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## A REVISION OF THE GENUS *GUAZUMA*<sup>1</sup>

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THE GENUS *GUAZUMA*, because of its omnipresence in the American tropics, is well represented in the larger herbaria. In spite of this, little systematic attention has been paid to this genus, with the result that the collections in these herbaria seem to consist of a confusing array of species. Several of the earlier systematists had worked out parts of the genus and because of the many variations and lack of material had been led astray on others. Many of their conclusions were inadequately stated. The results of their work have been scattered among the numerous publications of taxonomic literature and modern systematists have not had the time, nor the incentive, for the genus is of little economic importance, to uncover and recombine this literature. It has been attempted in this treatment to rectify some of the above conditions. It should be noted however that the species *Guazuma tomentosa* is still a complex entity offering material for further study. A key has been provided by which it should be possible to classify fruiting, flowering, and vegetative material. Indices to types and exsiccatae have been provided for convenience.

More than 400 specimens of the four species have been examined during the course of this study. The specimens were loaned from the herbaria at the Chicago Natural History Mu-

<sup>1</sup> Part of a thesis submitted to Henry Shaw School of Botany in partial fulfillment for the degree of Master of Arts. The author is deeply grateful to the curators of the herbaria at the Missouri Botanical Garden and Chicago Natural History Museum for the loan of study material used in the preparation of this revision.

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seum and the Missouri Botanical Garden. The work was carried out in the laboratories of the Missouri Botanical Garden under the direction of Dr. R. E. Woodson, Jr.

#### TAXONOMIC HISTORY

*Guazuma* was described first from the West Indies by Gonzalo Fernández de Oviedo y Valdés (Hist. Nat. 8: 7). In the first edition (Seville 1535) he observed that the tree is common in the West Indies and on 'tierra firme', by which he probably meant Mexico and Central America. In the second edition (Madrid 1851), published with additions and by José Amador de los Ríos, the original text was followed and some experiments described on the quality of powder made from the wood of *Guazuma* in the town of Santo Domingo. In neither of these books was the word *Guazuma* used in the generic sense. One would be led to believe that this name was taken from 'Guácimo' which is still in use by the natives of the West Indies.

Father Plumier (Nov. Pl. Am. Gen. 36. 1703) indicated that he had taken the name *Guazuma* from Oviedo. He recognized three entities, "The elm-leaved *Guazuma* with purple-black fruit", and two "Tree *Guazuma* with spreading foliage and woolly fruit", the first with large, the second with small fruit. The latter two are probably the same. A diagnosis and several drawings were given; though the drawings show the stamens free and petals without appendages, still one would not mistake them for other than those of *Guazuma*. Linnaeus (Sp. Pl. 782. 1753) placed *Guazuma* under *Theobroma* as a second species of that genus and it was to remain there until Adanson (Fam. Pl. 2: 383. 1763) observed the differences between them. He credited Plumier as the pre-linnaean author and presented in tabular form the characteristics of *Guazuma* and the other related genera. No species were given. Lamarck (Encycl. 3: 52-53. 1789) gave a very lucid description of a plant which he called *Guazuma ulmifolia*. Sufficient characteristics were given so that there is little doubt as to the species observed. His type specimen as well as his description clearly shows that his species had dehiscent fruit. For some reason most plants now labelled *Guazuma ulmifolia* Lam. bear the name regardless of whether the fruit is dehiscent or not. Humboldt, Bonpland, and Kunth (Nov. Gen. et Sp. Pl. 5: 320.

1823) described a species with indehiscent fruit which they named *Guazuma tomentosa*. Under this name they published two very good descriptions of plants in their herbarium, suggesting the possibility that they might in reality represent two distinct species.

Martius (Flora 20, Belbi. 2: 95. 1837) published a very short diagnosis of *Guazuma crinita*, a species collected near Sebastianopolis, Brazil, which he indicated as having fruit with long plumose hairs. It is interesting that his type (photograph seen) seems to contain two distinct elements. It consists of a single fruit and a flowering branch. The former has long plumose hairs, coinciding with his diagnosis, and therefore belongs to his species. The flowering branch obviously belongs to *Guazuma ulmifolia* Lam. Thus there are two species under the single Martius herbarium N° 89. It is suggested that the fruit become the type of *Guazuma crinita* Mart., and that the flowering branch be labelled *G. ulmifolia* Lam. One can only conjecture as to how the obviously different species came to be mounted on the same sheet.

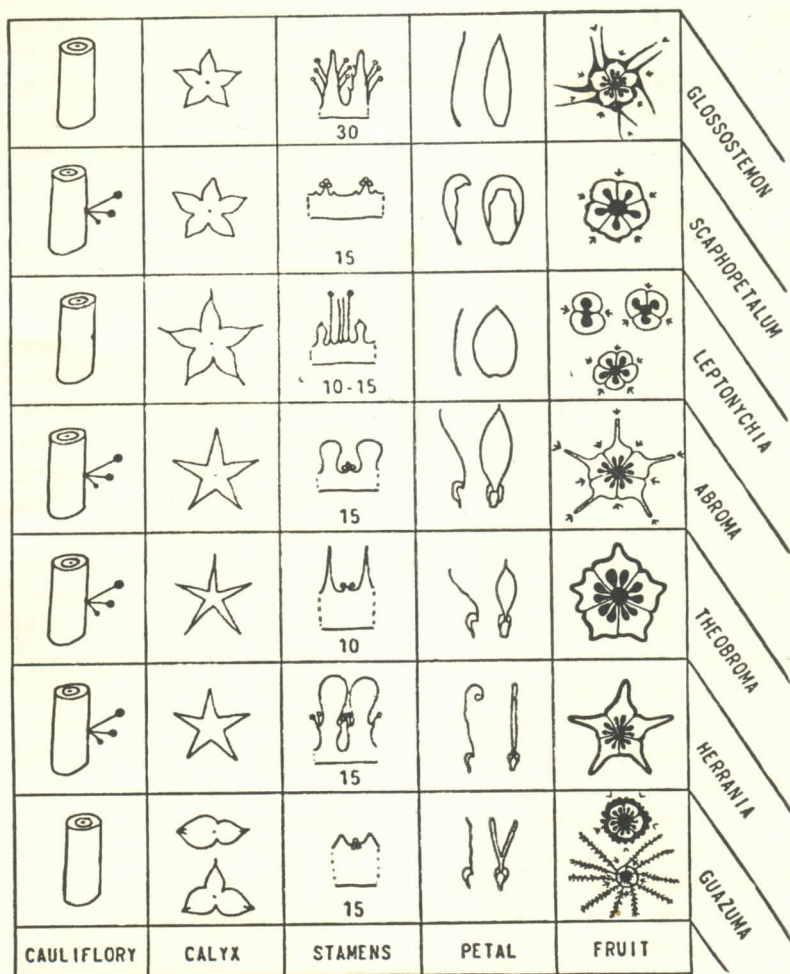
Schreber (Gen. 513. 1791) seems not to have known of Adanson's earlier work when he published the name *Bubroma* though he cites Plumier and Linnaeus in his synonymy. This event initiated a series of name changing from *Guazuma* to *Bubroma*. Willdenow (Sp. Pl. 3<sup>2</sup>: 1423. 1803) transferred the specific name *Guazuma* from *Theobroma* to a like status under *Bubroma*, and later (Enum. Pl. Berol. 806. 1809) described two new species from Brazil. Sprengel (Sys. Veg. 3: 332. 1826) upheld the names proposed by Willdenow and described a new species which he indicated might be conspecific with *Guazuma tomentosa* HBK.

Turczaninov (Bull. Soc. Nat. Mosc. 25<sup>2</sup>: 156. 1852) described a monotypic genus *Diuroglossum* which, according to his description, is indistinguishable from *Guazuma*. He mentions its proximity to *Herrania* and *Buettneria* but does not mention *Guazuma*. K. Schumann (Fl. Bras. 12<sup>3</sup>: 81. 1886) recognized *Guazuma crinita*, *G. rosea*, and several varieties of *G. ulmifolia*. Since that time, regardless of their morphological makeup, most northern plants of this genus have been named as *Guazuma tomentosa* HBK. while those more southern in distribution usually bear the name *G. ulmifolia* Lam.

## RELATIONSHIPS

The most inclusive treatment of the *Malvales* is that by K. Schumann published in Engler and Prantl's *Natürlichen Pflanzenfamilien* 3<sup>e</sup>: 1-99. 1890. There seems to be no doubt that *Guazuma* belongs in this order, nor is it difficult to place in the *Sterculiaceae*. *Guazuma* is closely allied to several other genera with which it forms the subtribe *Theobromineae* of the *Sterculiaceae*, which is characterized by stamens united into groups of two or three. This character separates it from the subtribe *Buettnerineae* which has the stamens borne singly. It is doubtful whether a division on this basis is natural since it separates from *Guazuma* the genera *Buettneria*, *Ayenia* and *Commersonia* all of which closely resemble *Guazuma*, particularly *Commersonia* which perhaps is as closely related to *Guazuma* as is *Theobroma*. The two subtribes form the tribe *Buettnerieae*, which is separated from the other tribes of the *Sterculiaceae* by the following major characters; bisexual flowers, absence of androgynophore (except in *Ayenia*), short staminal tube, and large separate cap-shaped petals. The last character though used as a key character in K. Schumann's treatment does not hold for the genera *Leptonychia* and *Glossostemon* of the subtribe *Theobromineae*. The differences of the *Theobromineae* are best summarized in table form. See figure 1.

Though the genera are quite distinct and sharply differentiated from each other, they are also clearly related one to another. It should be immediately apparent that *Guazuma* resembles the other genera in single characters more than in groups of characters. For instance the staminal arrangement of *Guazuma* is very similar to that of *Abroma*; in both genera there are 15 stamens grouped into threes. *Guazuma* has simple staminodia which are small, acute, triangular, and flat. On the other hand the staminodia of *Abroma* are large and petal-like, while representing a somewhat median position is *Theobroma* with rather long triangular staminodia. In *Scaphopetalum* the staminodes seem to be reduced to miniature teeth, two between each fertile staminal group. *Leptonychia* shows a condition of multiplication of stamens, some of which become sterile forming filamentous staminodes, and a resulting variable arrangement and number of alternating stamens and staminodes. When the staminal column is split between the sta-



**Figure 1.**—Morphological differences in the *Theobromineae*. Drawings are not to scale. Complete arrows indicate locations on fruit where dehiscence always occurs; partial arrows indicate locations where dehiscence may or may not occur.

mens nearly to the base, we find that, in *Herrania*, the 15 stamens become grouped in ones and twos on each side of the staminodes, or in *Glossostemon* the stamens become more numerous with a group of three on either side of a staminode.

All the genera of the *Theobromineae* have cap-shaped or hooded petals, except *Leptonychia* and *Glossostemon* in which

the petals are definitely flat. In *Leptonychia* the petals are scale-like while in *Glossostemon* they are quite showy. Neither of these two genera nor *Scaphopetalum* has appendages on the tips of the petals.

In those genera having apical appendages on the petals one finds a good series. Starting with *Abroma*, in which the appendage is scarcely differentiated but is very large and petal-like, the series passes through *Theobroma* with a well differentiated but small and petal-like appendage, to *Herrania* where it is extremely differentiated and extraordinarily long-linear. At the climax of this series might be found *Guazuma* in which the appendage is bifid and almost filiform.

On the basis of flower and fruit resemblances there are several other genera worth mentioning. *Buettneria*, which consists of vines or scandent shrubs and has only five stamens, resembles *Guazuma* to a remarkable degree in flower structure. The petals are hooded and with an apical appendage, the staminal tube closely resembles that of *Guazuma* although the petals are much more firmly attached, and the calyx is five-parted instead of somewhat united as in *Guazuma*. The fruits of *Buettneria* resemble those of *Guazuma* but have long spines and a more complicated dehiscence. The fruit of *Buettneria* first splits septocidally and later loculicidally nearly to the base, while that of *Guazuma* splits loculicidally only or is indehiscent.

The fruit of *Guazuma crinita* Mart. so closely resembles that of *Commersonia* that it is practically impossible to distinguish them offhand. In both genera the fruiting inflorescence bears many globose fruits covered with long plumose hairs. The mature leaves and fruits are nearly identical in size, shape, and coloration. *Commersonia* differs from *Guazuma* in that its mature fruit dehisces like that of *Buettneria*. There are usually one to two erect seeds in each carpel of the fruit of *Commersonia* while *Guazuma crinita* has two to five seeds in each carpel. The staminal arrangement in *Commersonia* is the same as that of *Guazuma* except that the two lateral anthers of each group have become minute filamentous staminodes. Perhaps the petals of *Commersonia* are an intermediate step from petals like *Guazuma* to those like *Buettneria* since they resemble the latter except that they are not so firmly attached to the staminal tube nor are the petals and appendages so large. A

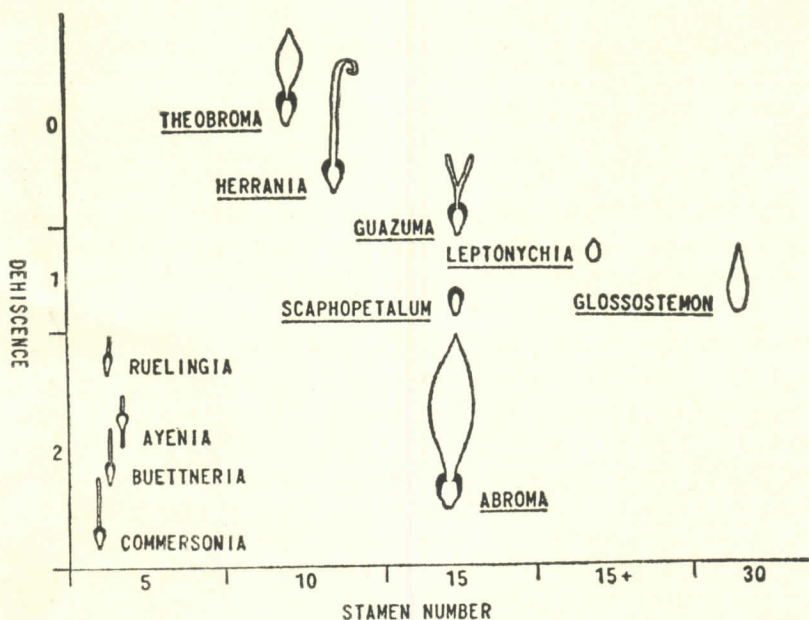


Figure 2.—Theoretical phylogeny for the *Buettnerieae*. The positions of the genera are indicated by drawings of petals representative of each. The drawings are not to scale. Genera of *Theobromineae* are underlined. Dehiscence numbers indicate: 0, indehiscent; 1, loculicidally or septicidally dehiscent; 2, loculicidally and septicidally dehiscent.

chart depicting the theoretical phylogenetic relationships of the genera of the *Buettnerieae* is given in figure 2.

*Guazuma* was divided by K. Schumann into two sections: *Commerioniopsis* containing the single species *Guazuma crinita*, and *Euguazuma* containing *G. ulmifolia* and *G. tomentosa*. Fruit and seed characters were used as a basis for this division. *Guazuma crinita* has long plumose hairs on the fruits while the other two species have short murications. There are only two to five seeds in the carpels of *Guazuma crinita* in contrast to the large number of seeds in *G. ulmifolia* and *G. tomentosa*. To support this division it may be noted that in the two species of *Euguazuma* the petals are quite large, while those of *Guazuma crinita* are very small. The fact that *Guazuma ulmifolia* and *G. crinita* dehisce alike while *G. tomentosa* is indehiscent weakens the basis for this division.

With the addition of the species *Guazuma longipedicellata*, unknown in Schumann's time, a new section (§ *Gynophoriola*) must be formed if one is to follow Schumann's scheme for subdivision of the genus. The presence of a gynophore accompanied by apiculate buds and exceptionally long pedicels seem sufficient basis for this division even though fruit characters upon which the other two sections are based, are lacking for this species.

### EVOLUTION

The evolution within the genus is, of course, speculative since one does not have the historic populations on which to base one's judgment but instead works only with the results of that population, the living representatives. To make it even more difficult one is dependent on specimens (only part of an individual plant) collected sporadically rather than systematically, with the result that there is but a fraction of the present population with which to work. Nevertheless it is quite easy to obtain some notion of the phylogeny of the four species of *Guazuma*. If one should attempt to explain the phylogeny of the genus by use of its present distribution, *Guazuma tomentosa* would be the most modern species while *G. crinita* becomes a relict population. *Guazuma ulmifolia* is placed as an intermediate, but very close to *G. tomentosa* because of their similarity of distribution. Not only has *Guazuma tomentosa* become adapted to a xerophytic habitat, while *G. crinita* prefers the rain forests, but it is seen that because of its variability and non-specificity of habitat it has occupied a larger geographic area than has the latter. Based on these criteria *Guazuma tomentosa* would seem to be the most recent species and *G. crinita* the oldest. In addition the fruit, the best taxonomic character of the species, is indehiscent in *Guazuma tomentosa*. This is presumed to be a specialization more advanced than dehiscent fruit.

Here too the flowers are the largest and the plants are by far the smallest of the genus, sometimes becoming shrubs. All of which tends to substantiate the derived condition of *Guazuma tomentosa*. Primitive characters are also found in this species. Among these are: numerous seeds, many flowers, and large anthers. *Guazuma ulmifolia* so resembles *G. tomen-*

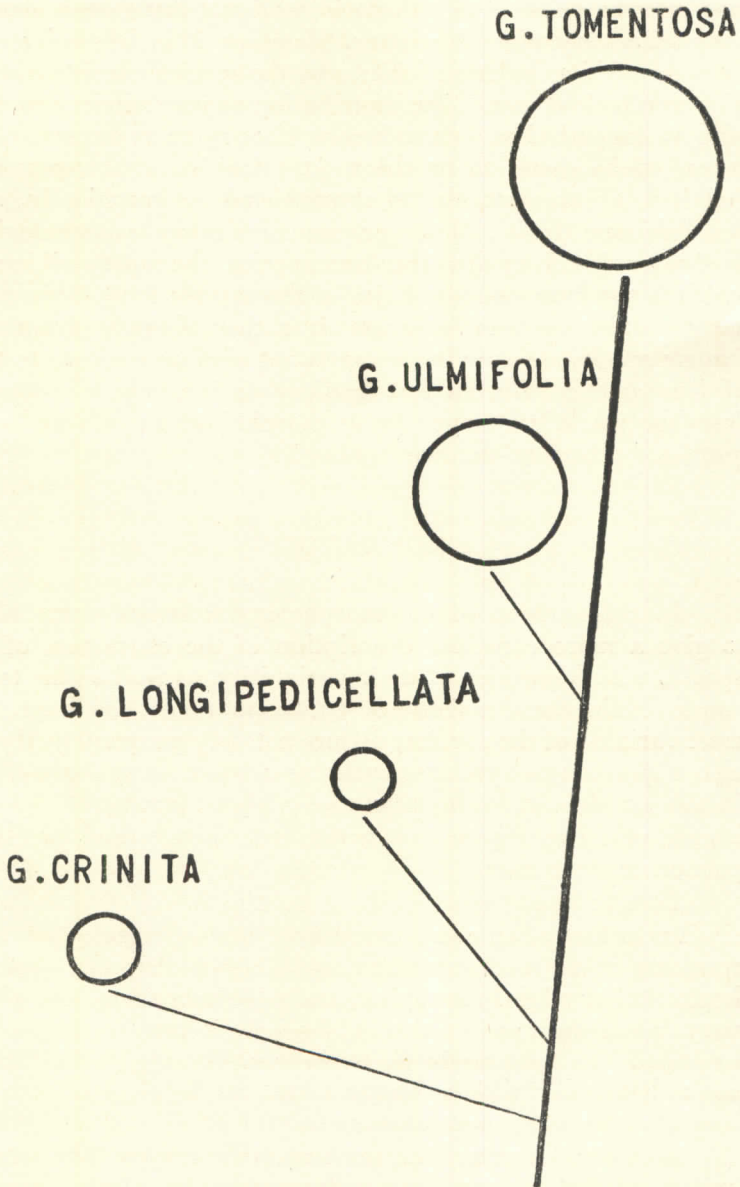
*tosa* morphologically that there is no doubt but that it should be placed very near the latter. However it is less advanced by reason of its dehiscent fruits, and the species consists mostly of medium sized trees. The distribution is very similar to that of *Guazuma ulmifolia* though somewhat more restricted. *Guazuma crinita* seems to be the most primitive of the genus in that it is arborescent, the most restricted geographically, and has dehiscent fruits. However, we find many morphological dissimilarities from the other two species, the most striking of which is the long plumose hairs of the mature fruit. This character would tend to separate it rather sharply from the former species. Occupying a somewhat similar position to that of *Guazuma crinita*, *G. longipedicellata* is sharply separated from the rest of the genus by its morphology as well as by its restricted distribution. See figure 3.

#### MORPHOLOGY

In a discussion of the morphology it seems worth while to give a more complete description of the characters of the species with some idea of their variability, as well as the terms employed in the descriptions. *Guazuma tomentosa* Lam., the most variable of the species, differs not only geographically but also within single specimens and the amount of variation within this species is greater than that within the others. The variations of all species occur in the same organs and to a proportionate degree.

**HABIT:** The general habit, at least in the upper portions, is similar to that of an elm formed by a multiply branched trunk resulting in a broad spreading, open crown. The branches are horizontal or slightly drooping, and wide spreading. The plants vary from shrubs as in *Guazuma longipedicellata* to semi-shrubs or broad low trees as in *G. tomentosa*. *Guazuma ulmifolia* is somewhat taller with a larger trunk, while *G. crinita* is the largest although a more slender tree.

