



**STUDY OF FLORAL DIVERSITY OF THE MEDICINAL
PLANT CONSERVATION AREA (MPCA) AT JHALDA,
PURULIA, WEST BENGAL**

FINAL PROJECT REPORT



Report submitted

By

Central National Herbarium

Botanical Survey of India

Howrah – 711 103

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ACKNOWLEDGEMENTS

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GENERAL INTRODUCTION

TITLE OF THE PROJECT: STUDY OF FLORAL DIVERSITY OF THE MEDICINAL PLANT CONSERVATION AREA AT JHALDA, PURULIA, WEST BENGAL

Officials engaged from the Central National Herbarium (CNH), Botanical Survey of India (BSI)

Team members

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- ii. Dr. Avishek Bhattacharjee, Scientist D, CNH, BSI (Co-PI)
- iii. Mr. P.P. Ghoshal, Botanist, CNH, BSI
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- v. Ms. Kasturi Chakraborty, Project Assistant, CNH, BSI

Project tenure: January 2022 to January 2023.

Submission of report: Within two months of the completion of project tenure, i.e. by March 2023.

Origin of the project proposal

India being one of the 17 mega-biodiverse countries, encompasses 4 of the 36 biodiversity 'hotspots' in the world, viz. the Himalaya, Indo-Burma, Western Ghats-Sri Lanka and the Sundaland. In the present state of our knowledge, India has close to 55,000 plant species belonging to different taxonomic groups contributing 11% of species to the world flora and the country has enormous wealth of medicinal plants. More than 8000 species of plants are in medicinal use for indigenous health practices as well as modern system of medicines in India. However, more than 90% of medicinal plants in India are facing threat due to excessive and unsustainable collection, utilization, overexploitation or un-skilled harvesting. Conservation of medicinal plants through Medicinal Plant Conservation Areas (MPCAs) is a novel in-situ conservation initiative in which the populations are allowed to flourish, while the conventional forestry management operations are kept to minimum.

The Principal Chief Conservator of Forest (PCCF), Research, Monitoring & Development, Government of West Bengal approached Botanical Survey of India (BSI) to carry out the study of floral diversity in the Medicinal Plant Conservation Area at Jhalda, Purulia vide letter no. 924/PCCF/-RMD/2P-7(2), dated 2.12.2021. BSI agreed with certain terms and conditions vide file no. BSI-295/1/WBPCCF/2021-Tech/1438 dated 24.12.2021 and the project got approval from West Bengal Forest Department vide letter no. File No.: BSI-295/1/WBPCCF/2021-Tech/1 dated 4.1.2022 and from BSI vide file no. BSI-295/1/WBPCCF/2021-Tech/1484 dated 7.1.2022 and the Central National Herbarium (CNH) was assigned to execute the project.

ROLES AND RESPONSIBILITIES AS PER THE OFFICIAL AGREEMENT WITH THE FOREST DEPARTMENT

1. Central National Herbarium, BSI

- i. Floristic survey and documentation of the plants (vascular plants) present in Medicinal Plants Conservation Area at Jhalda, Purulia, West Bengal.
- ii. Preparation of voucher specimens and deposition/incorporation of those specimens at CAL.
- iii. Digitization of the voucher specimens.
- iv. Preparation of detailed report, i.e. floristic account of the plants (vascular plants) present in the MPCA, Jhalda with description, photographs etc.
- v. Submission of report (along with digitised data of voucher specimens) within 2 months of the completion of project tenure.
- vi. Selection of Project Assistant was done by CNH, BSI after receiving approval for the project from West Bengal Forest Department. The salary of the Project Assistant was paid directly by the West Bengal Forest Department.

2. West Bengal Forest Department

- i. Providing all logistics support and field support including transport from Kolkata/ Howrah to field area and back, food and accommodation during the field tours.
- ii. Providing materials for poisoning and mounting of specimens (like Ethyl Alcohol, Mercuric Chloride, Formaldehyde, mounting boards, genus covers, species covers, fevicol etc.).

Cost estimation for purchasing the herbarium related materials (as per the approved project proposal)

Material	Quantity	Approximate cost (in Rs.)
Ethyl Alcohol	30 litres	(@Rs. 685/litre) 20,550 /-
Mercuric Chloride	500 grams	9980/-
Formaldehyde	5 litres	(@ Rs. 1000/litre) 5,000/-
Mounting boards	1200 nos	(@31.25/sheet) 37,500/-
Blotting papers	500 nos	(@ 12.214/sheet) 6,107/-
Genus covers	300 nos	(@ 21/sheet) 6,300/-
Species covers	600 nos	(@17.25/sheet) 10,350/-
Fevicol	10 litres	(@ 320/litre) 3,200/-
Secateurs	2 nos.	(@750/piece) 1,500/-
Hand Gloves	5 pairs	(50/pair) 250/-
		Total: Rs. 1,00,737/-

Note: The forest Department had to procure and provide the materials mentioned above to BSI for the preparation of herbarium specimens.

- iii. Printing and binding of the project report.
- iv. Providing salary to the Project Assistant [Rs. 20000/- + admissible HRA (27% at present), i.e. Rs. 25,400/- per month] for 1 year.

As it is a short-term project and CNH, BSI did not have any separate account to operate such project, the WB Forest Department took all other financial liabilities (besides the logistics and field supports as mentioned in point no. 'i') i.e. purchase and supply of herbarium related materials, providing salary to the Project Assistant, printing and binding of the final project report.

Materials procured by the WB Forest Department and supplied to BSI

Material	Quantity	Cost (in Rs. as per quotation)
Ethyl Alcohol	30 litres	24780/-
Formaldehyde	1 litre	705.64/-
Fevicol	2.5 litres	1416/-
Hand Gloves	2 packets of 100 pc	3540/-
		Total: Rs. 30,441.64/-

Salary paid to the Project Assistant by the WB Forest Department: Rs. 3,04,800/- [Rs. 25,400/- per month for 12 months]

Tours undertaken by BSI team

First Tour: 24th-28th January, 2022

Total 111 field numbers belonging to c. 80 genera under 35 families were collected during the first tour.

Second Tour: 4th – 9th April, 2022

Total 93 field numbers belonging to c. 76 genera under 39 families were collected during the second tour.

Third Tour: 29th – 3rd September, 2022

Total 157 field numbers belonging to c. 95 genera under 41 families were collected during the second tour.



Study area

It is a hilly terrain in the Purulia district of West Bengal situated at the West Bengal-Jharkhand border. The brief information of the study area is given below.

General Information

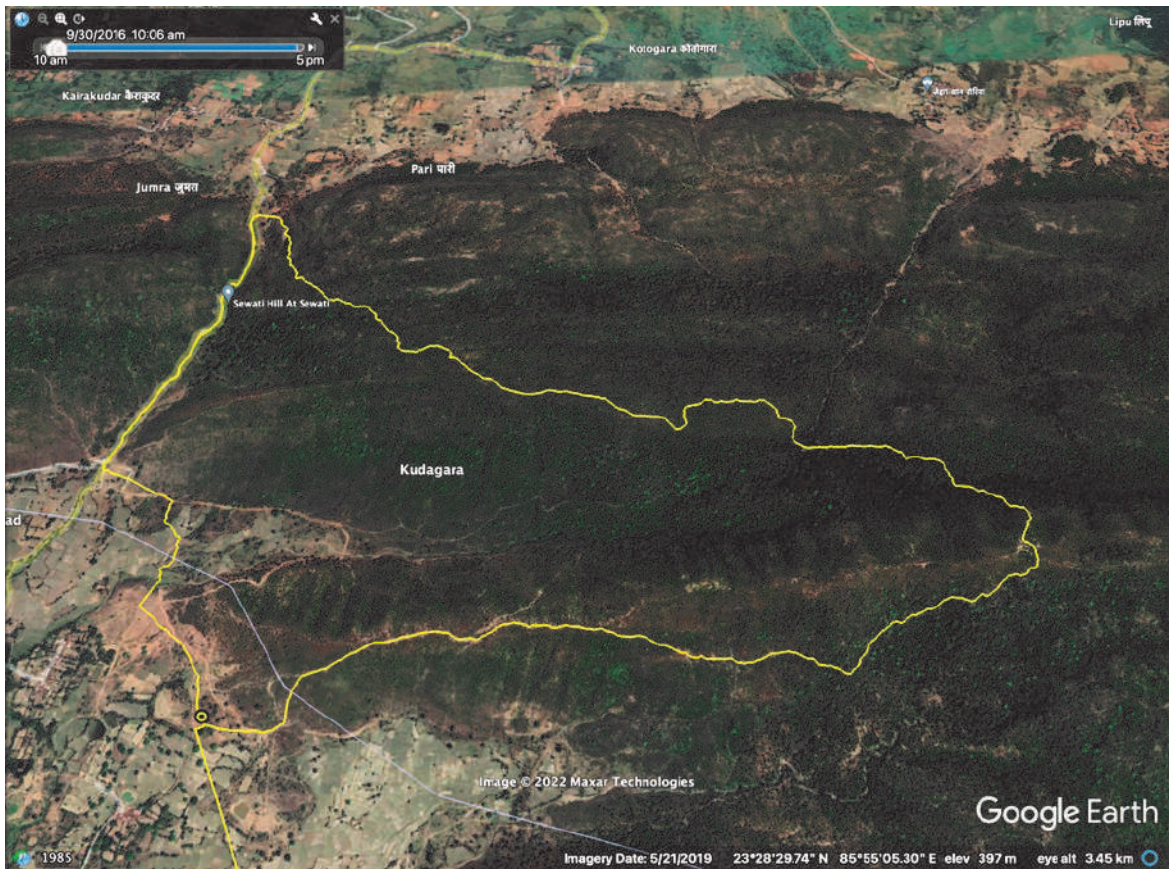
Name of the Site	Kudagara
Legal Status	Protected Forest (Conservation Working Circle).
MPCA effective area	Conservation Working Circle – 188.27 Ha.
Division	Purulia
Forest Range	Jhalda
Block	Jhalda
Mouza	Kudagara
J.L. No.	13
Total Area	188.27 Ha.

Physical Description of the Site

Latitude	N - 23°28'23.43"
Longitude	E - 85°55'31.11"
Altitude	409 m
Geology/Rock Formation	Granite gneiss
Soil Types	Laterite
Climate	Dry tropical with extreme winter & summer.
Average Rainfall (Annual)	1260 mm.
Temperature	Maximum – 46 °C, Minimum – 7 °C
Water Resources	Sewati water fall at north-west end and a small, narrow stream passing through the site



Study Area



Map of the MPCA, Jhalda, Purulia



MPCA, Jhalda, Purulia – the study area



MPCA, Jhalda, Purulia – the study area



MPCA, Jhalda, Purulia – the study area



MPCA, Jhalda, Purulia – the study area



MPCA, Jhalda, Purulia – the study area



MPCA, Jhalda, Purulia – the study area



Map showing collection points in the study area

Observations

Apart from the wild and naturalised plants, Sal (*Shorea robusta* C.F. Gaertn.) and Sonajhuri (*Acacia auriculiformis* A. Cunn. ex Benth.) plantations were found in some parts of the MPCA which were done by the state forest department.

