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A REVISION OF *MALVAVISCUS* (MALVACEAE)[1]

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Abstract

Comprehensive reevaluation of herbarium material of the genus *Malvaviscus* yields two widespread species, *M. arboreus* of North America and *M. concinnus* of South America, two localized species, *M. achanioides* of Mexico and *M. williamsii* of Peru and Colombia, and a widespread cultivar of unknown origin, *M. penduliflorus*.

In spite of recent attempts to delimit and classify its many specific and subspecific taxa, *Malvaviscus* (Malvaceae) remains enigmatic. The genus is highly variable morphologically and given to populational forms. Furthermore, these forms intergrade producing an array of character combinations. An extreme taxonomic treatment of the genus would recognize a horde of intergrading forms. Indeed, this extreme infrageneric variation has led to the proposal of over 50 specific names within *Malvaviscus*, though Schery (1942) recognized only three in his monograph of the genus.

Because of the common intergradation and recombination of character states, few characters within *Malvaviscus* have proven useful for specific recognition. Modern interpretations of the genus have generally recognized about a dozen overlapping taxa. However, we believe that the overwhelming majority of the species proposed under *Malvaviscus* represent only two biologically significant taxa, *M. arboreus* in North America and *M. concinnus* in South America.

History of the Genus

The genus *Malvaviscus* was established almost 200 years prior to its monograph by Schery (1942). Among the first generic names to include *Malvaviscus* were *Alcea*, *Althaea*, and *Malva*. Linnaeus did not recognize the genus and placed its species in *Hibiscus* in 1753. In 1759, Fabricius distinguished *Malvaviscus* based on a single species, i.e., *Hibiscus malvaviscus* L. (A discussion of the typification of *Malvaviscus* can be found in Taxon 17: 87, 1968.) In 1788, Swartz proposed to rename the genus as *Achania*. In 1824, A. P. de Candolle divided *Malvaviscus* into two sections: *Achania* and *Anotea*. *Anotea* was raised to generic rank by Kunth in 1846, and *Achania* is now recognized as synonymous with *Malvaviscus*.

Generic treatments have not been in agreement. Schery's monograph (1942) included a complex of 11 varieties of *M. arboreus* as well as two additional species that have since been transferred to *Pavonia*. Other treatments, which have recognized up to a dozen species, occur in floras throughout the range of *Malvaviscus* (Robyns, 1966; Standley, 1923; Standley & Steyermark, 1949). However, the only significant treatment of the genus since Schery has been the exemplary work of Fryxell (1988) in his monograph of the Malvaceae of Mexico. In his discussion of the taxonomic problems within *Malvaviscus*, Fryxell acknowledged the difficulty of clearly delimiting species: "There is a certain sameness of morphology that runs through the genus, and clear-cut differentiating characters are lacking." Fryxell recognized six species of *Malvaviscus* in Mexico, three of which are maintained here.

Chromosome Numbers

The first report of a chromosome count for *Malvaviscus* was presented by Skovsted in 1935 (Table 1). He reported a count of $2n$ = ca. 84 for an unidentified cultivated species in Kew Gardens, presumably obtained originally "from gardens on the Gold Coast." We take the species to be *M. penduliflorus* of the present treatment since Skovsted noted:

> Morphologically, the type under observation is distinctly different from the wild growing *M. arboreus* Cav. Its

[1] We are grateful for the encouragement and helpful comments of our esteemed colleague, Paul Fryxell, throughout the course of this study. Our investigation is based upon the examination of approximately 3,200 specimens on deposit at the following institutions: BRG (3), F (701), herb. Fryxell (2), GH (431), HUA (7), LL (200), MG (6), MO (783), NY (492), RB (6), SP (9), TEX (170), US (381). Nancy Webber provided the illustration.

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TABLE 1. Chromosome numbers in *Malvaviscus*.

Taxon	2*n* number	Voucher/reference
M. arboreus var. *arboreus* reported as var. *mexicanus*	ca. 56	Mexico. Veracruz: *Fryxell & Bates 940*; Bates (1976)
M. arboreus var. *arboreus* reported as var. *mexicanus*	ca. 56	Mexico. Veracruz: *Fryxell et al. 1676*; Bates (1976)
M. arboreus var. *arboreus* reported as *M. penduliflorus*	ca. 28	Mexico. Jalisco: *Fryxell, Bates & Blanchard 1575*; Bates (1976)
M. arboreus var. *drummondii*	ca. 28	U.S.A. Texas: Travis Co., *Mendenhall 485*; reported here
M. penduliflorus reported as *M.* sp.	ca. 84	Kew Gardens, where cultivated; Skovsted (1935)
M. penduliflorus	86	India. Karnataka: where cultivated; Krishnappa & Munirajappa (1982)

cytological behaviour indicates that it is probably a hybrid although its origin appears unknown. It is commonly cultivated in Trinidad where it is vegetatively reproduced as it is apparently completely sterile.

Krishnappa & Munirajappa (1982), however, reported *M. penduliflorus* to have a count of 2*n* = 86, presumably a miscount of 2*n* = 84, or possibly an aneuploid clonal derivative of what would seem to be its original number, 2*n* = 84, since other taxa in *Malvaviscus* appear to have an ancestral base number of *x* = 14, if not *x* = 7. Bates (1976) listed a count of 2*n* = ca. 28 for *M. penduliflorus*, but we believe the voucher concerned is more likely a morphological variant of the widespread, highly variable *M. arboreus* var. *arboreus*, as conceived of here.

Our report of 2*n* = ca. 14 pairs for *M. arboreus* var. *drummondii* is to some extent biased because of the report of 2*n* = 28 by previous workers. In truth, the count would have been any number between 12 and 15 pairs, the chromosomes being very small and not forming neat bivalents.

In summary, only two taxa of *Malvaviscus* have been counted with reasonable certainty to date: *M. arboreus* var. *arboreus* with 2*n* = ca. 28 and ca. 56, and the cultivated *M. penduliflorus* with counts of 2*n* = ca. 84 and 86 (Table 1). The base number of the genus appears to be *x* = 14, if not 7. The latter base would agree with that found in the large, closely related genus *Pavonia*, where some 35 or more species have been counted, all on a base of *x* = 7, ranging from *n* = 14 to *n* = 56 (although some authors have reported occasional counts of both *n* = 13 for a species that otherwise has been counted as *n* = 14 (e.g., *Pavonia zeylanica* (L.) Cav. with 2*n* = 52 (Krishnappa & Munirajappa, 1980) vs. 2*n* = 56 (Dasgupta & Bhatt, 1976, 1981, 1982)).

SPECIES CONCEPT

In this treatment, species concepts in *Malvaviscus* are largely those of the senior author, the junior author being new at the herbarium bench. Because fieldwork on the genus was limited, species concepts are based on morphogeographical considerations and our experience with species recognition in other groups (e.g., Asteraceae, Fabaceae), both in the field and as hypothesized by herbarium evaluations. We believe our specific delimitations in *Malvaviscus* are populational in nature and are comparable to what most workers refer to as good species. We do not claim this to be true for *M. penduliflorus*, for we suspect that the plants referable to this species are relatively uniform, mostly sterile cultivars, developed very early on by accidental or synthetic means. We have recognized *M. penduliflorus* as a "synthetic species," not occurring naturally in the wild except as it has persisted or escaped cultivation by vegetative means, although it is possible that occasional hybrids between *M. penduliflorus* and *M. arboreus* might occur, as noted under the discussion that follows each.

Our species concepts are similar to those of previous revisional workers on *Malvaviscus*, namely Schery (1942) and Fryxell (1988). In spite of the plethora of pressed specimens available for study, extraordinary variation, and widespread distribution of *Malvaviscus*, Schery recognized a single species with eleven varieties while Fryxell recognized six species in Mexico, which suggests that he would likely have recognized less than ten taxa for the remainder of its distribution. In short, our recognition of five species for *Malvaviscus* (including *M. penduliflorus*) is conservative, standing between the evaluations rendered by Schery and Fryxell. Except for *M. penduliflorus*, we believe

the taxa that we have recognized are comparable in nature and constitute populational or biological units that can be verified by future field workers.

Taxonomic Treatment

Malvaviscus Fabr., Enum. 155. 1759. TYPE: *Hibiscus malvaviscus* L. [= *Malvaviscus arboreus* Cav.]. See Dandy (1966) for typification of *Malvaviscus*.

Achania Sw., Prodr. 102. 1788. TYPE: *Achania pilosa* Sw.

Erect or clambering (vinelike) shrubs or small trees, pubescent or glabrous. Leaves petiolate, the blades linear-lanceolate to broadly ovate-cordate, unlobed to 3–5-lobed, serrate to subentire; stipules subulate, deciduous. Flowers solitary or several in the leaf axils or sometimes in apical cymes; bractlets of the involucel linear to obovate (rarely broadly ovate), usually (5–)8–9; calyx campanulate or tubular, 5-lobed; petals 5, red (rarely white), asymmetrically obovate-cuneate, auriculate toward the base, forming a tubular corolla; androecium usually exserted, the staminal column with 5 apical teeth, the filaments short and ± retrorse; styles 10 with capitate stigmas. Fruit a fleshy schizocarp, oblate, red (rarely white), with 5 carpels, each 1-seeded. Base chromosome number, $x = 14$.

Diagnosis and relationships. *Malvaviscus* is a member of the tribe Malvavisceae C. Presl, Reliq. Haenk. 2: 135, 1835 (as "Malvaviscaceae") by virtue of its five uniovulate carpels, schizocarpic fruit, ten free styles, and apically 5-toothed staminal column. Distinguishing generic characters of *Malvaviscus* are its auriculate petal and red or rarely white baccate fruit. The petal auricle is the basal lobe that gives each petal its characteristic mitten shape. Apical lobes are called simply lobes. The genera thought to be closest to *Malvaviscus* are *Pavonia*, *Lopimia*, and *Anotea*. The largest of these, *Pavonia*, has dry fruits. *Lopimia* and *Anotea* are small genera that have blue-black fruits (dry in *Lopimia*) and lack the auriculate petal.

Although *Malvaviscus* can be found in gardens throughout the tropical and subtropical world, it is native to the Western Hemisphere. Its range extends from Peru and northern Brazil to the southern United States and the West Indies. Although individuals and populations are highly variable, especially in Mexico and Central America, we recognize two major taxa, *M. arboreus* in the north and *M. concinnus* in the south. A third, relatively localized species of northwesternmost South America, *M. williamsii*, is recognized but clearly belongs to the *M. concinnus* complex. Were the characters that mark it not so easily identified, and if it had not already been treated at the specific level, we would probably have recognized this as an intergrading variety of the latter. Finally, for practicality, we maintain two species that would otherwise be absorbed by *M. arboreus*. These are *M. penduliflorus*, a distinctive hybrid cultivar, and *M. achanioides*, an intermediate form between *M. arboreus* and *M. concinnus*.

Key to Species of *Malvaviscus*

1a. Leaves mostly 15–35 cm long, the blades usually strongly cordate; vestiture of peduncles mostly pilose; corollas mostly 40–70 mm long; calyces mostly 18–30 mm long; fruits mostly 15–30 mm across; South America, Panama, Costa Rica, and Gulf slopes of Honduras and Mexico (Chiapas, Tabasco, Veracruz).
  2a. Calyces mostly 18–20 mm long; vestiture of peduncles and petioles densely pilose with hairs 1–3 mm long; Honduras and Mexico ..... 3. *M. achanioides*
  2b. Calyces mostly 20–30 mm long; vestiture of velutinous hairs mostly 0.2–1.5 mm long; South America, Panama, and Costa Rica.
    3a. Involucellar bracts broadly elliptical-ovate, widest at or near the middle, the margins strongly imbricate; Peru and Colombia ..... 5. *M. williamsii*
    3b. Involucellar bracts filiform to linear lanceolate, broadest at or near the base; South America, Panama, and Costa Rica ..... 4. *M. concinnus*

1b. Leaves mostly 5–20 cm long, if longer the blades ovate to elliptical, abruptly to not at all cordate; vestiture various but not usually densely pilose with hairs 1–3 mm long; corollas mostly 15–70 mm long; calyces mostly 8–18(–20) mm long; fruits, when present, mostly 8–14 mm across; North America and West Indies or else cultivated.
  4a. Cultivated, mostly sterile, rarely producing fruits; flowers pendulous, the corollas mostly 42–70 mm long; leaves ovate and subglabrous; widespread in gardens, and often escaping or persisting following cultivation ..... 2. *M. penduliflorus*
  4b. Wild and cultivated, usually fertile and producing red or white fruits; flowers usually erect, the corollas mostly 15–50 mm long; leaves variable in shape and vestiture; throughout southern and central Mexico, southeastern United States, West Indies, and rarely coastal areas of northern South America, occasionally cultivated and persisting elsewhere.
    5a. Leaves rather uniformly 3-lobed and mostly obtuse at the apex, strongly cordate; stems and petioles diffusely pubescent with overlapping stellate hairs that form a velvety vestiture only rarely exceeding 0.25 mm high;

mostly United States, just barely extending into Mexico along the Gulf coastal regions of Tamaulipas ..... 1b. *M. arboreus* var. *drummondii*

5b. Leaves various, but the blades usually acute at the apices, truncate or cordate; stem and petioles variously pubescent to glabrous, but the vestiture usually not as described above, if evenly velvety-pubescent then some or most of the hairs exceeding 0.25 mm; widespread throughout tropical and subtropical habitats of Mexico, Central America, and West Indies, rarely elsewhere in cultivation ..... 1a. *M. arboreus* var. *arboreus*

1. Malvaviscus arboreus Cav., Diss. 3: 131. t. 48. 1787.

1a. Malvaviscus arboreus var. **arboreus**

Malvaviscus arboreus Cav., Diss. 3: 131. t. 48. f. 1. 1787. *Hibiscus malvaviscus* L., Sp. Pl. 694. 1753. *Malvaviscus coccineus* Medikus, Malvenfam. 49. 1787, nom. superfl. *Achania malvaviscus* (L.) Sw., Prodr. 102. 1788. *Achania coccinea* Salisb. Prodr. 385. 1796, nom. superfl. *Malvaviscus malvaviscus* (L.) Millsp., Publ. Field Columbian Mus., Bot. Ser. 2: 73. 1900. TYPE: "Hibiscus malvaviscus" (holotype, LINN-875.22).

Achania mollis Aiton, Hort Kew. 2: 459. 1789. *Malvaviscus mollis* (Aiton) DC., Prodr. 1: 445. 1824. TYPE: Mexico (holotype, BM not seen, without additional information according to Fryxell, 1988).

