3. It is seen from the Table that the present study established new distributional records for *Culex apicalis, C. coronator, C. salinarius*, and *Psorophora discolor*.

4. *Aedes nigromaculis, Orthopodomyia signifera, Psorophora cynamensis, and P. varipens*, which have been reported by previous workers were not taken in this study.

5. The present study showed the genus *Culex* to be the most abundant one in number of individuals and species. *Culex tarsalis* was the most abundant species in early summer and *C. quinquefasciatus* was most abundant in late summer. *Anopheles punctipennis* was the most abundant and widespread *Anopheles* in the neighborhood of Dallas.

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**The Texas Species of Psoralea (Leguminosae)**

*Lloyd H. Shinners*

Twenty-five species and two varieties of *Psoralea*, distributed among three segregate genera, were recognized from Texas by Rydberg (1919) and by Tharp and Barkley (1945, 1946). Fourteen species and four varieties, of which one species and three varieties are newly described, are recognized in the present synopsis, all treated under *Psoralea*. For the most part the dismemberment of the genus is entirely reasonable as far as Texas species are concerned. Indeed at least one of the segregate genera of Rydberg could be further divided. *Pediomelum rhombifolium*, with slender elongate stems, strictly axillary, capitate, long-peduncled inflorescences, peculiar scarlet-brown corollas, and branched below-ground stem bases, is quite unlike the species with which it is usually associated. While admitting the justifications for recognizing separate genera, I prefer to follow Torrey & Gray, Vail, and Macbride in treating *Psoralea* as a single large and somewhat heterogeneous assemblage, but one of obviously closely allied groups, paralleling *Astragalus*. It is interesting to note that a recent South African student has gone so far as to merge with *Psoralea* a genus previously placed in a different tribe (Salter, 1939).

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This account is based on collections at Southern Methodist University (SMU in the citations), the Missouri Botanical Garden (Mo), and Iowa State College (IS); types and some other specimens were examined at the University of Texas (T). Grateful acknowledgment is made to those in charge of these collections for their courtesies.

KEY TO PLANTS IN FLOWER

1a. Leaves pinnately 3-foliolate
   2a. Leaflets lanceolate to oblong-lanceolate, 3-7 times as long as wide; flowers in elongate spike-like racemes
   3a. Corolla deep purple, 7-10 mm. long; calyx 3.2-4 mm. long
       —1. P. simplex
   3b. Corolla lilac or lavender, 4-7 mm. long; calyx 2.3-3 mm. long
       —2. P. psoralioides var. eglandulosa
 1b. Leaves palmately 3-7-foliolate, or the uppermost only 1-2-foliolate (rare proliferous form of P. scaposa has rachis extended beyond main group of leaflets and terminated by 3 sessile leaflets)
   5a. Inflorescence a slender loose raceme or slender interrupted spike less than 1.5 cm. thick; bracts of inflorescence 4 mm. or less long; calyx 2-7 mm. long (enlarging in fruit)
       —6a. Branches and under-surface of leaflets glabrous and prominently resin-dotted; upper and lower surfaces of leaflets similarly glabrous and prominently resin-dotted
       —3. P. lanceolata
   5b. Inflorescence a dense spike-like raceme 2-4 cm. thick; bracts of inflorescence 4-15 mm. or more long; calyx 8-17 mm. or more long
       —12a. Stem glabrous or appressed-pubescent
 2a. Leaflets rhombic-lanceolate to ovate or suborbicular, about 1-2 times as long as wide; flowers few in heads or very short spikes
 4a. Plant with elongate prostrate leafy stems; leaves membranous, upper and lower surfaces not markedly different, both pubescent to nearly glabrous, without white veins
       —13. P. rhombifolia
 4b. Plant scapose; leaves leathery, the lower surface densely appressed-pubescent, the upper glabrous or nearly so excepting the prominent white veins
       —14. P. Rydbergii
 2b. Leaflets rhombic-lanceolate to ovate or suborbicular, about 1-2 times as long as wide; flowers few in heads or very short spikes
 4a. Plant with elongate prostrate leafy stems; leaves membranous, upper and lower surfaces not markedly different, both pubescent to nearly glabrous, without white veins
       —13. P. rhombifolia
 4b. Plant scapose; leaves leathery, the lower surface densely appressed-pubescent, the upper glabrous or nearly so excepting the prominent white veins
       —14. P. Rydbergii
 6a. Branches and under-surface of leaflets glabrous and prominently resin-dotted; upper and lower surfaces of leaflets similarly glabrous and prominently resin-dotted
       —3. P. lanceolata
 6b. Branches and under-surface of leaflets minutely or conspicuously pubescent, not prominently resin-dotted; upper and lower surfaces of leaflets dissimilar
   7a. Pedicels of many or all flowers longer than the calyaxes; calyaxes 2-4 mm. long (slightly enlarged after flowering)
       —8a. Leaflets linear to lanceolate, 7-16 times as long as wide
       —4. P. linearifolia
   7b. Pedicels absent or shorter than the calyaxes; calyaxes 5-7 mm. long (conspicuously enlarged after flowering)
       —10a. Leaflets oblanceolate to oboval, 2-6 times as long as wide
       —9a. Leaflets 3-6 times as long as wide; plants of general distribution
             —5a. P. tenuiflora
       9b. Leaflets 2-3 times as long as wide; plants of Trans-Pecos
             —5b. P. tenuiflora var. Bigelovii
 7b. Pedicels absent or shorter than the calyaxes; calyaxes 5-7 mm. long (conspicuously enlarged after flowering)
   10a. Leaflets oblong-elliptic to narrowly oblong-lanceolate, those of middle and lower leaves 4-8 mm. wide
       —6a. P. digitata
   10b. Leaflets linear, those of middle and lower leaves 1.5-3 mm. wide
       —6b. P. digitata var. parvifolia
 5b. Inflorescence a dense spike-like raceme 2-4 cm. thick; bracts of inflorescence 4-15 mm. or more long; calyx 8-17 mm. or more long
   11a. Plant leafy-stemmed, the leaves at flowering time not all at or very near the base
       —12a. Stem glabrous or appressed-pubescent
13a. Bracts ovate-orbicular, abruptly contracted to a narrow sharp point, the body about as wide as long
—8. *P. Reverchoni*

