

STUDIES IN THE THEACEAE, XIII
NOTES ON THE MEXICAN AND CENTRAL AMERICAN
SPECIES OF *TERNSTROEMIA*

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THIS presentation of the Mexican and Central American species of the genus *Ternstroemia* is the second portion of a study of the New World species of the genus. The results of the work on the South American species were published in the Journal of the Arnold Arboretum, **23**: 298–343. 1942, and a study of the West Indian species will appear in the near future. Since the species of *Ternstroemia* in the Western Hemisphere are generally quite localized, one may roughly divide them into three geographical groups for study, namely, those of (1) the West Indies, (2) Mexico and Central America, and (3) South America. The North American groups were taken up first. After a very discouraging attempt at classification, the Mexican and Central American species were temporarily laid aside and the South American species studied instead. This proved to be a very fortunate move because, although many more species had been described and recognized in South America, these latter species exhibited characters which were more clearly distinct and consistent for specific delimitation. This knowledge aided considerably in the later classification of the Mexican and Central American species, many of which were described and based upon a single, extremely variable character. In fact, in contrast with the species of South America, there is throughout all the species of Mexico and Central America a certain sameness in the characters which might be used for specific delimitation.

This leads one to believe that the center of distribution for the genus in the Western Hemisphere lies in northern South America, where there is an abundance of very different species, and that all the Central American and Mexican species are very closely related and probably are derived from the same, not too remote, prototype. This latter assumption may be applied, for the most part, to the West Indian species also. However, there are more true species with definite outstanding characters in the West Indies than in Central America.

In most cases, throughout the genus, the species are rather localized, being confined to small but definite geographical localities. At the northern limits of the range are found two very variable species. In Mexico and Central America there is *T. Tepezapote* Schlecht. & Cham., ranging from southern Mexico into Nicaragua. Although several species have been described as differing from this original form, few present characteristics sufficiently distinct to permit specific recognition. The same holds true for *T. peduncularis* DC. in Cuba and southward through the West Indies. This latter species is better known under the name *T. obovalis* Rich., which

name one would naturally prefer retaining. However, *T. peduncularis*, although previously not well known, was described twenty-three years prior to *T. obovalis*.

Since a formal description was presented in the early part of the South American treatment, it hardly seems worthy of repetition here. However, immediately below is a brief discussion of the various characters used in specific delimitation throughout the genus. The differences which aided so much in the work on the South American species are shown. At the same time, the sameness of characters in the North American species is brought out. This "sameness" or lack of characters led to the assumption that these latter species had been derived from a single very recent prototype.

Leaves: In general, throughout the whole genus *Ternstroemia*, the leaves seldom furnish sound specific characters. The phrase "leaves coriaceous, obovate, crowded at the apex of the branchlets" may be applied to most species. From this characterization there is little variation to be found in the North American species. In one species, *T. sylvatica* (Vera Cruz), the leaves are definitely chartaceous or submembranaceous, and distinctly acute at the apex. A second species, *T. Pringlei* (Southern Mexico), has leaves which are always spatulate and consistently rounded at the apex.

Pedicels: The pedicel length, unless either very short (0.5 mm. or less) or very long (4–8 cm.) is hardly to be used as a distinctive specific character. Occasionally, on the large-fruited species of South America and Polynesia, the pedicels may be very stout (5 mm. diameter) at the apex, but ordinarily they scarcely exceed 2 mm. in diameter. In some instances, the pedicels may be somewhat flattened. This again is a rather inconsistent feature.

Bracteoles: The bracteoles, two in number (rarely four), often present good delimiting characters. They are always unequal in size, generally opposite and situated on the pedicel immediately below the calyx-lobes. In rare instances they may be alternate, with the outer bracteole two or even four millimeters below the calyx-lobes. Frequently the bracteoles appear to be caducous. Neither this latter character nor the alternate position of the bracteoles are consistent. At times, especially in the Mexican species, both alternate and opposite bracteoles with their corresponding positions may be found on a single specimen. In size and shape the bracteoles vary more, perhaps, than in any other individual character. An excellent example of this variation within a single species may be found in *T. Tepezapote*, native of Mexico and Central America. Variations from minute deltoid bracteoles through larger ovate and broadly ovate ones to even larger subrotund forms may be found. Nearly always, the bracteoles are glandular-denticulate. Often, in the very small forms, only a single denticulation may be found.

Calyx: The calyx-lobes, always persistent, offer one of the best and most used characters for differentiation. In the South American species many

different forms, including variations in size, shape, texture and the presence or absence of glandular-denticulations are used to complete satisfaction. In all species, the calyx-lobes are unequal, varying in size and shape from the smaller outer lobes to the larger inner lobes. Glandular denticulations are found only on the two outer lobes and occasionally on the exterior side of the middle lobe. The two inner lobes possess an entire and usually more scarious margin than the outer lobes. In the Mexican and Central American species, little variation is found in this character. All are of the same form and texture, usually rounded with little variation at the apex. Frequently the innermost lobes may be slightly apiculate.

Corolla: The petals, so often absent in herbarium specimens, cannot be relied upon for specific delimitation. They are usually about the same length as the calyx-lobes. Ordinarily they are white or yellowish white in color. A distinct difference in color is found in *T. Standleyana*, where the petals are always pink on the outer surface and red on the inner surface. Urban, in his treatment of the West Indian species, used extensively the character of connation of the base of the petals. In a few of the South American species, especially in *T. globiflora*, where the corolla is nearly cleistogamous, this character is very significant. However, in the Central American and Mexican species, the lobes are usually connate for one-half or a trifle less than one-half their length and vary slightly in this respect.

Stamens: The stamens are usually arranged in two series, only occasionally in one or in more than two series. The filaments are joined together (usually their entire length) and, in turn, are adnate to the base of the corolla. The anthers are usually linear. The connective is projected into an appendage extending beyond the anthers. In the North American species, there is little or no variation in the stamens. In the South American species, the character of the projected connective often presents excellent specific significance.

Pistil: In the pistil occur some of the best delimiting characters. In the South American species and those of the West Indies are found excellent characters for differentiation in the shape and number of cells of the ovary. Two-celled ovaries are the most typical and are present in the majority of species. However, several species in South America and two species in the West Indies have three-celled ovaries. It is interesting to note that the two West Indian species, *T. elliptica* and *T. delicatula*, having three-celled ovaries are confined to the southern islands of the Antilles and that *T. delicatula* is the only species extending into the West Indies from South America. Other species in South America have ovaries with four, five, or even six cells, these conditions usually resulting from incomplete doubling up of the two- or three-celled ovaries. Two species from South America, *T. Gleasoniana* and *T. discoidea*, and one species from the West Indies, *T. parviflora*, have supposedly one-celled ovaries. On the other hand, all the Mexican and Central American species possess two-celled ovaries, and furthermore both cells of the ovary always contain five or six

ovules. In the West Indian and South American species, one finds considerable differences in the number of ovules in the cells of the ovary.