Several trees of *Madhuca longifolia* (L.) J.F. Macbr. var. *latifolia* (Roxb.) A. Chev. (locally known as ‘Mahua’ or ‘Mohul’) were found in blooming condition during the second tour inside the MPCA and its surrounding area. Local people collect the juicy, edible flowers of the species and sell in local markets not only for its use in herbal/traditional medicine for treatment of various diseases, but also for brewing local liquor. However, the collection of ‘Mahua’ flowers from the trees inside the MPCA was not observed during the survey.

During the survey, low level of grazing was observed in the South-western part of MPCA. Also collection of firewood and fodder was observed by the local people within the jurisdiction of the MPCA, but at low level.

Though there were reports of forest fire in some nearby forest areas, no forest fire or mark of any previous forest fire (recent) were observed within the MPCA during the survey.



Collection of fodder inside the MPCA, Jhalda, Purulia



Grazing inside the MPCA, Jhalda, Purulia

Glimpses of survey and documentation work



Survey and collection near a narrow stream



Photography during field survey



Collecting and taking photographs of plants



Collecting epiphytes in the field



Team members recording field data



During survey and collection



Hiking uphill through the forest



Finalizing study area route map from the Kudagara mouza map with forest rangers and staff



Looking for flowering specimens of trees



**BSI team along with forest rangers and forest guards at West Bengal and Jharkhand border.
The stones indicate the boundary between the two states**



Photography during field survey



Figuring out the location map



Photography during field survey



Photography during field survey



Discussion during field survey



Discussion during field survey



BSI team along with forest ranger (Silviculture South) and supporting staff

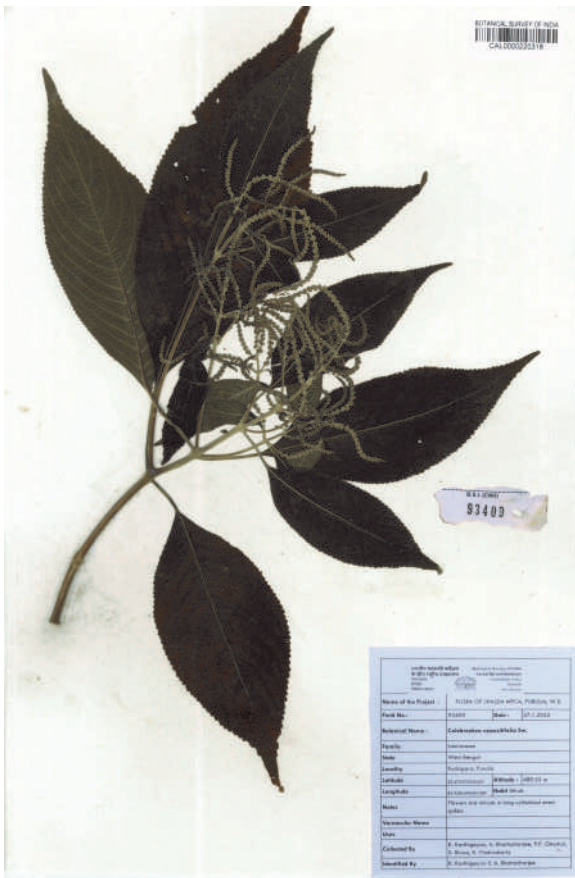


Plant collection during field survey

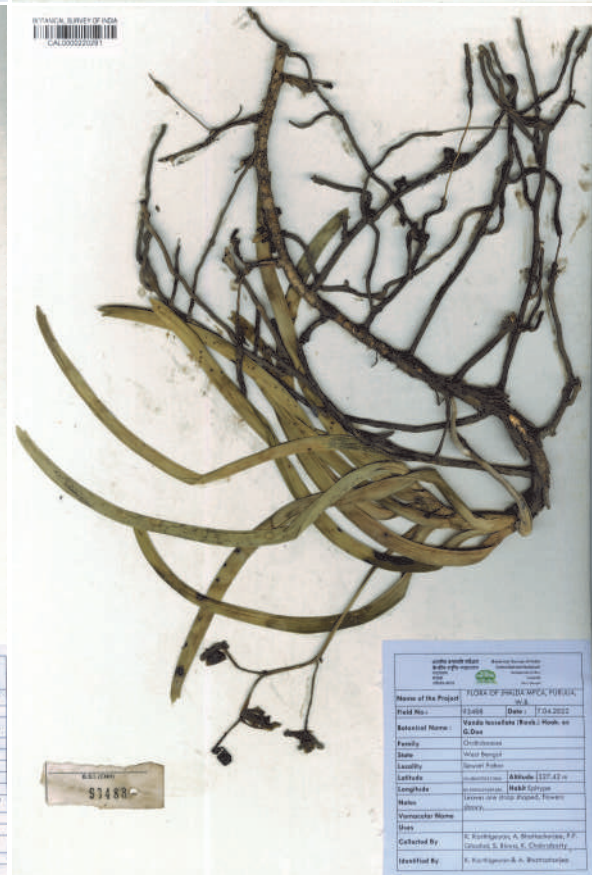
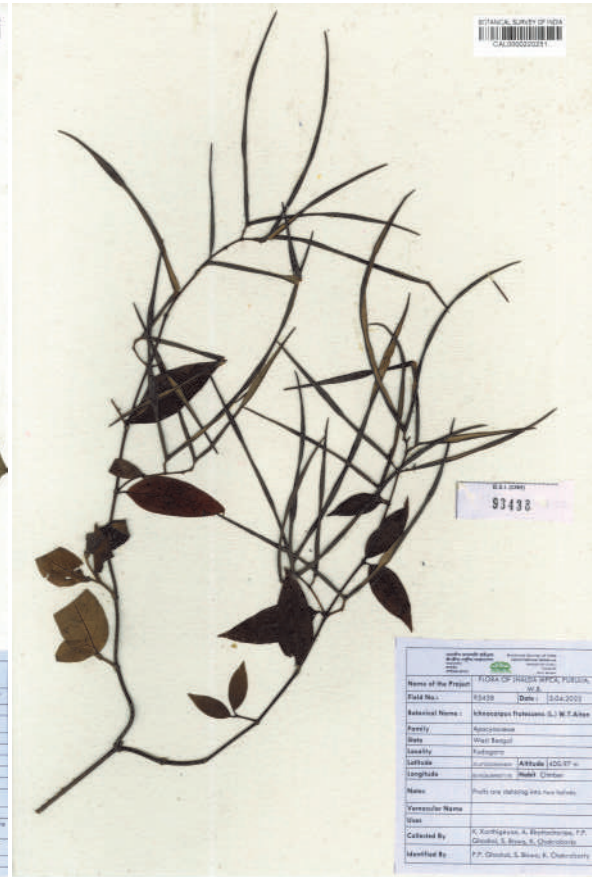


