

Contents

	Page
Introduction	247
Historical consideration	248
Economic consideration	249
Geographic distribution	249
Morphological characters	251
Taxonomic position	253
Systematic treatment, with key	253
Collections of <i>Dussia</i> cited	275
Index	277

Illustrations

1. Geographic distribution of collections of <i>Dussia</i>	250
2. <i>Dussia martinicensis</i>	256
3. <i>D. sanguinea</i>	258
4. <i>D. mexicana</i>	259
5. <i>D. cuscatlanica</i>	261
6. <i>D. macrophyllata</i>	264
7. <i>D. lehmannii</i>	265
8. <i>D. coriacea</i>	267
9. <i>D. foxii</i>	270
10. <i>D. tessmannii</i>	271
11. <i>D. discolor</i>	273

THE GENUS *DUSSIA* (LEGUMINOSAE)

By VELVA E. RUDD

Introduction

Dussia is a little known genus of American tropical rain-forest trees of the family Leguminosae, named in honor of Père A. Duss, a French botanist who collected the type material in the Lesser Antilles. The trees, usually tall with broad buttressed bases, are rare, and few herbarium specimens are available, owing to the difficulty of making collections from such large trees.

In this paper, the first general treatment of the group, ten species are recognized, including one described as new. The delimitation of taxa is of necessity tentative because of inadequate material. One species is thus far known only from sterile specimens and another is unknown as to fruit. This premature study was undertaken in an attempt to clarify certain nomenclatural problems involving other genera, particularly *Ormosia*, currently being revised. It is hoped that, by indicating the lacunae in our knowledge, further collection of specimens and data might be inspired.

In addition to material at the U.S. National Herbarium (US), specimens have been examined from the following herbaria, here cited with their abbreviations: Arnold Arboretum of Harvard University (A); Chicago Natural History Museum (F); Gray Herbarium of Harvard University (GH); Institute of Jamaica (IJ); Royal Botanic Gardens, Kew (K); Herbario Nacional de México (MEXU); Missouri Botanical Garden (MO); New York Botanical Garden (NY); Botanical Museum and Herbarium, Utrecht (U); Forest Service Herbarium, U.S. Department of Agriculture (USFS); Instituto Botánico, Caracas (VEN). The writer is grateful to the curators of these institutions for making such material available.

The citations of "F.M. Neg." refer to Field Museum [now Chicago Natural History Museum] negatives of a series of photographs taken in European herbaria by J. F. Macbride during 1929 to 1939.

The maps presented in this paper are based on Goode Base Maps No. 101 M, copyright by the University of Chicago Press.

The majority of the illustrations were prepared by Mrs. Martha H. Niepold.

Historical Consideration

The genus *Dussia* was established by Krug and Urban and applied to collections made by Père A. Duss in the Antillean islands of Martinique and Guadeloupe. The first publication of the name apparently was by Duss, himself, in "Légumineuses de la Martinique" (Com. Rend. Cong. Sc. Cath. (7) 241: 1891). This paper was essentially an annotated checklist, without sufficient data to validate new taxa. "*Dussia martinicensis* Krug et Urban" was characterized merely as an "arbre de taille moyenne," and one collection from Martinique was cited.

Taubert's treatment of the Leguminosae for Engler and Prantl's "Die natürlichen Pflanzenfamilien" (3, Abt. 3:193. 1892) included a brief description in German, with the one species noted, *Dussia martinicensis* Kr. & Urb. A long specific description, in French, with citation of collections, was presented in Duss' "Flore phanérogamique des Antilles françaises" (Ann. Inst. Colon. Marseille 3:223-225. 1897). Urban, one of the authors of the new taxon, finally (Symb. Ant. 1:318-320. 1899) published full generic and specific description in Latin.

Harms (Repert. Sp. Nov. 19:291-294. 1924) described two new species of *Dussia*, *D. cayennensis*, from French Guiana, and *D. lehmannii*, from Colombia. He also transferred to *Dussia* two species from other genera, *D. mexicana* from *Ormosia mexicana* Standl., and *D. micranthera*, a Brazilian species, from *Vexillifera micranthera* Ducke.

Two years later, Harms (Notizbl. Bot. Gard. Berlin 9:972. 1926) published *Dussia tessmannii*, based on Peruvian material, and in 1928 (Repert. Sp. Nov. 24:212. 1928) he transferred the Costa Rican *Diploctropis macrophyllata* Donn. Sm. to *Dussia macrophyllata*, bringing to seven the total number of species assigned to *Dussia*.

Four more species of *Dussia*, *D. sanguinea* Urb. & Ekm., from Haiti (Arkiv. Bot. 24A(4):9. 1931), *D. grandifrons* I. M. Johnst. from Guatemala (Journ. Arn. Arb. 19:118. 1938), *D. cuscatlanica* (Standl.) Standl. & Steyerl., from El Salvador (Field Mus. Pub. Bot. 22:341. 1940), based on *Cassia cuscatlanica* Standl., and *D. coriacea* Pierce, from Venezuela (Bull. Torr. Bot. Club 69:590. 1942), brought the total to eleven species.

In 1939, Amshoff (Meded. Bot. Mus. Utrecht 52:50. 1939) observed that *Geoffroya discolor* Benth. and *Dussia cayennensis* Harms were based on what apparently were duplicates of the same collection *Martin* s.n. at Paris and Kew, and *Martin* 1819 at Berlin. She made the combination *Dussia discolor* (Benth.) Amsh., reducing both *D. cayennensis* Harms and *D. micranthera* (Ducke) Harms to synonymy.

Dussia coriacea Pierce, a Venezuelan species, was next added to the literature (Bull. Torrey Bot. Club 69:590. 1942), followed two years later by *D. avilensis* (Pittier) Pittier (Bol. Téc. Caracas 5:16. 1944), a synonym in part. The complications of this situation are discussed further in connection with the species involved.

The present paper introduces one new species, from Peru.

Economic Consideration

According to Record and Hess (Timbers of the New World, 264. 1943), "the timber of *Dussia* is not utilized except in Salvador where it is said to be of some local importance for lumber . . . so far as is known, suitable only for common interior carpentry and construction; apparently too rare to be utilized extensively."

Standley (Journ. Wash. Acad. Sci. 13:441. 1923), in connection with his original description of *Cashalia cuscatlanica* Standl. [= *Dussia cuscatlanica* (Standl.) Standl. & Steycerm.] states that "this tree is well known in Salvador, under the vernacular name of *cashal*. It is said to be an important lumber tree."

Describing another new species from Panamá, *Cashalia panamensis* Standl. [= *Dussia macrophyllata* (Donn. Sm.) Harms], Standley (Field Mus. Publ. Bot. 4:213. 1929) quotes the collector's notes "the bark has a red sap, which is used as a purgative. The red 'skin' of the fruit is used as a febrifuge, and is sold for this purpose in the native drug shops." Allen, referring to wood of the same species in Costa Rica (The Rain Forests of Golfo Dulce, 197. 1956), states that it is not used locally."

Geographic Distribution

Dussia is an element of the American tropical rain forest, thus far known from restricted areas in the Antilles and southern Mexico southward to central Peru and the Amazon basin of Brazil (fig. 1). The present distribution of the genus suggests a former much more widespread range, probably in Cretaceous or Tertiary time, with subsequent reduction of area and separation of populations due to geologic and physiographic changes.

Each of the ten species of *Dussia* is essentially endemic. One of the most distinctive, *D. lehmannii*, is known only from a limited area along the Pacific coast of Colombia, where it may be a floristic relic of the old Colombian, or Chocó, borderland that is believed to have extended considerably farther out into the Pacific Ocean (Schuchert. Historical Geology of the Antillean-Caribbean Region, 635-639. 1935).

Dussia macropphyllata, the species that appears to be most closely related to *D. lehmannii*, occurs in southern Costa Rica and western Panamá, possibly as a relic from the northern end of the same Chocó borderland (Schuchert, 553).

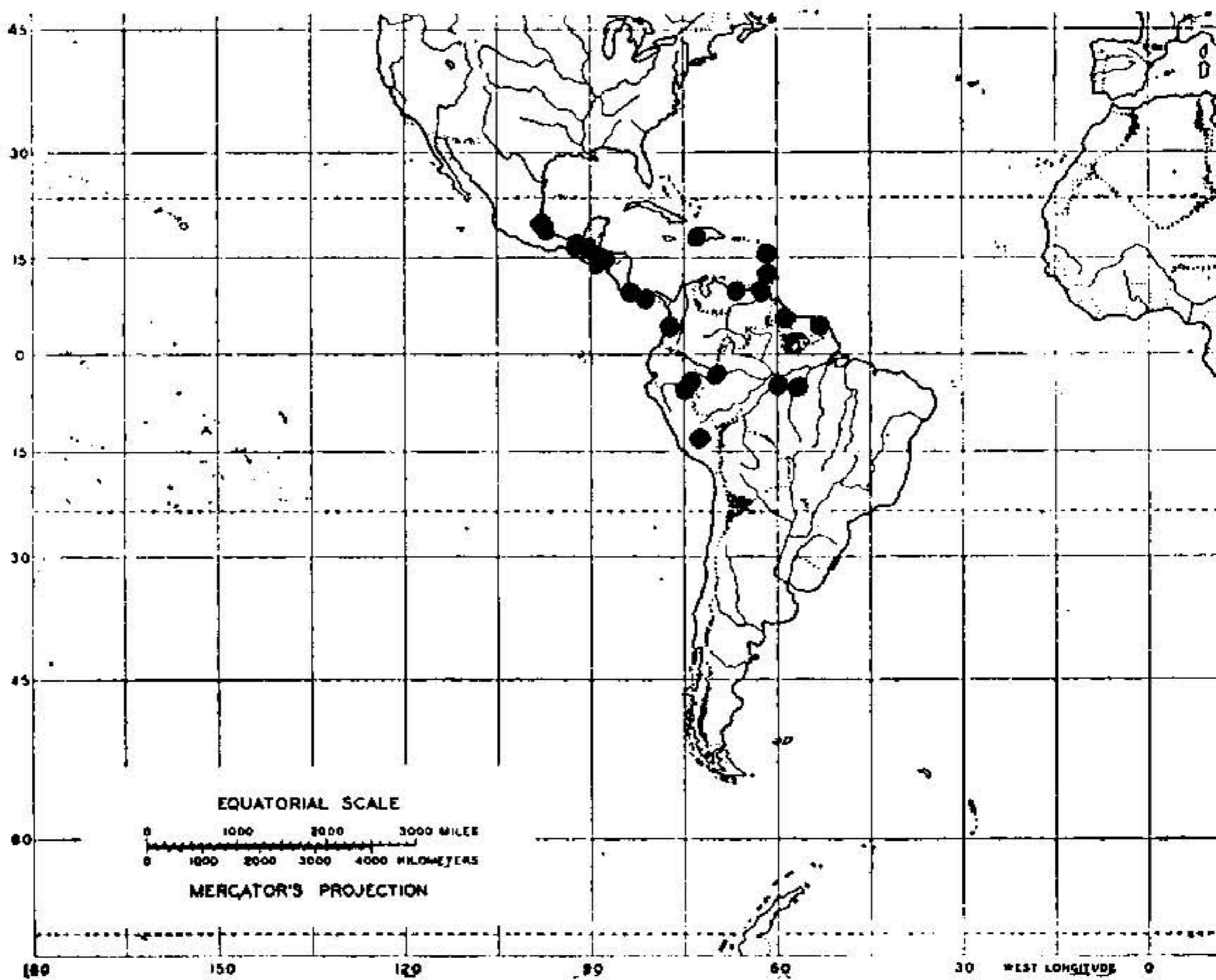


FIGURE 1.—Geographic distribution of collections of *Dussia*.

Another species, *D. coriacea*, is known only from El Avila, above Caracas, Venezuela, with its nearest relatives, *D. foxii*, in Peru, and *D. martinicensis*, in the Lesser Antilles. A common area of origin is suggested.

