

CROTNGAL. rev. 23 IV 99

NOTE FROM ELLEN DEAN: .THIS VERSION, ALTHOUGH DATED LATER THAN THE SCANNED VERSION OF 7 IV 99 DOES NOT CONTAIN THE EDITS HANDWRITTEN ON THE SCANNED VERSION, WHILE EDITS HANDWRITTEN ON THIS VERSION HAD BEEN MADE IN THE SCANNED VERSION.

CROTON L.

References: Croizat, L. New species of Croton from Guatemala. Field Mus. Nat. Hist. Bot. 22: 443-453. 1942. Thirty-five new species of American Croton. J. Arnold Arb. 21: 78-107. 1945. Webster, Grady L. Croton [in] Revised synopsis of Panamanian Euphorbiaceae. Ann. Missouri Bot. Gard. 75: 1116-1125. 1988. A provisional synopsis of the sections of the genus Croton (Euphorbiaceae). Taxon 42: 793-823. 1993.

Monoecious or dioecious trees, shrubs, or herbs; stems with clear or colored latex; trichomes branched (stellate or lepidote), at least in part; leaves alternate (sometimes clustered below inflorescences), stipulate or not, the blades pinnately or palmately veined, entire to serrate or lobed, often with paired laminar glands at junction with petiole; inflorescences usually terminal, thyrsoid but appearing racemose or spicate, with solitary _ flowers below and _ cymules distally; _ sepals mostly 5, entire, valvate (rarely imbricate), free or connate; disk glandular, usually densely hairy; stamens mostly 8-50 (5-300), free, the filaments glabrous or hirsutulous; anthers extrorse, dehiscent longitudinally; _ flowers sessile to pedicellate, the sepals mostly 5-7, imbricate to valvate, entire to dentate; disk entire or lobed, glabrous; petals usually reduced or

absent; ovary glabrous or more often pubescent, 3-locular; styles free or basally connate, bifid to multifid; fruits capsular, subtended by the persistent calyx; cocci dehiscing septicidally and loculicidally to leave a columnar columella; seeds 1 per locule, smooth or ribbed, carunculate; endosperm copious.

With over 1,200 species, Croton is the second largest genus of Euphorbiaceae; there are more than 500 neotropical species, of which about 100 occur in mainland North America. Most species of Croton are easily recognized by the characteristic spike-like inflorescence with _ flowers at the base and _ distally, combined with the generally palmately veined stipulate leaves and carunculate seeds. Relationships in the genus are complex, with about 40 sections recognized (Webster, 1993). Type species, C. aromaticus L., the lectotype, designated by Webster (J. Arnold Arb. 48: 354. 1967; Jarvis et al., 1993, p. 39), at BM, Herb. Hermann 1: 63, no. 345.

Croton is well represented in our area, with 33 species and 5 varieties in 13 sections. Sect. Julocroton, often treated as a distinct genus, is represented by two species.

Because of its complex classification and morphological diversity, Croton can be a challenging genus for identification. A few suggestions are offered here to facilitate use of the key and descriptions. Most of the local species of Croton are monoecious with bisexual inflorescences, but a common misleading phenomenon is the tendency of plants of a number of monoecious species to produce completely _ inflorescences, especially on lateral branches or early in the season's growth. Specimens with completely _ inflorescences, however, clearly indicate the

dioecious condition (although unfortunately, fruiting specimens may still be equivocal because of dehiscence of the _ portion of the inflorescence).

Indumentum furnishes important systematic characters in Croton (Webster et al., 1996). Most species (at least in young expanding leaves) have a relatively thin indumentum of stellate hairs with a number of distinct radii on the upper (dorsal or adaxial) surface of the lamina, and a denser, often tomentose lower surface. The hairs may be essentially identical on both surfaces, although they are often larger beneath. The stellate hairs may be sessile with the radii distinctly appressed to the lamina, or they may be pedicellate, with the radii atop a stalk. On the other hand, they may be porrect, with one radius oriented vertically, giving a hispid nature to the indumentum. When all of the lateral radii of a porrect hair are reduced or suppressed, a uniradiate hair results; this is referred to as a simple hair, even though in reality it is a highly modified stellate-porrect hair. In a few sections, the radii are webbed to produce scale-like structures (lepidae), and the indumentum is said to be lepidote. There are various degrees of webbing of radii, and those hairs with the radii fused approximately one third to two thirds are referred to as stellate-lepidote. In sect. Cyclostigma, a number of other hair types occur, including dendritic hairs that have radii scattered on a single vertical axis. In all sections of the genus, species may have more than kind of hair, either on the upper and lower surfaces or intermingled on the same surface. Hairs may also be somewhat different on the leaves, branches, and flowers.

In order to make explicit the relationships among Nueva Galician taxa of Croton, a key to the sections and a synoptic outline of the classification is given.

Assignments of species to sections follows the arrangement of Webster (1993). However, study of the taxa for this treatment has resulted in some changes in sectional placements. The affinities of some species, such as C. suberosus and C. xalapensis, will remain uncertain pending sectional revisions of the Neotropical taxa.

Key to the sections of Croton in Nueva Galicia

1 Petals well-developed (about as large as the sepals) in _ flowers; indumentum lepidote.

Eluteria

1 Petals absent or much narrower than sepals in _ flowers; indumentum stellate or dendritic (sometimes reduced to simple hairs; stellate-lepidote in one species of sect. Geiseleria).

2 Lower nodes of inflorescence bisexual; petiolar glands conspicuous; indumentum at least in part of dendritic hairs.

3 Styles multifid; _ sepals glabrous adaxially. Cleodora

3 Styles bifid; _ sepals stellate-pubescent

adaxially

Cyclostigma

2 Lower nodes of bisexual inflorescences with _ flowers only
(if bisexual, then petiolar glands obsolete or absent).

4 Receptacle (disk) of _ flower usually copiously villose;
seeds more or less ellipsoidal; leaf-blades entire to
dentate, not deeply lobed.

5 Stipules not laciniate or glandular-toothed (sometimes
reduced to glandular rudiments).

6 Sepals of _ flower not markedly unequal;
bracts lacking basal clusters of glands.

7 Styles multifid; blades eglandular at
base, pinnately veined or triplinerved.

Anadenocroton

7 Styles bifid; blades palmately veined or
at least triplinerved.

8 Leaf-blades glandular at base or apex of
petiole.

9 Leaf-blades coarsely duplicidentate;
stamens 9-11. Corylocroton

9 Leaf-blades entire to denticulate or
dentate; stamens 10-40.

Cyclostigma (sect. Xalapenses)

8 Leaf-blades eglandular at base (or glands
less than 0.2 mm broad).

10 Fruiting pedicels recurving, 3-7 mm long;
leaf-blades appressed-stellate; herbs with
entire leaves. Gynamblosis

10 Fruiting pedicels shorter, not recurved;
shrubs with entire or dentate leaves.

11 Bracts and _ sepals eglandular. Velamea

11 Bracts and _ sepals glandular-stipitate. Medea

6 Sepals of _ flower markedly unequal.

12 Sepals of _ flower laciniate; bracts and
leaf-blades without basal glands.

Julocroton

12 Sepals of _ flower entire; bracts and leaf-
blades with prominent basal glands. Geiseleria

5 Stipules laciniate, glandular; leaves with prominent
gland-tipped hairs; stamens over 20. Adenophyllum

4 Receptacle (disk) of _ flower glabrous or nearly so;
seeds tetragonal-cylindric; leaf-blades deeply lobed.

Astraea

Synopsis of Nueva Galician taxa

(Arrangement of sections after Webster, 1993)

Sect. **Cleodora** (Klotzsch) Baillon

1. C. billbergianus Muell. Arg.

Sect. **Cyclostigma** Griseb.

Subsect. **Cyclostigma**

1. C. draco Schlecht. & Cham.

Subsect. **Xalapenses**

1. C. stenopetalus G. L. Webster

2. C. suberosus H.B.K.
3. C. xalapensis H. B. K.

Sect. **Eluteria** Griseb.

1. C. niveus Jacq.
2. C. pseudoniveus Lundell
3. C. reflexifolius H.B.K.
4. C. guatemalensis Lotsy
5. C. schiedeanus Schlecht.

Sect. **Corylocroton** Webster [Nueva Galician taxa close to sect.

Ocalia]

1. C. cupuliferus McVaugh
2. C. mcvaughii Webster
3. C. repens Schlecht.

Sect. **Anadenocroton** Webster

1. C. acapulcensis Martínez Gordillo & Jiménez Ramírez
2. C. alamosanus Rose

Sect. **Velamea** Baillon

1. C. adpersus Benth.
2. C. disjunctus V. W. Steinm.
3. C. mazapensis Lundell

var. obtusifolius (Muell. Arg.) Webster

var. pacificus Webster

4. C. morifolius Willd.

var. brandegeanus (Croizat) Webster

var. morifolius

var. sphaerocarpus (H.B.K.) Muell. Arg.

5. C. roxanae Croizat

6. C. tremulifolius Croizat

7. C. ynesae Croizat

Sect. **Geiseleria** (Klotzsch) Baillon

1. C. hirtus L'Herit.

2. C. chamelensis Lott

3. C. martinianus V. W. Steinm.

4. C. varelae V. W. Steinm.

Sect. **Gynamblosis** (Torr.) A. Gray

1. C. pedicellatus H.B.K.

2. C. pottsii Muell. Arg.

Sect. **Julocroton** (Mart.) Webster

1. C. argenteus L.

2. C. conspurcatus Schlecht.

Sect. **Adenophyllum** Griseb.

1. C. ciliatoglanduliferus Ortega

Sect. **Medea** (Klotzsch) Baillon

1. C. michaelii V. W. Steinm.

Sect. **Astraea** (Klotzsch) Baillon

1. C. lobatus L.

1 Specimens with both _ and _ flowers.

2 Petals well-developed in _ flowers (as broad as sepals);
foliar indumentum lepidote.

3 Ovary stellate-tomentose; scales of leaves often with
porrect radii; fruiting pedicel 4-5 mm long; seeds 5.5-6.5
mm long. C. niveus

3 Ovary lepidote; scales of leaves never porrect.

4 Leaf-blades pinnately veined; fruiting pedicel slender
(less than 1 mm thick), 10-25 mm long; stamens 9-11,

filaments glabrous; seeds 6.5-9.5 mm long.

C. schiedeanus

4 Leaf-blades palmately veined (or distinctly triplinerved); stamens 10-18, filaments glabrous or hirsutulous; seeds 4.5-15 mm long.

5 Fruiting pedicels 1-2 mm long; stamens 10 or 11; leaf-blades sparsely lepidote abaxially.

C. pseudoniveus

5 Fruiting pedicels 4 mm long or more; stamens 13-18; leaf-blades densely lepidote abaxially.

6 Fruits and seeds over 10 mm long; inflorescences 8-22 mm long.

C. guatemalensis

6 Fruits and seeds less than 10 mm long; inflorescences not over 6 cm long.

C. reflexifolius

2 Petals of _ flower rudimentary (much narrower than sepals) or absent; indumentum not lepidote (sometimes stellate-lepidote).

7 Leaves and stipules conspicuously stipitate-glandular; stamens over 20.

C. ciliatoglanduliferus

7 Leaves and stipules not conspicuously stipitate-glandular.

8 Lower _ flowers of inflorescence accompanied by _
flowers (the cymules bisexual).

9 Leaf-blade with 1 or more prominent pairs of glands at base;
twigs scurfy [see also occasional specimens of
C. xalapensis].

10 Pistillate sepals discrete, valvate; stipules
10-20 mm long; inflorescence with 5-8 lower
bisexual cymules; filaments of stamens glabrous.

C. draco

10 Pistillate calyx gamophyllous, calyx lobes
somewhat imbricate; stipules 5-8 mm long;
inflorescence with 10-20 or more lower bisexual
cymules; filaments of stamens hirsutulous.

C. billbergianus

9 Leaf blade without prominent paired basal
glands (glands, if present, mostly 0.2 mm in diameter
or less)

- 11 Branches and young leaves scurfy with dendritic hairs; blades adaxially with both stellate-pedicellate and dendritic hairs; stipules 8-20 mm long. C. suberosus
- 11 Branches and young leaves without dendritic hairs; blades adaxially glabrescent, strigose (sometimes with scattered stellate hairs); stipules not over 1 mm long. C. roxanae
- 8 Inflorescence without bisexual cymules (lower nodes with solitary _ flowers).
- 12 Leaf-blades deeply lobed, hairs mostly simple on both surfaces, the lamina with paired basal glands; _ sepals imbricate, receptacle (disk) glabrous; seeds tetragonal-cylindric. C. lobatus
- 12 Leaf-blades entire to coarsely dentate, not lobed; simple hairs, if present, mainly on the adaxial surface of the blade; _ sepals valvate, receptacle sparsely to copiously pubescent; seeds more or less compressed, biconvex.

13 Styles twice bifid to multifid; filaments

hirsutulous; _ calyces without marginal glands.

14 Sepals of _ flower very unequal (2 adaxial reduced

or obsolete), prominently laciniate; disk of _

flower asymmetric, adnate to calyx; stamens 11;

inflorescences terminal, bisexual; stipules

subulate, 5-10 mm long.

15 Petals of _ flower glabrous on both surfaces; _

bracts entire; annual herb with silvery foliage.

C. argenteus

15 Petals of _ flower pubescent on both faces;

_ bracts laciniate at tip; shrub, foliage not

silvery.

C. conspurcatus

14 Sepals of _ flower subequal or slightly unequal,

entire or nearly so; disk of _ flower not asymm-

etric; stamens 10-15; inflorescences terminal or

axillary.

16 Inflorescences axillary; leaf-blades more or less

cordate at base, stipules more or less foliose,

1-2.5 mm broad;

C. alamosanus

16 Inflorescences terminal; leaf-blades obtuse to rounded at base; stipules not foliose.

17 Stipules subulate, 0.5-1 mm broad; _ bracts 2-4.5 mm long, entire; fruiting pedicel 2-4 mm long.

C. acapulcensis

17 Stipules reduced to glands 0.1-0.3 mm broad; _ bracts 0.5-1 mm long, with stipitate glands; fruiting pedicel not over 1 mm long.

C. disjunctus

13 Styles once bifid or bipartite; filaments mostly glabrous; _ calyces glandular or eglandular.

18 Stamens more than 20; pedicel of _ flower pubescent, 2.5-7.5 mm long; styles 3-6 mm long, pubescent.

19 Petals linear, 4-4.5 mm long; styles 5-6 mm long; basal glands of leaf-blade clustered, convex, irregular, mostly well under 0.5 mm

across; twigs stellate-villose at tips; stipules rudimentary, less than 1 mm long; scandent.

C. stenopetalus

19 Petals spatulate, 2.5-3 mm long; styles 3-4 mm long; basal glands of leaf-blade paired, discoid, sessile, ca. 1 mm across; twigs appressed-stellate at tips; stipules subulate, 1-3 mm long; not scandent.

C. xalapensis

17 Stamens fewer than 20; pedicel of _ flower glabrous to pubescent, mostly 1-4 mm long; styles 1-6 mm long, glabrous or pubescent.

20 Leaf-blades with distinct basal usually paired yellow or blackish glands, these mostly 0.5 mm across (or else conspicuously stalked); _ sepals equal or unequal.

21 Leaf-blades subentire (remotely serrulate);
_ sepals strongly unequal.

22 Leaf-blades stellate-lepidote abaxially; ovary stellate-lepidote; _ flowers appressed to the

inflorescence axis; floral bracts eglandular;
shrub to 3 m high. C. chamelensis

22 Leaf-blades stellate-tomentose abaxially; ovary
stellate-hispid; _ flowers not appressed to the
inflorescence axis; floral bracts glandular at
base; undershrub less than 0.5 m high. C. varelae

21 Leaves distinctly dentate or doubly
dentate; _ sepals equal or unequal.

23 Shrubs or undershrubs, distinctly woody
leaf-blades broadly ovate to suborbicular,
margins coarsely doubly dentate; bracts
without bottle-shaped glands.

24 Leaf-blades acute; petioles of the lower
leaves 2 cm long or more; petiolar
glands c. 0.3 mm long and broad;
pistillate pedicel pedicel 1-2 mm long.

C. cupuliferus

24 Blades obtuse (sometimes apiculate),
petioles 1.5 cm long or less; petiolar

glands at least 0.5 mm across.

25 Fruiting pedicel 3-5 mm long;
inflorescence with 1 or 2 _ flowers;
seeds 4 mm long. C. repens

25 Fruiting pedicel 1-1.5 mm long;
inflorescence with 3-7 _ flowers;
seeds 2.9-3.3 mm long. C. mcvaughii

22 Annual herbs, mostly well under 1 m high;
leaf-blades ovate to oblong, subentire to
dentate or serrate but not markedly
doubly dentate; bracts with bottle-shaped
glands at base.

26 Blades coarsely dentate (teeth 6-10 on
each side), stellate-pubescent
adaxially and tomentose abaxially;
stems not hispid (hairs less than 1 mm
long); inflorescences with up to 40 _
flowers; receptacle of _ flowers

copiously villose. C. martinianus

26 Blades less coarsely dentate (teeth
10-15 on each side), strigose with
mostly simple hairs; stems coarsely
hispid (hairs 1-2.5 mm long);
inflorescences with 4-7 _ flowers;
receptacle of _ flowers nearly
glabrous. C. hirtus

20 Leaf-blades eglandular at base (or with blackish
rounded sessile glands mostly not over 0.2 mm
across); _ sepals not distinctly unequal.

27 Leaves stellate-lepidote, linear-lanceolate,
1.5-6.5 X 0.25-1 cm; bracts and _ sepals with
stipitate glands. C. michaelii

27 Leaves stellate, mostly over 1 cm broad; bracts
and _ sepals lacking stipitate glands.

28 Pedicel and calyx of _ flower usually copiously
stellate-pubescent; leaf-blades mostly
persistently pubescent on the adaxial surface,

entire; twigs and petioles appressed-stellate to floccose, not hispid.

29 Shrubs with palmately veined or triplinerved leaf-blades; fruiting pedicels less than 3 mm long; _ flowers mostly 2-3 per bract.

30 Stipules subulate, (1-) 2-5 mm long; petioles mostly well over 5 mm long; blades more or less abruptly cuspidate or acuminate (acumen 1-2 cm long), often cordate at base; inflorescences mostly at least 5 cm long.

C. morifolius

30 Stipules rudimentary or absent; petioles mostly no more than 5 mm long; blades acute to short-cuspidate (acumen less than 1 cm long), cuneate to rounded at base; inflorescences mostly less than 5 cm long.

C. mazapensis

29 Herbs with pinnately veined leaf-blades; fruiting pedicels at least 3 mm long; _ bracts 1-flowered.

31 Annual; petioles 2-4 mm long; stamens 7-12, filaments glabrous; fruiting sepals c. 1.5 mm long, recurved. C. pedicellatus

31 Perennial, more or less suffrutescent; petioles 10-20 mm long; stamens 11-15 (-18), filaments pilose towards base; fruiting sepals 2-4 mm long, not recurved.

C. pottsii

28 Pedicel of _ flower glabrous or nearly so, the calyx glabrous to sparsely stellate; leaf-blades strigose on the adaxial surface, glabrescent; twigs and petioles glabrous to appressed-stellate or hispid, not floccose.

32 Twigs stiffly hispid (hairs 2-2.5 mm long); leaf-blades entire, cordate at base.

C. tremulifolius

32 Twigs glabrous to appressed-stellate (sometimes porrect-hispid in C. roxanae, but hairs less than 2 mm long); leaf-blades entire or dentate, mostly obtuse to rounded or subcordate at the base.

