

## LOPHANTHERA, A GENUS OF MALPIGHIACEAE NEW TO CENTRAL AMERICA

WILLIAM R. ANDERSON

Anderson, William R. (University of Michigan Herbarium, North University Building, Ann Arbor, MI 48109). *Lophanthera*, a genus of Malpighiaceae new to Central America. *Brittonia* 35: 37–41. 1983.—*Lophanthera hammelii* sp. nov. is described, illustrated, and compared to the other four species of the genus. The distribution of all five species is mapped and discussed, and the chromosome number of *L. lactescens* ( $n = 6$ ) is proposed as the likeliest base-number for the family Malpighiaceae.

*Lophanthera* Adr. Jussieu is a small genus of Malpighiaceae, subfamily Byrsonimoideae, tribe Galphimieae (Anderson, 1978). In 1981 I published descriptions and a key for all known species of *Lophanthera*. They were four, all Amazonian, three restricted to narrow ranges in Brazil, the fourth widespread in Amazonian Brazil and extending into the Alto Orinoco drainage of Venezuela (Fig. 1). At least one of those species (*L. spruceana* Nied.) very probably occurs also in Amazonian Colombia. However, I was surprised to receive recently a collection from Costa Rica. Collectors from Duke University have found *Lophanthera* there while collecting for Robert L. Wilbur's Flora of La Selva, which is a field station of the Organization for Tropical Studies located in the Atlantic lowland rainforest in northeastern Costa Rica. The species is new to science, so I am pleased to name it in honor of Mr. Barry E. Hammel, who collected the type, in recognition of his contributions to our knowledge of the plants of central America.

### *Lophanthera hammelii* W. Anderson, sp. nov. (Fig. 2)

Lamina foliorum apice abrupte acuminata acumine 1–2 cm longo; petiolus eglandulosus; stipulae 3.5–4 (5) mm longae; inflorescentia (10) 15–36 cm longa, pendens, ex 60–130 cincinnis 1–3 (4)-floris constans; bracteolae eglandulosae vel in glandulam peltatum stipitatum extensae; pedicellus (8) 10–12 (fructifer –15) mm longus; sepala revoluta, utrinque glabra (sed interdum margine paucipilifera), omnia biglandulifera, glandulis albis non connatis; petala rosea, glabra, dorsaliter non vel tantum basi carinata; antherae 1.3–1.4 mm longae; ovarium glabrum; cocci 5.7–6 mm longi, non vel paulo carinati.

Shrub 2.5–4 m tall, the branchlets loosely sericeous to glabrate. Lamina of the larger leaves 15–17 cm long, 5–7.2 cm wide, elliptical or obovate, cuneate at the base, abruptly acuminate at the apex with the acumen 1–2 cm long, glabrate adaxially or sparsely sericeous on the midrib, loosely sericeous or subtomentose abaxially on the midrib and lateral veins and thinly so between the veins, bearing variable numbers of small impressed glands abaxially near the midrib or distant from it; petiole 11–15 mm long, sericeous or eventually glabrescent, eglandular; stipules 3.5–4 (5) mm long, narrowly triangular, connate except for the distal 1–1.5 mm, abaxially sericeous, adaxially sericeous proximally, glabrous distally. Inflorescence terminal, (10) 15–36 cm long, pendent, loosely sericeous or tomentose, a thyse composed of 60–130 horizontal or reflexed cincinni of 1–3 (4) flowers; bracts 1.2–2.4 mm long, triangular, abaxially sericeous, eglandular; primary peduncle (from base to joint of first flower) 3–13 mm long, bearing slightly below its apex 2 triangular bracteoles like the bract but smaller, both eglandular or 1 terminating in a stalked peltate gland, the more distal bracteoles of the cincinnus glandular or eglandular (1-flowered cincinni produce a gland on 1 of the first 2 bracteoles, but larger cincinni usually defer production of glands to the third or later bracteoles). Pedicel (8) 10–12 mm long in anthesis, up to 15 mm long in fruit, loosely sericeous. Sepals extending 0.5–1.5 mm beyond the glands,