Dussia sanguinea, of uncertain affinities because it is known only from sterile material, is apparently restricted to the Massif de Hotte region of southwestern Haiti.

Dussia tessmannii and *D. discolor*, showing decreasing resemblance respectively, to *D. lehmannii*, occur eastward along the Amazon basin and along the coastal area of the Guianas. No collections have been reported from the intervening area of the Guayana Shield.

What may be the youngest species of the group, *D. mexicana* and *D. cuscatlanica*, are found in Central America and southern Mexico, possibly having arrived there by way of the Antilles.

On the basis of the scanty available data, I hazard the conjecture that the genus *Dussia* developed on the Chocó borderland and gradually advanced eastward, along two major migration routes. On

route may have been along the periphery of the Guayana Highland, the other into the Caribbean area, perhaps in a counterclockwise direction to Central America.

The geological facts and surmises as summarized by Schuchert (1935), Woodring (Bull. Geol. Soc. Amer. 65:719–732. 1954), and Jenks, ed. (Geol. Soc. Amer. Memoir 65. 1956) seem neither to confirm nor completely to preclude such possibilities.

Morphological Characters

The species of *Dussia* are trees, tall, growing to as much as 50 meters high and 1 meter in diameter, straight-trunked, with high crowns and buttressed bases. The bark is smooth and gray. Blood red sap is found in various parts of the plant, especially in the bark, fruit, and leaves of most specimens. According to Record and Hess (Timbers of the New World, 264. 1943), heartwood is "absent or not distinguishable from the creamy yellow sapwood; parenchyma markings distinct. Luster low. Odorless and tasteless. Of medium density, tough and strong; texture coarse; grain fairly straight." Bark scented of "Haiari" (*Lonchocarpus*) is mentioned by Fanshawe on a label of *Dussia discolor* from British Guiana (*Fanshawe Field No.* 2097).

The young stems are essentially terete, sometimes striate or slightly angular, puberulent to tomentose, glabrate with age. Stipules are lacking or reduced to minute tufts of hairs.

The leaves normally are imparipinnate, with as few as 5 leaflets in some species and as many as 25 in *D. cuscatlanica*. The leaf axis ranges from 8 to 100 cm. long, including petiole of 2.5 to 17 cm. long. The leaflets are alternate to subopposite, estipellate. The petiolules are 3–15 mm. long and 1–5 mm. in diameter. The blades are coriaceous or subcoriaceous, 2–35 cm. long, 1.5–15 cm. broad. The terminal leaflets mostly are obovate; the laterals may be obovate, elliptic, oblong, or ovate. The margin is entire, the apex obtuse to acuminate, the base obtuse to subcordate, often oblique. The upper surface is subnitid, glabrous or nearly so at maturity. The lower surface is pubescent with straight or crispate, simple or septate hairs, or, sometimes, the hairs are no more than papillae. The venation of the leaflets is fairly distinctive and often conspicuous because of the red sap that darkens on drying. The secondary veins are essentially parallel and straight, but arcuate near the leaflet margin. The number of veins and the angles at which they join the midvein seem to show some specific correlation. The tertiary veins are approximately parallel and at right angles to the secondary veins, a characteristic useful in recognizing sterile specimens of the genus.

The flowers are 15–25 mm. long, borne in racemose, pseudoterminal inflorescences 10–30 cm. long. The axes, bracts, bracteoles, and calyx are fulvous or ferruginous pubescent. The pedicels are 4–10 mm. long. The bracts and bracteoles furnish characters useful in specific distinction. The bracts vary from about 5–15 mm. long and may be linear, lanceolate, ovate, or rhombic, with the margin entire, or erose-dentate, and the apex acute to acuminate. The paired bracteoles at the base of the calyx are in most species similar to the bracts, but smaller. In *Dussia macroprophyllata*, however, the proportions are reversed and the bracteoles are conspicuously larger than the bracts.

The calyx is campanulate, somewhat oblique, with five subequal, deltoid teeth or lobes. The corolla is papilionaceous. The petals are pink to lilac or purple, sometimes with greenish or white markings. The outer face of the vexillum is pubescent with white hairs, and the other petals usually have some pubescence.

The ten stamens are subequal in length and are basally attached to the calyx tube. The filaments are separate to the base or there may be some adhesion toward the base, forming groups of two to four stamens. The anthers are small, about 0.5 mm. long, dorsifixed. Both Taubert and Urban mention andromonoecious flowers in *Dussia martinicensis*. There is too little material available to be certain, but it appears that it might be an abnormal condition.

The gynoecium is pubescent, brevistipitate or sessile, 1–5-ovulate. The style is pubescent to within about 2–5 mm. of the apex. The stigma is small and apical. The fruit is ellipsoidal, compressed laterally, commonly 1- or 2-seeded, dehiscent, with the margins of the valves usually rolling inward, coriaceous, densely orange-velutinous. There is some specific difference in size, especially in the width of the valves. The length is in part dependent on the number of seeds, a 2-seeded fruit being nearly twice as long as a single-seeded fruit. The few seeds available for study range in size from 2.5 to 4.5 cm. long and 1.5 to 2.5 cm. in diameter. They are approximately cylindrical in shape, with one end truncate, the other acute. The testa is dark when dry but is reported as red when fresh. The hilum is linear and lateral near one end of the seed.

The preceding summary of gross morphological characters is of necessity based on inadequate material. The leaves and inflorescences are borne so high on the trees that they are recognized with difficulty and rarely collected. The fruits are unknown in two species, the flowers in one, and the complete leaf from another.

Chromosome counts and chemical analyses of *Dussia* apparently have not been made.

Taxonomic Position

The earliest published species of *Dussia*, *D. discolor* (Benth.) Benth., was originally placed by Bentham in the genus *Geoffroya*, of the tribe Dalbergieae. No particular justification was given. Taubert, who validated the genus *Dussia* based on the description and opinion of Urban, included it in the tribe Sophoreae, a classification followed by most subsequent authors. Four species since transferred to *Dussia* were originally ascribed to other genera of the Sophoreae, *Armosia*, *Diplostropis*, and *Vexillifera*. Standley considered his genus *Cashalia*, now placed in synonymy under *Dussia*, "to be closely related to *Tounatea* (*Swartzia*) . . .," a genus usually placed in the subfamily Caesalpinoideae.

Until there is additional data to warrant revision of the generic and tribal relationships of the papilionoid Leguminosae, it is convenient to retain *Dussia* as a member of the tribe Sophoreae, which is characterized by stamens with the filaments separate to the base. The stamens of *Dussia* are somewhat atypical in that there is some tendency toward adhesion at the base, usually in groups of two to four filaments, with the vexillar filament sometimes separate. Perhaps the genus will be found to be more closely related to the Dalbergieae than to the Sophoreae.

Systematic Treatment

Dussia

Dussia Krug and Urban ex Taubert in Engler and Prantl, Natürl. Pflanzenfam. 3, Abt. 3:193. 1892.

Vexillifera Ducke, Arch. Jard. Bot. Rio de Janeiro 3:139. 1922.

Cashalia Standley, Journ. Wash. Acad. Sci. 13:440. 1923.

Trees; leaves alternate, imparipinnate, 5-25-foliolate, the leaflets ternate to subopposite; stipules and stipels lacking; flowers 15-25 mm. long, in racemose, pseudoterminal inflorescences; calyx campanulate, somewhat oblique, with 5 subequal deltoid teeth or lobes; corolla papilionaceous, pink to purple, sometimes with greenish or white markings, the outer surface of the vexillum pubescent; stamens 10, subequal, the filaments essentially separate to the base, or with some adhesion near the base in groups of two to four, the anthers small and dorsifixed; gynoeceum 1-5-ovulate, pubescent, brevistipitate or subsessile, the style pubescent except near apex, the stigma small, apical; fruit orange-velutinous, ellipsoidal, compressed laterally, 2-valved, dehiscent, commonly 1- or 2-seeded; seeds red, approximately cylindrical, acute at one end, truncate at the other, the hilum small, lateral.

The following key is admittedly less than satisfactory. It has been almost impossible to construct what might be a useful tool for identification of unnamed material rather than a mere summary of characters.

Key to species

Leaves 5-9-foliolate, the leaflets predominantly elliptic to ovate or obovate; fruit 2-3 cm. broad (not known in *D. foxii*).

Bracts and bracteoles mostly erose-margined, relatively large, 6-12 × 3-10 mm.; leaves 5-9-foliolate; fruit 2-2.5 cm. broad.

Lower surface of leaflets crisp-pubescent; leaves 7-9-foliolate; bracts smaller than the bracteoles, 7-10 mm. long, 4-7 mm. broad, the bracteoles 9-12 × 8-9 mm.; fruit about 2.5 cm. broad (southern Costa Rica and western Panamá) 5. *D. macrophylla*

Lower surface of leaflets subglabrous to moderately pubescent with hairs minute, subappressed, or reduced to papillae; leaves 5-7-foliolate; bracts larger than the bracteoles, 10-12 mm. long, 8-10 mm. broad, the bracteoles about 6 × 3-5 mm.; fruit 2-2.5 cm. broad (Colombia).

6. *D. lehmannii*

Bracts and bracteoles entire, relatively small, 3-9 × 1.5-5 mm.; leaves 5-foliolate; fruit 2.5-3 cm. broad (not known in *D. foxii*).

Leaflets with apex obtuse; pubescence of leaves and inflorescence fulvous (Venezuela) 7. *D. coriacea*

Leaflets with apex acute; pubescence of leaves and inflorescence ferruginous (Peru) 8. *D. foxii*

Leaves 7-25-foliolate, the leaflets predominantly oblong to oblong-ovate; fruit 2.5-5.5 cm. broad (not known in *D. sanguinea*).

Bracts mostly exceeding the calyx, 12-20 mm. long, 7-10 mm. broad, the bracteoles about as long as the calyx (or, at least, half as long); fruit 3-5 cm. broad, the valves not curling when dry; leaves 13-17-foliolate (upper Amazon region of Peru and Brazil) 9. *D. tessmannii*

Bracts mostly as long as the calyx or shorter, 4-10 mm. long, 0.5-5 mm. broad, the bracteoles shorter than the calyx; fruit 2.5-5.5 cm. broad, the valves curling when dry; leaves 7-25-foliolate.

Lower surface of mature leaflets uniformly crisp-pubescent.

Leaflets 7-13, obtuse to acute, the secondary veins forming approximate 50°-55° angles with the midvein; bracts deltoid to broadly lanceolate, acute or acuminate, 5-10 mm. long, 1.5-5 mm. broad, the bracteoles lanceolate to rhombic, acute, 2-9 mm. long, 1.5-5 mm. broad; fruit 4-5.5 cm. broad (Lesser Antilles and northeastern Venezuela).

1. *D. martinicensis*

Leaflets 11-17, acute to acuminate, the secondary veins forming 60°-65° angles with the midvein; flowers and fruit not known (Haiti).

2. *D. sanguinea*

Lower surface of mature leaflets with hairs subpatent, sometimes minutely papilliform, and sometimes crispate along the major veins.

Leaflets (7-)9-13, the lower surface pallid-pubescent with hairs subpatent to minutely papilliform; flowers 15-18 mm. long; fruit 3-4.5 cm. broad (French Guiana, British Guiana, and lower Amazon region of Brazil) 10. *D. discolor*

Leaflets 9-25, the lower surface fulvous-pubescent with hairs subpatent or sometimes crispate along the major veins; flowers (15-)18-25 mm. long; fruit 2.5-3.5 cm. broad.

Leaves 9-13-foliolate, the axis 15-40 cm. long, the leaflets ovate to oblong or obovate, obtuse or sometimes acute to breviacuminate, 3-26 cm. long, 2-10 cm. broad; bracts lanceolate, entire, acute to acuminate, 5-9 mm. long, 0.5-2 mm. broad, the bracteoles lanceolate, obtuse to acute, 3-4 mm. long, 0.5-1 mm. broad (Veracruz, Mexico).

