

STUDIES IN THE BORAGINACEAE, XV

NOTES ON SOME MEXICAN AND CENTRAL AMERICAN
SPECIES OF *CORDIA*

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A STUDY of *Cordia diversifolia* Pavon and its allies has revealed that these species are functionally dioecious. The male plants have flowers producing conspicuous stamens with villous filaments and an aborting ovary devoid of style. The female plants have slightly smaller corollas which, though bearing stamens, have glabrous filaments a half to a third as long and anthers a third to a fourth as long as those produced by the male plants. The ovary in the female flowers produces a well developed exerted branched style much overtopping the inconspicuous stamens. These two types of flowers are borne on separate plants in all material examined. Flowers of similar dimorphism are found in the large group of Old World species related to *C. Myxa* L. Authors, who appear to have studied these species in the field, state that these two types of flowers are commonly borne in the same inflorescence and frequently in distinct parts of it, and that only exceptionally are they segregated on separate plants. I must confess that I have not been able to verify this observation. In all the Old World material available to me the inflorescence seems to contain only one type of flower.

Besides the floral dimorphism exhibited by *C. diversifolia* and allies, there is another, less extreme dimorphism, found in other American species of *Cordia*. This is exemplified by the common West Indian *C. Collococca*, in which the male plants have the aborting ovary producing a short branching style, rather than devoid of a style as in *C. diversifolia* and relatives. The female flowers, as in *C. diversifolia*, differ from the male in their slightly smaller size and much shorter glabrous filaments and much smaller anthers. I studied this species in Cuba and could find no evidence that fruit was ever produced on those trees having flowers developing elongate hairy filaments. A study of herbarium material also shows that the plants are male or female and produce flowers of one form only. A dioecious condition of this type is present in *C. Collococca* L., *C. cymosa* (Donn. Sm.) Standley, and in all the species with strongly dimorphic leaves, viz., *C. Toqueve* Aubl.,

C. sericalyx A. DC. (including *C. opaca* Rusby), *C. macrophylla* L., *C. sulcata* DC. and *C. panamensis* Riley.

The types of dimorphic flowers exemplified by *C. diversifolia* and *C. Collococca*, differ only in the presence or absence of a style on the abortive ovary of the male flowers. The flowers of the *C. Collococca*-type are heterostyly in structure but actually unisexual in function. The conditions found in *C. Collococca* and *C. diversifolia* are very interesting as illustrating stages by which unisexuality may be achieved from heterostyly. True heterostyly, with both forms of flowers maturing fruit, appears to be not uncommon among American *Cordias*. In fact it seems to prevail in all those species having conspicuous funnellform or salverform corollas. It may be accompanied by some dimorphism in corolla-form as for example in *C. Sebestina* L. and *C. dodecandra* DC. Strictly monomorphic flowers, in fact, seem to predominate only in the section PILICORDIA and among the true (i.e., small-flowered) Varronias.

KEY TO THE MEXICAN AND CENTRAL AMERICAN SPECIES OF
CORDIA § PILICORDIA

Flowers functionally unisexual; plants dioecious.

Style not developed in male flowers, completely absent or represented by an inconspicuous stub on the aborting ovary.

Leaves glabrous above or nearly so (cf. *C. inornata*).

Leaves oblanceolate, 3–4 times as long as broad, scabrid above from scattered stiff erect hairs; hairs on calyx and inflorescence erect or ascending; montane, Guatemala. *C. Skutchii*.

Leaves ovate to elliptic or oblong, 2–3 times as long as broad, upper surface smooth, the scattered hairs (if present) closely appressed; hairs on calyx and inflorescence appressed; coastal, Honduras and Salvador. *C. salvadorensis*.

Leaves abundantly strigose or velutinous above.

Leaves elongate, 2.5–4 times as long as broad, oblong to oblanceolate, frequently slender-acuminate; Central America (cf. *C. inornata*). *C. diversifolia*.

Leaves broad, usually less than twice as long as broad, orbicular to broadly elliptic or obovate.

Calyx in bud ellipsoidal, 2–2.5 mm. thick and 3 mm. long; leaves more or less cordate at base; calyx with stiff elongate tortuous brown hairs; Guatemala. *C. cordiformis*.

Calyx in bud subcylindric, 1–1.5 mm. thick and 3–5 mm. long; leaves acute or obtuse or rounded at base; western Mexico.

Under surface of leaves strigose with closely appressed short stiff encrusted hairs. *C. inornata*.

Under surface of leaves more or less velvety with usually abundant soft slender elongate erect or ascending hairs.

- Leaves strigose above, the hairs short and closely appressed.
 *C. Hintoni*.
- Leaves bearing slender erect hairs on upper surface.
 *C. subvelutina*.
- Style developed in the male flowers, but reduced and non-functional.
- Fruit red; plant more or less deciduous, inflorescence developing from
 old wood before the leaves. *C. Collococca*.
- Fruit yellowish or greenish white; inflorescence developing along leafy
 stems.
- Leaves broadly elliptic to subcordate, subhomomorphic, obtuse,
 larger ones 15–25 cm. broad; branchlets very coarse and stout,
 5–14 mm. thick, with crowded leaves. *C. cymosa*.
- Leaves distinctly heteromorphic; larger leaves 5–11 cm. broad,
 oblong-lanceolate, apex distinctly acuminate; smaller leaves
 suborbicular; flowering branchlets slender and very elongate,
 3–5 mm. thick, with scattered leaves. *C. panamensis*.
- Flowers homomorphic, perfect, hermaphroditic.
- Calyx strongly ribbed; corolla funnellform with lobes broader than long;
 fruit elongate, erect; leaves more or less toothed. *C. dentata*.
- Calyx not ribbed, corollas salverform or subrotate, lobes longer than
 broad; fruit, except in *C. bicolor*, transversely or obliquely ovoid;
 leaves entire.
- Flower buds narrowly obconic, twice as long as broad, ca. 7.5 mm.
 long; corolla tube ca. 7 mm. long; leaves rigid with a stiff arcuately
 recurved midrib, under surface somewhat scabrid; Panama.
 *C. protracta*.
- Flower buds obovoid to nearly globose, 1–1.5 times as long as broad,
 3.5–4.5 mm. long; corolla tube about 3.5 mm. long or less; leaves
 less rigid and with midrib obscurely if at all arcuately recurved,
 lower surface not scabrid.
- Buds and calyx at anthesis covered with a dense strigose indument.
- Drupe nearly erect, with nearly apical stylar scar, usually evidently
 minute-strigose; fruiting calyx distinctly deep-saucers shaped,
 obscurely lobed; lower surface of leaves with an evident pallid
 indument of very abundant slender minute hairs... *C. bicolor*.
- Drupe compressed ovoid, becoming strongly oblique or nearly
 transverse, with the stylar scar lateral, glabrous; fruiting
 calyx deeply lobed; lower surface of leaves green, the hairs
 scattered and minute and inconspicuous.
- Calyx with 2–3 usually rounded lobes, the lobes with scarious
 disintegrating margins; ovary bearing scattered bristles
 about the base of the style. *C. eriostigma*.
- Calyx with 5 sharp triangular lobes, in fruit spreading and
 distinctly star-shaped; ovary glabrous; leaves tending to be
 more elongate than in preceding. *C. stellifera*.
- Buds and calyx at anthesis sparsely strigose or subglabrous.