33 Leaf-blades entire, more or less attenuate-acuminate;
twigs and petioles often hispid with porrect stellae.

C. roxanae

33 Leaf-blades not entire, obtuse or acute to
abruptly acuminate; twigs appressed-stellate
or glabrate.

34 Twigs appressed-stellate (or stellate-tomentose on
autumn twigs); leaf-blades denticulate, the petioles
mostly 1-2 cm long; stamens 10 or 11; styles 4-6 mm
glabrous. C. adpersus

34 Twigs glabrous; leaf-blades coarsely dentate, the petioles
mostly 3-7 cm long; styles ca 3 mm long, sparsely stellate.

C. ynesae

1 Specimen unisexual or fruiting (plants woody except for
C. pottsii).

35 Specimen entirely _.

36 Leaf blades at least 10 cm long, cordate, with conspicuous

basal glands; petioles mostly more than 5 cm long.

C. draco

36 Leaf blades mostly smaller, with shorter petioles;
basal laminar glands present or absent.

37 Blades, petioles, and stipules with conspicuous
stalked capitate glands. C. ciliatoglanduliferus

37 Foliage without conspicuous stalked capitate glands.

38 Foliage with lepidote hairs. C. niveus
(see also other species of sect. Eluteria)

38 Foliage with stellate hairs.

39 Stipules usually (at least in part) foliose;
filaments of stamens hirsutulous. C. alamosanus

39 Stipules subulate or narrowly lanceolate;
filaments of stamens glabrous or hirsutulous.

40 Leaf-blades pale and appressed-stellate on both
surfaces; petals villose on both surfaces.

C. pottsii

40 Leaf-blades paler and stellate-tomentose
on the abaxial surface; petals villose on
the margins only.

41 Leaf-blades elliptic or lanceolate, caudate-acuminate,
glabrescent above; _ pedicels (and often calyces)
glabrous. C. roxanae

41 Leaves ovate or orbicular to elliptic,
short-caudate, more or less persistently stellate
or strigose above; _ pedicels sparsely to densely
stellate (rarely glabrous), the sepals stellate-
pubescent abaxially. C. morifolius

35 Specimen entirely with _ flowers or fruits.

42 Leaves lepidote (indumentum of peltate scales).

43 Fruiting pedicel 4 mm long; leaf-blades copiously
lepidote (often silvery) abaxially.

44 Fruits less than 10 mm long or broad, seeds less

than 8 mm long.

45 Scales of leaf-blade often porrect (with hispid-stellate center); fruiting pedicel 4-5 mm long.

C. niveus

45 Scales of leaf-blade never porrect; fruiting pedicel 5-10 mm long or more. C. reflexifolius

44 Fruits 13-17 mm long, tuberculate; seeds 10-15 mm long, leaf-blade scales never porrect. C. guatemalensis

43 Fruiting pedicel 1-2 mm long; leaf-blades abaxially greenish, sparsely lepidote; leaf-blade scales never porrect. C. pseudoniveus

42 Leaf-blades with indumentum of stellate hairs.

46 Styles twice bifid; stipules well-developed.

47 Stipules (at least in part) foliose; _ sepals entire, not markedly unequal. C. alamosanus

47 Stipules not foliose; _ sepals markedly unequal, the 3

largest pinnately dissected. C. conspurcatus

46 Styles once bifid; stipules not foliose.

48 Ovary and fruit distinctly angled.

C. morifolius var. brandegeanus

48 Ovary and fruit rounded, not angled.

49 Seeds ribbed or corrugate; leaves large (blades often more than 15 cm long), cordate, with conspicuous basal laminar glands; stems when cut exuding reddish latex. C. draco

49 Seeds smooth (at most minutely rugulose); leaves smaller, short-petiolate, without conspicuous laminar glands; stems when cut not exuding reddish latex.

50 Blades elliptic-oblong, long-acuminate, adaxially strigose when young but soon glabrate; twigs appressed-stellate and often hispid when young, usually becoming glabrate. C. roxanae

50 Blades ovate, orbicular, or broadly elliptic,
short-acuminate, adaxially strigose or stellate-
fasciculate; twigs appressed-stellate, or
floccose with dendritic hairs. C. morifolius

Croton acapulcensis Martínez Gordillo & Jiménez Ramírez, Anal. Inst. Biol.
Univ. Nac. Autón. Méx. Bot. 60: 40. 1990.

Deciduous woodlands, 200-350 m; also found in oak-pine forest, 1500-2000
m.

Jal., Gro. (Mpio. Acapulco, Parque Nacional El Veladero, Noriega Acosta 599,
FCME, the holotype; MEXU, isotype).

Jal., Mpio. La Huerta, Estación Biol. Chamela (Ayala 827, Ayala & Lott 24,
Ayala & Magallanes 110, 116, Gentry & Woodruff 74399, Lott 3836, Lott & Pérez 1810,
Magallanes 3098); Rancho Cuixmala (Lott 3726); Mpio. Tapalpa, El Salto, Río
Jiquilpan (Lott 374).

Shrub 1-3 m high; branches terete, stellate-pubescent, greyish to
reddish-brown; leaf-blades oblong-lanceolate, mostly (2-) 4-8.5 cm long, 2-4 cm
broad, acuminate, obtuse to truncate or subcordate at base, adaxially
stellate-scabrous (hairs partly or mostly simple), abaxially appressed-stellate;

margins subentire (obscurely denticulate); basal laminar glands absent; petioles (8) 10-20 mm long; stipules subulate, entire, 3-9 mm long; inflorescences terminal, 2.5-5 cm long, with 2 basal _ flowers; _ flowers 1 per bract; bracts lanceolate, entire, 2-4.5 mm long; _ pedicel 2-3 mm long, stellate; sepals 5, deltoid, stellate-pubescent, 2-3 mm long; petals oblanceolate, villose abaxially, subglabrous adaxially, 2-2.5 mm long; receptacle villose; stamens (10-) 12-15, filaments hirsutulous, 2.5-4 mm long; anthers 0.5-0.9 mm long; _ pedicel (2-) 3-4 mm long, appressed-stellate; sepals 5 (rarely 6), subequal, oblong-lanceolate, entire, 2.5-3 mm long, ribbed on the back and stellate-hirsute on both surfaces; petals absent; ovary stellate-tomentose; styles 3, multifid, stellate-pubescent, 4-5.5 mm long; valves of fruit appressed-stellate, ca 7 mm long; seeds plump, smooth, ellipsoidal, 4.5-5 mm long. (sect. Anadenocroton)

This recently described species closely resembles Croton sutup Lundell from the Yucatán Peninsula; however, C. acapulcensis differs in its longer petioles, shorter _ pedicels, larger number of stamens, and shorter fruiting pedicels. It is more easily distinguished from our other species of sect. Anadenocroton, C. alamosanus, by its longer petioles and subulate rather than foliose stipules. Martínez and Jiménez (1990) have provided a table summarizing the differences between C. acapulcensis and C. alamosanus. The plants from Nueva Galicia differ in some respects from the description of Martínez and Jiménez (e.g. in having hirsutulous filaments and fewer stamens), but still appear conspecific.

Croton adspersus Benth. Pl. Hartw. 51. 1840. Croton calvescens S. Wat. Proc.

Amer. Acad. 26: 147. 1891.

Croton botryocarpus Croizat, Field Mus. Publ. Bot. 22: 445. 1942.

Rocky slopes, valleys, oak-pine forests, (1500-) 1700-2300 m.

Jal. (Chapala, Palmer 706, in 1886, GH, the holotype of Croton calvescens), Mich. (Morelia, Hartweg 389, K!, the holotype), Gro., Méx., D.F., Oax., Chis.; Guatemala (Jalapa, Standley 77519, A!, holotype of Croton botryocarpus; F, isotype).

Jal., Mpio. Tapalpa, 1-2 mi E of Tapalpa (McVaugh 20515); La Frontera to Barranca El Nogal (Chávez & López, GUADA 24119); Mpio. Talpa de Allende, 4.5 mi NNE of Talpa (McVaugh 20235); 19 km WSW of Talpa near Puente El Triunfo (Breedlove & Anderson 64079, CAS); Mpio. Venustiano Carranza, Apango (Lomeli Senci3n, GUADA 23819); Amacueca (McVaugh 20642); Mpio. Tlajomulco, Cerro Viejo (Cházaro et al. 5754, WIS); Cuyutlán (Rzedowski 27485); Mpio. Jocotepec, Potrerillos (Machuca Nuñez 2904, DAV); San Juan Cosalá, N of L. Chapala (Puga s.n.); Mpio. Gómez Farías, 11 km N of San Andrés Ixtlán (Fuentes 581); Mpio. Mazamitla, 10 km SW of Mazamitla (Estrada 27, WIS); 22 mi E of Mazamitla (Seigler & Holstein DS-9623, DAV); Mpio. Poncitlán, 2 km E of Sta. Cruz el Grande (Rodríguez & Guzmán 268, WIS); Mpio. Tepatitlán, between Las Calabazas and barranca de La Lima (Ramírez et al. 2725); Mpio. Tamazula de Gordiano, Agua Hedionda (Rzedowski & McVaugh 1114); Mich., San José de Gracia (Ballmer & Krantz s.n., DAV); 6 km NE of San José de Gracia (Rzedowski 15504); Cerro Santa María, 5 km NE of Quitupan (Feddema 5); Cerro Potrerillos,

5 mi N of Cotija (King & Soderstrom 4623); 6 km SW of Jacona (Iltis et al. 527);
Mpio. Tlazazalca, 2 km N of Tlazazalca (Martínez 71).

Monoecious shrub or undershrub 0.5-2 m (rarely to 4 m) high; branches terete, appressed-stellate, glabrate; leaf-blades ovate to elliptic, mostly 5-10 cm (-15) long, 2-5 (-9) cm broad, distinctly (and often abruptly) acuminate, obtuse to rounded or subcordate and 3 (-5)-nerved at base, with 5-7 arching lateral veins; reticulum of veinlets fine but distinct on the abaxial surface; blade adaxially strigose with simple hairs 0.2-0.5 mm long, abaxially sparsely stellate, the hairs 0.3-0.7 mm in diameter, with 5-10 radii (sometimes intermixed with simple strigose hairs); margins glandular-serrulate and strigose-hispid; basal laminar glands sessile or stalked, 0.2-0.4 mm in diameter, sometimes clustered or indistinct; petioles (0.5-) 1-2 (-3) cm long, scabrid or hispid with simple hairs; stipules ovate, acute, fleshy, entire, ca 0.5 mm long; inflorescences terminal (branches whorled below the first one), 5-20 cm long, the axis glabrous to appressed-stellate, with mostly 5-10 _ flowers tightly congested at base; _ flowers 2-3 to a bract (sometimes solitary distally); bracts lanceolate, entire, 1-1.5 mm long; _ flower pedicel 1.5-2 (-3) mm long, glabrous; sepals 5, valvate, lanceolate, 2-2.5 mm long, glabrous except for apical hair-tufts; petals linear-spathulate, glabrous, 2.5-3.5 mm long; receptacle scantily villose; stamens 10-11, the filaments 2.5-3.5 mm long, glabrous; anthers 0.8-1.2 mm long; _ flowers subsessile, the pedicel becoming 1-2 mm long in fruit; sepals 5, slightly connate at base, entire, acuminate, 2 mm long; disk entire, thin and delicate;

ovary densely stellate-hispid with golden-brown hairs; styles bifid, 4-6 mm long, glabrous or nearly so; capsules subglobose, glabrate, ca 6 mm long and 5.5 mm broad; columella slender, ca 4.5 mm long; seeds ellipsoidal, plump, beaked, smooth or very minutely pitted, grey, 3.9-4.6 mm long. (sect. Velamea).

This common species of open upland areas is distinguished by the densely clustered _ flowers and especially by the unusual foliage produced in the autumn at lower nodes on the stem: the leaves are smaller (2-5 cm long) and densely tomentose on both surfaces (e.g., in McVaugh 20515, Webster & Breckon 16142).

It appears that the relationship between Croton adpersus and C. ynesae is very close. The two species exactly replace one another in elevation, and in some leaf characters variation appears clinal. Leaves of C. ynesae at lower elevations (below 1000 m) tend to be large and prominently-- even irregularly-- toothed, but above 1000 m the tothing is more similar to that of C. adpersus. The leaves in C. adpersus at higher elevations (e.g., Lane 2416 from Michoacán, 2400 m) have only two very small glands (ca 0.1 mm) at the apex of the petiole. However, those lower down (e.g., McVaugh 20235 from 1450-1500 m) have leaves with longer petioles and more prominent glands. Specimens of C. ynesae from near its upper limit (e.g. McVaugh & Koelz 1302 at 1200 m) strikingly resemble these lower-elevation specimens of C. adpressus in general facies, although they differ in more prominently toothed leaves, larger petiolar glands, and glabrous stems.

Croton alamosanus Rose, Contr. U. S. Nat. Herb. 4: 111. 1893. Croton blasianus M. E. Jones, Extr. from Contr. W. Bot. 18: 49. 1933.

Arid deciduous woodlands and thorn forest, Pacific lowlands, 50-1400 m.

Son. (Alamos, Rose 742, US, the lectotype; designated here), Sin. (San Blas, Jones 23304, POM, holotype of Croton blasianus), Nay., Jal., Gro., Oax.

Nay., Mpio. Nayar, Los Sabinos (Lomelí Senci3n 2116, DAV); 7 km W of Jes3s Mar3a (Ram3rez 458); Islote de las Adjuntas (Calzada 18664); 5 km N of Colorado de la Mora (Flores-Franco 2989); Jal., Mpio. Huejuguilla de Alto, 15 km W of Huejuguilla el Alto (McVaugh 25718); Mpio. San Mart3n de Bola3os, San Mart3n de Bola3os (Flores & Mart3nez 1748, WIS); mines N of Bola3os (McVaugh 25856, 25859); Mpio. Tomatl3n, 6-8 km S of Tomatl3n (McVaugh 25340); 20 km SE of Tomatl3n (McVaugh 25291, 25292A); Mpio. La Huerta, Estaci3n Biol3gica Chamela (Ayala 162, DAV; Bullock 1272, 1273; Lott 1102, 1103, 1608, 1627, TEX; Magellanes 2762, DAV); 5.3 km SE de Estaci3n de Biolog3a, Chamela, (Lott et al. 1637, 1642); Chamela, Rinc3n de Ixt3n (Bullock 1161, DAV); Cuitzmala-Cumbres (Ayala 231, DAV); 1 km SW of Cuitzmala (Castillo 5183, TEX); Mich., Mpio. Aquila, Titzupan (Hinton 13824, GH).

Dioecious (rarely monoecious) shrub 1.5-3 m high; branches terete, glabrescent, reddish-brown to grey; leaf-blades lanceolate, 5-12 cm long, 3-7 cm broad, acuminate, subentire (obscurely serrulate), mostly subcordate at base, mostly with 8-15 obliquely arching laterals, adaxially stellate-pedicellate (the hairs 0.2-0.5 mm across, 4-12-radiate), the abaxial surface more densely stellate; margins entire; basal laminar glands absent; petiole 5-15 mm long; stipules more

or less foliose, (2-) 4-7 mm long, 1-2.5 mm broad, persistent or deciduous; inflorescences axillary, unisexual or bisexual [only unisexual observed from our area]; _ inflorescences axillary, ca 1-2 (-3) cm long, the axis tomentose, _ bracts 1-flowered, lanceolate to oblanceolate, more or less glandular-toothed, 1.2-2 mm long; _ pedicel 2-3 (-3.5) mm long; sepals 5, ca 2-3.5 mm long, stellate-tomentose; petals linear-elliptic, (2-) 2.5-3 mm long, glabrous on the abaxial surface, copiously hirsutulous adaxially; receptacle villose; stamens 10-14, the filaments 2-4 mm long, hirsutulous towards the base; anthers elliptic, 0.7-1.2 mm long; _ inflorescences axillary or occasionally terminal on lateral shoots, usually 1 cm long or less [at least in our area], with (1-) 2-5 flowers; fruiting pedicel 2-5 mm long, tomentose; sepals 5, 5-10 mm long, 2-5 mm broad, oblong-lanceolate, acute, entire, densely tomentose on both surfaces; disk 5-lobed, ca 4 mm across, glabrous; ovary stellate-tomentose; styles 4-fid, free, 3-5 mm long; capsules subglobose, stellate-pubescent; columella ca. 4 mm long; seeds plump, smooth, greyish, beaked, 4.4-4.8 mm long. (sect. Anadenocroton)

Croton alamosanus is distinctive among our woody species in its pinnately veined (but basally triplinerved-cordate) leaves and more or less foliose stipules. It appears closely related to C. axillaris Muell. Arg., a species of the Mexican Gulf coast to Central America, which has non-foliose stipules and typically longer-petiolate leaves. In our area, it usually may be easily distinguished from the sympatric C. acapulcensis by its dioecious condition and axillary inflorescences. Occasionally (as in Ayala 232) the axillary shoots elongate and the inflorescences are thus terminal on leafy short-shoots.

Most works on Mexican floras characterize C. alamosanus as dioecious, and indeed this appears to be true for the type collection from Sonora, and for specimens from our area. However, a number of specimens from the type area in Sonora commonly have bisexual inflorescences (e.g., Gibson 2066, Sanders 1345, Van Devender 93-1041; all DAV). One anomalous collection from Chamela (Bullock 1353), with terminal inflorescences, appears intermediate between C. alamosanus and C. acapulcensis. Clearly, more field observations need to be made in these populations from low-elevation deciduous scrublands.

Croton argenteus L. Sp. Pl. 1004. 1753. Julocroton argenteus (L.) Didr. Vidensk. Meddel. Dansk Naturh. Foren. Kjobenhavn 1857(8-10): 134. 1857.

Weedy habitats in deciduous woodlands, Pacific lowlands, below 200 m.

S Tex.; Jal., Ver., S.L.P., Tamps., Camp.; Centr. Amer.; S. Amer. (type "America", Hortus Cliffortianus Herbarium, BM).

Jal., Mpio. La Huerta, 3 km W of Quémaro (Guadalupe Ayala 916); Río San Nicolás, 19.5 km N of Chamela puente (Lott 2409).

Monoecious annual herb 0.2-1 m high; stems distally branching pseudo-dichotomously; branches terete or angled, appressed-stellate, with apparent verticels of leaves; blades ovate to oblong, 3-7 (-15) cm long, 2.5-5

cm broad, rounded to acute at tip, cuneate or rounded at base, 5-veined at base with usually 3 or 4 laterals on each side, adaxially green and appressed-stellate, abaxially grayish; margins serrulate; basal laminar glands absent; petiole 1-5 cm long; stipules subulate, mostly 5-10 mm long; inflorescences terminal, bisexual, 1-4 cm long; bracts entire; _ pedicel 1.5-2.5 mm long; sepals 5, 1.5-2 mm long; petals linear, 2.-2.3 mm long and less than 0.5 mm broad, glabrous except for the margins; receptacle villose; stamens usually 11; filaments hirsutulous, 2-2.5 mm long; anthers 0.6-0.8 mm long; _ pedicel 3-5 mm long in fruit; sepals 5, very unequal; 3 abaxial sepals 6-8 mm long and 2.5-6 mm broad, oblong, laciniate with 5-10 teeth on each side; 2 adaxial sepals much smaller or obsolete; petals absent; disk asymmetric, the larger lobes 0.9-1.2 mm long; ovary stellate-tomentellous; styles erect, distally 4-fid, 2-4 mm long; capsules subglobose; columella 3-4.5 mm long; seeds ellipsoid, smooth, mottled, beaked, 3-4 mm long. (sect. Julocroton)

This widespread neotropical weed is rare in our area, and appears to have been recently introduced. Croton argenteus is our only representative of sect. Julocroton, a mainly South American group that has often been treated as a distinct genus because of the highly asymmetric _ calyx.

