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A REVISION OF THE
NORTH AMERICAN GENUS *AMORPHA*
(LEGUMINOSAE-PSORALEAE)

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Amorpha is a small North American genus of papilionate legumes belonging to the tribe Psoraleae. It has been the subject of several taxonomic revisions (Schneider, 1907; Rydberg, 1919; and Palmer, 1931) as well as numerous regional treatments and one might suppose that such attention would have resulted in a rather satisfactory taxonomic understanding at the present time. However, such a favorable supposition would be completely unjustified and my presentation below is offered as an alternative. Although it is the result of an intensive if somewhat sporadic study timewise for more than fifteen years and an examination of more than twelve thousand specimens, I am not so naive as to believe that my account of the genus presented below is the ultimate answer either. Naturally I hope that future studies will show that the revision presented here is a closer approximation of the biological reality than the earlier accounts, but I would be less than candid if I were not to admit that I have found the genus to be extremely difficult and not especially tractable to the usual investigatory procedures of a "non-experimental" taxonomist.

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The difficulty encountered with *Amorpha* as with any taxonomically perplexing taxon is not that there is too much variability or too little but that the variability that seemed so discrete when a relatively small number of specimens was examined becomes ever so much more like a continuum when thousands of specimens are studied. Environmentally induced plasticity of at least certain members of the genus is sometimes spectacular, and it certainly would prove disconcerting to those who have recognized numerous taxa in what I refer to as the *fruticosa*-complex to see the number of specimens that clearly possess the characteristics of one "taxon" in the growth produced early in the season and that of another "species" or "variety" in the later growth. The extraordinary morphological diversity exhibited by certain species of *Amorpha*, due both to apparently great genetical flexibility (i.e. numerous biotypes) and environmental plasticity, has resulted in the recognition of numerous taxa. For example, Rydberg (1919) recognized 23 species while Palmer (1931) accepted 20 species, 11 additional varieties and 7 forms for a total of 38 named taxa. The treatment presented here recognizes 15 species (including one new species, *A. ouachitensis* Wilbur) and 3 additional varieties.

Any definitive statement concerning the interrelationships of the genus *Amorpha* with its tribal neighbors in the *Psoraleae* must await more complete understanding of those genera as well as of *Amorpha* itself. Morphologically *Amorpha* seemingly is most closely related to the ditypic *Parryella* T. & G. ex A. Gray of Arizona and New Mexico and to the more widespread but still western genus *Eysenhardtia* H.B.K., which ranges from central Texas west to California and south into Guatemala. *Parryella* differs principally from *Amorpha* in that it is without at least all outward evidence of petals while *Eysenhardtia* has all 5 petals. The fruits of all three genera are 1(2)-seeded but, although all are indehiscent, those of *Parryella* and *Amorpha* are far more similar in texture, shape, and all other respects. With the facts available to us at the present time,

future research may support the hypothesis that *Amorpha*, *Parryella*, and *Eysenhardtia* were derived from a common ancestral complex and that *Amorpha* and *Parryella* are more closely related to one another than either is to *Eysenhardtia*.

My gratitude to the curators of the herbaria listed below is far greater than is even usually the case in similar acknowledgments for they have been extremely tolerant in permitting me to keep loans for far longer than is customary and without their understanding the study could not have been completed.

A, ARIZ, CAS, COLO, CS, DES, DS, DUKE, F, FLAS, FSU, GA, GH, IA, ISC, JEPS, KANU, KSC, MICH, MINN, MO, NCU, NDA, ND-GREENE, NEB, NSC, NY, OKL, OKLA, PHIL, POM, RSA, SDC, SDU, SMU, TENN, TEX, UARK, UC, UMO, US, USF.

Amorpha L., Sp. Pl. 743. 1753; Gen. Pl. ed. 5. 319. 1754.

Bonfidia Necker, Elem. Bot. 3: 46. 1790. (Art. 20(2) of the I.C.B.N. clearly states that this is not to be regarded as a generic name.)

Suffrutescent low shrubs to large bushy-topped shrubs. Leaves odd-pinnately compound with setaceous to linear, caducous stipules and short- to long-petiolate; leaflets (7) 11-29(45), entire to crenulate, epunctate to very densely and conspicuously glandular punctate, petiolulate, stipellate on the upper side. Inflorescence a spike-like, terminal raceme or the racemes clustered and then appearing paniculate; flowers pedicellate from the axil of a setaceous to linear, caducous bract. Calyx persistent, obconic, funnel-form or even shortly campanulate, almost imperceptibly to strongly 5-lobed. Corolla reduced to a single petal, the banner, and it erect, enveloping the internal floral series, clawed, obovate to obcordate, often eventually the apical lobes adaxially recurved, purple, blue, violet or white, entire to erose. Stamens 10, at least basally monadelphous and occasionally the staminal tube exerted beyond the calyx; the filaments distinct above and exerted beyond the calyx

and usually the petal; anthers versatile, small, oblong, longitudinally dehiscent. Ovary ovoid, slightly compressed, 2-ovulate; style slender, elongate, exerted beyond the calyx and often the petal; stigma terminal, capitate. Fruit a 1-seeded, indehiscent pod, \pm oblique, straight to strongly curved, compressed, slightly to very noticeably longer than the calyx, eglandular to conspicuously punctate glandular; seeds ovoid to oblong, laterally compressed.

Typification: *Amorpha fruticosa* L.; the genus was comprised of only one species when originally established.

Distribution: a North American genus of about 15 species ranging from southern Canada south to southern Florida and west to California.

KEY TO THE SPECIES OF AMORPHA

1. Petioles and the rachises of leaves beset with spine-like glands; plants of Arizona, California and Baja California.
2. Vexillum reddish-purple, claw indistinct but about 1 mm long; filaments 6-7 mm long, united for the basal 2-3.2 mm; fruit densely to moderately pilosulose throughout (except in one area north of San Francisco Bay); plants of Arizona and northern California south into northern Baja California. 1. *A. californica*.
2. Vexillum white, claw 2-3 mm long; filaments 8-12 mm long, united for the basal 1-1.5 mm; fruit glabrous or sparingly pilosulose only near the apex; plants known only from the Sierra San Pedro Martir of northern Baja California. 2. *A. apiculata*.
1. Petioles and the rachises of leaves lacking spine-like glands.
3. Shrubs usually less than 1 m tall; leaves shortly petiolate with the petiole typically shorter than the width of the lowest leaflet.

4. Midvein of the leaflets included or but barely exerted and then its tip distinctly swollen, or if noticeably exerted, then the tip of mucro conspicuously swollen; plants of the southeastern United States.
5. Calyx-tube densely puberulent, or, if not, at least the lobes externally sparsely puberulent; stem, rachises (of both leaf and inflorescence), and leaflets densely pubescent, or, if not, usually at least somewhat puberulent; leaflets entire or but inconspicuously crenulate; petiolules usually less than 1.5 mm long and densely to sparsely pubescent; ranging from North Carolina south into peninsular Florida. 3. *A. herbacea*.
5. Calyx-tube and usually the lobes glabrous; stem, rachises (of both leaf and inflorescence), and leaflets glabrous or but very sparsely puberulent or short-pubescent; leaflets usually conspicuously crenulate; petiolules usually more than 1.5 mm long and glabrous (or rarely very sparingly puberulent); known only from Dade County, Florida.
. 4. *A. crenulata*.
4. Midvein of the leaflets exerted into a slender mucro with a tapered tip; plants of the southeastern United States and much of the central part of the continent.
6. Adaxial calyx-lobes 0.4-0.8(1.3) mm long, the abaxial lobe (1)1.2-1.6(1.8) mm long; plants of the coastal plain of the southeastern United States (the Carolinas and Georgia).
. 5. *A. georgiana*.
6. Adaxial calyx-lobes (0.6)1-1.5(1.8) mm long, the abaxial lobe (1.2)1.5-2.2(2.5) mm long; plants of the central United States (southern Canada south into Texas and from Indiana west into New Mexico and Wyoming).

- 7. Foliage and/or calyces conspicuously pubescent to the unaided eye and often canescent. 6. *A. canescens*.
- 7. Foliage and calyces glabrous or nearly so, or at least not conspicuously pubescent to the unaided eye and never canescent.
 - 8. Leaflets appearing epunctate or at least the punctate glands on the lower surface of the leaflets not discernible without magnification; racemes usually clustered and mostly in groups of 5-10. 6. *A. canescens*.
 - 8. Leaflets conspicuously punctate and the glands readily visible without magnification; racemes solitary. 7. *A. nana*.
- 3. Shrubs usually more than (1) 1.2 m tall; leaves with petioles longer than the width of the lowermost leaflet.
 - 9. Calyx-lobes nearly obsolete, all less than 0.8 mm long and never narrowly acute. . . 8. *A. glabra*.
 - 9. Calyx-lobes or at least some well developed and longer than 0.8 mm and some narrowly acute or acuminate.
 - 10. Calyx-lobes from about half as long to as long as the calyx-tube, all acute or acuminate; the lateral lobes more than 1 mm long.
 - 11. Secondary venation slightly to moderately elevated beneath but the leaflets never conspicuously reticulate; abaxial calyx-lobes (1.8) 2.5-3.5 mm long; plants of the Carolinas, Georgia, and Alabama. 9. *A. schwerinii*.
 - 11. Secondary venation conspicuously elevated beneath often to the 3rd and 4th degree of branching and thus forming a striking reticulum; abaxial calyx-lobes

- (1.2) 1.5-2.0 mm long; plants of Louisiana and eastern Texas.
- 10. *A. paniculata*.
10. Calyx-lobes or at least some of them less than half as long as the calyx-tube, at least the adaxial usually rounded; the lateral lobes less than 1 mm long.
12. Foliage, calyces and pedicels blackening or at least darkening upon drying; calyx-tube eglandular to sparingly glandular with very small and inconspicuous, slightly elevated punctate glands. 11. *A. nitens*.
12. Foliage, calyces and pedicels never blackening and rarely even darkening upon drying; calyx-tube usually glandular with often large, conspicuous, elevated punctate glands.
13. Petiolules conspicuously pustulate-glandular; leaflets typically emarginate and often with a globose tip to the midvein; plants of Texas or Oklahoma and/or Arkansas.
14. Petals present on specimen.
15. Petals bright blue to deep violet; stipules glabrous; plants of eastern Texas and Oklahoma.
- 12. *A. laevigata*.
15. Petals purplish; plants of central Texas; stipules pubescent; eastern Oklahoma and/or west central Arkansas.
16. Abaxial calyx-lobes (0.8) 1.0-1.2(1.4) mm long; central Texas on the Edwards Pla-

- teau.
- . . . 13. *A. roemeriana*.
16. Abaxial calyx-lobes about 0.6-0.9 (1.2) mm long; Ouachita Mts. of southeastern Oklahoma and west central Arkansas.
- . . . 14. *A. ouachitensis*.
14. Petals lacking on specimen.
17. Calyx-tube beset with large conspicuous pustulate glands throughout the upper $1/2$ - $2/3$ its length, glabrous; eastern Texas and southeastern Oklahoma.
- 12. *A. laevigata*.
17. Calyx-tube sparingly to moderately supplied with often inconspicuous pustulate glands in the upper third of its length; glabrous to moderately spreading to appressed short-pubescent; central Texas or the Ouachita Mts. of southeastern Oklahoma and west central Arkansas.
18. Abaxial calyx-lobes (0.8) 1.0-1.2 (1.4) mm long; fruit about 6-7 mm long and 2.5-3.5 mm wide; central Texas on the Edwards Plateau.
- . . . 13. *A. roemeriana*.

18. Abaxial calyx-lobes 0.6-0.9(1.2) mm long; fruit about 7-9 mm long and 3-4 mm wide; Ouachita Mts. of southeastern Oklahoma and west central Arkansas.

. 14. *A. ouachitensis*.

13. Petiolules eglandular or with only inconspicuous glands; leaflets acute to broadly rounded, only rarely emarginate and the midvein only rarely terminating in a globose or swollen tip; plants of almost the entire range of the genus.

. 15. *A. fruticosa*.

1. *Amorpha californica* Nutt. in Torr. & Gray, Fl. N. Am. 1: 306. 1838.

Erect, bushy shrub (0.7) 1-3(4) m tall. Current season's growth sparingly to more typically moderately puberulent or crinkly-pilosulose bearing few to numerous, usually conspicuous, often apically pointed or sharply hooked, as well as basally swollen, resiniferous, amber-colored glands. Leaves ascendant to spreading, (0.5) 1-1.5(2.0) dm long. Petioles (0.7) 1-1.5(2.5) cm long, usually equaling or longer than the width of the lowermost leaflet, densely crinkly-pilosulose or puberulent to glabrous with several to numerous, rounded and pointed, resiniferous, pustulate glands. Stipules caducous, oblong-lanceolate to lanceolate or linear, eglandular, reddish-brown, sparingly to densely, appressed tawny-pilosulose, (2) 4-6 mm long. Rachis of leaf slender, about 1 mm in diameter, densely crinkly-pilosulose or puberulent to glabrous, moderately beset with both sharp-pointed and rounded, amber-colored, resiniferous, sessile glands. Leaflets (11) 13-19(25), oblong to elliptic-oblong, (0.8) 1.5-2.5(4.2) cm long, (0.6) 1-1.5(2.0) cm wide, typi-

cally 1.5-2.2 times as long as wide, opposite or more typically alternate, symmetrical, more or less broadly rounded to subcordate basally, typically broadly rounded to obtuse and emarginate apically, entire to inconspicuously crenulate; secondary veins very slightly, if at all, elevated beneath. Midvein usually terminating in a swollen, globose tip flush with the margin or very rarely slightly exerted or very rarely somewhat tapering. Lower surface of leaflets moderately pilosulose throughout but densely so along the midvein to glabrous or very nearly so, conspicuously glandular-punctate below with light to dark brown, resinous glands of apparently 2 sizes; upper surface typically moderately pilosulose but occasionally glabrous, eglandular. Petiolule 0.7-1.5(1.8) mm long, densely spreading pilosulose to glabrous, sparingly to moderately pustulate-glandular. Racemes erect, usually solitary but rarely few together, (0.5) 1-1.8(2.5) dm long; rachis of inflorescence moderately spreading-pilosulose, hirsutulous or puberulent to glabrous, sparingly glandular pustulate with both rounded and sharp-pointed glands. Pedicels 0.3-1.2 mm long, densely spreading- to appressed-pilosulose hirsutulous or puberulent to glabrous, eglandular; bracts lanceolate to narrowly linear, 1.5-4 mm long, externally moderately spreading- to appressed-pilosulose, eglandular to moderately pustulate-glandular, internally glabrous, caducous. Calyx-tube narrowly cylindrical or somewhat funnelform, 2.0-2.8 mm long, moderately spreading- to appressed-pilosulose or puberulent throughout to glabrous, abundantly to sparingly pustulate-glandular in upper half. Calyx-lobes usually tipped by a conspicuous pustulate gland and also frequently sparingly to moderately glandular-pustulate, densely to moderately pilosulose or glabrous both externally and internally. Adaxial calyx-lobes broadly to narrowly triangular-dentate, acute, (0.4) 0.8-1.5(2) mm long; lateral calyx-lobes slightly longer, acute to acuminate, (0.5) 1-2(2.2) mm long; abaxial lobe narrowly lanceolate, acuminate, (0.8) 1.5-2.5 mm long. Vexillum 5-7 mm long, about 2.5-4 mm wide, broadly obovate, gradually tapering to the

short, indistinct claw about 1 mm long, moderately to strongly arching, apically more or less truncate to emarginate and often with a central apiculation, reddish-purple and with the claw and blade both strongly enveloping the filaments. Filaments 6-7 mm long, united into a sheath for the basal 2.0-3.2 mm, glabrous; anthers about 0.5-0.7 mm long, pale yellow. Style moderately ascending-pilose; ovary either densely pilosulose or very sparingly so and then only apically. Fruit 6-8 mm long, 2.5-3.5 mm wide, broadest above the middle, tapering somewhat basally, with the adaxial margin straight or slightly outwardly outcurved above and the abaxial strongly outwardly bowed, densely to moderately pilosulose throughout or only sparingly strigillose apically, pustulate-glandular in the upper half or two-thirds. Seeds smooth, plump, 2.5-3.2 mm long, light- to olive-brown.

Distribution: Northern California (approximately 41° N) south into the Sierra San Pedro Martir of northern Baja California (approximately 31° N) and sporadically eastward as far as southeastern Arizona.

Two rather strikingly distinct varieties have been recognized within this species. Their distribution as shown by our rather conventional but crude mapping does not suggest that they are strictly allopatric but a more refined appraisal of their relationship should wait at least careful field observations. The two may be separated by the following key.

- A) Upper surface of leaflets, rachises and petiolules moderately to densely spreading-pilosulose or puberulent; calyx-tube moderately spreading-pilosulose or occasionally appressed-pilosulose; calyx-lobes all, or at least the longest, over 1 mm long. 1a. var. *californica*.
- A) Upper surface of leaflets, rachises and petiolules glabrous or very nearly so; pubescence on lower surface of leaflet lacking or largely restricted to the midvein; calyx-tube glabrous or nearly so or sparingly to rarely

moderately strigillose; calyx-lobes all 1 mm long or less.
 1b. var. *napensis*.

1a. ***A. californica* var. *californica***

Amorpha californica Nutt. in Torr. & Gray, Fl. N. Am.

1: 306. 1838. TYPIFICATION: "St. Barbara, California, near the coast," Nuttall s.n. (holotype(?), NY!).

A. hispidula Greene, Fl. Fran. 14. 1891. TYPIFICATION: **California:** MONTEREY CO., *Hickman* s.n. (lectotype, ND-G!).

A. californica var. *hispidula* (Greene) Palmer, Jour. Arnold Arb. 12: 163. 1931.

Branchlets, rachises, petioles and petiolules moderately spreading pilosulose or puberulent; leaflets spreading- to appressed-pilosulose above and below. Calyx-tube usually moderately to densely spreading- or appressed-pilosulose or puberulent, eglandular or sparingly and inconspicuously pustulate-glandular. Calyx-lobes usually more than 1 mm long. Pod moderately to densely more or less appressed, short-pubescent.

Distribution: Coastal Ranges north of San Francisco to about 38°30' N and along the Coastal Ranges south of San Francisco from Monterey Co. (about 36°30' N) into northern Baja California in the Sierra San Pedro Martir (about 30°30' N); also in an area south of Mt. Shasta (about 41° N) and on the western slopes of the Sierra Nevada (about 39° N); disjunctly occurring in central and southeastern Arizona. (Map 2.)

1b. ***A. californica* var. *napensis*** Jepson, Man. Fl. Pl. Calif.

556. 1925. TYPIFICATION: **California:** Howell Mt.,

Napa Range, *Jepson* 6835 (lectotype, JEPS!). The

lectotype, designated by Jepson (Fl. Calif. 2: 331.