Branches of inflorescence glabrous or nearly so; buds obovoid; corolla tube short-exserted; calyx glabrous outside, strigose within; leaves less than 12 cm. long and 6 cm. wide, with a very conspicuous elongate acumination; Panama.
 *C. lasiocalyx*.

Branches of inflorescence with abundant appressed short hairs.

Flower buds obovoid, calyx strigose inside, corolla-tube short-exserted; leaves becoming 12–23 cm. long and 5–10 cm. broad; Panama and Costa Rica. *C. lucidula*.

Flower buds nearly globose, calyx subglabrous within, corolla-tube not exserted from calyx; leaves relatively small, becoming 8–12 cm. long and 3.5–5.8 cm. broad; Mexico and Guatemala.

Lobes of the calyx permanently united, with short prolonged tips forming an apiculate bud; calyx incompletely circumscissile below the summit, the calyptrate apical portion usually remaining attached to one side of the opened calyx; branchlets glabrous or nearly so; calyx glabrous except at apex. *C. stenoclada*.

Lobes of calyx without prolonged tips (buds not apiculate); calyx with lines of dehiscence extending down from apex, 3–5-lobed, not circumscissile nor with a calyptrate apex; branches and calyx sparsely strigose.
 *C. prunifolia*.

***Cordia Skutchii*, sp. nov.**

Frutex vel arbor parva ad 8 m. alta; ramulis hornis gracilibus ad 3 dm. longis 2–4 mm. crassis, partibus junioribus (et inflorescentia) pilos crassos rigidos ad 0.5 mm. longos erectos vel ascendentes curvatos haud abundantes et tuberculos vel muriculos minutos gerentibus; foliis membranaceis oblanceolatis 12–25 cm. longis 2.5–8 cm. latis supra medium latioribus deinde utrinque attenuatis, basi cuneatis 1–2 cm. longe attenuatis, apice graciliter acuminatis, margine (praesertim supra medium) denticulatis (dentibus 5–8 mm. distantibus subulatis antrorsis ad 1.2 mm. longis nervos majores terminantibus), supra costa (et petiolo) pilos rigidos laxe adpressos abundantes gerentibus, alibi pilis rigidis saepe curvatis sparsis 1–2 mm. longe distantibus erectis vel ascendentibus ad 0.5 mm. longis e basi pustulata orientibus inconspicue notatis, subtus subglabris pallidioribus secus costam et nervos sparsissime inconspicueque strigosis alibi minutissime albo-tuberculatis vel muriculatis vel rariter pilos sparsissimos subulatos erectos gerentibus; inflorescentia terminali 5–9 cm. longe pedunculata 8–16 cm. diametro, ramis gracilibus; floribus dimorphis, abortu styli vel staminum unisexualibus; calyce elongato ca. 5 mm. longo 10-costato (costis longitudinaliter sulcatis) extus minute tuberculato vel muriculato et setas rigidas erectas

vel ascendentes curvatas ad 0.5 mm. longas sparse gerente, intus supra medium minute strigoso, apice irregulariter 3–5-dentato; corolla alba 9–11 mm. longa, lobis 4–5 mm. longis ca. 2 mm. latis oblongis recurvatis; filamentis floris masculi 4–5 mm. longis basim versus villosis, eis floris feminei ad 1.5 mm. longis glabris antheras infertiles 0.3–0.5 mm. longas quam eis floris masculi ca. 1.5 mm. longis ad 4-plo minores gerentibus; stylo floris masculi ca. 1 mm. longo glabro, stylo floris feminei 6–7 mm. longo exserto; fructu albo ellipsoideo-ovoideo erecto elongato ad 1 cm. longo e calyce maturo explanato crateriformi ca. 6 mm. diametro oriente.

GUATEMALA: Palamar, dept. Quezaltenango, 1140 m. alt., shrub or small tree up to 8 m. tall, in forest, fl. and fruit white, species dioecious, Oct. 12, 1934, *Alexander F. Skutch 1425* (male, G) and *1426* (pistillate; TYPE, Gray Herb.).

In gross habit *C. Skutchii* is most suggestive of *C. diversifolia*, but differs from that widely distributed plant in its more slender and loosely branched habit and green, thinner, nearly glabrous leaves. It is a montane plant of northwestern Guatemala. Its relative is a plant of the tierra caliente chiefly on the Atlantic side of Central America from Vera Cruz to Panama.

In the field notes for his no. 1426, Skutch notes that it is a "pistillate fruiting individual of no. 1425; the species is dioecious." Dissection of his beautifully prepared material proves this to be true. The plant is dioecious by abortion. The male plants produce exserted stamens with fertile oblong anthers about 1.5 mm. long on filaments which are 4–5 mm. long and evidently hairy near their base. The ovary is 1–1.5 mm. long (at anthesis) and is rounded at the summit or bears a minute stub. There is no elongate branched style developed in the male flowers. The female flowers produce a well developed functional style which is evidently exserted from the corolla. This is slightly smaller than that on male plants. Its filaments are short (ca. 1.5 mm. long), glabrous and produce only reduced (0.3–0.5 mm. long) infertile anthers which are only a third to a quarter the size of those produced by the male flowers. The species is unquestionably dioecious.

Cordia salvadorensis Standley, Jour. Wash. Acad. Sci. **14**: 242 (1924).

SALVADOR: San Salvador, Aug. 1922, *Calderon 1126* (US, TYPE; G). HONDURAS: foot of El Tigre volcano above Amapala, volcanic soil in woods, tree 5–8 m., "Tibulote," 50 m. alt., Sept. 16, 1935, *West 3542* (G).

This species is known only from the Pacific tierra caliente of northern Central America. The collections cited above represent the female plants. The species is related to *C. Skutchii* but has broader more glabrous herbage and, when developed, more closely appressed hairs.

***Cordia diversifolia* Pavon ex A. DC. Prodr. 9: 474 (1845).**

Cordia Johnstoni Cufodontis, Archivio Bot. 10: 41 (1934).

? *Cordia paniculata* Sesse & Mociño, Fl. Mex. 49 (1894) and Fl. Mex. ed. 2, 45 (1894). Not Roth (1821), nor Sieber (1828).

A species widely distributed along the Atlantic tierra caliente from Mexico (Vera Cruz) to Panama. On the Pacific slope collected at Escuintla, Guatemala (*J. D. Smith 2481*). Most of the collections seen by me represent the staminate form. In collecting material collectors appear to have been attracted to the male, rather than female plants, probably because of the slightly larger corollas of the former.

This species was based upon specimens, one given as from Guayaquil, Ecuador, and the other from Mexico. Both collections are evidently from Mociño & Sesse and were, in all probability obtained in Guatemala or adjacent Mexico.

