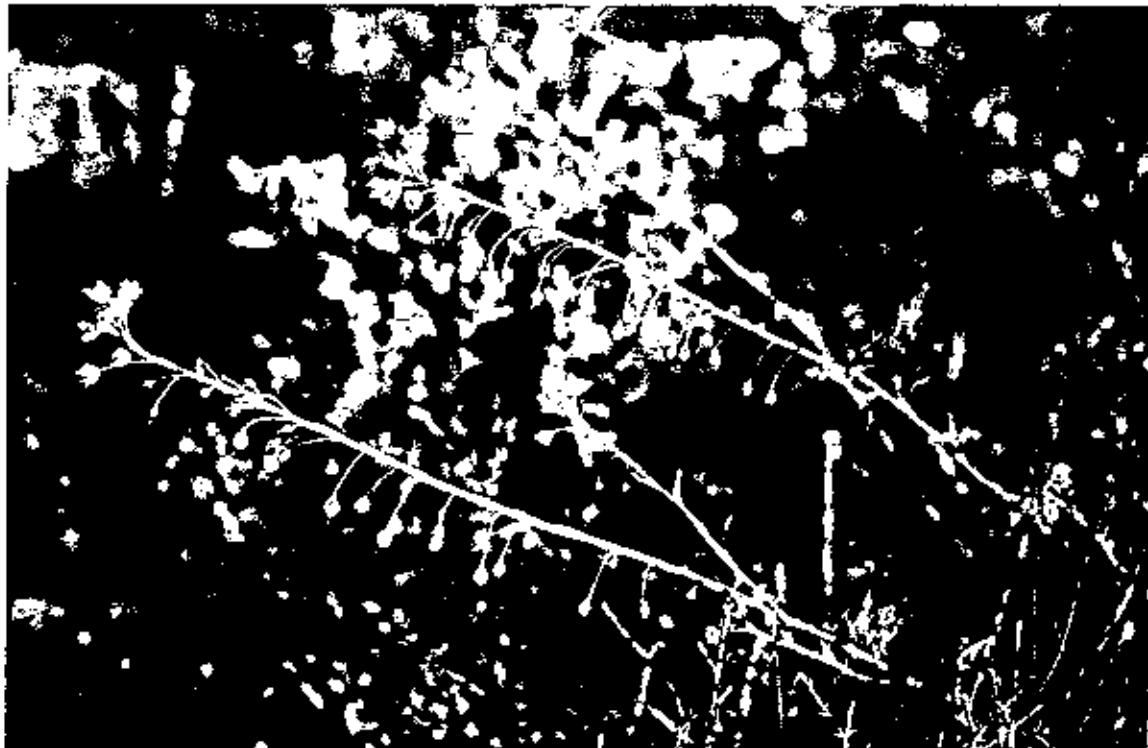
Comments: Listed as Endangered on 22 November 1999.

Illustrations: A line drawing appears with the type description in Rollins & Shaw (1973).

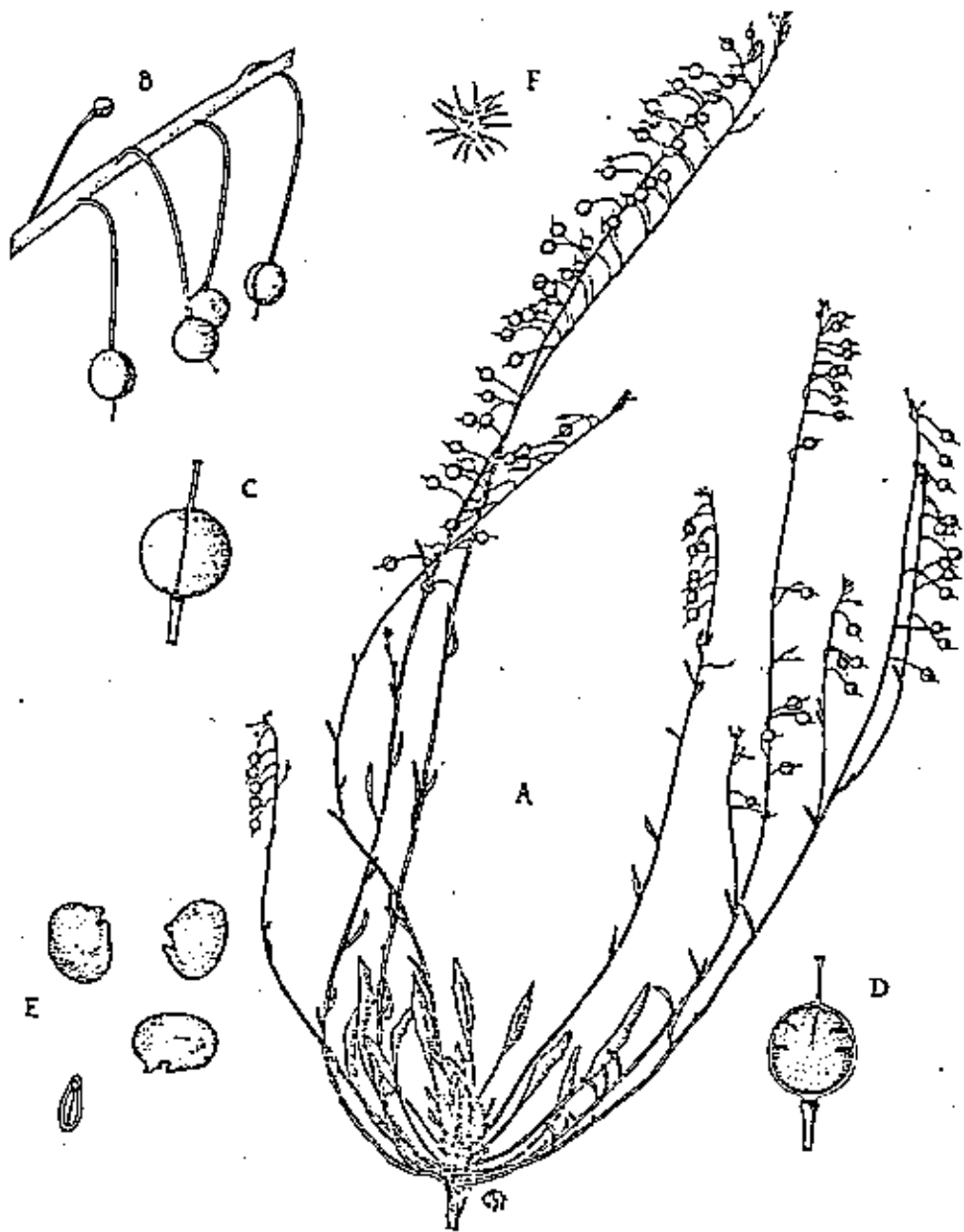
Selected References:

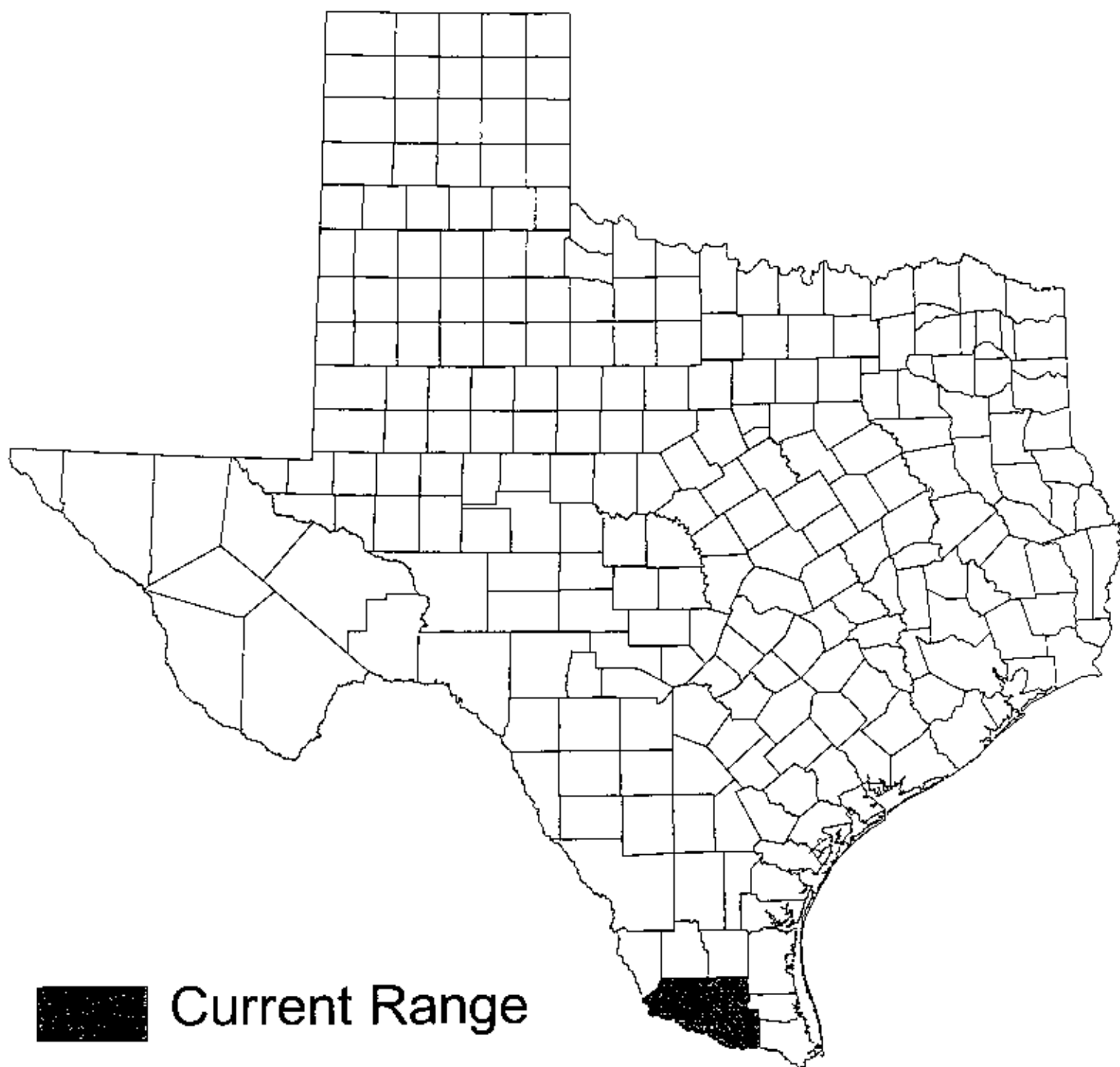
Poole, J. M. 1989. Status report on *Lesquerella thamnophila*. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

- Rollins, R. C. and E. A. Shaw. 1973. The genus *Lesquerella* (Cruciferae) in North America. Harvard University Press. 288 pp.
- Rollins, R. C. 1993. The Cruciferae of continental North America. Stanford University Press, Stanford. 976 pp.



Lesquerella thamnophila, Rollins and Correll 5949. Fig. A, habit $\times \frac{1}{4}$.
 Fig. B, portion of infructescence $\times 1\frac{1}{2}$. Fig. C, silique $\times 2\frac{1}{2}$. Fig. D, replum $\times 2\frac{1}{2}$.
 Fig. E, seeds in side view and cross-section $\times 5$. Fig. F, trichome $\times 25$. Drawings by
 C. S. Tseng.





■ Current Range

Lesquerella thamnophila
(Zapata bladderpod)

Scientific Name: *Lesquerella valida* Greene

Synonyms: *Lesquerella lepidota* Cory

Common Name: strong bladderpod, scaly bladderpod

Global/State Ranks: G3S1

Federal Status: 3C

Global Range: Mountains of south-central New Mexico, west Texas and northern Coahuila (Wood et al. 1999).

State Range: Guadalupe and Delaware Mountains of Culberson County and the Eagle Mountains and Sierra Diablo of Hudspeth County.

Description adapted from Rollins & Shaw 1973; Correll & Johnston 1970; Rollins 1993): Perennial, densely pubescent with sessile, granular, stellate trichomes, the many rays fused about 1/2 their length, once- or twice-forked; stems to 2 dm tall, erect to decumbent, unbranched. Leaves basal and cauline, simple; basal leaves 3-8 cm long, 5-15 mm wide, the blades broadly elliptic to lanceolate or obovate, tapering gradually to the petiole, entire to repand or coarsely dentate; cauline leaves alternate, to 2 cm long and 10 mm wide, elliptic to obovate, entire, tapering to a short petiole or sessile. Flowers in dense racemes, the pedicels straight or ascending or slightly curved but neither S-shaped nor strongly recurved, to 15 mm long; sepals 4, 4.5-5.3 mm long, narrowly elliptic or oblong; petals 4, bright yellow, 7.5-8.5 mm long and 2-3 mm wide, ligulate or with a broadly obovate blade narrowing to a broad claw, the margins lacerate; stamens 6, of 2 lengths, the longer to 5.5 mm long; style 1, 3-4 mm long. Fruit a subglobose to ovoid or ellipsoid silique 5.5-8 mm long, sessile or very slightly stipitate, somewhat compressed, slightly pubescent, containing 6-11 seeds in both of the 2 chambers.

Similar Species: Much like other *Lesquerella* species but recognized by its clearly perennial habit and its pubescent siliques on more or less straight pedicels.

Habitat: Open gravelly areas over limestone in pinyon-juniper woodlands above about 6000 feet. Associated species include *Pinus edulis*, *Quercus undulata*, *Q. grisea*, *Rhus trilobata*, *Opuntia imbricata*, *Juniperus deppeana*, *J. monosperma*, *Bouteloua hirsuta*, *B. gracilis*, *Muhlenbergia dubia*, *Schizachyrium scoparium*, *Artemisia ludoviciana*, *A. carruthii*, *Senecio neomexicanus*, *Bahia dissecta*, *Gutierrezia sarothrae*, *Chaetopappa ericoides* and *Eriogonum alatum* (Wagner & Sabo undated).

Phenology: Flowering March-May (-August).

Comments:

Illustrations: A color photograph appears in Warnock (1974).

Selected References:

Cory, V. L. 1930. A new *Lesquerella* from western Texas. *Rhodora* 32: 110.

Rollins, R. C. and E. A. Shaw. 1973. The genus *Lesquerella* (Cruciferae) in North America. Harvard

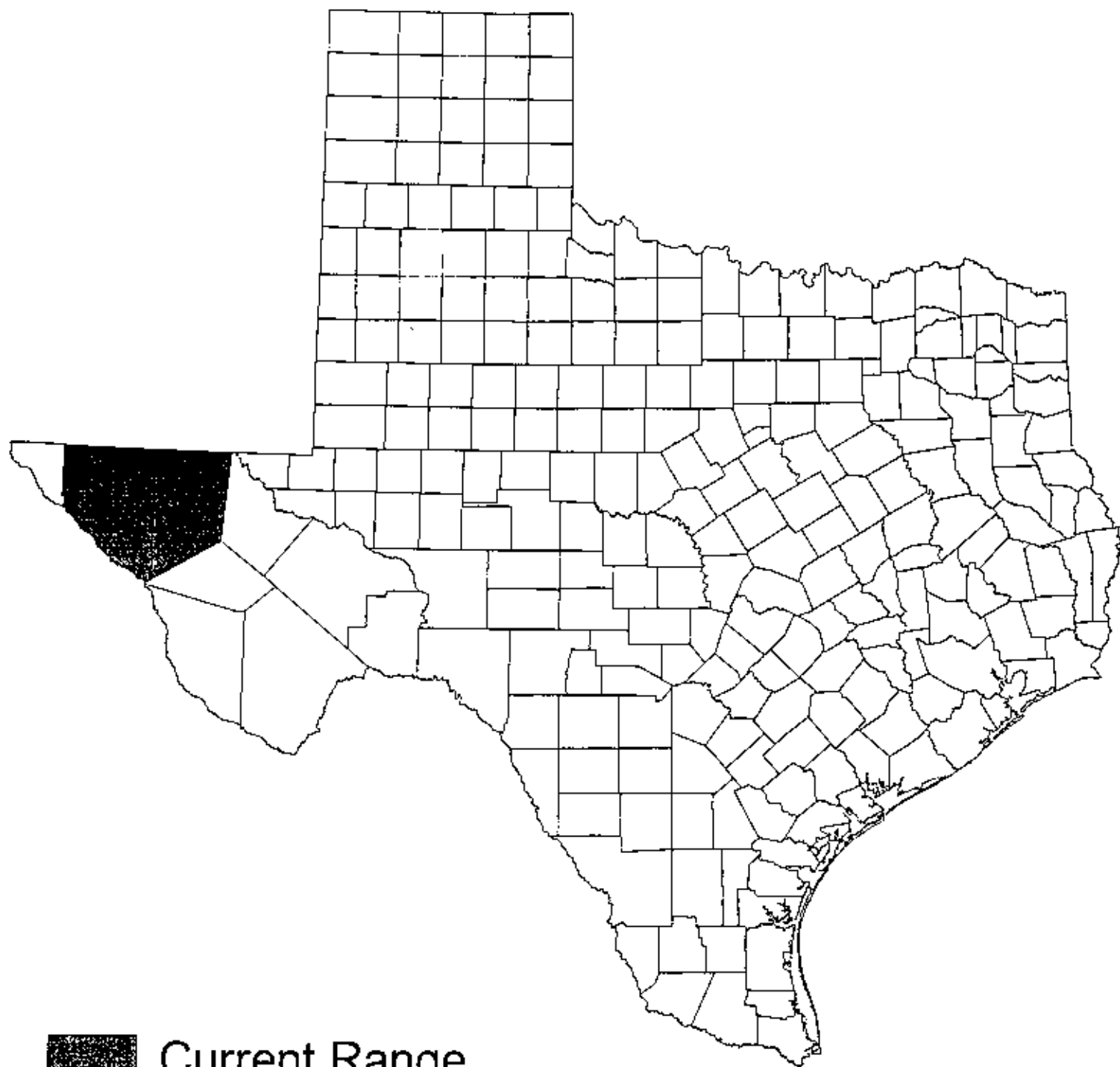
University Press, Cambridge, Massachusetts. 288 pp.

Rollins, R. C. 1993. *The Cruciferae of continental North America*. Stanford University Press, Stanford. 976 pp.

Wagner, W. L. and D. G. Sabo. Undated. *Status report for Lesquerella valida* Greene. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Warnock, B. H. 1974. *Wildflowers of the Guadalupe Mountains and the sand dune country, Texas*. Sul Ross State University, Alpine. 176 pp.

Wood, S., G. Harper, E. Muldavin and P. Neville. 1999. *Vegetation map of the Sierra del Carmen, U.S.A. and Mexico*. Final report submitted to the U. S. Geological Survey, National Wetlands Center, and the National Park Service. 57 pp. + maps and appendices.



 Current Range

Lesquerella valida
(strong bladderpod)

Scientific Name: *Liatris bracteata* Gaiser

Synonyms: None.

Common Name: coastal gayfeather

Global/State Ranks: G2G3S2S3

Federal Status: None

Global Range: Endemic to the Gulf Coastal Plain of Texas.

State Range: Aransas, Brazoria, Colorado, Galveston, Harris, Live Oak, Matagorda, Refugio, San Patricio and Waller counties.

Description (adapted from Gaiser 1946; Correll & Johnston 1970): Perennial from a subglobose corm ca. 4 cm thick from which emerge a few glabrous stems up to 5 dm tall. Leaves linear, glabrous, punctate, rigid, slightly channeled, the basal ones 7-12 cm long and 2-3 mm wide, somewhat rigid, the cauline ones similar but gradually reduced in size up the stem, becoming bractlike in the inflorescence. Flower heads few to many in a lax terminal spike, subturbinate, ca. 2 cm long and 15 mm thick, containing (8-) 10-14 disc flowers (rays absent); outer phyllaries ovate, acuminate; inner phyllaries broader, lanceolate, commonly cuspidate, 10-12 mm long and 3-4 mm wide, commonly purplish, long-ciliate on the margins; disc corolla purple, 5-lobed, 9-11 mm long, sparsely pilose within the tube. Achenes 8-12 mm long, capped with a pappus of plumose bristles 9-15 mm long.

Similar Species: Much like several other *Liatris* species. Characteristic features include narrow, channeled leaves; heads with (8-) 10-14 flowers; mostly appressed, rather broad phyllaries; and plumose (rather than barbellate) pappus.

Habitat: Coastal prairie grasslands of various types, from salty prairie on low-lying somewhat saline clay loams to upland prairie on nonsaline clayey to sandy loams. In salty prairie, coastal gayfeather is usually conspicuous only when the dominant *Spartina spartinae* has been recently burned or continuously heavily grazed, in the company of relatively few other species such as *Iva angustifolia* and *Helenium amarum*. In transitional prairie, coastal gayfeather is often locally common in patches of relatively sparse vegetation dominated by shortgrasses such as *Aristida oligantha* and *Bouteloua rigidiseta* and is relatively scarce in the surrounding matrix of *Paspalum plicatulum*, *Schizachyrium scoparium* and other mid-to tallgrasses. In Harris County, coastal gayfeather occurs with three other rare coastal prairie endemics, *Hymenoxys texana*, *Thurovia triflora* and *Machaeranthera aurea*, in patches of relatively sparse vegetation of slick spots around old pimple mounds. Habitat within upland coastal prairie farther from the coast is difficult to characterize, since most records are from remnants on railroad and highway rights-of-way.

Phenology: Flowering in fall. In heavily grazed pastures, *Liatris bracteata* often flowers when only 4 inches tall.

Comments:

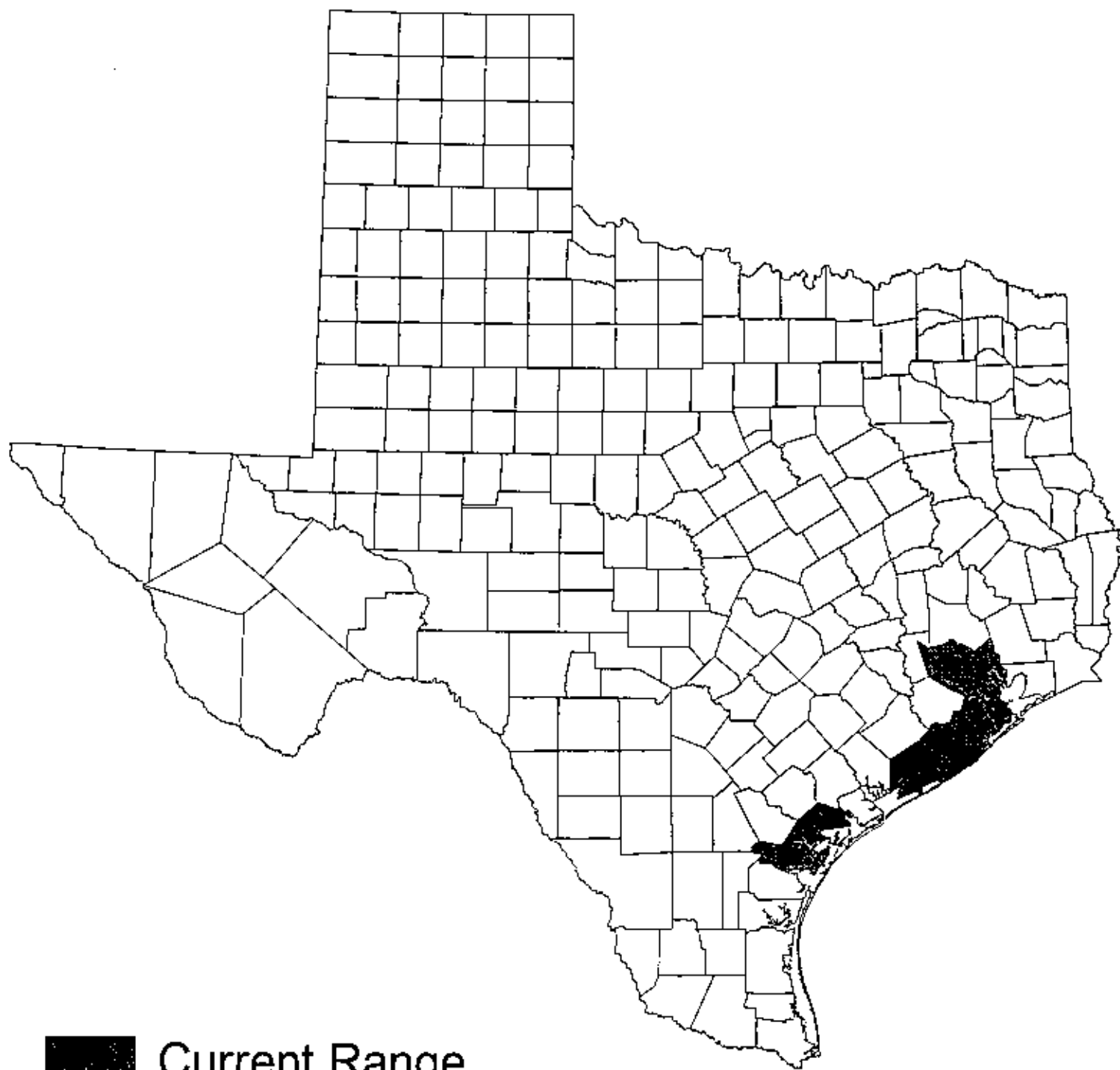
Illustrations: A color photograph appears in Tveten and Tveten (1993).

Selected References:

Gaiser, L. O. 1946. The genus *Liatris*. *Rhodora* 48: 165-183; 216-263; 273-326; 331-382.

Tveten, J. L. and G. A. Tveten. 1993. *Wildflowers of Houston*. Rice University Press, Houston. 309 pp.





■ Current Range
□ Historical Range
Liatris bracteata
(coastal gay-feather)

Scientific Name: *Liatris cymosa* (H. Ness) K. Schum.

Synonyms: *Laciniaria cymosa* H. Ness

Common Name: branched gayfeather

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to the post oak belt of south-central Texas.

State Range: Brazos, Burleson, Lee, San Jacinto, Walker and Washington counties.

Description (adapted from Ness 1899; Correll & Correll 1970): Perennial from a rounded corm to 3 cm thick, the stems stiffly erect, 25-60 cm tall, dichotomously cymosely branched above. Leaves mostly glabrous, punctate, linear-lanceolate, those arising from or near the root 15-20 cm long and 5-15 mm wide, tapering to the base, those on the stem alternate, linear and gradually reduced upward. Flower heads arranged in a simple or compound cyme, the heads 20-25 and 7-10 mm thick, containing ca. 20 disc flowers (rays absent); phyllaries appressed, closely imbricated, in about 6 series, slightly hirsute, ciliate-margined, the outer phyllaries almost orbicular with rounded or truncate apices, the inner ones oblong with mucronate tips, often tinged with purple; disc flowers purple, the corolla ca. 15 mm long, 5-lobed at apex, the lobes smooth. Achenes oblong, 8-15 mm long, 10-ribbed, the ribs hispid, capped by a pappus of plumose bristles ca. 8-10 mm long.

Similar Species: Unique among central Texas *Liatris* species in having a broadly branched cymose inflorescence. All other species have narrow spikes or racemes.

Habitat: Somewhat barren grassland openings in post oak woodlands on tight clayey, chalky, or gravelly soils, often over the Catahoula Formation. Associates include *Andropogon ternarius*, *Aristida oligantha*, *Aster pratensis*, *Bigelovia nuttallii*, *Bouteloua rigidiseta*, *Liatris mucronata*, *L. squarrosa*, *Polygonum tenue*, *Polypremum procumbens*, *Rhynchospora glomerata* and *Schizachyrium scoparium*.

Phenology: Flowering July-October.

Comments:

Illustrations: A line drawing appears in Ness (1899).

Selected References:

Ness, H. 1899. A new species of *Laciniaria*. Bulletin of the Torrey Botanical Club 26: 21-22.

543

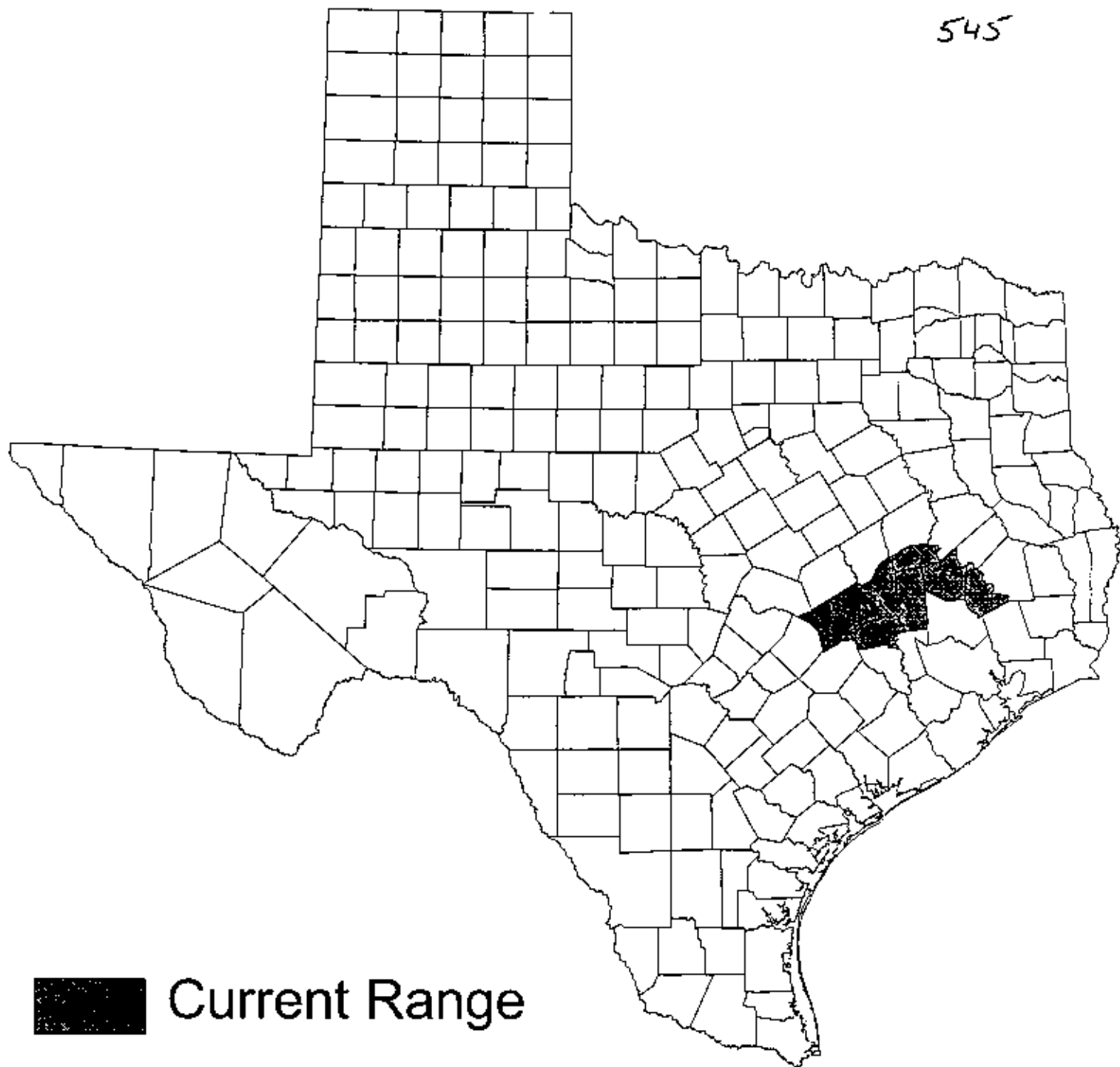


Lacina.

BULL. TORR. BOT. CLUB.



LACINARIA CYMOSA Ness.



■ Current Range

Liatris cymosa
(branched gay-feather)

Scientific Name: *Liatris tenuis* Shinners

Synonyms: None.

Common Name: slender gayfeather

Global/State Ranks: G3S3

Federal Status: SOC

Global Range: Western Gulf Coastal Plain of east Texas and western Louisiana.

State Range: Angelina, Hardin, Jasper, Newton, Orange, Sabine, San Augustine and Tyler counties.

Description (adapted from Shinners 1959; Correll & Johnston 1970; Gandhi & Thomas 1989): Perennial from a simple or branched rhizome; stems solitary or few, unbranched, glabrous below the middle, densely pilose upward. Leaves alternate, simple, linear, sheathing, becoming abruptly smaller above the middle of the stem, strongly 1-ribbed with 3-5 faint lateral nerves, granular-punctate, glabrous, the lower ones to 25 cm long and 3 mm wide, the upper ones 2-6 cm long. Flower heads in a compact terminal spike or spike-like raceme to 15-25 cm long and 2.5 cm wide, containing only disc flowers (rays absent); involucre cylindric-campanulate (Shinners 1959; Correll & Johnston 1970) or campanulate (Gandhi & Thomas 1989), to 4.5 mm wide and 10-13 mm long (Shinners 1959; Correll & Johnston 1970) or to only 9.5 mm long (Gandhi and Thomas 1989), short-pedicellate; phyllaries resinous-glandular, acuminate, the margins scarious and purplish, the apex recurved; outer phyllaries ovate, ciliate, ca. 3.3 mm long and 1.7 mm wide, the innermost one oblanceolate, slightly folded, to 8.5 mm long and 3 mm wide; disk flowers 10-11 per head (Shinners 1959; Correll & Johnston 1970) or only 5 per head (Gandhi & Thomas 1989), the corolla glabrous inside, to 7 mm long, the 5 lobes to 2.3 mm long; style to 11.5 mm long. Achenes dark, densely pilose (Gandhi & Thomas 1989) or prominently pilosulous along ribs (Correll & Johnston 1970), 4.2-4.7 mm long and 1.6 mm wide, capped by a pappus of 30 or more strongly barbellate or subplumose bristles 4-7 mm long. [***WRC: Does anybody really know what this plant is? Cronquist (1980) doesn't help, since the species isn't included (not known from LA at the time).]

Similar Species: *Liatris tenuis* can easily be confused with *L. squarrosa*, which frequently inhabits the same sites. *L. tenuis* has acuminate outer phyllaries with wide-spreading tips, whereas in *L. squarrosa* the outer phyllaries are triangular or lanceolate with a mucronate or squarrose tip and are recurved or loosely spreading (Orzell 1990).

Habitat: Sandy soils of fire-maintained upland longleaf pine savannas, mostly over the Catahoula Formation. Common associates include *Schizachyrium scoparium*, *Sporobolus junceus*, *Liatris squarrosa*, *L. elegans*, *Aster linearifolius*, *Echinacea sanguinea* and *Hymenopappus artemisiifolius* (Orzell 1990).

Phenology: Flowering June-August.

Comments: Apparently does not survive the conversion of natural longleaf pine stands to slash pine plantations, particularly if the site is subjected to soil disturbance during mechanical site preparation (Orzell 1990).

Illustrations: A color photograph appears in Ajilvsgi (1979).

Selected References:

- Ajilvsgi, G. 1979. Wild flowers of the Big Thicket, East Texas, and Western Louisiana. Texas A & M University Press, College Station. 360 pp.
- Gandhi, K. N. and R. D. Thomas. 1989. Asteraceae of Louisiana. Sida Botanical Miscellany No. 4. SMU Herbarium, Dallas. 202 pp.
- MacRoberts, M. H. and B. R. MacRoberts. 1995. Noteworthy vascular plant collections on the Kisatchee National Forest, Louisiana. Phytologia 78(4): 291-313.
- Orzell, S. L. 1990. Inventory of National Forests and National Grasslands in Texas. Report submitted in fulfillment of agreement between the Texas Natural Heritage Program of Texas Parks and Wildlife Department and the U. S. Forest Service in Lufkin, Texas. 526 pp.
- Shinners, L. H. 1959. *Liatris tenuis* n. sp. (Compositae), another endemic in southeastern Texas. Southwestern Naturalist 4: 207-208.



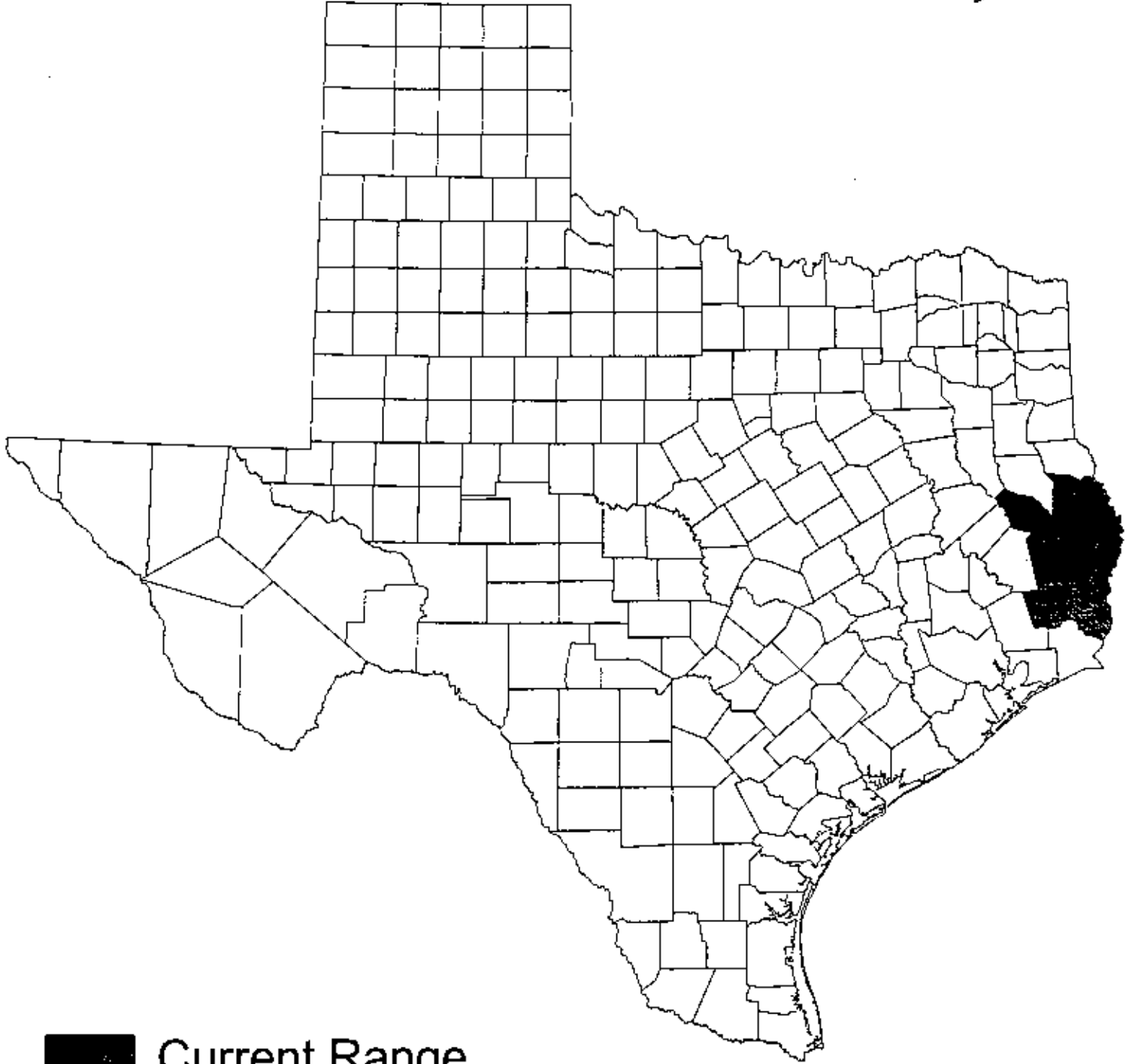


Asteraceae • *Liatris tenuis*

LLOYD & SHINNERS V 24242 BETH SPRING, JASPER CO., TX

ARTIST LONNY HEAGY

550



 Current Range

Liatris tenuis
(slender gay-feather)

Scientific Name: *Lycium texanum* Correll

Synonyms: None.

Common Name: Texas wolfberry

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Brewster, Culberson and Hudspeth counties.

Description (adapted from Correll 1965, Correll & Johnston 1970 and F. Chiang-Cabrera in Henrickson & Johnston in prep.): Profusely branched, thorny shrub. *Leaves* alternate, simple, somewhat succulent, linear-oblongate to narrowly spatulate, hispidulous-puberulous, to 2 cm long and 3 mm wide, usually quite small, obtusely rounded, often mucronulate at the tips. *Flowers* solitary or in pairs along branchlets, on pedicels ca. 1.5 mm long at anthesis but lengthening to 9 mm in fruit; age; calyx cup-shaped, 1.5-3 mm long, minutely 4-5-toothed, sometimes 2-lipped, hispidulous; corolla tubular or funnelform, gradually widening upward, 7-8 mm long, the lobes ovate, spreading to strongly revolute, 1.5-2.5 mm long, finely ciliate, lavender fading to white; stamens and style more or less exerted. *Fruit* an ovoid to ellipsoid, orange-red berry, 3-8 mm long, containing many small seeds.

Similar Species: Very similar to *Lycium puberulum*, from which it differs in its small, narrow leaves, non-glandular pubescence, floral differences and fleshy red berry (Powell 1998).

Habitat: Semi-desert grasslands and thorn shrublands on sandy, gravelly, and/or loamy soils, on very gently sloping terrain as well as in rocky areas in canyons, often over limestone at moderate elevations. Frequent associates include *Bouteloua eriopoda*, *B. gracilis*, *Dasyochloa pulchella*, *Flourensia cernua*, *Larrea tridentata*, *Scleropogon brevifolius*, *Sporobolus cryptandrus* and *Yucca elata* (Wester 1994).

Phenology: Flowering March-October (Powell 1998).

Comments:

Illustrations: A line drawing appears in Powell (1998).

Selected References:

Chiang-Cabrera, F. 1981. A taxonomic study of *Lycium* (Solanaceae) Ph.D. dissertation, The University of Texas at Austin.

Correll, D. S. 1965. Some additions and corrections to the flora of Texas. *Wrightia* 3(7): 126-140.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.

Wester, D. B. 1994. A report on the presence and relative abundance of *Lycium texanum* Correll on the

Faskin Ranch, Hudspeth County, Texas. 8 pp.



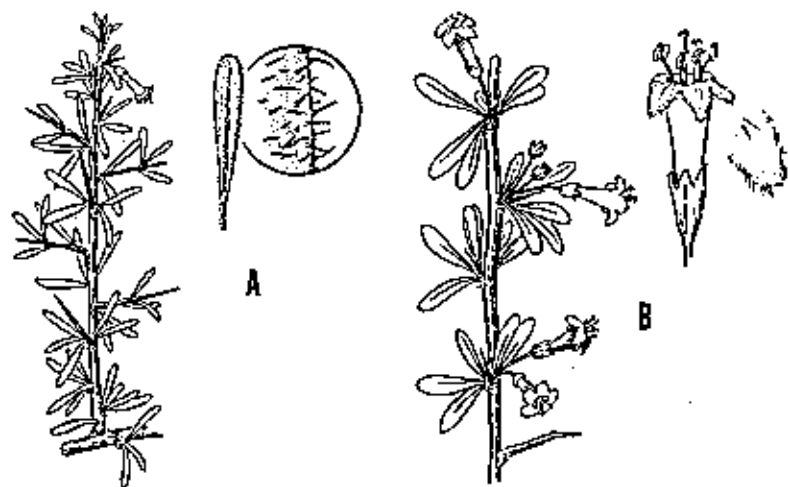


Fig. 313. A) *Lycium texanum* (Texas Wolfberry); B) *L. torreyi* (Torrey Wolfberry)

some plants is gray-green) gives the whole plant, excepting the chocolate bloom, a gray aspect. Only *Lycium pallidum*, *L. torreyi*, and infrequently var. *puberulum* with gray-green foliage approach the color aspect of var. *berlandieri*, and these taxa are not known to be sympatric in south Brewster County. *Lycium puberulum* is the only Trans-Pecos species with hardened fruit.

2. *Lycium texanum* Cortell. TEXAS WOLFBERRY. Fig. 313. Rocks and sandy soils, shrubby desert plains and canyons. Hudspeth Co., Quitman Gap base of Quitman Mts.; 10 mi E and 10 mi W Sierra Blanca. Culberson Co., 10 mi E Van Horn. Brewster Co., 39 mi S and 51 mi S Alpine. 3500-4000 ft. Mar-Oct; endemic in the Trans-Pecos. This species is set apart from *Lycium puberulum* by its small, narrow leaves, non-glandular short-pubescent stems, differences, and fleshy red berry.

3. *Lycium pallidum* Miers. PALE WOLFBERRY. Fig. 314. Rocks and canyons of hills and mountains, limestone and igneous habitats. El Paso Co., Franklin Mts.; 4 mi E Fabens. Hudspeth Co., 12 mi N Allamore. Brewster Co., Quitman Mts.; 4 mi E Ft. Hancock; 10 mi E Hueco Inn. Culberson Co., NW Van Horn; Eagle Mts.; Beach Mts.; near Salt Flats. Presidio Co., Pinto Canyon and vicinity. Jeff Davis Co., Davis Mts. Brewster Co., Alpine. 4000-5200 ft.; Feb-May. N to S CO, W to S UT and AZ; also in NM. The taxon in our area is *Lycium pallidum* var. *pallidum* with leaves glaucous



Fig. 314. *Lycium pallidum* (Pale Wolfberry)

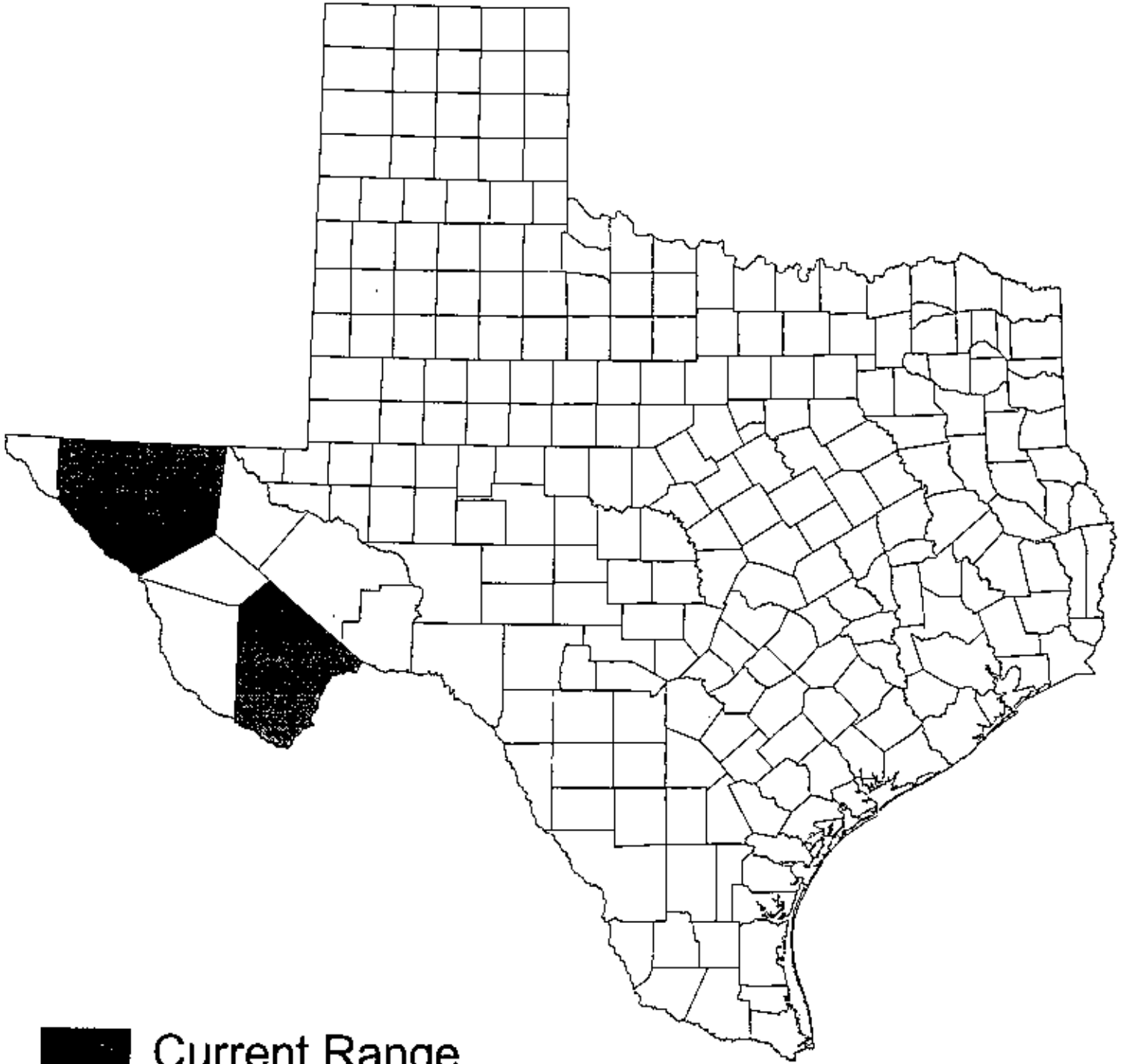
Fig. 315. *Lycium berlandieri* (Berlandier Wolfberry)

and glaucous (with a bloom), bark commonly reddish-purple (or chocolate), flowers 1.5-2.5 cm long, and juicy fruits with numerous seeds. Another variety of this rather common species are eaten by man as well as by wildlife species, especially birds. The armed hardy plants have long been grown as ornamentals, but on a limited scale. The Pale Wolfberry is recognizable by its spatulate leaves, dark stems, and longest corolla of the Trans-Pecos species.

4. *Lycium torreyi* Gray. TORREY WOLFBERRY, AGRITO. Fig. 313. Flats, canyons, along canals and near the Rio Grande, Pecos River, and other drainages, commonly in silty, sandy, or alluvial soils, often in alkali areas. Locally common throughout much of the southern Trans-Pecos, particularly along and near the Rio Grande, El Paso Co., E to Val Verde Co. 1600-4500 ft.; Mar-Oct. W through S NM to NV and CA; Mex. S to Hgo.

This species, recognizable by its grayish leaves (somewhat succulent) and densely hairy corolla lobes. The plants often form dense thickets, frequently in silt and saline habitats.

5. *Lycium berlandieri* Dun. BERLANDIER WOLFBERRY. Fig. 315. Rocky and gravel hills, flats, arroyos, in various soil types including alkali and gypsum, locally common throughout much of the Trans-Pecos, El Paso Co., E to



■ Current Range

Lycium texanum
(Texas wolf-berry)

Scientific Name: *Rayjacksonia aurea* (Gray) Hartman & Lane

Synonyms: *Haplopappus aureus* Gray; *Sideranthus aureus* (Gray) Small; *Machaeranthera aurea* (Gray) Shinnars

Common Name: Houston daisy, Houston machaeranthera

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Gulf Coastal Plain of Texas.

State Range: Galveston and Harris counties.

Description (adapted from Correll & Johnston 1970; Mahler 1980): Mostly glabrous taprooted annual herb with ascending, freely-branched stems 15-30 (-50) cm tall. Leaves alternate, simple, linear-lanceolate, 13-40 mm long and 1-2 mm wide, the margins entire or on with 2-4 remote bristle-like teeth on each side. Flower heads solitary at the tips of the numerous branchlets, containing both disk and ray flowers; involucre ca. 8 mm high, hemispheric; phyllaries in ca. 4 series, graduated, the largest on any head ca. 1 mm wide, each with a very prominent dark rhombic tip which does not extend down onto the midrib, the tips spreading or recurved; disk and ray flowers both yellow. Achenes ca. 2 mm long, sericeous-pubescent; pappus of disk and ray achenes both of numerous bristles of unequal length.

Similar Species: At least two other composites with yellow ray flowers and disk flowers, *Helenium amarum* var. *amarum* and *Heterotheca pilosa*, are found in or near habitats occupied by *Machaeranthera aurea*. However, *Machaeranthera aurea* is easily distinguished by its bristly, linear leaves and green-tipped recurved phyllaries, which give immature heads a bur-like appearance.

Habitat: Houston machaeranthera is most conspicuous on and around naturally barren or sparsely vegetated slick spots or pimple mounds on coastal prairies, usually on loamy to sandy loam soils (Clodine, Gessner, and Wockley series), occasionally in disturbed pastures and on roadsides in places where natural conditions are imitated. It is a component of early seral stage vegetation and apparently does not persist in later seral stage, tallgrass-dominated plant communities. Associates include other Texas coastal plain endemics such as *Hymenoxys texana*, *Chloris texensis*, *Liatris bracteata* and *Thurovia triflora*, as well as more widespread colonizers such as *Gossypianthus lanuginosus*, *Helenium amarum* var. *amarum*, *Iva* spp., *Portulaca pilosa*, *Sida ciliaris*, *Sporobolus pyramidatus* and *Talinum parviflorum*.

Phenology: Flowering late September-November.

Comments:

Illustrations: Line drawings appear in Mahler (1981) and Mahler (1983).

Selected References:

Lane, M. A. and R. L. Hartman. 1996. Reclassification of North American *Haplopappus* (Compositae: Astereae) completed: *Rayjacksonia* gen. nov. American Journal of Botany 83(3): 356-370.

- Mahler, W. F. 1980. Status report [on *Machaeranthera aurea*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.
- Mahler, W. F. 1981. Notes on rare Texas and Oklahoma plants. *Sida* 9(1): 76-86.
- Mahler, W. F. 1983. Rediscovery of *Hymenoxys texana* and notes on two other Texas endemics. *Sida* 10(1): 87-91.



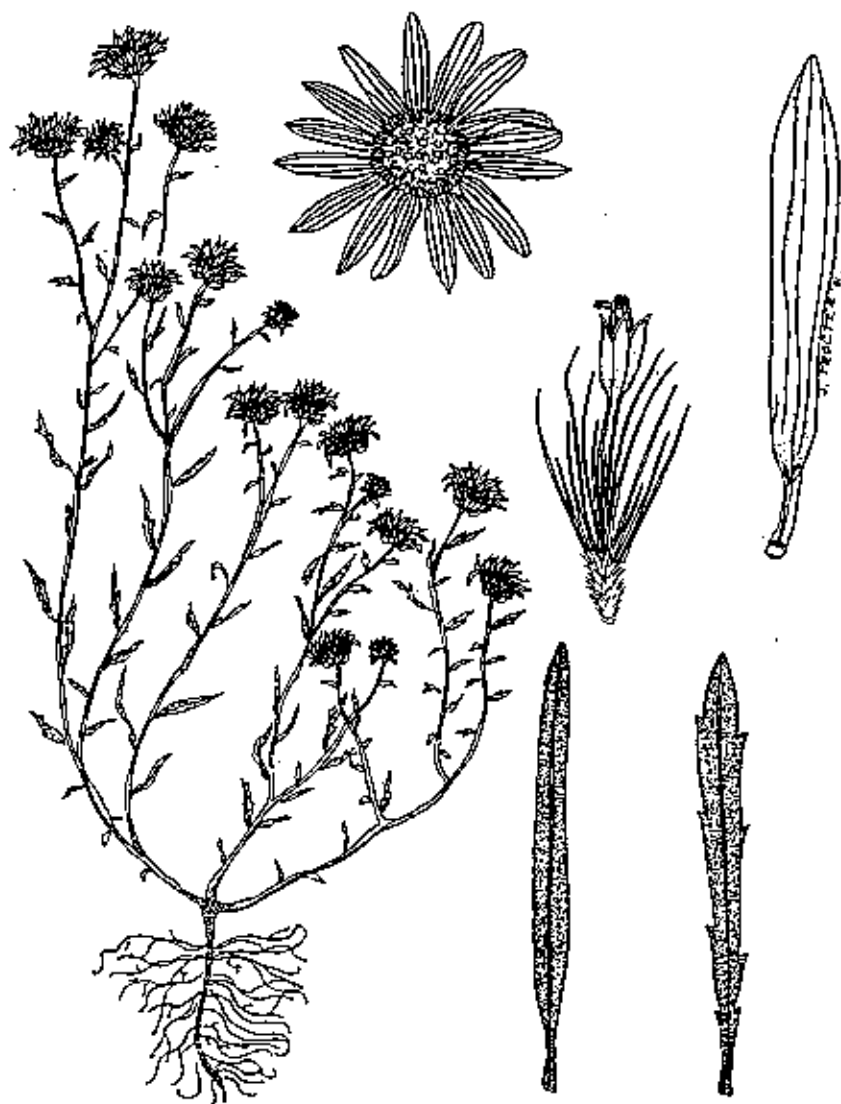
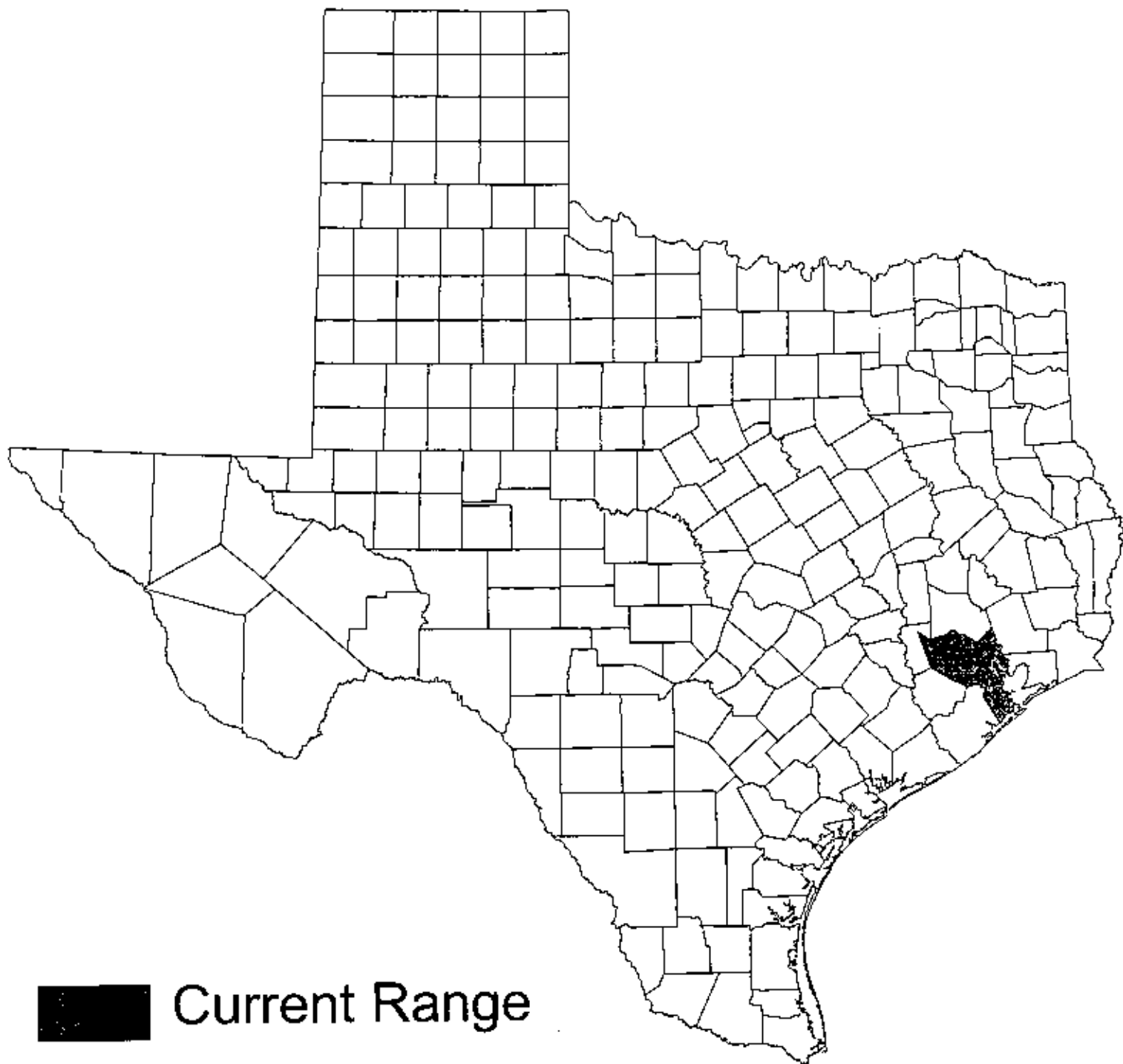


Fig. 7. *Machaeranthera aurea* (Gray) Shinnars



■ Current Range

Machaeranthera aurea
(Houston daisy)

Scientific Name: *Manfreda longiflora* (Rose) Verhoek

Synonyms: *Runyonia longiflora* Rose; *Polianthes runyonii* Shimmers

Common Name: Runyon's huaco

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: South Texas and northern Tamaulipas.

State Range: Hidalgo and Starr counties, with an unconfirmed report from Jim Hogg County. A report from Cameron County apparently resulted from the mailing-- rather than the collection-- of the type specimen from Brownsville.

Description (adapted from Correll & Johnston 1970; Rose 1922; Verhoek-Williams 1975): Glabrous perennial with a basal rosette of succulent leaves and a flowering stem to 5 dm tall (taller in cultivation). Leaves 3-7 (-15) in a basal rosette, fleshy or succulent, spreading, sometimes lying flat on surface of soil, green with small purplish or brownish spots throughout, elongate, channeled, lanceolate, up to 26.5 cm long and 1.4 cm wide but usually shorter and narrower, the margins with widely spaced small teeth. Flowers 10-21 in a spike at the end of an erect stalk to 5 dm tall, the stalk leafless except for a few small bracts 1.2-1.6 cm long; perianth tubular-funneliform, composed of 6 similar tepals that are fused at the base, white but quickly fading to pink or brick red, the tube narrow, 2.3-3.6 cm long, 1.5-3 mm wide at the middle, the lobes revolute, oblong, 8-14 (-19) mm long and 2-3.5 mm wide, the apex obtuse with a small tuft of hairs; stamens 6, short, the anthers yellow, nearly sessile, 5-6 mm long, attached at their midpoint to the tube and only one end exerted from the tube; style included (not exerted), 14-28 mm long, the stigma 3-lobed, papillate, the lobes reflexed at maturity. Fruit an erect, depressed-globose capsule 9-10 mm long and 10-13 mm in diameter, containing numerous black flattened seeds.

Similar Species: So similar vegetatively to other south Texas *Manfreda* species, such as *M. maculosa* and *M. sileri*, that "identification ... should not be attempted when the plant is not in bloom" (Damude & Poole 1990). *Manfreda longiflora* has included (not exerted) filaments and styles and a longer floral tube (2.3-3.6 cm) than *M. maculosa*, in which the floral tube is 0.6-2.6 cm long and the filaments and styles are exerted. *M. sileri* also has long-exserted stamens; it flowers April-July rather than September-October (Damude & Poole 1990).

Habitat: Thorn shrublands on clays and loams with various concentrations of salt, caliche, sand, and gravel. Most known sites are underlain by various Eocene strata of the Catahoula and Frio Formations; others are on Rio Grande floodplain deposits. At one site in Starr County, *Manfreda longiflora* is locally common with *Varilla texana* and *Billieturnera helleri* on saline clay of the Maverick Series on valley flats among gravelly hills, but smaller numbers were also found among or under *Acacia rigidula* and other thorny shrubs on the gravelly hills themselves. Other frequent associates include *Koerberlinia spinosa*, *Ziziphus obtusifolius*, *Prosopis reptans*, *Castela erecta*, *Forestiera angustifolia*, *Guaiacum angustifolium*, *Dyssodia pentachaeta*, *Aristida purpurea*, *Chloris cucullata* and *Sporobolus pyramidatus*.

Phenology: Flowering September-October.

Comments:

Illustrations: A line drawing appears in Rose (1922).

Selected References:

Damude, N. and J. M. Poole. 1990. Status report on *Manfreda longiflora* (*Polianthes runyonii*). Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

Rose, J. N. 1922. *Runyonia longiflora*. *Addisonia* 7: 39-40.

Shinners, L. H. 1966. Texas *Polianthes*, including *Manfreda* (*Agave* subgenus *Manfreda*) and *Runyonia* (*Agavaceae*). *Sida* 2(4): 333-338.

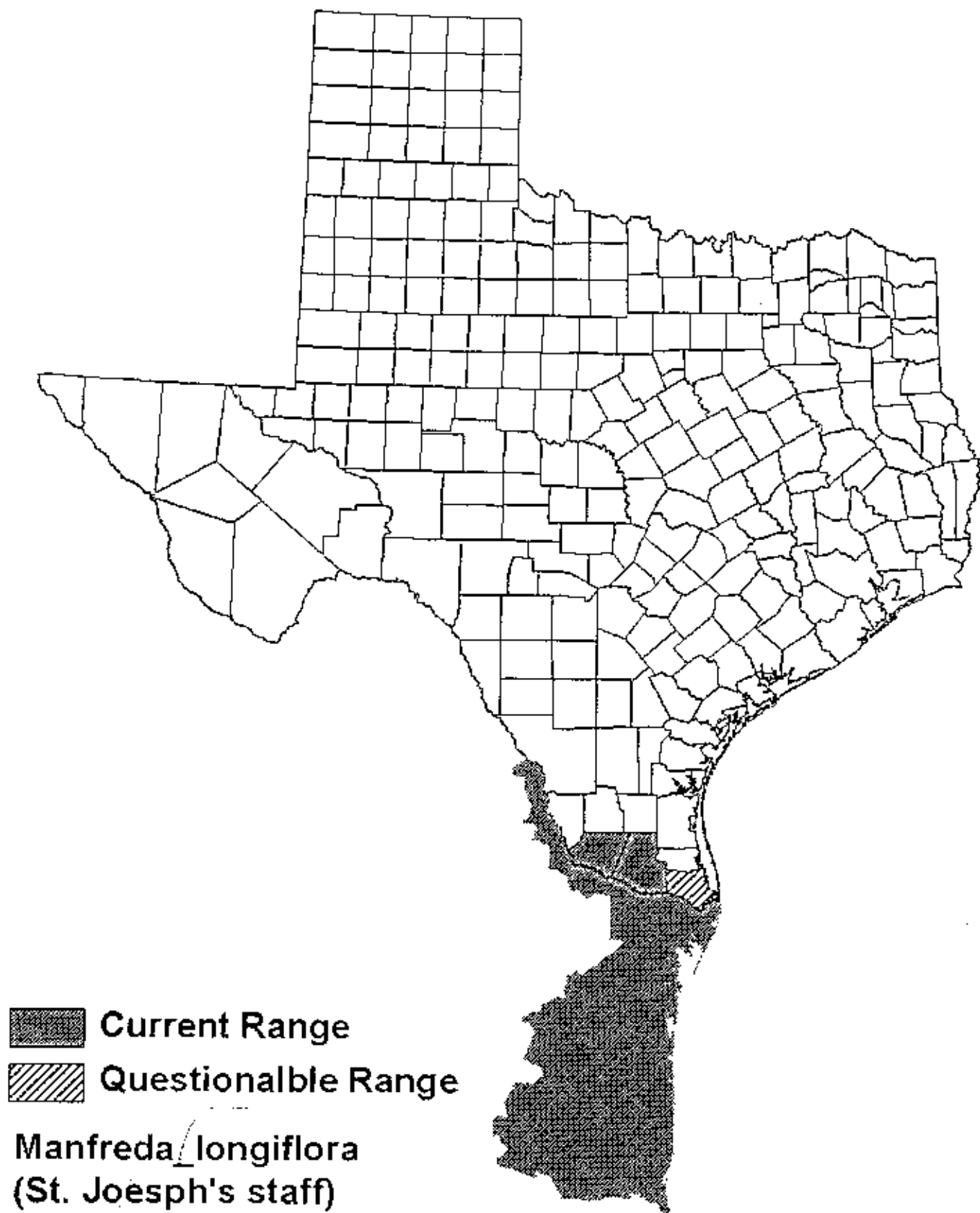
Verhoek-Williams, S. E. 1975. A study of the tribe Poliantheae (including *Manfreda*) and revisions of *Manfreda* and *Prochnyanthes* (*Agavaceae*). Ph.D. dissertation, Cornell University, Ithaca. 405 pp.





RUNYONIA-LONGIFLORA

(from Rose 1922)



Scientific Name: *Manihot walkerae* Croizat

Synonyms: None.

Common Name: Walker's manioc

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: Extreme southern Texas and Tamaulipas.

State Range: Hidalgo and Starr counties.

Description (adapted from Correll & Johnston 1970): Perennial herb (or weak shrub?) with strong odor of nitric acid in all parts; root tuberous, carrot shaped; stems herbaceous, ascending-erect (mostly prostrate per Correll & Johnston 1970), sometimes growing among the stronger stems of other shrubs. Leaves alternate, simple, deeply (3-) 5- (7-) lobed, pandurate to halberd-shaped, the lower 2 smaller lobes of the fully developed leaves frequently projecting downward at a sharp angle, the median lobe 2-5 cm long, all lobes entire along margins. Flowers in androgenous racemes; staminate flowers opening later than pistillate ones, borne in a simple raceme; pistillate flowers most often on single peduncles arising from the base of the staminate raceme; perianth of a single row of creamy white tepals; staminate flowers tubular, gibbous at base, the tepals 6-10 mm long, united half their length; stamens 6 or 8 in 2 whorls, one whorl longer than the other, the filaments arising from between the lobes of a circular disk; pistillate flowers with 5 separate strap-shaped tepals 5-8 mm long; stigmas 3, many-branched, on very short styles. Fruit a dry, dehiscent, vaguely 3-lobed capsule containing 3 seeds.

Similar Species: A species with leaves of a peculiar shape quite unlike those of most other species in the Lower Rio Grande Valley. The leaves are vaguely similar to those of *Jatropha cathartica*, a low, essentially stemless herbaceous perennial which has a bright red petals rather than a creamy white perianth; its leaves are oddly lobed but distinctly serrate along the margins. More similar is *M. subspicata*, which occurs to the north (near Lake Corpus Christi in Jim Wells and Live Oak counties) and to the south in Mexico. Both *Manihot* species have palmately-lobed leaves with leaflets of variable panduriform shape. The leaves of *M. subspicata* generally have (5-) 7 linear to narrowly lanceolate-attenuate lobes, while those of *M. walkerae* usually have (3-) 5 (-7) lanceolate (i.e., broader) lobes.

Habitat: Usually growing under or within the branches of somewhat taller, more robust shrubs in thorn shrublands in shallow, calcareous sandy loam on rather xeric slopes and uplands, often over caliche and conglomerate of the Goliad Formation. Principal woody associates at the largest known site, on very gentle upper slopes of bluffs along the Rio Grande near Rio Grande City, include *Acacia rigidula*, *Leucophyllum frutescens*, *Citharexylum spathulatum*, *Karwinskia humboldtiana*, *Opuntia leptocaulis* and *Prosopis glandulosa*.

Phenology: Flowering April-September, possibly following rains.

Comments: Listed as Endangered on 2 October 1991.

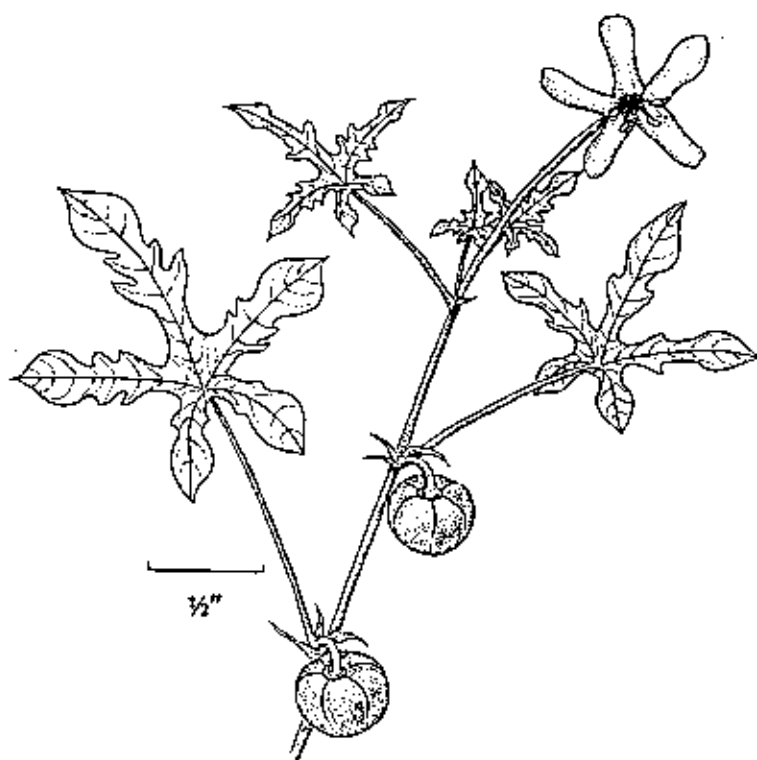
Illustrations: Black and white photographs appear in Rogers & Appan (1973). A line drawing and a color photograph appear in Poole & Riskind (1987).

Selected References:

- Croizat, L. 1942. New and critical Euphorbiaceae chiefly from the southeastern United States. *Bulletin of the Torrey Botanical Club* 69(6): 445-460.
- Ideker, J. 1990. *Manihot walkerae* rediscovered. *The Sabal* 7(8): 1-2.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Rogers, D. J. & S. G. Appan. 1973. *Flora Neotropica*, Monograph No. 13. *Manihot* [and] *Manihotoides* (Euphorbiaceae). Published for Organization for Flora Neotropica by Hafner Press, New York.
- Turner, B. L. 1982. Status report [on *Manihot walkerae*]. Report prepared for U. S. Fish and Wildlife Service, Albuquerque.
- U. S. Fish and Wildlife Service. 1993. Walker's manioc (*Manihot walkerae*) recovery plan. U.S. Fish and Wildlife Service, Albuquerque. 37 pp.



Common Name:
Walker's manihot



Leaves, male flowers,
and fruits of
Walker's manihot

Scientific Name: *Manihot walkerae* Croizat

Other Scientific Names: None

Federal Status: [REDACTED]

State Status: [REDACTED] Federally & State endangered

Photographs and Drawings: Rogers and Appan, 1973, p.

Description:

Habit: Sprawling perennial, with long, weak stems, from an enlarged carrot-shaped root. Young stems hairless, greenish-brown, turn grayish brown when mature.

Leaves: Alternate, deeply 5-lobed from a common point, with 3 major and 2 smaller lobes (of which the middle lobe projects sharply downward), the middle lobe 1/4-2 in. long; leaf stalks 2 3/4-4 in. long.

Flowers: Separate male and female flowers borne on the same plant, streaked with light purple; male flowers 5-lobed, almost tubular, 3/4-7/8 in. long, borne on a long stem, opening later than the female flowers; stamens 6 or 8 in 2 groups; female flowers with 5 separate strap-shaped lobes, 1/2-3/4 in. long, borne on stalks 1/8 in. long at the base of the male flowering stalk, stigmas 3, markedly branched, on short styles; flower in April-September, following rains.

Fruit: Globe-like, dry, 1/8-1/4 in. long, on slightly downward curved stalks; seed rounded or flattened, grayish, with large blackish spots on sides, 1/16 in. long, 1/4 in. broad.

Habitat: Thorn shrubland on caliche ridges or grassland on sandy loam soils overlying caliche; associated plant species not known.

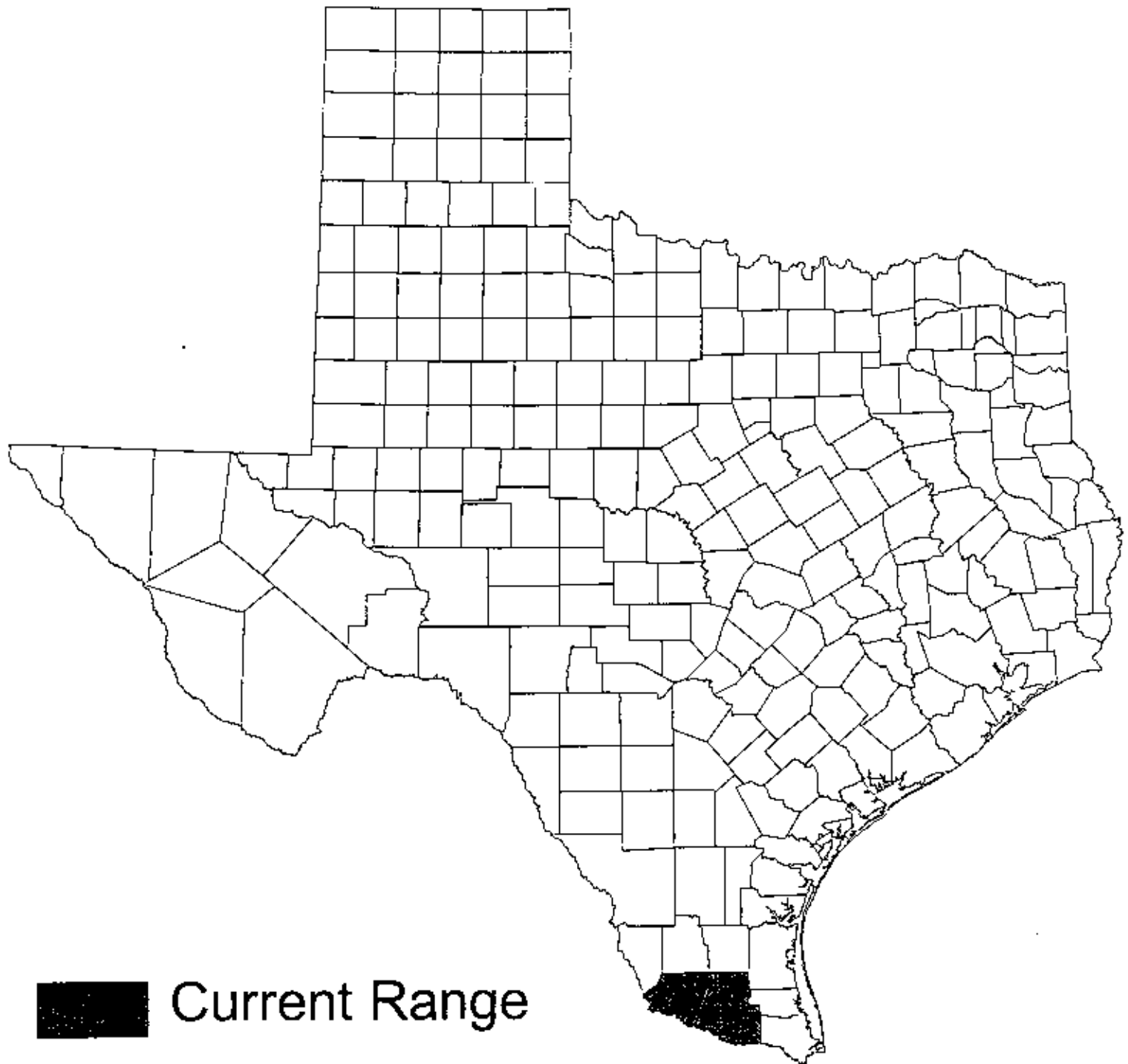
Ownership: No natural populations are known from Texas. A colony was established on the University of Texas at Austin campus from cuttings made in Lajitas, Texas.

Similar Species with Key Character Differences:

Leaf lobes broader; stamens

10; distribution outside of

Texas *Manihot angustiloba*



Manihot walkerae
(Walker's manioc)

Scientific Name: *Matelea radiata* Correll

Synonyms: None.

Common Name: Falfurrias milkvine, Falfurrias anglepod

Global/State Ranks: GSHH

Federal Status: SOC

Global Range: Endemic to south Texas.

State Range: Brooks and Hidalgo counties; possibly also in Starr County.

Description (adapted from Correll 1965; Correll & Johnston 1970): Slender herbaceous perennial twining vine with milky sap; stems puberulent with appressed hairs. Leaves opposite, simple, on a petiole less than 5 mm long; blades thick, narrowly triangular-lanceolate, shallowly sagittate to subcordate at base, acute at apex, to 2.2 cm long and 7 mm wide, sparsely puberulent to glabrous, the margins somewhat revolute. Flowers solitary or paired in leaf axils, on a stalk that is shorter than the subtending petiole; sepals 5, triangular-lanceolate, acute at apex, sparsely puberulent on outer surface, ca. 2.5 mm long; corolla rotate, probably reddish-brown, glabrous, the 5 lobes linear-oblong, ca. 7 mm long and 2 mm wide, spreading-rotate, united only at base; crown deeply 5-lobed, appendages ca. 2 mm long, oblong-quadrate, truncate and shallowly notched at apex, keeled on outer surface (Correll, 1965). Fruit undescribed.

Similar Species: Similar to *M. sagittifolia* from which it can be separated by crown characters. In *M. radiata* the crown is prominently thin lobed with the lobes ca. 2 mm long. In *M. sagittifolia* the crown is thickened and unlobed or very shallowly lobed.

Habitat: Uncertain. One of the two known specimens, *Runyon 2832*, was collected from clay soil on dry gravel hills at an altitude of about 45 m. The type specimen, *F. L. Lewton 828*, provided no information about habitat.

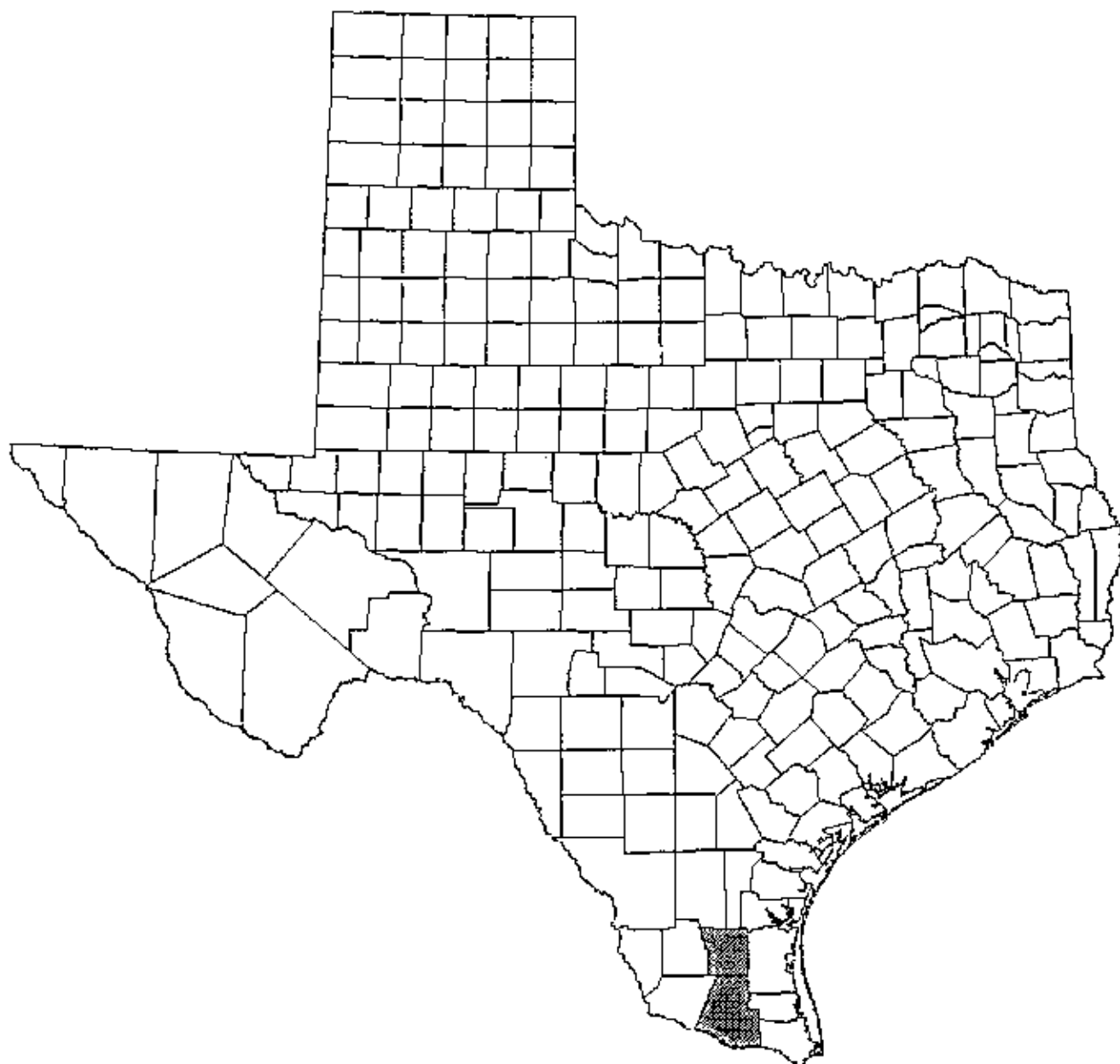
Phenology: Probably flowering May-June.

Comments: *Matelea radiata* is a poorly understood species known from only two specimens: BROOKS CO. [or county unstated?]: Falfurrias, 24 Jun 1909, *F. L. Lewton 828* (NA); HIDALGO CO.: La Joya, bordering the side road to the north, clay soil, dry gravel hills, alt. 45 m, 13 Jul 1941, *R. Runyon 2832* (TEX). Originally undetermined, the Runyon specimen was annotated to *M. radiata* by D. J. Drapalik in 1984.

Illustrations: None known.

Selected References:

Correll, D. S. 1965. Some additions and corrections to the flora of Texas. *Wrightia* 3(7): 126-140.



 Current Range

Matelea radiata
(*Falfurrias milkvine*)

Scientific Name: *Matelea texensis* Correll

Synonyms: None.

Common Name: Texas milkvine

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Brewster County.

Description (adapted from Correll & Johnston 1970; Henrickson & Johnston in prep.): Perennial twining vine with stems to 5 dm long [**perhaps much longer?], the stems and petioles more or less densely strigulose with decurved, white, tapering hairs 0.1-0.4 mm long mixed with short stipitate glands, with milky sap. Leaves opposite, on petioles 5-15 mm long, the blades ovate to triangular-lanceolate, 1.5-4 cm long, 7-25 mm wide, deeply cordate with rounded lobes and a rounded to truncate sinus at base, acuminate-attenuate at the apex, densely strigulose with antrorsely curved hairs on both surfaces. Flowers in few-flowered clusters on from the leaf axils, the shared peduncle ca. 2 mm long and the individual pedicels 2-4 mm long; sepals 5, lanceolate, 2-2.5 mm long, strigulose; corolla yellowish-green, campanulate, ca. 5.5 mm long, deeply 5-lobed to below the middle, the lobes oblong-lanceolate, ca. 4.2 mm long and up to 1.5 mm wide at base, more or less acute, ascending to recurved above, white-strigulose outside and inside; corona (crown) ca. 2 mm high and ca. 1.1 mm wide (twice as high as the anther head), deeply 5-lobed, the lobes thin, oblong, erect, bearing a deflexed ligule ca. 0.4 mm long on the inner face that extends toward the anther head; anther heads ca. 1.4 mm wide. Fruit undescribed.

Similar Species: Very similar in habit and foliage to *Matelea producta*, the common *Matelea* species in much of the Trans-Pecos. According to Correll (1966), "The smaller, more deeply divided, campanulate corolla with narrow, strongly recurved lobes that are densely pubescent on their inner surface, and the larger, deeply lobed crown of *M. texensis* immediately separate it from *M. producta*."

Habitat: Desert grasslands or shrublands over igneous substrate, at elevations between 4000 and 5000 feet.

Phenology: Uncertain. The type specimen was collected on 17 July 1952 and bears flowers but no fruit.

Comments: Hanks & Powell (1983) opined that *Matelea texensis* might be a mere form of *M. producta*.

Illustrations: None known. A color photograph of *Matelea producta* appears in Warnock (1977).

Selected References:

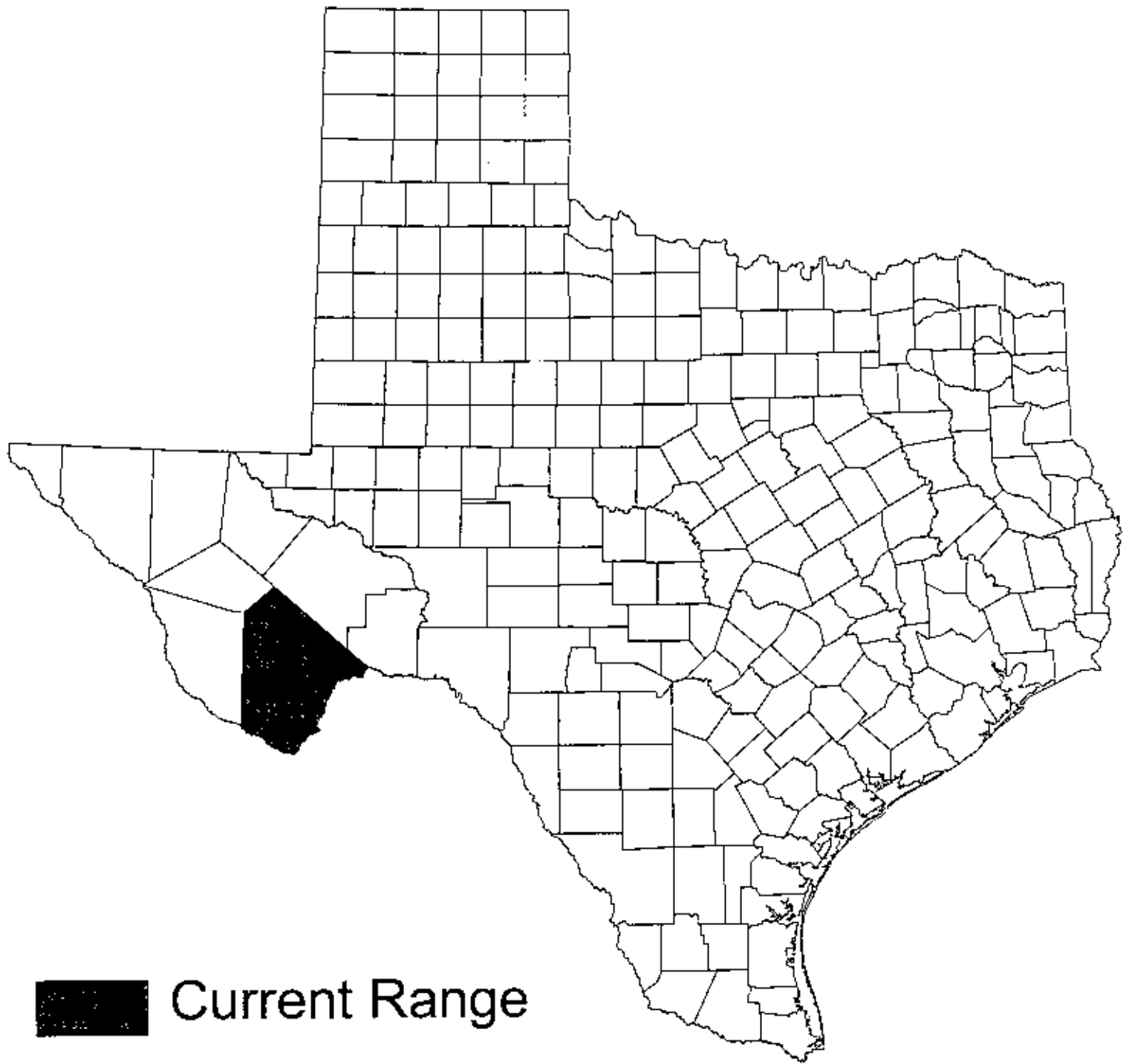
Correll, D. S. 1966. Some additions and corrections to the flora of Texas--II. *Brittonia* 18: 306-310.

Hanks, B. G. and A. M. Powell. 1983. Status report [on *Matelea texensis*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

Warnock, B. H. 1977. Wildflowers of the Davis Mountains and the Marathon Basin, Texas. Sul Ross

State University, Alpine. 276 pp.





■ Current Range

Matelea texensis
(Texas milkvine)

Scientific Name: *Mimulus dentilobus* Robins. & Fern.

Synonyms: *Mimulus parvulus* Woot. & Standl.

Common Name: fringed monkeyflower

Global/State Ranks: G1S1

Federal Status: None

Global Range: Baja California, Sonora and Arizona east to Chihuahua, New Mexico and Texas (Wiggins, 1980; Kearney & Peebles, 1960).

State Range: Chinati Mountains of Presidio County. A report from the Davis Mountains of Jeff Davis County (Weedin undated) has not been verified.

Description (adapted from Henrickson & Johnston in prep.): Low creeping perennial, rooting at nodes and forming dense mats; stems terete, glabrous or sparsely pubescent but not glandular, to 5 cm tall. Leaves opposite, simple, broadly ovate to suborbicular, 2-7 mm long and 2-5 mm wide, crenate to nearly entire, mostly with winged petioles shorter than the blades, covered with stiff white hairs. Flowers few, on slender pedicels much longer than the subtending leaves; mature calyx turbinate, 5-7 mm long, sparsely pubescent or glabrous, the 5 teeth deltate, acute; corolla 2-lipped, 9-13 mm long, yellow with red spots on the throat near the lower lip, the lobes erose or somewhat laciniate; stamens 4, of 2 lengths; styles bifid. Fruit an oblong capsule less than 1/2 as long as the calyx, containing many small seeds with scattered stiff hairs.

Similar Species: *Mimulus rubellus* and *M. glabratus* also occur in west Texas. *M. dentilobus* is unique among the three in having orbicular leaves which are covered with short stiff white hairs.

Habitat: Perennially wet areas near springs, on wet cliff-faces at waterfalls, and in creekbeds, mostly in mountains of the Chihuahuan Desert. Associated species include *Adiantum capillus-veneris*, *Aquilegia* spp., *Epipactis gigantea*, *Lobelia cardinalis*, *Andropogon glomeratus*, *Salix gooddingii* and *Populus fremontii*.

Phenology: Flowering (May-) June-August.

Comments:

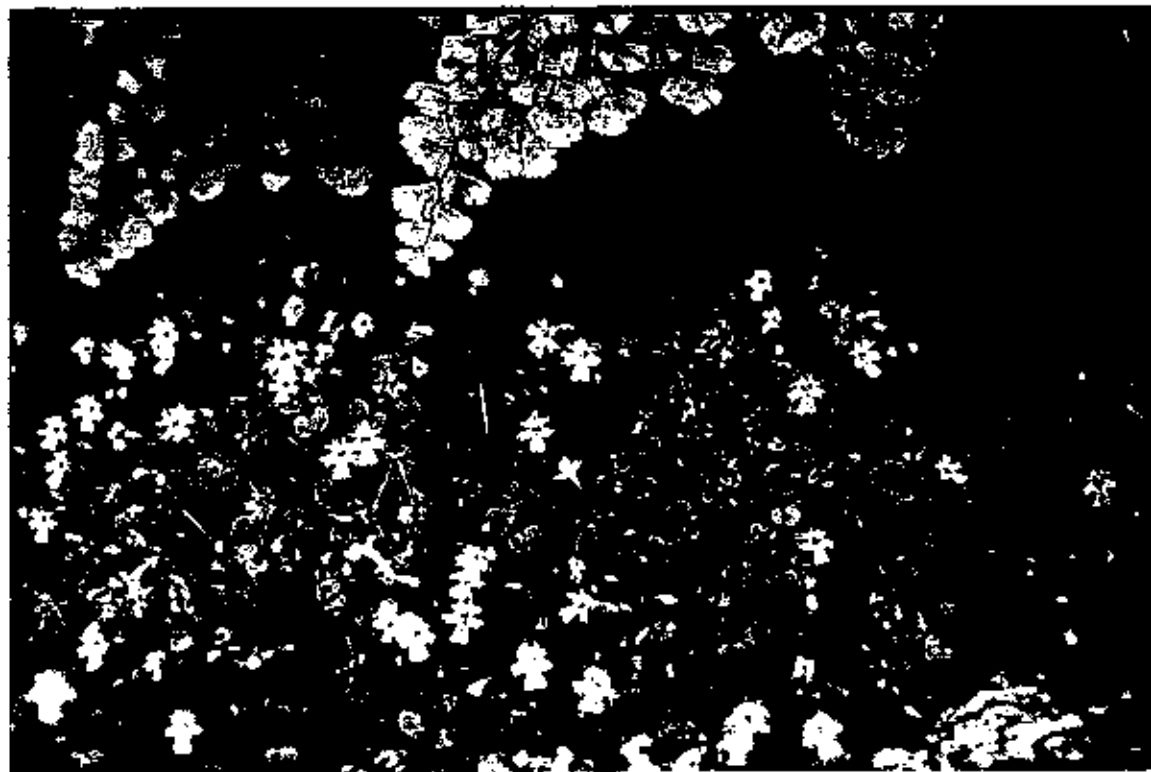
Illustrations: None known.

Selected References:

Kearney, T. H. and R. H. Peebles. 1960. Arizona flora. Second edition with supplement by J. T. Howell, E. McClintock and collaborators. University of California Press, Berkeley and Los Angeles. 1085 pp.

Weedin, J. F. Undated. A vegetation survey of Lower Madera Canyon and the Timber Mountain area, Davis Mountains, Texas. Unpublished report, 44 pp.

Wiggins, I. L. 1980. Flora of Baja California. Stanford University Press, Stanford. 1025 pp.



road, light-green to gray-
 ite vein, 3- or 5-nerved,
 he upper surface; flowers
 ibrous, slender, elongated;
 ten tinged with red; calyx
 al, mostly ciliate; corolla
 ldish-brown spots on the
 ; exerted and less than
 ing, emarginate or obcor-
 pair of stamens exerted,
 style exerted, glabrous,
 ae separating at the apex;

s, Coconino and Cochise

short, more or less pro-
 s; leaves broadly obovate
 ily and saliently dentate
 ; lower leaves sometimes
 face; flowers few, mostly
 calyx somewhat funnel-
 subulate, ciliate, slightly
 tube broadly funnelform,
 yellow, throat ampliate,
 s nearly equal, emargin-
 eared; style and stigma
 o spatulate; capsule un-

Ariz. (Apache, Navajo,

leafy, soft-villous and
 e; leaves sessile, lanceo-
 base, the lower leaves
 alyx oblique at orifice,
 prior tooth equaling the
 the lobes nearly equal,
 spots on the lower lip;

riz. (Yavapai, Graham,
 and Ore., s. to Ariz. and

forming dense mats, the
 n. high; leaves broadly
 ite to crenate or nearly
 , more or less covered
 edicels slender, almost
 yx turbinate, 5-7 mm.
 ar acute teeth; corolla



Fig. 696: a-c, *Mimulus dentilobus*: a, plant showing position on seeping rock cliff, x $\frac{1}{2}$; b, habit, x 1; c, flower, x 5. d-f, *Mimulus rubellus*: d, habit, x $\frac{1}{2}$; e, flower cluster, x 1; f, flower, x 5. (V. P.).



■ Current Range

Mimulus dentilobus
(fringed monkeyflower)

Scientific Name: *Nesaea longipes* Gray

Synonyms: *Heimia longipes* (Gray) Cory

Common Name: longstalk heimia, stalkflower heimia

Global/State Ranks: G3S3

Federal Status: 3C

Global Range: South-central and west Texas, extreme southeastern New Mexico and northern and central Coahuila (Graham, 1977).

State Range: Bandera, Brewster, Pecos and Val Verde counties.

Description (adapted from Correll & Johnston 1970; Graham 1977): Perennial glabrous herb with numerous trailing stems to 1 m long, often clambering over tops of adjacent vegetation. Leaves opposite, simple, sessile, gray-green, glaucous, spreading to ascending or reflexed, linear to very narrowly linear-lanceolate, acute at apex, auriculate to truncate at base, the margins revolute when dry, 10-50 cm long and up to 5 mm wide. Flowers solitary in the leaf axils, on 2-bracted, filiform peduncles 7-19 mm long (often as long as the leaves); peduncular bracts ovate, to 3 mm long, sometimes reaching the bottom of the calyx; calyx campanulate below, with 6 short triangular lobes at apex, 4-5 mm long and 3-4 mm wide; petals usually 6, sometimes 5 or 7, pink to lavender, obovate, 4-5 (-7) mm long; stamens (10-) 12 (-14), exerted; style filiform, exerted beyond petals and stamens. Fruit a globose 4-celled capsule ca. 4 mm in diameter.

Similar Species: None.

Habitat: Moist or subirrigated alkaline or gypsiferous clayey soils along unshaded margins of cienegas and other desert wetlands. At one site in Pecos County it occurs sparingly on alkaline, somewhat saline silt loam on the terrace of a spring-fed stream, in a grassland dominated by *Distichlis spicata*; associates there include other cienega species such as *Helianthus paradoxus*, *Agalinis calycina*, *Flaveria chlorifolia*, *Samolus ebracteatus*, *Scirpus* sp., *Eustoma exaltata* and *Limonium limbatum*. At a site in Val Verde County, longstalk heimia is common in moderately alkaline clay along a perennial stream and in subirrigated wetlands atop a poorly-defined spring system; associates in that area include *Sporobolus wrightii*, *Eleocharis cellulosa*, *E. montividentis*, *E. rostellata*, *Eustoma exaltatum*, *Fuirena simplex* and *Muhlenbergia utilis*. Details regarding the habitat at an historic site well to the east (Bandera Co.: Hondo River, 2 mi S of Tarpley, seepage slope along stream, 3 Jul 1963, D. S. Correll & H. K. Svenson 28220) is unknown.

Phenology: Flowering May-September.

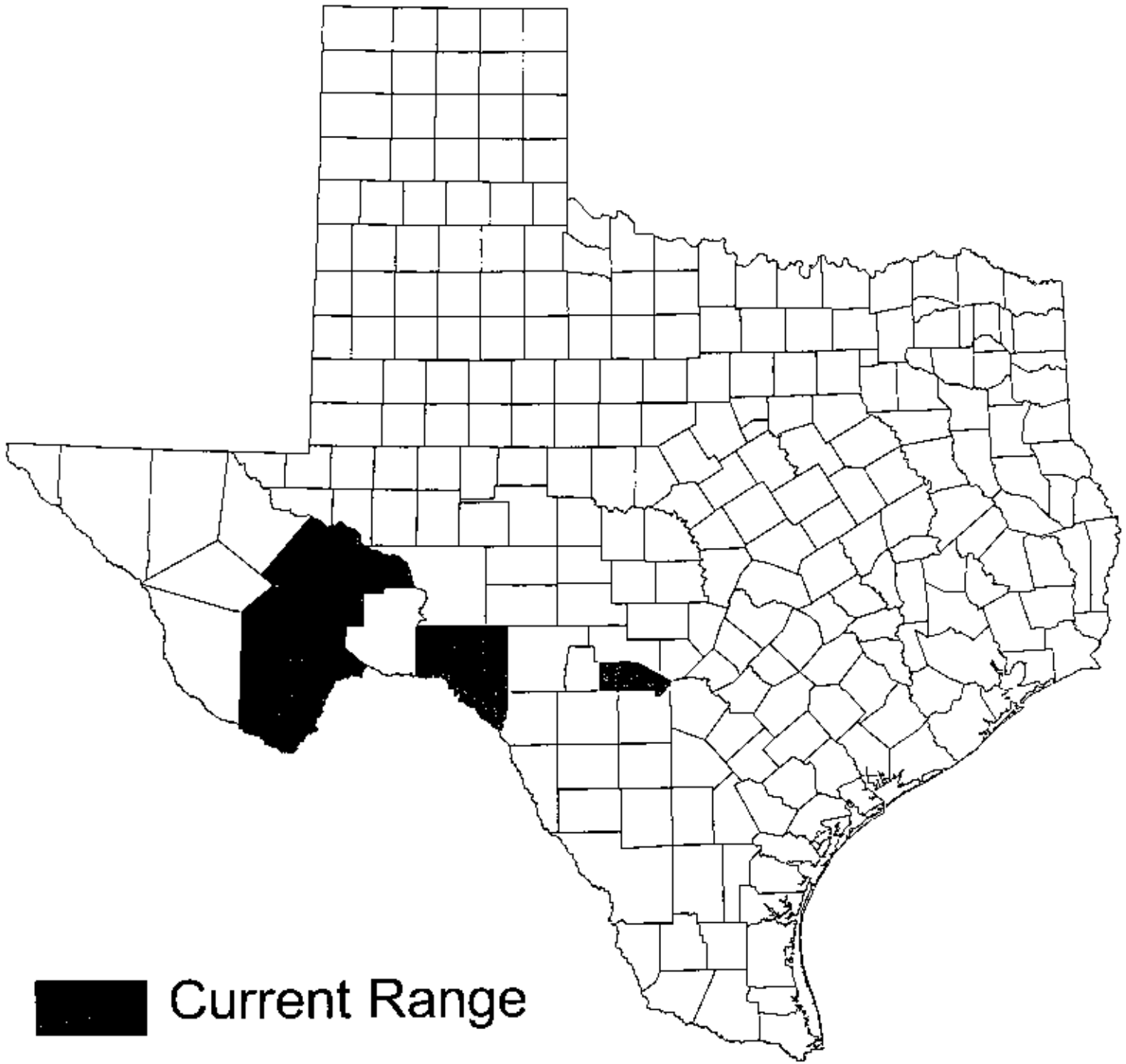
Comments:

Illustrations: Line drawings appear in Correll & Correll (1975) and Graham (1977).

Selected References:

- Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. 2 volumes. Stanford University Press, Stanford. 1777 pp.
- Graham, S. A. 1977. The American species of *Nesaea* (Lythraceae) and their relationship to *Heimia* and *Decodon*. Systematic Botany 2: 61-71.





■ Current Range

Nesaea longipes
(longstalk heimia)

Scientific Name: *Nolina arenicola* I. M. Johnst.

Synonymy: None

Common Name: sand sacahuista

Global Range: Texas

State Range: Culberson and Hudspeth counties; possibly also El Paso County (specimen identification is unclear).

Current Federal and State Status: Species of special concern.

Global and State Ranks: G2QS2

Description: (from Poole 1989)

Habit: Stemless, dioecious perennial with an underground woody stem, to 1.5 m (5 ft) tall.

Leaves: Narrowly linear, elongated, ascending-arching, numerous, clustered, to 1.3 m (4¼ ft) long, 4-11 mm (¼-¾ in.) wide, flat or concavo-convex, pale green, margins smooth or with a few, fine, sparse, very small teeth, tips filamentous.

Flowers: Flowering stem 50-100 cm (20-40 in.) long, 12-20 mm (½-¾ in.) wide, inflorescence an open, compound panicle, short pedunculate, stout, straw-colored or green, rarely purple-tinged, main axis thick, sinuate, scabrous, with coarse spreading or spreading-ascending branches, 10-20 cm (4-8 in.) long, sessile, the branches with many short, ascending, stubby branchlets; basal bracts long caudate, dilated at the base, basally 11-21 mm (½-¾ in.) wide, 25-60 cm (10-24 in.) long, half as long to slightly exceeding the inflorescence, coarsely denticulate toward the base; perianth segments 6, white to greenish, ovate-elliptic, 2.5-3.5 mm (¼ in.) long; stamens 6 (female flowers usually with rudimentary or abortive stamens), filaments shorter than perianth.

Fruits: Capsular, more or less inflated, with 3 thin-walled compartments, rupturing irregularly and early to expose ovules, 4-7 mm (½-¼ in.) wide, deeply notched at apex, the style prominent; fruiting pedicels 4-7 mm (½-¼ in.) long, articulated 1-2 mm (less than ½ in.) above the base, dilated into the fruits, with prominent ridges just under the fruits; seeds roundish, swollen, 3.5-6 mm (⅙-¼ in.) in diameter, brown, coarsely rugose.

Habitat: Mesquite-sandsage shrublands on windblown Quaternary reddish sand in dune areas; also in pine-oak-juniper woodlands on Permian limestone slopes in the Guadalupe Mountains. Associates in dune areas include *Prosopis glandulosa*, *Ziziphus obtusifolia*, *Yucca campestris*, *Larrea tridentata*, *Penstemon ambiguous*, *Dalea scoparia*, *Hymenopappus flavescens* var. *canotomentosus*, and *Helianthus petiolaris*. Associates on limestone slopes include *Pinus ponderosa*, *P. edulis*, *Quercus grisea*, *Q. gambelii*, *Juniperus deppeana*, *J. pinchotii*, *Arbutus xalapensis*, *Acer grandidentatum*, *Cercocarpus montanus*, *Dasyllirion*

leiophyllum, *Yucca elata*, *Y. torreyi*, *Agave neomexicana*, *Fendlera rupicola*, and *Fendlerella utahensis*.

Phenology: There is disagreement among authors as to the flowering time of *N. arenicola*. According to Correll & Johnston (1970), the species flowers May to June. Henrickson and Johnston (in prep.) state that the species flowers between June and September. Warnock (1974) notes that the species blooms March through August.

Similar Species: *Nolina* species look like a large clump of grass. However the flowering structure is very different, and upon close inspection, the leaves of *Nolina* are very coarse and almost woody. Two other *Nolina* species grow in the same area as *N. arenicola*, and look similar. The following characters distinguish the three species. The leaves of *N. arenicola* can be slightly wider {4-11 mm ($\frac{1}{8}$ - $\frac{1}{2}$ in.) wide} than those of *N. micrantha* {3-7 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) wide} and *N. texana* {4-7 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) wide}. The inflorescence of *N. arenicola* is stouter than that of either *N. micrantha* or *N. texana*. Also the inflorescence of *N. arenicola* is usually longer {0.5-1 m (20-40 in.) long} than that of *N. texana* {0.3-0.6 m (12-24 in.) long}, but about the same size as *N. micrantha* {0.7-1.0 m (27-40 in.) long}. The fruiting pedicels of *N. arenicola* are 4-7 mm ($\frac{1}{8}$ - $\frac{1}{4}$ in.) long, while those of *N. micrantha* are 2-4 mm ($\frac{1}{8}$ in. or less) long and those of *N. texana* are 3-4 mm (about $\frac{1}{8}$ in.) long. The floral bracts of *N. arenicola* are long caudate and widely dilated at the base while the floral bracts of *N. micrantha* are not dilated at the base and those of *N. texana* are only slightly dilated at the base.

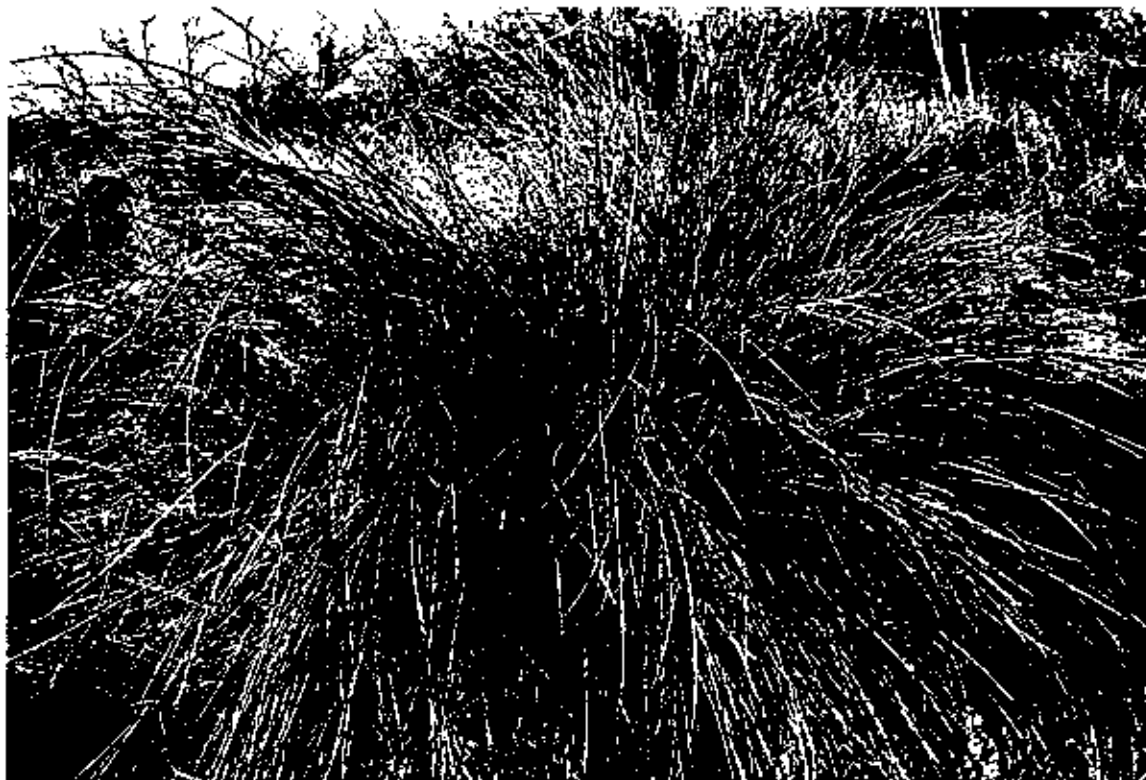
Comments: The taxonomy of *Nolina arenicola* is somewhat questionable. Many of the characters overlap with other closely related species. This group is in need of taxonomic revision.

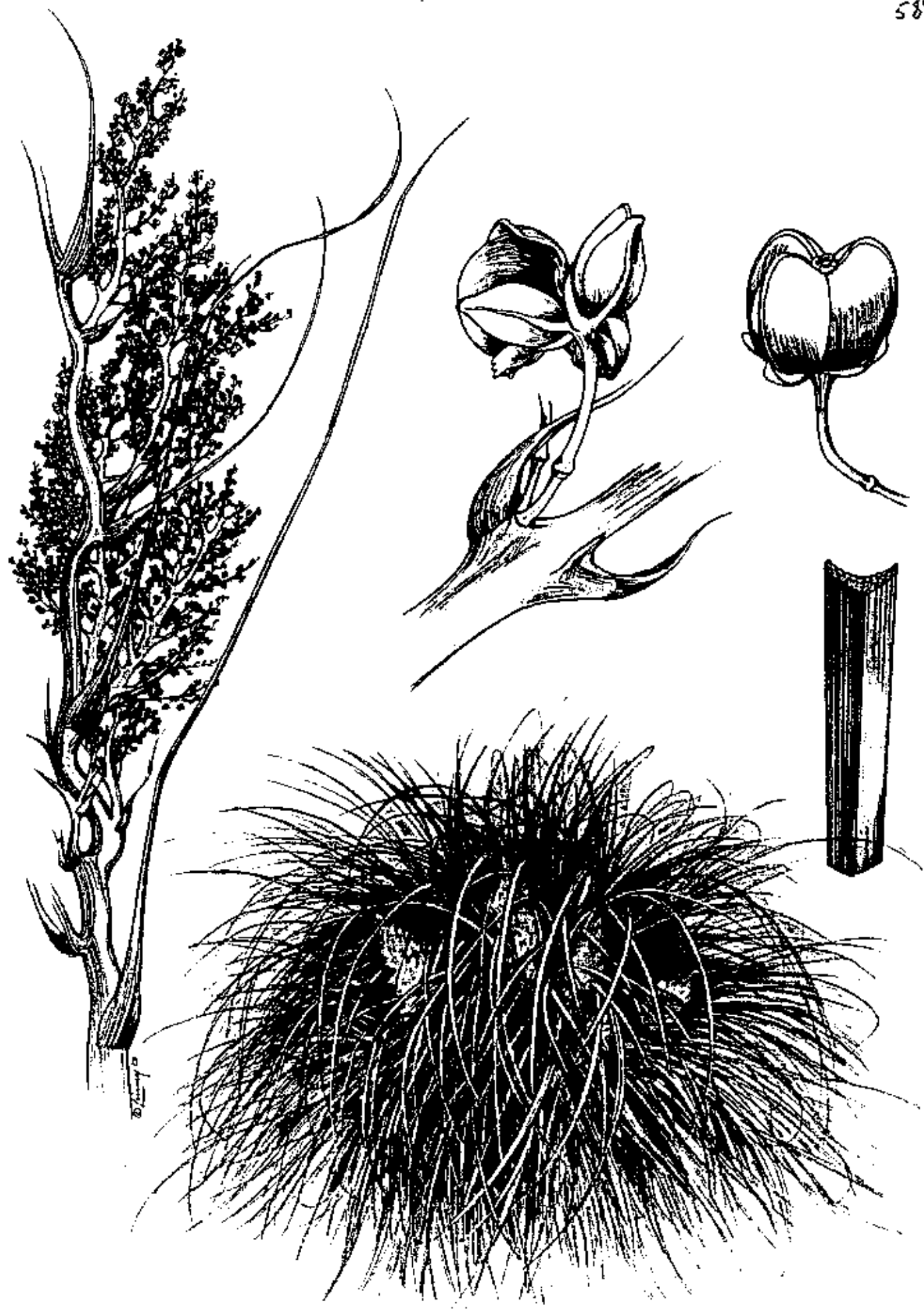
Additional Illustrations: There is a black and white photograph in Powell (1998). The color photograph in Warnock (1974) is probably *N. arenicola* as the flowering stalk is slender and reddish which is more characteristic of *N. micrantha*.

Selected References:

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Correll, D. S. 1968. Some additions to the flora of Texas--IV. *Madroño* 19: 187-191.
- Henrickson, J. and M. C. Johnston. In prep. Flora of the Chihuahuan Desert.
- Poole, J. M. 1989. Status report on *Nolina arenicola*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.







■ Current Range

▨ Questionable Range

Nolina arenicola
(sand sacahuista)

Scientific Name: *Oenothera pilosella* Raf. subsp. *sessilis* (Penn.) Straley

Synonyms: *Kneiffia sessilis* Penn.; *Oenothera sessilis* (Penn.) Munz

Common Name: Grand Prairie evening primrose

Global/State Ranks: G5T2SH

Federal Status: None

Global Range: Southeastern Arkansas, northwestern Louisiana and coastal Texas.

State Range: Known in Texas from a single specimen, collected by Ferdinand Lindheimer probably during the 1840's, from Galveston Island.

Description (adapted from Correll & Johnston 1970; Straley 1977): Perennial from a thickened, more or less bulbous rootstalk up to 1 cm thick; stems to 5 dm tall, simple or with a few ascending branches in the upper third, mid to upper stem densely strigose with hairs less than 1 mm long. Leaves alternate, simple, sessile to subsessile, ascending, lanceolate to narrowly lanceolate, (3-) 6-7 (-9) cm long and (3-) 6-8 (-11) mm wide, subentire (Straley 1977) or denticulate along margins (Correll & Johnston 1970). Flowers regular, from axils of upper leaves; mature buds erect, opening near sunrise; hypanthium 10-15 (-20) mm long; sepals 4, mostly 10-18 mm long and 2-3 mm wide, with free tips 1-2 mm long; petals 4, yellow to dark yellow, obovate, 15-25 mm long and 18-22 mm wide; stamens 8, the filaments 7-9 mm long, the anthers 5-8 mm long; style 10-12 mm long, the 4 stigmatic lobes 2-4 mm long. Fruit a linear-clavate (Correll & Johnston 1970) or elliptic (Straley 1977) capsule 8-10 mm long, 3-4 mm thick, 4-angled, wingless, sessile or on a stipe 1-2 mm long.

Similar Species: Most like *Oenothera pilosella* subsp. *pilosella*, which occurs in Arkansas and Louisiana but not Texas; differences between the two subspecies were discussed at length by Straley (1977). Among Texas species, this taxon is most similar to *Oenothera spachiana*, an annual species with a shorter (4-6 mm long) hypanthium and shorter (5-15 mm long) petals.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Specifics about the habitat in Texas are unknown. Elsewhere in its range, this taxon occurs in remnant moist to dry tallgrass prairies on sandy or silty Alfisols over claypan, on ancient river terraces of the Mississippi Alluvial Plain (Straley 1977; Tucker 1983). Associated species in prairie sites include *Andropogon gerardii*, *Schizachyrium scoparium*, *Panicum virgatum*, *Tripsacum dactyloides*, *Sorghastrum nutans*, and various species of *Carex*, *Liatris*, *Helianthus*, *Echinacea*, *Silphium*, *Penstemon* and *Physostegia*, among others (Tucker 1983; Steinauer 1989). It has also been reported from fragipan flatwoods dominated by *Quercus phellos* (Orzell & Bridges 1987).

Phenology: Flowering May-June.

Comments: The common name refers to the Grand Prairie of the Gulf Coastal Plain of Arkansas rather than the Grand Prairie of north-central Texas. This striking species should be sought in Alfisol prairies on the coastal plain of Texas.

Illustrations: Line drawings appear in Straley (1977) and Tucker (1983).

- Constance, L. and R. H. Shan. 1948. The genus *Osmorhiza* (Umbelliferae), a study in geographic affinities. University of California Publications in Botany 23: 111-156.
- Lowry, P. P., II. 1980. Preliminary status report on *Osmorhiza mexicana* ssp. *bipatriata*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Lowry, P. P. and A. G. Jones. 1984. Systematics of *Osmorhiza* Raf. (Apiaceae: Apioideae). Annals of the Missouri Botanical Gardens 71: 1128-1171.

Selected References:

- Kral, R. 1982. Paper 288 in U. S. Department of Agriculture, Forest Service. Endangered and threatened species of the southeastern United States. General report SA-GA-7.
- Munz, P. A. 1937. Studies in Onagraceae. X. The subgenus *Kneiffia* (genus *Oenothera*) and miscellaneous new species of *Oenothera*. Bulletin of the Torrey Botanical Club 64: 287-306.
- Orzell, S. L. and E. L. Bridges. 1987. Further additions and noteworthy collections in the flora of Arkansas, with historical, ecological, and phytogeographical notes. Phytologia 64: 81-144.
- Pennell, F. W. 1919. A brief conspectus of the species of *Kneiffia* with the characterization of a new allied genus. Bulletin of the Torrey Botanical Club 46: 363-373.
- Steinauer, R. F. 1989. Element stewardship abstract for *Oenothera pilosella* ssp. *sessilis*. The Nature Conservancy, Arlington, Virginia. 6 pp.
- Straley, G. B. 1977. Systematics of *Oenothera* sect. *Kneiffia* (Onagraceae). Annals of the Missouri Botanical Garden 64: 381-424.
- Tucker, G. E. 1983. Status report on *Oenothera pilosella* ssp. *sessilis*. Report prepared for U.S. Fish & Wildlife Service, Atlanta.

Scientific Name: *Osmorhiza mexicana* Griseb. subsp. *bipatriata* (Const. & Shan) Lowry & Jones

Synonyms: *Osmorhiza bipatriata* Const. & Shan

Common Name: Livermore sweet cicely

Global/State Ranks: G5T1S1

Federal Status: SOC

Global Range: Sierra Madera del Carmen in Coahuila, Cerro Potosí in Nuevo León, and the Davis Mountains of Texas (Lowry & Jones 1984).

State Range: Madera Canyon in the Davis Mountains of Jeff Davis County.

Description (adapted from Constance & Shan 1948; Lowry & Jones 1984): Perennial from thick fusiform roots with a weak anise smell; stems slender, 2-7 dm tall, sparingly hirsutulous to glabrescent. Leaves alternate, twice or thrice-ternately compound, ovate to broadly ovate, 4-10 (-14) cm long, villous or pilose, especially along the veins of the lower surface; leaflets ovate to ovate-oblong, (0.7-) 1.2-4 cm long, 0.5-3 cm wide, acute to acuminate, coarsely serrate-laciniate to lobed or divided at the base; petioles 4-10 (-12) cm long. Flowers in loose and rather open compound umbels on terminal and often lateral peduncles 3-15 (18) cm long; involucre absent or composed of 1 or sometimes 2 linear bracts 4-10 mm long and 0.5-0.8 mm wide; rays of umbel spreading-ascending, (1.4-) 1.6-6.5 (7.5) cm long; umbellets (2-) 3-9 per umbel; involucre of 1-4 linear, acuminate, ciliate bractlets (2-) 3-4.5 mm long and 0.3-1 mm wide; pedicels 3-22 per umbellet, those of hermaphrodite flowers 3-8 mm long, those of staminate flowers 2-4 mm long; hermaphrodite flowers 1-3 and staminate flowers 4-21 per umbellet; calyx absent; corolla of 5 small white petals, sometimes tinged with pink or purple; styles (including stylopodium) 0.5-0.75 mm long. Fruit a deep brown to black schizocarp, linear-fusiform and tapering into a short beak, concave-furrowed, 9-11 (-12) mm long, ribbed but not winged, the ribs glabrous or with a few retrorse bristles at the base, separating at maturity into 2 mericarps.

Similar Species: Very similar to subsp. *mexicana*, which ranges from Argentina north to Cerro Potosí in Nuevo León, where the two subspecies occur together (Lowry & Jones 1984) and may intergrade. Quite unlike any species in the mountains of Trans-Pecos Texas.

Habitat: Moist igneous soils of shaded rocky slopes around springs in high mountain canyons. One population in the Davis Mountains lies in the shade of a mesic canyon forest composed of *Pinus ponderosa*, *Quercus gambelii* and *Q. hypoleucoides*, in association with other montane herbs and grasses such as *Heuchera rubescens*, *Thalictrum fendleri*, *Geranium cespitosum*, *Stellaria cuspidata*, *Sicyos cf. laciniatus*, *Salvia arizonica*, *Euphorbia bifurcata* and *Panicum bulbosum*.

Phenology: Flowering June-July (Lowry & Jones 1984).

Comments: The specific epithet was chosen to reflect not only the two-country distribution of the taxon but also the different nationalities of the two authors (Constance & Shan 1948).

Illustrations: A black-and-white photo of the type specimen appears in Constance & Shan (1947).

