

ADDITIONAL NOTES ON THE GENUS *AVICENNIA*. XV

Harold N. Moldenke

AVICENNIA L.

Additional bibliography: Erickson, George, Marchant, & Morcombe, Flow. Pl. West. Austr., ed. 2, 13, 213, 215, & 222. 1979; Mold., Phytologia 46: 226--228. 1980.

AVICENNIA GERMINANS (L.) L.

Additional bibliography: V. J. Chapm., Mangr. Veg. 3, 20, 24, 125, 134, 139, 144, 271, 390, & 393, fig. 11. 1976; Mold., Phytologia 46: 226--228. 1980.

Additional illustrations: Carlton in Pritchard, Rare Endang. Biota Fla. 5: 167, fig. 89. 1978; Fournet, Fl. Illust. Phan. Guad. Mart. 1409, fig. 671. 1978; Schnetter, Beitr. Biol. Pfl. 54: 19, 20, 22, & 23, fig. 1--13. 1978.

Crutchfield refers to this plant as a 2--3 foot shrub growing in clay soil submerged during high tide, the corollas "white". The corollas are said to have been "creamy-white" on *Luteyn* & *Lebrón-Luteyn* 5144.

Lugo & Zucca (1978) have investigated the impact of a frost of -2.8 to -5.5° C. on a forest of *Avicennia germinans* in Florida. They report that "Leaf area index decreased from 2.5 to 1.5 in 63 days and was back to normal after 103 days. The energy drain of this event was conservatively calculated as 3570 kcal/m², and it was estimated that it would take the forest over 200 days to recover the energy loss. Since leaf biomass returned to normal in half the estimated time, it must be assumed that the forest partially recovered with energy from its reserves. Soil salinities averaged 31.4 percent. The mangrove [here at 29°08' latitude].... survive lower temperatures and develop as much structure as mangroves that grow at lower latitudes. In addition to acclimation to frost, this development may be due to the subsity of a mesic (1201 mm annual rainfall), low salinity environment. The lower energy drains of the environment probably account for higher energy stores and a greater tolerance to occasional low temperature stress. Mangrove growing under higher soil salinity stress in lower latitudes appear to be less tolerant to low temperature stress. Those that are exposed to moisture stress show comparable structural complexity at lower latitudes to mangroves growing at higher latitudes but under the influence of only 1 stress (low temperature). Review of the literature and measurements.....suggest that mangroves respond to stress by decreasing structural complexity (lower species richness, lower tree height, lower leaf area index, high tree density) and by decreasing the size of leaves. The decrease in species richness was linear and the decreases in tree height was exponential in the mangroves of the Gulf Coast of Mexico where low temperature, high temperature amplitude and low rainfall stressed mangroves along an increasing latitudinal gradient."

Schnetter (1978) studied material of this species from 5 sites in Magdalena, Colombia, differing in water and salt content of the soil and density and composition of the vegetation. The epidermal features were especially affected by the different environments. High salt concentration alone or together with relatively low water content of soil correspond to a thick external wall and cuticle and a cutinization of all walls in the upper epidermis; hairs were common. Under the same conditions the lower epidermis was always covered with trichomes and the number of cells per gland was higher than in the upper epidermis. When the salt content of the soil was low, no difference in size of glands could be noted. Moreover the thickness of the external wall and cuticle and the number of hairs on the upper epidermis decreased. Extremely shaded plants grown in sites with low salt content of soil possessed large, nearly hairless leaves with very thin external walls and low palisade tissue. In comparison, solitary trees showed small, narrow leaves.

Gunn & Dennis (1976) assert that "Black mangrove disseminules are amazingly hardy, as Guppy (1917) discovered when he dried some mature fruits for 25 days at room temperature. The fruits lost 50 percent of their weight during the drying process, yet they germinated when placed in fresh water. In our buoyance tests the fruits and seedlings often became soft and rotted, indicating that not all of them are as seaworthy as disseminules protected by a bony fruit or seed wall."

If it is true that the west African black mangrove was introduced (by man) from the New World, then *A. africana* P. Beauv. must represent the African population of the larger-leaved New World *A. germinans* var. *guayaquilensis* (H.B.K.) Mold. or perhaps the latter taxon should be divided into two separate taxa, only the larger-leaved form representing in the New World the west African plant and which very well include the similar-leaved *A. tonduzii* Mold.

Woodbury & Little (1976) record *A. germinans* from Buck Island in the Virgin Islands.

