

## THE AMERICAN SPECIES OF ORMOSIA (LEGUMINOSAE)

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### Introduction

*Ormosia* of the plant kingdom is a genus of tropical legumes comprising some 100 species, about half of which are American, the other half native to the Old World. All of the species are woody. Some are timber trees as much as 60 meters tall, others are small and scrubby, and at least two species have been reported as scandent. Seeds of some species are believed to have pharmaceutical properties. Native use of the seeds as beads inspired the name *Ormosia*, based on the Greek word *hormos*, meaning necklace.

There is no general treatment of the American species of *Ormosia*. The existing regional floras have limited scope and some areas have not been included in any recent floristic work. Among the available collections are several taxa new to science.

The present study is based on specimens from the herbaria listed below. To the curators of these institutions, who made such material available, the writer is most grateful.

Abbreviations of herbarium names are those of Lanjouw and Stafleu (*Index Herbariorum*, part I, ed 5. 1964).

A	Arnold Arboretum of Harvard University.
B	Botanisches Museum, Berlin.
BM	British Museum (Natural History).
BR	Jardin Botanique de l'Etat, Bruxelles.
C	Botanical Museum and Herbarium, Copenhagen.
CAS	California Academy of Sciences.
DS	Dudley Herbarium, Stanford University.
F	Chicago Natural History Museum.
G	Conservatoire et Jardin Botaniques, Genève.
GH	Gray Herbarium of Harvard University.
IAN	Instituto Agronómico do Norte, Belém.
IJ	Science Museum, Institute of Jamaica.
INPA	Instituto Nacional de Pesquisas da Amazônia, Manaus.
K	The Herbarium and Library, Kew.
LL	Lundell Herbarium, Texas Research Foundation.
M	Botanische Staatssammlung, München.
MER	Universidad de los Andes, Mérida, Venezuela.

MEXU	Herbario Nacional del Instituto de Biología, Universidad Nacional de México.
MO	Missouri Botanical Garden.
NA	U.S. National Arboretum.
NY	New York Botanical Garden.
P	Muséum National d'Histoire Naturelle, Laboratoire de Phanérogamie, Paris.
POM	Pomona College.
R	Museu Nacional, Rio de Janeiro.
RB	Jardim Botânico, Rio de Janeiro.
S	Naturhistoriska Riksmuseum, Stockholm.
SI	Instituto de Botánica Darwinion.
TRIN	Imperial College of Tropical Agriculture, Trinidad.
U	Botanical Museum and Herbarium, Utrecht.
UC	University of California, Berkeley.
US	U.S. National Museum, Smithsonian Institution.
USFS	Forest Service Herbarium, U.S. Department of Agriculture.
VEN	Instituto Botánico, Caracas.
Y	School of Forestry, Yale University.

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 line drawings are chiefly the work of Mrs. Martha H. Niepold.

### Historical Consideration

The genus *Ormosia* was presented to the scientific world by George Jackson, F.L.S., in a paper read to the Linnean Society of London on February 6, 1810. It was published the following year as an "Account of *Ormosia*, a new Genus of Decandrous Plants belonging to the Natural Order of Leguminosae" (Trans. Linn. Soc. Lond. 10: 358-362, t. 25-27. 1811). It included three species: *Ormosia coccinea*, based on *Robinia coccinea* Aublet, from French Guiana; *O. coarctata*, from British Guiana; and *O. dasycarpa*, from the West Indies. The latter was referred by Jackson to Swartz's *Sophora monosperma*, and is now correctly cited as *Ormosia monosperma* (Sw.) Urb.

An earlier generic name, *Toulitchiba*, had been proposed by Adanson (Fam. 2: 326. 1763), based on the same Plumier illustration "M.S. 7, t. 145" (pl. 1) that Jackson cited as "a very good representation" of his *Ormosia dasycarpa*. However, *Toulitchiba* was published as a monomial and, apparently, no specific names have ever been ascribed to it. Under the provisions of the International Code of Botanical Nomenclature (ed. 2: 98. 1935), *Ormosia* Jackson, with *O. coccinea*

(Aubl.) Jacks. as the type, has been conserved against *Toullichiba* Adanson.

De Candolle, in his *Prodromus* (2 : 97. 1825), listed under *Ormosia* only the three species of Jackson. No new American species were added until 1837, when Vogel (*Linnaea* 11 : 405. 1837) described three species based on Brazilian collections. During the next 25 years seven more species were published, two by Tulasne and five by Bentham. Among the latter were three new species of Richard Spruce, validated by Bentham, and included in his treatment of *Ormosia* for Martius' *Flora Brasiliensis* (*Fl. Bras.* 15 (1) : 314–319. 1862). This brought the total American species of *Ormosia* to about a dozen, the exact number depending on specific interpretation.

No additional species of American *Ormosia* were published until about the turn of the century. Urban added one species in 1899 and another in 1908. Glaziou published two *nomina nuda* in 1906. Huber published one species in 1909.

The largest increase in the genus occurred in the 1920's, when about 15 American species were added. The most active worker was Ducke, in Brazil, who not only collected the material but also described 11 new species and published a treatment of the Amazonian taxa. He also published the genus *Ormosiopsis* with two species, now being transferred to *Ormosia*.

Since 1920, in addition to Ducke's work, about 20 species have been added to the literature, mostly singly, by Benoist, Harms, Huber, Kleinhoonte, Kuhlmann and Campos Porto, Pittier, Monachino, Macbride, Standley, Schery, Pires, and Rudd. The present paper recognizes 50 species of American *Ormosia*, including 16 described as new.

The history and synonymy of *Ormosia* in the Old World has been treated by Merrill and Chen (*Sargentia* 3 : 77–117. 1943) and van Meeuwen (*Reinwardtia* 6 : 225–238. 1962) and will be referred to in the present paper only when pertinent to New World taxa. None of the species has been found to be native to both Eastern and Western Hemispheres.

#### Economic Consideration

The wood of most species of *Ormosia* is used locally for building and furniture construction. In Mexico, the wood of *O. isthmensis* "is used for ax handles, railroad ties, house-posts, and general construction" and that of *O. toledoana* (= *O. macrocalyx*) "for general construction and sometimes for canoes" (Standley and Steyermark, *Fieldiana* 24 (5) : 311. 1946). Bentham states in his original description of *O. panamensis*, "wood durable and used for building purposes."

In Dominica "the coarse-grained, hard wood of caconier [*O. monosperma*] is used by Carib and Creole alike for shingles and general building purposes" (Hodge and Taylor, *Webbia* 12 : 565. 1947). In French Guiana *O. paraensis* is called "bois de tournerie" (collector's notes, *Bena* 1157). "Sucupira branca," *O. flava*, has been reported as having "wood very durable; used for construction" (collector's notes, *Fróes* 1913, from Maranhão, Brazil). According to Record and Hess (*Timbers of the New World*, 300. 1943), the wood of *Ormosia*, exclusive of *O. coutinhoi*, is "not easy to work, finishing poorly; durability doubtful. A coarse unattractive wood, apparently of no commercial possibilities." The wood of *Macroule* (= *O. coutinhoi*), however, "will take a high polish; probably resistant to decay. Appears suitable for good furniture" (Record and Hess, *op. cit.*, 292).

An Asiatic species, *O. hosiei* Hemsl. & Wilson, known as "Hung-tou shu" or "red-bean tree" has been described as "one of the most beautiful of all Chinese trees and its red-colored wood, which is heavier than water, is esteemed above all other Chinese wood for high-grade cabinet work." (Rehder and Wilson *in Plantae Wilsonianae*, Publ. Arn. Arb. No. 4 : 94. 1916.)

Natives of both the Old and New World have used the brightly colored seeds of *Ormosia* as beads for personal adornment and as "gems" in ornamentation of weapons and other objects. Necklaces and earrings featuring *Ormosia* seeds are offered for sale to the tourist trade in several countries.

The seeds also are used medicinally. In eastern Venezuela *O. monosperma*, "pionia montañero," is "the seed used by doctors; cook seed and drink for pains of the heart; also cooked seed placed in water, given to children to put around their necks for sore throat" (collector's notes, *Steyermark* 61330).

Seeds of several species of *Ormosia* have been tested as possible sources of pharmaceutical preparations. Hess and Merck (*Ber.*, 52, 1976. 1919) reported that seeds of *O. "dasycarpa"* [actually the red-seeded *O. avilensis*, or *O. venezolana*, not *O. dasycarpa* (= *O. monosperma*), *fide* B. Krukoff, personal communication] contained the alkaloids ormosine and ormosonine, and that the former had a physiological effect resembling that of morphine. Lloyd and Horning (*Am. Chem. Soc. Journ.* 80 : 1506-1510. 1958) further investigated the problem and isolated the alkaloid panamine, supposedly from seeds of *O. panamensis* [actually, in part, at least, from seeds of *O. macrocalyx*]. In tests with dogs, panamine has been found to have hypotensive action.

In "Alkaloid-bearing plants and their contained alkaloids" (Willaman and Schubert, *Tech. Bull.* 1234, A.R.S., U.S. Dept. Agric. 1961) nine species of *Ormosia* are listed, with references to the chemical

literature. As stated in the introductory remarks, the plant names used are not necessarily true taxonomic synonyms, and it is not always possible to know what material the chemist had at hand. In the light of the present taxonomic study, at least two of the specific determinations should be changed, as indicated above, and a third species, *O. stipitata*, is a synonym of the true *O. panamensis*.

### Geographic Distribution

*Ormosia* is essentially a tropical genus with an extension to about 30° N. latitude in Asia and 30° S. latitude in eastern South America (fig. 1).

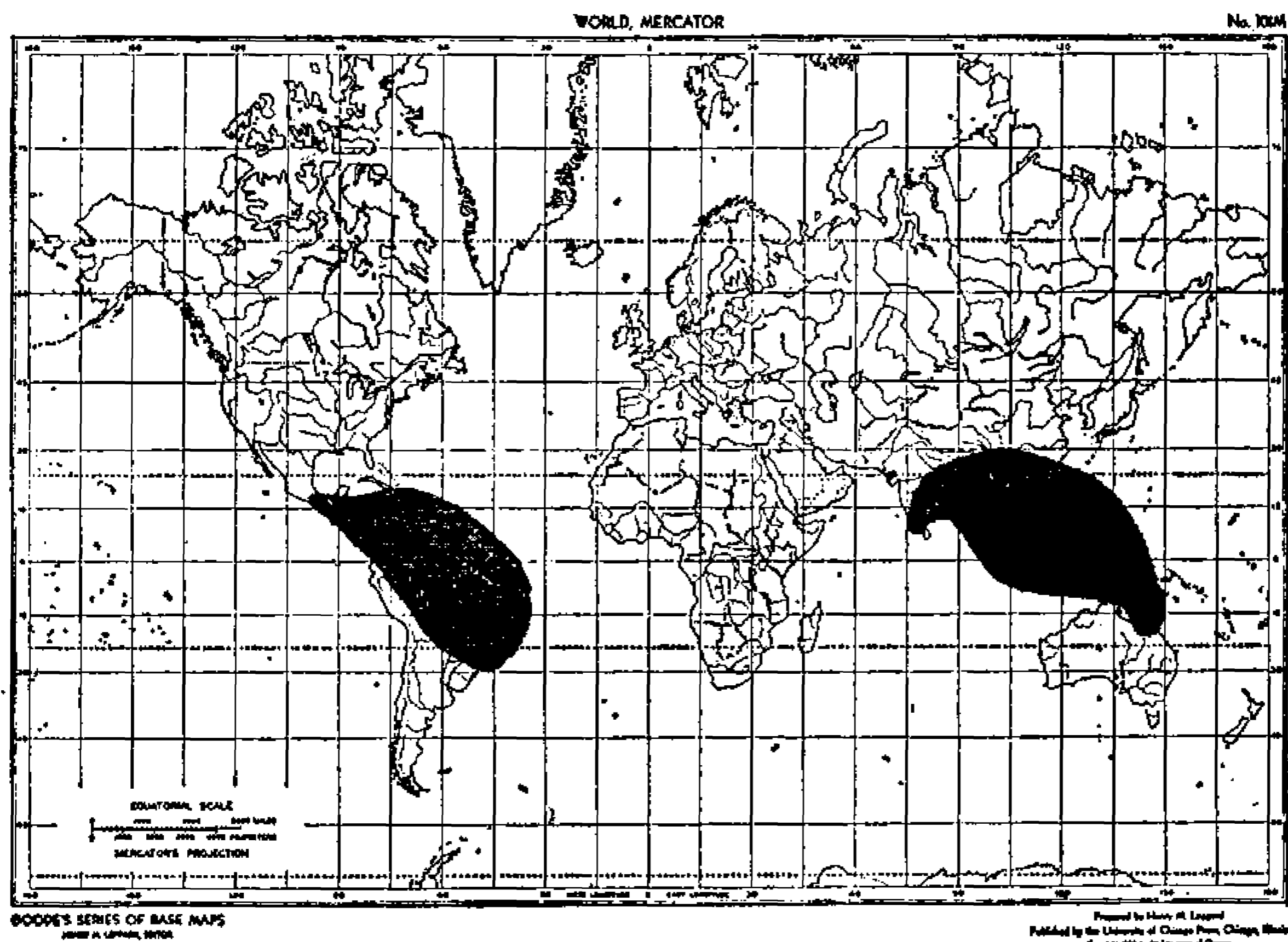


FIGURE 1.—Geographic distribution of the genus *Ormosia*.

Most American species are components of tropical or subtropical rain forest; some, such as *O. excelsa* and *O. smithii*, occur on wet land along the rivers near sea level; others, including *O. monosperma*, *O. tovarensis*, *O. venezolana*, and *O. colombiana*, are found on mountain slopes at elevations of about 1000–2000 meters; *O. costulata* and *O. bahiensis* are able to survive in dry woods or savanna areas.

The present disjunct distribution of the genus suggests an earlier continuous and much more extensive range, possibly with a trans-pacific connection in Cretaceous and Early Tertiary time. The various taxa appear to have developed from a common gene pool. Today,

although there are no species of *Ormosia* common to the Eastern and Western Hemispheres, there must be some close relationships. The best example is the similarity of *O. panamensis* to certain Chinese species such as *O. polysperma*, *O. xylocarpa*, and *O. henryi*. The most widespread *Ormosia* species of the Old World, *O. calavensis*, known from the Philippine Islands south to Australia, resembles, in many characters, members of the American section *Unicolores*, especially *O. macrocalyx*. Other species with unicolored seeds, such as those of series *Excelsae* and *Isthmenses*, also show varying degrees of kinship with species of the Eastern Hemisphere. The species with the strikingly marked red and black seeds, such as those of series *Coccineae* and *Monospermae*, are singularly American, although some Old World species show a tendency toward bicoloration with mottling or banding.

There are many gaps in our distribution records, not only of *Ormosia* but also of related genera, so many areas that are unknown botanically, that it is premature to generalize about areas of origin or paths of migration. The paleobotanical record does not provide any definite clues. Apparently, no fossils have been ascribed to *Ormosia*.

The individual maps and the citations that appear in the following text illustrate the current geographic information concerning the American species of *Ormosia*.

### Morphological Characters

All species of *Ormosia* are woody; some are large trees to about 60 m. tall; a few are small and scrubby, not more than about 4-5 m. high, and two, *O. scandens*, from Asia, and *O. coarctata*, from Brazil, have been described as scandent. The trunks may be buttressed or not, the diameter breast high not more than 1 or 2 m. The bark is gray and rough. The wood characters have been summarized as hard and heavy, or moderately so, the grain irregular or roey, the heartwood pinkish, reddish, or brownish yellow, the sapwood whitish to yellowish or gray (Record and Hess, *Timbers of the New World*, 292, 300, 301, pl. 45, fig. 1. 1943; Ortega-Gonzales, *Investigaciones sobre utilización industrial de maderas tropicales*, México, 2 : 89. 1959).

The young stems, leaves, floral axes, and fruit are densely pubescent, velutinous or tomentulose, in most species, sericeous in others, frequently glabrescent, the stems terete or somewhat angular, the floral axes often fasciculate, at least toward the base. The collector's notes for one specimen of *O. macrophylla* (Maguire, et al. no. 37603) state, "stems hollow; ant infested."

Apparently, symbiosis with nitrogen-fixing bacteria may occur in members of *Ormosia*, as is customary in the Leguminosae in general. Nodules are present on the roots of at least one herbarium voucher of

*O. coarctata* at Kew: "seedling of *Barakaro* 1 month old from forest nursery, Mazaruni Station, British Guiana, Forest Dept. B. G., Record no. 4363, Field no. *Fanshawe* 1627."

Stipules are deltoid or linear, about 0.5–15 mm. long, pubescent like the stems, usually caducous, not known in some species, possibly lacking. Minute, usually acicular, stipels are sometimes found in a few species.

The leaves are imparipinnate, the lateral leaflets paired, or approximately so, 3–19-foliolate, or, sometimes, unifoliolate. The leaflets mostly are large, their blades 1.5–35 cm. long and 0.5–20 cm. broad, coriaceous or subcoriaceous, the upper surface essentially glabrous, the lower glabrous to densely pubescent. The basal leaflets usually are the smallest and the terminal leaflet the largest. The axis may be as much as 50 cm. long, or more, the maximum length often not recorded because herbarium specimens tend to represent the smaller, more easily collected examples. The venation is pinnate, the secondary veins essentially straight and parallel, or arcuate and only approximately parallel, the tertiary veins and veinlets parallel or reticulate.

The inflorescences are racemose, many-flowered, terminal or pseudo-terminal with the branch resuming growth after flowering. The axes, bracts, and calyx are uniformly pubescent, sometimes glabrescent. The bracts are stipule-like, deltoid to lanceolate, about 0.5–10 mm. long and 0.5–4 mm. broad, pubescent like the floral axes, frequently caducous. Bracteoles are paired, subtending the calyx, deltoid to filiform, about 0.5–8 mm. long and 0.5–1 mm. broad, sometimes caducous, sometimes persistent at top of pedicel.

The flowers are 5-merous. The calyx is campanulate with 5 subequal deltoid teeth or lobes, the base of the tube hypanthoid. The corolla is papilionoid, the 5 petals separate, essentially glabrous, greenish white, yellow, pink, violet, or blackish purple. In some species the color is fairly uniform and constant, in others, variable with contrasting markings of white, green, red, or purple.

The stamens are alternately subequal, with filaments separate to the base, inserted on the inner surface of the calyx tube. The smaller stamens, in some cases, apparently are sterile, sometimes reduced in number, or lacking (viz, *O. semicastrata* Hance, a Chinese species, with only 5 fertile stamens).

The ovary is pubescent and essentially sessile in most species, commonly 3–6-ovulate. The style is decreasingly pubescent toward the apex, sometimes glabrous, characteristically curved with the bilobed stigma in a lateral position (fig. 2); in a few species and occasional individuals of others, the style is straight or nearly so, with the stigma oblique or terminal.

The fruits are 1-6-seeded, moderately compressed to somewhat inflated, dehiscent in most species with the valves separating, usually without distortion. A few species are indehiscent. The valves may be densely pubescent or glabrous at maturity, coriaceous and scarcely 1 mm. thick or carnose, 3-4 mm. thick, or they may be woody, 1-7 mm. thick. In one American species, *O. panamensis*, there are septae between the seeds, a character also found in several Asiatic species. The color of the fruit, if glabrous, may be fulvous to blackish brown; if pubescent, light to dark brown, or grayish.

The seeds of many American species, including the type, *O. coccinea*, are bicolored red and black. The marking of some species is very constant; the seeds of other species are characteristically variable from all red to almost all black, even within the same pod. One species is bicolored yellowish and red. Other species have unicolored seeds, red, yellow, or black. The yellow-seeded species, *O. excelsa*, apparently represents arrested chemical development, as the immature seeds of red-seeded species frequently are yellow in color but turn red gradually, even when removed from the pod. In shape, the seeds commonly are elliptic, slightly compressed, but also may be globose or lenticular. The hilum in most species is elliptic, 1-5 mm. long, and terminal; in *O. coutinhoi* the hilum is circumcinct, 30-45 mm. long, and in *O. cinerea*, somewhat transitional, about 20 mm. long.

Chromosome counts of  $2n=16$  have been published by Earlene Atchison for *O. krugii*, *O. macrocalyx* [as *O. panamensis*], and *O. monosperma* [as *O. dasycarpa*] (Journ. Elisha Mitchell Soc. 65 : 118-122. 1949; Amer. Journ. Bot. 38 : 538-546. 1951).

### Taxonomic Position

*Ormosia* is a genus of papilionoid legumes of the subfamily Faboideae, tribe Sophoreae. As is characteristic of the tribe, the stamens are separate to the base, the filaments being connate at their point of attachment to the calyx.

The genera most closely related appear to be *Clathrotropis* and *Diplostropis*, and, possibly, *Sophora*. *Ormosia* is primarily recognized by the style, which is usually curved so that the bilobed stigma is lateral. Two segregate genera are combined with *Ormosia* in this paper, *Ormosiopsis*, with its style slightly curved, or straight, placing the stigma in a terminal or oblique position, and *Macroule*, characterized by large seeds with the hilum longer than in other American species of *Ormosia*.

Comparative morphological studies are needed to establish relationships, not only within the Sophoreae, but also with the members of the tribe Dalbergieae and genera of the subfamily Caesalpinoideae, such as *Swartzia* and *Aldina*.



## Systematic Treatment

**Ormosia Jacks.**

- Ormosia* Jacks. Trans. Linn. Soc. Lond. 10:360, t. 25-27. 1811. Nom. cons.  
*Toulichiba* Adans. Fam. 2:326. 1763. Nom. rejec.  
*Layia* Hook. & Arn. Bot. Beech. Voy. 183. 1833, non Hook. & Arn. ex DC. 1838.  
*Macrotropis* sensu Miq. Fl. Ind. Bat. Suppl. 294. 1861, non DC. 1825.  
*Chaenolobium* Miq. Fl. Ind. Bat. Suppl. 302. 1861.  
*Arillaria* Kurz, As. Soc. Beng. 42(2):70. 1873.  
*Podopetalum* F. v. Muell. Melbourne Chem. Drugg. 5:12. 1882, non Gaudin 1828.  
*Ormosiopsis* Ducke, Arch. Jard. Bot. Rio de Janeiro 4:61. 1925.  
*Macroule* Pierce, Trop. Woods 71:2. 1942.

Trees, very tall to small and shrubby or, sometimes, reported as scandent; leaves imparipinnate, 3-19-foliolate, occasionally reduced to 1-foliolate; stipules small, deltoid to linear, caducous, possibly lacking in some species; inflorescences racemose, many-flowered, terminal or pseudoterminal; calyx campanulate, hypanthoid, with 5 subequal deltoid teeth or lobes; corolla papilionoid about twice as long as the calyx, composed of 5 separate petals, yellow to blackish purple, the standard glabrous on the outer face, sometimes with contrasting whitish or reddish spot; stamens 10, alternately subequal with 5 about as long as the standard and 5 slightly shorter, the filaments separate to the base, attached inside the calyx tube; fruit commonly dehiscent, a few species indehiscent, glabrous to densely pubescent, moderately compressed or turgid, 1-6-seeded; seeds ellipsoid, globose, or lenticular, unicolored red, yellow, or black, or bicolored red and black, or yellowish and red, the hilum terminal, elliptic in most species, sometimes linear.

The type of the genus is *O. coccinea* (Aubl.) Jacks., based on *Robinia coccinea* Aubl., as designated in the International Code of Nomenclature (ed. 2:98. 1935), in connection with conservation of the generic name *Ormosia*.

In the following treatment, Ducke's arrangement of the species into sections on the basis of fruit and seed characters has been followed in general, with certain modifications. The species of section *Ormosia* have been grouped into series, somewhat along the lines of the Merrill and Chen treatment of the Chinese and Indo-Chinese species.

In the keys, identifying characters are used that are not necessarily technical taxonomic criteria. When convenient, vegetative characters are included since specimens with adequate reproductive parts are not always available.

## Key to Sections and Series

Leaflets with both surfaces essentially glabrous at maturity, the secondary veins arcuate, only approximately parallel, about 5-9 pair; mature fruit glabrous or nearly so; seeds unicolored red, reddish brown, or black.

Hilum of seed linear, 20-45 mm. long, the seeds red or reddish brown; fruit indehiscent, the valves lignous, glabrous, 3-7 cm. broad.

Section I. **Macrocarpae**

Hilum of seed elliptic, about 3 mm. long or less, the seeds bright red or, in *O. flava*, black; fruit dehiscent, the valves coriaceous, glabrous or nearly so at maturity, 1-3.7 cm. broad . . . . . Section II. **Unicolores**

Leaflets essentially glabrous above but the lower surface usually pubescent at maturity, sometimes glabrate, the secondary veins essentially straight and parallel, although arcuate toward the margin, usually about 10-50 pair; mature fruit pubescent or glabrous; seed unicolored yellow or red, or bicolored red and black (or, yellowish and red in *O. friburgensis*) . Section III. **Ormosia**

Fruit indehiscent or tardily dehiscent; seeds unicolored, yellow to red or bicolored yellowish with red, or red with black, the hilum relatively larger than in other species of the section, 2.5-5 mm. long . Series 1. **Excelsae**

Fruit dehiscent; seeds red or bicolored red and black, the hilum relatively small, 1-4 mm. long.

Mature fruit glabrous or nearly so, usually nitid.

Seeds unicolored red.

Valves of fruit fulvous or light brown, carnose-coriaceous, septate between the seeds, 3-5 cm. broad including an alate margin; leaflets with lower surface fulvo- or aureo-sericeous, usually glabrescent.

Series 2. **Panamenses**

Valves of fruit black to ferruginous brown, lignous, sublignous, or coriaceous, not septate between the seeds, 2.5-4 cm. broad, the margin not alate; leaflets with lower surface pubescent, sometimes glabrate, but never fulvo- or aureo-sericeous. . . . . Series 3. **Isthmenses**

Seeds bicolored red and black.

Surface of fruit reticulate-rugose; leaflets with tertiary veins usually conspicuous, essentially parallel, or striate . Series 4. **Amazonicae**

Surface of fruit not rugose; leaflets with tertiary veins usually inconspicuous, reticulate or subparallel. . . . . Series 5. **Coccineae**

Mature fruit manifestly pubescent at maturity (unless glabrate due to weathering).

Valves of fruit minutely velutinous, sericeous, to subfarinose, sometimes glabrescent, coriaceous, about 1-2 mm. thick; seeds irregularly bicolored, red and black, or varying, sometimes within the same pod, from completely red to nearly all black; leaflets with lower surface sericeous or minutely velutinous, or, less commonly, tomentose.

Series 6. **Nobiles**

Valves of fruit densely velutinous or tomentose, lignous or sublignous, about 2-5 mm. thick; seeds bicolored, red and black, or sometimes completely red . . . . . Series 7. **Monospermae**

Key to Species and Varieties

SECTION I. MACROCARPAE

Fruit (3.5-) 5-7 cm. broad; seeds discoid or lenticular, 3-4 cm. long, 2.5-4 cm. broad, 1-2 cm. thick, the hilum 30-45 mm. long, 1.5-3 mm. wide; flowers (17-) 20-25 mm. long, the calyx 12-15 mm. long, 7-8 mm. in diameter (French Guiana; Surinam; British Guiana) . . . . . 1. *O. coutinhoi*

Fruit about 3 cm. broad; seeds ellipsoid, about 2.5 cm. long and 1.7 cm. in diameter, the hilum 20 mm. long and 1.5-2 mm. wide; flowers 15-18 mm. long, the calyx 6-11 mm. long, 3-7 mm. in diameter (French Guiana; Surinam).

2. *O. cinerea*

SECTION II. UNICOLORES

Fruit 1-2 cm. broad; seeds red or black.

Seeds black (Surinam; northeastern Brazil) . . . . . 3. *O. flava*

Seeds red.

Flowers 6 mm. long, the calyx 4 mm. long; seed 7-9 mm. long, 6-8 mm. broad, and 6 mm. thick, the hilum 1.2 mm. long and 0.8 mm. wide; leaves 7-11-foliolate, the leaflets breviacuminate (Surinam) . 4. *O. melanocarpa*

Flowers 15-17 mm. long, the calyx 7-10 mm. long; seed 7-10 mm. long, 10-14 mm. broad, and 6-9 mm. thick, the hilum 2-3 mm. long and 1-1.5 mm. wide; leaves (1-)3-5-foliolate, the leaflets conspicuously acuminate (western Brazil; eastern Peru) . . . . . 5. *O. grandiflora*

Fruit 2-3.7 cm. broad (if less than 2.5 cm., usually with some fine pubescence); seeds red.

Surface of fruit glabrous at maturity; flowers less than 18 mm. long, the calyx usually less than 10 mm. long.

Valves of fruit carnose, 3-4 mm. thick; seed with hilum 1.2 mm. long and 1 mm. wide; flowers 8-10 mm. long (northeastern Brazil) . 6. *O. bahiensis*

Valves of fruit 1-2 mm. thick; seed with hilum 2 mm. long and 1 mm. wide; flowers about 10 mm. long (possibly to 15 mm.).

Leaflets conspicuously acuminate, the base rounded or subcordate; flowers about 10 mm. long, the calyx 6-7 mm. long (Pará, Brazil).

7. *O. holerythra*

Leaflets acute or breviacuminate, the base acute to rounded; flowers probably more than 10 mm. long, the calyx 7-10 mm. long (Espírito Santo, Brazil) . . . . . 8. *O. nitida*

Surface of fruit glabrate but retaining considerable fine pubescence at maturity; flowers 18-25 mm. long, the calyx usually about 10-15 mm. long; leaflets obtuse to breviacuminate (southern Mexico to Brazil) . 9. *O. macrocalyx*

SECTION III. ORMOSIA

SERIES 1. EXCELSAE

Seeds globose or ellipsoid, 17-20 mm. thick, unicolored yellow to red or bicolored yellowish and red, the hilum 4-5 mm. long, 1-1.5 mm. wide; fruit 3-3.5 cm. broad; flowers 8-10 mm. long, the calyx 4-5 mm. long (southern Brazil).

11. *O. friburgensis*

Seeds compressed, 10 mm. thick or less, unicolored yellow or red, or bicolored red and black, the hilum 2-5 mm. long, 1.5-2 mm. wide; fruit 1.5-3.3 cm. broad; flowers 12-18 mm. long, the calyx 6-10 mm. long.

Leaves 11-19-foliolate; seeds unicolored yellow to orange, the hilum about 5 mm. long and 2 mm. wide; fruit 2.5-3.3 cm. broad; flowers 15-18 mm. long, the calyx and axes of the inflorescences pallido- to fulvo-tomentose (Amazon basin of Brazil) . . . . . 10. *O. excelsa*

Leaves 5-9-foliolate; seeds unicolored red, or bicolored red and black, the hilum 2.5-4 mm. long and 2 mm. wide; fruit 1.5-2.5 cm. broad; flowers 12-15 mm. long, the calyx ferrugino- to fulvo-tomentose.

Seed red, sometimes with an inconspicuous black line, about 10 mm. long, 10 mm. broad, and 6-7 mm. thick, the hilum 2.5 mm. long and 2 mm. wide; fruit 1.5-2 cm. broad; leaflets obtuse to acute (Rio Negro basin of Venezuela, Colombia, and Brazil) . . . . . 12. *O. williamsii*

Seed bicolored red and black, 11-14 mm. long, 10-13 mm. broad, 8-10 mm. thick; fruit 2-2.5 cm. broad; leaflets acute or breviacuminate.

Hilum of seed about 4 mm. long and 2 mm. wide; mature fruit strongly rugose; leaflets 7 or 9, ovate to ovate-oblong, the secondary veins scarcely raised (São Paulo [and Minas Gerais?], Brazil) . 13. *O. minor*

Hilum of seed 2.5-3 mm. long and 1.5 mm. wide; fruit not rugose; leaflets 9, elliptic to oblong, the secondary veins moderately raised (Minas Gerais, Brazil) . . . . . 14. *O. vicosana*

#### SERIES 2. PANAMENSES

One species (Panamá) . . . . . 15. *O. panamensis*

#### SERIES 3. ISTHMENSES

Fruit about 1.5 cm. broad, the valves 1 mm. thick; leaflets elliptic to elliptic-oblong, 1.5-3.5 cm. broad, glabrous or nearly so, the pubescence sparse, minute, appressed (Panamá) . . . . . 16. *O. cruenta*

Fruit 2-4 cm. broad, the valves 1-3 mm. thick; leaflets mostly more than 3.5 cm. broad, velutinous or tomentulose along the major veins, otherwise, moderately pubescent to glabrous.

Flowers about 10 mm. long, the calyx 7-8 mm. long, cinereo- or fulvo-velutinous; fruit 2-3 cm. broad (México to northern Colombia) . 17. *O. isthmensis*

Flowers more than 10 mm. long (complete flowers not known in *O. venezolana*), the calyx 10-13 mm. long, fulvo- to ferrugino-tomentulose; fruit 2.5-4 cm. broad.

Leaves (5-) 7-11-foliolate; fruit (2.5-) 3-3.5 cm. broad; seeds 12-14 mm. long, the hilum 2-3 mm. long (western Colombia) . . 18. *O. colombiana*

Leaves 5-7-foliolate; fruit 3-4 cm. broad; seeds 15-20 mm. long, the hilum 3-3.5 mm. long (Coastal Cordillera, Venezuela) . . . 19. *O. venezolana*

#### SERIES 4. AMAZONICAE

Flowers 13-17 mm. long, the calyx fulvo- to ferrugino-tomentulose.

Leaflets predominantly broadly ovate, cordate, the lower surface with tightly crispate pubescence; flowers 15-17 mm. long (upper Amazon basin of Brazil and Peru) . . . . . 20. *O. amazonica*

Leaflets predominantly elliptic to oblong, rounded to subcordate at the base, the lower surface with laxly crispate, spreading, or subappressed pubescence; flowers 13-15 mm. long (upper Amazon basin of Peru and Bolivia).

21. *O. bopiensis*

Flowers 18–22 mm. long, the calyx cinereo- to fulvo-tomentulose (southern Mexico; British Honduras) . . . . . **22. *O. schippii***

SERIES 5. COCCINEAE

Valves of fruit lignous, 2–7 mm. thick.

Leaflets with the lower surface puberulent to tomentulose along the major veins, otherwise minutely appressed-pubescent to subglabrous.

Flowers 10–15 mm. long, the calyx ferrugino-tomentulose, 7–9 mm. long; fruit 1.5–3 cm. broad, the valves 2–5 mm. thick; seeds 10–15×10–12×8–10 mm., the hilum 2×1 mm.

Leaflets predominantly ovate, or obovate to elliptic, with midvein tomentulose below, the major secondary veins mostly 4–10 mm. apart forming angles of 60°–70° with the midvein; petiole 3–5 cm. long; petiolules 3–5 mm. long, the pairs of leaflets 2–4 cm. apart; fruit 2–3 cm. broad, the valves 3–5 mm. thick . . . . . **23a. *O. coccinea* var. *coccinea***

Leaflets elliptic to obovate with midvein puberulent or appressed-pubescent below, the major secondary veins mostly 10–25 mm. apart, forming angles of about 50°–60° with the midvein; petiole 5–7 cm. long, the petiolules 5–10 mm. long, the pairs of leaflets 5–7 cm. apart; fruit 1.5–2.5 cm. broad, the valves 2–3 mm. thick.

**23b. *O. coccinea* var. *subsimplex***

Flowers (13–) 16–20 mm. long, the calyx fulvo-tomentulose, (8–) 10–12 mm. long; fruit 2.5–3.5 cm. broad, the valves 2–3 mm. thick; seeds about 13–15×13×10 mm., the hilum 3.5×1.5 mm. (southeastern Brazil) . . . . . **24. *O. arborea***

Leaflets with lower surface uniformly pubescent to subglabrous.

Pubescence of leaflets crispate, the secondary and tertiary veins prominent; fruit with valves 2.5–4 cm. broad, 5–7 mm. thick.

Hairs of leaflets laxly crispate, mostly about 1 mm. long; seeds with hilum 2–2.5×1–1.5 mm (Manaus, Brazil) . . . . . **25. *O. grossa***

Hairs of leaflets minute, scarcely 0.1 mm. long; seeds with hilum 3×1.5 mm. (French Guiana; British Guiana; southeastern Venezuela; upper Amazon area of Brazil) . . . . . **26. *O. lignivalvis***

Pubescence of leaflets appressed or subappressed, minute, sometimes lacking; fruit with valves 1.5–3 cm. broad, 2–5 mm. thick.

Leaves 7–19-foliolate, the lower surface of leaflets with secondary veins scarcely raised, about 12–20 pair, 3–7 mm. apart, forming angles of 60°–70° with the midvein (French Guiana; Surinam; southern Venezuela; Brazil) . . . . . **27. *O. paraensis***

Leaves 7- or 9-foliolate, the lower surface of leaflets with secondary veins prominent, about 10 pair, 5–10 mm. apart, forming angles of 45°–50° with the midvein (Brazil, along southern tributaries of the Amazon River) . . . . . **28. *O. elata***

Valves of fruit sublignous or coriaceous, 1–2 mm. thick.

Fruit 1.2–2 cm. broad; seeds 6–11 mm. long, the hilum 1–1.5 mm. long; leaflets 1–7 (Surinam; British Guiana; middle Amazon region of Brazil).

**29. *O. costulata***

Fruit 2–3 cm. broad; seeds 12–15 mm. long, the hilum 2–3 mm. long; leaflets 5–11.

Leaflets 9 or 11, the lower surface puberulent along the midvein, otherwise minutely and sparsely appressed, pubescent; seeds 15–17×15–17×10–

- 11 mm., red except for a black line along one edge, the hilum 3 mm. long (Jamaica) . . . . . 30. *O. jamaicensis*  
 Leaflets 5-9, the lower surface finely puberulent or subfarinose, sometimes tomentulose along the major veins; seeds 12-14×10-11×8-9 mm., approximately half red and half black, the hilum 2 mm. long (southern British Guiana; Rio Branco-Rio Negro region of Brazil) . 31. *O. smithii*

SERIES 6. NOBILES

- Flowers 15-27 mm. long, the calyx (8-) 10-15 mm. long; fruit 1-6 (frequently 4-6)-seeded; leaflets sericeous or subsericeous below.  
 Leaflets predominantly elliptic to oblong, sometimes suborbicular, obovate, or ovate.  
 Fruit (1.3-) 2-2.7 cm. broad; seeds 10-13 mm. long, the hilum 3 mm. long; leaflets frequently suborbicular (Hispaniola; Puerto Rico; Lesser Antilles) . . . . . 32. *O. krugii*  
 Fruit 1.5-2.2 cm. broad; seeds 8-11 mm. long, the hilum 1.5-2.5 mm. long; leaflets commonly elliptic to oblong.  
 Leaves 3-9-foliolate, the leaflets coriaceous, or sometimes subcoriaceous, densely sericeous below, with major lateral veins about 10-15 pair, diverging from the midvein at angles of 60°-70°.  
 Valves of fruit usually glabrate at maturity; leaflets commonly about 15-30 cm. long, the secondary veins conspicuous, about 10-35 mm. apart (coastal French Guiana; Bolivia; middle and lower Amazon basin of Brazil) . . . . . 33a. *O. nobilis* var. *nobilis*  
 Valves of fruit fulvo-sericeous at maturity, little glabrescent; leaflets about 8-18 cm. long, the secondary veins relatively inconspicuous, 5-20 mm. apart (British Guiana and Bolivar, Venezuela).  
 33b. *O. nobilis* var. *bolivarensis*  
 Leaves commonly 9-11-foliolate, the leaflets subcoriaceous, densely to sparsely sericeous below, with major lateral veins 12-20 pair, 2-10 mm. apart, diverging from the midvein at angles of 50°-60° (middle to upper Amazon basin of Colombia, Peru, and Brazil).  
 33c. *O. nobilis* var. *santaremnensis*  
 Leaflets predominantly ovate, cordate, or subcordate, sometimes elliptic, obtuse at the base.  
 Apex of leaflets acute or breviacuminate, the acumen to about 10 mm. long in largest leaflets; fruit 1.3-2 cm. broad; seeds 8-9 mm. long, the hilum 1.5-2 mm. long (middle to upper Amazon basin of Brazil; southern Venezuela; southwestern Colombia) . . . . . 34. *O. macrophylla*  
 Apex of leaflets acuminate, the acumen 10-30 mm. long; fruit 2-2.5 cm. broad; seeds 10-11 mm. long, the hilum 3 mm. long (Pacific coast of Colombia).  
 35. *O. cuatrecasasii*  
 Flowers (presumably) less than 15 mm. long, the calyx 4-8 mm. long; fruit 1-3-seeded; leaflets sericeous to tomentose below.  
 Major veins of leaflets 20-50 pair, 2-10 mm. apart, the leaflets sericeous below (upper Amazon basin of Brazil, Venezuela, and Colombia) . 36. *O. discolor*  
 Major veins of leaflets 10-25 pair, 5-25 mm. apart, the leaflets velutinous, tomentose, or subsericeous below.  
 Calyx 6-8 mm. long; fruit 1.5-2.3 cm. broad.  
 Leaves 3-7-foliolate, the leaflets strongly revolute; seeds about 8 mm. long, the hilum 2-2.5 mm. long (Pacific slope of Colombia) . 37. *O. revoluta*

Leaves 9-foliolate, the leaflets not revolute; seeds 10–12 mm. long, the hilum 3 mm. long (southern Venezuela) . . . 38. *O. maguireorum*  
 Calyx 4–6 mm. long; fruit 1–2 mm. broad.

Leaflets elliptic, obtuse at the base, tomentose below (Bolivia).

39. *O. larecayana*

Leaflets ovate to elliptic, cordate to obtuse at the base, finely velutinous to subsericeous below.

Fruit 1–1.5 cm. broad; seeds 7–8 mm. long, the hilum 1 mm. in diameter (southern Venezuela) . . . . . 40. *O. steyermarkii*

Fruit 1.5–2 cm. broad; seeds 8–10 mm. long, the hilum 2 mm. × 1 mm. (upper Amazon basin of Brazil) . . . . . 41. *O. solimoesensis*

SERIES 7. MONOSPERMAE

Seed bicolored, red and black, the black area about one-third to one-half as large as the red.

Lower surface of leaflets tomentulose along the major veins, otherwise sparsely and minutely crisp-pubescent, glabrescent (Lesser Antilles; northeastern Venezuela) . . . . . 42. *O. monosperma*

Lower surface of leaflets uniformly pubescent or nearly so.

Hairs on lower surface of leaflets loosely crispate to subpatent.

Fruit 2.7–3.8 cm. broad; seeds 15–22 mm. long, the hilum 3–3.5 mm. × 1.5–2.5 mm. (Coastal Cordillera, Venezuela to Cordillera Oriental, Colombia) . . . . . 43. *O. tovarensis*

Fruit 1.5–2.5 cm. broad; seeds about 10–13 mm. long, the hilum 2–4 mm. × 1.5 mm.

Blade of leaflets broadly ovate to elliptic; calyx about 10 mm. long (Amazonas, Brazil) . . . . . 44. *O. froesii*

Blade of leaflets ovate, obovate, oblong, or elliptic; calyx 6–9 mm. long.

Leaflets predominantly obovate to elliptic, the pubescence laxly crispate to subpatent; fruit 1.5–2 (–2.5) cm. broad; seed with hilum 2–4 × 1.5 mm.; bracts deltoid, about 4 mm. long (British Guiana; Pará, Brazil) . . . . . 45. *O. coarctata*

Leaflets predominantly ovate to oblong, the pubescence loosely crispate; fruit 2–2.5 mm. broad; seed with hilum 2 × 1.5 mm.; bracts linear-lanceolate, about 4–10 mm. long (southeastern Brazil).

46. *O. fastigiata*

Hairs on lower surface of leaflets tightly crispate.

