

## Revision of *Salvia* L., Section *Salviastrum* Gray<sup>1</sup>

*Eula Whitehouse*<sup>2</sup>

*Salviastrum*, with *S. texanum* Scheele as the only known representative, was described as a genus by Scheele in 1849 (Linnaea 22: 584). He placed it next to *Salvia* in systematic position, noting its resemblance in the structure of the anthers and separating it by the tuft of hairs in the calyx throat. His full description was based on specimens collected near New Braunfels. Torrey and Gray (Pac. R.R. Rept. 2: 169, t. 6. 1857) follow Scheele's classification. Their illustration, evidently drawn from dried specimens, bears more resemblance to living plants of *Dyschoriste linearis* (T. & G.) Kuntze; however, the detailed drawings, even though full of inaccuracies, leave no doubt of the plant depicted. The style is shown with two nearly equal divisions, instead of an anterior lobe about one third longer; and the upper corolla lip is divided nearly to the base, when actually the two lobes are united nearly to their apex.

In 1859 (Bot. Mex. Bound. 2: 132), Torrey removed *Salviastrum texanum* Scheele to *Salvia* and noted its close relationship to Bentham's section *Heterosphace* from which it differed in habit and in the calyx closed by hairs. In 1872 (Proc. Amer. Acad. 8: 368), Gray followed Torrey in placing *Salviastrum* with *Salvia* and described variety *canescens* of *Salvia texana*, based on Wright's specimen 467 from "S.W. Texas and Rio Grande on the Pecos." He also described *Salvia Engelmanni*, based on Wright 465 and Lindheimer (no number or locality given). Later in 1878 (Syn. Flora 2: 366), Gray gave a full description of *Salviastrum* as a section of *Salvia*, including the same two species and variety. Bentham & Hooker (Gen. Pl. 2: 1196-1197. 1876) did not approve of Torrey's reduction of the genus to *Salvia*

<sup>1</sup>Specimens cited are deposited in the following herbaria: Gray Herbarium (Gray), Missouri Botanical Garden (MBG), Southern Methodist University Herbarium (SMU), Tracy Herbarium of Texas Agricultural and Mechanical College (TAM), Texas University Herbarium (T). Specimens from the U.S. National Arboretum Herbarium arrived too late for inclusion in the citations. I wish to thank Dr. Lloyd H. Shinners for suggestions and criticism; Miss Nell C. Horner, librarian of the Missouri Botanical Garden, Miss Ruth D. Sanderson, librarian of the Gray Herbarium, and Dr. A. C. Smith, Curator of Phanerogams of the U.S. National Herbarium, for supplying several references.

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and maintained it as *Salviastrum* Scheele with four species, all Texan.

Briquet (Eng. & Prantl. Nat. Pflanzenfam. IV. 3a: 1897) maintains *Salviastrum* as a separate genus, including among his "2-3 species" *S. texanum* Scheele and *S. Engelmanni* (Gray) Briq., a *nomen nudum*. The chief characters which Briquet recognized as separating *Salvia* from *Salviastrum* were the usual absence of hairs in the calyx throat, a small posterior staminode or none at all, and ovate nutlets in the former in contrast to the calyx throat closed with hairs, the posterior stamen short and threadlike, style club-shaped or 2-lobed, and nutlets almost round in the latter.

While Small (Flora S.E. U.S. 1035-1036. 1903) maintained *Salviastrum* as a genus, separating it from *Salvia* merely by the presence of hairs in the calyx throat, he included only the species *S. texanum* Scheele. However, his descriptions of both genus and species included characteristics of both *Salvia texana* (Scheele) Torr. and *S. Engelmanni* Gray. Schulz (Texas Wild Fl.: 352-353. 1928) also combined the description of these two plants under the name *Salviastrum texanum* Scheele, evidently having in mind the plant which is *Salvia Engelmanni* Gray; but she mentioned a second form which fits the description of *S. texana* (Scheele) Torr. Whitehouse (Tex. Fl. in Nat. Col.: 127. 1936) also confused these two species and gave an illustration of *Salvia Engelmanni* Gray as *Salviastrum texanum* Scheele.

In 1930 Cory (Rhodora 32: 90. 1930) described *Salviastrum dolichanthum* from plants which he collected in Crockett County, Texas, not recognizing their affinity to *Salvia texana* (Scheele) Torr. var. *canescens* Gray because of their long tubular corollas which are so unlike the widely ringent corollas of *S. texana*, and which were absent from the late season plant collected by Wright on which Gray based his description. Thus Cory & Parks (Cat. Tex. Fl.: 91. 1937) recognize *Salviastrum texanum* Scheele and var. *canescens* (Gray) Cory, *S. Engelmanni* (Gray) Briq., and *S. dolichanthum* Cory. Cory had transferred variety *canescens* to *Salviastrum* in 1936 (Rhodora 38: 407).

Johnston (Jour. Arn. Arbor. 22: 118. 1941) called attention to the similarity of variety *canescens* and *Salviastrum dolichanthum* Cory and raised *canescens* to specific rank, but based his corolla description on a Mexican plant, Johnston

& Mueller 646. A close study of Wright's specimen, specimens collected by Cory from the type locality of *S. dolichanthum*, personal collections from the Pecos River vicinity, and a number of herbarium specimens has convinced me that Gray's variety *canescens* and *Salviastrum dolichanthum* are the same. Other than flower color and size there seems to be no essential difference between the Mexican and Texan plants. Other differences which Johnston brings out, such as the slender fruticulose habit, lateral flowers, and persistent stems representing several years growth, will not hold when many specimens are examined. The lateral flowers and woody stems are due to variations in annual growth conditions, flowers not being formed in the axils of the upper bracts when rainfall is not favorable. Later in the season the stems may show a renewal of growth, forming both new bracts and flowers while old calices are present lower down the stem. This renewal of growth has been noted on specimens of other species, one October collection of *Salvia texana* (Scheele) Torr. showing as many as thirty-three flowering nodes with an outgrowth of opposite branches about eight nodes from the top.