Selected References:



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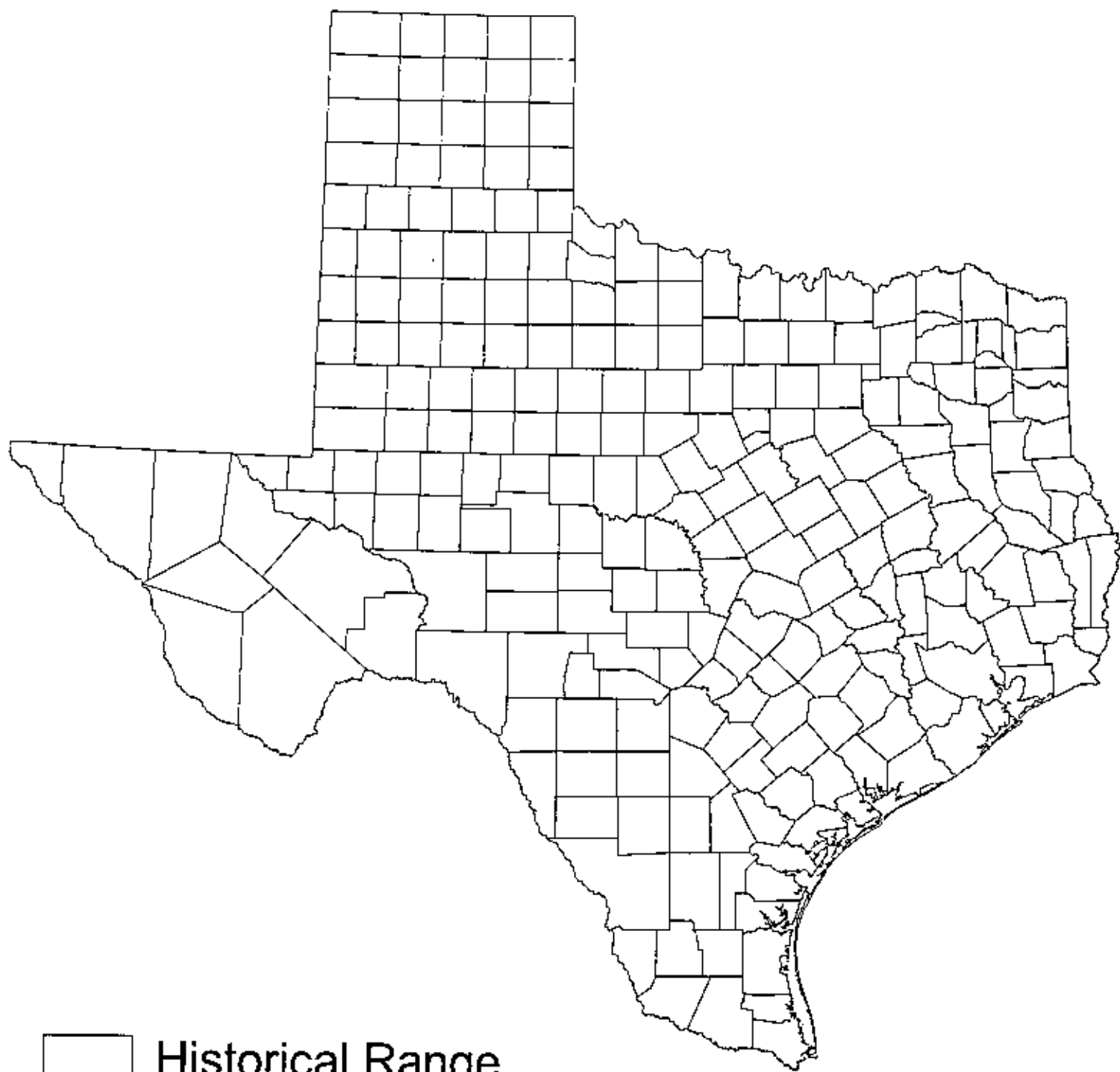
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FIGURES 81-82.—81. *Oenothera pilosella* subsp. *sessilis* ($\times\frac{1}{2}$). [After Straley 1049 (MO).]—82. *O. spachiana* ($\times\frac{1}{2}$). [After Emig 582 (MO).]

ems best assigned to subsp. *sessilis* is from Little Rock, AR, 26 May 1885 Hasse (NY) and is densely, short strigose throughout, lacking any long hairs. However, it has broader leaves, more typical of subsp. *pilosella*. A specimen with leaves of similar size and shape from near Corning, Clay Co., AR, 25 May 1893, Eggert (MO), has the strigose vestiture of subsp. *sessilis*—although distinctly yellowish—more typical of subsp. *pilosella*. These collections lack good underground parts and mature fruits, with which they could be more definitely assigned to one subspecies or the other.

Pennell's type specimen of this taxon was presumably collected by Hasse in the vicinity of Little Rock, although the hilly uplands around the city of present-day Little Rock are somewhat out of line with the ecology of the presently known



□ Historical Range

Oenothera pilosella ssp. *sessilis*
(Grand Prairie evening primrose)

Scientific Name: Opuntia arenaria Engelm.

Synonymy:

Common Name: sand pricklypear

Global Range: Along the Rio Grande in NM, TX and Chihuahua.

State Range: El Paso and Hudspeth counties.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Deep loose sands in sparsely vegetated dune or sandhill areas. Associated species include Larrea tridentata, Dalea scoparia, Phacelia integrifolia, Sporobolus flexuosus, Mentzelia multiflora (Sabo 1981).

Phenology: Flowering May-June.

Similar Species:

Comments:

Illustrations: Black and white photographs appear in Benson (1982); a color photograph appears in Weniger (1984); line drawings of various parts appear in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.

Sabo, D. G. 1981. Status report [on Opuntia arenaria]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.

Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. El Paso Southwest Botanical Miscellany No. 1. 56 pp.



Family: CACTACEAE

Scientific Name: *Opuntia arenaria* Engelm.

Common Name: Sand prickly pear

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: None

Description: Stems jointed, less than 30 cm (12 in.) high but forming clumps up to 1.5 m (4.9 ft.) broad, bearing roots with clusters of tiny spines; joints broadest above the middle, tapering to the base, or sometimes elliptic or ovate, to 8 cm (3 in.) long and 2–3 cm (0.8–1.0 in.) wide, and at least half as thick as wide, 5–7 spines per cluster, mostly white or gray or tinged with red, to about 30 mm (1.2 in.) long, flowers yellow, 4–6 cm (1.5–2.4 in.) wide, fruit green, broadly club shaped, bearing whitish spines. Flowers in May and June.

Known Distribution: Doña Ana County, New Mexico, and adjacent Texas and Mexico

Habitat: On and among sandy dunes, or on sandy floodplains in arroyos, at about 1,160 m (3,600 ft.)

Ownership: Bureau of Land Management, private

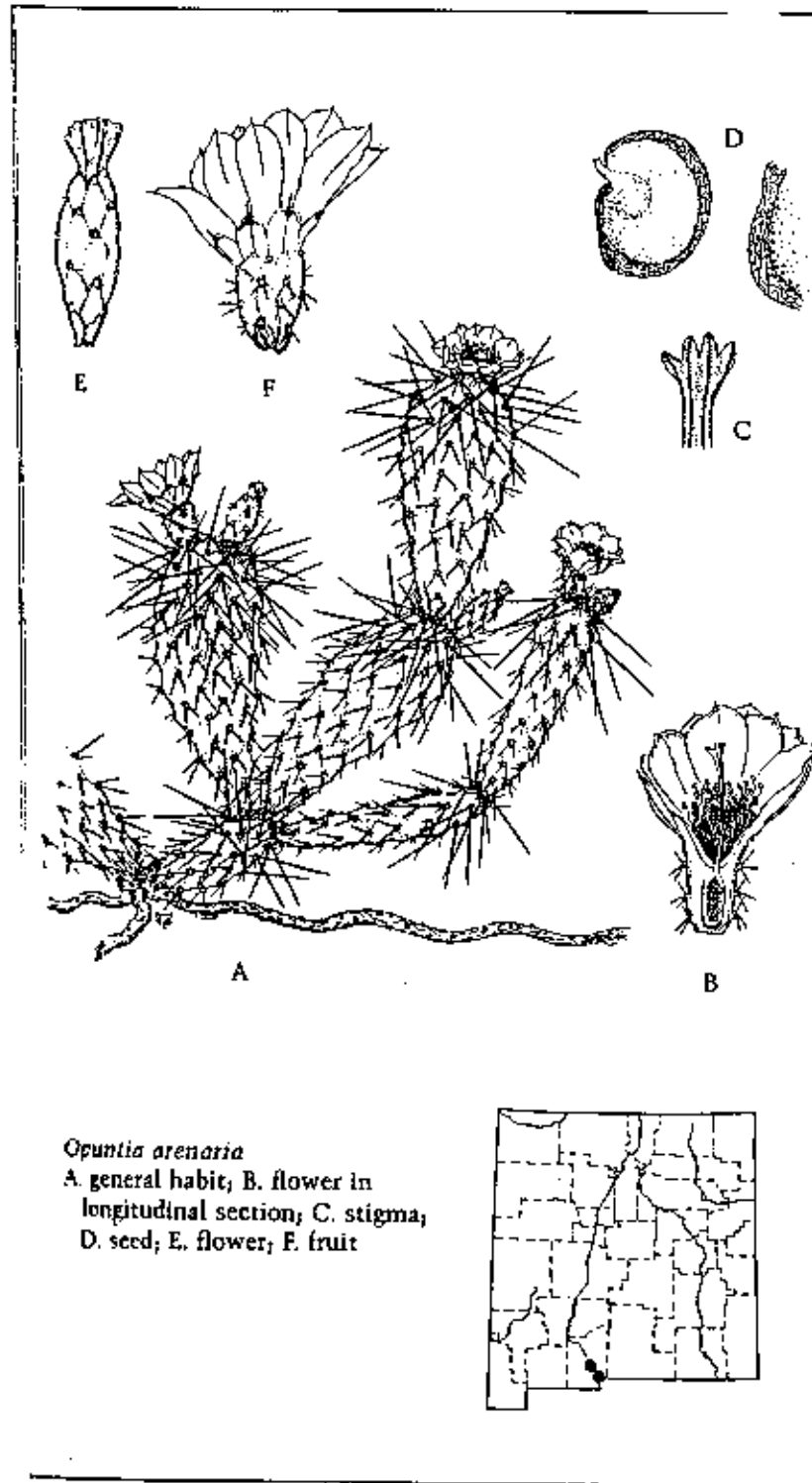
Threats to Taxon: Some populations have been lost to urban development, and others are threatened. Collectors also have reduced some populations to near extinction.

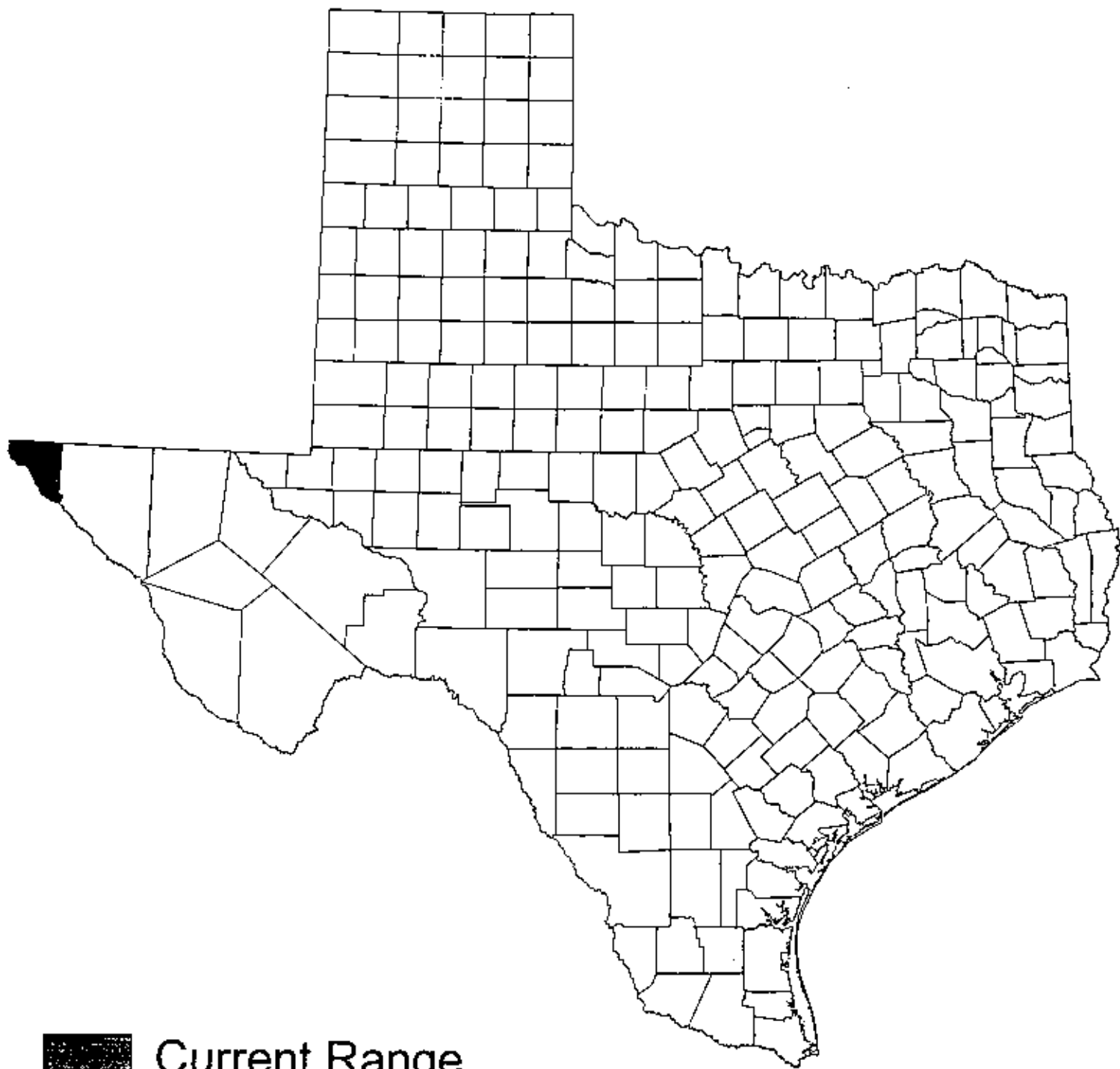
Similar Species: *Opuntia polyacantha*, in general, has larger stem joints which are relatively thinner, rarely more than one-fourth as thick as wide.

Remarks: The digging of plants by collectors is unfortunate and unnecessary, as plants will readily root and grow rapidly from detached stems.

Important Literature:

Correll and Johnston. Manual of the vascular plants of Texas. Renner. Tex.: Texas Research Foundation, 1970.





Opuntia arenaria
(sand prickly-pear)

Scientific Name: *Opuntia aureispina* (Brack & Heil) Pinkava & Parfitt

Synonymy: *Opuntia macrocentra* Engelm. var. *aureispina* Brack & Heil

Common Name: golden-spined pricklypear

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Trans Pecos Texas and Coahuila, Mexico.

State Range: Along the Big Bend of the Rio Grande in southern Brewster County.

Description (compiled from Heil and Brack 1988, Anderson 2001, Pinkava 2001): Large, upright, shrubby, perennial stem succulent to 1.5 m (5 ft.) tall, with heavily spined short trunks and many branches near ground level. **Stem segments** round to obovate, light blue-green to yellow-green, glaucous, 8-12 cm (3¼-4¾ in.) long and broad; areoles blackish, oblong, 4-5 mm (¼-½ in.) long, 1-3 mm (≤¼ in.) wide, 18-25 mm (¾-1 in.) apart. **Spines** well-distributed on stem segments, spreading, 1-6 per areole, usually 3-5, bright yellow to orangish, red brown at very base, aging to light-brown to orange-brown to blackish, all with yellow tips, never chalky, sometimes flattened or twisted, 2-6 cm (¾-2¾ in.) long; 1-7 slender accessory spines, same color as main spines, up to 2 cm (¾ in.) long; glochids yellow, unequal in length, well-spaced in a very narrow row encircling areoles. **Flowers** yellow, with orange to red bases, 6-8 cm long (2¾-3¾ in.) long, 6-7 cm (2¾-2¾ in.) in diameter. **Fruits** fleshy and green to slightly red at first, drying to a hard tan bur, 3-4 cm (1½-1½ in.) long, 2-2.5 cm (¾-1 in.) in diameter, covered with rigid spines; seeds tan, 3-6 mm (⅓-¼ in.) in diameter.

Habitat: Desert flats and low hills on slabs and fractured Boquillas Limestone, Chihuahuan Desert near Rio Grande, at about 1900 ft. elev. Associates include *Agave lechuguilla*, *Bouteloua breviseta*, *Euphorbia antisiphilitica*, *Jatropha dioica*, *Opuntia imbricata* var. *argentea*, *Coryphantha ramillosa*, and *C. duncanii*.

Phenology: Flowering in March-May.

Similar Species: Pricklypears are a difficult and confusing group, and they are known to hybridize. Identification should be approached cautiously, and never based on one character, but a suite of characters. *Opuntia aureispina* can be distinguished from other pricklypears by its spiny fruits that are fleshy at first but dry and hard at maturity, its yellow flowers with reddish bases, and the yellowish spines. All other pricklypears in west Texas have fleshy fruits except *O. x spinosibacca* which is thought to be a

hybrid between *O. aureispina* and *O. phaeacantha*. *Opuntia x spinosibacca* has fruits that are sparingly spiny and sometimes sterile and dry at maturity, and with 1-8, reddish brown to brown, yellowish tipped spines per areole.

Comments: This taxon was not described until 1988 and is therefore not treated in the relevant cactus manuals such as Benson (1982) and Weniger (1984).

Illustrations: Color photographs appear in Evans (1998) and Anderson (2001). A black and white photograph appears in the original publication as *O. macrocentra* var. *aureispina* (Heil and Brack 1988).

Selected References:

Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Evans, D. B. 1998. Cactuses of Big Bend National Park. University of Texas Press, Austin.

Heil, K. D. and S. Brack. 1988. The cacti of Big Bend National Park. *Cactus & Succ. J. (U.S.)* 60(1): 17-34.

Pinkava, D. J. 2001. Draft *Opuntia* treatment in Flora North America north of Mexico. 27 February 2001 draft.

Pinkava, D. J. and B. D. Parfitt. 1988. Nomenclatural changes in Chihuahuan Desert *Opuntia* (Cactaceae). *Sida* 13(2): 125-130.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



Opuntia aureospina photographed at Rooney's Place, Big Bend National Park, Brewster County, Texas 4/86 by Jackie M. Poole

Golden-spined pricklypear
(Opuntia aureispina)

- 14 • The golden-spined pricklypear is an upright shrub, with a distinct trunk, up to about 5 feet high. The trunk is densely covered with spines. The pads are bluish to yellowish green and are about 3 to 4³/₄ inches broad and long. The areoles bear 4 to 12 spines, which are often twisted and up to about 2¹/₂ inches long.

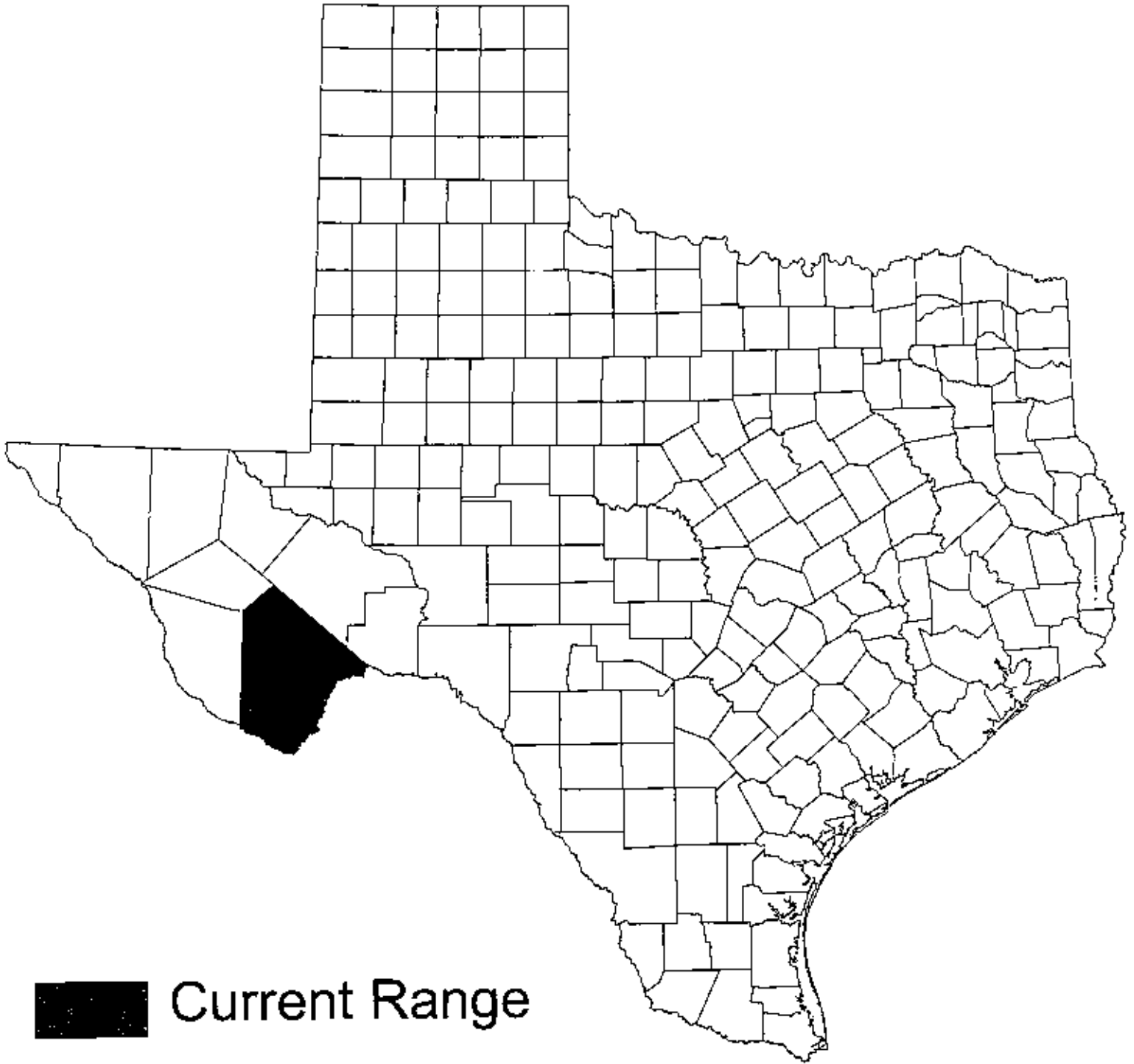
The golden-spined pricklypear blooms in March and April. The flowers are yellow with bright orange or red centers and are about 2¹/₂ inches in diameter. The mature fruits are dry and spiny.

This pricklypear grows in rocky limestone soils below 2,000 feet elevation. It is very rare in Big Bend National Park. It may also occur southward in Mexico.

GOLDEN-SPINED PRICKLYPEAR



The Genus *Opuntia*



■ Current Range

Opuntia aureispina
(golden-spine prickly-pear)

Scientific Name: Opuntia engelmannii Salm-Dyck var. flexospina (Griffiths) Parfitt & Pinkava

Synonymy: O. flexospina Griffiths; O. strigil Engelm. var. flexospina (Griffiths) L. Benson

Common Name: few-spined Engelmann's pricklypear

Global Range: South TX.

State Range: Starr, Webb and Zapata counties.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Dry hills overlooking Rio Grande (Weniger 1969).

Phenology:

Similar Species:

Comments:

Illustrations: A color photograph appears in Weniger (1984); a black and white photograph appears in Benson (1982).

Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

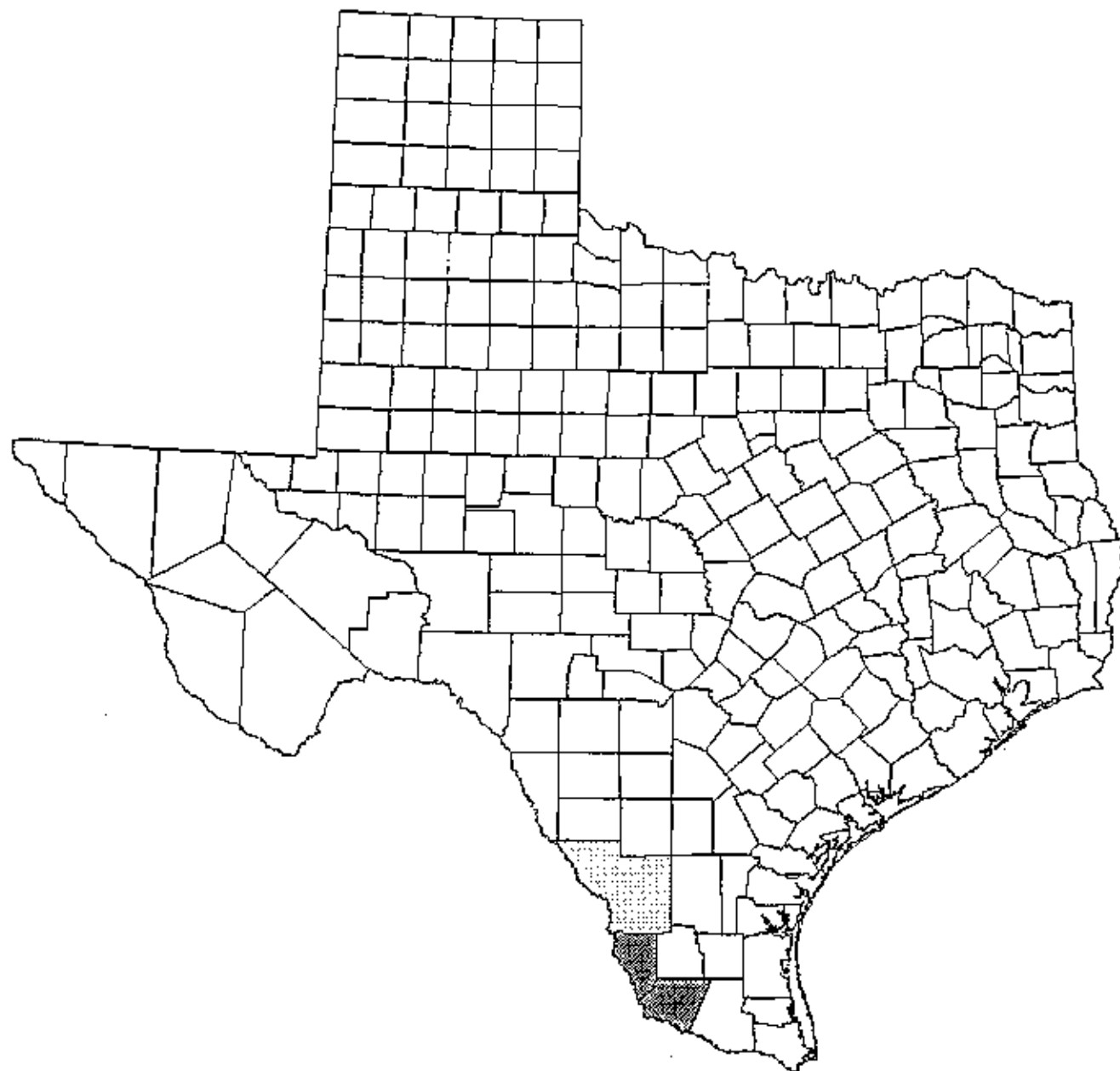
Griffiths, D. 1916. New species of Opuntia. Bull. Torr. Bot. Club 43: 87-88.

Parfitt, B. D. and D. J. Pinkava. Nomenclatural and systematic reassessment of Opuntia engelmannii and O. lindheimeri. Madroño 35(4): 342-349.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.



Quanta evolvitensis var. *flavescens* Mam. pad. 101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000



 Current Range

 Historical Range

Opuntia engelmannii var. *flexospina*
(Few-spined Engelmann's prickly pear)

Scientific Name: *Opuntia imbricata* (Haw.) DC. var. *argentea* Anthony

Synonymy: *Cylindropuntia imbricata* (Haw.) F. M. Knuth var. *argentea* (Anthony) Backeberg

Common Name: silver cholla; Big Bend cane cholla

Global/State Ranks: G5T1S1

Federal Status: SOC

Global Range: Trans Pecos Texas.

State Range: Along the Big Bend of the Rio Grande in southern Brewster County.

Description (compiled from Anthony 1956, Benson 1982, and Heil and Brack 1985): Erect, shrubby, stem succulent to 1.2 m (4 ft.) tall, trunk to 7.5 cm (3 in.) in diameter; branches numerous, spreading to erect. **Stem** segments relatively large, cylindrical, grayish-green, 10-20 cm (3⁷/₈-7⁷/₈ in.) long and 1.5-4 cm (5/8-1⁵/₈ in.) in diameter; tubercles prominent, 20 mm (3/4 in.) long, 5-12 mm (1/4-1/2 in.) wide, heavily glaucous, silvery green; areoles long oval, 5-7 mm (ca. 1/4 in.) long, 3-4 mm (about 1/8 in.) wide, woolly, to 20 mm (3/4 in.) apart. **Spines** 10-21, from all except the lowermost areoles, at first white to pink with a greenish base becoming silvery with pinkish bases and silvery white, papery sheaths, becoming gray with age; radial spines 5-7, to 1.8 cm (3/4 in.) long, spreading, deflexed; central spines 6-14, to 2 (3/4 in.) cm long, spreading; glochids inconspicuous, in compact row along upper margin of areole, white with green bases becoming pale yellow with age, barely 1 mm (<1/8 in.) long. **Flowers** reddish purple, 5-6.2 cm (2-2.5 in.) long, 5-7.5 cm (2-3 in.) in diameter. **Fruits** yellow, fleshy, spiny, 2.5-4.4 cm (1-1³/₄ in.) long, 2-3 cm (3/4-1¹/₈ in.) in diameter; seeds light tan, 3 mm (1/8 in.) in diameter.

Habitat: Rocky limestone soil (Heil et al. 1985). Associated species include *Larrea tridentata*, *Agave lechuguilla*, *Dasylinion leiophyllum*, *Ephedra trifurca*, *Hechtia scariosa*, *Bouteloua curtipendula*, *Yucca torreyi*, *Prosopis glandulosa*, *Condalia ericoides*, *Fouquieria splendens*, *Opuntia violacea* var. *minor*, *O. leptocaulis*, *O. schottii*, *O. engelmannii*, *O. rufida*, *O. phaeacantha* var. *brunnea*, *Escobaria albicolumnaria*, *E. duncanii*, *Coryphantha ramillosa*, and numerous other cacti (Heil et al. 1985)

Phenology: Flowering June-July; fruiting September-October (Heil et al. 1985)

Similar Species: *Opuntia imbricata* var. *imbricata* differs in its taller stature (up to 3 m (10 ft.)), its larger tubercles (2-3.5 cm (3/4-1³/₈ in.) long) that are set farther apart, and its red or pink spines with yellow sheaths. All other tree cholla species in west Texas (i.e., *O. leptocaulis*, *O. kleinae*) have much

smaller stem segments.

Comments: Weniger (1984) does not recognize this variety. Anderson (2001) uses *Cylindropuntia*.

Illustrations: A black and white photograph appears in Anthony (1956). A color photograph appears in Anderson (2001).

Selected References:

Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.

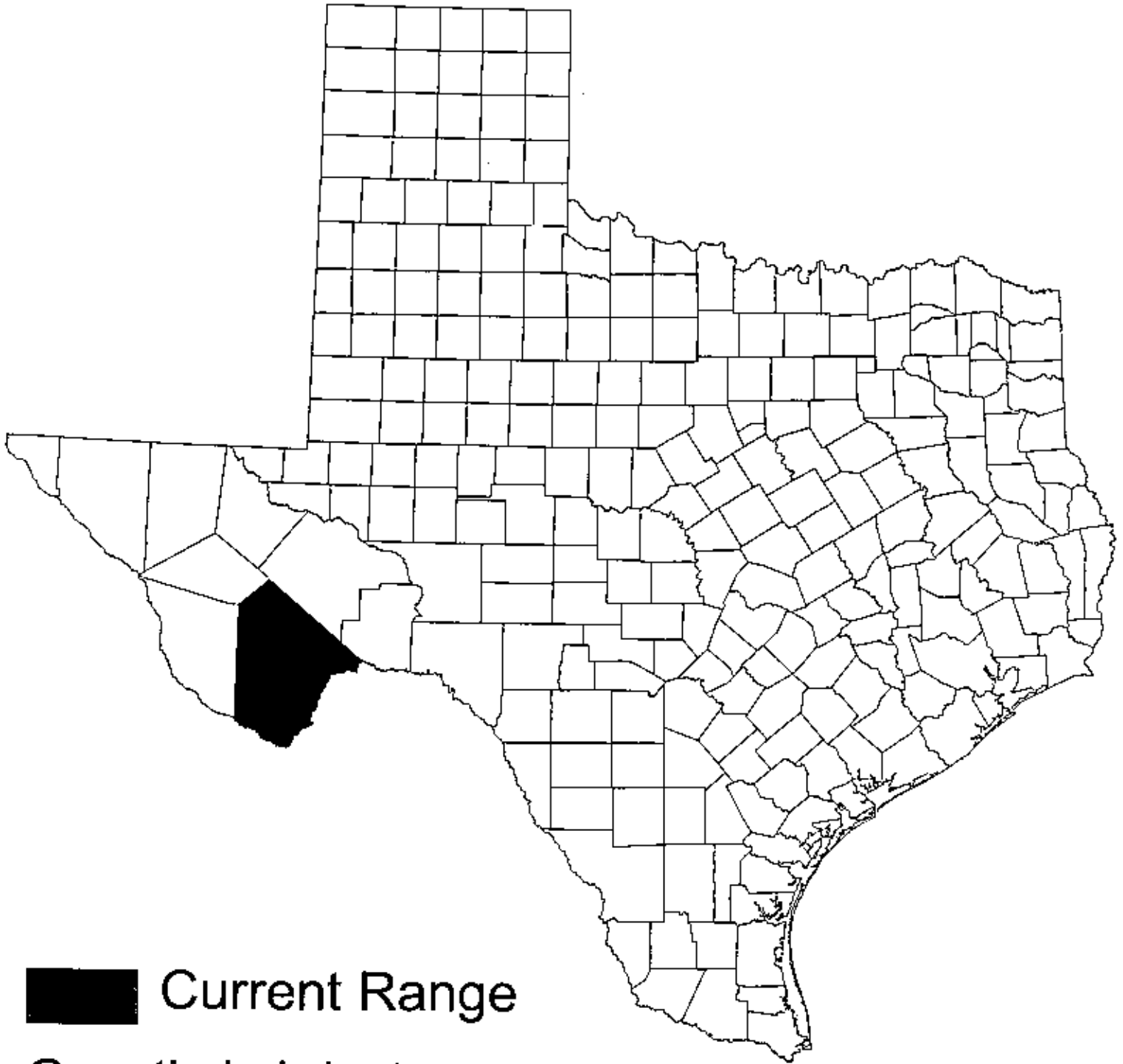
Anthony, M. S. 1956. The Opuntiae of the Big Bend region of Texas. Amer. Midl. Nat. 55(1): 225-256.

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

Heil, K. D., S. Brack, and J. M. Porter. 1985. The rare and sensitive cacti of Big Bend National Park. Report prepared for Big Bend National Park, Texas. 41 pp.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.





■ Current Range

Opuntia imbricata var. *argentea*
(silver cholla)

Scientific Name: *Osmorhiza mexicana* Griseb. ssp. *bipatriata* (Const. & Shan) Lowry & Jones

Synonymy: *Osmorhiza bipatriata* Const. & Shan.

Common Name: Livermore sweet-cicely

Global Range: Texas and Mexico (Coahuila and Nuevo León).

State Range: Jeff Davis County; known in Texas only from Madera Canyon in the Davis Mountains.

Current Federal and State Status: Species of special concern.

Global and State Ranks: G5T1S1

Description (compiled from Lowry and Jones 1984, Lowry 1980, Constance and Shan 1948, and Correll and Johnston 1970).

Habit: Slender perennial 2-7 dm (8-28 in) tall; stems sparsely hirsutulous to glabrescent; root system shallow and fibrous with a weak anise-like scent.

Leaves: Blades ovate, 4-14 cm (1½-5½ in) long and wide, 2-3 ternate, villous or pilose, especially on veins below; leaflets ovate to ovate-oblong, 0.7-4 cm (½-1½ in) long, 0.5-3 cm (½-1¼ in) wide, acute to acuminate, coarsely serrate-laciniate to lobed or divided at the base; petioles 4-12 cm (1½-5 in) long.

Flowers: Inflorescence of compound rather loose and open umbels, peduncles 1 to 3, terminal and often lateral, 3-18 cm (1¼-7¼ in) long; involucre lacking or often composed of 1-2, linear, foliaceous, ciliate bracts, 4-10 mm (¼-½ in) long, 0.5-0.8 mm (less than ¼ in) wide; rays 2 to 5, spreading-ascending, to 35 mm (1½ in) long, rarely to 80 mm (3¼ in) long; umbellets 2-9 per umbel, some to none of them producing only male flowers; involucre of 1-4 spreading, linear, acuminate, ciliate bractlets 1-4.5 mm (¼ in or less) long, 0.3-1 mm (less than ¼ in) wide; pedicels spreading, 3-22 per perfect umbellet, 3-17 per male umbellet, those of the perfect flowers 3-8 mm (¼-¾ in) long, those of the male flowers 1.5-4 mm (¼ in or less) long; flowers white tinged sometimes tinged with green or rose, inconspicuous, perfect flowers 1-3 per umbellet, 2-10 per umbel, male flowers 4-21 per umbellet, 33-125 per umbel; styles (including stylopodium) 0.5-0.75 mm (less than ¼ in) long, stylopodium low-conic, 0.25-0.3 mm (less than ¼ in) long, carphophore cleft about one fourth of its length.

Fruits: linear-fusiform, 9-12 mm (¾-½ in) long, black when mature, concave furrowed, ribs glabrous or rarely with a few bristles at the base, tapering into a short beak at the apex, acute or with rudimentary appendages at the base.

Habitat: Moist, often shaded, mountain ravines and canyons.

Phenology: Flowering June-July

Similar Species: The only other species of *Osmorhiza* in Texas occurs in the eastern part of the state, and has fruits with prominent basal appendages and bristles. The umbel family is often looked upon as difficult. However the combination of characters of *O. mexicana* ssp. *bipatriata* (flowers and fruits pedicillate in compound umbels; the linear, usually glabrous fruit; and the conspicuous involucre) should distinguish this taxon from others in the umbel family.

Comments: This plant has not been collected in Texas since 1968.

Illustrations: There are additional illustrations in Lundell's Flora of Texas and in Lowry and Jones 1984.

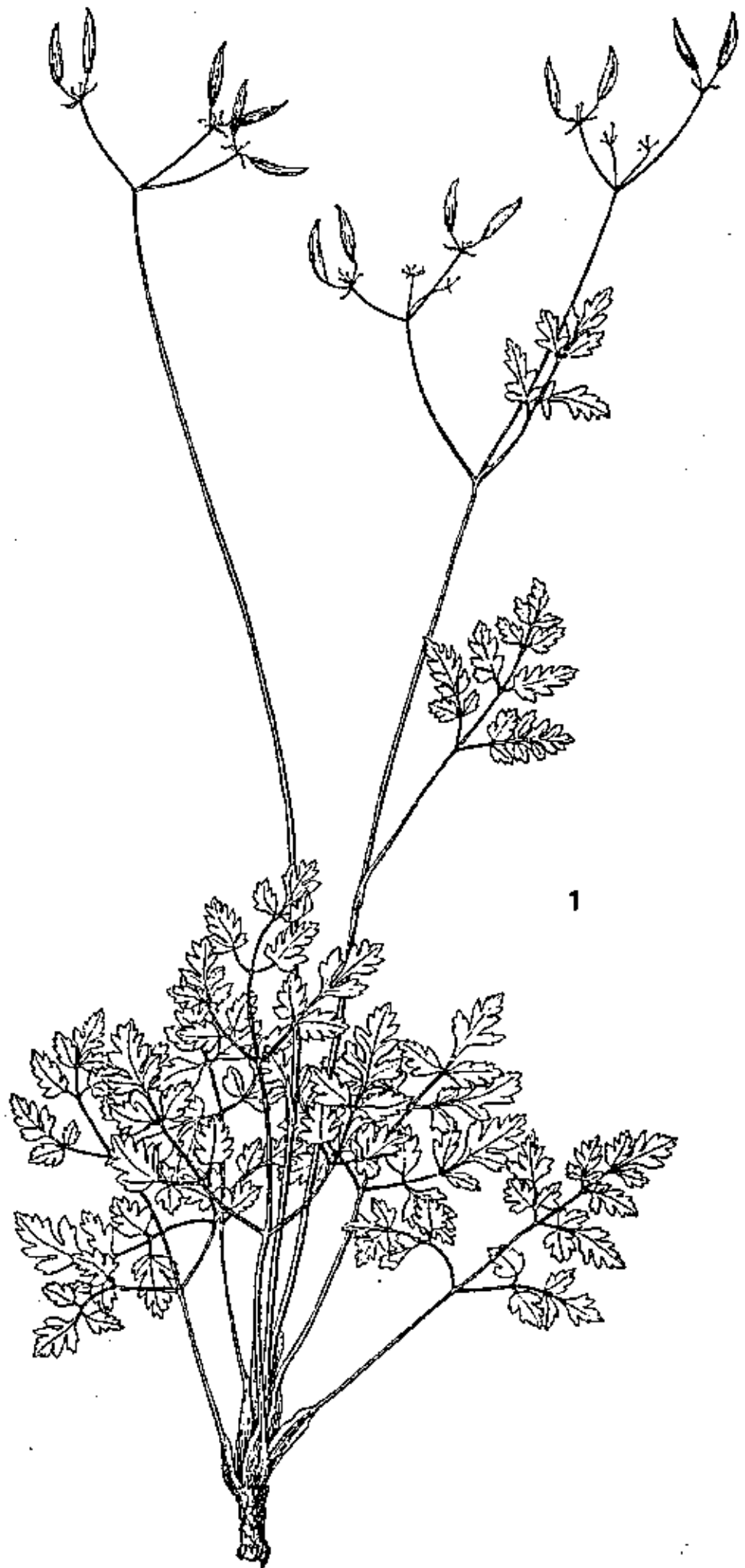
Selected References:

Constance, L. and R. H. Shan. 1948. The genus *Osmorhiza* (Umbelliferae), a study in geographic affinities. Univ. Calif. Publ. Bot. 23: 111-156.

Lowry, P. P., II. 1980. Preliminary status report on *Osmorhiza mexicana* ssp. *bipatriata*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Lowry, P. P. and A. G. Jones. 1984. Systematics of *Osmorhiza* Raf. (Apiaceae: Apioideae). Ann. Mo. Bot. Gard. 71: 1128-1171.

Lundell, C. L. 1961. Flora of Texas, vol. 3.

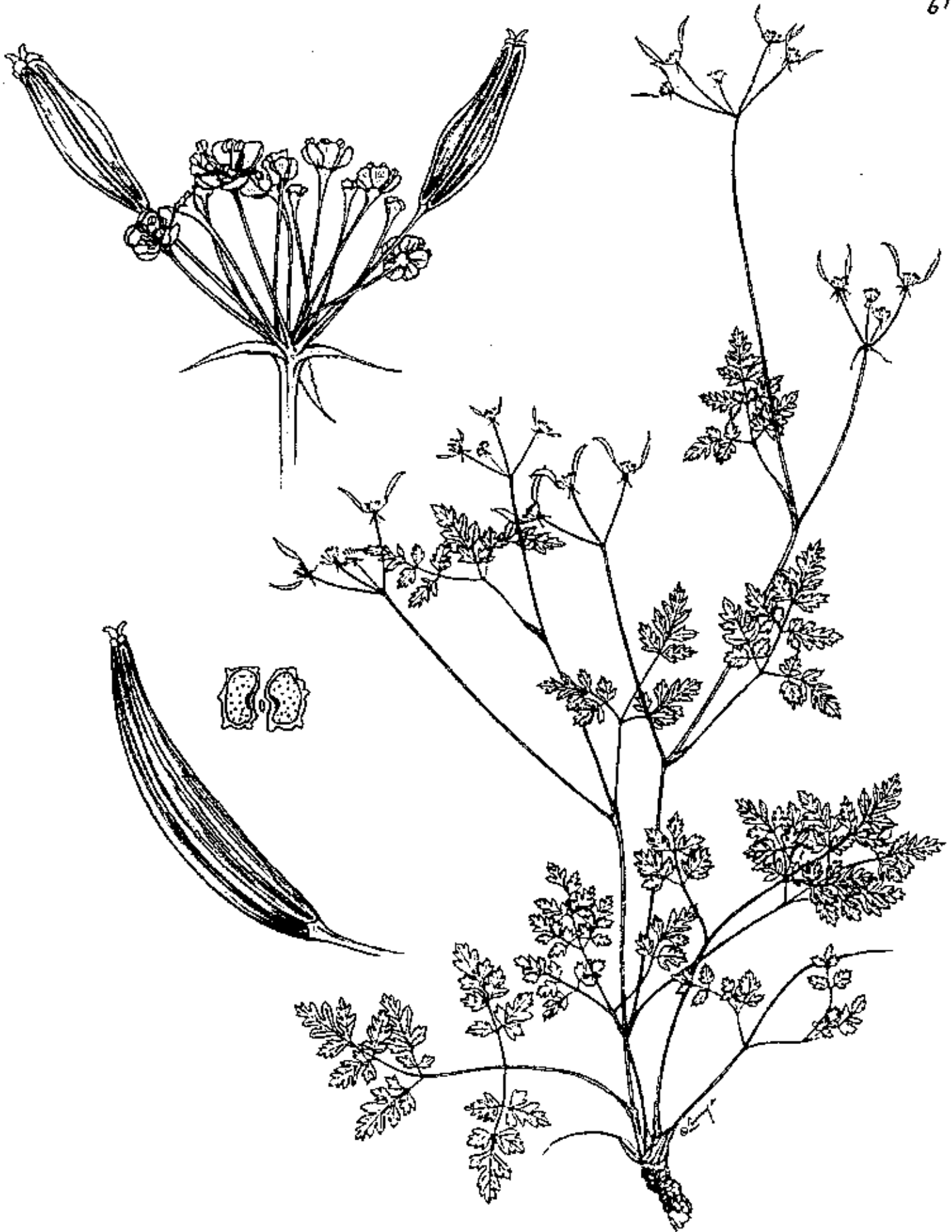


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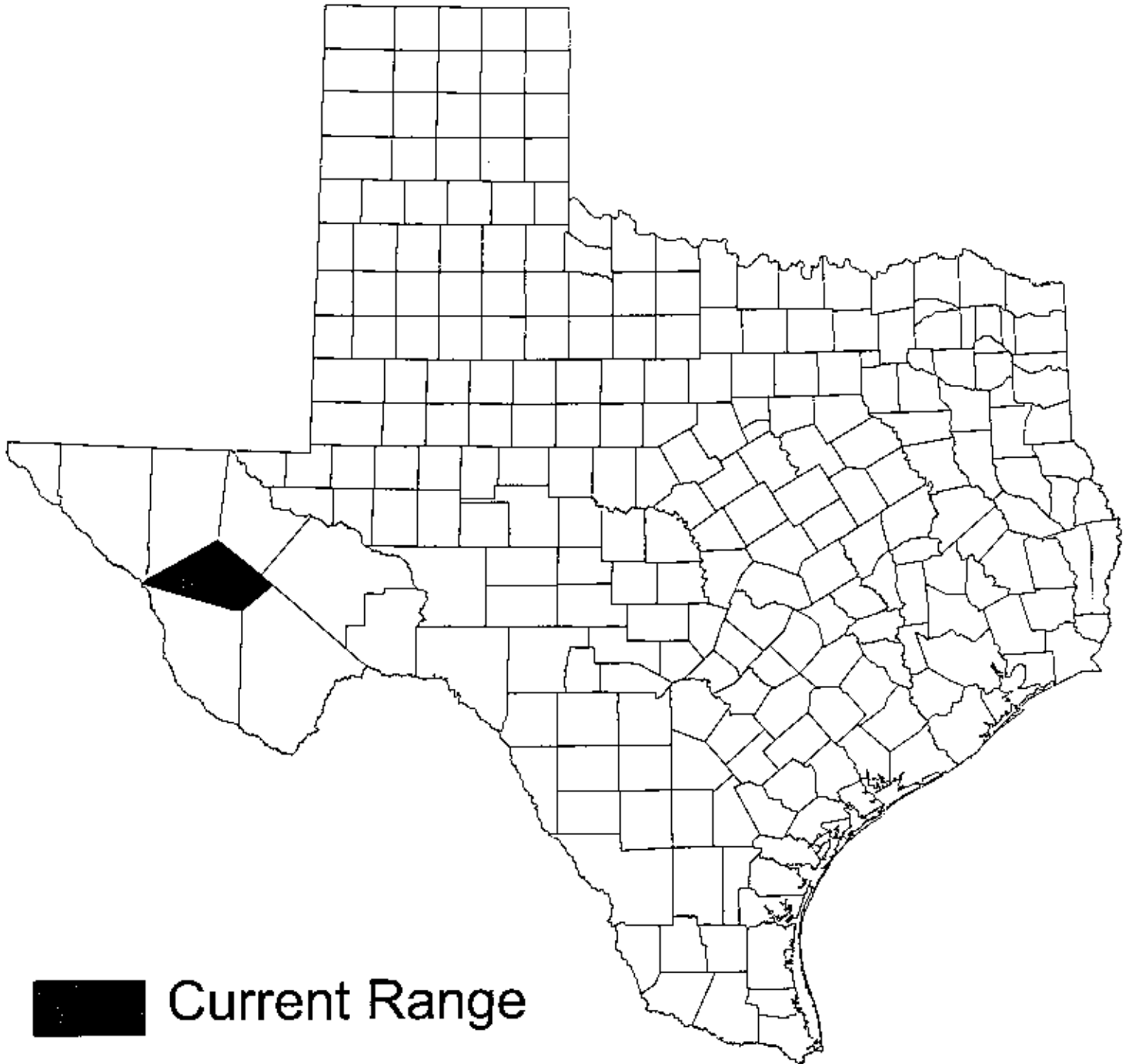


Apiaceae & *Osmorhiza mexicana* ssp. *bipartita*.

SUL. ROSS. HERBARIUM

BARTON & WARNECK & L. C. MINCKLEY

Artist: Emma Hays, 8/12/01
No. 2479, MEXICO, DAVIS CO., TEX.



■ Current Range

Osmorhiza mexicana ssp. *bipatriata*
(Livermore sweet-cicely)

Scientific Name: *Ostrya chisosensis* Correll

Synonyms: *Ostrya knowltonii* Sarg. subsp. *chisosensis* (Correll) E. Murray; treated in Powell (1998) as *Ostrya virginiana* (Mill.) K. Koch var. *chisosensis* (Correll) Henrickson, a combination that has apparently not been published.

Common Name: Big Bend hop-hornbeam

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: West Texas (Chisos Mountains) and northern Coahuila (Sierra Maderas del Carmen).

State Range: Known only from the Chisos Mountains of Brewster County.

Description (adapted from Correll 1965; Furlow 1997; Powell 1998): Deciduous tree to 14 m tall, with the branchlets, leaves and floral parts more or less pubescent but without stipitate glands; branches slender, distantly spaced to form a cylindrical crown, the branchlets and twigs slender and willowy. Leaves alternate, simple, subsessile or with a petiole 1.5-2 mm long, rather thin, ovate-elliptic to elliptic or elliptic-lanceolate, obliquely rounded and slightly cordate at base, obtuse to acute at apex, dark green on the upper surface, paler on the lower surface, up 6 cm long and 3 cm wide, sometimes widest above the middle, more or less doubly and finely serrate. Flowers unisexual, arranged in single-sex catkins on the same trees; staminate catkins cylindrical, in clusters of 2 or 3, 3-4 cm long and ca. 4 mm thick; staminate scales broadly triangular-ovate, concave, tapered to a long-cuspidate apex, 2.5-3 mm long and ca. 2 mm wide, with the cusp at least 1 mm long and usually about as long as the body, the margins and cusp long-fimbriate; fruiting pistillate catkins ca. 2 cm long, on stout stems ca. 1 cm long, composed of about 6 flowers concealed within bracts and bractlets that form a bladderlike involucre, the involucre pubescent, overlapping to form a conelike cluster reminiscent of the fruits of hops. Fruit a nutlet enveloped within the involucre, tan, ellipsoid to ovoid, flattened, ca. 6 mm long and 3 mm wide.

Similar Species: No other *Ostrya* species occurs in the Chisos Mountains. *Ostrya knowltonii* occurs in the Guadalupe Mountains; it has roundish-ovate to ovate-elliptic leaves, stalked glands on the petioles and branchlets, and staminate catkins 2-3 cm long. *Ostrya chisosensis* is very much like *Ostrya virginiana*, which ranges from Nova Scotia through east Texas and south to Guerrero. The ranges of the two species overlap in the Sierra Maderas del Carmen, where the two species reportedly intergrade (Henrickson & Johnston in prep.).

Habitat: Mixed woodlands on mesic rocky igneous slopes at high elevations in the Chisos Mountains. Associates include *Pinus cembroides*, *Juniperus deppeana*, *Acer grandidentatum*, *Rhamnus betulifolia*, *Salvia regla* and montane forbs and grasses such as *Silene laciniata*, *Piptochaetium fimbriatum* and *Aletes acaulis*.

Phenology: Flowering May-June.

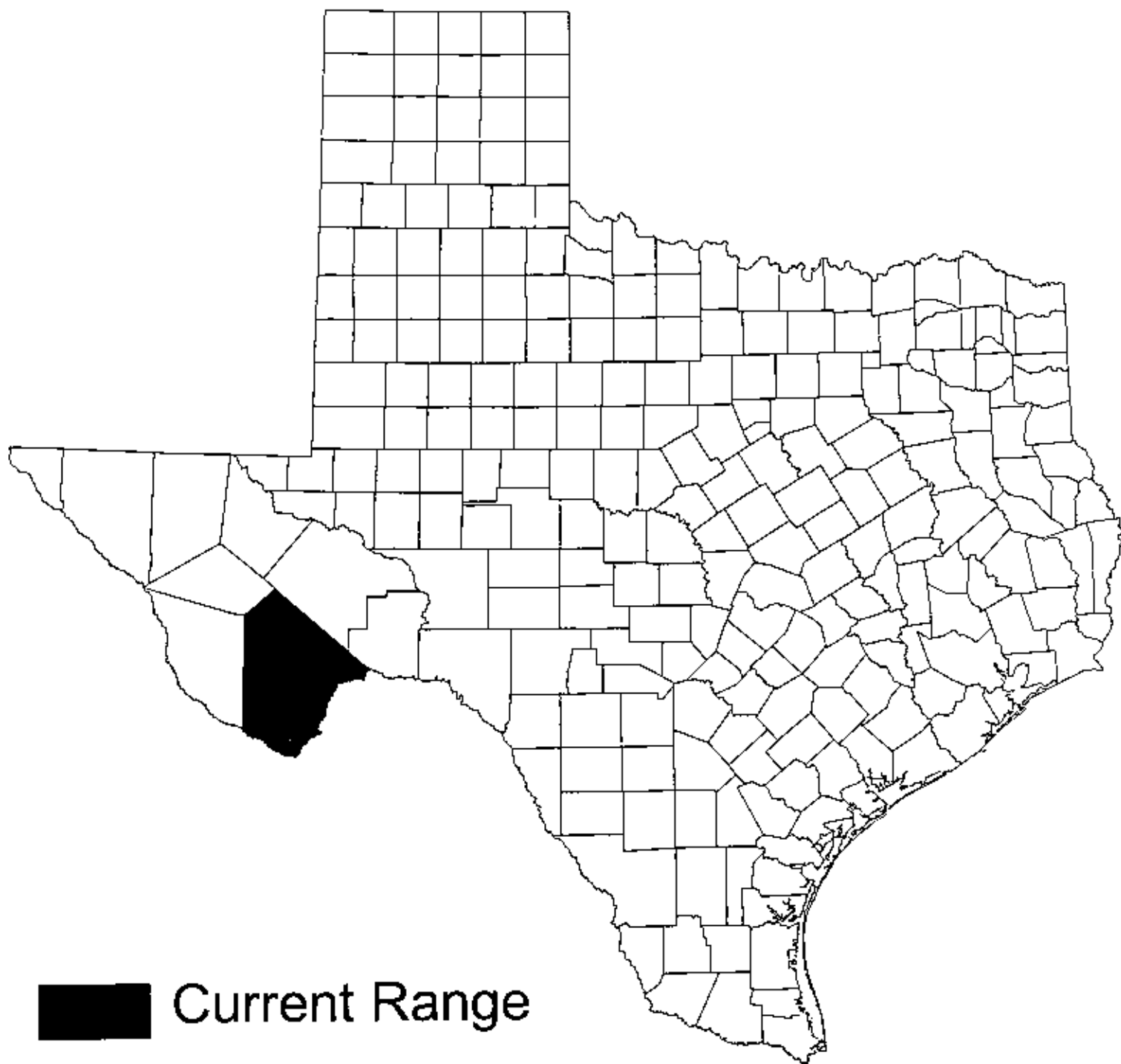
Comments:

Illustrations: A line drawing appears in Powell (1998).

Selected References:

- Correll, D. S. 1965. Some additions and corrections to the flora of Texas. *Wrightia* 3(7): 126-140.
- Furlow, J. J. 1997. *Ostrya*. Pp. 533-535 in: Flora of North America Committee. 1997. Flora of North America north of Mexico. Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, New York. 590 pp.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.





■ Current Range

Ostrya chisosensis
(Big Bend hop-hornbeam)

Scientific Name: *Oxypolis ternata* (Nutt.) A. Heller

Synonyms: *Peucedanum ternatum* Nutt.

Common Name: savanna cowbane, threeleaf cowbane

Global/State Ranks: G3S1

Federal Status: SOC

Global Range: Mostly in states along the Atlantic coast, from Virginia south through the Carolinas and Georgia to Florida; disjunct, if indeed present, in Texas.

State Range: Hardin County; reports from Angelina County and perhaps Tyler County are unconfirmed.

Description (adapted from Godfrey & Wooten 1981): Erect glabrous perennial with slender, little-branched stems. Leaves rather few, alternate, ternately compound, slenderly long-petioled, the leaves of the lower stem with 3 very narrow, entire leaflets, the uppermost sometimes simple or bractlike. Flowers in terminal and sometimes axillary compound umbels up to 10 cm wide in fruit, smaller in flower; involucre bracts several, linear-attenuate; bracts of the involucre several, unequal, filiform; ultimate umbels mostly with 8-12 flowers on slender pedicels slender to 15 mm long, the flowers ca. 3 mm wide; sepals 5, minute, deltoid-acuminate; petals 5, white, broadly ovate to obovate, spreading, the tips short-acuminate and strongly curved inward. Fruit a schizocarp 3-5 mm long, elliptic to obovate, with prominent lateral wings.

Similar Species: *Oxypolis ternata* can be distinguished from the two other Texas species of *Oxypolis* on the basis of its foliage, which is ternately compound (or some leaves simple). The foliage of *O. filiformis* is reduced to septate phyllodes, and that of *O. rigidior* is pinnately compound.

Habitat: Wetland pine savannas and flatwoods.

Phenology: Flowering late summer-early fall?; flowering in November in Florida Panhandle (Clewell 1985).

Comments: The status of *Oxypolis ternata* in Texas is uncertain at present. One report, from Hardin County, appears reliable: frequent in moist woods, 2.5 mi W of Silsbee, 2 Oct 1945, V. L. Cory 49902 (GH). Watson (1980) reported the species from two locations on the Big Thicket National Preserve, one in the east savanna of the Lance Rosier Unit (Hardin County) and the other in the east savanna of the Turkey Creek Unit (Tyler or Hardin County), but voucher specimen for these reports have not come to light (Larry Brown pers. comm.). A specimen at TEX from Angelina County (wet soil, about lake at Boykin Springs, Angelina National Forest, 7 Sep 1967, D. S. Correll 34924) was originally identified as *O. filiformis* but was annotated to *O. ternata* by A. O. Tucker in 1980. Since this specimen clearly has pinnately compound rather than ternately compound leaves, the annotation could be suspect.

Illustrations: A line drawing appears in Godfrey & Wooten (1981).

Selected References:

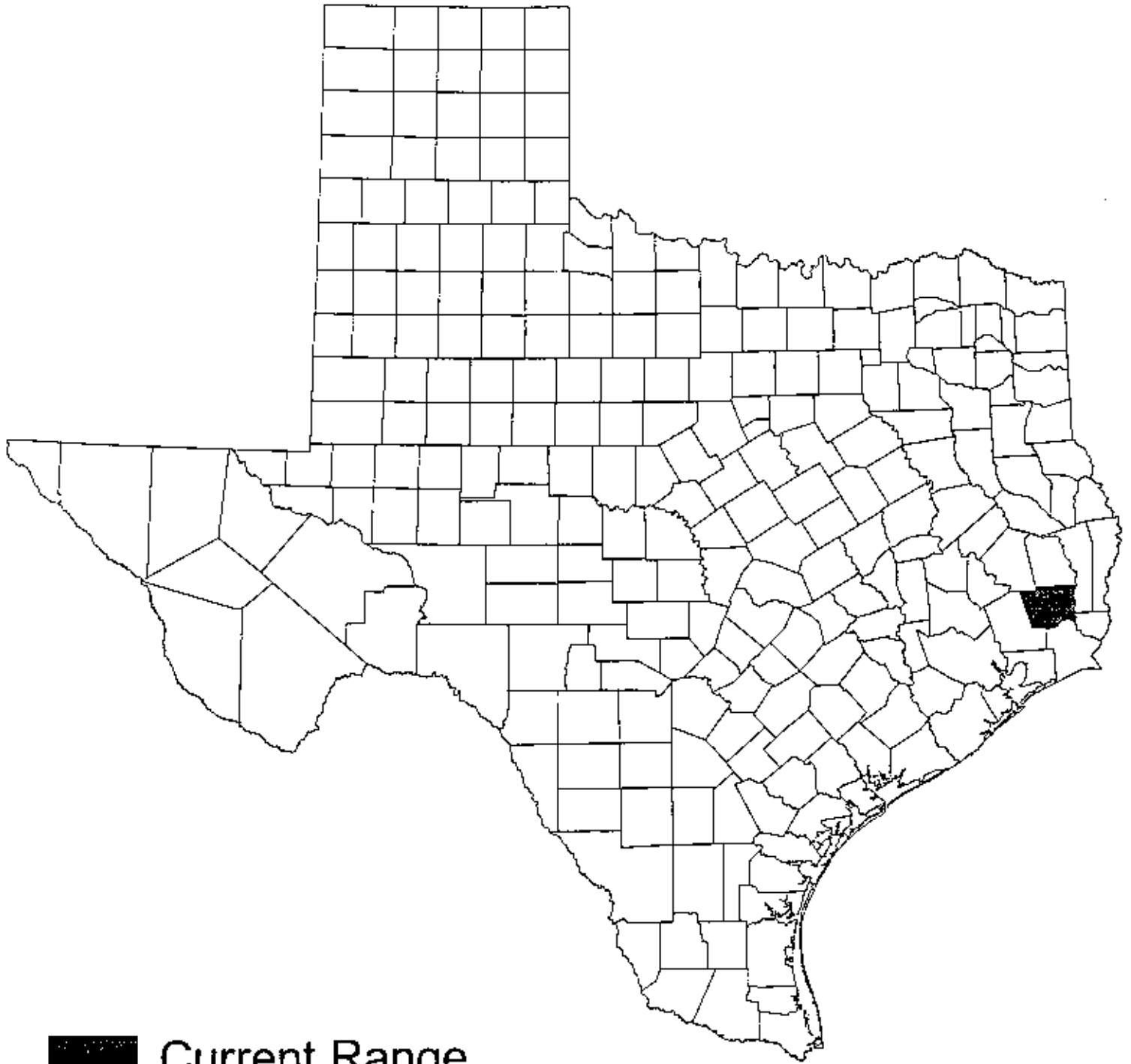
Clewell, A. F. 1985. Guide to the vascular plants of the Florida Panhandle. University Presses of Florida, Florida State University Press, Tallahassee. 605 pp.

- Godfrey, R. K. and J. W. Wooten. 1981. Aquatic and wetland plants of the southeastern United States. Dicotyledons. The University of Georgia Press, Athens. 933 pp.
- Radford, A. E. 1964. Manual of the vascular flora of the Carolinas. The University of North Carolina Press, Chapel Hill. 1183 pp.
- Watson, G. 1980. Vegetational survey of Big Thicket National Preserve. Unpublished report, Big Thicket National Preserve, Beaumont.



Fig. 210. a-h, *Oxypolis filiformis*: a, plant; b, seedling; c, section of sheath near base; d, section of sheath near apex; e, section at base of phyllode; f, flower; g, fruit, showing attachment of mericarps to carpophore; h, fruit from dorsal side, showing ribs; i, *Oxypolis ternata*: habit.

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■ Current Range

Oxypolis ternata
(threeleaf cowbane)

Scientific Name: *Paronychia congesta* Correll

Synonyms: None.

Common Name: bushy nailwort

Global/State Ranks: G1S1

Federal Status: C1

Global Range: Endemic to south Texas.

State Range: Known only from the vicinity of Thompsonville in the northwestern corner of Jim Hogg County.

Description (adapted from Turner 1983; Damude & Poole 1990): Tufted, densely short-pubescent perennial from a woody base. Stems usually 1 dm or less tall but sometimes reaching 2 dm; nodes bearing silvery lanceolate stipules. Leaves opposite, sessile, linear, sharply acute at apex, those of midstem 5-6 mm long, usually appressed to stem, notably overlapping and congested in lower part of stem. Flowers very small, arranged in somewhat congested clusters at the tips of branches; calyx 5-lobed, ca. 2.5 mm long including a terminal awn, the lemon-yellow inner surface appearing petal-like although true petals are absent. Fruit a single small dark seed wrapped in a thin membrane.

/Similar Species: *Paronychia congesta* is similar to some other south Texas species of *Paronychia*, but differs in this suite of characters: strong perennial habit; dense covering of short hairs on almost all plant parts; numerous congested overlapping leaves; and gradually tapering, awn-tipped sepals.

Habitat: Known populations are found in sparingly vegetated openings in thorn shrublands on extremely shallow, highly limy soils over caliche or calcareous rock of the Goliad Formation (Pliocene), on moderate slopes along its contact with the Catahoula and Frio formations (Miocene/Oligocene). Associated shrubs include *Leucophyllum frutescens*, *Acacia rigidula*, *Forestiera angustifolia*, *Prosopis glandulosa*, *Calliandra conferta*, *Eysenhardtia texana*, *Bernardia myricifolia*, *Krameria ramosissima*, *Koebertinia spinosa*, *Gochnatia hypoleuca*, *Sophora secundiflora*, *Ziziphus obtusifolius*, *Sideroxylon celastrinum* and *Dalea frutescens*. Herbaceous associates are few and include *Zinnia acerosa*, *Gilia rigidula*, *Heliotropium torreyi* and *Hedyotis nigricans* (Damude and Poole 1990).

Phenology: Flowering mostly April-June but as late as August (Damude & Poole 1990); probably sporadically after rains throughout the season.

Comments:

Illustrations: Line drawings appear in Turner (1983b).

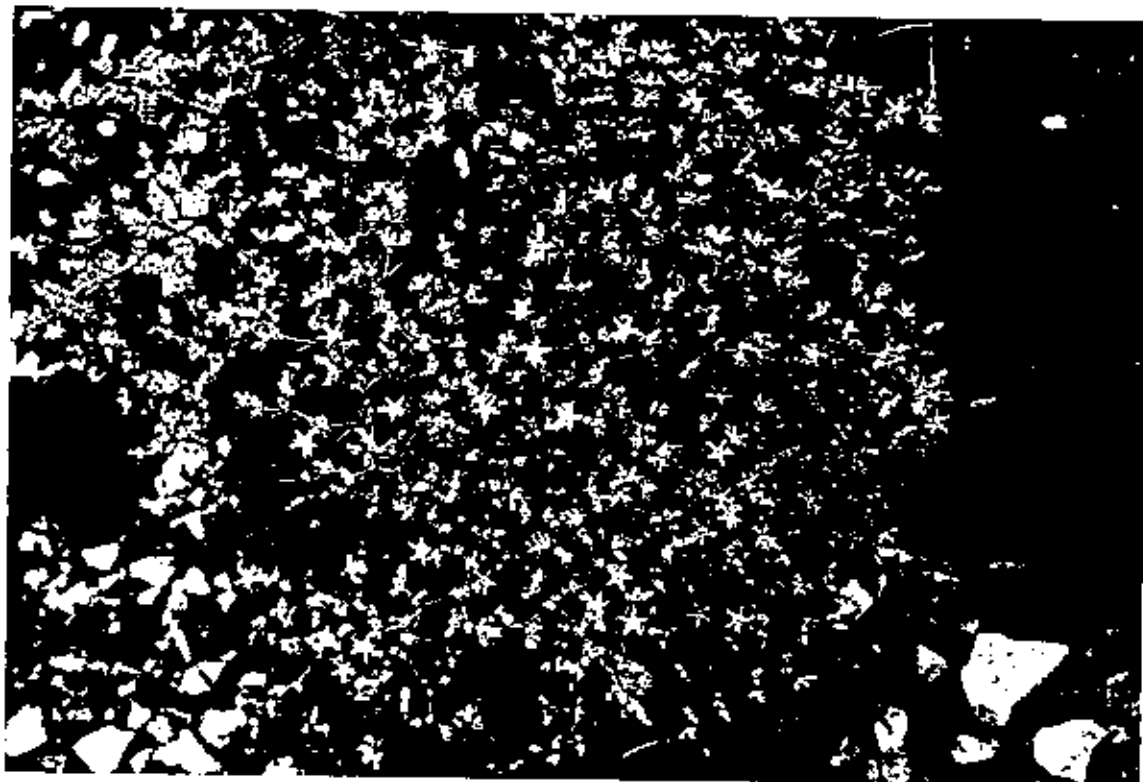
Selected References:

Correll, D. C. 1966. Some additions and corrections to the flora of Texas--II. *Brittonia* 18: 306-310.

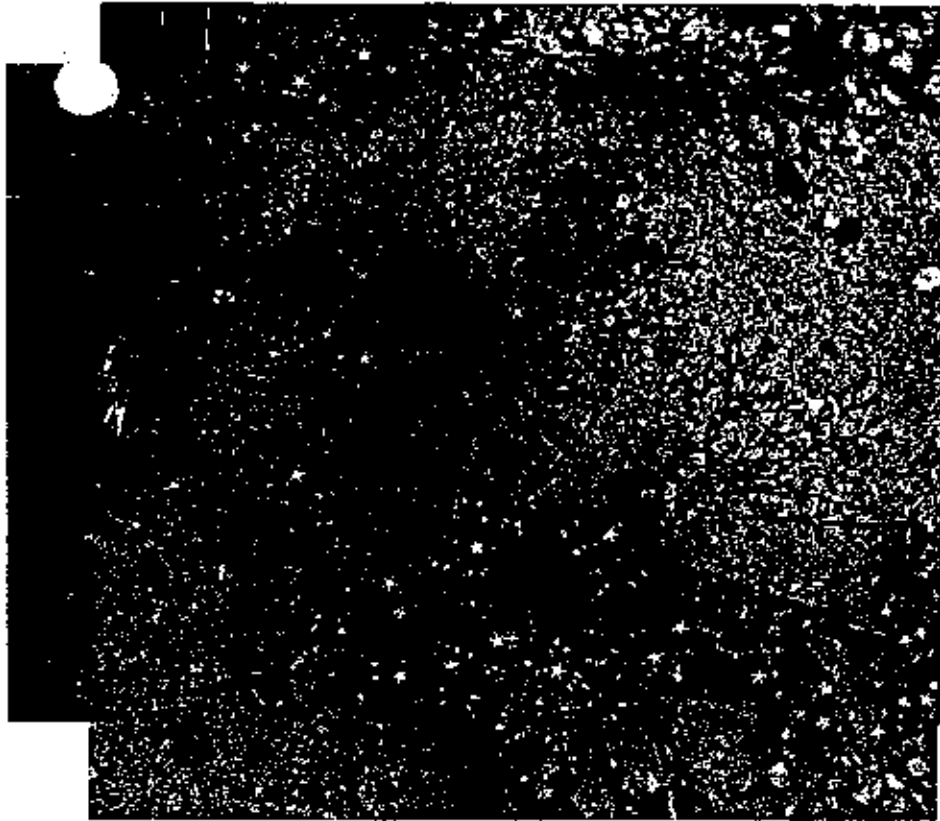
Damude, N. and J. M. Poole. 1990. Revised status report on *Paronychia congesta*. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.

Turner, B. L. 1983a. Status report (on *Paronychia congesta*). Report prepared for U.S. Fish and Wildlife Service, Albuquerque.

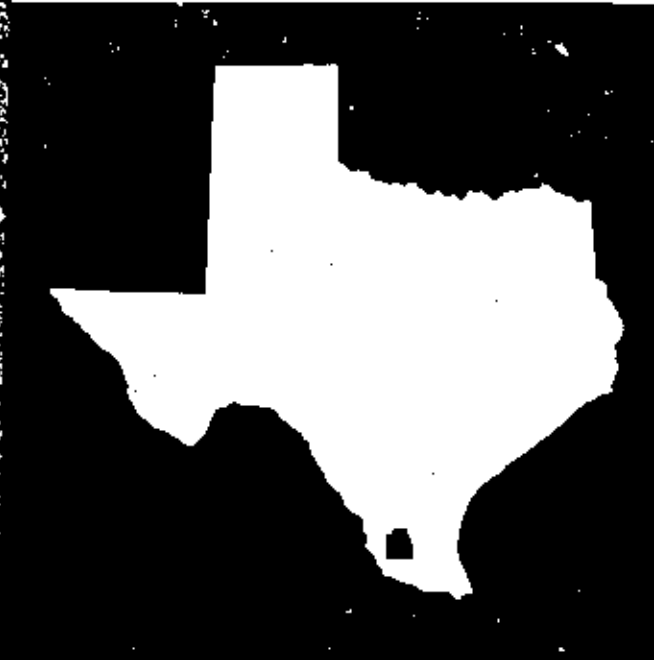
Turner, B. L. 1983b. The Texas species of *Paronychia*. *Phytologia* 54: 9-23.



Common Name:

Bushy whitlow-wort

Jackie Poole

Scientific Name: *Paronychia congesta* Correll

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Turner, 1983, p. 21.

Description:

Habit: Low, tufted perennial herb to 8 in. tall, stems densely covered with short hairs, stems clustered or more or less branched.

Leaves: Linear, sharp-pointed, flat against the stem and congested or overlapping; middle stem leaves $\frac{3}{16}$ - $\frac{1}{4}$ in. long, usually about equal in length to the lance-shaped, tissue-like stipules.

Flowers: In clusters at the top of branches, exceeding the bracts and leaves, flowers minute, about $\frac{1}{8}$ in. across, lemon-yellow, with bristly hairs, star-shaped, each point gradually terminating in a short, erect, straight awn; flowering in early summer (June) and probably in autumn if there is ample rainfall.

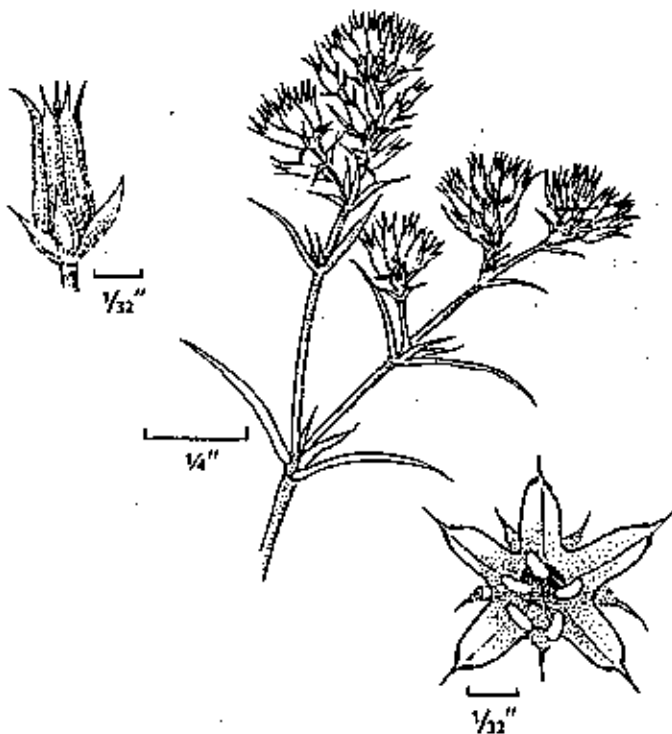
Fruit: Small, bladder-like, one-seeded.

Habitat: Barren, gypseous, rocky slopes along the breaks of the Rio Grande Plains; with ceniza, Texas palo-verde, acacia, Mexican persimmon, black datea, calderona, guayacan, and false-mesquite calliandra.

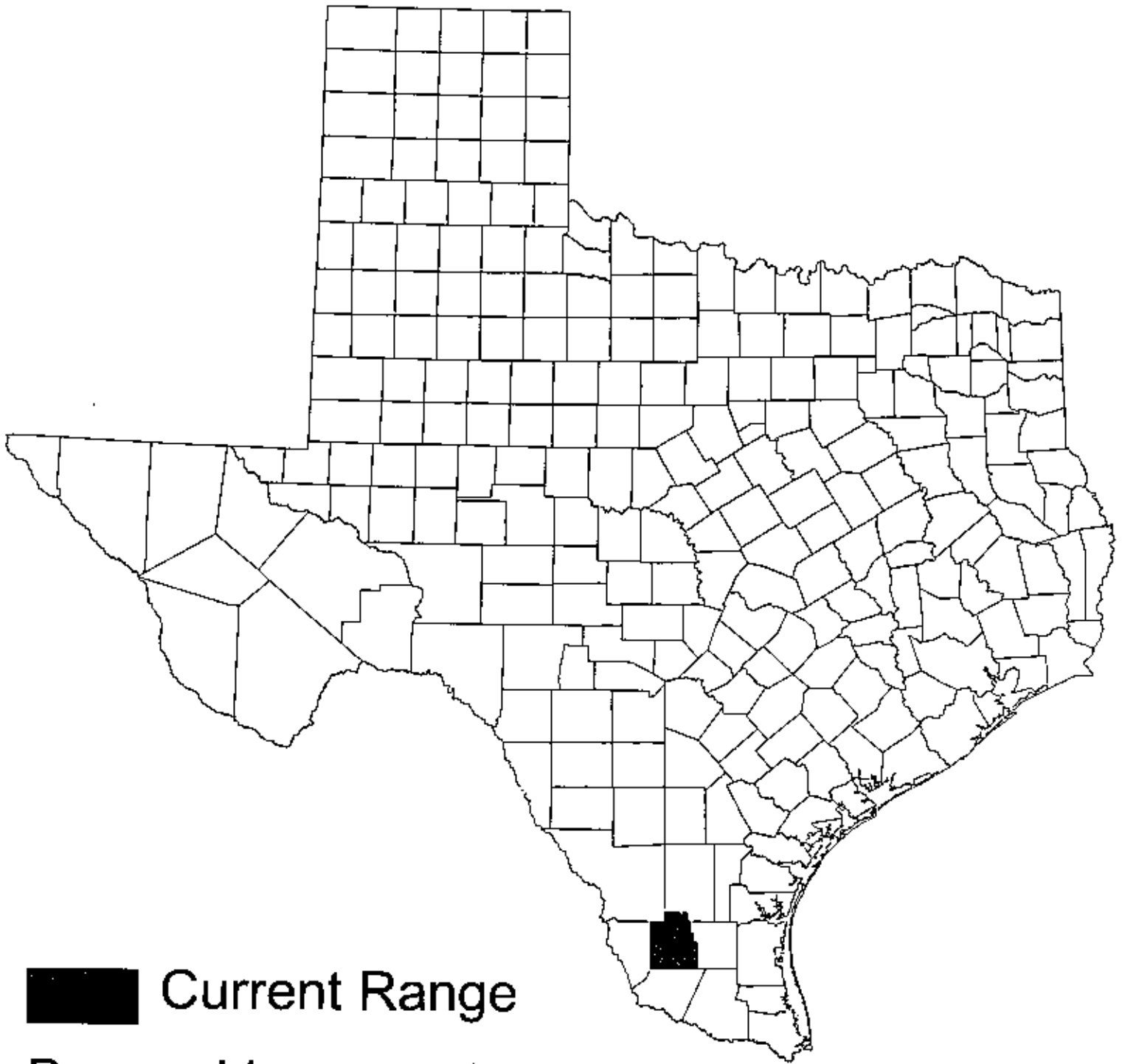
Ownership: Private land.

Similar Species with Key Character Differences:

Flower hairless or unevenly hairy, but not with bristly hairs; flower points abruptly terminating into a spreading awn *Paronychia jamesii*



Branch, flower, and fruit of
Bushy whitlow-wort



■ Current Range

Paronychia congesta
(bushy whitlow-wort)

Scientific Name: *Paronychia lundellorum* Turner

Synonyms: None.

Common Name: Lundells' nailwort

Global/State Ranks: G1S1

Federal Status: None.

Global Range: Endemic to the Sand Sheet of eastern South Texas.

State Range: Brooks, Kenedy and Kleberg counties.

Description (adapted from Turner 1983): Low perennial, sometimes flowering the first year, 6-24 cm tall. Leaves linear, 0.5-0.7 mm wide, erect to spreading, minutely pubescent, tipped with a short point; stipules ca. half as long as the leaves. Flowers tiny, arranged in small terminal clusters; calyx urn-shaped, ca. 2.5 mm long, 5-lobed, the fused portion covered with inconspicuous appressed white hairs, the free lobes with white-hyaline margins and tipped with a strongly divergent awn 0.75-1.0 mm long; petals absent, but the inner surface of the calyx lobes is of a lemon-yellow color that renders the calyx somewhat petaloid. Fruit a single small seed wrapped in a thin membrane.

Similar Species: Very similar to *Paronychia setacea*. Both species have needle-like leaves 1 mm in diameter or less. In *P. setacea*, the stems are very hispid throughout, and the sepals have white scarious margins. In *P. lundellorum*, the stems are minutely pubescent and the sepals have yellow margins (Turner, 1983).

Habitat: In tight sandy soils over saline clay on microhighs within salty prairie grasslands dominated by *Spartina spartinae*, and in upper portions of saline flats surrounding short drainages and brackish basins typical of the South Texas Sand Sheet. *Paronychia lundellorum* is apparently absent from bluestem-dominated mid- to tall-grass grasslands that occupy looser sandy soils on uplands surrounding such basins. In most areas, *Isocoma drummondii* is a common or at least conspicuous component of the vegetation; other frequent associates include *Jatropha dioica*, *Echinocactus texensis*, *Prosopis reptans* and *Sporobolus pyramidatus*.

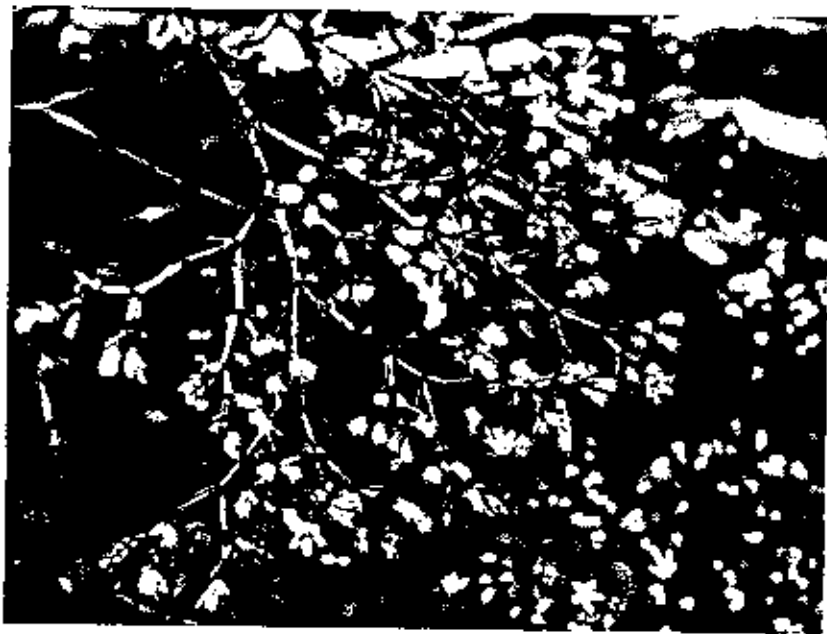
Phenology: April through at least October, probably intermittently throughout the year depending on rainfall.

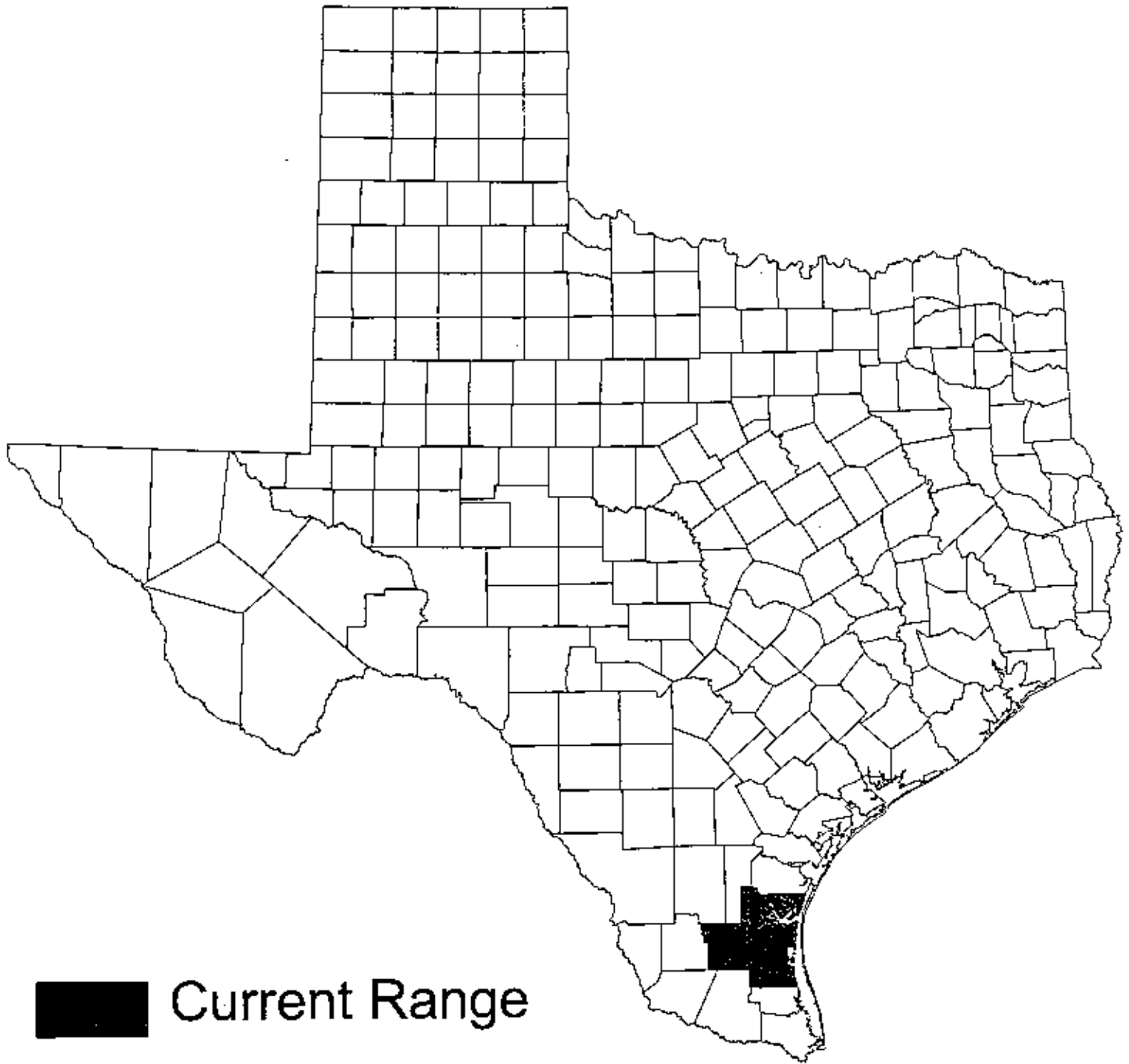
Comments:

Illustrations: None known.

Selected References:

Turner, B. L. 1983. The Texas species of *Paronychia*. *Phytologia* 54: 9-23.





■ Current Range

Paronychia lundellorum
(Lundell's whitlow-wort)

Scientific Name: *Paronychia maccartii* Correll

Synonyms: None.

Common Name: McCart's nailwort

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Apparently endemic to South Texas.

State Range: Webb County. Known only from type specimen, which was collected along F.M. 649, 8.3 miles south of Mirando City, in the southeastern part of the county.

Description (adapted from Turner 1983; Damude & Poole 1990): Tiny, mosslike, minutely puberulent perennial. Stems prostrate to sprawling, to 10 cm long, with very short internodes allowing the leaves to overlap conspicuously; nodes bearing silvery-white, attenuate stipules. Leaves bluish green, opposite, sessile, linear-oblong to linear-lanceolate, up to 10 mm long (often only slightly longer than the stipules) and 1.5 mm wide, tipped with a white awn. Flowers tiny, sessile in the axils of upper leaves; calyx 5-lobed, purplish-brown with conspicuous white margins, ca. 2 mm long, each lobe tipped with a white awn up to 2 mm long; petals absent. Fruit a small capsule containing a single seed (Correll 1966; Turner 1983a; Damude & Poole 1990).

Similar Species: Readily distinguished from other *Paronychia* species by the overlapping blue-green leaves, which are tipped with prominent white awns, and by the conspicuous white-margined stipules.

Habitat: Poorly known. The substrate at the type location was described by the collectors as "very hard-packed red sand;" this sand is probably of the Cuevitas-Randado association. Subsequent searchers, who have failed to re-locate the plant, have described the vegetation as a thorn shrubland composed of *Acacia* spp., *Leucophyllum frutescens*, *Celtis pallida*, *Ziziphus obtusifolia* and *Prosopis glandulosa* (Damude & Poole 1990).

Phenology: Details unknown. The type specimen, which bears flowers and fruit, was collected on 23 March 1962. *Paronychia maccartii* is probably conspicuous during other months as well, perhaps depending on rainfall.

Illustrations: Line drawings appear in Turner (1983).

Selected References:

- Correll, D. C. 1966. Some additions and corrections to the flora of Texas--II. *Brittonia* 18: 306-310.
- Damude, N. and J. M. Poole. 1990. Status report on *Paronychia maccartii*. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Turner, B. L. 1983a. Status report [on *Paronychia maccartii*]. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.
- Turner, B. L. 1983b. The Texas species of *Paronychia*. *Phytologia* 54: 9-23.

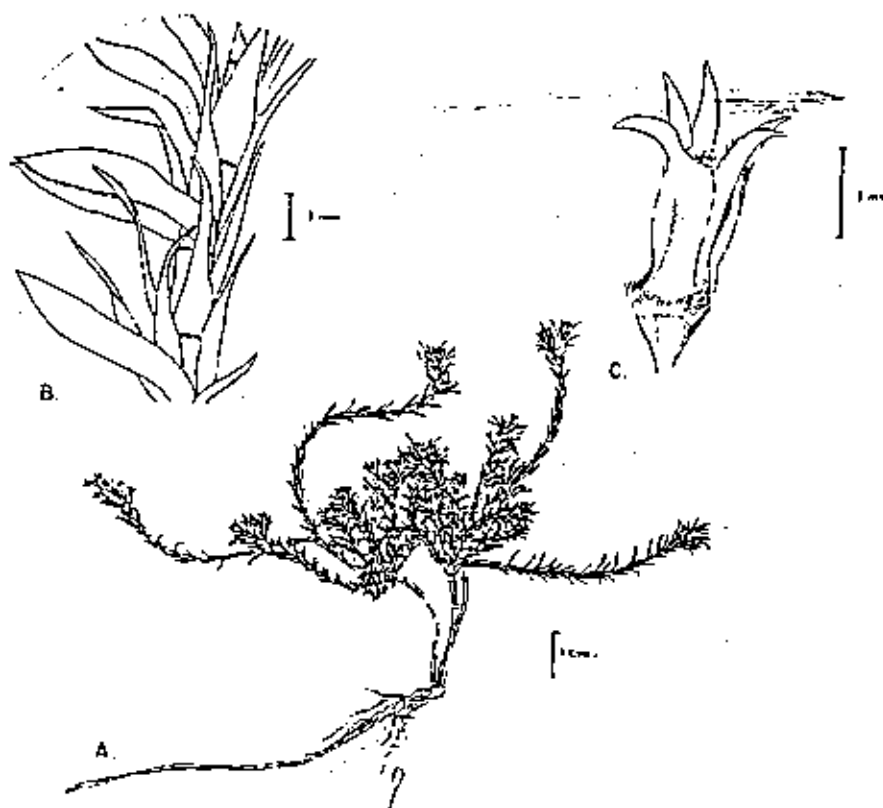
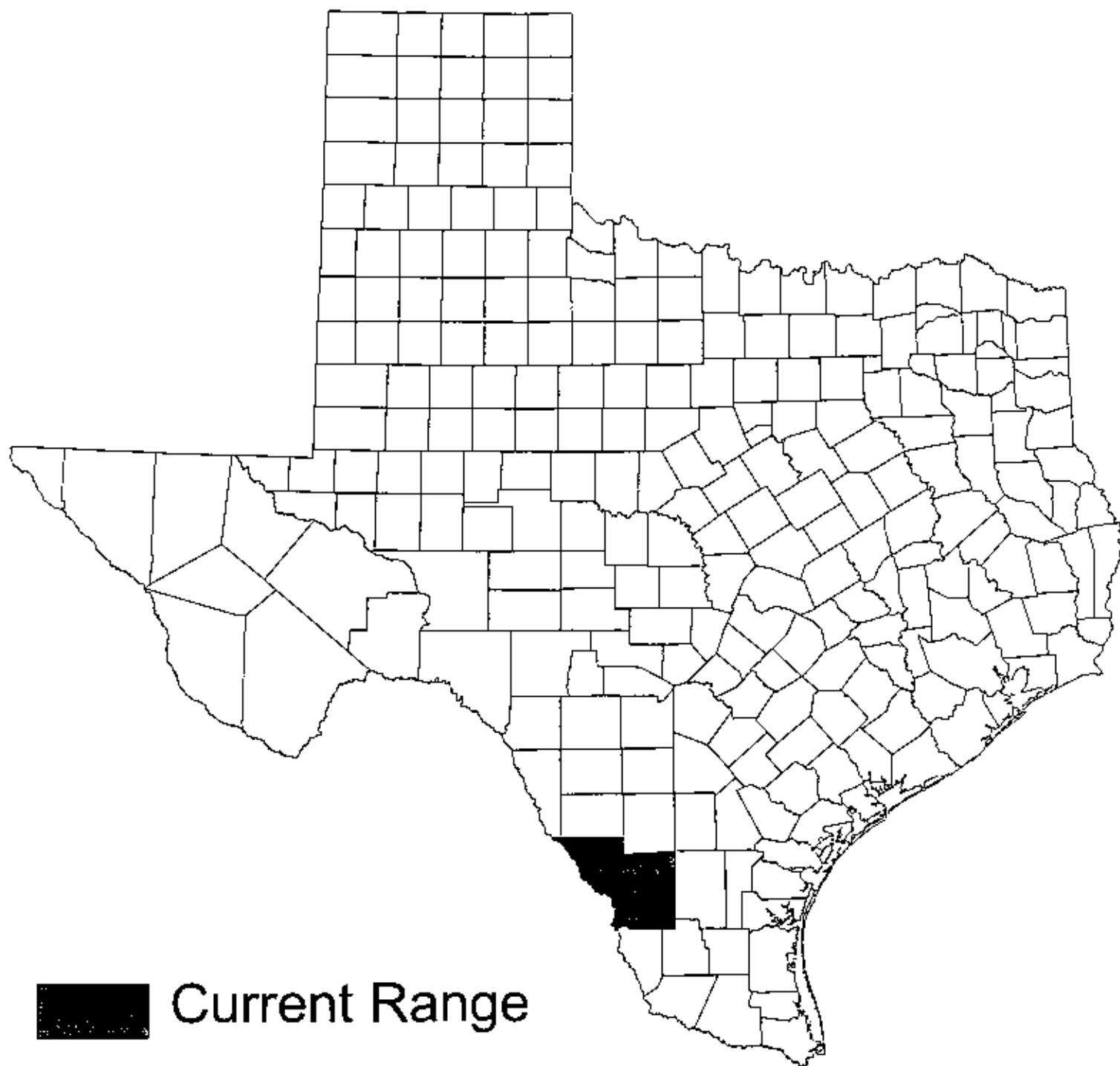


Fig. 3. *Paronychia maccartii*: A. habit; B. stem, showing leaves and stipules; C. flower. (from isotype, LL).



■ Current Range

Paronychia maccartii
(McCart's whitlow-wort)

Scientific Name: *Paronychia wilkinsonii* Wats.

Synonyms: None.

Common Name: Wilkinson's nailwort

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Trans-Pecos Texas south to central Chihuahua and northwestern Coahuila.

State Range: Brewster County.

Description (adapted from Correll & Johnston 1970; Henrickson & Johnston in prep.): Cushion-shaped low perennial 4-8 cm tall, moderately puberulent throughout; stems many from a much-branched caudex; new shoots 1-6 cm long, erect to prostrate. Leaves opposite, linear-subulate, 3-8 mm long and 0.4-1 mm wide, longer than the internodes, aristate, obscurely veined; stipules scarious, bilobed, as long as leaves. Flowers many in dense terminal inflorescences, equal to or slightly longer than the subtending bracts, 2.3-3.2 mm long excluding the awns, when closed the oblong calyx markedly enlarged below into a turbinate hypanthium; sepals 1.2-2.2 mm long, with conspicuous white scarious margins as much as 0.8 mm wide, each with a stout, divergent, white awn 1.5-2.2 mm long; petals absent. Fruit a small capsule containing a single seed.

Similar Species: In habit, *Paronychia wilkinsonii* is much like *P. sessiliflora* of the High Plains; however, the sepals of *P. sessiliflora* lack the conspicuous white margins and awn that are characteristic of *P. wilkinsonii* (Correll 1966).

Habitat: Shallow rocky soils in crevices on novaculite hills or outcrops at low to moderate elevations in the Chihuahuan Desert. Common associates include *Bouteloua breviflora*, *Erioneuron pulchellum* and *Selaginella arizonica*; other rare species are also present at some sites.

Phenology: Flowering April-October.

Comments: *Paronychia wilkinsonii* is a member of a small suite species restricted, at least in Texas, to outcrops of novaculite. Other members of this suite include *Echinocereus viridiflorus* var. *davisii*, *E. viridiflorus* var. *correllii*, *Escobaria hesteri*, *E. dasyacantha* var. *varicolor* and *Thelocactus bicolor* var. *flavidispinus*.

Illustrations: A color photograph appears in Warnock (1977).

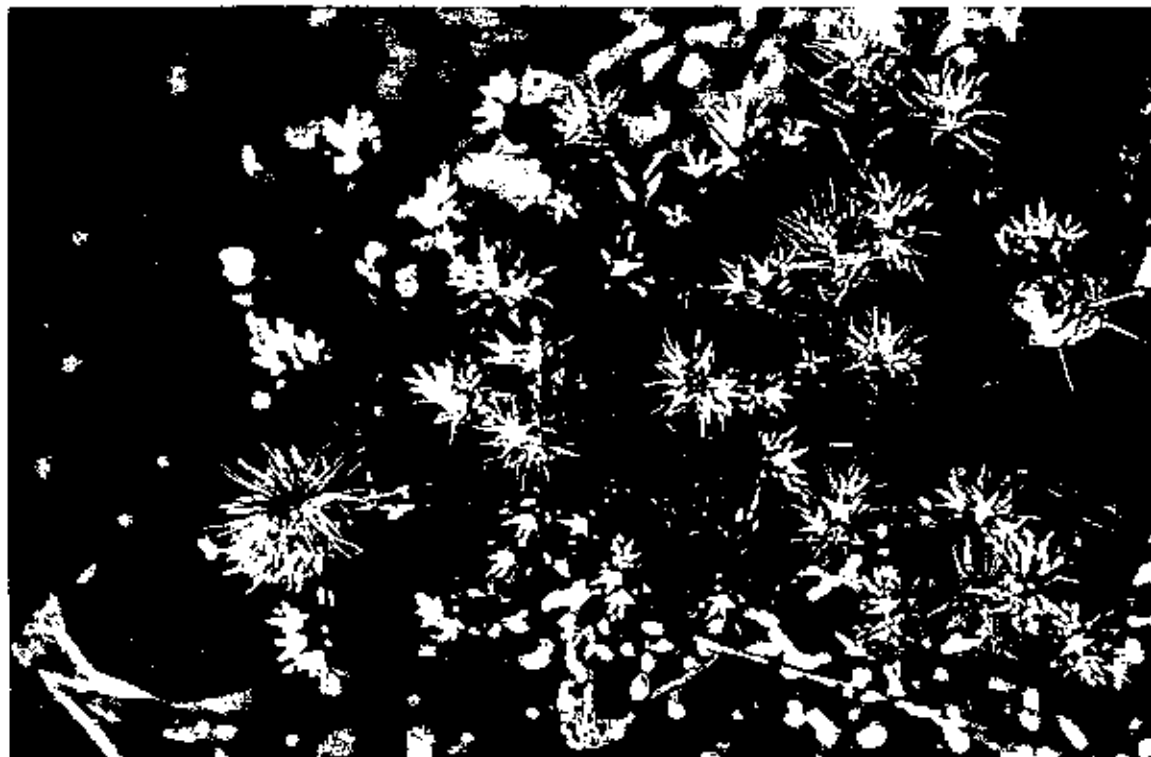
Selected References:

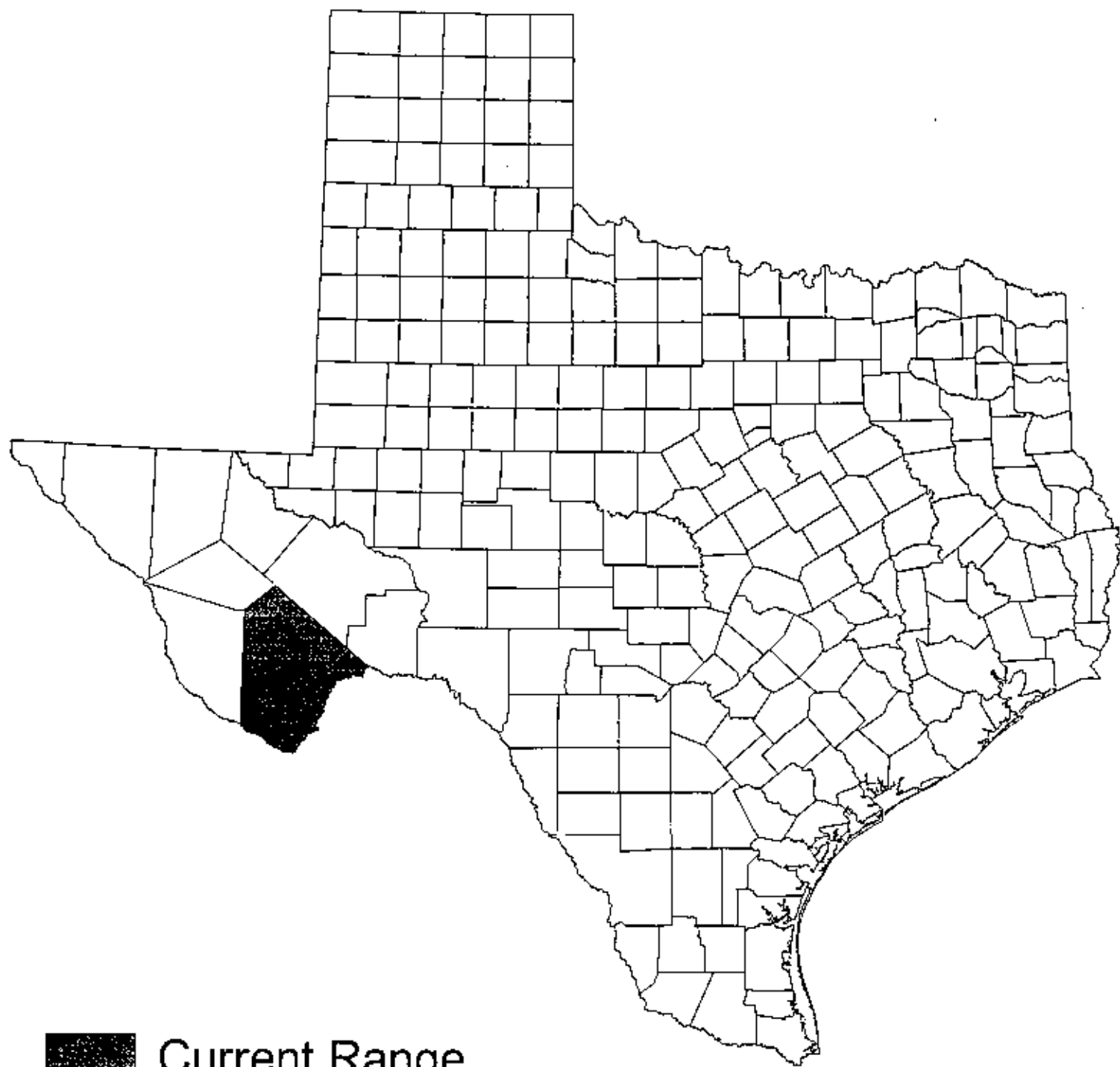
Core, E. L. 1943. The North American species of *Paronychia*. *American Midland Naturalist* 26: 369-397.

Correll, D. C. 1966. Some additions and corrections to the flora of Texas--II. *Brittonia* 18: 306-310.

Turner, B. L. 1983. The Texas species of *Paronychia*. *Phytologia* 54: 9-23.

Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine. 274 pp.





■ Current Range

Paronychia wilkinsonii
(Wilkinson's whitlow-wort)

Scientific Name: *Pedimelum humile* Rydb.

Synonyms: *Psoralea rydbergii* Cory; *Psoralea humilis* (Cory) MacBride

Common Name: Rydberg's scurfpea

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Southern Texas and northern Coahuila.

State Range: Val Verde County.

Description (adapted from Correll & Johnston 1970; Grimes 1990): Stemless, pubescent, glandular perennial from a tuberous, often elongate root; pubescence appressed or spreading. Leaves pinnately trifoliolate; stipules lanceolate to oblanceolate-oblong, 5-7 (-12) mm long and 2.5-3 mm wide, usually hyaline at base; petioles (3-) 5.5-12 cm long; petiolule of middle leaflet 5-12 mm long; leaflets broadly elliptic-obovate or orbicular, acute, obtuse or becoming rounded apically, 15-23 mm (-32) mm long and 10-19 (-24) mm wide, gland-dotted, the lower surface uniformly dotted with black glands and more or less pubescent with white hairs to 1 mm long, the upper surface dark green, gland-dotted between the veins, with white hairs conspicuous along the veins and margins. Flowers in dense, terminal, globose racemes to 3 cm long; peduncle 2-10 cm long, generally shorter than the petioles; pedicels to 3 mm long; bracts inconspicuous, scarious, lanceolate, to 8 mm long, similar to the stipules; flowers 10-20 mm long; corolla projecting well beyond the calyx; calyx 10-17 mm long, the tube brown-stramineous, ca. 6 mm long, the 5 lobes green and about as long as the tube, linear to narrowly lanceolate, subequal, the lower lobe slightly broader than the upper 4; calyx expanding and elongating in fruit; corolla purple, bilaterally symmetrical; banner petal paler than others, oblanceolate, ca. 17 mm long and 6-7 mm wide, the claw ca. 5 mm long; wing petals ca. 14 mm long, 2.5-3 mm wide, the claw ca. 6 mm long; keel petal ca. 15 mm long and 2.5-3 mm wide, the claw ca. 8.5 mm long, the apex somewhat bulbous; stamens 10. Fruit a single-seeded, oblong-elliptic pod ca. 11 (-15) mm long, the body ca. 6 mm long and 4 mm wide, the tapering beak about as long as the body; beak barely projecting beyond the calyx lobes.

Similar Species: Several other *Pedimelum* species occur in the general area. Rydberg's scurfpea is readily recognized by its pinnately trifoliolate leaves, the leaflets of which are strongly glandular on the lower surface, with conspicuous white pubescence along the veins and margins of the upper surface.

Habitat: Shortgrass grasslands on shallow stony to gravelly clay soils on dry open limestone or caliche hills.

Phenology: Flowering March-May.

Comments: The known range is very narrow, from the vicinity of Del Rio south to the vicinity of Piedras Negras, a distance of about 60 miles.

Illustrations: None known.

Selected References:

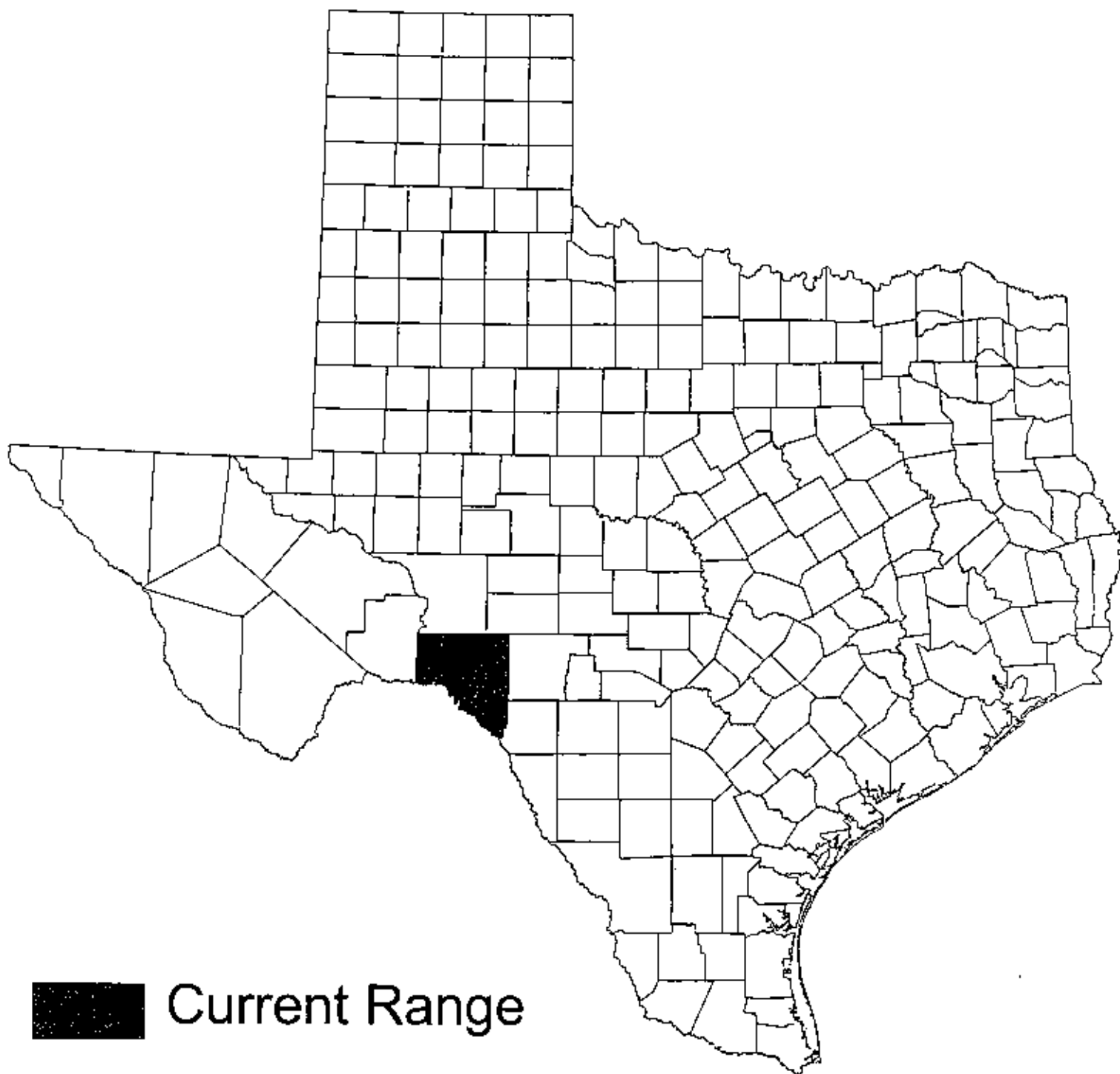
Grimes, J. W. 1990. A revision of the New World species of Psoraleae (Leguminosae: Papilionideae).

Memoirs of the New York Botanical Garden 61: 1-113.

Ockendon, D. J. 1965. A taxonomic study of *Psoralea* subgenus *Pedimelum* (Leguminosae).
Southwestern Naturalist 10(2): 81-124.

Shinners, L. H. 1951. The Texas species of *Psoralea* (Leguminosae). Field & Laboratory 19(1): 14-25.





■ Current Range

Pediomelum humile
(Rydberg's scurfpea)

Scientific Name: *Pediomelum pentaphyllum* (L.) Grimes

Synonyms: *Psoralea pentaphylla* L.; *Pediomelum trinervatum* Rydb.; *Psoralea trinervata* (Rydb.) Standl. Not *Pediomelum pentaphyllum* sensu Rydb. For a summary of the confusing taxonomic history of this species, see Tonne (2000).

Common Name: Chihuahua scurfpea, threenerve scurfpea

Global/State Ranks: G1SH

Federal Status: SOC

Global Range: Southeastern Arizona, southwestern New Mexico, west Texas and Chihuahua.

State Range: Presidio County. Known only from a specimen collected around 1853 from "fields near the Presidio del Norte."

Description (adapted from Correll & Johnston 1970; Ockendon 1965; Grimes 1990; Tonne 2000): Short erect perennial from an enlarged fusiform rootstalk 40-55 mm long and 12-20 mm thick; stems 2-3 dm tall (absent or less commonly to 12 cm long per Correll & Johnston 1970); pubescence conspicuous, appressed to somewhat spreading. Leaves palmately 5-foliolate or rarely 6-foliolate, the petiole 6-15 cm long; leaflets lanceolate, cuneate-obovate, obovate or elliptic, 25-50 mm long and (15-) 20-25 mm wide, the apex obtuse mucronate and the margins crinkly, gland-dotted and less densely pubescent on the upper surface; stipules scarious, lanceolate to linear, to 15 mm long. Flowers in dense, globose to elongate racemes up to 6 cm long, the racemes on peduncles (3-) 4-9 cm long, usually shorter than the petioles; pedicels to 2 mm long; flowers 12-18 mm long; corolla not projecting far beyond the calyx lobes; calyx tube (in flower), 4-5 mm long, the lobes 10-12 mm long, enlarging considerably in fruit, very unequal, the upper 4 linear-subulate, the lower 1 elliptic, ca. 3 mm wide in flower and 7 mm wide in fruit; lower calyx lobe sparsely punctate (glabrate in fruit), with 3 prominent veins. Fruit an elliptic-oblancheolate, single-seeded pod 7-8 mm long and 4-5 mm wide, appressed-pubescent distally, the beak broad, stout and flat, 10-15 mm long and 2-3 mm wide at base, barely projecting beyond the calyx lobes; seed reniform-oblong, 5-6 mm long and 3-3.5 mm wide, rather thick, reticulate or rugose.

Similar Species: Several other *Pediomelum* species occur in the general area. Chihuahua scurfpea can be recognized by its 5 glandular, obovate leaflets, the relatively broad racemes (more than 25 mm wide), and the broad beak of the fruit.

Habitat: In Arizona, *Pediomelum pentaphyllum* has been found in highly degraded desert grasslands dominated by *Bouteloua eriopoda* and *Yucca elata*, and in mixed desert scrub dominated by *Prosopis glandulosa* and *Larrea tridentata*. Soils are described as deep sandy loams, some of which display minor aeolian coppicing. Other associates include *Flourensia cernua*, *Ephedra trifurca*, *Gutierrezia microcephala*, *Croton pottsii*, *Rhus microphylla*, *Zinnia acerosa*, *Muhlenbergia porteri*, *Sporobolus contractus* and *Parthenium incanum* (Tonne 2000). The habitat in Texas is unknown.

Phenology: Flowering April-May?

Comments:

Illustrations: A line drawing and color photographs of a plant and habitat are provided in Tonne (2000).

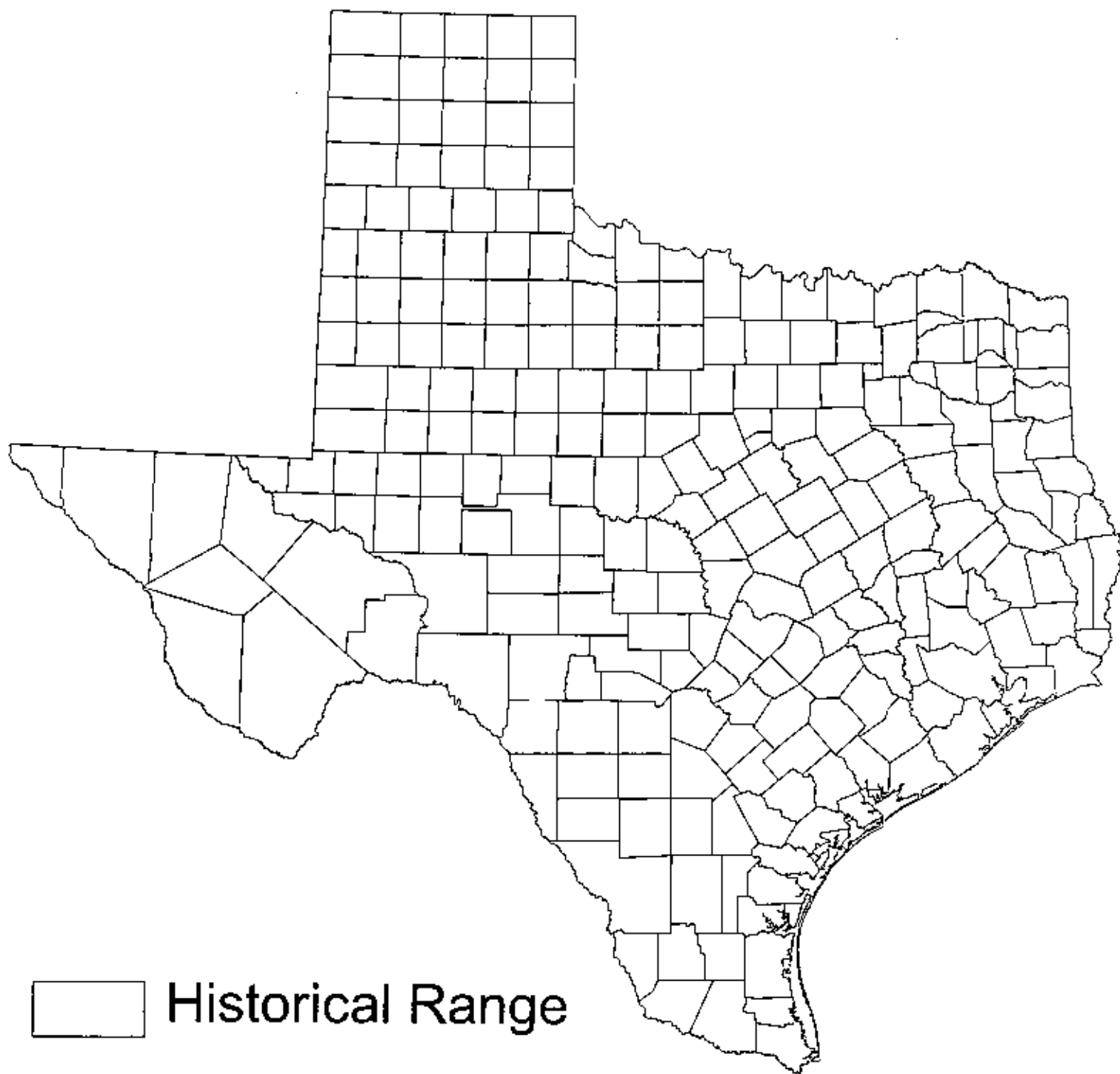
Selected References:

- Grimes, J. W. 1990. A revision of the New World species of *Psoraleae* (Leguminosae: Papilionideae). *Memoirs of the New York Botanical Garden* 61: 1-113.
- Isely, D. 1986. Notes about *Psoralea* sensu auct., *Amorpha*, *Baptisia*, *Sesbania*, and *Chamaecrista* (Leguminosae) in the southeastern United States. *Sida* 11(4): 429-440.
- Ladyman, J. A. R. 1998. Re-location and status assessment of the Chihuahuan scurfpea (*Pediomelum pentaphyllum*). Report to The Nature Conservancy for the 1998 Canon Exploration Grant Program.
- Ockendon, D. J. 1965. A taxonomic study of *Psoralea* subgenus *Pediomelum* (Leguminosae). *Southwestern Naturalist* 10(2): 81-124.
- Tonne, P. 2000. Status report for Chihuahua scurfpea (*Pediomelum pentaphyllum*; Fabaceae). Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Warren, P. 1994. Taxonomic history of *Pediomelum pentaphyllum* (*P. trinervatum*). The Nature Conservancy, Arizona Chapter.

Pediomelum pentaphyllum
(Chihuahua scurf pea)

[[rare plant list](#)] [[photos](#)] [[distribution map](#)] [[line drawing](#)] [[taxon report](#)]





 Historical Range

Pediomelum pentaphyllum
(Chihuahua scurfpea)

Scientific Name: Cereus greggii Engelm. var. greggii

Synonymy: Peniocereus greggii (Engelm.) Britt. & Rose

Common Name: desert night-blooming cereus; Arizona queen-of-the-night

Global Range: AZ, NM, TX, Chihuahua, Coahuila, Durango and Zacatecas.

State Range: Brewster, El Paso, Jeff Davis, Pecos, Presidio and Reeves counties.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Desert shrublands in lower elevation flats and washes.

Phenology: Flowering concentrated during a few nights in late May to late June.

Similar Species:

Comments: Visual similarity to the dead stems of woody plants under which it often grows renders this cactus inconspicuous except at night, when its large white flowers are open; this combination of characters makes this species a favorite of cactus collectors.

Illustrations: Two black and white illustrations appear in Benson (1982); a color photograph of a cultivated plant appears in Weniger (1984); black and white illustrations appear in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.

Weniger, D. 1984. Cacti of Texas and neighboring states: a field guide. University of Texas Press, Austin. 356 pp.

Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. El Paso Southwest Botanical Miscellany No. 1. 56 pp.



