

70-18,933

MacBRYDE, Bruce, 1941-
A REVISION OF THE GALPHIMIINAE NDZ., MALPIGHIACEAE.

Washington University, Ph.D., 1970
Botany

University Microfilms, A XEROX Company, Ann Arbor, Michigan

WASHINGTON UNIVERSITY

Department of Biology

Dissertation Committee:

Derek G. Burch, Chairman

Walter H. Lewis, Acting Chairman

John E. Ridgway

A REVISION OF THE GALPHIMIINAE NDZ.,

MALPIGHIACEAE

by

Bruce MacBryde

A dissertation presented to the
Graduate School of Arts and Sciences
of Washington University in
partial fulfillment of the
requirements for the degree
of Doctor of Philosophy

January 1970
Saint Louis, Missouri

ACKNOWLEDGEMENTS

This dissertation was initiated with Dr. Derek G. Burch, who suggested the family from which the problem was chosen. I wish also to express my sincere thanks for the assistance and encouragement given by the other members of the dissertation committee, Dr. Walter H. Lewis and Dr. John E. Ridgway, and by staff and students of the Missouri Botanical Garden.

The curators of the following herbaria (abbreviated as in Regnum Veg. 31) are acknowledged for the loan of some or all appropriate herbarium specimens and in some cases for the answering of questions (A, ARIZ, BR, C, CAS, F, G, GH, GOET, IAN, K, M, MA, MO, NY, P, UC, US, W).

This research was undertaken while the author benefited from a Junior Fellowship in the Center for the Biology of Natural Systems, Washington University. The pollen photographs were made through the courtesy of Walter H. Lewis with National Science Foundation Grant GB-5042 (technician Terry Luikart). Original drawings were executed by Leonardo Mourré Ruiz and Sandra Thornton. My wife Olga Herrera-MacBryde assisted in numerous mechanical details, for which I am most grateful.

TABLE OF CONTENTS

	Page
Acknowledgements.....	ii
List of figures.....	iv
Introduction.....	1
<u>Galphimiinae</u>	2
SEM pollen photographs.....	12
Key to <u>Galphimiinae</u>	25
<u>Coleostachys</u>	27
<u>Acmathera</u>	33
Key to <u>Acmathera</u>	35
<u>Blepharandra</u>	43
Key to <u>Blepharandra</u>	45
<u>Pterandra</u>	59
Key to <u>Pterandra</u>	62
<u>Lophanthera</u>	82
Key to <u>Lophanthera</u>	85
<u>Verrucularia</u>	104
<u>Galphimia</u>	110
Key to <u>Galphimia</u>	118
Familial Treatments.....	245
Enumeration of Recognized Taxa.....	246

LIST OF FIGURES

Fig.			Page
1	<u>Acmanthera</u>	pollen	13
2	"	"	"
3	<u>Coleostachys</u>	"	15
4	<u>Blepharandra</u>	"	"
5	<u>Pterandra</u>	"	17
6	"	"	"
7	<u>Lophanthera</u>	"	19
8	"	"	"
9	<u>Verrucularia</u>	"	21
10	<u>Galphimia</u> sect. <u>Microgalphimia</u>	pollen	"
11	<u>Galphimia</u> sect. <u>Galphimia</u>	"	23
12	" "	" "	"
13	<u>Coleostachys</u>	habit	29
14	<u>Acmanthera</u>	"	42
15	<u>Blepharandra</u>	"	48
16	<u>Pterandra</u>	"	73
17	<u>Lophanthera</u>	"	103
18	<u>Verrucularia</u>	"	109
19	<u>Galphimia</u>	"	228

INTRODUCTION

The Galphimiinae are a widespread primarily tropical subtribe of the Malpighiaceae, with 7 genera and 26 species in the New World. Some of the species may be an important element of their local flora, and a few are grown horticulturally.

The genera have usually been included in the tribe Malpighieae, but were segregated by Niedenzu (in Engler & Prantl, Nat. Pflanzenfam. III, 4: 69, 1890) as one subtribe of his tribe Galphimieae. The only prior revision of the subtribe was by Niedenzu (in Engler, Pflanzenreich 94(IV, 141): 589-610, 1928), which suffers from his lack of attention to type specimens and neglect of material in New World herbaria. With the description of new species in several of the genera, the unsatisfactory treatment of Galphimia, and the availability of recent additional collections (although sometimes still limited), it was clear that a modern revision would be worthwhile.

GALPHIMIINAE

Malpighiaceae subtr. Galphimiinae Ndz. in Engler & Prantl, Nat. Pflanzenfam. III, 4: 69, 1890.
(Type Galphimia Cav.).

Subshrubs, shrubs or trees, the indument usually medifixed hairs. Leaves simple, decussate, petiolate or sessile, eglandular or glandular on petiole or blade; stipules axillary, solitary or paired, persistent or deciduous, distinct or connate; blades small to large, linear to rotund, usually entire, glabrous or persistent, often glaucous beneath. Inflorescences paniculate, racemiform, spicate or fasciculate to umbelliform, terminal or axillary (rarely caudine), basally bracteate or ebracteate, pubescent or glabrous. Flowers zygomorphic or actinomorphic, sessile or pedicellate, bracteate and bibracteolate, articulated above bracteoles; calyx 5-lobed, glandular or eglandular, the glands simple or paired; receptacle concave or flat to 3-lobed or pyramidal, sometimes with a carpophore, rarely disciferous, glabrous or pubescent; petals 5, deciduous or rarely persistent, clawed, equal or superior? modified; stamens distinct to connate, obdiplostemonous with outer or inner whorl shorter, glabrous or pubescent, the filaments persistent in

fruit, the anthers basifixed to dorsifixed, the connective included or excluded, sometimes apically emergent or appendiculate, the thecae loculicidal or rarely poricidal, frequently appendiculate; ovary usually sessile, (2-)3(-4)-carpellate (or aborting to one), glabrous or pubescent (hairs usually basifixed), the carpels distinct or coherent, the (2-)3(-4) styles ventrified to terminal, persistent or deciduous, slender, the apex subulate (rarely minutely truncate at stigma or acuminate). Fruit schizocarpic (rarely capsular?) or coccate, smooth to carinate medially, the locules readily to tardily splitting medially or indehiscent, glabrous or pubescent; seed one per carpel, pendulous.

A diverse subtribe of 7 genera with the following composition: Coleostachys, 1 sp., Brazil: Pará and French Guiana; Acmanthera, 2 sp., Amazon basin; Blepharandra, 3 sp., Guayana Highland; Pterandra, 5 sp., tropical South America; Lophanthera, 4 sp., Amazon basin; Verrucularia, 1 sp., Brazil: Bahia and Piauí; Galphimia, 10 sp., U.S.A.: Texas, Mexico, Central America, eastern and southern South America to Argentina, cultivated worldwide.

The Galphimiinae Ndz. are closest to the Thryallidinae Ndz., from which they have been separated by bearing styles long, subulate, rather than short,

obtuse to capitellate, and fruits thin-walled, schizocarpic or coccate, smooth to carinate, rather than thick-walled, 3-nuciform or nucamentaceous schizocarpic, cristate to costate or smooth. The two subtribes compose the tribe Galphimieae Ndz., separated from the Malpighieae DC. by the latter having drupes or nuts abortively unilocular (sometimes 2-3-locular, the pericarp corrugated or indurated). These two tribes form the subfamily Malpighioideae (syn. Planitorae Ndz.), separated from the Gaudichaudioideae Ad. Juss. s.l. (syn. Pyramidotorae Ndz.) by the latter having fruits alate or setose and usually receptacles pyramidal rather than concave to flat.

It may be seen that the separation of these suprageneric taxa is based on trends of characters rather than clear discontinuities; the present revision is a contribution toward an ultimate refinement of the infrafamilial classification. Perhaps partly because of this confusion, Rusby placed his new genus Brittonella between Acmanthera and Pterandra (Bull. Torrey Bot. Club 20: 429, 1893); he referred only to Bentham and Hooker's classification (Gen. Pl. 1: 247-262, 1862), which was made before the Galphimiinae were recognized. The genus was correctly reduced to synonymy under Mionandra Griseb. by Niedenzu (in Engler, Pflanzenreich 91(IV, 141): 231,

1928); its interpetiolar stipules, pyramidal receptacle, infertile inner stamens, blunt styles and cristate nutlets (immature samaras) indicate Rusby's error. Also Maguire listed his new genus Sipapoa as being in the "Galphimieae Niedenzu, Byrsoniminae Niedenzu" (Mem. New York Bot. Gard. ^w 8: 124, 1953). As Sipapoa does not have a new fruit type for the subtribe and Maguire in no way indicates that he intends the transfer, the Galphimieae is still considered ditribal here.

One bibliographic problem has arisen during this study which concerns the entire subtribe, and certain other genera in the family as well. Adrien de Jussieu published his preliminary treatment of the Malpighiaceae in Ann. Sci. Nat. Bot. ser. 2, ^w 13: 247-291, 321-338, Apr-June 1840. In the library of the Missouri Botanical Garden is a separately paged printing of this work with the same title (Malpighiacearum synopsis, Monographiae mox edendae Prodromus); on the first page it is indicated as an "extrait" from the journal, and dated April 1840. In the journal p. 256 is the last page published in April. No additional copy of this separate is known to me at present, and it is not listed in bibliographies of Jussieu's works. In addition, Endlicher published the Malpighiaceae of his Gen. Pl. in April 1840, making use of Jussieu's manu-

script in his treatment. Until it can be resolved whether there were enough copies of the separate to constitute effective publication, I am considering Endlicher and Jussieu to have published simultaneously on the last day of April through p. 256 of Jussieu's work, and that Endlicher holds priority over Jussieu from there on. The actual day of publication of each work needs to be determined to resolve priority, especially if the separate is effective. Fortunately none of the taxa recognized here are seriously effected, as they are among those Endlicher deferred to a supplement published later.

The genera of the Galphimiinae are considered to be a highly reticulate but related group; further study of more cryptic characters in embryology, anatomy, cytology, chemistry or in the field (fragrance, pollinators?) perhaps will reveal something of a direct descent. Although the nomenclature would perhaps suggest some generic problems, each genus is quite distinctive.

HABIT. Growth forms are usually of some value in determining genera or species, but can be quite plastic (Blepharandra hypoleuca, Galphimia brasiliensis subsp. angustifolia).

LEAVES. Shape, size and texture of leaves could perhaps be useful alone to separate the genera; with the addition of characters on pubescence, glands, and length of petioles most species can be recognized (except in Galphimia, as G. glauca var. glaucia and G. gracilis). Stipules are highly useful at the generic level, with contrasts regarding size, connation, and persistence; specifically they can be useful (Pterandra) or not (Galphimia).

INFLORESCENCES. Useful at a generic level on differences in branching or pubescence, the inflorescence may also be strikingly different within species of a genus in position (Pterandra arborea), attitude (Lophanthera spruceana) or pubescence (Blepharandra cretacea var. composita, Galphimia glauca f. neoviscayana). Bracts and bracteoles are usually not taxonomically of value, although their glandular nature in Lophanthera (which among other characters suggests relationship with Spachea Ad. Juss. of the Thryallidinae) and fimbriate margins in Blepharandra fimbriata indicate some usefulness.

FLOWERS. Pedicels. Usually not useful generically (but sessile in Coleotachys), although sometimes helpful in separating species either by differences in diameter (Pterandra) or in position of the

articulation (Galphimia glauca var. glauca and G. multicaulis).

Calyx. While the calyx is not of particular value regarding differences in incision, shape of segments or pubescence, the presence or absence and connation of glands at the bases of the sinuses are highly useful both generically and often specifically (Lophanthera, some Galphimias) although in other cases specifically variable (Pterandra pyroidea, Blepharandra hypoleuca, Galphimia tuberculata).

Receptacle. Usually the size or pubescence of the receptacle is of some taxonomic value at a generic level, and sometimes its shape is strikingly useful (Verrucularia, Galphimia); within a genus the changes are usually slight (but note Galphimia).

Petals. Although usually not particularly distinctive between genera, the petals may occasionally be useful in indicating relationship (Verrucularia and Lophanthera), and have allowed a major increase in understanding of Galphimia, where only some species bear them in fruit. While it is probable that the superior petal is always the one that undergoes modification, evidence from herbarium sheets is not sufficient to decide (and the diversity within the family suggests caution).

Stamens. One of the most valuable of criteria at the generic level, with most anthers diagnostic on type (or absence) of appendages. The genera with the outer whorl longer than the inner indicate that the family may be more diverse in this regard than previously considered. Within genera the anthers may be diverse (Blepharandra, between Galphimia sections) or rather similar (within each Galphimia section). Lobreau's incorrect statement that Galphimia sect. Galphimia has porocidal anthers is unexplained (Pollen & Spores 9: 268, 1967).

Pistil. Ovaries are different in the 7 genera in connation and pubescence, yet usually not of great value in separating species (but note median fixed hairs of Lophanthera spruceana, pubescence of Galphimia langlassei). The place of attachment varies somewhat but within the two basic divisions used in the key; it is most useful specifically within Pterandra. The stigma is minute on a rather uniformly subulate style (occasionally minutely truncate or even acuminose), and is useful to separate the subtribe from other groups, which may have highly modified stigmas.

Fruits. The fruits are strong generic char-

acters, and fall into the two mayor types of the key. However, herbarium sheets are inadequate to understand the functional relationship of some of them, notably whether the locules medially split to release seeds at all, or before or at germination. Fruits may be useful within genera for determination based on differences of structure or pubescence (Acmanthera, Lophanthera) or rather similar (some Galphimias). The development of a carpopodium in Lophanthera is highly unusual. Seeds are similar, the testa only slightly differentiated.

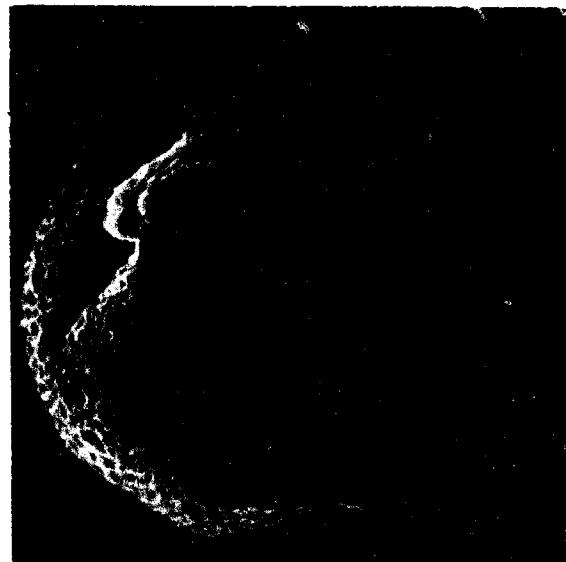
PALYNOLOGY. Preliminary pollen studies have indicated small differences in shape, surface reticulation, thickness of walls and length of colpi and ora which tend to support the recognition of the subtribe but the distinctness of the genera. The grains are usually tricolporate, the ora lalongate, the sexine reticulate. However, in Pterandra pyroidea only 4-colporate grains were observed. In Galphimia sect. Galphimia the grains are parasyntricolporate, whereas those of Galphimia sect. Microgalphimia are of the typical pattern. Four genera have been studied for the first time with the light microscope, and all are newly observed with the scanning electron microscope. The following list indicates the correct

taxa and whether newly (*) or additionally observed (voucher given), reported by Erdtman (Pollen Morph.

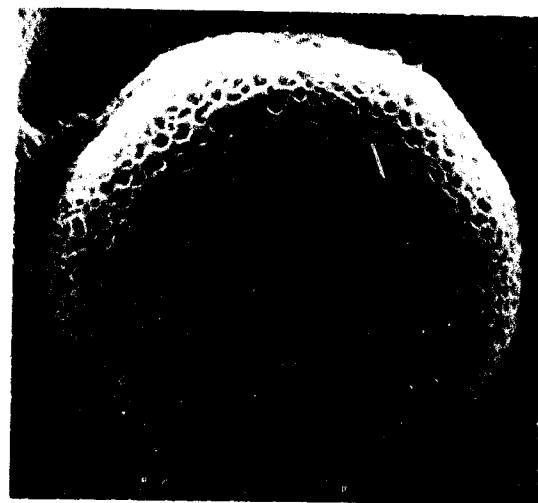
Pl. Tax. Angiosp. 259-261, fig. 150C, 1952) or by Lobreau (Pollen & Spores 9: 246-7, t. 1, no. 34-40, t. 2, no. 1-20, 1967).

- *1. Coleostachys genipifolia (Ducke 228 G).- Fig. 3.
- 2. Acmathera latifolia (Spruce s.n., Dec-Mart 1850-51, NY); Erdt.- Fig. 1 & 2.
- *3. Blepharandra hypoleuca (Cardona 2099 US).- Fig. 4.
- *4. Pterandra pyroidea (Riedel & Luschnatt 633 US).- Fig. 5 & 6.
- 5. Lophanthera longifolia (Spruce 3209 K); Erdt.- Fig. 7 & 8.
- *6 Verrucularia glaucophylla (Luetzelburg 16 M).- Fig. 9.
- 7a. Galphimia brasiliensis; Lobr. photo
- b. G. brasiliensis subsp. angustifolia; Erdt., Lobr. photo
- c. G. brasiliensis subsp. australis; Lobr. photo
- *d. G. vestita (Gentry 1137 US).- Fig. 10.
- e. G. multicaulis; Lobr. photo
- f. G. glauca (= G. gracilis?); Erdt. illus.
- g. G. glauca var. ovalifolia; Lobr. photo
- h. G. glandulosa (spec. not seen); Lobr. photo

13



1



2

Fig. 3. Coleostachys genipifolia Ad. Juss.,
equatorial view, $\times 5550$.

Fig. 4. Blepharandra hypoleuca (Bentham) Griseb.,
equatorial view, $\times 11500$.

15



3



4

Fig. 5. Pterandra pyroidea Ad. Juss.,
polar view, $\times 5550$.

Fig. 6. P. pyroidea Ad. Juss.,
equatorial view, $\times 5550$.

17



5

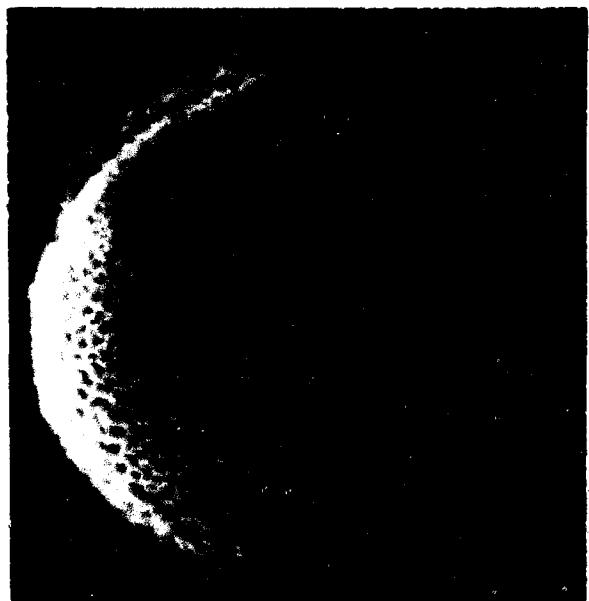


6

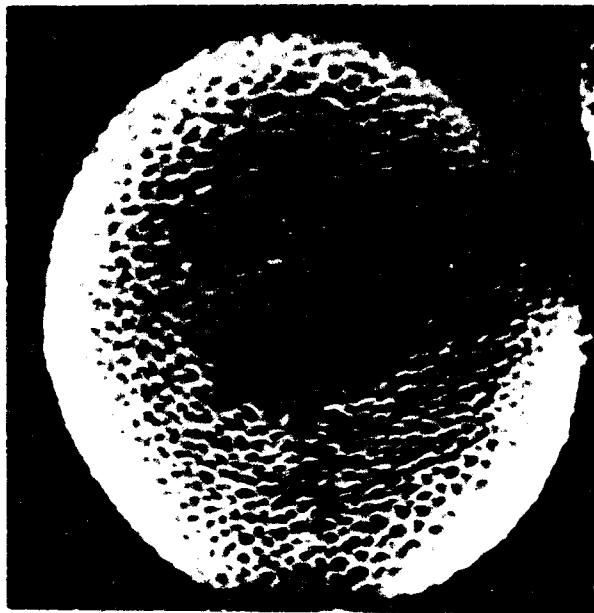
Fig. 7. Lophanthera longifolia (H.B.K.) Griseb.,
equatorial view, $\times 5600$.

Fig. 8. L. longifolia (H.B.K.) Griseb., ibidem.

19



7



8

Fig. 9. Verrucularia glaucophylla Ad. Juss.,
equatorial view, $\times 5550$.

Fig. 10. Galphimia vestita S. Watson,
equatorial view, $\times 5550$.

21



9



10

Fig. 11. Galphimia tuberculata (Rose) Ndz.,
polar view above, equatorial below,
 $\times 4250$.

Fig. 12. G. tuberculata (Rose) Ndz.,
equatorial view, $\times 11500$.

23



11



12

i. G. gracilis; Erdt., Lobr. photo

*j. G. tuberculata (González 7271 US).- Fig. 11 & 12.

CYTOTOLOGY. Chromosome counts are known for only 3 taxa of Galphimia, but now embracing both sections. The five counts summarized by Fouët (Adansonia 6: 495, 1966) are all considered as from G. gracilis, where $n = 12$ and $2n = 24$. To her summary may be added:

*1. G. brasiliensis subsp. angustifolia

(Lynch 710 MO): $n = 12$.

2. G. glauca var. glauca (Breedlove 7072 F):

$n = 6$ (Kyhos, Madroño 18: 245, 1965).

3. G. gracilis (MacBryde 63 MO): $n = 12$.

It can be seen that the two sections of Galphimia are not diverse in chromosome number to the extent that they are in pollen type, and that G. glauca and G. gracilis show a difference in chromosome number paralleling their persistent vs. deciduous petals (although difficult to differentiate when flowers are immature). Fouët (loc. cit. 482) and Kyhos (loc. cit.) remark on the large size of the chromosomes ($10-14 \mu$); the former considered $n = 12$ to reduce to $\times = 4$ (for the family), but was ignorant of Kyhos' count, which shows a basic number of $\times = 6$ for Galphimia.

Counts of $n = 10$, 20 and $2n = 56$, 72 are known for the Malpighieae (Fouët loc. cit. 496), but ad-

ditional date are needed to indicate a rational scheme for these tribes.

The reticulate nature of the relation of characters in the genera makes the following key only partially natural; the sequence of genera adopted also indicates only partial similarity.

Key to Galphimiinae Ndz.

- a. Styles ventrifixied to subterminal, carpels distinct or coherent centrally at basal carpophore. Fruit 3(-1)-coccate.
- b. Stipules persistent, small to 6 mm long.
Inflorescence fasciculate to umbelliform
.....4. Pterandra
- bb. Stipules deciduous, large, to 7 cm long.
Inflorescence spicate or racemiform.
- c. Stipules solitary, leaves large, to 60 cm long. Inflorescence spicate;
calyx eglandular; anthers unappendaged,
porocidal.....1. Coleostachys
- cc. Stipules paired, leaves moderate, 50
35 cm long. Inflorescence racemiform;
calyx glandular; anthers alate laterally,
loculicidal.....2. Acmanthera
- aa. Styles terminal to subterminal, carpels strongly to weakly coherent to adaxial faces. Fruit schizocarpic (or capsular).

- d. Indument usually of basifixed hairs.
Stipules deciduous. Anthers hispid
..... 3. Blepharandra
- dd. Indument of medifixed hairs. Stipules persistent. Anthers sometimes appendiculate, glabrous.
- e. Stipules solitary, to 15 mm.
long. Inflorescence usually pendulous (if erect fruit stipitate)..... 5. Lophanthera
- ee. Stipules paired, to 5 mm long.
Inflorescence erect (fruit sessile).
- f. Leaves eglandular. Calyx with large paired glands at each sinus. Anthers verrucose subapically..... 6. Verrucularia
- ff. Leaves glandular (rarely eglandular). Calyx eglandular or with single (rarely geminate) small glands at some to all sinuses. Anthers exappendiculate..... 7. Galphimia

1. COLEOSTACHYS

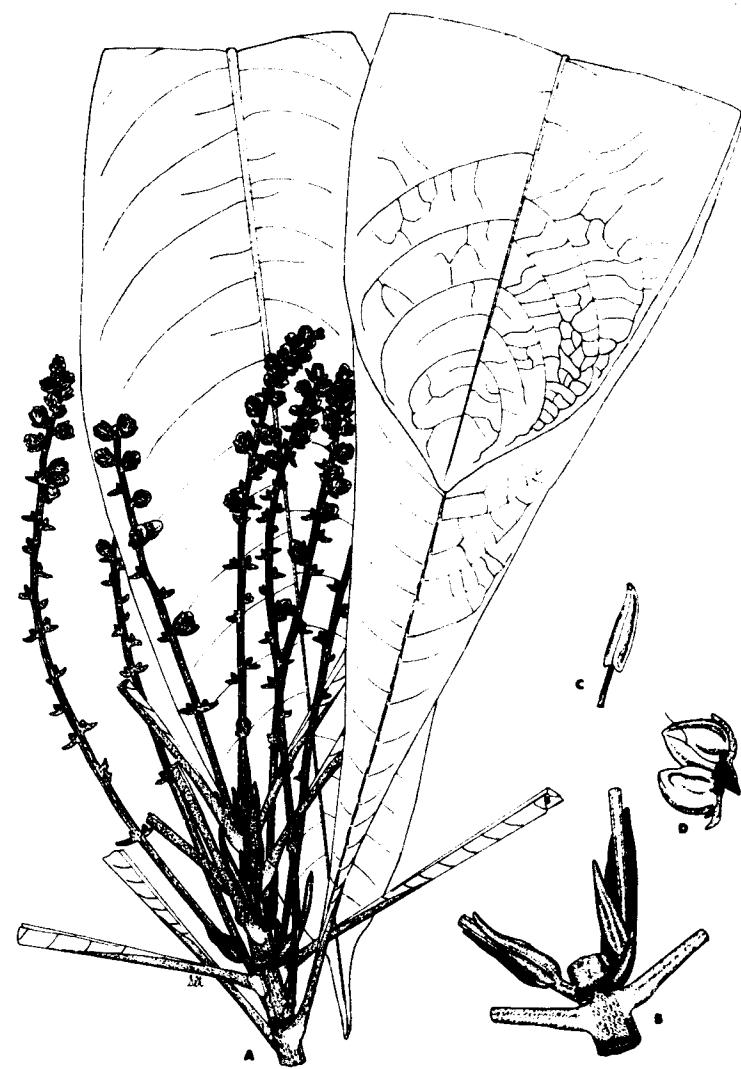
Coleostachys Ad. Juss., Ann. Sci. Nat. Bot. sér. 2, ~~13~~:
329, 1840. (Type C. genipifolia Ad. Juss.).

Coelostachys Meisner, Pl. Vasc. Gen. 2: 346, 1843, sphalm.
Monotypic.

Coleostachys genipifolia Ad. Juss., loc. cit.; Arch. Mus.
Hist. Nat. 3: 314, t. 5, 1843 (Monogr. Malp. 2: 60,
1844); sic C. genipaefolia. (Lectotype Martin s.n..
P not seen, photos MO, US; isolectotypes BR, F, K,
P-JU 11504 seen as IDC 6206. 853: III. 2; chosen
Juss., 1843).- Fig. 13.

Small trees to 3 m high, unbranched?, at least the young stem densely appressed-hirsute and light to medium brown. Leaves clustered at apex (internodes ca 2 cm long), decussate, eglandular; stipules deciduous, solitary (by fusion?), axillary, triangular, basally amplexicaul and connate, apically narrowly rounded, to ca 3 cm long, outside pubescent as stem, bearded between base and stem; petioles 1-2.5 cm long; blades to 65 × 14 cm, oblanceolate, the base cuneate, ± decurrent, the margin entire to repand, the apex acuminate to long-attenuate, chartaceous, glaucous except costa and lateral veins ferrugineous-appressed-hirsute. Spikes from stipular axils, with a subbasal pair of bracts similar to stipules except weakly keeled,

Fig. 13. Coleostachys genipifolia Ad. Juss.:
A, habit ($x \frac{3}{7}$); B, node with one
stipule removed ($x \frac{9}{10}$); C, stamen
($x 2 \frac{1}{2}$); D, fruit, ($x \frac{9}{10}$). A-B
after Ducke RB228 (US); C after
Prance et al. 1353 (NY); D after
Oliveira 422 (MO).



1.5–2 cm long, valvately enclosing immature spike; rachis to 22 cm or more, tan-tomentulose to appressed-pilose, with 20–35 or more flowers, each subtended by a seminavicular bract to 8 mm long transverse to 2 ovate bracteoles each to 4 mm, the 3 buff-appressed-pilose outside. Flowers ca 2.5 cm diam, deciduous (at fruit dispersal?); calyx 5-parted, the segments ca 6 mm long, accrescent, the lobes \pm ovate, buff-appressed-pilose outside, glabrous within, eglandular; rim of concave receptacle ascending to level of calyx sinuses, the center a short carpophore, the surface densely bearded (hairs not medifixed, ca 2.5 mm long); petals white to yellow, subequal, clawed, the claw ca 2 mm long, pubescent as calyx (\pm extending onto limb), the limb orbicular, the base cordate, the margin entire to erose, ca 9 mm diam; stamens distinct, glabrous, the filaments persistent in fruit, ca 2 mm long, the anthers yellow, crustaceous, basifixed, ca 5 mm long, lanceolate, the base sagittate, the apex acute, the connective included, the thecae apically confluent into a subterminal pore, ovary sessile, angular-ovoid, ca 2.5 mm diam, villous (hairs not medifixed), the 3 carpels distinct, lower 1/2 adnate to carpophore, the 3 styles \pm persistent in fruit, filiform, medially ventrified, ca 7 mm long, glabrous, the apex subulate. Cocci 3 (2 usually

abortive), the remaining compressed-lacrimiform, the apex medially sulcate introrsely and weakly ridged extrorsely, indehiscent (or tardily splitting from apex?), ca 9 mm diam, glabrous; seed pendulous, ellipsoid, the testa rugose, brown. Flowering in Sept, Nov & Jan.

Distribution disjunct (from present collections); in non-flooding forests of northeastern South America, where it may be locally abundant (Prance et al. 1353).

BRAZIL: Pará: Rio Mojú inferius, loco Fabrica, Ducke RB228 (G, K, US); km 129, Rodovia Belém-Brasilia, pico 17, km 3, E. Oliveira 422 (IAN not seen, fragment & photo MO); Rios Pacajá & Muirapiranga, km 1.5-3.5, line SW of Ilha de Breu, Prance et al. 1353 (F, NY).

FRENCH GUIANA: (Cayenne?), (J.) Martin s.n. (BR, F, K).

The specimen in the Jussieu herbarium is considered a duplicate of the type because "ex H.M.P." is on the label, and Ad. de Jussieu states "v.s. herb. mus. Par." While the name of the species on the label in the general herbarium is not in his handwriting, he apparently did write the rest of the label, as well as "ex H.M.P." on the sheet in the family herbarium. Since he maintained a distinction between the herbaria, the one he cites is

accepted.

The type labels do not mention Cayenne, which is taken from Bentham in London J. Bot. 7: 124, 1848 and is so listed by Niedenzu in Engler, Pflanzenreich 94
IV, 141): 603, 1928 and Lemée, Fl. Guy. Fr. 2: 229, 1952. Sagot does not mention the locality in his catalog for the area (Ann. Sci. Nat. Bot. sér. 6, 12: 180, 1881). Furthermore, Jussieu in Walpers, Repert. Bot. Syst. 5: 179, 1845 prematurely has "crescit in Brasilia" in error, for he has "arbor? Guianensis" on p. 178. Ducke considers his collection the first for Brazil (Arch. Jard. Bot. Rio de Janeiro 4: 104, 1925).

The apparently porocidal anther dehiscence is a new type for the family, which has only had longitudinal dehiscence reported. Hutchinson (Gen. Fl. Pl. 2: 570, 1967) mentions that the flowers are often polygamous; he may be referring to Jussieu's statement, here unconfirmed, that some anthers can be abortive (Arch. Mus. Hist. Nat. 3: 315, 1843).

SPECIES EXCLUSAE

Coleostachys hypoleuca Bentham, London J. Bot. 7: 125, 1848 = Blepharandra hypoleuca (Bentham) Griseb., q.v.
C. spicata (Cav.) Pritzel, Icon. Bot. Index 288, 1855,
 sphalm. from Juss., Arch. Mus. Hist. Nat. 3: t. 5, 1843 = Byrsonima spicata (Cav.) DC., Prodr. 1: 580,

1824. The citation of authors for some species within Byrsonima L. C. Rich. ex H.B.K. should be carefully checked, as traditional citations often do not follow the Internat. Code Bot. Nom. 1966. Even the generic author citation is not yet standard. Kostermans (Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 25: 9, 1936) suggests an older view, while Cuatrecasas (Webbia 13: 588, 602, 1958) and Morton (Taxon 17: 317, 1968) give current examples. However, Articles 33 & 34 were still not followed, as they are here, and were by Sandwith (Bull. Misc. Inform. 1935: 312, 1935).

C. vestita Bentham, London J. Bot. 7: 124, 1848 =
Sipapoa vestita (Bentham) Maguire, Mem. New York
 Bot. Gard. 8: 127, 1953.

2. ACMANTHERA

Acmanthera (Ad. Juss.) Griseb. in Mart., Fl. Bras. 12(1): 28, 1858. [Type A. latifolia (Ad. Juss.) Griseb.].
Pterandra sect. Androptera Ad. Juss. ex Endl. pro parte,
 Gen. Pl. 1064, April 1840.
Pterandra sect. Acmanthera Ad. Juss., Ann. Sci. Nat. Bot.
 ser. 2, 13: 328, June 1840.

Androptera (Ad. Juss. ex Endl.) Meisner, Pl. Vasc. Gen.

2: 346, 1843, pro syn., non Andropterum Stapf in
Prain, Fl. Trop. Africa 2: 38, 1917.

Shrubs or small trees, the branches with successive younger internodes perpendicularly complanate. Leaves decussate, eglandular; stipules 2, deciduous, axillary, large, when young valvately enclosing terminal bud; blades petiolate, narrowly elliptic to broadly ovate, the base truncate to cuneate (sometimes oblique), the margin entire to repand, the apex acute to attenuate, chartaceous or subcoriaceous, pubescent to glabrate, ± glaucous beneath. Racemes axillary or terminal, involucrate near base, ca 20-∞-flowered, pubescent. Flowers actinomorphic, bracteate, pedicellate; calyx 5-lobed, pubescent, with distinct paired thick glands below each sinus, each obovate, the proximal 4/5 sessile; rim of concave receptacle ascending to level of calyx sinuses, the center a stout carpophore, the surface densely bearded (hairs not medifixed); petals clawed, equal; stamens distinct, the filaments persistent in fruit, basally pubescent or glabrous, the anthers subbasifixed, the connective ligulate apically, the thecae alate laterally; ovary sessile, angular-subglobose, the 3 carpels distinct, subbasally adnate to carpophore, the

3 styles persistent in fruit, ventrified, filiform, the apex subulate. Fruit 1-3-coccate, tardily splitting medially or indehiscent; seed one per carpel, pendulous.

A genus with 2 species primarily known from the central Amazon basin; one collection reported from southern Guyana. Amanthera was raised to generic rank when fruit became available; Jussieu had previously commented on its diverse nature for Pterandra (Arch. Mus. Hist. Nat. 3: 318, 1843). Priority for the sectional synonymy is discussed under that genus. Androptera (Endl.) Meisner is invalid since listed as a synonym (Article 34, Internat. Code Bot. Nom. 1966). The striate coalescence of thecal wings is stronger in Pterandra than here.

Key to Amanthera

- a. Young branches pubescent; blades ± broadly ovate, the base usually obtuse, the apex acute to broadly acuminate, chartaceous, the costa caniculate above, the surface appressed-pilose beneath; racemes axillary, floral bracts suborbicular; cocci basally flanged, comose apically.....1. A. latifolia
- aa. Young branches glabrous; blades narrowly elliptic, the base cuneate, the apex attenuate, subcoriaceous, the costa convex above, the surface glabrate beneath;

racemes terminal on lateral branchlets, floral
bracts linear; cocci not flanged, glabrous....

.....2. A. longifolia

1. Acmanthera latifolia (Ad. Juss.) Griseb. in Mart.,
Fl. Bras. 12(1): 29, 1858.- Fig. 14B.

Pterandra latifolia Ad. Juss. in Delessert, Ic. Sel. Pl.
3: 19, t. 30, 1838. (Holotype sine coll. s.n. P).

Erect shrubs or small trees 1.5-6 m high, to 15 cm diam, the branches fulvous-appressed-pilose, canescent and tardily glabrescent. Leaves bistipular, the pair valvately connate, the lower portion coherent with opposite pair, each lanceolate, 3.5(-5) cm long, papyraceous, pubescent as stem outside, ferrugineous-appressed-tomentellous within, short-bearded between base and stem; petioles 1-2.5 cm long, pubescent as stem; blades 11-29 × 6-12 cm, narrowly to usually broadly ovate to elliptic (sometimes unequal), the base sometimes cuneate to usually obtuse or even truncate, the apex acute to broadly acuminate, usually mucronulate, chartaceous, above glabrate or main veins ± gray-appressed-pilose (costa canaliculate), beneath glaucous, gray to fulvous-appressed-pilose. Racemes geminate (rarely also a reduced secondary pair) in sub-terminal leaf axils, the rachis fulvous-pilose, to 20 cm long, the basal 2-6 cm sterile, terminated by a caducous

involucre of 2 linear outer and 4 sublorate inner bracts (pubescent as stipules), the distal portion with ca 20–30 flowers, each subtended by a bract transverse to 2 bracteoles, the 3 suborbicular, ca 4 mm long, fulvous-appressed-pilose outside. Flowers ca 1.5 cm diam, the pedicels 7–12 mm long, fulvous-pilose; calyx 5-cleft, the segments ca 6 mm long, the lobes triangular, ± revolute, fulvous-appressed-pilose outside, glabrous within, the glands 2.5–3.5 mm long; hairs of receptacle ca 2 mm long; petals white to yellow, ± costate beneath, fulvous-appressed-pilose ± medially outside, the claw ca 1.5 mm long, the limb oblong, the base ± short-decurrent, the margin erulose, 3.5–4.5 × 2–3 mm; stamens with filaments basally villous, the outer ca 2.5 mm long, the inner ca 3 mm, the anthers cuneiform, glabrous, the ligule of connective revolute, ca 0.5 mm long, the thecae ca 2 mm long, each with a 0.5 mm wide (proximally narrower) colliculate wing along outer margin; ovary ca 2 mm diam, villous (hairs not medifixed), the styles ca 5 mm long, basally villous. Cocci 3 (1 or 2 usually abortive), the remaining compressed-subglobose with an extrorse basal flange, medially ridged introrsely, striate extrorsely, indehiscent (or tardily splitting from apex), ca 7 mm diam, glabrous except comose apically; seed subglobose, the

testa colliculate, brown. Flowering Sept-Apr, especially in Apr.

Primarily known from the Amazon basin in the vicinity of Manáos, where it has been collected from inundated forest and floodplain.