A study of other Texas *Salvias* shows that, except for the dense ring of hairs in the calyx throat of *S. texana*, *S. Engelmanni*, and *S. dolichanthum*, there are no common differences which will separate them from other species of *Salvia*. If the species included in Bentham's section *Heterosphace* are included in *Salvia* L., then undoubtedly the *Salviastrum* section should be included, for they are closely linked by their similar calices which are alike in form and accrescence, the *Heterosphace* species lacking the hairs in the calyx throat. Before the discovery of the tubular corolla of *S. dolichantha*, the widely ringent corolla of *S. texana* and *S. Engelmanni* was a characteristic difference. Other *Salvias* have similar abortive posterior stamens and a slightly two-lobed style which Briquet considered characteristic of this group.

Inasmuch as *Salvia canescens* C. A. Meyer is a recognized plant from the Caucasus, Gray's variety *canescens* becomes *Salvia dolichantha* (Cory) Whitehouse. Because of the difference in color and size of the corolla, Johnston & Mueller's specimen 646 is designated as *Salvia dolichantha* var. *parvi-*

*flora* Whitehouse. A few changes are made in the description of Gray's section *Salviastrum* to include the presence of *S. dolichantha* and its variety *parviflora*.

SALVIA L. section SALVIASTRUM Gray (emended). Low erect perennials from a woody taproot, blooming the first year. Stems 4-angled, branched or unbranched. Leaves narrow, entire or with few serrations; bracts persistent, little different from the leaves, longer than the calyx, accessory shorter bracts sometimes present in the axils. Inflorescence racemose, almost spicate, mature calyx slightly inclined. Calyx broadly campanulate, deeply 2-lipped, throat conspicuously bearded with long pilose hairs, tube slightly shorter than the lips, 10-nerved, and conspicuously clothed with long setose hairs; upper lip broad, with 3 short rounded or deltoid lobes with midribs terminating in conspicuous cusps, the middle lobe symmetrical, the outer lobes usually only half complete with the midribs forming the outer margin except near the base of the lip where it slants to form a V-shaped sinus with the lower lip; lower lip divided into 2 linear or linear-lanceolate lobes, cuspidate. Corolla ringent or tubular, pink, blue, or purple; lower lip 3-lobed, spreading, middle lobe deeply notched and marked below the base by two white or yellow spots; upper lip 2-lobed, erect, concave or hooded. Stamens separate, or anterior joined by extremities of connectives; anterior stamens with two fertile unequal cells separated by a porrect or rounded connective which carries the upper cells under the upper lip of the corolla and extends the lower cells into the opening of the corolla throat, lower cells diverging, upper cells parallel; filament attached to upper part of corolla throat and jointed to the lower part of the connective; posterior stamens abortive, filament broader at base, anthers sagittate or oblong. Style elongate, slender, 2-lobed, the lobes recurved, somewhat broader than the style and trough-like, anterior lobe much longer than posterior; ovules rounded or ovate. Seeds brown.

3 species, Texas and Mexico.

#### KEY TO THE SPECIES OF SECTION SALVIASTRUM GRAY

A. Stems setose-hispidulous, retrorse-pubescent and glandular, 20-40 cm. high; leaves oblanceolate or linear oblanceolate, setose-hispidulous and glandular or hirsute and glandular-punctate; calyx tube villous on

nerves within; corolla tube and throat 8-10 mm. long, widely ringent, width of throat several times width of tube; style exserted.

B. Nodes below inflorescence 4-5; stem with retrorse pubescence continuous on all sides of stem; leaves setose-hispidulous and glandular, oblanceolate, 3.5-15 mm. wide and 2.5-5.5 cm. long, entire or with 2-3 dentations or lobes on each margin; opposite branches usually present at first node below inflorescence; racemes elongated, few flowers open at one time; corolla tube and throat 10 mm. long, throat funnelform, upper lip 6 mm. high, pubescent but without apical tuft of long glandular hairs, corolla purplish-blue. 1. *Salvia texana*.

BB. Nodes below inflorescence 8-11; stem lacking retrorse pubescence on internode directly below cauline leaves; leaves entire, petiolate, linear-oblanceolate, setose and conspicuously glandular-punctate on both surfaces, 3-5 mm. wide and 5-6 cm. long; tufts of branch leaves (or branches on late season specimens) present in axils of leaves for 4-5 nodes below inflorescence; raceme densely flowered, spike-like, 10-30 flowers open at one time; corolla tube and throat about 8 mm. long, upper lip 11-12 mm. high, with apical tuft of long glandular hairs, corolla pale lavender. 2. *Salvia Engelmanni*

AA. Stems stellate-canescens, glandular, 10-16 cm. high; leaves linear, 2-3 mm. wide and 3.5-6 cm. long, stellate-canescens and glandular; corolla tube and throat 2-3 cm. long, tubular, throat about twice width of tube, little differentiated, upper lip 1.5-5 mm. high, without apical tuft of long glandular hairs; style not exserted.