***Cordia cordiformis* Johnston, Jour. Arnold Arb. 18: 10 (1937).**

Known only from southern Guatemala (depts. Guatemala and Santa Rosa). It is very closely related to *C. diversifolia* but differs strikingly in its proportionately very broad leaves which may be even subcordate in outline. The species was based upon two staminate collections.

***Cordia inornata*, sp. nov.**

Arbor abortu styli staminumve dioica; ramulis hornis gracilibus ad 3 dm. longis inconspicue haud abundanterque strigosis pilos rigidos pallidos 0.2–0.5 mm. longos sparsos gerentibus; foliis obovatis vel ellipticis vel ovato-oblongis 6–12 mm. longis 3–7 cm. latis, apice obtusis vel acutis, basi acutis vel obtusis 0.8–3 cm. longe petiolatis, margine supra medium perinconspicue denticulatis (denticulis saepe 3–5 mm. distantibus subulatis ad 0.5 mm. longis incurvatis), supra strigosis pilos 0–0.5 mm. longos rigidos haud abundantes valde adpressos saepe e basi pustulata orientes gerentibus, subtus pallidioribus sparse strigosis pilos pallidos ad 0.4 mm. longos rigidos adpressos e nervis reticulatis orientes gerentibus; inflorescentia laterali et terminali 5–15 cm. longe pedunculata 3–6 cm. longa 3–5 cm. crassa pilos rigidos ad 0.5 mm. longos laxè adpressos proferentibus; floribus dimorphis; calyce elongato 3–4 mm. longo sparse breviterque strigoso inconspicue 10-costato (costis latis leviter longitudinaliterque sulcatis); corolla alba 5–10 mm. longa, eo floris masculi saepe majore, lobis recurvatis oblongis tubo subaequilongis; filamentis floris feminei ca. 1.5 mm. longis infra basim subglabris antheras ad 0.5 mm. longas gerentibus; filamentis floris masculi 2–4 mm. longis infra basim villosis antheras 1.2–1.5 mm. longas proferentibus; ovario glabro floris masculi ca. 1 mm. longo apice rudimento styli minus

quam 0.2 mm. longo coronato, eo floris feminei stylum ca. 4 mm. longum gerente; fructu elongato erecto ellipsoideo-ovoideo ca. 8 mm. longo e calyce explanato ad 8 mm. diametro et 2–3 mm. profundo crateriformi oriente.

MEXICO: Villa Victoria, dist. Coalcoaman, Michoacan, shrub 2 m. tall, 680 m. alt., 1939, *Hinton 13914* (G); near Colima, in arroyo, large shrub 12 ft. tall, crown wide-spreading, 1897, *Palmer 50* (G; US); near Colima, 1897, *Palmer 56* (US); Pihuamo, June 1892, *Jones 68* (US); Hac. de Ybarra, Tuxpan, Jalisco, tree, fringe of woods, fruit a white ball, 20 m. alt., 1926, *Mexia 1080* (G, TYPE; US); betw. Acaponeta and Pedro Paulo, Nayarit, 1897, *Rose 3309* (US); near Acaponeta, Nayarit, 1897, *Rose 3296* (US); Rosario, Sinaloa, 1897, *Rose 1826* (G; US); Coacoyolitos, municip. Rosario, alt. 20 m., 1925, *Ortega 5876* (US) and *6419* (G; US).

This species is closely related to *C. Hintoni* and to *C. subvelutina*. These three plants of western Mexico agree in habit and gross aspect and differ chiefly in pubescence. Perhaps they may represent forms of a single species. Of these three habitually similar plants, *C. Hintoni* ranges apart, but *C. inornata* and *C. subvelutina* appear to share the coastal hills from Colima and adjacent Jalisco and Michoacan north to southernmost Sinaloa. The stout appressed encrusted hairs on the leaves of *C. inornata* are very different from the more abundant slender elongate spreading hairs on the leaves of *C. subvelutina*. Until more is known of these two plants I believe that they may be accepted as separate species.

Two collections cited above (*Hinton 13914*, and *Palmer 56*) have the leaves nearly glabrous or with only very few and scattered appressed hairs, and in this regard suggest *C. salvadorensis* of Central America. These two collections, however, differ from *C. salvadorensis* and show affinities with *C. inornata* by having small obovate leaves and encrusted hairs. Furthermore, on the lower surface of the leaves of *C. salvadorensis* there are abundant slender hairs borne crowded in the axils of the principal veins. Such villous vein-axils are absent in *C. inornata* and in the two collections discussed.

The leaf-shape in *C. inornata*, and its two close relatives, is rather constant and characteristic, being usually obovate or elliptic and less than twice as long as broad. Two collections (*Ortega 6419* and *Rose 3309*), from near the northern limit of the range *C. inornata*, have elongate leaves becoming nearly four times as long as broad. These two aberrant collections, however, come from localities in which the normal form of the species has been found.

***Cordia Hintoni*, sp. nov.**

Frutex vel arbor 3–10 m. alta; ramulis hornis 1–3 dm. longis ad 3–4 mm. crassis, juventate pilis pallidis minutis erectis et setis rigidis brunneis 1–2 mm. longis saepe curvatis conspicue subvelutino-vestitis, maturitate subglabrescentibus; foliis homomorphis 1–7 cm. distantibus late obovatis vel ellipticis usque ad suborbicularibus 5–20 cm. longis 4–15 cm. latis 1–4 cm. longe petiolatis utrinque obtusis vel subrotundis vel non rariter apice breviter abrupteque acuminatis, supra strigosis pilos rigidos pallidos e basi pustulata orientes valde adpressos 0.1–1 mm. longos abundanter gerentibus, subtus pallidioribus velutinis pilos molles graciles curvatos erectos vel ascendentes 0.5–1 mm. longos praesertim secus costam et nervos orientes abundanter gerentibus, margine (praesertim supra medium) denticulatis, denticulis saepe nervos primarios et secundarios terminantibus ca. 5 mm. distantibus subulatis antrorse curvatis ca. 1 mm. longis; inflorescentia terminali vel laterali 4–10 cm. longa 5–10 cm. diametro laxa dichotomeque ramosa, ramulis ultimis 5–10 mm. longis dense unilateraliterque floriferis; floribus dimorphis abortu styli vel staminum unisexualibus; calyce subcylindraceo 4–5 mm. longo inconspicue 10-costato (costis longitudinaliter sulcatis), apice 4–5-dentato (dentibus plus minusve triangularibus subaequalibus, apice inconspicue villosulis), extus minute sed evidenter strigoso, intus supra medium dense minuteque strigoso, maturitate subexplanato 5–7 mm. diametro 2–3 mm. profundo; corolla alba ad 9 mm. longa, tubo ca. 4 mm. longo, lobis oblongis recurvatis ca. 5 mm. longis et 2 mm. latis; filamentis floris masculi 4–4.5 mm. longis basi villosis, eis feminei ca. 2.5 mm. longis glabris antheras infertiles quam antheras floris masculi ca. 1.6 mm. longas 3–4-plo minores gerentibus; ovario glabro, floris masculi ca. 1 mm. longo apice rudimento styli quam 0.2 mm. brevior coronato, floris feminei stylum exsertum ca. 4 mm. longum proferente; fructu glabro albo erecto elliptico-ovoideo elongato 8–10 mm. longo e calyce maturitate crateriformi oriente.