13b. Bracts ovate-lanceolate or obleng-lanceolate, gradually acute or acuminate, much longer than wide
14a. Leaflets linear-lanceolate or narrowly obleng-lanceolate, 7-14 times as long as wide
—7. *P. cyphocalyx*

14b. Leaflets broadly lanceolate, rhombic, elliptic, or oboval, 2-5 times as long as wide
9. *P. cuspidata*

12b. Stem densely hirsute with widely spreading hairs
—10. *P. latestipulata*

11b. Plant scapose, the leaves all at or crowded close to the base at flowering time
15a. Peduncles and petioles with widely spreading hairs
16a. Middle leaflet of later leaves 1.8-3 cm. wide, 4-6 cm. long
—11a. *P. subulata*

16b. Middle leaflet of later leaves 1-1.5 cm. wide, 2-3.2 cm. long
11b. *P. subulata* var. minor

15b. Peduncles and petioles with appressed or closely ascending hairs
17a. Peduncles 4-10 cm. long, slightly shorter to slightly longer than the petioles
12a. *P. scaposa*

17b. Peduncles 1-3 cm. long, mostly less than half as long as the petioles
12b. *P. scaposa* var. breviscapa

"Plains of Red River, Arkansas [Territory], Nuttall! Texas, Drummond!" *Orbexilum simplex* (Nutt.) Rydb., N. Amer. Fl. 24: 6. 1919. *Psoralea palustris* Bush, Ann. Rept. Mo. Bot. Gard. 17: 121. 1906. TYPE: swamps, Lindale, Smith Co., Texas, J. Reverchon 3175, May 15, 1902 (Mo).—Damp sandy soils, pine region of eastern Texas (Map 1); local and rather rare. Flowering mid- and late May. Corolla deep purple. The name *Psoralea palustris* was originally coined by Reverchon, whose herbarium labels give extensive notes on what he took to be an undescribed species. Name and notes were published by Bush without acknowledgment of their source. The piracy was in vain; the species had been described nearly seventy years earlier by Nuttall, and published for him by a more ethical generation of botanists.


4. **P. LINEARIFOLIUM** T.&G., Fl. N.A. 1: 300. 1838. "Arkansas [Territory], Beyrich!" *Psoralidium linearifolium* (T.&G.) Rydb., N. Amer. Fl. 24: 14. 1919. *Psoralea linearifolia* var. *robusta* Coulter, Contrib. U.S. Nat. Herb. 1: 34. 1890. TYPE: Clarendon, Donley Co., Texas, G. C. Nealley, in 1888 (U.S. Nat. Herb.; not seen). *Psoralidium linearifolium* var. *palodurense* Tharp & Barkley (as *palodurensis*), Bull. Torr. Bot. Club 73: 132. 1946. TYPE: Palo Duro Canyon, Randall Co., Texas, Tharp 5767, June 15, 1929 (T). *Psoralidium linearifolium* var. *texense* Tharp & Barkley (as *texensis*), l.c. TYPE: Sherman Lake, Grayson Co., Texas, Tharp, June 15, 1939 (T).—Prairies or open ground, especially characteristic of calcareous rock outcrops (though growing also in sandy soil), in the Panhandle and north-central Texas from Grayson, Rockwall, Ellis, and Mills counties westward; seemingly avoiding the area of Permian Red Beds (Map 4). Flowering late May-June, sporadically later. Corolla opening violet-blue, quickly fading nearly to white. Beyrich is known to have botanized in central Oklahoma (part of the "Arkansas Territory" of his day), and it is most probable that the type of this species came from that area. Tharp and Barkley, apparently assuming that the type locality was in the present state of Arkansas, remark that the typical variety enters Texas in the northeast corner. I have seen no specimens from farther east than the counties listed, over 100 miles west of the Arkansas border.