B. Corolla lavender, dark purple in bud, tube and throat 28-30 mm. long, upper lip 4-5 mm. high. 3a. *Salvia dolichantha*

BB. Corolla pink, marked with two elongate yellow spots at base of lower lip, 2 cm. long, upper lip 1.5 mm. high. 3b. *Salvia dolichantha* var. *parviflora*

1. SALVIA TEXANA (Scheele) Torrey, Rept. U.S. & Mex. Bound. Surv. 2: 132. 1859.

*Salviastrum texanum* Scheele, Linnaea 22: 585-586. 1849.

"Auf felsiger Prairie an der obern Guadeloupe (Lindheimer), bei Austin (Römer). April." (Specimens not seen.)

*Trichosphace laxiflora* Engelmann, Bot. Zeit. 9: 45. 1851.  
(*Nomen nudum*).

Perennial from a taproot. Stems several, herbaceous, 1-4 dm. long, commonly with two opposite branches from the first node below the inflorescence, occasionally with branches from all (4-5) nodes below inflorescence, densely clothed with long spreading setose-hispidulous and short retrorse setose hairs on all sides of the stem. Leaves rugose, clothed with long and short setose hairs, conspicuously glandular-punctate on the lower surface, apex acute or obtuse; radical leaves lanceolate-obovate, 2-4 cm. long and 5-10 mm. wide; cauline leaves oblanceolate, 3-6 cm. long and 4-20 mm. wide, radical and cauline leaf-margins usually incised-dentate with 2-3 teeth on each margin, occasionally entire, apex obtuse or

rounded and mucronulate on upper leaves; bracteal leaves, except the lower ones, linear, mucronate, entire, 1.5-2.0 mm. wide and 1-2 cm. long, 2-4 accessory bractlets about half length of bracts developing in their axils. Flowers in racemes on pedicels 1 mm. long in flower and 4-5 mm. long in fruit, peduncles seldom more than 10 cm. long in fruit, occasionally 20 cm. long, usually only two flowers developing at a node, but some lower nodes bearing 4(-6) flowers; peduncles and pedicels usually clothed with long setose hairs. Calyx at anthesis about 1 cm. long, slightly accrescent in fruit becoming  $\frac{1}{4}$ - $\frac{1}{3}$  longer; tube 4.5-5.0 mm. long, lobes 6.3-7.5 mm. long at anthesis, lower lobes 1.5 mm. wide and upper lips between outer tips of awns 11 mm. wide, tube and lobe margins clothed with long and short setose hairs, inner throat closed with a dense tuft of white hairs, inner tube villous on nerves. Corolla purplish-blue with two oblong white marks on throat below base of middle lobe; tube 4-7 mm. long and 1.4 mm. wide; throat 6 mm. long and 5 mm. wide, pubescent externally; upper lip erect, hooded, 5-6.4 mm. long and 3.2 mm. wide with two short and rounded lobes, pubescent on outer surface; lateral lobes rounded, 3.7 mm. wide, 4-5 mm. long; middle lobe 8.5-11 mm. wide, deeply notched and somewhat undulate margined, 6.5-8.5 mm. long. Anterior stamens 2, separate; filament threadlike, 3 mm. long, jointed to thickened connective below its middle and attached to upper part of throat; connective 3.8 mm. long and 0.7 mm. wide; upper anther 2.1 mm. long, 0.4 mm. wide; lower anther 1.3 mm. long and 0.4 mm. wide. Posterior stamens 2, abortive; filament 0.6 mm. long, 0.1 mm. wide, attached 0.6 mm. below sinus; sterile anther sagittate, 0.7 mm. long. Style 16.4 mm. long and 0.17 mm. thick, curving under upper lip of corolla and exerted about 0.5 mm.; upper stigma lobe 1.5 mm. long and about 0.3 mm. thick, lower lobe 2.5 mm. long, slightly wider. Ovules 0.6 mm. long and 0.65 wide. Nutlets brown, 2.1 mm. long and 2.1 mm. wide.

Widely distributed in limestone hill regions in rocky soil, central and western Texas and northern Mexico; blooming March to May and occasionally to October.

Specimens examined: TEXAS:—BELL Co.: near R.R., Little River, *S. E. Wolff 476*, April 15, 1929 (TAM). BEXAR Co.: 7 mi. NW San Antonio, *Sister Metz 3235b*, May