MEXICO (dist. Temascaltepec): Ixtapan, shrub 4 m. tall, llano, 1935, *Hinton 7918* (G); Limones, tree 6 m. tall, in barranca, July 5, 1935, *Geo. B. Hinton 7740* (TYPE, Gray Herb.); Limones, shrub 3.5 m. tall in barranca, 910 m., July 1, 1933, *Hinton 4266* (G); Bejucos, shrub 3 m. tall in barranca, fl. white, 610 m. alt., June 20, 1933, *Hinton 4141* (G); Bejucos, tree 10 m. tall, July 13, 1935, *Hinton 8048* (G).

This species, along with its close relatives, *C. inornata* and *C. subvelutina*, have been accepted as Mexican forms of *C. diversifolia*. True *C. diversifolia* is chiefly a plant of the Atlantic tierra caliente, from Vera Cruz south to Panama, and is a rather stable species with elongate leaves,

larger flowers, and strongly ribbed calyx. Our Mexican plant and its close relatives have a looser growth-habit, a less conspicuous more appressed indument, and broad leaves, and are plants of the dry Pacific slopes of Mexico. They may be distinguished from true *C. diversifolia* at a glance. The present species is most closely related to *C. subvelutina*, differing from that plant chiefly in having erect rather than appressed hairs on the upper surfaces of the leaves and in having, perhaps, less hairy branchlets.

***Cordia subvelutina*, sp. nov.**

Arbor ad 5 m. alta, abortu styli staminumve dioica; ramulis hornis gracilibus 1–3 dm. longis ad 3 mm. crassis, pilos graciles ad 1 mm. longos erectos vel ascendentes curvatos molles haud abundantes gerentibus, internodiis 1–6 cm. longis; foliis obovatis vel ellipticis vel suborbicularibus (2.5–)4–10 cm. longis (1.5)3.5–6.5 cm. latis, medium versus vel supra medium latioribus, apice rotundis vel acutis breviter vel vix acuminatis, basi obtusis vel acutis 1.5–3.5 cm. longe petiolatis, margine supra medium inconspicue denticulatis (dentibus 3–8 mm. distantibus cuneatis ca. 0.5 mm. longis antrorse incurvatis), supra asperulis pilos numeros erectos graciles rigidiusculos e basi pustulata orientes 0.1–1.0 mm. longos gerentibus, subtus velutinis pilos abundantes molles graciles ca. 1 mm. longos secus nervulos numeros orientes gerentibus; inflorescentia terminali subsessili 3–8 cm. crassa 2.5–4.5 cm. longa, ramulis pilos molles graciles erectos abundantes gerentibus; calyce (eo floris masculi 4–5 mm. eo feminei 3–4 mm. longo) elongato inconspicue 10-costato (costis longitudinaliter sulcatis) praesertim supra medium pilos 0.1–0.7 mm. longos rigidiusculos ascendentes haud abundantes gerente, intus subglabro supra medium minutissime et sparsissime striguloso, apice 3–5-dentato, dentibus triangularibus ca. 0.5 mm. longis apice minute villosulis; corolla alba medium versus lobata, floris feminei ad 6 mm. longa, masculi ad 8 mm. longa, lobis oblongis recurvatis; filamentis floris feminei ad 0.7 mm. longis inconspicuis infra basim glabris, masculi ad 3 mm. longis exsertis infra basim villosis; antheris masculi ca. 1.5 mm. longis quam eis floris feminei duplo vel subtriplo majoribus; ovario glabro, floris masculi ca. 1.5 mm. longo stylum haud proferente, feminei ad 2 mm. longo, stylo ad medium versus lobato ca. 4 mm. longo exserto coronato.

MEXICO: Barrolosa, dist. Coalcoman, Michoacan, 1250 m. alt., tree 5 m. tall on hill, fl. white, 1939, *Hinton 15066* (TYPE, Gray Herb.); Acaponeta, Nayarit, 1910, *Rose, Standley & Russell 14275* (US); Acaponeta, 1897, *Rose 3123* (US).

This species comes from the Mexican coastal districts in which *C.*

inornata has been repeatedly collected. It is evidently related to that species but differs from it conspicuously in the abundant slender erect or ascending hairs present on both leaf-surfaces. It is probably most closely related to *C. Hintoni*. That species grows in a detached area in the interior over 300 km. east of the range of *C. subvelutina* and *C. inornata*. It has the lower surface of the leaves with an indument similar to that of *C. subvelutina*. Its upper leaf surfaces, however, have short stiff closely appressed hairs which are similar to those found on *C. inornata* and hence very different from the erect elongate slender spreading hairs found on the upper leaf surface of *C. subvelutina*.

Cordia Collococca L. Sp. Pl. ed. 2, 274 (1762), excluding "*Cordia glabra* Sp. Pl. sp. 1. p. 191" which is *Bourreria succulenta* Jacq.

Cordia micranthus Sw. Prodr. 47 (1788) and Fl. Ind. Occ. 1: 460 (1797).

Dry warm localities at low altitudes in Central America (chiefly along the west coast), in northern Venezuela, and in the West Indies.

COSTA RICA: El Coyolar, Alajuela, 240 m., tree 30–50 ft. tall along quebrada, fr. red, 1925, *Standley* 40051 (US); Nicoya, Guanacaste, roadside, tree, fruit red, 1900, *Tonduz* 13918 (G; US) and 13921 (US). NICARAGUA: Granada, *Baker* 2549 (G); without locality, *Wright* (US). SALVADOR: near La Unión, shrub 3 ft. tall, dry thicket, "Manone," 150 m. alt., 1922, *Standley* 20853 (US); near Sonsonate, tree 20 ft. tall with spreading crown, dry field, fr. red, "Mamuno," 220–300 m., 1922, *Standley* 22371 (G; US); near San Vicente, roadside, tree 25 ft., "Manune," 350–500 m. alt., 1922, *Standley* 21407 (G; US).

This species was erected by Linnaeus to include Jamaican plants described and illustrated by Browne and Sloane. When he published the species he listed as one of his synonyms the "*Cordia glabra*" of the first edition of the Species Plantarum. Because of this, many recent authors have used *Cordia glabra* L. (1753) as an older name for our present species. This I believe is incorrect. A comparison of the description of *C. glabra* L. Sp. Pl. 191 (1753) with the original treatment of *Ehretia Bourreria* L. Sp. Pl. ed. 2, 275 (1762) makes it clear that Linnaeus considered them specifically identical and that his mention of *Cordia glabra* under *Cordia Collococca* must have been a clerical error. Obviously, *Cordia glabra* L. (1753) is an earlier name for *Ehretia Bourreria* L. (1762). There being a *Bourreria glabra* Don (1837), *B. succulenta* Jacq. remains the correct name for the commonest West Indian *Bourreria*, and *Cordia Collococca* L. remains the oldest name for this common *Cordia*.

