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The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

C.B. Ball

Salix in Lundell - Flora of Texas

3(VI): 369-391, 1961

species & vars.

amygdaloides 2, 2b, 11
var. *wrightii* 2, 13
babylonica 2, 3b, 36
caroliniana 2, 3b, 15
exigua 3a, 3b, 23
var. *nevadensis* 3a, 25
" *stenophylla* 3a, 26
fragilis 2, 3b, 36
gooddingii
var. *variabilis* 2, 3b, 9
humilis
var. *rigidiuecula* 3b, 33
interior 2, 3b, 18
var. *angustissima* 3a, 3b, 21
" *pedicellata* 2, 3b, ~~36~~ 20
lesiolepis
var. *bracelinae* 3a, 3b, 30
nigra 2, 3b, 4
var. *lindheimeri* 2, 6
taxifolia 3a, 3b, 28

Index compiled by
W.A.A.

SALICACEAE. WILLOW FAMILY

Shrubs or trees with soft light wood, bitter bark, and simple alternate deciduous leaves; dioecious (sexes on separate plants); flowers in aments (catkins), which fall off as a unit, the staminate after pollen shedding, the pistillate after ripening and dispersal of seeds; flowers subtended by a single scale-like bract; stamens 2-many; fruit a 1-celled, 2-4-valved capsule, containing numerous seeds bearing a basal tuft of long silky hairs; style 1; stigmas 2.

Genera 2: Salix, the willows, and Populus, the aspens and poplars or cottonwoods, both widely distributed, but most abundant in north temperate and alpine-arctic regions.

Key to Genera , tardily deciduous or persistent;
Buds with a single scale; flower scales entire or merely toothed; flowers with a ventral and sometimes a dorsal gland; disk none; stamens 2-7 or 8; capsule 2-valved - Salix.
Buds with several imbricated scales; often resinous; flower scales lacerate, caducous; flowers borne on a broad cup-shaped disk; stamens 8-30 or more; capsule 2-4-valved
----- Populus.

SALIX (Tournefort) L. WILLOW, OSTER

Prostrate to ascending or erect shrubs (rarely herbaceous) to large trees, 1 cm. to 36 m. or more in height; budscale 1, with an adhering inner membrane; leaf-blades variously linear, lanceolate, oblanceolate, elliptical, oblong, ovate, obovate, oval, broadly oval, to orbicular (only first five categories in Texas), often stipulate, petiolate, green or glaucous beneath, hairy to glabrous, margins plane or somewhat revolute, entire, denticulate, serrulate, crenate, undulate, or undulate-serrulate; aments precocious, coetaneous, or serotinous, ascending, divaricate, or somewhat recurved (never pendulous), 1-10 or more cm. long; slender and flexuous to stout and dense; flower scales entire to erose-toothed, yellowish to black, mostly hairy, tardily deciduous or persistent; stamens 2 (sometimes united)-7 or 8, with one ventral and sometimes 1 dorsal gland; capsules with 2 valves recurving at maturity, lanceolate to ovoid, 2-9 mm. long, hairy to glabrous, sessile to pedicelled (0.5-3 mm.), with 1 ventral gland and sometimes 1 dorsal gland; style 1 (sometimes wanting), entire or more or less divided, stigmas 2, entire or more or less divided; no disk; seeds numerous, minute, 0.8-1.2 mm. long, oblong, bearing a tuft of silky hairs at base.

SOME OF MANY USES OF WILLOWS

The uses of willows date from remote antiquity. They include: emblems of mourning (weeping); ornament (both plants and flowers); shade, hedges, and wild-life cover; browse for livestock and for game and non-game animals and birds; nectar and pollen for bees; food for humans in arctic areas; soil-holding against water and wind erosion, including living mattresses or revetments for holding crumbling river banks and wholesale planting of burned-over mountain slopes; poles, posts, props, pulpwood, firewood, excelsior, and lumber; furniture, carriages, cages, and fish-weirs; baskets, hampers, crates, and valises; canoe spreaders and paddles; bowls, trays, ladles, and spoons; whistles, switches, and baseball and cricket bats; artificial limbs, shoes, divining rods, and "diamond willow canes; charcoal, especially for gunpowder and gas-mask making; and salicin from the bark, used for tanning and in medicine as a substitute for quinine and a tonic and febrifuge.

KEYS TO TEXAS WILLOWS BASED ON VEGETAL CHARACTERS

- A. Leaves narrowly lanceolate to ~~to~~ lanceolate, acuminate to long-acuminate, 5-10 or 12 cm. long, finely serrulate, vein islets beneath very small
 Leaves ~~glaucescent to glaucous~~ green beneath, linear-lanceolate, acuminate (Sect. Nigrae)
 Twigs brown to blackish (seasonal ^{somewhat} yellowish)
 Petioles short, more brownish, pubescent; blades broader, less narrowed at base - - - - - 1. S. nigra
 Petioles longer, more yellowish, glabrous; blades narrower, more narrowed at base - - - - - 1 a. var. Lindheimeri
 Twigs all yellowish, blades ~~all~~ narrow lanceolate 2 a. S. Gooddingii var. validicola
 Leaves glaucescent to glaucous beneath variabilis
- Petioles without glands near leaf base
 Twigs brownish, often pubescent; blades linear- to narrowly lanceolate, long-acuminate, often pubescent, dark green above (Sect. Bonplandianae).
 (S. longipes var Wardii) §. S. caroliniana
 Twigs yellow or yellowish, glabrous; blades yellowish-green above, glabrous
 Twigs slender but not greatly elongated or pendulous
 Blades lanceolate, or somewhat ovate-lanceolate; anthers lax:
 3. S. amygdaloides
 Blades linear-lanceolate or linguulate-lanceolate, anthers denser:
 3a. var. Wrightii
 Twigs enormously elongated and pendulous (weeping)
 10 S. babylonica
 Petioles with glands near leaf base; blades lanceolate, coarsely crenate-serrate, dark green above, glabrous
 11 S. fragilis
- B. Leaves linear or linear-oblong, acute, almost sessile, subentire to remotely and ~~ir~~ irregularly denticulate (Sect. Longifoliae)
 Blades yellowish-green, somewhat translucent, glabrous (more or less thinly hairy while developing)
 Blades 5-10 mm. wide, 5-10 or 12 cm. long: 5. S. interior
 Blades 2-5 mm. wide, 5-8 or 10 cm. long: 5a. var. pedicellata

Blades green, more opaque, silvery-silky or more or less gray-puberulent to gary-pubescent

Blades silvery-silky, at least until full-sized

6-10 or 12 cm. long, usually sharply denticulate, hairs persisting beneath, especially on midrib: 5b. var. angustissima

5-8 cm. long, mostly subentire, hairs persisting on both surfaces:

6b. S. exigua var. stenophylla

Blades more or less gray-puberulent or gray-pubescent,

Blades 5-8 or 10 cm. long, 5-10 or 12 mm. wide, permanently more or less pubescent: - 3-5 - - - 6. S. exigua

Blades 4-6 or 8 cm. long, 2-4 or 6 mm. wide, quickly glabrate to glabrous and yellowish-green: 6a. var. nevadensis

Blades 2-4 or 5 cm. long, 2-4 or 5 mm. wide, usually crowded, yew-like, pubescent, often becoming glabrate 7. S. taxifolia

C. Leaves linear-oblong or linear-oblancoate, 5-10 cm. long, distinctly petiolad, entire to undulate-serrulate, glaucous beneath, more or less pubescent

Blades mostly linear-oblancoate, pubescent while young, becoming glabrous, densely glaucous and veiny; mostly in mountain canyons. (Sect. Lasiolopes): - - - - 8a. S. lasioplepis, var.

Blades narrowly elliptical to oblancoate, densely pubescent while young, more thinly so and somewhat rugose in age; in low or upland prairies or open wasteland eastward: (Sect. Capreae): 9a. S. humilis var. rigidiuscula

Braceliinae

A. Flower scales yellowish, slowly deciduous; aments leafy-pedunculate-

Aments only one per peduncle, mostly coetaneous, occasionally subprecocious; capsules always glabrous (in Texas). (Vegetal keys recommended for the first four, closely related and difficult to separate by floral keys).

Stamens 3-7 or 8; native trees-

Fruiting aments (mature) 10-15 mm. wide; capsules 4-5 or 6 mm. long; pedicels 1-2 mm. long: 1. S. nigra, and 2. S. amygdaloides

Fruiting aments (mature) 15-20 mm. wide; capsules 5-6 or 7 mm. long; pedicels 1.5-3 mm. long

Capsules mostly 5.5-6.5 mm. long:

2a. S. Gooddingii var. willisii

Capsule mostly 4.5-5.5 mm. long:

4. S. caroliniana

Stamens 2 (occasionally 3 or 4 in S. fragilis); mature fruiting aments 7-10 mm. wide; introduced trees

Capsules 1.5-2.5 mm. long, sessile:

S. babylonica

Capsules 4.5-5 mm. long; pedicels 0.5-0.8 mm. long: S. fragilis

Aments (especially staminate) 2-4 per peduncle, the supernumerary later, at base of the first, serotinous; stamens 2; ovaries sometimes, and capsules less frequently, more or less hairy while developing (Sect. Longifoliae)

Aments 3-6 or 8 cm. long, scattered along the twigs

Capsules 8-9 or 10 mm. long; aments to 2 cm. wide

Capsules thinly silky to glabrous when young, glabrous when mature:

5. S. interior, and 5a. var. pedicellata

Capsules densely white-hairy while young, gray-hairy when mature:

5b. var. angustissima

Capsules 5-6 or 7 mm. long; aments to 1.5 cm. wide: 6. S. exigua and vars.

Aments 1-1.5 cm. long, crowded near the tips of twigs: 7. S. taxifolia

B. Flower scales blackish, persistent; aments precocious, sessile or subsessile

Aments 8-12 mm. wide; capsules 4-5 mm. long, glabrous: 8a. S. lasiolepis var. willisii

Aments 15-20 mm. wide; capsules 7-9 mm. long, pubescent: 9a. S. humilis, var. rigidiuscula

Braceliinae

1. *SALIX NIGRA* Marshall, Arbust. Am. 139. 1785; Coulter, Contrib. U.S. Nat. Herb 2:419. 1894 (in part); Britton & Br. Illustr. Fl., ed. 1, 1:494. 1896, ed. 2, 1:592. 1913; Small Fl. Southeast. U.S., ed. 1, 341. 1903, ed. 2, 341. 1913; Schneider, Journ. Arnold Arb. 1:5-8. 1919; Ball, in Deam, Trees of Indiana, rev. ed 1, 36-38, pl. 10. 1921; Massey & Ball (Willows of Va.), Va. Polytech. Inst. Bull. 37(9):22. 1944.

Salix of Texas

Salix falcata Pursh, Fl. Am. Sept. 2:614. 1814.

Salix nigra Marsh. var. *falcata* (Pursh) Torrey, Fl. N.Y. 2:209. 1843; Blake, Rhodora 15:163. 1903.

Tree to 20 m. or more in height, with 1-3 or 4 trunks, often leaning, and dark-brown or blackish rough, flaky bark; branchlets slender, round, the newest growth yellowish and often pubescent, the successively older yellowish-brown, brown, and dark-brown, and glabrous, brittle at base; buds ovate, 2-3 mm. long; stipules semi-cordate, acute, serrulate, minute to 10 or 12 mm. long, inner surface not glandular; blades linear-lanceolate to narrowly lanceolate, long-acuminate, often falcate, acute to somewhat rounded at base, 6-12 cm. long (much larger on vigorous shoots and sprouts), finely serrulate green on both sides but slightly paler beneath, vein islets beneath very small, often pubescent while young; petioles 4-8, or up to 10-12, mm. long, usually pubescent above; anthers ochraceous (appearing with the leaves), slender, laxish, 3-7⁵ cm. long, 8-10 (staminate) or 12 (pistillate) mm. wide, on slender leafy peduncles 1-3 cm. long; scales oblanceolate to obovate, pale yellow, crisp-hairy, deciduous; stamens 3-7, the filaments pubescent below; capsules ovoid to ovoid-conic, 3-5 or rarely 6 mm. long, rounded at base, brown, glabrous; pedicels 1-2 mm. long, glabrous; styles about 0.2 mm. long, entire, stigmas 2, entire, equalling the style; gland 1, ventral, short, stout.

-- Common in alluvial soils near water bodies, New Brunswick and New England, south to Florida and west to southern Minn., southeastern Nebr., eastern Kansas, Oklahoma, and Texas. In Texas it extends west to about the 101st meridian (Floyd, Crosby, ~~Maricopa~~ Mitchell, Tom Green, and Val Verde Counties) and south to Cameron Co. Probably the most common species in its range.

1. *SALIX NIGRA* Marshall, Arbust. Am. 139. 1785; Coulter, Contrib. U.S. Mt. Herb. 1:
2:419. 1894 (in part); Britton & Dr., Illustr. Fl., ed. 1, 494. 1896, - ed. 2, 1:
592. 1913; Small, Fl. Southeast. U.S., ed. 1, 341. 1903, - ed. 2, 341. 1913;
Schneider, Journ. Arnold Arb. 1:5-8. 1919; Ball, in Deam, Trees of Indiana, rev.
ed. 1, 36-38, pl. 10. 1921; Mossey & Ball (Willows of Va.), Va. Polytech. Inst.
37(9):22. 1944.

Salix falcata Pursh, Fl. Am. Sept. 2:614. 1814.

163.

Salix nigra var. *falcata* (Ph.) Torr. Fl. N.Y. 2:209. 1843; Blake, Rhodora 15:126. 1903.

Tree to 20 m. or more in height, with 1-3 or 4 trunks an dark brown or blackish
trunk rough, flaky bark; branchlets slender, round, the newest growth yellowish and often
pubescent, the successively older yellowish-brown, brown, and dark brown and glabrous,
brittle at base; buds ovate, 2-3 mm. long; stipules semi-ovate, acute, serrulate,
minute to 10 or 12 mm. long; inner surface not glandular; blades linear-lanceolate
to narrowly lanceolate, long-acuminate, often falcate, acute to somewhat rounded at
base, 5-12 cm. long, much larger on sprouts and vigorous shoots, finely serrulate,
green on both sides but slightly paler beneath, vein islets beneath very small, often
pubescent with ascending white hairs; petioles 4-8 or 10 mm. long, usually pubescent
above; aments ochraceous (appearing with the leaves), slender, laxish, 3-7 cm. long,
8-10 (staminate) or 12 cm. (pistillate) wide, on slender leafy peduncles 1-3 cm. long;
scales oblanceolate to obovate, pale yellow, crisp-hairy, deciduous; stamens 3-7, the
filaments crisp-hairy below; capsules ovoid or ovoid-conic, 3-5 or mm. long, brown,
rounded at base, brown, glabrous; pedicels 1-2 mm. long, glabrous; styles about 0.2
mm. long, entire, stigma 2, entire, equalling the style; gland 1, ventral, short,
stout,

~~Common in swamps and along water bodies, New Brunswick and New England west to southern~~
1/4 ~~Minnesota, southeastern Nebraska, and central and southern Texas. Probably the most~~
abundant species in its range.

(Check shape of capsule, length of
style box as distribution)

Distribution by counties, collectors, and collection numbers.

Vernacular name: "black willow".

Authors (as Britton & Br., Illustr. Fl. and Man.), who assign to S. nigra a range extending westward from southwestern Texas to California, are including S. Gooddingii and var. vallicola in this species. Coulter (l.c., above) undoubtedly includes the var. vallicola when he says: "bordering over the waters of most streams of western Texas." He also has inserted a "Var. Wrightii Anders." under S. nigra but this variety really belongs to S. amygdaloides Anderson.

12/18/21
W.D.

Anderson Co., *Eucla white-house* 11407. G. nigra. Galley Texas

Angelina Co., C.L. and A. A. Lundell 13359, 13362, 13361; Effie Beon s.n. in 1934.

Archer Co., *Eucla Whitehouse* 9713. Bexar Co., V. Harvard s. n. in March, 1883; G. Jerry

s. n. Bowie Co., Delzie Demaree 20777; Lundell & Lundell 13983. Brazoria Co., P. J.

Palmer 13137. Brazos Co., *V.L. Cory 51598*; H. Hess 1599, 1600; R. S. Reeves 714, 763; Inward Timmons,

1598; W. H. Williams 1601. Calhoun Co., *Whitehouse 11412*; Cameron Co., L. H. Pammel s. n. in 1923; Robert Runyan 624;

R. A. Studhalter 1165. Cass Co., E. McClung s. n. in 1926. *Clay Co., Whitehouse 10817*; Crosby Co., s. l. & s. n.

in 1926. Dallas Co., Mary Hines s. n. in 1925; Lundell & Lundell 13398. Floyd Co.,

D.S. Correll 13119;

Whitehouse and Norwand s. n. in 1929. Fort Bend Co., W. L. Bray s. n. in 1899. Har-

ris Co., George L. Fisher 23, 24; Palmer 13122. Harrison Co., *D.S. Correll 13232*; Lloyd H. Shimmers 7573.

Henderson Co., Shimmers 7053. Kimble Co., C.R. Ball 1537. Llano Co., Whitehouse

s. n. in 1933. Marion Co., Lundell & Lundell 13957. Mitchell Co., Richard W. Pahl

4891, 4928; Orange Co., *Whitehouse 11410*; ~~Frank~~ 4871; Palmer 13771. Rockwall Co., Shimmers 7449. Rusk Co., Henderson High School

5729; Henderson School No. 22 s. n. in 1928 (possibly the same collection). San 1549

Starling Co., H.R. Reed s.n. on May 14, 1946; *Farrand Co. Whitehouse 11408*, Augustine Co., Palmer 13250. Taylor Co., W. L. Tolstead 7194; Whitehouse 9625. Tom

Green Co., *V.L. Cory 38826*; Travis Co., B. C. Sharp s. n. on April 10, 1937 (3

sheets); Whitehouse s. n. in 1933. Val Verde Co., W. P. Carr 162, 163; Palmer 13335.

Van Zandt Co., Lundell & Lundell 13949. Walker Co., Carl Hartmann s. n. on 4/5 &

5/26/ 1912. Wichita Co., Whitehouse 9570, 9749. Wilbarger Co., Effie Beon 213 in

1936; Whitehouse 9865, 10940, 10941, 10954. Wise Co., *Whitehouse 15087*.

Vernacular name: "Black Willow".

Neither *S. falcata* nor var. *falcata* can be recognized because falcate leaves may be found on nearly every specimen of *S. nigra* having mature foliage, especially when growing under very favorable conditions. Authors who assign to *S. nigra* a range extending westward from southwestern Texas to California are including *S. Gooddingii* and its variety *vallicola* in their concept of *S. nigra*. Coulter (l.c. above) undoubtedly included *S. Gooddingii* var. *vallicola* in the *S. nigra* which he describes as "bending over the waters of most streams of western Texas". Coulter also describes a "Var. *Brightii* Anders." under his *S. nigra*, but Anderson's variety has leaves glaucous beneath and must be arranged as a variety of *S. aryzonensis* if recognized at all.

la. *SALIX NIGRA* Marshall var. *LINDHEIMERI* Schneider, Bot. Gaz. 65:9-12. 1918; Schneider, Journ. Arnold Arb. 1:8. 1919; Ball, Castanea 3:5. 1938. (Willows Southern States)

Differs from the species in seasonal branchlets mostly less pubescent or sooner glabrous; stipules with some glands on inner surface; blades narrower, mostly 7-9-12 mm. wide or even 15-18 mm. on vigorous sprouts, the base more attenuate toward the petiole; petioles longer, 6-10 or 14 mm. long, glabrous or sometimes pubescent as the leaf unfolds; aments often laxer because of longer pedicels; up to 9 cm. long (Nealley 29, Harris CO.), capsule longer, to 6 or rarely 7 mm. long, ~~Mundell & Lindell 13352, 13353~~, usually more lanceolate; staminate flowers with two glands, the dorsal more or less 3-parted (digitate); pistillate flowers with one ventral gland, short, ovate-rectangular, truncate. — This southwestern variety of the species, with similar habitat, occurs from eastern (Crittenden Co.) and northern (Izard Co.) Arkansas and southeastern Kansas (Neosho Co.) south-southwestward across Oklahoma and Texas to northern ^{east} Mexico. It occurs with the species throughout Texas west to the 100th or 101st meridians (Wheeler, Donley, Hale, Irian, Val Verde Cos.) but has not yet been found in the three western tiers of counties, except Hale, or in the great southwestern extension, below New Mexico.

The type is Lindheimer 415, "Comal County, New Braunfels, on the Guadalupe and other rivers, 1850", as seen in the Gray and Missouri Botanical Garden Herbariums. Schneider states that No. 415 is the same as No. 1189, distributed by the Garden as *S. Humboldtiana*, and recorded by Blankinship (Mo. Bot. Gard. Ann. Rept. 18:194. 1907) as "Lindheimer) 415, Piedernales River, (March) 1850". It is the only specimen certainly from Texas listed by Schneider in his original paper. No. 1189 in the U.S. National Herbarium is ~~from~~ an early spring collection with very young leaves and pubescent petioles. Coulter probably included this variety with his *S. nigra*. On the east, var. *Lindheimeri* meets var. *altissima*, on the west it contacts the closely related *S. Gooddingii* var. *variabilis* ~~vallicola~~, and on the south it meets *S. Humboldtiana*.

Atascosa Co., C.L. & Amelia A. Lundell 18779, 13859; Bandera Co., E. J. Palmer 11529. Bell Co., Lundell & Lundell 13880. Bexar Co., C.R. Ball s.n. in 1906. Blanco Co., Lundell & Lundell 13849. Bowie Co., D.S. & H.B. Correll 12403. Brewster Co., J.A. Moore & J.A. Steyermark 3388. Briscoe Co., E.L. Reed & Delzie Demaree 7624. Burnet Co., Correll & Correll 12740. Cameron Co., Mrs. A.M. Davis s.n. in 1941; L.H. Pammel 1, 2, 5, in 1929. Childress Co., Eula Whitehouse 10734. Clay Co., Whitehouse 10697. Collingsworth Co., V.L. Cory 50199. Comal Co., F.J. Lindheimer 1189 (see text); ^HW.B. Parks & V.L. Cory 5983. Cooke Co., Correll & Correll 12940; Whitehouse 15982, 15705. Dallas Co., W.M. Glatfelter s.n. in 1898; Lundell & Lundell 13393, 13653. Denton Co., Whitehouse 15602. De Witt Co., Marguerite Risdal s.n. in 1941. Dickens Co., Fredk. V. Coville 1870. Dimmit Co., Lundell & Lundell 13809. Donley Co., Lundell & Lundell 14507. Ellis Co., Cory 53370. Erath Co., L.C. Gough s.n. in 1921; Palmer 14184. Falls Co., Lundell & Lundell 13891. Fort Bend Co., W.L. Bray 112. Gillespie Co., Lundell & Lundell 13947. Gonzales Co., Cory 41323. Grayson Co., Rogers McVaugh 7123. Grimes Co., Cory 50634. Guadalupe Co., Lundell & Lundell 13878; Whitehouse 11409. Hale Co., Whitehouse 9938. Harris Co., B.F. Bush 2 in 1899; Geo. L. Fisher 477; Geo. C. Nealley 29 in 1888; Palmer 13116; R.A. Studhalter 3933. Harrison Co., Lloyd H. Shimmers 7569. Hays Co., Lundell & Lundell 13852, Palmer 11590a; G. M. Watkins s. n. in 1929. Hidalgo Co., Chas. R. Cameron 66; Lundell & Lundell 13793; Whitehouse 249. Hopkins Co., Shimmers 7480. Irion Co., Cory s.n. in 1925; Palmer 12420. Jeff Davis Co., D.S. Correll 14028, 14057. Johnson Co., Cory 53340. Kaufman Co., F.J. Tyler s. n. in 1904. Kerr Co., Ball 1529; Cory 50469, 50520, 50541, 51741; Lundell & Lundell 13833. Kinney Co., Correll 14090; Whitehouse s.n. (5 shts.) in 1933. Lamar Co., Delzie Demaree 11999. LaSalle Co., Lundell & Lundell 13877. Liberty Co., Correll 13363. Live Oak Co., Lundell & Lundell 13780. Llano Co., Parks & Cory 6336. Madison Co., Correll & Correll 12611. McLennan Co., Lundell & Lundell 13882. McMullen Co., Lundell & Lundell 13862, 13864, 13865. Medina Co., Correll 14134. Menard Co., Ball 1548. Mitchell Co., Shimmers 8413. Montague Co., Cory 50084. Pannaola Co., Shimmers 7596. Real Co., Cory 51869; Lundell & Lundell 13827. San Saba Co., Correll & Correll 12682. Shackelford Co., C.H. Muller 8569. Starr Co., David Griffiths 6482; Lundell & Lundell 15797. Tarrant Co., Killian s.n. in 1926 or 1927; Albert Ruth 364; Whitehouse 10663, 15485. Taylor Co., Ball 1556; ⁸W.L. Tolstead 7019, 7027, 7098, 7315, 7323. Tom Green Co., Cory 39301. Travis Co., Ferguson s.n. in 1901; Lundell & Lundell 13856; McKee & Wesley 3918; A. Pratt 3695; B. C. ^HTharp s.n. in 1937; J. L. White 4713; Whitehouse s.n. in 1933, 11406. Uvalde Co., Lundell & Lundell 13814; Palmer 13342, 14485. Val Verde Co., Ball 1526; Cory & Ness s.n. in 1924; Cory 38091, 41696, 44532, 49360; J.N. Rose 11622. Walker Co., Royal A. Dixon 541; Palmer 13395. Washington Co., Eunice Brackett s. n. in 1939. Webb Co., Lundell & Lundell 13808. Wheeler Co.,

S. nigra v. *lindheimeri*

~~Lindheimeri~~ 2

Whitehouse 10589, 10958

~~MISSOURI BOTANICAL GARDEN~~ Cory 50238. Wilbarger Co., Cory 50118, Williamson Co.,

Pall 47; Lundell & Lundell 13879; Miss E.L. Woods s.n. in 1920. Wilson Co., Lundell
Whitehouse 15210, 15304.
& Lundell 13857. Wise Co., Shinnery 7937, Zapata Co., Lundell & Lundell 13800.