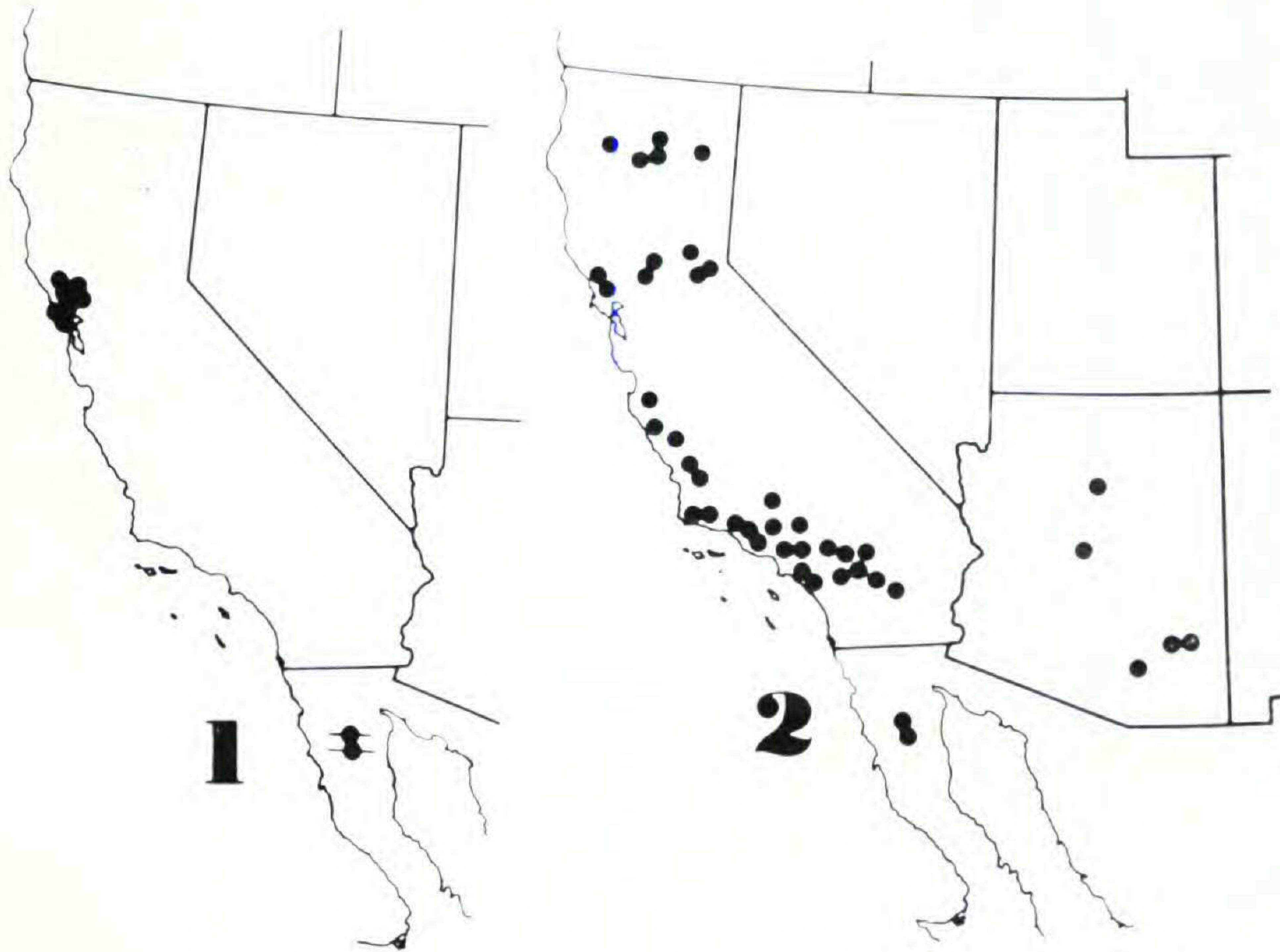
1936), is a sterile specimen and apparently a crown

sprout while his number 6834 collected on the same

day and the same place, is the fruiting specimen from

which most of the diagnostic information was ob-

tained.



MAPS 1-2. Map 1. *Amorpha californica* var. *napensis* (dots north of San Francisco Bay) and *A. apiculata* (dots with horizontal line in Baja California). Map 2. *A. californica* var. *californica*.

Branchlets, rachises, petioles and petiolules very sparingly pilosulose or more typically glabrous; leaflets glabrous above and either glabrous beneath or the pubescence primarily restricted to the midvein. Calyx-tube glabrous or sparingly strigillose above or rarely moderately strigillose throughout. Calyx-lobes usually all 1 mm long or less and ranging from 0.4-1.0 mm long. Fruit sparingly to moderately strigillose apically or throughout.

Distribution: endemic to the area north of San Francisco Bay in Marin, Napa and Sonoma Counties. (Map 1, in part.)

Both recent California floras (Munz, 1959, and Abrams, 1944) indicate the species is divisible into two varieties: a northern one ranging from the Shasta area of southern California south to Monterey and a southern variety ranging from the Santa Lucia Mountains just south of Monterey south to the Santa Ana and Santa Rosa Mountains

of extreme Southern California. The range of the varieties presented by these authors is in obvious conflict with those found in this study although the morphological features characterizing the taxa in all three studies seem to be identical.

2. ***Amorpha apiculata*** Wiggins, *Contr. Dudley Herb.* 1: 171. 1933. TYPIFICATION: **Mexico:** banks of the Rio Santo Domingo about 5 miles above Mission Santo Domingo, Baja California, *Wiggins & Demaree* 4776 (holotype, DS, not seen; isotypes, ARIZ!, DS!; F!; NY!, POM!, RSA!).

Erect, slender shrub 2-5 m tall. Current season's growth moderately to sparsely spreading-pilosulose bearing few to numerous, rounded, resiniferous, amber-colored, elliptic glands and a few, apically pointed, basally rounded, spine-like glands. Leaves ascendant to spreading, 1-2 dm long. Petioles 1-2.5 cm long, usually equaling or longer than the width of the lowermost leaflet, sparingly to moderately spreading-pilosulose, with several to numerous, usually rounded but occasionally pointed, amber-colored glands. Stipules caducous to tardily deciduous, linear to linear-setaceous, glandular, sparingly pilosulose, 2-3 mm long. Rachis of leaf slender, about 1 mm in diameter, sparingly to moderately pilosulose, moderately beset with rounded or pointed, amber-colored, resiniferous, sessile glands. Leaflets (9) 13-19 (25), elliptic to oblong-elliptic, mostly 1.5-3.0 (3.8) cm long and (0.5) 1.0-1.5 cm wide, typically 2.2-3.3 times as long as wide, usually alternate and symmetrical, tapering either both basally and apically and often acute to more or less rounded; secondary veins very slightly elevated beneath. Midvein exserted, 0.2-0.8 mm long, slightly to conspicuously swollen at the tip. Lower surface sparsely pilosulose throughout or more or less restricted to the midvein where tending to be wide-spreading, "light green, slightly glaucous," conspicuously glandular-punctate below with dark, resinous glands of apparently 2 sizes; upper surface glabrous, "bright green," moderately to sparingly punctate-glandular. Petiolules 1.5-2.2 mm long,

sparingly to moderately spreading to somewhat appressed pilosulose, moderately pustulate-glandular. Racemes solitary to several, 1-7 in number, 1-3 dm long, rachis moderately spreading-pilosulose; pedicels 0.8-1.2 mm long, moderately spreading to appressed pilosulose; bracts narrowly linear, 2.5-3.0 mm long, sparingly pilosulose, pustulate-glandular, caducous. Calyx-tube narrowly funnelform, 2.5-3.0 mm long, moderately spreading-pilosulose throughout, conspicuously pustulate-glandular in upper fifth. Calyxlobes usually tipped by a resinous, pustulate gland and otherwise eglandular, moderately to sparingly pilosulose or puberulent both externally and internally. Adaxial calyx-lobe triangular-dentate, acute to less frequently acuminate, 0.5-1 mm long; lateral lobes longer and more narrowly lanceolate, acuminate, 0.8-1 mm long; abaxial lobe narrowly lanceolate, acuminate, 1.2-2 mm long. Vexillum 5-7 mm long, about 4 mm wide, broadly obovate with a slender claw and a broad, truncate apical notch with a central, triangular-dentate apiculation about 0.1-0.2 mm long, white; the claw enveloping the filaments and the blade either plane or reflexed away from the filaments. Filaments greatly elongate, 8-12 mm long, united for the basal 1-1.5 mm, glabrous; anthers about 0.5 mm long, apparently pale yellow. Style moderately ascending-pilose; ovary glabrous except for the uppermost pilosulose region near the style. Fruit (apparently still immature) about 6 mm long and 2.5 mm wide, broadest above the middle, tapering to base, with the adaxial margin very nearly straight and the abaxial margin gradually outwardly bowed, glabrous or sparingly pilosulose only near the top, conspicuously glandular-pustulate.

Distribution: Known only from the Sierra San Pedro Martir of northern Baja California, Mexico at approximately 31° N. (Map 1, in part.)

This species is clearly very closely related to *Amorpha californica* and especially to that species's var. *californica* which apparently also reaches its southern limit in the

Sierra San Pedro Martir. I have examined only eleven different collections of either species from this area. These two species have been confused both in the field and the herbaria by collectors and identifiers and at the present time one cannot form any realistic picture of their ecologic or spatial arrangement to one another. It does not seem that the two are strictly altitudinally separated from one another but if anything *A. californica* tends to occupy the higher elevations.

The two species can seemingly be readily distinguished from each other vegetatively and either in flower or fruit. Additional collections and field observations from this region are certainly much to be desired.

Although *A. apiculata* seems in some respects to be less strikingly different from *A. californica* var. *californica* than is *A. californica* var. *napensis*, nothing would seem to be gained by attempting to surmise now the results of the needed research. The three taxa form a most distinctive complex within the genus.

3. *Amorpha herbacea* Walt., Fl. Car. 179. 1788.

A shrub mostly (0.3)0.6-1.2(1.5) m high arising from a thick, woody, often horizontal rootstock reportedly up to 2 m in length and 2 cm in diameter. Current season's growth dull reddish-purple, olivaceous to light brown, slender, about (1)2-4 mm in diameter, with numerous fine longitudinal grooves and ridges and sprinkled throughout with few to numerous, usually inconspicuous, small punctate glands, mostly densely short-pubescent or puberulent and then often appearing canescent but occasionally (especially in Florida) only very sparingly pubescent. Leaves numerous, spreading to ascendant, mostly about (0.6)0.8-1.8(2.4) dm long. Petioles mostly densely short-pubescent, puberulent or strigillose but occasionally glabrous or nearly so and with few to numerous postulate glands especially abundant near the base, typically shorter than the width of the lowest leaflet but occasionally as long as 1.5 times the width, about (0.5)1-10(13) mm long. Stipules incon-

spicuous, pigmented like the stem and rachis, glabrous to sparingly pubescent, caducous or persisting as a withered remnant, appressed, acicular to setaceous, about (1) 1.2-2.5 (3) mm long. Rachis of leaf slender, about 0.5-1 mm in diameter, usually densely short-pubescent or puberulent throughout (or if differentially so, then more densely pubescent above in and about the channeled groove) to less commonly sparsely short-pilose, strigillose or even glabrous or nearly so, sparingly glandular throughout. Leaflets (15) 23-45 (63) in number, about (0.7) 1.0-2.5 (3.2) cm long and (3) 4-10 (15) mm wide, mostly (1.2) 2-3 (4) times as long as broad, usually symmetrical but rarely asymmetrical, opposite or alternate, the interval between petiolules on the same side of the rachis about (0.3) 0.6-1.2 (1.8) cm long. Blades of leaflets mostly broadly to narrowly oblong or occasionally oblong-elliptic to elliptic, or rarely ovate-oblong, ovate, obovate, obcordate or almost orbicular with the base usually broadly rounded to obtuse, occasionally subcordate, truncate or nearly so, oblique or rarely tapering and then more or less acute; the apex obtuse to broadly rounded to almost truncate and occasionally shallowly emarginate, with the midvein terminating in a sessile or subsessile, distinctly swollen, often globose, glandular knob, or, when exerted, the swollen tip on a stalk about 0.2-0.5 (0.8) mm long. Texture of leaflets coriaceous to subcoriaceous when dry, finely reticulate above from the very slightly elevated venation excepting the scarcely depressed midvein; the margin usually slightly to conspicuously revolute and very inconspicuously crenulate to entire, or nearly so. Midvein prominently elevated beneath and the secondary veins but slightly raised. Both surfaces of the leaflets usually very densely pubescent, but rarely the upper or even both sides glabrous or very nearly so, and when most nearly glabrous, then often strigillose beneath along the principal veins; pubescence of the upper surface usually short-pilose, puberulent, or even strigillose and that of the lower surface usually short-villous, pilose, puberulent, or rarely strigillose; punctate glands on the lower surface

usually conspicuous and readily apparent to the unaided eye, appearing to be of approximately two size classes, usually numerous but occasionally few, ranging in number from about (40)75-225(425) glands per half-leaflet. Petiole about (0.7)1-2 mm long, usually densely puberulent, occasionally strigillose, less commonly sparsely puberulent or strigillose and rarely glabrous, with few to numerous pustulate glands. Stipels acicular to setaceous, mostly (0.4)0.8-2 mm long, rarely tardily deciduous, glabrous to puberulent, especially near the base. Racemes usually few to several or occasionally numerous, appearing terminally clustered or occasionally solitary, about (1)4-12(20) in number, mostly appearing slender and elongate, about (0.3)1-1.8(4) dm long and (0.8)1.2-1.8(2) cm in diameter, sessile, subsessile, or on a peduncle 1-4(7) cm long and with a usually densely but occasionally sparsely puberulent, conspicuously ridged and grooved, sparingly pustulate glandular rachis bearing numerous, usually densely clustered, mostly densely short-pubescent to puberulent or occasionally glabrous pedicels about (0.2)0.4-1.2(1.8) mm long, subtended by a caducous, sparsely glandular-punctate, usually sparingly puberulent to short-pubescent, brownish to amber colored, linear-subulate to setaceous bract about (1.2)1.8-2.5(3) mm long. Calyx-tube turbinate to narrowly campanulate or cylindrical, mostly about 1.5-2.5(3) mm high with the abaxial side slightly longer than the adaxial, usually either very densely puberulent or short-pilose throughout, and with the pubescence curly and spreading or, rarely, densely to sparingly minutely strigillose throughout, or the strigillose pubescence restricted to the upper third or half, or (occasionally in Florida) the tube completely glabrous or the lower half or two-thirds of the tube glabrous and the upper portion variously pubescent, bearing few to numerous conspicuous pustular glands scattered throughout the upper one-third to two-thirds of the tube. Calyx-lobes externally usually densely puberulent or short-pubescent and hence the margins not appearing strikingly ciliate or occasionally (especially in the more

glabrous Floridian forms) merely sparsely puberulent and then the margins appearing densely short-ciliate, punctate-glandular, internally the lobes and occasionally the very uppermost portion of the tube densely puberulent to short-pubescent (the tube otherwise glabrous within). Adaxial calyx-lobes usually triangular-dentate and often narrowly so, mostly acute to acuminate but occasionally (most commonly in the Floridian variety with a glabrous calyx-tube) oblong and then obtuse, about (0.4)0.5-1(1.2) mm long; lateral calyx-lobes broadly to narrowly triangular, mostly longer than the adaxial lobes but shorter than the abaxial, acute to acuminate and mostly (0.6)0.8-1.2(1.5) mm long; the abaxial lobe usually narrowly triangular, acute to acuminate and mostly (0.8)1-1.5(2) mm long. Vexillum about (4)5-6(7) mm long and (2)2.5-3.5 mm wide, broadly obcordate and tapering into a narrow claw, strongly arching and incurved laterally, and thus enveloping the inner floral parts with an entire to finely erose margin, blue-violet, purplish-violet to white. Filaments about 6-8 mm long, glabrous. Anthers about (0.3)0.4-0.6(0.8) mm long, yellow to yellowish orange. Pistil about 6 mm long with a sparsely ciliate or puberulent to glabrous ovary about 1 mm high, and broadest at or about the middle and tapering to either end and with a densely antrorsely pubescent style about 5 mm long terminated by a small, truncate, stigmatic tip. Fruit about 4-6 mm long and about 1.8-2.5 mm wide, broadest at or near the middle and tapering to the 1-2 mm stipe-like base, conspicuously pustular-punctate in the upper half or two-thirds, densely short-pubescent to glabrous or nearly so, exceeding the calyx-tube by about 2.5-4 mm, laterally compressed, obliquely obovate to very slightly, crescent-shaped, the adaxial side straight to slightly arched concavely away from the rachis, the abaxial side strongly outwardly bowed, terminated by the often 0.3-0.5 mm persistent base of the style.

Distribution: Dry, open woods, sandhills, or savannahs, typically of the Coastal Plain but occasionally in the Piedmont or mountains from North Carolina south into Florida.

This species, the most widespread of the southeastern dwarf taxa is not morphologically uniform throughout its extensive area. Its variability is most pronounced in Florida.

A striking extreme within the species as interpreted here is that element which was formerly designated *A. floridana*. My earlier survey of the southeastern dwarf species (Rhodora 56: 261-265. 1954) indicated that *A. floridana* represented a distinct species endemic to the west coast of Florida from about the Apalachicola region south at least to Manatee and Highlands counties. The suggested difference in curvature of the dorsal suture of the fruit employed by Small (Man. SE. Flora 688. 1933.) to distinguish the two taxa is not tenable. The dorsal suture of most fruiting specimens of the *floridana* type is straight, or very nearly so, just as in *A. herbacea*. Only rarely is it as curved as shown by Palmer (Jour. Arn. Arb. 12: 194. f. 5. 1931). Examination of many more specimens of *A. herbacea* s.s. and of *A. floridana* has convinced me that the difference between these two taxa is merely one of degree of pubescence. However, there are also a small number of specimens which seem at least partially intermediate between these extremes. Macroscopically they appear much closer to extreme *A. floridana* but microscopically the calyx-tubes are pubescent to a varying degree. Some of these tubes are sparsely puberulent or short-villous throughout, while others are sparingly to densely strigillose throughout. These intermediates might indicate introgression from *A. herbacea*, since they are often found in areas in which that taxon is known and are often collected with it. Except for the apparently isolated area of the glabrous extreme about Apalachicola in Franklin County, the range of the so-called *A. floridana* coincides with part of that of *A. herbacea* in western peninsular Florida. I tentatively have distinguished these two less than ideally separable taxa by the following key.

KEY TO THE VARIETIES OF *A. HERBACEA*

Upper portion of the plant including the leaves usually conspicuously pubescent; calyx-tube densely puberulent to short-pilose; fruit densely to sparsely puberulent or rarely glabrate. 3a. *A. herbacea* var. *herbacea*.

Upper portion of the plant and the leaves appearing glabrous or nearly so, or at least not densely pubescent; calyx-tube glabrous, sparingly puberulent or sparsely to densely minutely strigillose; fruit glabrous.
 3b. *A. herbacea* var. *floridana*.

3a. *A. herbacea* var. *herbacea*. TYPIFICATION: Doubtfully present in Walter's Herbarium (BM) as Dr. Carroll E. Wood, Jr. did not see a photograph of a specimen of this distinctive species in the GH photocopy of Walter's Herbarium. A neotype should therefore perhaps be designated.

A. pubescens Willd., Berlin Baumz. 17. 1796.

A. pumila Michx., Fl. Bor. Am. 2: 64. 1803.

(*nom. illegit.*, Intern. Code Art. 63). (TYPIFICATION: holotype, P, not seen; phototype, GH!)

A. cyanostachya M. A. Curtis, Boston Jour. Nat. Hist. 1: 140. 1835. TYPIFICATION: **North Carolina**: Wilmington, M. A. Curtis s.n. (lectotype, NY!).

A. herbacea var. α *typica* Schneider, Bot. Gaz. 43: 299. 1907.

A. herbacea var. β *Boyntoni* Schneider, Bot. Gaz. 43: 300. 1907. TYPIFICATION: **Florida**: PASCO CO., pine barrens, Richland, Curtiss 6664 (lectotype, MO!; isoelectotypes, CU!, GA!, GH!, ISC!, MIN!, NEB!, NY!, PHIL!, UC!, US!)

Usually at least the upper portion of the stem densely short-pubescent or puberulent, but occasionally only sparsely pubescent and rarely almost glabrous. Rachis of leaf usually densely short-pubescent or puberulent through-

out or rarely sparsely short-pilose, puberulent or strigillose. Rachis of the inflorescence usually densely short-pubescent or puberulent. Calyx-tube very densely puberulent or short-pilose throughout, and with the pubescence curling and spreading and not at all strigillose. Fruit densely to sparsely puberulent or short-pubescent throughout or in part glabrous.

