

confluens may have been an effort to establish visual relations as mentioned by Walls (10).

More observations of this type of behavior are needed to establish the possibility that the seeking-behavior is a usual prelude to mating in *Thamnophis* and *Natrix* and that these aggregations result generally in polyandrous matings.

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The *Cassia fasciculata* Complex (Leguminosae) in Texas

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The genus *Cassia* is represented in Texas by 15 well-marked species. One of these, *C. fasciculata*, is a highly variable taxon composed of several intergrading infraspecific taxa. The following treatment is the result of several summers' field work combined with distributional data and morphological study of herbarium material. In the present paper it has been necessary to make two new varietal combinations in *C. fasciculata*. Hence, in conformity with Article 17 of the International Code of Botanical Nomenclature (1952)¹, it seems desirable to give a somewhat detailed account of the distributional and morphological evi-

¹ ARTICLE 17. "No one may change a name (or combination of names) without serious motives, based either on more profound knowledge of facts or on the necessity of giving up a nomenclature that is contrary to the rules of this Code."

dence which leads the author to treat the *C. fasciculata* complex as indicated.

The author wishes to thank the curator, New York Botanical Garden, for the loan of the holotype of *Chamaecrista ferrisiae*.

ARTIFICIAL KEY TO VARIETIES OF *C. fasciculata* IN TEXAS
(numerous intermediate types excepted)

1. Stems stiffly erect, mostly unbranched below, the upper portion pubescent with spreading hairs 2-3 mm. long; face of leaflets glabrate; plants of easternmost Texas in cleared pine and oak woodland1. var. *robusta*
1. Stems stiffly erect to nearly prostrate, simple or diffusely branched but without spreading hairs 2-3 mm. long, the pubescence mostly shorter or appressed; widespread taxa.
 2. Face of leaflets glabrate (intergrades with varieties 4 and 5 occur).
 3. Petiolar gland 0.5 mm. wide or less; anthers purple; pinnae with mostly 6-10 leaflets; plants of central Texas and north-westward to New Mexico (intergrades with var. *fasciculata*)2. var. *rostrata*
 3. Petiolar gland 0.5-1.5 mm. wide; anthers yellow, occasionally purple or mottled; pinnae mostly with (9)10-15 leaflets; plants of central Texas and eastward (intergrades completely with varieties *ferrisiae* and/or *puberula*)3. var. *fasciculata*
 2. Face of leaflets densely pubescent with in-curved hairs.
 4. Stems stiffly erect, mostly unbranched in the lower portion; legumes 5-6 mm. wide; petiolar gland sessile or nearly so; plants of upper Texas Gulf Coast and inland (intergrades completely with varieties *fasciculata* and/or *ferrisiae*)4. var. *puberula*
 4. Stems branched from the base and widely spreading; legumes 3-4.5 (5) mm. wide; petiolar gland distinctly stalked; plants of lower Gulf Coast and inland (intergrades completely with varieties *fasciculata* and/or *puberula*)5. var. *ferrisiae*

1. *Cassia fasciculata* var. *robusta* (Pollard) Macbride

According to Pennel (1917) this taxon intergrades with var. *fasciculata*. In eastern Texas the varieties apparently grow together, and occasional intermediates are found from this area. The exclusive, long spreading stem pubescence, which characterizes var. *robusta*, is not found in other varieties of *C. fasciculata* in Texas.

2. *Cassia fasciculata* var. *rostrata* (W. & S.) Turner comb. nov. *Chamaecrista rostrata* Wootton and Standley, Contr. U. S. Natl. Herb. 16:135. 1913. (*Cassia fisheri* Cory; not *C. rostrata* Voight.)

The variety is characteristic of open, dry, sandy soils in central, northwestern Texas and adjacent New Mexico. The plants are smaller than var. *fasciculata* and more branched from the base (var. *fasciculata* will brench

at the base when the main stem is clipped or injured). A few specimens somewhat intermediate between the varieties, in petiolar gland size and degree of branching, have been seen from Travis, Palo Pinto, and Wichita counties. In addition, the specimens from Dimmit, Frio, and Maverick counties show a more pronounced venation of the leaflets than is typical for the variety.