Zavala Co., Lundell & Lundell 13810. ----- Co. (?), Chronister, Mary J. White
56 in 1911. No locality, Dr. Eman. Meyer, s.n. in 1844 (USNH).

Vernacular name: "Lindheimer Black Willow".

In 1918, Schneider said, after his full-page Latin description:-

"It is not always easy to separate it from typical *nigra* from northern Texas, but the leaves are usually narrower or at least more attenuate at the base, with a comparatively much longer petiole. The young branchlets and the petioles are glabrous or become so very soon".

A study of some 200 sheets of the variety, of which about one-half were from Texas, shows that these statements are true, with some qualifications. Just unfolding leaves of var. *Lindheimeri* often still have the short and pubescent petioles of the species. Late-autumn specimens of *S. nigra* may show some elongated glabrous petioles like the variety.

Schneider states further that "The fruits of var. *Lindheimeri* are somewhat larger (6-7 mm. long) than those of the typical form (4-5 mm.)." The capsules of the variety do reach these lengths, but those of the species also sometimes reach 6 mm. in length. Schneider did not mention the longer pedicels in the variety. They reach maximums of 2.5 mm. (Lundell & Lundell 13852) and 3 mm. (L. & L. 13857), which accounts for the laxer sements.

2a. SALIX GOODINGII Ball, var. varicosa (Dudley)VARIABILIS Ball (ined.)

Gooding, Leslie H. (Willows in Regia VIII), U.S. Dept. Agric., Soil Conserv. Serv., Regional Bull. 65:6-7, 4 illus. (mimeogr. (letter-size)). 1940.

Salix Goodingii Ball (the three following citations include var. varicosa with the species): Schneider, Bot. Gaz. 65:12-13. 1918; Schneider, Journ. Arnold Arb. 1:9.1919; Ball, Bot. ^{Cal.} 72:227-234, figs. 2-4. 1921 (amended description);Salix nigra Marsh., var. vallicola Dudley ^(in part) in Abrams, Fl. Los Angeles & Vicin., 100. 1904; Suppl. ed. 100. 1911.Salix vallicola (Dudley) Britton ^(in part) North Amer. Trees, 184, fig. 141. 1908.

with 2-4 trunks, (or 11 dm., Gooding Sal.-85, N.Mex.)
 Trees to 12 or 15 m. high and 3-9 dm. in diameter, with gray, furrowed bark;
 branchlets slender, straight, round, yellowish or yellowish-brown, the seasonal or-
 ten pubescent or puberulent, becoming glabrate or glabrous, older glabrous; bud-
 scales 2-4 mm. long, colored and clothed as the twigs; stipules 1-3 mm. long, or 7-10
 mm. on vigorous shoots, semi-cordate to subreniform or subulate, glandular-denticu-
 late, often more or less gland-bearing on the upper (inner) surface; petioles 3-6
 or 10 mm. long, yellowish, often pubescent while developing, becoming glabrate or gla-
 brous; blades linear-lanceolate to narrowly lanceolate, often somewhat falcate, 8-15
 mm. wide by 6-10 cm. long, or to 2.5-3 by 14-17 cm. on vigorous shoots, acute or acut-
 ish at base, long-acuminate at apex, sometimes somewhat pubescent while unfolding,
 especially at base and on the midrib beneath, usually glabrous at maturity, green or
 yellowish-green on both sides, veins prominent above, vein islets very small beneath;
 margins finely glandular-denticulate with about 8 teeth per cm. Aments coetaneous,
 numerous, 3-6 or 8 cm. long, the staminate to 1.2 cm. and the pistillate to 1.5-2 cm.
 wide, lax, terminating lateral seasonal shoots bearing 3-6 small leaves; scales lan-
 ceolate-oblong to $\overline{XX}$ oblanceolate, or the staminate obovate, occasionally toothed
 or even subaculate at apex, 2.5-3 mm. long, yellow, more or less densely pilose
 throughout, or glabrate on outer apical portion, deciduous; stamens 3-6, filaments
 pilose on lower third or half; ovaries usually glabrous, sometimes thinly pilose;
 capsules ovate-conic, 5 3.5-7 mm. long, glabrous, sometimes minutely roughened (papillate);
 styles 0.2-0.4 mm. long, stigmas 2, divided, 0.2-0.5 mm. long; pedicels $\overline{XX}$ 1.5-3 mm. long.

Vernacular Name: "Southwestern Hack Willow"; "Bald-fruited Gooding Willow."

Ver. reticulata differs from the species in having twigs, petioles, and unfolding blades less pubescent, or more quickly glabrate, or glabrous; the ovaries glabrous or only thinly pilose; and the capsule glabrous. Incomplete specimens are difficult to distinguish from *S. nigra* var. *lanceolata*, into which range it penetrates. The yellow twigs and usually pubescent petioles of *ver. reticulata* are distinguishing characters.

The "*S. nigra*" of southwestern authors, and of eastern authors assigning a range beyond Texas, is this variety, or the species, or both. "*S. Wrightii*" of Weston & Standley (Contr. U.S. Natl. Herb. 19:160. 1919) and the "*S. nigra* var. *Wrightii*" of Coulter (ibid. 2:119, 1894) are this variety.

In alluvial soil, near water bodies, California and southern Nevada to western Texas and northern Mexico. In Texas, this variety extends eastward from New Mexico into all of the mountainous counties in the southwestern corner, with one specimen from Starr Co., far down the Rio Grande in southern Texas. It crosses the divide east of the Pecos River to reach Hale, Lubbock, and Tom Green counties in west central Texas, and moves eastward down the tributaries of the Red River to Deaf Smith and Donley counties in the Panhandle.

V.L. Cory 53185, 53188;
Brewster Co., H.J. Cottle g. n. in 1926; Hugh Outler 21404; H. C. Hanson g. n. in 1919; C.H. Miller 7964; H.B. Parks & V.L. Cory 6952; Gar R. Sperry 141, 1365, 1366, 1432, 1453, 1863, 1864, T 450, T 624; R. A. Studhalter 1021; Burton H. Wernick 647, 1107. Culberson Co., G.L. and Amelia A. Lundell 14382, 14384. Deaf Smith Co., Lloyd H. Shimmers 8316. Donley Co., Shimmers 8013. El Paso Co., Valery Harvard g. n. in 1931 (2 sheets), ~~Harvard 8013~~, another Texas specimen/without number or locality, but probably from El Paso Co.; Marcus E. Jones 3760 (in 1894); George R. Vasey g. n. in March, 1891; 267 in April, 1891; Julia Whitehouse 8329, 8334, 8335, g. n. in 1932. ~~Hale Co., E. L. Reed & Debbie Deakne 7619.~~ Jeff Davis Co., Harvard g. n. in April, 1893; L. C. Minckley g. n. in 1936; Lundell & Lundell 14245, 14252; Miller 8179; E. J. Palmer 23091; Parks & Cory 6912; Sperry T 3, T 4, in 1936; Studhalter g. n. in 1925; S. M. Tracy 187; Wernick T 122 in 1936. Lubbock Co., H.C. Sharp g. n. in 1934. Presidio Co., Hanson 396, 655; Minckley 941, 1528, 2376, 2673, 2729, 3125; Douglas C. Ingram 2665; Miller 8129, 8177; Lundell and Lundell 14282, 14286; Starr Co., Parks and Cory 6525, 6526. Tom Green Co., Parks & Cory 19428, 19429, 19430.

Vernacular Name: "Southwestern Black Willow"; "Bald-fruited Goodding Willow."

Var. vallicola differs from the species in having twigs, petioles, and unfolding blade less pubescent, or more quickly glabrate, or glabrous; the ovaries glabrous or only thinly pilose; and the capsules glabrous. Incomplete specimens are difficult to distinguish from S. nigra var. linghin-ri, into whose range it penetrates. The yellow twigs and usually pubescent petioles of var. vallicola are distinguishing characters.

The "S. nigra" of southwestern authors, and of eastern authors assigning a range beyond Texas, is this variety, or the species, or both. "S. Wrightii" of Wooten & Standley (Contr. U.S. Natl. Herb. 19:160. 1915; and the "S. nigra var. Wrightii" of Coulter (ibid. 2:419, 1894) are this variety.

S. gooddingii v. *vallicola* Tuckerm.

Distribution of var. vallicola is shown by States and Counties. The latter are primarily arranged roughly from north to south and secondarily from east to west in each State, or from the periphery toward the center of distribution of species and variety combined. Abbreviations for the herbariums containing cited specimens are: GR., Carleton R. Ball; FS., U.S. Forest Service, Dept. Agric.; NA., National Arboretum; SMU., Southern Methodist Univ.; SRSTC., Sul Ross State Teachers' College; TAMC., Texas A. & M. College; TU., Texas University; USN., U.S. National Herbarium.

TEXAS. Hemphill Co.: Large tree on no. side Canadian R., near Canadian, D. S. & H.B. Correll 13067, July 6, 1946 (SMU). Donley Co.: Tree up to 6 m. tall, with platy gray-brown bark, occasional on margin of Lelia Lake, 6 mi. nw. of Hedley, Lloyd H. Shinnars 8013, June 21, 1945 (SMU). Deaf Smith Co.: A few bushes or small trees up to 3 m. tall, at margin of water hole in park on Tierra Blanca Creek, east side of Hereford (with S. amygdaloides and S. exigua var. nevadensis), Shinnars 8318, June 27, 1945 (SMU). Hale Co.: Shrub 6 ft. high near playa lake (dry most of time), between Abernathy and Petersburg, E.L. Reed and Delzie Demaree 7610, May 10, 1930 (USN). Lubbock Co.: Lubbock B.O. Tarp S. n., April 28, 1934 (UT). Tom Green Co.: South Concho R. at Cristoval, H. B. Parks & V. L. Cory 19428, 19429, 19430, (TAMC). Starr Co.: Rio Grande, Parks ~~and~~ Cory 6525, 6526, May 25, 1933 (TAMC, as S. Wrightii), (probably a flotation from far up river. CRB.). Pecos Co.: Tree 10 m. tall, 1.5 dm. in diam., frequent along small stream in City Park, Ft. Stockton, Cory 51045, May 3, 1946 (SMU).

Brewster Co.: Trees 6-8 m. tall, 1.5 dm. in diam., frequent, Alpine Creek and Kokernot Springs, Alpine, Cory 53185 (SMU), 53186 (SMU, USN), May 18, 1946; Kokernot Spring Alpine, H. J. Cottle S. n., Mar. 27, 1926 (SRSTC); 14 mi. east of Costolon, Hugh Cutler 21404, May 12, 1937 (TAMC); Alpine, H. C. Hanson S. n., May 24, 1919 (); Shrubs 6 and 3 ft. high, resp., Chisos Mtns., Basin, in stream bed at window, C.L. & Amelia A. Lundell 14610, 14611, Aug. 4, 1946 (SMU); Tree 30 ft. high, on sandy bar of the Rio Grande, near Santa Elena Canyon, Lundell & Lundell 14637, Aug. 6, 1946 (SMU); Chisos Mtns., C.H. Mheller 7964, July 12, 1931 (SMU); Oak Canyon, Parks & Cory 6952, July, 1933 (TAMC, as S. Wrightii); Flat sandy areas along the Rio Grande, so. of Chisos Mtns., Omer E. Sperry 141, June 21, 1936 (SRSTC, USN); San Francisco Creek near Hot Springs, Sperry 1355, 1356, Apr. 14, 1938 (SRSTC, USN); Mouth of Tornillo Creek, Hot Springs, Sperry 1452 (USN), 1454, July 4, 1938 (both SRSTC); Old Ft. Pena Blanca Spring, about 3 mi. sw. of Marathon, Sperry & 450, T ~~25~~ 624, Mar 26, 1938 (SRSTC); Ridge Spring, about 12 mi.

Most of the specimens listed were labelled S. nigra or S. Gooddingii or as one of their varieties. Where they were received under any other name, it is included in the citation.

(Brewster Co., cont'd.)

so. of Marathon, Sperry 1863, 1864, Feb. 23, 1941 (SRSTC); Alpine, R. A. Studhalter 10 April, 1925 (, USN); Common willow around Boquillas, Barton H. Warnock 647, Aug. 8, 1937 (SRSTC); Infrequent in canyon no. of Fisk Canyon, Chisos Mtns., area, Warnock 1107, Aug. 17, 1937 (SRSTC, USN).

Presidio Co. : Clump of trees near spring, Alpine, Hanson 396, Apr. 3, 1919 (USN); Abundant in Pinto Canyon, 17 mi. no. of Ruidosa, Hanson 655, Apr. 13, 1919 (USN); Medium trees just below San Estaban Dam, 12 mi. so of Marfa, L. C. Hinckley 941, April, 1937 (UT); A few small trees in old creek bed about 1 mi. sw. of rimrock hill, Candalaria-Valentine road, Sierra Tierra Viaja, alt. 1000 m., Hinckley 1528, Mar. 29, 1941 (CRB, UT); In creek bed just above RR. bridge below Alamo, about 50 mi. so. of Marfa, alt. about 3100 ft., Hinckley 2376, Feb. 14, 1942 (CRB, UT); Several medium-sized trees in bed of Capote Creek, just below Capote Fall, Brite Ranch, Tierra Viaja Mtns., alt. 3700-3800 ft., Hinckley 2673, Mar. 28, 1943 (UT); Medium trees rather plentiful below mouth of Cottonwood Canyon, Esby Miller Ranch, Sierra Tierra Viaja, alt. about 4800 ft., Hinckley 2729, June 11, 1943, (CRB, UT); Medium to fairly large tree at spring, old Dawson place, se. side of Shafter Mtns., alt. about 4000 ft., Hinckley 3125, July 18, 1944 (CRB, UT); SW. of Marfa, Douglas C. Ingram 2665, Apr. 14, 1929 (CRB, F.S. 96438) originally mistaken for S. Wrightii; Trees to 40 x 2 ft., common along the creek bank, Mexican Canyon, tributary of Fresno Canyon, (sw. part of Co.), C.H. Miller 8129, June 21, 1945 (SMU); Tree 30 x 1 ft., sparse in small canyon, San Estaban Lake, 12 mi. so of Marfa, Miller 8177, July 5, 1945 (SMU); Tree 15 ft. tall, 6 in. in diam., and 20 ft. x 14 in., resp., above the river bridge, along the Rio Grande, Presidio, Lundell & Lundell 14282, 14286, Aug. 5, 1945 (SMU).

Jeff Davis Co.: On floor of Madera Canyon, Favis Mtns., D.S. Correll 14048, Aug. 20, 1946 (SMU); Young trees 4-5 ft. high, in Mesquiz Valley, 7 mi. se. of Ft. Davis, Cory 53051, May 15, 1946 (SMU); Tree with 5 trunks 10 m. tall, 2.5 dm. in diam., branchlets slender, drooping, unique in being heavily fruited, Mesquiz Creek, 11.3 mi. se. of Ft. Davis, Cory 53069, May 16, 1946 (SMU); Occasional trees 6-7 m. tall 1.5 dm. in diam., Mesquiz Creek, 7 mi. se. of Ft. Davis, Cory 53108, July 16, 1946 (SMU)

Ft. Davis, Valery Havard s. n., in April, 1883 (USN); Ft. Davis, Hinckley s. n., Oct. 21, 1939 (UT, 2 sheets); Water sprout from tree 30 ft. high, 14 in. in diam., along stream, Limpia Canyon, 10 mi. from Ft. Davis, Lundell & Lundell 12245, Aug. 4, 1945 (SMU); Tree 15 ft. high, 3 in. in diam., as last. Lundell & Lundell 14252 (SMU); Trees to 35 x 1 ft., Musquiz Creek, 10 mi. nw. of Alpine, Miller 8179, July 18, 1945 (SMU); Along Limpia Creek near Ft. Davis, E.J. Palmer 32091, Oct. 8, 1926 (UT); Musquiz Canyon swamps, about 15 mi. no. of Alpine, Sperry T 3, T 4, Mar. 28, 1936 (SRSTC, USN, as S. Wrightii); Musquiz Canyon, R. A. Studhalter s. n., April 24, 1925 (SRSTC, as S. Wrightii); Davis Mts., S. M. Tracy 187, Apr. 24, 1902 (USN, as S. ^{longipes} ~~longipes~~ venulosa); Infrequent at Musquiz Swamp, Warnock T 122 (2 sheets), Mar. 28, 1936 (USN, UT).

Culberson Co.: Along stream above Pine Spring Camp, Guadalupe Mtns., D.S. Correll 13926, Aug. 15, 1946 (SMU); Along creek east of Guadalupe Mtns., no. of Pine Springs, Lundell & Lundell 14382, Aug. 8, 1945 (SMU); 11 mi. se. of N. Mex. boundary line, Lundell & Lundell 14384, Aug. 9, 1945 (SMU);

El Paso Co.: On bank of Hueco Tanks, Hueco Mtns., Correll 13784, Aug. 12, 1946 (SMU) Shrubs or small trees 3-6 m. tall, to 1.5 dm. in diam., Hueco Tanks, 32.5 mi. no. of El Paso, Cory 52922, Apr. 27, 1946 (SMU); ~~near~~ No loc., Valery Havard s. n., in Nov., 1881 (USN, 2 sheets); Another ~~near~~ Texas specimen with no data but probably from El Paso Co (USN); El Paso, Marcus E. Jones 3760, Apr. 23, 1884 (USN); No loc., George R. Vasey s. n., in Mar., 1881 (USN, 2 sheets); Vasey 267, in Apr., 1881 (USN); Hueco Mtns., Eula Whitehouse s. n., Mar. 27, 1932 (UT); El Paso, Whitehouse 8335, Apr. 9, 1932 (UT, 2 sheets, as S. Wrightii); Eagle Spring, Whitehouse 8334, Apr. 23, 1932 (UT, as S. amygdaloides Wrightii); Glint, near El Paso, Whitehouse 8329, June 1, 1932 (UT, as S. amygdaloides Wrightii).

3. SALIX AMYGDALOIDES Anderssen, Ofvers. Vet.-Akad. Förrhandl. 15:114. 1858 (Nörd-amerika Pilarter). This paper was published approximately simultaneously in Proc. Amer. Acad. Arts & Sci. 4:50-78 (S. amygdaloides pp. 53-54) 1858 (~~Salix~~ Salices Boreali-Americanae: A Synopsis of North American Willows), and widely distributed as a reprint, pp. 1-32. Britten & Gr., Illustr. Fl. 1:495. 1896; ed. 2, 1:593. 1913 (Texas not named); Britten, Man., eds. 1, 2, & 3, 313, 1901, 1905, 1907 (Texas not named); Small, Fl. Southeast. U.S. ed. 1, 341, 1903, ed. 2, 341. 1913; Ball, in Dean, Trees of Ind., rev. ed. 1, 38-40, pl. 11. 1921; Ball, in Coulter & Nelson, New Man. Rocky Mtn. Bot. 129. 1909; Rydberg, Fl. Rocky Mtns. & Adjac. Plains, 191. 1917.

Salix nigra Marsh., subsp. amygdaloides Anderss., Ken. Svensk. Vet.-Akad. Handling. 6:21. 1867 (Menog. Salicum).

Salix nigra Marsh., var. amygdaloides Anderss., in DC. Prodr. 16(2):201. 1868.

Trees to 12. m. high, yellowish-green in mass color; trunks 1-3 or 4, often leaning; bark furrowed, brown to dark brown; branchlets long, slender, usually pendulous at tip, yellow or the older grayish, glabrous; bud-scales mostly 1-3 mm., rarely to 5-6 mm. long, yellow, glabrous; stipules minute or usually wanting, but sometimes, on vigorous broad-leaved sprouts, large to very large, 0.5-1 or 2 cm. wide by 1-1.7 or 2.2 cm. long, lanceolate-reniform, reniform, or the largest nearly semi-lunate to subobovate, acute to apiculate (mostly mid-western); petioles slender, twisted, 5-15 or 20 mm. or rarely 22-28 on vigorous shoots, yellow, glabrous; leaf-blades narrowly to broadly lanceolate, acute to rounded at base, gradually to abruptly acuminate at apex (the lower often obovate and obtusish while unfolding), 5-10 cm. long by 1.5-3 cm. wide, on vigorous shoots up to 11-14.5 by 3-4.5 cm., finely serrulate, yellowish-green above, glaucescent to glaucous and with very small vein islets beneath, glabrous. Aments coetaneous, slender, 3-6 cm. long in flower, the pistillate ~~in~~ 5-8 or rarely 10-11 cm. long ^{and lax} in fruit, on leafy ~~peduncles~~ peduncles 2-3 or rarely 5-6 cm. long and bearing 3-5 or 8 leaves; flower scales lanceolate or broader, glabrate outside, crisp-villous inside, yellow, deciduous; stamens 3-7, the filaments crisp-hairy below; capsule lanceolate, ^{5.5} 4-5 or 6 mm. long, glabrous; pedicels filiform, 2 mm. long, glabrous; styles and stamens exceedingly short.

-- Alluvial soil, near water bodies, Quebec to southeastern British Columbia (east of Cascade Mountains), south to Pennsylvania, southwest Kentucky, western Texas, New Mexico, ^{(Juniper Mts. (near Apache Co.) 7000 ft.)} northeast Arizona, and northwest Nevada. In Texas it occurs in the Panhandle and far southward in Ward and El Paso Counties, these apparently being extensions of its ~~range~~ New Mexican range down the Rio Grande to Don Ana Co., and down the Pecos to Eddy Co., from its abundant occurrence in the northern half of the State.

Deaf Smith Co., Lloyd H. Shimmers 8317 ("possibly not native"). El Paso Co.,
 Vernon Bailey 465 (one twig with normal leaves, the other with very narrow leaves as
 in var. Wrightii); ^{Shimmers 8924.} ~~Mrs. Jos. Clemens s. n. in 1917; Hartley Co., H. B. Parks & V.L. Carleton R. Ball 1622, 1626, 1627, 1629.~~ ^{Hanford Co., D.S. & B. Correll;}
 Cory 16397. Hemphill Co., Cory 50275; E. J. Palmer 14104. Ochiltree Co., Cory
 Carleton R. Ball 1622 (seedlings), 1626, 1627, 1629;
 5034. ⁰⁵ Oldham Co., ~~Cory 50386~~; A. H. Leidigh 98 (in Ball, No. Amer. Willows); C.L.
 & Amelia A. Lundell 18503, 18504 A, 18504 B, ~~18504 C~~; Shimmers 8149. Potter Co.,
~~Cory 50386~~; Rogers McVaugh 7243; Geo. C. Nealley 34, in 1888 (leaves narrow but sub-
 tending leaf 3.3 by 12 cm.); B. C. Tharp s. n. on June 15, 1929 (3 sheets). Randall
 Co., ^{Correll & Correll 13059.} Cory 50430; ~~W. H. Muller 8038~~; Shimmers 8030; B. C. Tharp 4353; M. S. Young
 s. n. on Sept. 10, 1917; Ward Co., S.M. Tracy & F.S. Earle 52 (narrow-leaved).

Vernacular Name: "Peach-Leaved Willow".

This is a striking tree willow, with its yellow twigs; yellowish-green leaves, white beneath; and the outer branchlets of the lower limbs often somewhat drooping under favorable conditions.

Most of the specimens cited, and others from adjacent States, have relatively narrow leaves and have been assigned to var. Wrightii by their collectors and/or others, including the writer. Many of them have some broader leaves also, usually toward the basal (portion (older)) of a twig. A survey of some 300 specimens shows that narrow-leaved specimens occur occasionally throughout the range of the species. It is probable that if two to five specimens had been taken from different parts of a shrub, leaves of normal width would have been found. If these narrow-leaved specimens are admitted to be var. Wrightii, then its range is coincident with that of the species. This will be discussed further under that variety.