The shape of the ovary and the subsequent shape of the fruit have been misused as characters of separation in the Mexican species. At anthesis, most species have flat, almost umbonate ovaries, seldom over 2 mm. long and up to 5 mm. diameter at the base. This type of ovary develops into a conical fruit. On occasional specimens stages of this development may be observed. It appears as though the apical portion of the ovary develops almost immediately and continues to maturity. In Mexico and Central America, most species have fruit definitely conical in shape, although the degree of angle may vary considerably. Various specimens, such as the type of *T. oocarpha* Rose, have very pronounced conical fruit when compared with the majority of other specimens. However, to my mind, the degree of variation in the fruit of *T. Tepezapote* is so gradual and still so extensive that *T. oocarpha*, although very distinctive in the type, must be included under the binomial *T. Tepezapote*, at least from this characteristic.

The style and stigma in the Mexican and Central American species offer no variations in form or size. In all specimens examined, the style is entire, 4–8 mm. long, and the stigma is punctiform. In the other two geographic regions, the style may be consistently very short (1 mm. in *T. brevistyla* Kobuski and *T. Mutisiana* Kobuski) or very long (10 mm. in *T. dura* Gleason and *T. olaeafolia* Wawra); occasionally it may be two-parted, as in *T. tristyla* Gleason, *T. distyla* Kobuski and *T. grandiosa* Kobuski, or three-parted, as in *T. punctata* Swartz. Excellent characters were found in the stigma. Besides the punctiform type, peltate, bi-peltate, crenate and capitate stigmas were found to aid in specific differentiation.

KEY TO THE SPECIES

- A. Outer calyx-lobes entire, eglandular.
 - B. Leaves not retuse at apex, inconspicuously veined on upper surface or slightly elevated, not impressed.
 - C. Pedicels 3–6 cm. long, sturdy, 3 mm. diam. at apex; bracteoles alternately disposed on pedicel (Maria Madre Island).....1. *T. Maltbyi*.
 - CC. Pedicels not over 3 cm. long; bracteoles opposite, just below calyx-lobes.
 - D. Petals red on internal surface, pink on external surface (Costa Rica)....
.....2. *T. Standleyana*.
 - DD. Petals white or creamy white.
 - E. Leaves spatulate, rounded at apex, two or three times longer than broad, long-tapering from middle to base; bracteoles generally caducous (Mexico).....3. *T. Pringlei*.
 - EE. Leaves obovate, often oblong-obovate, obtuse at apex, occasionally bluntly acuminate, tapering from middle but not gradually; bracteoles persistent (Panama).....4. *T. Seemanni*.
 - BB. Leaves retuse at apex, with veins impressed on upper surface.
 - C. Leaves oblong-obovate, 5.5–9.5 cm. long, 1.5–2.0 cm. wide, obtuse or acute at apex, tapering at base; veins lightly impressed above (Chiapas).....
.....5. *T. chalicophila*.
 - CC. Leaves rounded to obovate, 2.5–6.5 cm. long, 1.5–3.0 cm. wide, rounded or obtuse at apex, broadly cuneate at base; veins deeply impressed above, as if etched (see also AA) (Chiapas).....6. *T. impressa*.

- AA. Outer calyx-lobes glandular-denticulate.
 B. Veins deeply impressed, as if etched, on the upper surface of the leaves (See also A) (Chiapas).....6. *T. impressa*.
 BB. Veins inconspicuous or lightly raised on upper leaf surface.
 C. Leaves elliptic, acuminate, chartaceous; pedicels short, less than 1 cm. long (Mexico).....7. *T. sylvatica*.
 CC. Leaves obovate, coriaceous; pedicels 1.0–2.5 cm. long.
 D. Larger bracteoles orbicular, 5–6 mm. long, 4–5 mm. wide; calyx-lobes 10–11 cm. long, ca. 11 mm. wide; petals 11–12 mm. long, 7–10 mm. wide (Honduras).....8. *T. megaloptycha*.
 DD. Bracteoles seldom more than 4 mm. long and 3 mm. wide; calyx-lobes not over 8–9 mm. long and 6–8 mm. wide; petals ca. 8 mm. long and 4 mm. wide (Mexico, Guatemala, British Honduras, Honduras, Salvador, Nicaragua).....9. *T. Tepezapote*.

1. ***Ternstroemia Maltbyi*** Rose in North Amer. Fauna, **14**: 78. 1899, as "*T. Maltbya*." *Taonabo Maltbyi* Rose in Contrib. U. S. Nat. Herb. **8**: 322. 1905.
Ternstroemia Maltbyana Standley in Contrib. U. S. Nat. Herb. **23**: 823. 1923. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.
Taonabo Maltbyana Standley in Contrib. U. S. Nat. Herb. **23**: 823. 1923, in synonym.

DISTRIBUTION: Mexico (Maria Madre Island, Sinaloa).

MEXICO: Maria Madre Island, gravelly arroyo, *T. S. Maltby 105* (TYPE, US), May 12, 1897. — Maria Madre Island, *E. W. Nelson 4242* (PARATYPE, US; ISOTYPES, FM, G), May 3–25, 1897. — Sinaloa, near Colomas, *J. N. Rose 1675* (US), July 14, 1897.

Branchlets grayish, verticillate. Leaves coriaceous, oblong-obovate, 5–11 cm. long, 3–5 cm. wide, obtuse or subrotund at apex, tapering at base, granular-punctate on both surfaces, the margin entire, plane, the midrib canaliculate above, the 5–7 pairs of veins rather obscure on both surfaces, the petiole 7–8 mm. long. Pedicel 3–6 cm. long, sturdy, as much as 3 mm. diam. at apex; bracteoles 2, quite equal, long-ovate, ca. 2 mm. long, 1.5 mm. wide, apiculate, subcarinate, the margin sharply glandular-denticulate, alternately disposed on the pedicel 4–5 mm. below calyx-lobes, generally caducous; calyx-lobes imbricate, pergamentaceous, subequal, the outer lobes quite rounded, ca. 9 mm. long and wide, the margin entire and scarious, the inner lobes broadly ovate or elliptic, ca. 9 mm. long and 7 mm. wide; petals ovate, 10–11 mm. long, 5–6 mm. wide, involute toward apex, joined at base for 4 mm.; stamens ca. 60, bi-seriate, 5 and 7 mm. long, the filaments 1.5–2.0 and 3 + mm. long, the shorter filaments crassate, the longer filaments linear, the anthers in both ca. 3 + mm. long and the connective projected about 1 mm.; ovary conical, ca. 5 mm. long and 5 mm. diam. at base, 2-celled with 5 ovules in each cell, the style 8 mm. long, the stigma punctiform. Fruit (probably immature) oval to rounded, 2 cm. long and 2 cm. diam., the seeds 10 mm. long and 6 mm. wide.

Distinguishing features of this species are the long pedicels (up to 6 cm.), the large, round, entire calyx-lobes and the large petals. Also the caducous bracteoles, consistently alternate on the pedicel, are unusual.

Rose, in his original description (1899), used the name *Ternstroemia Maltbya* for this species. In 1905, he made the new combination *Taonabo Maltbyi*, correcting the original spelling in both the species and the synonym, *Ternstroemia Maltbyi*. Standley (1923), assuming that Rose originally intended to use the name *Ternstroemia Maltbyana*, made this new combination and for the synonym made still another combination, *Taonabo*

Maltbyana. However, since Rose himself corrected the original spelling "Maltbya," which was grammatically incorrect, to "Maltbyi" in both the species and the synonym, one must accept the name and assume that, even though no actual reference was made to the change, the author intended it so.