Croton billbergianus Muell. Arg. Linnaea 34: 98. 1865.

The only North American species of the primarily South American sect. Cleodora, Croton billbergianus differs from all other Nuevan Galician species in its distinctive gamophyllous _ calyces with imbricate lobes. Our plants differ

from those in southern Mesoamerica, which belong to ssp. billbergianus (type from Panamá, Portobello, Billberg 316, photograph at DAV of the destroyed holotype at B), in their more pubescent leaves and reflexed fruiting sepals.

Croton billbergianus ssp. **pyramidalis** (J. D. Smith) Webster, Ann. Missouri Bot. Gard. 75: 1123. 1988. Croton pyramidalis J. D. Smith, Bot. Gaz. 35: 7. 1903.

Oak and pine woodlands, above 1000 m; rare in Nueva Galicia.

Jal., Oax., Ver., Tab., Chis.; Guatemala (Alta Verapaz, Río Dolores near Cubilgüitz, Tuerckheim 7974, US, the holotype of C. pyramidalis).

Jal., Mpio. Cuautitlán, 1-2 km SW of Telcruz (Vázquez & Zúñiga 4487, IBUG, WIS); 1 km SE of Las Mariás (Santana et al. 5307, IBUG, WIS).

Monoecious shrub or small tree 3-5 m high; branches subterete, scurfy-stellate; leaf-blades ovate, 8-17 cm long, 4-15 cm broad, more or less abruptly short-acuminate, entire, 5-7-veined at base with 5-10 major lateral veins, adaxially glabrate with scattered simple and pauciradiate hairs, abaxially loosely stellate; margins minutely serrulate; basal laminar glands sessile or nearly so, shallowly cupulate, 0.5-1.3 mm broad; stipules subulate, 5-8 mm long; inflorescences 1-3 and terminal, as well as solitary and axillary, 10-28 cm long, the axes appressed-stellate, proximally with 5-8 widely spaced bisexual cymules

(the lower ones pedicellate 2-4 mm), the _ flowers accompanied by a pair of _ flowers, the distal portion with 1-3 _ flowers in the axils of subulate bracts 1.5-2 mm long; _ pedicels 3.5-4.5 mm long, stellate-pubescent; calyx 3.5-4 mm long, sepals proximally connate, distally divided into 5 slightly imbricate segments; petals 3.5-4 mm long, villose on the abaxial surface and on the margins; receptacle densely villose; stamens 15-18, the filaments hirsutulous, the anthers ca 1 mm long; _ flowers pedicellate, the fruiting pedicels 5-11 mm long; calyx gamophyllous; sepals (calyx lobes) somewhat imbricate, ovate, entire, glabrous adaxially, ca 4 mm long, 2.5-3.5 mm broad, becoming reflexed in fruit; disk 5-lobed and with a ciliate ring; petals absent; ovary stellate-tomentose; styles ca 5 mm long, multifid, connate at base and stellate-tomentose; columella ca 7 mm long; capsules ca 10 mm in diameter; seeds broadly ellipsoidal, rugose, ca 6 mm long. (sect. Cleodora)

The Nueva Galician populations of Croton billbergianus, representing the northwesternmost outlier of the species, have so far been recorded only from the Sierra Manantlán. The longer stipules of the plants from Jalisco indicate an assignment to the northern Mesoamerican subspecies pyramidalis. Fruits and seeds are needed, however, to evaluate the distinctiveness of this taxon from the southern Mesoamerican (Panama to Nicaragua) subspecies billbergianus.

Croton chamelensis E. J. Lott, Brittonia 39: 302. 1987.

Deciduous forests, at low elevations (below 200 m); known mainly from the

vicinity of the Estación de Biología at Chamela.

Nay., Jal. (Estación de Biología Chamela, Pérez Jiménez 1391, MEXU, the holotype); Gro.

Nay., Mpio. Nayar, La Nopalera, 11 km E of the Cortina de la P. H. Aguamilpa (Flores-Franco 2799); Jal., Mpio. La Huerta, Estación de Biología Chamela (Ayala 18; Bullock 1924; Lott et al. 557, 1677, 1730; Magallanes 649, 699); Chamela, Vereda Chacalaca (Magallanes 4235, MEXU); Cerro Pedregoso (Pérez Jiménez 1811, DAV, MEXU); Cerro El Mirador (Martínez & Acevedo 1354, DAV); Rancho Cuixmala (Sanders 8675, DAV); Teopa (Lott 3727, 3728).

Monoecious shrub up to 3 m high; branches glabrate, brown to grey (pale and scaly with whitish trichomes when young); leaf- blades lanceolate to elliptic, acute to acuminate, cuneate at base, with 4-6 pairs of lateral veins; adaxially with stellate-pedicellate and simple hairs 0.2-0.4 mm across, 1-6-radiate, abaxially stellate-lepidote, hairs 0.5-0.8 mm in diameter, 10-25-radiate; margins subentire (more or less remotely serrulate); basal laminar glands usually stalked, 0.4-0.5 mm across; petioles mostly 5-8 (-10) mm long; stipules linear-subulate, 3-6 mm long; inflorescences terminal (and sometimes axillary as well), 1-7 cm long, the axis white-scaly, with 6-14 proximal _ flowers and greenish subulate bracts 1-2.5 mm long subtending solitary _ flowers; _ pedicel 2-3 mm long, glabrous; sepals 5, valvate, ovate, ca 1.5 mm long, appressed-stellate; petals oblanceolate, 1.8-2 mm long, glabrous except on the margins towards the base; receptacle villose;

stamens 10-13, the filaments glabrous, 2-3 mm long, the anthers 0.5-0.8 mm long; _ flowers subsessile, the fruiting pedicels 0.8-1.5 mm long; sepals 5, linear-lanceolate, entire, unequal, the outer 4 mostly 2-4 mm long and 0.5 mm broad, the inner sepal ca 1.5 mm long and less than 0.5 mm broad; petals absent; ovary stellate-lepidote, scales to 0.5 mm broad in fruit; styles erect, bifid, stellate, 2-2.5 mm long; capsules oblong, 3.5-5 mm high; columella 3-4 mm long; seeds oblong, slightly compressed, greyish-brown, finely striate, 3.5-4.3 mm long, 1.7-2.3 mm broad, the caruncle 0.7-1.5 mm broad.

(sect. Geiseleria)

As noted by Lott in the protologue, Croton chamelensis appears to be related to C. ramillatus Croizat of eastern Mexico (Oaxaca, Vera Cruz, Chiapas). The unequal _ sepals and characteristic bracteal glands suggest a placement of both species in sect. Geiseleria (sensu Webster, 1993). Although the herbaceous Mexican species of sect. Geiseleria appear very different in habit from C. chamelensis, there are a number of woody species in South America such as C. larensis Steyrm. (Venezuela) and C. verbenifolius Muell. Arg. (Brazil) that appear more similar.

Croton ciliatoglanduliferus Ortega, Nov. Pl. Descr. Dec. 51

(as C. ciliato-glanduliferum). 1797. Croton penicellatus Vent. Choix Pl. 2: pl. 12. 1803.

Roadsides, pastures, clearings in deciduous forest, very common, sea level to 2000 m.

S Tex.; Son., Dgo., Sin., Nay., Zac., Gto., Jal., Mich., Gro., Qro., Mor., Oax., Pue., Ver., Hgo., S.L.P., Tamps., N.L., Camp., Yuc., Q. R., Chis.; Centr. Amer. (Type: Ortega's plate of a plant from "Cuba", supposedly cultivated in Havana but perhaps from Mexico; the type of C. penicellatus was from a cultivated specimen in Herb. Willdenow 17878, B!).

Nay., Mpio. Tepic (Téllez & Salinas 12289); Mpio. Ahuacatlán, Tetitlán (Feddema 473); 3.5 mi NW Ahuacatlán (Feddema 435); 10 mi SE of Ahuacatlán (Feddema 315); Volcán Ceboruco, 10-13 km NW of Jala (Téllez & Miller 10578); Volcán Ceboruco (Miller & Téllez 3212, MO); Mpio. Ixtlán del Río (Mexia 816); Zac., 18 mi S of Valparaiso (McVaugh 17723); Jal., Mpio. Hostotipaquillo, "La Barranca" (M. E. Jones 23208, TEX), Plan de Barrancas (Carter & Kellogg 3637); 15 l, SE of Plan de Barrancas (Feddema 1742); La Barranca (M. E. Jones 23307, UC); Mpio. Villa Guerrero, Rancho Patagua (Flores 2311); Mpio. Tequila, Cerro Tequila (Rodríguez s.n., WIS); Etzatlán (Soule & Bremer 2492, TEX); Mpio. Ameca, 12 mi S of Ameca (Flores 1703, TEX); Mpio. San Martín Hidalgo, 6.6 mi E of Los Pocitos (Sundberg & Lavin 2933, TEX); Mpio. Zapopan, Río Caliente (Reyna 442, WIS); 20 mi NW of Tecolotlán (Seigler & Holstein DS-9517, DAV); Guadalajara (Palmer 273 in 1886); Mpio. Jocotepec, 2 mi S of Jocotepec (Harker & Mellowes 32); Mpio. Zapotlán del Rey (Goldsmith 116, UC); 3 km E of San Juan Cosalá (Duncan 2554, UC); N shore of Lago de Chapala, 9 mi W of Chapala (Webster & Lynch 17170, DAV); 13 mi SW of Juchitlán (Clarke et al. 1935-3, DAV); Mpio. Unión de Tula, Unión (Wilbur 36765, DUKE); Mpio. Autlán, 14-15 mi N of Autlán (Webster & Breckon 15984, DAV; Wilbur 1758);

Corcovado Canyon, 10 mi NE of Autlán (Wilbur 1390); 6-8 mi S and SW of Autlán (McVaugh 11921, Wilbur 1758); 1.5 km S of Ahuacapán (Lorente 128, IBUG); 2.5-3.5 mi S of El Chante (Iltis & Guzmán 3166, DAV); Mpio. Tuxcacuesco, La Cañita 3 km SW of Zenzontla (Santana & Figueroa 5103, IBUG); 2 km S of Tuxcacuesco (Cuevas & Rosales 2520, WIS); Tuxcacuesco, Rancho El Alcoste (Robles 576, IBUG); Sayula (A. Moldenke 1728, TEX); Jilotlán (Cházaro et al. 5627, WIS); Mich., Mpio. Jacona, Jacona (Moore 140, UC); Mpio. Coalcomán de Matamoros, Coalcomán (Hinton 13879).

Monoecious shrub (sometimes barely woody) 0.5-2 m high; branches terete, copiously stellate-tomentose when young; leaf-blades ovate, 2-8 cm long, 1-4 cm broad, abruptly acute to acuminate at apex, rounded to subcordate and 3-5-veined at base, with 4-6 pairs of straight lateral veins, adaxially stellate-pubescent, abaxially paler, stellate-tomentose; margins glandular-ciliate; basal laminar glands absent (stalked cilia similar to the marginal ones present instead); petioles 1-3 cm long, stellate-tomentose; stipules dissected into gland-tipped cilia up to 2-5 mm long; inflorescences terminal, mostly bisexual (occasional ones _), 2-10 cm long, with 1-5 basal _ flowers; _ flowers 1 per node, the bracts dissected into glandular cilia 1-1.5 mm long; _ pedicel 2-3 mm long, stellate-pubescent; sepals lanceolate, 2-2.5 mm long, stellate-pubescent; petals obovate, glabrous on both surfaces, 2.5-5 mm long; receptacle villose; stamens 30-45, the filaments glabrous, the anthers oblong or linear, 0.8-1.5 mm long; _ pedicel 2-5 mm long in fruit; sepals 5, equal, oblanceolate, 5-10 mm long, densely stellate-tomentose abaxially, darker and sparsely to moderately pubescent with simple and fascicular hairs adaxially, the margins densely glandular-ciliate;

ovary stellate-tomentose, the styles 3-6 mm long, multifid, proximally stellate-tomentose; capsules 6 mm long; seeds compressed, smooth, adaxially carinate, 4.5-5.2 mm long. (sect. Adenophyllum)

Both name and typification of this very common weedy species are problematical. The specific epithet has been spelled a number of different ways; in earlier works "ciliato-glandulosus" seems to have been most popular, while more recently "ciliatoglandulifer" has prevailed. Ortega's original spelling requires a double correction, since the hyphen must be removed according to the most recent nomenclatural code, and he treated the name Croton as neuter, which has been rejected by later workers. Curiously, the correct spelling has been adopted by no one except Seymour (Phytologia 43: 170. 1979), whose work on Croton was otherwise not outstanding.

There is some uncertainty about the typification of the name Croton ciliatoglanduliferus, because Ortega cited Cuba as the habitat. As noted by Carabia (Carib. For. 3: 120. 1942), Ortega was probably misled by the fact that Sessé sent the seeds of the plant from Havana; the seeds were surely collected in Mexico by Sessé (McVaugh, Contr. U. Mich. Herb. 16: 162-163, 1987). Furthermore, there is no evidence that C. ciliatoglanduliferus has ever been found growing wild in Cuba (Alain, Fl. Cuba 3: 66. 1953). Both Ortega and Ventenat apparently described the species from plants growing in Spanish and French gardens, and no type specimens of C. ciliatoglanduliferus have been found, so that the plate will have to serve as the type.

Croton conspurcatus Schlecht. Linnaea 7: 380. 1832. *Julocroton conspurcatus* (Schlecht.) Klotzsch, Arch. Naturgesch. 7: 193. 1841. *Julocroton triqueter* var. *conspurcatus* (Schlecht.) Muell. Arg. in DC. Prodr. 15, part 2: 705. 1866.

Disturbed areas, semideciduous and deciduous forests, 80-1100 m.

Jal., Ver. (Tiocelo [Teocelo], Schiede 39, HAL, the holotype); Guatemala to Nicaragua.

Jal., Mpio. Tuxcacuesco, Cerro del Palacio, 5-6 km ENE of Zenzontla (Santana & Benz 5921, DAV); Mpio. La Huerta, Cumbres de Cuixmala, El Salto (Acevedo et al. 999, WIS).

Monoecious scarcely woody shrub 1-3 m high; stems of current year distinctly angled, with long-pedicellate stellate hairs on the angles and appressed-stellate hairs between the angles; leaf-blades ovate to ovate-lanceolate, mostly 5-14 cm long, 5-8 cm broad, acute to acuminate, rounded to mostly cordate and 5-veined at base; adaxial surface appressed- or stellate-fasciculate, the abaxial surface stellate-pedicellate, initially tomentose, glabrescent; margins denticulate; basal laminar glands none, but clusters of small marginal glands present; petioles 2-5.5 cm long, appressed- and pedicellate-stellate; stipules subulate, stellate, (2-) 4-10 mm long; inflorescences terminal, bisexual or apparently _, sometimes in clusters of 3, 1-2.5 cm long; _ bracts persistent, oblanceolate-dissected, 3.5-4

mm long and 1-1.5 mm broad, with several apical subulate lobes 1-2 mm long; _ pedicel 1-1.5 mm long, densely stellate; sepals basally connate, deltoid-lanceolate, stellate-pubescent, ca 2.5 mm long, 1.8 mm broad; petals linear-spathulate, 2.5 mm long, 0.5 mm broad, villose adaxially, stellate-pubescent abaxially; receptacle villose; stamens 11; filaments ca 2 mm long, dilated and villose proximally, stellate-pubescent distally; anthers 0.8-1 mm long, stellate-pubescent on the connective; _ flowers subsessile, the pedicel not over 1 mm long and about as broad, stellate-pubescent; sepals very unequal, densely stellate-pubescent, the 3 largest ovate in outline, 5-7.5 mm long and 2.5-4.5 mm broad, laciniate with 7-10 linear lobes ca 1-2.5 mm long on each side; 2 smaller sepals lanceolate, acuminate, entire, 1.5-2.5 mm long; disk dark, asymmetrically lunate, ca 1.5-1.7 mm across; ovary whitish, stellate-hispidulous; styles 3.5-4 mm long, 4-fid, connate at base, the tips slender, copiously stellate; seeds compressed, tessellated, 2.9-3.2 mm long, 2.3-2.5 mm broad; caruncle erect, unlobed, ca 0.5 mm high, 1 mm broad. (sect. Julocroton)

Croton conspurcatus is readily distinguished from our other species of sect. Julocroton, C. argenteus, by its stems with loosely spreading (vs. appressed) tomentum, larger and greener more pointed leaf-blades with sparser non-silvery indumentum, _ petals pubescent on both surfaces, and more deeply laciniate fruiting sepals.

Croton cupuliferus McVaugh, Brittonia 13: 163. 1961.

Deciduous woodland on hills or in ravines, with Bombax, Bursera, Lysiloma, et al., 50-900 m.

Known only from Jalisco and Colima (Mpio. Manzanillo, 14 mi WNW of Santiago on road to Cihuatlán (McVaugh 20771, MICH, the holotype).

Jal., Mpio. Zapopan, 30 km N of Zapopan towards San Cristóbal de la Barranca (Rodríguez et al. 1416, WIS); Mpio. La Huerta, Chamela, Cerro Maderas (Lott et al. 1829).

Monoecious subshrub 0.3-1 m high, scarcely woody; branches slender, terete, appressed-stellate, glabrescent; leaf-blades ovate, 5-10 cm long, 3-7 cm broad, acuminate or cuspidate at the tip, margins dentate or doubly dentate, rounded to cordate and mostly 5-veined at base, adaxially strigose with simple hairs, the abaxial surface sparsely appressed-stellate, glabrescent; margins with 8-12 obtuse or acute teeth on each side; basal laminar glands small, tubular, c. 0.1-0.3 mm long and 0.1 mm broad; petioles (2.5-) 4-10 cm long, appressed-stellate; stipules filiform-subulate, 1-2 mm long, callose-glandular at base sometimes reduced to glandular base); inflorescences terminal, 5-10 cm long, with (1-) 2-7 _ flowers proximally, the distal nodes with solitary _ flowers, the bracts subulate, 0.3-0.6 mm long; _ pedicel 0.8-1 mm long, stellate-villose; sepals 5, sparsely appressed-stellate, ca 1.5 mm long, 0.8 mm broad; petals obovate, ca 1.5 mm long, nearly glabrous; receptacle villose; stamens 9-12, filaments glabrous; anthers 0.5-0.7 mm long; _ pedicel ca 1-1.5 mm long in fruit; sepals 5 (-6), rather

unequal, linear to oblanceolate, 1.7-2.5 mm long, 0.7-1.3 mm broad, nearly glabrous; ovary whitish, stellate-tomentose; styles 2-2.5 mm long, bipartite, minutely papillate and basally stellate; capsule subglobose, 4-4.5 mm long and broad, apically 3-lobed; columella ca 3.5 mm long; seeds compressed, shining, 3.5-4 mm long, 2.6-2.8 mm broad. (sect. Corylocroton)

This species, by virtue of its coarsely dentate leaf-blades with basal glands, and its bifid styles, resembles species of sect. Ocalia, but differs in its bipartite styles. It differs from the other Nueva Galician species of that section, Croton mcvaughii and C. repens, by its thinner leaf-blades with smaller basal glands, and by its longer petioles, as well as by its shorter _ pedicels and sepals.

Croton disjunctus Steinmann, Contr. Bot. Univ. Mich.

