

FLORA OF BANGLADESH

NO. 1

CASUARINACEAE, PHYTOLACCACEAE,
HYDROPHYLLACEAE,
MARTYNIACEAE AND CARICACEAE

EDITOR

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University of Dacca

October 1972

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Associate Professor of Botany
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And

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Preface to the Reprinted Edition

The First edition of the Flora of Bangladesh Number 1 published in October, 1972 was unpriced and of a limited circulation. The printing of this number was financed by Ministry of Forests, Fisheries and Livestock, Government of the People's Republic of Bangladesh. As the demand for the copies of the flora increased both at home and abroad, the Bangladesh Agricultural Research Council bore the printing expenses of the reprinted edition published in July, 1975.

By the continued demand for the copies of the flora and support of the Ministry of Environment & Forest, Bangladesh National Herbarium is going to publish this flora again by May 2007 to facilitate regularly to the students, researchers, and institutions all over the country and abroad in the botanical exploration.

The Editor

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Introduction

The major botanical works that are consulted for identifying the Angiosperms of Bangladesh are those of Hooker (1872-1897), and Prain (1903) while the 'Flora of Assam' by Kanjilal *et al.* (1934-40), and the lists of Heinig (1925), and Cowan & Cowan (1929) are also helpful when dealing with the plants of Sylhet, Chittagong & Chittagong Hill-Tracts, and north Bengal respectively. During the last half a century or so many new species and varieties have been added, nomenclature revised, and new reports on the distribution of taxa published. But so far no comprehensive work on the flora of this country was ever written due mainly to the absence of a Government sponsored Botanical Survey and the National Herbarium. The present venture on the floristic studies has been largely encouraged by the funds sanctioned by the Government of the People's Republic of Bangladesh to implement the project, 'Botanical Survey of Bangladesh'. This paper is the first of a series of detailed taxonomic accounts of Angiospermic families of Bangladesh initiated with a view to compile, in stages, the Flora of this country.

CASUARINACEAE

Trees or shrubs with branchlets jointed, sulcate or grooved. *Leaves* reduced to scales at the nodal region of the branches. *Flowers* naked in spikes, unisexual, plants being monoecious or dioecious; male spikes elongated on terminal portions of the lateral branches, and female ones ovoid or capitate on the twigs. *Male flowers* represented by a single stamen and subtended by 2 or 4 scale-like bracteoles. *Female flowers* minute, each subtended by two scale-like bracts, style short, terminal with elongated linear

branches. *Fruits* crowded into a 'cone' with persistent bracts which at maturity open like a capsule exposing the samaroid indehiscent nuts.

A monotypic family of the southern hemisphere distributed from East Africa and the Indian sub-continent eastwards to Australia and New Caledonia.

CASUARINA Adans., Fam. 2, 481 (1763);
Forst., Char., Gen., 103, t. 52 (1776).

A genus with 45-50 species; represented in Bangladesh by only one species.

Casuarina equisetifolia Forst., Char. Gen., 103, t. 52 (1776). Hook. f., Fl. Brit. Ind. 5, 598 (1888); Prain, Beng. Pl. 2, 739 (1903)-Reprint; Benth., Trees of Calcutta, 421 (1946). *Casuarina muricata* Roxb., Fl. Ind. ed. Carey, 632 (1832). (Pl. I)

Bengali: *Bilati Jhau*

English: Australian oak or Beef-wood

A spreading tree up to 50 m tall or more with long, slender, green branchlets cylindrical, jointed or grooved, internodes 3-8 mm long, 7-ridged with the same number of scale-leaves at the nodal region. Flowers unisexual. *Male Flowers* borne in 1.4 - 3 cm long terminal spikes on short lateral branches, each flower having 2 bracteoles; perianth 2, minute; stamen solitary, slender, filament up to 2 mm long, anther oblong, basifixed, 2-lobed, opening lengthwise. *Female flowers* naked, borne in dense spherical heads on the twigs; carpels 2, united into 1-celled ovary with 1-2 ovules, style terminal with two long, elongated linear branches or stigmas up to 6 mm long. 'Cones' elliptic, 1.5 - 2 cm long and 1.2 - 1.5 cm broad, formed of woody bracts enclosing the mature fruits. *Fruit* 1-seeded, samaroid nut up to 7 mm long. *Flowering period*: November to March. *Chromosome number*: $2n=24$ (Darlington & Wylie, 1955).

Chittagong district: Cox's Bazar, Jaripahar, 19.2.1971, M.S. Khan & A.M. Huq (K. 2472, K 2473, and K 2474); Cox's Bazar, 28.12.1957, M.S. Khan and party; *ibid.*, 27.12.1953, M.S. Khan and party.