Achania pilosa Sw., Prodr. 102. 1788. *Malvaviscus pilosus* (Sw.) DC., Prodr. 1: 445. 1824. *Hibiscus pilosus* (Sw.) Fawcett & Rendle, Fl. Jamaica 5: 137. 1926. TYPE: Jamaica. *Swartz s.n.* (holotype, S not seen, according to Fryxell, 1988).

Pavonia spiralis Cav., Icon. 5: 20. t. 434. 1799. *Malvaviscus ciliatus* DC., Prodr. 1: 445. 1824, nom. superfl. *Achania ciliata* Sprengel, Syst. Veg. 3: 100. 1826, nom. superfl. TYPE: Panama. Taboga Island, *Née s.n.* (holotype, MA not seen).

Malvaviscus cordifolius Moench, Meth. Suppl. 208. 1802. TYPE: no longer extant, according to Stafleu & Cowan (1981).

Malvaviscus acapulcensis Kunth, Nov. Gen. Sp. 5: 288 [folio ed. p. 224]. 1822. TYPE: Mexico. Guerrero: near Acapulco, *Humboldt & Bonpland*, 1803 (holotype, P-HBK not seen, according to Fryxell, 1988).

Malvaviscus grandiflorus Kunth, Nov. Gen. Sp. 5: 286 [folio ed. p. 223]. 1822. TYPE: Mexico. Guanajuato: prope Guanajuato, *Humboldt & Bonpland*, 1803 (holotype, P-HBK not seen; fragment holotype, F).

Malvaviscus pentacarpus DC., Prodr. 1: 445. 1824. TYPE: Icones Florae Mexicanae no. 124 (Torner Collection acc. no. 631.1093, Hunt Institute). (Cf. photo F-30507 of G copy (not the type), according to Fryxell, 1988.)

Malvaviscus arboreus var. *cubensis* Schldl., Linnaea 11: 360. 1837. *Malvaviscus arboreus* subsp. *cubensis* (Schldl.) Hadač, Folia Geobot. Phytotax. Praha 5: 432. 1970. TYPE: Cuba. *Poeppig s.n.* ex herb. Kunze (holotype, LZ destroyed; isotype, W? not seen, according to Fryxell, 1988).

Pavonia urticaefolia C. Presl, Reliq. Haenk. 2: 128. 1835. *Malvaviscus urticifolius* (C. Presl) Fryxell, Syst. Bot. 12: 279. 1987. TYPE: Mexico. "In terris occidentalibus" (probably in the state of Guerrero or Mexico during Haenke's trip from Acapulco to Mexico City and return during Nov.–Dec. 1791), *Haenke s.n.* (lectotype, designated by Fryxell (1988), PR-197902A not seen; isolectotype, PR-197902B not seen).

Malvaviscus sepium Schldl., Linnaea 11: 361. 1837. *Malvaviscus arboreus* var. *sepium* (Schldl.) Schery, Ann. Missouri Bot. Gard. 29: 226. 1942. TYPE: Mexico. Veracruz: near Xalapa, June 1829, *Schiede 480* (holotype, B destroyed; photoholotype, F, NY).

Malvaviscus arboreus var. *mexicanus* Schldl., Linnaea 11: 359. 1837. TYPE: Mexico. Veracruz: near Veracruz, *Schiede s.n.* (lectotype, designated by Fryxell (1988), HAL not seen).

Malvaviscus brevipes Benth., Bot. Voy. Sulphur 68. 1844. TYPE: Costa Rica. Nicoya, *Barclay s.n.* (holotype, BM not seen, according to Fryxell, 1988).

Malvaviscus sagraeanus A. Rich., Hist. Phys. Cuba, Pl. Vasc. 131. t. 14. 1845 [1841]. *Malvaviscus arboreus* var. *sagraeanus* (A. Rich.) E. G. Baker, J. Bot. 37: 345. 1899. TYPE: Cuba, *de la Sagra s.n.* (holotype, P? not seen; isotype, K not seen, according to Fryxell, 1988).

Malvaviscus pulvinatus A. Rich., Hist. Phys. Cuba, Pl. Vasc. 133. 1845 [1841]. TYPE: Cuba, *de la Sagra s.n.* (specimen unknown, according to Fryxell, 1988).

Malvaviscus arboreus var. *parviflorus* Griseb., Fl. Brit. W. I. 83. 1859. TYPE: Jamaica. Without locality, without date, *Wullschlaegel 768* (holotype, GOET not seen, according to Fryxell, 1988).

Malvaviscus palmanus Pittier & J. D. Smith, Bot. Gaz. (Crawfordsville) 23: 238. 1897. *Malvaviscus arboreus* var. *palmanus* (Pittier & J. D. Smith) Schery, Ann. Missouri Bot. Gard. 29: 222. 1942. TYPE: Costa Rica. San José: forests of La Palma, 5,100 ft., July 1895, *Tonduz 9712* (holotype, CR not seen; isotype, US; photoisotype, MO).

Malvaviscus arboreus var. *sloanei* E. G. Baker, J. Bot. 37: 345. 1899. TYPE: Jamaica. Sloane's Herb. vol. iv. F. 45 (holotype, BM not seen, according to Fryxell, 1988).

Malvaviscus brevibracteatus E. G. Baker, J. Bot. 37: 347. 1899. TYPE: Belize. Stann Creek, 27 Dec. 1899, *J. Robertson 34, 35* (syntypes, BM not seen, according to Fryxell, 1988).

Malvaviscus lanceolatus Rose, Contr. U.S. Natl. Herb. 5: 175. 1899. TYPE: Mexico. Chiapas: near Cicharras, 12–15 Feb. 1896, *Nelson 3807* (holotype, US; isotypes, GH—2 sheets).

Malvaviscus arboreus var. *grisebachii* E. G. Baker, J. Bot. 37: 345. 1899. TYPE: Jamaica. (Based on *M. arboreus* var. α Grisebach, which apparently applies to a vestiture form of *M. arboreus* var. *arboreus*.) Grisebach cited no specimen; neither did Baker. Any lectotype, if designation is needed, would presumably reside at BM or K.

Malvaviscus polakowskii E. G. Baker, J. Bot. 37: 346. 1899. TYPE: Costa Rica. Without specific locality,

without date, *Polakowsky 197* (holotype, BM not seen).

Malvaviscus jordan-mottii Millsp., Publ. Field Columbian Mus., Bot. Ser. 2: 73. 1900. TYPE: Cayman Islands. Cayman Brac, above Spot Bay, 8 Feb. 1899, *Millspaugh 1166* (holotype, F).

Malvaviscus rivularis Brandegee, Zoe 5: 211. 1905. TYPE: Mexico. Sinaloa: near Culiacán, banks of the Cofradia River, *Brandegee*, 1904 (holotype, UC not seen; isotype, US).

Malvaviscus conzattii Greenman, Field Mus. Nat. Hist. Bot. Ser. 2: 333. 1912. TYPE: Mexico. Oaxaca: San Pablo, Huitzo, 1,600 m, 25 Aug. 1907, *Conzatti 1981* (holotype, F; isotype, K not seen).

Malvaviscus oaxacanus Standley, Contr. U.S. Natl. Herb. 23: 775. 1923. TYPE: Mexico. Oaxaca: N of Tuxtepec, 9 Apr. 1894, *Nelson 348* (holotype, US).

Malvaviscus hintonii Bullock, Kew Bull. 1937: 291. 1937. *Malvaviscus arboreus* var. *hintonii* (Bullock) Schery, Ann. Missouri Bot. Gard. 29: 217. 1942. TYPE: Mexico. Mexico State: Distr. Temascaltepec, Tejupilco, 15 May 1933, *Hinton 3928* (holotype, K not seen; isotypes, A, NY).

Malvaviscus arboreus var. *brihondus* Schery, Ann. Missouri Bot. Gard. 29: 213. 1942. TYPE: Belize. Honey Camp, Sep. 1929, *Lundell 480* (holotype, MO; isotypes, F, US).

Malvaviscus arboreus var. *lobatus* Robyns, Ann. Missouri Bot. Gard. 52: 572. 1966. TYPE: Panama. Chiriquí: Fred Collins' Finca at edge of coffee plantation, 6,000 ft., 2 Aug. 1960, *J. Ebinger 692* (holotype, MO; isotype, F).

Erect or clambering shrubs 1–10 m high. Stems variously stellate-pubescent to glabrate, rarely glabrous. Leaves mostly 5–25 cm long, 3–12 cm wide, petioles mostly 1–12 cm long, the blades variously ovate to cordate, less often elliptical, mostly unlobed, but occasionally with shallow subterminal lobes, variously irregularly serrate, or rarely entire, pubescent with mostly stellate hairs, often densely so, but sometimes glabrous or nearly so. Calyces mostly 8–15(–18) mm long, variously pubescent, the hairs simple or stellate, rarely glabrous, the subtending bracts mostly 5–8(–11), linear to linear-oblanceolate. Corollas red, rarely white, mostly (15–)20–42(–50) mm long, the petals mostly imbricate at anthesis, not normally flaring. Staminal column usually exserted for ca. ¼ of its length, rarely included. Fruit usually bright red but sometimes white, 8–14(–16) mm across. Chromosome number, $2n$ = ca. 14 and 28 pairs.

We interpret this widespread, highly variable species as having a single populationally meaningful variety, variety *drummondii*, as noted below. We include in variety *arboreus* most other material previously placed in *M. arboreus* from North America north of Panama, and that from the West Indies. This includes *Malvaviscus arboreus* var. *mexicanus*, recognized by Fryxell (1988), and other taxa accepted by him as distinct, as noted in the synonymy above. *Malvaviscus arboreus* var. *arboreus* is perhaps the most variable species that the senior author has had the displeasure to work with. Detailed mapping of character states in Mexico and other regions reveals a hodge-podge of variation that must relate to localized genetic partitioning, as well as environmental influences. Thus, while any given population is relatively uniform with respect to, say, vestiture or leaf shape, closely contiguous as well as distant populations may show markedly different vestiture types and leaf shapes. The same may be said with respect to corolla and calyx size, and their vestiture.

A similar type of variation to that mentioned above is found throughout the West Indies and in Central America; all of this must be evident from the considerable synonymy and varietal names that have been proposed for *M. arboreus*.

We also believe that at least some of the variation found in *M. arboreus* must have arisen relatively recently by local hybridization with *M. penduliflorus*, a cultivar which, for convenience and because of its wide introduction in gardens throughout the world, we have treated as a species. Evidence for this is mostly speculative (based largely on herbarium collections from areas where *M. arboreus* grows with or near *M. penduliflorus*) for, as noted by Fryxell (1988), *M. penduliflorus* appears to be largely sterile (at least it does not readily set fruit). Nevertheless, occasional plants do develop fruits; indeed, in parts of southern Mexico and Central America, fruiting specimens assignable to that species seem to occur. The latter plants might be viewed as ancestral fruiting stocks of *M. arboreus* (we have treated these as such), from which the remarkably uniform *M. penduliflorus* developed. This is discussed in more detail under the latter.

Distribution (Figs. 1, 2). Mexico, West Indies, and throughout most of Central America (occasionally cultivated elsewhere, as indicated below), 0–2,000 m; flowering all seasons.

Diagnosis and relationships. We include *M. hintonii* in synonymy under *M. arboreus* var. *arboreus*, although Fryxell (1988) maintained the species (as *M. urticifolius*), while Schery reduced it to varietal rank under *M. arboreus*. The name is applied to specimens with white corollas, which otherwise appear to have the characters of *M. arboreus*. Indeed, it might reside within our concept of *M. penduliflorus*, except for its shorter corollas and pilose vestiture along the upper stems. One of the syntypes of *M. hintonii* (*Hinton 7912*, NY, US) has a notation by the collector that "the

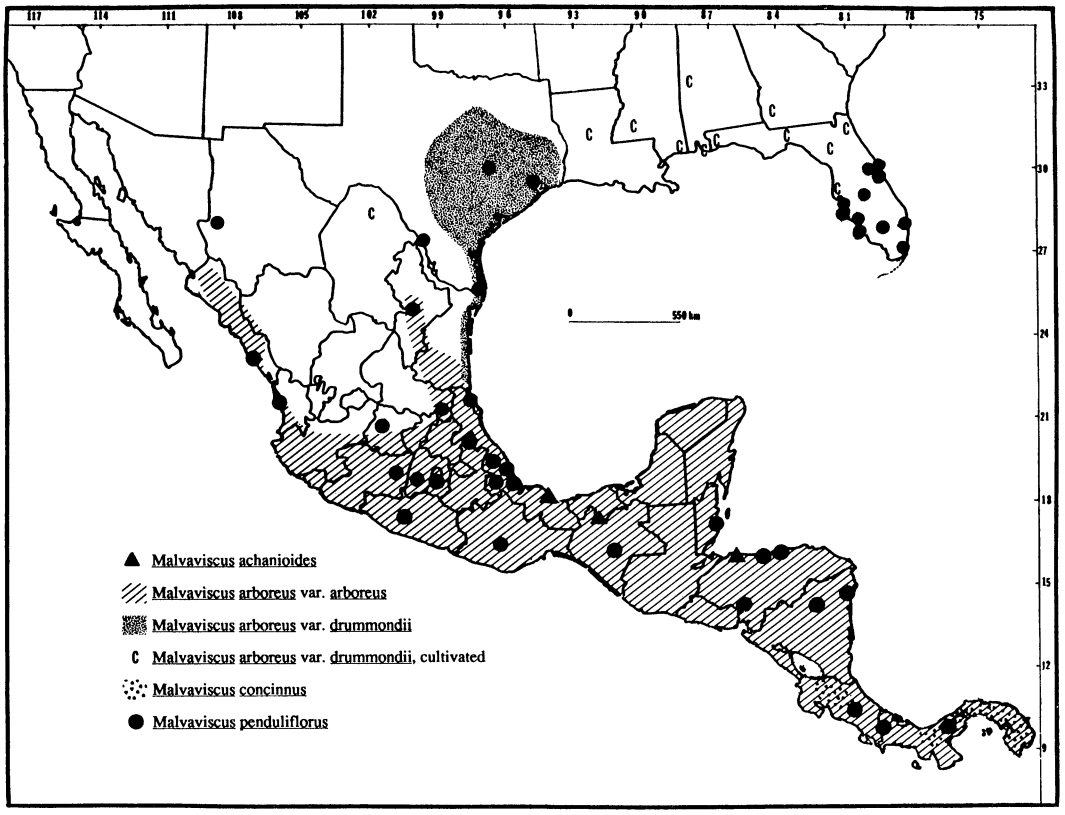

FIGURE 1. Natural distribution of *Malvaviscus* in North and Central America. Isolated collections of *Malvaviscus arboreus* var. *drummondii*, which are marked with "C," are known to be cultivated, thought to have persisted after cultivation, or thought to have escaped from cultivation.

fruit is very rare," suggesting that this might be a color form of *M. penduliflorus*, or perhaps a hybrid segregate between the latter and *M. arboreus*. For additional discussion of this problem see *M. penduliflorus*.

