THE GENUS PSORALEA

SISTER M. CONSTANCE GRACE, Guthrie

The genus *Psoralea* was first established by Linnaeus in 1742 and credited to Roan, France. As early as 1753 only one species was recognized as belonging to America. It was probably an introduced plant from the island of Madeira, and was described by Linnaeus as *Psoralea Americana*. But by 1894 fifteen species had been credited to the United States, Canada, and Mexico by DeCandolle and, in a detailed study conducted by Miss Anna Murray Vail[1], thirty-five species were found in various regions of these countries.

All observations indicate that *Psoralea* is an invader from the southeast and has penetrated the interior of the United States. This supposition was drawn from the study of the works accomplished by previous investigators, which show the majority of specimens were found growing in the southern parts. It is estimated that eleven species have Texas as their type locality, and all fifty-two of the number cited by Rydberg [2a, b] are found in southern and central portions of the United States.

Miss Vail states that *Psoralea lanceolata* and *Psoralea esculenta* have migrated as far north as Saskatchewan, *Psoralea physodes* to British Columbia and *Psoralea onobrychus* to Ottawa, Canada.

No species have been recorded from the extreme eastern and northern portions of the United States, but several occur in the southeastern states. The west as well as the central and south central states are well represented by several species.

The Oklahoma species are scattered throughout the state. Thirteen species have been collected from forty-seven of the seventy-seven counties and in ninety towns or localities.

Murray, Comanche, Woods, McCurtain and LeFlore Counties seem to be credited with the most representatives at the present time. These are mostly border regions: Woods County is in the extreme north; Comanche County is in the southwest; Murray County is located in the south central section; and McCurtain and LeFlore are in the extreme southeast. But future collections from other counties will probably reveal much more information regarding the occurrence of *Psoralea* within their boundaries.

Psoralea as it occurs in Oklahoma may be divided into two main categories, the differentiating characteristics based upon leaf structure. One group possesses palmately divided leaves and the leaves of the other are pinnately divided.

KEY TO THE OKLAHOMA SPECIES OF PSORALEA.

A. Leaves pinnate, 3 or rarely 5 foliate

B. Flowers in capitate or short rounded oblong spikes averaging 7 mm. in length; pods obliquely orbicular, transversely reticulate .....1. *P. simplex* (Nutt.) T. and G. 1838

B. Flowers in more or less elongated spikes, 5-6 mm. long; pods nearly orbicular, compressed, transversely wrinkled.....
.....2. *P. pedunculata* Vail 1894

A. Leaves palmate, 3—5 foliate
  C. Flowers small, 3—12 mm. in length.
    D. Flowers in raceme, distinctly pedicelled
      E. Pods globose with short beaks....3. *P. lanceolata* Pursh. 1814
      E. Pods ovoid to subelliptic
        F. Pods possessing short beaks, leaflets never linear
          G. Flowers few and loosely scattered, 1—2 in each bract.....4. *P. tenuiflora* Pursh. 1814
          G. Flowers many, either crowded or scattered, 2—3 in each bract.
            H. Leaflets oblong to oblanceolate; flowers densely crowded on raceme....5. *P. floribunda* (Nutt.) T. and G. 1838
            H. Leaflets oblong to obovate; flowers loosely scattered on raceme....6. *P. obtusiloba* T. and G. 1838
        F. Pods possessing slender elongate beaks; leaflets linear; flowers in loose, elongated racemes.....
        .....1. *P. linearifolia* T. and G. 1838
    D. Flowers in interrupted spikes; leaves silvery white at least below; bracts half as long as calyx.
      G. Beak of pod stout; leaflets oval; bracts lanceolate; calyx inflated in fruit .....8. *P. argophylla* Pursh. 1814
      G. Beak of pod slender; bracts obovate; leaflets linear-lanceolate; calyx inflated in fruit....9. *P. digitata*, (Nutt.) T. and G. 1838
  C. Flowers large, 10—17 mm. long.
    H. Plants tall, 2—10 dm. high, leafy.
      I. Pubescence of short, appressed hairs
        J. Bracts broadly ovate enclosing the calyx
        .....10. *P. Reverchoni* S. Wats. 1886
        J. Bracts ovate-lanceolate, acuminate, not enclosing the calyx .....11. *P. cuspidata* Pursh. 1814
      I. Pubescence of long spreading hairs.....12. *P. esculenta* Pursh. 1814
    H. Plants short, not exceeding 1.5 mm. high. acaulescent or nearly so .....13. *P. hypogaea* (Nutt.) T. and G. 1838

A few of the outstanding characters of each member of the genus are as follows:

Psoralea simplex, which is easily confused with *Psoralea pedunculata*, is recognised by its much larger flowers. The leaves are sparingly glandular and are short petioled on the upper part of the stem and much longer on the basal portion.

Psoralea pedunculata is so named due to the excessive length of the peduncles. Distinguished from *Psoralea simplex* its flowers are smaller, spikes more dense, and pedicles shorter. The stems are strigose-pubescent with scattered, minute, brown glands.