2. ***Ternstroemia Standleyana***, sp. nov.

Frutex vel arbor parva, 3–6 metralis, ramulis verticillatis teretibus griseis. Folia chartacea vel subcoriacea, obovata vel oblanceolata, 7.5 cm. \times 3 cm. vel 9 cm. \times 2.5 cm. vel 6.5 cm. \times 1.5 cm., apice obtusa, abrupte acuta vel acuminata, basi longo-attenuata, margine integerrima, plana vel subrevoluta, costa supra canaliculata, ad apicem evanida, venis undique inconspicuis, petiolis ca. 5 mm. longis. Pedicelli tereti, 1.5–2.3 cm. longi, bracteolis 2 inaequalibus ovatis 4.0 mm. \times 3.5 mm. vel 3.5 mm. \times 2.5 mm. vel 3.0 mm. \times 2.5 mm. integerrimis subcarinatis; sepala 5, imbricata, subaequalia, ovata, 9.5–10 cm. longa, exterioribus 5–6 mm. latis margine integerrimis et scariosis, interioribus 7–8 mm. latis, intimo apice apiculato; petala 5, ovata, extus rosea, intus rubra, ca. 10 mm. longa et 4 mm. lata, basi ad 2–4 mm. connata, apice acuta et involuta; stamina ca. 35, uni-seriata ut videtur, 5–7 mm. longa, filamentis 2.0–2.5 mm. longis, incrassatis, basi connatis et ad corollam adnatis, antheris linearibus vel subsagittatis, luteis, 4.0–4.5 mm. longis, connectivo in apiculum 0.5 mm. longum projecto; ovario late conico, 2 mm. longo et basi 3 mm. diam., 2-loculato, loculis 4–5-ovulatis, stylo ca. 6 mm. longo, stigmatibus punctiformi. Fructus conicus, 2-loculatus, probabiliter immaturus, 2.0 cm. longa, 1 vel 2 cm. lata, seminibus 1–3, grandis 1.2–1.5 cm. longis et 0.8–1.0 cm. diam., testa pallide lutea, arillo detergibili rubro-brunneo subcarnosa sub lente papillato induta.

DISTRIBUTION: Costa Rica.

COSTA RICA: Prov. Cartago: Alto de La Estrella, bushy slope, P. C. Standley 39279 (US; fragm. FM), March 1924 (shrub 3 ft. with green fruit). Prov. San José: Northeast of El Copey, near Laguna de la Escuadra, dense oak and bamboo forest, alt. 2000–2200 m., P. C. Standley 41914 (US), 41945 (FM, TYPE; US, ISOTYPE), Dec. 16, 1925 (common tree 4–6 m.; petals pink outside, red within; anthers yellow). — Laguna de la Chonta, northeast of Santa Maria de Dota, dense wet forest, alt. 2000–2100 m., P. C. Standley 42209 (US), 42274 (US; fragm. FM), Dec. 18, 1925 (common tree 4–6 m.; buds pink; petals red within; fruit green). — Near Quebradillas, about 7 km. north of Santa Maria de Dota, moist oak forest, alt. 1800 m., P. C. Standley 42991 (US), 43041 (US; fragm. FM), Dec. 24, 1925 (shrub or small tree 3.0–4.5 m. high; flowers pink outside, red within).

This excellent new species is characterized by large unequal bracteoles, up to 4 cm. long and 3.5 cm. wide, which are much larger than those of its nearest relative, *T. Seemanni*. The calyx-lobes (nearly 10 mm. long) and petals (also 10 mm. long) are considerably larger than those of *T. Seemanni*. In fact, the flowers of the present species measure over 2 cm. across when expanded. The petals of this species are consistently pink on the outside and red within, as contrasted with the yellowish white petals of *T. Seemanni*. The stamens are uni-seriate (35 in number) and 7.5 mm. long in *T. Standleyana*, while in *T. Seemanni* the stamens are bi-seriate (50+ in number) and much smaller in size. The branchlets on *T. Standleyana* are gray in color while in *T. Seemanni* the branchlets are red.

It is a pleasure to dedicate this species to Mr. Paul C. Standley, Curator of the Herbarium of Field Museum of Natural History, long recognized as an outstanding worker in the Central American flora and an indefatigable collector of tropical plants. This is truly Mr. Standley's species, considering that all six specimens cited above were collected by him.

3. **Ternstroemia Pringlei** (Rose) Standley in Publ. Field Mus. Nat. Hist. Bot. Ser. 4: 234. 1929.

Taonabo Pringlei Rose in Contrib. U. S. Nat. Herb. 8: 322. 1905. — Standley in Contrib. U. S. Nat. Herb. 23: 821. 1923.

DISTRIBUTION: Mexico (Morelos, Michoacan, Mexico, Oaxaca).

MEXICO: Morelos: Sierra de Tepoxtlán, alt. 2300 m., *C. G. Pringle 8013* (TYPE US; isotype, AA, G, Mich, Mo, NY), March 18, 1899 (small tree). — Woodlands about Alarcon Station, alt. 1800 m., *C. G. Pringle 11932* (FM, G, US), June 17, 1904. — Huitzilás, *E. Lyonnet 645* (AA, Mo, NY, US), Dec. 1930. — Near El Mirador, on road from Cuernavaca to Mexico, alt. 2200 m., *L. O. Williams 3819* (G), May 19, 1938 (tree). — Near Cuernavaca, *J. N. Rose & W. Hough 4406* (US), May, 1899. Michoacan: Vicinity of Morelia, Campanario, alt. 2100 m., *Bro. G. Arsène 5708* (AA, FM, G, Mo, US), Nov. 17, 1910. — Cerro Azul alt. 2100 m., *Bro. G. Arsène 2287* (AA, Mo, US), Nov. 4, 1909. — La Huéta, alt. 2200 m., *Bro. G. Arsène s.n.* (FM), Oct. 1910. — Hills of Patzcuaro, alt. 2550 m., *C. G. Pringle 5353* (G, US), July 29, 1892. — North slope of Mt. Tancitaro, alt. 2300–2750 m., *E. W. Nelson 6894* (G, US), Feb. 24, 1903 (tree 25–40 ft. with white flowers). Mexico State: Temascaltepec: Las Mesas, Rincón and Cumbre, alt. 2000–2800 m., *G. B. Hinton 3728* (FM), *5606* (AA, FM, NY), *5914* (AA, FM, NY), Apr. 25, 1933–Apr. 29, 1934 (small tree to 10 m. high; vernacular name, "trompillo"). Oaxaca: Teotepec, alt. 2500 m., *G. B. Hinton 14239* (NY), May 19, 1939 (tree 10 m. high with white flowers, in oak and pine forest).