131-132. 1946. TYPE: Midfield, Matagorda Co., Texas, Tharp, April 7, 1939 (T).—One of our most widespread species, rather common and variable; absent only from the extreme eastern and southern parts of the state (Map 5). The variations are so freely intergrading, and the extremes so poorly segregated geographically (except var. Bigelovii, below), that they scarcely seem worthy of recognition; certainly they would be weak varieties at most. The southernmost form has rather broad leaflets, approaching var. Bigelovii. The general area in which this occurs was botanized by Drummond, and also includes the type locality of Psoralidium Youngiae. The latter and Psoralea obtusiloba (based on a Drummond specimen) are undoubtedly the same. Flowering May-July, sporadically later. Corolla violet-blue or purple-blue.


6b. P. DIGITATA var. parvifolia Shinners, var. nov. Foliola angustiora linearia, foliorum mediorum inferiorumque 1.5-3 mm. lata. TYPE: 1¼ miles northwest of Lindale, Smith Co., Texas, Shinners 11174, May 15, 1949 (SMU).—Sandy oak and pine woods, northeast Texas. Seven additional col-
Tatum, Cory 56449, July 6, 1949 (SMU). Smith Co.: 3 miles west of Tyler, Cory 56220, May 21, 1949 (SMU). The Henderson and Limestone County records are not mapped; both would be just west of those shown.


April (south), late April-May (north Texas), May-early June (Panhandle). Corolla purple-blue to light violet-blue; flowers sometimes with strong sweet scent of alfalfa or sweet clover.


Root tuberous-enlarged 3-5 cm. below the surface of the ground, napiform or fusiform-globose, 1.5-3.2 cm. thick. Stem erect, 7-18 cm. high above ground, densely spreading-hirsute with white, somewhat curled or deflexed hairs. Leaves 4-6, crowded below and in the inflorescence. Stipules somewhat chartaceous, oblong-lanceolate or oblong-ovate, 3-7 mm. wide by 7-12 mm. long, obtuse or broadly acute, yellowish basally, green apically, glabrous or nearly so and conspicuously resinous-punctate on both surfaces, densely hispid-ciliate. Petioles 1.5-7 cm. long, rather sparsely spreading-hirsute. Leaflets 4-7, oblanceolate or oboval, 2.5-6.5 times as long as wide (5-11 mm. wide by 13-48 mm. long), obtuse or broadly acute; lower surface sparsely strigose, punctate, prominently veined; upper surface glabrous, densely and prominently black-punctate, the veins (except the impressed midrib) not prominent. Peduncles shorter than the leaves (0.7-4.8 cm. long in flower), rather sparsely to densely hirsute partly with spreading and partly with upwardly appressed hairs. Flowers in short dense spike-like racemes 2-5 cm. long, eventually about equalling the peduncle. Bracts ovate or ovate-lanceolate, acute, similar to the stipules in texture, indument, and coloration or usually more purpltinged, deciduous. Pedicels 1-2 mm. long. Calyx gibbous in flower, divided about half way (tube 6-8 mm. long, unequal lobes 5-8 mm. long), sparsely hirsute or glabrare, conspicuously dark-punctate, especially on the narrowly deltoid-lanceolate or linear-lanceolate lobes, the latter densely hispid-ciliate. Fruiting calyx enlarged, exceeding the pod. Legume thin-walled, glabrous, resin-dotted, about 6 mm. long with a nearly straight beak 5 mm.long; seed oval, turgid, black, 3 x 4 mm.
Very distinct from *P. esculenta* Pursh, for which it has passed. The latter species, occurring as far south as Murray County, Oklahoma, has elongating stems often with many leaves; narrowly deltoid-lanceolate to linear-lanceolate, acuminate or gradually acute, pubescent or canescent stipules; ultimately elongate peduncles exceeding the inflorescence, up to 10 cm. or more long; leaflets canescent beneath, glabrous above, not punctate; calyx lobes green, not punctate. *Psoralea latestipulata* is an apparently localized endemic of calcareous rock outcrops in north central Texas, from the Grand Prairie westward (Map 9). The following additional specimens have been seen:

**BROWN Co.:** "western plains," *Reverchon* 1267, April, 1882 (Mo).  
**COMANCHE Co.:** Round Top Mountain, north of Comanche, *Eggert*, May 9, 1900 (Mo).  
**PALO PINTO Co.:** Brazos, *Brazos School*, April, 1931 (T).  
**PARKER Co.:** without locality, *G. C. Broadhead*, no date or number (Mo).  
**TARRANT Co.:** 2 airline miles southwest of Benbrook, Cory 54394, May 7, 1948 (SMU).  
**TOM GREEN Co.:** San Angelo, *Reverchon*, May 19, 1903 (Mo).  
**WICHITA Co.:** 1.6 miles west of Electra, *Whitehouse* 9772, May 1, 1945 (SMU).  
**WISE Co.:** near Marine Camp at Newark, *Whitehouse* 15152, April 6, 1946 (SMU).