6, 1942 (T); *G. Jermy* (MBG); San Antonio, *E. H. Wilkinson* 52, 1897 (MBG); between Kerrville and San Antonio, *M. E. Jones* 18548, April 23, 1931 (MBG). BURLESON Co.: Caldwell, *German* 5 (T). CALLAHAN Co.: Baird, *G. W. Letterman* 70, August, 1882 (MBG, T). COMAL Co.: New Braunfels, *F. Lindheimer* 561, April, 1851 (MBG), *Lindheimer* 1094, (MBG, T). COMANCHE Co.: Prairies N of Comanche, *H. Eggert*, May 8, 1900 (MBG); Comyn, *Phipps*, May 1, 1931 (T); *Theny*, May, 1931 (T). DALLAS Co.: W. Oak Cliff, *R. Van Vleet* 92, May 11, 1947 (SMU); *C. L. and A. A. Lundell* 10576, May 13, 1941 (SMU); stony uplands near Dallas, *Eggert*, May 23, 1899 (MBG). DENTON Co.: prairie, *B. B. Harris*, July 20, 1927 (T). EASTLAND Co.: *McNeely*, Dec. 11, 1931 (T). EDWARDS Co.: Exp. Sta. 14, *V. L. Cory* 38970, April 25, 1944 (T). ERATH Co.: Stephenville State Park, *Hoisington* 16, April 17, 1946 (T); E of Bluff Dale, *E. Whitehouse* 15420, April 21, 1946 (SMU). GILLESPIE Co.: near Fredericksburg, *E. Ammerman*, July 1, 1938 (MBG). GOLIAD Co.: near Goliad, stony prairies, *Eggert*, April 9, 1900 (MBG); Goliad, *Williams* 105, April, 1927; near Goliad, *J. L. Berlandier* 2520, May, 1834 (MBG). HAYS Co.: San Marcos, *Strandtmann*, April 23, 1937 (T). HOOD Co.: Comanche Peak, *E. J. Palmer* 6556a, Sept. 16, 1914 (MBG); 10 mi. NE Granbury, rocky limestone, *L. H. Shinnery* 11038, May 1, 1949 (SMU). HOWARD Co.: Big Spring, *H. B. Parks & V. L. Cory* 12544, May 2, 1935 (TAM). IRION Co.: Mertzcn School, April, 1932 (T). JOHNSON Co.: SW of Cleburne, *F. H. Wagner* 45, April 27, 1947 (SMU). KERR Co.: Kerrville State Park, *Cory* 51753, April 27, 1946 (SMU); Mt. Tivy, Kerrville, *Cory* 49213, May 2, 1945 (SMU); about 5 mi. W of Ingram, *Whitehouse* 11536, May 17, 1940 (SMU); without locality, *Orr*, May, 1931 (T). KIMBLE Co.: SE of Junction, *Whitehouse* 11534, July 2, 1931 (SMU). MAVERICK Co.: 8½ mi. NW of Eagle Pass, *Cory* 43860, March 28, 1944 (TAM). MCLENNAN Co.: about 4 mi. S of Moody, *C. L. York* 46025, April 14, 1946 (T). MENARD Co.: without locality, *Mahony*, May 1, 1933 (T). MILLS Co.: Chesser Valley School, *N. Egg*, April, 1931 (T). MITCHELL Co.: dry caliche hills, Block 19, *R. W. Pohl* 4495, April 27, 1944 (SMU); Block 17, *Pohl*, April 16, 1945 (SMU). NAVARRO Co.: Corsicana, *Williams*, April, 1933 (T). NOLAN

Co.: Sweetwater, *Deel*, May 11, 1931 (T); Block 23, *Pohl 4423*, May 9, 1944 (SMU). REAGAN Co.: Best, *Best School* (T). SAN PATRICIO Co.: 3 mi. NW of Mathis, *Whitehouse 18349*, April 29, 1947. SCHLEICHER Co.: Ft. McKavett, *Jones*, April 21, 1931 (T). SUTTON Co.: 3 mi. S of Sonora, *Cory 41475*, April 24, 1943 (T); 5 mi. SW of Sonora, *Geib 4267*, July 3, 1933 (TAM); Exp. Sta., Sonora, *W. W. Eggleston 16698*, July 13, 1920 (MBG); Sonora, *Jones 26202*, April 14, 1930 (MBG). TAYLOR Co.: Camp Barkley, *Tolstead 7063*, April 28, 1943 (SMU, T); Lake Kirby, *B. H. Warnock T339*, June 4, 1938 (T); E of Merkel, *Lundell 11359*, April 29, 1942 (SMU); Camp Barkley, *Tolstead 5813*, Oct. 11, 1942. TARRANT Co.: rocky places, Fort Worth, *J. Reverchon*, April 1, 1902 (MBG); on plains and prairies, *A. Ruth 115*, June 5, 1929 (MBG, SMU); Fort Worth, *Ruth 89*, May 29, 1909 (T); Fort Worth, prairies, *Eggert*, May 4, 1900 (MBG); Cobb Park, Fort Worth, *Whitehouse 11521*, April, 1935 (SMU); Fort Worth, *Cory 54348*, April 16, 1948 (SMU); N of Crowley, *Whitehouse 15501*, April 26, 1946 (SMU); near Newark, *Whitehouse 15199a*, April 7, 1946 (SMU). TRAVIS Co.: Austin, *Letterman 400*, July 20, 1882 (MBG); Austin, *Young*, May 4, 1918 (T); dry, rocky limestone, *Johnson 6036*, April 10, 1946 (T); Austin, *Tharp 430142*, April 15, 1943; near Mansfield Dam, *Tharp 46014*, April 6, 1946; campus, T, *W. L. Bray*, April 20, 1907 (T); T campus, *Birge*, April 5, 1910 (T). UVALDE Co.: E of Sabinal, *Lundell 10266*, April 19, 1944 (SMU); near Laguna, *Lundell 10959*, April 3, 1942 (SMU); near Sabinal, *Whitehouse 11537*, March 30, 1933 (SMU); 5 mi. E of Uvalde, *Parks & Cory 8395*, April 17, 1934 (TAM). VAL VERDE Co.: 20 mi. NNW of Del Rio, *R. McVaugh 7726*, March 31, 1947 (SMU); Del Rio, *Jones 26201*, April 18, 1930 (MBG); 10 mi. N of Vinegarone, *Cory 39095*, May 3, 1942 (T). VICTORIA Co.: W of Victoria, *Whitehouse 11533*, April 20, 1934 (SMU). WILLAMSON Co.: Smith Branch, Georgetown, limestone outcrop, *Wolcott 53*, April 17, 1942 (T); N of Georgetown, *Whitehouse 15352*, April 19, 1946 (SMU). WISE Co.: 3 mi. N of Bridgeport, *Whitehouse 15277*, April 13, 1946 (SMU).