3a. SALIX AMYGDALOIDES Andersson, var. WRIGHTII (Andersson) Schneider, Bot. Gaz.

65:14. 1918; Schneider, Journ. Arnold Arb. 1:12-13. 1919.

Salix nigra Marshall, ^{subsp.} ~~var.~~ Wrightii Andersson, Kon. Svensk. Vet.-Akad. Handling. 6:20. 1867 (Monog. Sal.).

Salix nigra Marsh., var. Wrightii (Andersson), in D.C. Prodr. 16(2):201. 1868; Coulter, Contrib. U.S. Natl. Herb. 2:419. 1894 (in part).

Salix nigra Marsh., var. latifolia Andersson, forma brevifolia Andersson, subform testacea Andersson, (Monog. Sal.), Kon. Svensk. Vet.-Akad. Handling. 6:21. 1867 (by type specimen cited: Wright No. 1876).

Salix Wrightii Andersson, Ofvers. Kon. Vet.-Akad. Förhandl. 15:115. 1858 (printed simultaneously in Proc. Amer. Acad. Arts & Sci. 4:55. 1858; and reprinted as "Salices Boreali-Americanae", p. 9); Rydberg, Fl. Rocky Mtns. & Adjac. Plains 191. 1917 (in part). (Wootton & Standley, Contrib. U.S. Natl. Herb. 19:160. 1915 (Fl. N. Mex.) describe their plant with leaves green on both sides, and thus representing S. Gooddingii var. vallicola *variabilis*).

Variety Wrightii differs from the species only in very narrowly lanceolate leaf-blades 7-10 or rarely 15 mm. wide and 6-8 or 10 cm. long, tapering gradually to the acuminate or long-acuminate ~~with~~ apex and the bases always sharply acute; petioles shorter, 5-10 or 15 mm. long; aments as in the species, not congested or dense as in the abnormal type, where they are only 2-3 cm. long. The discussion of leaf-width is expanded below. -- Occurs near water bodies in western and southwestern Texas, adjacent New Mexico (Curry & Dona Ana Cos.), and probably in immediately adjacent Mexico (See discussion below).

^ V.L. Cory 53/82; Brewster Co., D. C. Ingram s. n. in 1929; Culberson Co., Agnes Chase 5930; Rogers

McVaugh 7387. El Paso Co., Vernon Bailey s. n. in June 17, 1931; V.L. Cory 46077; Cory s. n. on Oct. 19, 1944; E.J. Palmer 31095; Elmer Stearns 151; Eula Whitehouse

s. n. in Nov., 1931; Chas. Wright 1876, 1877 (if not from nearby N. Mex. or Mexico); Hudspeth Co., Lloyd H. Shinnery 8916.

Hemphill Co., E. J. Palmer 14106. ^ Oldham Co., Carleton R. Ball 1629, 1630; Presidio

Co., L. C. Hinkley 1780; H. B. Parks & V.L. Cory s. n. on June 29, 1927. Randall Co., Ball 1265; Cory 1706; ^ Ward Co., S.M. Tracy & F.S. Earle 52. Co.,

Aven & Ruth A. Nelson 5056 (Big Bend Natl. Park, April 2, 1942).

El Paso Co. Miss E.M. Slater,
S.N. June, 1923.

CL + Amelia A. Lundell 14504C.
Potter Co., Cory 50354.

For a comparatively unimportant willow, this variety has been the ~~XXX~~ victim of many placements and many misunderstandings. Andersson made it first an independent species, and then a subspecies and finally a variety of *S. nigra*. As a species he placed it in a different Section from his *S. amygdaloides*. A very similar Wright specimen (No. 1876) he described as *S. nigra*, subform testacea, in 1867. Schneider, placing it as a variety under *S. amygdaloides*, said it was a matter of personal opinion whether it was a species or variety. Collectors distribute both the species and the variety, as well as *S. nigra* var. Lindheimeri, *S. Gooddingii* var. variabilis ^{variabilis} vaillotei, and even *S. exigua*, under the name Wrightii, whether regarded as variety or species. In the publications cited, Coulter, Rydberg, and Wootton & Standley have included *S. Gooddingii* var. variabilis vaillotei in their treatments of Wrightii.

An examination of some 600 herbarium specimens shows that twigs with leaves only 1 cm. wide and ~~XXXXX~~ 6-8 or 9 cm. long are collected sparingly northward from Texas in the dry-land Great Plains area to So. Dak., and occasionally in the ^{lower} Mississippi Valley (Mo., Wis.), on the sand dunes of Mich. and Ohio, and even in Lower Canada.

The difficulty of certain interpretation of such material is four-fold: (1), Most herbarium specimens are mere fragments of the total expression of the plant; (2), leaf size on fruiting twigs almost always is reduced by competition for food; (3), drought or cold may reduce leaf-size on the apical (later) portion of an ~~XXI~~ seasonal shoot even if that on the basal (earlier) portion is normal, and the specimen may be only that apical portion; and (4), permanently unfavorable ^eunfavorable conditions ~~XX~~ (sandy soil, lack of water, etc.) may reduce all leaf size on an individual ^{plant} here and there.

Although taxonomic separations are arbitrary, as suggested here and by Schneider, the prevalence of this narrow-leaved form in the Rio Grande Valley may make it helpful to maintain the varietal status, especially as no changes in name are involved. Most of the northern narrow-leaved forms show more of the true lanceolate shape instead of that with parallel margins (ligulate) in the central portion of the blade, which is more characteristic of the variety. The type, Wright No. 1877, has short, dense pistillate aments, 1.5-3 cm. long, probably caused by some injury. No other specimen with such aments has been found.

4. SALIX CAROLINIANA Michaux, Fl. Bor.-Am. 2:225. 1803; Fernald, Rhodora 48-23-51. 1944

Salix arnibia Small, Flora Miami Gl. 1913.

Salix longipes Shuttleworth, in Andersson, Öfvers. Kon. Vet.-Akad. Förhandl. 15:114.

1858, and Proc. Am. Acad. Arts & Sci. 4:53. 1858; Britton, Man., eds. 1, 2, & 3, 313. 1901, 1905, 1907 (range to Texas); Ball, in Tidestrom, Elysium Marianum 3:21. 1910 (excl. *S. floridana*); Small, Fl. Southeast. U.S., eds. 1, 2, 341. 1903, 1913; Schneider, Bot. Gaz. 65:21-22. 1919; Schneider, Journ. Arnold Arb. 1:24-27. 1919; Ball, in Desm. Shrubs Indiana 42-44, pl. 9. 1924; Small, Man. Southeast. Fl. 415. 1933; 1934; Ball, Castanea 3:4-5. 1936 (Willows Southern States).

Salix longipes Shuttlew., var. Wardii (Rebb) Schneider, Bot. Gaz. 65:22. 1919; Schneider, Journ. Arnold Arb. 1:27-29. 1919; Ball, Castanea 3:5. 1936 (Will. Sou. St.); Messay & Ball, Va. Polytech. Inst. Bull. 37(9):21-22. 1944 (Willows Va.).

Salix nigra Marsh., subsp. longipes (Shuttlew.) Andersson, Kon. Svensk. Vet.-Akad. Handl. 6:22. 1867 (Monog. Sal.).

Salix nigra Marsh., supsp. longipes (Shuttlew.) Anders., var. venulosa Andersson (as the Salix nigra Marsh., var. longipes (Shuttlew.) Andersson, in DC. Prodr. 16[2]:201. 1868.

Salix nigra Marsh., var. Wardii Rebb, in Ward, Bull. U. S. Natl. Museum 22:114. 1891; Gray, Man., ed. 6, 481. 1890.

Salix occidentalis Bosc, in Koch, De Sal. Europ. Comm., 16. 1828, non Walter, 1788; Andersson, Kon. Svensk. Vet.-Akad. Handling. 6:23. 1867 (Monog. Sal.); Andersson, in DC. Prodr. 16(2):202. 1868.

Salix Wardii Rebb, Gard. & For. 8:363. 1895; Britton & Br., Illustr. Fl., ed. 1, 465. 1896, ed. 2, 593. 1913; Gettinger, Fl. Tenn. 66. 1901; Mohr, Contrib. U.S. Natl. Herb. 6:465. 1901 (Fl. Life Alab.); Gray, Man., ed. 7, 321. 1908;

Salix longipes Shuttlew., var. venulosa Andersson) Schneider, Bot. Gaz. 65:14. 1919; Schneider, Journ. Arnold Arb. 1:26-27. 1919 (full bibliography).

Shrubs or small trees, to 10 or 12 m. high; bark grayish; branchlets slender, mostly brown to dark brown, the seasonal sometimes yellowish and often thinly to densely white-pubescent, as are also the small bud scales and short petioles; stipules broadly reniform (kidney-shaped), 7-15 mm. long, obtuse to acute throughout the range (sometimes on the same twig), serrulate, glaucous beneath; leaf-blades ligulate, linear-lanceolate to lanceolate, the lower often obovate or oblanceolate while developing, 7-15 or 20 mm.

long, 1-2.3 or 3.5 cm. wide, acute to rounded or rarely subcordate at base, tapering gradually to a long-acuminate apex, closely but shallowly serrulate, rarely glandular spinulose-teethed, dark green above, densely white-glaucous^{and} with very small vein islets beneath, the younger often white-pubescent beneath, especially on the midrib, petioles 5-12 mm. long, or 16-20 mm. on vigorous shoots, pubescent to glabrous. Aments coetaneous, slender, lax, 3-8 or 11 cm. long, 8-14 mm. wide, terminal on leafy peduncles 1-5 or 7 cm. long and bearing 3-5 or 6 small leaves, sometimes becoming lateral through development of a shoot from the axillary bud of the uppermost peduncular leaf; flower scales oblanceolate to lanceolate or ovate, acutish, yellowish densely crisp-vellous, becoming glabrate outside, deciduous; stamens 5-8, filaments pubescent at base; ovaries sometimes thinly pubescent, capsules glabrous, narrowly ovoid-lanceolate, 4-5.5 or to 7 mm. long, mostly brownish; pedicels slender, 2-3.5 mm. (north and west) to 4-4.5 mm. (southeast) long, glabrous; style 0.10-0.2 mm. long, stigmas squalling it, entire; gland ventral, 0.3-0.5 mm. long, conic, capitate, per truncate. -- Along rocky water courses and in coastal sands, West Indies, Florida west to south-central Texas, north to the Potomac Valley, the Ohio River in western Penn., southern Ind., and southwest to eastern Okla. and northeastern Texas. ^{and south-central}
 O.S. Correll 13457, O.S. + H.B. Correll 12820;
 Edwards Co., V.L. Cory 28890. Kerr Co., Cory 41284; A. A. Heller 1902 (in 1894)
 O.S. Correll 13432, 5/822;
 C.L. & Amelia A. Lundell 13636, 13637. Real Co., Cory 42609; Bism. Normand S. D.
 in 1929. Uvalde Co., Correll + Correll 12888.

Vernacular Name: "Long-pedicelled Willow", "Southern W.", "Ward's W.".

The ^{four} ~~three~~ counties listed above all lie together on the rough Edwards Plateau in central southern Texas. Schneider, in 1919 (l.c.), reported that he had seen specimens of var. venulosa from 8 Texas Counties: Bandera, Blanco, Gillespie, Heed, Johnson, Kendall, Kerr, and Uvalde. Heed and Johnson lie just south-southwest of Fort Worth in northeastern Texas, and represent an extension of the Arkansas-Oklahoma ^{and Uvalde are} distribution. Kerr ^{is} included in our cited counties. The other ^{four} ~~three~~ form a solid block with the ^{four} ~~three~~ cited counties.

The specific names caroliniana, longipes, and occidentalis were first applied to southeastern and West Indian material; Wardii to Petenac Valley and other northern specimens and venulosa to southwestern material. Schneider transferred both Wardii and venulosa to varietal status under S. longipes. Wardii admittedly ^{only} because of its supposedly obtuse stipules, and venulosa, of which he knew little, presumably because of supposedly more veiny leaves. A study of abundant material throughout the range assigned to Wardii shows both acute and obtuse stipules occurring commonly, often on the same plant and sometimes on the same twig. Var. Wardii, therefore, is lumped with the species here, there being no other distinguishing characters. Schneider regarded all Texas material as belonging to var. venulosa because of the allegedly more veiny leaves. The leaves are most likely to be veiny in dry areas, but the same expression occurs, though less commonly, across the entire species range, especially in dry habitats and dry seasons and in old leaves. Therefore, this variety also is not recognized herein. Because the same species was named differently by different botanists, studying material from different regions, in different decades, is no reason for maintaining them, even as varieties, when there are no stable distinguishing characters.

5. SALIX INTERIOR Rowlee, Terr. Bot. Club Bull. 27:253, pl. 9, f. 12-13. 1900; Small, Fl. Southeast. U.S., ed. 1, 342. 1903; ed. 2, 342. 1913 (both incl. Texas in range); Britten, Man., ed. 2, 316. 1905; ed. 3, 316. 1907 (both to Texas); Britten & Br., Ill.-ustr. Fl., ed. 2, 1:595. 1913 (to Texas); Rydberg, Fl. Rocky Mtns. & Adjac. Plains, 192, 1917; Ball, in Dean, Shrubs of Ind., ~~ILLINOIS~~¹⁰ 44-46, pl. 10, 1924; Small, Man. ~~Yamox~~ Southeast. Fl., 414. 1935 (to La.); Mossy & Ball (Willows of Va.), Va. Polytech. Inst. Bull. 37(9):23-24. 1944.

Salix fluviatilis (as understood by some Amer. authors, not Nuttall), Britten & Br., Ill.-ustr. Fl., ed. 1, 1:497. 1896 (to N. Mex.); Britten, Man., ed. 1, 316. 1901 (to Texas)
Salix longifolia Muhlenberg, Neue Schrift. Naturforsch. Freund. Berlin 4:238, pl. 6, f. 6, 1803 (non Lamarck); Schneider, Bot. Gaz. 67:340-342. 1919.

Shrub with clustered stems, 1.5-4 or rarely 5.5 m. high and 2-6 or rarely 10 cm. in diameter; bark grayish; branchlets erect or ascending, mostly reddish-brown, usually glabrous but sometimes thinly pubescent while young; bud scales small, colored and clothed as the branchlets; stipules none; leaf-blades linear to broadly linear, sometimes linear-oblongate or the broadest very narrowly elliptical, 5-10 or 14 cm. long, 6-12 or 18 mm. wide, almost sessile, the acute base merging with the short petiole; acute or short acuminate at apex, often thinly villous when young, glabrous in age, the margins remote-ly and irregularly denticulate or spinulose-denticulate, green on both sides but paler and some times faintly glaucous beneath, (when defoliated by insects in midseason, the new leaves often densely silvery-villous). Aments serotinous (appearing after the leaves), 8-16 mm. wide, slender, lax, terminal on slender leafy peduncles 3-10 cm. long, the staminate 1-3 together, 2-5 cm. long, the pistillate 1-3 together, 3-6 or 8 cm. long, the super-numerary aments basal to the primary and later; scales lanceolate, thinly pubescent, yellowish, deciduous; stamens 2, filaments free, pubescent below; ovaries often thinly lanceolate-silvery-villous; capsules glabrous, narrowly obovoid, 7-9 or 10 mm. long; pedicels 0.5-1.5 mm. long; styles practically obsolete; stigmas very short, divided; gland 1, about 0.5-0.8 mm. long. -- In alluvial soil, mostly along ditches and water bodies, Potomac and Ohio Valleys north to southern Canada, and from the Mississippi River westward across the Great Plains, south to Louisiana and Texas and north to Alaska and Yukon.

5a. SALIX INTERIOR Rowlee, var. PEDICELLATA (Andersson) Ball, in Canad. Field-Nat. 40:175. 1926.

Salix interior Rowlee (in part), Britten & Br., Illustr. Fl., ed. 2, IX 1:595. 1913; and of other Amer. authors.

Salix linearifolia Rydberg, in Britten, Mem., ed. 1, 316. 1901; ed. 2, 316. 1905; ed. 3, 316. 1907; Small, Fl. Southeast. U.S., ed. 1, 342. 1903; ed. 2, 342. 1913;

Rydberg, Fl. Rocky Mtns. & Adjac. Plains 192. 1917 (in part, excl. "S. tenerrima")

Salix longifolia Muhl., var. pedicellata Andersson, Kon. Svensk. Vet.-Akad. Handling.

6:55. 1867; in IXXX DC. Prodr. 16(2):214. 1868.

Hidson).

Salix rubra Richardson, in Franklin, Harr. Journey Polar Sea, App. 752. 1823 (non ^

Differs from the species in the narrowly linear leaves, 2-4 mm. wide, and in ovaries nearly always glabrous. Andersson's varietal name is misleading, as the pedicels are not perceptibly longer than those of the species. The variety occurs commonly with the species in the drier and higher western part of the range, from ^{southwestern} northern Texas as to Mackenzie, Yukon, and Alaska, and less commonly in the Mississippi Valley.

Armstrong Co., E. J. Palmer 13632. Hardeman Co., H. B. Parks & V. L. Cery 13273, 13274, 13275, 13276. Oldham Co., Carleton R. Ball 1628. ~~McNair Co.~~ Pecos Co., ~~Carleton R. Ball 1622.~~ Potter Co., Rogers McVaugh 7246. Randall Co., ~~McNair 7244; Palmer 13663.~~ ~~McNair Co., Lower Rio Grande Valley, Ivan Chiller 700.~~

Vernacular Name : "Narrow-leaved Sandbar Willow".

Whether to assign certain specimens to this variety or to the species must always be a matter of arbitrary decision. This is true also of S. amygdaloides and its variety Wrightii, and to a lesser extent of S. nigra and var. Lindheimeri, as well as in many cases not occurring in the Texas flora. In all such cases, however, the extreme is so striking that the separation is an aid to students.

5b. SALIX INTERIOR Rowlee, var. ANGUSTISSIMA (Andersson) Dayton, in Sudworth, U. S.

De pt. Agric. Tech. Bull. 420:78, footnote 42. 1934.

Salix argophylla, in part, as understood by Rydberg, Fl. Rocky Mtns. & Adja. Plains
192. 1917 (not Nuttall).

Salix longifolia Muhlenberg, var. angustissima Andersson, Kon. Svensk. Vet.-Akad. Förhandl.
15:116. 1858 (published simultaneously in Proc. Amer. Acad. Arts & Sci. 4:56.

1858. ("Ha b. in Texas (Herb. Berland. n. 911, 3019, 2341, 2368) et Mexico nova
Schneider, Bot. Gaz. 65:26-27. 1918; Schneider, Bot.
(n. 1875, Coll. C. Wright)" & Gaz. 67: 345-346. 1919. *of Nuttall* *CRB*

Salix longifolia Muhl., var. argyrophylla (error for argophylla, *CRB*) (Nutt. Sylva

~~Amer. p. 87-9~~ Andersson (Monog. Sal.), Kon. Svensk. Vet.-Akad. Handl. 6(1):55.

1867 (the description is very brief and general and no specimens are cited but
the plant is said to occur "In regionibus meridionalibus, ut in Mexico, etc.");
Andersson, in DC. Prodr. 16(2):214. 1868 (the description is similar but the hab-
itat now is given as "In Texas et Mexico nova (Berlandier n. 2371 (error for 2341.
CRB); Wright n. 1873)", which are exactly the habitat and specimens assigned to
var. opaca in 1867, as noted below); Coulter, Bot. West. Texas, Contrib. U. S.
Nat. Herb. 2:419. 1894.

Salix longifolia Muhl., var. argyrophylla (error for argophylla, *CRB*) (Nutt. Sylva

~~p. 87-9~~ Andersson, forma angustissima Andersson (Monog. Sal.), Kon. Svensk.
the
Vet.-Akad. Handl. 6(1):55. 1867 (Here the form is said (doubtfully) to be ~~exactly~~
same as
supposed S. brachycarpa Nutt. and is credited to "California (Fremont); Rocky moun-
tains (Nuttall)"; Andersson, in DC. Prodr. 16(2):214. 1868 (treatment same as in
1867. CRB).

Salix longifolia Muhl., var. opaca Andersson, Kon. Svensk. Vet.-Akad. Handl. (Monog.

Sal.) 6:55. 1867 (The description is short and inconclusive but the statement:

"Frequent² occurrit in Texas et Mexico (Berlandier n. 2341; Wright n. 1873)"

gives it the habitat originally assigned to var. angustissima and cites for type
Berlandier 2341, previously cited under var. angustissima. Wright 1873 belongs
to S. exigua var. stenophylla. This habitat and these numbers were transferred
to var. "argyrophylla" in 1868. CRB).

Salix longifolia Muhl., var argyrophylla (error for argophylla. CRB) (Nutt.) Anders-
son, forma opaca Andersson, in DC. Prodr. 16(2):214. 1868 (Has the same descrip-
tion as in 1867, but no habitat or specimens cited, and is said to be similar to
S. incana of Europe. CRB).

Salix Thurberi Rowlee, Bull. N. Y. Bot. Garden 27:252. 1900; Blankinship, Rept. No.

Bot. Garden 18:194. 1907.

(Said to occur in southern

to be

and western Texas, and based on Thurber's Nos. "2368, 95, and 2341". Actually,

Nos. 2368 and 2341 are Berlandier's collections, not Thurber's, and both were

cited by Andersson with the original description of his var. angustissima. CRB).

Var. angustissima

pilose-

differs from the species principally in the ovaries densely white-pubescent and the
capsules remaining gray-pilose-pubescent even in age. In general the leaves are narrow-
er than in the species, but not usually "angustissima", being 4-7 or 10 mm. wide and 6-10
or 12 cm. long, denticulate as the species, more or less silvery-pilose on both sides
when young, becoming glabrous or glabrate rapidly or slowly, the hairs persisting longest
on the midribs, especially beneath; the flower scales also more densely white hairy. --
Near water bodies in south-central and southwestern Texas and immediately adjacent New
Mexico and Mexico.

C. L. v. Amelia A. Lundell 14636;

Brewster Co., Valery Havard s. n. in Aug., 1883; B. H. Warnock 581; Warnock s. n.
on Aug. 6, 1937. Cameron Co., V. L. Cory 51443; Mrs. A. M. Davis s. n. in summer, 1941;
Geo. L. Fisher (Am. Bot. Exch.) 41173; H. C. Hanson s. n. on June 10, 1919; Geo. C. Nealley
30 in Nov., 1888; L. H. Pammel 3, 4, in 1927; H. R. Reed 46 (U.S. For. Serv.); I.
Schaller 798; E. C. Tharp s. n. on April 30, 1940; C. H. Tyler Townsend 84 (?) in Oct.,
1895; H. H. York s. n. on Mar. 19, 1907. KK El Paso Co., Chas. Wright s. n. (Frontera)
in 1848; Guadalupe Co., Fred. Lindheimer 615 (also distrib. as 1191), "Cibolo River 12
miles southeast of New Braunfels" (His 515, also called 1190, may be from same locality);
Hidalgo Co., C. L. & Amelia A. Lundell 13794, 13795, 13796; Jeff. Davis Co., W. B. Davis
s. n. in June, 1939; L. C. Hinkley 3515. Matagorda Co., Geo. L. Fisher 136; Chas. Mohr
625; E. J. Palmer 9693. Presidio Co., L. C. Hinkley 1779, 2728, 3467; Lundell & Lun-
dell 14283, 14284, 14285, 14287; Starr Co., David Griffiths 6472. Val Verde Co., Chas.
Wright 668 (Field No. 664, San Felipe Spr., near Del Rio), July 11, 1849. ----- Co.
Berlandier 911, 938, 2341, 2368, 3019 (localities not known); V. Havard s. n., "shore of
Pecos River, Sept., 1881; Lindheimer 515 (1190), (see under Guadalupe Co.); G. C. Nealley

33, "banks of the Pecos, 1889"; Geo. Thurber 95, "Horse Head Crossing, Pecos River, Oct., 1850"; H. S. Young s. n., "bank of the Rio Grande, near San Vicente, April 26, 1915".

Vernacular Name: "Silvery-Fruited Sandbar Willow".

The tragic story of the seemingly intentional confusion wrought by Anderson, ^{the} and failure of Rowles to discover, when monographing the Longifoliae, that Anderson already had published three monographic papers including American willows, is partially indicated above in the annotated synonymy. A whole paper might be devoted to the matter.

There will be difficulty ⁱⁿ separating mature and glabrous or glabrate foliage specimens from the species, if broad-leaved, or from var. pedicellata if narrow-leaved. Anderson's reason for the name angustissima is not clear, as the ^{Ber} ~~more~~ landier ~~types~~ are not especially narrow-leaved and the Wright specimen is immature.