Fruit 1.5–2.5 cm. broad; seed 10–12 mm. long, the hilum 2.5–3 × 1–1.5 mm. (Central America) . . . . . 47. *O. velutina*

Fruit 2.5–3 cm. broad; seed 12–15 mm. long, the hilum 3 × 1.5 mm. (Cordillera Central, Colombia) . . . . . 48. *O. antioquiensis*

Seed completely red or red with a black line or narrow spot along one edge.

Leaflets with lower surface moderately to densely crisp-pubescent (Surinam; British Guiana; Brazil, along the northern coast and Amazon basin).

49. *O. stipularis*

Leaflets with lower surface tomentulose along the major veins, otherwise moderately and inconspicuously crisp-pubescent, glabrescent (El Avila, Venezuela) . . . . . 50. *O. avilensis*

Section I. *Macrocarpae*

*Ormosia* section *Macrocarpae* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 135, 136, 1922.

*Macroule* Pierce, Trop. Woods 71 : 2. 1942.

Trees; leaves 3-11-foliolate, the leaflets with blades coriaceous, essentially glabrous at maturity, the secondary veins about 5-9 pair, arcuate, only approximately parallel; fruit glabrous, indehiscent, lignous; seeds large, 25-40 mm. long, unicolored, red or drying to reddish brown, the hilum linear, 20-45 mm. long and 1.5-3 mm. wide.

*Ormosia coutinhoi*, the type, and *O. cinerea* are the only members of this section. The long hilum of the seed is the outstanding character and is the chief basis for Pierce's genus *Macroule*. This character is known only in these two species of *Ormosia* in the New World, but somewhat similar long hila are present in several Asian species. A variation in length of hilum occurs in other legume genera, notably, *Mucuna*, but is not usually considered sufficient basis for segregation.

1. *Ormosia coutinhoi* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 135, 136, t. 9, 10a. 1922. FIGURE 2

*Macroule coutinhoi* (Ducke) Pierce, Trop. Woods 71 : 2. 1942.

Tree to 60 m. high or more; young stems ferrugino-puberulent; stipules not seen; leaves 5-11-foliolate, the axis 8-50 cm. long, puberulent to subglabrous, the petiole 3-5 cm. long, the pairs of leaflets 4-8 cm. apart, the petiolules 8-20 mm. long, 4-5 mm. in diameter, the blades coriaceous, 6-27 cm. long, 3-16 cm. broad, ovate to elliptic or the terminal leaflet sometimes obovate, the apex obtuse or acute, the base rounded or subcordate, the upper surface glabrous, nitid, the lower surface glabrate, essentially glabrous at maturity, the secondary veins raised, about 6-9 pair, irregularly spaced, only approximately parallel, mostly 1-3 cm. apart, forming angles of 40°-50° with the midvein; inflorescences with axes argenteo- or cinereo-sericeous, the bracts minute, deltoid, about 1 mm. long and 1 mm. broad at the base, caducous, the bracteoles deltoid, about 0.5 mm. long and broad; flowers (17-) 20-25 mm. long; calyx argenteo-sericeous, 12-15 mm. long, the tube 7-10 mm. long, 7-8 mm. in diameter, the teeth 4-5 mm. long; petals pinkish to dark purple; fruit indehiscent, lignous, blackish brown, glabrous, nitid or sometimes minutely rimose with age, usually 1-seeded, 5-7 cm. long, sometimes 2-seeded, about 10-13 cm. long, constricted between the seeds, (3.5-) 5-7 cm. broad with a margin about 4 mm. wide, the valves 3-5 mm. thick; seeds red, or drying reddish brown, discoid or lenticular, 2.5-4 cm. in diameter, 1-2 cm. thick, the hilum linear, 30-45 mm. long and 1.5-3 mm. wide.



**TYPE LOCALITY:** "Belem do Pará," Brazil. Lectotype collected by Ducke (Museu Goeldi no. 16798), cited below.

**DISTRIBUTION:** British Guiana, Surinam, French Guiana, and the lower Amazon region of Brazil, in rain forest, "igapo," swampy flats, sandy banks, and hill slopes, at elevations up to about 400 m.

**FRENCH GUIANA:** Between Charvein and Acarouany, *Bur. Agr. & For. Guyanais* 73 M (P), 142 M (P), 212 M (U). Acarouany, *Melinon* 243 (P). Cachoeira Grande Roche, Rio Oiapoque, *Maguire, Pires, & Maguire* 47060 (K, NY, US).

**SURINAM:** Dam, *Stahel* 251 (A, K, NY, U). Jaffa, Commewijne, *Bosbeheer* 1021 (K, U). Mapana, *Bosbeheer* 1025 (U), 1026 (U). Macreabo, *Bosbeheer* 344 (U).

**BRITISH GUIANA:** Two miles E. of Atkinson Field, *Irwin* 165 (US). Makauria Creek, *Fanshawe* 523 [*For. Dept. B.G.* 3259] (K, NY, US). Barima R., *De la Cruz* 3388 (GH, NY, U, US). Butukari Forest, Bartica-Potaro Road, 54th mile, *Dawson* 8 [*For. Dept. B.G.* 2013] (K, NY). Near Haiama Creek, Demerara, *Hohenkerk* s.n. [*For. Dept. B.G.* 124 B] (K). "Santa," Pokorero Creek, Kumuni R., Demerara, *Hohenkerk* s.n. [*For. Dept. B.G.* 124 C] (K). Mahaica Camp, Moblissa Path, Demerara, *C. W. Anderson* s.n. [*For. Dept. B.G.* 582] (K, NY). Kaieteur Plateau, *Cowan & Soderstrom* 1976 (US).

**BRAZIL: PARÁ:** Without exact locality, *Martius* [*Iter brasiliense*] s.n. (M). Belém, *Ducke* 352 (NY), 585 (F, MG, MO, NY, R, US), 1615 (A, F, NY, R, US), 1962 (A, K, MG, NY, US), 16188 [MG no. = RB no. 15491] (BM, MG, P, S, U, US), 16798 [MG no.] (BM, F photo and fragment ex MG, MG lectotype, US); *Silva* 470 (IAN, NY, US). Guatipurú, *Fr. Lima* 16572 [MG no.] (BM, F photo and fragment ex MG, MG, US). Breves, *Ducke* 17093 [RB no.] (RB, US). Antonio Lemos, *Black* 48-3032 (IAN). "On beach at Caripi," *Spruce* s.n. in 1850 (K). Rio Guamá, Ourém, *Pires & Silva* 4626 (IAN, NY). **AMAPÁ:** Rio Araguari, Cachoeira do Paredão, *Frões & Black* 27679 (IAN, NY). Rio Iaue, confluence with Rio Oiapoque, *Irwin, Pires, & Westra* 47915 (K, NY, US).

**LOCAL NAMES:** Aguitin, neko-oudou, St. Martin blanc (French Guiana); warabokkadan (Surinam); korokororo, kurukoruru, kruk, red horse-eye (British Guiana); buiussú (Brazil).

The woody indehiscent fruit and large seeds with linear hila are distinctively characteristic of *O. coutinhoi*. In my opinion, however, these characters do not justify generic separation, and the species is retained in *Ormosia* rather than segregated in *Macroule*.

Of the three collections cited in the original description, Museu Goeldi numbers 16188, 16572, and 16798, the latter, with mature fruit and seed is designated as lectotype.

2. *Ormosia cinerea* R. Ben. Bull. Mus. Hist. Nat. Paris 26 : 86. 1920. FIGURE 2

Tall tree; young stems ferrugino-pubescent with subappressed hairs, glabrescent; stipules not seen; leaves (3-) 5-7-foliolate, the axis about (5-) 10-20 cm. long, puberulent, glabrate, the petiole 2-3 cm. long, the pairs of leaflets 3-4 cm. apart, the petiolules about 8 mm.

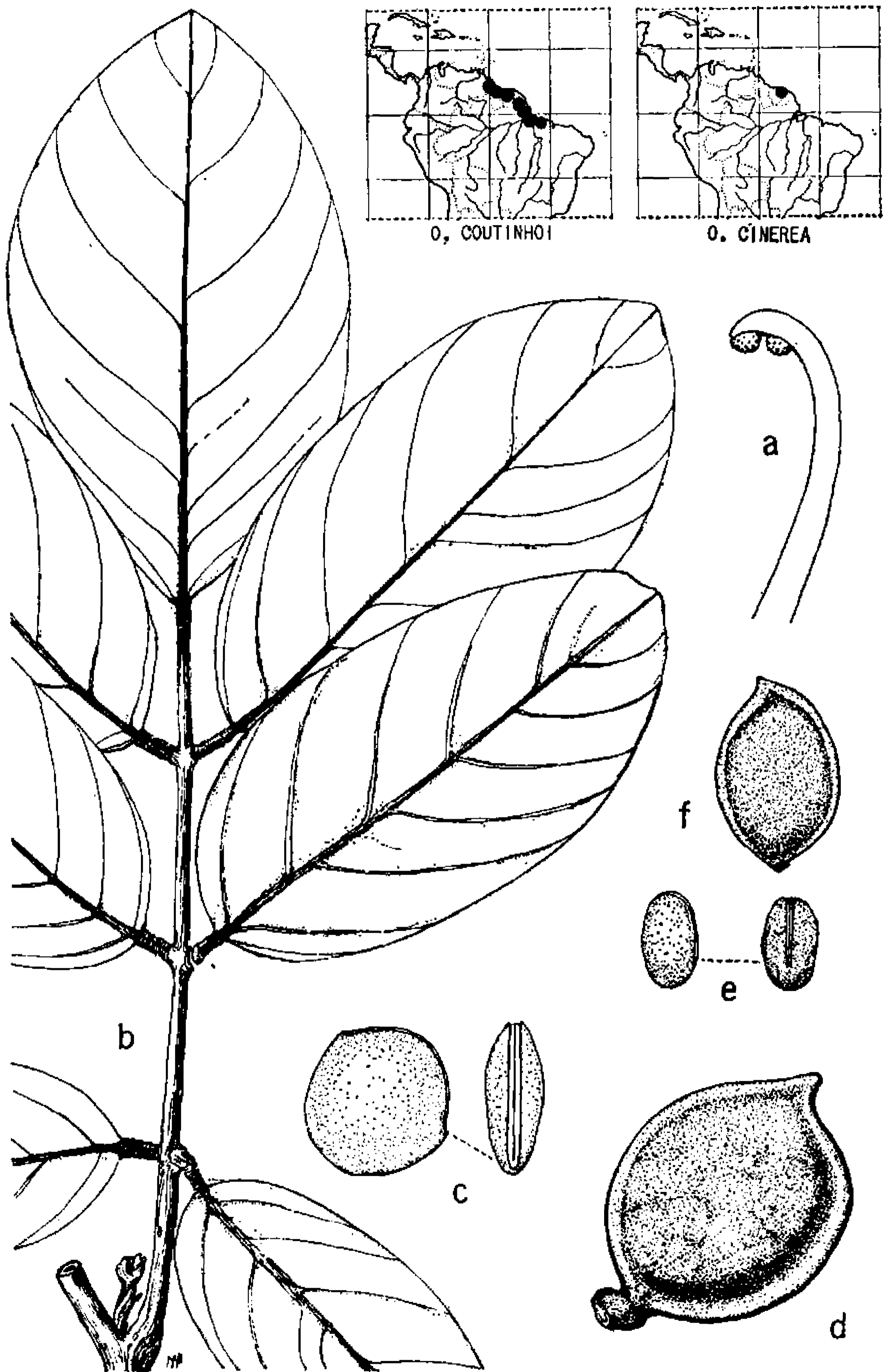


FIGURE 2.—*Ormosia* section *Macrocarpae*: Geographic distribution of species; *O. coutinhoi*: *a*, style showing bilobed stigma,  $\times 7$ ; *b*, leaf,  $\times \frac{1}{2}$ ; *c*, seed,  $\times \frac{1}{2}$ ; *d*, fruit,  $\times \frac{1}{2}$ . *O. cinerea*: *e*, seed,  $\times \frac{1}{2}$ ; *f*, fruit,  $\times \frac{1}{2}$ .

long and 1.5–2 mm. in diameter, the blades subcoriaceous, elliptic, 6–16 cm. long, 4–8 cm. broad, the apex acute or obtuse, the base acute to obtuse, the upper surface glabrous, nitid or subnitid, the lower surface glabrous at maturity, the secondary veins moderately raised, about 6–9 pair, irregularly spaced, only approximately parallel, mostly 1–2 cm. apart, forming angles of 45°–50° with the midvein; inflorescences with axes subsericeous, the hairs cinereous, the bracts and bracteoles deltoid, 1 mm. long or less, caducous; flowers 14–18 mm. long; calyx cinereo-subsericeous, 5–11 mm. long, the tube 4–8 mm. long, 3–7 mm. in diameter, the teeth 1–3 mm. long; petals dark purple, the standard with a white stripe down the middle, the wings whitish at the base; fruit indehiscent, lignous, brown, somewhat rugose, glabrous, nitid, 1-seeded, about 5 cm. long, 3 cm. broad with a margin 2–3 mm. wide, 2 cm. thick, the valves 1.5–2 mm. thick; seed red or reddish brown, ellipsoid, about 2.5 cm. long and 1.7 cm. in diameter, the hilum elongate, 20 mm. long and 1.5–2 mm. wide.

TYPE LOCALITY: Maroni River, French Guiana. Lectotype collected by Wachenheim (no. 88), cited below.

DISTRIBUTION: Known only from the region of the lower Maroni (=Marowijne) and Mana rivers, in French Guiana and Surinam.

FRENCH GUIANA: Maroni, *Melinon* 92 (P), s.n. in 1863 (BM, K, NY, P, US), s.n. in 1864 (BM, GH, K); *Wachenheim* 88 (P lectotype), 305 (K, P). St. Jean, *Benoist* 877 (P). Mana, *Bur. For. & Agr. Guyan.* 7335 (NY), 7357 (NY).

SURINAM: Marowijne R., *Bosbeheer* 609 (U). Nassau, *Lanjouw & Lindeman* 2958 (K, NY, U). Bigiëston, Marowijne R., *Lanjouw & Lindeman* 3451 (K, NY, U). Montecattinisoord, Marowijne R., *Wulfschlägel* 1439 (BR, U fragment ex BR).

LOCAL NAMES: Nekooudou, panacoco blanc de Marecage, San Martin blanc (French Guiana); agiti (Surinam).

This species, known only from a limited area of French Guiana and Surinam, is less robust and smaller in flower, fruit, and seed than its close relative, *O. coutinhoi*.

Pierce (*Trop. Woods* 71:2. 1942) suggested that *O. cinerea* probably was referable to *Macroule* and annotated several herbarium sheets with the combined name. He did not, however, officially publish the combination. As indicated earlier in this paper, I do not believe that segregation of the two species, *O. coutinhoi* and *O. cinerea*, into a separate genus is desirable.

Of the two Wachenheim collections cited by Benoist, nos. 88 and 305, both in flower, no. 88 is chosen as lectotype; the packet on that sheet contains a dissected flower, probably the basis of the original floral description.

Section II. *Unicolores*

*Ormosia* section *Unicolores* Amsh. Meded. Bot. Mus. & Herb. Rijks. Univ. Utrecht 52:48. 1939.

*Ormosiopsis* Ducke, Arch. Jard. Bot. Rio de Janeiro 4:61. 1925.

*Ormosia* section *Bicolores* Ducke subsection *Unicolores* (Amsh.) Ducke, Ann. Acad. Bras. Sc. 11:187. 1939.

*Ormosia* section *Unicolores* (Amsh.) Ducke, Bol. Tecn. I.A.N. Belem 18: 154. 1949.

Shrubs or trees; leaves (1-) 3-11-foliolate, the leaflets with blades coriaceous or subcoriaceous, essentially glabrous at maturity, the secondary veins about 5-9 pair, arcuate, only approximately parallel; fruit dehiscent, the valves coriaceous or sublignous, glabrous or nearly so at maturity; seeds small to medium-sized, 7-15 mm. long, unicolorous red or black, the hilum elliptic, 1.2-3 mm. long and 0.8-1.5 mm. wide.

The seven species included in this section seem to form a natural group, differing from one another chiefly in details of flower, fruit, and seed size and in shape of leaflets. One species, *O. flava*, differs in being black-seeded.

Although Ducke originally reduced the rank of *Unicolores* from section to subsection, later, in 1949, he indicated sectional status for the group, with the previous circumscription but without citing Amshoff as author.

Two species, *O. holerythra* and *O. melanocarpa*, were ascribed to this section by Amshoff. The older of the two, *O. holerythra*, is herewith designated as lectotype.

*Ormosiopsis* is not considered to be generically distinct and is being reduced to *Ormosia*. The chief basis of separation was the position of the stigma, lateral in *Ormosia*, terminal in *Ormosiopsis*. Actually, the so-called terminal stigmas of *Ormosiopsis* frequently are oblique, and are sometimes found in flowers of unquestioned "good" *Ormosia* species.

**3. *Ormosia flava* (Ducke) Rudd, comb. nov.**

FIGURE 3

*Clathrotropis* ? *flava* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 134. 1922.

*Ormosiopsis flava* (Ducke) Ducke, Arch. Jard. Bot. Rio de Janeiro 4 : 61, pl. 25a, b. 1925.

*Clathrotropis* ? *surinamensis* Kleinh. Rec. Trav. Bot. Néerl. 22:61, fig. 11. 1925.

Tree, to about 35 m. tall; young stems ferrugino-pubescent, the hairs subappressed, glabrate; stipules minute, deltoid, about 0.5 mm. long; leaves 5-11-foliolate, the axis about 7-15 cm. long, moderately appressed-pubescent, glabrescent, the petiole 2-3 cm. long, the pairs of leaflets 2-3 cm. apart, the petiolules 3-5 mm. long, 1-2 mm. in diameter, the blades coriaceous or subcoriaceous, elliptic or oblong-elliptic, 4-14 cm. long, 2-6 cm. broad, acute or broadly acuminate,

the acumen to about 1 cm. long, the base obtuse, the upper surface glabrous, nitid or subnitid, the lower surface ferrugino-sericeous along the midvein, otherwise glabrous or nearly so, the secondary veins inconspicuous, usually 8 or 9 pair, arcuate, irregularly spaced, about 5–15 mm. apart, forming angles of about 50°–60° with the midvein; inflorescences with axes ferrugino-pubescent with subappressed hairs, the bracts and bracteoles deltoid or linear-deltoid, about 1 mm. long or less; flowers 15–18 mm. long; calyx 8–12 mm. long, ferrugino-sericeous, the tube 6–10 mm. long, 5–7 mm. in diameter, the teeth about 2 mm. long; petals yellow, the standard sometimes with a red spot; fruit dehiscent, coriaceous or sublignous, reddish brown or dark brown, glabrous at maturity, 1–3-seeded, about 3–5 cm. long, often appearing stipitate due to abortion of the basal ovules, about 1–2 cm. broad, slightly constricted between the seeds, 1.5–1.7 cm. thick, the valves about 1–1.5 mm. thick; seeds black, 10–14 mm. long, 9–14 mm. wide, 9–12 mm. thick, the hilum elliptic, 1.5–2 mm. long and 1–1.5 mm. wide.

TYPE LOCALITY: Rio Branco de Obidos, Pará, Brazil. Lectotype collected by Ducke (MG no. 16955), cited below.

DISTRIBUTION: Surinam and lower Amazon basin of Brazil, on "terra firma."

SURINAM: Forest Reserve, Sectie O, Arbor no. 849, *For. Bur. Sur.*, [Herb. no. 2834] (BR, K, NY, US, isotypes of *C. surinamensis*). Brownsberg, Arbor no. 1095, *For. Bur. Sur.* [Herb. no. 1710] (K, NY).

BRAZIL: PARÁ: Belém, Bosque Municipal, *Ducke* 1714 (A, F, K, MG, NY, US), 1721 (A, F, K, MG, NY, US); *da Silva* 87 (P); *Pires & Black* 30 (P). Rio Tapajoz, Cach. do Mangabal, *Ducke* [MG no.] 16746 BM, (FM Neg. 28035 ex G, MG syntype of *C.? flava*, US). Rio Tapajoz, Pimental, *Ducke* [MG no.] 16779 (BM, MG syntype of *C.? flava*, US), [RB no.] 17081 (K, US). Rio Tapajoz, Francez, *Ducke* [RB no.] 17080 (K, US). Rio Branco de Obidos, *Ducke* [MG no.] 16955 (BM, MG lectotype of *Clathrotropis? flava*). Benevides, *Fr. Lima* [MG no.] 11834 (MG, US). Castanhal, Colonia 3 de Outubro, *Pires & da Silva* 4455 (NY, P). Rio Guamá, Ourem, *Pires & da Silva* 4631 (NY). MARANHÃO: Mata da Cachoeira, Rio Maracassumé, *Fróes* 1913 (F, K, NY, U, US).

LOCAL NAMES: Tatebojotok [Arawak], arieshie ie [Carib] (Surinam, fide Amshoff); tento preto (Pará, Brazil); sucupira branca (Maranhão, Brazil).

Black seeds and predominantly yellow flowers identify *O. flava* as unique among the American species of *Ormosia*. In Asia, however, there are several black-seeded species, and yellow or white flowers are not uncommon. The curved style with a lateral, bilobed stigma, as is characteristic of the genus *Ormosia*, is somewhat modified in this species; the style may be straight, or slightly curved, and the stigma may be terminal, or oblique with one lobe terminal, the other lateral.

Vegetatively, *O. flava* is essentially identical with the other species of section *Unicolores*.

Examination of type material of *C. surinamensis* shows that species to be conspecific with *O. flava*.

Of the three collections cited by Ducke in the original description of *C. flava*, on which this species is based, *Ducke* no. 16955, at MG, has been chosen as lectotype; that sheet alone bears a black seed, the outstanding character of the species. The other sheets, with flowers and fruits only, are less distinctive.

Walter Egler, in his list of Ducke's types (Bol. Mus. Emilio Goeldi II. Bot. 18 : 63. 1963), cites the sheet RB 17111 (MG 11834). It was not, however, cited in the original description of *Clathrotropis? flava*, the basionym of this species, and cannot correctly be designated as type.

4. *Ormosia melanocarpa* Kleinh. Rec. Trav. Bot. Néerl. 22 : 391. 1926. FIGURE 3

Tree; young stems fulvo- or ferrugino-pubescent with appressed hairs, glabrescent; stipules minute, deltoid, pubescent, scarcely 1 mm. long, caducous; leaves 7-11-foliolate, the axis about 8-10 cm. long, tomentulose, glabrescent, the petiole 3-5 cm. long, the pairs of leaflets 2-2.5 cm. apart, the petiolules 3-5 mm. long and 1-1.5 mm. in diameter, the blades subcoriaceous, ovate to elliptic-oblong, 5-11 cm. long, 3-5 cm. broad, the apex breviacuminate, the base rounded, the upper surface glabrous, nitid, the lower surface glabrous or minutely and sparsely appressed-pubescent, the major secondary veins inconspicuous, about 7-9 pair, irregularly spaced, forming angles of 40°-50° with the midvein; inflorescence with axes fulvo-pubescent, the hairs mostly appressed, the bracts deltoid-ovate, about 1 mm. long and 1 mm. broad, the bracteoles linear, mostly less than 1 mm. long; flowers about 6 mm. long; calyx about 4 mm. long, fulvous, appressed-pubescent, the tube about 3 mm. long and 2 mm. in diameter, the teeth about 1 mm. long; corolla dark brown (fide Kleinhoonte); fruit dehiscent, coriaceous, black or blackish brown, glabrous, nitid, 1- or 2-seeded, 2-3 cm. long, 1.3-1.8 cm. broad, scarcely constricted between the seeds, 8-9 mm. thick, the valves 1-2 mm. thick; seeds dark red, 7-9 mm. long, 6-8 mm. broad, and 6 mm. thick, the hilum elliptic, about 1.2 mm. long and 0.8 mm. wide.

TYPE LOCALITY: In Forest Reserve, "Sektion O," Surinam. Type from tree no. 775, (Herb. no. 4699, without collector's name), cited below.

DISTRIBUTION: In forest on sandy ridges, French Guiana and Surinam.

FRENCH GUIANA: Charvein, *Benoist* 212 (P).

SURINAM: Forest Reserve, "Sektion O," tree no. 775, *For. Bur. Sur.* [Herb.

no. 1409] (U), [Herb. no. 2391] (U), [Herb. no. 4699] (K, NY, U type), [Herb. no. 5015] (K, NY). Perica R., Commewijne, *Lindeman* 5358 (U, US).

LOCAL NAMES: St. Martin jaune (French Guiana); agipau, awaakoko, barakaro korero ibibero iwi, kokriki (Surinam).

The flowers, fruit, and seeds of this species are smaller than average for the genus, as well as for the section *Unicolores*. It has been especially helpful in preparing a description to have material in flower and fruit known to be from the same tree. Otherwise, *O. melanocarpa* has been little collected.

A holotype was not indicated in the original description, but the collection cited above has been so designated in the herbarium at Utrecht, presumably by the author of the species.

5. *Ormosia grandiflora* (Tul.) Rudd, comb. nov.

FIGURE 3

*Diploctropis grandiflora* Tul. Arch. Mus. Par. 4 : 109. 1844.

*Clathrotropis grandiflora* (Tul.) Harms, Engl. Bot. Jahrb. 33, Beibl. 72 : 27. 1903.

*Ormosiopsis triphylla* Ducke, Arch. Jard. Bot. Rio de Janeiro 5 : 133. 1930.

*Ormosiopsis cuspidata* Pierce ex Macbride, Field Mus. Pub. Bot. 13 : 247. 1943.

Tree or shrub to about 10 m. tall; young stems ferrugino- or fulvo-pubescent with short, subappressed hairs, glabrate; stipules linear, pubescent, about 1 mm. long, caducous; leaves (1-) 3-5-foliolate, the axis 2-15 cm. long, moderately appressed-pubescent to glabrous, the petiole 1.5-6 cm. long, the pairs of leaflets 1-3.5 cm. apart, the petiolules about 4-10 mm. long and 1-2 mm. in diameter, the blades subcoriaceous, ovate, obovate, or elliptic, 5-20 cm. long, 3-9 cm. broad, the apex acuminate with acumen 6-20 mm. long, the base obtuse to acute, the upper surface glabrous, subnitid, the lower surface essentially glabrous, the secondary veins inconspicuous or slightly raised, about 5-8 pair, arcuate, irregularly spaced, 6-30 mm. apart, forming angles of 40°-50° with the midvein, the tertiary reticulations sometimes prominent; inflorescences with axes cano- to fulvo-pubescent with subappressed hairs, glabrate, the bracts linear-deltoid, 1-1.5 mm. long, the bracteoles linear, about 0.5 mm. long; flowers 15-20 mm. long; calyx 8-12 mm. long, moderately appressed-pubescent, glabrescent, the tube 4-6 mm. long, 6-7 mm. in diameter, the teeth 3-6 mm. long; petals dark purple (fide Klug), pale lilac (fide Ducke), or greenish yellow (fide Ferreyra); fruit dehiscent, coriaceous or sublignous, black or dark brown, sparsely appressed-pubescent, glabrate, 1- or 2-seeded, 3-5 cm. long, 1.3-2 cm. broad, slightly constricted between the seeds, 1.5-2 cm. thick, the valves about 1 mm. thick; seeds bright red, 7-12 mm. long, 10-14 mm. broad, and 6-11 mm. thick, the hilum elliptic, 2-3 mm. long, 1-2 mm. wide.

TYPE LOCALITY: Pará, Brazil. Type at P, presumably collected by A. R. Ferreira. Isotype cited below.

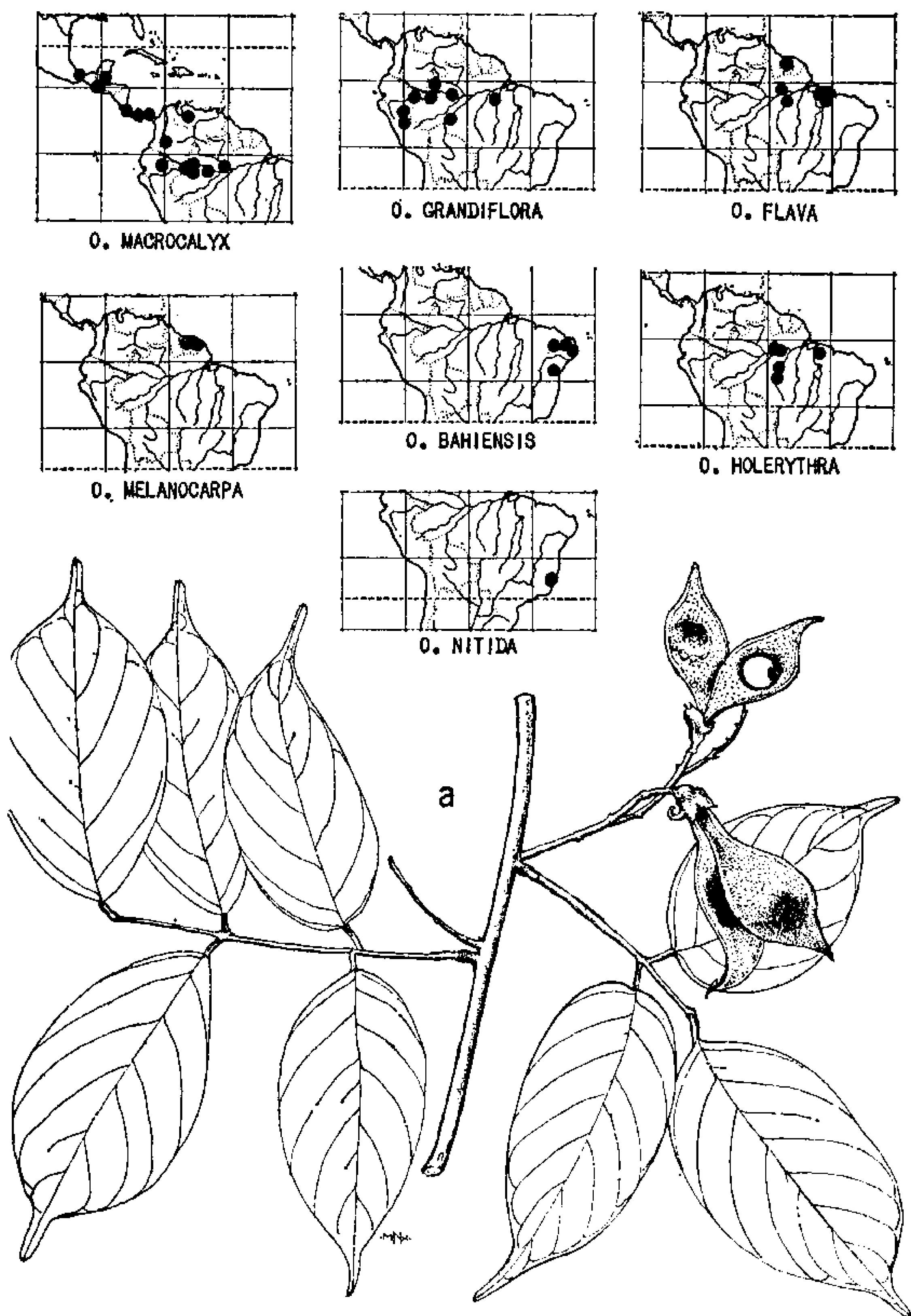


FIGURE 3.—*Ormosia* section *Unicolores*: Geographic distribution of species; *O. grandiflora*: a, portion of branch showing leaves, fruit, and seed,  $\times \frac{1}{2}$ .

**DISTRIBUTION:** In woods, "terra firma," Amazon basin in Peru and Brazil.

**PERU:** LORETO: Yurimaguas, Killip & Smith 29068 (A, NY type of *Ormosiopsis cuspidata*, US). Pampa de Sacramento, between Tingo María and Pucallpa, Ferreyra 1188 (US). Mishuyacu, near Iquitos, Klug 1207 (US).



BRAZIL: AMAZONAS: Teffé, *Ducke* [RB no.] 17260 (US iso-syntype of *O. triphylla*). Jauareté, S.P., Vaupés, *Fróes* 21158 (F, IAN, K, M, NY, US). São Paulo de Olivença, *Fróes* [*Krukoff*] 12081 (A, F, NY, US). Basin of the Rio Madeiro, Lobo [*Krukoff* Herb. no.] 15458 (NY). RONDÔNIA [Guaporé]: Pôrto Velho, *da Silva* 366 (US). PARÁ: Without exact locality, *A. R. Ferreira* s.n. (K isotype of *D. grandiflora*). Santa Julia, *Ducke* [RB no.] 20367 (NY, US, iso-lectotypes of *O. triphylla*).

LOCAL NAME: Tento (Brazil).

Examination of flowering material of *Ducke* 20367 and *Klug* 1207, shows the stigma to be bilobed and oblique to lateral, as is characteristic of *Ormosia*. The isotype of *Diploctropis grandiflora* examined at K is also a flowering specimen but the stigmas have been broken from the styles. The other collections cited above, all in fruit or seed, including the type of *Ormosiopsis cuspidata*, are similar vegetatively, varying slightly in prominence and angle of venation of the leaflets and in shape of the leaflet base. In general, this taxon closely resembles other members of the section of *Ormosia* to which it is being transferred in this paper.

As lectotype of *Ormosiopsis triphylla*, *Ducke* 20367, in flower, has been chosen rather than the other syntype, *Ducke* 17260, with weathered fruit, and with seeds that vary from sheet to sheet, possibly not belonging to this collection.

6. *Ormosia bahiensis* Monachino, *Phytologia* 4: 36. 1952.

FIGURE 3

Tree about 10 m. high; young stems fulvo- to cinereo-pubescent with subappressed hairs; stipules linear-deltoid, about 2–3 mm. long and 1 mm. broad, or less, caducous; leaves 5–7-foliolate, the axis about 8–12 cm. long, glabrous or nearly so, the petiole 3–4 mm. long, the pairs of leaflets 3–4 cm. apart, the blades coriaceous, ovate to elliptic, 6–11 cm. long, 2.5–7 cm. broad, the apex acute or brev acuminate, the base subcordate or rounded, the upper surface glabrous, nitid, the lower surface glabrous or sparsely pubescent along the midvein, the secondary veins moderately conspicuous, about 6–8 pair, forming angles of about 55°–60° with the midvein; inflorescences with axes fulvo- to ferrugino-pubescent with subappressed hairs, the bracts linear to deltoid, about 2 mm. long, scarcely 1 mm. broad, the bracteoles linear, about 1 mm. long; flowers 8–10 mm. long; calyx 6–7 mm. long, subvelutinous with subappressed, fulvous hairs, the tube 3–4 mm. long and about 5 mm. in diameter, the teeth about 3 mm. long; petals purplish; fruit dehiscent, carnose-coriaceous, sometimes somewhat lignous, black, glabrous, nitid, 1–4-seeded, 4–5 cm. long, 2.5–3.7 cm. broad, little constricted between the seeds, about 2 cm. thick, the valves 3–4 mm. thick; seeds red, 11–13 mm. long, 10 mm. broad, 8–9 mm. thick, the hilum elliptic, about 1.2 mm. long and 1 mm. wide.

TYPE LOCALITY: "Carrasco" dry land, Andaraí, Bahia, Brazil. Type collected by Fróes (no. 12629), cited below.

DISTRIBUTION: In dry woodland, northeastern Brazil.

BRAZIL: PARÁIBA: Areia, *Moraes* 893 (IAN, NY, P). PERNAMBUCO: Rio Gurjaú, *Ducke & Lima* 106 (IAN, R). Tuima, *Lima* 52-997 (IAN, R). Usina Agua Branca, *Gomes Leal e Octavio* 206 (RB, US). Usina Capiberibe, Recife, *Lima* s.n. (IAN). BAHIA: Andaraí, *Fróes* 12629 (A, CAS, DS, NY type).

LOCAL NAMES: Mongoló (Bahia); murta preta (Paráiba); brauna d mata, sucupira baraquim (Pernambuco).

As indicated in the key, the relatively fleshy fruits of this species help to distinguish it from others of the section.

7. *Ormosia holerythra* Ducke, Arch. Jard. Bot. Rio de Janeiro 4:61. 1922.

FIGURE

*Ormosia tapajosensis* Pires, Bol. Técn. Inst. Agron. No. 38 : 25. 1960.

Shrub or tree to about 5 m. high; young stems fulvo-pubescent with subappressed hairs, glabrescent; stipules linear-deltoid, 1.5-2 mm long, caducous; leaves 5-11-foliate, the axis 8-30 cm. long, glabrous or sparsely appressed-pubescent, the petiole about 3-6 cm. long, the pairs of leaflets 2-5 cm. apart, the petiolules 3-7 mm. long and about 2 mm. in diameter, the blades coriaceous, ovate to elliptic-oblong 3.5-14 cm. long, 2.5-5 cm. broad, the apex bluntly acuminate, the acumens (5-) 10-20 mm. long, the base rounded, usually obliquely, c subcordate, the upper surface glabrous, nitid, the lower surface glabrous or nearly so, the secondary veins inconspicuous, 5 or 6 pairs irregularly spaced, forming angles of about 50°-60° with the midvein; inflorescences with axes cinereo- to fulvo-puberulent, the bracts linear deltoid, attenuate, 1.5-2.5 mm. long, 0.5 mm. broad at the base, the bracteoles linear, about 1 mm. long; flowers about 10 mm. long; calyx 6-7 mm. long, cinereo-puberulent, the tube about 2 mm. long and 4 mm. in diameter, the teeth 4-5 mm. long; petals dark reddish purple; fruit dehiscent, coriaceous, black, glabrous, nitid, 1-3-seeded 4-6.5 cm. long, 2.5-3.6 cm. broad, somewhat constricted between the seeds, 1.5-2 cm. thick, the valves 1.5-2 mm. thick; seeds red, 12-15 mm. long, 10-12 mm. broad, and 8-9 mm. thick, the hilum elliptic about 2 mm. long and 1 mm. wide.

TYPE LOCALITY: "In arenosis siccis Campinas do Achipicá," near Rio Trombetas, Pará, Brazil. Type collected by Ducke ("Herbario do Amazon. Mus. Paraensis" no. 10944), cited below.

DISTRIBUTION: "Terre firme," dry sandy soil, secondary forest, Pará, Brazil.

BRAZIL: PARÁ: Obidos, *Barbosa Rodrigues* [R no. ] 64377 (R); *Ducke* [RB no. ] 20366 (RB, S, U). Rio São Manoel, Cachoeira do Caldeirão, above Igarajá Preto, *Pires* 3823 (IAN, NY). Campinas do Achipicá, near Trombetas, *Duc*

[MG no.] 10944 [RB no. 17112] (RB type, S, U). Rio Capim, *Fróes & Pires* 24162/74 (IAN). Arboretum IAN (cultivated, from Villa Nova, upper Tapajos R.), *J. S. Rodrigues* 205 (IAN, type of *O. tapajosensis*, US), 206 (IAN, US); *Pires* 7643 (IAN).

LOCAL NAMES: Pau do tentos, tento.

Examination of specimens cited by the authors of *O. holerythra* and *O. tapajosensis* shows the two species to be synonymous. The type of the former appears to be somewhat depauperate in comparison with the type of *O. tapajosensis*, which was taken from a tree in cultivation.

The type of *O. holerythra*, although originally cited as located in the Amazonian Herbarium, was later transferred by Ducke to the herbarium of the Jardim Botânico, Rio de Janeiro.

8. *Ormosia nitida* Vog. *Linnaea* 11 : 405. 1837, non sensu Bentham 1862, non Prain ex King 1897. FIGURE 3

Tree 10–12 m. high; young stems finely appressed-pubescent with fulvous hairs, glabrescent; stipules deltoid, pubescent, about 1 mm. long, caducous; leaves 5–9-foliolate, the axis about 6–17 cm. long, glabrous or nearly so, the petiole 2–5 cm. long, the pairs of leaflets about 2–5 cm. apart, the petiolules 5–7 mm. long and 1 mm. in diameter, the blades subcoriaceous, ovate to elliptic-oblong, 4–10 cm. long, 1.5–4.5 cm. broad, the apex acute to breviacuminate, the base rounded to acute, the upper surface glabrous, nitid, the lower surface glabrous with major secondary veins moderately evident, about 5–7 pair, irregularly spaced, 5–15 mm. apart, forming angles of 40°–50° with the midvein; inflorescences with axes appressed-pubescent with fulvous to cinereous hairs, glabrate, the bracts deltoid, attenuate, 1–2 mm. long, the bracteoles linear, about 1 mm. long; complete flowers not seen, probably 10–15 mm. long; calyx 7–10 mm. long, appressed-pubescent with fulvous hairs, the tube 4–5 mm. long, 5–6 mm. in diameter, the teeth 3–5 mm. long; fruit dehiscent, coriaceous, black, glabrous, 1–3-seeded, 4–6 cm. long, 2.5–3.5 cm. broad, slightly constricted between the seeds, 8–10 mm. thick, the valves 1–2 mm. thick; seeds scarlet, about 12 mm. long, 10 mm. broad, and 8 mm. thick, the hilum elliptic, about 2 mm. long and 1 mm. wide.

TYPE LOCALITY: "Vittoria-Bahia," probably in Espírito Santo, Brazil. Type collected by Sellow (no. 510), cited below.

DISTRIBUTION: Known only from the general area of the type locality.

BRAZIL: Without exact locality, *Sellow* s.n. in 1815–17 (BM), 820 (BM). ESPÍRITO SANTO?: "Vittoria-Bahia," *Sellow* 510 (F fragment, presumably of type ex B; F.M.Neg. 1913 of type ex B). ESPÍRITO SANTO: Lagôa do Juparaná, Linhares, Rio Doce, *Kuhlmann* 110 (K, RB, U, US).

LOCAL NAME: Tento.

*Ormosia nitida* Prain ex King (Journ. As. Soc. Bengal 66 : 149. 1897) is a homonym of *O. nitida* Vog. and was superseded by the new name *O. polita* Prain (Journ. As. Soc. Bengal 69 : 184. 1900). *Ormosia nitida* sensu Bentham is actually *O. arborea* (Vell.) Harms. The misinterpretation was recognized by Harms (Repert. Sp. Nov. Fedde 19 : 288. 1924) who cited the type of *O. nitida* Vog. as *Sellow* no. 510. That specimen, at Berlin, presumably is no longer extant but it is represented by a photograph, no. 1913, of the Field Museum series, and by a fragment at F.

In general, on the basis of incomplete material, this species appears to be most closely related to *O. macrocalyx*, but, because of the geographic separation and minor differences, as indicated in the key, I believe that, for now, at least, the two taxa should not be combined.

9. *Ormosia macrocalyx* Ducke, Arch. Jard. Bot. Rio de Janeiro 3:137. 1922.

FIGURE 3

*Ormosia apulensis* Cortés, Flora de Colombia, 61. 1919, nomen nudum.

*Ormosia toledoana* Standl. Carnegie Inst. Publ. 461:64. 1935.

*Ormosia chlorocalyx* Ducke, Bol. Téc. Inst. Agron. Belém, 2:23. 1944.

Tree to about 40 m. high; young stems finely pubescent with sub-appressed hairs, glabrate; stipules linear, about 5 mm. long, caducous; leaves 7-11-foliolate, the axis 10-45 cm. long, sparsely pubescent, glabrate, the petiole 4-10 cm. long, the pairs of leaflets 2.5-5 cm. apart, the petiolules 6-8 mm. long, 1.5-3 mm. in diameter, the blades coriaceous or subcoriaceous, ovate to ovate-oblong, 6-19 cm. long, 3-9 cm. broad, the apex obtuse to breviacuminate, the base rounded to subcordate, the upper surface glabrous, nitid or subnitid, the lower surface glabrous, the secondary veins inconspicuous, about 5-8 pair irregularly spaced, about 10-15 mm. apart, forming angles of about 40°-60° with the midvein; inflorescences with axes cinereo- to fulvo-pubescent with appressed hairs, the bracts linear, 3-10 mm. long, 1 mm. broad or less, the bracteoles subulate, 1-1.5 mm. long; flowers 18-25 mm. long; calyx 8-15 mm. long, pubescent with gray, sub-appressed hairs, the tube (3-) 8-10 mm. long, 8-10 mm. in diameter, the teeth 3-5 mm. long; petals lilac to dark purple; fruit dehiscent, coriaceous, black or brown, glabrescent but often with considerable fine, fulvous pubescence at maturity, 1-6- (commonly 2- or 3-) seeded, 3-10 cm. long, 2-3.5 cm. broad, slightly constricted between the seeds, 10-15 mm. thick, the valves 1.5-2 mm. thick; seeds red, 10-13 mm. long, 10 mm. broad, 7-8 mm. thick, the hilum elliptic, 1.2-1.5 mm. long, 1 mm. wide.