Small tree with brownish branchlets. Leaves coriaceous, oblanceolate to oblong-cuneate, 6–9 cm. long, 1–2 (–3) cm. wide, obtuse at apex, long tapering from middle to base, granular-punctate on both surfaces, the margin subserrulate or subentire toward apex, subrevolute and plane toward base, the midrib canaliculate above, elevated below, the veins (5–7 pairs) rather obscure above, when visible elevated, visible below, the petiole 5–10 mm. long. Flowers usually axillary, solitary; pedicel 1.0–2.5 cm. long; bracteoles 2, lanceolate, 3.5–5.0 mm. long, quickly caducous, when present usually opposite and immediately below calyx-lobes, occasionally alternate (in type) with lower bract 2–3 mm. below calyx; calyx-lobes imbricate, subequal, pergamentaceous, the outer lobes broadly ovate, ca. 9 mm. long and broad, the margin entire and scarious, the inner lobes broadly ovate, apiculate; petals white, orbicular or suborbicular, 1.0–1.3 cm. long, 1.0–1.2 cm. wide, free nearly to base (2 mm.), the corolla large (for Mexican species), as much as 2.5 cm. diam.; stamens ca. 60, bi-seriate, 5 and 7 mm. long, the shorter stamens with filaments swollen at base, 2 mm. long, the longer stamens with filaments less swollen, 4 mm. long, the anthers in both series ca. 2 mm. long with the projection 1 mm. long and sharply apiculate; ovary conical, ca. 3 mm. long and 5 mm. diam. at base, 2-celled with ca. 5 ovules in each cell, the style 7 mm. long, the stigma punctiform. Fruit elongate-conical, ca. 1.5 cm. long and 1 cm. diam., the seeds up to 8 mm. long and 5 mm. wide.

The outstanding feature of this species is the shape of its oblanceolate or oblong-cuneate leaves, obtuse or generally rounded at apex, and long tapering at base. The margin of the leaves is usually subserrulate or at

least with some evidence of denticulation. Most closely related is *T. chalicophila* Loesener, which can be separated by having its leaves obovate, hardly oblanceolate, distinctly serrulate, retuse at the apex, and with veins impressed above. The bracteoles in this latter species are smaller (2 mm. long), deltoid and definitely alternate, placed as low as 7 mm. on the pedicel away from the calyx-lobes, which are more rounded and smaller (as are probably the petals). In both species the bracteoles are quickly caducous.

4. ***Ternstroemia Seemanni*** Triana & Planchon in Ann. Sci. Nat. sér. 4, **18**: 260. 1862. — Alfara, List Pl. Costa Rica, 11. 1887. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — Standley in Contrib. Arnold Arb. **5**: 107 (Fl. Barro Colorado Isl.). 1933.

Ternstroemia peduncularis Seemann, Bot. Voy. Herald. 87. 1853. — Non *T. peduncularis* DeCandolle.

Mokofua Seemanni (Triana & Planchon) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo Seemanni (Triana & Planchon) Standley in Jour. Washington Acad. Sci. **15**: 459. 1925.

DISTRIBUTION: Panama.

PANAMA: *B. Seemann* 525 (ISOTYPE, G), March 1847. — *Duchassaing s.n.* (ISOTYPE, G). PROV. COLON: Chagres, *A. Fendler* 315 (ISOTYPES, FM, G, Mo, US), March 24, 1850. — Loma de la Gloria, near Fato, in forests, alt. 10–104 m., *H. Pittier* 4079 (NY, US), Aug. 1911. PROV. COCLÉ: Between Las Margaritas and El Valle, *R. E. Woodson, P. H. Allen & R. J. Seibert* 1300 (FM, NY), July–Aug. 1938 (tree 15 m.). — Penonome and vicinity, *R. S. Williams* 374 (NY, US), Feb.–March 1908 (tree 20 ft. with yellowish white flowers). PROV. PANAMÁ: Thickets and forests near Arraiján, alt. 15 m., *R. E. Woodson, P. H. Allen & R. J. Seibert* 1340 (FM, Mo, NY), July 21, 1938 (tree 10 m.). — Arraiján, in dense shade, alt. 50 m., *P. H. Allen* 732 (FM, G, NY), Apr. 11, 1938 (slender tree 10 m.; flowers pale tan). — Juan Diaz, moist woods, *P. C. Standley* 30585 (US), Jan. 11, 1924 (shrub or tree 10–20 ft. with dark green leaves). — Sabanas north of Panama City, *Bro. Paul* 416 (US), in 1934. Barro Colorado Island: West Shore, *C. L. Wilson* 132 (FM), Feb.–March 1931 (medium-sized tree). — Along shore near Zetek House, *R. H. Woodworth & P. A. Vestal* 686 (AA, FM), Feb. 24, 1932 (tree). — Along French Canal, *O. Shattuck* 783 (FM), Gross Point, *O. Shattuck* 860 (FM), Pena Blanca Bay, *O. Shattuck* 1092 (FM), shore near Zetek House, *O. Shattuck* 1159 (FM), 1932–1934.

Small tree. Branchlets reddish, terete, quite smooth. Leaves chartaceous to subcoriaceous, oblanceolate or oblong-obovate, 6–11 cm. long, 2–4 cm. wide, obtuse at apex, contracted into an obtuse acumens, long tapering at base, granular-punctate on both surfaces, the margin subcrenulate, plane or subrevolute, the midrib canaliculate above, raised below, the veins generally obscure on both surfaces, occasionally 10–15 pairs lightly raised on both surfaces, the petiole 4–6 mm. long. Pedicel 2–3 cm. long; bracteoles 2, opposite, immediately below the calyx-lobes, unequal, very small, rounded, broadly ovate or ovate, 1.0–2.5 mm. long, 2–3 mm. wide, the margin entire or subentire; calyx-lobes imbricate, suborbicular, the outer lobes 4–7 mm. long, 5–6 mm. wide, the margin scarious, entire or nearly so, not glandular-denticulate, the inner lobes 6–8 mm. long, ca. 6 mm. wide, apiculate at apex; petals ovate, 6–7 mm. long, 2–3 mm. wide, acute at apex, joined for 2–3 mm. at base; stamens ca. 50, bi-seriate, 4–5 mm. long, the filaments ca. 1 mm. long, joined at base and adnate to base of corolla, the anthers narrow-linear, ca. 2 mm. long, the connective projected into an appendage 1.0–1.5 mm. long; ovary umbonate at first, 2 mm. long, 4 mm. diam. at base, 2-celled, each cell about 5-ovulate, the style 4–5 mm. long. Fruit subconical

to conical, ca. 1.5 cm. long, 1.0–1.3 cm. diam. at base; seeds 7–8, red-brown, filling capsule completely, 8–10 mm. long, 5–6 mm. diameter.

This species is characterized by chartaceous or subcoriaceous, oblanceolate leaves, reddish branchlets, entire calyx-lobes, and very minute bracteoles, persistent and opposite.

5. ***Ternstroemia chalicophila*** Loesener in Bull. Herb. Bois. sér. 2, **3**: 213. 1903. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 143. 1925.

DISTRIBUTION: Mexico (Chiapas).

MEXICO: Chiapas: on calcareous slope above Huitztan, *E. Seler* 2276 (ISOTYPE, G), March 10, 1896.

