

STUDIES IN THE THEACEAE, XIX THE GENERA ARCHYTAEA AND PLOIARIUM

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Archytaea Martius (1826) and *Ploiarium* Korthals (1840) are two small and closely related genera of the Theaceae which have been alternately combined and separated by various workers during the past century. In fact, these two genera seem to have appeared far more frequently in literature than they have in the vascula of the collectors!

With *Bonnetia* they make up the tribe Bonnetieae and as such are located at the very beginning of the family in most herbaria.

Geographically these two are far removed. *Archytaea* is confined to the mainland of South America, while *Ploiarium* occupies the islands and mainland of the Malaysian area of the Old World.

Archytaea was first recognized and described by Martius (Nov. Gen. et Sp. 1: 116) in 1826. The author selected the name in memory of Archytas (ca. 428–346 B.C.), a philosopher and scientist of the Greek city Tarentum located in southern Italy.

It appears that Archytas was best known for his mathematical contributions, since he was the first to draw up a methodical treatment of mechanics with the aid of geometry and to distinguish harmonic from arithmetical and geometrical progressions. In biology he observed that the parts of animals and plants were in general rounded in form. He was also a military leader, having been elected seven times as commander of the army. Under his leadership Tarentum fought with varying success against the Messapii, Lucania and even Syracuse. One of his greatest claims to fame and glory (albeit reflected) is that he has been remembered as an intimate friend of Plato.

When introducing the genus, Martius described a single species, *A. triflora*, from the Amazonas region of Brazil. This species, after a hundred years, is still seldom collected and little known. A second and better-known species, *A. multiflora*, was described by Bentham in 1843.

In the meantime (1840), Korthals (Verh. Nat. Gesch. Bot., ed. Temminck 135) described a new genus *Ploiarium* from Borneo. This generic name was derived from the diminutive of the Greek word πλοῖον (*plouion*), meaning boat or canoe, and refers to the shape of the locules of the capsules after dehiscence. A single species, *P. elegans*, was introduced by Korthals.

These two genera retained their distinct status only fifteen years. In 1855 Choisy in his study of the family combined the two and reduced *Ploiarium* to synonymy under the earlier described *Archytaea*. Following Choisy's lead, Bentham and Hooker (1862) in Gen. Pl. 1: 188 continued the combination of the two genera under a single name, thus unwittingly

influencing contemporary and future authors by their stand. Workers on the Asiatic flora, evidently not sufficiently interested in American genera to compare the materials, followed the lead of Choisy and Bentham & Hooker. Szyszyłowicz continued the practice in his work on the Theaceae for *Das Natürliche Pflanzenfamilien* in 1893. Dalla Torre & Harms (1901) listed *Ploiarium* as a synonym in their *Genera Siphonogamarum*, and so it continued until 1925, when Melchior in the second edition of *Das Natürliche Pflanzenfamilien* (21: 151. 1925) reinstated *Ploiarium* as a separate genus.

I agree with Melchior and most of the present-day workers in the Malaysian flora that the two genera should remain distinct. To students of the American flora the name made little difference, since *Archytaea*, the accepted name, applied originally to an American plant.

There are several points of difference, major points — and consistent in the genera. The following chart indicates these points.

Ploiarium	Archytaea
Flowers solitary, axillary.	Flowers in three- to many-flowered inflorescences, never solitary; inflorescence axillary.
Calyx deciduous.	Calyx persistent.
Stamens deciduous.	Stamens persistent.
Styles five, free to the base.	Style one, entire its whole length.
Nutrient tissue fleshy.	Nutrient tissue none.
Distribution: Malaysia.	Distribution: South America.

From observation of the inflorescence it appears that *Ploiarium*, with its simple axillary flower, is more highly advanced evolutionally than *Archytaea*, with its three- to many-flowered inflorescence. The distribution of the genera is of importance. *Ploiarium* not only is confined to the tropical islands and the peninsular mainland of Malaysia, but, judging from collectors' notes and the comments of those who have seen it growing, it prefers the low altitudes and usually inhabits the seashore. *Archytaea*, on the other hand, prefers the higher altitudes and sandstone soil of Roraima, Duida, and Pteri-tepuí.

ARCHYTAEA

Archytaea Martius, Nov. Gen. Sp. 1: 116. 1826. — Cambessedes in Mém. Mus. Hist. Nat. Paris 16: 410. 1828. — G. Don, Gen. Syst. 1: 572. 1831. — Meisner, Pl. Vasc. Gen. 1: 41. 1836. — Endlicher, Gen. Pl. 1020. 1840. — Walpers, Repert. 1: 373. 1842; Ann. Bot. Syst. 1: 121. 1848. — Bentham in Hooker, London Jour. Bot. 2: 363. 1843. — Tulasne in Ann. Sci. Nat. Bot. III, 8: 340. 1847. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève 14: 160 (Mém. Ternstr. 72). 1855, in part. — Bentham & Hooker f., Gen. Pl. 1: 188. 1862, in part. — Baillon, Hist. Pl. 4: 259. 1873, in part. — Wawra in Fl. Bras. 12(1): 327. 1886, in part. — Szyszyłowicz in Nat. Pflanzenfam. III.

