CHAPTER 5

Qualitative Study
5. QUALITATIVE ANALYSIS OF MANGROVE FLORA

5.1. MANGROVES OF THE SUNDARBAN BIOSPHERE RESERVE

5.1.1. INTRODUCTION

The term ‘mangrove’ has been variously recognized and defined by several workers as follows:

i. Davis (1940) defined the mangroves as “Plants, which live in muddy, loose, wet soils in tropical tide waters”.

ii. Mac Nae (1968) defined the mangroves as “Trees or bushes growing between the level of high water of spring tide and level close to, but above the mean sea level”. He also used the term ‘Mangal’ for referring to the mangrove forest community”.

iii. Aubreville (1970) defined “Mangroves are the coastal tropical formations, found along the border of the sea and lagoons, reaching up to the edges of the river to point where the water is saline, growing in swampy soil and covered by sea water during high tides”.

iv. Blasco (1975, 1977) defined mangroves as “A type of coastal woody vegetation that fringes muddy saline shores and estuaries in tropical and sub-tropical regions”.

v. Arroyo (1977) defined mangroves as “A small group of true mangrove plants and associated species belonging to systematically unrelated families, possessing similar physiological characteristics and structural adaptations with common preference to the intertidal habitat”.

vi. Clough (1982) defined mangroves as “They are the only trees amongst relatively small group of higher plants those have been remarkably successful in colonizing the intertidal zone at the interphase between land and sea”.


vii. Naskar & Guha Bakshi (1987b) defined mangroves as ‘Coastal tropical forest formations encircled or spread by the tidal rivers and/sea water, flooded frequently by the tidal water’.

In the present work, the mangrove floral elements have been grouped in to 3 categories- mangroves, mangrove associates and back mangroves.

5.1.2. FOREST TYPES IN SUNDARBANS

Curtis (1933) classified the Sundarbans in to 3 main zones- i. Salt water forests, ii. Moderately salt water forests and iii. Fresh water forests.

Champion (1936) classified the mangrove forests of Sundarbans in to – i. Low-mangrove forests, ii. Tree-mangrove forests, iii. Salt water Heritiera forests and iv. Fresh water Heritiera forests.

Champion & Seth (1968) again described the Sundarbans of West Bengal under the category ‘4-B’ with the following subdivisions – i. Mangrove scrub, ii. Mangrove forests, iii. Salt water mixed forests and iv. Brackish water mixed forests.

Blasco (1975) identified the following 5 forest types based on the species composition- i. Back mangroves (Euryhaline zone), found on the river banks; ii. Dense mangrove consisting of different plant species; iii. Tall, dense forests of Heritiera fomes with primary associate Excoecaria agallocha; iv. Brackish water mixed Heritiera fomes forests with Rhizophora spp.; and v. Palm swamp dominated by Phoenix paludosa.

Naskar (1983) grouped the tidal mangrove forests and their floristic components in to the following categories- i. The sea face or beach forests, ii. The flora of formative island, iii. The flora of reclaimed low-lying cultivated zones, iv. The flora of river banks and v. The swamp forests.
Naskar (1987b) again presented his classification about the categories of different types of mangrove associations in Sundarbans as follows-

i. Deforested mangrove swamps,

ii. Dense mangrove forests,

iii. Tall and dense mangroves, comprising *Heritiera* sp.,

iv. Brackish water mixed *Heritiera* forests and

v. Palm swamps dominated by *Phoenix paludosa.*
5.2. RESULTS

5.2.1. Table 3. MANGROVE FLORA OF SUNDARBAN BIOSPHERE RESERVE

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### MONOCOTYLEDONS

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## FERNS

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5.2.2. PLANT DESCRIPTION WITH PHENOLOGY AND ECOLOGICAL NOTES

KEY TO THE FAMILIES

1a. Flowering plants ................................................................. (2)

2a. Leaves usually dorsiventral, reticulately veined; seeds with 2 cotyledons (Dicotyledons)................................................................. (3)

3a. Perianth usually 2-seriate, outer sepaloid; inner petaloid ......................... (4)

4a. Petals free; stamens free from petals........................................... (5)

5a. Sepals free from ovary............................................................. (6)

6a. Stamens indefinite................................................................. (7)

   7a. Flowers unisexual.............................................................. CLUSIACEAE

   7b. Flowers bisexual.............................................................. TILIACEAE

6b. Stamens usually definite....................................................... (8)

8a. Fruit dehiscent ................................................................. (9)

9a. Leaves fleshy................................................................. PORTULACACEAE

9b. Leaves not fleshy ............................................................. (10)

   10a. Leaves minute, scaly....................................................... TAMARICACEAE

   10b. Leaves not scaly.......................................................... (11)

      11a. Epicalyx present....................................................... MALVACEAE

      11b. Epicalyx absent.................................................... STERCULIACEAE

8b. Fruit indehiscent............................................................... MENISPERMACEAE
5b. Sepals usually adnate to the ovary. ........................................... (12)

12a. Ovary hypogynous................................................................. (13)

13a. Leaves often gland dotted ........................................ RUTACEAE

13b. Leaves not as above....................................................... MELIACEAE

12b. Ovary peri or epigynous (inferior) ............................... (14)

14a. Carpels usually free, if united then (ovary) 1-celled.......... (15)

15a. Flowers actinomorphic; perianth segments valvate in bud.............

................................................................. MIMOSACEAE

15b. Flowers zygomorphic; perianth segments imbricate in bud........ (16)

16a. Corolla papilionaceous, descendingly imbricate ...... FABACEAE

16b. Corolla not as above, ascendingly imbricate........................

................................................................. CAESALPINIACEAE

14b. Carpels united ................................................................. (17)

17a. Mangrove plants .............................................................. (18)

18a. Petals bifid or fimbriate; stigma capitate .... RHIZOPHORACEAE

18b. Petals absent or if present not as above; stigma umbrella-shaped.....

............................................................... SONNERATIACEAE

17b. Non-mangrove plants...................................................... (19)

19a. Ovary 1-celled......................................................... COMBRETACEAE

19b. Ovary 2 or more celled..................................................... (20)

20a. Trees; leaves apically clustered.............. BARRINGTONIACEAE
20b. Herbs, shrubs or climbers; leaves not apically clustered ...........

..........................AIZOACEAE

4b. Petals usually united; stamens inserted on the corolla.................... (21)

21a. Flowers epigynous ....................................................... (22)

22a. Leaves usually opposite, stipulate ..................... RUBIACEAE

22b. Leaves usually alternate, exstipulate.................................. (23)

23a. Inflorescence a capitulum; calyx reduced to pappus; ovary 1-celled ....

..........................ASTERACEAE

23b. Inflorescence other than capitulum; calyx not reduced as above; ovary 2-
many locular .......................... SPHENOCLEACEAE

21b. Flowers hypogynous .............................................. (24)

24a. Ovary 1-celled ..........................................................(25)

25a. Corolla salver-shaped; placentation basal ...... PLUMBAGINACEAE

25b. Corolla rotate, campanulate or infundibuliform; placentation free central ......................................................... MYRSINACEAE

24b. Ovary 2 to many-celled ................................................ (26)

26a. Stamens more than the number of corolla lobes...... SAPOTACEAE

26b. Stamens as many as corolla lobes or fewer......................... (27)

27a. Corolla actinomorphic ................................................. (28)

28a. Leaves usually alternate, if opposite then ovary 4-celled...... (29)

29a. Corolla lobes plicate; fruits capsules or rarely berries.......(30)
30a. Ovary many ovuled; fruit usually a berry or capsule ...........

.......................................................... **SOLANACEAE**

30b. Ovary usually with 2-ovules or rarely 1-4 in each cell; fruits capsular ................................................................. (31)

31a. Leafless parasitic vines; stems wiry....... **CUSCUTACEAE**

31b. Leafy non-parasitic, erect twiners or trailers; stems usually not as above................................. **CONVOLVULACEAE**

29b. Corolla lobes imbricate or contorted; fruits drupaceous ........

.......................................................... **BORAGINACEAE**

28b. Leaves opposite or whorled, sometimes radical.................(32)

32a. Gynostegium present; follicles divaricate......................

.......................................................... **ASCLEPIADACEAE**

32b. Gynostegium absent; follicles usually cohering ............

.......................................................... **APOCYNACEAE**

27b. Corolla usually zygomorphic.......................................(33)

33a. Leaves pinnately compound; fruits enlarged, woody ........

.......................................................... **BIGNONIACEAE**

33b. Leaves usually simple; fruits not enlarged and woody........(34)

34a. Fruits capsular; placentation axile ........ **ACANTHACEAE**

34b. Fruits usually drupaceous, pyrene or nutlets, rarely capsules; placentation basal................................................................. (35)

35a. Flowers in dense spikes or in lax cymes; ovules in axile placentation ........................................... **VERBENACEAE**
35b. Flowers in dense capitate cymes; ovules in free central placentation .......................... **AVICENNIACEAE**

3b. Perianth 1-seriate (apetalous), 2-seriate (monochlamydous) or absent (achlamydous) .............................................................. (36)

36a. Flowers usually bisexual ..............................................(37)

37a. Complete or partly parasitic plants......................... **LORANTHACEAE**

37b. Non-parasitic plants........................................................... (38)

38a. Perianth scarious, dry ............................................. **AMARANTHACEAE**

38b. Perianth membranous, herbaceous...................... **CHENOPODIACEAE**

36b. Flowers usually unisexual; if bisexual then perianth absent....................(39)

39a. Leaves usually reduced to scales..............................................(40)

40a. Parasitic herbs or shrubs; perianth lobes distinct............ **VISCACEAE**

40b. Trees; non-parasitic; perianth lobes indistinct.......... **CASUARINACEAE**

39b. Leaves well developed.....................................................(41)

41a. Aquatic plants; leaves whorled and dichotomously cleft into filiform segments ................................................. **CERATOPHYLLACEAE**

41b. Terrestrial plants; leaves not whorled as above......... **EUPHORBIACEAE**

2b. Leaves usually isobilateral, parallel veined; seeds with 1-cotyledon (Monocotyledons) .............................................................. (42)

42a. Perianth 2-seriate; the segments of both corolline, rarely herbaceous..........(43)

43a. Ovary superior ....................................................... **FLAGELLARIACEAE**

43b. Ovary inferior............................................................ **AMARYLLIDACEAE**
42b. Perianth series both calycine or if the inner series corolline then its segments not longer than those of the outer ones ............................................. (44)

44a. Perianth usually 2-seriate, trimerous.......................... ARECACEAE

44b. Perianth absent or reduced to scales, bristles or lodicules.........................(45)

45a. Inflorescence of heads or spikelets consisting of solitary flowers in the axils of glumaceous bracts.................................................................(46)

46a. Stems 3-angular, without nodes; leaves tristichous with closed sheaths;
flowers in the axils of single bract................................. CYPERACEAE

46b. Stems terete or 2-edged, nodes present; leaves distichous; flowers enclosed between lemma and palea........................................... POACEAE

45b. Inflorescence of many or few flowered spadices, spikes or racemes or if flowers solitary then not in the axils of glumes................................. (47)

47a. Marshy plants ....................................................... TYPHACEAE

47b. Aquatic plants ..................................................... RUPPIACEAE

1a. Non-flowering plants............................................................ (48)

48a. Fronds dimorphic; sori acrosticoid................................. BLECHNACEAE

48b. Fronds monomorphic (rarely sub-dimorphic); sori linear........ PTERIDACEAE
DICOTYLEDONS

CERATOPHYLLACEAE

Ceratophyllum L.


**Vernacular names:** Beng.: *Jhangji*.

Submerged, rootless, aquatic herbs, 1-3 m long with numerous side shoots making a bushy appearance. Leaves whorled, 6-12 at each node, linear, each 2-4 cm long, dentate. Flowers axillary, solitary, unisexual, minute, sessile. In male and female flowers tepals 9-12, linear, ciliate at apex. Nutlets ellipsoid, 4-5 mm long, usually with 3 spines, ovoid, laterally compressed, black.

**Fl. & Fr.:** September - December.

**Note:** This aquatic herb is found at the Bhagbtpur and Jharkhali, common in ponds, ditches and brackishwater fisheries.

PORTULACACEAE

Portulaca L.


**Vernacular names:** Beng.: *Baro-lunia*; Hindi: *Loniya*; Guj.: *Luni*; Mal.: *Neelakeera*; Mar.: *Khatechanval*; Sans.: *Laghulonina*; Tam.: *Chinnaparuppukirai*.

Much branched prostrate herbs with numerous ascending branches; nodes with whorl of hairs. Leaves fleshy, ovate-lanceolate to elliptic-cordate, 0.5-18.5 x 0.6-6.5 mm, acute at apex, entire, stipulate. Flowers solitary, terminal, bisexual subtended by a whorl

Fl. & Fr.: Throughout the year.

TAMARICACEAE

Tamarix L.

Key to the Species

1a. Flowers unisexual; leaves amplexicaul or sheathing

1b. Flowers bisexual; leaves not sheathing

2a. Stamens 5; capsules 3-5 mm across

2b. Stamens 10; capsules 8-15 mm across


Vernacular Names: Beng.: Lal-Jhau; Eng.: French Tamarisk.

Shrubs or small trees, with drooping branches. Leaves amplexicaul or sheathing, upper free part triangular-ovate, acute to acuminate at apex, 0.75-3.00 mm long. Flowers in simple or compound racemes, unisexual; bracts broadly ovate-lanceolate, 2-3 mm long, acuminate at apex, persistent. Male flower: Sepals 5, ovate or sub-orbicular, keeled; petals 5, obovate or oblong-ovobate, pinkish-red; stamens 5, disc 5-lobed; ovary abortive. Female flower: staminodes 5; style 3, ovary triquetrous. Capsules 3-5 mm, conical-oblong, with persistent sepals and staminodes. Seeds with coma.

Fl. & Fr.: April – November.
Notes: Occasional along the riverbanks and the edges of marshes, well adapted to sandy and salty areas.


**Vernacular names:** Guj.: *Gajri*; Hindi: *Jhau*; Mar.: *Saru*; Raj.: *Javra*; Tel.: *Jeelugu*.

Undershrubs or shrubs. Leaves ovate-lanceolate or broadly triangular, 1.5-6.5 mm long, acuminate at apex, keeled. Flowers in simple raceme, bisexual; bracts amplexicaul, broadly triangular, 2-5 mm long, acuminate at apex, denticulate. Sepals 5, free, ovate, irregularly denticulate. Petals 5, oblong-ovobovate, pink. Stamens 10, outer 5 longer, antisepalous; inner 5 shorter, antipetalous. Disc 10-lobed. Capsules 10-15 mm long. Seeds comose.

**Fl. & Fr.:** Throughout the year.

**Note:** Common along the river banks and marshes.


**Vernacular names:** Beng. & Hindi: *Nona-Jhau, Ban Jhau*; Guj.: *Jhav-nu-khada*; Or.: *Jaula*; Punj.: *Pilchi*; Sans.: *Jhavuka, Shavaka*; Tel.: *Palivi*; Tam.: *Kiri*.

Shrubs or small trees, up to 3 m tall. Leaves ovate-rhomboid, subulate or scale-like, 1.2-3.5 mm long, acute at apex, keeled, margin scarious. Flowers in simple or densely compound raceme, bisexual; bracts triangular ovate, 1.5-3 mm long, acuminate, denticulate, deflexed. Sepals 5, almost free, ovate or suborbicular, rounded or truncate at
apex, persistent. Petals 5, obovate or obovate-elliptic, pinkish, caducous. Stamens 5, twice as long as the petals. Disc 5-lobed, notched. Capsules 3-4 mm long. Seeds comose.

**Fl. & Fr.:** August - September.

**Note:** Usually found as ornamental, also as escape in the fields. Often forming a wide patch on coastal saline beach.

### CLUSIACEAE


**Vernacular Names:** Beng.: *Kath Champa or Sultan Champa*; Eng.: *Indian Laurel*; Hind.: *Surpan*; Sans.: *Nagachampa, Punnag*; Ori.: *Polanga*; Mal.: *Punna*; Tam.: *Punnagam*; Tel.: *Punnaga*.