This species is deciduous, dropping most of its leaves during the dry

season. At the beginning of the new growing season it sends forth its inflorescences before the new leaves appear. The inflorescence is consequently borne on old wood. Most flowering specimens of the plant are unattractive since they usually consist of an inflorescence springing from some twigs which are otherwise naked or, at most, bear a few old leaves. The plant is definitely dioecious. The male flowers produce a non-functional ovary and style, and anthers (ca. 1.5 mm. long) borne on well developed filaments that are evidently hairy at the base. The female flowers are slightly smaller and less conspicuous than those of the male plants, and have small non-functional stamens. The filaments are half as long and much less hairy than those found in the male flowers. Their anthers are only about 0.5 mm. long.

In Central America, under the name "*C. glabra*," this species has been repeatedly confused with *C. eriostigma* and *C. stellifera*. These latter plants inhabit moister areas, chiefly the Atlantic tierra caliente, and have perfect homomorphic flowers. Their foliage bears scattered minute short closely appressed hairs. Since the lower leaf-surface of *C. Collococca* bears numerous slender erect bristles, a simple examination with a hand-lens easily separates this species from the two confused with it.

Cordia cymosa (Donn. Sm.) Standley, Field Mus. Pub. Bot. 18: 891 (1938).

Cornutia cymosa Donn. Sm. Bot. Gaz. 40: 10 (1905).

This species has been repeatedly collected in the type region, in the mountains near San Ramon, Costa Rica. Elsewhere, I know it only from Monte Lirio in the Panama Canal Zone (*Christopherson* 152, tree ca. 12 m. tall, 35 cm. diam., with flat crown, March 1912) whence it has been reported as "*Cordia sulcata*" by Standley, Contr. U. S. Nat. Herb. 27: 318 (1928). The species is related to *C. panamensis* but is much coarser in all vegetative parts. It has larger, very ample, broadly elliptic, subcordate or obovate leaves which are rounded or broadly obtuse and never acuminate at the apex. The leaf-blades, which are not distinctly dimorphic, are usually less than one and a half times as long as broad, and, in actual measurements, are usually twice as wide as in the much more elongate distinctly acuminate blades of *C. panamensis*. The branchlets are short and very coarse, appearing to elongate less than 1 dm. annually. This is very different from the condition in *C. panamensis* in which the annual growth of the slender elongate branchlets usually exceeds 4 dm. Except that the female flowers of *C. cymosa* may be somewhat smaller than in *C. panamensis*, the flowers of the two species are very similar in structure and appearance. The fruit of

C. cymosa, however, is nearly twice as large as that of its relative, its stone being usually well over rather than distinctly less than 8 mm. long.

Cordia panamensis Riley, Kew Bull. 1927: 125 (1927).

Growing in Panama (and probably Colombia and western Ecuador) and northward, chiefly on the Pacific slopes, to Salvador.

Material of this species from Central America has passed mostly as "*C. heterophylla*" and "*C. Toqueve*," but these names belong to a very different species with strigose fruit, which is restricted to the Guianas and eastern Brazil, cf. Johnston, Jour. Arnold Arb. **16**: 21 (1935). Our present plant is very closely related to *C. sulcata* DC. and *C. macrophylla* L. of the West Indies and, in fact, may not be distinct. The species is dioecious as are all its close relatives, *C. sericalyx* DC., *C. Toqueve* Aubl., *C. sulcata* DC. and *C. macrophylla* L. All these plants have strongly dimorphic leaves.

Cordia dentata Poiret, Encyc. **7**: 48 (1806) and Dict. Sci. Nat. **10**: 407 (1818); Vahl, Ecl. Amer. **3**: 5, tab. 22 (1807).

Cordia calyptrata Bertero ex Sprengel, Syst. **1**: 649 (1825).

Varronia calyptrata (Bert.) DC. Prodr. **9**: 469 (1845); Delessert, Icon. **5**: 41, tab. 97 (1846).

Cordia tenuifolia Bertoloni, Rendic. Sess. Accad. Sci. Inst. Bologna 1860-61: 63 (1860) and Mem. Accad. Sci. Inst. Bologna, **11**: 199, t. 11 (1861).

Cordia ovata Brandeg. Pub. Univ. Calif. Bot. **10**: 187 (1922).

Cordia leptopoda Krause, Bot. Jahrb. **37**: 628 (1906).

Cordia et *Varronia alba*, sensu auct. recent.; non *V. alba* Jacq. Enum. Syst. 14 (1760) vel *Mespilus americana* Alni vel *Coryli foliis*, fructu mucaginoso albo, Commelin, Rar. Pl. Hort. Amst. 155, tab. 80 (1697).

At low altitudes from Mexico (Tamaulipas and Sinaloa) south through Central America to Colombia and Venezuela; throughout the West Indies.

The type material of *Cordia dentata* was collected by von Rohr in Curaçao. Through really Vahl's species, and subsequently described and illustrated by him, it was first published by Poiret on the basis of duplicates of the von Rohr material received from Vahl.

This is the well known and readily recognized species currently known as "*Cordia alba* (Jacq.) R. & S." That name is based upon *Varronia alba* Jacq., Enum. Stirp. 14 (1760), which was published as follows, — "*alba*. 7. VARRONIA floribus cymosis. Arbor *Commel. Amst.* t. 80." The next appearance of the name in botanical literature is in the writings of Linnaeus, Sp. Pl. ed. 2, 276 (1762), who treated it thus, — "*alba*. 5. VARRONIA foliis cordatis, floribus cymosis *Jacqu. amer.* 14. *Mespilus*

americana, alni vel coryli foliis, fructu mucaginoso albo. *Comm. hort.* 1. p. 155. t. 80. *Habitat in America. Arbor.*" The name *Varronia alba* Jacq. evidently belongs to the plant treated by Commelin, *Rar. Pl. Hort. Amst.* 155, t. 80 (1697), as "*Mespilus americana Alni vel Coryli foliis, fructu mucaginoso albo.*" The plate published by Commelin shows a sterile branch which is certainly not from the plant now currently called *Cordia alba*. It suggests none of the Boraginaceae and I do not believe it represents any member of the family. In his text Commelin infers that the plant is from Curaçao. He states that it is a tree bearing a broad lax inflorescence of white flowers and, later, white berries with mucilaginous pulp. Concerning the flowers and leaves he states, "praecedentis [*Bourreria succulenta*] floribus satis conformes, sed coloris albi, staminibus apiculatis ditati"; "Foliis a praecedente discrepat, quae in hac latiora, rugosiora, ad margines aliquomodo undulata & crenata, Alni vel Coryli foliis quodammodo comparanda, sed magis mucronata, nervo conspicuo per foliorum medium discurrente & minores alios ad latera emittente, donati." Possibly the reference to the inflorescence and mucilaginous fruit may apply to *C. dentata*, but the plate, the description of the leaves, and the comparison of the flowers to those of *Bourreria*, suggest that Commelin confused two or more species. Since the text supplied by Commelin is not definite, and is in fact confused, and since the plate, which would naturally be of chief interest to Jacquin and Linnaeus, does not represent our present species of *Cordia*, it is evident that the name "*Cordia alba* (Jacq.) R. & S.," which is ultimately based upon Commelin's account, must be discarded for our present plant.