BRAZIL: Amazonas: Manáos, Igarapé da Cachoeira Grande, Ducke 460 (F, K, MO, NY, US), Ducke 460 2nd coll. (UC, US); bas Rio Negro, bouche du Tarumá, Ducke MG11565 (G); Rio Negro infer, Kuhlmann RB19392 (G, K, US); Manáos, Schwacke III, 302 (GOET); in vicinibus Barra, prov. Rio Negro, Dec-Mart 1850-51, Spruce 1091 (M), Spruce s.n. (C, G, GOET, NY, W); Barra, gapo of river, Spruce 1307 (K); secus Rio Negro, inter Barra & Barcellos, Spruce 1903 (G, K, M, W); prope Barra, prov. Rio Negro, Mart-Aug 1851, Spruce s.n. [B† (photos MO, NY, US), W]. Minas Gerais: Caraca, Caminho da Chacara, Glaziou 13593 (C, K). Pará: s. loc., sine coll. s.n. (P).

GUYANA: ufern des Essequibo River, Schomburgk 167? (K).

Jussieu states the type locality as Pará in the original publication but as provincia Paraná in Arch. Mus. Hist. Nat. 3: 318, 1843; he lists it as Brasilia boreali in Walpers, Repert. Bot. Syst. 5: 181, 1845. On the holotype he has written Pará, although the original handwritten label has no locality. He does not suggest a collector;

A. R. Ferreira is a possibility suggested by the label information being in Portuguese and the early time and probable place of collection. Although his plants are not known to be at Paris, the specimen could have come with his material brought there by Geoffroy Saint-Hilaire ca 1808 (Bol. Soc. Brot. ser. 2, 1: 79, 82, 88, 1922).

The locality for Glaziou 13593 is reported in Bull. Soc. Bot. France 52 Mem. 3: 67, 1905; the specimens are not unusual. Glaziou 13594a is not listed in that publication, but "environs of Rio Janeiro" printed on the label suggests this specimen of Lophanthera longifolia as a similar disjunct. Recollection of both species in the south is clearly called for.

2. Acmanthera longifolia Ndz., Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5: 32, 1914. (Lectotype Spruce 3838 W; isolectotypes BR, G (photo MO), K, MO, NY; here chosen).- Fig. 14A & C.

Small tree?, the branches glabrous. Leaves with stipules to 7 cm long, glabrous, without beard; petioles 1-2.4 cm long, glabrous; blades to 35 × 11.5 cm, narrowly elliptic (rarely unequal), the base narrowly to broadly cuneate, the margin repand, the apex attenuate, subcoriaceous, above glabrate (costa convex), beneath punctately glaucous, glabrate. Racemes terminal on lateral branchlets,

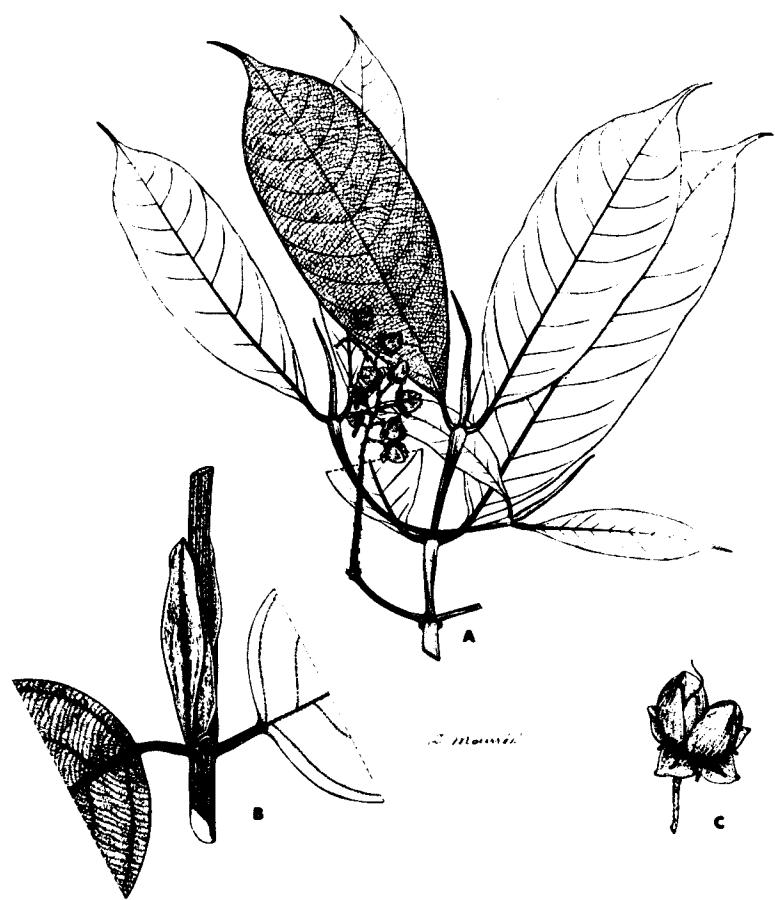
the rachis darkly ferrugineous-subappressed-pilose, to 17 cm long, caducously involucrate at base, fully floriferous with ∞ flowers, each subtended by 3 linear bracts ca 0.7 mm long, \pm pubescent as rachis outside. Flowers unknown. Fruits with pedicels ca 8 mm long, pubescent as rachis; calyx 5-parted, the segments ca 7 mm long, the lobes broadly triangular, sparsely ferrugineous-appressed-pilose outside, glabrous within, the glands ca 3.5 mm long; hairs of receptacle ca 2.5 mm long; filaments glabrous, subequal, ca 3 mm long; cocci 3 (1 or 2 usually abortive), compressed-subglobose without a flange, medially ridged introrsely, \pm smooth extrorsely, indehiscent (or tardily splitting from apex), ca 7 mm diam, glabrous, the styles ca 5.5 mm long, glabrous; seed subglobose, the testa colliculate, brown.

Known only from the type collection.

BRAZIL: Amazonas: prope Barra, prov. Rio Negro,
Spruce 3838 (BR, G, K, MO, NY, W).

The type locality, Barra (do Rio Negro), is now called Manáos (Spruce, Notes Bot. Amazon & Andes 1: 200, 1908).

Fig. 14. Acmanthera longifolia Ndz.: A,
habit ($\times \frac{1}{4}$); C, fruit ($\times 1$);
A. latifolia (Ad. Juss.) Griseb.:
B, node with stipules shedding
($\times \frac{4}{5}$). A & C after Spruce 3838
(K); B after Spruce s.n. Dec-Mar
(W).



3. BLEPHARANDRA

Blepharandra Griseb., Linnaea 22: 7, 1849. [Type
B. hypoleuca (Bentham) Griseb.].

Blephandra Griseb. ex M. R. Schomb., Reisen Br.-Gui. 3:
1096, 1849, nom. nud., syn. nov.

Galphimia Cav. pro parte, Baillon, Hist. Pl. 5: 454,
509-510, 1874 or 1875.

Trees or shrubs, the indument usually of basifixied hairs. Leaves decussate; stipules 2, deciduous, axillary, \pm distinct, bearded between base and stem; blades petiolate or sessile, rotund to ovate or oblong, the base obtuse to cordate, the margin entire, the apex \pm obtuse, coriaceous, beneath \pm pruinose, pubescent to glabrous. Inflorescences paniculate or racemose, terminal, involucrate with 2 pairs of basal bracts similar to stipules (valvately enclosing undeveloped inflorescence), sparsely to densely pubescent. Flowers weakly zygomorphic, pedicellate; calyx 5-parted, sparsely to densely pubescent, with 10 or rudimentary glands; rim of flat receptacle at level of calyx sinuses, the surface densely bearded (hairs not medifixed); petals clawed, \pm costate beneath, unequal or subequal (superior larger, claw stouter), white to pink or pale yellow, glabrous; stamens distinct, obdiplostemonous with outer whorl longer, the filaments glabrous or pubescent, the

anthers basifixed, oblongoid, the connective stout, the thecae hispid with apical and often lateral bristles; ovary sessile, angular-subglobose, tricarpellate, glabrous; the 3 styles deciduous, terminal, slender, the apex subulate. Fruit a schizocarp (possibly also a capsule), glabrous; seed one per carpel, pendulous.

An infrequently collected genus of 3 species from the Guayana Highland, for which a conservative taxonomic treatment has been adopted until living material and broader population samples are available. Two characters of the genus are unusual in the family. The indument is composed of basifixed hairs (except in B. cretacea var. composita), while single-celled medifixed hairs are usually considered diagnostic for the Malpighiaceae. Further, the stamens in the outer whorl are longer than those in the inner, the reverse of the typical condition.

Collections of material are at present inadequate to determine the kinds of fruits in Blepharandra, and living material has not been available. Although lines of separation and dehiscence may be forced on dried fruits from the herbarium which suggests that all known fruits are ultimately schizocarps with dehiscent mericarps in nature, the diversity within the subtribe prompts caution. In addition, some flowers of B. fimbriata showed 1 or 2 poorly developed carpels, suggesting a possible maturation similar to Coleostachys or some

Pterandras.

Although Blepharandra is readily separated from Galphimia by differences in indument, stipules, calycine glands and anthers, Baillon placed the then monotypic genus in Galphimia. His opinion has been followed only by E. Tison in Baillon, Dict. Bot. l: 430, 1876. Blephandra M. R. Schomb. is illegitimate by Article 41 of the Internat. Code Bot. Nom. 1966, although it may have priority. Article 42 does not apply because the genus is based on the previously published C. hypoleuca; further comments may be found under this species.

Natural Key to Blepharandra

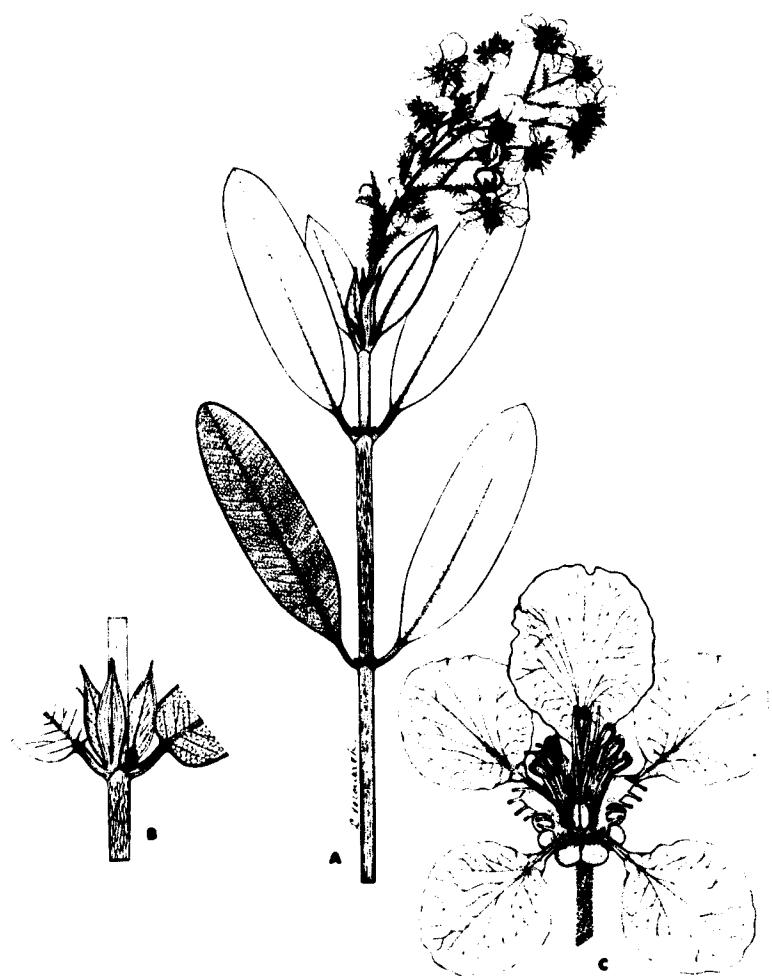
- a. Leaves small, blades to 6.5×2.8 cm, \pm powdery bloom slight, yellow-green. Inflorescence slender, indument moderate to sparse, the bracts & bracteoles persistent, their margins glandular-fimbriate. Calyx-lobes sparsely pubescent to glabrescent, their margins glandular-fimbriate; each theca hispid with ca 15-30 hairs 1. B. fimbriata
- aa. Leaves larger, blades $5-16 \times 3-11$ cm, exfoliate bloom heavy, dull white. Inflorescence stout, indument dense, the bracts & bracteoles deciduous, their margins entire. Calyx-lobes densely pubescent, their margins entire; each theca hispid with ca 4-10 or ∞

hairs.

- b. Leaves petiolate, the base not amplexicaul, to 16×11 cm, the veins subprominent beneath. Filaments villous; each theca hispid with a fringe of ∞ apical and (usually) lateral hairs 2. B. hypoleuca
- bb. Leaves sessile, the base \pm amplexicaul, to 8×6 cm, the veins usually prominent beneath. Filaments glabrous; each theca hispid with ca 4-10 apical hairs.
- c. Inflorescence racemose, the involucrate bracts broadly triangular, to 8 mm long, the indument rufous-tomentose (basifixed hairs). Apex of connective exceeding thecae ca 0.2 mm, hairs of each theca ca 6-10, 0.7 mm long.....
..... 3a. B. cretacea var. cretacea
- cc. Inflorescence paniculate, the involucrate bracts obovate, to 15 mm long, the indument ferrugineous to tan-villous (medifixed hairs with one arm short). Apex of connective exceeding thecae ca 0.5 mm, hairs of each theca ca 4-7, 0.5 mm long.....
..... 3b. B. cretacea var. composita

1. Blepharandra fimbriata B. MacBryde, sp. nov. (Holotype Cardona 944 US). - Fig. 15.

Fig. 15. Blepharandra fimbriata B. MacBryde:
A, habit ($\times \frac{5}{8}$); B, node with
stipules ($\times \frac{2}{3}$); C, flower ($\times 4$).
A-C after Cardona 944 (US).



Shrubs?, the branches glabrous. Leaves eglandular; stipules to 2 cm long, narrowly elliptic to lanceolate, the apex acute to acuminate, glabrous outside, the margin tomentellous and base densely villous within (otherwise glabrous); petioles 5-10 mm long, glabrous; blades to 6.5×2.8 cm, narrowly elliptic to oblong, the base obtuse to truncate, the apex obtuse to broadly acute (rarely mucronulate), above shining, glabrous, beneath with included lateral veins (usually extending to margin) and a weak yellow-green powdery bloom (especially when young), glabrous. Panicles ± cylindric, rachis to 10 cm long (basal 2 cm sterile), tan to canescent-pilose to usually tomentose, the branches ca 2-flowered, to 11 mm long, with the reddish solitary basal bract and subopposite subnodal bracteoles persistent, glabrous, 2.5-7 mm long, narrowly triangular to lanceolate, the margin with gland-tipped fimbriae ca 1 mm long at $3/4$ mm intervals. Flowers ca 1.5-2 cm diam, the pedicel articulated at the peduncle, 5-10 mm long, pubescent as rachis; calyx-segments 3-4 mm long, the lobes erect, ± ovate, the margin fimbriate as the bracts, the apex ± revolute, sparsely pilose to glabrescent outside, glabrous within, with distinct paired thick glands below each sinus, each obovate, to 2 mm long, the proximal 2/3 sessile; hairs of receptacle to 3 mm long; petals white or pale yellow, unequal, the

claw brown to red, 1-2 mm long, the limb rotund to obovate (decurrent basally), the margin erulose, 4-6 mm diam, the superior petal larger, with claw thicker, the limb 5-7 mm diam; stamens with filaments basally villous, the outer ca 4 mm long, the inner ca 3.7 mm, the anthers with connective \pm papillate, the rounded apex exceeding thecae ca 0.2 mm, the thecae ca 1.5 mm long (extended base free), each apically hispid with ca 15-30 introrsely angled hairs ca 0.7 mm long (usually 1 or 2 hairs also at base); ovary ca 2 mm diam, the carpels strongly coherent, the styles reddish, ca 5.5 mm long. Fruit unknown. Flowering in Oct.

Presently known only from a single specimen collected in eastern Venezuela.

VENEZUELA: Bolívar: Cerro Guaiquinima, alto Río Paragua, alt 1740 m, Oct 1943, Félix Cardona 944 (US).

The small leaves without a white exfoliate bloom, large stipules, delicate inflorescence with persistent bracts and bracteoles, and the fimbriate margin of these and the calyx-lobes readily suggest a new species. As there is also less indument and an apparent tendency for abortion of 1 or 2 carpels, a new section may be needed when the fruit is known.

Two characters of this species are found in a minor

way in B. hypoleuca, as might be expected from Vavilov's law of homologous series (J. Genet. 12: 47-89, 1922). In Cardona 2286 the lateral leaf veins frequently reach the margin, while in Steyermark & Nilsson 632 the bracts and bracteoles sometimes have one or a pair of gland-tipped teeth near the base (although not on the margins of calyxlobes). Lasser in Pittier, Cat. Fl. Venez. 2: 34, 1947 lists "Cardona 944-1107" under B. hypoleuca.

2. Blepharandra hypoleuca (Bentham) Griseb., Linnaea 22:
7, 1849.

Coleotachys hypoleuca Bentham, London J. Bot. 7: 125, 1848.
[Holotype R. H. Schomburgk 2nd coll. 677 = M. R. Schomburgk 1043B K not seen, photo NY; R. H. Schomb. 2nd coll. 677 isotypes G, W; M. R. Schomb. 1043 isotypes B (photos GH, NY, US), K].

Blephandra cordata Griseb. ex. M. R. Schomb., Reisen Br.-Gui. 3: 1096, 1849, nom. superfl., syn. nov.

Blepharandra ptariana Steyermark., Fieldiana, Bot. 28: 282, 1952, syn. nov. (Holotype Steyermark 60310 F not seen; isotypes K, NY, US).

Shrubs or trees 1.5-12 (-20) m high, the branches brown to canescent-tomentulose to appressed-pilose, glabrescent. Leaves eglandular; stipules triangular, to 15 mm long, outside pubescent as stem, more dense

to glabrescent within; petioles 5-15 mm long, pubescent as stem; blades 5-16 × 3-11 cm, rotund or ovate to oblong, the base cordate (sometimes truncate or obtuse), the apex broadly rounded to obtuse (rarely mucronulate), above somewhat shining, glabrous, beneath with subprominent lateral veins (rarely extending to margin) and a dull white exfoliate bloom, ferrugineous-pilose to glabrous.

Panicles rarely tripartite, ± cylindric, rachis to 15 cm long (basal 1-4.5 cm sterile or with a pair of deciduous bracts or small leaves), ferrugineous to tan-tomentose, the branches ca 4-flowered, to 9 mm long, with the brown solitary basal bract and subopposite subnodal bracteoles narrowly triangular, deciduous, 3-9 mm long, pubescent as rachis (or less dense). Flowers ca 1.3-1.5 cm diam, the pedicel articulated at the peduncle, 4-9 mm long, pubescent as rachis; calyx-segments 4-5.5 mm long, the lobes erect, triangular, the apex sometimes revolute, ferrugineous to tan-tomentulose outside, glabrous within, with distinct paired thick glands below each sinus (sometimes rudimentary), each obovate, to 1.5 mm long, the proximal 4/5 sessile; hairs of receptacle ca 2.5 mm long; petals white to pale yellow, subequal, the claw ca 1.5 mm long (the uppermost stouter), the limb rotund to elliptic, the base ± truncate to shortly attenuate, the margin erulose, 4-5.5 × 3-5 mm; stamens persistent in fruit, the filaments villous

(especially basally), subequal (the outer sometimes longer), 2-3 mm long, the anthers with connective papillate, the rounded apex exceeding thecae 0.1-0.6 mm, the thecae 1.2-1.8 mm long (free at slightly extended base), each hispid apically and usually with decreasing density down outer margin, the hairs introrsely angled, 0.7-1.4 mm long; ovary ca 1.5-2 mm diam, the carpels strongly coherent, the styles ca 6.5 mm long. Fruit a capsule (or schizocarp?), broadly ovoid, 2.5-3.5 mm diam, glabrous, the carpels (mericarps?) tardily loculicidal? along a weak medial ridge; seed with testa light to medium brown. Flowering throughout the year, especially in Nov.

Usually found in scrub forest ecotones, savanna or rocky outcrops in the Guayana Highland of eastern Venezuela and western Guyana, from altitudes of 885-2200 m; may be common (Foldats 2602).

GUYANA: Pakaraima Mts: Chinowieng, slope of Wandabu Mt, Forest Dept 7842 (RB18) (K, NY); upper Mazaruni River, Membaru Creek, alt 885 m, Forest Dept 2789 (K, photo NY), sine alt, Pinkus 28 (F, G, GH, US); Mt Roraima, M. R. Schomburgk 1043 (K) = R. H. Schomburgk 2nd coll. 677 (G, W).

VENEZUELA: Bolívar: Aprada-tepuí, alt 900 m, Cardona 1987 (US); Río Surucún, cerca campo de Paurai-tepuí, alt

900 m, Cardona 2099 (G, US); Acapan-tepuí, alt 1800 m,
Cardona 2286 (US), 2100 m, Cardona 2287 (US); altiplano
del Auyán-tepuí, alt 2100-2200 m, Cardona 2662 (NY, US);
parte central, plato del Auyán-tepuí, alt 1800-2000 m,
Foldats 2602 (NY); Kavanayén, Lasser 1807 (F, US);
SE-facing slopes of plateau, Ptari-tepuí, alt 1600 m,
Steyermark 59623 (F, NY); Río Caruai, betw Santa
Teresita de Kavanayén & base of Ptari-tepuí, alt 1220 m,
Steyermark 60310 (K, NY, US); vic km 150, valley of Río
Uarama below Uarama-tepuí, NE of Luepa, alt 1220 m,
Steyermark & Nilsson 632 (NY, US).

The Schomburgk brothers collected together, but distributed their material under different numbers: for the identity of B. hypoleuca type material see Bentham (London J. Bot. 7: 117, 1848) and McVaugh (Mem. New York Bot. Gard. 18(2): 58, 1969); note that in Schomb. 1043B the B means Berlin. Burkill (Trans. Linn. Soc. London, Bot. 6: 7, 1901) considered the species endemic to Mt Roraima; the range was extended with the second collection (after a lapse of 96 years) reported by A. C. Smith (Bull. Torrey Bot. Club 67: 287, 1940). This collection of Pinkus appears to be the same as Forest Dept 2789, from the same place, also on 27 Sept 1938. Blephandra cordata had been overlooked heretofore; it is illegitimate by Article 43 of the Internat. Code Bot. Nom. 1966, since

the genus name was without a description. Although it may have priority over Blepharandra hypoleuca (respectively published 7-10 Mar vs Mar or 4-7 Apr according to Stafleu in Reg. Veg. 52: 421, 429, 1967), Schomburgk's epithet is still superfluous to Bentham's because C.hypoleuca was given in synonymy.

The typography of the Guayana Highland has suggested a conservative treatment of this species with the small sample of specimens available. Blepharandra ptariana, described by Steyermark as new based on largely quantitative differences, does not appear so distinctive within the variability of collections studied. Several collections show noteworthy extremes: Forest Dept 7842 has plants with young leaves densely ferrugineous-pilose, the blades still strongly pilose at maturity, and with a pair of leaves to 1.8 cm long attached 1-2 cm from the base of the panicle. Cardona 2662 and Foldats 2602 from Auyán-tepui both show plants with rudimentary glands on the calyx, connectives exceeding the thecae ca 0.5 mm, and the thecae often with less hairs laterally. Cuatrecasas (Acta Bot. Venez. 2(5-8): 231, 1967) and Gleason & Killip (Brittonia 3: 168, 1939) have examined other collections from the area, but do not remark on the constancy of this morphology, which approaches the varietal level.

3. Blepharandra cretacea (Gleason) Steyermark, Fieldiana,

Bot. 28: 280, 1952.

Byrsonima cretacea Gleason, Bull. Torrey Bot. Club

58: 378, t. 28, fig. 2, 1931, non Ndz.

(Feddes Repert. Spec. Nov. Regni Veg. 33: 71, 1933). (Holotype Tate 533 NY; isotype US).

3a. Blepharandra cretacea var. cretacea

Shrubs to 2.5 m high, the branches divergent, dull brown-tomentulose, glabrescent. Leaves glandular?; stipules broadly triangular, to 8 mm long, outside pubescent as stem, more dense to glabrescent within; petioles ± obsolete, the base stout, sometimes with lateral glandular? swellings; blades to 8 × 6 cm, rotund to elliptic or ovate, the base deeply cordate (+ amplexicaul), the apex broadly rounded (sometimes mucronulate), above somewhat shining, glabrous, beneath with prominent lateral veins and a dull white exfoliate bloom, rufous-pilose to glabrous. Racemes rarely geminate, compact, rachis to 11 cm long [basal 2(-5) cm sterile or with a small pair of leaves], rufous-tomentose, with ca 30 flowers, each subtended by a deciduous, narrowly triangular, brown bracteole to 5 mm long, rufous-tomentose outside. Flowers ca 1.5 cm diam, articulated near the rachis, the pedicels to 16 mm long, rufous-tomentose; calyx-segments ca 5 mm long, the thick lobes erect,

triangular, the apex revolute, rufous-tomentose outside, glabrous within, with distinct paired thick glands below each sinus, each obovate, ca 2 mm long, the proximal 4/5 sessile; hairs of receptacle ca 2.5 mm long, petals white, unequal, the (red?) claw ca 2 mm long, the limb ovate to rotund or obovate, the base \pm truncate, the margin erulose, 4-6 \times 3-5 mm, the superior petal larger, with claw thicker, the limb 7 \times 5.5 mm; stamens \pm persistent in fruit, the filaments red, glabrous, the outer ca 3.7 mm long, the inner ca 3 mm, the anthers with connective papillate, the rounded apex exceeding thecae ca 0.2 mm, the thecae ca 1.4 mm long (free at slightly extended base), each apically hispid with ca 6-10 introrsely angled hairs ca 0.7 mm long (rarely a few hairs also down outer margin); ovary ca 1.5 mm diam, the carpels strongly coherent, the styles ca 5 mm long. Fruit unknown. Flowering in Aug & Dec.

Known only from summit of Cerro Duida, where it may be common in the valley forest, brush and nearby slopes; local colonies possible.

VENEZUELA: Amazonas: summit of Cerro Duida, betw Central Camp & Brocchinia Hills, alt 1675 m, Steyermark 58126 (F, NY); summit of Mount Duida, at Central Camp, alt 1570 m, G. H. H. Tate 533 (NY, US).

The apparently intentional omission of Byrsonima

cretacea Gleason by Sandwith in his review of the genus for British Guiana (Bull. Misc. Inform. ~~1935~~: 313, 1935 & J. Arnold Arbor. ~~24~~: 22, 1943) perhaps indicated his awareness that the species belonged elsewhere. Both Gleason and Steyermark mention the propensity of algae or fungi to grow on leaves of the species.

3b. B. cretacea var. composita Steyermark., Fieldiana, Bot. ~~28~~: 281, 1952. (Holotype Steyermark 58191 F not seen; isotype NY).

Differing from tautonymic variety by: height to 1.5 m; blades to 6.5×5.5 cm, ovate or broadly so, the base cordate, beneath with lateral veins subprominent, brown-villous when young, glabrous with age. Panicles ± globose, the involucrate bracts obovate, 15×9 mm, the apex acuminate; rachis ca 7 cm long (basal 3 cm sterile), ferrugineous to tan-villous (hairs medifixed but one arm reduced), the branches ca 5-flowered, to 1.7 cm long, each subtending bracteole red, triangular, 2-3 mm long. Flowers with pedicels to ca 1 cm; petals white to pink; outer filaments ca 3.3 mm long, the inner ca 2.8 mm, the apex of connective exceeding thecae ca 0.5 mm, the thecae ca 1.3 mm long, each with ca 4-7 hairs ca 0.5 mm long. Schizocarp broadly ovoid,

ca 3 mm diam, glabrous, the mericarps tardily loculicidal? along a weak medial ridge; seed with testa ferrugineous. Flowering in Sept.

Known only from type collection; habitat may be generally drier, on ridges.

VENEZUELA: Amazonas: summit of Cerro Duida, on Brocchinia Hills, alt 1700-1980 m, Steyermark 58191 (NY).

Outstanding differences for this variety are in the inflorescence and basal bracts, and the indument (the only taxon of the genus without basifixed hairs). As Steyermark has mentioned (loc. cit. 282), it may when better known prove to be a species.

4. PTERANDRA

Pterandra Ad. Juss. in St.-Hilaire et al., Fl. Bras.

Merid. ed. folio 3: 55 (ed. quarto 72, not seen), 1833. (Type P. pyroidea Ad. Juss.).

Echymacalyx Pohl ex F. L. von Welden, Flora 8(1): 183, 1825, nom. nud. pro syn. by Endl., Gen. Pl. 1064, April 1840.

Pterandra sect. Pterandra Ad. Juss. ex Endl., loc. cit.; superfluously by Ad. Juss., Ann. Sci. Nat. Bot. ser. 2, 12: 328, June 1840.

Pterandra sect. Eupterandra Endl., Enchir. Bot. 557,
1841.

Shrubs or trees. Leaves usually only apical, decussate, eglandular; stipules solitary, deeply bilobate to usually united, persistent, axillary, basally amplexicaul and usually \pm coherent, short-bearded between base and stem; blades petiolate or subsessile, narrowly elliptic to broadly obovate, the base subcordate to long-cuneate, the margin usually entire, the apex broadly rounded to attenuate, chartaceous to coriaceous with veins included to prominent beneath, pubescent to glabrate. Inflorescences usually subterminal, fasciculate to umbelliform, few to many-flowered, bracteate and bibracteolate. Flowers \pm actinomorphic, the pedicels sessile; calyx 5-lobed, pubescent, usually with 10 distinct thick sessile glands; receptacle flat to concave, with a carpophore, the surface usually pubescent; petals persistent in fruit, clawed, usually subequal, white, rose or pale yellow, pubescent outside and often basally; stamens \pm distinct, obdiplostemonous with outer whorl longer, the filaments persistent in fruit, glabrate to pubescent, the anthers centrally to subbasally dorsifixed, usually ovoid, the connective thick, the thickened apex usually obtuse, the thecae alate laterally, usually glabrous;

ovary sessile, hemispherical-trisulcate, the 3 carpels usually coherent centrally, pubescent (some hairs medifixed); the 3 styles persistent, ventrified to sub-terminal, usually rather stout, the apex subulate. Fruit tricocccate (1 or 2 sometimes abortive), tardily splitting medially or indehiscent, pubescent; seed one per carpel, pendulous.

A poorly collected genus of 5 species known from diverse habitats in a broad area in tropical South America. Several morphological features are of note: the outer whorl of stamens is longer than the inner, the reverse of the usual condition for the family. The thecal wings show a striate coalescence of tissue suggesting homology with the thecal hairs of Blepharandra hypoleuca. Fruits where known show a specific range from a rather thin pericarp with no definite suture to a thicker wall with a dorsal medial suture, presumably opening at germination.

The assurance of sectional rank for Endlicher's names comes from Stearn, J. Arnold Arbor. 28: 424, 1947; for Jussieu's from himself in Walpers, Repert. Bot. Syst. 5: 180, 1845. The synonymy involving priority for Endlicher or Adrien de Jussieu must remain tentative until it can be resolved whether the separate printing of Jussieu's Malp. Syn. was

in April 1840, and what were the relative dates in April for it and the appropriate pages of Endlicher's Gen. Pl. No change in current names is involved.

The generic name Ecphymacalyx is only associated with Pterandra following Endlicher. Neither Pohl's unpublished Icon. Pl. Brasil. ⁶⁹² nor his collections at W bear this name, but instead those published by Jussieu.

The generic key takes its pattern from Cuatrecasas, Brittonia ¹¹: 170, 1959; it correlates well with the geographic separations of the species, and is partly natural.

Key to Pterandra

- a. Shrubs to subshrubs, the distal internodes often 1 cm long, the pubescence + wooly. Stipules united or bidenticulate; leaves subsessile (petioles to 3 mm long), coriaceous, beneath with lateral veins & veinlets quite prominent. Pedicels ca gray-lanuginose; calyx 10-glandular to eglandular; anthers with acute connective, the thecal wings usually broader basally. (Brazil: Goias, Minas Gerais, Sao Paulo).....1. P. pyroidea
- aa. Trees or shrubs, the distal internodes rarely 1 cm long, the pubescence appressed. Stipules deeply bilobate to bidentate or united; leaves

petiolate (petioles 5-18 mm long), coriaceous to chartaceous, beneath with lateral veins sub-prominent to included, the veinlets included.

Pedicels ca tan-appressed-pubescent; calyx always 10-glandular; anthers with obtuse connective, width of thecal wings uniform.

b. Stipules deeply bilobate; blades to 16 cm long, the base & apex long-tapered, sub-coriaceous. Inflorescences umbelliform, ca 30-flowered, the bracts & bracteoles ± glabrous. Pedicels slender; outer filaments 2 mm long. (Colombia: Isla Gorgona).....

.....2. P. ultramontana

bb. Stipules bidentate or united; blades to 10.5 cm long, neither base nor apex long-tapered, coriaceous or chartaceous. Inflorescences ca 2-15-flowered subumbels or 3-5-flowered fascicles distally along twig, the bracts & bracteoles pubescent. Pedicels very slender or thick; outer filaments 2.5-3 mm long.
(East of Andes).

c. Leaves coriaceous, beneath with lateral veins included, the surface subglaucous. Flowers 2-10 per twig, each 1.5 cm diam; pedicels thick, 14-28 mm long, appressed-

hirsute; calycine glands 1.5-2 mm long;
outer filaments 2.5 mm long, the anthers
perpendicular to filaments, the thecal
wings 0.4 mm wide; ovary 3 mm diam.

(Venezuela: Cerro Sipapo).....

.....3. P. flavesens

- cc. Leaves chartaceous, beneath with lateral
veins subprominent, the surface not glaucous.
Flowers 10- per twig, each 1 cm diam;
pedicels very slender or rather thick,
10-15 mm long, appressed-pilose; calycine
glands 0.8-1.3 or 2-2.8 mm long; outer
filaments 3 mm long, the anthers ca
vertical to oblique, the thecal wings
0.25-0.3 mm wide; ovary 2-2.5 mm diam.
- d. Trees. Leaves with stipules united,
obtuse, petioles 10-15 mm long,
veinlets of blade conspicuous.
Inflorescences fasciculate distally
along twig, 25- flowered, the bracts
and bracteoles ± persistent. Pedicels
rather thick; calycine glands obovate,
2-2.8 mm long; receptacle concave,
tomentose; limbs of petals ca elliptic,
the margin subentire, 3 mm long,

chartaceous; filaments \pm hirsute,
the thecae 0.7 mm long; ovary 2.5
mm diam, the styles subterminal,
4 mm long. (Brazil: Manáos).....

.....4. P. arborea

dd. Shrubs. Leaves with stipules acute
or bidentate, petioles 5-10 mm long,
veinlets of blade inconspicuous.

Inflorescences subapically fasciculate
to subumbelliform, 10-15 flowered, the
bracts & bractioles deciduous. Pedicels
very slender; calycine glands elliptic,
0.8-1.3 mm long; receptacle flat;
glabrate; limbs of petals obovate, the
margin erose, 3.5-4.5 mm long, membrana-
ceous; filaments glabrous, the thecae
1 mm long; ovary 2 mm diam, the styles
ventrifixed, 4.5 mm long. (Brazil:
Rio dos Marmellos).....5. P. evansii

1. Pterandra pyroidea Ad. Juss. in St.-Hilaire et al.,
Fl. Bras. Merid. ed. folio 3: 56 (ed. quarto 74,
not seen), 1833, t. 179B, 1834. (Lectotype St.-
Hilaire B(1)1376 P; isolectotype P; here chosen).

P. psidifolia Ad. Juss. in St. Hilaire et al., loc. cit.

55 (ed. quarto 73, not seen), t. 179A; sic P.

psidiaefolia. (Lectotype St.-Hilaire C(1)3905 P;
here chosen).

P. pyroidea f. psidiifolia (Ad. Juss.) Griseb. ex Ndz.,
Arbeiten Bot. Inst. Königl. Lyceums Hosianum
Braunsberg 5: 33, 1914.

P. pyroidea f. typica Ndz., loc. cit. 32. (Lectotype
P. W. Lund. s.n. C; here chosen).

P. pyroides Hoehne, Indice Bibliogr. Num. Pl. Com.
Rondon 88, 255, 1951, sphalm, syn. nov.

Subshrubs or shrubs (1/4-) 1 (-2) m high, the branches ochraceous to ferrugineous-tomentose, usually canescent and glabrescent. Leaves clustered at apex (cauline rarely persistent, internodes ca 1-12 cm long); stipules ovate, apically obtuse to subacute or bidentate, to 6 mm long, outside pubescent as stem, more dense within; petioles obsolete (to 3 mm long), the base rather stout, pubescent as stem; blades 5.5-14 × 3.5-8.5 cm, narrowly to broadly obovate to elliptic (rarely ovate), the base subcordate to obtuse, the margin entire to repand, the apex broadly rounded to obtuse to acute or acuminate, frequently mucronulate, coriaceous, above densely ochraceous to ferrugineous-lanate when young, sparsely tomentulose to glabrate when mature, beneath with lateral

veins very prominent, the veinlets \pm prominent, pubescent as above when young, usually moderately arachnoid-villous with age (rarely glabrate).

Inflorescences \pm globose, fasciculate to umbelliform above the subapical leaf scars, sometimes also at lower nodes or in leaf axils, with ca 15 to usually flowers, each with the basal bract and bracteoles tardily deciduous, semiavicular, to 4 mm long, pubescent as stem outside. Flowers ca 1.4-1.7 cm diam, the pedicels rather thick, ca 10-22 mm long, usually white to gray-lanuginose; calyx 5-parted, the segments 3.5-5 mm long, accrescent, the lobes ovate to triangular, the apex obtuse to acute, revolute, \pm pubescent as pedicel outside, glabrous within, eglandular or glands rudimentary to few or all 10 well-developed, then paired below each sinus, each obovate to elliptic, 1-2 mm long; rim of concave receptacle ascending to level of calyx sinuses, the center a small carpophore, the surface villous; petals rose to pink (sometimes darker medially or fading to white), subequal to unequal, sparsely to densely appressed-pilose (frequently only medially) outside (\pm glabrate basally within), the claw 1-1.5 mm long, the limb broadly ovate to suborbicular, the base short-decurrent, the margin erulose to erose, 4.5-6.5

× 4–6 mm (one frequently larger; the claw stouter, the limb orbicular, to 7 mm diam, the margin erose), subchartaceous to chartaceous; stamens rose, distinct, the filaments somewhat broader basally, the outer ca 2–2.3 mm long, the inner ca 1.5–1.9 mm, glabrous except a few ovarian hairs basally, the anthers subdorsifixed (introrsely vertical), glabrous or a few hairs basally, the connective tuberculate, the acute apex exceeding thecae ca 0.3–0.4 mm, the thecae ca 1.2–1.3 mm long, each with 0.2–0.3 mm wide (distally narrower) tuberculate wing along outer margin; ovary ca 2.5 mm diam, villous (hairs rarely to often medifixed), the carpels ± coherent centrally, the styles rose, rather stout, ventrifixed, ca 4.5–5 mm long, glabrous to sparsely hirsute (especially basally). Cocci 3 (one or sometimes 2 abortive), each with adaxial lower 1/3 adnate to carpophore, compressed-obvoid, tardily loculicidal along a medial ridge, ca 3.5 mm diam, pilose; seed globose, the testa smooth, light brown.

Flowering Mar–Nov, especially in Sept.