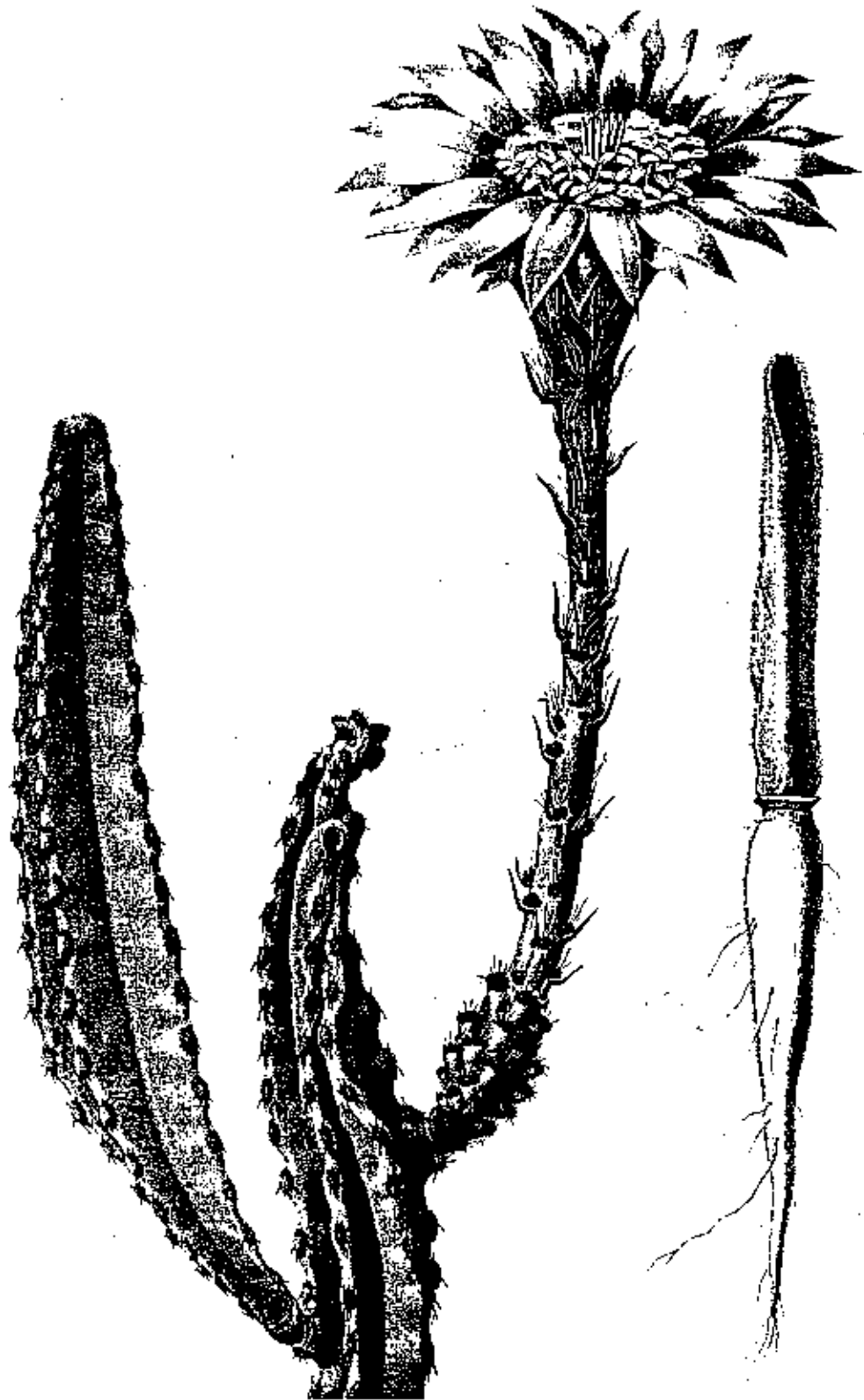
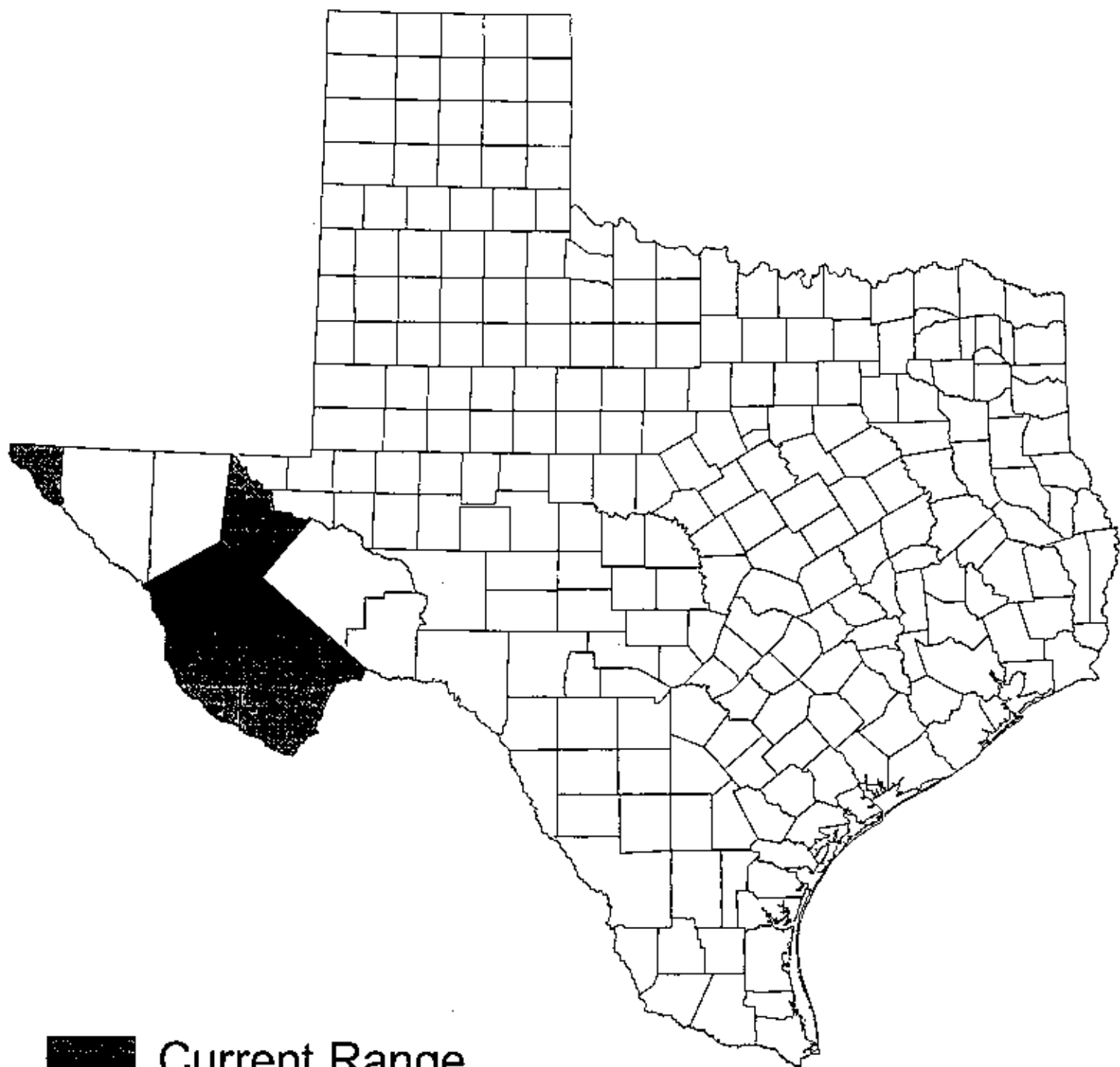


Fig. 625. Desert night-blooming cereus, *Cereus greggii* var. *greggii*, the type of New Mexico and Texas: branches and a flower; stem and tuberous root of a 3-year-old seedling. (Paulus Roetter in Engelmann/Emory, pl. 63)

Cenocereus greggii greggii



■ Current Range

□ Historical Range

Peniocereus greggii var. *greggii*
(desert night-blooming cereus)

m

Scientific Name: *Penstemon alamosensis* Penn. & Nisb.

Synonymy: Some workers submerge this species within *Penstemon havardii* Gray (Worthington 1991).
[***WRC: should the rank be changed to G2Q?]

Common Name: Alamo Canyon beardtongue, Alamo beardtongue

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: New Mexico (Sacramento and San Andreas mountains) and Texas.

State Range: El Paso County.

Description (adapted from Nisbet & Jackson 1960; Spellenberg 1981): Perennial with slender, glaucous, glabrous stems 3-7 dm tall. Leaves basal and cauline; basal leaves elliptic, obovate or broadly lanceolate, petiolate, acute to obtuse; cauline leaves opposite, 2-4 pairs, sessile, much reduced, lanceolate or narrowly oblong, acute at apex. Flowers in a narrow, subsecund, terminal panicle usually as much as half the total height of the plant; pedicels longer than the peduncles, each peduncle with (1-) 2 (-4) flowers; pedicels, calices and outside of the corolla sparingly glandular-pubescent; calyx 3-5 mm long, the 5 lobes ovate to lanceolate, acute or acuminate at apex, narrowly scarious-margined; corolla 2-25 mm long and 5-7 mm wide (when pressed), bright red, nearly regular rather than zygomorphic, the throat gradually and very moderately inflated, the 5 lobes spreading, rounded at apex; fertile stamens 4, included within the tube, the sterile staminode glabrous. Fruit a pointed capsule ca. 12 mm long.

Similar Species: According to Nisbet & Jackson (1960), *Penstemon alamosensis* is closely related to *P. wrightii*. In *P. alamosensis*, the stem leaves are reduced and about 4 times long as wide, with 2 to 4 pairs present; the corolla is 20-25 mm long; and the staminode is glabrous. In *P. wrightii* the stem leaves are not reduced in size, are about twice as long as wide, with 4 to 6 pairs present; the corolla is 15-20 mm long; and the staminode is bearded on the upper half. *P. alamosensis* is also very similar to *P. havardii*, which is known in Texas from Brewster County. *P. havardii* is generally larger, and the stem leaves are not reduced as is *P. alamosensis*.

Habitat: Semi-desert grassland dotted with arid-land shrubs on rocky soils derived from limestone, usually in sheltered sites, often on north-facing slopes and in mesic canyon bottoms, occasionally in rock crevices or among unbrowsed shrubs. Frequent associates in New Mexico include *Juniperus monosperma*, *Bouteloua curtipendula*, *Stipa neomexicana*, *Dalea formosa*, *Dasyllirion wheeleri*, *Forsellesia spinescens*, *Fouquieria splendens*, *Rhus microphylla*, *Viguiera stenoloba*, *Yucca baccata* and *Opuntia* spp. (Spellenberg 1981).

Phenology: Flowering late April-May.

Comments: The specific epithet is derived from the name of the type location, Alamo Canyon in the Sacramento Mountains of Otero County, New Mexico.

Illustrations: Line drawings appear in New Mexico Native Plant Protection Advisory Committee (1984) and Ivey (1995). Line drawings of selected parts appear in Nisbet & Jackson (1960).

Selected References:

- Ivey, R. D. 1995. Flowering plants of New Mexico. Third edition. Published by the author, Albuquerque.
- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Nisbet, G. T. and R. C. Jackson. 1960. The genus *Penstemon* in New Mexico. University of Kansas Science Bulletin 41: 691-759.
- Spellenberg, R. 1981. Status report on *Penstemon alamosensis*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. El Paso Southwest Botanical Miscellany No. 1. 56 pp.
- Worthington, R. D. 1991. Rare plant survey of the limestone hills east of Nations Well East and west of Hueco Tanks Historical Park, Fort Bliss Military Reservation, El Paso County, Texas. Report prepared for New Mexico Natural Heritage Program. 31 pp.



Family: SCROPHULARIACEAE

Scientific Name: *Penstemon alamosensis* Penn. and Nisbet

Common Name: Alamo beard tongue

Common Name: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: None

Description: Green or grayish green perennial herbs with hairless stems and leaves, stems 30–100 mm (12–40 in.) tall, solitary or few, basal leaves elliptic or broadly lance shaped, the stem leaves much smaller, of 2–4 pairs, lance shaped; flowers in a long narrow inflorescence, often all turned to one side; the flowers borne in well-spaced clusters of 1–4 (usually 2) flowers each; corolla to 25 mm (1 in.) long, bright red, minutely glandular-pubescent outside, hairy, evenly funnel shaped; sterile stamen without hairs on tip. Flowers May and June.

Known Distribution: Doña Ana and Otero counties, New Mexico, and adjacent Texas

Habitat: Canyon bottoms, crevices, and pockets in rocky limestone hillsides; about 1,500 m (5,000 ft.)

Ownership: Bureau of Land Management, Department of Defense, Forest Service, private

Threats to Taxon: Overutilization by wildlife and livestock, and overcollection

Similar Species: Two other red-flowered penstemons grow in the same region. *Penstemon cardinalis* has a slight constriction at the mouth (outer end) of the corolla tube; the tube is broadest just behind the mouth. *Penstemon barbatus* has longer corollas, the upper lip extended forward like a visor, the lower sharply bent downward.

Remarks: A specialist is transferring this taxon to *P. havardii* in the near future.

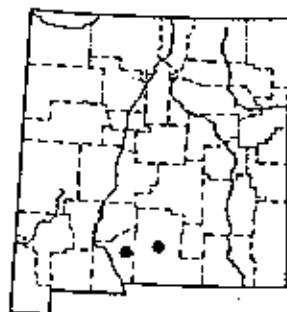
Important Literature:

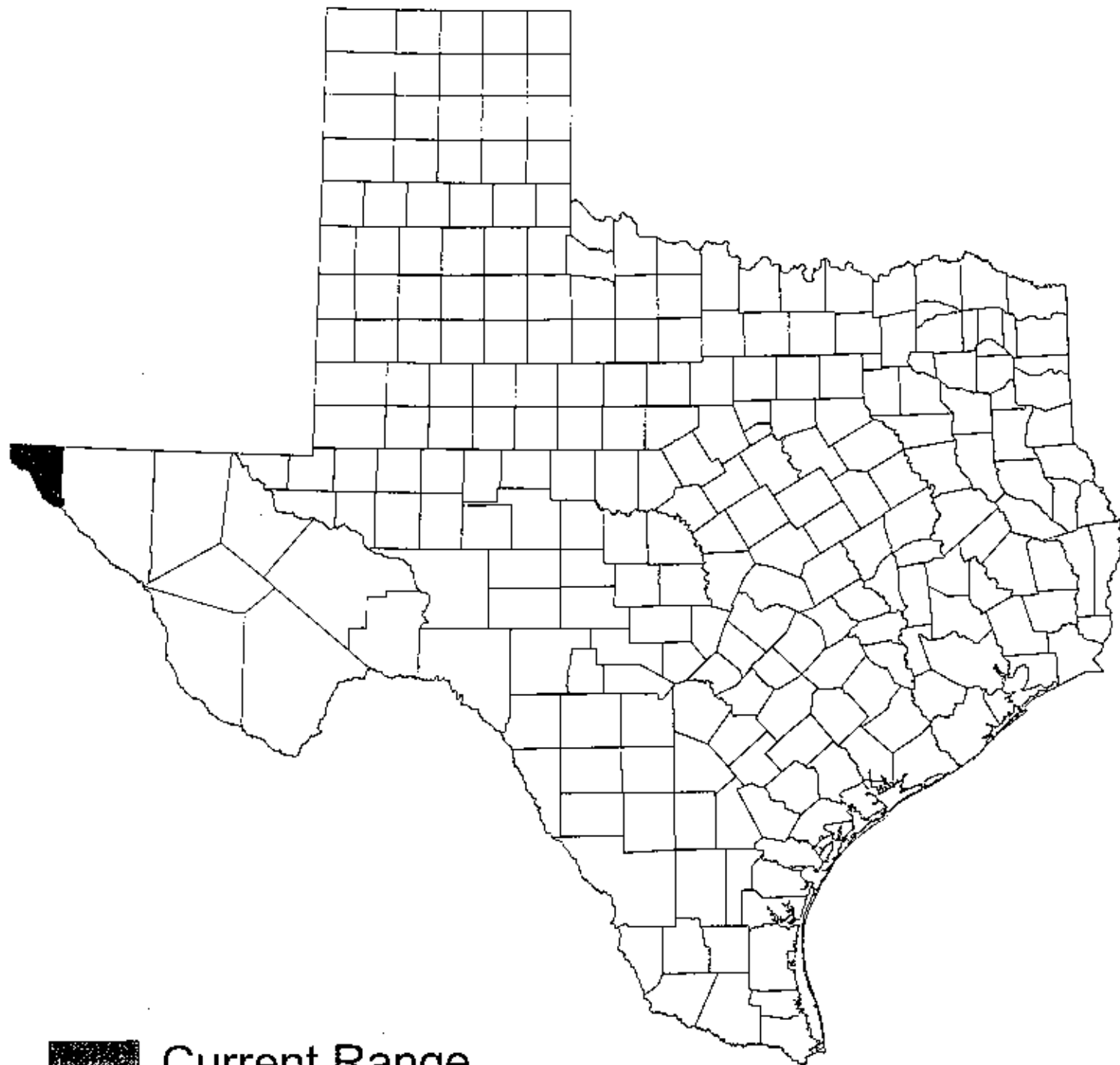
Nisbet, G. T., and R. C. Jackson. The genus *Penstemon* in New Mexico. Univ. Kansas Sci. Bull. 41(5):7–9–711; 1960.

Spellenberg, R. Status report on *Penstemon alamosensis*. U.S. Fish and Wildlife Service, 1981.



Penstemon alamosensis
A. root; B. inflorescence; C. fruit





Current Range

Penstemon alamoensis
(Alamo beardtongue)

Scientific Name: *Penstemon cardinalis* Woot. & Standl. subsp. *regalis* (A. Nelson) Nisbet & Jackson

Synonyms: *Penstemon regalis* A. Nelson

Common Name: royal red penstemon

Global/State Ranks: G3T2S2

Federal Status: None

Global Range: Mountains of southeastern New Mexico and west Texas.

State Range: Guadalupe Mountains of Culberson County and Davis Mountains of Jeff Davis County.

Description (adapted from Correll & Johnston 1970): Perennial 4-6 dm tall, with few to several glabrous stems from base. Leaves opposite, simple, thick, glabrous and strongly glaucous, the margins entire, those of midstem broadly ovate or suborbicular, 5-6 cm long and 4-5 cm wide, cordate at base. Flowers in a narrow terminal panicle; corolla two-lipped, scarlet-red, 26-30 mm long, the upper lip projecting, the lower lip densely bearded with golden hairs; stamens 4, with a glabrous staminode. Fruit a capsule, 1-1.5 cm long, 4-valved at maturity, containing many seeds 1.5-2.5 mm long.

Habitat: Pine-oak woodlands in canyons at higher elevations in the Davis and Guadalupe Mountains. Associates in the Guadalupe Mountains include *Acer grandidentatum*, *Arbutus xalapensis*, *Pinus ponderosa*, *Juniperus deppeana*, *Aquilegia chrysantha* var. *chaplinae*, *Fendlerella utahensis* and *Valeriana texana*.

Phenology: Flowering May-June (-August).

Similar Species: Several other red-flowered *Penstemon* species are found in west Texas. The broad, suborbicular, glaucous leaves and densely bearded lower lip of the corolla distinguish this taxon from all the others.

Comments: Weakly distinguished from subsp. *cardinalis*, which occurs in New Mexico but not Texas.

Illustrations: A color photograph appears in Warnock (1974). A line drawing appears in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

Nelson, A. 1934. Rocky Mountain Herbarium studies. II. American Journal of Botany 21: 573-582.

New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.

Nisbet, G. T. and R. C. Jackson. 1960. The genus *Penstemon* in New Mexico. University of Kansas Science Bulletin 41: 691-759.

Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.



Family: SCROPHULARIACEAE

Scientific Name: *Penstemon cardinalis* (Woot. & Standl.) ssp. *regalis* (A. Nels.) Nisbet & Jackson

Common Name: Guadalupe beard tongue

Classification: State priority 1

Federal Action: None

Common Synonyms: *Penstemon regalis* A. Nelson

Description: Perennial herb, stems mostly 40–60 cm [16–24 in.] tall, branching from the base; leaves opposite, thick, to 6 cm [2.5 in.] long and 5 cm [2 in.] wide, heart shaped, often rather blunt at the tip, wider than in the typical subspecies; calyx 4–6 mm [0.25 in.] long, corolla 26–30 mm [1.0–1.25 in.] long, red, narrowed at the mouth, lobes about 3 mm [0.12 in.] long, the lower ones bearded with soft, yellow hairs. Flowers from May to July.

Known Distribution: Eddy and Otero counties, New Mexico, and adjacent Texas

Habitat: Rocky limestone canyon bottoms and steep slopes in the protection afforded by rock cracks and large boulders; 1,400–1,800 m (4,500–6,000 ft.)

Ownership: Forest Service, National Park Service

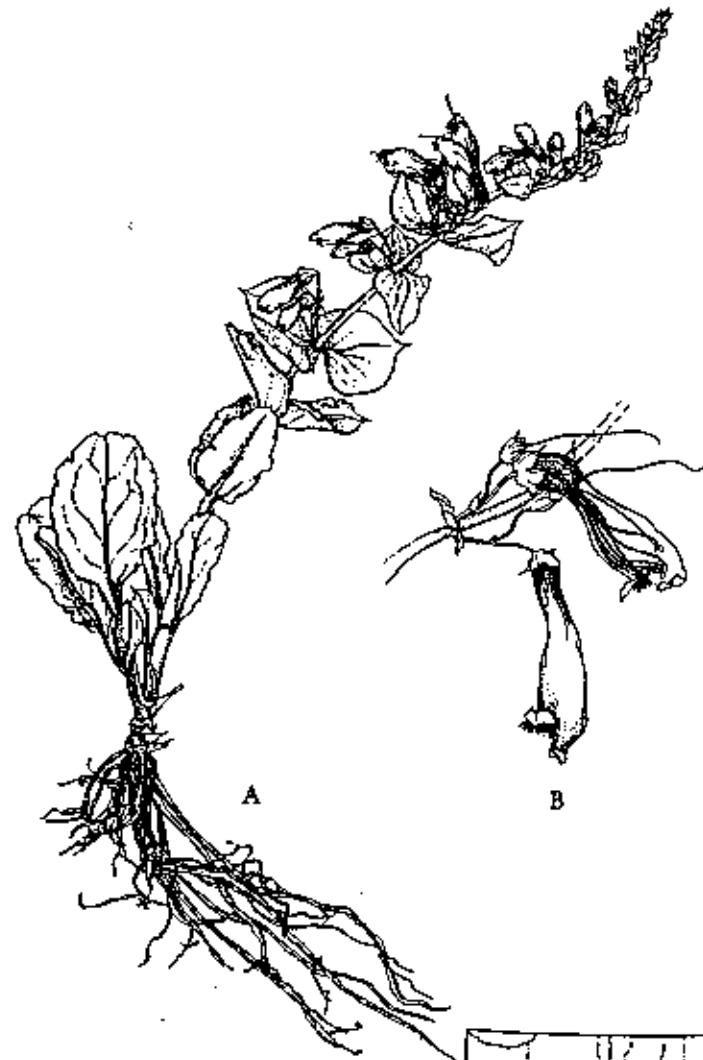
Threats to Taxon: None known

Similar Species: *Penstemon cardinalis* ssp. *cardinalis*, which has a shorter calyx. Other red *Penstemons* in the region do not have the mouth of the corolla constricted.

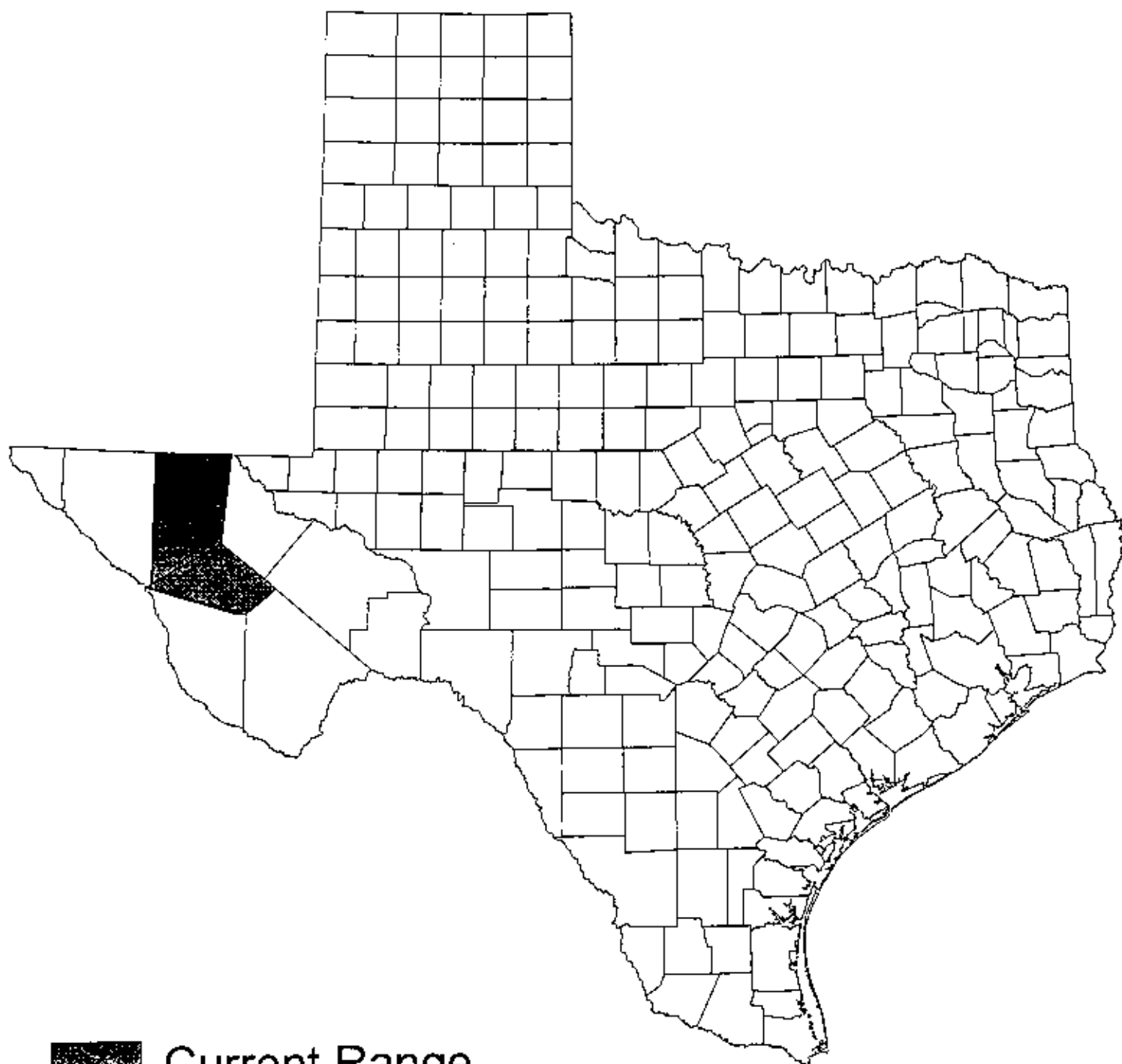
Remarks: Although restricted in range, this species is not uncommon within its habitat.

Important Literature:

Nisbet, G. T., and R. C. Jackson. The genus *Penstemon* in New Mexico. Univ. Kansas Sci. Bull. 41[5]:691–759, 1960.



Penstemon cardinalis ssp. *regalis*
A. general habit, B. flowers



 Current Range

Penstemon cardinalis ssp. *regalis*
(royal red penstemon)

Scientific Name: *Perityle bisetosa* (Torr. ex Gray) Shinnery var. *appressa* Powell

Synonyms: *Laphamia bisetosa* Torr. ex Gray

Common Name: appressed two-bristle rockdaisy

Global/State Ranks: G2T2S2

Federal Status: None

Global Range: West Texas and northern Coahuila.

State Range: Brewster County.

Description (adapted from Powell 1973): Perennial 4-8 cm high, 12-20 cm broad, growing in dense leafy clumps closely appressed to rocks. Leaves simple, alternate, rarely opposite on lower portion of stem, 10-15 mm long and 4-8 mm wide, glabrous, ovate, serrate or serrate-sinuate to shallowly lobed, on petioles 3-7 mm long. Flower heads mostly as in var. *bisetosa*. Achenes as in var. *bisetosa* but with pappus of 2 or 3 or rarely up to 5 bristles, at least 1-3 of which are reduced.

Habitat: Crevices in limestone exposures on bluffs and other rock outcrops.

Phenology: Flowering late summer-fall.

Similar Species: Similar to other varieties of *P. bisetosa*. Diagnostic features of var. *appressa* include its alternate, essentially glabrous, ovate, serrate leaves and the variable length of the pappus bristles (Powell 1973).

Comments:

Illustrations: Line drawings appear in Powell (1967).

Selected References:

Powell, A. M. 1967. Novelties in *Perityle* (Compositae). *Sida* 3(3): 177-180.

Powell, A. M. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5(2): 61-128.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.

(E)

179



Habit sketch, $\times 1$. B.

TEXAS: Brewster Co: in preserve, ca. 4 mi. s. of Mt. 25 Sept. 1965, isotype, TEX).

following characters: perityle shallow-lobed to serrate; leaves scabrous; lobes slightly larger than

II, var. nov. Plantae

Scudday, Sikes, and Watson 1394). A. 72—Fig. 4. Perityle $\times 7.2$. B. Leaves.

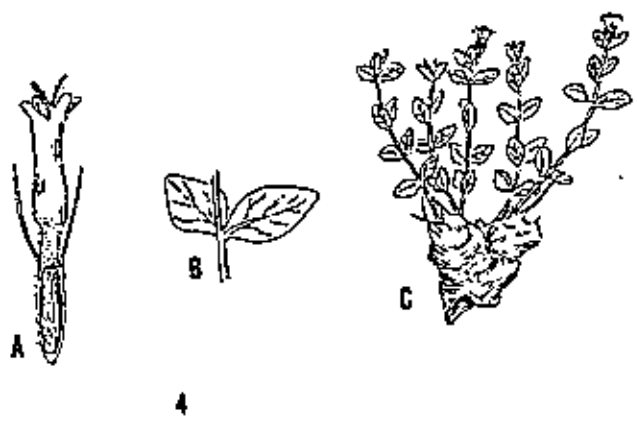
THE UNIVERSITY OF TEXAS AT AUSTIN
 HERBARIUM
 JUL 5 1977



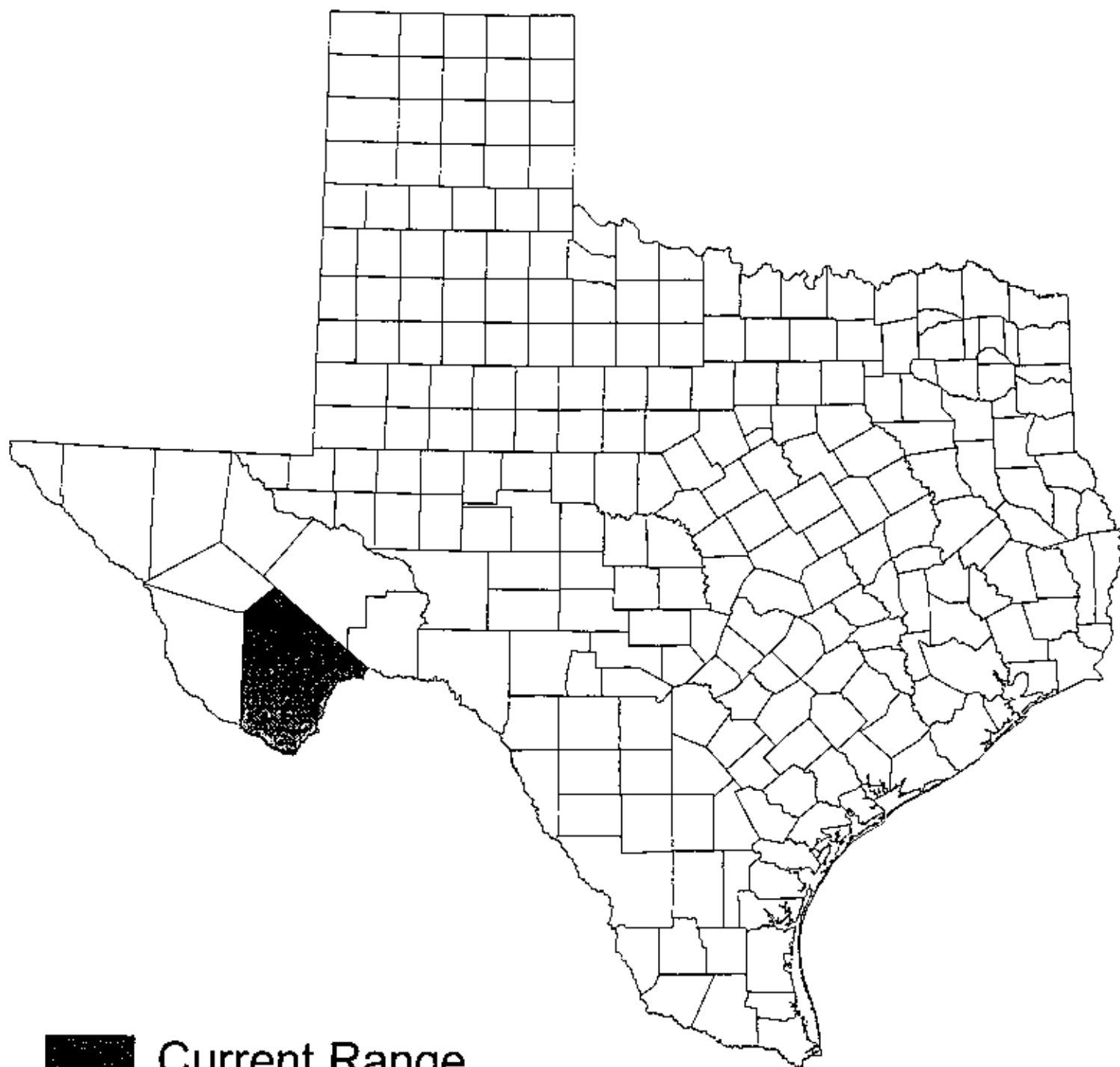
P. bisetosa
 var. *appressa*



P. bisetosa
 var. *scalaria*



P. bisetosa
 var. *bisetosa*



■ Current Range

Perityle bisetosa var. *appressa*
(appressed two-bristle rock-daisy)

Scientific Name: *Perityle bisetosa* (Torr. ex Gray) Shinnery var. *bisetosa*

Synonyms: *Laphamia bisetosa* Gray

Common Name: two-bristle rockdaisy

Global/State Ranks: G2T2S2

Federal Status: SOC

Global Range: Endemic to West Texas. Proximity of some known sites to the Rio Grande suggests that the taxon might be expected in northern Coahuila.

State Range: Brewster and Pecos counties.

Description (adapted from Powell 1973): Perennial 2-7 (-10) cm high; stems minutely pubescent, densely leafy. Leaves simple, opposite, less often alternate, 5-10 mm long and 2-6 mm wide, essentially glabrous, glandular-punctate, leathery, ovate to ovate-lanceolate or lanceolate, the margins entire or subserrate, often subundulate, acute at the apex, sessile or on petioles to 2 mm long. Flower heads solitary or in pairs on very short peduncles, 7-8 (-10) mm long and 3.5-7 mm wide, containing only disc flowers (ray flowers absent); involucre narrowly campanulate, the phyllaries 8-10 (-12), 4.5-5.5 mm long and 1-2 mm wide, keeled; disc flowers 11-17, white, (3.5-) 4.2-4.8 mm long, the 5 lobes acute and ca. 1 mm long; style branches up to 2 mm long. Achenes 1.8-2.2 mm long, oblong to oblong-obconical, often rounded or obscurely angled on one or both surfaces, with conspicuous callous margins, minutely pubescent on the surfaces but glabrous on the margins, capped by a pappus of 2 flattened bristles 1.5-2.3 mm long.

Habitat: Crevices in limestone exposures on bluffs and other rock outcrops.

Phenology: Flowering late summer-fall.

Similar Species: Much like several other *Perityle* taxa, at least in gross features. Characteristic features of this taxon include its sessile or nearly sessile, usually opposite, essentially glabrous leaves, the margins of which are entire to minutely toothed; its white disk corolla; and its 2-bristled pappus. Other varieties of *P. bisetosa* have distinctly alternate, distinctly petiolate leaves (Powell 1973).

Comments:

Illustrations: Line drawings appear in Powell (1967).

Selected References:

Powell, A. M. 1967. Novelties in *Perityle* (Compositae). *Sida* 3(3): 177-180.

Powell, A. M. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5(2): 61-128.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.



D

Habit sketch, x 1. B.

IAS: Brewster Co: in
serve, ca. 4 mi. s. of
Mt., 25 Sept. 1966,
isotype, TEX).

following characters:
sh; leaves scabrous-
hallow-lobed to ser-
slightly larger than

II, var. nov. Plantae

Scudday, Sikes, and
72. C. Leaf, x 1.44
Watson 1394). A.
72—Fig. 4. Perityle
x 7.2. B. Leaves.



2

P. b. setosa
var. *aggressa*



3

P. b. setosa
var. *scalaria*



4

P. b. setosa
var. *bisetosa*

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 Current Range

Perityle bisetosa var. *bisetosa*
(two-bristle rock-daisy)

Scientific Name: *Perityle bisetosa* (Torr. ex Gray) Shinnery var. *scalaris* Powell

Synonyms: None.

Common Name: Stairstep Mountain two-bristle rockdaisy

Global/State Ranks: G2T1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas. Proximity of known sites to the Rio Grande suggests that the taxon might be expected in northern Coahuila.

State Range: Known only from southeastern Brewster County.

Description (adapted from Powell 1973): Perennial 6-12 cm high, in small erect or pendulous clumps. Leaves simple, opposite on lower portion of stem, becoming alternate on higher portions, 8-12 mm long and 5-8 mm wide, scabrous-hispidulous, broadly ovate to suborbicular, with 1-2 shallow lobes on each margin or merely serrate, on petioles 2-4 mm long. Flower heads mostly as in var. *bisetosa* but with most features slightly larger. Achenes as in var. *bisetosa* but with pappus of 3 or rarely 4 bristles of equal length or with 1-2 reduced.

Habitat: Crevices in limestone exposures on bluffs and other rock outcrops.

Phenology: Flowering late summer-fall.

Similar Species: Similar to other varieties of *P. bisetosa*. Diagnostic features of var. *appressa* include its alternate, distinctly petiolate, rough-pubescent, serrate leaves and the variable length of the pappus bristles (Powell 1973).

Comments: The varietal and common names both refer to the type location on Stairstep Mountain in Black Gap WMA.

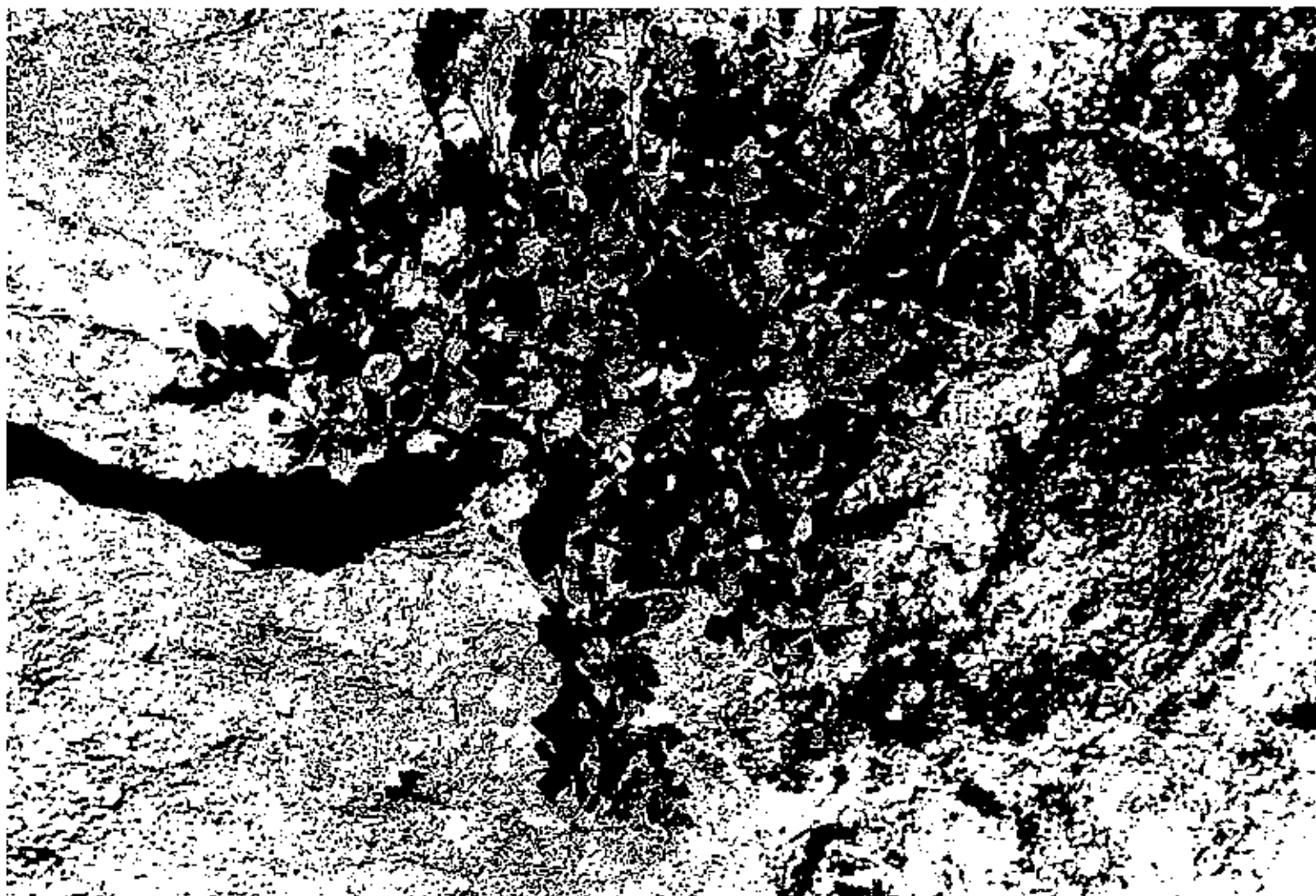
Illustrations: Line drawings appear in Powell (1967); a color photograph appears in Warnock (1977).

Selected References:

Powell, A. M. 1967. Novelties in *Perityle* (Compositae). *Sida* 3(3): 177-180.

Powell, A. M. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5(2): 61-128.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.



(E)

179



P. bisetosa
var. *appressa*

Habit sketch, $\times 1$. B.

XAS: Brewster Co: in
reserve, ca. 4 mi. s. of
p Mt., 25 Sept. 1965,
; isotype, TEX).

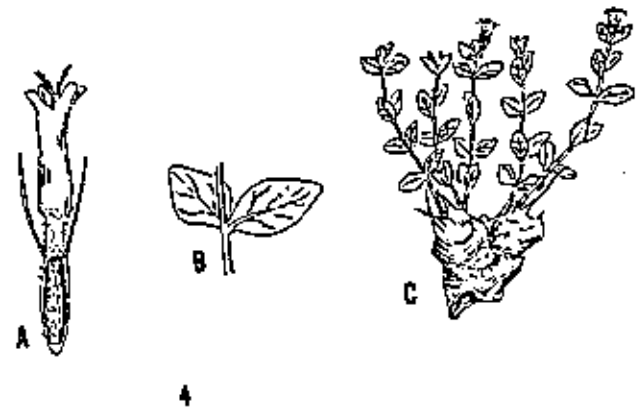
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igh; leaves scabrous-
shallow-lobed to ser-
slightly larger than

ell, var. nov. *Plantas*

(Scudday, Sikes, and
0.72. C. Leaf, $\times 1.44$
id Watson 1394). A.
0.72—Fig. 4. Perityle
 $\times 7.2$. B. Leaves,

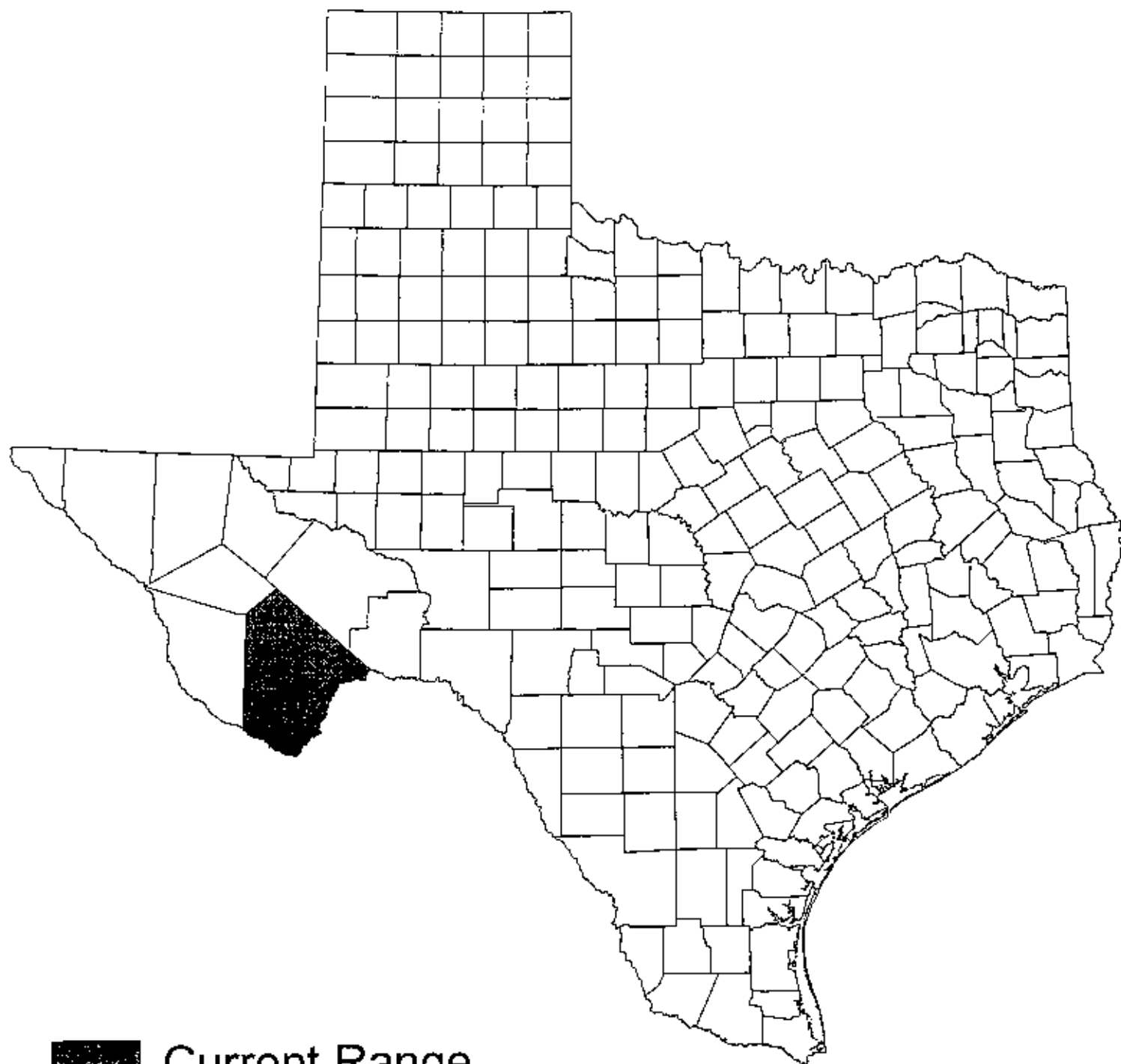


P. bisetosa
var. *scalaria*



P. bisetosa
var. *bisetosa*

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AT AUSTIN
JUL 5 1977



■ Current Range

Perityle bisetosa var. *scalaris*
(stairstep two-bristle rock-daisy)

Scientific Name: *Perityle cinerea* (Gray) Powell

Synonyms: *Laphamia cinerea* Gray; *Pappothrix cinerea* (Gray) Rydb.

Common Name: grayleaf rockdaisy, gray rockdaisy

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to west Texas.

State Range: Pecos, Reeves, Terrell and Upton counties.

Description (adapted from Powell 1969): Perennial 8-25 (-45) cm tall, tomentose-canescens, densely leafy. Leaves opposite on lower stem, alternate on upper stem, 12-35 mm long and 9-18 mm wide, broadly ovate to subdeltoid, rarely subreniform, obtuse to acute at the apex, subtruncate to subacute at the base, the margins deeply serrate, tomentose-canescens but the veins still conspicuous; petioles 6-10 mm long. Flower heads solitary or in clusters, borne on rather stout peduncles 3-10 mm long, containing only disc flowers (rays absent), the heads narrowly campanulate, 8-10 mm long and 4-7 mm wide, sometimes partially obscured by the subtending leaves; phyllaries 8-10, 5-7 mm long and 1.1-2 mm wide, more or less keeled, tomentose, the inner series like the outer but more membranous along the margins and less pubescent; disc flowers 10-15, the corolla white, 5.3-6.0 mm long, the tube 1.3-1.6 mm long, minutely glandular pubescent, the throat tubular, 2.8-3.2 mm long, sparsely glandular-pubescent, the 5 lobes narrow, acute, reflexed, 0.8-1.2 mm long. Achenes 2.6-3.0 (-3.5) mm long, partially flattened, capped by a pappus of 14-20 slender minutely antrorse-ciliate bristles.

Habitat: Crevices in dry limestone caprock of mesas.

Phenology: Flowering in spring and fall?

Similar Species: Much like other members of the genus, at least in gross features. The dusty-gray, ashy or cinereous pubescence of the foliage is conspicuous and diagnostic (Powell 1969).

Comments:

Illustrations: A line drawing appears in Powell (1969).

Selected References:

- Powell, A. M. 1969. Taxonomy of *Perityle* section *Pappothrix* (Compositae-Peritylinae). *Rhodora* 71: 58-93.
- Hanks, B. G. and A. M. Powell. 1983. Status report [on *Perityle cinerea*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

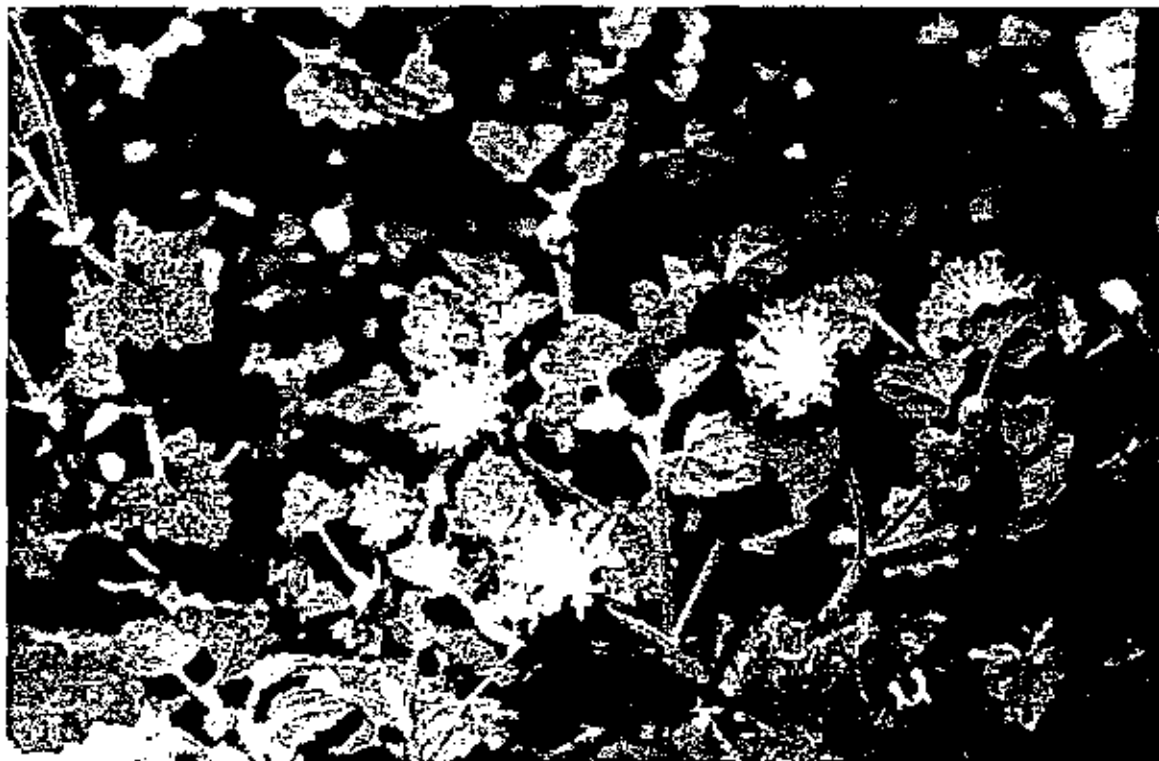
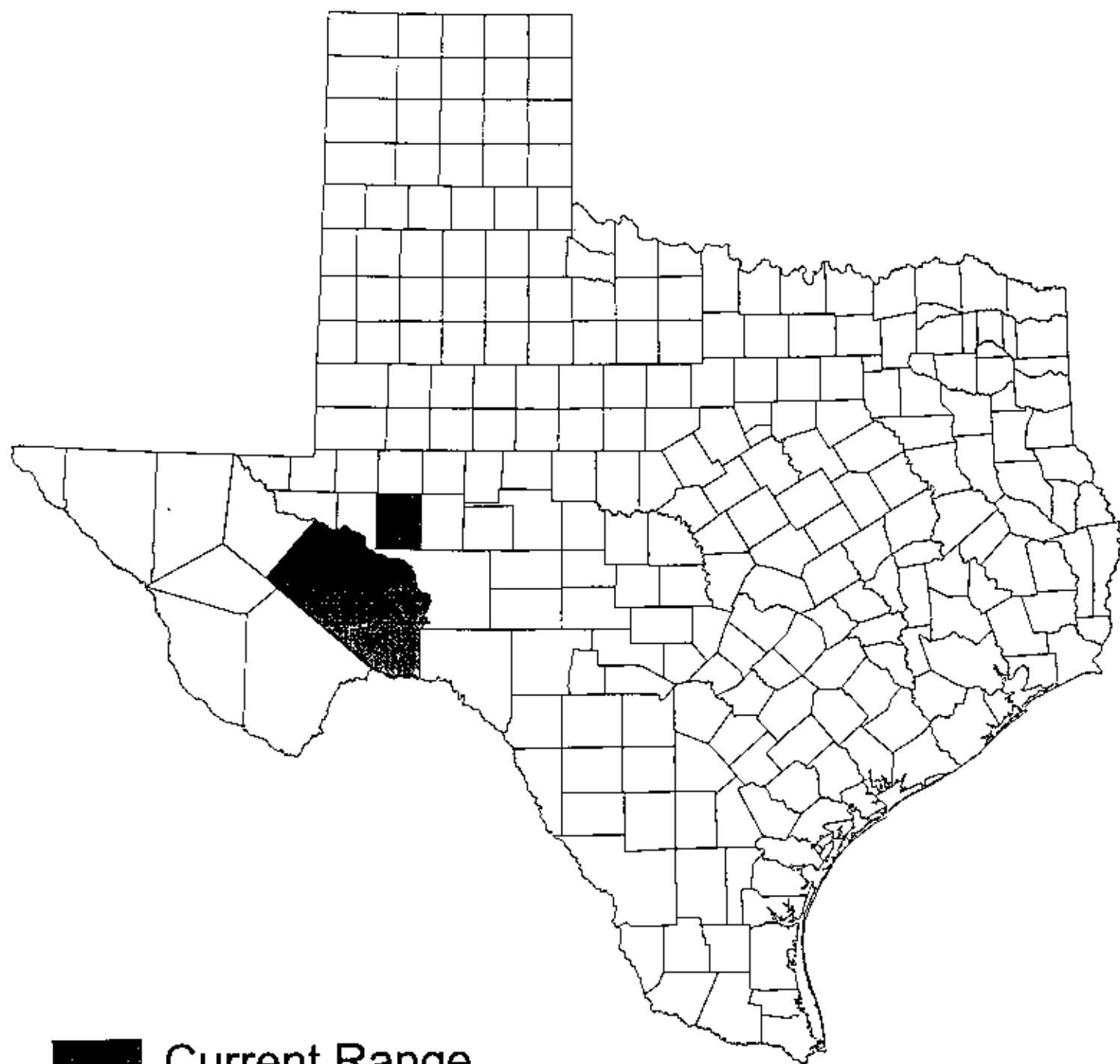




Figure 20. Habit sketch of *Perityle cinerea* (Powell 1310); $\times 1$. or very short and appressed to rocks, at least in some instances depending on whether or not they are in reach of sheep which browse the plants. *Perityle cinerea* appears to be most closely related to *P. vitreomontana* or the white-flowered variety of *P. rupestris*, notwithstanding the tomentose-canescens pubescence which is not approached by any other species of the genus except the Guadalupe Island endemic, *P. incana*.

The type locality of Escondido Creek, now called Tunis Creek, is about 30 miles east of Fort Stockton. No plants of this species could be found in the small rock bluffs along



■ Current Range

▨ Historical Range

Perityle cinerea
(grayleaf rock-daisy)

Scientific Name: *Perityle dissecta* (Torr.) Gray

Synonyms: *Laphamia dissecta* Torr.; *Leptopharynx dissecta* (Torr.) Rydb.

Common Name: slimlobe rockdaisy

Global/State Ranks: G2S2

Federal Status: None

Global Range: Southern Trans-Pecos Texas and northwestern Chihuahua.

State Range: Southern Brewster and southern Presidio counties.

Description (adapted from Correll & Johnston 1970; Powell 1973): Perennial from a woody base, 7-18 cm high. Leaves opposite or alternate, usually alternate above, 9-20 mm long and 5-20 mm wide, hirsute-pilose, irregularly dissected, one- to twice- or even thrice-divided, less often pinnately parted or cleft, the lobes irregular and rounded, puberulous and glandular punctate, pilose to hirsute-pilose; petioles (3-) 4-10 mm long. Flower heads containing only disc flowers, rays absent; involucre campanulate, 8-10 mm high and 4-5 mm wide, often partly obscured by leaves; phyllaries 11-13 mm long and 0.7-0.9 mm wide, linear-lanceolate, attenuate at apex; disk florets 20-30, the corolla yellow, often purple-tinged at maturity, (4-) 5-5.5 mm long. Achenes (2.8-) 3-3.8 mm long, slender-oblong to narrowly obconical, with rather conspicuous callous margins, short-pubescent on the margins and both surfaces; pappus a minute, inconspicuous crown of squamellae along with 1 (-4) rather stout bristle(s) (1-) 2.2-3 mm long, the bristle(s) rarely absent.

Similar Species: Grossly similar in habit and habitat to many other *Perityle* species, but quite distinct with its extremely dissected, pilose leaves and few-bristled, short-pubescent achenes. Most similar to *P. lemmonii*, a species of southeastern Arizona, southwestern New Mexico and northern Chihuahua, and *P. castillonii* of northern Coahuila and Chihuahua (Powell 1998).

Habitat: Walls of limestone canyons in desertic regions.

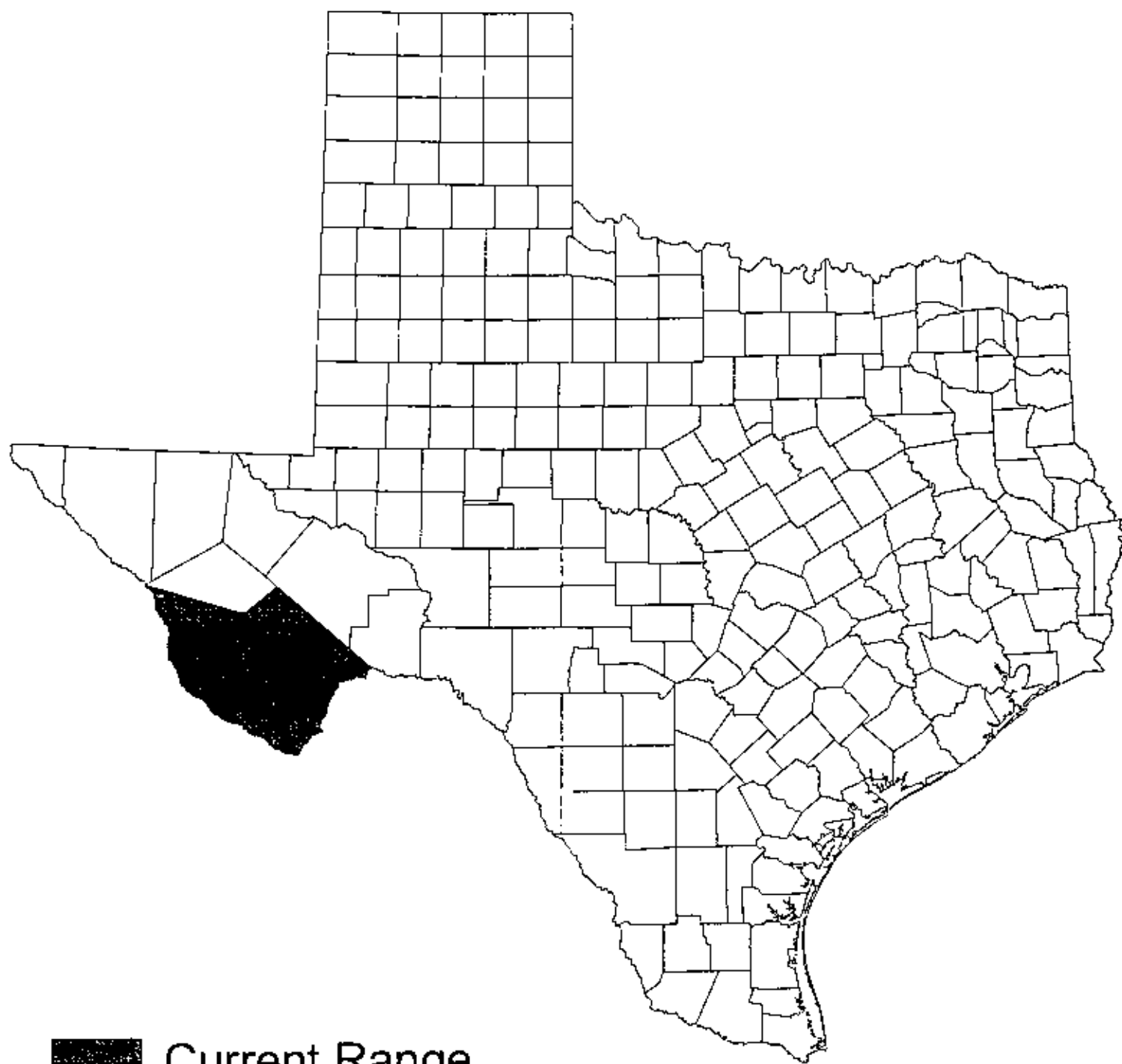
Phenology: Flowering/fruitleting spring-fall.

Comments:

Illustrations: Line drawings of a leaf and a flowering twig appear in Powell (1998).

Selected References:

- Powell, A. M. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5(2): 61-128.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.



■ Current Range

Perityle dissecta
(slimlobe rock-daisy)

Scientific Name: *Perityle fosteri* Powell

Synonyms: None.

Common Name: Foster's rockdaisy

Global/State Ranks: G1S1

Federal Status: None

Global Range: Endemic to west Texas.

State Range: Known only from the Apache Mountains of Culberson County.

Description (adapted from Powell 1983): Suffruticose perennial 6-15 cm tall, profusely branched and bushy in habit, rather densely short-pubescent. Leaves alternate, simple, the petioles 4-8 mm long, the blades 8-12 mm long and 5-12 mm wide, variously lobed but basically tripartite, short-pubescent and gland-dotted. Flower heads on short peduncles clustered among upper leaves, discoid (ray florets absent), involucre funnellform-cylindric, 6-7 mm long and ca. 4 mm wide; phyllaries 8, 5-6 mm long and 0.8-1.3 mm wide; disc flowers ca. 10, cream-color to pale yellow, ca. 4.5 mm long, the tube ca. 1 mm long, glandular-pubescent, the throat ca. 3 mm long, tubular-funnelform, the lobes acute, ca. 0.5 mm long; anthers ca. 2.3 mm long; styles 1-1.2 mm long, slender, flattened, truncate, minutely pubescent. Achenes 1.5-1.6 mm long, nearly oblong, flattened, short-pubescent on faces and margins; pappus of ca. 20 slender, unequal, minutely-antrorse bristles.

Similar Species: Most closely related to *Perityle rupestris* and distinguished from that species on the basis of its tripartite leaves and pale yellow corollas (Powell 1983).

Habitat: Known only from rock faces on limestone boulders and bluffs in a deep protected canyon (Powell 1983).

Phenology: The type specimen, *A. M. Powell 3365*, was collected on 3 July 1978, in flower and fruit.

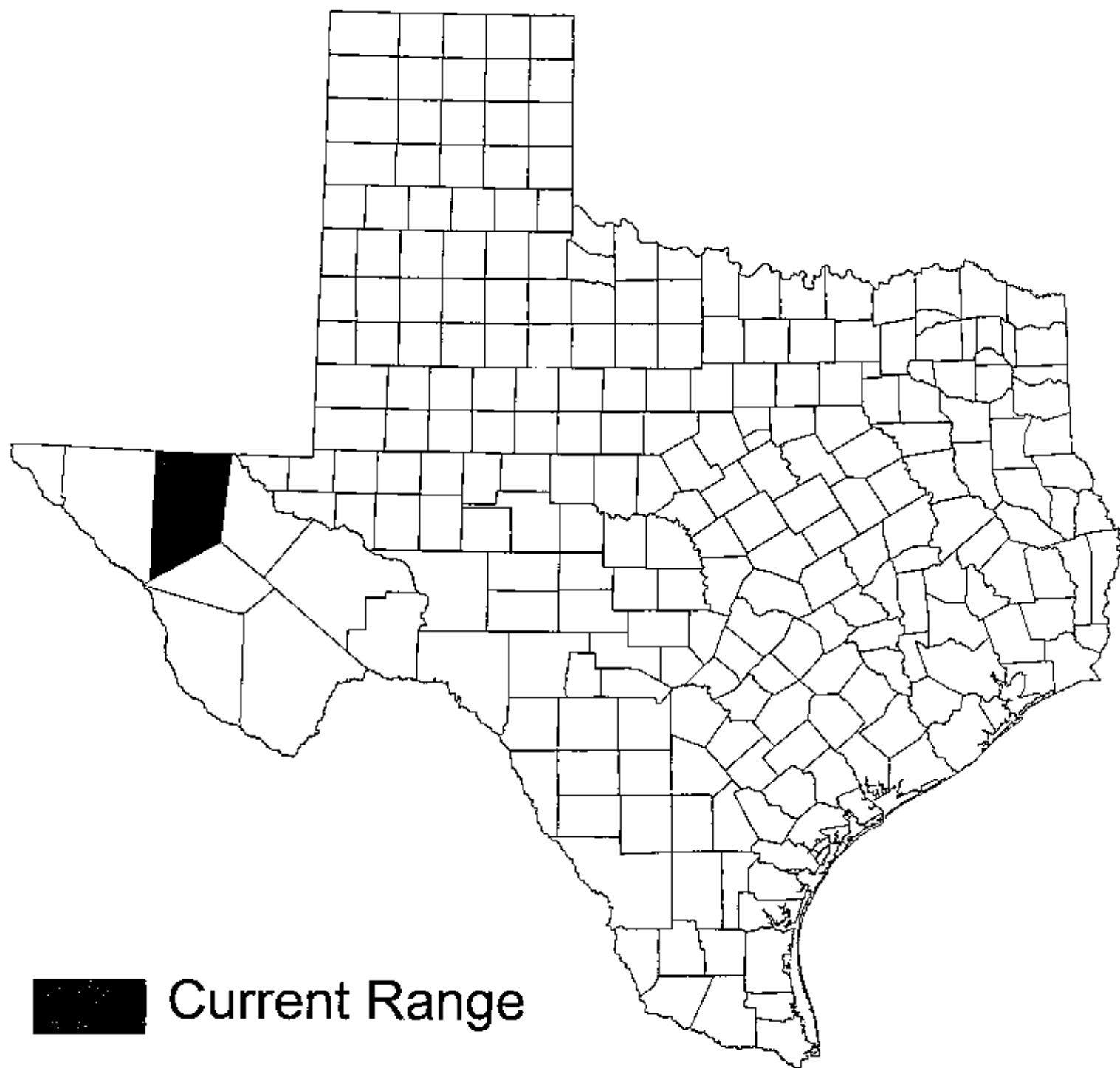
Comments: The epithet honors J. B. Foster, rancher on whose land the type specimen was collected.

Illustrations: A photograph of the type specimen appears in Powell (1983).

Selected References:

Powell, A. M. 1983. *Perityle* (Asteraceae), new species and notes. *Madroño* 30: 217-225.





■ Current Range

Perityle fosteri
(Foster's rock-daisy)

Scientific Name: *Perityle huecoensis* Powell

Synonyms: None.

Common Name: Hueco rockdaisy

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to west Texas.

State Range: The type location is near the Hueco Tanks area in the North Hueco Mountains, a location attributed to El Paso County in the type article (Powell 1983) but later to Hudspeth County (Powell 1988; Powell 1998). Other locations are clearly in El Paso County (Worthington 1989, Worthington 1991).

Description (adapted from Powell 1983): Suffruticose perennial 10-20 cm tall, densely short-pubescent. Leaves alternate, simple, on petioles ca. 4-8 mm long (half to almost as long as the blades), the blades 7-12 mm long and 7-10 mm wide, subcoriaceous, short-pubescent, gland-dotted, ovate to ovate-deltoid, the margins entire to serrate or irregularly few-lobed. Flower heads loosely aggregated on peduncles ca. 1 cm long, clustered among upper leaves; involucre somewhat funnelform, 5-6.5 mm long; phyllaries 4-5 mm long and 0.6-1 mm wide; florets (rays and discs) usually about 14; ray florets 3-5, the ligule yellow, 2.5-3 mm long and ca. 1.5 mm wide; disc flowers 11-13, yellow, ca. 3 mm long, the tube ca. 1.3 mm long, the throat ca. 1 mm long [not 1 cm long as in Powell 1983], markedly expanded to campanulate-funnelform, the lobes ca. 0.7 mm long; anthers ca. 1.5 mm long; style branches 1.2-1.5 mm long, subulate and pubescent. Achenes 2.8-3.2 mm long, linear-lanceolate, flattened, minutely pubescent on faces and margins; pappus typically of 2 longer bristles and 1 shorter bristle, the longest 1.0-2.5 mm long, or with 2-3 longer bristles and 2-4 shorter bristles, the bristles slender and antrorse-ciliate, often caducous.

Similar Species: Most closely related to *Perityle staurophylla* of south-central New Mexico. *P. huecoensis* "is distinguished by its ovate to ovate-deltoid leaves, small heads with ca. 12 disc florets, disc corollas ca. 3 mm long with markedly expanded throats, and short pappus bristles" (Powell 1983).

Habitat: North-facing or otherwise mostly shaded limestone cliff faces within relatively mesic canyon system (Worthington 1991). Exposed rock in this area is mapped as Hueco Limestone (Permian).

Phenology: The type specimen, *N. F. McCarten and [T.] Van Devender 2508*, was collected on 24 September 1977 and bears flowers and achenes, and surveys of May-July 1991 succeeded in detecting the species (Worthington 1991). Presumably *Perityle huecoensis* could be recognized throughout much of the growing season depending on rainfall and other weather factors.

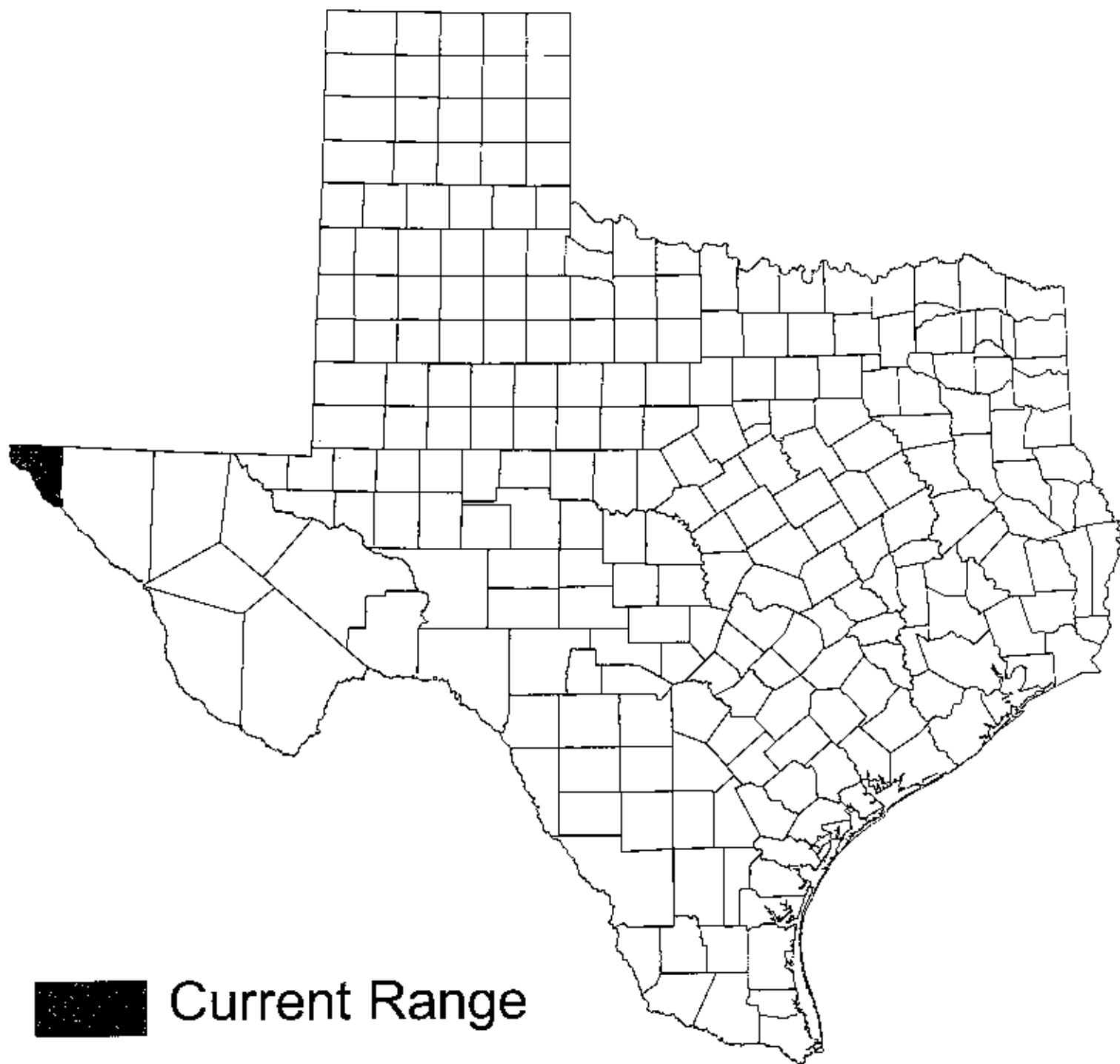
Comments:

Illustrations: A photograph of the holotype appears in Powell (1983).

Selected References:

Powell, A. M. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5(2): 61-128.

- Powell, A. M. 1983. *Perityle* (Asteraceae), new species and notes. *Madroño* 30: 217-225.
- Powell, A. M. 1988. Trees and shrubs of Trans-Pecos Texas. Big Bend Natural History Association, Big Bend National Park, Texas. 536 pp.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Worthington, R. D. 1989. An annotated checklist of the native and naturalized flora of El Paso County, Texas. *El Paso Southwest Botanical Miscellany* No. 1. 56 pp.
- Worthington, R. D. 1991. Rare plant survey of the limestone hills east of Nations Well East and west of Hueco Tanks Historical Park, Fort Bliss Military Reservation, El Paso County, Texas. Report prepared for New Mexico Natural Heritage Program. 31 pp.



■ Current Range

Perityle huecoensis
(Hueco rock-daisy)

Scientific Name: *Perityle vitreomontana* Warnock

Synonyms: None.

Common Name: Glass Mountain rockdaisy

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to west Texas.

State Range: Known only from the Glass Mountains of Brewster County.

Description (adapted from Warnock 1967; Powell 1969): Perennial 3-10 cm tall, pilose, densely leafy. Leaves opposite on lower stem, becoming alternate on upper stem, simple, 7-10 (-13) mm long and 5-8 (-12) mm wide, ovate to ovate-deltoid, the margins obtuse-serrate to incised-lobed, rarely lacinate, obtuse or rarely subacute at the apex, subtruncate to subacute at the base, pilose, strongly veined; petioles 2-4 mm long. Flower heads loosely clustered, rarely solitary, borne on short stout peduncles (1-) 2-3 (-8) mm long, containing only disc flowers (ray flowers absent), narrowly campanulate, 6-7 mm high and 3-4 mm wide, often mostly obscured by subtending leaves, phyllaries (9-) 10-12, in two series, 4-5 mm long and 0.8-1.0 mm wide, obscurely keeled; disc flowers 11-16, the corolla white, 4.2-4.5 mm long, the tube 0.8-1.0 mm long, minutely glandular-pubescent, the throat tubular, ca. 2.5 mm long, sparsely glandular-pubescent, the 5 lobes narrow, acute, reflexed, 0.8-1.0 mm long. Achenes 1.9-2.0 mm long, narrowly obconical, flattened, typically truncate at the base and apex, with rather inconspicuous callous but glabrous margins, the angles and surfaces short-pubescent, capped by a pappus of 2 to 3 very slender antrorsely-ciliate bristles 1.2-2.0 mm long, sometimes with 3-6 additional bristles that are shorter than the main 2, rarely with 10-20 even shorter vestigial bristles.

Similar Species: Among the many other west Texas species of *Perityle*, *P. vitreomontana* is distinguished by its strongly-veined leaves, 11-16-flowered heads, white corolla and variable pappus.

Habitat: Crevices in limestone exposures on cliffs and rock outcrops in the Glass Mountains. Associates include other petrophytes such as *Petrophytum cespitosum*, *Selaginella pilifera*, *Chaetopappa parryi* as well as various generalists.

Phenology: Flowering June-October.

Comments:

Illustrations: A line drawing appears in Warnock (1967).

Selected References:

Poole, J. M. 1992. Status report on *Perityle vitreomontana*. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.

Powell, A. M. 1969. Taxonomy of *Perityle* section *Pappothrix* (Compositae-Peritylinae). *Rhodora* 71: 58-93.

- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Warnock, B. H. 1967. *Perityle vitreomontana* B. H. Warnock (Compositae), new species. Southwestern Naturalist 12: 475-476.



PERITYLE VITREOMONTANA B. H. WARNOCK (COMPOSITAE), NEW SPECIES.—Plantae perennes parvae, e basi lignea natae, 3-10 cm. alt.; folia opposita, superon alterna facta, 7-10 (-13) mm. long., 5-8 (-12) mm. lat., pilosa, ovata ad ovatodeltoidea, marginibus obtuso-serratis ad inciso-lobatas, rure laciniatis, vix nervatis; petioli 2-4 mm. long., inflorescentia e capitulis laxo fasciculatis, raro solitariis, in pedunculis crassioribus (1-)2-3(-8) mm. long. parvis, typice constantibus; capitula discoidem subcampdnulata, 5-7 mm. alt., 3-4 mm. lat., per folia saepe

Warnock

475

Southern Nat. 12(4):475-476, 1967.

magna ex parte relata; phyllaria (0-)10-12, 2-seriata, aequa, 4-5 mm. long., 0.8-1.1 mm. lat.; disci flores 11-16; disci corollae albiae, 3.2-4.5 mm. long.; achenia 1.9-2.0 mm. long., anguste obconica, ad basim apicemque typice truncata, marginibus satis inconspicuis collosisque, angulis superficialibusque brevi-pubescentibus, marginibus admodum glabris; pappus 2(3) setis teneris, 1.2-2.0 mm. long., typice constantibus, 3-6 setis saepe brevioribus quam 2 setae principales; pappus 10-20 setis vestigiales tuberae raro habens; chromosomatum numerus, $n=17$. Type: TEXAS: Brewster Co: limestone bluffs, w. slopes of Old Blue, Glass Mountains, 21 Sept. 1963, B. H. Warnock & A. M. Powell 19111 (Holotype, SNSC; isotypes, GR, SMU, TEX, US).

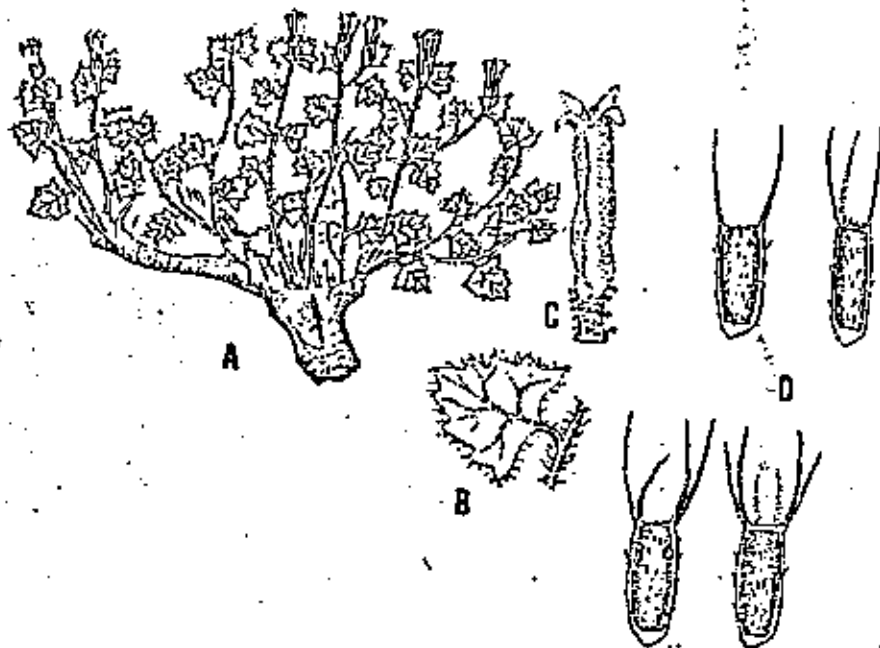
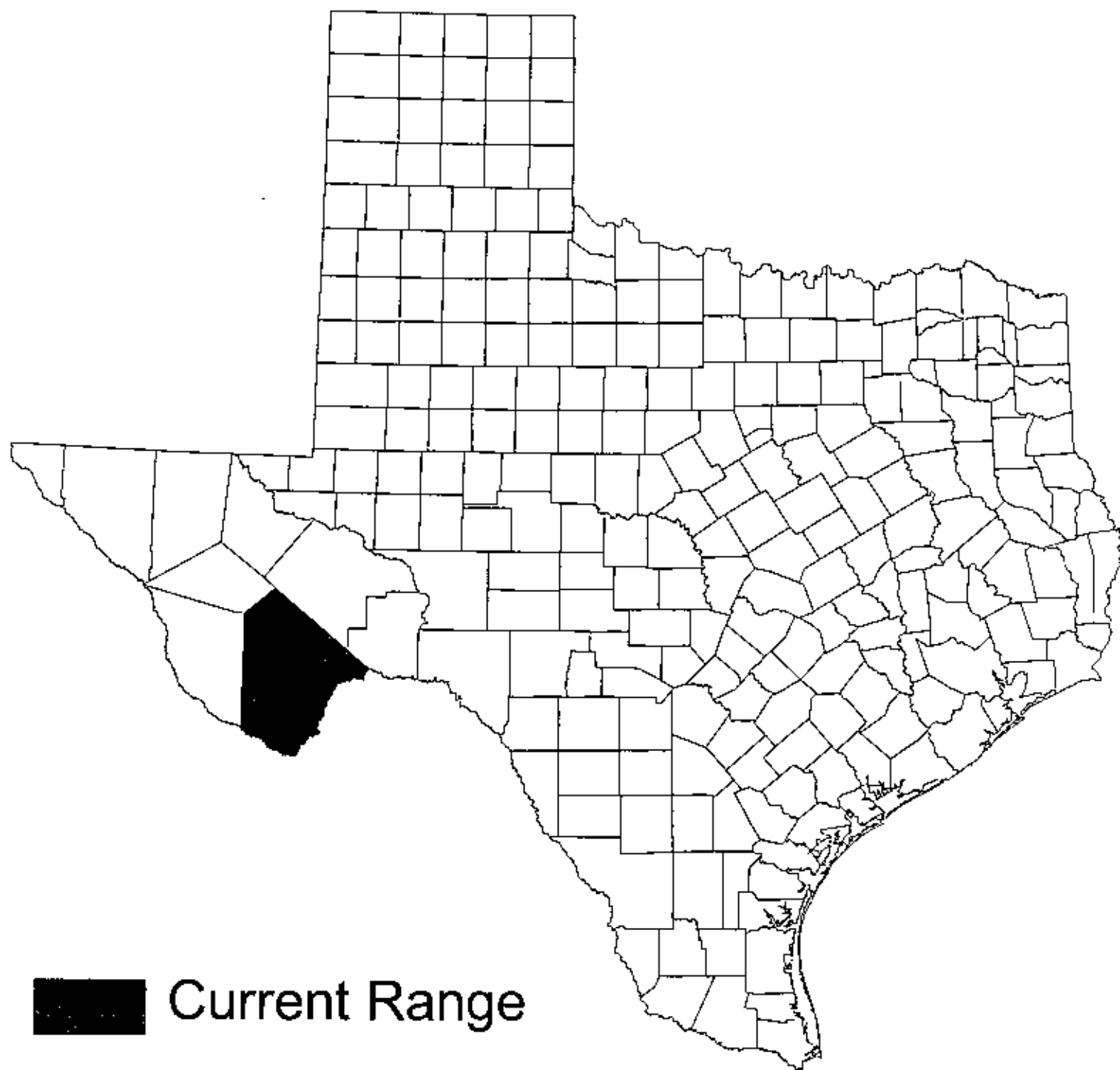


Fig. 1. *Perityle vitreomontana* (Warnock & Powell 19111). A. Habit sketch, X 1. B. Leaf, X 2. C. Corolla, X 10. D. Achenes, showing variable pappus structure, X 10.

As the species name implies, the distribution of this taxon is apparently restricted to the Glass Mountains in Brewster County, Texas. To be more exact, plants of this species have been collected only on the north side of the mountain-range. *Perityle vitreomontana* is related to *P. rupestris* var. *albiflora*, and thus belongs with the latter taxon in Section *Pappothrix*. Plants of this species are distinguished primarily by their small habit (3-10 cm. high), pilose pubescence, and pappus of 2(3) main bristles (less often with 3-6, or rarely 10-20, bristles much shorter than the main 2).—Barton H. Warnock, Department of Biology, Sul Ross State College, Alpine, Texas.

THE UNIVERSITY OF TEXAS AT AUSTIN
RARE PLANT STUDY CENTER

JUL 15 1977.



■ Current Range

Perityle vitreomontana
(Glass Mountains rock-daisy)

Scientific Name: *Perityle warnockii* Powell

Synonyms: None.

Common Name: Warnock's rockdaisy

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Val Verde County.

Description (adapted from Powell 1967, Powell 1998): Small perennial 2-10 cm tall. Leaves simple, opposite below, becoming alternate above, 8-15 mm long and 4-8 (-10) mm wide, scabrous, suborbicular, ovate to ovate-lanceolate, the margins conspicuously serrate; petioles 2-5 (-8) mm long. Flower heads solitary on short peduncles, containing only disc flowers; involucre campanulate, 7-10 mm long and 4-7 mm wide; disc corolla white, 5-6 (-6.5) mm long, the tube and lower throat glandular-pilose, the 5 lobes attenuate to acute, (1.0-) 1.2-1.6 mm long. Achenes 2.2-2.5 (-2.8) mm long, oblong to oblong-conical, truncate at the base and apex, with conspicuous callous margins, the pappus absent.

Habitat: Crevices in steep, dry, inaccessible limestone bluffs.

Phenology: Flowering spring-fall (Powell 1973).

Similar Species: According to Powell (1967, 1998) this species is closely related to *Perityle bisetosa*, a species that has glabrous leaves and a pappus of 2 bristles. *P. warnockii* is unique among Texas species in having a combination of white disc flowers (rays absent), no pappus, and rough-pubescent leaves.

Comments:

Illustrations: Line drawings appear in Powell (1967).

Selected References:

Powell, A. M. 1967. Novelities in *Perityle* (Compositae). *Sida* 3(3): 177-180.

Powell, A. M. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5(2): 61-128.

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.

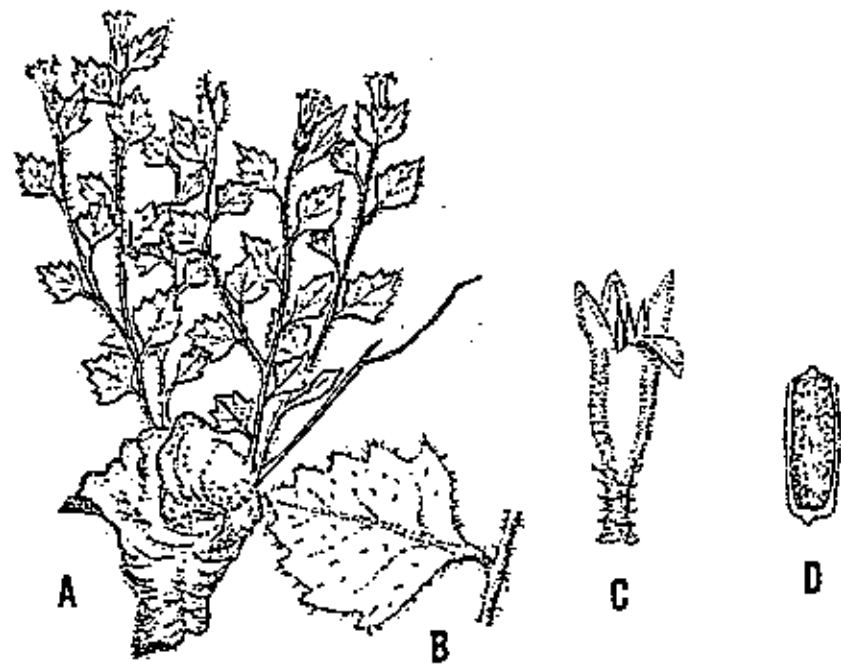


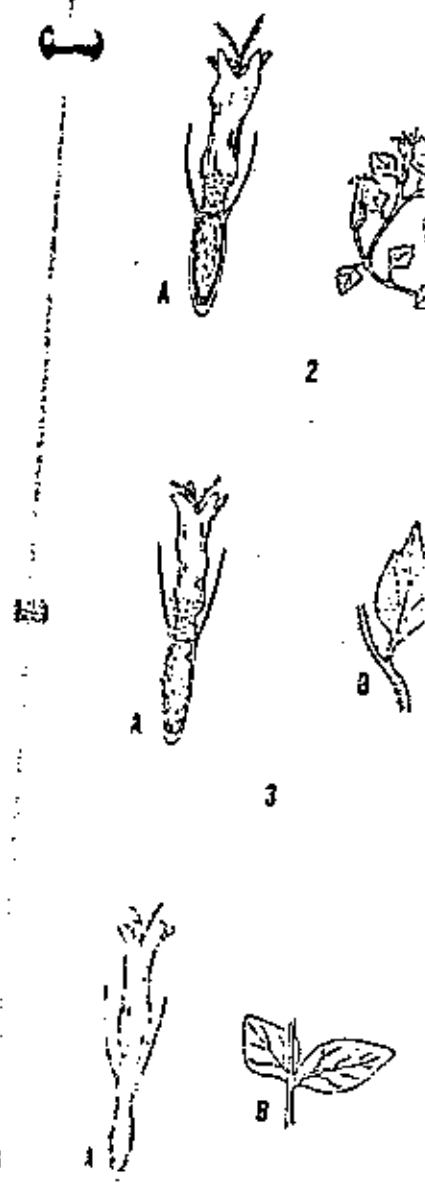
Fig. 1. *Perityle Warnockii* (Powell 1311). A. Habit sketch, $\times 1$. B. Leaf, $\times 2$. C. Corolla, $\times 10$. D. Achene, $\times 10$.

chromosomatum numerus, $n = c. 102$. Type: TEXAS: Brewster Co: in crevices of limestone bluffs, Black Gap Game Preserve, ca. 4 mi. s. of headquarters, Cave Hill, e. side, along Stairstep Mt., 25 Sept. 1963, A. M. Powell & T. Watson 1394 (Holotype, SRSC; isotype, TEX).

This variety is recognizable principally by the following characters: Plants in erect or pendulous clumps 6-12 cm. high; leaves scabrous-hispidulous, ovate to suborbicular, with margins shallow-lobed to serrate; petioles 2-4 mm. long; floral features mostly slightly larger than var. *bisetosa*.

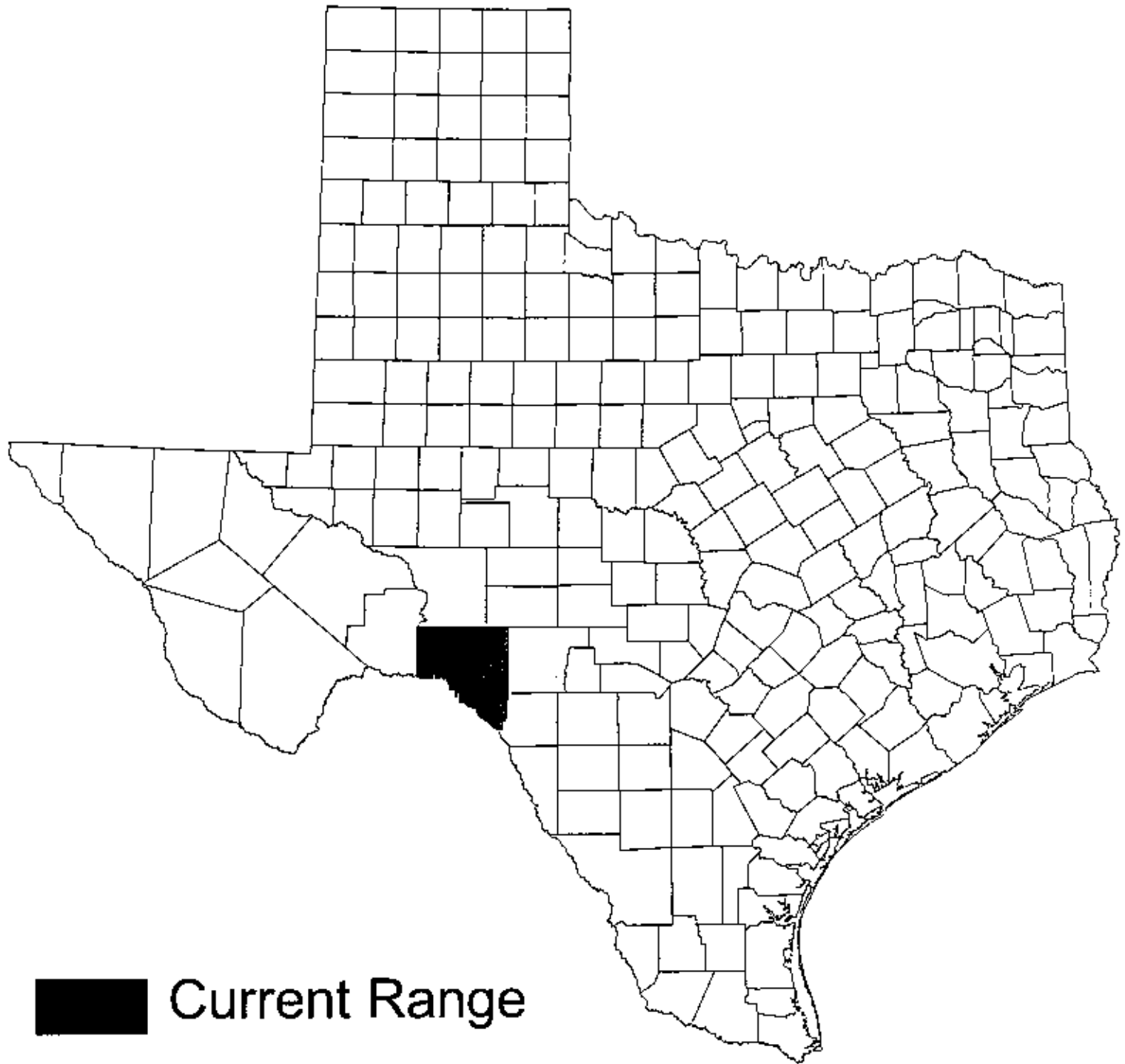
PERITYLE BISETOSA var. *appressa* A. M. Powell, var. nov. Plantae

(Opposite) Fig. 2. *Perityle bisetosa* var. *appressa* (Scudday, Sikes, et Powell 626). A. Floret, $\times 7.22$. B. Habit sketch, $\times 0.72$. C. Leaf, $\times 1.44$ —Fig. 3. *Perityle bisetosa* var. *scularia* (Powell and Watson 1394). A. Floret, $\times 7.22$. B. Leaf, $\times 1.44$. C. Habit Sketch, $\times 0.72$ —Fig. 4. *Perityle bisetosa* var. *bisetosa* (Warnock 18643). A. Floret, $\times 7.2$. B. Leaf, $\times 1.44$. C. Habit sketch, $\times 0.72$.



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 HERBARIUM

JUL 15 1977



■ Current Range

Perityle warnockii
(Warnock's rock-daisy)

Scientific Name: *Phacelia pallida* I. M. Johnst.

Synonymy: *Phacelia petiolata* I. M. Johnst.

Common Name: pale phacelia

Global Range: Texas and Mexico (Chihuahua and Coahuila).

State Range: Brewster County.

Current Federal Status: Species of special concern.

Global and State Ranks: G2S1

Description: (compiled from Atwood 1975 and Johnston 1943)

Habit: Perennial, 13-35 cm (5-14 in) tall, arising from a coarse woody root; stems several, branched, especially at the base, erect to decumbent, puberulent, hirsute to setose with flattened multicellular stipitate glands.

Leaves: numerous, fleshy, pale gray, simple, some of the lower ones with several small lobes on the petiole, blades oblong, lanceolate to broadly elliptic, 1-7 cm ($\frac{3}{8}$ -2 $\frac{3}{4}$ in) long {to 9 cm (3 $\frac{1}{2}$ in) long according to Johnston (1943)}, 1-3 cm ($\frac{3}{8}$ -1 $\frac{1}{4}$ in) wide {to 4 cm (1 $\frac{1}{2}$ in) wide according to Johnston (1943)}, long petiolate below to short petiolate above, strigose, glandular and setose, margins irregularly crenate to sinuate.

Flowers: Inflorescence terminal, racemose, puberulent to hispid (when old), stipitate-glandular, cymes densely flowered, to 15 cm (6 in) long in fruit, pedicels 0.5-1 mm long; sepals oblanceolate to spatulate, 4-5 mm (about $\frac{1}{4}$ in) long, 1.4-1.7 mm (less than $\frac{1}{2}$ in) wide, glandular, hirsute; corolla tubular to salverform, lavender to white, 4-6 mm ($\frac{1}{8}$ - $\frac{1}{2}$ in) long, ca. 4 mm (about $\frac{1}{4}$ in) wide; stamens and style exerted 5-7 mm ($\frac{1}{8}$ - $\frac{1}{2}$ in), style bifid $\frac{3}{4}$ of its length, the lower $\frac{1}{2}$ pubescent.

Fruits: Capsule subglobose, 3-3.5 mm (about $\frac{1}{4}$ in) long, 2.4-2.6 mm (less than $\frac{1}{4}$ in) wide, puberulent; seeds 4, oblong to elliptic, brown to blackish, pitted, 2.6-3 mm (about $\frac{1}{8}$ in) long, 1-1.5 mm (less than $\frac{1}{4}$ in) wide, the ventral surface excavated on both sides of the corrugated ridge, margins corrugated, dorsal surface transversely ridged.

Habitat: Chihuahuan Desert Scrub on gypsum or limestone soils at low elevations.

Phenology: The only known specimen from Texas was collected near Terlingua in June. Mexican collections have been made in May and August, presumably in flower.

Similar Species: *Phacelia pallida* can be distinguished from other west Texas phacelias by its perennial habit, crenate to sinuate leaves, tubular or salverform corollas, exerted stamens, and its four corrugated seeds. I. M. Johnston (1943) stated that *P. pallida* was "a relative of *P. integrifolia* Torr., characterized by its practically

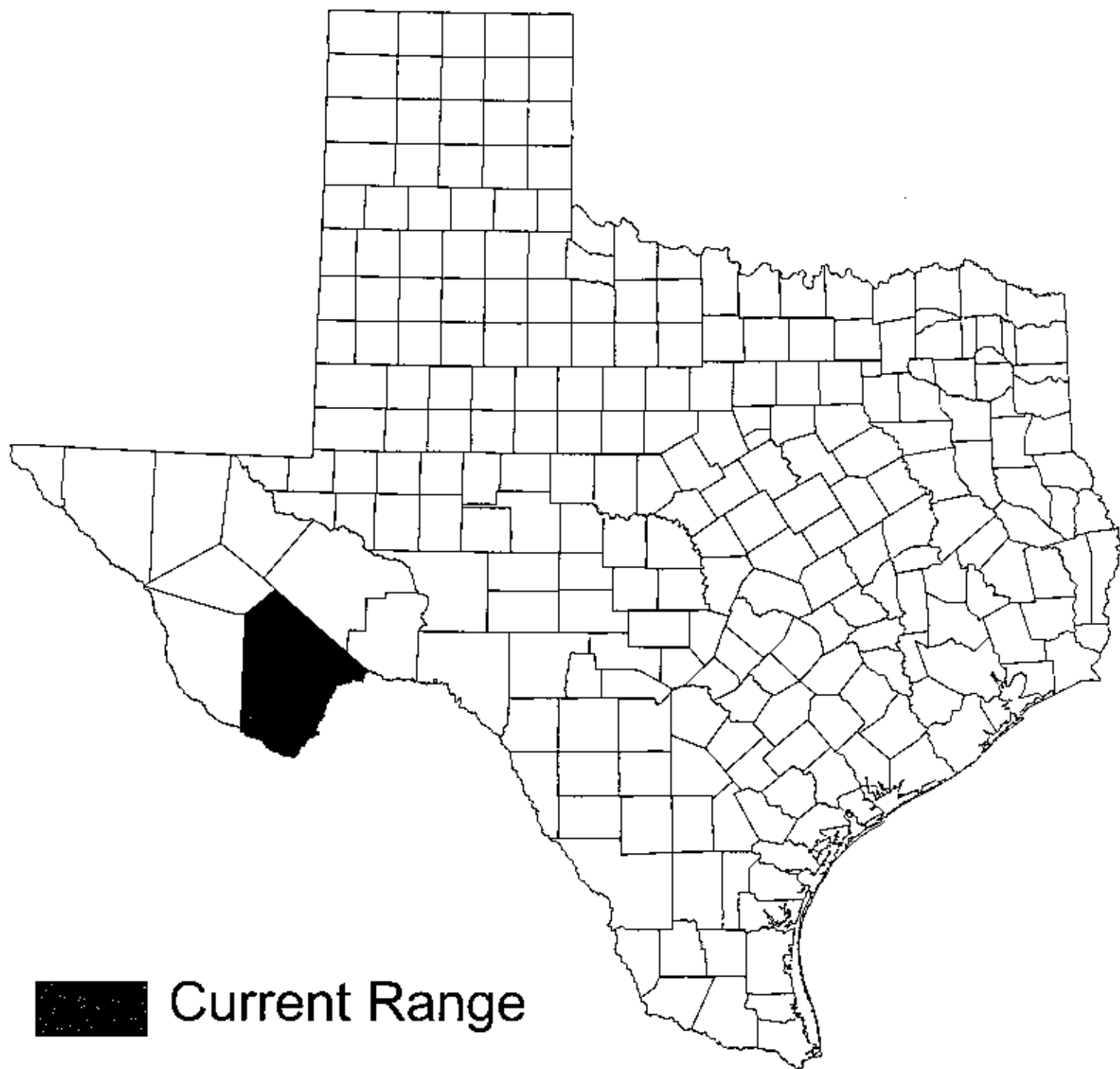
glandless herbage, branching habit, large gray pallid frequently lobed petiolate leaves, and few terminal cymes".

Comments: An entity known from a very few herbarium specimens; no extant populations known in Texas. *Phacelia pallida* does not appear in Correll and Johnston (1970). Although the species was described (Johnston 1943) before the flora was written, the first specimen was collected in Texas in 1972.

Additional Illustrations: None.

Selected References:

- Atwood, D. 1975. A revision of the *Phacelia* Crenulatae group (Hydrophyllaceae) for North America. *Great Basin Nat.* 35(2): 127-244.
- Clark, J. J. and A. M. Powell. 1984. Status report [on *Phacelia pallida*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque. 4 pp.
- Johnston, I. M. 1943. New phanerogams from Mexico, V. *J. Arn. Arb.* 24: 90-98.



■ Current Range

Phacelia pallida
(pale phacelia)

Scientific Name: *Philadelphus crinitus* (C. L. Hitchc.) Hu

Synonyms: *Philadelphus microphyllus* Gray subsp. *crinitus* C. L. Hitchc.

Common Name: bearded mockorange

Global/State Ranks: G2QS1

Federal Status: None

Global Range: Southern Arizona and west Texas.

State Range: Jeff Davis County.

Description (adapted from Hitchcock 1943; Hu 1956; Henrickson & Johnston in prep.): Shrub 1-2 m tall, the branchlets brownish-gray, the second year's growth castaneous, the current year's growth long-villose, the hairs more or less erect or sublanate. Leaves opposite, simple, 10-25 mm long, 5-10 mm wide, rounded or obtuse at the base, acute at the apex, entire, weakly villose above, moderately to densely villose or strigose-villose on the lower surface, the hairs appressed. Flowers solitary in the leaf axils, on long-villose pedicels ca. 2 mm long; hypanthium campanulate, long-villose and sublanate; sepals 4, ovate, 6-8 mm long and 3-4 mm wide at the base, the apex acuminate, long-villose, incanous and sublanate; petals 4, suborbicular, ca. 6 mm in diameter (per Henrickson & Johnston in prep.) or 11 mm long (per Hitchcock 1943), glabrous; stamens 48-74; disc and style glabrous, the style 1-1.5 mm long, the stigmas 3-4 mm long. Fruit a subglobose-ellipsoid capsule, 7-9 mm long and 6-7 mm wide, ringed circumferentially just below the apex by the persistent calyx, containing numerous small seeds.

Similar Species: Most *Philadelphus* specimens from the Trans-Pecos are difficult to identify with certainty. Reportedly characteristic features of *P. crinitus* include the soft, appressed hairs of the upper leaf surface, the gray-lanate pubescence of the calyx, and the numerous stamens.

Habitat: Igneous talus slopes at higher elevations in the Davis Mountains.

Phenology: Flowering July-August (Powell 1998).

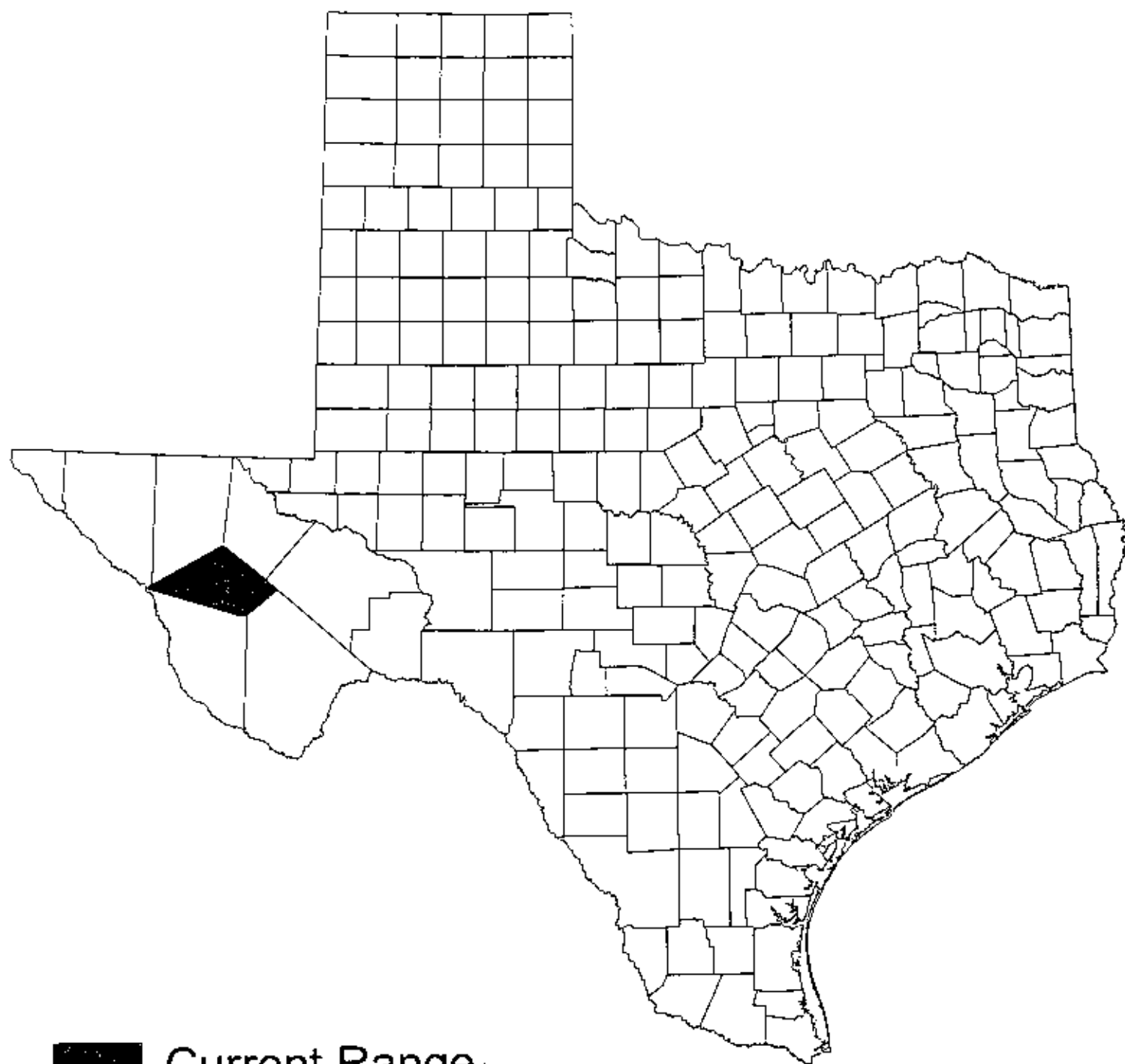
Comments: The type specimen was taken near the top of Mt. Livermore in the Davis Mountains in 1928. According to Hu (1956), the species is otherwise represented by specimens from the Catalina Mountains of southern Arizona. However, the taxon is not recognized as distinct from *P. microphyllus* by most Arizona botanists. The taxonomic status of the Davis Mountains plants merits additional study.

Illustrations: None.

Selected References:

- Hitchcock, A. S. 1943. The xerophyllus species of *Philadelphus* in southwestern North America.
- Hu, S. Y. 1954-1956. A monograph of the genus *Philadelphus*. *Journal of the Arnold Arboretum* 35: 175-233; 36: 52-109, 326-368; 37: 15-90.
- Powell, A. M. 1998. *Trees and shrubs of the Trans-Pecos and adjacent areas*. University of Texas Press,

Austin. 498 pp.



■ Current Range

Phliadelphus crinitus
(bearded mock-orange)

Scientific Name: *Philadelphus ernestii* Hu

Synonyms: None.

Common Name: canyon mock-orange

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the eastern portion of the Edwards Plateau in central Texas.

State Range: Blanco, Comal, Hays, Kendall and Travis counties.

Description (adapted from Correll & Johnston 1970; Hu 1956; Lynch 1981): Shrub with very numerous sparingly-branched stems from the base, which is normally concealed in rock, to ca. 1 m tall. Leaves opposite, simple, ovate, obtuse at apex, prominently 3-veined, 14-28 mm long and 8-13 mm wide, sparingly pilose on upper surface and villose on lower surface, the hairs more or less crisped at base. Flowers solitary but often closely spaced on short (<1.5 mm long) pedicels along the branchlets; calyx adnate to hypanthium below, with 4 free lobes, the lobes ovate, acuminate, ca. 4 mm long and ca. 2 mm wide; petals 4 (sometimes 5 per illustration in Lynch 1981), suborbicular or more commonly lance-ovate, pointed or sometimes notched at apex, 6-7 mm wide and slightly longer; stamens ca. 20; styles 1.5 mm long. Fruit a subglobose capsule 4-5 mm in diameter, circumferentially ringed with the withered remains of the calyx lobes.

Similar Species: *Philadelphus texensis* occurs in similar situations along the southern edge of the Edwards Plateau; the ranges of *P. ernestii* and *P. texensis* may overlap in Kendall and Comal counties. According to Hu (1956), "the two species can be distinguished easily, for [*P. ernestii*] has villose hypanthia and capsules, and the lower leaf surfaces have only one kind of hairs, which are villose with the bases more or less curled. In *P. texensis*, the hypanthia and fruit are glabrous, and the lower leaf surfaces have strigose appressed hairs mixed with a tight kinky covering of fine lanate tomentum."

Habitat: Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland. Frequently associated woody species include *Quercus buckleyi*, *Q. sinuata* var. *breviloba*, *Juniperus ashei*, *Prunus serotina* subsp. *eximia*, *Ulmus crassifolia*, *Ungnadia speciosa*, *Rhus virens*, *Rhamnus caroliniana*, *Cercis canadensis* var. *texensis*, *Eupatorium havanense*, *Garrya ovata* subsp. *lindheimeri* and *Buddleja racemosa*. Characteristic herbaceous species include *Aquilegia canadensis*, *Anemone edwardsiana*, *Carex edwardsiana*, *Desmodium psilophyllum*, *Brickellia cylindracea*, *Galium texense*, *Linum rupestre*, *Salvia roemeriana* and various ferns (*Adiantum capillus-veneris*, *Asplenium resiliens*, *Cheilanthes alabamensis*, *C. horridula* and *Pellaea atropurpurea*).

Phenology: Flowering April-May; fruit maturing in September (Hu 1956). Readily recognized throughout the growing season.

Comments:

Illustrations: A color photograph appears in Enquist (1987). A line drawing appears in Lynch (1981).

Selected References:

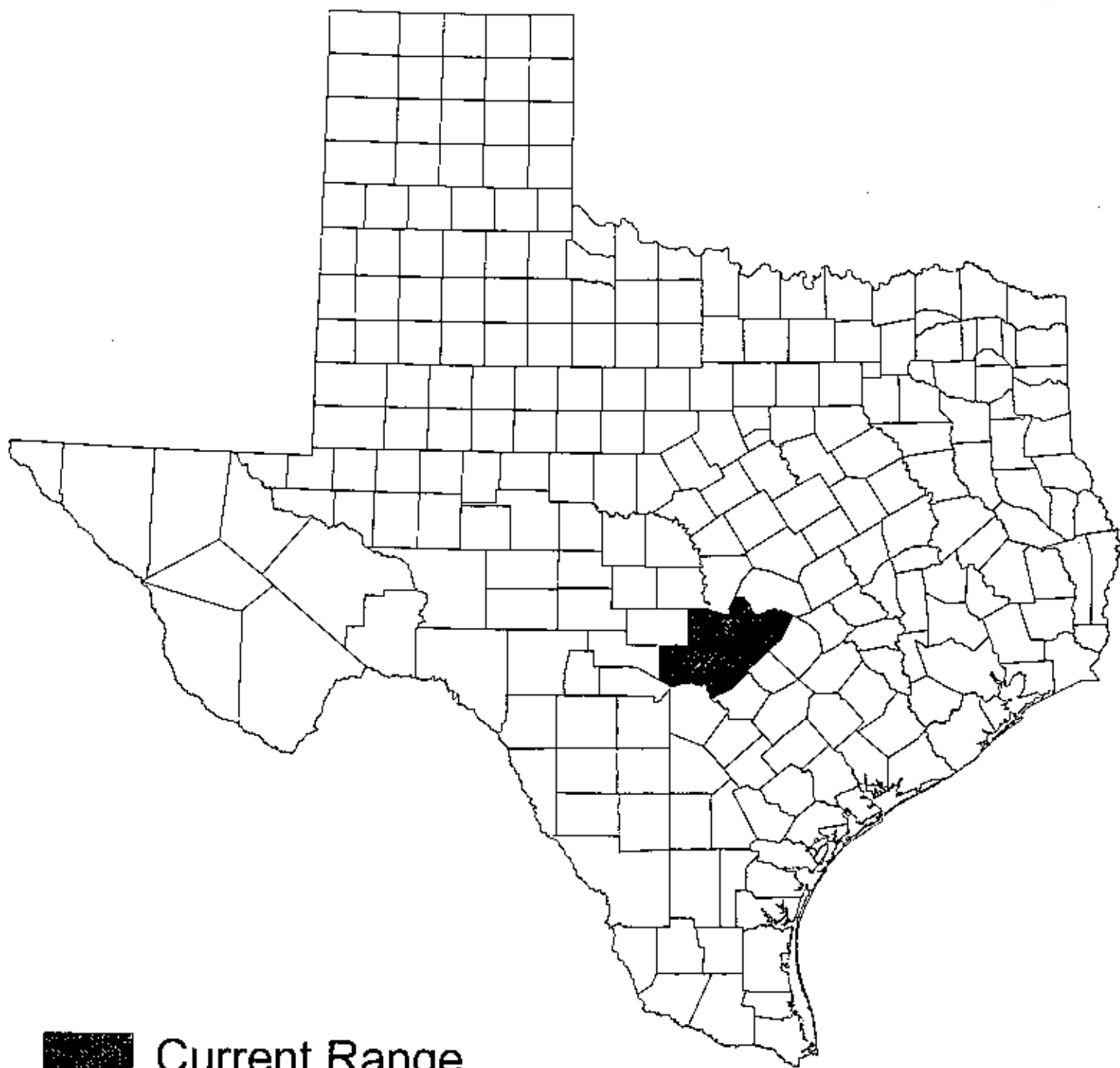
- Enquist, M. 1987. *Wildflowers of the Texas Hill Country*. Lone Star Botanical, Austin. 275 pp.
- Hu, S. Y. 1954-1956. A monograph of the genus *Philadelphus*. *Journal of the Arnold Arboretum* 35: 175-233; 36: 52-109, 326-368; 37: 15-90. [Type description of *P. ernestii* appears in volume 37, p. 50.]
- Lynch, D. L. 1981. *Native and naturalized woody plants of Austin and the Hill Country*. Acorn Press, Austin. 165 pp.
- Mahler, W. F. 1981. Status report [on *Philadelphus ernestii*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.



44 Saxifrage Family

**Mock-orange***Philadelphus Ernestii* Hu

Small shrub with loose bark on the main stems. Among boulders along streams. Rare and needing protection. Leaves narrowly ovate, up to $1\frac{3}{8}$ inches long by $\frac{1}{2}$ inch wide, with smooth margins and 3 prominent veins on the upper surface, the lower surface covered with appressed hairs visible under a 10x hand lens. Flowers white, showy, numerous along the branchlets, opening in April and May. Fruit a capsule shaped like a top, $\frac{3}{16}$ inch long by $\frac{3}{16}$ inch wide with 4 remnants of the flower projecting from the midpoint between the tip and the base.



 Current Range

Philadelphus ernestii
(canyon mock-orange)

Scientific Name: *Philadelphus texensis* Hu

Synonyms: *Philadelphus serpyllifolius* Gray var. *texensis* (Hu) B. L. Turner

Common Name: Texas mock-orange

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Essentially endemic to the southern portion of the Edwards Plateau of central Texas, with disjunct populations in limestone mountains of central Coahuila (Henrickson & Johnston in prep.).

State Range: Bandera, Comal, Edwards, Kendall, Medina, Real and Uvalde counties.

Description (adapted from Correll & Johnston 1970; Hu 1956): Shrub with numerous sparingly rebranched, erect to somewhat arching stems. Leaves opposite, simple, ovate or rarely elliptic, acute at apex, prominently 3-veined, 6-30 mm long and 3-20 mm wide, appressed-pilose on upper surface, white-villose and appressed-lanate on lower surface. Flowers solitary but often closely spaced on very short (< 1 mm long) pedicels along the branchlets; calyx adnate to hypanthium below, with 4 free lobes, the lobes acuminate; petals 4, oblong, 7-8 mm long and ca. 3 mm wide; stamens ca. 16; styles ca. 1 mm long. Fruit a subglobose capsule ca. 4 mm in diameter, circumferentially ringed with the withered remains of the calyx lobes.

Similar Species: *Philadelphus ernestii* occurs in similar situations in the eastern portion of the Edwards Plateau; the ranges of *P. texensis* and *P. ernestii* may overlap in Kendall and Comal counties. According to Hu (1956), "the two species can be distinguished easily, for [*P. ernestii*] has villose hypanthia and capsules, and the lower leaf surfaces have only one kind of hairs, which are villose with the bases more or less curled. In *P. texensis*, the hypanthia and fruit are glabrous, and the lower leaf surfaces have strigose appressed hairs mixed with a tight kinky covering of fine lanate tomentum." Perhaps more similar and more closely related to *P. serpyllifolius* of the mountains of the desert Southwest, including Trans-Pecos Texas. In *P. serpyllifolius*, the upper surface of the leaves is sparsely strigose with long appressed hairs but at the same time densely hirsute with shorter erect hairs, while in *P. texensis* the leaf pubescence is variable but does not include erect hairs.

Habitat: Limestone outcrops on cliffs and rocky slopes, on boulders in mesic canyon bottoms, usually in shade of mostly mixed evergreen-deciduous slope woodland forest. Frequently associated species are similar to those of *P. ernestii* (see above).

Phenology: Flowering April-May but readily recognized throughout the growing season.

Comments: Hu (1956) described *Philadelphus texensis* and segregated plants with pilose hypanthia and calices as var. *coryanus* Hu.

Illustrations: None known.

Selected References:

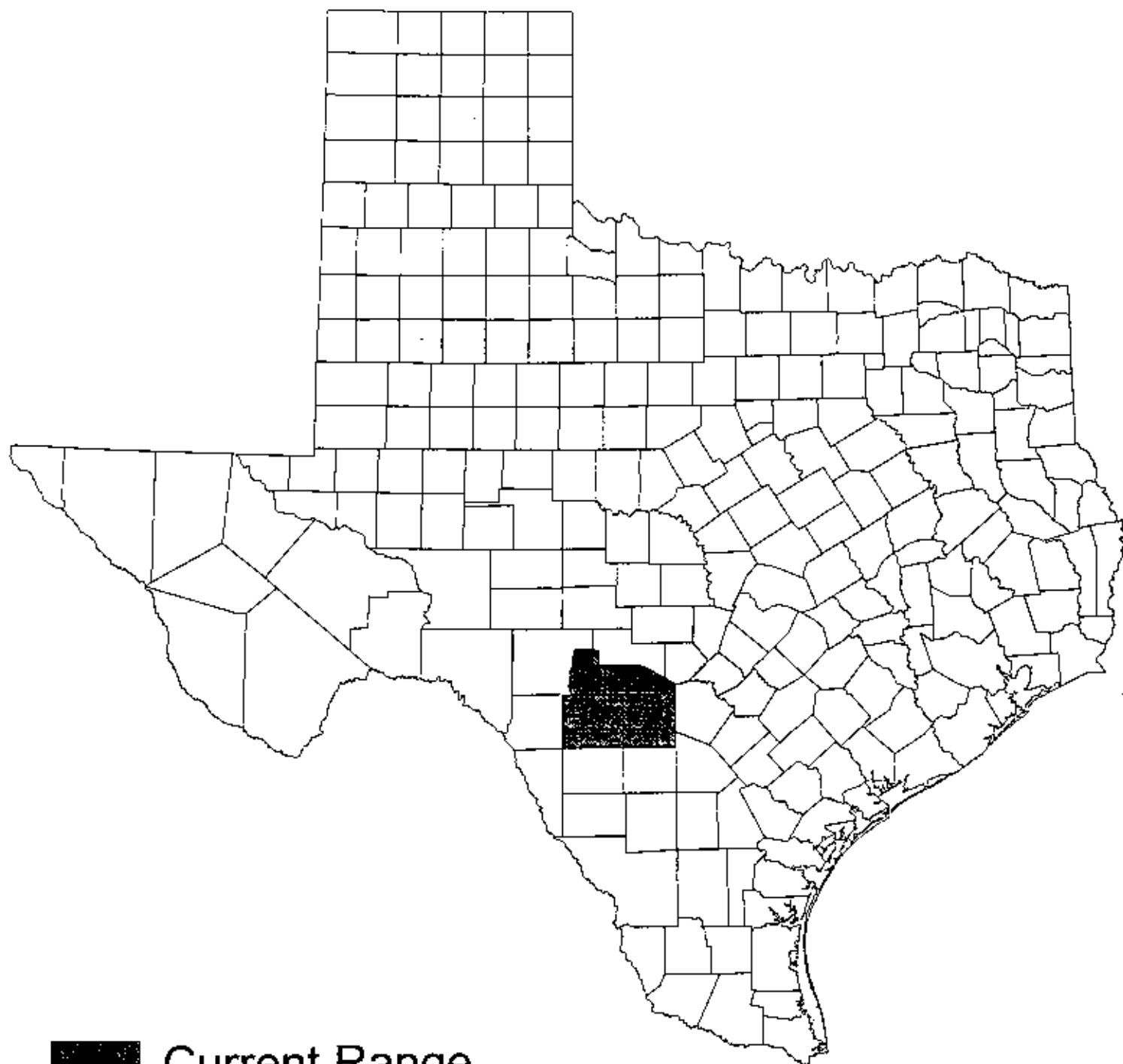
Hu, S. Y. 1954-1956. A monograph of the genus *Philadelphus*. *Journal of the Arnold Arboretum* 35: 175-233; 36: 52-109, 326-368; 37: 15-90. [Type description of *P. texensis* appears in volume 37, p. 54.]

Mahler, W. F. 1982. Status report [on *Philadelphus texensis*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.





Philadelphus texensis



- Current Range
□ Historical Range

Philadelphus texensis
(Texas mock-orange)

Scientific Name: *Phlox nivalis* Lodd. subsp. *texensis* Lundell

Synonyms: *Phlox texensis* (Lundell) Lundell

Common Name: Texas trailing phlox

Global/State Ranks: G4T2S2

Federal Status: Endangered

Global Range: Endemic to the Pineywoods of east Texas.

State Range: Hardin, Polk and Tyler counties.