Large trees, 12-15 m tall; mature bark widely fissured, grey or blackish, live bark pinkish with yellow exudate. Leaves obovate-elliptic or broadly elliptic, 15-20 x 5-8 cm, rounded or retuse at apex, subcuneate at base, entire, leathery, shining on both surfaces. Flowers few in axillary racemes or panicles, bisexual. Sepals 4, concave, reflexed. Petals 4, obovate-elliptic, 1.2-1.5 cm long, obtuse, white. Stamens numerous; filaments obscurely fasciculate. Ovary globose, 1-celled, reddish purple; ovule 1, basal; style twisted; stigma peltate, margin irregular. Drupes globose, 2.5-4 cm in diam., greenish, with long stalk, pulp scanty.

**Fl. & Fr.:** November – March.

**Notes:** Common on sea shores and river banks, occasional in mangrove areas in a zone beyond the frequent tidal action.
MALVACEAE

Key to the Genera

1a. Style undivided; stigma ribbed or lobed.............................. *Thespesia*

1b. Style distally divided into 5 arms; stigma more or less capitate or globose.......................... *Hibiscus*

**Hibiscus** L. (*nom. cons.*)


**Vernacular names:** Beng.: *Bola*; Hindi: *Bola*; Eng.: *Tree mallow*; Ori.: *Bariya*; Mal. & Tam.: *Nirparutti*.

Trees, 10-15 m tall with radiating branches; bark fibrous. Leaves cordate, 7-15 x 4-10 cm, acute to acuminate at apex, deeply cordate at base, entire; stipules ovate to oblong, caducous. Flowers solitary, axillary. Epicalyx cupular; segments 7-10, deltoid, usually shorter than calyx. Calyx campanulate. Petals obovate, apex rounded, base fleshy, drooping, bright yellow, with dark purple centre. Staminal column shorter than petals. Style distally divided into 5 arms; stigma more or less capitate or globose. Capsules globose to ovoid, with a short beak, 3.0 - 6.0 cm across. Seeds few.

**Fl. & Fr.:** February – September.

**Notes:** Occasional along the boundary line of the islands near estuaries, frequently inundated with high tides.
**Thespesia** Sol. ex Corr., *nom. cons.*

**Key to the Species**

1a. Leaves deeply cordate, green; pedicels 2-5 cm long, erect, jointed near base
.................................................................................................................... *T. populnea*

1b. Leaves shallowly cordate or sub-truncate, bronze-coloured; pedicels 8-12 cm long, drooping, without any joint
.................................................................................................................... *T. populneoides*


**Vernacular Names:** Beng.: Parash, Gajashundi, Palasipal, Paresipal, Porash, Prash; Eng.: Portia Tree, Tulip Tree, Umbrella Tree; Hind.: Bhenhi, gajadanda, Gajhanol, Parashajhad, Paraspipal, Parsipu, Pipal, Porush; Sans.: Gardabhanda, Kamandalu, Kandarala, Kapitana, Kundah, Nandi, Parisha; Guj.: Bendi, Bhindi, Paraspipar; Malay: Baru, Buah Keras laut; Mar.: Bendi, Bhenda, Bhendi,Paraspipar; Tamil: Kallal, Piram.

Trees, 5-10 m tall; twigs densely covered with minute scales, ultimately glabrescent. Leaves deltoid, 10-15 x 8-12 cm, acuminate at apex, deeply cordate at base; stipules linear to lanceolate, acute, caducous. Flowers solitary, axillary of distal foliage leaves. Epicalyx segments 3, oblong to lanceolate, acute, caducous. Calyx cupular, 5-lobed, pubescent on both sides, persistent. Corolla broadly campanulate. Petals 5, obliquely obovate, narrowed and fleshy at base, rounded at apex, light yellow with dark purple centre, densely scaly outside, glabrous inside. Staminal column 1-2 cm long. Ovary globose to ovoid; stigmas connate to a clavate 5-sulcate body. Capsules globose, 2-4 cm across, densely covered with brown hairs, indehiscent. Seeds angular, pubescent.

**Fl. & Fr.:** November – March.
Note: This species is common along riverbanks and outer fringes of mangroves, also planted along roadside for shade tree.


**Vernacular Names:** Beng.: *Paras*; Eng.: *Portia Tree*.

Trees, 4-8 m tall; twigs pubescent. Leaves deltoid to subcordate, with a broad sinus at base, 5-20 x 5-14 cm, acute to acuminate at apex; stipules subulate to lanceolate, early caducous. Flowers solitary, axillary. Epicalyx segments 3, triangular-ovate, early caducous. Calyx cupular, truncate or with 5 minute teeth, accrescent and flattened in fruit. Petals 5, obliquely obovate, rounded at apex, light yellow, with dark purple base, densely hairy outside, glabrous inside. Staminal column 1.5-2.5 cm long. Ovary globose; stigma ribbed or lobed. Capsules globose, 2-4 cm across, dehiscent into 5 valves. Seeds angular, pubescent.

**Fl. & Fr.:** April - December.

**Notes:** Frequent along muddy sea-shores and outer fringes of mangroves.

**STERCULIACEAE**

**Key to the Genera**

1a. Anthers in a ring on the column below the sterile ovaries; fruits samaroid..... *Heritiera*

1b. Anthers in a ring at the top of the staminal column enclosing the sterile ovaries; fruits capsular.......................................................... *Sterculia*
**Heritiera** Aiton


**Vernacular Names:** Beng.: *Sundri*; Eng.: *Looking glass mangrove*.

Trees, 5-20 m tall; branches pubescent. Stems with well-developed buttresses, pneumatophores present; bark grayish-red in colour with many fissures. Leaves elliptic-ovate, 5.-12 x 3-6 cm, tapering both at apex and base, upper surface green, lower surface silvery-white with scales; petioles up to 2.5 cm long. Flowers unisexual in axillary, branched, cymose panicles, golden yellow, with reddish tinged inside; pedicels slender, 4 cm long. Calyx campanulate, 5-toothed, stellate-hairy inside. Petals absent. Male flowers in the lower ramifications; stamens united into a column with a ring of anthers at the top. Female flowers in the upper ramifications; carpels 5, free. Samaras subglobose, 3-4 cm across, woody, a deep prominent ridge forming a keel on one end.

**Fl. & Fr.:** August – October.

**Note:** Rare in tidal forest along raised banks of creeks and channels, away from the river mouth generally in association with *Avicennia officinalis, Ceriops decandra* and *Excoecaria agallocha*. This species is more abundant in the eastern part than the western part of Sundarban Tiger Reserve.

**Sterculia** L.


**Vernacular names:** Beng.: *Jangli-badam*; Mal.: *Anaththondi*; Mar.: *Jungli-badam, Pun*; Tam.: *Pinari, Kudiraippiduku*.
Large trees, up to 30 m tall; branches whorled. Leaves digitately 5-9-foliolate; leaflets elliptic-lanceolate to oblong-lanceolate, 6.0-13.5 x 1.5-4.0 cm, acute to acuminate at apex, tapering at base, entire; stipules ensiform. Flowers unisexual, many in racemose panicles at the end of branchlets. Calyx campanulate, deeply 5-lobed; lobes lanceolate, subacute, hairy. Male flowers: Staminal column 5 mm long, hairy. Female flowers: Gynophore 8 mm long; ovary 5-angled. Follicles boat-shaped, 8-10 x 4-6 cm, beaked, woody. Seeds many, oblong, glabrous.

Fl. & Fr.: February – August.

Note: This species is found in estuarine region in association with mangroves in association with Aegiceras corniculatum and Ceriops decandra at the Bagmara block.

TILIACEAE

Brownlowia Roxb.


Vernacular Names: Beng.: Lata Sundari, Bhola Sundri, Kedar Sundri.

Semi-erect, shrubs or under trees, 2-4 m tall; stem woody, brownish, scaly. Leaves lanceolate, 10-16 x 3-5 cm, acuminate at apex, rounded at base, entire or slightly undulate, glabrous above, silvery white scaly beneath. Flowers in axillary or terminal panicles. Calyx campanulate, 4-5 lobed; lobes lanceolate, acute, connate below. Petals 5, polypetalous, narrowly obovate, reddish-white. Stamens many; anthers didynamous. Ovary 4-locuèd; ovules 2 in each locule; stigma 4-lobed. Capsules pyriform, 1- 1.5 cm across, a ridge separating the carpel present throughout the fruit, brownish-grey. Seeds obovoid.
Fl. & Fr.: May - September.

Notes: Very rare in the tidal forests and saltwater creeks and canals forming dense thickets along banks. Found only in Arbesi block in association with Aegiceras corniculatum, Acanthus ilicifolius, Clerodendrum inerme and Ceriops decandra.

RUTACEAE

Atalantia Correa, nom. cons.


Vernacular Names: Beng.: Ban lebu; Sans.: Atavi-jambira, Kurindai, Kurundu; Malay.: Kattukurunta, Kolanna, Kuttunarakam, Mal-naregam, Malanarakam; Mar.: Makadlimbu, Makadlimbu, Makurlimbu, Ranlimbu.

Large shrubs, 3-12 m high; banchlets woody, with single, axillary, spine; spines stout, up to 2 cm long; glabrous at maturity. Leaves unifoliolate; stipules awl-shaped, axillary; petioles up to 1 cm long; leaflets ovate-lanceolate to elliptic-oblong, 3-12 x 1-5 cm, emarginate at apex, broadly cuneate at base, margin entire, dark green and glossy above, pale green beneath, coriaceous, glabrous. Flowers bisexual, in axillary racemes or corymbs or umbels; peduncles slender; bracteoles subulate, pubescent, caducous; pedicels filiform, 8-15 mm long. Calyx cupular; lobes 3 or 4, obtuse, persistent. Petals 4 or 5, oblong-elliptic, rounded at apex, clawed below, white. Stamens 8 or 10. Ovary ovoid, smooth, 3-4-or 4-locular; each locule with 1-or 2-ovules; stigma capitate, 3-or 4-lobed. Berries globose, 3-or 4-locular. Seed solitary, oblong.

Fl. & Fr.: August – February.
Note: In riverine scrub jungles mixed with Ceriops tagal and Excoecaria agallocha. This mangrove associate was not included in Flora of West Bengal (1997) by R.B. Ghosh.

MELIACEAE

Key to the Genera

1a. Seeds arillate................................................................. Aglaia

1b. Seeds exarillate................................................................. Xylocarpus

Aglaia Lour.


Vernacular names: Beng.: Amur, Latmi; Mal.: Punyeva, Sempuli; Sans.: Anganapriya; Tam.: kannikkombu; Tel.: Ettanduga.

Trees, 8-12 m tall, with numerous, vertical blind-root suckers or woody pneumatophores. Leaves spirally arranged, imparipinnate; leaflets 2-4 pairs with an odd one, ovate-oblong-lanceolate, inequilateral, apex obtuse, base oblique except that of the terminal leaflet, glabrous on both surfaces. Flowers unisexual. Male flowers in axillary, lax, branched panicles. Calyx lepidote outside, 3-lobed; lobes rounded, minutely ciliate. Petals 3, broadly elliptic, concave, glabrous, yellow. Staminal tube scarcely shorter than the petals, obovoid, irregularly 5-7 toothed; anthers 6, pubescent. Female or hermaphrodite flowers a little larger than the male, in few-flowered, supraaxillary racemes. Calyx, petal, staminal tube as in the male; ovary lepidote, ovate-trigonoous, 3-celled; stigma sessile, large, 3-lobed. Capsules globose, depressed, trilocular, 5 - 12.5 cm diameter, dehiscing by 3 valves.

Fl.: Male flowers throughout the season, female flowers during April-July.
Fr.: August – November.

Notes: This species is common in tidal forests, but rare in intertidal mangrove areas.

**Xylocarpus** Koenig.

Key to the Species

1a. Leaflets obovate-oblong to elliptic-oblong, fruits to 25 cm across........... *X. granatum*

1b. Leaflets ovate to broadly obovate; fruits to 12 cm across............. *X. mekongensis*


Vernacular Names: Beng.: *Dhundul*; Eng.: *Cannon Ball Mangrove*.

Trees, upto 10 m tall; stem base long buttressed; bark pale-green to yellowish-brown, smooth. Leaves alternate, paripinnate, 12-15 cm long; leaflets opposite, variable in shape, mostly obovate-oblong to elliptic-oblong, 5-12 x 2-3 cm, rounded or emerginate at apex, rounded at base. Flowers unisexual, in axillary panicles, pedicellate. Calyx 4-lobed; lobes rounded, slightly obtuse-acuminate. Petals broadly oblong, rounded at apex, cream-coloured. Male flowers: Stamens 8 with undulate appendages; anthers included. Female flowers: Ovary broadly ovoid, 4-celled; style short; stigma discoid. Capsules globose, to 25 cm across, fleshy, splitting into 4-valves, brownish. Seeds 8-10, angular to triangular.

Fl. & Fr.: March - September.

Notes: This species is common in intertidal flat swamps, muddy lands in the mangrove forests, usually in association with *Avicennia marina*, *A. officinalis*, *Bruguiera gymnorrhiza* and *Rhizophora apiculata*.

Vernacular Names: Beng.: Pussur.

Trees, upto 15 m tall; stem base shortly buttressed, with woody blunt pneumatophores; bark reddish-brown, rough, peeling off as thick flakes. Leaves alternate, paripinnate; leaflets opposite, opposite, ovate to broadly obovate, apex runcate, base rounded, subsessile. Flowers unisexual, in lax panicles, pedicellate. Calyx 4-lobed; lobes rounded, obtusely acuminate. Petals 4, polypetalous, elliptic-oblong, pinkish-white. Male flowers: Stamens 8, staminal column turbinate. Female flowers: Ovary broadly ovoid, 4-celled; ovules 2-8 in each cell; style short; stigma discoid. Capsules globose, obscurely 4-lobed, 8-12 cm across, brown, dehiscing by valves. Seeds 3, triangular.

Fl. & Fr.: March – October.

Note: This species is usually found in slightly elevated lands of the intertidal region of mangrove swamps in association with Avicennia officinalis, A. marina, Heritiera fomes etc.

FABACEAE (nom. alt. PAPILIONACEAE)

Key to the Genera

1a. Plants erect ................................................................. (2)

2a. Pods not winged .......................................................... Millettia

2b. Leaflets alternate .......................................................... Dalbergia

1b. Plants climbers .......................................................... Derris
**Dalbergia** L. f., *nom. cons.*


**Vernacular Names:** Beng.: *Chulia Kanta*.

Erect shrubs, up to 5 m tall; branchlets many, each ending in a hard spine. Leaves crowded from the nodes; nodes contain spine like stipules; rachis slender, rusty pubescent; leaflets 9-15, alternate, elliptic-oblong, 1.0-2.5 x 0.5-1.2 cm. long, obtuse to emarginate at apex, cuneate or rounded at base, glabrous; petioles very short. Flowers in axillary, lateral racemes, pedicellate, unisexual, whitish-purple. Pods reniform, 1.5 –3.0 cm long, flat, glabrous, brown, 1-2 seeded.

**Fl.:** April – June; **Fr.:** August - December.

**Note:** Common in intertidal zones along the estuarine banks, usually in association with *Sonneratia apetala* and *Excoecaria agallocha*.

**Derris** Lour.

Key to the Species

1a. Pods narrow, thin, strap-shaped, much longer than broad…………………. *D. scandens*

1b. Pods much broader, thick and turgid ………………………………………… *D. trifoliata*

**Derris scandens** (Roxb.) Benth. in J. Linn. Soc. 4 (Suppl.):103. 1860; Baker in Hook. f., Fl. Brit. India 2:240. 1876; Prain, Bengal Pl. 1: 291. 1963 (Rep. ed.); Sanjappa, Legumes

**Vernacular Names:** Beng.: *Nola lata*; Eng.: *Hog-Creeper*; Hind.: *Gonj*; Ori.: *Kamocho*; Mal.: *Nulavalli*, Tam.: *Anaikkatu, Tirani*, Tel.: *Chiratalabodi*.