Processing of collected specimens at IB

SAMPLE IMAGES OF HERBARIUM SPECIMENS

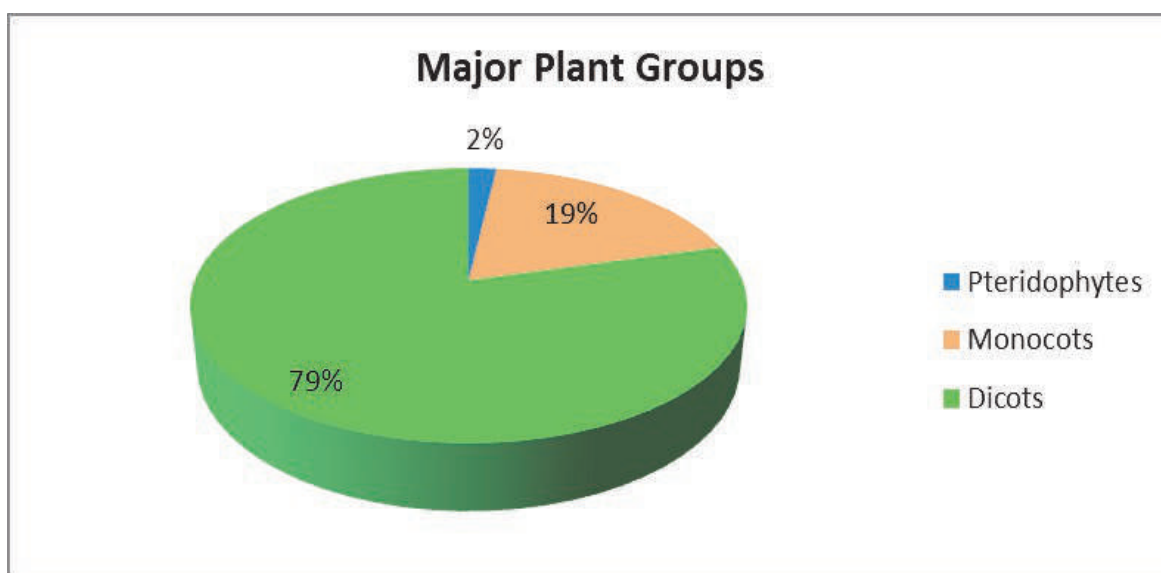


SAMPLE IMAGES OF HERBARIUM SPECIMENS

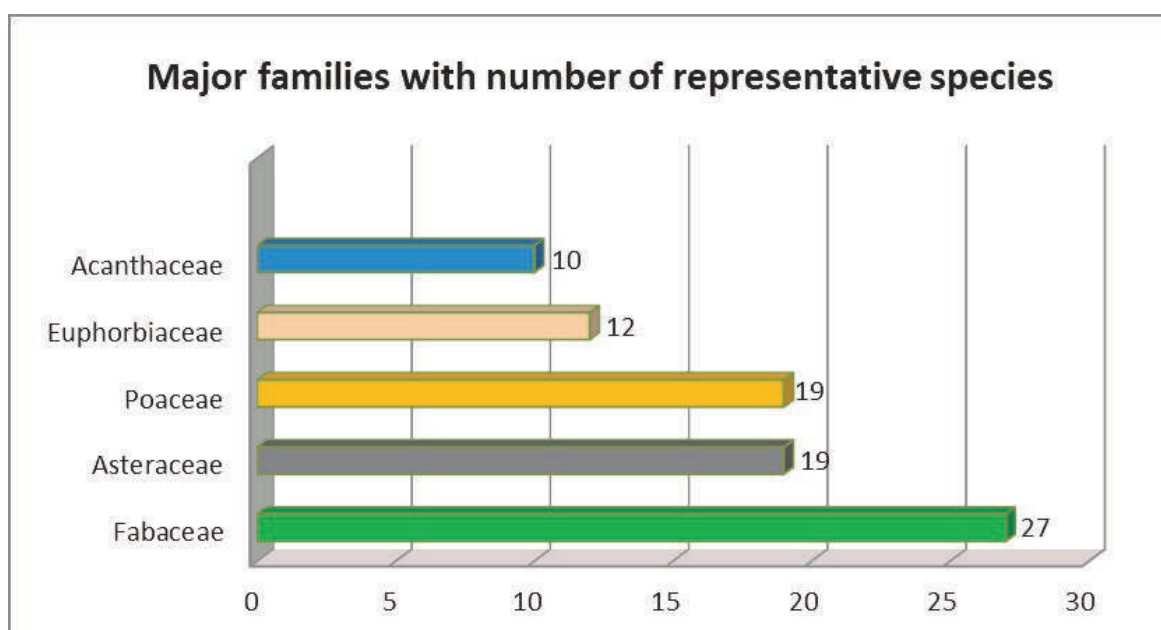


FLORAL ANALYSIS OF THE MPCA

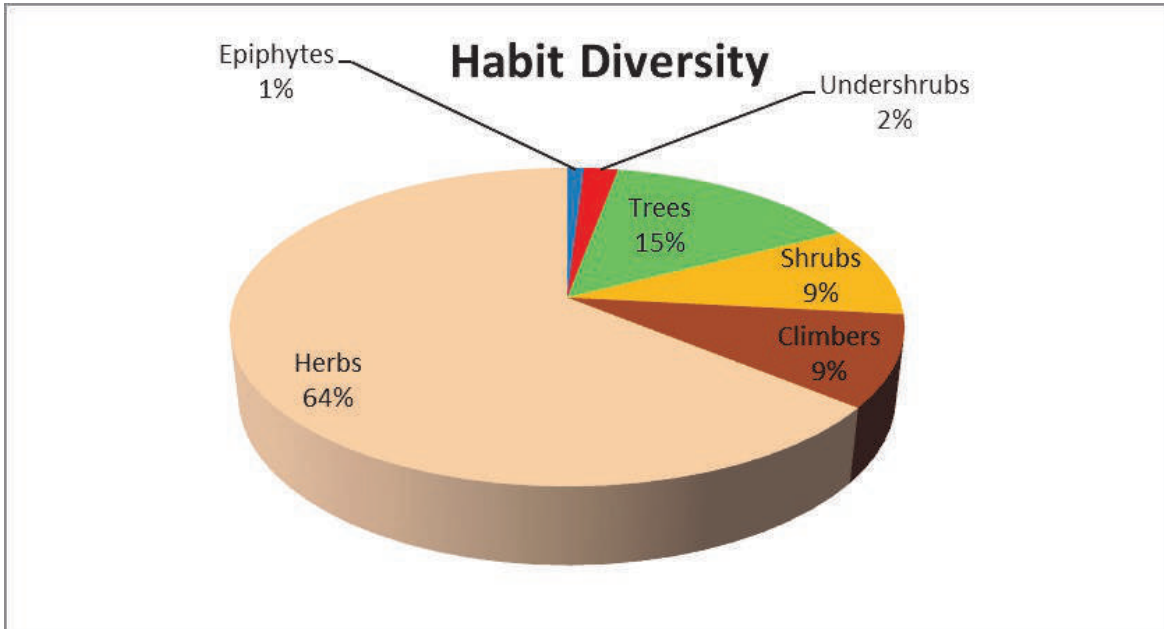
Botanical explorations covering 3 seasons i.e. winter, summer and post monsoon were made in the MPCA Jhalda in the year 2022. A total of 256 field numbers comprising 598 specimens have been collected and readied for deposition at CAL. The analysis of flora of the Jhalda MPCA reveals that, it comprises 206 taxa under 182 genera belonging to 64 families that includes 3 families of Pteridophytes (4 genera and 4 species) from the study area.



There are 8 families with more than 5 genera. The maximum representation is from the family Fabaceae with 23 genera, followed by Poaceae with 19 genera, Asteraceae with 17 genera, Acanthaceae with 8 genera, Euphorbiaceae with 7 genera, Lamiaceae and Malvaceae each with 5 genera. Fabaceae (s.l.) with 27 species followed by Asteraceae (19 spp.) and Poaceae (19 spp.), Euphorbiaceae (12 spp.) and Acanthaceae (10 spp.) are top 5 families with high species representation.



An analysis on the life-form composition of the flora reveals that there are 132 herba- ceous species that constitute 64% of the flora, followed by 30 tree species (15%), shrubs and climbers each with 19 species (9%), 4 species of undershrub (2%) and 2 species of epiphytes (1%).



Among the total 206 taxa found in the MPCA, 51 species are with known medicinal uses, whereas 37 species are known for different other uses.



Uses of the plants found in MPCA, Jhalda, Purulia

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
Dicotyledons				
1.	Acanthaceae	Andrographis paniculata (Burm.f.) Wall. ex Nees	Infusion of whole plant is used in fever and an extract as a medicine for liver and jaundice.	--
2.	Acanthaceae	Barleria cristata L.	Leaves and roots are used for treatment of cough and inflammation.	--
3.	Acanthaceae	Nelsonia canescens (Lam.) Spreng.		Leaves are used as a fodder.
4.	Alangiaceae	Alangium salviifolium (L.f.) Wangerin	Bark and roots are used in jaundice; root bark is purgative also useful in the treatment of fever and skin diseases.	--
5.	Amaranthaceae	Achyranthes aspera L.	The decoction of leaves is used as diuretic.	Used in preparation of green manure.
6.	Anacardiaceae	Buchanania cochinchinensis (Lour.) M.R. Almeida	--	Wood is used for furniture.
7.	Anacardiaceae	Lanea coromandelica (Houtt.) Merr.		The gum exudes from the tree is used for cotton printing by weavers.
8.	Apocynaceae	Holarrhena pubescens. ex G. Don	--	Wood is used in making toys.
9.	Apocynaceae	Ichnocarpus frutescens (L.) W.T.Aiton	--	Stems are used in making fishing nets and baskets.
10.	Asteraceae	Elephantopus scaber L.	Root is used to control vomiting.	--
11.	Asteraceae	Grangea maderaspatana (L.) Poir.	--	Used as fodder for cattle and as manure.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
12.	Asteraceae	Synedrella nodiflora Gaertn.	Leaves are used as laxative.	--
13.	Begoniaceae	Begonia picta Sm.	The plant juice is taken to get relieved from headache.	--
14.	Boraginaceae	Cordia dichotoma G. Forster	--	Unripe fruits are made into pickles and ripe fruits are edible.
15.	Capparaceae	Cleome viscosa L.	Seeds are anthelmintic, carminative and stimulant; poultice of seeds is efficacious in chronic painful joints.	--
16.	Convolvulaceae	Cuscuta reflexa Roxb.	Plant is a purgative and also used in liver complaints.	--
17.	Convolvulaceae	Ipomoea carnea Enum.	Plant is used as mild purgative.	--
18.	Convolvulaceae	Ipomoea nil (L.) Roth	Dried seeds are used as purgative.	--
19.	Convolvulaceae	Ipomoea pes-tigridis L.	--	Plant is used in cattle fodder.
20.	Dipterocarpaceae	Shorea robusta Roxb. ex C.F. Gaertn.	--	Wood is used chiefly for railways sleepers and in construction work; leaves are used for making beedies, and for preparing platters and cups. An oleoresin obtained on tapping trunk is used for joining planks in boats making. This resin is also used in paints and varnishes and also as an incense.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
21.	Ebenaceae	Diospyros malabarica (Desr.) Kostel.	In sore throats the infusion of fruits is used for gargle; for wounds and ulcers the juice is applied; bark is used in intermittent fever and dysentery.	--
22.	Euphorbiaceae	Croton bonplandianus Baill.	The root is used as a medicine against snake venom and the leaf extract used as a medicine for high fever, treatment of cuts and wounds.	--
23.	Euphorbiaceae	Jatropha gossypifolia L.	Decoction of leaves is used as purgative; leaf extract is applied in fevers; roots against leprosy; latex given in ulcers; seed oil as purgative.	--
24.	Euphorbiaceae	Phyllanthus amarus Schum. & Thonn.	The whole plant is used in gonorrhoea, menorrhagia and other genital affections. It is useful in gastropathy, diarrhoea, dysentery, intermittent fevers, ophthalmopathy, ulcers scabies and wounds.	--
25.	Fabaceae	Butea monosperma (Lam.) Taub.		Leaves are used for making plates and cups.
26.	Fabaceae	Grona triflora (L.) H.Ohashi & K.Ohashi	Leaves are used in dysentery, diarrhoea and convulsions.	Plants are used as fodder.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
27.	Fabaceae	Indigofera glabra L.	Leaves used as a bitter tonic and febrifuge, also used as an emollient in external applications.	--
28.	Fabaceae	Indigofera linifolia (L.f.) Retz.	Plant is given in skin eruptions. It is also used for fever.	--
29.	Fabaceae	Phanera vahlii (Wight & Arn.) Benth.	--	Seeds eaten raw or fried; when ripe they taste like cashew nuts. Leaves used for thatching and for preparing umbrellas used locally.
30.	Fabaceae	Pseudarthria viscida (L.) Wight & Arn.	Decoction or powder of roots is used for biliousness, rheumatism, diarrhoea, asthma, cardiac troubles, worms and piles. It is also used as a substitute of the roots of <i>Pleurolobus gangeticus</i> .	--
31.	Fabaceae	Senna tora (L.) Roxb.	Leaves and seeds are used against ringworm and itch. Leaves are used as aperients.	--
32.	Fabaceae	Senegalia pennata (L.) Maslin	--	Bark is used for tanning, bark and pounded seeds are used as fish poison.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
33.	Fabaceae	Vachellia nilotica (L.) P.J.H.Hurter & Mabb.	--	The gum produced by the tree, though actually not the true 'gum arabic' being the product of <i>Acacia senegal</i> Willd., is used for calico printing and dyeing, as sizing material for silk and cotton, and in paper industry; used also as a substitute for 'gum arabic'. Pods used as fodder.
34.	Lamiaceae	Anisomeles indica (L.) Kuntze	Plant is used as astringent and carminative. Oil extracted from the plant is useful in uterine affections.	--
35.	Lamiaceae	Coleus strobilifer (Roxb.) A.J.Paton	Plant extract is given in liver disorders also used after mixing with sugar-candy for cough and cold.	--
36.	Loranthaceae	Dendrophthoe falcata Blume	Bark is used to heal wound and to cure menstrual problems.	--
37.	Lythraceae	Ammannia baccifera L.	Leaves are used in the cure of skin infections; plant-extract is used against typhoid and bronchial tuberculosis.	--
38.	Lythraceae	Lagerstroemia parviflora Roxb.	--	Leaves used as fodder; wood is used in construction.
39.	Lythraceae	Woodfordia fruticosa (L.) Kurz	Dried fruits and flower-buds are used in bowel complaints.	A natural dye is prepared from the floral parts; wood is used for making axe-handles and also as fuel.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
40.	Malvaceae	Thespesia lampas (Cav.) Dalzell & A. Gibson	Roots and fruits are used for treating gonorrhoea and syphilis. Floral parts are used against cutaneous diseases.	Stems yield a fiber which is useful for fabrics, cordage and fishing nets.
41.	Menispermaceae	Cissampelos pareira L.	Leaf juice is used as refrigerant; roots are laxative, demulcent, used for bilious dyspepsia, rheumatism and stomach-ache in children.	--
42.	Moraceae	Artocarpus lacucha Buch.-Ham.	--	Leaves are eaten by cattle. Unripe fruits are used as vegetable; ripe ones eaten fresh or preserved in syrup; seeds are eaten after roasting or boiling; wood is used in making furniture.
43.	Nyctanthaceae	Boerhavia diffusa L.	Liquid extraction of plants is diuretic.	--
44.	Oleaceae	Jasminum sambac (L.) Aiton	Roots and leaves are used in preparation of eye lotion.	Flowers are used for making garlands, and also used for production of scented hair oil.
45.	Onagraceae	Ludwigia perennis L.	Plants boiled in oil and applied to the body externally for fever.	--
46.	Oxalidaceae	Biophytum umbraculum Welw.	The plant is used for stomach-ache. In case of insomnia the roots and leaves are being used.	--