It may be that he had seen the very narrowleaved Lindheimer plants but did not cite them.

Goodding (Willows in Region VIII), U.S. Dept. Agric., Soil Conserv. Serv., Regional Bull. 65: 4-5, 6 illus., (mimeogr., letter size), 1940 (incl next 2 vars.).

6. SALIX EXIGUA Nuttall, Sylva 1:75. 1843; Ball, in Coulter & Nelson, New Man. (S. lutescens as synonym); Rocky Mtn. Bot. 131. 1909; Britton & Br. Illustr. Fl., ed. 2. 1:594. 1913 (S. lutescens Rydb. as synonym); Wootton & Standley (Fl. N. Mex.), Contrib. U.S. Natl. Herb. 19: 159-160. 1915; Rydberg, Fl. Rocky Mtns. & Adjac. Plains 192. 1917 (S. lutescens as synonym); Schneider, in Bot. Gaz. 67:328-330. 1919;

Salix exigua Nuttall, var. lutescens (Rydberg) Schneider, Bot. Gaz. 67:334. 1919.

Salix exigua Nuttall, var. virens Rowlee, Torr. Bot. Club Bull. 27:255. 1900;

Schneider, Bot. Gaz. 67:332. 1919.

as understood by

Salix fluviatilis Nuttall, Britton & Br. Illustr. Fl., ed. 1, 1:497. 1896 (in part represented by most of Rocky Mountain and western distribution, not Nuttall).

Salix fluviatilis Nuttall, var. exigua (Nuttall) Sargent, No. Am. Silva 9:124. 1896. (in part).

Salix longifolia Muhlenberg, var. exigua (Nuttall) Bebb, in Watson, Bot. Calif. 2:85.

1880 (preprinted as "Willows of California" in 1879); Coulter, (Bot West. Texas),

Contrib. U.S. Natl. Herb. 2:419. 1894.

Salix lutescens Rydberg, in Britton, Man., ed. 1, 316. 1901, ed. 2, 316. 1905, ed. 3, 316. 1907; Small, Fl. Southeast. U.S., ed. 1, 342. 1903, ed. 2, 342. 1913; Rydberg, Fl. Colo. 94. 1906; (see under S. exigua for works listing it as synonym). Also S. argophylla of Nuttall, S. fluviatilis of Nuttall, S. longifolia of Muhl., and S. longifolia Muhl., var. argyrophylla of Andersson, in whole or in part, as these were understood by various American writers, but not by their authors.

Grayish, leafy, several-stemmed shrub, 2-4 m. high, with grayish mass effect; branchlets yellowish to sometimes light brown, the seasonal usually more or less white-pubescent or puberulent, the 1-year thinly gray-pubescent to glabrate, the 2-year usually glabrous; bud-scales small, 2-5 mm. long, obtuse, colored and clothed as the branchlets; stipules mostly minute or wanting but sometimes 2-5 mm. long and lanceolate on vigorous shoots; leaf-blades narrowly to broadly linear to linear-oblong, 5-7 or 10 cm. long, 5-10 or 12 mm. wide, still larger on vigorous shoots, almost sessile, the ^{ac}acute base passing gradually into the short petiole, sharp-acute or short-

acuminate at apex, entire or subentire to remotely and irregularly denticulate, or sometimes spinulose-denticulate, especially on vigorous shoots, opaque, gray-green and more or less densely gray-pubescent or puberulent on both ^{lastly} sides, sometimes silvery-white while unfolding (and then mistaken for S. argophylla Nuttall), Aments subcaneous or serotinous, terminating reduced seasonal ^{lastly} shoots 2-7 cm. long, the aments solitary or 2-3 together (the supernumary ones borne laterally at the base of the first), 2-5 or 6 cm. long, 0.6-1.2 cm. wide, flower scales obovate before anthesis, becoming elliptic-lanceolate to linear-oblong, 2-3 mm. long, acute, pubescent with crinkly gray hairs but becoming more or less glabrate, especially outside, pale yellow, deciduous; stamens 2, filaments free, pubescent on basal third; ovaries glabrous or sometimes densely to thinly pubescent, capsules glabrous or thinly pubescent to glabrate, mostly glabrous in age, 4.5-6 or 6.5 mm. long, mostly linear-lanceolate, sessile, subsessile, or on pedicels ^{up to} 0.5-1 mm. long, especially at base of ament; style none, stigmas 0.4-0.6 mm. long, divided; gland usually 1, ventral, slender, capitate, occasionally 2, the dorsal shorter. From California to Brit. Columbia (away from the ocean), eastward to the western ^{part} edge of the Great Plains area, more common in the central and northern parts, the varieties southward. In Texas, it occurs sparingly in the mountainous southwestern part and in the Canadian and Red River drainage of the Panhandle.

-- Near water bodies, at all elevations to 8000 or 9000 feet,

Brewster Co., V. L. Cory s. n. in 1927; H. B. Parks 2834. Briscoe Co., E. L. Reed and Delsie Demaree 7626. El Paso Co., Parks and Cory 2896. Hemphill Co., Parks and Cory 16179. Kendall Co., H. B. Parks s. n. in 1922.

Vernacular Name: "Gray Sandbar Willow", "Gray Long-leaf Willow".

S. exigua

Salix exigua probably is the most variable species in the exceedingly ~~variable~~ plastic Section Longifoliae. This is caused partly by its exceedingly wide distribution. Geographically, it extends from northern Mexico to northern British Columbia. Climatologically, it ranges from the hot, dry deserts and plains (Lower Sonoran) to the cold and snowy mountains of the ~~western~~ northern U.S. and western Canada (Transition Zone). ^{di}Altitudinally, it occurs from below sea-level in the Salton Sink of Imperial Co., Calif., to elevations of 8000 to 9000 feet in ~~the~~ our southern mountains. Its variability also is partly inherent. The Longifoliae are of comparatively recent origin in geologic time and are distinctively American, the European willows with long, slender leaves ~~being~~ belonging to quite different sections of the genus.

Four varieties have been named, ~~three~~ ^{three} (lutescens, nevadensis, and stenophylla) first described as species and the fourth, virens, as a variety. Schreider reduced the three species to varietal rank in 1918 and 1919, although Rydberg had abandoned his *S. ~~stenophylla~~* ^{lutescens} completely before 1917. Its hairs were not yellowish, however, but gray. Neither variety ~~stenophylla~~ lutescens nor var. virens is recognized in the present paper. The latter seems to represent merely the vigorous summer shoots of the species with large, glabrate, and greenish leaves., as collected in southwestern river valleys.

6. *SALIX EXIGUA* Nuttall, var. *NEVADENSIS* (Watson) Schneider, Bot. Gaz. 67:331. 1919.
Salix fluviatilis, as understood by Wootton and Standley (Fl. N. Mex.) Contrib. U.S.

Natl. Herb. 19:159. 1915, by the only specimen (Blumer 124) cited, not Nuttall.
Salix nevadensis Watson, in Amer. Nat. 7:302. 1873.

Differs from the species in browner and more glabrate branchlets; narrower, ^{rate} glabrate yellowish-green leaves; and somewhat more glabrate flower scales. Seasonal twigs more or less usually white- or gray-pubescent, 1-year twigs yellowish to brownish, puberulent to glabrous, 2-year twigs brownish to gray, glabrous; leaf-blades narrowly linear to linear, silvery pubescent or puberulent on both sides while unfolding, quickly becoming glabrate to glabrous, ~~shiny~~ yellowish-green and sometimes shining above, paler green and sometimes faintly glaucescent beneath, 3-6 or 8 cm. long, 2-4 or 6 mm. wide, or 3-6 mm. by 10-14 cm. on vigorous summer shoots, the smaller entire or minutely denticulate, the larger remotely and irregularly denticulate; flower scales usually more glabrate and often less acute; glands 1 or 2. -- Near water bodies and in canyons from low elevations to 8000 or rarely 9000 ft., occurring commonly in north Nevada, and Utah, and northern New Mexico, and more sparingly in a djacent Idaho and California, also Arizona, and southern Colorado and western Texas. In Texas, it has been found in the mountainous southwest, and in Red and Canadian River drainage of the western Panhandle: Brewster Co., C.H. Mueller 7965. *Lloyd H. Shimmers 87-25*
 Deaf Smith Co., Lloyd H. Shimmers 8316. El Paso Co., Elmer Stearns 151a. Jeff Davis Co., L.C. Hinckley 2665; J.A. Moore & J.A. Steyermark 3125; *Lloyd H. Shimmers 87-25*
 G.H. Muller 8178. Oldham Co., Shimmers 8148. Presidio Co., L. C. Hinckley 1779, 2512; ~~Muller 1933~~. County Unknown., "Banks of the Pecos, Texas", G.C. Nealley 32 in 1889

Because the type (Watson 1093) was quite immature, as were several other specimens referred to the species or variety, it has not been well understood. Specimens with mature foliage, especially, have been referred to other species. Schneider's belief that the presence of two flower glands was characteristic of this variety led him to refer to it some specimens which belong elsewhere.

In their narrow leaves, both var. *nevadensis* and var. *stenophylla* bear the same relation to *S. exigua* that var. *pedicellata* bears to *S. interior*. Separation of these varieties from each other, and of both from *S. exigua*, always must be a somewhat arbitrary matter.

68. SALIX EXIGUA Nuttall, var. STEMOPHYLLA (Rydberg) Schneider, Bot. Gaz. 66:25. 1918;
Bot. Gaz. 67:333. 1919.

Salix stenophylla Rydberg, Torr. Bot. Club Bull. 28:271. 1901; Rydberg, Fl. Rocky Mtn
and Adjac. Plains 192. 1917.

Differs from the species in narrower leaves and in the much more dense silvery-pubescent of all vegetal parts. Branchlets and bud scales more densely pilose-pubescent than in the species; leaf-blades narrowly to broadly linear, 3-5 or 7 mm. ^{wide} and 5-8 or 10 mm. long, or reaching 8-10 mm. wide and 12-14 cm. long on vigorous shoots, densely silvery pubescent on both surfaces while young and retaining enough in maturity to give a gray-white mass effect, mostly entire to subentire, the larger remotely and irregularly minutely denticulate. Ovaries usually glabrous but sometimes more or less ~~pubescent~~ pubescent, capsules glabrous or glabrate, subsessile or on pedicels 0.5-1 mm. long, ^{and} often thinly pubescent; gland 1 and slender, or sometimes 2.

From var. nevadensis it differs in its densely silvery-pubescent leaves, never becoming glabrate to glabrous or yellowish green in age (except on some vigorous summer or autumnal shoots). -- Common near water bodies as at all elevations to 8000 or rarely 9000 feet, from western Texas and northern Mexico to southern California, and more sparingly northward in Colorado, Utah, Nevada, southern Idaho, and eastern northwestern California, where the species and var. nevadensis are more common. In Texas, it occurs sparingly in the mountainous southwestern area and in the Red River drainage in the Panhandle. Some eastern specimens previously determined as var. ~~xxx~~ lutescens (Rydberg) Schneider are now referred to this variety.

Crosby Co., Eula Whitehouse 11405.

Bailey Co., Rogers McVaugh 7285, 7286 (det. as var. lutescens). Culberson (det. as var. lutescens).

Co., Vernon Bailey 419; ~~Eula~~ Whitehouse 8333. El Paso Co., Vernon Bailey 464.

Hudspeth Co., Lloyd H. Shimmers 8917.
Hardeman Co., C. V. Piper s. n. in 1912. Jeff Davis Co., Chas. Wright 1874.

Randall Co., E. J. Palmer 12518; E. L. Reed and C. V. Norton 3979 (det. as var. lutescens).

Vernacular Name: "Silvery Desert Willow". *S. exigua v. stenophylla*

Rydberg's types (Rydberg & Vreeland 6392, 6393) are too juvenile for certain identification but probably belong here. The other specimens cited by him, all immature, represent this variety, with the exception of Baker, Earle & Tracy 102 which is referred to the species because of broader young leaves. The Rusby specimen has not been seen. Rydberg describes the leaves as "about 3 mm. wide" but he was describing very young growth and apparently did not recognize mature foliage-specimens in the material he examined. He did not distinguish this species from *S. nevadensis* Watson and it is almost a toss-up whether to place Wright 1674 with var. *nevadensis* or with *stenophylla*. Schneider, reducing Rydberg's species to varietal rank in 1918, says that it probably is more than "an inconstant form", which the writer had called it in 1909. He says that it is distinguished from the species in leaves usually distinctly denticulate and the ovary long pedicelled. In 1919 he states that the main separating character is the longer pedicels but - "After all, even this character can scarcely be regarded as constant" (p.333). He then states that the material "seems to present slight variations and may be called var. *stenophylla*".

There are definite errors of statement in Rydberg's description. He says that the leaves are "permanently finely silky strigose, but not white". They really are silky-pilose or silky-pubescent, not strigose, and are definitely silvery-white in spring and summer. He makes "the peculiar swelling (of the capsule) just below the stigma" one of the three diagnostic characters. It is not a diagnostic character for any species, however, but is the normal appearance of the immature capsule in all of the species of this ~~GENUS~~ Section, and of some others. He records the "stigma minutely 4-lobed". All willows have 2 stigmas, each 2-lobed, or sometimes entire.

7. *SALIX TAXIFOLIA* Kunth, in Humboldt & Bonpland, Nov. Gen. et Sp. Pl. 2:22. 1817;

Andersson, in Kon. Svensk. Vet.-Akad. Handling. 6:57. 1867 (Monog. Sal.);

Anderss. in DC. Prodr. 16 (2):215. 1868; Coulter (Bot. EXX West. Tex.), Contrib.

U.S. Natl. Herb. 2:419. 1894; Sargent, Silva No. Am. 9:129, pl. 476. 1896; Wootton

& Standley (Fl. N. Mex.), Contrib. U. S. Natl. Herb. 19:160. 1915; Schneider, Bot.

Gaz. 65:23-24. 1918; Bot. Gaz. 67:516. 1919; Goodding, (Willows in Region VIII),

Dept. Agric., Soil Conserv. Serv. Regional Bull. 66:11, illus. (mimeogr. letter-
1940 194

Shrub to tree 4-12 m. high and 4 dm. in diameter (Hinkley 2575) or to 15-16 m.

(Palmer 20598), with furrowed bark, the lower branchlets somewhat drooping (Bebb), and
much branched, slender,
the color effect in mass grayish-white; branchlets/gray, yellowish-gray, or sometimes
somewhat brownish, the seasonal densely white- or silvery-pubescent, the 1-year and
2-year pubescent to puberulent and mostly yellowish gray, the older gray and glabrate;
budscales 2-3 mm. long, gray-pubescent; stipules mostly wanting, or very small and
deciduous; leaf-blades very small, 1-3 cm. long by 2-4 mm. wide, or the larger to
4-5 cm. long and 4-5 mm. wide, sometimes 2-3 cm. by 5 mm.; linear or linear-oblancoel-
ate, entire to remotely and minutely denticulate, especially toward the acute or apic-
ulate apex, the base gradually narrowed into the very short petioles, densely silvery-
pubescent while young, becoming gray-pubescent with age, or the older puberulent, more
or less densely crowded on the twigs. Aments serotinous, very small, 0.5-1 cm.
long in flower, and 1-1.5 cm. long in fruit, subglobose to ovate-oblong, 10-15- or 18-
flowered, 1-3 or 4 together, terminating densely-leaved seasonal shoots and often
yellowish,
nearly hidden by the apical leaves; flower scales/obovate to ovate and acute, densely
pubescent to becoming glabrate toward the apex, 1-1.5 mm. long, deciduous; stamens
2, filaments free, pubescent on the lower third or half; ovaries usually pubescent
but sometimes gla^obrate; capsules sessile, lanceolate, 4-5 or rarely 6 mm. long, thin-
ly pubescent to glabrate; styles 0.1-0.2 mm. long; stigmas 0.4-0.7 mm. long, di-
vided; gland

-- Near water bodies, southwestern Texas to southern Arizona and northern Mexico.

Infrequent.

Brewster Co., H. B. Parks and V. L. Cory 7367; R. A. Studhalter 1026 ~~XXXXXX~~ (label says "Alpine", which is in Brewster Co., but Alpine is the railroad station for the visitors to nearby Davis Mtns. and this may well have come from Jeff Davis Co.); B.H. Warnock 477; *Eula Whitehouse 11399*; *S.S. Correll 14050, 14051*; Jeff Davis Co., Vernon Bailey 404; W. L. Bray s.n. in IX 1902; Valery Havard (Muniz Canyon) s. n. in July, 1883; another unnumbered Havard specimen is labelled "Cottonwood Spring" and was collected also in July, 1883); C. L. & Amelia A. Lundell 14243, 14244; J. A. Moore & J.A. Steyermark s. n. on Mar. 25; E. J. Palmer 20598; Parks & Cory s.n. in 1927; Studhalter 1026 (see Brewster Co., above); B. C. Tharp 4544; S. M. Tracy & F.S. Earle 210; *Eula Whitehouse 11400, 11402, 11403*; Charles Wright 669 (without locality, but specimens in Gray Herb. are annotated to show that this number covers Field Numbers 894 and 988, which were collected in Limpia Canyon, Davis Mtns.); M. S. Young s.n. in May ¹³ 1914; s. n. ²⁶ Aug. 1914. Presidio Co., L. C. Hinekley 2575, *Whitehouse 11404*.

Vernacula r Name: "Yew-leaf Willow".

Most of the species in Section Longifolias are shrubby. Because S. taxifolia has the smallest leaves of any member of the Section, it apparently has been assumed that it must be a small shrub. This is quite untrue. Like S. Hindsiana, of California, ^{most} to which it is/closely related, it becomes a large-trunked tree of middle height, as noted by some collectors (see description above).

Andersson, 1867, records both S. Hindsiana and S. taxifolia as having no styles although he quotes Bentham's description of the former, which says "stylus brevissimus". The style in S. Hindsiana is from 0.2-0.4 mm. long, while in S. taxifolia it about one half as long but visible in ~~px~~ well-prepared specimens. Most species of the Longifolias have no styles.

OK
add from Nov 1946
after hearing from

lost 5 spec Whitehouse
Lundell

8 a. SALIX LASIOLEPIS Benth. var. (~~Narrow-leaved southern~~).

Salix Bigelovii Torrey & Gray, var. angustifolia (?) Andersson, Kon. Svensk. Vet.-Akad.

Handl. 6:163. 1867 ("Foliis lingulato-lanceolatis, apiculatis, subtus glaucis nudis"); Andersson, in DC. Prodr. 16(2):255. 1868 (no localities or specimens cited).

Salix irrorata ~~XXXXXX~~ (in part) as understood by Ball, in Coulter & Nelson, New Mex.

Rocky Mtn. Bot. 132. 1909 (by twigs "or downy-puberulent" and by the Texas, and probably some of the New Mexico, distribution), not Andersson.

Salix lasiolepis Benth. Pl. Hartweg. 355. 1857 (in part); Andersson, Oefvers. ~~Kon.~~

Kon. Vet.-Akad. Forhandl. 15:118. 1858 (in part); printed simultaneously in Proc.

Amer. Acad. Arts & Sci. 4:58. 1858 (reprinted as Salices Boreali-Americanae, p. 2, ~~but see S. Bigelovii p. 163~~).

omitted from Monog. Salicum, 1867; Andersson, in DC. Prodr. 16(2):264. 1868 (in

part); Wootton & Standley (Fl. N. Mex.), Contrib. U.S. Natl. Herb. 19:159. 1915;

Schneider, Bot. Gaz. 65:31. 1918 (distribution in Mexico); Schneider, Journ. Ar-

nold Arb. 2:187-188. 1921 (in part); Ball, in Abrams, Illustr. Fl. Pacif. States

1:496, fig. 1208. 1923 (in part); Goodding (Willows in Region VIII), U.S. Dept.

Agric., Soil Conserv. Serv. Regional Bull. 65:8, illus. (mimeogr.), 1940.

or 6 m. or small trees 5-8 m

Shrub 2-5 ~~9~~ 9 m. tall, with clustered stems and grayish bark; twigs mostly stoutish, the seasonal yellowish, pubescent to puberulent, the 1-year yellowish to brownish, often pubescent or puberulent before the epidermis peels in the spring and sometimes becoming puberulent thereafter, the older chestnut-brown to dark brown and glabrate to glabrous; buds stout, 2-6 mm. long, or 6-10 mm. long and 2-4 mm. wide on vigorous shoots, colored and clothed about as the supporting branchlets; stipules 2-4 mm. ~~much longer~~ long or to 8 mm. on vigorous shoots, semi-cordate, ovate, or subulate, sometimes serrulate; petioles stoutish, 5-10 or 15 mm. long, yellowish and pubescent when young, becoming brownish and glabrate-glabrous with age; leaf-blades narrow, linear-oblongate, linear-elliptical, linear-lanceolate, or sometimes narrowly oblong, 6-10 cm. long and 0.8-1.5 cm. wide, or to 11-15 cm. by 1.5-2 cm. wide on vigorous shoots, narrowed at base, acute or short-acuminate at apex, the somewhat rev-

S. lasioplepis v. *bracelinæ* 31 -

olute margins subentire to irregularly undulate-denticulate, ~~thence~~ or undulate-serrulate, gray-pubescent while unfolding, becoming glabrate to glabrous with age, dark green and somewhat shining above, densely glaucous and reticulate beneath, the yellowish midrib prominent on both sides and often minutely puberulent above in maturity. Aments precocious, sometimes appearing in Dec.-Jan. in the axils of old leaves, subsessile at first, 3-7 cm. long; the staminate 1.2 cm. wide, stamens 2, filaments ^g _{cm.} glabrous, usually united for $\frac{1}{2}$ (their length or more; pistillate 1-1.4 ~~mm.~~ wide, the peduncle in fruit 2-5 or ~~2~~ mm. long and bearing 2-4 tiny bract-like leaves; scales in both sexes persistent, obovate, very obtuse, 1-1.2 mm. long, dark brown or blackish, densely clothed with long straight or tangled white hairs; capsule lanceolate 3.5-4.5 mm. long, greenish, glabrous; pedicel 0.5-1 or 1.5 mm. long, glabrous; style 0.4-0.8 mm. long, entire or more or less bifid, stigmas shorter, usually notched. -- Along streams, mostly in mountains at middle elevations to 7000 or rarely 8000 ft. Southern Calif. eastward to ^{southwest} ~~S.W.~~ Texas and northern Mexico.

Brewster Co., "Infrequent at Buena Vista, west of Alpine, Brewster Co., Mar. 13, 1937", B.H. Warnock T 125; ⁴⁷⁴ Gulberson Co., Paul C. Standley 40485; M.S. Young s. n. ^{DS Correll} 13548, 14064; V.L. Cory 53086, 53106, 53158. in 1916. Jeff Davis Co., Vernon Bailey 407; L. C. Hinkley 1095; C. L. & Amelia A. Lundell 14251; C. H. Muller 8184; E.J. Palmer 30799, 32008, 32157, 33431, 34479; H. B. Parks and V.L. Cory 9098, 18520, 18521; Omer E. Sperry T 2 on May 3, 1936. Presidio Co., Hinkley 2726, 2727. ^{Co. model} (?) Co., Valery ~~H.W.~~ Havard s. n. in Oct., 1883

Vernacular Name: "Narrow-leaved Arroyo Willow".

This willow is sufficiently different from the typical western *S. lasioplepis* to warrant separation as a variety. The species has branchlets darkening more rapidly and more completely; leaves ^{ob} lanceolate to broadly ^{ob} lanceolate, and aments more nearly sessile and rarely if ever in the axils of old leaves. The first and last-named of these characteristics may be purely physiological (climatic).

~~This variety is not given a definite Latin name at this time because it may represent one or the other of two obscure Mexican species of this Section (*S. Hartwegii* and *S. mexicana*). They are not well known and available material is scanty, so that~~

S. lasiolepis v. *bracelinae*
 it seems best to wait until they can be studied more fully before burdening taxonomy with another combination.

In the northern⁷¹ part of the range of the species are two varieties with leaf-blades still wider than those of typical *lasiolepis*. One is var. *Bigelovii* (Torr.) Babb, with leaves broadly oblanceolate to obovate, and the other is var. *Sandbergii* (Rydb.) Ball, with leaves elliptical-oblanceolate to obovate or obovate-oval. Thus there is gradual broadening of the leaves as the range extends from south to north, in our western States. It must be remembered, however, that the apical leaves of summer or autumn shoots of all these forms may be more or less linear-oblanceolate if environing conditions are unfavorable.

In the mountain canyons of Colorado and extending southward into northern and western New Mexico and immediately adjacent southeastern Arizona is the closely related *S. irrorata* Andersson, also narrow-leaved. It differs from this *lasiolepis* variety in having the branchlets and bud scales glabrous throughout the year, the seasonal twigs sometimes yellowish but usually darkening, the one-year and older brown to blackish, and all branchlets more or less pruinose, at least during part of the year; the leaves glabrate or glabrous while unfolding and glabrous thereafter; and the aments shorter and more nearly sessile.