3. *D. mexicana*

Leaves 11-25-foliolate, the axis 30-100 cm. long, the leaflets predominantly oblong, acuminate, 7-35 cm. long, 2.5-9 cm. broad; bracts tridentate to rhombic or lanceolate, entire or erose, acuminate, 5-10 mm. long, 2-4 mm. broad, the bracteoles obovate, entire or dentate, acuminate, 5-7 mm. long, 2-3 mm. broad (Chiapas, Mexico to Costa Rica) **4. *D. cuscatlanica***

1. *Dussia martinicensis* Kr. & Urb. ex Taubert in Engl. & Prantl. Natürl. Pflanzenfam. 3, Abt. 3:193. 1892; ex Duss, Com. Rend. Sc. Cath. (7) 241. 1891, nomen; in Duss Fl. Ant. Franc. (Ann. Inst. Colon. Marseille 3:224) 224. 1897; in Urb. Symb. Ant. 1:319. 1899. FIGURE 2

Tree, 10-20 m. high; young stems ferrugino- to fulvo-tomentose glabrate; leaves 7-13-foliolate, the axis about 12-25 cm. long, ferrugino- to fulvo-tomentose, the petiole about 4-12 cm. long, the "pairs" of leaflets 3-6 cm. apart, the petiolules 3-5 mm. long, 1.5-2 mm. in diameter, the blades coriaceous, 4-15 cm. long, 3-8 cm. broad, oblong, elliptic, or ovate, the terminal leaflet sometimes obovate, the apex obtuse to acute, the base obtuse or subcordate, sometimes oblique, the upper surface glabrous, the lower surface tightly and minutely crisp-pubescent, the secondary veins 10-15 pairs, forming angles of about 50°-55° with the midvein; inflorescence with axes fulvo- to ferrugino-tomentose; bracts entire, deltoid to lanceolate, 5-10 mm. long, 1.5-5 mm. broad, acute to acuminate, the bracteoles broadly lanceolate to rhombic, 2-9 × 1.5-5 mm., acute; flowers 15-25 mm. long; calyx 8-15 mm. long, the tube 5-9 mm. long, the teeth 3-6 mm. long; petals lilac, usually dark, sometimes almost white; fruit 1- or 2-seeded, ellipsoidal, somewhat compressed, 8-11.5 cm. long, 4-5.5 cm. broad, dehiscent, the valves rolling inward when dry, coriaceous, verruculose, minutely crisp-pubescent with orange-colored hairs; seed reddish, cylindrical, 2.5-4.5 cm. long, 1.5-2 cm. in diameter, acute at one end, truncate at the other, the hilum lateral, near the truncate end, about 5 mm. long, 1-1.5 mm. broad.

TYPE LOCALITY: Bois de Fonds, St. Denis, Martinique. Type collected by A. Duss (No. 1072), cited below.

DISTRIBUTION: Lesser Antilles, and northeastern Venezuela, in forest, at elevations of about 280-850 meters.

LESSER ANTILLES: MARTINIQUE: Bois de Fond, St. Denis, *Duss* 1072 (NY, US, isotypes). Morne Rouge, *Duss* s.n. (F). **GADELOUPE:** Rivière Noir et Rouge, *Duss* 3757 (F, NY, US). **ST. VINCENT:** *H. H. & G. W. Smith*, s.n. (NY)

VENEZUELA: SUCRE: Cerro Patao, Peninsula de Paria, *Steyermark & Agostini* 91191 (US).

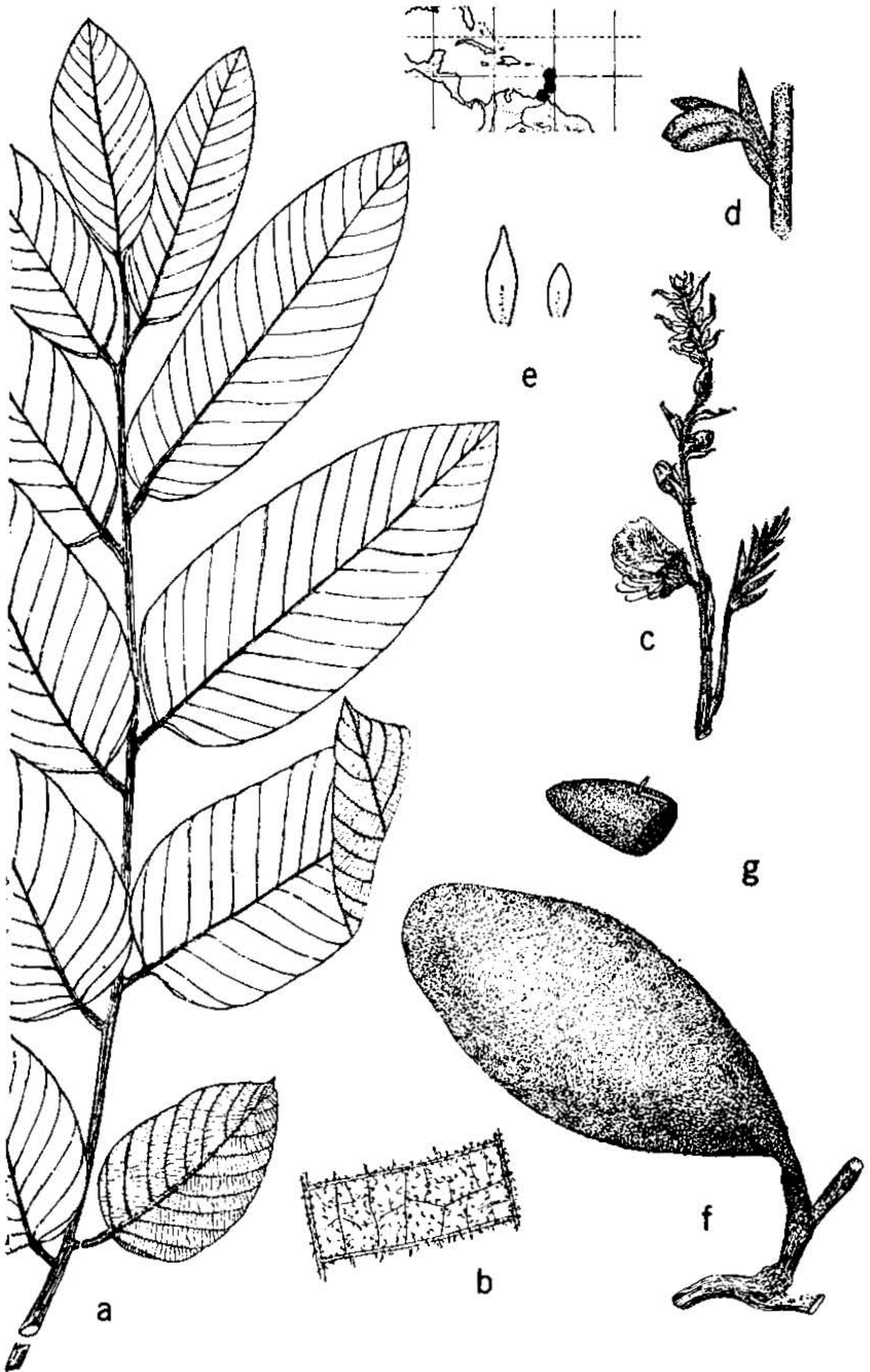


FIGURE 2.—*Dussia martinicensis*: a, leaf, $\times \frac{1}{2}$; b, portion of leaflet lower surface showing crispate pubescence, $\times 5$; c, portion of inflorescence, $\times \frac{1}{2}$; d, flower bud with bract and bractlet, $\times 1$; e, bract (larger) and bractlet, $\times 1$; f, fruit, $\times \frac{1}{2}$; g, seed, $\times \frac{1}{2}$.

Local names: Bois-gamelle (Martinique); caconnier blanc (Guadeloupe).

Urban also cites a collection by Ramage from Dominica, locally called "pommier," which I have not seen.

This species is the type of the genus. It is known only from a few localities in the Lesser Antilles and the Paria Peninsula of Venezuela, unless *D. sanguinea*, represented only by sterile material from Haiti, will be found to be conspecific. The available herbarium collections of *D. martinicensis* do include both flowers and fruits, but there is too little material to indicate what the range of characters might be.

The crispate pubescence on the lower surface of the leaflets is most like that found in *D. coriacea*, *D. foxii*, and *D. sanguinea*. The number and shape of the leaflets suggests *D. mexicana* and *D. discolor*. The fruit is similar to that in *D. coriacea*, *D. discolor*, and *D. cuscatlanica*. The bracts are of the general shape of those of *D. mexicana*, *D. discolor*, *D. coriacea*, and *D. foxii*.

In résumé, *Dussia martinicensis* appears to be intermediate, both in morphological characters and geographic position, between the species of northern South America and Mexico.

2. *Dussia sanguinea* Urb. & Ekm. Arkiv. Bot. 24 A (4): 9. 1931. FIGURE 3

Tree, to about 50 m. tall; young stems fulvo- to ferrugino-puberulent; leaves 11-17-foliolate, the axis about 10-20 cm. long, the petiole 6-10 cm. long, the "pairs" of leaflets 1-3.5 cm. apart, the petiolules 4-5 mm. long, 1-2 mm. thick, the blades coriaceous, 2-8 cm. long, 1.5-3 cm. broad, ovate to oblong, the terminal leaflet usually obovate, the apex acute to breviacuminate, the base obtuse, the upper surface glabrous, the lower minutely and densely crisp-pubescent and also papillose-farinose, the secondary veins about 15 pairs forming angles of 60°-65° with the midvein; inflorescence, flowers, and fruit not known.

TYPE LOCALITY: "Massif de la Hotte in parte occidentali prope Les Roseaux ad Nan-Patates in sylvis cr. 1000 m. alt." Type collected by E. L. Ekman (No. H. 10709), cited below.

DISTRIBUTION: Known only from southwest Haiti.

HAITI: SUD: Roseaux-Nan Patates, Massif de la Hotte, Ekman H. 10709 (IJ, NY, isotypes). Formond, Ekman H. 7569 (IJ). Rochelois, Ekman H. 7928 (IJ).

According to Ekman, this species is "non rara," yet it is known only from his three sterile collections. Superficially, the leaves, with numerous, acuminate leaflets suggest *Dussia cuscatlanica*. The pubescence on the lower surface of the leaflets is crispate, resembling that of *D. martinicensis*. Collection of flowers and fruit is necessary before the correct position of *D. sanguinea* can be established.