Habit has been rarely listed, but may generally be "caulibus simplicibus vel parce ramosis, saepius pluribus aggregatis e trunco subterraneo communi enatis" (Grisebach, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1875: 126, 1875 for Warming s.n.; illustrated in Köngel. Danske

Vidensk. Selsk. Skr., Raekke 6, Naturvidensk. Math. Afh.
6: 215, 1892). Often locally common in savannas of mid-eastern Brazil (largely Goias and Minas Gerais).

Glaziou (Bull. Soc. Bot. France 52 Mem. 3: 67, 1905) lists roão as a common name for this species in Brazil; Glaziou 18930 listed there is in error for Glaziou 18932.

BRAZIL: Distrito Federal: Parque Municipal do Gama, ca 20 km S of Brasília, alt 700-1000 m, Irwin & Soderstrom 5926 (NY); ca 35 km SW of Brasília, rd to Anapolis, alt 700-1000 m, Irwin & Soderstrom 6032 (NY); E of Lagôa Paranoa, nr Corrego Taquari, alt 975 m, Irwin et al. 15404; Brasília, Fudação Zoobotânica, Pires et al. 9558 (US). Goiás: Cavalcante, Burchell 7897 (GH, GOET, K); s. loc., Gardner 3622 (GH); Macacos, au Morro dos Crystaes, Glaziou 20766a (G); ca 35 km S of Caiaponia, rd to Jataí, alt 800-1000 m, Irwin & Soderstrom 7055 (NY); 24 km NW of Veadeiros, rd to Cavalcante, alt 1200 m, Irwin et al. 9511 (NY); Brasilandia, Macedo 15 (F). Minas Gerais: munic. Santa Luzia, Fazenda da Chicaca, alt 1100 m, Assis 3 (GH); Bello Horizonte, Jardim Botânico, Barreto 7484 (F); s. loc. Burchell 5805 (GH, GOET, K); s. loc., Aug-Apr 1840, Claussen 95A (BR, NY, W); s. loc., anno 1839?, Claussen s.n. (G); s. loc., Aug-Apr 1840, Claussen s.n. (BR, K); s. loc. & s. tempus, Claussen s.n. [F, P, P-JU (11506)

seen as IDC 6206. 853: III. 4), US, W]; Carandahy, Glaziou 14562 (BR, C, G), Glaziou 18932 (C, K), Glaziou 20233 (C); Caeté, Hoehne 6393=SP30253 (GH); campis, Paracatú, Sept 1834 (lectotype), Lund s.n. (C); in campis Santa Anna-Paracatú, Lund s.n. (C); s. loc., Lund s.n. (C, F); Taboleiro Grande (betw Santa Anna & Paracatú), Lund s.n. (C); inter Rio Aracuá & Arraial de Piedade, Martius 1430 [M (photos GH, MO, US)]; munic. Bello Horizonte, Serra do Taquaril, J. E. de Oliveira 1111 (US), J. E. de Oliveira 1172 (US); Arrayal, ad Santa Rita, Pohl 558, 558=1541d [F, W (spec. & Icon. Pl. Brasil. 692)]; s. loc., Pohl? 1541 (K); Sabara, Riedel & Luschnatt 633 (US); s. loc., Riedel (& Luschnatt) 2533 (A, NY); entre (Aldea) Alto dos Bois en Villa do Fanado (= Minas Novas), A. de St.-Hilaire B(1)1376 (P); s. loc., A. de St.-Hilaire B(1)1751(1)? (P); Campos, A. de St.-Hilaire B(1)1752(P); (in monte Serra de Canastra), A. de St.-Hilaire C(1)3905 (P); s. loc., A. de St.-Hilaire s.n. (K, NY); Congonhas do Campo, Stephan s.n. (BR); s. loc., Vauthier s.n. (W); Lagoa Santa, Aug & Sept 1863, Warming s.n. (C); s. tempus, Warming s.n. (C); s. loc., Warming s.n. (GOET); munic. Bello Horizonte, Morro das Pedras, alt 100 m, L. O. Williams & V. Assis 7465 (GH), Williams & Assis 7574 (BR, F, GH, MO, UC, US), alt 1000-1100 m, Williams & Assis 7551 (GH). São Paulo: Burchell 5527 (GH, GOET, K). State Unknown: Burchell 5980

(K); anno 1840, Claussen 577 (G); Claussen? s.n. (W); Pohl? 1539 (K); Pohl 4320 (W); A. de St.-Hilaire s.n. (P); Sellow 87 (K), Sellow s.n. (W); F. A. Varnhegen, Vicomte von Porto Seguro 90 (W).

Typification within the St.-Hilaire syntypes has been done by approximating the drawings with Paris specimens, numbered after the Weddellian system (Dwyer, Ann. Missouri Bot. Gard. ¹⁹⁵⁵ 42: 161, 1955); certain unnumbered specimens there may truly be duplicates, while other collections are indicated for some specimens. Some information was gleaned from the botanical catalogues of A. de St.-Hilaire, seen as microfilms. A type was needed for P. pyroidea f. typica Ndz. because no St.-Hilaire collection was indicated.

The variability of this species is most conspicuous in leaf shape and expression of calycine glands. The reduction of P. psidiifolia dates from the recognition of this by Grisebach in Martius Fl. Bras. ¹⁸⁵⁸ 12(1): 30, 1858; Burchel 7897 and Claussen s.n. (P) are good intermediate examples.

2. Pterandra ultramontana Riley ex Cuatr., Webbia ¹⁹⁵⁸ 13: 557, 1958. (Holotype L.A.M. Riley 707 K; isotype NY).- Fig. 16.

Dense trees to 6.5 m, the branches fulvous-appressed-

Fig. 16. Pterandra ultramontana Cuatr.: A,
habit ($\times \frac{4}{9}$); B, node with
stipules ($\times 1 \frac{1}{3}$); C, fruit ($\times 3$).
A & C after Riley 707 (K); B after
Riley 589 (NY).



hirsute, canescent and glabrescent. Leaves clustered at apex (internodes usually 1 cm long); stipules solitary but deeply bilobate, subdistinct, the lobes narrowly triangular, apically obtuse, to 5 mm long, outside pubescent as stem, densely hirsute within, weakly short-bearded; petioles 7-18 mm long, pubescent as stem beneath, early glabrescent above; blades to 16 × 6 cm, oblanceolate or sometimes elliptic, the base ± long-cuneate, the apex attenuate, subcoriaceous, above glabrate except the costa and usually lateral veins sparsely gray-appressed-hirsute, beneath with lateral veins subprominent, the veinlets inconspicuous (veination pubescent as stem), the surface glaucous, sparsely appressed-hirtellous. Inflorescences umbelliform above the subapical leaf axils, with ca 25-30 flowers, each with the basal and bracteoles persistent, lanceolate to linear, the apex obtuse, ca 1.5-2.5 mm long glabrous or sometimes glabrate. Flowers ca 1 cm diam, the pedicels slender, 18-25 mm long, ferrugineous-appressed-pilose; calyx 5-parted, the segments subequal, to 3.5 mm long, the lobes triangular, the apex obtuse, revolute, pubescent as pedicel outside, glabrous within, with paired glands below each sinus, each obovate, 1.2-2 mm long; rim of concave receptacle ascending to level of calyx sinuses, the center a minute carpophore, the surface lanate; petals white, appressed-pilose ± medially outside (a few ovarian

hairs basally within), the claw to 1 mm long, the limb obovate, the base decurrent, the margin subentire or subbasally erose, 3-3.5 × 2.5-3 mm, subchartaceous; stamens yellow, ± distinct, the filaments basally flattened and villous, distally glabrous, the outer ca 2 mm long, the inner ca 1.5 mm, the anthers introrsely oblique, the connective colliculate, the blunt apex exceeding thecae ca 0.2 mm, the thecae ca 0.7 mm long, each with a 0.35 mm wide tuberculate wing along outer margin; ovary ca 2.4 mm diam, lanate (hairs sometimes medifixed), the styles rather stout, ventrified, ca 3.5 mm long, glabrous. Cocci 3, each subglobose, indehiscent? (weakly ridged ventrally), ca 2.5 mm diam, sparsely tomentose; seed ± ovoid, the testa granulate, ferrugineous. Flowering in Oct & Nov.

Known only from the type and paratype collections gathered "at edge of jungle above sea beach" on an island off the southwest coast of Colombia.

COLOMBIA: Nariño: Isla Gorgona, Riley 589 (F, NY), Riley 707 (coll. C. L. Collenette) (K, NY).

The "St. George" Pacific Expedition was organized by the Scientific Expeditionary Research Association (S.E.R.A.) and named after its yacht; L. A. M. Riley was appointed botanist. The collections cited bear

numbers such as "St. George" Expedn. 707 and S.E.R.A. 707; the holotype mentions C. L. Collenette as collector. Cuatrecasas (*loc. cit.*) lists the collections as if in Collenette's numbering system, although it is clear from Riley's publications (see *Bull. Misc. Inform.* 1928: 158, 1928) that the numbering system was his own even after his return ill to England ca July 1924. Since Riley has published new taxa collected by others under his own system, it is best to follow that policy throughout.

3. Pterandra flavesrens Maguire, Mem. New York Bot. Gard. 8: 128, 1953. (Holotype Maguire & Politi 28104 NY; isotype US).

Shrubs or small trees ca 2-10 m high, the branches rufous-appressed-hirsute, canescent and eventually glabrescent. Leaves clustered at apex (internodes usually < 1 cm long); stipules broadly ovate, apically bidentate, to 5 mm long, outside pubescent as stem, more dense within; petioles ca 5-15 mm long, pubescent as stem; blades ca 4-10 × 1.5-5 cm, narrowly to broadly elliptic to obovate, the base ± cuneate to subobtuse, the apex usually obtuse to broadly rounded, mucronate, coriaceous, above glabrous except the costa pubescent as stem (sparser to glabrate on lateral veins), beneath with lateral veins ± included, the veinlets inconspicuous (veination pubescent as stem), the surface subglaucous,

sparsely appressed-hirtellous. Inflorescences fasciculate to subumbelliform above the subapical leaf axils and leaf scars, with ca 2-10 flowers, each with basal bract and bracteoles \pm persistent, narrowly triangular, ca 2.5 mm long, pubescent as stem outside. Flowers ca 1.5 cm diam, the pedicels thick (especially distally), 14-28 mm long, ferrugineous-appressed-hirsute; calyx 5-cleft, the segments to 4 mm long, the lobes triangular, the apex acute, \pm recurved, pubescent as pedicel outside, glabrous within, with paired glands below each sinus, each obovate, ca 1.5-2 mm long; rim of flat receptacle at level of calyx sinuses, the center a stout carpophore, the surface tomentose; petals pale yellow or cream with red costa, moderately appressed-pilose \pm medially outside (hirsute basally within), the claw 1-1.5 mm long, the limb obovate, the base \pm cuneate, the margin erulose to subentire, ca 4 \times 3-3.5 mm, subchartaceous; stamens subdistinct, the filaments somewhat flattened and hirsute basally, the outer ca 2.5 mm long, the inner ca 2 mm, the anthers perpendicular to filaments, oblongoid, the connective colliculate, the rounded apex exceeding thecae ca 0.2 mm, the thecae ca 1 mm long, each with a 0.4 mm wide tuberculate wing along outer margin; ovary ca 3 mm diam, tomentose (hairs often medifixed), the styles rather stout, subterminal, ca 3.5 mm long, glabrous.

Cocci 3 (one usually abortive), each with adaxial lower 1/2 adnate to carpophore, compressed-obovoid, tardily loculicidal along a medial ridge, ca 3.5 mm diam, tomentulose; seed ovoid, the testa smooth, ivory-brown. Flowering in Dec.

Known only from the type and paratype collections gathered from savanna and marsh along the Caño Negro in southwestern Venezuela.

VENEZUELA: Amazonas: Cerro Sipapo, infrequent marshes Caño Negro, alt 1500 m, Maguire & Politi 27692 (NY, US), Maguire & Politi 27692A (NY); savanna, Caño Negro, alt 1500 m, Maguire & Politi 27946 (GH, K, MO, NY, US); occasional in savanna, open banks of Lower Caño Negro, alt 1500 m, Maguire & Politi 28104 (NY, US).

4. Pterandra arborea Ducke, Bull. Mus. Hist. Nat. (Paris) sér. 2, 4: 736, 1932. (Holotype Ducke RB23649 RB not seen; isotypes P not seen, G, K, US).

Trees to ca 20 m, the branches tan to ferruginous-sericeous, canescent and tardily glabrescent. Leaves clustered at apex (internodes usually < 1 cm long); stipules ovate, apically obtuse, to 2.5 mm long, outside glabrate, rufous-tomentose within; petioles ca 1-1.5 cm long, tan to ferruginous-sericeous; blades to 10.5 × 5.5

cm, elliptic to subobovate (often slightly unequal), the base \pm cuneate, the apex rarely obtuse to usually broadly acute, mucronulate, chartaceous, above ferrugineous-appressed-pilose when young, glabrate except the veins when mature, beneath with lateral veins subprominent, the veinlets conspicuous, moderately tan-sericeous (sparser with age). Inflorescences fasciculate above the subapical leaf axils and leaf scars and from ligneous nodules along terminal ca 8 cm of branchlets, ca 3-5 flowers per fascicle, the basal cluster of bracts and bracteoles \pm persistent, each seminavicular, to 1.5 mm long, pubescent as stem outside. Flowers ca 1 cm diam, the pedicels rather thick (especially distally), 10-15 mm long, buff-appressed-pilose; calyx 5-cleft, the segments subequal, to 3.5 mm long, the lobes triangular, the apex obtuse, \pm revolute, ferrugineous-appressed-pilose outside, glabrous within, with paired glands below each sinus, each obovate, ca 2-2.8 mm long; rim of concave receptacle ascending to level of calyx sinuses, the center a small carpophore, the surface tomentose; petals white (to rose?), sparsely sericeous \pm medially outside (\pm glabrate basally within), the claw 1-1.5 mm long, the limb oblong to broadly elliptic, the base truncate to short-decurrent, the margin subentire, ca 3 \times 2.5 mm, chartaceous; stamens distinct,

the filaments somewhat flattened basally, \pm hirsute, the outer ca 3 mm long, the inner ca 2 mm, the anthers introrsely \pm vertical, the connective colliculate, the blunt apex exceeding thecae 0.1 mm, the thecae ca 0.7 mm long, each with a 1/4 mm wide tuberculate wing along outer margin; ovary ca 2.5 mm diam, tomentose (hairs frequently medifixed), the styles rather stout, subterminal, ca 4 mm long, hirsute basally. Fruit unknown. Flowering in Aug.

Presently known only by a single collection from the central Amazon basin, in non-flooding forest.

BRAZIL: Amazonas: nr Manáos, region of Cachoeira do Rio Tarumá Açu, Ducke RB23649 (G, K, US).

5. Pterandra evansii Cuatr., Brittonia ll: 170, 1959.
(Holotype R. E. Schultes & F. López 10332 US,
photos NY, US).

Shrubs, the branches ochraceous to ferrugineous-sericeous to appressed-pilose, glabrescent. Leaves (here young) clustered at apex (internodes usually < 1 cm long); stipules ovate to triangular, apically acute or bidentate, to 3 mm long, outside pubescent as stem, more dense within; petioles 5-10 mm long, ochraceous-sericeous; blades to 8×2.3 cm, narrowly elliptic to oblanceolate, the base \pm cuneate, the apex acuminate

to short-attenuate, chartaceous, above densely ochraceous-appressed-pilose when young (parser with age), beneath with lateral veins subprominent, the veinlets inconspicuous, pale buff to greenish yellow-sericeous (sparser with age). Inflorescences fasciculate to subumbelliform above the subapical leaf scars, with ca 10-15 flowers, each with the basal bract and bracteoles deciduous, seminavicular, to 3 mm long, pubescent as stem outside. Flowers ca 1 cm diam, the pedicels very slender, ca 15 mm long, pale buff to gray-appressed-pilose; calyx 5-parted, the segments ca 3.5 mm long, the lobes triangular, the apex acute to obtuse, revolute, pubescent as pedicel outside, glabrous within, with paired glands below each sinus, each elliptic, 0.8-1.3 mm long; rim of broad flat receptacle at level of calyx sinuses, the center a short carpophore, the surface \pm glabrate; petals sparsely appressed-pilose \pm medially outside (a few ovarian hairs basally within) the claw ca 1 mm long, the limb obovate, the base decurrent, the margin erose, 3.5-4.5 \times 2.5-3 mm, membranaceous; stamens \pm distinct, the filaments basally flattened, the outer ca 3 mm long, the inner ca 1.8 mm, glabrous except a few ovarian hairs around base, the anthers introrsely oblique, the connective tuberculate, the blunt apex

exceeding thecae ca 0.2 mm, the thecae ca 1 mm long, each with a 0.3 mm wide tuberculate wing along outer margin; ovary ca 2 mm diam, tomentose (hairs rarely medifixed), the styles slender, ventrified, ca 4.5 mm long, glabrous except a few basal hairs. Fruit unknown. Flowering in Aug.

Presently known only from a single specimen collected in southern Amazonas, Brazil.

BRAZIL: Amazonas: headwaters, Rio dos Marmellos, Schultes & López 10332 (US).

SPECIES EXCLUSAE

Pterandra latifolia Ad. Juss. in Delessert, Ic. Sel.

Pl. 3: 19, t. 30, 1838 = Acmanthera latifolia
(Ad. Juss.) Griseb., q.v.

P. opulifolia Rusby, Descr. Three Hund. New Sp. S.

Amer. Pl. 38, 1920 = Hiraea opulifolia (Rusby)

Ndz. in Engler, Pflanzenreich 91 (IV, 141): 144,
1928.

5. LOPHANTHERA

Lophanthera Ad. Juss., Ann. Sci. Nat. Bot. sér. 2,
13: 328, June 1840, nom. cons.; Arch. Mus. Hist.
Nat. 3: 315, t. 6, 1843 (Monogr. Malp. 2: 61,
1844); non Raf. (New Fl. Bot. N. Amer. 2: 58,

1837). (Type L. longifolia (H.B.K.) Griseb.).

Pterandra sect. Androptera Ad. Juss. ex Endl. pro parte, Gen. Pl. 1064, April 1840, sphalm., syn. nov.

Lophantera Iglesias, Album Florístico (ed. 2), sub nom., Minist. Agric., Serv. Florest. (dir. F. de A. Iglesias), Rio de Janeiro, 1940, sphalm., syn. nov.

Lophantaera Ribeiro & Machado, Revista Soc. Brasil. 15(1-2): 3, 1946, sphalm., syn. nov.

Shrubs or small to medium-sized trees, the young branches frequently laticiferous. Leaves decussate, petiolate, glandular; stipules solitary, persistent, axillary, ovate or triangular, basally amplexicaul and distinct, apically obtuse to acute or bidentate; petioles short to rather long, frequently biglandular medially; blades obovate to narrowly elliptic, the base usually + cuneate, the margin repand, the apex acuminate to obtuse, membranaceous to subcoriaceous usually glabrate except main veins pubescent, sometimes basally biglandular beneath. Panicles usually terminal, pendulous or rarely erect, basally bracteate, pubescent, the branches sympodial, few-flowered, bracteate and bracteolate, one subfloral bracteole glandular apically or rarely dorsally. Flowers weakly zygomorphic, pedicellate; calyx 5-lobed, +

pubescent, with 1-4 or 10 usually distinct glands; rim of small to large flat receptacle usually at level of calyx sinuses, the center with a carpophore, the surface usually pubescent; petals clawed, usually unequal, yellow or rarely pink, usually glabrous, usually medially sulcate above and keeled beneath; stamens basally subdistinct or coherent, glabrous, the filaments persistent in fruit, the anthers usually subbasifixed and oblongoid, the connective included or rarely slightly emergent, the thecae alate laterally; ovary sessile, subglobose or ovoid, the 3 (sometimes 2) carpels coherent, glabrous or pubescent (hairs medi-fixed or not), the 3 (sometimes 2) styles persistent in fruit, subterminal to terminal, slender, glabrous, the apex subulate or rarely acuminate. Schizocarp tricarpellate or sometimes bicarpellate, the mericarps readily or tardily separating, each stipitate or sessile, usually tardily splitting along a medial suture; seed one per carpel (sometimes abortive), pendulous.

The genus includes one widespread and 3 restricted species known from the Amazon basin. It was proposed for conservation by Mansfeld (Bull. Misc. Inform. ~~1935~~: 427, 1935) and notice of its acceptance was published in Bull. Misc. Inform., ~~1940~~: 109, 1940. Pterandra

sect. Androptera Endl. consists of mixed elements referring to Galphimia? longifolia and Acmanthera latifolia: Endlicher properly segregated the elements in Mant. Bot. Gen. Pl. Suppl. Sec. 84, 84, 1842. The consistent orthographic error attributed to Iglesias has occurred as an occasional typographic error in several works (including Jussieu, Arch. Mus. Hist. Nat. 3: 33, 48, 1843). The structure of the fruit in Lophanthera longifolia and L. spruceana is highly unusual; it may be that the development of such a carpopodium has allowed water dispersal by creating buoyancy in the mericarp.

Key to Lophanthera

- a. Stipules ovate, to 3.5 mm long; petioles to 12 mm long. Inflorescences erect; subfloral bracteoles dorsally glandular. Flowers pink; styles apically acuminate. Fruit with a carpopodium.....1. L. spruceana
- aa. Stipules triangular, 5-15 mm long; petioles 10-30 mm long. Inflorescences pendulous; subfloral bracteoles apically glandular. Flowers yellow; styles apically subulate. Fruit with or without a carpopodium.
- b. Young branches seemingly without latex.

Leaves usually oblanceolate. Petals
subequal; anthers 2-2.5 mm long, the
thecae of equal length with connective,
their wings 0.5 mm wide. Mericarps
readily separating, each with a stout
carpopodium.....2. L. longifolia

- bb. Young branches conspicuously laticiferous.
Leaves obovate or elliptic. Petals unequal;
anthers 1-1.5 mm long, the thecae exceeding
connective, their wings 0.2-0.3 mm wide.
Mericarps tardily separating, sessile.

c. Young branches strongly laticiferous.

Stipules to 15 mm long, apically
acuminate (rarely bidenticulate);
petioles medially biglandular.
Inflorescences densely flowered,
the indument rufous, the rachis
stout, each peduncle 2-4-flowered,
to 18 mm long. Calyx 10-glandular;
filaments 2.5-2.8 mm long, the
anthers ca 1 mm long; ovary glabrous,
tricarpellate, the styles ca 3 mm long.

Mericarps subcarinate, glabrous, gray...

.....3. L. lactescens

cc. Young branches weakly lacticiferous.

Stipules to 9 mm long, apically
 bidentate to acute; petioles rarely
 with one or 2 glands medially.
 Inflorescences laxly flowered, the
 indument russet to fuscous, the
 rachis slender, each peduncle one
 or sometimes 2-flowered, to 5 mm
 long. Calyx 1-4 glandular; filaments
 3-3.5 mm long, the anthers ca 1.5 mm
 long; ovary villous, usually bicarpel-
 late, the styles ca 4.5 mm long.
 Mericarps carinate, pilose, tan...
4. L. pendula

1. Lophanthera spruceana Ndz., Arbeiten Bot. Inst.

Königl. Lyceums Hosianum Braunsberg 5: 30,
 1914. [Lectotype Spruce 2518=2632 BR;
 isolectotypes C not seen (photos F, GH, MO,
 US), G, K, NY, W; here chosen].

Shrubs or small trees to 4.5 m high, the branches
 soon glabrate. Leaves with stipules ovate, apically
 obtuse, to 3.5 mm long, outside fuscous or gray-
 appressed-pilose (hairs centrally medifixed), glabrate
 within; petioles thick, to 12 mm long, russet to
 canescent-appressed-pilose or glabrate; blades to

24 × 9 cm, obovate to subelliptic, the base cuneate to attenuate, decurrent, minutely revolute, the apex acuminate, subcoriaceous, glabrous above, beneath sparsely russet-appressed-pilose with a pair of ± sunken basal glands. Inflorescences racemiform, axillary and terminal (single to quadrigeminate), erect, russet-subappressed-pilose (including bracts), the rachis to 27 cm long, the basal 3–6 cm sterile except usually with one to several ranks of 2 linear bracts [2–7(–25) mm long, basally biglandular] and/or 2 triangular laterally inner bracts 2–3 mm long, moderately ~~oo~~-flowered distally, each peduncle 1–3-flowered, to 7 mm long, with a free lanceolate basal bract to 2.5 mm long and 2 lanceolate subnodal bracteoles, one ca 1 mm long, the other ca 1.5 mm long with a thick orbicular gland dorsally. Flowers ca 1 1/4 cm diam, deciduous after fruit dispersal?, the pedicels 5–7 mm long, pubescent as peduncles; calyx 5-parted, the segments ca 4 mm long, the lobes ovate, appressed-pilose outside, the margin ciliate, glabrous within, with distinct paired thick glands below each sinus, each suborbicular, ca 1 mm diam, sessile; receptacle large, the center a minute carpophore, the surface glabrate; petals pale pink (rarely white), medially ± sulcate above and costate beneath, the claw ca 1.5 mm long, the limb elliptic

to oblong, the base cordate, the margin crenulate, ca 4.5–5.5 mm long, the uppermost petal larger, the claw stouter, ca 3 mm long, the limb oblong, the base auriculate, the margin erulose, ca 5 × 3.5 mm; stamens basally flattened and coherent, the outer filaments ca 1.8 mm long, the inner ca 2.5 mm, the anthers subdorsifixed, ovoid, ca 2 mm long, the thecae equal to or slightly exceeded by connective, each with a 0.6 mm wide (proximally narrower) bullate wing along outer margin; ovary subglobose, ca 1.8 mm diam, tomentulose (hairs medifixed), the 3 carpels moderately coherent, the 3 styles rather slender, terminal, ca 2.5 mm long, the apex acuminate. Schizocarp tricarpellate (1 or 2 sometimes abortive), trisulcate-obovoid, ca 8 mm diam, glabrate, weakly rugose, the mericarps readily separating, each with a medial suture (tardily splitting?), basal third developed into a cavernose carpopodium; seed sub-globose with a subapical point, the testa reticulate-alveolate, shining, ferruginous. Flowering ca Oct-Jan.

Known only from caatingas along the Rio Uaupes, northwestern Amazonas.

BRAZIL: Amazonas: Rio Uaupes, Panure, Pires 1080

(NY); Rio Uaupés, betw Ipanoré & Rio Negro, Schultes & Pires 9090 (GH, US); Rio Uaupés, prope Panure, Spruce 2518, 2518=2632 (BR, G, K, NY, W).

Unusual features of this distinctive species include the dorsal instead of apical bracteolar glands, the centrally medifixed ovarian hairs and the somewhat blunted style apex.

2. Lophanthera longifolia (H.B.K.) Griseb. in Mart., Fl.

Bras. 12(1): 25, 1858.

Galphimia? longifolia H.B.K., Nov. Gen. Sp. Pl. ed.

quarto 5: 173, 1822. (Holotype Humboldt & Bonpland

ms. 1208 P-HB not seen, photos MO, US & IDC 6209.

124: III. 1 from P-HB).

L. kunthiana Ad. Juss., Ann Sci. Nat. Bot. sér. 2, 13:

329, 1840, nom. superfl.; Arch. Mus. Hist. Nat. 3:

316, t. 6, 1843 (Monogr. Malp. 2: 62, 1844).

L. longiflora C. Mueller in Walpers, Ann. Bot. Syst. 7:

469, 1869, sphalm.

Shrubs or small trees 1-10 m high, the branches ochraceous to ferrugineous-pilose (hairs medifixed, one arm often short), eventually glabrescent. Leaves with stipules narrowly triangular, usually bidenticulate apically, 6-12 mm long, outside subappressed-pilose, glabrous within; petioles 1-2.5 cm long, pubescent as

stem, with a pair of usually prominent glands medially (sometimes a second distal pair); blades 10-32 × 3-11 cm, oblanceolate to obovate (rarely elliptic or oblong), the base attenuate to cuneate, ± decurrent, the apex acuminate to acute (rarely obtuse and apiculate), membraceous to chartaceous, usually glabrous above and glabrate beneath except the main veins ± appressed-pilose, with occasional glandular foveolae beneath.

Inflorescences racemiform, terminal (very rarely also axillary), pendulous, pubescent as stem (bracts sub-appressed-pilose), the rachis to 48 cm long, the basal 3-11 cm sterile except usually with one or rarely 2 ranks of 2 linear outer bracts [ca 5-13(-25) mm long, rarely foliar, oblanceolate, to 11 cm long] and 2 triangular (± bidenticulate) laterally inner bracts 2.5-8 mm long, moderately ~~oo~~-flowered distally, each peduncle 1-3(-5)-flowered, 1-4 mm long, with a free lanceolate basal bract to 3.5 mm long and usually 2 subnodal bracteoles, one lanceolate, 1.5-2 mm long, the other apically modified into a stipitate acetabuliform gland (2 glandular bracteoles terminally). Flowers ca 1 1/4- 1 1/2 diam, deciduous after fruit dispersal, the pedicels 3.5-6 mm long, pubescent as peduncles; calyx 5-parted, the segments ca 3.5-4 mm long, the lobes triangular, sparsely appressed-pilose outside, the

margin weakly ciliate, glabrate within, with distinct paired thick glands below each sinus, each obovate, ca 1-2 mm long, sessile and \pm sunken; receptacle fairly large, the center a small carpophore, the surface \pm villous; petals yellow, subequal, the claw ca 2(-3) mm long, the limb obovate to ovate, the base decurrent, the margin subentire to crenulate, ca 3.5-4 mm long; stamens basally flattened and subdistinct, the outer filaments 2.2-2.5 mm long, the inner 2.6-2.9 mm, the anthers 2-2.5 mm long, the thecae of equal length with connective, each with a 0.5 mm wide (proximally narrower) striately bullate wing along outer margin; ovary trisulcate-obvoid, 1.6-2.1 mm diam, glabrous, the 3 carpels moderately coherent, the 3 styles subterminal, 3.6-4.1 mm long. Schizocarp tricarpellate (all 3 carpels usually fertile), trisulcate-oblongoid, ca 6-7 mm diam, glabrous, rugose-reticulate, the mericarps readily separating, each tardily splitting along a medial suture, basal half developed into a cavitate carpopodium, the cavity \pm filled with fibers; seed \pm lacrimiform, the testa reticulate-alveolate, shining, rufous. Flowering May-Jan, especially Sept-Dec.

Widespread in the Amazon basin, where it is usually found along streams on land which may be flooded; sometimes in non-flooding disturbed forest. Reported Brazilian common names are muricirana (Pires 80) and pracuhuba (Mexia 6048).

BRAZIL: Amazonas: Rio Canuma, G. P. Cooper III 34 (NY, US); Rio Madeira, Borba, Ducke 76 (A, F, MO, NY, US); Rio Negro, Cucuy, alt ca 120 m, Holt & Gehriger 387 (NY, US); Rio Madeira basin, munic. Borba, nr Bella Vista, Krukoff 5988 (A, F, G, K, MO, NY); Rio Madeira basin, munic. Humayta, nr Tres Casas, Krukoff 6269 (A, F, G, K, MO, NY); Rio Madeira basin, munic. Humayta, on Rio Livramento nr Livramento, Krukoff 6757 (NY); Manaos, R. de Lemos Fróes 20486 (NY); ad Barra do Rio Negro, Martius 2760 & s.n. (M); ad Tefé, prov. Rio Negro, Martius s.n. (M); s. loc., prov. Rio Negro, Martius s.n. (M); Maues, Pires 80 (NY); Tefé, Pires 1413 (US); Parintins, Pires & Black 1158 (GH); Ega (= Tefé), Poeppig 2602=2694 (F, G, NY, W); Rio Negro, Sept 1828, Riedel (&Luschnatt) 1447 (A, US); Rio Negro, R. H. Schomburgk 1st coll. 905 (F, G, GH, K, NY, US, W); vic Barra, prov. Rio Negro, Dec-Mart 1850-51, Spruce 1226 & s.n. (M, W); Campo de Janauiri, Spruce 1271 (K); prope Barra, prov. Rio Negro, Spruce 1480 (G, K, NY); Rio Negro, Mirapenima, Tate 53 (K, NY, US); mouth Rio Negro, Igarape da Colonia, Lages, Trail 88p.p. (GH); Rio Purus, at Priti, Trail 88p.p. (K); Rio Negro, Manaos, Ule 5995 (G, K). Pará: Faro, Ducke MG3719 (G, US), Ducke RB12396 (US); Rio Acara, Ducke? MG10850 (G); distr. Acara, Tomé Açu, alt 35 m, Mexia 6048 (A, CAS, F, G, GH, MO, NY, UC, US); sine coll. s.n.

[P-JU (11505 seen as IDC 6206. 853: III. 3)]. Rondonia: terr. Guaporé, Porto Vehlo, J.T. Baldwin Jr 3151 (A, US); region Rio Machado, source of Rio Jatuarana, Angustura, Krukoff 1546 (A, G, NY). State Unknown: environs of Rio Janeiro, 1882, Glaziou 13594a (K); Martius s.n. (M).

VENEZUELA: Amazonas: Río Casiquiare, Humboldt & Bonpland ms. 1208 [P-HB (seen as photos MO, US & IDC 6209. 124: III)]; São José do Casiquiare, R. de Lemos Fróes 21500 (NY, US); Santa Rosa de Amadona, Luetzelburg (Com. Rondon 23100 (M)); Río Cuao, Danta Falls, Maguire & Politi 27321 (NY, US); Río Casiquiare superioris, Spruce 3209 (G, GH, K); isla de El Ratón, alt 100 m, L. Williams 13161 (F, G, US); San Carlos de Río Negro, alt 100 m, Williams 14563 (F, US); Río Negro, Cucuy, alt 100 m, Williams 14716 (A, F, G, US); Río Casiquiare, Solano, alt 100 m, Williams 14771 (F, US); alto Río Orinoco, Esmeralda, alt 143 m, Williams 15314 (F), Williams 15414 (F, US); Río Orinoco, abajo de Esmeralda, alt ca 143 m, Williams 15361 (F, G, US); alto Río Casiquiare, Capihuara, alt ca 120 m, Williams 15642 (F, US).

The distribution of this species was thought to probably extend to Peru by J.F. MacBride (Field Mus. Nat. Hist., Bot. Ser. 13(3,3): 852, 1950) and is definitely listed for Peru by Soukup (Biota 7(59): 364, 1969); no specimens are known to me.

The holotypic specimen of Lophanthera longifolia at P is poor, but it and the remainder of the original description are considered enough for 'racemi erecti' to be taken as error rather than referring to L. spruceana. Maguire's statement that his is the first collection for Venezuela (Mem. New York Bot. Gard. 8: 128, 1953) is in error, since preceded by the type collection and those of L. Williams (Pittier, Cat. Fl. Venez. 2: 34, 1947). Lophanthera kunthiana is clearly superfluous and should not be separately typified, since Galphimia? longifolia is treated as a synonym. Presumably Jussieu gave a new name because of the question mark, while at the same time adding a description of the flower based on new collections (especially of Martius).

Ducke mentions that Lophanthera longifolia has latex only in feeble traces, difficult to observe (Trop. Woods 50: 35, 1937). The structure of the thecal wings here suggests some affinity both with Verrucularia and Blepharandra.

3. Lophanthera lactescens Ducke, Arch. Jard. Bot. Rio de Janeiro 4: 103, 1925. [Lectotype Ducke RB17698 RB not seen; isolectotypes B † (fragment NY, photos GH, MO, NY, US), G, K, US; chosen Engler

& Cavalcante, Bol. Mus. Paraense Emilio Goeldi
ser. 2 Bot. 18: 55, 1963].

Lophantaera lactecens Ribeiro & Machado, Revista Soc.
Brasil. Quí. 15(1-2): 3, 1946, sphalm., syn. nov.
Lophanthera latescens Hegnauer, Chemotax. Pfl. 5: 25,
1969, sphalm., syn. nov.

Trees to 15 m high, the branches densely aureous-sericeous, soon sparsely appressed-pilose and revealing some rufous hairs, then glabrescent (hairs medifixed, one arm often short), when young white-laticiferous.

Leaves with stipules triangular, apically acuminate (rarely bidenticulate), to 15 mm long, outside pubescent as stem, sparsely pilose within; petioles to 2.5 cm long, sparsely aureous-sericeous to glabrate, with a pair of sunken glands medially; blades to 27 x 13 cm, obovate to elliptic, the base cuneate, the apex obtuse to subacute, chartaceous, glabrate and shining above and beneath.

Inflorescences racemiform, terminal, pendulous, rufous-pilose (including distal bracts), the rachis to 65 cm long, the basal 4-6 cm sterile except toward base with one or sometimes 2 ranks of 2 oblanceolate outer bracts (6-10 mm long, densely aureous-sericeous) and 2 triangular laterally inner bracts (4-8 mm long, aureous and rufous-sericeous), densely ∞ -flowered distally, each peduncle 2-4 flowered, to 18 mm long, with an adherent lanceolate basal bract to 3 mm long and usually 2 \pm subnodal

bracteoles, one lanceolate, ca 2 mm long, the other apically modified into a stipitate acetabuliform gland (frequently 2 glandular bracteoles terminally).

Flowers ca 1 1/3 cm diam, deciduous at fruit dispersal, the pedicels usually to 7 mm long, pubescent as peduncles; calyx 5-cleft, the segments ca 4 mm long, the lobes triangular, sparsely pilose to glabrate outside, the margin pilose, glabrous within, with paired thick glands below each sinus, ca 2 mm long, the proximal 4/5 sessile, 3 pairs with each gland distinct, obovate, the 2 most inferior pairs with glands of adjacent sepals + fused, the pair broadly obovate; rim of small flat receptacle above level of calyx sinuses, the center a minute carpophore, the surface sparsely villous; petals yellow, the claw ca 1.5 mm long, the limb elliptic to oblong, the margin subentire, ca 5 mm long, the uppermost petal (opposite fused glands) larger, the claw ca 2 mm long, the limb broadly elliptic, the margin subentire, ca 5 x 4.5 mm; stamens basally linear and subdistinct, the outer filaments ca 2.5 mm long, the inner ca 2.8 mm, the anthers ca 1 mm long, the thecae exceeding connective, each with a 0.2 mm wide (proximally narrower) bullate wing along upper half of outer margin; ovary ovoid, ca 1.7 mm diam, glabrous, the 3 carpels strongly coherent, the 3 styles introrsely subterminal, ca 3 mm long. Schizocarp tricarpellate,

trisulcate-subglobose, ca 5 mm diam, glabrous, the mericarps tardily separating, subcarinate medially, tardily splitting; seed subglobose with a large subapical point over radicle, the testa rugose-alveolate, shining, rufous. Flowering in May.

Rarely collected in the wild, in non-flooding forest of middle Rio Tapajoz, lower Amazon basin.

BRAZIL: Pará: Rio Tapajoz, infra cataractas infimas loco Bella Vista, Ducke RB17698 (G, K, NY, US). Guanabara: Horto Bot. Rio de Janeiro culta, Ducke RB23659 (US).

Ducke brought this species into cultivation in the Jardim Botanico do Rio de Janeiro (Arch. Jard. Bot. Rio de Janeiro 5: 39, 88, 1930) and the grounds of Museu Paraense Emilio Goeldi, Belem (D.F. Austin, personal communication, 1969. Comments on its horticultural value and illustrations are in Rodriguesia 2(5): fig. facing 118, 127, 1936; Album Florístico (ed. 2) sub nom., Minist. Agric., Serv. Florest. (dir. F. de A. Iglesia), Rio de Janeiro, 1940; E.A. Menninger, Fl. Trees World 149, t. 179, 1962; and A.B. Graf, Exotica 3, 1129, 1963. It deserves wider attention.