Description (adapted from Lundell 1942; U.S. Fish & Wildlife Service 1995): Perennial, the stem woody at base, trailing or decumbent, often matted; flowering shoots lax, erect, up to 20 cm long, pubescent, the hairs inconspicuously glandular. Leaves opposite, simple, persistent, very dense on the lateral shoots, linear subulate and canaliculate or linear-lanceolate and essentially flat, 2.5-30 mm long and to 3 mm wide but usually narrower, the apex spine-tipped, the margins with stiff hairs. Flowers in small terminal cymes; pedicels slender, glandular-pubescent, 3-25 mm long; calyx glandular-pubescent, 6.5-9 mm long, fused below, the 5 narrow, spine-tipped lobes about equalling the tube in length; corolla rotate, pink, rose-pink, bluish, lavender or purplish, rarely white, the eye reddish or purplish, fused below into a tube up to 15 mm long, the 5 lobes up to 12 mm long, obovate or cuneately obovate, usually notched at the apex with a sinus to 2.5 mm deep; stamens usually 5, rarely 4, usually included within corolla tube; ovary 3-celled, the 3 styles 1.5-2.5 mm long. Fruit a glabrous, 3-celled capsule, each capsule bearing a single seed.

Habitat: Relatively open, fire-maintained pine or pine-hardwood forests on soils with a deep, sandy surface layer and clayey subsurface layers. Common canopy components include *Pinus palustris*, *P. taeda*, *Quercus stellata*, *Q. incana*, *Q. falcata* and *Carya texana*. Herbaceous associates include *Viola pedata*, *Panicum anceps*, *Berlandiera pumila*, *Stillingia sylvatica*, *Aristida longespica*, *Tradescantia hirsutiflora*, *Helianthemum carolinianum*, *Liatris elegans*, *Eryngium yuccifolium*, *Tephrosia onobrychoides* and *Silphium gracile* (U. S. Fish & Wildlife Service 1995).

Phenology: Flowering late March through early April, sometimes into May.

Similar Species: The creeping, subshrub habit and subulate leaves distinguish this plant from all other *Phlox* species in Texas. Two other subspecies occur in the southeastern US, at least as far west as Mississippi. The subspecific status of plants of central Louisiana is uncertain (Bogler 1992).

Comments: Listed as Endangered on 30 September 1991.

Illustrations: Color photographs appear in Ajilvsgi (1979) and Poole & Riskind (1987). Line drawings appear in Poole & Riskind (1987).

Selected References:

Ajilvsgi, G. 1979. Wild flowers of the Big Thicket, East Texas, and Western Louisiana. Texas A & M University Press, College Station. 360 pp.

Bogler, D. J. 1992. Element stewardship abstract for Texas trailing phlox. The Nature Conservancy,

Arlington, Virginia.

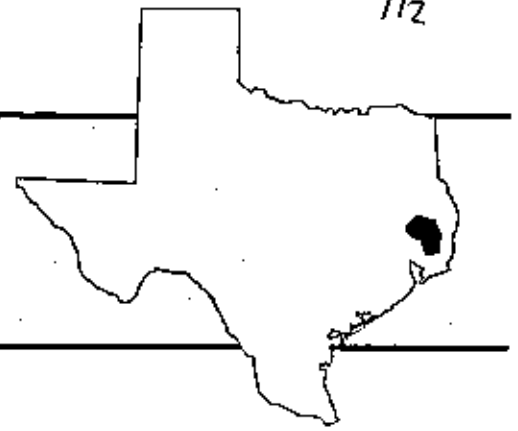
- Lundell, C. L. 1942. Studies of American spermatophytes-- III. Contributions from the University of Michigan Herbarium 8: 77-79.
- Mahler, W. F. 1980. Status report [on *Phlox nivalis* ssp. *texensis*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Schwelling, S. R. 1999. Habitat prediction for Texas trailing phlox (*Phlox nivalis* ssp. *texensis*), using Landsat Thematic Mapper and ancillary data in a geographic information system. M.S. Thesis, Southwest Texas State University, San Marcos. 67 pp. + maps.
- U.S. Fish and Wildlife Service. 1995. Texas trailing phlox recovery plan. U. S. Fish and Wildlife Service, Albuquerque, New Mexico. 42 pp.
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Federally and State Endangered

Texas Trailing Phlox

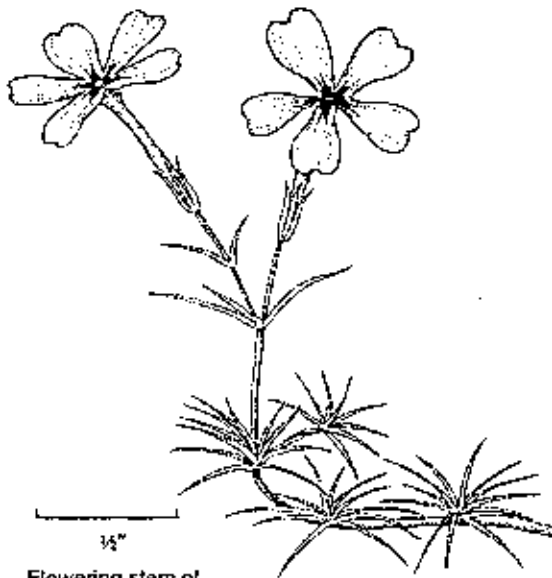
Phlox nivalis ssp. texensis



Texas trailing phlox (*Phlox nivalis ssp. texensis*) was listed as endangered by the U.S. Fish and Wildlife Service in September, 1991. Texas trailing phlox was first collected in 1931 in Hardin County. Its historic range includes Hardin, Polk, and Tyler Counties. Today, Texas trailing phlox occurs in fewer than 20 populations in Hardin, Polk, and Tyler Counties. The largest group of populations occur on the Roy E. Larsen Sandyland Sanctuary in Hardin County, a property owned and managed by The Nature Conservancy of Texas.

Texas trailing phlox is an evergreen perennial herb or subshrub. Plants often form clumps but not mats. The stems tend to spread along the ground, with only the terminal one to six inches of the stem erect. Leaves are about 5/8 inch long, needle-like, and densely packed on the stem (somewhat like a juniper seedling in appearance). Young stems produce the flowers, are more or less erect, and have leaves that are longer and lighter-green in color. Older stems have smaller leaves, darker-green in color, and typically lie directly on the surface of the ground. The flowers are pink to magenta in color, and darker near the throat. Flowers have five petals, each about 3/8 inch in length. Flowering occurs during March through May.

Texas trailing phlox plants are evergreen, growing whenever temperature and moisture conditions are favorable. New growth is most often seen during periods of highest rainfall, in early spring and early fall. Little is known about the pollination of this species; however, based on the plant's floral structures, butterflies are the most likely pollinators. Individual plants may produce 3 to 50 or more flowers, depending on the size of the plant. A plant may produce flowers over a period of one to 5 weeks.

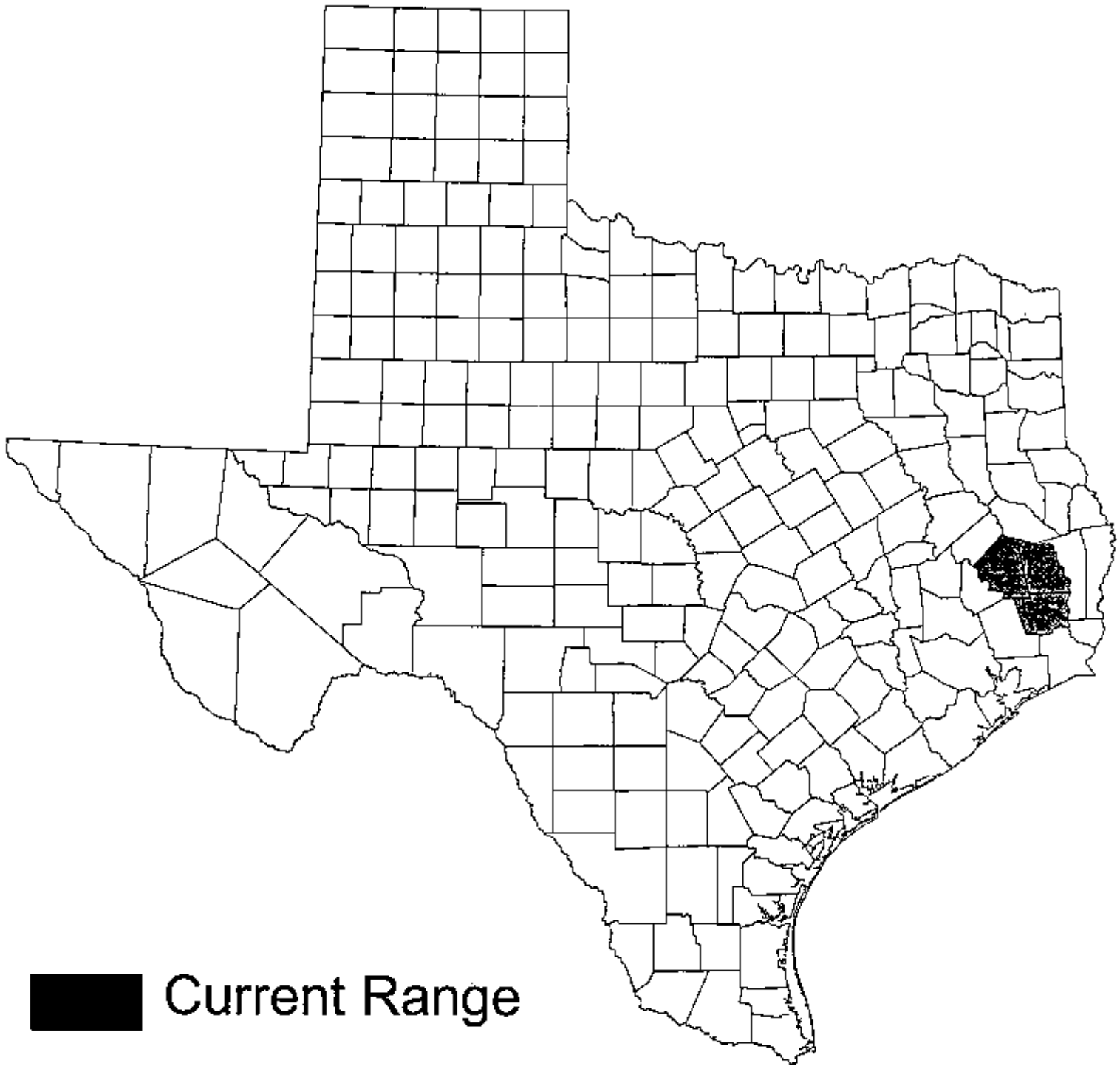


Flowering stem of Texas trailing phlox

Texas trailing phlox is well-adapted to fire. Although aboveground parts of the plant are destroyed by fire, underground parts are undamaged, and new growth appears within two weeks after a spring burn. If prescribed burning occurs in April, even plants that had flowered before the fire will resprout and flower again in May.

Habitat

Texas trailing phlox grows on sandy soils in open pine woodlands. Recent field studies suggest that soils associated with this species have sandy topsoil and moisture-bearing clays or sandy-clays at a depth of 1.5 to 6 feet. These sites are often located in transitional areas between the drier sands of longleaf pine woodland and the clay or sandy-clay soils supporting a mixed forest of hardwoods and pines, usually loblolly.



■ Current Range

Phlox nivalis ssp. *texensis*
(Texas trailing phlox)

Scientific Name: *Phyllanthus ericoides* Torr.

Synonyms: None.

Common Name: heather leaf-flower

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: West Texas and Chihuahua. A report from Coahuila (Miller & Powell 1984) appears to have been based on speculation rather than a specimen record, although the species should be expected to occur in the northern part of that state.

State Range: Southeastern Brewster and western Terrell counties.

Description (adapted from Johnston & Warnock 1963; Correll & Johnston 1970): Strongly perennial glabrous herb or subshrub, many-branched from a woody base as much as 1.5 cm thick, 5-10 (-15) cm tall; internodes extremely short, ca. 1 mm long or less, stems usually reddish-brown toward tips. Leaves alternate, simple, densely crowded and overlapping, to 1.3-3.5 (-5) mm long and 0.7-1.5 mm wide, narrowly oblanceolate or linear-lanceolate, sharp-pointed at apex, entire, leathery, rigid, glaucous, pellucid-punctate especially beneath, usually erect, appressed to stems, dull grayish-green; petioles very short and colored like the stipules; stipules persistent, paired, ca. 1 mm long, elongate-deltoid, acuminate to subulate, usually reddish-brown with white margins. Flowers unisexual, on the same (or perhaps separate) plants, solitary in the upper leaf axils; calyx of both sexes deeply (5-) 6-parted, the free sepal lobes 0.9-1.4 mm long; petals absent; staminate flowers nearly sessile in the upper axils, the sepals narrowly oblong-lanceolate, pale brownish, erect; stamens 3, ca. 1/2 as long as the sepals, the filaments united into a column, the anthers distinct; pistillate flowers very short-pedicellate, the sepals ovate to elliptic, spreading; ovary depressed-globose, ca. 1.5 mm wide; styles 3, very short, bifid. Fruit an oblate, 3-loculed capsule ca. 2 mm in diameter, wide, containing 6 dark brown, verruculose seeds 0.9-1 mm long.

Habitat: Crevices in limestone on dry canyon walls and other rock outcrops. Associated species include *Cirsium turneri*, *Penstemon baccharifolius*, *Polygala maravillasensis*, *Paronychia jamesii*, *Stenaria butterwickiae*, and *Perityle* spp.

Phenology: Flowering in October; presumably also in other months given sufficient moisture (Johnston & Warnock 1963).

Similar Species: None. *P. ericoides* is the only *Phyllanthus* species in Texas with blatantly woody stems.

Comments:

Illustrations: Line drawing of a complete plant and a fruiting pistillate calyx appear in Powell (1998). Line drawings of staminate and pistillate flowers and a photograph of a seed appear in Webster (1970).

Selected References:

Johnston, M. C. and B. H. Warnock. 1963. *Phyllanthus* and *Reverchonnia* (Euphorbiaceae) in far western Texas. *Southwestern Naturalist* 8(1): 15-22.

- Miller, D. J. and A. M. Powell. 1984. Status report [on *Phyllanthus ericoides*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Webster, G. L. 1970. A revision of *Phyllanthus* (Euphorbiaceae) in the continental United States. *Brittonia* 22: 44-76.

Val Verde counties. 990–4600 ft.; summer–fall. E to Crane Co.; N into NM; also Coah. and Chih., Mex.

A central and south Texas species, *Bernardia myricifolia* (Scheele) S. Wats. (Fig. 195), extends west to Val Verde Co. and into the Lower Canyons of the Rio Grande. *Bernardia obovata* is distinguished by its obovate leaves which are not so densely pubescent and are grayish-green (instead of dark green) when dry, usually less than 10 stamens, and usually 2-celled capsule with 1–2 seeds.

5. PHYLLANTHUS L. LEAFFLOWER

Herbs or shrubs (in our area) or trees; monoecious or dioecious. Leaves entire. Flowers usually in axils, single or in small clusters; sepals united; petals absent; staminate flowers with 3–6 stamens; pistillate flowers with 5–6 fused sepals; disk present; ovary 3-celled. Fruit a capsule, elastically dehiscent; seeds 2 per cell.

A large and variable genus of about 700 species, centered in tropical regions of the Old World. Seven species occur in Texas.

KEY TO THE SPECIES

1. Miniature subshrubs about 10 cm high, in rock crevices; leaves mostly less than 5 mm long; filaments of stamens fused into a column 1. *P. ericoides*
 1. Herbaceous perennial or somewhat woody at the base, in various habitats; leaves 5–10 mm long; filaments fused about halfway into a column

2. *P. polygonoides*

1. *Phyllanthus ericoides* Torr. HEATHER LEAFFLOWER. Fig. 196. A rare subshrub usually in crevices of limestone walls. Brewster Co., SE part of the county, Bullis Range. Terrell Co., mouth of San Francisco Canyon, and in 2–3 other side canyons of the Rio Grande, Lower Canyons (Reagan Canyon to Sanderson); about 2100 ft. Also one locality in Chih., and certainly in Coah., Mex.

2. *Phyllanthus polygonoides* Nutt. ex Spreng. KNOTWEED LEAFFLOWER. Fig. 197. Widespread and often common, various habitats, limestone and igneous, desert mountains and canyons up to moderate elevations, El Paso to Val Verde counties throughout the Trans-Pecos. 2100–6000 ft.; spring–fall. S to Rio Grande Plains, E to the Edwards Plateau, to OK, with outlying populations in MO and LA; N and cen. Mex.

6. CROTON L. CROTON

Shrubs or herbs (in our area) or trees. Characterized by scurfy appearance resulting from microscopic stellate (sea-urchinlike) hairs or stalked scales.

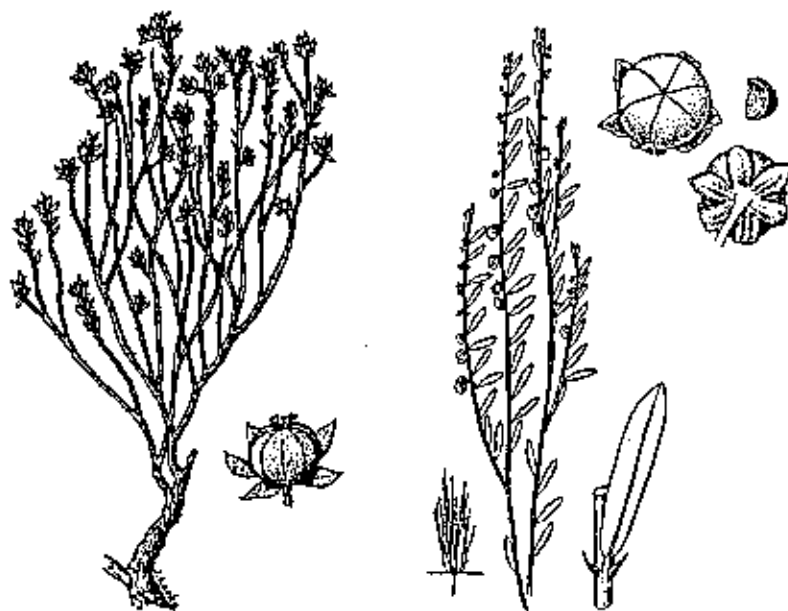


Fig. 196. *Phyllanthus ericoides*
(Heather Leaf Flower)

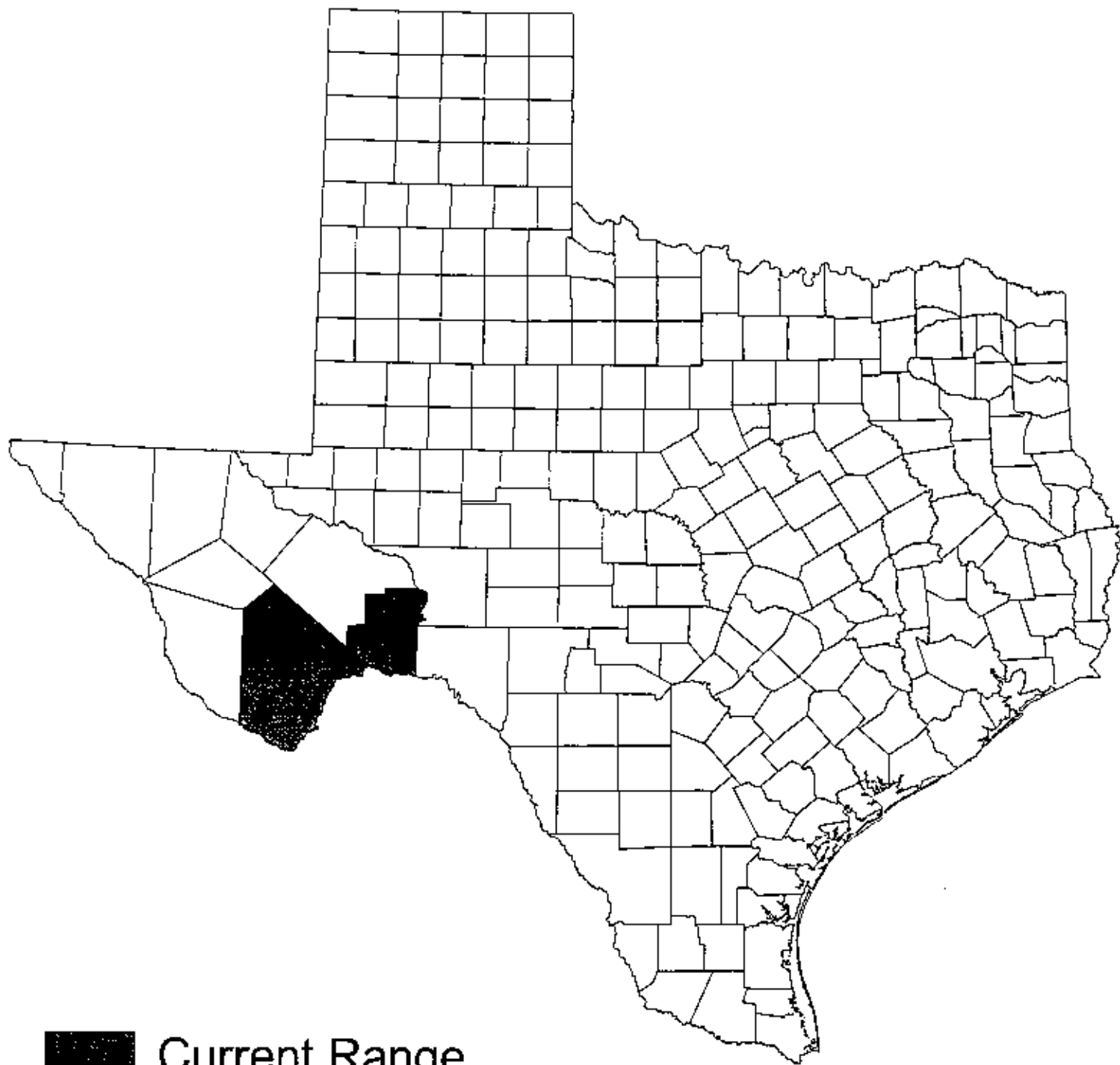
Fig. 197. *Phyllanthus polygonoides*
(Knotweed Leaf Flower)

Leaves alternate, with petioles, blades various in shape, margins toothed or entire. Flowers in terminal spikes or racemes, often with male and female flowers in same inflorescence; staminate flowers with 4–6 lobed calyx; petals absent or present; stamens 5–20; pistillate flowers with 5–9 lobed calyx; petals absent or present; ovary usually 3-celled; styles 3, each branched one or more times. Fruit a 3-celled capsule; seeds 3, 1 in each cell, resembling an engorged tick.

A variable genus of more than 600 species, mostly in tropical and subtropical regions. Twenty species occur in Texas with about one-half of these found in the Trans-Pecos. Many species are reportedly toxic to livestock, and at least one species, *Croton ciliatoglandulifer* Ort. is noted for causing rashes of the skin and eyes when its glandular hairs are brought into contact. Most crotons are aromatic and many species exude sap from broken leaves or stems. Medicinal properties, most of them probably unfounded, have been attributed to many species, but *C. tiglium* L. is the source of croton oil, the well-known pharmaceutical. Seeds of the common crotons furnish abundant food for mourning doves and other birds.

KEY TO THE SPECIES

1. Styles (in at least some female flowers) branching to form at least 10 stigmas
 1. *C. dioicus*.



■ Current Range

Phyllanthus ericoides
(heather leaf-flower)

Scientific Name: *Physostegia correllii* (Lundell) Shinnery

Synonyms: *Dracocephalum correllii* Lundell

Common Name: Correll's false dragonhead

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Ranging from northern Mexico (Coahuila, Nuevo León and Sonora) through Texas to Louisiana.

State Range: Bexar, Galveston, Montgomery, Travis, Val Verde and Zapata counties. No extant populations have been located.

Description (adapted from Correll & Correll 1975; Lundell 1947): Robust perennial from a thick creeping rhizome, with simple or sparingly-branched glabrous stems up to 2.2 m tall and up to 25 mm thick. Leaves decussately opposite, sessile, simple, rather leathery and firm, elliptic to oblong-elliptic, 5-13 cm long and 2-6.5 cm wide, short-acuminate at apex, slightly narrowed at base and inconspicuously clasping, the margins conspicuously and sharply serrate-dentate to base, primary vines 2-3 on each side, the upper leaves only slightly reduced. Flowers on very short pedicels in short, simple or compound spikelike racemes; bracts of racemes leafy, ovate, those at base of raceme about equal to or longer than the calyx, upper ones reduced, acuminate; calyx finely pubescent with abundant gland-tipped hairs, subcylindric, 8-9.5 mm long, the 5 acuminate lobes slender and about as long as the tube, inflated at maturity; corolla lavender-pink, spotted or streaked with purple, ca. 3 cm long, sparsely pubescent, 2-lipped, the upper lip erect, nearly entire, the lower lip 3-lobed, spreading; stamens 4, ascending beneath upper lip. Fruit a set of (4?) smooth, ovoid, sharply angled nutlets ca. 2.3 mm long.

Similar Species: Among Texas *Physostegia* species, only *P. correllii* and *P. pulchella* have leaves 2-6 cm wide and corollas 3 cm long. *P. correllii* has large elongate rhizomes and calyx lobes as long as the tube; *P. pulchella* has short thick rhizomes and calyx lobes about half as long as the tube (Correll & Johnston 1970).

Habitat: Wet silty clay loams on streamsides, in creekbeds, irrigation channels and roadside drainage ditches (Irving 1980; Correll & Correll 1975).

Phenology: Flowering June-July.

Comments:

Illustrations: Two line drawings appear in Lundell (1969), one of which is reproduced in Correll & Correll (1975).

Selected References:

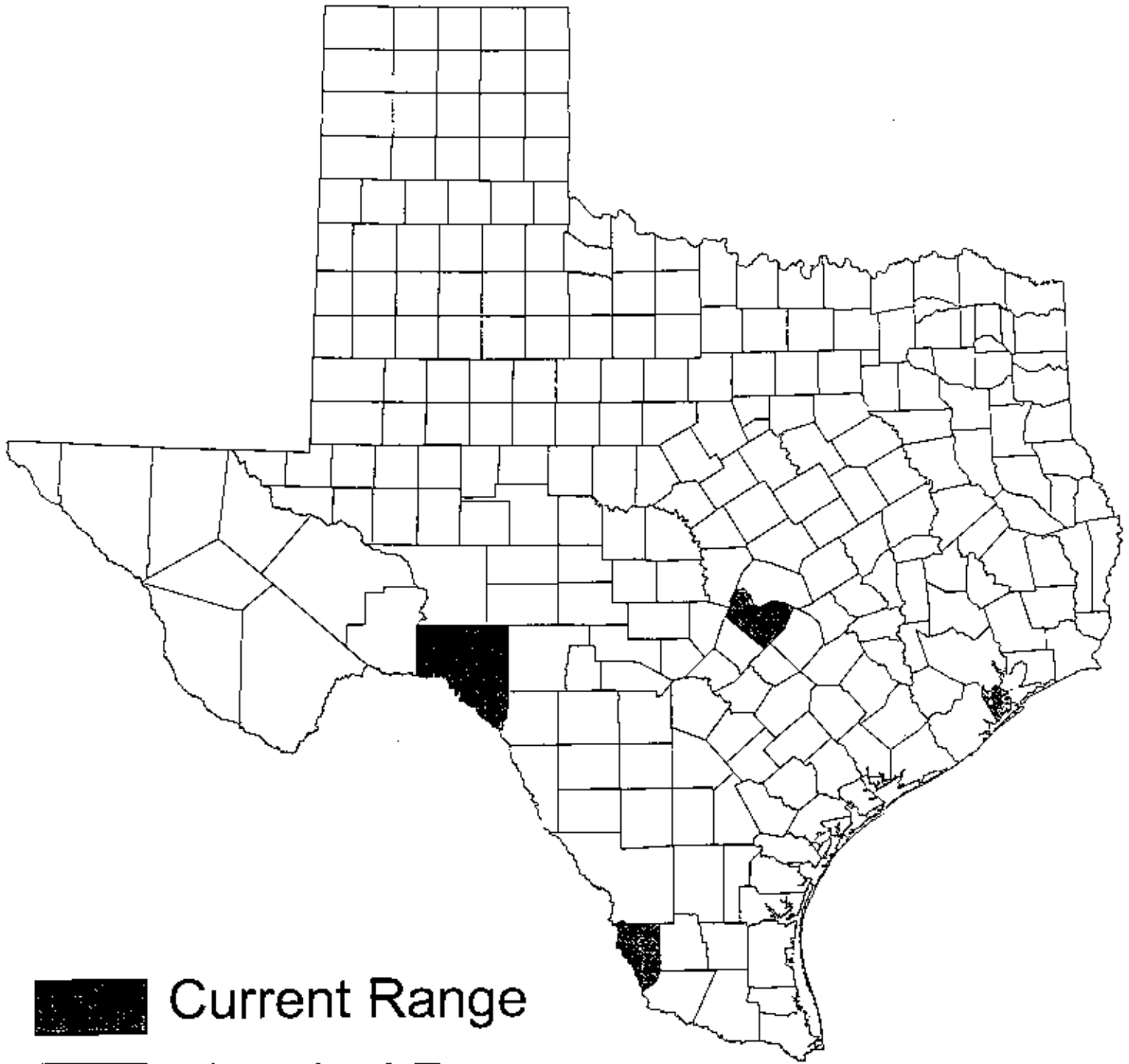
Cantino, P. D. 1982. A monograph of the genus *Physostegia* (Labiatae). Contributions from the Gray Herbarium 211: 1-105.

Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. Stanford

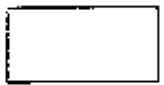
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- Irving, R. S. 1980. Status report [on *Physostegia correllii*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.
- Lundell, C. L. 1947. A new species of *Dracocephalum* L. from Texas. *Wrightia* 1(3): 165.
- Lundell, C. L. 1959. Studies of *Physostegia*-- I. New species and observations on others. *Wrightia* 2(1): 4-12.
- Lundell, C. L. 1969. Labiatae: *Brazoria* and *Physostegia*. Pp. 319-330 in Lundell, C. L. 1969. Flora of Texas, volume 2. Texas Research Foundation, Renner. 417 pp.







Current Range



Historical Range

Physostegia correllii
(Correll's false dragon-head)

Scientific Name: *Physostegia longisepala* Cantino

Synonyms: None.

Common Name: longsepal falsedragonhead

Global/State Ranks: G2G3S2

Federal Status: SOC

Global Range: Western Gulf Coastal Plain of Louisiana and Texas.

State Range: Hardin, Jasper, Newton, Orange and Tyler counties.

Description (adapted from Cantino 1982): Erect, rhizomatous perennial to 1 m tall, the stem squarish, with 9-15 nodes below the inflorescence. Leaves opposite, simple, variable from bottom to top of stem; leaves of lowest 4-8 pairs on the stem with a petiole to 3.5 cm long, the blade 5-8 cm long and 1-1.5 cm wide, elliptical, oblong or oblanceolate, the base cuneate to attenuate, the apex obtuse to acute, the margin repand or with a few widely-spaced blunt teeth; leaves of central stem sessile, mostly clasping the stem, 5-12 cm long and 0.5-1.7 cm wide, elliptical to oblanceolate or lanceolate, the base attenuate to cuneate, becoming rounded to auriculate upward on stem, the apex acute to attenuate, the margin repand, bluntly toothed, or serrate; leaves of upper stem moderately to greatly reduced in size compared to central stem, lanceolate to elliptical, often widest near the clasping base. Flowers in terminal, bracted, spikelike racemes, the raceme axis densely pubescent with short hairs up to 0.25 mm long; bracts lanceolate, attenuate, (3-) 4-6 (-7) mm long and 1-2 mm wide; flowers 22-32 mm long; calyx not conspicuously glandular-punctate, never bearing stalked glands, the tube at anthesis 4-8 mm long, the 5 lobes attenuate to cuspidate, 2-3.5 mm long, at maturity the entire calyx 7.5-10 mm long; corolla 2-lipped, deep lavender to reddish violet, spotted or streaked with purple, puberulent or tomentulose to subglabrous. Fruit a set of (4?) separate nutlets, the nutlets 3-3.3 mm long with a smooth surface.

Similar Species: Described more than 10 years after the publication of the Manual of the Vascular Plants of Texas, *Physostegia longisepala* is not included in that Bible of the Texas flora. Specimens would key to either *P. pulchella* or *P. angustifolia*, from both of which it *P. longisepala* is rather difficult to distinguish. In *P. pulchella* the calyx lobes are rarely more than 2.2 mm long and are infrequently cuspidate, whereas in *P. longisepala* the calyx lobes are 2-3.5 mm long and are usually cuspidate. In *P. angustifolia* the corolla is very pale lavender to white, whereas in *P. longisepala* the corolla is deep lavender to reddish violet (Cantino 1982).

Habitat: Relatively open areas on poorly drained, acid loams on level terrain over the Beaumont, Deweyville and Montgomery formations. Probably originally found in fire-maintained wetland pine savannahs or in the transition zone between such flatwoods and adjacent coastal prairies, now found primarily in secondary habitats such as wet borrow ditches along roadsides and moist areas in man-made clearings in pine woodlands.

Phenology: Flowering early May to late June.

Comments:

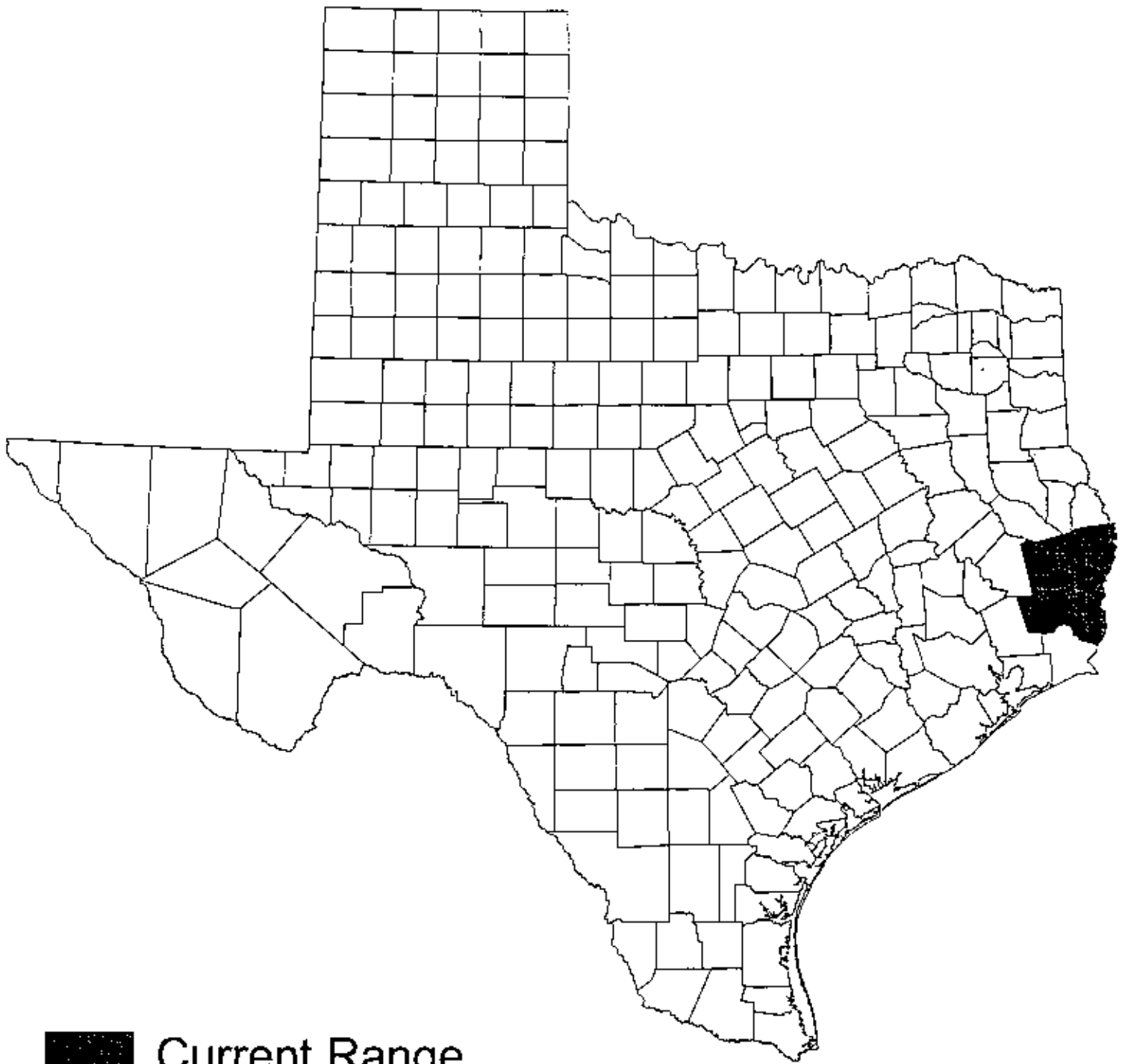
Illustrations: None.

Selected References:

- Cantino, P. D. 1982. A monograph of the genus *Physostegia* (Labiatae). Contributions from the Gray Herbarium 211: 1-105.
- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Gilmore, N. M. and L. M. Smith. 1988. Final status report [on *Physostegia longisepala*]. Report prepared for U.S. Fish and Wildlife Service, Jackson, Mississippi.
- Singhurst, J. R. 1996. The status of nine endangered plants of East Texas: Historical, ecological and phytogeographical notes. M. S. Thesis, Stephen F. Austin University, Nacogdoches, Texas. 278 pp.







■ Current Range

Physostegia longisepela
(long-sepaled false dragon-head)

Scientific Name: *Poa strictiramea* A. Hitch.

Synonyms: *Poa involuta* A. Hitchc.; *Poa filiculmis* Swall.; *Poa coahuilensis* Beetle

Common Name: Big Bend bluegrass, Chisos bluegrass

Global/State Ranks: G3S1

Federal Status: SOC

Global Range: West Texas, Chihuahua, Coahuila, Durango, Nuevo León and Zacatecas (Soreng 1991).

State Range: Brewster County.

Description (adapted from Henrickson & Johnston in prep.): Tufted perennial; culms shortly decumbent or rarely stoloniferous at the base, otherwise erect, (10-) 20-50 (-80) cm tall and 0.5-1 mm thick. Leaves 1-2 (2-5) mm wide, initially flat but quickly folding and eventually becoming involute in drought conditions for most of their length, ascending; sheaths microscopically scaberulous especially in the upper portion; ligule (0.5-) 2-3 (-8) mm long. Flowers in terminal panicles, the panicles open and diffuse at maturity, (3-) 10-25 cm long, 3-8 cm wide, usually with 2 basally-naked branches at each node; pedicels 1-5 (-10) mm long; spikelets laterally compressed, containing (2-) 3-5 (-6) perfect flowers; first glume 1.8-2.4 (-2.9) mm long; second glume 2.2-3.1 (-3.4) mm long; lowest lemma (1.8-) 2.5-3.5 mm long, green with wide, thin, white-hyaline margins, 5-veined, merely minutely scabrous between the veins; veins partly glabrous and partly with minute antrorse whiskers 0.05-0.1 mm long, sometimes finely sericeous on the veins.

Similar Species: None. Clearly distinguished from other *Poa* species of the Trans-Pecos by its perennial habit, involute leaves, open panicles, and perfect flowers that lack the cottony web found at the base of the lemma in many other members of the genus.

Habitat: Grasslands and open oak woodlands on igneous soils on rocky slopes above 6000 feet in the Chisos Mountains. In Mexico, *Poa strictiramea* is found mostly in pine-oak woodlands, on both igneous and limestone substrates.

Phenology: Flowering May-September (Powell 1994).

Comments: *Poa involuta* was at one time under review for possible federal listing as a threatened or endangered species, when it was thought to be distinct species endemic to the Chisos Mountains. When it was submerged within *P. strictiramea*, a more widespread species, *P. involuta* was assigned to Category 3B (not taxonomically valid and thus no longer under review). However, *P. strictiramea* (the larger entity) remains a federal "species of concern."

Illustrations: Line drawings are presented in Gould (1975), as *Poa involuta*, and in Powell (1994), as *P. strictiramea*.

Selected References:

Gould, F. W. and T. W. Box. 1965. Grasses of the Gulf Coastal Bend. Texas A & M University Press, College Station. 186 pp.

Powell, A. M. 1994. Grasses of the Trans-Pecos and adjacent areas. University of Texas Press, Austin.

377 pp.

Soreng, R. J. 1991. Systematics of the "Epiles" group of *Poa* (Poaceae). *Systematic Botany* 16(3): 507-528.



Fig. 56. *Poa involuta*. Inflorescence and
spikelet.

(*Stizoloma*)

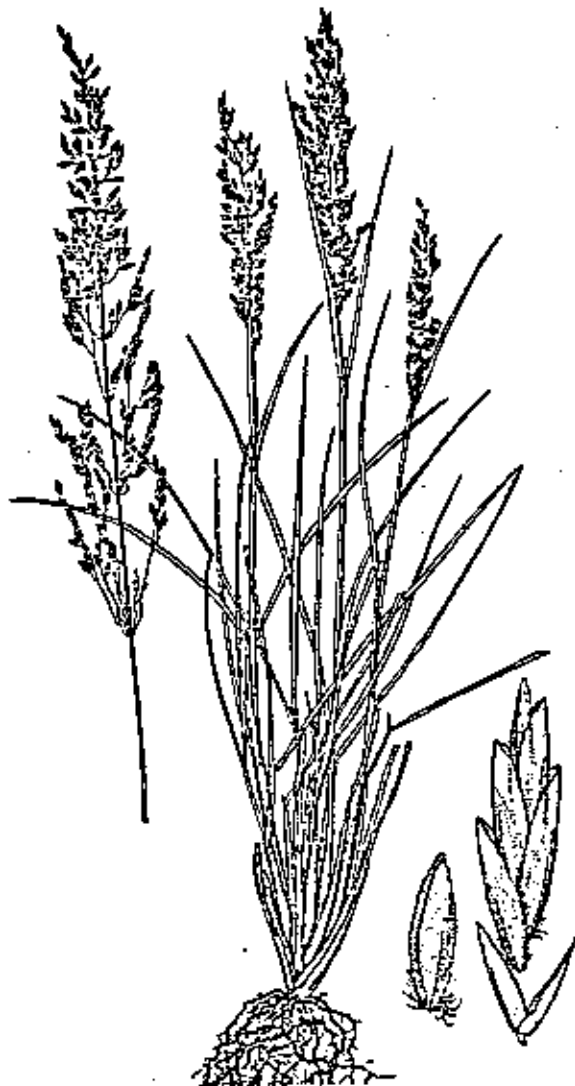
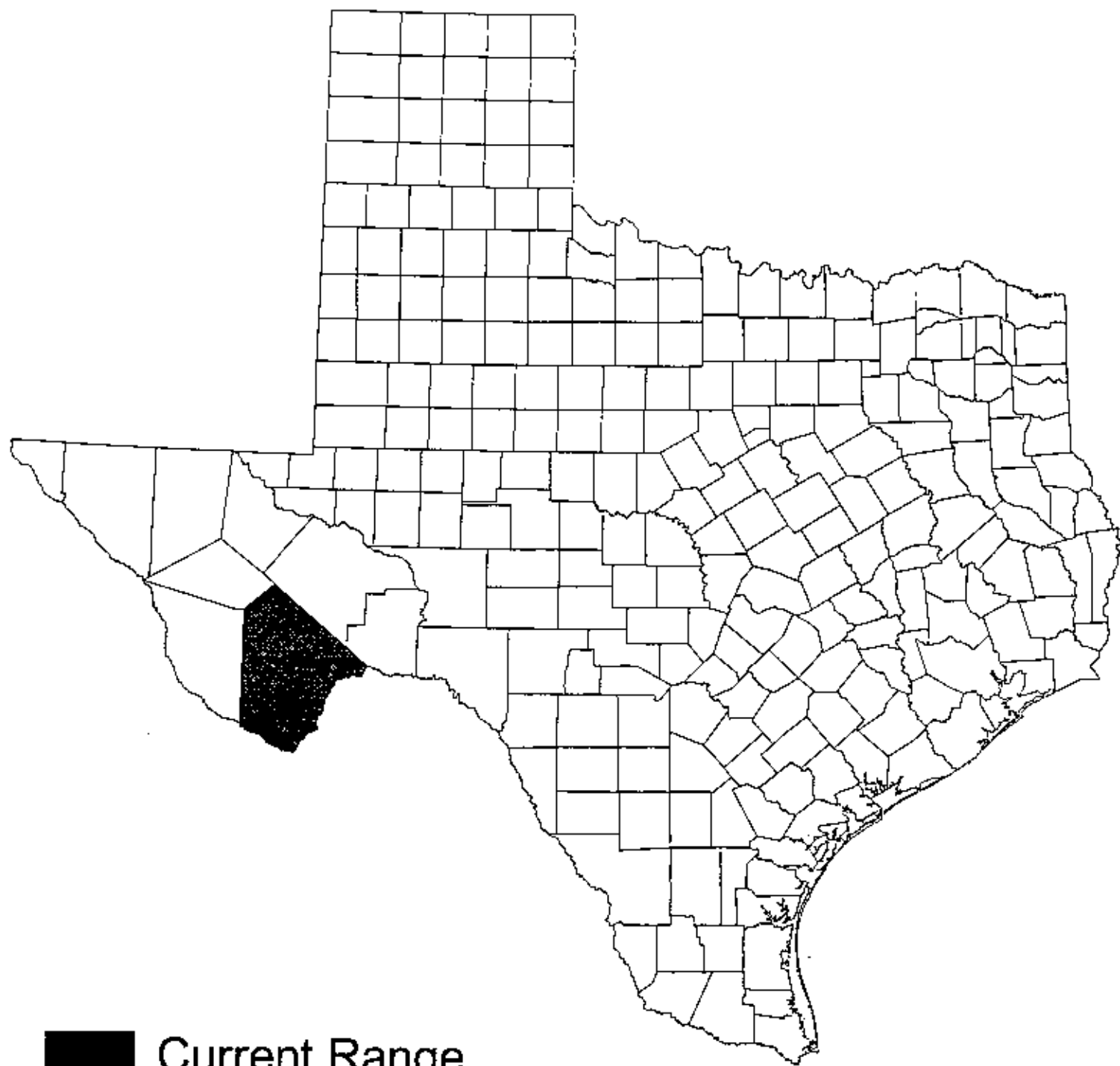


Fig. 57. *Poa fendleriana*. Plant, separate
inflorescence, spikelet with glumes sepa-
rated from florets and floret. From Gould,
1931.

SUBFAMILY IV. POIDEAE 117

THE UNIVERSITY OF TEXAS AT AUSTIN
RARE PLANT STUDY CENTER

JUL 15 1977



■ Current Range

Poa strictiramea
(desert mountains bluegrass)

Scientific Name: *Polemonium pauciflorum* Wats. subsp. *hinckleyi* (Standl.) Wherry

Synonyms: *Polemonium hinckleyi* Standl.

Common Name: Hinckley's Jacob's-ladder

Global/State Ranks: G3T2QS1

Federal Status: SOC

Global Range: Mountains of Arizona and Sonora west to northern Chihuahua, Nuevo León and west Texas. See comments below.

State Range: Davis Mountains of Jeff Davis County.

Description (adapted from Correll & Johnston 1970): Perennial to 5 dm tall, musky-glandular above. Leaves alternate, pinnately compound, to 15 cm long, with a basally expanded petiole and an oblong blade; leaflets 11-21, the terminal confluent, to 25 mm long and 6 mm wide. Flowers paired or solitary, projecting horizontally, on a peduncle to 45 mm long; sepals united ca 1/3 their length, tapering to the tip, at anthesis ca. 15 mm long but lengthening in fruit; corolla funnelform, yellowish-greenish, often suffused with purple, the tube to 3 cm long and the limb to 1 cm long, stamens zygomorphic, about equalling the corolla tube, pilose at the base; stigmas exceeding the anthers. Fruit a 3-celled capsule containing several seeds in each cell.

Habitat: A population in the Davis Mountains lies in the bottom of a mesic canyon on an igneous slope at between 7000 and 7500 feet, in shade of a pine-oak-juniper forest composed of *Pinus ponderosa*, *Quercus gambelii*, *Q. hypoleucoides*, *Juniperus deppeana* and a few other trees. Ground layer associates include a number of forest forbs characteristic of higher-elevation mountain canyons, including *Heuchera rubescens*, *Thalictrum fendleri*, *Geranium cespitosum*, *Stellaria cuspidata*, *Sicyos cf. laciniatus*, *Salvia arizonica*, *Euphorbia bifurcata* and *Panicum bulbosum*.

Phenology: Flowering July-October.

Similar Species: None.

Comments: In their treatment of the flora of the Chihuahuan Desert region, Henrickson & Johnston (in prep.) do not recognize subspecific taxa within *Polemonium pauciflorum*, and they include *Polemonium stenocalyx* in their concept of the species. From that perspective, the species ranges from the mountains of Sonora, southeastern Arizona and Trans-Pecos Texas south through the Sierra Madre Occidental in Chihuahua and the Sierra Madre Oriental in Nuevo León to Queretaro. Those who recognize subsp. *hinckleyi* restrict it to a subset of the species' range, from Sonora and Arizona west to Texas, northern Chihuahua and Nuevo León.

Illustrations: A color photograph appears in Warnock (1977). A line drawing of a different variety of *P. pauciflorum* appears in Niehaus (1984).

Selected References:

Standley, P. C. 1937. Three new plants from Texas and New Mexico and some recent additions to the Texas flora. *American Midland Naturalist* 18: 683-684.

Warnock, B. H. 1977. Wildflowers of the Davis Mountains and Marathon Basin, Texas. Sul Ross State University, Alpine. 274 pp.

Wherry, E. T. 1942. The genus *Polemonium* in America. American Midland Naturalist 27: 741-760.





■ Current Range

Polemonium pauciflorum ssp. *hinckleyi*
~~(Glen Rose-Yucca)~~

Scientific Name: *Polygala maravillasensis* Correll

Synonyms: None.

Common Name: Maravillas milkwort

Global/State Ranks: G2S1

Federal Status: SOC

Global Range: Texas and Coahuila.

State Range: Brewster and Terrell counties.

Description (adapted from T. Wendt in Henrickson & Johnston in prep.): Suffrutescent perennial with numerous ascending, glabrous, glaucous stems 15-40 cm tall. Leaves reduced to scales. Flowers in loose terminal inflorescences 2-10 cm long; pedicels 1.5-3.2 (-3.6) mm long; flowers (3-) 3.4-5 mm long; upper sepal persistent in fruit, the other caducous, the wings pink; keel puberulent with incurved hairs in the upper distal portion, green, with an apical blunt beak 0.3-0.8 mm long, this green or yellow; stamens 7. Fruit (2.6-) 3.3-4.4 mm long, obovate, glabrous or with a few distal hairs, the base cuneate to rounded-cuneate; seed body more densely hairy near the base than near aril or sometimes more or less evenly hairy; hairs projecting 0.4-1 mm beyond the seed base; aril 0.6-1.1 mm long, the umbo glabrous, the margin slightly shorter to deeper than the height of the umbo, comprising an oblong ventrolateral lobe on each side.

Similar Species: Closely related to *Polygala minutifolia*, from which it differs in being a larger glaucous plant with longer inflorescences and larger fruits. Also similar to *Polygala nudata*, which is sparsely puberulent or sometimes glabrate but not glaucous and has white to greenish rather than pink flowers.

Habitat: Crevices of limestone exposed on canyons walls, mostly along the Rio Grande and its tributaries, in low desertic mountains at 450-950 m elevation (Wendt in Henrickson & Johnston in prep.).

Phenology: Flowering May-October.

Comments:

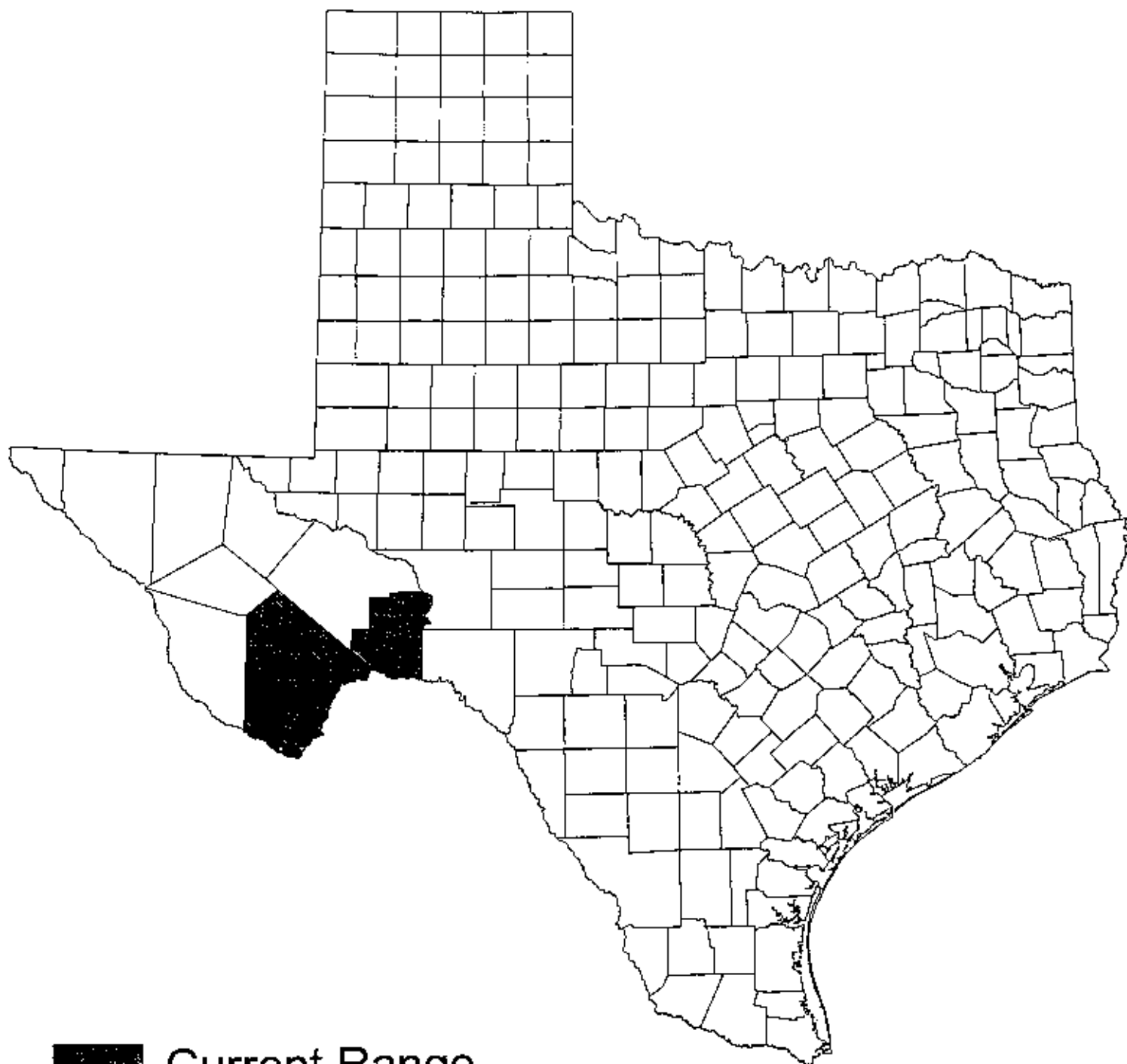
Illustrations: None known.

Selected References:

Correll, D. S. 1965. Some additions and corrections to the flora of Texas. *Wrightia* 3(7): 126-140.

Hanks, B. G. and A. M. Powell. 1983. Status report [on *Polygala maravillasensis*]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.





 Current Range

Polygala maravillasensis
(Maravillas milkwort)

Scientific Name: *Polygala rimulicola* Steyerl. var. *rimulicola*

Synonyms: None.

Common Name: rock-crevice milkwort

Global/State Ranks: G3T3S2

Federal Status: 3C

Global Range: Mountains of New Mexico and Texas

State Range: Guadalupe Mountains and Sierra Diablo of Culberson and Hudspeth counties.

Description (adapted from Steyermark 1932): Delicate perennial from a woody base; stems numerous, very slender, prostrate or slightly ascending, branching, 1-5 cm long, covered with numerous minute papillae and short, soft, scattered, incurved hairs. Leaves sessile, elliptic-ovate, 1.5-4 mm long, 1-2.5 mm wide, with numerous minute papillae and short, soft, scattered hairs. Flowers 1-2, terminal, rose-purple or white, 5 mm long; pedicels at maturity recurved and nodding, ca. 2 mm long; upper sepal persistent, rose-purplish and white, ovate, 1.5-2 mm long and 1 mm broad, acute, glabrous; lower sepals free, deciduous, rose-purplish and white, oblique, broadly obovate, ca. 4 mm long and 2.5 mm wide, obtuse at the apex, narrowed at the base, glabrous; keel petal unbeaked, inflated, greenish-yellow, pouch-shaped, ca. 3 mm long, the outer upper and lower ends rounded, the inner upper end terminating in 2 short, parallel, straight appendages extending towards the base of the flower, the upper third of the keel covered with numerous short, erect, fine hairs; upper petals united to the keel for about 3/8 their length, white at the base, purplish-red at the apex, linear-oblong, ca. 4.5 mm long and 1 mm wide, subtruncate at the apex, slightly puberulent within; stamens 7. Fruit a capsule ca. 2 mm long and 1.5-2 mm wide, broadly obovate-oval, sparingly covered with short, incurved hairs, densely pubescent in the sinus of the notched apex; seed 1-1.5 mm long, densely sericeous-pubescent with long hairs, the aril subglobose and 0.5 mm high, with a large corneous, glabrous umbo at each side.

Similar Species: "In habit this species approaches *P. macradenia* but the latter has a pubescent umbo, a 3-plicated beaked keel, thickly gland-dotted leaves, sepals, and fruit, and erect to ascending instead of prostrate stems" (Steyermark 1932).

Habitat: Shaded to partially shaded limestone cliffs and ledges in pine-oak-juniper woodlands mostly above 5000 feet. Associates include *Cercocarpus montanus*, *Ceanothus greggii*, *Garrya ovata*, *Philadelphus hitchcockianus*, *Hedeoma apiculatum*, *H. costatum*, *Petrophytum cespitosum*, *Fendlerella utahensis*, *Stipa comata*, *Chaetopappa hersheyi*, *Pinaropappus parvus*, *Penstemon cardinalis* subsp. *regalis*, *Sedum wrightii*, *Galium microphyllum*, *Aristida glauca*, *Valeriana texana*, *Perityle quinqueflora*, *Aquilegia chrysantha* var. *chaplinaei* and *Muhlenbergia pauciflora*.

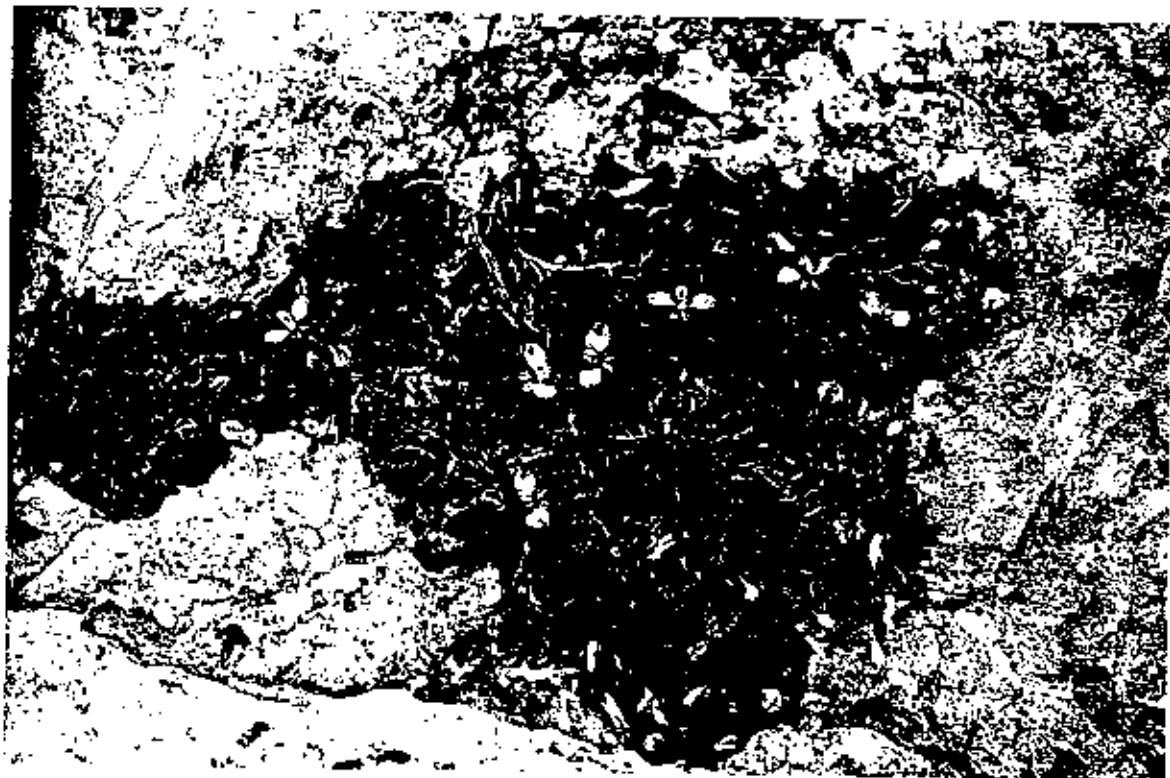
Phenology: Flowering June-October.

Comments: The other variety, *Polygala rimulicola* var. *mescalorum*, occurs in the San Andres Mountains of Doña Ana County, New Mexico.

Illustrations: A color photograph appears in Warnock (1974). A line drawing appears in New Mexico Native Plant Protection Advisory Committee (1984).

Selected References:

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Miller, D. J. and A. M. Powell. 1982. Status report [on *Polygala rimulicola*]. Report to U.S. Fish & Wildlife Service, Albuquerque.
- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Steyermark, J. 1932. Some new spermatophytes from Texas. *Annals of the Missouri Botanical Garden* 19: 389-395.
- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.
- Wendt, T. L. 1978. A systematic study of *Polygala* section *Rhinotropis* (Polygalaceae). Ph.D. dissertation, University of Texas at Austin.



Family: POLYGALACEAE

Scientific Name: *Polygala rimulicola* Steyermark var. *rimulicola*

Common Name: Guadalupe milkwort

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, removed from consideration for federal protection

Common Synonyms: None

Description: Delicate perennial from a woody base, stems numerous, glabrous, slender, mostly prostrate, branching, up to 5 cm (2 in.) long; leaves green, elliptic-oval, 1.5–4.0 mm (0.06–0.16 in.) long, one or two flowers at the ends of branches, rose-purple to white, about 5 mm (0.16 in.) long, keel unbecked or obscure. Flowers from June through September.

Known Distribution: Eddy County, New Mexico, and adjacent Texas
Habitat: Crevices of limestone boulders and cliffs, 1,550–2,400 m (5,000–8,000 ft.)

Ownership: Forest Service, National Park Service

Threats to Taxon: None known

Similar Species: *Polygala rimulicola* var. *mescalorum*, which is distinguished by its prominent beaked keel.

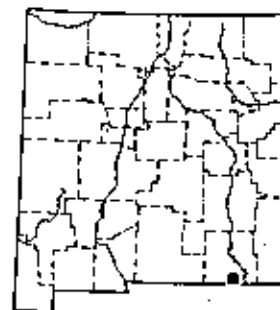
Remarks: This species appears to be rare throughout its range.

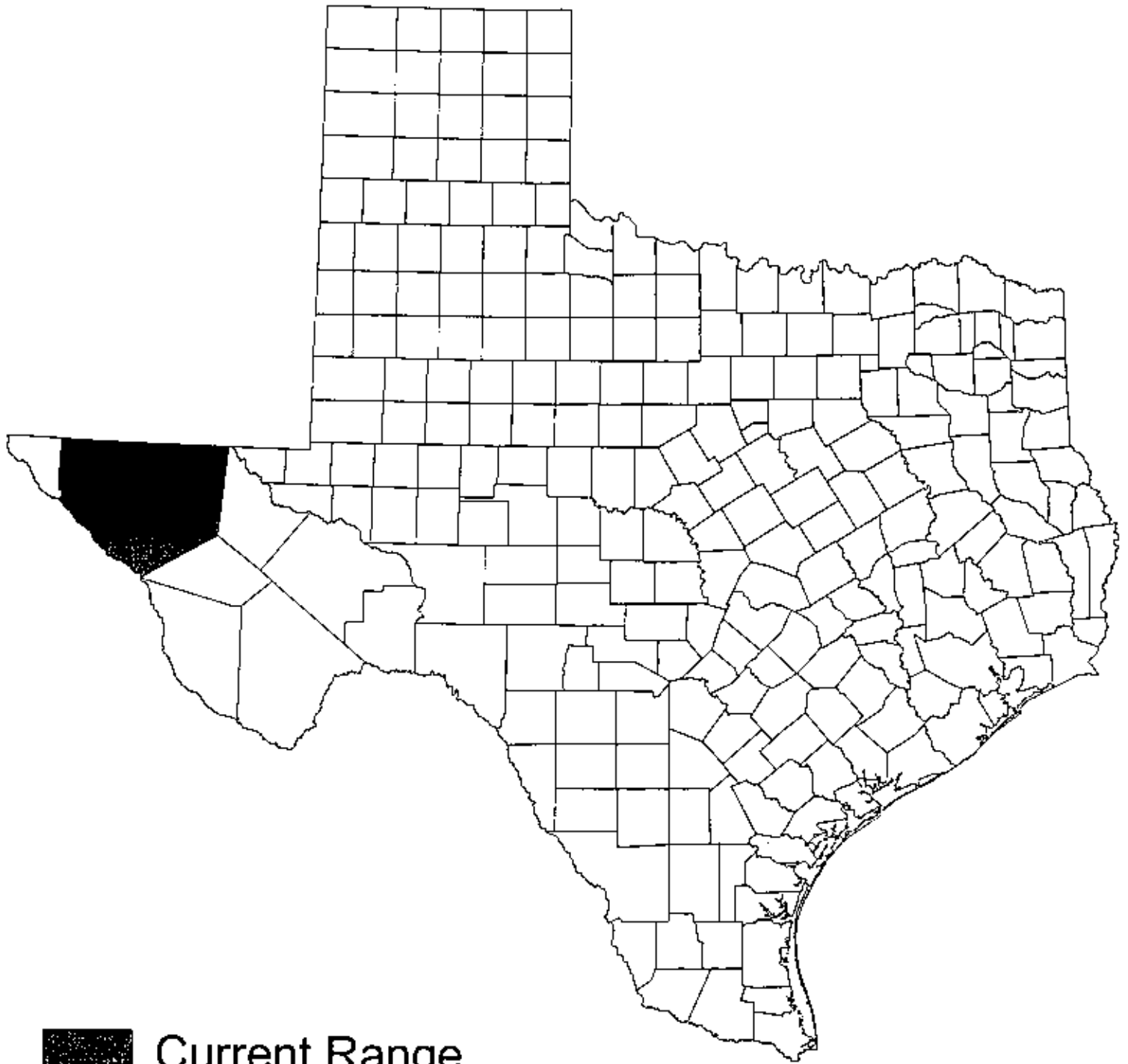
Important Literature:

Steyermark, J. A. Some new Spermatophytes from Texas. *Ann. Missouri Bot. Gard.* 19:289–395, 1932.



Polygala rimulicola var. *rimulicola*
A. general habit, B. flower





■ Current Range

Polygala rimulicola var. *rimulicola*
(rock crevice milkwort)

Scientific Name: *Polygonella parksii* Cory

Synonyms: None.

Common Name: Parks' jointweed

Global/State Ranks: G2S2

Federal Status: 3C

Global Range: Endemic to the post oak belt of central Texas.

State Range: Atascosa, Bexar, Burleson, Guadalupe, Leon, Robertson and Wilson counties.

Description (adapted from Cory 1937; Correll & Johnston 1970; Mahler 1980): Annual with slender, almost leafless stems up to 1.6 dm tall and 4 mm in diameter, simple below but multi-branched above; branches mostly 1-2 mm in diameter, green in youth but becoming red in age. Leaves alternate, simple, glabrous, 1-15 mm long and 0.3-0.8 mm wide, filiform to linear spatulate or narrowly ovate, the margins entire or the wider blades sinuately and coarsely toothed, jointed to the ochreae and rather quickly deciduous, usually absent from fruiting plants; ochreae green, distally pale, bearing 4-8 pale brown bristles 2-3 mm long. Flowers in spike-like racemes, some sessile and others on spreading to recurved pedicels up to 3 mm long, the subtending ochreolae overlapping, equal to or shorter than the pedicel in fruit; calyx white, of 5 sepals in two ranks, the outer 2 shorter than to longer than the 3 inner sepals depending on developmental stage, the largest sepals ca. 3 mm long, the 3 inner sepals at first enveloping and concealing the achene and later shrinking and spreading away, eventually becoming deciduous and fully exposing the achene at maturity; stamens 8 in 2 series; styles 3. Fruit a light brown achene, ovoid in outline, triangular in cross-section, narrowly winged on the angles, ca. 2 mm long and 1.2-1.4 mm wide.

Similar Species: The two other Texas species of *Polygonella*, *P. americana* and *P. polygama*, both occur in within the range of arks' jointweed. Both are strong, somewhat bushy perennials on which the ochreae bear no bristles. *P. parksii* is a slender annual with ciliate ochreae.

Habitat: Early successional grasslands and mechanically disturbed areas on deep, loose, whitish sands. Most populations are found in post oak "savanna" landscapes over the Carrizo and similar Eocene formations.

Phenology: Flowering September-November (Mahler 1980).

Comments: Considered by Mahler (1980) to be a weed of disturbed habitats, Parks' jointweed is a rather narrow endemic that is currently known from only a few sites.

Illustrations: Line drawings of a complete plant, a bristly ochrea, two inflorescence segments, and a flower with nearly mature fruit appear in Mahler (1981).

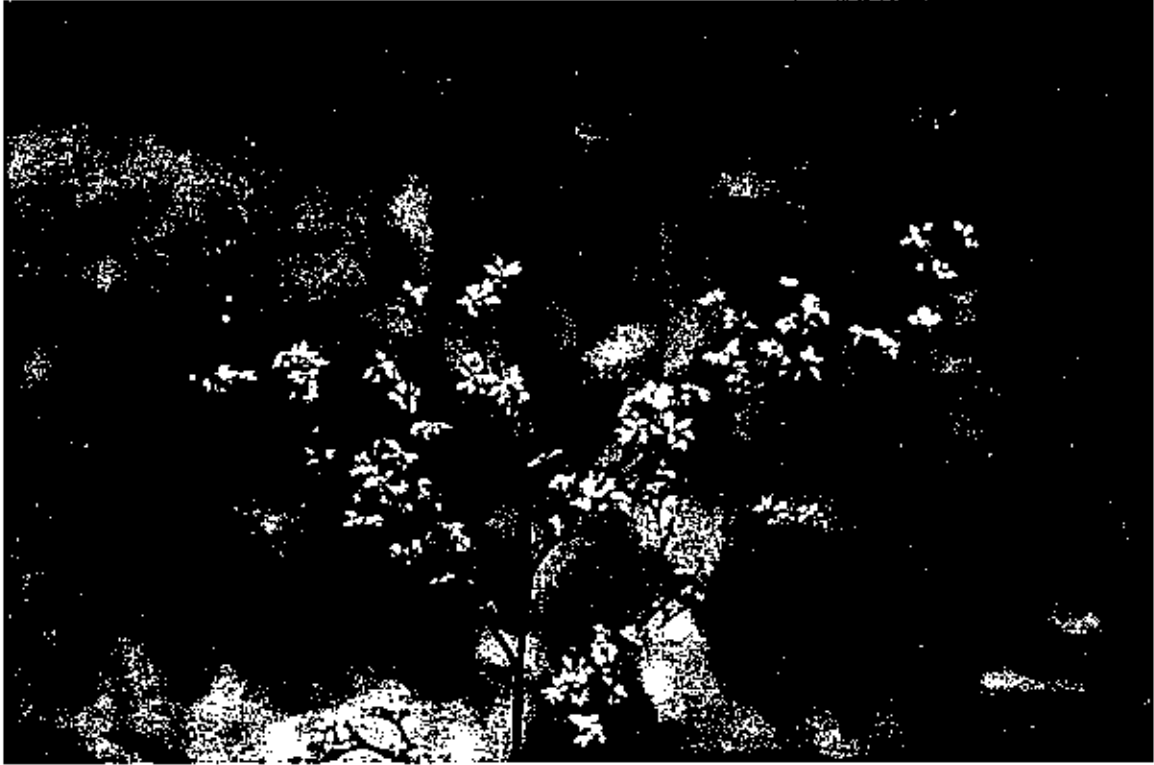
Selected References:

Cory, V. L. 1937. Some new plants from Texas. *Rhodora* 39: 417-421.

Horton, J. H. 1963. A taxonomic revision of *Polygonella* (Polygonaceae). *Brittonia* 15: 177-203.

Mahler, W. F. 1980. Status report [on *Polygonella parksii*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Mahler, W. F. 1981. Notes on rare Texas and Oklahoma plants. *Sida* 9(1): 76-86.



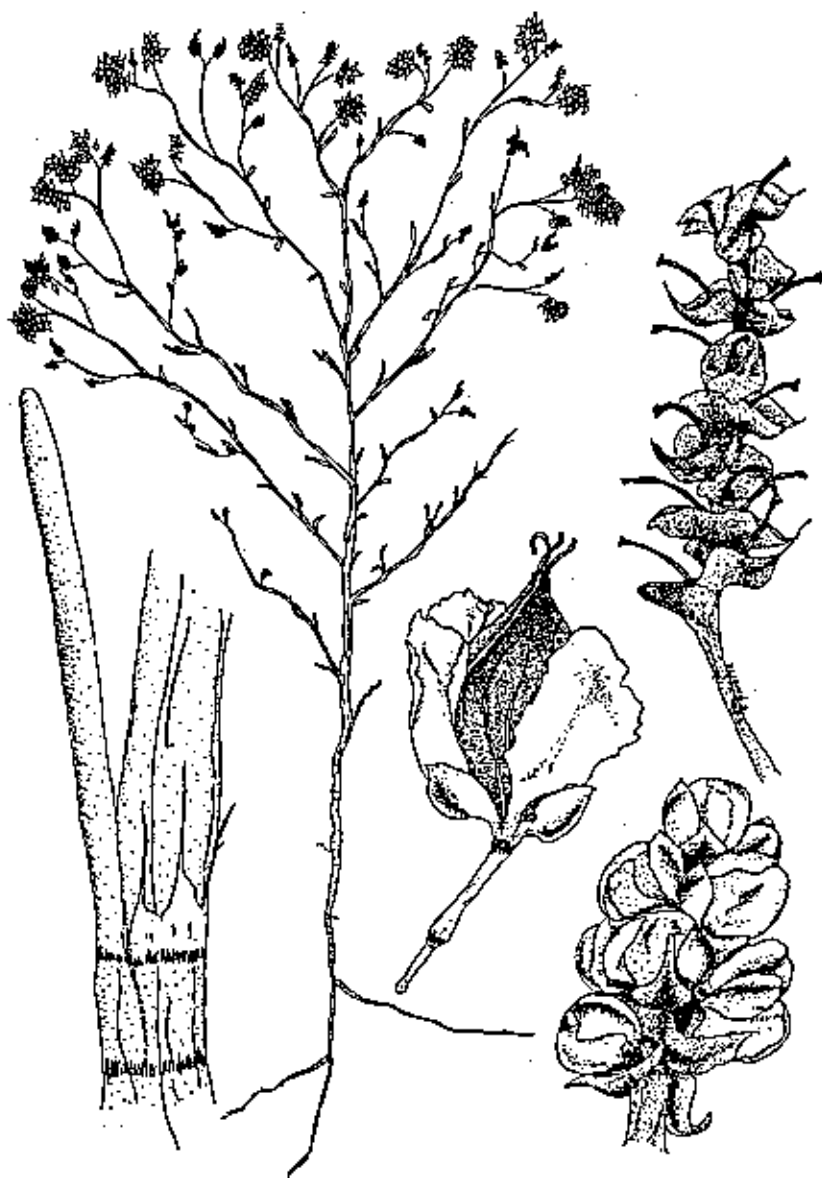
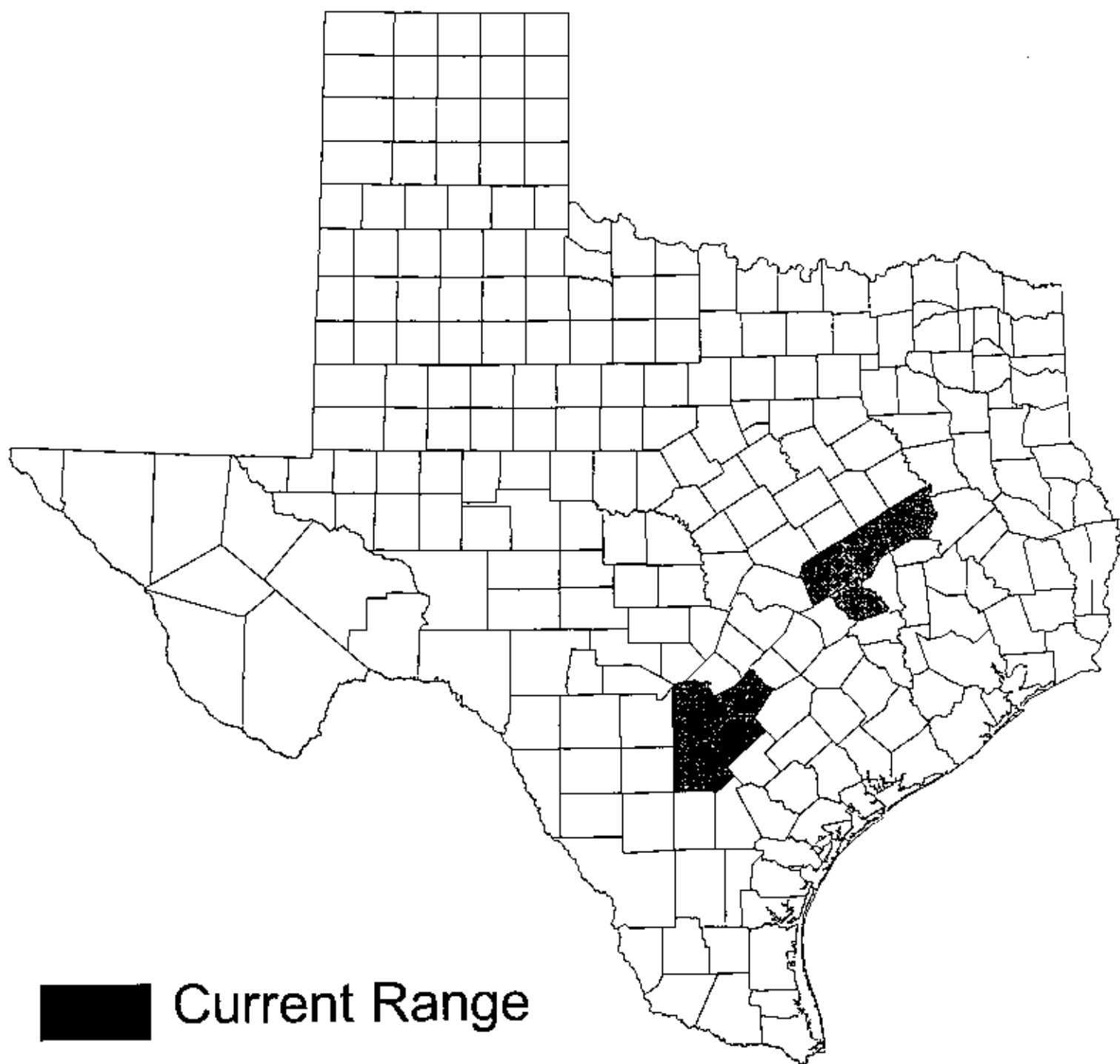


Fig. 2. *Polygonella parkii* Cory



■ Current Range

Polygonella parksii
(Parks' jointweed)

Scientific Name: *Pomaria brachycarpa* (Gray) Fisher

Synonyms: *Hoffmannseggia brachycarpa* Gray; *Caesalpinia brachycarpa* (Gray) Fisher

Common Name: broadpod rushpea

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Edwards Plateau of Texas.

State Range: Crockett, Edwards, Kinney, Llano and Sutton counties.

Description (adapted from I. J. Eifert in Correll & Johnston 1970; Simpson 1998): Many-branched shrublet or suffruticose perennial 1-4 dm tall, the stems sometimes sprawling and the plant thus appearing shorter; old stems yellow to brown, striate with glandular-punctate dots; young stems green with red markings. Leaves alternate, bipinnately compound; pinnae 5-7; leaflets 3-6 pairs per pinna [terminal leaflet absent?], oblong, rounded at apex, 3-7 mm long and 1.2-3.0 mm wide, glabrous or puberulent on both surfaces, with a line of scattered glandular-punctate dots near the margin on the lower surface. Flowers caesalpinoid, on short pedicels in terminal racemes; sepals 5, unequal in size, 5-6 mm long and 2.0-3.5 mm wide, lightly pilose on margins and midvein, with glandular-punctate trichomes near margins; petals 5, yellow, the flag petal 5-6 mm long and 2.0-2.5 mm wide, bearing a few glandular-punctate trichomes, the lateral petals 5.0-5.5 mm long and 3.0-3.5 mm wide, glabrous; stamens 10, with filaments to 3.5 mm long; style simple, 1.5-2.5 mm long, bearing glandular-punctate trichomes basally. Fruit a flattened pod, oval in outline, bilaterally symmetrical, 15-21 mm long and 7-10 mm wide, short-mucronate, the valves glabrous or puberulent with a few glandular-punctate trichomes, the margins bearing black glandular-punctate trichomes and many multicellular projections to 1 mm long terminating in hairs or a black glandular dot; seeds 1-2, 1-3 mm long and 2 mm wide.

Similar Species: Very similar to *Caesalpinia phyllanthoides*, which in Texas is restricted to the Coastal Bend area, and to *Hoffmannseggia* species. All of these similar legumes lack orange or black glandular dots on the lower surface of leaflets. In addition, the fruit of *Pomaria brachycarpa* is unique in having flat oval pods that appear fringed on the margins due to the presence of 1 mm long projections (Simpson, 1998).

Habitat: Grasslands, live oak savannas, and open mesquite woodlands on shallow stony clay soils over limestone. Most specimens are from ungrazed roadsides, often in the shallowest soils on the landscape where competition from taller perennial grasses is minimal. Frequently associated herbaceous plant species include *Aristida* spp., *Bouteloua curtipendula*, *Chloris cucullata*, *Eragrostis intermedia*, *Acalypha monostachya*, *Aphanostephus riddellii*, *Boerhavia linearifolia*, *Calylophus hartwegii*, *Croton dioicus*, *Tiquilia canescens*, *Dalea aurea*, *Desmanthus velutinus*, *Engelmannia pinnatifida*, *Conoclinium greggii* (*Eupatorium greggii*), *Chamaesyce acuta*, *Gilia rigidula*, *Hedyotis nigricans*, *Hermannia texana*, *Krameria lanceolata*, *Macrosiphoniu lanuginosa* var. *macrosiphon*, *Melanpodium leucanthum*, *Salvia texana*, *Mimosa roemeriana*, *Simsia calva*, *Justicia pilosella*, *Thamnosma texanum*, *Thelesperma simplicifolium*, and *Wedelia hispida*. The exotic King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*) is present at many known sites and may constitute a competitive threat.

Phenology: Flowering April-July.

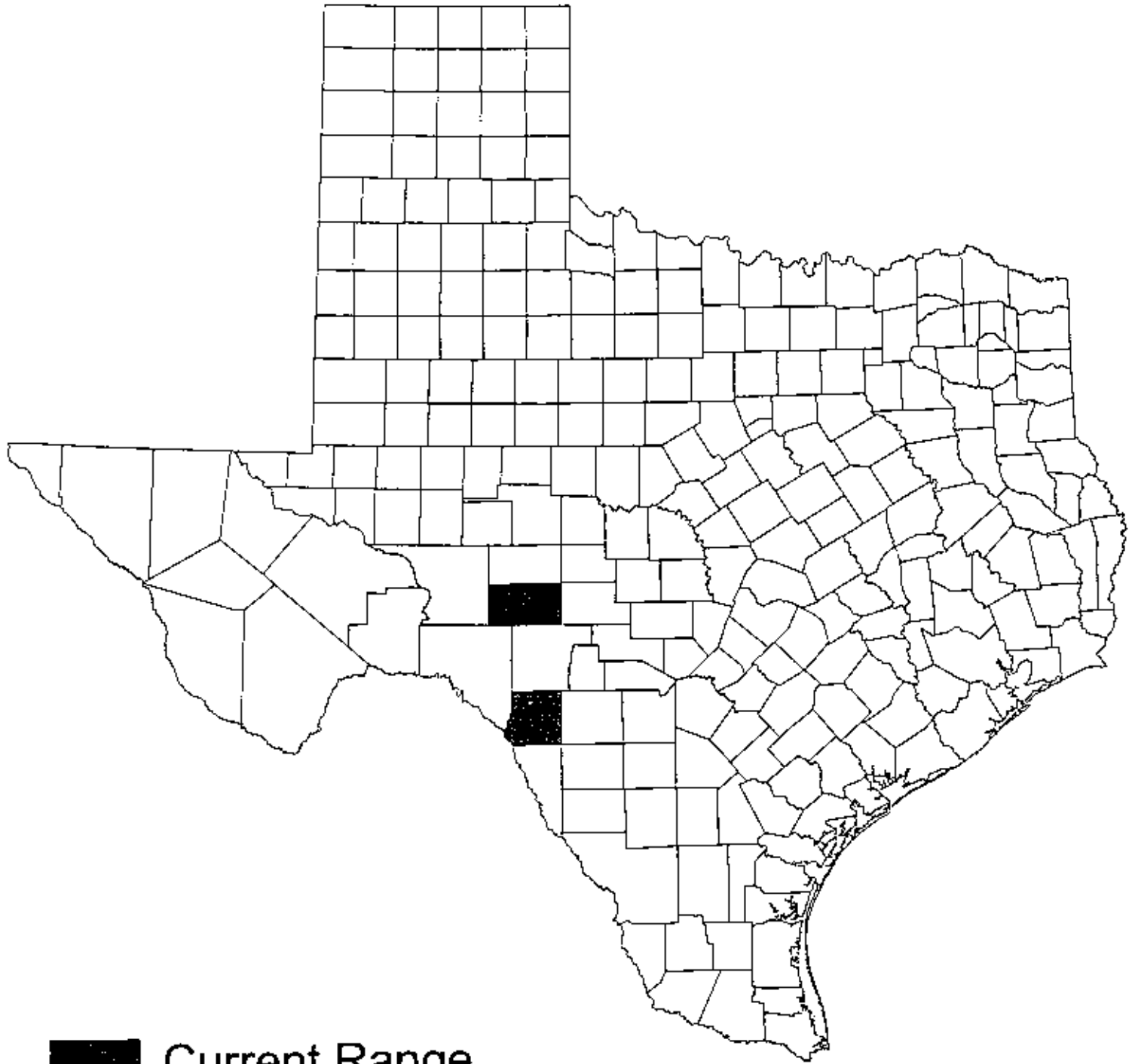
Comments:

Illustrations: None known.

Selected References:

- Isely, D. 1975. Leguminosae of the United States: II. Subfamily Caesalpinoideae. *Memoirs of the New York Botanical Garden* 25: 1-228.
- Mahler, W. F. 1981. Status report [on *Caesalpinia brachycarpa*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Simpson, B. B. 1998. A revision of *Pomaria* (Fabaceae) in North America. *Lundellia* 1: 46-71.





■ Current Range
□ Historical Range

Pomaria brachycarpa
(broadpod rushpea)

Scientific Name: *Potamogeton clystocarpus* Fern.

Synonyms: None.

Common Name: Little Aguja pondweed

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: Endemic to Trans-Pecos Texas.

State Range: Known only from the Davis Mountains of Jeff Davis County.

Description (adapted from Haynes 1974): Submersed aquatic; stems light green to brown, terete to slightly compressed, rarely ridges, to 57 cm long and 0.5-0.7 mm wide. Leaves alternate (sometimes appearing opposite), simple, linear, 3 (-5) nerved, 3.2-7.8 cm long and 0.7-1.7 mm wide; apex acute; glands usually present, white to gold, 0.2-0.3 mm in diameter; lacunae to 4 rows on each side of the midrib, rarely absent; lateral nerves joining midrib 0.2-0.4 mm below apex; stipules brown, delicate, not shredding at tip, usually convolute, to 6.2 mm long and 0.5-0.8 mm wide (5-10 mm long per type description in Fernald 1932, in either case longer than the 0.5-1 mm cited in Ogden 1966 and echoed in Correll & Johnston 1970). Flowers on pedunculate spikes from the leaf axils, or terminal; peduncle cylindrical, erect, 3.4-4.8 cm long and 0.3-0.5 mm wide; spike capitate to cylindric, 5.5-7.5 mm long and 3.0-5.7 mm wide, consisting of three whorls of flowers 1.5-1.7 cm apart; perianth segments 4, 1.7-2.0 mm long, 1.5-1.8 mm wide; stamens 4; carpels 4, free. Fruit a set of 4 one-seeded drupelets, the drupelets brown to yellow-green, obovate to suborbicular, 2.0-2.2 mm long and 1.7-1.8 mm wide (2.5-2.8 mm long and 1.8-2 mm wide according to the type description in Fernald (1932), 2.5-2.8 mm long and 1.8-2.2 mm wide according to Ogden 1966), with 2 or more protuberances near base; sides rough; dorsal keel rounded to prominently ridged, gibbous at base, ca. 0.2 mm high; lateral keels rounded to obscure; beak recurved, 0.2-0.5 mm long. Winter buds unknown.

Similar Species: Three other species of *Potamogeton* subsection *Pusilli*, *P. foliosus*, *P. pectinatus* and *P. pusillus*, have been reported from Little Aguja Creek. *P. clystocarpus* is the only species in this group with gibbous and tuberculate-based fruits (Fernald 1932). Stipules of *P. clystocarpus* are 0.5-1.0 mm long with free margins, whereas the other three species have stipules longer than 6 mm with margins at least basally connate (Rowell 1983). Fruits of *P. clystocarpus* are "unlike those of any other American species but strongly suggesting those of a western Eurasian and African plant" (Fernald 1932).

Habitat: Submersed in still or slowly-flowing water of pools in intermittent creek, rooted in sand and gravel derived from igneous rocks of surrounding mountain slopes. *Potamogeton foliosus*, *P. pectinatus*, *P. pusillus*, *P. nodosus* and *Najas guadalupensis* have also been found at various spots in the same creek and may or may not occur with *P. clystocarpus* (U.S. Fish & Wildlife Service 1994).

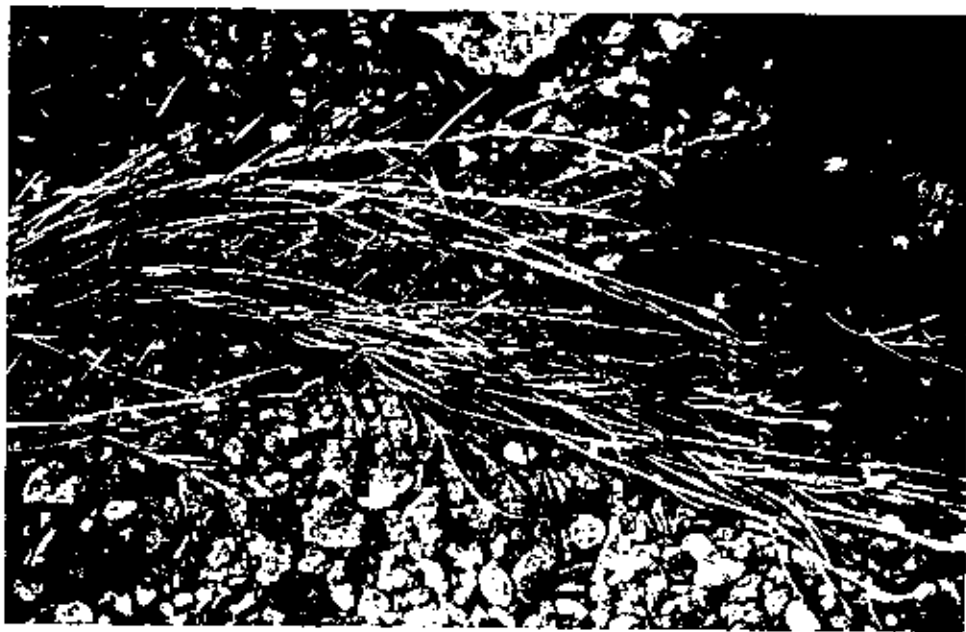
Phenology: In fruit from May to October and perhaps later (Correll & Correll 1975).

Comments: Listed as Endangered on 14 November 1991.

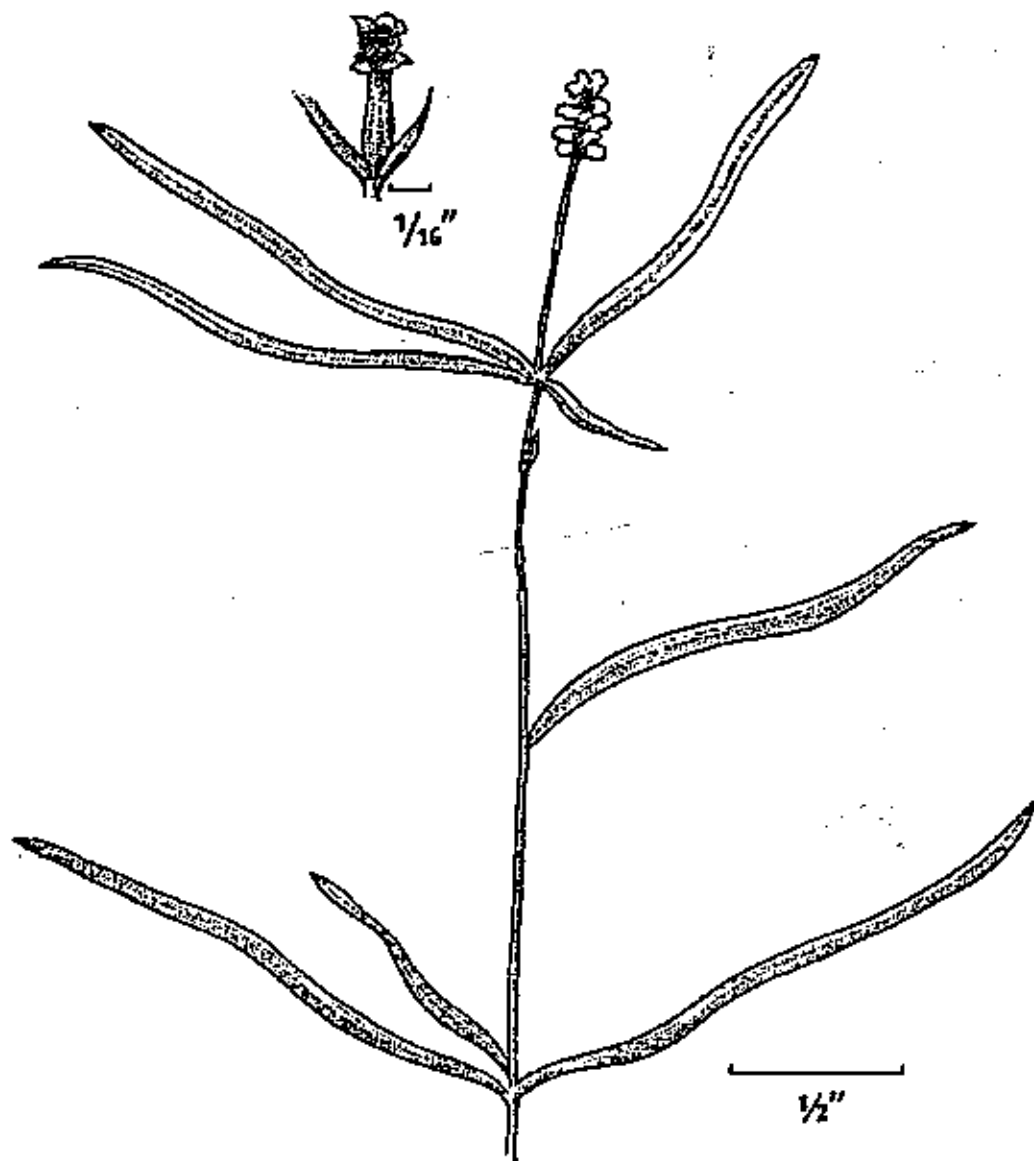
Illustrations: Line drawings of critical characters appear in Correll & Correll (1975) along with complete drawings of *P. foliosus*, *P. pectinatus*, and *P. pusillus*.

Selected References:

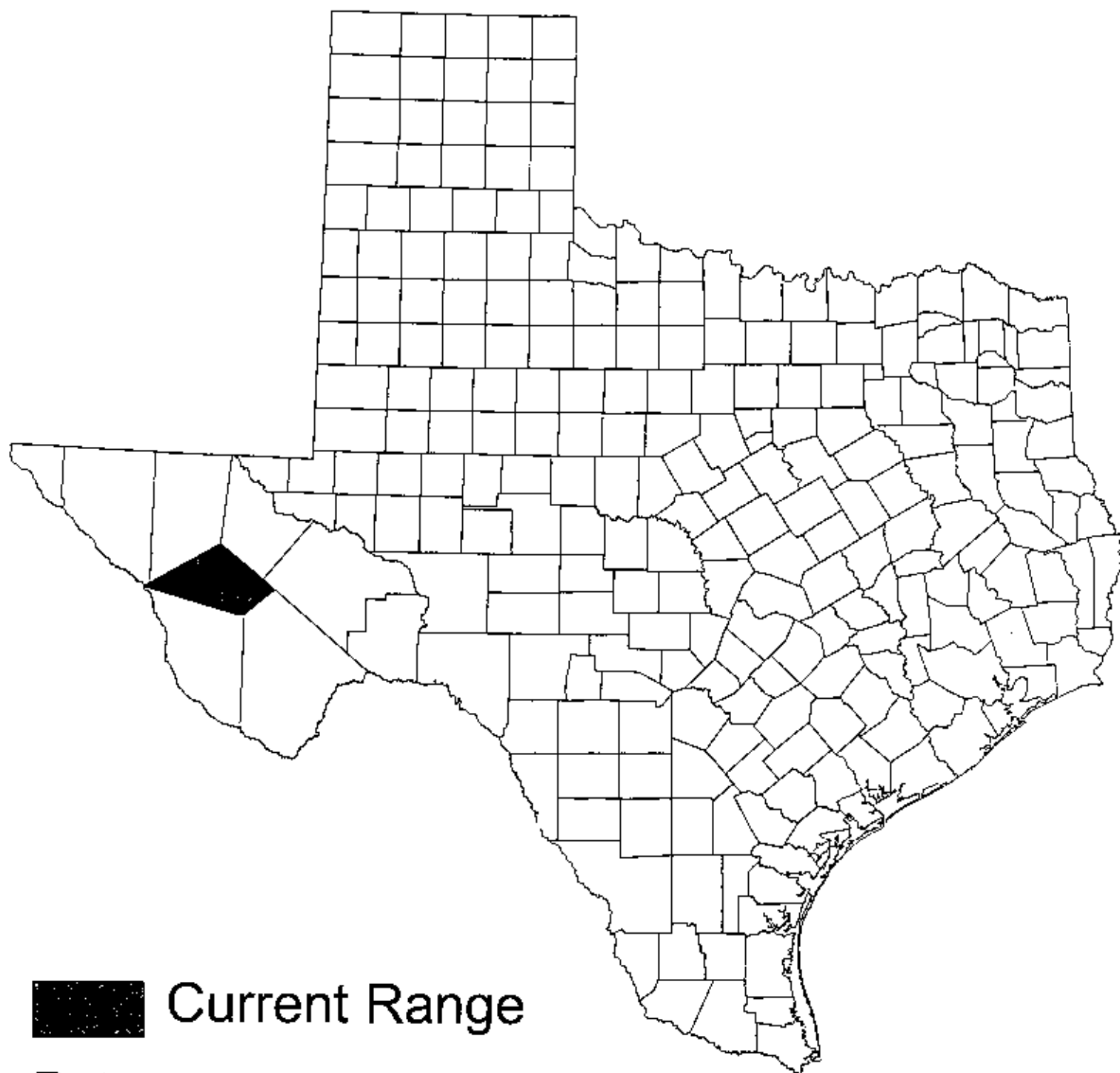
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- U.S. Fish and Wildlife Service. 1994. Little Aguja pondweed (*Potamogeton clystocarpus*) recovery plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 78 pp.



Little Aguja Pondweed Recovery Plan
(*Potamogeton clystocarpus*)



U.S. FISH AND WILDLIFE SERVICE
REGION 2, ALBUQUERQUE, NEW MEXICO
1994



Current Range

Potamogeton clystocarpus
(Little Aguja pondweed)

Scientific Name: *Proboscidea sabulosa* Correll

Synonyms: None.

Common Name: dune unicornplant

Global/State Ranks: G3S2

Federal Status: 3C

Global Range: Central and southeastern New Mexico, west Texas and northern Chihuahua.

State Range: Andrews, Cranc, Loving, Ward and Winkler counties.

Description (adapted from Correll 1966): Viscid annual with sprawling, much-branched stems up to 12 dm across and 4 dm high. Leaves with thickened petioles up to 10 cm long or more, triangular-ovate to broadly subreniform, broadly cordate at the base, rounded to obtuse at the apex, the margins undulate-repand, up to 12 cm long and wide. Flowers several, borne in a congested raceme on an abbreviated peduncle, greatly exceeded by the foliage; pedicels slender and ca. 1 cm long in flower, becoming stout and ca. 2 cm long in fruit; bracts 2, oblong-elliptic, 7-8 mm long; calyx 1-1.3 cm long, irregularly 5-lobed above the middle, ventrally split to the base; corolla 2-lipped, tubular-cylindric, only slightly ventricose; tube cream-color and sparsely glandular, ca. 2 cm long and 1 cm across the orifice, the glabrous throat cream-color with small reddish spots and a deep yellow line running the length of the tube on the lower side; lobes 5, ovate to somewhat quadrate, purplish-red, 4-5 mm long, recurved, the lower lobe pleated. Fruit an oblong-ellipsoid, laterally compressed, beaked, drupaceous capsule, the endocarp of which eventually dries to become a woody "devil's claw" as in other species of *Proboscidea*, ca. 7 cm long and 1.5-2 cm wide, the horns about twice as long as the body.

Similar Species: Distinguished from other *Proboscidea* species by the small flowers that are often hidden among the leaves (Correll 1966).

Habitat: Deep dry to seasonally moist loose sands on sparsely vegetated, unstabilized dunes and in openings in shinneries formed by *Quercus havardii*. In New Mexico, *Proboscidea sabulosa* also occurs as a secondary successional species in fallow fields (Sivinski & Cully 1990). Common associates include *Abronia fragrans*, *Andropogon hallii*, *Artemisia filifolia*, *Cenchrus incertus*, *Chloris cucullata*, *Heliotropium convolvulaceum*, *Oryzopsis hymenoides*, *Palafoxia sphacelata*, *Prosopis glandulosa*, *Sporobolus giganteus*, *S. cryptandrus* and *Yucca elata* (Sivinski & Cully 1990).

Phenology: Flowering July-August, with fruits maturing in fall.

Comments:

Illustrations: A line drawing appears in New Mexico Native Plant Protection Advisory Committee (1984). A color photograph appears in Warnock (1974). Black and white photographs appear with the type description in Correll (1966).

Selected References:

Bretting, P. K. 1981. A systematic and ethnobotanical survey of *Proboscidea* and allied genera of the

- Martyniaceae. Ph.D. dissertation, Indiana University, Bloomington.
- Correll, D. S. 1966. Some additions and corrections to the flora of Texas—III. *Rhodora* 68: 420-428.
- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Sivinski, R. and A. Cully. 1990. Status report on *Proboscidea sabulosa*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Warnock, B. H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine. 176 pp.



Family: MARTYNIACEAE

Scientific Name: *Proboscidea sabulosa* Correll

Common Name: Dune unicorn plant

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: None

Description: Sticky-hairy annual; stems spreading, branched, about 1 m (40 in.) or more across; leaves long, stalked, the blades roughly triangular to rounded, heart shaped in outline, about 8–12 cm (3.2–4.8 in.) in diameter, wavy on the margins, flowers in small clusters, usually hidden by foliage, somewhat tubular with five irregular lobes, about 2 cm (0.8 in.) long and half as wide at the widest point, the base cream colored with small reddish spots or pale blotches on the inside, the lobes reddish purple; fruit oblong-ellipsoid, keeled on the back, to about 7 cm (2.8 in.) long and 2 cm (0.8 in.) wide, bearing a long, tapering, recurved tip, the tip splitting into two long, recurved claws when dry. Flowers in July and August.

Known Distribution: Eddy, Lea, and Socorro counties, New Mexico, and adjacent Texas

Habitat: Deep sands of mostly stabilized dunes, desert scrub, often with mesquite, 915–1,050 m (3,000–3,500 ft.)

Ownership: Bureau of Land Management, private, U.S. Fish and Wildlife Service

Threats to Taxon: None known

Similar Species: *Proboscidea louisianica* (Mill.) Thell. has substantially larger flowers.

Remarks: This species is a widely scattered, regional endemic adapted to dune regions.

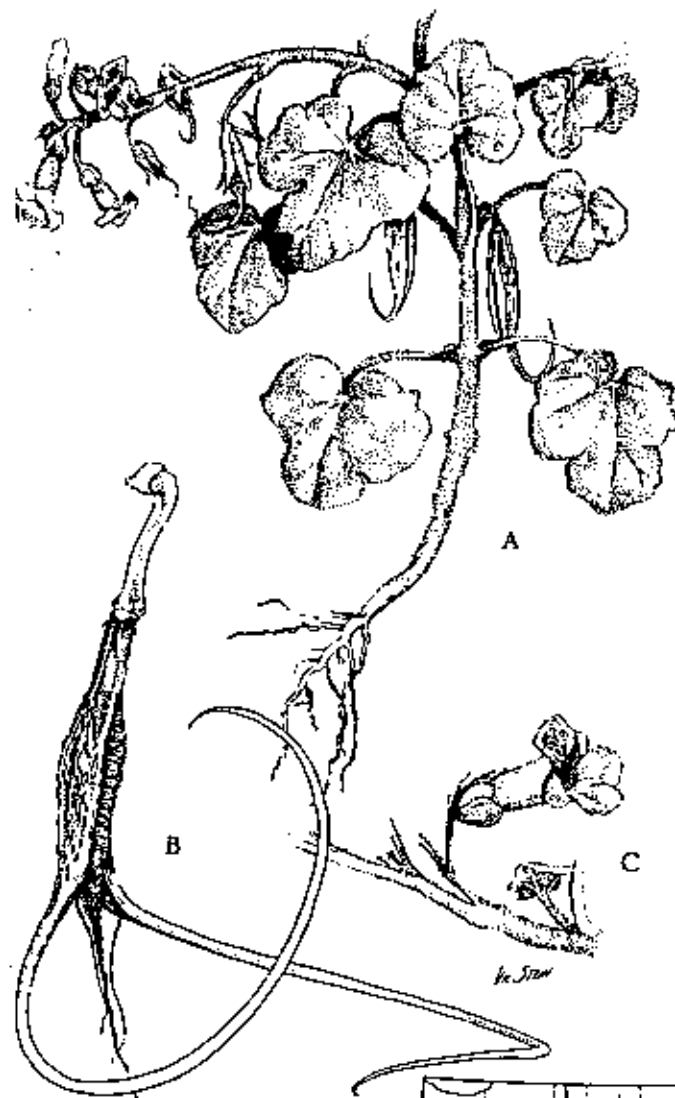
Important Literature:

Correll, D., and M. Johnston. Manual of the vascular plants of Texas.

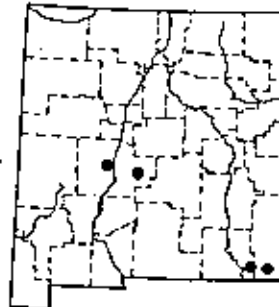
Renner, Tex.: Texas Research Foundation, 1970.

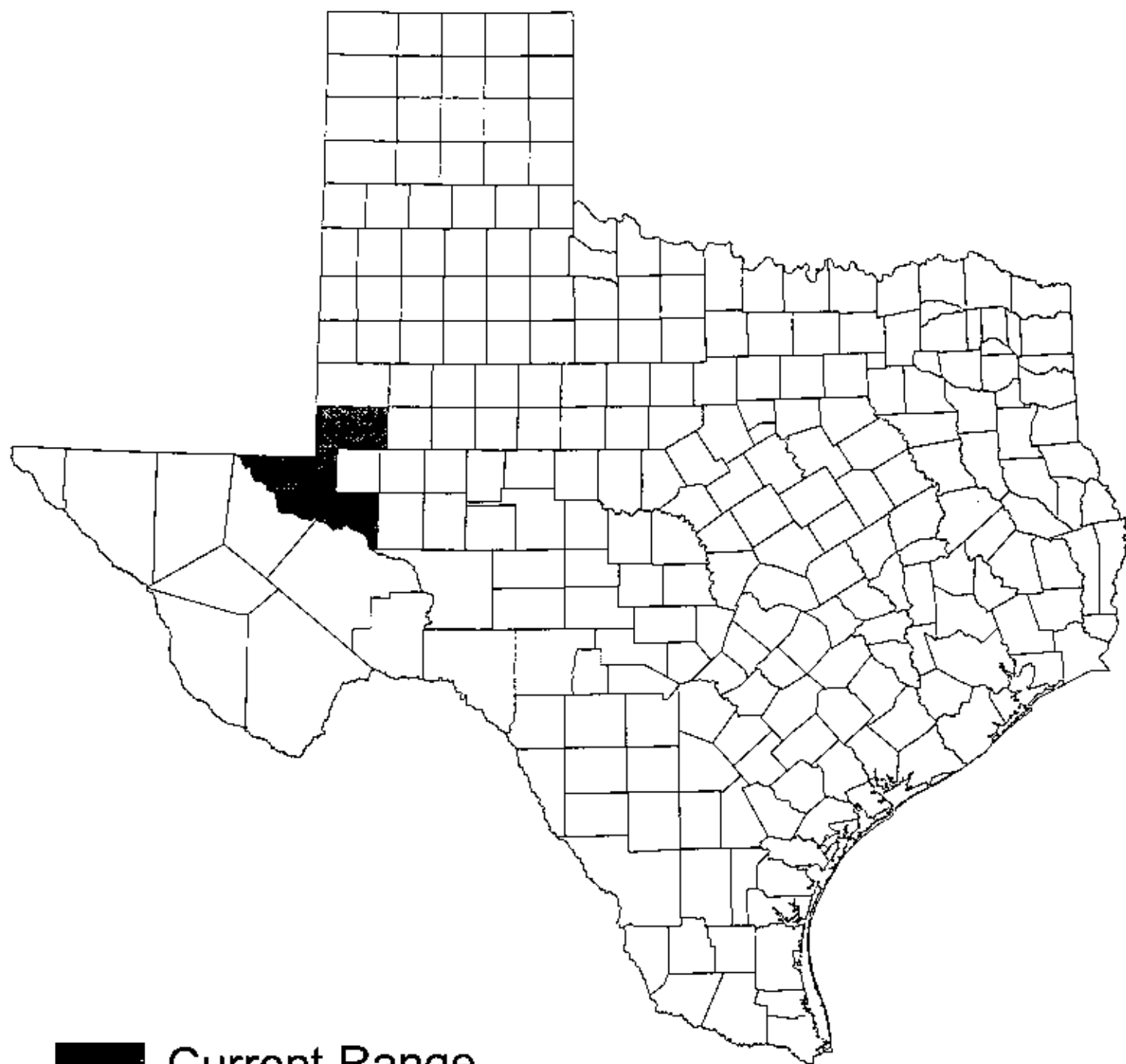
Van Eseltine, G. A preliminary study of the unicorn plants. New York

Agr. Exp. Sta. Tech. Bull. 149; 1929.



Proboscidea sabulosa
A. general habit; B. fruit (devils
claw); C. flower





■ Current Range

Proboscidea sabulosa
(dune unicorn-plant)

Scientific Name: *Proboscidea spicata* Correll

Synonyms: None.

Common Name: manyflower unicornplant

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Trans-Pecos Texas and northern Coahuila.

State Range: Brewster, Jeff Davis and Presidio counties.

Description (adapted from Henrickson & Johnston in prep.): Viscid, decumbent annual to 3 dm tall. Leaves opposite, on petioles 5-10 cm long, the blades cordate-orbicular, cordate-ovate to cordate-reniform, 6-10 mm long and about as wide, undulate-repand at the margin, sometimes shallowly 3-lobed, obtuse to rounded at the tip, cordate at base. Flowers as many as 25, on crowded racemes 6-17 cm long; pedicels slender, 7-15 mm long; pedicel bracts oblanceolate, 6-7 mm long, green; bracteoles oblong-lanceolate, 5-8 mm long and up to 2 mm wide, greenish; calyx campanulate, split to the base adaxially, cream-white to greenish, 8-14 mm long, the lobes about one third of total calyx length, the adaxial lobe the longest, 1.2-3 mm long; corolla 5-lobed, zygomorphic, 2.5-3 cm long, the throat pinkish purplish with scattered purplish or reddish spots adaxially, yellow in the lower throat, the lobes reddish purple, mostly broadly orbicular, 5-7 mm long and 7-10 mm wide; stamens 4, the anthers white, 4-5 mm long. Fruit unknown but presumably an elongate, beaked, drupaceous capsule, the endocarp of which eventually dries to become a woody "devil's claw" as in other species of *Proboscidea*.

Similar Species: Closely related to *Proboscidea louisianica*, and "future research may show that *P. spicata* is a reduced form of that species" (Bretting 1981).

Habitat: Dry sandy alluvial and/or eolian soils on terraces along Rio Grande; also in disturbed sandy soils at scattered sites along roadsides elsewhere in the Trans-Pecos.

Phenology: Flowering May-June (-August).

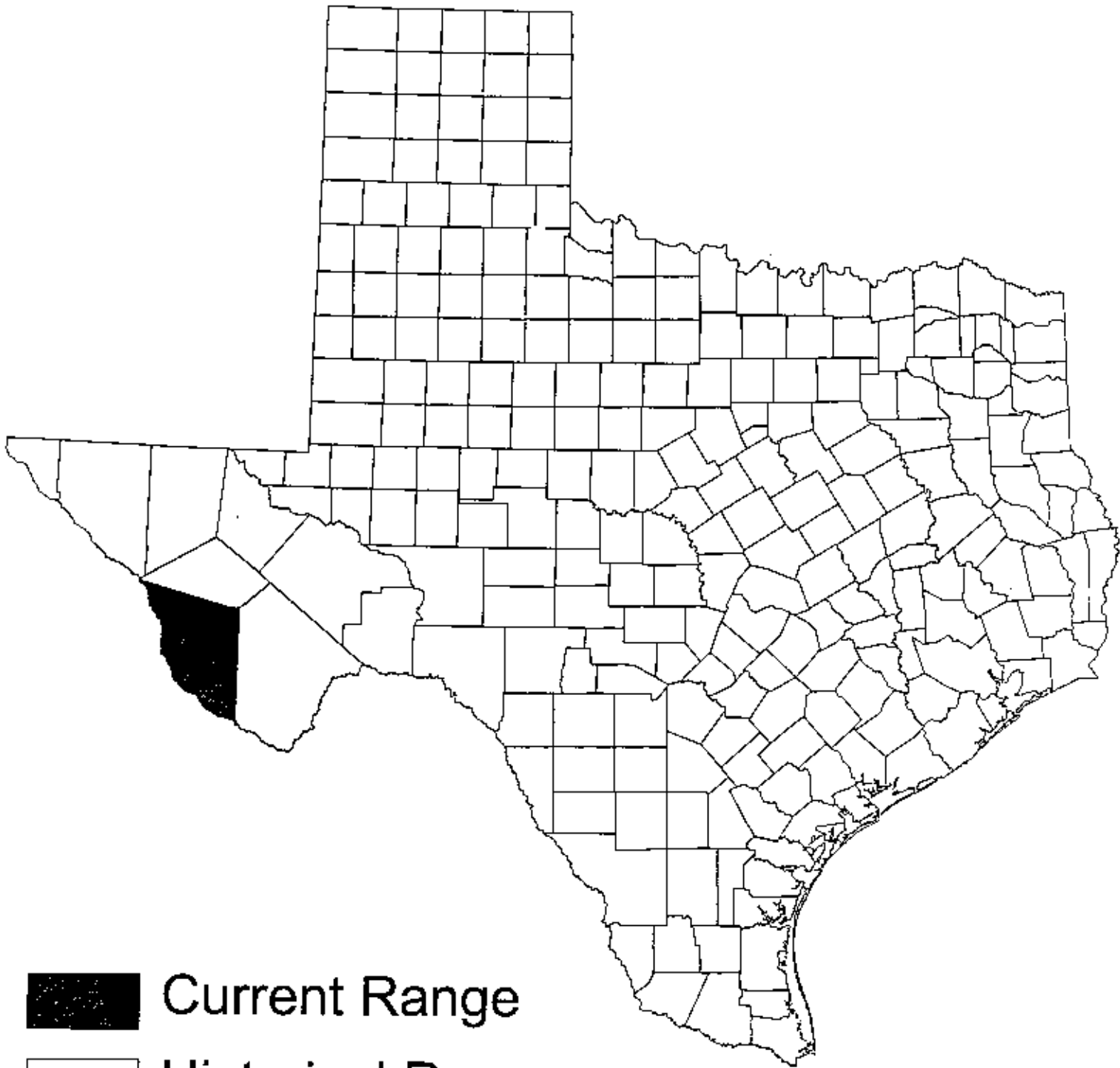
Comments: A poorly understood, seldom collected species of which there are no known extant populations in Texas.

Illustrations: None known.

Selected References:

Bretting, P. K. 1981. A systematic and ethnobotanical survey of *Proboscidea* and allied genera of the Martyniaceae. Ph.D. dissertation, Indiana University, Bloomington.





■ Current Range

□ Historical Range

Proboscidea spicata
(many-flowered unicorn-plant)

Scientific Name: *Pseudoclappia watsonii* Powell & Turner

Synonyms: None.

Common Name: Watson's false clappia-bush

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to the Chihuahuan Desert of Trans-Pecos Texas.

State Range: Brewster, Hudspeth and Presidio (or Jeff Davis?) counties. (A Presidio County specimen cited in Powell & Turner (1976), "53.8 mi N of Candelaria... along the primitive road to Chispa," *T. Watson* 630, may actually be from Jeff Davis County.) [**JMP: the Brewster Co. record is based on B. L. Turner 21-360 at TEX (seen by WRC on 14 Feb 2002.)]

Description (adapted from Powell & Turner 1976; Henrickson & Johnston in prep.): Intricately-branched, rounded shrub 25-74 cm tall; stems numerous, white, slender, arcuately ascending. Leaves alternate, linear, subterete, fleshy, glabrous, (3-) 6-13(-17) mm long and 0.6-1 mm wide. Flower heads solitary from peduncles at the branch tips, containing both disk and ray flowers; peduncles erect, straight to twisted, ca. 4 cm long, with scattered subulate bracts 3-5 mm long; involucre broadly obconical, 11-14 mm tall, phyllaries 7-12 in 3-4 series, the inner phyllaries oblong-lanceolate, 12-14.5 mm long and 2.5-4 mm wide, attenuate to acute, scarious-margined, somewhat ciliate at the tip, the outer phyllaries 5-8 mm long; ray flowers 4-7 (-11), yellow, the tube 4-5 mm long, the ligule 10-13 mm long and 2-3.5 mm wide, oblong-elliptic; disc flowers ca. 25, yellow, the corolla 8-9 mm long, the 5 lobes ca. 0.5 mm long; style branches ca. 2 mm long. Achenes black, 4-5.2 mm long, slightly rhomboid to quadrate in cross-section, densely pubescent with appressed or ascending hairs 0.3-0.5 mm long, capped by a pappus of numerous unequal bristles 3-11 mm long.

Similar Species: The other Texas member of the genus, *Pseudoclappia arenaria*, has smaller heads with phyllaries 7-10 mm long and disc corollas 6.5-8 mm long. *P. watsonii* is an intricately branched low shrub found on dry gypseous clay soils; *P. arenaria* is less intricately branched and occurs in more mesic to wet saline-gypsum habitats (Powell & Turner 1976).

Habitat: Chihuahuan Desert shrublands on dry rocky gypseous clay hills and arroyos. Associates include various species of *Acacia*, *Agave*, *Condalia*, *Erioneuron*, *Larrea*, *Xylorhiza* and *Yucca* (Powell & Turner 1976).

Phenology: Flowering May-August.

Comments:

Illustrations: A line drawing appears in Powell & Turner (1976).

Selected References:

Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.

Powell, A. M. and B. L. Turner. 1976. New gypsophilic species of *Pseudoclappia* and *Sartwellia*

(Asteraceae) from west Texas and eastern Chihuahua. Sida 6(4): 317-320.

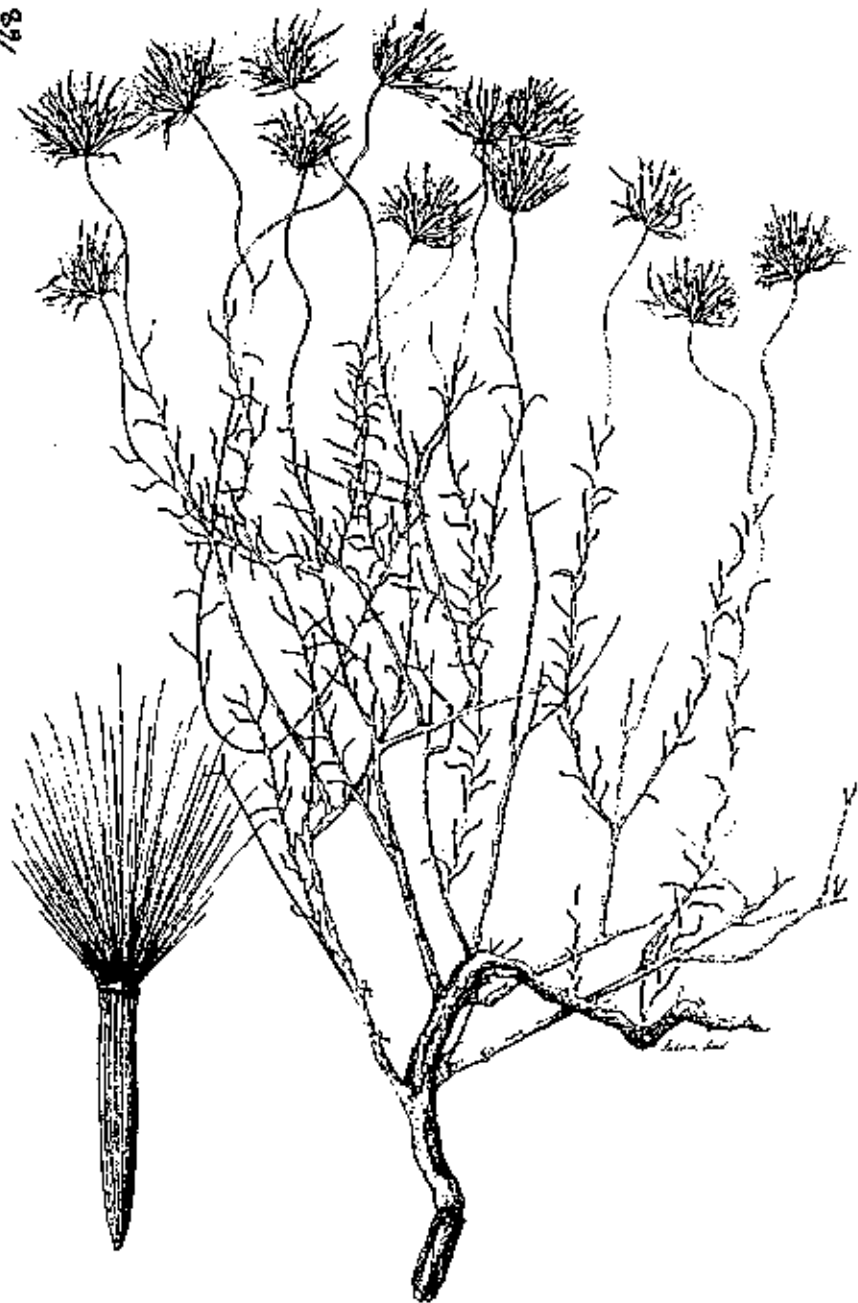


Figure 1. *Pseudoclappia watsonii* (Powell 2792); habit and achene.

Pseudoclappia watsonii is only the second species of the genus to be described, the other one being *P. arenaria*, a halophytic-gypsophile of south-eastern New Mexico, north-central Mexico, and adjacent Texas. The new species is similar to *P. arenaria* except that most floral features and the heads are larger in *P. watsonii*. The two species are readily distinguished, however, by habit and habitat differences. *Pseudoclappia watsonii* is a strong, intricately branched, low shrub which apparently is restricted to dry, gypseous-clay soils; *P. arenaria*, while also a low shrub, evidently does not attain the size and branching habit of the other species and it occurs in more mesic saline-gypsum habitats such as along playa lakes, etc.