The Dorantes collection, cited below, consists only of seedlings. Russell (1963) and Mound & Halsey (1978) assert that the whitefly, *Trialeurodes vaporariorum* (Westwood) Quaint. & Bak. sometimes infests *Avicennia germinans*. Chapman (1976) lists the following marine fungi as attacking this species: *Buellia haliotrepha* J. & E. Kohlm., *Culcitalna achyaspora* Meyers & Moore, *Didymosphaeria enalia* Kohlm., *Hydronectria tethys* J. & E. Kohlm., *Lulworthia* sp., *Metasphaeria pneumatophorae* Kohlm., *Paraliomyces lentiferus* Kohlm., *Phoma* sp., and *Torpedospora radiata* Meyers. He also notes that the wood is sometimes used to make charcoal. Perkins & Payne (1978) report that the species is "reported to be toxic".

Little (1978), calling this species "black-mangrove", gives its natural distribution in Florida (USA) and beyond as "Silt shores of coasts and islands of n. to s. Fla. incl. Fla. Keys, n. locally to St. Johns Co. on e. coast and to s. Miss., s. La., and s. Tex. Also widely distributed on coasts of tropical America from Bermuda and Bahamas through West Indies incl. P. R. and V. I. From n. Mex.

(Temps., Son. and B. C. Norte) s. on Atlantic coast to Brazil and on Pacific coast to Ecuador incl. Galapagos Is. and n.w. Peru. The same or a very closely related sp. on coasts of w. Africa."

Knuth (1927) cites *Pittier s.n.* from Zulia and *Johnston 139* from Margarita Island, Venezuela. He records the vernacular name there of "mangle prieto".

The *Breteler 5174*, *Idrobo & Weber 1424*, and *Philcox & Raynal 7850*, distributed as typical *A. germinans*, represent, instead, the large-leaved (perhaps *A. tonduzii*) form of var. *guayaquilensis* (H.B.K.) Mold.

Additional citations: TEXAS: Cameron Co.: *Crutchfield 2985* (N); *Richardson 2487* (Au). Galveston Island: *Waller & Bauml 2930* (Au). MEXICO: Veracruz: *Dorantes & al. 5132* (N); *Novelo 356* (N), *408* (N). GUATEMALA: San José: *Kellerman s.n.* (Me--125422). BELIZE: *Wiley 178* (W--2846919). EL SALVADOR: La Libertad: *González & Pérez 193* (Me--186769, Me--186843). NICARAGUA: Rivas: *F. C. Seymour 1269* (N). BAHAMA ISLANDS: Tonay: *B. Dunn s.n.* [17 July 1977] (W--2942087). PUERTO RICO: *Luteyn & Lebrón-Luteyn 5144* (N). VENEZUELA: Zulia: *Mocquerys 829* (N).

AVICENNIA GERMINANS var. *CUMANENSIS* (H.B.K.) Mold.

Additional synonymy: *Avicennia tomentosa* var. *cumanensis* Humb. & Bonpl. apud Steud., *Nom. Bot. Phan.*, ed. 1, 96. 1821.

Additional bibliography: Steud., *Nom. Bot. Phan.*, ed. 1, 96. 1821; Mold., *Phytologia* 40: 410. 1978.

AVICENNIA GERMINANS var. *GUAYAQUILENSIS* (H.B.K.) Mold.

Additional synonymy: *Avicennia tomentosa* var. *guayaquilensis* Humb. & Bonpl. apud Steud., *Nom. Bot. Phan.*, ed. 1, 96. 1821.

Additional bibliography: Steud., *Nom. Bot. Phan.*, ed. 1, 96. 1821; Mold., *Phytologia* 40: 409 & 410. 1978.

Recent collectors describe this plant as a frequent tree, 1.5--15 m. tall, the leaves gray-green beneath and the flowers slightly fragrant, and have found it growing on riverbanks, flowering in September. The corollas are said to have been "white" on *Araujo & al. 2207 & 3194* and *Idrobo & Weber 1424*, "yellowish" on *Lescure 223*, and "cream, the throat yellow, the anthers dull-purple" on *Philcox & Raynal 7850*. *Idrobo & Weber 1424* is accompanied by 3 excellent in situ photographs, one showing a very dense growth of sponges on each of the many pneumatophores depicted in the photograph.

Additional citations: TRINIDAD AND TOBAGO: Tobago: *Philcox & Raynal 7850* (N). COLOMBIA: Atlántico: *Plowman 3540* (W--2838856). Nariño: *Idrobo & Weber 1424* (W--2844577). VENEZUELA: Sucre: *Breteler 5174* (N). FRENCH GUIANA: *Lescure 223* (N, N). BRAZIL: Rio de Janeiro: *Araujo, Oliveira, & Vianna 2207* [Herb. FEEMA 14629] (Z). Criminosa Island: *Araujo & Maciel 3194* (Ld).

