

and igneous soils; whereas the latter seems confined to igneous ones. *C. reticulata* Gray has been reported for Texas, but I have not seen specimens identifiable as that species. *C. eriophylla* in Texas specimens has consistently only one pair of pinnae. Specimens from more western states have from 1-7 pairs.

7. ACACIA. Two species, *A. texensis* and *A. hirta*, are frequently confused with *Desmanthus*. In flower they are easily separated by the number of stamens. *Acacia* has numerous stamens, *Desmanthus* has only 5 or 10. Vegetatively, their separation is more difficult. The presence of a petiolar gland between the lower pinnae of the leaves on *Desmanthus* seems the best artificial character. *A. texensis* is a low suffrutescent plant occurring in the Trans-Pecos. *A. hirta* occurs in east Texas as well as the Trans-Pecos.

8. HOFFMANSEGGIA. Ten species in Texas (Britton & Rose, 1928), mainly in southern and western Texas. In flower, this genus is easily recognized as belonging to the subfamily *Caesalpinioideae*. Vegetatively, however, the genus is frequently confused with *Desmanthus*, or other herbaceous form of *Mimosoideae*.

REFERENCES

- BENTHAM, GEORGE. Notes on *Mimoseae* with a short synopsis of species. Hook. Journ. Bot. 4: 323-418, 1842.
 BRITTON, N. L. & J. N. ROSE. *Mimosaceae*. North American Flora. 23: 1-194, 1928.
 FISHER, E. M. Revision of the N. American Species of *Hoffmanseggia*, Contrib. U.S. National Herbarium 1: 143-150, 1892.
 ROBINSON, B. L. Revision of the North American species of *Neptunia*. Proc. Am. Acad. 33: 332-334, 1898.
 TURNER, B. L. Texas Species of *Desmanthus*. Field & Lab. 18: 54-65, 1950.
 WIGGINS, I. L. *Acacia angustissima* (Mill.) Kuntze and its near relatives. Contrib. Dudley Herbarium 3: 227-239, 1942.

Texas Species of *Desmanthus* (Leguminosae)

B. L. Turner¹

The Texas species of *Desmanthus* (*nomen conservandum*), as treated in the present paper, total nine, one of which has two varieties. Six of these are found almost exclusively within the state (Maps 2-6, 10); three others are restricted to the continental United States or north-western Mexico; the remaining one (*D. virgatus* var. *depressus*) is a species widely distributed along coastal areas of Florida, the West Indies, Mexico, and South America.

¹Graduate Student, Southern Methodist University, Dallas.

Dalla Torre & Harms (1900-1907) credit the genus with 12 species in their comprehensive tabulation of the world's flora. Britton & Rose (1928) described 13 new species in their treatment of the genus for North America alone. A recent count of species published to date, excluding known synonyms (compiled from Index Kewensis, its supplements, and the Gray Index), gives a total of 39 species. A number of these are transfers of Madagascar species from the genus *Dichrostachys*. Standley & Steyermark in treating *Desmanthus* for their *Flora of Guatemala* (1946) criticize rather unjustly the number of new species described and recognized by Britton & Rose in the *North American Flora*, stating that the total "is a rather excessively optimistic number."

There has apparently been a tendency for many taxonomists who work on tropical floras to avoid detailed study of plants such as *Desmanthus*, in which the vegetative and floral characters are remarkably alike. This is probably due to the necessity of having mature fruit with which to identify all specimens correctly. As a result of this neglect, taxonomists have lumped their local specimens into convenient "catch-alls," in this case *D. virgatus* (L.) Willd. and *D. depressus* H.&B. The former plant with a distribution throughout tropical North America, South America, and tropical Asia has been particularly inviting. Accumulation of a quantity of herbarium material representing localities of wide (and even local) separation show that each locality has its own peculiar variant of *D. virgatus*. In spite of the often obvious mistakes made by Britton & Rose, they have certainly recognized the complex problem presented by this genus, and have done much to bring it to focus.