The new taxon was first collected by Dr. Tom Watson, former student of both authors, after whom we are pleased to name the species.

SARTWELLIA gypsophila Powell & Turner, sp. nov.

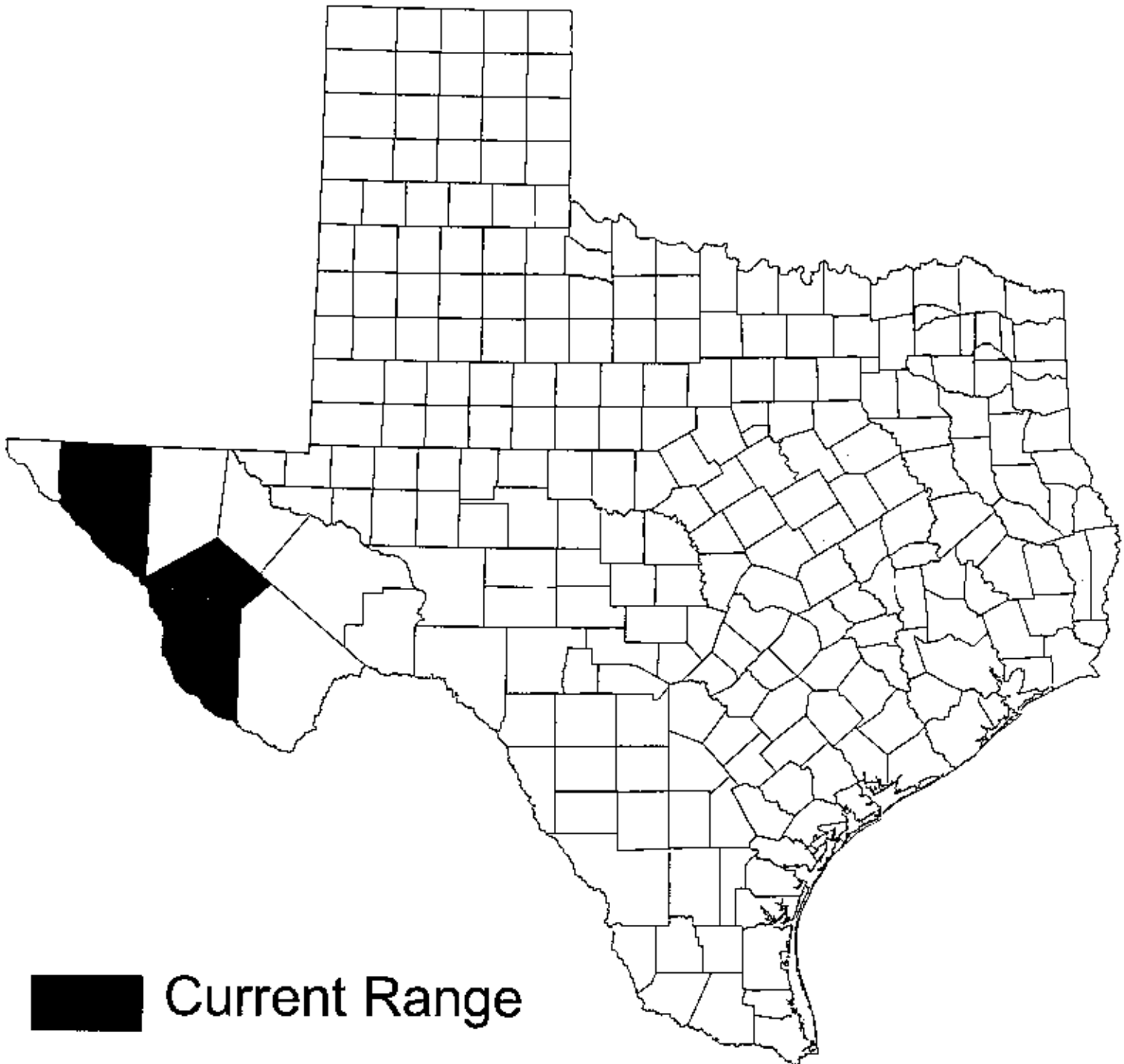
Suffrutices perennes glabri 35-60 cm alti erecti vel caulibus effusis. Folia opposita anguste linearia 7-12 cm longa 1.0-2.5 mm lata sessilia inferiora connato-vaginata. Capitulescentiae corymbiformes multiflorae apice planae. Capitula radiata 12-15 flora; involucra turbinate, bracteae 5 ellipticae acutae apice minute ciliato-laceratae; flores radiati saepe 5, ligulis flavis ovalibus vel oblongis vel ellipticis 1.5-1.8 mm longis 1.0-1.5 mm latis; flores disci corollis 2.0-2.5 mm longis lobis fere indistinctis, faucibus superius abrupte expansis lobis ca. 1 mm longis acutis maturis reflexis, styli rami ca. 0.5 mm longi vel breviores apice truncati penticillati. Achenia nigra 1.0-1.5 mm longa minute pubescentia; pappus coroniformis squamellis pluribus pro parte coalescentibus ca. 0.3 mm longis. Chromosomatum numerus, $n = 18$.

TYPE: MEXICO: Chihuahua, Jurassic gypsum near the lake road and ca. 5 mi NW of Lake Granero, ca. 16 mi from Morrión, 14 July 1973, A. M. Powell 2536 (Holotype, SRSC; Isotype, TEX).

Known only from the type locality.

Sartwellia gypsophila was discovered at a locality where several other novel gypsophilic taxa have been found in the past few years, including members of *Argemone*, *Selinocarpus*, *Nerisyrenia*, and *Gaillardia*. The discovery of a new *Sartwellia* is surprising since the genus, containing only three species, was recently treated by the junior author (Turner, 1971); however, the gypsum area at the type locality was unexplored by botanists at that time which leads us to believe that yet other gypsophiles within this genus might remain undescribed from the area concerned.

Judging from pappus structure, leaf morphology, head size, and floral characters, *Sartwellia gypsophila* seems most closely related to the more northerly *S. flavina* of southern New Mexico and adjacent Texas although it also shares characters with the more southerly *S. puberula*. *Sartwellia gypsophila* is readily distinguished by its tall, suffruticose habit and selected floral characters. Other species of *Sartwellia* are annuals or short-lived perennial herbs, but all are restricted to gypsum substrates (Turner, 1971).



■ Current Range

Pseudoclappia watsonii
(Watson's false clappia-bush)

Scientific Name: *Psilactis heterocarpa* (Hartman & Lane) Morgan

Synonyms: *Machaeranthera heterocarpa* Hartman & Lane. Treated in Correll & Johnston (1970) and Jones (1977) as *Machaeranthera tenuis* (S. Wats.) Turner & Horne (*Psilactis tenuis* S. Wats.), which is restricted to the mountains of west Texas and northern Mexico (Hartman & Lane 1987).

Common Name: Welder machaeranthera

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Gulf Coastal Plain of south Texas.

State Range: Jackson, Karnes, Kleberg, Nueces, Refugio, San Patricio and Victoria counties.

Description (adapted from Hartman & Lane 1987; Morgan 1993): Taprooted annual 25-100 cm tall; stems erect, up to 6 mm in diameter, the epidermis of a light brown color and barklike; stems and branches pubescent above with glandular and sparse appressed nonglandular trichomes. Leaves alternate, simple, sessile, those of the lower stem narrowly lanceolate, 20-35 mm long and 3-5 mm wide, entire, sparsely appressed-pubescent, those of the upper stem lanceolate to linear lanceolate, reduced, the smallest 2-15 mm long and 0.3-1.5 mm wide, the bases tapered and slightly clasping, sparsely pubescent with glandular and appressed nonglandular trichomes. Flower heads 40-100 per plant, usually solitary at the tips of branchlets; involucre broadly turbinate to hemispheric, 4-6 mm high and about as wide; phyllaries in 2-3 imbricate series, narrowly elliptic to linear-lanceolate or linear, 2-4 mm long and 0.5-0.75 mm wide, the herbaceous portions glandular-pubescent; receptacle flat to convex; ray flowers 15-25, blue or violet, the petal-like ligule 4-5 mm long and 0.75-1.25 mm wide; disc flowers 25-35, 3-4 mm long, the lobes yellow, sometimes with purplish lobes. Achenes of ray flowers fusiform, 1.3-1.5 mm long, with 9-12 rounded ribs, thinly appressed-pubescent, the pappus absent; achenes of disk flowers fusiform to clavate, 2.5-3 mm long, with 12-18 indistinct ribs, glabrous or glabrate, capped by a pappus of 25-40 tawny bristles 3.2-4 mm long.

Similar Species: *Psilactis heterocarpa* could easily be mistaken for any of the local blue-rayed *Aster* species, from which it is easily distinguished on the basis of its heteromorphic achenes. In *P. heterocarpa*, the achenes of the disc florets are capped by a conspicuous bristly pappus, whereas those of the ray florets have no pappus; all of the other blue-rayed *Astereae* in the Coastal Bend have a bristly pappus on both types of achenes. Although supposedly annual, the stems of *P. heterocarpa* have a cracked, bark-like, light brown to tan-colored surface (Hartman & Lane 1987), whereas the stems of local blue-rayed asters all have a rather ordinary, smooth, green-colored surface. The phyllaries and subtending inflorescence branches are strongly glandular-glutinous in *P. heterocarpa*; some of the local asters have a few glands on the phyllaries, but these are small and not readily detected.

Habitat: Shrub-invaded grasslands, weedy pastures and open mesquite-huisache woodlands on mostly gray-colored clayey to silty soils over the Beaumont and Lissie formations on the Gulf Coastal Plain. Herbaceous associates include *Bothriochloa laguroides*, *Bouteloua curtipendula*, *Agalinis heterophylla*, *Ambrosia psilostachya*, *Aster ericoides*, *A. praealtus*, *A. subulatus*, *Chloracantha spinosa*, *Croton* spp., *Euphorbia bicolor*, *Euthamia leptcephala*, *Gutierrezia* sp., *Helenium amarum*, *Iva angustifolia*, *I. annua*, *Melochia pyramidata*, *Palafoxia texana*, *Parthenium hysterophorus*, *Paspalum plicatulum*, *Ruellia nudiflora*, *Verbesina virginica* and *Zexmenia hispida*.

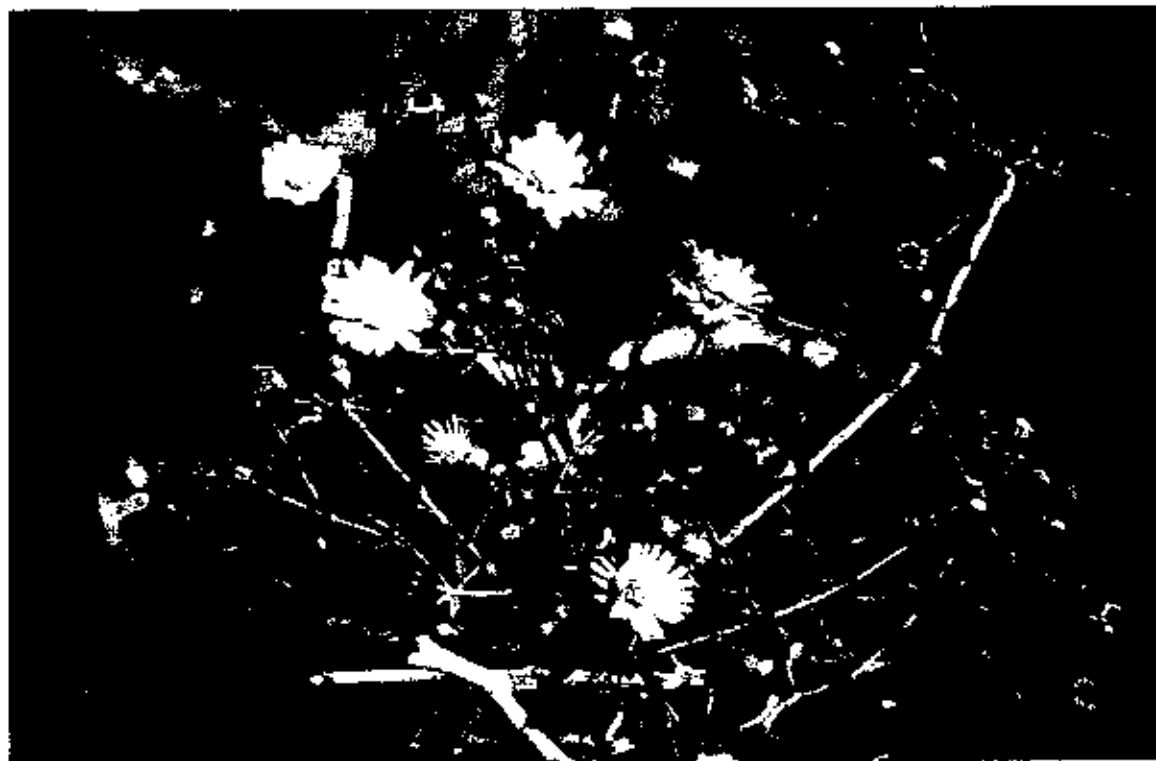
Phenology: Flowering September-November.

Comments: *Psilactis heterocarpa* often occurs as a weed of pastures on clayey soils. It may prove to be simply overlooked (due to its similarity to *Aster* species) rather than rare or of conservation concern.

Illustrations: Line drawings of various parts appear in Hartman & Lane (1987).

Selected References:

- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Hartman, R. L. 1976. A conspectus of *Machaeranthera* section *Psilactis* (Compositae: Astereae) and a biosystematic study of the section *Blepharodon*. Ph.D. dissertation, University of Texas at Austin.
- Hartman, R. L. and M. A. Lane. 1987. A new species of *Machaeranthera* section *Psilactis* (Asteraceae: Astereae) from coastal Texas. *Brittonia* 39(2): 253-257.
- Hartman, R. L. 1990. A conspectus of *Machaeranthera* (Asteraceae: Astereae). *Phytologia* 68: 439-465.
- Jones, F. B. 1977. Flora of the Gulf Coastal Bend. Second edition. Welder Wildlife Refuge, Sinton. 262 pp.
- Morgan, D. R. 1990. A systematic study of *Machaeranthera* (Asteraceae) and related groups using restriction site analysis of chloroplast DNA and a taxonomic revision of *Machaeranthera* section *Psilactis*. Ph.D. dissertation, University of Texas at Austin.
- Morgan, D. R. 1993. A molecular systematic study and taxonomic revision of *Psilactis* (Asteraceae: Astereae). *Systematic Botany* 18 (2): 290-308.
- Morgan, D. R. and B. B. Simpson. 1992. A systematic study of *Machaeranthera* (Asteraceae) and related groups using restriction site analysis of chloroplast DNA. *Systematic Botany* 17: 511-531.
- Turner, B. L. and D. Horner. 1964. Taxonomy of *Machaeranthera* sect. *Psilactis* (Compositae-Astereae). *Brittonia* 16: 316-331.



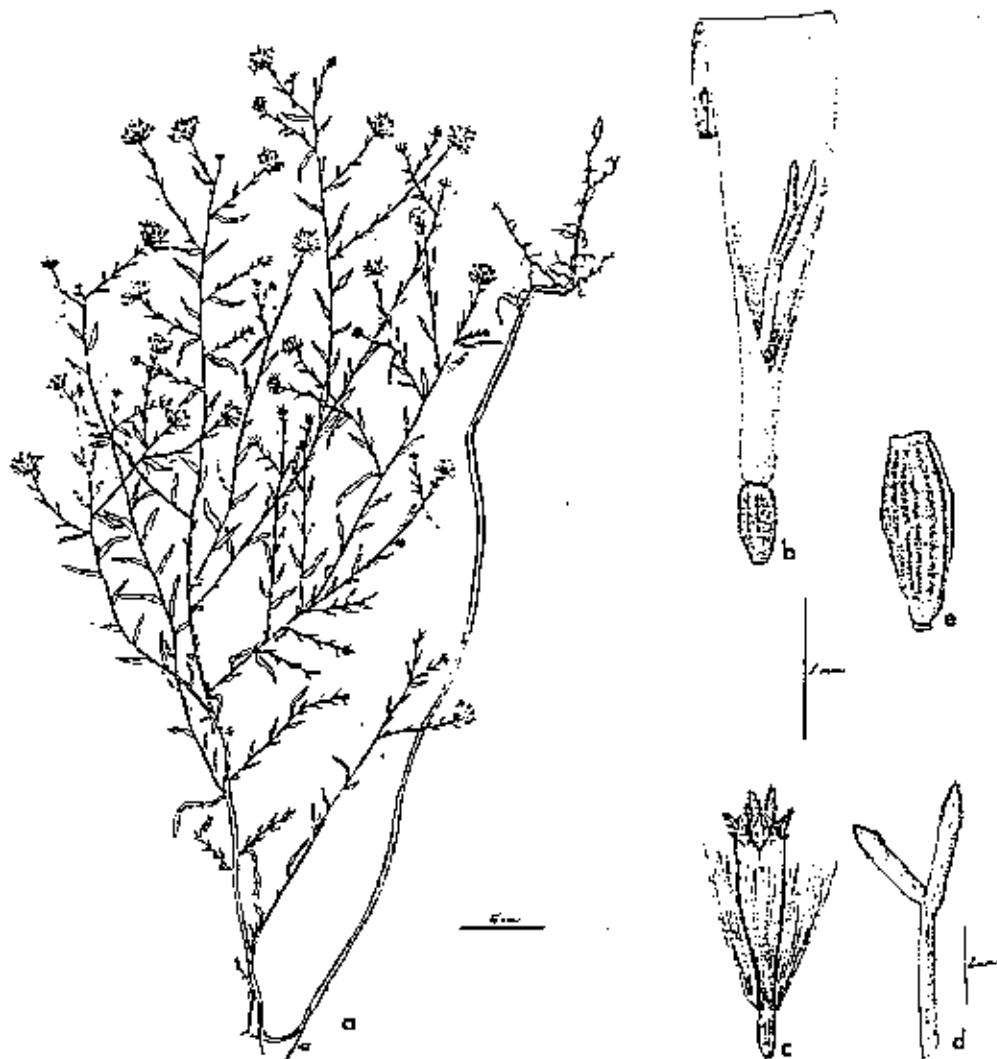


FIG. 1. *Machaeranthera heterocarpa*. A. Habit. B. Ray floret. C. Disc floret. D. Style of disc floret. E. Mature achene of ray floret. (Drawings from Hartman 3785.)

1.5–1.7 mm long, rounded at base, with a broadly lanceolate appendage at the apex, exerted to 0.5 mm; achenes of ray florets fusiform, oval in cross section, 1.3–1.5 mm long, with 9–12 indistinct ribs, thinly puberulent with simple to bifurcate hairs, epappose; achenes of disc florets irregularly oblanceoloid, narrowly elliptic in cross section, 2.5–2.9 mm long, with 14–18 distinct ribs, glabrous or essentially so, the pappus of 26–40 fine, minutely barbellate, tawny, subequal bristles in a single series, 3.2–4 mm long; chromosome number, $2n = 6$.

TYPE: UNITED STATES. TEXAS. San Patricio Co.: Welder Wildlife Refuge: ca 1.5 mi E of headquarters; occasional to abundant in scrub flats dominated by *Zanthoxylum fagara* (L.) Sarg., *Diospyros texana* Scheele, *Ziziphus obtusifolia* (Torrey & Gray) A. Gray, *Berberis trifoliolata* Moric., and *Prosopis glandulosa* Torrey with species of *Acacia*, *Tragia*, *Bothriochloa*, *Ipomoea*, *Conoclinium*, *Sida*, and *Croton* in the understory, 20 Oct 1973, R. L. Hartman 3785 (HOLOTYPE: RM; ISOTYPES: NY, TEX, and to be distributed).

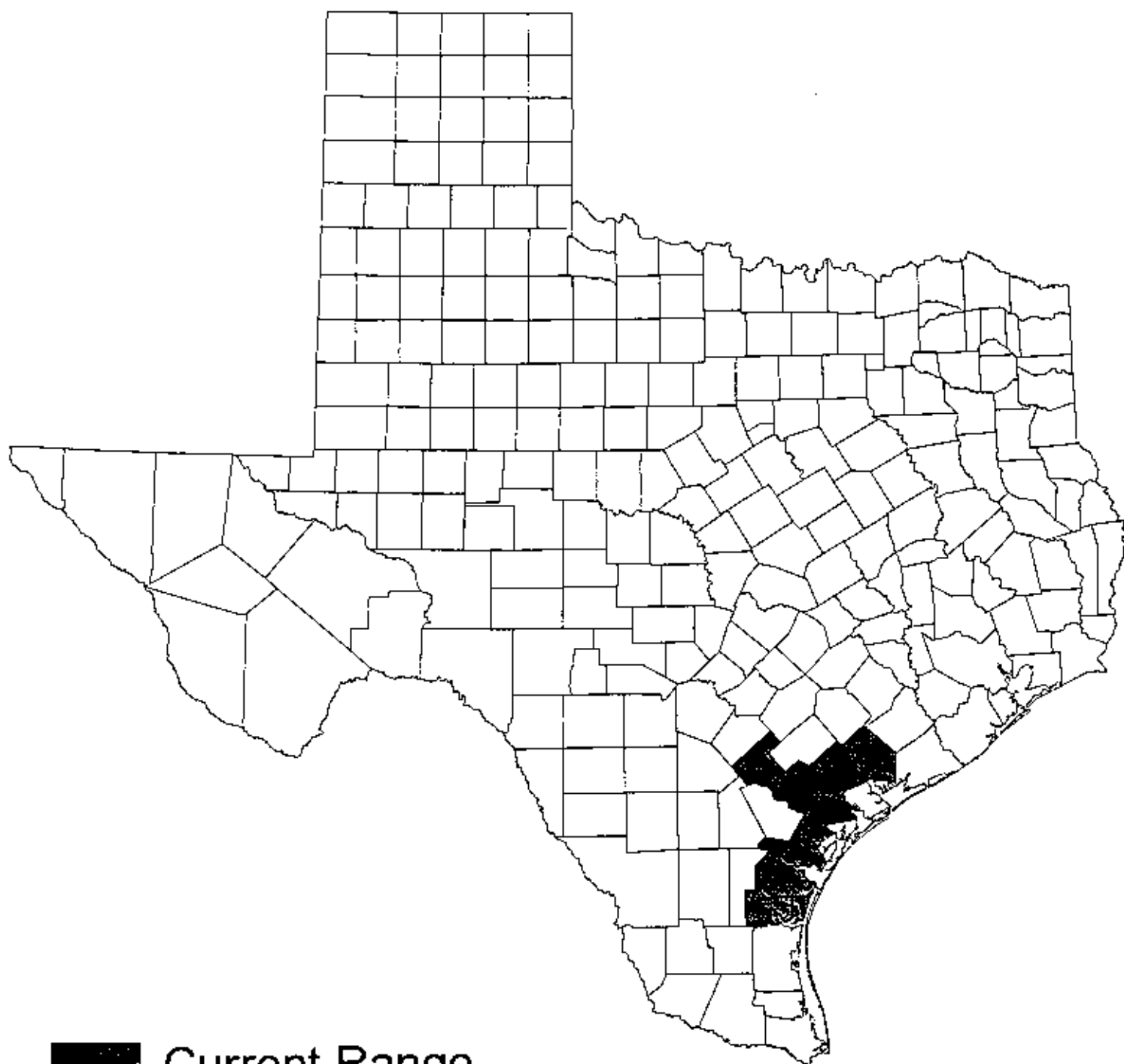
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■ Current Range

Psilactis heterocarpa
(*Welder machaeranthera*)

Scientific Name: Quercus boyntonii Beadle

Synonymy: Quercus stellata var. boyntonii (Beadle) Sarg.

Common Name: Boynton's oak; running post oak

Global Range: AL and TX.

State Range: Angelina County.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Shrub layer of loblolly pine-oak forests on deep sandy soils in creekbottoms; possibly also in shallower soils of upland prairies.

Phenology:

Similar Species: Closely related to Quercus stellata; however, Q. boyntonii is a rhizomatous shrub less than ten feet tall rather than a single-stemmed tree.

Comments: It is not clear that field surveys have been conducted for this species since Muller visited Angelina County in the 1950s.

Illustrations: A photograph of a herbarium specimen appears in Muller (1956); a line drawing of a single leaf appears in Trelease (1924).

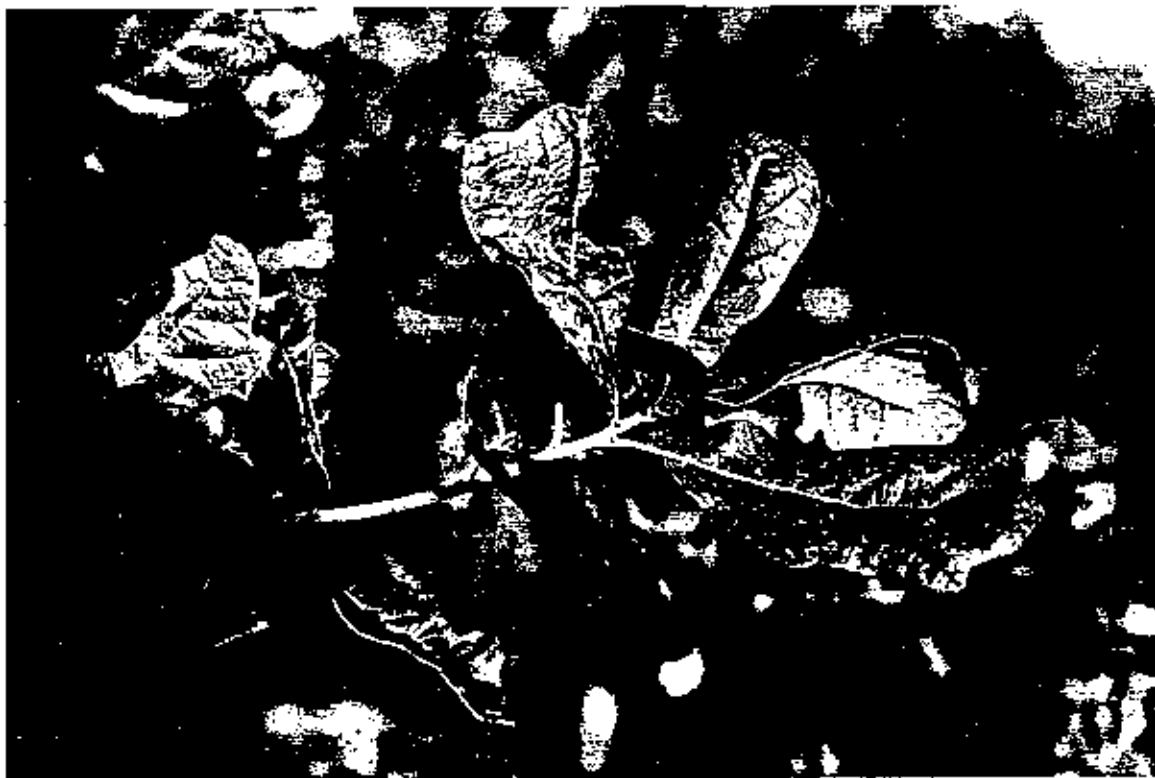
Selected References:

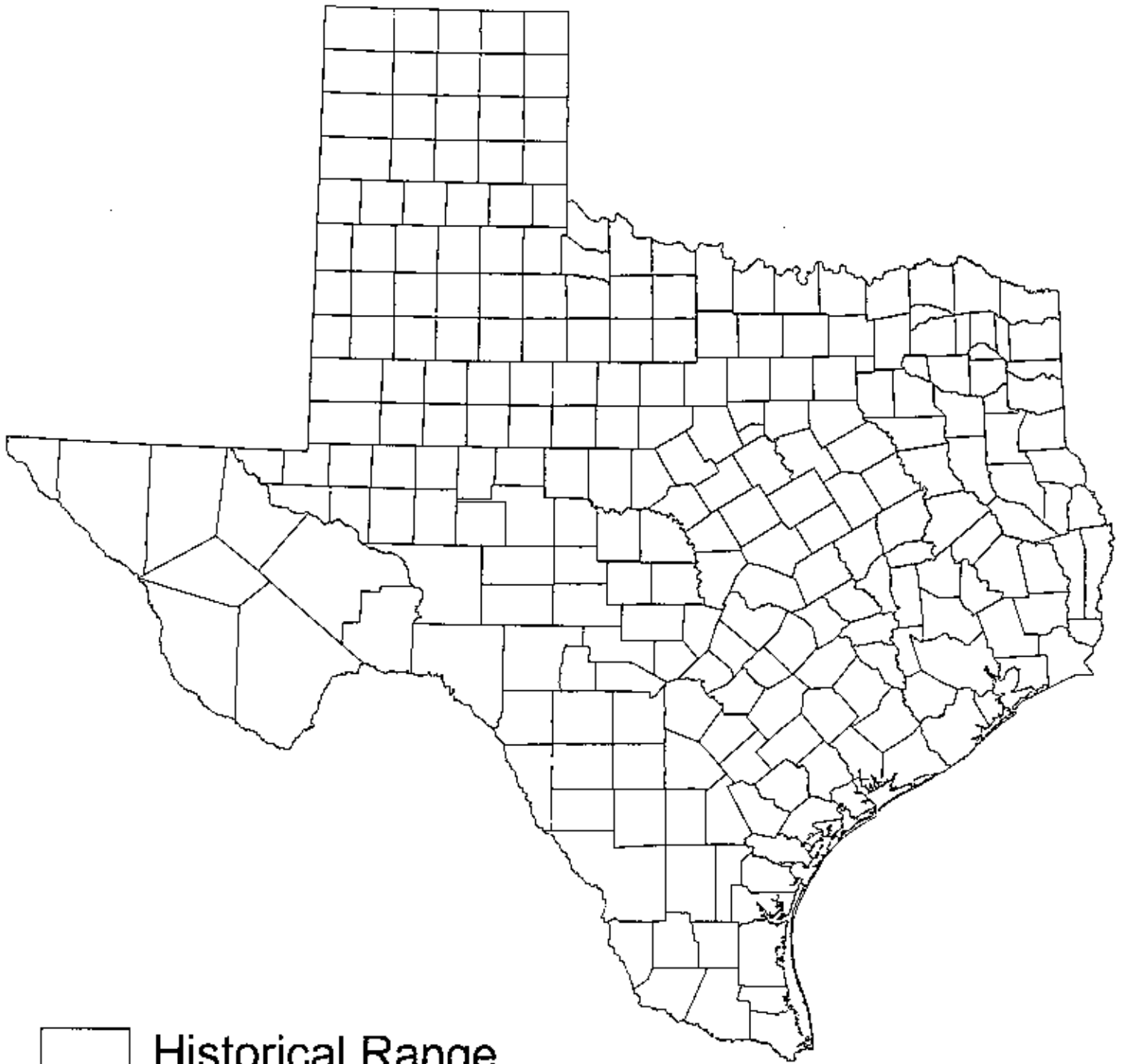
Muller, C. R. 1951. The oaks of Texas. *Contrib. Texas Research Found.* 1(3): 21-311.

Muller, C. H. 1956. The distribution of Quercus boyntonii. *Madroño* 13: 221-225.

Sargent, C. S. 1949. *Manual of the trees of North America*. Two volumes. Dover reprint edition, 1965. 934 pp.

Trelease, W. 1924. The American oaks. *Memoirs of the National Academy of Sciences* Volume 20. 255 pp. + 420 plates.





Quercus boyntonii
(Boynton's oak)

Scientific Name: *Quercus carmenensis* C. H. Mull.

Synonymy: *Quercus undulata sensu* C. H. Mull., *non* Torr.

Common Name: Sierra del Carmen oak, Delcarmen oak

Global/State Ranks: G2S1

Federal Status: None

Global Range: west Texas, and Coahuila, Mexico.

State Range: Chisos Mountains, Brewster County.

Description (compiled from Muller 1937, Nixon and Muller 1997, and Muller in prep.): Rhizomatous shrub 0.5-2 m (1½-6½ ft.) tall, or small tree (on better sites) to 12 m (40 ft.) tall; trunk to 0.75 m (30 in.) in diameter; bark light gray, checkered or furrowed; twigs 1-1.5 mm (<¼ in.) thick, sparingly (rarely densely) stellate-pubescent, exposed surfaces strikingly red, somewhat glabrescent and gray the second year; buds nearly round, 1-1.5 mm (<¼ in.) long, light brown, pubescence similar to twigs. **Leaves** deciduous; blades 2-5 cm (¾-2 in.) long, 1-3 cm (⅜-1½ in.) broad, thin to moderately leathery, upper surfaces dark green, glossy, sparsely and minutely stellate-pubescent, lower surfaces light green or yellow green, prominently pubescent with minute, erect velvety hairs, oblong to obovate, usually broadest above the middle, acute or sometimes broadly rounded apically, cuneate to rounded basally, margins shallowly and irregularly lobed or coarsely toothed in distal half, rarely subentire, teeth mucronate; veins 9-12 on each side, readily apparent on both surfaces due to their light color; petioles 2-10 mm (<¼-¾ in.) long, about 1 mm (<¼ in.) thick, basally red like the twigs. **Flowers** dioecious, much reduced; staminate inflorescence unknown; pistillate inflorescence 1-1.5 cm (⅜-¾ in.) long, distally 2-3 flowered on slender tomentose peduncles. Fruit produced annually, solitary or paired, subsessile or short-pedunculate; cups with acute, light brown, canescent scales; mature acorns not known.

Habitat: Shrublands and woodlands on limestone talus slopes; 2200-2500 m (7260-8250 ft.).

Phenology: Immature fruit collected in July.

Similar Species: The bright red color of the twigs and petioles is quite distinct, and can be seen at some distance. However the character is practically lost in drying. There are several other shrubby oaks in west Texas. *Quercus depressipes* has leaves that are moderately to deeply cordate at the base with petioles that are strongly depressed in the basal sinus. Also the leaves are completely glabrous or with a few stellate hairs on the midrib. On *Q. turbinella* the lower leaf surfaces are usually yellowish or

reddish, minutely simple- or stellate-puberulent, and the puberulence is often glandular. The leaves of *Q. pungens* var. *vaseyana* are oblong and usually coarsely 3-5 toothed or lobed. The leaves of *Q. grisea* are dull green above and covered with a felty pubescence below. The leaves of *Q. intricata* are very small, thick, coarsely revolute, and densely woolly tomentose beneath. The leaves of *Q. mohriana* are quite distinctive, with lustrous, dark green upper surfaces contrasted to white, densely tomentose lower surfaces.

Comments: Only recently discovered in the United States (Powell 1998), this species is in need of further study.

Illustrations: A line drawing of a branch appears in Powell (1998). A line drawing of a few leaves and an acorn appears in Nixon and Muller (1997).

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- Muller, C. H. 1937. Studies in Mexican and Central American plants. *American Midland Naturalist* 18:842-855.
- Muller, C. H. In prep. Fagaceae. In Henrickson, J. and M. C. Johnston. Chihuahuan Desert Flora.
- Nixon, K. C. and C. H. Muller. 1997. *Quercus* sect. *Quercus*. In Flora North America Editorial Committee. Flora of North America north of Mexico, vol. 3. Oxford University Press, New York. 590 pp.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent Texas. University of Texas Press, Austin. 498 pp.

780

8 m (rarely 20 m) tall, with hard, furrowed, gray bark. The species name is taken after the slender, arching, graceful branches and pendent leaves. The leaves are rather thin, narrowly lanceolate, 8–10 cm long, 2–3 cm wide, aristate apically, usually unequally 8–10 toothed or lobed, these aristate. A form (*parvilobata*) with lanceolate leaves and entire margins does occur. Fruit maturation requires two years. It is possible that some plants in the populations of *Q. graciliformis* are instead *Q. emoryi* X *Q. graciliformis* (synonym, *Q. tharpii*). Recent information (K. Nixon, per. comm.) indicates that *Q. graciliformis* is a valid species restricted to the Chisos Mts., and that it is closely related to *Q. canbyi* Trel. of northeastern Mexico. Fruit maturation in *Q. canbyi* requires one year (K. Nixon, pers. comm.). The National champion Chisos Oak in Blue Creek Canyon was found by Liles to be 66 ft. high with a girth of 5.4 ft.

19. *Quercus gravesii* Sudw.

GRAVES OAK, CHISOS RED OAK.

Fig. 77. [*Quercus texana* Sarg., not Buckl.; *Q. stellipila* (Sarg.) Parks; *Q. chisosensis* (Sarg.) C. H. Mull.]. Mountains, canyons, and arroyos, igneous and limestone substrates, rather common in Davis, Glass, and Chisos Mts. Presidio Co., Sierra Vieja. Jeff Davis Co., Davis Mts., Timber Mt. to Mt. Livermore. Brewster Co., vicinity of Alpine, S to the Chisos Mts. Pecos Co., Sierra Madera. Val Verde Co., Hidden Trail Canyon, off Rio Grande below Seminole Canyon. 1200–7600 ft. Also common in mts. of Coah. Mex.

The small or large trees of Graves Oak may reach 14 m high, with roughly furrowed, hard black bark. The leaves are deciduous, scarlet in autumn, rather thin in texture, to 14 cm long, 12 cm wide, usually with 2–3 lobes on each side with deep rounded sinuses, the lobes few-toothed and aristate-tipped. The National co-champion was discovered by Liles in Panther Canyon, Chisos Mountains, Big Bend National Park, with measurements 42 ft. tall, 40 ft. crown spread, and 12.8 ft. girth.

It is somewhat surprising to find Graves Oak, normally a species of moderately high elevations (above 4000–5000 ft.) in Hidden Trail Canyon at about 1200 ft. in Val Verde Co. There, plants grow with the rare American Pistachio (*Pistacia texana*).

20. *Quercus tardifolia* C. H. Mull. LATELEAFOAK.

Fig. 78. Along arroyos and canyons, in woodlands at about 7000 ft., endemic to the Chisos Mts., Brewster Co. This is a rare species.



Fig. 78. *Quercus tardifolia*
(Lateleaf Oak)



Fig. 79. *Quercus carmenensis*
(Delcarmen Oak)

Only two colonies or clones have been discovered, between Boot Spring and the South Rim along upper Boot Canyon. Also Mex., Coah., Sierra del Carmen, one colony near Schott Tower (El Pico).

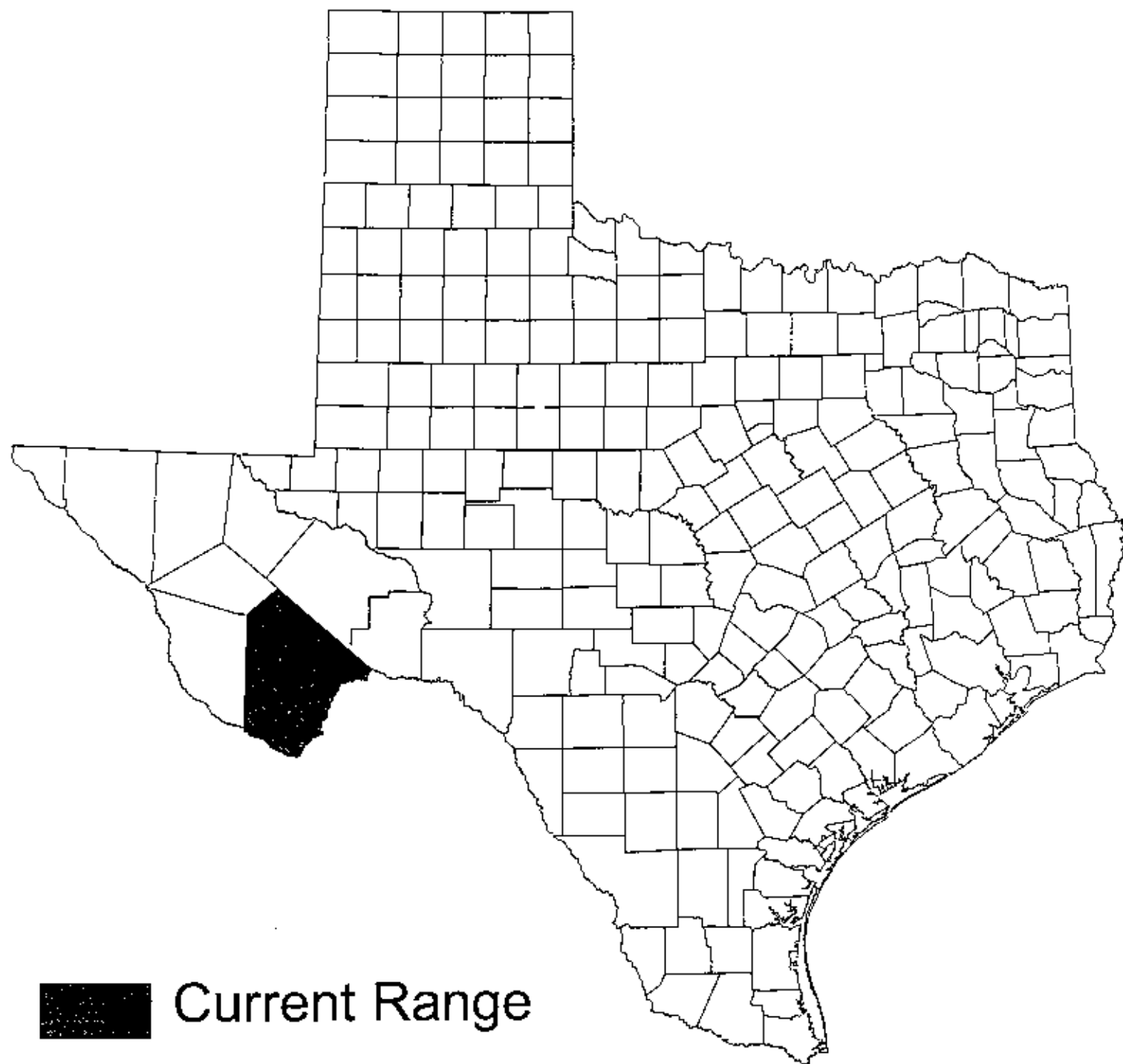
The plants of Lateleaf Oak are small, erect, evergreen trees with short branches and furrowed bark. The leaves appear late in the year, the new ones about the first of July, covered by a dense tomentum. The leaves are 5–9 cm long, 2.5–5.5 mm wide, with 3–4 aristate-tipped lobes on each side. The upper surfaces are a dull bluish-green, and the lower surfaces are detachably stellate-tomentose. *Quercus tardifolia* may prove to be a hybrid, *Q. gravesii* Sudw. X *Q. hypoxantha* Trel.

21. *Quercus carmenensis* C. H. Mull. DELCARMEN OAK.

Fig. 79. High wooded ridge. Brewster Co., Chisos Mts., Casa Grande, ca. 7300 ft., just below the SE bluffs. Collected by the author, Sept. 1982, a new record for the United States. Otherwise known from Coah., Mex., Sierra del Carmen.

The one plant seen was a shrub, 0.5 high, with leaves ovate-elliptic, evenly and minutely stellate, the upper surfaces lustrous and perhaps glabrous. More information should be sought about this oak in the Chisos Mountains.





Current Range

Quercus carmenensis
(Sierra del Carmen oak)

Scientific Name: *Quercus depressipes* Trel.

Synonymy: *Quercus bocoyneensis* C. H. Muller

Common Name: dwarf Mexican oak; Mexican dwarf oak, depressed oak

Global/State Ranks: G2S1

Federal Status: None.

Global Range: west Texas; Chihuahua, Durango, and Zacatecas, Mexico

State Range: Davis Mountains, Jeff Davis County.

Description (compiled from Nixon and Muller 1997, Muller in prep.):

Rhizomatous shrub, often forming dense thickets, to 1 m (3½ ft.) tall; bark gray, scaly; twigs tan-brown, becoming reddish gray, 1-1.5 mm (<¼ in.) in diameter, glabrate or hairy; buds tan or brown, subglobose, 1-1.5 mm (<¼ in.) long, glabrate or scales inconspicuously ciliate. **Leaves** evergreen or subevergreen, emerging from bud red and nearly glabrous; petioles 1-2 mm (<¼ in.) long, strongly depressed in basal sinus; blades oblong to elliptic, 5-30 mm (¼-1½ in.) long, rarely to 60 mm (2¾ in.) long, 4-25 mm (⅙-1 in.) wide, thick, leathery, base cordate, margins inconspicuously toothed in distal half, rarely entire, sometimes sublobate, somewhat revolute, apex broadly rounded to subacute; surfaces dull gray-green or glaucous, completely glabrous or with a few stellate hairs on midrib, secondary veins somewhat raised. **Flowers** dioecious; male inflorescence to 2 cm (¾ in.) long, somewhat pubescent, rather closely flowered; female inflorescence 2-flowered on short stellately pubescent or glabrous peduncles. **Fruits** annually produced, paired, peduncle 7-15 mm (¼-⅝ in.) long; cup 4-7 mm (⅙-¼ in.) deep, 8-13 mm (⅔-½ in.) wide, goblet-shaped, enclosing ¼-½ of nut, base somewhat constricted or rounded, scales moderately tuberculate, basally densely gray-tomentose, tips rather closely appressed, reddish brown, glabrous and ciliate, closely appressed; nut tan-brown, elliptic to ovoid or globose, 10-15 mm (⅔-⅝ in.) long, 8-11 mm (±¾ in.) wide, apex rounded, transiently glaucous, glabrous.

Habitat: Grasslands and open wooded slopes; 2100-2600 m (6900-8600 ft.); known in Texas from north and south facing slopes of Mount Livermore.

Phenology: Flowering in the spring.

Similar Species: *Quercus depressipes* has glabrous (or practically so) leaves in contrast to most of the shrubby oaks of west Texas (*Q. carmenensis*, *Q. grisea*, *Q. intricata*, *Q. mohriana*, *Q. pungens* var. *vaseyana*, and *Q. turbinella*). The only other shrubby oak with glabrous leaves is *Q. hinckleyi* which is easily distinguished by its very spiny leaves.

Comments: Hybridizes with *Q. rugosa* in Mexico

Illustrations: Line drawings appear in Powell (1998), Nixon and Muller (1997), and in Vines (1960); a back-and-white photograph of a pressed specimen appears in Trelease (1924).

Selected References:

Muller, C. R. 1951. The oaks of Texas. *Contrib. Texas Research Found.* 1(3): 21-311.

Muller, C. H. In prep. Fagaceae. In Henrickson, J. and M. C. Johnston. Chihuahuan Desert Flora.

Nixon, K. C. and C. H. Muller. 1997. *Quercus* sect. *Quercus*. In Flora North America Editorial Committee. *Flora of North America north of Mexico*, vol. 3. Oxford University Press, New York. 590 pp.

Powell, A. M. 1998. *Trees and shrubs of the Trans-Pecos and adjacent Texas*. University of Texas Press, Austin. 498 pp.

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Fig. 60. *Quercus depressipes*
(Mexican Dwarf Oak)

wide, but are usually much smaller, and the margins usually are strongly wavy or with few shallow lobes. Nixon and Muller (1992) have clarified the status of *Q. laceyi* in Texas and have determined that *Q. glaucooides* Mart. & Gal. with which *Q. laceyi* has been included as synonymous in recent literature, is a Mexican species.

4. *Quercus depressipes* Trel. MEXICAN DWARF OAK. Fig. 60. Open wooded grasslands at high elevations in the Davis Mts. Jeff Davis Co., near the summit of Mt. Livermore; reported from near Mt. Locke; ca. 8000 ft. Also Chih. and Dgo., Mex.

Plants of this species are subevergreen low shrubs to ca. 1 m tall, often growing singly or forming dense thickets by stolons. The smallish leaves are oblong to elliptic, to 3 cm long and 1.2 cm wide.

5. *Quercus muehlenbergii* Engelm. CHINKAPIN OAK. Fig. 61. [*Quercus prinoides* sensu Coult., not Willd.; *Q. prinus* sensu Coult., not L.; *Q. laevis* Small]. Usually protected slopes and canyons of the higher mountains. Culberson Co., Guadalupe Mts., common in most canyons, to the top. Jeff Davis Co., Davis Mts., Timber Mt., Little Aguja Canyon, Limpia Canyon, Wildcat Pass, Madera Canyon of Mt. Livermore. Brewster Co., Chisos Mts., Maple Pulliam Canyon. 5000–8000 ft. Elsewhere mostly in calcareous upland forests to NE and central TX; east to the Atlantic; N to WI; W into S NM; also N Mex.

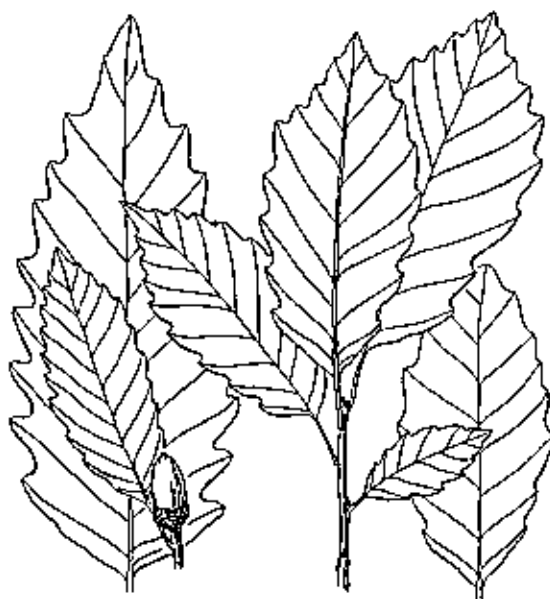
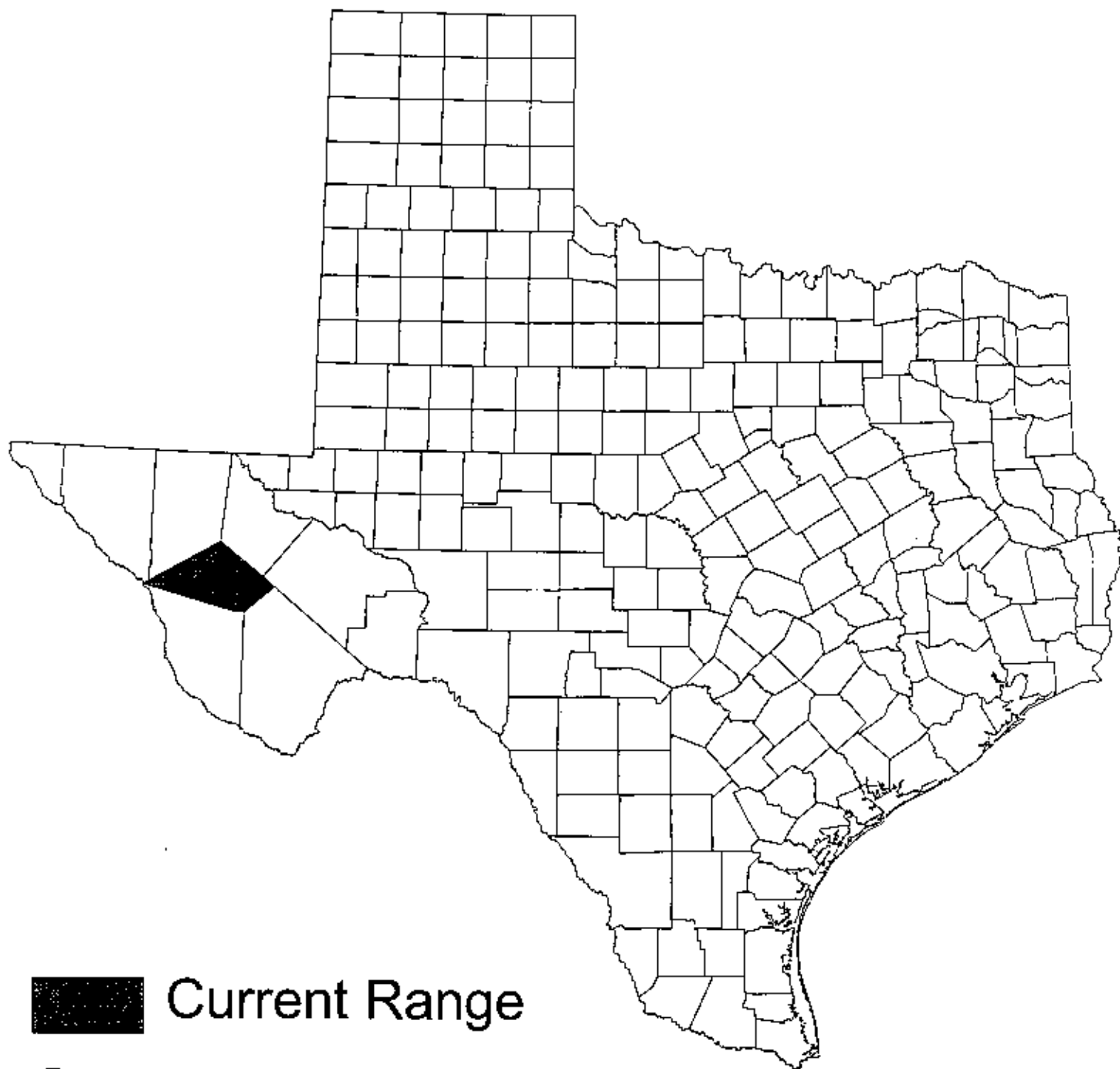


Fig. 61. *Quercus muehlenbergii* (Chinkapin Oak)

This is one of the most attractive oaks of the Trans-Pecos. The plants are deciduous moderate-sized to large trees, 5–16 m high, with large leaves, usually obovate in outline with strongly undulating margins. Jim Liles measured a Chinkapin Oak 65 ft. high in Maple Canyon of the Chisos Mountains in Big Bend National Park. The Chinkapin Oak is valuable for its wood, and it grows from the stump. It is relatively free of insects and disease. *Quercus muehlenbergii* is similar to *Q. prinus* L. (Chestnut Oak) of east Texas and the southeastern U.S.

6. *Quercus gambelii* Nutt. GAMBEL OAK. Fig. 62. [*Quercus novomexicana* (A. DC.) Rydb.; *Q. undulata* Torr.; *Q. fendleri* Liebm.; *Q. obtusifolia* (A. DC.) Rydb.]. Slopes, valleys and canyons, higher elevations. El Paso Co., 0.5 mi NE of top of North Franklin Mts. Culberson Co., Guadalupe Mts., Pine Top Mt., in the Bowl, and at the head of South McKittrick Canyon. Presidio Co., Chinati Peak. Jeff Davis Co., Davis Mts., upper Madera Canyon; Mt. Livermore; N side of Mt. Livermore; NW slopes Sawtooth Mt.; N slopes Haystack Mt. Brewster Co., Mt. Ord, igneous soil; Chisos Mts., upper slopes Casa Grande; Lost Mine Peak. Jul–Sept.; 5000–8300 ft. Also N to CO and UT; N Mex., Chih. and Coah.

The Gambel Oak is variable in habit, being either shrubs 1–2 m high, often forming dense thickets, small trees, or rather large trees to 17 m high. The



Current Range

Quercus depressipes
(Mexican dwarf oak)

Scientific Name: *Quercus graciliformis* C. H. Mull.

Synonymy: *Quercus canbi* sensu Cory and Parks non Trel.; *Q. graciliformis* var. *parvilobata* C. H. Mull.

Common Name: slender oak; Chisos oak

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: west Texas

State Range: Chisos Mountains, Brewster County

Description (compiled from Muller 1951, Jensen 1997, and Muller in prep.):

Small trees 6-8 m (20-26 ft.) tall with slender gracefully arching branches and pendent leaves; bark gray, hard, furrowed; twigs straw colored to brown to deep reddish brown, 1-2 mm (<1/8 in.) in diameter, glabrate or somewhat pubescent at the tip; buds glossy brown or red-brown, ovoid, 1.5-3 mm ($\leq 1/8$ in.) long, minutely ciliate. Leaves tardily deciduous; petioles 1-2 cm (3/8-3/4 in.) long, glabrous or glabrate, very flexible; blades thin but coriaceous, lanceolate to narrowly elliptic, 4.5-10 cm (1 3/4-4 in.) long, 1-3 cm (3/8-1 1/8 in.) wide, base rounded to cuneate, margins rarely entire, usually with 8-10 aristate teeth or shallow lobes with rounded sinuses, apex acute to long-attenuate; soon glabrate and entirely smooth or rarely with an axillary tuft on lower surface, glossy green above, duller and slightly coppery beneath. Flowers dioecious; male inflorescence unknown; female inflorescence ca. 4 mm (1/8 in.) long, usually 2-flowered, deep reddish brown, usually glabrous. Fruits produced biennially, solitary or sometimes paired, sessile, cup saucer- or shallowly bowl-shaped, 4-6 mm (1/8-1/2 in.) high, 7-10 mm (1/2-3/4 in.) wide, covering 1/4-1/2 of nut, outer surface canescent to glabrate, ultimately ciliate; inner surface uniformly pubescent; scales ovate, thin, closely appressed, apices acute to rounded, brown, occasionally tuberculate at base; nut ovoid to narrowly ellipsoid, 9-18 mm (3/8-3/4 in.) long, 7-10 mm (1/2-3/4 in.) wide, minutely puberulent.

Habitat: Oak woodlands in "dry rocky canyons, usually associated with a high water table" (Muller 1951); in moister portions of canyons of the Chisos Mountains, above 5400 feet elevation.

Phenology: Flowering in the spring; fruiting July-early September.

Similar Species: *Quercus graciliformis* is very similar to *Q. gravesii*. However the leaves of *Q. graciliformis* are narrowly lanceolate (4-5 times as long as wide) with only coarse teeth or shallow lobes as compared to the broadly lanceolate to ovate leaves (2-3 times as long as broad) with definite lobes and deep sinuses of *Q. gravesii*. *Quercus emoryi* has thick, coriaceous

leaves as opposed to the thin but coriaceous leaves of *Q. graciliformis*. Also *Q. emoryi* produces fruits annually as opposed to biennially.

Comments: *Quercus tharpii*, a hybrid of *Q. graciliformis* and *Q. emoryi*, was described by Muller (1951).

Illustrations: Line drawings appear in Powell (1998) and in Vines (1960). Three black and white photographs, showing the variability of the leaves appear in Muller (1951).

Selected References:

- Jensen, R. J. 1997. *Quercus* sect. *Lobatae*. In Flora North America Editorial Committee. Flora of North America north of Mexico, vol. 3. Oxford University Press, New York. 590 pp.
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FRUIT. Acorns biennial, solitary or paired, sessile or very short-peduncled, narrow-ovoid, acute, length about $\frac{3}{8}$ in., width about $\frac{1}{8}$ in., finely pubescent, striate, basally enclosed only by the cup; cup hardly more than $\frac{1}{8}$ in. deep, about $\frac{1}{8}$ in. in diameter; scales ovate, closely appressed, brown, thin, hairy to glabrate later, somewhat ciliate.

LEAVES. Partially evergreen, thin but leathery, blades 3-4 in. long, $\frac{3}{8}$ - $1\frac{1}{4}$ in. wide, narrowly lanceolate, apex long-acuminate and bristle-pointed, base cuneate, margin 8-10-toothed or lobed and bristle-pointed, lobes with shallow, or deep, rounded sinuses between; upper surfaces lustrous green, mostly glabrous; lower surface paler and duller, glabrous, or occasionally a tuft of hairs in the leaf axils; petiole flexible to cause a pendent leaf, flattened above, glabrous, greenish red or yellowish, length $\frac{3}{8}$ - $\frac{1}{2}$ in.

TWIGS. Lustrous, reddish brown and gray later, somewhat hairy at first but soon glabrate, fluted, the small, pale lenticels inconspicuous; buds shiny brown, ovoid, apex acute to rounded, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, scales ciliate; stipules early deciduous, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, slightly hairy, setaceous to spatulate.

RANGE. The species, variety, and hybrid, are known only from the Chisos Mountains of Brewster County in western Texas. Its closest relatives are in Mexico.

HYBRID AND VARIETY. Chisos Oak is reported as hybridizing with Emory Oak to produce Sharp Oak, *Q. x tharpii* C. H. Muller.

A variety of Chisos Oak has been named *Q. gracilif.*



FEW-LOBED CHISOS OAK

Quercus graciliformis var. *parvilobata* C. H. Muller

formis var. *parvilobata* C. H. Muller. It has fewer leaf lobes than the species.

REMARKS. The genus name, *Quercus*, is the ancient classical name, and the species name, *graciliformis*, refers to the slender, drooping, graceful branches.

PIN OAK

Quercus palustris Muenchh.

FIELD IDENTIFICATION. Beautiful tree attaining a height of 120 ft, with a diameter of 5 ft. The crown oblong or broadly pyramidal. Branches numerous and spreading, the lower often pendulous. The short tough branchlets from the trunk produce a "pin-like" appearance in winter.

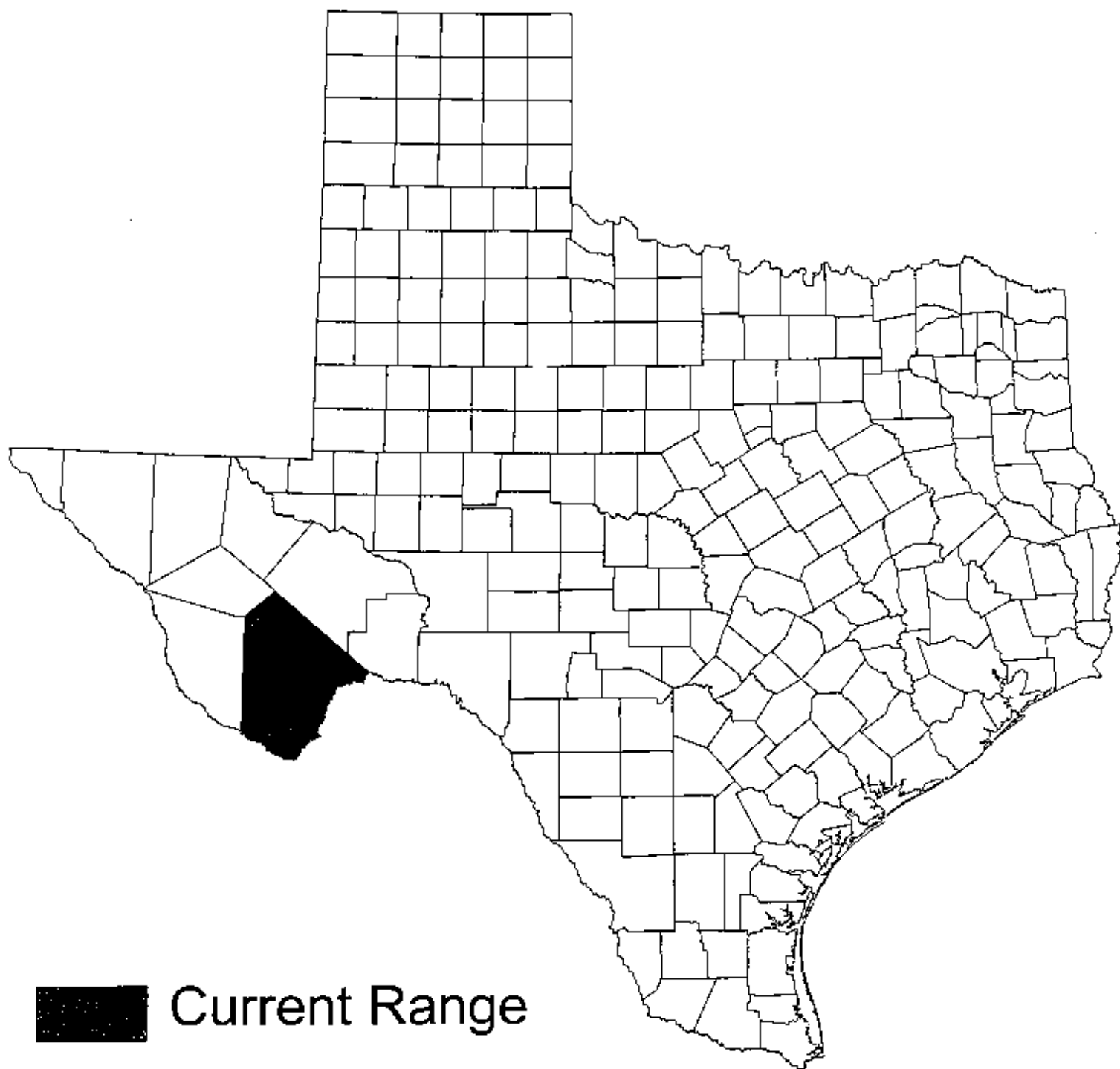
FLOWERS. Borne April-May, in separate staminate and pistillate catkins; staminate catkins slender, pubescent, 2-3 in. long, calyx-lobes 4-5, oblong, rounded at apex, denticulate on margin, shorter than the stamens, stamens exserted; pistillate flowers 1-3, on slender tomentose peduncles, scales of involucre ovate, tomentose, shorter than the acuminate calyx-lobes, styles slender, spreading, stigmas red.

FRUIT. September-October, biennial, solitary or



CHISOS OAK

Quercus graciliformis C. H. Muller



 Current Range

Quercus graciliformis
(Chisos oak)

Scientific Name: *Quercus hinckleyi* C. H. Mull.

Synonymy: None.

Common Name: Hinckley's oak

Global/State Ranks: G2S2

Federal Status: Threatened

Global Range: west Texas and Chihuahua, Mexico

State Range: Presidio County

Description (compiled from Muller 1951, Nixon and Muller 1997, Muller in prep.):

Rhizomatous, thicket-forming, intricately branching, evergreen shrubs, 0.5-1.5 m (1½-5 ft.) tall; bark gray, scaly; twigs light brown, pruinose, becoming waxy-glaucous in the second season, 1-1.5 mm (<¼ in.) in diameter, glabrous or sparsely and minutely stellate-pubescent; buds minute, subrotund, 0.5-1 mm (<¼ in.) long; scales reddish brown, flabrous except for ciliate margins. **Leaves** petiole to 2 mm (<¼ in.) long, glabrous, pruinose, rose-tinted; blades subrotund or rotund in outline, 5-15 mm (½-¾ in.) long and wide, occasionally broader than long, thick, leathery, base cordate or auriculate, margins strongly crisped with 2-3 coarse, spinescent, cartilaginous-thickened teeth on each side, apex acute or obtuse, spine-tipped; surfaces blue-green, glaucous, glabrous, secondary veins slightly raised. **Flowers** dioecious; male inflorescence 3-5 mm (⅓-½ in.) long, few-flowered on loosely tomentose peduncles; female inflorescence unknown. **Fruits** produced annually, solitary, sessile or on peduncle to 4 mm (⅓ in.) long; cup shallow, saucer-shaped, 1-3 mm (≤⅓ in.) deep, 10-15 mm (⅓-⅝ in.) wide, enclosing base of acorn only, margin irregularly undulate, scales closely appressed, minute, basally tuberculate-thickened, glabrous except for thin ciliate margins; nut ovoid, 10-20 mm (¾-¾ in.) long, 8-12 mm (⅓-½ in.) wide, glabrous.

Habitat: arid limestone slopes at mid elevations in Chihuahuan Desert.

Dominant associated species are *Acacia constricta*, *Parthenium incanum*, and *Agave lechuguilla* (Miller & Powell 1982). Other associates include *Mortonia scabrella*, *Cowania ericifolia*, *Rhus virens*, *Forsellesia spinescens*, *Dasyllirion leiophyllum*, *Euphorbia antisiphilitica*, *Aristida wrightii*, *Bouteloua warnockii*, *Viguiera stenoloba*, and *Selaginella lepidophylla*.

Phenology: Flowering in spring; produces acorns late August to early September (Miller & Powell 1982)

Similar Species: *Quercus hinckleyi* is easily distinguished from all other oaks in west Texas by its very small, crisped, spiny-toothed, glabrous leaves.

Comments: Some individuals show greater height, more pubescent twigs and leaves, and hemispheric acorn cups to 10 mm ($\frac{3}{8}$ in.) deep, suggesting gene flow with *Q. pungens* (Nixon and Muller 1997). Preserved leaves from packrat middens imply that *Quercus hinckleyi* was more abundant and wider-ranging 9500 to 19,000 years ago (Van Devender et al. 1978; Van Devender 1986).

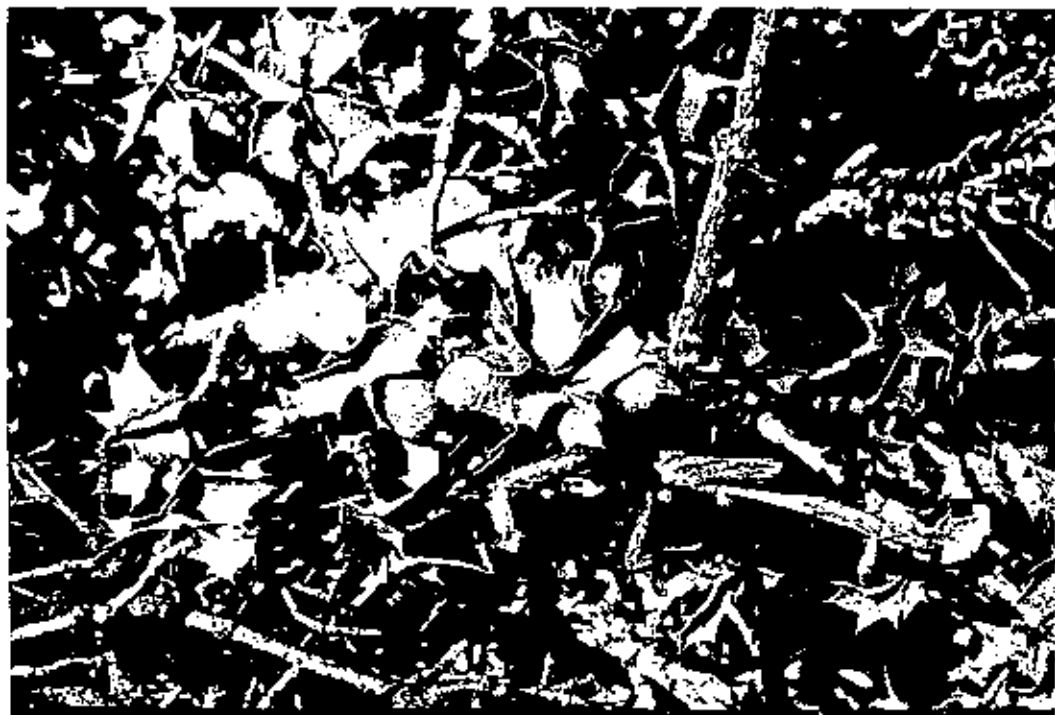
Illustrations: Color photographs appear in Warnock (1970) and in Poole & Riskind (1987). Line drawings appear in Powell (1998), Poole & Riskind (1987), and Nixon and Muller (1997).

Selected References:

- Bacon, J. R. 1989. A report on the project "Germination and establishment phase biology of the Hinckley oak (*Quercus hinckleyi*). Report submitted to the Texas Parks & Wildlife Department, Austin.
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Chihuahuan Desert flora. Pp. 1-19 in Second symposium on the resources of the Chihuahuan Desert region.

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Common Name: 797
Hinckley's oak
Hinckley oak



Paul Montgomery



Scientific Name: *Quercus hinckleyi* C.H. Muller

Other Scientific Names: None

Federal Status: Listed as Threatened, August 26, 1988

State Status: Listed as Threatened, December 30, 1988

Photographs and Drawings: Warnock, 1970, p. 28; Vines, 1976, p. 159; Powell, 1988, p. 99.

Description:

Habit: Dwarf, evergreen, much-branched shrub to 4 ft. high, forming dense stands; twigs slender, light brown.

Leaves: Thick, stiff, leathery, gray-green, very small, $\frac{3}{8}$ - $\frac{1}{2}$ in. long and wide, egg-shaped or almost round in outline, heart- or ear-shaped at the base, pointed or blunt at the top and spine-tipped, hairless, waxy, margins wavy, with coarse spiny teeth; veins obscure; leaf stalks very short, about $\frac{1}{8}$ in. long.

Flowers: Male flowers in very small, loose, elongate clusters, cluster $\frac{1}{8}$ - $\frac{3}{8}$ in. long; female flowers very hairy.

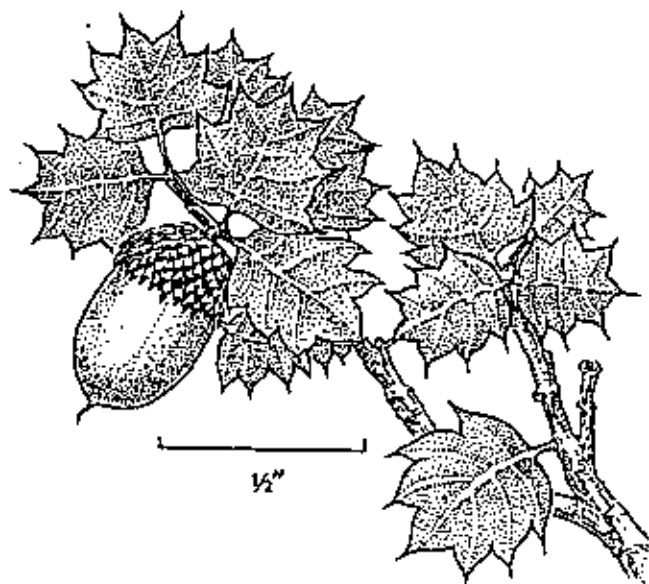
Fruit: Produced on an annual basis, solitary or paired, stalkless or on short stalks to $\frac{1}{4}$ in. long; acorns oval in shape, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad, brown, hairless, maturing in the fall; acorn cups shallow, saucer-shaped, $\frac{1}{2}$ - $\frac{3}{8}$ in. broad, $\frac{1}{2}$ - $\frac{3}{8}$ in. deep, margins more or less wavy.

Habitat: Desert shrublands on dry limestone slopes; with tickbush, sotol, lechugilla, resurrection plant, myrtle-croton, and evergreen sumac.

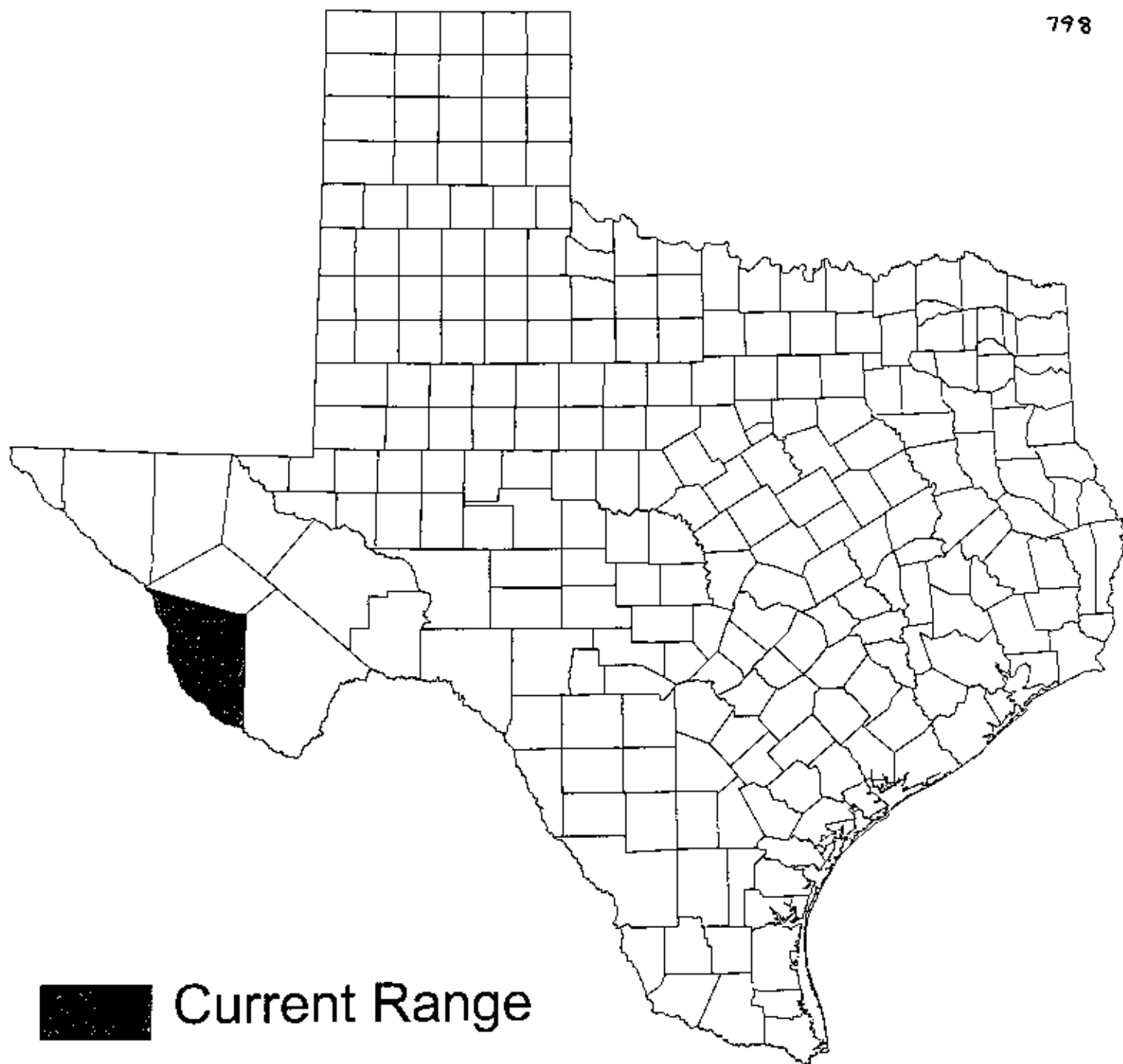
Ownership: Texas Parks and Wildlife Department and private.

Similar Species with Key Character Differences:

Leaves without spine-tipped teeth,
oblong to elliptic in outline *O. depressipes*

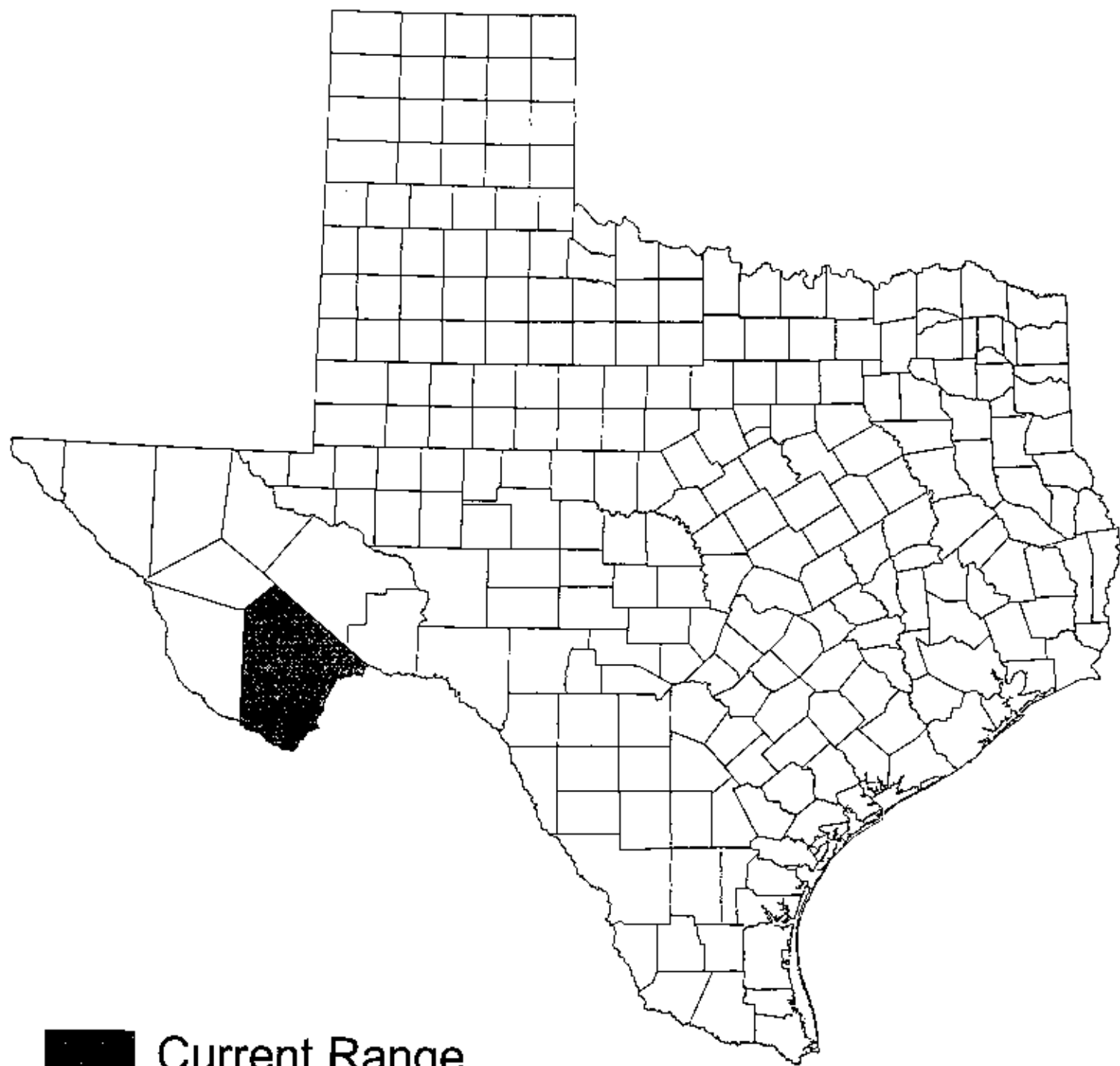


Leaves and fruit of
Hinckley's oak



■ Current Range

Quercus hinckleyi
(Hinckley's oak)



Quercus robusta
(robust oak)

Scientific Name: *Quercus tardifolia* C. H. Mull.

Synonymy: None.

Common Name: Chisos Mountains oak; lateleaf oak

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: west Texas and Coahuila, Mexico

State Range: Chisos Mountains, Brewster County

Description (compiled from Muller 1936, Muller 1951, Jensen 1997, Muller in prep.): Tree to 15 m; bark gray, hard, furrowed; twigs dark reddish brown, 1.5-2.5 mm in diameter, densely fulvous-stellate-tomentose the first season, red-brown and glabrate or nearly so by the second season; terminal buds brown or reddish brown, ellipsoid or ovoid, 3.5-5.5 mm long, apex hairy, scales broadly truncate, slightly pubescent, margins ciliate. **Leaves** evergreen, new ones appearing in dense tomentum about the first of July; petiole 10-20 mm long, pubescent or glabrate; blades broadly elliptic or obovate, widest at or distal to the middle, rather thick and chartaceous, flat, 5-10 cm long, 2-7 cm wide, base subequilateral, cordate or occasionally rounded, 3-4 lobed on each side with shallow or moderate sinuses, the lobes aristate-tipped and entire or rarely 2-tooth, apex acute or obtuse; lower surfaces conspicuously stellate-tomentose, pubescence detachable, primary and secondary veins raised; upper surfaces dull blue-green, somewhat rugose, eventually glabrate. **Flowers** unknown. **Fruits** biennially produced, solitary or paired, sessile, immature cups with thin, closely appressed scales, apices short and truncate, glabrous, brown, tomentose basally; mature fruit unknown.

Habitat: Mixed evergreen-deciduous woodlands in moist canyon bottoms at about 7000 feet elevation in the Chisos Mountains. Associates include *Cupressus arizonica*, *Acer grandidentatum*, *Juniperus deppeana*, *J. flaccida*, *Quercus emoryi*, *Q. gravesii*, *Pinus cembroides*, and *P. arizonica* var. *stormiae*.

Phenology: Flowering in the spring.

Similar Species: *Quercus tardifolia* is fairly unique among the west Texas oaks with its shallowly lobed, rather thick, chartaceous, somewhat rugose, dull bluish-green leaves and its dense covering of detachable pubescence on the lower surface. Although it may be closely related to *Q. gravesii*, the thin, deeply lobed, glossy, dark green, glabrous to sparsely pubescent leaves of *Q. gravesii* bear little resemblance to those of *Q. tardifolia*.

Comments: In the upcoming Chihuahuan Desert Flora, Muller treats *Q. tardifolia* as a hybrid of *Q. gravesii* and *Q. coahuilensis* (Muller in prep.). All other treatments have recognized lateleaf oak as a species, albeit of probably hybrid origin. Jenson (1997) in his Flora North America treatment states that lateleaf oak may be a hybrid of *Q. gravesii* and *Q. hypoxantha*. However neither *Q. coahuilensis* nor *Q. hypoxantha* presently occur in the Chisos Mountains.

Illustrations: Line drawings appear in Powell (1998) and Vines (1960). A black and white photograph of the type specimen appears in Muller (1951).

Selected References:

- Jensen, R. J. 1997. *Quercus* sect. *Lobatae*. In Flora North America Editorial Committee. Flora of North America north of Mexico, vol. 3. Oxford University Press, New York. 590 pp.
- Muller, C. H. 1936. New and noteworthy trees in Texas and Mexico. Bull. Torr. Bot. Club 63(3): 147-155.
- Muller, C. H. 1951. The oaks of Texas. Contrib. Texas Research Found. 1(3): 21-311.
- Muller, C. H. In prep. Fagaceae. In Henrickson, J. and M. C. Johnston. Chihuahuan Desert Flora.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent Texas. University of Texas Press, Austin. 498 pp.
- Vines, R. A. 1960. Trees, shrubs, and woody vines of the Southwest. University of Texas Press, Austin. 1104 pp.

BEECH FAMILY



LATELEAF OAK
Quercus tardifolia C. H. Muller

LEAVES. Evergreen, the new ones appearing with dense tomentum about the first of July, rather thick and chartaceous, blades 2-2½ in. long, 1-2¼ in. wide, sometimes to 4 in. long and 3 in. wide, oblong-ovate to subobovate, 3-4-lobed on each side with shallow or moderate sinuses, the lobes aristate-tipped and entire or rarely 2-toothed, short and rather broadly acute like the apices, basally subequilateral and slightly cordate, the upper surface dull bluish green, at length glabrate, lower surfaces detachably stellate-tomentose; veins 6-8 on each side, alternately passing into the teeth, hardly evident above but prominent beneath; petioles ¾-¾ in. long, ¼-½ in. thick, red at base, glabrate with the leaves; buds ¼-½ in. thick, acutely fusiform, hairy at the apices, the broadly truncate scales usually split at the end, slightly pubescent and often ciliate; stipules at length deciduous, ¼-¼ in. long, setiform to broad-ligulate, pubescent at apex.

TWIGS. About ½ in. thick, somewhat fluted, densely fulvous, with stellate tomentum the first season, glabrate or nearly so the second and reddish brown with minute inconspicuous lenticels, finally becoming gray.

RANGE. C. H. Muller states that only 2 clumps of this species have been found in the Chisos Mountains of western Texas in woodlands at an altitude of about 7,000 ft.

REMARKS. The genus name, *Quercus*, is the classical

name, and the species name, *tardifolia*, refers to the late appearance of the leaves. The flowers and mature fruit are unknown. More study is needed to determine the plant's place in taxonomy.

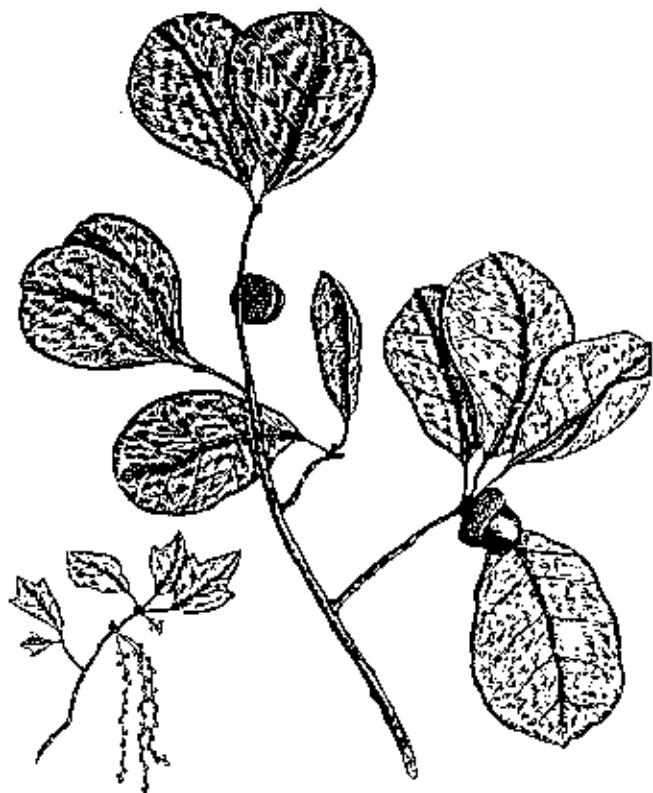
ARKANSAS OAK

Quercus arkansana Sarg.

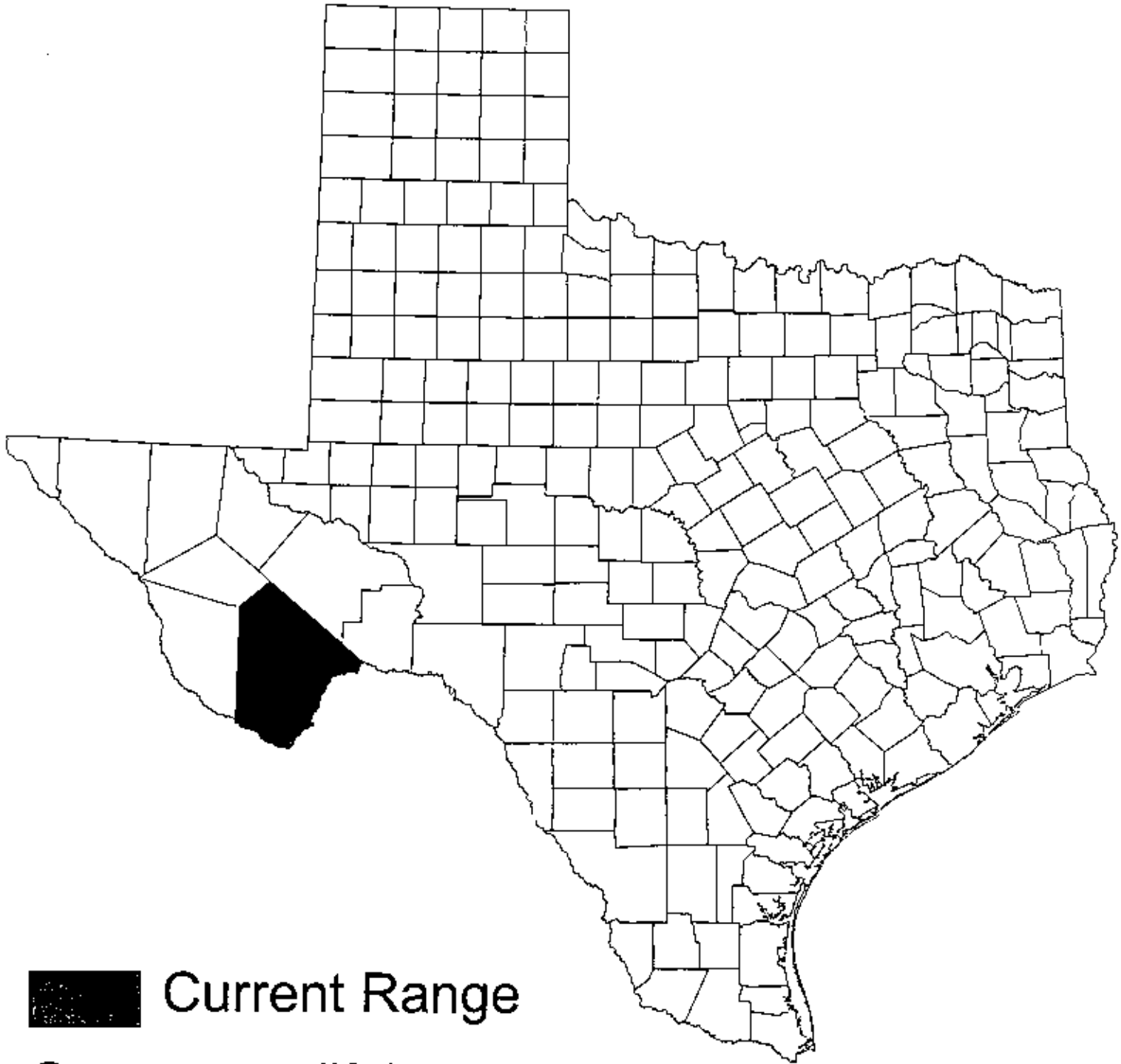
FIELD IDENTIFICATION. Tree to 70 ft high, and 1 ft in diameter, the stout ascending branches forming a narrow head.

FLOWERS. Staminate catkins 2-2½ in. long, white-hairy; calyx 3-4-lobed, hairy; stamens 4; anthers ovoid-oblong, apiculate, dark red; pistillate on stout peduncles with tomentose involucre scales; stigmas dark red.

FRUIT. Acorn solitary or paired, sessile or on short, glabrous peduncles; body ovoid, apex rounded, at first pubescent with fascicled hairs, later more glabrous, light brown, slightly striate, length ¼-½ in., width ¼-¾ in.; cup saucer-shaped, enclosing the acorn only at the base, scales closely appressed, apex obtuse, pubescent.



ARKANSAS OAK
Quercus arkansana Sarg.



■ Current Range

Quercus tardifolia
(lateleaf oak)

Scientific Name: *Rhododon angulatus* (Tharp) B. L. Turner

Synonyms: *Stachydeoma angulata* Tharp; included within *Rhododon ciliatus* (Benth.) Epling in recent floras such as Correll & Johnston (1970) and Jones (1977).

Common Name: Tharp's rhododon

Global/State Ranks: G1QS1

Federal Status: None

Global Range: Endemic to the Coastal Bend of South Texas.

State Range: Apparently restricted to the Ingleside Barrier of coastal Aransas, Nueces (per map in Turner 1995) and Refugio (per Jones 1977) counties. Extant populations are known only from the Live Oak Peninsula near Fulton, Aransas County.

Description (adapted from Tharp 1945 and Turner 1995): Annual with square stem, unbranched or with a few branches above, (5-) 18-28 cm tall. Leaves opposite, simple, sessile, 12-22 mm long and 5-12 mm wide, those of midstem broadly ovate to ovate-elliptic, mostly 1.5-2.0 times long as wide, entire to subentire, obtuse to subacute at apex, cordate to rounded-truncate at base, glandular-punctate, ciliate on the margins but otherwise glabrous. Flowers in terminal interrupted spikelike panicles, the subtending leaves broadly ovate, obtuse at apex, cordate to obtuse at base, ciliate on margins, usually conspicuously purplish; bracts also purplish and marginally ciliate, lanceolate, acuminate, ca. 5 mm long; pedicel ca. 2 mm long, slender, pubescent, about half as long as calyx tube, densely retrorsely pubescent; calyx purplish above, becoming 7 mm long in age, the tube 4.5-5 mm long, glandular-punctate, finely puberulent and with 5 sparsely long-hirsute lines; calyx teeth 5, connivent or parallel, deltoid-lanceolate to lance-acuminate, subequal, ca. 2.5 mm long, densely ciliate along the margins with hairs 0.5 mm long or less, otherwise glabrous; corolla 2-lipped, light lavender (per Tharp 1945) to purple or violet, 5-6 mm long, the tube equalling the calyx, puberulent externally, the throat hirsute, the upper lip obcordate, the lower lip 3-lobed; stamens 2, included within corolla tube; style hirtellous-pubescent. Fruit a cluster of (4?) separate nutlets, each ca. 1.5 mm long and 0.6 mm wide.

Similar Species: Very similar to *Rhododon ciliatus*, but according to Turner (1995) distinguished from that Texas endemic on the basis of leaf shape, pubescence of corolla lobes, and density of floral spikes. The ranges of the two species do not overlap; *Rhododon ciliatus* is restricted to deep sands of post oak belts (mostly on Eocene strata) to the north, in Anderson, Bastrop, Burleson, Lee, Leon, Limestone, Milam, Robertson, and Smith counties.

Habitat: Deep loose sand in sparingly vegetated areas on stabilized dunes of Pleistocene barrier islands.

Phenology: Flowering (May-) June-September, sometimes later with appropriate rainfall.

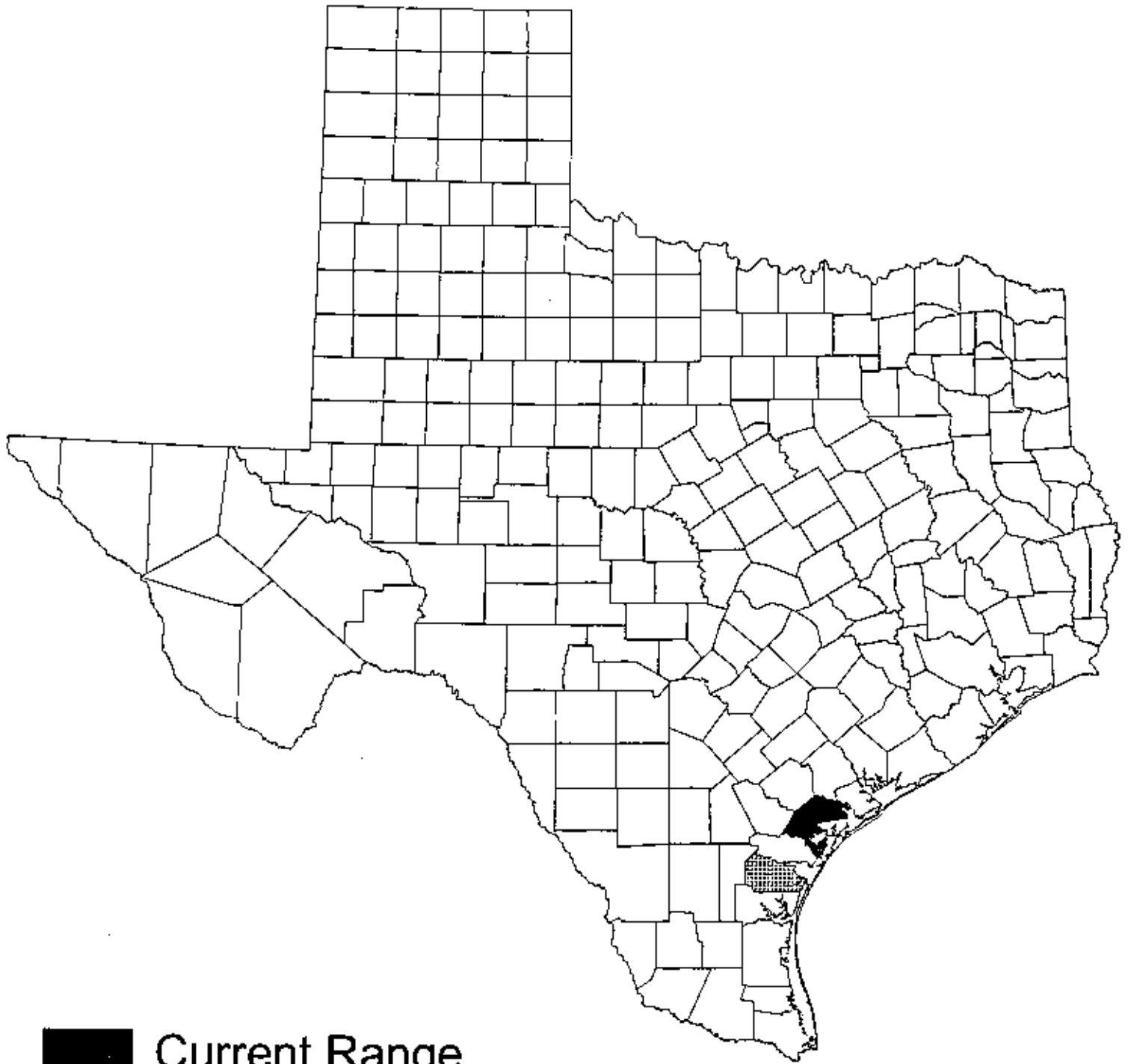
Comments:

Illustrations: A black and white photograph of the holotype appears in Tharp (1945).

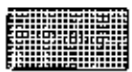
Selected References:

- Jones, F. B. 1977. Flora of the Texas Coastal Bend. Second edition. Welder Wildlife Foundation, Sinton. 262 pp.
- Tharp, B. C. 1945. Noteworthy plants of Texas-- III. *Stachydeoma* as represented in Texas. Brittonia 5: 304-307.
- Turner, B. L. 1995. Synoptical study of *Rhododon* (Lamiaceae). Phytologia 78(6): 448-451.





Current Range



Questionable Range

Rhododon angulatus
(Tharp's rhododon)

Scientific Name: *Rorippa ramosa* Roll.

Synonyms: None.

Common Name: canyon watercress; Durango yellow-cress

Global/State Ranks: G2S1

Federal Status: None.

Global Range: West Texas, Chihuahua, Coahuila and Durango (Henrickson & Johnston, in prep.).

State Range: Brewster and Terrell counties.

Description (adapted from Correll & Johnston 1970, Henrickson & Johnston in prep., Rollins 1961, and Stuckey 1972): Perennial with numerous, multiply-branched prostrate stems 1-5 (-6) dm long, sparsely pubescent with hemispherical vesicular trichomes. Leaves numerous, alternate, sessile, auriculate, thick, grayish green, oblong to broadly lanceolate, pinnately lobed, 3-5 cm long and 5-12 mm wide, the lobes confluent toward base; midrib prominent on lower surface, pubescent with vesicular trichomes. Flowers in short axillary racemes mostly less than 5 cm long; pedicels divergent to ascending, 3-5.2 (-6) mm long; sepals 4, oblong, glabrous or with a few vesicular trichomes on the outer (dorsal) surface, hyaline-margined, 2-2.5 mm long; petals 4, pale yellow, spatulate, not differentiated into blade and claw, 2.5-3 mm long and 0.75-1 mm long, expanded at summit; stamens 6(?), the anthers elongate, not notched at tip; styles glabrous, 1.5-2.5 mm long. Fruit a silique 6-10 mm long, divaricately spreading to erect, slightly curved inward, oblong to lanceolate, plump, the sides densely covered with vesicular trichomes along the margins; seeds plump, cordiform, prominently colliculate, lustrous, ca. 1.5 mm in diameter.

Similar Species: Closely related to the widespread *Rorippa sinuata* but differing in several features. Rollins (1962) stressed differences in habit, particularly that *R. sinuata* usually produces a single stem while *R. ramosa* produces numerous stems that apparently form a large circular mat as much as 1 m in diameter. In addition, the flowers of *R. sinuata* are more than twice as large as those of *R. ramosa*, with petals of the former being 2.5-6 mm long versus 2.5-3.5 mm long in the latter. The pedicels of *R. sinuata* are usually 5-12 mm long, while in *R. ramosa* they are shorter, only 3-6 mm long, and stouter. *Rorippa sinuata* ranges from central Canada south across much of the western US but does not occur within the range of *R. ramosa*.

Habitat: Moist, fine textured, alluvial soils on floodplains and in beds of intermittent streams.

Phenology: Flowering March-May.

Comments: Seldom collected from any of the states within its range.

Illustrations: A detailed line drawing appears in Rollins (1961).

Selected References:

Rollins, R. C. 1961. Notes on American *Rorippa* (Cruciferae). *Rhodora* 63: 1-10.

Rollins, R. C. 1993. The Cruciferae of continental North America. Stanford University Press, Stanford. 976 pp.

Stuckey, R. L. 1972. Taxonomy and distribution of the genus *Rorippa* (Cruciferae) in North America. *Sida* 4(4): 279-430.

characteristics with it, including
 cular trichomes. A critical comparison
 al with *R. sinuata* shows that the speci-
 it but represent a closely related un-

ins, sp. nov.

l, up to 10 dm. in diameter; stems numerous,
 pubescent with vesicular trichomes, 3-6 dm.
 axil of nearly all leaves from base to apex
 illy pubescent than principal stems; leaves
 te, thick, greyish-green, oblong to broadly
 . 3-5 cm. long, 6-12 mm. wide, lobes con-
 prominent on lower surface of leaf, pubes-
 nes; inflorescences short, mostly less than
 labrous or with a few trichomes present on
 -margined, non-saccate, 2-2.5 mm. long;
 e, not differentiated into blade and claw,
 wide; pedicels widely spreading to ascend-
 rved outward, sparsely covered with tri-
 anded at summit; siliques divaricately
 urved inward, oblong to lanceolate, plump,
 e, 6-10 mm. long, valves densely covered
 ong their margins; styles glabrous, 1.5-
 us, funiculi slender; seeds plump, cordi-
 r, seed coat colliculate (cf. Murley, 1951)
 ument. Fig. A-C.

ns, caulibus numerosis ramosis 3-6 dm.
 s angulatis oblongis vel late lanceolatis
 s 4-12 mm. latis sparse pubescenti-
 longis 2-2.5 mm. longis; petalis flavis
 pedicellis divaricatis vel adscendentibus
 longis; siliquis oblongis vel lanceolatis
 sparse pubescentibus; stylis glabris 1.5-
 is; seminibus cordiformibus colliculatis;

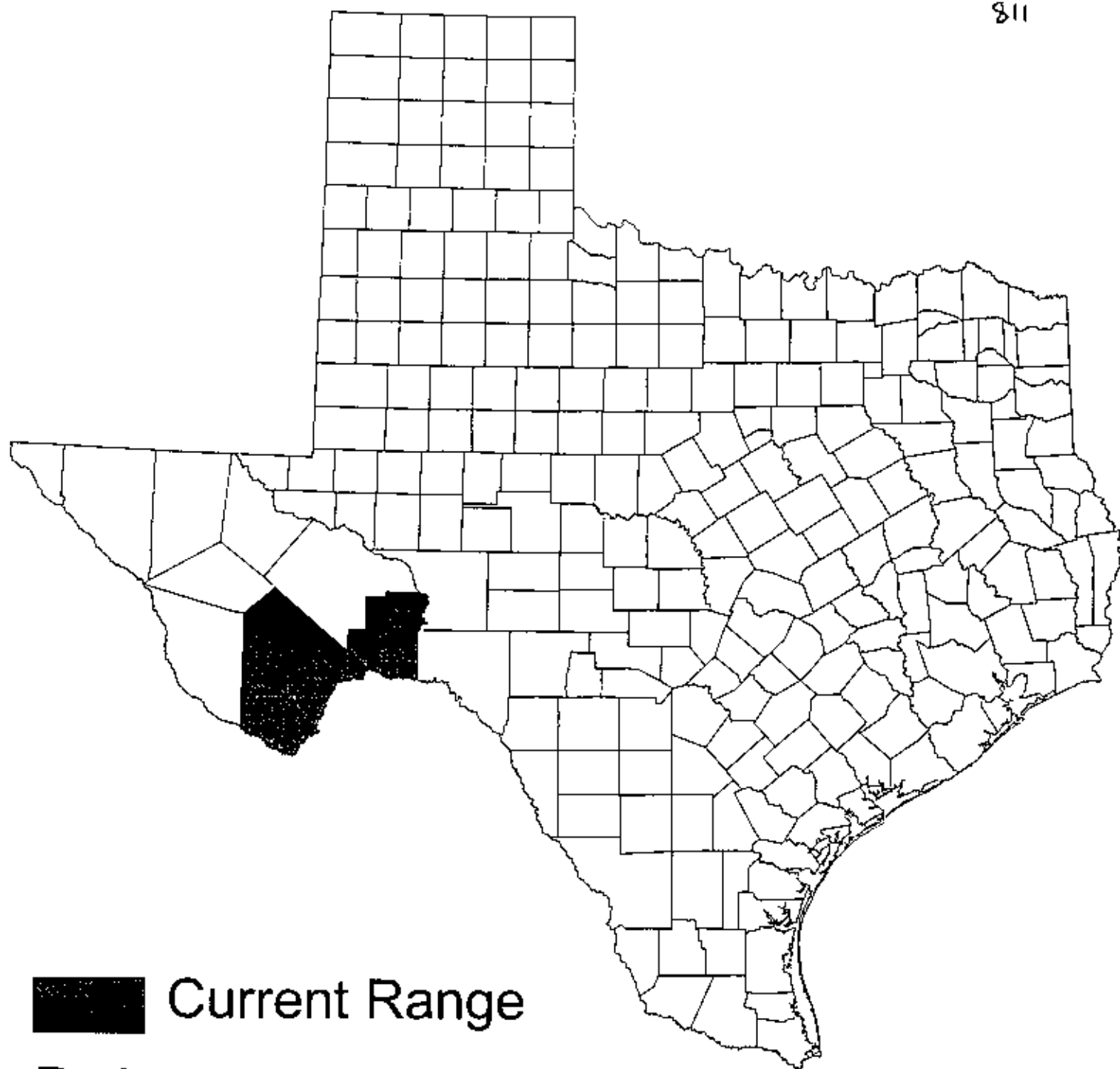
um, collected in a dry arroyo, 3 miles
), Mexico, May 4, 1959, D. S. Correll and
 in the Lundell Herbarium of the Texas

Rorippa ramosa is: San Lorenzo de La-
 us, Coahuila, May, 1880, E. Palmer 34

with of *Rorippa ramosa* is that of
 nified, flat, nearly circular plant.



FIG. A-C. *Rorippa ramosa*. FIG. A. habit sketch, $\times \frac{1}{2}$. FIG. B. silique $\times 2$. FIG. C. replum showing numerous funiculi, $\times 2$. Drawings by C. S. Tsao.



 Current Range

Rorippa ramosa
(Durango yellow-cress)

Scientific Name: *Rudbeckia scabrifolia* L. E. Brown

Synonyms: None.

Common Name: bog coneflower

Global/State Ranks: G2G3S2

Federal Status: SOC

Global Range: Endemic to the western Gulf Coastal Plain of western Louisiana and eastern Texas.

State Range: Angelina, Jasper, Newton, Sabine and Shelby counties.

Description (from Brown 1986): Erect perennial to 2 m tall, branched above; stems terete, striate, somewhat glaucous when fresh, glabrous except for a few hairs in the inflorescence. Leaves simple, dark green, lustrous and scabrous-pubescent with erect, reclining or sometimes appressed hairs 0.1-0.2 mm long; basal leaves large, the petiole to 28 cm long, winged near top, the blade 9.4-23.5 cm long and 7.3-16.7 cm wide, oval to ovate, the margins entire to undulate, truncate to cuneate at the base, midvein prominent, the principal lateral veins numerous and arcuate; lower cauline leaves similar but smaller; midstem leaves elliptic, to 13 cm long, often winged to base; upper cauline leaves sessile, auriculate, elliptic to oblong, often contracted above middle to a more narrow apex; extreme upper leaves bractlike. Flower heads 3-11 in a branched, somewhat paniculate inflorescence, containing both disc and ray flowers; involucre hemispherical to ovate, not elongating, 1.1-2.5 cm long and 1.2-2 cm wide; phyllaries spreading to reflexed, ciliate and pubescent abaxially; receptacle columnar, to 1 cm long; chaff present, of strongly keeled pales to 6 mm long, partially enfolding achene, lined with purple and with pale or yellowish hairs at the apex; ligules pale yellow, reflexed, 1-3.3 cm long and 3.5-9 mm wide, the abaxial surface hirsute with glandular and non-glandular hairs, the adaxial surface glabrous; disc flowers with corolla tube to 4.9 mm long, brown with 5 purple lines terminating at the sinuses between the 5 erect lobes, the lobes to 0.9 mm long, purple at the tips. Achenes purple, glabrous, 3-4 mm long, 4-angled, somewhat compressed, acute at the base and basilaterally attached to the receptacle; pappus an irregularly toothed or lacerate crown 1.1-2 mm long, emerging from the head about as far as the chaff.

Similar Species: Until their uniqueness was elucidated by Brown (1986), plants of *Rudbeckia scabrifolia* were mistaken for *R. maxima*, a species of upland prairies and woodland margins in northeast Texas. The foliage of *R. scabrifolia* is generally scabrous and shining, and the receptacle is up to 2.5 cm long. In *R. maxima*, the foliage is glabrous and glaucous, and the receptacle is usually elongate, up to 8 cm long. The ranges of the two species apparently do not overlap. There are no similar species in the hillside seepage bog habitat of *R. scabrifolia*.

Habitat: Hillside seepage bogs and associated broadleaf semi-evergreen acid seep forests, usually on sites underlain by the Catahoula Formation or near the Catahoula-Willis contact (Orzell 1990). Frequent associates include *Acer rubrum*, *Asclepias rubra*, *Carex glaucescens*, *Eriocaulon decangulare*, *Magnolia virginiana*, *Myrica heterophylla*, *Osmunda cinnamomea*, *Persea palustris*, *Platanthera ciliaris*, *Toxicodendron vernix*, *Rhynchospora chalarocephala*, *R. gracilentia*, *R. oligantha*, *Scleria reticularis*, *Smilax laurifolia*, *Viburnum nudum*, *Woodwardia virginica*, *Xyris ambigua* and *X. scabrifolia* (Orzell 1990).

Phenology: Flowering June-September.

Comments:

Illustrations: Line drawings appear in Brown (1986).

Selected References:

- Brown, L. E. 1986. A new species of *Rudbeckia* (Asteraceae- Heliantheae) from hillside bogs in east Texas. *Phytologia* 61: 367-371.
- Ghandi, K. N. and R. D. Thomas. 1989. Asteraceae of Louisiana. *Sida Botanical Miscellany* No. 4. SMU Herbarium, Dallas. 202 pp.
- Orzell, S. L. 1990. Inventory of National Forests and National Grasslands in Texas. Report submitted in fulfillment of agreement between the Texas Natural Heritage Program of Texas Parks and Wildlife Department and the U. S. Forest Service in Lufkin, Texas. 526 pp.

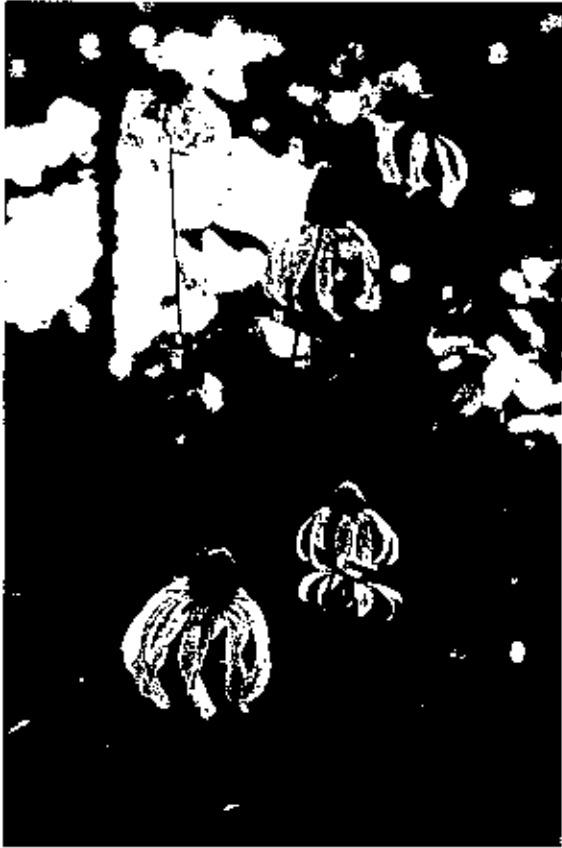




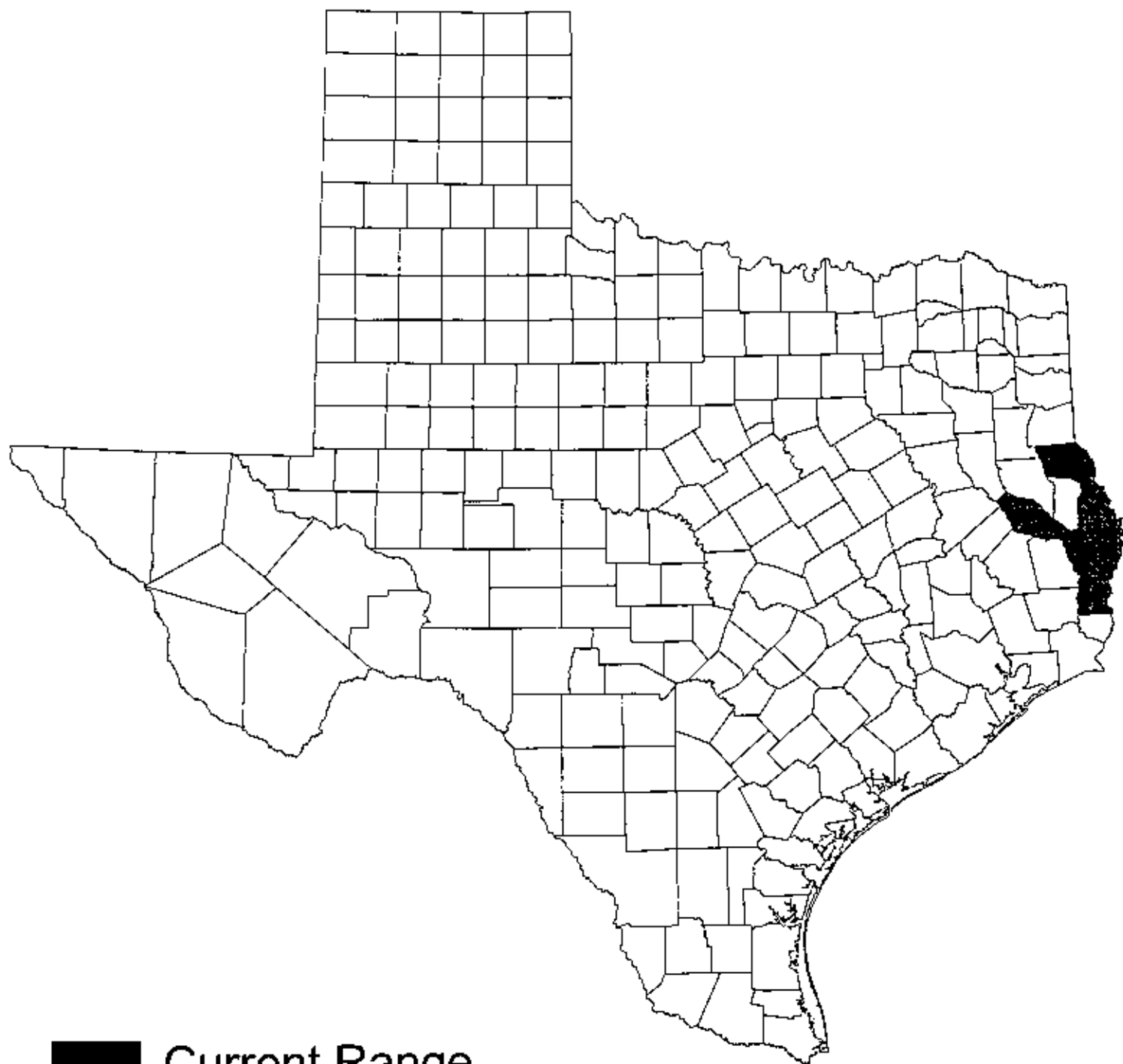
Fig. 1. *Rudbeckia scabrifolia* (from holotype).
A, inflorescence; B, basal leaf; C, upper culm leaves.

apex with hairs extending a short distance down the abaxial keel, a purple line on the margins with the purple line of the abaxial keel somewhat expanded at the acute chaff apex. Corolla tube of disk flowers to 4.9 mm long, brown with 5 purple lines terminating at the sinuses of the 5 erect corolla lobes. Corolla lobes to 0.9 mm long, purple at tips. Achenes purple, glabrous, 3-4 mm long, 4-angled, somewhat compressed, acute at base and basilaterally attached to receptacle. Pappus an irregularly toothed or lacerate crown, 1.1-2 mm long. On mature flower heads the pappus extends to, or almost to, the apex of chaff. Flowering mostly in June but perhaps again in the fall as Brown 4646 (ASTC) collected on 22 September 1979 has a number of immature flower heads.

TYPE: UNITED STATES. TEXAS. ANGELINA COUNTY: ca 1 mi S of junction FR 339 and Fr 330 on 330, SW facing seepage slope with some pitcher plants present; 17 Jul 1980, John R. Ward 352 (holotype, ASTC, two sheets). This site is now in the Upland Island Wilderness of the Angelina National Forest.

Additional Collections Examined: ANGELINA CO.: bog SE of Zavalla on U.S. highway 63, 0.5 mile NW of the Angelina-Jasper Co. line, 27 June 1978, E. L. Marietta 321 (ASTC); proposed Graham Creek Wilderness area, 878 mi S of Zavalla on U.S. 69 left on FR 314, 22 Sept 1979, Nixon & Ward 9790 (ASTC); hillside bog with pitcher plants below highway 63 at first guardrail S of intersection with FR 327, 16 Aug 1986, Brown 10656 (SBSC); same site, 19 Aug 1985, Brown 9405 (SMU). JASPER CO.: pitcher plant bog area associated with creek, 3 mi S of Letney, 6 Aug 1976, Nixon et al. 7296 (ASTC); Boykin Springs, Angelina National Forest, July 1964, D. J. Banks s.n. (ASTC); on seepage slope, Boykin Springs, Angelina National Forest, 6 June 1963, Correll & Wasmuth 27533 (LL); proposed Graham Creek Wilderness area, ca 0.3 mi N of intersection FR 314 & 330 on 330, seepage slope with pitcher plants, 17 June 1980, Ward 339 (ASTC); same site, 16 Aug 1986, Brown 10652 (SBSC, SMU, VDB); same site, 2 Aug 1986, Brown 10594 (TAES, NY). NEWTON CO.: pitcher plant bog 9 mi N of Wiergate on Hwy 87, then 2.5 mi E of Walker Cemetery in vicinity of Mill & Copperas Creeks, 24 July 1973, Nixon & Cox 6103 (ASTC).

Rudbeckia scabrifolia most closely resembles *R. maxima* Nutt.; however, the author has observed no plants intermediate between *R. scabrifolia* and *R. maxima*. Plants referable to *R. maxima* have not been observed by the author in those counties where *R. scabrifolia* is found. Table 1 is a list of some of the major differences between these two species. *R. scabrifolia* is a distinct species that is adapted to a unique environment which is present as scattered small patches on some east Texas hillsides.



■ Current Range

Rudbeckia scabrifolia
(bog coneflower)

Scientific Name: *Salvia penstemonoides* Kunth & Bouché

Synonyms: None.

Common Name: big red sage

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to the Edwards Plateau of central Texas.

State Range: Bandera, Bexar, Gillespie, Guadalupe, Kendall, Kerr, Real and Wilson counties; introduced into Travis County.

Description (adapted from Correll & Johnston 1970): Perennial with erect, square stems to 15 dm tall, often with long basal leaves in addition to the opposite cauline leaves. Leaves simple, thickish, linear-lanceolate to oblong-lanceolate, acute to acuminate and mucronate, entire to obscurely denticulate and with ciliolate-scabrous margins, the midnerve prominent on lower surface; lower leaves 7.5-1.3 mm long, with long margined petioles; upper leaves gradually much smaller and becoming essentially sessile; leaves within inflorescence ovate to linear-lanceolate, cuspidate. Flowers in several clusters in an elongate raceme-like or thyrselike inflorescence; calyx campanulate, strongly 2-lipped, ca. 13 mm long (about as long as the subtending hirsute pedicel), glandular puberulent, the broad upper lip truncate and with 3 short and broad cuspidate-mucronate teeth, the lower lip 2-lobed with its teeth lanceolate and cuspidate; corolla showy, crimson in color, 2-lipped, ca. 4 cm long, slightly pubescent, the tube villous-annulate toward the base inside, the upper lip nearly straight, about half as long as the tube, the shorter lower lip 3-lobed with its middle lobe concave; stamens 2; style glabrous. Fruit a set of 4 small nutlets.

Habitat: Moist to seasonally wet limestone outcrops on seeps within canyons and on clayey to silty soils of creekbanks and terraces, in partial shade to full sun. Associates include *Adiantum capillus-veneris*, *Aquilegia canadensis*, *Thelypteris ovata* var. *lindheimeri*, *Verbesina virginica*, *Cornus drummondii*, *Garrya ovata* var. *lindheimeri*, *Juglans microcarpa*, *Platanus occidentalis*, *Salix nigra*, *Styrax platanifolius* subsp. *stellatus*, *Chaetopappa effusa*, *Eupatorium serotinum*, *Salvia roemeriana*, *Teucrium canadense*, *Eleocharis montividenis*, *Fuirena simplex*, *Juncus texanus*, *Panicum virgatum*.

Phenology: Flowering June-October, with the basal leaves conspicuous for much of year.

Similar Species: Two other red-flowered sages, *Salvia roemeriana* and *S. coccinea* occur within the range of *S. penstemonoides*. Both are half the size of the aptly nicknamed big red sage. An unrelated species, *Lobelia cardinalis*, is of large size, has large red flowers and grows in similar moist to wet habitats. It can be distinguished at once from *Salvia penstemonoides* on the basis of its alternate leaves.

Comments: Since its rediscovery by Marshall Enquist in the 1980's, big red sage has become widely available in the native plant nursery trade.

