

THE GENUS *AMORPHA* IN OKLAHOMA

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Amorpha is a North American genus in the legume family consisting of shrubs characterized by flowers having only one petal (the standard), pinnately compound leaves, and the foliage and fruit more or less gland dotted. Our species fall into two groups, the dwarf, gray-canescens shrubs of the prairies known as lead plants, and a group of stream-bank and flood-plain shrubs called false indigo or river locust. The type of the genus *Amorpha* is *Amorpha fruticosa* L., an attractive shrub native from Pennsylvania and Ohio to Minnesota and eastern Oklahoma, introduced as an ornamental and naturalized in the northeastern States and in Europe and Asia. Palmer (1931) has treated the genus as a whole with detailed drawings of leaflets and pods. My work is based on a study of the material in the Bebb Herbarium at the University of Oklahoma with much use of Palmer's monograph and reference to treatments in the manuals. The characters useful in separating species, as far as our material is concerned, are variable and each has to be valued in relation to the others. Type of pod; size, shape, texture, and number of leaflets; number and distribution of glands; type, amount, and distribution of pubescence; and character of calyx are the main criteria for determination of species. Five species and three varieties have been collected in Oklahoma and the occurrence of an additional species is postulated. *Amorpha fruticosa* is of especial interest at present because of the recent work done on its insecticidal properties at the Oklahoma Agricultural Experiment Station (Brett 1946). Our species may be distinguished by the following key:

- A. Shrubs, 3-9 ft. hgh, with green aspect, on river banks and flood plains.
 - B. Leaflets usually more than 25, narrowly oblong and crowded on the rachis.
 - A. fruticosa* var. *tennesseensis* (3).
 - BB. Leaflets mostly not more than 25; oval, oblong, elliptic, or narrower.
 - C. Petiolules strigose, villous, or tomentose and usually without conspicuous glands; fruit more or less curved dorsally.
 - D. Pubescence appressed-strigose, silvery; leaflets mostly tapering to base.
 - A. fruticosa* var. *angustifolia* (2).
 - DD. Pubescence not appressed-strigose, leaflets mostly rounded (rarely subcordate) at base.
 - E. Pubescence yellowish, villous, or tomentose; fruit pubescent; leaflets thick.
 - A. croceolanata* (7).
 - EE. Pubescence grayish, of spreading crisped hairs; fruit without pubescence.
 - F. Leaflets thin, punctate beneath; fruit conspicuously gland dotted.
 - A. fruticosa* (1).
 - FF. Leaflets thick, glossy above, not punctate; glands of fruit small and few.
 - A. virgata* (4).
 - CC. Petiolules without pubescence; fruit straight or nearly so; plants glabrous throughout.

D. Petiolules with raised glands; upper calyx lobes short but broadly triangular or rounded.

A. laevigata (5).

DD. Petiolules without glands; upper calyx lobes almost obsolete.

A. glabra (6).

AA. Low shrubs (usually less than 3 ft. tall); grayish, or at least the calyx densely canescent; on prairies.

B. Common shrub with grayish aspect.

A. canescens (8).

BB. Similar but glabrate.

A. canescens var. *glabrata* (9).

1. *A. fruticosa* L. A variable species extending over the eastern United States and reaching Oklahoma in its typical form only in the southeastern corner of the State. Two sheets collected by Chas. C. Deam and identified by E. J. Palmer, Nos. 56989 and 56993, may be considered representative of this species. Oklahoma specimens are: M. Hopkins and G. L. Cross 1757, Delzie Demaree 12051.