Grassy oak woodland and oak forest/subtropical scrub, common on rocky soils, 1800-2200 m.

Chih. (E of Río de Balleza canyon, Wilson 96-213, RSA, the holotype), Ags.

Ags., Mpio. San José de Gracia, Barranca Serpiens (Garcia R. 4390, RSA); mountains above Presa Calles, S of Rincón de Romos (Shreve 9263, DAV, RSA).

Monoecious shrub ca 1 m high; twigs and foliage stellate-tomentose; leaf-blades ovate, 1-4.5 cm long, 0.5-2.5 cm. broad, acute, rounded to cordate at base; margins entire or denticulate with stipitate glands (to 0.3 mm long); basal laminar glands stipitate, to 1 mm long, or sometimes absent; petioles 0.3-1.3 cm long; stipules reduced to 1 or 2 greenish to black sessile or short-stalked glands 0.1-0.3 mm in diam.; inflorescences bisexual, ca 1-4 mm long, with 1-4 basal _ flowers and 4-7 distal _ flowers, each _ flower subtended by a triangular to subulate bract 0.5-1.1 m long with stipitate glands (ca 0.3 mm long); _ pedicels 2-6.3 mm long; sepals 5, ovate, 1.5-2.6 mm long; petals ovate to obovate, 1.9-2.6 mm long, glabrous except for the margins ciliate at base; receptacle villose; stamens 12-15, filaments glabrous; anthers 0.6-1.1 mm long; _ flowers sessile (fruiting pedicel less than 1 mm long); sepals 5, valvate, equal, triangular to ovate, 1.3-2.5 mm long; petals absent; ovary ; styles twice bifid, basally stellate; capsule subglobose, 4.9-6.2 mm in diam.; columella ; seeds oblong, grey, shiny, smooth or minutely rugulose, rounded at base and apex, 4.6-5.5 mm long; caruncle reniform, 1.3-1.9 mm wide. (sect. Velamea)

The describer suggests a relationship of Croton disjunctus with C. fruticulosus Torr., a primarily Chihuahuan Desert species of sect. Velamea, from which it differs by its 4-fid rather than bifid styles. In the system of Webster (1993), this styler character would indicate a relationship of C. disjunctus with C. acapulcensis Martínez & Jiménez of sect. Anadenocroton. However, that species differs in its larger stipules, hirsutulous filaments, and pedicellate _ flowers with ribbed sepals. It appears that C. disjunctus is really closer to C.

fruticulosus, and should probably be referred to sect. Velamea. Here, as occurs elsewhere in Croton, the degree of division of the styles seems to be an ambiguous character for assigning species to sections; and sect. Velamea, in particular, appears to be an artificial taxon.

Croton draco Schlecht. & Cham. Linnaea 6: 360. 1831. Cyclostigma draco (Schlecht. & Cham.) Klotzsch in Seem. Bot. Voy. Herald 105. 1853.

Deciduous woods, most commonly in arroyos, or in oak or oak-pine forest, 400-1500 m (mostly above 800 m).

Sin., Nay., Jal., Col., Mich., Méx., Oax., Pue., Ver. (Papantla, Schiede 1127, HAL, the holotype), Hgo., S.L.P., Chis.; Guatemala (ssp. draco).

Nay., Miramar (Hernández 121, LL); Mpio. Tepic, between Tepic and Jalcocotán (many collections); 28 mi SW of Tepic (Webster & Breckon 15773); Mpio. Compostela, Compostela to Las Varas (Téllez 9217, DAV); 1.5 mi W of Mazatán (Feddema 1081); Jal., gorge of Río Horcones, 27 mi S of Puerto Vallarta (Dieterle 4027); Mpio. Talpa, La Crucecita to El Desmoronado (González 322); 5-8 mi N of La Cuesta, road to Talpa (McVaugh 20300); Mpio. Autlán, pass S of Autlán (Spetzman & Pérez-Jiménez 28924, IBUG); Puerto Los Mazos, 10 mi SW of Autlán (Webster & Breckon 16031, DAV); 10-12 mi SSW of Autlán (McVaugh 19558, 22275); 1-2 km W of Ahuacapán (De Niz et al. 275, IBUG); 2 km NW of Ahuacapán (Santana & Lorente 3683, IBUG); 21 km SE of

El Chante (Iltis 28924, IBUG); Mpio. Cuautitlán, 12-13 km NW of Minatitlán (Guzmán & López 431, IBUG); 1-2 km NE of Telcruz (Vázquez & López 4394, IBUG); 4 km W of Ayotitlán (Santana 4321, WIS); 1-2 km NE of Ayotitlán (Benz & Santana 1251, IBUG); Col., SW foothills of Nevada de Colima, above Hda. San Antonio (McVaugh 16117); Mich., Coalcomán, Sierra Naranjillo (Hinton 13930, LAM).

Monoecious shrub or tree 3-12 m high; twigs terete, scurfy with multiradiate hairs, usually exuding reddish latex when cut; leaf-blades ovate, mostly 10-20 (-30) cm long, 5-15 (-25) cm broad, acuminate, generally truncate to cordate and 5-ribbed at base, veinlet reticulum distinct and more or less scalariform on the abaxial surface; adaxial surface with simple, stellate, and sparse multiradiate-tufted hairs, the abaxial surface stellate-tomentose; margins finely denticulate or subentire; basal laminar glands paired, patelliform, sessile or stalked, 0.5-1.5 mm in diameter; petioles (3-) 10-20 cm long, stellate-pubescent; stipules lanceolate, attenuate-acuminate from a deltoid base, entire or with a single tooth on one side, 10-20 mm long, 1.5-3 mm broad; inflorescences terminal, bisexual (or occasionally entirely _), mostly 15-30 (-40) cm long, with ca 10-20 (-30) proximal cymules with both _ and _ flowers, the distal cymules each with usually 3 _ flowers subtended by a lanceolate or subulate entire bract 1-1.5 mm long; _ pedicel 5-8 mm long, stellate-scurfy; sepals 5, lanceolate, stellate-tomentose, 2-2.5 mm long; petals obovate, 2-2.8 mm long, glabrous on both surfaces but villose on the margins; receptacle copiously villose; stamens 13-17, the filaments glabrous, ca 2-4 mm long; anthers 0.6-0.8 mm long; _ pedicel (2-) 3-5 (-7) mm long in fruit, stellate-scurfy; sepals 5, equal, elliptic to oblong

or obovate, entire, stellate-tomentose abaxially, stellate-pubescent and often porrect adaxially, 3-4 mm long; petals filiform, up to 1 mm long (sometimes not evident); ovary densely yellowish stellate-hispid; styles bifid, sparsely stellate, ca 3 mm long; capsules subglobose, ca 6.5 mm across; columella 4-5 mm long; seeds ellipsoid, obliquely corrugate-sulcate on both faces, rounded at tip, 3.7-4.7 mm long; caruncle flat, 0.7-1 by 1.5-2 mm. (sect. Cyclostigma)

The only representative of sect. Cyclostigma in our area, Croton draco stands out by virtue of its large caudate leaf-blades, reddish stem exudate, large inflorescences in which the _ flowers are typically accompanied by a number of _ flowers, and ribbed/sulcate seeds. Nueva Galician plants are assigned to subsp. draco because of their large, relatively broad stipules that contrast with the linear to subulate stipules of subsp. panamensis (Klotzsch) Webster. Although plants of subsp. panamensis are recorded from Guatemala to Panamá, it appears that the two subspecies may intergrade in eastern Mexico (Oaxaca, Chiapas). Furthermore, occasional Nueva Galician specimens (e.g. Webster & Breckon 16031) have stipules about as narrow as those in Panamá. It is possible, therefore, that further study will show that the two subspecies cannot be maintained as distinct.

As in other species of sect. Cyclostigma, a number of specimens of Croton draco in herbaria have entirely _ inflorescences. Occasional specimens (e.g., Sanders et al. 4313, Sin.; Harriman & Jansen 12234, S.L.P.) have primarily _ inflorescences with a reduced number of _ flowers. It appears that there may be incipient dioecism in this species.

Croton fantzianus Seymour, *Phytologia* 43: 171. 1979.

Riparian vegetation in deciduous woodland, 900 m.

Son., Sin., Jal., Gro., Oax.; Nicaragua (Dept. Nueva Segovia, Dipilto, *Budier 6390* (FLAS, the holotype, FLAS), Costa Rica.

Jal., Mpio. Bolaños, 11 km NE of San Martín de Bolaños (*Lott et al.* 2108).

Monoecious arborescent shrub 2--4 m high; twigs terete, densely lepidote. Leaf-blades chartaceous, ovate, 5--13 cm long, 4--10 cm broad, rounded or obtuse to bluntly apiculate at the tip, cordate and 5--7-nerved at base, adaxially sparsely lepidote and glabrescent, abaxially copiously to densely lepidote and sometimes with porrect or stellate hairs; petioles 1--3 cm long, densely lepidote (radii sometimes porrect); stipules lanceolate, 1.5--3 mm long, caducous; racemes axillary or terminal on lateral shoots, 1-1.5 cm long; rachis over 1 mm thick, obscured by the closely packed buds; bracts 2-2.5 mm long, often dilated to cover the bud, deciduous; _ buds oblate, 2-2.5 mm wide, subsessile (pedicel usually less than 1 mm long); sepals deltoid, 1.8-2 mm long; petals spatulate, 2-2.7 mm long, adaxially villose, abaxially glabrous or lepidote, marginally ciliate; stamens mostly 14-16, filaments glabrous, 3-4 mm long; anthers 0.8-1.5 mm long; _ flowers sessile or subsessile, pedicel 1-3 mm long in fruit; sepals deltoid, 1.7-2 mm long; petals oblanceolate, c. 2.5 mm long, villose adaxially, lepidote abaxially; ovary

lepidote or stellate-lepidote, scales 0.3-0.6 mm in diam., 20--35--radiate, denticulate to lacerate or divided into distinct radii; styles 2 mm long, glabrous, several times bifid, branches slender; fruit ca 6 mm in diameter, ± tuberculate with scales raised on processes 0.2-0.3 mm high; columella ca 7 mm long; seeds ellipsoid, smooth, 7.5-8 mm long, caruncule ca 2 mm broad. (sect. Eluteria)

Because of its broad ovate leaves and abbreviated inflorescences, Croton fantzianus has often been mistaken for C. pseudoniveus. However, that species clearly differs in its sparser and more homogeneous indumentum, shorter bracts, lesser stamen number, and smaller seeds. In a number of respects, C. fantzianus is closer to C. niveus, which also has heterogeneous indumentum on leaves and ovaries, and stamen number of 14-17. However, C. niveus differs in its laxer inflorescences with smaller buds, longer fruiting pedicels, and smaller seeds.

Croton guatemalensis Lotsy, Bot. Gaz. 20: 353. 1895. Croton eluterioides Lotsy, op. cit. 352. Croton pyriticus Croizat, J. Arnold Arb. 26: 186. 1945. Croton wilburi McVaugh, Brittonia 13: 166. 1961.

Mesic forest or cloud forest, often a dominant, 1600-1700 m.

Jal. (moist forested ridge 10 mi S of Autlán, Wilbur & Wilbur 2431, MICH,

holotype of Croton wilburi), Col., Méx., Ver., Chis.; Guatemala (Santa Rosa, Heyde & Lux 3470, F, holotype of C. eluterioides; Heyde & Lux 3035, F, the holotype of C. guatemalensis), El Salvador, Costa Rica (El Alto RR. station on road to Cartago, Allen 661, A, holotype of Croton pyriticus), Panama.

Jal., Mpio. Autlán, Puerto del Abusado, 3 km SW of Ahuacapán (De Niz 12, IBUG, WIS); wooded slopes 10 mi S of Autlán towards La Resolana [Casimiro Castillo] (Wilbur & Wilbur 1421; Santana & Iltis 4284, IBUG); Puerto Los Mazos, entre Autlán y Casimiro Castillo (Cházaro 4967; Cuevas 2975, IBUG; Santana & Lorente 3798, IBUG); 2 km S of Pto. Los Mazos, 9 km E of Casimiro Castillo (Iltis & Santana 30114, Wetter et al. 1053); Col., Mpio. Minatitlán, 9-10 km NNE of Minatitlán (Santana 4508, IBUG); Cerro Grande, limestone plateau, 3.5 km by air SW of El Terrero (Cochrane et al. 11746, IBUG, WIS; 12253, WIS).

Tree 5-15 m high; branches terete or angled distally, closely lepidote; leaf-blads ovate, (5-) 9-13 cm long, (4-) 7-11 cm broad, bluntly acuminate, cuneate to more often broadly rounded or truncate (to broadly and openly cordate) and 3 (-5)- veined at base; adaxial surface greenish, sparsely to densely lepidote, the abaxial paler and densely lepidote (scales 0.2-0.3 mm in diameter, 40-50-radiate); margins entire; basal laminar glands absent or indistinct; petioles (1-) 2-4.5 (-7) cm long; stipules subulate, 1-3.5 mm long, deciduous; inflorescences 8-22 cm long, bisexual, with 1-4 basal _ flowers; bracts of _ flowers 1-flowered, lanceolate, entire, indurate, ca 1-2 mm long; _ pedicel 4-7 mm long; sepals 5, ovate, lepidote abaxially; petals spatulate, ca 3 mm long and 1.5 mm broad, villose

adaxially, lepidote abaxially; receptacle villose; stamens mostly 15-17 (rarely to 12, or 20), filaments glabrous or sparsely hirsutulous; anthers ca 1 mm long; _ flowers distinctly stalked, the fruiting pedicel 5-12 mm long, lepidote; sepals deltoid, villose adaxially, lepidote abaxially, 4.5 mm long, 3.5 mm broad; petals elliptic, ca 3-3.5 mm long, 1.5-2.3 mm broad, villose adaxially, lepidote on abaxially; ovary lepidote (scales ca 0.5-1 mm broad, more or less lacerate); styles 4-fid, 5-6 mm long, glabrous (or nearly so); capsule 13-17 mm long, tuberculate; seeds mostly 10-15 mm long. (sect. Eluteria)

Of the five species of sect. Eluteria in our area, Croton guatemalensis is distinctive in its large fruits and seeds (over 1 cm long). This widespread species is here diffidently circumscribed in a broad concept, as it exhibits perplexing variability. Lotsy created a major problem in interpretation by describing two species from the same locality; and like Croizat and Gómez-Pompa, I cannot find any distinguishing characteristics between them. A particularly vexing obstacle in typification and circumscription is that Lotsy described both Guatemalan species from flowering material alone, when the large long-pedicelled fruits are the major diagnostic character for the species. Croizat (Field Mus. Publ. Bot. 22: 447. 1942) reported mature capsules on an isotype of C. eluterioides at GH, and distinguished the species on the basis of fruit size. Croizat (J. Arnold Arb. 26: 187. 1945), in his key to the Mesoamerican species of sect. Eluteria, distinguished C. eluterioides from C. guatemalensis by fruit size, but he was extrapolating (unconvincingly) from examination of specimens of uncertain affinity. Originally (Ann. Missouri Bot. Gard. 54: 254. 1968), I adopted the name

C. pyriticus for Panamanian and Costa Rican populations, but noted that these were extremely close to C. eluterioides. Further study of specimens throughout the range indicates that C. wilburi, despite the striking aspect of its large inflorescences, can best be interpreted as the westernmost outpost of C. guatemalensis. I therefore concur with the inclusive species concept of Gómez-Pompa (Estudios Botánicos en la Región de Misantla, 119, 1966), although it is clear that further analysis of this complex is needed.

Croton hirtus L'Her. Stirp. Nov. 17, pl. 9. 1785. Croton glandulosus var. hirtus (L'Her.) Muell. Arg. in DC. Prodr. 15, part 2: 684. 1866. Croton glandulosus subsp. hirtus (L'Her.) Croizat, Bull. Torrey Bot. Club 75: 401. 1948.

Weed in agricultural fields and open disturbed areas, sea level to 1000 m.

Sin., Jal., Col., Mich., Gro., Méx., Oax., Ver., Tamps.; Centr. Amer.; S. Amer. (in the absence of an authentic specimen, L'Heritier's plate must be considered the type).

Jal., Mpio. Hostotipaquillo, 15 km W of La Quemada (McVaugh 18664); 15 km E of Plan de Barrancas (Feddema 1744); Mpio. Purificación, Purificación (Guzmán & Puga 1255); Mpio. La Huerta, just N of La Huerta (Wilbur 36715, DUKE); Mpio. Cuautitlán, 1 km SE of Las Marías (Santana et al. 5306, IBUG); Col., Rancho el Jabalí, 22 km NNW of Colima (Sanders et al. 8490, DAV); Colima (Palmer 37 in 1897); Mich., Mpio. Aguila, Playa Cocula, 70 km SE of Colima/Michoacán boundary (Wilbur

36633, DUKE).

Monoecious annual herb 10-50 cm high; stems stellate-hispida (hairs 1-2.5 mm long); leaf-blades membranous, ovate to elliptic, 2-6.5 cm long, 1.5-5 cm broad, acute or obtuse at tip, cuneate to rounded at base; adaxial surface rather sparsely strigose-hispid, the abaxial appressed-stellate; margins (at least of larger leaves) coarsely crenate or doubly crenate (10-15 major teeth on each side); basal laminar glands distinctly stalked, discoid, 0.1-0.3 mm across; petioles 3-25 mm long, stellate-hispidulous; stipules subulate, subentire, sparsely stellate, 1.5-4.5 mm long; inflorescences terminal, bisexual (0.5-) 1-2.5 cm long, nearly sessile, with usually 5-12 proximal _ flowers and 4-7 solitary distal _ flowers; _ bracts mostly 2-5 mm long, greenish, linear-lanceolate to subulate, gland-tipped, with several stipitate ellipsoidal glands at base; _ pedicel stellate-pubescent, 0.5-1 mm long; sepals 5, elliptic, hispidulous-stellate, 1-1.5 mm long; petals oblong, ca 1 mm long, glabrous except the margins; receptacle glabrous or scantily villose; stamens usually 11, the filaments ca 1 mm long, glabrous; anthers 0.4-0.5 mm long; _ flowers subsessile, the pedicel 0.5-1.5 mm in fruit; sepals usually 4 (5th sepal rudimentary or obsolete), linear to oblanceolate, distinctly unequal, the larger ones 4-6.5 mm long in fruit; petals ellipsoidal, 0.2-0.3 mm long; ovary stellate-hispidulous; styles free or basally connate, bifid or bipartite, 1.7-2.5 mm long, sparsely hispidulous; capsules subglobose, c. 3.5 mm in diameter; columella slender, ca 3 mm long; seeds compressed, dark, smooth (minutely foveolate), 2.6-3.1 mm long. (sect. Geiseleria)

It seems probable that Croton hirtus is more widespread than the rather few recorded localities suggest. Another weedy species of sect. Geiseleria, C. glandulosus L., has not been found in our area, but may possibly occur there. It differs from C. hirtus in the non-hispidulous stems, blunter leaves, and sessile foliar and bracteal glands.

Croton lobatus L. Sp. Pl. 1005. 1753. Astraea seemannii Klotzsch in Seem. Bot. Voy. Herald 103. 1853. Croton lobatus var. seemannii (Klotzsch) Muell. Arg. in DC. Prodr. 15, part 2: 669. 1866.

Disturbed areas and fields, sea level to 700 m.

Sin., Nay., Jal., Mich., Oax., Ver. (Hortus Cliffortianus Herbarium, BM, the holotype; probably collected by Houston); S.L.P., Tamps., Tab., Yuc., Q.R., Chis.; Centr. Amer. (Panama, Seemann, BM, holotype of Astraea seemannii); W. Ind.; S. Amer.