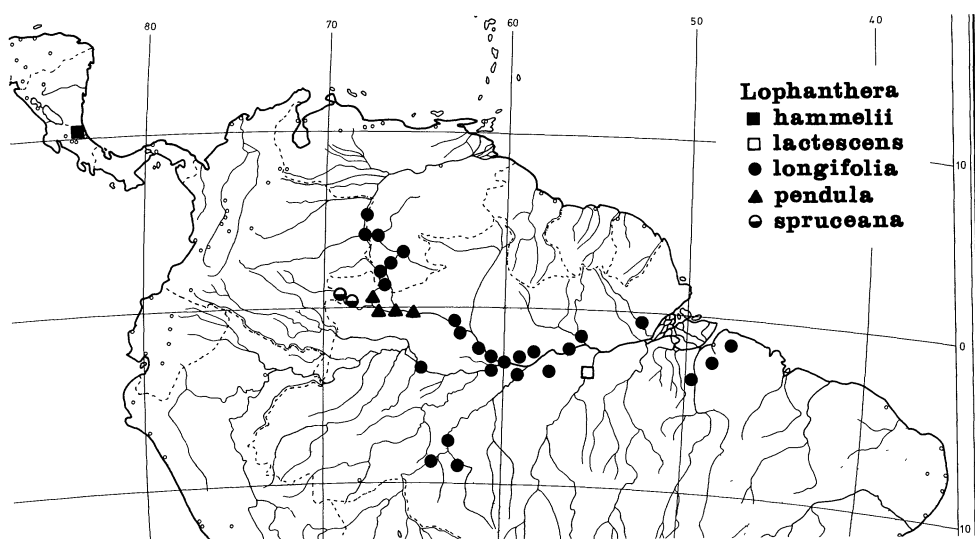


FIG. 1. Distribution of all species of *Lophanthera*. Flora Neotropica base map no. 1, copyright the University of Utrecht.

ovate, rounded at the apex, revolute in anthesis, glabrous on both sides but occasionally bearing a few hairs on the margin, all biglandular, the glands white, 2–3 mm long, ellipsoidal, free from the sepal distally and slightly reflexed, not fused with adjacent glands. Petals pink, glabrous, nearly entire (minutely denticulate), dorsally smooth or slightly carinate only on the claw, 5.3–6 mm long, with the claw 1.5–2 mm long, the limb 3.8–4 mm long, 3–3.5 mm wide, somewhat sagittate at the base and often revolute at the margin in anthesis, the posterior petal hardly different from the lateral 4 but more erect and with a slightly longer claw. Filaments straight, glabrous, free or slightly connate only at the very base, 2.2–2.5 mm long opposite the sepals, 1.8–2 mm long opposite the petals; anthers 1.3–1.4 mm long, glabrous, the wing 0.2–0.4 mm wide, widest distally and sometimes exceeding the locules; pollen 3 (4)-colporate, with the colpi bifurcate at both ends. Receptacle glabrous. Ovary 1.5 mm high, glabrous, with all 3 locules fertile; styles ca 3 mm long, slightly exceeding the stamens, straight or slightly inbent at the apex, borne at the apex of the ovary. Cocci separating from a pyramidal base ca 0.8 mm high, 5.7–6 mm long, 3–3.3 mm wide, 2.5–2.8 mm deep, glabrous, narrowly ovoidal, not or only obscurely carinate at the apex, the proximal  $\frac{1}{4}$ – $\frac{1}{2}$  filled with tough fibrous aerenchyma, the distal  $\frac{3}{4}$ – $\frac{1}{2}$  filled with the seed. Embryo with the thick cotyledons equal, flat, folded upward near their middle.

TYPE: COSTA RICA. PROVINCIA DE HEREDIA: Finca La Selva, OTS Field Station on Río Puerto Viejo just E of its junction with Río Sarapiquí, elev. about 100 m, Rafael's point on river, about 300 S  $\times$  1300 E m grid, 1 Aug 1980 (fl/fr), *B. Hammel* 9397 (HOLOTYPE: MICH; ISOTYPE: DUKE).