6: 181. 1893, in part. — Dalla Torre & Harms, Gen. Siphon. 317. 1901, in part. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 151. 1925. — Lemée, Dict. Pl. Phan. 1: 363. 1929, in part. — Kobuski in Bull. Torrey Bot. Club 75: 412. 1948.

Flowers hermaphroditic, 3– ∞ in inflorescence. Sepals 5, glabrous, imbricate, persistent, thick, concave, subequal. Petals 5, free, deciduous, glabrous. Glands 5, alternate with petals. Stamens ∞ , persistent; filaments pentadelphous, closely joined at the lower end, free, thread-like above; anthers two-celled, minute, with wide connective, versatile. Ovary glabrous, 5-loculate, the locules multiovulate; style simple, persistent with a punctate stigma. Capsule 5-celled, dehiscing septicidally, the margin wavy, the columnella persistent. Seeds ∞ , linear, imbricate.

Evergreen trees or shrubs. Leaves alternate, coriaceous, congested at the apices of the branchlets. Inflorescence axillary, near apex; peduncles long, ancipitous, increasing in diameter toward the apex; pedicels 1-bracteate at base, 2-bracteolate midway to calyx.

TYPE SPECIES: *Archytaea triflora* Martius.

KEY TO THE SPECIES

Peduncles subcapitate, many-flowered; bracts foliaceous, with large glands (usually two) along the margin.....*A. multiflora*.
 Peduncles 3-flowered; bracts not foliaceous and without glands...*A. triflora*.

Archytaea multiflora Benth in Hooker, London Jour. Bot. 2: 363. 1843. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève 14: 160 (Mém. Ternstr. 72). 1855. — Wawra in Martius, Fl. Bras. 12(1): 329. 1886. — Szyszyłowicz in Nat. Pflanzenfam. III. 6: 181. 1893. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 151. 1925. — Kobuski in Bull. Torrey Bot. Club 75: 412. 1948.

Tree up to 10 m. high, occasionally a shrub, glabrous throughout; branchlets thick, terete, dark gray, roughened by conspicuous leaf-scars. Leaves sessile, coriaceous, congested at the apex of the branchlets, alternate, obovate, 5–7 cm. long, 2–2.5 cm. wide, acute to acuminate at the apex, tapering at the base, dark green and shiny above, pale green and dull beneath, the margin entire, red, the midrib prominent, wider at the base, tapering toward the apex, the veins prominent on both surfaces, 16 or more pairs, at first running parallel to and as part of the midrib, then branching off, anastomosing, and sweeping upward near the margin in the form of submarginal veins. Flowers few to several, congested at the end of the peduncle, telescoped in the form of a small head; peduncle axillary, varying in length up to 10 cm., ancipitous, increasing in diameter toward the apex; pedicels short, terete, 5 mm. (more or less) long, subtended by a single bract; bract foliaceous in texture and outline, varying in length, usually ca. 2 cm. long, with a single gland midway on each side; bracteoles 2, opposite, at varying distances along the pedicel. Sepals 5, imbricate, thick, subequal, broadly ovate to subrotund, varying from

green to deep red, or green with red margins, ca. 5 mm. long and 4 mm. wide, the margins lightly membranaceous; petals 5, ovate to obovate, rose to white in varying degrees of color combination, 12–13 mm. long, 4–6 mm. wide; glands 5, alternating with petals, less than 1 mm. long; stamens numerous, pentadelphous, red, ca. 10 mm. long, joined compactly along the lower half, the upper half free; the anthers measuring ca. 1 mm. across, with the cells and the connective of about equal measurement; ovary obovoid, rounded or ovoid, ca. 4 mm. diam., 5-angled, 5-celled, with numerous minute ovules, the style entire, ca. 12 mm. long, red, the stigma punctate. Capsule somewhat rounded, ca. 7–8 mm. diam., septical, the seeds very numerous, linear, closely packed in series, ca. 2 mm. long.