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
47.	Papavaraceae	Argemone Mexicana L.	Seeds yield nauseous, bitter, non-edible oil which is used in cutaneous troubles; Yellow juice of the plant is used in the treatment of scabies and ophthalmia.	Used in paint industry and soap-making.
48.	Pedaliaceae	Martynia annua L.	--	Leaves are eaten as vegetable.
49.	Polygonaceae	Persicaria hydropiper (L.) Delarbre	Plant is used as stimulant and diuretic; liquid extract is used as an oral contraceptive; infusion is used in uterine disorders.	Powder of dried herb used as fish-poison.
50.	Rhamnaceae	Ziziphus mauritiana Lam.	Kernels are used in nausea, vomiting and for abdominal pain in pregnancy. Seeds are given in diarrhoea.	Fruits are eaten fresh, dried, candied or stewed. Wood is used for well, axe and hoe-handles, yokes and toys.
51.	Rutaceae	Aegle marmelos (L.) Corrêa	--	The leaves are considered as very sacred. Fruits are edible.
52.	Sapindaceae	Cardiospermum halicacabum L.	Roots have diuretic, diaphoretic, emetic and laxative properties. Plants are used for rheumatism and nervous diseases.	--
53.	Sapindaceae	Schleichera oleosa (Lour.) Oken	Timber yielding tree. Bark is used to cure leprosy, skin disease and ulcers.	Seeds are edible.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
54.	Sapotaceae	Madhuca longifolia (J. König ex L.) J.F. Macbr.	--	Corollas are eaten raw or cooked and a spirit is distilled from them. Seed oil is edible and also used for soap-making. Wood is very hard and proper for naves of wheels.
55.	Solanaceae	Solanum americanum Mill.	Extraction of leaves is useful for skin disease and to cure ulcers.	--
56.	Sterculiaceae	Byttneria herbacea Roxb.	Pulverised root-stock is used on swellings, also in cholera and diarrhoea in combination with other drugs.	--
57.	Sterculiaceae	Helicteres isora L.	Juice of the root is beneficial in empyema and stomach affections, also used in diabetes.	--
58.	Verbenaceae	Clerodendrum infortunatum L.	Leaves used as tonic, vermifuge and laxative. Poultice of leaves and root applied externally to treat tumours.	--
59.	Verbenaceae	Lantana camara L.	--	Plant is used as green manure.
60.	Verbenaceae	Tectona grandis L. f.	Oil extracted from the plant is used to cure scabies and to promote hair growth.	One of the best durable timber yielding plant
61.	Vitaceae	Ampelocissus latifolia (Roxb.) Planch.	Fruits are edible. Juice of tender leaves is used in dental troubles and as detergent for ulcer. Decoction of leaves used in dysentery.	--

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
61.	Vitaceae	Leea asiatica (L.) Ridsdale	Fruits edible; tuberous roots used against guinea worms.	--
Monocotyledons				
1.	Araceae	Colocasia esculenta (L.) Schott	--	Tubers are edible, eaten boiled or fried. They are also used for production of industrial alcohol.
2.	Asparagaceae	Asparagus racemosus Willd.	Root juice is mixed with honey and given in dyspepsia; roots are also used in nervous and rheumatic complaints. Plant is also used as diuretic.	--
3.	Colchicaceae	Gloriosa superba L.	Tubers possess Several alkaloids, chiefly colchicines, which are used in treatment of gout and rheumatism, and also in the laboratory to induce polyploidy.	--
4.	Commelinaceae	Commelina benghalensis L.	Plant extract is used in leprosy.	Rhizomes are cooked and eaten.
5.	Cyperaceae	Cyperus compressus L.	--	Used as fodder.
6.	Dioscoriaceae	Dioscorea bulbifera L.	--	Tubers after washing and boiling are eaten.
7.	Hypoxidaceae	Curculigo orchoides Gaertn.	Tuberous roots are used in piles, diarrhoea, jaundice, skin ailments and asthma.	--
8.	Orchidaceae	Vanda tessellata (Roxb.) Hook. ex G. Don	Roots are used in bronchitis.	--
9.	Poaceae	Chrysopogon lancearius (Hook. f.) Haines	--	Used as a good fodder.

Sl. No.	Family	Name of the species	Medicinal uses	Other uses
10.	Poaceae	Dendrocalamus strictus (Roxb.) Nees	--	Culms are employed for rafters, battens, baskets, sticks, furniture, fishing rods and paper-pulp. Leaves are used as fodder.
11.	Poaceae	Saccharum spontaneum L.	--	Young parts are used as fodder. It is also a source of paper-pulp. Culms are used for thatching.
12.	Poaceae	Thysanolaena latifolia (Roxb. ex Hornem.) Honda	--	Young leaves and culms are used as fodder. Culms along with inflorescences are made into brooms.



Floristic account of the plants of the MPCCA



ACANTHACEAE

Andrographis Wall. ex Nees

Andrographis echioides (L.) Nees in Wall., Pl. Asiat. Rar. 3: 117. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 4: 505. 1884; Haines, Bot. Bihar Orissa: 700. 1922; Prain, Bengal Pl. 2: 603. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 335. 1994; J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 181. 2019. *Justicia echioides* L., Sp. Pl.: 16. 1753. *Neesiella echioides* (L.) Sreem. in Phytologia 15: 271.1967. *Indoneesiella echioides* (L.) Sreem. in Phytologia 16: 466. 1968.



Herb 20–50 cm high. Stems 4-angular with whitish pubescent. Leaves simple, opposite, sessile, lanceolate or oblong-lanceolate, 2–6 × 0.5–2.3 cm, acute to rounded at base, entire at margins, acute to obtuse at apex, sparsely pubescent or hairy both surfaces. Flowers sessile erect on divaricate simple or branched racemes from all the axils, the whole forming sometimes a large pyramidal but leafy panicle, but in early stages only lower leaves bearing racemes. Flowers 1.5–2 cm long; bracts minute. Calyx 5-lobed cut till base linear 5–10 × 0.5–1 mm, glandular hairy. Corolla bi-lobed; tube

c. 1 cm long, white; upper 3-lobed, white, with dark pink or maroon ting on the upper half of the inner surface, hairy on outer surface; lower 2-lobed, curled back, white. Stamens 2; filaments thinly hairy, anthers dark-purple, densely white-bearded. Style slender ciliate at the apex, white; stigma capitate, dark pinkish or maroon. Capsules ellipsoid-oblong, compressed, 0.5–1 cm long, slightly hairy. Seeds somewhat oblong, rugose.

Flowering & Fruiting: August–January.

Habitat: On moist shady places.

Specimens examined: Jhalda MPCA, Kudagara, 380.20 m, 23.47495599 N, 85.91671698 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93455 (CAL).

Andrographis paniculata (Burm.f.) Wall. ex Nees in Wall., Pl. Asiat. Rar. 3: 116. 1832; C.B. Clarke in Hook.f., Fl. Brit India 4: 501. 1884; Prain, Bengal Pl. 2: 603. 1963 (Repr.); Haines, Bot. Bihar Orissa: 699. 1922; J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 182. 2019. *Justicia paniculata* Burm.f., Fl. Ind. (N. L. Burman): 9. 1768. *Andrographis subspathulata* C.B. Clarke in Hook.f., Fl. Brit. India 4: 502. 1884.

Vernacular name: Kalmegh (Bengali, Santal).

Herbs, 40–90 cm high. Stems 4-angled, glabrous below, glandular-pubescent above. Leaves linear-obovate or lanceolate, narrowed at both ends, 5–8 × 1–2 cm, paler below; lateral nerves 3–5 pairs; petioles *c.* 1.5 cm long. Inflorescences panicles, branches divaricate, 6–15 cm long; pedicels 3–5 mm long, distant, pubescent; bracts linear, 1.2–1.5 mm long; bracteoles short. Calyx 5-lobed, subulate, 2.5–3.7 mm, sparsely glandular-hairy. Corolla 0.8–1.2 cm long, white with purple spots; tube *c.* 5 mm, glandular-hairy outside; upper lip *c.* 6 mm, deeply 2-fid; lower lip *c.* 6 mm. Stamens 2, *c.* 4 mm;



filaments broad; anther 2-celled, muticous, bearded at base. Ovary oblong, *c.* 1.5 mm, 2–6 per cell, puberulous; ovules 3–10 in each locule; style slender, *c.* 1 cm long, sparsely hairy; stigma minutely bifid. Capsules linear-oblong, acute at both ends, 15–18 × 2–3 mm, glandular, pubescent; seeds many, ovoid, glabrous, yellow; retinacula long, acute.

Flowering & Fruiting: September–May.

Habitat: Along edges in the forests and on moist semi shaded places.

Specimens examined: Jhalda MPCA, Kudagara, 320.46 m, 23.4719 N, 85.91167 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92303 (CAL).

Uses: Infusion of whole plant is used in fever and an extract as a medicine for liver and jaundice.

Barleria L.

Barleria cristata L., Sp. Pl.: 636. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 488. 1884; Haines, Bot. Bihar Orissa: 683. 1922; Prain, Bengal Pl. 2: 606. 1963 (Repr.); J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 185. 2019.

Vernacular name: Rail baha (Hindi).



Herb or undershrub, c. 1 m high. Stems 4-angled, appressed yellow-hairy, densely hairy at nodes. Leaves opposite elliptic or oblong-lanceolate, cuneate at base, ciliate at margins, acute at apex, 4–14 × 1–3 cm, appressed-hairy; lateral nerves 4–7 pairs; petioles 4–8 mm long. Flowers subsessile, 1–3 together in leaf-axils or forming dense capitate spike on branchlets; bracteoles linear-lanceolate, with spinule-tipped apices, 0.8–1.5 cm long. Outer calyx-lobes ovate-oblong, 1.8–2.5 cm long, toothed, softly hairy, subspinescent, 8–10 nerves radiating from base; inner ones linear-lanceolate, ciliate at margins, acuminate at apex, 0.8–1 cm long. Corolla 3–5 cm long, softly pubescent outside, rose-coloured or deep purple; tube obtuse, 4 cm long. Stamens 2, c. 2.5 cm, hairy; anthers 3 mm; filaments 2–2.6

cm long, pubescent; staminodes 5 mm, with sterile anther cell, central one linear. Ovary oblong-ellipsoid, 4 mm, 4-ovuled; style 4 cm long; stigma minutely 2-lamellate. Capsules ellipsoid, 1.5–2 cm long, glabrous, without a solid beak; seeds 4, suborbicular, compressed, 4–5 cm across, brown, silky hairy.

Flowering & Fruiting: September–March.

Habitat: On hilly tracks and on open areas.

Specimens examined: Jhalda MPCA, Kudagara, 334.67 m, 23.47197002 N, 85.91129498 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93558 (CAL).