The genus *Desmanthus* is characterized floristically by having a 5-lobed calyx, 5 distinct petals, and 5 or 10 stamens. It is separated in most technical keys by the dehiscent legumes (the valves of the legume never separate from the margin) which contain obliquely or longitudinally arranged seeds. Vegetatively the genus is characterized by its bipinnate, often sensitive, leaves which contain between the lowest pair of pinnae a petiolar gland. In North American species the base of the leaves is subtended by a pair of subulate, rarely caducous, stipules. Some species recently trans-

ferred from the genus *Dichrostachys* are spinescent.

I am indebted to the following herbaria for the loan of material: U.S. National Herbarium (US); University of Michigan Herbarium (M); Texas University Herbarium (T); S. M. Tracy Herbarium, Texas A.&M. College (TAM); Sul Ross State College Herbarium, Alpine, Texas (SR). Grateful acknowledgment is made to Miss Ruth D. Sander-son, librarian, Gray Herbarium, for necessary bibliographi-cal information; and to Dr. H. N. Moldenke and Mr. J. V. Monachino of the New York Botanical Garden for checking the types of *Acuan texanum* and *Acuan Tracyi*. Latin de-scriptions are by Dr. Lloyd H. Shinners.

KEY TO TEXAS SPECIES OF DESMANTHUS

1. Legume falcate (Fig. 4), 2-5 times as long as wide; stems erect1. *D. illinoensis*
1. Legume linear, at least 7 times longer than wide; stems decumbent to erect.
2. Leaflets with raised somewhat reticulate veins (upper surface sometimes smooth); legumes at maturity on peduncles 3-15 cm. long.
3. Mature fruiting peduncles 8-15 cm. long; legume tapering to a point; the larger leaves with petioles 1 cm. or more long; leaflets glabrous or sparsely pubescent along the margins only2. *D. reticulatus*
3. Mature fruiting peduncles 3-8 cm. long; legumes obtuse or abruptly mucronate, never tapering to a point; leaves with petioles 1 cm. long or less; leaflets pubescent over the lower surface3. *D. obtusus*
2. Leaflets without raised reticulate veins; legumes on peduncles 0.4-6 cm. long.
3. Stem densely short villous throughout; petiolar glands orbicular, minute (0.4 mm. long or less)4. *D. velutinus*
3. Stem glabrous or sparingly pubescent along the angles, never evenly pubescent throughout; petiolar glands 0.3-3 mm. long.
4. Stipules small or wanting, less than 2 mm. in length; peduncles 2 cm. long or less (exceptionally 3 cm.)5. *D. Cooleyi*
4. Stipules longer, setiform, 2-8 mm. long (sometimes appearing less when the tips are broken off); peduncles 0.4 cm.-6 cm. long.
5. Seeds placed lengthwise in pod, elliptic, 4.5-5 mm. long (Fig. 5a); legumes somewhat constricted along the margin between the seeds; pinnae 4-10 pairs; stamens 56. *D. leptolobus*
5. Seeds placed obliquely in pod (most noticeable in immature fruit), variously shaped but less than 3 mm. in length; legume margins straight; pinnae 1-7 pairs; stamens 10.
6. Stipules conspicuously pubescent (Fig. 10); plants prostrate, arising from a deep tuberous tap root; petiolar gland 0.7-1.5 mm. long7. *D. acuminatus*
6. Stipules glabrous (rarely with 5 or 6 scattered hairs); petiolar gland 0.7 mm. long or less if plant prostrate, 0.7-3 mm. long if plant erect.
7. Fruiting peduncles 2-6 mm. long; pinnae 1-2 pairs only8. *D. brevipes*

7. Fruiting peduncles 1 cm. or more long; pinnae 2-7 pairs.
8. Stipules with a conspicuous auricle at base (Fig. 9): petiolar gland at base of lower pinnae only, 0.7 mm. long or less; plants prostrate, rarely ascending; plants of Central Texas and Gulf Coastal Plain9. *D. virgatus* var. *depressus*
8. Stipules not conspicuously auricled at base; petiolar glands 1-4 between at least some of the pinnae, 0.7-2.5 mm. long; plants erect or ascending; plants of western Texas10. *D. virgatus* var. *glandulosus*