3. *Cassia fasciculata* Michx. var. *fasciculata*

Mainly central and eastern Texas in sandy soils. The taxon is highly variable, probably as a result of long-time introgression with related varieties. Characters used in the key will separate on an artificial basis most of the specimens referable to the variety. However, many obvious intermediates as well as apparently less "contaminated" types will key to *C. f. puberula* or *C. f. ferrisiae*, in which case the biologic situation must be taken into consideration when evaluating the taxa. Most intermediate types will be found in the area of geographical overlap of their ranges (see Fig. 1). Herbarium sheets at the University of Texas have been annotated with the varietal epithet that seemed to fit the specimen best; additional comments were appended when it was thought necessary to indicate in which direction variability was tending. Pennell (1917) apparently treated some of these intermediate types from Texas as *Chamaecrista mississippiensis* (Pollard) Pollard. However, this latter taxon, if recognized as a variety of *C. fasciculata*, appears to be restricted to the coastal areas of Louisiana, Mississippi, Alabama, and western Florida. As interpreted by the present author, pubescent forms of the Texas species of *C. fasciculata* are the result of introgression or gene flow from the fairly well marked geographical variants of *C. f. puberula* and *C. f. ferrisiae*. Each of these latter varieties in its typical form differ from *C. mississippiensis* in having purple anthers in combination with other characters which mark it distinct.

4. *Cassia fasciculata* var. *puberula* (Greene) Macbride

Mainly a variety of the upper Gulf Coastal prairies in Texas, but extending southward and westward from the Galveston-Houston-Beaumont area into the sandy oak-hickory and/or pine woodlands where it intergrades with

varieties *fasciculata* and *ferrisiae*. In the dune sand on Galveston Island, plants with the habit of *C. f. ferrisiae* occur; otherwise the morphological characters are somewhat intermediate between those of *C. f. puberula* and *C. f. ferrisiae*. On herbarium sheets flowering or immature specimens of variety *puberula* are difficult or impossible to distinguish from certain pubescent-leaved introgressant individuals of *C. f. fasciculata*, but in fruit and in the field the typical form of the variety is readily recognized.

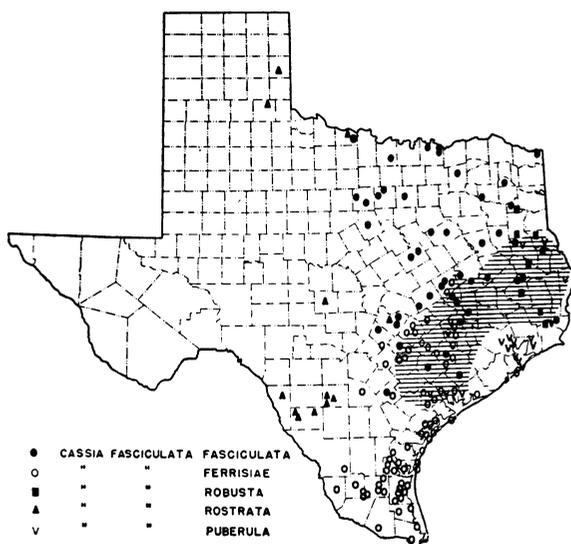


FIG. 1. Distributional dot-map of *Cassia fasciculata* varieties in Texas (based on collections in the University of Texas Herbarium). Legend for symbols as indicated in lower left. Lined area shows the general region of extensive intergradation between overlapping taxa. Further explanation in text.

5. *Cassia fasciculata* var. *ferrisiae* (Britton) comb. nov. *Chamaecrista ferrisiae* Britton, N. Amer. Fl. 23:285. 1930. HOLOTYPE examined, New York Botanical Garden (forty miles north of Edinburg on road to Falfurrias, Texas, Aug. 7, 1921, R. S. Ferris & Duncan 3202).

Britton and Rose (1930) placed this species in the perennial section *Deeringianae* of the Genus *Chamaecrista*. Apparently, they thought the species closely related to *C. aristellata*, a definite perennial, and failed to detect the annual nature of *C. f. ferrisiae*. *C. aristellata*

occurs sympatrically with *C. f. ferrisiae* and does not show evidence of hybridization with this latter taxon. On the other hand, *C. f. ferrisiae* intergrades completely with *C. f. fasciculata* and undoubtedly, on both morphologic and geographic grounds, should be treated under the section Fasciculatae of *Chamaecrista* (*sensu* Britton and Rose) whether it is recognized as a species or yet another variety of *C. fasciculata*, as adopted in the present paper.

SUMMARY

Cassia fasciculata in Texas is treated as a highly variable species composed of five intergrading varieties. Interrelationships among these varieties are reviewed in terms of morphologic characteristics and geographical distribution. Typical forms can be identified by use of an artificial key which is included. Two new varietal combinations [*C. f. ferrisiae* (Britton) Turner and *C. f. rostrata* (W. & S.) Turner] are made.

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