Ribeiro and Machado were led to investigate this species chemically because of its popular use in

lowering fevers. They isolated the new alkaloid 'lofanteria' which had certain chemical properties similar to quinine (Revista Soc. Brasil. Quím. 15(1-2): 3-10, 1946). Its physiological properties were yet to be tested, and its molecular structure is still undetermined (Hegnauer, Chemotax Pfl. 5: 25, 1969).

There are morphological similarities between the flowers of this species and those of Verrucularia glaucophylla, particularly with regard to the tendency for fusion of inferior calycine glands, and the character of the thecal appendages.

4. Lophanthera pendula Ducke, Trop. Woods 50: 34, 1937. [Holotype Ducke RB29041 RB not seen; isotypes G, K, NY (as Y31953), US].- Fig. 17.

Small trees or shrubs, the branches russet to fuscous-subappressed-pilose (hairs medifixed, one arm often short), glabrescent, when young weakly white-laticiferous. Leaves weakly glandular; stipules triangular, apically bidentate to acute, to 9 mm long, outside pubescent as stem, glabrous within; petioles to 3 cm long, pubescent as stem, rarely with one or a pair of sunken glands medially; blades to 23.5×10 cm, narrowly to broadly elliptic,

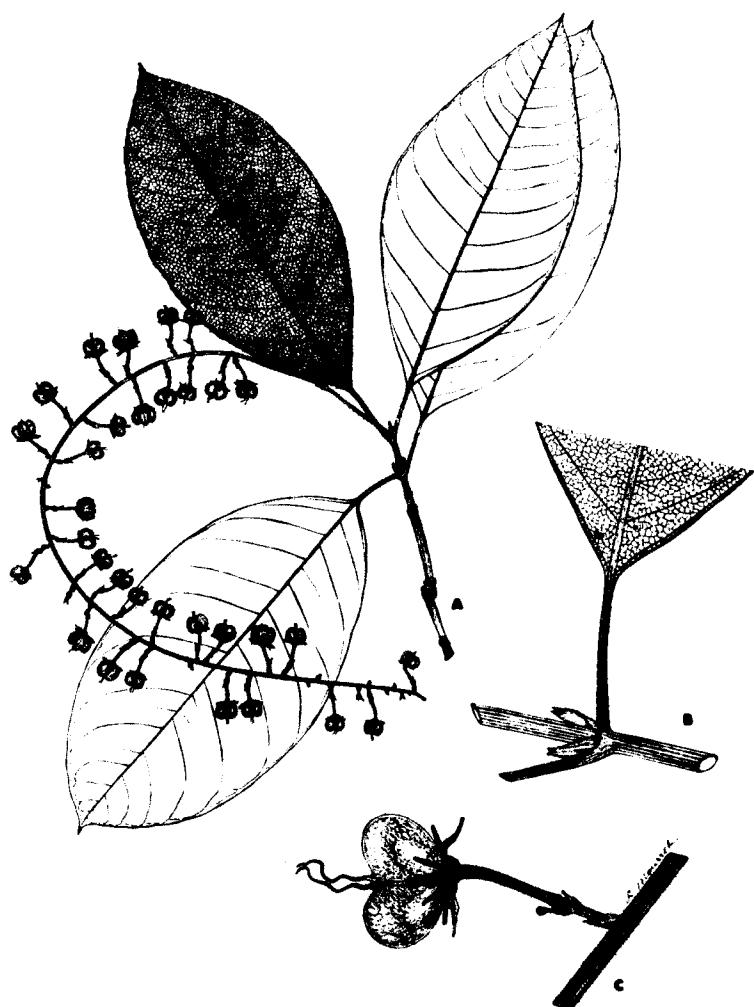
the base acute to rarely obtuse, the apex acute to subobtuse, apiculate to acuminate, chartaceous, glabrate above and beneath except the main veins \pm pubescent as stem, usually with occasional glandular foveolae beneath, especially basally. Inflorescences racemiform, terminal, pendulous, russet to fuscous-pilose (including bracts), the rachis to 55 cm long, the basal 7-13 cm sterile except midway with 2 linear outer bracts 4-28 mm long and usually 2 ovate laterally inner bracts to 5 mm long, laxly ∞ -flowered distally, each peduncle one or sometimes 2-flowered, to 5 mm long, with a free lanceolate basal bract to 3 mm long and 2 subnodal bracteoles, one lanceolate, ca 1.5 mm long, the other apically modified into a stipitate acetabuliform gland. Flowers ca 1-1/4 cm diam, deciduous at fruit dispersal, the pedicels accrescent to 9 mm long, pubescent as peduncles; calyx 5-parted, the segments 3-4 mm long, the lobes narrowly ovate-triangular, moderately setulose outside, puberulent within, with 1-4 distinct thick glands below superior sinuses, each \pm orbicular, ca 1.2 mm diam, sessile; receptacle small, the center a short carpophore, the surface sparsely villous; petals yellow, glabrate, the claw ca 1.5 mm long, the limb el-

liptic to oblong, the margin subentire, 3.5–4 mm long, the uppermost petal (adjacent to calycine glands) larger, the claw to 2.5 mm long, the limb suborbicular, the margin erulose, ca 6 mm diam; stamens basally flattened and coherent, the outer filaments ca 3 mm long, the inner ca 3.5 mm, the anthers ca 1.5 mm long, the thecae exceeding connective, each with a 0.3 mm wide (proximally narrower) colliculate wing along outer margin; ovary subglobose, ca 2 mm diam, villous (hairs not medifixed), the 2 (sometimes 3) styles terminal, ca 4.5 mm long. Schizocarp usually bicarpellate, short-obcordiform, ca 7–9 mm wide (sometimes tricarpellate, trisulcate-subglobose, ca 8 mm diam), moderately pilose, the mericarps tardily separating, carinate medially, tardily splitting; seed subglobose, with a small subapical point over radicle, the testa alveolate, shining, ferrugineous. Flowering in Oct, Jan & April.

Collected rarely along river banks in central Rio Negro region between Içana and Tapurucuara, Amazonas.

BRAZIL: Amazonas: Rio Curicuriari (*inferius*), affl. Rio Negro, Ducke RB29041 [G, K, NY (as Y31953)];

Fig. 17. Lophanthera pendula Ducke: A,
habit (x 3/5); B, node with
stipules (x 1); C, fruit (x 2 1/5).
A-B after Schultes & Lopez 9600
(resp. US & GH); C after Ducke
RB29041 (K).



Rio Negro, Tapuruquara, mata da ilha, Pires 250
 (NY, US); Rio Negro, San Felipe & vic, below
 mouth Rio Içana, Schultes & Lopez 9600 (GH, US),
Schultes & Lopez 9061p.p. (US).

The original handwritten label at NY (Ducke
226=Y31953) states 'latex bruneo' although it is
 published 'laticem album'. According to F. C.
 Hoehne (Relat. Anual Inst. Bot. 1943: 91, 1944)
 this species is cultivated in the Jardim Botânico
 do Rio de Janeiro.

6. VERRUCULARIA

Verrucularia Ad. Juss., Ann. Sci. Nat. Bot. sér 2,
13: 327, 1840.
 Monotypic.

1. Verrucularia glaucophylla Ad. Juss., loc. cit.;
 Arch. Mus. Hist. Nat. 3: 319, t. 7, 1843 (Monogr.
Malp. 2: 65, 1844). (Lectotype Martius 1921 M,
 photos MO, NY, US; isolectotypes M, P-JU 11507
 seen as IDC 6206. 853: III. 5; chosen Juss.,
 1843).- Fig. 18.

Banisteria glaucophylla Mart. ex Mohl, Beitr. Anat.
 Phys. Gew. 1. Bau Form. Pol. 70, 96, 1834, nom.
 subnud.

Dense shrubs to 2.5 m high, the branches erect, ferrugineous-tomentulose, canescent and appressed-pilose to glabrescent. Leaves decussate, eglandular; stipules 2, persistent, axillary, triangular, basally vaginant (by fusion within and between pairs), to 2.5 mm long, appressed-pilose outside; petioles basally extended into a brief annulus adherent to stipules, to 5 mm long, pubescent as stem; blades to 7.5 × 3.5 cm (usually smaller near inflorescence), ovate to obovate or oblong, the base attenuate, the margin entire, revolute, the apex acute to truncate (rarely emarginate), usually apiculate, coriaceous with lateral veins inconspicuous, beneath ruminately glaucous, ferrugineous and moderately pilose to glabrescent.

Panicles terminal or in upper axils, compact, to 12 cm long, ferrugineous-tomentulose to pilose, the branches sympodial, usually 4-6-flowered, to 4 cm long, with the solitary basal bract and subopposite subnodal bracteoles seminavicular, 1.5-3 (-5.5) mm long, usually glabrous. Flowers ca 1.5 cm diam, deciduous (after fruit dispersal?), the pedicels 6-11 mm long, ferrugineous-tomentulose; calyx 5-cleft, the segments ca 3.5 mm long, the

thick lobes erect, triangular, the apex broadly acute, basally ferrugineous-pilose outside, glabrous within, with paired thick glands below each sinus, ca 1.5 mm long, the proximal 4/5 sessile, 3 pairs with each gland distinct, obovate, 2 pairs (inferior?) with glands of adjacent sepals fused, the pair broadly obovate to obcordiform; rim of glabrous receptacle at level of calyx sinuses, the center a trigonous pyramid beneath the ovary; petal reclinate, unequal, keeled beneath, glabrous (or keel glabrate), clawed, the claw red, 2-3 mm long, the limb yellow to orange, oblong, the margin entire to erulose, 4-5 mm long, the petal opposite fused glands (innermost in bud) larger, with claw \pm thicker, canaliculate above, the limb \pm oval, erose, to 6 mm; stamens basally flattened and weakly coherent, glabrous, the filaments persistent in fruit, red, the outer ca 2 mm long, the inner ca 3 mm, the anthers pale yellow, dorsifixed, ovoid, ca 1 mm long, the thecae exceeding connective, each with a subreniform bullate wart projecting subapically from outer margin; ovary sessile, angular-subglobose, ca 2 mm diam, hirtellous especially

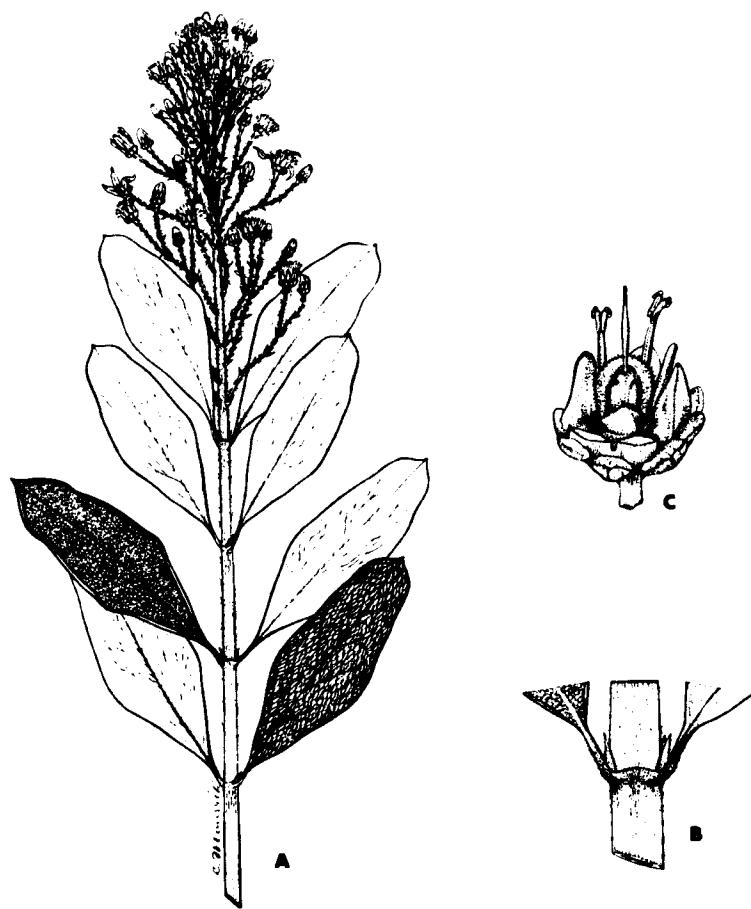
basally (hairs not medifixed), the 3 carpels weakly coherent, the 3 styles slender, pale yellow, introrsely subterminal, ca 2 mm long, glabrous, the apex subulate, minutely truncate at stigma. Schizocarp short-obvoid, ca 4.5 mm diam, puberulous, the mericarps loculicidal; seed pendulous, ± orbicular-pulvinate with a subapical point over radicle, the testa smooth, shining, ferrugineous. Flowering in Feb, July & Oct.

In the savannas and outcrops of mideastern Brazil, where it may locally form as much as 20% of the vegetation (Luetzelburg 16).

BRAZIL: Bahia: entre Sincorá e Mucugé, região da Serra do Sincorá, R. de Lemos Fróes 20229 (NY); Ibyquara, R. de Lemos Fróes 20247 (NY); Rio de Contas, Carrasco, Luetzelburg 16 (M, NY); Serra da Villa do Rio de Contas, Martius 1921 (M). Piauí: Vão do Faria, Luetzelburg 307 (M).

The receptacle here is clearly a low 3-angled pyramid, and the carpel bases are oblique to accommodate it. Jussieu apparently interpreted the receptacle as merely convex, although he speaks

Fig. 18. Verrucularia glaucophylla Ad. Juss.:
A, habit ($x \frac{2}{3}$); B, node with
stipules ($x 2$); C, young fruit
($x 4 \frac{1}{2}$). A-C after Luetzelburg
307 (M).



of a "disci stipitantis jam rudimentum" which is "brevi 3-lobo", and his own drawings suggest its integral pyramidal nature (Arch. Mus. Hist. Nat. 3: 70, 319, 320 & t. 7, 1843). The pyramid cannot be considered a carpophore because it is beneath the carpels rather than between them. A pyramidal receptacle has not previously been reported in conjunction with an unappendaged fruit.

Arènes, in an overlooked reclassification within the family [Notul. Syst. (Paris) 13: 134-136, 1946], had already indicated that the traditional emphasis given to receptacle shape is unwarranted in delimiting subfamilies. However, Verrucularia does not fit his grouping either, and emphasizes the need for detailed comparative studies of receptacle development and adult structure in relation to fruit type.

For the present it seems best to follow Arènes (and indeed Jussieu) by considering fruit structure of greater importance, and allow the subfam. Malpighioideae (syn. Planitorae Ndz.) to include a range of receptacle shapes as well.

7. GALPHIMIA

Galphimia Cav., Icon. Descript. Pl. 5: 61, 1799.

(Type G. glauca Cav.).

Thryallis L., Sp. Pl. ed. 2, l: 554, 1762; Gen. Pl. ed. 6, 213, 1764, non Mart. (Nov. Gen. Sp. Pl. 3: 78, 1829, nom. cons.). (Type Thryallis brasiliensis L.).

Vorstia Adanson, Fam. Pl. 2: (23), 1763, nom. superfl.

Malpighia Galphimia (Cav.) Persoon, Synop. Pl. l: 506, 1805.

Galphinia Poiret in Lamarck, Encycl. Méth. Bot. Suppl. 2: 702, 1812; loc. cit. 5: 687, 1817; sphalm.

Subshrubs or usually shrubs, rarely arborescent.

Leaves decussate, petiolate to sessile, usually glandular; stipules 2, persistent, axillary, triangular to subulate, basally vaginant (by fusion with opposite pair); petioles usually confluent basally with stipules, sometimes biglandular proximally or distally; blades ovate or elliptic to linear, the base obtuse to attenuate (rarely truncate or cordate), the margin usually entire, ± revolute, the apex acute to obtuse, membranaceous to coriaceous, usually glabrous above and beneath, usually with 2 ± sessile marginal glands near base. Inflorescences terminal, racemiform or sometimes paniculate (basal portion sterile and ebracteate or suppressed), laxly few-flowered to densely many-flowered, bracteate and bibracteolate,

pubescent to glabrous. Flowers zygomorphic to actinomorphic, accrescently pedicellate, articulated above the bracteoles, deciduous (after fruit dispersal?); calyx deeply 5-parted, variously pubescent to glabrous, eglandular to ca 5-glandular; rim of glabrous receptacle at level of calyx sinuses, the center briefly elevated as a disc beneath the ovary, the disc variously protruding into carpels; petals deciduous or persistent in fruit and accrescent, usually unequal, yellow (sometimes aging reddish), usually glabrous, subpatent to reclinate, clawed, costate to carinate beneath; stamens basally sub-distinct to connate, usually glabrous, the filaments persistent in fruit, the anthers usually basifixed, ovoid to oblongoid, usually the thecae exceeding included connective; ovary sessile on disc, usually angular-subglobose and glabrous, the usually 3 carpels \pm coherent, the usually 3 equal styles persistent in fruit, terminal, glabrous, the apex subulate. Schizocarp usually angular-subglobose, glabrous, the mericarps tardily separating, each subcarinate medially and loculicidal; seed one per carpel, pendulous, usually ovoid with a subapical point over radicle, shining.

A commonly collected genus of 10 species

usually found in drier habitats from Texas to Argentina. Some species have been introduced into cultivation, but only Galphimia gracilis is widely grown. Morphologically the genus appears closest to Verrucularia, although it differs especially in lacking thecal appendages and the calycine glands are usually single rather than paired. Galphimia langlassei subsp. latanthera is unusual in the genus (and family) in that the inner whorl of stamens is shorter than the outer whorl.

The brief receptacular disc beneath the ovary sets this genus apart from the others in the subtribe, although its development is not a surprising departure from the more typical flat to concave condition. Its variability within the genus and even within single specimens indicates its minor taxonomic value. Schizocarps here are the most weakly sutured, although the value of single-seeded dehiscent mericarps which readily separate from each other is not apparent. The weakly bulbous and ± cavitate base occasionally found (eg. G. glandulosa Cav.) is reminiscent of the carpopodium in certain species of Lophanthera, although there is no certain indication of homology.

Galphimia has been the most poorly understood genus of the Galphimiinae, suffering both from historical accidents of collection and publication and from poor taxonomic judgment or understanding. The availability of most types and the recognition of the importance of deciduous versus persistent petals in fruit have been primary factors in developing the current treatment.

Thryallis L. was described based on an illustration of a plant only recently rediscovered (see G. brasiliensis subsp. brasiliensis). Linnaeus placed his single species in Decandria-Monogynia, and also in his natural group Tricoccae (Linnaeus, Gen. Pl. ed. 6, Ord. Nat. 38, no. 533, 1764). The explanation for his error in considering the taxon single-styled is still uncertain. However, the error when coupled with the obscure 1648 woodcut was enough to cause various placements of the genus before additional collections stabilized the situation. It was placed in the Aceraceae by Jaume St.-Hilaire (Expos. Fam. Nat. 2(1): 17, 1805); in the Meliaceae by K. Sprengel (Anleit. Kennt. Gew. ed. 2, 2(2): 690, 1818); and in the Zygophyllaceae by Rueling (Ord. Nat. Pl. Comment. Bot. 48, 1774). Giseke treated Thryallis in the Tricoccae, evidently considering it a member of the

Euphorbiaceae from his grouping of genera (Praelect. Ord. Nat. Pl. 474, 1792). However, he probably was considering Jatropha curcas L., Sp. Pl. ed. 1, 2: 1006, 1753, for Linnaeus there refers to "Marcgr. bras. 97" which is correct for this species, while the numbers transposed to 79 refer to the page for Marcgrave's woodcut of Thryallis brasiliensis.

This early confusion probably influenced contemporary botanists in taking up Galphimia. Yet here also there has been difficulty in taxonomic interpretation, since the plates and descriptions published by Cavanilles proved inadequate to differentiate future collections, and the specimens at Madrid were not distributed (nor apparently even examined). This difficulty is unfortunately not yet resolved. Further complications developed with the publication of new species in Thryallis which were not congeneric (Martius, Nov. Gen. Sp. Pl. 3: 78, 1829). For a time botanists tended to accept the rather well documented concepts of Cavanilles and Martius, but with more recent emphasis on nomenclatural legitimacy Thryallis L. again came into use.

This history prompted Morton and Cuatrecasas to propose Thryallis Mart. for conservation (Taxon

16: 76, 1967), which was accepted by the Committee for Spermatophyta (Taxon 17: 328, 1968), by the General Committee (Regnum Veg. 60: 104, 107, 1969), was conserved at final nomenclatural session of the Internat. Bot. Congress, Seattle, 1969. However, it is interesting to note that in the survey made upon the change of the homonym rule, Green considered that Thryallis Mart. should not be conserved (Bull. Misc. Inform. 1935: 516, 1935), since it was not originally described as a new genus. Finally Persoon's placement of Galphimia under Malpighia was done without consideration to the latter having drupaceous fruits and truncate styles; although not definitely considered a section by Persoon, it was so listed by Pfeiffer, Nom. Bot. 1:(20), 1405, 1874.

With this treatment from the scientific community, one may question its treatment by natives in Mexico and Central America. It has fared little better, as the common names listed below are usually not closely associated with any one taxon. The earliest probable reference to Galphimia is Hernández, Hist. Pl. Nueva Esp. 3: 1022, fig. 253, 1946; the manuscript was prepared ca 1570-1575 (Langman, Select. Guide Lit. Fl. Pl. Mex. 361, 1964). The

figure bears the name totoncapatli and could well be any Galphimia with racemes.

While the specific treatment followed here departs widely from that presented by Niedenzu (*Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg* 5: 21-28, 1914), his sectional understanding of the genus is appropriate and is largely followed here. The characters still of value in differentiating the sections are presented in the key below; the position of the bracteoles on the pedicel, the diameter of the flowers, the shape of the sepals and the length of the filaments in relation to the sepals are no longer considered useful. Although the leaves are never as linear in Galphimia sect. Galphimia, their variability and range in each section make description unpractical.

In Galphimia sect. Galphimia, I recognize G. gracilis, G. glandulosa, G. sessilifolia, G. glauca, G. multicaulis and G. hirsuta (as G. burchiana), and have reduced G. paniculata and G. schiedeana to varietal rank (as G. glauca var. ovalifolia and G. glauca var. schiedeana); in addition G. tuberculata has been placed here from Niedenzu's *Species incertae invisae*, and G. langlassei has been taken out of synonymy. While there thus appears to be reasonable

stability in the numbers of species recognized by Niedenzu and myself, comparative examination of synonymy and specimens annotated will indicate the marked differences in our concepts. The key is considered to be largely natural.

Key to Galphimia

- a. Plants usually suffruticose, to 1-1/4 m high. Petals reclinate, deciduous; anthers small, 0.7-1.5 mm long.....
.....Galphimia sect. 1 Microgalphimia
- b. Petioles to 4 mm long; blades densely pubescent above and beneath. Bracts 5-10 mm long, bracteoles 1.3-4 mm long. Filaments 4.3-5.5 mm long; styles 6.8-8 mm long. (Mexico: N Sierra Madre Occidental).....2. G. vestita
- bb. Petioles to 8 mm long; blades glabrous (or costa rarely glabrate beneath). Bracts 1-4.5 mm long, bracteoles 0.5-1.5 mm. Filaments 1.8-4.6 mm long; styles 3.9-5 mm long. (Mexico: Baja Calif., Sonora-Sinaloa coast, N. Sierra Madre Oriental, U.S.A.: Texas, South America).....1. G. brasiliensis

- c. Branches usually pubescent. Leaves usually narrowly lanceolate or ovate. Bracts & calyx eglandular; inner filaments 3-4.6 mm long, ovary pubescent. (North America & NE Brazil, ca 5°-15° S lat.).
- d. Ramal hairs with crosspieces flexuose, 0.4-0.8 mm long; petioles usually only confluent with interpetiolar portion of stipular bases; blades ovate, commonly ± truncate basally & subacute apically; frequently resinous-pusticulate beneath. Flowers ca 3/4-1 cm diam; petals unequal; outer filaments 2-3 mm long. (NE Brazil).....
...la. G. brasiliensis subsp. brasiliensis
- dd. Ramal hairs with crosspieces usually straight, 0.7-1.5 mm long; petioles ± completely confluent with stipular bases; blade if ovate commonly ± obtuse basally & subobtuse apically, nonresinous beneath. Flowers ca 1-1-1/2 cm diam; petals equal to subequal; outer filaments 3-4 mm long. (N Mexico & U.S.A.: Texas).....
...lb. G. brasiliensis subsp. angustifolia

- cc. Branches often glabrous. Leaves usually lanceolate to broadly lanceolate. Bracts sometimes basally biglandular; calyx usually glandular; inner filaments 2.1-3.8 mm long; ovary glabrous. (S. South America, ca 15°-35° S lat.)...lc. G. brasiliensis subsp. australis
- e. Leaves usually lanceolate, the apex long-acute, usually 0.4-2.8 cm wide. Racemes usually pubescent. (S. South America)...
-lca. G. brasiliensis subsp. australis
f. australis
- ee. Leaves usually broadly ovate, the apex rounded, usually 2-5.3 cm wide. Racemes usually glabrous. (E-central Paraguay)
-lcb. G. brasiliensis subsp. australis
f. platyphylla
- aa. Plants fruticose, to 5 m high. Petals subpatent; anthers large, 1.4-3.7 mm long (where rarely short petals persistent).....Galphimia sect. 2 Galphimia
- f. Biglandular on base of blade to junction or on distal half of petiole (inflorescence then subappressed-hirsute). Calyx eglandular; petals persistent in fruit, accrescent; ovary glabrous.
- g. Leaves subappressed-hirsute beneath &

- sometimes above; petioles biglandular (on distal 1/3-1/2). Bracts 1.2-2 mm long, ± subappressed-hirsute outside. Flowers 1 1/2 - 1 3/4 cm diam; calyx-segments 2.3-3 mm long; petal-limbs 5-7 mm long, uppermost 5-6.8 mm; anthers 1.4-1.8 mm long. (Mexico: Oaxaca).....5. G. burchiana
- gg. Leaves glabrous (or costa rarely glabrate beneath), biglandular, near base, at junction with petiole or on its distal 1/2. Bracts 1.2-7.5 mm long, glabrate to glabrous outside. Flowers 1 1/2-3 cm diam; calyx-segments 2.7-5 mm long; petal-limbs 5.5-12.5 mm long, uppermost 6-12.5 mm; anthers 1.8-3.5 mm long. (Mexico-Nicaragua).
- h. Shrubs to 1.5 m high, the many stems few-branched. Petioles short, obsolete to 7(-11) mm long; blades usually ovate to lanceolate, basally obtuse & biglandular, often red-maculate, veination often conspicuously pale. Racemes frequently tripartite, densely ~~oo~~-flowered, bracteoles usually near basal bract.

Petals apically subacute....

.....3. G. multicaulis

hh. Shrubs (rarely arborescent) 0.5-5 m

high, the fewer stems ∞ -branched.

Petioles usually longer, 1-70 mm

long; blades ovate to elliptic,

basally obtuse to attenuate, bi-

glandular basally or on petiole,

usually nonmaculate, veination

usually inconspicuous. Inflores-

cences racemiform to paniculate,

laxly few-flowered to densely

∞ -flowered; bracteoles usually

separated from basal bract. Petals

seldom subulate.....4. G. glauca

i. Blades to 8×4.5 cm, usually

biglandular above or below

junction with petiole to 3 cm

long. Inflorescences usually

single racemes or strongly

paniculate; bracts usually 1.2-3.5

mm long (if larger leaf glandular-

dentate), triangular to subulate.

Calyx-segments usually 2.7-4 mm

long; petal-limbs 5.5-10.5 mm

long, largest 6-11 mm.

- j. Stipules 1.2-3.8 mm long;
blades usually ovate, the base
 \pm obtuse and usually bigland-
ular above junction with
petiole 1-20 mm long. In-
florescences racemiform....
.....4a. G. glauca var. glauca
- jj. Stipules 1-2 mm long; blades
often elliptic, the often
attenuate base \pm minutely
decurrent to paired glands
usually or distal 1/2 - 1/3
of petiole 5-30 mm long.
Inflorescences usually pan-
iculate.....
-4b. G. glauca var. ovalifolia
- ii. Blades to 14.5×8.2 cm (never
dentate), usually biglandular
at junction with petiole to 7 cm
long. Inflorescences usually
 \pm tripartite racemes to weakly
paniculate; bracts usually 2.3-
7.5 mm long, ensiform. Calyx-
segments 3.8-5 mm long; petal-
limbs 7.5-12.5 mm long, largest
8.5-12.5 mm.....

.....4c. G. glauca var. schiedeana

k. Recent branches ± sub-appressed-hirsute. Leaves often elliptic & attenuate basally, rarely over 7 cm long; petioles to 4.3 cm. Rachis brown, densely to sparsely subappressed-hirsute; bracts 2.5-7.5 mm long. Anthers 2.3-3 mm long (W-central Mexico)...

...4ca. G. glauca var. schiedeana
f. schiedeana

kk. Recent branches glabrous. Leaves usually ovate & obtuse basally, frequently over 7 cm long; petioles to 7 cm. Rachis usually green, glabrous except when very young; bracts 1.5-4.8 mm long. Anthers 2.8-3.5 mm long. (usually NW Mexico).....

...4cb. G. glauca var. schiedeana
f. neoviscayana

ff. Biglandular on base of blade or on proximal half of petiole (inflorescence then glabrous).

Calyx frequently glandular; petals deciduous in fruit (rarely a few marcescent); ovary glabrous to pilose.

l. Leaves \pm cadaceous; petioles biglandular.

Inflorescences racemiform to rarely paniculate, usually \pm subappressed-hirsute to rarely glabrate. Petals yellow or claw aging reddish. Fruit glabrous or pilose.

m. Leaves obtuse to attenuate basally & biglandular, subchartaceous to subcoriaceous; petioles usually 2-33 mm long (if shorter then slender from \pm attenuate leaf base). Flowers eglandular or glandular.

n. Upper petal-limb 5.5-7.5 mm long; ovary usually glabrous (if sparsely pilose along sutures then leaf base broad), upper style 0.2-1.3 mm shorter than lower 2. Fruit (4-)4.5-6 mm diam.....7. G. gracilis

nn. Upper petal-limb 4.2-6.2 mm long; ovary usually densely to sparsely

pilose (if glabrous leaf glands strongly stipitate), styles equal. Fruit 3.5-4 mm diam.

o. Branches usually smooth, glabrous to sparsely subappressed-hirsute. Petioles 2-33 mm long, glabrous; blades smooth, basal glands subsessile. Rachis smooth; bracts 1.3-2.5 mm long & bracteoles 0.8-1 mm (if longer anthers broad, < 2.9 mm long). Subsessile calycine glands rarely present; ovary densely pilose.....8. G. langlassaei

p. Young branches brown.

Petioles slender, ± brown. 2-11 mm long; blades to 2.3 cm wide, chartaceous. Inflorescences racemiform, their branches ± brown, 2-11 mm long; blades to 2.3 cm wide, chartaceous. Inflorescences racemiform, their branches ± brown, moderately flowered, the bracts to 2.5 mm long, the

bracteoles to 1 mm.

Petals with claws 1.6-2.2 long (largest 2.2-3.9 mm), the limb ovate, basally obtuse to subcordate; outer stamens shorter than inner, the inner filaments 3.1-4 mm long, the anthers oblongoid with small included connectives, 2.8-3.7 × 0.7-1 mm, styles 5.5-6 mm long.....

.....8a. G. langlassei subsp. langlassei

pp. Young branches green. Petioles rather stout, green to ivory-tan, 8-33 mm long; blades to 4.6 cm wide, subcoriaceous. Inflorescences paniculate, their branches ± green, rather densely flowered, the bracts to 4.5 mm long, the bracteoles to 2.5 mm. Petals with claws 2.4-2.5 mm long (largest 4-4.7 mm), the limbs broadly ovate to short-subreniform, basally cordate to truncate; outer stamens longer than inner, the inner filaments 1.6-2.7 mm long, the anthers broadly oblongoid to ovoid with stout often excluded connectives, 2.3-2.9 × 1-1.8 mm; styles 4.5-5.5 mm long.....

-8b. G. langlassei subsp. latanthera
- oo. Branches \pm tuberculate, moderately to densely subappressed-hirsute. Petioles (0-) 1-8.5 mm long, pubescent; blades ivory-pusticulate above, brown-granulate beneath, basal glands strongly stipitate. Rachis usually \pm tuberculate; bracts 2.5-4 mm long, bracteoles 1-2 mm. Stipitate calycine glands often present; ovary glands often present; ovary glabrous to moderately pilose.....9. G. tuberculata
- q. Leaves glabrous above & beneath (or costa subappressed-hirsute beneath). Calyx-segments glabrous outside, eglandular or some sinuses basally with a usually stipitate gland to 0.4 mm diam.....
- ...9a. G. tuberculata var. tuberculata
- qq. Leaves subappressed-hirsute above & beneath. Calyx segments \pm similarly pubescent, eglandular? or each sinus basally with a subsessile gland 0.5-0.6 mm diam.....
-9b. G. tuberculata var. hirsuta

mm. Leaves cordate to rarely obtuse
 basally (± amplexicaul) & usually
 eglandular, coriaceous; petioles
 stout, obsolete to 2 mm long.
 Flowers eglandular.....
10. G. sessilifolia

Galphimia sect. 1 Microgalphimia Ndz., Arbeiten Bot.

Inst. Königl. Lyceums Hosianum Braunsberg 5: 21,
 1914 (Type G. brasiliensis (L.) Ad. Juss.).

G. sect. Microsteria Lobreau, Pollen & Spores 9: 246,
 1967, sphalm.

1. Galphimia brasiliensis (L.) Ad. Juss. in St.-Hilaire
 et al., Fl. Bras. Merid. ed. folio 3: 54 (ed. quarto
 71, not seen), 1833.

Thryallis brasiliensis L., Sp. Pl. ed. 2, 1: 554, 1762.
 (Type Marcgrave, Hist. Rerum Nat. Brasil. 79, fig.
inf. dextr., in Piso & Marcgrave, Hist. Nat. Brasil.,
 1648; typotype Marcgrave s.n. C - Herb. ... Bras. ...
 G. Marcgr. p. 20 not seen, photo M0; spec. here
 chosen).

G. brasiliensis var. pubescens f. ovata Ndz., Arbeiten
 Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5:
 22, 1914, syn. nov. (Lectotype Salzmann s.n. G;
 isolectotype M0; here chosen).

This widespread and successful species of North and South America is best considered as three subspecies each of which presents some geographical isolation. The treatment of its elements in past literature has been marred by lack of clear typification and the regionalism of the interest taken.

Galphimia brasiliensis subsp. brasiliensis may perhaps best be considered as a relict which has diverged into successful northern and southern rather independent evolutionary units which are both making somewhat parallel adaptations to subtemperate climates.

There are three references from the literature which cannot be determined to subspecies. Ducke mentions that latex is known to exist here as well as in Lophanthera (Arch. Jard. Bot. Rio de Janeiro 4: 104, 1925), and Record & Hess indicate that the latex may also be bitter (Timbers New World 349, 1943). Heal et al. (Lloydia 13: 129, 1950) tested a sample of the species in a general survey seeking plants with insecticidal activity, but found no insect responses with their experimental design which were worthy of further study.

1a. G. brasiliensis subsp. brasiliensis

Suffruticose to fruticose plants ca 45 to 125

cm high, the branches ascending to erect, frequently tuberculate, moderately to sensely fulvous to russet-tomentulose to subappressed-hirsute [crosspieces of hairs flexuose, ca (0.4-) 0.5 (-0.8) mm long], tardily conescnt, eventually glabrate. Leaves with stipules subulate, 1.5-3.5 mm long, pubescent as stem outside to glabrate, rufous; petioles usually only confluent with outer (interpetiolar) portion of stipular bases, 2-8 mm long, pubescent as stem or sparser; blades 1.4-5.5 × 0.63.2 cm, ovate or rarely subelliptic, the base truncate to obtuse and short-decurrent, the margin subrevolute, the apex acute or subacute to rarely obtuse, apiculate, membranaceous to subcoriaceous, beneath glabrous or sometimes costa glabrate, the surface frequently brown-pusticulate, with usually 2 sessile to stipitate glands near base. Racemes 5-20 cm long, pubescent and muricate as stem, laxly few-flowered, each flower basally with a lanceolate bract 1-2 mm long (proximal sometimes foliar) often transversely somewhat separated from 2 lanceolate bracteoles 0.5-1.2 mm long, the 3 pubescent as stipules. Flowers ca 3/4-1 cm diam, the pedicels 3-5(-7) mm long, pubescent as stem; calyx deeply 5-parted, the segments 2.5-3.5 mm long, usually revolute, lanceolate to elliptic, green to purplish, glabrous outside and within, us-

ually caespitously pilose apically (sometimes persistent), eglandular; receptacular disc intruding as a short persistent nodule or ligule into base of each carpel; petals deciduous in fruit, yellow often aging red or rose, reclinate, costate to subcarinate beneath (costa often darker), the claw 1-1.3 mm long, the limb ovate to trullate (uppermost? broadly ovate), the base cuneate to truncate, the margin erulose, the apex acute to obtuse or praemorse, 3.3-4.5 mm long (uppermost? usually longest); stamens weakly coherent basally, the filaments unequal, the outer basally flattened, 2-3 mm long, the inner less flattened, 3.2-4.6 mm long, the anthers subbasifixed, ovoid, 0.7-0.9 mm long; ovary 1.2-1.5 mm diam, moderately hirtellous (hairs not medifixed), the carpels moderately coherent, the styles filiform, 4-4.5 mm long, the apex subulate, minutely truncate at stigma.

Schizocarp angularly short-obovoid to globose, 3-4.5 mm diam, puberulous, the mericarps separating at maturity; seed with testa ± alveolate, fulvous to darkly ferrugineous. Flowering throughout the year (Jan, Apr-July & Oct).

Infrequently collected in northeastern Brazil in dry areas, sometimes along roadsides.

BRAZIL: Bahia: s. loc., Blanchet 1046 (G); Jacobina, Blanchet 2184 (G); Muritaba, Blanchet 2674p.p. (G); Serra de Jacobina, Blanchet 2674p.p. (BR, G, K); Villa di Barra (nr Jacobina), Blanchet 2674p.p. (G); s. loc., Blanchet 2674 (BR, C, G, MO, W); Serra de Jacobina, Blanchet 2674 & 3904 (NY); Jacobina, Blanchet 3904 (G); s. loc., Blanchet 3904 (F, G); s. loc., annis 1847 & 1857, Blanchet s.n. (G); s. loc., in fruticetis, anno 1830, Salzmann s.n. (G, MO); s. loc., inter frutices, anno 1831 & s. anno, Salzmann s.n. (G); s. loc., in collibus, Salzmann s.n. (K): Catinga bei Remanso, Ule 7180 (G, K). Paraíba: s. loc., Coelho de Moraes 2116 (A, NY, UC, US); Serra Borborema, Luetzelburg 12473 (M). Pernambuco: s. loc., Gardner 944 (GH, K, NY, US, W); s. loc., anno 1842, Houlet s.n. (BR). Piuái: s. loc., Gardner 2077 (GH); s. loc., (civ.) superioris, anno 1819, Martius 3411 (M); prope Terra Nova, Martius s.n. [P-JU (11508p.p. seen as IDC 6206. 853. III. 6)]. Piuai or Pernambuco: Terra Nova or S. Isabella, Martius 3411 (M). State Unknown: July 1839, Gardner 1044 (W); (NE Brazil), Marcgrave s.n. (Herb. Brasil. p. 20) (photo MO), Marcgrave s.n. (loc. cit. p. 22) (photos MO, US); Martius s.n. (M); Swainson s.n. (K).