PARATYPES: COSTA RICA. Same locality as for type, 5 Aug, *Grayum* 2231A (fl) & 2231B (fr) (both DUKE); 4 Nov (fl), *Hammel* 10351 (DUKE); 1 Aug (fl/fr), *Wilbur* 30163 (DUKE).

*Lophanthera hammelii* differs from all other species of the genus in its long-acuminate leaves, long pedicels, and glabrous revolute sepals. Its stipules are longer than those of *L. spruceana* and shorter than those of the other three species. It agrees with *L. spruceana* in having pink, dorsally smooth petals, whereas the other

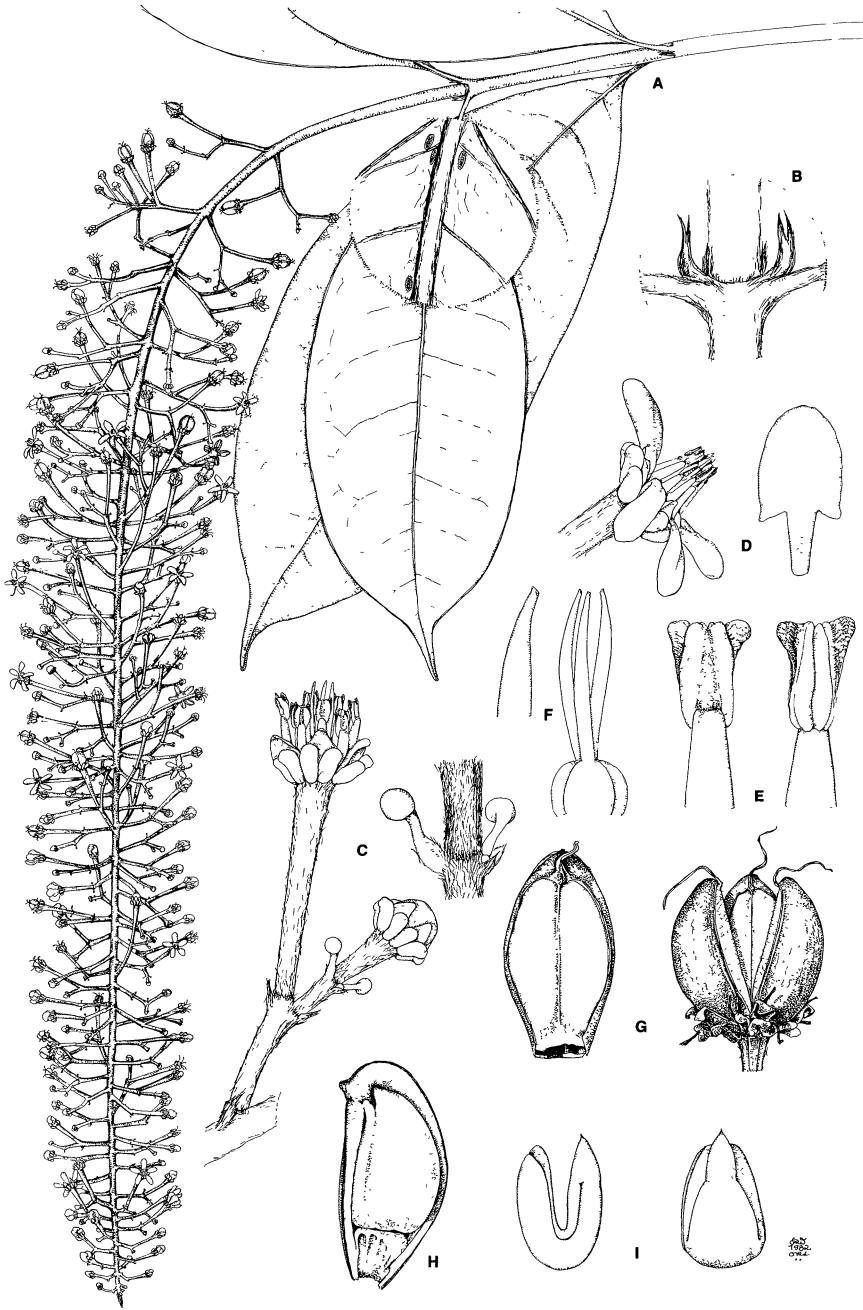


FIG. 2. *Lophanthera hammelii*. A. Flowering branch,  $\times 0.5$ , with circle  $\times 2.5$ . B. Stipules,  $\times 2.5$ . C. Cincinnus of two flowers,  $\times 2.5$ , with bracteole-glands (right)  $\times 5$ . D. Flower, side view with posterior petal erect,  $\times 2.5$ , with single petal  $\times 3.5$ . E. Stamens,  $\times 10$ , abaxial view left, adaxial view right. F. Gynoeceium,  $\times 7.5$ , with tip of style (left)  $\times 15$ . G. Fruit,  $\times 3$ , with adaxial view of single mericarp (left)  $\times 4.5$ . H. Mericarp in longitudinal section, with intact seed in position,  $\times 4.5$ . I. Embryos,  $\times 4.5$ , side view left, abaxial view right. Drawn by Karin Douthit, A-B from *Grayum 2231A*, C-I from *Hammel 9397*.

species have yellow, dorsally carinate petals. However, *L. spruceana* differs from *L. hammelii* in having obtuse or rounded stipules, an erect inflorescence shorter than the subtending leaves, the bracteole-gland abaxial and sessile, a densely sericeous ovary, and longer cocci. Among the yellow-flowered species with long pendent inflorescences and stalked bracteole-glands, the one least similar to *L. hammelii* is *L. pendula* Ducke, which has cincinni of only one flower each, 1–4 circular calyx glands per flower, a densely pilose ovary, and a laterally flattened, dorsally keeled coccus completely filled by the seed. The remaining two species are the ones most like *L. hammelii* overall, but each differs not only in having yellow carinate petals but in several additional characters. *Lophanthera longifolia* (H.B.K.) Grisebach usually bears 2 (4) glands on the petiole, its anthers are 2–2.5 mm long, and its cocci are 7–9 mm long with the proximal half filled by