Uses: Leaves and roots are used for treatment of cough and inflammation.

Eranthemum L.

Eranthemum pulchellum Andrews, Bot. Repos: 2, t. 88. 1800. *Justicia nervosa* Vahl, Enum. Pl. 1: 164. 1804. J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 201. 2019. *Eranthemum nervosum* (Vahl) R. Br., Prodr.: 477. 1810; Mooney, Suppl. Bot. Bihar Orissa: 115. 1950; N.P. Singh & al. (eds.), Fl. Bihar Anal.: 384. 2001. *Daedalacanthus nervosus* (Vahl) T. Anderson, J. Linn. Soc., Bot. 9: 487. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 418. 1884; Haines, Bot. Bihar Orissa: 679. 1922.

Herbs or undershrubs, 30–90 cm high. Stems terete, short hairy. Leaves simple, opposite, ovate or ovate-oblong or ovate-elliptic, 3–17 × 1.5–8.6 cm attenuate or cordate at base, entire or crenulated at margins, acuminate at apex, puberulous on both surfaces, lateral veins 3–7 pairs; petioles 0.2–4.5 cm long. Flowers in terminal, closed, panicle composed of short, uninterrupted, spikes, 3–7.5 cm long; bract foliaceous, ovate or elliptic, 1.5–3 × 0.5–1.2 cm, ciliate at margins, acuminate at apex, glabrous, lineolate white with dark green veins; bracteoles lanceolate, 5–6 mm long, ciliate. Calyx 5-lobed, lobes lanceolate, 8–9 × 1.5–2 mm, densely pubescent whitish. Corolla 5-lobed, bluish, tube 2.5–3 cm long; lobes obovate, 1–2 × 0.3–0.5 cm, twisted to left in bud, spreading in flower. Stamens 2,



perfect, anthers oblong, *c.* 3 × 1.5; staminodes 2. Ovules oblong, 2 per locule; styles filiform, 4–4.5 cm long, slender, sparsely hairy; stigma clavate, *c.* 2 mm long, hairy. Capsules, oblong, 1–1.5 cm long, glabrous. Seeds 4, discoid, 3–4 × 2–2.5 mm, hairy.

Flowering & Fruiting: January–May.

Habitat: On dry deciduous forests.

Specimens examined: Jhalda MPCA, Kudagara, 408.57 m, 23.48259 N, 85.91067 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92363 (CAL).

Eranthemum purpurascens Wight ex Nees in Wall., Pl. Asiat. Rar. 3: 106. 1832; J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 201. 2019. *Daedalacanthus purpurascens* (Wight ex Nees) T. Anderson in J. Linn. Soc., Bot. 9: 488. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 420. 1884; Haines, Bot. Bihar Orissa 680. 1922; Prain, Bengal Pl. 2: 602. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 332. 1994.



Erect herbs, 25–50 cm long; stems 4-angular. Leaves elliptic to ovate, 6–12 × 3–7, acuminate at apex, entire or crenate at margins, decurrent at base, puberulent; petioles 0.6–3.4 cm long. Bracts c. 2 × 1 cm. Calyx c. 8.6 mm long, pubescent, 5-lobed; lobes linear, unequal. Corolla tube c. 2.4 cm long, 5-lobed above; lobes obovate, c. 5 × 5 mm. Stamens inserted below throat, c. 2.5 cm long; anthers oblong. Ovary 2-locular; style c. 2.3 cm long; stigma dark pale purple. Capsules clavate, 0.8–1.2 cm long, stipitate; seeds discoid, compressed, hairy.

Flowering & Fruiting: October–April.

Habitat: On dry deciduous forests.

Specimens examined: Jhalda, MPCA, Kudagara, 486.85 m, 23.4725109860301 N, 85.9280410129576 E, 27.01.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93410 (CAL).

Hemigraphis Nees

Hemigraphis latebrosa (B. Heyne ex Roth) Nees in DC., Prodr. (Ed. A.DC.) 11: 723. 1847; C.B. Clarke in Hook.f., Fl. Brit. India 4: 423. 1884; Haines, Bot. Bihar Orissa: 672. 1922; J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 204. 2019. *Ruellia latebrosa* B. Heyne ex Roth, Nov. Pl. Sp.: 307. 1821.

Herbs 20–40 cm high. Stems quadrangular hairy. Leaves simple, opposite, upper leaves larger compared to the lower ones, broadly ovate or ovate-oblong, 0.6–4 × 0.5–3.5 cm, attenuate base crenate-dentate at margins acute to acuminate at apex, lower surface with small hair interspersed with few large ones upper surface with more larger white hair. Flowers in heads, usually borne on small, axillary branches; bracts ovate or elliptic, of outer flowers much longer, ciliate on margin, glandular pubescent. Calyx-lobes 5, linear-lanceolate, 5–8 × c. 1 mm, unequal with one lobe longer than the other, $\frac{3}{4}$ of



upper part united, hairy and ciliate. Corolla 1–2 cm long, funnel-shaped; tube yellowish to white; lobes rounded, with narrowed basal part, blue, glabrous, pubescent on the outer surface of the lobes. Stamens 4, in pairs; anthers oblong, 1–2 mm long; filaments 2–4 mm long, the longer filaments bearded with papillose hairs in upper part, the shorter filaments glabrous. Ovary 2–3 × c. 1 mm, slightly pubescent at apex; style 4–6 mm long. Capsules oblong-ellipsoid, subtetragonous, with a small beak at the tip, 5–6 mm long, pubescent, 6-seeded. Seeds suborbicular, c. 1.5 mm, clothed with hairs, yellowish brown.

Flowering & Fruiting: November–March.

Habitat: On open grassland and on forest beds.

Specimens examined: Jhalda MPCA, Kudagara, 316.70 m, 23.47182 N, 85.912 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92308 (CAL).

Lepidagathis Willd.

Lepidagathis incurva Buch.-Ham..Don, Prodr. Fl. Nepal. 119. 1825; J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 221. 2019. *Lepidagathis hyalina* Nees in Wall., Pl. Asiat. Rar. 3: 95.1832; C.B. Clarke in Hook.f., Fl. Brit. India 4: 521. 1885; Prain, Bengal Pl. 2: 608. 1963 (Repr.).



Prostrate herbs, stem angular, strigose. Leaves simple, 6-8 × 3 cm, ovate, apex acute, base cuneate, hispid, nerves to 7 pairs. Spikes terminal and axillary, clustered; bracts and bracteoles similar, 3.5 × 2 mm, lanceolate, ciliate, hyaline. Flowers densely packed. Sepals 5, 5 mm long, linear-lanceolate, ciliate, glandular-hairy at apex. Corolla 6 mm long, bilabiate, tube short, slender, upper lip

entire, lower lip 3-lobed, hairy outside. Stamens 4, didynamous, anthers softly hairy. Ovary ovoid, thinly hairy, style curved, stigma capitate. Capsule 4 mm long, ellipsoid, hairy at apex; seeds 4, compressed, rugose, brown.

Flowering & Fruiting: October–May

Habitat: On grassland and under the shade of trees or stones.

Specimens examined: Jhalda MPCA, Kudagara, 338.98 m, 23.47182 N, 85.91698 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92348 (CAL).

Nelsonia R.Br.

Nelsonia canescens (Lam.) Spreng., Syst. Veg. 1: 42. 1825; J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 225. 2019. *Justicia canescens* Lam., Tabl. Encycl. 1: 41. 1791. *Nelsonia campestris* R. Br., Prodr.: 481. 1810; C.B. Clarke in Hook.f., Fl. Brit. India 4: 394. 1884; Haines, Bot. Bihar Orissa: 667. 1922; Prain, Bengal Pl. 2: 594. 1963 (Repr.).

Herbs, radiating from central tap root. Stems mostly short, often 12–16 cm long; flowering stems trailing, 30–65 cm long, subterete.

Leaves dimorphic; leaves on main stem elliptic-oblong, entire at margins, obtuse at apex, 3–10 × 1.5–5 cm, sparsely pilose and distinctly petioled, c. 4 cm long; those on flowering twig, 1–4 × 0.8–2.5 cm, sessile, densely pilose. Flowers in ovate or cylindric spikes, terminally on lateral branches, 1.5–5 cm long, glandular-villous; bracts broadly ovate or ovate-elliptic, 5–8 mm long, silky pubescent, obtuse at apex, 5–7-nerved. Calyx 4-partite, subequal; lobes lanceolate,



3–5 × 1 mm, hairy, acute at apex, 4–5 parallel nerved. Corolla bilabiate; tube c. 1.5 cm long, with a constriction, posterior longer 2-lobed, c. 2 mm long, anterior shorter 3-lobed, c. 2 mm long, glabrous. Stamens 2, inserted at point of constriction, included; anther cells subglobose, c. 0.5 mm across; filaments glabrous, c. 5 mm long. Ovary c. 1.5 mm long, glabrous; style c. 1 mm long; stigmas shortly 2-lobed, lobes unequal. Capsules ovoid-oblong, 4–6 cm long; seeds many, yellow with brown granulations, small.

Flowering & Fruiting: September–March.

Habitat: On dry deciduous forest, under the shade of trees.

Specimens examined: Jhalda MPCA, Kudagara, 309.92 m, 23.47245399 N, 85.91449502 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93424 (CAL).

Uses: Plant is used as a fodder.

Petalidium Nees

Petalidium barlerioides (B.Heyne ex Roth) Nees, Pl. Asiat. Rar. 3: 82. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 4: 416. 1884; Haines, Bot. Bihar Orissa: 677. 1922; Prain, Bengal Pl. 2: 600. 1963 (Repr.); J. Bhattacharya in Lakshmin. & al. (eds.), Fl. West Bengal 4: 226. 2019. *Ruellia barlerioides* Roth. Nov. Pl. Sp.: 310. 1821.



Undershrubs, 1–1.5 m high; twigs straw-coloured. Leaves broadly ovate, rounded at base, crenate-serrate, acuminate at apex, 5–10 × 3–7 cm, comparatively larger on stem and smaller on flowers bearing branches. Flowers solitary or crowded on lateral branches; bracts absent; bracteoles foliaceous, ovate-elliptic, 2–2.5 cm long, enclosing the young flower, with prominent reticulate nerves, eventually turning scarious; lateral nerves c. 4–6 pairs. Calyx

lobes 5, subequal, connate at base; lobes linear or lanceolate, ciliate at margin, acute at apex, glandular-pubescent. Corolla yellowish white, large, ventricose; lobes obovate-suborbicular, 3–3.5 cm long, crenulate. Stamens 4, didynamous; longer stamens exserted; shorter ones subexserted; anthers 2-loculed, subsimilar; locules parallel, shortly spurred or mucicous at base. Disc prominent. Ovary oblong, 2-loculed, glabrous or glandular-pubescent at apex; ovules 1 or 2 in each locule; style slender, exserted, glabrous or minutely hairy; stigma unequally 2-lobed. Capsules clavate c. 1.2 cm long, compressed parallel to the septum, dehiscent from the base; seeds usually 2 or rarely 4, discoid, areole prominent with long hygroscopic hairs around; rectinacula rigid.

Flowering & Fruiting: September–May.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 404.86 m, 23.47344297 N, 85.92463796 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93439 (CAL).