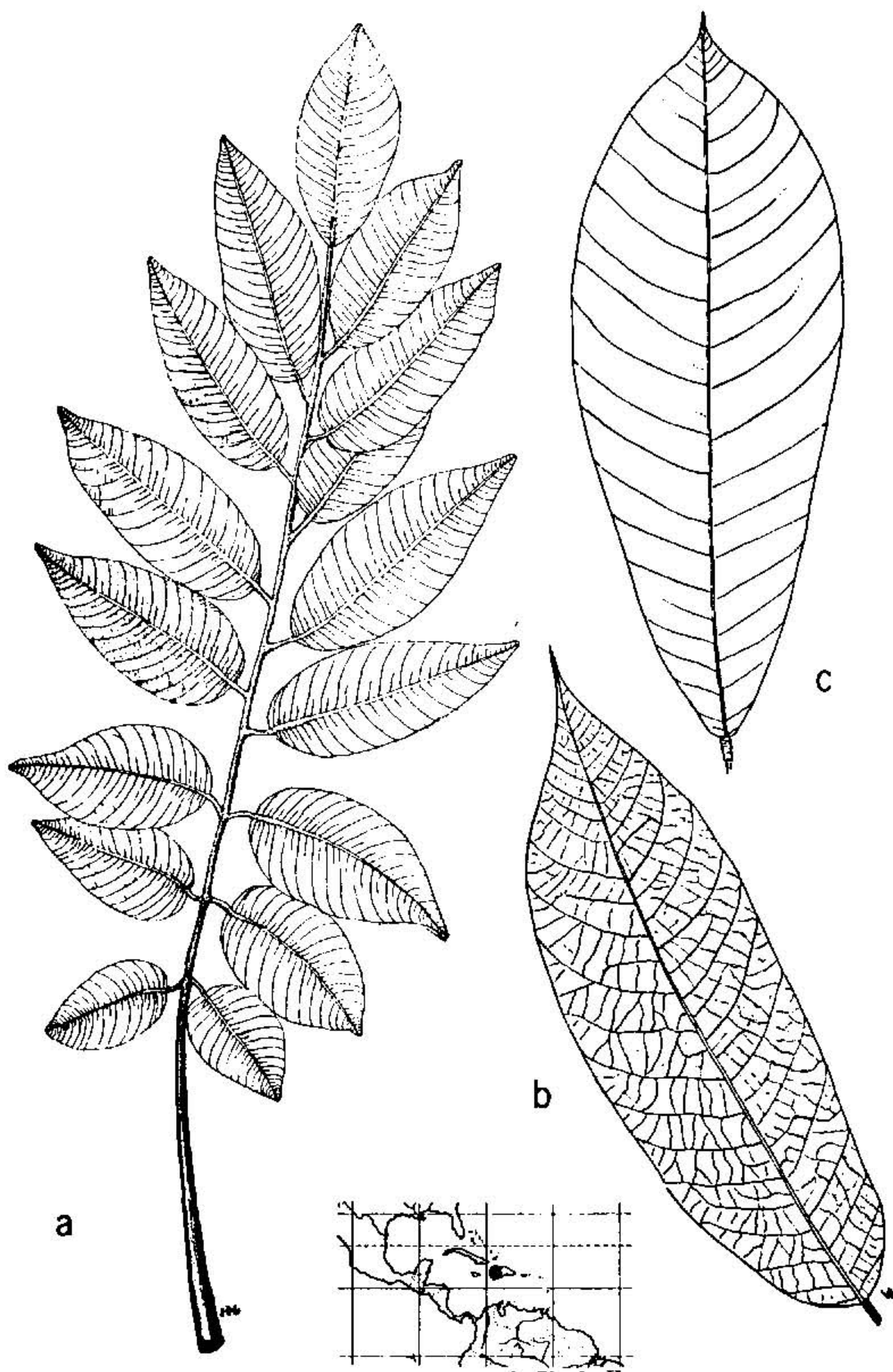


FIGURE 3.—*Dussia sanguinea*: *a*, leaf, Ekman H.10709; *b* and *c*, leaflets, Ekman H.7569, all $\times \frac{1}{2}$.

3. *Dussia mexicana* (Standl.) Harms, Repert. Sp. Nov. 19: 294. 1924.

FIGURE 4

Ormosia mexicana Standl. Contrib. U.S. Nat. Herb. 23: 436. 1922.

Tree, to about 30 m. tall; young stems fulvo- or ferrugino-tomentose, glabrate; leaves 9–13-foliolate, the axis 15–40 cm. long, the petiole 6–11 cm. long, the “pairs” of leaflets 2–4 cm. apart, the petiolules

—7 mm. long, 1-2 mm. in diameter, the blades subcoriaceous, 3-26 cm. long, 2-10 cm. broad, ovate to oblong, the terminal leaflet usually ovate, the apex predominantly obtuse, acute, or sometimes brevicuminate, the base obtuse to subcordate, often oblique, the upper

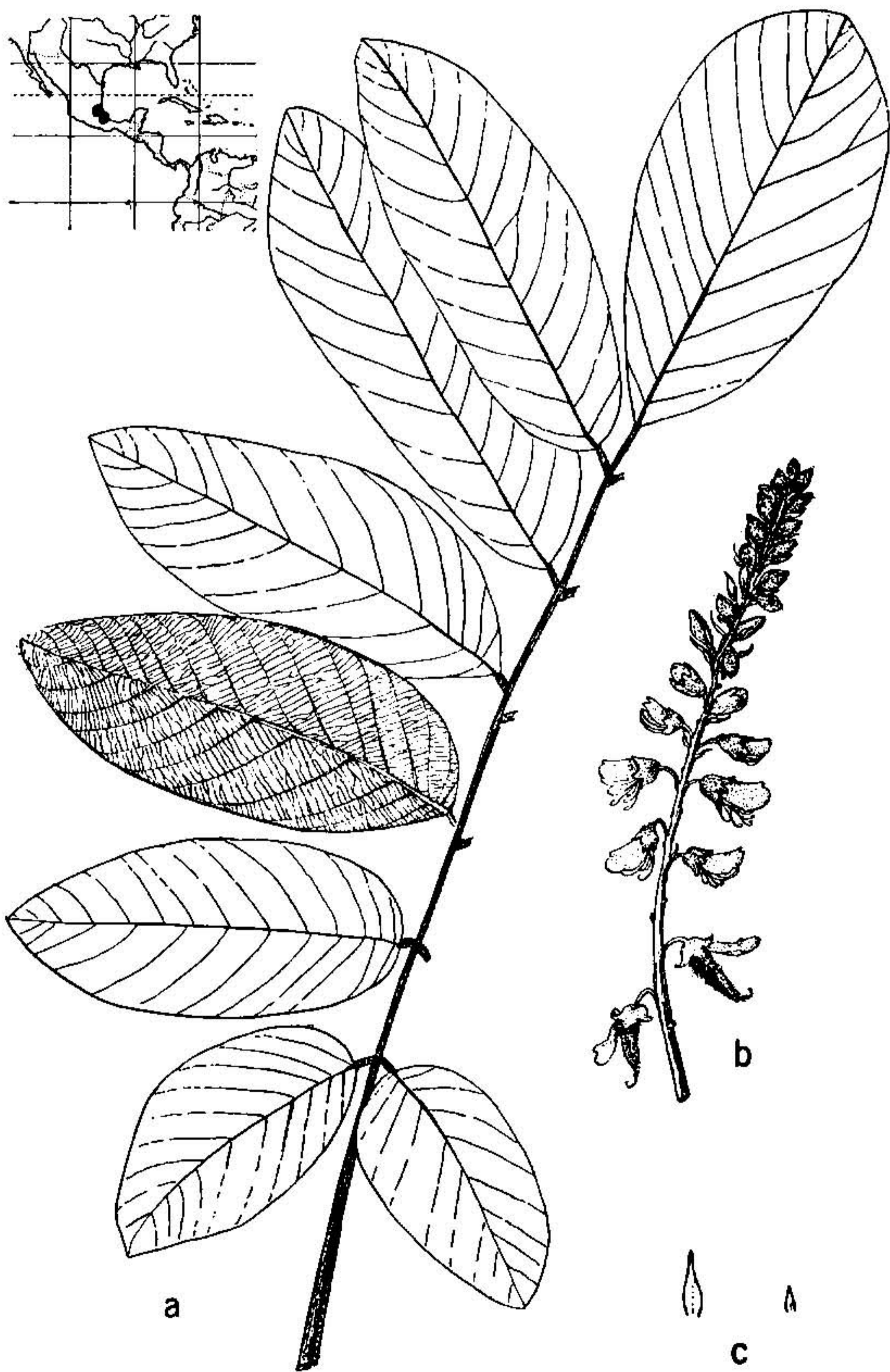


FIGURE 4.—*Dussia mexicana*: a, leaf, $\times \frac{1}{2}$; b, portion of inflorescence, $\times \frac{1}{2}$; c, bract (larger) and bracteole, $\times 1$.

surface glabrous, the lower surface moderately puberulent with patent or subpatent hairs, or sometimes crispate along the major veins, the secondary veins commonly 8–15 pairs, forming angles of 50° – 60° with the midvein; inflorescence with axes ferrugino-tomentose, the bracts lanceolate, acute to acuminate, 5–9 mm. long, 0.5–2 mm. broad, the bracteoles lanceolate, obtuse to acute, $3\text{--}4 \times 0.5\text{--}1$ mm.; flowers 18–22 mm. long; calyx 8–10 mm. long, the tube 5–6 mm. long, the teeth 3–4 mm. long; petals pink; ovary fulvo-villous; fruit minute, fulvo-velutinous, 5–6 cm. long and about 2.5 cm. broad, dehiscent, the valves curling; seeds not seen.

TYPE LOCALITY: Zacuapan, Veracruz, Mexico. Type collected by C. A. Purpus (No. 6326), cited below.

DISTRIBUTION: Known only from the state of Veracruz, Mexico, in forest.

MEXICO: VERACRUZ: Zacuapan, Purpus 6326 (GH, MO, NY, US type *Ormosia mexicana*). El Mirador, Purpus 277 (A), 16459 (A, F, US); Liebmann 5355 (F). Zontecomapan, André & Artell 5 (US). Tapalapan, André 91 (US).

Local names: frijolillo; jaboncillo.

Dussia mexicana appears to be most closely related to *D. cuscatlanica*, its nearest neighbor geographically. The two species have similar spreading pubescence and in many characters there are but small differences. In general, the leaves, leaflets, flowers, floral bracts and fruits of *D. mexicana* are smaller than those of *D. cuscatlanica*. The leaflets of *D. mexicana* are acute or obtuse at the apex but usually conspicuously acuminate in *D. cuscatlanica*. Superficially in shape and number of leaflets, *D. mexicana* and *D. martinicensis* are similar, differing in the crispate pubescence of the latter, more spreading in *D. mexicana*.

4. *Dussia cuscatlanica* (Standl.) Standl. & Steyerl. Field Mus. Pub. B. 22:341. 1940. FIGURE

Cassia cuscatlanica Standl. Journ. Wash. Acad. Sci. 13:441. 1923.

Dussia grandifrons Johnst. Journ. Arn. Arb. 19:118. 1938.

Tree, to about 50 m. tall; young stems fulvo- to ferrugino-pubescent, the hairs patent to crispate, glabrate with age; leaves 11–25-foliolate, the axis about 30–100 cm. long, the petiole 5–17 cm. long, the “pair” of leaflets 4–8 cm. apart, the petiolules 4–10 mm. long, 1.5–4 mm. thick, the blades subcoriaceous, 7–35 cm. long, 2.5–9 cm. broad, oblong, sometimes ovate or obovate, the apex acuminate to acute, the base obtuse, truncate, or subcordate, the upper surface glabrous, the lower surface moderately pubescent with subpatent or somewhat crispate hairs, the secondary veins mostly 15–20 pairs, forming angles of 40° to 60° with the midvein; inflorescence with axes fulvo-ferrugino-tomentose, the bracts tridentate to rhombic, or lanceolate, ciliate or entire, acuminate, 5–10 mm. long, 2–4 mm. broad, the



FIGURE 5.—*Dussia cuscutlanica*: *a*, portion of young leaf, $\times \frac{1}{2}$; *b*, portion of leaflet lower surface showing spreading pubescence, $\times 5$; *c*, calyx with bracteole, $\times 1$; *d*, bract (larger) and bracteole, $\times 1$; *e*, portion of inflorescence with young fruit, $\times \frac{1}{2}$; *f*, mature fruit, $\times \frac{1}{2}$.

bracteoles obovate, entire or dentate, acuminate, 5–7 mm. long and 2–3 mm. broad; flowers (15–) 18–25 mm. long; calyx 8–10 mm. long, the tube 4–5 mm. long, the teeth 4–5 mm. long; petals pink with greenish or purple markings; fruit 5–10 cm. long, 1- or 2-seeded, fulvo-velutinous, 2.5–3.5 cm. broad, dehiscent, the valves curling; seeds 2–3.5 cm. long, 1.3–1.7 cm. in diameter.

TYPE LOCALITY: Finca Colima, Sierra de Apaneca, Ahuachapán, El Salvador, in mountain forest, at 870 meters elevation. Type collected by P. C. Standley (No. 20197), cited below.

DISTRIBUTION: In forest, southern Mexico to Costa Rica, at 20–2000 meters elevation.