AVICENNIA LANATA Ridl.

Additional bibliography: Worsdell. *Ind. Lond. Suppl.* 1: 111. 1941; Walsh in Reimold & Queen, *Ecol. Haloph.* 59. 1974; V. J.

Chapm., Mangr. Veg. fig. 61, 62, 105a, & 106a. 1976; Mold., Phytologia 40: 410. 1978.

AVICENNIA MARINA (Forsk.) Vierh.

Additional & emended bibliography: Roxb., Hort. Beng. 46. 1814; Kurz, Forest Fl. Brit. Burma 2: 275 & 276. 1877; Wight, Illustr. Ind. Bot. 2: pl. 173 bis. 1850; Peters, Naturwiss. Reise Mossamb. 6 (1): Bot. 266. 1861; Blanco, Fl. Filip., ed. 3, 2: 289, pl. 73. 1878; Balf. f., Trans. Roy. Soc. Edinb. 31 [Bot. Socotra] 237 & 414. 1888; Baill., Hist. Pl. 11: 88. 1891; Koord. & Valet., Meded. Lands Plant. Bat. 42 [Bijd. Booms. Java 7]: 216. 1900; Gamble in King & Gamble, Journ. Asiat. Soc. Beng. 74 (2 extra): 869. 1908; Chiov., Fl. Somalia [1]: 65 & 274--275. 1929; E. D. Merr., Univ. Calif. Publ. Bot. 15: 268. 1929; Stapf, Ind. Lond. 1: 370. 1929; Dop in Lecomte, Fl. Gén. Indo-chine 4: 892 & 897, fig. 92 (5--8) & 93 (1). 1935; Kirtikar & Basu, Indian Med. Pl., ed. 2, imp. 1, 1952 & 1954--1955. 1935; Bedevian, Illustr. Polyglott. Dict. 99. 1936; Fletcher, Kew Bull. Misc. Inf. 1938: 405, 407, 443, & 444. 1938; Worsdell, Ind. Lond. Suppl. 1: 111. 1941; H. N. & A. L. Mold., Pl. Life]: 49, 69, & 80. 1948; Perez-Arbelaes, Pl. Util. Colomb., ed. 2, 740. 1956; McMillan in Reimold & Queen, Ecol. Haloph. 389. 1974; Napp-Zinn, Anat. Blatt. A (1): 395, fig. 134. 1974; Walsh in Reimold & Queen, Ecol. Haloph. 59, 83--86, 96, 99, 103, 104, 106, 117, 139, & 156. 1974; Kirtikar & Basu, Indian Med. Pl., ed. 2, imp. 2, 3: 1952 & 1954--1955. 1975; Albright, N. Zeal. Journ. Freshw. Res. 10: 385--389. 1976; V. J. Chapm., Mangr. Veg. 19, 20, 24--27, 48, 76, 87--92, 94, 96, 97, 100, 101, 103--105, 107--109, 111--114, 118, 123, 125, 127--130, 132, 134, 136, 139, 144, 147--149, 151, 153--156, 158--163, 168, 169, 172, 174, 199, 234--236, 253, 257, 261--266, 268, 269, 271, 281, 300, 305, 306, 316, 338, 345, 369, 373, 375, 376, 378, 390, 393, 394, & 407, fig. 11, 53, 61--63, 65, 68, 71, 74, 83, 84, 91, 94--99, 105a, 106a, & 122. 1976; Albright, Biol. Abstr. 63: 1938. 1977; Bird & Barsom, Mar. Res. Indones. 18: 73--80. 1977; Hutchings & Recher, Mar. Res. Indones. 18: 1--11. 1977; Lewis & Elvin-Lewis, Med. Bot. 324. 1977; Mathias, Mar. Res. Indones. 18: 17. 1977; Bird & Barsom, Biores. Ind. 15: 848. 1978; Edlin & Nimmo, Illustr. Encycl. Trees 226, 227, & 250. 1978; Hsiao, Fl. Taiwan 4: 411 & 412, pl. 1055. 1978; Hutchings & Recher, Biores. Ind. 18: 1--11. 1978; Mathias, Biores. Ind. 15: 17. 1978; Mold., Phytologia 40: 407, 408, & 410--411. 1978; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 51. 1978; Rabinowitz, Biotropica 10: 54, 56, & 57. 1978; Erickson, George, Marchant, & Morcombe, Flow. Pl. West. Austr., ed. 2, 13, 213, 215, & 222. 1979; J. & E. Kohlmeyer, Marine Mycol. 93, 95, 243, 244, 301, 317, 370, & 529. 1979; Pemadasa, Balasub., Wijewansa, & Amarsinghe, Journ. Ecol. [Brit.] 67: 45. 1979; Steinke, Biol. Abstr. 68: 7294. 1979; Steinke, Journ. A. Afr. Bot. 45: 133--138. 1979; Mold., Phytologia 46: 197 & 199. 1980; R. Moran, Environ. Southw. 488: [10]--12. 1980.