Jacquin, *Selec. Stirp.* 41 (1863), first identified Commelin's treatment with our present plant. He quoted the treatment of *Varronia alba* given by Linnaeus (1762) and added a long description. This description contains some details derived from Commelin (size and shape of leaves) but appears to have been chiefly based upon material of *C. dentata* which he had collected at Cartagena. This new description, attributed to Jacquin, is repeated by Lamarck, *Encyc.* 4: 265 (1796) and Roemer & Schultes, *Syst.* 4: 466 (1819). Other writers during the same period accepted *Varronia alba* essentially as defined by Linnaeus in 1762. Following Roemer & Schultes, Jacquin's interpretation of *Varronia alba* was ignored until Grisebach, *Fl. Brit. W. Ind.* 478 (1861), accepted it and became instrumental in establishing it in modern usage. It is notable that Kunth, *HBK. Nov. Gen. et Sp.* 3: 70 (1818), used *C. dentata* for our present plant, and that DeCandolle, *Prodr.* 9: 469 (1845), called it *Varronia calyptrata*. DeCandolle cited *V. alba* as a synonym of *V. calyptrata* but only after excluding all reference to

Commelin (the original basis of *V. alba*) and accepting Jacquin's new description of 1763. It is only by some such irregular procedure that the name "*Cordia alba* (Jacq.) R. & S.," can be continued as a proper designation for the well known species which I am calling *C. dentata* Poir.

***Cordia protracta*, sp. nov.**

Frutex altus; ramulis elongatis ad 4 mm. crassis, juventate pilos rigidulos ascendentes vel erectos 0.3–0.8 mm. longos sparse gerentibus, maturitate plus minusve glabrescentibus; foliis rigidis prominenter reticulate venosis (ad furcas ramulorum floriferas ut videtur heteromorphis), majoribus 20–30 cm. longis 7.5–9.5 cm. latis ovato-oblongis infra medium latioribus basi obtusis apice in acumen conspicuum 2–3 cm. longum abrupte protractis, supra sublucentibus glabris vel juventate pilos sparsissimos secus nervos raro gerentibus prominente venosis, infra scabridulis minute inconspicueque strigosis et secus venas majores et costam setas rigidas ascendentes ca. 0.2 mm. longas gerentibus, costa arcuato-recurvata; inflorescentia dichotome ramosa 2–4 cm. longe pedunculata ad 5 cm. diametro; alabastro floris plus minusve obconico apice convexo; calyce ad anthesin ad 7.5 mm. longo, apicem versus ad 3 mm. crasso deinde basim versus contracto, extus sparse minute strigoso laevi, intus supra medium strigoso, lobis 5 triangularibus ca. 1 mm. longis et latis; calyce submaturo campanulato membranaceo; corolla alba, tubo ad 7 mm. longo basi ad 3.5 mm. crasso apice ad 4 mm. crasso, lobis ad 4 mm. longis oblongis recurvis ca. 2.5 mm. latis, filamentis ad 4.5 mm. longis basim versus (et infra basim) villosis, antheris ad 2.3 mm. longis infra medium fissis; ovario glabro fusiformi-ellipsoideo, stylo ad 7.5 mm. (lobis ca. 2 mm. longis inclusis) longo coronato; drupa obliqua alba, nuce ellipsoideo-ovoidea ca. 1 cm. longa et 6 mm. crassa rugosa.

PANAMA: Perme, San Blas District, tall shrub with small white flowers, April 23, 1933, *G. Proctor Cooper 244* (TYPE, Gray Herb.); Perme, shrub, fl. white, fruit creamy white, 1928, *Cooper 235* (US).

This species is probably most closely related to the West Indian *Cordias* allied to *C. laevigata* Lam. It has no close relative in Central America nor adjacent South America. Its very large rigid leaves, which are long acuminate at the apex, practically glabrous above, and falcate-recurved, permit it to be readily separated from other Central American species.

Cordia bicolor A. de Candolle, Prodr. 9: 485 (1845); Johnston, Jour. Arnold Arb. 16: 23 (1935).

Cordia trichostyla Pittier, Contr. U. S. Nat. Herb. 18: 252, fig. 102 (1917).

Known from the Atlantic tierra caliente in Panama, Honduras, Guatemala and British Honduras; also in the southernmost West Indies, and from Colombia to the Guianas to southern Brazil. A widely distributed species but apparently sporadic in occurrence and apparently never very common. The usually strigose, nearly erect (rather than oblique) fruit and the strikingly bicolored leaves with their under surface covered with a dense short pubescence, permit this species to be readily recognized. The flowers are perfect.

Cordia eriostigma Pittier, Contr. U. S. Nat. Herb. 18: 251, fig. 101 (1917).

COSTA RICA: clearing near El General, 640 m., tree 12–23 m., fl. white, 1936–39, *Skutch* 2509 and 4132 (G; US); vicinity of San José, thickets, tree 25 ft., crown very dense, fruit green, ca. 1150 m. alt., 1924, *Standley* 34785 (US); vicinity of San José, 1889, *Pittier* 1123 (US); cultivated in park at San José, indigenous, fruit red, “Muneco” 1901, *Pittier* 10136 (US); margin of road to La Palma, tree with rounded crown, fruit green, 1449 m. alt., 1898, *Tonduz* 12520 (US); hills of Tremedal near San Ramon, 1300–1400 m. alt., *Tonduz* 17690 (US); Cuesta de la Vieja, road to San Carlos, 300 m. alt., 1903, *Cook & Doyle* 106 (US); Tilarán, 750 m., 1923, *Valerio* 115 (US). SALVADOR: Colina de Santa Tecla, “Manune,” 1923, *Calderón* 1742 (G; US); Berlin, dept. Usulután, “Manune,” 1924, *Calderón* 2145 (G; US).

This species was based upon material collected by Pittier (no. 1489) at Paso de la Balsa, on the Cauca River near Jamundi, Colombia, at 980 m. alt. This original collection is evidently conspecific with the specimens above cited. These Central American plants have been determined as *C. glabra* and *C. Collococca*, which is certainly incorrect. The relationships of *C. eriostigma* are with *C. stellifera*, of the Atlantic tierra caliente from Honduras to southernmost Mexico, which is a more slender stemmed plant with usually more elongate leaves, regularly and sharply toothed calyx, and completely glabrous ovary. The calyx of *C. eriostigma* has papery very friable calyx-lobes. The ovary frequently bears some scattered hairs about the base of the style. Pittier's specific epithet is inappropriate since the stigmas are as glabrous as in other species of the genus. The hairs he observed on the stigmas were probably germinating pollen-tubes.