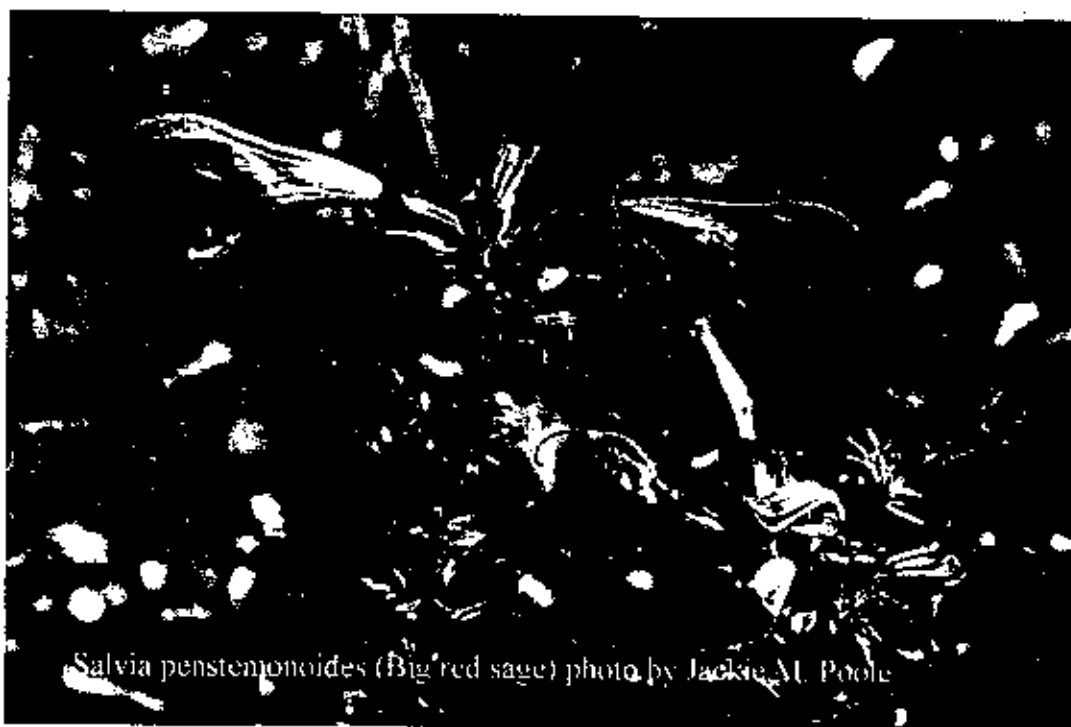
Illustrations: A photograph appears in Enquist (1987). A watercolor painting appears in Sander (2001).

Selected References:

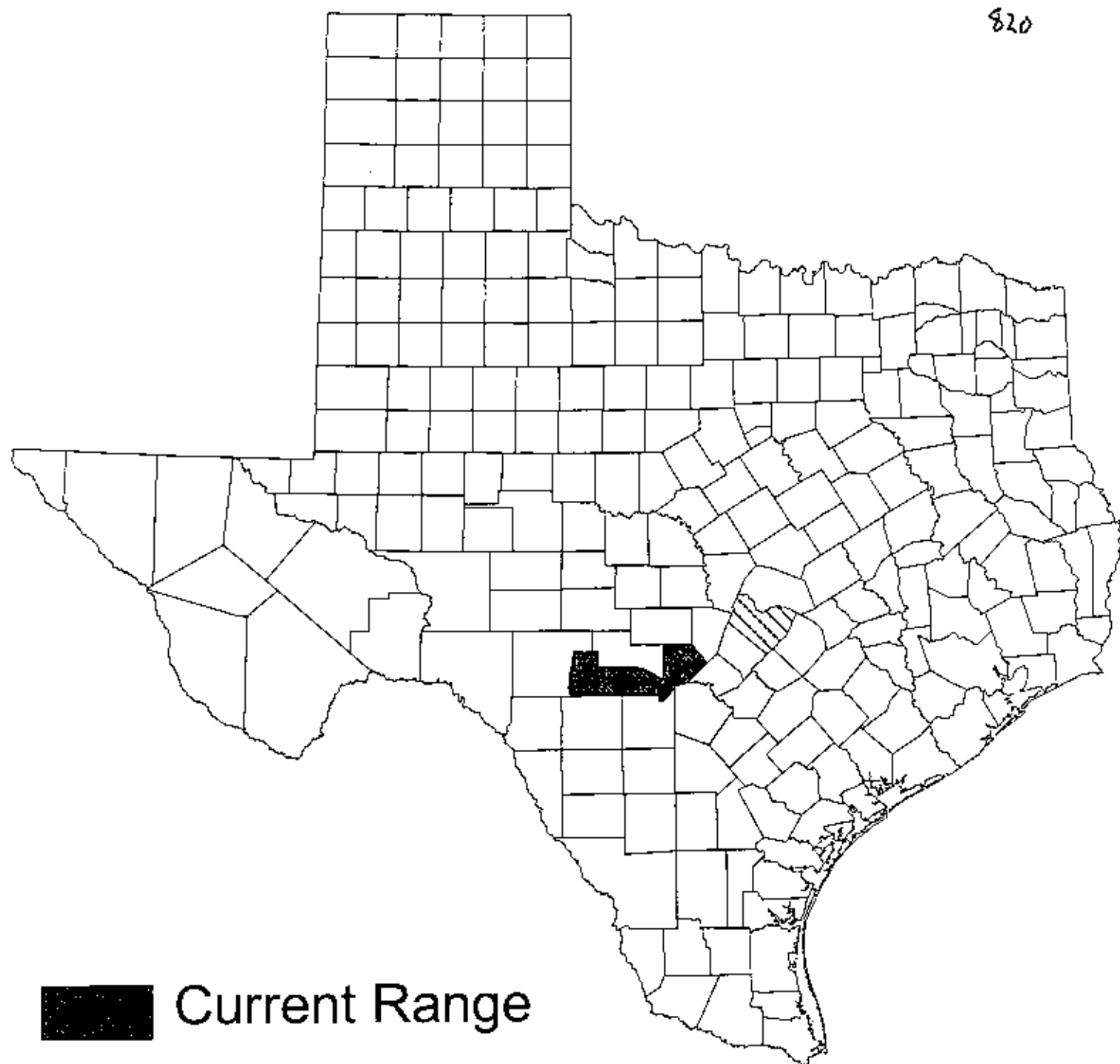
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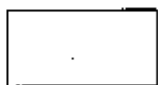



Salvia pensilvanica (Big red sage) photo by Jackie M. Poole



Salvia penstemonoides (Big red sage) photo by Jackie M. Poole



-  Current Range
-  Historical Range
-  Introduced

Salvia penstemonoides
(big red sage)

Scientific Name: *Schwalbea americana* L.

Synonyms: *Schwalbea australis* Penn.; *Schwalbea americana* var. *australis* (Penn.) Reveal & Broome

Common Name: American chaffseed

Global/State Ranks: G2SR

Federal Status: Endangered

Global Range: Widely but very patchily distributed across much of the southeastern US north into the Mid-Atlantic and New England states, with records from 16 states and perhaps Texas. Most states have few or no extant populations.

State Range: Unknown. Correll & Johnston (1970) reported the species from east Texas, apparently on the basis of information that has been lost to antiquity. No extant populations or historic voucher specimens are known.

Description (adapted from Kral 1983; Johnson 1991; Correll & Johnston 1970): Perennial herb 3-6 dm tall, the stems mostly simple but sometimes branched at the base, villous at the base, puberulent higher up, yellow-green, sometimes tinged with red or purple. Leaves alternate, simple, sessile, mostly ascending or erect, the larger sometimes spreading, overlapping in a tight spiral, those in the lower 1/3 of the stem elliptic to lanceolate, 2-4 (-5) cm long, and 15 mm wide, rather fleshy, acute at the apex, cuneate at the base, entire and slightly revolute along the margins, the surface yellow-green or deep dull green with red undertones, both sides pale villous-puberulent, the venation sparsely pinnate, impressed above, only the midvein raised beneath, or three-nerved; upper stem leaves gradually smaller and narrower, grading into the bracteal leaves of the inflorescence. Flowers short-pedicellate from the axils of upper leaves or leafy bracts, in a tight, many-flowered, spicate raceme; pedicels 2.0-2.5 mm long, villosulous, apically bibracteolate, the bracteoles linear, ca. 5-10 mm long, shorter than the calyx; calyx 2-lipped, 1.5-2.0 cm long, the tube narrowly campanulate, strongly 10-nerved, the 5 lobes unequal, triangular, 1-nerved, shorter than the tube, the upper lip shallowly 2-lobed, the lower lip 3-lobed and longer than the upper; corolla strongly 2-lipped, narrow, 3-3.5 cm long and 7 mm wide, yellow toward the base, purplish or reddish toward the apex, fused below into a tube, the apical lips projecting forward about and about as long as the tube; upper lip hooded, shallowly notched at the tip; lower lip 3-lobed, shorter than the upper lip; stamens 4, included under upper lip; ovary superior, the style mostly included under upper lip. Fruit a capsule mostly contained in the calyx, oblong-cylindrical, 1-1.2 cm long; seeds numerous, linear, 2.5-3.0 mm long.

Similar Species: *Schwalbea americana* is the sole member of its genus. With its mostly unbranched stems, 2-bracted pedicels, and long, 2-lipped yellow corolla tinged with red or purple, it is quite unlike any other plant species in Texas.

Habitat: As might be expected in a wide-ranging species, the habitat of American chaffseed is quite variable. In some parts of its range, it occurs in grass-sedge communities on moist acid sandy substrates within pine woodlands where an open structure is maintained by wildfire or by a fluctuating water table (Kral, 1983); associates in such habitat include various *Carex*, *Xyris*, *Eriocaulon*, *Lachnocaulon* and *Juncus* species. In other areas American chaffseed occurs in fire-maintained upland forests or woodlands on sandy substrates; principal woody components of such sites include *Pinus palustris*, *Quercus margaretta*, *Q. marilandica* and *Q. stellata*, while herbaceous associates include various species of *Schrankia*, *Tephrosia*, *Stylosanthes* and *Orbexilum*

(Townsend, 1997). The habitat in Texas is unknown.

Phenology: If present in Texas, probably flowering April through June or July.

Comments: Listed as Endangered on 29 September 1992.

Illustrations: A line drawing appears in Gleason (1952).

Selected References:

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- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA, Forest Service, Technical Publication R8-TP2. 1305 pp.
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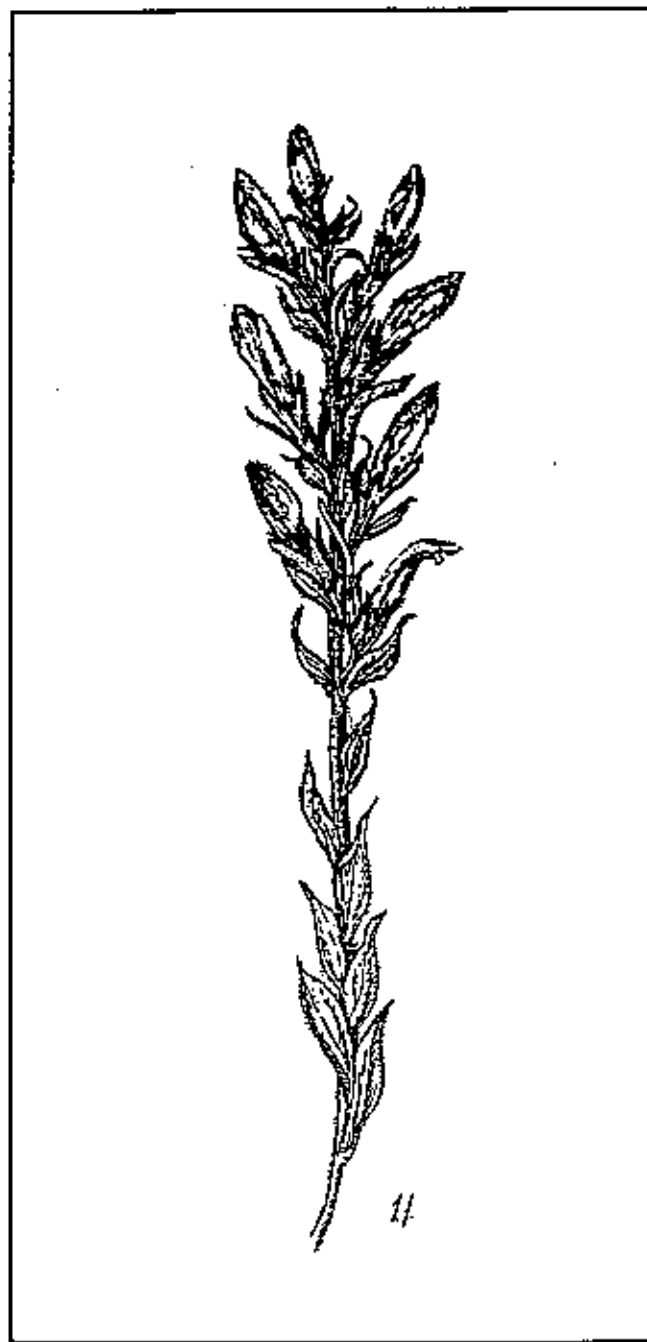
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AMERICAN CHAFFSEED

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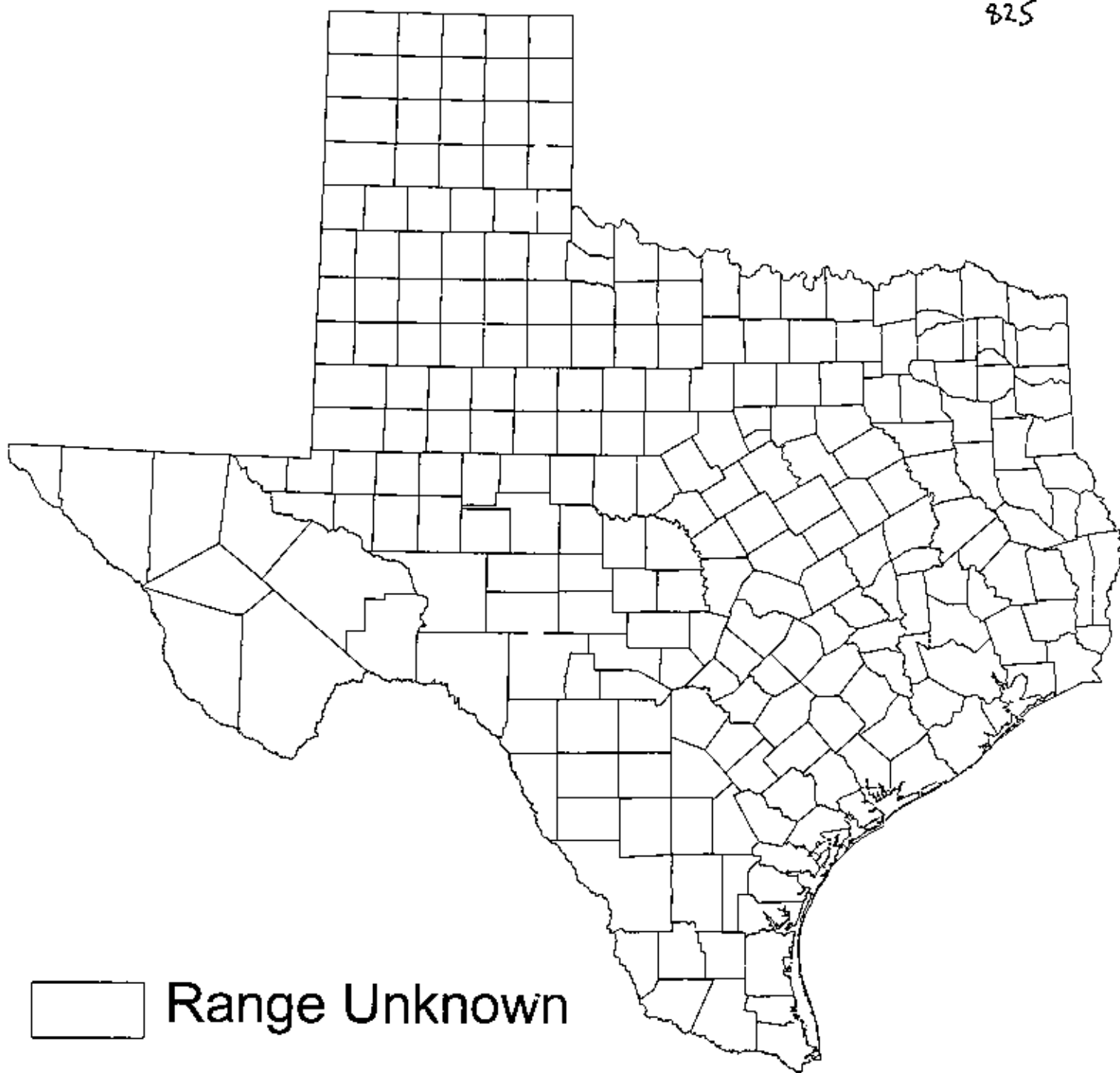
(Schwalbea americana)

RECOVERY PLAN



U.S. FISH AND WILDLIFE SERVICE
REGION FIVE, HADLEY, MASSACHUSETTS

66pp.



Range Unknown

Schwalbea americana
(chaffseed)

Scientific Name: *Sclerocactus brevihamatus* (Engelmann) D. R. Hunt ssp. *tobuschii* (W. T. Marshall) N. P. Taylor

Synonymy: *Ancistrocactus tobuschii* W. T. Marshall; *Echinocactus tobuschii* (W. T. Marshall) Weniger

Common Name: Tobusch fishhook cactus

Global/State Ranks: G3T3S3

Federal Status: Endangered

Global Range: Edwards Plateau of Texas

State Range: Bandera, Edwards, Kerr, Kimble, Kinney, Real, Uvalde and Val Verde counties.

Description (compiled from Benson 1982, Weniger 1984, Poole and Riskind 1987, USFWS 1987, Lockwood pers. comm. 1995, Westlund pers. comm. 1995, Poole pers. obs.): Perennial stem succulent, with either a short, brown taproot, or many fine fibrous roots, or both. **Stems** usually solitary, rarely 8-20 stems in a cluster due to apical injury, dark green or yellow to red or purple when stressed, usually flattened and hemispheric, 3-15 cm (1½-5½ in.) tall, 1-15 cm (¾-5¾ in.) in diameter; tubercles 9-12 mm (¾-½ in.) long, each with a shallow groove on the upper surface, ending in a spine cluster, roughly aligned into 8-12 ribs; areoles linear, about 4.5 mm (¼ in.) in diameter. **Spines** yellowish, sometimes red tipped, turning gray with age, covered with microscopic hairs; radial spines 7-9(-12), straight, needle-like, irregularly spreading, 1.5-2 cm (5/8-¾ in.) long; central spines 3-5, upper 2 forming an erect "V" (sometimes the "V" bisected by 1 or 2 smaller centrals), to 4 cm (1½ in.) long, the lower, perpendicular or ascending central spine stout, hooked, to 2.5 cm (1 in.) long. **Flowers** clear, bright yellow, sometimes creamy yellow or yellowish-green (especially upon opening), turning golden-yellow with age, 2.5-4 cm (1-1½ in.) in diameter, opening fully during anthesis; filaments cream to yellowish, anthers pale orange or golden yellow; stigma lobes 5-9, green, yellow or whitish. **Fruits** elongate egg-shaped, green with a pink tinge at maturity, about 2.5 cm (1 in.) long, with 2-6 small (ca. 2-5 mm (<¼-¼ in.)) scales; seeds dark brown to black, shiny, 1.5-1.7 mm (<¼ in.) long and in diameter.

Habitat: Discontinuous patches of very shallow, moderately alkaline, rocky loams, clay loams, or clays (primarily of the Tarrant, Ector, or Eckrant series) over massive, fractured limestone (usually the Edwards formation or an equivalent formation). Usually on level to slightly sloping hill or ridge tops, occasionally on ledges or other relatively level areas on steeper slopes, and in rocky floodplains. Such sites are usually open with only herbaceous cover such as grasses and forbs, although individual plants may be somewhat protected by rocks, grasses, or spikemosses (*Selaginella* spp.).

This habitat is quite patchy, with the openings being scattered within a mosaic of woodlands, shrublands, and grasslands. Associates include *Juniperus ashei*, *Quercus fusiformis*, *Q. pungens* var. *vaseyana*, *Pinus remota*, *Diospyros texana*, *Opuntia lindheimeri*, *Berberis trifoliolata*, *Rhus virens*, *Sophora secundiflora*, *Coryphantha sulcata*, *Mammillaria heyderi*, *Echinocereus enneacanthus*, *Echinocereus triglochidiatus*, *Nolina lindheimeri*, *Plantago helleri*, *Hedeoma drummondii*, *Verbena canescens*, *Sida abutilifolia*, *Evax verna*, *Yucca rupicola*, *Hilaria belangeri*, *Bouteloua hirsuta*, *B. trifida*, *B. rigidiseta*, *Aristida purpurea*, and *Erioneuron pilosum*.

Phenology: Flowering (late January-) February-March (rarely early) April, depending on temperature.

Similar Species: *Sclerocactus brevihamatus* ssp. *brevihamatus*, which occurs on the southern and western border of the range of *S. brevihamatus* spp. *tobuschii*, looks almost identical. Although *S. brevihamatus* spp. *brevihamatus* has more radial spines (12-22) and is usually a larger and more cylindrically shaped plant, the best character to distinguish between the two species is flower color. *Sclerocactus brevihamatus* spp. *tobuschii* has bright, clear yellow (occasionally tinged bright spring green or pale yellow) flower while *S. brevihamatus* ssp. *brevihamatus* has dusky rose to yellowish pink or olivaceous (usually the color looks muddy or dusky) flowers. Also in general Tobusch fishhook cactus occurs within plant communities typical of the Edwards Plateau (such as live oak-juniper woodlands) while *S. brevihamatus* ssp. *brevihamatus* typically is found within communities typical of the south Texas brushlands such as cenizo shrublands.

Comments: A report from Brewster County (Wauer 1973) is based on a misidentification (Weniger 1979; Zimmerman pers. comm.) and represents a soon-to-described species with whitish flowers. Benson (1982) considered *Ancistrocactus brevihamatus* to be a part of *A. scheeri*.

Illustrations: Color photographs appear in Anderson (2001) and Weniger (1984) as *Echinocactus tobuschii* (there is also photograph of *E. brevihamatus*) and in Poole & Riskind (1987) as *Ancistrocactus tobuschii*; line drawings appear on the cover of the *A. tobuschii* recovery plan (USFWS 1987) and in Poole & Riskind (1987) as *A. tobuschii*.

Selected References:

- Anderson, E. F. 2001. The cactus family. Timber Press, Portland, Oregon. 776 pp.
- Benson, L. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford. 1044 pp.

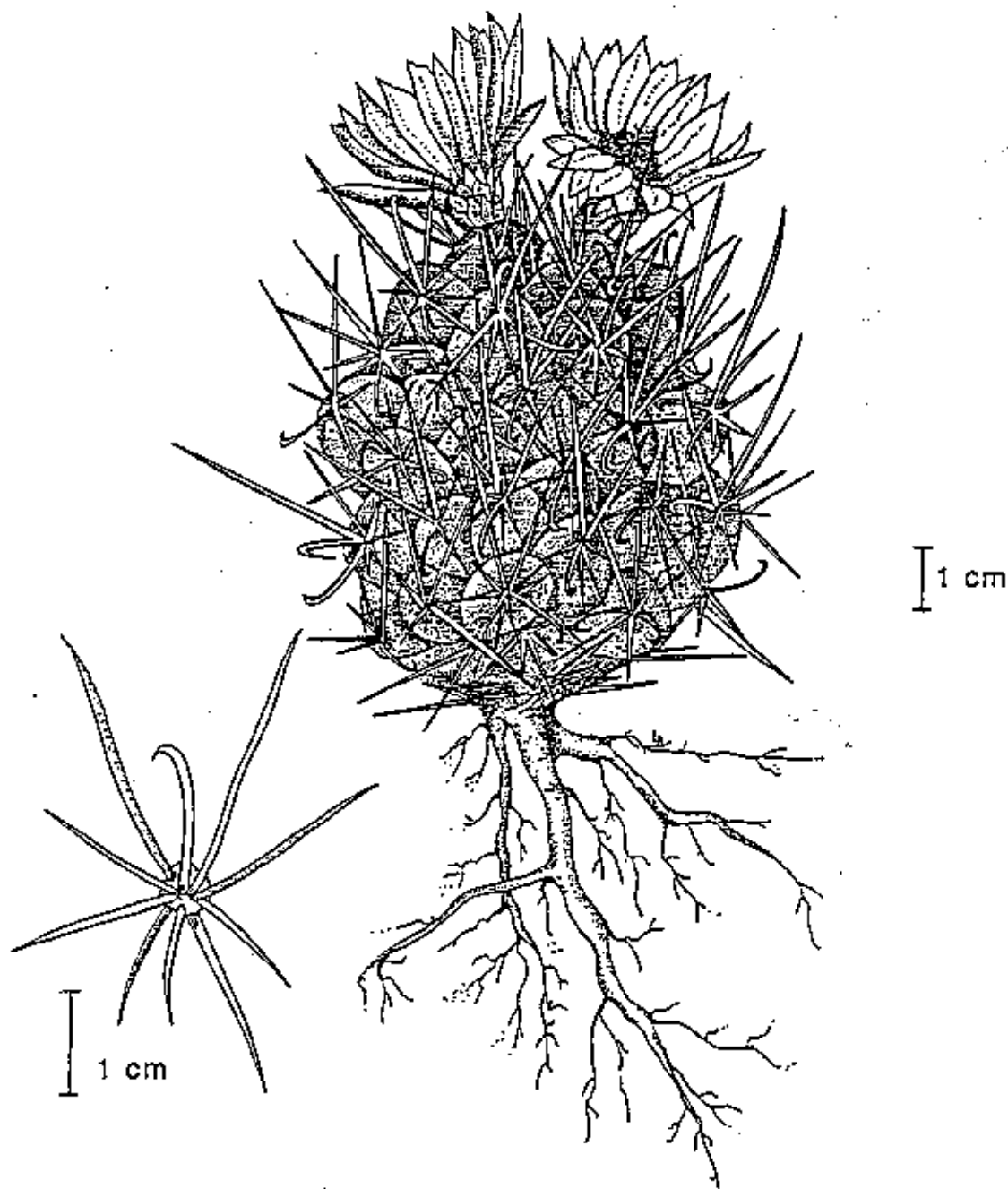
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- Sutton, K., J. T. Baccus, and M. S. Traweek, Jr. 1997. Habitat of *Ancistrocactus tobuschii* (Tobusch fishhook cactus, Cactaceae) on the Edwards Plateau of Central Texas. *The Southwestern Naturalist* 42(4):441-445.
- U.S. Fish & Wildlife Service. 1987. Tobusch fishhook cactus (*Ancistrocactus tobuschii*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.
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- Weniger, D. 1979. Status report on *Ancistrocactus tobuschii*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Weniger, D. 1984. *Cacti of Texas and neighboring states: a field guide*. University of Texas Press, Austin. 356 pp.



TOBUSCH FISHHOOK CACTUS

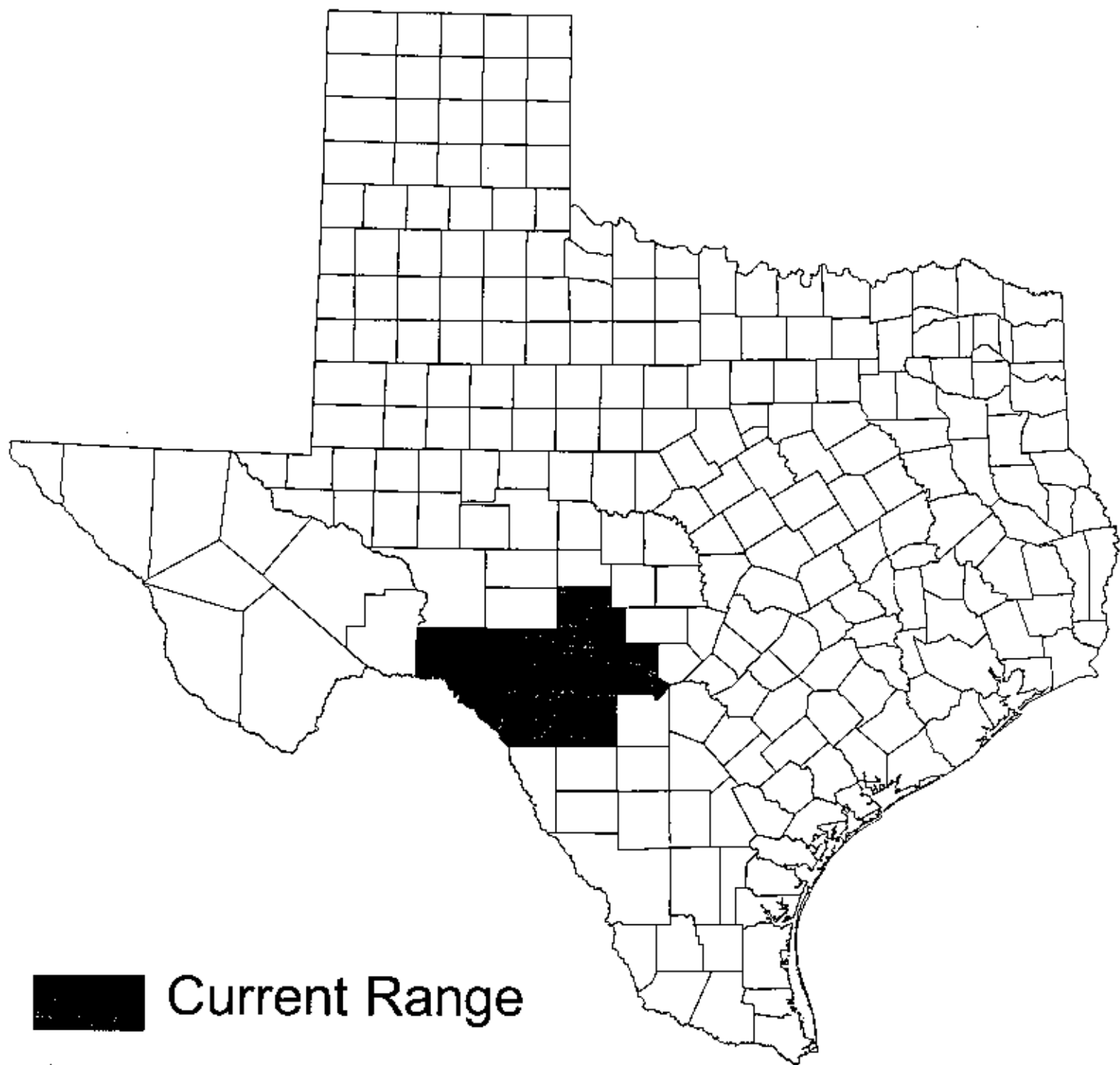
(*Ancistrocactus tobuschii*)

RECOVERY PLAN



U.S. Fish and Wildlife Service
Albuquerque, New Mexico

1987



■ Current Range

Sclerocactus brevihamatus var. *tobuschii*
(Tobusch fishhook cactus)

Scientific Name: *Sclerocactus mariposensis* (Hester) N. P. Taylor

Synonymy: *Neolloydia mariposensis* (Hester) L. Benson; *Echinomastus mariposensis* Hester; *Echinocactus mariposensis* (Hester) Weniger

Common Name: Lloyd's mariposa cactus

Global/State Ranks: G2T2

Federal Status: Threatened

Global Range: west Texas and Coahuila, Mexico

State Range: Big Bend region of Brewster County.

Description (compiled from Benson 1982, Weniger 1984, USFWS 1989, Anderson 2001, Zimmerman and Parfitt 2001): Perennial stem succulent. **Stems** solitary, globose to egg-shaped or slightly cylindrical, blue-green, 3-10 cm (1 $\frac{1}{8}$ -4 in.) long, 3-6 cm (1 $\frac{1}{8}$ -2 $\frac{3}{4}$ in.) in diameter; ribs 21 (rarely 13 or stems appearing only tuberculate); tubercles narrowly pointed, to 5 mm ($\frac{1}{4}$ in.) long; areoles elliptic, 3 mm ($\frac{1}{8}$ in.) in diameter, 6-12 mm ($\frac{1}{4}$ - $\frac{1}{2}$ in.) apart. **Spines** dense, obscuring stem, 23-38; radial spines 19-36, white to gray, sometimes tipped with light brown, rigid, radiating, closely appressed to stem, 3-15 mm ($\frac{1}{8}$ - $\frac{5}{8}$ in.) long; central spines 2-7, white, gray, pale yellow or dull tan with chalky blue-gray or partly brown tips, one descending or perpendicular to stem, others erect or ascending, 5-21 mm ($\frac{1}{4}$ - $\frac{3}{4}$ in.) long, longest one often slightly curved toward stem apex. **Flowers** flesh-pink or sometimes white or pale yellowish tan to pale green, broadly funnel-shaped, 2.2-3 cm ($\frac{7}{8}$ -1 $\frac{1}{2}$ in.) long, 3-4 cm (1 $\frac{1}{8}$ -1 $\frac{1}{2}$ in.) in diameter; stigma lobes green or yellow green. **Fruits** short oblong or globose, yellowish green at first, becoming dry, indehiscent or disintegrating irregularly, ca. 10 mm ($\frac{3}{8}$ in.) long, ca. 8 mm ($\frac{5}{8}$ in.) wide; seeds black, ovate, 1.3-1.5 mm (< $\frac{1}{8}$ in.) long and broad.

Habitat: Among low shrubs and rosette-forming perennials in gravelly or rocky soils on arid limestone slopes in the Chihuahuan Desert, mostly on Boquillas Formation; elevation 2500-3500 feet. Associated species include *Larrea tridentata*, *Agave lechuguilla*, *Fouquieria splendens*, *Jatropha dioica*, *Euphorbia antisiphilitica*, *Leucophyllum candidum*, *Dasyliiron leiophyllum*, *Hechtia scariosa*, *Buddleja marrubiiifolia*, *Bouteloua breviseta*, *Tiquilia greggii*, *Calliandra conferta*, *Krameria glandulosa*, *Erioneuron pulchellum*, *Selaginella* sp., *Epithelantha bokei*, *Ariocarpus fissuratus*, and *Coryphantha ramillosa* (USFWS 1989).

Phenology: Flowering February-early March; at Black Gap WMA, flowering may begin as early as mid-February but normally begins in early March (McKinney 1998).

Similar Species: Two other closely related species often occur in the same habitat as Lloyd's mariposa cactus. *Sclerocactus warnockii* differs in having 13 ribs, 12-20 spines per areole, and 9-17 radial spines. *Sclerocactus intextus* red or pink (rarely white) stigma lobes and fruits that dehisce by gaping basal pores. *Escobaria albicolumnaria* and *Mammillaria pottsii* also co-occur with Lloyd's mariposa cactus, and are superficially similar vegetatively. *Escobaria albicolumnaria* has 11-15, white central spines, white bristle-like radial spines, pink flowers, and a fleshy fruit. *Mammillaria pottsii* has cylindrical, often branching or clustered stems, small brownish-red flowers, and club-shaped, fleshy, red fruits.

Comments: Research has shown this species to be more common than previously considered (McKinney 1998; Anderson and Schmalzel 1997).

Illustrations: Line drawings of spine characters and a color photograph appear in Poole & Riskind (1987); color photographs appear in Warnock (1977), Weniger (1984), and Anderson (2001). A black and white photograph appears in Heil and Brack (1988). The line drawing on the cover of the Recovery Plan is *Echinomastus (Neolloydia) intertextus*.

Selected References:

- Anderson, E. F. 1986. A revision of the genus *Neolloydia* B. & R. (Cactaceae). *Bradleya* 4: 1-28.
- Anderson, E. F. and R. Schmalzel. 1997. Final report on Lloyd's mariposa cactus survey (*Sclerocactus (Neolloydia) mariposensis*). Prepared for Joint Task Force. Desert Botanical Garden, Phoenix, Arizona.
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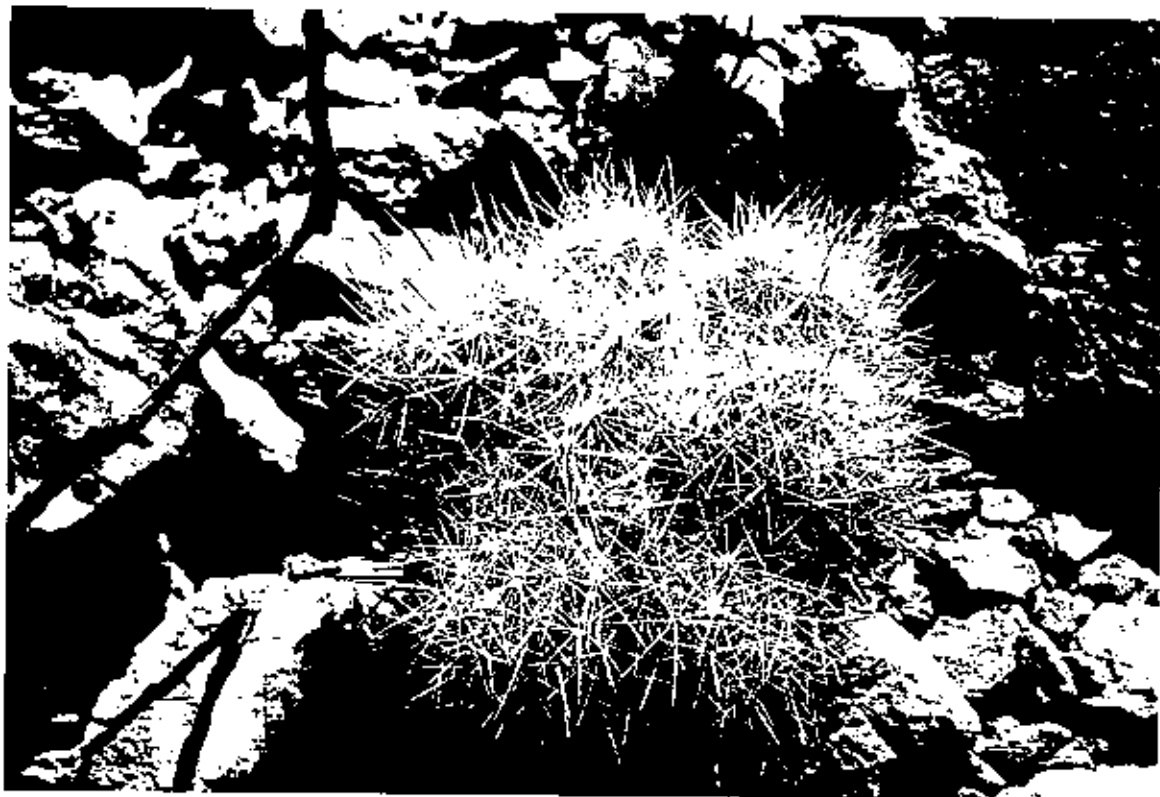
of western Texas. Attachment F. Status report: Lloyd's mariposa cactus (*Neolloydia mariposensis*). Section 6 Final Report, produced by Texas Parks and Wildlife Department for U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

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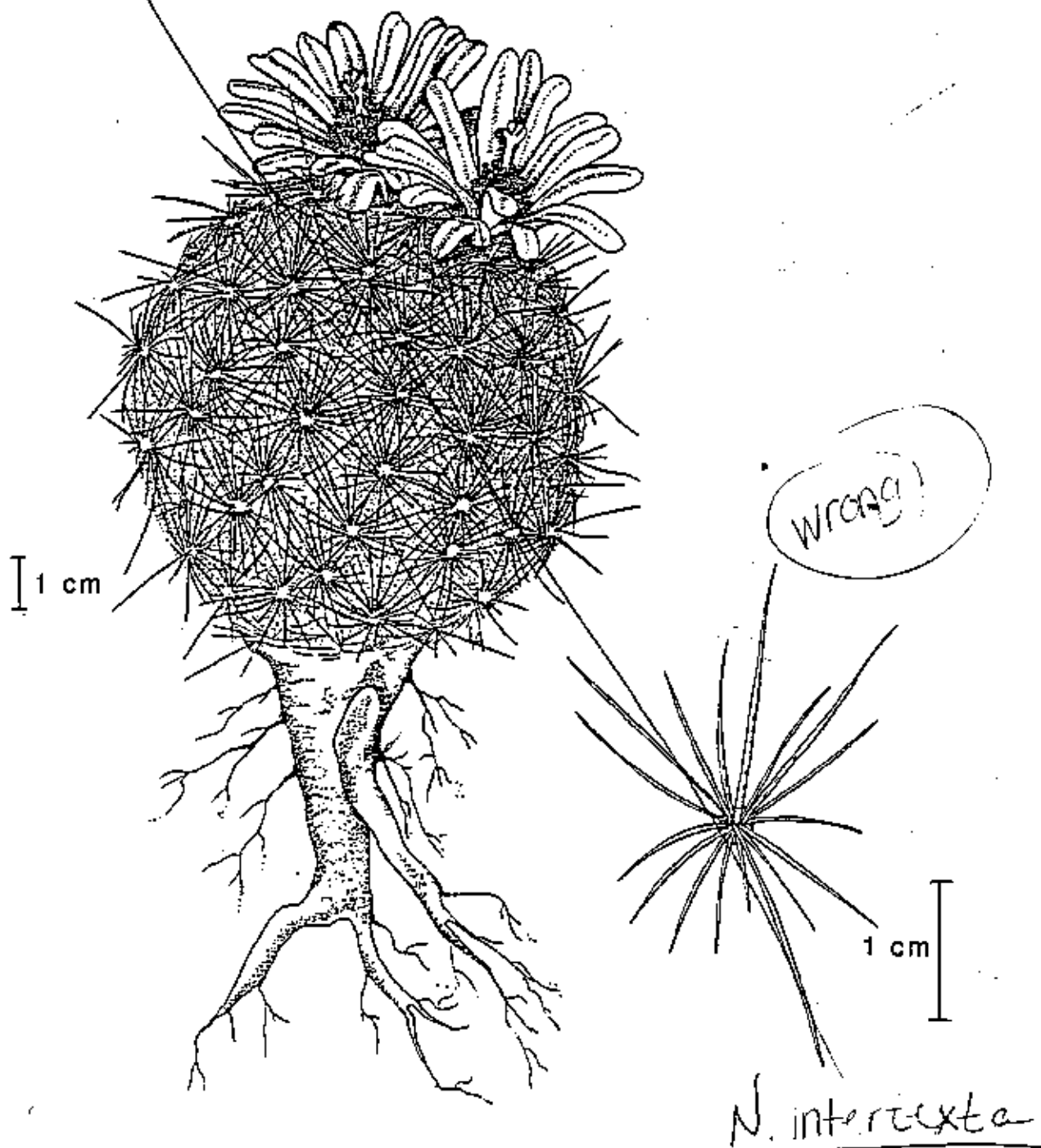
Zimmerman, A. D. and B. Parfitt. 2001. Draft treatment of *Echinomastus* for Flora North America. 22 December 2001 draft.



LLOYD'S MARIPOSA CACTUS

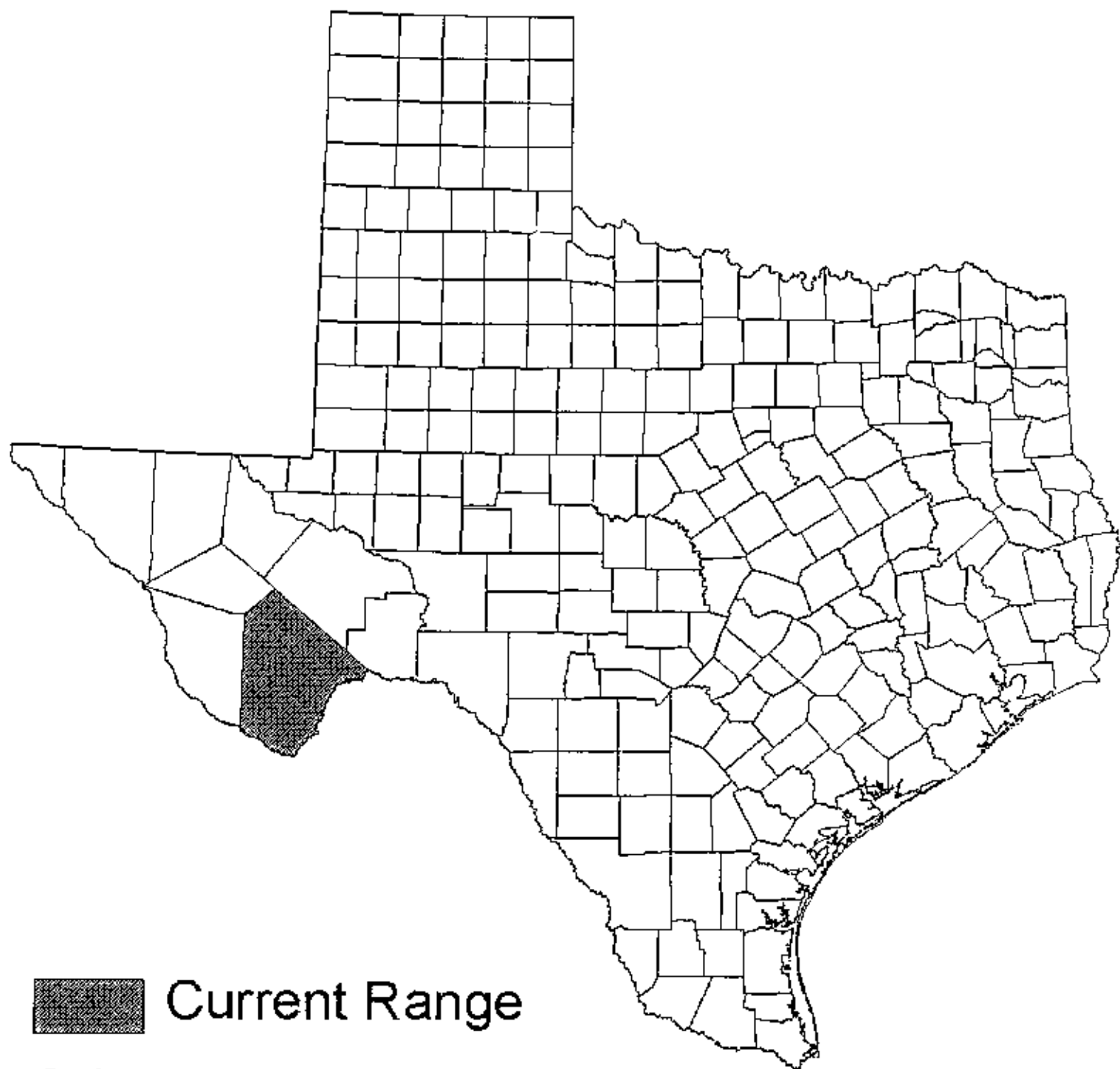
*Sclerocactus**(Neolloydia mariposensis)**limbo-texta*

RECOVERY PLAN



U.S. Fish and Wildlife Service
Albuquerque, New Mexico

1989



Current Range

Sclerocactus mariposensis
(Lloyd's mariposa cactus)

Scientific Name: Pediocactus papyracanthus (Engelm.) L. Benson

Synonymy: Toumeyia papyracantha Britt. & Rose

Common Name: paperspine cactus; grama grass cactus

Global Range: AZ, NM and TX.

State Range: Hudspeth County.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Red sandy soils of open flats in desert grasslands, often among perennial bunchgrasses such as blue grama (Bouteloua gracilis) and galleta (Hilaria jamesii).

Phenology: Flowering April-June (New Mexico Native Plant Protection Advisory Committee 1984).

Similar Species:

Comments: Spines resemble dried blades of grasses, making this cactus easy to overlook.

Illustrations: A black and white photograph and several line drawings appear in Benson (1982); line drawings also appear in New Mexico Native Plant Protection Advisory Committee (1984); color photographs appear in Weniger (1984) and Heil et al. (1981).

Selected References:

Benson, L. 1962. A revision and amplification of Pediocactus II. Cactus & Succulent Journal 35: 57-61.

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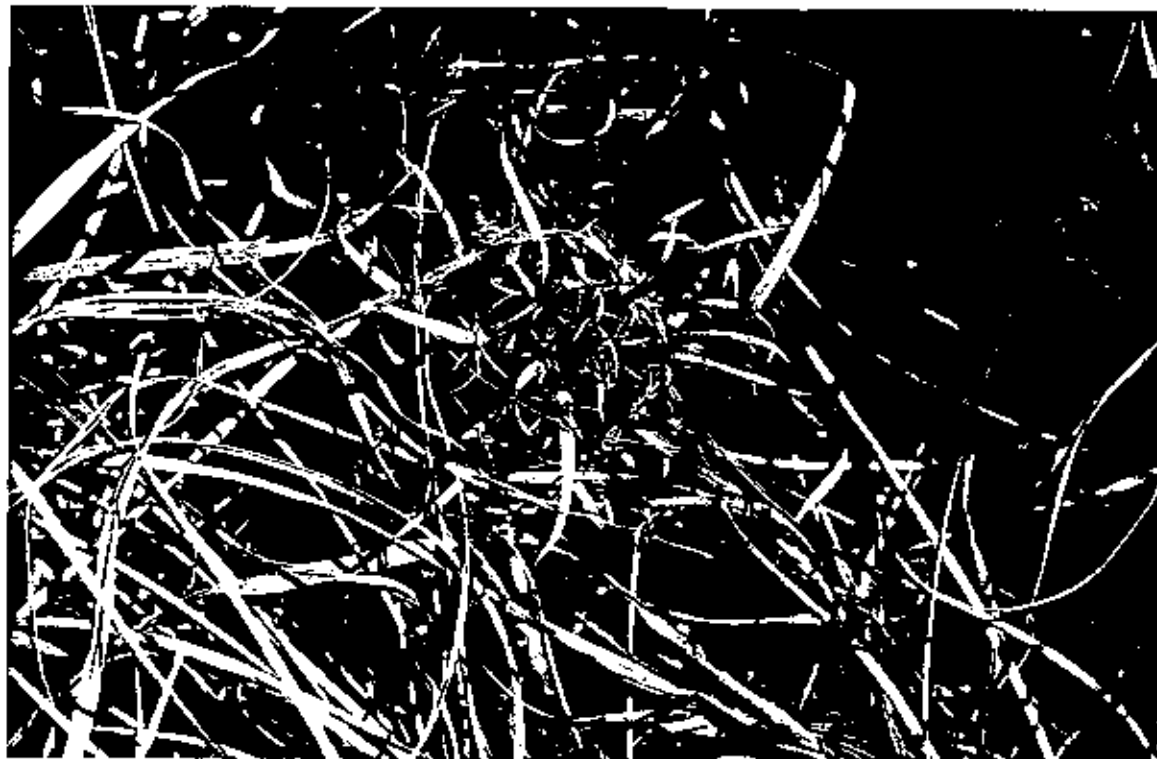
Fletcher, R. and W. Moir. 1992. Pediocactus papyracanthus, passenger pigeon of plants? Pp. 151-161 in Southwestern rare and endangered plants: proceedings of the Southwestern Rare and Endangered Plant Conference, R. Sivinski and K. Lightfoot, eds. New Mexico Forestry and Resources Conservation Division, Energy, Minerals and Natural Resources Department Miscellaneous Publication

No. 2.

Heil, K., B. Armstrong, and D. Schleser. 1981. A review of the genus Pediocactus. *Cactus and Succulent Journal (U.S.)* 53: 17-39.

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Weniger, D. 1984. *Cacti of Texas and neighboring states: a field guide*. University of Texas Press, Austin. 356 pp.



Family: CACTACEAE

Scientific Name: *Toumeyia papyracantha* (Engelm.) Britt. & Rose

Common Name: Grama grass cactus

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: *Mammillaria papyracantha* Engelmann

Echinocactus papyracanthus Engelmann

Pediocactus papyracanthus (Engelm.) L. Benson

Description: Stems solitary, ribbed, 2.5–20 cm (1–8 in.) tall; central spines elongate, flexible, grooved, flattened, resembling dry grass blades, radial spines short, straight, flowers white, not spreading widely when open; fruit round, tan, dry when mature, up to 18 mm (0.75 in.) long. Flowers from April to June.

Known Distribution: Bernalillo, Cibola, Doña Ana, Grant, Los Alamos, Otero, Rio Arriba, Sandoval, Santa Fe, Socorro, Torrance, and Valencia counties, New Mexico, and adjacent Arizona

Habitat: Grama grass and galleta grasslands, usually where soil is sandy, rarely on gypsicous soils, 1,525–2,225 m (5,000–7,300 ft.)

Ownership: Bureau of Land Management, Department of Defense, Forest Service, private, State of New Mexico

Threats to Taxon: Overcollection, overgrazing, and destruction of habitat by urbanization are the major threats to this species.

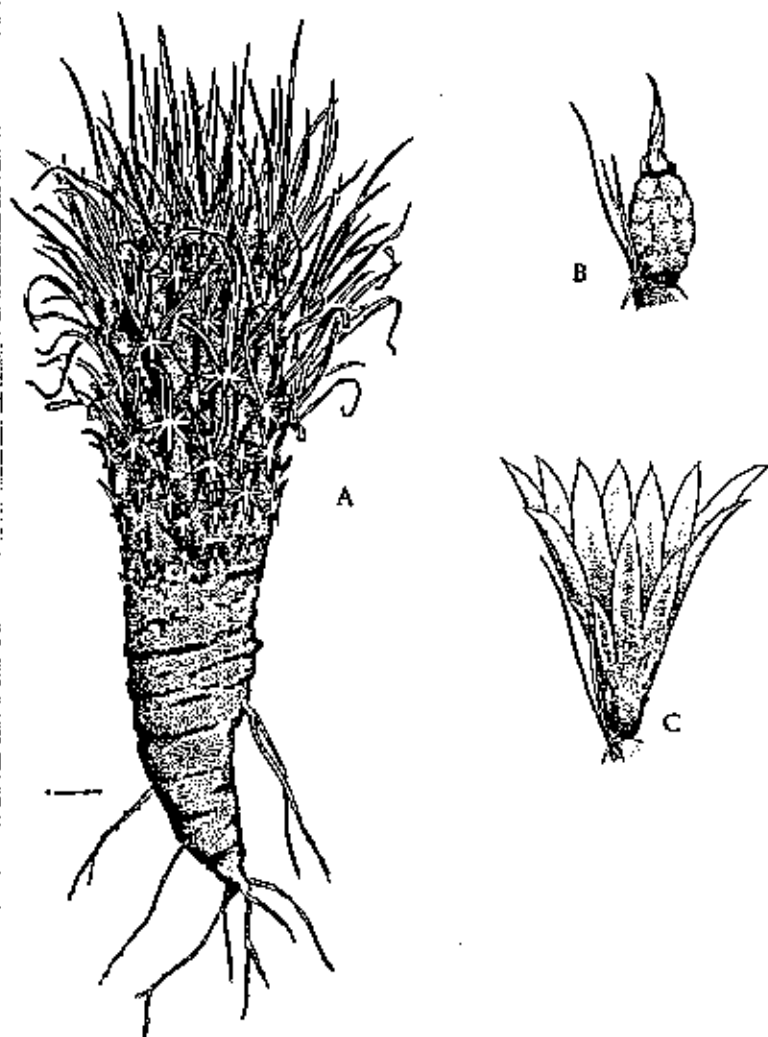
Similar Species: No other species in this area is similar.

Remarks: This cactus was probably, at one time, quite abundant in central New Mexico. However, degradation of rangeland and overgrazing have sharply reduced the abundance of this species throughout its range. *Toumeyia* is preferred over *Pediocactus* as *T. papyracantha* seems discordant in the genus *Pediocactus*.

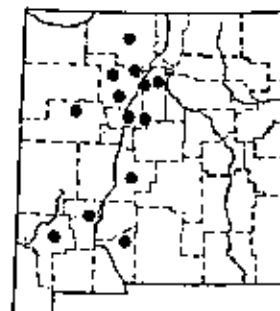
Important Literature:

Benson, L. A revision and amplification of *Pediocactus* II. *Cact. and Succ. Jour.* 35:57–61; 1962.

Benson, L. *The Cactaceae of the United States and Canada*. Stanford University Press; 1982.



Toumeyia papyracantha
A. general habit, B. fruit, C. flower



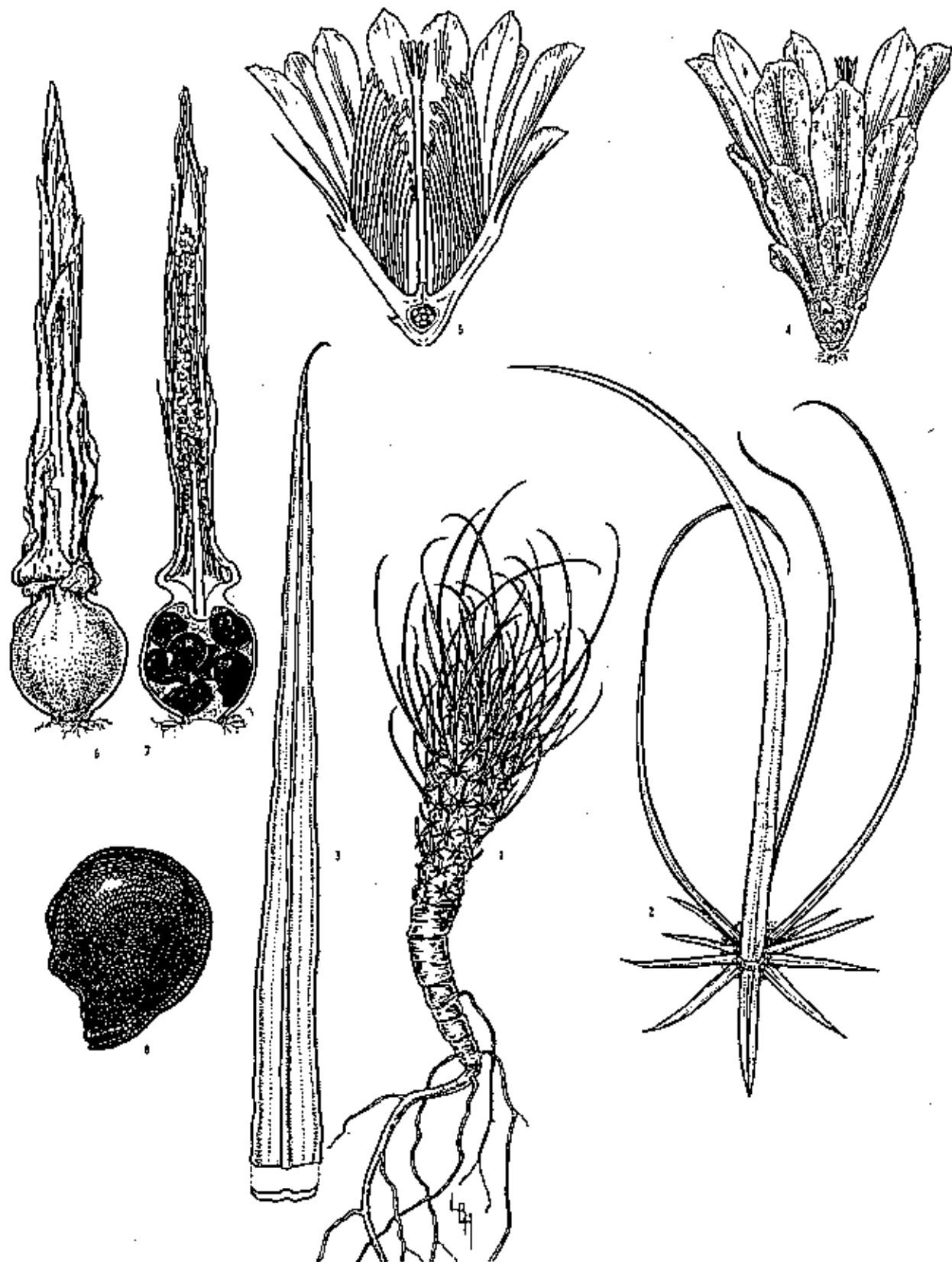


Fig. 809. Grama grass cactus, *Pediocactus papyraceanthus*. 1, Plant, $\times 2.5$, showing the long, flat spines, resembling grass blades (especially of blue grama grass, *Bouteloua gracilis*) in clumps of which the species grows. 2, Areole with the elongate central spines and the shorter, spreading radials, and with wool, $\times 5$. 3, Tip of a central spine, showing the median groove, and a cross section, $\times 12$. 4, Flower, $\times 2.5$. 5, Flower in longitudinal section, $\times 2.5$. 6, Fruit, with the upper flower parts persistent, $\times 4.25$. 7, Fruit in longitudinal section, $\times 4.25$. 8, Seed, in hilum appearing more or less basal, more so than usually in this genus, $\times 12$.

Sciencetology

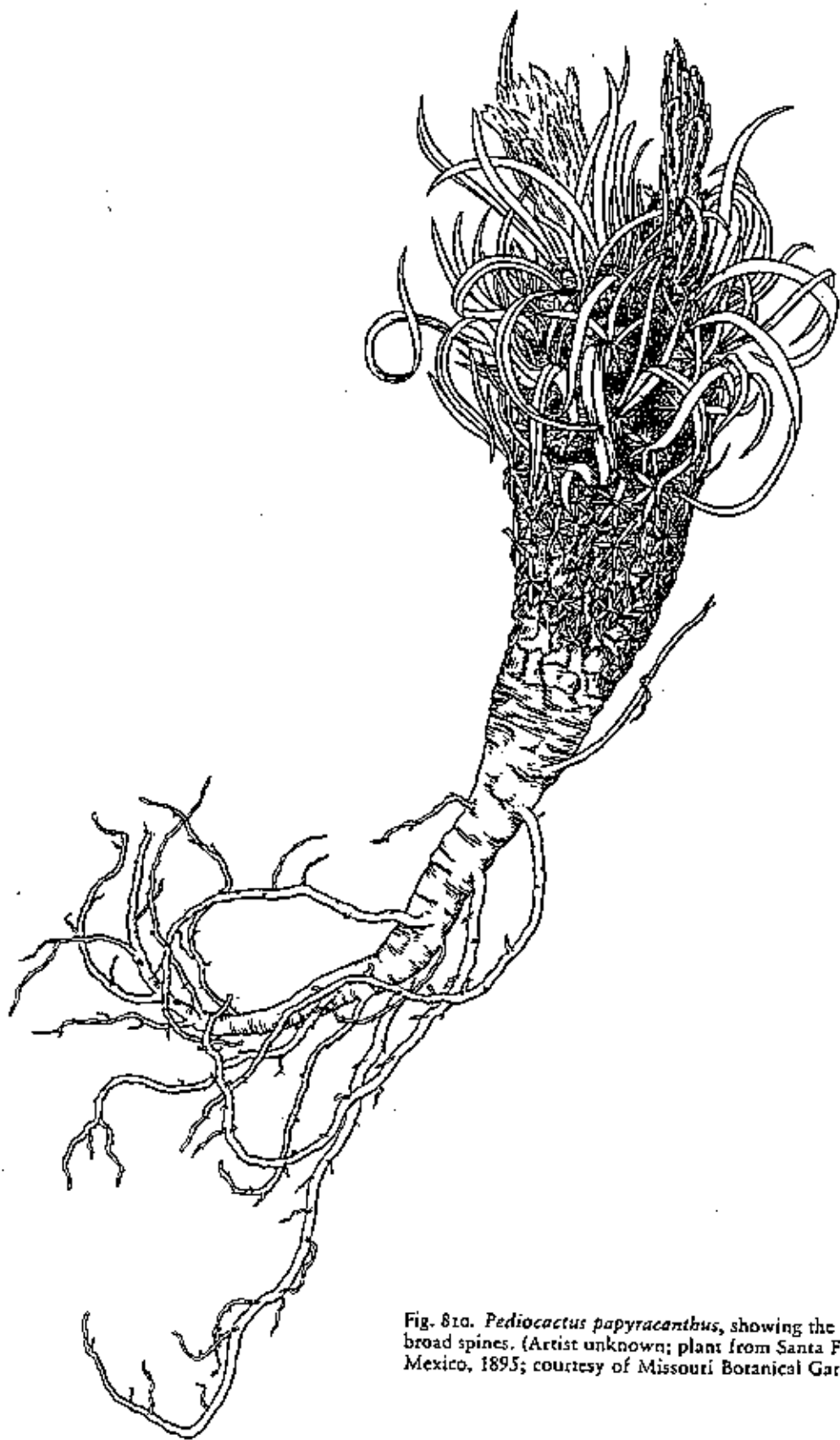
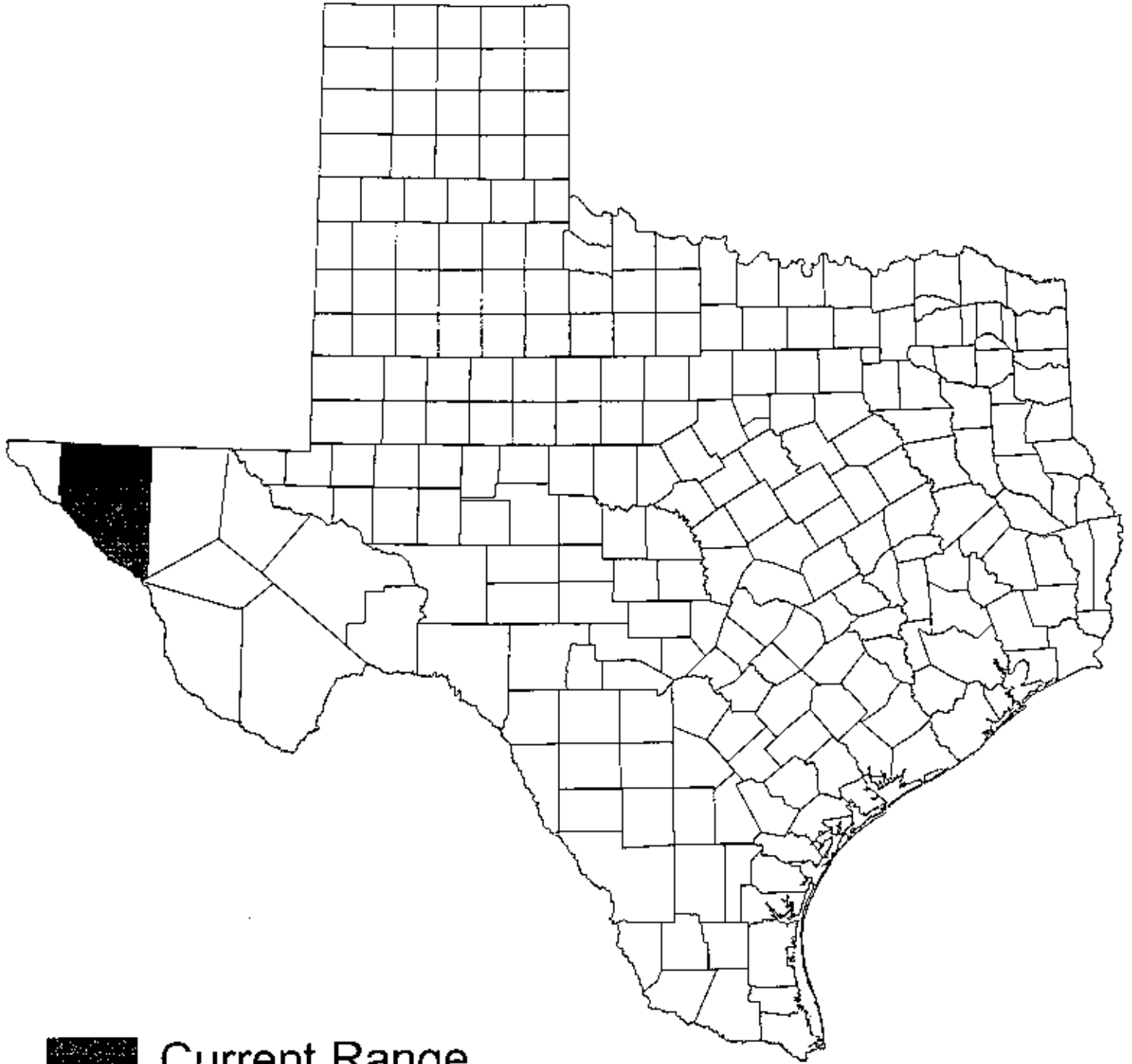


Fig. 81a. *Pediocactus papyracanthus*, showing the relatively broad spines. (Artist unknown; plant from Santa Fe, New Mexico, 1895; courtesy of Missouri Botanical Garden)



■ Current Range

Sclerocactus papyracanthus
(paper-spine cactus)

Scientific Name: *Scutellaria laevis* Shinners

Synonyms: None.

Common Name: smoothstem skullcap

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to mountains of Trans-Pecos Texas.

State Range: Culberson and Hudspeth counties.

Description (adapted from Correll & Johnston 1970, Henrickson & Johnston in prep., Shinners 1962, Turner 1994): Erect, bushy, mostly glabrous, yellow-green perennial 20-35 cm tall; stems several, moderately branched above, glabrous or sparsely puberulent with antrorse curled hairs to 0.1 mm long, with sessile yellow glands. Leaves opposite, simple, on petioles 0.5-1 mm long, the blades ovate, elliptical-ovate to oblong-ovate, 5-12 (-21) mm long and 2.5-8 (-11) mm wide, obtuse to acute at the tip, rounded at the base, entire, glabrous or puberulent on veins and margins with short antrorse hairs like those of the stem. Flowers in short spicate racemes from upper leaf axils; pedicels to 2.5 mm long; calyx 2-lipped, the lips entire, 2.5-3.5 mm long, with sessile glands and scattered curled hairs as on leaves; corolla two-lipped, reportedly white with purple on the lips and galea (rather than mostly purple as in other Texas *Scutellaria*), 14-17 mm long; stamens 4, ascending under the upper lip. Fruit a set of (4?) nutlets pressed together, the surface muriculate (Shinners 1962), granular-tuberculate to somewhat muriculate (Correll & Johnston 1970) or papillate (Turner 1994).

Similar Species: Much like several other low, strongly perennial *Scutellaria*, but differing in its mostly glabrous stems and leaves and perhaps by the mostly white, rather than mostly purple, corolla.

Habitat: On mountain slopes and in arroyos along dry streambeds (Correll & Johnston 1970).

Phenology: Flowering April-September.

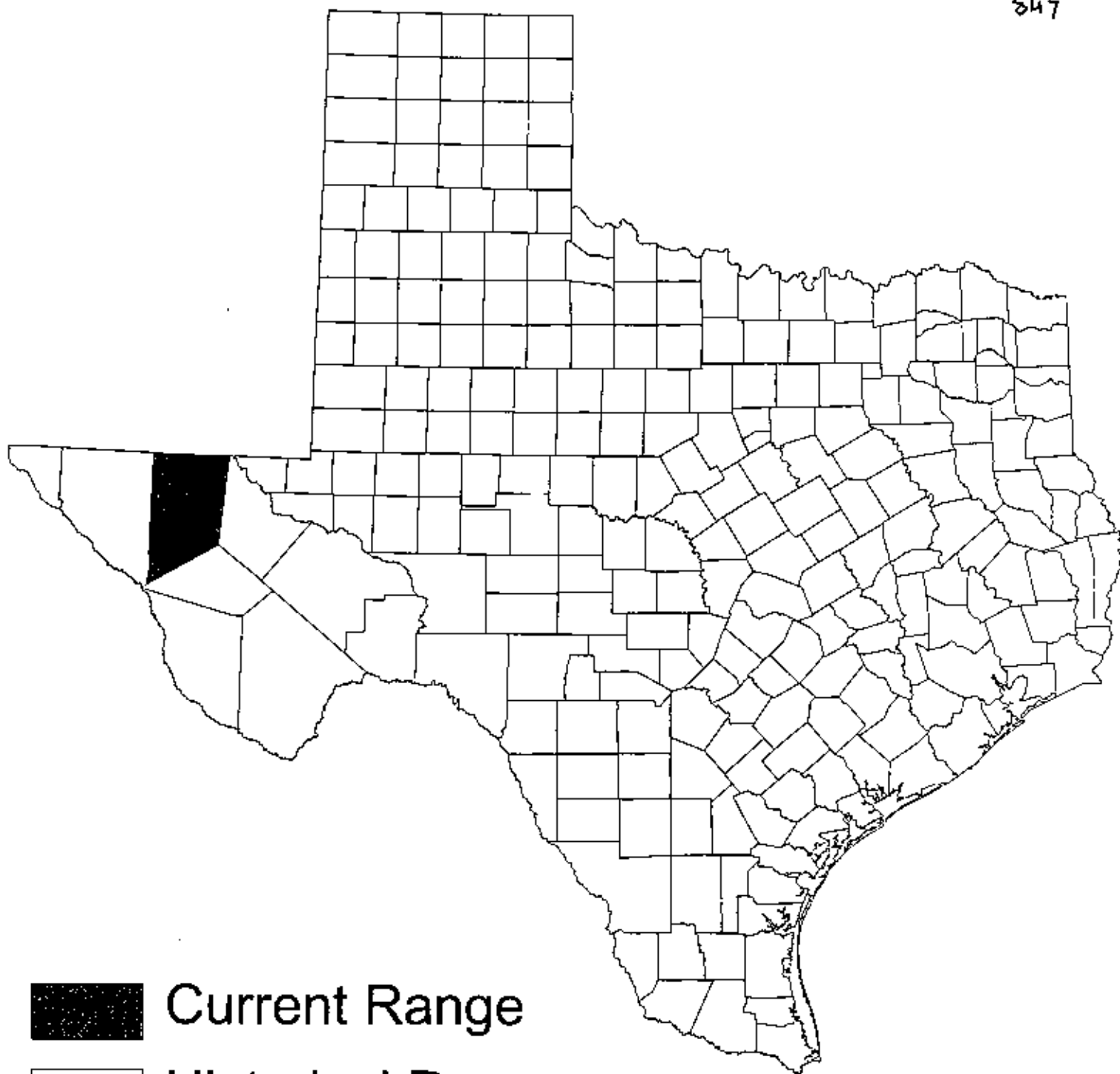
Comments: Known from the Sierra Diablo, Beach Mountains and Guadalupe Mountains.

Illustrations: None known.

Selected References:

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant surveys. Report prepared for Guadalupe Mountains National Park.
- Shinners, L. H. 1962. *Scutellaria laevis* (Labiatae), another endemic in Trans-Pecos Texas. Sida 1(2): 107-108.

Turner, B. L. 1994. A taxonomic overview of *Scutellaria*, section *Resinosa* (Lamiaceae). *Phytologia* 76(5): 345-382.



Current Range



Historical Range

Scutellaria laevis
(smooth-stem skullcap)

Scientific Name: *Sedum havardii* Rose

Synonyms: None.

Common Name: Havard's stonecrop

Global/State Ranks: G2S2

Federal Status: None.

Global Range: West Texas and Coahuila.

State Range: Brewster and Jeff Davis counties.

Description (adapted from Correll & Johnston 1970 and R. T. Clausen in Henrickson & Johnston in prep.): Subshrub to 14 cm tall; stems erect (key in Clausen in Henrickson & Johnston) to procumbent (Correll & Johnston 1970), not widely creeping; reddish brown to grayish, tuberculate. Leaves linear, spurred, obtuse, somewhat flattened to subterete, 4-9 mm long and 1-2 mm wide, the distal ones distinctly overlapping. Flowers sessile or subsessile in slender, few-flowered, terminal cymes; flowers 7-11 mm in diameter; sepals 5, lanceolate, unequal, 1-2 mm long; petals 5, white, sometimes red-tipped, linear-lanceolate, erect at base, widely spreading distally, 4-5 mm long and ca. 1 mm wide, united at base for less than 1 mm. Fruit a set of separate follicles, the follicles divergent, 4-5 mm long.

Similar Species: Apparently quite distinct from other *Sedum* species in Texas. Diagnostic features include imbricated leaves 55 mm long or less, tubercle-encrusted stems, and white petals.

Habitat: Crevices in igneous rock outcrops, sometimes loose igneous talus, in oak-pinyon woodlands and chaparral at medium to high elevations in the Chisos and Davis Mountains.

Phenology: Flowering June-September.

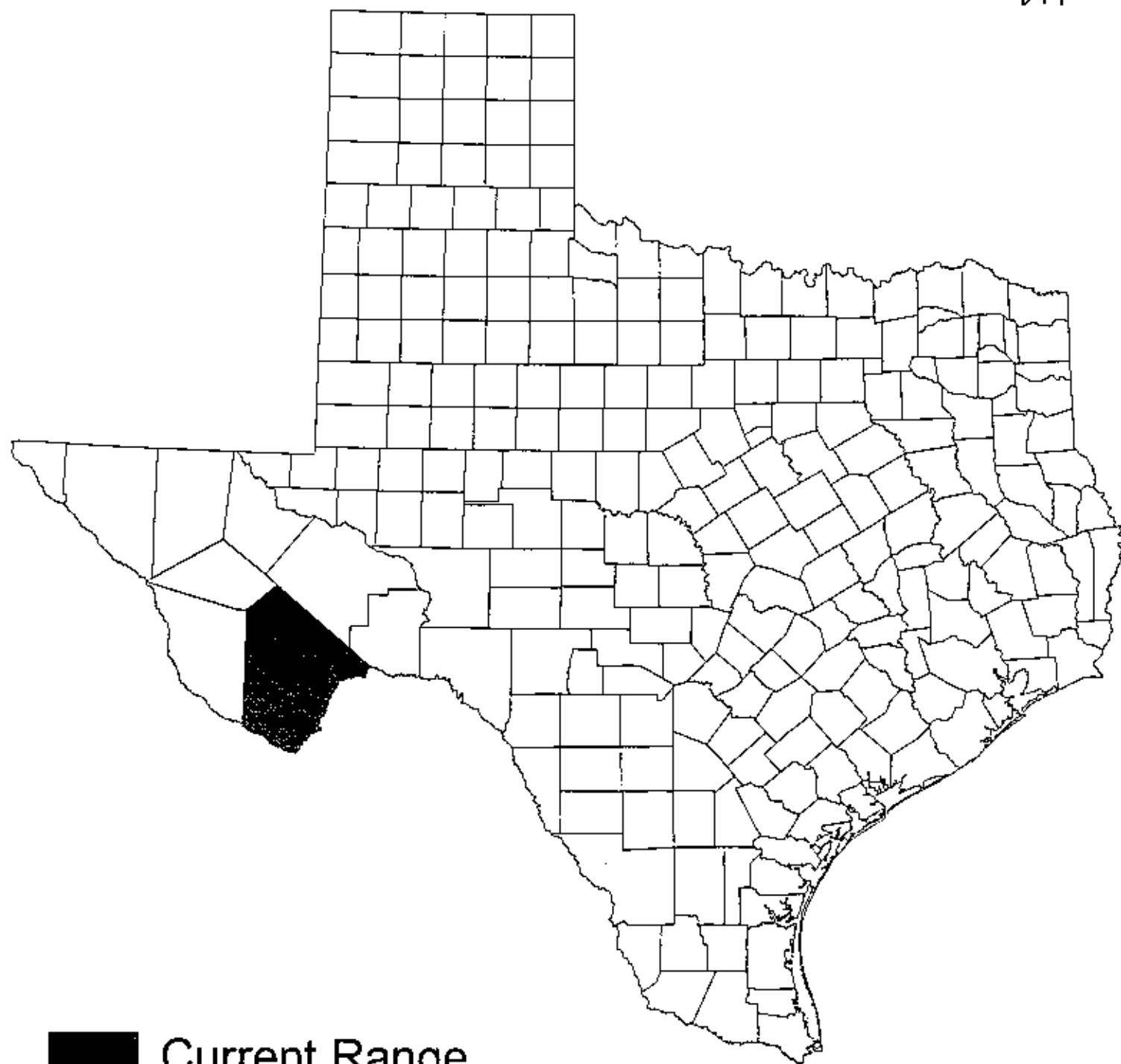
Comments:

Illustrations: None known.

Selected References:

Clausen, R. T. 1975. *Sedum* of North America north of the Mexican Plateau. Cornell University Press, Ithaca. 742 pp.

Uhl, C. H. 1972. Intraspecific variation in chromosomes of *Sedum* in the southwestern United States. *Rhodora* 44:301-320.



■ Current Range
□ Historical Range

Sedum havardii
(Havard's stonecrop)

Scientific Name: *Selaginella viridissima* Weatherby

Synonyms: *Selaginella coryi* Weatherby; *Bryodesma viridissima* (Weath.) Sojak

Common Name: green spikemoss; slender spikemoss

Global/State Ranks: G2S1

Federal Status: None.

Global Range: West Texas and Coahuila.

State Range: Brewster and Jeff Davis counties.

Description (adapted from Correll & Johnston 1970, Valdespino 1993, and Reeves in Henrickson & Johnston in prep.): Mosslike plants forming large clumps up to 1 m in diameter on rock; stems radially symmetric, both subterranean and aerial, not readily fragmenting, irregularly forked, tips straight; aerial stems mainly erect but sometimes ascending, with budlike arrested or suppressed branches throughout stem length; rhizophores borne on upper side of stems, restricted to subterranean stems and lower 1/4 of aerial stems. Leaves dimorphic, not clearly arranged in ranks; aerial stem leaves appressed, ascending, green, linear-lanceolate to narrowly lanceolate, (1.5-) 1.8-2.1 mm long and 0.49-0.56 mm wide; abaxial ridges prominent; base cuneate and decurrent to slightly rounded and adnate, glabrous; margins denticulate, very short ciliate, cilia transparent, spreading to ascending toward apex, less than 0.04 mm long, apex acute or seldom blunt. Strobili noticeably broader than the stems and branches, solitary, 0.5-1.2 (-2.5) cm long; sporophylls deltate-ovate to ovate-lanceolate, abaxial ridges prominent, base glabrous, margins denticulate, apex acute to obtuse.

Similar Species: Field identification of *Selaginella* species can be difficult, but according to Correll & Johnston (1970) *S. viridissima* can be recognized by its mat-forming habit, erect stems and comparatively thick, muticous (pointless) leaves. According to Lellinger (1985), *S. viridissima* can be distinguished from similar *Selaginella* species by its slender stems.

Habitat: Shaded or sheltered igneous rock ledges and cliffs in the Chisos and Davis Mountains.

Phenology: Sporiferous June-August.

Comments:

Illustrations: None known.

Selected References:

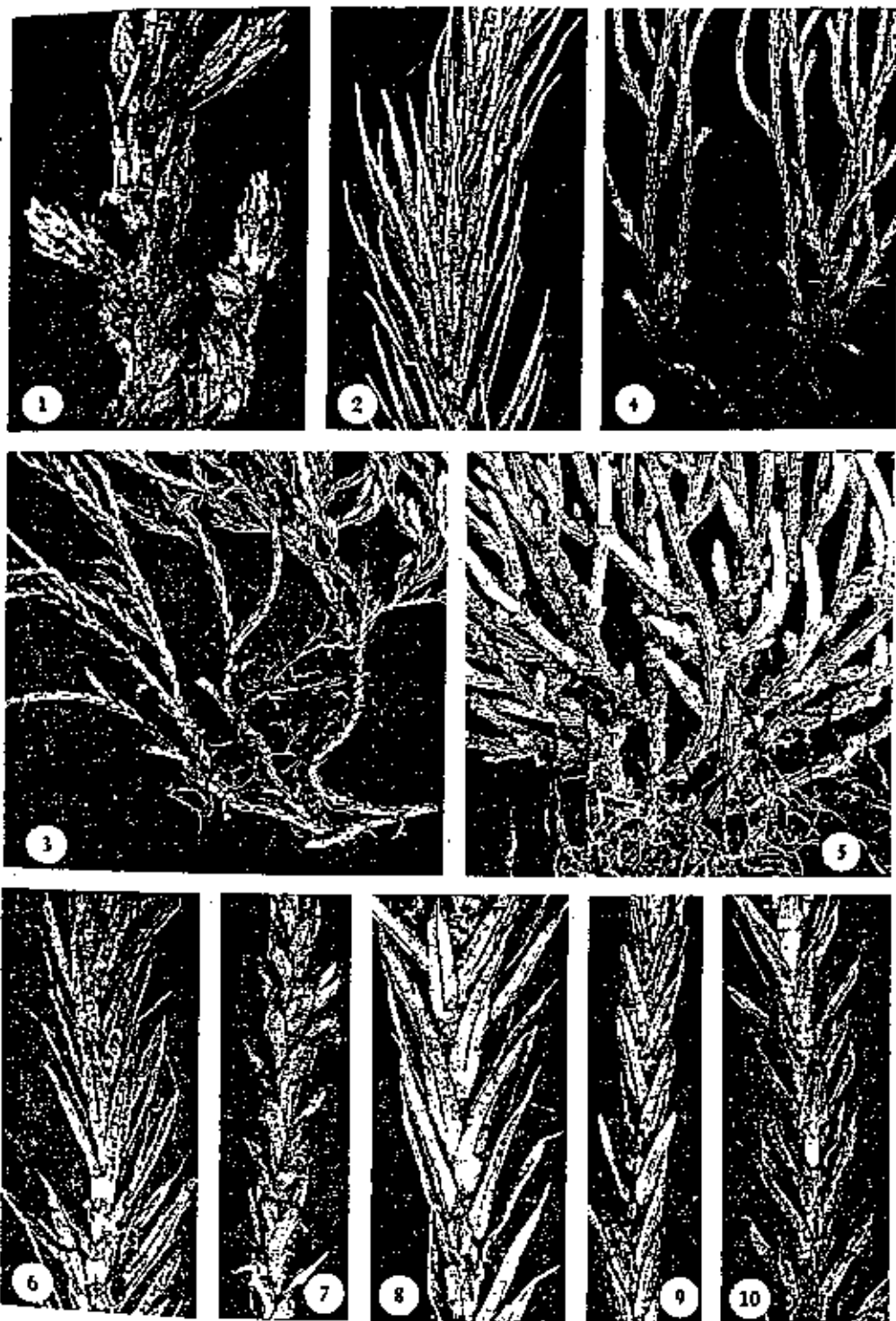
- Lellinger, D. B. 1985. A field manual to the ferns and fern-allies of the United States and Canada. Smithsonian Institution Press, Washington, D. C. 389 pp.
- Tryon, R. M., Jr. 1955. *Selaginella rupestris* and its allies. *Annals of the Missouri Botanical Garden* 42: 1-99.
- Valdespino, I. A. 1993. Selaginellaceae. 38-63 in *Flora of North America Committee*. 1993. *Flora of North America north of Mexico*. Volume 2. Pteridophytes and Gymnosperms. Oxford University

Press, New York. 475 pp.

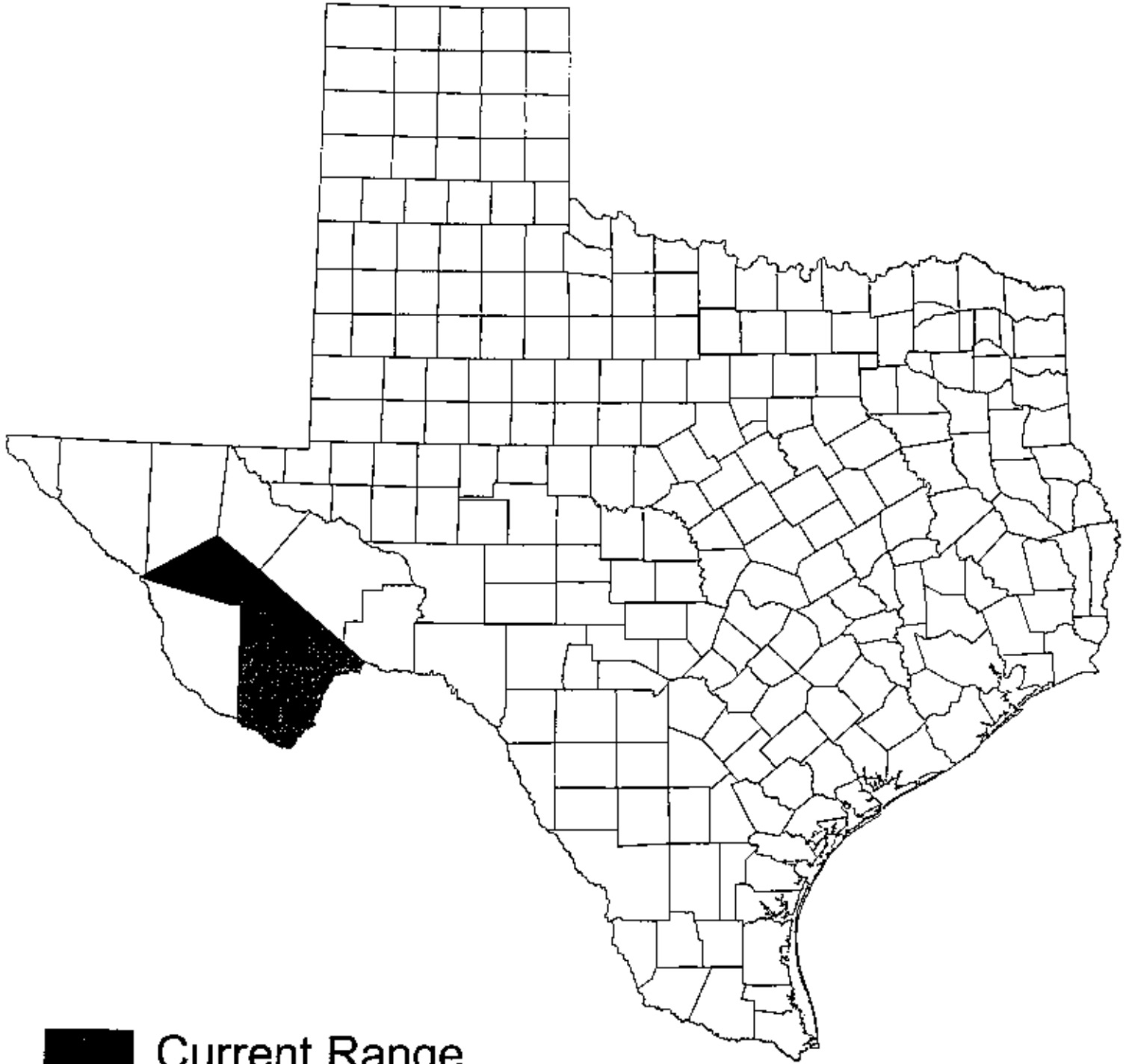
BOTANICAL GARDEN

(Vol. 4)

tipila	23
sinosa	17
terwoodii	61
ar. <i>dolichotricha</i>	61
hensis	74
dei	61
dissima	23
llacei	41
<i>columbiana</i>	41
tsonii	74
utlica	46
atherbiaga	23
ghtii	33
ar. <i>Phillipsiana</i>	40
ar. <i>velusta</i>	33
ar. <i>Wightii</i>	33
ghtii	41
<i>gynandrum rupestre</i>	61
AGONOSTACHYAE	17
GONOSTACHYS	17
ASTICHAE	17
STICHUS	17
<i>ichys carinatus</i>	17



TRYON — SELAGINELLA RUPESTRIS AND ALLIES



■ Current Range

Selaginella viridissima
(green spikemoss)

Scientific Name: *Senna orcuttii* (Britt. & Rose) Irwin & Barneby

Synonyms: *Peiransia orcuttii* Britt. & Rose; *Cassia orcuttii* (Britt. & Rose) B. L. Turner

Common Name: Orcutt senna

Global/State Ranks: G2S2

Federal Status: None.

Global Range: Southeastern New Mexico, west Texas and Coahuila.

State Range: Brewster and Terrell counties, primarily in the Del Norte and Altuda Mountains (Isely 1975).

Description (adapted from H. S. Irwin & R. C. Barneby in Henrickson & Johnston in prep.; Correll & Johnston 1970): Perennial herb to 3-6 dm tall; stems few to several, erect or ascending, brown distally, commonly thinly hispid at the base with fine spreading setae. Leaves alternate, even-pinnately compound with 4-6 pairs of leaflets; petioles and leaflets strigulose on both surfaces with appressed hairs 0.2-0.5 mm long, glaucescent in age; stipules linear-subulate, 6-10 mm long; leaflets lanceolate, acute to acuminate, apiculate, 15-25 mm long and 5-8 mm wide; petiolar glands setaceous, one between each of the lower 3-5 leaflet pairs. Flowers in racemes borne in the upper axils, equally or surpassing the subtending leaves; pedicels slender, 1-1.5 cm long; sepals 5, oblong, 4.5-7 mm long; petals 5, light yellow, orbicular, (5-) 8-10.5 mm long; stamens 10, the uppermost 3 reduced. Fruit a narrowly linear pod 4-9 (-12) cm long and 3.5-6.5 mm wide, minutely strigulose, acuminate, glabrous, raised over the obliquely-arranged, numerous seeds.

Similar Species: Much like the wide-ranging *Senna lindheimeriana*. *S. orcuttii* has sepals 4.5-7 mm long, petals 8-10.5 mm long, fruits 4-9 (-12) cm long and 3.5-6.5 mm wide, whereas *S. lindheimeriana* has sepals 6-8 mm long, petals 12-15 mm long, fruits 4-6 cm long and 7-8 mm wide.

Habitat: Gravelly soil on limestone slopes and in beds of intermittent streams within various mid- to lower-elevation Chihuahuan Desert communities.

Phenology: Flowering July-August.

Comments: Closely related to *S. lindheimeriana* and in similar habitats (Irwin & Barneby 1982). Isely (1975) noted that *S. orcuttii* is locally common but speculated that the populations might be relictual. Reported from Otero County, New Mexico; should be sought in Guadalupe Mountains National Park.

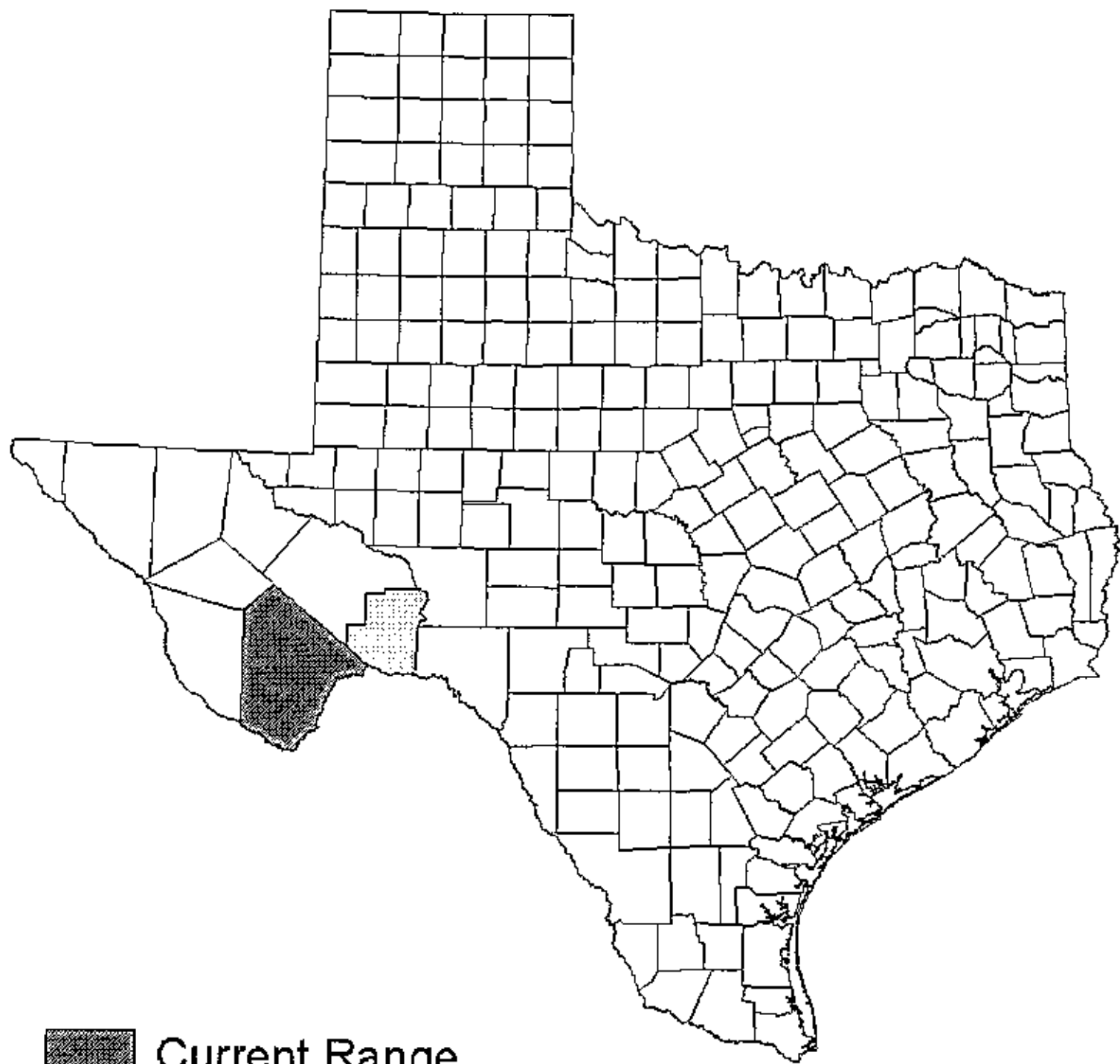
Illustrations: None known.



Selected References:

- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Irwin, H. S. and R. C. Barneby. 1982. The American Cassiinae: a synoptical revision of Leguminosae Tribe Cassieae Subtribe Cassiinae in the New World. *Memoirs of the New York Botanical Garden* 35: 1-918.

Isely, D. 1975. Leguminosae of the United States: II. Subfamily Caesalpinoideae. *Memoirs of the New York Botanical Garden* 25: 1-228.





-  Current Range
-  Historical Range

Senna orcuttii
(Orcutt's senna)

Scientific Name: *Senna ripleyana* (Irwin & Barneby) Irwin & Barneby

Synonyms: *Cassia ripleyana* Irwin & Barneby

Common Name: Ripley's senna

Global/State Ranks: G1SH

Federal Status: SOC

Global Range: Local in a few spots within the Chihuahuan Desert: west Texas, southeastern Chihuahua and extreme northern Zacatecas.

State Range: Glass Mountains of Brewster County.

Description (adapted from Irwin & Barneby 1975 and Irwin & Barneby 1982): Dwarf, loosely caespitose, subcaulescent perennial, pilosulous throughout with forwardly incurving-ascending hairs less than 1 mm long and a few weak filiform hairs to ca. 2.5 mm long. Leaves alternate, compound with a pair of leaflets; stipules linear-caudate, (4-) 6-10 mm long; petioles 1-2.5 (-3.2) cm long, more or less filiform, interfoliar gland linear-claviform, 0.7-2.7 mm long; leaflets 2, oblong to oblong-elliptic, (6-) 8-20 mm long, 3-10 mm wide, green but slightly villous on the upper surface, ashen-pubescent on the lower surface, broadly cordate at the base on the proximal side, cuneate on the distal side. Flowers on pedicels 5-8 mm long at the end of erect, scape-like peduncles 2.5-6 cm long; sepals 5, 5-6.5 mm long, the broad inner sepals obovate; petals 5, pale yellow, subequal, spatulate-oblongate, 8.5-9.5 mm long; style filiform, 3-3.5 mm long. Fruit an erect pod, (13-) 15-24 mm long and 5-8 mm wide, more or less straight, abruptly apiculate, moderately compressed, hispidulous with shorter appressed hairs and basally dilated ascending hairs to 0.7-1 mm long; seeds ca. 3 mm long, olivaceous to pinkish-brown, smooth and lustrous.

Similar Species: Easily confused with *S. bahinioides*, from which it is "distinguished by the caespitose habit, wiry subscapiform peduncles, filiform style, and lustrously smooth olivaceous to pinkish-brown seeds" (Irwin & Barneby 1982).

Habitat: Gravelly hilltops in arid grasslands and creosote flats in Chihuahuan Desert, at elevations between 4000 and 5000 feet.

Phenology: Flowering/fruitlet July-October.

Comments: Very similar to and sympatric with the common *Senna bahinioides*, and thus perhaps merely overlooked rather than rare. Careful field inspection will be required to determine the true status of this species.

Illustrations: A line drawing appears in Irwin & Barneby (1975).

Selected References:

Irwin, H. S. and R. C. Barneby. 1975. Notes preliminary to an account of *Cassia* in the Chihuahuan Desert. *Sida* 6(1): 7-18.

Irwin, H. S. and R. C. Barneby. 1982. The American Cassiinae: a synoptical revision of Leguminosae Tribe Cassieae Subtribe Cassiinae in the New World. *Memoirs of the New York Botanical Garden*

35: 1-918.

Isely, D. 1975. Leguminosae of the United States: II. Subfamily Caesalpinoideae. *Memoirs of the New York Botanical Garden* 25: 1-228.

lustrous.—Fig. 1.

Gravelly hilltops and flats in arid grassland and Larrea desert, \pm 1400-1650 m, local within the borders of the Chihuahuan Desert from Trans-Pecos Texas (Glass Mts., Brewster Co.) to s.-e. Chihuahua near Bolsón de Mapimí (w. of Jiménez; Rancho La Gloria) and extreme n. Zacatecas (Cedras), not yet collected but to be expected in n. and w. Coahuila.

Material seen: UNITED STATES, Texas, Brewster: Glass Mts., 13.VII.40 (fl. fr), Warnock W-44 (TEX); s. l., 9.X.36, Sharp s. n. (CAS, in part, mixed with *C. bauhinioides*). MEXICO, Chihuahua: Sa. del Diablo 14 km s.-e. of Rancho La Gloria, 28.VIII.73 (fr), Chiang & al. 9000d (TEX). Zacatecas: n. of Cedras, 22.IX.73 (fl. fr), Reveal & Atwood 3357 (NY, US).

A neat little cassia related to *C. bauhinioides* but readily distinguished by the tufted habit, the wiry scapiform peduncles, and the lustrously smooth olivaceous to pinkish-brown seeds. The subcaulescent growth-form and relatively stiff stipules recall *C. pumilio* Gray, but the oblong-obovate, basally semicordate leaflets are entirely different.

Named in memory of Harry Dwight Dillon Ripley, 1908-1973, an avid collector and eclectic devotee of small and rare desert plants, who in the field noted of the type-collection: "near *C. bauhinioides*, but not the same."

II. Section CHAMAESENNA Benth

The genus *Palmerocassia* Britt. (1930, p. 253), based on *Cassia wislizeni* A. Gray, consisted in the first instance of five species, endemic to desert regions of Mexico and immediately adjoining United States. They are twiggy, subsapinescent, microphyllous shrubs and treeclets with glandless leafstalks, large flowers, the androecium and tardily dehiscent, compressed pod of sect. *Chamaesenna* Benth., forming in Benth's scheme of classification a xerophytic offshoot of the *Eglandulosae* series. An interesting feature of the group is the dimorphic foliage, an adaptation to desert climate achieved by many Leguminosae of different groups. The leaves of the current season are solitary, but subtend in their axil a compressed-conical bud which, lying dormant the first year, develops during the second into a brachyblast, taking the form of a fascicle of small leaves intermixed with setiform stipules.

Three of Britton's five *Palmerocassias* are almost or quite confined to the Chihuahuan Desert, but are so closely related that they may best be interpreted as geographic varieties of a widespread *C. wislizeni*; their differential characters appear in the key following. The perhaps also closely related *C. pringlei* Rose, differing in the often more flexuous branches and greatly elongated pod (18-20 not 8-16 cm long) represents this complex in the Balsas Depression and low valleys of Oaxaca; while *C. unifuga* Rose, locally endemic in southern Puebla, is well marked by the combination of villous pubescence and unijugate leaflets with revolute margins. A parallel reduction of the leaflets to one pair has occurred also in the Chihuahua Desert, described below as *C. monoxyla*. The members of the group occurring in our range are

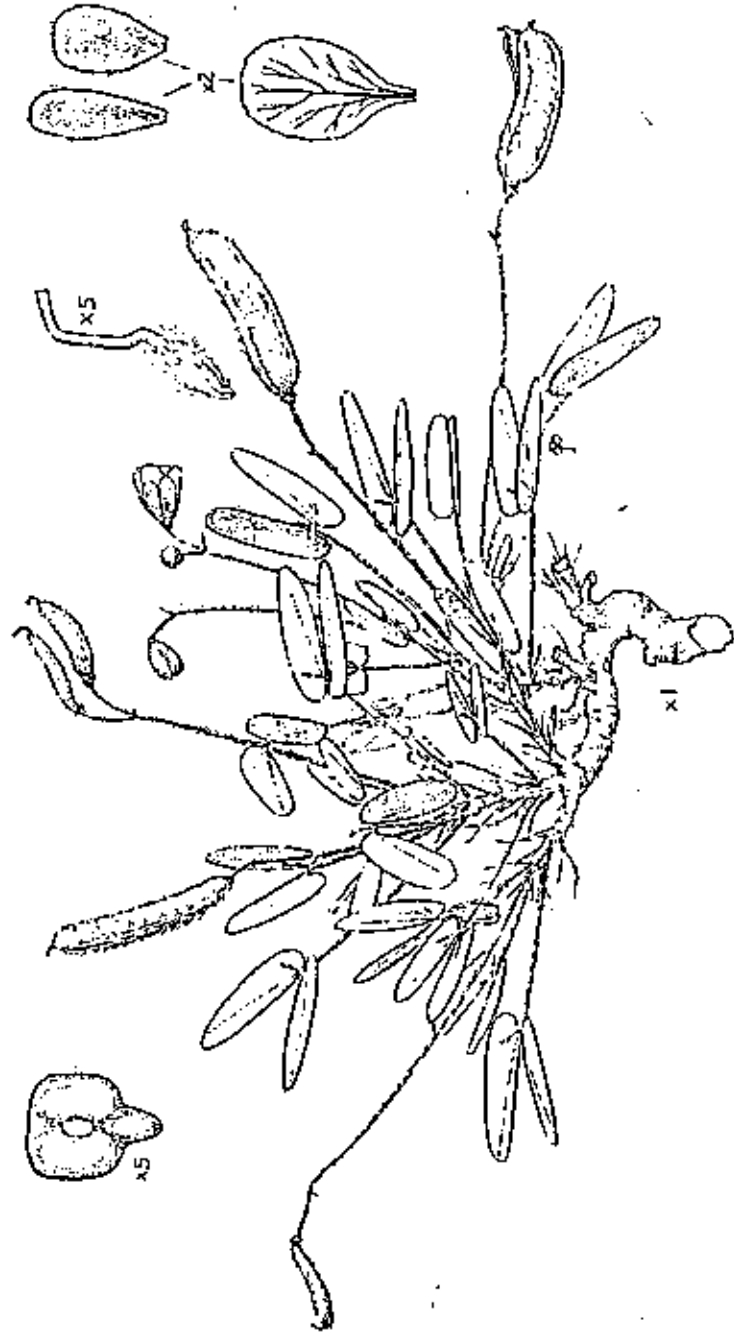
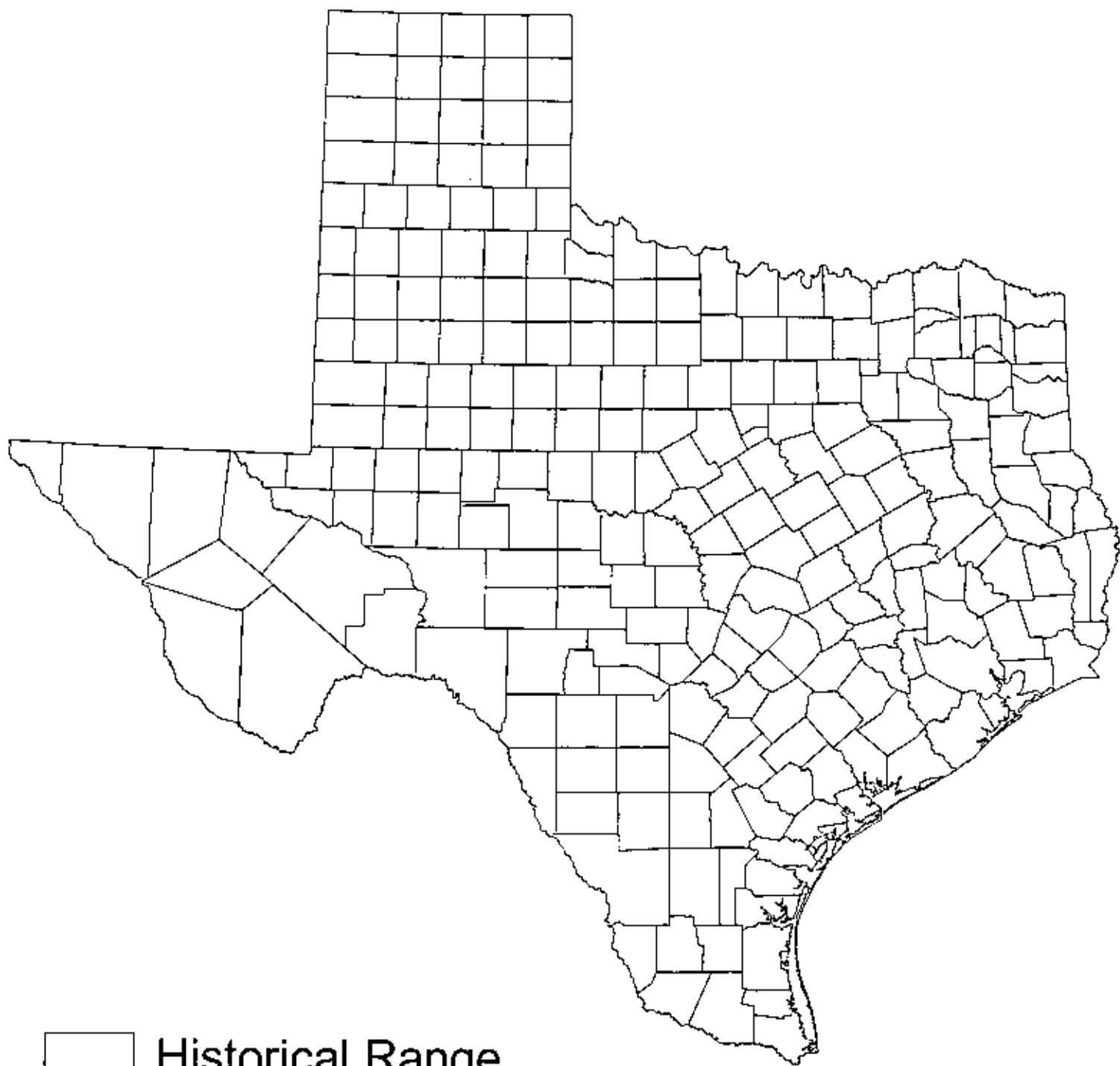


Fig. 1. *Cassia ripleyana* Irwin & Barneby. Habit X1; sepals + petal (ventral view) X2; ovary and seed X3. HS IRWIN & DC BARNEBY, 1975. Names preliminary to an account of *Cassia* in the

Senna ripleyana



Senna ripleyana
(Ripley's senna)

Scientific Name: *Sesuvium trianthemoides* Correll

Synonyms: None.

Common Name: Texas sea-purslane; roughseed sea-purslane

Global/State Ranks: GSHH

Federal Status: SOC

Global Range: Apparently endemic to Texas.

State Range: Kenedy County. Known only from the type specimen: dunes, 11 July 1947, B. C. Tharp 47431. Reports from Aransas and Nueces counties (Jones, 1977) were based on misidentified specimens of *Sesuvium maritimum*.

Description (adapted from Correll 1966): Fleshy annual, branched from the base, the herbage with scattered large crystalline globules; stems to 35 cm long or more, the internodes 4-5 cm long. Leaves opposite, oblanceolate to spatulate, obtuse at apex, at least 3 cm long (including the petiole) and 1 cm wide above the middle, tapered below into a conspicuous broadly scarious-winged clasping petiole. Flowers solitary and sessile in the axils of leaves and branches; calyx lobes 5, triangular ovate, subacute at apex, strongly nerved, ca. 3.5 mm long, with hyaline margins, the dorsal apical appendage small; petals absent; stamens 5, with slender filaments ca. 1 mm long; ovary ovoid, 2-celled; styles 2, ca. 0.5 mm long. Fruit an ovoid-ellipsoid capsule 4-5 mm long, pointed at apex, circumscissile, containing ca. 10 seeds; seeds ca. 1.5 mm long, conspicuously rugose with brownish granular ridges, with additional light patches extended in irregular lines from the hilum.

Habitat: Described on the label of the type specimen simply as "dunes," but perhaps in saline clay of tidal flats or ephemeral ponds within a dune landscape.

Phenology: Flowering June-August?

Similar Species: The only other species of *Sesuvium* in Texas with only 5 stamens is *S. maritimum*, which differs from *S. trianthemoides* in having smooth rather than rugose seeds. Correll (1966) noted its overall resemblance to *Trianthema portulacastrum*, which sometimes has as few as 5 stamens. However, *Trianthema portulacastrum* has conspicuous stipules, which are lacking in all *Sesuvium* species.

Comments: Described by Donovan Correll in 1966, *Sesuvium trianthemoides* remains a poorly understood species known only from the type collection.

Illustrations: A line drawing appears in Correll & Correll (1975).

Selected References:

Correll, D. S. 1966. Some additions and corrections to the flora of Texas--III. *Rhodora* 68: 420-428.

Correll, D. S. and H. B. Correll. 1975. Aquatic and wetland plants of southwestern United States. 2 volumes. Stanford University Press, Stanford. 1777 pp.

Jones, F. B. 1977. Flora of the Texas Coastal Bend. Second edition. Welder Wildlife Foundation, Sinton.

262 pp.

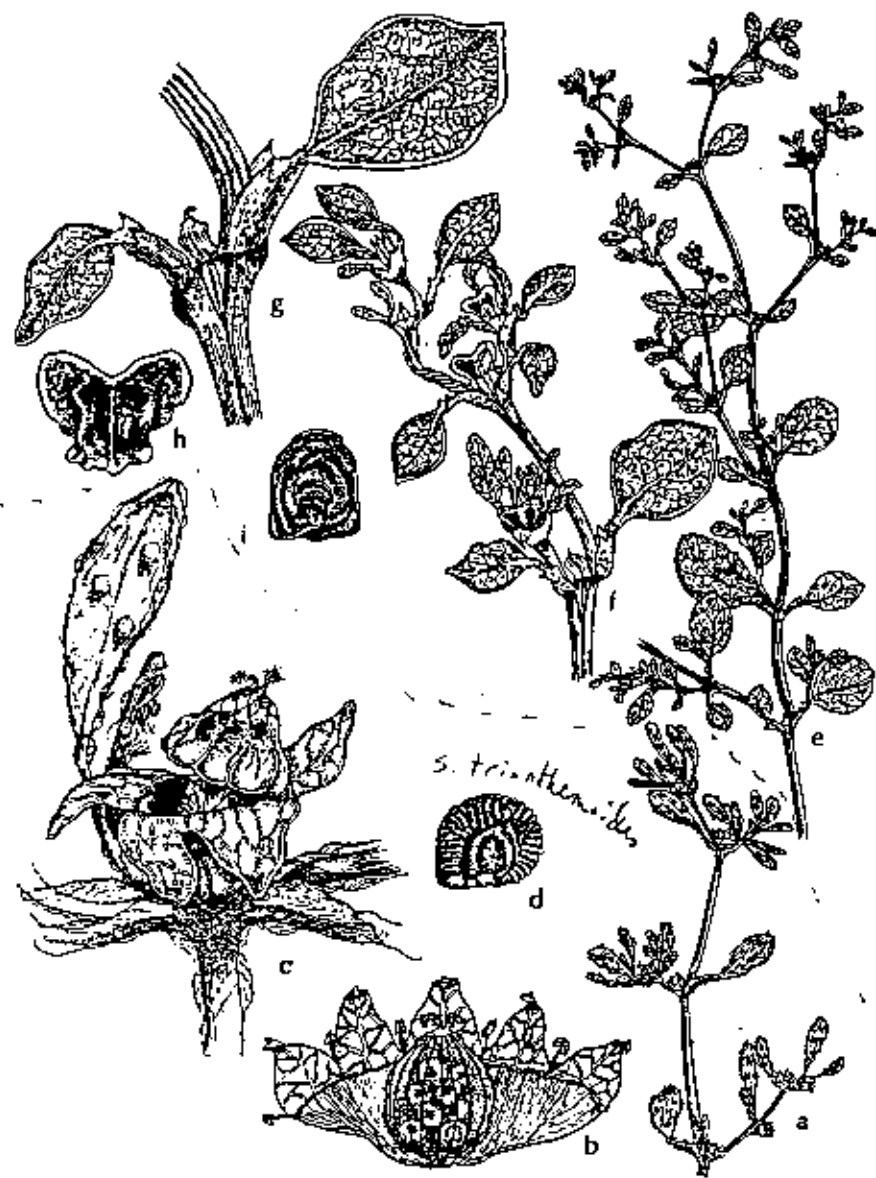
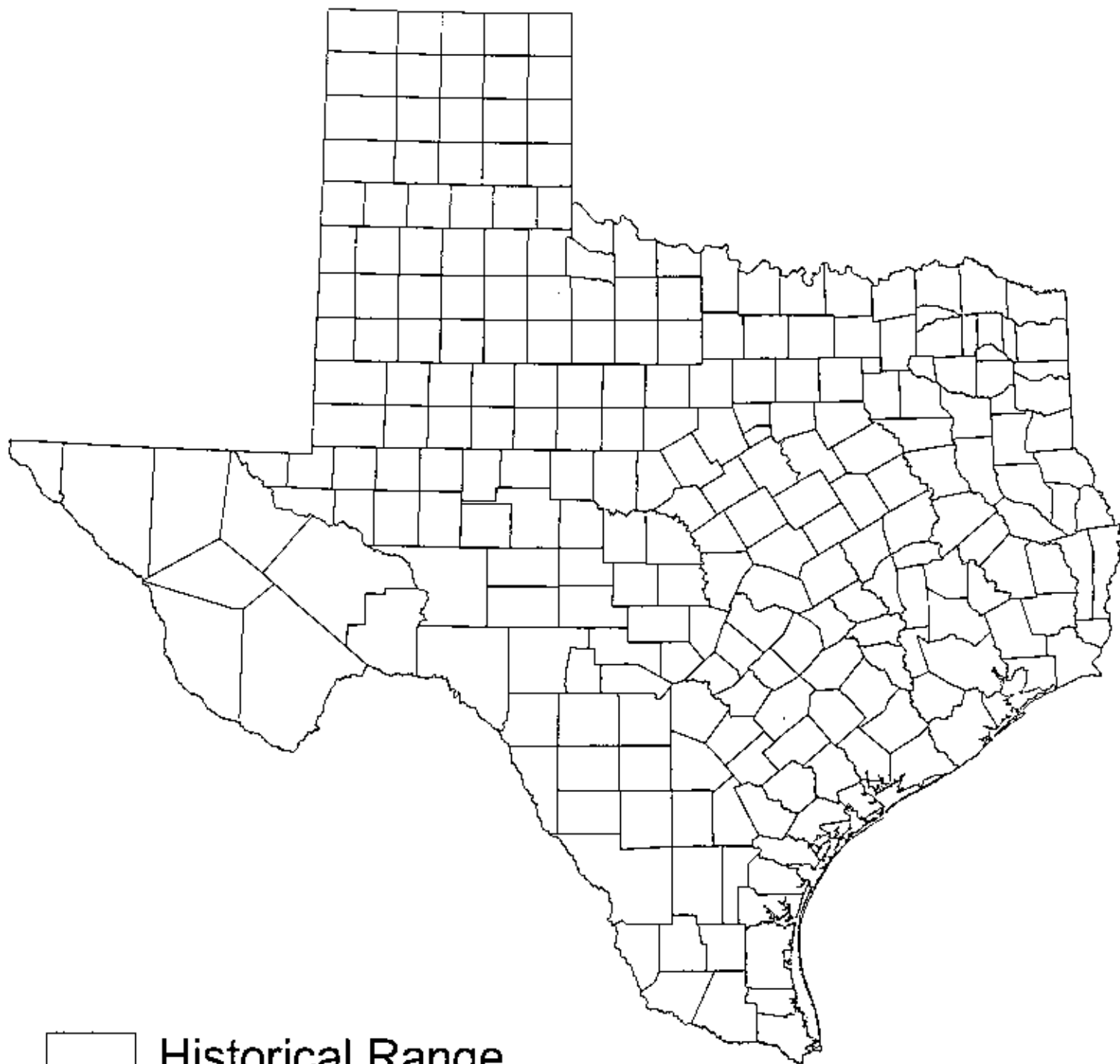


Fig. 432: a-d, *Sesuvium trianthemoides*: a, habit, $\times \frac{1}{2}$; b, open calyx, $\times 5$; c, flower, $\times 5$; d, seed, $\times 10$. e-i, *Trianthera Portulacastrum*: e, habit, $\times \frac{1}{2}$; f, end of stem, $\times 1\frac{1}{2}$; g, node, $\times 2\frac{1}{2}$; h, capsule, $\times 5$; i, seed, $\times 10$. (V. F.).



Sesuvium trianthemoides
(roughseed sea-purslane)

Scientific Name: *Silene subciliata* Robins.

Synonyms: None.

Common Name: scarlet catchfly

Global/State Ranks: G3S3

Federal Status: SOC

Global Range: Endemic to the Coastal Plain of southeast Texas and southwest Louisiana.

State Range: Confined to the Pineywoods, with records from Hardin, Jasper, Jefferson, Liberty, Newton, Polk, Sabine, Shelby and Tyler counties.

Description (adapted from Hitchcock & Maguire 1947; Correll & Johnston 1970): Herbaceous perennial with one to several stems from a branched crown; stems up to 2-11 dm tall, often shorter, few-leaved and twiggy in appearance. Leaves simple, opposite, 10 pairs or fewer per stem, linear to narrowly oblanceolate, to 16 cm long and 12 mm wide, usually glabrous, rarely ciliate on the margins. Flowers few in a sparingly-branched inflorescence; calyx tubular, 10-nerved, glabrous and smooth, to 25 mm long, the 5 lobes lanceolate, ciliate, ca. 4 mm long; petals 5, scarlet, clawed, the blade portion oblong-elliptic, ca. 15 mm long, shallowly notched at the tip or entire, the claw portion narrow and slightly auriculate at the top, the margins ciliate; appendages 2, produced from the junction of the claw and blade, erect, linear, tubular, entire, ca. 4 mm long; stamens 10, exerted; styles 3, scarcely exerted. Fruit a light brown, somewhat narrowly ellipsoidal capsule; seeds ca. 2 mm long, subreniform.

Similar Species: With its twiggy habit, long, linear, opposite leaves and bright scarlet petals, *Silene subciliata* is not likely to be confused with any other species in southeast Texas. Three other scarlet-petaled species of *Silene* are found in Texas, but two of them *S. laciniata* and *S. plankii*, are restricted to mountains of the Trans Pecos. *Silene virginica* was recently discovered in extreme northeast Texas (Singhurst, White & Holmes in press). It is usually a smaller plant, with a glandular stem bearing 2-4 pairs of lanceolate to lance-ovate leaves up to 4.5 cm wide; it flowers in the spring rather than late summer-fall.

Habitat: *Silene subciliata* is most commonly found in deep, well drained sandy soils in and along margins of fire-maintained dry upland longleaf pine savannas. In fire-suppressed forests with dense, shading understory, it is often limited to sunnier roadsides or cleared utility easements. *Silene subciliata* also occurs sparingly in moister sands on openly forested creekbanks.

Phenology: Flowering from early August to October, sometimes into early November.

Comments:

Illustrations: Color photographs appear in Ajilvsgi (1979) and Loughmiller & Loughmiller (1984). Line drawings of a perianth and a petal appear in Hitchcock & Maguire (1947).