Dacca district: Dacca High court area, A.F. Mahmud 98.

Jessore district: Near Jheneidah civil court, A.M. Majeed.

The branchlets of the tree resemble *Equisetum* in their switch-habit from which the specific name has been derived.

It is indigenous to the sea coast of New South Wales in Australia, but later introduced into various countries. It owes its wide distribution to sea transport of 'cones', and on land by the wind action in which the winged nuts are drifted far and wide.

The tree is occasionally planted on the road side and in the gardens. The soft

sighing of the wind through the long slender branchlets is reminiscent of the murmuring of the distant sea. There is a plantation at Cox's Bazar beach to reclaim the sand dunes. Its timber is very hard and can be used as beams, and the wood also makes an excellent fuel. The bark yields a good resin useful for tanning.

PHYTOLACCACEAE*

Herbs, shrubs or rarely trees, some times scandent. *Leaves* exstipulate, simple, alternate, entire, pinnately reticulate. *Flowers* usually in terminal, leaf-opposed or axillary racemose inflorescences, bisexual or rarely unisexual (plants then monoecious), bracts and bracteoles generally present. *Perianth* simple, membranous, white or coloured, mostly uniseriate, 4-5 partite, more or less persistent. *Stamens* 3-many (the number varying within the same species), alternate with the perianth segments or irregularly inserted on a fleshy, minute, hypogynous disc, filaments free or connate below, anther 2-locular, introrse, dorsifixed, opening lengthwise. *Carpels* 1-many, free or connate, ovary usually superior, ovule solitary, amphitropous or campylotropous on basal placentation when ovary unilocular, if 2-more locular, placentation axile, style absent or very short, stigmas as many as carpels, usually linear to filiform (peltate in *Rivina*). *Fruits* of as many carpels, free or connate, very variable, and may be berries, drupes, achenes, utricles or schizocarps. *Seeds* erect to reniform, sometimes arillate, with abundant endosperm.

A family of about 17 genera and 110 species largely of tropics and sub-tropics of America.

RIVINA [Plumier ex] Linn., SP. PL., 121 (1753).

Rivina Linn., Gen. Pl. ed. 5, 57 (1754).

3 species native of tropical America. The genus is represented in Bangladesh by only 1 species.

Rivina humilis Linn., Sp. Pl., 121 (1753). Prain, Beng. Pl., 660 (1903)- Reprint. (Pl. II).

Herbs, c. 1 m long or more, woody at the base, branches sulcate. *Leaves* simple, exstipulate, alternate, petiolate, petiole up to 2.5 cm long, lamina ovate, entire, acuminate. *Flowers* up to 2.5 mm long, hermaphrodite, in axillary rarely terminal, many flowered racemes, pedicellate, pedicel up to 1 mm long, bracteoles deciduous. *Perianth* inserted on the hypogynous disc, 4-partite, white in colour at the young stage but becoming greenish at maturity, segments subequal, ovate-oblong. *Stamens* 4, up to 2

* The name *Phytolaccaceae* Lindl. (1836) is conserved over *Petiveriaceae* Link (1829).

mm long, hypogynous, alternate with the perianth segments, filaments slender, green at maturity, anthers oblong, opening lengthwise. *Carpel* 1, ovary sub-globose, uniovulate, ovule basal, amphitropous, style short, subterminal, stigma peltate. *Fruit* indehiscent, subglobose, pericarp adnate to the seed. *Seed* more or less lenticular to reniform, with hairy aril, endospermic. *Flowering period*: October to April. *Chromosome number*: $2n=108$ (Darlington & Wylie, 1955).

Dacca district: Dacca, Mahouttooly, 14.2.1953, Md. Shahjahan; *ibid.*, Bakshi Bazar, 12.10.1971, A.M. Huq 397; Sripur, 20.4.1964, M.A Baquee.

The species is indigenous to the United States of America, distributed from Florida to Texas. It is now naturalized in Bangladesh and India.

HYDROPHYLLACEAE

Annual or perennial herbs, rarely shrubby. *Leaves* alternate or opposite, often radical, entire or pinnately rarely palmately divided. *Flowers* regular, bisexual, usually pentamerous in cymose, often helicoid inflorescences, some times the flowers solitary and axillary. *Sepals* 5, imbricate, often with appendages in the sinuses. *Petals* 5, tubular or funnel-shaped, imbricate or contorted. *Stamens* usually 5, mostly epipetalous, alternate with petals, some times inserted towards the base of the tube, often with scale-like appendages at the bases, anthers 2-celled, linear or sagittate, staminodes present or absent. *Carpels* 1 or 2, ovary superior, rarely sub-inferior, 1-locular with 2 parietal more or less intruding placentae, some times meeting at the centre to make the ovary appear bilocular, style 1 or 2, stigmas more or less capitate. *Fruit* mostly loculicidal or septicidal capsule, dehiscing by 2, rarely by 4 valves, some times indehiscent. *Seeds* minute, often carunculate, variously sculptured, with small straight embryo and fleshy endosperm.