Nay., Jesús María (Feddema 1286); Mpio. Compostela, between Villa Varadero and mouth of Río Ameca (Cházaro & Montes 6333); Jal., Mpio. de La Huerta, Rancho Cuixmala (Sanders et al. 8660, DAV); Puente de Arroyo Seco, W of Ejido Miguel Hidalgo (Flores & Ramos 2923); Mich., Mpio. Tepalcatepec (Cházaro et al. 5601).

Monoecious annual herb ca 0.5-1 m high; stems sparsely stellate, soon glabrate; leaf-blades membranous, 3-7 cm long, 5-9 cm broad, mostly deeply divided into 3 (less commonly 5) elliptic-lanceolate to obovate-lanceolate acuminate lobes, adaxially strigose with simple hairs, abaxially hirsute (especially on veins) and sparsely stellate; margins (at least of larger leaves) coarsely doubly dentate (10-15 teeth on each side); basal glands minute (scarcely exceeding 0.1 mm), globular, clustered on adaxial surface; petioles stellate-pubescent, 2-8 cm long; stipules lanceolate to setaceous, acute or acuminate, subentire, 1-7 mm long; inflorescences terminal, bisexual, mostly 7-15 cm long, with (1-) 3-7 _ flowers and cymules of 2-4 _ flowers at distal nodes; bracts lanceolate, sometimes lobed, 1-2.5 mm long; _ pedicel glabrous, 1.5-2.5 mm long; sepals 5, equal, distinctly imbricate, elliptic and rounded at tip, glabrous or very sparsely hispid, 1-1.2 mm long; petals elliptic, glabrous, 1.2-1.5 mm long; receptacle glabrous; stamens (8-) 12-15, filaments ca 1 mm long; anthers broader than long, ca 0.3 mm long, 0.5 mm wide; _ flowers subsessile, the pedicel stellate, becoming 2-3 mm long in fruit; sepals 5, subequal, lanceolate to linear, acute, 4.5-9 mm long, sparsely hispidulous, toothed with stalked glands toward the base; petals absent; ovary sparsely to densely hispidulous with simple or stellate hairs; styles free, strigose-hispidulous, distally 4-fid, 2.5-3.5 mm long; capsules oblong, 3-lobed, 6-6.5 mm high; columella ca 4 mm long; seeds oblong, tetragonal, prominently rugulose-costate, 4-4.8 mm long. (sect. Astraea)

As our only representative of sect. Astraea, Croton lobatus is taxonomically and morphologically isolated in our flora. It is easily distinguished from all

other Nueva Galician species of Croton by its deeply palmately lobed leaves, glabrous receptacle in the _ flower, and tetragonal seeds. (sect. Astraea)

Mueller referred Mesoamerican specimens of Croton lobatus to var. seemannii on the basis of slight differences in indumentum, but it is not clear that the variability within the species is significantly correlated geographically. The Nueva Galician specimens have longer _ calyces and seeds than those from southern Mesoamerica, but special taxonomic recognition does not appear warranted at our present state of knowledge.

Croton martinianus Steinmann, Novon 8: 81. 1998.

Tropical deciduous forest, 900 m.

Son. (Sierra de Alamos, Mpio. Alamos, Steinmann 952, ARIZ, the holotype), Sin., Jal.

Jal., Mpio. San Cristóbal de la Barranca, 1 km NE of San Cristóbal (Lomelí Sención 2010, DAV).

Monoecious perennial herb (flowering in first year) 30-50 cm high; stems stellate-pubescent (hairs less than 1 mm long); leaf-blades chartaceous, ovate, 2-4.5 cm long, 1.5-3.5 cm broad, acute at the tip, rounded to subcordate at base, stellate-pubescent on both surfaces but abaxially paler and more densely tomentose; margins coarsely dentate (6-10 major teeth per side); basal laminar

glands stipitate, discoid, 0.1-0.3 mm across; petioles of lower leaves 2-3 cm long, stellate-pubescent; stipules linear-subulate, 3-5 mm long, entire, stellate-pubescent; inflorescences terminal, bisexual, 2.5-7 cm long, with mostly 4-8 proximal _ flowers and up to 40 _ flowers; bracts linear-subulate, with several stipitate ellipsoidal glands at base, 1-2.5 mm long; _ pedicel 1-2 mm long; sepals 5, deltoid, 1.2-1.7 mm long; petals narrowly obovate, 1.7-2.2 mm long, villose on the margins; receptacle densely villose; stamens 10 or 11, filaments 1-1.5 mm long, glabrous; anthers ca 0.5 mm long; _ pedicels ca 0.5-2 mm long in fruit; sepals unequal, 4 larger ones ca 3-4 mm long, entire, appressed-stellate; petals filiform, up to 0.8 mm long; ovary stellate-villose; styles free, 1.7-2 mm long, bipartite, sparsely and minutely stellate; capsule subglobose, ca 3.5-4 mm across; columella ca 3 mm long; seeds oblong, compressed, smooth (minutely foveolate), 3-3.3 mm long. (sect. Geiseleria)

This species, known with certainty from only a single collection in our area, may possibly be a recent introduction. It is rather similar to Croton hirtus, but differs in its apparently more robust habit, stems with shorter hairs, leaves paler beneath with a larger number of lateral veins, and broader more foliaceous _ sepals. A collection from Río Santiago, Mpio. Amatitán (Puga 4990) differs strongly in its sparse pubescence, larger petiolar glands, and hispid _ calyces, but could be an extreme shade form of C. martinianus. It was collected in a mango plantation, which also suggests the possibility of recent introduction.

Croton mazapensis Lundell, Contr. Univ. Mich. Herb. 7: 19. 1942.

As here interpreted, Croton mazapensis comprises three varieties distributed from western Mexico to Guatemala and Yucatán. Variety mazapensis, based on a collection from Chiapas (Matuda 4834, MICH, the holotype), and occupying the eastern part of the range, is distinguished from our representatives by its longer inflorescences (up to 12 cm long). In Nueva Galicia, two varieties occur as disjunct populations, along the coastal lowlands and in the highlands; the species description includes both taxa, but not the nominate variety. Local populations of C. mazapensis var. obtusifolius often occur sympatrically with C. morifolius and C. roxanae, but can usually be distinguished by the short-petiolate leaves with copious indumentum on both surfaces.

Monoecious shrub 0.5-2 m high; twigs terete, densely appressed-stellate; leaf-blades ovate or elliptic to obovate, (1.5-) 2-3 (-6) cm long, 1-2.5 (-3.5) cm broad, mostly abruptly acute or short-acuminate at tip, broadly obtuse to rounded or subcordate at base, pinnately veined (triplinerved), the adaxial surface stellate-fasciculate or appressed-stellate, the abaxial paler and usually densely stellate-tomentose; margins entire or subentire (remotely and obscurely denticulate); basal laminar glands obsolete or absent; petioles 1-5 (-10) mm long, appressed-stellate; stipules subulate or deltoid, ca 0.5 mm long, deciduous; inflorescences terminal, bisexual or _, 2-3 (-6) cm long, bisexual inflorescences mostly with 2-5 _ flowers at lower nodes (unaccompanied by _ flowers), _ flowers 2 or 3 to a node, bracts linear-lanceolate or oblanceolate, 1-2.5 mm long; _ pedicel 1-1.5 mm long, generally copiously stellate; sepals oblong or deltoid, 1.5-2 mm long, copiously stellate abaxially; petals elliptic-oblong, glabrous except for

villose margins in the proximal half, 1.8-2.5 mm long; stamens 13-15, the filaments glabrous, 1.5-2 mm long; anthers 0.5-0.7 mm long; receptacle sparsely to moderately villose; _ flowers subsessile, the fruiting pedicels villose, 0.7-1.5 mm long; sepals 5, subequal, narrowly lanceolate, 1-1.5 mm long, entire, whitish-tomentose abaxially; ovary whitish or yellowish, stellate-hispidulous; styles bifid or bipartite, stellate-pubescent, 2-3 mm long; capsule subglobose, shallowly 3-angled, hispidulous (stellate-porrect), 5.5-6 mm in diameter; columella 4.5-5 mm long; seeds plump, greyish, smooth, 4.2-5.2 mm long. (sect. Velamea)

Croton mazapensis* var. *obtusifolius (Muell. Arg.) Webster, comb. nov. *Croton morifolius* β *obtusifolius* Muell. Arg. in DC. Prodr. 15, part 2: 641. 1866. *Croton rzedowskii* M. C. Johnston, Brittonia 20: 227. 1968.

Grassy slopes or savannas, 1500-2100 m.

Zac., Gto., Qro., Oax. (Oaxaca, Andrieux 109, G, the holotype), Pue., Hdg., S.L.P. (Río Verde to San Ciro, Rzedowski 4543, MICH!, holotype of *C. rzedowskii*).

Zac., 18 mi S of Valparaíso (McVaugh 17701); 5 mi SW of Jalpa (McVaugh 18503, Rzedowski 14205); 20-21 km S of Jalpa (McVaugh 23800), 15 km NE of Juchipila (Johnston 12234, LL).

Leaf-blades lanceolate or elliptic, acute to short-cuspidate, with minute spinulose tip, adaxially greenish, fasciculate-stellate, abaxially copiously

tomentose; twigs hirtellous, the hairs stellate-porrect.

This variety is very common in the highlands of the Mexican Plateau, from Puebla and Oaxaca to Hidalgo and San Luis Potosí; however, it is much less common to the west in Guanajuato and Zacatecas. Marshall Johnston, who explicitly included C. morifolius var. obtusifolius within C. rzedowskii (even though he designated a different type), pointed out the close relationship to C. mazapensis.

Croton mazapensis var. **pacificus** Webster, var. nov.; ab. var. obtusifolius
differt ramulis non hirtellis, foliis acutis non mucronulatis.

Lowland deciduous woodland, sea level to 100 m.

Sin., Jal. (Mpio. La Huerta, Cerro Pedregoso, cerca de Chamela, L. Alfredo Pérez J. 1809, DAV, the holotype).

Jal., Mpio. La Huerta, Cumbres de Cuixmala, El Salto, entre Cerro Careyes y Cerro El Zarco (Acevedo 998, DAV); Estación Chamela (Pérez J. 1828).

Leaf-blades ovate-lanceolate, evenly narrowing to a bluntish tip without a mucro, adaxially brownish, appressed-strigose (sometimes with scattered stellate hairs), abaxially paler, appressed-pubescent, mostly 2.5-6 cm long, 1.5-3 cm broad; twigs appressed-stellate, not hirtellous due to porrect radii (as in

var. obtusifolius).

Although morphologically very close to var. obtusifolius, the population of Croton mazapensis at Chamela occupies a very different ecological niche from the upland variety. Dried specimens of var. pacificus appear strikingly different because of the blunter leaves that are brown on the upper surface rather than green, and less pale on the lower surface because of the looser indumentum.

Croton mcvaughii Webster, sp. nov.

Oak forests and "bosque mesófilo de montaña", 200-2300 m.

Known only from Nueva Galicia: Nay., Jal. (Mpio. Cabo Corrientes, 5 km N of El Tuito, McVaugh 25521, MICH, the holotype).

Nay., Mpio. San Blas, 5 km NE of Miramar (Téllez 9272, DAV); 12 km W of Jalcocotán (Téllez & Flores 11750, DAV); Jal., Mpio. Jocotepec, Cerro Viejo, Zapotitán de Hidalgo (Machuca Nuñez 6375); Jocotepec, Sierra Las Vigas, San Juan Cosalá (Machuca Nuñez 4456, WIS).

Monoecious shrub 0.7-1.5 m high; branches terete, reddish-brown stellate-scurfy when young; leaf-blades ovate to ovate-lanceolate, 3-9.5 cm long, 2-5.5 cm broad, obtuse or acute, rounded to subcordate and (3-) 5-veined

at base; adaxial surface stellate-fasciculate, the abaxial more densely so; margins evenly or coarsely doubly dentate and with minute stalked glands at the sinuses; basal laminar glands sessile or subsessile, patelliform, 0.5-0.7 mm in diameter; petioles 3-9 mm long; stipules lanceolate-subulate, 1.3-2.5 mm long; inflorescences 3-4.5 cm long, with 3-7 _ flowers at base; _ flowers mostly 1 to a bract; bracts entire, oblong-lanceolate, 1-1.8 mm long, persistent; _ pedicel 1.2-1.8 mm long, densely stellate; sepals 5, deltoid, densely stellate, 1.3-1.5 mm long; petals oblanceolate, 1.3-1.8 mm long, glabrous except for the villose margins; receptacle villose; stamens 8-11, the filaments glabrous, 1-2 mm long; anthers 0.5-0.7 mm long; _ flowers subsessile, the fruiting pedicel 1-1.5 mm long; sepals 5, oblong-lanceolate or -obovate, entire or obscurely toothed, ca 3.5 mm long, hispid-stellate abaxially, stellate on the distal half adaxially; petals absent; ovary stellate-tomentose; styles free, bifid (the third style often again bifid); capsule stellate-tomentose; columella 3-3.5 mm long; seeds plump, flat on the adaxial face, smooth (finely rugulose-foveolate), 2.9-3.3 mm long. (sect. Corylocroton)

It is highly appropriate to name this species in honor of my mentor and colleague, Dr. Rogers McVaugh, in recognition of his critical studies of the Euphorbiaceae of Nueva Galicia. This apparently uncommon species greatly resembles Croton repens, but differs in its larger size of stems and leaves, brownish indumentum on young parts, inflorescences with 3-7 _ flowers, shorter fruiting pedicels, and possibly smaller seeds. One specimen, Feddema 1394 from

east of Jesús María, approaches C. repens in its longer fruiting pedicels (up to 2.5 mm) and larger seeds (4-4.5 mm long), as well as the lack of the characteristic brownish tomentum on younger parts. This is the only collection seen that appears to be transitional between the two species.

Croton michaelii V. W. Steinm., Contr. Univ. Mich. Herb.

Oak woodlands and grasslands, on white soils and in rock crevices, with Arctostaphylos pungens, et al., 2100 m.

Dur. (Mpio. Canatlán, 5 km W of El Carmen, Wilson 96-236, RSA, the holotype; ARIZ, DAV, MEXU, isotypes), Ags.

Ags., Mpio. Calvillo, 1 km S of presa El Capulín (García 2717, HUAA).

Perennial herb or subshrub 0.3-0.6 m high; stems ranching dichotomously, branches stellate-lepidote with deeply divided scales 0.4-0.7 mm in diameter; leaf-blades narrowly lanceolate to linear, 1.5-6.2 cm long, 0.25-1 cm broad, acute at the tip, attenuate at base, veins obscure except for the midrib; margins entire; petioles 0.2-0.5 cm long, lacking paired glands; stipules rudimentary, of minute conical processes c. 0.1 mm thick; inflorescences terminal or pseudoaxillary, 1.3-2.1 cm long, bisexual with 1-3 _ flowers at base; _ flowers 1 per bract; _ bracts subulate, ± stipitate-glandular at base, 1-2.8 mm long; _ pedicel slender, 1.5-3.7 mm long; sepals 5, ovate, 1.5-2 mm long; petals ± elliptic, 1.8-2.1 mm

long; receptacle villose; stamens 11-15; filaments glabrous or basally villose, c. 2-2.5 mm long; anthers 0.6-0.8 mm long; _ flowers subsessile, the pedicel 0.7 mm long or less; sepals 5, equal, valvate, subulate to linear-lanceolate, 3.5-6.5 mm long, acute, margins with a few stipitate glands; petals rudimentary, subulate, 0.6-0.8 mm long; ovary stellate-lepidote (?); styles bifid or bipartite, 2.5-4 mm long, stellate-pubescent; capsules subglobose, 4.8-5.9 mm in diameter; seeds strongly compressed, elliptic, rugulose and shiny. (sect. Medea)

The author of C. michaelii compares this species to C. yecorensis V. W. Steinm. & Felger from Sonora; both species have glands on bracts and _ sepals, but the conspicuous foliar glands of the Sonoran plant are lacking in C. michaelii. The stellate-lepidote indumentum and rudimentary stipules of C. michaelii suggest a possibility with sect. Gynamblosis. However, because of the glandular sepals, bracts, and _ calyces, I believe that C. michaelii and C. yecorensis are best placed in sect. Medea (Klotzsch) Baillon. Both species are aberrant in the section in having bifid rather than multifid styles, and it seems probable that the diagnostic characters of sect. Medea will have to be modified to accompany these Mexican taxa.

Croton morifolius Willd. Sp. Pl. 4: 535. 1805.

Deciduous forests, scrublands, and savannas, Mexico to northern S. America (the type from Venezuela). Three varieties of this species are represented in Mexico, and in our area.

Monoecious shrub or tree 1-4 m high; branches subterete, appressed-stellate

to floccose; leaf-blades ovate to elliptic, mostly 5-15 cm long, 2-8 cm broad, typically abruptly acuminate or cuspidate and with a subulate mucro, obtuse to prominently cordate and 3-5-veined at base, with 5-7 pairs of lateral veins, the major basal pair of veins extending half the length of the lamina, the margins entire or nearly so, the adaxial surface strigose or stellate-fasciculate and often glabrescent, the abaxial surface appressed-stellate to stellate-tomentose; margins entire or obscurely denticulate; basal laminar glands rudimentary or absent; petioles (except those of leaves immediately below the inflorescences and at first nodes of annual growth) 1-4.5 cm long, copiously stellate-pubescent (never hispid with long porrect hairs); stipules subulate, entire, mostly 1-3 mm long; inflorescences terminal, bisexual or staminate, 5-15 cm long, the bisexual with 1-8 (-13) _ flowers at base (very rarely with associated _ flowers); _ flowers mainly 2-3 to a bract; bracts of _ flowers lanceolate or subulate, entire, 0.5-1.5 mm long; _ pedicel 0.8-2 (-4) mm long, sparsely to densely stellate (rarely glabrous); sepals 5, deltoid, 1.2-1.7 mm long, sparsely to densely stellate-pubescent abaxially; petals 5, obovate to oblanceolate, 1.5-2 mm long, glabrous except for villose margins toward base; receptacle villose; stamens 12-18, the filaments glabrous, 2-2.5 mm long; anthers 0.6-0.8 mm long; _ flowers subsessile, the pedicel 1 mm or less in fruit, densely stellate-pubescent; sepals 5, equal, narrowly lanceolate, entire, sometimes gland-tipped, in fruit 1.2-1.7 mm long and more or less deciduous; ovary rounded to distinctly angled, whitish to brown, densely stellate-tomentose; styles bifid to bipartite, 2-2.5 mm long, stellate below the bifurcation; capsules subglobose, 6-7 mm broad; columella 5-5.5 mm long; seeds plump, smooth, obscurely carinate or ribbed on the adaxial surface,

apiculate, 4.3-5.8 mm long. (sect. Velamea)

This variable species, perhaps the commonest woody Croton in drier habitats in southern and western Mexico, is delineated conservatively to include three distinctive varieties that have often been treated as distinct species.

1. Indumentum of ovary whitish or yellowish; twigs appressed-stellate (dendritic hairs rare or absent); stipules mostly 1-2 mm long.

2. Ovary distinctly angled, whitish to yellowish; capsule 3-angled. var. brandegeanus

2. Ovary rounded, whitish; capsule rounded, not angled. var. morifolius

1. Indumentum of ovary brownish; twigs floccose with stipitate stellate and dendritic hairs; stipules less than 1 mm long; capsule rounded, floccose-pubescent. var. sphaerocarpus

Croton morifolius var. **brandegeanus** (Croizat) Webster, comb. nov. Croton flavescens var. brandegeanus Croizat, J. Arnold Arb. 26: 187. 1945. Croton flavescens Greenman, Proc. Amer. Acad. Sci. 39: 81. 1903.