Selected References:

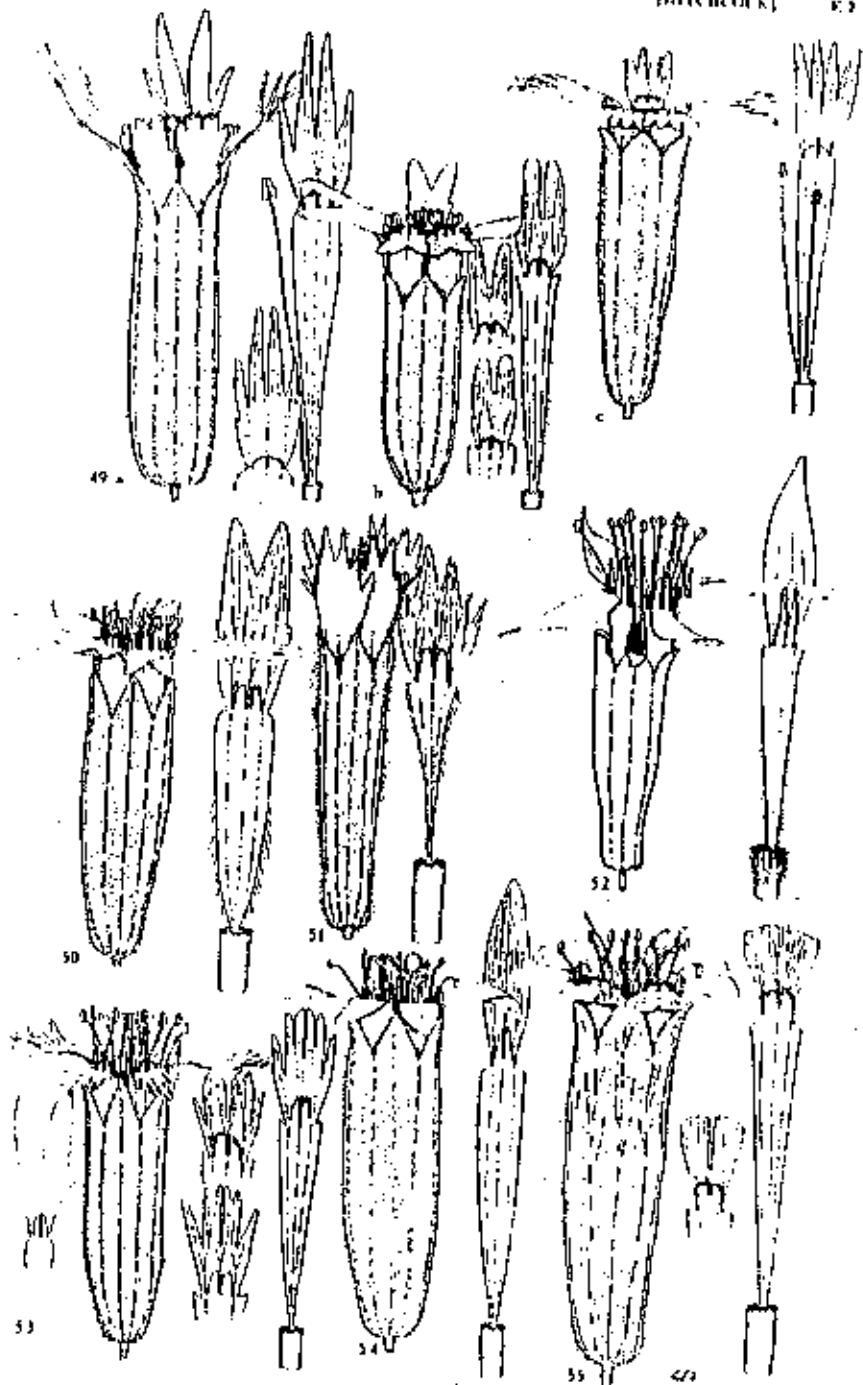
Ajilvsgi, G. 1979. Wild flowers of the Big Thicket, East Texas, and Western Louisiana. Texas A & M University Press, College Station. 360 pp.

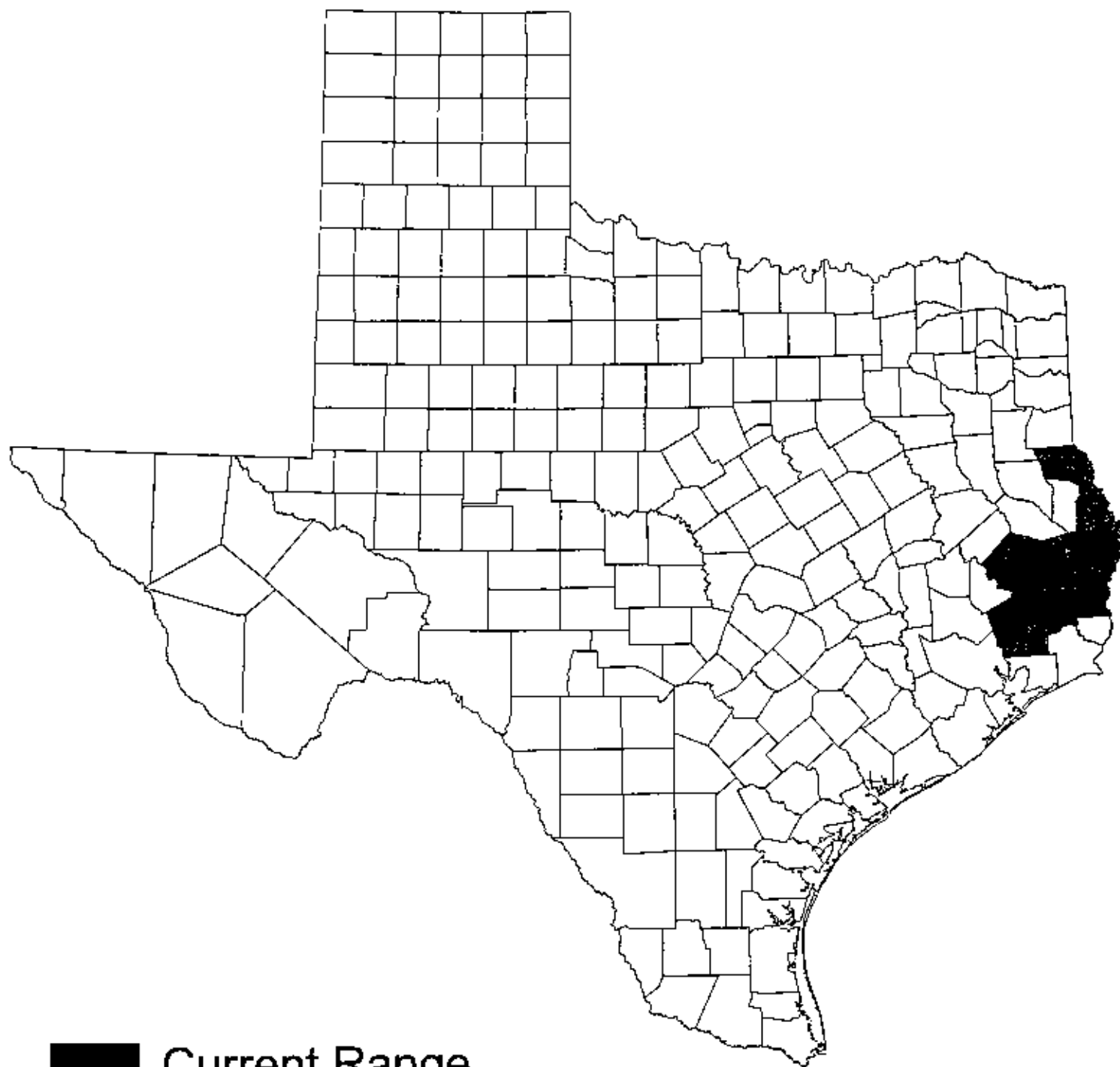
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FIGURES 49-55

- 49. *S. laciniata* Cav.; a=ssp. *Greggii* (Gray) H. & M.; b=ssp. *Brandegei* H. & M.; c=ssp. *typ.*
- 50. *S. virginica* L.
- 51. *S. rotundifolia* Nutt.
- 52. *S. subciliata* Rollins.
- 53. *S. californica* Durand
- 54. *S. goyia* Sims
- 55. *S. Plunkii* H. & M.





■ Current Range
□ Historical Range

Silene subciliata
(scarlet catchfly)

Scientific Name: *Sophora gypsophila* Turner & Powell var. *guadalupensis* Turner & Powell

Synonyms: None. Treated in Correll & Johnston (1970) as *Sophora formosa* Kearn. & Peeb., from which Texas material was subsequently separated.

Common Name: gyp mountain-laurel; Guadalupe Mountains mescal-bean

Global/State Ranks: G2G3T2S1

Federal Status: 3C

Global Range: Guadalupe Mountains and Brokeoff Mountains of Texas and New Mexico.

State Range: Culberson County.

Description (adapted from Turner & Powell 1972): Shrub 6-12 (-20) dm tall; stipules deltoid, acute, sericeous, 1-2 mm long, caducous. Leaves alternate, pinnately compound with (9-) 11-13 leaflets, the rachis 5-10 cm long, densely pubescent with silvery, appressed hairs; leaflets alternate or less often appearing opposite on rachis, thick and leathery, the lateral leaflet blades mostly oval, (8-) 10-16 mm long and 4-10 mm wide, the terminal leaflet blade somewhat larger and often obovoid and retuse at the apex, the upper surface greenish and glabrate at maturity, the lower surface silvery pubescent. Flowers ca. 25 mm long, in terminal racemes, pea-like; bracts at base of pedicels 3-6 mm long; bracteoles at base of calyx ca. 1 mm long; calyx of 5 equal sepals united at the base, appressed-pubescent, ca. 10 mm long, the sinuses between the free tips ca. 1-2 mm deep; corolla purple, papilionaceous, the standard petal somewhat longer than the wing and keel petals. Fruit a leathery pod 5-14 cm long and 10-14 cm wide, silvery-pubescent when young but glabrate and straw-colored at maturity, slightly constricted between the seeds; seeds quadrangular, 7-10 mm long and 5-6 mm wide.

Similar Species: This is one of two varieties of *Sophora gypsophila*. The other, var. *gypsophila*, is restricted to Chihuahua; it has smaller seeds (5-6 mm long and 3-4 mm wide) in a narrower pod (ca. 10 mm wide). The species as a whole is very closely related to *Sophora arizonica*, and some authors, e.g., Isely 1981, consider the two indistinguishable.

Habitat: One-seed juniper (*Juniperus monosperma*) shrublands on dry slopes above 5000 feet elevation in the Guadalupe Mountains, on slightly gypseous pink sandstone that occurs as lenses within the pervasive limestone of the region (Sivinski 1991). Woody associates include *Pinus edulis*, *Nolina micrantha*, *Yucca torreyi*, *Y. elata*, *Dasyllirion leiophyllum*, *Fouquieria splendens*, *Mortonia scabrella*, *Forsellesia spinescens*, *Cercocarpus montanus*, *Ceanothus greggii*, *Berberis haematocarpa*, *Parthenium incanum*, *Rhus microphylla*, *Leucophyllum minus*, *Gutierrezia sarothrae* and *Tiquilia hispidissima* (Sivinski 1991).

Phenology: Flowering late March-late April or May.

Comments:

Illustrations: Line drawings appear in New Mexico Native Plant Protection Advisory Committee (1984) and Powell (1998).

Selected References:

- Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.
- Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant surveys. Prepared for Guadalupe Mountains National Park.
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- New Mexico Native Plant Protection Advisory Committee. 1984. A handbook of rare and endemic plants of New Mexico. University of New Mexico Press, Albuquerque. 291 pp.
- Northington, D. K. 1976. Evidence bearing on the origin of infraspecific disjunction in *Sophora gypsophila* (Fabaceae). *Plant Systematics and Evolution* 125: 233-244.
- Powell, A. M. 1988. Trees and shrubs of Trans-Pecos Texas, including Big Bend and Guadalupe Mountains National Parks. Big Bend Natural History Association. 536 pp.
- Sivinski, R. 1991. Status report on *Sophora gypsophila* var. *guadalupensis*. Report prepared for U. S. Fish and Wildlife Service, Albuquerque.
- Turner, B. L. and A. M. Powell. 1972. A new gypsophilic *Sophora* (Leguminosae) from northcentral Mexico and adjacent Texas.



Family: FABACEAE (Leguminosae)

Scientific Name: *Sophora gypsophila* var. *guadalupensis* Turner and Powell

Common Name: Guadalupe Mountain mesal bean

Classification: Biologically threatened

Federal Action: Federal Register, 15 December 1980, candidate for federal protection

Common Synonyms: None

Description: Shrub, about 1 m (3 ft.) tall; leaves pinnately compound, with 11-13 roundish, leathery, hairy leaflets; flowers purple, pealike, about 25 mm (1 in.) long; pod 5-14 cm (2.0-5.5 in.) long, 10-14 mm (0.4-0.6 in.) wide, slightly constricted between the seeds; seeds 7-10 mm (0.3-0.4 in.) long, 6-7 mm (0.3 in.) wide. Flowers in March and April.

Known Distribution: Eddy and Otero counties, New Mexico, and adjacent Texas

Habitat: Dry limestone slopes with one-seed juniper; 1,525-1,950 m (5,000-6,400 ft.)

Ownership: Bureau of Land Management, Forest Service, National Park Service

Threats to Taxon: None known

Similar Species: The leaflets of *S. secundiflora* are hairless on the under surface.

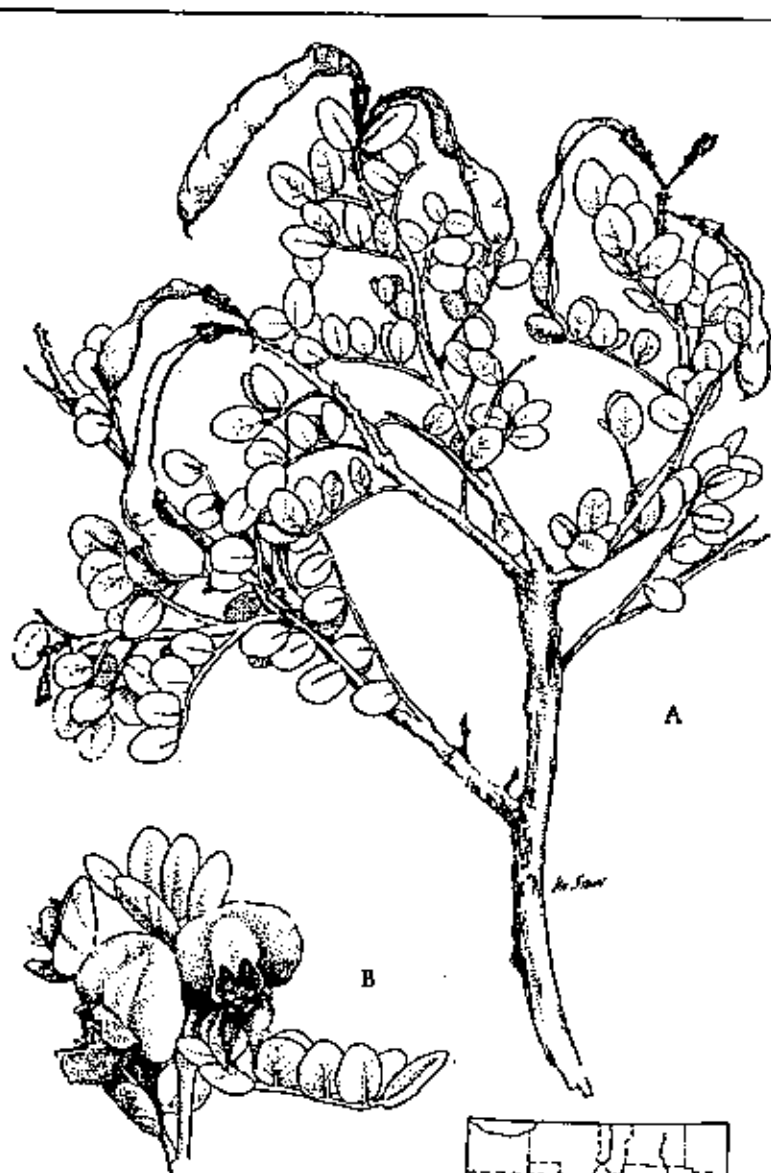
Remarks: This unpalatable and apparently poisonous taxon is probably a population left from a species formerly more widespread.

Important Literature:

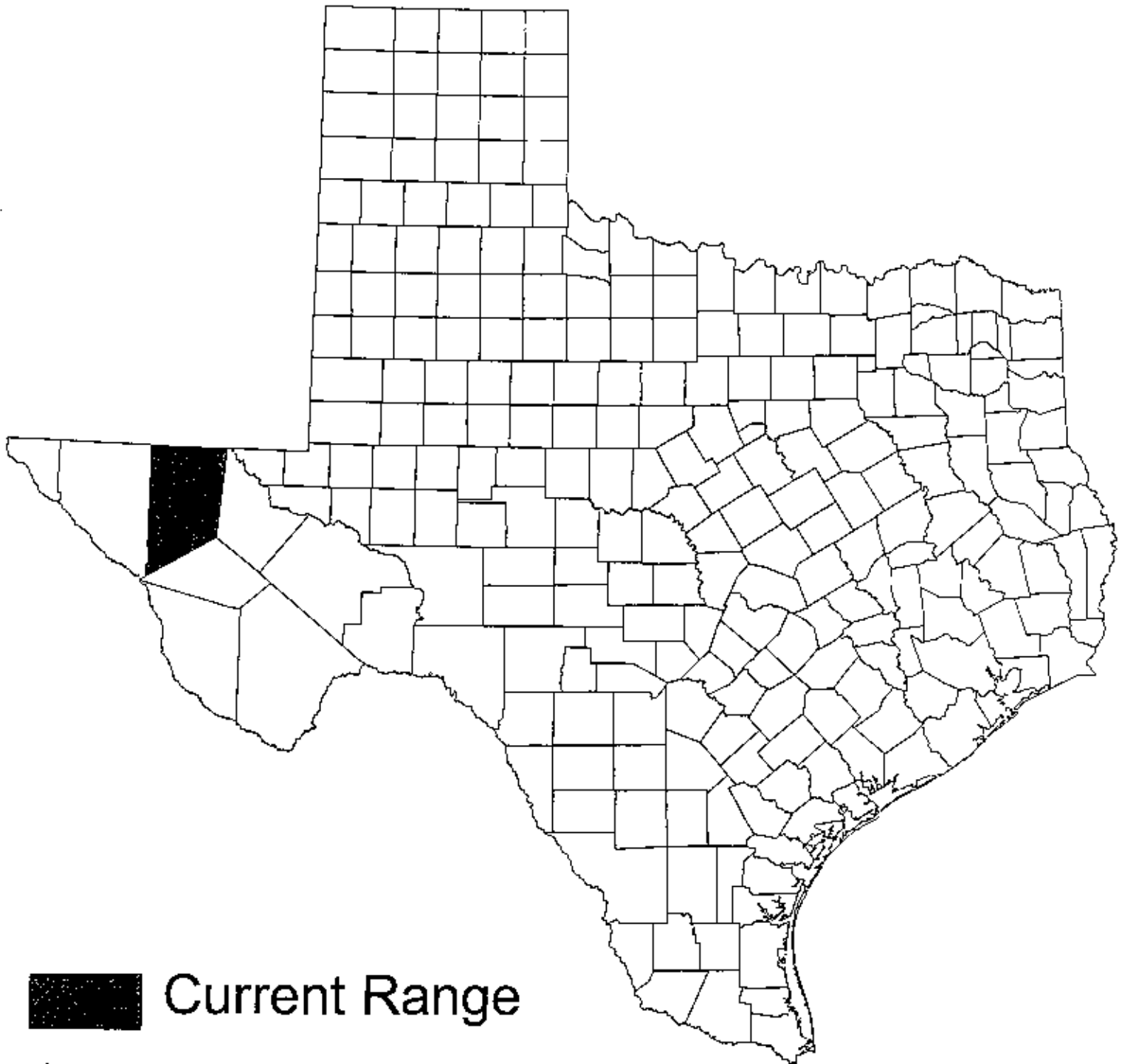
Northington, D. K. Evidence bearing on the origin of infraspecific disjunction in *Sophora gypsophila*. *Plant Syst. Evol.* 125:233-44, 1976.

Rudde, V. E. *Leguminosae-Faboideae-Sophoreae*. N. A. Flora, Botanic Garden, series 2, part 7. New York, 1972.

Turner, B. L., and A. M. Powell. A new gypsophilic *Sophora* from north-central Mexico and adjacent Texas. *Phytologia* 22:419-23, 1972.



Sophora gypsophila var. *guadalupensis*
A. upper branch with fruit, B. flower



Current Range

Sophora gypsophila var. *guadalupensis*
(Guadalupe Mountains mescal bean)

Scientific Name: *Spiranthes parksii* Correll

Synonyms: None.

Common Name: Navasota ladies-tresses

Global/State Ranks: G3S3

Federal Status: Endangered

Global Range: Endemic to post oak belt of northeast Texas.

State Range: Brazos, Burleson, Freestone, Grimes, Jasper, Lee, Leon, Madison, Robertson and Washington counties; also Milam County per Kathy Parker, pers. comm. 14 Dec 1994 [**WRC: if this is mapped, we can remove the pers. comm. source.]

Description (adapted from Correll 1947; Catling & McIntosh 1979; Poole 1985): Perennial from fleshy fasciculate roots; stems erect, unbranched, 2-3.3 dm tall, glandular-pubescent in upper portion, provided with several tubular, acuminate sheaths. Leaves basal, absent at flowering time. Flowers creamy white, usually with yellow-green markings toward the center, arranged in a single, spirally-twisted, vertical row in a terminal spike ca. 5 cm long and 1 cm wide, the axis glandular-pubescent, the floral bracts ovate-lanceolate, concave, 8-10 mm long, acuminate, usually white-tipped; sepals 3, pubescent on the outer surface, 3-nerved, longer than the petals; dorsal sepal ovate-elliptic to broadly ovate-lanceolate, abruptly recurved at the acute-apiculate apex, deeply concave, ca. 6 mm long and 2.8 mm wide below the middle; lateral sepals narrowly triangular-lanceolate, acuminate, oblique, with involute margins, ca. 7 mm long and 2-2.5 mm wide below the middle; petals 3, adherent to the dorsal sepal, oval to obovate or suborbicular, rounded and sometimes irregularly notched at the apex, with the anterior margin more or less erose, 5-nerved, scarcely oblique, ca. 5 mm long and 2.5-3 mm wide; lip petal oval, broadly rounded or emarginate at the apex, minutely erose-laciniate on the upcurved margins, 5-5.5 mm long and 3.8-4 mm wide at about the middle; lateral petals with a conspicuous central green stripe; basal callosities stout, pubescent; column short, stout, ca. 3.5 mm long. Fruit a capsule; details undescribed.

Habitat: Margins of post oak (*Quercus stellata*) woodlands in sandy loams along intermittent streams, often in areas where edaphic or hydrologic factors, such as high aluminum content of soil and a perched water table, limit competing vegetation in the herbaceous layer. Associated species include *Gratiola flava*, *Baptisia leucophaea*, *Chaetopappa asteroides*, *Pityopsis graminifolia*, *Spiranthes gracilis* var. *gracilis*, *S. cernua*, *Heleastrum hemisphaericum*, *Panicum brachyanthum*, *Sporobolus junceus*, *Andropogon ternarius*, *A. virginicus*, *Schizachyrium scoparium*, *Muhlenbergia capillaris*, *Drosera annua*, *Pterocaulon virgatum* and *Aristida longespica* (USFWS 1984).

Phenology: Flowering late October-early November.

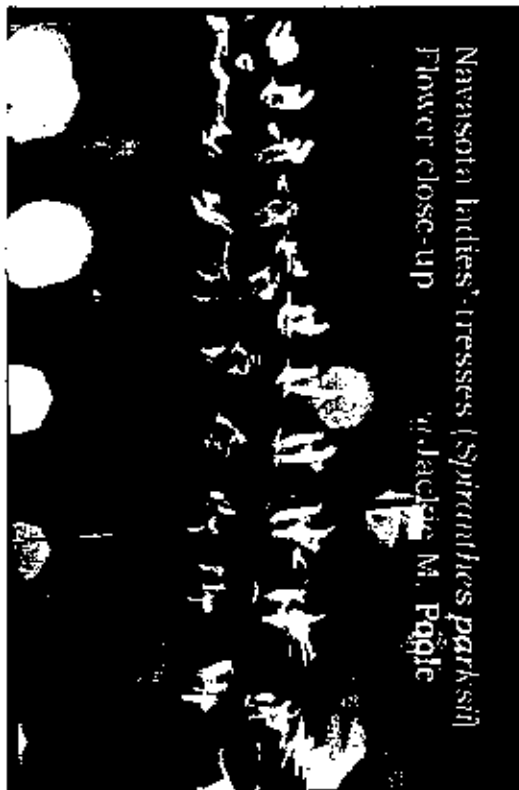
Similar Species: Navasota ladies'-tresses is very much like and often grows with several other *Spiranthes* species, including *S. gracilis* var. *gracilis* and *S. cernua*. According to Liggio & Liggio (1999), the short, rounded, creamy-white petals with a central green stripe, the oval lip, and the white-tipped floral bracts distinguish *Spiranthes parksii* from the others. According to Correll & Johnston (1970), "the characteristically obovate petals and oval lip are distinctive and conveniently separate this species from all other species of *Spiranthes* found in Texas."

Comments: Listed as Endangered on 6 May 1982.

Illustrations: Line drawings of various features appear in the recovery plan (USFWS 1984). A line drawing and a color photograph of the inflorescence appear in Poole & Riskind (1987). Additional color photographs appear in Liggio & Liggio (1999).

Selected References:

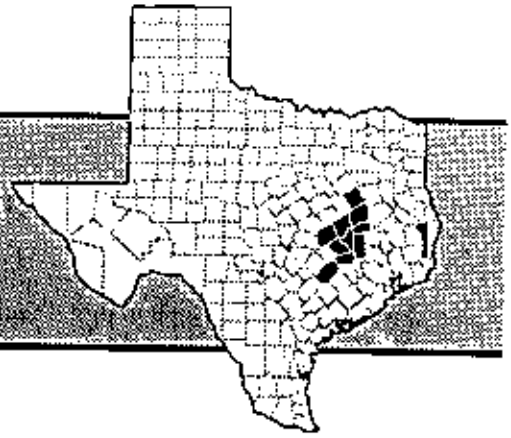
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- Liggio, J. and A. O. Liggio. 1999. *Wild orchids of Texas*. University of Texas Press, Austin. 228 pp.
- Mahler, W. F. 1980. Status report [on *Spiranthes parksii*]. Report to U.S. Fish & Wildlife Service, Albuquerque.
- MacRoberts, M. II, B. R. MacRoberts and R. E. Evans. 1997. Notes on *Spiranthes parksii* Correll (Orchidaceae) in deep east Texas. *Phytologia* 83(3): 133-137.
- Poole, J. M. 1985. Endangered Species Information System species workbook for *Spiranthes parksii*. Report prepared for U.S. Fish & Wildlife Service, Region 2.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
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- U.S. Fish & Wildlife Service. 1984. Navasota ladies'-tresses (*Spiranthes parksii*) recovery plan. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Wilson, H. D. 1988. Progress report, population biology/ distribution of *Spiranthes parksii*, Sundew Creek population, Lick Creek Park, College Station, Texas. Unpublished report, Department of Biology, Texas A & M University, College Station.
- Wilson, H. D. and G. Ajilvsgi. 1983. Status report [on *Spiranthes parksii*]. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.



Federally and State Endangered

Navasota ladies'-tresses

Spiranthes parksii



Navasota ladies'-tresses (*Spiranthes parksii*) was listed as endangered by the U.S. Fish and Wildlife Service (USFWS) in May 1982, and listed as endangered by the State of Texas soon afterwards. At the time of listing, only two populations were known, both in Brazos County. Since 1982, many more populations have been discovered in Brazos, Burleson, Fayette, Freestone, Grimes, Jasper, Leon, Madison, Milam, Robertson, and Washington Counties.

This member of the orchid family is an erect, slender-stemmed perennial herb, 8-15 inches tall. The roots are clusters of fleshy tubers. Leaves are linear and found primarily at ground level, but are usually gone by flowering time. Flowers are creamy white and arranged in a loose spiral up the stem. Conspicuously white-tipped bracts occur underneath each 1/4 inch-long flower. Flower petals are round or oval. The side petals have a green central stripe, and the lip (bottom petal) is distinctly ragged.



Inflorescence of
Navasota
ladies'-tresses

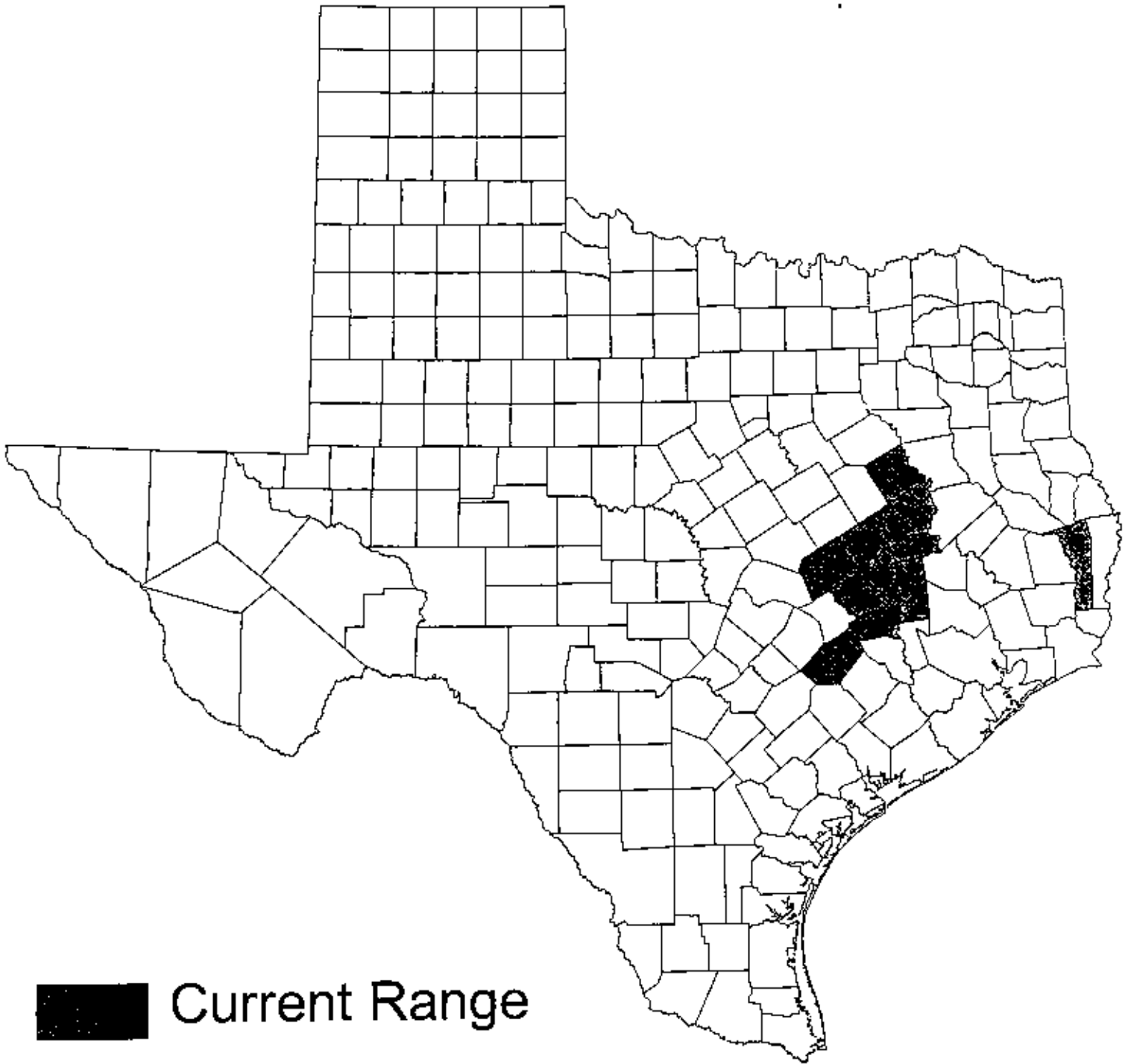
1/2 inch

by Patrick Stark

Navasota ladies'-tresses can be confused with two species of more common ladies'-tresses, *Spiranthes cernua* and *S. gracilis*, which grow in similar habitat. The flowers of *S. cernua* are arranged in a tighter spiral up the stem and are whiter in color, compared with *S. parksii*. *Spiranthes gracilis* is also very similar in appearance except that the lower petal (lip) has a green central stripe.

Navasota ladies'-tresses bud from early to late October, flower from mid-October to mid-November, and form fruit from mid-October to the first frost (usually late November). The fruit dehises (breaks apart) during mid-November and December. Each fruit normally contains thousands of microscopic seeds which are not easily cultivated. After frost, the plants die back and do not reappear until early spring, when basal rosettes can be seen.

Populations of Navasota ladies'-tresses are known to fluctuate from year to year. It is thought that cool, wet conditions (without hard frosts) between January and May provide ideal growing conditions for this orchid.



■ Current Range

Spiranthes parksii
(Navasota ladies'-tresses)

Scientific Name: *Stenaria butterwickiae* (Terrell) Terrell

Synonyms: *Houstonia butterwickiae* Terrell; *Hedyotis butterwickiae* (Terrell) Nesom

Common Name: Mary's bluets, Butterwick's bluets

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to Trans-Pecos Texas.

State Range: Brewster County.

Description (adapted from Terrell 1979; Terrell 2001): Erect perennial with many wiry, slender, glabrous stems from a thick, woody taproot, to 25 cm tall, diffusely branched from upper nodes. Leaves basal and cauline, simple; basal leaves somewhat clustered, sessile, linear, glabrous, to 7 mm long and 1 mm wide; cauline leaves few and scattered, opposite, sessile, stiff and erect, to 20 mm long and 0.5-1 mm wide, shorter than the internodes, acuminate at apex, glabrous or scaberulous, the midrib thick, the margins revolute. Flowers heterostylous, in terminal, diffuse, few-flowered cymes, on filiform pedicels up to 1 cm long; calyx lobes 4, fused below, the free lobes linear-lanceolate, acute to acuminate, 0.8-3 mm long, glabrous; corolla funnelform, 4-lobed, white, 2.3-4.7 mm long, puberulent within but glabrous on the lobes and bud tips; stamens 4, the anthers 0.8-1.0 mm long, in pin flowers attached near midpoint of corolla tube and included but in thrum flowers ca. 1.0 long, attached at sinuses of corolla lobes and exerted; stigmas 2-branched, exerted from tube in pin flowers but included within tube in thrum flowers. Fruit a globose to subglobose capsule 1.5-2.2 mm long, 1/2-3/4 inferior, much shorter than the erect calyx lobes.

Similar Species: Very similar to the extremely variable *Stenaria nigricans* (*Hedyotis nigricans*). In that species, the leaves are usually more than 1 mm wide, the corolla lobes are often pubescent, and the capsule is usually turbinate, longer than wide. In *S. butterwickiae*, the leaves are 1 mm wide or less, the corolla lobes are glabrous, and the capsule is usually globose to subglobose, about as long as wide.

Habitat: Shallow pockets or crevices in limestone bedrock on ridgetops. Associates include *Penstemon baccharifolius*, *Phyllanthus ericoides*, *Polygala maravillasensis* and *Cirsium turneri* (Terrell 1979).

Phenology: Flowering or fruiting at least May-August.

Comments: *Stenaria butterwickiae* was described in 1979 (as *Houstonia butterwickiae*) and remains poorly known.

Illustrations: Line drawings appear in Terrell (1979) and are reproduced in Terrell (2001).

Selected References:

Nesom, G. L. and L. A. Vorobik. 1988. *Hedyotis spellenbergii* (Rubiaceae), a new species from Chihuahua, Mexico. *Systematic Botany* 13: 432-434.

Terrell, E. E. 1979. New species and combinations in *Houstonia* (Rubiaceae). *Brittonia* 31(1): 164-169.

Terrell, E. E. 2001. Taxonomy of *Stenaria* (Rubiaceae: Hedyotideae), a new genus including *Hedyotis nigricans*. Sida 19(3): 591-614.

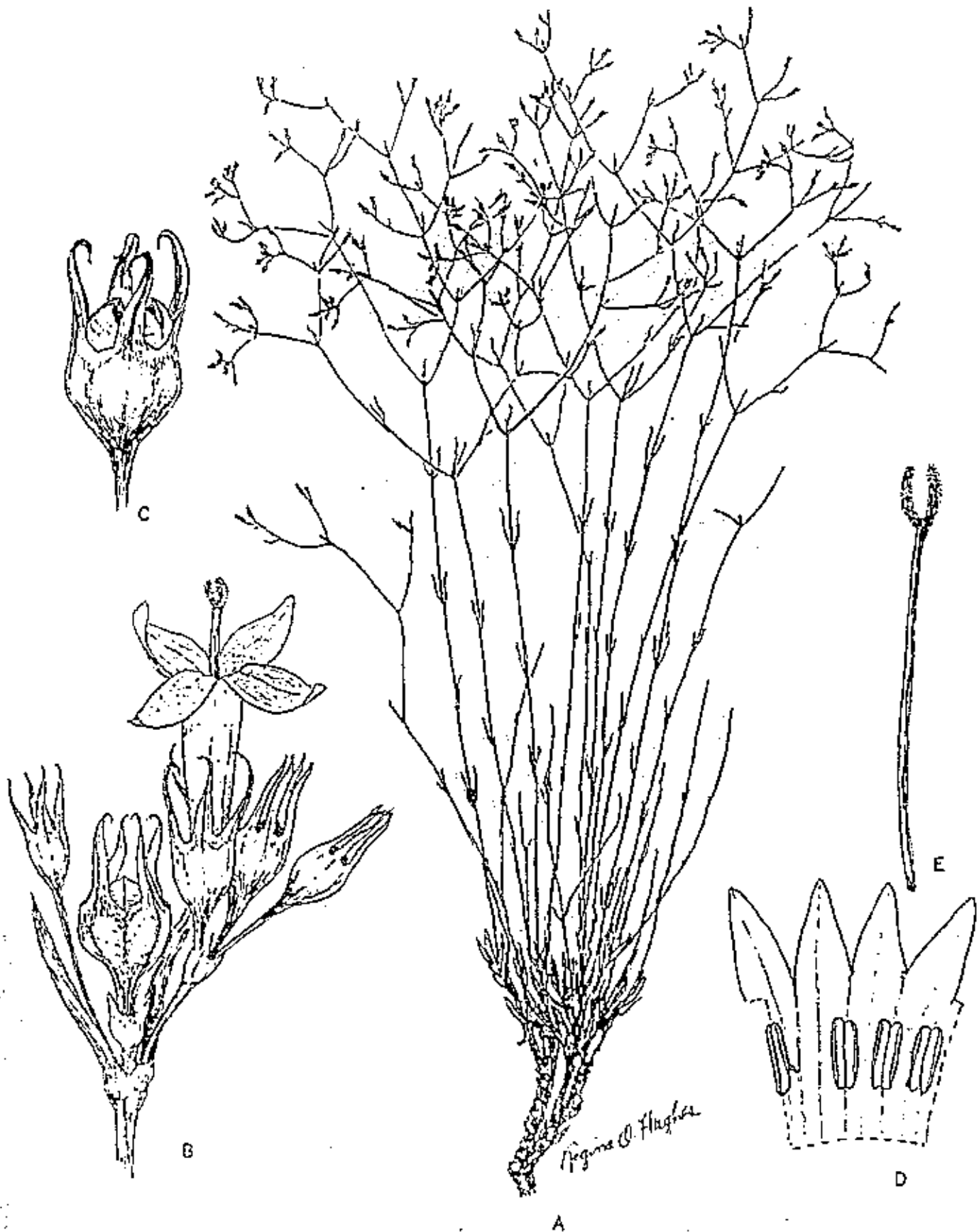
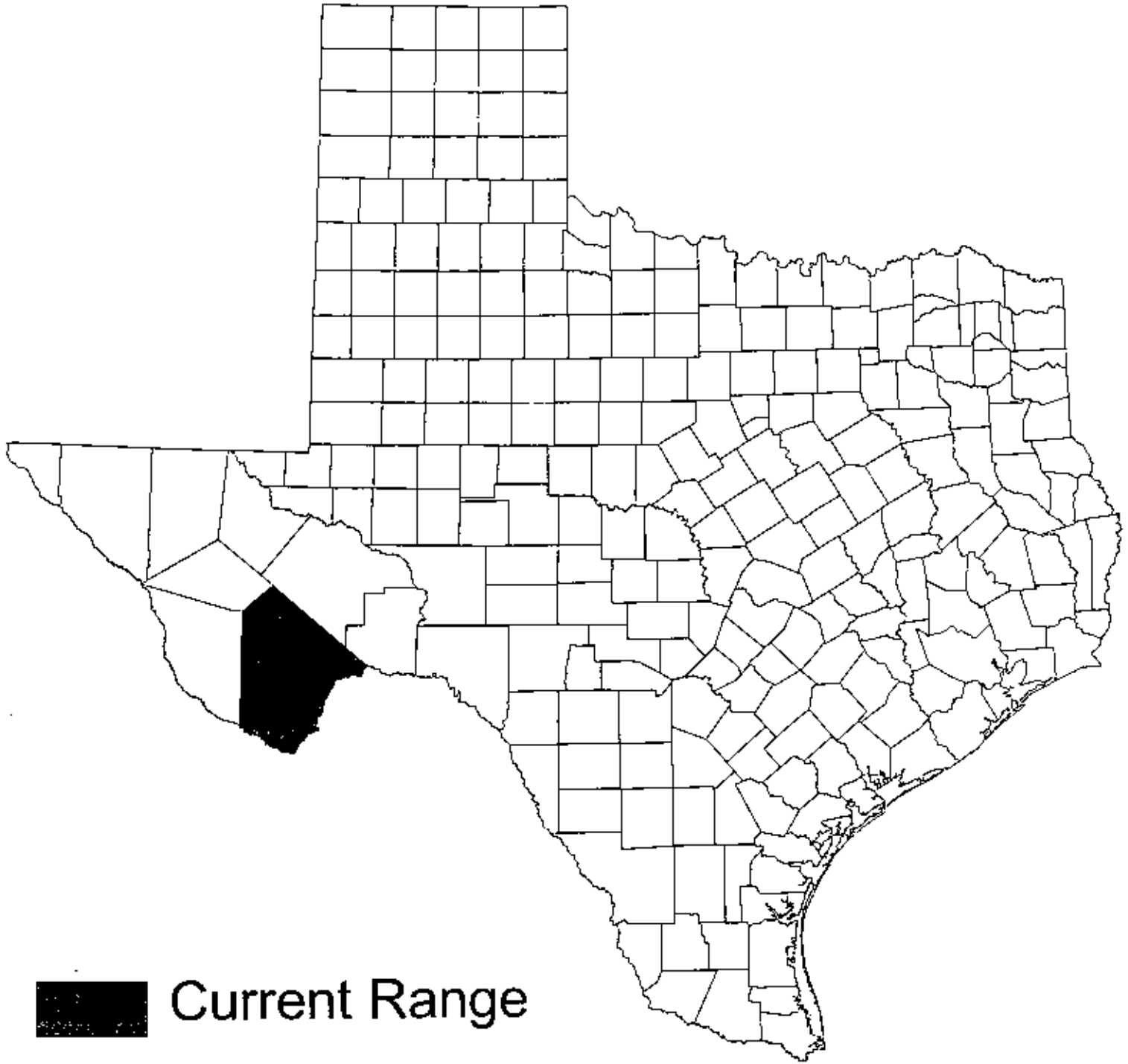


FIG. 1. *Houstonia butterwickiae* Terrell (from holotype). A. Habit, $\times \frac{1}{2}$. B. Detail of inflorescence, pin form, $\times 8$. C. Capsule, $\times 6$. D. Opened corolla with anthers, pin form, $\times 6$. E. Style and stigma, $\times 6$.



Current Range

Stenaria butterwickiae
(Mary's bluet)

Scientific Name: *Stenaria mullerae* (Fosb.) Terrell var. *pooleana* (B. L. Turner) Terrell

Synonyms: *Hedyotis pooleana* B. L. Turner

Common Name: Jackie's bluets

Global/State Ranks: G2T1QS1

Federal Status: None

Global Range: Endemic to Texas.

State Range: Known only from the Dead Horse Mountains of eastern Brewster County.

Description (adapted from Turner 1995; Terrell 2001): Mat-forming perennial 2-3 cm tall; stems glabrous and multi-branched from base, the internodes mostly 1-3 cm long; stipules lanceolate, cuspidate, 1-2 mm long [****is this the length of the whole stipule or just the apiculus?**]. Leaves opposite, those of midstem thick, lanceolate, 5-7 mm long, 1.0-1.4 mm wide, strongly 1-nerved, glabrous except for minutely hispidulous margins, tapering gradually to the tip (per Terrell 2001; not apiculate as described in Turner 1995); flowering branches not much extending beyond the leaves, if at all. Flowers in small clusters in the leaf axils, essentially sessile (on pedicels 0.1-0.4 mm long); calyx 4-lobed, ca. 2 mm long, the lobes ca. 1 mm long; corolla 4-lobed, white, 2.5-3.0 mm long, the lobes lanceolate, ca. 2 mm long, hispidulous externally at the apices, moderately pilose within; anthers included within the corolla tube; styles exerted ca. 2 mm beyond tube. Fruit an orbicular capsule 1 mm long, dehiscent longitudinally across the disk.

Similar Species: Very similar to *Stenaria mullerae* var. *mullerae* (*Hedyotis mullerae*) of central and western Coahuila. In var. *mullerae*, the leaves are elliptic to oblanceolate, sometimes narrowly so, rather than lanceolate as in var. *pooleana*. In var. *mullerae*, the stipules are abruptly pointed, apiculate or scarcely pointed, apical points 0.2-0.4 mm long; in var. *pooleana*, the stipules are cuspidate with caudae 1-2 mm long (Terrell 2001).

Habitat: North- to east-facing vertical limestone cliff faces in mid-elevation canyons in mountains in the Chihuahuan Desert. Associates at the type location include *Agave lechuguilla*, *Rhus virens* and *Quercus pungens*. The two known locations lie at elevations between 4800 and 4900 feet.

Phenology: Flowering at least during May, perhaps to September as in var. *mullerae*.

Comments: Described as a new species in 1995 (Turner, 1995); placed in synonymy under *Hedyotis mullerae* Fosb. by Terrell in 1996 (Terrell, 1996); resurrected by Turner in 1997 (Turner, 1997); moved to varietal rank under *Stenaria mullerae* by Terrell in 2001 (Terrell, 2001).

Illustrations: A color photograph is provided along with the type description in Turner (1995).

Selected References:

Terrell, E. E. 1996. Taxonomic notes on Texas and Mexican species of *Hedyotis* and *Houstonia* (Rubiaceae). *Phytologia* 81(2): 108-114.

Terrell, E. E. 2001. Taxonomy of *Stenaria* (Rubiaceae: Hedyotideae), a new genus including *Hedyotis nigricans*. *Sida* 19(3): 591-614.

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■ Current Range

Stenaria mullerae var. *pooleana*
(Jackie's bluet)

Scientific Name: *Streptanthus bracteatus* Gray

Synonyms: None.

Common Name: bracted twistflower

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Edwards Plateau of central Texas.

State Range: Bandera, Bexar, Comal, Medina, Real, Travis, and Uvalde counties. A report from Caldwell County has not been verified.

Description (adapted from Gray 1850 and Correll & Johnston 1970): Glabrous annual with erect stems to 12 dm tall, mostly simple or branched above. Leaves alternate, those of lower stem petiolate, irregularly lobed or irregularly dentate, to 15 cm long; middle and upper cauline leaves simple, ovate, entire to shallowly dentate, sagittate at base and clasping the stem. Flowers in bracted terminal racemes, the lower bracts leaflike, the upper bracts reduced; pedicels terete, papillose or glabrous, divaricately ascending; sepals 4, purplish; petals 4, showy, lavender-purple, 1-2.5 cm long, with a broad blade tapering at base to a narrow claw, the margins entire; stamens 6; ovary with 2 locules; style single, 2-branched. Fruit a sessile, flattened, linear siliqua 8-12 cm long and up to 4 mm wide; seeds numerous, flattened, broadly oblong, winged.

Similar Species: The range of *Streptanthus platycarpus* may overlap the western and southwestern edge of the range of *S. bracteatus*. All flowering pedicels of *S. bracteatus* are subtended by a small but conspicuous bract; in the inflorescence of *S. platycarpus* such bracts are present below only the lowermost pedicel.

Habitat: Shallow, well drained gravelly clays and clay loams over limestone, in oak-juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms. Bracted twistflower is often found amid dense shrub growth where some protection from browsing animals is afforded.

Phenology: Flowers from mid April through mid to late May; fruit matures and foliage withers by early summer. Dead yet erect stems may persist until mid-winter.

Comments:

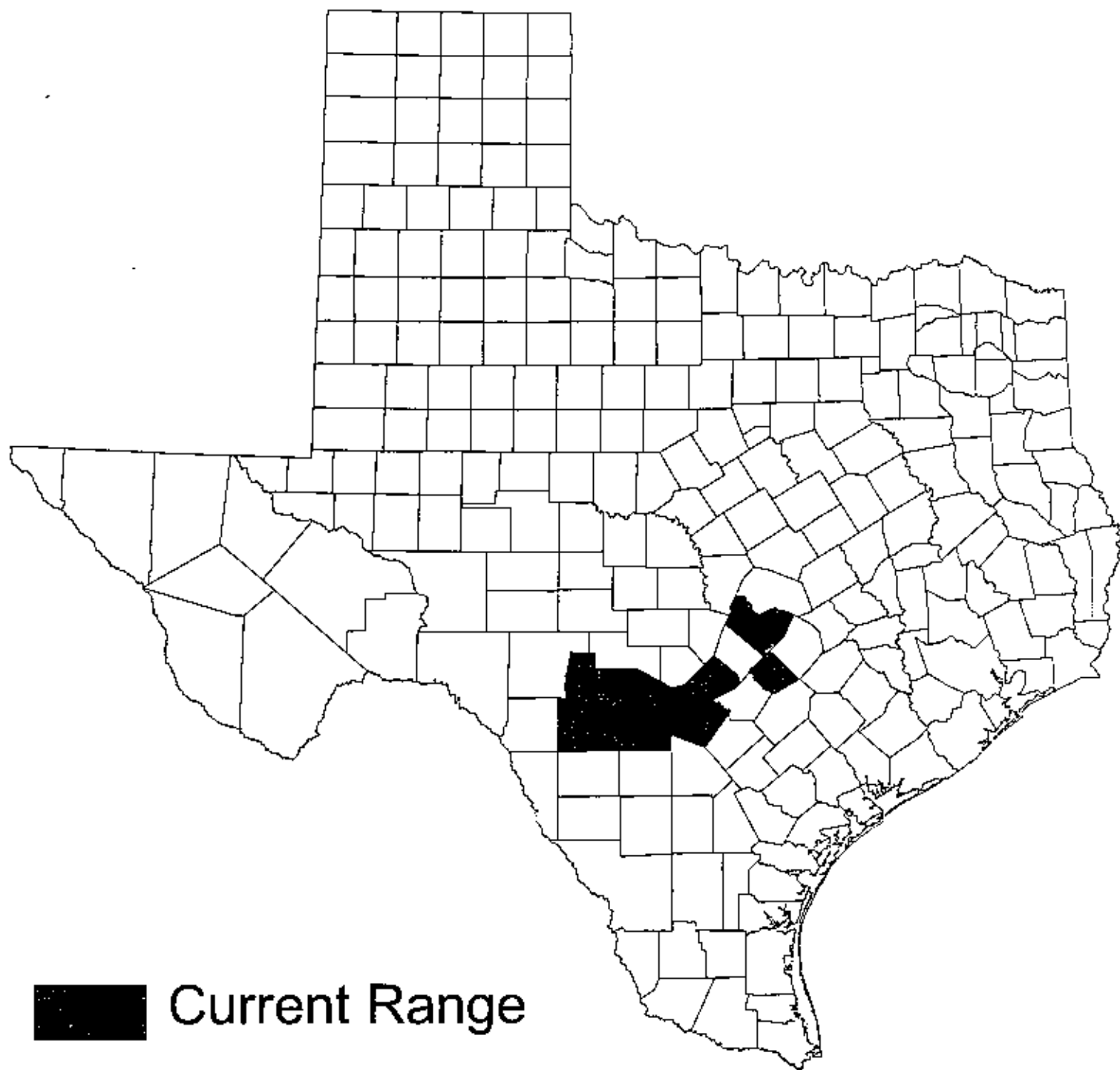
Illustrations: A color photograph appears in Enquist (1987).

Selected References:

- Damude, N. and J. M. Poole. 1990. Status report on *Streptanthus bracteatus*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Dieringer, G. 1991. Pollination ecology of *Streptanthus bracteatus* (Brassicaceae), a rare central Texas endemic. *Southwestern Naturalist* 36(3): 341-343.
- Enquist, M. 1987. *Wildflowers of the Texas Hill Country*. Lone Star Botanical, Austin. 275 pp.

- Gray, A. 1850. *Plantae Lindheimerianae*: an account of a collection of plants made by F. Lindheimer in the western part of Texas in the years 1845-46 and 1847-48. Parts I and II. In: *Boston Journal of Natural History* 6(2): 143-144.
- McNeal, P. 1989. Status of *Streptanthus bracteatus*, *Philadelphus ernestii* and *Amorpha roemerana* in Travis County. Report prepared by the Texas Parks & Wildlife Department for the Austin Regional Habitat Conservation Plan.
- Rollins, R. C. 1993. *The Cruciferae of continental North America*. Stanford University Press, Stanford. 976 pp.
- Zippin, D. A. 1997. Herbivory and the population biology of a rare annual plant, bracted twistflower (*Streptanthus bracteatus*). Ph.D. dissertation, The University of Texas at Austin. 265 pp.





■ Current Range

Streptanthus bracteatus
(bracted twist flower)

Scientific Name: *Streptanthus cutleri* Cory

Synonyms: None.

Common Name: Cutler's twistflower

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: West Texas and Coahuila.

State Range: Brewster County.

Description (adapted from Cory 1943; R. C. Rollins and E. A. Shaw in Henrickson & Johnston in prep.):

Glabrous annual with stems 35-50 cm tall and up to 2 mm in diameter, simple at base, usually branched above. Leaves basal and cauline; basal leaves 5-10, oblanceolate, petiolate, runcinate-pinnatifid, 5-10 cm long and up to 2 cm wide, becoming purplish, the terminal lobe with ca. 3 sinuses extending halfway to the midrib, the apex broadly triangular; leaves of lower stem as long as or longer than the basal leaves (up to 20 cm long per Rollins & Shaw), ascending, with narrower segments; the terminal segment lanceolate to linear-lanceolate, usually entire except toward the base; upper cauline leaves linear, entire or undulate to few-toothed near base; petioles scarcely differentiated, purplish, narrowly winged, dilated at base but not clasping. Flowers in terminal racemes, bilaterally symmetrical; sepals 4 (or 5 per Cory 1943), deep purple, oblong, 10-12 mm long, thin and scarious near the tips; petals 4, clawed, unequal; 2 upper petals ca. 25 mm long in total, with broad, erect, blades 10-14 long, the blades light purple to purple-lavender with darker veins; lower petals much reduced and lacking blades; stamens 6, unequal, the upper exerted, the lower included. Fruit a flattened, erect or ascending silique 3.5-6 cm long and 3-5 mm wide, glabrous, on a pedicel (10-) 1.5-3 cm long but without a stipe; seeds 8 or more in each of 2 chambers, orbicular, broadly winged, ca. 4 mm wide.

Similar Species: Distinct from other *Streptanthus* species in that only two of the four petals develop expanded blades, and from other West Texas *Streptanthus* in that its leaves are not clasping (Cory 1943).

Habitat: Open shrublands or grasslands on calcareous gravel of talus slopes, rocky hillsides and gravelly stream beds, at moderate elevations in the Chihuahuan Desert.

Phenology: Flowering mostly February-March, sometimes continuing into May.

Comments:

Illustrations: A color photograph appears in Warnock (1970). A line drawing of a flower appears in Rollins (1963).

Selected References:

Cory, V. L. 1943. A new *Streptanthus* from the Big Bend of Texas. *Rhodora* 45: 259-260.

Rollins, R. C. 1963. Protandry in two species of *Streptanthus* (Cruciferae). *Rhodora* 65: 45-49.

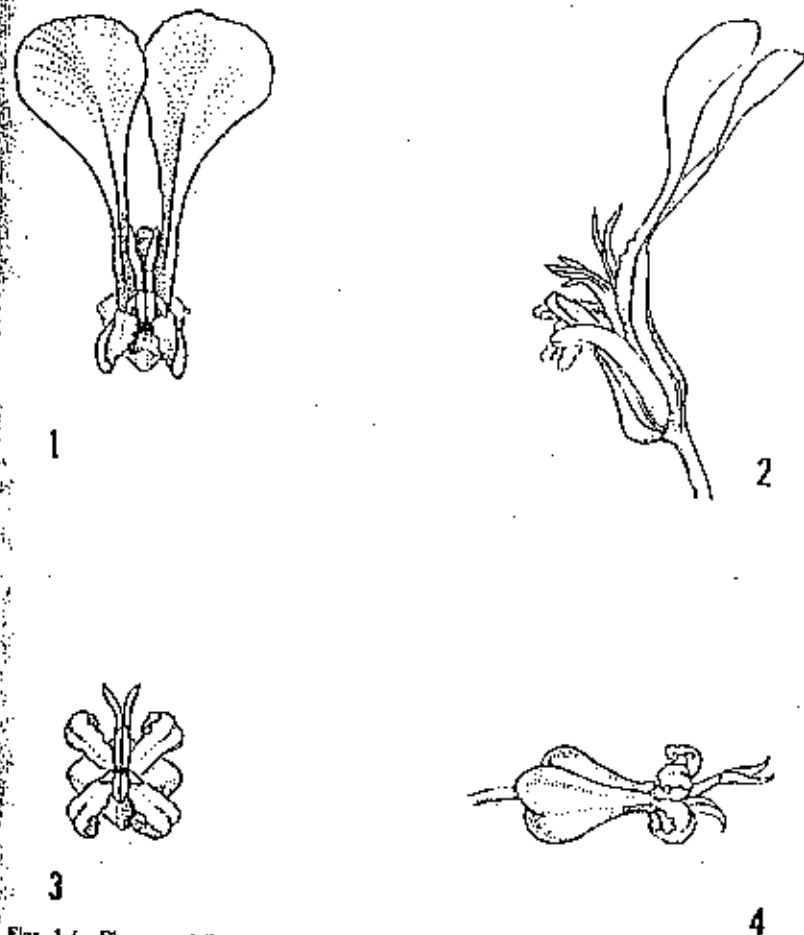
- Rollins, R. C. 1993. *The Cruciferae of continental North America*. Stanford University Press, Stanford. 976 pp.
- Warnock, B. H. 1970. *Wildflowers of the Big Bend Country, Texas*. Sul Ross State University, Alpine. 157 pp.



well after the pollen has been shed. At the stage of anther maturity, the outer floral parts tightly close the flower entrance. Following anther maturation and the shedding of pollen, the ovary elongates, the stigma expands and the floral parts move to an open stance. The stigma becomes much enlarged and is brought by the elongating ovary and style to a central position below the entrance of the flower. The primary flow of nectar from the nectaries located at the base of the filaments and near the point of insertion of the petals coincides with stigma maturation rather than anther maturity. This is significant not only because it correlates with the opportunity of flower entry by insects and the receptivity of the stigma to pollen but because it actually avoids the time of anther maturation as well. The question as to what it is about the flowers in the closed condition, where nectar is not available, that attracts appropriate insects for pollen pick-up, is a pertinent one. We do not have a definite answer but we did notice that flower odor seemed to be at its peak during the period of anther maturity and pollen shedding. Odor, together with flower shape and perhaps color, may fulfill the requirements for insect attraction. On the other hand, it may be that the insects pollinating these flowers do not distinguish between the open and closed condition. If so, they would move from flower to flower indiscriminately, sometimes being rewarded by available nectar and sometimes not. In any case, the timing of pollen pick-up by the insect is effectively separated from pollen deposit not only by protandry but by several correlated reinforcing mechanisms in addition. The situation is approximately the same in *Streptanthus cutleri* and *S. carinatus*, although the flower form in these two species is radically different because of the differences in petal development. The petal color is also different. The petals of *S. cutleri* are light to reddish purple while those of *S. carinatus* are brownish white with the veins prominently purple. In both species the calyx is a deep blackish purple. Undoubtedly different insects pollinate these two species of *Streptanthus*. However, we have not observed insect visitation to the flowers of either species in

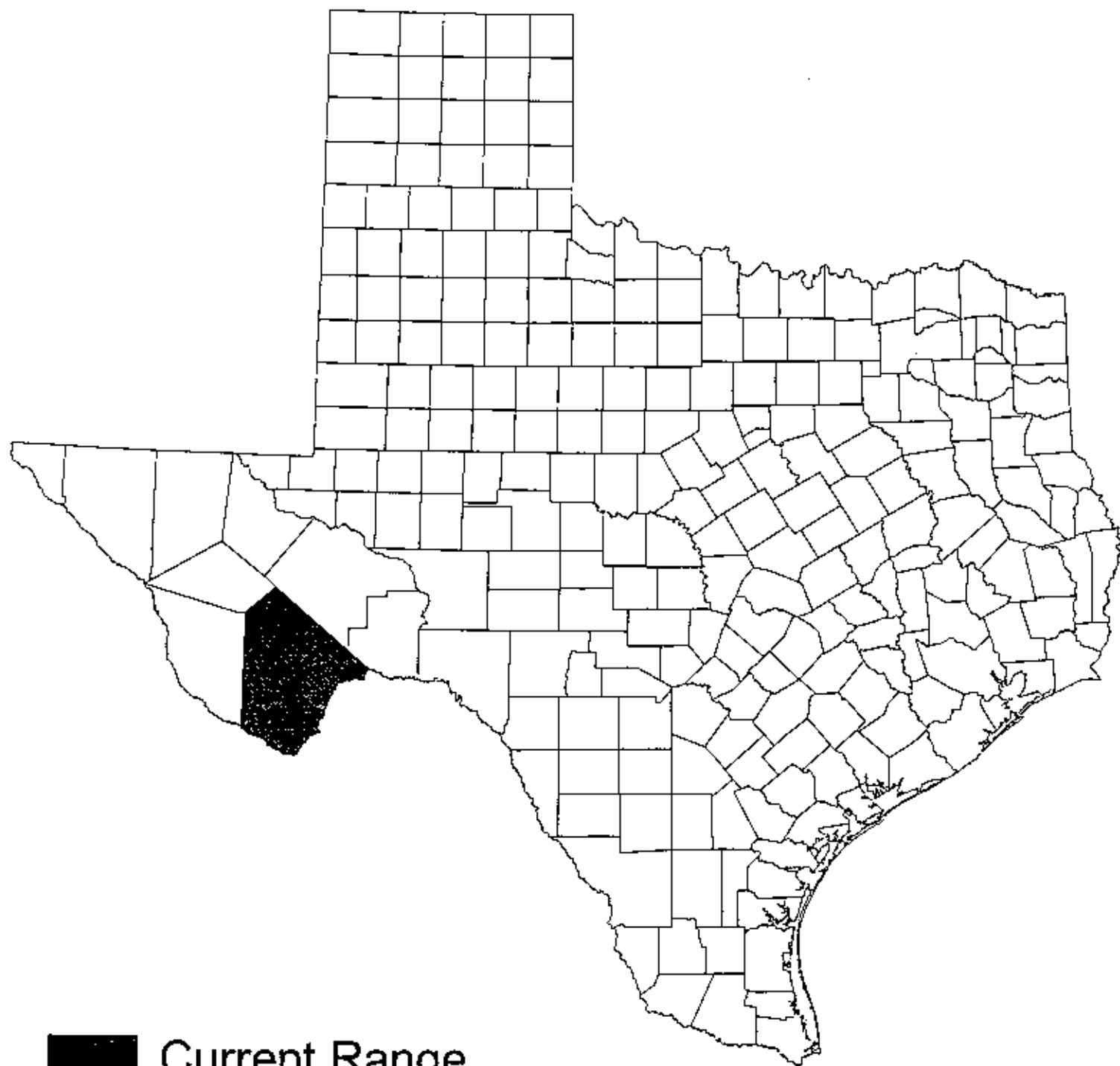
its native habitat. Both species occur wholly in extreme western Texas.

Two levels of zygomorphy are shown by *Streptanthus carinatus* and *S. cutleri*. In the former, the stamen whorls



Figs. 1-4. Flowers of *Streptanthus*, X 2. FIG. 1 & 2, front and side view respectively of *S. cutleri*. FIG. 3 & 4, front and side view respectively of *S. carinatus*. Drawings by Dorothy H. Marsh.

are strongly zygomorphic but the other floral parts show little or no zygomorphy. The situation is readily seen by reference to fig. 3 and 4. The filaments of the paired sta-



■ Current Range

Streptanthus cutleri
(Cutler's twistflower)

Scientific Name: *Streptanthus sparsiflorus* Rollins

Synonyms: None.

Common Name: fewflower jewelflower, Guadalupe twistflower, sparsely-flowered jewelflower

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Guadalupe Mountains of New Mexico and Texas

State Range: Culberson County

Description (adapted from Rollins 1970): Glabrous annual with erect stems 3-6 dm tall, simple below but branching above; stems and leaves glaucous. Leaves alternate, simple, greenish and minutely punctulate on upper surface, slate-colored and non-punctulate on lower surface; lower cauline leaves sessile, auriculate, repand-toothed to lyrate-pinnatifid or nearly runcinate, 8-12 cm long and 2-4 cm wide; upper cauline leaves smaller, mostly entire, occasionally sinuate-dentate, ovate to broadly oblong, obtuse auriculate and clasping the stem. Flowers slightly zygomorphic, in terminal racemes; sepals 4, straw-colored and to pale purplish, non-saccate, narrowly ovate, 9-11 mm long and ca. 2 mm wide, the lateral sepals more tapering and thicker at the tip than the other sepals; petals 4, showy, purplish, 15-18 mm long, the blade portion 3-5 mm wide, reflexed at anthesis; stamens 6, the filaments 7-9 mm long and the anthers 3-4 mm long, the upper pairs slightly exerted beyond the calyx. Fruit a linear, flattened capsule 4-7 cm long and 5-7 mm wide, on a stout, ascending pedicel 5-10 mm long, containing 2 chambers and several seeds; seeds flattened, ca. 5 mm wide, the margins broadly winged.

Similar Species: *Streptanthus carinatus* also occurs in Guadalupe Mountains National Park. Its petal blades are not expanded, whereas those of *S. sparsiflorus* are more than twice as broad as the petal claws. *S. platycarpus* occurs in the general region. In this species the lower cauline leaves are petiolate, whereas in *S. sparsiflorus* they are auriculate (Rollins 1970).

Habitat: Shaded areas in gravelly limestone canyons and arroyos, often in dry creekbeds at elevations between 4000 and 6000 feet.

Phenology: Flowering May-June. Populations vary widely in size from year to year depending on rainfall.

Comments: According to Burgess & Northington (1979), *Streptanthus sparsiflorus* reaches its greatest abundance on dry gravel streambeds in McKittrick and Pine Canyons but is scattered in other canyons along the eastern escarpment of the range.

Illustrations:

Selected References:

Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.

Higgins, L. C. 1989. Guadalupe Mountains National Park threatened and endangered and exotic plant

surveys. Report prepared for Guadalupe Mountains National Park.

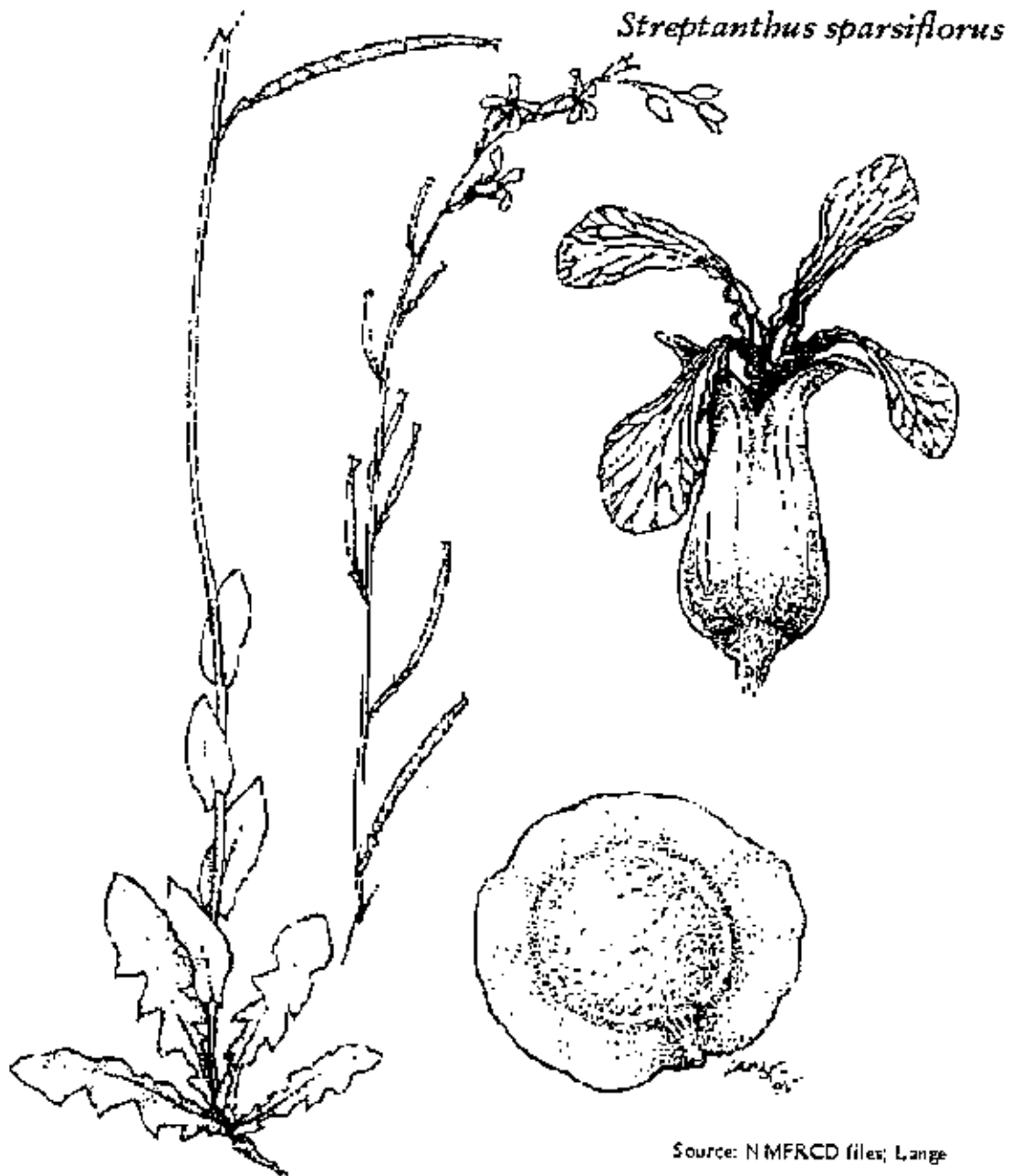
Rollins, R. C. 1970. Notes on *Streptanthus* and *Erysimum* (Cruciferae). Contributions from the Gray Herbarium 200: 190-192.

Rollins, R. C. 1993. The Cruciferae of continental North America. Stanford University Press, Stanford. 976 pp.

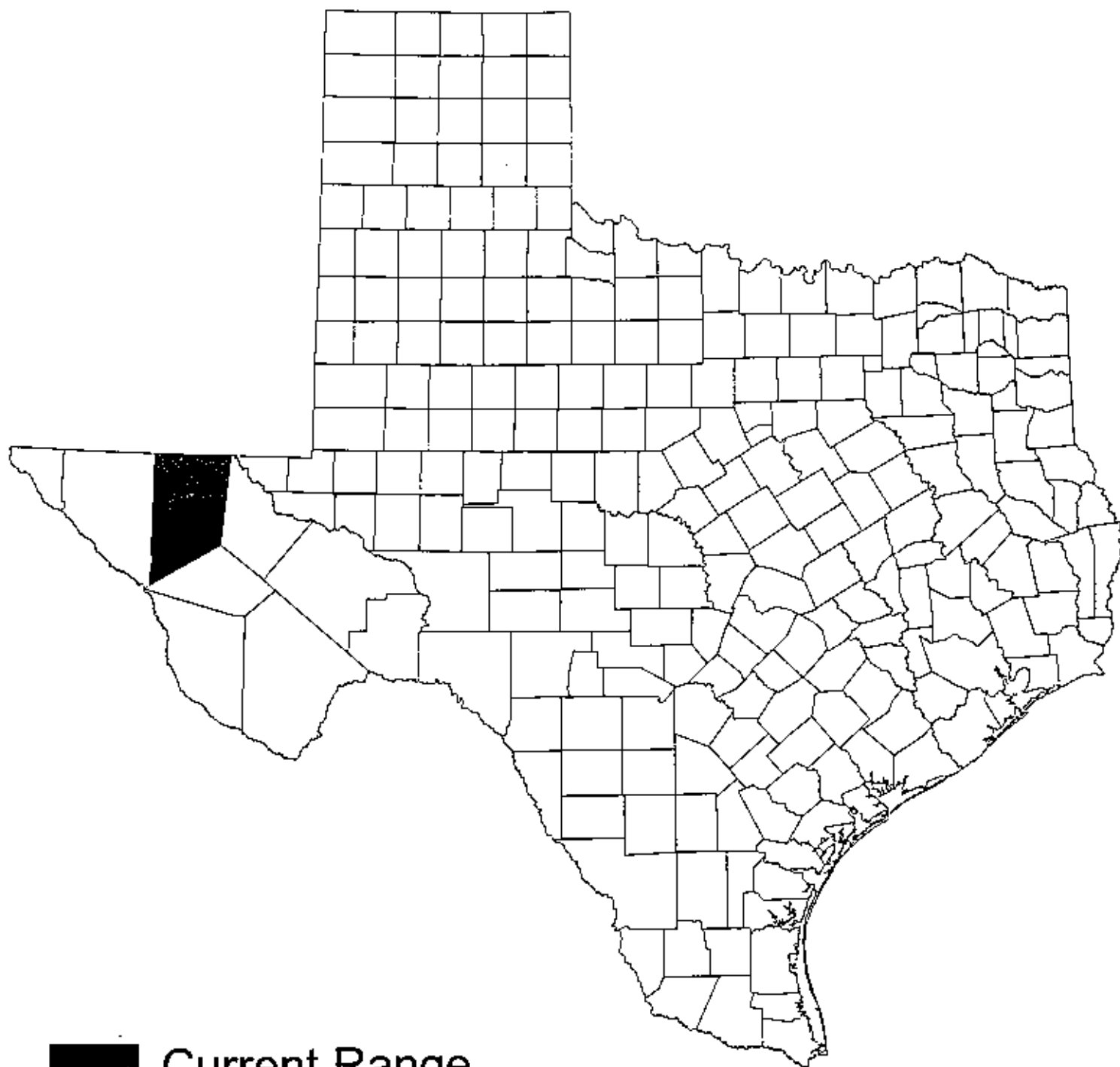


Streptanthus sparsiflorus (Guadalupe jewelflower)

[\[rare plant list\]](#) [\[photos\]](#) [\[distribution map\]](#) [\[line drawing\]](#) [\[taxon report\]](#)



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■ Current Range

Streptanthus sparsiflorus
(sparsley-flowered jewelflower)

Scientific Name: *Styrax platanifolius* Engelm. subsp. *texanus* (Cory) P. W. Fritsch

Synonyms: *Styrax texanus* Cory; *Styrax platanifolius* Engelm. var. *texanus* (Cory) B. L. Turner

Common Name: Texas snowbells

Global/State Ranks: G3T1S1

Federal Status: Endangered

Global Range: Endemic to the Edwards Plateau of Texas.

State Range: Edwards, Real, and Val Verde counties; introduced at a site in Kinney County. Reports from Bandera and Kimble counties were based on misidentified specimens of *S. platanifolius* subsp. *stellatus*.

Description: (adapted from Fritsch 1997 and Correll & Johnston 1970): Slender, spreading, deciduous shrub to 3 m tall; young twigs faintly glaucous. Leaves alternate, simple, the petioles 8-15 mm long, the blades suborbicular, 2.5-7.5 cm long and about as wide, entire or nearly so, cuneate to truncate or rounded at the base, acute at the apex, bright green and glabrous on upper surface, silvery with a very fine and dense tomentum on the lower surface. Flowers 3-5 on recurved pedicels in short, leafy, axillary, pedunculate racemes; pedicels to 10 mm long, about as long as the peduncle, evenly white stellate-pubescent; calyx campanulate, ca. 4-6 mm long and 4 mm wide, densely white-stellate-pubescent, pubescent, with 6-7 small teeth at the otherwise truncate apex, the teeth and margins densely glandular; petals 5, white, puberulent, narrowly elliptic, obtuse, to 2 cm long; stamens 10, the anthers bright orange; style solitary, pubescent from base to 15-35% of total length. Fruit a globose, tardily-dehiscent, 2- or 3-valved capsule 7-12 mm in diameter; seed usually 1, ca. 6 mm in diameter.

Similar Species: Easily confused with other subspecies of *Styrax platanifolius* but differing from them in leaf characters (as well as more transient floral features). In subsp. *texanus*, the leaf margin is usually entire and the lower leaf surface is completely and densely covered with white or silvery pubescence. In subsp. *platanifolius* and subsp. *stellatus*, the leaf margins usually include a few large, irregular, rounded teeth, and the lower surface is either glabrous (in subsp. *platanifolius*) or relatively sparsely stellate-pubescent (in subsp. *stellatus*). Subsp. *youngiae* does have a densely pubescent lower leaf surface, but in that subspecies the upper leaf surface and young twigs are also stellate-pubescent. In subsp. *texanus*, the upper leaf surface is essentially glabrous and the young twigs are merely glaucous. The round, entire leaves of Texas redbud (*Cercis canadensis* var. *texanus*) have been known to cause momentary excitement among the snowbells hunter, until the hunter moves close enough that the glabrous lower leaf surface becomes apparent.

Habitat: Limestone bluffs, boulder slopes and cliff faces, usually along perennial streams in canyon bottoms, in full sun or in partial shade of evergreen-deciduous woodlands.

Phenology: Flowering April-May. Readily identified throughout the growing season by foliage alone.

Comments: Listed as Endangered on 12 October 1984.

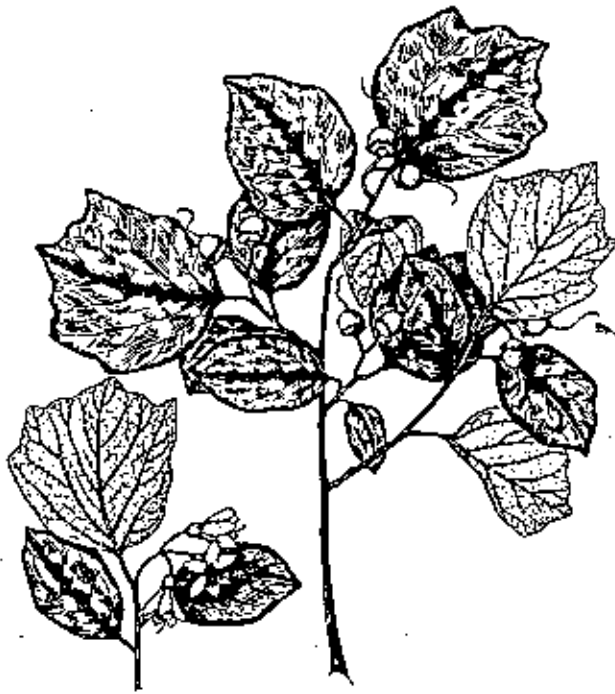
Illustrations: Line drawings appear in Vines (1960) and in Poole & Riskind (1987). A color photograph appears in Poole & Riskind (1987).

Selected References:

- Cory, V. L. 1943. The genus *Styrax* in central and western Texas. *Madroño* 7: 110-115.
- Fritsch, P. W. 1997. A revision of *Styrax* (Styracaceae) for western Texas, Mexico and Mesoamerica. *Annals of the Missouri Botanical Garden* 84(4): 705-761.
- Gonsoulin, G. J. 1974. A revision of *Styrax* (Styracaceae) in North America, Central America, and the Caribbean. *Sida* 5: 191-258.
- Mahler, W. F. 1981. Status report [on *Styrax texana*]. Prepared for US Fish & Wildlife Service, Albuquerque.
- Nicholson, E. H. and G. C. Steyskal. 1976. Masculine gender of generic name *Styrax*. *Taxon* 25: 581-587.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- U.S. Fish & Wildlife Service. 1986. Texas snowbells (*Styrax texana*) recovery plan. Technical agency review draft. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.



STORAX FAMILY



HAIRY SYCAMORE-LEAF SNOW-BELL
Styrax plataniifolia var. *stellata* (Engelm.) Cory

The clavate peduncles, margin set with remote, abruptly pointed, subulate teeth; surface semiglabrous to densely tomentose; body of fruit subglobose or obovate, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, the style persistent and apiculate; pericarp tough, leathery, dehiscent, flesh thin; seeds 1–2, about $\frac{1}{4}$ in. long, testa thin, oval to obovate, rounded or obtuse at apex and base, a ridge running from the hilum down the side.

LEAVES. Simple, alternate, deciduous, blades $1\frac{1}{2}$ –3 in. long, about as broad, ovate or broadly heart-shaped, margin entire or some with short acute or obtuse lobes, apex acute to obtuse, base cordate or semitruncate; upper surface light to dark green, semilustrous to dull, semiglabrate or set with minute, scattered stellate hairs, veins numerous and finely reticulate; lower surface paler, reticulate veins more conspicuous than above, smooth or softly and densely stellate-hairy; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. long, glabrate to stellate-hairy.

TWIGS. Slender, when young brown and pubescent; with age brown to gray and glabrous.

BARK. Gray to black, when young smooth, on old trunks near the base broken into small scales.

RANGE. Wooded rocky banks and ledges in central and western Texas—Spanish Pass, Kendall Co.; Enchanted Rock, Llano County; Little Blanco River, Blanco County; and Travis Peak, Travis County. The hairy variety, *S. plataniifolia* var. *stellata* (Engelm.) Cory, has been collected 9 miles west of Boerne, and in Sabinal Canyon $8\frac{1}{2}$ miles north of Vanderpool, Texas.

us to very densely stellate-hairy. However, these are connected by intermediate forms with varying degrees of hairiness. Those with copious stellate tomentum have been relegated to the status of a variety known as Hairy Sycamore-leaf Snow-bell, *S. plataniifolia* var. *stellata* (Engelm.) Cory.

The snow-bells may be propagated by seeds or layers. Some species are grafted on the closely related *Halesia carolina*.

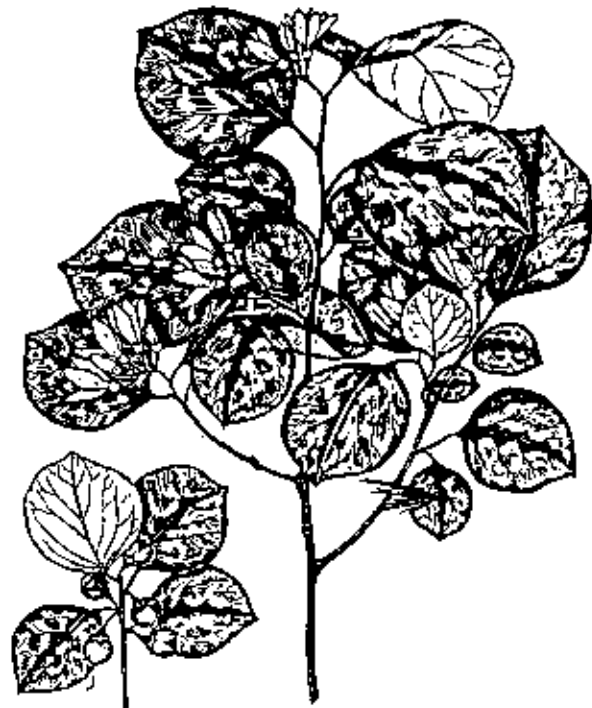
REMARKS. The genus name, *Styrax*, is the ancient Greek name, and the species name, *plataniifolia*, refers to the sycamore-like foliage.

TEXAS SNOW-BELL

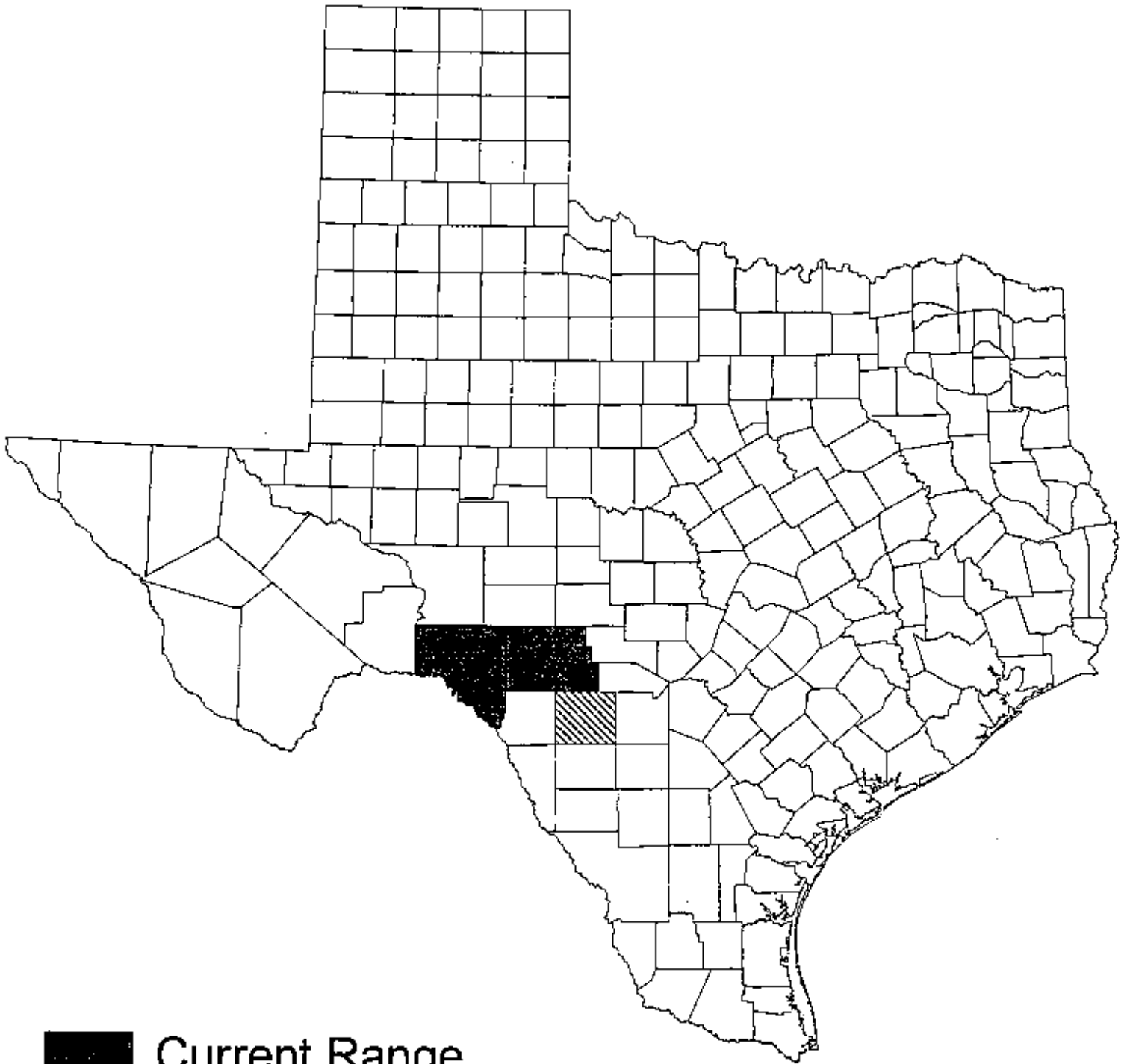
Styrax texana Cory

FIELD IDENTIFICATION. Shrub to 15 ft, with slender and irregular branches; often appearing one-sided and unshapely because of its frequent occurrence on the faces of bluffs or cliffs.

FLOWERS. In spring, axillary, solitary, or in clusters of 2–5; peduncles $\frac{1}{2}$ – $\frac{3}{4}$ in. long, finely tomentulose; individual flower pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. long; calyx $\frac{3}{8}$ – $\frac{1}{4}$ in. long, spreading at the apex, shallowly set with remote, minute teeth; corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. long, petals 5–6, distinct, white, elliptic to oblong, apex obtuse or acute; stamens



TEXAS SNOW-BELL
Styrax texana Cory



■ Current Range

▨ Introduced Range

Styrax plantanifolius ssp. *texanus*
(Texas snowbells)

Scientific Name: *Styrax platanifolius* Engelm. subsp. *youngiae* (Cory) P. W. Fritsch

Synonyms: *Styrax youngiae* Cory; *Styrax platanifolius* Engelm. var. *texasus* (Cory) B. L. Turner

Common Name: Young's snowbells

Global/State Ranks: G3T1S1

Federal Status: SOC

Global Range: West Texas, Coahuila and Nuevo León.

State Range: Davis Mountains of Jeff Davis County. Known only from the type specimen, collected on 12 May 1914 by Mary Sophie Young "in a canyon, Davis Mts., Texas." No other locational information is provided on the label. Labels on other collections by Young on 12 May 1914, accessible in part via search of the Flora of Texas database, read "Limpia Canyon" or "near Limpia;" one reads "Star Mt. Limpia."

Description (adapted from Fritsch 1997; Correll & Johnston 1970; S. Strong and M. C. Johnston in Henrickson & Johnston in prep.): Much-branched shrub 1-3 m tall; young twigs stellate-pubescent. Leaves alternate, simple, the blades orbicular to elliptic, 3-8 cm long and 2-7 cm wide, more or less entire, truncate to cuneate at the base, acute or obtuse at the tip, dull green with stellate hairs on the upper surface, with a dense white tomentum of stellate hairs on the lower surface, the veins on the lower surface prominent (visible through the tomentum) and straw colored. Flowers 2-5 on drooping pedicels in short, leafy, axillary, pedunculate racemes; pedicels 10-25 mm long, coarsely stellate-pubescent; calyx campanulate, ca. 4 mm long, with 5-7 small teeth at the otherwise truncate apex, bearing both a dense tomentum and stellate hairs, with sparse glands along the margin; petals 5, white, narrowly elliptic obtuse, densely stellate-hairy, 15-17 mm long; style solitary, 10-15 mm long, pubescent from base to 60-80% of the total length. Fruit a tardily-dehiscent, 3-valved capsule, dark brown, ovoid, 5-8 mm long, covered with a dense tomentum and stellate hairs, the slender style persistent; seed 1, ca. 9 mm long and 6-7.5 mm wide, brown and leathery.

Similar Species: Young's snowbells is the only *Styrax* taxon reported from Trans-Pecos Texas. Three other subspecies of *Styrax platanifolius* occur in the southwestern and western Edwards Plateau, but subsp. *youngiae* is quickly distinguished from them all by its coarsely stellate-pubescent pedicels.

Habitat: In Mexico, Young's snowbells occurs in relatively mesic montane limestone canyons, and other varieties of *Styrax platanifolius* are restricted to limestone substrates. It might be assumed that the Davis Mountains specimen was collected from a moist limestone canyon, but most of the exposed bedrock in the range is of igneous origin. Small areas of limestone are mapped in the northwestern quarter of the mountains, but such areas have not been searched.

Phenology: Flowering in May?

Comments:

Illustrations: Line drawings appear in Powell (1998) and Vines (1960).

Selected References:

Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research

- Foundation, Renner. 1881 pp.
- Cory, V. L. 1943. The genus *Styrax* in central and western Texas. *Madroño* 7(4): 110-115.
- Fritsch, P. W. 1997. A revision of *Styrax* (Styracaceae) for western Texas, Mexico and Mesoamerica. *Annals of the Missouri Botanical Garden* 84(4): 705-761.
- Fritsch, P. W. 1999. Phylogeny of *Styrax* based on morphological characters, with implications for biogeography and infrageneric classification. *Systematic Botany* 24(3): 356-378.
- Gonsoulin, G. J. 1974. A revision of *Styrax* (Styracaceae) in North America, Central America, and the Caribbean. *Sida* 5: 191-258.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.

TREES, SHRUBS, AND WOODY VINES OF THE SOUTHWEST

equaling the petals, or shorter, included when the petals are not reflexed; style filiform, sometimes exceeding the corolla.

FRUIT. Maturing August-September, peduncles finely tomentose, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, gradually expanded into the shallow, cup-shaped, minutely toothed calyx; fruit subglobose, about $\frac{3}{8}$ in. long, green at first, brown-tomentose later, dehiscent into 2-3 valves; seed solitary, globose or slightly longer than wide, smooth, often with 1 or 2 shallow grooves on the side, dark lustrous-brown, about $\frac{1}{16}$ in. long.

LEAVES. Simple, alternate, deciduous, blades 2-3 in. long, almost as broad, mostly oval or a few broadly elliptic, margin entire, base abruptly contracted into petiole, apex rounded or blunt-pointed, upper surface pale green and glabrous, veins delicate and impressed, lower surface conspicuously white with veins raised and more prominent; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in. long, green to reddish, grooved above, essentially glabrous.

TWIGS. Slender, when young reddish brown, older gray and glabrous, minutely white-scaly under the glass; bark of trunk smooth, light gray to dark gray.

RANGE. Rare and local, confined to limestone areas of the central Texas Edwards Plateau-Edwards County, on Polecat Creek $14\frac{1}{2}$ miles southeast of Rocksprings, also on Cedar Creek; Real County, 3 miles north of Vance on Hackberry Creek near old post-office site.

REMARKS. The genus name, *Styrax*, is the ancient Greek name, and the species name, *texana*, refers to the state of Texas.

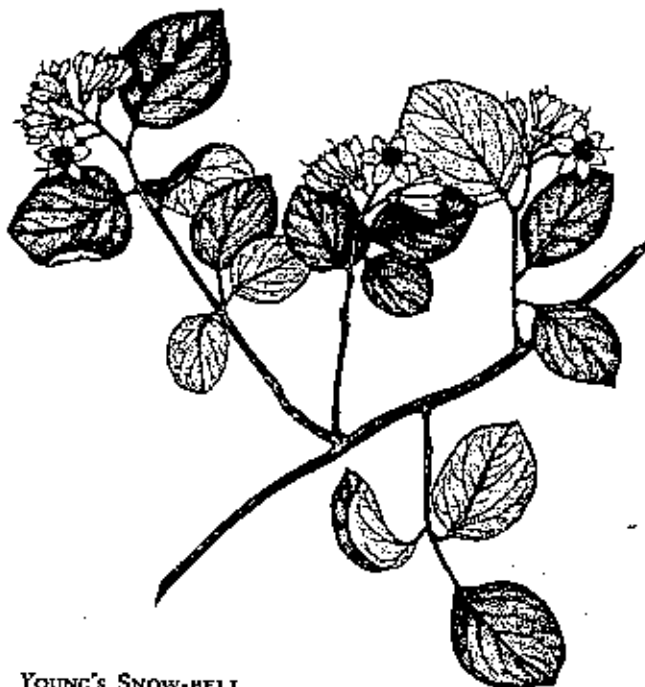
YOUNG'S SNOW-BELL

Styrax youngae Cory

FIELD IDENTIFICATION. Shrub 6-9 ft. Very rare plant known only from the type collection at the University of Texas Herbarium. The following description of this specimen is given by Cory (1943b, p. 113):

FLOWERS. Appearing the middle of April, in racemose clusters of 3-7, peduncle stout, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, coarsely stellate-pubescent, pedicels stout, $\frac{1}{4}$ - $\frac{1}{3}$ in. long, densely and coarsely stellate-pubescent; calyx campanulate, about $\frac{1}{4}$ in. long and $\frac{1}{2}$ in. broad, dark brown, densely stellate-pubescent, apex truncate, non-glandular, teeth inconspicuous; petals 5, white, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, narrowly elliptic, obtuse, densely stellate-pubescent; style stout, about $\frac{3}{8}$ in. long; fruit not seen.

LEAVES. Smaller leaves orbicular, larger leaves elliptic, to 2 in. long and $1\frac{3}{8}$ in. broad, subentire, more or less rounded at the apices and bases, or somewhat acute at the apices, thin; green above, but densely pubescent with coarse stellate hairs; tomentose below, but not silvery, with a very fine and dense indumentum which



YOUNG'S SNOW-BELL
Styrax youngae Cory

is beset with coarse stellate hairs; veins very prominent and straw-colored; short-petioled.

RANGE. Igneous soil at an altitude of 4,000 ft. In a canyon, Davis Mountains, Texas. Type collected May 12, 1914.

REMARKS. The genus name, *Styrax*, is the ancient Greek name. The species name, *youngae*, honors Mary S. Young, formerly with the University of Texas. V. L. Cory remarks, "It is the only collection of *Styrax* from the mountains of southwestern Texas . . . and it might possibly be a species of northern Mexico."

The author has compared the type specimen with specimens of *S. texana* in the University of Texas Herbarium and finds a very close resemblance. *S. youngae* has smaller, less conspicuously veined leaves than *S. texana*, and the flowers appear to be more numerous in the cluster (3-8). Both are similar in having a very dense whitish tomentum on the under surface of the leaves. However, since only one specimen of *S. youngae* exists, it is difficult to judge validity and status of this taxon, and until more material can be collected it seems best to maintain it as a separate species.

The above lack of certainty is brought about by precise collection data being absent from the collection sheet. This points up the need for better data on herbarium specimens in general. Many botanists are seemingly loath to spend the time needed to insure proper data on collections.



□ Historical Range

Styrax platanifolius ssp. *youngiae*
(Young's snowbells)

Scientific Name: *Symphoricarpos guadalupensis* Correll

Synonyms: None.

Common Name: McKittrick snowberry

Global/State Ranks: GHQSH

Federal Status: SOC

Global Range: Guadalupe Mountains of Texas; not yet reported from adjacent New Mexico. Powell (1998) reported seeing similar plants in the Sierra del Carmen in Coahuila.

State Range: Culberson County.

Description (adapted from Correll 1968): Shrub, entirely glabrous, the stems slender, with thinly fibrous-shredded bark and reddish twigs. Leaves opposite, simple, with petioles ca. 1.5 mm long, the blade oval to elliptic, up to 15 mm long and 9 mm wide, rounded-apiculate at the apex, the margins entire or with a few coarse teeth or lobules above the middle. Flowers on thick pedicels ca. 1.5 mm long; floral bracts ovate-concave, ca. 1.5 mm long; calyx ca. 1.8 mm long, the (4-5?) short lobes broadly rounded; corolla campanulate, 3-4 mm long, the (4-5?) lobes broadly rounded and concave. Fruit unknown, presumably a small drupe.

Similar Species: Very difficult to separate from *S. palmeri*, *S. oreophilus* and *S. rotundifolius*, all of which are also found in the Guadalupe Mountains. (In fact, the type specimen is a mixed collection including a branch of *S. palmeri*.) The small corolla reported for *S. guadalupensis*, if truly a consistent character, would be diagnostic; the corolla of all other species in the Trans-Pecos is 6 mm long or longer.

Habitat: Details unknown. The two specimens were presumably collected from pine-oak woodlands on limestone slopes in higher canyons of the Guadalupe Mountains. Trees near the imprecisely known historic locations include *Pinus ponderosa*, *P. strobiformis*, *Pseudotsuga menziesii*, *Quercus gambelii*, *Acer grandidentatum* and *Ostrya knowltonii* (Poole 1987).

Phenology: Flowering August-September.

Comments: Known from two specimens, one collected in 1948 and the other in 1954. Perhaps only an aberrant form of *S. oreophilus*, a species widely distributed in the montane west.

Illustrations: A line drawing appears in Powell (1998).

Selected References:

Burgess, T. L. and D. K. Northington. 1979. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks: an annotated checklist. Chihuahuan Desert Research Institute Publication Number 107.

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- Jones, G. N. 1940. A monograph of the genus *Symphoricarpos*. Journal of the Arnold Arboretum 21: 201-252.
- Poole, J. M. 1987. Status report on *Symphoricarpos guadalupensis* Correll. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.



Fig. 337. A) *Symphoricarpos longiflorus*
(Longflower Snowberry); B) *S. guadalupensis*
(Correll Snowberry)

3. Twigs short-hairy; corolla densely hairy inside.

4. Hairs of twigs dense, straight, spreading; anthers reaching to base of corolla lobes; leaf apexes obtuse-rounded 4. *S. rotundifolius*

4. Hairs of twigs short and curved; anthers reaching to middle of corolla lobes; leaf apexes usually with a tiny sharp point 5. *S. pulmeri*

1. *Symphoricarpos longiflorus* Gray. LONGFLOWER SNOWBERRY. Fig. 337. Higher slopes and canyons, often near streams. Culberson Co., Guadalupe Mts., North and South McKittrick canyons. Brewster Co., Glass Mt., Honeysuckle Canyon. 5000-6500 ft.; Jun-Aug. NW to CO and SE with W to SE CA.

This is perhaps the most distinct snowberry of the Trans-Pecos with its smaller leaves having the aspect of Littleleaf Sumac, and rather long, slender tubular corollas. The leaves are glabrous and glaucous. The shrubs are usually to 1 m high and with spreading, somewhat declining branches to 2 m long.

2. *Symphoricarpos guadalupensis* Correll. CORRELL SNOWBERRY. Fig. 337. Pine woods. Culberson Co., Guadalupe Mts., head of South McKittrick Canyon, 8100 ft.; Aug-Sep; possible endemic.

This completely glabrous shrub is characterized by its short corollas, 4 mm long. I have seen one specimen from Coahuila, Mexico. The flowers

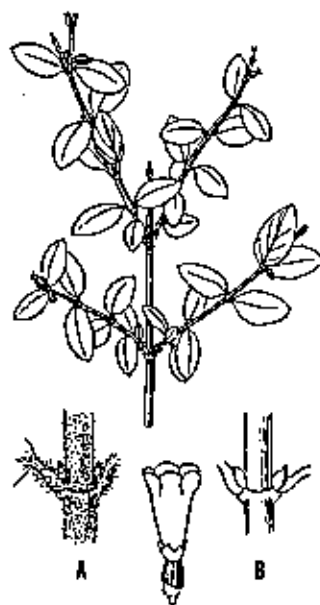


Fig. 338. A) *Symphoricarpos palmeri*
(Palmer Snowberry); B) *S. oreophilus*
(Mountain Snowberry)

Mountains, Picacho del Centinela, 6000 ft., that resembles the Correll Snowberry. The Correll Snowberry is poorly known and requires further study to determine its relationship to other snowberries. It is possibly close to *Symphoricarpos oreophilus*, or conspecific with the latter (also discussed by Burgess and Northington, 1981).

3. *Symphoricarpos oreophilus* Gray. MOUNTAIN SNOWBERRY. Fig. 338. Mountains and high canyons. Culberson Co., Guadalupe Mts. Jeff Davis Co., Mt. Livermore. 7500 ft.; spring-summer. Also NM, AZ, NV, UT, CO; N Mex.

The taxonomic distinctions of *Symphoricarpos oreophilus*, *S. rotundifolius* (Dempster, 1992), and *S. pulmeri* are not clear, at least as far as the Trans-Pecos populations are concerned. The three taxa appear to be closely related and may represent but one specific entity in the Trans-Pecos. Mountain Snowberry is reported to be an erect shrub to 1.5 m high with slender, spreading branches.

4. *Symphoricarpos rotundifolius* Gray. ROUNDEAF SNOWBERRY. Mountains and high canyons. El Paso Co., Franklin Mts.; Hueco Tanks. Culberson Co., Guadalupe Mts., upper South McKittrick Canyon. 6500-8100 ft.; spring-summer. W to AZ and CO.

The Roundleaf Snowberry is reported to be a low sprawling shrub with slender arching branches.



Historical Range

Symphoricarpos guadalupensis
(McKittrick snowberry)

Scientific Name: *Thalictrum arkansanum* Boivin

Synonyms: None.

Common Name: Arkansas meadow-rue

Global/State Ranks: G2QS1

Federal Status: SOC

Global Range: Southern Arkansas, southeastern Oklahoma and northeastern Texas.

State Range: Bowie, Cass, Delta, Lamar and Red River counties. A report from Grayson County is ambiguous and may be erroneous.

Description (adapted from Correll & Johnston 1970): Dioecious perennial from a fascicle of small, ribbed, carrot-like roots that become brown when dry; stems weak, decumbent, 2-4 dm tall. Leaves alternate, twice ternately-compound; leaflets ovate to obovate to reniform or orbicular, glabrous, the margins irregularly crenate or lobed, the largest leaflets less than 15 mm wide. Flowers in small terminal panicles, unisexual, the male and female on separate plants; sepals 4-5, those of male flowers ovate to elliptical, 2-3 mm long, those of female flowers ovate and 1-1.5 mm long; petals absent; stamens numerous, the filaments 2-3 mm long and the anthers 1.8-2.3 mm long; stigma 1.5-3 mm long. Fruit a cluster of separate, sessile, ellipsoid achenes, each 3.5-4.5 mm long and 1.5-2 mm wide, with 10-12 low ribs or nerves.

Similar Species: Exceedingly similar to *Thalictrum texanum*, which occurs in Brazos, Fayette, Grimes, Harris, and Waller counties in southeast Texas. *T. arkansanum* has brown roots, ellipsoid carpels, and stigmas 1.3-3 mm long. *T. texanum* has black roots, ovoid carpels, and stigmas 0.5-1 mm long (Correll & Johnston 1970). Both are considered by some authors to be varieties of *T. debile*, which is found in limited portions of Alabama, Georgia and Mississippi.

Habitat: Mostly deciduous forests on alluvial terraces. A huge population in Red River County occurs on acid clay loam on the broad terrace of a perennial stream, in a forest dominated by *Carya laciniosa*, *C. ovata*, *Quercus nigra* and *Quercus phellos*. Herbaceous associates include *Melica muica*, *Sanicula* sp., *Carex debilis*, *C. intumescens*, *C. retroflexa*, *Podophyllum peltatum*, *Tovara virginica*, *Arisaema dracontium* and *Poa sylvestris*.

Phenology: Flowering March-April and withering by midsummer.

Comments: Flowering season, identifying features, and habitat and management implications are discussed by Kral (1983) under *T. debile*.

Illustrations: A line drawing appears in Diggs, Lipscomb & O'Kennon (1999). A line drawing of the very similar *Thalictrum texanum* appears in Mahler (1983).

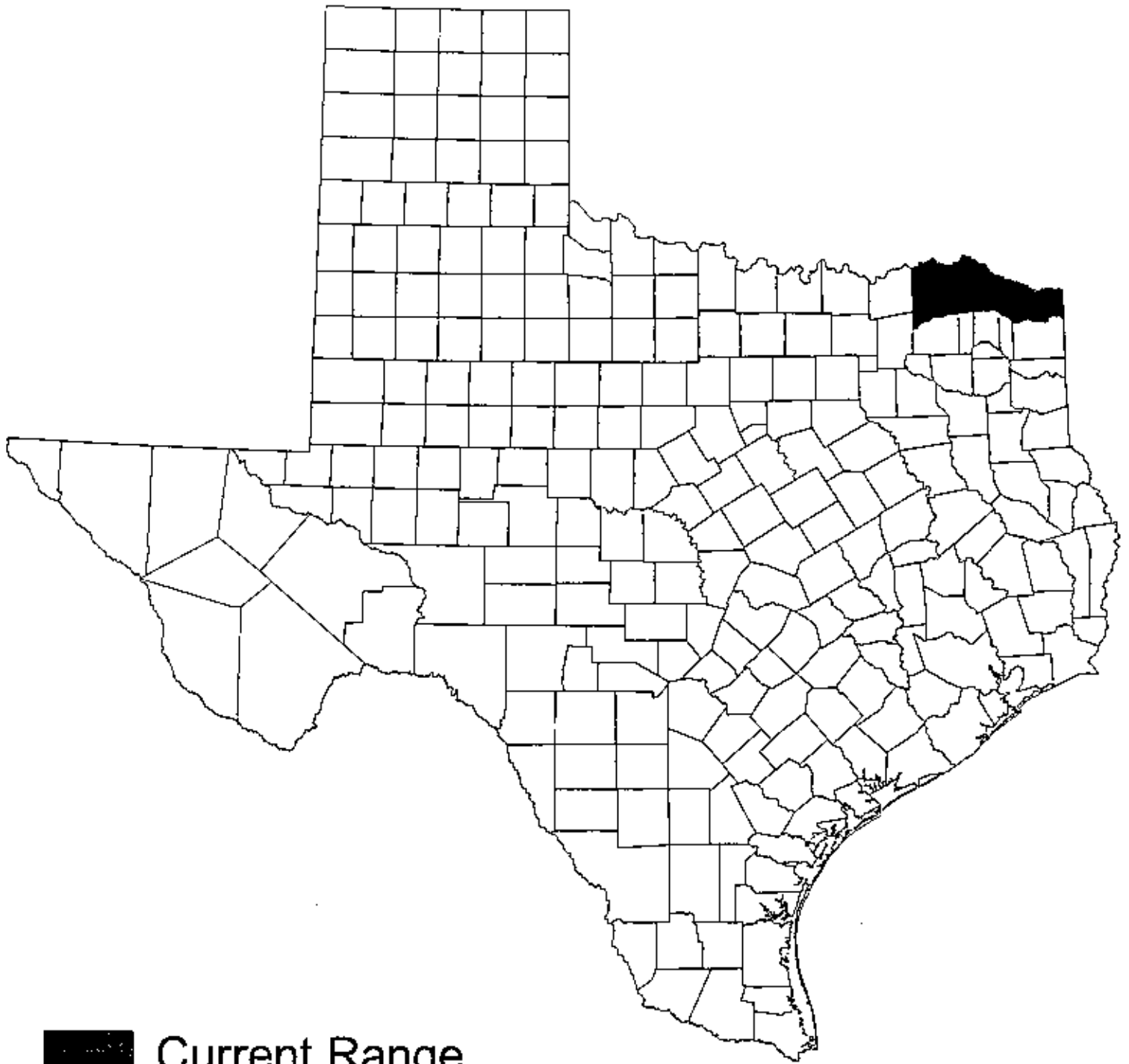
Selected References:

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Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research

- Foundation, Renner. 1881 pp.
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 Current Range

Thalictrum arkansanum
(Arkansas meadow-rue)

Scientific Name: *Thalictrum texanum* (Hall ex Gray) Small

Synonyms: *Thalictrum debile* Buckl. var. *texanum* Hall ex Gray

Common Name: Houston meadow-rue, Texas meadow-rue

Global/State Ranks: G2QS2

Federal Status: SOC

Global Range: Endemic to Texas.

State Range: Brazos, Fayette, Grimes, Harris, and Waller counties.

Description: (adapted from Correll & Johnston 1970): Dioecious perennial from a fascicle of small carrot-like roots that become black when dry; stems reportedly rigidly erect but more often weak, decumbent to somewhat erect, 1-4.5 dm tall. Leaves alternate, twice ternately-compound; leaflets cuneate to reniform, 2-7 mm wide, glabrous and glaucous, entire or irregularly few-toothed or lobed. Flowers in terminal panicles, unisexual, the male and female on separate plants; sepals 4-5, those of male flowers 1.7-3 mm long, those of female flowers 0.7-1.5 mm long; petals absent; stamens numerous, the filaments ca. 1.5 mm long and the anthers 1.4-2 mm long; stigma 0.5-1 mm long. Fruit a cluster of separate, very shortly stipitate, ovoid achenes, each 2.7-3.7 mm long and 1.4-1.6 mm wide, with 6-8 low ribs or nerves.

Similar Species: Exceedingly similar to *Thalictrum arkansanum*, which occurs in Bowie, Cass, Grayson, Lamar and Red River counties of northeast Texas. *T. arkansanum* has brown roots, ellipsoid carpels, and stigmas 1.3-3 mm long. *T. texanum* has black roots, ovoid carpels, and stigmas 0.5-1 mm long (Correll & Johnston 1970). Both are considered by some authors to be varieties of *T. debile*, which is found in limited portions of Alabama, Georgia and Mississippi.

Habitat: Woodlands and woodland margins on soils with a surface layer of sandy loam, on both uplands and creek terraces, perhaps mostly commonly on claypan savanna sites. At one site in Grimes County, Texas meadow-rue occurs in abundance along the margins of upland woodlands dominated by *Quercus stellata* and *Juniperus virginiana*. Shrub components include *Ilex vomitoria*, *Callicarpa americana* and *Vaccinium arboreum*. Margins are dominated in the spring by *Carex complanata* and in the fall by *Schizachyrium scoparium*. The surface layer of the soil is slightly acid fine sandy loam, while the upper part of the subsoil is slightly acid, very slowly permeable clay, a combination that produces a perched water table in winter and allows only poor root penetration. These soils are very moist during periods of active growth of *Thalictrum texanum*. At a site in Brazos County, Texas meadow-rue occurs along the margins of a mostly deciduous woodland on an alluvial terrace, in partial shade of *Quercus nigra*, *Ulmus* sp., *Ilex vomitoria*, in association with *Carex cherokeensis*, *Tridens flavus*, *Elephantopus carolinianus*, *Salvia lyrata*, *Verbesina virginica* and *Schizachyrium scoparium*.

Phenology: Flowering/fruitletting March-May and withering by midsummer. Foliage reappears in late fall (November) and may persist through the winter.

Comments:

Illustrations: A line drawing appears in Mahler (1983).

Selected References:

- Boivin, B. 1944. American *Thalictra* and their allies. *Contributions from the Gray Herbarium* 152: 338-491.
- Correll, D. S. and M. C. Johnston. 1970. *Manual of the vascular plants of Texas*. Texas Research Foundation, Renner. 1881 pp.
- Mahler, W. F. 1983. Rediscovery of *Hymenoxys texana* and notes on two other Texas endemics. *Sida* 10(1): 87-91.
- Park, M. M. and D. J. Festerling, Jr. 1997. *Thalictrum*. Pp. 258-271 in: *Flora of North America* Committee. 1997. *Flora of North America north of Mexico*. Volume 3. Magnoliophyta: Magnoliidae and Hamamelidae. Oxford University Press, New York. 590 pp.

Texas meadow-rue (*Thalictrum
texanum*) a Hugh Wilson





Thalicttrum texanum; a. habit, fruiting; b. pistillate flowers; c. staminate
flowers; d. fruit.

1983.

Financial support from the Office of Endangered Species, U.S. Fish and Wildlife Service, Albuquerque NM enabled me to conduct field studies to determine if current populations still existed. I rediscovered *Macbaeranthera aurea* in the vicinity of Cypress in the fall of 1980 (Mahler, 1981). Since that publication, another herbarium specimen was found by James W. Kessler (Texas A&M University) from Galveston County (TAES). With the habitat of this taxon noted, I enlisted the aid of Kessler who began searching the same area the following spring (March 1981) for *Hymenoxys texana*. He rediscovered three small populations growing in the equivalent of "buffalo wallows" or shallow wet depressions, the first collection since Thuro's in 1889-90.

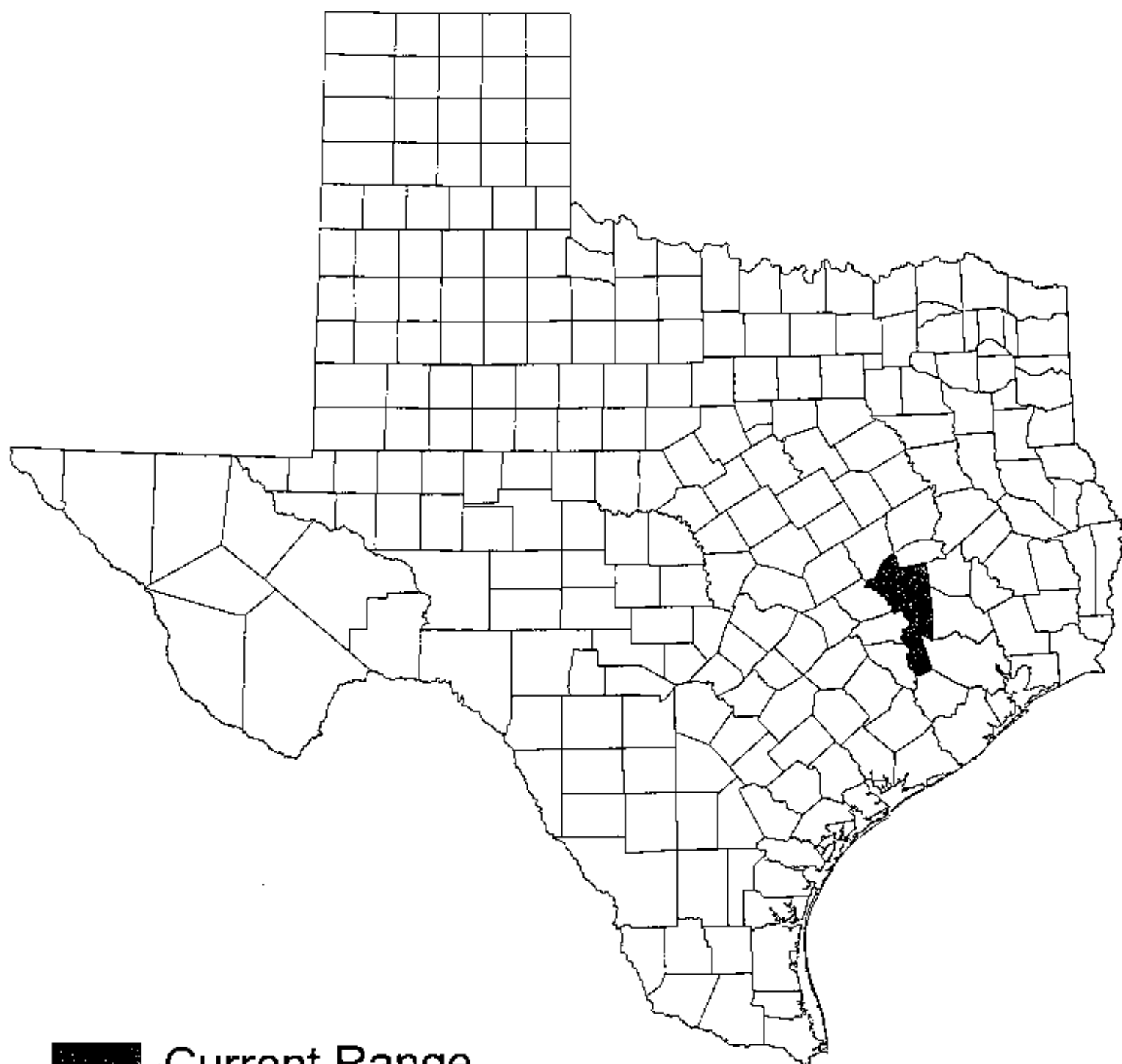
In the original article, it was stated that *Actinella texana* was "also mounted on a sheet with *A. odorata* (No. 742) of Palmer's 1879-80 collection from S.W. Texas." Examination of a duplicate of Palmer 742 at US by R. B. Faden (1981, pers. comm.) revealed no specimen of *A. texana* mounted on it, but the label did provide more precise data: Jan 1880, between the Nueces and the Frio rivers on the Old San Antonio Road. Toney M. Keeney (Southwest Texas Junior College) and I have searched unsuccessfully in this area.

Additional data are being sought regarding the current distribution of *Thalicttrum texanum* (Gray) Small. The only specimens I have examined were from Brazos County: moist post oak woodland, 13 mi S of College Station near Highway 6, 15 Mar 1970, *Lonard & Bacon-2533* (SAT, SMU); frequent in moist woods along creek, 9.6 mi SE of College Station, 26 Mar 1949, *Cory-2203* (SMU); shady, sandy soil, 8 mi SE of College Station, 11 Mar 1949, *Whizenbunt-29* (TAMU); growing in damp sandy soil partially shaded area 6 mi S of College Station in road ditch along Highway 6, 20 Mar 1957, *Cypert-206* (TAMU). The small stature, 30 cm or less tall, renders this species rather distinct as well as probably inconspicuous.

In summary, three rare endemic species were described in the 1800's with their type localities all from the prairies near Houston, Texas. Populations of two of the three endemics are now known, with current populations of *Thalicttrum texanum* still being sought.—Wm. F. Mahler, Herbarium, Southern Methodist University, Dallas, TX 75275.

REFERENCES

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 SMALL, J. K. 1903. Manual of the southeastern flora. Publ. by author, New York. pp. 446, 1331.



- Current Range
□ Historical Range

Thalictrum texanum
(Texas meadow-rue)

Scientific Name: Thelocactus bicolor (Gal.) Britt. & Rose var. flavidispinus Backeberg

Synonymy: Echinocactus flavidispinus (Backeberg) Weniger

Common Name: yellowspine glory of Texas; strawspine glory of Texas

Global Range: TX and Tamaulipas; reports from Tamaulipas may be based on misidentifications.

State Range: Brewster County; report from Starr County in Benson (1982) probably represents a clerical error.

Current Federal Status: Category 2 candidate for possible federal listing as a threatened or endangered species.

Habitat: Gravel hills in desert grasslands or shrublands below about 1400 feet; in the Marathon Basin of Brewster County this species is apparently restricted to soils derived from Caballos Novaculite.

Phenology: Flowering in May.

Similar Species:

Comments:

Illustrations: color photographs appear in Warnock (1977) and Weniger (1984).

Selected References:

Anderson, E. F. and K. D. Heil. 1982. Status report [on Thelocactus bicolor var. flavidispinus]. Report prepared for U.S. Fish and Wildlife Service, Albuquerque.

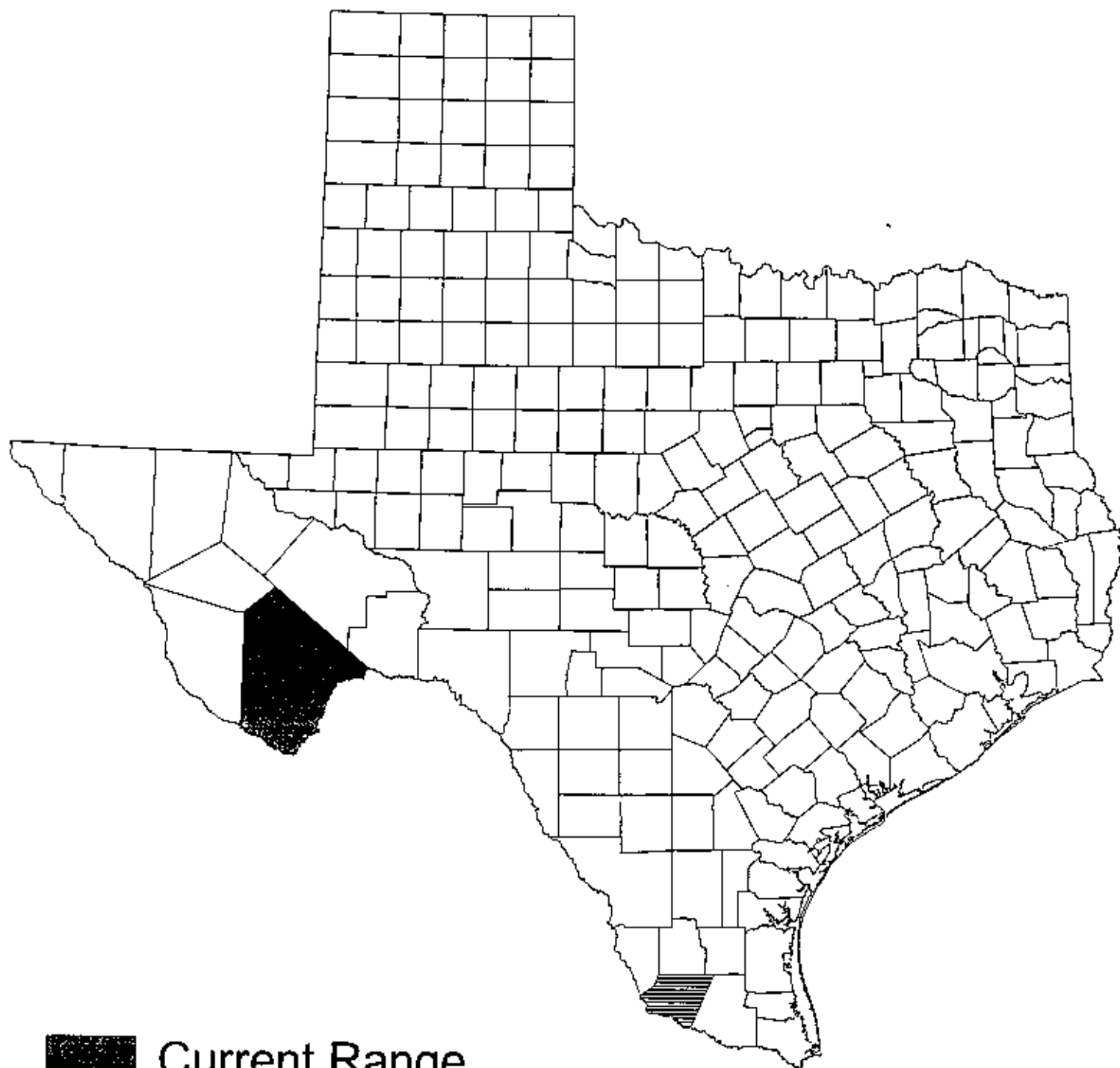
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Warnock, B. H. 1977. *Wildflowers of the Davis Mountains and Marathon Basin, Texas*. Sul Ross State University, Alpine. 274 pp.

Weniger, D. 1984. *Cacti of Texas and neighboring states: a field guide*. University of Texas Press, Austin. 356 pp.





Current Range



Misidentification Range

Thelocactus bicolor var. *flavidispinus*
(straw-spine glory-of-Texas)

Scientific Name: *Thelypodium tenue* Roll.

Synonyms: None.

Common Name: Fresno Creek thelypody

Global/State Ranks: G1QS1

Federal Status: SOC

Global Range: Apparently endemic to Texas.

State Range: Known only from Presidio County.

Description (adapted from Correll & Johnston 1970): Glabrous annual herb with a single branched stem. Leaves alternate, pinnately lobed, petiolate, the basal ones 1-2 dm long and the cauline shorter, the lobes irregularly dentate. Flowers in dense elongate terminal racemes that are bracted in lower portion, on very slender ascending pedicels 2-3 cm long; sepals 4, greenish to slightly tinged with purple, 4-5 mm long; petals 4, white, narrowly spatulate, 7-8 mm long; stamens exerted, the filaments nearly equal; anthers purplish, recurved. Fruit a silique on a short (1 mm long or less) stipe, terete or nearly so in cross section.