1. *D. ILLINOENSIS* (Michx.) MacM., Metasp. Minn. Valley 308. 1892. Map 1. June to September. Along creek banks, ditches, road-shoulders, and in low fields. Widely distributed throughout northern Texas, but conspicuously absent from the Rio Grande Plain and the Trans-Pecos with one exception: springs at Peña, Colorado, Brewster Co., Warnock 6035, June 15, 1947, (SMU, SR). This species is the most distinct and easily recognized one in the genus *Desmanthus*.

2. *D. RETICULATUS* Benth., Hook. Journ. Bot. 4:357. 1842. Map 2. March to April, flowering again sparingly in the fall. Open prairies and fields. A rare endemic, extending from Kerr and Uvalde counties southward to the coast. The extreme length of the mature fruiting peduncle easily separates this plant from other Texas species. *D. reticulatus* derives its name from the pods which at maturity show a very distinct reticulation (Fig. 2). The foliage in fresh material is reported to be very glaucous.

3. *D. OBTUSUS* S. Wats., Proc. Amer. Acad. 17:371. 1882. Map 3. April to August. Dry sandy, limestone, or caliche soils. Widely distributed in western Texas and southeastward on the Rio Grande Plain. Though keyed with *D. reticulatus*, this plant shows its closest relationship to *D. velutinus*. The range of this latter species overlaps that of *D. obtusus* (see Maps 3 & 4). Britton & Rose report the stamens as 6 in this species. Counts made on a number of specimens (flowers examined while in bud) showed the number to be 10.

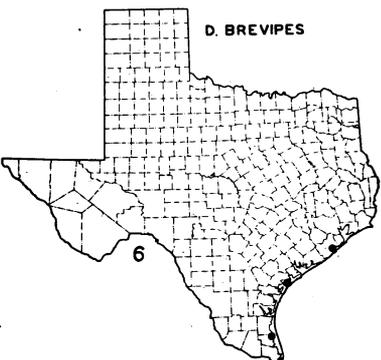
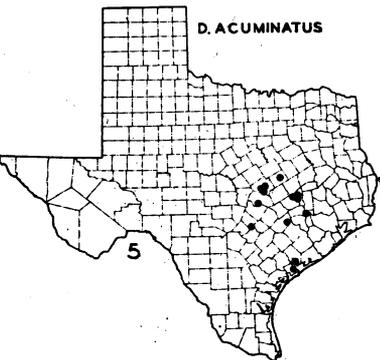
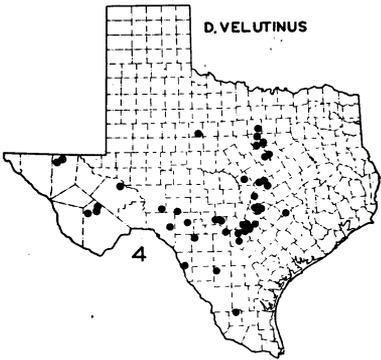
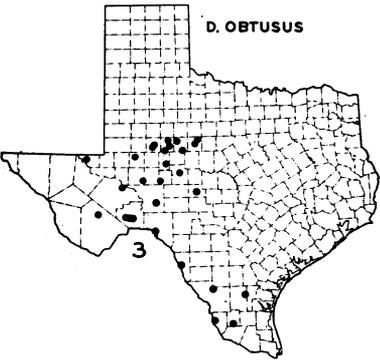
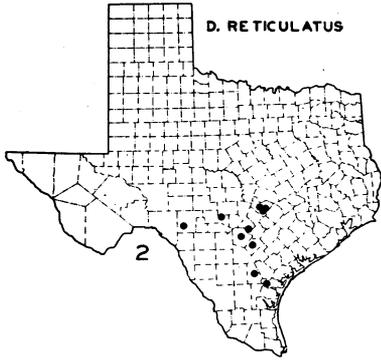
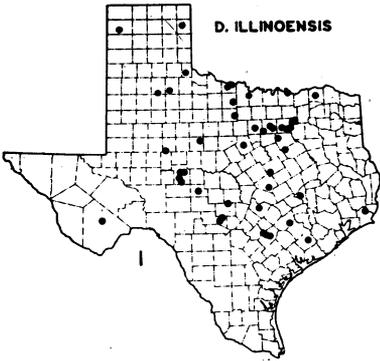
4. *D. VELUTINUS* Scheele, Linnaea 21: 455. 1848. Map 4. April to June, flowering again sparingly in the fall. Widely distributed, following the line of the Balcones fault from Ellis County southwestward to the Trans-Pecos; also occurring south on the Rio Grande Plain. Two specimens were seen from New Mexico (near Carlsbad Caverns, Eddy