This subspecies is the type of Thryallis L., a genus which Lindley has called "one of the most obscure in the science of Natural History. It was established by Linnaeus, upon a specimen which has never been seen by any other person, but to which he referred the rude figure in Marcgraaf, p. 79.

f. 3. Sir James [Edward] Smith [founder of the Linnean Society] could find no trace of it in the Linnaean Collection" (Bot. Reg. 14: 1162, 1828).

K. Sprengel also remarked on the lack of a specimen when associating this genus with Galphimia (in Caroli Linnaei ... Gen. Pl. ed. 9, 1: 377, 1830).

Ad. de Jussieu (in St.-Hilaire et al., Fl. Bras. Merid. ed. folio 3: 54, 1833) commented on the plant of Marcgrave that Linnaeus "parait l'avoir connu autrement que par la description et la figure de cet auteur, puisqu'il fait entrer dans son caractere des parties qui ne s'y trouvaient pas mentionnees, notamment le fruit." Jussieu later remarked (in Arch. Mus. Hist. Nat. 3: 322, 1843) that the problem was "nunc insolubile typo in herbario Linnaei amisso." The species is not listed by Savage in his Cat. Linnaean Herb., 1945.

Fortunately, the recent rediscovery of the

Marcgrave herbarium has allowed at least partial resolution of this problem (B. MacBryde, *Taxon* 18?: in press). Since Linnaeus did not indicate what specimen of Thryallis brasiliensis he observed, and cited only the treatment of Marcgrave, the illustration there is taken as type. There were at one time oil paintings and water colors associated with at least some of these woodcuts (see especially Nissen, *Bot. Buchillus.* ed. 2, 2: 141, 1966), but I have received a letter dated 19 Sept 1969 from Dr. Hans-Erich Teitge, Abteilungsdirektor, Handschriftenabteilung & Literaturarchiv, Deutsche Staatsbibliothek in Berlin, in which he states that these paintings "gehören leider zu unseren Kriegsverlusten." However, one can now determine the Marcgrave specimen from which the quite accurate woodcut was made. Both the typotype and the duplicate are in a state of preservation which would have allowed Linnaeus' complete descriptions, but do not explain his error in considering the species to bear flowers with single styles. If he did not in fact make the error while observing Marcgrave's collection of T. brasiliensis, then there may yet be another specimen which he attempted to associate with the woodcut. Discovery of this specimen would not change the typification

as here presented. Some of the consequences of his mistake are indicated in comments under the genus.

Morton and Cuatrecasas (Taxon 16: 76, 1967) had remarked that "there is some doubt that the Linnaean T. brasiliensis is properly associated with this species of Galphimia"; if they were not referring to the problem of Linnaeus' error with regard to the monogynous flowers, they perhaps suspected that Marcgrave's specimens collected in northeastern Brazil were unlikely to be the commonly collected plant from further south which is now seen to be G. brasiliensis subsp. australis. Niedenzu has included only northeastern Brazilian collections under his G. brasiliensis var. pubescens f. ovata, although he followed Jussieu in considering the southern population as typical G. brasiliensis. However, in a surprising departure from common practice, Pickel (Revista Fl. Med. 16: 247, 1949) identified Marcgrave's illustration as G. gracilis Bartl., without explanation.

The few collections of this subspecies prevent a proper understanding of its variability, although present specimens indicate a closer affinity to the North American subspecies. Two collections are aberrant in having developed foliar bracts and

calyces (Blanchet 1046 & Houlet s.n.). Although abnormal individuals are also known in G. brasiliensis subsp. australis, it is difficult to suggest a meaningful single explanation for the teratology.

1b. Galphimia brasiliensis subsp. angustifolia
(Bentham) B. MacBryde, comb. & stat. nov.

G. angustifolia Bentham, Bot. Voy. H.M.S. Sulphur 9
t. 5, 1844. (Holotype R. B. Hinds s.n. K).
G. linifolia A. Gray, Gen. Fl. Amer. Bor.-Orient.
Illus. (Gen. Pl. U.S. Illus.) 2: 196, t. 173,
1849. [Lectotype Wright 93 (Texas non Cuba)
GH; isolectotypes G, GH, K?, US; here chosen].

G. linifolia β oblongifolia A. Gray, Smithsonian
Contr. Knowl. 3(5): 36, 1852 (Pl. Wright. 1).
[Holotype Wright 94 (Texas non Cuba) GH;
isotypes G, GH, K, NY, UC, US].

G. angustifolia var. oblongifolia (A. Gray) S.
Watson, Proc. Amer. Acad. Arts 24: 42, 1889.

Thryallis angustifolia (Bentham) O. Kuntze, Rev. Gen.
Pl. 1: 89, 1891; superfluously by Rose, Contr.
U.S. Natl. Herb. 12: 280, 1909.

T. linifolia (A. Gray) O. Kuntze, loc. cit.

T. angustifolia oblongifolia (A. Gray) Vail, Bull.
Torrey Bot. Club 22: 228, 1895.

G. angustifolia var. ovalifolia J. Arènes, Notul.

Syst. (Paris) 12: 189, 1946. (Holotype Scott
Elliot s.n. = Palmer 217 P not seen; Palmer
217 isotypes C, GH, K, NY, UC, US).

Caespitose suffrutescent to fruticose plants
(10-) 20-40(-100) cm high, the long taproot ligneous,
the branches rarely decumbent to usually ascending
or erect, sparsely incanous-appressed-hirsute to
densely ferrugineous-subappressed-hirsute (cross-
pieces of hairs usually straight, ca (0.7-) 1 (-1.5)
mm long, ± canescent. Leaves with stipules subulate,
1-4 mm long, pubescent as stem outside to glabrate,
reddish; petioles ± completely confluent with stip-
ular bases, obsolete to 7 mm long, sparsely pubescent
as stem; blades 0.7-6.5 × 0.2-2 cm, linear to ovate
or oblong (lower frequently broader), the base cuneate
to obtuse, the margin subrevolute, the apex acute to
obtuse or rarely rounded, often apiculate, chartaceous
to subcoriaceous, beneath glabrous or costa glabrate,
the surface nonmuricate, with usually 2 sessile to
stipitate glands near base. Racemes 5-25 cm long,
pubescent as stem, laxly few-flowered, each flower
basally with a lanceolate bract 1.5-3.5 mm long
(proximal sometimes foliar) usually transversely

adjacent to 2 lanceolate bracteoles 0.5-1.5 mm long, the 3 pubescent as stipules. Flowers ca 1-1 1/4 (-1 1/2) cm diam, the pedicels 2-7(-11) mm long, pubescent as stem; calyx-segments 2.5-4 mm long, erect to recurved, lanceolate, green to reddish, glabrous to rarely glabrate outside, usually caespitously pilose apically (often persistent), glabrous within, eglandular; receptacular disc intruding as a short persistent nodule or ligule into base of each carpel; petals deciduous in fruit, yellow, often aging pink to purple, reclinate, equal (to subequal), costate to subcarinate beneath (costa frequently reddish to greenish), the claw 1-2 mm long, the limb narrowly to broadly ovate, the base rarely cordate to usually truncate or broadly cuneate, the margin subentire to erulose (rarely erose), the apex acute to usually rounded or truncate, rarely apiculate, 3-5 mm long; stamens weakly coherent basally, the filaments subequal to equal (by up to 0.5 mm), the outer (shorter) basally flattened, 3-4 mm long, the inner usually less flattened, 3-4.5 mm long, the anthers ovoid, 0.7-1.2 mm long; ovary 1.3-1.5 mm diam, sparsely to moderately hirtellous (hairs not medifixed), the carpels moderately coherent, the styles slender,

3.5-5 mm long, the apex subulate, minutely truncate at stigma. Schizocarp angularly short-obovoid to globose, 2.5-3.5 mm diam, puberulous, the mericarps separating at maturity; seed with testa \pm alveolate, fulvous to darkly ferrugineous. Flowering throughout the year, especially May-July.

Frequently collected in dry, rocky areas of western Mexico (Baja California del Sur and adjacent mainland) and southcentral Texas, U.S.A. and adjacent eastern Mexico (especially Nuevo León and Tamaulipas). The exact location of the lone collection (Wright 930) from central Mexico is tentative, based on information in Smithsonian Contr. Know. 5(6): 30, 1853 (Pl. Wright. 2) and Bull. Torrey Bot. Club 33: 566, 1906. Parks (Texas Agric. Exp. Sta. Bull. 551: 65, 1937) reports the subspecies for three floral areas in Texas: Western Hardwood Forest, Edwards Plateau and Brush Country; he recommends it for desert gardens and states "it blooms after every rain of any amount no matter what time of year." For Mexico, Shreve & Wiggins (Veg. Fl. Sonoran Des. 1(2): 766, 1964) indicate its habitat as mainly in the Lower Sonoran Zone, while Goldman (Smithsonian Misc. Collect. 115: 354, 1951) lists it for the Arid Upper Tropical Sub-zone. There is an excellent illustration of habit

in R. A. Vines, Trees Shrubs & Woody Vines SW 604,
1960.

UNITED STATES: Texas: Bandera Co: Medina
Lake, Palmer 12269 (A, CAS, GH, MO). Bee Co: N
of Beeville, Albers 46332 (F). Bexar Co: Leon
Springs, Mr & Mrs Clemens 843 (CAS, MO); nr
Bracken, Groth 64 (CAS, F, GH, NY US); Fredericks-
burg Rd 15 mi NW of San Antonio, Sr M. C. Meltz
249 (NY); Gutzeit Ranch, Schulz 91 (US); San
Antonio, Slater s.n. (US). Comal Co: Smithson
Valley, 15 mi NW of New Braunfels, alt 780 ft,
Cutler 3248 (MO); nr New Braunfels, Lindheimer s.n.
(MO); s. loc., Matthes 357 (G, W). Comanche Co:
Comanche Spring, Lindheimer 692 (A, ARIZ, BR, C,
F, G, GH, K, M, MO, NY, UC, US, W). Fayette Co:
s. loc., Matthes 241 (G, W). Goliad Co: Goliad,
C. B. Williams 30 (F). Hays Co: vic San Marcos,
annis 1895-7, Stanfield s.n. (NY). Jim Hogg Co:
s. loc., Lehmann & Davis 6 (F). Kendall Co: 13
mi NW of Boerne, alt 1500 ft, Barmeby 14496 (CAS,
NY); 8 mi N of Sisterdale, Parks 1032 (MO). Kerr
Co: Kerrville, alt 1600-2000 ft, Heller 1737
(ARIZ, BR, C, F, G, GH, MO, NY, UC, US); Lacey's
Ranch, Palmer 10017 (MO, US); s. loc., Tharp s.n.

(GH). Kimble Co: nr Junction City, Johnson's Creek, Reverchon 1504 (F, MO, NY, US). Kinney Co: Anacacho Hills, Cory 28912 (GH). Live Oak Co: George West, Schiller 896 (US); southern escarpment, Tharp s.n. (ARIZ, GH, MO, NY, US). Medina Co: prope Medina, Arroyo de Francisco Perez, Berlandier 954 (GH, MO, US), Berlandier 2384 (G, MO, US); San Geronomi valley, Reverchon 26 (GH); N of Castroville, Reverchon 1505 (F, MO, NY, US); Medina Lake Hills, Tharp? s.n. (GH); (nr Castroville), banks of Medina River, (1) June 1849, Wright 93, 30=93? (G, GH, K, US), Wright 94, 32=94? (G, GH, K, NY, UC, US).

Travis Co: Mt Bonnel, Albers et al. 46460 (K, MO, NY, UC), E. Hall 26 & s.n. (F, MO), anno 1930, Tharp s.n. (NY), anno 1937, Tharp s.n. (GH, MO, NY, UC, US); 3 mi NW of Austin, Barkley 13246 (K, MO, NY, UC, US); 15 mi NW of Austin, Kretschmar section, Austin Project, Texas Syst. Nat. Labs., Lynch 710 (MO); Austin, Tharp 647 & s.n. (MO, UC, US); mts nr Austin, 29 July & 28 Sept, Wright s.n. (GH, NY).

Valverde Co: 16 1/4 mi NE of Comstock, Cory 26763 (GH); 10 mi N of Vinegarone, Cory 39132 (GH); Devils River, Eggert s.n. (MO), Orcutt 6217 (MO); ca 20 mi NNW of Del Rio, Devils Lake, above dam,

McVaugh 10589 (G, GH, US). County Unknown:
 Comancheries Orientales du Texas (NW of San
 Antonio), Nov & Dec 1828, Berlandier 511=1886
 (G, GH, K); Nueces River, Havard s.n. (F, US);
 nr Bexar, & rocky hills & prairies of upper
 Guadalupe River, July & Aug 1845, Lindheimer
361 (G, GH, K, MO, NY, UC, US, W); (western
 Texas), anno 1890, Nealley s.n. (F); Riddell 40
 (NY); western part, Schott s.n. (F); Wright s.n.
 (GH); sine coll. s.n. (GOET, NY).

MEXICO: Baja California: San José del Cabo,
T. S. Brandegee 77 (UC), Purpus 495 (US); Purísima,
Brandegee s.n. (UC); San Grogorio, Brandegee s.n.
 (UC); 0.32 km E of Cabo San Lucas, Carter et al.
2259 (K, US); Arroyo del Salto, E of La Paz, Carter
2586 (US); Comondú, Gander 9684 (CAS); below Comondú,
Gentry 4223 (ARIZ, GH, MO, UC, US); just above
 Comondú, Hammerly 173 (CAS, US); Cabo San Lucas,
R. B. Hinds s.n. (K), J. T. Howell 10593 (CAS); La
 Paz, M. E. Jones 22579 (MO), Palmer 109 (GH, K, US);
 Miraflores, M. E. Jones 24169 (A, CAS, F, MO, UC),
Purpus 284 (K, MO, UC, US); San Bartolo, M. E. Jones
24234 (CAS); Bahía de San Nicolas (Golfo de California),
Johnston 3736 (CAS, GH, K, MO, NY, UC, US); cape
 region, nr canon mouth, El Chorro, alt 200 m, Moran
7279 (ARIZ, CAS, GH, UC, US); 10 mi S of Mulege,

Shreve 7085 (ARIZ, F, US); 5 mi N of Santiago,
Shreve 7288a (ARIZ, F, US); Arroyo Santa Anita
nr Casas Viejas, ca 5 mi SW of La Palma & ca 8
mi NW of Santa Anita, alt ca 1000 ft, Thomas 7740
(CAS, GH, UC, US); ca 1.5 mi S of Mission Dolores
landing, alt ca 275 ft, Wiggins et al. 275 (UC);
along rd to Los Planes, 5.5 mi SE of La Paz, alt
500 ft, Wiggins et al. 437 (UC); foot of Infierno
Grande, 9 mi from Santa Rosalia, Wiggins 7940A
(US); Arroyo de San Jose de Magdalena, Wiggins
11380 (CAS, GH, MO, NY, UC, US); arroyo 1.5 mi
NW of San Bartolo, Wiggins 14755 (CAS, GH, UC);
vic Cabo San Lucas, Xantus 15 (GH, NY US). Chi-
huahua: betw Sabinal & San Pedro, ca 19 Apr 1852,
Wright 930 (G, GH, NY, US). Coahuila: mts 24 mi
NNE of Monclova, Palmer 128 (F, G, GH, NY, US);
Jimulco, Pringle s.n. (GH); 5 km NE of Jimulco,
alt 1730, Stanford et al. 134 (ARIZ, GH, MO, NY,
UC); munic. de Muzquiz, Hacienda Mariposa, nr
Puerto Santa Anna, Wynd & Mueller 282 (A, ARIZ,
MO, NY, US). Nuevo León: N of Linares, Clark
6809 (MO, NY); Monterrey, C. K. Dodge 138 (NY,
US), Edwards & Eaton 25 (GH, NY), Pringle 1940
(BR, F, G, GH, K, M, NY, UC, US, W), C. & E.
Seler 1063 & 1068 (GH); on rd to Monterrey, 5

km S of Sabinas Hidalgo, Frye & Frye 2433 (US); Margarita, S of Monterrey, Hitchcock & Stanford 6859 (US); nr Monterrey, Pringle 2708 (F, MO, UC); 40 mi S of Laredo, Schery 16 (MO); 20 km NW of Montemorelos, nr Río Ramos, alt 1000 ft, Weaver 1018 (GH). Sinaloa: Cerros del Fuerte, 18-24 mi N of Los Mochis, Gentry 14291 (US); Cerros de Navachiste nr Bahia Topolobampo, Gentry 14365 (US); Topolobampo, hills nr Yacht Hotel, ca 100 ft, Hastings & Turner 64-112 (ARIZ); Topolobampo, Palmer 184 (ARIZ, C, UC, US). Sonora: Río Mayo, Navojoa, Gentry 1661 (ARIZ, F, GH, K, MO); Guaymas, Palmer 217 (C, GH, K, NY, UC, US), Rose 1220 (GH, US), Rose 1287 (GH, US); vic Guaymas, Los Ranchos, Rose et al. 15029 (US). Tamaulipas: Sierra de San Carlos, vic San José, Cerro Tinaja, alt 2850, Bartlett 10319 (US); Sierra de San Carlos, vic San Miguel, La Tamaulipecas, Bartlett 10582 (F, NY, US); Sierra de Tamaulipas, ca 40 km NNW of Aldama, E of Rancho Las Yucas nr Juan Tomas, Dressler 2424 (GH); above Río San Marcos, 5 mi W of Ciudad Victoria, alt 500 m, Meyer & Rogers 2491 (G, MO); vic of Victoria, alt ca 320 m, Palmer 483 (F, GH, NY, US); Tamaulipas, July 1930, Viereck 665 (US). State Unknown: anno

1844, Karwinsky s.n. (M); hills along Rio Bravo del Norte, Oct 1852, Schott 185 (Mex. Bound. Survey) (K, NY, US). MEXICO OR UNITED STATES: Head Leone, 23 Oct 1850, Bigelow s.n. (GH); betw San Luis Potosí & San Antonio, Aug 1878, Parry 94 (GH, MO, NY, US).

The collection of Hinds from the Bentham herbarium at K is considered holotype based on Bentham's statement (Bot. Voy. H.M.S. Sulphur 182, 1846) that Hinds gave Bentham his collections for Bentham's herbarium; this statement contrasts somewhat with Stafleu's (Regnum Veg. 52: 26, 1967) that the original material of the H.M.S. Sulphur voyage is at BM (i.e., the G. W. Barclay material). In our case no duplicates are known. The plant was collected ca 21 Nov 1839 (Belcher, Narr. Voy. World H.M.S. Sulphur 1: 338, 1843); the year 1841 on the holotype label refers to the time of incorporation in Bentham's herbarium (Aliso 5: 471, 1964), during which time H.M.S. Sulphur and crew were in the orient.

The selection of lectotype for G. linifolia within the Wright collections is somewhat arbitrary, as no plant readily matches the plate. The distribution number 93 is taken from Smithsonian Contr. Know. 3(5): 36, 1852; the herbarium sheet chosen bears the

Boston Society of Natural History and GH stamps. Since the illustrator Isaac Sprague was a member of that society and a branch on the sheet resembles the drawing, the choice seems justified. When dealing with Wright collections one should recall the statement of Johnston in McKelvey (Bot. Explr. Trans-Miss. West 1063, 1955) that Gray ignored Wright's field numbers and sometimes combined collections when assigning new distribution numbers. However Wright 93 and 94 do seem to be single collections with the different herbaria preserving true duplicates of the types, since the plants of each number are similar in appearance and Gray mentioned only a single locality (Smithsonian Contr. Knowl. 3(5): 36, 1852).

Heller (Bot. Explr. S. Texas in Contr. Herb. Franklin & Marshall Coll. 1: 54, 6 Feb 1895) erroneously considered the first valid place of publication for G. linifolia to be Boston J. Nat. Hist. 6: 166, 1850 (Pl. Lindheimer. 2) and the type to be Lindheimer 361. However, the name in Gray's 1849 publication is valid by Article 44 of the Internat. Code Bot. Nom. 1966, and Gray clearly considered the Wright collection apart from the others mentioned, which are therefore paratypes. Although Vail (Bull.

Torrey Bot. Club 22: 228, 15 May 1895) states that Gray's variety "is found with the type" (which is true for Wright's collections while no variety is mentioned for Lindheimer's), she also cites the 1850 publication for the specific name. In the 1849 (original) publication Gray states for one of the paratypes (Edwards & Eaton 25) that it was collected in Monterrey and "communicated by Dr. Torrey." This appears to be only a personal communication, as there is a specimen from the Torrey herbarium at NY with a duplicate "Ex herb. J. Torrey" at GH. L. A. Edwards did collect in Mexico for Torrey in 1846-7 or 1847-8 (respectively Field & Lab. 26: 127, 1958 and Barnhardt, Biograph. Notes Bot. 1: 496, 1965). The only pertinent published comments by Torrey appear to be mentioned in Report U.S. Mex. Bound. Survey 2(1) Bot. Bound. 48, 1859 that Edwards collected certain other Malpighiaceae near Monterrey.

Finally, J. Arènes' new variety is based on a mistake. Certain plants collected by E. Palmer in Mexico in 1887 were sent by K to P with false indication that they were collected by S. Elliot in Madagascar. See Notul. Syst. (Paris) 13: 163, 166, 1948 for details and Arènes' reduction of the name

to synonymy. Fortunately or not, there is a fine drawing presumably of Arènes' holotype under the name "Galphimia linifolia var." Baillon in Grandidier, Hist. Phys. Nat. Pol. Madagascar 35 Hist. Nat. Pl. 5 (Atlas 3) (1): t. 264, 1894.

Galphimia brasiliensis subsp. angustifolia is most closely related to the tautonymic subspecies, as may be seen from the key. The northern subspecies is a quite variable taxon for which extensive biogeographic study would prove rewarding. The western population tends to differ from the eastern by typical plants having denser and redder indument and longer petioles with broader blades. However individual plants from one population resemble those from the other too often for meaningful taxonomic separation to be made (see Dressler 2424, Frye & Frye 2423, Palmer 184, Palmer 483 GH, Pringle s.n., Reverchon 1505 & Wiggins et al. 437). Gray himself reduced his species to synonymy, perhaps having published it in ignorance of Bentham's (Proc. Amer. Acad. Arts 5: 155, 1862 and Gray, Synop. Fl. N. Amer. 1(1,2): 351, 1897). There is additional more local or ecotypic variation, as in length of claw compared to length of limb, shape of limb base, or total size of flower (those of Stanford et al. 134 are strikingly

large, the limb cordate basally. The typical sub-desert habitat of the subspecies may have allowed such local differences to develop in semi-isolation from neighboring populations.

lc. Galphimia brasiliensis subsp. australis (Chodat)

B. MacBryde, sta. nov.

G. brasiliensis B pubescens Ad. Juss. in St.-Hilaire et al., Fl. Bras. Merid. ed. folio 3: 55 (ed. quarto 72, not seen), 1833, syn. nov. (Lectotype St.-Hilaire C(2)2495bis P; here chosen).

Basionym: G. australis Chodat, Arch. Sci. Phys. Nat. ser. 3, 24: 500, 1890; Mem. Soc. Phys. Genève 31(2,3): 22, 1892 (Contr. Fl. Parag. 5). (Lectotype Balansa 2393 P not seen; isolectotypes G, K; chosen Chodat, loc. cit. 13, 1892).

G. australis f. angustifolia Chodat, Mem. Soc. Phys. Genève 31(2,3): 23, 1892. (Holotype Balansa 2394 P; isotype G).

G. brasiliensis var. typica Ndz., Bull. Herb. Boissier sér. 2, 7: 294, 1907 (Pl. Hassler 2:650), syn. nov. (Lectotype Hassler 5609 G; here chosen).

G. brasiliensis var. brasiliensis f. angustifolia (Chodat) Ndz., Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5: 22, 1914, syn. nov.

G. brasiliensis var. australis (Chodat) Chodat, Bull.

Soc. Bot. Genève sér. 2, 9: 96, 1917, syn. nov.

G. australis var. angustifolia (Chodat) Ndz. in Engler,

Pflanzenreich 94(IV, 141): 594, 1928, pro syn.

G. pubescens (Ad. Juss.) Herter, Estud. Bot. Reg. Urug.

14(11): 491, fig. 1884, 1956 (Fl. Ilus. Urug. 11).

1 ca. G. brasiliensis subsp. australis f. australis

Suffrutescent plants ca 15-100 cm high, the gnarled taproot ligneous, the branches decumbent to ascending or erect (sometimes partially rhizomatous), glabrous to moderately (or young sometimes densely) ferruginous to russet-subappressed-hirsute [crosspieces of hairs flexuose, ca (0.3-)0.5(-0.6) mm long], tardily canescent, usually glabrate to glabrous with age.

Leaves with stipules subulate, 1.5-5 mm long, usually glabrate outside, rarely reddish; petioles usually only confluent with outer (interpetiolar) portion of stipular bases, 1.5-5.5 mm long, usually less pubescent than stem; blades 2-7.5 x 0.4-2.8(-3.6) cm, usually narrowly to broadly lanceolate, sometimes subelliptic (rarely elliptic to oblong or ovate), the base usually attenuate to obtuse and short-decurrent (rarely broadly rounded), the margin usually ± revolute, the apex usually long-acute (sometimes subacute to

obtuse), usually mucronulate to apiculate, chartaceous to subcoriaceous, the surface nonmuricate beneath, with usually 2 sessile to stipitate glands near base (gland rarely terminal on a linear foliar appendage to 4 mm long). Racemes 8-33 cm long, pubescent as stem but relatively denser (rarely glabrous with age), laxly few-flowered, each flower basally with a lanceolate sometimes basally biglandular bract 1.5-4.5 mm long (proximal sometimes foliar) transversely adjacent to or occasionally somewhat separated from 2 lanceolate rarely glandular bracteoles 0.7-1.5 mm long, the 3 usually glabrate. Flowers ca 3/4-1 1/2 cm diam, the pedicels 2.5-8 mm long, \pm pubescent as rachis; calyx-segments 2.5-4.5 mm long, \pm revolute, lanceolate to oblanceolate, green or sometimes purple-margined, glabrous outside and within, usually caespitously pilose apically (rarely persistent), eglandular (only some flowers of inflorescence) or usually rudimentary to fully developed glands below one to all sinuses, the glands at a sinus paired, the pair distinct or fused or one lost, each gland rather thick, suborbicular, ca 1/2 cm diam, usually sessile; receptacular disc intruding as a short persistent nodule into base of each carpel; petals deciduous

in fruit, yellow or orange often aging reddish to purple (or sometimes redder beneath?), reclinate, subequal to unequal, costate to subcarinate beneath (costa often darker), the claw 0.8-2 mm long, the limb ovate to trullate, the margin subentire to erose, the apex praemorse to obtuse, 2.6-5.4 mm long, the uppermost? petal larger, with claw stouter, 1-2.3 mm long, the limb 3.5-6.3 mm long; stamens weakly to moderately coherent basally to rarely ca midway, the filaments rarely equal to usually unequal (by up to 0.5 mm), the outer basally flattened, 2-3 mm long, the inner usually less flattened, 2.2-3 mm long, the anthers ovoid to ellipsoid, 0.8-1.1 mm long, the connective rarely protruded to 0.1 mm; ovary 1.3-1.8 mm diam, the carpels moderately to strongly coherent, the styles slender to filiform, 3.9-5 mm long. Schizocarp angularly short-obovoid to globose, 3-4.5 mm diam, the mericarps separating at maturity; seed with testa alveolate to rugose-alveolate, ferrugineous to rufous (rarely fulvous).

Flowering Sept-May, especially in Nov.

Rather frequently collected in southern Brazil, Uruguay, eastern Argentina, Paraguay and eastern Bolivia. Its general habitat is in dry, sandy to rocky, grassy to overgrown fields, although plants

sometimes are found at the edge of woods or in disturbed areas along rivers, roads or even burned, plowed fields (Mattos & Mattos 8484). It may be abundant (Grisebach, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1875: 126, 1875) for Warming s.n. to rare (Pedersen 983 c).

Common names reported are quaró in Brazil (Ad. Juss. in St.-Hilaire et al., Fl. Bras. Merid. ed. folio 3: 54, 1833) which is apparently still used (as quaró) in Rio Grande do Sul (Arg. Serv. Florest. 2(2): 147, 1946) and yerba de San Antonio in Uruguay (Herter, Est. Bot. Reg. Urug. 14(11): 491, 1956).

ARGENTINA: Corrientes: La Cruz, vías, Burkart 7889 (UC); dept. Paso de los Libres, vic Tepebicua, Ibarrola 2001 (US, W); dept. Monte-Caseros, E of Juan Defot, km 12, Ibarrola 2366 (A); dept. Berón de Astrada, Puerto Yahapé, Ibarrola 3931 (W); dept. San Martín, N of Yapeyú (Guaviraví), Ibarrola 11926 (A); Paso Troncón, Palacios Cuezzo 2242 (MO); dept. Santo Tomé, Estancia "Garruchos", Pederson 983 (C). Entre Ríos: Concepción, Quinta de Sagastane, Lorentz 209 (GOET); Concepción, Lorentz 563 & s.n. (F, G, GH, K, M); Concepción, Quinta del Colegio, Lorentz 601 (GOET), Lorentz 605 (GOET). Misiones: dept. Posadas, Posadas, Bertoni 828 (CAS);

Zarman, Bertoni 1224 (W); dept. San Pedro, Campo Cumprido, Bertoni 2026 (W); dept. Candelaria, Garupa, Bertoni 2222 (W); Mártires, Nov. 1947, Bertoni s.n. (MO); dept. Posadas, vías, Burkart 14069 (GH, US); La Granja, Ekman 1520 (G, MO, US); dept Apóstoles, Bueblo, Ibarrola 946 (CAS); Santa Ana, A. de Llamas 453 & 874 (G); dept. Candelaria, Santa Ana, Meyer 6629 (A); Montes 1089 (W); Yabebiri, Montes 728 (W); dept. Iguazú, Puerto Esperanza, km 12, Montes 9389 (W); Posadas y Suburbios, Muniez 16 (G); dept. Concepción, Concepción, borde del bosque, Schulz 6936 (MO); dept. Candelaria, Arroyo Martín Chico, Schwarz 575 (F); Arroyo El Tigre, Schwarz 645 (F); dept. San Ignacio, Naucauguasú, Schwarz 1823 (W); Santo Pipó, Schwarz 5270 (MO); Corpus, Schwarz 5313 (MO); Colonia Chica, Schwarz 5865 (MO); dept. Candelaria, Santa Ana, Schwindt 229 (W); dept. Iguazú, Eldorado, Schwindt 2187 (C); dept. Cainguás, Ruta 14, km 252, Schwindt 2957 (C); Dept. San Pedro, Fracrán a San Pedro, Ruta 14, Schwindt 3358 (C. G. W.).

BOLIVIA: Santa Cruz: s. loc., alt 450 m,
Steinbach 2872 (A); Buena Vista, alt 500 m, Steinbach 5210 (GH), Steinbach 7370 (A, GOET, MO), alt 450 m,
Steinbach 14933 (GH); San Isidro, alt 460 m, Steinbach 6628 (GH). Department Unknown: in den Hugelcampus von

Florida, alt 900 m, Herzog 1291 (W).

BRAZIL: Goias: Fazenda Cova, près Monjolo, Glaziou 20766 (BR, G, K). Minas Gerais: s. loc., anno 1839?, Claussen s.n. [G, P-JU (11508p.p. seen as IDC 6206. 853. III. 6)], Santa Luzia do Rio das Velhas, Glaziou 20228 (BR, C, K); munic. Ituiutaba, Macedo 26 (US), Macedo 1209 (MO); Contendas, Martius s.n. (M); s.loc., A. de St.-Hilaire s.n. (K); Bom Retiro, Sellow III. it. Bl1852-cl323 (NY); Lagôa Santa, Nov 1863, Dec 1863, Mar 1864, Warming s.n. (C); s. loc., Warming s.n. (GOET); (vic Caldas), Widgren 711, 5590 & s.n. (BR, C, M). Parana: Jaguariaiva, Dusén 10671 (GH, K, MO); Itararé opp., Morungave praedium, alt 760 m, Dusén 16570 (A, NY, US), 740 m, Dussén 17413 (GH, MO, US); Yaguaraiava, Dusén 17480 (F, G); Guarapuava, alto Cavernose, Pereira 7708 & Hatschbach HH-10324 (M). Rio Grande do Sul: Arroio da Raiz, Estancia L. Gomez, alt 500 m, Bornmüller 227 (GH, M); Belem Vehlo, Czermak & Reineck 566 (G); Instituto Agronômico do Sul, Pelotas, J. da Costa Sacco 407 (F, NY); Itapuan, Fox 356 (K); s. loc., anno 1833, Gaudichaud s.n. (Herb. Imp. Br. 1797) (P); vic São Francisco de Borja, banda oriental del Río Uruguay, A. de St.-Hilaire C(2)2495bis (P); munic. Rio Pardo, Fazenda Soledade, alt 70 m, Jürgens div. 26 (B): s. loc.,

Sellow IV. it. d3105 (B, NY); Río Uruguay, banda oriental, Tweedie s.n. (GH, K). São Paulo: Tatuí (Campo de Santa Cruz), Hoehne 1454 (NY). Araracuara & Jaboticabal, Loefgren 1136 (C, GH); munic. Moji-Guaçu, Fazenda Campininha, 7 km NW de Padua Sales, Mattos & Mattos 8484 (US). State Unknown: Burchell 5454 (K), Burchell 6389 (K); anno 1832, Lhotsky s.n. (G); Pohl? 1549 (NY); Gamelleira, Pohl 2161=1459d (spec. & Icon. Pl. Brasil. 690) (W); Pohl s.n. (M); Pôrto Alegre, Rambo 38 (W); Sellow s.n. (K, W); Tamberlik s.n. (W); Warming s.n. (US).

PARAGUAY: Alto Paraná: s. loc., anno 1910, Fiebrig 6348 (G). Caaguazú: in campo prope Igatimi, Hassler 5609 (G). Concepción: Centurión, zwischen Río Apa & Río Aquidabán, Fiebrig 4205 (G, GH, GOET, K, M), Concepción, Fiebrig 5330 (G); prope Concepción, Hassler 7572 (G, K, NY, UC). Guaira: pairies de Cosme, entre Villarrica & Caaguazú, Balansa 2393 (G, K); plaine de Doña-Juana, près Villarrica, Balansa 2393a (G, GOET, P); paturages Itangu, près Villarrica, Balansa 2394 (G, P); prope Villarrica, Hassler 8743p.p. (G), Jorgensen 4220 (A, C, F, MO, NY, US). La Cordillera: Cordillera de los Altos, Fiebrig 439 (F, G, K); fluminis Y-acá, prope Chololo, Hassler 6788 (G); Rio Y-acá, prope

Valenzuela, Hassler 6948 (G, K, NY); Colonia Pedro Pablo Caballero, Piribebuy, Rojas 12731 (W). Misiones: Santiago, Estancia "La Soledad", Pedersen 3281 (C). Alto Parana' or Caaguazú: Sierra de Maracayú, in regione fluminis Capibary, Hassler 4393p.p. (F), in regione fluminis Corrientes, Hassler 4524 (F, G, GH, K, NY, W). Department Unknown: Hassler 131? (G).

URUGUAY: Paysandú: Chapicuy, orillas del Río Uruguay, Santa Sofia, Rosenqurtt B-32781/2 (GH, MO). Department Unknown: Campos de Concordia, Arechavaleta 132 (G); Sellow IV. it. d967 (B, NY).

COUNTRY UNKNOWN: sine coll. s.n. (W).

Galphimia australis was described by Chodat to contrast plants of Paraguay with those from Minas Gerais (which he considered typical; Bull. Soc. Bot. Genève sér. 2, 9: 96, 1917). Although those populations he contrasted are not so divergent, his epithet is the most suitable in meaning for the subspecies, and its type is the most representative of the southern taxon.

Chodat's mention of Grisebach's Plantae Lorentzianae (Abh. Königl. Ges. Wiss. Gottingen 19, 1874) in the original publication of G. australis apparently is in error for Grisebach's Symbolae ad Floram Argentinam

(loc. cit. 24(1), 1789), where Balansa 2393a is identified as G. brasiliensis. Since this collection is not directly mentioned in Chodat's 1890 (original) publication and the identification is treated + as a synonym (see also the 1892 publication), the uncontroversial Balansa 2393 collection is considered lectotypic. This collection is the only one indicated by Chodat in Bull. Soc. Bot. Genève sér. 2, 9: 96, 1917 (where G. australis is reintroduced as a variety).

Adrien de Jussieu described Galphimia brasiliensis β pubescens to differentiate plants with denser, more persistent indument (and a usually glandular calyx). Although it is not certain whether he considered the rank varietal or formal (see Arch. Mus. Hist. Nat. 3: 260, 281, 1843 & Walpers, Repert. Bot. Syst. 5: 161, 1845), it is treated as varietal by Niedenzu (Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5: 22, 1914). With the collections now available it is clear that glandularity of calyces is variable independently of density of pubescence, and that the indument grades from a commonly dense condition in the south to a frequently glabrate state further north. Jussieu's epithet was not adopted for the subspecies since it is inappropriate in meaning and the circumscription of

the taxon would require emendation. The type is chosen with reference to the botanical catalogues of A. de St.-Hilaire, where neighboring numbers are indicated as having been collected in the locale mentioned by Jussieu in the original publication (although this number is without locale there or on the herbarium label). The specimen chosen has been annotated by Jussieu, and is provisionally considered lectotype rather than holotype since St.-Hilaire mentions in the catalogue under St.-Hilaire C(2)2495bis "Pl. analysée plusieurs fois", so duplicates are probably extant.

Galphimia brasiliensis var. typica requires a type because only Hassler collections were listed; the lectotype chosen is the only one of the syntypes both annotated by Niedenzu and also quite representative of the subspecies. G. brasiliensis var. australis is a combination overlooked heretofore; the epithet was reintroduced by Chodat as a variety in opposition to Niedenzu's reduction of the species to synonymy, and Chodat clearly indicated it for use (Articles 33 & 34 of Internat. Code Bot. Nom. 1966 therefore do not apply).

Finally, Galphimia pubescens has also not been previously noticed, and is invalid by Article 33 of

Code because no basionym is listed. Probably Harter intended later publication of the correlated text in Est. Bot. Reg. Urug. 24 (see Revista Sudamer. Bot. 10*: cover 4, 1957) had his death in 1958 not intervened.

Useful illustrations of the subspecies may be found in Ad. Juss. in St.-Hilaire et al., Fl. Bras. Merid. ed. folio 3: t. 178, 1834; Arch. Mus. Hist. Nat. 3: t. 7, 1843; Spegazzini, Fl. Prov. Buenos Aires 124, 1905 (Republ. Argent. Minist. Agric. Secc. Biol. Veg.); Lilloa 9: 301, 1943 and Dawson in Cabrera, Fl. Prov. Buenos Aires 4: 51, 1965 [Colección Ci. Inst. Nac. Tecnol. Agropecu. 4(4)].

This southern subspecies of G. brasiliensis has departed markedly from the other two, as may be seen in part from the key. Further collections need to be made particularly in northern Minas Gerais and southern Bahia to study the degree of morphological similarity between this subspecies and the tautonymic one where their ranges meet.