TYPE LOCALITY: Lake Teffé, Amazonas, Brazil. Type collected by Ducke (no. 7345), cited below.

**DISTRIBUTION:** In wet, swampy forest, "igapo," southern Mexico to the Amazon basin of Brazil, at elevations up to about 100 meters.

**MEXICO:** VERACRUZ: Fortuño, Río Coatzacoalcos, *Lt. Williams* 8926 (F, G, K, S, U, US). TABASCO: Cocoital, Comalcalco, *Guzmán* s.n. (US).

**GUATEMALA:** ESCUINTLA: "Lower coast," *Pettersen* 9984 (NY).

**BRITISH HONDURAS:** TOLEDO: Forest Home, *Schipp* 1052 (A, BM, F type of *O. toledoana*, G, GH, K, MO, NY, S, UC, US).

**COSTA RICA:** HEREDIA: Muella de San Carlos, *Holdridge* 5203 (F).

**PANAMÁ:** BOCAS DEL TORO: Changuinola Valley, *Cooper & Slater* 125 (A, GH, NY, US, Y). CHIRIQUÍ: Progreso, *Cooper & Slater* 243 (F, GH, NY, US, Y). CANAL ZONE: ANCON (cultivated), *Schubert & Lindsay* 602 (US). Paraíso Sta., *Hayes* 522 (BM, BR, K, M). PANAMÁ: Chepo, *Kluge* 14 (US, Y).

**CUBA:** LAS VILLAS: Cienfuegos, Soledad (cultivated, introduced from Panamá). *Atchison* 66 (US); *Gonzales* s.n. (SI, US); *Walsingham* [Krukoff Herb. no.] 15153 (NY), s.n. (NY).

**VENEZUELA:** COJEDES: Between Campo Carabobo and San Carlos, *Aristeguieta* 3252 (US, VEN). PORTUGUESA: Píritu, *Brito* 40 (VEN). BARINAS: Barrancas, *Díaz* 3 (MER, US); *Ruiz-Terán & Marcano-Berti* 1172 (MER, US).

**COLOMBIA:** AMAZONAS: Río Loretoyacu, *Schultes* 6088 (F, US). CUNDINAMARCA: Río Apulo, *Triana* 4336 (BM, isotype of *O. apulensis*).

**PERU:** LORETO: Gamitanococha, Río Mazán, *Schunke* 214 (A, F, NY, US).

**BRAZIL:** AMAZONAS: Paraná do Careiro, *Ducke* 1998 (A, MG, NY, R, SI, U, US), 2133 (MG, R, SI). Lago do Genipapo, Río Javari, *Fróes* [Krukoff] 12083 (A, DS, F, NY, US). Río Tonantins, *Fróes* [Krukoff] 12206/119 (A, F, NY, SI, US), 12208/121 (A, F, NY, SI, US). Manaus, Paraná do Xiborema, *Fróes* 29622 (IAN, NY, US), 29638 (IAN, NY, UC, US); Manaus, Río Janceiré, *Corner* 5 (IAN). Manaus, *Ducke* [RB no.] 24060 (F, G, K, NY, P, RB, S, U, US). Camatian, *Fróes* 24047 (IAN, NY, US), 23982 (IAN, NY). Lago Teffé, *Ducke* 7345 (BM isotype). Río Teffé, Assahituba, *Fróes* 26114 (IAN, NY, US). Esperança, Río Solimões, "boca do Javari," *Ducke* 1516 (A, F, K, MG type of *O. chlorocalyx*, NY, R, SI, US).

**LOCAL NAMES:** Colorín, caracolillo (Mexico); alcornoque, casique, pernila del monte (Panamá); chocho grande (Colombia); tento (Brazil); huyruro (Peru).

According to Egler (Bol. Mus. Par. Emilio Goeldi II. 18 : 63. 1963), the type of *O. macrocalyx* is at MG. I have not seen that specimen but an isotype from BM has been available for study.

The collections previously assigned to *Ormosia apulensis*, *O. chlorocalyx*, and *O. toledoana* all appear to be conspecific with *O. macrocalyx* although there are minor differences, especially in leaflet characters. The material from Panamá, for example, commonly has subcoriaceous, subnitid leaflets, blunt at the apex; collections from Brazil mostly have coriaceous, nitid leaflets, with acute to brev acuminate tips. The variations are not consistent, however. The flower color varies somewhat, from lilac to dark purple.

Specimens from Panamá and Cuba, the latter introduced from Panamá, have been erroneously identified and distributed as *O.*

*panamensis*. Examination of the type of *O. panamensis* shows it to be a distinct species.

One of the Mexican collections cited above as *O. macrocalyx*, *Ll. Williams* 8926, was included as a paratype in the original description of *O. isthmensis* but with the note that it "exhibits some differences from the type, and it is possible that it really represents a different species."

### Section III. *Ormosia*

*Ormosia* Jacks. Trans. Linn. Soc. London 10 : 360. 1811. Nom. cons.

*Toullichiba* Adans. Fam. 2 : 326. 1763. Nom. rejec.

*Ormosia*, *Concolores* [rank not designated] Benth. in Mart. Fl. Bras. 15(1) : 315. 1862.

*Ormosia*, *Discolores* [rank not designated] Benth. in Mart. Fl. Bras. 15(1) : 318. 1862.

*Ormosia* section *Concolores* (Benth.) Taub. in Engler & Prantl Natur. Pflanzenfam. 3(3) : 194. 1892.

*Ormosia* section *Discolores* (Benth.) Taub. in Engler & Prantl Natur. Pflanzenfam. 3(3) : 194. 1892.

*Ormosia* subgenus *Toullichiba* (Adans.) Prain, J. As. Soc. Beng. 69 : 176. 1900.

*Ormosia* section *Flavae* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 135. 1922.

*Ormosia* section *Bicolores* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 135. 1922.

*Ormosia* section *Bicolores* subsection *Subglobosae* Ducke, Ann. Acad. Bras. Sc. 11 : 187, 192. 1939.

*Ormosia* section *Bicolores* subsection *Vulgares* Ducke, Ann. Acad. Bras. Sc. 11 : 187, 192. 1939.

Trees or shrubs; leaves (1-) 3-19-foliolate, the leaflets with blades coriaceous or subcoriaceous, essentially glabrous above at maturity but usually pubescent below, tomentose, velutinous, sericeous, or subfarinose, sometimes glabrate, the secondary veins about 10-50 pair essentially straight and parallel; fruit dehiscent, glabrous to densely velutinous, the valves lignous, sublignous, or coriaceous; seeds small to large, 8-25 mm. long, unicolored red to yellow, or bicolored, red and black, or yellowish with red, the hilum elliptic, 1-5 mm. long.

This section is typified by *O. coccinea* (Aubl.) Jacks., the type of the genus.

The large majority of American species of *Ormosia* have black and red, bicolored seeds, and belong to this section. Several species included here have seeds that are unicolored, red, or yellow, but in other characters show closer relationship to the typical species of the section than to members of section *Unicolores*.

All of the species in Bentham's *Concolores* and *Discolores*, separate on the basis of leaflet pubescence, are referable to section *Ormosia* as interpreted in this paper.

Series 1. *Excelsae* Rudd, ser. nov.

*Ormosia* section *Flavae* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 135. 1922.

*Ormosia* section *Bicolores* subsection *Subglobosae* Ducke, Ann. Acad. Bras. Sc. 11 : 187, 192. 1939, in part.

*Ormosia* section *Bicolores* subsection *Vulgares* Ducke, Ann. Acad. Bras. Sc. 11 : 187, 192. 1939, in part.

Arbores vel arbusculae; fructus indehiscens nonnumquam tarde dehiscens, valvulis coriaceis vel sublignosis, pubescentibus, saepe glabratis; semina unicolora flava vel coccinea aut bicolora, flava macula rubra notata, aut bicolora, coccinea macula nigra notata, hilo elliptico, 2.5–5 mm. longo.

Chief distinguishing characters of this group of species are the indehiscent fruits, usually opening only by decay, and the seeds with hila relatively longer than in other species of section *Ormosia*. The members of this series may be transitional to other groups, yet they seem to show closer relationships to one another.

The type of this series is *O. excelsa* Spruce ex Benth., which bears the oldest specific name, and is also the type of Ducke's section *Flavae*.

10. *Ormosia excelsa* Spruce ex Benth. in Mart. Fl. Bras. 15(1) : 318. 1862.

FIGURE 4

*Sclerolobium polyphyllum* Benth. ex Ducke, Arch. Jard. Bot. Rio de Janeiro 4 : 61. 1925, nomen in synon.

Tree to about 15 m. high; young stems ferrugino-tomentose; stipules linear, attenuate, 3–4 mm. long, 1 mm. wide at the base or less, tomentose, caducous; leaves 11–19-foliolate, the axis about 8–20 cm. long, fulvo- to cano-tomentose, the petiole 4–7 cm. long, the pairs of leaflets about 1–2.5 cm. apart, the petiolules 2–3 mm. long and 1 mm. in diameter, the blades coriaceous or subcoriaceous, ovate or obovate to oblong, about 2–9 cm. long, 2–4 cm. broad, the lower leaflets frequently much smaller than the upper and terminal leaflets, the apex acute to acuminate, the base rounded to subcordate, the upper surface glabrous or sparsely pubescent, subnitid, the lower surface puberulent along the midvein, otherwise mostly glabrous, pallid, the secondary veins moderately conspicuous, about 9–11 pair, essentially parallel, 3–5 mm. apart, forming angles of about 60° with the midvein; inflorescences with axes densely pallido- to fulvo-tomentose, the bracts deltoid to linear, attenuate, about 4–5 mm. long, 1 mm. broad or less, the bracteoles linear, about 3 mm. long; flowers 15–18 mm. long; calyx densely pallido-tomentose, 7–10 mm. long, 5 mm. in diameter, the tube 4–5 mm. long, the teeth about 4–5 mm. long; petals lilac to purple; fruit indehiscent or tardily dehiscent, coriaceous, fulvo-pubescent or glabrate, dark brown, 1- or 2-seeded,

4-7 cm. long, 2.5-3.3 cm. broad, only slightly constricted between the seeds, 12-14 mm. thick, the valves 1.5-2 mm. thick; seeds pale yellow to orange, 15 mm. long, 10-15 mm. wide, 8 mm. thick, the hilum about 5 mm. long and 2 mm. wide.

TYPE LOCALITY: "Santarem-inund. forest by the Amazon," Pará, Brazil. Type collected by Spruce (no. 1068), cited below.

DISTRIBUTION: In inundated forest, "igapo," along the Amazon and Mamoré rivers, Brazil.

BRAZIL: PARÁ: Santarem, *Spruce* s.n. [probably no. 1068] (BM, C, F fragment ex B, F.M. Neg. 1907 ex B, K, M), 1068 (G, GH, K type, NY, P); *Ducke* [MG no.] 16361 [= RB no. 15493] (BM, G, MG, P, R, RB, S, U, US). Ric Jamunda, *Ducke* [MG nos.] 11726 (MG), 11740 (MG). Belterra, *Schultes & Lopez* 10293 (US). Oriximiná, *Ducke* [MG no.] 15902 (BM, G, MG, US). Rio Cumins below Trombetas, *Ducke* [MG nos.] 14836 (BM, MG, US), 14836a (G, MG) 15883 (BM, G, MG, US). Piriqueto, Rio Tapajos, *Ducke* [MG no.] 16401 (BM, MG). Bôa Vista, Tapajos, *Capucho* 415 (F). Monte Alegre, *Fróes* 30572 (IAN, US), 30577 (IAN, US). Faro, *Ducke* 15915 (BM, G, MG, P, R, US); *Black & Ledoux* 50-10708 (IAN, NY, U). AMAZONAS: Manaus [as "Barra"], *Spruce* 1194 (M), 1450 (K, NY), s.n. (F. M. Neg. 1809 ex B); *Ducke* 145a (A, F, Y), 182 (A, F, K, MO, NY, R, S, US), 577 (F, GH, K, MG, MO, NY, R, SI, US); *Rodrigue & Chagas* 1318 (US). Parintins, *Ducke* 145 (A, F, NY, Y). Prainha, Rio Negro *Fróes* 12016 (A, F, NY, SI, US). Maués, *Pires* 77 (IAN). Rio Urubú, *Fróes* 25422 (IAN, US). RONDÔNIA [Guaporé]: Rio Ouro Preto, *Kuhlmann* [RB no. 18222 (S, U).

LOCAL NAMES: Itauba-rana, jatobahy do igapó, tento, tento amarello.

The leaves with numerous leaflets, the pallid pubescence of the inflorescence, and the indehiscent pods with yellow seeds make *O. excelsa* one of the most easily recognized species of the genus.

No collection number was cited in the original description but the Spruce collection, no. 1068 at K, annotated in both Spruce's and Bentham's handwriting, is obviously the type, and has been so assigned in that herbarium. Several other specimens distributed without number appear to be of the same collection and presumably are isotypes.

As pointed out by Ducke, specimens distributed as *Sclerolobium polyphyllum* (Spruce nos. 1194 and 1450) are referable to *O. excelsa*.

11. *Ormosia friburgensis* Taub. ex Harms, Fedde Rep. Spec. Nov. 19: 290. 1924. FIGURE

*Ormosia friburgensis* Taub. ex Glaziou, Bull. Soc. Bot. Fr. 53, Mem. 3b : 15. 1906, nomen nudum.

*Ormosia getuliana* Kuhlmann & Campos Porto, Arch. Jard. Bot. Rio de Janeiro 6 : 113, t. 13. 1933.

Tree about 4 m. high; young stems fulvo-tomentose; stipules not seen; leaves 7-13-foliolate, the axis about 7-12 cm. long, glabrous or subglabrous, the petiole 1-4 cm. long, the pairs of leaflets 1-2 cm.



apart, the petiolules 1–2 mm. long, 1 mm. in diameter, the blades subcoriaceous, mostly elliptic-oblong, about 2–8 cm. long, 1–3 cm. broad, the base and apex acute, the terminal leaflet sometimes obovate, the basal leaflets ovate, the upper surface glabrous, subnitid, the lower surface sericeous along the midvein, otherwise sparsely sericeous, glabrescent, often completely glabrous at maturity, the secondary veins relatively inconspicuous, about 10–12 pair essentially parallel, 2–5 mm. apart, forming angles of about  $55^{\circ}$ – $60^{\circ}$  with the midvein; inflorescences with axes fulvo-tomentose, the bracts deltoid, 1–2 mm. long, the bracteoles linear, scarcely 1 mm. long; flowers 8–10 mm. long; calyx 4–5 mm. long, densely ferrugino-tomentulose, the tube 2–3 mm. long, 3 mm. in diameter, the teeth about 2 mm. long; petals purplish; fruit indehiscent, sublignous, transversely rugose, ferrugino-velutinous, 1- or 2-seeded, 2.5–4.5 cm. long, 3–3.5 cm. broad, slightly constricted between the seeds, about 2 cm. thick, the valves 1.5–2 mm. thick; seeds ellipsoid or globose, yellow to red or, sometimes, bicolored, yellowish and red, 17–25 mm. long, 18–25 mm. wide, and 17–20 mm. thick, the hilum about 4–5 mm. long and 1–1.5 mm. wide.

**TYPE LOCALITY:** "Au bord de la riviere," Nova Friburgo, Rio de Janeiro, Brazil. Type collected by Glaziou (no. 19045), cited below.

**DISTRIBUTION:** Along rivers; known only from the general area of the type collection and São Paulo.

**BRAZIL: RIO DE JANEIRO:** Nova Friburgo, *Glaziou* 19045 (F. fragm. of type ex B, F.M.Neg. 1910 ex B, K, P). Itatiaia, *Campos Porto* 2077 (RB, US iso-syntypes of *O. getuliana*), [RB no.] 17942 (US iso-syntype of *O. getuliana*); *Duarte de Barros* [Parque Nacional de Itatiaia Herb. no.] 1184 (MG, R, SI, US), 1212 (K, M, NY, P, U, US). **SÃO PAULO:** Socavão, near Bananal, *Manduca Palma* [R no.] 69343 (R, US).

**LOCAL NAME:** Olho de cabra grande.

The globose seeds, commonly bicolored yellowish and red, furnish a good character for recognizing this species. The coloration suggests a transition in the series from the completely yellow-seeded *O. excelsa* to the red and black seeded *O. minor*. The bicolored marking of the seeds of *O. friburgensis* shows the same design as is found in many species of *Ormosia*, including the type of the genus, *O. coccinea*.

Harms is correctly cited as the publishing author of Taubert's herbarium name rather than Glaziou because the latter's description "grand arbre, fl. roses" was essentially nude, being applicable to many species, of many families. Harms' description was based on the same collection although, presumably, the sheet at Berlin rather than the one at Paris. The Field Museum photograph, no. 1910 ex B, and a fragment at F probably is all that remains to represent the holotype.

12. *Ormosia williamsii* Rudd, sp. nov.

FIGURE 4

Arbuscula 6–8 m. alta; ramuli novelli ferrugino-tomentosi; stipulae deltoideae, tomentosae, acuminatae, circiter 4 mm. longae et basi 1

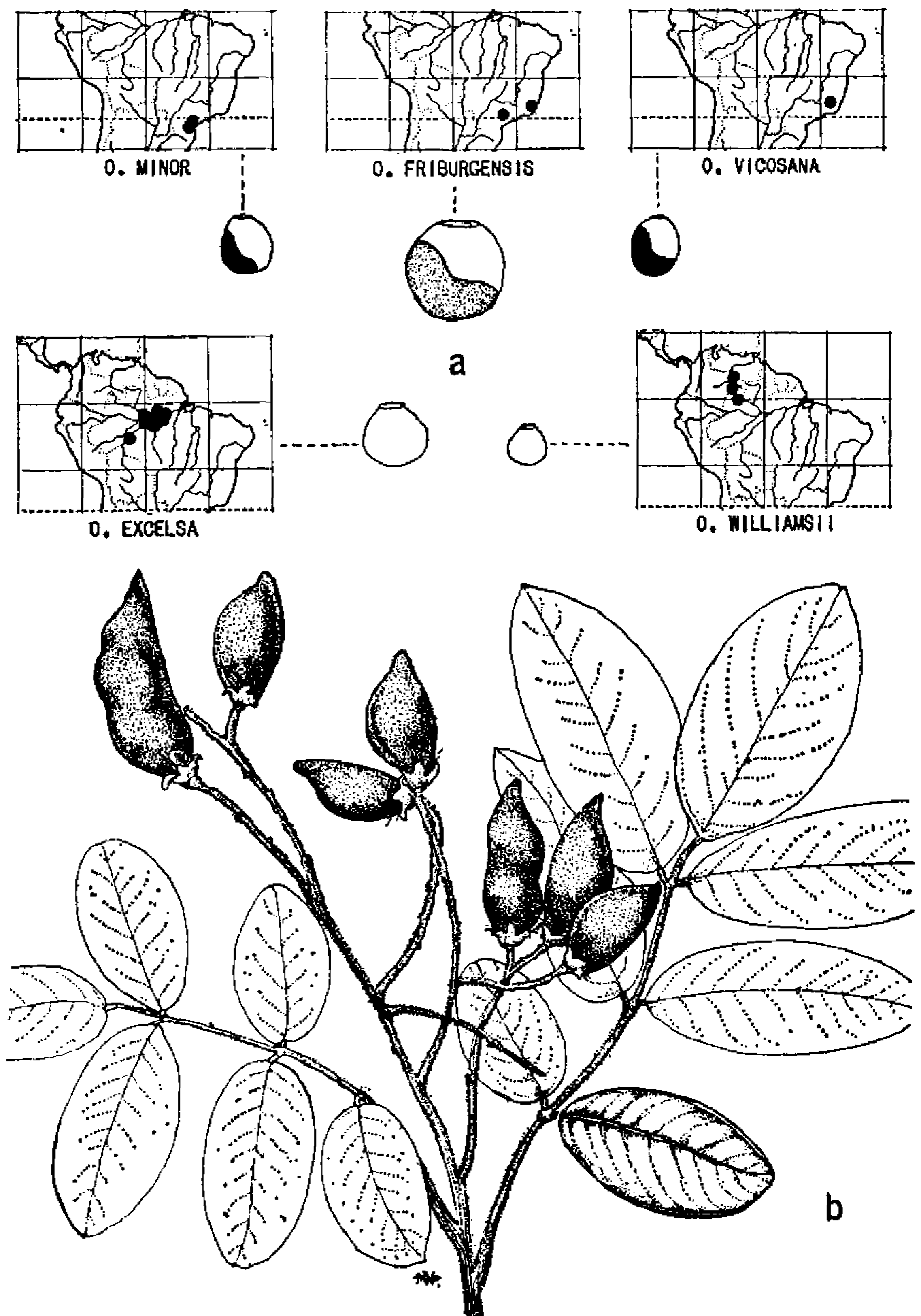


FIGURE 4.—*Ormosia* section *Ormosia* series *Excelsae*: Geographic distribution of species; a, seeds of *O. excelsa*, *O. minor*, *O. friburgensis*, *O. vicosana*, and *O. williamsii*,  $\times \frac{1}{2}$ ; b, branch with leaves and fruit of *O. williamsii*,  $\times \frac{1}{2}$ .

mm. latae, caducae; folia 5-9-foliolata, axi 6-15 cm. longo, ferrugino-tomentoso, petiolo 2-5 cm. longo, jugis inter sese 2-3 cm. distantibus, stipellis parvis saepe emersis, foliolis cum petiolulis 1-2 mm. longis et 1.5 mm. diametro, laminis coriaceis, ovatis vel oblongis, circiter (1-) 3-10 cm. longis, (1-) 2-5 cm. latis, apice obtusis vel acutis, basi obtusis, supra glabris, subnitidis, subtus glabris, ad venis marginibusque tomentulosis, saepe glabratis, venis secundariis mediocriter elevatis, utrinsecus 10-15, fere parallelis, inter sese 3-8 mm. distantibus, angulis venarum costaeque circiter  $55^{\circ}$ - $65^{\circ}$ ; inflorescentiae cum axibus ferrugino- vel fulvo-tomentosis, bracteis anguste deltoideis, 4-5 mm. longis et 1 mm. latis, bracteolis linearibus circiter 2 mm. longis; flores 15 mm. longi, calyce ferrugino- vel fulvo-tomentoso, 6-8 mm. longo, tubo 3-4 mm. longo, 5 mm. diametro, dentibus 3-4 mm. longis, petalis atropurpureis; fructus indehiscens, coriaceus, fulvo-tomentosus, glabrescens, 1-3-spermus, 3-4 cm. longus, 1.5-2 cm. latus, inter semina plus minusve constrictus, 1 cm. crassus, valvulis 1-1.5 mm. crassis; semina coccinea vel bicolora, macula linearia nigra notata, circiter 10 mm. longa et lata, 6-7 mm. crassa, hilo 2.5 mm. longo et 2 mm. lato.

Type in the U.S. National Herbarium, no. 1834939, collected in forest along the lower Río Sanariapo, Territorio Amazonas, Venezuela, July 2, 1942, by Llewelyn Williams (no. 15965). Duplicates at F, G, MO, NY, S, VEN.

DISTRIBUTION: In wet forest along streams in the region of the upper Río Negro and upper Río Orinoco.

ADDITIONAL SPECIMENS EXAMINED:

VENEZUELA: AMAZONAS: Sanariapo, *Ll. Williams* 15954 (F, G, US, VEN). Caño Magua, Río Orinoco, *Wurdack & Adderly* 43791 (F, K, NY, S, US, VEN).

COLOMBIA: AMAZONAS: Río Negro, near base of Cerro Cocuy, *Schultes* 9888 (US).

BRAZIL: AMAZONAS: "Uananaca," between Barcellos and São Gabriel, *Spruce* 2071 (K, M, P). Rio Cajury-Miri, *Fróes [Krukoff]* 12449/193 (A, CAS, DS, F, NY).

LOCAL NAME: Tento (Brazil).

The fruit and seeds of this species are very similar to those of *O. excelsa*, but average somewhat smaller, and the seeds are red, occasionally marked with a thin black line, indicating relationship with other bicolored species.

Flowering material of this species, *Spruce* 2071, was erroneously referred to *O. dasycarpa* by Bentham (Fl. Bras. 15(1) : 317. 1862). Ducke noted this as a distinct species but did not publish it as new (An. Acad. Bras. Sci. 18 : 191. 1939).

13. *Ormosia minor* Vog. *Linnaea* 11 : 405. 1837.

FIGURE 4

*Ormosia dasycarpa* var. *minor* (Vog.) Benth. in Mart. Fl. Bras. 15(1) : 316. 1862 [as  $\beta$  *minor*].

Tree; young stems ferrugino-tomentose; stipules minute, deltoid, about 1 mm. long; leaves 7- or 9-foliolate, the axis 8-14 cm. long, tomentulose to subglabrous, the petiole 2-4 cm. long, the pairs of leaflets 1.5-3 cm. apart, the petiolules puberulent, 3-6 mm. long, 1-2 mm. in diameter, the blades subcoriaceous, ovate to ovate-oblong, 3-10 cm. long, 1-4 cm. broad, the apex acute to breviacuminate, the acumen to about 6 mm. long, the base rounded, the upper surface glabrous, subnitid, the lower surface sometimes ferrugino-tomentose along the midvein, otherwise essentially glabrous, the secondary veins scarcely raised, about 10-12 pair, essentially parallel, 3-10 mm. apart, forming angles of 40°-50° with the midvein, the tertiary veins reticulate, inconspicuous; inflorescences with axes ferrugino-tomentose, the bracts linear, 4-5 mm. long, 0.5 mm. broad or less, the bracteoles linear, 2-3 mm. long; flowers 12-13 mm. long; calyx 6-9 mm. long, ferrugino-tomentose, the tube 3-5 mm. long, 5-6 mm. in diameter, the teeth 3-4 mm. long; petals purplish; fruit indehiscent or tardily dehiscent, coriaceous or somewhat lignous, rugose, ferrugino-velutinous glabrescent, becoming dark brown, 1- or 2-seeded, 4-6 cm. long, 2-2.5 cm. broad, somewhat constricted between the seeds, about 13-17 mm. thick, the valves 1-1.5 mm. thick; seeds bicolored red and black, about 12-14 mm. long, 10-13 mm. broad, and 8-10 mm. thick, the hilum 4 mm. long and 2 mm. wide.

TYPE LOCALITY: São Paulo ? or Minas Gerais, Brazil. Lectotype collected by Sellow (no. 353), cited below.

DISTRIBUTION: Known only from the region of the type collections.

BRAZIL: Without exact locality [São Paulo ?], *Sellow* 353 (B lectotype, presumably no longer extant but represented by fragment at F and F.M.Neg. 1912 ex B, K iso-lectotype). SÃO PAULO: Alto da Serra, Paranapiacaba, *Andrade* [R no.] 1557 (R); *Burkart* 17437 (SI). São Paulo, cultivated, *J. Coelho* [SPSF no.] 3094 (MO); *Pickel* [SPSF no.] 3715 (MO). São Paulo, Jardim Botânico, Planta vivi (nativa) no. 210, *Hoehne* [SP no.] 28688 (A, GH, NY, S, SI, US), [RB no.] 24951 (RB).

LOCAL NAMES: Olho de cabra; guaraci; guaracy.

The indehiscent, or tardily dehiscent, fruit and the relatively large hilum of the seed indicate relationship of *O. minor* with other species of series *Excelsae*. The unmistakable red and black bicoloration of the seeds suggests a link between the *Excelsae* and species of other series of section *Ormosia*, such as the *Coccineae* and the *Monospermae*.

In the original description of this species, Vogel cited two collections, "Manso et Lhotzky leg. in Prov. Minas Geraës; Sellow leg. in Brasil. merid." I have not seen a specimen of the former collection; the

material that Vogel studied at Berlin presumably is no longer extant. The other collection, by Sellow, cited above as lectotype, probably also was destroyed but it had been photographed by MacBride, and is now represented by that photograph, a fragment at F, and a duplicate at K.

14. *Ormosia vicosana* Rudd, sp. nov.

FIGURE 4

Arbor (?); ramuli novelli fulvo- vel ferrugino-tomentulosi, glabrescentes; stipulae non visae; folia 9-foliolata, axi 6–15 cm. longo, petiolo 2–3 cm. longo, jugis inter sese 1.5–3 cm. distantibus, foliolis cum petiolulis 2–3 mm. longis et 1.5 mm. diametro, laminis coriaceis vel subcoriaceis, ellipticis vel oblongis, 4–11 cm. longis, 2–5 cm. latis, apice acutis vel breviacuminatis, acumine usque ad 4 mm. longo, basi acutis vel obtusis, supra glabris, subtus glabris vel subglabris, ad venas principales pauciter vel mediocriter tomentulosi, venis secundariis mediocriter elevatis, utrinsecus 10–12, fere parallelis, inter sese 5–8 mm. distantibus, angulis venarum costaeque circiter 45°–50°; inflorescentiae cum axibus fulvo- vel ferrugino-tomentulosi, bracteis acute deltoideis, circiter 2–4 mm. longis, basi 1 mm. latis vel minor, bracteolis linearibus circiter 1 mm. longis; flores completi non visi; calyx circiter 5 mm. longus, tubo 2.5 mm. longo et 4 mm. diametro, dentibus 2.5 mm. longis; fructus indehiscens vel tarde dehiscens, lignosus vel sublignosus, fulvo- vel ferrugino-velutinus, 1-spermus, 3–4 cm. longus, 2–2.3 cm. latus, 1.2 cm. crassus, valvulis 1.5–2 mm. crassis; semina coccinea macula nigra notata, 11–13 mm. longa et lata, circiter 9 mm. crassa, hilo 2.5–3 mm. longo et 1.5 mm. lato.

Type in the U.S. National Herbarium, no. 2370768, collected by Alvim at the Escola Superior de Agricultura, Viçosa, Minas Gerais, Brazil (E.S.A.V. no. 3527).

ADDITIONAL SPECIMENS EXAMINED:

BRAZIL: MINAS GERAIS: Escola Sup. Agric., Viçosa, *Kuhlmann* 2263 (US); without collector's name, 3935 (US); without collector's name or number (S).

LOCAL NAMES: Olho de onca, olho de cabra, tento.

The specimens cited above show some similarity to material of *O. minor* but, as indicated in the description and the key, appear to be sufficiently distinct to warrant publication of a new species. The leaflets of *O. vicosana* somewhat resemble those of *O. arborea*; the seed and fruit characters approach those of *O. fastigiata*.

Series 2. *Panamenses* Rudd, ser. nov.

Arbores vel arbusculae; fructus dehiscens, valvulis glabris, fulvis, carnosio-coriaceis, inter semina transverse septatis; semina unicolora rubra obscura, hilo elliptico circiter 2.5 mm. longo.

This series has been circumscribed to include only the one species, *O. panamensis*. There apparently are no close relatives in the New World; instead, the affinities seem to be with Chinese species such as *O. polysperma* Chen and *O. xylocarpa* Chun ex Chen of series *Xylocarpae* Merrill and Chen or, possibly, *O. henryi* Prain of series *Layia* (Hook. and Arn.) Merrill and Chen (Sargentia 3:77-117. 1943), all of which have fruit septate between the seeds.

15. *Ormosia panamensis* Benth. in Seem. Bot. Voy. Herald 111. 1854. FIGURE 5  
*Ormosia stipitata* Schery, Ann. Missouri Bot. Gard. 30: 90, fig. 2. 1943.

Tree to about 15 m. high; young stems fulvo- or aureo-sericeous, glabrate; stipules not seen; leaves 5-9-foliolate, the axis 9-17 cm. long, sparsely pubescent, glabrate, the petiole 5-8 cm. long, the pairs of leaflets 2-3 cm. apart, the petiolules 5-8 mm. long, 1-1.5 mm. in diameter, the blades subcoriaceous, elliptic to obovate-oblong, 4.5-15 cm. long, 2-5.5 cm. broad, the apex acute to breviacuminate with acumen about 1 cm. long, the base obtuse, the upper surface subglabrous, glabrate, the lower surface moderately to densely aureo- or fulvo-sericeous, glabrescent, the secondary veins scarcely raised,

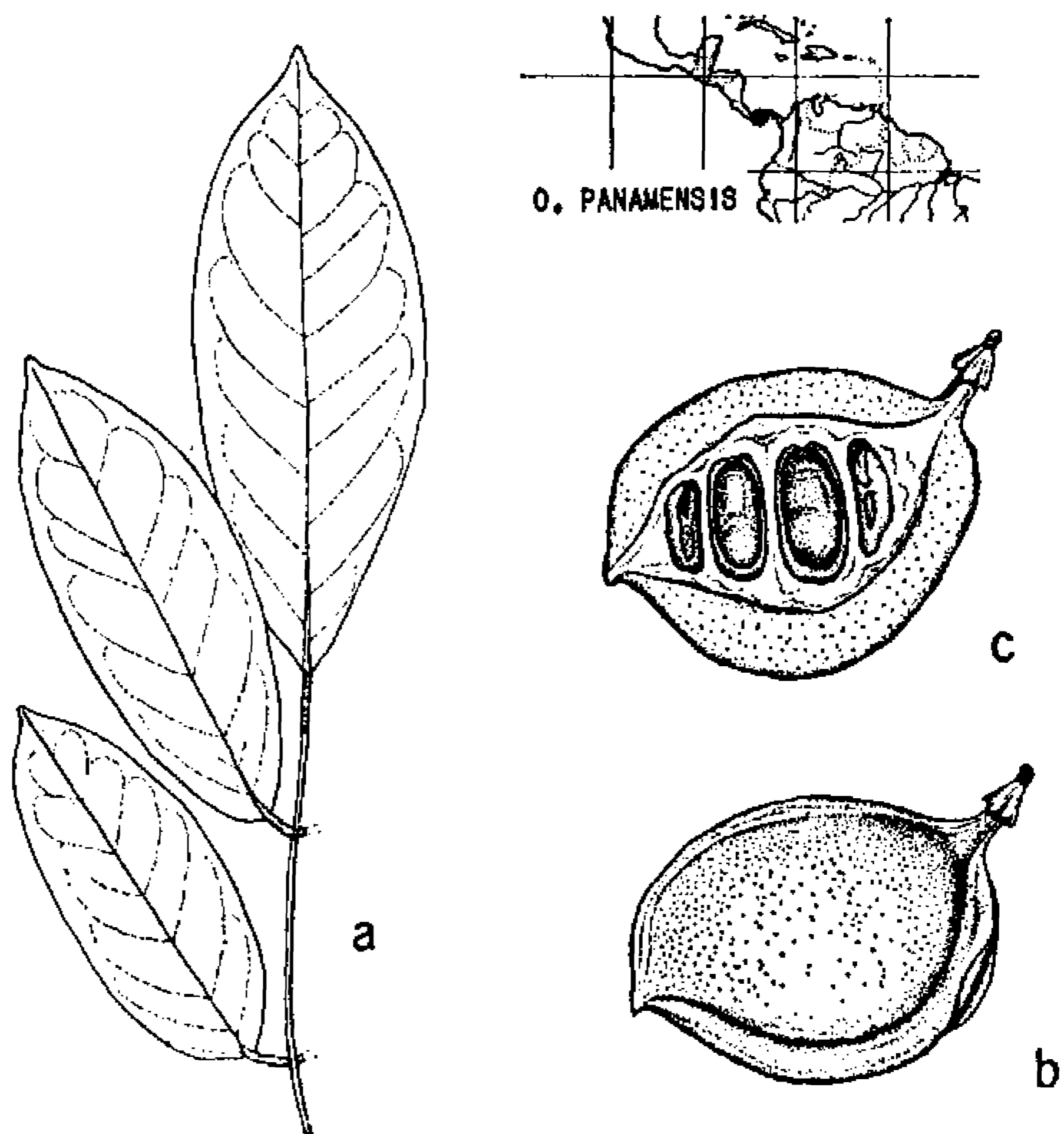


FIGURE 5.—*Ormosia* section *Ormosia* series *Panamenses*: *O. panamensis*: Geographic distribution; a, portion of leaf,  $\times \frac{1}{2}$ ; b, fruit,  $\times \frac{1}{2}$ ; c, inside of fruit,  $\times \frac{1}{2}$ .

about 10–16 pair, essentially straight and mostly parallel, 5–20 mm. apart, forming angles of about  $40^{\circ}$ – $50^{\circ}$  with the midvein; inflorescences with axes densely aureo- to fulvo-pubescent, the bracts deltoid, 1 mm. long, the bracteoles 0.5 mm. long; flowers 15–20 mm. long; calyx densely fulvo-sericeous, 8–11 mm. long, the tube 6–7 mm. long, 8–10 mm. in diameter, the teeth 3–4 mm. long; petals lilac or the standard lilac, the other petals white; fruit dehiscent, coriaceous, fulvo-sericeous, glabrate, light brown or fulvous, 1–4-seeded, septate between the seeds, but little constricted, 3–7 cm. long, about 2 cm. thick, 3–5 cm. broad including an alate margin 0.5–1.5 cm. wide, the valves 1–1.5 mm. thick, thinnest at the margin; seeds dark red, 15–17 mm. long, 9–10 mm. broad, 7 mm. thick, the hilum elliptic, about 2.5 mm. long and 1 mm. wide.

**TYPE LOCALITY:** "Village of Remedios, Veraguas," Chiriquí, Panamá. Type collected by Seemann, cited below.

**DISTRIBUTION:** Known only from western Panamá.

**PANAMÁ:** BOCAS DEL TORO: Talamaca Valley [near Almirante], Cooper & Slater 150 (US). **CHIRIQUÍ:** Remedios, Seemann s.n. (K type). Between Remedios and David, White 306 (MO type of *O. stipitata*, US). David, Seemann 1673 (BM, K). Near David, on road to Gualaca, Birdsall s.n. (US); Roy s.n. (US).

**LOCAL NAMES:** Peronil, coronil.

Comparison of the types of *O. panamensis* and *O. stipitata* shows the two species to be identical.

I am especially grateful to Mr. José M. Roy, of David, for providing ample fruiting material so that the relative taxonomic position of *O. panamensis* could be established.

### Series 3. *Isthmenses* Rudd, ser. nov.

Arbores vel arbusculae; fructus dehiscens, valvulis lignosis, sublignosis, vel coriaceis, glabratibus; semina unicolora coccinea, hilo elliptico 2–4 mm. longo.

*Ormosia isthmensis*, the earliest named species of the group, typifies this series. In characters such as seed color and leaf venation the members of this series show relationship with species of section *Unicolores*, but the fruit, flowers, and pubescence tend to resemble those of the *Coccineae*.

The smallest seeds of the *Isthmenses* are essentially identical with those of section *Unicolores*. The largest, those of *O. venezolana*, resemble the seeds of *O. stipularis*. The valves of the fruit are most woody in *O. isthmensis*, less so in the other species.

The four species of this series seem to form a natural group. *Ormosia cruenta*, vegetatively and as to fruit, is most distinctive, but in flowering characters is much like *O. colombiana*. Otherwise, the

other three species are similar, with differences chiefly in size of parts, grading from smallest in *O. isthmensis* to largest in *O. venezolana*.

16. *Ormosia cruenta* Rudd, sp. nov.

FIGURE 6

Arbor usque ad 30 m. alta; ramuli ferrugino-tomentosi, glabrati; stipulae triangulares, attenuatae, 1-2 mm. longae et basi 1 mm. latae; folia 5-11-foliolata, axi 8-10 cm. longo, velutino, glabrescenti, petiolo circa 2 cm. longo, jugis inter sese 2-2.5 cm. distantibus, foliolis cum petiolulis 2 mm. longis et 1-1.5 mm. diametro, laminis subcoriaceis ellipticis vel elliptico-oblongis, 2-8 cm. longis, 1-3.5 cm. latis, apice acutis, basi obtusis, supra glabris, subnitidis, subtus glabris vel tenuiter sericeis, venis secundariis inconspicuis, utrinsecus 5-10; inflorescentiae cum axibus ferrugino-velutinis, bracteis bracteolisque triangularibus, 1-3 mm. longis et 1 mm. latis, floribus 15-18 mm. longis, calyce ferrugino-velutino, 10 mm. longo, tubo 6 mm. longo, dentibus 4 mm. longis, petalis lilacinis; ovarium subsessile, ferrugino-villosum, 3-5-ovulatum; fructus dehiscentis, sublignosis, glaber, subnitidus, nigratus, 1-spermus, 2-2.5 cm. longus, 1.5 cm. latus, 1 cm. crassus, valvulis 1 mm. crassis; semina coccinea, 8-10 mm. longa, 9-10 mm. lata, 7-9 mm. crassa, hilo 2 mm. longo et 1.5 mm. lato.

Type in the U.S. National Herbarium, no. 1820777, collected at Boquete, Chiriquí, Panamá, June 30, 1938, by M. E. Davidson (no. 848). Duplicates at A, F, MO.

DISTRIBUTION: Known only from the mountains of western Panamá, at elevations of about 800-1300 meters.

ADDITIONAL SPECIMEN EXAMINED:

PANAMÁ: COCLÉ: Cerro Pajita, Allen 4499 (C, G, K, MO, NY, S, U, US).

This is a distinctive species, yet it is known only from the two collections cited above, one, the type, in fruit, the other, in flower. Originally, duplicates of these numbers were distributed as *O. panamensis*, an entirely different species.

17. *Ormosia isthmensis* Standl. Publ. Field Mus. Bot. 17 : 264. 1937.

FIGURE 6

Tree, to about 50 m. tall; young stems ferrugino- to fulvo-velutinous; stipules deltoid, acicular, about 1-2 mm. long, 1-1.5 mm. broad at the base, pubescent like the stem; leaves (3-5-) 7-13-foliolate, the axis 9-45 cm. long, pubescent, glabrescent, the petiole 4-8 cm. long, the pairs of leaflets 3-5 cm. apart, the petiolules 4-6 mm. long, 2-3 mm. in diameter, the blades coriaceous, ovate, oblong, to obovate-oblong, 3-35 cm. long, 2-10 cm. broad, acute to abruptly acuminate, the acumen to about 10 mm. long, the base obtuse or truncate, the upper surface glabrous, subnitid or nitid, the lower surface finely velutinous



along the major veins, otherwise finely and sparsely appressed-pubescent, glabrescent, the secondary veins moderately raised, about 10–12 pair, essentially parallel, 5–25 mm. apart, forming angles of 50°–55° with the midvein; inflorescences with axes fulvo- to cano-velutinous, the bracts and bracteoles linear, 2–3 mm. long; flowers about 10 mm. long; calyx cano- to fulvo-velutinous, 7–8 mm. long, the tube 3–4 mm. long, 4 mm. in diameter, the teeth 4 mm. long; corolla white and pink purplish (fide Schultes & Reko); fruit dehiscent, lignous, black or dark brown, glabrous, nitid or subnitid, 1–3-, commonly 1-seeded, 3–7 cm. long, 2–3 cm. broad, 1 cm. thick, the valves 1.5–3 cm. thick; seeds red, 10–13 mm. long, 10–11 mm. wide, and 6–8 mm. thick, the hilum 2–2.5 mm. long and 1 mm. wide.