Woody climbers; stem greenish-grey. Leaves imparipinnate, 8-16 cm long; leaflets 7-13, elliptic-oblong or obovate-oblong, 6-8 x 1-2 cm, lowest pair smaller, subacute at apex, rounded at base, dark green, glabrous above, pale, puberulous beneath. Flowers arranged in fascicles in short peduncled axillary and terminal racemes. Calyx cupular, 3-4 mm long; teeth obscure. Corolla to 1.8 cm long, white to pale pink. Stamens monadelphous; staminal sheath 0.8-1.0 cm long. Ovary pubescent; ovules up to 8. Pods narrowly oblong, 3.5-11.5 x 0.8-1.2 cm, tapering at both ends, apex pointed, winged on the dorsal suture, reticulately veined, with adpressed minute, silky hairs. Seeds 1-4.

**Fl. & Fr.:** February – April.

**Note:** Common in the river side scrub jungles, hedges, thickets and often in tidal flats.


**Vernacular Names:** Beng.: *Pan lata*; Malay: *Akarketuil*; Tel.: *Nallatige, Tigakranuga*.

Climbing, scandent shrubs; bark grayish-black with white spots. Leaves 3-pinnate, to 20 cm long; leaflets 5-7, broadly ovate-oblong, 4-18 x 2-12 cm, acuminate at apex, rounded at base, upper portion shining, lower portion rough. Flowers in axillary racemes. Calyx cupular, 3-4 mm long; teeth minute. Corolla to 1.5 cm long, pinkish. Pods obliquely rounded, 2.3 x 2.7 cm, winged. Seeds solitary.

**Fl. & Fr.:** February – July.
Millettia Wight and Arn.


**Vernacular Names:** Beng.: Karanja.

Small trees, to 10 m tall; bark grayish to brownish-green. Leaves imparipinnate, 18-30 cm long; leaflets 5-7, opposite, ovate to oblong, to 12 x 7 cm, acuminate at apex, truncate at base. Flowers 5-10 in peduncled, axillary racemes; pedicel to 1 cm long. Calyx campanulate, 3 mm long. Corolla mauve-pink, 8-9 mm long; standard broad; keels obtuse. Stamens monadelphous; anther oblong, versatile. Ovary subsessile, 2-ovules. Pods woody, elliptic - rhomboid, with short curved tip, compressed, 4-7 x 2-3 cm. Seeds 1 or rarely 2, tetrangular.

**Fl. & Fr.:** October – March, mature fruits persists for about one year in plant.

**Note:** Common in deciduous forests, especially along the Ichamati river in South 24-Parganas.

CAESALPINIACEAE

**Key to the Genera**

1a. Leaves uni-pinnate................................................................. (2)

2a. Petiolules twisted; petal 1.............................................. *Intsia*
2b. Petiolules straight; petals 5 ............................................ Cynometra

1b. Leaves bi-pinnate.................................................................(3)

3a. Stigma peltate; pods winged lengthwise along both margins......... Peltophorum

3b. Stigma not peltate; pods not winged, if winged only along upper margin................................................................. Caesalpinia

Caesalpinia L.

Key to the Species

1a. Pods smooth................................................................. C. crista

1b. Pods densely armed with rigid spines.................................. C. bonduc


Vernacular Names: Beng.: Nata, Natakaranja; Eng.: Fever nut, Indian Filbert, Nickar, Physic Nut; Hin.: Kanja, Kanthekaranja, Karanjava, Karanju, Katakaleja; Sans.: Kakachika, Kantakini, Karaja, Latakaranja, Tirini; Ori.: Gila; Guj.: Kakachia; Mar.: Sagargota; Mal.: Kazhanchikkuroo; Tam.: Kalakkodi; Tel.: Gacha.

Much branched shrub; branches scandent, armed with hooked, straight, hard yellowish prickles. Leaves alternate, bipinnate, stipulate; stipules a pair of reduced pinnae at the base of the leaf; pinnae 6-10 pairs, each with pair of hooked stipular spines at the base; pinnules opposite, 6-10 pairs per pinna, elliptic-oblong, mucronate at apex, obtuse
at base, membranous, glabrous above, puberulous beneath. Flowers in dense (usually spicate) supra-axillary racemes, bracteate. Calyx 5-lobed; lobes obovate-oblong, obtuse, hairy along the margins. Petals 5, oblanceolate, yellow, densely hairy on both sides. Stamens 10; filaments clothed with long, white, silky hairs. Ovary oblong-ovoid, densely set with long spine; ovules hairy; stigma ciliate. Pods ovoid-oblong, 5.0-7.5 x 3.4-4.5 cm, densely armed with rigid spines, dehiscent. Seeds 2-3, rounded, gray.

**Fl. & Fr.:** July – April.

**Notes:** The ecological amplitude of this pantropical species seems to be very wide. Common in littoral forests and occasionally along sandy sea-shore, also found in waste lands.

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**Vernacular Names:** Beng.: *Shingri Lata*; Eng.: *Molucca bean*.

Climbing shrubs; young branches glabrous, dark green, armed with sharp, hooked, black, prickles. Leaves alternate, bipinnate, exstipulate; pinnae 2-4 pairs, with very small, sharp, hooked prickles beneath; pinnules opposite, 2-5 pairs per pinna, ovate or elliptic-oblong, acute at apex, obtuse at base, subcoriaceous, petiolate, glabrous, pale glaucous beneath. Flowers in axillary or supra-axillary branched racemes. Calyx 5-lobed; lobes obtuse, lowest one cucullate, glabrous, others ciliate. Petals 5, bright yellow, claw hairy; limb suborbicular. Stamens 10; filaments hairy in lower half. Pods ellipsoid, 5.7-6.3 x 2.4-3.2 cm, flattened, apex pointed, sharply beaked, dark brown, leathery, hairy, without spines, indehiscent. Seeds 1-2, rounded, black.

**Fl. & Fr.:** January - March.

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Notes: Common on river banks, sandy beaches, in and around mangrove areas, also as hedge in wastelands.

**Cynometra L.**

Key to the Species

1a. Pods deeply wrinkled, apical part hooked.................................*C. iripa*

1b. Pods rugose, apical part not hooked.................................*C. ramiflora*


**Vernacular Names:** Beng.: *Shingar*; Eng.: *Wrinkle Mangrove*.

Trees, 5-12 m tall with spreading crown. Leaves 2-jugate rarely 1-jugate; leaflets smaller in lower pairs, obliquely obovate-elliptic, emarginate at apex, obliquely cuneate at base, chartaceous to subcoriaceous, dark green, glabrous, shining above, petiolate. Flowers few, arranged in densely contracted, axillary, corymbose racemes, covered with scales, pedicellate; bracts broadly ovate, deciduous; bracteoles small, lanceolate, caducous. Calyx- 4-5 lobed, curved distally at anthesis, ovate-lanceolate. Petals 5, linear-lanceolate, white. Stamens 10. Ovary and style rusty pubescent. Pods obliquely elliptic or semiorbicular, 1.3-2.5 cm long, fleshy, much wrinkled, with hooked apical beak.

**Fl. & Fr.:** September – February.

**Note:** Frequent along intertidal zones of mangrove forest in association with *Heritiera fomes*, *Excoecaria agallocha* and *Bruguiera* species.

Vernacular Names: Beng.: Shinger; Eng.: Wrinkle Mangrove.

Trees, 5-10 m tall. Leaves 1-jugate; leaflets variable in shape, lower pairs of leaflets comparatively small, ovate-oblong, suborbicular or lanceolate, 2.5-4.0 x 1.0-1.5 cm, acute to acuminate at apex, obliquely cuneate at base, dark green, glabrous, main nerve obliquely placed, petiolate. Flowers arranged in condensed axillary corymbose racemes, pedicellate; pedicels slender, 4-8 mm long; bracts ovate-oblong, deciduous; bracteoles lanceolate, caduceus. Calyx deeply 4 lobed, reflexed, unequal. Petals 5, lanceolate, purple. Stamens 10. Ovary densely hairy, shortly stipitate. Pods ovate-elliptic, 2.3-4.2 cm across, woody, with rugose to undulated surface. Seed solitary, flat, smooth.

Fl. & Fr.: September – February.

Note: Frequent along the inner as well as outer fringes of tidal forests, generally in association with Heritiera fomes and Xylocarpus granatum.

Intsia Thouars


Vernacular Names: Eng.: Borneo Teak; Hind.: Merbau.

Trees, 12-18 m tall; stem devoid of branches up to certain height, somewhat curved; bark smooth, whitish-grey. Leaves bijugate; leaflets 2-6, ovate-elliptic to broadly elliptic, rounded, subacute or retuse at apex, obliquely rounded at base, inequilateral, subcoriaceous. Flowers arranged in terminal corymbs with racemiform branches,
bracteate, deep purple, white in bud. Pods compressed, 14.5-18.5 x 3.5-4.5 cm, unequal-sided, woody, curved, transversely reticulovenose, bi-valved. Seeds 3-8 per pod, transverse, 2.0-3.0 x 1.5-2.5 cm, covered with yellow or reddish-brown, incompletely arillate.

**Fl.:** January – March.  **Fr.:** March - December.

**Notes:** Sparse towards the inner mangroves, sometimes along the intertidal zones in association with *Cynometra ramiflora* and *Brownlowia tersa*.

**MIMOSACEAE**

**Key to the Genera**

1a. Stamens indefinite, more than twice the number of petals; seeds exalbuminous..........................*Acacia*

1b. Stamens definite, as many as or twice as many petals; seeds albuminous............(2)

2a. Aquatic herbs, without prickles..........................*Neptunia*

2b. Terrestrial shrubs or trees, with prickles..........................*Prosopis*

**Acacia** Mill.

**Key to the Species**

1a. Leaves converted into phyllodes; pods coiled..................*A. auriculiformis*

1b. Leaves normal, not converted into phyllodes; pods straight.............*A. nilotica*

Trees, to 15 m high, bark brown, smooth; branchlets glabrous. Phyllodes alternate; stipules lateral; petiole 8-20 mm long, pulvinate, slender, glabrous; lamina linear to falcate-elliptic, 7-20 x 1-5 cm, subacute or obtuse at apex, attenuate at base, margin entire, glabrous, coriaceous. Flowers bisexual, yellow, in axillary spikes. Calyx campanulate; lobes 5. Corolla \textit{ca} 2 mm long; lobes 5, lanceolate, 1.5-1.8 mm. Stamens many. Pods flat, 3-10 x 0.5-1 cm, glabrous, woody and much twisted forming irregular coils. Seeds black, 0.6 x 0.5 cm, with orange-yellow coloured aril.

**Fl. & Fr.:** August – April.


\textbf{Vernacular names:} Beng.: \textit{Babla}; Hind.: \textit{Kikar, Babul}; Eng.: \textit{Babul, Gum tree}.

Trees, to 8 m high; branchlets smooth. Leaves bipinnate, alternate, stipulate; stipular spines in pairs, upto 5 cm, straight, slender, white with grey spots; rachis slender, pulvinate; pinnae 4-9 pairs, slender; leaflets 20-40, opposite, sessile; lamina linear, oblong or linear-oblong, 3-4 x 1-2 mm, obtuse at apex, oblique at base, margin entire, glabrous, chartaceous. Flowers bright yellow, in heads on axillary peduncle; involucre of 2 bracteoles near or above the middle peduncle. Calyx campanulate; teeth triangular to ovate. Corolla 2.5-3.5 mm long; lobes oblong to ovate. Stamens many. Ovary terete, stipitate. Pods flattened, strap-shaped, 7.5-22.5 x 1.5-2 cm, straight to slightly curved, deeply constricted between seeds, dehiscent. Seeds 8-13, black.

**Fl. & Fr.:** May - December.
Neptunia Lour.


**Vernacular names:** Beng.: *Panilajuk*; Hindi: *Lajalu*.

Aquatic, floating annual; stems stout, swollen, with abundant fibrous roots arising from leaf and flower bearing nodes. Leaves bipinnate, 8-12 cm long; leaflets 8-15 pairs, 5.6-10 x 1.5-3 mm sessile, oblong, obtuse at both ends, glabrous; stipules obliquely ovate. Flowers yellow, subsessile, the lower flowers replaced by numerous yellow staminodes; peduncles 7-20 cm long, erect; bracts small, ovate. Pods flat, broadly oblong, 2.0-2.5 x 1.0-1.5 cm, falcate, beaked, dehiscent. Seeds 6-10, ovoid, compressed, brownish.

**Fl. & Fr.:** October – January.

**Note:** This species is found only in the back mangrove areas, near water ditches and ponds.

Prosopis L.


Large shrubs or small, evergreen, armed tree; branches armed with pair of straight, conical, spinescent stipules. Leaves bipinnate; leaflets 13-25 pairs, oblong to oblong-lanceolate, 2.5-6.5 x 1.5-2.0 mm. Inflorescence in axillary spikes. Calyx campanulate, 5-toothed. Petals 5, free. Stamens 10. Pods linear, compressed, straight or often falcate, indehiscent, beaked. Seeds 20-25, obovoid, compressed.

**Fl. & Fr.:** Almost throughout the year.
BARRINGTONIACEAE

Barringtonia Forster & Forster

Key to the Species

1a. Leaves upto 15 cm long; sepals obtuse; fruits distinctly 4-angled throughout.................................................................B. acutangula

1b. Leaves upto 30 cm long; sepals acute; fruits slightly 4-angled towards base only.................................................................B. racemosa


Vernacular names: Beng.: Hijal, Kumia, Samundar; Eng.: Indian Oak, Small Indian Oak;

Tree, 7.5-15.0 m high, glabrous; young branches pale grayish. Leaves oblong to elliptic, 6.3-15.0 x 3-8 cm, rounded or subacute at apex, cuneate at base, minutely dentate at margin, spreading. Flowers in racemes, fragrant, dark scarlet; bracteoles lanceolate, caducous. Petals 5 mm long. Fruits quadrangular, crowned by small, persistent calyx.

Fl. & Fr.: Almost throughout the year.


Vernacular names: Beng.: Samudra.

Shrubs or trees, up to 25 m tall; branches pendulous, gray-brown; bark smooth or fissured. Leaves obovate-oblong, 18-32 x 5-12 cm, acute or acuminate at apex, cuneate at base, margin serrate-crenulate; petiole 2-15 mm, winged. Racemes usually terminal or in
axils of fallen leaves, pendulous, many flowered; bracts triangular; bracteoles triangular. Flowers 6-9 mm long, pedicellate. Calyx 2-4-lobed; tube ca. 2.5 mm long. Petals 4, green or tinged red or yellow, oblong. Stamens in 5 or 6 whorls, innermost sterile. Fruits ovoid-cylindric, 4-angled. Seed ovoid.

Fl. & Fr.: Almost throughout the year.

**RHIZOPHORACEAE**

**Key to the Genera**

1a. Trees with extensively developed stilt roots; flowers tetramerous; calyx 4-lobed; petals 4, entire, without distal appendages; anthers sessile, multiloculate, dehiscing by adaxial valve…………………………………………………………………………………………. *Rhizophora*

1b. Trees without stilt roots; flowers penta to more (upto 16) merous; calyx 5 or more lobed; petals 5 or more, deeply emarginate, with apical appendages; anthers with filaments, 4-locular, dehiscing by slits…………………………………………………………………………….. (2)

2a. Trees without pneumatophores; petals without marginal hairs; stamens numerous; hypocotyle of seedling slender, gradually narrowed and distally pointed… .. *Kandelia*

2b. Trees with knee-like pneumatophores; petals with marginal hairs, stamens twice as many as calyx lobes; hypocotyle of seedlings blunt or abruptly pointed distally…………………………………………………………………………………………………… (3)

3a. Leaves usually less than 10 cm long, apex rounded; calyx 5 or 6-lobed, lobes blunt, 2-4 m long; petals less than 0.5 cm long; stamens 10-12 ………………………………………………………………………………………………………. *Ceriops*

3b. Leaves usually more than 10 cm long, apex acute; calyx 8-16 lobed, lobes pointed, 10-15 mm long; petals 0.5-2.0 cm long; stamens 16-32…………………………………………………………………………………………………. *Bruguiera*
**Bruguiera** Lam.