G. brasiliensis subsp. australis shows morphological diversity somewhat as its northern counterpart, as in diversity of pubescence, width of leaf, length of claw to length of limb, and also expression of calycine glands and degree of coherence of filaments. In addition there

are rare aberrant individuals with ternate leaf attachment (A. de St.-Hilaire s.n.) and Schwarz 1823 (which also exhibits invaginant stipular bases for one leaf pair). Fiebrig 6348 is a specimen from NE Paraguay with weak stems and subsessile leaves (ovate, ca 3×2 cm) which is worthy of formal rank if not anomalous. The subspecies appears to have little ethnobotanical importance, although Arechavaleta states "Las raíces tienen sabor muy amargo y son aperitivas" [Anales Mus. Nac. Montevideo 3: 180, 1900 (Fl. Urug. 1)] and Macedo 26 mentions that the roots are medicinal.

lcb. Galphimia brasiliensis subsp. australis f. platyphylla (Chodat) B. MacBryde, comb. nov.
G. platyphylla Chodat, Arch. Sci. Phys. Nat. ser. 3, 24: 500, 1890; Mem. Soc. Phys. Genève 31 (2,3): 23, t. 50, 1892. (Lectotype Balansa 2396 P; isolectotype G; chosen Chodat, loc. cit. 24, 1892).

G. brasiliensis var. platyphylla (Chodat) Ndz.
 Bull. Herb. Boissier ser. 2, 7: 294, 1907.
G. brasiliensis var. brasiliensis f. platyphylla (Chodat) Ndz., Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5: 22, 1914, syn.

nov.

Differing from tautonymic form by: ca 10-70 cm high, the branches ascending to erect, glabrous. Stipules 2-4 mm long, glabrous; petioles \pm obsolete to 6.5 mm long, glabrous; blades 2-9 \times (1.5-)2-5.3 cm, the majority usually broadly ovate (sometimes elliptic or suborbicular or the apical narrower), the base usually obtuse to broadly rounded and short-decurrent (sometimes attenuate), the margin \pm plane, the apex usually rounded to obtuse (sometimes acute or emarginate), the marginal glands frequently sunken, reduced. Racemes to 25 cm long, usually glabrous to glabrate, the bracts and bracteoles usually glabrous. Flowers ca 1-1 1/2 cm diam, the pedicels 2.5-8.5 mm long, sometimes accrescent, usually glabrous; calyx-segments 3.5-5 mm long; claw 1.3-2 mm long, the limb 3.5-6.3 mm long, the larger petal with claw 1.1-2.3 mm long, the limb 3.6-6.5 mm long; outer filaments 1.8-3.3 mm long, the inner 2.1-3.8 mm, the anthers 1-1.3 mm long; ovary 1.8-2.0 mm diam, the styles 4.1-5 mm long. Schizocarp 4-5 mm diam; seed with testa strongly rugose-alveolate.

Flowering Aug-Mar.

Infrequently collected in east-central Paraguay especially in dry fields.

PARAGUAY: Amambay: Sierra de Amambay, Ponta Porá, Hassler 9884 (G, NY, UC, W). Caaguazú: Caaguazú, dans les campos, Balansa 2396 (G, P); Sierra de Maracayú, in campo Ypé-Jhú, Hassler 5298 (G); prope Caaguazú, Hassler 9132 (F, GH, NY, UC, W). Guaira: prope Villarrica, Hassler 8743 (G). Alto Paraná or Caaguazú: Sierra de Maracayú, in regione fluminis Tapiracuay, Hassler 4327 (F, G, NY, W); Sierra de Maracayú, in regione fluminis Capibary, Hassler 4393 (G, NY, W).

Although there is not a strong discontinuity between this form and the typical one, those plants with most leaves unusually broad and rounded offer a meaningful segregate. Some sheets of Hassler 9132 (F, GH) are noteworthy for their flowers having extra stamens or styles, perhaps indicating that this form may have chromosomal aberrations.

2. Galphimia vestita S. Watson, Proc. Amer. Acad.

Arts [~]21: 421, 1886. (Holotype Palmer 187 GH, photos A, NY; isotype US).

Thryallis vestita (S. Watson) Rose, Contr. U.S. Natl.

Herb. [~]12: 281, 1909.

Caespitose suffrutescent plants 15-40 cm high, the long taproot ligneous, the branches ascending,

densely ochraceous to stramineous-subappressed-hirsute, canescent. Leaves with stipules subulate, 2-5 mm long, pubescent as stem outside, usually reddish; petioles obsolete to 4 mm long, pubescent as stem; blades 2.5-6 cm long, 1.5-7.5 mm wide, linear to lanceolate, the base acute to cuneate, the margin subrevolute, the apex attenuate, subcoriaceous, pubescent as stem above and beneath, nonglaucous, with 2 + sessile glands near base. Racemes to 15 cm long, laxly few-flowered, each flower basally with a linear bract 5-10 mm long (proximal sometimes foliar, to 2 cm long) transverse to 2 linear bracteoles 1.3-4 mm long, the 3 and the rachis pubescent as stem. Flowers ca 1 1/4 cm diam, the pedicels 4-7 mm long, pubescent as stem; calyx-segments 4-5 mm long, erect, narrowly lanceolate, green, pubescent as stem outside, glabrous within, eglandular; receptacular disc intruding as a short persistent ligule into base of each carpel; petals deciduous in fruit, yellow, aging pink to purple, reclinate, equal, costate beneath, glabrous except costa hirsute, the claw 1-2 mm long, the limb ovate, the base truncate to obtuse, short-decurrent, the margin erulose, the apex subacute to retuse, apiculate, 3.5-5.5 mm long; stamens weakly

coherent basally, the outer basally flattened, the inner less so to linear, the filaments subequal, 4.3-5.5 mm long, the anthers ovoid, 1-1.5 mm long; ovary ca 1.8 mm diam, sparsely hirtellous (hairs not medifixed), the carpels strongly coherent, the styles filiform, 6.8-8 mm long, the apex subulate, minutely truncate at stigma. Schizocarp ca 4 mm diam, puberulous; seed with testa alveolate to smooth, ferruginous to darkly rufous. Flowering throughout the year, especially in Sept & Oct.

Infrequently collected in the northern Sierra Madre Occidental of Mexico usually in dry, rocky areas. The common name "Ku-si W" is reported for Sonora (Gentry 1137).

MEXICO: Chihuahua: 1 mi from Batopilas, Hacienda San Miguel, alt 2400 ft, Palmer 187 [GH (photos A, NY), US]. Sinaloa: vic Culiacán, Cofradía, 20 Oct 1904, T. S. Brandegee s.n. (C, UC), 27 Oct 1904, Brandegee s.n. (UC); SE of Badiraguato, Cieneguita, alt 1000 ft, Gentry 5939 (ARIZ); Choix, Gentry 6779 (GH, NY). Sonora: Río Mayo, Arroyo Guajaray, Gentry 1137 (ARIZ, F, GH, K, MO, UC); Río Mayo, San Bernando, Gentry 2282 (GH, MO); region of Río de Bavispe, Cañón del Agua Amarga, S. S. White 3574p.p. (ARIZ);

region of Río de Bavispe, Cañón de las Bellotoas,
S. S. White 3574p.p. (GH); barranca 13 mi S of
 Divisaderos, alt 1880 ft, Wiggins 7464D (US); ca
 14 mi S of Divisaderos, along wash, alt 1800 ft,
Wiggins 7471 (US).

Although closest to G. brasiliensis subsp.
angustifolia, the morphological and geographic
 differences indicate a distinct species.

Galphimia sect. 2 Galphimia

G. sect. Cosmogalphimia Ndz., Arbeiten Bot. Inst.
 Königl. Lyceums Hosianum Braunsberg 5: 23,
 1914.

3. Galphimia multicaulis Ad. Juss., Ann. Sci.
 Nat. Bot. sér. 2, 13: 327, 1840; Arch. Mus.
 Hist. Nat. 3: 322, 1843 (Monogr. Malp. 2:
 68, 1844). [Lectotype Andrieux 496 K;
 isolectotypes G, K, M (photos GH, MO, US),
 P-JU 11509 seen as IDC 6206. 853: III 7;
 chosen Juss., 1843].

Thryallis multicaulis (Ad. Juss.) O. Kuntze, Rev.
 Gen. Pl. 1: 89, 1891.

Shrubs to 1.5 m high, the stems erect, few-
 branched, densely russet-subappressed-hirsute when
 very young, ± canescent and glabrate with age.

Leaves with stipules \pm narrowly triangular, 1.8-4 mm long, glabrate outside; petioles basally \pm confluent with stipules, occasionally obsolete or usually 1.7(-11) mm long, usually glabrous; blades 1.4-9.5 \times 0.7-4.5 cm, often red-maculate, ovate to lanceolate or rarely subelliptic, the base obtuse to rounded, the margin \pm plane, the apex frequently obtuse to rarely acute, often mucronulate to apiculate, chartaceous to subcoriaceous, the veination often pale and conspicuous with lateral subprominent beneath, with usually 2 sessile to stipitate glands near or at base. Racemes frequently tripartite, 6-33 cm long, \pm moderately russet-subappressed-hirsute, densely many-flowered, each flower basally with a linear-subulate bract 1.9-4 mm long \pm transversely adjacent to 2 usually subopposite bracteoles 1.2-3 mm long, the 3 glabrate. Flowers ca 1 3/4 - 2 1/4 cm diam, the pedicels 6-15 mm long, pubescent as rachis; calyx-segments 3-4.5 mm long, \pm subrevolute, lanceolate to rarely oblanceolate, the apex usually acute, the margin scarious and erulose to ciliate distally, glabrous outside and within, eglandular, receptacular disc intruding as a \pm broad persistent nodule into base of each carpel; petals persistent in

fruit, yellow, subpatent, carinate beneath, glabrous (or keel glabrate), the claw aging red, 1-3.5 mm long, the limb lanceolate to ovate, the base broadly attenuate to subcordate, the margin erulose to subentire, the apex subacute, 5.5-9.7 mm long, the uppermost? petal with claw stouter, 2-3.5 mm long, the limb broader, 6.5-9.5 mm long; stamens basally somewhat flattened and subdistinct, the filaments frequently aging red, the outer shorter than inner by 0.5-3 mm, the outer unequal, 2-5.2 mm long (1-3 nearest larger petal shorter by 0.5-1.3 mm), the inner usually equal, 3.5-5.8 mm long (rarely differing up to 0.5 mm), the anthers ovoid-oblongoid, 2.3 mm long; ovary 1.6-2.2 mm diam, the 3 (rarely 2 or 4) carpels weakly coherent, the 3 (rarely 2-6) styles filiform, aging red, 4.5-6.5 mm long. Schizocarp 3-4 mm diam; seed subglobose, the testa subrugose, ferrugineous.

Flowering June-Dec, especially Sept.

Rather frequently collected in south-central Mexico, in dry, open to somewhat forested habitats or sometimes along roadsides or near towns; elevation from 1800-2300 m. Only reported as locally scarce (King & Soderstrom 4671, McVaugh 12988).

MEXICO: Guanajuato: Montes de Obrajuelo,

Salazar s.n. (US). Hidalgo: munic. Ixmiquilpan,
 along hwy nr Ixmiquilpan, alt 6000 ft, Leavenworth
1929 (F). Jalisco: Sierra del Tigre, 3 mi S of
 Mazamitla, alt 2100-2200 m, McVaugh 12988 (G, US);
 mts nr Chapala, sine coll. s.n. (F). Mexico: 5
 km N of Valle de Bravo, Ripley & Barneby 14869 (CAS).
 Michoacán: vic Morelia: barranca NW of Punguato,
 alt 1900 m, Bro. Arsène 2606 (A, GH, MO, US), Bro.
Arsène 5164 (A, MO, NY, US), alt 2100 m, Bro. Arsène
s.n. (G), alt 2110 m, Bro. Arsène 5929 (MO, US),
 alt 2200 m, Bro. Arsène 8402 (B, GH, NY, UC), Cerro
 de las Nalgas, alt 2100 m, Bro. Arsène 2654 (US),
Bro. Arsène s.n. (G), Loma Santa María, alt 1990 m,
Bro. Arsène 3507 (US), Cerro Azul, alt 2200 m, Bro.
Arsène 6570 (MO, US), s. alt., Bro. Arsène s.n. (K, NY);
 Morelia, Campanario, alt 2100 m, Bro. Arsène s.n.
 (G); nr junction Mexico Hwy 15 & Jungapeo Rd, Barr
65-523 & Niles 300 (ARIZ); Mexico Hwy 15, San José
 de Purúa Rd, alt ca 6000 ft, Barr & Barr 64-554 (ARIZ,
 UC); junction Mexico Hwy 15 & Jungapeo Rd, Barr &
Dennis 65-380 (ARIZ); ca 5 mi N of Cotija & 22 mi S
 of Jiquilpan, alt 6000-6200 ft, King & Soderstrom
4671 (NY, UC, UC). Oaxaca: Huauapan, Andrieux 496
 [G, K, M (photos GH, MO, US), P-JU 11509 (seen as
 IDC 6206. 853: III. 7)]; dept. Nochixtlán, Huancilla,
 alt 200 m, Conzatti & González 1199 (GH), alt 2000 m,

Conzatti 1881 (F, GH); distr. Ella, La Carbonera, alt 2240 m, Conzatti 4210 (US); dept. Nochixtlán, Galeotti s.n. (BR); Yavesia, Galeotti s.n. (M); W of valley of Oaxaca, Huautlillo, Jurgensen 288 (G, K); Cuesta de San Juan del Estado, alt 7500 ft, Pringle 4828 (A, BR, F, GH, GOET, M, MO, NY, UC, W); prope Oaxaca, C. & E. Seler 98 (GH); Cuesta de San Juan del Estado, Continental Divide, alt 7500 ft, Smith 82 (GH). State Unknown: anno 1835, Hegewisch s.n. (GOET); Parkinson s.n. (NY); Uhde 1143 (NY).

The lectotype is a specimen in the J. Gay herbarium at K annotated by Jussieu in Jan 1840; the isolectotype in P-JU is ex Herb. J. Gay. Since Jussieu stated "v.s. herb. J. Gay" in Arch. Mus. Hist. Nat. 3: 322, 1843, the specimen in P-JU must be considered a duplicate. The distribution number 496 apparently equals field number 210; both are found on the lectotype.

The species is closest to G. glauca Cav., with which it was confused by Bartling (Linnaea 13: 550, 1839), and indeed it was put in questionable synonymy by Standley (Contr. U.S. Natl. Herb. 23: 568, 1923). It is distinct by its low habit, short petioles, dense + cylindric racemes, and by

the bracteoles usually being adjacent to the bracts. The small ovate, rather long-petiolate leaves of W. & M. Leavenworth 1929 may indicate some hybridization with that species.

4. Galphimia glauca Cav., Icon. Descript. Pl. 5:

61, t. 489, 1799, non Hort. ex Bartl. (Linnaea 13: 552, 1839). (Lectotype L. Née s.n. MA not seen, photos C, MO; isolectotype MA not seen, photo MO; here chosen).

Malpighia glauca (Cav.) Persoon, Synop. Pl. 1: 506, 1805; superfluously by Poiret in Lamarck, Encycl. Meth. Bot. Suppl. 4: 7, 1816.

Galphinia glauca Poiret in Lamarck, loc. cit. 5: 687, 1817, sphalm.

Thryallis glauca (Cav.) O. Kuntze, Rev. Gen. Pl. 1: 89, 1891.

The most widespread and commonly collected species of this section, G. glauca ranges from northern Mexico to Nicaragua. It has been rarely cultivated, but often confused with the commonly cultivated G. gracilis.

Three variable varieties are recognized.

The common names flor de chinche and petsjoyo' are apparently used for this species in Chiapas, Mexico (Miranda, Veg. Chiapas 2: 17, 355, 1952).

Shrubs 0.5-3.7 m high, the many branches ascending to erect, densely russet to rufous-subappressed-hirsute when young, readily to tardily glabrescent, sometimes canescent. Leaves with stipules triangular to subulate, 1.2-3.8 mm long, usually glabrous outside, the margin usually weakly ciliate; petioles 1-20 mm long, sparsely pubescent as stem to glabrous; blades 1-8 × 0.4-4.5 cm, ovate to occasionally oblong or elliptic, the base obtuse to broadly attenuate, sometimes decurrent, the margin entire to suberose (or rarely dentate from multiple glands), subrevolute, the apex obtuse to rarely subtruncate, usually minutely apiculate, chartaceous to subcoriaceous, beneath glabrous (or costa rarely glabrate), with usually 2 sessile to occasionally stipitate glands near base or sometimes at junction of blade and petiole (rarely subpetiolar on decurrent blade; rarely some leaves eglandular or with up to 5 pairs of glands diminishing distally). Racemes very rarely tripartite, 4-21 mm long, the rachis brown, densely to sparsely pubescent as stem, laxly few-flowered to densely many-flowered, each flower basally with a triangular to subulate (rarely obtuse) bract 1.2-3.5(-5) mm long usually ± transversely separated

from 2 usually ± opposite triangular to subulate
bracteoles 0.7-2.8 mm long, the 3 glabrate or
margin ciliate. Flowers ca 1 1/2 - 2 1/4 cm
diam, the pedicels (5-) 9-22 mm long, pubescent
as rachis; calyx-segments 2.7-4(-4.5) mm long, ±
revolute, narrowly to broadly obovate to lanceo-
late, the apex obtuse to acute, the margin scarious,
erulose to entire and usually somewhat ciliate,
glabrous outside and within, eglandular; recepta-
cular disc intruding as a broad persistent nodule
into base of each carpel; petals persistent in
fruit, yellow, subpatent, carinate beneath, glabrous
(or keel glabrate), the claw often aging red, 1-3
(-3.5) mm long, the limb ovate to lanceolate or
oblong, the base cuneate or broadly attenuate to
obtuse or truncate, the margin erulose (rarely
strongly ciliate), the apex obtuse to subacute,
5.5-9.5 mm long, the uppermost petal with claw
stouter, 1.5-3.5 mm long, the limb broader, some-
times subdeltoid and basally cordate, 6-10 mm long;
stamens basally flattened and subdistinct to connate,
the filaments aging red, the outer shorter than inner
by 0.2-0.3 mm, the outer unequal, 1.2-4.5 mm long
(1-3 nearest larger petal shorter by ca 0.2-1 mm),
the inner subequal to unequal, 2.8-6 mm long (differing up

to 1.8 mm), the anthers ± oblongoid, 1.8-3 mm long, the thecae exceeding ± thickened connective; ovary 1.4-2.1 mm diam, the carpels weakly coherent, the styles filiform, aging reddish, 4.5-6.5 mm long, the apex subulate (rarely bent). Schizocarp 2.9-4.2 mm diam; seed with testa obscurely to strongly reticulate-alveolate, pale brown to darkly ferruginous. Flowering throughout the year, but especially June-Aug to north and Nov & Dec to south.

Commonly collected from central Mexico to Nicaragua, usually in dry, rocky areas, but sometimes in forest or along streams, from 360-3110 (-3660) m. It is occasionally found along roadsides, and has been rarely brought into cultivation both where native (e.g. Molina 18786, Standley 16547) and in Europe and U.S.A. (apparently from Hartweg 13, see J. Hort. Soc. London 5: 139, fig. p. 140, 1850 and Jard. Fleur. 1: 9, fig. p. 10, 1851; also Spaulding et al. s.n.). It may be soboliferous in the wild, the clumps to 1.2 m in diameter (White 46).

Known under the common names chavelita in Guatemala (Standley 59913, Standley 63820), grano de oro in Honduras (Standley 16547) and Nicaragua (Williams & Molina 10959), and lluvia de oro in Honduras (Standley & Chacon 6620).

UNITED STATES: California, W of Los Angeles,
 Mr. River's place in Mandeville Canyon, cult, anno
 1945, Spaulding et al. s.n. (CAS).

MEXICO: Aguascalientes: s. loc., Hartweg 13
 (K, w). Chiapas: 3 mi NW of Pinola along Soyatitan
 Rd, alt 4600 ft, Breedlove 7072 (F): munic. Carranza,
 1 km N of Aguacatenango, alt 5900 ft, Breedlove 7897
 (F); Miramar, Matuda 0395 (US); Amatenango de Valle,
 alt 1835 m, Matuda 15848 (F); vic & E of Ocozocuautla,
Moore 2533 (GH); betw San Cristóbal de las Casas &
 Teopisca, alt 6700-8500 ft, Nelson 3457 (GH, US); 17
 mi NW of Comitán, alt 6300 ft, Webster et al. 12891
 (MO); 5 km E of Las Casas, alt 8000 ft, L. & T.

Williams 21708 (F). Guanajuato: lower plateau on
 Xichú Rd, nr San Luis de la Paz, Kenoyer 2331 (GH);
 vic Acambaro & Salvatierra, Née s.n. (photos C, MO).
 Hidalgo: munic. Jacala, alt 5000 ft, Chase 7281 (ARIZ,
 F, GH, MO); Pachuca, Clark 7361 (MO, NY): Zimapán,
Coutler 865 (GH, K, NY), Galeotti 4391 (BR); Jacala,
Edwards 778 (F), Kenoyer 433 (F, MO); Punta de Dios,
 Zacualtipán-Zimapán, Ehrenberg 1126 (NY); 40 mi NNW
 of Ixmiquilpán, Hitchcock & Standford 7004 (GH, NY,
 UC, US): 37 mi S of Jacala, alt 5000-6000 ft,
Manning & Manning 53620 (GH); Sierra Madre Oriental,
 betw Ixmiquilpán & Zimapán, Mex Hwy 85, Weber &

Charatte 11891 (CAS). Jalisco: Salcillo, Jones 20 (US). Oaxaca: Oaxaca, alt 1750 m, Conzatti & González 1056 (GH, US); nr Tamazulapan, alt 6500-7000 ft, Nelson 1957 (GH, US). Puebla: Sierra de Mixteca, cerros nr San Luis Tultitlanapa nr Oaxaca, Purpus 2733 (F, G, GH, MO, NY, UC, US). Querétaro: del Cuervo al Cerro de la Mesa, Altamirano 1580 (US); betw San Juan del Río & Cadereyta de Montes, Hacienda Ciervo, Rose et al. 9654 (NY, US); betw Cadereyta & Visaron, Rose et al. 9750 (NY, US). San Luis Potosí: Ciudad de Valles, Kenoyer s.n. (ARIZ); betw Ciudad de Valles & Villa Juárez, White 46 (F). Tamaulipas: 6 km W of Miquihuana, alt 3110 m, Stanford et al. 721 (ARIZ, GH, MO, NY); 3 km N of Huizachal, 30 km from Victoria, alt 1500 m, Stanford et al. 2031 (G, UC, US); betw Hermosa & Miquihuana, Stanford et al. 2691 (US). Zacatecas: s. loc., Hartweg 13 (GH, K). State Unknown: Aschenborn 233 (GOET); Ehrenberg s.n. (GOET); Hartweg 13 (G, NY, W); Karwinsky 58 (W); Karwinsky 68 (M); rd from Tamaulipas to Mexico City, Knauz s.n. (MO); Sierra Madre Oriental, nr El Caracol, 3 mi NE, Dulces Nombres, Meyer & Rogers 2532 (BR, G, GH, K, MO).

GUATEMALA: Alta Verapaz: carretera a San Juan, Chamelco, Molina & Molina 12285 (F, NY). Chimaltenango:

El Manchen, J. R. J. 15 (F); along rd from Chimaltenango to San Martín Jilotepeque, alt 1500-1900 m, Standley 57864 (A, F, NY, US). El Quiche: San Miguel Uspantán, Heyde & Lux 3272 (US). Guatemala: Guatemala, Aguilar 53 (F): Amatitlán, alt 1102 m, Morales 834 (US). Huehuetenango: 47 km from Huehuetenango, betw Puente Cuevas & Los Monos, cliff of Río Selegua, alt 1400 m, Molina 21380 (F); San Miguel Acatán, alt 6800 ft, Skutch 999 (A, F, G, NY, US); Aguacatán, alt 6400 ft, Skutch 1932 (A, F, US); vic Aguacatán, nr the spring of San Juan, alt ca 1600 m, Standley 83368 (F); above San Idelfonso Ixtahuacán, Cerro Pixpix, alt 1600-2800 m, Steyermark 50626 (G, F). Sacatepéquez: volcán Acatenango, Smith 2548 (GH, K, US); nr Antigua, alt 1500-1600 m, Standley 58056 & 63820 (F); S of Santa María de Jesús, slopes of Volcán de Agua, alt 1800-2100 m, Standley 59433 (A, F); nr Pastores, alt 1560-1650 m, Standley 59913 (F); N of Antigua, finca El Hato, alt 1950-2040 m, Standley 61130 (F); along Río Guacalote, rd betw Antigua & Chimaltenango, alt ca 1660 m, Standley 80988 (F). Santa Rosa: Barberena, Heyde & Lux 3704 (G, GH, M, MO, NY, US). Sololá: above Panajachel, Lake Atitlán, alt 5000 ft, Hunnewell 14708 (GH; San Lucas, alt 5100 ft, Kellerman 6438 (F, US); nr Pana-

jachel Water Falls, rd to Sololá, Molina et al.
16251 (F, NY); above San Pedro village, alt 1900-
2000 m, Steyermark 47159 (F); ca 3-5 km W of
Panajachel, above Lake Atitlán, alt 2100 m, L.
Williams et al. 25260 (F). Suchitepéquez: above
Chicacao, on middle slopes of volcano Santa Clara,
finca El Naranjo, alt 1250 m, Steyermark 46593 (F).
Department Unknown: Heyde 256 (US); volcán de
Fuego, anno 1873-4, Salvin s.n. (W); Wendland 292
(GOET).

HONDURAS: Comayagua: Tegucigalpa-Siguatepeque Hwy, km 128, alt 128 ft, Edwards 511 & P-511 (A, F, K, UC, US); vic Siguatepeque, alt ca 1050 m, Standley & Chacon 6620 (F); Agua Salada, alt 360 m, L. Williams & Molina 11452 (F, GH). El Paraíso: betw quebrada El Pescadero & El Paraíso, Hacienda San Isidro, cult, Molina 18786 (F); vic Danlí, alt 700-800 m, cult, Standley 16547 (F); Danlí, alt 755 m, Rodríguez 1989 (F). Morazán: along rd to Agalteca, alt 800 m, Molina 18715 (F, GH). Olancho: cerca del Río Juticalpa, 6 km de Juticalpa, Molina 13225 (F, NY); carretera a San Francisco La Paz, mt Uval, Molina 13227 (F, NY). Yoro: Yoro, alt 2800 ft, Edwards 738 & P-738 (A, F, MO, NY, US).

NICARAGUA: Estelí: mt nr Estelí, alt 800 m,

L. Williams & Molina 10959 (A, F, MO, UC); ca 8 km SW of Estelí, at edge of Río Estanzuela, alt 1160 m, Williams & Molina 20185 (F, NY). (Nueva) Segovia: s. loc., Oersted 8672 (C, GH, UC). Department Unknown: inter Matagalpa & Jinotega, alt 4000–5000 ft, Oersted 8673 (C), Oersted 8674 (C); inter Matagalpa & Arinotega, Oersted? 21 (GOET).

This most widespread variety of the species is closest to G. glauca var. ovalifolia, from which it may be separated by the characters in the key. Somewhat intermediate specimens are known; for example, Hunnewell 14708 has tripartite racemes and Skutch 999 has glands subpetiolar on decurrent blades.

The stipules, bracts and bracteoles are generally longer in specimens from the northern part of the range of this variety. Indeed, in Hidalgo and Querétaro the bracts sometimes approach the normal length of those in G. glauca var. schiodeana (Chase 7281), although flowers are smaller here in such examples and the leaves are ± glandular-dentate.

Molina 13225 from Honduras bears an unusual flower with extra bracteoles on the pedicel.

Galphimia glauca Cav. has been long confused with G. gracilis, but is distinctive when older flowers or fruits are present; in younger flowers the

petals of G. glauca are usually more carinate beneath. The lectotype chosen is the specimen which most closely matches the original plate; however, the photograph has not allowed critical determination of the type. As explained under G. tuberculata var. hirsuta, the problem will be resolved later when MA specimens can be examined. The validity of the combination made by Persoon is also discussed there.

4b. G. glauca var. ovalifolia (DC.) B. MacBryde,
comb. nov.

G. glandulose sensu H.H.B., Nov. Gen. Sp. Pl. ed.
quarto 5: 172 (ed. folio 133, not seen), 1822,
t. 452, 1821, nec Cav. (Anales Hist. Nat. 1:
37, 1799), nec Rose (Contr. U.S. Natl. Herb.
5: 137, 1897). [Holotype Humboldt & Bonpland
s.n. P-HB (seen as IDC 6209. 124: II. 7); iso-
type Humboldt & Bonpland 3936 P].

Basionym: G. glandulosa Cav. $\not\propto$ ovalifolia DC.,
Prodr. 1: 582, 1824. (Type Icones Fl. Mex.
Ined. s.n. G not seen, photos GH, MO, US and
as Alph. de Candolle, Calques Dessins Fl. Mex.
Mociño & Sessé t. 140, 1874, MO, US; typotype
Sessé & Mociño 2a G; spec. here chosen).

G. glandulosa Cav. β oblongifolia DC., Prodr. 1:
582, 1824. (Type Icones Fl. Mex. Ined. s.n.

- G not seen, photos GH, MO and as Alph. de Candolle, loc. cit. t. 139, 1874, MO, US).
- G. grandiflora Bartl., Linnaea 13: 554, 1839.
 (Holotype Hegewisch s.n. GOET; isotypes NY).
- G. humboldtiana Bartl., loc. cit. 555, nom nov.
- G. paniculata Bartl., loc. cit. 556. (Holotype
Hegewisch s.n. GOET; isotype NY).
- Thryallis grandiflora (Bartl.) O. Kuntze, Rev
 Gen. Pl. 1: 89, 1891.
- T. humboldtiana (Bartl.) O. Kuntze, loc. cit.
- T. paniculata (Bartl.) O. Kuntze, loc. cit.
- G. gracilis var. grandiflora (Bartl.) Ndz., Arbeiten
 Bot. Inst. Königl. Lyceums Hosianum Braunsberg
5: 24, 1914, syn. nov.
- G. paniculata var. humboldtiana (Bartl.) Ndz., loc.
 cit. 26.

Differing from tautonymic variety by: shrubs
 or slender trees 0.6-4 m high. Leaves with stipules
 1-2 mm long; petioles 5-30 mm long, with usually 2
 subopposite + sessile glands on distal half to third
 or occasionally to abrupt junction with blade; blades
 often elliptic, the base often attenuate and minutely
 decurrent to glands. Inflorescences paniculate (by
 suppression of ramal internodes) or rarely racemiform,
 the bracts 1.2-3 mm long, the bracteoles 0.8-1.8 mm

long. Flowers with calyx-segments 2.9-4(-5) mm long; petals unequal to subequal, the limb 6.5-10 (-10.5) mm long, the uppermost? petal 0.4-2 mm long; stamens basally ± connate, the outer filaments shorter than the inner by 0.9-3 mm, the outer unequal to subequal, 1.5-3.5 mm long (1-3 nearest larger petal often shorter by up to 1.5 mm), the inner subequal to equal, 3-5 mm long (sometimes differing up to 0.5 mm). Flowering Sept-Mar, especially in Nov.

Commonly collected from ca lat. 22°N-16°N in west-central and southern Mexico on open, dry and rocky slopes, from 610-2140 m.

Common names reported are calderona amarilla (Langlasse 64), cortinchi (Rabadán s.n.), palo del muerto (Barcena 121: Ramírez, Sin. Vul. Ci, Pl. Mex. 97, 149, 1902; Urbina, Cat. Pl. Mex. (Fan.) 32, 1897), tlatlacoxochitl (Sesse & Mocino 2a), vachacata (Ramírez loc. cit.), xaxaxacotic (Redfield s.n.), and yerba del mosco (Hinton 2546).

MEXICO: Chiapas: Miramar, Matuda S-63 (A, MO, US); Escuintla, Matuda 1878 (ARIZ, F, GH, K, NY, US); Mt Ovando, Escuintla, Matuda 16240 (MO, US). Guerrero: environs of Taxco, Abbott 29 (GH); distr. Mina, Trincheras, Hinton et al. 10124 (US); nr Toro Muerto,

Hinton et al. 1197 (NY); Campo Morado, alt 1220 m,
Hinton et al. 11097 (US), alt 1300 m, Hinton et al.
14846 (NY, UC, US); Manchón, Hinton 11292 (NY, UC,
US); distr. Montes de Oca, Vallecitos, Hinton (et al.)
11758 (NY, US); Acaguisotla (to Alto de los Caxones),
alt 3000-3500 ft, anno 1803, Humboldt & Bonpland
3936 & s.n. [P, P-HB (seen as IDC 6209. 124: II. 7)];
distr. Alarcón, Teloloapan, Rabadian s.n. (F);
Cerro del Gallo, alt 900 m, Reko 5031 (US); distr.
Hidalgo, lei Tlaxmalac, C. & E. Seler 4243 (B, CAS).
Jalisco: Barranca de Guadalajara, Barcena 121
(A), Galeotti 4347 (BR, G), slopes of barranca nr
Guadalajara, Pringle 1728 (A, BR, F, G, GH, K, M,
MO, NY, UC, US, W), Pringle 3005 (GH), alt 4000 ft,
Pringle 9699 (F, GH, K, MO, NY, US), Pringle 11391
(CAS, F, GH, MO, UC, US), Safford 1457 (US);
Guadalajara, Barranca de Oblatos, alt 5000 ft,
Erlanson & Souviron 13 (US), alt 4000 ft, Gourlay
21 (NY); above Talpa de Allende, nr rd to Mascota,
alt ca 1250 m, McVaugh 14237 (US); Río Blanco,
Palmer 684 (G, GH, US); hillsides nr Guadalajara,
Pringle 2757 (F, UC, W); rd betw Bolaños & Guadalajara,
Rose 3021 (NY, US). Mexico: distr. Temascaltepec,
Rincón Mine, Hinton 116 (K), Hinton 313 (GH), alt
1960 m, Hinton 2433 (G, K, NY); Bejucos, alt 610 m,
Hinton 2546 & Hinton et al. 2546 (A, G, K, NY, US).

Michoacán: Morelia, Cerro Azul, Bro. Arsène s.n.
 (G); distr. Coalcomán, Coalcomán, alt 1100 m,
Hinton et al. 12691 (US), Hinton 12694 (G, NY, UC,
 US), alt 100 m, Hinton et al. 12893 (ARIZ, GH, NY,
 US, W); Aquila, Hinton 16245 (G, K, NY, UC); ca
 4 km NE of Inguarán, Monte de Santa Helena, alt
 1400 m, Langlasse 64 (G, GH, K, US). Morelos:
 lava beds nr Cuernavaca, Pringle 7215 (GH, US);
 mt side above Cuernavaca, alt 7000 ft, Pringle
8036 (A, BR, C, F, GH, GOET, M, MO, NY, UC, US, W);
 Tepoxtlán, Redfield s.n. (US); Temixco, prope
 Cuernavaca, Woronow 2599 (F). Nayarit: hills back
 of Jalisco, Ferris 5943 (A, US); trail Ixtlán to
 Barranca de Oro, alt 1480 m, Mexia 784 (A, CAS, F,
 G, GH, MO, NY, UC); Tepic, Palmer 2030, 2030?,
2030-1/2 (ARIZ, C, F, GH, NY, US); 10 mi SE of
 Ahuacatlan, rd to Barranca de Oro & Amatlán, alt
 1100-1300 m, McVaugh & Koelz 847 (G, US). Sinaloa:
 San Vicente, González 5094 (US). State Unknown:
Allaman s.n. (K); Ehrenberg s.n. (GOET, NY); Chiapas,
 etc., Ghiesbreght 624 (MO, NY); Ghiesbreght s.n.
 (US); Gregg 993 (MO); Hegewisch s.n. (typus G.
paniculata) (GOET, NY); Mairet s.n. (G); Ocampo s.n.
 [P-JU 11511 (seen as IDC 6206. 854: I. 2)]; Sesse &
Mociño 2a (G); Sesse et al. 4901 (F); Schiede s.n.

(NY); Ramadija, Uhde 1142 (B, NY); P. W. von Würtemberg s.n. (M). Mexico?: Née? s.n. (MA); Sesse & Mociño s.n.? (MA).

This common variety of G. glauca is most distinctive with paniculate inflorescences and ca medially biglandular petioles, although both of these characters approach the condition in the tautonymic variety. Somewhat intermediate specimens include Ghiesbreght 624 which has racemiform to paniculate inflorescences with glands usually subpetiolar on decurrent blades (sometimes medially petiolar), and Hinton 313 with paniculate inflorescences and glands at the junction of blade and petiole. Some other collections from the states of Mexico and Morelos have glands at the junction, but these can be distinguished from G. glauca var. schiedeana f. schiedeana by their smaller bracts and bracteoles, usually smaller flowers, and more heavily branched inflorescences.

A. P. de Candolle was the first to note that Humboldt, Bonpland & Kunth had confused another taxon with G. glandulosa Cav. However, instead of resolving its position he briefly but adequately described two additional infraspecific taxa for Cavanilles' species, indicating that these (at least)

could certainly ("nempe") be differentiated (Prodr. 1: 582, 1824). Although these two taxa were thus published somewhat obliquely, a careful reading makes it clear that he intended these names for use. He typified them with plates from *Icones Fl. Mex. Ined.*, which were later distributed as tracings. Although these two taxa have generally been ignored, they meet the requirements of legitimacy (see especially Articles 29, 34, 44 in *Internat. Code Bot. Nom.* 1966), and must be accounted for. It is probable that A. P. de Candolle considered their rank varietal (see his *Théorie Element. Bot.* ed. 3, 238, 1844), and this rank has been definitely used for the epithet adopted here by Hooker & Arnott (*Bot. Capt. Beechey's Voy.* 280, 1838) and Alph. de Candolle [*Calques Dessins Fl. Mex. Mociño & Sesse' (Enum.)* 2, 1874]. The latter work lists that the plate of G. glandulosa var ovalifolia is a duplicate colored original given by Mociño to A. P. de Candolle, whereas the plate of the other variety is a colored copy.

Both of these varieties are well within the concept of this taxon, and they hold priority over the names provided by Bartling and used by Niedenzu. The epithet chosen here perhaps somewhat better characterizes the specimens studied, and it refers

to the taxon provided with the best plate, and also a definite typotype.

The typotype bears an original label with "Nueva España. Herb. Pavon.", and a recent label from Herb. Barbey-Boissier; how some Sesse & Mocino specimens arrived in G is discussed under G.

tuberculata. Since A. P. de Candolle referred to no specimen and may not have been seen this one, it is considered typotypic (although the "2a" on the label may be associated with this taxon (as 3∞) in the original publication.

Galphimia paniculata was described to contrast certain characters from those in G. humboldtiana (as length of largest petal, color of its claw, and length of filaments); the characters are not segregated in the specimens examined. Niedenzu maintained both epithets, contrasting minor differences in size of lower parts which are also variable. Lastly, G. grandiflora belongs here rather than with G. glauca var. schiedeana, as the bracts and bracteoles are short and the glands subpetiolar.

The only ethnobotanical information is the report on Rabadán s.n. that "para la bilis, se toma el cocimiento añadiéndole canela y coñac."

4c. G. glauca var. schiedeana (Ndz.) B. MacBryde,
comb. nov.