**TYPE LOCALITY:** Ubero, Oaxaca, Mexico. Type collected by Llewelyn Williams (no. 9423), cited below.

**DISTRIBUTION:** In rain forest, from southern Mexico to northern Colombia, at elevations of about 5–800 meters.

**MEXICO: OAXACA:** Ubero, *Ll. Williams* 9423 (BM, F type, G, K, S, US). Santiago Yaves, Choapan, *Reko* 9(F). San Juan Lalana, Choapan, *Schultes & Reko* 822 (F, GH, NA, UC). Sierra Juarez, *Gomez-Pompa, Sharp, & Hernandez* 380 (MEXU, US).

**GUATEMALA: ALTA VERAPAZ:** Cubilgüitz, *Steyermark* 44658 (F). **IZABAL:** Between Puerto Barrios and Milla 7, *Steyermark* 42058 (F, NY, US).

**BRITISH HONDURAS: TOLEDO:** Temash River, *Kinlock* 6 (F, Y).

**HONDURAS:** "Potrero, along Highland Creek, Pto. Sierra," *Wilson* 144 (NY, US). **ATLANTIDA:** Lancetilla Valley, near Tela, *Standley* 52908 (F).

**COSTA RICA: SAN JOSÉ:** San Isidro del General, *Dayton & Barbour* 3127 (NY, USFS).

**PANAMÁ: VERAGUAS:** Isla Coiba, *Dwyer* 1170 (US). **CANAL ZONE:** Río Grande Sta., *Hayes* 352 (BM, K). Peña Blanca Bay, Barro Colorado Island, *Shattuck* 1103 (F, US).

**COLOMBIA: CHOCÓ:** Without exact locality, *Krukoff* [Herb no.] 9383 (US).

**LOCAL NAMES:** Colorín, mū-sa, palo de Salvador (Mexico); acu-té (Guatemala); hormiga (British Honduras); alasán (Costa Rica).

Of the four species assigned to this series, *O. isthmensis* has been most collected and is known over the largest geographic area. It exhibits the greatest variability in size, shape, and number of leaflets, sometimes on the same branch. The fruits also show some variation in size and number of seeds; the 3-seeded fruits are not only longer but usually narrower than those with one seed.

Two of the collections cited above, *Dayton & Barbour* 3127 from Costa Rica and *Krukoff* 9383 from Colombia, are sterile but appear to be referable to this species.

In the original description of *O. isthmensis*, Standley cited a paratype, *Ll. Williams* 8926, but noted that it differed from the type and might represent another species. In this present paper it is so treated, as *O. macrocalyx*.

18. *Ormosia colombiana* Rudd, sp. nov.

FIGURE 6

Arbores vel arbusculae usque ad 15 m. altae; ramuli novelli cano-vel ferrugino-velutini; stipulae deltoideae, velutinae, circiter 2 mm. longae, basi 1 mm. latae; folia (5-) 7-11-foliolata, axi velutino, 9-18 cm. longo, petiolo 2.5-6 cm. longo, jugis inter sese 2-6 cm. distantibus, petiolulis 3-4 mm. longis, 1.5-2 mm. diametro, laminis coriaceis vel subcoriaceis, ovatis, 4-10 cm. longis, 3-7 cm. latis, apice acutis, basi obtusis, supra glabris, subnitidis, subtus plus minusve glabris praeter venis maioribus saepe tomentulosis, venis secundariis medio-criter elevatis, utrinsecus 8-12, fere parallelis, inter sese 5-20 mm. distantibus, angulis venarum costaeque circiter 60°-70°; inflorescentiae cum axibus fulvo-vel ferrugino-velutinis, bracteis deltoideis, circiter 3 mm. longis et latis; flores 17-20 mm. longi, calyce ferrugino-velutino, 10-13 mm. longo, tube 5-7 mm. longo et 7 mm. diametro, dentibus 5-6 mm. longis, petalis atroviolaceis; fructus dehiscens, coriaceus vel sublignosus, saepe transverso-rugosus, subtiliter ferrugino-tomentulosus, glabrescens, 1-4-spermus, 3-8 cm. longus, (2.5-) 3-3.5 cm. latus, 1.5 cm. crassus, inter semina plus minusve constrictus, valvulis 1-1.5 mm. crassis; semina coccinea, 12-14 mm. longa, 10-14 mm. lata, 9-11 mm. crassa, hilo elliptico 2-3 mm. longo et 1-1.5 mm. lato.

Type in the U.S. National Herbarium, no. 1900922, collected in the Hoya de Albán, El Valle, Colombia, at 1350-1400 meters elevation, October 26, 1946, by J. Cuatrecasas (no. 22617). Isotype at F.

DISTRIBUTION: Western Colombia, at elevations of about 1350-1730 meters.

## ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: MAGDALENA: Vista Nieve, *Espina & Giacometto* A102 (Y). CUNDINAMARCA: Bogota, *Cespedes* s.n. (BM). ANTIOQUIA: Jerico, *Bro. Daniel* 2459 (S, US). Sonsón, *Bro. Daniel* 2476 (A, F, NY). Itagui, Medellín, *Domingo-Penagos* [*Bro. Daniel* no.] 3823 (US). EL VALLE: Quebrada de la Elvira, *Cuatrecasas* 23785 (F). Between Sevilla and Caicedonia, *Pérez-Arbeláez & Cuatrecasas* 6452 (US).

LOCAL NAMES: Chocho (Antioquia); mate (Magdalena).

This species appears to be intermediate between *O. isthmensis* and *O. venezolana*, probably more closely related to the latter.

The specimen from Magdalena is sterile, with essentially glabrous leaflets. From the wood it was identified by S. J. Record as *Ormosia* sp. It is being referred to *O. colombiana*, tentatively, and with the hope that other collections will be forthcoming.

19. *Ormosia venezolana* Rudd, sp. nov.

FIGURE 6

Arbor; ramuli novelli fulvo-vel ferrugino-velutini; stipulae deltoideae, velutinae, 1.5-2 mm. longae, basi 1 mm. latae; folia 5-

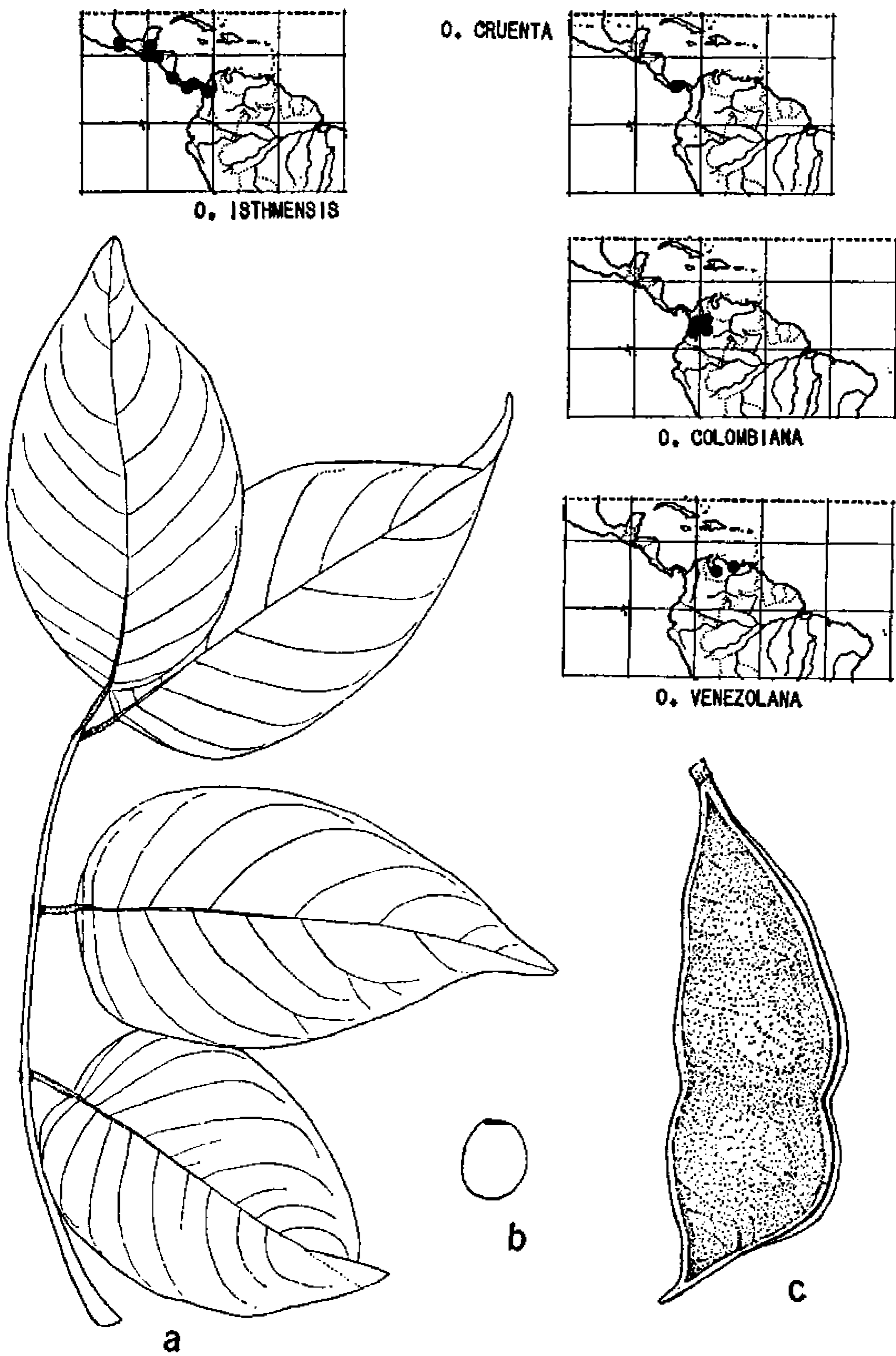


FIGURE 6.—*Ormosia* section *Ormosia* series *Isthmenses*: Geographic distribution of species; *O. venezolana*: a, portion of leaf,  $\times \frac{1}{2}$ ; b, seed,  $\times \frac{1}{2}$ ; c, fruit,  $\times \frac{1}{2}$ .

vel 7-foliolata, axi velutino, glabrati, 9–15 cm. longo minimo, petiolo 4–6 cm. longo, jugis inter sese 2.5–5 cm. distantibus, petiolulis 3–6 mm. longis, 2 mm. diametro, laminis coriaceis vel subcoriaceis, ovatis, 4–15 cm. longis, 3–9.5 cm. latis, apice acutis, basi obtusis vel subcordatis, supra glabris, subnitidis, subtus plus minusve glabris

praeter venis maioribus saepe tomentulosis, venis secundariis mediocriter elevatis, utrinsecus 8-10, prope parallelis, inter sese 5-20 mm. distantibus, angulis venarum costaeque circiter 40°-55°; inflorescentiae cum axibus fulvo- vel ferrugino-velutinis, nec bracteis bracteolisque nec floribus completis visis, calyce fulvo- vel ferrugino-velutino circiter 10 mm. longo, tubo 4 mm. longo et 6 mm. diametro, dentibus 6 mm. longis; fructus dehiscens, coriaceus vel sublignosus, reticulosus vel saepe transverso-rugosus, subtiliter fulvo- vel ferrugino-tomentulosus, glabrescens, 1-5-spermus, 5-12 cm. longus, 3-4 cm. latus, 1.5 cm. crassus, inter semina nonnihil constrictus, valvulis 0.5-1 mm. crassis; semina coccinea, 15-20 mm. longa, 13-18 mm. lata, 11-13 mm. crassa, hilo elliptico 3-3.5 mm. longo et 1-1.5 mm. lato.

Type in the U.S. National Herbarium, no. 2373489, collected in the Quebrada los Chorros, El Avila, above Caracas, Estado Miranda, Venezuela, at about 1400 meters elevation, April 4, 1962, by José Rafael Garcia (s.n.).

DISTRIBUTION: Coastal Cordillera, Venezuela, in forest at elevations of about 1400-2100 meters.

ADDITIONAL SPECIMEN EXAMINED:

VENEZUELA: MÉRIDA: Between La Trampa and Caña Brava, *Bernardi* 3155 (MER).

As suggested by the characters given in the key, the two species, *O. venezolana* and *O. colombiana*, are very similar, differing chiefly in size of fruit and seed. It seems desirable, however, on the basis of the limited number of specimens available, to maintain them as separate taxa.

Series 4. *Amazonicae* Rudd, ser. nov.

Arbores; venae tertiae foliolorum communiter conspicuae, parallelae; fructus dehiscens, valvulis glabris vel subglabris, reticulato-rugosis; semina bicolora coccinea macula nigra notata, hilo elliptico, 2-3 mm. longo.

As indicated in the key, this series appears to be related to the *Coccineae*. However, these three species resemble one another closely enough to suggest a natural group.

The type of this series is *O. amazonica*.

20. *Ormosia amazonica* Ducke, Arch. Jard. Bot. Rio de Janeiro 3 : 139. 1922.

FIGURE 7

*Ormosia euneura* Harms, Notizbl. Bot. Gard. Berlin 9 : 972. 1926.

Tree to about 20 m. high; young stems cinereo- to fulvo-tomentulose; stipules not seen; leaves 7-11-foliolate, the axis 14-40 cm. long, velutinous or tomentulose, the petiole 7-12 cm. long, the pairs of

leaflets 5–7 cm. apart, the petiolules 5–10 mm. long, 2–4 mm. in diameter, the blades coriaceous, elliptical, ovate, or obovate, 8–22 cm. long, 4.5–11 cm. broad, the apex obtuse, breviacuminate, the base rounded to cordate, the margin sometimes revolute, the upper surface essentially glabrous, the lower surface finely and tightly crisp-pubescent, the venation prominent, the secondary veins about 10–12 pair, essentially parallel, 5–20 mm. apart, forming angles of about 60°–65° with the midvein; inflorescences with axes fulvo-tomentulose, the bracts lanceolate, acuminate, about 8 mm. long, 1–2 mm. broad,

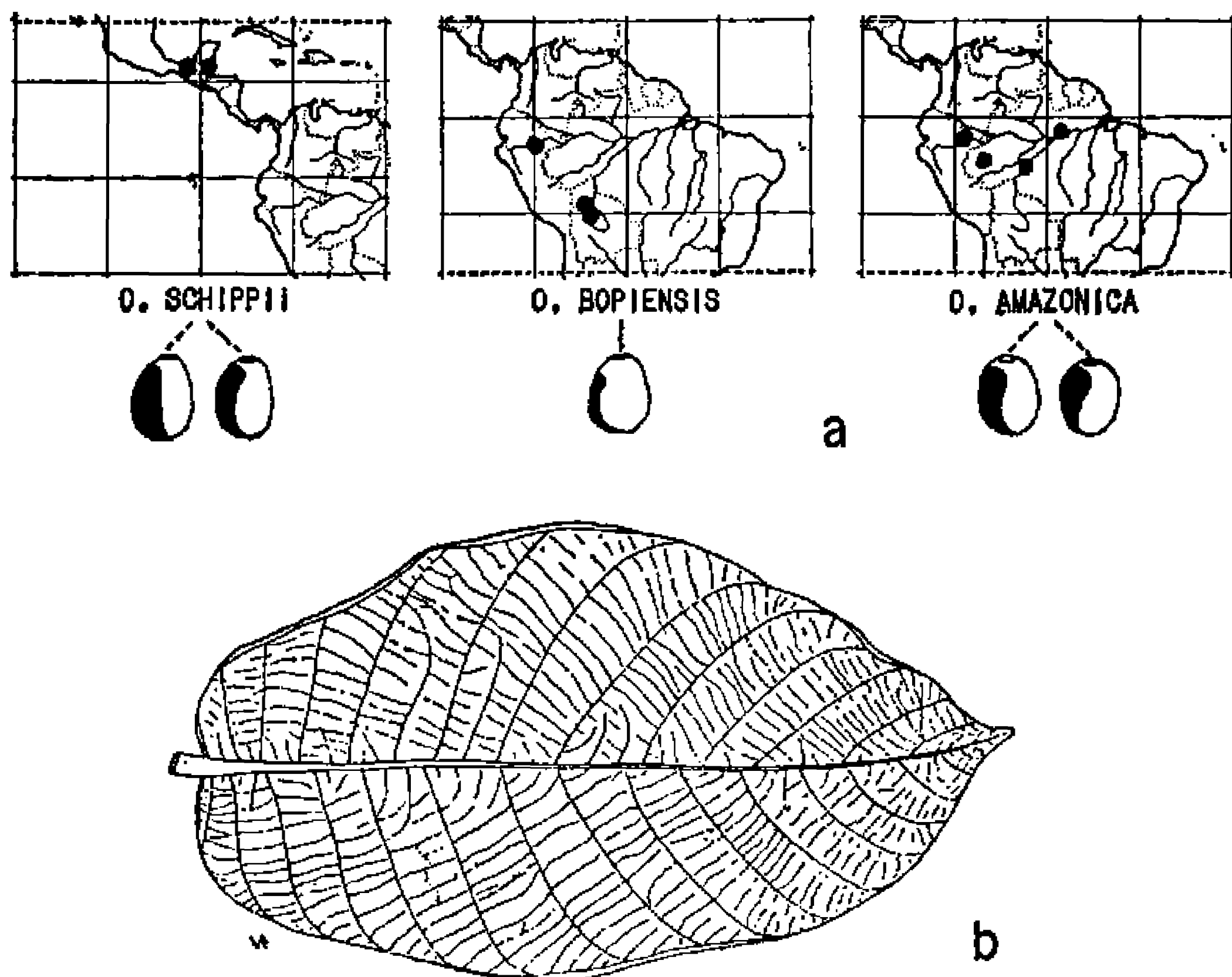


FIGURE 7.—*Ormosia* section *Ormosia* series *Amazonicae*: Geographic distribution of species; a, seeds of *O. schippii*, *O. bopiensis*, and *O. amazonica*,  $\times \frac{1}{2}$ ; b, leaflet of *O. amazonica*,  $\times \frac{1}{2}$ .

the bracteoles linear, 7–8 mm. long and 1 mm. wide or less; flowers 15–17 mm. long; calyx fulvo- to ferrugino-tomentulose, 8–10 mm. long, the tube 4–5 mm. long and about 5 mm. in diameter, the teeth 4–6 mm. long; petals purplish; fruit dehiscent, sublignous or coriaceous, essentially glabrous at maturity, reticulate-rugose, black to dark brown, 1–3-seeded, about 2–5 cm. long, 1.5–2.5 cm. broad, somewhat constricted between the seeds, 1.5 cm. thick, the valves 1–1.5 mm. thick; seeds bicolored, red with a black spot, 10–13 mm. long, 9–11 mm. broad, and 7–8 mm. thick, the hilum 2 mm. long and 1.5 mm. wide.

TYPE LOCALITY: "Cacoal Imperial," below Obidos, Pará, Brazil. Type collected by Ducke (no. 14833), cited below.

**DISTRIBUTION:** In forests along rivers, periodically inundated, "varzea land," middle to upper Amazon basin, Brazil and Peru.

**BRAZIL:** PARÁ: Obidos, *Ducke* [MG no.] 14833 (B M, F. M. neg. 28237 ex G, G, NY, P, R type, US). **AMAZONAS:** Near mouth of Rio Embira, *Krukoff* 4838 (A, G, K, NY), 5123 (A, BM, F, G, K, M, MO, NY, S, UC, US). "Basin of Rio Madcira," *Lobo* [Krukoff Herb. no.] 15459 (NY).

**PERU:** LORETO: Iquitos, *Tessmann* 3665 (F fragment of type of *O. euneura* ex B, F. M. neg. 1808 of type of *O. euneura* ex B, NY, S, US).

**LOCAL NAMES:** Mulungu, tento grande da varzea (Brazil).

Examination of type material of *O. amazonica*, in fruit, and *O. euneura*, in flower, shows the two species to be synonymous.

**21. *Ormosia bopiensis*** Pierce ex Macbr. Field Mus. Pub. Bot. 13(3) : 248. 1943. FIGURE 7

Tree to about 20 m. high; young stems fulvo- to ferrugino-tomentulose; stipules linear-deltoid, 3–10 mm. long, 1–2 mm. broad at the base; leaves (3–5-) 7–13-foliolate, the axis 6–35 cm. long, tomentulose, glabrate, the petiole 3–10 cm. long, the pairs of leaflets 2–8 cm. apart, the petiolules 2–9 mm. long, 1.5–4 mm. in diameter, aculeate stipels, about 2 mm. long, sometimes present, the blades coriaceous, ovate, elliptic-oblong, or obovate, 4–35 cm. long, 3–17.5 cm. broad, the apex obtuse to acuminate with acumen 10–15 mm. long, the base truncate, subcordate, or obtuse, the upper surface subnitid, glabrous except for a trace of pubescence along the major veins, the lower surface tomentulose along the major veins, otherwise moderately to sparsely pubescent with loosely crispate hairs, the secondary veins moderately raised, about 10–18 pair, essentially parallel, 3–30 mm. apart, forming angles of 50°–60° with the midvein; inflorescences with axes fulvo- to ferrugino-tomentulose, the bracts linear-deltoid, 4–10 mm. long and about 2 mm. broad at the base, the bracteoles linear, 4–5 mm. long, 1 mm. broad or less; flowers 13–15 mm. long; calyx 8–12 mm. long, the tube about 4–6 mm. long and 4–6 mm. in diameter, the teeth 4–6 mm. long; petals deep violet (fide Klug), reddish brown (fide Pearce) fruit dehiscent, sublignous or coriaceous, finely velutinous, glabrescent, essentially glabrous at maturity, black or dark brown, reticulate-rugose, 1- or 2-seeded, 3–6 cm. long, (1.5-) 2.5–2.8 cm. broad, constricted between the seeds, about 1.5 cm. thick, the valves 1 mm. thick; seeds bicolored red and black, 11–14 mm. long, 10–12 mm. broad, 6–8 mm. thick, the hilum about 2 mm. long and 1–1.5 mm. wide.

**TYPE LOCALITY:** Mishuyacu, near Iquitos, Loreto, Peru, in forest, 100 meters elevation. Type collected by Klug (no. 669), cited below.

**DISTRIBUTION:** Upper Amazon basin of Peru and Bolivia.

**PERU:** LORETO: Mishuyacu, near Iquitos, *Klug* 669 (F type, NY, US). Cuzco: Paucartambo, *Vargas* 14907 (US).

BOLIVIA: LA PAZ: Rio Coroico, *Pearce* s.n., April 1866 (BM, NY). Basin of Río Bopi, San Bartolomé, near Calisaya, *Krukoff* 10408 (A, F, G, K, MO, NY, S, U, US, Y). Apolo, *R. S. Williams* 1434 (BM, K, NY, UC).

LOCAL NAME: Huyruro (Bolivia).

Superficially, this species resembles *O. amazonica* and, obviously, there is a close relationship. The differences are not readily expressed, as indicated by my wording of the key. However, I believe that at least two taxa are involved.

The NY sheet of *Krukoff* 10408, a fruiting specimen from the Río Bopi, Bolivia, was annotated by Pierce as the type of his *Ormosia bopiensis*, but he did not publish the species. Macbride, who validated the name in his treatment of the Leguminosae for the Flora of Peru, cited only a Peruvian collection, *Klug* 669, in flower, that Pierce had annotated as *O. bopiensis*, and which, therefore automatically became the type of the species. The original description, however, must have been based on the *Krukoff* collection, because fruit was described, but not flowers.

22. *Ormosia schippii* Pierce ex Standl. and Steyerl., emend Rudd, Trop. Woods No. 113: 125. 1960. FIGURE 7

*Ormosia schippii* Pierce ex Standl. and Steyerl. Fieldiana Bot. 24(5): 311. 1946, pro. parte.

Tree to about 35–40 m. high; young stems fulvo- to cinereo-tomentulose; stipules not seen; leaves 5–9-foliolate, the axis 10–35 cm. long, tomentulose, glabrescent, the petiole about 5–7 cm. long, the pairs of leaflets 3–5 cm. apart, the petiolules 4–5 mm. long, 2–3 mm. in diameter, the blades coriaceous or subcoriaceous, ovate to ovate-oblong, or, sometimes obovate, 5–27 cm. long, 3–11 cm. wide, the apex acute or breviacuminate, the acumen to about 10 mm. long, the base obtuse to subcordate, the upper surface glabrous except for a trace of pubescence along the major veins, the lower surface moderately pubescent, the hairs loosely crispate, the secondary veins raised, about 8–14 pair, essentially parallel, 5–20 mm. apart, forming angles of about 55°–65° with the midvein; inflorescences with axes cinereo- or fulvo-tomentulose, glabrescent, the bracts lanceolate, acuminate, 8–10 mm. long, 2–2.5 mm. broad, the bracteoles linear, 7–8 mm. long, 1 mm. broad; flowers 18–22 mm. long; calyx cinereo- to fulvo-tomentulose, 7–10 mm. long, the tube 4–5 mm. long, 4–5 mm. in diameter, the teeth 3–5 mm. long; corolla reddish purple; fruit dehiscent, sublignous, black or dark brown, essentially glabrous at maturity but often with a trace of pubescence at the base, commonly 1-seeded, 2–3 cm. long, 2–2.5 cm. broad, about 1.5 cm. thick, the valves 1–2 mm. thick; seeds bicolored, red with a black spot, 12–13 mm. long, 10–12 mm. broad, and 7–9 mm. thick, the hilum 2–3 mm. long and 1–1.5 mm. wide.

TYPE LOCALITY: "Temash River, in forest shade," Toledo District British Honduras. Type collected by Schipp (no. 1297), cited below.

DISTRIBUTION: In rain forest, generally in swampy places, southern Mexico and British Honduras, at elevations up to about 150 meters.

MEXICO: CHIAPAS: Selva Lacandona, *Gomez-Pompa* 339 (MEXU, US). Between La Arena and Salas, *Miranda* 8471/1 (MEXU).

BRITISH HONDURAS: EL CAYO: Gallon Jug, *Lancaster* 24 (US). TOLEDO: Temash R., SCHIPP 1297 (A, BM, F type, G, GH, K, MO, NY, S); *Peck* 800 (GH, K).

LOCAL NAMES: Palo macho, carne de caballo (Mexico); John Crow bead (British Honduras).

The original publication of *O. schippii* was based on two specimens, one in fruit, *Schipp* 132, which Pierce had annotated as the type of his unpublished species, and *Schipp* 1297, in flower, which Standley and Steyermark designated as type. Later it was observed that the two specimens represented different species; one, *O. schippii*, was emended, the other, given the name *O. velutina*, was published as new.

Series 5. *Coccineae* Rudd, ser. nov.

Arbores nonnumquam maximae; fructus dehiscentis, valvulis lignosis vel sublignosis, glabris, usitate nitidis; semina bicolores coccinea macula nigra notata, hilo elliptico 1-3.5 mm. longo.

The type of this series is *O. coccinea*, which is also the type of the genus. This may in part be an artificial grouping, but the similarities seem to outweigh the dissimilarities, and there appears to be intergradation from species to species. Perhaps this is a complex of species showing effects of isolation as well as hybridization.

23. *Ormosia coccinea* (Aubl.) Jacks. Trans. Linn. Soc. 10 : 360, t. 25. 1811.

FIGURE 8

Tree to about 30 m. high; young stems ferrugineo- to fulvo-tomentulose, sometimes glabrescent; stipules minute, deltoid, 1-2 mm. long; leaves 7-11-foliolate, the axis 8-30 cm. long, tomentulose to subsericeous, the petiole 3-7 cm. long, the pairs of leaflets 2-7 cm. apart, the petiolules 3-10 mm. long, 2-4 mm. in diameter, the blades coriaceous, ovate, elliptic, or obovate, 3-22 cm. long, 2-11 cm. broad, acute, breviacuminate, or obtuse, the base obtuse, the margin sometimes revolute, the upper surface glabrous, nitid or subnitid, the major veins sometimes deeply impressed, the lower surface usually tomentulose along the major veins, sometimes appressed-pubescent, or glabrate, otherwise sparsely pubescent with minute appressed hairs, or sometimes glabrate, the secondary veins usually conspicuously raised, about (8-) 10-17 pair, 4-25 mm. apart, forming angles of 50°-70° with



the midvein; inflorescences with axes fulvo- to ferrugino-tomentulose, the bracts deltoid or linear-deltoid, 2-3.5 mm. long and about 1 mm. broad at the base, the bracteoles linear or linear-deltoid, 1-2 mm. long; flowers 10-15 mm. long; calyx fulvo- or ferrugino-tomentulose, 7-9 mm. long, the tube 4-4.5 mm. long, 4 mm. in diameter, the teeth 3-5 mm. long; corolla dark purplish; fruit dehiscent, lignous, black or dark brown, glabrous at maturity, nitid, usually 1-seeded, sometimes with 2-4 seeds, about 2.5-6 cm. long, 1.5-3 cm. wide, slightly constricted between the seeds, about 1 cm. thick, the valves 2-5 mm. thick; seeds bicolored, red and black, 10-15 mm. long, 9-12 mm. broad, and 7-10 mm. thick, the hilum elliptic, about 2 mm. long and 1 mm. wide.

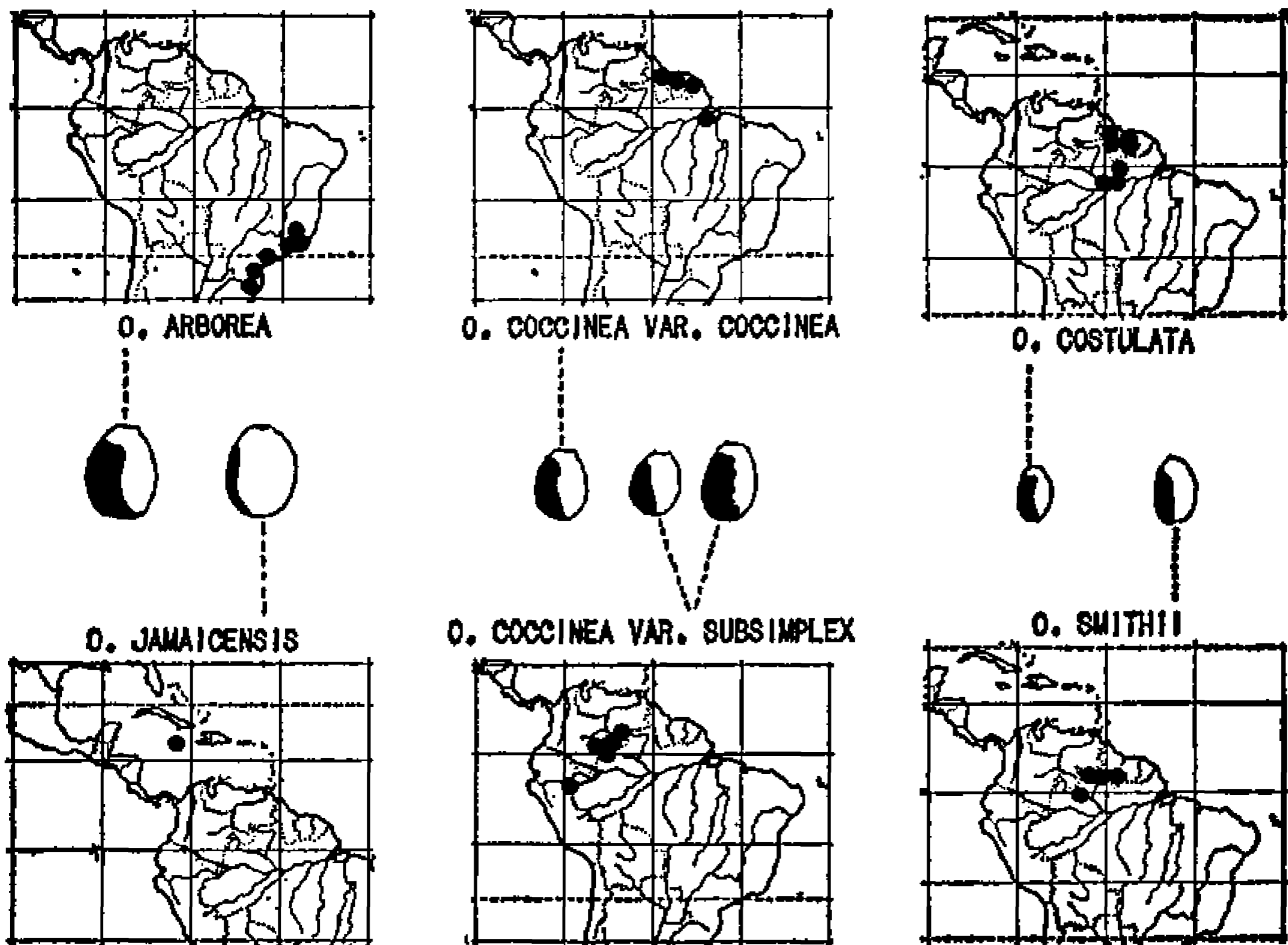


FIGURE 8.—*Ormosia* section *Ormosia* series *Coccineae*, in part: Geographic distribution of species; seeds of *O. arborea*, *O. jamaicensis*, *O. coccinea* var. *coccinea*, *O. coccinea* var. *subsimplex*, *O. costulata*, and *O. smithii*,  $\times \frac{1}{2}$ .

**23a. *Ormosia coccinea* var. *coccinea*.**

FIGURE 8

*Ormosia coccinea* (Aubl.) Jacks. Trans. Linn. Soc. 10 : 360, t. 25. 1811.

*Robinia coccinea* Aubl. Fl. Guian. 2 : 773. 1775, sine syn. Plumieri.

The typical variety characteristically has leaflets ovate, or obovate to elliptic, with lateral veins mostly 4-10 mm. apart, strongly depressed above and raised below, diverging from the midvein at 60°-70° angles; petiole 3-5 cm. long, the petiolules 3-5 mm. long, the pairs of leaflets 2-4 cm. apart; fruit 2-3 cm. broad, the valves 3-5 mm. thick.

**TYPE LOCALITY:** French Guiana. Type collected by Aublet, cited below.

**DISTRIBUTION:** French Guiana, Surinam, British Guiana, and Amazon delta of Brazil, in sandy soil.

**FRENCH GUIANA:** Without exact locality, *Aublet* s.n. (BM type of *R. coccinea*); *Richard* s.n. (P); *Martin* s.n. (BM, NY); *Poiteau* s.n. (G). Mana, *Sagot* 112; (BM, F, K, P). Route de Mana, Camp des Malagaches, *Bur. For. & Agric. Guyan.* 7323 (NY). Pariacabo, *Benoist* 1417 (P). Godebert, *Wachenheim* s.n. (A, BM), 95 (P), 140 (P). Cayenne, *Soubirou* s.n. (P); *Cowan & Maguire* 38037 (NY). Route Charvein-Acarouany, *Bur. For. & Agric. Guyan.* 274 M (NY, U). Estrada Kourou-Sinnamary, *Black & Klein* 54-17330 (US).

**SURINAM:** Wayombo, Donderkreek, *Stahel* 357 (A, K, NY, U, Y); *Lindeman* 7127 (U). Brownsberg, *Zaandam, Sur. For. Bur.* 6630 [tree no. 1252] (U). Moengo tapoe, *Lanjouw & Lindeman* 645 (U).

**BRITISH GUIANA:** Upper Kamuni Creek, Demerara R., *C. W. Anderson* 283 (K).

**BRAZIL: PARÁ:** Gurupá, *Ducke* [MG no.] 15962 (BM, G, MG, R, US); [MG no.] 16675 [=RB no. 945] (BM, G, MG, P, R, RB, S, U, US); *Pires & Silva* 4730 (NY, US). Porto de Moz, *Ducke* [MG no.] 16657 (MG). Rio Xingu, Campo Grande, *Ducke* [MG no.] 17159 (MG). Breves, *Pires, Fróes, & Silva* 5421 (IAN); *Ducke* [RB no.] 17097 (U).

**LOCAL NAMES:** Panacoco, agui (French Guiana); kokriki, hoogland-kokriki (Carib, Surinam); barakaro firiberoebana ibikaro iwi (Arawak, Surinam).

In general, the collections listed above are remarkably uniform in character, in contrast to those that have been "lumped" in the other variety of *O. coccinea*. Among the material of *Stahel* 357, however, are some large leaflets similar to those commonly found on specimens of *O. coccinea* var. *subsimpler*.

Jackson, in his original description of *O. coccinea*, did not mention the specimens collected by Martin, cited above, but it appears that Martin's material, with flowers and fruit, was used in preparing the illustration of the species. The general aspect of the specimens indicates the likelihood, and they were at one time a part of the Lambert Herbarium, to which Jackson did refer in his paper. The holotype of *Robinia coccinea*, the basionym of the species, is a sterile specimen and, apparently, did not serve as the artist's model.

**23b. *Ormosia coccinea* var. *subsimpler* (Spruce ex Benth.) Rudd, comb. et stat. nov.**

FIGURE 8

*Ormosia subsimpler* Spruce ex Benth. in *Mart. Fl. Bras.* 15(1):316. 1862.

The leaflets of this variety are elliptic to obovate, with the lateral veins less conspicuous than in the typical variety, commonly 10-15 mm. apart, diverging from the midvein at angles of about 50°-60°; petiole 5-7 cm. long, the petiolules 5-10 mm. long, the pairs of leaflets 5-7 cm. apart; fruit 1.5-2.5 cm. broad, the valves 2-3 mm. thick.

TYPE LOCALITY: San Carlos, Amazonas, Venezuela. Type collected by Spruce (no. 2955), cited below.

DISTRIBUTION: Upper Río Negro, Río Vaupes, and Río Orinoco basins of Venezuela, Colombia, and Brazil, and in the upper Amazon basin of Peru, at edge of savannas, in "sabaneta," and "restinga."

VENEZUELA: AMAZONAS: Maroa, *Ll. Williams* 14304 (F, G, US, VEN), 14336 (F, G, US, VEN). San Carlos, *Spruce* 2955 (K type, NY, P); *Holt & Blake* 632 (GH, NY, US, VEN); *Ll. Williams* 14614 (F, G, US, VEN), 14660 (A, F, MO, US, VEN). Caño Arapacua, Río Pacimoni, *Maguire & Wurdack* 34882 (G, NY, U, VEN). Between San Fernando de Atabapo and San Antonio, *Level* 49 (NY, US, VEN). Cerro Moriche, Río Ventuari, *Maguire, Cowan, & Wurdack* 30845 (NY, VEN). La Esmeralda, *Croizat* 154 (NY). Santa Rosa de Amena-dona, *Ll. Williams* 14694 (F, G, US, VEN). BOLÍVAR: Piedra Marimare, 2 km. east of Río Orinoco, opposite head of Isla El Gallo, *Wurdack & Monachino* 40856 (F, G, K, NY, S, US, VEN), 40883 (F, K, NY, S, US, VEN).

COLOMBIA: VAUPÉS: Río Apaporis, Jirijirimo, *Schultes & Cabrera* 14541 (NY, US); *García-Barriga* 13686 (US). Miraflores, *Gutiérrez & Schultes* 825 (US). AMAZONAS: Río Igaraparaná, La Chorrera, *Schultes* 3973 (K, SI, US).

BRAZIL: AMAZONAS: "Prope Panure ad Rio Uaupes," *Spruce* 2951 (BM, BR, F, G, K, NY, P). Rio Uaupes, *Fróes [Krukoff]* 12468/211 (A, CAS, NY, POM), 12566/290 (A, CAS, DS, F). Coró-Coró, Rio Uaupes, *Pires* 858 (IAN, NY); *Schultes & Pires* 8998 (US). Ca-te-espera, São Gabriel, *Fróes [Krukoff]* 12377/137 (A, CAS, F, NY, POM). Cucui, *Fróes [Krukoff]* 12406/150 (A, CAS, DS, F, NY, POM). Içana, Rio Negro, *Fróes* 22279 (IAN, NY, U). Tunuí, Rio Içana, *Pires* 762 (IAN, NY). Rio Içana, between Içana and Tunuí, *Black* 48-2668 (IAN).

PERU: LORETO: Alto Río Itaya, *Ll. Williams* 3505 (F, G, US).

LOCAL NAMES: Huairura (Quechua, Peru); peonía (Venezuela); tento, tento da restinga (Brazil); wo-ká (Puinave, Colombia).

Bentham, at the close of his original description of *O. subsimplex*, questioned whether it should be considered as a variety of *O. coccinea*. However, the two collections by Spruce that he cited as *O. coccinea* are now placed in *O. smithii*, another species, although closely related.

The specimens being assigned to var. *subsimplex* in this paper are not uniform in characters, and it is possible that additional varieties or forms should be recognized. Surprisingly, the westernmost collections, from Colombia and Peru, resemble those of the typical variety more closely than do most of the collections from the intervening area.

24. *Ormosia arborea* (Vell.) Harms, Repert. Sp. Nov. 19:288. 1924.

FIGURE 8

*Abrus arboreus* Vell. Fl. Flum. 303. 1825; Icon. 7: pl. 99. 1835.

*Ormosia acuta* Vog. Linnaea 11:405. 1837.

Tree, to about 12 m. tall; stipules not seen; young stems fulvo-tomentulose; leaves 7-11-foliolate, the axis about 12-30 cm. long, pilose, the petiole 4-8 cm. long, the pairs of leaflets 3-5 cm. apart,

the petiolules 3–5 mm. long and 2–3.5 mm. in diameter, the blades subcoriaceous, elliptic-oblong to ovate, 5–22 cm. long, 4–9 cm. broad, obtuse, acute to acuminate, the base rounded or subcordate, the upper surface subnitid, glabrous, the lower surface fulvo-tomentulose along the major veins, otherwise sparsely and minutely subappressed-pubescent, glabrescent, the secondary veins raised, about 10–15 pair, 3–8 (–20) mm. apart, forming angles of about 50°–55° with the midvein; inflorescences with axes fulvo-tomentulose, the bracts linear, 2–3 mm. long, the bracteoles linear, 1.5–2 mm. long; flowers (13–) 16–20 mm. long; calyx fulvo-tomentulose, (8–) 10–12 mm. long, the tube 7–8 mm. long, 6–7 mm. in diameter, the teeth 4–5 mm. long; petals lilac, bluish, or purple; fruit dehiscent, lignous, glabrous or nearly so at maturity, nitid, black, 1–3-, commonly 1-seeded, 4–6 cm. long, 2.5–3.5 cm. broad, 2 cm. thick, the valves 2–4 mm. thick; seeds bicolored red and black, about 13–15 mm. long, 13 mm. broad, and 10 mm. thick, the hilum 3.5 mm. long and 1.5 mm. wide.

TYPE LOCALITY: Rio de Janeiro, Brazil. Type presumably collected by Vellozo, represented by Plate 99, op. cit.

DISTRIBUTION: In woods and along the coast in "restinga," southeastern Brazil.

BRAZIL: Without exact locality, *Claussen* s.n. (P); *Sellow* 155 (BM, possible isotype of *O. acuta* ?), s.n. (F fragment, possibly type material of *O. acuta* ? ["inter Rio et Campo"]). RIO DE JANEIRO: Cabo Frio, *Ule* s.n. (R, US); *Segadas-Vianna et al.*, Restinga I-571 (US). Macae [Macahé], *Riedel & Luschnath* 1254 (MO). GUANABARA: Rio de Janeiro: *Gomes* s.n. (K); *Glaziou* 15 (BR, P); *Riedel* s.n. (NY); *Richard* s.n. (BR, G, P); *Widgren* s.n. (S). Jardim Botânico, cultivated, *Constantino* 276 (K, S, U, US); *Whitford* 38 (F, GH, S, US, Y). "Praia Copacabana," *Luschnath* 131 [*Martius Herb. Fl. Bras.* no.] (BR, G, M, P). Copacabana, *Nadeaud* s.n. (P); *Neves Armand* 44 (R). Recreo do Bandeirantes, *Lutz* 655 (R). Restinga de Tijuca, *Kuhlmann* 732 [RB no.] (RB, US); *Mikan* s.n. (F, NY, US); *Machado* [RB no.] 76105 (RB), 76112 (RB, US). "Praia da Tijuca," *Lund* 101 (C). Gruta de Imprensa, *Duarte* 64 (RB, US). Morro dos Cabritos, *Kuhlmann* [RB no.] 41437 (RB). MINAS GERAIS: Caldas, *Regnell* III.472 (K, S, US). Horto Florestal de Paraopeba, *Heringer* [RB no.] 93624 (RB). Carlos Prates, Belo Horizonte, *Mendes de Magalhães* s.n. (R). Tombos, *Mello Barreto* 1981 (R). Lagoa Santa, *Warming* s.n. (P). SÃO PAULO: Campinas, *Severin* 157 (S). Santos, *Mosén* 2830 (S). Santa Rita do Passa Quatro, *Hemmendorff* 235 (S). Serra da Cantareira, *Hoehne* 29416 (NY). Rio Itararé, Itaporanga, *Joly* 725 (SI). PARANÁ: Jacareí, *Dusén* 8265, (BM, S, US), 8731 (BM, S, US). Itararé, opposite Morungava, *Dusén* 16533 (A, BR, F, G, GH, MO, S). Alexandra, *Dusén*, s.n. (S). SANTA CATARINA: Barra do Sul, Araquari, *Reitz & Klein* 799 (G, NY, S, U, UC, US). Cedro Baixo, *Reitz & Klein* 1406 (NY, S, UC). Luiz Alves, Itajai, *Reitz* 4212 (BR, G, NY, S, U, UC, US).