Typification: Probably not in Walter's Herbarium (BM). Supposedly from the area about Walter's plantation in present day Berkeley County, South Carolina, where it is common.

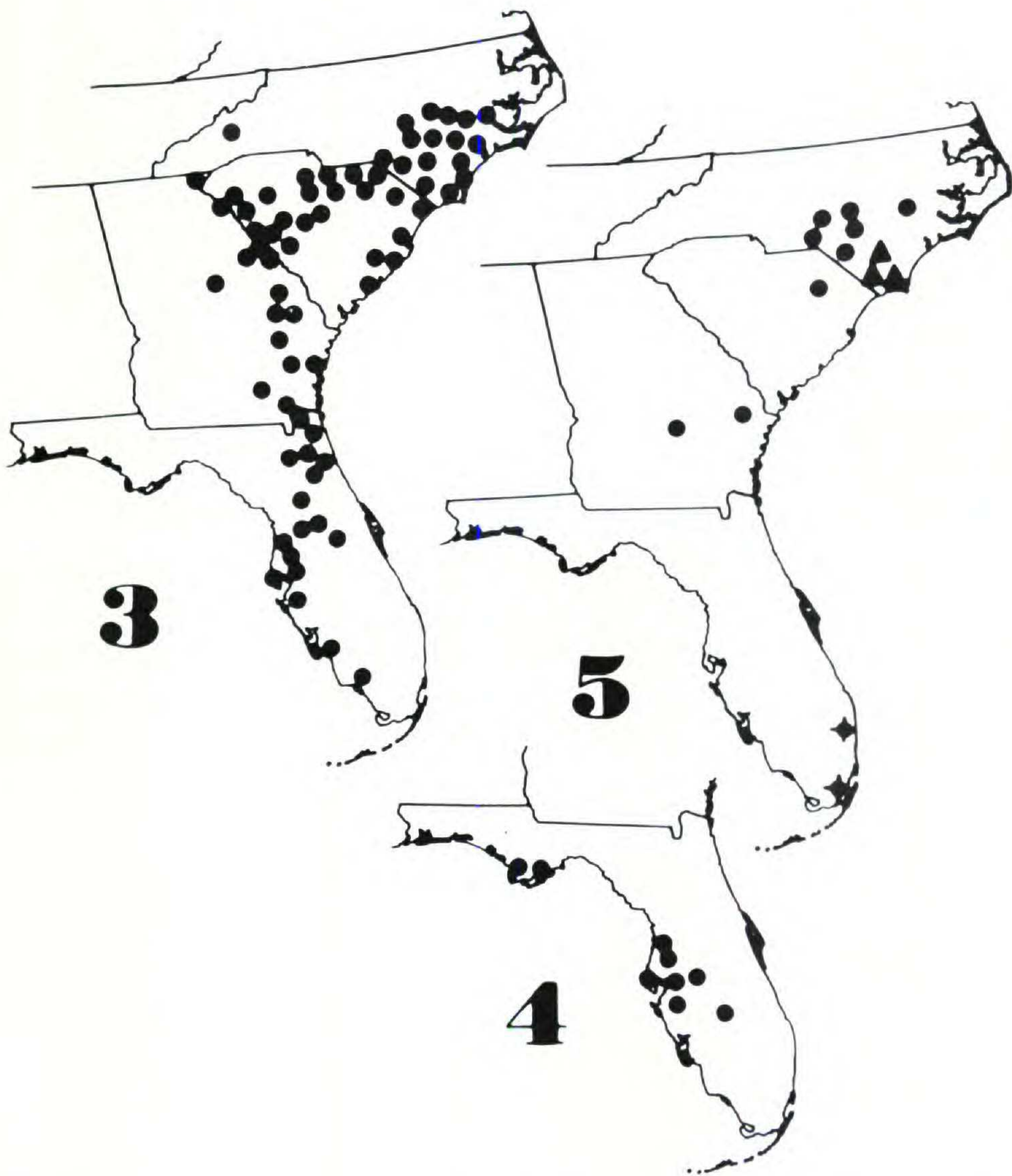
Distribution: Dry, open woods, sandhills, or savannahs, typically of the Coastal Plain but occasionally in the Piedmont and mountains from North Carolina south into peninsular Florida. (Map 3.)

Schneider did not treat his two proposed varieties as distinct species since they were "apparently connected . . . by some intermediate forms." The extremes in leaflet size and number are striking but the transition from one morphological type to the other is complete. The more northern specimens are often separable from those from the southern portion of the range, but exceptions are frequent.

3b. *A. herbacea* var. *floridana* (Rydb.) Wilbur, Jour. Elisha Mitchell Sci. Soc. 80: 55. 1964.

A. floridana Rydb., N. Am. Fl. 24: 31. 1919. TYPIFICATION: **Florida**: [no other locality given], *Chapman* s.n. (NY!).

Upper portion of the stem glabrous or nearly so to sparsely short-pilose or puberulent, but occasionally noticeably puberulent or strigillose. Rachis glabrous or nearly so to more or less densely puberulent or short-pubescent, especially above. Rachis of the inflorescence sparsely to



MAPS 3-5. Map 3. *Amorpha herbacea* var. *herbacea*. Map 4. *A. herbacea* var. *floridana*. Map 5. *A. georgiana* var. *georgiana* (dots in the Carolinas and Georgia), *A. georgiana* var. *confusa* (triangles) and *A. crenulata* (dots with vertical and horizontal lines in southern Florida).

densely puberulent. Calyx-tube glabrous or nearly so to sparsely short-puberulent or minutely strigillose throughout, and the pubescence, when present, often restricted to the upper portion of the tube or at least sparsely distributed below, or, if more or less equally dispersed and dense, then the pubescence strigillose.

Distribution: Known definitely only from western Florida from Franklin County to Manatee County in dry pine lands and fields, sandy roadsides. (Specimens of this species collected by Leavenworth [GH, PH], and others [NY] are labeled "East Florida.") (Map 4.)

4. *Amorpha crenulata* Rydb., N. Am. Fl. 24: 30. 1919.

TYPIFICATION: **Florida:** DADE CO., in hummocks, between Coconut Grove and Cutler, *Small & Wilson* 1898 (holotype, NY!; a presumed isotype, F!).

A low, apparently rhizomatose shrub about 0.4-1.0(1.5) m high. Current season's growth usually dull reddish-purple or more rarely olivaceous, usually slender, 1-2(3) mm in diameter and but sparsely puberulent to glabrous, or very nearly so, with numerous fine longitudinal grooves and ridges and sprinkled throughout with few to numerous small glandular blistered areas; older branches gray to light brownish and less conspicuously lined. Leaves numerous, spreading to ascendant, (0.8)1.5-2.5(3) dm long. Petioles very sparingly puberulent to glabrous and usually longer than the breadth of the lowermost leaflet, but occasionally equaling or exceeded by the breadth of the lowermost leaflet, sparingly glandular throughout and densely so near the base, (0.3)0.8-1.5(1.8) cm long. Stipules inconspicuous and pigmented like the stem and rachis, glabrous, usually caducous, appressed, setaceous to acicular, 1.2-2.2 mm long. Rachis slender, about 0.5-1 mm in diameter, glabrous to sparsely puberulent, usually sparingly glandular, channeled above. Leaflets (19)23-33(41) in number, (0.7)1.2-2.5(4.2) cm long, (2.5)5-9(11) mm wide, mostly (1.2)2-4(5) times as long as broad, remote, usually well separated from the nearest leaflet on the same side of the rachis, the interval between those petiolules about (5)7-17(20) mm long. Blades of leaflets mostly narrowly to broadly oblong or elliptic but varying from almost orbicular to ovate-oblong or obovate, with the base commonly broadly rounded to almost truncate or gradually tapering and

sometimes acute; the apex broadly rounded to almost truncate and commonly emarginate or occasionally somewhat acute, with the midvein terminating in a sessile or subsessile globose glandular knob or exerted 0.2-0.5 mm as a gland-tipped mucro. Texture of leaflets coriaceous to subcoriaceous when dry, finely reticulate above from the slightly elevated venation although the midvein depressed, the margin flat or more typically slightly to conspicuously revolute, usually very noticeably crenate or crenulate. Midvein prominently elevated beneath, the secondary veins but slightly raised. Both surfaces of the leaflets glabrous or rarely very sparsely pubescent beneath along the principal veins; punctate glands on the lower surface usually conspicuous and readily apparent to the unaided eye, appearing roughly of two sizes, varying from dense and very numerous to relatively sparsely scattered and few, ranging mostly between 40-180 punctate glands per half-leaflet. Petiolule glabrous or rarely sparsely pubescent, pustulate-glandular, (1) 1.5-2(3) mm long. Stipels acicular, 0.4-1.5 mm long, glabrous, often not long-persisting and the lower often not developing. Racemes solitary or very commonly few to several closely associated, slender and elongate, mostly (0.5) 1-2.5(3) dm long and about 0.7-1.8 cm in diameter, sessile or nearly so, or on a peduncle about 1-2 (4) cm long, with a conspicuously ridged and grooved glabrous to very sparingly puberulent rachis bearing numerous densely clustered to more loosely arranged glabrous to very sparsely puberulent pedicels (0.5) 1-1.8(2.2) mm long, subtended by a caducous, gland-dotted, brownish to amber-colored, sparsely puberulent, linear-setaceous or narrowly spatulate bract nearly 1.2-2.5 mm long. Calyx-tube turbinate to narrowly campanulate, mostly (2) 2.2-3.2(3.5) mm high with the abaxial side slightly longer than the adaxial, glabrous or very nearly so throughout, with the few to numerous punctate glands mostly restricted to the upper half of the tube. Calyx-lobes punctate-glandular, glabrous or very nearly so externally with a densely short-ciliate margin; internally the lobes and uppermost portion of the

tube densely matted-puberulent, the lower portion of the tube glabrous internally. Adaxial lobes triangular-dentate and acute to acuminate to oblong and obtusely rounded and about 0.5-1 mm long; lateral lobes broadly to narrowly triangular and acute to acuminate and mostly about 0.8-1.2 mm long; abaxial lobe usually narrowly triangular and acute or more commonly acuminate, mostly (1) 1.2-1.8 (2) mm long. Vexillum about (4.5) 5-6 (7) mm long and 3-4.5 mm wide, very broadly obovate and tapering abruptly to a slender claw, strongly arched and incurved and enveloping the inner floral parts, the margin irregularly finely erose to almost entire, white to violet-blue. Filaments about 6-9 mm long, glabrous. Anthers about 0.5-0.7 mm long, yellowish. Pistil about 6 mm long with a glabrous ovary about 1 mm high, an antrorsely pubescent style about 5 mm long and a small, capitate, terminal stigma. Fruit about 4-6.5 mm long and 1.8-2.5 mm wide with the base tapered below into a stipe about 1-2 mm long, glabrous, conspicuously punctate-glandular in the upper two-thirds, exceeding the calyx-tube by about 2.5-4 mm, laterally compressed, obliquely obovate, the adaxial side straight or nearly so, the abaxial side strongly outwardly bowed, terminated by the often 0.5 mm long, persistent base of the style.

Distribution: Apparently restricted to Dade County, Florida. (Map 5, in part.)

This appears to be a weakly differentiated species endemic to the southern tip of Florida. It seems very closely related to *A. herbacea* and particularly to the more glabrate variant of that species, var. *floridana*.

5. ***Amorpha georgiana*** Wilbur, *Rhodora* 56: 261. 1954.
[10 Jan. 1955]

A low shrub 0.3-1 m high. Current season's growth olivaceous to dull reddish purple, about 1-3 mm in diameter, very sparsely puberulent or more commonly glabrous with numerous fine longitudinal grooves and ridges and sparsely sprinkled with small punctate glands; the older growth

glabrous, dull reddish purple or brownish and less noticeably ridged and occasionally, especially in the southern portion of its range, persisting for one or perhaps more years and then darker and often grayish or black. Leaves numerous, spreading to ascendant, mostly (3)6-15(18) cm long. Petioles glabrous or sparsely to moderately puberulent or short-pubescent, ranging in length from practically absent to two or more times longer than the breadth of the lowermost leaflet, varying from 1-15(20) mm long, sparingly glandular to densely so especially at or near the base. Stipules inconspicuous, glabrous, caducous to semipersistent, appressed, linear-subulate or more commonly setaceous, mostly about (1)1.5-2(2.5) mm long. Rachis slender, about 0.5-1 mm in diameter, glabrous to sparingly strigillose, puberulent or short-pubescent below and the channeled groove similar or rather densely short-puberulent, sparingly glandular throughout. Leaflets varying from about (11)15-43(47) in number, (0.3)0.6-2.5(3.2) cm long and (0.2)0.6-1.2(1.6) cm wide, usually about (1)1.5-2.5(3) times as long as wide, opposite or nearly so to conspicuously alternate, approximate and often imbricately overlapping with an interval between petiolules of (0.2)0.3-0.5(0.6) cm to rather widely separated with the interval between petiolules on the same side of the rachis about (0.5)0.8-1.4(1.8) cm long. Blades of the leaflets mostly broadly to narrowly oblong or occasionally oblong-elliptic to elliptic and rarely ovate-oblong, or the terminal sometimes obovate, obcordate or even nearly orbicular, with the base broadly rounded or almost truncate to subcordate and the apex usually obtuse to broadly rounded and commonly slightly emarginate with the midvein exerted as a slender mucro about (0.2)0.4-1 mm long and tapering gradually to the not at all or rarely very indistinctly swollen, globose or knob-like tip. Texture of leaflets coriaceous to subcoriaceous when dried; inconspicuously reticulate above from the scarcely elevated venation except for the sometimes but slightly depressed midvein; the margin usually slightly to conspicuously revolute although occa-

sionally flat or nearly so; entire or inconspicuously crenulate and with the midvein prominently and the secondary veins slightly elevated beneath; at maturity both surfaces glabrous or nearly so, or with the lower surfaces sparsely to moderately strigillose, especially along the principal veins, or rarely moderately spreading, short-pubescent, the punctate glands on the lower surface usually inconspicuous but still noticeable to the unaided eye and of uniform size, or at least not conspicuously of two size-classes, mostly about (30)50-120(160) glands per half-leaflet. Petiolule glabrous or sparsely to densely strigillose, puberulent or pilosulose with few to numerous conspicuous to very inconspicuous pustulate glands, 0.7-1.8(2) mm long. Stipels acicular or setaceous, glabrous, usually persistent, mostly 0.8-1.8 mm long. Racemes usually with densely clustered flowers or less commonly with the flowers more loosely arranged, usually appearing terminally clustered and arising from the naked upper portion of the stem or from the axils of the upper leaves or occasionally solitary, varying in number from (1)4-11(15), mostly (0.2)0.5-2.0(3.0) dm long and about (1.0)1.2-1.6 cm in diameter, sessile or nearly so or on a peduncle up to about 8 cm long, the rachis conspicuously ridged and grooved, glabrous or nearly so to sparsely strigillose or puberulent or less commonly densely puberulent, sparingly glandular, bearing numerous, glabrous to sparingly strigillose or puberulent pedicels about 0.4-1 mm long subtended by a caducous, sparingly if at all glandular-punctate, sparsely short-pubescent and often merely ciliate, brownish to amber-colored, linear to linear-subulate bract mostly 1.5-2.5(3) mm long. Calyx-tube turbinate, narrowly campanulate or cylindrical, about 1.7-2.2 mm high with the abaxial side slightly longer than the adaxial, glabrous or rarely inconspicuously and very sparingly pilosulose, bearing few to numerous more or less inconspicuous pustular glands on the upper third to two-thirds of the tube. Calyx-lobes externally glabrous to puberulent (if the latter, usually sparingly so), and usually

punctate glandular and with densely white-ciliate margins; internally the lobes and occasionally even the uppermost portion of the tube densely puberulent to short-pubescent (with the tube otherwise glabrous within). Adaxial calyx-lobes either triangular-dentate and acute to acuminate or oblong, and then obtuse to rounded, mostly 0.4-0.8 (1.3) mm long; lateral lobes usually longer than the adaxial lobes and shorter than the abaxial, usually triangular-dentate and acute to acuminate but occasionally oblong and obtuse to rounded, mostly (0.6) 0.8-1.2 (1.5) mm long; abaxial lobe usually narrowly triangular to lance-subulate, acute or more typically acuminate, mostly (1.0) 1.2-1.6 (1.8) mm long. Vexillum about (4) 5-6 mm long and 3-3.5 (4) mm wide, broadly obovate to obcordate, tapering abruptly into a narrow claw, strongly arching and incurving laterally and thus enveloping the inner floral parts, strikingly to inconspicuously emarginate, the margins entire to very finely erose, purplish-blue, bluish or violet in color. Filaments about 5-8 mm long, glabrous. Anthers about 0.4-0.6 (0.7) mm long, exerted, yellowish prior to pollen discharge. Pistil about 6 mm long with a glabrous ovary about 0.8-1 mm high, including the somewhat stipitate base, broadest above the middle, with an antrorsely pubescent style about 4-5 mm long terminated by a small, truncate, stigmatic tip. Fruit about 4-5.5 mm long and 2-2.5 mm wide, broadest at or near the apex and tapering to the 1-2 mm stipe-like base, glabrous, conspicuously punctate-glandular in the upper half or two-thirds, exceeding the calyx-tube by about 2.2-3.5 mm, laterally compressed, obliquely obovate, the adaxial side straight or nearly so, the abaxial side strongly outwardly bowed, usually terminated by the 0.2-0.5 mm long, persistent base of the style.

Distribution: Sandy wire-grass savannahs, pine woods, and thickets in the Coastal Plain from southeastern North Carolina southward into eastern Georgia.

This species seems to be represented by two varieties which are distinguished in the following key:

KEY TO THE VARIETIES OF *A. GEORGIANA*

- Lateral leaflets (3) 6-10 (15) mm long and (2) 3-5 (8) mm wide; petioles 1-3 (5) mm long; racemes typically solitary but rarely with 1-3 short, additional racemes, mostly (2) 3-5 (6) cm long; vexillum reddish-purple. 5a. var. *georgiana*.
- Lateral leaflets typically (10) 15-25 (35) mm long and (7) 9-15 (18) mm wide; petioles usually (6) 8-15 (20) mm long; racemes in clusters of (1) 3-5 (8), 10-20 (30) cm long; vexillum light to more typically an intense bright blue. 5b. var. *confusa*.

5a. *A. georgiana* var. *georgiana*. TYPIFICATION: **Georgia:** TELFAIR CO., sandy wire-grass savannah about 3 miles northwest of Lumber City, *Wilbur* 3158 (holotype, GH!; isotypes, DUKE!, GA!, MICH!, MO!, NSC!, NY!, US!).

Distribution: Sandy flats bordering streams and lowland woods from the central Coastal Plain of North Carolina south into central coastal Georgia. (Map 5, in part.)

5b. *A. georgiana* var. *confusa* Wilbur, Jour. Elisha Mitchell Sci. Soc. 80: 58. 1964. TYPIFICATION: **North Carolina:** BRUNSWICK CO., grassy savannah, 7 miles southwest of Wilmington, *Godfrey & Shunk* 4122 (holotype, GH!; isotype, US!).

A. glabra in the sense of Boynton, Bot. Gaz. 25: 279. 1898 and in Small's Fl. SE. U.S. 626. 1903, but not of Poiret, Encycl. Méth. Suppl. 1: 330. 1810.

A. caroliniana in the sense of T. & G. Fl. N. Am. 1: 305. 1838 in part; Schneider, Bot. Gaz. 43: 302. 1907 and Ill. Handb. Laubh. 2: 74. 1907; Rydb., N. Am. Fl. 24: 29. 1919, but not of Croom, Am. Jour. Sci. 25: 74. 1834.