**Key to the Species**

1a. Flowers in pedunculate cymes, less than 2 cm long.................................................(2)

2a. Calyx tube smooth; lobes stout, more than 3 mm long, half the length of the calyx; horizontal or reflexed in fruit......................................................... *B. cylindrica*

2b. Calyx tube ribbed; lobes slender, less than 3 mm long, only one-fourth to one-fifth the length of the calyx, erect or at most slightly spreading in fruit......... *B. parviflora*

1b. Flower solitary, 3-4 cm long..............................................................(3)

3a. Petal lobes blunt, without filamentous appendages.........................*B. sexangula*

3b. Petal lobes acute, each extended into 3 filamentous appendages.......*B. gymnorrhiza*

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**Vernacular Names:** Beng.: *Bakul Kankra*.

Trees, 10-15 m tall; stilt roots absent; stem base buttressed, producing pneumatophores and knee root system. Leaves oblanceolate, rarely elliptic, 5.2-12.0 x 2.5-5.0 cm, acute at apex, cuneate at base, entire, petiolate. Flowers less than 2 cm long, in 3-flowered axillary, pedunculate cymes, pedicellate. Calyx 8-10 lobed, smooth; lobes stout, with pointed apex, 0.4-0.5 cm long; tube base funnel-like; horizontal or reflexed in fruit. Petals 8, polypetalous, 0.2-0.4 cm long, each petal minutely bilobed with a bristle in the sinus, fringed with white hairs along margin, white in colour. Stamens 16, free, 2-grouped; filaments unequal, basifixed. Ovary cupular, 2-4-celled; ovules solitary in each
chamber; style 1, terminal, glabrous; stigma bifid, pubescent. Hypocotyle cylindrical, 12-16 x 0.7-1 cm, ends blunt, slightly curved, obscurely ribbed, green.

**Fl.:** March – August.

**Notes:** Gregarious on newly formed stiff clay along the estuaries. Sometimes in pure strands in association with *Bruguiera gymnorrhiza* along the intertidal zones.


**Vernacular Names:** Beng.: Kankra; Mal.: Kantal; Tam.: Ugappukakhandal; Tel.: Dudduponna.

Trees, 12-18 m tall; stilt roots absent; stem base buttressed with knee-like pneumatophores and knee roots. Leaves elliptic-oblong or ovate-lanceolate, 7.5-20.0 x 3.2-8.5 cm, apex acute, cuneate or rarely obtuse at base. Flowers solitary, 3-4 cm long; pedicellate. Calyx 8-14 lobed, upto 1.5 cm long, lobes pointed; tube smooth, green in buds, becoming scarlet before opening, persistent. Petals 10-16, polypetalous, 10-15 mm long, bilobed, with a bristle in the sinus; lobes acute, each lobe extended into 3 filamentous appendages, with a tuft of hairs along margin at base, whitish, turning brown at maturity. Stamens 26-32, free. Hypocotyle cylindric, often curved, 15-18 x 2.5-3.0 cm, obscurely ridged, dark green.

**Fl.:** March – August.

**Notes:** This species is one of the largest trees of the mangroves, common in intertidal regions along the creeks and canals of mangrove forests, usually in association with *Rhizophora apiculata* and *Kandelia candel*. 

**Vernacular Names:** Beng.: Bakul Kankra.

Trees, 10-15 m tall; stilt roots absent; stem base buttressed with knee-roots and pneumatophores. Leaves elliptic-oblong or rarely ob lanceolate, 4.5-10.0 x 2.5-5.0 cm, acute at apex, cuneate at base, entire, petiolate. Flowers 2-3, in pedunculate cymes. Calyx tube ribbed; lobes slender, less than 3 mm long, only one-fourth to one-fifth the length of the calyx; erect or at most slightly spreading in fruit. Petals bilobed, each with 3 long cilia at apex, sinus with a bristle, petal margin sparsely hairy, white. Stamens 16, free, 8 grouped. Hypocotyle cigar-shaped, sometimes slightly curved, smooth.

**Fl.:** April – September.

**Notes:** Common in intertidal regions of estuarine swamps. Generally, in association with *Bruguiera gymnorrhiza*, *Rhizophora apiculata* and *Lumnitzera racemosa*.

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**Vernacular Names:** Beng.: Kankra.

Trees, 6-15 m tall, buttressed; stilt roots absent, conspicuously lenticellate on buttresses. Leaves elliptic-oblong, oblong-ob lanceolate, 4.5-13.0 x 3.0-6.5 cm, acute at apex, cuneate or rarely obtuse at base, entire, petiolate. Calyx green in bud, becoming yellowish before opening, whitish within, 10-13 lobed. Petals 10-13 lobed, whitish; lobes blunt, without filamentous appendages; stiff, fringed with white hairs along the

Fl.: April – September.

Notes: Common in the outward mangrove fringes, on dry sandy soil that is occasionally inundated by high tide.

**Ceriops** Arnold

Key to the Species

1a. Apex of petal with 3 clavate appendages; stamens with long, slender filaments, much exceeding the blunt anther; hypocotyle up to 25 cm long, warty throughout, terete or slightly ridged……………………………………………………………………………. *C. tagal*

1b. Apex of petal with a fringe of filamentous appendages; stamens with a short filament, equal or exceeding the anther; hypocotyle not exceeding 15 cm length, warty towards apex, sharply ridged………………………………………………………. *C. decandra*


**Vernacular Names:** Beng: *Jhamti Goran, Jele Goran*; Eng.: *Yellow mangrove*; Mal.: *Ankantal*; Tam.: *Pendikutti*; Tel.: *Gedera*.

Shrubs or small trees, 3-9 m tall; stems grayish-brown, supported by many stilt roots at the base. Leaves obovate or elliptic-oblong, 3.4-9.5 x 2.3-5.5 cm, emargiante or rounded at apex, cuneate at base, entire, coriaceous, petiolate. Flowers in axillary condensed cymes, 8-14 in number. Calyx deeply 5-6 lobed, ovate, acute. Petals 5-6, white, with broad base, apex tipped with a fringe of filamentous appendages. Stamens with a short filament, equal or exceeding the anther. Hypocotyle club-shaped, 12-13.5 cm long, sulcate, warty towards apex, sharply ridged.
Fl.: March – October.

Notes: Common along the proximal zones of mangrove swamps, intertidal zones of creeks and canals and sometimes towards the outer mangrove zones on elevated sandy habitat.


**Vernacular Names:** Beng.: *Mat Goran, Jat Goran*; Eng.: *Yellow mangrove.*

Shrubs or medium sized trees, 3-15 m tall; stems often with small stilt roots. Leaves obovate to obovate-oblong, 4.5-9.4 x 2.5-4.4 cm, apex obtuse or emarginate, cuneate at base, coriaceous, dark green above, pale below. Flowers in upper axillary condensed cymes, resinous, white. Calyx 5-lobed; lobes ovate, acuminate. Petals 5, oblong, with 3 clavate appendages at the tip and uncinate hairs at base. Stamens 10, alternately longer and shorter. Stamens with long, slender filaments, much exceeding the blunt anthers. Hypocotyle club-shaped, 20-24.5 cm long, reddish-brown, thickened towards apex, deeply grooved and ribbed, warty throughout.

Fl.: March – October.

Note: Common on the intertidal banks of mangrove swamps and also in areas nearer to and estuarine influence.

**Kandelia** Wight & Arnold


**Vernacular Names:** Beng.: *Goria*; Eng.: *Candle Mangrove*; Ori.: *Rasunia*; Mal.: *Kantal*; Tam.: *Kandal*; Tel.: *Kandigala*.

Shrubs or small trees, up to 7 m tall; stem base buttressed with stilt roots. Leaves oblong or elliptic-oblong, 8.5-13.5 x 3.0-5.5 cm, rounded at apex, cuneate or obtuse at base, coriaceous, dark green above, light brown beneath. Flowers axillary, 8-9 in dichotomously branched cymes. Calyx 5-lobed; lobes linear, acute. Petals 5, each divided into capillary segments, white. Fruits ovoid, 2.0-3.5 cm long, green. Hypocotyle clavate, 25-80 cm long, pointed towards the radical end.

**Fl.:** April – September.

**Notes:** Common along the banks of estuarine islands, usually in association with *Rhizophora apiculata*.

**Rhizophora L.**

**Key to the Species**

1a. Leaf apex apiculate; cymes 2-flowered; peduncle *ca* 10 mm long, shorter than petiole; flowers sessile; petals glabrous; stamens 12, sessile ....................... *R. apiculata*

1b. Leaf apex mucronate; cymes 4-flowered; peduncle *ca* 15-40 mm long, longer than petiole; flowers pedicellate; petals slightly to conspicuously hairy on the margins; stamens 8, with a short filament ...................................................... *R. mucronata*

**Vernacular Names:** Beng.: Garjan, Bhara; Eng.: Long-fruit-stilted mangrove.

Trees, up to 30 m tall; stems with branched stilt roots. Leaves elliptic-oblong to lanceolate, 7.5-15.0 x 3.5-7.0 cm, entire, apiculate at apex, cuneate at base, coriaceous; petioloae ca 4 cm long; stipules glabrous, caducous. Flowers sessile, arranged in 2-flowered cymes from upper axils of the cupular involucres; peduncles short, ca 5 m long. Calyx 4-lobed, ovate, concave, acute, reflexed in fruit. Petals 4, lanceolate, glabrous, white or cream coloured, caducous. Stamens 12; filaments short; anthers linear. Capsules ca 3 cm across, obpyriform, hard, brown, with 4 persistent calyx lobes at the base. Hypocotyle cylindrical, clavate, smooth, attaining a length up to 55 cm at maturity.

**Fl.:** May – September.

**Note:** Frequent along the inter-tidal creeks subjected to regular normal high tides.


**Vernacular Names:** Beng.: Bhara, Bhora, Kamo, Khamu; Eng.: Long-fruit-stilted Mangrove; Mar. & Tam.: Kandal; Andam.: Bairada, Jumuda; Malay: Bakau Korap, Belukap; Tel.: Ponna.

Trees, up to 25 m tall; stem much branched; branches conspicuously marked with scars of fallen leaves and stipules; supported at the base by branched stilt roots. Leaves decussate, broad elliptic to oblong, 6.5-16.0 x 3.5-8.0 cm, mucronate at apex, base cuneate, coriaceous, bright green above, dull and black-dotted beneath. Flowers in axillary, usually 3-flowered, pedunculate cymes; peduncles stout, ca 3.7 cm long; pedicels very short. Calyx 4-lobed; lobes triangular-oblong, subacute, keeled within, pale yellow, glabrous, reflexed in fruit. Petals 4, free, oblong-lanceolate, shorter than the calyx lobes, white, thick, densely hairy along the margin and less hairy on the inner face. Stamens 8; 4 antisepalous, 4 antipetalous, sessile; anthers linear. Capsules ca 3.8 cm
long, ovoid-conical, enclosed at base by persistent calyx lobes. Hypocotyle cylindric, warty, attaining a length upto 75 cm at maturity.

Fl.: July – November.

Note: Gregarious along the inter-tidal banks of creeks or in estuaries.

COMBRETACEAE

Key to the Species

1a. Erect or straggling shrubs; petals present.............................. Lumnitzera

1b. Trees; petals absent.............................................................. Terminalia

Lumnitzera Willd.


Vernacular Names: Beng.: Kripa or Kripal; Eng.: Black Mangrove.

Large shrubs or small trees, 8-10 m tall. Leaves oblanceolate or obovate, sessile, emarginate at apex, cuneate at base, margin entire, coriaceous. Flowers in axillary spikes, sessile; receptacle tubular, with 2 adnate, persistent bracteoles. Calyx 5-lobed; lobes ovate–acuminate. Petals 5, elliptic-oblanceolate, white. Stamens10, approximately equalling the petals in length. Fruits ellipsoid, 7.5-10.0 x 3.5-6.0 mm, woody, compressed, crowned with persistent calyx lobes, 1-seeded.

Fl.: January – July.

Notes: Frequent in muddy or sandy elevated areas in the estuarine and backwater mangroves, usually in association with Excoecaria and Avicennia species.
Terminalia L. nom. Cons.


Vernacular names: Beng.: Badam; Eng.: Indian Almond, Malabar Almond, Malay Almond; Guj.: Badamalili, Deshibadam, Lili badam; Hindi: Badami, Jangli Badam; Mal.: Ata, Kottakkuru, Nattu badam, Tilatanna; Mar.: Bengali badam, Hirani badam, Jangali badam, Nat badam; Sans.: Desa Badama, Grahadruma, Ingudi, Kshudra Badam, Tailaphala, Vatama; Tam.: Amandi, Nattuvadumai, Pinja, Sirrupinja, Vadumai; Tel.: Bagamu, Ingudi, Natu badamu, Tapasataruvu.

Tall tree, ca 25-30 m, deciduous, branches whorled, horizontal, buttressed at base; bark with long fissures; branchlets with persistent leaf scars. Leaves clustered towards top of the branchlets, obovate or elliptic-ovate, 15-30 x 10-15 cm, retuse at apex, cuneate or subcordate at base, softly hairy when young, shining glabrous above, turning red before falling. Flowers sessile, solitary or in spike; male flowers towards upper part and hermaphrodite at lower part of inflorescence; bracts minute. Drupes elliptic, compressed, glabrous, reddish, 2-ridged at maturity.

Fl. & Fr.: April - December.

Note: This back mangrove is found in the Bagmara area in association with Lumnitzera racemosa and Caesalpinia bonduc.
SONNERATIACEAE
Sonneratia L.f., nom. cons.

Key to the Species

1a. Petals absent

2a. Calyx 4 lobed, lobes erect at fruit base; leaves elliptic-oblong or oblanceolate; fruits 2-3 cm across. ................................................................. S. apetala

2b. Calyx 6-8 lobed, lobes reflexed at fruits; leaves obovate to sub-orbicular; fruits 4.5-9 cm across............................................................... S. griffithii

1b. Petals present................................................................. S. caseolaris


Vernacular Names: Beng.: Tak Keora, Keora, Kerba, Khoura; Eng.: Fire Fly mangrove.

Trees, upto 10 m tall; branches drooping; pneumatophores peg-like, branched or forked. Leaves elliptic-oblong or oblanceolate, 5-15 x 2-5 cm, obtuse at apex, attenuate and oblique at base. Flowers axillary, solitary or in terminal, 3-flowered dichasia or 7-flowered cymes, pedicellate. Calyx 4-lobed; lobes elliptic, erect, greenish-brown. Petals absent or early caducous. Stamens 4, epipetalous. Ovary globose; style 2-3 cm long, included or slightly exserted; stigma umbrella-shaped. Capsules globose or orbicular, 2-3 cm across, depressed, 8-chambered, with persistent, reflexed calyx lobes at base.

Fl.: January – October.

Notes: Common along the inter-tidal river flat lands towards upstream swamps, invariably found in places, affected with fresh and brackish water mixture.

**Vernacular Names:** Beng.: Archaka, Orcha, Ora, Chak Keora; Eng.: Mangrove Apple;

Trees, up to 5 m tall, with many drooping branches and numerous pneumatophores; main branches sometimes running prostrate along the ground in a zigzag way covering a large area. Leaves nearly sessile, elliptic-oblong or obovate, 8.0-12.0 x 4.0-6.0 cm, mucronate at apex, cuneate at base, coriaceous. Flowers solitary, terminal, pedicellate. Calyx 6-lobed; lobes lanceolate-oblong, larger than the tube. Petals 6, linear-lanceolate, membranous, dark-rose coloured. Stamens numerous, free. Ovary depressed, globose; style very long, often exceeding 5 cm, persistent in fruit; stigma capitate. Fruits globose, berry, ca 5 cm diameter, depressed, subtended by sharp, pointed long style and persistent calyx.