Co., P. C. Standley 40420, Aug. 12-20, 1924, US; and 45 miles southwest of Carlsbad, C. O. Grassl 66, July 10, 1930 [in part] M); otherwise the species seems confined to Texas. This plant most closely resembles *D. obtusus*, especially in the inner lining of the pod (mesocarp) which breaks from the margins at maturity (cf. Figs. 3 & 8) and in the villous foliage. In the fall the decumbent stems become coarse and brittle, their terminal portions curving upward.

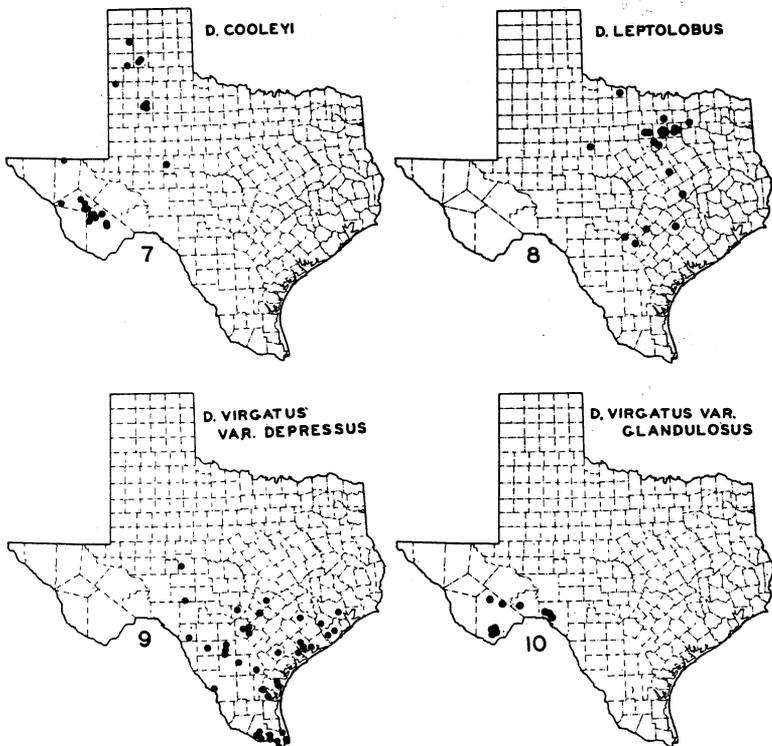
5. *D. COOLEYI* (Eaton) Trel., Rep. Ark. Geol. Surv. 1888, 4: 178. 1891. Map. 7. *D. Jamesii* T.&G. June to August in dry soil. This plant is separated from all other Texas species by the small, often deciduous, stipules. It is the most abundant *Desmanthus* in the mountainous areas of western Texas and in the High Plains of the Panhandle, extending westward to Arizona and south into northern Mexico.

6. *D. LEPTOLOBUS* T.&G., Fl. N. Am. 1:402. 1840 (Isotype examined, *Drummond 152*, Texas, US). Map 8. May to June, occasionally developing flowers again in the rainy periods of August and September. Occurring mainly in deep calcareous soils. A plant of northern distribution, extending from our area into Kansas, Missouri, and Arkansas. Its southern limit in Texas is about the same as that of *D. illinoensis* (Maps 8 & 1) but its distribution and frequency are more restricted. This plant and *D. illinoensis* are the only species in Texas with 5 stamens; all the others have 10.