BRITISH GUIANA: Roraima, *R. Schomburgk* 876 (G). — Kaieteur Savannah, side of small gully, *T. G. Tutin* 624 (US), Aug. 28, 1933 (tree 35 ft. with dark gray, fissured bark; young leaves waxy white; flowers pink, the filaments pink, the anthers deep red and the style yellow). — Kaieteur Savannah, rare in white sand from conglomerate and sandstone, *B. Maguire & D. B. Fanshawe* 23108 (A, NY), April 30, 1944 (small tree to 4 m. high, 10 cm. diam., leaves leathery, brittle, red-margined, crowded at the branch ends, of high phyllotaxy; flowers rose-pink, the stamens rose-pink, the peduncles gray and the bracts waxen). — Along the Arubaru River (Kako tributary), Mazaruni drainage, near Haiamatipu Mt., alt. ca. 2000 ft., *A. S. Pinkus* 175 (NY, US), Feb. 4, 1939 (tree 15 ft. high, the trunk 6 in. diam.; petals and filaments pink, the anthers brownish).

VENEZUELA: Bolivar, vicinity of "Misia Kathy Camp" on mesa between Ptari-tepuí and Sororopan-tepuí, margin of swamp, alt. 1600 m., *J. A. Steyermark* 60241 (Ch), Nov. 15–17, 1944 (shrub 10 ft.; leaves deep green above, dull paler green below; petals pinkish white with orchid-pink along upper edge of one side, in bud rose-pink, the calyx grass-green with pink at the apex). — Bolivar, Mt. Roraima, southwest-facing slopes bordered by hilly savannah, alt. ca. 1100 m., *J. A. Steyermark* 58603 (Ch), Sept. 25, 1944 (shrub 5–15 ft.; leaves coriaceous, dark green and shiny above, pale green suffused with lavender below; petals white within with pink borders, rose without on margin with salmon-pink over other part, the sepals dull red and green). — Mt. Roraima district, vicinity of Arabupu, on swamp soil, alt. 4200 ft., *A. S. Pinkus* 48 (Ch, G, NY, US), Nov. 18, 1938 (tree ca. 12 ft. high; sepals deep red, yellowish distally, the petals, stamens and style pink). — Bolivar, Gran Sabana, Salvas de galeria del río Uarí, *F. Tamayo* 3127 (US), 3129 (US), March 1946 (small tree ca. 2 m. high; flowers rose). — Summit of Mt. Duida, hillsides and flat ground at Central Camp, alt. 4800 ft., *G. H. H. Tate* 535 (NY), 1034 (NY), Dec. 1928 (bushy tree with pink flowers). — Bolivar, Ptari-tepuí, southeast-facing slopes, shrubby, dry rocky open slopes above "Rocky Swamp," alt. ca. 1600 m., *J. A. Steyermark* 59969 (Ch), Nov. 1944 (shrub 5–8 ft.; leaves coriaceous, dark green and shiny above, pale green below; peduncles pale green; bracts rich green with rose margins; sepals pale green with pale rose tips; petals dull rose).

This species is characterized by an inflorescence of several flowers and chiefly on this character is separated from the following species, *A. triflora* Martius.

Like the majority of species in the Theaceae which enjoy a wide distribution, considerable variation may be found in most characters. This variation is especially noticeable in the inflorescence. In some instances the flowers at the end of the peduncle appear congested into a tight head, while in other cases they are considerably more open. This congestion is due both to the variation in the length of the pedicel and the number of flowers. In *Maguire & Fanshawe 23108* the pedicels measure as much as 12 mm. in length.

The size and shape of the bracts vary considerably on single specimens. On the whole, however, even though varying in size, they are usually the same shape as the leaves of the specimen. An interesting character of the bract is the single (rarely two) large gland found midway along each side of the margin. This appears to be quite consistent in this species but apparently lacking in *A. triflora*.

The bracteoles, more readily distinguished on the flowers of the more open inflorescences, are usually two in number and opposite. Their position along the pedicel varies but they are usually found midway along the pedicel.

The leaves of this species vary in width and the acuteness of the apex. Although all leaves are generally obovate and acute at the apex, it seems to be true that the wider the leaf the more acuminate is the apex.

Archytaea triflora Martius, Nov. Gen. Sp. 1: 117, *t.* 73. 1826. — G. Don, Gen. Syst. 1: 572. 1831. — Tulasne in Ann. Sci. Nat., Bot. III, 8: 340. 1847. — Walpers, Ann. Bot. Syst. 1: 121. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève 14: 160 (Mém. Ternstr. 72). 1855. — Wawra in Martius, Fl. Bras. 12(1): 328. 1886. — Szyszyłowicz in Nat. Pflanzenfam. III. 6: 181. 1893. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 151. 1925.

VENEZUELA: Amazonas, Cano Pavón, Rio San Miguel, Guainia, in open places free from inundation, alt. ca. 120 m., *L. Williams 14908* (Ch), March 26, 1942 (shrub 2.5 m. with rough bark and few branches; leaves coriaceous; flowers large, white).

Archytaea triflora Martius was the first species described in this genus and was so titled because of the three-flowered inflorescence. This species appears, from the few known records, to be confined to the Amazonas region of Brazil and Venezuela.