MEXICO: CHIAPAS: Near Finca Prusia, south of Jaltenango, *Miranda* 6964 (MEXU, US).

GUATEMALA: CHIMALTENANGO: Volcán Fuego, *Steyermark* 52072 (A,F). QUEZALTENANGO: Colomba, *Skutch* 2027 (A type of *D. grandifrons*, F,NY, US). Quebrada San Gerónimo, between Santa María de Jesús and Calahuaché, *Steyermark* 33329 (F). Río Samalá, between Santa María de Jesús and Calahuaché, *Steyermark* 33862 (F). SUCHITEPÉQUEZ: Volcán Zunil, *Steyermark* 35244 (F).

EL SALVADOR: AHUACHAPÁN: Sierra de Apaneca, *Standley* 20197 (GH, NY,US type of *Cashalia cuscatlanica*). Colina de Santa Tecla, *Calderón* 1752 (GH,NY,US) 2070 (GH,NY,US). Comasagua, *Calderón* 1379 (GH,US).

HONDURAS: ATLÁNTIDA: Tela, Lancetilla Valley, *Standley* 54199 (US), 55293 (US).

COSTA RICA: ALAJUELA: La Palma de San Ramón, *Brenes* (412) 4627 (F). PUNTARENAS: Golfito de Golfo Dulce, *Allen* 5988 (US).

Local names: Matabuey (Mexico); cashal (El Salvador); cereza de montaña, garvancillo de montaña, palo de tigre (Guatemala).

The longest leaves and the largest leaflets of the genus are to be found in this species. The type collection of *D. grandifrons* appears to be an especially luxuriant example of *D. cuscatlanica*. The oblong, acuminate leaflets, frequently as many as 25, and the spreading pubescence found on the leaves and young stems of most specimens help to distinguish the species. The collection, *Allen* 5988, referred tentatively to *D. cuscatlanica*, exhibits finer pubescence, rather crispate, and the secondary veins of the leaflets meet the midvein at a broader angle than average, resembling somewhat the type collection of *D. sanguinea*.

This species is the type of the genus *Cashalia*, originally placed in the Caesalpinaceae, and later recognized as synonymous with *Dussia*.

A photograph showing the buttressed based trunk of *D. cuscatlanica* was published by Miranda in "La Vegetación de Chiapas" (pt. 1:86. 1952).

5. *Dussia macrophyllata* (Donn. Sm.) Harms, Repert. Sp. Nov. 24:212. 1928.

FIGURE 6

Diplothropis macrophyllata Donn. Sm., Bot. Gaz. 61:56. 1913.

Cashalia panamensis Standl. Trop. Woods 16:16. 1928, nomen; Field Mus. Bot. 4:212. 1929.

Tree, to about 40 m. tall; young stems fulvo- to ferrugino-tomentose; leaves 7- or 9-foliolate, the axis 25–30 cm. long, tomentose, the petiole 10–12 cm. long, the "pairs" of leaflets 4–5 cm. apart, the petiolules 4–5 mm. long, 2–4 mm. in diameter, the blades coriaceous, 6–18 cm. long, 4–9 cm. broad, ovate, elliptic, elliptic-oblong, or obovate, the apex obtuse, the base obtuse to subcordate, the upper surface glabrous, the lower surface moderately to densely crisp-pubescent, the secondary and tertiary veins raised, the secondary veins about 15 pairs, forming angles of about 55° with the midvein; inflorescence with axis ferrugino-tomentose, the bracts clawed, rhomboid-lanceolate, acuminate, 7–10 mm. long, 4–7 mm. broad, oblique, erose, the bracteoles clawed, cordate, erose-dentate, 9–12 mm. long, 8–9 mm. broad, acute; flowers 17–20 mm. long; calyx about 10 mm. long, the tube 5 mm. long and the teeth 5 mm. long; petals purplish; fruit [submature] about 5 cm. long and 2.5 cm. broad 1-seeded.

TYPE LOCALITY: Las Vueltas, Tucurrique, Cartago, Costa Rica, in forest, at an elevation of 635 meters. Type collected by A. Tonduz (No. 12949), cited below.

DISTRIBUTION: In rain forest, at elevations of 15 to 2000 meters, southern Costa Rica and western Panamá.

COSTA RICA: CARTAGO: Tucurrique, Tonduz 12949 (NY, US type of *Diplothropis macrophyllata*). PUNTARENAS: Coto Junction, Allen 6655; Golfito de Río Dulce, Allen 6703 (photographs by Allen in "Rain Forests of Golfo Dulce," pl. 15. 1956).

PANAMÁ: BOCAS DEL TORO: Almirante, Cooper 520 (F type of *Cashalia panamensis*, US). CHIRIQUÍ: El Volcán, Little 6048 (MO, US, USFS).

Local names: Citrón, pizarró (Panamá).

This species shares with *D. lehmannii* the character of bracts and bracteoles that are larger and more leaflike than in any other species of the genus, and it is unique in that the bracteoles are larger than the bracts.

The relatively few, predominantly broad, obovate leaflets, densely crisp-pubescent below, and the fairly small fruit, help to distinguish *D. macrophyllata*. Probably *D. lehmannii* and *D. coriacea* are its closest relatives, but *D. cuscatlanica*, its nearest neighbor geographically, is least related.

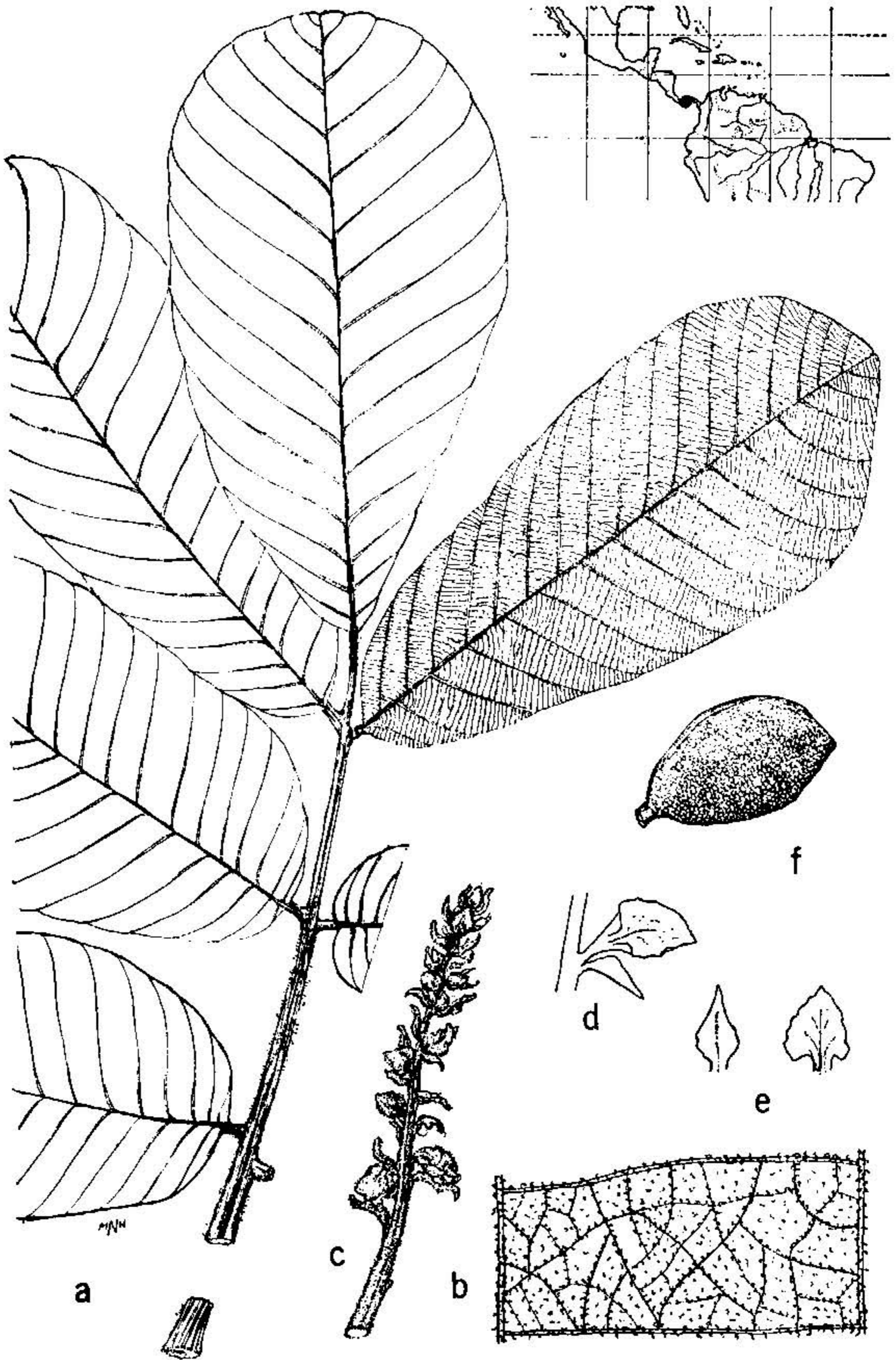


FIGURE 6.—*Dussia macrophyllata*: a, leaf, $\times \frac{1}{2}$; b, portion of lower surface of leaflet showing crispate pubescence, $\times 5$; c, portion of inflorescence, $\times \frac{1}{2}$; d, flower bud showing bract and bracteole, $\times 1$; e, bract (smaller) and bracteole, $\times 1$; f, fruit, $\times \frac{1}{2}$.

Dussia lehmannii Harms, Repert. Sp. Nov. 19:292. 1924. FIGURE 7

Tree, to about 35 m. tall; young stems fulvo-puberulent, glabrate; leaves 5-7-foliolate, the axis 13-40 cm. long, finely puberulent, the



FIGURE 7.—*Dussia lehmannii*: a, portion of leaf, $\times \frac{1}{2}$; b, fruit, $\times \frac{1}{2}$; c, opened fruit, showing seeds, $\times \frac{1}{2}$; d, flower with bract and bracteole, $\times 1$; e, bract (larger) and bracteole, $\times 1$.

petiole 8–20 cm. long, the “pairs” of leaflets 3–6 cm. apart, the petiolules 5–15 mm. long, 2–5 mm. in diameter, the blades coriaceous 8–26 cm. long, 4–15 cm. broad, elliptic, ovate, or obovate, the apex breviacuminate or sometimes obtuse the base obtuse or subcordate the upper surface glabrate, the lower surface puberulent with short subappressed hairs and also minutely papillose, appearing farinose the secondary veins mostly 10–12 pairs, forming angles of 45°–50° with the midvein; inflorescence fulvo-puberulent, glabrate, the bracts deltoid-ovate, acute, somewhat erose, about 10–12 mm. long and 8–10 mm. broad, the bracteoles about 6 mm. long and 3–5 mm. broad, rhombic, acute, erose; flowers 18–20 mm. long; calyx 8–10 mm. long, the teeth about half as long as the tube; petals pinkish to lilac fruit ellipsoidal, dehiscent, minutely fulvo-velutinous, 1- or 2-seeded 3–5 cm. long, 2–2.5 cm. broad; seeds 20–30 mm. long, 10–14 mm. diameter.

TYPE LOCALITY: Coastal region between Buenaventura and Guapi, El Valle or Cauca, Colombia. Type collected by F. C. Lehmann (N. 8985), probably no longer extant, photograph cited below.

DISTRIBUTION: Known only from the general area of the type collection, at elevations up to about 80 meters.

COLOMBIA: EL VALLE: Río Yurumanguí, between Isla de Golondro and La Amargura, *Cuatrecasas* 16054 (F). Río Calima, between La Esperanza and Bellavista, *Cuatrecasas* 16788 (F, US). Río Calima, Quebrada de la Br. *Cuatrecasas* 21075 (F), 26094 (US). Barco, *Cuatrecasas* 17258 (F, US). Quebrada de Guapecito, *Cuatrecasas* 17680 (F, US). Bahía de Buenaventura, Quebrada San Joaquín, *Cuatrecasas* 19897 (F, US). **CAUCA, or EL VALLE?:** Between Buenaventura and Guapi, *Lehmann* 8985 (F.M. Neg. 1896, photo of type ex l.).