MEXICO.—COAHUILA: gravelly mesas near Diaz, *C. G. Pringle 8326*, April 25, 1900 (MBG); Saltillo, *J. Gregg*,



122.2, June 2, 1848 (MBG); Cerralbo, *Gregg 852*, May 29, 1847 (MBG). NUEVO LEON: near Monterrey, *Barkley, Cuthbert & Fernandez 14495*, June 29, 1944 (T); 3 mi. S of Sabinas Hidalgo, *T. C. and E. M. Frye 2424*, April 21, 1939 (MBG).

2. *SALVIA ENGELMANNI* A. Gray, Proc. Amer. Acad. Arts & Sci. 8: 368. 1872. TYPE: west Texas, *Wright 465* (Gray Herb.: not seen but duplicate from MBG studied).

*Salviastrum Engelmanni* (Gray) Briq. In Engler & Prantl, Pflanzenfam. Teil IV, Abt. 3a: 286. 1897. (*Nomen nudum*).

Perennial from a woody taproot. Stems 2.0-3.8 dm. high, slightly hirsute or setose, also retrorsely pubescent except on internode face directly below leaves, vernal stems unbranched with 8-11 nodes below inflorescence, autumnal stems with short leafy branches from upper nodes, often without flowers. Leaves petiolate, entire, linear-oblongate, conspicuously glandular-punctate on both surfaces, with scattered setose hairs on upper surface and lower midrib; radical leaves 4 cm. long and 6-10 mm. wide, obovate, acute or obtuse at apex; cauline leaves 5-8 cm. long and 3-6 mm. wide, margins often involute in drying; bracteal leaves 1-5 cm. long and 1-2.5 mm. wide, linear with lanceolate acuminate apex, the uppermost usually 16-17 mm. long. Inflorescence a compact raceme (branches often formed from lower axils of inflorescence), 2-6 flowers at a node, 4-8 cm. long, bearing 40-50 flowers, most of which are open at one time. Pedicels 2.5-5 mm. at anthesis and 6-8 mm. long in fruit, densely pubescent and hirsute. Calyx deeply 2-lipped, tube 5-5.1 mm. long, glandular, pubescent, and a few scattered setose hairs, the two lobes of lower lip linear, 6.8 mm. long and 2 mm. wide, awn-tipped, upper lip about 1 cm. broad, 6.8 mm. long, throat closed with dense ring of hairs, tube villous on nerves within. Corolla widely ringent, pale lavender, throat darker veined, with two oblong-oval white marks on throat below base of middle lobe, these surrounded by a suffusion of purple; tube 2.1-2.8 mm. long, 1.7 mm. wide, glabrous; throat 6-8 mm. long, 5.5-6 mm. wide, pubescent externally and within at the base of the throat; upper lip 10-11 mm. high, 2-lobed, hooded, erect, pubescent externally and with tuft of long white hairs and stalked glandular

hairs at crest, glands orange-yellow; lower lip spreading, undulate, middle lobe reflexed, notched, 9-11 mm. long and 15-17 mm. wide; lateral lobes rounded 11-12 mm. long and 5 mm. wide. Anterior fertile stamens 2, attached at anthers by connectives; filament slender, jointed to connective, 6.4 mm. long and 0.28 mm. wide, attached 6.8 mm. above base of corolla; upper anther 3.1 mm. long and 0.5 mm. wide; lower anther 1.4 mm. long and 0.25 mm. wide; connective thickened, 4.2 mm. long; filament 0.85 mm. long. Style slender, 22.1 mm. long, recurving under upper lip and exerted about 5 mm., lavender; upper stigma 1.6 mm. long, lower 2.5 mm., both darker than style; ovules 0.6 mm. long and 0.5 mm. wide; one gland of disk greatly enlarged. Seed dark brown, 2.38 mm. long and wide.

Widely distributed in limestone hill region of central Texas, plants often forming dense clumps and conspicuous with their densely-flowered stems; blooming in April and May, occasionally later.

This species has often been confused with *Salvia texana*, but in flower may readily be distinguished by its pale lavender, widely ringent flowers in densely flowered clusters. Specimens without flowers may be separated by the numerous nodes and narrow entire leaves conspicuously glandular punctate on both surfaces.

Lindheimer's specimens no. 50 (1089) which Gray had called *Salvia Engelmanni*, differ from the Wright specimen and other Lindheimer specimens which Gray had identified by the same name. They are somewhat difficult to place without dissection of a flower. The corolla and toothed leaves appear to be those of *Salvia texana*; but the leaves are very broad and long petioled, suggestive of *Salvia farinacea* Benthams, and it is possible that these specimens are hybrids of *Salvia texana* and *S. farinacea*.