The single specimen examined and cited above was collected in Venezuela. Unfortunately, an accurate description cannot be drawn from the specimen, since mature flowers and fruit are not represented. However, excellent descriptions have been recorded by both Martius and Wawra, obviously from much better material. Martius describes the leaves of *A. triflora* as "obovato-lanceolata . . . tres circiter pollices longa, duodecim ad octodecim lineas lata." Translated into the metric system that would read 7–8 cm. long and up to ca. 4 cm. wide, and so the illustration of Martius depicts it. In the Williams specimen the leaves are definitely oblanceolate, the largest leaves measuring 10 cm. long, 2 cm. wide.

This species is closely allied to *A. multiflora*, but can be separated from it by the three-flowered inflorescence and the smaller glandless bracts. These characters may not appear sufficient for retaining the two species as separate entities. However, in case of the combination of the two species, *A. triflora*, being the genotype, would have priority, and I am unwilling at present to combine the two under this name or to reduce *A. multiflora* to varietal status.

Archytaea multiflora is the more vigorous of the two and enjoys a wider distribution, inhabiting the sandstone mountains of Roraima, Duida, and Ptari-tepuí. On the other hand, *A. triflora* seems to have been recorded only from the lower altitudes along the upper Amazonas region.

Realizing the close relationship of the two species, I prefer to wait until more ample and better material of *A. triflora* becomes available before making a decision involving the union of the two entities.

PLOIARIUM

Ploiarium Korthals, Verh. Nat. Gesch. Bot., ed. Temminck 135. 1840. — Walpers, Repert. 1: 376. 1842. — Schnitzlein, Iconogr. 3: *t.* 25, *fig.* 26. 1852. — Turczaninow in Bull. Soc. Nat. Moscou 31: 246. 1858. — Miquel, Fl. Ind. Bat. 1(2): 491. 1859; Fl. Ind. Bat. Suppl. 1: 483. 1862. — Hallier in Beih. Bot. Centralbl. 34(2): 34. 1916. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 151. 1925.

Archytaea Auctores quoad orbem vetustiore. Choisy in Mém. Soc. Phys. Hist. Nat. Genève 14: 160 (Mém. Ternstr. 72). 1855. — Bentham & Hooker f., Gen. Pl. 1: 188. 1862. — Scheffer in Tijdschr. Nederl. Ind. 32: 406. 1871. — Baillon, Hist. Pl. 4: 259. 1873. — Thistleton-Dyer in Hooker, Fl. Brit. India 1: 294. 1874. — Pierre, Fl. For. Cochinch. 2: *t.* 129. 1888. — Boerlage, Fl. Nederl. Indie 1: 98. 1890. — King in Jour. As. Soc. Bengal 59(2): 206 (Mat. Fl. Malay. Penins. 146). 1890. — Szyszyłowicz in Nat. Pflanzenfam. III. 6: 181. 1893. — Beccari, Nelle For. Borneo 569. 1902. — Pitard in Lecomte, Fl. Gén. Indo-Chine 1: 331, *fig.* 31. 1910. — Merrill in Jour. Straits Br. Roy. As. Soc., Spec. No. 389. 1921. — Ridley, Fl. Malay. Penins. 1: 208. 1922. — Lemée, Dict. Pl. Phan. 1: 363. 1929. — Non Martius, 1826.

Flowers hermaphroditic, solitary, axillary. Sepals 5, glabrous, imbricate, deciduous, unequal, the outer two concave, thick, the inner three larger becoming increasingly membranaceous and petaloid. Petals 5, free, deciduous, glabrous. Glands 5, alternating with petals. Stamens numerous, deciduous; filaments pentadelphous closely joined at lower end, free and thread-like above; anthers two-celled, versatile, opening thru longitudinal slits. Ovary glabrous, oblong-ovoid, 5-loculate, the locules multi-ovulate, sulcate; styles 5 free to the base, persistent with truncate or punctate stigmata. Capsule subligneous, oblong-ovoid, alternate, dehiscent septically, the margin thin, the columnella persistent. Seeds ∞ , linear, imbricate.

Evergreen trees or shrubs. Leaves alternate, coriaceous, congested at or alternating close to the apex of the branchlets. Flowers axillary, solitary; peduncles ancipitous, increasing in diameter toward the apex.

TYPE SPECIES: *Ploiarium alternifolium* (Vahl) Melchior (*Hypericum alternifolium* Vahl).

KEY TO THE SPECIES

- A. Flowers long-pedunculate; bracts disposed along the peduncle, distant from the calyx.
 - B. Stamens and petals long and of equal length (ca. 25 mm.); bracts up to 18 mm. long, 8–9 mm. wide, opposite and at middle of the peduncle.....1. *P. alternifolium*.
 - BB. Stamens (ca. 12 mm. long) shorter than the petals (15–20 mm. long); bracts 5–10 mm. long, 3–4 mm. wide, 3–5 mm. below the calyx.....2. *P. pulcherrimum*.
 - AA. Flowers sessile; bracts appressed to the calyx.....3. *P. sessile*.
1. ***Ploiarium alternifolium* (Vahl) Melchior** in Nat. Pflanzenfam. ed. 2, 21: 151. 1925.