A. cyanostachya in the sense of Palmer, Jour. Arn. Arb. 12: 169. 1931, and of Small, Man. SE. Fl. 639. 1933, but not of M. A. Curtis, Boston Jour. Nat. Hist. 1: 140. 1835.

Distribution: Pine woods, sandy ridges, savannahs, and sandy roadbanks of southeastern North Carolina (Bladen, Brunswick, and Columbus Counties). (Map 5, in part.)

The confused basis of the previous names applied to this taxon has been discussed rather fully in an earlier paper (Jour. Elisha Mitchell Sci. Soc. 80: 58-61. 1964) and there is no need to repeat that discussion here. Although, I remain skeptical that the present arrangement of the *georgiana* and *confusa* taxa will prove to be satisfactory when more is learned about them, I refrain from further nomenclatural shifts at the present time. I suspect future investigation may well demonstrate that the two taxa are specifically distinct. Perhaps I am overly impressed by the strikingly different colors of their petals.

6. *Amorpha canescens* Pursh, Fl. Am. Sept. 467. 1814.

Typification: Not seen. Perhaps in Pursh's collection but Nuttall (Gen. N. Am. Pl. 2: 92. 1818) states that "Mr. Pursh places his usual mark of v.v. to this species, although he has never seen a flowering specimen except in my herbarium." "On the banks of the Missouri and Mississippi," Pursh; and "From the banks of Fox River and the Quisconsin [Wisconsin River] to the Mississippi; around St. Louis, Louisiana, and on the banks of the Missouri probably to the Mountains," according to Nuttall.

A. canescens Nutt., Fraser's Cat. no. 4. 1813. *nom. nud.*

A. canescens var. β *leptostachya* A. Gray, Mem. Am. Acad. II. 4: 31. 1849. *nom. nud.*

A. canescens var. *glabrata* A. Gray, Smithson. Contr. Knowl. 3 (Art. 5, Pl. Wright): 49. 1852. TYPIFICATION: eastern Texas, *Charles Wright*, not seen.

A. canescens var. α *typica* C. K. Schneid, Bot. Gaz. 43: 300. 1907.

A. brachycarpa Palmer, Jour. Arnold Arb. 12: 171. 1931. TYPIFICATION: **Missouri:** STONE CO., dry

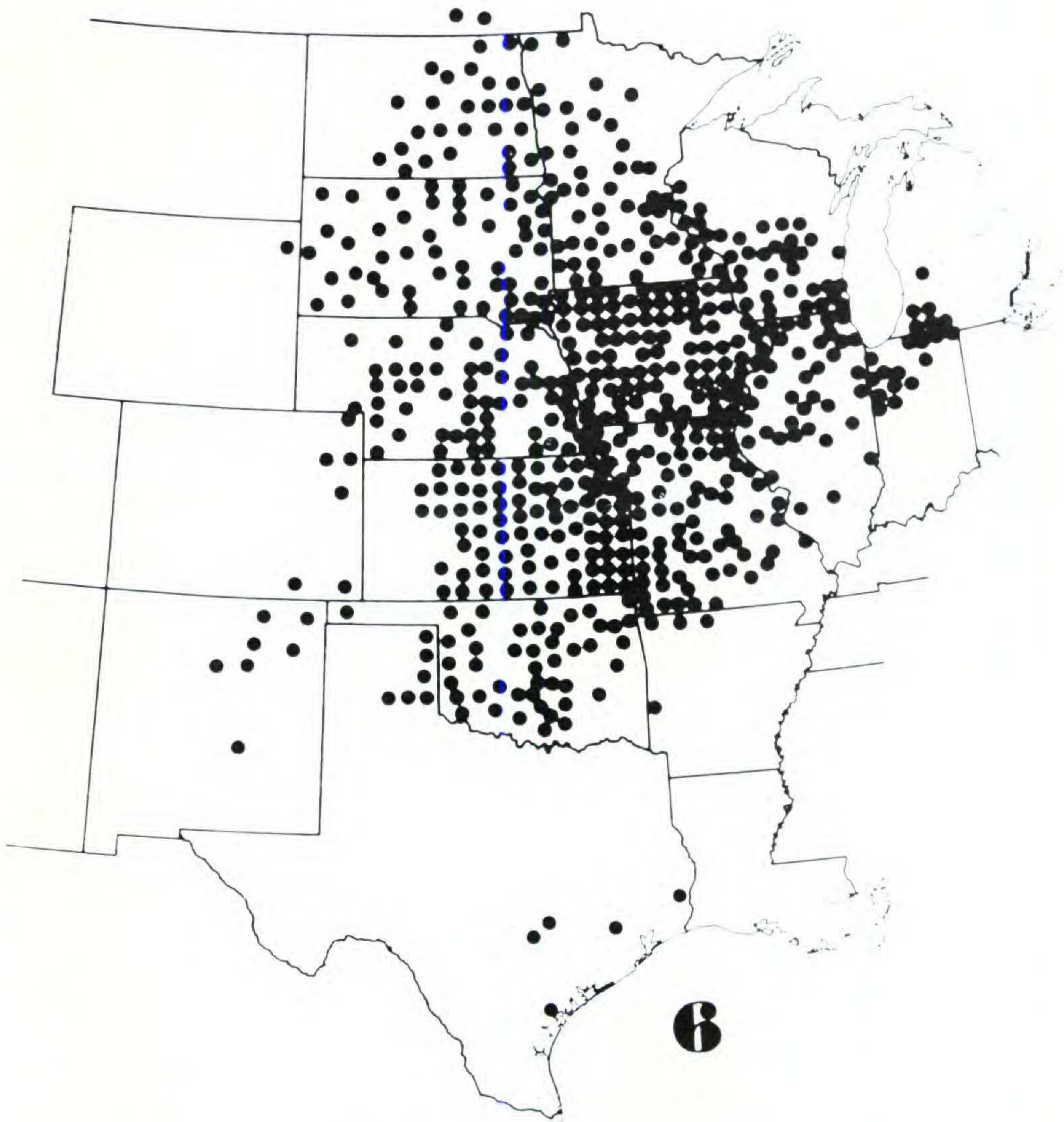
slopes and ledges, rocky hills near Galena, *E. J. Palmer* 19197 (holotype, A!; isotypes, KANU!, MIN!, US!).

A. canescens f. *glabrata* (A. Gray) Fassett, *Rhodora* 38: 191. 1936.

A low, ascendant to erect, apparently rhizomatose, usually canescent, shrub mostly about (3)5-8(10) dm high. Current season's growth light brown to olivaceous and slender (about (1)2-3 mm in diameter) and typically very densely grayish tomentose or occasionally but moderately so or very rarely glabrous or nearly so, with numerous very fine longitudinal striations and apparently eglandular or at most with very few minute, amber-colored, very inconspicuous glands; older branches mostly light gray to brownish and very slightly, if at all, lined, glabrous or very nearly so. Leaves numerous, spreading, about (3.0)6.0-12.0(15.0) cm long. Petioles whitish to pale gray, moderately to very densely tangled tomentose, villous or even-spreading short-pubescent or very rarely moderately puberulent to spreading short-pilose, sometimes equaling but usually very much shorter than the breadth of the lowermost leaflet, apparently always lacking pustulate glands, mostly (0.5)1-3(5) mm long. Stipules inconspicuous, caducous, densely canescent-pilose externally, glabrous, dark reddish and amber-colored within, initially appressed but spreading and often becoming reflexed with age, linear-lanceolate, linear to setaceous, mostly (1.2)2-3(3.5) mm long, pustular glands apparently always lacking. Rachis of leaf slender, mostly about (0.2)0.5-1.0(1.2) mm in diameter, usually very densely grayish, tangled-tomentose but occasionally varying to sparingly so to even strigillose or spreading puberulent, channeled above, pustular glands apparently always absent. Leaflets mostly (11)27-41(47) in number, usually about (0.3)1.0-1.8(2.5) cm long and (2.0)4.0-7.0(12.0) mm wide, usually about (1.8)2.0-3.0(3.8) times as long as broad, typically crowded and commonly overlapping one another, the interval between peti-

olules on the same side of the rachis characteristically about (2.0)3.0-8.0(10.0) mm long. Blades of leaflets mostly ovate-oblong, oblong-elliptic, oblong, elliptic, or even ovate with the terminal rarely obcordate and those of the dwarf suckers often almost suborbicular to obovate, with the base obtuse to broadly rounded, and more rarely subcordate or even somewhat truncate and the apex obtuse to broadly rounded but rarely acute or even emarginate with the midvein exserted into a slender tapering mucro (rarely slightly swollen at tip on a few leaflets) usually about (0.2)0.4-0.8(1.2) mm long. Texture of leaflet subcoriaceous to thick-membranous when dry, venation often completely obscured or nearly so by the dense pubescence, but when discernible usually only finely and inconspicuously reticulate above from the slightly elevated secondary and tertiary venation (the midvein somewhat depressed); the margin flat to very slightly revolute and entire; the midvein markedly elevated beneath and the secondary and tertiary venation often forming an inconspicuous net (which is usually completely obscured or nearly so by the dense pubescence); both surfaces usually very densely grayish tomentose and then appearing canescent to less commonly moderately short-pubescent or very rarely nearly glabrous with pubescence restricted to the midvein and sometimes principal veins and to the margin, and the leaves then greenish (the pubescence usually both denser and longer below than above); pustular-punctate glands usually present beneath, although completely obscured from view by the tangled pubescence, when not hidden by pubescence still relatively inconspicuous, light olive-green or brown in color, more or less of uniform size, very small. Petiolules very densely spreading pilose to short-pubescent but rarely sparingly short-pubescent, usually appearing canescent, mostly (0.5)0.8-1.2 mm long, usually lacking punctate glands or glands, if present, very inconspicuous. Stipels acicular, about (0.5)0.8-1.2(1.5) mm long, mostly slightly exceeding but sometimes almost twice as long as the petiolule, glabrous to sparsely short-pubescent, long-persistent,

dark reddish brown, the lower rarely developing beyond the swollen base. Racemes usually numerous in the axils of the uppermost leaves and often forming a dense compound cluster, mostly (1) 5-20 (30) or even more in number, very densely flowered, mostly (2.0) 7.0-15 (25) cm long and about 1-1.5 cm thick; peduncle short, mostly about 1-5 (8) cm long; rachis strongly ridged and grooved, very densely spreading-pilose to short-pubescent, sparingly and very inconspicuously glandular-punctate and bearing numerous, very densely arranged, moderately to (more typically) densely spreading, wavy, short-pubescent or pilose pedicels appearing short and stout with a truncate apex, about (0.4) 0.6-1.2 (1.5) mm long, subtended by a caducous, sparsely glandular-pustulate, amber-colored, moderately to densely pilose externally and glabrous within, linear-setaceous to narrowly lanceolate (with a long tapering apex) bract mostly (2.5) 3.0-4.0 (4.5) mm long. Calyx-tube turbinate to obconic-campanulate, mostly (1.5) 1.8-2 (2.5) mm high, slightly asymmetrical with the abaxial slightly longer than the adaxial, usually very densely canescent throughout, but very rarely sparingly pilose to almost glabrous (the trichomes mostly spreading short- to long-pilose), usually rather inconspicuously (due to the pubescence) punctate-glandular, internally glabrous except for possibly the uppermost fringe. Calyx-lobes all narrowly triangular-lanceolate, obscurely punctate-glandular and acute; adaxial lobes (0.6) 1-1.4 (1.6) mm long; lateral lobes (1.0) 1.2-1.5 (1.8) mm long; abaxial lobe (1.2) 1.5-2.2 (2.5) mm long, all very densely canescent, short- to long-pilose externally and internally more sparingly pilose. Vexillum about 4.5-6.0 mm long and 2.5-4 mm wide, very broadly obcordate and abruptly tapering into a slender claw (about 1-1.5 mm long), strongly arched and incurved, enveloping the inner floral parts, its apex usually somewhat emarginate but occasionally also obscurely apiculate, its margin entire to irregularly erose, bright violet. Filaments golden-brownish to purplish, about 6-8 mm long, glabrous, united into a tube for the lowest 1.5-2.0 mm. Anthers about 0.4-

MAP 6. *Amorpha canescens*.

0.8 mm long, yellowish to golden brown. Pistil about 5.0-7.0 mm long with densely pilose ovary about 1 mm high, a densely antrorsely pubescent style about 4-6 mm long and a small, capitate, terminal stigma. Fruit about (3.0)3.5-4.5(5.0) mm long and (1.5)1.8-2.2 mm wide, tapering to the somewhat stipe-like base, usually densely to moderately villous-canescens but very rarely glabrous, punctate-glandular in the upper half or two-thirds, exceeding the calyx-tube by 2-3.5 mm, with the adaxial straight or very nearly so and the abaxial side strongly outwardly bowed, terminated by the 0.5-1.5 mm long, persistent base of the style.

Distribution: Roadsides, fields, prairies, hillsides, and open woodlands from Indiana west into the Dakotas, Wyoming, and New Mexico, and southern Canada south into eastern Texas. (Map 6.)

The reasons for recognizing neither *A. canescens* var. *glabrata* A. Gray nor *A. brachycarpa* have been presented in an earlier paper (Jour. Elisha Mitchell Sci. Soc. 80: 62-63. 1964) and will not be repeated here.

An apparently rarely encountered hybrid between *A. canescens* and *A. fruticosa* may be better discussed here than elsewhere since the overall aspect of the plant is such that it most likely would be taken as an aberrant, oversized *A. canescens*. The rarity of the supposed hybrid certainly attests to the effectiveness of the isolating mechanisms between the two species for they occupy the same general geographical area over a very extensive region of the central United States.

Palmer (Rhodora 55: 158-159. 1953) described the hybrid of these two species as *Amorpha* × *notha* from a single plant found on a "low rocky bank between upland prairie and alluvial valley of Center Creek, about 1 mile north of Webb City, Jasper Co., Missouri." Both species are common in southwestern Missouri and yet Palmer, who was extremely familiar with the plants of that area and who had a particular interest in *Amorpha*, knew only one example of the hybrid. In addition to the two collection numbers made by Palmer from the type plant (*Palmer* 52047, 27 May 1951, in flower; isotypes, F, MO, SMU, UMO); and *Palmer* 52930, 9 August 1951, in fruit (F, UMO). Palmer made an additional collection (#56605) from the same area, if not from the same plant, two years later. Another collection which I take to represent this hybrid was collected by Palmer, #25305, 4 June 1924: dry rocky ledges, limestone bluffs of Spring River, near Melugin, Jasper Co., Missouri (A, MIN, UMO) and was cited, mistakenly, I believe, (Jour. Arnold Arb. 12: 167. 1931) as *A. canescens* var. *glabrata* A. Gray.

The hybrid differs from *A. canescens* with which it has the greatest overall affinity in its taller habit, much shorter calyx-lobes and particularly in its dorsally strongly curved fruit. From its *A. fruticosa* parentage, it differs in densely canescent, pilosulose calyx-tube as well as the finely canescent leaves and young stems. The practice of giving binomials to hybrids of this sort has, I believe, very little to recommend itself as a botanical custom.

7. ***Amorpha nana*** Nutt., Fraser's Cat. 1813. TYPIFICATION: "Collected near the Mandan towns, 1600 miles up the Missouri," *Nuttall*, not seen.

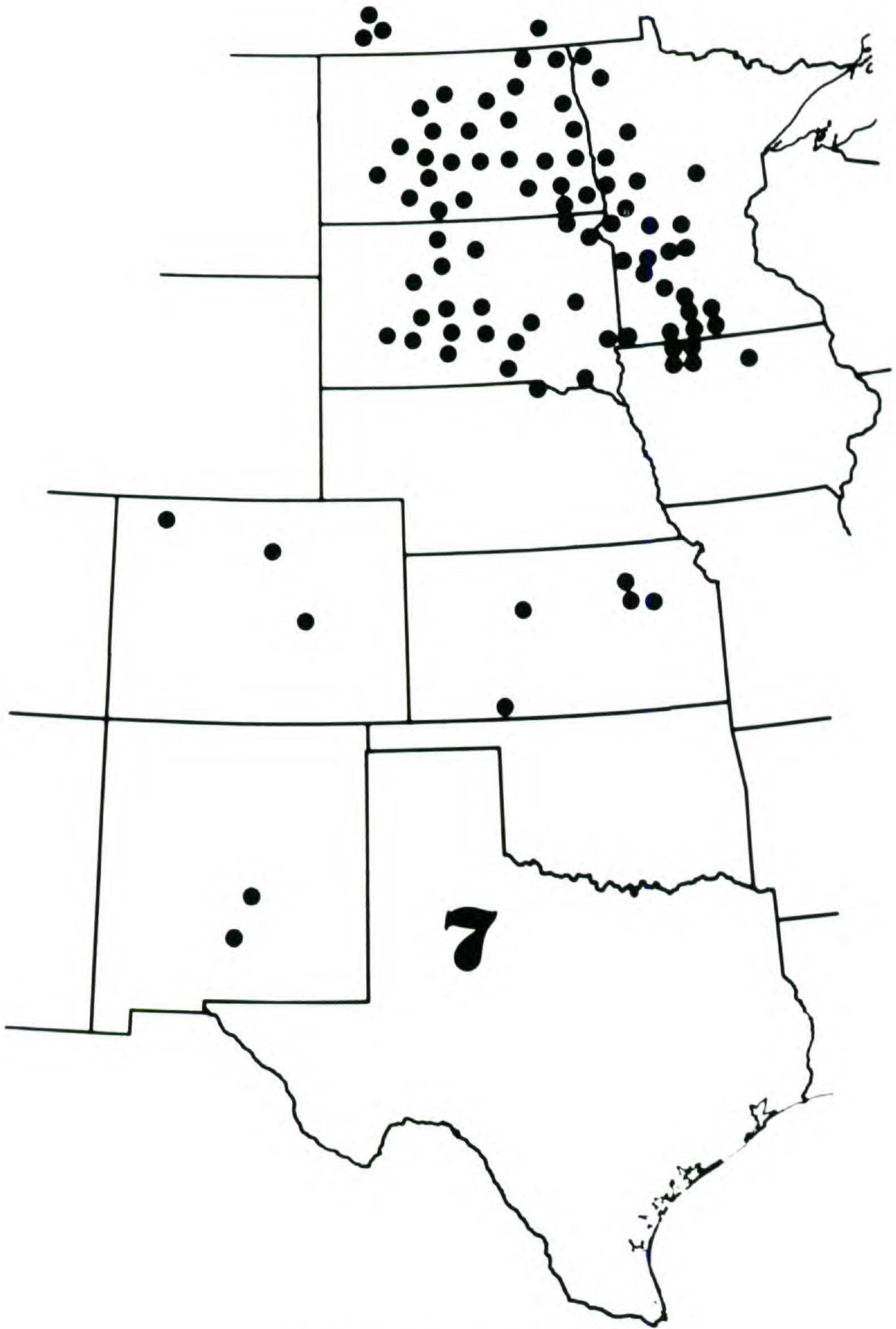
A. microphylla Pursh. Fl. Am. Sept. 466. 1814. *nom. illegit.*, Art. 63. TYPIFICATION: not seen; Pursh stated that he based name on a specimen presented to him by Meriwether Lewis of the Lewis and Clark Expedition.