7. *D. ACUMINATUS* Benth., Hook. Journ. Bot. 4: 357. 1842. Map 5. April to May, flowering again sparingly in the fall. Prostrate from a deep tuberous tap-root thickened at summit. Open ground, gravelly or sandy-silt soils. This plant shows close affinity with *D. virgatus* var. *depressus*, but is separated from it by the more villous foliage (see stipules, Fig. 10), smaller, fewer-seeded pods (Fig. 7), and larger petiolar glands. Southward from the type locality, "Brazos River" (probably in Austin, Washington or Waller County), there seems to be occasional intergradation between these two species. *D. acuminatus* has been collected on open prairies and is reported as "adventive in yard." Recent collections have increased the known range of this plant, here-



tofore recorded only from the Brazos River area. While examining specimens of *Desmanthus* from South America, I was struck with the similarity and apparently parallel development that has occurred in species of this genus. In particular a specimen from Ceres, Prov. Santa Fe, Argentina, *O. Kuntze, s.n.* Oct., 1892 (US), fits the description of *D. acuminatus* almost exactly, except that it has a pubescent pod.



8. *D. brevipes* B. L. Turner sp. nov. Map. 6. Caulis ut videtur erectus ad 30 cm. altus superne parce ramosus glaber. Folia glabra petiolo 2-6 mm. longo, rachide cum petiolo 6-18 mm.; pinnae 1- vel 2-geminae 2-5 cm. longae glandula elliptica 1.5-3 mm. longa 1-2 mm. lata inter inferiores ornatae; foliola 15-24-gemina linearia vel lineari-oblonga glabra 2-7 mm. longa obtusa vel apiculata; stipulae subulatae subauriculatae 2-4 mm. longae. Pedunculi rigidi brevissimi 2-6 mm. longi. Flores ignoti. Legumina 3-9 com-

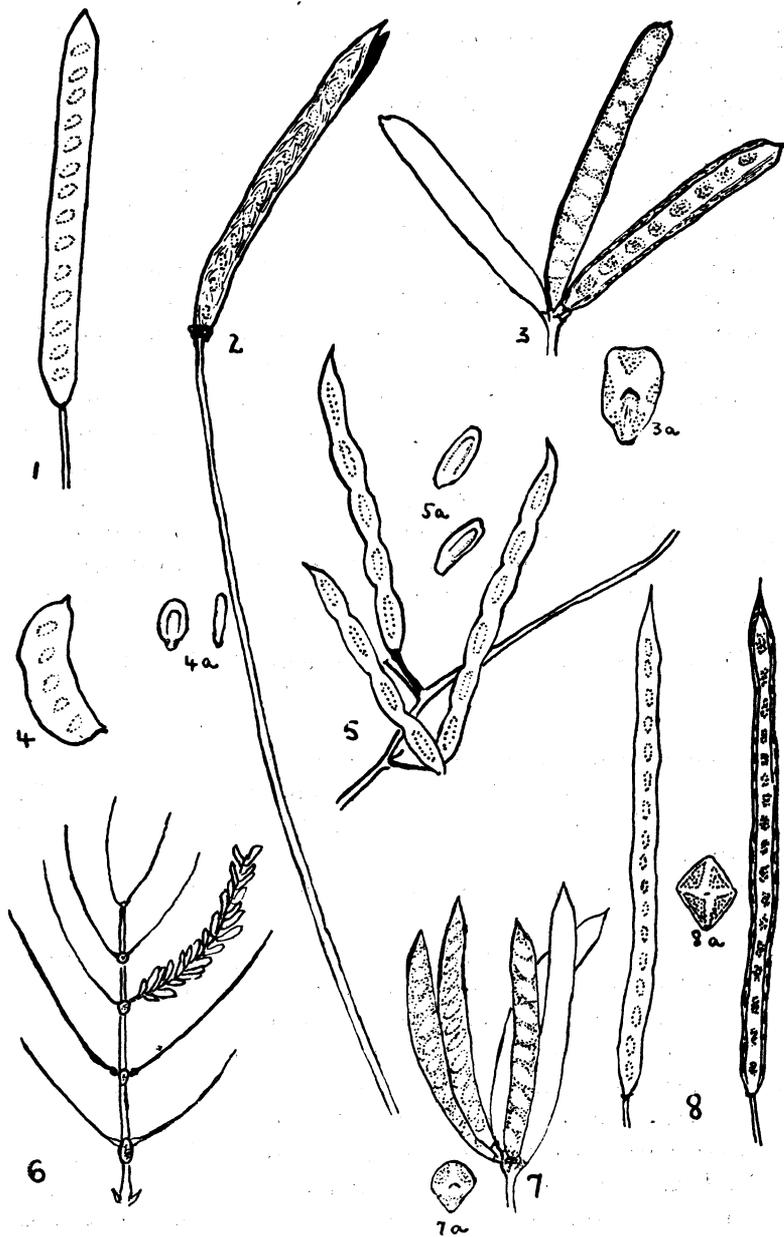
pacta recta vel subarcuata 2.5-5 cm. longa ca. 3 mm. lata glabra acuta; semina 12-18 oblonga vel subrhomboidea nitida 2.5 mm. longa 1.2-1.5 mm. lata.