Tropical deciduous forest, oak forest, pine forest, and cloud forest, often

in secondary vegetation or along streams, 150-1600 m.

Son. (4 mi N of Macori, Wiggins & Rollins 391, A!, the holotype), Chih., Dgo., Sin., Nay., Zac., Jal., Mich. (Monte León, Pringle 8667, GH!, holotype of Croton flavescens), Gro.

Nay., Mpio. Nayar, Mesa del Nayar ca 7-10 km W of Jesús María (Ramírez 466, 549, Tenorio 16137); near Jesús María (Norris & Taranto 13948); 4-14 km E de la Cortina de la P. H. Aquamilpa (Calzada 18587, 18604, Flores-Franco 2720, 2739, 2746); Zac., Mpio. Moyahua, San José, 8 km S of Moyahua (Rzedowski 20252); Santa Rosa, E side of Río Juchipila (Taylor 6045, MO); Jal., Mpio. Huejuquilla, 15 km NW de Huejuquilla (Flores 2000); Mpio. San Martín de Bolaños, 1 km S of San Martín (Rzedowski 26082); Mpio. Hostotipaquillo, 3 km E of Nayarit/Jalisco border (Marcks 1158, DAV); Mpio. Tequila, barranca of Río Grande de Santiago N of Amatitán (McVaugh 18540); Mpio. Amatitán, Rancho Las Animas (Puga 4984); Mpio. Jocotepec, El Molino (McVaugh 18608); Mpio. Zapopan, Las Animas, Pte. de Guadalupe (Puga 4945); Mpio. Tuxcacuesco, 5-6 km ENE of Zenzontla (Santana & Benz 5907, WIS); Mich., Mpio. Cojumatlán, Palo Alto, E of Tizapán el Alto (McVaugh 15046); Mpio. Apatzingán, canyon below Acahuato (Leavenworth & Hoogstraal 1545, 1550, MO); Mt. Apatzingán (Leavenworth & Hoogstraal 1725, MO).

Shrub or small tree 1.5-4 m high; branches appressed-stellate, sometimes glabrescent; leaf-blades mostly 5-10 cm long, 4-8 cm broad, abruptly acuminate with an acumen ca. 1 (rarely 2) cm long, adaxially persistently

stellate-fasciculate (sometimes strigose), abaxially greenish to whitish, appressed-stellate to moderately tomentose (with stipitate hairs); petioles 1-2 (-3) cm long (shorter immediately below the inflorescence), appressed-stellate; stipules subulate, appressed-stellate, 1.5-3 mm long; inflorescences 5-10 cm long, the rachis appressed-stellate, mostly with 3-8 _ flowers, pedicels of _ flowers stellate-pubescent; stamens 12-15; ovary distinctly angled, the indumentum white to yellowish; seeds 4.3-5.2 mm long.

The distinctly angled ovary, seen especially well in the type and other collections from Michoacán, permits easy recognition of this variety when the plants are in full flower or young fruit. It is roughly allopatric with var. sphaerocarpus, replacing that taxon to the west from Nayarit to Sonora; the two taxa overlap in Michoacán, however, even though they have never been found at the same locality. One Jaliscan specimen from Mpio. Zacoalco de Torres (Lomelí Senci3n s.n., GUADA 23853) is anomalous in combining the angled ovaries and strongly pubescent leaves of var. brandegeanus with the bisexual cymules and glabrate _ pedicels of Croton roxanae.

Croton morifolius var. **morifolius**. Croton morifolius var. genuinus Muell. Arg. Linnaea 34: 125. 1865. Croton deppeanus Steud. Nomencl. Bot. ed. 2, 1: 446. 1840. Croton fragilis
 α sericeus Muell. Arg. DC. Prodr. 15, part 2: 642. 1866.

Deciduous forest, 75-1000 m.

Nay., Jal., Col., Gro., Oax., Ver. (Plan del Río, Schiede 59, HAL!, lectotype of Croton deppeanus and of var. sericeus), Chis.; Centr. Amer.; northern S. Amer. (Colombia; Venezuela).

Nay., Mpio. Tepic, Colorado de la Mora (Lomelí Sencion 2062, DAV); Jal., Mpio. La Huerta, Cuitzmala, Cerro de Alborada (Castillo 5314, DAV); Mpio. Tuxcacuesco, 1 km E of Zenzontla (Santana & Jardel 5669, IBUG, WIS), 5-6 km ENE of Zenzontla (Santana 5177, IBUG, WIS); Col., Mpio. Colima, 5 mi S of Colima (McVaugh 15507), 10 mi SSW of Colima (McVaugh 15519).

It is not certain how common var. morifolius is in Nueva Galicia, because it is vegetatively very similar to var. brandegeanus, and can hardly be distinguished from wholly staminate specimens of that variety. A specimen from Michoacán (Cerro de Carboneras, S of Uruapan, King & Soderstrom 4884, UC) may possibly represent var. morifolius, although the elevation (over 1000 m) and indumentum of twigs suggests var. sphaerocarpus.

Croton morifolius var. **sphaerocarpus** (H. B. K.) Muell. Arg. Linnaea 34: 125. 1865. Croton sphaerocarpus H. B. K. Nov. Gen. Sp. 2: 84, pl. 105. 1817.

Thorn forest, gallery forest, and montane forest, 100-1400 m.

Nay., Zac., Gto., Jal., Col., Mich. (Volcán Jorullo, Humboldt & Bonpland,

P!, the holotype), Méx., Qro., Mor., Pue., Hgo.

Nay., Mpio. Ahuacatlán, 5-10 mi SE of Ahuacatlán towards Barranca del Oro (Feddema 272, McVaugh 16359); Mpio. Ixtlán del Rio, Cacalotán (Téllez 10603); Gto., Mpio. León, 4.5 km ENE de Alfaro (Galván 3087, TEX); Jal., Mpio. San Martín de Bolaños, 8-10 km NW de El Platanar (Rzedowski 26142, 26213); El Yerbanis, El Platanar (Diaz Luna 932, MO); Mpio. Ixtlahuacán de los Membrillos, Barranca El Tecuán, S de La Cañada (Lomeli Sención 2133); Mpio. Jocotepec, Cerro Viejo, Zapotitán de Hidalgo (Machuca 6375); vicinity of San Juan Cosalá (Detling 8452, Machuca 4456, McVaugh 23828, Puga 20); Mpio. Chapala, Ajijic (Diaz Luna 808); Mpio. Tuxcueca, 6 km E of San Luis Soyatlán (McVaugh 15090); Mpio. Tapalpa, El Salto, Río Jiquilpan (Lott 374); La Frontera to Barranca del Nogal (Lomeli Sención GUADA 23945); Mpio. Atotonilco el Alto, 1.5 mi W of Atotonilco (McVaugh 17323); Col., Rancho El Jabalí, 22 km NNW of Colima (Lott 2912; Vázquez 476, 688, 817; Sanders 10324); Mich., Mpio. Sahuayo, 8 mi NW of Sahuayo (McVaugh 18190); Mpio. Jiquilpan, 8-10 km SW of Jiquilpan (Feddema 241); Mpio. Zamora, 9 km. W of Jacona (Rzedowski 29344); between Zamora and Jacona (Moore 139, UC); Mpio. Aguililla, 8 km NW of Aguililla towards Aserradero Dos Aguas (McVaugh 22657).

Shrub or small tree 1-4 m high; branches subterete, stellate-scurfy with stipitate and dendritic hairs; leaf-blades mostly 5-15 cm long, 2-8 cm broad, rather abruptly narrowed to an acumen 0.5-1 cm long, adaxially stellate and sometimes strigose, often glabrescent, the abaxial surface lightly tomentose with stipitate stellate hairs; petioles (0.5-) 1-3 (-4.5) cm long, more or less

floccose-stipitate as the twigs; stipules deltoid to subulate, mostly 0.5-1 mm long; inflorescences 5-10 cm long, the rachis loosely appressed-stellate to scurfy, with 1-5 _ flowers; pedicels of _ flowers stellate-pubescent; stamens 14-18; ovary not distinctly angled, the indumentum brownish; seeds 4.7-5.8 mm long.

At higher elevations in Nueva Galicia, var. sphaerocarpus is common, and easily distinguishable from var. brandegeanus by its roundish ovaries with brown indumentum and its floccose pubescence of twigs and petioles. To the north and east, from Guanajuato and Morelos to Hidalgo and Puebla, var. sphaerocarpus appears to be the only representative of C. morifolius.

A series of specimens from Colima near the border with Jalisco (Mpio. Comala, Rancho El Jabalí, Lott 2912, Sanders 10324, and Vázquez 817, DAV) are aberrant in having whitish ovaries and bisexual cymules. It is possible that these populations may represent a distinct taxon, but at present it seems most expedient to group them with var. sphaerocarpus.

Croton niveus Jacq. Enum. Syst. Pl. 32. 1760; Sel. Stirp. Amer. 255, pl. 162, fig. 2. 1763. Croton septemnerius McVaugh, Brittonia 13: 165. 1961.

Deciduous or semi-deciduous forest or woodland, sometimes in thorn forest, mostly sea level to 300 m but ascending to 900 m.

Son., Sin., Nay., Jal., Col. (Manzanillo, Palmer s.n. in 1890, MICH, holotype of Croton septemnerius), Oax., Ver., Tamps.; Centr. Amer.; W. Ind.; S. Amer.

(Colombia, Cartagena, Jacquín, the type apparently not preserved; neotype here designated as Schott, Cartagena, XI. 1857, MO 1905037).

Jal., Mpio. La Huerta, between El Higueral and Juan Gil Preciado (Flores & Ramos 2945, 2973, WIS); Arroyo Careyes, N of Rancho Cuixmala (Guadalupe Ayala 114B, DAV); Rancho Cuixmala (Guadalupe Ayala 1208, DAV); Mpio. Cihuatlán, Playa de Cuastecomate, 8 km NW of Navidad (McVaugh & Koelz 1698); between Bahía Navidad and La Manzanilla (McVaugh 20994); Mpio. Tuxcacuesco, Tuxcacuesco (Robles 671, WIS); near Zenzontla, 10-11 km SW of Tuxcacuesco (Guzmán & Cuevas 1168, 1169, 3484, 3709, IBUG; Cuevas & Guzmán 3709, WIS); Col., Mpio. Manzanillo, 14 mi WNW of Santiago (McVaugh 20765); Manzanillo (Ferris 6055, DS; Palmer 1058 in 1890).

Monoecious (occasionally apparently dioecious) shrubs, sometimes arborescent, 2-5 (-10) m high; twigs subterete, lepidote; leaf-blades ovate to lanceolate, 3-11 cm long, 1.5-8.5 cm broad, acuminate, rounded to cordate and 5-7-veined at base, entire; adaxially greenish, sparsely lepidote, glabrescent; the abaxial surface densely silvery lepidote, scales sometimes stellate-porrect; margins entire; basal laminar glands absent; petioles 0.5-4 cm long, lepidote; stipules subulate, 0.5-1.5 mm long, caducous; inflorescences terminal and axillary, unisexual or bisexual, 1-4 cm long, with 1 or 2 basal _ flowers; bracts of _ flowers lanceolate, 0.5-1.3 mm long, persistent; _ pedicel 1.5-3.5 mm long; sepals connate at base, deltoid, 1.3-1.7 mm long; petals elliptic, 1.8-2.5 mm long, adaxially hirsutulous, densely villose on the margins; receptacle villose; stamens 13-16, the filaments glabrous, 1.5-2 mm long; anthers 0.7-1 mm long; _ pedicel

4-5 mm long in fruit; sepals deltoid, ca 1.5 mm long; petals obovate, ca 2 mm long, adaxially hirsutulous; ovary stellate-tomentose; styles multifid, 1.5-2 mm long, glabrous; capsules ca 8 mm in diameter, stellate-pubescent; columella 6.5-7.5 mm long; seeds ellipsoid, smooth, 5.5-6.5 mm long. (sect. Eluteria)

The most widely distributed representative of sect. Eluteria, this species is distinguished from others in Nueva Galicia by the stellate-pubescent rather than lepidote ovary. Although Burger & Huft (Fieldiana Botany II. 36: 95. 1995) question the value of this character, it seems consistent in all the hundreds of specimens I have examined. The scales on leaves and petioles often have several porrect radii, with the appearance of a stellate trichome sitting on top of a lepidote one; the type of Croton septemnerivus is such a specimen.

Typification of Croton niveus presents some difficulties, since apparently no type specimen was preserved, and the description by Jacquin in the Enumeratio (1760) is so brief that the name would have to be considered a nomen dubium. However, in his later Historia Selectarum Stirpium Americanarum (1763), Jacquin provided a description and illustration of a leaf which makes the identity of his species reasonably certain. In order to unequivocally establish the application of the name C. niveus, it seems desirable to designate a neotype, a Schott specimen from the type locality (Cartagena).

Croton pedicellatus H. B. K. Nov. Gen. Sp. Pl. 2: 75. pl. 104. 1817. Croton tenuilobus S. Wats. Proc. Amer. Acad. 21: 439. 1886.

Thorn forest or thickets, sometimes with Dodonaea; woods transitional between tropical deciduous forest and oak woodland, 750-1300 m.

Son., Sin., Chih. (Chihuahua, Hacienda San José, Palmer 29, GH, holotype of Croton tenuilobus), Nay., Jal., Mich.; S. Amer. (Peru, Cajamarca, Pongo de Rentama, Humboldt & Bonpland, P, the holotype).

Nay., Mpio. Nayar, 1 km from Mesa de Nayar (Steinmann 1064, DAV); 32.5-40 km NE of Jesús María (Flores & Tenorio 966, 1009); Labra, W of Jesús María (Norris & Taranto 14171); 1 km N of Mesa de Nayar (Steinmann 1064, DAV); Mpio. Acaponeta, Cancial (Norris & Taranto 14171); 4 mi E of La Ciénaga (Norris & Taranto 14263); Jal., Mpio. Jocotepec, San Juan Cosalá (Puga 31); Mpio. Chapala, 9 mi W of Chapala (Webster & Lynch 17169); Mich., Mpio. Coalcomán, Coalcomán (Hinton 12690); Mpio. Aguila, 73 km W of Playa Azul (Koch & Fryxell 83185).

Monoecious annual herb 0.5-1 m high; stems slender, often forking, appressed-stellate; leaf-blades elliptic- to oblong-lanceolate, 2-3.5 cm long, 0.3-1 cm broad, acute to acuminate, cuneate at base, pinnately veined with 4-6 pairs of laterals; margins entire; adaxial surface appressed-stellate, the stellae 5-10--radiate; abaxial surface more densely appressed-stellate, the stellae 15-20--radiate; margins entire; basal laminar glands absent; petioles 2-4 mm long; stipules absent; inflorescences terminal, 1-2 cm long, with (1-) 3 or 4 _ flowers at base; _ flowers to a bract, bracts inconspicuous, entire, ca 0.5 mm long; _ pedicel 1-2 mm long, stellate-pubescent; sepals 5, deltoid, 1-1.3 mm long; petals

obovate, glabrous except the margins toward base, ca 1.5 mm long, 0.5 mm broad; receptacle villose; stamens 8-11, the filaments glabrous, 1-1.7 mm long; anthers 0.4-0.5 mm long; _ pedicel at anthesis 2-3 mm long, recurving and lengthening in fruit to 3-7.5 mm long; sepals somewhat unequal, lanceolate, 1.3-1.5 mm long, entire, recurving in fruit; ovary densely appressed-stellate; styles bifid, ca 1.5 mm long, stellate-pubescent; capsules oblong-ellipsoidal, ca 5 mm high; columella 4.5 mm long; seeds oblong, compressed, finely reticulate-striate, ca 3 mm long. (sect. Gunamblosis)

As pointed out by McVaugh (Brittonia 13: 164. 1961), these herbs of Nueva Galicia with long recurved pedicels strongly resemble plants from South America; there appears to be ample reason to consider them as conspecific.

Croton pottsii (Klotzsch) Muell. Arg. in DC. Prodr. 15, part 2: 561. 1866. Lasiogyne pottsii Klotzsch in Seem. Bot. Voy. Herald 278. 1856. Croton corymbulosus Engelm. in Rothrock, Rep. Wheeler Exped. 6, Bot.: 242. 1878. Croton eremophilus Wooton & Standley, Contr. U.S. Nat. Herb. 16: 144. 1913.

Arid grasslands or shrublands, often on limestone, 700-2300 m.

Ariz. (Cochise Co., Ft. Bowie (Rothrock 506, US, holotype of Croton corymbulosus), N. Mex. (Hidalgo Co., Dog Spring, Mearns 2336, US, holotype of Croton eremophilus), Tex., Son., Chih. (near Chihuahua, Potts, BM, the holotype),

Dur., Zac., Ags., Qro., S.L.P., Tamps., N.L., Coah.

Ags., Cerro Palmira, 4 km W of Asientos, on limestone (Rzedowski 25053).

Monoecious perennial herbs, sometimes suffrutescent, mostly 0.1-0.5 m high; stems usually forking distally, terete, appressed stellate-pubescent; leaf-blades ovate-oblong to obovate-oblong (the lowermost sometimes nearly orbicular), mostly 1.5-4 (-6) cm long, 1-2.5 cm broad, acute to rounded at tip, broadly obtuse to rounded and 3-veined at base, with margins entire, densely appressed-stellate on both surfaces (usually paler abaxially); petioles 1-2 cm long, more or less appressed-stellate; margins entire; basal laminar glands absent; stipules subulate, 0.8-1 mm long, deciduous, with basal glandular papillae; inflorescences terminal, subtended by opposite or whorled leaves, bisexual or sometimes unisexual, 1-1.5 cm long, the bisexual with 3-7 _ flowers at base; _ flowers 1 to a bract; _ bracts subulate, entire, stellate-pubescent, gland-tipped, deciduous, 1-2 mm long; _ pedicel mostly 1-4 (-6) mm long, stellate-pubescent; sepals 5, deltoid, acute, stellate-tomentose, 1.5-2 mm long; petals oblanceolate, ca 2 mm long, villose on both surfaces; receptacle densely villose; stamens 11-15 (rarely -18); filaments 2.5-3.5 mm long, densely pilose towards base; anthers 0.7-0.8 mm long; _ pedicel 3.5-7 mm long in fruit, more or less recurving, stellate-pubescent; sepals 5, oblong to obovate, acute, in fruit 2-4 mm long, 1.3-2 mm broad, appressed-stellate abaxially, densely stellate on the distal half adaxially, entire; petals absent; ovary densely stellate-tomentose; styles bifid or bipartite, 1.5-3 mm long, stellate at base; capsules mostly oblong, 4-6 mm long;

columella 3.2-4 mm long; seeds slightly compressed, oblong, smooth, 3.5-4.3 mm long. (sect. Gynamblosis)

A characteristic Chihuahuan Desert species, Croton pottsii barely enters our area in northeastern Aguascalientes. The species is closest to C. pedicellatus, which is easily distinguished by its annual habit and narrower short-petiolate leaves. Both species differ from tax of sect. Velamea such as C. morifolius in their distinctly recurved pedicels; they are best assigned to sect. Gynamblosis, a group disjunct between warm temperate to subtropical North America and South America.

Croton pseudoniveus Lundell, Phytologia 1: 449. 1940.

Deciduous woodlands, from near sea level to 500 m.