Malvaviscus conzattii, because of its relatively large corollas and lanceolate leaves, was relegated to synonymy under *M. penduliflorus* by Schery (1942). Corolla size would position it in our concept of the latter, but its leaf blade shape (having cordate bases) suggests that it belongs to the *M. arboreus* complex, although it is possible that the type concerned is of hybrid origin, as noted above.

Malvaviscus oaxacanus and *M. lanceolatus* were both retained by Fryxell (1988), but we believe these to be localized populational "calyx-forms" or "leaf-forms" of *M. arboreus* var. *arboreus*. *Malvaviscus oaxacanus* possesses a rather dense, short, furfuraceous vestiture on the calyces, otherwise it is very similar to *M. arboreus*. *Malvaviscus lanceolatus* has lanceolate-elliptic, nearly glabrous leaves (similar to those of *M. penduliflorus*) and nearly glabrous involucels, otherwise it is very similar to typical *M. arboreus*. Schery (1942) also included both of these names in synonymy under *M. arboreus*.

In an initial "run-through" of the entire *M. arboreus* complex, we thought it possible to recognize *M. lanceolatus* as distinct, but restricted the name to those individuals and/or populations with strictly ovate-elliptic, nearly glabrous leaves and glabrous or nearly glabrous calyces. So construed, the "species" would have comprised (along with the type) the following specimens: MEXICO. CHIAPAS: Mpio. Unión Juárez, between Unión Juárez and Santo Domingo, 1,060 m, 6 Sep. 1980, *Fryxell 3203* (MO, NY). OAXACA. ca. 8.4 mi. S of Putla de Guerrero, ca. 1,000 m, 16 Jan. 1979, *Croat 45810* (MO); Putla, Vicente, ca. 1,200 m, *MacDougall*, 1970 (NY); Juquila, Lachao, Santa Rosa, ca. 1,200 m, *MacDougall*, 1971 (NY); Yaveo, Arroyo San Pedro, 440 m, 23 Mar. 1938, *Mexia 9204* (GH, MO, NY, US); S slope of Sierra S of Lachao, 1,700 m, 5 Dec. 1962, *Moran 10114* (US). Fryxell (1988), however, cited specimens from Nayarit, Jalisco, Morelos, and Puebla that we intended to include within our concept of *M. arboreus* var. *arboreus*, most of these having ovate

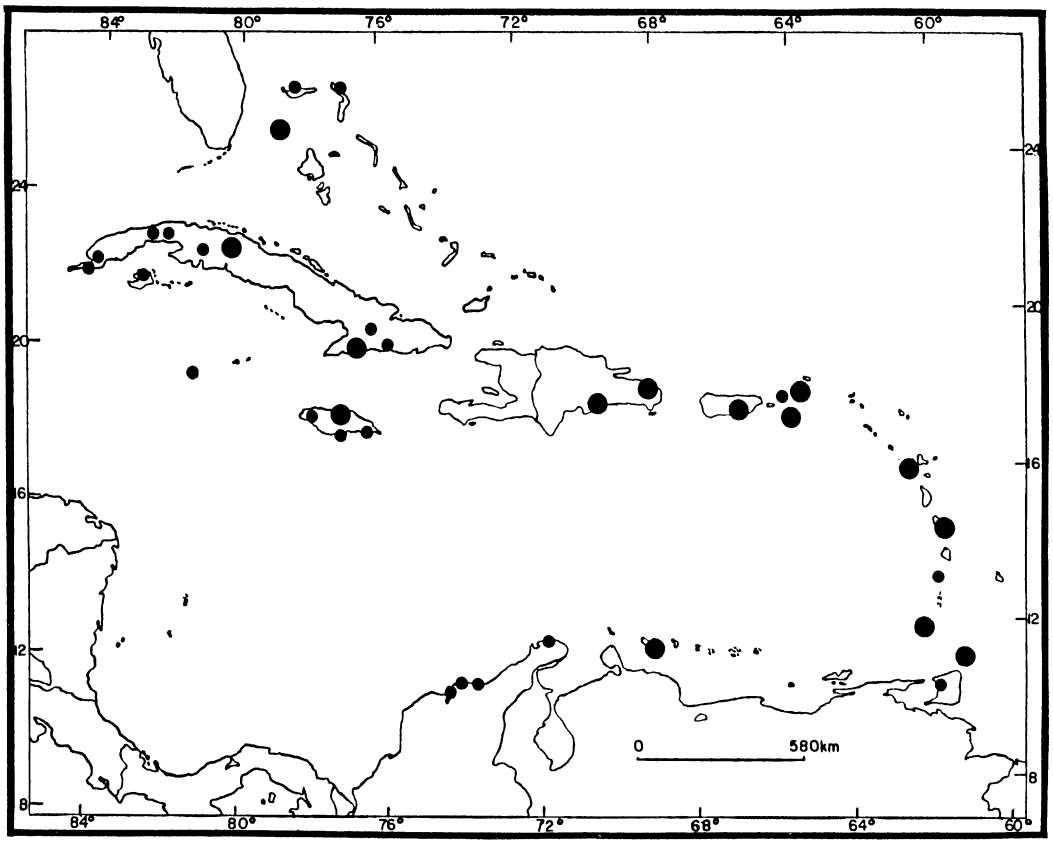

FIGURE 2. Collections of *Malvaviscus arboreus* var. *arboreus* (small closed circles); and *M. penduliflorus* (large closed circles) from the West Indies.

leaf blades and a vestiture reminiscent of the latter. Indeed, all of *M. lanceolatus*, sensu Fryxell, can be submerged within *M. arboreus* without creating much of a morphological ripple, for even as we intended to circumscribe *M. lanceolatus*, the taxon would have differed from *M. arboreus* by a combination of weakly differentiating characters, mainly leaf shape (lanceolate-elliptic), essentially glabrous stems and foliage, relatively large glabrous calyces, and longer corollas (mostly 40–50 mm). The same can be said with respect to the "cultivar," *M. penduliflorus*, for it appears to be a largely sterile derivative from the *M. arboreus* complex centering about *M. lanceolatus* (sensu Fryxell). Indeed, all of the characters that purportedly distinguish *M. penduliflorus* and *M. lanceolatus* from *M. arboreus* crop up in one or more combinations throughout the range of *M. arboreus*, as treated here. For example, *M. palmanus* has been applied to populations from Central America having ovate-elliptic blades and other characters resembling those of *M. lanceolatus*.

In eastern Panama and parts of Costa Rica, *M. arboreus* shows variation in the direction of *M. concinnus*, especially in the size of calyx and fruit and in leaf shape and vestiture, and occasional specimens from this region have been somewhat arbitrarily positioned in one or the other species. A case might be made for the treatment of the mostly South American *M. concinnus* as a broad regional variety of *M. arboreus*, such as was done by Schery (1942) under the name *Malvaviscus arboreus* var. *longifolius*. Strangely, Robyns (1966), in his treatment of *Malvaviscus* for Panama, mentioned none of this variation, relegating all of the Panamanian material that he examined to *M. arboreus* var. *mexicanus*, including the cultivated *M. penduliflorus*. Nevertheless, he described a new variety, *M. arboreus* var. *lobatus*, which is no more than a form of his *M. arboreus* var. *mexicanus* with apically lobed petals.

Representative specimens examined. UNITED STATES. FLORIDA: Monroe Co., Big Pine Key, hammock borders, 26 July 1981, *Brumbach 9708* (GH, MO, cultivated?). HAWAII: Maui, Kohala, persistent along roadside, 8 Aug. 1926, *Degener 9840* (NY, cultivated?). LOUISIANA. Orleans Parish, New Orleans, 1 Nov. 1971, *Ewan 23082* (NY, cultivated). NORTH CAROLINA: New

Hanover Co., Wilmington, along railroad cut, 3 Sep. 1970, *Leonard 3714* (GH, NY). MEXICO. CAMPECHE: Tuxpeña, 22 Nov. 1931, *Lundell 970* (A, F, MO, NY, US). CHIAPAS: Nuevo Amatenango, 1,300 m, 17 July 1941, *Matuda 4724* (A, LL, MO, NY). COLIMA: without locality, 1–31 Dec. 1890, *Palmer 963* (GH, NY, US). DISTRITO FEDERAL: Tlalpam, July 1905, *Rose 8497* (GH, NY, US). DURANGO: 10 mi. N of Tamazula, deep canyon bottom, 1,500 ft., 19 Dec. 1939, *Gentry 5258* (GH, MO, NY). GUANAJUATO: San Miguel Allende, 9 Aug. 1947, *Kenoyer 1912* (A). GUERRERO: Mina, Manchon, ravine, 27 Sep. 1936, *Hinton 9597* (A, F, MO, US). HIDALGO: Valley of Tula, 8,300 ft., 10 Sep. 1899, *Pringle 8232* (A, F, GH, MO, NY, US). JALISCO: barranca near Guadalajara, 5,000 ft., 11 May 1901, *Pringle 8498* (F, GH, MO, NY, US); mountains N of Autlán, 1,500–1,650 m, 5 Oct. 1960, *McVaugh 19917* (GH, LL, NY, TEX, US). MEXICO: Temascaltepec, Bejucos, barranca, 6 Oct. 1934, *Hinton 6719* (A, F, GH, LL, US). MICHOACAN: vicinity of Morelia, Rincón, 1,950 m, 14 Aug. 1910, *Arsène 5494* (A, GH, MO, NY, US). MORELOS: 8 km NW of Oacalco on Hwy. 115D, 1,500 m, 2 Oct. 1983, *Anderson 12940* (MO, NY). NAYARIT: vicinity of Acaponeta, 9 Apr. 1910, *Rose 14210* (GH, NY). NUEVO LEON: 30 mi. S of Sabinas Hidalgo, Cuesta de Mamulique, 4 Apr. 1962, *Rivas 8154* (TEX). OAXACA: Oaxaca valley, 1 Oct. 1894, *Smith 638* (F, MO, NY). PUEBLA: Archeveche, 14 July 1907, *Arsène 1957* (US). QUERETERO: Cerro de las Campanas, 1,850 m, 9 July 1914, *Arsène 10058* (F, MO). QUINTANA ROO: 20 mi. S of Tihosuco, 4 Aug. 1972, *Webster 17681* (GH, MO). SAN LUIS POTOSI: Tamazunchale, 11 July 1937, *Edwards 482* (F, MO, NY, TEX). SINALOA: Villa Unión, Jan. 1895, *Lamb 399* (GH, MO, NY, US). TABASCO: Balancán, 12 Mar. 1975, *Novelo 74* (TEX). TAMAULIPAS: 10 km NW of El Progreso, 21 Aug. 1941, *Stanford 1005* (GH, MO, NY). VERACRUZ: al N de Orizaba, Cerro de Escamela, 15 Oct. 1966, *Rosas 66* (F, GH, LL, NY, US). YUCATAN: Lake Chichankanab, Apr. 1917, *Gaumer 23686* (F, GH, MO, NY, US). BELIZE. TOLEDO DISTRICT: Swasey Branch of the Monkey River, 24 Nov. 1941, *Gentle 3812* (A, LL, MO, US). STANN CREEK DISTRICT: All Pines, 5 ft., 23 Jan. 1930, *Schipp 708* (A, F, GH, MO, NY). WEST INDIES. BAHAMAS: Abaco Island, Allan's Cay, 6 Dec. 1904, *Brace 1527* (F, GH, NY). CUBA: without locality, without date, *Wright 2068* (MO, NY, US); Sierra de Anafe, Pinar del Río, 14 Dec. 1911, *Wilson 11297* (NY). JAMAICA: Walderston, Manchester, 2,600 ft., 1 Jan. 1918, *Harris 12863* (F, GH, MO, NY, US). TRINIDAD: Caroni River swamps, 1917, *Curran 1340* (US). VIRGIN ISLANDS: St. Thomas, Dec. 1928, *Nelthrop 3* (NY). GUATEMALA. ALTA VERAPAZ: 8 km below Tactic, along the Río Frío, 1,400 m, 1 Apr. 1941, *Standley 90542* (F, MO). BAJA VERAPAZ: Niño Perdido, bordering Río San José, 30 May 1977, *Lundell 21022* (LL). CHIMALTENANGO: Tecpam, 2,100 m, 3 Aug. 1933, *Skutch 541* (A, F, NY, US). CHIQUIMULA: 3–5 mi. N of Jocotán, Cerro Tixixi, 10 Nov. 1939, *Steyermark 31635* (F); 3–15 mi. NW of Chiquimula along Río Taco, between Chiquimula and Montaña Barriol, 26 Oct. 1939, *Steyermark 30615* (F). ESCUINTLA: NE of Escuintla, wooded barranca of Río Burrion, 720 m, 16 Mar. 1941, *Standley 89571* (F, MO). GUATEMALA: Guatemala, 1,480 m, 30 May 1923, *Ruano 405* (US). HUEHUETENANGO: San Miguel Acatan, 6,400 ft., 19 Aug. 1934, *Skutch 1021* (A, F, NY, US). IZABAL: vicinity of Quiriguá, 15–31 May 1922, *Standley 23857* (GH, NY, US). JUTIAPA: vicinity of Jutiapa, 850 m, 24 Oct.–5 Nov. 1940, *Standley 75248* (F, MO). PETEN: Santa Elena, entre carretera Turicentro y San Francisco, a 12 km, ca. 20 m lado sureste de la carretera, 9 Feb. 1972, *Ortíz 2244* (F, MO, NY). QUEZALTENANGO: Santa María de Jesús, Finca Pireneos, 1,350–1,380 m, 11 Mar. 1939, *Standley 68236* (F, NY). QUICHE: San Miguel Uspantan, Apr. 1892, *Smith 2920* (GH, MO, NY, US). RETALHULEU: region of Ajaxa, 330 m, 23 Feb. 1941, *Standley 88240* (F, MO). SACATEPEQUEZ: W of Alotenango, wooded slope on road to Escuintla, 3,200 ft., 3 Aug. 1965, *Breedlove 11413* (F, LL). SAN MARCOS: Tajumulco, NW slopes of Volcán Tajumulco, barrancas, 2,300–2,500 m, 25 Feb. 1940, *Steyermark 36553* (F). SANTA ROSA: Malpais, 4,000 pp., Nov. 1893, *Smith 6071* (GH, US). SOLOLA: San Pedro, between slopes of Volcán Santa Clara, 1,900–2,100 m, 6 June 1942, *Steyermark 47120* (A, F). SUCHITEPEQUEZ: near Patulul, 330–600 m, 5 Jan. 1939, *Standley 62146* (A, F). ZACAPA: Zacapa, 1 Jan. 1908, *Kellerman 7019* (F, NY, US). EL SALVADOR. AHUACHAPAN: without locality, 1921, *Padilla 197* (A, MO). LA UNION: vicinity of La Unión, 150 m or less, 13–21 Feb. 1922, *Standley 20809* (GH). MORAZAN: Montecristo, 140 m, 8 Dec. 1941, *Tucker 490* (US). SAN MIGUEL: Laguna de Olomega, 75 m, 20 Feb. 1922, *Standley 21021* (GH, US). SAN SALVADOR: without locality, Jan. 1922, *Calderón 121* (GH, MO, NY, US). SAN VICENTE: vicinity of San Vicente, 400–500 m, 7–14 Feb. 1947, *Standley 3573* (F). SONSONATE: vicinity of Sonsonate, 220–300 m, 18–27 Mar. 1922, *Standley 22300* (NY, US). HONDURAS. ATLANTIDA: vicinity of Tela, 0 m, 14 Dec. 1927–15 Mar. 1928, *Standley 53743* (A, F, US). CHOLUTECA: San Marcos de Colón, 6 June 1970, *Barkley 40510* (F, GH, MO). COMAYAGUA: 20 km al N de Siguatepeque, Barranco Trincheras, 1,400 m, 18 July 1962, *Molina 10840* (F, LL, NY, US). COPAN: 8 km de Santa Rosa de Copán, entre El Portillo y San Juan Opoa, 1,000 m, 23 Sep. 1963, *Molina 12882* (F, LL, NY). CORTES: San Pedro Sula, 1,000 pp., Sep. 1887, *Smith 5153* (GH, NY, US). DISTRITO CENTRAL: Suyapa, 10 July 1969, *Barkley 29429* (GH). EL PARAISO: road from Danlí to El Paraíso, 22 Feb. 1952, *Carlson 2517* (F). GRACIAS A DIOS: Río Lisiksa, 13 Nov. 1976, *Fryxell 2807* (F, NY). ISLAS DE LA BAHIA: Roatán Island, 4 km E of Coxenhole, 5–20 m, 21 Apr. 1967, *Molina 20701* (F, US). MORAZAN: Jicarito River, 2,600 ft., 18 June 1948, *Glassman 1652* (F, GH, TEX, NY). OCOTEPEQUE: NW of Ocotepeque, Mt. Cocal de Cordillera Merendón, 25 Aug. 1968, *Molina 22080* (F, NY). OLANCHO: 20 km NE de Juticalpa, Cerro El Boquerón, 700 m, 15 Jan. 1982, *Segovia 176* (NY). YORO: Quebrada Seca, 30 m, Dec. 1927, *Standley 53926* (A, F, US). NICARAGUA. BOACA: toward Camoapa, 200–500 m, 4 Apr. 1971, *Seymour 5426* (MO). CARAZO: N bank of Río Escalante, 6 km upstream from mouth, 24 Aug. 1977, *Neill 2438* (MO). CHINANDEGA: El Viejo, near Río Chiquito, 0–100 m, 27 Dec. 1969, *Seymour 2671* (MO). CHONTALES: 2.8 km N of Cuapa, 400–500 m, 21 Jan. 1978, *Stevens 6043* (MO); vicinity of Juigalpa, wet thicket along Río Paigua, 160 m, 4–13 June 1947, *Standley 9226* (F). COMARCA DEL CABO: Bilwaskarma, Thaler Memorial Hospital, pine woods, 9 July 1972, *Robbins 5777* (MO, NY, cultivated?). ESTELI: 6 km de Pueblo Nuevo, carretera a Limay cerro San Ramón, 810 m, 27 Sep. 1980, *Moreno 3094* (MO). GRANADA: Granada, Lake Nicaragua, 24 Dec. 1968, *Hamblett 1112* (F, GH, NY). JINOTEGA: 10 km NE of Jinotega, La Bastilla, 11 Jan. 1969, *Zelaya 2145* (F, NY). LEON: Momotombo, 27 July 1972, *Robbins 6110* (F). MADRIZ: Cerro Volcán de Somoto (Tepesomoto),