Similar Species: Very much like *Thelypodium texanum*, a much more common regional endemic that also occurs in the Fresno Creek area. In *T. tenue*, the pedicels are very slender, divaricately ascending and 20-30 mm long; in *T. texanum*, the pedicels are rigidly spreading, almost perpendicular to the stem, and 15 mm long or less. In *T. tenue*, the lower part of the inflorescence is bracted; in *T. texanum*, it is bractless.

Habitat: Known only from the gravel bed of Fresno Creek, an intermittent desert stream draining a landscape of varied geology.

Phenology: Flowering January-March.

Comments: The taxonomic status of this species is uncertain. Some researchers consider it to be a long-pedicelled form of *T. texanum*, a species which is also endemic to the Big Bend area and also occurs on Fresno Creek.

Illustrations: None known. A color photograph of the very closely related *Thelypodium texanum* appears in Warnock (1970).

Selected References:

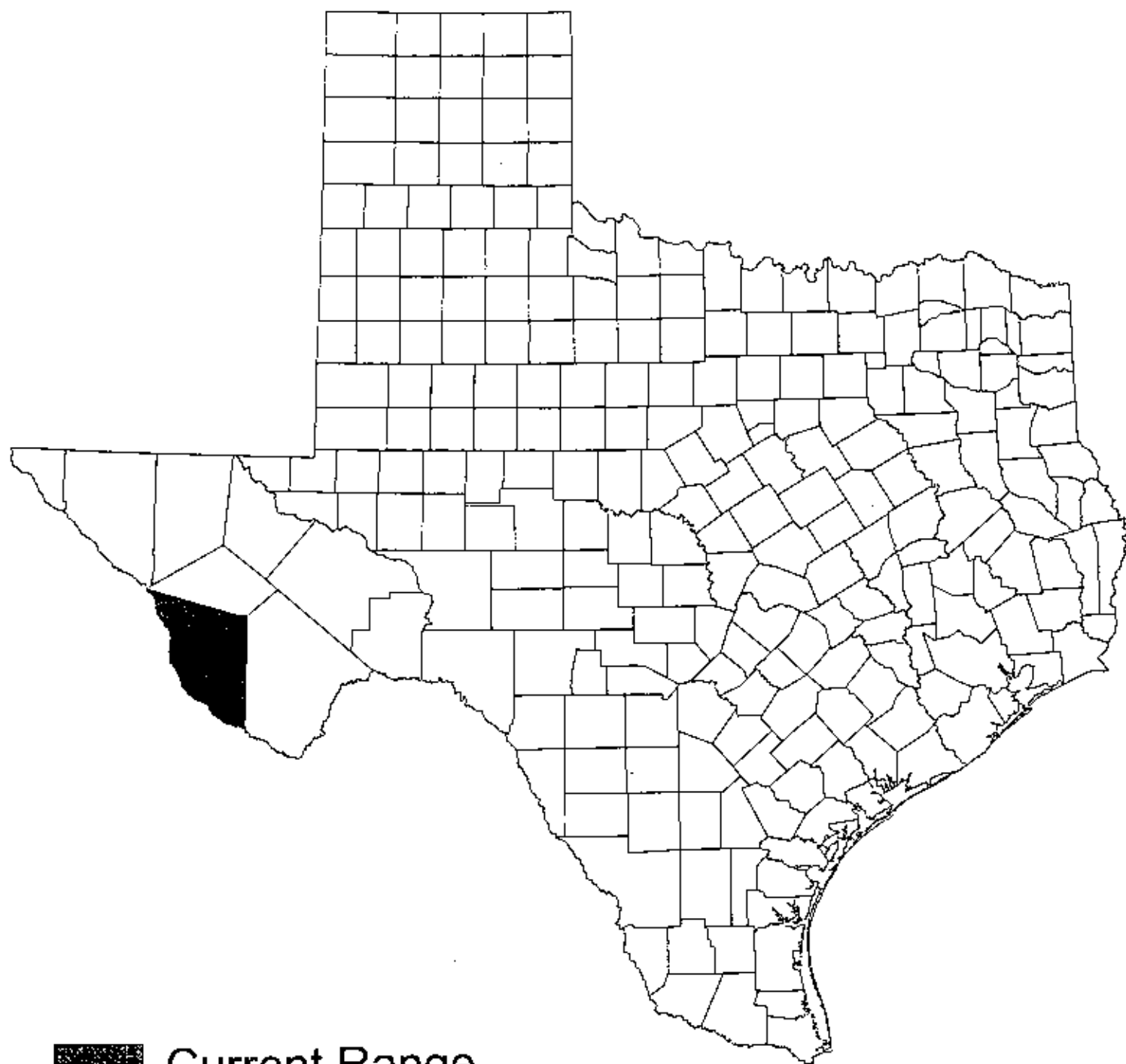
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Warnock, B. H. 1970. Wildflowers of the Big Bend Country, Texas. Sul Ross State University, Alpine.

157 pp.



 Current Range

Thelypodium tenue
(Fresno Creek thelypody)

Scientific Name: *Thurovia triflora* Rose

Synonyms: *Gutierrezia triflora* (Rose) M. A. Lane

Common Name: threeflower thurovia

Global/State Ranks: G2S2

Federal Status: None

Global Range: Endemic of the Gulf Coastal Plain of Texas.

State Range: Aransas, Brazoria, Calhoun, Galveston, Harris, Jackson, Matagorda, Refugio, San Patricio and Waller counties.

Description (adapted from Correll & Johnston 1970): Taprooted annual, profusely branched in upper half, usually ca. 1 dm tall or somewhat shorter but occasionally to 3 dm tall. Leaves both appressed and very small and thus inconspicuous, simple, sessile, entire, glutinous, 1-4 mm long and ca. 1 mm wide. Flower heads numerous on leafy branchlets, the involucre 3-4 mm long, urceolate-turbinate; phyllaries few, in about 3 series, strongly graduated, mostly stramineous but with a darker patch toward tip; receptacle flat and naked; ray flowers absent; disk flowers usually 3, the corolla dirty white to cream in color, rarely very pale yellow, with a short tube and a broadly flaring 5-lobed limb; pappus of about 10 acute scales nearly as long as the corolla. Achene narrowly obpyramidal, rather densely covered with ascending, short, stiff, white pubescence.

Similar Species: The somewhat ericoid habit, the few-flowered rayless heads, the white to yellow disk flowers, and the large scale-like pappus are as a group diagnostic of this particular broomweed, separating it from species of *Amphiachyris*, *Gutierrezia*, and *Xanthocephalum*.

Habitat: Most commonly encountered in sparse low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between salty prairies and tidal flats. Also present in light-colored, presumably somewhat saline soils in sparsely vegetated, often circular "slick" spots within coastal prairie grasslands, where associates include other rare Upper Texas Gulf Coast endemics such as *Hymenoxys texana* and *Machaeranthera aurea*.

Phenology: Flowering September-November.

Comments:

Illustrations: Line drawings of a complete plant and details of floral parts appear in Rose (1895); line drawings of various floral parts appear in Ruffin (1974).

Selected References:

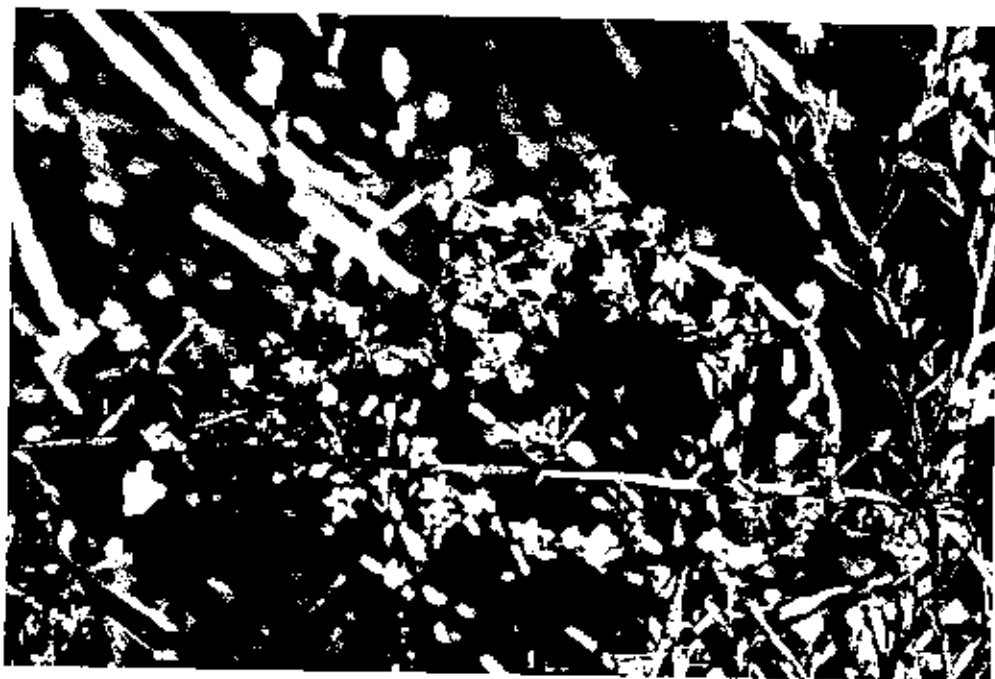
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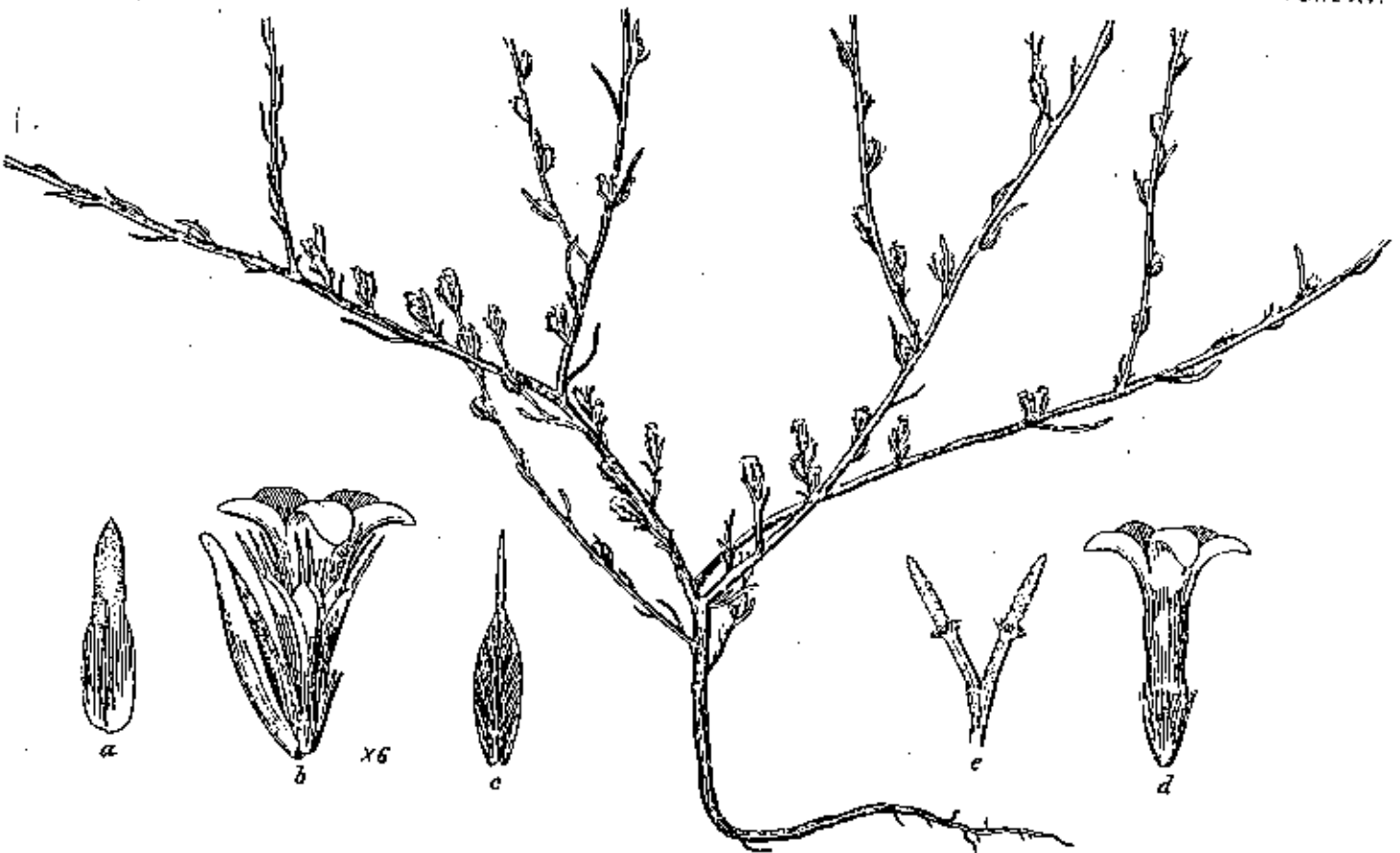
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THUROVIA TRIFLORA Rose.

Cumberland Basin, La Plata Mountains, Co. 1881, and in fruit August, 1892.

Miss Eastwood sent this plant in for several so that its position can be satisfactorily determined; we can name a new species for this diligent worker very much alike in habit and quite different species.

XEROPHYTUM OF PLATE. — Fig. a, fruiting branch a diameter c, cross section of the same, enlarged 11 diameters.

Velaria glauca Conlt. & Rose, sp. nov.

Shortly caulescent, slender, 4.5 dm. or less glabrous and somewhat glaucous; radical leaves often simply ternate; leaflets small, 12 mm. at base, often 3-lobed or 5-parted, irregularly involucre and involucre of small linear lobes 2 mm. or less long; fruit orbicular, 2 mm. in middle; flowers yellow.

Oregon, Canyonville (Thomas J. Howell, April 30, 1887), Woodville (Joseph Howell, April 30, 1887).

After a study of the so-called glabrous material and the notes kindly furnished by that this requires separation as a distinct

V. glauca differs from *V. kelloggii* etc., etc., and smaller fruit.

EXPLANATION OF PLATE.—Fig. a, fruiting branch;

THUROVIA, A NEW GENUS

Thurovia Rose, gen. nov.

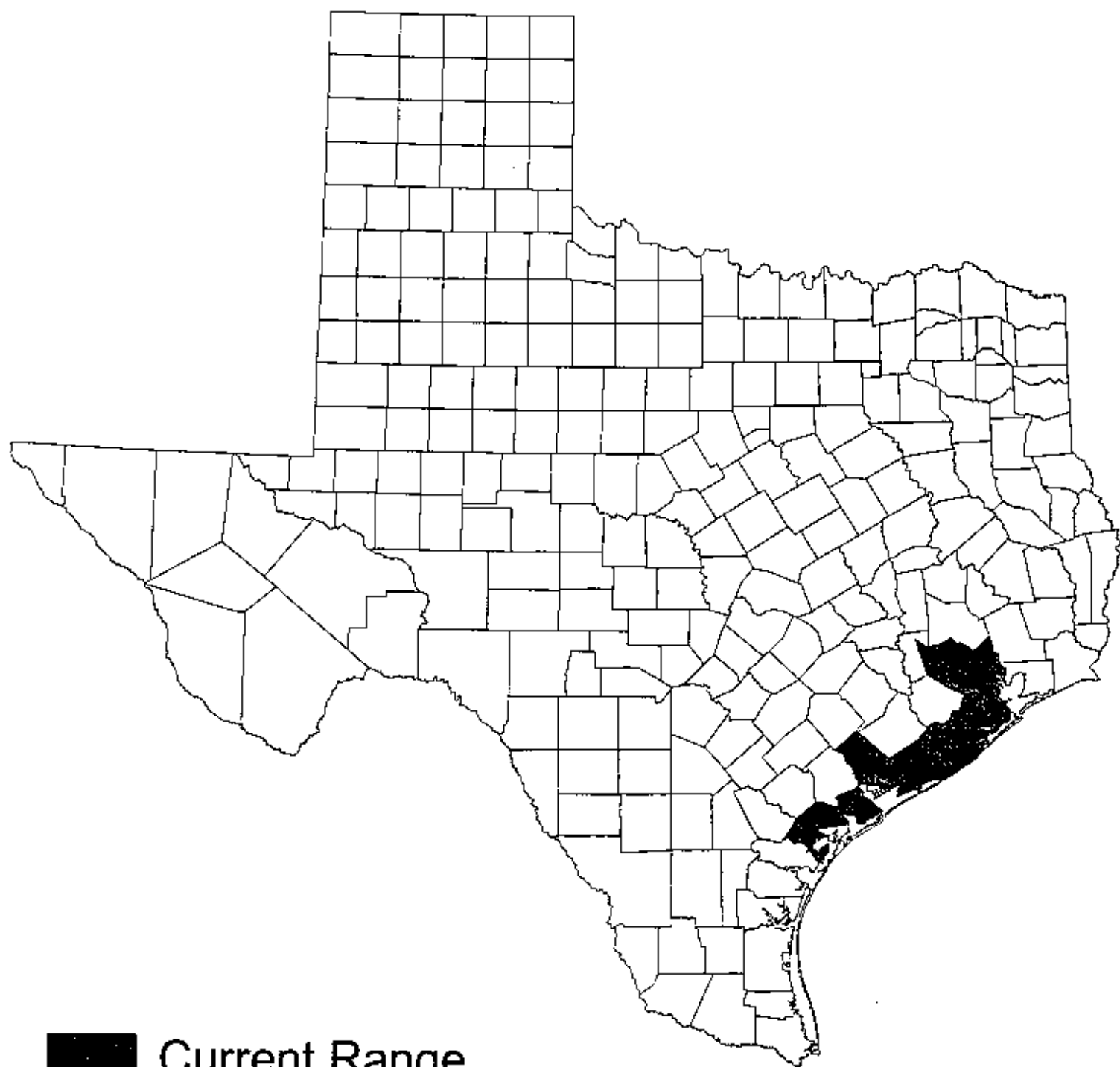
Herbs discoid, few-flowered, sessile in the habit, fertile. Involucre small, oblong to ovate, 5, linear, with conspicuous green tingling the stem, larger, with small erect broad funnel-form throat, proper tube short, comose-bearded, and with long slender, silky-pubescent, not nerved. Pappus of 10, spreading, much-branched glabrous lobes, involucre sessile mostly solitary in the axils. The relationships of this genus are Asteroides. Mr. Thunberg writes me that its habit, however, is more that of *Gnaphalium*. I have submitted a specimen to Dr. O. Hoffmann, of Berlin, but he points to this type. It is true, however, that the relationships are with the *Helianthoides* of *Eriophyllum*, but as distinct from the

and habit. This genus has been named for Mr. J. Texas, who has already discovered several

Thurovia triflora Rose, sp. nov.

Low, 20 to 45 cm. high, either bushy or 3-4 dm. high, 3-flowered;

Common on the prairie northwest of
Collected October 25, 1892, by J.



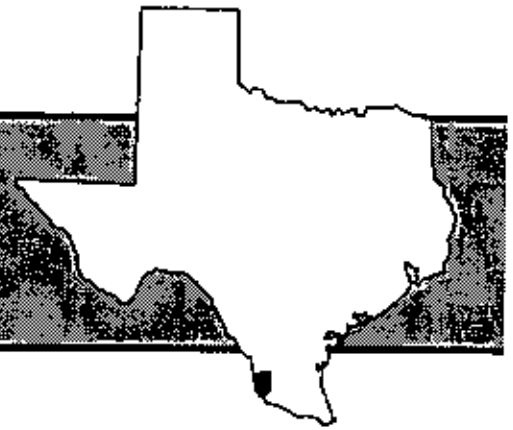
- Current Range
□ Historical Range

Thurovia triflora
(threeflower broomweed)

Federally and State Endangered

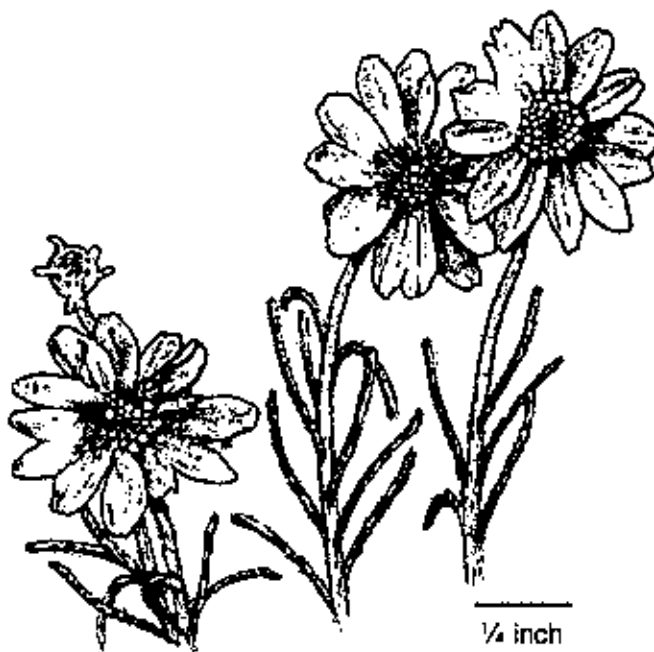
Ashy dogweed

Thymophylla tephroleuca



Ashy dogweed (*Thymophylla tephroleuca*) was listed endangered by the U. S. Fish and Wildlife Service (USFWS) in July 1984, and listed as endangered by the State of Texas soon afterwards. At the time of its listing only one population was known from Zapata County. Today, we know of three small populations in northern Zapata County. Historically, ashy dogweed was reported from Starr County just north of Rio Grande City, but it has not been seen in that county since 1932. There have been reports that ashy dogweed may also occur in the southern part of Webb County; however, no biologists have been able to verify this. There are no reports of this species in Mexico.

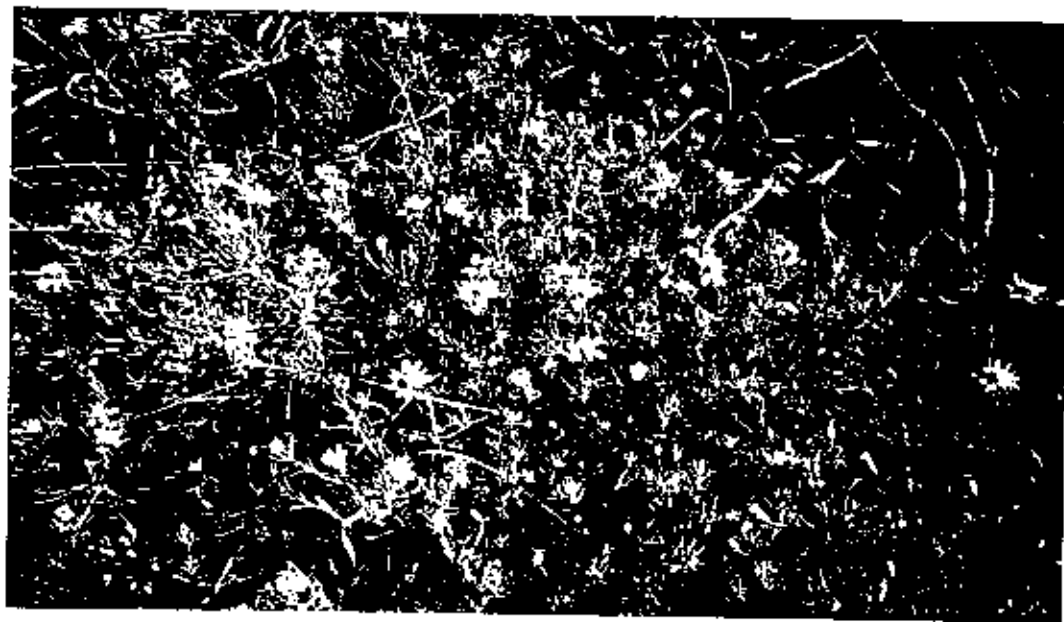
Ashy dogweed is an herbaceous perennial wildflower. Ashy dogweed gets its name from the ashy grayish-green color of the stems and leaves. This color makes it easily identifiable in the field. The stems and the very thin leaves (1/2 inch long and 1/10th of an inch wide) are covered with tiny woolly white hairs which are responsible for the distinctive ashiness. These tiny woolly white hairs also make the stems and leaves very soft to the touch. At maturity the species can reach almost a foot tall (but usually they



are a little smaller) and form dense, circular clumps. Although this plant is mostly herbaceous, the stems near the base of the plant tend to get woody. The composite (or daisy-like) flowers have 10 to 15 bright, golden yellow "petals" and an equally golden yellow center. When open, these flowers are about the size of a penny. Numerous flowers will cover the plants in the spring and summer creating a spectacular sight. In the winter months, the plants become brittle and dry, a little rougher to the touch, and the color appears gray to almost white. The small, cup-like empty seed pods remain on the ends of the stems in the winter as reminders of the summer flowers.

Leaves and flowers of
Ashy dogweed

by Patrick Stark



- Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.
- Poole, J. M. 1986. Endangered species information system species workbook [for] *Dyssodia tephroleuca*. Report prepared for the U.S. Fish & Wildlife Service, Region 2.
- Poole, J. M. 1992. Habitat factors and reproductive biology of the ashy dogweed. Report prepared for the U.S. Fish & Wildlife Service, Albuquerque.
- Poole, J. M. and D. H. Riskind. 1987. Endangered, threatened, or protected native plants of Texas. Texas Parks & Wildlife Department, Austin. Looseleaf binder with periodic updates, no pagination.
- Strother, J. L. 1967. Systematics of *Dyssodia* (Compositae: Tagetae). Ph.D. dissertation, The University of Texas at Austin.
- Turner, B. L. 1980. Status report on *Dyssodia tephroleuca* Blake. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.
- U.S. Fish & Wildlife Service. 1987. Ashy dogweed (*Thymophylla tephroleuca*) recovery plan. U.S. Fish & Wildlife Service, Albuquerque.

Scientific Name: *Thymophylla tephroleuca* (Blake) Strother

Synonyms: *Dyssodia tephroleuca* Blake

Common Name: ashy dogweed

Global/State Ranks: G2S2

Federal Status: Endangered

Global Range: Endemic to south Texas.

State Range: Starr, Webb and Zapata counties.

Description (adapted from Blake 1935, Correll & Correll 1970 and Turner 1980): Erect perennial to 3 dm tall, lanate-tomentose, the stems somewhat woody at base, the upper stems white with dense wool, various parts emitting a pungent odor when crushed. Leaves alternate, simple, linear or weakly trifid at the apex, 10-15 mm long and 0.3-0.8 mm wide, with several glands hidden in the dense pubescence. Flower heads solitary on peduncles at the end of branch tips, the peduncle 1-3 cm long, white tomentose, bearing 0-3 foliaceous bracts; head subtended by a calyculum of 3-4 linear bracts about 1/2 as long as the phyllaries; involucre a campanulate, lanate cup ca. 5-10 mm tall and 4-8 mm wide; phyllaries 12-13, united for ca. 3/4 their length, bearing a pair of yellow glands near the top of the fused portion, the tips acutely triangular and 1.5-2 mm long, usually with a single gland near the base; ray flowers (10-) 12-13 (-15), golden yellow, the tube ca. 2 mm long, the petal-like lamina oblong-oval, 6-8 mm long and 3-4 mm wide, with 2-3 small teeth at the tip; disk flowers 30-70, yellow, 4.5-5 mm long; pappus of 10-11 subequal squamellae about as long as the disk corollas, each scale bearing a central awn and 2-4 shorter lateral ones. Achenes very slender, black, multistriate, 3-4 mm long and ca. 0.4 mm wide.

Similar Species: *Thymophylla micropoides* (*Dyssodia micropoides*) also occurs in south Texas and is quite similar. In *T. micropoides* the stems are short (less than 1 dm tall) and spreading, and the leaves are spatulate. In *T. tephroleuca* the stems are erect and 1-3 dm tall, and the leaves are linear-filiform (Correll & Johnston 1970).

Habitat: Grassland with scattered shrubs such as *Prosopis glandulosa*, *Leucophyllum frutescens*, *Castela erecta*, *Cordia boissieri* and *Yucca* sp. Common herbaceous associates include *Aristida* sp., *Bouteloua* sp., *Heliotropium confertifolium* and the exotic *Pennisetum ciliare*. Most known sites are on sands or sandy loams on level or very gently rolling topography over Eocene strata of the Laredo Formation (USF&WS 1987).

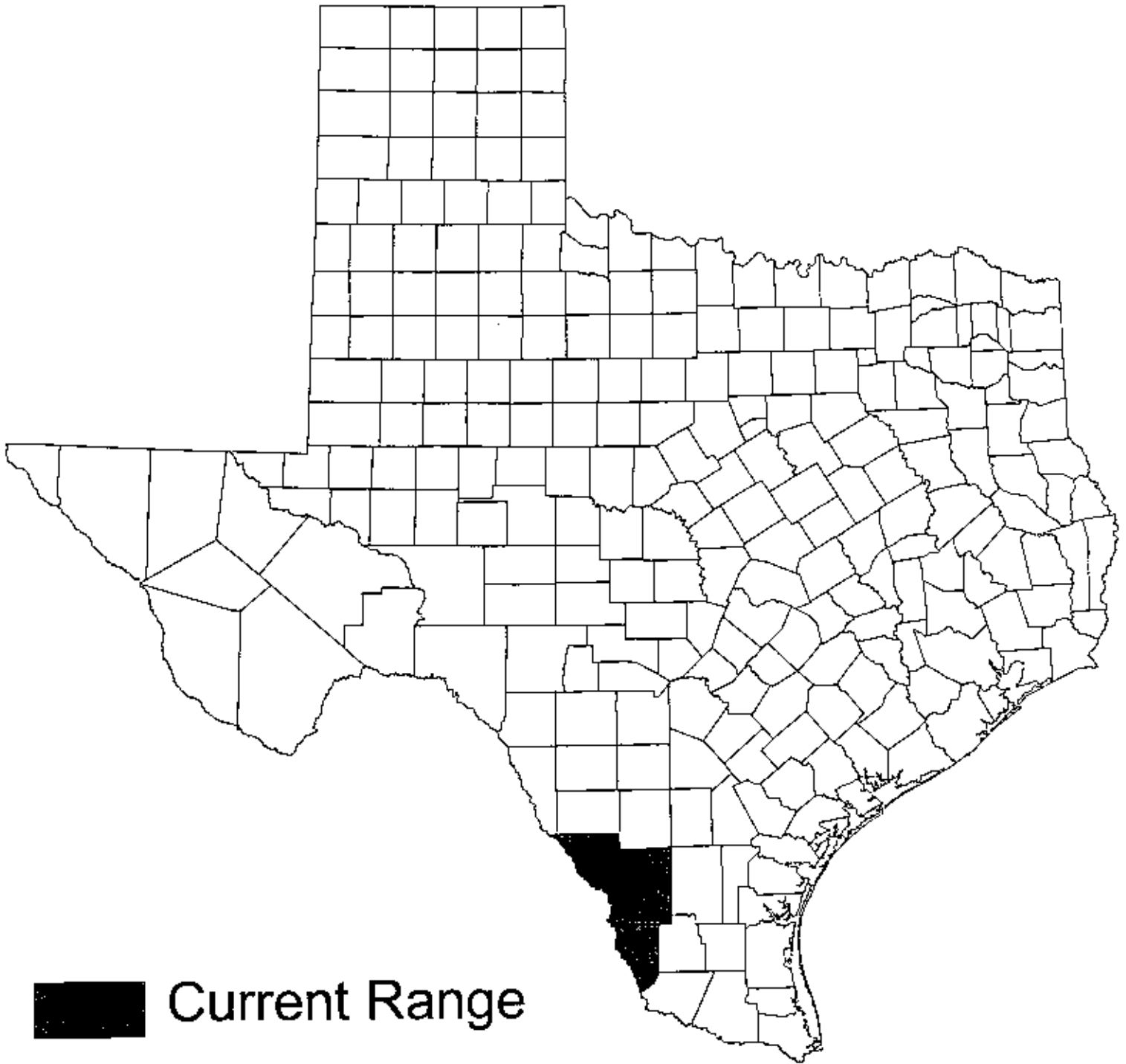
Phenology: Flowering March through May depending to some extent on rainfall.

Comments: Listed as Endangered on 19 July 1984.

Illustrations: A line drawing appears on the front cover of the recovery plan (USF&WS 1987); line drawings and a color photograph appear in Poole and Riskind (1987).

Selected References:

Blake, S. F. 1935. New Asteraceae from the United States, Mexico, and South America. *Journal of the Washington Academy of Sciences* 25: 311-325.



■ Current Range
□ Historical Range

Thymophylla tephroleuca
(ashy dogweed)

Scientific Name: *Tillandsia baileyi* Small

Common Name: Bailey's ballmoss

Synonyms: None.

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Texas and Tamaulipas; reports from southern Mexico and Central America (e.g., Correll & Johnston, 1970) were apparently based on specimens of *T. pseudobaileyi* (Gardner 1984).

State Range: Brooks, Cameron, Hidalgo, Jim Wells, Kenedy, Kleberg and Willacy counties.

Description (adapted from Correll & Johnston 1970, Richardson 1995 and Smith 1944): Globose perennial epiphyte usually at least 2 dm in diameter. Leaves radiating outward from a bulb-like base, linear, involute-subulate, arcuate, usually 1-2 dm long and 5 mm thick, densely cinereous with grayish scales. Flowers clustered in a usually solitary bracted spike at the end of a stout scape exerted from the cluster of leaf bases but sometimes not as long as the leaves; spikes linear, 4-10 cm long and ca. 12 mm wide, somewhat dense, with 6-17 flowers, complanate, gray-cinereous like the leaves; floral bracts suberect, loosely imbricate, ovate, acute, ca. 2 cm long, longer than the sepals, roseate; sepals 3, lanceolate, acute, to 16 mm long, chartaceous, gray-scaly like the leaves; petals 3, ligulate, ca. 3 cm long, purple; stamens and pistil exerted. Fruit a slenderly cylindrical capsule ca. 4 cm long.

Similar Species: Only one other globose epiphytic *Tillandsia* species occurs in Texas, and it is unlikely to be mistaken for *T. baileyi*. Clumps of *T. recurvata* are the diameter of a softball or smaller, while clumps of *T. baileyi* are usually as large as a volleyball. Photographs of both species are provided in Richardson (1995).

Habitat: Epiphytic on various trees and tall shrubs, perhaps most common in mottes of live oak (*Quercus virginiana*) on vegetated dunes and flats in coastal portions of the South Texas Sand Sheet, but also on Texas ebony (*Pithecellobium ebano*) and other shrubs in evergreen subtropical woodlands along resacas in the Lower Rio Grande Valley.

Phenology: Flowering (February-) April-May but conspicuous throughout the year.

Comments:

Illustrations: A line drawing appears in Smith (1944). A color photograph appears in Richardson (1995).

Selected References:

Gardner, C. S. 1984. New species and nomenclatural changes in Mexican *Tillandsia*- I. Selbyana 7: 361-379.

Richardson, A. 1995. Plants of the Rio Grande delta [revised edition of "Plants of Southmost Texas"]. University of Texas Press, Austin. 332 pp. + 94 plates.

Smith, L. B. 1944. Bromeliaceae. Pp. 200-207 in Lundell, C. L. 1961. Flora of Texas, volume 3. Texas Research Foundation, Renner. 433 pp.



[VOLUME 3

PART IV)

BROMELIACEAE

207

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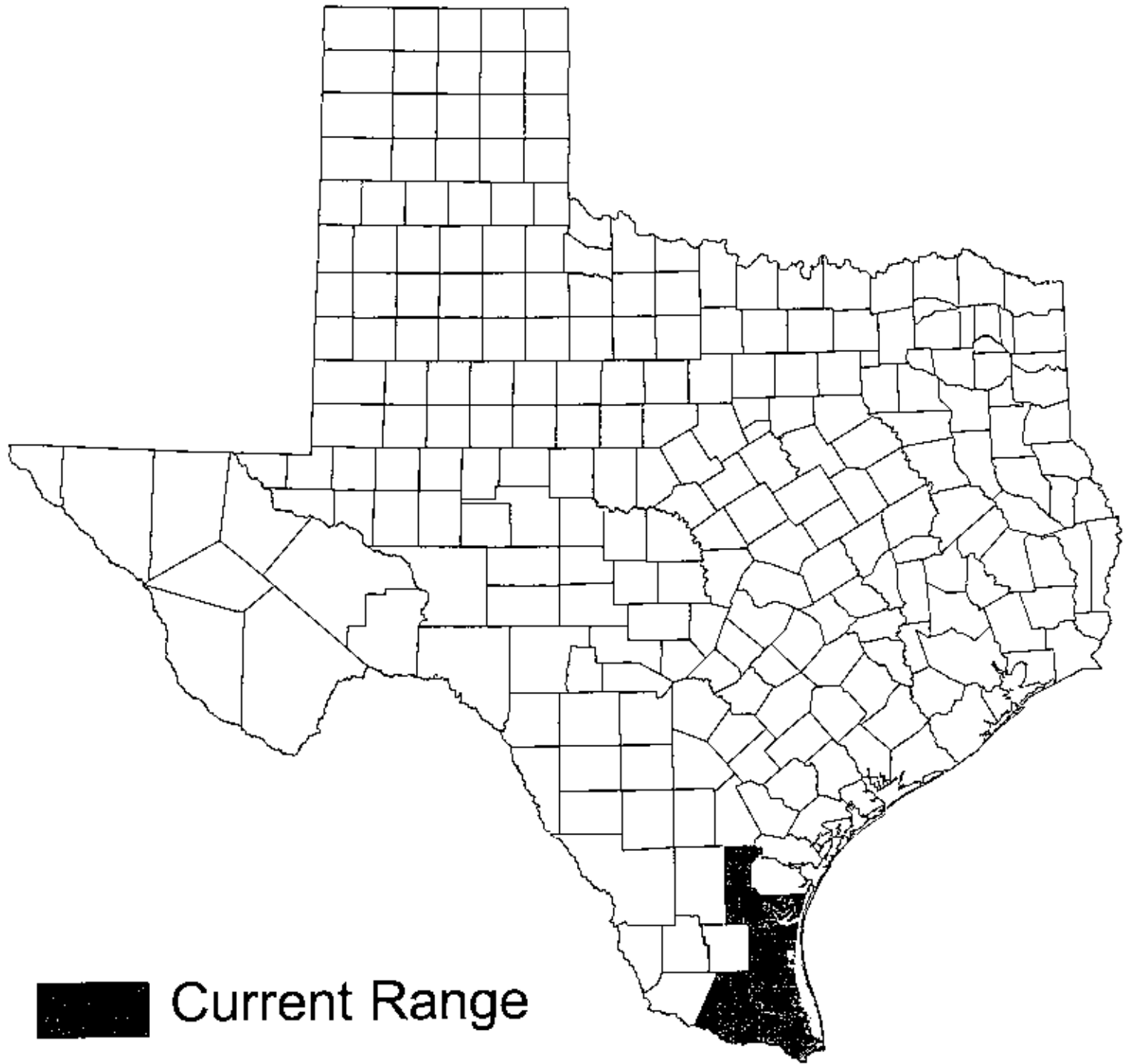
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FIG. 23. *Tillandsia Baileyi* Rose
a, habit, $\times \frac{1}{2}$; b, flower, $\times 1$.



■ Current Range
□ Historical Range
Tillandsia baileyi
(Bailey's ballmoss)

Scientific Name: *Agalinis auriculata* (Michx.) Blake

Synonyms: *Tomanthera auriculata* (Michx.) Raf.; *Aureolaria auriculata* (Michx.) Farw.; *Gerardia auriculata* Michx.; *Otophylla auriculata* (Michx.) Small

Common Name: eared foxglove; earleaf foxglove

Global/State Ranks: G3SX

Federal Status: FC2

Global Range: Known, at least historically, from more than 20 states in the eastern half of the US, from Pennsylvania and New Jersey west to Minnesota and Kansas, south to South Carolina and Texas.

State Range: Known in Texas solely from a Tarrant County specimen collected in the late 19th century by Julien Reverchon, the label of which reads only "Benbrook."

Description (adapted from Correll & Johnston 1970): Annual with retrorsely hirsute to scabrous, 4-angled, sparingly branched stems to 8 dm tall. Leaves opposite, sessile, lanceolate to ovate-lanceolate, to 5.5 cm long and 2 cm wide, the lower unlobed but the uppermost with a short divergent triangular lobe (auricle) on either margin near the base. Flowers sessile in leafy spikes; calyx 9-12 mm long with 5 short ovate-lanceolate lobes; corolla pink-purple with darker purple spots, 2-2.5 cm long, bilaterally symmetrical, 5-lobed. Fruit an ovoid, 2-celled capsule 10-14 mm long, containing numerous small seeds.

Similar Species: While the corolla of this species is very similar to that of other Texas *Agalinis* species, the foliage is quite distinctive. The upper leaves are sessile and lanceolate, with conspicuous auricles near the base. Upper leaves of other *Agalinis* species in north central Texas (see Diggs, Lipscomb & O'Kennon, 1999) are either linear or, in the case of *Agalinis densiflora*, pinnately divided into linear segments.

Habitat: Found in a variety of situations over its range, mostly in grasslands and along margins of upland woodlands. In Oklahoma the habitat is described as degraded prairies and floodplains, fallow fields and borders of upland sterile woods (Watson 1989). In Arkansas, the species has been found in blackland prairies. Anecdotal evidence suggests that periodic fire or other natural disturbance may be required to maintain habitat in an appropriate successional state.

Phenology: Flowering September-October.

Comments: Although reported historically from 20 states, many states, including Texas, have no known extant populations. Pennell (1921) suggested that its nativity in Texas is uncertain.

Illustrations: Line drawings appear in Diggs, Lipscomb & O'Kennon (1999), Cooperrider (1995) and Gleason (1952).

Selected References:

- Cooperrider, T. S. 1995. The Dicotyledoneae of Ohio. Part 2: Linaceae through Campanulaceae. Ohio State University Press, Columbus. 656 pp.
- Diggs, G. M., Jr., B. L. Lipscomb and R. J. O'Kennon. 1999. Shinners and Mahler's illustrated flora of North-central Texas. Botanical Research Institute of Texas, Ft. Worth. 1626 pp.
- Gleason, H. A. 1952. The new Britton and Brown illustrated flora of the northeastern United States and adjacent Canada. 3 volumes. Hafner Press, New York.
- Mahler, W. F. 1988. Shinners' Manual of the North Central Texas flora. Botanical Research Institute of Texas, Fort Worth. 313 pp.
- Orzell, S. L. and B. W. Summers. 1983. *Agalinis auriculata* (Michx.) Blake (Scrophulariaceae) in southeastern St. Louis County, Missouri. *Castanea* 48: 272-276.
- Pennell, F. W. 1921. Scrophulariaceae of the west gulf states. *Proceedings of the Academy of Natural Sciences of Philadelphia* 73: 459-536.
- Rawinski, T. J. 1990. Final status survey report: the distribution and abundance of eared [sic] false foxglove (*Tomanthera auriculata*). Report prepared for U.S. Fish and Wildlife Service, Newton Corner, MA.
- Watson, L. E. 1989. Status survey of *Agalinis auriculata* (synonym =*Tomanthera auriculata*), earleaf foxglove, in Oklahoma. Report prepared for U.S. Fish and Wildlife Service, Tulsa.
- Watson, W. C. 1993. Iowa inventory for *Agalinis auriculata* (Michx.) S. F. Blake. 1993 final report. Iowa Field Office, The Nature Conservancy.



Tomianthera auriculata @ L.A. Leitner
(Reprinted from University of Wisconsin Web page; permission pending)



□ Historical Range

Tomanthera auriculata
(auriculate false foxglove)

Scientific Name: *Tradescantia pedicellata* Celarier

Common Name: granite spiderwort

Synonyms: Jones, Wipff & Montgomery (1997) placed this species in synonymy under *Tradescantia x diffusa* Bush, a hybrid between *Tradescantia humilis* Rose and *Tradescantia occidentalis* (Britt.) Smyth.

Global/State Ranks: G2QS2

Federal Status: None

Global Range: Endemic to central Texas.

State Range: Blanco, Burnet, Llano and Mason counties, mostly in the Llano Uplift area of central Texas.

Description (adapted from Correll & Johnston 1970): Perennial with large fleshy roots and somewhat succulent, spreading stems usually less than 3 dm tall; nodes 2-5; internodes to 1 dm long. Leaves membranous, dark green to light yellowish-green, linear-lanceolate, mostly 2-3 dm long and up to 1 cm wide, recurved and somewhat lax, sparsely to densely covered with long and short, glandular or eglandular hairs or a mixture of both, the hairs less common on upper surface than on lower surface and margins. Flowers in umbellate, few- to many-flowered terminal and axillary cymes; subtending bracts 2, foliaceous, somewhat recurved and lax as in the leaves, one of the pair usually much longer than the other, to 15 cm long and 3-6 mm wide, sparsely to densely covered with glandular or eglandular hairs or both; pedicels very long and slender, 25-45 mm long, densely pubescent with medium to long glandular hairs; sepals broadly elliptic, acute to acuminate, 6-11 mm long, densely and uniformly covered with medium to long glandular hairs; petals 3, broadly ovate, pink to dark blue, ephemeral (quickly melting when stem picked); stamens 6, the filaments abundantly pilose; ovary ovoid, the terminal third with scattered glandular hairs, terminating with a dense tuft at the base of the style, which is filiform and capitate. Fruit a 3-valved capsule.

Similar Species: Most *Tradescantia* in Texas are very difficult to identify with certainty since so the characters used in keys are mostly qualitative rather than quantitative and are often ambiguous. *Tradescantia pedicellata* is similar to and sympatric with several of its congeners but can reportedly be distinguished by the combination of spreading stem, long pedicels, and glandular hairs on both the leaves and the sepals.

Habitat: Mostly in fractures on outcrops of granite, gneiss and similar igneous and metamorphic rocks, or in early successional grasslands or forb-dominated assemblages on well drained, sandy to gravelly soils derived from same.

Phenology: Flowering at least April-May.

Comments:

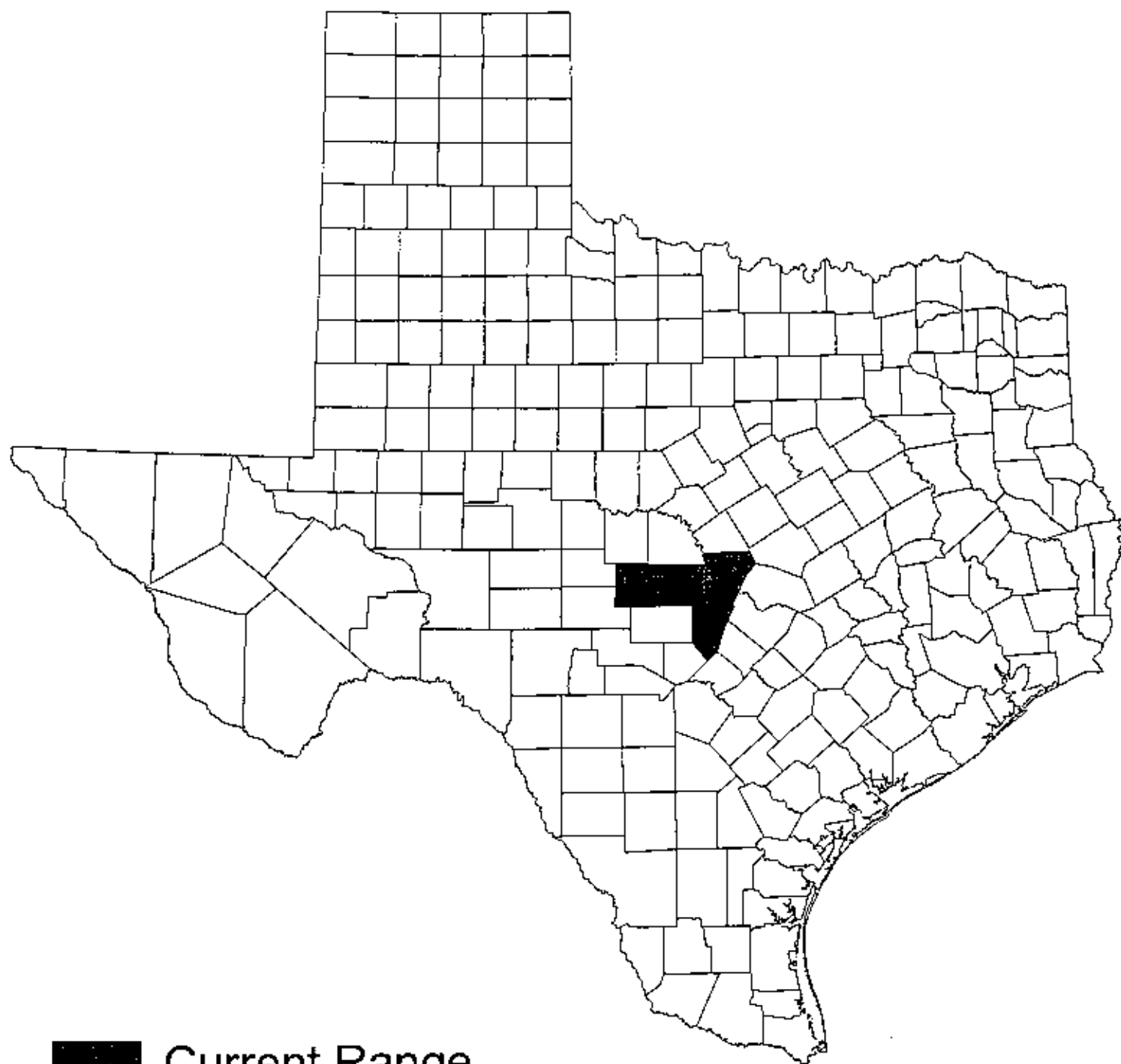
Illustrations: A color photograph appears in Enquist (1987).

Selected References:

Celarier, R. P. 1956. A new species of *Tradescantia* (Commelinaceae) from South Texas. *Field & Laboratory* 24(1): 5-9.

Enquist, M. 1987. *Wildflowers of the Texas Hill Country*. Lone Star Botanical, Austin. 275 pp.





■ Current Range

Tradescantia pedicellata
(granite spiderwort)

Scientific Name: *Trillium pusillum* Buckl. var. *texanum* (Buckl.) Reveal & Broome

Synonyms: *Trillium texanum* Buckl.

Common Name: Texas trillium

Global/State Ranks: G3T2T3S2S3

Federal Status: SOC

Global Range: Louisiana and east Texas. Reports from Arkansas were based on specimens of var. *ozarkanum* (Palmer & Steyermark) Steyermark.

State Range: Angelina, Cass, Cherokee, Harrison, Houston, Jasper, Nacogdoches, Panola, Rusk, Smith and Wood counties.

Description (adapted from J. D. Freeman in Correll & Johnston 1970 and Kral 1983): Rhizomatous perennial forming clonal colonies; stems technically absent, but the flowering scape stem-like and 1-2 (-3) dm tall. Leaves technically absent, but the 3 large bracts in a single whorl at the apex of the stem decidedly leaf-like; said bracts sessile or abruptly narrowed into short petiolules, spreading-ascending, narrowly lanceolate to elliptic-lanceolate or oblong, obtuse to rounded at the apex, the upper surface somewhat farinose due to the presence of numerous stomates, (3-) 4-6 (-8) cm long and (1-) 1.3-2 (-3) cm wide. Flowers showy, solitary on an erect pedicel produced from the apex of the scape; pedicels (2.5-) 3-4 (-4.5) cm long; sepals 3, spreading, green, lanceolate, usually larger than the petals; petals 3, spreading, white but becoming pink and finally reddish in age, narrowly lanceolate to lanceolate, acute at apex, often narrowed at base into a short claw, (1.5-) 2-2.5 (-3) cm long and 7-10 (-14) mm wide; stamens 6, 10-14 mm long, the anthers 6-8 mm long (slightly longer than the white or pale-green filaments), the connectives often purple; ovary ca. 3 mm high; style about as long as the ovary, with 3 stigmas as long as or longer than the style. Fruit a triangular-ovoid berry, sharply 6-ridged at the base of the persistent style, containing 8-15 seeds.

Similar Species: Three other *Trillium* species are found in east Texas. Texas trillium differs from them all in having pedicellate flowers with white petals.

Habitat: In or along the margins of hardwood forests on wet acid soils of bottoms and lower slopes, often in or downslope from hillside seeps, often associated with ferns such as *Athyrium filix-foemina*, *Onoctlea sensibilis*, *Osmunda cinnamomea*, *O. regalis* and *Woodwardia areolata* (Kral 1983). Freeman (1994) offered perceptions regarding the transitory nature of habitat occupied by *Trillium pusillum* throughout its range. In his view, *Trillium pusillum* prospers during early seral stages of plant succession and persists but seldom flowers in later seral stages.

Phenology: Flowering March-mid April.

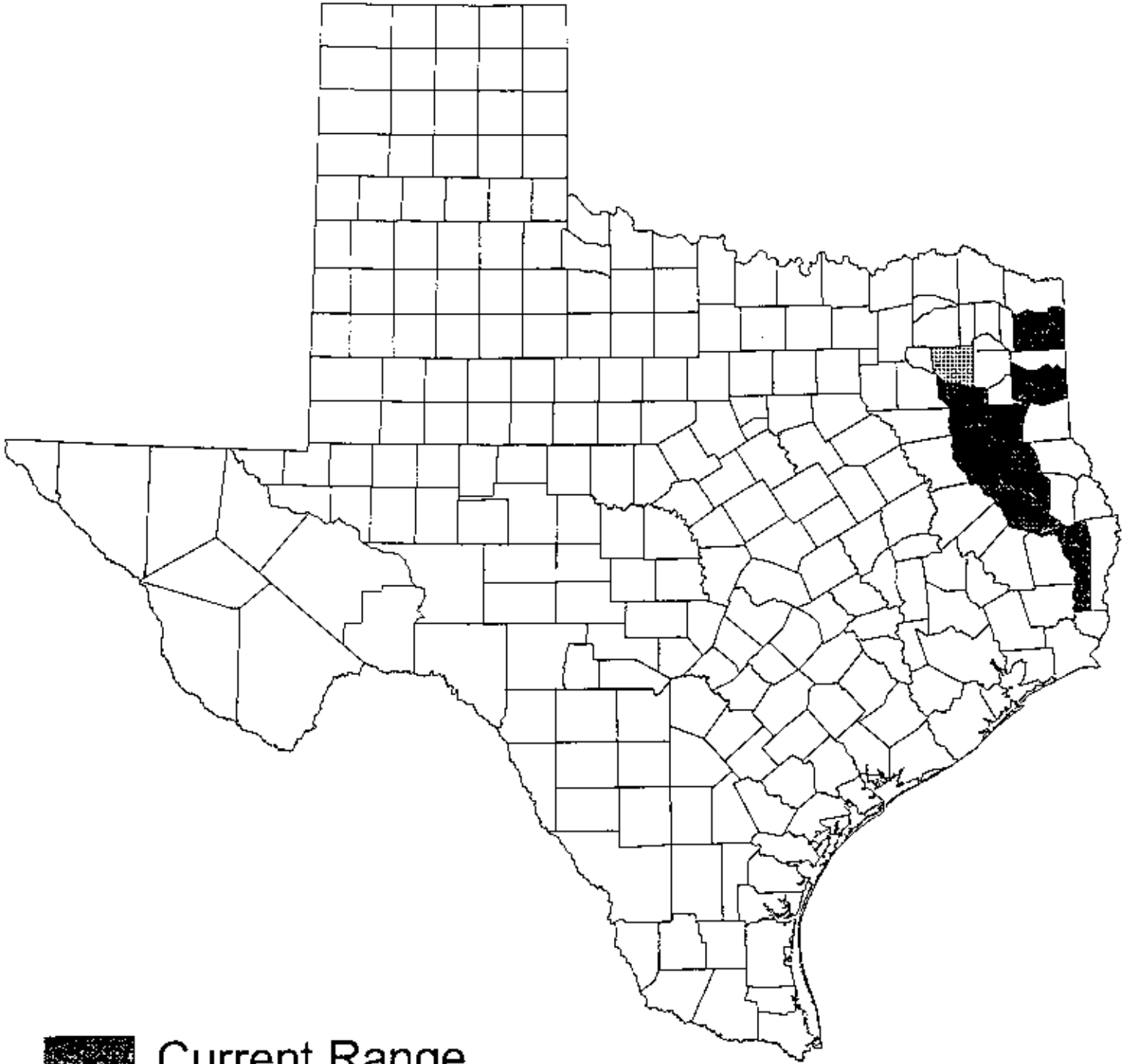
Comments: Freeman (1994) provided a detailed account of the confusing taxonomic/nomenclatural history of the *Trillium pusillum* complex, along with perceptions, based on observations of the species on a range-wide basis.

Illustrations: Color photographs appear in Ajilvsgi (1979) as *Trillium texanum* and in Case & Case (1997). A line drawing appears in Niehaus (1984) as *Trillium texanum*.

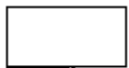
Selected References:

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- Case, F. W., Jr. and R. B. Case. 1997. Trilliums. Timber Press, Portland, Oregon. 285 pp.
- Freeman, J. D. 1994. Status survey of the *Trillium pusillum* complex. Preliminary report covering Table 1 work elements. Report prepared for Alabama Natural Heritage Section, State Lands Division, Department of Conservation and Natural Resources, Montgomery, Alabama. 58 pp.
- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA, Forest Service, Technical Publication R8-TP2. 1305 pp.
- MacRoberts, D. T. 1977. Additions to the Louisiana flora. *Sida* 7(2): 220-222.
- Reveal, J. L. and C. R. Broome. Minor nomenclatural and distributional notes on Maryland vascular plants with comments on the state's proposed endangered and threatened species. *Castanea* 46: 50-82.
- Roe, G. F. 1978. Additions to the range of *Trillium pusillum*. *Castanea* 43(3): 187-191.
- Singhurst, J. R. 1996. The status of nine endangered plants of East Texas: Historical, ecological and phytogeographical notes. M. S. Thesis, Stephen F. Austin University, Nacogdoches, Texas. 278 pp.





Current Range



Historical Range

Trillium pusillum var. *texanum*
(Texas trillium)

Scientific Name: *Valerianella texana* Dyal

Synonyms: None.

Common Name: Llano corn-salad

Global/State Ranks: G2S2

Federal Status: SOC

Global Range: Endemic to the Llano Uplift (Central Mineral Basin) of central Texas.

State Range: Burnet, Gillespie and Llano counties.

Description (adapted from Correll & Johnston, 1970): Small annual with stems less than 1 dm tall, rarely slightly taller. Leaves opposite, simple, entire, of a pale green color, the lower spatulate, the upper oblong-ovate. Flowers tiny, rather densely clustered in a flat-topped corymbose cyme; corolla bright white, funnellform, 2.0-2.5 mm long, the tube about equal to the five lobes. Fruit a yellowish-brown three-celled capsule 1-1.5 mm long, vaguely triangular in cross section, with minute stiff white hairs on the angles; one cell contains a single seed and is rounded on the back, while the other two are sterile and separated by a deep sulcus (groove).

Similar species: Vegetatively very similar to all other *Valerianella* species in Texas. Most diagnostic features are displayed in mature fruit, which is comparatively small (ca. 1.0-1.5 mm long), with a deep sulcus between the sterile cells and scattered stiff white hairs on angles.

Habitat: Very shallow, well drained but seasonally moist gravelly-sandy soils derived from igneous or metamorphic rocks, often along the downslope margin of rock outcrops, in full sun or in partial shade of oak-juniper woodland. More likely to be encountered with other annuals in early successional areas than in later successional areas supporting dense cover of perennial grasses.

Phenology: Peak blooming period is mid March to late April; mature fruit is produced during roughly the same period. Stems normally wither and disappear by the beginning of May, preventing detection during other months.

Comments: Population numbers fluctuate considerably from year to year; larger numbers can be expected following winters of higher rainfall and/or more moderate temperatures.

Illustrations: A line drawing appears in Mahler (1981b).

Selected References:

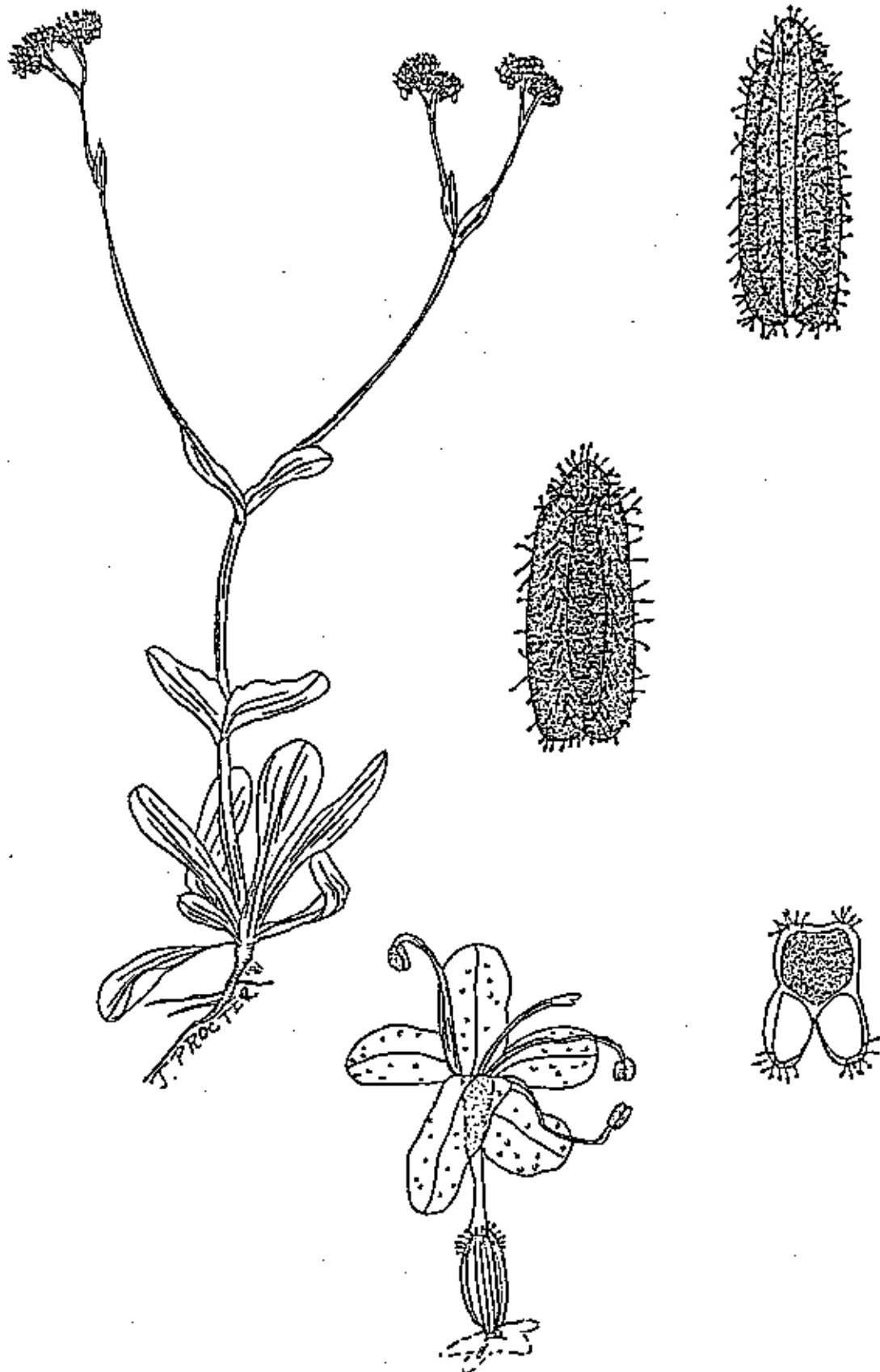
Dyal, S. C. 1938. *Valerianella* in North America. *Rhodora* 40: 185-212.

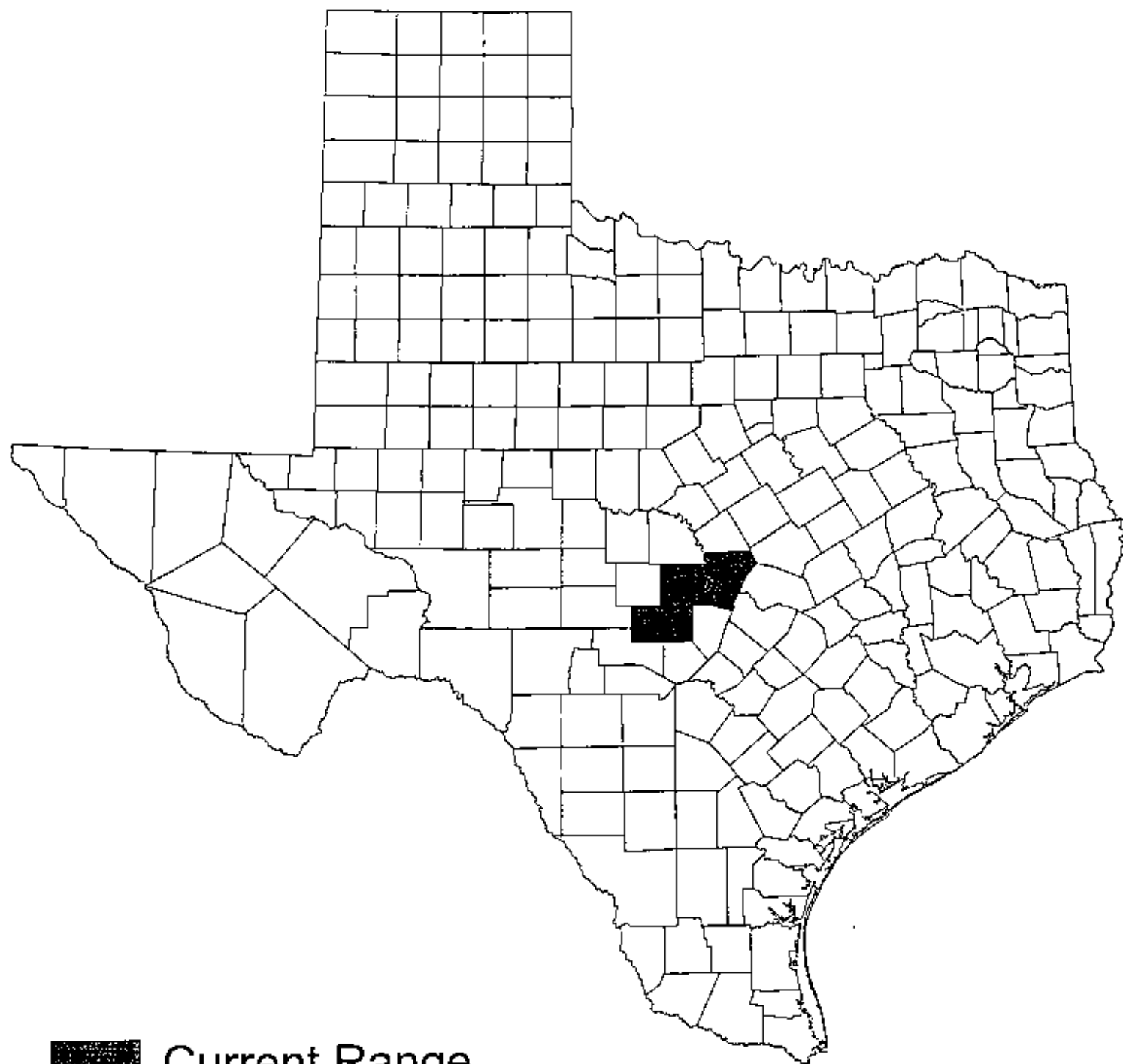
Eggers, D. M. 1969. A taxonomic revision of the genus *Valerianella* in North America. Ph.D. dissertation, Vanderbilt University.

Mahler, W. F. 1981a. Status report on *Valerianella texana*. Report prepared for U. S. Fish & Wildlife Service, Albuquerque.

Mahler, W. H. 1981b. Field studies on Texas endemics. *Sida* 9(2): 176-181.







■ Current Range

Valerianella texana
(Edward's plateau cornsalad)

Scientific Name: *Viola guadalupensis* A. M. Powell & B. Wauer

Synonyms: None.

Common Name: Guadalupe Mountains violet

Global/State Ranks: G1S1

Federal Status: SOC

Global Range: Endemic to the Guadalupe Mountains of Texas.

State Range: Culberson County.

Description (adapted from Powell & Wauer 1990): Perennial to 10 cm tall; stems glabrous, 1-4 cm long. Leaves simple, alternate [and basal?]; petioles glabrous, 2-6 cm long; stipules 3-11 mm long, 0.5-1.8 mm wide, lanceolate to ovate or ovate-lanceolate, or linear, whitish to greenish and thin, sparingly glandular-fimbriate; blades ovate to triangular ovate or ovate-lanceolate, 1.2-2.4 cm long and 0.7-1.3 cm wide, glabrous or with a few short hairs especially along the veins on the lower surface, the margins entire or with 1-3 crenations on lower half, the apex acute to rounded, the tip rather obscurely calloused, the base broadly cuneate to rounded or truncate. Flowers borne among or above the leaves, on slender, glabrous pedicels-peduncles 3.5-6 cm long; sepals glabrous, linear to linear-lanceolate, 3.5-5 mm long, the margins scarious, the base truncate or rounded to subauriculate; corolla yellow, fading to reddish-brown, 7-10 mm long, some of the petals smeared with reddish brown, inconspicuously brown-veined near the base of lateral petals, prominently brown-veined on the lower (spurred) petal, the spur 1-1.3 mm long, the two lateral petals bearded inside; styles ca. 1.5 mm long. Fruit a capsule, tan at maturity, glabrous, 3-4.5 mm long; seeds ovoid, ca. 2 mm long, with a well-developed caruncle.

Similar Species: None. No other yellow-flowered *Viola* species are found in the Guadalupe Mountains, although some occur in other ranges of northern Mexico and the western U.S.

Habitat: "Bullet hole" openings in dolomitized limestone rock faces, in the shade of an open Douglas fir (*Pseudotsuga menziesii*) woodland at ca. 8000 feet elevation. Associates on the rock outcrop at the type location include *Petrophytum cespitosum*, *Valeriana texana*, *Pinaropappus parvus*, *Chaetopappa hersheyi* and *Stipa lobata* (Powell & Wauer 1990).

Phenology: Flowering March-May.

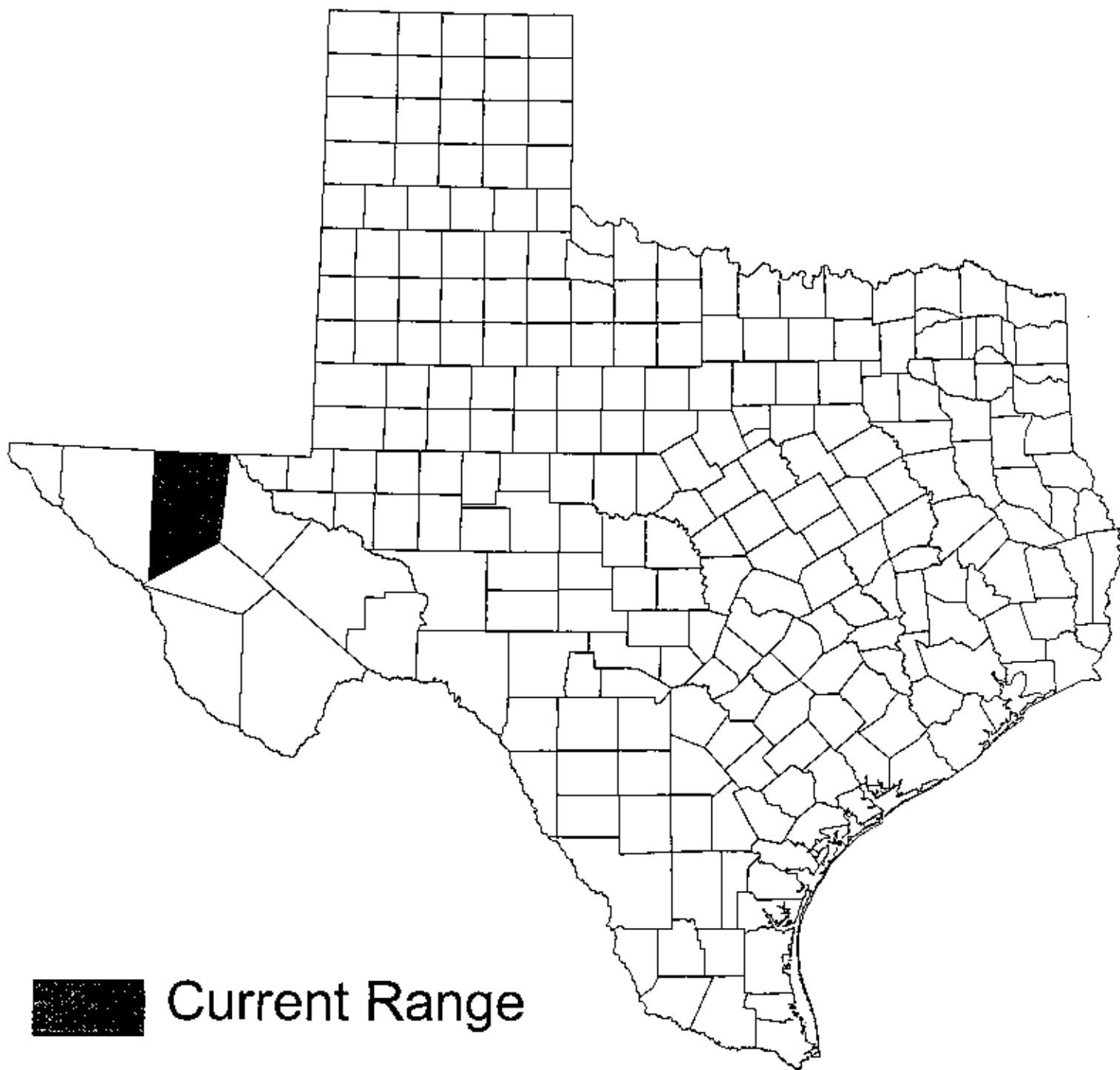
Comments: Discovered by park ranger and naturalist Brent Wauer in 1987.

Illustrations: A photograph of the species in habitat appears in Powell & Wauer (1990).

Selected References:

Powell, A. M. and B. Wauer. 1990. A new species of *Viola* (Violaceae) from the Guadalupe Mountains, Trans-Pecos Texas. *Sida* 14(1): 1-6.





Viola guadalupensis
(Guadalupe Mountains violet)

Scientific Name: *Xyris drummondii* Malme

Synonyms: None.

Common Name: Drummond yellow-eyed grass

Global/State Ranks: G3S2

Federal Status: SOC

Global Range: Coastal Plain from Florida and Georgia west through Alabama, Mississippi and Louisiana to east Texas.

State Range: Angelina, Jasper and Newton counties.

Description (adapted from R. Kral in Godfrey & Wooten 1979): Tufted grasslike perennial, the plant bases often buried in the substrate, the leaves in a basal tuft, the flowers produced in conelike spikes at the ends of much longer scapes. Leaves in a basal tuft, broadly linear or linear-lanceolate, 3-8 (-10) cm long and 1.5-5 mm wide, flabellately spreading but not curvate, mostly a lustrous green but becoming stramineous toward the base and at the very base marked with a conspicuous dark brown or castaneous patch; apex acute but not curvate; surface smooth or with low, short lines of papillae; upper margins papillose or smooth; sheaths of the scapes about as long as the leaves, tightly clasping the scape below, expanding about mid-way up into a narrow, blade-like structure, the margins joining at about 1 mm below the tip. Flowers in conelike spikes at the ends of scapes, the scapes linear-filiform, sometimes flexuous, 4-20 cm long, terete and with many low ribs below, flattened and 2-edged above; spikes at seed-bearing time lance-ovoid, of many, rather tightly imbricated bracts of which the lowest few are barren with elongate green dorsal areas; fertile bracts suborbicular or broadly obovate, 4-5 mm long, definitely keeled, the apex rounded or obtuse, the exposed margin thin and subentire, the outer surface tan or pale brown with a narrowly elliptic, greenish dorsal area nearly as long as the bract (on leaflike lowermost bracts, the dorsal area is sometimes prolonged into a tiny blade-like structure); sepals 3, concealed behind the scale, the inner sepal membranous, inconspicuous, the 2 lateral sepals broadly curvate, the sides broad, thin, brownish, the keel broad, thickened, a lustrous brown, evidently ciliate for most of its length; petals 3, the blades yellow, obovate, ca. 3 mm long, unfolding in the morning. Fruit capsular, oblong-compressed; seeds ellipsoid, slightly longer than 0.3 mm long, translucent, with 18-20 fine, evenly-spaced longitudinal lines and numerous faint cross-lines.

Similar Species: At least 16 species of this difficult genus are known from the state, and most or all of them occur in east Texas. *Xyris drummondii* is distinguished from other *Xyris* species by a conspicuous dark brown or castaneous patch at the leaf base and a laterally flattened flowering spike (Kral 1966; Orzell 1990).

Habitat: Wet sand or peaty sand in hillside seepage bogs. Texas sites lie exclusively over the Catahoula Formation (Miocene), but in adjacent Louisiana some sites are found at the contact between the Willis and Bentley Formations (Quaternary). Plants frequently associated with *X. drummondii* include *Burmanna capitata*, *Drosera capillaris*, *Eriocaulon texense*, *Lycopodium adpressum*, *Lycopodium carolinianum*, *Marshallia tenuifolia*, *Polygala ramosa*, *Rhynchospora gracilentia*, *R. oligantha*, *Sarracenia alata*, *Xyris baldwintana* and *X. difformis* var. *curtissii* (Orzell 1990).

Phenology: Flowering mid June to mid August; seeds developing mid to late summer and early fall.

Comments: Once thought to be a rare species confined to a small portion of southeastern Georgia, northwestern Florida, and southern Alabama and Mississippi, *Xyris drummondii* is now known to occur in more than 75 bogs in Louisiana (MacRoberts & MacRoberts 1995) and more than 30 bogs in east Texas.

Illustrations: Line drawings appear in Kral (1966) and Godfrey & Wooten (1979). A color photograph appears in Mohlenbrock (1992).

Selected References:

- Bridges, E. L. and S. L. Orzell. 1989. Additions and noteworthy vascular plant collections from Texas and Louisiana, with historical, ecological, and geographical notes. *Phytologia* 66: 12-69.
- Godfrey, R. K. and J. W. Wooten. 1979. Aquatic and wetland plants of the southeastern United States. Monocotyledons. The University of Georgia Press, Athens. 712 pp.
- Kral, R. 1966. *Xyris* (Xyridaceae) of the continental United States and Canada. *Sida* 2: 177-260.
- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA, Forest Service, Technical Publication R8-TP2. 1305 pp.
- MacRoberts, M. H. and B. R. MacRoberts. 1993. Floristics of a bog in Vernon Parish, Louisiana, with comments on noteworthy bog plants in western Louisiana. *Phytologia* 75(3): 247-258.
- MacRoberts, M. H. and B. R. MacRoberts. 1995. Noteworthy vascular plant collections on the Kisatchee National Forest, Louisiana. *Phytologia* 78(4): 291-313.
- Mohlenbrock, R. H. 1992. Boykin Spring Longleaf, Texas. *Natural History* [magazine], July 1992, 63-65.
- Orzell, S. L. 1990. Inventory of National Forests and National Grasslands in Texas. Report submitted in fulfillment of agreement between the Texas Natural Heritage Program of Texas Parks and Wildlife Department and the U. S. Forest Service in Lufkin, Texas. 526 pp.



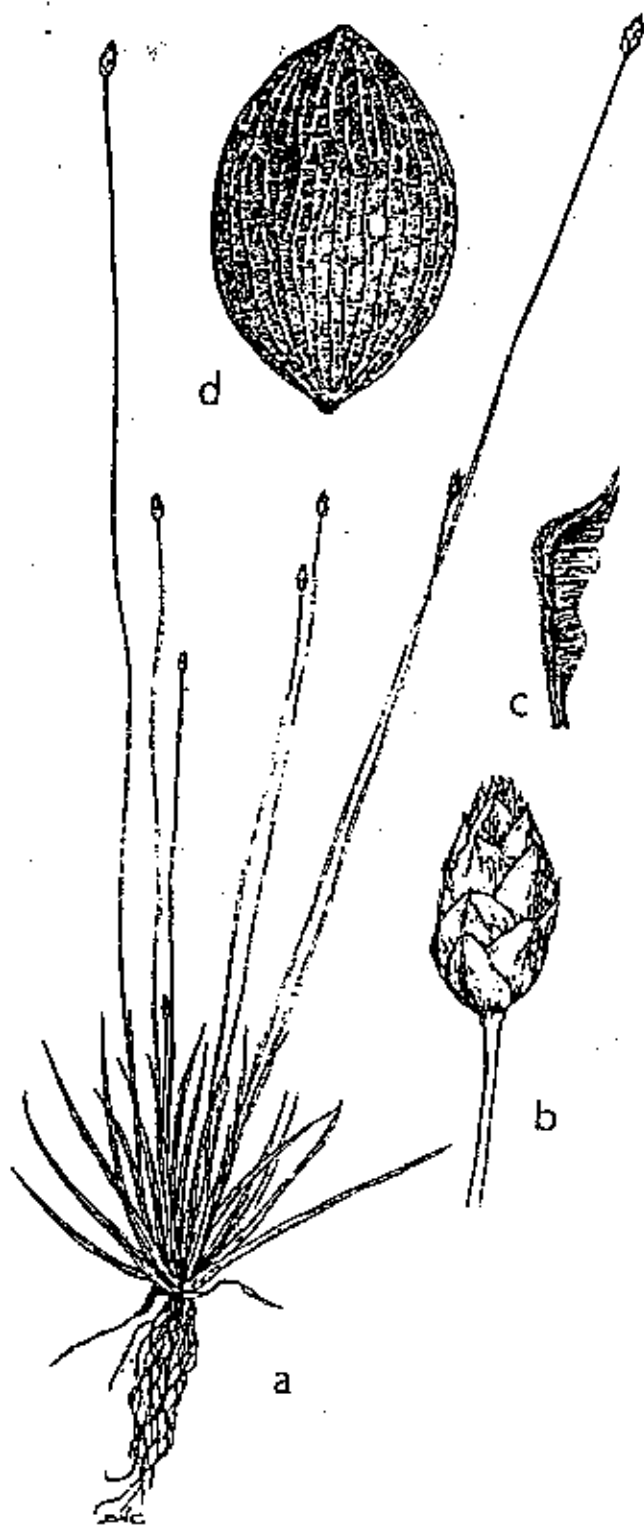
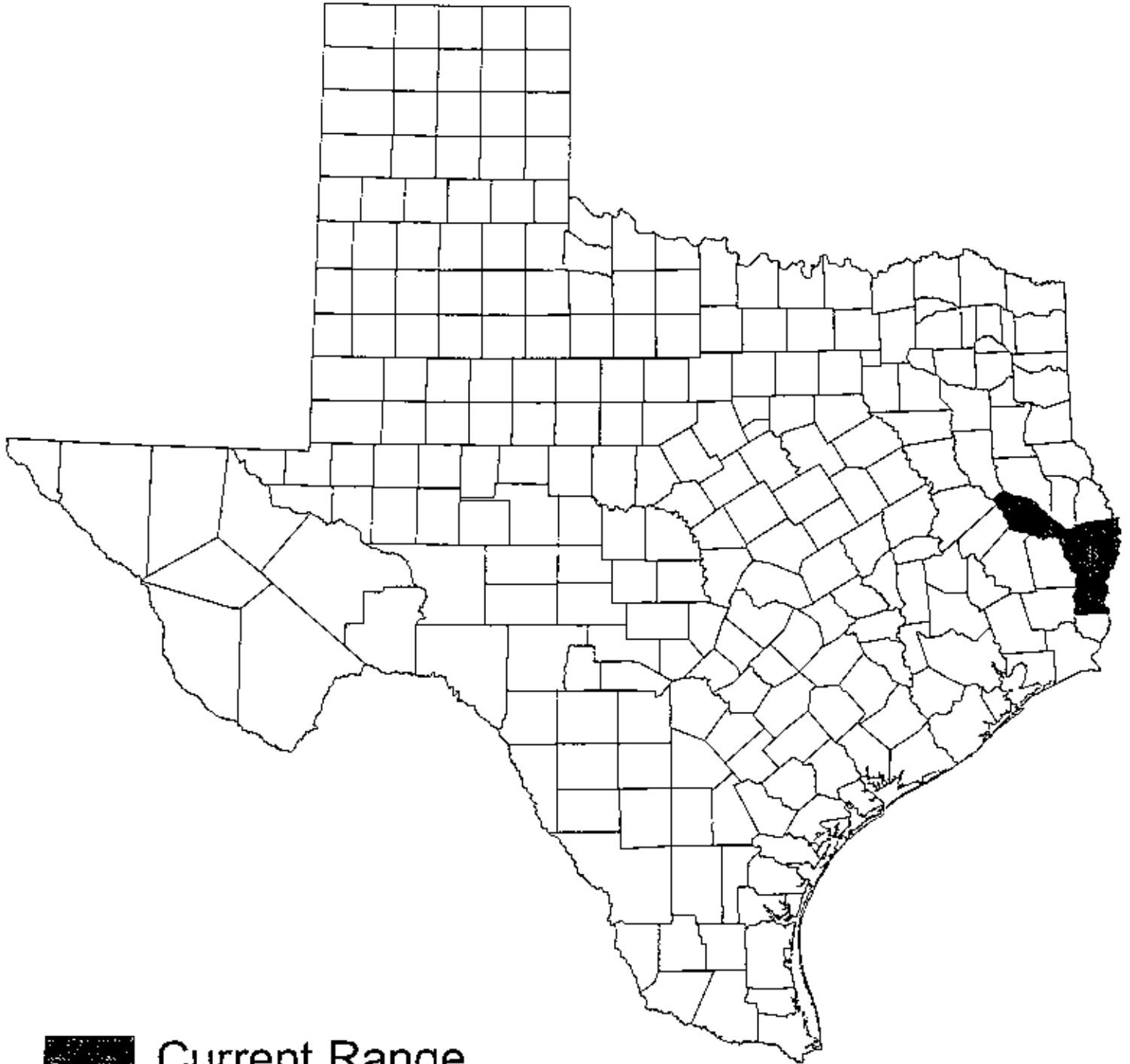


Figure 36: *Xyris drummondii*, Drummond's yellow-eyed grass.
a) habit; b) head; c) lateral sepal; d) seed.
c) from Kral 1966b; other drawings from Godfrey and Wooten 1979.



■ Current Range

Xyris drummondii
(Drummond's yellow-eyed grass)

Scientific Name: *Xyris scabrifolia* Harper

Synonyms: None.

Common Name: roughleaf yellow-eyed grass

Global/State Ranks: G3S2

Federal Status: SOC

Global Range: Coastal Plain from Florida and Georgia west through Alabama, Mississippi and Louisiana to east Texas; seemingly disjunct in North Carolina.

State Range: Angelina, Henderson, Jasper, Newton and Sabine counties.

Description (adapted from R. Kral in Godfrey & Wooten 1979): Tufted grasslike perennial, the plant bases shallowly set on the substrate, the leaves in a basal tuft, the flowers produced in conelike spikes at the ends of scapes. Outer leaves scaly, pinkish, later brown; principal leaves linear, 10-40 cm long and 5-10 mm wide, twisted, striate-scabrid throughout, the blades dull green, the equitant portion fleshy and pinkish, later brownish and fibrous; sheath of the scape shorter than the leaves, tight below and castaneous, looser and greenish above toward the oblique orifice which is tipped with a short blade. Flowers in conelike spikes at the ends of scapes, the scapes linear, 30-60 cm long, twisted and sometimes flexuous, terete and multicarinate toward the base, 2-4 ridges above, striate-tuberculate throughout but particularly rough on the ridges; spikes 10-20 mm long, obovoid or ellipsoidal, with many tightly imbricate bracts; fertile bracts 6-8 mm long, obovate, subentire, tan with a broadly elliptic or rhombic gray-green dorsal area, becoming somewhat erose, dark reddish brown with a red-brown dorsal area; sepals 3, concealed behind the scale, the inner sepal membranous, inconspicuous, the 2 lateral sepals linear, about as long as the subtending bracts, brown, the margin of the narrow keel lacerate below, fimbriate toward the apex; petals 3, the blades yellow, suborbicular, ca. 5 mm long, opening in the afternoon. Fruit capsular, oblong-compressed; seeds oblong to ellipsoidal, 0.6-1 mm long, caudate, translucent, with 12-14 distinct, smoothish, longitudinal lines and scattered indistinct, irregularly disposed, transverse lines.

Similar Species: At least 16 species of this difficult genus are known from the state, and most or all of them occur in east Texas. *Xyris scabrifolia* is distinguished from other *Xyris* by the prominently scabrid foliage which gives the leaves a "glazed" look, and its more oblong and caudate seeds (Kral 1966, Godfrey and Wooten 1979, Orzell 1990).

Habitat: Wet sand and/or peat in acid seepage areas or hillside seepage bogs on the Catahoula Formation (Miocene) or near the contact of the Catahoula and the Willis Formations (Quaternary), in open areas and in partial shade of evergreen shrub thickets, often on hummocks of *Sphagnum* moss (Bridges and Orzell 1989). Frequently associates at Texas sites include *Myrica heterophylla*, *Osmunda cinnamomea*, *Persea palustris*, *Rudbeckia scabrifolia*, *Sarracenia alata*, *Scleria reticulata*, *Rhynchospora chalarocephala*, *R. gracilentia*, *R. macra*, *R. oligantha*, *X. ambigua*, *X. baldwiniana* and *X. difformis* var. *curtissii* (Bridges and Orzell 1989; Orzell 1990).

Phenology: Flowering late July-early September

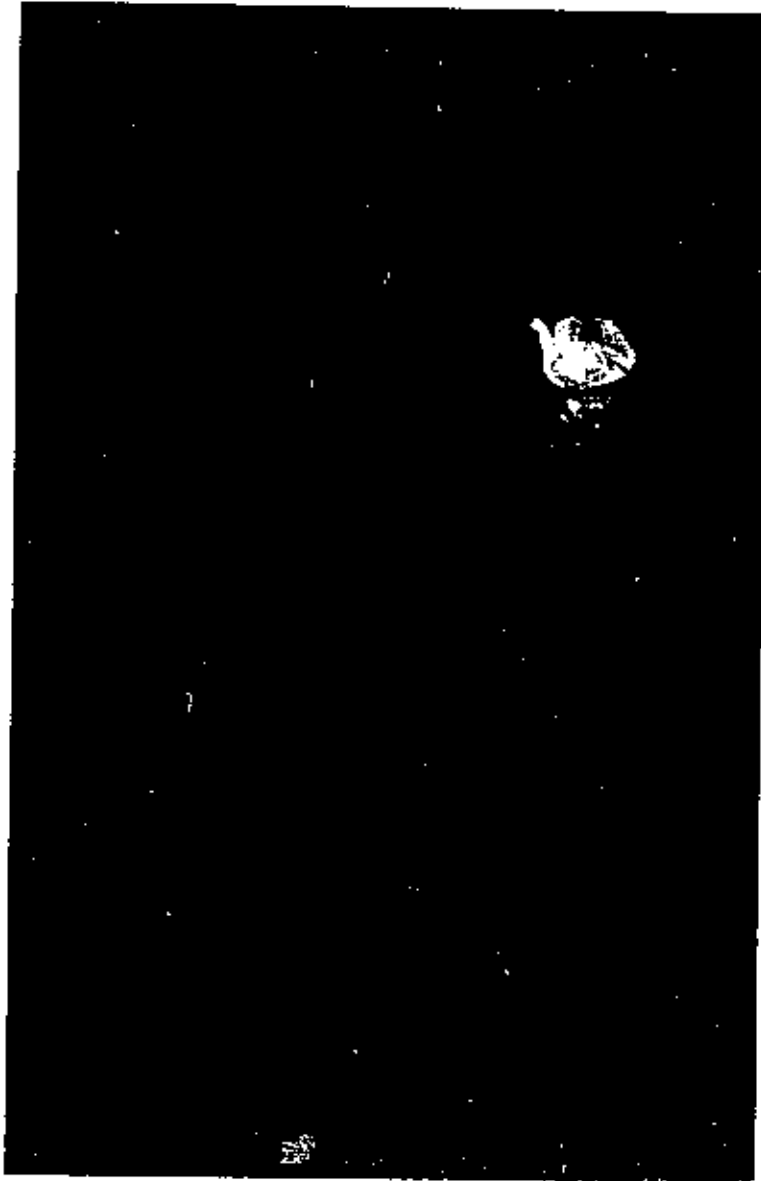
Comments: Decades ago, *Xyris scabrifolia* was known only from northwestern Florida and the type location in Georgia, and it was thus considered the rarest *Xyris* in the southeastern U.S. (R. Kral in Godfrey & Wooten 1979). Subsequent careful inventories of bogs in other areas have greatly

expanded the known range.

Illustrations: Line drawings appear in Kral (1966) and Godfrey & Wooten (1979).

Selected References:

- Bridges, E. L. and S. L. Orzell. 1989. Additions and noteworthy vascular plant collections from Texas and Louisiana, with historical, ecological, and geographical notes. *Phytologia* 66: 12-69.
- Godfrey, R. K. and J. W. Wooten. 1979. Aquatic and wetland plants of the southeastern United States. Monocotyledons. The University of Georgia Press, Athens. 712 pp.
- Kral, R. 1966. *Xyris* (Xyridaceae) of the continental United States and Canada. *Sida* 2: 177-260.
- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. USDA, Forest Service, Technical Publications R8-TP2. 1305 pp.
- MacRoberts, M. H. and B. R. MacRoberts. 1993. Floristics of a bog in Vernon Parish, Louisiana, with comments on noteworthy bog plants in western Louisiana. *Phytologia* 75(3): 247-258.
- MacRoberts, M. H. and B. R. MacRoberts. 1995. Noteworthy vascular plant collections on the Kisatchee National Forest, Louisiana. *Phytologia* 78(4): 291-313.
- Orzell, S. L. 1990. Inventory of National Forests and National Grasslands in Texas. Report submitted in fulfillment of agreement between the Texas Natural Heritage Program of Texas Parks and Wildlife Department and the U. S. Forest Service in Lufkin, Texas. 526 pp.



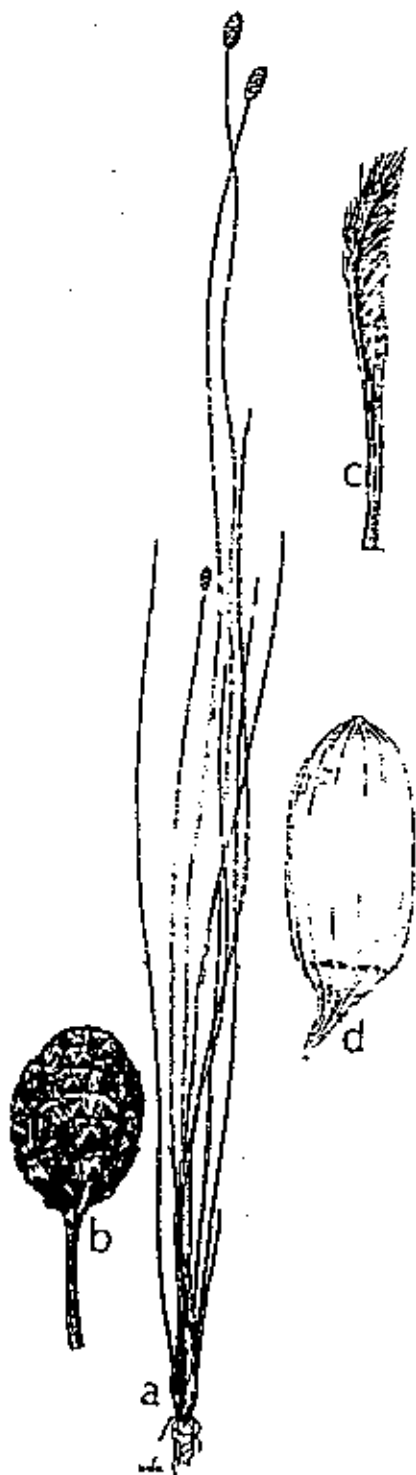
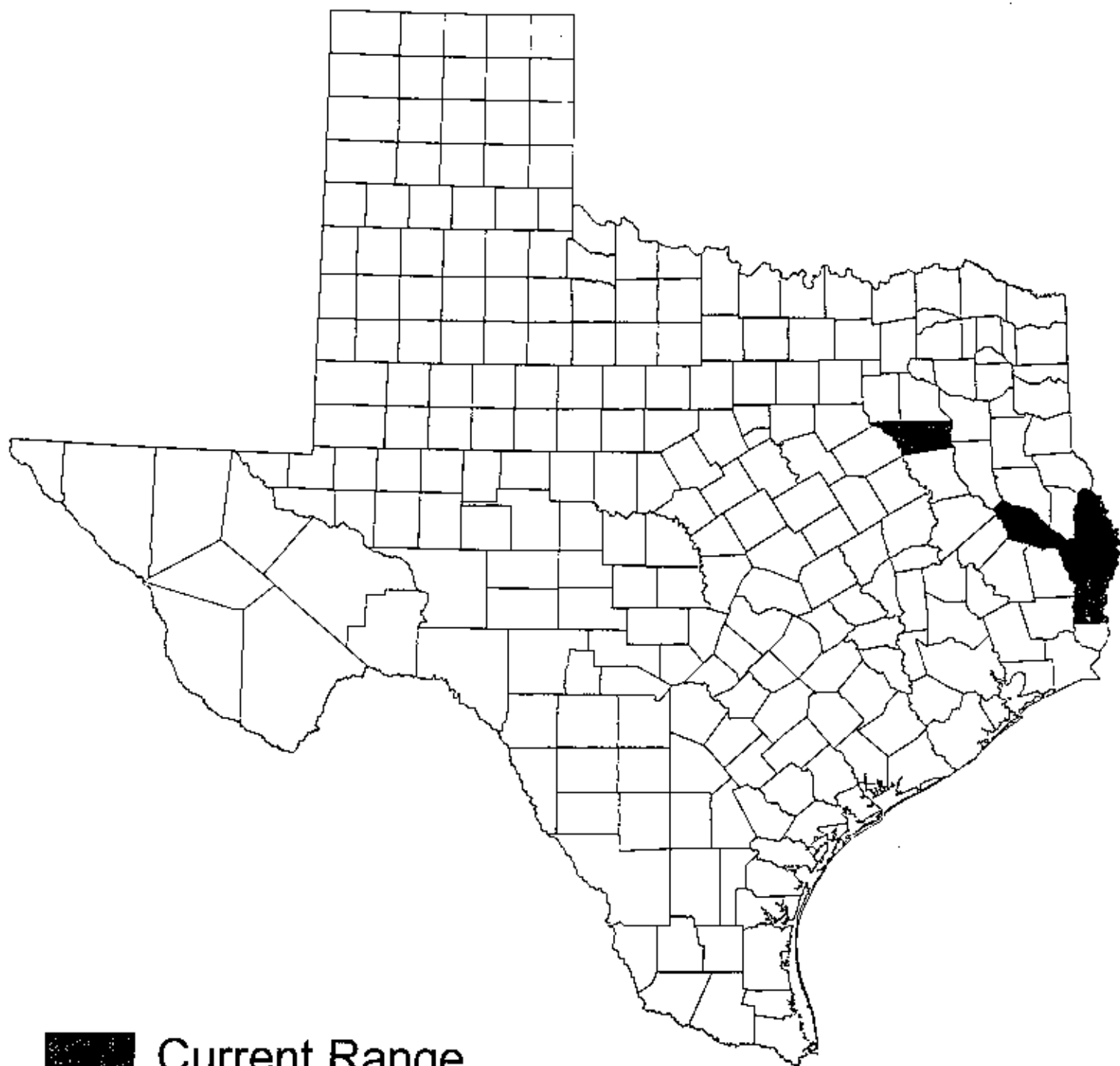


Figure 37: *Xyris scabrifolia*, rough-leaf yellow-eyed grass.
a) habit; b) head; c) lateral sepal; d) seed.
c) from Kral 1966b; other drawings from Godfrey and Wooten 1979.



Xyris scabrifolia
(rough-leaf yellow-eyed grass)

Scientific Name: *Yucca necopina* Shinnery

Synonyms: Submerged by some authors within *Yucca arkansana* Trel.

Common Name: Glen Rose yucca

Global/State Ranks: G1G2S1S2

Federal Status: None.

Global Range: Endemic to north-central Texas.

State Range: Long known only from Somervell County but recently reported from Hood, Parker and Tarrant counties by Diggs, Lipscomb & O'Kennon (1999), who considered it to be the common *Yucca* of sandy soils in the Western Cross Timbers.

Description (adapted from Correll & Johnston 1970; Diggs, Lipscomb & O'Kennon 1999; and Shinnery 1958): Essentially stemless shrub with a basal cluster of stiff succulent leaves and a woody-stalked inflorescence held well above the leaves, 1-3 m tall. Leaves stiff, very narrowly linear-lanceolate, 50-80 cm long and 1.5-4 cm wide, the margins white, with curling fibers; inner band of leaves 18-30; outer band of leaves 45-70, narrower than those of the inner band. Flowers in an unbranched spike or more commonly in a short-branched panicle at the top of a woody, sparingly bracted stalk 1-3 m high; perianth of 6 white to greenish-white tepals 3-6 cm long; stamens 6; ovary twice as long as the styles and stigma combined; stigmas 3. Fruit a dry, almost woody capsule 4-7 cm long, about twice as long as broad.

Similar Species: Described by Shinnery (1958) as similar to *Yucca arkansana* but differing in several respects. In *Y. necopina*, the flowering stalk is 1-3 m tall and the inflorescence itself is usually branched into a panicle; in *Y. arkansana*, the stalk is 1 m tall or less, and the inflorescence is an unbranched raceme.

Habitat: Grasslands on sandy soils.

Phenology: Flowering April-June?

Comments: Considered by some to be a mere form of *Y. arkansana*, or a possible hybrid between and *Y. arkansana* and *Y. pallida*, Glen Rose yucca is regarded by most recent authors as a distinct species. Clary (1997) placed *Y. necopina* in a group of derived, smooth marginate, dry-fruited species that includes *Y. glauca*, a wide-ranging species of the North American central plains, and several other species of the desert southwest and northern Mexico. *Y. arkansana*, on the other hand, belongs to a group of basal, smooth marginate species with dry fruit that includes, among Texas species, *Y. constricta* and *Y. louisianensis*.

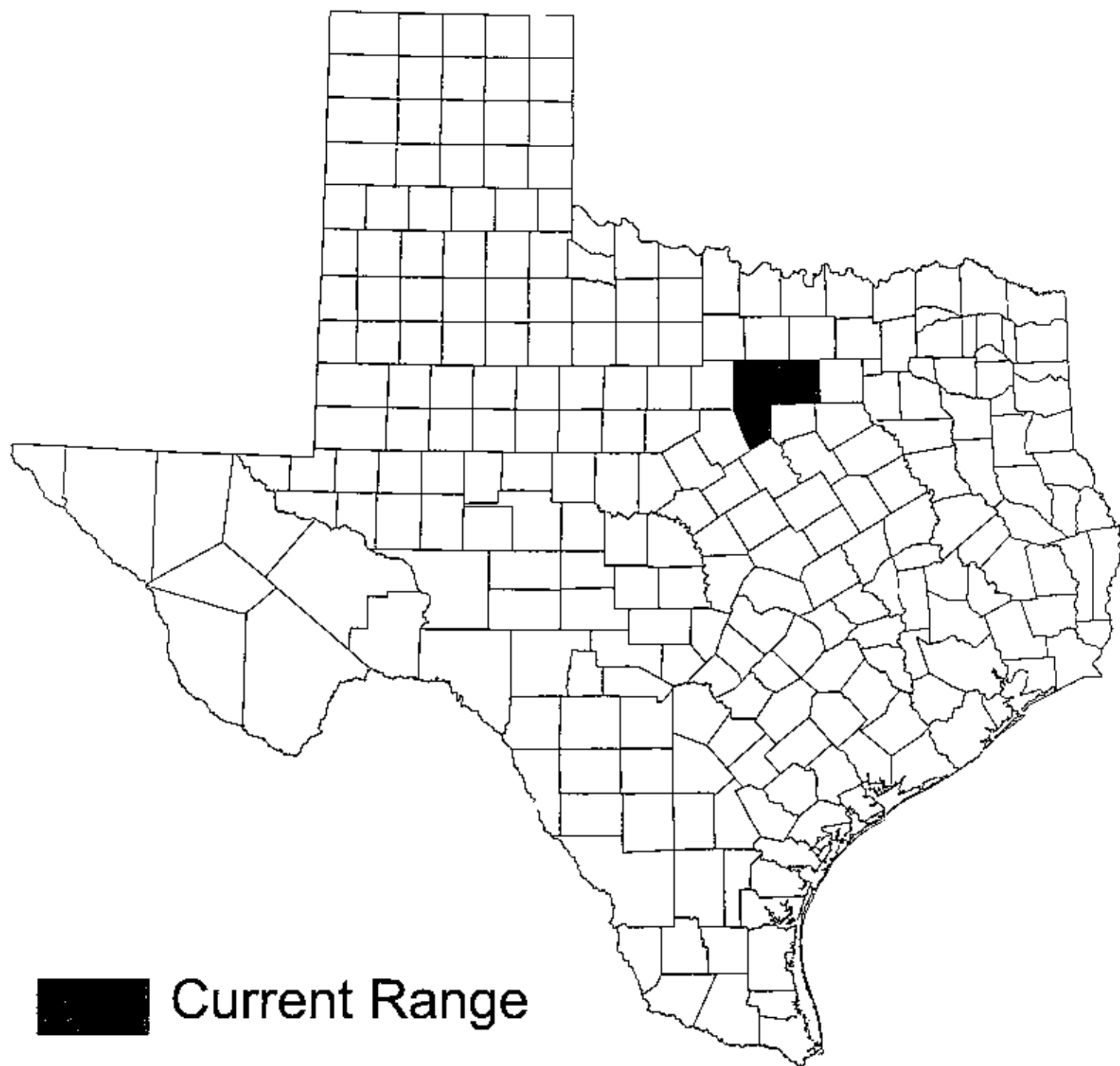
The common name reflects the fact that *Yucca necopina* was known for years only from a fence-row on a sandy terrace along the Brazos River near the city of Glen Rose. Recent field studies by Bob O'Kennon suggest that *Yucca necopina* is much more common than previously thought and perhaps should not be considered a rare species.

Illustrations: A set of line drawings showing rosette with emergent flowering panicle, a leaf and a leaf cross-section appears in Diggs, Lipscomb & O'Kennon (1999).

Selected References:

- Clary, K. H. 1997. Phylogeny, character evolution, and biogeography of *Yucca* L. (Agavaceae) as inferred from plant morphology and sequences of the internal transcribed spacer (ITS) region of the nuclear ribosomal DNA. Ph.D dissertation, the University of Texas at Austin. 214 pp.
- Diggs, G. M., Jr., B. L. Lipscomb and R. J. O'Kennon. 1999. Shiners and Mahler's illustrated flora of North-central Texas. Botanical Research Institute of Texas, Ft. Worth. 1626 pp.
- Shiners, L. 1958. Spring flora of the Dallas-Fort Worth area. Privately published, Dallas. 514 pp.





■ Current Range

Yucca necopina
(Glen Rose yucca)

Scientific Name: *Zanthoxylum parvum* Shimmers

Synonyms: None.

Common Name: Shimmers' tickletongue; small prickly-ash

Global/State Ranks: G2S2

Federal Status: Category 1

Global Range: Apparently endemic to mountains of Trans-Pecos Texas.

State Range: Brewster and Jeff Davis counties.

Description (adapted from Poole 1989; Porter 1976; D. M. Porter in Henrickson & Johnston in prep.; Powell 1998; J. Zech pers. comm.): Rhizomatous, deciduous, dioecious shrub to 2 m tall; stems with prickles, the prickles single or in pairs, 4-13 mm long. Leaves alternate, pinnately compound, with 7-9 (-11) leaflets; leaflets broadly elliptic to ovate-lanceolate, mostly 6-16 mm long (rarely up to 35 mm according to Porter in Henrickson & Johnston in prep.) and up to 11 mm wide (up to 18 mm according to Porter in Henrickson & Johnston in prep.), obtuse at the tip, crenulate, pellucid-punctate along the margins and on the blades, pubescent on and between the veins. Flowers in small umbellate clusters from the leaf axils, unisexual, the different sexes found on separate plants; sepals absent; petals (4-) 5, with reddish hairs near the tips; stamens 5; ovary with (2-) 3 (-4) connate carpels, stipitate, tomentose. Fruit a follicle, with 2 seeds per carpel.

Similar Species: The only other species of *Zanthoxylum* in Trans-Pecos Texas is *Z. hirsutum*, which has occurs primarily on limestone substrates. It has glabrous leaflets generally longer than 16 mm, and its flowers contain both sepals and petals.

Habitat: Understory of maple-oak woodlands or evergreen oak shinnery on rocky, well drained, neutral, non-calcareous loams underlain by rhyolite, tuff or other igneous rock, at elevations between 4500 and 5700 feet. Frequent woody associates include *Quercus hypoleucoides*, *Q. gravesii*, *Acer grandidentatum*, *Pinus cembroides*, *Juniperus deppeana*, *Prunus serotina* ssp. *virens*, *Ungnadia speciosa*, *Rhus trilobata*, *R. virens*, *Fendlera rupicola*, *Cercocarpus montanus* and *Arbutus xalapensis*.

Phenology: Flowering in late March and early April before the leaves have fully expanded, the staminate plants blooming slightly earlier than the pistillate plants. Although eventually deciduous, the characteristic foliage is present through most of the growing season.

Comments: A poorly understood species known from a few small populations in the Davis Mountains and an ambiguous, historic collection from Brewster County.

Illustrations: Line drawings appear in Powell (1998) and Vines (1960).

Selected References:

Poole, J. M. 1989. Status report on *Zanthoxylum parvum*. Report prepared for U.S. Fish & Wildlife Service, Albuquerque.

Porter, D. M. 1976. *Zanthoxylum* (Rutaceae) in North America north of Mexico. *Brittonia* 28(4): 443-447.

- Powell, A. M. 1998. Trees and shrubs of the Trans-Pecos and adjacent areas. University of Texas Press, Austin. 498 pp.
- Shinners, L. H. 1956. *Zanthoxylum parvum* (Rutaceae), a new species from the Trans-Pecos Texas. Field and Laboratory 24: 19-20.
- Vines, R. A. 1960. Trees, shrubs and woody vines of the southwest. The University of Texas Press, Austin. 1104 pp.

James Zech photos
Zanthoxylum parvum





SMALL PRICKLY-ASH
Zanthoxylum parvum Shimmers

green, oblong to ovate, concave, $\frac{1}{2}$ – $\frac{3}{8}$ in. long, about twice as long as the sepals; stamens 4, alternate with the petals, filaments slender and exerted; pistils 2 (rudimentary in staminate flower), style slender, stigmas capitate and obliquely spreading.

FRUIT. Ripening in September, follicle globose or obovoid, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, rusty brown, pitted, warty, rugose, thin-walled, splitting at maturity; seed persistently attached to the follicle lip, solitary, subglobose, black, smooth, shiny, hilum rather conspicuous, cotyledons oval and foliaceous.

LEAVES. Alternate, evergreen, odd-pinnately compound, 3–4 in. long, with 5–13 leaflets (usually 7–9) on a broadly winged rachis; leaflets opposite, $\frac{1}{2}$ – $1\frac{1}{4}$ in. long, sessile or nearly so, oval to obovate, apex rounded or notched, base cuneate or rounded, margin bluntly crenulate-toothed mostly above the middle, slightly revolute, coriaceous, young leaves often bronze-green; older with upper surface bright green, shiny and glandular-punctate, lower surface somewhat paler, aromatic and bitter to taste because of pellucid glands; petiole winged and jointed.

TWIGS. Numerous, zigzag, slender, smooth, gray to

brown, glabrous to puberulent, set with hooked stipular spines; buds minute, globular, dark brown, woolly; leaf scars deltoid, vascular bundles with 3 scars, pith white and not interrupted.

BARK. Gray, thin, smooth or with warty excrescences; older trunks with small, thin, appressed scales, aromatic.

WOOD. Reddish brown, sapwood yellowish, compact, hard, heavy, close-grained, specific gravity about 0.74.

RANGE. Southern Florida and southwestern and coastal Texas. Extending eastward along the Texas coast to Harris and Galveston counties. Abundant in the Texas lower Río Grande Valley area. In Mexico in the states of Tamaulipas, Sonora, Veracruz, Yucatán, Chiapas, and Baja California.

REMARKS. The genus name, *Zanthoxylum*, is from the Greek and means "yellow wood." The species name, *fagara*, is the old generic name. Vernacular names in use in various countries are Colima, Limoncillo, Uña de Gato, Palo Mulato, Espino, Espino Rubial, Corriosa, Tomeguin, Xic-ché, and Wild Lime. It is generally known as "Colima" to the Mexican people of the Texas Río Grande Valley area. The plant has long been used medicinally in the Latin-American countries. Various extracts of the bark and leaves are taken as a sudorific and nerve tonic. The powdered bark and leaves are used as a condiment, and are also said to produce a yellow dye.

SMALL PRICKLY-ASH
Zanthoxylum parvum Shimmers

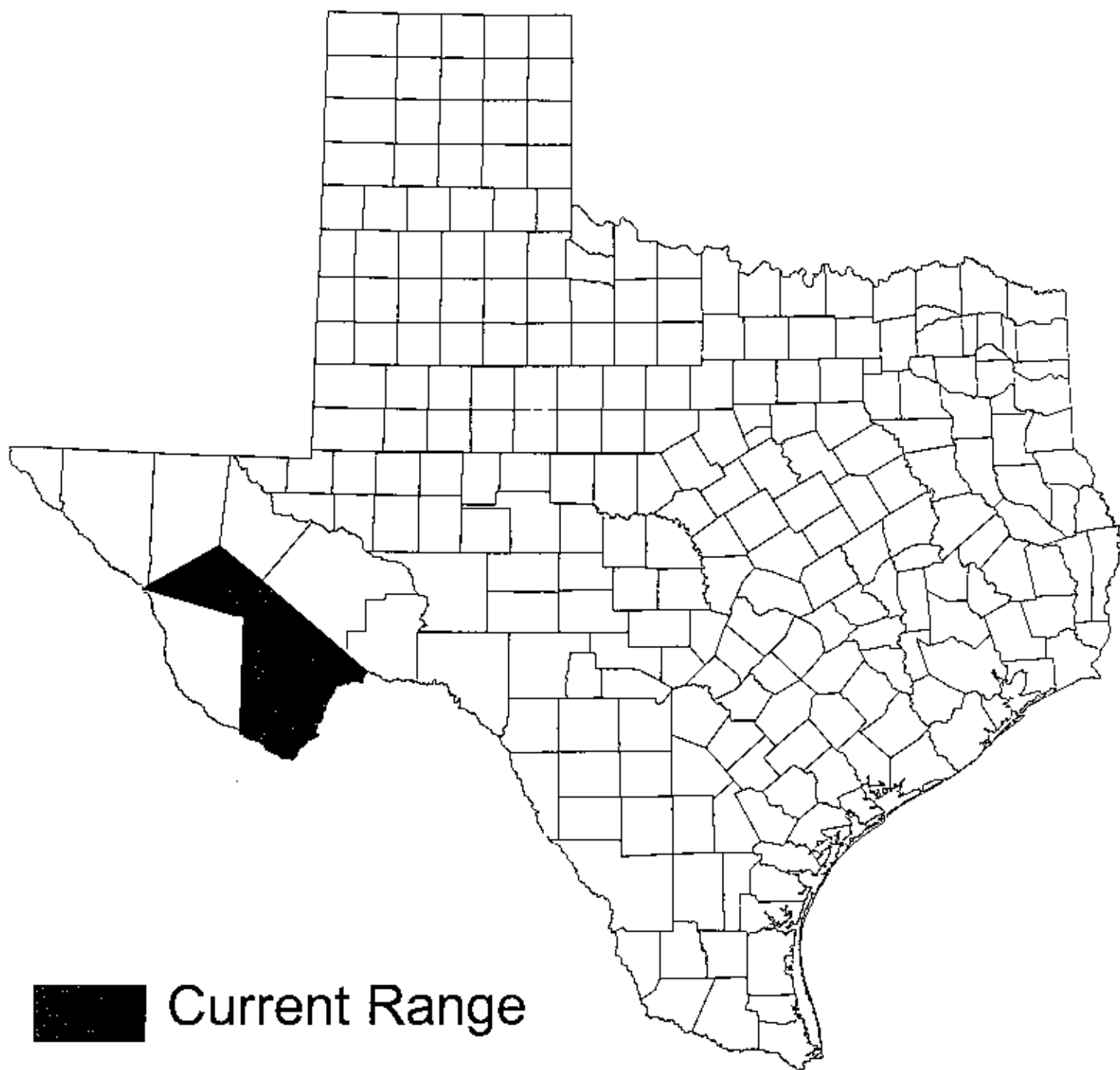
FIELD IDENTIFICATION. Shrub to 4½ ft, with spines erect or curved and $\frac{1}{2}$ – $\frac{3}{4}$ in. long at the nodes. Evidently closely related to *Z. americanum*.

FLOWERS. Inflorescence sessile or nearly so, umbellate, before the leaves mature. Flowers 2–12, pistillate pediceled, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, scarcely pilose; sepals absent, petals 4, elliptic to ovate-oblong, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, green, apices reddish-bearded; ovary thick, stipitate; carpels 2–4, connate, short tomentose; styles slender, becoming twisted, almost connate, at length free; stigmas short and subclavate; fruit not seen.

LEAVES. Leaflets 7–9, broad elliptic to ovate or lanceolate, apex obtuse, margin crenulate, base broadly to narrowly cuneate, both sides pilose, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, sessile or nearly so.

TWIGS. Young ones reddish brown with a few long gray hairs, later dark gray to black and glabrous, rather erratic or crooked, stiff, irregularly roughened by leaf scars and nodes; spines either solitary or in pairs, at the nodes, mostly straight, slender, sharp-pointed, reddish brown to dark gray.

RANGE. The holotype was collected in rocky igneous



Current Range

Zanthoxylum parvum
(Shinners' tickle-tongue)

Scientific Name: *Zizania texana* Hitchc.

Synonyms: None.

Common Name: Texas wild-rice

Global/State Ranks: G1S1

Federal Status: Endangered

Global Range: Endemic to the San Marcos River of central Texas.

State Range: Short stretch of the San Marcos River in Hays County.

Description (adapted from Gould 1975 and Poole 1984): Perennial submersed in flowing water, only the upper portions emergent, the culms decumbent, rooting at the nodes. Leaves linear, elongate, 12-110 cm long and 5-25 mm wide, glabrous, with a strong midvein; ligule membranous, 5-15 mm long. Flowers borne in panicles 16-31 cm long, unisexual, with male and female flowers produced on the same plant; spikelets of both types 1-flowered; staminate spikelets on spreading lower branches, becoming pendulous at maturity, 7-9 mm long, awnless, the lemma 5-nerved, the palea 3-nerved and about equalling the lemma in length; pistillate spikelets on stiffly erect upper branches, 8-12 mm long and 1.2-1.8 mm wide, the lemma 3-nerved, clasping the palea by its margins and tapering into a stout scabrous awn 10-35 mm long; palea indistinctly 3-nerved.

Similar Species: Flowering specimens are not likely to be confused with any other species. *Vallisneria americana* and *Sagittaria* spp. occur in the San Marcos River and have long linear submersed leaves vaguely similar to those of *Zizania texana*. However, the leaves of those species lack the a strong midvein so conspicuous on *Zizania texana*.

Habitat: Clear, cool, rapidly-flowing water of the spring-fed San Marcos River, primarily in water less than 1 m deep, usually where substrates are coarse sandy soils rather than finer clays (Poole & Rowles 1999).

Phenology: Flowering late spring-late autumn.

Comments: Arguably the rarest plant species in Texas. Texas wild-rice was first collected from the San Marcos River in 1892 by G. C. Nealley, and the population there persists today. No other populations, historical or extant, are known. Texas wild-rice was listed as Endangered on 26 April 1978.

Illustrations: A color photograph appears in Poole & Riskind (1987). Black and white photographs appear in Silveus (1933) and Terrell et al. (1978). Line drawings appear in Silveus (1933), Beaty (1972), Gould (1975) and Poole & Riskind (1987).

Selected References:

Beaty, H. E. 1972. *Zizania texana* Hitchc. (Texas wildrice): a rare and endangered species. Unpublished manuscript, Baylor University, Waco.

Gould, F. W. 1975. The grasses of Texas. Texas A & M University Press, College Station. 653 pp.

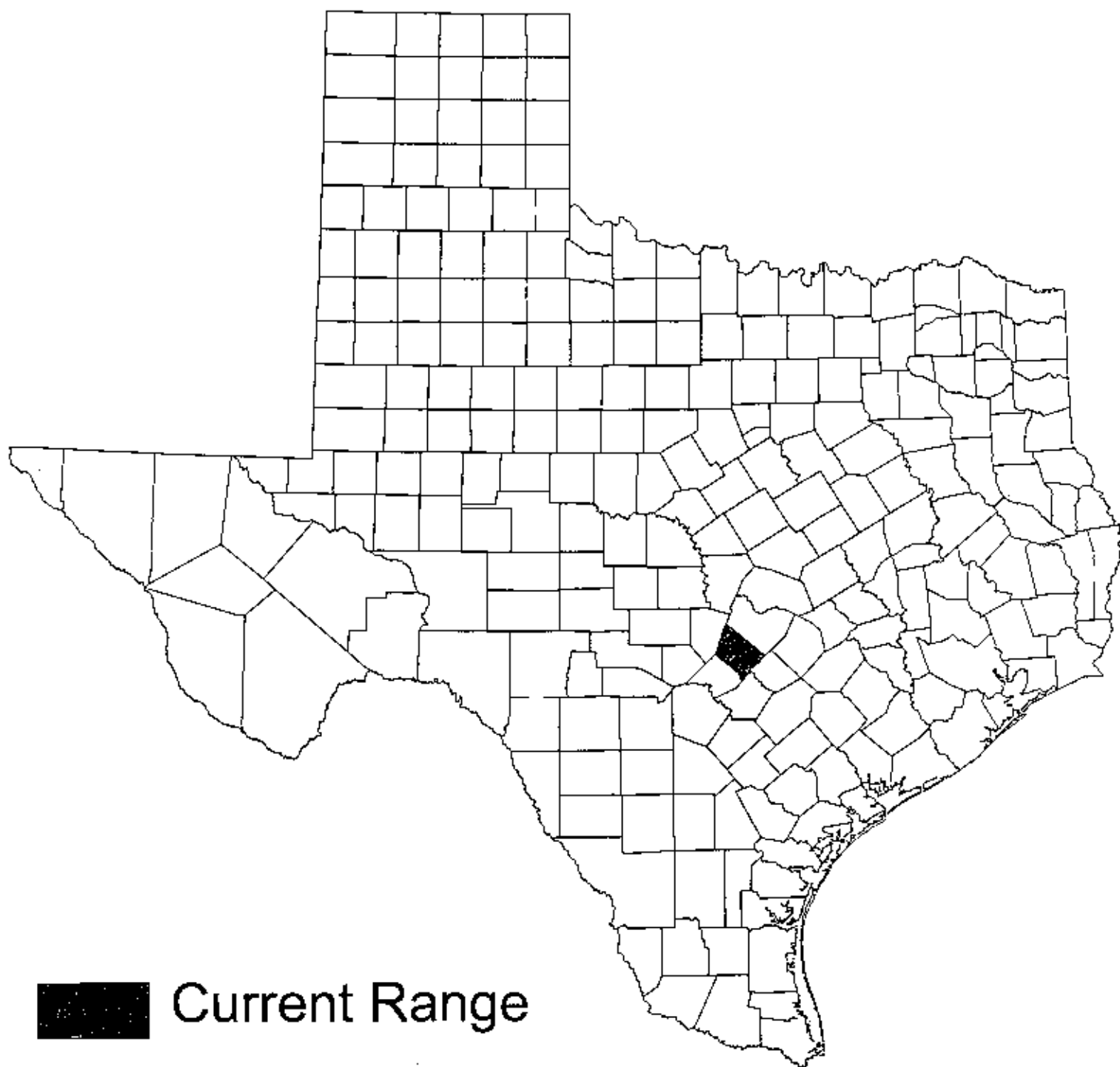
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Fig. 135: 1, *Zizania texana*: plant, X $\frac{1}{2}$; pistillate and staminate spikelets, X 5. 2, *Leersia hexandra*: X 1. 3, *Leersia virginica*: X 1. (From Hitchcock & Chase).

Fig. 136:
pistillate spil



■ Current Range

Zizania texana
(Texas wild-rice)