Strobilanthes Blume

Strobilanthes hirta Blume, Bijdr. Fl. Ned. Ind. 14: 797. 1826. *Hemigraphis hirta* (Vahl.) T. Anderson, J. Linn. Soc., Bot. 9: 462. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 422. 1884; Prain, Bengal Pl. 2: 600. 1963 (Repr.); Bennet, Fl. Howrah Distr.: 341. 1979; Guha Bakshi, Fl. Murshidabad Distr.: 239. 1984; Sanyal, Fl. Bankura Distr.: 331. 1994; Karthik. & al., Fl. Pl. India Dicot. 1: 19. 2009. *Ruellia hirta* Vahl, Symb. Bot. 3: 84, t. 67. 1794.

Herbs prostrate. Stem 15–60 cm long, villous, become hirsute, tetragonous. Leaves ovate or elliptic, 1.5–3 × 0.5–1.5 cm, obtuse or rounded at base, acute or obtuse at apex; veins 3–5 pairs, hirsute; petioles softly hairy. Flowers few on heads, rarely solitary axillary. Bracts elliptic, 1–1.5 cm long, pubescent. Calyx 7–8 mm long; lobes linear or spatulate, densely ciliate. Corolla pale blue, 0.6–1.7 cm long, 0.4–1.2 cm across; lobes suborbicular or



broadly oblong, apex rounded, fugacious, almost glabrous, inflated upper portion almost equal to length of tube. Stamens 4, didynamous, sparsely hairy at base. Styles sparsely hairy. Capsule linear cylindrical, 1.5–2 cm long, c. 12-seeded, glabrous except tip. Seeds suborbicular, hygroscopically hairy.

Flowering & Fruiting: March–September.

Habitat: In the shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 322.63 m, 23.47311398 N, 85.911241 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93461 (CAL).

ALANGIACEAE

Alangium Lam.

Alangium salviifolium (L.f.) Wangerin in Engl., Pflanzenr. IV. 220b (Heft 41): 9. 1910; *Grewia salvifolia* L.f., Suppl. Pl.: 409. 1782; U.P. Samaddar in Ranjan & al. (eds.), Fl. West Bengal 3: 51. 2016. *Alangium lamarckii* Thwaites, Enum. Pl. Zeyl.: 133. 1859; Hook.f., Fl. Brit. India 2: 741. 1879, p.p.; Haines, Bot. Bihar Orissa: 418. 1922; Prain, Bengal Pl. 1: 399. 1963 (Repr.).

Vernacular name: Akola (Hindi).



Trees, 10–15 m tall, deciduous. Branchlets appressed-tomentose to glabrescent. Leaves variable, oblong or oblong-lanceolate to elliptic, obliquely rounded to subcuneate at base, entire at margins, obtuse or subacute at apex, 6–15 × 2.5–5 cm, glabrescent; petioles to 1 cm long, hairy. Inflorescences sessile, usually in clusters of 4–8 flowers, sometimes fewer and even solitary, rusty-tomentose.

Flowers 1.5–3 cm long; bracts ovate, 1–1.5 mm long, deciduous. Calyx

cupular, 5–10-lobed; lobes triangular, 3–3.5 mm long, toothed. Petals 4–10, usually 6 or 7, oblong, swollen at base, obtuse at apex, 1.5–2.5 cm long, reflexed, densely pubescent outside, cream-coloured. Stamens 10–30; filaments 6–10 mm long. Ovary 1-loculed; ovule 1; style 1–2 cm long, glabrous; stigma subglobose, large. Drupes subglobose, c. 2 × 1.5 cm, red when ripe; seeds ovoid, 7–10 mm long.

Flowering & Fruiting: March–July.

Habitat: On open areas and on edges of forest.

Specimens examined: Jhalda MPCA, Kudagara, 345.87 m, 23.47322001 N, 85.91333203 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93457 (CAL).

Uses: Bark and roots are used in jaundice. Root-bark is purgative; also useful in the treatment of fever and skin diseases.

AMARANTHACEAE

Achyranthes L.

Achyranthes aspera L., Sp. Pl.: 204. 1753; Hook.f., Fl. Brit. India 4: 730. 1885; Haines, Bot. Bihar Orissa: 767. 1924; T.K. Paul & G. Chaudhury in Lakshmin. & al. (eds.), Fl. West Bengal 4: 369. 2019.

Vernacular name: Apang (Bengali), *Chirchira* (Hindi), *Chaff flower* (English), *Apamargah* (Sanskrit).

Herbs, perennial, erect or subscandent, to 1 m high. Stems simple or branched; nodes more or less shrunken on drying. Leaves opposite, elliptic, oblong or ovate, narrowed at base, acute, acuminate or obtuse at apex, 3–12 × 1.5–6 cm, glabrous or variously pubescent. Flowers in initially dense, later elongating to 8–30 cm long slender spikes; peduncles 1–6 cm long; bracts lanceolate, 1.5–5 mm long, membranous, glabrous; bracteoles 1.5–4 mm



long; basal wings c. 1 mm, membranous, thinly ciliate, entirely adnate to midvein. Tepals 5, lanceolate, truncate to rounded at base, acute at apex, 3–6 mm long, whitish, pale green to red or purple. Stamens 5; filaments connate at base into a short cup, 1.5–4 mm long; staminodes fimbriate, prominently appendaged inside. Ovary oblong, c. 0.7 mm long; style c. 1.5 mm long, filiform; stigma capitate. Utricles ellipsoid, rounded at base, 1–3 mm long, 1-seeded; seed oblong, c. 2 mm long, smooth, red.

Flowering & Fruiting: August–February.

Habitat: On forest pathways and in open and waste land and along roadsides.

Specimens examined: Jhalda MPCA, Kudagara, 316.13 m, 23.47471702 N, 85.909242 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95027 (CAL).

Uses: Plants in preparation of green manure. The plant is best in treatment of fistula and abscess. Decoction of leaves is used as diuretic; also used in treatment of scorpion bites.

Allmania R.Br. ex Wight

Allmania nodiflora (L.) R. Br. ex Wight in Hook., J. Bot. 1: 226. t. 128. 1834; Hook.f., Fl. Brit. India 4: 716. 1885; Haines, Bot. Bihar Orissa: 759. 1924; Prain, Bengal Pl. 2: 648. 1963 (Repr.); T.K. Paul & G. Chaudhury in Lakshmin. & al. (eds.), Fl. West Bengal 4: 371. 2019. *Celosia nodiflora* L., Sp. Pl. 1: 205. 1753.



Erect herbs, 12–20 cm tall. Leaves lanceolate, 3.5–6 × 1.4–2.6 cm, acute at apex, erose at margins, attenuate at base. Inflorescences terminal or axillary; bracts and bracteoles green at young and orange-red at maturity, ovate-lanceolate, long acuminate at apex, ciliate at margins. Perianth lobes 5, ovate-lanceolate. Stamens 5; filaments connate at base. Ovary 1-locular; stigma 2-lobed. Utricles ovoid, enclosed in persistent perianth.

Flowering & Fruiting: July–November.

Habitat: Dry deciduous forests, near stream.

Specimens examined: Jhalda, MPCA, Kudagara, Arar Dungri, 374.24 m, 23.4760290384292 N, 85.912769017741 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95008 (CAL).

Gomphrena L.

Gomphrena celosioides Mart. in Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 13(1): 301. 1826; T.K. Paul & G. Chowdhury in Lakshmin. & al. (eds.), Fl. West Bengal 4: 384. 2019. *G. decumbens auct. non* Jacq. 1804; Gamble, Fl. Madras 2: 1179. 1925; Santapau in Rec. Bot. Surv. India 16(1): 226. 1967; Sanyal, Fl. Bankura Distr.: 370. 1994.



Low spreading erect or prostrate, much-branched, annual herbs. Stems pilose, glabrescent with age. Leaves narrowly oblong to oblong-elliptic or oblanceolate, 2.5–4.5 × 0.8–2 cm, obtuse to subacute at apex, narrowed to a poorly demarcated petiole at base, with long, white hairs on margins and beneath. Flowers white compressed in dense, cylindrical or ovoid terminal spikes, 2.5–7 cm long. sessile; bracts deltoid-ovate, 2.5–4 mm long; bracteoles 5–6 mm long, mucronate. Tepals 5, narrowly lanceolate, 4–5 mm long; outer 3 almost

flat; inner 2 sigmoid, slightly longer than outer. Styles and stigmas *c.* 1 mm. long. Utricles pyriform, *c.* 1.6 mm long, Seed *c.* 1.5 mm long, brown, shining.

Flowering & Fruiting: April-August.

Habitat: In wastelands and along roadsides.

Specimens examined: Jhalda, MPCA, West Bengal-Jharkhand Border, Kudagara, 430.04 m, 23.4847810026258 N, 85.9108680021017 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95033 (CAL).

ANACARDIACEAE

Buchanania Spreng.

Buchanania cochinchinensis (Lour.) M.R.Almeida, Fl. Maharashtra 1: 287. 1996. *Toluifera cochinchinensis* Lour., Fl. Cochinch. 1: 262. 1790. *Buchanania lanzan* Spreng., Schrad. J. Bot. 2: 234. 1800. *B. latifolia* Roxb., Fl. Ind. 2: 385. 1832; Hook.f., Fl. Brit. India 2: 23. 1876; Haines, Bot. Bihar Orissa: 221. 1921; Malick in Fl. West Bengal 1: 477. 1997.

Vernacular name: *Piyal* (Bengali), *Chironji* (Hindi), *Tarop* (Santal).

Trees, to 15 m tall; bark grey to black, tessellated; branchlets with prominent leaf scars, glabrescent with age. Leaves simple, oblong or elliptic-oblong, rounded at base, entire at margins, obtuse or emarginate at apex, 8–20 × 4–12.5 cm, glabrescent above, tomentose below; petioles 1.2–2 cm long, pubescent. Panicles dense, pyramidal, 5–15 cm long. Flowers sessile,



bisexual; bracts small, caducous. Calyx 3–5-lobed; lobes ovate, obtuse at apex, c. 1 mm long, persistent. Petals 5, ovate, sub-acute at apex, c. 3 mm long, greenish white. Disk fleshy, 5-lobed. Stamens 10, spreading, as long as petals. Ovary with 5 or 6 free carpels, situated within the disk, only 1 carpel fertile. Drupes subglobose, c. 1.2 cm across, slightly compressed with 2-valved bony stone, black; seeds gibbous, acute at one end with thick cotyledons.

Flowering & Fruiting: February–May.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 350.56 m, 23.47378101 N, 85.92036403 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93431 (CAL).

Uses: Wood is used for making furniture.

Lannea A.Rich.

Lannea coromandelica (Houtt.) Merr. in J. Arnold Arbor. 19: 353. 1938. *Dialium coromandelicum* Houtt. in Nat. Hist. 2(2): 39, t. 5, f. 239. 1774. *Odina wodier* Roxb., Fl. Ind. 2: 293. 1832; Hook.f., Fl. Brit. India 2: 29. 1876; Haines, Forest Fl. Chota Nagpur: 256. 1910 & Bot. Bihar Orissa: 223. 1921; Malick in Fl. West Bengal 1: 480. 1997.