Additional illustrations: Dop in Lecomte, Fl. Gén. Indo-chine 4: 892, fig. 92 (5--8). 1935; Napp-Zinn, Anat. Blatt. A (1): 395,

fig. 134. 1974; Edlin & Nimmo, Illustr. Encycl. Trees 226 (in color). 1978; Hsiao, Fl. Taiwan 4: 412, pl. 1055. 1978.

Lewis & Elvin-Lewis (1977) report that the aromatic bitter juice of this species is used as an abortive in tropical Asia and Africa.

Recent collectors describe this species as a small tree, 5--10 m. tall, with vertical pneumatophores, the outer bark smooth and white, the immature fruit green, the mature fruit light-green, and have encountered it among mangroves in secondary forests along the seashore, at sealevel, flowering in August and September, and fruiting in January. They report the vernacular name, "api-api". The corollas are said to have been "yellow" on *Nicholson 19126* and *Stoddart 932*, but "4-lobed, orange" on *Cramer 4326*. Cramer report the plant "occasional" on tidal flats

Material of this species has been widely misidentified and distributed in herbaria as *A. alba* Blume and as *A. officinalis* L.

The Napp-Zinn (1974) reference in the bibliography of this species (above) is incorrectly listed in the book's index as occurring on page "394".

Steinke (1979) used the potometric method to investigate the apparent transpirational rhythms in this species and found an increase in transpiration rate to a maximum at 1000 h followed by a steady decrease, but inundation by a spring tide did not reverse the decrease in rate during the late afternoon. Mangroves growing in a dry area inundated only during spring tides and in a wet area in which moisture was freely available to the trees showed no difference in apparent transpirational rhythm.

The *Shimizo & al. T.7658*, collected in sunny places on a wet moor in Thailand, is obviously the *A. intermedia* type of the species which, it would appear to me now, probably deserves at least form recognition. *Frazier 43* is said to have had no pneumatophores. Ridgeway reports the local vernacular name, "manglier blanc", on Astove island. Hsiao (1978) cites *Mori s.n.* and *Morimoto s.n.* from Taiwan and notes that the species occurs on that island's west coast only.

For *A. sphaerocarpa* Stapf Fletcher (1938) cites only *Collins 1028*, *Kerr 2095*, *8162*, *11017*, *15702*, & *18861* and *Marcan 855* from Thailand. He notes that the type of the "species" is from Penang and claims that the plant occurs also in the Philippines and China. He asserts that its fruit is not beaked, the flowers are in small heads, and the leaves are ovate to elliptic -- all characters which would seem to apply also to *A. marina*.

It should be noted here that the sterile *Fosberg & Frazier 49758* collection from Astove island bears extremely close resemblance to some collections of *A. alba* -- without fruit its exact identity cannot be established.

Additional citations: TANZANIA: Tanga: *Balslev 327* (Ac), *328* (Ac). COMORO ISLANDS: Aldabra: *F. R. Fosberg 48678* (W--2836693). Euphrates: *F. R. Fosberg 48779* (W--2836686); *Renvoize 762* (W--2835418). Main: *Stoddart 760* (W--2835391). Moustiques: *F. R. Fosberg 48674* (W--2836685), *48675* (W--2836684). South: *F. R. Fos-*

berg 49034 (W--2836687). West: Rhyne 880 (W--2834352); Stoddart 932 (W--2835378). Wizard: Fosberg & Grubb 49825 (W--2836692). SEYCHELLES ISLANDS: Astove: Fosberg & Frazier 49758 (W--2836691); Frazier 43 (W--2834335); T. Ridgway 67 (W--2834353). ARABIA: Oman: Pettitt 25060 (W--2859151). SRI LANKA: Cramer 4326 (W--2808322); Davidse 7561 (W--2778545); Fosberg & Jayasuriya 52773 (N). THAILAND: Shimizu, Fukuoka, & Nalampoon T. 7658 (Ac). GREATER SUNDA ISLANDS: Sabah: Meijer SAN. 27653 (Sn--40602); D. I. Nicholson 19126 (Sn--40601).

AVICENNIA MARINA var. *ACUTISSIMA* Stapf & Mold.

Additional bibliography: Jafri, Fl. Karachi 290 & 351. 1966; V. J. Chapm., Mangr. Veg. 105, 390, & 394. 1976; Mold., Phytologia 40: 411. 1978.