Branchlets rough, gray-brown. Leaves coriaceous, oblong-obovate, 5.5–9.5 cm. long, 1.5–2.0 cm. wide, obtuse or acute at apex, always retuse, tapering at base, granular-punctate on both surfaces, the margin flat and serrulate toward apex, slightly revolute and entire toward base, the midrib canaliculate above, the veins (5–7 pairs) obscure, impressed above and lightly raised below, the petiole 3–6 mm. long. Flowers axillary, solitary, the pedicel ca. 2 cm. long, thickened near the apex; bracteoles 2, alternate, on pedicel 2–4(–7) mm. below calyx, deltoid, ca. 2 mm. long, glandular-denticulate, quickly caducous; calyx-lobes imbricate, pergamentaceous, subequal, the outer lobes orbicular, 6–7 mm. long and wide, the margin entire, the inner lobes orbicular, only slightly larger, entire; petals (fide Loesener) oval, joined probably 1–2 mm. at base, 1 cm. diam. at apex; stamens (fide Loesener) 5 and 7–8 mm. long, the filaments thickened at base, the anthers with a deltoid acute projection; ovary (after anthesis) conical, ca. 4 mm. long and 4.5 mm. diam. at base, 2-celled with 5–7 ovules in each cell, the style 5–6 mm. long, the stigma punctiform.

The outstanding feature of this species are (1) the small (2 mm. long) quickly caducous bracteoles; (2) the alternate position of the bracteoles on the pedicel, usually 2–4 and occasionally as much as 7 mm. below the calyx-lobes; (3) the narrow obovate serrulate leaves, retuse at the apex with impressed veins on the upper surface and (4) the eglandular calyx-lobes.

Standley (Contrib. U. S. Nat. Herb. **23**: 821. 1923) and Melchior (Nat. Pflanzenfam. ed. 2, **21**: 143, 1925) both intimate that this species and *T. Pringlei* (Rose) Standley are conspecific. If such were the case the name *T. chalicophila* would have priority by two years. However, the leaves in *T. Pringlei* are truly oblanceolate, never retuse at the apex, occasionally serrulate with the veins raised rather than impressed on the upper surface. The bracteoles, when present, are lanceolate, 3–5 mm. long, generally opposite and close to the calyx-lobes. However, in the type and in other occasional specimens, the bracteoles may be alternate with the lower bracteole about 2–3 mm. below the calyx. In both species the bracteoles are quickly caducous and the calyx-lobes are entire.

6. ***Ternstroemia impressa*** Lundell in Bull. Torrey Bot. Club, **66**: 599. 1939.

DISTRIBUTION: Mexico (Chiapas), Guatemala.

MEXICO: Chiapas: Chiquihuite, Mt. Tacana, alt. 2800 m., *E. Matuda* 2814 (TYPE, Mich; isotype, NY), March 27, 1939. — Pico de Loro, Barranca Honda, Siltepec, alt. 2600 m., *E. Matuda* 4077 (AA, Mich), Oct.–Nov. 1940 (shrub).

GUATEMALA: Dept. Huehuetenango, Soloma, alt. 3000 m., *A. F. Skutch 993* (AA), August 17, 1934 (small tree, 20 ft. high, in second-growth woods).

Small tree or shrub. Branchlets with rough, grayish bark. Leaves coriaceous, obovate, 2.5–6.5 cm. long, 1.5–3.0 cm. wide, rounded or obtuse at apex, retuse, cuneate at base, granular-punctate on both surfaces, usually reddish below, the margin lightly serrulate, revolute, the midrib canaliculate above, the veins (5–7 pairs) deeply impressed above (as if etched), inconspicuous below, the petiole 4–6 mm. long. Pedicel 2.0–3.5 cm. long, the bracteoles either opposite immediately below calyx-lobes or alternate on pedicel, when opposite deciduous, when alternate persistent, broadly ovate, 2–3 mm. long, glandular-denticulate; calyx-lobes imbricate, subequal, outer lobes suborbicular or broadly ovate, 4–7 mm. long, 5–6 mm. wide, the margin scarious, entire or glandular-denticulate, the inner lobes broad-ovate, 6–8 mm. long, 5–6 mm. wide; petals obtuse or suborbicular at apex, 6–7 mm. long, 5–6 mm. wide, joined only for 1 mm. at base; stamens ca. 50, probably uni-seriate, appearing bi-seriate, 3.5–4.5 mm. long, the filaments 1⁺ and 2 mm. long, uniformly linear, the anthers ca. 2 mm. long, the connective projected into a blunt apex ca. 0.5 mm. long; ovary umbonate at first, 1 mm. long, ca. 3 mm. diam. at base, 2-celled with ca. 5 ovules in each cell, the style 3 mm. long, the stigma punctiform. Fruit immature, conical.

This species is characterized by thick coriaceous leaves with deeply impressed veins on the upper surface. The two specimens collected by Matuda are characterized also by a reddish color on the lower surface of the leaf, especially on the midrib. However, in the Skutch specimen, the midrib is more nearly yellow. In the type, *Matuda 2814*, the outer calyx-lobes are distinctly glandular-denticulate, yet in *Matuda 4077* and *Skutch 993* the outer lobes are scarious and entire. In *Skutch 993* and the type, *Matuda 2814*, both fruiting specimens, the bracteoles are opposite and immediately below the calyx, while in *Matuda 4077*, a flowering specimen, the bracteoles are alternate and situated on the pedicel. However, despite all this variation, there is no question concerning the status of the species and the relationship of the specimens cited above.

7. ***Ternstroemia sylvatica*** Schlechtendal & Chamisso in *Linnaea*, **5**: 220. 1831. — Hemsley, *Biol. Centr.-Amer. Bot.* **1**: 92. 1879. — Conzatti, *Gen. Veg. Mexico*, 111. 1903. — Melchior in *Nat. Pflanzenfam.* ed. 2, **21**: 142. 1925.
Mokofua sylvatica (Schlechtendal & Chamisso) O. Kuntze, *Rev. Gen. Pl.* **1**: 63. 1891.
Taonabo sylvatica (Schlechtendal & Chamisso) Szyszylowicz in *Nat. Pflanzenfam.* III, **6**: 189. 1893. — Rose in *Contrib. U. S. Nat. Herb.* **8**: 323, fig. 14. 1905. — Standley in *Contrib. U. S. Nat. Herb.* **23**: 822. 1923.
Ternstroemia occidentalis Sessé & Moçño, *Fl. Mex.* ed. 2, 128. 1894. Non Choisy 1855.
 ?*Ternstroemia cuneifolia* Sessé & Moçño, *Fl. Mex.* ed. 2, 128. 1894. Non Gardner 1845.

DISTRIBUTION: Mexico (Vera Cruz, Mexico, Guerrero, Hidalgo).