A. punctata Raf., New Fl. 3: 14. 1837. TYPIFICATION: Specimen not seen. "Discovered by Bradbury in the upper Missouri."

A low, erect, apparently rhizomatose shrub about 3-6 (9) dm high. Branches of the current season light reddish-brown to pale olivaceous; clustered near the top of the stem; slender (about 1-2(3) mm in diameter), sparsely or, more typically, moderately strigillose but becoming glabrate below with age and with numerous very fine, longitudinal grooves and ridges and a sparse to moderate sprinkling of small inconspicuous punctate-pustular, amber-colored glands; older branches usually light gray or pale brownish, only slightly, if at all, lined. Leaves numerous, spreading to ascendant, (1.5)3-7(10) cm long. Petioles sparsely to densely strigillose or somewhat finely spreading-puberulent, becoming glabrous or nearly so, equaling or usually longer than the breadth of the lowermost leaflet (rarely the breadth of leaflet is greater than length of petiole), about (2)4-8(10) mm long, very sparingly pustulate-glandular. Stipules inconspicuous, pigmented like the

young stem and petiole, caducous, short-pubescent along margins and outer surface and often with a moderately long tuft of trichomes near tip, appressed to spreading, setaceous to linear, (2) 3-5 (6.5) mm long, occasionally sparingly pustulate-glandular. Rachis of leaf very slender, mostly about 0.3-0.7 mm in diameter, glabrous or nearly so to densely very short-puberulent or strigillose and sparingly to moderately beset with minute pustular-glands, channeled above. Leaflets mostly (7) 13-27 (31) in number, (2) 6-13 (18) mm long, (2) 3-6 (7.5) mm wide, usually (1) 1.8-2.9 (3.5) times as long as broad, rarely overlapping to more commonly remote, usually the interval between petiolules on the same side of the rachis about (3) 4-7 (9) mm long. Blade of leaflet mostly narrowly to broadly oblong or even somewhat elliptical but occasionally varying to ovate or obovate to almost orbicular, with the base usually rounded or occasionally with margins gradually tapering and with the base then cuneate, the apex usually broadly rounded or even truncate and commonly emarginate but occasionally acute, with the midvein exerted into a slender, tapering mucro usually about (0.6) 0.8-1.2 (1.5) mm long. Texture of leaflet coriaceous to subcoriaceous when dry, finely and inconspicuously reticulate above from the somewhat elevated secondary and tertiary venation (the midvein somewhat depressed), the margin flat or more typically somewhat revolute and entire to inconspicuously crenulate; the midvein conspicuously elevated beneath and with the secondary and sometimes the tertiary veins somewhat elevated and sometimes forming an inconspicuous net; surface glabrous on both sides but the midvein beneath and the margin usually sparingly short-pubescent, puberulent or somewhat strigillose or rarely glabrous or nearly so; the punctate glands conspicuous and readily visible to the unaided eye on the lower surface, appearing to be of uniform size or at least not falling mostly into two more or less distinct size classes, usually with about (10) 20-35 (55) punctate glands per half-leaflet. Petiolule densely to sparingly short-pubescent or strigillose and sometimes becoming

glabrate with usually few to several small pustulate glands and mostly about (0.5)0.7-1 mm long. Stipels acicular, about (1.0)1.5-2.5(3) mm long, often 2 times or more as long as the petiolule, glabrous, long-persistent. Racemes solitary at the tips of the current season's growth, contracted and very densely flowered, mostly (2.0)3-7(9) cm long and about 1-1.5 cm in diameter, subsessile or the peduncle about 0.3-1.5(2.0) cm long; rachis conspicuously ridged and grooved, moderately to very densely puberulent or occasionally strigillose; pedicels bearing numerous very densely clustered, moderately to densely puberulent or strigillose (often becoming sparsely so or even glabrate in fruit), often long-persistent (and with a truncate, somewhat expanded apex), about 1.0-2.0(2.5) mm long, subtended by a caducous, sparsely glandular-pustulate, brownish to amber-colored, moderately to densely puberulent, linear-setaceous to narrowly spatulate bract mostly (2.5)3.0-4.0(5.0) mm long with a long, tapering apex. Calyx-tube turbinate, mostly 1.8-2.2 mm high with the abaxial side slightly longer than the adaxial, glabrous throughout with few to more usually numerous punctate glands mostly arranged in rows and restricted to the upper half of the tube. Calyx-lobes all narrowly triangular-lanceolate and acute, punctate-glandular, glabrous or very sparsely puberulent externally but with densely short-ciliate margins; internally the lobes and the very uppermost portion of the tube densely matted short-puberulent and the lower portion of the tube internally (as well as externally) glabrous; adaxial lobes about (0.8)1.0-1.5(1.8) mm long; lateral lobes mostly (1.0)1.2-1.8(2.0) mm long; abaxial lobe (1.5)1.8-2.0(2.2) mm long. Vexillum about 4.5-6.0 mm long and 3.5-4.5 mm wide, very broadly obcordate, abruptly tapering into a slender claw, strongly arched and incurved and enveloping the inner floral parts, its margin emarginate and usually finely erose, dark purple. Filaments purplish, about 6-8 mm long, glabrous; anthers about 0.4-0.6 mm long, purplish. Pistil about 4.0-6.0 mm long with a glabrous ovary about 0.8 mm high, an antrorsely pubescent



MAP 7. *Amorpha nana*.

style about 3.5-5 mm long and a small, capitate, terminal stigma. Fruit about 4.5-5.5 mm long and 2.0-2.8 mm wide, oblongish but tapering to a stipe-like base of about 0.5 mm long, glabrous, conspicuously punctate-glandular in the upper two-thirds, exceeding the calyx-tube by about 2.0-3.5 mm, the adaxial side straight or nearly so, the abaxial side strongly outwardly bowed, terminated by persistent base of the style, this about 0.5 mm long.

Distribution: Prairies, hillsides, plains, and buttes from Iowa and Minnesota west into the Dakotas and Colorado and from southern Manitoba and Saskatchewan south into New Mexico; primarily a plant of the northern plains. (Map 7.)

8. *Amorpha glabra* Poir., *Encycl. Meth. Suppl.* 1: 330. 1810.

TYPIFICATION: type not seen, perhaps at P; based on a specimen grown in cultivation in Paris.

?*A. glabra* Desf., *Tabl. Ecole Bot. Paris* 192. 1804, *nom. nud.*

?*A. glabra* Pers., *Syn. Pl.* 2: 295. 1807. *nom. seminud.*

A. montana Boynt., *Biltmore Bot. Stud.* 1: 138. 1902.

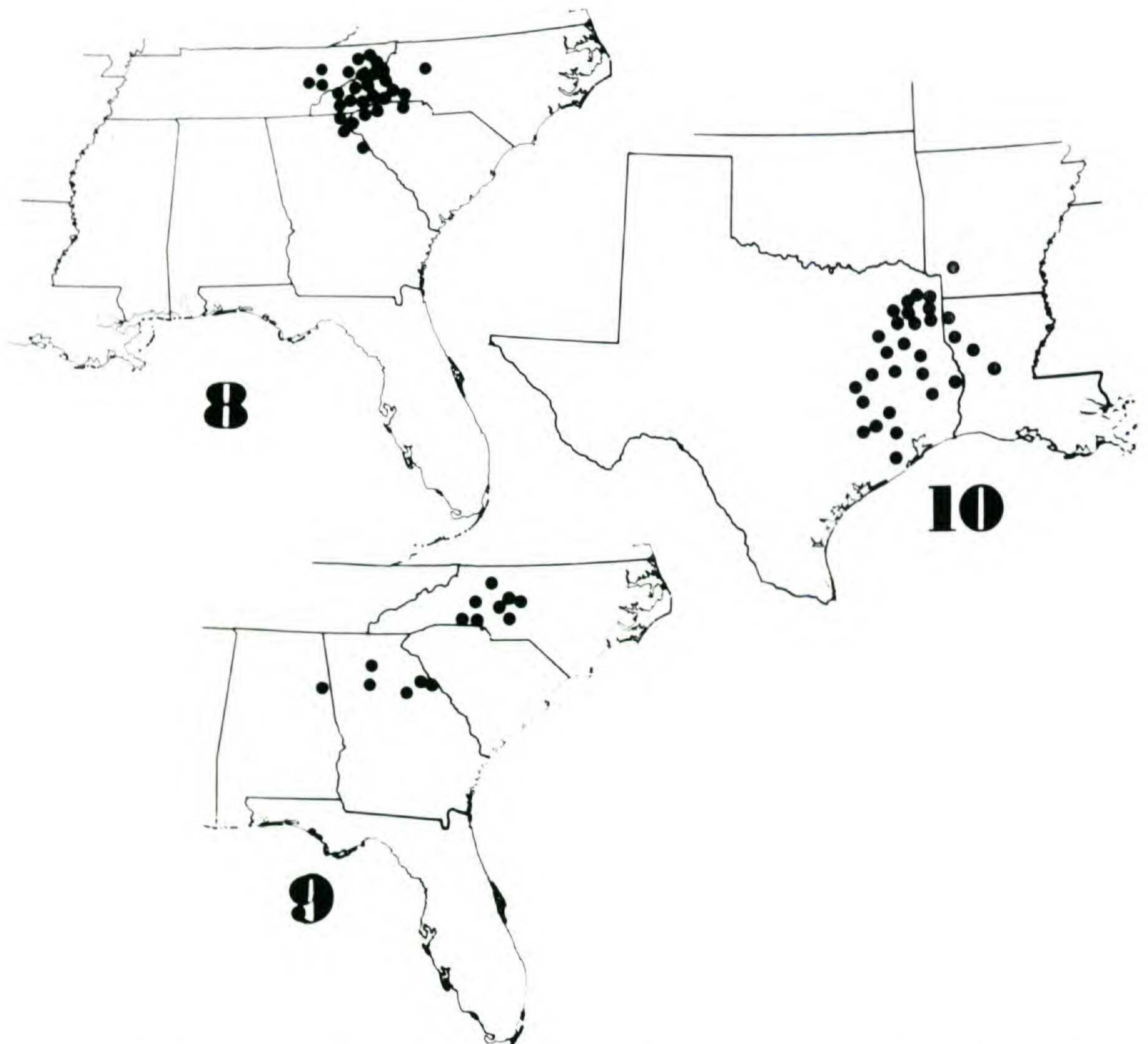
TYPIFICATION: **North Carolina:** rocky woods, Biltmore, *Biltmore Herb.* 14 (lectotype, US!; fruiting specimen collected 29 August 1896 on sheet numbered 331562; isoelectotypes, A!, CU!, GH!, MIN!, MO!, ND-Greene!, NY!, RM!, US!).

?*A. fruticosa* var. *glabra* Bean, *Trees and Shrubs Brit. Isles* 1: 193. 1914.

A much-branched, erect shrub mostly 1-2 m high. Current season's growth light to dark purplish or light-brown to olivaceous, slender to moderately thickened, about 1-2 (3) mm in diameter, usually completely glabrous or at most very sparsely and obscurely strigillose to puberulent, sparingly, if at all, beset with inconspicuous, minute, amber-colored pustulate glands; branches of the preceding year

mostly grayish to blackish. Leaves wide-spreading, mostly (1.0) 1.4-2.2 (3.0) dm long. Petioles mostly (1.6) 2.0-4.0 (5.7) cm long, typically much longer than the width of the lowermost leaflet, glabrous or very nearly so or very sparingly puberulent, sparsely beset, if at all, with amber-colored pustulate-glands. Stipules inconspicuous, appressed when present, caducous, thin, sparsely to moderately puberulent to short-pubescent on margins and outer surface, dark reddish-brown, typically linear to linear-lanceolate, about 2.5-4.5 mm long, apparently eglandular. Rachis of leaf about 0.5-1.0 mm in diameter, usually greenish-olivaceous, glabrous or rarely at most exceedingly sparingly puberulent or strigillose, usually sparingly glandular pustulate throughout, interval between petiolules on the same side of the rachis about (0.8) 1.5-3.0 (3.6) cm long. Leaflets mostly (7) 11-15 (21), either opposite or alternate, about (1.4) 2.2-4.6 (7.4) cm long and (1.0) 1.4-2.8 (3.6) cm wide, mostly (1.2) 1.4-2.2 (2.7) times as long as broad, characteristically widely spaced and not overlapping, usually broadly oblong, oblong-elliptic to elliptic or less commonly ovate-oblong to ovate or rarely nearly orbicular, basally typically very broadly rounded to truncate or nearly so or even subcordate but rarely gradually tapering to even acute, apically very broadly rounded to strongly obtuse and almost invariably conspicuously emarginate. Midvein usually terminating in a swollen, globose, glandular tip either sessile or exerted on a stalk about 0.2-0.4 mm long. Both surfaces with venation scarcely either elevated or depressed on either surface except for the conspicuously elevated midvein and the primary and secondary veins obscurely reticulate, glabrous or rarely sparsely and inconspicuously strigillose beneath along the midvein and principal lateral veins, usually conspicuously glandular-punctate; punctate glands variable in size, usually numerous, mostly ranging in number from about (30) 50-150 (300) glands per half-leaflet. Margin entire, inconspicuously and finely undulate to conspicuously crenulate, slightly revolute to more or less flush-margined. Petiolules about 2.0-4.0 (5.5) mm long,

usually glabrous but occasionally sparingly to moderately puberulent or strigillose, mostly sparsely glandular-pustulate, wrinkled when dried. Stipels acicular to setaceous, mostly 1.2-2.0 mm long (but the tips quickly caducous and thus appearing shorter), glabrous, usually long-persistent, dark reddish-brown. Racemes often solitary and terminal or few and terminally clustered, 1-3(4) in number, with densely clustered flowers, mostly about (0.5)1.0-1.8(2.8) dm long and 1.2-2.0 cm in diameter, sessile or nearly so or with a peduncle 1-6 cm long; rachis sparsely glandular-punctate, glabrous or very sparingly strigillose or puberulent. Pedicels glabrous or at most sparsely strigillose or puberulent, usually eglandular, about (0.8)1.0-2.5(3.0) mm long; bracts caducous, apparently eglandular, golden-brown, usually puberulent or ciliate, linear-oblong or linear-lanceolate, about (0.5)0.8-1.5(2.0) mm long. Calyx-tube broadly turbinate or campanulate, mostly (2.0)2.2-3.0(3.2) mm high, somewhat asymmetrical with the abaxial side slightly higher than the adaxial, glabrous externally and internally throughout excepting the densely short-ciliate rim, bearing 1 or 2 rows of small, inconspicuous, pustulate-glands mostly restricted to the upper third of the tube. Calyx-lobes often obsolete or nearly so and the top of the calyx then appearing truncate or the lobes low and depressed with the calyx-rim appearing weakly undulate but when noticeably developed usually broader than high, mostly rounded or broadly triangular-dentate; adaxial lobes often rounded and shorter than the lateral lobes but frequently triangular-dentate and then occasionally longer than the lateral lobes, when developed mostly (0.1)0.2-0.3(0.5) mm long; lateral lobes often broadly rounded but commonly broadly triangular-dentate and when developed beyond mere undulations then mostly (0.1)0.2-0.4(0.5) mm long; adaxial lobe typically triangular and acute although occasionally rounded, mostly (0.1)0.2-0.6(0.8) mm long. Vexillum about (4.5)6.0-8.0(8.5) mm long and 4.0-6.0 mm wide, broadly obcordate, abruptly to gradually tapering into a narrow, short claw about 1 mm long, entire to erose,



MAPS 8-10. Map 8. *Amorpha glabra*. Map 9. *A. schwerinii*.
Map 10. *A. paniculata*.

usually moderately to strongly emarginate, bright reddish-purple. Filaments yellowish to golden, about 8-11 mm long, glabrous; the monadelphous tube noticeably exerted at maturity from the calyx-tube for about (0.5)1.0-2.0 mm, the united portion of the filaments mostly about 3.0-4.5 mm long; anthers about 0.5-1.0 mm long, golden-yellow to orange. Pistil about 7.0-9.0 mm long with a glabrous, obovate ovary about 1 mm high and an antrorsely short-pubescent style terminated by a truncate stigmatic tip. Fruit about (6.5)7.5-9.0(10.5) mm long and (2.5)3.0-

4.0(4.5) mm wide, broadest at or above the middle and tapering to the slender, conical base, glabrous throughout, the upper two-thirds sparsely to moderately covered with small but usually conspicuously pustulate glands, obliquely obovate with the adaxial valve straight or nearly so and the abaxial valve very strongly outwardly bowed above, often terminated by the persistent, 0.2-0.5 mm long base of the style.

Distribution: Endemic to the southern Appalachian Mts. of western N. and S. Carolina, northeastern Ga. and eastern Tennessee. (Map 8.)

The attribution of this species to Arkansas and Oklahoma (Jour. Arnold Arb. 12: 174-175. 1931, and Proc. Oklahoma Acad. Sci. 27: 69. 1947.) is, I believe, an error. Specimens so annotated in the past seem to me to be *A. ouachitensis* whose closest relative appears to be the central Texan *A. roermeriana* (= *A. texana*) and not the southern Appalachian endemic.

9. *Amorpha schwerinii* Schneider, Bot. Gaz. 43: 301. 1907. [as *Schwerini*]. TYPIFICATION: North Carolina: ROWAN CO., Dunn's Mountain, alt. 1200 ft. *J. K. Small* s.n. (holotype, MO!; isotypes, F! NY!).

A. densiflora F. E. Boynton ex Small, Fl. SE. U.S. ed. 2. 1342. 1913. TYPIFICATION: North Carolina: GASTON CO., slopes of Crowder's Mountain, *Biltmore Herb.* 14756b (lectotype, NY!; isolectotypes, MIN! NY! RM!).

A bushy, widely branched, erect shrub mostly (1) 1.5-2.5 m high. Current season's growth dull olive-brown to reddish-brown or dull grayish to almost black and typically slender, about 1.0-2.0 mm in diameter, mostly densely puberulent to curly short-pubescent, usually with a moderate to dense scattering of inconspicuous, small, amber-colored, pustular glands; older branches dark grayish to blackish but becoming dark reddish-brown with numerous, inconspicuous longitudinal fissures and more or less orbicular,

slightly elevated, lenticels, becoming progressively glabrate. Buds globose to ovoid, scales densely puberulent to short-pilose. Leaves wide-spreading, about (0.5)0.8-1.2(2.2) dm long. Petioles mostly (0.7)1.0-1.8(2.6) cm long, mostly equaling or exceeding the length of the lowermost leaflet but occasionally shorter, moderately to densely pubescent with spreading hyaline trichomes (up to 0.7 mm long), bearing none or but few pustular, amber-colored glands. Stipules inconspicuous, usually appressed while present but soon caducous, copiously tawny puberulent to curly short-pubescent externally and glabrous or nearly so within, dark reddish-brown, typically linear to linear-lanceolate, about 3.0-4.5 mm long, eglandular. Rachis of leaves slender, mostly 0.5-0.7 mm in diameter, typically brownish to grayish, moderately to densely puberulent to spreading short-pubescent with the trichomes up to about 0.5 mm long, eglandular or the pustulate glands sparse and inconspicuous. Leaflets mostly (7)19-27(29) in number, usually about (0.5)1.5-3.0(4.0) cm long and (0.4)0.8-1.5(1.9) cm wide, typically about (1.3)2.0-3.0(3.8) times as long as broad, rarely overlapping, the interval between petiolules on the same side of the rachis mostly about (0.6)0.8-1.5(1.8) cm long; usually narrowly to broadly oblong but varying from elliptic to elliptic-oblong and rarely from ovate-oblong to ovate or even almost orbicular in unusual terminal leaflets, typically with the base broadly rounded but varying to somewhat truncate or even slightly subcordate and the apex mostly obtuse to broadly rounded or occasionally emarginate; venation slightly elevated above and more pronouncedly so below. Midvein usually swollen terminally, usually exserted for 0.2-0.5(0.8) mm. Margin entire to very obscurely crenulate and inconspicuously revolute. Lower surface densely pilose with soft ascendant or spreading hyaline, tapering trichomes mostly 0.3-0.6 mm long particularly pubescent along the midvein, moderately to densely beset with olivaceous to amber, punctate glands beneath (about 30-120 glands/half-leaflet); upper surface minutely and obscurely but copiously short-pubescent with hyaline,

appressed to spreading trichomes about 0.1-0.3 mm long. Petiolules usually (0.5)1-2 mm long, densely spreading pilosulose to short-pubescent with hyaline trichomes mostly 0.2-0.6 mm long, indistinctly glandular-pustulate. Stipels acicular, about 1.0-2.2 mm long, often equaling the petiolules in length, typically long-persistent, dark reddish-brown, pilosulose and often densely so at base and glabrous or nearly so above, sparingly pustulate. Racemes 1 or sometimes 2 and the principal one usually terminating strong shoots and the second when present smaller and arising at or near base of the terminal cluster, mostly (2.0)4.0-8.0(12.0) cm long and 1.0-1.5(1.8) cm in diameter; rachis of inflorescence densely pilosulose to short-pubescent, eglandular or nearly so. Pedicels puberulent to pilosulose, eglandular, about (0.8)1.0-1.5(2.0) mm long; bracts caducous, sparingly glandular-pustulate, moderately to densely pilosulose externally and glabrous within, linear to linear-lanceolate, about 2.0-3.5 mm long. Calyx-tube turbinate to obconic-cylindrical, mostly 1.8-2.5 mm long, somewhat asymmetrical with the adaxial side slightly longer than the abaxial, externally sparingly to densely spreading pilosulose throughout, moderately to densely beset with amber-colored, pustulate glands in the upper one-fifth to one-third but eglandular below. Calyx-lobes mostly linear to linear-lanceolate (very rarely the four paired lobes triangular-dentate), acute, sparingly to moderately glandular-punctate, short-pilose both externally and internally, mostly equaling or exceeding the length of the tube. Adaxial lobes about (1.2)2.0-3.0 mm long; lateral lobes about (1.5)2.0-3.2 mm long; abaxial lobe (1.8)2.5-3.5 mm long. Vexillum about 4.5-6.5 mm long, 3.0-4.2 mm wide, very broadly obovate to obcordate, tapering into the slender claw of about 1.5 mm long, apically emarginate and sometimes also inconspicuously apiculate, margin entire to irregularly erose, purplish. Filaments yellowish to golden, about 6-8 mm long, glabrous, united at base into a tube 1.5-2.0 mm long; anthers about 0.5-0.8 mm long, golden-yellow. Pistil about 5-7 mm long with a densely antrorsely pubescent style about 4-6 mm

high and a capitate stigma. Fruit about 5-6.5 mm long and 1.8-2.2 mm wide, tapering to base, usually densely short-pubescent or rarely glabrous or nearly so, usually conspicuously glandular-pustulate in upper half, the adaxial valve straight or nearly so and the abaxial very strongly outwardly bowed above, terminated by the persistent base of the style.