2. *A. fruticosa* var. *angustifolia* Pursh (*A. fragrans* Sweet, *A. angustifolia* Boynton). In eastern Oklahoma the species passes into this variety which extends over the State. In typical form it is characterized by an appressed, instead of spreading, pubescence and by narrower leaflets which in general show more tapered bases. However many variations appear especially in the width of the leaflets. (True *A. fruticosa* has the leaflets rounded at the base). The appressed strigose pubescence of the petiolules seems to be the best diagnostic character but in late-season specimens these tend to be glabrate, but careful examination will usually show a few strigose hairs remaining. The fruits vary somewhat in size averaging 6-8 mm in length. They are curved and conspicuously dotted with raised, resinous glands. The bulk of *Amorpha* collections from Oklahoma belong here. Representative specimens: Elroy Rice 82, Hopkins and Cross 1872, M. Hopkins 7 and 28, Leo Maricle 746, O. C. Smith 798.

3. *A. fruticosa* var. *tennesseensis* Palmer (*A. tennesseensis* Shuttleworth). Distinguished from all other forms found in Oklahoma by its more numerous leaflets which are consistently narrowly oblong and tend to be more rounded at base than those of var. *angustifolia*. In addition it is distinguished from the latter by having a very fine pubescence, almost tomentulose rather than strigose. It seems to be restricted to the extreme eastern part of the State. Representative specimens: Delzie Demaree 15727, G. W. Stevens 2620, Little and Olmsted 536.

4. *A. virgata* Small. Distinguished from *A. fruticosa* by the thicker, glossy leaflets; from var. *angustifolia* by the different type of pubescence (this being spreading or almost tomentose), the more broadly oblong or oblong-ovate leaflets rounded at base; and from *A. croceolata* by the absence of pubescence on the fruits. McCurtain Co., Little and Olmsted 510 and 537.

5. *A. laevigata* Nutt. Validity of the name *A. laevigata* is open to question. No type specimen is known but Nuttall's notes for 1819 give the type locality as "Banks of the Arkansas near Salt River." "Salt River" is identified by Pennell (1936) as the Cimarron. Our plants do not agree perfectly with this description but there is a species of eastern Oklahoma (extending west as far as Cleveland and Pottawatomie Counties) and occurring also in eastern Texas, which has been confused with the related species *A. texana*

Buckley of west-central Texas. Palmer chose to retain the name *A. laevigata* for our plant and I follow him. It seems to me this plant conforms as closely to the Nuttall description as many other species agree with their 100-year-old descriptions. This plant is characterized by being glabrous throughout and having large raised glands on the petiolules. The leaflets are broadly elliptic, oval, or sometimes slightly obovate, more or less emarginate at apex, and conspicuously dotted beneath. The best diagnostic character is found in the very short, comparatively broad, straight fruit, 5 mm long by 3 mm wide. Representative specimens: E. L. Little 2138, R. E. Jeffs 6-27-19, Delzie Demaree 12572, Little and Olmsted 1951, George J. Goodman 2545, R. E. Mason 86.

6. *A. glabra* Desfontaines. Another glabrous species differing from *A. laevigata* mainly in the larger size of the fruit which is 7-9 mm long, and in the very short calyx lobes, the upper ones being nearly obsolete. There is only one Oklahoma specimen at this date, Little and Olmsted 612 from LeFlore County. Delzie Demaree's 22264 from Arkansas seems to be the same thing.

7. *A. croceolanata* Wats. At the present time there are no Oklahoma specimens in the Bebb Herbarium, but since this species occurs in the Ozarkian region of western Arkansas it may be expected in similar situations in southeastern Oklahoma. Its most distinctive character is the pubescent fruit. It may also be recognized by the yellowish color and crisped character of the pubescence which on rachises, peduncles, and young stems becomes tomentose. Representative specimens from Arkansas: Delzie Demaree 15357, 17400, 19232.

8 and 9. *A. canescens* Pursh and *A. canescens* var. *glabrata* Gray present no particular problems and are not therefore treated in detail here.

LITERATURE CITED

- Brett, C. H. 1946. Insecticidal properties of the indigobush (*Amorpha fruticosa*). *J. Agric. Research* 73: 81-96.
- Palmer, E. J. 1931. A conspectus of the genus *Amorpha*. *J. Arnold Arboretum* 12: 157-197.
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