MEXICO: Vera Cruz: "In sylvaticis inter Jalapan et San Andres, Aug. atque prope San Miguel del Soldado," *Schiede & Deppe 455* (ISOTYPE of *T. sylvatica*, G, Mo; photo & fragment, FM). — San Miguel del Soldado, alt. 1800 m., *C. G. Pringle 8169* (AA, G, Mich, Mo, NY, US), April 20, 1899 (10–15 ft. high). — Zacuapan and vicinity, *C. A. Purpus 2290* (FM, G, Mo, NY, US), Oct. 1906 (small tree). — Forests near Tecomatla and Tolutla, *C. A. Purpus 10118* (G, NY, US), *10846* (FM, Mo, NY, US). — Sierra Chiconguiaco, *C. A. Purpus 6226* (FM, G, Mo, NY, US), Aug. 1916. — Vallee de

Cordova, *M. Bourgeau* 2241 (G, US), April 2, 1866. Mexico: Temascaltepec and Toluca, in mountains, *Sessé & Moçino s.n.* (ISOTYPES of *T. occidentalis*, FM). Guerrero: Cliffs along Acapulco Bay, Acapulco, *O. M. Clark* 6903 (NY), June 23, 1935. — Hidalgo: Trinidad, *C. G. Pringle* 13480 (US), April 25, 1904.

Small tree with grayish rugose branchlets. Leaves chartaceous to subcoriaceous, oblong-elliptic to oblanceolate, 5.5–8.0 cm. long, 1.5–2.0 cm. wide, acuminate at apex, tapering at base, granular-punctate on both surfaces, the margin plane, entire, the midrib lightly canaliculate above, fading toward apex, the veins ca. 8 pairs, obscure, the petiole 3–5 mm. long. Pedicel short, usually less than 1 cm., occasionally up to 1.5 cm. long; bracteoles 2, opposite, immediately below calyx-lobes, deltoid-ovate, ca. 2 mm. long, 2.0–2.5 mm. wide at base, sparingly glandular-denticulate; calyx-lobes imbricate, subequal, rounded, the outer lobes ca. 5 mm. long and 4.5 mm. wide, very sparingly glandular-denticulate, often appearing entire, the inner lobes ca. 5 mm. long and 5 mm. wide; petals suborbicular, 6.0–6.5 mm. long and ca. 5 mm. wide, joined 1.5–2.0 mm. at base; stamens ca. 60, bi-seriate, 4–5 mm. long, the filaments linear, ca. 2.5 mm. long, joined at the base and adnate to the base of the corolla, the anthers linear, 1.5–2.0 mm. long, the connective projected into a short appendage 0.25 mm. long; ovary ovate at first, developing conically, 2 mm. long and ca. 2 mm. diam. at base, 2-celled, each cell with ca. 5 ovules, the style 5–6 mm. long, the stigma punctiform. Fruit conical to ovate, ca. 1.7 cm. long and 1.5 cm. diam.

The elliptic, acuminate, chartaceous leaves, seldom over 2 cm. wide, are the outstanding characters of this species. The pedicels are short, seldom over 1 cm. wide, usually less. Closely related, if not identical, is the dubious species *T. lineata* DeCandolle. This latter name is discussed later in this treatment under the heading "Dubious Species."

8. ***Ternstroemia megaloptycha***, sp. nov.

Arbor parva, 6–12 metralis, ramulis teretibus griseis vel brunneo-griseis. Folia crasso-coriacea, obovata, 7–12 cm. longa et 3.0–4.5 cm. lata, apice obtusa vel rotundata, basi cuneata vel attenuata, margine integerrima, plana vel laeve subrevoluta, costa supra canaliculata, venis undique inconspicuis, petiolis 1.0–1.5 cm. longis. Pedicelli crassi, 2.0–2.5 cm. longi, bracteolis 2 inaequalibus, majore orbiculare 5–6 mm. longo et 4–5 mm. lato, margine glanduloso-denticulato, minore ovato vel deltoideo, 2.5–3.0 mm. longo et lato, margine glanduloso-denticulato; sepala 5, imbricata, granda, rotundata, sublignosa, exterioribus 10–11 mm. longis et ca. 11 mm. latis, margine glanduloso-denticulatis non scariosis, interioribus 11–12 mm. longis et latis, apice apiculatis, margine scariosis integerrimis; petala 5, pallide luteo-albida, 11–12 mm. longa et 7–10 mm. lata, basi ad 4 mm. connata; stamina ca. 70, bi-seriata, crassa, 7–9 mm. longa, filamentis 2–3 mm. longis, basi connatis et ad corollam adnatis, antheris 4.5–5.0 mm. longis, connectivo in apiculum 1⁺ mm. longum projecto; ovarium umbonatum vel subconicum, 2.5 mm. longum et basi 5 mm. diam., 2-loculatum, loculis 7–8-ovulatis, stylo 4.5–5.0 mm. longo, stigmatibus punctiformi. Fructus immaturus conicus, ca. 1.5 cm. longus et basi 1.2 cm. diam.

DISTRIBUTION: Honduras.

HONDURAS: Dept. Comayagua: San Luis, cut-over valley lands, alt. 750 m., *J. B. Edwards* 594 (AA, TYPE; FM, US), May 2, 1933 (tree 35 ft. high with ivory-

colored flowers). — San Luis, Rancho Grande, open mountain forest, alt. 1200 m., *J. B. Edwards* 220 (AA, FM), May 18, 1932 (tree 45 ft. high). — Malcotal, Minas de Ora, open mountain forest, alt. 1260 m., *J. B. Edwards* 201 (AA, FM), May 9, 1932 (tree 40 ft. high). — Near El Achote, above the plains of Siguatepeque, in forest at head of ravine, alt. 1350 m., *T. G. Yuncker, R. F. Dawson & H. R. Youse* 6372 (FM, G, Mich, Mo, NY, US), Aug. 7, 1936 (tree about 20 ft. tall, 6 in. diameter). — River bank, plains in vicinity of Siguatepeque, alt. 1050 m., *T. G. Yuncker, R. F. Dawson & H. R. Youse* 5592 (FM, G, Mich, Mo), July 2, 1936 (tree ca. 20 ft. tall, 6–8 in. diameter, leaves leathery, dark green and shining above, lighter beneath). — Vicinity of Siguatepeque, moist thickets and along stream in pine forest, alt. 1080–1400 m., *P. C. Standley* 55935 (AA, FM, US), 56187 (AA, FM, US), Feb. 14–27, 1928 (tree 20 ft.). — Dept. Santa Barbara: San Pedro Sula, alt. 1200 m., *C. Thieme* 5141 (FM, NY, US), May 1888.

This species is characterized by the largest flowering parts to be found in the Central American species. The bracteoles measure up to 5–6 mm. long and 4–5 mm. wide, as large as or larger than the calyx-lobes in most other species. The calyx-lobes and petals are over a centimeter long and generally nearly as wide. The stamens are thick and in some instances nearly as long as the petals, far exceeding those in other species in this region. Unfortunately the fruit is immature, but shows evidence of becoming rather large. The species seems to be confined to the Depts. of Comayagua and Santa Barbara in Honduras.