Unfortunately for a clean-cut separation, the variety under discussion shows some of the pruinose glaucousness of branchlets in the eastern part of its range, namely, Texas and immediately adjacent New Mexico, although such branchlets are characteristically pubescent and many of them yellowish. The above-cited specimens showing this pruinosity are: Brewster Co., Warnock T 123 (faintly pruinose on one of several short, yellowish 1-year twigs which are pubescent toward their tips); Jeff Davis Co., Bailey 407 (July 11, faintly pruinose on ~~middle portion of~~ 1-year pubescent but dark-brown twigs); Lundell & Lundell 14251 (det. as *S. irrorata* but young twigs and younger leaves pubescent, 1-2-year twigs pruinose, Aug. 4); Palmer 34479 (June 11, faintly pruinose on middle portion of two 1-year darkened twigs which earlier had borne aments). From Dona Ana Co., New Mexico, E.O. Wootton s.n. on Mar. 12, 1899, is faintly pruinose on the glabrate base of one of several long, yellow, pubescent 1-year twigs. From Catron Co., W-C N. Mex., L. N. Goodding 30, 31, on May 20, show dense pruinosity on glabrous 1- and 2-year blackish twigs but the unfolding leaves and tips of yellow 1-year twigs are pubescent.

9 a. SALIX HUMILIS Marshall, var. RIGIDIUSCULA (Andersson) Robinson & Fernald*, in Gray's New Man. Bot. 326. 1908; Ball, in Deam (Scrubs of Ind.), Ind. State Dept. Publ. Conserv. ~~Bull.~~ 44:63. 1924; Massey & Ball (Willows of Va.) Va. Polytech. Inst. Bull. 37(9):28. IX 1944.

 * Robinson & Fernald apparently credited Andersson with having published a variety but he really published a form and therefore they must be considered to be the authors of the varietal combination.

Salix humilis Marshall, as understood by Britton, Britton & ^BBrown, Small, and most other recent authors, includes this and other varieties. These authors give the range as westward to Tenn. and Kan. or Nebr.; Ball (Willows SO. St.), Castanea 3:8-9. 1938.

Salix humilis Marsh., var. longifolia Andersson, forma rigidiuscula Andersson, Kom. Svensk. Vet.-Akad. Handling. 6:111. 1867 (Mnog. Sal.); Andersson, in DC. Prodr. 16(2):236. 1868.

Shrubs with clustered stems 1-2 or rarely 3 m. ^{tall} high; young branchlets, bud scales, and petioles (5-10 mm. long) yellowish and densely gray-pubescent, becoming brownish with age, and less pubescent. 1-year and 2-year branchlets brownish to blackish and more or less puberulent; stipules narrowly to broadly lanceolate, acute, toothed, often deciduous; leaf-blades narrowly oblanceolate, oblanceolate, or narrowly ~~4-10 or, on vigorous shoots, 12-15 cm. long, 1-1.5 or sometimes 2-2.5 cm. wide, elliptical, narrowed at the base, acute or short-acuminate at apex, entire or margins somewhat undulate or undulate-serrate, and somewhat revolute, dark green with whitish midribs and veins and often puberulent above, glaucous and densely gray-pubescent beneath, becoming glabrate and strongly reticulated or subrugose with age.~~ Aments strongly precocious, sessile, naked, or rarely on short, bracted peduncles, numerous, often crowded, obovoid or oval, 1.5-2 cm. long, becoming 2-4 cm. long in persistent, fruit, often recurved; scales ^{very} oblanceolate, obtuse, 1.5-2 mm. long, blackish, long-villous; stamens 2, filaments free, glabrous; capsules narrowly lanceolate-rostrate, 7-8 or 9 mm. long, gray-pubescent; pedicels 1-2 mm. long, pubescent; styles 0.2-0.4 mm. long, equalling the divided stigmas. -- Scattered but common in dry barrens and open woods from the Appalachian Plateau to ^{the eastern edge of} the Great Plains and in more moist or swampy ground westward to northeast Texas and central No. Dakota.

6-10 cm. long by 1-1.8 cm. wide, or 12-15 cm. by 2-2.5 cm. on vigorous shoots,

Harrison Co., E. J. Palmer 13221 "in moist, sandy open ground, Marshall, Mar. 29"),
Upshur Co., J. Reverchon s.n. on Aug. 27 ("swamps, Big Sandy"). Wood Co., J. Rever-
chon 2084 ("swamp, Mineola, Aug. 14"; some vandal apparently has written the word
"Damp" over the faintly pencilled "swamp", and a supplementary label bears, in ink,
"S. tristis, Damp sands, Mineola"). ^A _{a/}

Vernacular Name: "Narrow-leaved Prairie Willow".

When the leaves of this narrow-leaved variety are only one-third to one-half grown, as in the case of Palmer 13221, ~~they bear a very deceptive resemblance to those of the Dwarf Gray Willow, S. tristis~~ they bear a very deceptive resemblance to those of the Dwarf Gray Willow, S. tristis for which Palmer's 13221 was once mistaken by the writer. When the leaves on sterile summer shoots have been stunted by drought, or reduced by the coming of cool weather, they may be only 4-6 cm. long, although mature, and then are even more like mature foliage of S. tristis. This is the condition in Reverchon 2084, from Wood Co.

The occurrence of ~~this~~ ^{rigidiuscula} variety in three counties of northeastern Texas marks the southwestern limit of its known distribution. It may be expected to occur in other counties of that area. S. tristis may yet be found there also.

^{a/} The author greatly appreciates the courtesy of the Missouri Botanical Garden and the Arnold Arboretum in sending their material of this variety for study, and that of the Chicago Natural History Museum and the Gray Herbarium in making sure that they had no Texas specimens.

Salix of Texas

- . **SALIX TRISTIS** Aiton, Hort. Kew. 3:393. 1789; Britton & Br., Illustr. Fl., ed. 1, 1:499. 1896, ed. 2, 1:600. 1913; Small, Fl. Southeast. U.S., ed. 1, 343. 1903, Small, Man. Southeast. Fl., 415. 1933; ed. 2, 343. 1913; Ball in Deam, Shrubs of Indiana, 63, pl. 20. 1924; Ball, (Willows Southern St.), Castanea 3:9. 1938; Massey & Ball (Willows of Va.), Va. Polytech. Inst. Bull. 37 (9):29, frontisp., 1944.

Low, many-stemmed, ~~shrub~~ leafy shrubs, 0.4-1 m. high, similar to S. humilis but smaller in every way; branchlets slender, brownish, pubescent; stipules wanting or very small and deciduous; bud-scales short, pubescent; leaves usually crowded toward ends of branchlets, narrowly oblanceolate, 2-5 or 6 cm. long, 7-10 or 12 mm. wide, acute at apex, tapering at base to a very short pubescent petiole, mostly entire, dark green and pubescent above but becoming glabrate, subglaucous and densely gray-tomentose beneath, sometimes glabrate in age; aments numerous, ~~sessile~~ precocious, sessile, naked, often somewhat crowded, 1-1.5 or 2 cm. long in fruit, oval or subglobular; flower scales oblanceolate, obtuse, 1-1.5 mm. long, blackish, villous; stamens 2, filaments free, glabrous; capsules narrowly lanceolate, 6-7 mm. long, gray-pubescent; pedicels 1-2 mm. long, pubescent; style 0.2-0.3 mm. long, equalling the divided stigmas. -- Occasional in moist to dry, and often sandy, uplands, roadsides, thicket-borders, mountain balds, etc., in the eastern half of the U.S., west to the eastern Great-Plains States. In Texas, only in the extreme northeast.

Harrison Co., E. J. Palmer 13221 (in moist sandy open ground, Marshall; as S.

humilis).

= *S. humilis* var. *rigidiuscula*

Vernacular name: "Dwarf Upland Willow".

This little prairie willow, blooming in earliest spring, may be looked for in several counties of Northeast Texas. The similar but larger S. humilis Marshall, 1-3 m. high, with leaves 5-10 or even 15 cm. long and 1-2 or 3 cm. wide, and aments 2-4 cm. long, may yet be found in northeastern Texas, as it occurs in Arkansas and Oklahoma, preferring drier and more clayey upland habitats.

10. SALIX BABYLONICA L., Sp. Pl. 1017. 1753; Britton & Br., Illustr. Fl. ed. 1, 1:496.
1896; Britton, Man., ed. 1, 314. 1901;

Massey & Ball (Willows of Va.), Va. Polytech. Inst. Bull. 37(9):21. 1944.

Introduced tree, to 12 m. high; branchlets extremely slender and greatly elongated, pendulous, yellowish to brownish, glabrous; stipules mostly wanting, or 2-7 mm. long, lanceolate; leaf-blades linear-lanceolate, long-acuminate, mostly falcate, 6-12 cm. long, 0.5-1.5 cm. wide, finely but unevenly spinulose-serrulate, yellowish-green above, glaucescent to glaucous beneath, glabrous; axillary bracts coriaceous, short-pedunculate, very small, 1-2.5 or the staminate 4 cm. long, 6-9 mm. wide; peduncles 0.5-1.5 cm. long, bearing 2-4 tiny leaves; flower scales pale yellow, crinkly hairy, deciduous; stamens always 2, filaments free, pubescent at base; capsules narrowly ovoid, 1.5-2.5 mm. long, sessile, glabrous; styles almost obsolete, stigmas minute. -- A north-China plant, long cultivated in Europe as an emblem of mourning (see Shakespeare), and early introduced into America as an ornamental, especially for cemeteries. Now widely planted and sparingly escaped in the eastern States.

Dallas Co.: C.L. and Amelia A. Lundell 14530 (University Park; not indicated as an escape). Kerr co.: V. L. Cory 50538 (along Guadalupe River, 3/4ths mile east of Hunt; no statement regarding escape).

Vernacular Name: "Weeping Willow" (This willow does not occur in the Tigris-Euphrates River basin and therefore the name "babylonica" is inappropriate, as is the vernacular name: "Babylon Weeping Willow").

II. SALIX FRAGILIS L., Sp. Pl. 1017. ~~1833~~ 1753; Britton & Br., Illustr. Fl. ed. 1, 1:496.
1896, ed. 2, 1: . 1913; Britton, Man. ed. 1, 313. 1901;

Massey & Ball (Willows Va.), Va. Polytech. Inst. Bull. 37(9):20. 1944.

Large introduced tree to 20 m. high; branchlets greenish to reddish, glabrous, brittle at base (falling in wind-storms); stipules small or wanting; petioles 7-15 mm. long, glandular above near base of blade; blades narrowly lanceolate to lanceolate, 7-12 or 15 cm. long, 2-3.5 cm. wide, acuminate, glandular marginal serrations 5-6 per cm., dark green above, glaucescent to glaucous beneath, glabrous after unfolding; aments coetaneous, leafy-pedunculate, slender and lax, 4-8 cm. long, 8-10 mm. wide; peduncles 1-5 cm. long, bearing 2-5 small leaves; flower scales oblong, crisp-villous, greenish-yellow, stamens 2, occasionally 3 or 4; deciduous; ^{capsules} narrow ly conic, 4.5-5 mm. long, glabrous; pedicels 0.5-0.8 mm. long, glabrous; style 0.3-0.7 mm. long, usually entire; stigmas shorter, notched. -- Introduced from Europe in Colonial times for ornament, sentiment, pasture shade, and charcoal for gunpowder making. Common in farm-yards and along pasture streams in the eastern and central States and Canada and often escaping. Less common, and rarely escaping in the drier areas.

Reported from:

Vernacular name: "Brittle Willow", "Crack Willow".

Should the very similar White Willow (*S. alba* L.) be found, it differs from *S. fragilis* in leaves about two-thirds as large, with 9-10 glandular serrations per cm., silvery-pubescent on both sides, especially beneath, and somewhat smaller, ^{s.} sessile or subsessile/ capsules.

WILLOWS OF TEXAS: Additions and Corrections in 1957.

1. *SALIX NIGRA* Marsh. (p. 7) - 9

None under var. altissima in CRB De/

Angelina Co.: H.J. Hamby 1576 (CRB)

(Val Verde Co.: in mss. strike out Palmer 13335. (done). Belongs in Uvalde Co.)
Anderson Co.: E.J. Palmer 13148, 14393 (both as var. altissima Sarg.) in US in 1918

Brazoria Co.: insert E.J. Palmer 13136 ((in 1918, US)

Childress Co.: John W. Hubbard 1162 (in 1935 USFS)

Harris Co.: insert E.J. Palmer 13118 (as var. altissima Sarg.) US

Harrison Co.: E. J. Palmer 13224 (as var. altissima Sarg.) US.

Houston Co.: E.J. Palmer 13180 (as var. altissima Sarg.) US

Jones Co.: John W. Hubbard 1026 (at Abilene in 1935, USFS)

Webb Co.: E. J. Palmer 11278 (annot. by Schneider as var. Lindheimeri) US in 1917

2a. *S. NIGRA* Marsh., var. Lindheimeri Schneider (p. 9)

Cass Co.: V. L. Cory 55947 (in 1949, USN).

Fort Bend Co.: W. L. Bray s. n. in in 1899. (deleted from species)

Uvalde Co.: E. J. Palmer 13335. (in 1918 USN). Deleted from Val Verde Co.

Harrie Co.: Ernest C. Smith 2339 (CRB)

Kaufman Co.: Ellen Hamby 1256 (CRB)

Nacogdoches Co.: Edwin A. Robb ET 134 (CRB).

Uvalde Co.: Ernest C. Smith 2421 (CRB)

Anderson Co., ⁽¹⁾ Eula Whitehouse ⁵ 11407.

Angelina Co., C.L. and Elia A. Lundell 13359, 13360, 13361; Effie Beon s.n. in 1934.

Archer Co., Eula Whitehouse 9713. Bexar Co., V. Harvard s. n. in March, 1883; G. Jerry

s. n. Bowie Co., Delzie Demaree 20777; Lundell & Lundell 13983. Brazoria Co., E. J.

Palmer 13137. ^{V.L. Cory 51598;} Brazos Co., H. Moss 1599, 1600; R. S. Reeves 714, 723; Lurward Timmons,

1598; W. H. Williams 1601. ^{Calhoun Co., Whitehouse 11412.} Cameron Co., L. H. Pammel 8, in 1929; Robert Runyan 624;

R. A. Studhalter 1165. ^{Clay Co., Whitehouse 10817.} Cass Co., F. McClung s. n. in 1926. Crosby Co., S. A. & S. n.

^{D.S. Correll 13119;} Dallas Co., Mary Himes s. n. in 1925; Lundell & Lundell 13398. Floyd Co.,

Whitehouse and Normand s. n. in 1929. Fort Bend Co., W. L. Bray s. n. in 1899. Har-

ris Co., George L. Fisher 23, 24; Palmer 13122. ^{D.S. Correll 13232;} Harrison Co., Lloyd H. Shinnors 7573.

Henderson Co., Shinnors 7053. Kimble Co., C.R. Ball 1537. Llano Co., Whitehouse

s. n. in 1933. Marion Co., Lundell & Lundell 13957. Mitchell Co., Richard W. Pohl

4892, 4928; ^{Orange Co., Whitehouse 11410, Crockett 41. 3/26/40, 168a} Palmer 13771. ^{Reckwall Co., Shinnors 7449. Rusk Co., Henderson High School}

5729; Henderson School No. 22 s. n. in 1928 (possibly the same collection). San

Augustine Co., Palmer 13250. ^{Frank Tweedy s. n. in 1880.} Taylor Co., W. L. Tolstead 7194, Whitehouse 9625. Tom

Green Co., V. L. Cory 38825. ^{Travis Co., B. C. Thayer s. n. on April 10, 1937 (3}

sheets); Whitehouse s. n. in 1933. Val Verde Co., W. P. Carr 162, 163; Palmer 13335.

Van Zandt Co., Lundell & Lundell 13949. Walker Co., Carl Hartmann s. n. on 4/5 &

5/28/ 1912. Wichita Co., Whitehouse 9570, 9749. Wilbarger Co., Effie Beon 213 in

1936; Whitehouse 9865, 10940, 10941, 10954. ^{Wise Co., Whitehouse 15087.}

Vernacular name: "Black Willow". ^{*(not S. amygdaloides Wrightii, as named.)}

^{** (with pubescent seasonal twigs and petioles but}

^{neither S. falcata nor var. falcata can be recognized because falcate leaves may be}

found on nearly every specimen of S. nigra having mature foliage, especially when grow-

ing under very favorable conditions. Authors who assign to S. nigra a range extending

westward from southwestern Texas to California are including S. Gooddingii and its

variety vallicola in their concept of S. nigra. Coulter (l.c. above) undoubtedly in-

cluded S. Gooddingii var. vallicola in the S. nigra which he describes as "bending over

the waters of most streams of western Texas". Coulter also describes a "Var. Wrightii

Anders." under his S. nigra, but Andersson's variety has leaves glaucous beneath and

must be arranged as a variety of S. amygdaloides if recognized at all.

* The 3 comments marked by *, **, and *** above were made by me in my

letter of 20/11/46 and inserted by Lundell in his retyping of my ms. 20/11/46

2a. *S. GOODINGII* Ball, var. *VARIABILIS* Ball, Jour. Washington (D.C.) Acad. Sci. (p. 13)
40: 324-(329). Oct., 1950.

None in CRB Home Herb.

(*S. Goodingii* Ball, "var. *vallicola* (Dudley) Ball" in annotations on herbarium
specimens, but never published) 5 covers in USN.

Digitized by Hunt Institute for Botanical Documentation

Presidio Co.: L. G. Hinckley 4189 (in 1948. USN)

2a. *S. GOODINGII* Ball, var. *VARIABILIS* Ball,

"Salix Gooddingii Ball, var. vallicola (Dudley) Ball" is an unpublished name and ~~must be disregarded~~

must be disregarded. Very unfortunately, however, a large number of collections were so identified, and herbarium specimens so annotated, by the writer, some years ago. This ~~action~~ ^{full} ^{of this action} requires explanation ~~and one~~ was given in connection with the publication of var. variabilis. Briefly stated, the facts are as follows. The species has pubescent capsules. When ~~Dudley published~~ S. nigra var. vallicola Dudley, ~~which was published in~~ was published in Abrams, (Fl. Los Angeles and Viv. 100. 1904) the capsules were described as "glabrous or more or less pubescent". When Britton raised Dudley's variety to specific rank (North Am. Trees, 184. 1908), the capsules were described merely as "glabrous". Because of this emphasis on the word "glabrous", the writer assumed that "vallicola" was a glabrous-capsuled variety. Later, he discovered that Dudley's type specimen had pubescent capsules, ^{as in} ^{Sense} rather than those of the description, ~~like~~ ^{the} the species. ~~the~~ the characters of the type govern the validity of a name, ~~rather than~~ ^{as in} the name vallicola was invalid, as variety and species, as it really was the species, Gooddingii. Then it was realized that the publication of the combination "S. Gooddingii var. vallicola Dudley) Ball had been overlooked, and therefore the new variety, variabilis, was published.

Since the validity of a ~~publish~~ name is governed by the characters of the type specimen rather than those given in the description, it was evident that the name "vallicola" was invalid, either as variety or as species, because it really was the species, Gooddingii, published in 1905.

Atascosa Co., C.L. & Amelia A. Lundell 13779, 13859; Bandera Co., E. J. Palmer 11529.
 Bell Co., Lundell & Lundell 13880. Bexar Co., C.R. Ball s.n. in 1906. Blanco Co., Lundell & Lundell 13849. Bowie Co., D.S. & H.B. Correll 12403. Brewster Co., J.A. Moore & J.A. Steyermark 3388. Briscoe Co., E.L. Reed & Delzie Demaree 7624. Burnet Co., Correll & Correll 12740. Cameron Co., Mrs. A.M. Davis s.n. in 1941; L.H. Pammel 1, 2, 5, in 1929. Childress Co., Eula Whitehouse 10734. Clay Co., Whitehouse 10697. Collingsworth Co., V.L. Cory 50199. Comal Co., F.J. Lindheimer 1189 (see text); ^{H.}W.B. Parks & V.L. Cory 5983. Cooke Co., Correll & Correll 12940; Whitehouse 15682, 15706. Dallas Co., M.M. Glatfelter s.n. in 1898; Lundell & Lundell 13393, 13653. Denton Co., Whitehouse 15602. De Witt Co., Marguerite Risdal s.n. in 1941. Dickens Co., Fredk. V. Coville 1870. Dimmit Co., Lundell & Lundell 13809. Donley Co., Lundell & Lundell 14507. Ellis Co., Cory 53370. Erath Co., L.C. Gough s.n. in 1921; Palmer 14184. Falls Co., Lundell & Lundell 13881. Fort Bend Co., W.L. Bray 112. Gillespie Co., Lundell & Lundell 13847. Gonzales Co., Cory 41323. Grayson Co., Rogers McVaugh 7123. Grimes Co., Cory 50634. Guadalupe Co., Lundell & Lundell 13878; Whitehouse 11409. Hale Co., Whitehouse 9938. Harris Co., B.F. Bush 2 in 1899; Geo. L. Fisher 477; Geo. C. Nealley 29 in 1888; Palmer 13116; R.A. Studhalter 3933. Harrison Co., Lloyd H. Shimmers 7569. Hays Co., Lundell & Lundell 13852; Palmer 11590a; G. M. Watkins s. n. in 1929. Hidalgo Co., Chas. R. Cameron 66; Lundell & Lundell 13793; Whitehouse 249. Hopkins Co., Shimmers 7480. Irion Co., Cory s.n. in 1925; Palmer 12420. Jeff Davis Co., D.S. Correll 14028, 14057. Johnson Co., Cory 53340. Kaufman Co., F.J. Tyler s. n. in 1904. Kerr Co., Ball 1529; Cory 50469, 50520, 50541; 51741; Lundell & Lundell 13833. Kinney Co., Correll 14090; Whitehouse s.n. (5 shts.) in 1933. Lamar Co., Delzie Demaree 11999. LaSalle Co., Lundell & Lundell 13877. Liberty Co., Correll 13363. Live Oak Co., Lundell & Lundell 13780. Llano Co., Parks & Cory 6336. Madison Co., Correll & Correll 12611. McLennan Co., Lundell & Lundell 13882. McMullen Co., Lundell & Lundell 13862, 13864, 13865. Medina Co., Correll 14134. Menard Co., Ball 1548. Mitchell Co., Shimmers 8413. Montague Co., Cory 50084. ^{Orange Co., R.L. Crockett 83, Mar. 29, 1940.} Pannaola Co., Shimmers 7596. Real Co., Cory 51869; Lundell & Lundell 13827. San Saba Co., Correll & Correll 12682. Shackelford Co., C.H. Muller 8569. Starr Co., David Griffiths 6482; Lundell & Lundell 15797. Tarrant Co., Killian s.n. in 1926 or 1927; Albert Ruth 364; Whitehouse 10663, 15485. Taylor Co., Ball 1556; TX W.L. Tolstead 7019, 7027, 7098, 7315, ~~7315~~, Tom Green Co., Cory 39301. Travis Co., Ferguson s.n. in 1901; Lundell & Lundell 13856; McKee & Wesley 3918; A. Pratt 3695; B. C. Tharp s.n. in 1937; J. L. White 4715; Whitehouse s.n. in 1933, 11406. Uvalde Co., Lundell & Lundell 13814; Palmer 13342, 14435. Val Verde Co., Ball 1526; Cory & Ness s.n. in 1924; Cory 38091, 41696, 44532, 49360; J.N. Rose 11622. ^{Victoria Co., R.L. Crockett 317, Apr. 12, 1940.} Walker Co., Royal A. Dixon 541; Palmer 13395. Washington Co., Eunice Brackett s. n. in 1939. Webb Co., Lundell & Lundell 13805. Wheeler Co.,

3. SALIX AMYGDALOIDES Andersson, (p/ 16)

No additional specimens in CRB Home Herb.
None in USFS

Ochiltree Co.: Beryl & Helger Jespersen 2671, 2672 (in 1945 USN)

Oldham Co.: C.R. Ball 1622 (2 sh.), 1626 (2 sh), 1627 (2 sh), 1629 in CRB Dept. Herb
(Delete Ball 1629 from ex. from variety) *all in order mess*

3a. S. amygdaloides Anders., var. ~~WRIGHTII~~ (Andersson) Schneider (p. 18)

No additional specimens in CRB. HEM. Herb.

Armstrong Co.: J. M. Aikman 1145 (USFS in 1935)

Oldham Co.: Change Ball 1629 to 1625

~~Exhibition Co.: Ochiltree Co.: C.R. Ball 1625 (in 19 USN)~~

~~Oldham Co.: 1625 C.R. Ball 1625 (2 sh.), 1630 (in CRB DEpt. Herb.)~~

~~Oldham Co. (delete Ball 1629 from var. & put in species)~~

to 1625 (delete)

delete
Oldham Co.: Ball 1629, 1630 are in mes., but 1625 (and others) are in mes. under species.