LOCAL NAMES: Mariana, olho de cabra, olho de onca, pau ripa, pau de Santo Inácio, tento, sapiranga.

This species appears to be a part of the *O. coccinea* complex that has been geographically separated from the main area of distribution

for some time. I believe that it is desirable to maintain it as a separate species, at least until we have more information concerning the flora of the intervening region.

Harms correctly noted that *O. arborea*, based on Vellozo's *Abrus arboreus*, was distinct from Vogel's *O. nitida* and should not be in synonymy, as placed by Bentham.

25. *Ormosia grossa* Rudd, sp. nov.

FIGURE 9

Arbor 8 m. alta; ramuli novelli fulvo-velutini; stipulae non visae; folia 7- vel 9-foliolata, axi 8-14 cm. longo, velutino, petiolo 3-3.5 cm. longo, jugis inter sese 2-3.5 cm. distantibus, foliolis cum petiolulis 4-5 mm. longis et 3 mm. diametro, laminis coriaceis, ellipticis, 6-11 cm. longis, 3.5-5 cm. latis, obtusis vel retusis, basi obtusis, supra nitidis, glabris, subtus leviter tomentosi, pilis ferruginis, circiter 1 mm. longis, laxe crispis, venis secundariis prominentibus, utrinsecus circiter 9-11, fere parallelis, inter sese 5-10 mm. distantibus, angulis venarum costaeque circiter 50°-55°; inflorescentiae cum axibus fulvo-velutinis; bractee bracteolaeque non visae; flores non visi; fructus dehiscentis, lignosus, glaber, nitidus, 1-4-spermus, 4-9 cm. longus, 3-3.5 cm. latus, inter semina aliquanto constrictus, 2.5-3 cm. crassus, valvulis 5-7 mm. crassis; semina bicolora, coccinea macula nigra notata, 13-14 mm. longa, 11-13 mm. lata, et 10-11 mm. crassa, hilo 2-2.5 mm. longo et 1-1.5 mm. lato.

Type in the Herbarium Amazonicum, Museu Paraense Emilio Goeldi, no. 21296, collected at Cachoeira Baixa do Tarumã, Manaus, Amazonas, Brazil, July 1, 1955, by W. Rodrigues (Instituto Nacional de Pesquisas da Amazonia no. 1291).

DISTRIBUTION: Known only from the type collection.

LOCAL NAMES: Mulungu, tento.

The one known specimen cited above appears to be sufficiently distinct to warrant specific recognition. Superficially, it is most similar to *O. lignivalvis* but differs, as indicated in the key, in characters that seem to be significant, at least in this genus.

26. *Ormosia lignivalvis* Rudd, sp. nov.

FIGURE 9

Arbor usque ad 50 m. alta; ramuli novelli fulvo- vel cano-velutini; stipulae minutae, deltoideae, 1 mm. longae vel minus, caducae; folia 5-11-foliolata, axi 8-20 cm. longo, velutino, petiolo 2-8 cm. longo, jugis inter sese 1-4 cm. distantibus, foliolis cum petiolulis 3-10 mm. longis et 1.5-3.5 mm. diametro, laminis coriaceis, ellipticis vel oblongis, 3-17 cm. longis, 1.5-9 cm. latis, obtusis vel subacutis, basi obtusis vel subcordatis, supra nitidis, glabris, interdum costa puberulis, subtus uniformiter subsericeis, pilis plus minus crispis, venis secundariis prominentibus, utrinsecus circiter 10-15, fere parallelis,

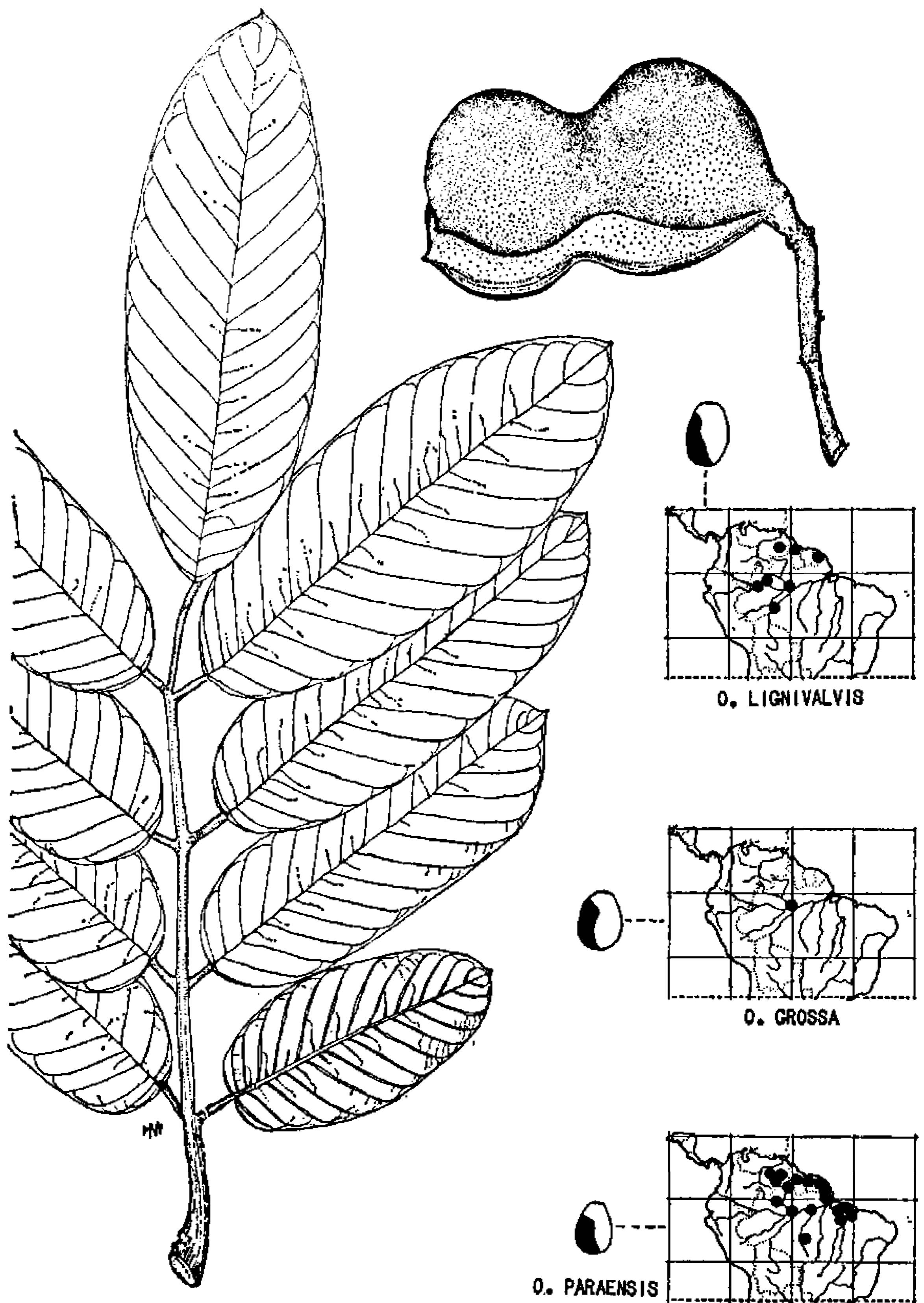


FIGURE 9.—*Ormosia* section *Ormosia* series *Coccineae*, in part: Geographic distribution of species; leaf, fruit, and seed of *O. lignivalvis*; seeds of *O. grossa* and *O. paraensis*,  $\times \frac{1}{2}$ .

inter sese 3–10 mm. distantibus, angulis venarum costaeque circiter  $50^{\circ}$ – $60^{\circ}$ ; inflorescentiae cum axibus fulvo- vel ferrugino-velutinis, bracteis deltoideis, 1–4 mm. longis, basi 1 mm. latis, bracteolis deltoideis, 1–1.5 mm. longis; flores 11–12 mm. longi, calyce fulvo-

velutino, 6–7 mm. longo, tubo 4–4.5 mm. longo, 4.5 mm. diametro, dentibus 2–2.5 mm. longo, petalis atropurpureis, vexillo macula alba notato; fructus dehiscens, lignosus, glabrescens, nitidus, castaneus, nigratus, 1–4-, communes 1-spermus, 6–10 cm. longus, 2.5–4 cm. latus, inter semina aliquanto constrictus, circiter 2.5 cm. crassus, valvulis 5–7 mm. crassus; semina bicolora, coccinea macula nigra notata, 13–15 mm. longa, 12–13 mm. lata, 9–10 mm. crassa, hilo 3 mm. longo et 1.5 mm. lato.

Type in the U.S. National Herbarium, no. 2266008, collected at São Paulo de Olivença, Amazonas, Brazil, April 1945, by R. de Lemos Fróes (no. 20796). Duplicates at F, K, and NY.

DISTRIBUTION: In forest on sandy soil, "terra firma," in French and British Guiana, southeastern Venezuela, and the upper Amazon area of Brazil.

ADDITIONAL SPECIMENS EXAMINED:

FRENCH GUIANA: Route de St. Laurent à Cayenne, km. 11.5, *Bur. Agr. & For.* 151 M (P). Route de Cayenne, km. 8.9, *Bur. Agr. & For.* 7535 (NY, U).

BRITISH GUIANA: Aiamoradan Forest, Mazaruni Station, *Fanshawe* 734 [For. Dept. B.G. no. 3470] (K, US).

VENEZUELA: BOLÍVAR: E. of Cruzero, ESE of Villa Lola, *Steyermark* 86413 (US, VEN). NE of Serranía Pia-shauhy, *Steyermark* 90665 (US, VEN). Pica de La Lira, El Dorado, *Conejos-Sobrino* 82 (MER, US).

BRAZIL: AMAZONAS: Tonantins, Vila Velha, *Ducke* 770 (F, GH, MG, MO, NY, R, RB, SI, US). São Paulo de Olivença, *Fróes* 12077 (A, F, NY, US), 12082 (A, F, NY, US). Rio Tonantins, *Fróes* 12183/94 (A, F, NY, US), 12185/96 (A, NY). Manaus, *Ducke* [RB no.] 23366 (P, RB, S, US). Basin of Rio Madeira, Lobo [Krukoff Herb. no.] 15461 (NY). Humaitá, Cipoal, *Krukoff* 7222 (A, BM, BR, F, K, MO, NY, U, US).

LOCAL NAMES: Agui [Paramaka], panacoco (French Guiana); barakaro (British Guiana); chaparillo, peonfo (Venezuela); tento, tenteiro, tento da terra firma (Brazil).

The minutely crispate pubescence of the leaflets and the relatively long hilum of the seed are characters that help to distinguish *O. lignivalvis* from the other species with thick-valved fruit.

27. *Ormosia paraensis* Ducke, Arch. Jard. Bot. Rio Janeiro 4 : 62. 1925.

FIGURE 9

*Ormosia crassicarpa* Pierce ex Pittier, Bol. Soc. Venez. Cienc. Nat. 10 : 108.

1944; M. A. C. Serv. Bot. Bol. Tecn. No. 5 : 15. 1944, without Latin diagnosis.

*Ormosia heterophylla* Pires, Bol. Técn. Inst. Agron. Belém No. 38 : 24. 1960.

Tree to about 40 m. high; young stems subsericeous, the hairs fulvous or canus; stipules not seen; leaves (1–3–) 7–15– (–19) foliolate, the axis (2–) 7–25 cm. long, subsericeous, the petiole about 2–6 cm. long, the pairs of leaflets 1.5–4 cm. apart, the petiolules 6–7 mm. long and 1.5–2 mm. in diameter, the blades coriaceous or subcoriaceous,

elliptic-oblong, 4–23 cm. long, 1.5–8 cm. broad, obtuse to acute or sometimes breviacuminate, the base obtuse, the upper surface glabrous, nitid or subnitid, the lower surface minutely appressed-pubescent, glabrescent, the secondary veins inconspicuous, but slightly raised, about 12–20 pair, 3–7 mm. apart, forming angles of 60°–70° with the midvein; inflorescences with axes fulvo-sericeous, the bracts deltoid or lanceolate, 1–2 mm. long and 1 mm. broad at the base, the bracteoles linear, about 1 mm. long; flowers (6–) 9–10 mm. long; calyx fulvo-sericeous, (4.5–) 6–7 mm. long, the tube 2.5–4 mm. long, 2.5–3 mm. in diameter, the teeth about 2–3 mm. long; petals purplish, marked with white; fruit dehiscent, lignous, glabrous at maturity, nitid, black or dark brown, 1–3-seeded, 3–6.5 cm. long, 2–3.5 cm. broad, 1.2–2 cm. thick, the valves 2–5 mm. thick; seeds bicolored red and black, 12–15 mm. long, 10–13 mm. broad, and 8–10 mm. thick, the hilum about 2 mm. long and 1 mm. wide.

TYPE LOCALITY: "Serra Itauajury prope Montealegre," Para, Brazil. Lectotype collected by Ducke (RB no. 17108).

DISTRIBUTION: Sandy or clay soil, "terra firma," lowland, high jungle of the Guianas, Venezuela, and the middle to lower Amazon region of Brazil, at elevations up to about 800 meters.

FRENCH GUIANA: Camp Lorrain, *Bur. Agric. & For. Guyan*, 7 M (P). "Route babassou," *Bena* [Herb. no.] 1157 (U).

SURINAM: Commewigne, Perica R., *Lindeman* 5352 (US). Near Paramaribo, Zanderij I, *Stahel* 118 (NY, U); *For. Bur. Sur.*, *Arbor* no. 77 [Herb. no.] 1508 (U), 4647 (K, NY, U); *Arbor* no. 192, [Herb. no.] 1427 (BR, U). Forest Reserve, Sektie O, *Arbor* no. 572 [Herb. nos.] 1138 (U), 6079 (K, U). Watramiri, *Arbor* no. 1589 [Herb. no.] 1824 (U).

BRITISH GUIANA: Moraballi Creek, Essequibo R., *Fanshawe* 464 [*For. Dept. B.G.* no. 3200] (K). Keriti Creek, Essequibo R., *Fanshawe* 881, [*For. Dept. B.G.* no. 3617] (K, NY).

VENEZUELA: BOLÍVAR: Guayapo, *Ll. Williams* 12058 (K, NY, UC, US, VEN type of *O. crassicarpa*). Ptari-tepui, *Steyermark* 60683 (F, MO, VEN). Urimán, Río Apacará, *Bernardi* 1623 (VEN).

BRAZIL: RIO BRANCO: Estrada Boa Vista, Caracarai, *Frões* 22971 (IAN); *Black* 51–13457 (NY, P). Serra do Divisor Brazil-Venezuela, *Frões* 23174 (IAN). AMAZONAS: Manaus, *Ducke* 1047 [MG no. 18125] (K, MG, MO, NY, R, SI, US), 1275 [MG no. 18126] (A, F, MG, NY, R, SI, US), [RB no.] 23357 (K, RB, S, US). Padauri, Rio Negro, Tapera, *Frões* 22900 (NY, U, US). AMAPÁ: Curiaú, Macapá, *Pires & Silva* 4771 (NY, US). Mt. Tipac, *Irwin* 48691 (NY, US). PARÁ: Belém, *Ducke* [MG no.] 15543 (F photo and fragment ex MG, MG syntype, S), 16575 [MG no.] (F photo and fragment ex MG, MG syntype, U). Bragança, *Ducke* [RB no.] 17107 (K, P, S, U, US, isosyntypes). Serra do Santarem, *Ducke* [MG no.] 16357 (F photo and fragment ex MG, MG syntype). Breu Branco, Rio Tocantins, *Frões* 23571 (IAN, NY). Belterra, *Black* 47–1003 (NY, U, US, VEN, Y). Mosqueiro, *Ducke* [RB no.] 20362 (RB, S, U). Boa Vista, Tapajos R., *Monteiro da Costa* 93 (F). Upper Cupari R., *Krukoff* 1164 (A, BM, K, NY, P, S, U). Near highway Belém-Brasília, km. 93, *Kuhlmann & Jimbo* 307 (IAN type of *O. heterophylla*); *Pires & Egler* 7648 (IAN paratype of



*O. heterophylla*, NY). MARANHÃO: Mata da Cochoeira, Maracassumé R., *Fróes* 1910 (A, G, K, NY, S, U). São Luiz, *Fróes* 11601 (A, K, MO, NY, U, UC, US), 11612 (A, K, MO, NY, U, UC, US), 21573 (F, K, NY, US). Candido Mendes, *Fróes* 1796 (A, BM, F, G, MO, NY, P, S, U, US). Alcântara, *Fróes* 30763 (US). MATO GROSSO: Rio Arinos, *Kuhlmann* 383 (R), 384 (RB), 385 (R), 387 (R).

LOCAL NAMES: Agui, panacoco (French Guiana); barakaro konok-hodiboxo ibikoro [Arawak], barakaroe hohoro di koro [Arawak], "tervejoballi"? [Arawak], itjoerano anakoko [Carib], konoboyepo [Carib], konoweyno [Carib], wootjiano-anakoko [Carib], kokriki (Surinam); barakaro, jumbi bean (British Guiana); metari-yek [Arekuna], mureyenu-yek, peonía, peonilla (Venezuela); tento, tenteiro (Pará, Brazil); jutahy do capoeira, mulungu, mulunga da mata (Maranhão, Brazil).

The specimen that Egler (Bol. Mus. Par. Emilio Goeldi, II. 18:63. 1963) cited as type, RB no. 17108, collected by Ducke, actually a lectotype, has not been available to me. However, I have seen several syntypes as well as other collections annotated by Ducke, so that the identity of his *O. paraensis* can be readily established. After examining types of *O. crassicarpa* and *O. heterophylla*, I believe they should be included within the circumscription of *O. paraensis*. The species, *sensu latior*, has a relatively extensive geographic range, and, according to the collectors' notes, can be found on clay or sandy soil. There is considerable variation in the size and number of leaflets, but the pubescence and the angle of divergence of the secondary veins is fairly constant. The types of *O. crassicarpa* and *O. heterophylla* are similar in having leaflets larger than average. There is a gradation in size of fruit from small pods in the paratype of *O. heterophylla*, for example, to larger ones in the type of *O. crassicarpa*, but there seems to be no general geographic correlation.

28. *Ormosia elata* Rudd, sp. nov.

FIGURE 10

Arbor usque ad 60 m. alta; ramuli novelli fulvo- vel cano-velutini; stipulae minutae, deltoideae, 1 mm. longae vel minus, caducae; folia 7-9-foliolata, axi 12-17 cm. longo, jugis inter sese 2.5-3.5 cm. distantibus, foliolis cum petiolulis 3-8 mm. longis et 2 mm. diametro, laminis subcoriaceis, ovatis, obovatis, vel oblongis, 4-15 cm. longis, 3-7 cm. latis, acuminatis, basi obtusis, supra glabris vel subglabris, nitidis, costa puberulis, subtus uniformiter puberulis vel suffarinosi, venis secundariis prominentibus, utrinsecus circiter 10, fere parallelis, inter sese 5-10 mm. distantibus, angulis venarum costaeque circiter 45°-50°; inflorescentiae cum axibus fulvo- vel cano-tomentulosis, bracteis deltoideis vel rhombicis, 3-5 mm. longis, 1-2 mm. latis, bracteolis linearibus, 1.5-2 mm. longis; flores maturi non visi, calyce juvenali circiter 5 mm. longo; fructus dehiscens, lignosus, glabrescens,

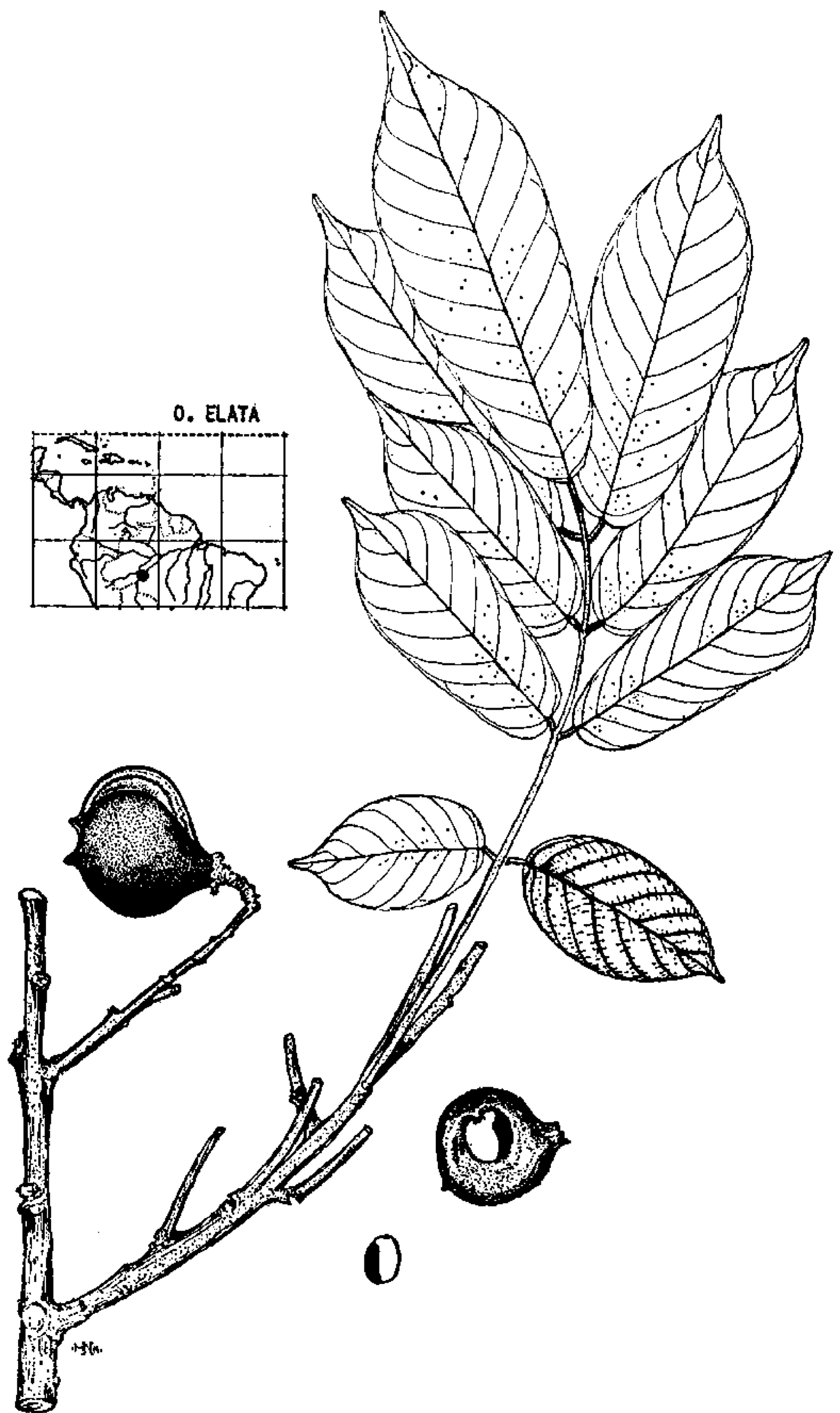


FIGURE 10.—*Ormosia* section *Ormosia* series *Coccineae*, in part: *O. elata*: Geographic distribution; leaf, fruit, and seeds,  $\times \frac{1}{2}$ .

castaneus, nigratus, nitidus, 1- vel 2-spermus, 3-6 cm. longus, 2-3 cm. latus, inter semina aliquanto constrictus, circiter 1.5 cm. crassus, valvulis 4-5 mm. crassis; semina bicolora, coccinea macula nigra notata, circiter 13 mm. longa, 10 mm. lata, 8-9 mm. crassa, hilo 2.5 mm. longo et 1 mm. lato.

Type in the U.S. National Herbarium, no. 1660701, collected on "low terra firma," near Tres Casas, Humaitá, State of Amazonas, Brazil, September 14-October 11, 1934, by B. A. Krukoff (no. 6478). Duplicates at A, BM, BR, F, G, K, MO, NY, S, U.

DISTRIBUTION: On "low terra firma," along southern tributaries to the Amazon.

ADDITIONAL SPECIMENS EXAMINED:

BRAZIL: AMAZONAS: Tres Casas, Humaitá, *Krukoff* 6303 (A, BM, BK, F, G, K, NY, S, U, US). Near mouth of Rio Embira, *Krukoff* 5053 (A, F, G, K, MO, NY, U, US), 5894 (A, G, K, NY).

LOCAL NAME: Mulungu.

In leaflet pubescence this species resembles *O. smithii*, but the fruits are heavier valved, as in *O. coccinea*, and related species. The angles of divergence of the secondary veins are more acute than in most species of the genus.

29. *Ormosia costulata* (Miq.) Kleinh. Rec. Trav. Bol. Néerl. 22 : 392. 1925.

FIGURE 8

*Leptolobium costulatum* Miq. Stirp. Sur. Sel. 17. 1850.

*Ormosia trifoliolata* Huber, Bol. Mus. Goeldi 5 : 398. 1909.

*Ormosia costulata* var. *trifoliolata* (Huber) Amshoff (as *trifoliata*).

Tree to about 14 m. high; young stems fulvo-velutinous, glabrescent; stipules minute, deltoid, about 1 mm. long; leaves (1-) 3-7-foliolate, the axis about 2-9 cm. long, the petiole 1-3 cm. long, the pairs of leaflets 1-2 cm. apart, stipels sometimes visible, especially in young plants, the petiolules 3-5 mm. long, 1-2 mm. in diameter, the blades coriaceous, elliptic to obovate, 2-18 cm. long, 1-10 cm. broad, obtuse or emarginate to broadly acute, the base acute to subcordate, the upper surface glabrous, nitid, the veins slightly impressed, the lower surface puberulent along the midvein, otherwise minutely pubescent with appressed hairs, glabrescent, the secondary veins prominent, about 9-15 pair, 3-6 mm. apart, forming angles of about 50°-60° with the midvein; inflorescences with axes fulvo-velutinous, the bracts deltoid, acute, 1-2 mm. long and about 1 mm. broad at the base, the bracteoles deltoid, about 1 mm. long; flowers 10-12 mm. long; calyx 5-7 mm. long, densely fulvo-sericeous, the tube about 3 mm. long and 3-4 mm. in diameter, the teeth 3-4 mm. long; petals blackish purple, the banner sometimes with a white mark at base; fruit dehiscent, sublignous or coriaceous, brown to black, glabrate, 1-3-, commonly 1-, seeded, 2-4 cm. long, 1.2-2 cm. wide, slightly constricted between the seeds,

1-1.2 cm. thick, the valves 1-2 mm. thick or less; seeds bicolored, red and black, (6-) 9-11 mm. long, (6-) 8-10 mm. wide, and 5-6 mm. thick, the hilum elliptic, 1-1.5 mm. long and 1 mm. wide.

TYPE LOCALITY: Surinam. Type collected by Hostmann (no. 1299), cited below.

DISTRIBUTION: In sandy savanna, Surinam, British Guiana, and the middle Amazon region of Brazil at elevations up to about 500 meters.

SURINAM: Without exact locality, *Wullschlägel* 829 (BR); *Hostmann* 1299 (BM, C, FM neg. 21898 ex C, GH, K, NY, P, S, U type of *Leptolobium costulatum*). *Matta, Maguire & Stahel* 24960 (A, F, K, NY, U, US, VEN); *Gonggrijp* 442 (U). "Zandery," *Samuels* 261 (A, K, NY, P, US); *Zanderij I, Lindeman* 6515 (U); *Stahel* 119 (NY, U); *Maguire & Stahel* 25051 (A, F, K, NY, U, US, VEN); *Stahel [For. Bur. Sur.]* 83 (A, K, NY, Y); *Maguire* 24222 (BR, F, K, MO, NY, U, US, VEN). *Tafelberg, Lisa Creek, Maguire* 24383 (NY, U). *Corantyne R., Pulle* 473 (NY, U). *Patamaka, Lanjouw & Lindeman* H 9 (NY, U). *Wia Wia Bank, Lanjouw & Lindeman* 1292 (K, NY, U). *Sapende, Lanjouw & Lindeman* H 59 (U). *South of Paramaribo, Lindeman* 4526 (U). *Donder Kreek, Lindeman* 7126 (U). "Tibiti savanne," *Lanjouw & Lindeman* 1710 (NY, U). *Jodensavanne, Suriname R., Heyligers* 295 (US).

BRITISH GUIANA: Without exact locality, *Jenman* 6569 (K). *Membaru Creek, upper Mazaruni R., Pinkus* 206 (F, G, GH, IAN, MO, NY, S, US). 6 miles east of *Atkinson Field, Irwin* 189 (US). *Upper Demerara R., Jenman* 4171(K). *Demerara R., Jenman* 6299 (K). *Imbaimadai savannas, upper Mazaruni R., Maguire & Fanshawe* 32247 (NY). *Malali, Demerara R., De La Cruz* 2662 (F, GH, MO, NY, US). *Hariva Quarry, 32 miles south of Mackenzie, Cowan* 39274 (NY). *Partang Rapids, Partang R., Maguire, Tillett & Tillett* 43858 (NY, US). *Kamantin Creek, Wiruni R., For. Dept. B.G. no. 2604 [D 563] (K)*. *Orealla savannah, Courantyne R., For Dept. B.G. no. 5383 [Field no. 2595] (K)*.

BRAZIL: AMAZONAS: *Manaus, Ducke* 1194 (K, MG, MO, NY, R, SI, US), [MG no.] 11195 (MG). *Barreira do Baracari, Rio Uatumã, Rodrigues* 212 (US). PARÁ: *Faro, Ducke [MG no.] 8697 (F fragment & photo ex MG, FM neg. 28239 ex G, G, MG syntype of O. trifoliolata), [MG no.] 15797 (BM, FM neg. 28239 ex G, G, MG, P, R, S, U, US), [RB no.] 5695 (K, RB)*. *Rio Mapuera, Ducke [MG no.] 9118 [= RB no. 566] (BM, F fragment & photo ex MG, MG syntype of O. trifoliolata, RB)*.

LOCAL NAMES: *Barakaro [Arawak] (British Guiana; Surinam); barakaroe, barakaroe ibiberoe, barakaroe karabandikoro, ibikoro barakaro [Arawak]; koenakoko, woitjano anakoko [Carib]; kokriki, kokrikie, sabana kokrikie, savanne-kokrikie (Surinam). Tento (Brazil)*.

The leaves of *O. costulata* are sometimes difficult to distinguish from those of *O. paraensis* and *O. coccinea* var. *subsimplax*, but the relatively small, thin-valved fruits are distinctive.

Reduction in number of leaflets to one, or three, the basis for separating *O. trifoliolata*, is not believed to be sufficiently significant

for specific delimitation, especially since the other characters appear to be constant.

30. *Ormosia jamaicensis* Urb. Symb. Ant. 5:366. 1908.

FIGURE 8

Tree, to about 25 m. tall; stipules not seen; young stems moderately fulvo-puberulent, glabrescent; leaves 9- or 11-foliolate, the axis about 10–25 cm. long, puberulent to subglabrous, the petiole 4–8 cm. long, the pairs of leaflets 3–5 cm. apart, the petiolules 5–7 mm. long, 1.5 mm. in diameter, the blades subcoriaceous, ovate to oblong-lanceolate, 4–14 cm. long, 2–7 cm. wide, acuminate, the base rounded, the upper surface glabrous, subnitid, the lower surface puberulent along the midvein, otherwise minutely and sparsely pubescent with fulvous, appressed hairs, the secondary veins moderately raised, about 12–18 pair, essentially parallel, 5–10 mm. apart, forming angles of about 50° with the midvein; inflorescences with axes minutely fulvo-velutinous, sometimes glabrescent, the bracts linear, attenuate, 2–6 mm. long, 1 mm. broad or less at the base, the bracteoles filiform, 1–2 mm. long; flowers 11–14 mm. long; calyx fulvo- to ferrugino-velutinous, about 7–9 mm. long, the tube 3–5 mm. long, 5 mm. in diameter, the teeth 3–4 mm. long; corolla rose-purple; fruit dehiscent, coriaceous, nitid, black or brown, glabrous or sparsely and minutely appressed-pubescent, 1- or 2-seeded, about 5–6 cm. long, 2.5–3 cm. broad, 1.5 cm. thick, the valves 1–2 mm. thick; seeds red with a black line along the chalazal edge, 15–17 mm. long, 15–17 mm. broad, and 10–11 mm. thick, the hilum about 3 mm. long and 1.5 mm. wide.

TYPE LOCALITY: Jamaica, Hanover Parish, along road from Askenish to Dolphin Head, at 400–530 m. elevation. Type collected by W. Harris (no. 9241), cited below.

DISTRIBUTION: Known only from the general area of the type collection, on Dolphin Head, at about 300–540 m. elevation.

JAMAICA: HANOVER PARISH: Dolphin Head, *Harris* 9241 (NY isotype); *Britton & Hollick* 2210 (F, NY); *Barton & Spence* s.n. (IJ, NY, US); *Barton* s.n. (IJ, US fragment); *Proctor* 10406 (IJ), 10414 (IJ, NY, US); *Stearn* 145 (A, BM, K).

LOCAL NAME: Nickel, a corruption of necklace.

This species not only is geographically isolated, with a very restricted range, but is so distinct from its putative relatives that its origin is obscure. Superficially, *O. jamaicensis* most resembles a glabrous-fruited form of *O. monosperma*, and, perhaps, is more closely related to that species than members of the *Coccineae*.

31. *Ormosia smithii* Rudd, sp. nov.

FIGURE 8

Arbor usque ad 20 m. alta; ramuli novelli fulvo- vel pallido-velutini; stipulae minutae, deltoideae, circiter 2 mm. longae, basi 0.5 mm. longae, caducae; folia 5–9-foliolata, axi 9–22 cm. longo, fulvo-velutino,

petiolo 4–8 cm. longo, jugis inter sese 2–5 cm. distantibus, foliolis cum petiolulis 5–10 mm. longis et 2–2.5 mm. diametro, laminis coriaceis vel subcoriaceis, ovatis vel obovato-oblongis, (2–) 4–15 cm. longis, (1.5–) 2–6 cm. latis, acutis vel breviacuminatus, acumine ad 10 mm. longo, basi obtusis, supra glabris, subnitidis, subtus subtiliter pubescentibus vel suffarinosus, interdum venis maioribus tomentulosus, venis secundariis plus minus prominentibus, utrinsecus circiter 11–14, fere parallelis, inter sese 5–15 mm. distantibus, angulis venarum costaeque circiter 50°–60°; inflorescentiae cum axibus fulvo- vel cano-tomentulosus, glabrescentibus, bracteis linearibus, circiter 3 mm. longis et 1 mm. latis vel minus, bracteolis linearibus, circiter 1 mm. longis; flores 13–15 mm. longi, calyce pallido- vel fulvo-velutino, 6–7 mm. longo, tubo circiter 4 mm. longo et 4 mm. diametro, dentibus 2–3 mm. longo, petalis violaceis vel purpureis, vexillo macula alba notato; fructus dehiscens, sublignosus, glaber, nitidus, castaneus, nigratus, 1–5, communes 1-spermus, 2–5 (–10) cm. longus, 1.5 cm. latus, inter semina aliquanto constrictus, circiter 1.5 cm. crassus, valvulis 1–2 mm. crassis; semina bicolora, coccinea macula nigra notata, 12–14 mm. longa, 10–11 mm. lata, et 8–9 mm. crassa, hilo 2 mm. longo et 1 mm. lato.

Type in the U.S. National Herbarium, no. 1777602, collected in forest, Isherton, basin of the Rupununi River, British Guiana, November 11, 1937, by A. C. Smith (no. 2455). Isotypes at A, F, K, MO, NY, P, S, U, Y.

DISTRIBUTION: Southern British Guiana and the Rio Branco-Rio Negro region of Brazil, usually in forest along rivers.

ADDITIONAL SPECIMENS EXAMINED:

BRITISH GUIANA: Isherton, Rupununi R., A. C. Smith 2513 (A, F, G, MO, NY, P, S, U, US). "Banks of the Quitaro" [Kwitará R. ?], Schomburgk 580 (A, BM, BR, F, G, K, NY, P, US).

BRAZIL: RIO BRANCO: Porto Alegre, Rio Amajari, Fróes 23119 (IAN, NY, U). Between Fazendas Bom Intento and Capela, Black 51-13226 (IAN, NY, P). Igarapé Caraná, Black 51-12779 (IAN, NY). Anno Bom, Kuhlmann [RB no.] 3133 (S, U, US). Maruay, Rio Surumú, Luetzelburg [Exped. Rondon] 21194 (M). AMAZONAS: Rio Negro between Barcelos and Santa Isabel, Spruce 1958 (BM, G, GH, K, M, NY, P). Barcelos, Fróes 33853 (IAN); Ducke [MG no.] 7168 b (BM, MG). Santa Isabel, Krukoff 12103/15066 (A, F, NY, US). "Ad Rio Negro," Spruce 3785 (BM, BR, G, K, NY, P). Ilha Nova Vida, upper Rio Negro, Baldwin 3267 (US). Tapera, Rio Preto, Fróes 22438 (U, VEN).

Although the fruit and seeds of *O. smithii* are entirely different from those of *O. excelsa*, the pallid pubescence of the floral axes is similar. Two specimens here assigned to *O. smithii* (Spruce 1958 and 3785) were cited by Bentham (Fl. Bras. 15 (1) : 317. 1862) as *O. coccinea*, which is similar in seed characters but otherwise differs in many respects, as indicated in the key and descriptions. Ducke (Ann.

Acad. Bras. 11 : 189. 1939) identified collections of *O. smithii* (Ducke 7168 and Kuhlmann 3133) as *O. discolor*, apparently on the basis of table 126 in Flora Brasiliensis (15(1). 1862), which, unfortunately, does not accurately represent *O. discolor*.

**Series 6. Nobiles** Rudd, ser. nov.

Arbores; fructus dehiscens, valvulis coriaceis, brevissimo-velutinis, sericeis, vel suffarinosi, nonnumquam glabrescentibus; semina irregulariter bicolores, coccinea macula nigra variegata, nonnumquam in ipsissimo legumine nunc semina unicolora coccinea nunc fere unicolora nigra; hilo elliptico 1–3 mm. longo.

The chief characteristic of this series is the irregular marking of the seeds, with no two seeds exactly alike, this in contrast to the great degree of uniformity found in the seeds of other series. In the same pod of some species of this series there may be seeds entirely red to almost entirely black, with intermediates of varying patterns of red and black. When only one seed is present, it tends to be mostly red. The specimens illustrated are merely examples and do not show all of the possible sizes and patterns.

The type of this series is *O. nobilis* Tul.

**32. Ormosia krugii** Urb. Symb. Ant. 1 : 320. 1899.

FIGURE 11

Tree, to about 25 m. tall; young stems finely aureo to fulvo-sericeous; stipules not seen; leaves 5–9-foliolate, the axis finely velutinous or sericeous, about 20–50 cm. long, the petiole 7–28 cm. long, the pairs of leaflets 6–16 cm. apart, the petiolules 8–20 mm. long, 3–5 mm. in diameter, the blades subcoriaceous, elliptic to suborbicular, (9–) 14–23 cm. long, (5–) 8.5–20 cm. wide, the terminal leaflet sometimes obovate, the apex obtuse, sometimes breviacuminate, the acumen about 10 mm. long or less, the base rounded to subcordate, the upper surface glabrous, subnitid, the lower surface moderately sericeous or subsericeous, sometimes glabrate, the secondary veins about 14–20 pair, essentially parallel, mostly 10–20 mm. apart, forming angles of 50°–60° with the midvein; inflorescences with the axes aureo- to ferrugino-sericeous or finely velutinous; the bracts and bracteoles deltoid, 1 mm. long or less; flowers 15–18 mm. long; calyx 10–12 mm. long, ferrugino-sericeous, the tube 5–7 mm. long, 7 mm. in diameter, the teeth 3–6 mm. long; petals brownish to blackish purple, the standard with a white center; fruit dehiscent, coriaceous, brown, fulvo- or ferrugino-sericeous, glabrescent, sometimes somewhat reticulate rugose, 1–6-seeded, 3–10 cm. long, (1.5–) 2–2.7 cm. broad, submoniliform, about 1.5 cm. thick; seeds red, or bicolored red and black, the markings variable in shape and proportion, 10–13 mm.

long, 12–13 mm. broad, 9–10 mm. thick, the hilum about 3 mm. long and 1.5 mm. wide.

TYPE LOCALITY: "Prope Juncos in monte Guvuy," Puerto Rico. Lectotype collected by P. Sintenis (no. 1886), cited below.

DISTRIBUTION: In rain forest, Puerto Rico, Hispaniola, and the Lesser Antilles, at elevations of 100–880 meters.

HAITI: Massif du Nord, Mt. Organisé, *Ekman* 6232 (A, F, G, IJ, S, US).

DOMINICAN REPUBLIC: Duarte, Matanzas, *Ekman* 15890 (K, NY, S, US). La Cumbre, *Ekman* 11422 (S), 12425 (S). Liali, *Abbott* 2658 (US). La Vega, Piedra Blanca, *Allard* 18841 (US). La Cidra, *Jiménez, Gonzales, & Marcano* 2953 (US).

PUERTO RICO: Juncos, *Sintenis* 1886 (BM, F, G, GH, K, M, MO, NY, S, SI, US lectotype). "Sierra de las Piedras in Monte Francés," *Sintenis* 5336 (BM, BR, F, G, GH, K, M, NY, P, S, UC, US). "Sierra de Lares ad Guajataca," *Sintenis* s.n. (A). Sierra de Yabucoa, *Sintenis* 2587 (P). "Prope Utuado ad Roncador," *Sintenis* 6509 (BR, K, POM, UC). Fajardo, Río Arriba, *Britton & Shafer* 1695 (F, NY, US). Bayamón, *Stahl* 319 (F, S). Manatí, *Hess* 4105 (NY). Sierra de Naguabo, *Shafer* 3167 (K, NY). Maricao, *Britton, Cowell, & Brown* 4465 (F, NY, US); *Schubert, Winters, & Veléz* 334; *Schubert & Winters* 334 a (US). Luquillo Mts., *Britton & Brunner* 7670 (NY, US); *Kramer* 10 (Y). Luquillo Forest, *Hess* 5376 (NY).

GUADELOUPE: Ste. Rosa, *Stehlé & Quentin* 5680 (US). Petit Bourg, *Questel* 2488 (P, US).

DOMINICA: Castle Bruce, *Ramage* s.n. (BM, K). Riversdale, *Beard* 240 (A, K, MO, NY, U, UC), 659 (A, K, MO, NA, NY, U, UC).

LOCAL NAMES: Bois nan-non (Haiti); palo peronia, peronila, peonia (Dominican Republic); matos, palo de matos, mosongo (Puerto Rico); caconnier, caconnier blanc (Dominica; Guadeloupe).