Stem evidently erect, 30 cm. tall or more, sparingly branched above, brittle, glabrous, with 5 reddish ridges. Leaves glabrous; petiole 2-6 mm. long; rachis and petiole 6-18 mm. long; pinnae 1 or 2 pairs only, 2-5 cm. long with a large elliptic gland 1.5-3 mm. long, 1-2 mm. wide between the lower pair; leaflets 15-24 pairs per pinna, linear to linear-oblong with a faint excentric mid-vein, glabrous, 2-7 mm. long, obtuse to apiculate at apex; stipules reddish-brown, subulate, 2-4 mm. long from a somewhat auricled base. Peduncle stiff, erect to ascending, very short, 2-6 mm. long. Pods 3-9 in tight erect clusters, straight or slightly curved, 2.5-5 cm. long, about 3 mm. wide, glabrous, acute; seeds 12-18 per pod, oblong to irregularly-rhomboid in shape, dark and shining with a crescent-shaped scar on each side, about 2.5 mm. long, 1.2-1.5 mm. wide. Specimen in fruit only.

TYPE: In sand along roadside near Redfish Bay, Wilacy Co., *C. L. Lundell & Amelia A. Lundell 8776*, May 8, 1940 (University of Michigan Herbarium). Additional specimens seen (both fragmentary): Aransas Co.: Turtle Bay Peninsula, *B. C. Tharp 1611*, Sept. 10, 1922. (US, T), and Brazoria Co.: Hoskins Mound, *B. C. Tharp 2347*, June 20, 1923 (T).

Desmanthus brevipes is closely related to *D. virgatus*, a plant of wide distribution, especially in the West Indies. It is distinguished from that species primarily by its extremely short peduncles, its short leaf rachis, and smaller, fewer-seeded pods. Of the approximately 800 specimens of *Desmanthus* examined by me from North America, West Indies, and South America, only one specimen (from Chauar [?] Pojo, Argentina), *S. Venturi 5444*, Oct. 26, 1927 (US), showed a peduncle length similar to the 3 specimens cited from Texas. This Argentine specimen, however, was broken at the base and showed only a few short stems. It is possible that *D. brevipes* has a bicentric distribution.

9. *D. VIRGATUS* (L.) Willd. var. **depressus** (H.&B.) Turner comb. nov.—*D. depressus* H.&B., ex Willd., Sp. Pl. 4: 1046. 1806. *Acuan texanum* Britton & Rose, N. Amer. Fl. 23: 136.