9. ***Ternstroemia Tepezapote*** Schlechtendal & Chamisso in *Linnaea*, **6**: 420. 1831. — Walpers, *Repert. Bot. Syst.* **1**: 369. 1842. — Choisy in *Mém. Soc. Phys. Hist. Nat. Genève*, **14**: 108 (*Mém. Ternstr.* 20). 1855. — Urbina, *Cat. Pl. Mex.* 19. 1877. — Conzatti, *Gen. Veg. Mex.* 111. 1903. — Melchior in *Nat. Pflanzenfam.* ed. 2, **21**: 142. 1925.
- Mokofua tepezapote* (Schlechtendal & Chamisso) O. Kuntze, *Rev. Gen. Pl.* **1**: 63. 1891.
- Taonabo tepezapote* (Schlechtendal & Chamisso) Szyszylowicz in *Nat. Pflanzenfam.* III. **6**: 189. 1893. — Rose in *Contrib. U. S. Nat. Herb.* **8**: 323. 1905. — Standley in *Contrib. U. S. Nat. Herb.* **23**: 822. 1923.
- Ternstroemia Seleriana* Loesener in *Bull. Herb. Bois. sér. 2*, **3**: 213. 1903. — Melchior in *Nat. Pflanzenfam.* ed. 2, **21**: 142. 1925.
- Taonabo oocarpa* Rose in *Contrib. U. S. Nat. Herb.* **8**: 322. 1905. — Standley in *Contrib. U. S. Nat. Herb.* **23**: 822. 1923.
- Taonabo sphaerocarpa* Rose in *Contrib. U. S. Nat. Herb.* **8**: 322. 1905. — Standley in *Contrib. U. S. Nat. Herb.* **23**: 822. 1923.
- Ternstroemia Hemsleyi* Hochreutiner in *Ann. Conserv. Jard. Bot. Genève*, **20**: 193. 1917. — Melchior in *Nat. Pflanzenfam.* ed. 2, **21**: 142. 1925.
- Ternstroemia Hemsleyi* Hochreutiner var. *dentobracteata* Hochreutiner in *Ann. Conserv. Jard. Bot. Genève*, **20**: 194. 1917.
- Ternstroemia oocarpa* (Rose) Melchior in *Nat. Pflanzenfam.* ed. 2, **21**: 142. 1925.
- Ternstroemia sphaerocarpa* (Rose) Melchior in *Nat. Pflanzenfam.* ed. 2, **21**: 142. 1925.

DISTRIBUTION: Mexico, Guatemala, British Honduras, Honduras, Nicaragua, El Salvador.

MEXICO: Vera Cruz: Tecolutla, *Schiede s.n.* (TYPE, Berlin; photo, FM, G). — Misantla, *C. A. Purpus* 5958 (FM, G, Mo, NY, US), July 1912. Tabasco: Achotal, Balancan, *E. Matuda* 3104 (FM, Mich, NY), May 1939 (tree 7–9 m.). Chiapas: Mt. Ovando, *E. Matuda* S-193 (AA, Mich, Mo, NY), 641 (Mich, Mo, US), 656 (Mich, US), Apr. 1936, 1937. — Mountains near Tonalá, alt. 600–1000 m., *E. W. Nelson* 2904 (NY), 2994 (US, type of *T. oocarpa*), Aug. 1895. — Fenia, mountain slopes, *C. A. Purpus* 10015, 10153 (US), Apr. 1925. — Canjob, *E. A. Goldman* 785

(US), 789 (US), March 24, 1904. — Precise locality lacking, *Ghiesbreght 501* (FM, G, Mo). Oaxaca: Valley of Cuicatlan, alt. 2300–2400 m., *E. W. Nelson 1902* (US, type of *T. sphaerocarpa*; G, NY), Nov. 1894. — Cumbre de Talca, alt. 1800 m., *B. P. Reko 4045* (US), Feb. 20, 1919. — Sierra San Pedro Nolasco, Talea, etc., *C. Jurgensen 567* (type of *T. Hemsleyi*, photo and fragm. FM), 1843–1844. — Rincón Antonio, *C. R. Orcutt 3225* (FM, G, US), Apr. 21, 1910.

GUATEMALA: Dept. Santa Rosa: Santa Rosa, alt. 1000 m., *Heyde & Lux 2967* (G, US), *2969* (G, US), May 1892. — Zamorora, alt. 1675 m., *Heyde & Lux 2968* (G, Mo, NY, US), May 1892. Dept. Alta Verapaz: Secanquim, alt. 250–600 m., *O. F. Cook & C. B. Doyle 64* (US), Apr. 1904. — Secanquim, forest along Saklak River, alt. 200 m., *H. Pittier 227* (NY, US), May 1905. Dept. Huehuetenango: Chacula, in gorge, alt. 1600 m., *E. Seler 3099* (G, NY, US, isotypes of *T. Seleriana*), June 27, 1896 (shrub). Dept. Peten: La Libertad and vicinity, *M. Aguilar 30* (AA, FM, Mich, Mo, NY), Aug.–Nov. 1933. — La Libertad, *C. L. Lundell 2578* (FM, Mich, US), *3046* (AA, FM, Mich), *3541* (FM, Mich), *4883* (Mich), Apr.–July, 1933. — Monte Polol, *C. L. Lundell 3026* (FM), *3036* (Mich), Apr. 1933. — Lake Peten, *C. L. Lundell 3204* (FM, Mich), May 1933. — Near Chiché, *C. L. Lundell 1653* (Mich), May 1932 (large tree of savannah island flora). — Vaxactum to San Clemente, *H. H. Bartlett 12802* (AA, FM, Mich, NY), Apr. 1931. Dept. Izabal: Vicinity of Quirigua, on pine ridge, alt. 75–225 m., *P. C. Standley 24505* (AA, FM, G, Mo, NY, US), May 1922 (tree 25–40 ft. with dense irregular crown; flowers yellowish white). — Quebradas, open shrubby hillside, *S. F. Blake 7549* (G, US), May 1919 (tree 15 m.; flowers pinkish white with yellow-tipped anthers). — Between Mella and Izabal on Montana de Mico, alt. 65–600 m., *J. A. Steyermark 38530* (FM), Apr. 1940 (tree).

EL SALVADOR: *S. Calderon 1407* (G, Mo, NY, US), Dec. 1922 (large tree; vernacular name "trompillo"). — *S. Calderon 2319* (G, NY, US).

BRITISH HONDURAS: El Cayo, *H. H. Bartlett 13013* (AA, FM, Mich, NY, US), May 1931. — Middlesex, dense forest, alt. 60 m., *W. A. Schipp 344* (AA, FM, G, Mich, Mo, NY), Sept. 1929 (rare tree, 30 ft. high). — All Pines, secondary forest, *W. A. Schipp 556* (AA, FM, G, Mich, Mo, NY), July 1930 (tree 20 ft.). — Little Cocquericot, Belize River, Big Fall Pine Ridge, *C. L. Lundell 4320* (FM, Mich), Apr. 1933. — El Cayo Distr., Mt. Pine Ridge, San Agustin, in sandy pine-oak uplands, *C. L. Lundell 6838* (G, Mich, NY, US), July–Aug. 1936 (tree 17 m.). — El Cayo Distr., Vaca, on river bank, *P. H. Gentle 2480* (FM, Mich), Apr. 1938. — Between Mullins River and Manatee, in pinelands, *P. H. Gentle 3384* (AA, Mich, NY), Aug. 1940 (fruit yellow). — Toledo Distr., Monkey River, Swasey Branch, in hummock in pine ridge, *P. H. Gentle 3838* (AA), Dec. 1941. — Maskall, *P. H. Gentle 1270* (AA, FM, G, Mich, Mo, NY), July 1934.