Cordia stellifera, sp. nov.

Arbor ad 12 m. alta; ramulis hornis 1–4 dm. longis 3–4 mm. crassis; foliis elliptico-oblongis ad late oblanceolatis medium versus vel saepe supra medium latioribus, majoribus 5–7.5 cm. latis 11–20 cm. longis,

apice obtusis vel evidenter acuminatis, basi acutis 1–1.5 cm. longe petiolatis, subtus pallidioribus plus minusve evanescenter strigosis et non raro pilos paucos ad 0.2 mm. longos adpressos gerentibus, supra minutissime tuberculatis pilos 0–2.5 mm. longos adpressos sparsissimos gerentibus impresso-nervatis; inflorescentia laxe dichotome ramosa 2–7 cm. longe pedunculata 5–12 cm. diametro; alabastro floris subgloboso dense strigoso; calyce sub anthesi plus minusve campanulato ca. 3 mm. longo basi rotundato utrinque dense minute strigoso, lobis 4–5 triangularibus acutis subaequalibus ca. 1 mm. longis; calycibus fructiferis stelliformibus plus minusve explanatis 6–9 mm. diametro; corolla alba ad 7 mm. longa, lobis late ovatis 3.5–4 mm. longis 3–3.5 mm. latis, tubo 3–3.5 mm. longo basim versus 2–2.5 mm. diametro et apicem versus 3–3.5 mm. diametro, filamentis ad 4 mm. longis, antheris ca. 1.5 mm. longis; stylo 3.5 mm. longo; ovario glaberrimo; fructu glabro depresso transverseque ovoideo rubro.

HONDURAS: near Tela, wet thickets, small tree, 1928, *Standley 55499* (G; US); near Tela, wet thicket, large tree "Sombra de ternero," 1928, *Standley 54657* (G); foothills above Ceiba near Danto River, tree ca. 25 ft., corolla cream-colored, 1938, *Yuncker 8746* (G). GUATEMALA: near Quirigua, dept. Izabal, wet field, tree 25 ft., fl. white, 1922, *Standley 24139* (G; US); Santa Teresa, Subin River, Peten, 1933, *Lundell 2899* (G); La Libertad, Peten, 1933, *Lundell 3146* (G). BRITISH HONDURAS: Forest Home, Punta Gorda, 200 ft. alt., large tree 40 ft. tall, occasional in secondary forest, fl. white sweetly perfumed, 1933, *Schipp 1040* (TYPE, Gray Herb.); El Cayo, 1931, *Bartlett 13009* (G); Cocquericot, large tree, 1931, *Bartlett 12024* (G); Stann Cr. Dist., Middlesex, in acahual, tree, 1939, *Gentle 2884* (G); without locality, large forest tree, *Peck 483* (G). MEXICO: San Sebastian, Tabasco, April 28, 1889, *Rovirosa 474* (US); Reforma, Balancan, Tabasco, tree 15 m., 1939, *Matuda 3215* (G); Atoyac, Vera Cruz, 1937, *Matuda 1391* (G).

This is a plant of the Atlantic tierra caliente from Honduras to southern Mexico. It is most closely related to *C. eriostigma* of the dryer areas in northern Colombia and the Pacific slopes of Central America, from which it differs in its sharply 5-toothed calyx, more elongate leaves and glabrous ovary. Most of the specimens above cited have been identified as *C. glabra* (an invalid name for *C. Collococca*) and *C. nitida*. The perfect flowers readily separate the plant from *C. Collococca*, and the densely strigose calyx, among many other details, readily separates it from *C. nitida* of the West Indies. I have no field notes giving the color of the fruit. From some of the dried specimens I suspect that it may be red.

Cordia lasiocalyx Pittier, Contr. U. S. Nat. Herb. 18: 251 (1917).

PANAMA (southern Darien): around Garachine, near sea-level, Jan.-Feb. 1912, *Pittier 5694* (TYPE, US); forests around Pinogana, small tree, fl. white, fruit yellow-green sweet, April 1914, *Pittier 6560* (US).

I know this species only from the two collections cited above. It has passed as *C. nitida* Vahl, but that is a West Indian species first described from St. Croix and is one apparently restricted to Haiti, Porto Rico and the Virgin Islands. The present species ranges on the Pacific side of the Isthmus adjacent to the Colombian border. Among Central American species it is characterized by its relatively small, very long-acuminate, glabrous leaves. Its stems, inflorescence and outer surfaces of the calyx are glabrous or practically so.

Cordia lucidula, sp. nov.

Arbor ad 7.5 m. alta; ramulis hornis in sicco brunnescentibus sparse inconspicueque strigosis mox glabris teretibus ad 5 dm. longis 2–4 mm. crassis foliosis dichotome ramosis, internodiis saepe 3–5 cm. longis; foliis sublucidis in sicco nigrescentibus evanescenter inconspicuissimeque sparse strigosis ovatis vel oblongo-ovatis vel elliptico-lanceolatis infra medium latioribus (majoribus 15–23 cm. longis et 7–10 cm. latis), basi obtusis in petiolum 0.5–0.9 mm. longum abrupte contractis, apice in acumen gracile 1–2 cm. longum abrupte protractis, nervis primariis 5–7-jugatis reticulate conjunctis utrinque prominulis; inflorescentia 1–5 cm. longe pedunculata laxe ramosa 1–2 dm. diametro, ramulis dense minutissime strigulosis (pilis 0.1–0.4 mm. longis vestitis); alabastro plus minusve elongate obovoideo 3.5–4.5 mm. longo et 2–2.5 mm. crasso extus sparse strigoso apice convexo; calyce sub anthesi campanulato intus inconspicue strigoso, lobis triangularibus saepe 2–3 cohaerentibus; corolla alba, tubo calycem distincte (ca. 0.5 mm. longe) superante 4–5 mm. longo, lobis 2–2.5 mm. longis 1.7 mm. latis recurvatis apice rotundis; staminibus longe exsertis, basi villosis; drupa “rubra.”

PANAMA: Progreso, Chiriqui, small tree with spreading crown, 1927, *Cooper & Slater 300* (US); Research Lagoon, region of Almirante, Bocas del Toro, small tree 12 ft. tall, fl. white, 1928, *Cooper 406* (US); Daytonia Farm, Bocas del Toro, tree 20–25 ft. tall, fl. white, with pleasant odor, 1928, *Cooper 372* (G; US); Changuinola Valley, Bocas del Toro, small tree, 1924, *Dunlop 322* (G; US); Potrero, Changuinola Valley, small tree, 1923, *Dunlop 284* (TYPE, U. S. Nat. Herb.); lower Changuinola Valley, small tree, fruit red, 1923, *Stork 273* (US). COSTA RICA: Boca Culebra, Guanacaste, alt. 50 m., 1898, *Pittier 12334* (US); El Arenal, Guanacaste, 485–600 m., moist thicket, shrub 8–12

ft., fruit red 2 cm. diameter, 1926, *Standley & Valerio* 45051 (US); hedges, Turialba, 570 m. alt., 1893, *Tonduz* 8367 (US).