4. S. CAROLINIANA Michaux. (p. 21)

Kendall Co.: E. J. Palmer 11606 (in 1917 (US) .

Kerr Co.: A. A. Heller 1621 (in 1894, US), 1643 (in 1894, USN). 1902 in mss (US 3 sheets)
 " " Eula Whitehouse 16346 (in 1945, US as S. caroliniana)

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Uvalde Co.: E. J. Palmer 33682 (in 1928, US)

Uvalde Co.: Ernest C. Smith 2420, 2491, 2495, 2500, 2501; (CRB in 1951)

County unknown: C. Wright 1879, in 1851 (US, cotype of S. nigra, var. longipes, forma venulosa Andersson, in D.C. Prodr. 16(2):201. 1868).

Salix amphibia Sm. No. spec. in USN under this name.

S. nigra var. No. " " # " these names.

S. Wardii Babb 3 covers in USN, but no Texas spec.

S. longipes Shults & Wootton *listed above*

5. S. INTERIOR Rowlee (p. 24)

No additions in CRB Home Herb.

Briscoe Co.: E.L. Reed and Delzie Demaree 7626 (in 1930, US)

5a. S. interior Rowlee, var. PEDICELLATA Anders.) Ball (p. 27)

No additions in CRB Home Herb.

Digitized by Hunt Institute for Botanical Documentation

5b. S. interior Rowlee, var. ANGUSTISSIMA Anders.) Dayton (p. 28)

No additions in CRB Home Herb.

~~XXXXXXXXXXXXXXXXXXXX~~Donley Co.: Eula Whitehouse 19151 (US, 2 sheets, in 1947 (check fragments)
as 775 exiguus

Guadalupe Co.: Specimens dist. by Mo. Bot Garden are labelled Comanche Spring, New Braunfels, etc. OK

Lindheimer 1190, 1191 (US)

see what "etc." will mean

6. *S. EXIGUA* Nuttall (p. 31)

No additions in CRB Home Herb.

None in USM

6a. *S. exigua* Nutt., var. *NEVADENSIS* (Watson) Schneider (p. 34)

El Paso Co.: (Frontera) Charles Wright 1875 (US, photo only)

El Paso Co.: Charles Wright 1874 ("Field No. 441, head of Limpia Creek, Davis Mts,
Jeff Davis Co., June 12, 1851") USN
(Printed labels read: "C. Wright Coll. N. Mex. 1851-52".)

Presidio Co.: L. C. Hinkley 2512 (CRB in 1942) (already in my)

6b. *S. exigua* Nutt., var. *STENOPHYLLA* (Rydberg) Schneider (p. 36)

No additions in CRB Home Herb.

7. SALIX TAXIFOLIA Kunth. (pp. 38-40)

Add as synonym:

Salix taxifolia var. limitanea Johnston (Ivan M.), Jour. Arnold Arb. 25:432-(433). 1944.

Jeff Davis Co.: L. C. Hinckley 2665; Victor L. Cory 53560, ^{Chas} as var. limitanea;

Variety limitanea Johnston is here regarded as a synonym of the species. ^{hence} Johnston refers to "Intermediate forms, connecting it with the phases of S. taxifolia, ~~and~~". He then discusses the characters and relationships of the species and varieties limitanea and microphylla, as ~~follows~~ quoted below.

"The commonest form of S. taxifolia ^{in central Mexico} is var. microphylla (S. & C.) Schneider, which has short, proportionately broad leaves with evidently toothed margins. The typical form of S. taxifolia appears to be only an ecological variant. It is sporadic within the range of var. microphylla and is characterized by having larger, more elongate, obscurely toothed, oblanceolate leaves. In general size and shape of leaves this typical form suggests var. limitanea, but it differs in having the leaves thinner and less firm in texture and the indument darker, coarser, and less appressed."

"Northern material representing var. limitanea can be quickly distinguished from the southern plants belonging to typical S. taxifolia and to var. microphylla by ~~its~~ more closely and finely pubescent leaves, lighter color, and ~~and~~ generally cleaner and neater appearance. In addition, the thicker leaves tend to be somewhat larger in size, entire-margined, and in age glabrescent"

As pubescence and leaf size vary greatly, ^{not only} on different plants ^{but also on the} and at different ^{same plant} stages of development during the season, the one ^{definite} taxonomic character for separating var. limitanea ~~from~~ would seem to be the assertedly entire-margined leaves.

A "generally cleaner and neater appearance" is not exactly a taxonomic character but apparently refers to shorter and appressed pubescence, not becoming fuzzy in drying.

Pubescence and leaf size vary greatly, not only on different plants but also on the same plant ~~back~~ at successive stages of development during the season. A series of ~~specimens~~ ^{from the} specimens, taken ~~at intervals~~ same plant at intervals from early spring until autumn, are necessary to full knowledge of these characters. Such series seem to be completely lacking in *S. taxifolia*. "generally cleaner and neater appearance" is not exactly a taxonomic character, but here it apparently refers to the shorter and appressed pubescence, not becoming fuzzy in drying. Difference in the actual thickness of tiny and more or less hairy leaves is very difficult to determine. Accordingly, the one most definite character for separating limitanea ^{variety} would seem to be the assertedly entire leaves.

From Johnston's view-point, the leaves of *S. taxifolia* are "obscurely toothed", these of var. *microphylla* presumably are evidently toothed, while these of his var. limitanea are entire. The problem is not quite that simple. The tiny denticulations do not project from the margin of very young leaves. They begin to extrude as the leaf grows ~~at~~ more nearly to full size and even then may be almost totally hidden by thick pubescence. Because of the desire to obtain flowers of fruit, most ~~care~~ ^{care} collections are made before the leaves are fully grown and the greatest ~~care~~ in microscopic examination under strong light is required to ascertain the actual facts.

Apparently such procedure was not followed by the author of var. limitanea.
specimens of five collections

Recently, the writer has studied ~~specimens of five collections~~ ^{specimens of five collections} cited by Johnston as representing his var. *limitanea*. These are Tracy & Earle 210 and C. Wright 666 (cotype in U.S. Natl. Herb.), from ~~Mexico~~, Jeff Davis Co., Texas; Blumer 1247 from Arizona, and Phillips 331 and White 2329 from Mexico. The first three have only very young leaves but the larger show occasional denticulations. The two Mexican collections have small leaves but obviously denticulate. Cery 53560 is a 1947 collection from Jeff Davis Co., Texas, not seen by Johnston but distributed as var. limitanea. It has very young leaves but the larger show occasional denticulation. So far no collection of *S. taxifolia* has been found without some denticulation, if ~~the~~ ~~some~~ of the leaves had reached half normal size.

Johnston Cedar Texas spec. as follows

Jeff Davis Co

- x Lempia Creek, Aug 22 & 24, 1849 Wright 669 (type very hard)
- x " Canyon 1902, Tracy & Earle 210,
Lempia Creek, 15 mi. west of Ft Davis, 1926, Palmer 30957;
Little Aguja Canyon Davis Mts, 1937, Moore
and Stengermark 3125;
Eastern Jeff Davis Co, 1926, Palmer 30499
Cubala Creek above Chafter, 1942, Henckley 25124

Wm. Wolf 2585 Hidalgo Co.

- x Ariz. Blumer Blumer 1247, 1623
Gooding 4641,
Towmey (3)
Pringle (2) one No 14.
McKelvey 1579

x 45N

Tracy & Earle 210 are very young but on occasional
faint denticulation on lower
Wright 669 as above

Blumer 1247 larger are acc. finely dentic.

8. *S. IASIOLEPIS* Benth. var. *BracELINIAE* Ball, Jour. Wash. (D.C.) Acad. Sci. 40: 331-(335).
Oct., 1950.

None in U.SFS.

Jeff Davis Co.: Change Cory 53086 in mss. to 53096 (TEN) Look up in CRB Dept.

none of them or other " " "

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Presidio Co.: L.C. Hinckley & B. H. Warnock 46900 (CRB)

add ~~In *S. irrorata* -~~

*T1412 as *S. irrorata**

Jeff Davis Co.: Omer E. Sperry T-412, in 1946 (US) (compare *irrorata* and var. *Braceliniae* carefully)

9. *S. HUMILIS* Marshall (determine if it occurs)

No Texas specimens in CRB Home Herb.

No Texas specimens in USN.

NONE in USFS

In Gleason, The New Britten and Brown Illustrated Flora of the Northeastern
United States and Adjacent Canada 2: . 1952, the writer stated that the/species,
S. humilis, extended west "to E. Tex." To date no Texas specimens of the species
have been discovered.

p 22

9a. *S. humilis* Marsh., var. *RIGIDUSCULA* (Andersson) Robinson & Fernald

(pp 44-46)

No additions in CRB HOME Herb.

No Texas specimens in USN (no cover for variety).

None in USFS

10. S. BABYLONICA L. (p. 46)

No additions in CRB Home Herb.

None in USN

None in USFS

11. S. FRAGILIS L. (p. 47-48)

No specimens cited in mss.)

Digitized by Hunt Institute for Botanical Documentation

No additions in CRB Home Herb.

No. specimens in USN

None in USFS

(S. ALBA L. (Not included in mss; determine if there are specimens.

None in CRB Home Herb.

None in USN

None in USFS

1. ~~SALIX NIGRA~~ Marsh. (pp. 7-9)

After Salix falcata Pursh (p. 7) insert

Salix nigra var. altissima Sargent, Trees and Shrubs 2:216. 1913; Schneider (Notes on American Willows. V) in Jour. Arnold Arb. 1:8. 1919; Ball (Willows of the Southern States) in Castanea 3:5. 1938 (where it is erroneously cited as S. nigra var. altissima Schneider).

Angelina Co.: H. J. Hamby 1576;

Anderson Co.: E. J. Palmer 13148, 14393; (both as S. nigra var. altissima Sarg.);

Brazoria Co.: E. J. Palmer 13136;

Childress Co.: John W. Hubbard 1162.

Harris Co.: E. J. Palmer 13118, (as var. altissima ~~SCHNEIDER~~ Sarg.),

Harrison Co.: E. J. Palmer 13224 (as var. altissima Sarg.);

Houston Co.: E. J. Palmer 13180 (as var. altissima Sarg.).

Jones Co.: John W. Hubbard 1026.

Val Verde Co.: delete Palmer 13335 (it belongs in Uvalde Co., as var. Lindheimeri)

Webb Co.: E. J. Palmer 11278 (annotated by Schneider as var. Lindheimeri).

1a. S. NIGRA Marsh., var. LINDHEIMERI Schneider (pp. 9-13)

Cass Co.: V. L. Cory 55947.

Fort Bend Co.: W. L. Bray s. n. in 1899. (deleted from species)

Harris Co.: Ernest C. Smith 2339;

Kaufman Co.: Ellen Hamby 1256;

Nacogdoches Co.: Edwin A. Robb ET-134.

Uvalde Co.: E. J. Palmer 13355; (deleted from species in Val Verde Co.)
Ernest C. Smith 2421;

XXM.

- 2a. *SALIX GOODINGII* var. *VARIABILIS* Ball, in Jour. Washington (D.C.) Acad. Sci. 40: 324-(329). Oct., 1950.

In the synonymy (p. 13) after the paragraph *S. Goodingii* Ball, insert ^{alix} "*S. Goodingii* Ball, var. *vallicola* (Dudley) Ball." This is an unpublished name and must be disregarded. Very unfortunately, however, a large number of collections were so identified and herbarium specimens so annotated, by the writer, some years ago. A full explanation of this action was given in connection with the publication of var. *variabilis*. Briefly stated, the facts are as follows. The species has pubescent capsules. When *S. nigra*, var. *vallicola* Dudley was published in Abrams (Fl. Los Angeles and Vicinity. 100. 1904), the capsules were described as "glabrous or more or less pubescent". When Britton raised Dudley's variety to specific rank (North Amer. Trees, 184. 1908), the capsules were described merely as "glabrous". Because of these emphases on the word "glabrous", the writer assumed that "*vallicola*" was a glabrous-capsuled variety. Later, he discovered that Dudley's type specimen had pubescent capsules, as in the species. Since the validity of a name is governed by the characters of the type specimen ~~not~~ rather than by those given in the description, it was evident that the name "*vallicola*" was invalid, either as variety or as species, because it really represents the species *Goodingii*, published in 1905. It was realized then that the combination, *S. Goodingii* var. *vallicola* (Dudley) Ball, never had been published. ~~and therefore the new variety, *variabilis*, was published.~~

Prewitt Co.: L. C. Hinckley 4189;

3. *SALIX AMYGDALOIDES* Andersson. (pp. 16-18)

Ochiltres Co.: Beryl and Helger Jespersen 2671, 2672.

3a. *SALIX AMYGDALOIDES* Andersson var. *WRIGHTII* (Andersson) Schneider (pp. 18-21)

Armstrong Co.: J. M. Aikman 1145.

h
Oldham Co.: change Ball 1629 to 1625,

4. *SALIX CAROLINIANA* Michaux (pp. 21-24).

Kendall Co.: E. J. Palmer 11606.

Kerr Co.: A. A. Heller 1621 (4 sheets), 1643, 1902 (3 sheets); all as *S. longipes*;

Eula Whitehouse 16346 (as *S. caroliniana*),

Uvalde Co.: E. J. Palmer 33682; Ernest C. Smith 2420, 2491, 2495, 2500, 2501.

County unknown: Charles Wright 1879, in 1951 (cotype of *S. nigra* var. *longipes*, forma *venulosa* Andersson, in D.C. Fredrom. 16(2):201. 1868).

5. SALIX INTERIOR Rowlee, (pp. 24-27)

Briscoe Co.: E. L. Reed and Delzie Demaree 7626.

5a. SALIX INTERIOR Rowlee, var. PEDICELLATA (Andersson) Ball (pp. 27-28)

Donley Co.: Eula Whitehouse 19151 (2 sheets as S. exigua).

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2b. SALIX INTERIOR Rowlee, var. ANEUSTISSIMA (Andersson) Dayton (pp. 28-31)

Guadalupe Co.: Add to present entry in mss., if desired,

(Specimens of Lindheimer 1190 and 1191, distributed by the Mo. Bot. Garden, are labelled "~~Comanche Spring, New Braunfels, etc.~~", in US. Nat. Herb.).
{ "Comanche Spring, New Braunfels, etc."

6. *SALIX EXIGUA* Nuttall. (pp. 31-34)

6a. *SALIX EXIGUA* Nuttall, var. *NEVADENSIS* (Watson) Schneider. (pp. 34-36)

El Paso Co.: Charles Wright 1875 (at Frontera; photograph only, in US. Nat. Herb.).

Digitized by Hunt Institute for Botanical Documentation

6b. *SALIX EXIGUA* Nuttall, var. *STENOPHYLLA* (Rydberg) Schneider (pp. 36-38).

Jeff Davis Co.: Charles Wright 1874 (Field No. 441. Head of Limpia Creek, Davis Mts.,
June 12, 1851. The printed caption on the label reads: "C. Wright,
Coll. N. Mex. 1851-52").

(These data from the label may help to clear up the confusion regarding State and place of collection. CRB.)

ADDITIONS AND CORRECTION OF ORIGINAL RES. OF WILLOWS OF TEXAS.

2. SALIX TAXIFOLIA Kunth. (pp. 38-40)

Insert as synonym-

Salix taxifolia Kunth, var. limitanea Johnston, Jour. Arnold Arb. 25:432-(433). 1944. (See extended discussion after description and distribution).

Jeff Davis Co.: L. C. Hinckley 2665; V.L. Cory 53560 (as var. limitanea);

(Add the following at end of the discussion on p. 40)

Variety limitanea Johnston is here regarded as a synonym of the species. Johnston himself refers to "Intermediate forms, connecting it with the phases of S. taxifolia - - - ." He then discusses the characters and relationships of the species and the varieties limitanea and microphylla, as quoted below.

"The commonest form of S. taxifolia in central Mexico is var. microphylla (S. & G.) Schneider, which has short proportionately broad leaves with evidently toothed margins. The typical form of S. taxifolia appears to be only an ecological variant. It is sporadic within the range of var. microphylla and is characterized by having larger, more elongate, obscurely toothed, oblanceolate leaves. In general size and shape of leaves this typical form suggests var. limitanea, but ~~but~~ it differs in having the leaves thinner and less firm in texture and the indument darker, coarser, and less appressed."

"Northern material representing var. limitanea can be quickly distinguished from the southern plants belonging to typical S. taxifolia and to var. microphylla by its more finely and closely pubescent leaves, lighter color, and generally cleaner and neater appearance. In addition, the thicker leaves tend ~~tend~~ to be somewhat larger in size, entire-margined, and in age glabrescent."

It seems desirable to analyze the above-quoted statements. Pubescence and leaf size vary greatly, not only on different plants but also on the same plant at successive stages of development during the season. A series of specimens, taken from the same plant at intervals from early spring to autumn, is necessary to a full knowledge of the range of variation in these characters. Such series seem to be ~~more~~ completely lacking for S. taxifolia. A "generally cleaner and neater appearance" is not exactly a taxonomic character, but here it apparently refers to the shorter ~~and~~

and appressed pubescence, not becoming fuzzy in drying. Differences in the actual thickness of tiny and more or less hairy leaves are very difficult to determine. Accordingly, the one most definite character for separating var. limitanea would seem to be the assertedly entire leaves.

From Johnson's view-point, the leaves of *S. taxifolia* are "obscurely toothed", those of var. microphylla presumably are evidently toothed, while those of his var. limitanea are entire. The problem is not quite that simple. The tiny denticulations do not project from the margins of very young leaves. They begin to extrude as the ~~in~~ leaf grows more nearly to full size, and even then may be almost totally hidden by thick pubescence. They continue to enlarge thereafter. Because of the desire to obtain flowers or fruit, most collections are made before the leaves are fully grown and denticulation well advanced. For this reason, the greatest care in microscopical examination under strong light is required in order to ascertain the actual facts in each case.

Recently, the writer has studied specimens of five of the collections cited by Johnston as representing his var. limitanea. These five are Tracy and Earle 210 and C. Wright 666 (cotype in U.S. Natl. Herb.); from Jeff Davis Co., Texas; Blumer 1247 from Arizona; and Phillips 331 and White 2329 from Mexico. The first three have only very young leaves but the larger ones show occasional denticulations. The two Mexican collections have small leaves, but obviously denticulate. So far, no collection of any form of *S. taxifolia* has been seen by the writer which did not show some denticulation if some of the leaves had reached about half their normal size. A recent (1947) collection from Jeff Davis Co., Texas, is Cory 53560, not seen by Johnston but distributed as var. limitanea. It also has very young leaves but the larger show occasional denticulations.

ADDITIONS AND CORRECTIONS (1957) to orig. mss. of Willows of Texas.

(pp. 40-43)

8. *SALIX LASIOLEPIS* Benthams, var. *BRACELINIAE* Ball, in Jour. Wash. (D.C.) Acad. Sci.

40:331-(335). Oct., 1950.

Jeff Davis Co.: Change Cory 53086 in mss. to 53096

Presidio Co.: L. C. Hinkley and B.H. Warneck 46900

Digitized by Hunt Institute for Botanical Documentation

?? Jeff Davis Co.: Omer E. Sperry T 6412 in S. *irrorata* at US ? study carefully
in 1946

Additions and Corrections to original Mss. of Willows of Texas.

9a. *SALIX HUMILIS* Marsh., var. *RIGIDUSCULA* (Andersson) Robinson & Fernald. (pp. 44-46)

Add at end of discussion on p. 46:

The species, *S. humilis*, recently was credited by the writer with a range extending into eastern Texas (Ball, in Gleason, New Britten & Brown Illus. Fl. NE. U.S. and Adjac. Can. 2:22. 1952). To date, no Texas specimens of the species have been located.

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10. SALIX BABYLONICA L. (pp. 46-47)

No additional specimens found in CRB, USN, or USFS.

11. SALIX FRAGILIS L. (pp. 37-48)

No Texas specimens are cited in mss. and none have been found in CRB, USN, or USFS.
The species undoubtedly occurs in parks and cities in Eastern Texas and I think that the description and discussion should be retained for the benefit of students.
You may wish to insert: CRB

No Texas specimens of S. fragilis have been seen.

SALIX ALBA L.

(p. 48)

No Texas specimens of the White Willow have been located in CRB, USN, or USFS.
If the description of S. fragilis is retained, this comparison of S. alba with the Crack willow should remain.

PLANTAE LINDBEIMERIANAE. PART III. III.

Blankinship, J.W. Missouri Botanical Garden, Eighteenth Annual Report 123-223. Frontisp. (Lindheimer) and 1 pl. (The cabin on the Comal). 1907.

Blankinship says the Engelmann and Gray did not use Lindheimer's field numbers (p. 125) but first planned to give a number to each species and later decided to give one to each collection, which was done also for the material presented by Blankinship.

"Fascicle I contained 214 species collected in 1843; Fascicle II represented the 1844 collections with nos. 215-318; Fascicle III consisted of nos. 319-574 of 1845-6; and Fascicle IV, comprising nos. 575-754, was collected in 1847-8. The specimens of the collection of 1849-1851, here treated, were probably intended to form Fascicle V." (p. 124).

"Unfortunately this publication (Plantae Lindheimerianae) was left incomplete at the end of the Compositae (Renthall and Hooker sequence) for Fascicles III and IV, so that there have been no data given for numbers 449-574 Fasc. III and 652-754 (Fasc. IV), as found in various herbaria, and these will be supplied in the present paper, as far as the number specimens in the Engelmann herbarium permit." (p. 125)

Blankinship further states that when the labels were printed for Fascicle V (Nos. 652-1223), it was not known numbers 652 to 754 had been assigned in Fascicle IV but not published upon. These inclusive numbers are duplicated, therefore, but those in Fasc. IV were in Lobeliaceae-Marsiliaceae, whereas as those in Fasc. V are in Ranunculaceae-Juglandaceae. (p. 125)

In his record of the specimens in Fascicle V, he inserts Lindheimer's No. in the data, preceded by "L.". The willows occur on p. 194, as follows:

*1189. *Salix humboldtiana* Willd. fl. alb. Niedermittelrhein. (March) 1850.

"These specimens are identical with those of Berlandier (Nos. 2317, 2274, and 3026), collected in adjacent Mexico and enumerated by Andersson (Mon. Sal 16) as of this species, though I do not find it heretofore reported from the United States. It appears to be confluent with *S. nigra* Marsh. in this region, from which it is easily distinguished by the narrower dull-surfaced leaves."

1190. *S. Thurberi* Bowles. L. 515. (New Braunfels, Aug. 1851). Bull. Torr. Bot. Club 27:232.

1191. *S. Thurberi* Bowles. L. 605. (sic) Dry bed of the Comal. Aug. 1851."

Schneider (Bot. Gaz. 65:9, 1912) lists what Blankinship calls *S. humboldtiana* above as a synonym under his *S. nigra* var. *Lindheimeri* nov. var. and under "Specimens Examined (p. 11) says:-

"Texas: Comal County, New Braunfels, on the Guadalupe and other rivers, 1850, F. Lindheimer (no. 615, m., f., fr., type); G., K.; in the Gray herbarium named by Andersson himself *S. nigra* var. *angustifolia*; it is the same as no. 1189 distributed by the Mo. Bot. Gard. as *S. humboldtiana*."

(2) *File Texas or Mexico*
Eastern Distribution of *Salix Gooddingii* Ball, var. *vallicola* (Dudley)

③ The eastward extension of var. *vallicola* from New Mexico into Texas is interesting ecologically. In northeastern New Mexico, it crosses the divide east of the Rio Grande and Pecos River and extends down the headwater stream of the Canadian and Red Rivers of Mississippi drainage. In east-central and southeastern New Mexico, it crosses the divide east of the Pecos and extends down the headwaters of the White (Brazos) and Concho (Colorado) Rivers, of the Gulf drainage. It occurs along the Rio Grande and the Pecos River, and their tributaries in southwestern Texas as far as Brewster and Pecos Counties, with one sporadic occurrence far down the Rio Grande in Starr Co. in extreme southern Texas. On the other hand, *S. nigra* and its var. *Lindheimeri* Schn. have not been able to cross these divides between the eastward-flowing rivers and the southward-flowing Pecos and Rio Grande. In fact they are unable to ascend these streams to their headwaters in any case. This emphasizes the comparative ease of downstream spread and the comparative difficulty of up-stream penetration.

S. nigra Marsh. extends west in Texas to about 101° 30' W., including Crosby and Floyd Cos. in the Staked Plains of west-central Texas, Mitchell and Tom Green cos. in central-west, and Val Verde Co in the southwest on the Rio Grande.