Branchlets terete, gray, verticillate. Leaves coriaceous, oblong-obovate or obovate, 7–13 cm. long, 3–4 cm. wide, obtuse or rounded at apex, frequently bluntly acuminate, attenuate at base, the margin entire or slightly crenulate, subrevolute, the midrib canaliculate above, the veins inconspicuous on both surfaces, the petiole 0.7–1.0 cm. long. Pedicels 1.5–2.5 cm. long; bracteoles 2, unequal, opposite, broadly ovate and suborbicular, 2–3 mm. long, 3 mm. wide, glandular-denticulate along the margin; calyxlobes imbricate, unequal, the outer lobes suborbicular, ca. 8 mm. long and wide, the margin glandular-denticulate, the inner lobes broadly ovate or subelliptic, ca. 9 mm. long and 6 mm. wide, apiculate, the margin scarious, entire; petals lanceolate to ovate, ca. 8 mm. long and 4 mm. wide, acute at apex, joined nearly one-half their length; stamens ca. 50, bi-seriate, 4.5–5.5 mm. long, the filaments 1.0–1.5 mm. long, somewhat thickened, joined at base and adnate to base of corolla, the anthers 2.5–3.0 mm. long, the connective projected into an apicule ca. 1 mm. long; ovary flattened or um-

bonate, 1.5–2.0 mm. long, 3 mm. diam., 2-celled, each cell 4–5-ovulate, the style 6–7 mm. long, the stigma punctiform. Fruit conical or subconical, 1–2 cm. long, 1.0–1.5 cm. diam.

The type of this species was collected by Schiede at Tecolutla, Vera Cruz, and is deposited in the herbarium at Berlin. Photographs may be found at the Gray Herbarium and the Field Museum. The actual type is very fragmentary, consisting of a very few leaves and two fragmentary flowers past anthesis. Very little information concerning this species could be gleaned from an examination of this specimen, as Loesener attested in describing *T. Seleriana*.

Only one specimen, *C. A. Purpus 5958*, is found in American herbaria collected in Vera Cruz. To my mind, this is not typical *T. Tepezapote*, although, as in the type, the leaves are slightly crenulate along the margin. On the Purpus specimen, the outer calyx-lobes are only 4 mm. long and less than one-half the length of the inner lobes (8–9 mm.). The young immature fruit capsule is oblong-conical, ca. 1 cm. long and 0.5 cm. diameter. The type shows outer calyx-lobes smaller than the inner lobes but not to such a marked degree as is found in *Purpus 5958*.

The above specific description was drawn from *Matuda S-193*. To my mind this specimen is the most typical representative of *T. Tepezapote* examined. However, as far as that goes, any worker might select any specimen as typical and be justified in his selection. Several species, *T. Seleriana* Loesener, *T. oocarpa* Rose, *T. sphaerocarpa* Rose and *T. Hemsleyi* Hochreutiner have been placed under *T. Tepezapote* as synonyms. This action was taken only after several periods of study. Although there are minor variations, they are all too close for specific delimitation. I have considered them under the headings of varieties and forms and could not find any clear lines of separation based on any characters. They vary most in bracteole structure. As stated in an early paragraph, the bracteoles are always unequal in size and vary in shape as well, on a single flower. Both rounded and deltoid bracteoles may subtend the calyx-lobes on a single flower. Hence, we have variations from the minute deltoid (*Purpus 5958*, 1 × 1 mm.) through the ovate-triangular (*Ghiesbreght 501*, 2 mm. long) and the subrotund and ovate-deltoid (*Lundell 1653*, 3 × 3 mm.) to the broadly ovate and orbicular (*Nelson 1902*, 4.5 × 3.0 mm.). Combinations of these typical variations may be found on a single pedicel. The bracteoles of *T. oocarpa* are described as deciduous. In the type, this condition holds quite true. When present (a few were found) they are broadly ovate-elliptic, ca. 3.0 mm. long and 2.5 mm. wide. This character of deciduous bracteoles is not consistent. The fruit of *T. oocarpa* is markedly conical, but so are the fruits of all material cited above, to one degree or another.

To set up a series of varieties based on the bracteole character is not at all satisfactory, as I have discovered. From the Peten and Alta Vera Paz regions of Guatemala comes a series of specimens with large bracteoles, ca. 4 mm. long and 3 mm. wide, varying from subrotund to deltoid-ovate. This same type of bracteole is found on *Nelson 1902*, (Oaxaca), the type

of *T. sphaerocarpa*. On the type of *T. Hemsleyi*, the bracteoles are ca. 3 mm. long and wide but are ovate-triangular. In the latter specimen, the calyx-lobes are only sparsely glandular-denticulate, appearing entire.

From the El Cayo district of British Honduras a series of specimens has been collected with small minute deltoid bracteoles. However, in Vera Cruz and Oaxaca, specimens with similar small bracteoles are found. One might here suggest two varieties or at least forms. However, connecting the two is a series of variations making it impossible to draw a dividing line even on a geographical basis.

DUBIOUS SPECIES

Ternstroemia lineata DeCandolle in Mém. Soc. Phys. Hist. Nat. Genève. **1**: 409, t. 1 (Mém. Ternstr. 17, t. 1). 1822; Prodr. **1**: 523. 1824.—Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 105 (Mém. Ternstr. 17). 1855.—Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Taonabo lineata (DeCandolle) Rose in Contrib. U. S. Nat. Herb. **3**: 322. 1905.

DeCandolle, in the original description of this species, states: "Corolla subglobosa albida cum linea rubra transversali in medio loborum picta" and "Bracteolae nullae aut deciduae." The above quotations would indicate that the description was drawn from a plate of Moçinho in the possession of DeCandolle or from a copy of the original. An actual type may be nonexistent! I doubt the presence of a transverse red line on the corolla of any species of *Ternstroemia*! Possibly a mark or line across the petals caused by pressure against the stamens may be indicated. However, the illustration shows this marking on both surfaces of the corolla. Furthermore, DeCandolle, had he possessed an actual specimen, should have been able to distinguish definitely whether the bracteoles were "nullae aut deciduae." The bracteole scars, undoubtedly, were present, even though the actual bracteoles were not.

These two characters (corolla markings and bracteoles) are the only differences I can mark between *T. lineata* and *T. sylvatica*, and these two characters are as dubious as the species itself. However, I am unwilling to use the name *T. lineata* in place of the well established and well described *T. sylvatica*, one of the best known species in Mexico, unless the actual type can be found in the Madrid Herbarium.

EXCLUDED SPECIES

Ternstroemia Purpusii T. S. Brandege in Univ. Calif. Publ. Bot. **6**: 187. 1915 = ***Symplococarpon Purpusii*** (Brandege) Kobuski in Jour. Arnold Arb. **22**: 191. 1941.

Ternstroemia serrulata Pavon ex Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 110 (Mém. Ternstr. 22). 1855 = ***Cleyera serrulata*** Choisy, loc. cit.

Ternstroemia siphilitica Pavon ex Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 110 (Mém. Ternstr. 22). 1855 = ***Cleyera integrifolia*** (Benth.) Choisy, loc. cit.