1,500–1,600 m, 16 Apr. 1980, *Araquistain 2122* (MO). MANAGUA: 12 km E of Managua, vicinity of Escuela Nacional de Agricultura y Ganadería, Route 1, 16 Jan. 1969, *Seymour 2235* (GH, MO, NY, cultivated?). MASAYA: without locality, 13 Feb. 1903, *Baker 163* (GH, NY, US). MATAGALPA: Cordillera Central de Nicaragua between Matagalpa and Jinotega, Santa María de Ostuma, 1,300–1,500 m, 8–15 Jan. 1963, *Williams 23401* (F, LL, US). NUEVA SEGOVIA: Ocotal, 7 Aug. 1977, *Stevens 3039* (MO). RIO SAN JUAN: near Cano Chotaleno, 20 km NE of El Castillo, 200 m, 18–21 Apr. 1978, *Neill 3582* (MO). RIVAS: Belén, K97, Route 2, 7 Jan. 1969, *Moore 1913* (GH, MO). ZELAYA: Madregava, rainforest on Mt. Liveco near Siuna, 19 Mar. 1971, *Nelson 5048* (MO); Punta del Mico, 0–100 m, 5 Mar. 1971, *Nelson 4248* (MO). COSTA RICA. ALAJUELA: Santiago de San Ramón, 26 Jan. 1937, *Brenes 21982* (F, NY). CARTAGO: 3 km SE of Cartago, 1,200 m, 10 Aug. 1967, *Taylor 4231* (MO, NY). GUANACASTE: along road from Santa Cruz to Playa Tamarindo near Río La Lima, 40–80 m, 28 Dec. 1966, *Burger 4113* (F, NY); Comelco Ranch 7 km NW of Bagaces, 8 May 1971, *Heithaus 87* (F, MO). HEREDIA: 5 km N of Puerto Viejo, along road to El Muelle, 100 m, 8 Jan. 1967, *Burger 4328* (F, MO, NY). LIMON: Los Diamantes on RR to Guapiles, Río Santa Clara, 6 Feb. 1957, *Carlson 3452* (F, US). PUNTARENAS: 4 mi. W of Rincón de Osa, forested area near the airfield, 4–7 June 1968, *Burger 5425* (F, NY); Monteverde, Oct. 1977, *Dryer 1662* (F, MO); Cabo Blanco Nature Reserve, 1–7 Dec. 1969, *Burger 6576* (F, LL). SAN JOSE: vicinity of El General, 1,040 m, Jan. 1936, *Skutch 2368* (A, GH, MO, NY, US); La Palma, 1,540 m, Aug. 1898, *Smith 7393* (F, GH, MO, NY). PANAMA. BOCAS DEL TORO: Water Valley, 9 Sep. 1940, *von Wedel 657* (GH, MO, US). CHIRIQUI: Burica Peninsula, 11 mi. W of Puerto Armueles in the vicinity of San Bartolo Límite, 19 Feb. 1973, *Liesner 71* (F, GH, MO); Borquete, in forest on slope of La Popa, 5,400 ft., 5 Aug. 1972, *D'Arcy 6408* (LL, MO, NY). COCLE: vicinity of El Valle, 800–1,000 m, 22 Dec. 1936, *Allen 91* (A, GH, MO). COLON: Salamanca, along stream 3 mi. E of Transisthmian highway on road to Salamanca, 100 m, 19 Dec. 1972, *Gentry 6735* (F, MO, NY). DARIEN: Tucuti, Chepigana, 5 Mar. 1940, *Terry 1386* (A, F, MO). HERRERA: hill above Chepo de las Minas, 700 m, 19 Dec. 1977, *Folsom 6979* (MO). LOS SANTOS: Las Tablas, 10 Aug. 1962, *Dwyer 2480* (MO, US). PANAMA: N of El Llano, 500–800 m, 25 July 1972, *Gentry 5573* (LL, NY). SAN BLAS: Comarca de San Blas, trail along Continental Divide, 25 July 1986, *McDonagh 368* (MO). VERAGUAS: Sona, 500 m, 24 Nov. 1938, *Allen 1045* (F, GH, MO, US). COLOMBIA. ATLANTICO: Barranquilla and vicinity, Tulara, Jan. 1928, *Elias 428* (US). BOLIVAR: vicinity of Turbaco, 200–300 m, 6–22 Nov. 1926, *Killip 14187* (GH, MO, NY). GUAJIRA: Maicao, Arroyo Tabaco near the Intercor Coal campamento at Tabaco, 9 Mar. 1981, *Bunch 0437* (HUA). SUCRE: trail from Coloso to Reserva de Primatas, 300–350 m, 17 Nov. 1981, *Gentry 34793A* (MO). GUYANA. Cultivated in British Guiana Botanic Gardens, Apr. 1907, *Jenman 8631* (BRG, cultivated). VENEZUELA. DISTRITO FEDERAL: around Caracas, 29 Apr. 1917, *Pittier 7121* (F, GH, US, cultivated). MIRANDA: San Diego de los Altos, 1,300 m, 24 June 1928, *Pittier 13014* (F, GH, NY, US, cultivated). OLD WORLD: FRENCH POLYNESIA. SOCIETY ISLANDS: Raiatea, Huaru, 31 Mar. 1927, *Moore 692* (MO, cultivated). INDIA. WEST BENGAL: Calcutta, Sibpur, without date, *Raizada 29153* (MO, cultivated). KENYA. Nairobi, Keren, Feb. 1963, *Gardner EAH, 12669* (US, cultivated). MALAYSIA. SARAWAK: Kapit, 1929, *Clemens 21029* (NY, cultivated). THAILAND. Bangkok, 1899, *Zimmermann 51* (MO, US, cultivated). VIETNAM. Da Nang, "ANNAM: Tourane," May–July 1927, *Clemens 4275* (MO, US, cultivated).

1b. Malvaviscus arboreus var. **drummondii** (Torrey & A. Gray) Schery, Ann. Missouri Bot. Gard. 29: 215. 1942. *Malvaviscus drummondii* Torrey & A. Gray, Fl. N. Amer. 1: 230. 1838. *Pavonia drummondii* (Torrey & A. Gray) Torrey & A. Gray, Fl. N. Amer. 1: 682. 1840. *Hibiscus drummondii* (Torrey & A. Gray) M. J. Young, Familiar Lessons in Botany with Flora of Texas 186. 1873. TYPE: United States. Texas: Austin Co., San Felipe de Tejas, *T. Drummond*, 1835 (Texas Drummond Coll. III, no. 1) (lectotype, selected here, NY [Torrey herbarium]; isolectotype, GH; probable isolectotype, NY).

Selection of a NY specimen from the Torrey collection as lectotype was necessitated by the absence of material at GH that might have been examined by either Gray or Torrey; the isotypes cited above were accessioned by GH well after *M. drummondii* was published.

It is unclear whether Young was describing *Hibiscus* as a new species, as a new combination after Torrey & A. Gray, or as a previously treated taxon. It is unlikely that Young intended to present a new species. Elsewhere in the flora Young's new species bear the notation "n. sp." The specimen described was certainly of Torrey & Gray's previously described *Malvaviscus drummondii* (red flowers, red fruit), and the identical specific epithet suggests Young was transferring the species to *Hibiscus*. However, Young did not cite Torrey & Gray as basionym authors and did not specifically state that *Hibiscus drummondii* was a new combination. Young did have at least indirect access to the *Flora of North America*; Torrey & Gray were cited elsewhere in the flora. However, many species that Torrey & Gray had named did not include an author citation. It seems possible that Young was simply unable to associate an author with what she thought was a legitimate name, *Hibiscus drummondii*.

Malvaviscus arboreus var. *drummondii* closely resembles variety *arboreus*, but the former plants are erect suffruticose, clone-forming, herbs or shrublets 0.5–1.5 m high; blades having mostly obtuse or rounded apices and abruptly cordate bases, the vestiture of petioles and peduncles densely and uniformly stellate-pubescent, the hairs

scarcely exceeding 0.25 mm. Chromosome number, $2n$ = ca. 14 pairs.

Distribution (Fig. 1). Sparsely occurring in northeastern Mexico and southern Texas along the Gulf Coast, but more widespread (albeit patchy) and numerous throughout central and eastern Texas, especially in rich soils along streams in shaded areas, cultivated or escaped from cultivation eastward to Florida; flowering all seasons, depending upon time, severity, and duration of frost conditions.

Diagnosis and relationships. According to Schery (1942), the variety *drummondii* "is one of the most distinct varieties of *M. arboreus*," which is an overstatement if one considers that he included within his concept of *M. arboreus* several taxa that others, including the present workers, would treat as distinct species. Actually, variety *drummondii* is a weakly differentiated, relatively uniform, populational complex of *M. arboreus*, which is largely restricted to central Texas. Southward along the Gulf coastal region of northeastern Mexico it appears to grade into variety *arboreus*, especially in the vicinity of Tampico, Mexico. Southward from Tampico variety *arboreus* becomes increasingly shrubby or clambering, the leaves less uniformly lobed, with mostly acute apices and a vestiture on the petioles and stems that is sparsely distributed, usually in lines, or sometimes glabrate or nearly so. Fryxell (1988) did not account for *M. arboreus* var. *drummondii* in his treatment of Mexico; the several specimens from Mexico that we cite here as belonging to variety *drummondii* are superficially similar to variety *arboreus* and, as indicated, the two taxa appear to intergrade in northeastern Mexico.

It is questionable whether variety *drummondii* is truly native to the states east of Texas, although it is certainly native to Texas, as attested to by the numerous and remarkably uniform populations that grow in central Texas. The taxon apparently was, early on, taken into cultivation in the more coastal southeastern United States. Collections in this area have been relatively isolated and are represented in Figure 1 as cultivated, whether known to be cultivated, thought to be persisting after cultivation, or thought to be escaped.

