

BATIDACEAE (P. van Royen, Leyden)

1. BATIS

P. BROWNE, Hist. Jamaic. 1 (1756) 356; LINNÉ, Syst. Nat., ed. 10, Holm. (1759) 1289, non 1380 *auctores*; Lc. Hal. Magd. ed. (1760) 1289; VAN ROYEN, Nova Guinea, *n.s.* 7 (1956) 187–195, f. 1, 2, t. 11.

Dioecious or monoecious small shrubs with thick woody roots. *Leaves* simple, opposite, sessile, fleshy, with a distinctly saccate, colourless base. Stipules minute. *Flowers* unisexual, either solitary and terminal or axillary, or in small axillary spikes. ♂ *Flowers* subtended by bracts, enclosed in a membranous spathella which opens with one or two transverse or radial slits giving rise to 2–4 lobes. Tepals 4, valvate. Stamens 4, alternitepalous; anthers dorsifixed, introrse, dehiscing lengthwise with 2 slits. Sometimes an abortive gynaecium present. ♀ *Flowers* merely consisting of a naked ovary, in the axil of leaves when solitary, in the axil of cordate bracts when growing in spikes, 2-carpellate, 4-celled by one true and one false septum; ovules 1 in each cell, basal, anatropous, with a long funicle. Stigmas 2, sessile, distinctly papillate. *Fruit* a septical berry dehiscing with 2 valves, either solitary or many united together with the bracts into a connate, spikelike whole. *Seeds* with a large, straight embryo, exalbuminous.

Distr. The *Batidaceae*, consisting of one genus with two species, show a remarkably discontinuous area, viz *B. maritima* L. growing along the Atlantic and Pacific coasts of tropical America, the Hawaiian and Galapagos Islands, while *B. argillicola* has hitherto only been found in South New Guinea. As the distribution of the species is still rather insufficiently known and they are confined to littoral districts it has been found advisable to include both of them in the key given below.

Ecol. The Malaysian species, *B. argillicola* is found on littoral, rarely flooded, saline clay plains around Merauke in southern New Guinea, behind the mangroves where it occurs sometimes gregariously over large areas though it is sometimes also found solitary on the edge of the mangroves and of bushes scattered over the plains. It seems not to be entirely restricted to clayey soils as it is also found on sandy banks along small creeks in open connection with the sea but out of reach of normal high tide. For a full description of the habitat of this species cf. VAN ROYEN, Nova Guinea *n.s.* 7 (1956) 176–180, f. 1, t. 9. *Fl.* Aug.–Oct. (end dry season), *fr.* Dec.–Jan. (wet season).

B. maritima, the American species, is also found on saline clay plains, but these appear to be regularly flooded by the tides.

Taxon. Opinions on the taxonomic affinity of the *Batidaceae* have varied. SCOPOLI (1777) referred them to the *Amentiferae*, followed by VON WETTSTEIN, who arranged them close to *Salicaceae*. LINDLEY compared them with *Empetraceae* and in an other publication with *Urticaceae*. PULLE raised the family to the rank of an order related to *Rhoeadales*.

KUNTH (1817) was the first to point to their close relationship with *Chenopodiaceae* and this opinion has been accepted by BENTHAM, DAMMER, BESSEY, HALLIER *f.*, and HUTCHINSON. The flower structure is considered similar to that found in *Chenopodiaceae* and *Amaranthaceae*. According to ERDTMAN the pollen structure shows a resemblance to that in *Gyrostemonaceae*, a family closely related to *Aizoaceae* and sometimes merged with it. The presence of stipules, first reported by JOHNSON (1935) is matched with their presence in *Caryophyllaceae*. There seems, therefore, ample support for placing the *Batidaceae* among *Centrospermae*.

Morph. The morphological evaluation of the tepals in the ♂ flowers is disputed. They have mostly been regarded as representing staminodes. I have tried to demonstrate (1956), supported by anatomical data, that there is little evidence in favour of their staminal origin.

KEY TO THE SPECIES

1. Monoecious. Flowers and fruits solitary, in the axil of leaves or terminal, bracteate. Spathella of ♂ flowers consisting of two membranous, fused parts. Tepals of the ♂ flowers gradually tapering from the middle towards the base. Connective of anthers shield-like produced above the cells. Fruits free.
 1. *B. argillicola*
1. Dioecious. Flowers and fruits in spikes, in the axil of bracts and inflorescences axillary. Spathella of the ♂ flowers consisting of one membranous structure. Tepals of the ♂ flowers abruptly narrowed below the middle. Connective of anthers not produced. Fruits united into a connate, spikelike whole.
 1. *B. maritima* L.