Hypericum alternifolium Vahl, Symb. Bot. 2: 85, t. 42. 1791. — DeCandolle, Prodr. 1: 545. 1824. — Wallich, Cat. no. 4806. 1832.

Ploiarium elegans Korthals, Verh. Nat. Gesch. Bot., ed. Temminck 135, t. 25. 1840. — Walpers, Repert. 1: 376. 1842. — Schnitzlein, Iconogr. 3: t. 215, fig. 26. 1852. — Miquel, Fl. Ind. Bat. 1(2): 491. 1859; Fl. Ind. Bat. Suppl. 1: 483. 1862.

Archytaea VahlII Choisy in Mém. Soc. Phys. Hist. Nat. Genève 14: 161 (Mém. Ternstr. 73). 1855. — Thistleton-Dyer in Hooker f., Fl. Brit. Ind. 1: 294. 1874. — Pierre, Fl. For. Cochinch. 2: t. 129. 1888. — King in Jour. As. Soc. Bengal 59(2): 206 (Mat. Fl. Malay. Penins. 146). 1890. — Pitard in Lecomte, Fl. Gén. Indo-Chine 1: 331, fig. 31. 1910. — Ridley, Fl. Malay. Penins. 1: 208. 1922.

Archytaea alternifolia (Vahl) Szyszylowicz in Nat. Pflanzenfam. III. 6: 181. 1893. — Hochreutiner in Bull. New York Bot. Gard. 6: 274. 1910. — Merrill in Jour. Str. Br. Roy. As. Soc., Spec. No. 389. 1921.

? *Ploiarium* sp., Turczaninow in Bull. Soc. Nat. Moscou 31: 246. 1858.

Small tree (or shrub) up to 5 m. high, glabrous throughout. Branchlets terete, gray (when very young, red), roughened with leaf-scars (ca. 3 mm. diam.) of varied proximation. Leaves coriaceous, usually congested at the ends of the branchlets, alternate, oblong-obovate or obovate, (5–)7–9(–15) cm. long, 1–2.5(–4) cm. wide, acute at the apex, truncate or nearly so at the narrowed base, the margin subrevolute, red, entire along the lower half, serrulate at the apical end, the midrib prominent, wider at the base, tapering toward the apex, red, the veins 8–10 pairs, at first running parallel to and as part of the midrib, then branching off, anastomosing near the margin and extending upward in the form of sub-marginal veins, the petiole merely the end of the costa, abruptly thickened at the point of attachment to the stem. Flowers solitary, axillary; peduncle 2–5 cm. long, compressed, often ancipitous, subterete near the apex, red, bibracteate; bracts usually 2 (very rarely 3, 4, or 5), opposite, 3–5 mm. below the calyx, unequal, variable in size and shape, oblong-ovate, oblong-deltoid, obovate or lanceolate, usually 5–10 mm. long, 3–4 mm. wide, entire near the base, lightly glandular-denticulate at the apex;

sepals 5, imbricate, subrotund to broadly ovate, unequal, the outer two thick, smaller, more rotund, 5–7 mm. long, about as wide, with only a very fine membranaceous margin, the inner three increasing in size, becoming petaloid, the innermost occasionally nearly membranaceous; petals 5, unguiculate, obovate, 15–20 mm. long, 7–12 mm. wide, tapering abruptly at the middle into an extended narrowed base, pink, white, to white with pink or purple margins; stamens numerous, the filaments pentadelphous, ca. 12 mm. long, joined in phalanges for ca. 5 mm. long, free above, the anthers minute, subglobose, less than 0.5 mm. across; glands 5, alternating with phalanges of stamens, pointed, ca. 1 mm. long; ovary oblong-ovoid, 10–12 mm. long, 5-sulcate, 5-loculate, the locules multiovulate, the styles 5, free, subterete, 5–7 mm. long, the stigmas truncate. Capsule oblong-ovoid, attenuate, up to 2 cm. long and 1 cm. diam. near the base, the seeds numerous.

DISTRIBUTION: Common throughout the Malay Peninsula; also in Indonesia, British North Borneo, and Sarawak and Indo-China.

INDO-CHINA: Cambodia, prov. Srê-imbél, near Po-long, *E. Poilane* 15314 (A), May 14, 1928.