AVICENNIA MARINA var. *ANOMALA* Mold.

Additional bibliography: V. J. Chapm., Mangr. Veg. 394. 1976; Mold., Phytologia 34: 169. 1976.

AVICENNIA MARINA var. *RESINIFERA* (Forst. f.) Bakh.

Additional bibliography: Jack, Descr. Malay. Pl., imp. 1, 58. 1822; Jack, Malay. Misc., imp. 1, 2: 58--59. 1822; D. Dietr., Syn. Pl. 3: 619. 1843; Jack, Calc. Journ. Nat. Hist. 4: 194--195. 1843; Gamble in King & Gamble, Journ. Asiat. Soc. Beng. 74 (2 extra): 868 & 869. 1908; H. Hallier, Meded. Rijks Herb. Leid. 37: 88 & 91. 1918; Stapf, Ind. Lond. 1: 370. 1929; Rotherham, Briggs, Vlackell, & Carolin, Flow. Pl. N. S. Wales 18 & 185, pl. 2 & 3. 1975; Albright, N. Zeal. Journ. Freshw. Res. 10: 385--389. 1976; V. J. Chapm., Mangr. Veg. 3, 9, 11, 14, 17, 25, 27, 48, 146, 148, 149, 151, 154--156, 159--161, 163--165, 169, 180, 192, 193, 195, 201, 208, 212, 217, 222, 227, 230--232, 234--236, 269, 305, 306, 308, 316, 345, 390, 394, & 422, fig. 91, 94--102, 113, 120, 124, 136, 137, 139--142, & 208. 1976; Albright, Biol. Abstr. 63: 1938. 1977; Jack, Descr. Malay. Pl., imp. 2, 58. 1977; Jack, Malay. Misc., imp. 2, 2: 58--59. 1977; A. E. Wight, TANE 23: 17. 1977; Mold., Phytologia 40: 411. 1978; J. & E. Kohlmeyer, Marine Mycol. 93, 95, 243, 244, 301, 317, 370, 412, & 529. 1979; Zamski, Biol. Abstr. 68: 4387. 1979; Zamski, Bot. Gaz. 140: 67--76. 1979; R. Moran, Environ. Southw. 488: [10]--12. 1980.

Additional illustrations: Rotherham, Briggs, Blaxell, & Carolin, Flow. Pl. N. S. Wales 18, pl. 2 (in color) & 3 (in color). 1975; V. J. Chapm., Mangr. Veg. fig. 101 (a & b), 102, & 208. 1976; R. Moran, Environ. Southw. 488: [10] & 12. 1980.

Wight (1977) lists this plant from Whale Island, an island in the Moturva Islands off North Island, New Zealand. Chapman (1976) records it from Low and Magnetic Islands, Queensland. He lists the following marine fungi that are known to attack it: *Gnomonia longirostris* G. & G., *G. marina* G. & G., *Halosphaeria quadricornuta* G. & G., *Metasphaeria australiensis* G. & G., *Ophiobolus australiensis* Johns. & Sparr., *Phialophorophoma litoralis* Linder, and *Phytophthora* spp. He also notes that the gall-wasp, *Eriophyes avicenniae*,

may distort its leaves.

Regarding the most interesting Moran collection, cited below, from "in salt marsh with *Suaeda*, *Salicornia*, *Batis*, and *Spartina* at Kendall Ecological Reserve, northeast side of Mission Bay, San Diego, [California], about sealevel, near 38°48' N., 117°13 1/4' W, 9 September 1979, shrubs 2.3 m. tall.....perhaps 100 or more flowering size plus many seedlings", Dr. Moran, in a letter to me dated September 20, 1979, says, in part: "Apparently a single specimen was planted about 1966-69 by a biologist at Scripps Institution of Oceanography; it is now spreading rather aggressively. Also, there is a single small plant of *Aegiceras corniculatum*, which was flowering this month; but there seem to be no seedlings. The Kendall/Frost marsh, the only marsh remaining in Mission Bay, is a wildlife reserve. An endangered Clapper Rail (*Rallus longirostris levipes*) nests in the native marsh vegetation; and the *Avicennia* is considered an undesirable weed, which should be eliminated. I'd like to see some maintained as a botanical exhibit if they could be kept in bounds; but I guess that isn't practical: it's either all or nothing." He suggest that this may be the only record of the variety growing in the Northern Hemisphere, as it certainly is the first record of it from the New World.

Additional citations: CALIFORNIA: San Diego Co.: R. Moran 28024 (Ld).

AVICENNIA MARINA var. *RUMPHIANA* (H. Hallier) Bakh.