Local names: Embagatao, bagatá.

The smallest fruits of the genus are found in this species. Other characters that aid in recognition are the relatively few large leaflets with fine, pseudofarinose pubescence. The bracts are conspicuous, usually erose, the bracteoles fairly large and also erose. The nearest relative probably is *D. macrophyllata*. The two species are readily separable but both have smaller fruit than the other species of *Dussia* and large leaflets, bracts, and bracteoles.

7. *Dussia coriacea* Pierce, Bull. Torrey Club 69:590. 1942. FIGURE 1

Ormosia avilensis Pittier, Bol. Soc. Venez. Cien. Nat. 4:84. 1938, pro parte (descr. flor., non typus fructiferus), non emend Pierce, loc. cit.

Dussia avilensis (Pittier) Pittier, Bol. Tée. Caracas 5:16. 1944, pro parte (flores fructusque, non typus fructiferus).

Tree, to about 20–30 m. tall, the trunk 60 cm. in diameter; young stems crisp-pubescent with fulvous hairs; leaves 5-foliolate, the axes about 8–12 cm. long, crisp-pubescent, the petiole 4–6 cm. long, the “pairs” of leaflets 2.5–4 cm. apart, the petiolules 3–6 mm. long and about 2 mm. in diameter, the blades coriaceous, ovate to oblong

iptic, the terminal leaflet usually obovate, 4–13 cm. long, 2.5–7 cm. broad, the apex obtuse, the base obtuse to subcordate, the upper surface glabrous at maturity, the lower surface minutely crisp-bescent, the secondary veins about 13–15 pairs, forming angles of about 55° with the midvein; inflorescence with axes fulvo-tomentose.

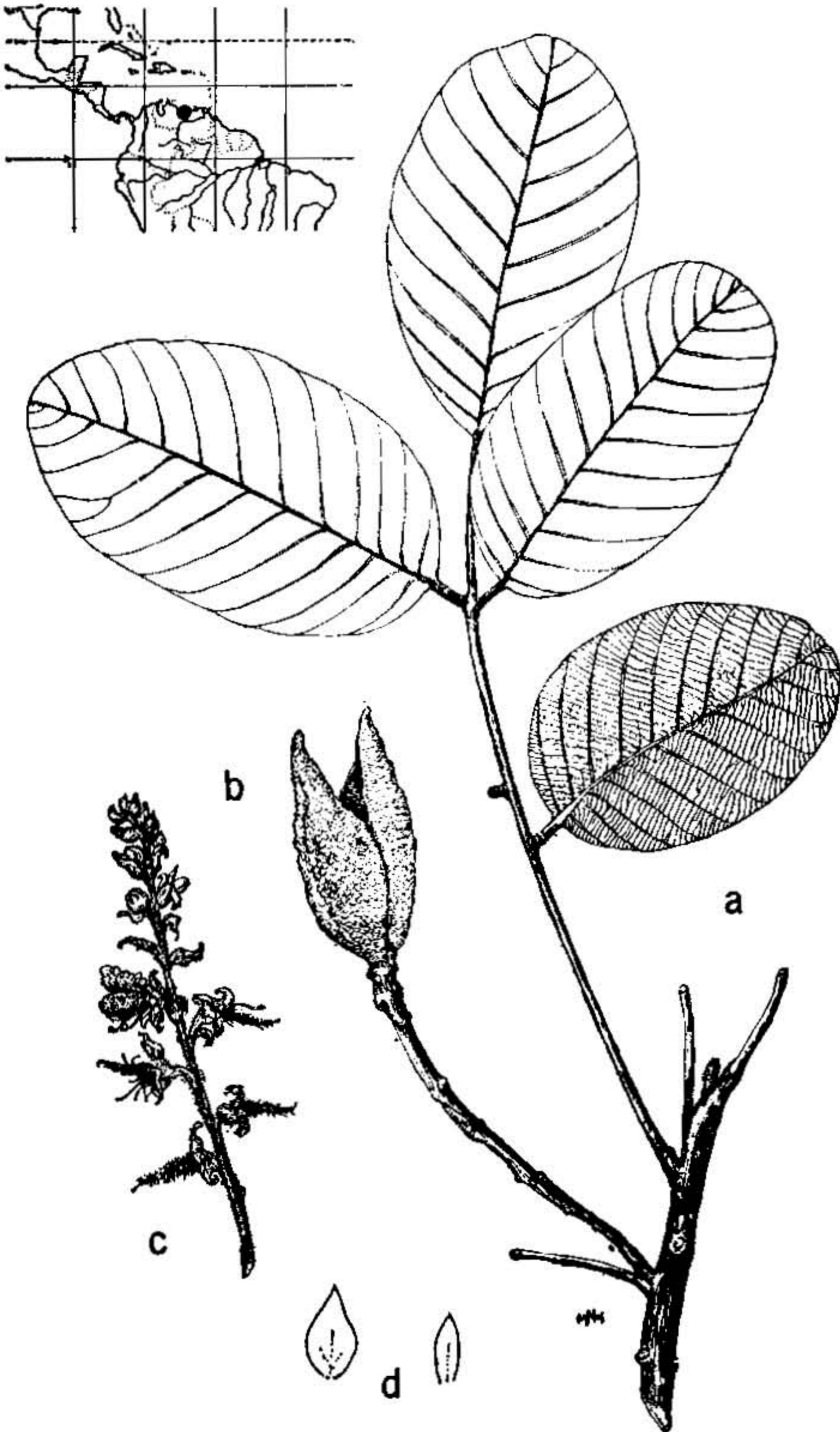


FIGURE 8.—*Dussia coriacea*: a, leaf, $\times \frac{1}{2}$; b, fruit, partly opened, $\times \frac{1}{2}$; c, portion of inflorescence, $\times \frac{1}{2}$; d, bract (larger) and bracteole, $\times 1$.

the bracts lanceolate to ovate, acute, entire, 4–9 mm. long, 2–5 mm. broad, the bracteoles lanceolate or rhombo-lanceolate, acute to obtuse, entire, 3–7 mm. long and 1.5–3 mm. broad; flowers 15–17 mm. long, calyx 10 mm. long, the tube and teeth about 5 mm. long each; petals reddish purple; fruit fulvo-velutinous, 5–7 cm. long, 2.5–3 cm. broad; seed about 3 cm. long and 1.5 cm. in diameter.

TYPE LOCALITY: "Selvas del Avila," Distrito Federal, Venezuela. Type collected by E. Delgado (No. 47), cited below.

DISTRIBUTION: Known only from the type locality, in sheltered forest at about 1600 meters elevation.

VENEZUELA: DISTRITO FEDERAL: El Avila, Caracas, *Delgado* 47 (F, G, I, type, US, VEN), 153 (F, G, US, VEN), 430 (US, VEN)

Dussia coriacea, thus far known only from the type locality, recognizable by its leaves, 5-foliolate, with subelliptic, obtuse leaflets, crisp-pubescent below. They resemble but are smaller than those of *D. macrophyllata*. The bracts resemble those of *D. martinicensis*. The fruit is intermediate in size and shape between those of *macrophyllata* and *D. martinicensis*.

Pierce's name for this species, *Dussia coriacea*, is correct, but there has been considerable confusion in nomenclature and typification. Somehow, material from Delgado's collections of *Dussia* and *Ormosia* became mixed, a situation unfortunately overlooked by Pittier. A sheet of *Delgado* 35 (erroneously cited in publication as 37) with leaves and seeds of *Ormosia* was annotated as the type of *O. avilensis* Pittier. The floral portion of the original description of *O. avilensis* was based on *Dussia* flowers, undoubtedly from *Delgado* 47, but no flowering specimen was cited.

In connection with his studies of *Ormosia*, Pierce encountered the bigeneric description, and as a means of clarification, published *Dussia coriacea* based on the collections of Delgado, Nos. 47 and 153, along with an emendation of *O. avilensis* to exclude the description of *Dussia* flowers. Pittier, still not recognizing that a mixture of collections was involved, apparently misinterpreted Pierce's delimitation of *Dussia* and *Ormosia* and transferred *Ormosia avilensis* to *Dussia avilensis* (Pittier) Pittier, placing *D. coriacea* Pierce in synonymy. In the list of "colectores y colecciones Venezolanas papilionaceas hasta 1942" (op. cit. p. 157) Pittier cited the three Delgado collections, 35, 47, and 153, all as *Dussia avilensis*. The illustrations in that same publication include a camera lucida drawing of a *Dussia* flower (fig. 5) and a plate (pl. VI) with leaves of *Dussia* from *Delgado* 153 at VEN, a flowering branch of *Dussia* from *Delgado* 47 at VEN, but a fruit of *Ormosia*, probably from *Delgado* 59 at VEN, which is the type of *Ormosia tovarensis* Pittier.

Because the type of *Ormosia avilensis* is unquestionably a specimen of *Ormosia*, the use of the specific epithet *avilensis* in this case is correctly limited as emended by Pierce. The name *Dussia avilensis* fortunately falls into synonymy, as indicated above.

8. *Dussia foxii* Rudd, sp. nov.

FIGURE 9

Arbor ad 18 m. alta, ramulis junioribus ferrugineo-tomentosis, glabratis; folio integro non vidi, fortasse 5-foliolato, foliolis cum petiolulis 4–5 mm. longis et 3 mm. diametro, laminis coriaceis, ovatis vel elliptico-ovatis, 9–12 cm. longis, 4–8 cm. latis, apice acutis, basi obtusis vel subcordatis, supra glabris, subnitidis, subtus denso-velutinis, nervis secundariis utrinsecus 12–15; inflorescentiis ferrugineo-tomentosis, bracteis deltoideo-ovatis, unguiculatis, acuminatis 4–5 mm. \times 2–3 mm., bracteolis lanceolatis, acutis 3 mm. \times 1.5 mm.; floribus 18–20 mm. longis, calyce 9–10 mm. longo, tubo 6–7 mm., dentibus 2–3 mm. longis, petalis pallido-rosaceis, ovario ferrugineo-villoso, 4- vel 5-ovulato; legumen ignotum.

Type in the Herbarium of the Royal Botanic Gardens, Kew, collected at Liberia, Department of Loreto, Peru, January 17, 1911, by W. Fox (No. 85). Isotype at K.

DISTRIBUTION: Known only from the type collection.

The above cited collection of *Dussia* was found among undetermined specimens of *Ormosia*. The material on the two herbarium sheets consists of five leaflets and several pieces of inflorescence, with flowers. The leaf rachis is missing, so that one can merely surmise that the complete leaf was 5-foliolate, with four ovate lateral leaflets and one somewhat elliptical terminal leaflet.

The pubescence of tightly crispate hairs on the lower surface of the leaflets and the relatively small bracts and bracteoles of *D. foxii* are characteristics also found in *D. coriacea*, *D. sanguinea*, and *D. martinicensis*. The angles at which the secondary veins join the midvein in *D. foxii* are among the broadest of the genus, about 60°–70°.

9. *Dussia tessmannii* Harms, Notizbl. Bot. Gart. Berlin 9:972. 1926.