S. nigra var. ~~*vallicola* (Dudley)~~ *Lindheimeri* Schn. occurs westward across Texas nearly to the 102nd meridian, including Wheeler and Donley Cos. in the southeast Panhandle, Hale Co. in the Staked Plains, Irion Co. far to the south in the Concho headwaters, and Val Verde Co. in the Rio Grande. It thus is absent from the 3 tiers of counties east of New Mexico, except Hale Co. and from all of the large mountainous area south of New Mexico.

③ *in Texas* *variabilis*
S. Gooddingii Ball, var. *vallicola* (Dudley) is found on the Canadian River in Hemphill Co. in the northeastern Panhandle, within the range of both *S. nigra* and its variety. On the headwaters of the Red River, it reaches Deaf Smith and Donley Cos., in the southern Panhandle, Donley Co. being within the range of var. *Lindheimeri*. In the Staked Plains, it reaches Hale and Lubbock Cos. in the Brazos drainage, Hale Co. being within var. *Lindheimeri* territory. Farther south and east, it occurs in Tom Green Co., occupied also by *S. nigra*. It occupies most of the mountainous counties in the large area south of New Mexico, as far east as Pecos and Brewster Cos. with one sporadic occurrence in Starr Co. in far southern Texas where both *S. nigra* and var. occur.

in the Concho drainage

*where mountainous area
nigra not
when forced*

In the Southwest, *S. Gooddingii* and its variety *variabilis* are the counterparts and closest relatives of the abundantly-occurring *S. nigra* and varieties of the eastern half of the United States. *S. nigra* and its southwestern variety *Lindheimeri* Schn. are marked by twigs light brown to dark brown and glabrous or sometimes puberulent; leaves smaller and green to dark green; stipules without glands on the upper (inner) surface, ~~stipules~~ or occasionally a few such glands on var. *Lindheimeri*; and capsules *S. nigra* but sometimes as large in var. *Lindheimeri*, and always glabrous. sules shorter in ~~the variety~~

S. Gooddingii and var. *variabilis*, on the other hand, have twigs yellow to yellowish and more or less pubescent-puberulent to glabrous; leaves larger and mostly yellowish green (those on vigorous shoot up to 15-19.5 cm long by 2-3 or cm. wide); stipules commonly with abundant ~~and~~ fragrant glands on the upper surface; and capsules commonly to 6.5 or 7 mm. long. and ovaries and young capsules always pubescent in *S. Gooddingii* but glabrous in the variety.

In Texas, variety *variabilis* is found (north to south) on the Canadian River in Hemphill Co. in the northeast Panhandle, within the range of both *S. nigra* and its variety. On the headwaters of the Red River, it reaches Deaf Smith and Donley Counties in the southern Panhandle, Donley Co. being within the range of variety *Lindheimeri*. In the Staked Plains (Llano Estacado), it reaches Hale and Lubbock Counties in the Brazos drainage, Hale Co. being within var. *Lindheimeri* territory. Farther south and east, it occurs in Tom Green County of the Concho River drainage, occupied also by *S. nigra*. It occupies also most of the mountainous counties in the large area south of New Mexico, as far east as Pecos and Brewster Counties, and area where neither *S. nigra* nor var. *Lindheimeri* are found. It has one sporadic occurrence in Starr Co., in far southern Texas, where both *S. nigra* and var. *Lindheimeri* occur. This probably resulted from flotation down the Rio Grande.

All known Texas specimens showing the distribution of both variety *variabilis* and of *S. nigra* and its var. *Lindheimeri* are cited in Dr. Lundell's forth-coming Flora of Texas.

3
SALIX AMYGDALOIDES var. WRIGHTII (Andersson) Schneider TYPE
TYPE: Wright No. 1877, in

Isotype in U.S. Natl. Herbarium (Sheet No. 38597).

Twigs yellow;
Leaves slender, small, 3-8 or 7 cm. long, glabrescent.
Petioles yellow, 8-10 mm. long, glabrous;
Aments 1.5-3 cm. long, oval, dense, evidently very abnormal, perhaps parasitized.
Capsules 4.5-5 mm. long, lanceolate, acute at base,
Pedicels 1-1.5 mm. long,
Style none

The Label reads: "C. WRIGHT Coll. N. MEX. 1851-52"
"1877 Salix"

Annotations Are:
"S. nigra Marsh., var. Wrightii Anders.
typica Isotype"

And:
"S. amygdaloides Wrightii AM Schm.
C. Schm. 1919".

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SALIX NIGRA, (var. latifolia, * (forma) y brevifolia, (subf. testacea
"y brevifolia: foliis subpollicaribus basi apiceque subrotundatis sed
evidenter apiculatis, subtus glabrescentibus"

--- testacea: ramis flavo-testaceis (WRIGHT Mex. n. 1876) p 21

* That latifolia is intended as a var. and a subsp. is shown by the
arrangement under a Greek letter and without "S.", because the four
subsp. are introduced by asterisks and the "S.", as follows:
* S. marginata (Wimm); ** S. amygdaloides (And.); *** S. longipes
(Shuttleworth); **** S. Wrightii (And.) Monog. Sal. pp 21-22.

TYPE: WRIGHT No. 1876, in

Schneider says that this No. is ~~XX~~ var. Wrightii (Bot. Gaz. 65: 1918).

In the Type Collection of the U.S. Natl. Herbarium, this No. (Sheet No.)
consists of a pistillate and a staminate twig, both immature:

Pistillate has the petioles elongated, glabrous,
and probably is S. amygdaloides var. Wrightii
Staminate has the shoot and petioles pubescent
and probably is S. Gooddingii var. vallicola (Dudley)

WRIGHT NO. 1879, mentioned by Schneider (Bot. Gaz. 65:14) as type of
S. nigra longipes venulosa is S. longipes (S. caroliniana Mx. in U.S. Nat. Herb.
WRIGHT NO. 1878: is S. humilis var. angustifolia forma opaca "capsulis brevissime vel
vix pedicellatis" (Wright Coll. Nov. Mexic. n. 1878" (Monog. Sal. III. 1867).

2

S. interior angustissima (Anders.) Dayton

BERLANDIER'S TEXAS SPECIMENS OF *S. LONGIFOLIA* VAR. *ANGUSTISSIMA*

In Herb. Mo. Bot. Garden; studied by CRB, December, 1945

All 5 sheets bear the standard blue label with the words:

"Herbarium Berlandieriarum Texano-Mexicanum" at top
and with "No." just below and "Hab." at lower left. None of
labels has other data than the number in pencil. All bear Mo.
Bot. Garden labels with annotations and also Schneider annotations.

911. (First cited specimen (type) under var. *angustissima*. CRB.)

Annotations: "*S. longifolia* Muhl., Ball, 1-23-'99".

"*S. Thurberi* Rowlee, C. Schn. VI, 1917."

"*S. longifolia angustissima* And., Camillo Schneider, 1918"

Desc., CRB. 3 14-15 in. shoots, gray- to white-pubescent, bearing
small to large cone galls; leaves on older growth 4-6 mm. wide by 6-10
cm. long, or one subtending broken leaf to 9 mm. wide, darkening in dry-
ing, rather sharply denticulate, occasionally subspinulose, silvery hairy
or becoming sparingly so, the older badly eaten by larvae and the new
growth crowded, small, 2-3 mm. by 2-3 cm., densely silvery-silky, twigs
also. Aments (4) terminating new silvery growth, small, w 2-3 cm.

long, extremely lax (remotely flowered), ; capsules subsessile, 5-6 mm.
long, lanceolate, densely white-hairy with long straight hairs; stigmas
sessile, divided; scales narrowly ovate, acuminate, 2 mm. long, hairy.

938. As 911 on label and annotations. Not cited by Andersson in 1938.

Normal 12-in. shoot, very similar to 2368 but leaves up to 7 mm. by
10 cm. plus, somewhat broken and eaten, as in 2368; aments numerous,
3-5 cm. long, lax; ovaries 2mm to capsules to 5.5 mm. (not fruit), dense-
ly white hairy; scales to 2.5 mm., acuminate.

2341. Annotations as in 911 except: "*S. longifolia* Muhl., var
opaca Anders., teste Andersson, Monog. Sal. 55, Ball 1/11/99"

Shoots are 8-10 in. tips, old leaves insect eaten, up to 6 mm. by
8 cm., short-denticulate, thinly pubescent, midribs white, new leaves
small, crowded, densely white hairy; aments on new growth, very small,
lax; capsules to 6 mm., densely white-hairy, sessile; apparently a short
style in some cases; stigmas 0.3-0.6 mm.; scales lanceolate, acuminate.

The Gray Herb. specimen is normal, much as 2368, but with some-
what narrower leaves, no new crowded silvery growth, and with aments
distributed throughout.

2368. Annotations as 2368 except Schneider say "Cotype of *S. Thurberi*
Rowlee" and "*S. longifolia angustissima* And.".

Normal 15-in. shoot with grayish-yellow twigs, puberulent or younger
pubescent; leaves 3.5-6 mm. by 6-8 cm. long, older glabrate except for
petioles and especially the midribs below, darkening in drying, the youn-
ger pubescent and youngest silvery-hairy, short-denticulate or subspinu-
lose; aments numerous, on 6-10 cm. peduncles, 3-5 cm. long, lax; scales
2.5 mm. as ovaries; capsules to 5.5 mm., sessile or lowest subsessile,
densely white-long-hairy. Gray Herb. specimen very similar.

3019. Notes as on 911 except: "*S. longifolia* Muhl., teste Anders. Mon-
og. Sal. p. 54, C.R. Ball, 1/11/99".

Older 12-14 in. shoots grayish-brown, remnant-pubescent, newer reddish-
brn yellowish, puberulent, youngest white-pubescent; leaves 4-6 mm. by
6-8 cm., the newer outer, shorter and broader, to 7 mm., from sparse rem-
nant pubescence & darkening in drying denticulate, to youngest densely

silver-hairy. Aments (3) 2-3.5 cm. long, lax, on peduncles 1-1.5 cm. long and densely white-pubescent; scales 2-2.5 mm. long, narrowly ovate, acuminate, white-pubescent; capsulules sessile, 5-6 mm. long, subovate at base, densely white-long-hairy (mature).

5
Salix interior angustissima (Andersson) Dayton

SPECIMENS OF FERDINAND LINDHEIMER FROM So. Cent. Texas. Herb. Mo. Bot. Gard.

Studied by GRB in December, 1945

All 4 of the sheets bear the blue "FLORA TEXANA" label, with "Ferd. Lindheimer, leg. 18--" on lower portion. The numbers, and any other data, are written in ink and apparently by Lindheimer himself.

"515. *Salix*"

(Mo. Bot. Gard. No. 76531)

Annotations: "S. *Thurberi* Rowlee, C. Schn., VI, 1917".

"S. *longifolia angustissima* And. Camillo Schneider, 1918".

Two shoots, 7 and 15 in. long, with slender leaves but the 7-in. has some lower leaves oblanceolate, 1-1.5 cm. long. Leaves 1.5-2.5 or 3 mm. wide by 4-9 cm. long, sparsely sharp-denticulate; twigs gray- to white-pubescent; leaves silvery silky with long hairs, becoming less so and darkening in age but midribs still hairy on both sides; aments 2-3 cm. long, lax; ovaries densely white-hairy, sessile; scales lanceolate, acuminate, to 2.5 mm. long, white hairy.

"515. *Salix*"

(Mo. Bot. Gard. No. 78263)

The second sheet of each number from Mo. Bot. Gard., like those in U.S. Natl. Herb., bears a second label (white) reading:

"LINDHEIMER, FLORA TEXANA

"(SUPPLEMENTARY TO 'FLORA TEXANA EXSICCATA')"

Distributed by the Missouri Botanical Garden

SALIX LONGIFOLIA Nutt.

"Collected by Lindheimer from 1849 to 1851

"Comanche Spring, New Braunfels, etc,

No. 1190" (for 515)

ANNOTATIONS: *longifolia* is stricken out and "*Thurberi* Rowlee" inserted, apparently in Rowlee's hand

"vidi, C. Schn. VI, 1917"

"S. *longifolia* var. *angustissima* And. Camillo Schneide, 1918"

Two shoots 13 & 14 inches long, somewhat more advanced than 515 above. ~~Leaves~~ Twigs gray -pubescent to pubescent to white-pubescent (youngest); leaves as above or rarely to 4 mm. by 10 cm., sharp denticulate, somewhat more silvery-hairy, also darkening in drying, occasionally a lower oblanceolate; ovaries to 4.5 mm. long, sessile, densely white-hairy, stigmas to 0.7 mm. long, divided; scales to 3 mm., lanceolate, acuminate, thinly white hairy.

615.

(Mo. Bot. Gard. No. 76529)

The blue "Flora Texana" label bears no written data. There is a large brown-paper field label, ink written (mostly in German), reading:

"615.

Texas, Aug., 1851"

Salix

"Im ~~XXX~~ trockenen Bett der Cibolo, 12 miles südöstlich von New Braunfels. Mit *Baccharis angustifolia*, *Opuntia Lindheimeri*, *Diospyros mexicana*, *Dolichos*, etc.

P. Lindheimer."

A specific name and Author follow "*Salix*" but are undecipherable to me.

On this hand-written field label, the number evidently was originally written "515" but a larger and heavier 6 has been written over the first 5, apparently by the same hand.

Annotations: "S. Thurberi Rowl. C. Schn. 1917."

"S. longifolia angustissima And. Camillo Schneider, 1918"

Two slender shoots 16 in. long; stems grayish-puberulent to the youngest densely white-pubescent; leaves 1.5-3 or 4 mm. long wide, 5-9.5 cm. long, mostly short-denticulate, darkening in drying, thinly to younger densely silvery hairy on both sides, becoming glabrate with age but persistent on midribs beneath. Aments (3) just expanding; scales 2-2.5 mm. long, lanceolate-acuminate, white-hairy; ovaries yet shorter than the scales, densely white-silvery-hairy with long hairs.

- - - - -

"615.

(Mo. Bot. Gard. No. 78264)

Salix

"Dry bed of Cibola.

Aug., 1851. (all on blue label)

Annotations: "vidi, C. Schn., VI, 1917". And.

"S. longifolia angustissima/Camillo Schneider, 1918."

"longifolia Muhl" has been deleted from the white M.B.G. label and "Thurberi Rowlee" inserted in ink, apparently by Rowlee.

Two shoots, on 14 in. and one 8 in. long, apparently identical with the narrowest-leaved one on the other sheet of 615. Aments 2-3 cm. long, becoming lax; small ovaries densely white hairy; scales 2-3 mm. long, lanceolate-acuminate, thinly white-hairy.

- - - - -

See also desc. of specimens in Gray and U.S.N.H.

LINDHEIMER'S SALIX COLLECTIONS IN TEXAS, U.S. NATIONAL HERBARIUM

Labels read: Lindheimer; Flora Texana
(Supplementary to Flora Texana Exsiccati)
Distributed by the Missouri Botanical Garden.

1190. *Salix longifolia* Muhl. (This stricken out and *S. Thurberi* Rowlee written in).

Description by CRB. Branchlets gray pubescent to white pubescent. Leaves darkened in drying, the younger more or less silvery silky on both sides but not much more so on midribs, 2-4 mm. wide, 4-8 cm. long, denticulate. Aments none.

1191. "*Salix Longifolia* Muhl." (Changed as in last). "Cibolo River. Aug., 1851."
(Presumably in Guadalupe Co. CRB.)

Description by CRB.: Leaves smaller, 2-3 mm. by 4-6 cm., more glabrate but the younger silvery hairy and persistent on midribs. Aments none.

- - - - -

LINDHEIMER'S TEXAS LONGIFOLIAE FROM THE GRAY HERBARIUM

Received for study by CRB on October 23, 1945.

"615. *S. longifolia* (Andersson). With *Bacharis angustifolia*, etc.,
in the dry bed of the Cibolo River, 12 miles southeast of
H. Br. (New Braunfels)
F. L. Aug., 1851."

Annotations:

"*S. Thurberi* n. sp. WWR., Feb., '00."

"*S. Thurberi* Rowlee. C. Schn., 1917."

Two branching 13-15-inch shoots, grayish and gray-puberulent to the younger white-pubescent; leaves ~~narrow~~ very narrow, 2-3 or 4 mm. wide, 5-7 cm. long, sparingly short-denticulate, more or less silvery-silky on both sides, especially the younger, and most persistent on the midribs. Aments in flower, 3-4.5 cm. long, lax to remotely flowered, on peduncles to 4 cm. long; capsules (ovaries) to 4 mm. long, densely white-silvery pubescent, sessile; stigmas divided, about 0.5 mm. long; scales 2-3 mm. long, acuminate; gland about 0.5 mm. long.

2ND. Desc. Two large, freely branched, 14-in. shoots, with narrow leaves, more abundantly more abundantly fruited and slightly more silvery silky than the Mo. Bot. Gard. specimen. Twigs grayish, puberulent to gray- to almost white-pubescent, 2-3 or rarely 4 mm. wide, 5-7 or 8 cm. long; aments 2-3 cm. long, lax; ovaries white-pubescent, sessile; scales 2-3 mm. long, lanceolate, acuminate, white-pilose.

Leaves puberulent to pubescent, to hairy, especially below and on midribs, the youngest silvery-white on both sides.

Identical, with Mo. Bot. Garden specimen, essentially.

6 S. exigua Nutt., var. luteosericea (Rydb.) Schn.

FREMENT, ~~MINNEAPOLIS, MINN.~~ LONGIFOLIAE FROM TEXAS & SOUTHWEST

Received for study from the Gray Herbarium, on October 23, 1945

Label: Fremont's Expedition to California, 1845-67 or 1845-47

----, "Salix longifolia"

"ex Torr."

Annotations: "S. interior" n. nom., WARR. Feb., '00".

"Probably from Kansas, and representing S. exigua var. stenophylla (Rydb.)
n. rather than S. longifolia form". C. Schneider, 1917."

Description by CRE.: Branchlets puberulent. Leaves darkened in drying, sub-entire to sparingly shallowly denticulate, 4-6 mm. wide by 4-7 cm. long, short-gray-pubescent on both sides, somewhat silvery on new leaves, and approaching var. luteosericea (Rydb.) Schn. Aments 3-5 cm. long, 10-11 mm. wide. Capsules sessile or subsessile, 5 mm. long, thinly gray-pubescent.

Aments fairly compact, terminating long, leafy, later lateral shoot; capsules parallel, at right angles to rachis, on short pedicels 0.5-1 mm. long. This belongs to S. exigua Nutt.

S. interior angustissima (Andersson) Dayton
SOME OF BERLANDIER'S LONGIFOLIAE FROM TEXAS

Label: Herbarium Berlandierianum Texano-Mexicanum

Received for study, from Gray Herbarium, on October 23, 1945.

2341. "S. (longifolia var. angustissima And.)" ~~and~~ in pencil.

Annotations: "S. Thurberi n. sp., WWR. Feb., '00."

"S. Thurberi Rowlee. C. Schneider, 1917." "This is the type of
Andersson's S. longifolia v. opaca, as well as v. angustissima Schneider.

Description by CRB.: Branchlets puberulent to younger white-pubescent. Leaves
narrow, 2-4.5 mm. wide by 5-8.5 cm. long, denticulate, more or less
white hairy on both sides, especially on midribs. Capsules young, 4-5
mm. long, densely white-pubescent. Aments 2.5-5 cm. long, lax.

Description of specimen in U.S. Nat. Herb.: As in Gray Herb. spec. but leaves
up to 5 or 5.5 mm. wide, and more glabrate.

2368. "salix"

Annotations: "S. Thurberi n. sp., WWR. Feb., '00." "S. Thurberi Rowlee,
C. Schneider, 1917.

Description by CRB.: As No. 2341 but leaves larger, to 6 or 7 mm. wide for
short (4-5 cm. long) and long (to 12 cm. long) alike, denticulate.
Aments 5 cm. long, Capsules young, 3-6 mm. long, white-pubescent.

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3019. "salix longifolia Muhl., var. angustissima And."

Annotations: "S. Thurberi n. sp., WWR., '00."

"S. Thurberi Rowlee. C. Schneider, 1917. f. satis latifolia"

Description by CRB. As No. 2368 but leaves all broad and short, 3-6 cm.
long by 4-7, 8, or 9 mm. wide, denticulate, pubescent on both sides.
In shape, these resemble S. interior approaching var. Wheeleri Rowlee.
Capsules dehiscent, 5-6 mm. long, densely long-gray-hairy.

Salix interior var. angustissima (Andersson) Dayton

Collections of CHARLES WRIGHT in Texas, in 1848 and 1849; Gray Herbarium material studied by C.R.B. from Nov., 1945, to Feb., 1946.

✓ No. 668. Blue Wright label with "No." printed in upper left hand corner and the following printed at the bottom of the label:

"Collected in Expedition from Western Texas to El Paso, New Mexico, May-October, 1849, by CHARLES WRIGHT."

The label reads: "No. 668". In the upper right-hand corner the number "664" is written in pencil. On the label, in ink in another hand, is written:

"S. longifolia ex Anderss."

On the sheet is written, in ink, and still a different hand but the same on several different sheets:

"Field No. 664-

"664. Salix San Felipe Spr. 11-15 ft. tall. July 11, 1849".
"(near Del Rio, Val Verde Co., Texas)".

Annotations: "S. Thurberi n.sp., H.W.W., Feb., '00". by Rowlee, on sheet
" "S. Thurberi Rowlee. Camillo Schneider, 1917". (annot. label).
Floral drawings in pencil by Schneider, May 8, 1917.

The sheet bears two branching specimens about 30 cm. long, on bearing on the lower stem a narrowly ovate cone gall, with tips of normal leaves protruding from the apex; twigs brownish, puberulent; leaves very long and slender, 5-10 cm. long, 2-5 mm. wide, denticulate, becoming glabrate but the youngest still silvery-silky and persisting on other midribs; staminate aments just opening, 1-2 cm. long, with 1-2 additional aments at base; scales white wpply, apiculate

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✓ In Gray Herbarium also is another sheet bearing an unnumbered Wright collection. There is a tiny unprinted white label, bearing, in faint pencil, the words:

"Salix Rio Grande, Frontera. July. small tree".

On the sheet is stamped: "RIO GRANDE, WRIGHT, 1846". On the sheet, in pencil, "Salix Rio Grande July, near ---?, small tree", an attempted translation of the label. Apparently some one has tried to trace the word "Frontera" with a pencil so as to make the first 4 letters spell "near". Actually, Frontera was a point near El Paso.

Annotations: "S. Thurberi n. sp." in Rowlee's hand but not initialed or dated.
"S. Thurberi Rowlee, Camillo Schneider, 1917".

~~The following~~ The fragment, about 15 cm. long, and bearing two staminate aments, is almost identical with Wright's No. 668, above.

No. 668, above, is very similar to the Berlandier and Lindheimer series, described from specimens in the Herbarium of the Missouri Botanical Garden, and part of which were photographed by Fiboretum Herbarium, Plant Industry.

SOME LONGIFOLIAE OF SOUTH TEXAS

Collected by F. Lindheimer, and George Thurber

Received for study, from the Gray Herbarium, on October 23, 1945

-----I-----

Lindheimer 615. *S. longifolia*. (Andersson).
"in the dry bed of the Cibolo (River), 12 miles southeast of N. Br. (New Braunfels). F. L. Aug., 1851."

Annotations: "*S. Thurberi* n. sp. WWR. Feb., '00".
"*S. Thurberi* Rowlee. Schneider, 1917"

Description by CRB.: Branchlets gray-pubescent to the younger white-pubescent. Leaves very narrow, 2-3 or 4 mm. wide, 5-7 cm. long, sparingly short-denticulate, more or less silvery-silky on both sides, especially the younger, and most persistent on the midrib. Aments in flower, 3-4.5 cm. long, lax. Capsules (ovaries) 4 mm. long, white pubescent.

✓ Thurber No. 95. ----- "10°-12°". Horse Head Crossing, Pecos.
(River), Texas. C. T. Oct. 1850".

Annotations: "*S. Thurberi* n. sp. WWR. Feb., 1900."
"*S. Thurberi* Rowlee. Schneider, 1917."

Description by CRB.: Branchlets ~~white~~ gray- to white-pubescent. Leaves narrow, short, 2-3.5 mm. wide, 4-6 cm. long, sparingly denticulate, the younger gray-pubescent on both sides. Aments 2-3.5 cm. long in fruit, dense. Capsules 5-6 mm. long, lanceolate to narrowly ovate, sessile, densely white-pubescent.

The younger leaves are silvery and the hairs are longer than in *S. exigua* and are more persistent on the midrib below. The aments are more compact than in the *Serland-* series, but the capsule hairs are long. It seems definitely to belong with them to var. *angustissima*.

= *interior angustissima* Long.

TEXAS COLLECTIONS OF V (alery) HAVARD, U.S. NATIONAL HERBARIUM

-----, "Salix longifolia Muhl. Rio Gde, south of Chisos Mtns., Texas. Aug., '83."
(This locality is in Brewster Co. CRB.)

Description by CRB.: Branchlets yellowish, puberulent, the very tips whitish.