EXPLANATIONS OF THE FIGURES

Figs. 1-8. Pods of *Desmanthus* (drawn to scale, except for seeds, where noted). 1. *D. virgatus* var. *depressus*. 2. *D. reticulatus*. 3. *D. obtusus*, 3a. seed $\times 4.3$. 4. *D. illinoensis*, 4a. seed $\times 1.7$. 5. *D. leptolobus*, 5a. seed $\times 2$. 6. *D. virgatus* var. *glandulosus* (showing glands between pinnae). 7. *D. acuminatus*, 7a. seed $\times 2.7$. 8. *D. velutinus*, 8a. seed $\times 3.2$.

1928. (Isotype examined, *Tracy 7786*, Pierce, Wharton Co., Texas, Sept. 16, 1901, T). *Acuan Tracyi* Britton & Rose, N. Amer. Fl. 23: 135. 1928. Map 9. April to November (the long flowering season of this plant is probably due to its subtropical habitat). *D. virgatus* var. *depressus* is probably our most abundant coastal species, extending throughout the Rio Grande Plain and northeast along the coast to Harris Co. In recent treatments of this species there has been a tendency to combine the prostrate *D. depressus* H.&B. with *D. virgatus* L., an erect form with larger petiolar glands. The Texas coastal plants, however, fit almost

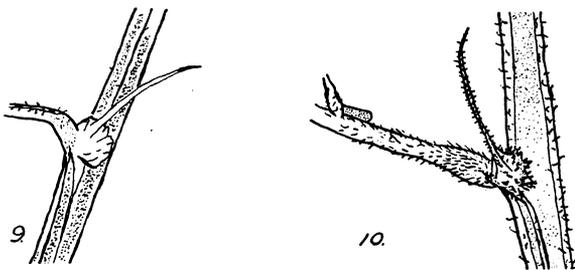


Fig. 9. *D. virgatus* var. *depressus*, showing glabrous stipule.

Fig. 10. *D. acuminatus*, showing pubescent stipule.

exclusively the definition of *D. depressus*. Though admittedly of wide variation, the consistency of the small petiolar gland and prostrate stems separate our plant from *D. virgatus* (typical). This latter form, oddly enough, is not known from the Texas coastal region; but a variety closely resembling the plant is found in the mountainous areas of western Texas. *A. texanum* B.&R. was distinguished by having "legumes constricted between the seeds." This characteristic is found in all species of Texas *Desmanthus* when the pods are immature. Examination of isotypic material which contained both mature and immature pods show this diagnostic characteristic to be untenable. Both *A. texanum* and *A. Tracyi* were collected at the same locality by Tracy and distributed under the same number. When Britton & Rose designated the types of the two species they merely added an "a" below the number 7786 so that it is almost impossible to distinguish isotype material. Britton & Rose evidently assigned *A. Tracyi* specific rank on the basis of its 5 stamens. Mr. J. V. Monachino of the New York Botanical Garden examined the type of *A. Tracyi* upon my request.

I quote from his letter: "My flower dissection of the N. Y. Botanical Garden type specimen of *Acuan Tracyi* 7786a, showed *ten* stamens, not five as described in the N. Am. Fl. In the bud, the ten anthers are compactly arranged, five at a higher and five at a lower level." He also examined the "type or isotype" of *A. texanum* which showed 10 stamens. I could distinguish only one species in the above forms.

10. *D. VIRGATUS* var. **glandulosus** Turner var. nov. Map 10. A specie differt glandulis magnis orbicularibus vel oblongis inter pinnas geminarum superiorum. Plants erect to ascending, suffrutescent, perennial, from a deep tap root, 20-70 cm. tall; stems simple below, sparingly branched above; leaves 2-8 cm. long; pinnae 3-7 pairs, a large oblong gland between the lower pair of pinnae and usually 1-4 glands between the upper pairs of pinnae. Resembling *D. virgatus* (typical) in all respects except for the large orbicular to oblong glands located between the upper pinnae (cf. figure of *D. virgatus* in Degener: Fl. of Hawaii.) Exceptional specimens are found that contain a few leaves which show only the lower petiolar gland present. Limestone soil in Val Verde, Terrell, and Brewster counties. TYPE: 6 miles east of Sanderson, Terrell Co., *Barton H. Warnock* 6710, Aug. 23, 1947 (Sul Ross State College Herbarium, Alpine, Texas). Other specimens examined: TEXAS. BREWSTER Co.: west limestone slopes of Gilliland Peak, Glass Mts., *Barton H. Warnock* 6965, Aug. 29, 1947 (SR); 19 miles east of Marathon, *V. L. Cory* 44677, July 6, 1944 (T). TERRELL Co.: east of Sanderson, *C. C. Albers* 46167, Aug. 30, 1946, (T). VAL VERDE Co.: 3 miles east of Pecos Bridge on Highway 90, *H. B. Parks s.n.*, Sept. 29, 1938 (TAM). MEXICO: COAHUILA, Muzquiz, *F. L. Wynd & C. H. Muller* 299, June 26, 1936 (US).