Specimens examined: TEXAS:—BELL Co.: 1 mi. west of Moffat, on limestone rocks, *Wolff 678*, May 5, 1929 (T). BEXAR Co.: Blanco Rd., *Parks & Cory 6067*, May 2, 1933 (T). BLANCO Co.: W of Johnson City, *Cory 51681*, April 22, 1946 (SMU); 9½ miles SE of Johnson City, *Cory 42589*, July 4, 1943 (T). COMAL Co.: New Braunfels, *Lindheimer 1088*, May, 1850 (MBG); *Lindheimer 494* (MBG). CORYELL Co.: 6½ mi. E of Evant, *Parks & Cory 13055* (TAM). DALLAS Co.: near Dallas, stony uplands, *Eggert*, June 23, 1899

(MBG). ERATH Co.: E of Bluff Dale, *Whitehouse 15423*, April 21, 1946 (SMU); rocky places, *Reverchon 796*, April 1, 1882 (MBG). GILLESPIE Co.: Live Oak Creek, *Jermy 741* (MBG); 13 mi. N of Fredericksburg on U.S. Hwy. 87, A. & R. A. *Nelson 5205*, April 27, 1942 (T). GONZALES Co.: Ottine, *Tharp*, May 2, 1935 (T). HAMILTON Co.: Hamilton, *Lundell 9129*, May 28, 1940 (SMU). HAYS Co.: 4 $\frac{2}{3}$  mi. N of Blanco, *Cory 41395*, April 15, 1943 (SMU); Wimberley, *Fisher 49051*, April 24, 1949 (SMU). HOOD Co.: N of Granbury, *Eggert*, May 6, 1900 (MBG); 2 mi. WSW of Granbury, *Shinners 11108*, May 1, 1949 (SMU). JOHNSON Co.: SW of Cleburne, *Lundell 13467*, April 16, 1945 (SMU). KENDALL Co.:  $\frac{1}{4}$  mi. NE of Waring, *Parks & Cory 12944 & 12945*, May 9, 1935 (TAM); Spanish Pass, *Cory 48801*, April 5, 1945 (SMU). KERR Co.: Lacey's Ranch, abundant on adobe slopes, light blue masses, *Bray*, May 6, 1899 (T); Mt. Tivy, Kerrville, *Cory 44146*, April 30, 1944 (T);  $\frac{1}{2}$  mi. SW of Ingram, *Cory 51852*, April 29, 1946 (SMU). KIMBLE Co.: 21 mi. SE of Junction, *McVaugh 8297*, May 13, 1947 (SMU). LAMPASAS Co.: SE of Lampasas, *Whitehouse 15376*, April 20, 1946 (SMU). MCLENNAN Co.: Waco, *L. Pace 232* (MBG). MILLS Co.: Goldthwaite, *Rude*, April 11, 1921 (TAM). SOMERVELL Co.: Glen Rose, *O. Sanders 196*, June 20, 1942 (SMU). TARRANT Co.: 1 mi. SW of Benbrook, *Cory 54429*, May 13, 1948; Polytechnic, Ft. Worth, dry rocky soil, *Ruth 115*, Aug. 15, 1912 (MBG). TRAVIS Co.: near Austin, *Letterman 400*, July 25, 1882 (MBG); Bull Creek, *Tharp*, April 28, 1940 (SMU); Bull Creek, *Tharp 47192*, May 28, 1940 (TAM); Austin, *Tharp 46520*, April 27, 1932 (TAM); 8 mi. W of Oak Hill, *Lundell 89-5*, May 15, 1940 (SMU); 5 mi. W of Oak Hill, *Lundell 8887*, May 14, 1940 (SMU); 7 mi. SSE of Austin, *F. Barkley & C. Rowell 87*, Aug. 9, 1946 (T); U.T. Campus, *York*, March 28, 1907 (T); Mt. Barker, river bluffs, March 28, 1907 (T); Austin, *Tharp 44074*, April 10, 1944 (T); Bull Creek hill, *Warnock 143*, April 28, 1940 (T); 5 mi. W of Austin, *Marie Barkley & Rowell*, June 3, 1947 (T); Bull Creek, *Young*, April 7, 1918; Austin, *Heald*, May 16, 1912. WILLIAMSON Co.: 14 mi. SE of Lampasas, *Barkley 13* (T); Liberty Hill, *Strandtmann*, Aug. 18, 1940 (T); Liberty Hill, *Tharp*, Aug. 10, 1940 (T). WITHOUT LOCALITY: *Wright 465*, October, 1849 (MBG, isotype).

3a. *SALVIA dolichantha* (Cory) Whitehouse, comb. nov.

*Salvia texana* (Scheele) Torr. var. *canescens* Gray, Proc. Am. Acad. Arts & Sci. 8: 368. 1872. TYPE: hills of the Pecos, Texas, Wright 467, 1849 (Gray).

*Salviastrum dolichanthum* Cory, Rhodora 32: 90. 1930. TYPE: Cory 675, Crockett County, Texas, April 20, 1929 (Gray). (Not seen, but topotype in SMU studied).

*Salviastrum texanum* Scheele var. *canescens* (Gray) Cory, Rhodora 38: 407. 1936.

*Salviastrum canescens* (A. Gray) I. M. Johnston, Jour. Arn. Arbor. 22: 118. 1941, as to name on which based, not as to plant described (Johnston & Mueller 646).