**LEAVES:** These are the most variable organs. The stipules are minute, flat, acuminate scales sometimes almost filamentous or linear, about 3 mm. long, one on each side of the petiole. These are early deciduous. The petioles are short, pubescent and distichous with a peculiar thickened portion just below the leaf blade. This thickened portion is striate and



**Figure 3.**—Theoretical phylogeny for the genus *Guazuma*. Circles indicate position of species with the most advanced at top. Area of circle is proportional to distribution.

enlarged and is possibly connected with the sleep movements of the leaves noticed by George Don (Gen. Hist. Dich. Pl. 1: 522. 1831). The petiole at the base of the leaf blade divides into three to five veins, the middle of which extends up the blade to the tip. The lateral veins diverge from the base of the leaf equally with the smallest at the leaf margin. This gives an aspect of palmateness to short leaves. When the leaves are inequilateral the smaller portion of the blade bisected by the vein is always towards the branch axis. The leaves are predominantly stellate-pubescent with a few simple hairs intermingled. In *Guazuma tomentosa* both surfaces of the leaves may be densely pubescent or they may be densely pubescent on the lower but nearly glabrous on the upper surface. The leaf blade in all species is very thin, in dried specimens a fraction of a millimeter, and in the more pubescent leaves the pubescence may account for the greater part of the apparent leaf thickness.

There are all stages of intermediate pubescence. The leaves of *Guazuma longipedicellata* resemble those of *G. tomentosa* though generally thinner, while not even in the most glabrous specimens of *G. tomentosa* are there leaves that are lustrous as are those of *G. ulmifolia*. The lustrous quality seems to be due to the smoothness of the surface of the leaves. The leaf surface of *Guazuma tomentosa* is very minutely wrinkled. In the leaves of *Guazuma crinita* the surface is somewhat lustrous but the lustrous quality is slightly modified by the presence of many sessile and short stellate hairs which give a rough feel to the leaves. The degree and type of serration is variable, but in most cases is twice crenate-serrate with the largest teeth about 2 mm. long.

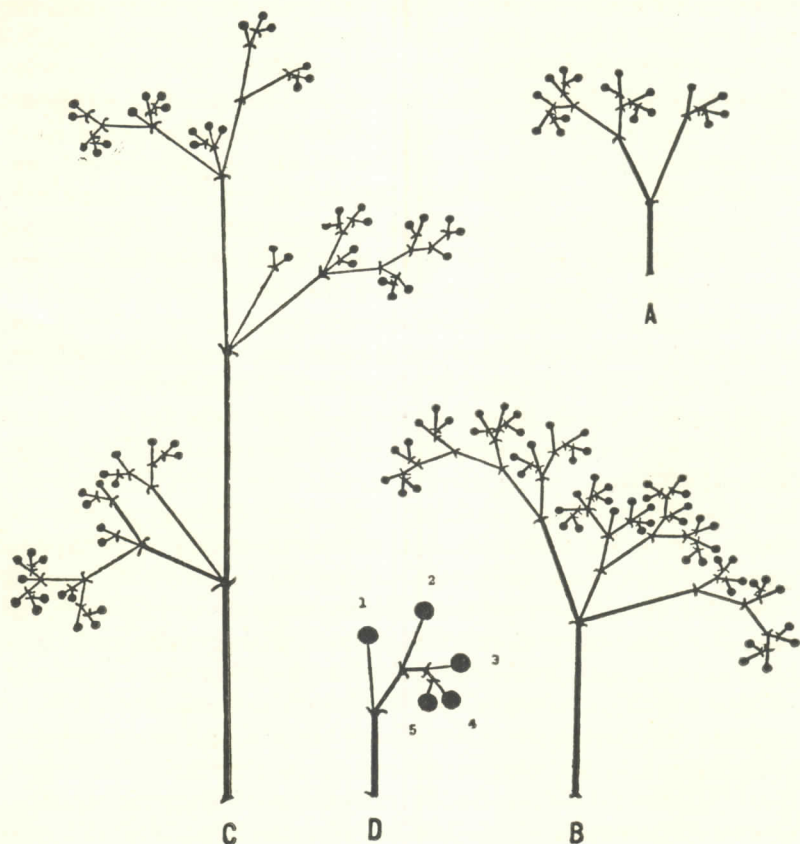
**INFLORESCENCES:** The cyme is the basic structure of the inflorescence in *Guazuma*. The main axis of an inflorescence appears to be thyriform but at each secondary branch it is jointed. Thus the main axis ends abruptly usually in a flower that may or may not develop. At the base of this 'flower' and subtended by two bracts are two lateral peduncles, one of which may become a scorpioid cyme, the other continuing the main inflorescence axis. This thyriform branching may occur but once at the base of each inflorescence as is usually the case in *Guazuma tomentosa*, several times as in *G. ulmifolia* and *G. longipedicellata*, or five to eight times as in *G. crinita*. This branching in conjunction with longer internodes results in *Guazuma crinita* having the largest inflorescences. The sec-

ondary peduncles of all four species may also branch in this manner but only a few times. The terminal scorpioid cymes have very much fore-shortened internodes which results in the flowers being tightly clustered at the tips of the secondary peduncles, a character remarkably well shown in *Guazuma ulmifolia*. The genus characteristically has very short pedicels, usually no longer than the length of the petals; however, *Guazuma longipedicellata* has pedicels 3.5 times longer than the petals. The inflorescences of *Guazuma tomentosa* are, on the whole, few-flowered and rather small when compared to those of *G. ulmifolia*, though there are many more inflorescences. In spite of the large number of flowers in *Guazuma ulmifolia* it sets no more fruit per inflorescence than does *G. tomentosa*. In both these species there are few fruits on each inflorescence while in *Guazuma crinita* there are usually many. See figure 4.

**FLOWER, GENERAL:** The flowers are relatively stable. The buds just before anthesis are spherical except in *Guazuma longipedicellata* in which they are nearly conical with an apiculate tip. As the bud opens a slit develops in the calyx, spreading from the apex down two or three sides to the receptacle. It may also split somewhat between the other sepals but here it never seems to progress to the base. The sepals therefore are valvate. The petals are also valvate but with the edges inrolled. The apical appendage is crumpled on the top of the petal in bud. The flowering in all cases occurs with the flush of leaves but tends to be earliest in *Guazuma ulmifolia* and latest in *G. crinita*. The perianth is absent in fruit.

**CALYX:** As mentioned above the calyx is slightly split between all sepals but only split to the base in two or three places. At maturity it is densely stellate on the dorsal surface and is cup-shaped, probably because of its form in the bud. The cup may be turned inside-out or not, and may be nearly perpendicular to the flower axis to definitely reflexed.

**COROLLA:** The bases of the petals may be elongated, forming claws which attach the petals to the receptacle. There are usually five large and several smaller veins extending up the petal to its apex. The petals are usually appressed-stellate on the dorsal surface. They are hooded over the stamens and weakly attached to the inside edge of the staminal column by two tiny teeth, one on each side of the petal apex. The appendage, though well differentiated from the basal hood of the



**Figure 4.**—Inflorescence diagrams for the genus *Guazuma*. A. Inflorescence diagrams for *Guazuma tomentosa*. X 1 1/2 B. Diagrams of inflorescence found in *Guazuma ulmifolia* (X 1 1/2) and in *Guazuma longipe icellata* (X 1/2). C. Inflorescence diagram for *Guazuma crinita*. X 1 D. Diagram of ultimate inflorescence showing order of flowering.

All diagrams have been simplified as to number of buds and flowers present, which are indicated by black dots. All peduncles are to scale.

petal, is no more than the elongated, reflexed apex. Three of the median veins of the petal extend up the appendage to the bifurcation where the middle vein splits into two smaller veins. In *Guazuma crinita* the resulting veins and, or, the two lateral veins, may then branch in the portions of the appendage above the bifurcation. This secondary vein branching does not seem

to occur to such an extent in the other three species; however there may be extremely small veinlets in all four.

**ANDROECIUM:** There are five staminodes, alternate with the petals, which are united into a hollow cylinder narrower at base than at the top. The tips of the staminodes are slightly shorter than the petals and usually do not project above them. The staminodes are somewhat bladderly, short, triangular structures. Between these staminodes are five sessile groups of fertile anthers. In each group, if one looks at the flower centripetally, there are two anthers on the right attached by their very short filaments to each other and then to the staminal tube, while on a somewhat longer filament, and to the left of the first two, is attached the third anther. The filaments, all of which are extremely short, are reflexed towards the receptacle so that the anthers are pendent and on the outside of the staminal tube. There are no clearly defined veins in the staminal tube leading to these structures, although there is a trace of one to each staminode and perhaps the remnants of two to each stamen group. The anther at dehiscence is extremely small, consisting of two divergent and nearly separate loculi which are united at the base and attached to a short filament. The basal body of each loculus is ellipsoidal and dark colored, usually a deep red. The valves, about the length and width of a loculus, are on the opposite end from the stalk; they are membranaceous and white or cream-colored. At maturity the valves diverge from the filament axis at an angle of approximately 80 degrees. The valves of one loculus of an anther, are almost contiguous with the valves of the other loculus, and nearly form a straight whitish disk over the top of the anther.

**GYNOECIUM:** The pistil is minute and hidden within the staminal column, only the stigma protruding slightly above the top. However, in *Guazuma longipedicellata*, because of the presence of a distinct gynophore of about the same length as the style, the entire style may protrude above the staminal column. The stigma is as long as the style and, though usually cleft into five parts, these seldom diverge. Nevertheless the lobes can be separated by mechanical means quite easily. The stigma and the style are covered with minute bristles. The base of the style has a whorl of five geniculate lobes which extend directly onto the top of the carpels of the ovary. In § *Euguazuma* and § *Gynophoriola* the ovary is covered with erect, simple and branched hairs. In § *Commersoniopsis* the

ovary is covered with longitudinal rows of minute knobs which later develop into the long plumose structures of the mature fruit.

**FRUIT:** The fruit of *Guazuma longipedicellata* is unknown so will not be mentioned in the following discussion. In the other species the fruit is a capsule consisting of five more or less heavily vascularized carpels. It may dehisce loculicidally by splitting from the apex or may release the seeds through pores which are formed by the disintegration of nonvascular tissue of the carpel wall, or may remain indehiscent if the fruit does not fall to the ground and partially decompose. The capsules of *Guazuma tomentosa*, which are more or less dehiscent by pores, may vary considerably in shape and structure. They may be quite oblongoid in the more xerophytic forms which have small, very pubescent leaves, and more spherical in mesophytic plants. The fruits of *Guazuma ulmifolia* are loculicidally dehiscent from the apex and are spherical or somewhat depressed at the ends with little variation in size and shape. *Guazuma crinita* fruits vary but little and are very small, spherical, and dehisce loculicidally. They are borne on a very short but distinct stipe formed from the base of the carpels as the fruit matures. Perhaps this may be a repressed gynophore.

The gross structure of the carpel wall is quite interesting. Here are found three distinct layers which are, centrifugally, the inner vascular or structural network, the more or less fleshy tissue or cortex, and the appendages or murications. The innermost layer in all species is quite distinct and remains hard and durable after the other tissues have rotted away in those fruits which fall to the ground. It is a network of large thick veins variously branching and forming a foundation for the other tissues. Surrounding and especially external to this network of vascular tissue is a more fleshy tissue which in dry fruits separates irregularly. In *Guazuma crinita* this separation is not noticeable while in *G. tomentosa* it is shrunken and contracted, particularly in the rounder capsules. The very outside of the carpel walls develops extremely long filamentous appendages which are plumose as in *Guazuma crinita* or short pyramidal protuberances or murications in the other species. The plumose appendages consist of a many-celled central stalk several times as long as the fruiting body, at maturity covered by numerous multicelled stellate hairs which, at times, are

quite long. The central stalk seems to develop from small meristematic region occurring as knobs in rows on the ovary and, as it forms cells basally which become hairs and stalk, it is carried up at the apex of the plumose emergence. The meristem of the murications on the other hand seems to be basal and functions for a relatively short time immediately after fertilization. When the murications have reached their full size, the fruit then begins to enlarge and at maturity may cause the murications to separate basally from one another to a greater or less degree. In *Guazuma ulmifolia* the murications are strictly pyramidal with few lateral stellate hairs, while those of *G. tomentosa* are usually conical and covered with pubescence. The mature capsule of *Guazuma ulmifolia* is extremely mucilaginous while those of the other species exhibit this character to a lesser degree.

The seeds of the three species are very similar and covered with very clear and translucent mucilage. On the seed coat are found various slightly raised groups of colored cells, and in *Guazuma crinita* they form minute, blunt, short horns. In the other two species they form irregular blotches scattered over the seed coat. The testa is extremely cartilaginous and hard but not very thick and forms a good protective layer for the embryo, which occupies the whole of the central cavity. The small amount of endosperm present is pressed into the crevices formed by the folds on the cotyledons. The embryo is straight with a micropylar plumule. The cotyledons are reflexed and rolled around the hypocotyl.

#### ECONOMICS

*Guazuma crinita* and *G. longipedicellata* have no uses other than as ornamentals while the other two species have been variously employed. Oviedo (Nat. Hist. 8: 7. 1535) must have believed the trees to be of considerable importance to the Indians of the West Indies. He mentions that a beverage made from the fruit contributed to their well-fed appearance and general healthiness. Many other uses have been noted since. They may be summarized as follows.

## FOOD

1. Fruit is eaten by animals, particularly horses and cows in the periods of drouth. The dried and ground fruit is at present used as a molasses substitute for féed concentrates in the tropics. Leaves are also eaten.

2. The succulent fruits are eaten by humans: they are a very mucilaginous affair with the taste of green figs. In the case of *Guazuma tomentosa*, the succulent tasteless fruit is edible but by no means delicious.

3. Used as a beverage by soaking the crushed fruit in water and straining off the liquid.

## WOOD

1. A very light and easily worked wood, it has been used for making slack cask staves, furniture, violins, and side pieces for coaches, general carpentering, and interior construction.

2. Used to make charcoal which is supposedly very excellent in the manufacture of gunpowder.

3. Has been used by the natives as a base board for making fire by the crossbow and stick method.

## ORNAMENTAL

The tree makes a very good shade tree since it is wide-spreading. Also interesting as the leaves hang vertically at night. Has been transported to Hawaii, Java, and India where it has escaped.

## OTHER

The tree should be mentioned as a weed since it has so many tendencies in common with those plants with widespread distribution and found in disturbed localities. *Guazuma tomentosa* particularly fits this description.

## COMMON NAMES

General: American elm, bastard-cedar, caulote, guácima, guácimo, guásima, tapaculo.

West Indies: Bay cedar, West Indian elm.

Cuba: guácimo baba.

Haiti and French Antilles: bois d'orme, bois puant, bois zombre.

St. Thomas: jackocalalu.

Tobago: congo calliloo.

Mexico: aquiche, bulines, cabal-pixoy, cuahulote, cahuilote, cuaulote, majahua de toro, palote negro, pixoi, pixoy tablole, vácima, yaco granadillo.

Guatemala: cablote.

El Salvador: caca de mico, chicharrón.

Costa Rica: diankrá, kudzir, serúru, shumgín, sungí, sungín, surruru, udzir.

Panama: guácimo de ternero.

Colombia: guácimo colorado.

Venezuela: guácimo blanco, guácimo dulce, guácimo macho.

British Guiana: wonan.

French Guiana: anhuiba, cédre, cédre jaune, mahot baba.

Brazil: ibixuma, motamba, mutamba.

Ecuador: guamo.

Peru: bolaina, iluminasi, lluicho-vainilla, papayillo.

Argentina: cambá-acá, cabeza de negro, inga-hú, inga negro, marmelero.

#### TAXONOMY

GUAZUMA Plum. ex Adans., Fam. 2: 382. 1763.

*Bubroma* Schreb., Gen. 513. 1791.

*Diuroglossum* Turcz. in Bull. Soc. Nat. Mosc. 25<sup>2</sup>: 157. 1852.

Trees. Leaves simple, alternate, stipulate, 3- to 5-costate, shortly petiolate, crenate-serrate, stellate-pubescent. Inflorescences axillary, more or less asymmetrical, thyriform, aggregate, scorpioid cymes; flowers perfect, regular, small. Calyx valvate, 2- to 5-parted at anthesis, reflexed at maturity, deciduous, stellate-pubescent dorsally. Petals 5, valvate, involute in bud, cucullate, the tips somewhat involute and minutely bifid, bearing an erect, elongate, bifid apical appendage. Stamens 15, united into a cyathiform column, the reflexed, dithecous, divergent anthers in 5 groups of 3 alternating with 5 dentiform staminodia; pollen spherical, 12.8-19.0  $\mu$  in diameter, light yellow to gray, the exine tricolpate, minutely

rugose, transparent, the intine appearing slightly tetragonal or flattened on several sides. Pistil superior, sessile, or on a minute gynophore, the ovary ellipsoidal to spherical, stellate-pubescent, 5-celled, the few to many 2-seriate, anatropous ovules on axile placentae, the style filiform, confluent at the base with 5 minute, geniculate lobes, the stigma 1- to 5- cleft, the lobes divergent or erect and connivent. Fruit a more or less woody, indehiscent or dehiscent capsule, muricate or bearing filiform appendages; seeds small, obovoid, albuminous, mucilaginous, the testa maculate, the embryo typically dicotyledonous, erect, the cotyledons supervolute.

Type species: *Guazuma tomentosa* HBK. (*Theobroma Guazuma* L.)

#### KEY TO SECTIONS AND SPECIES

- A. Flowers white, the buds narrowly ovoid, acuminate, the pedicels 3 times longer than the sepals, the gynophore manifest. Leaves ovate to oblong-ovate, slightly pubescent below and not lustrous above. (Fruit not known.) Shrubs. El. Salvador. (Sect. *Gynophoriola* G. F. Freytag) .... 1. *G. longipedicellata*  
G. F. Freytag
- AA. Flowers yellowish to lilac or pink, the buds spherical, the pedicels less than twice as long as the sepals, gynophore absent. Trees or shrubs.
- B. Fruit covered with relatively short, stout murications; seeds many in each cell; petal appendages scarcely longer than the basal hood. (Sect. *Euguazuma* K. Schumann)
- C. Fruit indehiscent, the murications separating irregularly at maturity; petals prominently clawed; leaves ovate to oblong-ovate, pubescent and not lustrous above. Mexico, Central America, and Antilles, south to Ecuador ..... 2. *G. tomentosa* HBK.
- CC. Fruit dehiscent, the murications not separating at maturity; petals not prominently clawed; leaves oblong

to ovate-oblong, glabrate and lustrous above. British Honduras and Antilles, south to Paraguay ..... 3. *G. ulmifolia* Lam.

- BB. Fruit covered with filiform, plumose emergences and stellate hairs; seeds 3-6 in each cell; appendages three to four times longer than the basal hood. (Sect. *Commersoniopsis* K. Schumann). Ecuador, northeastern Peru and adjacent Brazil; Rio de Janeiro bay area ..... 4. *G. crinita* Mart.

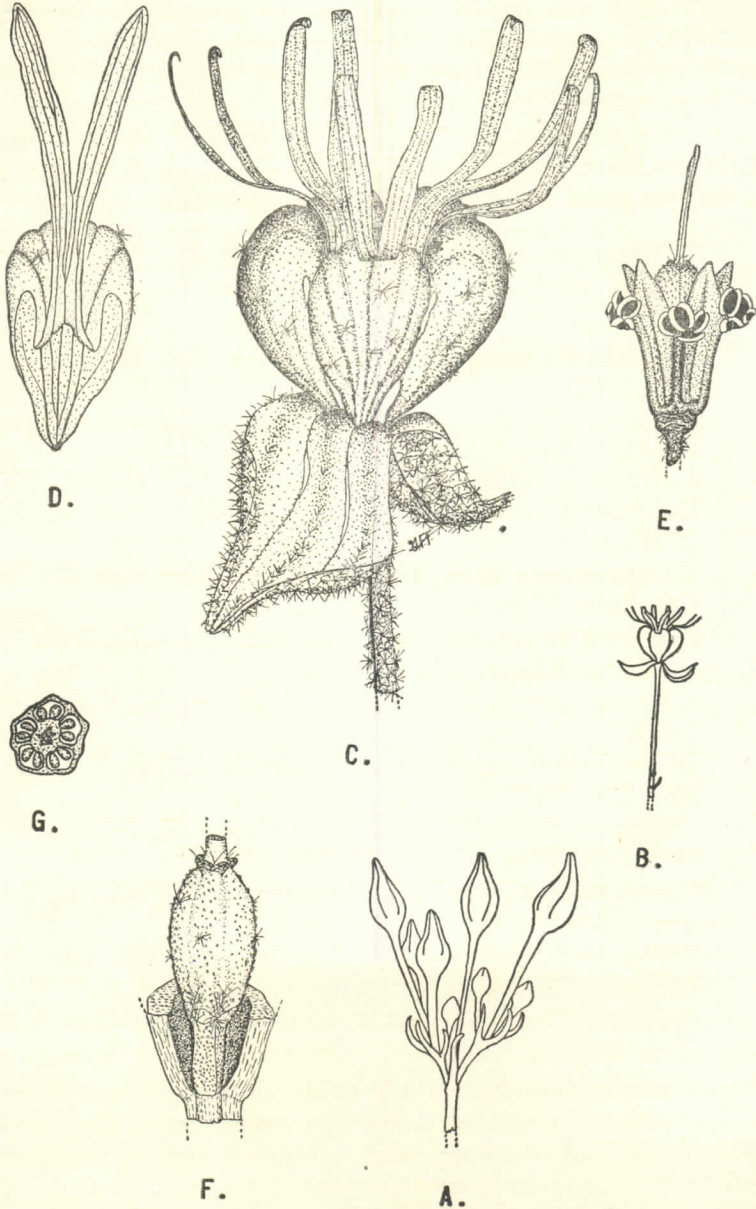
### § *Gynophoriola* G. F. Freytag, n. sect.

Inflorescentia laxiflora, pedunculis pedicellisque pro genere longissimis. Alabastra florum anguste acuminata. Pistillum breve stipitatum, gynophorio manifesto.

#### 1. *Guazuma longipedicellata* G. F. Freytag, n. sp.

Frutex ca. 3 m. altus; ramis foliosis obscure flexuosis juventute albo-stellato-pubescentibus, internodiis 1.0-1.5. cm. longis. Folia opaca ovata vel oblongo-ovata, 5-11 cm. longa, et 2.5-5.0 cm. lata, supra glabra subtus pubescentia, basi leviter cordata nunc inaequilateralia nunc aequilateralia, 5-costata, apice acuta vel acuminata; petiolis 0.5-1.5 cm. longis. Inflorescentiae laxiflorae 5-6 cm. longae; pedunculis et pedicellis 15-20 mm. longis. Sepala ovato-lanceolata acuminata, 5 mm. longa, in anthesi irregulariter separata. Petala alba, lamina cucullata apice profunde inflexa, basi minute unguiculata, basi 3-4 mm. longa 2 mm. lata; appendicibus usque 1/2 bifidis 4-6 mm. longis 0.25-0.5 mm. latis. Tubus stamineus 1 mm. longus; antheris et staminodiis 1 mm. longis. Pistillum breve stipitatum, gynophorio manifesto 2.5 mm. longo; ovariis 1 mm. longis pubescentibus et minute papillatis; stylis 1.5 mm. longis; stigmatibus conniventibus. Fructus desideratur.