About 20 genera and 265 species distributed in all continents except Australia.

HYDROLEA Linn., Sp. Pl. ed. 2, 328 (1762).

About 20 species distributed in the warm regions. The genus is represented by only one species in Bangladesh.

Hydrolea zeylanica (Linn.) Vahl, Symb. Bot. 2, 46 (1791). Hook. f., Fl. Brit. Ind. 4, 133 (1883); Prain, Beng. Pl. 2, 528 (1903)-Reprint. *Nama zeylanica* Linn., Sp. Pl., 226 (1753). (Pl. III).

Bengali: *Kasschara*

An annual, prostrate to semierect herb up to 40 cm or more long, usually branched, rooting at the nodes. *Leaves* shortly petioled, simple, up to 8 cm or more, narrowed to the base, lanceolate, entire. *Flowers* up to 1 cm or more long in terminal and axillary inflorescences often in cymes, regular, 5-merous, pedicellate or subsessile. *Sepals* 5, up to 8 mm long, lobes lanceolate, more or less persistent, pubescent, glandular. *Corolla* rotate to campanulate, petals 5, imbricate, membranous, blue. *Stamens* 5, filaments filiform, up to 4 mm long, wider at the base, anthers sagittate. *Carpels* 2, ovary superior, enclosed by a thin membrane, pubescent, 2-celled due to the intruding parietal placentae at the centre, with numerous ovules in each cell, styles 2, distinct, stigmas capitate or often truncate. *Fruit* a thin, transparent, globose, septicidal capsule, up to 4.5 mm long. *Seeds* minute, c. 0.4 mm long, brownish with thin striations on the surface. *Flowering period*: October to March.

Chittagong district: Dohazari, 27.11.1970, M.S. Khan & A. M. Huq (K 2286), Mohamuni near Rangunia, 30.1.1971, A.M. Huq 309.

Chittagong Hill Tracts: Bandarban-Ruma, 14.1.1965, M. S. Khan 869; Ruma, 25.1.1965, M. S. Khan 1139.

Dacca district: Dacca, Jorepul, 13.12.1964, Moula Baksha 99; Tejgaon, 24.11.1963, A. Ghani 98.

Hydrolea zeylanica is widely distributed from tropical America and Africa extending through the Indian sub-continent and Malesia up to Australia. In Bangladesh it is fairly common throughout the country in shallow water, near ditches or in moist muddy places.

The plant is often eaten by cattle. The leaves are considered to possess antiseptic properties and are used as a poultice for obstinate ulcers (Kirtiker & Basu, 1918).

MARTYNIACEAE*

Annual or perennial, viscid-pubescent herbs. *Leaves* opposite or alternate, exstipulate. *Flowers* in terminal racemes, bisexual, zygomorphic. *Sepals* 5, nearly free or partly united at the base or spathaceous. *Corolla* of 5 united petals, more or less bilabiate, tube gradually expanded from the base, lobes more or less rounded. *Stamens* 2-4, epipetalous, the fifth one often represented as a staminode, anthers 2-celled, divergent or divaricate. *Carpels* 2, united to form a superior ovary, ovules few to many

* The members of this family were included in *Pedaliaceae* by Bentham and Hooker (1862-1883), but the *Martyniaceae* are distinguished by their characteristic horned fruits and parietal placentation.

on parietal placentation, style 1, slender, with two stigmas. *Fruit* a beaked or horned capsule, loculicidally dehiscent, exocarp fleshy, viscid hairy, deciduous, endocarp woody, crested on median line above and some times below, style single, proboscis-like, persistent, splitting at maturity into 2 horn-like processes. *Seeds* few to many, more or less compressed.

About 5 genera and 16 species, indigenous to the tropics of the New World. The family is represented in Bangladesh by only one genus.

MARTYNIA Linn., Sp. Pl., 618 (1753).

Represented in Bangladesh by a solitary species.

Martynia annua Linn., Sp. Pl., 618 (1753). *Martynia diandra* Glox., Obs., 14. t. 1; Prain, Beng. Pl. 2, 589 (1903)-Reprint. (Pl. IV).