**Fl. & Fr.:** March – September.

**Notes:** Occasional in the inter-tidal banks of creeks and canals in association with *Avicennia alba* and *Bruguiera* species.


**Vernacular Names:** Beng.: Ora; Eng.: Mangrove Apple.

Trees, up to 20 m tall; stems with numerous, pale green, drooping branches and pneumatophores. Leaves obovate-suborbicular, 5.0-10.0 x 3.0-6.0 cm, thickly coriaceous, emarginate at apex, cuneate at base. Flowers solitary at the apices of terminal branches. Calyx flat, 6-8 lobed, spreading in fruit, greenish–white. Petals absent. Stamens many,
white. Fruits ovoid-globose, 4.5-9.0 cm across, with pointed tips, inflated with reflexed calyx lobes at base. Seeds many.

**Fl.:** March – July; **Fr.:** July – September.

**Notes:** Common along the inter-tidal zones and muddy banks near the estuarine mouth, generally in association with *Avicennia alba* and *A. marina*.

**AIZOACEAE**

*Sesuvium* L.


Erect suberect herbs, prostrate or creeping; stem smooth, rooting at nodes. Leaves opposite, oblanceolate, 2.0-3.5 x 0.2-1.3 cm, amplexicaul at base, fleshy; petioles short. Flowers axillary, pedicellate. Calyx 5-lobed; lobes unequal, triangular, acute, purplish outside. Stamens numerous, free. Ovary usually 3-celled. Style 1. Fruit capsules, enclosed in persistent calyx.

**Fl. & Fr.:** October – January.

**RUBIACEAE**

*Scyphiphora* Gaertn. *f.*


**Vernacular Names:** Beng.: *Tagri Bani*; Eng.: *Wild Ixora*.

Erect shrubs, 3-5 m tall, branchlets swollen at nodes. Leaves opposite, oblong-ovate, 4.0-9.0 x 3.0-5.5 cm, obtuse at apex, narrowed towards base, glossy above,
coriaceous. Flowers densely arranged in supra-axillary, glabrous cymes. Calyx tube narrowly obconical, glabrous. Corolla tube narrowly obconical; lobes ovate-oblong or ovate, white. Stamens inserted at throat; anthers with sagittate base, dorsifixed below the middle; disc annular, lobed. Ovary 2-celled. Pyrene ellipsoid-cylindric, with 8-10 longitudinal grooves, corky. Seeds sub-cylindric, membranous.

**Fl. & Fr.:** March – November.

**Note:** This species was reported from Indian Sundarbans by Mandal *et al*., 1995. But during field visit no such species was recorded, except in the Jharkhali Mangrove Park.

**ASTERACEAE**

**Key to the Genera**

1b. Capitula heterogamous; florets both ray and disk.......................... *Grangea*

1a. Capitula homogamous; florets all ligulate or tubular or tubuliform.............. (2)

2a. Leaves opposite; stem climber.................................................. *Mikania*

2b. Leaves alternate; not as above.................................................. *Eclipta*

**Grangea** Adans.


**Vernacular names:** Beng.: *Namuti*; Hindi: *Mustaru*; Guj.: *Jhinkimundi*; Mar. & Tam.: *Mashipatri*; Mal.: *Nelampala*; Tel.: *Save*.

Annual, prostrate herbs. Leaves many, sinuately pinnatifid with 2-4 pairs of opposite or subopposite lobes, largest at apex, smaller towards base, coarsely serrate-
dentate. Heads yellow, solitary or 2-nate, globose. Involucral bracts elliptic, obtuse. Achenes ca 2 mm long. Pappus a short tube with fimbriate mouth.

Fl. & Fr.: March – November.

**Mikania** Willd.


Vernacular names: Beng.: *Tara-lata*; Eng.: *Climbing hempwood*.

Stem glabrous, up to 6 m long. Leaves petioled, ovate-deltoid, 2.5-8.5 x 1-5 cm, acute to acuminate at apex, cordate at base, coarsely undulate dentate, sparsely pubescent on both surfaces. Capitula cylindrical, numerous in corymbs borne on short axillary branches. Phyllaries membranous, 2-3-nerved. Corolla grayish-white. Achenes narrowly oblong, dark brown, glabrous. Pappus white.

Fl. & Fr.: September – February.

**Eclipta** L.


Vernacular names: Beng.: *Keshori, Kesuti, Keysuria*.

Annual, erect or prostrate, branched herb, often rooting at nodes; stem and branches strigose with appressed white hairs. Leaves sessile, simple, opposite, elliptic-oblong or oblong-lanceolate, 1.5-7.0 x 0.5-2.0 cm, mucronate at apex, cuneate at base, entire, serrate or shallowly toothed; teeth mucronulate, pubescent. Heads white, solitary
or fascicled, axillary, on 5-7 cm long, unequal peduncles; peduncles 0.2-0.9 cm across. Involucral bracts in 2-series, ovate-lanceolate, 3-6 mm long, acute or short acuminate, pubescent. Ray florets in 2-3 series with 2 dentate corolla, 1-3 mm long; tube short, sparingly pubescent above. Disc florets numerous. Achenes dark brown, oblong-turbinate, dorsiventrally compressed and sharply angled, the apical ridge with few small hairs. Pappus a ring of thick, ciliate, partially or completely united scales forming a cone on the top of the achenes.

Fl. & Fr.: Throughout the year.

SPHENOCLEACEAE

Sphenoclea Gaertn.


Erect, simple or divaricately branched, annual herbs; stem terete. Leaves petiolate, oblong or oblong-lanceolate, 2.0-10.5 x 0.7-4.0 cm, narrowed at both ends, entire, membranous. Flowers crowded in dense, terminal, cylindric, pedunculate spikes, sessile; bracts spathulate, acuminate; bracteoles lateral to bracts, linear. Calyx tube cupular; lobes 5, deltoid-suborbicular, obtuse. Corolla campanulate, white; segments 5, ovate-triangular, obtuse. Capsules globose, depressed.

Fl. & Fr.: July – September.

PLUMBAGINACEAE

Aegialitis R. Br.


**Vernacular Names:** Beng.: *Tora*; Eng.: *Club Mangrove*.

Evergreen shrubs, 1-6 m tall; stems straight, branching only towards apex, base swollen with numerous stilt root; bark thin, brownish, lenticellate with numerous leaf scars. Leaves alternate, broadly ovate or orbicular, acute or slightly apiculate at apex, rounded or broadly cuneate at base. Flowers in axillary, dichotomously branched, leafy panicles. Calyx tubular, 5-lobed, persistent. Petals 5, spatulate, united at base forming a compact tube with staminal bases. Stamens 5, adnate to the corolla tube; anthers basifixed. Ovary ovoid, conical, 5-ribbed, one chambered; ovule solitary, pendulous; styles 5, free at apex, adnate towards base; stigma capitate. Capsules linear, curved, 5-ribbed, splitting finally along the ribs from the apex. Hypocotyle curved, whitish.

**Fl. & Fr.:** February – September.

**Notes:** This species is common along the muddy as well as sandy seashores, often forming a pure strand, usually in association with *Excoecaria agallocha* and *Bruguiera gymnorrhiza*.

**MYRSINACEAE**

*Aegiceras* Gaertn.


**Vernacular Names:** Beng.: *Khalsi*; Eng.: *River Mangrove*.

Small trees, 2.5-7.5 m tall; stem much branched with broom-shaped stilt roots arising from the base. Leaves alternate, ovate-oblong or elliptic, 6.0-10.0 x 3.0-5.0 cm, retuse or emarginate at apex, cuneate at base, coriaceous, petiolate. Flowers 10-30 in leaf opposed umbels, sub-sessile, white, fragrant; peduncle upto 0.5 cm long. Sepals 5,
polysepalous. Petals 5, fused at the base to form short tube. Stamens 5; filaments 0.3 cm long, base united to form a tube; anthers sagittate. Ovary pyramidal, one chambered; ovules many in each chamber; style 1. Fruits falcate, 5.5-8.0 cm long, tapering to a pointed apex, coriaceous, yellowish-brown with persistent, imbricate calyx. Hypocotyle 2.5-4.0 cm long, curved, pointed.

Fl.: February – September.

Notes: Common along the intertidal banks of the creeks, often in association with *Rhizophora mucronata*, *Ceriops tagal* and *Bruguiera gymnorrhiza*.

**SAPOTACEAE**

**Manilkara** Adans., *nom. cons.*


**Vernacular Names:** Beng.: *Bilati Bakul*; Eng.: *Milk-tree*; Hind.: *Khirui*.

Trees, 15-20 m tall; stem much branched, glabrous, with milky latex; branches smooth, with many short lateral branchlets. Leaves often clustered at the ends of branches, obovate-oblong, 5-10 x 2.5-5 cm, retuse-emarginate at apex, cuneate at base, dark green shining above, whitish beneath, glabrous; petioles upto 1.5 cm long, glabrous. Flowers 2-6 in axillary fascicles; pedicels upto 1.2 cm long, pale yellow. Calyx 6 lobed; lobes ovate, reflexed, pubescent outside, margin ciliate. Corolla lobes 18, 3-seriate; outer lobes 12, linear; inner lobes 6, oblanceolate; tube *ca* 0.6 cm long; lobes connate at base, whitish. Stamens 6. Staminodes 6, dentate at apex. Berries oblong-ellipsoid, 1.5-2 cm long, yellow, 1-2-seeded.

Fl.: March – April; Fr.: June – July.
**Note:** Occasional in mangrove forests, generally beyond the tidal inundated zones; found only within Sundarban Tiger Reserve at Netidhopani block.

**APOCYNACEAE**

**Cerbera L.**


**Vernacular Names:** Beng: *Dabur, Dhakur*; Burm.: *Kalwah*; Malay: *Betakbetak*, Marathi: *Sukanu*, Tamil: *Kadalma, Kattarali, Kattima*.

Large shrub or small tree, 10-12 ft high with milky juice; stem glabrous; branchlets whorled, stout, marked with leaf-scars. Leaves alternate, closely set or whorled at the apices of branchlets, lanceolate, oblanceolate or oblong-obovate, abruptly acuminate at apex, much tapering to the base. Flowers in terminal paniculate cymes, large, funnel-shaped, pentameras, odorous, pedicellate. Calyx deeply 5-lobed; segments linear-oblong, apex acute, recurved, imbricate, glabrous, deciduous. Corolla salver-shaped, white with a brownish eye-like spot at base, tops of antheriferous ridges ending very near the throat closing the entrance to the tube. Stamens 5. Drupes subglobose, 5-10 cm. long, drupaceous, usually two from each stalk, smooth, green.

**Fl.:** March – June. **Fr.:** June – August.

**Notes:** Very rare, found only along intertidal banks of creeks and channels of mangrove forests, usually in association with *Heritiera fomes* and *Sonneratia apetala* at Bhagbatpur area.
ASCLEPIADACEAE

Key to the Genera

1a. Corona absent................................................................. Sarcolobus

1b. Corona present............................................................. (2)

2a. Corona uniseriate........................................................ (3)

3a. Corona staminal............................................................ (4)

4a. Pollinia pendulous....................................................... Pentatropis

4b. Pollinia horizontal or ascending...................................... Hoya

3b. Corona coralline........................................................... Finlaysonia

2b. Corona biseriate........................................................... Tylophora

Finlaysonia Wall.


Vernacular Names: Beng: Dudhi lata.

Large climbing shrub; stem stout, much branched; branches terete, glabrous. Leaves obovate-oblong or oblanceolate, 5-10 x 2.2-4 cm, apiculate or emarginate at apex, acute at base, glabrous; petioles terete, 2-2.5 cm long. Flowers in axillary di- or trichotomously branched cymes; peduncles terete, upto 2 cm long, rusty pubescent; bracts ovate, glabrous; pedicels terete, upto 1.7 mm long, pubescent. Calyx 5-lobed; lobes nearly connate, free at apex, ca 1.5 mm long, margin ciliate, glabrous. Corolla rotate, whitish; lobes 5, ovate, ca 4 mm long, acute, pubescent within, glabrous outside; tube ca
1.5 mm long, with filiform hairs within. Corona corolline, uniseriate, 5-lobed. Follicles paired, divaricate, ovate or ovoid, 6.5-8.5 × 3.5-4.5 cm, acute at apex, narrowed at base, ribbed. Seeds ovate-oblong; coma silky-white.

**Fl.:** April – December.

**Note:** Frequent along the seashores in swampy places, often in the mangrove along the tidal streams.

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**Vernacular names:** Beng.: *Pargachaa*; Eng.: Wax flower.

Epiphytic twining undershrub; stem branched; branches glabrous. Leaves oblong-elliptic or lanceolate, 4.0-14.0 × 2-5.5 cm, acute to acuminate at apex, rounded at base, fleshy, glabrous; petiole terete, 1.5-2.5 cm long. Flowers in axillary umbellate cymes; peduncles stout, 2.5-5 cm long, glabrous; pedicels slender, terete, 1.5-2 cm long, glabrous. Calyx deeply 5-partite; lobes ovate, acute, glabrous. Corolla rotate, white, with a purplish centre; lobes 5, upto 4 mm long, ovate, apex acute, inflexed, glabrous. Corona staminal, uniseriate, 5-lobed, shining. Stamens 5; pollinia 5. Follicles usually single, linear, 5.5-10.5 cm long, apex acute, with a blunt tip, finely striate, glabrous. Seeds elliptic; coma silky-dull white.

**Fl. & Fr.:** May – July.

**Note:** Frequent in the intertidal mangrove forests, generally grows on the old *Xylocarpus* trees and *Avicennia officinalis.*
Pentatropis Wt. & Arn.


Vernacular Names: Hind.: Ambarvel; Guj.: Shingroti, Singroti; Mar.: Shingrota, parparam; Sans.: Shringariti, Suryavalli; Tamil: Oopilankodi, Tel.: Chekurtitivva.

Twining, perennial; stem slender, pubescent. Latex watery. Leaves oblong to ovate-oblong, 1.0-4.5 x 0.4-2.4 cm, obtuse-mucronate at apex, subcordate at base, ciliolate along margin, glabrous above, pubescent beneath, extipulate; petioles 2-6 mm long. Flowers in extra-axillary, umbelliform cymes, 3-4 flowered; peduncles terete, 1.5-3.7 mm long, pubescent; bracts linear, ciliolate along margin, glabrous; pedicel filiform, terete, upto 1 cm long, glabrous. Calyx deeply 5-lobed; lobes lanceolate, acute at apex, glabrous, glandular within. Corolla rotate, divided almost to the base; lobes 5, lanceolate-deltoid, acute at apex, broader at base, pubescent within. Corona staminal, uniseriate, 5-lobed, adnate to back of stamens; free at apical end, curving outwards. Follicles single, lanceolate, 3.5 –5.5 x 0.6-1.2 cm long, gradually tapering to a blunt tip, glabrous. Seeds ovate, slightly crenulate at base; coma silky-white.

Fl.: July – December.

Note: Found mainly on mangrove-cleared zones.

Sarcolobus R. Br.