EL SALVADOR: Usulután: dry flats of Río Lempa, near the highway, altitude 120 m., Feb. 14, 1946, *Margery C. Carlson 651* (TYPE in Herb. Chicago Natural History Museum).



**Plate I.—*Guazuma longipedicellata* G. F. Freytag** A. Terminal portion of inflorescence. X 3 B. Flower and pedicel. X 1 C. Flower. X 15 D. Petal and appendage. X 16 E. Flower with petals and sepals removed. X 16 F. Portion of gynoecium showing gynophore. X 20 G. X-section of ovary. X 20.

Though this species resembles *Guazuma tomentosa* vegetatively, its long peduncles and pedicels in addition to the apiculate buds make it quite a distinct species. The presence of a gynophore has been considered of sufficient importance to erect a new section. The fruit no doubt would cast much light on the true position of the species since the other sections are based primarily on fruit characters.

§ EUGUAZUMA K. Schumann in Mart. Fl. Bras. 12<sup>3</sup>: 81. 1886.

2. GUAZUMA TOMENTOSA HBK., Nov. Gen. et. Sp. Pl. 5: 320. 1823.

*Theobroma Guazuma* L., Sp. Pl. 782. 1753.

*Bubroma Guazuma* (L.) Willd., Sp. Pl. 3<sup>2</sup>: 1423. 1803.

*Bubroma tomentosum* (HBK.) Spreng., Syst. 3: 332. 1826.

*Guazuma tomentosa* HBK. var. *mompoxensis* G. Don, Gen. Hist. Dich. Pl. 522. 1831.

*Guazuma tomentosa* HBK. var. *cumanensis* G. Don, l. c.

*Guazuma Blumei* G. Don, l.c.

*Guazuma parvifolia* A. Rich. in Sagra, Fl. Cuba, 190. 1845.

*Diuroglossum rufescens* Turcz. in Bull. Soc. Nat. Mosc. 25<sup>2</sup>: 156. 1852.

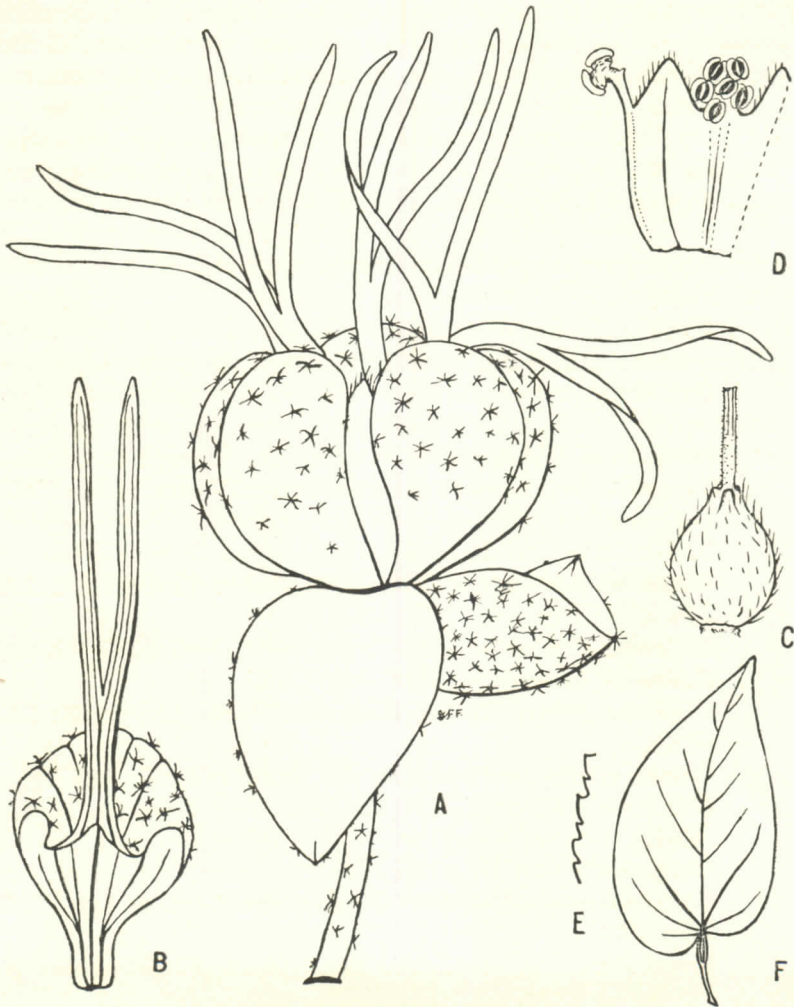
*Guazuma ulmifolia* Lam. var. *velutina* K. Schumann in Mart., Fl. Bras. 12<sup>3</sup>: 81. 1886.

*Guazuma ulmifolia* Lam. var. *tomentosa* (HBK.) K. Schumann, l.c.

*Theobroma tomentosa* (HBK.) Gómez in An. Hist. Nat. 19: 217. 1890.

*Guazuma Guazuma* (L.) Cockerell in Bull. Torrey Bot. Club 19: 95. 1892.

Trees 2-16 m. tall; leafy twigs obscurely flexuose, with white to orange-brown stellate pubescence when young, the internodes 0.5-4.5 cm. long, with a purple-tinted, minutely reticulate or ridged bark when mature. Leaves ovate to oblong-ovate, 3.0-15.5 cm. long, 1.8-6.5 cm. wide, usually pubescent on both surfaces, prominently 3- to 5-costate at base, cordate, sometimes obtuse, inequilateral or not, the tip acuminate to acute; petioles 0.5-2.0 cm. long. Inflorescences dense, 2-3 cm.



**Plate II.**—*Guazuma tomentosa* HBK. A. Flower. X 13 B. Petal and appendage. X 13 C. Pistil. X 13 D. Portion of staminal column viewed centripetally. X 13 E. Leaf margin. X 2 F. Leaf. X 1/2.

long in flower, not enlarging in fruit, the flowers more or less clustered; primary peduncles of inflorescence 0.5-1.0 cm. long; pedicels 3-5 mm. long at anthesis. Sepals 3-4 mm. long, reflexed. Petals green to cream, usually yellowish, 3-4 mm. long, 1.5-3.0 mm. wide, with a claw at times reaching 1 mm. in

length; appendage 4-6 mm. long, 0.2-0.5 mm. wide. Staminal column 1.5-2.0 mm. long, the stamens and staminodes 2-3 mm. long, the anthers 0.5-0.8 mm. in diameter. Ovary 1 mm. long, pubescent, the style 1 mm. long, the stigmas loosely connivent. Fruit spherical to oblongoid, 17-37 mm. long, 14-26 mm. wide, indehiscent, the murications tuberculate to acuminate-pyramidal, separating deeply and irregularly at maturity; seeds numerous in each cell, obovoid, 2.0-3.8 mm. long, covered by reddish-gray papillae visible through the mucilaginous coating, the embryo 1.7-2.5 mm. long.

Growing in dry open forests, 0-3,000 feet above sea level. Mexico and Antilles south through Central America to Ecuador.

By far the most variable species of the genus not only in morphology but also in habitat preference. It is not advisable at present to divide the species complex. Though the fruit is indehiscent it most closely resembles that of *Guazuma ulmifolia*.

3. *GUAZUMA ULMIFOLIA* Lam., *Encycl.* 3: 52. 1789.

*Guazuma polybotrya* Cav.,  *Ic. et Descr. Pl.* 3: 51. t. 299. 1794.

*Bubroma Invira* Willd., *Enum. Hort. Berol.* 806. 1809.

*Bubroma polybotryum* (Cav.) Willd.,  *l.c.*

*Bubroma grandiflorum* Willd. ex Spreng.,  *Syst.* 3: 332. 1826.

*Guazuma Bubroma* Tussac,  *Fl. Antill.* 4: 69. 1827.

*Guazuma Invira* (Willd.) G. Don,  *Gen. Syst. Pl.* 1: 523. 1831.

*Guazuma grandiflora* (Willd. ex Spreng.) G. Don,  *l.c.*

*Guazuma utilis* Poepp. et Endl.,  *Nov. Gen. ac Sp. Pl.* 3: 72. 1844.

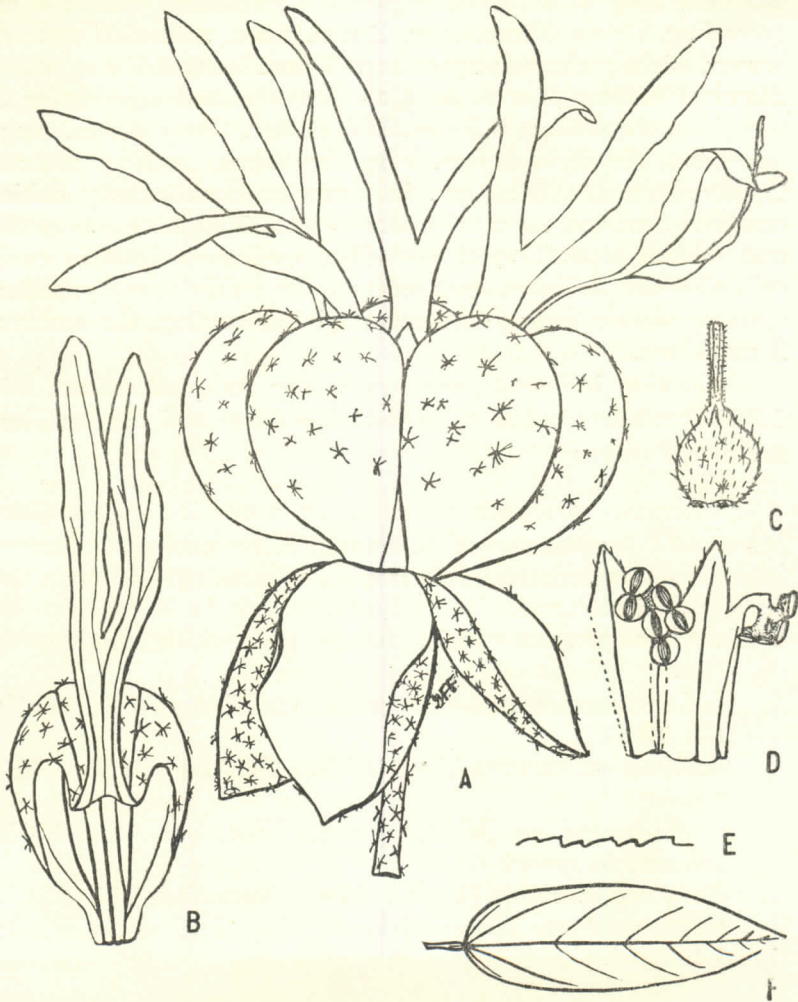
*Guazuma ulmifolia* Lam. var.  *glabra* K. Schumann in  *Mart., Fl. Bras.* 12<sup>3</sup>: 81. 1886.

*Guazuma ulmifolia* Lam. var.  *tomentella* K. Schumann,  *l.c.*

*Guazuma Guazuma* (L.) Cockerell var.  *ulmifolia* (Lam.) O. Ktze.,  *Rev. Gen. Pl.* 3<sup>2</sup>: 24. 1893.

*Guazuma coriacea* Rusby in  *Bull. N. Y. Bot. Gard.* 4: 332. 1907.

Trees 1.5-20 m. tall; leafy twigs obscurely flexuose, with orange-brown stellate pubescence when young, the internodes 0.5-2.5 cm. long, with purple-gray, minutely reticulate or ridged bark when mature. Leaves oblong to ovate-oblong, 7-16 cm. long, 2-8 cm. wide, pubescent below, glabrate and lustrous



**Plate III.**—*Guazuma ulmifolia* Lam. A. Flower. X 13 B. Petal and appendage. X 13 C. Pistil. X 13 D. Portion of staminal column viewed centripetally. X 13 E. Leaf margin. X 2 F. Leaf. X 1/2.

above, distinctly 3-costate at base, obtuse, sometimes cordate, inequilateral or not; petioles 0.8-2.5 cm. long. Inflorescences dense, 3-5 cm. long in flower, not enlarging in fruit, the flowers inequilateral or not; petioles 0.7-2.5 cm. long. Inflorescences 0.5-1.0 cm. long, the others extremely fore-shortened; pedicels

4-5 mm. long at anthesis. Sepals 3-4 mm. long, reflexed or spreading. Petals 4 mm. long, 2 mm. wide, yellow to yellow-brown, slightly clawed; appendage 4 mm. long, 0.5 mm. wide. Staminal column 2 mm. long, the stamens and staminodes 3 mm. long, the anthers 0.5 mm. in diameter. Ovary 1 mm. long, pubescent, the style 1 mm. long, the stigmas loosely united. Fruit spherical, 0.5-2.0 cm. in diameter, loculicidally dehiscent into 5 valves, the murications 4- to 6-sided, obtuse to acute and seldom separating at maturity; seeds numerous in each cell, obovoid, 2.5 mm. long, covered by reddish-gray papillae scarcely visible through the mucilaginous coating, the embryo 2 mm. long.

Growing in forests, swampy to dry rocky situations, 90-1,000 feet above sea level. British Honduras and the Antilles, south to Paraguay.

*Guazuma ulmifolia* seems to be a species intermediate between *G. tomentosa* and *G. crinita*. It resembles the former in most characteristics, differing most strikingly in that the fruit is dehiscent as is that of *Guazuma crinita*. It seems to be a fairly homogeneous species though quite widely distributed.

§ COMMERSONIOPSIS K. Schumann in Mart., Fl. Bras. 12<sup>3</sup>: 81. 1886.

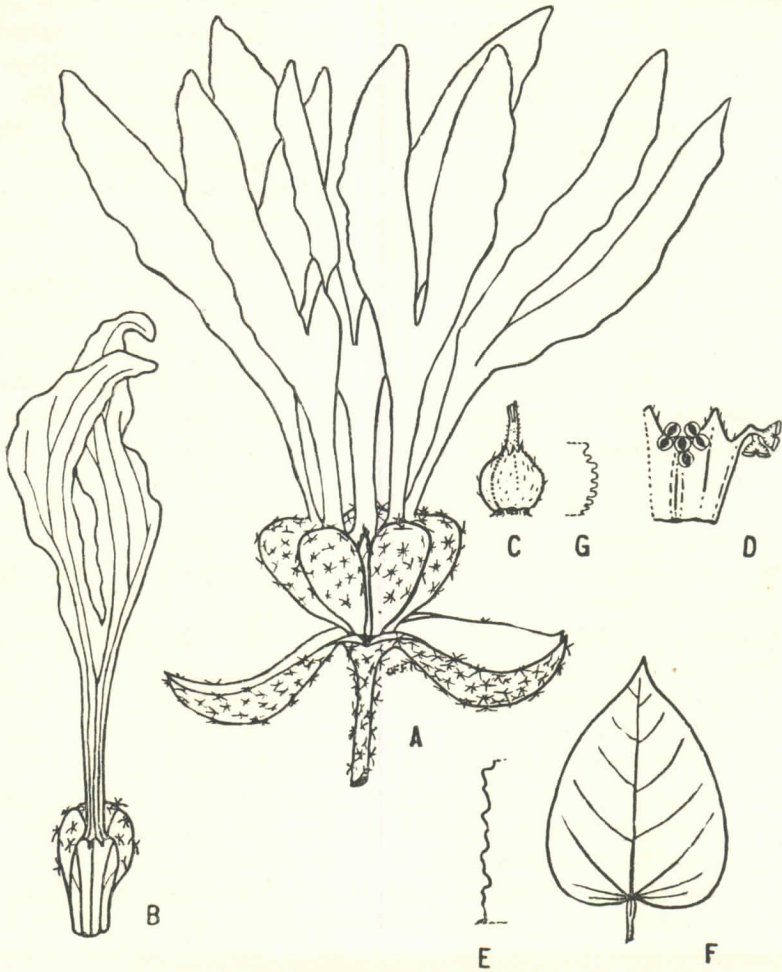
4. GUAZUMA CRINITA Mart. in Flora 20, Beibl. 2: 95. 1837.

*Guazuma critina* (Mart.) Steud., Nom. Bot. 710. 1841, *sphalm. in synonym.*

*Bubroma crinitum* (Mart.) Steud., Nom. Bot. 233. 1841.

*Guazuma rosea* Poepp. et Endl., Nov. Gen. ac Sp. Pl. 3: 72. 1844.

Trees 10-20 m. tall; leafy twigs slightly flexuose, with orange-brown stellate pubescence when young, the internodes 2-5 cm. long with nearly black, minutely reticulate or ridged bark when mature. Leaves broadly ovate, 11-13 cm. long, 6.0-8.5 cm. wide, pubescent below, usually glabrate above, prominently 3- to 5-costate at base, obtusely cordate to truncate, the tip acute to slightly acuminate; petioles 1.5-2.5 cm. long. Inflorescences open, 6-7 cm. long in flower, becoming 15 cm. long, 10 cm. wide; pedicels 3-4 mm. long at anthesis. Sepals 3 mm. long, spreading. Petals 2 mm. long, less than



**Plate IV.**—*Guazuma crinita* Mart. A. Flower. X 13 B. Petal and appendage. X 13 C. Pistil. X 13 D. Portion of staminal column viewed centripetally. X 13 E. Leaf margin. X 2 F. Leaf. X 1/3 G. Outline of meristematic knobs on ovary. X 50.

1 mm. wide, pink or lilac; the appendage 6-7 mm. long, 1 mm. wide, somewhat crisped above the bifurcation. Staminal column 1 mm. long, the stamens and staminodes 1.5 mm. long, the anthers 0.3 mm. in diameter. Ovary 0.8 mm. in diameter, covered by minute papillae in longitudinal ridges, the style

1 mm. long, the stigmas united. Fruit spherical, the body 5-8 mm. in diameter, loculicidally dehiscent into 5 valves, covered with stellate hairs and numerous, minutely plumose, filiform emergences 30 mm. long, the base produced into a pedestal 1 mm. long; seeds 3-6 in each carpel, broadly obovoid, 2 mm. long, with many short black aculeae which appear through the mucilaginous coating as black speckles, the embryo 1 mm. long.

Growing in forests on frequently flooded river banks, 600-900 feet above sea level. Flowering from November to April. Ecuador, northeastern Peru and adjacent Brazil; Rio de Janeiro bay area.

This species is quite distinct in appearance from the others in that the leaves are considerably larger, the petals very small but with very large appendages, and the fruit quite remarkable because of the long plumose emergences which completely cover it.

#### INDEX TO TYPES

*Bubroma grandiflorum* Willd. ex Spreng., (Brazil, *Hoffmann-segg s.n.*).

*Bubroma Invira* Willd., (Brazil, *Willdenow 849.3*).

*Diuroglossum rufescens* Turcz. (*Jameson 399*).

*Guazuma Blumei* G. Don, (Java, collector unknown).

*Guazuma coriacea* Rusby, (Bolivia, near *Rusby 1859*, Guanai, Bolivia, *Bang 2217*).

*Guazuma crinita* Mart., (Montis Telegraphici prope Sebastiano-polis, Brazil, *Herb. Mart. 89* in part [fruit]).

*Guazuma longipedicellata* G. F. Freytag, (El Salvador, Usulután, dry flats of Río Lempa, near the highway, alt. 120 m., Feb. 14, 1946, *Margery C. Carlson 651*).

*Guazuma polybotrya* Cav., (Nova-Hispania, collector unknown).

*Guazuma rosea* Poepp. et Endl., (Crescit in sylvis provinciae peruvianae Maynas and pagum Yurimaguas, *Poeppig 2366*).

*Guazuma tomentosa* HBK., (*Theobroma Guazuma* L., Jamaicae campestribus, *Herb. Linn. 934.2*).

*Guazuma ulmifolia* Lam., (St. Thomas, *Herb. Lam. s.n.*).

*Guazuma ulmifolia* Lam. var. *glabra* K. Schumann, (Amazonas, Brazil, *Poeppig 2118*).

*Guazuma ulmifolia* Lam. var. *tomentella* K. Schumann, (Peruvia orientali ad Maynas, *Poeppig s.n.*).

*Guazuma ulmifolia* Lam. var. *tomentosa* K. Schumann, (In Pro-

vincia Bahia in ripis fluviorum, e.g. Jaguaripe, Aracatay, Brazil, *Martius s.n.*).