Distribution: River banks and open slopes from the inner North Carolina Piedmont southwest into Alabama. (Map 9.)

This is morphologically one of the most distinctive and clearcut species within the genus.

10. *Amorpha paniculata* T. & G., Fl. N. Am. 1: 306. 1838.

TYPIFICATION: Texas: *T. Drummond* 461 (lectotype, NY!; isolectotype, GH!).

Erect coarse suffrutescent herb or shrub 1-3 m tall and relatively unbranched. Current season's growth usually densely puberulent to spreading short-pubescent or glabrate in age, often somewhat canescent and lacking pustulate glands. Buds obovoid, densely appressed short-pubescent, canescent. Leaves wide-spreading, mostly (1)2-4 dm long. Petioles (2)3-6(9) cm long, usually noticeably longer than the width of the lowermost leaflet, stout, canescent, densely puberulent. Stipules caducous, setaceous, pubescent, about 3 mm long. Rachis of leaf about 2.5 mm in diameter, densely puberulent throughout and more or less canescent. Leaflets drying coriaceous, mostly 11-19, oblong to oblong-elliptic, usually (1.5)3-6(8) cm long and 1.5-3(5.3) cm wide, typically (1.4)1.8-2.2(2.6) times as long as wide, opposite or more commonly alternate, usually symmetrical, typically broadly rounded both apically and basally, conspicuously reticulate below with the veins elevated often to the fourth degree of branching. Midvein exerted up to 1.8 mm or ending at the margin, usually somewhat tapering but rarely swollen. Lower surface usually moderately to densely covered with spreading, crisped, hyaline to tawny, pilosulose trichomes but rarely sparingly to mod-

erately short-pubescent or even glabrate; upper surface glabrate or sparingly short-pubescent to puberulent especially along the principal veins, usually inconspicuously and sparingly to moderately beset beneath with small, pustulate, punctate glands. Petiolules (0.2)0.4-1.0 cm long, moderately to more typically densely spreading pilosulose, somewhat canescent, sparingly and inconspicuously pustulate-glandular. Racemes several to numerous, (1)5-12 in number, about (0.5)1.5-3.0(4.0) dm long; rachis of inflorescence finely pilosulose, canescent. Pedicels slender, about 1-2 mm long, pilosulose; bracts very slender, setaceous, pilosulose, about 2-2.5 mm long. Calyx-tube funnel-form, (1.8)2(2.2) mm long, moderately to densely pilosulose with fine hyaline trichomes or rarely glabrate in age, sparingly to moderately and inconspicuously glandular-pustulate above. Calyx-lobes inconspicuously glandular-pustulate, densely but finely pilosulose; adaxial lobes broadly to narrowly triangular-dentate or ovate, acute, 0.8-1.0(1.2) mm long; lateral lobes longer and usually more narrowly lanceolate, acute to acuminate, (1.0)1.2-1.4 mm long; abaxial lobe (1.2)1.5-2.0 mm long, linear to linear-lanceolate. Vexillum 5-7 mm long, 3-4 mm wide, entire to slightly erose apically, purple. Filaments about 5-6 mm long, united for about half their length, glabrous; anthers about 0.6-0.8 mm long, orange. Style densely villous; ovary glabrous. Fruit 4-6(8) mm long and 2-2.5 mm wide, broadest somewhat above the middle, tapering to the base, with the adaxial margin strongly outwardly bent in the upper quarter and the abaxial margin strongly outwardly bowed, glabrous, conspicuously glandular-pustulate. Seed reddish-brown, about 3.5 mm long and 1.8 mm wide, smooth.

Distribution: Thickets, bogs, swampy woods and ditches of southwestern Arkansas, west central Louisiana and eastern Texas. (Map 10.)

The distinctiveness and relative uniformity of this species is suggested by its lack of synonyms. The only synonym sometimes associated with it has been *A. roemeriana*

Scheele, but I believe this binomial properly belongs to the central Texan plant previously referred to as *A. texana* Buckl.

11. ***Amorpha nitens*** Boynton, Biltmore Bot. Stud. 1: 139. 1902. TYPIFICATION: **Georgia:** swamp near Waynesboro, *Biltmore Herbarium* s.n. (holotype: not seen, designated as at the Biltmore Herbarium and hence presumably at the US).

A. nitens var. *leucodermis* E. J. Palmer, Jour. Arnold Arb. 12: 177. 1931. TYPIFICATION: **Georgia:** thicket along lake, Augusta, *Boynton* 7035 (holotype, GH!).

An erect, branching shrub 1-3 m tall. Current season's growth usually blackening or at least darkening upon drying, glabrous to sparingly or even moderately puberulent to pilosulose, usually eglandular or bearing only a few scattered, small inconspicuous glands. Buds compressed and broadly oblong or ovoid, blackish when dried, sparingly pilosulose to glabrate except for the shortly puberulent margins of the outer scales. Leaves more or less wide-spreading to ascendant, mostly 1-1.8(2.2) dm long, usually conspicuously darkening or blackening upon drying. Petioles glabrous to moderately crispy short-pilose, eglandular or with a few, inconspicuous, small, pustulate glands, typically longer than the width of the lowermost leaflet, mostly (1.5)2-3.5(5) cm long. Stipules caducous, linear to linear-setaceous, eglandular, drying blackish, usually glabrous except externally with an apical tuft of tawny pubescence, mostly 3-5 mm long. Rachis of leaf about 0.6-1.0 mm in diameter, glabrous to moderately crispy-pilosulose, usually eglandular but rarely very sparingly and inconspicuously glandular. Leaflets (7)9-15(19) in number, oblong to elliptic-oblong or occasionally somewhat ovate, mostly 2-4(7) cm long and (1.0)1.5-3.5(4.5) cm wide, typically 1.5-2.5 times as long as wide, opposite or more typically alternate, usually widely spaced, symmetrical, usually broadly

rounded basally, apically obtuse to more typically broadly rounded and often emarginate, entire; secondary venation usually little, if at all, elevated beneath. Midvein typically shortly exserted and but little tapered. Lower surface of leaflets glabrous to moderately spreading pilosulose throughout or the pubescence sometimes restricted to the midvein, eglandular or inconspicuously and often rather sparingly beset with small punctate glands; upper surface eglandular and glabrous and often shiny at maturity but occasionally sparsely beset with extremely minute and fine, appressed short-pubescence. Petiolules about 2-3.2 mm long, glabrous to moderately spreading pilosulose, eglandular to inconspicuously and very sparingly pustulate glandular. Racemes erect, solitary or with several clustered together, (0.5)0.8-1.5(2.5) dm long; rachis of inflorescence glabrous to moderately pilosulose or puberulent, eglandular or very sparingly and inconspicuously pustulate-glandular. Pedicels 1-2.2 mm long, glabrous to moderately pilosulose or crispy pubescent, slender, eglandular, blackening upon drying; bracts usually caducous, basally attached on pedicel or distally as much as midway towards the tip, very narrowly linear to setaceous, 1.5-3(4) mm long, glabrous to externally tangled tawny-pilosulose especially along the margins, usually eglandular but occasionally inconspicuously and very sparingly pustulate glandular, typically blackening upon drying. Calyx-tube slenderly obconic to broadly funnelform to rarely even roundedly campanulate, mostly 2-2.5 mm long, glabrous to moderately pilosulose, often completely eglandular but occasionally very sparingly beset with inconspicuous, minute pustular glands in the upper third. Calyx-lobes with a ciliate fringe and with the outer surface glabrous to pilosulose, eglandular; adaxial calyx-lobes usually broadly rounded and obtuse but occasionally varying to triangular, and acute, about 0.2-0.6 mm long; lateral calyx-lobes broadly rounded to more typically triangular, about 0.4-1.0 mm long; abaxial lobe triangular and acute and often narrowly so, 0.6-1.4 mm long. Vexillum 4.5-6 mm long, 3-4.8 mm wide, broadly obovate, grad-

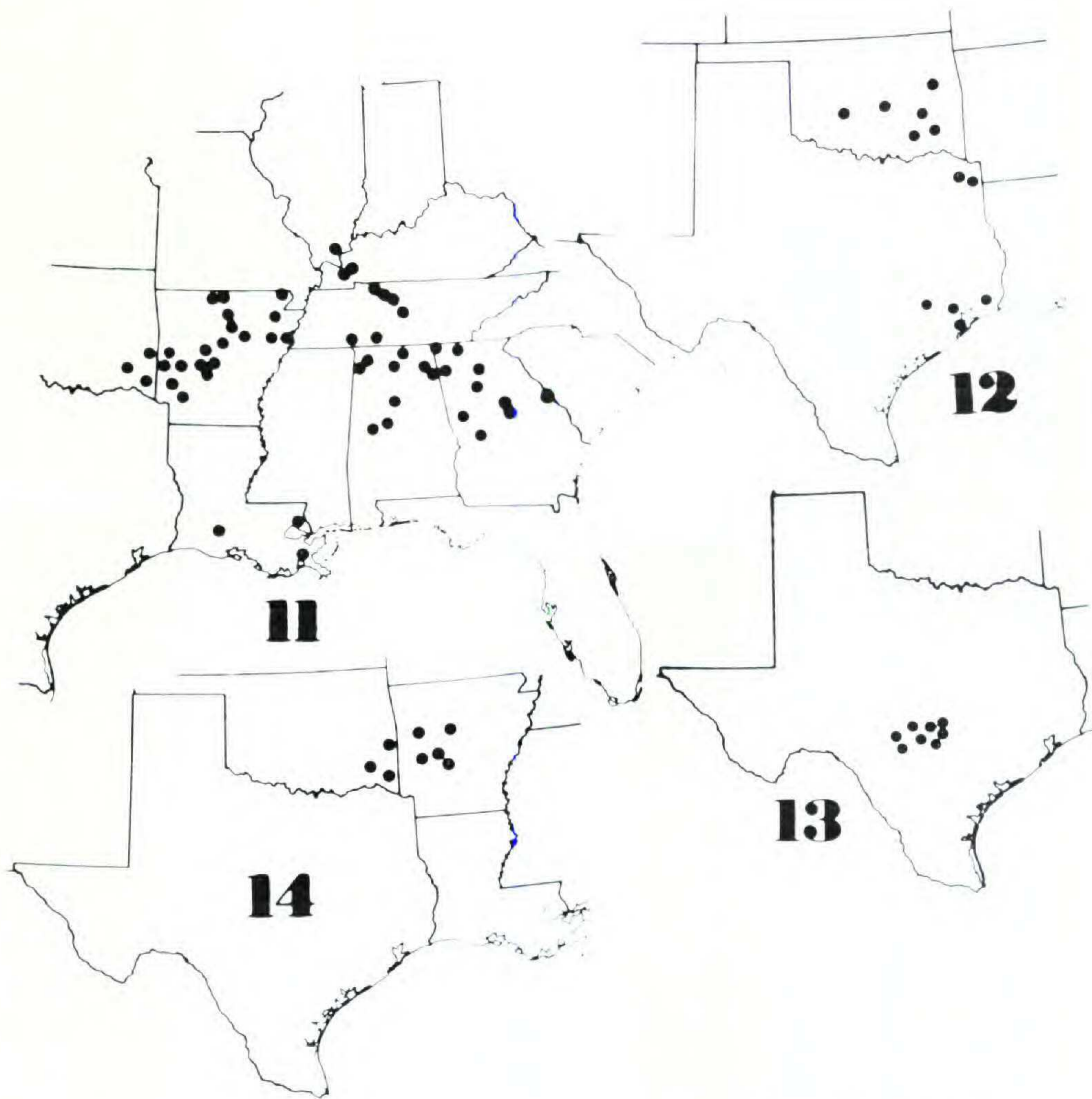
usually tapering into an indistinct claw about 1-1.5 mm long, slightly to strongly arched, apically broadly rounded and entire to irregularly erose, apparently reddish purple ["blue-purple *fide* Palmer"] and with the claw and blade both enveloping the filaments. Filaments 5-7 mm long, united into a sheath for the lower 2-2.5 mm, glabrous; anthers 0.5-0.8 mm long, yellow. Style moderately ascendingly pilose, 5-7 mm long; ovary glabrous. Fruit 6-8 mm long and 2.5-3.5 mm wide, broadest above the middle and tapering basally with the adaxial suture straight or slightly curved and the abaxial strongly outwardly bowed, glabrous, moderately pustulate glandular distally. Seeds smooth, dark reddish-brown to blackish, 3-4.2 mm long.

Distribution. Thickets and moist woods along creeks, rivers and bottomlands from southern Illinois southeast into Georgia and west into Louisiana and eastern Oklahoma. (Map 11.)

12. *Amorpha laevigata* Nutt. in Torr. & Gray, Fl. N. Am. 1: 306. 1838. TYPIFICATION: "Banks of the Arkansas, near Salt River," *Nuttall* s.n. (holotype, BM, not seen; phototype: A!)

A. laevigata var. *typica* Schneider, Illustr. Handb. Laubh. 2: 74. 1907.

Shrub 1-2(3) m tall. Current season's growth sparingly to moderately strigillose and glandular-pustulate, light brown to more characteristically deep reddish-purple. Buds sub-orbicular to ovoid, compressed; the scales sparingly short-pubescent. Leaves wide-spreading to moderately ascendant, mostly (0.5)0.8-1.5(2.4) dm long. Petioles (0.6)1.0-2.5(3.4) cm long, about 1 mm in diameter, very sparingly strigillose or glabrous, sparingly to moderately glandular-pustulate, usually longer than the width of the lowermost leaflet. Stipules caducous, linear-subulate to setaceous, glabrous, dark reddish-purple, about 2-3 mm long. Rachis of leaf 0.5-1 mm in diameter, glabrous or very sparingly



MAPS 11-14. Map 11. *Amorpha nitens*. Map 12. *A. laevigata*.
Map 13. *A. roemeriana*. Map 14. *A. ouachitensis*.

strigillose, sparingly to moderately glandular-pustulate. Leaflets (9) 13-19 (25), oblong or oblong-elliptic to rarely obovate, usually (1.0) 1.6-3.2 (4.2) cm long and (0.4) 1.0-1.5 (2.2) cm wide, typically (1.5) 1.8-2.4 (2.8) times as long as wide, usually alternate and symmetrical, characteristically basally rounded but rarely acutely tapering, apically usually broadly rounded and often emarginate; venation little elevated beneath except for the midvein; margin entire to slightly crenulate. Midvein either exerted as a blunt or slightly tapering mucro or more characteristically terminating in a swollen knob exerted not more than 0.2

mm. Lower surface glabrous or very sparingly strigillose especially along the midvein, moderately to densely beset with conspicuous punctate glands often appearing to be of two size classes or rarely nearly epunctate; upper surface glabrous. Petiolules (1)2-3(4) mm long, glabrous or more typically sparingly to moderately strigillose, conspicuously and densely beset with markedly elevated pustulate glands; stipels usually persisting, dark reddish or blackish, about 1-2 mm long. Racemes solitary or loosely clustered, 1-3(8), about (0.5)1.0-2.0(3.0) dm long; rachis of inflorescence very sparingly strigillose, eglandular or sparingly glandular-pustulate. Pedicels usually 0.6-1.2 mm long and sparingly to moderately strigillose, eglandular; bracts caducous, setaceous to narrowly lanceolate with a long-tapering apex, sparingly to moderately strigillose, 1.5-3 mm long, glandular-pustulate. Calyx-tube funnelform to somewhat campanulate, about 1.5-3 mm high, glabrous or sparingly to moderately strigillose, moderately to more typically densely beset with pustulate glands in upper two-thirds. Calyx-lobes sparingly to densely strigillose with a dense fringe of white trichomes, glandular-pustulate; adaxial lobes broadly rounded to triangular-dentate and acute, about 0.2-0.5 mm long; lateral lobes usually triangular dentate and acute to acuminate but occasionally broadly rounded, 0.5-0.8 mm long; adaxial lobe narrowly triangular-dentate, 0.8-1.2 mm long. Vexillum about 4-6 mm long and about 4.0-4.5 mm wide, entire to finely erose, bright blue to deep violet blue. Filaments to 9 mm long, united for about half their length, glabrous; anthers about 0.5-0.7 mm long, orange. Ovary glabrous; style antrorsely pubescent. Fruit about 4.5-6 mm long and 2-2.5 mm wide, with the adaxial suture straight or slightly incurved near the apex and the abaxial suture strongly outwardly bowed, glabrous or rarely sparingly strigillose, conspicuously glandular-pustulate on the distal three-fourths.

Distribution: A rare species of prairies, open woods and creek banks of eastern Texas and Oklahoma. (Map 12.)