Representative specimens examined. UNITED STATES. ALABAMA: Tuscaloosa Co., University of Alabama campus, near Smith Woods, 25 July 1965, *Dermus 444* (GH, cultivated?). FLORIDA: Columbia Co., ca. 3 mi. N of U.S. 27 along Ichetucknee River, *Will*, 1961 (GH); Duval Co., near Jacksonville, without date, *Curtis s.n.* (GH, cultivated?); Escambia Co., Pensacola, *Brinker*, 1941 (MO, cultivated); Hillsborough Co., without locality, *Fredholm*, 1904 (GH, cultivated?); Leon Co., Tallahassee, live oak woods, 3 Oct. 1957, *Godfry 56118* (GH). GEORGIA: Daugherty Co., Albany, vacant lot by railroad yards, 5 Aug. 1947, *Thorne 5853* (GH, cultivated?). LOUISIANA: Rapides Parish, Alexandria, without date, *Hale s.n.* (NY, cultivated from Texas). MISSISSIPPI: Adams Co., near Natchez, without date, *Gale s.n.* (NY); Jackson Co., near Ocean Springs, 14 July 1889, *Fredholm 2176* (US); Lincoln Co., 11 mi. W of Brookhaven, 11 July 1950, *Webster 3281* (NY, US). TEXAS: Angelina Co., Neches River, *Boon*, 1934 (TEX); Aransas Co., Goose Island, N shore of Copano Bay, 10 June 1953, *Johnston 53175.27* (TEX); Bastrop Co., Bastrop State Park, 10 June 1953, *Gentry 1467* (NY); Bell Co., along Leon River channel, 5 July 1954, *York 54566* (TEX); Bexar Co., without locality, *Jermy*, 1904 (MO, NY); Brazoria Co., 4 mi. S of Angleton, 22 Oct. 1948, *Rogers 6579* (TEX); Brazos Co., College Station, 19 Sep. 1916, *Palmer 10756* (MO, US); Brown Co., 2 mi. E of Brownwood, along U.S. Hwy. 67, 3 Oct. 1965, *Wheat 10* (LL, cultivated); Burnet Co., Marble Falls, *Vanderbilt*, 1903 (US); Caldwell Co., Columbia, along streams, 1 Nov. 1899, *Bush 312* (MO, NY); Calhoun Co., 4 mi. NE of Tivoli, Guadalupe River bottoms, 24 Nov. 1945, *Cory 51153* (GH, NY, TEX); Cameron Co., near Brownsville, banks of the Rio Grande, 2 Aug. 1888, *Pringle 1959* (F, GH, NY, MO, US); Colorado Co., Eagle Lake, 21 Aug. 1946, *Warnock 46369* (TEX); Comal Co., Comanche Spring, Aug. 1849, *Lindheimer 685* (F, GH, MO, NY, TEX); Dallas Co., Dallas, *Reverchon*, 1879 (F); DeWitt Co., without locality, *Riedel*, 1941 (TEX); Fayette Co., Muldoon, 3 Oct. 1950, *Ripple 51-773* (TEX); Galveston Co., without locality, *Nelson*, 1941 (GH, TEX); Gillespie Co., Fredericksburg, without date, *Jermy 707* (MO); Goliad Co., Goliad, 22 Sep. 1926, *Williams 70* (F, MO); Gonzales Co., Ottine, woodland near bog on the Soefje farm, 3 Oct. 1943, *Barkley 13856* (F, GH, MO, NY, TEX); Grimes Co., Navasota, 1897, *Turner 2* (NY); Harris Co., Houston, 1 July 1872, *Hall 53* (F, GH, NY); Hays Co., San Marcos, *Tharp*, 1939 (F, GH, NY, TEX); Jackson Co., Navidad River, 1 July 1915, *Drushel 2844* (MO); Karnes Co., Green, Media Creek bottoms, 2 Sep. 1952, *Johnson 1004* (TEX); Kendall Co., Spanish Pass, 5 July 1911, *Clemens 609* (MO, NY); Kennedy Co., King Ranch, 6 mi. SE of headquarters, 23 Sep. 1958, *Lundell 15136* (LL, MO, NY); Lavaca Co., 18 mi. SE of Yoakum, along Hwy. 111, 16 July 1949, *Tharp 49167* (F, TEX); Limestone Co., N of Groesbeck, 18 Aug. 1968, *Fryxell 706* (F, MO); Madison Co., near Trinity River, 13–14 July 1909, *Dixon 441* (F, GH, NY); McLennan Co., Waco, without date, *Pace 221* (MO); Montgomery Co., Willis, Aug., *Warner s.n.* (MO); Nacogdoches Co., without locality, *Barrett*, 1944 (TEX); Nueces Co., Bishop, 20 June 1925, *Eifrig 19* (F); Refugio Co., Gulf Coast, "probably near Tivoli," July 1976, *Williams 454* (GH, MO); Robertson Co., 13 mi. E of Benchley, 28 July 1950, *Gould 5765* (TEX); San Patricio Co., Mathis, 26 Sep. 1958, *Correll 20414* (LL, NY); Travis Co., Harthaven, 6 Oct. 1944, *Warnock W1021* (F, NY, TEX); Tyler Co., 5 mi. NW of Woodville, roadside park, 28 Sep. 1948, *Cory 54840* (LL); Victoria Co., 8 mi. from Victoria, in field along Coletto Creek, 3 Oct. 1952, *Correll 14819* (LL); Walker Co., near Lake Livingston, 10 Aug. 1975, *Fryxell 2538* (NY); Washington Co., without locality, June 1938, *Brackett 175* (TEX); Wharton Co., Pierce, 14 Sep. 1901, *Tracy 7476* (F, GH, MO, NY, TEX); Wilson Co., Flo-

resville, June 1930, *Garza 2* (TEX). MEXICO. COAHUILA: Músquiz, *Hoult*, 1930 (TEX, possibly cultivated). TAMAULIPAS: San José, 18 Feb. 1939, *LeSueur 283* (F, TEX); vicinity of Tampico, 3–6 June 1910, *Palmer 525* (GH, US).

2. Malvaviscus penduliflorus DC., Prodr. 1: 445. 1824. *Malvaviscus arboreus* var. *penduliflorus* (DC.) Schery, Ann. Missouri Bot. Gard. 29: 233. 1942. *Malvaviscus arboreus* subsp. *penduliflorus* (DC.) Hadač, Folia Geobot. Phytotax. 5: 432. 1970. TYPE: Mexico. Without locality, date, or collector, Icones Florae Mexicanae no. 100 (Torner Coll. acc. no. 6331.1712, Hunt Institute, according to Fryxell, 1988).

Malvaviscus penduliflorus, except for its large corollas (mostly 5–6 cm long) and somewhat larger calyces (mostly 15–20 mm long), falls well within the descriptive parameters of *M. arboreus* var. *arboreus*. Chromosome number, $2n$ = ca. 84, 86.

Distribution (Figs. 1–3). *Malvaviscus penduliflorus* is a widespread cultivar of unknown origin. It is widely planted in gardens throughout the New World and escapes cultivation, to judge from information on herbarium labels. In addition, it is believed to hybridize occasionally with locally native taxa, mostly *M. arboreus*; flowering all seasons.

Diagnosis and relationships. *Malvaviscus penduliflorus* is remarkably uniform throughout its artificial range and is distinguished from *M. arboreus* var. *arboreus* by its larger corollas (mostly 50–60 mm long vs. 20–50 mm) and somewhat larger calyces (mostly 15–20 mm long vs. 10–15 mm). In addition, the leaves are nearly always ovate and subglabrous, and the flowers tend to be single and axillary with a pendulous nature. Its original habitat (or the area from which the "cultivar" might have arisen) is unknown, but it was first described by de Candolle from drawings made for the *Icones Florae Mexicanae* (cf. Fryxell, 1988), perhaps from garden material. As noted by Fryxell (1988), the species only rarely sets fruit, and this is verified by our own observations. Nevertheless, the area of origin of this species is probably south-central Mexico, for numerous collections from this region might reside within the descriptive parameters of *M. penduliflorus* except that the corollas tend to be shorter.

It is likely that *M. urticifolius* (= *M. hintonii*) is a white-flowered corolla form of *M. penduliflorus* with somewhat shorter petals, for as noted by Fryxell (1988), *M. hintonii* appears to be largely sterile and appears to occur in cultivation. We have, nevertheless, placed *M. hintonii* within the synonymy of *M. arboreus* var. *arboreus* because its leaf shape and vestiture more closely resemble that of *M. arboreus*. Certainly, it is not typical of material we include under *M. penduliflorus*. The corolla of *M. penduliflorus* is nearly always crimson or red; occasional specimens will have corollas that are pale pink (e.g., *Hu 12353A*, from Hong Kong, US), or "pure white" (*Plowman 11215*, Peru, F). It should also be noted that while the androecium is normally included within, or barely exceeding the corolla, as noted by Fryxell (1988), it is not uncommon to find the androecium extending beyond the corolla for 1–3 cm (e.g., *Cowan 4923*, TEX; *Hinton 13529*, LL; *Taylor 36*, TEX); at least this is true for our concept of this widespread, cultivated taxon.

We accept the likelihood that *M. hintonii* is a synonym of the earlier *M. urticifolius* (as treated by Fryxell, 1988), the latter having been first collected by Haenke, probably on his trip from Acapulco to Mexico City and return during the year 1791.

As noted under *M. arboreus* var. *arboreus*, it is likely that occasional hybridization between *M. arboreus* and *M. penduliflorus* occurs, at least to judge from seemingly intermediate specimens, most of these occurring in regions where both are known to occur near each other.

This is all discussed here to emphasize that the probable region of origin of the morphologically uniform cultivar *M. penduliflorus* is south-central Mexico, perhaps from the region south of Mexico City.

Representative specimens examined. UNITED STATES. FLORIDA: Dade Co., Miami, 24 Dec. 1927, *Moldenke 3581* (NY, cultivated); Hendry Co., Clewiston, 4 May 1958, *Cooley 6231* (NY); Hillsborough Co., Auburn Highlands, July 1970, *Burch 3755* (MO, cultivated); Lee Co., East Fort Myers, apparently escaped, *Moldenke 993* (MO, NY, US); Manatee Co., Palmetto, 31 July 1970, *Burch 3757* (MO, cultivated); Palm Beach Co., Delray Beach, edge of coastal sand dune thickets, 29 Dec. 1966, *Moldenke 24176* (LL); Seminole Co., 1.4 mi. W of Sanford city limit, grassy thicket near Florida Hwy. 46, escaped but not actively spreading, 24 Sep. 1960, *Ward 2240* (GH, US); Volusia Co., Ponce Inlet, grassy soil on edge of salt marsh, 4 Oct. 1981, *Correll 52747* (NY). HAWAII: Oahu, Mokuleia, 30 July 1937, *Degener 11402* (GH, MO, NY, cultivated). TEXAS: Bosque Co., Clifton, 16 June 1925, *Eifrig 15* (F); Brazos Co., College Station, flowerbed, S side Hart Hall, (Texas A&M University) campus, 22 Nov. 1948, *Trew 162* (TEX, cultivated); Cameron Co., Brownsville, 21 Dec. 1919, *Hanson 36* (GH, MO, NY, cultivated); Harris Co., Houston, Teas Nursery, 5 Dec. 1933, without collector (TEX, cultivated); Webb Co., Laredo Jr. College Campus, 11 Nov.

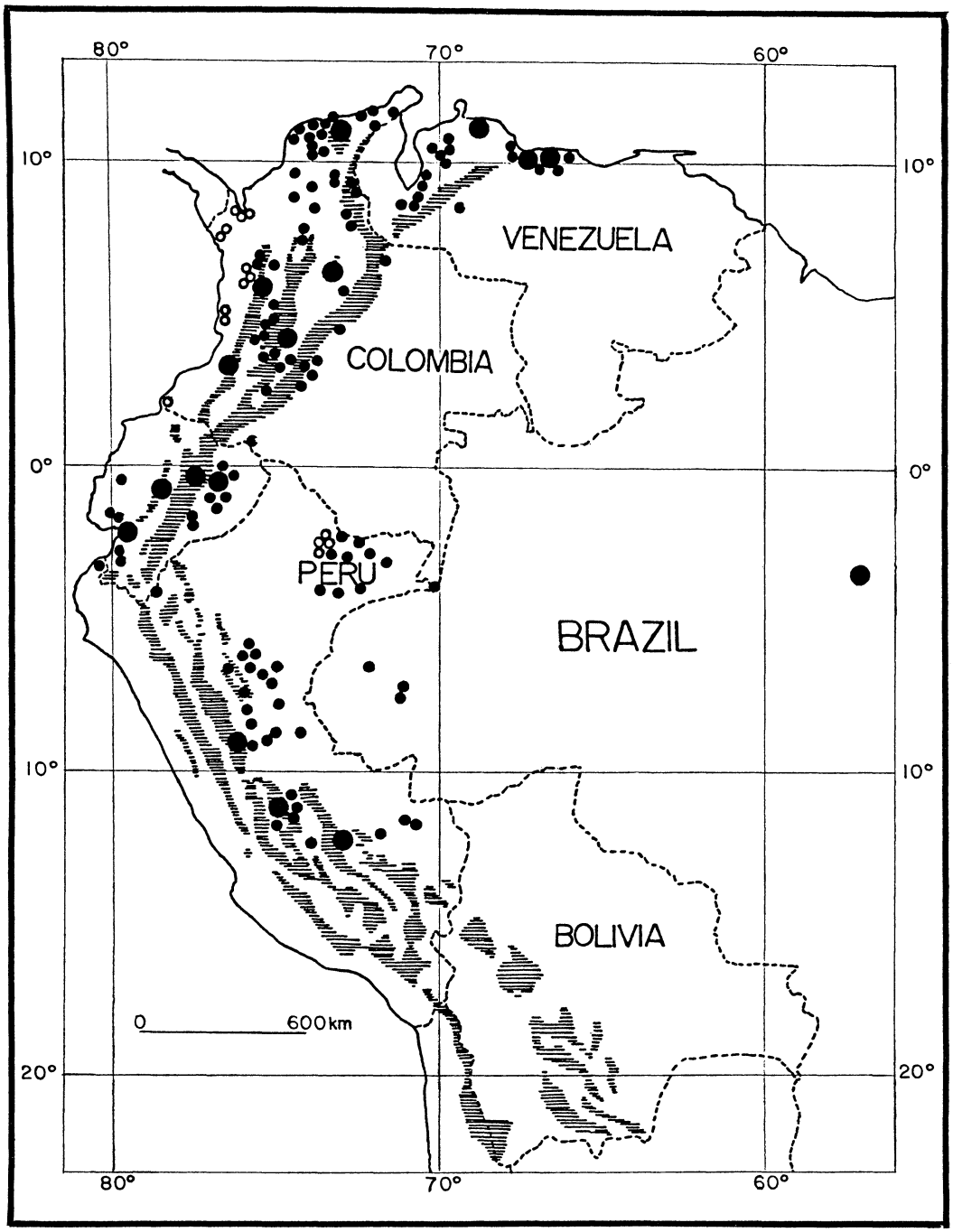

FIGURE 3. Distribution of *Malvaviscus concinnus* (small closed circles), *M. penduliflorus* (large closed circles), and *M. williamsii* (small open circles) in South America.