This taxon is obviously so closely related to the varieties of *O. nobilis*, especially var. *santaremnensis* and var. *bolivarensis*, as to suggest that it might be correct to treat it as a fourth variety of that species. However, in view of the geographic separation, our inadequate knowledge of *O. nobilis*, sens. lat., and the distinguishing characters summarized in the key, it has been decided to maintain the status quo of *O. krugii*.

From the numerous sheets of syntype material cited above, viz the collections made by Sintenis, Stahl, and Ramage, I have chosen as lectotype a fruiting specimen, *Sintenis* no. 1886, at US; in this species the fruit and seeds provide better diagnostic characters than do the flowers. The specimens studied at Berlin by Urban presumably are no longer extant, hence the designation of the US sheet

33. *Ormosia nobilis* Tul. Arch. Mus. Par. 4 : 106. 1844.

FIGURE 1:

Tree, to about 40 m. tall; young stems fulvo-sericeous or subsericeous; stipules deltoid, about 1 mm. long; leaves 3–11-foliolate, the axis 8–70 cm. long, finely velutinous, glabrate, the petiole 4–20 cm. long, the pairs of leaflets 2–35 cm. apart, the petiolules 8–30 mm. long, 2–5 mm



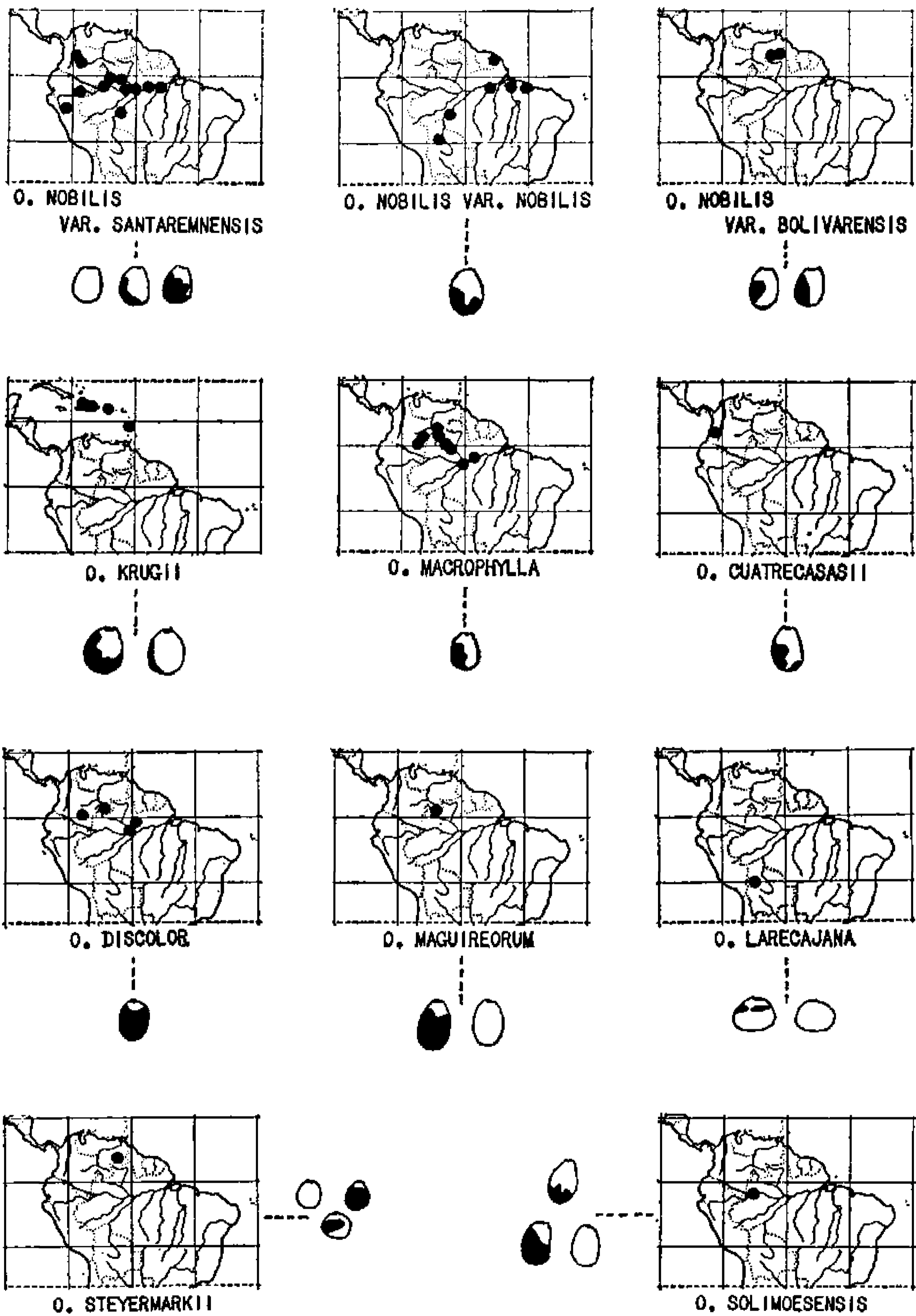


FIGURE 11.—*Ormosia* section *Ormosia* series *Nobiles*, in part: Geographic distribution of species; seeds of *O. nobilis* var. *santaremnensis*, *O. nobilis* var. *nobilis*, *O. nobilis* var. *bolivarensis*, *O. krugii*, *O. macrophylla*, *O. cuatrecasatii*, *O. discolor*, *O. maguireorum*, *O. larecajana*, *O. steyermarkii*, and *O. solimoensis*, all  $\times \frac{1}{2}$ .

in diameter, the blades coriaceous or subcoriaceous, elliptic to elliptic-oblong, sometimes ovate or obovate, 5–35 cm. long, 2–20 cm. broad, the apex acute to breviacuminate, the acumen to 1 cm. long, the base obtuse to subcordate, the upper surface glabrous, nitid or subnitid, the lower surface aureo- or fulvo-sericeous, the secondary veins conspicuous or only moderately raised, about 10–20 pair, essentially parallel, 2–35 mm. apart, forming angles of 50°–70° with the midvein, the tertiary reticulations sometimes prominent; inflorescences with axes fulvo- to ferrugino-sericeous, the bracts deltoid, acute, 1–2 mm. long, the bracteoles 1 mm. long or less; flowers 15–22 mm. long; calyx (8-) 10–15 mm. long, fulvo- or ferrugino-sericeous, the tube 5–10 mm. long, 6–8 mm. in diameter, the teeth 3–5 mm. long; petals dark purple, the standard usually with a white spot; fruit dehiscent, coriaceous, finely fulvo- or ferrugino-sericeous, usually glabrate, light or dark brown, about 2.5–7.5 cm. long, 1.5–2.2 cm. broad, 1–6-seeded, submoniliform, about 1 cm. thick, the valves about 1 mm. thick; seeds red, or red and black, usually varying, sometimes within the same pod, from all red to almost all black, 8–11 mm. long, 7–10 mm. wide, 5–8 mm. thick, the hilum 1.5–2.5 mm. long and 1–1.5 mm. wide.

**33a. *Ormosia nobilis* Tul. var. *nobilis***

FIGURE 11

*Ormosia nobilis* Tul. Arch. Mus. Par. 4 : 106. 1844.

The typical variety is characterized by leaves commonly with 7 or 9, sometimes only 5, large, coriaceous leaflets, densely sericeous below, with 10–15 pair of secondary veins spaced about 10–35 mm. apart, forming angles of 60°–70° with the midvein, the tertiary reticulations often prominent; flowers usually 18–22 mm. long.

TYPE LOCALITY: Pará, Brazil, without further data, cited below.

DISTRIBUTION: In forest of coastal French Guiana; Bolivia; middle and lower Amazon basin of Brazil.

FRENCH GUIANA: Gourdouville, *Benoist* 1611 (P).

BRAZIL: PARÁ: Without exact locality and collector (F fragment, probably of type ex P, P type collection?). Belém, *Ducke* [RB no.] 15492 (K, RB, S, U), [MG no.] 15814 (MG), [MG no.] 16189 (BM, G, MG, US), [MG no.] 17033 (BM, MG, R, US); *Dahlgren & Sella* 688 (F, US); *Guedes* 304 (US), 335 (IAN, US). Bragança, *Ducke* [RB no.] 17098 (RB, S, U, US), [RB no.] 1709 (RB). Vigia, Ilha de Colares, *Black* 54–16888 (US). Santarém, *Ducke* [RB no.] 5096 (K, S, U, US). MARANHÃO: Estrada do Pinheiro, *Frões* [*Krukoff*] 11984/1502 (A, NY, US). AMAZONAS: Humaitá, *Krukoff* 7085 (A, BR, F, K, M, MO, NY, S, U, US). Basin of Rio Madeira, *Lobo* [*Krukoff* Herb. no.] 15463 (NY). Barcelos, Rio Negro, *Ducke* [RB no.] 35175 (G, K, P, RB, S, U, US); *Frões & Addison* 29319 (IAN).

BOLIVIA: "Moro Yungas," *Pearce* s.n., January 1866 (K).

LOCAL NAMES: Mulungu, tenteiro, tento, tento das campinas.

**33b. *Ormosia nobilis* var. *bolivarensis* Rudd, var. nov.**

FIGURE 11

A varietate typica foliolis minoribus, venis tertiariis inconspicuis, calyce breviori, densiter fulvo-sericeo (floribus completis non visis), fructibus maturis breviter fulvo-sericeis, minus glabrescentibus differt.

The leaves are 3–9, predominantly 5–9-foliolate as in the typical variety, but with the leaflets averaging smaller in size, about 10–18 cm. long, coriaceous or subcoriaceous, minutely and densely fulvo-sericeous below, with 10–15 pair of secondary veins, 5–20 mm. apart, forming angles of 60°–70° with the midvein.

Type in the U.S. National Herbarium, no. 1833230, collected in “selvas del valle del Canaracuni,” Bolívar, Venezuela, December 29, 1941, by F. Cardona (no. 405). Isotypes at UC and VEN.

DISTRIBUTION: In rain forest, southern part of the state of Bolívar, Venezuela and adjacent British Guiana, at elevations of about 300–500 meters.

## ADDITIONAL SPECIMENS EXAMINED:

BRITISH GUIANA: Kako River, *Tillett & Tillett* 45476 (NY, US).

VENEZUELA: BOLÍVAR: Río Ayaiche, headwaters of Río Chicanán, Sierra de Lema, *Steyermark* 89475 (US, VEN). Sierra Ichún, *Steyermark* 90344 (US, VEN). Icabarú, *Bernardi* 6665 (NY).

**33c. *Ormosia nobilis* var. *santaremnensis* (Ducke) Rudd, comb. nov.**

FIGURE 11

*Ormosia santaremnensis* Ducke, Arch. Jard. Bot. Rio de Janeiro 4 : 63. 1925.

*Ormosia feroensis* Ducke, Arch. Jard. Bot. Rio de Janeiro 4 : 64. 1925.

The leaves tend to have more leaflets than those of the typical variety, usually 9 or 11, narrower, subcoriaceous, more closely spaced on the axis, the blades less densely pubescent on the lower surface, the secondary veins commonly about 12–20 pair, 2–10 mm. apart, forming angles of 50°–60° with the midvein; the flowers average somewhat smaller than in the typical variety, about 15–20 mm. long.

TYPE LOCALITY: Near Santarém, Pará, Brazil. Type collected by Ducke [MG no. 16718], cited below.

DISTRIBUTION: In “terra firma,” clay or sandy soil, in “restinga” and secondary forest, middle to upper Amazon basin of Colombia, Peru, and Brazil.

COLOMBIA: CUNDINAMARCA: El Pénón, *García-Barriga* 12475 (US). META: San Martín, *Uribe-Urbe* 1611 (US).

PERU: SAN MARTÍN: north of Uchiza, *Schunke* 5783 (US). LORETO: Iquitos, San Juan Nuevo, *Ducke* 1818 [MG no. 18129] (F, MG, NY, R, RB, US).

BRAZIL: PARÁ: Santarém, *Ducke* [MG no.] 16718 (BM, G, MG type of *O. santaremnensis*, P, R, RB, US). Faro, *Ducke* [MG no.] 15912 [RB no. 15494, in part, as to flowers] (BM, G, K, MG type of *O. feroensis*, P, R, RB, S, U, US). AMAZONAS: Manaus, *Ducke* 664 [MG no. 18121] (F, K, MG, MO, NY, R, SI, UC, US), [RB no.] 23365 (K, NY, P, RB, S, U, US). São Paulo de Olivença,

*Ducke* [RB no.] 20363 (RB); *Krukoff* 8986 (A, BM, BR, K, MO, NY, S, U, US). Codajás, *E. Ferreira* 58-237 (IAN). Rio Tonantins, *Fróes* 12184/95 (A, DS, NY, U, US), 12211/124 (A, F, NY, SI, US), 12234/126 (A, F, NY, US). Tonantins, above Villa Velha, *Ducke* (IAN no.) 125 (IAN, US). Rio Uaupés, *Fróes* 12564/288 (A, CAS, DS, F, POM). "Porto Curucuhy," Rio Negro, *Fróes* 21107 (F, K, M, NY, U, US). Moura, Rio Negro, *Krukoff* 12102 (A, NY, US). Humaitá, Cipoal, *Krukoff* 7194 (K, U, US). Parintins, *Pires & Black* 1145 (IAN). Rio Tiquié, *Pires* 1012 (IAN).

LOCAL NAMES: Chocho, peonía (Colombia); mulungu, tento (Brazil); huayuro hembra (Peru).

In his original description of *O. santaremnensis* Ducke noted the close affinity of that species to *O. nobilis*, and on the next page described *O. faroensis* as being closely related to *O. nobilis* and *O. santaremnensis*. Later (Ann. Acad. Bras. Sci. 11:190. 1939) he reduced *O. faroensis* to synonymy under *O. santaremnensis*. Had he not published that reduction, I should have preferred to reverse the relationship, making *O. santaremnensis* the synonym; the type of *O. faroensis* is a little more distinct and representative of the variety as a whole, whereas the type of *O. santaremnensis* better shows the transition to the typical variety of *O. nobilis* and to var. *bolivarensis*.

**34. *Ormosia macrophylla* Benth. Ann. Wien. Mus. 2:88. 1838. FIGURE 11**

Tree, to about 10 m. high; young stems minutely aureo- or fulvo-sericeous; stipules not seen; leaves 5-9-foliolate, the axis 15-30 cm. long, minutely fulvo-velutinous, the petiole 5-15 cm. long, the pairs of leaflets about 4-7 cm. apart, the petiolules 10-15 mm. long, 3-4 mm. in diameter, the blades coriaceous, broadly ovate or sometimes elliptical, 4-21 cm. long, 3-13 cm. broad, the apex obtuse to brev acuminate, the acumen to about 10 mm. long, the base usually cordate, sometimes rounded, the upper surface glabrous, nitid, the lower surface densely aureo-sericeous, the secondary veins moderately raised, about 10-20 pair, essentially parallel, 5-10 mm. apart, forming angles of 70°-75° with the midvein, the tertiary veins inconspicuous; inflorescences with axes fulvo- to ferrugino-velutinous, the bracts and bracteoles deltoid, acute, about 1 mm. long or less; flowers 17-27 mm. long; calyx fulvo- or aureo-sericeous, about 10-15 mm. long, the tube 5-8 mm. long, 6 mm. in diameter, the teeth 5-7 mm. long; petals brownish to dark purple; fruit dehiscent, coriaceous, fulvo-sericeous to dark brown, glabrate, sometimes reticulate-rugose, 1-6-seeded, 2-8 cm. long, (1.3-) 1.8-2 cm. broad, submoniliform, about 1 cm. thick, the valves 1.5-2 mm. thick; seeds red or red and black, sometimes varying within the same pod, 8-9 mm. long, 7-8 mm. broad, 6 mm. thick, the hilum 1.5-2 mm. long and 1 mm. wide.

TYPE LOCALITY: "In campis ad montes Araracoara provinciae Rio Negro Brasiliae" [Colombia], in the region of the upper Japurá river. Type collected by Martius, cited below.

DISTRIBUTION: Gallery woods, scrub forest, savanna, or caatinga, in sandy soil at elevations up to about 400 meters, southern Venezuela, and upper Amazon basin of Colombia and Brazil.

VENEZUELA: AMAZONAS: Santa Rosa, *Fróes* 12384/143 (A, DS, F, NY, POM), 12385/144 (A, DS, F, NY), 12386/145 (A, DS, F, NY). Near Yapacana, northwest base of Cerro Yapacana, *Maguire & Wurdack* 34486 (F, NY, S, US, VEN), 34491 (K, NY, VEN). Río Siapa, Caño Hechimoni, *Maguire, Wurdack & Bunting* 37650 (NY, VEN). Río Pacimoni, *Maguire, Wurdack, & Bunting* 37603 (F, NY, S, US, VEN); *Maguire, Wurdack, & Maguire* 41668 (K, NY, US).

COLOMBIA: VAUPÉS: Río Kananarí, Cerro Isibukurí, *Schultes & Cabrera* 14533 (US). Río Negro, Piedra de Cocuí, *Schultes & Lopez* 9503 (US). Raudal de Yuruparí, *Schultes & Cabrera* 19747 (NY, US). AMAZONAS: Araracuara, *Martius* s.n. (F.M. Neg. 6278 ex M, M type); *Maguire, Maguire, & Fernandez* 44171 (K, NY, US).

BRAZIL: AMAZONAS: Preto, Rio Negro, *Fróes* 22765 (IAN, NY, U, US, VEN). Ca-te-espera, São Gabriel, *Fróes* 12380/139a (A, DS, F, NY). PARÁ: Lago de Faro, near Serra do Dedal, *Ducke* [MG no.] 8613 (BM), [RB no.] 11429 (K, RB, S, U, US). Borba, *Ducke* 230 [RB no. 35177], July 7, 1936 (A, F, G, K, MO, NY, P, R, RB, S, U, US), 230 II, August 25, 1942 (MG, SI, US).

LOCAL NAMES: Tento (Venezuela; Brazil).

This species, like *O. krugii*, is closely related to *O. nobilis* and its varieties. In leaf characters it also shows considerable similarity to *O. cuatrecasasii* and *O. discolor*.

### 35. *Ormosia cuatrecasasii* Rudd, sp. nov.

FIGURE 11

Arbor circiter 8 m. alta vel plus; ramuli novelli aureo-sericei; stipulae deltoideae, acutae, 1 mm. longae vel minus; folia 7-9-foliolata, axi sericeo, (10-) 20-25 cm. longo, petiolo (3-) 8-9 cm. longo, jugis inter sese 3-5 cm. distantibus, petiolulis 10-13 mm. longis, 4 mm. diametro, laminis coriaceis, ellipticis vel ovatis, 7-24 cm. longis, 4-11 cm. latis, apice acuminatis, acumine 10-30 cm. longo, basi obtusis vel subcordatis, supra glabris, nitidis vel subnitidis, subtus densiter aureo-sericeis, pilis brevissimis, venis secundariis mediocriter elevatis, utrinsecus 11-14, fere parallelis, inter sese 7-20 mm. distantibus, angulis venarum costaeque 55°-60°, venis tertiariis inconspicuis; inflorescentiae cum axibus subtiliter aureo- vel ferrugino-velutinis; bractee deltoideae, acutae, 1-2 mm. longae, bracteolis deltoideis, acutis, 1 mm. longis vel minus; flores completi non visi; calyx subtiliter ferrugino-sericeus, circiter 10 mm. longus, tubo 6-7 mm. longo, 7 mm. diametro, dentibus 3-4 mm. longis; fructus dehiscens, coriaceus, sublignosus, marginatus, subtiliter fulvo- vel ferrugino-velu-

tinus, glabrescens, brunneus, 1-6-spermus, 5-10 cm. longus, 2-2.5 cm. latus, 0.8 cm. crassus, valvulis circiter 1-2 mm. crassis; semina coccinea vel bicolora coccinea macula nigra notata, 10-11 mm. longa, 9-10 mm. lata, 7 mm. crassa, hilo 3 mm. longo et 1.5 mm. lato.

Type in the U.S. National Herbarium, no. 1900636, collected near the Pacific coast, at 0-10 meters elevation, Bahía de Buenaventura, Quebrada de San Joaquín, Departamento del Valle, Colombia, February 22, 1946, by J. Cuatrecasas (no. 19914). Isotypes at F, US, and Y.

DISTRIBUTION: Known only from woods on the western slope of the Cordillera Occidental, Colombia, at elevations of 0-1000 meters.

ADDITIONAL SPECIMEN EXAMINED:

COLOMBIA: VALLE: Río Digua, Piedra de Moler, Cuatrecasas 15129 (F, US).

Superficially, this species resembles *O. macrophylla* and some specimens of *O. nobilis*. However, it differs from those taxa in various characters, as summarized in the key, and, geographically, its location indicates a long period of separation.

36. *Ormosia discolor* Spruce ex Benth. in Mart. Fl. Bras. 15(1) : 318. 1862.

FIGURE 11

*Ormosia micrantha* Ducke, Arch. Inst. Biol. Veg. Rio de Janeiro 4 : 21. 1938.

Tree, to about 18 m. high; young stems fulvo- or ferrugino-velutinous, glabrescent; stipules not seen; leaves (3-) 5-7-foliolate, the axis 5-18 cm. long, finely velutinous, glabrescent, the petiole 3-10 cm. long, the pairs of leaflets 2-6 cm. apart, the petiolules 5-25 mm. long, 1.5-4 mm. in diameter, the blades coriaceous, ovate to oblong, 7-30 cm. long, 4-12 cm. broad, acuminate, the acumen to about 1-1.5 cm. long, the base rounded to subcordate, the upper surface glabrous, nitid, the lower surface finely fulvo-sericeous, the secondary veins inconspicuous, about 20-50 pair, essentially straight and parallel, 2-10 mm. apart, forming angles of 70°-75° with the midvein; inflorescences with axes minutely fulvo- or ferrugino-velutinous, the bracts linear-deltoid, 2-4 mm. long, the bracteoles deltoid, scarcely 1 mm. long; flowers 6-8 mm. long; calyx fulvo- to ferrugino-velutinous, 4-6 mm. long, the tube 2.5-4 mm. long and about 3 mm. in diameter, the teeth deltoid, 1.5-3 mm. long; corolla blackish purple; fruit dehiscent, coriaceous, minutely fulvo- to ferrugino-velutinous, usually 1- or 2-seeded, 2-5 cm. long, 1.5-2 mm. wide, 1 cm. thick, the valves about 1 mm. thick; seeds red, or red with irregular black markings, 9-11 mm. long, 8 mm. broad, and 6 mm. thick, the hilum about 1.5 mm. long and 1 mm. wide.

TYPE LOCALITY: "Barra do Rio Negro" [Manaus], Amazonas, Brazil. Type collected by R. Spruce (no. 1506), cited below.

**DISTRIBUTION:** In forest, "terra firme," "arenoso, capoeira fechada, alta," upper Amazon basin of Colombia, Venezuela, and Brazil.

**COLOMBIA:** VAUPÉS: Río Apaporis, Cachivera de Jirijirimo, *Schultes & Cabrera* 12952 (NY, US).

**VENEZUELA:** AMAZONAS: Río Casiquiare at mouth of Río Pacimoni, *Spruce* 3408 (BR, C, F fragment, F. M. Neg. 21899 ex C, G, GH, K, NY, P). Río Yatua, *Wurdack & Adderly* 43432 (NY, US).

**BRAZIL:** AMAZONAS: "Barra do Rio Negro" [Manaus], *Spruce* 1506 (BM, G, GH, K type, M, NY, P). Manaus, Cachoeira do Mindú, *Ducke* 547 [in fruit] and 35084 [RB no., in flower] (A, F, G, K, MO, NY, P, S, U, US, composite sheets, isosyntypes of *O. micrantha*). Manaus, Cachoeira alta do Tarumã, *Chagas* [INPA no.] 948 (MG). Manaus, Igarapé do Binda, *Coelha* [INPA no.] 3839 (IAN, US). Rio Urubú, Pedra Branca, *Próes* 25269 (IAN, US), 25397 (IAN).

**LOCAL NAMES:** Mulungū, tenteiro (Brazil).

This species is readily recognizable by its small flowers and leaflets with numerous lateral veins. Specimens of *Wurdack & Adderly* 43432 have larger and glossier leaflets than the other collections cited, but otherwise they seem to be comparable.

According to Egler (Bol. Mus. Par. Emílio Goeldi, II. 18:63. 1963) the type, actually a lectotype, of *Ducke's O. micrantha* is RB no. 35084, which is a flowering specimen, presumably at RB. *Ducke* cited two collections in his original description, one in flower, the other in fruit; composite specimens with material of both collections have been distributed to various herbaria, sometimes as one number, sometimes as the other, or with both numbers. Since the material is essentially identical to the collections by *Spruce* cited above, including the type of *O. discolor*, *O. micrantha* falls into synonymy and the designation of its holotype becomes relatively unimportant. *Ducke* apparently based his concept of *O. discolor* on the illustration, table 126, in *Flora Brasiliensis*, which is misleading as to venation of the leaflets; his misinterpretation, as indicated by specimens that he annotated as *O. discolor*, prompted him to describe his material of true *O. discolor* as the new species, *O. micrantha*.

37. *Ormosia revoluta* Rudd, sp. nov.

FIGURE 12

Arbor magna; ramuli novelli ferrugino-tomentosi; stipulae deltoideae, 2–3 mm. longae, basi 2 mm. latae; folia 3–7-foliolata, axi velutino 6–18 cm. longo, petiolo 4–6 cm. longo, jugis inter sese 3–5 cm. distantibus, petiolulis circiter 5 mm. longis et 3 mm. diametro, laminis coriaceis, ellipticis vel ovato-ellipticis, 7–16 cm. longis, 3–7 cm. latis, apice acutis, basi obtusis, marginibus fortiter revolutis, supra glabris, nitidis, venis impressis, subtus densiter velutinis, pilis nonnihil crispis, venis secundariis fortiter elevatis, utrinsecus 12–16, fere parallelis, inter sese 5–10 mm. distantibus, angulis venarum costaeque

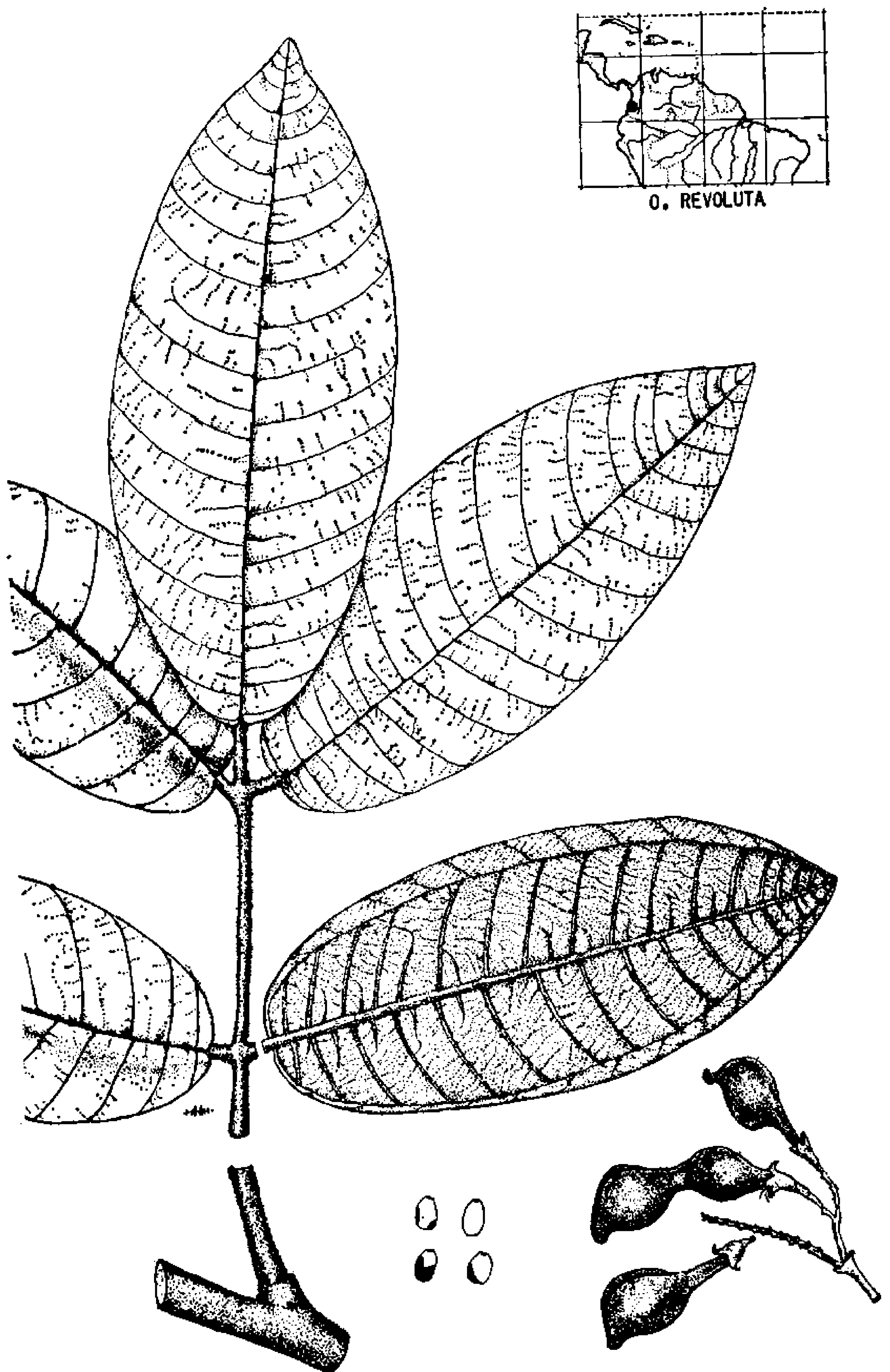


FIGURE 12.—*Ormosia* section *Ormosia* series *Nobiles*, in part: *O. revoluta*: Geographic distribution; portion of leaf, seeds, and fruit,  $\times \frac{1}{2}$ .



circiter 70°, venis tertiariis fortiter reticulatis; inflorescentiae cum axibus ferrugino- vel fulvo-tomentosis, bracteis bracteolisque caducis, non visis; flores completi non visi; calyx fulvo-tomentosus, 6–7 mm. longus, tubo 4 mm. longo et 4 mm. diametro, dentibus 2–3 mm. longis; fructus (submaturus) dehiscens, coriaceus vel sublignosus, fulvo-tomentosus, 1–3-spermus, 3–5 cm. longus, 1.5–2 cm. latus, circiter 1 cm. crassus, valvulis vix 1 mm. crassis; semina coccinea macula nigra, irreguliter notata, circiter 8 mm. longa, 8 mm. lata, et 7 mm. crassa, hilo elliptico 2–2.5 mm. longo et 1 mm. lato.

Type in the U.S. National Herbarium, no. 1852053, collected at Piedra de Moler, basin of the Río Digua, west slope of the Cordillera Occidental, El Valle, Colombia, August 27, 1943, by J. Cuatrecasas (no. 15198), at an elevation of 900–1180 meters. Isotypes at F.

DISTRIBUTION: Known only from the type collection.

The leaflets of the one collection cited above are more strongly revolute than in any other species treated in this paper. The pubescence of the leaflets and young fruit resembles that commonly seen on members of the series *Monospermae*. However, *O. revoluta* has irregularly marked seeds such as are characteristic of series *Nobiles*, and, I suspect that the fruit is potentially glabrescent.

38. *Ormosia maguireorum* Rudd, sp. nov.

FIGURE 11

Arbor 15–25 m. alta; ramuli novelli fulvo-velutini; stipulae non visae; folia 9-foliolata, axi velutino, 30–35 cm. longo, petiolo 10 cm. longo, jugis inter sese 6–7 cm. distantibus, petiolulis 10 mm. longis, 4 mm. diametro, laminis coriaceis, elliptico-ovatis, 16–22 cm. longis, 8–11 cm. latis, apice acutis, basi obtusis, supra glabris, nitidis, subtus densiter velutinis, pilis brevissimis, venis secundariis fortiter elevatis, utrinsecus 18–25, fere parallelis, inter sese 5–15 mm. distantibus, angulis venarum costaeque 70°–75°; inflorescentiae cum axibus fulvo-tomentosis, bracteis bracteolisque non visis; flores completi non visi; calyx velutinus, 6–8 mm. longus, tubo 3–4 mm. longo, 4 mm. diametro, dentibus 3–4 mm. longis; fructus dehiscens, coriaceus vel sublignosus, velutinus, 1–3-spermus, 2–5 cm. longus, 1.7–2.3 cm. latus, 1–1.3 cm. crassus, valvulis circiter 1 mm. crassis; semina coccinea vel bicolora coccinea macula nigra irreguliter notata, 10–12 mm. longa, 9–10 mm. lata, 8–9 mm. crassa, hilo 3 mm. longo et 1.5–2 mm. lato.

Type in the U.S. National Herbarium, no. 2267454, collected at Cañon Grande, Cerro de la Neblina, Río Yatua, Amazonas, Venezuela, December 26, 1957, by Bassett Maguire, John J. Wurdack, and Celia K. Maguire (no. 42530) at an elevation of 1100–1150 meters. Isotypes at NY.

DISTRIBUTION: Known only from the type collection.

The specimens of the collection cited above are distinct from any known species of *Ormosia* but exhibit enough similarities to indicate close relationship to other members assigned to the series *Nobiles*.

39. *Ormosia larecajana* Rudd, sp. nov.

FIGURES 11, 13

Arbor circiter 23 m. alta; ramuli novelli fulvo-tomentulosi; stipulae deltoideae, tomentulosae, circiter 2 mm. longae, basi 1.5–2 mm. latae; folia 7- vel 9-foliolata, axi velutino, 15–25 cm. longo, petiolo 5–8 cm. longo, jugis inter sese 3–7 cm. distantibus, petiolulis 8–13 mm. longis, 3–4 mm. diametro, laminis coriaceis, ellipticis, 7–17 cm. longis, 3–8 cm. latis, apice obtusi vel acuti, basi obtusi, marginibus nonnihil revolutis, supra glabris, nitidis, subtus dense tomentosus, venis secundariis elevatis, utrinsecus 10–12, fere parallelis, inter sese 5–20 mm. distantibus, angulis venarum costaeque circiter 70°–75°; inflorescentiae floresque completi non visi; calyx tempestate jactatus, incompletus, glabratus, circiter 4–6 mm. longus, 3–4 mm. diametro; fructus dehiscens, coriaceus, velutinus, 1–3-spermus, 1.5–4 cm. longus, 1.3–1.5 cm. latus, circiter 1 cm. crassus, valvulis vix 1 mm. crassis; semina coccinea vel bicolora coccinea macula nigra irregulariter notata, 8–10 mm. longa et lata, 6–8 mm. crassa, hilo elliptico, 2 mm. longo et 1–1.5 mm. lato.

Type in the U.S. National Herbarium, no. 1905696, collected at Copacabana, about 10 km. south of Mapiri, Province of Larecaja, La Paz, Bolivia, October 8–November 15, 1939, by B. A. Krukoff (no. 11049) at an elevation of 850–950 meters. Isotypes at A, F, G, K, MO, NY, S, U, Y.

DISTRIBUTION: Known only from the type collection.

This is another species with leaves that suggest relationship with members of series *Monospermae*. The decision to place *O. larecajana* in the series *Nobiles* is based on one seed from a sheet at K that shows irregular black spotting on an otherwise red surface. All other seeds of this collection that I have seen are completely red. The fruits are very similar to those of several other species being assigned to the *Nobiles*.

40. *Ormosia steyermarkii* Rudd, nom. nov.

FIGURE 11

*Ormosia microsperma* Pittier, Bol. Soc. Venez. Ci. Nat. 10 : 109. 1945, non Baker, 1878.

Tree, to about 17 m. high; young stems ferrugino-tomentulose; stipules deltoid, about 3 mm. long and 1.5 mm. broad at the base; leaves 3–7-foliolate, the axis 3–10 cm. long, tomentose, the petiole 2–5 cm. long, the pairs of leaflets 2–3.5 cm. apart, the petiolules 3–5 mm. long, 3 mm. in diameter, the blades coriaceous, ovate, 5–12 cm.

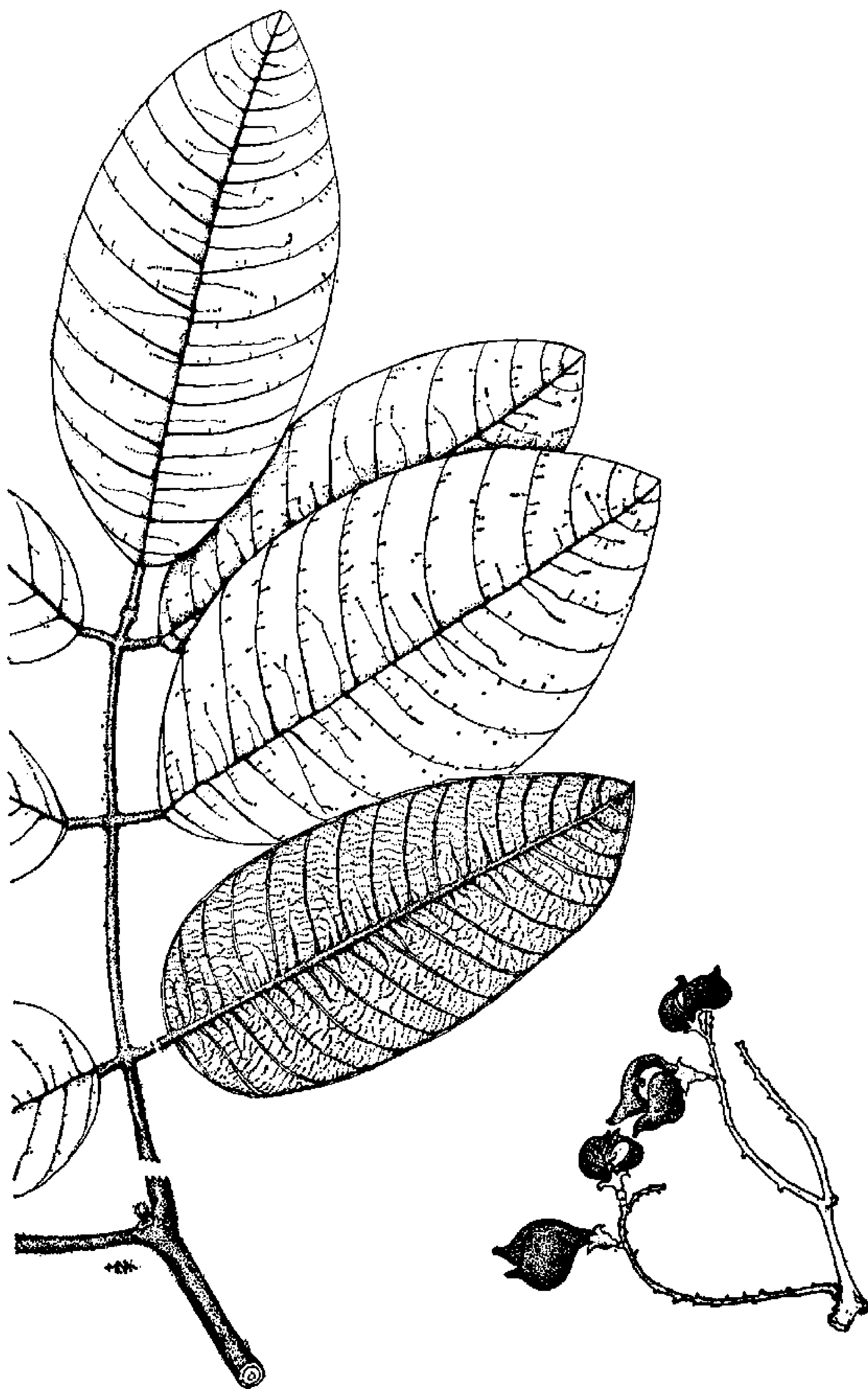


FIGURE 13.—*Ormosia* section *Ormosia* series *Nobiles*, in part: *O. larecajana*: fruit and portion of leaf,  $\times \frac{1}{2}$ .

long, 3.5–7 cm. broad, the apex acute to breviacuminate, the base obtuse to subcordate, the upper surface glabrous, nitid, the lower surface densely and minutely velutinous or subsericeous, the secondary veins prominent, about 10–13 pair, essentially parallel, 5–10 mm. apart, forming angles of about  $65^\circ$  with the midvein, the tertiary veins moderately raised; inflorescences with axes ferruginotomentulose; bracts and complete flowers not seen; bracteoles linear, about 1 mm. long; calyx ferrugino-velutinous, about 4 mm. long, the tube 2 mm. long and 3 mm. in diameter, the teeth 2 mm. long; fruit finely brown-velutinous, rugose, 1- or 2-seeded, 1–1.5 cm. broad, the valves chartaceous, less than 1 mm. thick; seeds bicolored, irregularly marked with red and black, or sometimes entirely red or almost entirely black, 7–8 mm. long, 8–10 mm. broad, and 7–8 mm. thick, the hilum orbicular, about 1 mm. in diameter.

TYPE LOCALITY: Río Pacairao, about 3 km. east of Santa Teresita de Kavanayén, Bolívar, Venezuela. Type collected by J. A. Steyermark (no. 60503), cited below.

DISTRIBUTION: Known only from Venezuela in the general vicinity of the type collection, at elevations of 1220–1615 meters.

VENEZUELA: BOLÍVAR: Kavanayén, *Steyermark* 60503 (F, MO, VEN type). Vicinity of Misia Kathy Camp, on mesa between Ptari-tepuí and Sororopán-tepuí, *Steyermark* 60266 (F, MO).

LOCAL NAMES: Mutare-yek (Arekuna), peonilla (Spanish).

The name given by Pittier was especially appropriate for this small-seeded species of *Ormosia*; unfortunately, it was a later homonym, the earlier *O. microsperma* being a Malaysian species. A new name has been chosen honoring the collector of the only specimens thus far known of this species.

41. *Ormosia solimoesensis* Rudd, sp. nov.

FIGURE 11

Arbor circiter 18 m. alta; ramuli novelli fulvo-velutini; stipulae non visae; folia (3–) 5–9-foliolata, axi velutino, 10–30 cm. longo, petiolo 9–11 cm. longo, jugis inter sese 4–6 cm. distantibus, petiolulis 10–15 mm. longis, 3–4 mm. diametro, laminis coriaceis, ovatis vel ellipticis, 8–22 cm. longis, 6–12 cm. latis, apice acutis, basi truncatis vel subcordatis, supra glabris, subnitidis, subtus densiter velutini, pilis brevissimis, venis secundariis elevatis, utrinsecus 10–18, fere parallelis, inter sese 10–25 mm. distantibus, angulis venarum costaeque circiter  $65^\circ$ – $70^\circ$ ; inflorescentiae cum axibus fulvo- vel ferrugino-velutinis, bracteis bracteolisque non visis; flores completi non visi; calyx velutinus, 4–5 mm. longus, tubo 2–3 mm. longo, 4 mm. diametro, dentibus 2 mm. longis; fructus dehiscens coriaceus, velutinus, 1–2-spermus, 2–3 cm. longus, 1.5–2 cm. latus, 1 cm. crassus, valvulis vix 1 mm. crassis; semina coccinea vel bicolora coccinea macula nigra irregulariter

notata, 8–10 mm. longa, 6–11 mm. lata, 6–8 mm. crassa, hilo elliptico circiter 2 mm. longo et 1 mm. lato.

Type in the U.S. National Herbarium, no. 1859577, collected at Belém, Município de São Paulo de Olivença, basin of the Rio Solimões, Amazonas, Brazil, June 28, 1941, by R. Fróes (Field no. 30, Krukoff no. 12078). Isotypes at A, F, NY.

DISTRIBUTION: Known only from the type locality, in "igapo."