aerenchyma. *Lophanthera lactescens* Ducke has the petals pilose on the margin, the anthers 0.8–1 mm long, and the coccus completely filled by the seed. The stems of *L. longifolia* and *L. lactescens* often (always?) contain white latex, which was not noted by any of the collectors who have gathered *L. hammelii*. Lowrie (1982) reported that the colpi in the pollen of *L. lactescens* are bifurcate at the tips, which is also true in *L. hammelii*, whereas those of *L. longifolia* and most other byrsonimoid genera are not. This shared derived character-state gives some support to my general impression, based on gross morphology, that *L. lactescens* is probably the species most closely related to *L. hammelii*.

All species of *Lophanthera* grow in wet forest along rivers, and their dry mericarps are probably dispersed by water (Anderson, 1981). *Lophanthera hammelii* is like the other species in this regard, which suggests to me that it is rather unlikely to have achieved its present disjunct distribution (Fig. 1) through long-distance dispersal. I find it much easier to believe that in Colombia there were formerly wet forests extending from the southeastern part west across the present llanos and mountains to the Caribbean lowlands of northwestern Colombia and up into Central America. With the final rise of the Andes and the creation of a rain shadow, that forest was broken and many taxa of Amazonian origin were left isolated in forest refugia in northern Colombia, Panama, and Costa Rica. I have already invoked this argument to explain the isolated populations of *Dicella julianii* (Macbride) W. Anderson and *Ectopopterys soejartoi* W. Anderson found in the Nechí refugium of Colombia (Anderson, 1975, 1980). *Pterandra isthmica* Cuatr. & Croat is an isolated endemic of wet forests in Panama whose closest relatives occur in the Guayana Highland of southern Venezuela and western Guyana (Cuatrecasas & Croat, 1981). *Lophanthera hammelii* is another example of such a relictual species. Since it combines features of the various Amazonian species, it is surely not a simple derivative from any of them, but more likely represents an otherwise extinct evolutionary stock intermediate between an ancestor resembling *L. spruceana* and the other, more derived species.