A coarse herb up to 2 m tall. *Leaves* exstipulate, opposite, petiolate, petiole up to 7 cm long, lamina toothed, viscid-pubescent. *Flowers* up to 5 cm long, pedicellate, pedicel up to 12 mm long or more; bracteole 1, ovate-lanceolate, about 10 mm long. *Sepals* 5, as long as the bracteole, membranous, slightly united at the base, pubescent. *Petals* 5, pale-blue, lobes subequal, more or less rounded, tube gradually expanded from the base. *Stamens* 2, epipetalous, about 2 cm long, anthers 2-celled, oblong, divergent with longitudinal dehiscence. *Carpels* 2, united to form a superior ovary, placentation parietal, ovules few, style filiform, stigma of 2 unequal lobes. *Fruit* a 4-locular, loculicidally dehiscent capsule, up to 3 × 2.5 cm, exocarp fleshy, viscid-hairy to velutinous, beaked, deciduous, endocarp up to 2.7 × 2 cm, woody, alveolate or pitted, sculptured. *Seeds* up to 1.5 × 0.5 cm, 1 in each locule, oblong, compressed, endospermic, testa thin, longitudinally striated. *Flowering period*: October to November. *Chromosome number*: 2n=36 (Darlington & Wylie, 1955).

Chittagong district: St. Martin's island, 29.10.1963. M.S. Khan 667.

Rajshahi district: Rajshahi University campus, 2.10.1971, M.S. Khan 2555.

Dacca district: Tejgaon, 14.9.1961, Hadiuzzaman.

The species is a native of Brazil and Mexico. According to Ridley (1930) it was introduced into West Indies as early as 1824, and was brought before 1843 to India where it got established. In Bangladesh it is found on waste ground and rubbish heaps.

The hooks at the top of the fruit are readily attached to the fur of passing animals, and there can be no doubt that this plant owes its distribution to the agency of wild beasts.

The fruits rubbed down with water are applied as a cure in case of scorpion stings (Kirtikar & Basu, 1918).

CARICACEAE

Soft-wooded, small, dioecious or monoecious trees or shrubs with trunks rarely branched, sap milky. *Leaves* in a terminal crown, palmately lobed, long petioled, exstipulate. *Flowers* unisexual, rarely bisexual. *Staminate flowers* sessile on male plant in clusters on long pendent inflorescences; petals 5, united into a slender tube, contorted or valvate; stamens 10 in 2 series, inserted on corolla; pistil rudimentary, rarely functional. *Pistillate flowers* sessile on female plants, solitary or in few flowered corymbs in the leaf axils; corolla gamopetalous; ovary large, globose, pentacarpellary, syncarpous with numerous ovules on parietal placentation, style short, stigmas 5, sessile. Sepals 5, small in both the sexes. *Fruit* a pulpy berry. *Seeds* with fleshy endosperm and straight embryo.

4 genera and 55 species of tropical African and American distribution. Represented in Bangladesh by a single genus.

CARICA Linn., Sp. Pl., 1036 (1753); Gen. Pl., 458 (1754).

The genus consists of 45 tropical American species of which *Carica papaya* is the only species cultivated locally.

Carica papaya Linn., Sp. Pl., 1036 (1753). Prain, Beng. Pl., 374 (1903)-Reprint. (Pl. V).

Bengali: *Pepe*

English: Papaya

A tree growing up to 5 m or more, with milky latex in all parts. *Stem* greyish, rarely branched, marked with scars of leaf bases, bark thin. *Leaves* large, palmately, 7-9 lobed, clustered at the top of the trunk, petioles very long, leaf segments oblong, acute, deeply toothed. Generally male and female flowers on different plants but sometimes on the same plant, fragrant and night blooming. Plants with hermaphrodite but sterile flowers also occur producing seedless fruit without fertilization. *Male flowers* in panicles (very rarely solitary in the axils of leaves), up to 1.5 × 0.5 cm (up to 4 cm long when solitary in the axils of the leaves); sepals small, 5-toothed, gamosepalous; petals 5, cream coloured, twisted, about 1 cm long; stamens 10 in 2 series, inserted on the corolla. *Female flowers* c. 3.9 cm long, axillary, solitary or in groups of few flowers together, sometimes arising at the ends of the branches of male panicles, sessile or pedicellate, white; sepals 5, small, gamosepalous; petals 5, gamopetalous; carpels 5, syncarpous, ovary large, superior with 5-rayed sessile stigmas, each broadly fan-shaped, style almost absent, ovules numerous on parietal placentation. *Fruit* a pulpy berry, green, turning to yellow or orange-yellow when ripe. The flesh, when ripe, is of pinkish or orange tint about an inch thick. The fruits formed from the female flowers on male trees are always small in size, but contain fertile seeds. Seeds black, wrinkled, each enclosed by a thin

mucilaginous membrane derived from the aril. *Chromosome number*: $2n=18$, 36 (Darlington & Wylie, 1955).