ADDITIONAL SPECIMEN EXAMINED:

BRAZIL: AMAZONAS: Belém, São Paulo de Olivença, Fróes 12075 (A, NY).

LOCAL NAME: Tento alongado.

The leaves of this species superficially suggest *O. amazonica*, but the pubescence is quite different, as are the fruit and seeds.

**Series 7. *Monospermae* Rudd, ser. nov.**

Arbores vel arbusculae; fructus dehiscens, valvulis lignosis vel sublignosis, densiter velutinis vel tomentosus; semina bicolora coccinea macula nigra notata nonnumquam unicolora coccinea, hilo elliptico, 2–5 mm. longo.

The densely pubescent fruits distinguish the members of this series. The type is *O. monosperma* (Sw.) Urb., the species with the prior epithet.

42. *Ormosia monosperma* (Sw.) Urb. Ant. 1:321. 1899.

FIGURE 14; PLATES 1, 2, 3, 4

*Sophora monosperma* Sw. Prodr. Veg. Ind. Occ. 66. 1788; Fl. Ind. Occ. 722. 1798.

*Podalyria monosperma* (Sw.) Poir. in Lam. Encyc. Meth. 5:440. 1804.

*Ormosia dasycarpa* Jacks. Trans. Linn. Soc. 10:362, tab. 26. 1811.

*Virgilia rubiginosa* DC. Ann. Sc. Nat. 4:98. 1824.

*Ormosia subsessilis* Pittier, Bol. Soc. Venez. Sci. Nat. 10:109. 1945.

Tree, to about 17 m. tall; young stems fulvo- to ferrugino-tomentulose; stipules linear-deltoid, about 3 mm. long; leaves (5-) 7–11-foliolate, the axis about 6–16 cm. long, tomentulose, glabrescent, the petiole 2–4 cm. long, the pairs of leaflets about 2–4 cm. apart, the leaflets sometimes subopposite, the petiolules 3–4 mm. long, 1.5–2 mm. in diameter, the blades subcoriaceous, ovate to oblong, 4–20 cm. long, 1.5–6 cm. broad, acute to acuminate, the acumen sometimes to 2 cm. long, the base rounded to acute, the upper surface glabrous, subnitid, the lower surface tomentulose along the major veins, otherwise sparsely and minutely crisp-pubescent, glabrescent, the secondary veins moderately raised, about 12–15 pair, essentially parallel, 5–7 mm. apart, forming angles of 50°–60° with the midvein, inflorescences with axes ferrugino-tomentulose; bracts linear-deltoid, about 3–5 mm. long and 1 mm. broad, the bracteoles linear, 2 mm. long; flowers 15–20 mm. long; calyx ferrugino-tomentulose, 8–10 mm.

long, the tube 4–5 mm. long and 5 mm. in diameter, the teeth deltoid, 3–5 mm. long; corolla dark purple, the standard with a white spot; fruit dehiscent, lignous or sublignous, densely fulvo- to ferruginovelutinous, 1–3-seeded, 2–6 cm. long, (2–) 2.5–3.5 cm. broad, and about 2 cm. thick, the valves 2–3 mm. thick; seeds red and black, (13–) 15–17 mm. long, (10–) 15–17 broad, and (7–) 10–11 mm. thick, the hilum 4–5 mm. long and 1.5–2 mm. wide.

**TYPE LOCALITY:** West Indies, presumably St. Vincent. Type collected by Alexander Anderson, cited below.

**DISTRIBUTION:** Lesser Antilles, Trinidad, and northeastern Venezuela, in primary forest, on hillsides, at elevations up to about 1600 meters.

**CUBA:** Atkins Garden, Soledad, Cienfuegos [cultivated, introduced from Dominica], *Atchison* 88 (US).

**LESSER ANTILLES:** "Ind. Occ.," without collector's name or number (S). "Ind. Occid.," *Anderson* s.n. (G type of *O. dasycarpa*). "India Occidentalis," *Anderson* s.n. (BM type of *Sophora monosperma*). "India Occidentalis, St. Vincent," *Anderson* s.n. (G). "India occid." [Montserrat?], *Ryan* s.n. (BM). **NEVIS:** *Tobin* s.n. (G). **MONTSERRAT:** *Richard* s.n. (P); *Rohr* s.n. (BM); *Shafer* 537 (F, NY, US). **GUADELOUPE:** *Bertero* s.n. (G type of *V. rubiginosa*); *Duss* 3453 (NY), 3580 (F, NY, US); *Stehlé & Quentin* 5511 (US); *Stehlé, Quentin, & Béna* 5334 (US), 5667 (US); *Questel* 866 (P, US); *Holdridge* 448 (NY). **DOMINICA:** *W. H. & B. T. Hodge* 2037 (GH); *Imray* s.n. (GH, NY); *Eggers* 924 (US); *Ramage* s.n. (BM, K, UC); *Cowan* 1621 (NY, S, US). **MARTINIQUE:** *Plée* s.n. (P); *Hahn* 1346 (BM, BR, G, GH, K, P, US); *Duss* 686 (F), 1090 (MO, NY, US); *Bélangier* 1040 (G). **ST. LUCIA:** *Ramage* s.n. (BM, K); *Box* 1846 (BM); *Howard* 11367 (A, S, US); *Proctor* 17894 (NY, US); *Cowan* 1553 (NY, S, US). **ST. VINCENT:** *Eggers* 6833 (A, S); *H. H. & G. W. Smith* 460 (GH, K, NY), 1909 (NY). **GRENADA:** Bon Accord Mts., *Broadway* 1887 (BM, F, GH, NY, US). Black Forest Mts., *Broadway* s.n. (F, GH, K, NY, U).

**TRINIDAD and TOBAGO:** **TOBAGO:** Botanic Station, *R. O. Williams* s.n. (TRIN). **TRINIDAD:** Without exact locality, *Lockhead* s.n. (G). Royal Botanic Garden, *Crueger* 175 [TRIN no. 1007] (NY, TRIN, US). Arima, *Dannouse* s.n. (TRIN). Arima-Blanchisseuse Road, *Bhorai* 285 (TRIN, US). Valencia, *Britton, Hazen, & Mendelson* 1797 (GH, NY, US); *Britton* 9292 (TRIN). Matura, *Marshall* [TRIN no.] 12243 (K, TRIN); *Pierre* [TRIN no.] 12576 (K, TRIN), [TRIN no.] 12590 (K, TRIN). Toco Road, 8 mile, *Mélozan* [TRIN no.] 12439 (K, TRIN).

**VENEZUELA:** **MONAGAS:** La Cuchilla, between Guanaguana and Guácharo, *Steyermark* 62245 (F, MO, VEN type of *O. subsessilis*). **ANZOÁTEGUI:** Bergantín, *Steyermark* 61330 (F, MO, VEN). Between Barcelona and Cumaná, *Vareschi* 6338 (VEN).

**LOCAL NAMES:** Snakewood (Montserrat); bois fougé, caconi rouge (Guadeloupe); caconnier rouge (Dominica, Guadeloupe); bois oui, wawi, grain l'église, angelin (St. Lucia); bastard nickars (St. Vincent); jumbi beads, jumbie, jumby (St. Vincent, Grenada, Trinidad); pionia, pionia montañero (Venezuela).

As indicated in the key, the pubescence of the leaflets provides a convenient basis for recognition of this species. The shape and size

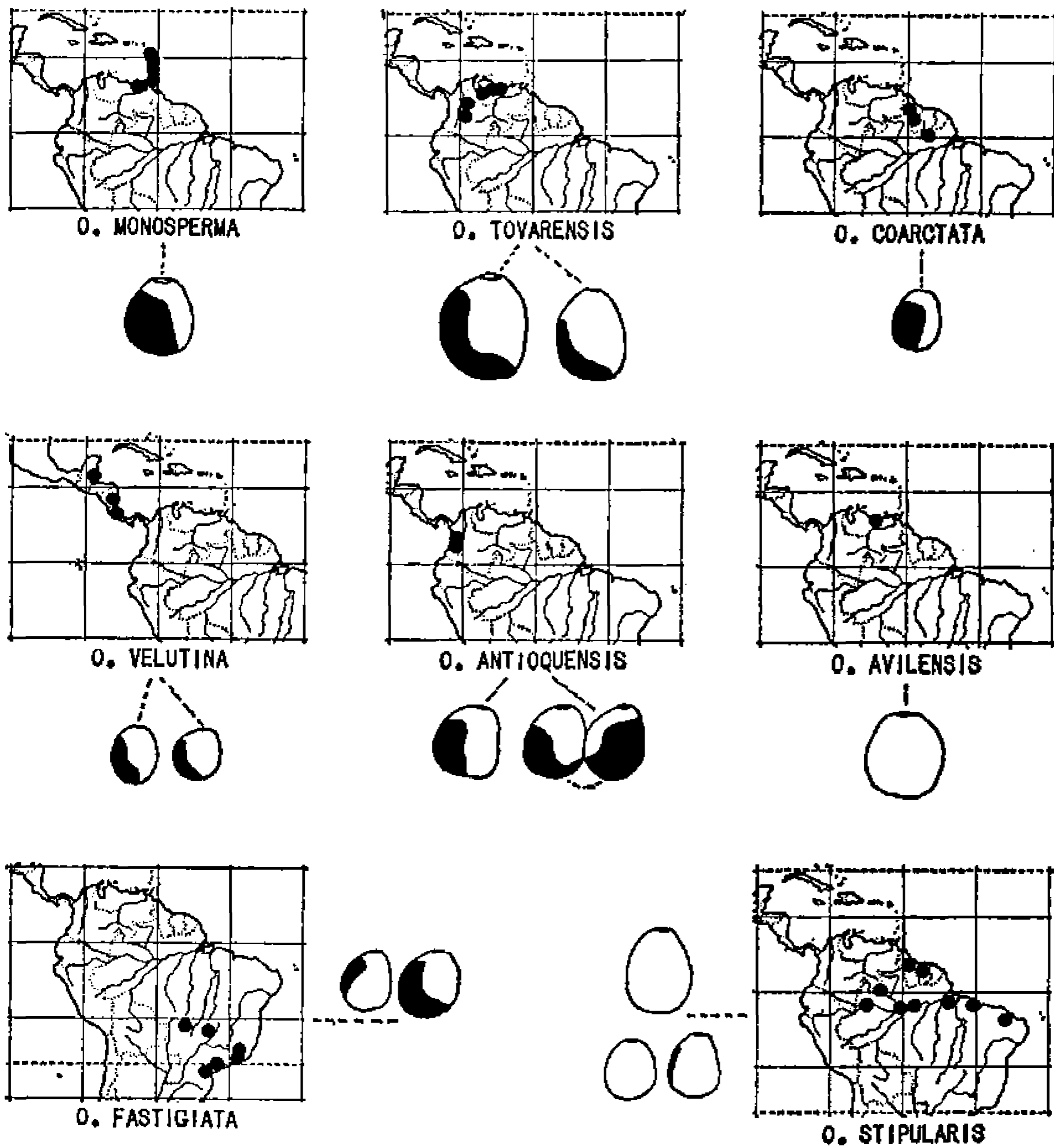


FIGURE 14.—*Ormosia* section *Ormosia* series *Monospermae*, in part: Geographic distribution of species; seeds of *O. monosperma*, *O. towarensis*, *O. coarctata*, *O. velutina*, *O. antioquensis*, *O. avilensis*, *O. fastigiata*, *O. stipularis*, all  $\times \frac{1}{2}$ .

of the blades are somewhat variable, but I do not believe that subdivision of the taxon is desirable.

Examination of type material or photographs of types shows the above listed species to be synonymous. An interesting surprise among the undetermined specimens from G was a sheet collected by Alexander Anderson that proved to be a mirror image of table 20 which illustrated Jackson's original description of *O. dasycarpa* (pls. 18, 19). It apparently had once been a part of the Lambert Herbarium, to which Jackson referred, and I consider it to be the type of *O. dasycarpa* which, however, falls into synonymy under *O. monosperma*.

In addition to the synonymy listed above, there are two earlier polynomial names cited by Jackson in connection with his original description of *O. dasycarpa*. The first is "Pseudo-acacia ingens, fructu coccineo, nigra macula notato. *Plum. Cat. p. 19, et MSS. cum Icone*," and through the kindness of Mr. T. D. Pennington, of the Commonwealth Forestry Institute, and Mr. R. C. Olby, Librarian of the Botany School, University of Oxford, England, a photograph of the "Icone" has been made available from the Sherardian collection (pl. 16). The other is "Glycine arboreum, foliis oblongis, seminibus majoribus. *Browne Jam. p. 298 [1756]*," concerning which Browne stated "I have seen this tree pretty often in Mountserat, where it grows naturally."

43. *Ormosia tovarensis* Pittier, Bol. Soc. Venez. Cien. Nat. 4:85. 1938.

FIGURE 14

Tree, to about 25 m. tall; young stems fulvo- to ferrugino-tomentose; stipules deltoid, about 3–6 mm. long, 2.5 mm. broad at the base; leaves 7–11-foliolate, the axis 12–36 cm. long, the petiole 4–15 cm. long, the pairs of leaflets 4–12 cm. apart, the petiolules 3–10 mm. long, 3–5 mm. in diameter, the blades coriaceous, elliptic or oblong-elliptic, 8–30 cm. long, 1–18 cm. broad, the apex rounded or brevicauminate, the base rounded, the margins often revolute, the upper surface essentially glabrous, the lower surface densely to moderately ferrugino-pubescent with loosely crispate hairs, the secondary veins moderately raised, 13–20 pair, essentially parallel, 10–20 mm. apart, forming angles of 55°–65° with the midvein; inflorescences with axes ferrugino-tomentose, the bracts deltoid, 5–6 mm. long and 2 mm. broad at the base, the bracteoles linear-deltoid, about 2 mm. long and 1 mm. wide or less; flowers 15–16 mm. long, the petals violaceous; calyx ferrugino-tomentulose, 10–11 mm. long, the tube 6–7 mm. long and 6 mm. in diameter, the teeth 4–5 mm. long; fruit fulvo- to ferrugino-velutinous, 1–3-seeded, 4–9 cm. long, 2.7–3.8 cm. broad, 1.5–2 cm. thick, the valves lignous, about 1–3 mm. thick; seeds bicolored red and black, 15–22 mm. long, 13–19 mm. broad, and 10–18 mm. thick, the hilum 3–3.5 mm. long and 1.5–2.5 mm. wide.

TYPE LOCALITY: "Selvas del Avila," Distrito Federal, Venezuela, at 1700 meters elevation. Type collected by Delgado (no. 59), cited below.

DISTRIBUTION: On wooded slopes at elevations of 200–2745 meters, on the Coastal Cordillera of Venezuela and the Cordillera Oriental of Colombia.

VENEZUELA: DISTRITO FEDERAL: El Avila, *Delgado* 59 (F, P, VEN type); *Vogl* 795 (BR, M). San José del Avila, *Vogl* s.n. (F). Las Flores, El Avila, *Steyermark* 55144 (F, MO). Galipán, *Pittier* 7576 (US, VEN). Between Las



Flores and Galipán, *Rudd* 1001 (US, VEN). Quebrada Guayabal, above Los Venados, *Rudd* 1000 (US, VEN). Papelón, *Moncado* s.n. (US, VEN). "Camino de ronda del Papelón a la Ciénega," *Delgado* 123 (US, VEN). Boca del Tigre, *Alston* 5556 (BM). East of Colonia Tovar, *Rudd* 1008 (US). ARAGUA: Colonia Tovar, *Fendler* 1751 (G, GH, K, MO, NY, US). Quebrada de Guamitas, Parque Nacional Rancho Grande (Henri Pittier), *Pittier & Nakichenovitch* 15365 (US, VEN). Choroní Pass, Parque Nacional Rancho Grande (Henri Pittier), *Rudd* 1021 (US, VEN). MÉRIDA: Tabay, *Steyermark* 56581 (F, MO).

COLOMBIA: SANTANDER: Barranca Bermeja, *Castañeda* 4914 (US). CUNDI-NAMARCA: Gachalá, *Grant* 10562 (US). Pacho, *Uribe-Uribe* 1573 (US); *García-Barriga* 12510 (US). Ubalá, *Triana* 6667 (BM, K, P, US).

LOCAL NAMES: Peonía, pionillo (Venezuela); peronilo, pionfo (Colombia).

The pods, seeds, and leaves of this species are among the largest in the genus. Some of the specimens from Colombia have more numerous leaflets than those from Venezuela, but that may be merely coincidence of the collections.

Steyermark's collection no. 56581, from the State of Mérida, Venezuela, is sterile. The leaflets are somewhat similar to those of the type of *O. avilensis*, a species of uncertain status, but they also resemble some of the Colombian material identifiable as *O. towarensis*. It is hoped that fruiting material of this taxon may be collected which will certify the determination.

#### 44. *Ormosia froesii* Rudd, sp. nov.

FIGURE 15

Arbuscula usque ad 3 m. alta; ramuli novelli ferrugino-tomentulosi; stipulae deltoideae, 2–3 mm. longae, basi 1 mm. latae; folia 9-foliolata, axi tomentuloso, circiter 25–50 cm. longo, petiolo 8–15 cm. longo, jugis inter sese 7–10 cm. distantibus, petiolulis 5–10 mm. longis, 3–6 mm. diametro, laminis coriaceis, late ovatis vel ellipticis, 5–28 cm. longis, 5–16 cm. latis, acutis vel obtusis, basi obtusis, marginibus leviter revolutis, supra glabris, nitidis, venis maioribus fortiter impressis, subtus mediocriter pubescentibus, pilis brevibus laxo-crispatis, venis secundariis fortiter elevatis, utrinsecus circiter 10–12, fere parallelis, inter sese 5–25 mm. distantibus, angulis venarum costaeque circiter 50°–60°, venis tertiariis fortiter reticulatis; inflorescentiae cum axibus ferrugino-tomentosis, bracteis deltoideis, 3–5 mm. longis, 1–1.5 mm. latis, bracteolis linearibus, circiter 1 mm. longis; flores completi non visi; calyx ferrugino-tomentosus, circiter 10 mm. longus, tubo 5 mm. longo et 8 mm. diametro, dentibus 5 mm. longis; fructus dehiscens, lignosus, ferrugino-velutinus, 1- vel 2-spermus, 3–5 cm. longus, 1.5–2.3 cm. latus, circiter 1.5 cm. crassus, inter semina plus minusve constrictus, valvulis 1.5–2 mm. crassis; semina bicolora coccinea macula nigra notata, 10 mm. longa, 9–10 mm. lata, 8–9 mm. crassa, hilo 3 mm. longo et 1.5 mm. lato.

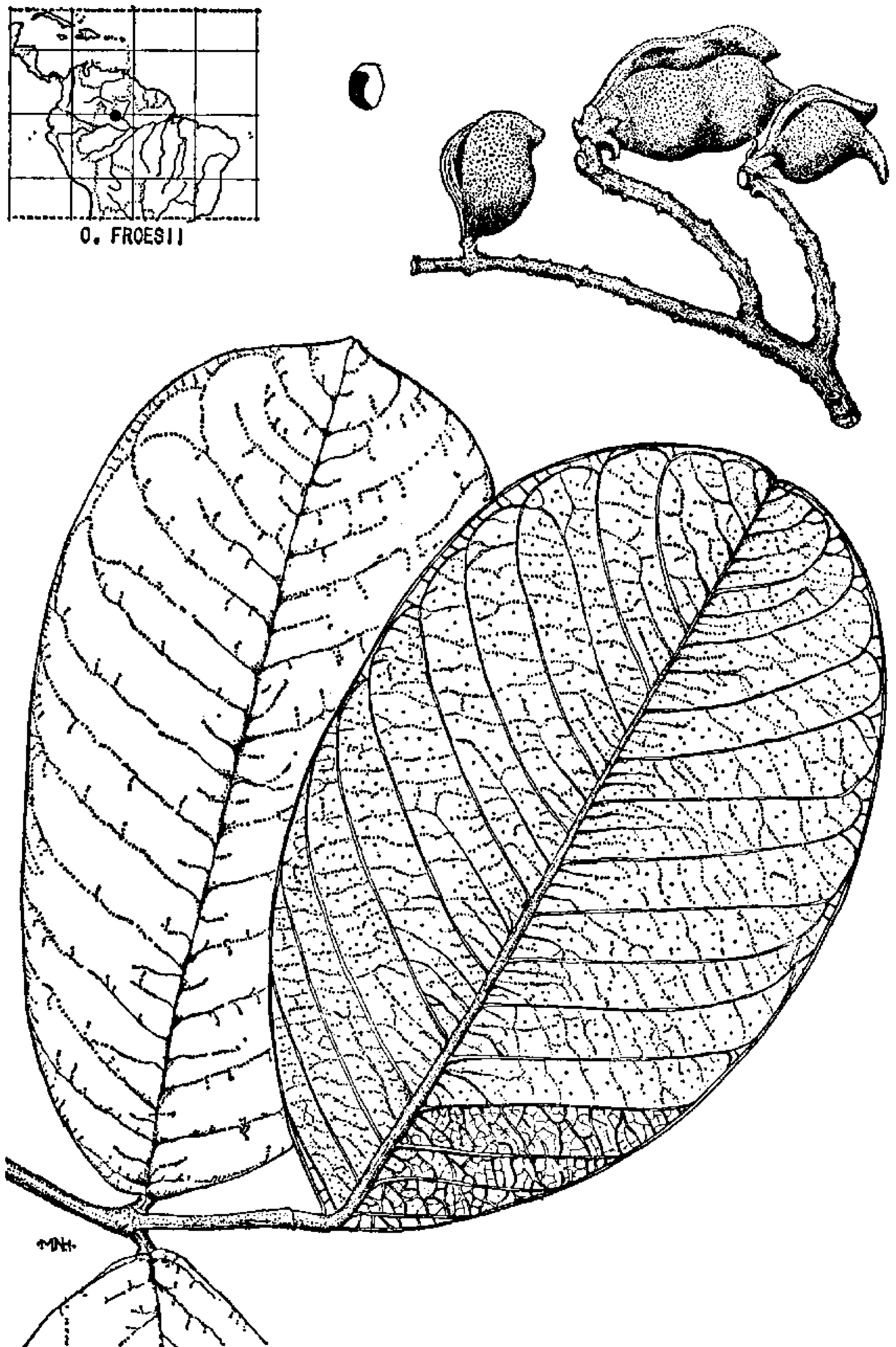


FIGURE 15.—*Ormosia* section *Ormosia* series *Monospermae*, in part: *O. froesii*: Geographic distribution; portion of leaf, seed, and fruit,  $\times \frac{1}{2}$ .

Type in the herbarium of the Instituto Agronomico do Norte, no. 32621, collected at Matupiri, Preto, Rio Negro, Amazonas, Brazil, November 1947, by R. L. Fróes (no. 22821).

DISTRIBUTION: In sandy soil, in the region of the lower Rio Negro, Amazonas, Brazil.

ADDITIONAL SPECIMEN EXAMINED:

BRAZIL: AMAZONAS: Rio Aracá, Rio Negro, *Fróes & Addison* 29268 (IAN, US).

The large, coriaceous leaflets of the two collections cited above are distinctive, and, considering other characters as well, I believe that the material represents a hitherto undescribed species of *Ormosia*.

45. *Ormosia coerctata* Jacks. Trans. Linn. Soc. 10 : 363, t. 27. 1811.

FIGURE 14; PLATES 5, 6

*Ormosia cuneata* Ducke, Arch. Jard. Bot. Rio de Janeiro 4 : 64. 1925.

Tree, to about 30 m. tall; young stems ferrugino- to fulvo-tomentose; stipules linear-deltoid, 3–5 mm. long and about 1 mm. broad at the base; leaves 5–11-foliolate, the axis 9–16 cm. long, velutinous, glabrescent, the petiole 1–7 cm. long, the pairs of leaflets 2–7 cm. apart, the petiolules 2–5 mm. long, 2–3 mm. in diameter, the blades coriaceous, obovate to elliptic, (1.5–) 6–19 cm. long, (0.5–) 3–8 cm. wide, the apex acute to brevi-acuminate, the acumen to about 5 mm. long, the base rounded or cuneate, the upper surface glabrous or sometimes with a trace of pubescence on the major veins, the lower surface moderately to densely pubescent with laxly crispate to subpatent, ferruginous hairs, the secondary veins prominent, 10–16 pair, essentially parallel, 5–10 (–15) mm. apart, forming angles of about 60°–70° with the midvein; inflorescences with axes ferrugino-tomentose, the bracts deltoid, about 4 mm. long and 1 mm. broad at the base, the bracteoles linear-deltoid, 1–2 mm. long, 1 mm. broad or less; flowers 12–15 mm. long; calyx ferrugino-tomentulose, 6–9 mm. long, the tube 4–5 mm. long, 4–6 mm. in diameter, the teeth 2–4 mm. long; petals dark purple; fruit dehiscent, sublignous, ferrugino- to fulvo-velutinous, 1–3-seeded, 2–4 cm. long, 1.5–2 (–2.5) cm. broad, about 1.3 cm. thick, the valves 1–2 mm. thick; seeds bicolored red and black, 10–13 mm. long, 9–11 mm. broad, and 7–10 mm. thick, the hilum 2–4 mm. long and 1.5 mm. broad.

TYPE LOCALITY: "Guiana" [British Guiana]. Type collected by Alexander Anderson, cited below.

DISTRIBUTION: British Guiana and southward into Pará, Brazil, north of the Amazon River.

TRINIDAD: [Cultivated in Royal Botanic Garden, Port of Spain ?], *Hart* [*Herb. Trin.* no.] 1014 (K).

BRITISH GUIANA: "Guiana," *A. Anderson* s.n. (G type). Upper Rupununi R., near Dadanawa, *De La Cruz* 1733 (F, GH, MO, NY, UC, US). Quimatata, Rupununi R., *Jenman* 5569 (BM, K, NY). Camaria Falls, Cuyuni R., *Davenport* 1 (K). Manaribisi Hole, Cuyuni R., *CAP* 47 [*For. Dept. B.G.* 5356] (K, MO, NY, P, S, U, US, VEN); *Fanshawe* F-248 [*For. Dept. B.G.* 2984] (K). Kurupung, upper Mazaruni R., *Lang & Persaud* 129 (F, NY). Muritaro, *Persaud* 26 (F, K, NY, Y). Malali Mission, Demerara R., *Fanshawe* F-901 [*For. Dept. B.G.* 3637] (K, NY). Upper Mazaruni R., *De La Cruz* 2380 (F, GH, MO, NY, UC, US). Upper Kamuni Creek, Demerara R. [*C.W.* ?] *Anderson* 283 (K).

BRAZIL: PARÁ: Rio Mapuera, upper Rio Trombetas, *Ducke* [MG no.] 9098 [=RB no. 779] (BM, RB type of *O. cuneata*). Rio Erepecurú (=Rio Cuminá), *Sampaio* 5354 (R). Rio Parú do Cuminá, *Sampaio* 5507 (R), 5560 (R, RB, US).

LOCAL NAMES: Baracaro, barakaro, bara-kara, jumbie bead (British Guiana); tenteiro (Brazil).

The specimen I have annotated as the type of *O. coarctata* was found among the unidentified *Ormosia* at Geneva. It obviously was the model for table 27 which illustrated the original publication of the species; the illustration may be readily recognized as a mirror image of the specimen (pls. 20, 21).

Miss G. J. H. Amshoff, in connection with her studies of "South American Papilionaceae" (Meded. Bot. Mus. & Herb. Rijks. Univ. Utrecht 52:49. 1939) stated that "The type specimen of *O. coarctata*, Anderson from Br. Guiana, could not be traced in the Br. Mus. or in Geneva. Possibly it is identical with *O. fastigiata* . . ." Although undoubtedly closely related, I prefer to maintain the two taxa as separate species.

Examination of the type of *O. cuneata*, however, reveals no essential differences from *O. coarctata* and I am treating the two species as synonyms.

One collection cited above, *Sampaio* 5507, has been reported as a "trepadeira," but since other collections of this species refer to trees, I suspect that the so-called vine is really a weak tree that is leaning on other larger trees, rather than truly scandent.

46. *Ormosia fastigiata* Tul. Arch Mus. Par. 4 : 108. 1844.

*Ormosia escragnolliana* Glaziov, Bull. Soc. Bot. France 53, Mem. 3 b : 152 1906, nomen.

*Ormosia glazioviana* Harms, Fedde Repert. Sp. Nov. 19 : 289. 1924.

Large trees; young stems fulvo-tomentose; stipules lanceolate, 4-15 mm. long, 1-4 mm. broad at the base; leaves 7-11-foliolate, the axis about 10-20 cm. long, tomentose, glabrescent, the petiole 2-8 cm. long, the pairs of leaflets 2-6 cm. apart, the petiolules 2-5 mm. long and 2-5 mm. in diameter, the blades coriaceous, ovate to oblong, sometimes obovate, 3-16 cm. long, 2-10 cm. broad, the apex obtuse or acute or, sometimes, breviacuminate, the acumen about 5 mm. long,

the base obtuse to subcordate, the upper surface essentially glabrous except for a trace of pubescence along the midvein, the lower surface densely to moderately fulvo-tomentose, the hairs loosely crispate, the secondary veins usually prominent, about 10–13 pair, essentially parallel, 3–15 mm. apart, forming angles of about 55°–70° with the midvein; inflorescences with axes fulvo-tomentose; the bracts linear-lanceolate, 4–10 mm. long, 1–2 mm. broad, the bracteoles linear, 2–3 mm. long, 0.5–1 mm. broad; flowers 10–15 mm. long; calyx fulvo- or ferrugino-tomentulose, 6–8 mm. long, the tube 4–5 mm. long, 5–6 mm. in diameter, the teeth 2–4 mm. long; petals dark lilac, or purple; fruit dehiscent, lignous, densely ferrugino- or fulvo-velutinous, 1–3-seeded, 2–5 cm. long, 2–2.5 cm. broad, slightly constricted between the seeds, about 1.5 cm. thick, the valves 2–3 mm. thick; seed bicolored, red and black, 10–13 mm. long, 9–12 mm. broad, 7–9 mm. thick, the hilum about 2 mm. long and 1.5 mm. wide.

TYPE LOCALITY: Near Belo Horizonte, Minas Gerais, Brazil. Type collected by Claussen (no. 1704), cited below.

DISTRIBUTION: Southeastern Brazil, along river banks, at elevations up to 500–600 meters.

BRAZIL: MINAS GERAIS: Near Belo Horizonte, *Claussen* 1704 (F, MO, P type, US); 239 [=1704?](M); s.n. [probably no. 1704](BM, BR, G, K). GOIÁS: Balsamo, *Macedo* 2687 (MO, S, US). MATO GROSSO: Branch of upper Jaurú R., *Hoehne (Comissão Rondon)* 713 (R), 714 (R), 715 (R). Cuiabá, *Malme* [Regnell II. no.] 2295 (R, S), 2295a (S). Santa Anna da Chapada, *Malme* s.n. (S). RIO DE JANEIRO: Petropolis, *Mello Moraes* [RB no.] 39323 (K, US). Nova Friburgo, *Glaziov* 20275 (F.M. Neg. 1911 ex B, type of *O. glazioviana*, BR, GH, K, NY, P, S, UC). GUANABARA: Tijuca, *Glaziov* 11892 (F.M. Neg. 1906 ex B, BR, F fragments ex B & P, G, K, P type of *O. escragnoiliana*). "Near Rio de Janeiro, *Glaziov* 10555 (K). SÃO PAULO: Mococo, *Rawitscher* [Krukoff Herb. no.] 15362 (NY). PARANÁ: Carvalho, *Dusen* 12193 (S, SI). Campininha, Piraquara, *Hatschbach* 2646 (SI). Capão Grande, *Dusen* 4007 (M).

LOCAL NAMES: Angelim (Rio de Janeiro); arvore do tento (Mato Grosso); coronha, corunha (Paraná); tento (Goiás).

The type collection of *O. fastigiata* consists of flowering material, and one can only presume that the fruit would be velutinous and the seeds bicolored. On the basis of the leaves, compared with fruiting collections from the same general area, I believe that to be a safe presumption. In most cases, however, the other collections tend to have leaflets with less dense pubescence. There is some variation in the size and shape of the leaflet blades, but all extremes are represented on the many sheets of type material collected by Claussen.

In his original description of *O. glazioviana*, Harms suggested the possibility that *O. escragnoiliana* might belong to his new species. I agree, but prefer to reduce both names to synonymy under *O. fastigiata*.

47. *Ormosia velutina* Rudd, Trop. Woods 113 : 124. 1960. FIGURE 14  
*Ormosia schippii* Pierce ex Standl. & Steyerl., Fieldiana Bot. 24 (5) : 311.  
 1946, pro parte, haud quoad typum.

Tree, to about 19 m. high and 23 cm. diameter; young stems fulvo- to aureo-tomentose; stipules deltoid-acicular, tomentose, 4-7 mm. long, 1-2 mm. broad at the base, caducous; leaves 5-7-foliolate, the axis fulvo-ferrugino-tomentose, about 8-22 cm. long, the petioles 3-7 cm. long, the pairs of leaflets 3-6 cm. apart, the petiolules 2-4 mm. long and 2-3 mm. in diameter, the blades coriaceous, obovate to elliptic, 3-16 cm. long, 2-9.5 cm. broad, the margins usually revolute, the apex obtuse to breviacuminate, the acumen about 6 mm. long or less, the base obtuse to subcordate, the upper surface glabrous, nitid, sometimes with a trace of pubescence along the midvein, the lower surface densely fulvo-tomentulose, the hairs tightly crispate, the secondary veins raised, about (5-) 10-12 pair, 5-20 mm. apart, essentially parallel, forming angles of about 60°-70° with the midvein; inflorescences with axes fulvo- to ferrugino-tomentose, the bracts tomentose, deltoid-acicular, about 5-6 mm. long, 1-2 mm. broad, bracteoles 5-6 mm. long, 0.5 mm. broad, linear, tomentose; flowers 14 mm. long; calyx fulvo- to ferrugino-tomentose, 10-12 mm. long, the tube 7-8 mm. long, 7 mm. in diameter, the teeth deltoid, 3-4 mm. long; corolla purple; fruit lignous, fulvo- to ferrugino-velutinous, 1-3-, commonly 1-, seeded, 2.5-6 cm. long, 1.5-2.5 cm. broad, about 1.5 cm. thick, the valves 2-3 mm. thick; seeds bicolored red and black, 10-12 mm. long, 9-10 mm. broad, and 8-10 mm. thick, the hilum 2.5-3 mm. long, 1-1.5 mm. wide.

TYPE LOCALITY: In hammock, Monkey River, near Jenkins Creek, Toledo District, British Honduras. Type collected by Gentle (no. 4145), cited below.

DISTRIBUTION: In forest, British Honduras to Costa Rica, at elevations up to about 200 meters.

BRITISH HONDURAS: EL CAYO: Humming Bird Highway, *Gentle* 8961 (LL). Ravine, Mountain Pine Ridge, *Bartlett* 11775 (A, MO, NY, S). STANN CREEK: Mullins River Road, *Schipp* 132 (A, BM, F, G, GH, MO, NY, POM, UC, U, US). TOLEDO: Monkey River, near Jenkins Creek, *Gentle* 4145 (A, LL, MO, NY, US type). Near Condemn Branch Pine Ridge, *Gentle* 5400 (LL).

NICARAGUA: ZELAYA [Bluefields]: Cukra, Pearl Lagoon, *Long* 162 (F).

COSTA RICA: HEREDIA: La Virgen de Sarapiquí, *Holdridge* 5181 (F), 5245 (F).

LOCAL NAMES: Pine-ridge grande betty (British Honduras); nena (Costa Rica).

As explained in connection with the original description of *O. velutina*, there was some confusion in the circumscription of *O. schippii*, the two collections included actually represented two different

species. For that reason, *O. schippii* was emended to include only the one collection, in flower, and a new species was proposed to accommodate the other, in fruit.

Among the specimens cited above, there is some variation in the width of the fruit which can be correlated with the number of ovules maturing; the 3-seeded pods are on the average considerably narrower than those with 1 seed.

48. *Ormosia antioquiensis* Rudd, sp. nov.

FIGURE 14

*Ormosia xanthocarpa* Lloyd and Horning, Journ. Org. Chem. 23 : 1074. 1958, nomen nudum.

Arbuscula 4–5 m. alta; ramuli novelli fulvo-tomentosi; stipulae lineari-deltaeidae, tomentosae, 3–4 mm. longae, basi circiter 1 mm. latae; folia 5–9-foliolata, axi fulvo- vel ferrugino-tomentoso, 10–30 cm. longo, petiolo 5–9 cm. longo, jugis inter sese 3–6.5 cm. distantibus, petiolulis 2–6 mm. longis et 2–5 mm. diametro, laminis coriaceis, obovatis vel ellipticis, 4–17 cm. longis, 2–10 cm. latis, marginibus nonnunquam revolutis, apice obtusis vel acutis, basi obtusis, supra glabris, nitidis, venis impressis, subtus densiter vel mediocriter tomentulosis, pilis crispis, venis secundariis fortiter elevatis, utrinsecus circiter 10–18, prope parallelis, inter sese, 5–15 mm. distantibus, angulis venarum costaeque circiter 55°–60°; inflorescentiae cum axibus ferrugino-tomentosis, bracteis bracteolisque non visis; flores non visi; fructus dehiscens, lignosus, fulvo- vel ferrugino-velutinus, 1- vel 2-spermus, 4–6 cm. longus, 2.5–3 cm. latus, circiter 1.5 cm. crassus, valvulis 2–3 mm. crassis; semina bicolora, coccinea macula nigra notata, 12–15 mm. longa, 11–15 mm. lata, 8–12 mm. crassa, hilo circiter 3 mm. longo et 1.5 mm. lato.

Type in the U.S. National Herbarium, no. 1802685, collected at Nigüfa, near Bello, Antioquia, Colombia, May 1941, collected for Bro. Daniel (no. 2460) by Bro. Luis Emmanuel. Isotype at S.

DISTRIBUTION: Known only from the region of the Cordillera Central, southern Antioquia, Colombia.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: ANTIOQUIA: Hatillo, Bro. Daniel 2103 (US). Sonsón, Guarín [Bro. Daniel no.] 2507 (S, US). Bello, Bro. Daniel [Krukoff Herb. no.] 19132 (US).

LOCAL NAME: Chocho.

This species, thus far known only from a limited area, shows characters intermediate between *O. velutina* from Central America and *O. towarensis*, which occurs farther east in Colombia and Venezuela.

49. *Ormosia stipularis* Ducke, Arch. Jard. Bot. Rio de Janeiro 4: 65. 1925.

FIGURE 14

Tree to about 25 m. tall; young stems fulvo-tomentose; stipules deltoid or linear-deltoid, 3–15 mm. long, 1–3 mm. broad at the base; leaves 7–13-foliolate, the axis 10–30 cm. long, tomentose, the petiole 3–8 cm. long, the pairs of leaflets 2–7 cm. apart, the petiolules 2–5 mm. long, 1.5–3 mm. in diameter, stipels sometimes present, the blades coriaceous, ovate, obovate, or oblong, 3–18 cm. long, 2–9 cm. broad, acute or breviacuminate with acumen to about 7 mm. long, the base obtuse to subcordate, the upper surface essentially glabrous, sometimes with a trace of pubescence along the midvein, the lower surface moderately to densely pubescent with crispate hairs, the secondary veins fairly prominent, (8–) 10–13 pair, approximately parallel, 5–15 mm. apart, forming angles of 50°–65° with the midvein; inflorescences with axes fulvo-tomentulose, the bracts linear-deltoid, 8–13 mm. long, 2–3 mm. broad, the bracteoles linear, 3–6 mm. long, 1 mm. broad or less; flowers 13–20 mm. long; calyx fulvo-tomentulose, 10–12 mm. long, the tube 6–7 mm. long and 6–7 mm. in diameter, the teeth 3–5 mm. long; petals pale lilac; fruit dehiscent, lignous, fulvo- or ferrugino-velutinous, 1–3-seeded, 3–7 cm. long (2–) 2.5–3.7 cm. broad, somewhat constricted between the seeds, 2–2.5 cm. thick, the valves 2–5 mm. thick; seeds red or red with a black line or small black spot along one edge, 12–16 mm. long, 10–15 mm. broad, and 8–10 mm. thick, the hilum 2–4 mm. long and 1.5–2 mm. in diameter.

TYPE LOCALITY: Breves, Pará, Brazil. Lectotype collected by Ducke (RB no. 17101), cited below.

DISTRIBUTION: "Terra firma" but low land, forest, primary or secondary, Surinam, British Guiana, and Brazil along the Amazon Basin and northern coast to Ceará.

SURINAM: Without exact locality, [*For. Bur. Sur.* no.] 6322 (U). Zanderij I, *Stahel* 120 (A, NY, U), 235 (A, K, NY, U, Y). Forest Reserve, Section O, tree no. 544, [*For. Bur. Sur.* no.] 1469 (U), 1612 (U), 1806 (U), 3382 (K, MO, NY, U), 5991 (BR, MO, U, US), 6132 (BR, MO, U, US). Raleigh Falls, Coppename R., *Stahel* [*For. Bur. Sur.* no.] 6346 (K, NY, U, US).

BRITISH GUIANA: Big Winiperu Creek, Demerara R., *Fanshawe* 387 [*For. Serv. B.G.* no. 3123] (K).

BRAZIL: AMAZONAS: Rio Negro, Padauri, Mata do Tucano, *Fróes* 22599 (IAN, U, US, VEN). Rio Urubú, *Fróes* 25334 (IAN, US). Manaus, Estrada da Raiz, *Ducke* 677 [MG no. 18122] (GH, K, MG, MO, NY, R, SI, US). Manaus, Ponte do Mindú, *Ducke* 758 [MG no. 18123] (GH, K, MG, NY, R, SI, US). Manaus, Cachoeira Mindú, *Ducke* [RB no.] 23363 (G, K, NY, P, RB, S, U, US). Rio Branco de Obidos, *Ducke* [RB no.] 20365 (RB, S, U). São Paulo de Olivença, *Fróes* [*Krukoff*] 12079 (A, NY, SI, US), 12080 (A, NY, US). PARÁ: Breves,



*Ducke* [RB no.] 17101 (K, RB lectotype, S, U, US). MARANHÃO: Candido Mendes, *Frões* 1787 (A, BM, F, G, K, MO, NY, P, S, U, US). Caxias, *Ducke* [RB no.] 17102 (F fragment ex B, F.M.Neg. 1914 ex B isosyntypes). CEARÁ: Serra Grande [Ibiapaba], "Caminho S. Felix," *Löfgren* 333 (R). Sa. do Ibiapaba, São Benedicto, "Cayriris," *Allemão e Cysneiros* 440 (P, R, RB syntype), [as *Glaziou* 11898] (F.M.Neg. 1909 ex B, P).

LOCAL NAMES: Barakaro-friberoe (Arawak, Surinam); itoerano-anakoko (Carib, Surinam); kokrikie (Surinam); buiussu (Maranhão, Brazil); mulungu bravo, mulungu brabo (Ceará, Brazil); tenteiro, tento (Amazonas and Pará, Brazil).

Of the several syntypes it seemed appropriate to choose as lectotype one of *Ducke's* own collections and preferable to select a fruiting specimen.

The fruits of this species are relatively large for the series although a few specimens are well below the average size. Most of the seeds observed are completely red, but a few show a black line along one edge, suggesting relationship with other members of the *Monospermae*.

As mentioned under *O. fastigiata*, Amshoff believed *O. stipularis* to be synonymous with *O. fastigiata* and so convinced *Ducke* who, in his later works, treated the taxa as one. However, I consider them to be separate species.

Specimens distributed as *Glaziou* 11898, from Minas Gerais, appear to be in reality material of Fr. *Allemão* 440, from Ceará. The situation may be similar to that noted by *Sleumer* (*Bot. Jahrb.* 76 : 153, 154. 1954) concerning *Roupala pallida*: "Zu *Glaziou* 18464a bemerkt E. Ule in Herb. Berlin: Diese Pflanze hat A. *Glaziou* 1890 von mir unter nr. 1556 erhalten und wie so viele andere Pflanzen unter seinem Namen herausgegeben . . ."