Additional bibliography: Dop in Lecomte, Fl. Gén. Indo-chine 4: 895. 1935; V. J. Chapm., Mangr. Veg. 3, 134, 281, 282, & 390, fig. 176d. 1976; Mold., Phytologia 40: 411 (1978) and 46: 197. 1980.

Additional illustrations: V. J. Chapm., Mangr. Veg. 282, fig. 176d. 1976.

Recent collectors report this plant from sandy shores and list the vernacular name, "api api".

Herbarium material has been widely misidentified and distributed in herbaria as *A. officinalis* L., from which its smaller flowers at once serve to distinguish it.

Additional citations: GREATER SUNDA ISLANDS: Sabah: Meijer SAN. 19910 (Sn--40603).

AVICENNIA OFFICINALIS L.

Additional synonymy: *Avicennia officinalis* L. ex Sonohara, Tawada, & Amano, Fl. Okin. 131, sphalm. 1952. *Avecinia alba* Lantoh, in herb.

Additional & emended bibliography: L. in Stickm., Herb. Amb. 13. 1754; Roxb., Hort. Beng. 46. 1814; Jack, Descr. Malay. Pl., imp. 1, 2: 59. 1822; Jack, Malay. Misc., imp. 1, 2: 59. 1822; D. Dietr., Syn. Pl. 3: 619. 1843; Jack, Calc. Journ. Nat. Hist. 4: 195. 1843; Peters, Naturwiss. Reise Mossamb. 6 (1): Bot. 266. 1861; Kurz, Rep. Veg. Andam. App. A: 45. 1870; F. Muell., Descr. Notes Pap. Pl., imp. 1, 1: 91 & 110. 1875; Blanco, Fl. Filip., ed. 3, 2: 289, pl. 73. 1878; Fern.-Villar in Blanco, Fl. Filip., ed. 3, 4: Nov. App. 62. 1880; Vidal, Sin. Fam. Gen. Pl. Leñ. Filip. [Introd. Fl. For. Filip.] 1: 201, 206, & 336 (1883) and 2 [Atlas]: 36, pl. 75, fig. G. 1883;

Koord. & Valet., Meded. Lands Plant. Bat. 42 [Bijdr. Booms Java 7]: 216--221. 1900; F. N. Williams, Bull. Herb. Boiss., ser. 2, 5: 432. 1905; Gamble in King & Gamble, Journ. Asiat. Soc. Beng. [2 extra]: 867--869. 1908; Sim, For. Fl. Cape Col. pl. 120. 1920; Bot. Congr. Brux. 2: pl. 12--14. 1910; Tobler, Engl. Bot. Jahrb. 50: Suppl. 398--404. 1914; Wangerin, Justs Bot. Jahresber. 40 (2): 862. 1914; B. L. Robins., Proc. Am. Acad. 5: 531. 1916; E. D. Merr., Sp. Blanc. 335--336. 1918; H. J. Lam, Verbenac. Malay. Arch. 340--344 & 349, pl. 3. 1919; Wangerin, Justs Bot. Jahresber. 42: 363 & 364. 1920; Haines, Bot. Bihar Oris., ed. 1, 4: 725. 1922; Fedde, Justs Bot. Jahresber. 42: 822. 1923; Knuth, Feddes Repert. Spec. Nov. Beih. 43: [Init. Fl. Venez.] 608. 1927; Stapf, Ind. Lond. 1: 370 (1929) and 6: 536. 1931; Dop in Lecomte, Fl. Gén. Indo-chine 4: 895--896. 1935; Kirtikar & Basu, Indian Med. Pl., ed. 2, imp. 1, 3: 1952--1953, pl. 748. 1935; Bedevian, Illust. Polyglot. Dict. 99. 1936; Fletcher, Kew Bull. Misc. Inf. 1938: 405, 443, & 444. 1938; Worsdell, Ind. Lond. Suppl. 1: 111. 1941; Metcalfe & Chalk, Anat. Dicot. 2: 1031--1033, 1035, 1036, 1038, & 1041, fig. 248 A & I. 1950; Haines, Bot. Bihar Oris., ed. 2, 2: 760. 1961; Jafri, Fl. Karachi 290 & 351. 1966; Napp-Zinn, Anat. Blatt. A (1): 632. 1974; Walsh in Reimold & Queen, Ecol. Haloph. 59, 84, 86, 87, 89, 98, 102, 104, 106, 114, 123, 133, 139, 145, 149, 154, & 165. 1974; Kirtikar & Basu, Indian Med. Pl., ed. 2, imp. 2, 3: 1952--1953, pl. 748. 1975; V. J. Chapm., Mangr. Veg. 3, 14, 20, 24, 26, 27, 100. 105--109, 112, 114, 118, 125, 127, 134, [138], 139, 141, 144, 174, 177, 181, 182, 186--188, 192, 193, 217, 233, 250, 258, 259, 268, 279, 288, 289, 291, 296, 300, 304, 308, 310, 312, 313, 345, 346, 357, [361], 373, 393, 394, 413, 415, 417, 422, & 423, fig. 11, 74, 79, 84, 114, 117, 186a, 194, 213 (3), 260 (4), & 279. 1976; Jack, Descr. Malay. Pl., imp. 2, 2: 59. 1977; Jack, Malay. Misc., imp. 2, 2: 59. 1977; Lewis & Elvin-Lewis, Med. Bot. 352. 1977; Hsiao, Fl. Taiwan 4: 411. 1978; Mold., Phytologia 40: 407, 409, & 411--412. 1978; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 51 & 54. 1978; F. Muell., Descr. Notes Pap. Pl., imp. 2, 1: 91 & 110. 1979; Mold., Phytologia 46: 199. 1980.