MALAY PENINSULA: Johore, Pontian, Pengkalan Raja, at low altitudes, *Ngadiman* (Singapore Field no. 36662) (A), June 29, 1939 (tree 90 ft. high in peat forest). — Singapore, *Capt. Wilkes U. S. South Pacific Explor. Exped. s. n.* (G), 1838–1842. — Singapore, Botanic Garden, *C. S. Sargent s. n.* (A) in 1903. — Malacca, *M. Harvey s. n.* (A). — Precise records lacking, *A. C. Maingay* 193 (G) and *W. Griffith* 754 (G).

SUMATRA: Subdiv. Laboehan Batoe: District Kota Pinang, Langga Pajoeng on the Soengai Kanan, *Rahmat Si Toroes* 3301 (A), March 1933. — District Kota Pinang, Goenoeng Si Papan in Concess. Kaloebi, *Rahmat Si Toroes* 3771 (A), April 1933. — District Kota Pinang, Saboengan on the Soengai Kanan, *Rahmat Si Toroes* 3805 (A), April 1933. — District Bila, Hitean Haloban, south of Concess. Rantau Parapat B, *Rahmat Si Toroes* 4309 (A), May 1933.

RIOUW & LINGGA: precise locality lacking, near sea level, *Neth. Ind. For. Serv. bb.* 17166 (A), Nov. 13, 1932.

SARAWAK: Mount Matang, forest, alt. 800 ft., *J. & M. S. Clemens* 20972 (A), 1929 (tree 15 ft.; flowers white with a purple margin). — Precise locality lacking, *Native Collector* 469 (A), 868 (A), 1073 (A), 1364 (A).

BRITISH NORTH BORNEO: Sandakan and vicinity, *M. Ramos* 1313 (A, G), Sept.-Dec. 1920. — Sandakan, *Panching* 828 (A), July 1928 (tree 6 ft.; flowers white). — Jesselton, *M. S. Clemens* 9562 (A), Oct. 1915. — Marintaman, swampy forest, *Malegrito* (B. N. B. For. Dept.) 2522 (A), June 12, 1932 (shrub 6 ft. high, 1 inch diam.; flowers pale pink to whitish; fruit red; good for timber). — Membakut, on plain, *Tandom* (B. N. B. For. Dept.) 3320 (A), April 21, 1933 (shrub 10 ft. high, 2 inches diam.; flowers yellow). — Precise locality lacking, *D. D. Wood* 1898 (A), and *J. Agama* 997 (A).

BORNEO: Westerafd., Mempawah, Peladis, Andjoengan, alt. ca. 10 m., *Neth. Ind. For. Serv. bb.* 23951 (A), 23952 (A), Feb. 17, 1938. — Precise locality lacking, *J. E. Teysmann* 25 (G).

This species grows generally along the seashore or in open country at low altitudes, usually in damp spots. Occasionally it is found at somewhat higher altitudes. Ridley refers to it as growing at 3000 ft. altitude on Mt. Ophir and terms this plant of higher altitudes a "dwarf mountain form." The timber, according to Ridley, is red and is considered good for building purposes, although small. Frequent references by various collectors to its worth in building have been recorded.

One specimen collected by *Ngadiman* (Singapore Field no. 36662) in the peat forests of Jahore records the height of the tree as 90 feet. In view of the fact that all other specimens record the species as a small tree or shrub, I wrote to Mr. M. R. Henderson, the Acting Director of the Singapore Botanic Gardens, for verification of this measurement, suggesting that there might have been an error on the part of the collector. Mr. Henderson assured me that the measurement was probably correct and referred to Mr. E. J. H. Corner's book, "Wayside Trees of Malaya," in which the author describes this species as growing up to forty feet and notes that on swampy peaty soil (the same as cited in Singapore Field no. 36662) old trees may be found with massive stilted trunks reaching nearly one hundred feet high. These examples, according to Henderson, were observed personally by Corner and so may be taken to be accurate. Thus there is surprising variation in the size of the species, depending probably upon the locality.

On the Malay Peninsula, according to Ridley, this species is known in the vernacular as: *Poko Riang Riang* (Cicada tree), and *Kuat Kuat*. On Sumatra, according to Rahmat Si Toroes, it is known as *Galoegar Padang* and *Galoegar Poja*, and in British North Borneo, especially around Brunei, it is called *Sahuma* and *Sumah*. Pitard records the vernacular names *Chúng nôm* and *Dam top* for Indo-China.

There is little variation in the leaf other than size. Some of the older leaves, found occasionally at the point of branching, are large enough (15×4 cm.) to compare favorably with those found normally in *P. pulcherrimum* (Becc.) Melch.