FIGURE 10

Tree, to about 25 m. tall; young stems fulvo-velutinous; leaves (9–) 13–17-foliolate, the axis 15–70 cm. long, fulvo-puberulent, the petiole 10–18 cm. long, the "pairs" of leaflets 2–6 cm. apart, the petiolules 4–10 mm. long, 1–2 mm. in diameter, the blades 3–17 cm. long, 3–7 cm. broad, subcoriaceous, lanceolate, oblong-lanceolate, or ovate, the apex acute to breviacuminate, the base obtuse, the upper surface glabrous, the lower surface moderately pubescent with subpatent or tightly crispate hairs, especially on young leaflets, the secondary veins about 15–20 pairs, forming angles of 45°–55° with the midvein; inflorescence fulvo-velutinous; bracts ovate-lanceolate to rhombic, acute or acumi-

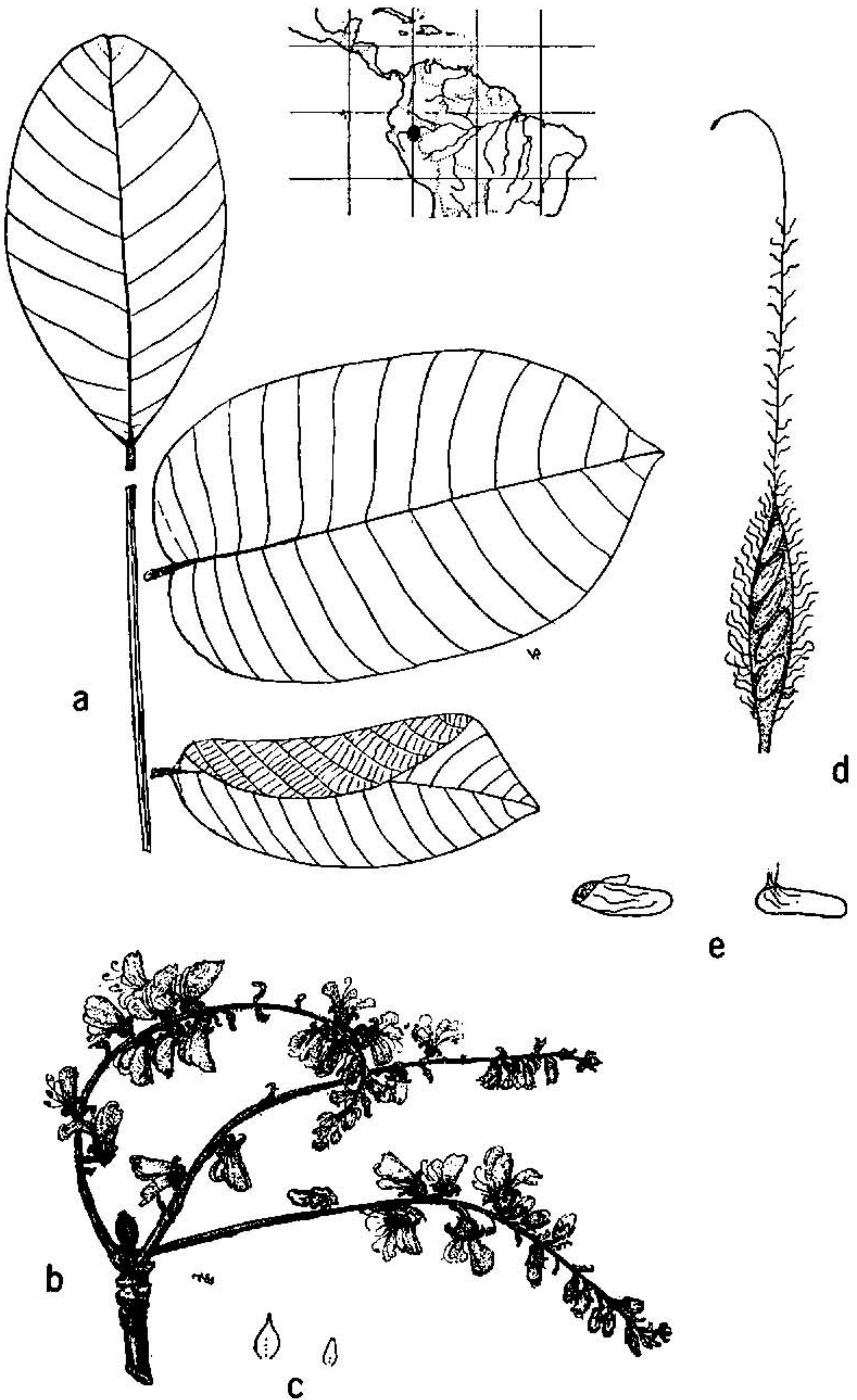


FIGURE 9.—*Dussia foxii*: *a*, three leaflets arranged in postulated position on rachis, $\times \frac{1}{2}$; *b*, portion of inflorescence, $\times \frac{1}{2}$; *c*, bract (larger) and bracteole, $\times 1$; *d*, gynoecium with five ovules, $\times 5$; *e*, ovules, $\times 10$.

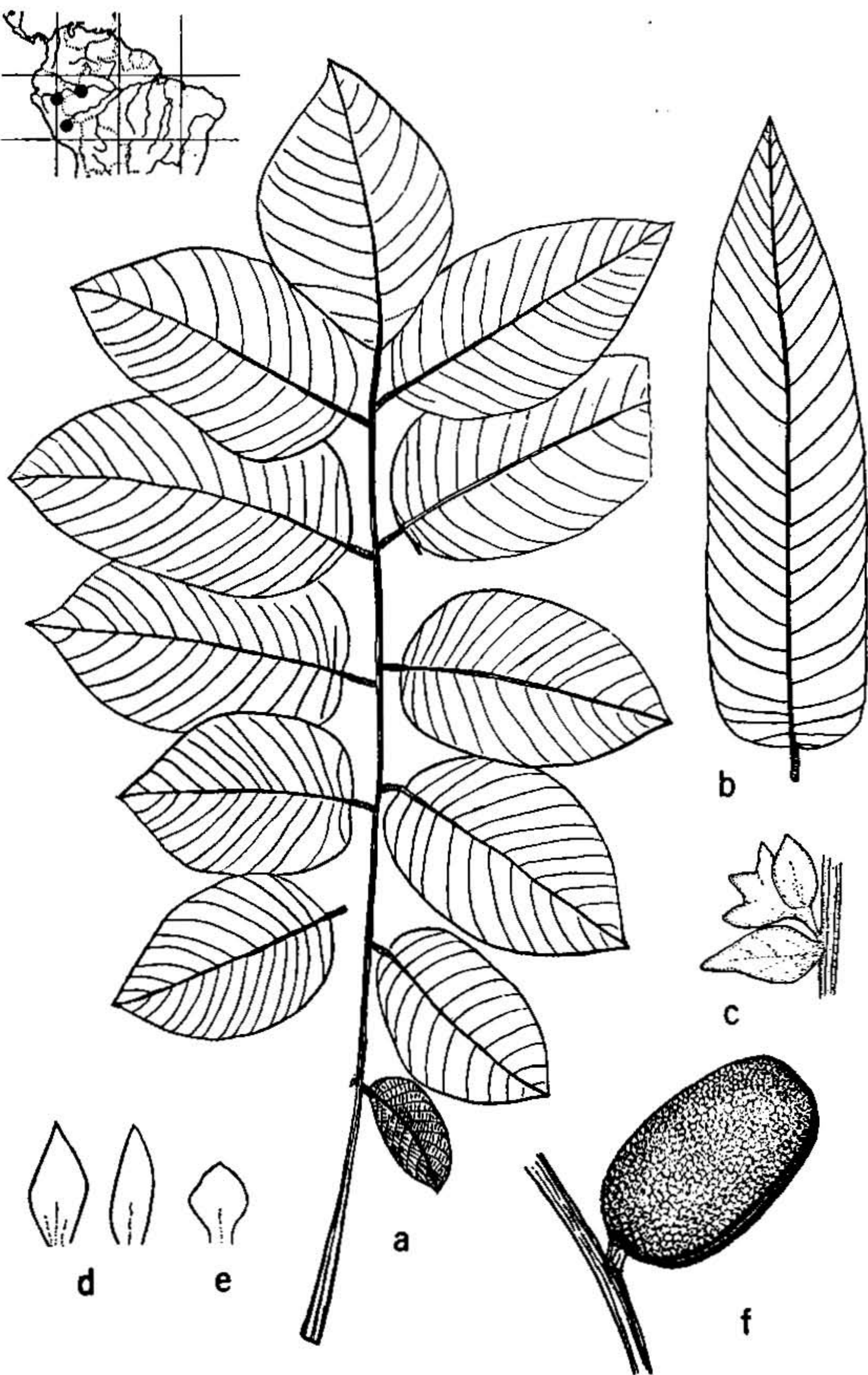


FIGURE 10.—*Dussia tessmannii*: a, leaf, *Ducke* 1031, $\times \frac{1}{2}$; b, leaflet, *Tessmann* 4085, $\times \frac{1}{2}$; c, calyx with bract and bracteole, $\times 1$; d, bracts, $\times 1$; e, bracteole, $\times 1$; f, fruit, *Ducke* 1031, $\times \frac{1}{2}$.

nate, the base broadly clawed to subhastate, 12–20 mm. long, 7–10 mm. broad, the bracteoles ovate, lanceolate, or spatulate, 6–17 mm. long, 7–8 mm. broad; flowers 17–21 mm. long; calyx 8–10 mm. long, the tube 4–5 mm. long, the teeth 4–5 mm. long; petals lilac or purple with white or purple markings; fruit reddish orange, velutinous, ellipsoidal, 4–6 cm. long, 3–4 cm. in diameter, 1- or 2-seeded, the valves lignous, 3–4 mm. thick, apparently not curling when dry.

TYPE LOCALITY: In high forest, mouth of the Río Santiago, Department of Loreto, Peru. Type collected by G. Tessmann (No. 4085) cited below.

DISTRIBUTION: In the upper Amazon basin of Peru and Brazil.

PERU: LORETO: Mouth of Río Santiago, *Tessmann* 4085 (F.M. Neg. 1898, photo of type ex B; F fragment of type ex B, NY isotype). Río Marañón near Teniente Pinglo, just above Pongo de Manseriche, *Wurdack* 2087 (US, USM). **JUNÍN:** La Merced, Río Chanchosmayo, *Weberbauer* 1877 (F.M. Neg. 1898, B; F fragment ex B).

BRAZIL: AMAZONAS: Esperança, mouth of Rio Javary, *Ducke* 18 (A, F), 1032 (MO, NY, US), 1032 (GH, MO, NY, US), [RB No.] 23800 (U, US).

As indicated in the key, this species is distinguished from its nearest relative, *Dussia discolor*, by larger bracts and smaller fruit with thick valves that do not curl when dry. Unfortunately, so few collections are available that generalizations are difficult to make. Macbride's inclusion of *D. tessmannii* under *D. discolor* in the Flora of Peru (Publ. Field Mus. Bot. 13: 244. 1943) may be correct, but for the time being it seems convenient to consider the material from the upper Amazon region as distinct.

The type of *D. tessmannii* presumably is no longer extant, but is represented by a photograph and a fragment, as well as by one or more isotypes.

10. *Dussia discolor* (Benth.) Amsh. Meded. Bot. Mus. Utrecht 52:50. 1939

FIGURE

Geoffroya discolor Benth. Journ. Bot. Hooker 2:69. 1840.

Vexillifera micranthera Ducke, Arch. Jard. Bot. Rio de Janeiro 3:140. 1922.

Dussia micranthera (Ducke) Harms, Repert. Sp. Nov. 19:291. 1924.

Dussia cayennensis Harms, Repert. Sp. Nov. 19:293. 1924.