1962, *Garcia 28* (TEX, cultivated); Willacy Co., 5 mi. W of Raymondville, 18 Apr. 1965, *Rios 273* (LL, cultivated). MEXICO. CHIAPAS: Tenejapa, near the school house of Pokolum, paraje of Sibanilha, 5,200 ft., 15 July 1965, *Breedlove 11048* (F, LL). CHIHUAHUA: Llano Grande, 19 May 1960, *Pennington 151* (TEX). GUANAJUATO: Guanajuato, 1891, *Dugès 280* (GH, cultivated). GUERRERO: Atoyac de Alvarez, 1,000 m, 19 Dec. 1984, *Cowan 4923* (TEX). MEXICO: Temascaltepec, Tenayac, 1,450 m, 8 June 1933, *Hinton 4014* (A, NY, US). MICHOACAN: Zitácuaro, La Mora, 1,300 m, 12 Dec. 1938, *Hinton 13529* (GH, LL, NY, US). MORELOS: near Cuernavaca, 5,500 ft., 28 Aug. 1935, *Bailey 305* (F). NAYARIT: 6.5 mi. E of Jalcocotán, 800–1,200 m, 9 Sep. 1960, *McVaugh*

18932 (NY, TEX, US). NUEVO LEON: on I.T.E.S.M. campus, 1,700 ft., 28 July 1970, *Taylor 36* (TEX, cultivated). OAXACA: Santo Domingo, 1,600 m, 22 Dec. 1906, *Conzatti 1683* (F). PUEBLA: Cuetzalán, 940 m, 4 Mar. 1976, *Baez 275* (F). SAN LUIS POTOSI: Mpio. San Antonio, El Lejem, 15 Dec. 1978, Alcorn *2260* (TEX, cultivated). SINALOA: vicinity of Mazatlán, 7 Apr. 1910, *Rose 14156* (NY, US, cultivated). VERACRUZ: 2 km S of Tampico, 23–31 May 1910, *Palmer 391* (MO); near Córdoba, 20 July 1941, *Schery 188* (MO). BELIZE. St. Johns College Grounds, 15 May 1970, *Dieckman 237* (MO, cultivated). WEST INDIES. BAHAMAS: northern Bimini Island, Lerner Lab, 6 May 1948, *Howard 10226* (GH, NY, US, cultivated). CUBA: Sierra Maestra, 30 km S of Bayamo, 400 m, 17 Aug. 1951, *Webster 4123* (GH, US). CURAÇAO: at pool St. Martha, Jan. 1970, *Arnold-Broeders 3888* (A). DOMINICAN REPUBLIC: Peravia, El Taton, 13.7 km E de San José de Ocoa en la carretera a La Laguna, 20 Oct. 1982, *Mejia 23795* (NY). GUADELOUPE: Basse Terre, 25 Mar. 1982, *Howard 19775* (NY, cultivated). JAMAICA: St. Andrew, U.C.W.I. campus, 550 ft., 30 Oct. 1957, *Yuncker 17241* (NY, cultivated). PUERTO RICO: Barranquitas, along Hwy. 156, 6.0 mi. SW of Comerío, 4.7 mi. SW of junction with Hwy. 776, 25 Nov. 1981, *Hansen 9335* (MO). ST. LUCIA: Canaries River approaching Morne Gimie, 28 Jan. 1985, *Howard 19935* (A, NY). TORTOLA: Treasure Isle Hotel grounds, 10 m, 15 Dec. 1965, *D'Arcy 387A* (MO, cultivated). TRINIDAD AND TOBAGO: I.C.T.A. Savanna, 23 Feb. 1959, *Richards 1378* (NY). HONDURAS. ATLANTIDA: vicinity of La Ceiba, near Puente Alto stop on S.F. Co. RR, 800 ft., 19 July 1938, *Yuncker 8523* (F, GH, MO). COMAYAGUA: vicinity of Siguatepeque, 1,050 m, 25 Mar.–5 Apr. 1947, *Standley 6658* (F, cultivated). MORAZAN: Zamorano, 800 m, Feb. 1945, *Rodriguez 2264* (F). NICARAGUA. ZELAYA: vicinity of Puerto Cabezas, 11 Feb. 1977, *van Stelle 18* (MO). COSTA RICA. SAN JOSE: San José, grounds of Nacional Museum, 1,140 m, 13 Dec. 1966, *Meyer 10021* (MO, cultivated). PANAMA. CHIRIQUI: El Hato del Volcán, fencerows and old citrus grove around hotel, 1,390 m, 5 Jan. 1975, *Nee 14143* (MO). COCLE: near El Cope, 27 Oct. 1967, *Garner 39* (A). COLOMBIA. ANTIOQUIA: Medellín, Ciudad Universitaria U. de A., 6 Aug. 1981, *Alzate 13* (HUA). CUNDINAMARCA: valley above Colegio, 800 ft., 5 July 1968, *Barkley 38852* (TEX). SANTANDER: 17 km SE of San Vicente de Chucuri on road to Zapatoca, 1,250 m, 25 July 1975, *Gentry 15438* (MO, NY). VALLE DEL CAUCA: Palmira, 1,100 m, 2 Jan. 1972, *Maas 576* (MO); Calí, Universidad del Valle Zona de residencias, 26 Nov. 1982, *Paz 12* (MO). VENEZUELA. ARAGUA: Maracay, Agronomia, Universidad Central de Venezuela, 24 June 1963, *Trujillo 5709* (F, cultivated). DISTRITO FEDERAL: Caracas, Colinas de El Paraíso, Jan. 1944, *Lasser 1025* (US). MIRANDA: Parque Nacional Guatopo, 24 km NNW of Altagracia de Orituco, along Quebrada Agua Blanca, 350 m, 23 Aug. 1979, *Nee 17718* (F). BRAZIL. AMAZONAS: Maués, avenue facing river, cultivated, 1983, *Hill 13204* (R). PARAIBA: Areia Escola de Agronomia do Nordeste, 25 Oct. 1944, *Vasconcellos 177* (RB). RIO DE JANEIRO: Rio de Janeiro, Estrada da Vista Chinesa km 2, Alto da Boa Vista, 3 Sep. 1979, *Carauta 3183* (F). SÃO PAULO: Limeira, *Hoehne*, 1946 (SP). ECUADOR. COTOPAXI: 1.9 km NW of El Corazon, road between Quevedo and El Corazon, 1,225 m, 5 Apr. 1983, *Croat 55836* (MO, NY); near La Mana, islet in Río San Pablo, 500 ft., 18 July 1978, *Webster 22724* (TEX). GUAYAS: Guayaquil, 0–20 m, 1964, *Valverde 680* (US); Capeira, km 21 Guayaquil to Daule, 17 Sep. 1982, *Dodson 11280* (MO). LOS RIOS: km 56 Quevedo–Santo Domingo, Río Palenque Biological Station, 150–220 m, 31 Mar. 1971, *Dodson 4290* (F, MO). NAPO: Puerto Napo, 7 km S of Tena, 8 Aug. 1988, *Mendenhall 15* (TEX, cultivated). PERU. CUZCO: La Convención, Quillabamba, Salaspampa, road to Kiteni, chacra del Sr. Alejo Daniel Caceres, Río Urubamba, 1,110 m, 28 Oct. 1986, *Nuñez 6320* (MO). HUANUCO: Tingo María, Río Huallaga, 12 Mar. 1977, *Boeke 1229* (MO, NY); Jardín Botánico de Tingo María, 670 m, 8 Dec. 1981, *Plowman 11215* (F, cultivated). JUNIN: N of La Merced, 12 km N of Puente Paucartambo, Río Paucartambo, chacra Schuler, 960 m, 6 Feb. 1979, *Teppner 79/318* (US). OLD WORLD: EGYPT. Cairo, Cairo University garden, 28 Aug. 1974, without collector (LL, MO, cultivated). FRENCH POLYNESIA. MOOREA: Faatoai Valley, usually cultivated but beginning to escape in areas of deserted dwellings, 19 July 1967, *Smith 103* (MO, NY, US). INDIA. UTTAR PRADESH: Dehra Dun, Forest Research Institute, *Raizada*, 1954 (NY, cultivated); Lucknow, Central Drug Research Institute, 113 m, 26 Apr. 1982, *Parsad 11769* (F, cultivated). PAKISTAN. SIND: Karachi, National College, 6 Aug. 1969, *Abedin 3777* (NY, US, cultivated). PAPUA NEW GUINEA. MANUS ISLAND: Pelikawa Village, 25 June 1971, *Stone 10494* (A, cultivated). PHILIPPINES. LUZON: Manila, Jan. 1954, *Steiner 332* (US, cultivated). MINDANAO: Davao, valley near Santa Cruz, 900 ft., *A.N.U. 1587* (A). SOCIETY ISLANDS. TAHITI: Punaauia, Outumaoro, Hotel Maeva, 3 m, 2 Feb. 1983, *Florence 4473* (NY, cultivated). TAIWAN. Pingtung city, 29 Sep. 1976, *Ching-en Chang 9417* (MO, cultivated). TANZANIA. Kibaha, 14 Nov. 1970, *Flock 710* (MO, cultivated). WESTERN SAMOA. UPOLU ISLAND: Moto'otua in the Apia area, 2 Jan. 1975, *Whistler W2006* (US, cultivated).

3. Malvaviscus achanioides (Turczaninow) Fryxell, Syst. Bot. 4: 253. 1979. *Abelmoschus achanioides* Turczaninow, Bull. Soc. Imp. Nat. Moscou 31: 196. 1858. *Hibiscus achanioides* (Turczaninow) Hemsl., Biol. Centr. Amer., Bot. 1: 121. 1879. TYPE: Mexico. Tabasco: "in sylvis Teapae," 2,000 ft., *Linden 838* [*938*] (holotype, not located; photoisotype, F).

Malvaviscus cutteri Standley, Publ. Field Columbian Mus., Bot. Ser. 4: 315. 1929. TYPE: Honduras. Atlantida: Lancetilla Valley near Tela, Dec. 1927–Mar. 1928, *Standley 54127* (holotype, F; isotypes, A, US).

Shrub or small tree 1–4 m high. Stem densely pilose, the hairs 1–2 mm long. Leaves mostly 15–35 cm long, 5–20 cm wide, scarcely reduced upward; petioles 3–15 cm long, pilose like the stem; blades broadly ovate to cordate, rarely weakly lobed, pubescent on both surfaces, especially along the major veins, the margins irregularly serrate, undulate, to nearly entire. Flowers mostly 1–7 in short terminal subfasciculate clusters, or rarely 20–30 in an abbreviated panicle, the peduncles mostly 0.5–3.0 cm long. Calyces mostly 16–22 mm long, pilose, yellowish, the subtending bracts 8–11 and

about ½ as long at the calyx. Corollas 4–5 cm long, red, not flaring, petal apices occasionally lobate. Fruit ca. 15 mm across, fleshy, and red.

Distribution (Fig. 1). Eastern Honduras to Mexico, along the lower montane slopes and adjacent flood plains of the Gulf coastal regions, mostly evergreen rainforests, 100–1,000 m; flowering October to January.

Diagnosis and relationships. The large leaves, which are scarcely reduced upward along the stem, pilose vestiture, and large calyces distinguish this species from the more typical elements of *M. arboreus*. In vegetative characters, and because of its large yellowish calyces, it approaches *M. concinnus* of South America, but in most other traits it is like *M. arboreus*.

Specimens from Honduras, which have been called *M. cutteri*, have somewhat larger, thinner, more cordate, leaves than specimens from Mexico; otherwise these are quite similar. Occasional specimens from the more montane Pacific slopes of western Chiapas (e.g., *Matuda 5357*, Boquerón, ca. Motozintla, 2,540 m, LL), and perhaps some of those examined by Fryxell (1988) but not examined by us, resemble *M. achanioides* in vestiture and leaf shape, but in other characters they more nearly approach *M. arboreus* (e.g., the corollas are quite short, ca. 30 mm long, and tend to flare) and we have placed such collections in the latter, believing the pubescence and larger leaves to be convergent characters in this area.

An alternative treatment might include all of *M. achanioides* within an expanded *M. arboreus*, but that would also collapse the more artificially maintained *M. penduliflorus*. In short, we have maintained a nomenclature that is both traditional and pragmatic, though imperfect if one considers the character variations found in the occasional population, which tend to blur the specific lines proposed.

Finally, except for its somewhat smaller calyces and less flaring, somewhat shorter corollas, *M. achanioides* is similar to the more southern *M. concinnus*, and some future workers might opt to treat the former as part of the latter complex.

Additional specimens examined. MEXICO. CHIAPAS: Mpio. Ixtacomitán, stream above Ixtacomitán, 455 m, *Breedlove 56796* (LL, NY). TABASCO: Mpio. Teapa, Cerro del Cocona, 3 km from Teapa, 26 Oct. 1980, *Cowan 3318* (F, MO, NY, TEX); Grutas del Cocona, ca. Teapa, 18 Nov. 1979, *Ramos 2696* (NY). VERACRUZ: 5 km E of Tebanca (5 km E of E side of Lago Catemaco), 830 m, 15 Jan. 1981, *Nee 19971* (F). GUATEMALA. *Martínez et al. 23588* (MO). HONDURAS. ATLANTIDA: Lancetilla Valley near Tela, 6 Dec.–20 Mar. 1928, *Standley 52756* (A, F, US).

4. Malvaviscus concinnus Kunth, Nov. Gen. & Sp. 5: 286. 1822. *Achania concinna* (Kunth) Sprengel, Syst. Veg. ed. 16, 3: 100. 1826. TYPE: Ecuador. Loja: "Crescit prope Loxam Peruvianorum," *Humboldt*, 1802 (holotype, P-HBK not seen; photoisotype (from Berlin), F, GH).

Malvaviscus balbisii DC., Prodr. 1: 445. 1824. TYPE: Brazil (according to Index Kewensis). Without locality, without collector (holotype, G-DC, microfiche (single leaf only)).

Malvaviscus cordatus Balbis ex DC., Prodr. 1: 445. 1824. nomen nudum (merely listed by de Candolle as synonymous with *M. balbisii* DC.).

Malvaviscus populifolius C. Presl, Reliq. Haenk. 2: 135. 1853. TYPE: "In terris occidentalibus Mexici," without date, *Haenke s.n.* (holotype, PR not seen; photoholotype TEX, from negative in possession of Fryxell, who graciously loaned the same).