The bracts, generally two in number, are found about 5 mm. below the calyx, opposite in arrangement. In *Agama* 997 collected in British North Borneo, variation from this number can be found. Here there are instances of both two and four bracts, with the latter more frequent. When four bracts are present, they are arranged in two opposite pairs at the same height on the peduncle, appearing verticillate. They are unequal, however, with one pair larger than the other. In *Rahmat Si Toroes* 3805 from Sumatra, the number of bracts varies from two to three or five. When only the normal two are present, they are opposite in arrangement. When there are three, they may appear either verticillate or two opposite with one above. In the case of five bracts, the arrangement along the peduncle is similar to that of the leaves. In no instance are they verticillate. Oddly enough, on this specimen no flowers were found with four bracts.

In this species the leaf-scars are very conspicuous and quite large, measuring about three mm. in diameter. The interval between the leaf-

scars varies, of course, with the rapidity of growth. On some of the older branches the scars are so close together that a very rugose appearance results. On younger branchlets the interval may be as high as three or even five centimeters. In the latter case the branchlet appears comparatively smooth. Both these conditions may appear on single specimens, depending on the size of the specimen. Since the younger flowering growth is usually collected, the specimens with the more extended intervals are more frequent.

2. **Ploiarium pulcherrimum** (Beccari) Melchior in Nat. Pflanzenfam. ed. 2, 21: 151. 1925.

Archytaea pucherrima Beccari, Nelle For. Borneo 569. 1902, *nom. nud.* — Merrill in Jour. Straits Br. Roy. As. Soc., Spec. No. 389, 1921.

Small tree up to 4 m. high, glabrous throughout. Branches terete, gray or grayish brown with reddish leaf-scars (ca. 3 mm. diam.) at very close intervals. Leaves coriaceous, alternate, oblong-obovate, acute at the apex, truncate or nearly so at the sessile base, up to 14 cm. long, 3.5 cm. wide, the margin subrevolute, red, serrulate at the apical end, entire along the lower half, the midrib prominent, wider at the base, tapering toward the apex, red, the veins 8–10 pairs, at first running parallel to and as part of the midrib, then branching off, anastomosing near the margin and extending upward, forming submarginal veins. Flowers solitary, axillary; peduncle 3–3.5 cm. long, somewhat compressed, red, swelling in diameter to a midpoint articulation of the two opposite bracteoles, then thickening again toward the calyx; bracteoles 2, opposite, near middle of the peduncle (ca. 12 mm. below the calyx), ovate, subequal, 14–18 mm. long, 8–9 mm. wide, slightly oblique at the base (hardly cordate), glandular-denticulate at the apex; sepals 5, imbricate, unequal, the outer two thick, obovate to subrotund 11–12 mm. long, 8–12 mm. wide, the margin only lightly membranaceous, the inner three appearing petaloid, wider than long, with an increasing tendency toward membranaceous margins to nearly membranaceous, ca. 9 mm. long, 14–15 mm. wide; petals 5, unguiculate, obovate, 25–27 mm. long, 13–15 mm. wide, red; stamens numerous, the filaments pentadelphous, ca. 25 mm. long, joined in phalanges for as much as 15 mm., free above, the anthers minute, subglobose, less than 0.5 mm. diam.; glands 5, long-deltoid, ca. 3 mm. long, 1.7 mm. wide at base; ovary ovoid, ca. 10 mm. long, 5-sulcate, 5-loculate, the locules multiovulate, the styles 5, free, subterete, ca. 12 mm. long, the stigmas truncate. Capsule not seen.

DISTRIBUTION: Sarawak and Sumatra.

SARAWAK: vicinity of Kuching (Kutien), *O. Beccari* 319 (TYPE, Firenze; fragment, A), August 1865. — Vicinity of Kuching, *G. D. Haviland & C. Hose* 975 (G), Oct. 31, 1894 (tree with very hard wood, used for pepper-posts). — Mt. Stupong, old jungle, alt. 600 ft., *Native Collector* 5121 (A), July 1, 1928 (small tree 16 ft. with red flowers).

SUMATRA: Bila, vicinity of Rantau Parapat, *Rahmat Si Toroes* 2165 (A), March-May 1932.

Listed by Beccari as a *nomen nudum* under *Archytaea pulcherrima*, this species was later transferred to the present genus by Melchior with a brief description in the key. Melchior separated this species from *P. alternifolia* on the wider bracteoles, somewhat heart-shaped, and the larger flowers. The bracteoles can hardly be termed heart-shaped. They are oblique but only slightly so at the most. The larger flowers offer several characters which distinguish the species. The petals and stamens are of equal length in *P. pulcherrima* and considerably larger than in *P. alternifolia*, measuring about 25 mm. In the latter species the petals are considerably longer (up to 20 mm.) than the stamens (12 mm.). In the present species the filaments are joined for 15 mm., a distance greater than the entire length of those in *P. alternifolium*, where they are joined for only 5 mm.