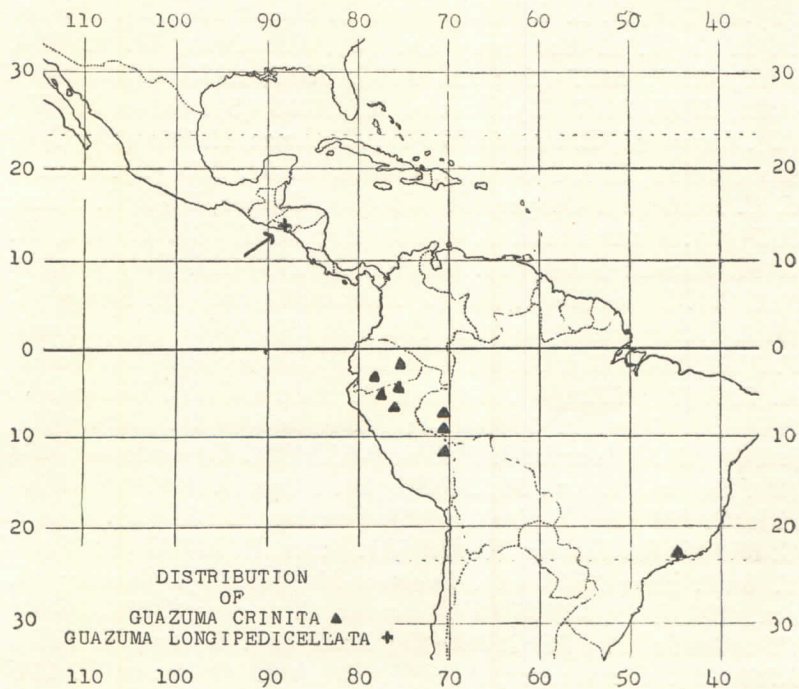
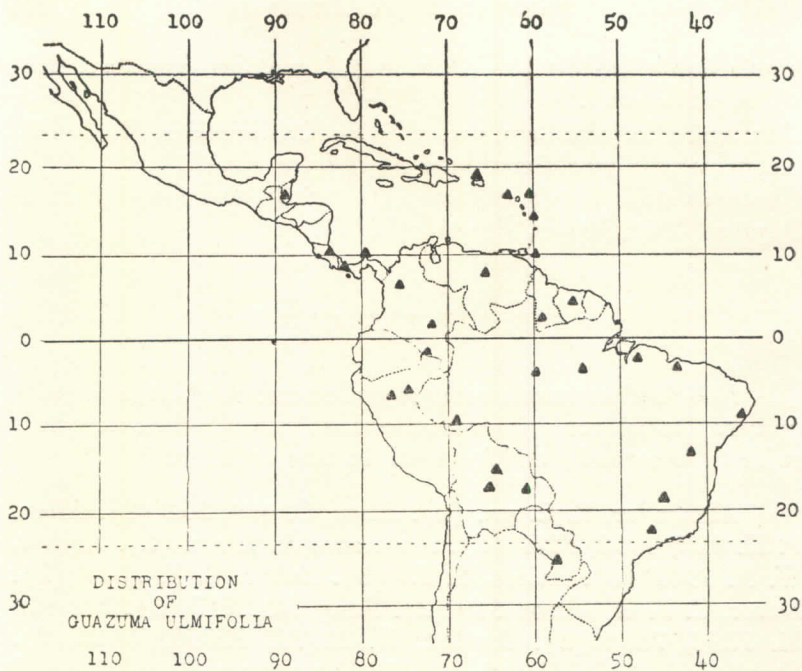
*Guazuma ulmifolia* Lam. var. *velutina* K. Schumann, (In Braziliae provinciis meridionalibus, *St.-Hilaire s.n.*).

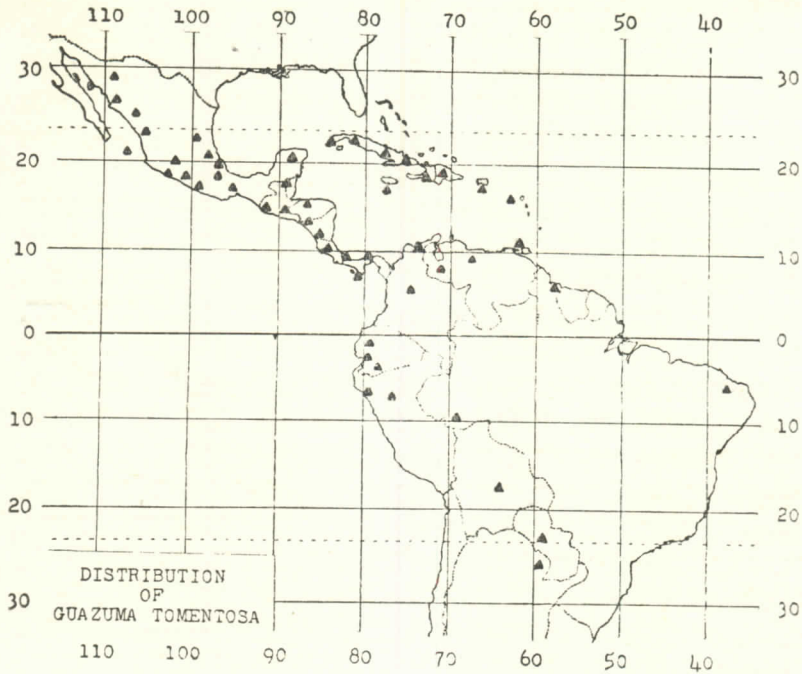
*Guazuma utilis* Poepp. et Endl., (Crescit in ripa fluminis Huallaga ad Yurimaguas, *Poeppig 2118*).

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*Italicized* numerals refer to collectors' numbers, *s.n.* (*sine numero*) to an unnumbered collection; parenthetical numerals refer to taxonomic entities used in this revision.

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## TOLTEC, ANOTHER NEW HORTICULTURAL VARIETY OF AVOCADO

Wilson Popenoe

IT IS COMING TO BE GENERALLY RECOGNIZED that the improvement of Central American fruit culture depends in large part upon the vegetative propagation of superior seedling trees which are to be found here and there. Up to now, vegetative propagation has been limited mainly to those species such as the banana and the pineapple, which produce suckers or are otherwise propagated by divisions. The species of *Spondias* grow so readily from cuttings that when sections of large branches are used for fence posts they take root and develop into satisfactory trees.

In some parts of Central America grafting has in recent years become the accepted means of propagating numerous imported fruit varieties, such as those of the family Rosaceae, the citrus fruits, the mango and the avocado. But there is still a vast field awaiting us, in the selection and vegetative propagation of many fine tropical fruits such as the anonas, the sapotes, and the guavas.

While vegetative propagation is the basis of this work we must devote more attention to the selection of the best seedling forms of local origin. To make these known, to classify them, and to put on record accurate details regarding their qualities, good and bad, we must have recourse to systematic pomology. This is a subject which seems almost to have escaped attention in Central America. So far as I can recall, I have never seen a pomological description of a new fruit variety prepared in Central America — if we except the description of *Aztec*, a new horticultural variety of avocado, published recently in *Ceiba*.

In future issues of this journal, we propose to devote more attention to systematic pomology and its application to

the development of scientific fruit culture in these regions. Special techniques must be worked out for the description of many fruits which have been neglected by horticultural science. I endeavored to bring this matter to the attention of tropical horticulturists by publishing in "Tropical Agriculture" (Trinidad), vol. XVIII, N° 2, 1941, a brief paper entitled "The Mango: a Study in Systematic Pomology". In this I set forth the method which has been developed in Asia, and later in the United States, for the accurate description of named varieties of this popular fruit.

The description of avocado varieties has received much attention in the United State ever since avocados were first grafted commercially by George B. Cellon in Florida, back in 1901. William A. Taylor published during the early years of this century what were probably the first good descriptions of avocado varieties in the Yearbooks of the United States Department of Agriculture. No one was better prepared to set the standards for future workers in this particular field.

I now desire to place on record the description of a new avocado variety, one of the 1947 introductions from the Rodiles grove in Atlixco, state of Puebla, Mexico. The history of these introductions is adequately set forth in connection with the description of *Aztec*, referred to above. It should be mentioned that the present variety, when the parent tree was examined in the Rodiles grove, did not meet with approval on the part of several members of our party, because of the large size of the seed. In its favor was the tremendous crop it was carrying, the relatively small size of the fruit (now considered to be commercially a desideratum in California), and its brilliant, glossy green color. Budwood was brought to the Escuela Agrícola Panamericana, where several trees, both original buddings and several others propagated from them, came into bearing in 1950. The quality of the fruit has proved to be so excellent that it is considered worth while to name and describe the variety. It may prove to be highly desirable for the home garden, even if not acceptable for extensive commercial use. So far as concerns such regions as California and Florida, much will of course depend upon its resistance to frost, a feature which cannot be determined here. Though probably of hybrid origin, it leans strongly toward the Mexican race in characteristics of foliage and fruit, which gives rise to the hope that it may prove to be reasonably hardy.

*PERSEA AMERICANA* var. **Toltec**, *hort. var. nov.*

Originated as a seedling of unknown provenance in the Rodiles orchard, Atlixco, Puebla, Mexico, N° 13522. Age of tree unknown, but probably 25 years or more. First propagated vegetatively in October 1947. To be known as "*Toltec*".

FRUIT broadly ovoid to obovoid, occasionally almost round and occasionally tending toward broadly pyriform; size small; weight 6 to 8 ounces; surface smooth, glossy moss green with abundant small yellowish lenticels; skin thin, about like that of many varieties of the Mexican race; flesh cream-yellow near the seed, changing to yellowish green near the skin, texture smooth, no conspicuous fiber streaks; fat content not yet determined but probably rather high; flavor rich and nutty as is commonly the case in the Mexican race; quality excellent; seed medium large to large, round or broadly ovoid, tight in the cavity; season November to January at Escuela Agrícola Panamericana, Tegucigalpa, Honduras, (elevation 2600 feet).

TREE erect, well-branched, with rather small and stiff leaves, the anise-like odor not as strong as in many varieties of the Mexican race. The parent tree bore a tremendous crop in 1947 in Atlixco; budded trees did not produce any fruit in 1949 at Escuela Agrícola Panamericana but bore excellent crops in 1950. The tendency to alternate bearing cannot be determined as yet.

TWO NEW SPECIES OF PLEUROTHALLIS  
FROM HAITI

Louis O. Williams

A PECULIAR circumstance is to be noticed in West Indian orchids of several genera, apparently not common elsewhere or at least not common enough to impress itself on the observer. This is the dentate or denticulate margins of the leaves in a large number of species. This characteristic is to be noticed on both of the species described here. It is found on other species of the same genus and on species of *Oncidium* particularly.

**Pleurothallis** (§ *Lepanthiformes*) **dentifera** *L. Wms.*,  
*sp. nov.*

Herbae parvae epiphyticae caespitosae usque ad ca. 4 cm. longae. Folia elliptica vel obovata, acuta vel obtusa, denticulata. Sepalum dorsale late ovatum, acutum. Sepala lateralia usque ad medium connata, ovalia, acuta, cucullata, leviter arcuata. Petala lineari-lanceolata vel elliptico-lanceolata, acuta. Labellum oblongo-ovatum; lamina basi truncata vel retusa. Columna sectionis.

Small caespitose epiphytic herbs up to ca. 4 cm. long, the 3-6 sheaths with flaring, ciliate mouths. Leaves 4-13 mm. long and 1.5-5 mm. broad, elliptic to obovate, acute or obtuse, the margins denticulate and subcartilaginous. Inflorescence one or more few-flowered racemes, subequal to the leaves. Dorsal sepal ca. 1.3-1.8 mm. long and 1-1.2 mm. broad, broadly ovate, acute, 1-nerved. Lateral sepals connate to about the middle, 1.3-8 mm. long and each 0.6-0.8 mm. broad, ovate, acute, cucullate, 1-nerved, slightly arcuate. Petals 1-1.2 mm. long and ca. 0.2-0.3 mm. broad, linear-lanceolate to elliptic-lanceolate, acute, nerveless. Labellum ca. 0.8 mm. long and 0.5-0.6 mm. broad, oblong-ovate, the lamina truncate or retuse at the base, surface minutely puberulent. Column 0.5-0.7 mm. long.

HAITI: epiphytic on hardwood trunks, Guimbi, Galata, Mornes des Commissaires, altitude 1800 m., June 21, 1942, *Holdridge 1296* (TYPE in The Ames Herbarium, Harvard University, Cambridge, Massachusetts).

*Pleurothallis dentifera* is allied to the Haitian *P. hotteana* Mansf. but is easily distinguished by the shape of the lip and by other details. The specific name is in allusion to the denticulate leaf margins.

### ***Pleurothallis platyglottis* L. Wms., sp. nov.**

Herbae epiphyticae caespitosae parvae usque ad ca. 11 cm. altae. Folia lineari-elliptica, acuta vel obtusa, carnosa, denticulata vel serrulata. Sepalum dorsale anguste lanceolatum, acutum. Sepala lateralia usque ad medium connata, ovato-lanceolata, acuminata. Petala lineari-lanceolata, acuta vel acuminata, obscure denticulata vel integra. Labellum unguiculatum; unguis perbrevis; lamina orbiculari-subquadrata, basi auriculata, discus callis duobus ornatus et margine denticulatus.

Small caespitose epiphytic herbs 4-11 cm. tall. Secondary stems 1.5-5 cm. long, slender, with 1-2 scarious sheaths below. Leaves (when mature) 1.9-3.8 cm. long and 0.3-0.5 cm.

broad, linear-elliptic, acute or obtuse, fleshy, the margins denticulate or serrulate. Inflorescence a slender, few-flowered raceme usually exceeding the leaves in length. Dorsal sepal 9-10 mm. long and ca. 2.5 mm. broad, narrowly lanceolate, acute, 3-nerved. Lateral sepals ca. 10 mm. long and together 4-5 mm. broad, ovate-lanceolate, acuminate, connate to about the middle or beyond. Petals 4-5 mm. long and ca. 1 mm. broad, linear-lanceolate, acute or acuminate, obscurely denticulate or entire, 1-nerved. Lip ca. 2 mm. long and 1.5 mm. broad, unguiculate; claw very short, subfiliform; lamina attenuated into a narrow claw-like base which is provided with 2 small auricles, the terminal part broad, orbicular-subquadrate and with basal auricles and 2 small calluses on the disc near the auricles, margins more or less denticulate. Column ca. 3 mm. long; the clinandrium denticulate above, with a pair of obtuse, conspicuous terminal auricles.

HAITI: small epiphyte, Guimbi Galata, Mornes des Commissaires, alt. 1800 m., sepals greenish-brown streaked with brown lines, June 21, 1942, *Holdridge 1287* (TYPE in Ames Herbarium, Harvard University, Cambridge, Massachusetts).

*Pleurothallis platyglottis* seems to be most closely allied to the Cuban *P. trichophora* Lindl., from which it differs in several details. *Pleurothallis platyglottis* is a much more delicate plant than *P. trichophora*, has the lateral sepals connate to the middle or beyond, not free, and different in shape, has a pair of small auricles at the much contracted base of the lip.

The lip of this species reminds one of the lip of *Masdevallia simula* Reichb. f.

## A NEW TILLANDSIA FROM HONDURAS

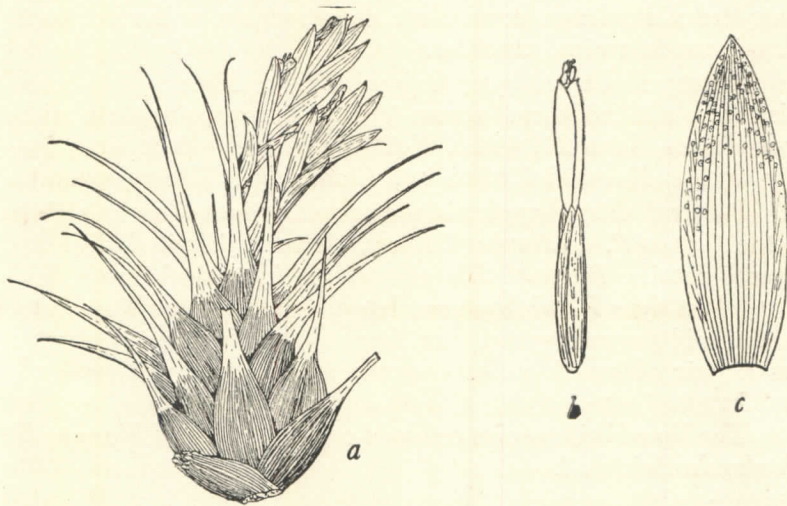
Lyman B. Smith

AMONG a number of unusual Bromeliaceae received from the Escuela Agrícola Panamericana in the last few years we find a *Tillandsia* which does not appear to have been noted before.

### ***Tillandsia cryptopoda* L. B. Smith, n. sp.**

Acaulis, florifera 24 cm. alta; foliis multis, dense sed haud bulbosae rosulatis, ad 20 cm. longis, utrinque densissime adpressequae lepidotis, vaginis ellipticis, amplis, castaneo-lepid-

otis, laminis anguste triangularibus, acuminatis, basi 15 mm. latis, cinereo-lepidotis; scapo brevissimo, foliis omnino occulto; inflorescentia pauperrime ramosa (spicis binis formata), curvata; bracteis primariis minimis quam eis florigeris multo minoribus; spicis erectis, ellipticis, valde stipitatis et bracteis sterilibus auctis, ca. 3 cm. latis, valde complanatis, densis 3-5-floris; bracteis florigeris ellipticis, acutis, ad 45 mm. longis, sepala superantibus, carinatis, vivis verisimiliter subcarnosis, ex sicco tenuibus nervatisque, rubris (! Williams), dissite obscaesque cinereo-lepidotis; floribus subsessilibus; sepalis lanceolatis, acutis, 4 cm. longis, liberis, membranaceis, dissite lepidotis; petalis erectis, fere 7 cm. longis, nudis, viridibus (! Williams); staminibus exsertis.



TILLANDSIA CRYPTOPODA L. B. Smith - *a*, habit, X 1/4; *b*, flower, X 1/2; *c*, floral bract, X 1.

HONDURAS: Morazán: on oak near La Labranza, Cloud forest on Mt. Uyuca, drainage of the Río Yeguaré at about Longitude 87° W. and Latitude 14° N., alt. 2000 m., March 1950, *Louis O. Williams 17224* (TYPE in Herb. Esc. Agr. Panam.).

In its habit and especially in its very short scape, *Tillandsia cryptopoda* resembles such species as *T. incurva* Griseb., *T. flabellata* Baker, and *T. patula* Mez. It differs from all three

in its large sepals, from *T. incurva* and *T. patula* in its carinate floral bracts and from *T. flabellata* and *T. patula* in its lepidote sepals.

## PLANTAE CENTRALI-AMERICANAE, II

Paul C. Standley y Louis O. Williams

EN las páginas siguientes aparecen descripciones de más de treinta especies nuevas de plantas de Costa Rica, encontradas en colecciones recientes determinadas en el Herbario de la Escuela Agrícola Panamericana. Especialmente ricas en novedades han sido las colecciones de Paul H. Allen, provenientes de los bosques de la costa del Pacífico, y las de Jorge León, de la tierra caliente atlántica y de las montañas del interior.

Los tipos están todos en el Herbario de la Escuela Agrícola Panamericana. Duplicados de muchos de ellos, sobre todo los de las colecciones Allen y Williams, han sido distribuidos al Herbario del Chicago Natural History Museum, y a otros herbarios de los Estados Unidos.

**Philodendron brevinodum** Standl. & L. Wms., *sp. nov.*

Frutex epiphyticus scandens, caudice 5-6 mm. tantum crasso, internodiis superioribus 1.5-3 cm. longis, cataphyllis lineari-attenuatis usque ad 5 cm. longis, cito caducis; folia inter minora, in sicco firme chartacea, petiolo gracili vulgo 2.2-2.5 cm. longo, anguste fere ad apicem alato; lamina sub-oblique late ovata vel late deltoideo ovata, 7.5-10 cm. longa, inferne 5.5-7 cm. lata, basi oblique brevissime subcordata, apice subabrupte contracto-acuminata, acumine anguste acuminato, costa vix prominente, nervis lateralibus numerosissimis et approximatis, omnibus subaequalibus, paullo in sicco conspiciuis; pedunculus spadiceus crassus fere 2 cm. longus; spatha in statu fructifero convoluta, 7.5 cm. longa, 3.5 cm. diam., ventricosa, perfecta non visa; spadix sessilis, ca. 5.5 cm. longa et 3 cm. crassa.

COSTA RICA: Moravia, Turrialba, Prov. Cartago, alt. 1100 m., Jun. 14, 1950, León 2548.

La especie es notable por sus entrenudos cortos, y por sus hojas relativamente pequeñas, anchas, de nervadura fina y espesa, todos los nervios casi iguales en su prominencia.

**Philodendron hastiferum** Standl. & L. Wms., *sp. nov.*

Liana epiphytica glabra, caudice 1.5 cm. crasso, internodiis brevibus; cataphylla magna, petiolum fere aequantia; petiolus usque 37 cm. longus vel ultra, anguste vaginatus, vaginae ala 6 cm. infra basin laminae terminante, apice brevissime auriculata; lamina in sicco crasse membranacea, supra laete viridis, sublucida, subtus paullo pallidior, oblongo-hastato-ovata, lobis basilaribus inclusis ca. 40 cm. longa, 20 cm. lata, prope medium latissima, inferne versus lobos paullo contracta, apice triangulari-acuminata, basi profunde angustaque cordata, lobis basilaribus inferne vel paullo extus directis, inaequalibus, longiore 12 cm. longo, anguste triangulari, apicem obtusum versus sensim angustato, altero 8 cm. tantum longo; lamina supra laevis, nervis obscuris, costa subtus prominente, basi 4 mm. lata, nervis basalibus 6, lateralibus primariis ca. 10-jugis, teneris, prope marginem in nervum collectivum regularem junctis, secundariis multo tenuioribus, numerosissimis; pedunculi pseudofasciculati, 5-12 cm. longi, in sicco 5-8 mm. crassi; spatha viridescenti-alba, ca. 11 cm. longa, valde convoluta, 2-2.5 cm. crassa, in praeflorescentia apice acuminata, infra medium paullo angustata; spadix sessilis vel breviter pedunculatus, parte feminea 3 cm. longa, parte mascula 5.5 cm. longa, 1.5 cm. crassa, alba, apice obtusa; stigmata breviter 4-loba, 2-2.5 mm. lata.

COSTA RICA: epiphytic aroid, spathe greenish white, spadix white, fairly frequent on the sides of large trees, region between Río Esquinas and Palmar Sur de Osa, forested hills above Esquinas, Province of Puntarenas, alt. 60 m., June 14, 1950, *Allen 5563*.

Especie fácil de reconocer por sus grandes hojas hastadas. Debe ser una planta muy ornamental. como muchas otras especies del mismo género.

**Philodendron lancigerum** Standl. & L. Wms., *sp. nov.*

Epiphytica scandens, caudice radicante, 1-1.5 cm. crasso, internodiis brevibus; cataphylla usque 21 cm. longa, convo-

luta, longe sensim attenuata, apice acuminata; folia magna, petiolo perfecto non viso, parte suprema 4 cm. longa nuda, dense granuloso tuberculata; lamina in sicco membranacea, oblongo-lanceolata, ca. 42 cm. longa et inferne 15 cm. lata, apicem versus sensim angustata, apice subito triangulari-acuminata, basi sat profunde lateque cordata, lobis basalibus inferne directis, ca. 6 cm. longis, apice rotundatis, costa supra obvia, basi 4 mm. lata, nervis primariis obviis sed vix elevatis, utroque latere 7-8, angulo lato abeuntibus, marginem attingentibus, basalibus vulgo 4, secundariis tenerrimis, oculo obscuris; pedunculi solitarii vel bini, 8-20 cm. longi, ca. 5 mm. crassi; spatha vinaceo-rubra, superne alba, convoluta, 9.5 cm. longa et 2 cm. crassa, expansa 4 cm. lata, apice obtusa et apiculata; spadix sessilis, parte feminea 3 cm. longa, parte mascula 6.5 cm. longa, 1.5 cm. crassa.