Perennial from a woody taproot, caudex becoming much branched and woody. Stems herbaceous, annual, usually several, 6-28 cm. high, commonly unbranched, canescent or cinereous with stellate and long setose hairs, with 3-5 nodes below the inflorescence. Leaves simple, linear, densely covered with stellate hairs (some glands and long simple hairs present), paler beneath, margins revolute, apex acute, base slightly narrowed. Lower leaves commonly 3-4.5 cm. long and 2 mm. wide (occasionally 5-8.5 cm. long and 4-5 mm. wide); lower bracts about 3 cm. long and 1.5 mm. wide, becoming narrower and shorter towards apex where they are usually about 1.3 cm. long and 1 mm. wide. Flowers in axillary racemes 5-10 cm. long, 1-2 flowers in each axil, seldom more than 3-5 flowers in one raceme open at same time; pedicels densely stellate-pubescent, 0.5-2 mm. long at anthesis, becoming 3-4 mm. long. Calyx 2-lipped; tube 10-nerved, 5 mm. long, outer surface clothed with scattered long setose hairs about 2.5 mm. in length and some short-stalked glandular hairs, the inner surface clothed with long villous hairs and throat closed with dense band of villous hairs; lower lip with two linear-lanceolate lobes, 7.2 mm. long and 1.1 mm. wide at mid-point, margins and surface clothed with short-stalked glandular and longer setose hairs, apex acute ending in awn 0.5 mm. long; upper lip 3-lobed, united 4.8 mm. above sinus; lobes 2.4 mm. high including awn 0.5 mm. long, lobes rounded slightly at base with triangular-apiculate apex. Corolla lavender, dark purple in bud, two white marks below base of middle lobe, 2-lipped, tubular-funnelform, commonly 3.5 cm. long (3-4.5 cm.); tube and throat scarcely differentiated, 28-35 mm. long, 1.3

mm. wide at base and 3 mm. at throat, pubescent outside with branched and unbranched hairs; upper lip erect, hooded, short pubescence outside, 5 mm. high and 6 mm. wide, divided into two short rounded lobes at top; lower lip spreading, lateral lobes 3 mm. long and 6 mm. wide, the middle lobe 7 mm. long and 9 mm. wide, deeply notched. Anterior stamens 2, fertile; filament 3.4 mm. long and 0.2 mm. thick, attached about 2.4 cm. above base of corolla and joining connective about  $\frac{1}{3}$  distance from its lower end; connective curved or bent and thickened at middle, 1.6 mm. long; upper anther sac 1.4 mm. long and 0.5 mm. wide, lower sac 1 mm. long and 0.5 mm. wide. Posterior stamens abortive; filament 0.5 mm. long; anther sagittate, 0.5 mm. long. Style filiform, included, 3 cm. long and 0.17 mm. thick, slightly enlarged at base; upper lobe 2.1 mm. long and 0.34 mm. thick; lower lobe 3 mm. long and 0.43 mm. thick, both trough-like; ovules 4, globose, 0.6 mm. in diameter; glands of disk 0.85 mm. by 0.68 mm. Seed dark brown, obovoid, ridged on inner face, 2.1-2.4 mm. long and 1.5-1.8 mm. wide.

On chalky outcrops, southwest Texas; blooming March to May.

Specimens examined: TEXAS: CROCKETT Co.: 32 mi. NW Ozona, *Cory 53416*, April 23, 1947 (SMU); *Cory 38723*, March 30, 1942 (T); *Cory* May 7, 1938 (T). PECOS Co.: 25 mi. S of Ft. Stockton, *H. C. Hanson 534*, April 18, 1919 (MBG); 20.5 mi. NE Ft. Stockton, *Whitehouse 19534*, April 9, 1948 (SMU). TERRELL Co.: 3 mi. W of Sanderson, *W. R. & J. P. Moore 28*, March 30, 1941 (SMU); *B. H. Warnock T273*, March 25, 1938 (T). UPTON Co.: Langtry, *Cory*, April 2, 1938 (T). WITHOUT DEFINITE LOCALITY: Hills of Pecos, *Wright 467*, 1849 (Gray, MBG).

3b. *SALVIA DOLICHANTHA* var. **parviflora** Whitehouse, var. nov. TYPE: Coahuila, Sierra del Pino, NE Noria, *Johnston & Mueller 646*, 1940 (Gray) (not seen).

*Salviastrum canescens* (A. Gray) Johnston, Jour. Arn. Arbor. 22: 118. 1941.

A specie differt corolla minore 2 cm. longa.

Stems persistent. Corolla pink, marked with two elongate yellow spots at base of lower lip, subtubular, 2 cm. long; upper lip 1.5 mm. high; middle lobe of lower lip 5 mm. broad, 3.5 mm. long, lateral lobes 1.5-2 mm. long. Anterior fertile stamen attached 15 mm. above base of corolla, fila-

ment 1.5 mm. long and 0.25 mm. wide; connective thick, curved, about 0.5 mm. long; upper anther sac about 1.2 mm.; lower sac 0.9 mm. long. Posterior sterile stamen about 0.5 mm. long. Style 15 mm. long, lobes 3-3.5 mm. long and 0.5 mm. wide; otherwise as in the species.