11b. *P. subulata* var. *minor* Shinners, var. nov. *Planta tota minor foliolis ( nisi foliorum primorum) 1-1.5 cm. latis, 3-3.2 cm. longis.* TYPE: sandy hillside oak woods 10 miles east of Wills Point, Van Zandt County, Texas, *Shinners* 11024, April 29, 1949 (SMU).—Restricted endemic, east Texas (Map 10). When first collected, this was thought to be a distinct species, but in the herbarium the only difference between it and *P. subulata* appears to be size. Flower color may be an important distinguishing characteristic, but unfortunately only one detailed description of fresh flowers of each is available. The variety has keel and wings purple, the banner white with purple-streaked center. The following additional collections have been seen: **SMITH Co.:** Lindale,


12b. P. scaposa var. *breviscapa* Shinners, var. nov. Scapi abbreviati 1-3 cm. longi, foliis valde breviore. TYPE: 6 miles west of Weatherford, sandy roadway, Parker Co., Texas, Shinners 10190, May 30, 1948 (SMU; fruiting).—Sandy soils, West Cross Timbers westward (Map 11). I agree with Macbride and Rydberg that Gray’s var. *scaposa* is specifically distinct from *P. hypogaea* Nutt. The latter is a localized species of eastern Colorado and adjacent New Mexico and Wyoming, with nearly oblong or linear leaflets up to 9 mm. wide and 46 mm. long, wider near base or of uniform width, and lower lobe of fruiting calyx about 3.5-3.8 mm. wide. In *P. scaposa* and var. *breviscapa*, of Oklahoma and Texas, the leaflets are broadly lanceolate or elliptic-oblong, up to 14 mm. wide and (rarely) 46 mm. long, widest near middle, and lower lobe of fruiting calyx about 4-4.5 mm. wide. Short scapes are found in *P. hypogaea* and in *P. scaposa* var. *breviscapa*, but the latter is otherwise similar to *P. scaposa*, except in its preference for sandy soils. The following additional collections have been seen:

OKLAHOMA. TILLMAN Co.: Frederick, Mrs. J. F. Duncan, 25, July 6, 1903 (Mo). WOODS Co.: near Fairvalley, G. W. Stevens 754, May 28, 1913 (Mo). TEXAS. CALLAHAN Co.: Clyde, Palmer 13824, May 30,
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13. P. RHOMBIFOLIA T.&G., Fl. N.A. 1: 303. 1838. "Texas, Drummond!" Pediomelum rhombifolium (T.&G.) Rydb., N. Amer. Fl. 24:23. 1919. Pediomelum Coryi Tharp & Barkley, Madrono 8: 54-56. 1945. TYPE: Katherine, Willacy Co., Texas, W. L. Bray & H. H. York 5, March 22, 1907 (T).— Sandy soils, nearly throughout the state, absent from the Panhandle and rare in the Trans-Pecos (Map 12). New shoots are usually more pubescent than older ones, and the canescence is occasionally persistent. Specimens have been seen from widely scattered localities similar to the type of Pediomelum Coryi, which I consider to be merely a growth form of Psoralea rhombifolia. Flowering March-July. Corolla rust-brown or scarlet-brown, unique among our species of this genus.

14. P. RYDBERGII Cory, Rhodora 38: 405. 1936. Pediomelum humile Rydb., N. Amer. Fl. 24: 24. 1919 (Not Psoralea humilis Mill., 1768.) "Type collected in the valley of the Rio Grande near Piedras Negras, Coahuila, April 19, 1910, Pringle 9205 (U.S. Nat. Herb. no. 381823). DISTRIBUTION. Type locality and San Felipe, Texas." (The latter is not the town of San Felipe in Austin County, famous as the San Felipe de Austin of Berlandier's collections, but the San Felipe Springs or Creek of Charles Wright's collections, near Del Rio, Val Verde County.) Evidently a very rare species (Map 3); only the following collection has been seen. VAL VERDE Co.: rocky (limestone) hills above dam at foot of Devil's Lake, about 20 miles N-NW of Del Rio, Rogers MCVaugh 8261, May 9, 1947 (SMU).

REFERENCES