A well marked species which is most closely related to *C. lasiocalyx* from the portion of the Isthmus adjacent to Colombia. It agrees with its relative in having the corolla tube shortly exerted from the calyx, the calyx strigose within, and the flower buds of similar shape and dehiscence, but differs from it in its much larger, less conspicuously acuminate leaves, hairy rather than glabrous inflorescence-branches, slightly smaller corollas, coarser habit, and detached more westerly and northern range.

***Cordia stenoclada*, sp. nov.**

Arbor ut videtur parva; ramulis gracilibus subglabris sparsissime strigosis ca. 5 dm. longis 1–3 mm. crassis dichotome ramosis internodiis 2–3 cm. longis; foliis 8–12 cm. longis 3.5–5 cm. latis medium versus vel infra medium latioribus sublucidis in sicco saepe brunnescentibus, basi obtusis vel acutis ca. 1 cm. longe petiolatis, apice in acumen ad 1 cm. longum abrupte contractis, supra glabrescentibus pustulis minutis abundantibus ornatis, subtus sparsissime inconspicueque strigosis reticulo venarum prominulo ornatis; inflorescentia 1–2 cm. longe pedunculata laxa ramosa ca. 5 cm. diametro pilis 0.1–0.4 mm. longis adpressis plus minusve abundantibus vestita; alabastro floris obovato-globoso vel ovato-globoso apice apiculum ca. 0.2 mm. longum gerente secus apiculo strigosum alibi glabro 3–3.5 mm. longo et 2.6–3 mm. crasso; calyce sub apicem irregulariter rupto et calyptram membranaceam plus minusve distincte formante intus subglabro; corolla alba, lobis 2.5–3 mm. longis ca. 1.7 mm. latis recurvatis, tubo lobis corollae subaequilongo tubum calycis haud superante; staminibus exsertis, filamentis basi villosis; drupa glabra oblique ovoidea ad 1.5 mm. diametro.

MEXICO: Santo Domingo, Oaxaca, 900 ft., 1895, *Nelson* 2664 (US); Paso de Canoa, dist. Tuxtepec, Oaxaca, 500 ft., 1895, *L. C. Smith* 608 (TYPE, Gray Herb.); Mayito, Tabasco, July 9, 1888, *Rovirosa* 228 (US).

In the manner of dehiscence the flower buds of this species resemble *C. dentata*. Its closest relative, however, is probably *C. prunifolia* of northwestern Guatemala and western Mexico, from which it differs in the dehiscence of the flower buds, sparser pubescence, more slender nearly glabrous stems, smaller cymes, and smaller less rigid leaves.

***Cordia prunifolia*, sp. nov.**

Arbor 21 m. alta; ramulis hornis teretibus subglabris ad 5 dm. longis 3–4 mm. crassis foliosis dichotome ramosis internodiis saepe 3–5 cm.

longis; foliis oblongo-ovatis subglabris 10–12 cm. longis 3.5–5.8 cm. latis medium versus vel paullo infra medium latioribus, basi obtusis vel acutis ca. 1 cm. longe petiolatis, apice in acumen ca. 1 cm. longum abrupte contractis, supra plus minusve lucidis glabris vel raro pilos breves sparsissimos gerentibus sub lente minutissime pallideque tuberculatis nervis et costa prominulis notatis, subtus pallidioribus saepe pilos sparsissimos minutos adpressos gerentibus; inflorescentia 1–3 cm. longe pedunculata laxe ramosa 5–12 cm. diametro, ramulis pilis 0.1–0.4 mm. longis adpressis abundante vestita; alabastro obovoideo-globoso ad 3.5 mm. longo et 2.9 mm. crasso summum ad apicem dense strigoso (non apiculato) alibi sparse strigoso; calyce sub anthesi campanulato irregulariter lobato intus subglabro, lobis saepe 3 rotundis membranaceo-marginatis 1–3 mm. latis ad 1 mm. altis; corolla alba ca. 5.5 mm. longa, lobis recurvatis 2.5–3 mm. longis oblongis ad 2 mm. latis, tubo calycem haud superante; staminibus exsertis infra basim villosis; ovario glabro; fructu ignoto.

GUATEMALA: Finca Moca, dept. Suchitepequez, 1080 m. alt., a relic of forest in a coffee plantation, tree 70 ft. tall, 16 inches thick breast high, bark finely tessellated brown, fl. white, Jan. 10, 1935, *Skutch 298* (TYPE, Arn. Arb.).

The above description is based upon the flowering material collected by Skutch in Guatemala. Probably also referable to the species are fruiting collections obtained by Mrs. Mexia (no. 1843, US & 1689, G; US) near Hacienda de Ototal, west of San Sebastian, Jalisco at about 1500 m. alt. These have a transverse globose-ovoid drupe about 1 cm. in diameter and an ovoid nut about 9 mm. long and 5 mm. thick.

***Cordia parvifolia* A. DC. Prodr. 9: 498 (1845).**

Cordia Greggii Torr. Bot. Rep. U. S. & Mex. Bound. Surv. 135 (1859).

Cordia Greggii var. *Palmeri* Wats. Proc. Am. Acad. 24: 61 (1889).

Cordia Watsoni Rose, Contr. U. S. Nat. Herb. 1: 89 (1890).

The desert shrub of northern Mexico well known as *Cordia Greggii* has a neglected older name in *Cordia parvifolia* A. DC. The type material of *C. parvifolia*, at Geneva, is evidently part of the same collection as that in the Sesse & Mociño herbarium at Madrid which is labelled, "*Cordia exsucca* N. in litore maris asiatici apud Coaguayanam." The locality given, Coahuayan, is in western Michoacan near the boundary of Colima. No recent collectors have discovered this species so far south. The plant grows in central Baja California and along the coast of Sonora (north to the Altar Valley) and has been reported from Sinaloa. As a shrub of the coastal deserts *C. parvifolia* may well grow

along the coast of Colima and adjacent Michoacan. The species is best known from the desert plateau in northern Mexico. It is frequent on rocky bahadas and hillsides in southern Coahuila (south and west of Cuatro Ciénegas) and in adjacent Durango and Zacatecas. The plant is particularly abundant in the region about Mapimi, Durango, where the type of *C. Greggii* was almost certainly collected. When I visited this area in Sept. 1938 the shrub was in abundant flower and was one of the most conspicuous elements in the desert scrub from Bermejillo to near Cadena Pass. Repeated examination showed the flowers to be definitely heterostylous.

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Johnston, I. M. 1940. "Studies in the Boraginaceae. XV. Notes on some Mexican and Central American species of Cordia." *Journal of the Arnold Arboretum* 21(3), 336–355. <https://doi.org/10.5962/p.325810>.

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