Leaves 3-4 mm. wide, 5-9 mm. long, denticulate, yellowish-green, somewhat glaucescent, almost glabrous but youngest with silvery hairs on midrib. They resemble those of *S. interior* var. *pedicellata* superficially.

Aments on two staminate shoots 3-5 together, very small, just opening.

Aments on two pistillate shoots mostly solitary, sometimes two together, 1-5 5 cm. long. Ovaries densely white-pubescent, the fruiting capsules white hairy, sessile to subsessile. Scales net densely hairy. Aments lax.

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-----, "Dwarf Salix on edge of Pecos R., W. Tex.
Sept., '81."

Description by CRB. Branchlets and buds gray pubescent to white pubescent.

Leaves on some shoots 5-8 cm. long by 2.5-4 mm. wide. On others to 5 mm. wide, densely clothed with short gray or somewhat silvery pubescence on both sides, denticulate.

Aments none on leafy twigs but on pistillate twig with leaves just starting has tiny sessile aments with somewhat hairy scales and white pubescent ovaries. This seems to be delayed growth and flowering after some injury.

Salix lasiolepis Benth., var. Braceliniae Ball (narrow-leaf southern)

TEXAS

Gulberson Co.:

Guadalupe Mtns.,

Brewster Co.: Infrequent at Buena Vista, west of Alpine, B.H. Warnock 123, ^{in 1924 (USN)} ^{my fls. faintly pubescent} Mar 3, 1937

Jeff Davis Co.: Davis Mtns.

Limpia Creek, four small trees 4-5 m. tall, 2 mi. west of Ft. Davis, V. L. Cory 53086, May 16, 1946 (USN)

Mt. Livermore, L. C. Hinckley, 1095, May 29, 1938⁵ (CRB, USN.) ^{frag}

Shrub 15 ft. tall; Limpia Canon, 10 mi. from Ft. Davis, C.L. & Amelia A. Inndell 14251, Aug. 4, 1945. (CRB ^{frag})

Upper Limpia Canyon, alt. 2200 m., 5-6 m. tall, E. J. Palmer 30799, June 14, 1926 (CRB)
Arborescent shrubs or small trees, 8-9 m. tall; rocky canyon of small mountain stream alt. 2100 m., E. J. Palmer 32008, Oct. 6, 1926 (CRB).

Arborescent shrubs, Limpia Creek, near Ft. Davis, E. J. Palmer 32157, Oct. 10, 1926 (CRB.

Arborescent shrubs or small trees, Upper Madera Canyon, E. J. Palmer 33431, Apr. 21, 1928² (USN, fls. & tiny lfs.)

Limpia Canyon, near Ft. Davis, E. J. Palmer 34479, June 11, 1928 (USN., twigs subpruinose, leaf serrulate).

Fern Canyon, H. B. Parks & V. L. Cory 9098, Aug. 9, 1934 (CRB.

Madera Canyon, Mt. Livermore, Omer E. Sperry T 2, May 3, 1936 (USN., twigs faintly pruinose; flowers)

Presidio Co.:

^{clump 8-10 ft. creek,}

Small tree in bed of ^{2726 m.} ZH Canyon, at mouth of Cottonwood Canyon, Rspy Miller Ranch, Sierra Tier ra Vieja, elev. about 4800 ft., L. C. Hinckley 2727, June 11, 1943 (CRB

18 mi. ne. of Shafter, Chinati Mtns., Hinckley & Warnock 46900 in 1946 (CRB)

***** Co.: No locality, Valery Havard c.n., Oct., 1883 (USN)

NEW MEXICO:

Catron Co.:

Dense clumps 8-10 ft. tall, Beaverhead Ranger Station, Leslie N. Goodding Sal. 31, May 20, 1938 (CRB

Rock Creek Crossing below Beaverhead Station, Goodding Sal. 30, May 20, 1938 (CRB

Reserve, Goodding A9633, Mar. 26, 1939 (CRB, stam. aments opening). ^{small w. probably a good abortion}

^{large bunch willow, sometimes twigs}

Golfax Co.:

^{Large shrubby willow}
Pond Creek near Cimarron, L. N. Goodding A 9645, Apr. 18, 1939 (CRB, ams not open).

Dona Ana Co.: Filmore Canyon, Organ Mts., E.O. Wootton (none numbered): ^(all USN) (all USN)

1899: Feb. 10, el. 5500 ft. (no. lfs or ams); Mar. 12, el. do. (3 shts, pist. fls; tw. pub.)

Apr. 15, 5500 ft. (2), 7000 ft. (1), (both yng lfs. & frt. & twigs pubesc.)

1903: Apr. 18, el. 7000 ft. (2 sheets, yng leaf and fruit);

" " e. 8000 ft., Organ Paek, (tiny leaf and pist. fls.)

SPECIMENS EXAMINED.

MEXICO. Specimens have been seen from Lower California and Chihuahua, and from various other States, ranging as far south in Mexico as the State of Vera Cruz and the Federal District. These will be cited in another paper on the willows of Mexico.

NEW MEXICO. Dona Ana Co., Organ Mts., Filmore Canon: alt. 5,500 ft., E. O. Wooton, March 12, 1899 (N); alt. 7,000 ft., Apr. 15 (1 specimen) ¹⁸⁹⁹ Apr. 18 (2 specimens), 1899 (N);-- Organ Peak, Wooton, Apr. 18, 1899 (N). *these are 1903*

ARIZONA. Cochise Co., Chiricahua Mts.: J. W. Tourney, Mar. 20-23, ^{for} July 25-27, 1894 (FBb, N); May 1, 1897 (N); Pine Canon, alt. 6,000 ft., J. C. Blumer 2281, Oct. 4, 1906 (B); Pine Canon, alt. 6,700 ft., J. C. Blumer 2282, Oct. 5, 1906 (B); Barfoot Fork, alt. 7,200 ft., ^(upper limit) Blumer 2283, Oct. 7, 1906 (B); Bonita Canon, alt. 6,500 ft., ^{photo 14-15.5 x 1.5-1.8 cm.} Blumer 2303, Nov. 13, 1906 (B);-- Huachuca Mts.: (Internat. Bound. Surv.) E. A. Mearns 2176, Sept. 9, 1893 (N); ^{var} Foud's Ranch, ^{var} Mearns 2614, Oct. 18, 1893 (N); near Ft. Huachuca, T. E. Wilcox 81, 84, 1894 (N);-- Santa Rita For. Res., D. Griffiths 4198, Mar.-Apr., 1903 (B, N);-- Pima Co., Rillito, Ft. Lowell, alt. 2,400 ft., J. J. Thornber, Feb. 15, 1904 (N);-- Graham Co.: Clifton, H. H. Rusby 372, Feb., 1881 (N, 2 spec.); Ash Creek, ^{as S. inornata} alt. 6,100 ft., E. G. H. 118, May 20, 1914 (B);-- Santa Catalina Mts., D. Griffiths 7037, Sept. 5, 1904 (B); G. R. Vasey 1881 (N);-- ^{Apache Co.} White Mtn. Indian Reservation: McClintock Canon, F. V. Coville 1056, June 2, 1900 (N); San Carlos ^{prob Lake Co} to Cazador Spring, F. V. Coville 1912, June 24, 1904 (N);-- ^{var} Navajo Co., ¹⁸⁻¹⁸ along Showlow Creek, Showlow, F. V. Coville 1094, June 8, 1900 (N); 2023, July 4, 1904 (N);-- Black Mesa Forest Reserve, and vicinity, northern Gila, ^{var} south

over

var. *brachylinea*

Ariz USN

✓ Cochise Co. about Portal, Chiricahua N. F. W.W. Eggleston
11011, Sept. 26-28, 1914 (USN)

✓ Huachuca Mts, Sunny side, Kearney & Peckles 13846
Jul 3, 1927 (USN)

Pima Co

✓ Sta Catalina Mts, 7500 ft, RN Peckles 4072, May
29, 1927 (CRB) ?

~~Yavapai Co~~

~~Peckles, Harrison, Kearney 2618, 8/8/26 (USN)~~

Pima Co

Mt Lemmon 7500 ft, Peckles & H. L. Davis 7105
✓ May 31, 1930 (USN) X

Pima Co

Sta Catalina Mts. near Soldier's Camp, J. Arthur
Harris 216437, Aug, 1916 (USN)

✓ Sta Catalina Mts G. R. Vasey 8 (no type), Mar, 1889 (USN)
CRB notes = No. 6502 in B. H. Vasey.

Species

Gila Co Forest date, Apache River, 66 mi so of
Holbrook, Walter Hough 82, in 1901. (USN)

9 Salix humilis Marshall Texas

PLANT RECORD

H. R. 201 (Mr. Marshall, Jan. 2, 1913) This bill was revised and referred

passed on H. R. 201

H. R. 201 (Mr. Marshall, Jan. 2, 1913) As above indicated, this bill is

a revision of H. R. 201. It authorizes Government employees to use appro-

priations available therefor in establishing contracts or contracts

health program which will provide health services for their employees.

Small, Fl. Southeast U.S. Ed 1, 343. 1903; Ed 2, 343
1913 (St. Louis + Neb.); Man. Southeast Fl. 415. 1933
(To Texas Kan; adds "viny" beneath but does not
not prove incl. of rigidiuscula).

Br + Br illus. Fl. Ed 1, 498, 1896, 1185. (to Tenn + Neb)
" " " " Ed 2, 600, 1913, 1473 (to Tenn + Kan)
(purple gray - tan beneath)

Red Man. 3rd ed. 317, 1901, 1905, 1907. (to D.C., Tenn + Neb.)
(always 8-16 mm wide)

stet ~~No Texas specimens in C.R. B. H. H.~~
~~of S. humilis or var. rigidiuscula~~

See Mr. B. 2.

H. R. 201 (Mr. Marshall, Jan. 2, 1913) Provides for health program

employees for health services in the District of Columbia and in the courts of

the United States in any State.

H. R. 201 (Mr. Marshall, Jan. 2, 1913) Provides that the wages and salaries

of all Government employees shall be subject to the remedies of garnishment,

execution, and trustee process in the same manner as may be applicable in

Salix Texas *Benth Man Beck. to Torr*

• *SALIX TRISTIS* Aiton, Hort. Kew. 3:393. 1789; Britton & Br., *Illustr. Fl.*, ed. 1, 1:499. 1896, ed. 2, 1:600. 1913; Small, *Fl. Southeast. U.S.*, ed. 1, 343. 1903, Small, *Man. Southeast. Fl.*, 415. 1933; ^(to Torr) ~~(to Torr)~~ Ball in Deam, *Shrubs of Indiana*, 63, pl. 20. 1924; Ball, ^(to Torr) ~~(to Torr)~~ *(Willows Southern St.)*, *Castanea* 3:9. 1938; ^(to Torr) ~~(to Torr)~~ Massey & Ball (*Willows of Va.*), *Va. Polytech. Inst. Bull.* 37 (9):29, frontisp., 1944. ~~(to Torr)~~

Low, many-stemmed, much leafy shrubs, 0.4-1 m. high, similar to *S. humilis* but smaller in every way; branchlets slender, brownish, pubescent; stipules wanting or very small and deciduous; bud-scales short, pubescent; leaves usually crowded toward ends of branchlets, narrowly oblanceolate, 2-5 or 6 cm. long, 7-10 or 12 mm. wide, acute at apex, tapering at base to a very short pubescent petiole, mostly entire, dark green and pubescent above but becoming glabrate, subglaucous and densely gray-tomentose beneath, sometimes glabrate in age; aments numerous, ~~sessile~~ ^{precocious} sessile, naked, often somewhat crowded, 1-1.5 or 2 cm. long in fruit, oval or subglobose; flower scales oblanceolate, obtuse, 1-1.5 mm. long, blackish, villous; stamens 2, filaments free, glabrous; capsules narrowly lanceolate, 6-7 mm. long, gray-pubescent; pedicels 1-2 mm. long, pubescent; style 0.2-0.3 mm. long, equalling the divided stigmas. — Occasional in moist to dry, and often sandy, uplands, roadsides, thicket-borders, mountain balds, etc., in the eastern half of the U.S., west to the eastern Great-Plains States. In Texas, only in the extreme northeast.

Harrison Co., E. J. Palmer 13221 (in moist sandy open ground, Marshall; as *S. humilis*). = *S. h. v. rigidiuscula*

Vernacular name: "Dwarf Upland Willow".

This little prairie willow, blooming in earliest spring, may be looked for in several counties of Northeast Texas. The similar but larger *S. humilis* Marshall, 1-3 m. high, with leaves 5-10 or even 15 cm. long and 1-2 or 3 cm. wide, and aments 2-4 cm. long, may yet be found in northeastern Texas, as it occurs in Arkansas and Oklahoma, preferring drier and more clayey upland habitats.

L.
Fuller Bibliographies of *Salix babylonica* and *S. fragilis* L.

S. babylonica L., Sp. Pl. 1017. 1753; Andersson (*Mnog. Sal.*), in Kon. Svensk. Vet.-Akad. Handl. 6:30-52, ~~32~~ pl. 3, fig. 32. 1867; Andersson, in DC. Prodr. 16(2):212. 1868; Britt. & ~~Br.~~ ^{B.}, Illus. Fl., ed. 1, 496, fig. 1179. 1896, - ed. 2, ~~504~~ 1:595. 1913; Britt., Man. eds. 1, 2, 3, 314. 1901, 1905, 1907; Small, Fl. S.E. U.S., ed. 1, 341. 1903, - ed. 2, 1913; Small, Man. south-east. Fl. 414. 1933; Massey & Ball (*Willows of Va.*), in Va. Polytech. Inst. Bull. 37(9):21. 1944.

S. fragilis L., Sp. Pl. 1017. 1753; Andersson (*Mnog. Sal.*), in Kon. Svensk. Vet.-Akad. Handl. 6:41-43, pl. 3, fig. 28. 1867; Andersson, in DC. Prodr. 16(2):209. 1868; Britt. & Br., Illus. Fl., ed. 1, 496, fig. 1177. 1896, - ed. 2, 1:594. 1913; Britt., Man., eds. 1, 2, 3, 313. 1901, 1905, 1907; Small, Fl. Southeast. U.S., ed. 1, 341, 1903, ed. 2, 1913; Small, Man. southeast. Fl. 413. 1933; Massey & Ball (*Willows of Va.*), in Va. Polytech. Inst. Bull. 37(9):20. 1944.

Chapman, Fl. South. U.S., ed. 3, 453. 1897;

Notes on Dr. Lundell's Copy of Manuscript of Texas Willows. Changes Made:

Page	Item and location	Done	CRB mes.
3	In keys, changes <u>vallicola</u> to <u>variabilis</u>	x	2
4	After " <u>S. lasiolepis</u> var." add <u>Braceliniae</u>	x	3a
5	In keys, change " <u>vallicola</u> " to <u>variabilis</u>	x	3b
6.	In keys, to " <u>S. lasiolepis</u> var." add <u>Braceliniae</u>	x	3b
9.	In par. 1, change <u>vallicola</u> (2 times) to <u>variabilis</u>	xx	5
10	In par. 1, change " " to <u>variabilis</u>	x	6
12	In heading, change <u>vallicola</u> to <u>VARIABILIS</u> Ball (ined.) (ined to be deleted when name is published)	x	9
"	In citation of <u>S. gooddingii</u> var. take same action	x	9
"	Add "(in part)" after Dudley and after Britton in 2nd. & 3rd change citations	xx	10g
13	Line 7 from bottom, "eastward from N.M." to southward from	x	10
14	3rd. par. change <u>vallicola</u> (2 times) to <u>variabilis</u>	xx	10
15	Insert(before <u>Salices</u> in line 5, to match) after Willows	x	11
"	The ? in margin, before (Nordamerika Pilarter) in not clear to me. That is the title of Andersson's original paper, but Gray gave the title in line 4 to the simultaneous American printing.		
17	In par. 6, change <u>vallicola</u> to <u>variabilis</u>	x	13
18.	In last par., " <u>vallicola</u> (2 times) to <u>variabilis</u>	xx	14
37	<i>Delete citation of S. Bigelovii</i>	x	30
37	After <u>S. LASIOLEPIS</u> var., delete (narrow-leaved southern) and insert BRACELINIAE <u>BRACELINIAE</u> Ball (ined.) "(ined.)" to be deleted when name is published)	x	30
39	Par. 1, line 3. Change lanceolate (2 times) to oblanceolate	xx	31
"	Par. 2. <i>Delete the following new languages</i>	x	31
37	<i>Change desc. "Shrubs 2-5 or 6 m. or small trees 5-8 or 9 m tall,"</i>	x	30
41.	<i>Complete data on petioles and leaf widths</i>		33
42	<i>Par. 2. Change "hair usually to "various thick pubescent"</i>	x	
42	<i>Par. 3. Add: S. stricta may at be found there also.</i>	x	
42, 43	Fuller bibliographies for <u>S. babylonica</u> and <u>S. fragilis</u> are attached, for your use if desired. (item 11 in my letter of Mar. 19).		
43.	There are no Texan specimens of <u>S. fragilis</u> in Herb. CRB, Nat. Arb., or USN. I have specimens from Ark., Okla, and N. Mexico but not La. (item 12 in my letter of Mar. 19).		

Question for Dept. Botany, Univ. of Texas.

In the list of ~~plants~~ willows determined for the Univ. Texas, of which copy is attached to my letter to Dr. C.L. Lundell of Dec. 27, 1945,

of *S. Gooddingii* Ball, var. *valleyola* (Dud)
There are listed, under El Paso Co. 3 Whitehouse (Eula) collections, as follows:

- 8335, El Paso, April 9, 1932 (5 sheets, as *S. Wrightii*)
8334, Eagle Spring, April 23, 1932 (as *S. amygdaloides Wrightii*)
8329, Clint, near El Paso, June 1, 1932 (as *S.* " ")

Under Jeff Davis Co. is listed one Whitehouse collection of this variety:

8332. April 22, 1932 (as *S. wrightii*)

I have listed no locality, and the date is within the series of dates for the El Paso Co. specimens. The numbers are not in order of dates of collection, so do not help any in this connection.

Will you be kind enough to look at these specimens and let me know if these is any locality given on No. 8332, and if Jeff Davis Co is indicated on the label.

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In what list and herbarium is Parks and Cory 6952 from Jeff Davis Co.?

Parks and Cory 6952 was listed as Co. undetermined. It got entered on both Brewster and Jeff Davis Co. I have entered "Brewster Co." in pencil in the determination sheet but it must be deleted from on Co. The locality is Oak Canyon.

S. lasiolepis var

SOUTHWEST TEXAS WILLOWS

In ~~NEW~~ U.S. Natl. Herbarium (or Herb. CRB)

BREWSTER CO.

- S. Gooddingii var. vallicola (Dudley) ined.
Alpine, R. A. Studhalter 1021, April, 1925 (USNH) ✓
Ridge Spring, about 12 mi. so. of Marathon, Omer E. Sperry 1863, 1864, Feby. 23, 1941. (young flowers) ✓✓
- S. amygdaloides var. Wrightii (Anderss.) Schn.
Near Alpine (NW corner of Co.) D. C. Ingram in 1929 (as S. Wrightii, herb. CRB.) ✓✗
- S. interior
Shrubby to 15 ft., Chisos Mtn. area, Soñlis Ranch along Rio Grande, Barton H. Warnock 581. ✓
- S. interior var. angustissima (Andersson) Dayton.
Rio Grande, Chisos Mts., V. Havard
- S. taxifolia HBK.
Davis Mts., Sharp bend in Limpia Canyon, near Wild Rose Pass, L. C. Hinckley 2665, Several trees about 4 in. diam. and 15 ft. high, Feb. 21, 1943 (buds just opening); wrongly determined first as S. interior var. angustissima ✓
Alpine, R.A. Studhalter 1026, April, 1925 (fls.). See other list ✓
- S. lasiolepis Benthams, var. southern narrow-leaf.
Buena Vista, west of Alpine, B. H. Warnock 123, March 3, 1937. (young flowers) ✓
faintly pruned, see ms

CULBERTSON CO.

- S. amygdaloides var. Wrightii (Anders.) Schn.
Guadalupe Canyon, Guadalupe Mts., (NW corner of Co.) elev. 5000-6000 ft., Agnes Chase 5930, May 29-June 4, (fruit) ✓

EL PASO CO.

- S. Gooddingii var. vallicola (Dudley) Marcus E. Jones 3760, El Paso, Apr. 23, 1884 (SNH) ✓
S. amygdaloides var. Wrightii (Anders.) Schn. (as S. Wrightii) ✓
(= S. amygdaloides) Vernon Bailey 465, Sept. 25, 1901 (fls.) ✓
alt. 1370 m., " " June 17, 1931. (fls.)

JEFF DAVIS CO.

- S. Gooddingii var. vallicola (Dudley) ined.
Misquitz Swamp, infrequent. B.H. Warnock 122, March 28, 1936 ✓
- S. taxifolia HBK.
Davis Mts., Vernon Bailey 404, July 7, 1901. ✓
Misquitz Canyon, V. Havard, July, 1883. ✓✓
Davis Mts., Little Aguja Canyon, J.A. Moore & J.A. Steyermark Mar. 25 ✓
Davis Mts., Limpia Canyon near Ft. Davis, S.M. Tracy & F.S. Earle 210, April 24, 1902. (as S. longifolia opaca And.) ✓
See also Hinckley 2665, under Brewster Co., above)

S. lasiolepis Benthams (var. southern narrow-leafed)

- Davis Mts., rocky canyon of small mountain stream, alt. 2100 m., E.J. Palmer 32008, arborescent shrubs or small trees, 809 m. tall, Oct. 6, 1926. (fls.) ✓
Davis Mts., Madera Canyon, Mt. Livermore, Omer E. Sperry T 2, May 3, 1936 (fls.) ✓
Davis Mts., Upper Madera Canyon, E. J. Palmer 33431, Arborescent shrubs or small trees, April 21, 1928 (fls. & tiny leaves) ✓
Davis Mts., Limpia Canyon, near Ft. Davis, along creek, E.J. Palmer 34479, June 11, 1928. *faintly pruned, see ms*

dupl ms Texas & S. taxifolia

Look up in U S N H

Rothrock, Ariz 1874

Type of *S. exigua* var *Rowley*
and compare *S. exigua*

Rydberg & Ireland 6392 stem
6393 fruit.

^{Cals.}
Type of *S. exigua* var *stenophyll*

Baker, Cook & Tracy 102 referring

to *S. exigua* - get very warm

yg. 1. 1/2 to 5+ mm x 5 cm

small equally broad in prop to length

S. exigua var. "stenophylla"

Cannabiz found in Atlas

Beaver Dam, Ariz. (Gooding 1905)
Laguna Dam Calif. Westover

Carlisle N.M. Wootton

Pecos Nat Forest N.M. Wootton Ranch
8400 ft
Trijada Canyon Texas (probably in the
Tahiti)

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~~To *S. lasiolepis* var
add in Brewster Co, Wasmock 474 (det
11/1/46)~~

~~I have used Synonyms of *Lathyrus* *truncatus*
genus of 1.~~

County Locations Texas

Anderson	NE Dallas
EC Angelina	Denison
NC Archer	SE-E DeWitt
SC Atascosa	SC Dimmit
C-SC Bandera	NW Donley ^{Donley}
C-E Bell	SW El Paso
SC Bexar	NC Erath
C-S Blanco	C-E Falls
NE Bowie	NE Floyd
SE Brazoria	SE Fort Bend
EC Brazos	C-S Gillespie
Burnet	SE-E Gonzales
NW Collingworth	NC-E Grayson
Calhoun	SE Grimes
SC Cameron	SC-E Guadalupe
Childress	
NE Cass	
Clay	
C-SE Comal	
NC Cooke	
WC-N Crosby	
SW - - - Culberson	

WC Hale
NW-N Mansford
SE Harris

NE Harrison

C-S Itayo
NW Hemphill
NE Henderson

C-S
SC Hidalgo

NE, Hopkins
SW Hubbs
C-W Drury
SW Johnson
NE Kaufman

C-S Kelsey

C-S Kimble

SC-W Kinney

NE Lamar (2)

SE La Salle
Liberty

SC Live Oak

C Plano

Madison

NE Marion

C-E McTennan

SC McMullen
Medina

C-S Menard

WC Mitchell ^{Col}

NE Montague

SE Orange
Pecos

NE Panola
SW Presidio
C-SC Real

NE Rockwall

SC Tarrant

EC Tarrant
Haskell

EC (Ha) San Augustine
San Safo

AC Shackelford

SC Starr

C-W Sterling

NE Tarrant

W Taylor

SW Texell

CW Tom Green

C-SE Travis

S Walde

SC Val Verde

NE Van Zandt

SE Walker

SE Washington

SC Webb

NW Wheeler

NC Wichita

NC Wilbarger

C-E Williamson

SC Wilson

NC-E Wise

SC Zapata

SC Zavala

— Chromster