COSTA RICA: spathe wine red on inner and outer surfaces except upper half of outer surface is greenish-white, vicinity of Palmar Norte, Río Térraba, province of Puntarenas, alt. 30 m., August 20, 1950, *Allen 5612*.

La forma de las hojas es característica para la especie, que no se puede referirse a cualquiera otra señalada para Costa Rica o Panamá.

***Costus maritimus* Standl. & L. Wms., sp. nov.**

Planta ut videtur erecta et gracilis, 2.5 m. alta, caulibus superne ca. 1 cm. crassis; folia numerosa, superioribus 2.5-3.5 cm. sejunctis, vaginis dense velutino-pilosulis, pilis brevissimis; lamina lineari-lanceolata, firme membranacea, plerumque 23-26 cm. longa et 3-5 cm. lata, longe sensim in apicem subulatum attenuata, basin versus sensim angustata, basi ipsa anguste obtusa, utrinque sat dense pilis brevibus tenerrimis patentibus vel subadpressis molliter pilosula, tactu mollis; spicae terminales, anguste pyramidales, 7-12 cm. longae; bracteae numerosissimae, sursum sensim decrescentes, reflexae, appendicibus lanceolatis, inferioribus usque 3.5 cm. longis et 12 mm. latis, viridibus, longe anguste attenuatis, ut foliis indutis, superioribus 2-2.5 cm. longis, glabratibus, roseo tinctis, ut inferioribus reflexis; calyx 9 mm. longus, breviter trilobus, nervosus, dense adpresso-pilosulus, arcte nervosus, lobis late ovatis, subacutis; corolla lutea, 2.5 cm. longa, glabra, labello segmentis aliis vix longiore.

COSTA RICA: flowers yellow, bracts green tinged with pink, fairly frequent, plant 2.5 m. tall, in brushy places above rocky beaches, vicinity of the delta of the Río Esquinas, Golfo Dulce, province of Puntarenas, alt. 0, Aug. 28-29, 1950, *Allen 5625*.

Aliada con *Costus Lima* Schum., de Costa Rica y Panamá, pero en ésa la corola es rosado intenso y más grande, y las hojas son mucho más grandes, 18-40 cm. de largo y 5-12 cm. de ancho.

***Calathea platystachya* Standl. & L. Wms., sp. nov.**

Planta magna erecta ca. 3-metralis, caulescens, omnino glabra; folia longipetiolata, petiolo tereti, apice 5-8 mm. crasso; lamina papyracea, utrinque glabra, oblongo-ovata, 80-95 cm. longa, 25-38 cm. lata, apice abrupte breviterque cuspidato-acuminata, basi late rotundata vel subtruncata, abrupte contracta et breviter lateque decurrens; spicae 24-28 cm. longae, 10 cm. latae, oblongae, valde compressae; bracteae distichae, utroque latere ca. 14, conduplicatae, explanatae subreniformes, ca. 5.5 cm. longae, chartaceae, apice rotundatae et apiculatae, arcte nervatae, primo glaucae, in vivo viridescenti-albae; flores sessiles, rubescenti-brunneae, 5.5-6 cm. longae; sepala pallida, lineari-lanceolata, 2.5 cm. longa, 3 mm. lata, acuta, arcte nervosa; corollae tubus 3.5-4 cm. longus, 2-2.5 mm. crassus, lobis patentibus, lineari-lanceolatis, 12-17 mm. longis, acutis, paucinervis; stamen et staminodia petaloidea, obovato-flabellata, inferne sensim contracto-unguiculata.

COSTA RICA: plants about ten feet tall, bracts greenish-white, flowers reddish-tan, infrequent in climax forest, region between Río Esquinas and Palmar Sur de Osa, forested hills above Esquinas, province of Puntarenas, alt. 60 m., June 14, 1950, *Allen 5564* (TYPE); bracts grayish-green, flowers reddish-tan, infrequent in forest, forested hills near the Esquinas Experiment Station, vicinity of Río Esquinas, province of Puntarenas, alt. 60 m., August 7, 1950, *Allen 5597*.

Es difícil creer que todavía existiera en Costa Rica una planta tan grande y tan vistosa que fuera una especie nueva, sobre todo en el género *Calathea*. La especie más afín es claramente *Calathea insignis* Peters., una planta común en los pantanos de ambas costas de Centro América, y uno de los habitantes más conspicuos de tales lugares. Esta especie nue-

va se distingue fácilmente por sus espigas florales mucho más anchas y menos rígidas, sus brácteas largas y relativamente angostas, y por sus flores de casi doble tamaño.

EPIDENDRUM PSEUDOWALLISII Schltr. en Fedde Repert, Sp. Nov. Beihefte 19: 124. 1923.

COSTA RICA: Cariblanco, Prov. Heredia, alt. 800 m., Mar. 15, 1950, *León 2364*.

Especie sumamente rara, tal vez no recolectada después de encontrada por los hermanos Brade, cerca de Buena Vista, llanuras de San Carlos, en 1910. Ames, Hubbard y Schweinfurth en "The genus Epidendrum", 157. 1936, no habían visto colecciones, pero dicen que puede resultar nada más que una forma grande de *E. Endresii* Reichb. f. La especie es muy distinta, de ningún modo parecida a *E. Endresii*. La colección presente está tan perfectamente de acuerdo con la descripción de Schlechter, como también con una copia de su análisis floral que existe en nuestro herbario, que no puede haber duda acerca de la identificación. La columna es muy corta en proporción al tamaño de la flor; es adnata a la base del labio por 2-3 mm.; tiene en el ápice tres apéndices delgados pero coriáceos, el dorsal (y central) hendido, y todos truncados y carcomidos.

***Leochilus parviflorus* Standl. & L. Wms., sp. nov.**

Herbae parvae epiphyticae usque ad 10 cm. altae; pseudobulbus suborbicularis vel late ovato-orbicularis, valde complanatus, 8-12 mm. longus, 5-8 mm. latus, apice unifoliatus et cum (1-2) foliis cataphyllariis subtenientibus, foliis 3-4.5 cm. longis, 0.5-1 cm. latis, ellipticis, coriaceis; inflorescentiae e basi pseudobulbi et basibus vaginantibus cataphyllorum nascentes, paniculatae, foliis longiores; bracteeae 1.5-2.5 mm. longae, scariosae, canaliculatae, plerumque pedicellis breviores; flores minimi generis, perianthii segmentis omnibus ocellatis; sepalum dorsale ovatum, obtusum et breviter apiculatum, 1-nervium, cochleatum, dorso paullo ad apicem secus nervum carinatum, ca. 3.5 mm. longum et 2 mm. latum; sepala lateralia oblongo-ovata, obtusa, apiculata, 1-nervia, obliqua, ad medium vel altius connata, basi aliquanto cochleata, ca. 4 mm. longa et quoque sepalo ca. 1.5 mm. lato; petala subquadrato-ovata, subtruncata, 3-nervia, ca. 3 mm. longa et 2.5 mm. lata; labellum lineari-oblongum, subpanduratum, obtusum et retu-

sum, parte centrali carnosoincrassatum, apice tenui, basi incrassatum et subsaccatum, cum disco tenui calloso retrorse supra orificium basis saccatae perducto, ca. 5 mm. longum et 2.5 mm. basi latum, ad medium 1.25 mm. latum, apice 2 mm. latum; columna generis.

COSTA RICA: Carrizal, Prov. Alajuela, alt. 1500 m., Mar. 12, 1950, *León* 2325 (TIPO en Herb. Esc. Agr. Panamá.; dupl. en Herb. Instit. Interam. Cienc. Agr., Turrialba, C. R.)

Más angostamente aliada con *Leochilus gracilis* Schltr., pero fácil de distinguir de ésa por las flores más pequeñas con pétalos más anchos, por los sépalos laterales connatos y por detalles del labelo.

### **Ficus Georgii** Standl. & L. Wms., *sp. nov.*

Subgenus *Urostigma*. Arbor omnino glabra, ramulis crassiusculis, cinnamomeis, cortice exfoliante, internodiis brevibus; stipulae caducae, lanceolato-ovatae, 12-14 mm. longae, longe attenuato-acuminatae; folia parva, tenuiter coriacea, petiolo crasso, 6-10 mm. longo; lamina oblongo-elliptica vel elliptica, 6.5-8.5 cm. longa, 3-4 cm. lata, subito breviterque acuminata, acumine subobtusum, basi obtusa, costa crassa, utrinque prominente, nervis supra in sicco prominulis, utroque latere ca. 13, angulo fere recto divergentibus, teneris, prope marginem in nervum collectivum conjunctis, venulis utrinque prominulis et arcte reticulatis; pedunculi geminati, tenues, patentes, 5-8 mm. longi; involucrum patens vel subreflexum, bilobum, 4 mm. latum, lobis apice late rotundatis; receptacula depresso-globosa, 7 mm. lata, basi et apice rotundata, laevia, dense minute puncticulata, ostiolo parvo, sat prominente.

COSTA RICA: Prov. Cartago: Pejibaye, Turrialba, alt. 600 m., Jul. 15, 1950, *Jorge León* 2560.

En sus caracteres superficiales parecida a *Ficus padifolia* HBK., especie común en casi toda Centro América, pero diferenciada por el ostiolo prominente del receptáculo, y por las hojas más coriáceas con nervadura bien distinta, los nervios laterales saliendo casi a un ángulo recto.

FICUS TORRESIANA Standl. en Field Mus. Nat. Hist. Bot. Series 18: 387. 1937.

COSTA RICA: Prov. Cartago: Instituto, Turrialba, 600 m., Abr. 1950, *León* 2463.

Cuando se publicó esta especie de *Ficus*, no se conocían los receptáculos, pero la colección reciente aquí citada los tiene bien desarrollados, y se puede suministrar la siguiente descripción de ellos: Receptacula sessilia, geminata, depresso-globosa, 15-18 mm. lata, 1 cm. alta, dense pilis adpressis brunneis strigosis, apice paullo depressa, ostiolo parvo, valde prominente; involucrum magnum, ca. 18 mm. latum, extus intusque dense brunneo-strigosum, lobis apice late rotundatis.

Las hojas de esta colección son algo menores que las descritas originalmente, 27-30 cm. de largo y 13 cm. de ancho.

**Mollinedia minutiflora** Standl. & L. Wms., *sp. nov.*

Frutex 3-metralis, gracillimus, ramosus, ramis vetustioribus ochraceis, teretibus, novellis vix ultra 1 mm. crassis, minutissime strigillosis, cito glabratis, internodiis elongatis; folia breviter petiolata, membranacea, petiolo tenui 6-8 mm. longo, minute strigilloso vel glabrato; lamina oblongo-lanceolata, 7-11.5 cm. longa, 2.5-4 cm. lata, subito anguste longiacuminata, basin versus sensim angustata, basi ipsa acuta vel acuminata, sparse apicem versus incurvo-serrata vel fere integra, supra viridis, glabra, costa prominente, subtus paullo pallidior, ad costam teneram prominentem minute strigillosa, nervis lateralibus prominulis utrinsecus ca. 6, tenellis, prominulis, angulo semirecto arcuato-adscendentibus, venis prominulis laxe reticulatis; paniculae parvae, laxae multiflorae, sessiles vel brevissime pedunculatae, ca. 2 cm. longae, ramulis gracillimis pedicellisque dense strigillosis, pedicellis teneris 2-9 mm. longis; receptacula mascula late turbinata, ca. 1.7 mm. alta, basi acuta, dense ut sepala albido-strigillosa; sepala latissime ovata, obtusa vel subrotundata.

COSTA RICA: in second growth woods at edge of forest, shrub 3 m. tall, flowers yellowish, finca Los Cusingos of Dr. A. F. Skutch, Quizarrá de Pérez Zeledón, eight miles S. E. from San Isidro del General, province of San José, alt. 2,500 feet, March 4, 1949, *Darwin & Barbara Norby 317*.

Entre las pocas especies de *Mollinedia* conocidas de Centro América, ésta se reconoce luego por sus flores diminutas.

**Ocotea fulvescens** Standl. & L. Wms., *sp. nov.*

Arbor ca. 20-metralis, ramis dense pilis fulvis adpresso-pubescentibus, in statu adulto glabrescentibus; folia versus

apices ramorum novellorum congestis, ca. duobus annis persistentia, sessilia vel subsessilia, marginibus basalibus recurvis, subcoriacea, elliptica usque elliptico-oblonga, acuta, 8-15 cm. longa, 3-5.5 cm. lata, dense fulvo-velutina, indumento brevissimo et arcte adpressa, serius saltem supra glabrata, costa lata, nervis lateralibus 10-14-jugis, angulo semirecto divergentibus; inflorescentia brevis, paniculata, crassiramosa, subterminalis vel in axillis novellorum axillaris, multiflora, foliis brevior, saltem in statu immaturo; perianthii segmenta ca. 4-5 mm. longa atque 2-3 mm. lata, ovata vel oblongo-ovata, obtusa, subaequalia, dense puberula; flores perfecti.

COSTA RICA: común en la zona, Ojo de Agua, Cordillera de Talamanca, Prov. Cartago, alt. 2800 m., 31 En. 1950, *León* 2166.

*Ocotea fulvescens* es aliada con *O. Endresiana* Mez, pero es distinta de esta y las otras especies centroamericanas por la pubescencia densa y persistente.

***Ocotea rivularis* Standl. & L. Wms., sp. nov.**

Arbor usque ad 15-metralis, ramis glabris vel glabrescentibus, in sicco angulatis; folia duo terminantia ramos novellos, pro genere magna, late elliptico-obovata, abrupte breviter caudato-acuminata, ad basin cuneatam et aliquanto recurvam attenuata, 30-45 cm. longa, 15-20 cm. lata, parte exalata petioli usque 1 cm. longa; lamina subcoriacea, costa lata, supra vix prominente sed subtus prominente, nervis primariis 11-15-jugis, angulo semirecto abeuntibus, glabra vel ad nervos obscure puberula; inflorescentia paniculata, multiflora, subterminalis atque axillaris, foliis dimidio brevior, puberula vel in statu adulto glabra, floribus perfectis; perianthii segmenta ovata usque oblongo-ovata, obtusa, obscure puberula, 1.25-2 mm. longa, 1.2-1.5 mm. lata; fructus immaturus ellipsoidal, ca. 10-12 mm. longus et 5-6 mm. diam., cupula ca. 2 mm. alta, perianthio ad marginem persistente et lobato.

COSTA RICA: flowers green, rachis red, common, forested hills along the upper Río Piedras Blancas, vicinity of Río Esquinas, province of Puntarenas, alt. 30 m., August 3, 1950, *Allen* 5590.

Por sus hojas grandes, ésta recuerda a tales especies que *Ocotea atirrensis* Mez & Donn. Smith y *O. nicaraгуensis* Mez.

Sin embargo, su verdadera afinidad es con *O. Ira* Mez & Pittier, de la cual es fácil distinguirla por sus enormes hojas.

**Rubus malacocarpus** Standl. & L. Wms., *sp. nov.*

Frutex, caulibus elongatis, ramis gracilibus, 2-3 mm. crassis, sat dense pilis patentibus fulvis pilosis, dense aculeis recurvis tenuibus vix ultra 3 mm. longis armatis; stipulae magnae, reniformes, foliaceae et virides, 7-8 mm. longae et latiores, apice rotundatae, integrae, venulosae, sparse adpresso-pilosae vel glabratae; folia trifoliolata, longe petiolata, petiolo 2-3 cm. longo, aculeolato, fulvo-piloso; foliola longe petiolulata, subcoriacea, valde rugosa, elliptica vel oblongo-elliptica, 4.5-7.5 cm. longa, 2.5-4.5 cm. lata, acuta, basi obtusa vel anguste rotundata, duplicato-serrata, supra viridia, sparse adpresso-pilosa vel glabrata, venis impressis, subtus ad nervos venasque adpresso-pilosa, ad costam elevatam vulgo pauci-aculeata, venis elevatis et arcte reticulatis; pedunculi plerumque paniculam paucifloram efformantes, graciles, vulgo 2.5-6 cm. longi, dense aculeolati, bracteis stipulis conformibus sed minoribus; sepala 1.5-2 cm. longa, e basi ovato-lanceolata longe anguste subulato-attenuata, basi sparse aculeolata, extus intusque dense adpresso-pilosa; petala rosea vel ut videtur roseo-rubra, ovalia, ca. 1.5 cm. longa, apice rotundata et interdum apiculata, venosa, glabra; styli longius persistentes, usque 7 mm. longi, rubro-purpurei; fructus immaturus pyramidali-ovoideus, 1.5 cm. longus, 1 cm. basi latus, drupis numerosissimis, densissime longipilosis.

COSTA RICA: flowers pink, in edge of forest near the bog "El Jardín", Cerro de las Vueltas in cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 2700 m., March 30, 1949, *Williams 16116* (TYPE); carretera Panamericana arriba de El Roble, alt. 2800 m., Agosto 20, 1950, *León 2692*.

Esta bella especie es relacionada, sin duda alguna, con *Rubus stipularis* Benth. y *R. macrocarpus* Benth., ambas ecuatorianas. No está perfectamente de acuerdo con las descripciones originales de éstas, y aunque no hemos visto muestras de las plantas ecuatorianas, tomando en cuenta la distancia que separa El Ecuador y Costa Rica, tenemos casi la seguridad que la *Rubus* norteña representa una entidad bien distinta de este vasto género.

**Mimosa germana** Standl. & L. Wms., sp. nov.

Herba annua ut videtur annua laxa e basi ramosa, ramis gracilibus, dense pilis longis patentibus fulvis hispido-pilosis, sub stipulis aculeis 2 stramineis patentibus vix recurvis 5-6 mm. longis armatis; folia parva, petiolo gracillimo ca. 2 cm. longo, dense hispido, inermi; pinnae bijugae, petiolum terminantes, breviter petiolulatae; foliola vulgo 5-juga, membranacea, oblongo-ovalia, utrinque rotundata, nervis venisque obsoletis, ca. 8-9 mm. longa et 4 mm. lata, inferioribus minoribus, subtus glabra vel sparse pilosula et pilis longis hispida; stipulae lineari-lanceolatae, nervosae, ca. 7 mm. longae, hispidulae, persistentes; flores capitati, pedunculis axillaribus, gracillimis, 3-4.5 cm. longis, pilis longis patentibus fulvis hispidis, capitulis dense multifloris; calyx minutus, cupuliformis, corolla ca. 1.2 mm. longa, extus glabra, brevissime lobulata; stamina brevia, vulgo 4; legumina in quoque capitulo numerosa, sessilia, 1-2 cm. longa, 4.5 mm. lata, articulis 2-4 molliter pilosulis, interdum sparse hispidis, ad margines dense pallido-hispidis, pilis brevibus, tenerimis.

COSTA RICA: Naranjo, Prov. Alajuela, alt. 1000 m., Dic. 28, 1949, *León 2011*.

La especie más afín es *Mimosa Skinneri* Benth., fácilmente diferenciada por sus hojuelas más anchas y mucho más densamente hispidas, y por sus lomentos, provistos en las válvulas de agujijones gruesos y rígidos. Es muy posible que se encuentren en los grandes herbarios colecciones anteriores de esta misma especie nueva, confundidas con *M. Skinneri*.

**Guarea macrantha** Standl. & L. Wms., sp. nov.

Arbor, ramis vetustioribus crassis, teretibus, ochraceis, rimosis et lenticellatis, novellis sparse strigosis vel glabratis, internodiis brevibus; folia petiolata, glabra, 6-10-foliolata, petiolo crasso 3-4.5 cm. longo, petiolulis interdum valde incrassatis, usque ad 8 mm. longis; foliola pergamentacea, angustissime oblonga vel lanceolato-oblonga, plerumque 8-13.5 cm. longa et 2.5-5 cm. lata, acuta vel abrupte breviter acuminata, apice ipso obtuso, basi cuneato-acuta, in axillis nervorum non barbata, costa supra plus minusve impressa, subtus elevata, nervis lateralibus utrinsecus 7-9, teneris, angulo semirecto arcuato-adscendentibus, juxta marginem arcuato-conjunctis; pa-

niculae e nodis defoliatis nascentes, sessiles vel brevissime pedunculatae, multiracemosae, multiflorae, densiusculae, ca. 5 cm. longae et fere aequilatae, ramis crassis sparse strigillosis vel fere glabris, bracteis minutis, ovalibus vel late ovatis, apice obtusis vel rotundatis, dense strigillosis, pedicellis crassis, usque 3 mm. longis, dense strigosis; calyx late campanulatus, 6-7 mm. latus, 4 mm. altus, breviter 4-lobus, basi rotundatus vel obtusus, strigillosus vel glabratus, lobulis late triangularibus vel rotundatis, apice obtusis vel rotundatis; petala 4, anguste oblonga, 10-12 mm. longa, 4 mm. lata, apice obtusa vel rotundata, intus glabra, extus prope apicem minute strigillosa, sessilia; tubus staminalis petala fere aequans, glaber; ovarium glabrum, apice in stylum sensim attenuatum, stylo crasso ca. 3 mm. longo, glabro.

COSTA RICA: rain forest area, Río Sarapiquí near Cariblanco, province of Heredia, alt. 800 m., April 19, 1949, *Williams 16444a*.

De Costa Rica se conocen actualmente no menos de 14 especies de Guarea, casi todas muy semejantes en aspecto, y diferenciadas sólo por detalles minuciosos de las flores y las hojas. Esta especie nueva es distinta entre otros caracteres, por sus hojuelas perfectamente lampiñas; por el ápice del ovario atenuado y no súbitamente contracto, y, sobre todo, por sus flores grandes, apenas igualadas en tamaño por otra Guarea norteamericana.