Son., Sin. (Los Labrados, Mexia 921, MICH!, the holotype), Jal., Col., Oax., Chis.; Centr. Amer. to Panamá.

Jal., Mpio. Tomatlán, 20 km SE of Tomatlán (McVaugh 25292A); Mpio. La Huerta, Estación de Biología Chamela (Bullock 997, Lott 1461, Lott & Wendt 2195, Magallanes 365); Rincón de Ixtlán (Lott & Wendt 2196); Rancho Cuixmala (Lott 2862); Arroyo Tapeixtes, 4 km SE of Estación Chamela (Guadalupe Ayala 109); Mpio. Cihuatlán, Playa de Cuastecomate, 8 km NW of Navidad (McVaugh & Koelz 1692); between Bahía de Navidad and La Manzanilla (McVaugh 20993); Barra de Navidad (Pérez 769, TEX);

Mpio. Jilotlán, 10 km NW of Tepalcatepec (Rzedowski 17511); Col., 10 mi S of Colima (Webster & Breckon 16094); 11 mi SSW of Colima (McVaugh & Koelz 1051).

Monoecious shrub or tree 2-6 m high; twigs lepidote; leaf-blades chartaceous, ovate, 6-13 cm long, 4-9 cm broad, acute to bluntly acuminate, rounded or truncate to cordate and (3-) 5-veined at base, lateral veins 3-5 on each side; blades sparsely lepidote on both surfaces; margins entire; basal laminar glands absent; petioles 1-3 cm long, lepidote; stipules narrowly lanceolate, 5-7 mm long, deciduous; inflorescences axillary, bisexual, 1-2 cm long, with 1 basal _ flower; _ flowers 1 to a bract; bracts lanceolate, entire, 0.5-0.7 mm long, persistent; _ pedicel 1-1.5 mm long, lepidote; sepals deltoid, ca 1.5 mm long; petals obovate, ca 2 mm long, glabrous adaxially, densely villose on the margins; receptacle villose; stamens 10 or 11, the filaments glabrous; anthers 0.6-0.7 mm long; _ pedicel 1-2 mm long in fruit; sepals 5, equal, deltoid, 1.5-2 mm long; petals ca 2 mm long, glabrous or stellate-lepidote abaxially; ovary lepidote with scales 0.8-1 mm across; styles spreading, multifid, glabrous (or nearly so), 2.5-3 mm long; capsules smooth, ca 7 mm long; seeds smooth, ca 5 mm long. (sect. Eluteria)

Although Croton pseudoniveus is very similar in appearance to C. niveus, it differs diagnostically in its lepidote rather than stellate indumentum of the ovary. Furthermore, as illustrated by McVaugh (Britton 13: 165. 1961), the ovarian scales of C. pseudoniveus are notably large than those of other species of sect. Eluteria such as C. reflexifolius H.B.K. and C. guatemalensis Lotsy.

The geographic distribution of C. pseudoniveus appears peculiarly spotty,

with gaps between Chiapas, El Salvador, and Panamá; but this may simply be due to insufficient collecting in the deciduous woodland communities, which are highly disturbed in Central America.

Croton reflexifolius H.B.K. Nov. Gen. Sp. 2: 68. 1817.

Deciduous woodlands with Bursera, Caesalpinia, Cordia, Ipomoea, Jatropha, et al., sea level to 200 m.

Jal., Gro. ("in maritimis prope Acapulco", Humboldt, Herb. Humb. & Bonpl., P!), Ver., S.L.P., Tamps.

Jal., Mpio. La Huerta, vicinity of Estación Biológica UNAM, 3 km SE of Chamela, wooded hills and bluffs (McVaugh 26256).

Shrub or tree 3-10 m high; branches terete, closely lepidote; leaf-blades ovate, mostly 5-11 cm long, 4-8 cm broad, bluntly and rather abruptly acuminate, rounded to truncate or cordate and 3-5-veined at base; adaxial surface olivaceous, sparsely lepidote and glabrescent, the abaxial paler and silvery, densely lepidote (scales 0.1-0.3 mm in diameter, 25-35-radiate); margins entire; basal laminar glands absent; petioles 1.5-2.5 (-3.5) cm long; stipules subulate, 0.5-1.5 mm long, deciduous; inflorescences 2-6 cm long, bisexual, with 1-3 basal _ flowers; _ bracts 1-flowered, lanceolate, entire, indurate, deciduous, 0.5-1.2 mm long; _ pedicel

1.5-5 mm long, glabrous; sepals 5, ovate, 1.8-2 mm long, lepidote abaxially; petals spatulate, 2-2.3 mm long and 0.7-1.2 mm broad, villose adaxially, glabrous or lepidote abaxially; receptacle villose; stamens (12-) 14-15 (-18), filaments glabrous or hirsutulous at base; anthers 0.7-1 mm long; _ pedicels becoming 5-11 (-15) mm long in fruit, lepidote; sepals deltoid, entire, ca 2 mm long, nearly glabrous adaxially, lepidote abaxially; petals narrowly elliptic, 1.7-2.2 mm long, 0.5-1 (-1.5) mm broad, glabrous or villose adaxially, lepidote abaxially; ovary lepidote (scales 0.3-0.7 mm in diameter, denticulate to lacerate); styles 4-6-fid, 1-2 mm long, glabrous; capsule 6-7 mm in diameter, smooth or slightly tuberculate, silvery-lepidote; columella slender, 5.5-6.5 mm long; seeds ellipsoidal, smooth, 4.5-6 mm long. (sect. Eluteria)

It is very surprising that only a single collection has been made of this species in the well-collected vicinity of the Chamela station, particularly since the collector noted it as locally abundant. The deciduous woodland habitat of the Chamela site appears to be similar to that of Humboldt's type locality near Acapulco, so presumably we can expect Croton reflexifolius to be encountered in other coastal lowland areas in Nueva Galicia.

The name Croton reflexifolius has been applied to a variety of other species of sect. Eluteria in eastern Mexico and Central America, and relationships among these taxa are still not well understood, as indicated by the discussion of Gómez-Pompa (Estudios Botánicos en la Región de Misantla, 1966). Although it resembles C. guatemalensis in its foliage, C. reflexifolius is clearly separable by its much smaller capsules and seeds and by its shorter inflorescences. In the

Chamela area, it is sympatric with C. niveus, from which it is readily distinguished by its more abruptly pointed leaves lacking porrect trichomes, and by its lepidote (rather than stellate-tomentose) ovary.

Croton repens Schlecht. Linnaea 19: 237. 1847.

Common in oak woodlands and savannas, sometimes in the ecotone with tropical deciduous woodland, 300-1000 (-1500) m.

Nay., Jal., Gro., Oax., Ver. (Hacienda de la Laguna, Schiede 40, holotype at B destroyed; lectotype, HAL), Chis.; Centr. Amer.

Nay., Mpio. Nayar, 1 km N of Mesa de Nayar (Steinmann 1062, DAV); Mpio. San Blas, 2 mi SE of Mecatán (Norris & Taranto 13312); 1.5-2.5 km W of Tetitata, 15 km SE of San Blas (Feddema 1023); 12.9 km W of Jalcocotán (Téllez 11750); 2-9 mi W of Jalcocotán (McVaugh & Koelz 694); 3 mi NE of Puga [Fco. I. Madera] (Feddema 843); 22 mi SE of Tepic (McVaugh 16418); Mpio. Santa María del Oro (Téllez & Miller 10527); Jal., Mpio. Zapopan, 10 km N of Tesistán (Cházaro & Flores 6303, TEX); Río Blanco (Cházaro & Dean 6676, WIS); 5 mi N of Guadalajara (La Follette 395, LAM); Guadalajara, Río Blanco (Pringle 4426, UC); 1-1.5 mi N of Pihuamo (McVaugh 15477).

Subshrub or low shrub 0.3-1 m high; branches terete, whitish stellate-pubescent; leaf-blades broadly ovate to orbicular, 2-6 cm long, 2-5 cm broad, acute or obtuse at apex, obtuse to truncate or cordate and mostly 5-veined at base, loosely stellate on both surfaces; margins coarsely doubly dentate, often with stalked glands at the sinuses; basal glands paired, somewhat stipitate, 0.5-0.7 mm broad; petioles 1-2.2 cm long; stipules linear, 1-1.7 mm long; inflorescences terminal, 2-3.5 cm long, with 1 or 2 _ flowers at base; _ flowers 1-3 to a bract; bracts lanceolate, entire, 1.5-2 mm long; _ pedicel 1.5-2.5 mm long, stellate-hispidulous; sepals 5, elliptic, 1.5-2 mm long; petals ca 2 mm long, glabrous on both surfaces; receptacle villose; stamens 10 or 11, the filaments glabrous, 2-2.5 mm long; anthers 0.5-0.7 mm long; _ pedicel becoming 3-5 mm long in fruit; sepals 5, nearly equal, oblanceolate, entire, the larger ones 3.5-6 mm long in fruit; petals absent; ovary stellate-hispidulous; styles free, bifid, stellate-pubescent, ca 3 mm long; capsules ca 6 mm broad; seeds compressed, smooth, dark, minutely beaked, ca 4 mm long.

(sect. Corylocroton)

This species, although having the habit of species of sect. Ocalia, differs in its bifid (rather than multifid) styles, and fits into sect. Corylocroton. It is easily recognizable by its low stature, roundish coarsely toothed leaves, and (in comparison with the related C. mcvaughii) elongated fruiting pedicels. It appears to be common in Nayarit but unaccountably scarce in Jalisco. The Nueva Galician plants show no marked differences from those in eastern Mexico and Central America.

Croton roxanae Croizat, J. Arnold Arb. 21: 81. 1940. Croton
fragilis of many authors, probably not C. fragilis H. B. K.

Tropical deciduous forest, thorn forest or scrubland, oak forest, sea level
to 1500 m.

Sin., Nay. (Tres Marias I., Maria Madre, Ferris 5601 (A, the holotype), Jal.,
Col., Mich., Gro., Chis.; Guatemala.

Nay., Mpio. Nayar, 21 km NW of Jesús Maria (Flores 2187); Mpio. San Blas,
12 mi NE of Singayta (Webster & Lynch 17071); Mpio. Compostela, 2 mi SE of Las
Varas (McVaugh 15358, 15362, 15374); 5 mi E of Las Varas (Norris & Taranto 13745);
Mpio. Tepic, Planta Hidroeléctrica del Río Ingenio, ca 5 mi N of Otates (McVaugh
15216); Mirador del Aguila, ca. 14 mi N of Tepic (McVaugh 15286); Jal., Mpio.
Zapopan/Guadalajara, barranca near Guadalajara (Gregory & Eiten 168, Palmer 93
in 1886); barranca de Huentitán (Cuevas 736, Díaz Luna 1241, García 1240); barranca
de Colimilla, 4 mi NE of Guadalajara (Gentry & Gilly 10896); Mpio. Tonalá, Puente
Grande (Guerrero 272); Mpio. La Huerta, Rancho El Palmar, 15 km NE of Juan Gil
Preciado (Flores 2770); Cuitzmala, Cerro Costero (Castillo 5197, 5241, DAV); El
Salto, entre Cerro Careyes y Cerro El Zarco (Acevedo 998, DAV); Estación de Biología
Chamela (Bullock 932, 1183, Delgado 294, Gentry 74451, Lott & Ayala 29, Magallanes
693, Pérez 683, 1755); Mpio. Autlán, 2 mi W of Autlán (Wilbur 1688); Corcovado
Canyon, 15-16 mi NE of Autlán (McVaugh 19766, Wilbur 1494), 10 mi NE of Autlán
(Wilbur 1380); 6 mi NE of Autlán (Gentry 10940); 7 mi S of Autlán (Wilbur 1760);

Mpio. El Grullo, 3 km NE of El Grullo (Santana Michel 4501); Mpio. Casimiro Castillo, Cerro La Petaca, 2 km SE of Casimiro Castillo (Santana & Benz 5691, WIS), 2 km NE of Ahuacapán (Santana & Lorente 3725, WIS), 0.5-3 km SSE of Ahuacapán (Guzman & Cuevas 246, WIS; Lorente P.129, IBUG); Mpio. Cuautitlán, between El Chante and Manantlán, 15 mi SE of Autlán (Wilbur 2080); Peña Colorada, near Potrereros (Santana & Lemus 6070, IBUG); Mpio. Tolimán, 5-6 km NW of Zacualpan (Cuevas & Guzman 3941, WIS); Mpio. Cihuatlán, 10-15 mi NW of Barra de Navidad (McPherson 871); Col., Mpio. Manzanillo, gorge of Río Cihuatlán, 13 mi N of Santiago (McVaugh 15837); 16 mi NW of Santiago (McVaugh 14978, 14979, 14988, 15731); Mpio. Armería, 20 mi ESE of Manzanillo (McVaugh 15667); Mpio. Tecomán, 10 km N of Tecomán (Rzedowski 15421); Mpio. Colima, 10 mi SSW of Colima (McVaugh 15524); Mich., Mpio. Coalcomán, Coalcomán (Hinton 13850); Mpio. Aguila, 2 mi NW of La Placita (Turner 2085), 1 mi E of La Placita (Turner 2079).

Monoecious (sometimes dioecious?) shrub 2-3 m high; twigs terete, appressed-stellate, often hispid with porrect hairs when young; leaf-blades elliptic to mostly lanceolate, (2-) 5-12 cm long, (1-) 2-5 cm broad, more or less attenuate-acuminate, cuneate to rounded at base, entire, pinnately veined (sometimes triplinerved), the adaxial surface strigose with simple hairs (especially near the margins) and sometimes with very sparse small stellate hairs, usually soon glabrescent, the abaxial surface appressed-stellate; margins entire; basal laminar glands minute or absent; petioles (3-) 5-20 (-40) mm long, appressed-stellate, often porrect-hispid; stipules rudimentary or absent; inflorescences bisexual or _, the bisexual 1-6 cm long, proximal 1-4 nodes with

both _ and _ flowers, distal nodes each with 2 or 3 _ flowers (sometimes 1 at a node near tip of inflorescence); _ bracts deltoid or lanceolate, entire, (0.2-) 0.5-1 mm long; _ pedicel 1.5-2.5 mm long, glabrous or sparsely stellate; sepals 5, deltoid, 1.5-2 mm long, sparsely stellate to nearly glabrous; petals elliptic, glabrous except for ciliate margins; stamens 12-15 (-17), the filaments glabrous, 2-2.5 mm long; anthers 0.5-0.8 mm long; receptacle sparsely villose or nearly glabrous; _ flowers subsessile, the fruiting pedicels 1-1.5 (-3) mm long; sepals 5, equal, narrowly lanceolate, acute, entire, 1.5-2 mm long, glabrous or sparsely stellate adaxially; ovary stellate-tomentose; styles bipartite, glabrous, 2-3 mm long; capsule subglobose, rounded, c. 6-8 mm in diameter; columella 4-5 mm long; seeds plump, smooth, adaxially carinate, 3.8-4.6 mm long. (sect. Velamea)

This widespread shrub of mostly secondary vegetation has generally passed under the name of Croton fragilis H. B. K. in previous treatments. However, since its discovery in Venezuela, C. fragilis has remained poorly understood, and it seems doubtful that the name can be applied to our Mexican plants. Kunth described the type collection (from Cumaná) as having stellate pubescence on the upper leaf surface and tomentose-pilose twigs and petioles, which does not agree well with our specimens.

The application of the name Croton roxanae to this common Nueva Galician shrub is made not without with some reservation, since the nomenclatural type is a specimen from the Tres Marias Islands; adequate flowering specimens of this insular population are still not available, and the type collection from María Madre has _ flowers with distinctively hispid ovaries. However, the

long-acuminate glabrescent leaves of plants from the Tres Marias are so similar to mainland specimens that it appears the insular plants are at most subspecifically different.

Croton roxanae is the most proteanly variable of the Nueva Galician species, especially in leaf-size, and in the disposition of the _ and _ flowers in the inflorescences. Plants from higher elevations (above 1000 m) tend to be more densely pubescent on the leaf undersurface, inflorescence rachis, and the _ calyx and to have the veins more prominently raised on the abaxial surface; it is possible that subspecific taxa could be defined on further study. Very commonly the _ flowers are accompanied at the nodes by _ flowers, in contrast to the unaccompanied _ flowers of related species in sect. Velamea, such as C. mazapensis and C. morifolius. However, many specimens of C. roxanae have entirely _ inflorescences, and a few specimens (e.g. McVaugh 15362 from Nayarit) have separate _ and _ inflorescences.

Despite the high degree of variability, plants of Croton roxanae can usually be distinguished by their caudate-acuminate adaxially glabrescent leaves, obsolete stipules, and the common occurrence of porrect hairs on young parts.

Croton schiedeanus Schlecht. *Linnaea* 19: 243. 1847.

Known in Nueva Galicia from only two sites, both in semi-deciduous tropical forest on mountainous slopes facing the sea, 300-400 m.

Nay., Ver. (Misantla, Schiede 1126, HAL, the holotype), Tab., Chis.; Centr.

Amer., S. Amer. (Col., Ec., Peru, Venez., Guayanas).

Nay,, Mpio. San Blas, 2 km W of Cora towards Jalcocotán (Téllez 10057, DAV, MEXU); Mpio. Compostela, 1-1.5 mi above La Cucaracha, 12-13 mi S of Las Varas (McVaugh 19200).

Monoecious tree 5-15 m high, the trunk 1-3 dm thick; twigs terete in age, closely lepidote; leaf-blades chartaceous, elliptic to oblong, 7-22 cm long, 3-9 cm broad, usually abruptly contracted to an acuminate tip, cuneate to rounded at base, greenish on both surfaces, adaxially glabrescent and sparsely lepidote, more densely lepidote abaxially; margins entire; basal laminar glands absent; stipules subulate, densely lepidote, 1-4 mm long, caducous; inflorescences axillary, bisexual (or sometimes entirely _), 2-10 cm long, sometimes fascicled; _ flowers 1 or 2 at the base; bracts of _ flowers 1-flowered, lanceolate, 0.5-1 mm long; _ pedicel 2-4 mm long, lepidote; sepals lanceolate, 1.5-2 mm long, lepidote abaxially; receptacle villose; petals elliptic, 1.3-2 mm long, adaxially hirstulous and abaxially glabrous or with 1 or 2 scales, the margins densely villose; receptacle villose; stamens (9-) 10-12 (-13), filaments glabrous, 1.5-2.5 mm long; anthers 0.7-1 mm long; _ pedicel 10-30 mm long, slender (less than 1 mm thick), lepidote; sepals deltoid, 2.2-2.7 mm long, entire, lepidote abaxially; petals 1.8-2.7 mm long, pubescent as the _; ovary densely lepidote, the scales denticulate, 0.3-0.4 mm across; styles multifid (usually 3 times bifid), the branches slender, glabrous; capsules ca 8-10 mm long and broad, more or less verruculose and lepidote; columella 6.5-8.2 mm long; seeds ellipsoid, compressed,

smooth, obtusely beaked, mostly 6-8 (-9) mm long. (sect. Eluteria)

The isolated populations of this species in coastal Nayarit represent a remarkable geographic disjunction of nearly 1000 km from sites in eastern coastal Mexico (Veracruz to Tabasco). Croton schiedeanus is easily distinguished from the other species of sect. Eluteria by its pinnately veined leaves and elongated fruiting pedicels. Gómez-Pompa (in Estudios Botánicos en la Región de Misantla, Veracruz, 1966) applied the name C. nitens Sw. to the species here called C. schiedeanus. Croton nitens, which I interpreted as a strictly Caribbean (mainly West Indian) species, is indeed very similar but differs in its shorter fruiting pedicels. Under a very broad species concept, C. schiedeanus could perhaps be treated as an allopatric mainland American subspecies of C. nitens.