1. *Batis argillicola* VAN ROYEN, Nova Guinea, *n.s.*, 7 (1956) 176–180, f. 1, t. 9; *ibid* p. 187–195, f. 1, 2, t. 11.—Fig. 1.

Shrub up to 70 cm, glabrous, innovations covered with numerous, white, elliptic lenticels. *Leaves* linear, 4–15 by 1–2 mm, submucronate to acute, saccate base c. 1 by 1 mm. Stipules very minute, one at either side of the leaf base. ♂ *Flowers* terminal or axillary, borne on brachyblasts consisting of a few leaves and one or more flowers, subtended by two sheathed bracts up to 4 by 2 mm, enclosed by a membranous spathe which splits radially and is often crested and saccate at the base, ultimately caducous. Tepals 4, spatulate, membranous, $1\frac{1}{2}$ – $2\frac{1}{2}$ by $\frac{1}{2}$ –1 mm, obtuse or truncate. Stamens 4, alternate with the tepals, 2– $2\frac{1}{2}$ mm long; filaments linear, winged, in bud with incurved apex; anthers elliptic, c. 1 mm, connective distinctly produced. *Ovaries* axillary, sessile, obliquely ovoid-ellipsoid, 4–7 by $1\frac{1}{2}$ –3 mm, glabrous, the 2 adaxial cells smaller than the abaxial ones. *Fruits* markedly oblique, up to 11 by 5 by 5 mm, the abaxial cells much larger than the adaxial ones. Ripe seeds not yet known.

Distr. *Malaysia*: New Guinea.

Ecol. On saline clay plains which are rarely flooded by seawater, but sometimes also along gulleys in open connection with the sea.

Vern. *Haha*, *ahake*, Marind dial.

Excluded

Batis hermaphroditica BLCO, Fl. Filip. (1837) 791 = *Pothos hermaphroditicus* (BLCO) MERR., cf. MERR. Sp. Blanc. (1918) 90 (*Araceae*).

Batis spinosa ROXB. Hort. Beng. (1814) 71, non Fl. Ind. ed. Carey 3 (1832) 762, based on *Cudranus bimanus* RUMPH. Herb. Amb. 5, p. 22, t. 15 f. 2 = *Cudrania cochinchinensis* (LOUR.) KUDO & MASAM. Ann. Rep. Taihoku Bot. Gard. 2 (1932) 27 (*Moraceae*).

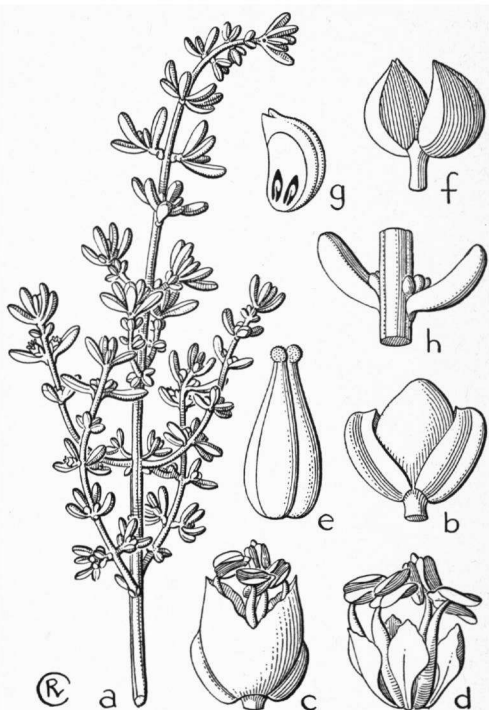


Fig. 1. *Batis argillicola* VAN ROYEN. a. Twig with ♂ flowers, b. juvenile ♂ flower, c. ♂ flower still enclosed by two bracts and spathe, d. ♂ flower after removing bracts and spathe, e. ♀ flower, f. two immature fruits, g. immature fruit after removing lateral wall of two cells, h. leaves with axillary ♂ flowerbuds (a × 1, b–e × 6, f–h × 2, a–e and h after VAN ROYEN 4828, f–g after BOENDERMAKER *s.n.*).