***Acalypha apodanthes* Standl. & L. Wms., sp. nov.**

Frutex gracilis ramosus, ramis 2.5 mm. crassis, teretibus, brunneis, novellis dense pilis fulvis, patentibus vel adscendentibus pilosis, internodiis brevibus; stipulae diutius persistentes, lineari-subulatae, erectae, 6-7 mm. longae; folia inter minora, graciliter petiolata, membranacea, petiolo 1-2.5 cm. longo, dense pilosulo; lamina anguste lanceolata vel oblanceolata, medio vel paullo supra medium latissima, 5.5-10 cm. longa, 1.3-2.5 cm. lata, longe anguste acuminata, basin versus sensim angustata, basi ipsa anguste rotundata vel subcordata, arcte serrato-dentata, dentibus parvis subobtusis, supra viridis, sparse pilosula vel glabrata, subtus paullo pallidior, subsparse et molliter pilosula, e basi trinervia, costa tenui prominente, nervis lateralibus utrinsecus ca. 12, arcuato-adscendentibus; flores monoici, inflorescentiis omnibus axillaribus; spicae masculae

ex axillis inferioribus nascentes, solitariae, breviter pedunculatae, 5-8 cm. longae vel ultra, sublaxae, inferne plus minusve interruptae, axi dense pubescente, bracteis parvis, floribus paullo longioribus, patentibus, floribus minutis; bractee femineae in axillis superioribus solitariae, sessiles, dense pilosulae, virides, 8-9 mm. longae, profunde ca. 11-laciniatae, laciniis parte indivisa multo longioribus, lineari-lanceolatis et subulato-attenuatis; capsula immatura subglobosa, 3.5 mm. longa, dense fulvo-pilosula.

COSTA RICA: Cariblanco, Prov. Heredia, alt. 800 m., Mar. 15, 1950, *León* 2370.

Especie singular, apenas estrechamente aparentada con otra que conocemos entre las centroamericanas, fácil de reconocer por sus flores monoicas, las brácteas femeninas solitarias y sentadas en las axilas de hojas bien desarrolladas. Pocas de nuestras especies de *Acalypha* tienen hojas tan angostas.

**Meliosma maxima** Standl. & L. Wms., *sp. nov.*

Arbor 10-metralis, ramis crassis, teretibus, in sicco fusco-brunneis, glabris, lenticellis sparsis magnis pallidis conspersis; folia magna, glabra, longipetiolata, firme chartacea, petiolo tereti, gracili, 6-13 cm. longo; lamina oblongo-obovata, 35-70 cm. longa, 14-23 cm. lata, breviter abrupteque acuminata vel interdum (abnormaliter?) rotundata, basin acutam versus paullo angustata, supra viridis, nervis venisque non elevatis, saepe plus minusve impressis, subtus pallidior, densissime minuteque pallido-puncticulata, costa gracili prominente, nervis lateralibus utrinsecus ca. 15, angulo semirecto abeuntibus, leviter arcuatis, prominentibus, juxta marginem arcuato-conjunctis, venis prominulis laxe reticulatis; paniculae ut videtur e nodis defoliatis oriundae, longipedunculatae, laxe multiflorae (in statu fructifero), 10-15 cm. longae et fere aequilatae, ramis crassis lignosis, pedunculo 4-18 cm. longo, pedicellis fructiferis brevibus, crassis; fructus siccus pyriformi-globosus, immaturus albus, maturus niger, ca. 2.5 cm. longus, et 2 cm. diam., apice late rotundatus, basi contractus, glaber.

COSTA RICA: tree 10 m., young fruits pure waxy white, mature black, in heavy forest, vicinity of Palmar Norte de Osa, province of Puntarenas, alt. 30 m., Sept. 6, 1950, *Allen* 5648.

De Costa Rica se conocen actualmente 6 especies más de *Meliosma*. La presente tiene hojas dos veces más grandes que cualquiera de ellas, y es probable que las inflorescencias, cuando conocidas, den otros caracteres diferenciales.

**Mortoni dendron costaricense** Standl. & L. Wms.,  
*sp. nov.*

Frutex gracilis ramosus, ramis vetustioribus 2-2.5 mm. crassis, cinereo-ferrugineis, rimosis, novellis viridibus, dense minutissime stellato-puberulis et sparse pilis simplicibus breviter hirsutis, internodiis vulgo elongatis; folia breviter petiolata, membranacea, petiolo 4-5 mm. longo, tenui, minute stellato-puberulo; lamina oblonga vel anguste oblonga, 8.5-13.5 cm. longa, 2.5-5 cm. lata, abrupte acuminata vel longiacuminata, basi subrotundata, valde inaequalis, uno latere semi-acuta, altero semirobundata vel breviter semicordata, utrinque fere omnino glabra, supra viridis, ad costam interdum minute stellato-puberula costa nervisque prominulis, subtus concolor, basi inconspicue trinervia, costa elevata, pallida, tenella, nervis lateralibus utrinsecus 4-6, tenerrimis, pallidis, laxe prope marginem conjunctis, angulo latiusculo arcuato-adscendentibus, venis laxe reticulatis; inflorescentiae terminales, cymosae, laxe pauciflorae, ca. 7-florae, ramis pedicellisque dense minute pallide stellato-tomentellis et pilis patentibus hirtellis, pedicellis crassiusculis 3-15 mm. longis; sepala 5, caduca, lanceolata, 8-9 mm. longa, longiacuminata, intus glabra, extus dense minutissime stellato-tomentella, tomento albido; petala ca. 7 mm. longa, glabra, ovata, acuminata vel acuta; stamina glabra, antheris apice apiculatis; ovarium subglobosum, dense minutissime stellato-tomentellum, stylo gracili, abrupte in stigma contractum, 5 mm. longo, prope basin stellato-tomentello, superne gracili, glabro.

COSTA RICA: flowers white, shrub in canyon above San Isidro del General in cloud forest area, Cordillera de Talamanca, province of San José, alt. 1600 m., April 10, 1949, *Williams 16307*.

El género *Mortoni dendron*, de las Tiliáceas, fué publicado en 1938, y basado sobre una sola especie, la *M. anisophyllum* (Standl.) Standl. & Steyerl., de la región de Almirante, Panamá. En 1940 aparecieron dos especies más, de los mismos autores, *M. guatemalense*, del departamento de

Izabal, Guatemala, y *M. membranaceum*, del departamento de Atlántida, Costa Norte de Honduras. De estas tres, se pudiera suponer que la especie costarricense fuera más afín a la especie panameña, pero actualmente es relacionada con la hondureña, que es diferenciada por la pubescencia menos aprimida de las ramas y de la inflorescencia, por sus sépalos solamente agudos y no angostamente acuminados, y por el estilo mucho más corto. Las otras especies tienen hojas coriáceas, no membranáceas, que apenas son desiguales en la base. Las tres especies antes publicadas vienen de la tierra caliente, a una altura de 360 metros o menos, mientras *M. costaricense* encuéntrase a una elevación de 1600 metros sobre el nivel del mar.

***Clusia pithecobia* Standl. & L. Wms., sp. nov.**

Frutex epiphyticus glaber, ramis teretibus, ca. 6 mm. crassis, in sicco brunneis, dense foliatis, internodiis vix ultra 1 cm. longis; folia majuscula, fere sessilia, petiolo crasso vix 3 mm. longo, crasse pergamentacea, anguste oblanceolata, 20-26 cm. longa, 5-6 cm. prope apicem lata, acuta vel subacuta, apice ipso obtuso, basin versus longe sensim attenuata, basi ipsa anguste obtusa, marginibus basalibus recurvis, coloria, costa gracili utrinque saliente, nervis primariis numerosissimis et arcte approximatis, supra vix prominulis, subtus occultis, angulo lato divergentibus; flores dioici; inflorescentiae femineae axillares, 1-5-florae, pedicellis crassis, 3-4 cm. longis, in sicco obtuse angulatis, adscendentibus, infra medium bibracteatis, bracteis vix ultra 2 mm. longis, acutis, late deltoideo-ovatis; sepala 4, decussata, leviter imbricata, coriacea, 10-12 mm. longa et aequilata vel paullo latiora, apice rotundata, interiora vulgo paullo longiora; fructus immaturus 6 locularis, globoso-ovoideus, ca. 18 mm. altus et 13 mm. diam., ad apicem abrupte breviter contractus, apice 3 mm. tantum lato.

COSTA RICA: epiphytic shrub in tops of tall trees, forested hills along the upper Río Piedras Blancas, vicinity of Río Esquinas, province of Puntarenas, alt. 30 m., Aug. 3, 1950, *Allen* 5592.

Especie bien marcada por sus hojas largas, angostas y sentadas, y por sus flores, relativamente pequeñas por el género, terminando pedicelos largos y delgados.

**Xylosma excelsum** *Standl. & L. Wms., sp. nov.*

Arbor 25-metralis ut videtur omnino glabra, ramulis gracilibus, subteretibus, brunneis, sat dense pallido-lenticellatis, internodiis brevibus; folia majuscula, breviter petiolata, tenuiter coriacea, petiolo 7-8 mm. longo; lamina oblongo-lanceolata, 10-14 cm. longa, 3-5 cm. lata, longe attenuato-acuminata, basi rotundata vel obtusa, arcte grosseque crenata, crenaturis subincurvis, supra viridis, lucida, costa venisque prominulis, subtus brunnescens, costa tenera saliente, nervis lateralibus utrinsecus 6-7, teneris, prominentibus, angulo semirecto arcuato-adscendentibus, venis prominulis, arctissime reticulatis; flores breviter racemosi vel cymosuli, inflorescentiis paucifloris, vulgo in axillis congestis, sessilibus vel breviter pedunculatis, pedicellis crassiusculis, vix ultra 2 mm. longis; sepala 4, patentia, ovalia vel ovata, obtusa, vix 2 mm. longa, diutius persistentia; fructus globosus, 7 mm. diam., basi et apice rotundatus, apice stylo brevi crasso apicatus.

COSTA RICA: flowers white, fruits green, tree 25 m., vicinity of Palmar Norte de Osa, province of Puntarenas, alt. 30 m., Sept. 6, 1950, *Allen 5650*.

Es algo temerario proponer en este género especies nuevas, considerando que el grupo está en condiciones caóticas en cuanto a su taxonomía. Nunca ha sido monografiado, y no se entienden bien los caracteres que se deberían emplear para segregación de las especies, sobre todo que las flores ofrecen pocas variaciones que pudieran servir para ésta. La planta costarricense es notable por sus grandes dimensiones; las otras especies son generalmente arbustos de poca altura. Ninguno de los varios ejemplares ostenta espinas, pero es de presumir que éstas aparecen en el tronco del árbol, como en sus afines.

**Matelea stellulifera** *Standl. & L. Wms., sp. nov.*

Herba magna scandens, caulibus viridibus, crassis, teretibus, pilis multilocularibus patentihirsutis et quoque dense villosulis, internodiis elongatis; folia magna, membranacea, longipetiolata, petiolo crassiusculo 6-7 cm. longo, ut caule induto; lamina ambitu fere orbicularis, 21-28 cm. longa, 18-22 cm. lata, apice rotundata et breviter (1-1.5 cm. longe) cuspidata, basi rotundata et breviter (ca. 2.5 cm. longe) cordata, lobis

basalibus anguste rotundatis et imbricatis, supra laete viridis, sat dense villosopilosa, subtus pallidior, sat dense pilis patentibus fulvis villosopilosa, costa crassa, subtus prominente, nervis lateralibus utrinsecus vulgo 5, arcuato-ascendingibus, venis manifestis laxe reticulatis; flores magni, umbellato-corymbosi, pedunculis axillaribus vel extra-axillaribus, multifloris, floribus dense congestis, pedunculo crasso usque 1.5 cm. longo, pedicellis brevibus et crassis vel nullis; sepala pallida, ovata vel late ovata, ca. 12 mm. longa, subacuta, venosa, dense fulvo-pilosa; corolla intus brunnea, tubo lato ca. 13 mm. longo, usque 8 mm. lato, extus inferne glabro, superne pilosulo, limbo explanato ca. 3 cm. lato, extus pilosulo, profunde plus minusve ad medium 5-loba, intus subsparse minuteque stellulato-puberulo, lobis suborbicularibus, apice late rotundatis, orificio corollae 4-5 mm. diam.

COSTA RICA: flowers brown, vine, infrequent in trail side thickets, vicinity of Palmar Norte de Osa, province of Puntarenas, alt. 30 m., September 11, 1950, *Allen 5666*.

Esta planta pertenece al subgénero *Macroscepis* de Woodson, y se parece mucho a *Matelea obovata* (HBK.) Woodson, especie común del norte de Centro América. En ésta, la corola es glabra por dentro, y las hojas son comúnmente mucho más pequeñas que en la especie costarricense.

CLERODENDRON EPIPHYTICUM Standl. en *Field Mus. Nat. Hist. Bot. Series 22: 168. 1940.*

COSTA RICA: Carrizal, Prov. Alajuela, alt. 1500 m., Mar. 12, 1950, *León 2312*.

Cuando se publicó esta especie, no se conocían las flores. La colección citada lleva flores y hojas tiernas, de modo que ahora es posible completar la descripción de la especie: Flores ad nodos vetustiores fasciculati vel interdum axillares, pedicellis teneris, usque ad 1.5 cm. longis, glabris; calyx 10-12 mm. longus, tubo 6-7 mm. longo, obconico-campanulato, basi acuto, angulato, lobis tubo fere duplo longioribus, anguste triangulari-lanceolatis, longe sensim attenuatis; corolla 2.5 cm. longa, tubulosa, glabra, apice in alabastro rotundata, tubo 4.5 mm. diam., lobis rotundatis, vix 3 mm. longis; genitalia inclusa.

**Solanum irazuense** Standl. & L. Wms., *sp. nov.*

Frutex ramosus gracilis, fere glaber, internodiis brevissimis, subangulatis; folia solitaria, alterna, parva, tenuiter membranacea, omnia conformia, petiolo tenui 6-10 mm. longo; lamina lanceolata vel oblongo-lanceolata, 5-8 cm. longa, 1.5-2.5 cm. lata, sensim acuminata, basin versus abrupte acuminata et longiuscule decurrens, supra viridis, ad costam sparse brevissime pilosula vel fere glabra, ad margines densius pilosula vel ciliata, subtus fere concolor, ad costam sparse pilosula, aliter glabra, costa tenui, prominula, nervis lateralibus tenerrimis, inconspicuis, utrinsecus ca. 14, arcuato-adscedentibus; inflorescentia terminalis vel axillaris, bis bifida, erecta, ca. 1.5 cm. longe gracillime pedunculata, laxe pauciflora, vix ultra 1.5 cm. lata, floribus recurvis, pedicellis glabris, usque 4 mm. longis; calyx ca. 1.8 mm. longus, obturbatus, breviter 5-lobus, lobis late triangularibus, apice ciliatis; corolla ca. 4.5 mm. longa, fere ad basin 5-loba, lobis triangulari-oblongis, ad margines densissime minuteque albido-ciliatis; filamenta brevia, antheris erectis, 2.5 mm. longis.

COSTA RICA: Chicué, Volcán de Irazú, Prov. Cartago, alt. 2750 m., Agto. 12, 1950, *León* 2682.

Considerando las muchas colecciones que se han hecho en el Irazú, en un período de más de un siglo, es sorprendente que no se hubiera encontrado antes esta planta, que, aunque no vistosa, es suficiente distinta de las demás especies costarricenses de *Solanum*. No parece tener parientes muy afines entre las numerosas especies citadas en la *Flora of Costa Rica*.

**Solanum vacciniiflorum** Standl. & L. Wms., *sp. nov.*

Frutex ramosus inermis, ramis vetustioribus gracilibus, teretibus, ochraceis, lenticellatis, internodiis plerumque brevibus, novellis sparse pilis patentibus plurilobularibus villosulis; folia interdum opposita et aequalia, interdum valde inaequalia, axillis saepe foliis 2-3 minimis fere stipuliformibus onustis, petiolata, membranacea, petiolo 9-14 mm. longo, sparsissime villosulo vel glabrato; lamina foliorum majorum elliptico-oblonga vel lanceolato-oblonga, 6-9 cm. longa, 2-2.5 cm. lata, acuminata vel subito acuminata, basi acuta vel acuminata, integra, supra in sicco lutescens, sparse villosula, costa tenera subimpresa, subtus paullo pallidior, sparse ad nervos venasque breviter villosula, intra venas glabra, nervis laterali-

bus prominulis utrinsecus ca. 15, angulo lato adscendentibus, valde arcuatis; lamina foliorum minorum similis sed 3-4 cm. tantum longa; lamina foliorum stipuliformium similis, forma variabilis, vulgo 1 cm. longa vel minor; inflorescentiae oppositifoliae vel infra-axillares, racemosae, pauciflorae, secundiflorae, recurvae, breviter pedunculatae vel sessiles, pedicellis plerumque 1.5-2 cm. longis, saepe saltem in alabastro recurvis, fere omnino glabris; calyx latissime campanulatus, vix 2 mm. longus sed saepe fere 5 mm. latus, viridis, sparse villosulus, brevissime lobulatus, lobulis late rotundatis; corolla alba, glabra, alte lobata, lobis ovatis vel lanceolato-oblongis, acutis vel apicem obtusum versus angustatis, ad anthesin stellatim radiantibus; stamina paullo inaequalia, filamentis fere nullis, antheris lineari-oblongis, 5-6 mm. longis.

COSTA RICA: flowers white, shrub in edge of the forest near the bog "El Jardín", Cerro de las Vueltas in cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 2700 m., March 30, 1949, *Williams 16114*.

El nombre específico alude a la semejanza de las flores en botón a las de algunas especies de *Vaccinium* (Ericáceas). La especie más afín es la *Solanum copeyanum* Bitter, basada sobre una colección de la región de El Copey, no lejos del lugar de *S. vacciniiflorum*, pero a una altura de sólo 1800 metros. Esa planta tiene hojas de 12-16 cm. de largo y menos pubescentes, inflorescencias umbeliformes, y un cáliz con lóbulos elípticos.

**Besleria callista** Standl. & L. Wms., *sp. nov.*

Herbacea vel suffrutescens, usque ad 40 cm. alta; folia opposita, obovata usque elliptico-obovata, margine superne undulato, acuta, 8-25 cm. longa, 5-10 cm. lata, petiolo usque 2 cm. longo, supra glabra sed dense minute papillosa, subtus pallidior, reticulata, ad nervos et partem obscuram reticulationum pubescens, aliter glabra; inflorescentiae 1-2 e pedunculo communi, caulem terminantes, quaque inflorescentia 1-3-flora, foliis subtendentibus longiores; calyx urceolatus, sepalis lateralibus intra dorsale et ventrale aliquanto imbricatis, utrinque dense puberulis, nervis subparallelis, segmento dorsali suborbiculari-obovato, obtuso, aliquanto cochleato et plicato, calcarem corollae amplectente, ca. 15 mm. longo et fere aequilato; segmenta lateralia suborbiculari-ovata, obtusa, obliqua,

obscure dentibus subglandularibus dentata, ca. 12 mm. longa et 10 mm. lata; segmenta ventralia late obovata, obtusa, regularia, obscure dentibus subglandularibus dentata, ca. 12 mm. longa et 10 mm. lata; corolla, calcare incluso, usque 70 mm. longa, expansa ca. 25 mm. in fauce lata, in calyce horizontalis, basi calcare usque 15 mm. longo onusta, paullo ventricosa, campanulata, valde bilabiata, basin versus extus intusque pubescens, lobis dorsalibus aliis brevioribus, rotundatis, labio ventrali 3-lobo, lobis lateralibus rotundatis, subserrulatis, lobo medio ovato, acuto, crispato, calcare usque 15 mm. longo, conico, paullo curvato, apicem versus dense pubescente; stamina 4 pro paribus geminata; antherae connatae, 2-loculares, loculis confluentibus, filamentis fere ad basin liberis, inferne pro paribus connatis atque ad basin tubi corollae adnatis, sigmoideis, puberulis; ovarium superum, puberulum, stylo tenui ca. 12 mm. longo, stigmatē stomatomorphico; discus annularis, tenuis, disciformis sed posteriore incrassatus, sulcatus et prominens, pubescens, staminibus sterilibus perparvis in sulco recumbentibus.

COSTA RICA: corolla white, shading to pale yellow on frontal lobes, inside heavily striped with purple, erect terrestrial herbs locally common in heavy shade bordering river, forested hills along the upper Río Piedras Blancas, vicinity of Río Esquinas, Province of Puntarenas, alt. 30 m., Agto. 3, 1950, *Allen 5589*.

*Besleria callista*, según la monografía de Morton en Contr. U. S. Nat. Herb. 26: 395-474. 1939, pertenece a la sección *Neobesleria*, subsección *Wendlandianae*. La especie más cercana, como parece, es *B. Wendlandiana* Hanst. La especie presente es diferenciada fácilmente de esa por sus grandes flores, las cuales la diferencian también de todas las demás representantes de su género. Otros detalles también distinguen la especie. La planta debe ser una de las más vistosas de todo su género.

***Palicourea lancifera* Standl. & L. Wms., sp. nov.**

Frutex ramosus, ramis gracilibus, obtuse quadrangularibus, fusco-ferrungineis, internodiis brevibus, novellis adpresso-puberulis; stipulae persistentes, in vaginam laxam 4 mm. longam strigosam coalitae, vagina apice truncata et utroque latere lobis 2 erectis lineari-attenuatis aequilongis onusta; folia

modica, breviter petiolata, membranacea, petiolo tenui 1-1.8 cm. longo, minute adpresso-pilosulo; lamina lanceolata vel anguste oblongo-lanceolata, 7-14 cm. longa, 2-4 cm. lata, longissime angustaque attenuato-acuminata, basin versus sensim attenuata et breviter decurrens, supra viridis, glabra vel tantum ad costam pilulis paucis adpressis induta, costa venisque inconspicuis, subtus paullo pallidior et in sicco brunnescens, ad costam nervosque sparse inconspicue strigillosa, costa tenerrima, prominente, nervis lateralibus utrinsecus ca. 12, angulo lato fere recto abeuntibus, valde sursum arcuatis, in marginem desinentibus, venis prominulis, laxe reticulatis; inflorescentia terminalis, anguste thyrsiformis, subdense multiflora, 9 cm. longa et 2.5 cm. lata, 2 cm. longe pedunculata, erecta, bracteae lanceolato-linearibus, usque 6 mm. longis, rhachi crassiuscula ramulisque densiuscule puberulis, pedicellis brevissimis vix ultra 2 mm. longis; hypanthium columnare, ca. 1 mm. longum, sparse adpresso-pilosulum vel fere glabrum; calyx 2 mm. longus vel paullo ultra, brunnescens, membranaceus, sparse puberulus vel glabratus, profunde lobatus, segmentis ovalibus, apice obtusis vel rotundatis; corolla in alabastro 11 mm. longa, extus glabra vel tantum ad margines lobulorum puberula, tubo crassiusculo, basi tumido, superne angustato, lobis ovato-oblongis, obtusis, tubo multo brevioribus.