Psoralea lanceolata may be distinguished from *Psoralea linearifolia*, a plant with which it is commonly confused, by its fine leaves which are densely arranged on petioles as long or sometimes longer than the leaflets. The stem is glabrous with scattered brown glands. The flowers are bluish to white and arranged in small heads or loosely scattered in short spikes.

Psoralea linearifolia is a profusely branching plant. The stem is mostly glandular, and is sparingly pubescent to glabrous; the leaves are generally three-foliate, sessile or very short petioled. The flowers are bluish to white with long pedicels and loosely scattered on rather long peduncles.

Psoralea tenuiflora is commonly misidentified as *Psoralea floribunda*, but upon close examination, it will be seen that *Psoralea tenuiflora* has a minutely canescent to glabrous, glandular stem, with short petioles, three-foliate leaves, glabrous above and sparingly canescent beneath. *Psoralea tenuiflora* is more slender in habit, has smaller leaves and fewer and more scattered flowers than *Psoralea floribunda*.

Psoralea floribunda has a canescent, non-glandular stem. The leaflets are from three to five-foliate. Most of the five-foliate leaves are confined to the stem. Vail, and Britton and Brown[3] state that the leaflets are occasionally seven-foliate but I have never observed one with more than five pinnules. The flowers are arranged in dense flowered, oblong or cylindrical spikes. Sometimes the flowers appear to be whorled. The calyx is hoary pubescent.

Psoralea obtusiloba appears to be an intermediate between *Psoralea tenuiflora* and *Psoralea floribunda*. It differs from *Psoralea floribunda* in its less dense inflorescence and much broader leaflets and larger flowers. It is less pubescent in appearance.

Psoralea argophylla is a very beautiful plant typified by its silky silvery canescence throughout. The leaves are five-foliate and petioled. The peduncles much exceed the leaves in length and the flowers are arranged in twos and threes on interrupted spikes.

Psoralea digitata is readily recognized by its digitate (five) foliate leaves, which are appressed canescent hirsute throughout, and by its long peduncles and obcordate bracts. In the fruit the calyx becomes greatly enlarged and completely incloses the seed pod.

Psoralea Reverchoni has an erect branching pubescent stem. The stipules are awl shaped and nearly equal the petioles of the three-to-five foliate leaves. It is quite easily recognized by its bracts which are broadly ovate, have sharp rigid points and are cordate at the base. They are pubescent and covered with brown glands. The flowers are large.

Psoralea cuspidata has an erect, stout, branching stem, glabrous below and more or less canescent above. It has large five-foliate leaves and large, short, pedicelled flowers crowded in short, dense spikes on peduncles that are longer than the leaves. The bracts are prominent, lanceolate, cuspidate, and longer than the calyx which is very glandular. The roots of this plant are used as food.

Psoralea esculenta also has an edible root. Its stem is short, erect, and hirsute. The long petioled leaves are five-foliate, and the large flowers are densely crowded in oblong spikes on petioles much longer than the leaves. This species is readily recognizable by the dense, long, white hairs that appear throughout the entire plant.

Psoralea hypogaea is a small plant not more than one decimeter high. The petioles are usually much longer than the five-to-seven foliate leaves. The petioles, peduncles, calyx, and leaves are covered with long white hairs. The flowers are in capitate racemes varying from nearly sessile to short-peduncled.

The members of this genus are most commonly found in the prairie regions of Oklahoma, and thrive well in hot, dry situations. They are, however, occasionally found in open thickets and woods. Under normal conditions they flower in late spring and early summer and fruit in late summer.

Apparently *Psoralea* is of little economic importance, but it was recorded by E. P. James[4], who collected plants while on a journey to and from the Rocky Mountains, during the summer of 1820, that *Psoralea canescens*, *Psoralea cuspidata*, and *Psoralea esculenta* were used as food by the Pawnee and Canadian traders.

Observation shows that *Psoralea* and especially *Psoralea floribunda* are absent from many apparently undisturbed prairies; yet in prairies only a few miles away they may be abundantly represented. These legumes were perhaps entirely exterminated by grazing for a few years, after which the prairie, no longer pastured, "returned" without them.

If a pasture has been grazed, very frequently burned or otherwise disturbed in the past, the present flora may not be entirely representative of the prairie proper.

BIBLIOGRAPHY

[1] Vail, Anna Murray. 1894. A study of the genus Psoralea in America. Bull. Torrey Bot. Club 21: 91-119.

[2a] Rydberg, P. A. 1919. North American flora, vol. 24. New York Botanical Garden.

[b] Rydberg, P. A. 1932. Flora of the prairies and plains of central North America. New York Botanical Garden.

[3] Britton, N. L., and H. P. Brown. 1913. An illustrated flora of the northern states and Canada. 3 vol., second ed. New York: Charles Scribner's Sons.

[4] James, E. P. 1825. Trans. Am. Philosoph. Soc. N. S. ii.