Vernacular name: *Jiol* (Bengali), *Mohin* (Hindi), *Docka*, *Jhingam* (Santal).



Trees, to 15 m tall; bark smooth, grey; branchlets rusty stellate-tomentose. Leaves clustered at branchlet's end, 15–30 cm long. Leaflets 7–11, opposite, elliptic-oblong or ovate-oblong, equilateral at base, entire at margins, caudate-acuminate at apex, 5–12 × 3–5.5 cm, membranous, puberulous below, especially on midrib and nerves; lateral nerves 8–11 pairs, pink-tinged when young. Racemes crowded at tips of branches, 10–25 cm long, pubescent. Flowers unisexual, subsessile, borne in simple or compound racemes from axils of leaf-scars, greenish-yellow; female flowers in simple

racemes; male in compound racemes; pedicels very short, fulvous-pubescent; floral bracts triangular, ciliate at margins, c. 1 mm long. Calyx lobes 4, ovate-triangular, ciliate at margins, obtuse at apex, 1–1.5 mm long, imbricate. Petals 4, imbricate, ovate-oblong, obtuse at apex, 2–3 mm long, spreading, reflexed in female flowers, yellowish green. Disk annular, 8-lobed. Stamens 8–10, inserted below the disk; reduced to staminodes in female flowers. Ovary subglobose, 1-loculed; styles 3 or 4. Drupes in fascicled racemes, oblongoid, c. 2 cm long, green turning purple red when ripe; pedicels enlarged 5–9 mm long; seed 1, compressed.

Flowering & Fruiting: February–May.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 376.54 m, 23.47336602 N, 85.92155199 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93434 (CAL).

Uses: A gum exudes from the tree is used for cotton printing by the weavers.

Semecarpus L.f.

Semecarpus anacardium L.f., Suppl. Pl.: 182. 1782 (1781); Hook.f., Fl. Brit. India 2: 39. 1876; Haines, Bot. Bihar Orissa: 222. 1921; Malick in Fl. West Bengal 1: 483. 1997.

Vernacular name: *Bhelwa* (Hindi).

Tree, 6–10 m high, exude a dark blackish acrid juice; young parts finely pale-pubescent.



Leaves simple, alternate, obovate-oblong, 11–32.5 × 5.5–15 cm, rounded, subcordate or subcuneate at base, entire at margins, obtuse to rounded or slightly retuse-emarginate at apex, thick-coriaceous, opaque above, sparsely pubescent above, pubescent beneath, more on the veins; lateral veins 16–25 pairs, slightly arched; petioles 1–4.5 cm long, finely pubescent. Panicles erect, terminal, 12–30 cm long. Flowers 5–6 mm in diameter, subsessile; pedicels accrescent, 0.5–0.7 cm long in fruits. Calyx lobes 5, deltoid, ovate, acute at apex, c. 1 mm long, pubescent outside. Petals 5, oblong, 2–3 × 1–1.5 mm, acute at apex, yellowish. Disk intrastaminal, 1.5–2.5 mm, villous. Stamens 5, inserted at disk base, filaments c. 3 mm long, reddish. Ovary subglobose, densely hairy, rudimentary in male. Drupes obliquely ovoid or oblong, 2.5–3 × 1.5–2.5 cm, smooth, shining, green, black on ripening; hypocarp equal to drupe, orange-coloured.

Flowering & Fruiting: September–March.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 399.55 m, 23.48235 N, 85.91047 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92362 (CAL).

ANNONACEAE

Milium Lesch. ex A.DC.

Milium tomentosum (Roxb.) Finet & Gagnep., Bull. Soc. Bot. France 4: 153. 1906; Malick, Bull. Bot. Surv. India 8: 47. 1966. *Uvaria tomentosa* Roxb., Pl. Corom. 1: t. 35. 1795 & Fl. Ind. 2: 667. 1832. *Saccopetalum tomentosum* (Roxb.) Hook. f. & Thomson in Hook.f., Fl. Brit. India 1: 88. 1872; Haines, Bot. Bihar Orissa: 14. 1921.

Vernacular name: Hoom (Hindi).



Large deciduous trees 15–20 m tall; bark 15–25 mm thick, brownish-black, longitudinally grooved; blaze yellowish; young parts tomentose. Leaves simple, alternate, distichous; petiole 2–6 mm long, slender, pubescent; lamina 8–17 × 2–10 cm, ovate or oblong-ovate; base cuneate to round or subacute; apex acute, margin entire chartaceous, tomentose above when young, glabrous with age except midrib, tomentose beneath; lateral nerves 8–10 pairs, oinnate, slender, prominent beneath, intercostae reticulate; intramarginal nerves present. Flowers bisexual, greenish-yellow, solitary or a few

together, leaf opposed or subterminal cymes, pedicels 3–7 cm long, very slender, tomentose; sepals 3.5 × 1.5 mm, linear-lanceolate, 4–7 mm long, tomentose, inner ones ovate-oblong, saccate at base, obtuse, 1.5–2 × 0.5 cm, tomentose on both sides, outer petal shorter than inner; stamens many, connectives apiculate, not concealing the anthers; carpels many, stalked, broadly ovate, brown tomentose; ovules 4–6, in two rows, stule absent, stigma capitate. Fruits aggregate of berries, fruitlets 2.5 cm across, subglobose, tapering to base, succulent, purple, stalk stout, 1–1.5 cm long; seeds 4–5.

Flowering & Fruiting: September–March.

Habitat: On hilly areas of dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 356.82 m, 23.47562 N, 85.91563504 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93452 (CAL).

APIACEAE

Centella L.

Centella asiatica (L.) Urb. in Mart., Fl. Bras. 11: 287, t. 78, f. 1. 1879; Sanyal, Fl. Bankura Distr. 194. 1994; S.C.Srivast. in Ranjan & al. (eds.), Fl. West Bengal 3: 8. 2016. *Hydrocotyle asiatica* L., Sp. Pl.: 234. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 2: 669. 1879; Haines, Bot. Bihar Orissa: 405. 1922.

Vernacular name: *Thankuni* (Bengali), *Brahm-manduki* (Hindi).



Herbs with creeping and stoloniferous stems; rootstock perennial. Stems nearly glabrous or puberulous when young, rooting at nodes. Leaves simple, alternate or rosette, sub-orbicular or reniform, 1–2 × 1.5–3.5 cm, deeply cordate at base, crenate or dentate at margins, rounded at apex, glabrous or sparsely hairy, palmately 5–7-prominent-veined; petioles 2–5(–10) cm long, sheathing at base, sometimes puberulous. Umbels simple, solitary or 2–5 together from axils of bracts; involucre bracts 2, 2–3 mm long, membranous. Flowers usually 3 or 4 in each umbel; middle one sessile, lateral ones short-pedicellate. Calyx teeth obsolete. Petals ovate-rounded, 1.2–1.5 mm long, brown. Stamens 5; filaments c. 0.5 mm long, flat; anthers c. 0.5 mm long. Ovary inferior, 2-loculed; styles 2, to 0.5 mm long. Mericarps reniform or ellipsoid, c. 2.5 × 1.5 mm, cordate to truncate at base, strongly ridged, strongly laterally compressed, sparsely hairy when young.

Flowering & Fruiting: February–November.

Habitat: On shady grassland and on moist, marshy areas.

Specimens examined: Jhalda MPCA, Kudagara, 338.76 m, 23.47186 N, 85.917 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92347 (CAL).

APOCYNACEAE

Carissa L.

Carissa spinarum Mant. Pl. 2: 559. 1771; Hook.f., Fl. Brit. India 3: 631. 1882: Prain, Bengal Pl. 2: 495. 1963 (Repr.); O.N. Maurya & S.K. Mandal in Ranjan & al. (eds.), Fl. West Bengal 3: 376. 2016. *Carissa diffusa* Roxb., Fl. Ind. (Eds. Carey & Wall.) 2: 524. 1824.

Vernacular name: *Baichee* (Bengali), *Garnaee*, *Kharanu*, *Khirni*, *Jungli Karonda* (Hindi).

Erect, shrub with cross branching, thorny, 2–3 m tall; Stem terete divaricate, can be stripped off longitudinally by hand; thorns upto 3 cm long; Leaves coriaceous, ovate, 2.4–3.6 × 2–3 cm, margin entire, apex rounded, exudes latex when plucked from the stem, Flowers in corymbose cyme, fragrant, fragrant, pedicilate, bracteate, bract linear, acuminate, corolla white, stigma densely hairy; Fruits berry, dark-purple when ripen; Seeds 4.

Flowering & Fruiting: April–August.

Habitat: On hilly slopes in the dry deciduous forest.



Specimens examined: Jhalda MPCA, Kudagara, 340.87 m, 23.47176 N, 85.91698 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92349 (CAL); 403.84 m, 23.47334398 N, 85.92315202 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93437 (CAL).

Holarrhena R.Br.

Holarrhena pubescens Wall. ex G.Don, Gen. Syst. Hist. 4: 78. 1838; O.N. Maurya & S.K. Mandal in Ranjan & al. (eds.), Fl. West Bengal 3: 378. 2016. *Holarrhena antidysentrica* Wall. ex A. DC. in DC., Prodr. 8: 413. 1844; Hook.f., Fl. Brit. India 3: 644. 1882; Haines, Bot. Bihar Orissa: 538. 192. Prain, Bengal Pl. 2: 499. 1963 (Repr.); Sanyal, Fl. Bankura Distr. 258. 1994. *Echites pubescens* Buch.-Ham., Trans. Linn. Soc. London 13: 524. 1822, nom. illeg.

Vernacular name: *Kurchi* (Bengali), *Karva Indrajau*, *Kutaja* (Hindi).



Trees, 4–8 m high. Leaves opposite, elliptic-oblong to ovate-oblong, rounded to obtuse or shortly acute at base, entire at margins, acute to abruptly acuminate at apex, 10–16 × 5–10 cm, chartaceous, pubescent or glabrous; lateral nerves 10–15 pairs, looping near margins; petioles 4–6 mm long. Cymes paniculate or corymbose, terminal and axillary; pedicels

to 1.5 cm long. Calyx copular, unequally 5-lobed; lobes lanceolate, acute at apex, c. 4.5 mm long, glandular inside, hirsute outside. Corolla salver-form 2.5–3 cm across, white; tube slender, 0.8–1.2 cm long, slightly inflated near base, 5-lobed; lobes overlapping to left in bud, obtuse at apex, 1.2–1.4 cm long, puberulous outside. Stamens 5, inserted near the base of corolla tube, included; corona absent; filaments c. 0.7 mm long, hirsute; anthers oblong, rounded-sagittate at base, mucronate at apex, c. 1.5 mm long, free from stigma. Carpels 2, free, subglobose; ovules many, marginal; style c. 1 mm long, puberulous; stigma fusiform, 2-lobed. Disk absent. Follicles paired, terete, blunt-tipped, 20–30 × c. 0.5 cm, slender, curved; seeds oblong, c. 2 cm long; coma apical, c. 4.5 cm long.

Flowering & Fruiting: September–March.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, , 23.47381001 N, 85.92059302 E, , K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93432 (CAL).

Uses: Wood is used in making toys.

Ichnocarpus R.Br.

