Medusagynaceae

Medusagynaceae Engler & Gilg (1924), nom. cons.

W.C. Dickison† and K. Kubitzki[1]

Small tree with a rounded crown. Leaves opposite, simple, elliptic or elliptic-oblong, glabrous, with a retuse apex and apical sinus, an attenuate base, and fine, widely spaced marginal glandular teeth, apical sinus contains a colleter on either side of the depression and a single one at the base of the cavity; stipules 0. Inflorescences lax, multiflowered, paniculate. Flowers regular, hypogynous, bisexual and male, the plants andromonoecious; staminate flowers without evidence of an abortive gynoecium; sepals 5, connate at the base, quincuncial in their distinct apices; petals 5, contort, at first spreading, later reflexed; stamens numerous, filaments distinct, slender, anthers basifixed, bithecate and tetrasporangiate, latrorse, dehiscing by slits; connective shortly protruding as apical extension; carpels numerous, 16–25, attached to central axis, each on its outer shoulder with a short stylodium and capitate stigma; ovules anatropous, epitropous, bitegmic, 2 per locule, on separate axile placentas, one ascending, the other descending; endosperm cellular. Fruit a septicidal capsule, each carpel separating acropetally from the central column along its entire margin, the dehisced carpels only maintaining a distal connection to the persistent columella. Seeds winged, with a thin layer of endosperm and a straight embryo.

A single genus and sp., *Medusagyne oppositifolia* J.G. Baker, endemic to Mahé of the Seychelles Islands, where it occurs at middle altitudes in pockets of soil between granite masses (Hemsley 1905).

Vegetative Morphology and Anatomy. *Medusagyne* grows to about 10 m in height; its trunk is up to 20 cm in diameter with dark, fibrous, striated bark (Robertson et al. 1989). Vegetative anatomy was described by Beauvisage (1920) and Dickison (1990a). Leaves are subcoriaceous with pinnate and brochidodromous venation. Veins are surrounded by a double sheath, a dense inner fibrous zone and an outer, parenchymatous layer. The petiole contains numerous small collateral bundles having various orientations and arranged in an arc. The mesophyll contains mucilaginous and crystalliferous cells. Cristarque cells have not been found. Nodal anatomy is multilacunar, multitrace, an infrequent pattern in dicotyledons with opposite leaves (Dickison 1990a). As described by Dickison (1990a), the wood contains solitary vessel elements with simple perforations. Intervascular pitting is opposite to predominantly alternate. Tracheids are present. Rays are heterogeneous with both uniseriates and multiseriates; axial parenchyma is diffuse and diffuse-in-aggregates, also paratracheal scanty. Tanniniferous tissue is present throughout the plant body. Sieve-tube plastids are of the S-type (H.-D. Behnke, pers. comm.).

Floral Morphology and Anatomy. The actinomorphic flowers are either bisexual or staminate (Robertson et al. 1989; Dickison 1990a). Nothing is known of the pollination biology or breeding system. Bisexual flowers possess numerous, distinct stamens that surround the gynoecium in layer-like groups that differ in length and are vascularized by the breakup of individual stamen fascicle traces (stamen trunk bundles). The biovulate carpels

[1]In his paper on *Medusagyne* (Dickison 1990a) and in the manuscript to this contribution, the late Dr. Dickison had ascribed spiral phyllotaxis to the androecium of *Medusagyne*, which definitely does not exist there; I have deleted this from the manuscript, and also added some recent information on the family.

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K. Kubitzki (ed.), *Flowering Plants. Eudicots*, The Families and Genera of Vascular Plants 11,
DOI 10.1007/978-3-642-39417-1_18,