COSTA RICA: Zarcero, Prov. Alajuela, alt. 1500 m., Jun. 17, 1941, *Austin Smith 2794*.

La colección tipo fue distribuida con el nombre de *Palicourea costaricensis* Benth., especie no estrechamente afín. La planta presente parece aparentada con la *P. angustifolia* HBK., la cual tiene un cáliz más pequeño, y una corola densamente pubérula o peluda.

***Palicourea talamancana* Standl. & L. Wms., sp. nov.**

Frutex 4-metralis, ramosus, ramis crassis, obtuse tetragonis, internodiis brevibus, glabris, fusco-ferrugineis; stipulae in vaginam 6-7 mm. longam et 9-10 mm. latam coalitae, vagina coriacea, glabra, apice truncata, lobis 4 erectis, 7-9 mm. longis, remotis, triangulari-linearibus, attenuatis, viridescens; folia majuscula, glabra, petiolata, subcoriacea, rigida, in sicco lutescentia, petiolo crassiusculo 1.5-2 cm. longo; lamina elliptico-oblonga vel oblanceolato-oblonga, 11-17 cm. longa, 3.5-6.5 cm. lata, abrupte cuspidato-acuminata, basin versus sen-

sim longe angustata, ima basi attenuata, costa nervisque supra prominentibus, venis manifestis sed non elevatis, subtus concolor, costa valde elevata, nervis lateralibus utrinsecus ca. 19, angulo lato adscendentibus, valde arcuatis, in marginem desinentibus, venis prominentibus reticulatis; inflorescentia terminalis, thyrsoido-paniculata, 9-13 cm. longa, prope basin 4-9 cm. lata, multiflora, erecta, 1.5-3 cm. longe pedunculata, pedunculo usque 5 mm. crasso, densissime lutescenti-strigoso, ramis inferioribus oppositis, superioribus alternis vel subverticillatis, adscendentibus vel patentibus, rectis, rigidis, strigillosis vel puberulis; bractee inferiores lineari-lanceolatae, usque 14 mm. longae, patentes, superioribus multo minoribus, pedicellis usque 5 mm. longis sed vulgo multo brevioribus, crassis, sparse puberulis vel glabris; hypanthium crasse columnare, 1.5 mm. longum, minute puberulum vel glabrum; calyx profunde lobatus, coriaceus, glaber, segmentis 1.5-2 mm. longis, late ovatis vel ovalibus, apice obtusis vel rotundatis, vel interdum anguste attenuatis, vulgo excurvis vel apice recurvis; corolla caerulea, extus glabra, in alabastro apice rotundata vel obtusa et verruculosa (bene evoluta non visa), 10 mm. longa, tubo crasso, superne dilatato, lobis latis, brevibus, apice rotundatis, in alabastro 3 mm. tantum longis.

COSTA RICA: flowers blue, shrub 4 m., near Vuelta Alta, Cerro de las Vueltas in cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 3200 m., April 10, 1949, *Williams 16264*.

De Costa Rica se conocen al presente unas 14 especies de *Palicourea*, por la mayor parte plantas muy semejantes. La especie aquí publicada se reconoce por sus grandes hojas que carecen de pubescencia, por sus flores azules, por sus grandes estípulas y por la forma particular del cáliz.

***Psychotria copeyana* Standl. & L. Wms., sp. nov.**

Arbuscula 4-metralis, ut videtur dense ramosa, ramis gracilibus, vetustioribus obtuse tetragonis, in sicco fuscis, internodiis brevibus, glabris; stipulae virides, coalitae, 3-4 mm. longae, glabrae, 6-7 mm. latae, persistentes, apice breviter bilobae, lobis approximatis, triangulari-acutis; folia parva, petiolata, rigide membranacea, petiolo gracillimo, 10-18 mm. longo, glabro; lamina oblongo-elliptica vel lanceolato-oblonga, 5-9 cm. longa, 2-4 cm. lata, abrupte attenuato-acuminata vel

caudato-acuminata, basi acuta vel acuminata, supra intense viridis, sublucida, glabra vel tantum ad costam sparsissime breviter pilosula, costa prominente, venis anguste impressis, subtus multo pallidior, tantum ad costam nervosque sparse dense pilosula, aliter glabra, nervis lateralibus utrinsecus ca. 15, angulo fere recto abeuntibus, tenerrimis, sursum arcuatis, in marginem desinentibus, venis paucis, non elevatis, laxe reticulatis; inflorescentiae terminales, erectae, cymoso-paniculatae, laxe multiflorae, 1.5 cm. longe pedunculatae vel sessiles, basi saepe foliis 2 reductis bracteatae, ramis omnibus basi bracteatis, sat dense, saepe bifariam, pilosulis, bracteis persistentibus, viridibus, patentibus, lanceolato-triangularibus, 3-4 mm. longis, acuminatis, floribus plerumque sessilibus et aggregatis; hypanthium crasse columnare, vix 1 mm. longum, glabrum; calyx viridis, glaber, 1.5 mm. longus, profunde lobatus, segmentis ovatis, inaequalibus, obtusis vel apiculatis; corolla evoluta non visa, in alabastro brevis, extus glabra, apice subtruncata.

COSTA RICA: small tree to 4 m., near El Copey in cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 1800 m., April 23, 1949, *Williams & Allen 16482*.

Planta de posición algo dudosa entre las especies costarricenses, pero aparentada con la *Psychotria Goldmanii* Standl. de Panamá y de Costa Rica. En ésa las hojas son dos veces más grandes que en ésta.

**Valeriana laxissima** Standl. & L. Wms., sp. nov.

Frutex scandens epiphyticus, praeter inflorescentiam omnino glaber, ramosus, caulibus gracilibus, vetustioribus teretibus, ochraceis, novellis striatis, in sicco fusco-purpurascentibus, internodiis plerumque elongatis; folia longipetiolata, membranacea, petiolo 1-2.5 cm. longo; lamina late ovata vel ovaliovata, 4-6 cm. longa, 2.5-4 cm. lata, integra, apice rotundata vel late obtusa et abrupte breviter cuspidato-acuminata, basi rotundata vel obtusa, supra intense viridis, subtus pallidior, bene supra basin quintuplinervia, venis paucis, obscuris; flores paniculati, paniculis usque 25 cm. longis et aequilatis, nudis, laxissimis, multifloris, ad nodos dense albo-pilosis, ramis gracilibus sparse patentipilosis, bracteis parvis, viridibus, patentibus, lanceolato-triangularibus, floribus in cymulas parvas laxas dispositis, bracteolis minutis, triangularibus, subob-

tusis; corolla alba, turbinato-campanulata, glabra, vel inferne minute puberula, 1.2 mm. longa, lobis tubo subaequalibus, rotundatis; stamina subexserta; fructus non visus.

COSTA RICA: flowers white, epiphyte, near El Copey in cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 1800 m., April 23, 1949, *Williams & Allen 16524*.

Del sur de Centro América, se conocen sólo dos otras especies trepadoras de Valeriana, la *V. scandens* L. con hojas compuestas, y la *V. Candolleana* Gardn., con hojas sencillas pero acorazonadas, las dos ampliamente diferenciadas de la planta presente.

**Valeriana pumilio** Standl. & L. Wms., *sp. nov.*

Herba perennis caespitosa, 5 cm. tantum alta, radice valde elongata, carnosa, usque 7 mm. crassa, acaulescens; folia numerosissima, subrosulata, suberecta, spathulato-lineararia, 2-6.5 cm. longa, 3-8 mm. lata, obtusa, integra, basin versus longe attenuata, basi ipsa paullo dilatata et pallida, utrinque sat dense pilis patentibus albidis pilosa; inflorescentiae 1.5-3 cm. longe pedunculatae, umbellato-corymbosae, vulgo densae et fere capituliformes, pedunculo ramisque sat dense pilosis, pedunculo inferne folia 2 vulgo gerente, umbella basi bracteis 2 linearibus usque 1 cm. longis foliiformibus sustenta, bracteis superioribus brevioribus, floribus sessilibus, aggregatis; corolla alba, extus glabra, tubo brevi, limbo alte 5-loba, segmentis triangulari-ovatis, patentibus, obtusis, intus glabris; antherae fere quadratae, breviter exsertae; fructus non visus.

COSTA RICA: flowers white, along spring bog in paramo, summit of Cerro de la Muerte above the cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 3300 m., April 10, 1949, *Williams 16729* (TYPE); Carretera Panamericana, Cerro de la Muerte, alt. 3100 m., 20 Agosto 1950, *León 2710*.

Especie bien distinta de las conocidas antes de Centro América, fácil de reconocer por su estatura enana, y por sus hojas pequeñas, angostas y densamente peludas. Es claramente una planta alpina, de las que caracterizan los páramos andinos. La segunda colección, recién recibida, consiste en una planta de 18 cm. de alto, pero con todos los demás caracteres del tipo.

**Eupatorium reticuliformum** Standl. & L. Wms., *sp. nov.*

Frutex laxe ramosus, ramis vetustioribus teretibus, brunnescentibus, junioribus densissime villosulis, pilis brunnescentibus, patentibus, internodiis brevibus vel saepius elongatis; folia modica, petiolata, firme membranacea, petiolo 1-1.5 cm. longo, dense breviter villosulo; lamina late rhombeo-ovata vel late ovata, 4-7.5 cm. longa, 2.5-5 cm. lata, acuminata vel acuta, basi latissime cuneata vel subrotundata, non decurrens, in fere toto margine grosse crenato-dentata, supra viridis, sparse minutissime puberula vel fere glabra, venatione omni prominente et arctissime reticulata, subtus multo pallidior, subcinerea, sparse minute lutescenti-puncticulata, praesertim ad costam nervosque sordide villosula, bene supra basin quintuplinervia, nervis interioribus fere ad apicem laminae protractis, venulis prominulis et arctissime reticulatis; inflorescentiae corymbiformes, 5-8 cm. latae et aequilongae, vulgo ramos breves foliatos terminantes, dense multicapitatae, ramis pedicellisque dense villosoto-tomentosis, bracteis inconspicuis, filiformibus, pedicellis tenellis usque 8 mm. longis; capitula, pappo incluso, ca. 7 mm. alta, campanulata, ca. 10-flora; phyllaria subaequilonga, late linearia, ca. 6 mm. longa, apice obtusa vel rotundata, dorso minute villosula; corolla alba, fere 5 mm. longa, extus glabra, tubo fere filiformi, subito in faucem tubo longiorem dilatata, dentibus brevibus, triangulari-ovatis, acutiusculis; achaenia paullo ultra 2 mm. longa, acute costulata, glabra, pappo albo, setis paullo inaequalibus, subrigidis, 4-4.5 mm. longis.

COSTA RICA: flowers white, spreading shrub in opening, Cerro de las Vueltas in the cloud forest area, Cordillera de Talamanca, province of Cartago, alt. 2700 m., March 30, 1949, *Williams 16103*.

Especie que carece de caracteres sobresalientes, pero no hemos podido referirla a una especie ya registrada de Costa Rica, o de otras partes de Centro América.

*SPIRANTHES URENS* Jacq., Enum. Pl. Carib. 28. 1760.

COSTA RICA: al nivel del mar, Cienaguaita, provincia de Limón, 22 de julio 1950, *León 2574*.

La especie es nueva para Centro América. Se parece a la especie común, *Spilanthes ocymifolia* (Lam.) A. H. Moore, pero las hojas son sésiles y lanceoladas. La planta costarricense tiene hojas esparsamente pilosas.

## NUEVAS ESPECIES DE PLANTAS DE LA REPUBLICA DE HONDURAS

Antonio Molina R.

DURANTE nuestras excursiones en busca de plantas, en nuestro suelo hondureño, hemos tenido la buena suerte de encontrar y coleccionar unas centenas de plantas, entre ellas un buen número de especies nuevas, algunas de las cuales damos las descripciones a continuación.

### **Cassia mensarum** A. Molina, *sp. nov.*

Herba perennis prostrata, caulibus pubescentibus; foliola 3-6-juga, oblonga, acuta, utrinque pilosula, ciliata, stipulis lanceolato-linearibus; flores lutei, sepalis hyalinis 1 cm. longis, petalis 0.5-1.5 cm. longis; legumen dehiscens, 2.5-4 cm. longum, 5 mm. latum.

Hierba perenne, esparsamente ramificada, tallos muy delgados, erguidos y de densa pubescencia, los entrenudos cortos o alargados; estípulas lanceolado-lineares, atenuadas, rígidas, erectas, visiblemente nervosas, ciliadas; hojas pequeñas, de pecíolos cortos, el pecíolo con una pequeña glándula subsésil; hojuelas 3-6 pares, oblongas, 5-10 mm. de largo, 3-5 mm. de ancho, obtusas y puntiagudas en el ápice, oblicuamente redondeadas a la base, subcoriáceas, esparsamente pilosas o lampiñas, ciliadas, peninerviadas, los nervios y venas prominentes en ambas caras; flores solitarias, axilares, los pedicelos delgados 2-3.5 cm. de largo, pubescentes, llevando cerca del ápice 2 brácteas lanceolado-lineares; sépalos delgados, lanceolado-lineares, cerca de 1 cm. de largo, 1-4 mm. de ancho, largo-atenuados, pálidos, pilosos; pétalos aovados, desiguales, amarillo brillante, por lo común 1-1.5 cm. de largo y 3-15 mm. de ancho, redondeados en el ápice, lampiños; fruto oblongo-linear, elásticamente dehiscente, 2.5-4 cm. de largo, 5 mm. de ancho, apretado o achatado, brevemente estipitado a la base,

agudo en el ápice, densamente piloso-pubescente; semillas 7-9.

HONDURAS: flowers yellow, in pine forest along stream, Agua Amarilla, Dept. Morazán, alt. 1300 m., Oct. 11, 1946, *Williams & Molina 10579* (TIPO en Herb. Esc. Agr. Panam.; dupl. en Herb. Chicago Nat. Hist. Mus.); del mismo lugar Oct. 5, 1948, *Standley 12814* y Aug. 29, 1949, *Standley 23246*; procumbent, petals yellow, El Quebracho above El Zamorano, in pine-oak forest, about 950 m., Nov. 29, 1946, *Standley 345*; procumbent, on rock along creek, Las Mesas, alt. 900 m., July 14, 1947, *Molina 318*; flowers yellow, repent herb on rocky hillside near Las Mesas, alt. 900 m., Oct. 2, 1949, *Williams 16900*.

La especie pertenece al subgénero *Chamaecrista*. Se distingue de *Cassia serpens* L., con la cual es especie afín, por sus flores y frutos dos veces más grandes, las hojuelas 3-6 pares, acompañadas por glándulas, que es una de los caracteres más sobresalientes, y por los bordes de las láminas ciliados.

*Cassia mensarum* encuéntrase generalmente en colinas rocosas, potreros y florestas de pinos y robles, entre las alturas de 800 a 1300 metros.

### **Mimosa hadrocarpa** *A. Molina, sp. nov.*

Subscandens, sat aculeata; pinnae 4-5-jugae, foliolis 9-13-jugis, parvis, oblongis, obtusis, mucronatis, basi binerviis, adpresse setoso-ciliatis; flores capitati, capitulis solitariis, axillaribus, pedunculatis, dense multifloris; legumina numerosa, dense aggregata, articulata, praesertim ad margines dense setosa vel aculeato-hispida.

Arbusto pequeño, erecto, de 70 cm. de alto, o bejuco trepador sobre arbustos, tallos verdes, delgados, recurvo-aculeados, densamente hispido-setosos; estípulas cerca de 5 mm. de largo, alesnadas, rígidas, hispido-ciliadas; raquis de la hoja densamente aculeado y esparsamente hispiduloso; hojas con pecíolos largos, las pinas 4-5 pares, de 2-3 cm. de largo; hojuelas 9-13 pares, oblongas, subagudas y puntiagudas en el ápice, lampiñas, densamente aprimido-setoso-ciliadas, con las setas amarillentas, oblicuas y redondeadas a la base y binervias; pedúnculos axilares, comúnmente solitarios, cerca de 1.5 cm. de largo, recurvo-aculeados; flores (no vistas aún) dispuestas en cabezuelas, sésiles; fruto estrechamente oblongo, obtuso y rostrado en el ápice, sésil y obtuso en la base, de

2-4 articulaciones, hispido en las válvulas, pero lampiño entre las setas, densamente espinoso-hispido en el margen; semillas de 2-4.

HONDURAS: bejuco 2-5 m., sobre matorrales húmedos, en la floresta de nubes, área de Rancho Quemado, sudoeste de San Juancito, Dept. Morazán, alt. 2000 m., junio 19, 1948, *Molina 1039a*; bejuco sobre arbustos, floresta de nubes de Montaña La Tigra, sudoeste de San Juancito, Dept. Morazán, alt. 2000 m., febrero 5, 1950, *Williams & Molina 17092* (TIPO en Herb. Esc. Agr. Panam.; dupl. en Herb. Chicago Nat. Hist. Mus.); "dormilona", in oak forest, erect shrub 70 cm., vicinity of La Esperanza and Intibucá, Dept. de Intibucá, alt. 1500-1600 m., Jan. 31-Feb. 12, 1950, *Standley 26464*.

*Mimosa hadrocarpa* en la mayoría de sus caracteres, es muy distinta de todas las especies de *Mimosa* que aparecen en la Flora of Guatemala de Standley y Steyermark. Esta especie crece en matorrales húmedos y florestas de nubes, a las alturas de 1500-2000 metros.

**Zornia lasiocarpa** *A. Molina, sp. nov.*

Annua tenerrima erecta glabra, caule acute angulato, insigniter flexuoso; foliola 1-juga, linearia, 1-nervia, acuta, glanduloso-punctata; stipulae lanceolato-lineares, glanduloso-punctatae; inflorescentia racemosa elongata remote pauciflora; legumen 3-4-articulatum, articulis dense lanosis, sat dense glochidiatis, glochidiis retroso-barbellatis.

Planta delgada, anual, estrictamente erecta, 15-30 cm. de alto, completamente lampiña, a veces simple pero comúnmente esparsamente ramificada, los tallos en la mayoría filiformes, zigzagueados, los entrenudos comúnmente alargados; estípulas pequeñas y conspicuas, lanceolado-lineares; pecíolos cerca de 1 cm. de largo; hojuelas 2 en el ápice del pecíolo, lineares, 5-20 mm. de largo, 0.5 mm. de ancho, uninervias, aguzadas, densamente sembradas de puntos glandulosos; flores racimosas, los racimos delgado-pedunculados, 3-7 cm. de largo, las 3-6 flores distantes, sésiles o casi sésiles; brácteas cerca de 7 mm. de largo, aprimidadas, cortamente dilatadas en la base abajo del punto de inserción, lanceolado-lineares, largo-atenuadas, lampiñas, conspicuamente ciliadas, trinervias, con puntos glandulosos; cáliz cerca de 4 mm. de largo, profundamente lobado, los lóbulos estrechamente atenuados, sub-

membranosos, pálidos; pétalos amarillos, rojos cuando marchitados; fruto de 3-4 articulaciones densamente glochidiadas, las setas densamente retrorso-barbeladas.

HONDURAS: flores rosado marchito, planta erecta de 15-30 cm. de alto, colinas húmedas, Quebrada Dantas, a 20 Kms. noroeste de Yuscarán, área de robles, Dept. El Paraíso, alt. 600 m., Nov. 23, 1948, *Molina 1660* (TIPO en Herb. Esc. Agr. Panam.; dupl. en Herb. Chicago Nat. Hist. Mus.); moist sandy meadow, erect, plentiful in one spot where found, tubercles on roots, Quebrada El Muro, between Las Mesas and Yuscarán, Dept. El Paraíso, alt. 600 m., Nov. 23, 1948, *Standley 14920*.

*Zornia lasiocarpa* se distingue de *Zornia diphylla* (L.) Pers. por sus flores que son más pequeñas, por sus frutos visiblemente más grandes, por las brácteas del fruto que son mucho más pequeñas y lampiñas, las hojuelas lineares, lampiñas por ambas caras, agudas, angostas y uninervias; los tallos erectos y zigzagueados y completamente lampiños, y también por ser planta anual.

Antes se conocía una sola especie del género *Zornia* en Centro América, mientras que existen diversas en la América del Sur, especialmente en el Brasil.

### **Maytenus Williamsii** A. Molina, sp. nov.

Frutex vel arbuscula glabra; folia breviter petiolata, lanceolato-oblonga usque ovato-oblonga, alterna, acuta vel breviter acuminata, apice ipso obtuso, basi obtusa vel rotundata, remote minute serrulata vel fere omnino integra; flores racemosi, racemis foliis vulgo longioribus, saepe ex axillis nudis oriundis, longuiscule pedicellati; fructus unilocularis, valvis 3 recurvis latis apice rotundatis dehiscentis; semen unum, arillo toto involutum.