13. *Amorpha roemeriana* Scheele, *Linnaea* 21: 461. 1848. TYPIFICATION: "In margine rivulorum prope, Austin," *F. Roemer* s.n. (holotype: not seen by me or by anyone else who has commented upon it.)
- A. fruticosa* var. [1] *subglabra* A. Gray, *Boston Jour. Nat. Hist.* 6: 174. 1850. TYPIFICATION: **Texas:** on a creek near Fredericksburg, June 1847, *Lindheimer* s.n. (holotype, GH!). It is doubtful if Gray intended or actually did publish this varietal name. The type-style is different than that employed in this paper for varieties and its punctuation is also different. The next entry in the *Plantae Lindheimerianae* is also listed by Gray as *A. fruticosa* var. *subglabra*.
- A. laevigata* var. *pubescens* A. Gray, *Smithsonian Contr. Knowledge* 3: 49. 1852. TYPIFICATION: "Eastern" Texas, *Charles Wright* s.n. (holotype, GH!).
- A. texana* Buckley, *Proc. Acad. Nat. Sci. Philadelphia* 1861: 452. 1862. TYPIFICATION: **Texas:** "On the Pierdenalis River," *S. B. Buckley* s.n. (holotype, PHIL!).
- A. subglabra* (A. Gray) Heller, *Contr. Herb. Franklin & Marshall Coll.* 1: 48. 1895.
- A. texana* [var.] *mollis* Boynton, *Biltmore Bot. Stud.* 1: 139. 1902. A needlessly created "*nom. nov.*" based on "*A. laevigata pubescens* A. Gray."
- A. laevigata* var. *pubescens* f. *mollis* (Boynton) C. K. Schneider, *Bot. Gaz.* 43: 307. 1907.
- A. texana* var. *glabrescens* E. J. Palmer, *Jour. Arnold Arb.* 12: 180. 1931. TYPIFICATION: **Texas:** [COMAL CO.] Comanche Spring; New Braunfels etc., *Lindheimer* 743 (holotype, A!; isotypes, ARIZ!, F!, GH!, MO!, NY!, OKL!, PHIL!, UC!, US!).

Shrub 1-3 m tall. Current season's growth sparingly to densely puberulent or strigillose or rarely glabrous, occa-

sionally glabrate in age, sparingly to moderately glandular-pustulate. Buds ovoid, compressed, the scales often somewhat keeled, sparingly to moderately puberulent. Leaves strongly divergent, (0.5) 1-1.5 (2) dm long. Petioles (0.5) 1.5-3.0 cm long, about 1 mm in diameter, very sparingly to occasionally densely puberulent or strigillose, sparingly to moderately glandular-pustulate, usually equaling or longer than the width of the lowermost leaflet. Stipules caducous and rarely seen, linear, tawny puberulent, ca. 2 mm long. Rachis of leaf slender, 1-1.6 mm in diameter or less, very sparingly to moderately strigillose or puberulent or rarely densely puberulent. Leaflets (7) 9-11 (15), oblong or more typically broadly oblong to oblong-elliptic or rarely obovate to suborbicular, usually (1.0) 2.5-4.0 (5.2) cm long and (0.7) 1.5-2.5 (3.8) cm wide, typically (1.0) 1.3-2.9 (3.0) times as long as wide, opposite or more commonly alternate, typically symmetrical, usually broadly rounded basally and apically either broadly rounded or more characteristically emarginate and often conspicuously so; venation little elevated beneath other than the midvein and to a slight degree the secondary veins; margins entire to conspicuously crenulate. Midvein rarely exerted as much as 0.8 mm long as a tapering mucro but more typically terminating in a slightly swollen knob at the margin or tapering less than 0.2 mm beyond. Lower surface usually sparingly to moderately pilosulose or puberulent with fine, hyaline trichomes or rarely glabrous or nearly so, usually inconspicuously and moderately beset with small punctate glands; upper surface glabrous or at least glabrate to moderately pilosulose or finely puberulent especially along the principal veins. Petiolules usually 2-5 (7) mm long, glabrous to densely puberulent or pilosulose, often becoming wrinkled upon drying, usually sparingly to moderately glandular-pustulate but rarely eglandular. Stipels inconspicuous, often caducous, dark reddish, about 1.2-2 mm long. Racemes solitary or loosely clustered, 1-3 (6) in number, about (4) 6-12 (20) cm long; rachis usually sparingly to moderately strigillose or puberulent, rarely densely tawny or

hyaline puberulent or short-pubescent, sparingly glandular-pustulate; pedicels mostly 1-1.5 mm long, usually sparingly to moderately puberulent or strigillose; bracts caducous, setaceous to narrowly lanceolate and then often with a long-tapering apex, puberulent or pilosulose, 1.2-2.2 mm long. Calyx-tube funnelform, usually 2.5-3.8 mm long, very sparingly to moderately strigillose to pilosulose with hyaline trichomes, moderately glandular-pustulate in upper third; lobes moderately to more characteristically densely short-pubescent above with a conspicuous fringe of white trichomes, glandular-pustulate; adaxial lobes broadly rounded to broadly triangular-dentate and acute, (0.2) 0.4-0.6(0.8) mm long; lateral lobes broadly rounded to more characteristically acutely triangular-dentate, 0.5-0.8(1.0) mm long; abaxial lobe usually narrowly triangular-dentate, about (0.8) 1.0-1.2(1.4) mm long. Vexillum about 5-7 mm long, 5-6 mm wide, emarginate and occasionally apiculate, entire to slightly erose, purple. Filaments at maturity to 10 mm long, united for up to two-thirds their length, glabrous; anthers about 0.6-0.8 mm long. Style villous; ovary glabrous. Fruit about 6-7 mm long and 2.5-3.5 mm wide, plump at maturity, with the adaxial margin straight or somewhat inwardly bent in the upper third and the abaxial margin strongly outwardly bowed, glabrous to moderately strigillose, conspicuously glandular-pustulate above. Seed bright brown, about 3 mm long and 2 mm wide.

Distribution: All creek bed and stream banks of the "Hill Country" of central Texas in the eastern portion of the Edwards Plateau. (Map 13.)

There is no record in the literature that anyone has examined authentic material of *A. roemeriana* Scheele. A. Gray stated (Boston Jour. Nat. Hist. 6: 175. 1850.) that *A. roemeriana* was "doubtless a form of *A. fruticosa* or of *A. paniculata*." Later Gray (Proc. Acad. Nat. Sci. Phil. 1862: 162) indicated that *A. roemeriana* was apparently the same as *A. texana* Buckl. which he synonymized with *A. laevigata* var. *pubescens*. Watson (Smithsonian Misc.

Coll. 258. 188. 1878), Schneider (Bot. Gaz. 43: 307. 1907) Rydberg (N. Am. Fl. 24: 27. 1919) and Palmer (Jour. Arnold Arb. 12: 179. 1931) have all listed Scheele's *A. roemeriana* as a synonym of *A. paniculata* T. & G.

Unfortunately for the sake of stability, it would seem most unlikely that *A. roemeriana* can be considered a synonym of *A. paniculata*. *A. paniculata* is a largely East Texas species of thickets and low swampy or marshy ground. *A. roemeriana* was originally collected along a creek bend near Austin which is its eastern range limit. *Amorpha texana* has been collected in Travis Co. while *A. paniculata* is not known from the vicinity. The original description itself is far more suggestive of the central Texan species than it is of more easterly ranging *A. paniculata*. I have no doubt that *A. roemeriana* is an earlier name for the species recently known as *A. texana*.

Palmer (1931) recognized a glabrous or subglabrate and a spreading pubescent variety of this species. There seems to be no geographic segregation of these pubescence types and actually there seems to be as much of a continuum in vestiture as one could expect in so small a number of collections as are available of this species. I concur with Turner (The Legumes of Texas, p. 143, 1959) and Correll and Johnston (Man. Vasc. Pl. Tex., p. 818, 1970) who did not recognize the varieties either. Both of these taxonomic works suggest that *A. laevigata* is not specifically distinct from *A. texana*, Turner suggesting that *A. laevigata* "perhaps is best treated as a narrow-leaved eastern variety of *A. texana*" while Correll and Johnston indicated that it was "perhaps only a form of *A. texana*." I believe the differences in petal color, calyx shape, texture and glandularity etc. all indicate considerable morphological divergence between the two taxa.

14. ***Amorpha ouachitensis*** Wilbur, sp. nov. TYPIFICATION:
Oklahoma: LE FLORE CO., dry, rocky (sandstone) slopes of Black Fork Mountain, near Page, *Palmer* 20572 (holotype, A!; isotypes, GA!, NY!, US!).

Frutex erectus 1-2 m altus. *Foliola* (7)9-13(17), lateralia oblonga vel oblongo-elliptica, opposita, basi et apice rotundata vel emarginata, (1.2)2.5-4.0(7.0) cm longa et (0.9)1.5-2.5(3.6) cm lata. *Tubus calycis* 2.8-3.2 mm altus, ± glaber, glanduloso-punctatus in quarta parte superiore. *Lobi calycis* glabri vel pubescentes; lobi abaxiales 0.4-0.6 mm longi; lobi laterales 0.5-0.7 mm longi; lobi adaxiales 0.6-0.9 (1.2) mm longi. *Vexillum* 5-7.5 mm longum, rubicundo-purpureum.

Shrub 1-2 m tall. Current season's growth glabrous or more typically very sparingly to moderately pilosulose and sparingly pustulate glandular with inconspicuous lenticular glands. Buds ovoid to almost globose with the scales moderately appressed pubescent on the outer surface and apically densely ciliate with tawny-villous trichomes. Leaves strongly divergent, 7-23 cm long. Petioles 1.2-2(2.4) cm long and about 0.5-1.5(2) mm in diameter, moderately puberulent or short-pilose with hyaline to tawny trichomes, sparingly to moderately glandular-pustulate, usually equaling or longer than the width of the lowermost leaflet. Stipules caducous, lanceolate, densely tawny villous apically, ca. 3-4 mm long including the apical tuft but only about 2 mm long excluding the apical villosity. Rachis of leaf mostly 1 mm in diameter or less, very sparingly pilosulose to even glabrous, sparingly glandular-pustulate. Leaflets (7)9-13(17), typically broadly oblong to oblong-elliptic or oblong, mostly (1.2)2.5-4.0(7.0) cm long and (0.9)1.5-2.5(3.6) cm wide, typically (1.4)1.5-2(2.4) times as long as wide, usually opposite, typically symmetrical, usually broadly rounded basally and apically characteristically conspicuously emarginate to broadly rounded; venation but little elevated beneath other than the midvein; margins entire to inconspicuously undulate-crenate. Midvein exerted either as a tapering mucro about 0.2-0.6(1.0) mm or only slightly exerted and terminating in a swollen knob. Lower surface of the leaflets glabrous or

glabrate to sparingly or even moderately appressed pilosulose or less commonly spreading pilosulose or short pubescent with fine, hyaline to pale tawny, slender trichomes and usually conspicuously beset with numerous pustulate, amber-colored glands; upper surface glabrous or glabrate to moderately pilosulose with inconspicuous, slender trichomes and lacking pustulate glands. Petiolules mostly 2-3 (4) mm long, glabrous or glabrate to moderately short-pubescent or pilosulose, sparingly to moderately glandular-pustulate or rarely eglandular. Stipels inconspicuous, sometimes caducous, drying dull dark reddish-brown, mostly 1.2-2.2 mm long, glabrous or sparingly appressed pilosulose. Racemes solitary or in loose clusters of 2-4, mostly (8) 10-20 cm long; rachis of inflorescence glabrous to sparingly or even moderately spreading short-pubescent with hyaline or very rarely tawny trichomes and eglandular or very sparingly and inconspicuously pustulate-glandular; pedicels about 1-1.5 mm long, glabrous to sparingly puberulent; bracts caducous, narrowly lance-oblong, about 1-1.5 mm long, marginally short-pubescent with stiff, hyaline trichomes. Calyx-tube narrowly conical to funnelform, about 2.8-3.2 mm long, usually glabrous or nearly so to moderately puberulent or spreading short-pubescent, sparingly glandular pustulate in the upper quarter; lobes usually glabrous but occasionally moderately appressed pubescent on the external surface and densely margined with a conspicuous fringe of white trichomes, eglandular to sparingly pustulate glandular; adaxial lobes broadly rounded, mostly 0.4-0.6 mm long; lateral lobes broadly rounded or perhaps more characteristically broadly triangular-dentate, about 0.5-0.7 mm long; abaxial lobe narrowly triangular-dentate with an acute to acuminate apex, about 0.6-0.9 (1.2) mm long. Vexillum about 5-7.5 mm long and 4.5-6 mm wide, strongly emarginate but otherwise entire, purple. Filaments at maturity 8-10 mm long, united for up to $\frac{3}{5}$ their length, glabrous; anthers about 0.6-0.8 mm long. Style antrorsely pilosulose; ovary usually glabrous. Fruit about 7-9 mm long and 3-4 mm wide and with the adaxial margin

either straight or more typically mostly straight but with the upper portion bent sharply abaxially and the abaxial margin strongly outwardly bowed, glabrous or occasionally somewhat appressed, short-pubescent and conspicuously pustulate-glandular. Seed solitary, dark brownish to blackish, about 4-5 mm long and 2.5-3 mm wide.

Distribution: Ouachita Mountains of west-central Arkansas and southeastern Oklahoma. (Map 14.)

This species has previously been included within the concept of other species. Palmer cited specimens of it as *A. glabra* Poir. (Jour. Arnold Arb. 12: 175. 1931) and also *A. virgata* (Jour. Arnold Arb. 12: 182. 1931) which I have treated as a synonym of *A. fruticosa*. *Amorpha glabra* is in my opinion a southern Appalachian endemic while the range of *A. fruticosa s.lat.* spans the continent. I believe the morphology of *A. ouachitensis* indicates a closer relationship with the rare central Texan endemic *A. roemeriana* (= *A. texana*) than with either *A. glabra* or *A. fruticosa*.

Representative Specimens: **Arkansas:** CONWAY CO., rocky mountainsides, Petit Jean Mt., *Demaree* 37161 (SMU); GARLAND CO., shale outcrop on banks of Ouachita River near Hot Springs, *Palmer* 24252 (A); LOGAN CO., rocky glades, top of Magazine Mt., *Palmer* 24187 (A, MO, UARK); MONTGOMERY CO., Mount Ida, open banks of Ouachita River below bridge, *Demaree* 37965 (SMU); POLK CO., Rich Mt., rich woods E of lodge near Lover's Leap, *Tucker* 12285 (DUKE). **Oklahoma:** LE FLORE CO., Ouachita National Forest, *Goodman* 2545 (GH, ISC, MO, NY, OKL), rocky slopes of Blackfort Mt., near Page, *Palmer* 20913 (A); MCCURTAIN CO.: rocky sandy soil in woods 37 mi. N of Broken Bow, *Stratton* 1146 (OKL); PUSHMATAHA CO., rocky stream bank, 4 mi. W of Albion, *Stratton* 4161 (LL, OKL).

15. *Amorpha fruticosa* L., Sp. Pl. 2: 713. 1753.

A. fruticosa α *vulgaris* Pursh, Fl. Am. Sept. 2: 466. 1814.

A. fruticosa β *emarginata* Pursh, Fl. Am. Sept. 2: 466. 1814.

A. fruticosa γ *angustifolia* Pursh, Fl. Am. Sept. 2: 466. 1814.

- A. croceolanata* Wats., Dendr. Brit. 2: t. 139. 1825
[as *crocealanata*].
- A. emarginata* (Pursh) Sweet, Hort. Brit. 121. 1827.
- A. fragrans* Sweet, Brit. Fl. Gard. 3: t. 241. 1828.
- A. caroliniana* Croom, Amer. Jour. Sci. 25: 74. 1834.
TYPIFICATION: **North Carolina**: near New Bern,
Loomis s.n. (lectotype, NY!).
- A. fruticosa* var. 5 *coerulea* Loudon, Arb. Brit. 607.
1838.
- A. humilis* Tausch, Flora 21: 750. 1838. TYPIFICA-
tion: undetermined; based on cultivated plants
grown in Prague.
- A. fruticosa* var. 4 *Lewisii* Loudon, Arb. Brit. 2: 607.
1838.
- A. tennesseensis* Shuttleworth ex Kunze in Delect.
Sem. Hort. Lips. 1848: 1. 1848; Linnaea 24: 191.
1851. TYPIFICATION: **Tennessee**: Ad rivulos prope
Dandridge, *Rugel* s.n., June 1842 (isolectotype,
GH!).
- A. fruticosa* var. *caroliniana* (Croom) S. Wats.,
Smithsonian Misc. Coll. 258. 188. 1878.
- A. fruticosa* var. *crispa* Kirchn., Arb. Musc. 370.
1864.
- A. pendula* Carr., Rev. Hort. 1870-71: 378.
- A. fruticosa* var. *pendula* (Carr.) Dipp., Laubh. 3:
691. 1893.
- A. fruticosa* f. *albiflora* Sheldon, Bull. Geol. & Nat.
Hist. Surv. Minnesota 9: 72. 1894. TYPIFICATION:
Minnesota: MILLE LACS CO., on the banks of the
Rum River, 3 miles north of Milaca, *Sheldon*
s.n. (holotype, MIN!).
- A. virgata* Small, Bull. Torrey Club 21: 17. pl. 171.
1894. TYPIFICATION: **Georgia**: DE KALB CO., NW.
slope of Stone Mountain, alt. 1000-1400 ft., *Small*
s.n., 3 July 1893 (lectotype, NY!; isolectotypes,
GA!, GH!, ISC!, MIN!, MO!, UC!, US!).
- A. fruticosa* var. *croceolanata* (Wats.) Moullefort,
Arb. Arbriss. 1: 577. 1894.

- A. angustifolia* (Pursh) Boynton, Biltmore Bot. Stud. 1: 139. 1902.
- A. fruticosa* f. *aureo-variegata* Schwerin, Mitteil. Deutsch Dendr. Ges. 16: 255. 1907.
- A. fruticosa* var. *typica* Schneider, Bot. Gaz. 43: 304. 1907.
- A. fruticosa* f. *crispa* (Kirchn.) C. K. Schneider, Illustr. Hand. Laubh. 2: 72. 1907.
- A. fruticosa* f. *pendula* (Carr.) C. K. Schneider, Illustr. Handb. Laubh. 2: 73. 1907.
- A. fruticosa* var. *humilis* (Tausch) Schneider, Bot. Gaz. 43: 305. 1907.
- A. occidentalis* Abrams, N. Y. Bot. Gard. Bull. 6: 394. 1910. TYPIFICATION: **California**: San Diego River, near Old San Diego Mission, *Abrams* 3425 (holotype, DS, not seen; isotypes, A!, DS!, GH!, MO!, NY!, POM!, UC!, US!)
- A. Bushii* Rydb., N. Am. Fl. 24: 31. 1919. TYPIFICATION: **Florida**: uncommon near spring, Chattahoochee River, *Bush* 13 (holotype, NY!; isotype: A!)
- A. Curtissii* Rydb., N. Am. Fl. 24: 30. 1919. TYPIFICATION: **Florida**: DUVAL CO., low ground near river, Jacksonville, *Curtiss* 4703 (holotype, NY!; isotypes, KANU!, US!)
- A. arizonica* Rydb., N. Am. Fl. 24: 33. 1919. TYPIFICATION: **Arizona**: COCHISE CO., along streams, Ramsey Canyon, Huachuca Mountains, *Gooding* 136 (holotype, NY!; isotypes: ARIZ!, GH!, NEB!, NY!, RM!, UC!).
- A. occidentalis* var. *arizonica* (Rydb.) E. J. Palmer, Jour. Arnold Arb. 12: 185. 1931.
- A. fruticosa* f. *humilis* (Tausch) E. J. Palmer, Jour. Arnold Arb. 12: 189. 1931.
- A. fruticosa* f. *coerulea* (Loud.) E. J. Palmer, Jour. Arnold Arb. 12: 189. 1931.