Additional & emended illustrations: Kirtikar & Basu, Indian Med. Pl., ed. 2, imp. 1, pl. 748. 1935; Metcalfe & Chalk, Anat. Dicot. 2: 1036, fig. 248 A & I. 1950; Kirtikar & Basu, Indian Med. Pl., ed. 2, imp. 2, pl. 748. 1975; V. J. Chapm., Mangr. Veg. fig. 186a, 194, 213 (3), 260 (4), & 279. 1976.

Recent collectors describe this species as a tree, 20--25 feet tall, the trunk girth 4 feet, the outer bark "black and white", inner bark yellowish, sapwood white and yellow, and the fruit "brownish". They have encountered the species at altitude of sea-level to 10 feet. Bedevian (1936) lists the following vernacular names for the species, but undoubtedly most, if not all, of these apply, instead, to *A. marina*: "avicennia", "kurâm", "palétuvier", "gurram", "Salzbaum", "shūrâ", "white mangrove", and an Arabic not-transliterated name.

Lewis & Elvin-Lewis (1977) report that a poultice made from the green fruits of this species is applied medicinally to boils in India.

Knuth (1927) cites *Humboldt & Bonpland s.n.* from Bermudez and *Pittier 11011* from Miranda, Venezuela, and records the vernacular names, "mangle negro" and "mangle prieto", but, of course, these are palpable misidentifications, since *A. officinalis* does not occur in the New World.

Schumann & Lauterbach (1900) cite *Hellwig 212* from New Guinea and erroneously give the distribution of the species as "von Ostafrika bis Polynesien verbreitet". The species does not occur in Africa. Merrill (1918) cites *Merrill Sp. Blanc. 583* from Luzon, Philippines, as representative of the taxon. Fletcher (1938) notes that the type of the species came from India, lists the species also from Sri Lanka, Burma, Cochinchina, the Malay Peninsula, and Java, "eastwards to the Pacific", and cites from Thailand only *Bourke s.n.* and *Kerr 17474 & 18593*.

The illustrations given by Hayata (1912) as depicting *A. officinalis* do not depict that taxon at all, but represent *A. marina* instead and are cited by me under that taxon in this series of notes.

The *Cramer 4326*, *Meijer SAN.19910 & 27653*, and *Nicholson 19126*, distributed as *A. officinalis*, actually are *A. marina* (Forsk.) Vierh.

Additional citations: GREATER SUNDA ISLANDS: Timbun-mata: *Lantoh SAN.62376* (Sn--40604)

AVICENNIA SCHAUERIANA Stapf & Leechman

Additional synonymy: *Avicennia schauerana* Stapf ex Walsh in Reimold & Queen, *Ecol. Haloph.* 59. 1974. *Acicenia schaueriana* Stapf & Leechman ex Reitz, Klein, & Reis, *Proj. Madeira S. Catar.* 42. 1978.

Additional bibliography: Walsh in Reimold & Queen, *Ecol. Haloph.* 59. 1974; V. J. Chapm., *Mangr. Veg.* 3, 21, 24, 30, 65--67, 275, 276, & 281, fig. 11, 169a, & 175. 1976; Mold., *Biol. Abstr.* 63: 2452 & 3036. 1977; Fournet, *Fl. Illust. Phan. Guad. Mart.* 1408--1410. 1978; Hocking, *Excerpt. Bot. A.31: 16.* 1978; Mold., *Phytologia* 40: 409 & 412. 1978; Reitz, Klein, & Reis, *Proj. Madeira S. Catar.* 42. 1978; Rizzini, *Trat. Fitogeog. Bras.* 2: 242 & 258. 1979.