Key to the Species

1a. Leaves elliptic, obovate, lanceolate or linear-oblong, 2-5 cm long; flowers yellowish, with brown dots; corolla lobes glabrous within.......................... S. carinatus

1b. Leaves ovate or oblong, 6-10 cm long; flowers purplish, without brown dots; corolla lobes pubescent within.......................... S. globosus

**Vernacular Names:** Beng: *Baoli-lata*.

Twining shrub; stem weak, terete, glabrous. Leaves elliptic, obovate, lanceolate or linear-oblong, 2-5 x 0.5-1.5 cm, acute or obtuse at apex, acute at base, margin ciliolate, pubescent mainly along the vein on both sides; petioles terete, 3-8 mm long. Flowers in axillary corymbose cymes; peduncles terete, 2.5-4.5 mm long, pubescent; bracts small, ovate, margin ciliate, pubescent outside; pedicels terete, 1.5-3 mm long, pubescent. Calyx 5-lobed; lobes ovate, connate at base, apex obtuse, glabrous, glandular within. Corolla campanulate-subrotate; lobes 5, ovate, ca 2 mm long, apex acute, yellowish with scattered brown dots, minutely pubescent along margin; tube ca 2 mm long. Corona absent. Follicles single, obovate, 4.0-5.5 x 2.5-3.0 cm, yellowish-brown; seeds ovate, not comose.

**Fl. & Fr.:** March – October.

**Notes:** Generally restricted to the muddy river slopes and river flats away from tidal currents.


**Vernacular Names:** Beng: *Baoli-lata*.

Twining shrub; stem weak, glabrous. Leaves ovate or oblong, rarely obovate, 6.5-9.5 x 2.5-4.5 cm, apiculate at apex, truncate or rounded at base, margin ciliolate, pubescent beneath and only along veins above; petioles terete, 1-1.7 cm long. Flowers in
axillary, corymbose cymes; peduncles slender, 2-5 mm long, glabrous; pedicels filiform, 2-3 mm long, glabrous. Calyx 5-lobed; lobes free, ovate-oblong, ca 2.5 mm long, apex obtuse, margin ciliate, glabrous. Corolla subrotate, purplish; lobes 5, oblong, ca 3 mm long, obtuse, glabrous; tube ca 2.5 mm long. Corona absent. Follicles single, globose, 2.5-4.5 x 1.5-3 cm, brownish; seeds ovate, not comose.

Fl.: February – September.

Notes: Sporadic on muddy inter-tidal areas, often in association with and climbing on *Phoenix paludosa*.

**Tylophora R. Br.**


**Vernacular Names:** Tam: *Nanjaruppan*.

Twining, perennial herb; stem much branched, slender, tough, glabrous. Leaves opposite, decussate, oblong-lanceolate, 2.5-7 x 0.7-1.5 cm, acute or shortly apiculate at apex, rounded at base, margin ciliate, pubescent along veins on both surfaces; petioles terete, 3-6 cm long. Flowers in lateral repeatedly forked sub-umbellate cymes; peduncles terete, 1.2-6.5 cm long, pubescent; bracts triangular, margin ciliate; pedicels filiform, upto 1 cm long, glabrous. Calyx 5-lobed; lobes free, triangular or ovate, obtuse at apex, glabrous, with basal glands within. Corolla 5-lobed, united upto 1.5 mm; lobes ovate-oblong, obtuse at apex, glabrous, dark purple; corona staminal, uniseriate, 5-lobed. Stamens 5; pollinia 5. Follicles paired, 5-7.5 x 0.7-1 cm, lanceolate, with acute apex, slightly winged. Seeds oblong; coma silky-white.
Fl.: April – September.

Notes: Common along the inter-tidal regions and back mangrove areas.

BORAGINACEAE

Heliotropium L.


Vernacular names: Beng.: Hatisura; Hindi: Hattasura; Eng.: Heliotrope; Sans.: Hatisunda; Guj.: Hathisundhana; Mar.: Bhurundi; Mal.: Tekkada; Tam.: Telkodduki; Tel.: Telumani.

Prostrate, much branched, succulent herb with swollen nodes. Stem fleshy, pubescent, whitish-green. Leaves lanceolate to linear, spathulate, 2.0-4.5 x 0.5-0.7 cm, rounded at apex, tapering at base, exstipulate, sessile, succulent. Flowers in unipodial helicoid cyme, bisexual, ebracteate, sessile. Sepals 5. Petals 5, united at abse to form gamopetalous corolla, white. Stamens 5, epipetalous; filaments very short; anthers sagittate. Ovary cylindrical; stigma absent. Capsules globose, green, with persistent calyx, breaking up into 4 rugulose nutlets.

Fl.: March – January.

Note: Frequent on the embankments near the mangrove swamps and along the border of salt marshes.
CONVOLVULACEAE

Key to the Genera

1a. Pollen with short spines or spinules ........................................... *Ipomoea*

1b. Pollen without spines ................................................................. *Operculina*

*Ipomoea* Jacq.

Key to the Species

1a. Leaves entire, rarely 3-lobed ......................................................... (2)

2a. Inflorescence many flowered cymes ......................................... *I. carnea* ssp. *fistulosa*

2b. Inflorescence few flowered cymes ............................................. *I. marginata*

1b. Leaves lobed ............................................................................... *I. pes-caprae*


Shrubs, 1-2.5 m high, erect or ascending. Leaves ovate or ovate-oblong, 5.5-23.5 x 3.5-15.5 cm, acuminate at apex, cordate to truncate at base, petiolate. Inflorescence axillary and terminal, many flowered cymes. Sepals subequal, orbicular, puberulent. Corolla tubular to funnel-shaped, pink. Capsules ovoid, mucronate, pale brown, 4-valved. Seeds 4 or less, black.

Fl. & Fr.: Throughout the year.

Herbs, perennials; stem twining or prostrate, hirsute or glabrous. Leaves broadly ovate or orbicular, 2.0-5.5 x 1.5-4.5 cm, attenuate at apex, deeply cordate at base, margins purple, petiolate. Inflorescence axillary, few to several flowered cymes; bracts minute, persistent. Calyx equal, 3.5-5.5 mm long, coriaceous. Corolla salver-shaped, pale lilac. Capsules depressed-globular. Seeds 4, covered with dense tomentum.

**Fl. & Fr.:** November – March.

**Note:** Occasional in moist grasslands, thickets, hedges and waste places.

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**Vernacular Names:** Beng.: *Chhagal Knuri*; Eng.: *Beach Morning Glory, Goat’s foot*.

Prostrate, creeping much-branched herb, often forming tangled mats; stems trailing and rooting at nodes, with milky juice. Leaves kidney-shaped or sub-orbicular, 2.5-7.5 x 4.5-7.5 cm, apically bilobed, slightly folded, each fold broadly ovate, cuneate or cordate at base, glabrous; petiole base conspicuously twisted, pulvinous. Flowers in solitary cymes, pedicellate. Sepals-5, subequal; inner 3 larger, orbicular in shape; outer 2 smaller, ovate to broadly elliptic. Corolla 5-lobed, funnel-shaped, with 5 apical pointed beaks, pink to purple. Capsules ovoid to depressed-globose, 12-17 cm long, with apical beak and persistent calyx, reddish at margin. Seeds brownish, tomentose.

**Fl. & Fr.:** October – March.

**Note:** Common along the coastal belts and in sandy beaches.
Operculina Gaertn.


Vernacular names: Beng.: Dhudkalmi, Teori; Eng.: False Jalap, Indian Jalap, Indian Rubarb, Turbeth Root, Turbith, Turpeth; Guj.: Nahotara; Hindi: Nishotar, Nisoth, Nukpatar, Pitohri, Tarbal.

Perennial, climbing shrub with milky latex; branches 3-5-angular; roots fleshy; stems brown when old. Leaves ovate or oblong, 41-5 x 1-14 cm, slightly lobulate, subacute or mucronate at apex, cordate or truncate at base, pubescent on both surfaces when young. Flowers white or pale green, in racemose cyme; bracts large, caducous, pinkish; outer 2 sepals enlarged in fruit; 3 inner sepals smaller. Capsules globose, 8-15 mm in diam., enclosed by enlarged sepals, glabrous. Seeds black, glabrous, with pitted sides.

Fl. & Fr.: February – October.

CUSCUTACEAE

Cuscuta L.


Vernacular names: Beng.: Algusi, Hadialgusilutta; Eng.: Dodder; Guj.: Amarabel, Nirmuliakashavela; Sans.: Akashabhavana, Akashavalli, Amaravallari, Dusparsha, Khavalli, Nilatar, Vyomavallika; Tam.: Kodiyagundal, Sadadari; Tel.: Lanjasavaramu, Savarapukada, Sitasavaramu.
Parasitic, leafless, much branched, twining herb; stem long, greenish-yellow, fleshy, glabrous. Flowers solitary or in umbellate clusters of 2-4 or in short raceme; pedicels short; bracts ovate-oblong, fleshy. Calyx lobes deltoid, 3 mm long, fleshy. Corolla white, deltoid, reflexed, scales at base of corolla tube. Stamens at throat of the corolla tube. Capsules depressed, globose, glabrous. Seeds 2-4, black, glabrous.

**Fl. & Fr.:** September – March.

**SOLANACEAE**

*Solanum* L.


**Vernacular names:** Mal.: Tutavalam; Or.: Bryhoti; Sans.: Achuda, Alarka; Tam.: Kudalam, Nittidam, Sandunayattam, Surai, Tudi, Tudulai, Tuduvalai; Tel.: Alarkapatramu, Kondavuchinta, Mundlamuste, Tellavuste, Uchinta, Uste.

Much branched trailing or climbing herb, up to 3.5 m long; stem with sharply recurved, compressed spines, yellowish brown. Leaves petiolate, ovate-angular, 2.5-7.5 x 2-6 cm, acute or obtuse at apex, cordate-truncate at base, wavy at margin, densely stellate-pubescent on both surfaces, prickly on nerves. Flowers in extra-axillary racemose-cyme, purplish blue, violet or purple. Calyx cupular or infundibuliform, *ca* 4 mm long; lobes 5, linear, prickly, recurved. Corolla stellate-pubescent without; lobes 5, deltoid. Stamens 5; anthers linear. Ovary oblong-globose. Berry globose, red or scarlet when ripe, glabrous. Seeds circular in outline, smooth or slightly pitted.

**Fl. & Fr.:** Almost throughout the year.

**Note:** This climber is found only in the Jharkhali area.
BIGNONIACEAE

Dolichandrone Fenzl. ex Seeman


Vernacular Names: Beng.: Gorshingiah; Malay.: Poco Kulo, Malay: Nirponnalyam; Tamil: Attukombudi, Kanbillai.

Tree, 5-9 m tall with large crown; branchlets stout, marked with prominent leaf-scars, lenticellate, young shoots glabrous. Leaves imparipinnate; leaflets 5-9, opposite, ovate-lanceolate, caudate-acuminate at apex, unequal at base, glabrous above, hairy beneath. Flowers 2-8 together in terminal raceme or panicle, 1.5-2.5 cm long, pedicellate; pedicel erect. Calyx completely closed and with a curved beak in bud, afterwards splitting to base, spathaceous, beaked. Corolla 5-lobed; tube cylindrical, upper part funnel-shaped; limb 6.3-7.5 cm in diameter; lobes rounded, much crisped and crenate on margin, white. Style exserted. Capsules 25-40 cm long, with flattened pseudospetum, semi-woody, bluntly pointed, smooth or obscurely ribbed, purplish-brown.

Fl.: April – September.

Note: This species is rather sporadic and found in nearly pure strands along the edge of lagoons or scattered near the inner age of mangrove swamps in association with Sonneratia caseolaris and Heritiera species.
ACANTHACEAE

Acanthus L.

Key to the Species

1a. Twining under-shrub; stem and leaves without spines or arms ........... A. volubilis

1b. Erect shrub; branches and leaf margin with sharp spines and arms ........ A. ilicifolius


Dilivaria ilicifolia (L.) Juss., Gen. Pl. 103. 1789.

Vernacular Names: Beng: Hargoja; Eng: Sea Holy Mangrove; Hin: Harkuchkanta, Sans: Harikusa; Mar.: Marandi; Mal.: Payinachhulli; Tamil: Attumulli, Laludaimulli; Tel.: Alchi.

Erect, sprawling or somewhat straggling undershrubs, up to 2 m tall; stem cylindric, stout, glabrous, with tap roots, stilt roots occasional. Leaves oblong to lanceolate, 3-15 x 1.5-6.0 cm, pinnatifid or toothed, acute or truncate at apex, narrowed at base, with sharp spinous teeth on the margin; petioles upto 7 mm long, each with 2 stipule-like spines at the base. Flowers sessile, arranged in opposite pairs in terminal or pseudo-axillary, dense, strobilate spike. Calyx glabrous, segments oblong, rounded, ciliate at apex, slightly apiculate. Corolla blue or bluish violet, hairy on the upper surface. Stamens with thick filaments; anthers densely bearded. Capsules ca 2.5 cm. long, ovoid-oblong, compressed, apiculate, smooth, shining.

Fl.: April- August.

Note: Gregarious in brackish swamps along the tidal streams.

**Vernacular Names: Beng:** Lata Horgoja, **Eng.:** Sea Holy Mangrove.

Twining undershrubs up to 8 m tall. Leaves oblong to obovate-oblong, 3.5-8.0 x 2.7-5.6 cm, obtuse or mucronulate at apex, cuneate at base. Flowers in simple or branched spikes; bracts lanceolate, subtending the calyx, caducous; calyx 4-lobed, shortly cuneate below in two opposite pairs; outer lobes larger than the inner; corolla 5-lobed; lobes connate, 2-lipped, white; lower lip shortly 3-lobed; stamens 4, didynamous; anthers densely bearded; carpels 2, syncarpous. Capsules ellipsoid, compressed, mucronate at apex.

**Fl.:** April – August.

**Notes:** Rare in tidal forests and swamps, common in sheltered mangrove areas, climbing on tree like Ceriops decandra, generally mixed with Sarcolobus spp.

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**VERBENACEAE**

**Key to the Genera**

1a. Trees; corolla lobes unbequal.......................................................... Premna

1b. Shrubs; corolla lobes subequal...................................................... Clerodendrum

**Clerodendrum L.**


**Vernacular Names:** Beng.: Banjui.

Straggling or scandent, perennial shrub, to 2 m tall; stem much branched, slender, obtusely tetragonal. Leaves opposite, rarely ternate, obovate, 1.5-3.0 x 0.8-1.6 cm, punctuate, obtuse at apex, cuneate at base; petioles to 5 mm long. Flowers in axillary, 3-
7-flowered cymes, pedicellate; peduncles 1-3 cm long; bracts linear-subulate, upto 1 mm long. Calyx minutely 5-toothed; teeth triangular. Corolla white; tube slender, 2-4 cm long; lobes ovate. Stamens exserted. Drupes pyriform to obellipsoid, to 10 mm x 8 mm, calyx deeply anchored at the base of the drupe.

**Fl. & Fr.:** January - May.

**Note:** This mangrove associate and slightly salt resistant species grows along the river banks, intertidal zones of creeks and channels, sporadic towards back mangroves, often planted as hedge plant.

**Premna** L., *nom. cons.*


**Vernacular Names:** Beng.: *Ganiari. Bhui Biravi.*

Small trees, to 6 m tall; young shoots pubescent. Leaves elliptic-oblong to ovate, 4-10 x 2.5-6.5 cm, acuminate at apex, obtuse at base, sinuate or in upper half minutely serrate, hairy on the nerves above and beside the nerves beneath; petioles 1-1.5 cm long. Flowers in axillary and terminal paniculate or corymbose cymes; peduncles to 4 cm; bracts upto 2 mm long, lanceolate, pubescent. Calyx 2-lipped. Corolla subequally 5-lobed; lobes to 4 mm long, greenish-white, throat hairy, Drupes globose, fleshy, 3-4 mm in diam., black and wrinkled when ripe.

**Fl. & Fr.:** April – July.

**Note:** Frequent along the inter-tidal regions of creeks and channels, sometimes also in cultivated lands.
AVICENNIACEAE
Avicennia L.