Dacca district: Dacca, Jinijira, 14.6.1970, A. M. Huq 37; Dhanmondi, 12.9.1970, A. M. Huq 143; Segunbagicha, 2.8.1953, Md. Shahjahan.

Mymensingh district: Banogram, 14.3.1968. Paritosh 32.

The origin of *Carica papaya* is somewhat obscure. It may represent the fusion of two or more of its related species native of Mexico and Costa Rica. Papaya tree was introduced in the east from tropical America by the Spaniards. It is now cultivated in all parts of the tropics.

The large fleshy fruits are edible. Papain of commerce is obtained from the raw fruits. Green fruits are cooked as vegetables and also used for softening the tough meats. Milky latex goes into the manufacture of chewing gum. The seeds are some times used as an adulterant of black pepper.

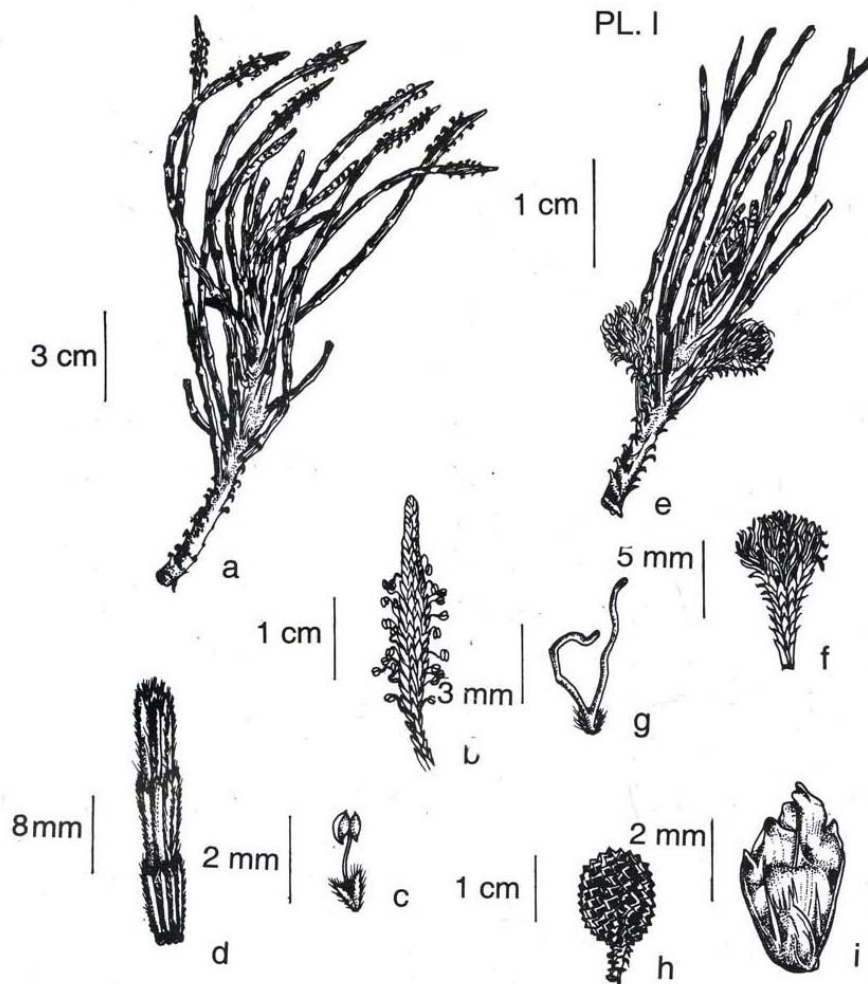
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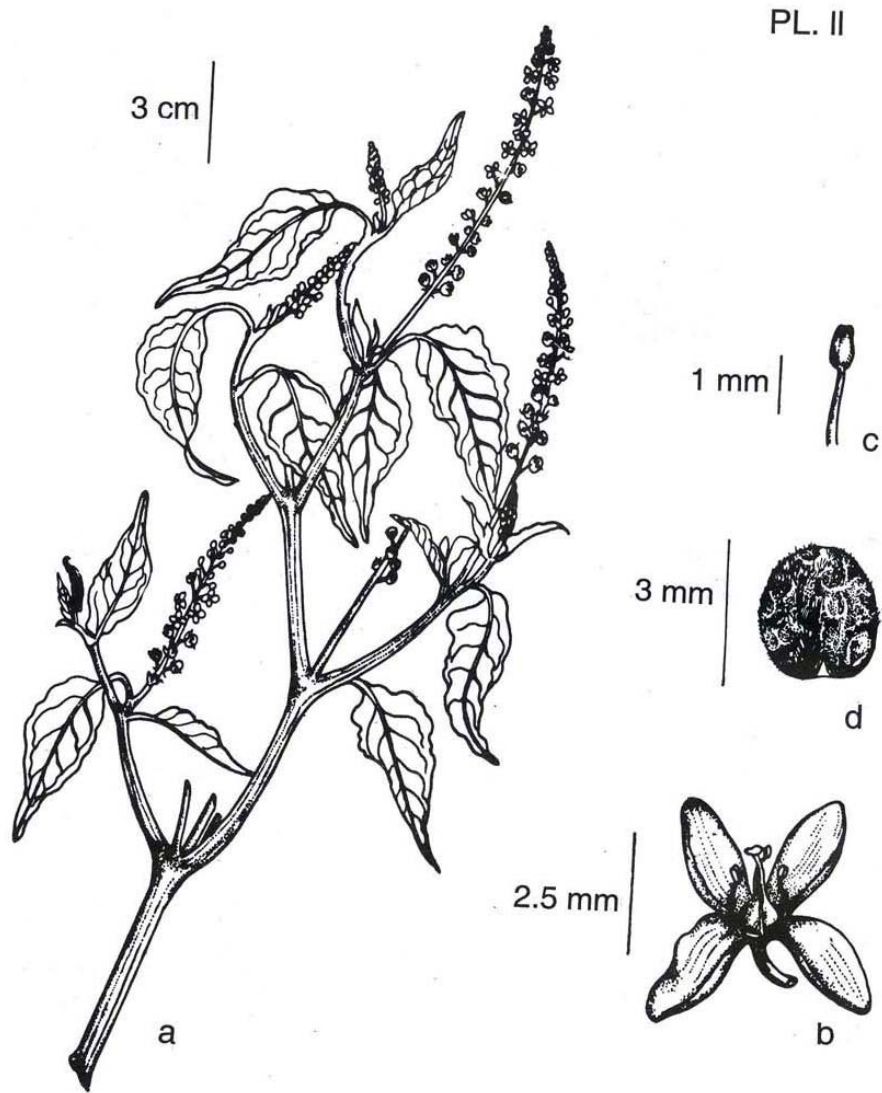