Additional illustrations: V. J. Chapm., *Mangr. Veg.* fig. 169a & 175. 1976.

Recent collectors describe this plant as a tree, 6--10 m. tall, frequent in praia arenosa, sandy soil, and "crescendo numa faixa estreita de mangue", and have found it in flower in May, June, August, and October. The corollas are described as "white" on *Araujo & Maciel 3093, 3135, & 3250*. On *Herb. FEEMA 15111* some of the leaves are canescent beneath or partly so, but most of them seem to be glabrous.

Reitz and his associates (1978) record "siriúba" as a vernacular name for this species in Brazil.

Additional citations: BRAZIL: Maranhão: *Maciel s.n.* [*Herb. FEEMA 15111*] (Ld). Rio de Janeiro: *Araujo 2261* [*Herb. FEEMA 14735*] (Fe); *Araujo & Maciel 3135* [*Herb. FEEMA 15024*] (Ld), 3250 [*Herb. FEEMA 15437*] (Ld). Grande Island: *Araujo & Maciel 3093* [*Herb. FEEMA*

14973] (Ld).

AVICENNIA SCHAUERIANA f. *CANDICANS* Mold.

Additional bibliography: Mold., Biol. Abstr. 63: 3036. 1977; Mold., Phytologia 40: 409 & 412. 1978.

Recent collectors refer to this plant as a common tree, 2 m. tall, and have found it in flower in February and October and in fruit in February. The corollas are said to have been "white" on Araujo 2260.

Additional citations: BRAZIL: Espirito Santo: Araujo 2221 [Herb. FEEMA 14604] (N). Rio de Janeiro: Araujo 2260 [Herb. FEEMA 14736] (Fe); Moura s.n. [Herb. FEEMA 14601] (Fe), s.n. [Herb. FEEMA 15666] (Ld).

AVICENNIA TONDUZII Mold.

Additional bibliography: H. N. & A. L. Mold., Pl. Life 2: 86. 1948; Walsh in Reimold & Queen, Ecol. Haloph. 59. 1974; V. J. Chapm., Mangr. Veg. 3, 21, 24, & 394, fig. 11. 1976; Mold., Phytologia 40: 409 & 413. 1978; Hocking, Excerpt. Bot. A.33: 89. 1979.

ADDITIONAL NOTES ON THE GENUS *AEGIPHILA*. XXVII

Harold N. Moldenke

For a detailed explanation of all herbarium acronyms used in this and all others in my series of notes on genera in this and other families see my Fifth Summary (1971), volume 2, pages 795 to 801.

Aegiphila Jacq.

Additional synonymy: *Aegiphica* Cordeiro, in herb.

Additional & emended bibliography: Jacq., Stirp. Amer. 16. 1763; J. A. MURR. in L., Syst. Veg., ed. 14, 160. 1784; Pers., Syst. 165. 1797; Vent., Tabl. 2: 318. 1799; Duchesne, Dict. 1: 267. 1804; St.-Hil., Expos. 1: 246. 1805; Pers., Sp. Pl. 1: 339, 340, & 342. 1817; Spreng. in L., Syst. Veg., ed. 16, 1: 29, 419, 421, 422, 647, & 648. 1825; Bartl., Ord. 180. 1830; Kunth, Syn. 2: 42. 1832; Spach, Hist. Nat. Vég. 9: 226 & 227. 1840; Endl., Ench. 312. 1841; Lemr. in Orbigny, Dict. Univ. Hist. Nat. 1: 142. 1841; Reichenb., Nom. 108. 1841; Hassk., Flora 25: Beibl. 26. 1842; Brongn., En. Genr. 65. 1843; Lindl., Veg. Kingd. 664. 1847; A. L. Juss. in Orbigny, Dict. Univ. Hist. Nat. 13: 185. 1849; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 218--220. 1863; Pfeiffer, Nom. Bot. 1 (1): 64 (1873), 1 (2): 1834 (1874), 2 (1): 6 (1874), and 2 (2): 1569, 1570, & 1593. 1874; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 143 & 164--166 (1894) and ed. 1, 4 (3a): [381]. 1897; J. C. Willis, Dict. Flow. Pl., ed. 2, 226. 1903; Dalla Torre & Harms, Gen. Siphonog., imp. 1, 432. 1904; J. C. Willis, Dict. Flow. Pl., ed. 3, 224. 1908; Fedde & Schust., Justs Bot. Jahresber. 39 (2): 319. 1913; Fedde,



Moldenke, Harold N. 1980. "Additional notes on the genus *Avicennia*. XV." *Phytologia* 46(5), 308–317.

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