G. schiedeana Ndz., Arbeiten Bot. Inst. Königl.

Lyceums Hosianum Braunsberg 5: 28, 1914

[Type Schiede s.n. B†, photos GH, MO, NY, US;
fragment NY (Herb. Ndz.) ex B].

Differing from tautonymic variety by: shrubs
or slender trees 1-5 m high. Leaves with stipules
1.8-4 mm long; petioles 5-43 mm long, eglandular;
blades 1.6-11 x 0.7-6.2 cm, often elliptic, the
base often attenuate with 2-4 often substipitate
glands at or distal to junction of blade and
petiole. Inflorescences usually tripartite racemes
to panicles (by suppression of ramal internodes),
7-37 mm long, the ensiform bracts (2.5-)3-7.5 mm
long, the bracteoles 1.3-3 mm long. Flowers ca
2 1/4-2 3/4 cm diam; calyx-segments 4-5 mm long;
petals unequal to subequal, the claw 1.3-3 mm long,
the limb 7.5-12.5 mm long, the uppermost? petal
0-1.8 mm longer, the claw 2-4 mm long, the limb
(9-)10-12.5 mm long; outer filaments shorter than
inner by 0.5-2 mm, the outer unequal to equal, 2-5
mm long (1-3 nearest larger petal often shorter by
up to 1 mm), the inner unequal to equal, 3-6 mm
long [differing up to 0.8(-1.5) mm], the anthers

2.3-3 mm long; ovary 1.5-2.5 mm diam, the styles 4.5-6 mm long. Flowering Nov-Feb.

Infrequently collected in west-central Mexico, usually along streams in forest (sometimes in open fields), from 1425-2440 m.

Common names reported are huachacata (Duges s.n.) and vara de San Vicente (Mexia 1548-a).

MEXICO: Colima: Volcán de Colima, Reiche 419 (M). Guerrero: distr. Mina, Chiriagua, alt 1600 m, Hinton 9848 (G, MO); Sierra Madre del Sur, trail betw Ajuchitlán & Tecpan, N of El Carrizal, alt 1800 m, Langlassé 780 (F, G, GH, K, NY, US). Jalisco: San Sebastián, E of Arroyo del Cura, alt 1425 m, Mexia 1394 (F); Sierra Madre Occidental, San Sebastián, Segundo Arroyo, alt 1500 m, Mexia 1548-a (G, NY, US); Sierra Madre Occidental, trail from San Sebastián to Real Alto, alt 2000 m, Mexia 1637-a (A, CAS, GH, MO, UC, US). Mexico: distr. Temascaltepec, Nanchititla, Hinton et al. 7364 (F, NY, US). Michoacán: distr. Zitácuaro, Zitácuaro-Lomas, alt 1850 m, Hinton et al. 13435 (NY, UC, US); distr. Uruapan, Tancitaro, alt 1950 m, Hinton et al. 15684 (ARIZ, GH, NY, US); ca 18 mi E of Morelia, S facing slopes of mts betw Río del Salto & La Polvilla, alt 7200-8000 ft,

King & Soderstrom 5098 (NY, UC, US); s. loc., W. C. Exp. s.n. (F). Michoacán or Guanajuato: Morelia or s. loc., Duges s.n. (US). State Unknown: betw Iguala & San Gabriel, Ehrenberg s.n. (NY); prope Ario, Dec 1829, Schiede s.n. (NY).

Although a name usually ignored in identification, the rather large glands at the junction of blade and petiole (or slightly epilaminar), the moderately branched inflorescences, the large bracts and bracteoles and the generally larger flowers indicate its distinctness from G. glauca var. ovalifolia. As flowers in some specimens of the form are very large and showy, it should be tried in cultivation (note especially Langlasse 780). Niedenzu originally published this taxon as a new species with a question mark, which he later removed (in Engler, Pflanzenreich 94 (IV, 141): 600, 1928). Article 34 (Internat. Code Bot. Nom. 1966) allows its use from the earlier date.

4cb. G. glauca var. schiedeana f. neoviscayana
B. MacBryde, forma nov. (Holotype H. S. Gentry 1372 (MO 1089218; isotypes A, ARIZ, F, K, UC, US)).

Differing from tautonymic form by: shrubs

(sometimes single-stemmed) 1-2 m high, the branches glabrous. Leaves with stipules 1-3.1 mm long; petioles 6-70 mm long, eglandular; blades 1.6-14.5 x 1-8.2 cm, usually ovate and obtuse, subcoriaceous to coriaceous, the basal glands usually sessile. Inflorescences 7.5-26 cm long, the rachis usually green, glabrous except when very young, the bracts (1.5-)2.3-4.8 mm long, glabrous. Flowers ca 2-2.3(-3) cm diam; calyx-segments 3.8-4.8 mm long; petals with limbs 8-10.5(-12.5) mm long, the uppermost? petal 0.5 mm shorter to 1 mm longer, the claw 2.5-3.2 mm long, the limb 8.5-12 mm long; outer filaments usually shorter than inner by up to 1.5 mm, the outer 2.5-4 mm long, the inner 3-4.5 mm long, the anthers 2.8-3.5 mm long; styles 4.1-5.5 mm long.

Flowering in Feb & Mar.

Infrequently collected in northwestern Mexico, mainly in the Upper Sonoran Zone (Shreve & Wiggins, Veg. Fl. Sonoran Des. 1(2): 766, 1964); habitat ranges from open to shaded, usually on slopes.

Known by the common names garbancilla or garboncillo (Gentry 1372, Gentry 3037) and "Ley-chi W" (Gentry 1372).

MEXICO: Chihuahua: cumbres de Loreto, alt 4000 ft, Hewitt 268 (GH). Durango: nr Chacala,

Goldman 326 (GH, NY, US); Sianori, alt 800 m,
González 923 (GH, K), González 5379 (US); San Ramón,
Palmer 101 (F, GH, MO, NY, UC, US). Guerrero:
Calabazas, Reko 4864 (US). Jalisco: Río Blanco,
Palmer 684 (NY). Sinaloa: NW base of Cerro
Colorado, alt 1500 ft, Gentry 5476 (ARIZ); Sierra
de Tacuichamona, Capadero, alt 3000 ft, Gentry 5565
(ARIZ, NY). Sonora: Sierra La Chuna, Río Mayo,
27 Feb 1935, H. S. Gentry 1372 (A, ARIZ, F, K, UC,
US); Río Mayo, rancho Agrimincor, Gentry 3037 (A);
Sierra de los Alamos, Palmer 2184 (GH, NY, US),
Rose et al. 12794 (NY, US), Rose et al. 13095
(NY, US). State Unknown: Sierra Madre, Seemann
2149 (K), Seemann s.n. (K).

Although first collected at least 120 years ago (perhaps first by Seemann in 1849-50), this essentially glabrous, large-leaved and large-flowered form has not been recognized as distinct. It has however elicited comments such as "It is the most beautiful plant of the mountain ... a just claim for cultivation" (Rose, Contr. U.S. Natl. Herb. 1: 95, 1891) for Palmer 284 (= 2184?) and "one of the showiest shrubby plants ... with an immense load of yellow flowers" for Palmer 101 (US).

The four northwestern states of mainland Mexico which made up the former province of Nueva Viscaya almost exactly delimit its range and hence have suggested the epithet chosen. The lone collection outside this area (Reko 4864) is depauperate to the extent that its classification is somewhat doubtful. González 5094 is a specimen of G. glauca var. ovalifolia which has large flowers, fairly large bracts and bracteoles, and a sparsely pubescent inflorescence, although the elliptic leaves bear subpetiolar glands; it indicates gene flow between these taxa (note that "San Vicente" on the label may be either its locality or common name).

Gentry mentions on the type collection "roots remedy for urine obstruction. Cook in water and drink hot."

SYNONYMA DUBIA

Galphimia latifolia Bartl., Linnaea 13: 553, 1839.
 (Neotype Bartling s.n., (Hort. Bot. Goet.?),
 June 1840, GOET; here chosen).

Thryallis latifolia (Bartl.) O. Kuntze, Rev. Gen.
 Pl. 1: 89, 1891, non Mart. (Nov. Gen Sp. Pl.
3: 79, t. 231, 1829).

The small branch collected by Bartling in

June 1840 (apparently from Hort. Bot. Goet.) is inadequate to place this name infraspecifically within G. glauca Cav., even when combined with the original description. The introduction of seed into Europe by Hartweg in 1837 suggests that the seed Bartling received from Hunnemann in 1837 may have come from Hartweg's gathering, although glands are not found on the petioles in Hartweg 13. Ghiesbreght 624 MO is also similar to the description, but other specimens of that collection are paniculate.

5. Galphimia burchiana B. MacBryde, nom. nov.

G. hirsuta sensu Bartl., Linnaea 13: 557, 1839, non Cav. (Icon. Descript. Pl. 5: 62, 1799). (Neotype Pringle 4873 MO; isoneotypes A, BR, F, G, GH, GOET, K, M, NY, UC, US, W; here chosen).

G. mollis Hort ex Bartl., loc. cit. 558, pro syn., non G.? mollis H. B. K. [Nov. Gen. Sp. Pl. ed. quarto 5: 173 (ed. folio 134, not seen), 1822].

G. hirsuta Cav. f. rufa K. Koch, Berliner Allg. Gartenzeitung 1857(50): 394, 1857, syn. nov. (s. typo).

G. hirsuta Cav. f. virescens K. Koch, loc. cit.

394, t. 9, syn. nov. (Type loc. cit. t. 9;
here chosen).

Shrubs to 4.5 m high, the branches ascending,
densely rufous-subappressed-hirsute when young,
 \pm canescent and glabrescent. Leaves with stipules
triangular, 1.2-3.5 mm long, \pm pubescent as stem
outside; petioles 2-19 mm long, \pm pubescent as
stem with a pair of opposite to alternate \pm sessile
glands on distal to third half; blades 1.3-6.5 x
0.4-3.4 cm, elliptic to ovate or lanceolate,
the base attenuate to obtuse, usually minutely
decurrent, the margin \pm plane, the apex acute to
occasionally obtuse, sometimes mucronulate, charata-
ceous, above glabrous to moderately rufous-
subappressed-hirsute when young, glabrate to glabrous
with maturity, beneath sparsely to moderately pubes-
cent as above (hairs persistent). Inflorescences
paniculate (by suppression of ramal internodes)
to racemiform, 7-20 cm long, rather densely many-
flowered, each flower basally with a seminavicular
bract 1.2-2 mm long transversely separated from 2
opposite seminavicular bracteoles 0.8-1.5 mm long,
the 3 and the rachis \pm pubescent as stem. Flowers
ca 1 1/2-1 3/4 cm diam, the pedicels 7-15 mm long,

pubescent as rachis; calyx-segments 2.3-3 mm long, subrevolute, lanceolate to obovate-oblong, the apex subobtuse, the margin scarious and weakly to strongly ciliate, outside basally \pm pubescent as pedicel, glabrous within, eglandular; receptacular disc intruding as a broad persistent nodule into base of each carpel; petals persistent in fruit, yellow, subpatent, carinate beneath, glabrous (or keel glabrate), the claw aging red, 1.3-2.5 mm long, the limb ovate-oblong, the base obtuse to subtruncate, the margin erulose-ciliate, the apex obtuse, 5-7 mm long, the uppermost? petal with claw stouter, 2.5-3.2 mm long, the limb usually broader, 5-6.8 mm long; stamens basally flattened and connate, the filaments aging red, the outer usually shorter than inner by 0.5-3 mm, the outer unequal, 2.5-4.8 mm long (3 nearest larger petal usually shorter by up to 1.3 mm), the inner subequal, 3.5-6 mm long [sometimes differing up to 0.3(-1) mm], the anthers oblongoid-ovoid, 1.4-1.8 mm long, the connective \pm thickened; ovary 1.5-2 mm diam, the 3 (rarely 4) carpels weakly coherent, the 3 (rarely 4) styles filiform, aging red, 5-6 mm long. Schizocarp 3-4 mm diam; seed subglobose with a small subapical point, the testa reticulate-subfoveate, ferrugineous.

Flowering July-Nov.

Occasionally found in Oaxaca, Mexico; sometimes grown horticulturally in Europe or U.S.A.

UNITED STATES: California; Santa Barbara,
Eastwood s.n. (CAS).

MEXICO: Oaxaca: nr Oaxaca, Conzatti 1373 (US); distr. del Centro, Cerro de San Felipe, Conzatti 2283 (F, GH); Yavesia, alt 6000-7000 ft, Galeotti 4335 & s.n. (BR, G, W); s. loc., anno 1859, Cuming s.n. (G), anno 1842. Franco 205 & s.n. (G, W), anno 1842, Ghiesbreght s.n. (G); nr Oaxaca, Monte Albán, alt 5800 ft, Pringle 4873 (A, BR, F, G, GH, GOET, K, M, MO, NY, UC, US, W), alt 5500-6000 ft, Smith 648 (MO, NY, UC, US); Jayacatlán, alt 4000-6000 ft, Smith 83 (GH); Sierra de San Felipe, alt 7000 ft, Smith 647 (NY). State Unknown: Karwinsky s.n. (M, W); Schiede 1319 (NY).

FRANCE: Paris, Hort. Bot. Paris., annis 1839, 1841, 1842, 1847, sine coll. s.n. [P-JU (11512 seen as IDC 6206. 854: I. 3)], anno 1845, sine coll. s.n. (G).

GERMANY: Leipzig, anno 1845?, sine coll. s.n. (W); Hort. Bot. Lips., anno 1849?, sine coll. s.n. (M); Hort. Bot. Monacensis, annis 1852, 1860, 1863, sine coll. s.n. (M).

COUNTRY UNKNOWN: Herb. Bernhardi, sine coll.
s.n. (MO).

Long confused with Galphimia hirsuta Cav., this species is here recognized as distinct. It has longer, glandular petioles, blades persistently pubescent only beneath and smaller anthers, while Cavanilles' description and the photo of Nee s.n. appear to match Hinton et al. 14533. Also the geographic range of G. burchiana is allopatric from that of G. tuberculata var. hirsuta (including the Nee type). Further discussion of this problem may be found under that variety.

Galphimia burchiana is appropriately named in honor of my major professor Derek Burch, who created an enjoyable atmosphere for this study. A neotype is necessary for Bartling's description since he refers only to living material, and no specimen is found in his herbarium at GOET. (As discussed under G. gracilis the specimen from the Bernhardi herbarium (MO 1898739) cannot be proved to be from GOET). A more extensive description by Newmann (and color plate) may be found in Rev. Hort. sér. 3, l: 281, t. 15, 1847.

The two forms recognized by Koch had been overlooked heretofore; they seem to apply only to the

rapidity of canescence of the indument, although living material should be studied. Galphimia hirsuta f. rufa cannot be satisfactorily typified, since Koch refers to "der Pflanze, welche Adr. v. Jussieu beschreibt." Jussieu did mention Galeotti 4335 (without a description, in Arch. Mus. Hist. Nat. 3: 325, 1843); but where Jussieu had a description (in Walpers, Repert. Bot. Syst. 5: 186, 1845), he was only quoting Bartling and cited no specimens. This red-haired condition is found in the specimens seen.

Galphimia hirsuta f. virescens refers to plants with gray-green hairs grown in the botanical garden at Berlin; no type collection is now known to exist, but the plate is of this form. Some specimens seen here are early canescent (e.g. Conzatti 1373, Franco s.n., G. Smith 647 NY), which may be what Koch was referring to (although Bartling stated "pilis demum rufis" in Linnaea 13: 558, 1839).

6. Galphimia glandulosa Cav., Anales Hist. Nat. 1: 37, 1799; Icon. Descript. Pl. 6: 43, t. 563, 1801, nec sensu H. B. K. (Nov. Gen. Sp. Pl. ed. quarto 5: 172 (ed. folio 133, not seen), 1822, t. 452, 1821), nec Rose (q. v.

inf.). (Holotype L. Née s.n. MA not seen, photos MO).

Malpighia glandulosa (Cav.) Persoon, Synop. Pl.

l: 506, 1805, nec Cav. (Monadel. Cl. Diss.

Decem (8); 411, t. 239, 1789), nec Jacq.

(Icon. Pl. Rar. 3(10): t. 469, 1792).

M. biglandulosa Poiret in Lamarck, Encycl. Méth.

Bot. Suppl. 4: 7, 1816, nom. superfl.

Galphinia glandulosa Poiret in Lamarck, loc. cit.

5: 688, 1817, sphalm.

G. biglandulosa (Poiret) Steudel, Nom. Bot. Phaner.

505, 1821, pro syn.

G. glandulosa Cav. & lanceolata DC., Prodr. l: 582,

1824, nom. superfl.

Thryallis glandulosa (Cav.) O. Kuntze, Rev. Gen.

Pl. l: 89, 1891.

G. glandulosa Rose, Contr. U.S. Natl. Herb. 5:

137, 1897. (Holotype Palmer 474 US 266649;

isotype fragment & photo NY).

T. palmeri Rose, loc. cit. 12: 281, 1909.

T. dasycarpa Small, N. Amer. Fl. 25: 151, 1910

[Holotype Lamb 470 NY; isotypes F, G, GH, NY,
UC (fragment), US]

G. paniculata var. glandulosa (Rose) Ndz. in Engler,

Pflanzenreich 94(IV, 141): 599, 1928, syn.

nov.

Slender ± erect shrubs 0.5-3 m high, the taproot to 2.5 cm diam, the branches glabrous. Leaves often ± caducous; stipules triangular, 1-2 mm long, glabrous outside; petioles 3-37 mm long, glabrous, usually with a pair of opposite to alternate sessile glands on proximal half; blades 1.5-9(-11.5) x 0.6-5(-6.5) cm, ovate to lanceolate, the base attenuate to obtuse, the margin subrevolute, the apex usually subobtuse to subacute, mucronulate, chartaceous to subcoriaceous. Racemes terminal (often tripartite) and axillary, 6-33 cm long (basal portion sterile), ± densely many-flowered, each flower basally with a subulate bract 1.5-3 mm long transversely ± adjacent to 2 usually opposite subulate bracteoles 1-1.6 mm long, the 3 and the rachis glabrous. Flowers ca 1.4-1.7 cm diam, the pedicels 6-16 mm long, glabrous; calyx-segments 2.7-3 mm long, erect, lanceolate to oblong or obovate, the apex obtuse to subacute, the margin scarious and erulose to subciliate distally, glabrous outside and within, eglandular or usually a few to most flowers of inflorescence with one to all sinuses basally bearing a subsessile suborbicular gland (rarely geminate); receptacular disc ± triradiately ridged between carpel bases and sometimes elevated

centrally as a small carpophore or rarely intruding as a ligule into base of each carpel; petals deciduous in fruit (rarely marcescent), yellow soon darkly purpurascent, subpatent, subcarinate beneath, the claw 1.5-2 mm long, the limb ovate to oblong, the base attenuate to truncate, the margin erulose-ciliate to subentire, the apex obtuse, 4.5-6.5 mm long, the uppermost petal with claw stouter (\pm complanate), often purplish, 2.5-4 mm long, the limb broadly ovate to subcordate, 4.2-6 mm long; stamens basally \pm flattened and connate, the filaments purpurascent, the outer usually shorter than inner by 0.3-1.7 mm, the outer unequal to subequal, 1-3 mm long (3 nearest larger petal usually shorter by 0.3-1 mm), the inner equal to subequal, 1.5-3.5 mm long (sometimes differing up to 0.7 mm), the anthers narrowly ovoid-oblongoid, 3-3.6 mm long; ovary angularly short-ellipsoid, 1.6-2 mm diam, moderately incanous-pilose (to densely along medial sutures; hairs not medifixed), the carpels moderately coherent, the styles slender, \pm purpurascent, 3.8-5.5 mm long. Schizocarp 4-6 mm diam, sparsely incanous-pilose (to densely along medial sutures), the mericarps separating at maturity, each carinate medially (basal quarter \pm

bulbous and cavitate); seed with testa subalveolate, usually darkly ferrugineous. Flowering Dec.-June.

Infrequently collected in Mexico from about lat. 25°N - 17°N in wooded to open, usually dry habitats; it may be locally common to abundant (Mexia 8948a, Narvaez & Salazar 140).

Common names reported are grano de oro and margarita (Ramírez, Sin. Vul. Ci. Pl. Mex. 97, 149, 1902), hierba del piojo (Reko 4919) and palo de San Vicente (González 5631, Narvaez & Salazar 140). The latter collection states that leaves are sometimes used for wounds, with good results.

MEXICO: Guanajuato: Acámbaro, Née s.n. (photos MO). Guerrero: Sierra Madre del Sur, distr. Adama, N of Río Balsas, trail E of Temisco, alt 320 m, Mexia 8948a (UC); Acapulco & vic, Palmer 474 (NY, US); Achotla, alt 700 m, Reko 4919 (US). Mexico: distr. Temascaltepec: Pineda, Hinton 3195 (A, GH, K, NY); Nanchititla, Hinton 3411 (A, G, K, NY, US), Hinton et al. 7354 (ARIZ, F, GH, K, NY, US); Platanal, Hinton et al. 5749 (A, F, G, NY); Palmar, Hinton et al. 7528 (A, G, NY). Sinaloa: San Ignacio, Pueblo del Limón, alt 280 m, Gonzalez 140 (K, F, US); Balboa, González 5138 (US), González 5141 (US); El Zapote, González 5212 (US); Guaracha,

González 5419 (US); Mazatlán, González 5631 (K, US),
González s.n. (K); Agua Caliente, Gregg 1143 (MO);
Rosario, Lamb 470 (F, G, GH, NY, UC, US); vic
Rosario, Rose et al. 14567 (A, C, F, GH, MO, NY,
US); vic Guadalupe, Rose et al. 14743 (US), Rose
et al. 14776 (GH, NY, US). Veracruz: Córdoba,
alt 600 m, Reko 5133 (US).

Galphimia glandulosa Cav. is a species which has long been misunderstood, and the name has been little used. The holotype is a mixed collection, but the description and plate clearly apply to this taxon. It was in part correctly treated by Niedenzu (Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5: 27, 1914) when he reduced T. dasycarpa to synonymy (in Engler, Pflanzenreich 94(IV, 141): 599, 1928). This reduction is still correct, although calycine glands are here found present in the type collection. Small had considered the calyx eglandular (N. Amer. Fl. 25: 150, 1910). The range of collections now available makes it clear that T. palmeri, with a strongly glandular calyx, is also synonymous.

The combination made by Persoon is a similar situation to that discussed under G. tuberculata var. hirsuta. The new epithet provided by A. P.

de Candolle was made to contrast Cavanilles' taxon with those newly created by de Candolle (see also Hooker & Arnott, Bot. Capt. Beechey's Voy. 280, 1838).

Galphimia glandulosa Cav. appears to be somewhat isolated within the genus; it is most distinctive by its large anthers, dark older petals, long racemes, low petiolar glands and glabrous condition. The exocarp only weakly coheres to the mesocarp on drying.

7. Galphimia gracilis Bartl., Linnaea 13: 552, 1839. (Neotype sine coll. s.n. P-JU 11510 seen as IDC 6206. 854: I. 1; here chosen).

G. glauca Hort. ex Bartl., loc. cit., pro syn., non Cav. (Icon. Descript. Pl. 5: 61, t. 489, 1799).

G. splendens Makoy ex Ad. Juss., Arch. Mus. Hist. Nat. 3: 324, 1843 (Monogr. Malp. 2: 70, 1844), nom. nud. pro syn.

G. elegans Baillon, Hist. Pl. 5: 431, 1874 or 1875. (Type Baillon, loc. cit. figs. 429-435; here chosen).

Thryallis gracilis (Bartl.) O. Kuntze, Rev. Gen. Pl. 1: 89, 1891.

G. gracilis var. gracillima Hieron., Bot. Jahrb.

Syst. 20(3) Beibl. 49: 36, 1895, syn. nov.

(Lectotype Lehmann 7439 F; isolectotypes GH, US; here chosen).

T. montana Rose, Contr. U.S. Natl. Herb. 12: 281, 1909. (Holotype Rose 2309 US 301220; isotype NY).

G. glauca Cav. f. parvifolia Ndz., Arbeiten Bot.

Inst. Königl. Lyceums Hosianum Braunsberg 5: 25, 1914, syn. nov. [Lectotype Pringle 9698 NY (Herb. Ndz.) isolectotypes F, GH, MO, NY, US; here chosen].

G. montana (Rose) Ndz. in Engler, Pflanzenreich 94(IV, 141): 601, 1938, syn. nov.

Full to lax ± erect shrubs (0.6-)1-2(-4) m high, the branches ascending, dark to pale brown, often reddish, subglabrous or usually sparsely to densely russet to ferrugineous-subappressed-hirsute, occasionally canescent, usually sparser to glabrous with age. Leaves with stipules triangular to subulate, 1.2-3.5 mm long, usually glabrous to glabrate outside, the margin often ± ciliate, often reddish; petioles 2-15 mm long, often reddish, usually more sparsely pubescent than stem, sometimes glabrous; blades 1-6.5(-8) x 0.4-3.2 cm,

narrowly to broadly lanceolate to ovate or elliptic-oblong, the base obtuse to acute, usually short-attenuate, the margin plane to minutely revolute, the apex acute to obtuse, frequently mucronulate to subapiculate or rarely acuminate, subchartaceous to subcoriaceous, beneath glabrous or costa often glabrate to pubescent as petiole, with (0-)2(-4) sessile to rarely stipitate glands near base.

Racemes (5-)7-29 cm long, rarely glabrate or usually ± pubescent as stem, rarely reddish, ± laxly and moderately floriferous, each flower basally with a lanceolate to subacute bract 1.4-3.1 mm long usually ± transversely separated from 2 opposite to alternate subnodal to distant ± subulate bracteoles 0.7-2 mm long, the 3 ± glabrous or frequently caespitously pilose apically to ciliate distally, often red-margined. Flowers ca 1.4-2.2 cm diam, the pedicels 6-17 mm long, pubescent as rachis; calyx-segments (2.5-)3-4(-5) mm long, ± revolute, obovate-oblong to lanceolate, the apex obtuse to subacute, the margin scarious and usually ± erulose to weakly ciliate distally or caespitously pilose apically, globrous outside and within, usually eglandular (rarely some flowers of inflorescence with one to all sinuses bearing a sessile suborbicular gland basally); receptacular disc intruding

as a short persistent ligule or nodule into base of each carpel or \pm elevated centrally as a small carpophore (often confluent with a brief triradiate ridge between carpel bases); petals deciduous in fruit, yellow, subpatent, costate to subcarinate beneath, the claw frequently reddish with age, 1.3-3(-3.5) mm long, the limb ovate to ovate-oblong, the base broadly cuneate or obtuse to truncate, usually short-decurrent, the margin subentire to usually erulose and frequently ciliate, the apex obtuse to subacute, 5-9 mm long, the uppermost petal with claw stouter, often reddish with age, (2.5-)3-4.5 mm long, the limb broadly ovate to subdeltoid, the base sometimes cordate, the apex subcucullate, 5.5-7.5 mm long; stamens broadly \pm flattened and subdistinct to connate, the filaments often aging red, the outer usually shorter than inner by 0.3-1.7 mm, the outer unequal to subequal, 1-3.5 mm long (usually 3 nearest larger petal shorter by 0.2-0.8 mm), the inner subequal to unequal (2.4-)3.5-5 mm long [frequently differing by 0.2-1(-2) mm], the anthers ovoid-oblongoid, 2-3(-3.5) mm long; ovary (1.5-)1.8-2.4 mm diam, usually glabrous (rarely sparsely incanous-pilose along medial sutures; hairs not

medifixed), the carpels very weakly coherent, the styles slender, often aging red, unequal, 4-7(-7.8) mm long (uppermost usually shorter by 0.2-1.3 mm), the apex subulate (often bent to flexuose in lower 2). Schizocarp (4-)4.5-6 mm diam, glabrous (or rarely glabrate along medial sutures), the mericarps ± tardily separating, each subcarinate to costate medially; seed ovoid to subglobose, the testa alveolate to rugose (rarely smooth), usually rufous. Flowering throughout the year, but especially May-Sept in Mex.

Common in Mexico from about lat. 23°N - 17°N in a wide range of habitats (cliffs, dry ridges or roadsides to river banks, chaparral to deep forest), from 30-725 m. Frequently cultivated in Central America, northern South America and especially in the Caribbean, from 0-110 m; occasionally grown in warmer regions throughout the world, sometimes as a hedge. Probably native only in Mexico.

Known under the common names botón de oro in El Salvador (Calderón 19), Honduras (Valerio 3005, Standley 17400) and Panama (Bro. Paul 132); consulita in Haiti (Barker & Dardeau, Fl. Haiti 174, 1930) and Puerto Rico (Urban, Symb. Antil. 4(2): 331, 1905); hierba de piojo (Seler 660)

and hierba del venado (Trejo 1085) in Mexico; lluvia de oro in Colombia (e.g. Bro. Daniel 746, Cuatrecasas 23671), Cuba (Killip 41288), Nicaragua (Bro. Garnier A872, All43). Panama (Bro. Paul 132) and Peru (Williams 5941); and ramo or ramito de oro in Nicaragua (Maxon et al. 7350, Chaves 225).

NATIVE AND/OR CULTIVATED

MEXICO: Durango: southern Durango, Rose 2309 (NY, US). Guerrero: distr. Mina, Guayameo, alt 560, Hinton et al. 9372 (K, NY, US); Iguala, Lyonnet 1715 (US); Río Balsas, Orcutt 4183 (F, GH, MO, US); hillsides nr Balsas Station, alt 2000 ft, Pringle 10063 (C, CAS, F, G, GH, GOET, K, M, MO, NY, UC, US, W); Limón Mt, alt 1800 ft, Rusby 156 (NY, US). Hidalgo: distr. Huejutla, vic Huejutla on rd to San Felipe Orizatlán, alt 172 m, H. E. Moore Jr. 2894 (GH, US); Huejutla, C. & E. Seler 660 (GH, US), Jalisco: barranco nr Guadalajara, Palmer 97 (G, GH, MO, NY, US), Pringle 3004 (A, F, GH), Pringle 9698 (F, GH, MO, NY, US); rd betw Bolaños & Guadalajara, Rose 3050 (NY, US). Michoacán: distr. Huétamo, Mal Paso, Hinton et al. 8039 (A, F, K); distr. Zitácuaro, Zitácuaro-Tiripitillo, alt 725, Hinton et al. 13220 (NY, UC, US). Nayarit: hillsides, Cañón de

Jesús María, Goldsmith 159 (F, GH, MO, UC, US).
 San Luis Potosí: munic. El Pujal, valley of
Río Tamaoan, alt 100 ft, Chase 7504 (ARIZ, F, GH,
 MO, NY); Ciudad de Valles: alt 500 ft, Cottam
10556 (ARIZ), alt 270, Fisher s.n. (ARIZ, F, GH,
 MO, NY, US), Kenoyer A442 (F), roadside to S, alt
 200 ft, Leavenworth 221 (ARIZ, F, GH, MO, NY),
C. & A. Lundell 7275 (ARIZ, NY, US); Tamazunchale,
 alt 400 ft, Fisher 45174 (CAS); 2 mi E, N side of
 river, alt 250 ft, Hitchcock & Stanford 7318
 (UC, US); C. & A. Lundell 7145 (US); Chamal,
LeSuer 564 (F); nr Tancanhuitz (=General Pedro
 Antonio Santos), Nelson 4403 (GH, US); San Dieguito,
Palmer 104 (F, GH, MO, NY, UC, US); rd from San
 Luis Potosí to Tampico, Palmer 1065 (GH, MO, NY,
 US); Rasón Station, Pringle 3099 (A, BR, F, G,
 GH, GOET, M, MO, NY, UC, US, W); betw Ciudad de
 Valles & Villa Juárez, White 65 (A, F). Sinaloa:
 munic. Concordia, Cerro del Ocote, alt 456 m,
Trejo (& Dehesa) 1085 (F, K, US). Tamaulipas:
 nr Limón, ca 73 mi S of Ciudad Victoria on Pan
 American Hwy, Frye & Frye 2665 (GH, MO, NY, UC, US);
 nr Antiguo Morelos, alt 650 ft, Happ 32 (MO);
 Chamal, Ocampo rd, Kenoyer & Crum 3579 (GH).
 Veracruz: Tantoyuca, Berlandier 2149 (G, NY),

Berlandier 2149=729 (GH), Ervendberg 130 (G, GH, GOET), Ervendberg 233 (NY); banks of Panuco, nr Ebano, LeSuer 608 (ARIZ, F). State Unknown: ex Herb. F. M. L. von Bergler (W); entre Tampico & Real del Monte, Berlandier 277 (G, MO, W); Villa Juárez, Clark 6837 (MO); Orcutt 4182 (K); C. & E. Seler 3729 (B, NY); P. W. von Würtemberg s.n. (M).

COSTA RICA: Puntarenas: Esparta, nr Puntarenas, alt 50 m, Biolley 2022HP (US); Jardín de Esparta, alt 50 m, Biolley 17307 (US).

EL SALVADOR: La Unión: vic La Unión, alt 150 m or less, Standley 20828 (GH, US); San Salvador: San Salvador, Calderón 19 (F).

HONDURAS: Comayagua: Río Selguapa, El Taladro, Molina 14342 (F, NY, US); Siguatepeque, alt 110 m, Rodríguez 3005 (F). Cortés: vic La Lima, alt ca 30 m, Standley & Chacon 7134 (F). Morazán: vic El Zamorano, alt 780-900 m, Standley 5145 (F), alt 800 m, Rodríguez 3086 (F). Olancho: vic Juticalpa, alt 380-480 m, Standley 17400 (F).

NICARAGUA: Granada: environs de Granada, alt 40 m, Levy 428 (C, F, G). Managua: Managua, Chaves 225 (US), Maxon et al. 7350 (US); vic Managua, Bro. Garnier A872 (US), Garnier All43

(US); Sierras de Managua, Grant 1050 (GH).

PANAMA: Canal Zone: Matachin to Las Cascadas, Cowell 358 (NY); hospital grounds at Ancon, alt 20-80 m, Mason 12 (US). Panama: Capira, Bro. Paul 132 (US).

CUBA: Habana: Santiago de las Vegas, Baker 80 (C, GH, MO, NY, UC, US), von Hermann 3374 (NY); Habana, Ekman 13656 (NY, US); cult, León 2826 (NY); munic. Isla de Pinos, Nueva Gorgona, Killip 41288 (US); San Miguel del Padron, cult, León 11550 (NY). Las Villas: munic. Cienfuegos, Soledad, Harvard Tropical Garden, Jack 5519 (A). Matanzas: nr Matanzas, Britton & Wilson 109 (NY).

Oriente: Dos Bocas, Santiago de Cuba, Bro. Clemente (GH); Baracoa, cult, Ekman 4275 (G). Province Unknown: anno 1909, Serre s.n. (BR); cult, Wright 149=2159, 2159 (G, GH, GOET, MO).

DOMINICAN REPUBLIC: Barahona: Paraíso, Fuertes 434 (A, C, F, G, GH, GOET, K, M, MO, NY, US, W), H. von Türkheim 2828 (BR, NY). District of Santo Domingo: vic Ciudad Trujillo, alt 0-25 m, cult, Allard 12182 (US); Cambita, Bro. Basilio Augusto 1277 (NY); Cordillera Central, San Cristóbal, at Cambita, Ekman 11350 (C, F, NY, US). Montecristi: dist. Monción, Patilla, alt 375, Valeur 660

(A, C, G, MO, NY, US). Pacificador: Villa Riva (Almacén), hills to NW, alt 0-100 m, Abbott 592 (GH, US). San Pedro de Macorís: San Pedro de Macorís, N of town, Rose et al. 4234 (NY, US). Santiago: Cordillera Septentrional, Navarrete, Cañada Bonita, alt 300 m, Ekman 16115 (G, US).

HAITI: prope Turgeau, cult, Buch 1116 (US); Pétionville, Massif de la Selle, alt 350 m, cult, Ekman 9136 (A, G, NY, US); Port au Prince, Bois-Chêne, Favrat 30 (G).

JAMAICA: Cornwall: St. James Parish, Montego Bay, hotel district, Austin 4240 (MO, US); St. Elizabeth Parish, Hunnewell 11086 (GH). Middlesex: St. Ann Parish, Moneague, Jan 1850, cult, R. C. Alexander Prior s.n. (K); Manchester Parish, Watsons Hill, Fawcett 3894 (F, NY); St. Ann Parish, Reynolds housing area nr Lydford P. O., alt ca 1600 ft, Howard & Proctor 14251 (A). Surrey: St. Andrew Parish, Hope Estate (=Hope Gardens), alt 100 ft, cult, Harris 11884 (CAS, GH, K, MO, NY, US). County Unknown: cult, Jenman 55 (K).

PUERTO RICO: Aguadilla: Aguadilla, alt 50 ft, Heller 4512 (A, G, GH, MO, NY, US). Mayagüez: Cabo Rojo, Sintenis 721 (GH, GOET, US), Stevens 2267 (NY). Ponce: Coamo Springs, Goll et al. 670

(NY, US). San Juan: Santurce, Mr & Mrs Heller
855 (NY, US), Otero 311 (MO); Rio Piedras, Johnston
514 (NY), Stevenson 533 (US).

ANTIGUA: S edge of St John's cult, Burch
1430 (MO).

BARBADOS: s. loc., Ex Herb. Munro-Herb. Kew
 1882 (GOET).

BARBUDA: Codrington, sine coll., s.n. (NY,
 US).

DOMINICA: St. Andrew, village of Marigot
 nr Melville Hall Airport, Burch 1407 (MO); Roseau,
 Botanic Gardens, cult, Hodge 977 (GH).

GUADELOUPE: Basse Terre, cult, Père Duss 2415
 (F, NY, US).

MARTINIQUE: Vallée de St. Pierre, cult, Hahn
846 (G); Fort de France, Père Duss 1471 (F, MO, NY,
 US); Bellefontaine, alt 0-15 m, cult, M. & H.
Stehle 4630 (US).

ST. CROIX: s. loc., cult, Krebs s.n. (C);
 Bassin, Ricksecker 184 (F, MO), March 1896,
Ricksecker s.n. (US), April 1896, Ricksecker s.n.
 (MO), June 1896, cult, Ricksecker s.n. (F); Herman
 Hill, Thompson 1064 (NY).

ST. EUSTATIUS: Oranjestad, along rd.

ST. JOHN: cult, Cruz Bay, Raunkiaer 1890

(c), s. loc., Raunkiaer 2768 (c), Vest, Feb 1906,
Raunkiaer s.n. (c).

ST. KITTS: Basseterre, public square, Britton
& Cowell (NY).

ST. THOMAS: s. loc., Eggers 144 (GH), cult,
Eggers 158 (BR, CAS, G, GOET, K, M, W), July 1881,
cult, Eggers s.n. (US); s. loc., anno 1871, Krebs
s.n. (c); St Thomas?, s. loc., Krebs s.n. (F);
nr Charlotte Amalie, cult, Rose 3164 (NY, US).

TRINIDAD: San Fernando, Palmiste, Aug 1932,
Broadway s.n. (A, B); St. Augustine, Goverment
Farms, cult, Friend 89 (NY).

VIEQUES: s. loc., Jan 1876, Eggers s.n.
(c, MO).

ANTILLES: s. loc., Eggers 248 (G).