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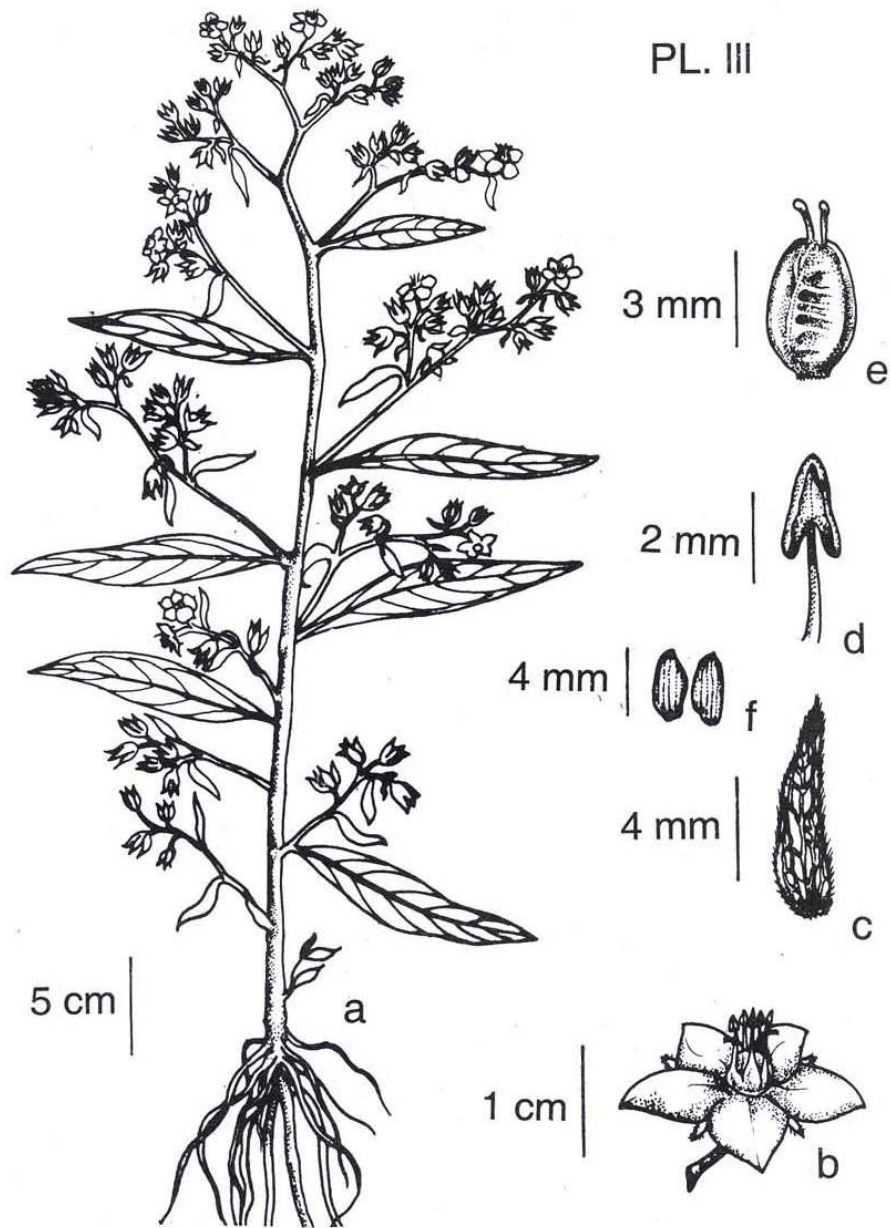
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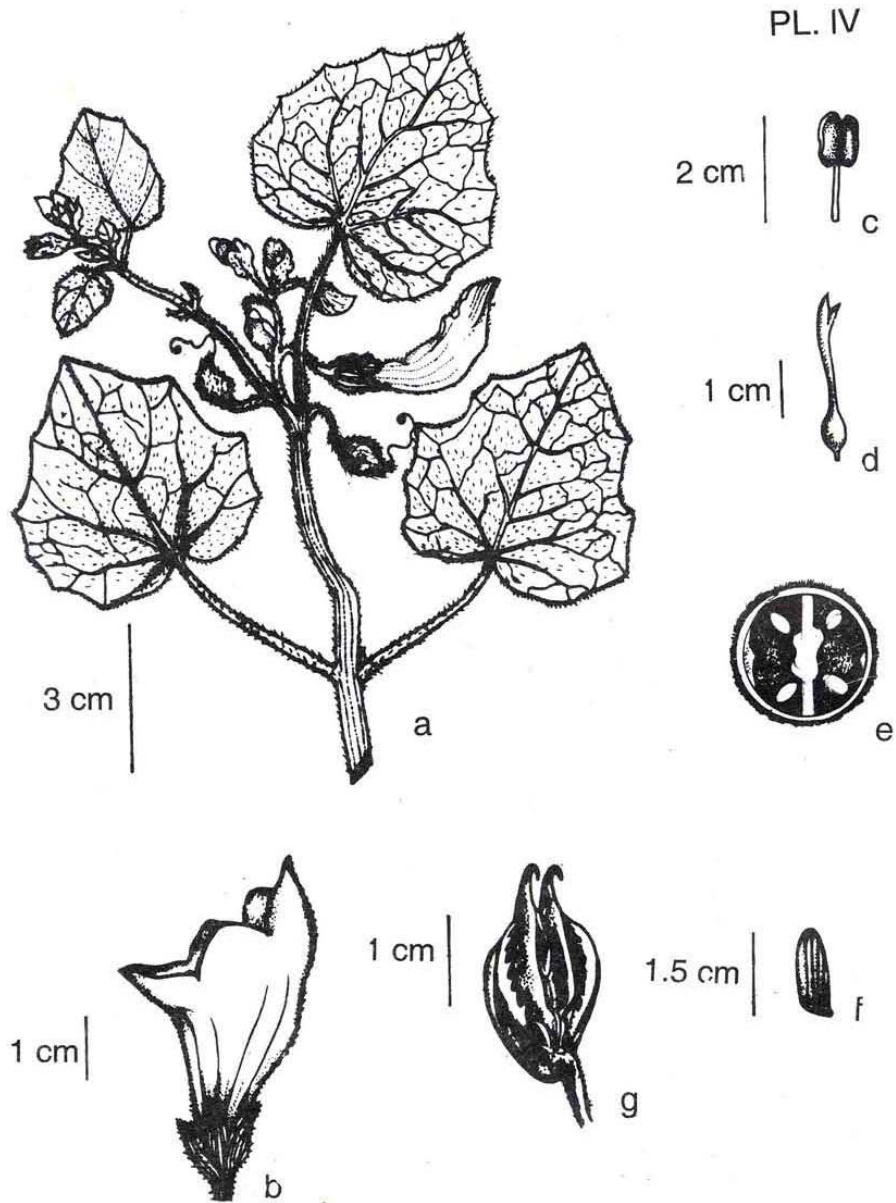
PL. I. *Casuarina equisetifolia* Forst. a) A twig showing male inflorescences; b) a male inflorescence; c) a male flower; d) a portion of a branchlet; e) a twig showing female inflorescences; f) a female inflorescence; g) a female flower; h) a 'cone'; i) a fruit.