Key to the Species

1a. Large trees, upto 20m tall; stem bark whitish, smooth; leaves obovate or ovate-oblong.......................................................... A. officinalis

1b. Small trees, upto 8 m tall; stem bark blackish to light yellow or guava-like; leaves oblong-lanceolate to elliptic-lanceolate........................................ (2)

2a. Leaves larger, to 15 cm long, apex acuminate or acute; fruits ellipsoid to ovoid-compressed................................................................. A. alba

2b. Leaves smaller, to 5 cm long, apex mostly obtuse or acute; fruits obconical-compressed ................................................................. A. marina


Small trees, upto 8 m tall; stem bark brownish-black, with numerous lenticels; pneumatophores straight, pointed, lenticellate, spongy, narrowly pointed. Leaves elliptic-lanceolate, 8-15 x 2-3.5 cm, acute to shortly acuminate at apex, cuneate at base, shining above, silvery papillose beneath, petiolate; petiole upto 2 cm long. Flowers in axillary or terminal cymes; peduncles 2.5-3.5 cm long, trichotomously branched. Calyx 5-lobed, lobes ovate. Corolla 4-lobed above, ending in a short tube below, orange-yellow, fragrant. Ovary ovoid-oblong, adpressed hairy; styles ca 1.5 mm long; stigma 2. Capsules
ellipsoid to ovoid-compressed, 3-5 cm long, shortly beaked at apex, densely pubescent throughout.

**Fl.:** March – October.

**Notes:** Common along estuarine borders under the influence of high salinity and soft mud, usually in association with *Bruguiera parviflora* and *Sonneratia caseolaris*. A very common species forming secondary line of succession after *Porteresia coarctata*.


**Vernacular Names:** Beng.: *Peyara Baine, Peyara Ban*; Eng.: *White Mangrove*.

Small tress, to 5 m tall; stem bark grayish, peeling off just like *Psidium guajava*; lenticel present only in younger parts; pneumatophores straight, narrowly pointed, not branched or hooked. Leaves elliptic-lanceolate or oblong-lanceolate, 3-5 x 2-2.5 cm, sharply acute at the apex, rounded or tapering at base, shinning above, tomentose beneath, petiolate; petiole up to 1 cm long. Flowers in condensed terminal cymes; peduncles up to 10 cm long. Calyx deeply 5-lobed, lobes free, hairy. Corolla 4-lobed above, lobes ovate, pale yellow; fragrant. Ovary villous; style very short; stigma 2. Capsules ovoid, 1.0-2.5 cm long, apiculate at apex, grayish tomentose.

**Fl.:** April – August.

**Notes:** This species forms pure strands in the proximal zone of the estuarine mangrove swamps. This species has been reported to grow in highly saline soils such as 46 ppt. This is a pioneer species. In newly formed silted areas it comes first behind
*Porteresia coarctata* forming pure stands in intertidal flat swamp lands of high salinity areas.


**Vernacular Names:** Beng.: *Jat Baine, Jat Ban*; Eng.: *White Mangrove*; Hindi: *Bina, Tuvar*; Sans.: *Tuvama*; Guj.: *Tavariyan*; Mar.: *Tiwar*; Tamil: *Kandal, Madaipattai*; Tel.: *Madda*.

Large trees, 15-20 m tall; stem bark smooth, greyish, lenticellate; pneumatophores straight, pointed, often forked, sometimes hooked at apex. Leaves broadly ovate or ovate-oblong, obtuse at apex, tapering at base, coriaceous, shining above, silvery papillose with small brownish dots beneath, petiolate; petiole upto 1.5 cm long. Flowers in trichotomous sessile heads; peduncles upto 25 cm long. Calyx 5-lobed almost to the base. Corolla 4-lobed above; lobes ovate, acute, subequal, yellow, glabrous within. Ovary ovoid, tapering into and about as long as the style, both villous; stigma shortly bifid. Capsules broadly ovoid, compressed, 2.5-3.8 cm. long, densely silvery papillose, beaked at apex.

**Fl.** June – August.

**Notes:** Sporadic in intertidal zones of salt marshes and tidal forests at river mouth and also along seashores. Abundant in iner mangrove areas in association with *Excoecaria agallocha, Avicennia alba, Sonneratia apetala* etc.
AMARANTHACEAE

Key to the Genera

1a. Leaves alternate.............................................................................................................. Aerva

1b. Leaves opposite or whorled.......................................................................................... Alternanthera

Aerva Forssk., nom. cons.


Vernacular names: Beng.: Chaya; Guj.: Bur, Kapurimadhuri; Hindi: Chaya, Gorkhabundi, Kapurijadi; Mal.: Cerula, Cerupula; Mar.: Kapurmadhura, Kapurphuti, Kumrapindi; Sans.: Astmabayda, Bhadra; Tam.: Sirupulai; Tel.: Pindikumda, Pindicettu.

Perennial, erect, prostrate or straggling, stiff or weak, 30-70 cm long herbs; stem and branches terete, striate, woolly. Leaves petiolate, alternate, suborbicular-ovate or ovate-elliptic, 0.5-5.0 x 0.3-2.5 cm, apiculate to acute at apex, cuneate at base, entire at margin, densely white pubescent. Flowers in solitary or axillary, clustered, white, cylindrical, 4-15 mm long, sessile spikes, bisexual; bracts deltoid-ovate, mucronate, white, hairy without, persistent; bracteoles similar or slightly smaller. Tepals or perianth segments 5, densely lanate dorsally; outer 2 hyaline, ovate-oblong, 0.6-1.2 cm long and inner 3 slightly shorter and narrower, with green midrib. Stamens 5, alternating with pseudostaminodes. Utricles rotundate, 0.1 cm across, compressed. Seeds reniform, c 0.7 mm long, black, shining.

Fl. & Fr.: July – April.
Alternanthera Forssk.


Perennial, prostrate mat-forming herbs. Leaves petiolate, ovate or elliptic, 6.5-26.5 x 1.5-8.0 cm, sparsely hairy at beneath. Flowers in axillary, solitary, ovoid or globose, sessile heads; bracts membranous, white. Tepals oblong-lanceolate, dissimilar; outer 3 larger; inner 2, narrower, all white. Stamens 5, all fertile. Utricle orbicular-obcordate, compressed. Seeds discoid, shining, brownish.

Fl. & Fr.: Almost throughout the year.

CHENOPODIACEAE

Key to the Genera

1a. Stem jointed; leaves absent; flowers hermaphrodite..............................Salicornia

1b. Stems leafy, not jointed; flower unisexual or bisexual..............................Suaeda

Salicornia L.


Vernacular Name: Beng.: Nona Palang.

Annual, much branched, erect or decumbent herbs with jointed nodes; each segment at apex forming a little cup usually with short teeth. Leafless. Flowers bisexual, minute in groups of 3, pale yellow; each group sunken on either side of each segment; sterile segments 5-10 mm long. Perianth obpyramidal. Stamens 1-2. Utricles ovoid,

**Fl. & Fr.:** November – March.

**Notes:** Commonly found in marshy areas, grows on the river flats in sandy soils.

**Suaeda** Forssk. *ex* G. F. Gmelin.

Key to the Species

1a. Leaves terete, 5-12 mm long; bracteoles pectinate; styles 3…………….. *S. nudiflora*

1b. Leaves not terete, more than 12 mm long; bracteoles entire; styles 2…….. *S. maritima*


**Vernacular Name:** Beng.: *Giria sak.*

Erect or ascending herbs or undershrubs; stem much branched, often reddish-purple, glabrous. Leaves linear-oblong, 0.8-4.0 x 0.4-0.8 cm, crowded, occasionally purple. Flowers in axillary clusters or in slender elongated spikes, laxly arranged, whitish-green; bracteoles ovate, entire, membranous. Styles 2. Utricles ovoid. Seeds horizontal, shining, brown.

**Fl. & Fr.:** December – March.

**Notes:** Commonly found in saline banks near the coast and estuaries in association with *Suaeda nudiflora, Sesuvium portulacastrum, Heliotropium curassavicum* etc.

**Vernacular Name:** Beng.: *Giria sak.*

Erect or ascending, perennial herbs or undershrubs; stem much branched from the woody base, often reddish, glabrous, often reddish. Leaves sessile, linear, 6-12 x 2-4 mm, acute at apex, fleshy, terete. Flowers clustered in terminal spikes, globose, white; bracts leafy; bracteoles ovate, acute, pectinate. Petals obovate, transparent with transverse thickening at apex. Styles 3. Fruits ovoid. Seeds horizontally arranged.

**Fl. & Fr.:** June – October.

**Notes:** Commonly found in salt marshes and saline embankments near estuaries, associated with *Suaeda maritima, Sesuvium portulacastrum, Heliotropium curassavicum* etc. Often found in pure strand behind the estuaries and sides of fisheries.

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**LORANTHACEAE**

**Key to the Genera**

1a. Bracteoles present................................................................. *Macrosolen*

1b. Bracteoles absent................................................................. *Dendrophthoe*

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**Dendrophthoe** C. Martius

**Vernacular names:** Beng.: *Bara Manda*; Hindi: *Banda*; Guj.: *Vando*; Mar.: *Bandgul*; Mal.: *Iththil*; Tam.: *Pulluruvi*; Tel.: *Badanika*.

Semi-parasitic shrub; branches profuse, greyish, glabrous. Leaves variable in shape, ovate-elliptic, orbicular, 7-15 x 2.5-10 cm, acute at apex, cordate-amplexicaul to cuneate at base, entire at margin, petiolate, glabrous, coriaceous. Flowers in axillary raceme, pedicellate. Calyx tubular, to 4 mm long, persistent. Corolla to 4.5 cm long; lobes 5, linear; tube curved, slightly inflated upwards, orange. Berries oblong, 10-13 x 5-6 mm, orange or pink, crowned by persistent calyx.

**Fl. & Fr.:** October - March.

**Notes:** Common parasite on *Sonneratia apetala*.

**Macrosolen** (Blume) Reichenb.


Semi-parasitic undershrubs. Leaves elliptic or elliptic-lanceolate, 3.5-11.5 x 2.0-5.5 cm, acute to subacute at apex, cuneate at base, entire, petiolate, glabrous, coriaceous. Flowers in axillary racemes, in groups of 3-6, pedicellate. Calyx infundibuliform; limb entire. Corolla tube linear-oblong, inflated just below the middle; lobes usually 6, linear-spathulate. Fruits ellipsoid, to 6 mm long; crowned by the conical style base and the calyx-limb.

**Fl. & Fr.:** March – July.
VISCACEAE

Viscum L.

Key to the Species

1a. Leaves obliquely ovate-lanceolate, acuminate.................. V. monoicum

1b. Leaves elliptic to elliptic-lanceolate, obtuse........................ V. orientale


Semi-parasitic, undershrubs; branches longitudinally wrinkled. Leaves sessile, obliquely ovate-lanceolate, 2.5-6.5 x 0.6-2.5 cm, acuminate at apex, tapering at base, 3-5-nerved. Flowers in axillary fascicles, greenish; bracts truncate, apiculate. Perianth lobes 4. Berries ovoid, green, smooth.

**Fl. & Fr.**: June – December.


Semi-parasitic, undershrubs; stem much branched, leafy parasitic; branches terete, grooved, thickened at nodes. Leaves elliptic to elliptic-lanceolate, 2.0-4.5 x 0.8-2.0 cm, obtuse at apex, tapering at base, entire or undulate, coriaceous. Flowers in axillary, sessile or shortly pedunculate clusters. Berries globose.

**Fl. & Fr.**: October – June.

**Notes**: Commonly found on *Excoecaria agallocha* and sporadically on *Avicennia spp.*
EUPHORBIACEAE

Excoecaria L.


Vernacular Names: Beng.: Gangwa, Gengwa, Gogheria, Gneu, Geria, Goria; Hindi: Gwa; Eng.: Blinding Tree, River poison; Sans.: Aguru; Mar.: Surund; Mal.: Katappala; Tam.: Agadil, Tillai; Tel.: Chilla, Tellachettu.

Evergreen deciduous, medium-sized tree with milky latex, upto 15 m tall; bark greyish, lenticellate; lateral roots often forming elbow shaped pegs from subterranean beds. Leaves alternate, spirally arranged, ovate, ovate-elliptic or ovate-oblong, 2.0-7.5 x 1.4-3.5 cm., acute or acuminate at apex, narrowed at base, margin entire to shallowly crenulate, thickly coriaceous, green in young and mature condition, reddish before falling; petioles 1-2 cm long; stipules minute, ephemeral, triangular, scale-like. Flowers unisexual, fragrant. Male flowers almost sessile in axillary many flowered catkin-like spikes, yellow, 2.5-5.0 cm long; tepals 3, minute, narrow, unequal, subserrulate; stamens 3, yellow, exserted; filaments long; anthers bilocular, basifixed, pistillode absent. Female flowers in axillary few flowered racemes; upper flowers usually imperfect, pedicellate, 1.3-2.5 cm long; tepals 3, broadly ovate, acute, subserrulate, wider than those in male flowers; staminodes absent; styles free nearly to the base, ovary trilocular. Capsules depressed globose, variable in size, 6-25 mm in diameter, 3-lobed, pubescent. Seeds subglobose, black.

Fl.: March – August.

Note: Common along the intertidal forests, estuaries and muddy seashores, usually with association with Avicennia officinalis, A. marina, Ceriops decandra, Aegiceras corniculatum and Bruguiera species. Often found in non-tidal zones, village surroundings and degraded forest along with Acrostichum aureum, Tamarix indica and Clerodendrum inerme.
CASUARINACEAE

Casuarina L. ex Adans.


Vernacular names: Beng.: Jahu; Hindi: Janglisaru; Eng.: Beef-wood tree; Guj.: Vilayati saru; Mar.: Khadsherani; Mal.: Choolamarum; Tam.: Savukku; Tel.: Saravu.

Tall trees, evergreen, dioecious, up to 15 m high; branches drooping. Leaves scaly, 6-7 per node. Male spikes terminal, cylindrical; tepals 2, lanceolate. Female spikes axillary, ovoid, shortly pedunculate. Carpophores ovoid. Nutlets thin, compressed.

Fl. & Fr.: February – June.
MONOCOTYLEDONES

AMARYLLIDACEAE

Crinum L.


Vernacular names: Beng.: Sukh darshan; Hindi: Sukhadarshan; Eng.: Saffron; Sans.: Chakrangi; Tam.: Vishamungil.

Perennial, erect, stout, stoloniferous herbs; bulbs ovoid, upto 6 cm diam., caudex. Leaves clustered, linear-oblong, 50-68 x 2.3-5 cm, acute at apex, subfleshy; sapes axillary, 40-70 cm long, cylindric, 7-10 flowered, spathaceous; bracts 2, oblong-lanceolate; bracteoles filiform. Flowers white. Perianth hypocrateriform, 2.5 cm diam.

Fl. & Fr.: May – July.

Note: Rare in the river banks on softy, muddy new silted areas, found mainly along the Ichamati river in North 24-Parganas.

FLAGELLARIACEAE

Flagellaria


Plants perennial. Leaf sheaths 2-6 cm; pseudopetiole 3 - 8 mm, abaxially flattened; leaf blade lanceolate to linear, 6.5-23.5 x 0.5-1.5 cm, base abruptly contracted, rounded, or slightly cordate. Panicles erect, irregularly branched, dense; bracts short, broad. Flowers small; tepals white, ovate to broadly so, thinly membranous. Stamens exserted. Drupes globose, reddish when mature, smooth. Seeds 1(or 2).

Fl. & Fr.: April - November.
**TYPHACEAE**

*Typha L.*


**Vernacular names:** Beng.: *Hogla*; Eng.: Bulrush, Cat’s tail, Elephant Grass, Reed Mace; Guj.: *Ghabajarin*; Hindi: *Mothitrina, Pater*; Mar.: *Eraka, Panalavhala, Rambana*; Or.: *Hogola*; Punj.: *Baj, Bori, Dab, Gond, Kundar, Lukh, Pan, Patira, Pitz, Yira*; Sans.: *Eraka, Gundra, Gundramula, Shari, Shimbi*; Tam.: *Anaikkorai, Anaippul, Chambu*; Tel.: *Enugaymmu, Jammugaddi, Kandra*.