COLOMBIA: Antioquia: Medellín, Bro. Daniel
746 (US); Barranquilla, Bro. Elias 147 (US),
Bro. Elias 173 (US); vic Antioquia, alt 570 m,
Gutierrez et al. 1474 (F). Atlántico: Barranquilla,
cult, Dugand 5077 (US), Bro. Paul (US). Bolívar:
vic Cartagena, Bro. Heriberto 74 (US), Bro. Heri-
berto 116 (GH, NY, US), Bro. Heriberto 200 (US).
Cauca: Cerrito Buga etc., Cauca, alt 1000 m, cult,
Lehmann 7439 (F, GH, US). Córdoba: Tierra Alta,
Río Sinu, March 1818, cult, Pennel s.n. (NY).

Cundinamarca: Tocaima, Bro. Ariste-Joseph A778 (US).

Huila: Gigante, anno 1920, Bro. Ariste-Joseph s.n. (US). Valle: Plana del Valle, nr Vijes, alt 1050 m, Cuatrecasas 23671 (F); Palmira, Agric. Exp. Sta., alt 1080 m, Cuatrecasas & Willard 26568 (NY, UC, US); area de la ciudad de Cali, alt 1000 m, Duque 1855 (US); El Cerrito, N of Palmira, alt 1050 m, García 6480 (US).

ECUADOR: Province Unknown: cult, Mille 1168 (F).

PERU: Huanaco: Tingo María, alt 625-1100 m, Allard 21631 (US). Loreto: Caballo-Cocha, Amazon River, L. Williams 2374 (A, F). San Martín: Tarapoto, alt 750 m, Williams 5941 (F, US).

COUNTRY UNKNOWN: Herb. Bernhardi, sine coll. s.n. (MO).

ONLY CULTIVATED

UNITED STATES: California: Santa Barbara Co: Gould's place, Montecito, Nov 1923, Eastwood s.n. (CAS); s. loc. July 1914, Rehder s.n. (A). Florida: Alachua Co: Gainesville, beside McCarthy Hall, Univ. of Florida, D'Archy 1406 (MO). Dade Co: Miami, Tidestrom 6998 (US). Monroe Co: Key West, Miss Cunniff's garden, 404 South St, Killip 45079 (US). Palm Beach Co: Clark State, Palm

Beach, Ricker 4005 (UC). Seminole Co: Altamonte Springs, Schallert 20782 (B, M). Missouri: St. Louis, Missouri Bot. Gard., 68-98-1, anno 1970, MacBryde 63 (MO), Sherft 825 (F), Thompson 272/00 (MO). Texas: Houston, alt 50 ft, Fisher 41259 (US).

BERMUDA: Bellueve?, Stewardson et al. s.n. (NY).

BRAZIL: Bahia: s. loc., anno 1887, Paulay s.n. (W). Pernambuco: Nazaré da Mata, Coelho de Moraes 942 (NY); Recife, Campo Grande, Vasconcelos 06 (US).

GUYANA: Demerara Co: Georgetown, Bot. Gard., Dahlgren & Persad s.n. (F), Feb 1932, Fairchild s.n. (A, US), C. & R. Mell 251 (NY, US); Hyde Park, Warren s.n. (F).

DENMARK: Copenhagen, Hort. Haun. ?, Herb. Liebmann (C), Hort. Bot. Haun., annis 1874, 1887, sine coll. s.n. (C).

FRANCE: Paris, Hort. Bot. Paris., anno 1837, sine coll. s.n. [P-JU (11510 seen as IDC 6206. 854: I. 1)].

GERMANY: Munich, Hort. Bot. Monac., Kupper s.n. (M), anno 1958, sine coll. s.n. (M).

GREAT BRITAIN: Royal Bot. Gard., Kew, anno 1914, sine coll. s.n. (K).

CHINA: Fukien: s. loc., Chung 6312 & 6361 (NY). Province Unknown: Faber s.n. (W).

INDIA: Dehra Dun, New Forest, nr Ballupur gate, May 1956, Bhatnager s.n. (MO); Dehra Dun, Raizada 96 (NY).

INDONESIA: Java: Buitenzorg Bot. Gard. Sargent 16? (A); Bogor Bot. Gard., Warburg 1999 (NY).

JAPAN: Hondo, Onuma Kohei 3391 (A).

MALAYA: Johore: Timor Estate, Franck 1429 (C).

PHILIPPINES: Luzon: Rizal: Malabon, July 1923, Clemens s.n. (CAS); Laguna: Los Baños, Steiner 501 (US).

EGYPT: Giza, Dept. Agric., Hort. Sect., Brown 1 & 2 (K).

GHANA: Achimota, Roberty 12869 (G, MO).

NIGERIA: Ibadan, Jones 13731 (MO).

SIERRA LEONE: Freetown, Roberty 17984 (G).

SUDAN: Khartoum, Roberty 5377 (G).

GUAM: Exp. Sta., Thompson 277 (US).

HAWAII: Oahu: Mokuleia, Degener 12149 (NY); Honolulu, Univ. of Hawaii, anno 1930, Inafuku s.n. (NY), anno 1961, McClintock s.n. (CAS), Maneki 2457 (NY); s. loc., Kelly 245 (CAS); Meebold 26634 (M); Wawra 2466 (W); Hawaii, s. loc., Mann &

Brigham 289 (US).

Galphimia gracilis was described by Bartling based on a plant from the botanical garden at Goettingen, but also grown in others. Since no type used by him has been located a specimen from P-JU of a plant grown in Paris in 1837 is chosen as neotype (its label bears only the two names published by Bartling, but is not in his hand). A specimen from the Bernhardi herbarium (MO 1898723) could perhaps have come from Bartling (Missouri Bot. Gard. Bull. 7: 30, 1919), but since it and MO 1898739 bear labels (apparently in Bernhardi's hand) with only the names and synonyms Bartling used for G. gracilis and G. hirsuta, the sheets must be bypassed for purposes of typification.

Galphimia splendens Makoy ex Ad. Juss. is probably based on a plant grown by L. Jacob-Makoy in Belgium (Belgique Hort. 24: 5, 1874) and perhaps also in Paris (Arch. Mus. Hist. Nat. 3: 324, 1843), but as yet no horticultural catalog or specimen has been found. Galphimia elegans Baillon is not certainly this species from the figures, but a specimen of G. gracilis (Hahn 864 G) collected in 1873 was probably annotated by Baillon (see Urban, Symb. Antil. 3: 5, 1902); the name has also been

placed here by Niedenzu (in Engler, Pflanzenreich 94(IV, 191): 596, 1928). Galphimia gracilis var. gracillima had been overlooked heretofore; it is based on weakly cultivated specimens.

Thryallis montana was described as new apparently in Galphimia sect. Microgalphimia; its large anthers clearly indicate it should be in the tautonymic section. It is representative of many of the western collections of the species (e.g. Goldsmith 159, Hinton et al. 9322, Orcutt 4183, Pringle 1163, Rusby 156), which may have basally broader leaves, less pubescent stems, calycine glands, and/or a slightly pubescent ovary. It is possible that this variability indicates some introgression from G. langlassei and G. tuberculata. Galphimia glauca f. parvifolia is another example of the western population, but the leaves are not remarkably smaller. Hinton et al. 13220 is unusual for its height (4 m, where 3 m is rarely reported), almost tripartite inflorescences (by reduction of lateral internodes) and rather small fruit (ca 4 mm diam).

When this species was brought into cultivation is not clear, although it is certain that plants from eastern Mexico were chosen. It is surmised

to be only introduced in the Caribbean from its lack of mention in the early floras of that region and from the frequency of comments (from herbarium labels) on its cultivation there (although also said to be escaped); the earliest specimens I have seen from the area are Alexander Prior s.n. (cultivated in Jamaica, 1850), and Wright 2159 (cultivated in Cuba, 1860-64). Its dispersion in Europe and the world probably dates from about the 1820's; the neotype is the earliest collection seen here. It is not known to be cultivated in Mexico.

Baker 80 indicates it is "one of the most valuable of the smaller garden shrubs of Cuba." Illustrations may be found in Fl. Males. ser. 1, 5: 143, 1955; J. Bombay Nat. Hist. Soc. 45: 104-105, 1945; Kuck & Tongg, Hawaiian Fl. & Fl. Trees 101, 1958; and Menninger, Seaside Pl. World 13, 169, 1964. Mention of an exposed ovule in one carpel may be found in J. Indian Bot. Soc. 18: 59, 1939; there is a detailed micromorphological study by B. Singh in Hort. Advance (Saharanpur) 3: 1-19, 1959. It should be cautioned that much literature referring to G. glauca is in fact on this species.

8. Galphimia langlassei (Blake) B. MacBryde,

comb. nov.

Thryallis langlassaei Blake, Contr. Gray Herb. 3
(52); 71, 1917. (Holotype Langlasse 955
GH; isotypes F, G, K, US).

Infrequently collected in Jalisco, Michoacán
and Guerrero, Mexico; northern and southern popu-
lations are divergent.

8a. G. langlassaei subsp. langlassaei

Shrubs 1-3 m high, the branches ascending,
smooth or rarely scabridous, brown, glabrous to
sparsely russet-subappressed-hirsute (then
glabrescent). Leaves with stipules triangular,
1-2 mm long, pubescent as stem outside; petioles
slender, 2-11 mm long, ± brown, glabrous; blades
2.5-10.3 x 0.8-2.3 cm, narrowly lanceolate to
lanceolate or elliptic, the base usually long-
cuneate, the margin repand, minutely revolute, the
apex usually subacute, rarely mucronulate, charta-
ceous, beneath glabrous or costa glabrate, with 2 or
3 subsessile glands near base. Inflorescences
racemiform, single or sometimes tripartite, 8-16 cm
long, smooth or rarely scabridous, ± brown, ±
laxly and moderately floriferous, each flower
basally with a seminavicular bract 1.3-2.5 mm long

± transversely separated from 2 opposite to alternate seminavicular bracteoles 0.8-1 mm long, the 3 and rachis sparsely to moderately russet-subappressed-hirsute. Flowers ca 1 1/4- 1 3/4 cm diam, the pedicels 9-14 mm long, pubescent as rachis; calyx sometimes ± succulent basally, the segments 2.5-3 mm long, revolute, obovate to oblong, the apex obtuse, the margin scarious and ± ciliate distally, glabrous outside and within, usually eglandular (rarely a few flowers of inflorescence with 1 or 2 sinuses bearing a sessile suborbicular gland basally); very brief receptacular disc usually elevated centrally as a small carpophore confluent with a short triradiate ridge between carpel bases; petals deciduous in fruit, yellow, subpatent, costate to subcarinate beneath, the claw 1.6-2.2 mm long, the limb ovate, the base obtuse to subcordate, the margin erulose to erose, the apex obtuse, 4.3-7 mm long, the uppermost? petal with claw stouter (sometimes complanate) often red, 2.2-3.9 mm long, the limb broadly ovate, the base truncate to subcordate, 4.2-6.2 mm long; stamens basally somewhat flattened and connate, the filaments aging red, the outer shorter than inner by 0.2-1.5 mm, the outer unequal, 2-3.1 mm long (3 nearest

larger petal shorter by 0.6-1 mm), the inner sub-equal, 3.1-4 mm long, (sometimes differing up to 0.4 mm), the anthers narrowly ovoid-oblongoid, the base deeply cordate, 2.8-3.7 x 0.7-1 mm, the included connective small; ovary 1.7-2.3 mm diam, densely incanous-pilose (hairs not medifixed), the carpels strongly coherent, the styles filiform, aging red, 5.5-6 mm long. Schizocarp ca 4 mm diam, moderately incanous-pilose; seed with testa alveolate, rufous.

Flowering in Dec & March.

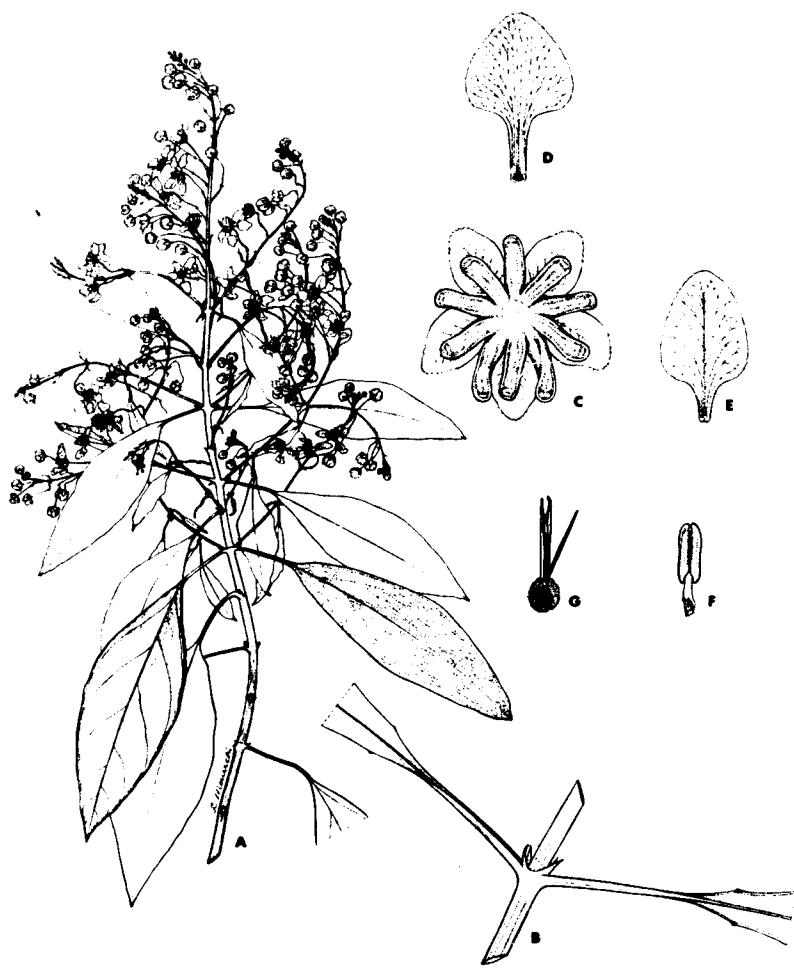
A few collections from the coastal side of the mountains in Michoacán and western Guerrero; habitat generally wooded.

MEXICO: Guerrero: vic San Andrés (ca 15 km NE of Atoyac), alt 700 m, Langlasse 955 (F, G, GH, K, US). Michoacán: distr. Coalcomán, Aquila, alt 100 m, Hinton et al. 15867 (NY, US).

Sometimes rather similar to Galphimia tuberculata in appearance (see González 6757, 7271); some flowers of Hinton et al. 11683 bear calycine glands.

8b. G. langlassei subsp. latanthera B. MacBryde
subsp. nov. (Holotype Mexia 1778 MO 957535;
isotypes A, CAS, GH, UC, US).- Fig. 19.

Fig. 19. Galphimia langlassei subsp. latanthera
B. MacBryde: A, habit ($\times \frac{3}{8}$); B, node
with stipules ($\times 1 \frac{1}{2}$); C, calyx &
androecium, D, superior petal, E, lower
petal, F, stamen, G, gynoecium (all $\times 3$).
A after Mexia 1778 (CAS); B-G ibidem
(GH).



Differing from tautonymic subspecies by:

branches smooth, green (eventually browning), glabrous.
Leaves with stipules 1.5-3 mm long, usually glabrous; petioles rather stout, 8-33 mm long, green to ivory-tan; blades 4-11.5 x 1.2-4.6 cm, lanceolate to elliptic (sometimes ovate), the base frequently attenuate, the apex often apiculate, subcoriaceous, glabrous. Inflorescences paniculate (by suppression of ramal internodes), to 25 cm long, smooth and ± green, rather densely many-flowered, the usually subulate bracts to 4.5 mm long and bracteoles to 2.5 mm, they and rachis sparsely pubescent to glabrate.
Flowers with pedicels 12-17 mm long; calyx strongly succulent basally, the margin frequently reddened; petals tardily deciduous, but marcidous in young fruit, the claw 2.4-2.5 mm long, the limb broadly ovate to short-subreniform, the base cordate or sometimes truncate, the apex broadly rounded to obtuse, 4.2-5 mm long, the uppermost? petal with claw very stout, complanate, aging red, 4-4.7 mm long, the limb semicircular to subdeltoid, the base truncate, 4.5-5 mm long; stamens with stout filaments, the outer longer than inner by 0.2-0.8 mm, the outer unequal, 1.8-3 mm long (3 nearest larger petal shorter by 0.6-1 mm), the inner subequal, 1.6-2.7

mm long (sometimes differing up to 0.7 mm), the anthers broadly oblongoid to ovoid, the base ± cordate, 2.3-2.9 x 1-1.8 mm, the thecae exceeding stout often excluded connective; ovary 1.9-2.5 mm diam, the styles slender, 4.5-5.5 mm long. Flowering in March.

A few collections from Jalisco; habitat wooded or open.

MEXICO: Jalisco: Sierra Madre Occidental, San Sebastián to Hacienda de Ototal, alt 1425, 2 Mar 1926, Ines Mexia 1778 (A, CAS, GH, MO, UC, US), Mexia 1779a (NY); trail San Sebastián to Las Margaritas, alt 1700 m, Mexia 1863a (F, US); along rd betw Mascota & San Sebastián, Nelson 4060 (GH, US).

A remarkable subspecies unusual in the genus for its shorter inner whorl of filaments and distinctive in the section for its broad anthers with stout connectives. Mexia mentions that the type collection has long branches; Mexia 1778 (US 1319507) shows the succulent calyx base well. A few flowers of Nelson 4060 bear calycine glands. The key indicates this subspecies similarity to the tautonymic subspecies.

9. Galphimia tuberculata (Rose) Ndz. in Engler,
Pflanzenreich 94(IV, 141): 602, 1928.

Thryallis tuberculata Rose, Contr. U.S. Natl. Herb.

12: 281, 1909. [Holotype Rose 1607 US 300453,
photos A, NY; isotypes GH, NY (fragment)].

T. humilis Rose, loc. cit. 280, syn. nov. (Holotype
Rose 1907 US 300792, fragment NY, photos A,
NY).

G. humilis (Rose) Ndz. in Engler, loc. cit. 601.

Infrequently collected in Sinaloa, Nayarit,
Guerrero and Oaxaca, Mexico. Distinctive by its
stipitate glands on the leaves and often on the
calyx.

Galphimia tuberculata and G. humilis are
conspecific, although separately and simultaneously
published by Rose. The two type collections some-
what demonstrate the extremes of the species; however
Rose 1607 has some flowers with a few calycine
glands (not described by Rose, and considered absent
by Small, N. Amer. Fl. 25: 150, 1910), and Rose
1907 is weakly tuberculate. González 7271 offers a
more recent collection with prominent calycine glands
and tubercles. Somewhat similar murication of branches,
racemes and leaves is found only in G. brasiliensis
subsp. brasiliensis.

9a. G. tuberculata var tuberculata

Shrubs 3-6(-30) dm high, the branches \pm erect, strongly to occasionally weakly tuberculate, moderately to densely russet to rufous-subappressed-hirsute (hairs \pm persistent, each often from apex of tubercle). Leaves with stipules narrowly triangular, 1.5-3.5 mm long, usually glabrous to glabrate outside; petioles slender, occasionally obsolete or usually 1-8.5 mm long, \pm muricate and pubescent as stem; blades 1-7.7 x 0.4-3 cm, lanceolate or ovate to elliptic, the base usually attenuate to long-cuneate, \pm decurrent, the margin often subrevolute, the apex usually acute to subobtuse, frequently mucronulate, chartaceous, above ivory-pusticulate, beneath glabrous except costa (and rarely margin) weakly muricate and/or pubescent as petiole, the surface gray to green-glaucous, brown-granulate, with (1-)2(-5) strongly stipitate (to 1.5 mm) glands near base. Racemes 8-23 cm long, \pm muricate and pubescent as stem, \pm laxly and moderately floriferous, each flower basally with a narrowly lanceolate bract 2.5-4 mm long transversely separated from 2 opposite to alternate subulate bracteoles 1-2 mm long, the 3 usually glabrous. Flowers ca 1 1/2 - 1 3/4 cm diam, the pedicels 6-16 mm long,

often more densely pubescent than rachis; calyx-segments 3-4.5 mm long, erect, obovate to oblong or lanceolate, the apex obtuse to subacute, the margin scarious and \pm erulose to ciliate distally, glabrous outside and within, eglandular or often a few to most flowers of inflorescence with one to all sinuses basally bearing a usually foliaceous stipitate (to ca 0.8 mm) suborbicular gland (to 0.4 mm diam; sometimes \pm geminate); very brief receptacular disc elevated centrally as a small carpophore \pm triradiately ridged between carpel bases; petals deciduous in fruit, yellow, subpatent, subcarinate to costate beneath, glabrous or medially glabrate beneath, the claw 1.5-2.5 mm long, the limb ovate to oblong, the base subcordate to obtuse, the margin subentire to erose, the apex obtuse to acute, 4.5-6.9 mm long, the uppermost? petal with claw stouter, \pm canaliculate, often red, 3.3-5 mm long, the limb broadly ovate to subdeltoid, the base cordate to truncate, 4.3-6 mm long; stamens basally \pm flattened and subdistinct to weakly coherent, the filaments often aging red, the outer shorter than inner by (0.1-) 0.5-1.5 mm, the outer unequal, 1.5-4.7 mm long (3 nearest larger petal shorter by 0.4-1.7 mm), the inner subequal to unequal, 3-4.8 mm long (sometimes

differing up to 1.2 mm), the anthers ovoid-oblongoid, 2.8-3.4 mm long; ovary 1.5-2.2 mm diam, very sparsely to moderately incanous-pilose (especially proximally; hairs not medifixed), the carpels weakly coherent, the styles slender, often aging red, 4.6-6 mm long, the apex subulate, minutely truncate at stigma.

Schizocarp angular-subglobose to short-ovoid, ca 3.5-4 mm diam, subglabrous to sparsely incanous-pilose, the mericarps separating at maturity (basal third of each sometimes cavitate); seed with testa reticulate-alveolate, rufous. Flowering March, June-July especially, and Oct.

Range of the species (Liebmamn collections inferred to be from Oaxaca); habitat reported as in Arid Upper Tropical Subzone by Goldman (Smithsonian Misc. Collect. 115: 354, 1951), where it may be scarce (Gregg 1046). Gonzalez 4001 has a rhizome bearing erect shoots.

Known under the common names of flor de diciembre (Langlasse' 255), palo de San Vicente (Gonzalez 7271) and tlatlacoxochitl (Sesse & Mocino s.n.)

MEXICO: Guerrero: distr. Montes de Oca, San Antonio, Hinton et al. 11683 (US); environs de la Union, alt 50 m, Langlasse' 255 (F, G, GH, US).

Nayarit: territorio de Tepic, Acaponeta, Rose 1450 (NY, US); betw Concepcion & Acaponeta, Rose 1907 (NY, US). Sinaloa: San Agustín, González 4001 (US), Liebm 8676 (C), Liebm 8682 (C); Mazatlán, González 6557 (F), alt 10 m, González 7271 (CAS, F, G, US); betw Rosario & Colomos, Rose 1607 (GH, NY, US). State Unknown: Gregg 1046 (MO); Liebm 8675 (C); Sesse & Mociño s.n. (G).

Galphimia tuberculata var. tuberculata was first collected by Sesse & Mociño ca 1800, then by F. M. Liebm in 1842, then J. Gregg in 1849, and was finally described in 1909 based on a collection of J. N. Rose in 1897. A specimen from the M.-E. Moricand herbarium now at G has a label with 'Peru' on it, and 'Pavon' in a later hand; although accepted as such by Niedenzu (in Engler, Pflanzenreich 94 (IV, 141): 596, 1928), it is surely a duplicate of another specimen from the Sesse & Mociño herbarium at G. Comments on the incorporation of some Sesse & Mociño collections in the Pavón herbarium have been made by T. A. Sprague (Bull. Misc. Inform. 1926: 417, 419, 1926), by J. Jaramillo-Arango (including the note that Pavon was never in Mexico; see Ruiz & Pavón, Relac. Hist. Viage ed. 2, 1: xxxvii, 1952) and A. R. Steele, Fl. for King 295,

1964. There is a colored drawing by J. Baÿer (apparently of this species) at C; it bears a new specific epithet (indicating affiliation with Galphimia) which was probably given by Liebmann, but which has not been found elsewhere.

9b. G. tuberculata var. hirsuta (Cav.) B. MacBryde, comb. & stat, nov.

G. hirsuta Cav. Icon. Descript. Pl. 5, 62, 1799, non sensu Bartl. (Linnaea 13: 557, 1839). (Lectotype L. Née s.n. MA not seen, photo M0; here chosen).

Malpighia hirsuta (Cav.) Persoon, Synop. Pl. 1: 506, 1805; superfluously by Poiret in Lamarck, Encycl. Méth. Bot. Suppl. 4: 6, 1816, non Vellozo (Fl. Flum. 193, 1825 (seen reprinted, Arq. Mus. Nac. Rio de Janeiro 5: 185, 1881), (Atlas) 4: t. 171, 1835.

Galphimia hirsuta Poiret in Lamarck, loc. cit. 5: 687, 1871, sphalm.

Thryallis hirsuta (Cav.) O. Kuntze, Rev. Gen. Pl. 1: 89, 1891, non Sesse & Moc. [Fl. Mex. 119, 1893 (Naturaleza (Mexico City) ser. 2, 2)].

Differing from tautonymic variety by: shrub 1 m high, the branches moderately to weakly tuberculate,

cupreous to fulvous-subappressed-hirsute. Leaves with stipules pubescent as stem outside to glabrate; blades ca 3.5-7.4 x 1.8-3 cm, the margin \pm plane, the apex \pm apiculate, moderately pubescent as stem above and beneath. Racemes weakly tuberculate to smooth, the bracts and bracteoles pubescent as rachis. Flowers ca 1.5 cm diam; calyx-segments \pm medially pubescent as rachis, the margin strongly ciliate, eglandular? or all flowers of inflorescence with each sinus basally bearing a subsessile gland (0.5-0.6 mm diam); petals with claws 2-2.7 mm long, the limbs usually subcordate basally and obtuse apically, 5.1-6.2 mm long, the uppermost? petal glabrate medially beneath, the claw 3.5-4 mm long, the limb 5.5-6 mm long; ovary sparsely puberulous basally to glabrous. Schizocarp glabrous to subglabrous; seed with testa rugose-alveolate, ferrugineous.

Flowering in Aug or Sept.

Rare in central Guerrero; habitat sometimes in forest (Hinton et al. 14533).

MEXICO: Guerrero: distr. Galeana, Atoyac, alt 25-100 m, Hinton et al. 14533 (NY, US); inter Chilpancingo & Rio Azul, Nee s.n. (photo MO).

The variety is distinctive for its pubescent

leaves above and beneath, and large calycine glands (when present). Hinton et al. 14533 is considered to be the only additional collection to match the type of Galphimia hirsuta Cav., judging from the photograph of that type (Nee s.n.) obtained for MO. Certain morphological details are unclear in the photograph (especially whether calycine glands are completely absent), the original description of the taxon is too meager to determine its identity, the specimen cannot be loaned, and it is currently unavailable for study while the MA herbarium is being moved. However, its distinctness from G. burchiana will be resolved before publication.

The combination by Persoon was made under Malpighia + Galphimia; the specific epithet is numbered in the sequence begun under Malpighia proper. Judging also from his statement concerning the cross and his treatment of Galphimia in the index (Synop. Pl. 1: x, 527, 534, 1805), the combination is considered to have been made there. (Persoon's use of the cross is also discussed in Taxon 15: 146, 1966). The combination was accepted by Steudel in Nom. Bot. Phaner. 505, 1821, and a similar one by Wiggins in Shreve & Wiggins, Veg. Fl. Sonoran Des. 1(2): 766, 1964. The difference

in page numbers in the original and reprint of Vellozo's Fl. Flum. is not noticed by Stafleu in Regnum Veg. 52: 481, 1967.

10. Galphimia sessilifolia Rose, Contr. U.S. Natl. Herb. 3: 313, 1895. [Holotype Pringle 4901 US 49255; isotypes A, BR, F (photo C), G, GH, GOET, M, MO, NY, UC, US, W].

Thryallis sessilifolia (Rose) Rose, loc. cit. 12: 281, 1909.

Small shrubs 30-90 cm high, the branches ascending, glabrate to glabrous when mature, moderately russet-subappressed-hirsute when very young. Leaves usually eglandular; stipules narrowly triangular, 1.5-3 mm long, usually glabrous outside; petioles stout, obsolete to 2 mm long, usually glabrous; blades 1-3.5 x 0.8-2.4 cm, ovate (rarely oblong or suborbicular), the base cordate to truncate (rarely obtuse) and ± amplexicaul, the margin subrevolute, the apex subacute to obtuse, apiculate, coriaceous, glaucous above and beneath (costa rarely glabrate beneath), occasionally with 1-3 ± stipitate glands near base of smaller leaves. Racemes 10-23 cm long, moderately to sparsely russet-subappressed-hirsute, ± laxly few-flowered, each flower basally with a

subulate bract 2-3 mm long usually somewhat separated from 2 ± transverse subopposite subnodal bracteoles 1-1.5 mm long and subulate, the 3 usually glabrous. Flowers ca 1 1/2 - 2 cm diam, usually deciduous, the pedicels 5-17 mm long, densely to moderately pubescent as rachis; calyx-segments 2.5-3.5 mm long, erect, oblong or elliptic to obovate, the apex obtuse, the margin often scarious and red, usually ciliate distally, glabrous outside and within, eglandular; receptacular disc intruding as a short persistent nodule into base of each carpel; petals deciduous in fruit, yellow (claw often aging red), subpatent, costate beneath, the claw 1.5-2 mm long, the limb ovate, the base obtuse to subtruncate, the margin erulose, the apex obtuse, 5.2-8 mm long, the uppermost? petal with claw stouter, 3-4.5 mm long, the limb usually broadly ovate, the base truncate to cordate (rarely obtuse); stamens basally somewhat flattened and weakly coherent to subdistinct, glabrous (or sometimes with a few medifixed hairs near outer apex of filaments), the filaments aging red, the outer usually shorter than inner by 0.3-1.4 mm, the outer equal to unequal, 2-4.8 mm long (3 nearest larger petal sometimes shorter by up to 1.3 mm), the inner equal, 3.5-4.9 mm long (or sometimes

subequal by up to 0.7 mm), the anthers ovoid-oblongoid, 2.5-3.6 mm long; ovary 1.3-2.1 mm diam, the carpels moderately coherent, the styles filiform, aging red, 4.8-7 mm long, the apex subulate (sometimes bent). Schizocarp ca 3-3.5 mm diam; seed subglobose with a small subapical point, the testa subrugose, ferruginous. Flowering in July & Aug.

Rarely found in Oaxaca, Mexico, especially in ravines.

MEXICO: Oaxaca: nr Penan, Conzatti s.n. (US); banks of ravines, hills of Las Sedas, alt 6000 ft, Pringle 4901 (A, BR, F, G, GH, GOET, M, MO, NY, UC, US, W); ravines, Las Sedas, 6500 ft, Pringle 7458 (F).

Leaf glands were not mentioned by Rose, and the leaves were considered eglandular by Small (N. Amer. Fl. 25: 151, 1910) and Niedenzu (in Engler, Pflanzenreich 94(IV, 141): 600, fig. 43, 1928). However, glands are sometimes present on smaller basal leaves in the type collection (Pringle 4901 F, UC). The single branch of Pringle 4901 MO is unusual in having ternate leaf attachment.

SPECIES DUBIAE AND EXCLUSAE

Galphimia brachystachys (Lindl.) Dietrich, Synop.

Pl. 2: 1859, 1840, syn. nov. = Thryallis
brachystachys Lindl., Bot. Reg. 14: t. 1162, 1828.

G. cauca K. Sprengel, Caroli Linnaei ... Syst.

Veg. ed. 16, 2: 385, 1825 = Caucanthus edulis
Forssk., Fl. Aegypt.-Arab. cxi, 91, 1775, fide
Ndz. in Engler, Pflanzenreich 94(IV, 141):
602, 1828.

G. chrysophylla (H. B. K.) Sprengel, loc. cit. =

Byrsonima chrysophylla H. B. K., Nov. Gen.
Sp. Pl. ed. quarto 5: 150, 1822, nec Ad. Juss.
in St.-Hilaire et al. [Fl. Bras. Merid. ed.
folio 3: 61 (ed. quarto 81, not seen), 1833],
nec Griseb. (Cat. Pl. Cub. 42, 1866), fide
Ndz., loc. cit.

Thryallis hirsuta Sessé & Moc., Fl. Mex. 119, 1893

[Naturaleza (Mexico City) ser. 2, 2], non
(Cav.) O. Kuntze (Rev. Gen. Pl. 1: 89, 1891)
=? Echinopterys eglandulosa (Ad. Juss.) Small,
N. Amer. Fl. 25: 148, 1910. The description
of this species definitely excludes Galphimia;
Rogers McVaugh has suggested it may belong
here (personal communication).

G. ? longifolia H. B. K., Nov. Gen. Sp. Pl. ed.
quarto 5: 173 (ed folio 133, not seen), 1822 =
Lophanthera longifolia (H. B. K.) Griseb., q.v.

T. macroptera Mart. ex Ad. Juss., Ann. Sci. Nat.

Bot. sér. 2, 13: 323, 1840, pro syn.; etiam
(Ad. Juss.) Mart. (Flora 24 Beibl. 2(1-7):
104, 1841) = Dicella macroptera Ad. Juss.,
Ann. Sci. Nat. Bot. sér. 2, 13: 323, 1840,
fide Ndz., loc. cit. 676.

G. ? mollis H. B. K., Nov. Gen. Sp. Pl. ed. quarto
5: 173 (ed. folio 134, not seen), 1822, non
G. mollis Hort. ex Bartl. (Linnaea 13: 558,
1839) = Tetrapteris cotoneaster Ad. Juss.,
Ann. Sci. Nat. Bot. sér. 2, 13: 264, 1840,
fide Ndz., loc. cit. 602.

G. nitida P. W. Reasoner & E. N. Reasoner, Annual
Cat. & Price List Royal Palm Nurseries 1886-
1887: 69, 1866, nom. nud. The statement in
the catalog that the species is originally from
India suggests its placement under G. gracilis,
although it has been treated as a synonym of
G. glauca Cav. by Preston (R. H. S. Dict. Gard.
2: 857, 1951). No original material has been
located.

T. ovata Rose, Contr. U.S. Natl. Herb. 12: 281,
1909, nom. nud. The accidental introduction
of this name in discussion does not provide
enough information to decide what species Rose

had in mind.

G. pabulosa Kellogg, Hesperian (San Francisco) 5:

387, 1860, sphalm.; Bull. Calif. Acad. Sci.

1(3): t. (9), 1885 = Simmondsia chinensis

(Link) C. K. Schneider, Ill. Handb. Laubh. 2:

141, 1907, fide Jepson, Fl. Calif. 2: 443,

1936; Shreve & Wiggins, Veg. Fl. Sonoran Des.

1(2): 839, 1964.

G. splendens Hort. ex Marnock, Floric. Mag. & Misc.

Gard. 3: 133, t. 33, f. 3, 1838. The drawing is based on a plant from the Handsworth Nursery, but neither it nor the casual description are sufficient to place the taxon. The editor of the journal is perforce the author for the name, although he cited no author; as no catalog of the nursery nor specimen has yet been located, one cannot say whether this is G. gracilis (which would then no longer enjoy priority) or G. glauca Cav. Both were in Great Britain at this time, as indicated by Maund (Bot. 1(5): t. 18, 1837) and Lindley (J. Hort. Soc. London 5: 139, 1850). Whether this is the same taxon known to Makoy or another must also await further evidence.

FAMILIAL TREATMENTS

- Baillon, H. E. 1874 or 1875. Malpighiacées. Histoire des Plantes 5: 429-469. Librairie Hachette & Cie., Paris.
- Candolle, A. P. de. 1824. Malpighiaceae. Prodromus Systematis Naturalis Regni Vegetabilis 1: 577-592. Treuttel & Würtz, Paris.
- Cuatrecasas, J. 1958. Prima Flora Colombiana 2. Malpighiaceae. Webbia 13: 343-664.
- Grisebach, A. H. R. 1858. Malpighiaceae. pp. 1-123 in C. F. P. von Martius, Flora Brasiliensis 12(1). Frid. Fleischer, Leipzig.
- Hooker, J. D. 1862. Malpighiaceae. pp. 247-262 in G. Bentham & J. D. Hooker, Genera Plantarum 1. A. Black, London.
- Hutchinson, J. 1967. Malpighiaceae. The Genera of Flowering Plants. Dicotyledones. 2: 569-592. Oxford University Press, London.
- Jussieu, A. H. L. de. 1843. Monographie de la Famille des Malpighiacées. Arch. Mus. Hist. Nat. 3: 5-151, 255-616, t. 1-23.
- Niedenzu, F. 1890. Malpighiaceae. pp. 41-74 in A. Engler & K. Prantl, eds., Die Natürlichen Pflanzenfamilien. III, 4. Verlag von Wilhelm Engelmann, Leipzig.
- _____. 1928. Malpighiaceae. pp. 1-870 in A. Engler, ed., Das Pflanzenreich 91, 93, 94 (IV, 141). Verlag von Wilhelm Engelmann, Leipzig.
- Pereira, E. 1953. Contribuição ao Conhecimento da Família Malpighiaceae. Arq. Serv. Florest. 7: 11-70.
- Small, J. K. 1910. Malpighiaceae. N. Amer. Fl. 25: 117-171.

ENUMERATION OF RECOGNIZED TAXA

1. Coleostachys Ad. Juss.

1. C. genipifolia Ad. Juss.

2. Acmanthera (Ad. Juss.) Griseb.

1. A. latifolia (Ad. Juss.) Griseb.

2. A. longifolia Ndz.

3. Blepharandra Griseb.

1. B. fimbriata B. MacBryde

2. B. hypoleuca (Bentham) Griseb.

3. B. cretacea (Gleason) Steyerl.

- b. B. cretacea var. composita Steyerl.

4. Pterandra Ad. Juss.

1. P. pyroidea Ad. Juss.

2. P. ultramontana Riley ex Cuatr.

3. P. flavesens Ducke

4. P. arborea Ducke

5. P. evansii Cuatr.

5. Lophanthera Ad. Juss.

1. L. spruceana Ndz.

2. L. longifolia (H.B.K.) Griseb.

3. L. lactescens Ducke

4. L. pendula Ducke

6. Verrucularia Ad. Juss.

1. V. glaucophylla Ad. Juss.

7. Galphimia Cav.

G. sect. 1 Microgalphimia Ndz.

1. G. brasiliensis (L.) Ad. Juss.

b. G. brasiliensis subsp. angustifolia
(Bentham) B. MacBryde

c. G. brasiliensis subsp. australis
(Chodat) B. MacBryde

b. G. brasiliensis subsp. australis f.
platyphylla (Chodat) B. MacBryde

2. G. vestita S. Watson

G. sect. 2 Galphimia

3. G. multicaulis Ad. Juss.

4. G. glauca Cav.

b. G. glauca var. ovalifolia (DC.) B. MacBryde

c. G. glauca var. schiendeana (Ndz.) B. MacBryde

b. G. glauca var. schiendeana f. neoviscayana
B. MacBryde

5. G. burchiana B. MacBryde

6. G. glandulosa Cav.

7. G. gracilis Bartl.

8. G. langlassiei (Blake) B. MacBryde

b. G. langlassiei subsp. latanthera B. MacBryde

9. G. tuberculata (Rose) Ndz.

b. G. tuberculata var. hirsuta (Cav.)

B. MacBryde

10. G. sessilifolia Rose