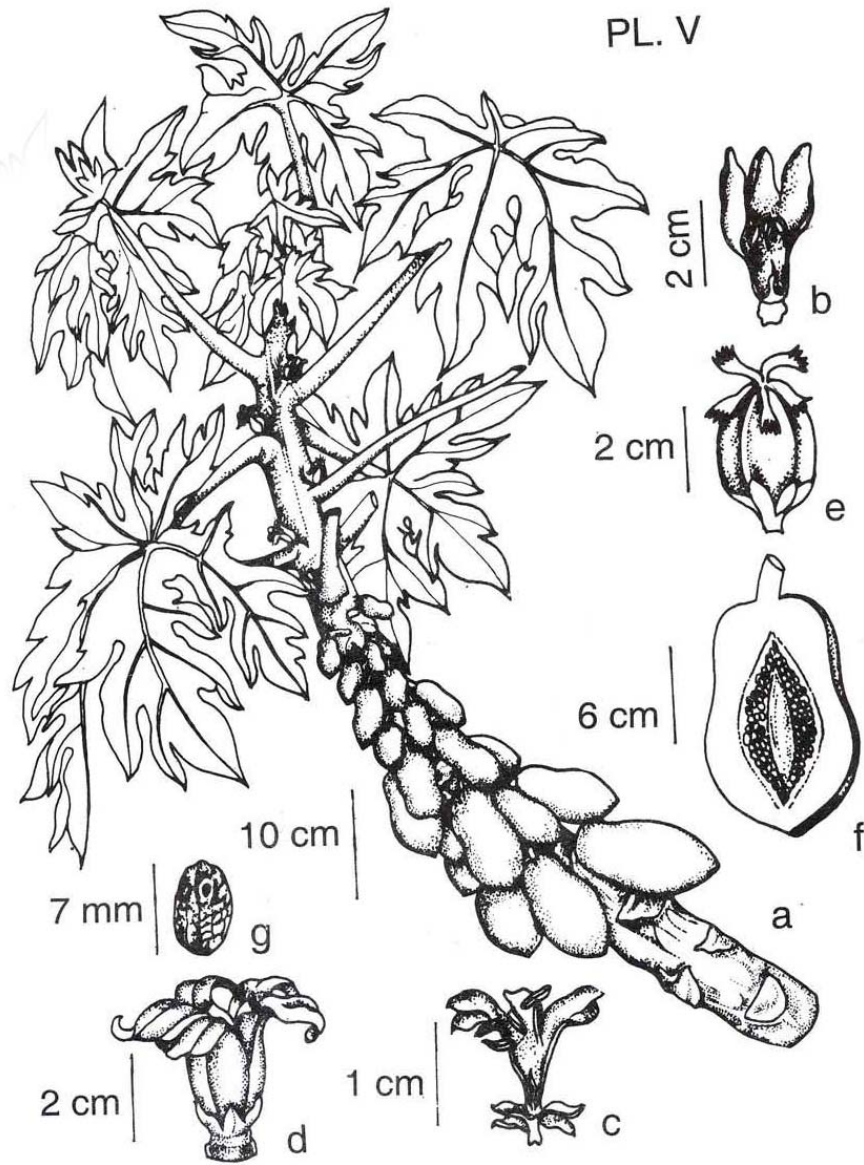
PL. II. *Rivina humilis* Linn. a) A portion of flowering shoot; b) a flower; c) a stamen; d) a seed with aril.



Pl. III. *Hydrolea zeylanica* (Linn.) Vahl a) A plant; b) a flower; c) a sepal; d) a stamen
e) ovary with styles; f) seeds.



Pl. IV. *Martynia annua* Linn. a) A portion of flowering shoot; b) a flower; c) a stamen; d) pistil; e) ovary in cross section; f) a seed; g) a mature fruit.



Pl. V. *Carica papaya* Linn. a) A portion of fruiting shoot; b) a solitary staminate flower rarely found in the axil of leaf; c) a staminate flower from the panicle; d) a pistillate flower; e) a pistillate flower with petals removed; f) a fruit in vertical section; g) a seed.

LIST OF FAMILIES PUBLISHED

	Flora No.
Caricaceae	1
Casuarinaceae	1
Hydrophyllaceae	1
Martyniaceae	1
Phytolaccaceae	1

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