Croton stenopetalus Webster, sp. nov.

Cloud forest (bosque mesófilo de montaña) with Quercus, Ternstroemia, Styrax, et al., 2000-2200 m.

Jal., known only from the Sierra de Manantlán (Mpio. Tolimán, 1-1.5 km W of El Terrero (Santana & DeNiz 4543, IBUG 9335, the holotype; WIS, isotype).

Jal., Mpio. Tolimán, 3 km W of El Terrero (Santana & Ceballos 4559, IBUG).

Monoecious scandent shrub up to 2 m high; branches angled, whitish

stellate-villose at tips; leaf-blades membranous, lanceolate, 8-15 cm long, 4-7 cm broad, acuminate, entire, rounded to open-cordate at base, more or less triplinerved, with 7-10 pairs of nearly straight laterals; adaxial surface green, appressed-stellate or strigose with simple hairs (0.2-0.4 mm across, 1-12--radiate), glabrescent, the abaxial surface paler, appressed-stellate (the stellae 0.5-0.8 mm across); glands at base of blade blackish, irregularly clustered, 0.2-0.5 mm across; petiole stellate-villose, 10-25 mm long; stipules rudimentary, glandular, less than 1 mm long; inflorescences terminal, bisexual or _, becoming 5-6 cm long, the rachis whitish, stellate-tomentose, with 1-3 basal _ flowers; _ flowers mostly 3 to an axil, the bracts lanceolate and glandular at base, ca 1 mm long; _ pedicel 5-7.5 mm long, copiously stellate-hirsute; petals linear-lanceolate, 4-4.5 mm long and less than 1 mm broad; receptacle villose; stamens 22-27, the filaments glabrous, the anthers linear to oblong, 1.2-1.5 mm long; _ pedicel ca 1 mm long in flower; sepals 5, equal, lanceolate, entire, 2.5-3 mm long, stellate abaxially, subglabrate adaxially; ovary whitish, stellate-hirsute; styles 5-6 mm long, bifid, densely stellate-hirsute proximally and glabrous distally; fruits and seeds not seen.

(sect. Cascarilla)

Croton stenopetalus is not only one of the rarest and most geographically restricted of our species, but is taxonomically rather isolated. By virtue of the bifid styles and irregular basal foliar glands, it appears to belong in sect. Velamea. However, the apparently scandent habit of C. stenopetalus, as well as the large _ flowers with very narrow petals and high stamen number, are distinctive.

The mainly eastern Mexican Croton xalapensis, which barely enters our area in Michoacán, is perhaps most similar, but is easily distinguished by its characteristically more ovate and strongly cordate finely denticulate leaves that are tomentose beneath and with well-developed basal glands and stipules, longer inflorescences, shorter _ pedicels, and broader _ petals.

Croton suberosus H.B.K., Nov. Gen. Sp. 2: 86. 1817. Croton cladotrichus Muell. Arg. Linnaea 34: 124. 1865. Croton purpusii Brandegee, Univ. Cal. Publ. Bot. 6: 184. 1915.

Deciduous or semideciduous woodlands, sea-level to 750 m.

Sin., Jal., Col., Mich., Gro. (Acapulco, Humboldt & Bonpland, P, the holotype), Oax. (San Geronimo, Purpus 7146, UC!, holotype of Croton purpusii); ["Mexico", Hb. Pavon, G, holotype of Croton cladotrichus].

Jal., Mpio. Puerto Vallarta, 10 km NE of Puerto Vallarta (Feddema 2592); W of Los Llanitos (González 807, CAS); Mpio. Cabo Corrientes, 15 km W of El Tuito (Cochrane et al. 11967); coastal highway 18.7 km N of Río Tomatlán (Steinmann & Varela 1083, DAV); Mpio. Tomatlán, 20 km SE of Tomatlán (McVaugh 25299); Mpio. La Huerta, bridge at Río San Nicolas (Daniel & Butterwick 3229, CAS); Rancho El Palomar, 15 km NE of Juan Gil Preciado (Flores et al. 2767, DAV); Chamela (Lott 590, McVaugh 26297, Miller & Neill 410; Pérez J.214, 1818, DAV); 2 mi W pf Rancho Nacastillo (Flores 3055); NE cumbres de Cuixmala (Castillo et al. 5398, DAV); Mpio.

Pihuamo, 14 km SE of Pihuamo (Fuentes 434B); Col., Mpio. Manzanillo, 12 mi SE of Cihuatlán (Webster & Breckon 16088); Playa de Oro, 25 km WNW of Manzanillo (Iltis et al. 639); 14-16 mi WNW of Santiago (McVaugh 15739, 14976); Manzanillo (Palmer 888 in 1890; Ferris 6074, DS); Mpio. Colima, Colima (Palmer 76 in 1897); 10 km S of Colima (Webster & Breckon 16102); 27 mi NE of Armería (Seigler & Holstein DS-9583, DAV); 1 km E of Río Salado (Miller 251, TEX); Río Tuxpan, 18 mi E of Colima (McVaugh 15487); 20 mi ESE of Manzanillo (McVaugh 15670); 5-10 mi N of Tecomán (Thompson & Fields 324); Mpio. Comala, 8 km N of Comala (Santana & Cervantes 544, CAS); Mich., Mpio. Coahuayana, Rancho Chila, 20 km SE of Coahuayana (Feddema 2712); Mpio. Aguila, Ostula (J. H. Hill 17); 4 km E of Río Motín del Oro (Tucker 2953, CAS); Playa de Cocula (Tucker 2953, DUKE); Mpio. Villa Victoria, 7 km NW of Victoria (Soto Nuñez & Cortes 2557, CAS); Mpio. Nueva Italia, 3 km S of Nueva Italia (McVaugh 22533).

Monoecious shrub 1-2 m high; branches terete, stellate-scurfy with pale dendritic hairs 1-2 mm long; bark of older branches becoming thick, furrowed, and corky; leaf-blades broadly ovate to orbicular, (4-) 6-18 cm long, (3-) 4-15 cm broad, acute to acuminate at tip, truncate to cordate and 5-veined at base (in larger leaves); adaxial surface with stellate-pedicellate or dendritic hairs mixed with simple ones, the abaxial surface densely white stellate-tomentose; margins entire; basal laminar glands absent; petioles 2-11 cm long, stellate-scurfy; stipules subulate, long-acuminate, 8-20 mm long, scurfy, entire; inflorescences terminal, 4-8 cm long, with 8-12 _ flowers tightly clustered at base; bracts of _ flowers 1-2--flowered, reflexed, scurfy abaxially, lanceolate, ca 1 mm long,

with conspicuous stipules; _ pedicel 2-5 mm long, stellate-pubescent; sepals 2.5-3.5 mm long, deltoid, densely stellate abaxially; petals ovate-lanceolate, 2.3-3.5 mm long, glabrous except for the margins; receptacle villose; stamens 12-15, the filaments glabrous, 5-6 mm long; anthers 0.7-1.3 mm long; receptacle villose; _ flowers sessile at anthesis, the fruiting pedicel not over ca 1 mm long; sepals 5, subequal, obovate, entire, densely stellate on both surfaces, ca 5 mm long and 3.5 mm broad; petals absent; ovary densely stellate-tomentose; styles bipartite, densely stellate proximally, 7.5-9 mm long; capsules ca 6 mm long and 5 mm broad; columella 5 mm long; seeds compressed, smooth, 4.5-4.8 mm long.

(sect. Cyclostigma)

Although it has the habit of species of sect. Cyclostigma because of its large cordate long-petiolate leaves, Croton suberosus does not have basal bisexual cymules in the inflorescence, and the leaf-blades lack basal glands. By strictly diagnostic characters, it would have to be referred to sect. Velamea, where it is clearly anomalous. The elaborate dendritic trichomes of C. suberosus provide another link with sect. Cyclostigma, and further study will probably show it to be referable to that group.

Croton tremulifolius Croizat, J. Arnold Arb. 21: 83. 1940.

Deciduous woodlands on sandy soil along the Pacific coast, below 100 m.

Jal., Col. (hill between Cuyutlán Lagoon and the ocean, Ferris 6176, A!, the holotype; CAS, isotype).

Jal., Mpio. La Huerta, Playa Perula adjacent to Bahía Chamela (Mayfield 1631, DAV); Col., Mpio. Manzanillo (Palmer 968 in 1890); 5 km E of Manzanillo toward Cuyutlán (Díaz Luna 3324); Playa Campos, 4-5 km S of Manzanillo (Orcutt 4504, CAS).

Monoecious shrub ca 1 m high; branches terete, hispid with stellate perrect hairs 1-1.5 mm long; leaf-blades ovate, 5-10 cm long, 3.5-7.5 cm broad, obtuse or acute, deeply cordate and 5 (-7)--veined at base; adaxial surface strigose with simple hairs 1-1.5 mm long, the abxial appressed-stellate with 5-10--radiate hairs 1.5-2 mm across; margins subentire (obscurely undulate); basal glands clustered on the adaxial side of petiole at base of blade; petioles (1-) 2-6 cm long, hispidulous with hairs 1-2.5 mm long; stipules lanceolate, 0.5-1.5 mm long, entire, deciduous; inflorescences terminal, with 4 or 5 basal _ flowers; bracts subtending _ flowers narrowly lanceolate to subulate, 1-1.5 mm long, persistent; _ flowers 1 per bract; _ pedicel 2-2.5 mm long, stellate-pubescent; sepals 5, deltoid, ca 2 mm long, densely stellate-tomentose abaxially; petals oblanceolate, ca 2 mm long, glabrous except for the ciliate margins; stamens c. 15 [20, according to Croizat], the filaments glabrous, 1-1.5 mm long; anthers 0.6-0.8 mm long; _ flowers subsessile, the pedicel in fruit 0.5-2 mm long; sepals linear-lanceolate, entire, ca 1.5 mm long; ovary stellate-pubescent; styles bipartite, stellate at base, ca 5 mm long; capsules not seen entire; columella 5-5.5 mm long; seeds plump, smooth, 4.4-4.7 mm long. (sect. Velamea)

Croton tremulifolius, an apparently rare coastal species, is perhaps most closely related to Croton ynesae, although it is easily distinguishable from that species by its entire leaves and hispid branches and petioles. These two species form a distinctive subgroup within sect. Velamea. An anomalous specimen from Rancho Jabalí, at 1300 m near the border with Jalisco (Sanders 8470), resembles C. tremulifolius but the stems are not hispid.

Croton varelae V. W. Steinm., Contr. Univ. Mich. Herb.

Dry oak-pine woodland, 1300 m.

Nayar., known only from the type collection (Mpio. Nayar, 1 km N of Mesa de Nayar, trail to El Congrejo (Steinmann, Varela, & Ramírez 1063, RSA, the holotype; isotypes at ARIZ, BM, DAV, HUAA, IBUG, MEXU, MICH, NY).

Monoecious perennial herb or subshrub to 0.2 m high; branches more or less stellate-hispid; leaf-blades oblong to ovate, 0.5-2.5 cm long, 0.5-1.5 cm broad, subacute to rounded at the tip, rounded to oblique at base, adaxially olive green, stellate-villose, abxially whitish, stellate-lanate; margins entire to remotely serrulate; basal laminar glands abaxial, conical, 0.2-0.3 mm broad; petiole (2-) 5-11 mm long; stipules rudimentary, glandular, not over 0.2 mm long; inflorescences

terminal or axillary, bisexual, 1-2.5 cm long, with 1-4 proximal _ flowers and up to 25 _ flowers distally; bracts subulate, 0.5-1 mm long, glandular at base, each subtending 1 flower; _ pedicel copiously stellate-pubescent, 1.3-3 mm long; sepals 5, deltoid, 1-1.5 mm long; petals elliptic or oblong, 1.2-1.7 mm long, strigose abaxially; receptacle densely villose; stamens 11, the filaments glabrous, ca 1-1.5 mm long; anthers 0.4-0.6 mm long; _ flowers subsessile, the pedicel 1-1.5 mm long in fruit; sepals 5 or 6, very unequal, the larger (abaxial) ones oblong to spatulate, 2-2.5 mm long, entire, the smaller (adaxial) ones subulate, 0.8-2 mm long; petals absent; ovary stellate-hispid; styles connate at base, bipartite, 1.3-2.2 mm long; capules 3.2-4.1 mm in diameter; seeds compressed, ellipsoid, smooth and shiny, mottled, 2.7-3.4 mm long. (sect. Geiseleria)

This recently described species, known only from northeastern Nayarit, can be distinguished from the other herbaceous species of sect. Geiseleria by its finely serrulate leaves with reduced petiolar glands and stipules.

Croton xalapensis H.B.K. Nov. Gen. & Sp. Pl. 2: 85. 1817.

Croton aguilari Lundell, Phytologia 1: 401. 1940. *Croton asteroides* Lundell, Phytologia 1: 402. 1940. *Croton pseudoxalapensis* Croizat, J. Arnold Arb. 21: 85. 1940.

Secondary forest, common at mostly 1000-1500 m on the Atlantic slope of Mexico and Central America, but rare in Nueva Galicia.

Mich., Ver. ("Xalapa" [Jalapa], Humboldt, the holotype presumably at P); Guatemala (Petén, La Libertad, Aguilar 463, MICH!, holotype of C. aguilari; Belize (El Cayo Distr., Vaca, Gentle 2218, MICH!, holotype of C. asteroides); Honduras (Dept. Comayagua, Siguatepeque, Standley 55987, A!, holotype of C. pseudoxalapensis); Nicaragua; Costa Rica.

Mich., Mpio. Coalcomán de Matamoros, Coalcomán (Hinton 15899).

Monoecious shrubs or trees 1-6 m high; branches subterete, copiously appressed-stellate, or sometimes floccose with dendritic hairs; leaf-blades ovate to lanceolate, 7-20 cm long, 3-10 cm broad, acuminate, broadly obtuse or rounded to shallowly cordate and 3-5-veined at base; margins subentire (minutely serrulate); adaxial surface sparsely to moderately stellate, the abaxial stellate-tomentose; margins subentire (minutely serrulate); basal laminar glands paired, sessile, discoid, ca 1 mm across; petioles 2-5 cm long; stipules subulate, 1-3 mm long; inflorescences 10-30 cm long, bisexual or unisexual, the bisexual with (3-) 8-20 _ flowers at the proximal nodes (an nodes bisexual, with 1 _ and 2 or 3 _ flowers); _ flowers 2 or 3 to a bract; bracts of _ flowers lanceolate, pubescent, entire, 0.5-1 mm long; _ pedicel copiously stellate-pubescent, 2.5-4.5 mm long; sepals 5, elliptic or ovate, 2-2.5 mm long, stellate-pubescent; petals spatulate, 2.5-3 mm long, glabrous except for the villose margins; receptacle villose; stamens 22-35, the filaments glabrous or somewhat hirsutulous at base; anthers 0.7-1.1 mm long; _ flowers sessile, the pedicel ca 1 mm long and thick in fruit; sepals lanceolate, acute, entire, densely stellate abaxially, glabrous

adaxially, 2-3.5 mm long; ovary stellate-tomentose; styles deeply bifid, 3-4 mm long, proximally stellate; capsule 7-8 mm in diameter; columella 4.8-5 mm long; seeds compressed, rugose-ribbed, 4.3-5.3 mm long. (sect. Cascarilla)

Although it is abundant and weedy in disturbed forests in eastern Mexico and Central America, Croton xalapensis is recorded from only one site within our area. The large cordate leaves, long spikes, and occasional bisexual cymules suggest that C. xalapensis is probably an aberrant representative of sect. Cyclostigma.

Croton ynesae Croizat, J. Arnold Arb. 21: 83. 1940.

Deciduous and semi-deciduous forests, oak forest or mixed forests, 300-1200 m.

Nay., Jal. (Santa Cruz de Vallarta, Mexia 1279, A!, the holotype), Col., Gro.

Nay., Mpio. Ruiz, barranca of Río San Pedro between El Venado and Zopilote (Breedlove 44317, Breedlove & Almeda 45206, 60679, CAS); Mpio. San Blas, San Blas, first hill on old Spanish road to Tepic (Ferris 5518, DS); Mpio. Santiago de Pochotitán, 15 km E of Francisco Madero (Téllez 10781, DAV); Mpio. Compostela,

28 mi SW of Tepic (Webster 15774); 9 mi N of Compostela (McVaugh & Koelz 508); 5 mi N of Compostela (McVaugh & Koelz 648); 7 mi W of Compostela (Norris & Taranto 13826); 6-10 mi W of Compostela (Gentry 22326); Mpio. Santa María del Oro, lake NE of Santa María (Feddema 753; Webster 19911, DAV); 2 mi NE of Santa María del Oro (McVaugh 19040); Jal., Mpio. San Sebastián del Oeste, cañada towards Las Palmas (Delgadillo & González T. 1780, WIS); Mpio. Puerto Vallarta, Santa Cruz de Vallarta (Mexia 1279, GH); canyon of Río Cuale 3 km SE of Puerto Vallarta (Feddema 2509); Mpio. Autlán, 10 km SSW of Autlán (Vázquez & Rosales 4326, IBUG); Mpio. Cuautitlán, 6-7 km NW of Minatitlán (Santana & Lemus 6112, IBUG); 1 km S of Ayotitlán (Benz 1262, IBUG); Mpio. Tecalitlán, Puente San Pedro, 5 mi SW of Tecalitlán (McVaugh 15451); 9.9 km S of Tecalitlán (Lott 824); Col., Mpio. Minatitlán, 9 km NE of Minatitlán, near border with Jalisco (McVaugh 26235).

Monoecious shrub or small tree 2-4 m high; branches slender, subterete, completely glabrate; leaf-blades ovate, (6-) 9-14 cm long, (3-) 4-8 cm broad, more or less cuspidate-acuminate, broadly obtuse to rounded and 3-veined at base; adaxial surface glabrescent (sparsely strigose with simple hairs), abaxially sparsely appressed-stellate; margins irregularly and coarsely doubly dentate; basal laminar glands roundish or elongated, greenish, clustered, ca 0.2-0.3 mm across; petioles smooth and glabrous, angled, 3-7 cm long (shorter in the pseudo-verticil of leaves below inflorescence); stipules rudimentary, less than 0.5 mm long; inflorescences 3-10 cm long, bisexual, with 3-7 _ flowers at base; _ flowers 3 to a bract; _ pedicel c. 5 mm long, glabrous; sepals deltoid, ca 1.7 mm long; petals oblanceolate, 2.3 mm long, glabrous except for ciliate margins; stamens 13-15, the filaments 2-2.5 mm long, glabrous; anthers 0.6-0.7 mm long;

_ flowers subsessile, the pedicel in fruit ca 1-1.5 mm long and thick; sepals lanceolate, 1.2-1.3 mm long, nearly glabrous; ovary yellowish stellate-tomentose; styles erect, bipartite, sparsely stellate, ca 3 mm long; capsule ca 7 mm in diameter; columella 5 mm long; seeds ellipsoidal, plump, beaked, smooth, 4.7-5.4 mm long. (sect.

Velamea)

Because of its very sparse indumentum and long-petiolate irregularly toothed leaves, this very distinctive species can hardly be mistaken for any other in Nueva Galicia. The sparseness of indumentum is suggestive of sect. Tiglium, but the leaves are unlike any other species in that group; the glabrous _ pedicels and strigose upper leaf surface clearly relate it to C. tremulifolius and C. adpersus, in sect. Velamea.