Fryxell did not account for this name in his Mexican treatment but noted that the type material does "not conform to anything I have seen from Mexico" (pers. comm.). We agree with this observation and believe that the type concerned, on morphological grounds, is best placed with *M. concinnus*, thinking that Haenke probably collected the material in Central or South America, but subsequently mislabeled as from Mexico, as also suggested by Fryxell (pers. comm.).

Malvaviscus elegans Linden & Planchon, Pl. Columb. 1863. TYPE: Venezuela. Trujillo: La Pena, 1,675 m, ca. 1846, *Schlim 751* (holotype, BR not seen; photoisotype, F).

This tome (*Plantae Columbianae*) was not effectively published until ca. 1875, according to Sprague (1927). The name, however, was only questionably published at that time, there being only five copies produced for distribution and these without knowledge of the authors concerned. Guerke (1892) took up the name, and one might give the latter date as the point of effective publication.

Malvaviscus funckeanus Linden & Planchon, Pl. Columb. 1863. TYPE: Venezuela. Distrito Federal: Caracas, La Cumbre, without date, *Funck 372* (holotype, BM not seen).

See discussion after *M. elegans*, above. Guerke (1892) took up this name for his *Flora Brasiliensis* treatment.

Malvaviscus speciosus Linden & Planchon, Pl. Columb. 1863. TYPE: Venezuela. Mérida: forests, 1,950 m, Aug. 1842, *Linden 354* (holotype, BM not seen; photoisotype, F).

See discussion after *M. elegans*, above.

Malvaviscus spathulatus Garcke in Otto & Dietr., Allg. Gartenzeitung 21: 321. 1853. TYPE: Costa Rica. *Oersted 407* (holotype, B destroyed?; photoholotype, F-9429; isotype, C not seen; photoisotype, F-21598).

Malvaviscus longifolius Garcke in Otto & Dietr., Allg. Gartenz. 22: 321. 1854. TYPE: cultivated in Erfurt, Germany, from seed collected in northern Peru,

Warszewicz s.n. (holotype, B destroyed?; photoholotype, F-9427).

Malvaviscus cuspidatus Turcz., Bjull. Moskovsk. Obšč. Isp. Prir., Otd. Biol. 31: 190. 1858. SYNTYPES: Venezuela. Caracas: La Cumbre, *Funck 350* (specimen not located); Caracas, La Cumbre, *Funck* [*Galeotti*] *372* (syntypes, G not seen, P not seen; photosyntype, F-23715, according to Fryxell, 1988).

Malvaviscus oligotrichus Turcz., Bjull. Moskovsk. Obšč. Isp. Prir., Otd. Biol. 31: 190. 1858. *Malvaviscus glabrescens* Planchon & Linden ex Triana & Planchon, Ann. Sci. Nat. (Paris) 17: 168. 1862, nom. superfl. TYPE: Colombia. Norte de Santander: Ocaña, 1850, *L. Schlim 105* (isotype, G not seen; photoisotype, F).

Malvaviscus leucocarpus Planchon & Linden ex Triana & Planchon, Ann. Sci. Nat. (Paris) 17: 169. 1862. TYPE: Colombia. Sativa, Cordillera Oriental, *Triana 5278/3* (lectotype, P not seen; isolectotype, COL not seen, according to Fryxell).
See: Bol. Soc. Argent. Bot. 8: 101. 1960.

Malvaviscus velutinus Planchon & Linden ex Triana & Planchon, Ann. Sci. Nat. (Paris) 17: 168. 1862. TYPE: Colombia. Tolima: Maraquita, "Entre la Mesa et El Espinal, bassin du Magdalena," 400–1,200 m, Jan. 1854, *Triana 3132* (holotype, P not seen; isotypes, NY not seen, US not seen; according to Fryxell, pers. comm.).

Malvaviscus guerkeanus Hieron., Bot. Jahrb. Syst. 21: 320. 1895. TYPE: Colombia. Low wet areas along Río Magdalena, Mar. 1868, *A. Stuebel 106b* (lectotype, B destroyed?; isolectotypes, F, GH).

Malvaviscus maynensis Huber, Bol. Mus. Paraense Hist. Nat. 4: 583. 1906. TYPE: Peru. "Cerro de Canchahuaya," Quebrada de Cerrado, 27 Oct. 1898, *J. Huber 1383* (holotype, MG; photoholotype, F; isotype, R).

Malvaviscus integrifolius Ulbr., Verh. Bot. Vereins Prov. Brandenburg (1908) 88. 1909. TYPE: Brazil. Amazonia: "bei Humaytha am oberen Juruá," 22 Apr. 1901, *E. Ule 5444* (holotype, B destroyed?; fragment holotype, R; photoholotype, F, GH; photoisotype, US).

Malvaviscus ulei Ulbr., Notizbl. Königl. Bot. Gart. Berlin 6: 328. 1915. TYPE: Brazil. Amazonia: "Alto Acre bei Seringal Auristella," June 1911, *Ule 9591* (holotype, B destroyed?; photoholotype, GH).

Shrubs, small trees, or clambering vines, mostly 1–8 m high. Leaves broadly ovate to cordate, densely pubescent to subglabrous, the vestiture uniformly short and variously spaced to long and closely packed so as to appear velutinous. Flowers single and axillary, or in terminal aggregations, the peduncles 1–10 cm long. Calyces mostly broadly campanulate at maturity, 18–40 mm long, 10–30 mm wide, variously pubescent, as noted in the discussion below, the subtending bracteoles mostly 10–20, filiform to linear-lanceolate (1–3 mm wide), if the latter, nearly always broadest at or near the base. Corollas pale pink to dark red, usually broadly flaring at anthesis, mostly 40–70 mm long, rarely less, broadly to sometimes narrowly oblanceolate, usually at least a few petals with some degree of apical lobing, rarely not. Style and staminal column mostly protruding from the corolla for 10–40 mm. Fruits large and fleshy, red or white, mostly 15–30 mm wide at maturity, the seeds large, ovoid, up to 10 mm long and 4 mm wide.

Distribution (Figs. 1, 3). Northwestern South America along the upper tributaries of the Amazon River in Peru, Ecuador, Colombia, Venezuela, Brazil, Panama, and Costa Rica, from 100 to 2,000 m, often in lower montane cloud forests; flowering all seasons.

Diagnosis and relationships. Malvaviscus concinnus is an extremely variable species throughout its range, often over very short distances, the variation being much like that found in *M. arboreus* in North America. Thus, collections from San Martín, Peru, may possess a minutely stellate-pubescent vestiture (0.2 mm high or less) upon the calyces and associated bracts (*Klug 3919*, F, GH, MO, NY, US), or the vestiture may be quite pronounced or hirsute-stellate (0.5–1.5 mm high) on these same organs (*Schunke-Vigo 7767*, MO, US), and intermediates between these extremes may also occur (*Schunke-Vigo 6898*, MO, US). The corolla length and degree of apical flaring are quite variable: among the specimens just cited, and others from San Martín, the length varies from ca. 42 mm (*Schunke-Vigo 6898*, MO, US) and not so widely flaring (4 cm across), to ca. 65 mm (*Allard 22074*, US) and markedly flaring (to 9 cm across).

Variation from population to population is especially apparent along the upper, more western, tributaries of the Amazon River basin from Venezuela, Colombia, Ecuador, and Peru eastward to 70°W longitude. Thus, the names *M. elegans*, *M. oligotrichus*, *M. longifolius*, and *M. maynensis* have been applied to forms with broadly lanceolate leaves; *M. velutinus* to forms with a vestiture of densely packed, long-stellate hairs; *M. integrifolius* and *M. ulei* to forms with nearly entire leaves, the latter having somewhat shorter petioles and longer calyces; and *M. speciosus* with trilobed, cordate leaves. In all of the aforementioned type material, as well as among the representative specimens cited, there is considerable variation in leaf shape, corolla size, vestiture, and fruit dimensions, so much so that one is forced to the conclusion that there exists in South America a single widespread, highly variable species, *M. concinnus*, and a more localized, more readily recognized, relatively uniform species, *M. williamsii*. The latter might have been treated, with equal validity, as a variety of *M. concinnus*. But *M. williamsii* is much

better delimited than variety *drummondii*, the only infraspecific taxon maintained under *M. arboreus*, and it is certainly better delimited than *M. achanioides*.

Some comments on the large white fruits occasionally found in *M. concinnus* seem in order. Such fruits in North America are mostly confined to Panama and Costa Rica, where they are usually associated with plants having large cordate leaves; however, similar fruits also occur on elliptical-leaved specimens from Costa Rica that have been called *M. palmanus* (e.g., *Burger 5425*, F, NY; *Burger 5492*, F, NY; *Burger 7228*, F, GH), but which we include in *M. arboreus*. White fruits, though smaller than those found in Central America, occasionally occur on Mexican plants referable to typical *M. arboreus*. Thus, fruit color (the basis for the name *M. leucocarpus*), like leaf shape and vestiture, is variable and cannot be used alone for delimitation.

Representative specimens examined. PANAMA. COCLE: El Cope, E of sawmill above El Cope, 2,300 ft., 27 July 1978, *Hammel 4096* (MO). DARIEN: lower slopes of Alturas de Nique along Río Coasi, 26 Dec. 1980, *Hartman 12258* (MO). PANAMA: N of El Llano, 500–800 m, 25 July 1972, *Gentry 5573* (F, MO). VERAGUAS: near Sante Fé, road at base of Cerro Tute, 3,000 ft., 18 Sep. 1979, *Antonio 1899*, 1901 (MO). COSTA RICA. ALEJUELA: between Cañas and Upala, 4 km NNE of Bijagua, ca. 400 m, 24 June 1976, *Croat 36309* (MO); San Carlos, márgen del Río Peñas Blancas, 29 June 1985, *Haber 1756* (MO). HEREDIA: Finca La Selva, OTS Field Station along the Río Puerto Viejo, just E of the junction with the Río Savapiquí, ca. 100 m, 29 Nov. 1982, *McDowell 995* (LL, TEX), 3 Dec. 1982, *McDowell 1028* (MO); Tirimbina, 700 ft., 1 June 1971, *Proctor 32220* (LL). COLOMBIA. AMAZONAS: east bank of Amazon River ca. 3 mi. N of Leticia, 27 Jan. 1969, *Croat 7566* (MO). ANTIOQUIA: Cordillera Central Boquerón, ca. 16 km NW of Medellín on road to Turbo, 6°20′N, 75°40′W, 2,500–2,600 m, 10 Jan. 1986, *Stein 3160* (MO). ATLANTICO: region de Barranquilla, llanada de Juanmina, 10 m, 15 Jan. 1961, *Dugand 5499* (NY). BOLIVAR: near Cartagena, La Popa, 50–175 m, 2 Nov. 1926, *Killip 14052* (A, GH, NY). BOYACA: Valle de la Uvita, near Úvita, 2,490–2,560 m, 16 Sep. 1938, *Cuatrecasas 1850* (F, US). CESAR: La Jagua, Magdalena Valley, 5 Sep. 1924, *Allen 565* (F, MO). CUNDINAMARCA: Mpio. La Mesa, carretera de La Mesa a Anapoima, 1,300 m, 14 May 1952, *Fernández 1336* (NY, US). GUAJIRA: N slopes of Cerro del Espejo Serranía de Perija, Venezuela border, 10°28′N, 72°50′W, 2,550 m, 28 Apr. 1987, *Gentry 57192* (MO). HUILA: 1 km S of Villavieja, E of Río Magdalena, 400 m, 21 July 1950, *Smith 1241* (GH, US). MAGDALENA: Las Nubes, Sierra del Libaus, 4,500–6,000 ft., 15 Dec. 1898–23 Jan. 1899, *Smith 734* (several individuals and specific localities under this number) (A, F, GH, MO, NY). META: Río Guejar, S of El Mico Airstrip, 400 m, 7 Nov. 1949, *Philipson 1372* (F, US). PUTUMAYO: Umbria, 0°54′N, 76°10′W, 325 m, Oct.–Nov. 1930, *Klug 1712* (A, F, MO). SANTANDER: vicinity of Las Vegas, 2,600–3,000 m, 21–23 Dec. 1926, *Killip 16087* (A, GH, MO, NY, US). SUR DE SANTANDER: vicinity of Barranca Berjema, Magdalena Valley between Sogamoso and Colorado rivers, 100–500 m, 20 Jan. 1935, *Haught 1532* (F). TOLIMA: Armero, Valle del Río Magdalena, 400 m, 6 Oct. 1940, *Cuatrecasas 10496* (F, MO, NY, US). VENEZUELA. ARAGUA: subida de Las Vueltas, Parque Nacional, 1,300 m, Aug. 1947, *Pittier 15.519* (US). CERRO EL AVILA: Quebrada Quintero, 1,600 m, *Manara*, 1976 (NY). DISTRITO FEDERAL: Camino de ronda Las Flores a Papelón (Guayabal), 23 Aug. 1939, *Delgado 271* (F, US); near Caracas, between Cotiza and Los Venados, Oct. 1924, *Albert 76* (US); vicinity of Caracas, Chacaito Gorge, 800–1,000 m, 24 Aug. 1923, *Pittier 1116* (A, GH, NY, US). LARA: hacia la Estación Experimental del Ministerio de Agricultura y Cría en Sanare, 1,500 m, Aug. 1959, *Aristeguieta 3943* (F). MERIDA: Río Gonza, La Isla Jaji, 1 Nov. 1968, *López-Palacios 1918* (NY). MIRANDA: E of Quebrada Serraduro, E of Hacienda Garate, 16 km NE of Caucaguito, 30 km NE of Petare, between Petare and Guarenas, 1,200–1,500 m, 6 Oct. 1963, *Steyermark 91616* (GH). PORTUGUESA: Pozo Blanco, estación lluviosa, 2 Oct. 1979, *Ortega 804* (MO). TACHIRA: Quebrada Agua Azul, S of El Reposo, 14 km SE of Delicias, 7°31′N, 72°24′W, 2,150–2,300 m, 22–23 July 1979, *Steyermark 11874* (MO). ECUADOR. CHIMBORAZO: Sibambe, Hacienda "La Carmela," 100–1,600 m, 16 Aug. 1943, *Solís 5349* (F). ESMERALDAS: between Tonchigue and Galera, Esmeraldas–Muisne Road, 23 Nov. 1980, *Harling 16693* (F). GUAYAS: 12 km W of Guayaquil, Hacienda Barcelona Trasil, 4 Apr. 1962, *Gilmartin 667* (US). MANABI: above Noboa, 200 m, 19 July 1942, *Haught 3413* (GH, NY, US). MORONA-SANTIAGO: Parroquia Cumanda, Río Pastaza, ca. 4 km W of Mera, 23 Aug. 1968, *Lugo 355* (F, NY). NAPO: Río Gueppi (tributary of Río Putumayo), below Peruvian border post of Puerto Peru, 200 m, 15 May 1978, *Gentry 21871* (F, MO). EL ORO: Sitio denominado pénjamo, 100 ft., 23 Nov.–16 Dec. 1978, *Escobar 824* (HUA, TEX); between Santa Rosa and La Chorita, 0–100 m, 27 Aug. 1923, *Hitchcock 21141* (NY, US). PASTAZA: Puyo–Tena road, 4.5 km from Puyo, ca. 900 m, 8 July 1980, *Sobel 2452* (NY). SANTIAGO–ZAMORA: E slope of the cordillera, valley of the Ríos Negro and Chupianza on the trail from Sevilla de Oro to Méndez, 1 Nov. 1944, *Camp E-829* (US). PERU. AYACUCHO: Estrella, between Huanta and Río Apurimac, 500 m, 8 and 14 May 1929, *Killip 23065* (F, NY, US). HUANUCO: Leoncio Prado, La Divisora, Cordillera Azul near border with Ucayali, 1,620–1,760 m, 75°48′W, 9°05′S, 10 Aug. 1980, *Gentry 29567* (F, MO); Pachitea, Honoria, Bosque Nacional de Iparia, a lo largo del Río Pachitea cerca del campamento Miel de Abeja, 300–400 m, 5 May 1967, *Schunke-Vigo 925* (F, NY, US). JUNIN: Schunke Hacienda, above San Ramón, 1,400–1,700 m, 8–12 June 1929, *Killip 24714* (F, NY, US). LORETO: along Río Amazonas, S of Iquitos, 18 Aug. 1972, *Croat 19309* (F, GH, MO, NY); Maynas, Moena Cano between Iquitos and Río Itaya, 7 Jan. 1976, *Gentry 15654* (F, MO, NY); Balsapuerto, 220 m, Apr. 1933, *Klug 3015* (A, F, GH, MO, NY, US); Coronel Portillo, Bosque Nacional de Iparia, a lo largo del Río Ucayali cerca del pueblo de Iparia, 18 Aug. 1968, *Schunke-Vigo 2617* (F, GH, MO). MADRE DE DIOS: Tambopata, Tambopata Nature Reserve, ca. 30 air km SSW Puerto Maldonado at effluence Río La Torre/Río Tambopata (SE bank), 12°49′S, 69°17′W, 260 m, 17 May 1980, *Barbour 5332* (F, MO,