A form of this species, possibly worthy of nomenclatural recognition, is found in the higher altitudes of the Chisos and Guadalupe Mountains. It differs from var. *glandulosus* in its uniform, reddish-brown stem and foliage, its smaller (30-50 cm. long), less branched stems, its thicker, fewer-seeded pods, and the frequent absence of glands between the upper pairs of pinnae. It is distinguished from *D. Cooleyi* by the longer persistent stipules (2-4 mm.), and predominantly erect habit. The following specimens are

intermediate between these forms: TEXAS. BREWSTER Co.: *B. H. Warnock 711* (T); *M. S. Young s.n.*, summer 1915 (T); *C. H. Mueller 8024* (T, M); *B. C. Tharp s.n.*, Oct. 9, 1936 (T, M); *O. E. Sperry s.n.*, July 31, 1938 (in part) (TAM). NEW MEXICO: DONA ANA Co.: southwest corner of Range Reserve in Mountains, *E. O. Wooton s.n.* Oct. 6, 1912 (US); Guadalupe Mts., *L. N. Goodding s.n.*, Oct. 29, 1936 (this plant approaches the typical form of the variety—the sheet bears a notation in pencil, initialed THK, that the plant is the same as one in the Herb. of Soil Conserv. Service, Tucson, and is cited as from the Guadalupe Mountains of that state (US).

REFERENCES

- BRITTON, N. L. & J. N. ROSE. *Mimosaceae. Acuan.* North American Flora 23: 131-138. 1928.
- PARKS, J. O. *Leguminosae* of Trans-Pecos Texas. Unpublished M.S. thesis, Sul Ross State College, Alpine, Texas. 1950.
- SHINNERS, L. H. Geographic limits of some alien weeds in Texas. *Texas Geographic Magazine*, 12: 16-25. 1948. (Discussions of S. American *Sisyrinchium* with distribution in Texas.)
- STANDLEY, P. C. & J. A. STEYERMARK. *Fieldiana: Botany* 24: pt. 5, p. 28. 1946. (*D. depressus* considered as synonym of *D. virgatus*.)
- TURNER, B. L. Vegetative key to Texas *Desmanthus* and similar genera. *Field & Lab.* 18: 51-54. 1950.
- WATSON, S. Contributions to American Botany, *Proc. Amer. Acad.* 17: 348-349. 1882. (A short key to N. American species of *Desmanthus* known at that time.)

The Distribution and Flower Preferences of the Theclinae of Texas (Lepidoptera, Rhopalocera, Lycaenidae)

*H. A. Freeman*¹

In 1944 I began work on the hairstreaks of North America. Since that year, nine new records for the United States, and one new species, were found in the vicinity of Pharr, Hidalgo County, Texas. While collecting over the State, I have found thirty-three species, five subspecies, and two forms, representing five genera of hairstreaks. One new Texas record is reported in this paper, *Mitoura siva* (Edw.) Most of the information contained here was obtained at first hand; but the fine collection of Stallings and Turner, at Caldwell, Kansas, was checked for Texas specimens.

My primary purpose here is to furnish data for future collectors, especially on distribution, date of capture, and

¹Instructor in Biology, Southern Methodist University, Dallas.