Arbusto o árbol 3-5 m. de alto, las ramas delgadas, las más viejas algunas subteretes, ferruginosas, las más jóvenes unas subanguladas, los entrenudos cortos; hojas corto-pecioladas, alternas o algunas de ellas subopuestas, subcoriáceas, los pecíolos gruesos, 3-4 mm. de largo; láminas lanceolado-oblongas hasta aovado-oblongas, 5-6.5 cm. de largo, 2.5-3.3 cm. de ancho, agudas o acuminadas, con ápice obtuso, obtusas o redondeadas a la base, remotamente y en la mayoría diminutamente serruladas o en la mayoría completamente enteras, de

igual color por ambos lados, la costilla subprominente por arriba, y elevada por abajo, los nervios laterales cerca de 7 en cada lado, oscuros, las venas también oscuras, flojamente reticuladas; flores en racimos axilares o naciendo de los nudos deshojados, pocas o muy numerosas, los racimos pedunculados, 6-9 cm. de largo, los pedicelos gruesos de 8 mm. de largo o menos, divergentes, las brácteas diminutas; cáliz persistente en la base del fruto, cerca 2 mm. de ancho; cápsula sésil, redondeada en la base, profundamente 3-valvada, las válvulas de 8-10 mm. de largo, cerca de 8 mm. de ancho, redondeadas en el ápice, espeso-coriáceas, recurvadas después de la dehiscencia, el endocarpio (arilo) oval, cerca de 12 mm. de largo y 7 mm. de ancho; semilla oval, café oscuro, lisa, muy lustrosa, 1 cm. de largo, redondeada la final.

HONDURAS: área de bosque de nubes, montaña arriba de San Juancito, Dept. Morazán, alt. 2000 m., febrero 22, 1949, *E. D. Merrill, Williams & Molina 15640* (TIPO en Herb. Esc. Agr. Panam.; dupl. en Herb. Chicago Nat. Hist. Mus.); floresta de nubes de Montaña La Tigra, sudoeste de San Juancito, Dept. Morazán, alt. 2000 m., febrero 5, 1950, *Williams & Molina 17100*.

Por falta de las flores, la propia posición taxonómica de este pequeño árbol es algo dudosa. Tiene muchas de las apariencias de ciertas especies del género *Celastrus*, especialmente por sus inflorescencias racimosas y alargadas. La cápsula, a lo menos, es 1-celular, conteniendo una sola semilla, por lo cual sería excluida de *Celastrus*, y parece necesario referirlo a *Maytenus*. En tal género, los racimos de las inflorescencias son anormales.

### ***Croton suyapensis* A. Molina, sp. nov.**

Frutex 1-2-metralis ramosus, dense stellato-tomentosus, radio centrali pilorum multo elongato, ceteris brevissimis, internodiis brevibus vel elongatis; folia longe vel breviter petiolata, superiora interdum fere sessilia; lamina late ovata usque ad cordato-ovata, abrupte acuminata, basi breviter cordata, dentata vel crenata, supra sparse pilis plerumque simplicibus pilosula, subtus dense stellato-pilosa; flores monoeci, racemosi, parte inferiore feminea racemi brevi, parte staminea valde elongata; stigmata bipartita; capsula sparse longipilosa et sparse stellato-puberula vel glabra.

Arbusto de 1-2 m. de alto, copiosamente ramificado, las ramas delgadas, abundantemente hojosas, densamente estrellado-tomentosas, el rayo central de los pelos más alargado, los otros cortos, los entrenudos de las ramas cortos o alargados; estípulas pequeñas, divididas en varias secciones cortas, éstas terminando en glándulas alargadas; hojas delgadamente pecioladas o las superiores casi sésiles, membranosas, los pecíolos de 4 cm. de largo o más cortos, pubescentes como los tallos; láminas anchamente aovadas hasta redondeado-aovadas, comúnmente de 5-11 cm. de largo, de 3-7 cm. de ancho, ásperamente largo-puntiagudas, brevemente acorazonadas en la base, los lóbulos basales anchamente redondeados, grosamente dentadas o denticuladas, a menudo glanduloso-ciliadas, esparsamente vellosas por arriba con pelos comúnmente sencillos, a veces pálidas por abajo, densamente estrellado-tomentosas; flores monoicas, racimosas, los racimos sencillos, comúnmente terminales y solitarios, las flores pistiladas son pocas, aglomeradas a la base de la espiga, la parte estaminada de la espiga con muchas flores flojamente dispuestas, hasta 8 cm. de largo, los ráquises densamente hispídeos, los pedicelos cortos, las brácteas muy pequeñas, lineares, divergentes; flores estaminadas pequeñas, los sépalos apenas 2 mm. de largo, esparsamente pilosos o lampiños, los sépalos pistilados verdes, oblongo-lineares, apenas 2 mm. de largo, obtusos, hispídulosos; cápsula sésil, subglobosa, verde, de 6-7 mm. de largo, esparsamente estrellado-puberulenta, algunos de los pelos con el rayo central grandemente alargado, en la vejez lampiña; semillas morenas, de 4 mm. de largo, a veces lustrosas, la carúncula muy pequeña.

HONDURAS: camino viejo entre Tegucigalpa y Suyapa, colinas pedregosas sobre barro colorado, Dept. Morazán, alt. 1100 m., Nov. 6, 1948, *Molina 1469* (TIPO en Herb. Esc. Agr. Panam.; dupl. en Herb. Chicago Nat. Hist. Mus.), con los mismos datos *Standley 25062*; La Travesía noroeste de Tegucigalpa, floresta mesofítica, Dept. Morazán, alt. 1100 m., Sept. 18, 1948, *Molina 1142*, *Standley 12464*; matorrales pedregosos, Puente Colorado, norte de Tegucigalpa, Dept. Morazán, alt. 1000 m., Dic. 7, 1949, *Standley 24894*; matorrales húmedos, Quebrada Suyapa, Dept. Morazán, alt. 1100 m., *Standley 12930*, *Molina 1202 y 2557*.

Esta especie abunda cerca de Suyapa y alrededores de Tegucigalpa, en matorrales que son húmedos en el invierno.

pero muy secos durante el verano. Esta es una de las mejor caracterizadas de todas las especies hondureñas, fácil de reconocerse porque es planta muy ancha, delgada, de hojas suaves, de las cuales las de arriba son en la mayoría sésiles, y por lo delgado y alargado de las espigas de las flores, con sólo unas pocas flores pistiladas en la base de la espiga, pero muy alargada la parte estaminada caudiforme.

***Eugenia hondurensis* A. Molina, sp. nov.**

Frutex vel arbor, ramis novellis dense tomentosis; folia modica, breviter petiolata, crassiusculis, subrigidis, lamina elliptico-oblonga, apice rotundata, basi obtusa, supra dense puberula vel glabrata, subtus dense piloso-tomentosa; flores axillares, solitarii, longipedicellati; fructus obovoideus, basi subacutus, tenuiter tomentosus vel glabratus; semen unicum; sepala 4, rotunda, 4-5 mm. longa et aequilata, extus intusque tomentulosa, apice rotundata.

Arbusto o árbol 1-6 m. de alto, ramas subteretes, rojizas o cenicientas, cuando jóvenes muy densamente tomentosas con pelos divergentes o enredados, los pelos rojizos o cenicientos, los entrenudos comúnmente alargados; hojas de tamaño mediano, cortamente pecioladas, gruesas y a veces rígidas, los pecíolos gruesos, como 6 mm. de largo, tomentosos; láminas elíptico-oblongas, de 5.5-9.5 cm. de largo, de 3-4.5 cm. de ancho, redondeadas o anchamente obtusas en el ápice, obtusas en la base, verdes por el haz, densamente puberulentas o lampiñas, densamente punteadas, la costilla subimprimida, los nervios visibles, pálidas por el envés, densamente velloso-tomentosas, el tomento amarillento, la costilla delgada, elevada, los nervios laterales cerca de 10 pares, muy delgados, a veces irregulares, ascendiendo por un ángulo agudo, en la mayoría rectos, anastomosantes distantes del margen, las venas estrechamente reticuladas; flores axilares, solitarias, los pedicelos rectos, gruesos, de 14-18 mm. de largo, tomentosos; fruto inmaturo aovado o elíptico-aovado, cerca de 14 mm. de largo, de 9 mm. de ancho, subtruncado al ápice, subagudo en la base, esparsamente tomentoso o lampiño; semillas 2 o comúnmente 1 sola.

HONDURAS: matorrales húmedos, Quebrada Suyapa, noroeste de Tegucigalpa, Dept. Morazán, alt. 1100 m., agosto 10, 1949, *Molina 2559* (TIPO en Herb. Esc. Agr. Panam.;

dupl. en Herb. Chicago Nat. Hist. Mus.), del mismo lugar octubre 7, 1948, *Molina 1185*.

No se relaciona con ninguna de las especies ya conocidas del norte de Centro América. Es notable por su tomentosidad, hojas redondeadas u obtusas, por los frutos largos, solitarios en las axilas de las hojas.

### **Rondeletia Standleyana** *A. Molina, sp. nov.*

Frutex, ramis dense patenti-pilosulis; stipulae persistentes, erectae, lineari-lanceolatae, ca. 3 mm. longae; folia parva, breviter petiolata, oblonga vel lanceolato-oblonga, obtusa, basi subacuta, supra viridia, pilosula, subtus pallidiora, dense patenti-pilosula; flores corymbosi, corymbis densis, multifloris, longipedunculatis, terminalibus, floribus sessilibus vel breviter pedicellatis; hypanthium densissime patenti-pilosulum, calycis lobis paullo inaequalibus, lanceolato-linearibus, attenuatis, hypanthio plerumque longioribus; corolla alba, extus dense patenti-pilosula, tubo tenui 15 mm. longo, intus dense luteo-barbato, lobis brevibus subpatentibus rotundatis.

Arbusto 2 m. de alto, las ramas densamente vellosas con pelos divergentes, los entrenudos cortos o alargados; estípulas persistentes, erectas, lanceolado-lineares, cerca de 3 mm. de largo, puntiagudas; hojas membranosas, en los pecíolos cerca de 3 mm. de largo; láminas oblongas o lanceolado-oblongas, de 3-5.5 cm. de largo, de 1.5-2 cm. de ancho, obtusas, subagudas en la base, verdes por el haz, vellosas, ligeramente pálidas por el envés, densamente vellosas con pelos divergentes; flores corimbosas, los corimbos densos, multifloros, terminales, largo-pedunculados, flores sésiles o cortamente pediceladas, densas; hipantio subgloboso, apenas 2 mm. de largo, densamente velloso con pelos divergentes, los lóbulos del cáliz erectos, a veces desiguales, lanceolado-lineares, atenuados, comúnmente más largos que el hipantio, densamente vellosos; corola blanca, densamente vellosa con pelos divergentes, el tubo delgado, de 15 mm. de largo, densamente amarillo-barbado en la base de los lóbulos, los 5 lóbulos redondeados, explanados, de 2.5-3 mm. de largo; cápsula subglobosa, de 2 mm. de largo.

HONDURAS: pinares en un barranco, arriba de Zambrano, Dept. Morazán, alt. 1200 m., julio 20, 1948, *Williams &*

*Molina 14417* (TIPO en Herb. Esc. Agr. Panam.; dupl. en Herb. Chicago Nat. Hist. Mus.).

En la mayoría de los caracteres, esta especie está estrechamente relacionada con *Rondeletia nicaraguensis* Oerst. de las Segovias, república de Nicaragua. Las diferencias esenciales de *Rondeletia Standleyana* son sus hojas más anchas, corola más corta y la pubescencia apimada de la mayor parte de la inflorescencia.

## L I T E R A T U R E

IT is our purpose here to call attention to literature which we think will be of interest especially to our Central American readers. We shall do this either by title and a few lines of description or by a brief review.

EL AHUEHUETE (*TAXODIUM MUCRONATUM* TEN.). SÉPTIMA CONTRIBUCIÓN AL ESTUDIO DE LAS PINÁCEAS MEXICANAS. Por Maximino Martínez. Anal. Inst. Biol. (México). Tomo xxi. N° 1, págs. 25-82. figs. 1-36. 1950.

Esta contribución más reciente del Profesor Martínez a sus estudios notables de las Pináceas mexicanas es un modelo de lo que debería ser un tratado de esta índole. Trata detalladamente la taxonomía y la morfología de uno de los árboles más conocidos de México, y el folleto incluye muchas excelentes fotografías de ejemplares históricos, como los antiguos ahuehuetes de Chapultepec, el Arbol de la Noche Triste, que conmemora a Hernán Cortés, y el gigante ahuehuete de Santa María del Tule de Oaxaca, tal vez uno de los árboles más antiguos de todo el mundo.

El ahuehuete llega sólo a los últimos confines de Centro América. Dice Martínez, "Esta especie es de México y se extiende hasta Guatemala, pues se ha observado en Huehuetenango (Standley y P. Hernández, aunque aparentemente cultivado)". Actualmente, el árbol nace, aunque no en abundancia, en las orillas del río que conduce de Huehuetenango a la frontera mexicana, pero no se encuentra más adentro de Guatemala. Se cultiva raramente en las fincas guatemaltecas. Más de eso, es casi seguro que los mercenarios mexicanos, que dieron a los pueblos guatemaltecos al tiempo de la conquista nombres mexicanos, en lugar de sus propios guatemal-

tecos, le nombraron primero a la cabecera actual del departamento de Huehuetenango, Ahuehuetenango, más o menos "lugar de ahuehuetes," pero que este nombre, largo aún para los chapines, que no tienen dificultades con tales nombres indígenas que Chichicastenango y Totonicapán, y lo acortaron por una sílaba. Así fué más tarde con otro nombre de cabecera, Cuajiniquilapa, del departamento de Santa Rosa, que mandó acortar el gobierno de Guatemala a Cuilapa, palabra que no tiene en esa forma significado alguno.—P. C. S.

THE TAXONOMY, GENETICS, PRODUCTION AND USES OF THE CULTIVATED SPECIES OF CUCURBITA. Por Thomas W. Whitaker y G. W. Bohn. *Economic Bot.* 4: 52-81. 15 figs. En.-Mar., 1950.

En una gran parte, las plantas menos conocidas taxonómicamente son las cultivadas, y entre ellas, no hay grupo más confuso que las múltiples formas que constituyen el género *Cucurbita*. Así ha sido desde el tiempo de Linné, y después de leer esta contribución nueva, parece que así sigue. Los horticultores entienden, o profiesan entender, las diversas formas cultivadas en el Norte, porque es de suma importancia tal conocimiento para el cultivo económico y comercial. Los botánicos, menos confiados, si sean sabios, se confiesan ignorantes, y los muchos estudios recientes han hecho poco para aclarar el asunto.

Los autores presentes reconocen en las Américas cinco especies cultivadas y explotadas de *Cucurbita*: *C. Pepo* L., *C. moschata* Duch., *C. maxima* Duch., *C. mixta* Pang. y *C. ficifolia* Bouché. La última ofrece pocas variaciones y es fácil de reconocimiento; es el chilacayote de México y Guatemala, el chiverre del Sur de Centro América. *Cucurbita mixta*, del ruso Pangalo, fué basada sobre plantas cultivadas en México y Centro América, y parece incluir entre otras, las variedades de esta región cuyos frutos se comen cuando muy tiernos. Las distinciones entre esta especie y *C. Pepo*, *C. maxima* y *C. moschata* son obscuras, y la tabla comparativa de las especies, ofrecida por los autores, apenas despeja la obscuridad; aunque con los informes actualmente disponibles, probablemente no fuera posible presentar mejor.

Los autores, parece, tienen poco conocimiento de las *Cucurbitas* de los países tropicales de América, donde hay el número más grande de variaciones, y donde es de suponer que

originaron las formas que se cultivan en los Estados Unidos. Tampoco toman en consideración las especies y formas silvestres discutidas por L. H. Bailey en su reciente monografía. Por falta de datos cosmopolitas, la discusión del origen de las especies cultivadas no parece conclusiva, ni aún probable. Actualmente, fuera más exacto si los autores hubieran limitado su título a "las especies de Cucurbita cultivadas en los Estados Unidos de América." Es de presumir que en su tratamiento de la cría, la genética y la citogenética, están en campos más familiares; y la bibliografía, de 65 títulos, suministra un epítome útil de la literatura de este género de Cucurbitáceas.—*P. C. Standley.*

THE PIPERACEAE OF NORTHERN SOUTH AMERICA. William Trelease and Truman G. Yuncker. 2 volumes. University of Illinois Press, Urbana. 1950.

A useful account of the Piperaceae of the Guianas, Venezuela, Colombia and Ecuador. The two volumes, in addition to the systematic account of the genera and the species, contain 674 half-tone illustrations. The illustrations alone are worth more than the cost of the volumes. The prepublication price was US\$7.50.

COMPOSITION OF THE FOOD PLANTS OF CENTRAL AMERICA. IV. EL SALVADOR. Hazel E. Munsell, Louis O. Williams, Louise P. Guild, Cynthia B. Troeschner, Gertrude Nightingale, Lucille T. Kelley and Robert S. Harris. *Food Technology* 15: 263-296. 1950.

The fourth of a projected series of eight papers reporting studies on the composition of Central American foods which are derived from plants.

The composition of the plant foods used in Central America is now as well known as is the composition of the food plants anywhere in the world.

It is expected that a monograph reporting the entire study in detail will appear this year.

THE AMERICAN SPECIES OF TRIUMFETTA *L.*—Ko Ko Lay in *Annals of the Missouri Botanical Garden* 37: 315-395, ff. 13. 1950.

One of the most carefully done and well presented monographs which it has been our pleasure to check through for some time. The tropical Tiliaceae are notoriously difficult and *Triumfetta* was one of the most difficult of the genera in the

family. The monograph works beautifully for the Central American kinds.

HANDBOOK OF SOUTH AMERICAN INDIANS, THE CIRCUM-CARIBBEAN TRIBES. VOL. 4. Julian H. Steward, editor. Smithsonian Institution, Bureau of American Ethnology, Bulletin 143. 1948.

Although the title of this series of volumes is "Handbook of South American Indians" a very large part of volume 4 is devoted to Central America and Panama. The volume should be in the library of every one interested in the ethnology or archeology of this area.

Titles of chapters having to do principally with Central America and Panama are as follows:

Central American Cultures, by Frederick Johnson;

The Archeology of Central America: an Introduction, by Wm. Duncan Strong;

The Archeology of Honduras, by Wm. Duncan Strong;

The Archeology of Costa Rica and Nicaragua, by Wm. Duncan Strong;

The Archeology of Panama, by Samuel B. Lothrop;

The Basic Cultures of Central America, by Doris Stone;

The Post-Conquest Ethnology of Central America: An Introduction, by Frederick Johnson;

The Meso-American Division, by Frederick Johnson;

The Northern Highland Tribes: The Lenca, by Doris Stone;

The Caribbean Lowland Tribes: the Mosquito, Sumo, Panya, and Jicaque, by Paul Kirchnoff;

The Caribbean Lowland Tribes: the Talamanca Division, by Frederick Johnson;

The Tribes West and South of the Panama Canal, by Samuel K. Lothrop;

The Cuna, by David B. Stout;

The Choco, by David B. Stout.

The volume contains a large number of illustrations, both line drawings and half-tones. The line illustrations are mostly quite good but the half-tones often leave much to be desired, both in reproduction and in selection of photographs to be reproduced.

POLLINATION IN CORYANTHES SPECIOSA. Paul H. Allen in American Orchid Society Bulletin 19: 528-536, 7 figures. 1950.

A good account, with excellent illustrations, of observations on the pollination of the curious orchid *Coryanthes speciosa*. There has been much written on the pollination of the members of this genus but so far as we know this is the best documented of these accounts. It is based on Honduras material. Written in popular style.

NEUE PFLANZEN AUS COSTA RICA, INSBESONDERE VOM CHIRRIPO GRANDE 3837m.—Karl Suessenguth in *Botanische Jahrbücher* 72: 270-302, tt. 4. 1942.

The paper is primarily a systematic report of some of the new or more interesting plants out of a collection of 2100 specimens of flowering plants and ferns made in Costa Rica, principally on the slopes of Chirripó Grande by Walter Kupper in 1931 and 1932. The specimens are deposited in the Botanischen Staatssammlung in Munich.

Following the systematic lists are a few pages of lists of plants collected at various elevations on the slopes of the mountain. A few pages are devoted to a rather interesting discussion of the floral elements of Chirripó Grande.

There are some twenty-five new varieties and species described and two new genera are proposed, one "ad interim". The genera are *Triphylleion* (Umbelliferae), since reduced to synonymy under *Arracacia*, and *Chirripoa* which has the aspect of some Tillandsias.

THE FISHES OF THE CHOLUTECA DRAINAGE OF SOUTHERN HONDURAS.—A. F. Carr, Jr. and Leonard Giovannoli in *Occasional Papers of Museum of Zoology, Univ. of Michigan* No 523: 1-38, tt. 1950.

A short paper giving some characteristics of the fish fauna in the Choluteca River drainage of south Central Honduras. A sketch map showing the Choluteca river system with collecting stations is well done. There is a key to the 22 species or subspecies of fishes known by the authors to occur in the drainage.

There follows a brief account of each concept encountered in the river or its tributaries with pertinent data concerning the entity.

Two species are described as new, *Cichlasoma hogaboomorum* and *C. popenoei* and each is illustrated.

It is to be hoped that Dr. Carr will soon be able to finish and publish more of his observations on the fauna of Honduras made during his residence here.

PLANTAS INDESEABLES EN LOS CULTIVOS TROPICALES. Manual ilustrado para el agricultor (basado en material de Puerto Rico). Texto por Ismael Vélez; fotografías por Johannes van Overbeek. Págs. i-x, 1-497. Editorial Universitaria, Río Piedras, P. R., 1950.

Este manual, adornado con 246 fotografías de plantas puertorriqueñas y preparado para el uso de los agricultores de aquella isla, es igualmente útil para determinación de las malezas más comunes de todos los trópicos americanos, y hasta de las del Antiguo Mundo. Casi todas las especies ilustradas son familiares a la gente centroamericana.

El tomo es de buena tipografía, el texto limitado a una corta descripción de detalles que no sean obvios en las ilustraciones, con indicaciones de los nombres latinos de las plantas, y los nombres vulgares que corren en Puerto Rico, usualmente diferentes de los del continente.

Los grabados, basados sobre fotografías hechas en pleno aire, de plantas seleccionadas, son de una calidad apenas igualada en otro manual reciente, y algunos son verdaderas obras de arte. Es de desear que la edición sea amplia, pues suministra informes exactos en una forma llamativa que puedan ser sumamente útiles a todos los que se interesen en las plantas más familiares de la tierra caliente de las Américas. No conocemos a otra obra igual para la enseñanza de la botánica diaria y práctica de nuestros países tropicales.—P. C. S.