Various Byrsonimoideae retain character-states that are probably ancestral in the Malpighiaceae, for which reason I consider this subfamily to be the most primitive branch of the family. Among the species of *Lophanthera* such character-states are a shrubby or arborescent habit, glands on the leaves, thyriform inflorescences, all five sepals abaxially biglandular, and tricolporate pollen (Anderson, 1978, 1981; Lowrie, 1982). Associated with these character-states is the lowest chromosome number known for the family,  $n = 6$ , counted in *Lophanthera lactescens* (voucher is Anderson 11665, MICH). The same number has been reported for *Galphimia glauca* Cav. (Seavey, 1975); *Galphimia* is fairly closely related to *Lophanthera* but advanced in several aspects, especially in its reduced inflorescence. Except for *Mcvaughia*, with  $n = 10$ , the other byrsonimoid Malpighiaceae

that are known cytologically (*Byrsonima* spp., *Galphimia* spp., *Pterandra* sp.) have  $n = 12$  (Anderson, 1979, and unpublished counts; Bawa, 1973; MacBryde, 1970). These data suggest to me that  $n = 6$  is the basic chromosome number for the Malpighiaceae. The larger, more derived branch of the family is the subfamily Malpighioideae (including the Gaudichaudioideae of some authors); it includes the wing-fruited vines that comprise the majority of species, and its basic chromosome number is apparently  $n = 10$  (Anderson, 1978, and many unpublished counts). That number was probably derived by aneuploidy from a byrsonimoid ancestor with  $n = 12$ , but it is also possible that there occurred an early reduction from  $n = 6$  to  $n = 5$ , followed by doubling to 10 pairs. No species with 5 pairs is known yet for the family, but the number of species investigated cytologically is still small, and we do not have even one count yet for a number of genera, so some interesting surprises undoubtedly await us.

### Acknowledgments

I thank Barry E. Hammel and Robert L. Wilbur of Duke University for supplying material of this species, and Allan Bornstein for help in studying the pollen. Preparation and publication of this paper was subsidized by National Science Foundation grant DEB 81-03522 to The University of Michigan.

### Literature Cited

- Anderson, W. R. 1975. *Dicella* a genus of Malpighiaceae new to Colombia. *Acta Amaz.* 5: 279–283.  
———. 1977 [1978]. Byrsonimoideae, a new subfamily of the Malpighiaceae. *Leandra* 7: 5–18.  
———. 1979. *Mcvaughia*, a new genus of Malpighiaceae from Brazil. *Taxon* 28: 157–161.  
———. 1980. *Ectopopterys*, a new genus of Malpighiaceae from Colombia and Peru. *Contr. Univ. Michigan Herb.* 14: 11–15.  
———. 1981. Malpighiaceae. In: B. Maguire & collaborators. *The Botany of the Guayana Highland—Part XI*. *Mem. New York Bot. Gard.* 32: 21–305.  
Bawa, K. S. 1973. Chromosome numbers of tree species of a lowland tropical community. *J. Arnold Arbor.* 54: 422–434.  
Cuatrecasas, J. & T. B. Croat. 1980 [1981]. Malpighiaceae. In: R. E. Woodson, Jr., R. W. Schery & collaborators. *Flora of Panama, Part VI*. *Ann. Missouri Bot. Gard.* 67: 851–945.  
Lowrie, S. R. 1982. The palynology of the Malpighiaceae and its contribution to family systematics. Ph.D. thesis, The University of Michigan, 354 pp.  
MacBryde, B. 1970. In: *Chromosome numbers of phanerogams* 4. *Ann. Missouri Bot. Gard.* 57: 382–384.  
Seavey, S. 1975. In: *IOPB chromosome number reports* L. *Taxon* 24: 671–678.