Perennial aquatic or marshy herb; stems 1.5-3.6 m tall; stock rhizomatous. Leaves linear, grass like; 2-4 m long, somewhat convex dorsally and concave ventrally, trigonous in cross section above the sheath, undulate margin, spongy, erect, glabrous. Inflorescence spadix or cylindric spike Male spikes: to 20 cm long; rachis clothed with short, often forked hairs. Female spikes much shorter, to 12 cm long.

**Fl. & Fr.:** May – January.

**Notes:** Common in shallow water logged areas like jheels, canals and ditches.

**ARECACEAE**

**Key to the Genera**

1a. Plants monoecious; fruits covered by woody scales................................. *Nypa*

1b. Plants dioecious; fruits not covered by woody scales............................. *Phoenix*
**Nypa Steck**


**Vernacular Names:** Beng.: Golpata, Gabna, Gulga; Eng.: Water Coconut, Hind.: Gulga, Guj.: Pardeshitadio; Malay: Nipah; Tel.: Kotitikaya; Andm.: Poothada; Tel.: Nipamu.

Rhizomatous stemless, monoecious palm; rootstock prostrate, up to 45 cm. in diam., rooting along the lower surface. Leaves arising from the rootstock, pinnatisect, 5-6 m long, midrib woody; leaflets linear-lanceolate, 1.5-2.5 m long, bright green above, waxy-glaucous beneath, with bifurcate soft spine-like scales along the undersurface of midrib, tip subulate; petioles 1.5-2 m long; spathes many; spadix terminal, pedunculate, erect. Male flowers minute, intermingled with bracteoles, arranged in catkins on lateral branches of the spadix; sepals linear with clavate inflated tips; petals narrowly clavate, brown in colour. Female flowers larger, arranged in globose terminal heads, yellow in colour. Fruits globose, 12-16 x 6-10 cm, with pyramidal tips making a hexagonal appearance.

**Fl. & Fr.:** April – September.

**Note:** Gregarious towards inner parts of creeks and canals under the influence of more fresh water flow.

**Phoenix L.**


**Vernacular Names:** Beng.: Hental or Bokra; Eng.: Sea Date; Tel.: Hintalamu.
Sobiliferous bushy, dioecious palm, up to 4 m tall; stems often inclined, annulated, base supported by spongy, needle-like, perforated breathing roots; leaf scar prominent. Leaves imparipinnate with dialated petioles and fibrous sheath embracing stems, 2-3.5 m long; leaflets many, linear-lanceolate, acuminate at apex ending in a sharp spine, the lower few pairs completely modified into sharp spines. Inflorescence spadix, arising in between leaves; spathes 25-30 cm long, brownish, enclosing the flowers; spadices arising in between leaves. Flowers trimerous. Petals 3, yellowish-white. Stamens 3 (in male flowers). Carpels 3 (in female flowers). Drupes oblong or ellipsoid, 10-12 mm long, smooth, turning red to purple when ripe.

Fl.: January – August.

Note: Common on elevated muddy swamps along the estuarine banks. Often form pure strands starting from the inter-tidal zones up to 15-20 km. away.

RUPPIACEAE

Ruppia


Branched, aquatic herbs. Leaves entire except the minutely denticulate apex. Peduncle 2-3 mm long when young. Flowers 0.5-1 mm long. Fruitlets drupaceous, obliquely ovoid, stipitate, 2-3 mm long excluding stipe, black, lateral projections short; stipe 1-2 cm long, slender in fruit.

Fl. & Fr.: April - August.
CYPERACEAE

Key to the Genera

1a. Glumes distichous; hypogynous bristles absent……………………………………… Cyperus

1b. Glumes spirally arranged; hypogynous bristles present…………………………… (2)

2a. Leaves not well developed, often scaly at base; stem hollow or soft; Stylar base articulated………………………………………………………………… Fimbristylis

2b. Leaves well developed; stem solid; stylar base articulated with ovary……………………………………………………………………………………………….. Schoenoplectus

Cyperus L.

Key to the Species

1a. Leaves short; rhizomes stout and creeping, not stoloniferous………. C. corymbosus

1b. Leaves long; rhizomatous stoloniferous tuber distinct………………… C. rotundus


Vernacular Names: Beng.: Golamethi.

Creeping, rhizomatous herbs with dark brown scales; stems 0.7-1.6 m tall, triangular above, sub-cylindric below. Leaves reduced to sheath or small blades. Umbel decompound; bracts linear, 3-5; spikelets 10.2-10.5 x 1.3-1.6 mm; rachilla winged; glumes navicular, ovate-oblong, 2.5-3 mm long, reddish-brown. Nuts ellipsoid, 1.3-1.6 mm long, trigonous.

Note: Commonly found in marshy land, side of pond and ditches and newly silted area in river banks.

**Vernacular Names:** Beng.: *Motha, Mutha ghas*; Hindi: *Motha, Mutha*; Eng.: *Common sedge*; Sans.: *Abda, Arnoda, Mustaka*; Ori.: *Mutha ghasa*; Guj.: *Barik-motha*; Mar.: *Nagar-motha*; Mal.: *Kora*; Tam.: *Korai*; Tel.: *Pura gaddi*.

Perennial herb; stem erect, 10-40 cm. high, terminated at the end by ellipsoid, tunicate, tuber; root fibres clothed with flexuous hairs. Leaves usually shorter than the stem, 5.2-5.5 x 0.1-0.6 cm, finely acuminate, flat, margin scabrid in upper part, 1-nerved, dark green above. Inflorescence simple or compound umbel; bracts 3; spikelets 10-50-flowered, 1-3.5 x 1.5-2.5 cm, compressed, reddish-brown; glumes ovate, 2.8-3.2 mm long, minutely acuminate at apex; rachis with hyaline wing. Nuts ellipsoid, 1.6-1.8 mm long, grayish-black.

**Fl. & Fr.:** July - December.

**Note:** This species is found mainly in newly formed lands in the intertidal zones also as sedge in crop fields and waste lands.

**Fimbristylis** Vahl

**Key to the Species**

1a. Stigma 2; style flat, usually hairy; nut biconvex or planoconvex; glumes spiral, never in 2 rows.................................................................(2)

2a. Glumes ovate to orbicular; less than twice as long as wide; inflorescence mostly spikelets.................................................................*F. ferruginea*

2b. Glumes lanceolate to oblong-ovate, twice or more than twice as long as wide; inflorescence usually of single spikelets ........ ..................*F.polytrichoides*
1b. Stigma 3, styles 3-angled, usually glabrous; nuts 3-angled; glumes in 2 rows…………………………………………………………………….. *F. quinquagularis*


Perennial, rhizomatous, shortly creeping sedge; culms tufted, striate, upto 70 cm high. Leaves cauline; sheath leathery, reddish-brown, upper ones gland dotted, hairy; ligule a dense fringe of short hairs; blades absent. Inflorescence of simple or compound head; involucral bracts 2 or 3; spikelets sessile or sessile, terete; glumes ovate-oblong, apiculate, obscurely keeled, usually hairy in the upper half, brown. Stamens 3. Stigmas 2; style flat, hairy. Nuts obovoid to oblong-obovoid.

**Fl. & Fr.:** July- November.

**Note:** Common in moist places, sides of rivers, ponds and other marshy places.


Perennial herbs; culm tufted, setaceous, upto 40 cm high, flexuous; leaf sheath membranous; ligule a row of short hairs, leaf blades flatted, setaceous; involucral bracts 1 or rarely 2; spikelet solitary, sub terete, pale-brown; glumes lanceolate to oblong-ovate, obtuse; keel green. Stamens 1 or 2. Stigma 2; style hairy. Nuts oblong-obovoid.

**Fl. & Fr.:** June - November.

**Note:** Abundant in marshy wet places, near river banks, sides of ditches and ponds, saline mud.

Perennial rhizomatous herb; culm 4-or-5-angled or winged or grooved, upto 30-70 cm long, glabrous. Leaves reduced to 3 or 4 tubular sheath; ligule absent. Inflorescence compound comymbose; involucral bracts 2-3; spikelets solitary, ovoid; glumes membranous. Stamens 2. Stigma 3; style 3angled. Nuts obovoid, warty.

**Fl. & Fr.:** June - December.

**Note:** Common in wet, swampy places, sides of ponds and canals.

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**Schoenoplectus** (H.H.L. Reichb.) Palla, *nom. cons.*


**Vernacular names:** Eng.: Club-brush; Beng.: Nalor Dharma.

Perennial herbs, 55-90 cm tall, with hard root stock and fibrous roots; rhizome stout; stems spongy, trigonous. Leaves 2.5-5 cm long, hollow, membranous, acuminate; sheaths splitting into fibres. Inflorescence lateral compound, often drooping umbels. Spikelets 1.5 x 0.5 cm, pale brown, clustered near the top of the stem; bristles upto 7, plumose. Style base not swollen. Nuts obovoid, biconvex, smooth, apiculate, brown.

**Fl. & Fr.:** August - November.

**Note:** Frequent along waterlogged areas near the river banks and back mangrove swamps.
POACEAE

Key to the Genera

1a. Awns present.................................................................Phragmites

1b. Awns absent.................................................................(2)

2a. Inflorescence of spikes or racemes.................................Aeluropus

2b. Inflorescence of panicles............................................(3)

3a. Panicles spiciform.........................................................Porteresia

3b. Panicles lax or contracted...........................................Myriostachya

Aeluropus Trin.


Vernacular Names: Beng.: Nona Durba; Eng.: Saline Gran; Mar.: Dola-gavat.

Stoloniferous perennial herb; culms tufted, creeping with erect branches 5-35 cm high, glabrous, leafy throughout; stolons long; nodes glabrous. Leaves distichous, linear-lanceolate, rounded or shallowly cordate at base, subacute at apex, coriaceous; ligule membranous; sheath coriaceous, glabrous or pilose. Inflorescence a terminal elliptic or oblong head; spikelets ovate-elliptic, pubescent; lower glume lanceolate, acute, 2 x 0.5 mm, 3-5 nerved; lemma ovate, 2.5 x 1.2 mm, 9-nerved; palea oblong-elliptic, tridentate, 2.3 x 1 mm, 2-nerved, hyaline. Stamens 3; anthers linear. Styles 2, free; stigmas 2, plumose. Caryopsis oblong or obovate, free within lemma and palea.

Fl. & Fr.: Throughout the year.
Notes: Rare along the mangrove belt but frequent in salt marshes, often in damp soil, sometimes on sandy soils.

**Myriostachya** Hook. f.


**Vernacular Names:** Beng.: *Nalnay.*

Perennial, erect or suberect, rhizomatous grass; culms stout, densely tufted, 2-3 m tall with thick spongy root stock; roots sheathed, smooth, spreading, simple or branched to a long distance. Leaves linear, 1.5 cm broad, acuminate at apex, smooth, serrate. Panicles 6-12-flowered, to 50 cm long; spikelets 5-8 mm long, compressed; glumes 1 and 2 unequal, lanceolate, coriaceous, 1-veined, keeled with a long awn; palea chartaceous, 2-toothed; lodicules minute, retuse. Stamens 3. Caryopsis obliquely ovoid, suberete with a large scutellum and long elongated embryo.

**Fl. & Fr.:** March - April.

Note: Common in sandy elevated intertidal regions in the mangrove swamps as a pioneer species along with *Porteresia coarctata.* Frequent on the inner side of creeks and canals of the tidal forests.

**Phragmites** Trin.

**Vernacular Names:** Beng.: *Nalkhagra*; Hindi: *Nuda-nar*; Eng.: *Nodding reed*; Ori.: *Janki*; Guj.: *Nali*; Mar.: *Nala*; Mal.: *Nalam*; Tam.: *Perunanal*; Tel.: *Kikkasagaddi*.

Perennial, large grass, upto 7 m tall. Culms erect, close-jointed, hollow, usually widely spreading by means of long stolons. Leaves distichous, linear-lanceolate, 8.5-58.5 x 0.4-2.0 cm, tip subulate, base cordate, margin scabrous; ligule a ridge of short stiff hairs. Panicles loose, erect, 20-55 x 10-35 cm, silky hairy at base; branches filiform, scabrous, purple brown. Spikelets 1-2 cm long, many flowered. Lower glume oblong-lanceolate, 1-nerved, 2-2.5 mm long; upper glume oblong-lanceolate, 3-nerved, 5-6 mm long. Lower lemma narrowly oblong-lanceolate, convolute, 1-1.5 cm long; upper lemmas subulate-lanceolate, subaristate, successively a little shorter than lower. Paleas upto 3 mm long, ending in 2 short horns. Rachilla above the lowest lemma penicillate. Stamens 3; anthers 2-2.5 mm long, yellow. Caryopsis narrowly ellipsoid, purplish, 1.2-1.5 mm long.

**Fl. & Fr.:** August – December.

**Porteresia** Tateoka


**Vernacular Names:** Beng.: *Dhani Ghas*; Eng.: *Wild rice*.

Perennial branched, rhizomatous herbs; culms erect, 1-2 m tall, smooth; rhizomes creeping, long. Leaves linear, to 50 cm long, cordate-acuminate at apex, coriaceous with spinoulouse margins, midrib covered with hairs; sheath to 15 cm long; ligule short. Panicles spiciform, branched, few flowered, to 15 cm long; rachis trigonous; spikelets laxly arranged, chartaceous; glumes 3, narrowed, dorsally winged ending into a rigid awn; palea keeled; keel dialated into a rounded wing; lodicules large, membranous. Caryopsis cylindrical longitudinally striated.
**Fl. & Fr.:** May – September.

**Note:** This is a pioneer species in the succession process, commonly found in newly formed mud flats of intertidal silted areas. Often form continuous vegetation having growth from the rhizomatous part.
FERNS

PTERIDACEAE
Acrostichum L.


**Vernacular Names:** Beng: *Hudo*, Eng: *Golden leather fern, Mangrove Fern.*

Shrubby fern. Rhizome thick, erect, covered with scales. Stipes *ca* 1 m long, thick, pale-straminous. Fronds imparipinnate, *ca* 4m or more tall including stipes, narrowly oblong to elliptic in shape; pinnae 8-14, simple, only the upper fertile. alternate; sterile pinnae 7.5-17 x 1.5-4 cm., on 2 cm. long stalks, linear-oblong, base cuneate to rounded, apex abruptly rounded to truncate and shortly mucronate. Fertile pinnae like the sterile but smaller in size. Sori densely covering the undersurface of upper pinnae. Indusium absent.

**Fl. & Fr.:** Sori formation during May to December.

**Notes:** This species is extremely abundant in mangrove areas and can withstand partial immersion by the daily tide. It grows sometimes near the sea. It is generally found in the landward side of mangrove swamps, surviving sometimes in ditches or in wet ground, which have been completely cut off from the sea.

BLECHNACEAE

*Stenochlaena* J. Sm.


**Vernacular Names:** Eng.: *Climbing fern.*
Twining fern, up to 7 m long, with base rooted to the ground; rhizomes scendent, 5 - 7 mm in diameter, pale green, sometimes slightly glaucous, smooth, with scattered, dark, small scales; scales cordate-lanceolate, attached above the base, thick, forming a single row of narrow areoles on each side of the costae, free in sterile frond, especially towards the apex, the growing tip completely covered. Stipes woody, glossy; fronds widely spaced, including stipe 5 - 20 cm long, horizontal to pendulous with drooping pinnae, sterile pinnae for the most part articulate to the rachis, lanceolate to oblong-lanceolate, 19.0-24.5 x 2.5-6.0 cm, acute at apex, cuneate at base, slightly attenuate, with a small dark gland on the apical side, shining, margin almost entire to serrulate, especially at the apex; fertile pinnae linear-oblong, 15.0 –20.0 x 0.7-1.3 cm, narrowly contracted into rolled margins. Sori acrostichoid, scattered throughout the surface of lamina; sporangia slender stalked, oval; spores elliptic, light brown, exine with scattered tubercle-like appendages.

Fl. & Fr.: Sori formation takes place during July-December.

Notes: Common in back mangroves, on sandy uplands and inland rocky crevices.