Tree, to about 30 m. tall and 50 cm. in diameter, buttressed to 1 m.; young stems puberulent with ferruginous to pallid aureus hairs; leaves (7-fide Bentham) 9–13-foliolate, the axis 10–35 cm. long, the petiole 2.5–12 cm. long, the "pairs" of leaflets 1.5–5 cm. apart, the petiolules 3–4 mm. long and 1.5 mm. in diameter, the blades coriaceous or subcoriaceous, ovate to oblong, 3–13 cm. long, 1.5–7 cm. broad, the terminal leaflet usually obovate or oblanceolate, the apex obtuse to acute or breviacuminate, the base obtuse or subcordate, the upper surface glabrous the lower surface pallid pubescent with hairs sparse to minutely papilliform, the secondary veins 12–20 pairs, for

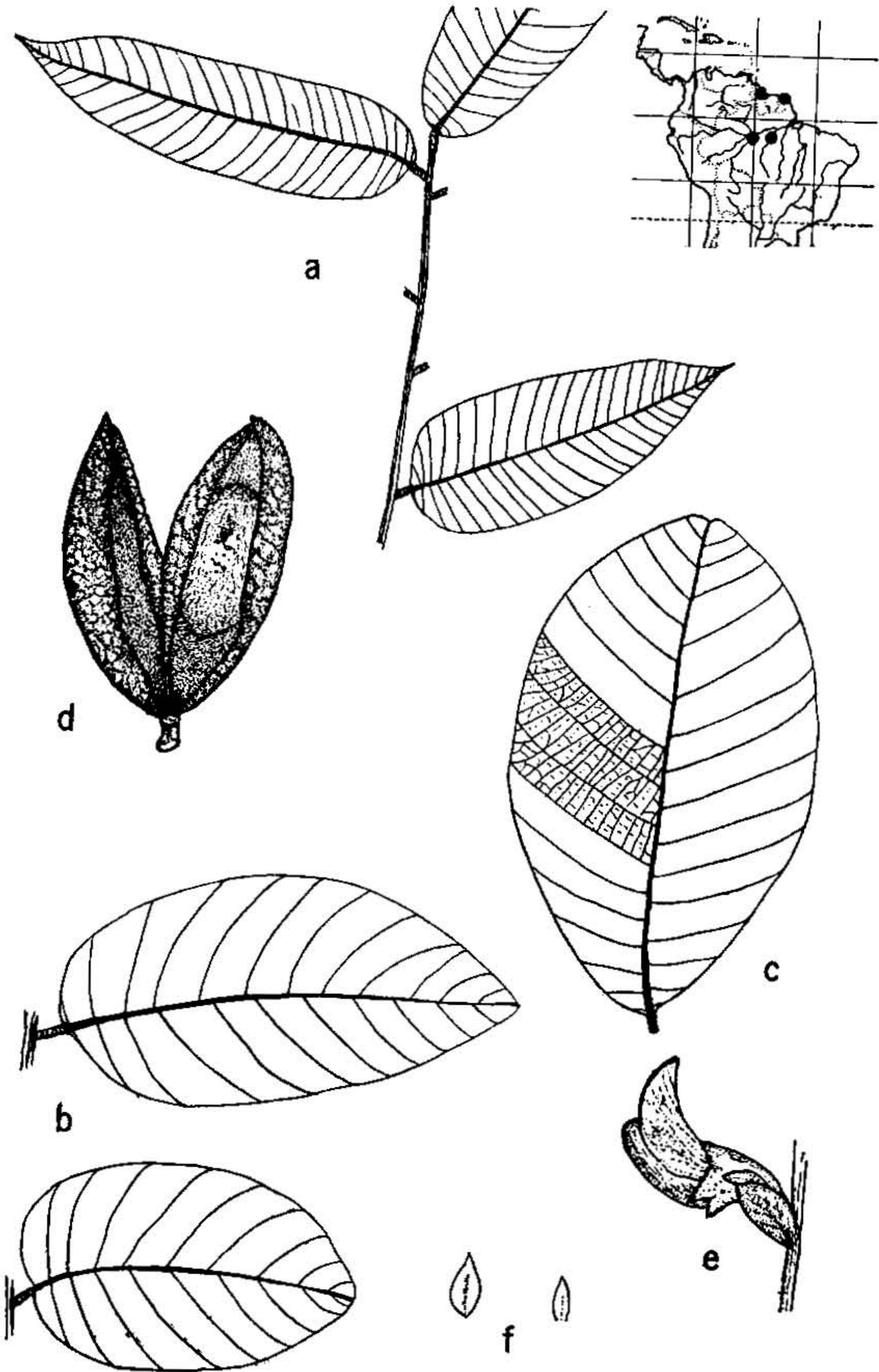


FIGURE 11.—*Dussia discolor*: a, portion of leaf, *Bur. Agric. & For. Guyan.* 340, $\times \frac{1}{2}$; b, leaflets, *Fanshawe* 2097, $\times \frac{1}{2}$; c, leaflet, *Ducke* 988, $\times \frac{1}{2}$; d, fruit with seed, $\times \frac{1}{2}$; e, flower with bract and bracteole, $\times 1\frac{1}{2}$; f, bract (larger) and bracteole, $\times 1$.

ing angles of 55°–65° with the midvein; inflorescence fulvo-puberulent, or pallid; bracts deltoid-ovate, acuminate, 4–8 mm. long, 3–5 mm. broad, the bracteoles 4–6 mm. long and about 3 mm. broad; flowers 15–18 mm. long; calyx fulvous, 8–10 mm. long, the tube 4–5 mm. long, the teeth 3–4 mm. long; petals rose-lilac; fruit minutely velutinous, fulvous or ferruginous, 6–12 cm. long, 3–4.5 cm. broad, 1- or 2-seeded, the seeds red, 2–5 cm. long, 2 cm. in diameter.

TYPE LOCALITY: Cayenne, French Guiana. Type collected by J. Martin (s.n.), cited below.

DISTRIBUTION: French Guiana, British Guiana, and lower Amazon basin of Brazil, in non-inundated forest.

FRENCH GUIANA: Cayenne, *Martin s.n.* (F.M.Neg. 1895, photo of type of *D. cayennensis* ex B=isotype of *Geoffroya discolor*). Between St. Laurent and Cayenne, *Bur. Agric. & For. Guyan.* 127 M (U); St. Laurent, *Bur. Agric. & For. Guyan.* 340 M (NY, U).

BRITISH GUIANA: Takutu Creek to Puruni R., Mazaruni R., *Fanshawe* 2097 [*For. Dept. B.G.* 4833] (NY, U, US).

BRAZIL: PARÁ: Rio Tapajoz, between Poção and Pimental, *Ducke* [MG Herb. No. 16411=RB Herb. No. 11457] (F.M.Neg. 20307 ex G, U, US, isotypes of *Vexillifera micranthera*). AMAZONAS: Borba, *Ducke* 988 (MO, NY, US).

Local names: Goué-goué-sabana, montouchi, montouchi de savanne (French Guiana).

In combining *Dussia discolor* with *D. micranthera*, I am following Amshoff rather than Harms, but with so little material available it is difficult to decide which is the better opinion. The collections here cited under *D. discolor* all have fairly small bracts and bracteoles, in contrast to the larger ones of *D. tessmannii*.

Dussia discolor is the earliest described species of the genus, but not the type because it was originally placed in *Geoffroya* of the tribe Dalbergieae. Amshoff recognized that *G. discolor* Benth. and *Dussia cayennensis* Harms were based on the same collection, and correctly made the combination *Dussia discolor* (Benth.) Amsh.

Reduction of the genus *Vexillifera* Ducke was accepted by Ducke, and, in fact, anticipated by him. In his original publication of the genus he noted that it seemed to have affinity with the genus *Dussia*, which he apparently knew only from its description.

Collections of *Dussia* Cited

- ALLEN, P. H.
5988. *cuscatlanica*
6655. *macrophyllata*
6703. *macrophyllata*
- ANDRLE, R. F.
91. *mexicana*
- ANDRLE, R. F., and AXTELL, H. R.
5. *mexicana*
- BRENES, A. M.
4627 (412). *cuscatlanica*
- CALDERÓN, S.
1379. *cuscatlanica*
1752. *cuscatlanica*
2070. *cuscatlanica*
- COOPER, G. P.
520. *macrophyllata*
- CUATRECASAS, J.
16054. *lehmannii*
16788. *lehmannii*
17258. *lehmannii*
17680. *lehmannii*
19897. *lehmannii*
21075. *lehmannii*
26094. *lehmannii*
- DELGADO, E.
47. *coriacea*
153. *coriacea*
430. *coriacea*
- DUCKE, A.
18. *tessmannii*
988. *discolor*
1031. *tessmannii*
1032. *tessmannii*
11457. (RB Herb.) *discolor*
16411. (MG Herb.) *discolor*
23800. (RB Herb.) *tessmannii*
- DUSS, A.
1072. *martinicensis*
3757. *martinicensis*
s.n. *martinicensis*
- EKMAN, E. L.
H.7569. *sanguinea*
H.7928. *sanguinea*
H.10709. *sanguinea*
- FANSHAWE, D. B.
2097. (For. Dept. B.G. 4833) *discolor*
FOX, W.
85. *foxii*
- GUIANA, BRITISH, FOREST DEPARTMENT
4833. *discolor*
- GUIANA, FRENCH, BUREAU AGRICOLE & FORESTIER
127 M. *discolor*
340 M. *discolor*
- LEHMANN, F. C.
8985. *lehmannii*
- LIEBMANN, F. M.
5355. *mexicana*
- LITTLE, E. L., JR.
6048. *macrophyllata*
- MARTIN, J.
s.n. *discolor*
- MIRANDA, F.
6964. *cuscatlanica*
- PURPUS, C. A.
277. *mexicana*
6326. *mexicana*
16459. *mexicana*
- SKUTCH, A. F.
2027. *cuscatlanica*
- SMITH, H. H., and SMITH, G. W.
s.n. *martinicensis*
- STANDLEY, P. C.
20197. *cuscatlanica*
54199. *cuscatlanica*
55293. *cuscatlanica*
- STEYERMARK, J. A., ET AL
33329. *cuscatlanica*
33862. *cuscatlanica*
35244. *cuscatlanica*
52072. *cuscatlanica*
91191. *martinicensis*
- TESSMANN, G.
4085. *tessmannii*
- TONDUZ, A.
12949. *macrophyllata*
- WEBERBAUER, A.
1877. *tessmannii*
- WURDACK, J. J.
2087. *tessmannii*

Index

(Synonyms in *italics*. Page numbers of principal entries in **boldface**)

- gatá, 266
 s-gamelle, 257
 onnier blanc, 257
 esalpinaceae, 262
 hal, 249, 262
 shalia, 262
 uscatlanica, 248, 249, 260
 panamensis, 249, 263
 eza de montaña, 262
 rón, 263
 lbergieae, 253, 274
 plotropis, 253, 263
 macroprophyllata, 248, 254
 ssia, 253
 avilensis, 249, 266, 268, 269
 ayennensis, 248, 272, 274
 oriacca, 248, 249, 250, 254, 257,
 263, **266**, **267**, 268, 269
 uscatlanica, 248, 249, 250, 251, 255,
 257, **260**, **261**, 262, 263
 discolor, 248, 250, 251, 253, 254, 257,
 272, **273**, 274
 oxii, 250, 254, 257, **269**, **270**
 grandifrons, 248, 260, 262
 ehmannii, 248, 249, 250, 254, 263,
 265
 macroprophyllata, 248, 249, 250,
 252, 254, **263**, **264**, 265, 266, 268
 martinicensis, 248, 250, 252, 254,
 255, **256**, 257, 260, 268, 269
 mexicana, 248, 250, 255, 257, **258**,
 259, 260
- Dussia—Continued**
micranthera, 248, 272, 274
 sanguinea, 248, 250, 254, **257**, **258**,
 262, 269
 tessmannii, 248, 250, 254, **269**, **271**,
 272, 274
 embagatao, 266
 frijolillo, 260
 garvancillo de montaña, 262
 Geoffroya, 253, 274
 discolor, 248, 272, 274
 goué-goué-sabana, 274
 hairari, 251
 jaboncillo, 260
 Lonchocarpus, 251
 matabuey, 262
 montouchi, 274
 montouchi de savanne, 274
 Ormosia, 253, 268, 269
 avilensis, 266, 268, 269
 mexicana, 258
 tovarensis, 268
 palo de tigre, 262
 pizarró, 263
 pommier, 257
 Sophoreae, 253
 Swartzia, 253
 Tounatea, 253
 Vexillifera, 253, 274
 micranthera, 248, 272, 274