The bracts in *P. pulcherrimum* are considerably larger than those of *P. alternifolium* and are placed on the peduncle midway between the branchlet and the calyx. In *P. alternifolium* the number of bracts varies from two to five, and when two (opposite), are located only 3–5 mm. below the calyx. Only four specimens were available for the study of this species. More material may show, however, that two bracts is not a constant character in this species.

The leaves are truly concentrated at the apex of the branchlet, and the branchlets are thicker with the leaf-scars in very close succession on the present species. In *P. alternifolium* there are numerous variations in these points.

This species should have and may have as wide distribution as *P. alternifolium*, although from our specimens it is known to occur only as far north as Sarawak. The Sumatran specimen, *Rahmat Si Toroes 2165* cited here, is only in bud, but the size of the bracts and their position on the peduncle, along with the size of the bud, leaves little doubt that it belongs here, although no dissections were made.

In Sarawak this species is known as *Somak* and *S'Mak o Somà* (Beccari), *Saumur* and *Tbar* (Haviland & Hose), while in Sumatra it is known as *Mombang* (Rahmat Si Toroes).

3. ***Ploiarium sessile*** (Scheffer) Hallier in Beih. Bot. Centralbl. 34(2): 34. 1916. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 151. 1925.

Archytaea sessilis Scheffer in Tijdschr. Nederl. Ind. 32: 406. 1871. — Boerlage, Fl. Nederl. Indie 1: 98. 1890.

A portion of the original description of Scheffer's species, *Archytaea sessilis*, is quoted below. Since no specimen of this species was available for the present study, a detailed description by the present author is not possible. In order to bring together the descriptions of all the species in one place, I am including this description here.

"Folia dense congesta, alterna, oblongo-obovata; flores axillares, sessiles; bracteae calyci adpressae; stamina petalis fere aequilonga.

"In ins. Gèbèh, ins. *Halmahairae* vicina, in littoribus, detexit Teysmann.

"Gl; bra; ramuli validi, rugulosi; folia versus ramorum apicem valde

conferta, alterna, basi subcordata, oblongo-obovata, obtusa, marginibus revoluta, prope basin integerrima, apicem versus glandulose obsolete serrata, coriacea, $3\frac{1}{2}$ – $4\frac{1}{2}$ poll. longa, 1 – $1\frac{1}{2}$ lata. Bractae rotundatae. Sepala 5 subaequalia rotundata, bracteis duplo longiora. Petala sepalis duplo longiora, obovata, apice rotundata, subcoriacea, $1\frac{1}{4}$ poll. longa. Stamina numerosa, 5-adelpha, antheris versatilibus. Ovarium, stylus et fructus ut in *A. eleganti* Choisy (*Ploiarium* Korth., Verh. Nat. Gesch., Bot., p. 135; tab. 25). Semina nec ovula vidi.—Nostra species differt a Korthalsiana foliorum forma, floribus sessilibus, bracteis calyci adpressis, flore majore, staminibus petalis fere aequilongis.”

The characteristics mentioned in the above description which show distinction from either *P. alternifolium* or *P. pulcherrimum* are as follows:

1. *Leaves obtuse at apex.* In both *P. alternifolium* and *P. pulcherrimum* the leaves are acute even though obovate.

2. *Flowers sessile with bracts appressed to the calyx.* Since both *P. alternifolium* and *P. pulcherrimum* are known to have peduncles varying in length up to 5 cm., this character of sessile flowers alone sets the species off as distinct.

3. *Sepals twice as long as the bracts.* In this instance the relationship is with *P. alternifolium*; although no measurements are given, it is obvious that the bracts do not measure more than 3–5 mm. in length.

4. *Stamens and petals of equal length.* The length of the petals is given as one and a quarter inches or about 28 mm. This character agrees well, both in length and relationship, with the petals and stamens found in *P. pulcherrimum*.

The specimen cited by Scheffer in his description of *Archytaea sessilis* was collected on the shores of the island of Gebe (Gèbèh), which the author records as near the island of Halmahera. Detailed maps of Indonesia show that Gebe lies on the equator at approximately 129.5° longitude just east of the south-central extension of Halmahera. Its long narrow shape appears to be an interrupted projection of Halmahera, and as such it probably once formed the northern coast of the Halmahera Sea.

This position is east of the Wallace Line and close to or perhaps east of the Weber Line, depending upon one's point of view. Following the line of demarkation proposed by either of these workers, one would expect the association of this species to be more closely allied with the Australasian than with the Malaysian flora. Lam (in Ann. Jard. Bot. Buitenzorg 37: 33–48. 1927) offers the broader view of a gradual transitions from the Australian to the Malayan flora, using members of the family Sapotaceae to illustrate his thesis. I prefer to follow his lead, since, as far as I know, no mention has ever been made of this genus in any flora other than the Malaysian. However, in the sessile flowers this species is very distinct from any specimen of the genus found in the Malaysian flora west of the Wallace and Weber boundaries.

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