- A. fruticosa* var. *angustifolia* f. *glabrata* E. J. Palmer, Jour. Arnold Arb. 12: 191. 1931. TYPIFICATION: **Texas**: BRAZOS CO., shores of lake, Kurten, *Palmer* 13479 (holotype: A!; isotype, MO!).
- A. fruticosa* var. *tennesseensis* (Shuttleworth ex Kunze) E. J. Palmer, Jour. Arnold Arb. 12: 192. 1931.
- A. fruticosa* var. *oblongifolia* E. J. Palmer, Jour. Arnold Arb. 12: 192. 1931. TYPIFICATION: **Arkansas**: PHILLIPS CO., low alluvial ground, along Mississippi River, near Helena, *Palmer* 26628 (holotype, A!; isotypes, DS!, MO!, UARK!).
- A. occidentalis* var. *emarginata* E. J. Palmer, Jour. Arnold Arb. 12: 185. 1931. TYPIFICATION: **Arizona**: [MARICOPA CO.] Fish Creek, Apache Trail, *Eastwood* 8745 (holotype, A!; isotype, CAS!).
- A. emarginata* Eastwood, Proc. Calif. Acad. Sci. 20: 148. 1931, not *A. emarginata* (Pursh) Sweet, 1827. TYPIFICATION: **Arizona**: [MARICOPA CO.] Fish Creek, Apache Trail, *Eastwood* 8745 (holotype, CAS!; isotype: A!).
- A. DeWinkeleri* Small, Man. Se. Fl. 689. 1933. TYPIFICATION: **Florida**: LEE CO., prairies near Ft. Shackelford, Big Cypress, *Small* 8349 (lectotype, NY!; isolectotypes, GH!, MO!, US!).
- A. fruticosa* var. *angustifolia* f. *latior* Fassett, Rhodora 38: 190. 1936. TYPIFICATION: **Wisconsin**: ST. CROIX CO., stony shore of Lake St. Croix, 10 miles south of Hudson, *Fassett* 17014 (holotype, WIS, not seen; isotypes, GH!, MO!, NY!).
- A. fruticosa* var. *occidentalis* (Abrams) Kearney & Peebles, Jour. Washington Acad. Sci. 29: 483. 1939.

An erect shrub (1)2-3(4) m tall with one to several stems arising from the base and often branching above sufficiently so as to appear bush-topped. Current season's growth rarely glabrous or densely to moderately pilosulose

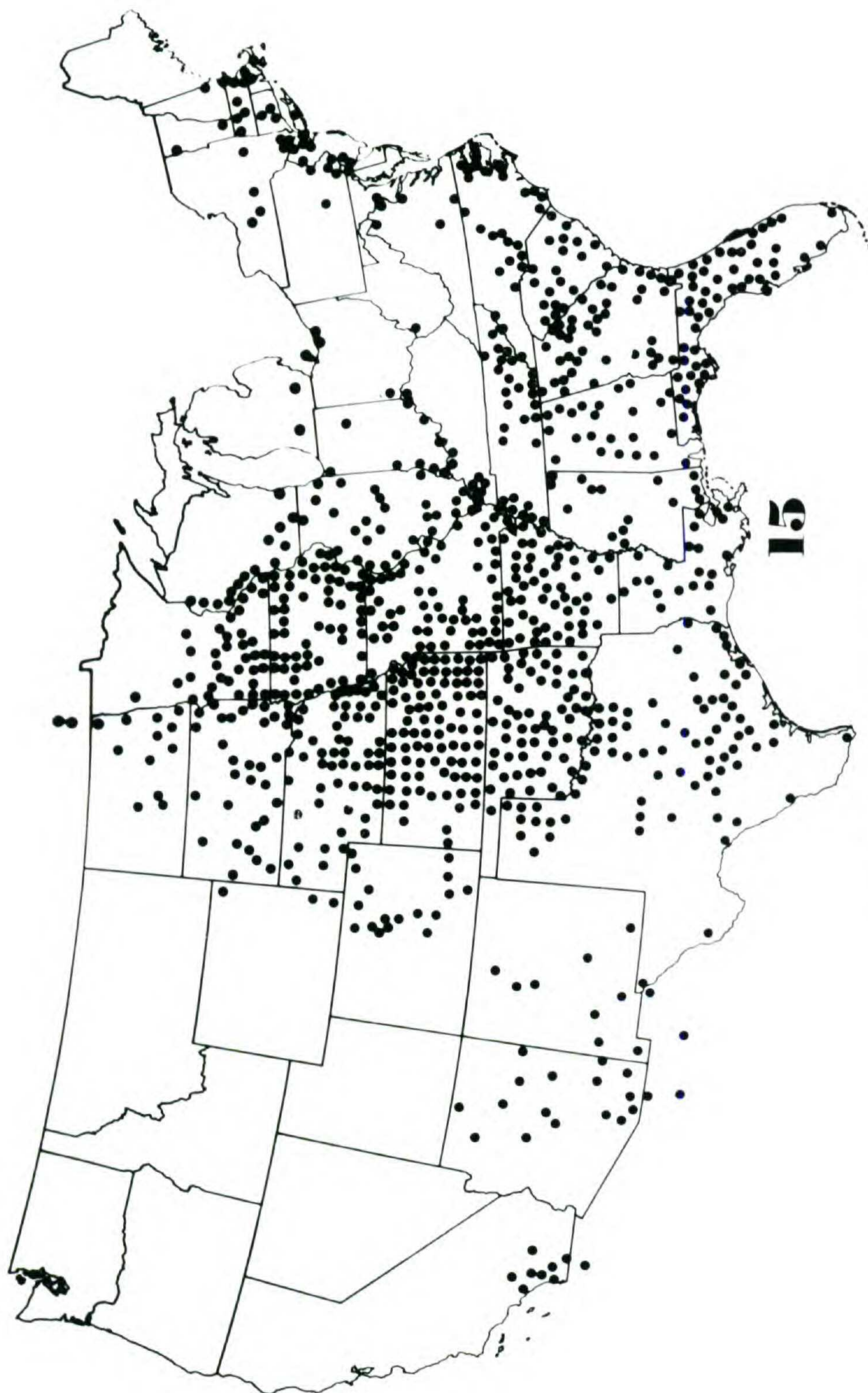
to puberulent or strigillose, occasionally becoming glabrate; eglandular or very sparingly and inconspicuously pustulate-glandular, grayish to dark reddish-brown, occasionally somewhat glaucescent. Buds ovoid to subglobose, light brownish to dark reddish-brown, usually more or less glabrous except for the ciliate margins of the scales or occasionally pilosulose. Leaves wide-spreading to somewhat ascendant, mostly 1-2.8 dm long, usually remaining green but occasionally turning brownish upon drying but not blackening. Petioles moderately puberulent to crispy pilosulose and often becoming glabrate, rarely glabrous, eglandular or sparingly pustulate with small, inconspicuous glands, typically longer than the width of lowermost leaflet, mostly 1-4 cm long. Stipules caducous, narrowly linear, eglandular or very sparingly and inconspicuously pustulate, reddish-brown, externally and especially apically tawny to hyaline pilosulose, usually 2-4 mm long. Rachis of leaf about 0.5-1 mm in diameter, rarely glabrous or more typically sparingly to densely puberulent to crispy pilosulose or glabrate, eglandular or very sparingly and inconspicuously pustulate-glandular. Leaflets 9-21 (31), oblong to elliptic-oblong or elliptic or even occasionally ovate, (1)2-4 (5) cm long and (0.5)1-2 (2.7) cm wide, mostly 2-3 (6) times as long as wide, usually opposite or subopposite, basally symmetrical or rarely asymmetrical, acute to broadly rounded basally, rounded to acute or rarely emarginate apically, entire or nearly so; secondary venation moderately elevated beneath. Midvein usually slender, exserted, about 0.5-1.5 mm long and tapering, but occasionally only very shortly exserted and little, if at all, tapering. Lower surface of leaflets sparsely to densely spreading puberulent to crispy pilosulose (occasionally so densely so as to appear velvety) when young or rarely either glabrous or sometimes glabrate in fruit, often strigose or strigillose or occasionally even short-spiculate with the trichomes either hyaline, or ashy or even tawny; eglandular or inconspicuously beset with small pustulate glands or very rarely rather conspicuously glandular-punctate; upper surface

usually very short-puberulent to glabrous when young and typically glabrate when mature but occasionally densely pilosulose, eglandular. Petiolules about (1.5)2-4 mm long, sparingly to densely puberulent or more typically spreading pilosulose, occasionally becoming glabrate, or very rarely glabrous, usually inconspicuously pustulate-glandular. Stipels slenderly cylindrical, setaceous mostly 2-4 mm long, glabrous to moderately puberulent. Racemes erect, solitary or more typically with several to many clustered together, usually densely flowered, (0.5)1-2(2.5) dm long; rachis of inflorescence usually moderately to densely puberulent or pilosulose, sometimes becoming glabrate in age, eglandular or very sparingly and inconspicuously pustulate-glandular. Pedicels mostly 1-2.2 mm long, sparsely to densely spreading puberulent or more typically crispy pilosulose or short-spiculate or even glabrous, eglandular or very sparingly and inconspicuously pustulate-glandular; bracts caducous, borne basally on the pedicels, very narrowly linear to setaceous, mostly 1.5-3 mm long, sparingly to densely pilosulose externally, usually eglandular, typically dull reddish-brown. Calyx-tube usually obconic but varying to funnelform or even somewhat campanulate, mostly 2-3(4) mm long, glabrous or spiculate, or sparingly to densely puberulent or pilosulose, sparsely to moderately pustulate-glandular on the upper third of tube with small and inconspicuous to large and conspicuous amber-colored glands but occasionally eglandular; lobes with a hyaline, ciliate-fringed margin and with the external surface sparingly to moderately pilosulose and either eglandular or very sparingly beset with inconspicuous pustulate glands; adaxial lobes broadly rounded to broadly triangular-dentate, about 0.2-0.5 mm long; lateral lobes usually acute and triangular-dentate but occasionally broadly rounded, about 0.3-0.8(1.0) mm long; abaxial lobe narrowly triangular-dentate, acute, (0.5)0.8-1.2 mm long. Vexillum about 5-6 mm long about 3.5-4.2 mm wide, broadly obovate, gradually tapering to a rather indistinct claw of about 1-1.5 mm long, moderately to strongly arched, apically broadly rounded

and entire or indistinctly emarginate to irregularly erose, appearing dark reddish-purple either fresh or dried and with the claw and blade enfolding and enveloping the filaments and style. Filaments 6-8 mm long, united into a sheath for the lower 1-2(3) mm, glabrous; anthers 0.4-0.6 mm long, yellow. Style moderately ascending pilose, 5-7 mm long; ovary glabrous or rarely pubescent. Fruit 5-9 mm long and (2.0)3-4.5 mm wide, basally tapering, straight to strongly curved along the abaxial suture and the abaxial suture strongly outwardly bowed, glabrous to densely appressed short-pubescent, conspicuously pustulate-glandular or eglandular. Seeds smooth, reddish-brown, 3.5-4.5 mm long.

Distribution: Southern Quebec south into Florida and west into northern Mexico, southern California, and Wyoming. (Map 15.)

This wide-ranging species is, as one might infer from its lengthy synonymy, extremely variable. Numerous species and/or varieties have been segregated from it in the past and many have been recognized in most recent floristic treatments. The striking variability is such that it might seem reassuring indeed to have a formally designated system by which one could categorize the very dissimilar appearing plants. Unfortunately, however, the examination of many hundreds of specimens soon demonstrates the inadequacy of even the numerous described segregates to convey the extent of the variability encountered not to mention the not inconsiderable number of specimens which clearly match the characteristics of one described taxon in its older growth and another in its younger and more recently formed portions. Clearly then what might be conveniently referred to as the *fruticosa*-complex is an extremely diverse assemblage of populations whose variability is due both to environmentally induced plasticity and also to the presence of a great number of biotypes. I have found it taxonomically unclarifying to attempt to categorize this variability formally by the recognition of the previously



MAP 15. *Amorpha fruticosa*.

segregated species, varieties and forms and have concluded that the variability could best be treated as representing one extremely polymorphic taxon. The alternate approach is exemplified by Steyermark's treatment in the flora of Missouri where as many as four of the five varieties recognized as occurring in Missouri are known from a single county. No indication of ecological preference is suggested to account for at least partial isolation of these populations and they are in fact stated to be "intergrading."

TAXA EXCLUDED FROM THE GENUS AND BINOMIALS AND TRINOMIALS OF UNCERTAIN POSITION

Certain binomials or trinomials have in the interests of completeness been included in the following list which perhaps could have been excluded since they were not validly published. Names published without a diagnosis or description or without a reference to one that was effectively published are *nomina nuda* and hence technically could be ignored (ICBN Art. 32(3)). Also binomials or trinomials which were originally published in synonymy are not validly published (ICBN Art. 34(4)) and hence could be ignored (Art. 12).

Amorpha arborea Hort. ex Schkuhr, Bot. Handb. Deutschl. Gew. 2: 333. 1796. [Publication not seen by me; this binomial was reportedly published as a synonym.]

Amorpha canescens [f.] *glabrescens* Zabel in Beissner *et al.*, Handb. Laubh. Ben. 268. 1903. [Publication not seen by me; reportedly this binomial was published as a *nom. nud.* and a synonym of *A. canescens* f. *glabrata* (A. Gray) N. C. Fassett.]

Amorpha colorata Raf., Aut. Bot. 81. 1840. [Appalachian Mts.] Rafinesque himself questioningly suggested that it might be *A. caroliniana* Croom, and Merrill (Index Rafinesquianus, p. 142. 1949) suggested, again with a question mark, its identity with *A. nitens* Boynton. I am unable to identify it with any certainty.

- Amorpha crocea* Hort. ex Lavallée, Arb. Segrez. 60. 1877.
[Publication not seen by me but this binomial reportedly appeared as a *nom. nud.*]
- Amorpha dealbata* Hort. ex Lavallée, Arb. Segrez. 60. 1877.
[Publication not seen by me but this binomial reportedly appeared as a *nom. nud.*]
- Amorpha discolor* Raf., Aut. Bot. 79. 1840. [Alabama.]
Merrill (Index Rafinesquianus, p. 142. 1949.) synonymized this binomial with *A. fruticosa* L.
- Amorpha elata* Hayne, Dendr. Fl. 134. 1822. [Publication not seen by me. Rydberg cited this binomial in the synonymy of *A. fruticosa* L.]
- Amorpha elatior* Hort. ex Lavallée, Arb. Segrez. 60. 1877.
[Publication not seen by me but this binomial is reportedly a *nom. nud.*]
- Amorpha flexuosa* Raf., Aut. Bot. 80. 1840. [Unaka Mts. of Carolina.] Perhaps a synonym of *A. fruticosa* L. as suggested by Merrill (Index Rafinesquianus, p. 142. 1949).
- Amorpha fruticosa* var. *fragans* Bean, Trees and Shrubs Brit. Isl. 1: 193. 1914. [Publication not seen by me; Palmer states that the brief description would apparently exclude it from synonymy of *A. fragans* Sweet but that its identity is undeterminable.]
- Amorpha gaertnerii* Hort. ex K. Koch, Dendr. 1: 70. 1869.
[Publication not seen by me; reportedly a *nom. nud.*]
- Amorpha gardnerii* Hort. ex. Kirchner, Arb. Musc. 370. 1864. [Publication not seen by me; reportedly a *nom. nud.*]
- Amorpha glandulosa* Blanco, Flora de Filipinas. ed. 1. 555. 1837. [Philippines.] = *Dalaea glandulosa* (Blanco) Merr., Dept. of Interior, Manila. 37. 1905. = *Thornbera dalea* (L.) Rydb., Fl. N. Am. 24(2): 120. 1920. = *Dalea annua* (Mill.) Kuntze, Rev. Gen. 178. 1891.
- Amorpha glauca* Raf., Aut. Bot. 80. 1840. [Missouri.] A synonym of *A. fruticosa* L. *s.lat.* as suggested by Merrill (Index Rafinesquianus, p. 142. 1949.)

- Amorpha Lewisii* Loddiges ex Loudon, Arb. Brit. 2: 607. 1838. [Publication not seen by me; reportedly published in synonymy.]
- Amorpha ludoviciana* Hort. ex Lavallée, Arb. Segrez. 60. 1877. [Publication not seen by me but this binomial is reportedly a *nom. nud.*]
- Amorpha Ludwigii* Hort. ex K. Koch, Dendr. 1: 70. 1869. [Publication not seen by me; reportedly published in synonymy.]
- Amorpha ? lutea* Raf., Fl. Ludov. 105. 1817. [Louisiana.] Clearly not an *Amorpha* but its identity has not yet been established.
- Amorpha macrophylla* Raf., Aut. Bot. 79. 1840. [Florida.] Probably another synonym of *A. fruticosa* L. *s.lat.* as suggested by Merrill (Index Rafinesquianus, p. 142. 1949.). The identity of this name is totally impossible to surmise if one were following Palmer's treatment with its numerous accepted segregates from the *Amorpha fruticosa* complex.
- Amorpha marginata* Hort. ex Lavallée, Arb. Segrez. 60. 1877. [Publication not seen by me but reportedly the binomial appeared as a *nom. nud.*]
- Amorpha non-perforata* Schkuhr, Bot. Handb. Deutschl. Gew. 2: 333. 1796. [Publication not seen. Usually listed in the synonymy of *A. fruticosa* L.]
- Amorpha ornata* Wenderoth, Ind. Sem. Hort. Marburg. 1835. [Publication not seen by me; reportedly a *nom. nud.*]
- Amorpha ovalis* M. E. Jones, Contr. West. Bot. no. 16: 32. 1930. Typification: **Arizona:** Miller Canyon, Huachuca Mts., M. E. Jones 25027 (holotype, not seen; isotypes, CAS!, MO!, OKLA!, RM!, UC!) = *Indigofera sphaerocarpa* A. Gray.
- Amorpha pedalis* Blanco, Flora de Filipinas, ed. 1. 553. 1837. [Philippines.] According to Merrill (Dept. of Interior, Manila. 19. 1905) this is probably *Solominia oblongifolia* DC. (Polygalaceae).

- Amorpha perforata* Schkuhr, Bot. Handb. Deutschl. Gew. 2: 333. 1796. [Publication not seen. Usually listed in the synonymy of *A. fruticosa* L.]
- Amorpha rabiae* Lexarza, Nov. Veg. Desc. fasc. I. 22. 1824. [Michoacan, Mexico.] Palmer (Jour. Arn. Arb. 12: 197. 1931) presents a resumé of the original description. It does not possess the characters of an *Amorpha* but its identity is otherwise uncertain.
- Amorpha retusa* Raf., Aut. Bot. 80. 1840. [Appalachian Mts.] Probably a synonym of *A. fruticosa* L.; Rafinesque's description mentioning its tomentose leaflets and acute calyx-lobes would certainly exclude the possibility of its being *A. glabra* as was suggested by Merrill (Index Rafinesquianus, p. 142. 1949) and Rehder (Bibliogr. Cult. Trees and Shrubs. 369. 1949).
- Amorpha tomentosa* ? Raf., Fl. Ludov. 105. 1817. [Louisiana.] Identity uncertain as all that Rafinesque states about it is "a doubtful species, of which Robin only mentions it being tomentose . . ." Rydberg (N. Am. Fl. 24 (1): 27. 1919) questioningly placed it in the synonymy of *A. paniculata* but the description is far too incomplete to allow anyone to identify the plant being described. It is not even certain that it is an *Amorpha*.
- Amorpha tomentosa* Raf., Aut. Bot. 81. 1840. not Raf., Fl. Ludov. 105. 1817. ["On Wabash and West Kentucky."] Merrill (Index Rafinesquianus, p. 142. 1949) questioningly suggests that it might be a synonym of *A. canescens* Pursh but that species is unknown to me from "West Kentucky" one of the two cited localities.
- Amorpha verrucosa* Raf. Aut. Bot. 80. 1840. [Alabama.] Merrill (Index Rafinesquianus, p. 142. 1949) suggested this binomial was a synonym of *A. fruticosa* L. and I would agree that the original description is vague enough to fit the very broad concept I have of the species, although it would be impossible to tell to which of the segregates recognized by Palmer from the *A. fruticosa* complex that Rafinesque's species belongs.

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