50. *Ormosia avilensis* Pittier, *Bol. Soc. Venez. Cien. Nat.* 4:84. 1938; emend. *Pierce*, *Bull. Torr. Bot. Club* 69:590. 1942. FIGURE 14

*Dussia avilensis* (Pittier) Pittier, *Bol. Téc. Caracas* 5:16. 1944, pro parte.

Tree, about 10–12 m. tall; young stems ferrugino-velutinous; stipules deltoid, about 2 mm. long and 1 mm. broad at the base; leaves 3–9-foliolate, the axis 7–12 cm. long, the petiole 3–6 cm. long, the pairs of leaflets 2–4.5 cm. apart, the petiolules 3–4 mm. long, 2–3 mm. in diameter, the blades coriaceous, elliptic to ovate, 4–12 cm. long, 3–8 cm. broad, the apex acute, the base rounded to subcordate, the upper surface essentially glabrous, the lower surface ferrugino-tomentulose along the major veins, otherwise moderately and inconspicuously crisp-pubescent, glabrescent, the secondary veins about 10–17 pair, essentially parallel, 5–15 mm. apart, forming angles of

60°–70° with the midvein; inflorescences with axes ferruginovelutinous, the bracts, bracteoles, and complete flowers not seen; fruit dehiscent, lignous, brownish black, glabrate [due to weathering; originally velutinous ?], 1-seeded, 3.5–4.5 cm. long, 2.5–3 cm. broad, about 1.5–2 cm. thick, the valves 1–2 mm. thick; seeds red, 14–17 mm. long, 14–18 mm. broad, and 10–15 mm. thick, the hilum 3–4 mm. long and 1.5–2 mm. broad.

TYPE LOCALITY: "Selvas del Avila, Guayabal; camino de ronda del Avila," above Caracas, Venezuela, at 1600–1700 meters elevation. Type collected by Delgado (no. 35), cited below.

DISTRIBUTION: Known only from the type collection.

VENEZUELA: DISTRITO FEDERAL: El Avila, Caracas, *Delgado* 35 (F, US, VEN type).

LOCAL NAME: Peonía.

In the original publication of this species, the type was erroneously cited as *Delgado* no. 37, obviously a typographical error, as the specimens, including the holotype at VEN, bear the number 35. As added confusion, a floral description was included, unfortunately based on *Dussia* flowers from material of *Delgado* no. 47. Pierce clarified the situation by emending the description of *O. avilensis* and publishing the new species, *Dussia coriacea* Pierce, typified by *Delgado* 47. Pittier apparently misunderstood Pierce's efforts and transferred *O. avilensis* to *Dussia avilensis*, compounding the confusion.

However, the type of *Ormosia avilensis*, *Delgado* 35, is unquestionably a specimen of *Ormosia*; the type of *Dussia coriacea*, *Delgado* 47, is entirely material of *Dussia*. Conveniently, the name *Dussia avilensis* falls into synonymy, in part under *Ormosia*, and partly under *Dussia*.

Not only has the nomenclature been confused by mixture of material, the species itself is suspect. It is possible that the leaves really represent young, less pubescent specimens of *O. tovarensis*, and the red seeds could be from *O. stipularis* or *O. venezolana*. Perhaps additional material will be found to elucidate the status of *O. avilensis*.

#### Excluded Taxa

*Ormosia mexicana* Standl. Contr. U.S. Nat. Herb. 23:436. 1922. = *Dussia mexicana* (Standl.) Harms.

*Ormosia pacimonensis* Spruce ex Benth. Journ. Linn. Soc. 4 suppl.:119. 1860, nomen in synon. = *Vatairea guianensis* Aubl.

*Ormosiopsis paradoxa* Sandw. Kew Bull. 1928:371. 1928. = *Clathrotropis paradoxa* Sandw.

## New Taxa, New Names, and New Combinations

- Ormosia* series *Amazonicae* Rudd, ser. nov.  
*Ormosia* series *Coccineae* Rudd, ser. nov.  
*Ormosia* series *Excelsae* Rudd, ser. nov.  
*Ormosia* series *Isthmenses* Rudd, ser. nov.  
*Ormosia* series *Monospermae* Rudd, ser. nov.  
*Ormosia* series *Nobiles* Rudd, ser. nov.  
*Ormosia* series *Panamenses* Rudd, ser. nov.  
*Ormosia antioquiensis* Rudd, sp. nov.  
*Ormosia coccinea* var. *subsimpler* (Spruce ex Benth.) Rudd, stat. nov.  
*Ormosia colombiana* Rudd, sp. nov.  
*Ormosia cruenta* Rudd, sp. nov.  
*Ormosia cuatrecasasi* Rudd, sp. nov.  
*Ormosia elata* Rudd, sp. nov.  
*Ormosia flava* (Ducke) Rudd, comb. nov.  
*Ormosia froesii* Rudd, sp. nov.  
*Ormosia grandiflora* (Tul.) Rudd, comb. nov.  
*Ormosia grossa* Rudd, sp. nov.  
*Ormosia larecajana* Rudd, sp. nov.  
*Ormosia lignivalvis* Rudd, sp. nov.  
*Ormosia maguireorum* Rudd, sp. nov.  
*Ormosia nobilis* var. *bolivarensis* Rudd, var. nov.  
*Ormosia nobilis* var. *santaremnensis* (Ducke) Rudd, stat. nov.  
*Ormosia revoluta* Rudd, sp. nov.  
*Ormosia smithii* Rudd, sp. nov.  
*Ormosia solimoesensis* Rudd, sp. nov.  
*Ormosia steyermarkii* Rudd, nom. nov.  
*Ormosia venezolana* Rudd, sp. nov.  
*Ormosia vicosana* Rudd, sp. nov.  
*Ormosia williamsii* Rudd, sp. nov.

Collections of *Ormosia* Cited

(In most cases the numbers are those of the collectors, but some are herbarium numbers and are so indicated in the text if the fact is known.)

- |  |   |
|--|---|
| <p>ABBOTT, W. L.<br/>2658. <i>krugii</i></p> <p>ALLARD, H. A.<br/>18841. <i>krugii</i><br/>ALLEMÃO E CYSNEIROS, FREIRE F.<br/>440. <i>stipularis</i></p> <p>ALLEN, P. H.<br/>4499. <i>cruenta</i></p> <p>ALSTON, A. H. G.<br/>5556. <i>tovarensis</i></p> <p>ANDERSON, A.<br/>s.n. <i>coarctata</i><br/>s.n. <i>monosperma</i></p> <p>ANDERSON, C. W.<br/>283. <i>coccinea</i> var. <i>coccinea</i><br/>582. <i>coutinhoi</i></p> <p>ANDRADE, N. DE<br/>1557. <i>minor</i></p> <p>ARISTEGUIETA, L.<br/>3252. <i>macrocalyx</i></p> <p>ATCHISON, E.<br/>66. <i>macrocalyx</i><br/>88. <i>monosperma</i></p> <p>AUBLET, F.<br/>s.n. <i>coccinea</i> var. <i>coccinea</i></p> <p>BAILEY, L. H.<br/>s.n. <i>monosperma</i></p> <p>BALDWIN, J. T., JR.<br/>3267. <i>smithii</i></p> <p>BARBOSA RODRIGUES, J.<br/>s.n. <i>holerythra</i></p> <p>BARTLETT, H. H.<br/>11775. <i>velutina</i></p> <p>BARTON, E., ET AL.<br/>s.n. <i>jamaicensis</i></p> <p>BEARD, J. S.<br/>240. <i>krugii</i><br/>659. <i>krugii</i></p> <p>BÉLANGER, C. P.<br/>1040. <i>monosperma</i></p> <p>BENA, P.<br/>1157. <i>paraensis</i></p> | <p>BENOIST, R.<br/>212. <i>melanocarpa</i><br/>877. <i>cinerea</i><br/>1417. <i>coccinea</i> var. <i>coccinea</i><br/>1611. <i>nobilis</i> var. <i>nobilis</i></p> <p>BERNARDI, A. L.<br/>1623. <i>paraensis</i><br/>3155. <i>venezolana</i><br/>6665. <i>nobilis</i> var. <i>bolivarensis</i></p> <p>BERTERO, C. G. L.<br/>s.n. <i>monosperma</i></p> <p>BHORAI, M.<br/>285. <i>monosperma</i></p> <p>BIRDSALL, B. J.<br/>s.n. <i>panamensis</i></p> <p>BLACK, G. A., ET AL.<br/>47-1003. <i>paraensis</i><br/>48-2668. <i>coccinea</i> var. <i>subsimplex</i><br/>48-3032. <i>coutinhoi</i><br/>50-10708. <i>excelsa</i><br/>51-12779. <i>smithii</i><br/>51-13226. <i>smithii</i><br/>51-13457. <i>paraensis</i><br/>54-16888. <i>nobilis</i> var. <i>nobilis</i><br/>54-17330. <i>coccinea</i> var. <i>coccinea</i></p> <p>BOSBEHEER<br/>(" 's Lands Bosbeheer," Surinam)<br/>344. <i>coutinhoi</i><br/>609. <i>cinerea</i><br/>1021. <i>coutinhoi</i><br/>1025. <i>coutinhoi</i><br/>1026. <i>coutinoi</i></p> <p>Box, H. E.<br/>1846. <i>monosperma</i></p> <p>BRITO<br/>40. <i>macrocalyx</i></p> <p>BRITTON, N. L., ET AL.<br/>1695. <i>krugii</i><br/>1797. <i>monosperma</i><br/>2210. <i>jamaicensis</i><br/>4465. <i>krugii</i><br/>7670. <i>krugii</i><br/>9292. <i>monosperma</i></p> |
|--|---|

BROADWAY, W. E.

1887. monosperma

s.n. monosperma

BUREAU AGRICOLE ET FORESTIER

GUYANAIS (FRENCH GUIANA)

7 *M. paraensis*

73 *M. coutinhoi*

142 *M. coutinhoi*

151 *M. lignivalvis*

212 *M. coutinhoi*

274 *M. coccinea* var. *coccinea*

7323. *coccinea* var. *coccinea*

7335. *cinerea*

7357. *cinerea*

7535. *lignivalvis*

BURKART, A.

17437. *minor*

CAMPOS PORTO, P.

2077. *friburgensis*

17942. *friburgensis*

CAPUCHO, P.

415. *excelsa*

CARDONA, F.

405. *nobilis* var. *bolivarensis*

CASTAÑEDA, R. R.,

4914. *tovarensis*

CESPEDES, J. M. DE

s.n. *colombiana*

CHAGAS

948. *discolor*

CLAUSSEN, P.

239. *fastigiata*

1704. *fastigiata*

s.n. *fastigiata*

s.n. *arborea*

COELHO, D.

3839. *discolor*

COELHO, J. DE P.

3094. *minor*

CONEJOS-SOBRINO, J.

82. *lignivalvis*

CONSTANTINO, D.

276. *arborea*

COOPER, G. P., and SLATER, G. M.

125. *macrocalyx*

150. *panamensis*

243. *macrocalyx*

CORNER, E. J. H.

5. *macrocalyx*

COWAN, R. S., ET AL.

1553. *monosperma*

1621. *monosperma*

1976. *coutinhoi*

38037. *coccinea* var. *coccinea*

39274. *costulata*

CROIZAT, L.

154. *coccinea* var. *subsimplex*

CRUEGER, H.

175. *monosperma*

CUATRECASAS, J.

15129. *cuatrecasasii*

15198. *revoluta*

19914. *cuatrecasasii*

22617. *colombiana*

23785. *colombiana*

DAHLGREN, B. E., and SELLA, E.

688. *nobilis* var. *nobilis*

DANIEL, BRO.

2103. *antioquensis*

2459. *colombiana*

2460. *antioquensis*

2476. *colombiana*

2507. *antioquensis*

3823. *colombiana*

19132. *antioquensis*

DANNOUSE, L.

s.n. *monosperma*

DAVENPORT

1. *coarctata*

DAVIDSON, M. E.

848. *cruenta*

DAWSON, A.

8. *coutinhoi*

DAYTON, W. A., and BARBOUR, W. R.

3127. *isthmensis*

DE LA CRUZ, J. S.

1733. *coarctata*

2380. *coarctata*

2662. *coarctata*

3388. *coutinhoi*

DELGADO, E.

35. *avilensis*

59. *tovarensis*

123. *tovarensis*

DIONÍSIO

(see D. Coelho)

DOMINGO-PENAGOS

(see Bro. Daniel)

DUARTE, A. P.

64. *arborea*

DUARTE DE BARROS, V.

1184. *friburgensis*

1212. *friburgensis*

## DUCKE, A., ET AL.

106. bahiensis  
 125. nobilis var. santaremnensis  
 145. excelsa  
 145a. excelsa  
 182. excelsa  
 230. macrophylla  
 230.II. macrophylla  
 352. coutinhoi  
 547. discolor  
 566. costulata  
 577. excelsa  
 585. coutinhoi  
 644. nobilis var. santaremnensis  
 677. stipularis  
 758. fastigiata  
 770. lignivalvis  
 779. coarctata  
 945. coccinea var. coccinea  
 1047. paraensis  
 1194. costulata  
 1275. paraensis  
 1516. macrocalyx  
 1615. coutinhoi  
 1714. flava  
 1721. flava  
 1818. nobilis var. santaremnensis  
 1962. coutinhoi  
 1998. macrocalyx  
 2133. macrocalyx  
 5096. nobilis var. nobilis  
 5695. costulata  
 7168b. smithii  
 7345. macrocalyx  
 8613. macrophylla  
 8697. costulata  
 9098. coarctata  
 9118. costulata  
 10944. holerythra  
 11195. costulata  
 11429. macrophylla  
 11726. excelsa  
 11740. excelsa  
 14833. amazonica  
 14836. excelsa  
 14836a. excelsa  
 15491. coutinhoi  
 15492. nobilis var. nobilis  
 15493. excelsa  
 15494. nobilis var. santaremnensis  
 15543. paraensis  
 15797. costulata  
 15814. nobilis var. nobilis  
 15883. excelsa  
 15902. excelsa  
 15912. nobilis var. santaremnensis  
 15915. excelsa  
 15962. coccinea var. coccinea  
 16188. coutinhoi  
 16189. nobilis var. nobilis  
 16357. paraensis  
 16361. excelsa  
 16401. excelsa  
 16572. (see Fra. Lima)  
 16575. paraensis  
 16657. coccinea var. coccinea  
 16675. coccinea var. coccinea  
 16718. nobilis var. santaremnensis  
 16746. flava  
 16779. flava  
 16798. coutinhoi  
 16955. flava  
 17033. nobilis var. nobilis  
 17080. flava  
 17081. flava  
 17093. coutinhoi  
 17097. coccinea var. coccinea  
 17098. nobilis var. nobilis  
 17101. stipularis  
 17102. stipularis  
 17104. paraensis  
 17106. paraensis  
 17107. paraensis  
 17112. holerythra  
 17159. coccinea var. coccinea  
 17260. grandiflora  
 18113. flava  
 18114. flava  
 18117. lignivalvis  
 18118. coutinhoi  
 18119. coutinhoi  
 18120. excelsa  
 18121. nobilis var. santaremnensis  
 18122. stipularis  
 18123. stipularis  
 18124. macrophylla  
 18125. paraensis  
 18126. paraensis  
 18127. costulata  
 18128. macrocalyx  
 18129. nobilis var. santaremnensis  
 18130. macrocalyx  
 18131. macrocalyx  
 20362. paraensis

20363. nobilis var. santaremnensis  
 20365. stipularis  
 20366. holerythra  
 20367. grandiflora  
 23357. paraensis  
 23363. stipularis  
 23365. nobilis var. santaremnensis  
 23366. lignivalvis  
 24060. macrocalyx  
 35084. discolor  
 35175. nobilis var. nobilis  
 35177. macrophylla  
 54971. coutinhoi  
 DUSEN, P.  
 4007. fastigiata  
 8265. arborea  
 8731. arborea  
 12193. fastigiata  
 16533. arborea  
 s.n. arborea  
 DUSS, PÈRE  
 686. monosperma  
 1090. monosperma  
 3453. monosperma  
 3580. monosperma  
 DWYER, J. D.  
 1170. isthmensis  
 EGGERS, H. F. A.  
 924. monosperma  
 6833. monosperma  
 EKMAN, E. L.  
 6232. krugii  
 11422. krugii  
 12425. krugii  
 15890. krugii  
 ESPINA AND GIACOMETTO  
 A 102. colombiana  
 FANSHAW, D. B.  
 248. coarctata  
 387. stipularis  
 464. paraensis  
 523. coutinhoi  
 734. lignivalvis  
 881. paraensis  
 901. coarctata  
 15151. coutinhoi  
 FENDLER, A.  
 1751. tovarensis  
 FERREIRA, A. R.  
 s. n. grandiflora  
 FERREIRA, E.  
 58-237. nobilis var. santaremnensis
- FERREYRA, R.  
 1188. grandiflora  
 FORESTRY BUREAU SURINAM  
 (BOSCHWEZEN SURINAME)  
 83. costulata  
 1138. paraensis  
 1409. melanocarpa  
 1427. paraensis  
 1469. stipularis  
 1508. paraensis  
 1612. stipularis  
 1806. stipularis  
 1824. paraensis  
 2391. melanocarpa  
 2834. flava  
 3382. stipularis  
 4647. paraensis  
 4699. melanocarpa  
 5015. melanocarpa  
 5991. stipularis  
 6079. paraensis  
 6132. stipularis  
 6322. stipularis  
 6346. stipularis  
 6630. coccinea var. coccinea  
 FORESTRY DEPARTMENT BRITISH  
 GUIANA  
 2013. coutinhoi  
 2604. costulata  
 2984. coarctata  
 3123. stipularis  
 3200. paraensis  
 3259. coutinhoi  
 3470. lignivalvis  
 3617. paraensis  
 3637. coarctata  
 5356. coarctata  
 5383. costulata  
 FRÓES, R. DE L., ET AL.  
 (many actually are Krukoff numbers)  
 1787. stipularis  
 1796. paraensis  
 1910. paraensis  
 1913. flava  
 11601. paraensis  
 11612. paraensis  
 11984. nobilis var. nobilis  
 12016. excelsa  
 12075. solimoesensis  
 12077. lignivalvis  
 12078. solimoesensis  
 12079. stipularis  
 12080. stipularis

- 12081/28. *grandiflora*  
 12082. *lignivalvis*  
 12083. *macrocalyx*  
 12183/94. *lignivalvis*  
 12184/95. *nobilis* var. *santaremnensis*  
 12185/96. *lignivalvis*  
 12206/119. *macrocalyx*  
 12208/121. *macrocalyx*  
 12211/124. *nobilis* var. *santaremnensis*  
 12234/126. *nobilis* var. *santaremnensis*  
 12377/137. *coccinea* var. *subsimplex*  
 12380/139a. *macrophylla*  
 12384/143. *macrophylla*  
 12385/144. *macrophylla*  
 12386/145. *macrophylla*  
 12406/150. *coccinea* var. *subsimplex*  
 12449/193. *williamsii*  
 12468/211. *coccinea* var. *subsimplex*  
 12564/288. *nobilis* var. *santaremnensis*  
 12566/290. *coccinea* var. *subsimplex*  
 12629. *bahiensis*  
 15198. *excelsa*  
 20796. *lignivalvis*  
 21107. *nobilis* var. *santaremnensis*  
 21158. *grandiflora*  
 21573. *paraensis*  
 22279. *coccinea* var. *subsimplex*  
 22438. *smithii*  
 22599. *stipularis*  
 22765. *macrophylla*  
 22821. *froesii*  
 22900. *paraensis*  
 22971. *paraensis*  
 23119. *smithii*  
 23174. *paraensis*  
 23571. *paraensis*  
 23982. *macrocalyx*  
 24047. *macrocalyx*  
 24162/74. *holerythra*  
 25269. *discolor*  
 25334. *stipularis*  
 25397. *discolor*  
 25422. *excelsa*  
 26114. *macrocalyx*  
 27679. *coutinhei*  
 29268. *froesii*  
 29319. *nobilis* var. *nobilis*  
 29622. *macrocalyx*  
 29638. *macrocalyx*  
 30572. *excelsa*  
 30577. *excelsa*  
 30763. *paraensis*  
 33853. *smithii*
- GARCÍA-BARRIGA, H.
12475. *nobilis* var. *santaremnensis*  
 12510. *tovarensis*  
 13686. *coccinea* var. *subsimplex*
- GENTLE, P. H.
4145. *velutina*  
 5400. *velutina*  
 8961. *velutina*
- GLAZIOU, A. F. M.
15. *arborea*  
 10555. *fastigiata*  
 11892. *fastigiata*  
 11898. *stipularis*  
 19045. *friburgensis*  
 20275. *fastigiata*
- GOMES, A. I.
- s.n. *arborea*
- GOMEZ LEAL E OCTAVIO, C.
206. *bahiensis*
- GOMEZ-POMPA, A., ET AL.
339. *schippii*  
 380. *isthmensis*
- GONGGRIJP, J. W.
442. *costulata*
- GONZÁLES, F.
- s.n. *macrocalyx*
- GRANT, M. L.
10562. *tovarensis*
- GUARÍN, R.
2507. *antioquensis*
- GUEDES, T. N.
304. *nobilis* var. *nobilis*  
 335. *nobilis* var. *nobilis*
- GUTIERREZ, G., and SCHULTES, R. E.
825. *coccinea* var. *subsimplex*
- GUZMÁN, R.
- s.n. *macrocalyx*
- HAHN, L.
1346. *monosperma*  
 s.n. *monosperma*
- HARRIS, W.
9241. *jamaicensis*
- HATSCHBACH, G.
2646. *fastigiata*
- HAYES, S.
352. *isthmensis*  
 522. *macrocalyx*
- HEMMENDORFF, E.
235. *arborea*
- HERINGER, E. P.
93624. *arborea*



Hess, W. E.

4105. *krugii*

5376. *krugii*

HEYLIGERS, P. C.

295. *costulata*

HODGE, W. H. and B. T.

2037. *monosperma*

HOEHNE, F. C.

713. *fastigiata*

714. *fastigiata*

715. *fastigiata*

24951. *minor*

28688. *minor*

29416. *arborea*

HOHENKERK, L. S.

124 B. *coutinhoi*

124 C. *coutinhoi*

HOLDRIDGE, L. R.

448. *monosperma*

5181. *velutina*

5203. *macrocalyx*

5245. *velutina*

HOLT, E. G., and BLAKE, E. R.

632. *coccinea* var. *subsimplex*

HOSTMANN, F. W.

1299. *costulata*

HOWARD, R. A.

11367. *monosperma*

IMRAY, J.

s.n. *monosperma*

IRWIN, H. S., ET AL.

165. *coutinhoi*

189. *costulata*

47915. *coutinhoi*

48691. *paraensis*

JENMAN, G. S.

4171. *costulata*

5569. *coarctata*

6299. *costulata*

6569. *costulata*

JIMÉNEZ, J. DE J., ET AL.

2953. *krugii*

JOLY, A. B.

725. *arborea*

KILLIP, E. P., and SMITH, A. C.

29068. *grandiflora*

KINLOCK, J. B.

6. *isthmensis*

KLUG, G.

669. *bopiensis*

1207. *grandiflora*

KLUGE

14. *macrocalyx*

KRAMER, W. P.

10. *krugii*

KRUKOFF, B. A.

(see also Fróes)

1164. *paraensis*

4838. *amazonica*

5053. *elata*

5123. *amazonica*

5894. *elata*

6303. *elata*

6478. *elata*

7085. *nobilis* var. *nobilis*

7194. *nobilis* var. *santaremnensis*

7222. *lignivalvis*

8986. *nobilis* var. *santaremnensis*

9383. *isthmensis*

10408. *bopiensis*

11049. *larecajana*

12102. *nobilis* var. *santaremnensis*

12103/15066. *smithii*

KUHLMANN, J. G.

110. *nitida*

383. *paraensis*

384. *paraensis*

385. *paraensis*

387. *paraensis*

732. *arborea*

3133. *smithii*

18222. *excelsa*

41437. *arborea*

KUHLMANN, M., and JIMBO, S.

307. *paraensis*

LANCASTER, D. A.

24. *schippii*

LANG, H., and PERSAUD, A. C.

129. *coarctata*

LANJOUW, J., and LINDEMAN, J. C.

H 9. *costulata*

H 59. *costulata*

645. *coccinea*

1292. *costulata*

1710. *costulata*

2958. *cinerea*

3451. *cinerea*

LEVEL, J. S.

49. *coccinea* var. *subsimplex*

LIMA, D. A.

52-997. *bahiensis*

s.n. *bahiensis*

LIMA, FRA.

11834. *flava*

16572. *coutinhoi*

- LINDEMAN, J. C.
4526. *costulata*  
 5352. *paraensis*  
 5358. *melanocarpa*  
 6515. *costulata*  
 7126. *costulata*  
 7127. *coccinea* var. *coccinea*
- LOBO, M.
15458. *grandiflora*  
 15459. *amazonica*  
 15461. *lignivalvis*  
 15463. *nobilis* var. *nobilis*
- LOCKHEAD
- s.n. *monosperma*
- LÖFGREN, A.
333. *stipularis*
- LONG, L. E.
162. *velutina*
- LUETZELBURG, P.
21194. *smithii*
- LUSCHNATH,
131. [Martius no.] *arborea*
- LUTZ, B.
655. *arborea*
- MACEDO, A.
2687. *fastigiata*
- MACHADO, O.
76105. *arborea*  
 76112. *arborea*
- MAGALHÃES, G. M. DE
- s.n. *arborea*
- MAGUIRE, B., ET AL.
24222. *costulata*  
 24383. *costulata*  
 24960. *costulata*  
 25051. *costulata*  
 30845. *coccinea* var. *subsimplex*  
 32247. *costulata*  
 34486. *macrophylla*  
 34491. *macrophylla*  
 34882. *coccinea* var. *subsimplex*  
 37603. *macrophylla*  
 37650. *macrophylla*  
 41668. *macrophylla*  
 42530. *maguireorum*  
 43858. *costulata*  
 44171. *macrophylla*  
 47060. *coutinhoi*
- MALME, G. O. A.
2295. *fastigiata*  
 2295a. *fastigiata*  
 s.n. *fastigiata*
- MANDUCA PALMA
69343. *friburgensis*
- MARSHALL, R. C.
12243. *monosperma*
- MARTIUS, K. F. P. VON
131. *arborea*  
 3143. *macrophylla*  
 s.n. *coutinhoi*  
 s.n. *macrophylla*
- MÉLINON, M.
92. *cinerea*  
 243. *coutinhoi*  
 s.n. *cinerea*
- MELLO BARRETO, H. L.
1981. *arborea*
- MÉLOZAN, L. F.
12439. *monosperma*
- MIKAN, J. C.
- s.n. *arborea*
- MIRANDA, F.
- 8471/1. *schippii*
- MONCADA, A.
- s.n. *tovarensis*
- MONTEIRO DA COSTA, R.
93. *paraensis*
- MORAES, J. C. DE
893. *bahiensis*
- MORAES, M.
39323. *fastigiata*
- MOSÉN, H.
2830. *arborea*
- NADEAUD, J.
- s.n. *arborea*
- NEVES ARMOND
44. *arborea*
- PEARCE, R.
- s.n. *bopiensis*
- PECK, M. E.
800. *schippii*
- PÉREZ-ARBELÁEZ, E., and  
 CUATRECASAS, J.
6452. *colombiana*
- PERSAUD, A. C.
26. *coarctata*
- PETTERSEN, L. L.
9984. *macrocalyx*
- PICKEL, B.
3715. *minor*
- PIERRE, S. O.
12576. *monosperma*  
 12590. *monosperma*
- PINKUS, A. S.
206. *costulata*

PIRES, J. M., ET AL.

30. flava  
 77. excelsa  
 762. coccinea var. subsimplex  
 858. coccinea var. subsimplex  
 1012. nobilis var. santaremnensis  
 1145. nobilis var. santaremnensis  
 3823. holerythra  
 4455. flava  
 4626. coutinhoi  
 4730. coccinea var. coccinea  
 4771. paraensis  
 5421. coccinea var. coccinea  
 7643. holerythra  
 7648. paraensis

PITTIER, H.

7576. towarensis  
 15365. towarensis

PLÉE, A.

- s.n. monosperma

POITEAU, A.

- s.n. coccinea var. coccinea

PROCTOR, G. R.

10406. jamaicensis  
 10414. jamaicensis  
 17894. monosperma

PULLE, A.

473. costulata

QUESTEL, A.

866. monosperma  
 2488. krugii

RAMAGE, G. A.

- s.n. krugii  
 s.n. monosperma

RAWITSCHER, F.

15362. fastigiata

REGNELL, A. F.

- II. 2295. fastigiata  
 II. 2295a. fastigiata  
 III. 472. arborea

REITZ, R., ET AL.

799. arborea  
 1406. arborea  
 4212. arborea

REKO, B. P.

9. isthmensis

RICHARD, L. C.

- s.n. arborea  
 s.n. coccinea var. coccinea  
 s.n. monosperma

RIEDEL, L., ET AL.

1254. arborea  
 s.n. arborea

RODRIGUES, J. S.

205. holerythra  
 206. holerythra

RODRIGUES, W., ET AL.

212. costulata  
 1291. grossa  
 1318. excelsa

ROHR, J. P. B. VON

- s.n. monosperma

ROY, J. M.

- s.n. panamensis

RUDD, V. E.

1000. towarensis  
 1001. towarensis  
 1008. towarensis  
 1021. towarensis

RYAN, J.

- s.n. monosperma

SAGOT, P. A.

112. coccinea var. coccinea

SAMPAIO, A. J. DE

5354. coarctata  
 5507. coarctata  
 5560. coarctata

SAMUELS, J. A.

261. costulata

SCHIPP, W. A.

132. velutina  
 1052. macrocalyx  
 1297. schippii

SCHOMBURGK, R.

580. smithii

SCHUBERT, B. G., ET AL.

334. krugii  
 334a. krugii  
 602. macrocalyx

SCHULTES, R. E., ET AL.

822. isthmensis  
 3973. coccinea var. subsimplex  
 6088. macrocalyx  
 8998. coccinea var. subsimplex  
 9503. macrophylla  
 9888. williamsii  
 10293. excelsa  
 12952. discolor  
 14533. macrophylla  
 14541. coccinea var. subsimplex  
 19747. macrophylla

SCHUNKE, J. M.

214. macrocalyx

- SCHUNKE, V. J.  
5783. nobilis var. santaremnensis
- SEEMANN, B. C.  
1673. panamensis  
s.n. panamensis
- SEGADAS-VIANNA, F., ET AL.  
Restinga I.571. arborea
- SELLOW, F.  
155. arborea  
353. minor  
510. nitida  
820. nitida  
s.n. arborea  
s.n. arborea
- SEVERIN, A. E.  
157. arborea
- SHAFFER, J. A.  
537. monosperma  
3167. krugii
- SHATTUCK, O.  
1103. isthmensis
- SILVA, A.  
470. coutinhoi
- SILVA, N. T. DA  
87. flava  
366. grandiflora
- SINTENIS, P.  
1886. krugii  
2587. krugii  
5336. krugii  
6509. krugii  
s.n. krugii
- SMITH, A. C.  
2455. smithii  
2513. smithii
- SMITH, H. H. and G. W.  
460. monosperma  
1909. monosperma
- SOUBIROU, G.  
s.n. coccinea var. coccinea
- SPRUCE, R.  
1068. excelsa  
1194. excelsa  
1450. excelsa  
1506. discolor  
1958. smithii  
2071. williamsii  
2951. coccinea var. subsimplex  
2955. coccinea var. subsimplex  
3408. discolor  
3785. smithii  
s.n. coutinhoi  
s.n. excelsa
- STAHEL, G.  
83. costulata  
118. paraensis  
119. costulata  
120. stipularis  
235. stipularis  
251. coutinhoi  
357. coccinea var. coccinae
- STAHL, A.  
319. krugii
- STANDLEY, P. C.  
52908. isthmensis
- STEARNS, W. T.  
145. jamaicensis
- STEHLÉ, H., ET AL.  
5334. monosperma  
5511. monosperma  
5667. monosperma  
5680. krugii
- STEYERMARK, J. A.  
42058. isthmensis  
44658. isthmensis  
55144. tovarensis  
56581. tovarensis  
60266. steyermarkii  
60503. steyermarkii  
60683. paraensis  
61330. monosperma  
62245. monosperma  
86413. lignivalvis  
89475. nobilis var. bolivarensis  
90344. nobilis var. bolivarensis  
90665. lignivalvis
- TESSMANN, G.  
3665. amazonica
- TILLET, S. S. and C. L.  
45476. nobilis var. bolivarensis
- TOBIN, I.  
s.n. monosperma
- TRIANA, J. J.  
4336. macrocalyx  
6667. tovarensis
- ULE, E.  
s.n. arborea
- URIBE-URIBE, L.  
1573. tovarensis  
1611. nobilis var. santaremnensis
- VARESCHI, V.  
6338. monosperma
- VARGAS, C. C.  
14907. bopiensis

- Vogl, C.  
 795. *tovarensis*  
 s.n. *tovarensis*
- WACHENHEIM  
 88. *cinerea*  
 95. *coccinea* var. *coccinea*  
 140. *coccinea* var. *coccinea*  
 305. *cinerea*  
 s.n. *coccinea* var. *coccinea*
- WALSINGHAM, F. G.  
 15153. *macrocalyx*  
 s.n. *macrocalyx*
- WARMING, E.  
 s.n. *arborea*
- WHITE, P.  
 306. *panamensis*
- WHITFORD, H. N.  
 38. *arborea*
- WIDGREN, J. F.  
 s.n. *arborea*
- WILLIAMS, L.L.  
 3505. *coccinea* var. *subsimplex*  
 8926. *macrocalyx*  
 9423. *isthmensis*  
 12058. *paraensis*
14304. *coccinea* var. *subsimplex*  
 14336. *coccinea* var. *subsimplex*  
 14614. *coccinea* var. *subsimplex*  
 14660. *coccinea* var. *subsimplex*  
 14694. *coccinea* var. *subsimplex*  
 15954. *williamsii*  
 15965. *williamsii*
- WILLIAMS, R. O.  
 s.n. *monosperma*
- WILLIAMS, R. S.  
 1434. *bopiensis*
- WILSON, P.  
 144. *isthmensis*
- WULLSCHLÄGEL, H. R.  
 829. *costulata*  
 1439. *cinerea*
- WURDACK, J. J., ET AL.  
 40856. *coccinea* var. *subsimplex*  
 40883. *coccinea* var. *subsimplex*  
 43432. *discolor*  
 43791. *williamsii*
- ZAANDAM, C.  
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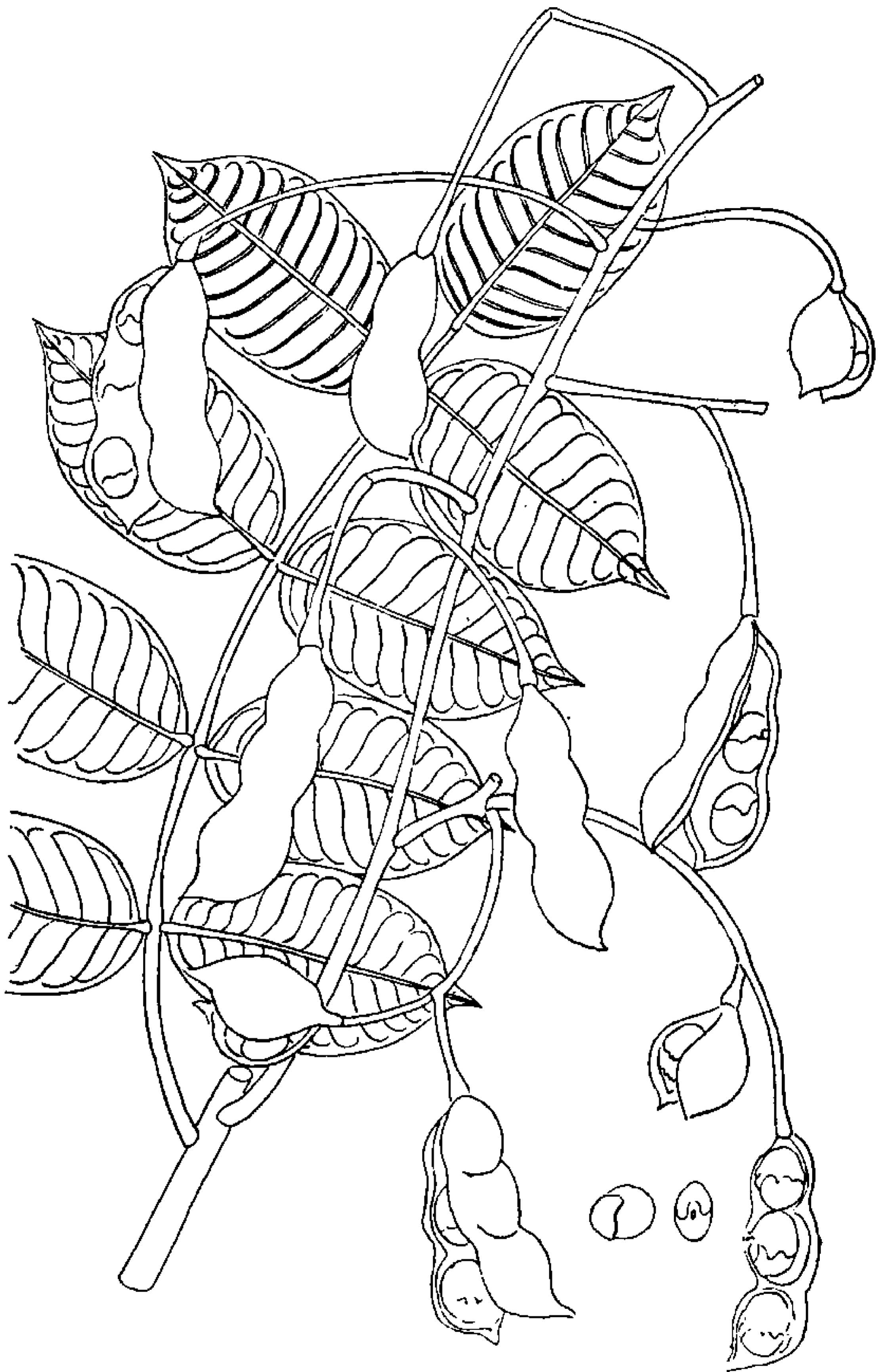
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## **PLATES**



*Pseudo-Acacia ingens, flore coccinea, nigra macula notato* (L.) P.

Drawing of "Pseudo-Acacia ingens, fructu coccineo, nigra macula notato" from Plumier's Catalog, p. 19 (M.S. 7, t. 145) [Sherard MS 150, Plate 161, at University of Oxford]



*Justicia speciosa*

1847  
 Ormosia  
 monosperma  
 Swartz



Specimen of *Sophora monosperma* Sw. (= *Ormosia monosperma* (Sw.) Urb.) in Swartz herbarium.

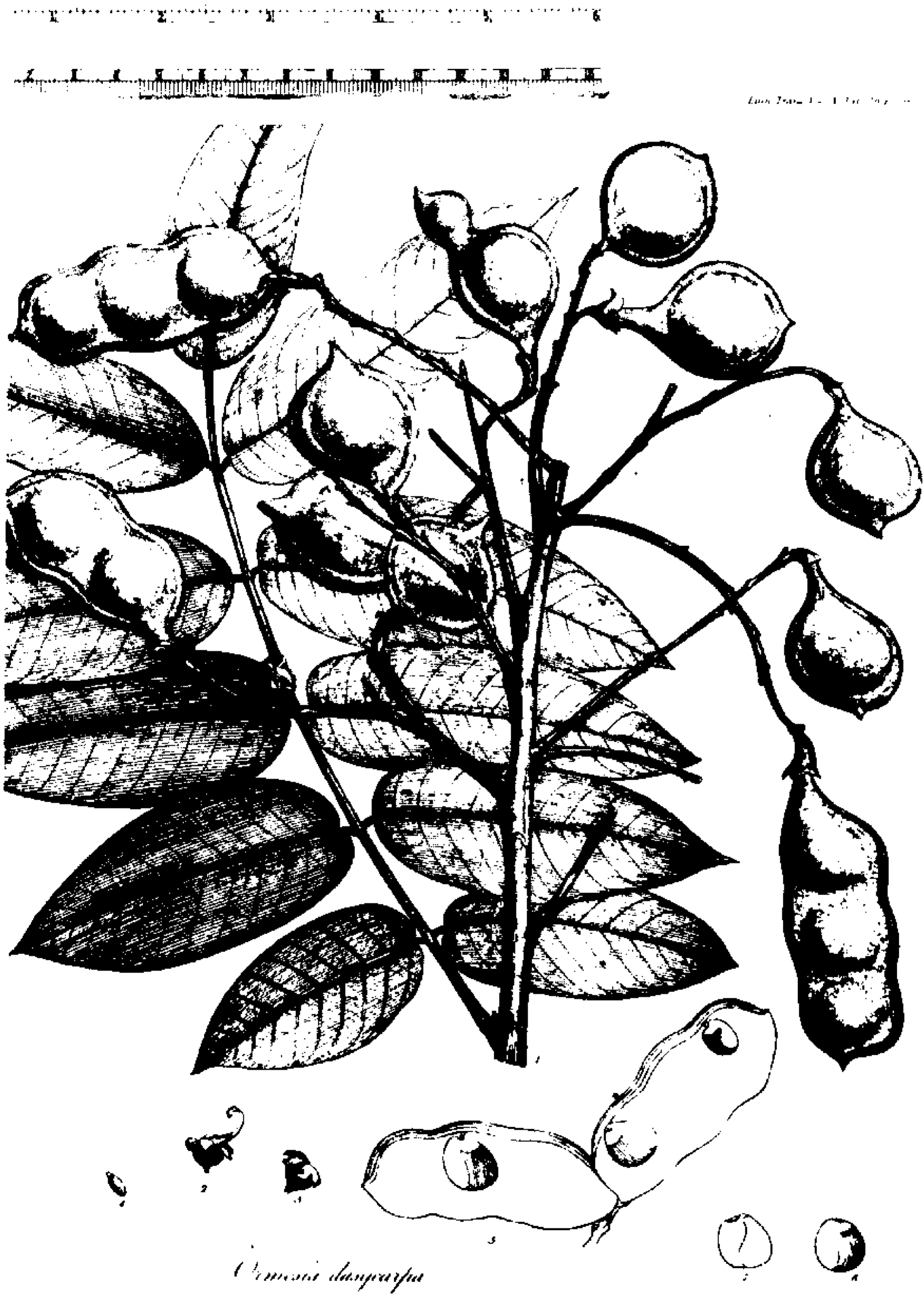


*Ormosia dasycarpa* Jacks.

HERBARIUM OF THE UNIVERSITY OF CALIFORNIA  
 UNIVERSITY AND Jepson Herbaria  
 3101 SHILBURN AVENUE  
 BERKELEY, CALIF. 94720

*Ormosia dasycarpa* Jacks. *Sin. Trans: vol*  
*Sophora monosperma* (Sw.) Urb. *Sin. Hild.*

Type of *Ormosia dasycarpa* Jacks. (= *O. monosperma* (Sw.) Urb.), originally in herbarium of A. B. Lambert.



*Ormosia dasycarpa*

Illustration of *Ormosia dasycarpa* Jacks. (= *O. monosperma* (Sw.) Urb.) from original publication of the genus *Ormosia* Jacks., based on specimen shown in plate 3.



Type of *Ormosia cuneolata* Jacks., originally in herbarium of A. B. Lambert.

1 2 3 4 5 6

1 cm



*Ormosia coarctata.*

Illustration of *Ormosia coarctata* Jacks based on specimen shown in plate 5.