NY). SAN MARTIN: Juan Jui Alto Río Huallaga, 400 m, Oct. 1934, *Klug 3919* (F, GH, MO, NY, US); near Boquerón, Boquerón Pass, 92 km from Tingo María on highway to Pucallpa, 400 m, 16 Dec. 1949–5 Jan. 1950, *Allard 22074* (US); Mariscal Caceres, Uchiza, E of Puente del Río Uchiza, 400 m, 25 July 1974, *Schunke-Vigo 7767* (MO, US); Marsical Caceres, Tocache Nuevo, Puerto Pizana, Río Huallaga, 350 m, 4 June 1974, *Schunke-Vigo 6898* (MO, US). TUMBES: Zarumilla, Bosque Nacional de Tumbes, cerca de Campo Verde, 600–800 m, 17 Dec. 1967, *Simpson 380* (F, NY). UCAYALI: Bosque von Humboldt, entrance to Carretera Marginal, km 88 of Pucallpa–Tingo María Road, 75°02′W, 08°45′S, 220 m, 14 June 1987, *Gentry 58344* (F, MO). BRAZIL. AMAZONAS: Manariao, basin of Rio Juruá, 27 May 1933, *Krukoff 4589* (A, F, MO, NY, US); basin of Rio Juruá, near mouth of Rio Embira (tributary of Rio Tarauaca), 7°30′S, 70°15′W, 1 July 1933, *Krukoff 5150* (A, F, MO, NY, US).

5. Malvaviscus williamsii Ulbr., Notizbl. Bot. Gart. Berlin-Dahlem 11: 545. 1932. *Malvaviscus arboreus* var. *williamsii* (Ulbr.) Schery, Ann. Missouri Bot. Gard. 29: 226. 1942. TYPE: Peru. Loreto: Lower Río Nanay, forest between Río Nanay and Río Napo, 6 June 1929, *L. Williams 706* (holotype, B destroyed?; isotype, F not located). Ulbrich cited only two specimens, one at B the other at F, neither of which we could locate. From the description and location there is little doubt as to the identity of the material concerned. In lieu of extant types we have proposed the following: NEOTYPE: Peru. Loreto: Maynas, "trail between Río Amazonas above Indiana and Mazan (Río Napo) between Mazan and halfway," mature upland rainforest over clay, 100–130 m, 5 July 1971, *Sidney McDaniel 15218* (neotype, MO; isoneotype, F). Figure 4.

Erect or clambering (lianalike) shrub to 7 m high, stems densely and evenly pubescent with short hairs (the felt ca. 0.2 mm high). Leaves mostly 10–30 cm long, 6–22 cm wide; petioles 3–16 cm long, pubescent like the stems; blades mostly cordate, rarely subcordate, the margins irregularly dentate to nearly entire. Flowers mostly axillary and single along the upper stems, erect or occasionally pendulous; corollas pink to bright carmine, 48–70 mm long, at least some of them lobed, the apical portion usually flaring at anthesis and the staminal column usually exserted for 10–30 mm. Calyces 18–30 mm long in fruit, usually densely pubescent with long, stellate, yellowish hairs, the associated bracts 5 or 10, 10–18 mm long, 4–8 mm wide, broadly elliptical-ovate, widest at or near the middle, sparsely stellate pubescent, the margins mostly strongly imbricate. Fruits red (white), 8 mm high, 15–30 mm diam., fleshy at maturity.

Distribution (Fig. 3). Northwestern South America, along the Pacific Coast tributaries of western Colombia, and also in a restricted area on the eastern slopes of the Andes, along the Napo River in Peru; flowering all seasons.

Diagnosis and relationships. Malvaviscus williamsii, because of the very broad imbricate bracts (Fig. 4), is readily distinguished from the seemingly sympatric *M. concinnus*. The former, however, occurs mostly along the Pacific Coast tributaries, although the type is from the eastern slopes of the Andes, mainly along the Napo River in Peru (Fig. 3). Material from the latter region is essentially indistinguishable from that of the Pacific coastal region. Populations of *M. concinnus* are not known to occur with or especially close to *M. williamsii*, nor does the principal character (bract shape), which distinguishes between the two, irreverentially crop up hither and yon, as occurs with most other "diagnostic" characters in the genus *Malvaviscus*. Most specimens of *M. concinnus* have linear or linear-lanceolate bracts (mostly 1–3 mm wide), which are broadest at or near the base; occasional specimens, however, have somewhat broader bracts (3–5 mm) and may be said to approach the character state found at the type locality of *M. williamsii*. Because of this, some workers might prefer to accord the taxon only varietal rank, as was done by Schery (1942). But among the species of *Malvaviscus*, it is as distinct and probably more so than *M. achanioides* and *M. penduliflorus*, which are retained. In short, our specific assessments are consistent with our evaluation and treatment of the *M. arboreus* complex of North America.

Additional specimens examined. COLOMBIA. ANTIOQUIA: Mpio. de Turbo, carretera Tapon del Darien, 10–20 m, *Brand & Narváez 620* (MO, HUA); Mpio. Chigorodo, ca. 15 km W of Chigorodo, ca. 100 m, 14 Mar. 1962, *Feddema 1893* (NY); Mpio. Chigorodo, Vereda Malagon, ca. 20 m, 11 Feb. 1986, *Renteria 4505* (MO); Mpio. Uraba, ca. al Río Chado, 70–90 m, Feb. 1950, *Uribe 2024* (US—2 sheets). CHOCO: Mpio. de Río Sucio, orillas del Río Truando, entre la confluencia de los Ríos Chintado y Salado, *Romero-Castaneda 6121* (MO); orillas del Río Truando, 24 Oct. 1956, *Romero-Castaneda 4674* (MO); near Madurex Logging Camp above Teresita, below rapids on Río Truando, 7–8 Feb. 1967, *Duke 9992* (MO); area of Baudo on Río Baudo, ca. 5 m, 3 Feb. 1967, *Fuchs et al. 21725* (MO, US); area of Baudo, 11 Feb.–29 Mar. 1967, *Fuchs & Zanella 22225* (US—2 sheets); 8–10 km E of Tutunendo, 150

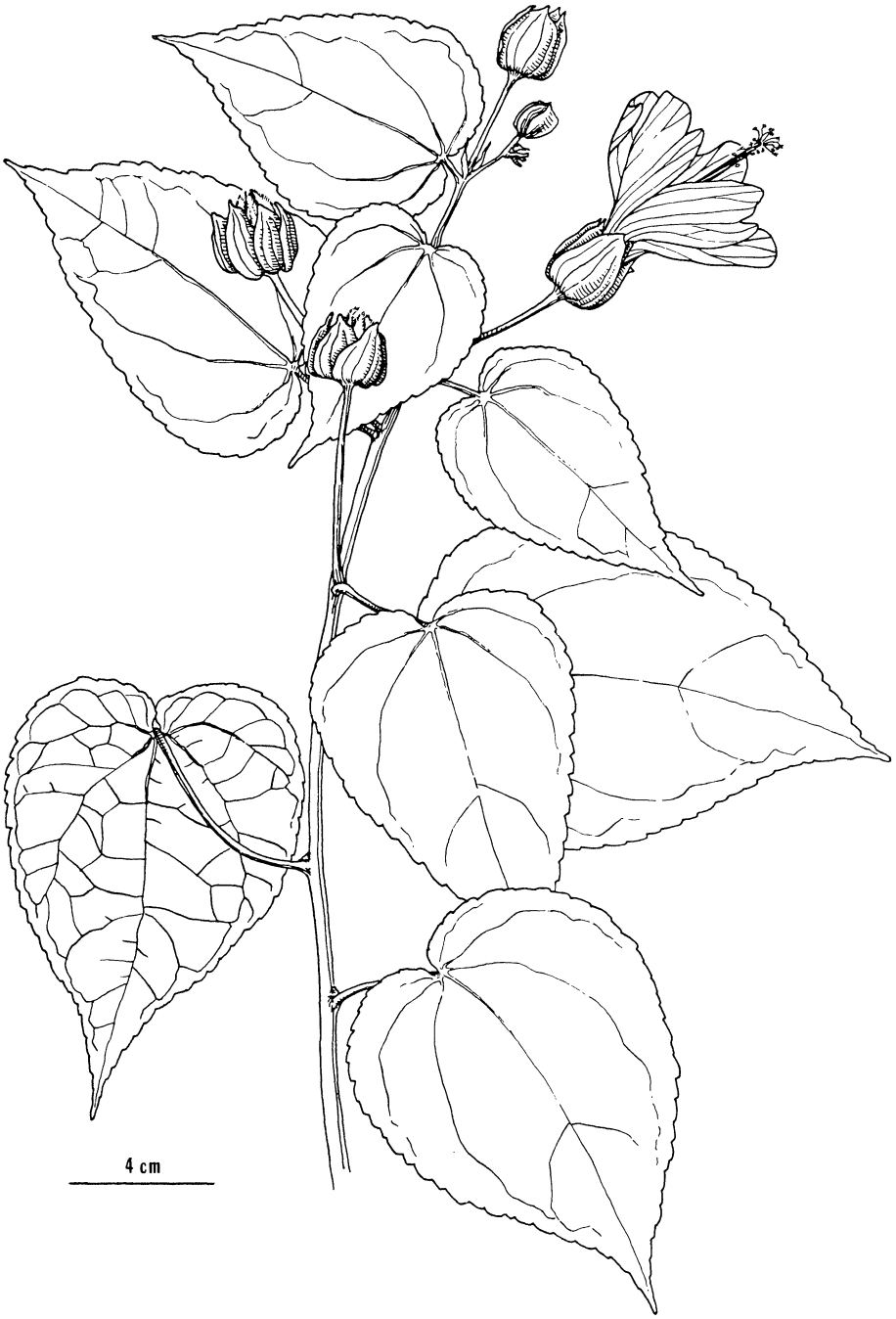

FIGURE 4. *Malvaviscus williamsii* (*Feddema 1893*, US).

m, 14 June 1982, *Gentry & Brand 36872* (MO); between Bolívar and Quibdo, 290 m, 8 Nov. 1983, *Juncosa 1338* (MO). PERU. LORETO: Gamitanacocha, Río Mazan, 100–125 m, 20 Feb. 1935, *Schunke-Vigo 293* (A, F, NY, US); Maynas, Río Momon hacia arriba caserios de San Francisco, 130 m, 8 Mar. 1978, *Díaz & Jaramillo 129* (F, MO). NARIÑO: between Tumaco and El Diviso, along Río Mojada, 150 m, 8 Jan. 1956, *Vogel 32* (US).

EXCLUDED NAMES

Malvaviscus palmatus Ulbr., Verh. Bot. Vereins Prov. Brandenburg 1908: 89. 1909. TYPE: Brazil. Minas Gerais: "am oberen [Rio] Juruá," 25 Apr. 1901, *E. Ule 5443* (holotype, B destroyed?; isotype, MG).

Schery (1942), not having examined type material, accepted this species in *Malvaviscus* with reservation, noting, "from description only, it is difficult to say with surety that this species may not belong in the genus *Pavonia*; yet Ulbrich's description of the fruit and his excellent illustration of the type specimen indicate that this plant probably is a *Malvaviscus*. On the other hand, the original description does not state that the petals are auriculate, from which the inference is that the plant may be *Pavonia*." Examination of the type shows the fruit, which was described by Ulbrich as "niger baccatus," to be rather rigidly, or not clearly, bacculate, having five well-defined fused carpels each with a small, smooth, rounded ridge extending down its length, the whole appearing brownish red. In short, the fruit is *not* clearly black and fleshy as described, although this might have been so in living material; there is no indication that Ulbrich observed fresh fruits, and our observations leave the matter moot. Regardless, dissection of the corolla did not reveal any clearly defined auricles on the petals, and because of this and the seeming absence of stellate pubescence and the markedly palmately lobed leaves, we here transfer the species to *Pavonia*.

Pavonia palmata (Ulbr.) B. Turner & M. Mendenhall, comb. nov. *Malvaviscus palmatus* Ulbr., Verh. Bot. Vereins Prov. Brandenburg 1908: 89. 1909. TYPE: Brazil. Minas Gerais: "am oberen [Rio] Juruá," 25 Apr. 1901, *E. Ule 5443* (holotype, B destroyed?; isotype, MG).

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