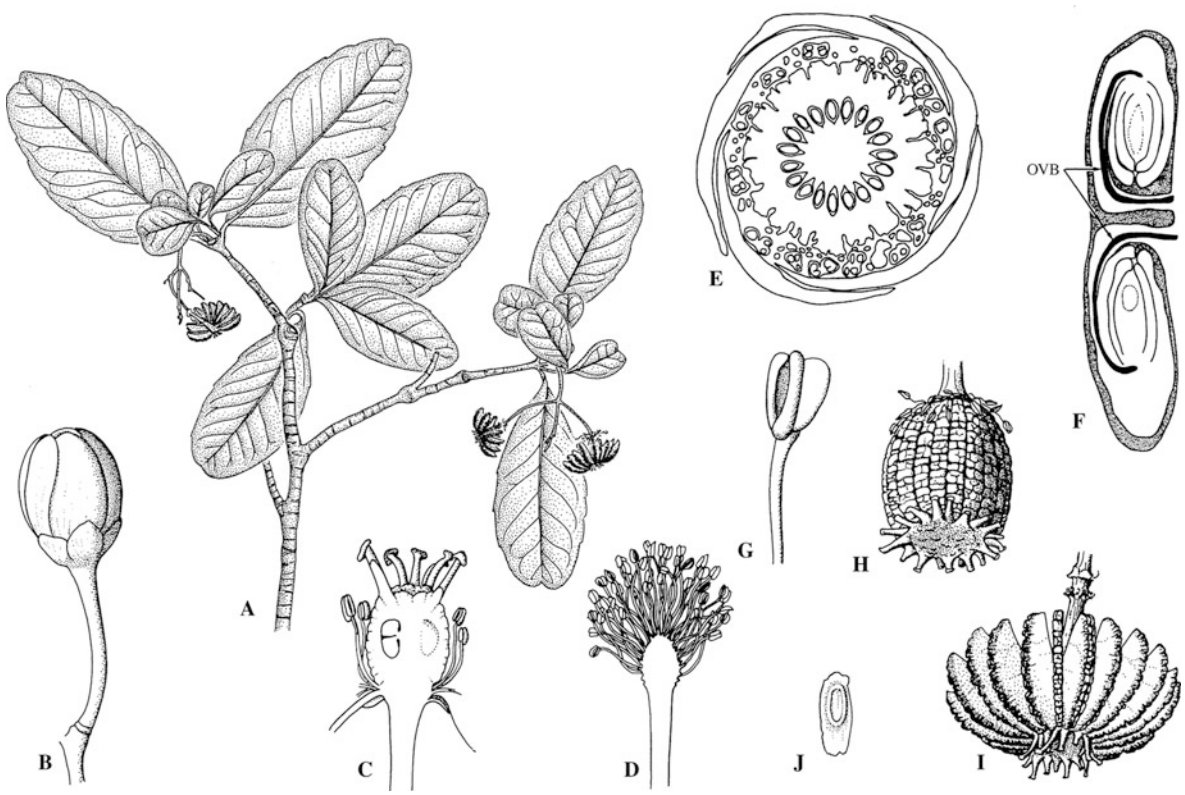

Fig. 58. Medusagynaceae. *Medusagyne oppositifolia*. **A** Fruiting branching. **B** Flower bud. **C** Bisexual flower, vertical section. **D** Staminate flower, vertical section. **E** Bisexual flower, transverse section. **F** Carpel locule, vertical section showing biovulate condition and ovulary vascular supply (OVB). **G** Stamen. **H** Fruit. **I** Open fruit. **J** Seed. (**A** original; **B–D** Robertson, Wise & White 1989; **E, F** Dickison 1990a)

occur in a single whorl and are borne on the sides of a broad, elongated torus that represents the upward extension of the receptacle. In a manner somewhat comparable to *Dillenia* (Dilleniaceae), carpels show pronounced ontogenetic adaxial deformation, during which the upper ventral surfaces become expanded, greatly extending the ventral margins and forming a domelike cushion of carpel-derived tissue over the summit of the torus (Dickison 1990b). Details of floral vascularization were presented by Dickison (1990a, b).

Embryology. The anther wall contains a subdermal endothecial layer with cells having well-developed bands of secondary thickenings and an inner tapetal layer. Each carpel locule contains a pair of superimposed ovules attached separately on axile placentae. Funiculi are long and curved. The upper ovule of the pair is ascending or erect, micropyle below, raphe dorsal. The micropyle is straight. The inner integument is 3–4 cells thick, and the outer epidermal cells of the inner integument differentiate into a fibrous layer in the seed. Ovules are weakly crassinucellate and vascularized by a single bundle that extends unbranched from the funiculus to the chalaza. Embryo sac and embryo development are unknown.

Pollen. Pollen is subisopolar, i.e. the distal and proximal faces are unequal, one being very convex, the other less convex, triporate, semiangular, small (13–15 x 14–17 μm). Apertures protrude. Sculpture striate, intertwined at different levels. At the TEM level, pollen is tectate-columellate with a massively developed foot layer (Dickison 1990a).

Fruit and Seed. As the fruit matures, carpels unfold on a radial frame from the base upwards in a manner resembling the ribs of an umbrella. In mature pericarps an inner region of thick-walled, lignified cells lines the locules. Seeds are small, c. 3.0 mm in length, compressed, winged and exarillate with reduced endosperm. The mature seed coat is exotegmic-exotestal with 4 or 5 layers of cells with thickened and suberized walls and a tegmic layer of thick-walled, lignified fibres. The endosperm is represented by a narrow, cellular zone without starch. The embryo is straight. See the detailed study of the fruit and seed anatomy by Doweld (1998).

Affinities. The totality of the structural evidence confirms the view that *Medusagyne* is a very distinct genus. Cladistic analyses based on the plastid gene *rbc*L by Fay et al. (1997) place *Medusagyne* in a clade with Quiinaceae and Ochnaceae, and Xi et al. (2012) resolve it with moderate support in a sister position with Quiinaceae. With these families, *Medusagyne* shares various characters including multilacunar nodes, mucilage cells and dentate leaves, but differs in, i.a., the organisation of the petiolar vascular supply.

Distribution and Habitats. *Medusagyne oppositifolia* is endemic to Mahé, the largest island in the Seychelles group. It occurs as a very rare component of the intermediate forest zone.

Conservation. The genus was once feared extinct, and even today only very few individual plants remain alive in scattered populations. One locality is now a national park nature reserve, although the area is threatened by a proposed dam construction. Attempts to cultivate *Medusagyne* have met with somewhat limited success.

One monotypic genus:

Medusagyne J.G. Baker Fig. 58

Medusagyne J.G. Baker, Fl. Mauritius Seych.: 17 (1877).

Characters as for family.

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