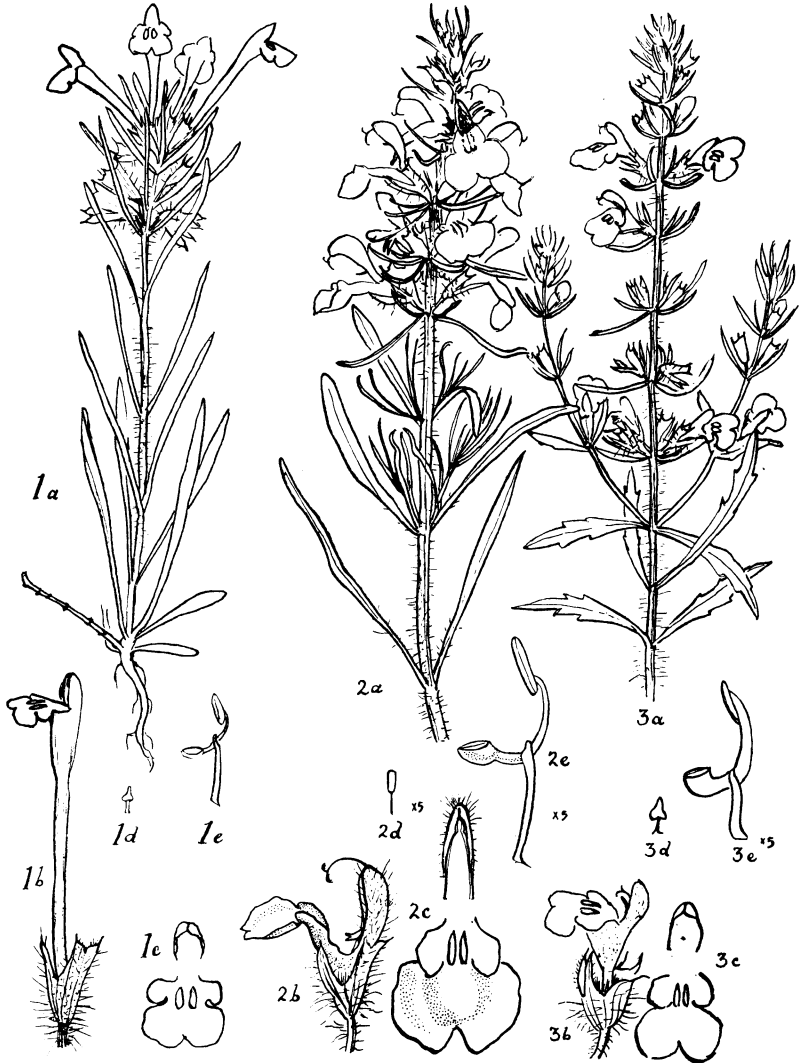


PLATE I. (1) *Salvia dolichantha*; (2) *Salvia Engelmanni*; (3) *Salvia texana*. a. Habit sketch ( $\times 0.27$ ); b. Corolla and calyx ( $\times 0.54$ ); c. Upper and lower lips of corolla ( $\times 0.54$ ); d. Abortive posterior stamen ( $\times 1.34$ ); e. Fertile anterior stamen ( $\times 1.34$ ).

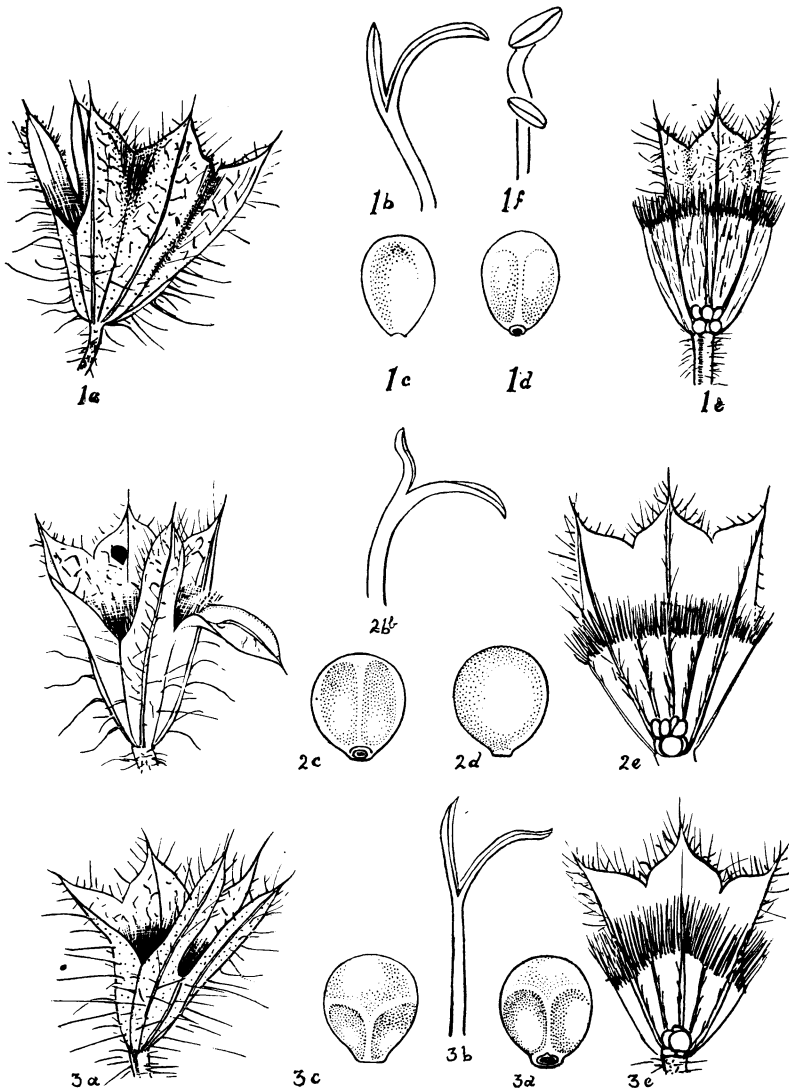


PLATE II. (1) *Salvia dolichantha*; (2) *Salvia Engelmanni*; (3) *Salvia texana*. a. Calyx ( $\times 1.34$ ); b. Stigma lobes ( $\times 2.7$ ); c. Nutlet, outer face ( $\times 2.7$ ); d. Nutlet, inner faces ( $\times 2.7$ ); e. Inner upper lip and tube of calyx, nutlets, and glands ( $\times 1.34$ ) [not all hairs and net-veins are shown]; f. Fertile stamen ( $\times 2.7$ ).