Ichnocarpus frutescens (L.) W.T.Aiton, Hort. Kew. ed. 2, 2: 69. 1811; Hook.f., Fl. Brit. India 3: 669. 1882; Haines, Bot. Bihar Orissa: 546. 1922; Prain, Bengal Pl. 2: 504. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 262. 1994; O.N. Maurya & S.K. Mandal in Ranjan & al. (eds.), Fl. West Bengal 3: 379. 2016. *Apocynum frutescens* L., Sp. Pl.: 213. 1753. *Gardenia volubilis* Lour., Fl. Cochinch.: 148. 1790. *Ichnocarpus ovatifolius* A. DC., Prodr. 8: 435. 1884; Hook.f., Fl. Brit. India 3: 670. 1882. *Ichnocarpus volubilis* (Lour.) Merr. in Philipp. J. Sci. 21: 506. 1922.

Vernacular name: *Dudhi, Shyamalata* (Bengali), *Black creeper* (English), *Kali dudhi* (Hindi).

Straggling shrubs, with glabrous or rusty tomentose branches. Leaves opposite, elliptic-oblong or elliptic-obovate, rounded to subcuneate at base, entire at margins, acute to shortly acuminate at apex, 4–7.5 × 1.5–3 cm, subcoriaceous, glabrous above, glabrous to sparsely pubescent below; lateral nerves 4–6 pairs; petioles 3–6 mm long. Flowers paniculate cymes, terminal and axillary; peduncles c. 8 cm long; pedicels 3–4 mm long. Calyx cupular, 5-lobed;



lobes subequal, ovate, acute at apex, alternating with 5 glandular scales, c. 1.5 mm long, hirsute outside. Corolla salver-form, 5–6 mm across, cream-coloured; tube 2–3 mm long, pubescent at mouth, 5-lobed; lobes falcate, acuminate at apex, twice as long as tube, undulate. Stamens 5, adnate below the middle of corolla tube, included; anthers oblong, sagittate at base, c. 1 mm long, shortly spurred, connivent around stigma; filaments c. 0.5 mm long. Carpels 2, partly connate, c. 0.5 mm long; ovules many, marginal; style obconic, c. 0.5 mm long; stigma columnar. Disk of 5, linear glands. follicles paired, cylindric, 8–12 × c. 0.3 cm; seeds linear, c. 1.7 × 0.2 cm, basally furrowed; coma apical to 1 cm long.

Flowering & Fruiting: September–April.

Habitat: Climbing on trees on dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 400.97 m, 23.47325597 N, 85.92262899 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 93438 (CAL).

Uses: Stems are used in making fishing nets and baskets.

ASCLEPIADACEAE

Calotropis R.Br.

Calotropis gigantea (L.)T.Aiton, Hortus Kew. Ed. 2, 2: 78. 1811; Hook.f., Fl. Brit. India 4: 17. 1883; Prain, Bengal Pl. 2: 510. 1963 (Repr.). S. Murmu & K.L. Maity in Ranjan & al. (eds.), Fl. West Bengal 3: 393. 2016. *Asclepias gigantea* L., Sp. Pl. 214. 1753.

Vernacular name: *Akanda* (Bengali), *Safed aak* (Hindi).



Shrubs, stem rounded. Leaves simple, opposite, 10-16 × 8-10 cm, smaller in branches, elliptic-ovate to obovate, apex acute or obtuse, base cordate; lateral nerves 5-7 pairs, adpressed pubescent when young, becoming glabrous on maturity. Flowers pale purple or greenish-white, 3 cm across; pedicels to 3 cm long, stout. Calyx lobes to 3 mm long. Corolla campanulate, tube short, lobes ovate to oblong, recurved. Staminal corona of 5 vertical lobes, c. 1 cm long. Fruits saccate, to 6 × 3 cm, ovoid; seeds many with pappus.

Flowering & Fruiting: Throughout the year.

Habitat: On forest pathways and along roadsides.

Specimens examined: Jhalda MPCA, Kudagara, 399.89 m, 23.4824 N, 85.91018E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92360 (CAL).

ASTERACEAE

Acmella Rich. ex Pers.

Acmella paniculata (Wall. ex DC.) R.K. Jansen, Syst. Bot. Monogr. 8: 67. 1985. *Spilanthes paniculata* Wall. ex DC., Prodr. 5: 625. 1836; H.J. Chowdhery in Hajra & al., Fl. India 12: 410. 1995; Hook.f., Fl. Brit. India 3: 307. 1881. *Spilantes acmella* var. *paniculata* (DC.) Clarke, Compos. Ind. 139.1876; Hook.f., Fl. Brit. India 3: 307.1881.



Herbs, 10–30 cm high. Stems terete, glabrous. Leaves simple, opposite, ovate-lanceolate, 1–1.5 × 0.2–0.7 cm, attenuate at base, slightly serrate at margins, acute at apex, glabrous; petioles 0.6–1.5 cm long, pubescent. Capitula in corymbose panicle, terminal, heterogamous, discoid, 5–10 × 5–8 mm; peduncles 1–5 cm long, glabrous. Phyllaries 1 or 2-seriate, elliptic or oblanceolate, 2–3 mm long; paleae oblong, 2.5–3 mm long, concave. Ray florets: unisexual, female only; corolla 1.5–2 mm long; stamens 0; pistil 1–1.2 mm long; stigma bifid 0.5

–0.8 mm across. Disk florets: corolla 1–1.5 mm long, 4- or 5-lobed in same head; stamens 3 or 5, c. 0.5 mm long; anthers basifixed, purplish blackish; pistil 1–1.5 mm long bifid. Achenes oblong, 1.5–1.8 × 0.8–1 mm, truncate at apex, border ciliate, dark blackish; pappus bristles present, c. 0.8 mm long, often not exceeding cilia but scabridulous.

Flowering & Fruiting: November–March.

Habitat: On open grassland and along forest pathways and on shady places.

Specimens examined: Jhalda MPCA, Kudagara, 328.30 m, 23.47249 N, 85.91293 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92322 (CAL).

Acmella radicans (Jacq.) R.K. Jansen, Syst. Bot. Monogr. 8: 69. 1985. *Spilanthes radicans* Jacq. Collectanea 3: 229. 1791; H.J. Chowdhery in Hajra & al., Fl. India 12: 412. 1995; Karthik. & al., Fl. Pl. India 1: 278. 2009.



Erect herbs; stems green to purple, minutely pubescent, muricate. Leaves opposite, ovate to oblong-ovate, 1–9 × 0.5–4.5 cm, acute at apex, minutely serrate at margins, obtuse at base, glabrous to sparsely pilose; petioles hairy, narrowly winged. Heads white, discoid, axillary, in groups of 2–3, c. 8 mm across; peduncles 4–7 cm long, angled, sparsely pilose. Receptacles glabrous; palea solitary, concave, boat shaped, c. 4 mm long, glabrous. Involucral bracts 6–9, biseriate, lanceolate, acute at apex, ciliate at margins, minutely hairy outside. Disc florets numerous; corolla green, 1.5–2 mm long, base bulbous with a short neck, 4–5 lobed; lobes papillose. Achenes dimorphic, marginal ones trigonous, densely ciliate; pappus of 3 bristles; others brownish-black, ellipsoid, obcordate, laterally compressed, margins cork-like, densely ciliate; pappus of 2 subequal bristles.

Flowering & Fruiting: December–March.

Habitat: On open grassland and along shady and moist places.

Specimens examined: Jhalda MPCA, Kudagara, 328.21 m, 23.47247 N, 85.9129 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92321 (CAL).

Ageratum L.

Ageratum conyzoides L., Sp. Pl.: 839. 1753; Hook.f., Fl. Brit. India 3: 243. 1881; Haines, Bot. Bihar Orissa: 462. 1922; Sanyal, Fl. Bankura Distr. 220. 1994; Uniyal in Hajra & al., Fl. India 12: 348. 1995. *A. cordifolium* Roxb., Fl. Ind. 3: 415. 1832.

Vernacular name: *Uchunti* (Bengali), *Goat weed* (English), *Gha buti* (Hindi).



Herbs, 10–40 cm high, aromatic. Stems, terete, decumbent sparsely puberulous. Leaves simple, opposite, broadly ovate, 0.6–4.5 × 0.2–3 cm subcordate at base, bluntly serrate at margins, acute to obtuse at apex, sparsely puberulous on both surface, palmately 3-veined at base; petioles 0.1–2 cm long, puberulous. Capitula terminal, branched corymbs, 4–8 × 5–10 mm, homogamous, white or violet; peduncles 0.5–2 cm long, pubescent. Phyllaries 2 or 3-seriate, linear-oblongate, 3–4 × 0.5

–1 mm, abruptly acuminate at apex, sparingly hairy, 2 or 3-veined. Paleae *c.* 3 mm long, finely ciliate at margins. Disk florets: Corolla 2.5–3 mm long, white or purplish; tube *c.* 2.5 mm long, lobes 5 acute at apex. Stamens 5; anthers 0.5–0.8 mm long apiculate at apex, filament *c.* 0.5 mm long. Ovary oblong, *c.* 1.2 mm long; style *c.* 2–3 mm long; stigma *c.* 1 mm long bi-fid, obtuse. Achenes oblong-obconic, 1.5–2 mm long, 5-angled, glabrous or minutely hirsute on angles; pappus scales 5, lanceolate, barbellate awned at apex, scabrous on margins, 2–2.5–0.2–0.3 mm, glabrous.

Flowering & Fruiting: Throughout the year.

Habitat: In open grassland and forest beds.

Specimens examined: Jhalda MPCA, Kudagara, 323.59 m, 23.47257 N, 85.91394 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92325 (CAL).

Blumea DC.

Blumea eriantha DC. in Wight, Contr. Bot. India: 15. 1834; Hook. f. Fl. Brit. India 3: 266. 1881; Sanyal, Fl. Bankura Distr. 224. 1994; Sarv. Kumar in Hajra & al. (eds.), Fl. India 13: 122, t. 38. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 257. 2016.



Erect unbranched herbs, to 50 cm high; stems reddish, sparsely hairy. Leaves 3-6 × 1-2 cm, elliptic to obovate, acuminate at base, scabrid above. Heads 6 × 0.5 mm, lanceolate, acuminate, brown; outer smaller, pubescent. Bisexual flowers few, central; corolla 4 mm long, sparsely hairy; lobes pubescent. Achene 1 mm long, ribbed, sparsely hairy; pappus 4 mm long, brownish.

Flowering & Fruiting: September–March.

Habitat: In forest beds, often under shady places.

Specimens examined: Jhalda MPCA, Kudagara, 315.62 m, 23.47227302 N, 85.912752 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93417 (CAL).

Blumea lacera (Burm.f.) DC. in Wight, Contr. Bot. India: 14. 1834; Hook.f., Fl. Brit. India 3: 263. 1881; Haines, Bot. Bihar Orissa: 470. 1922. S. Kumar in Hajra & al. (eds.), Fl. India 13:128. 1995; Prain, Bengal Pl. 1: 438. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 226. 1994; Arti Garg in Ranjan & al. (eds.) Fl. West Bengal 3: 259. 2016.



Herb, 15–70 cm high. Stems terete, ribbed, hollow, branched usually from base; branches hairy and stipitate glands particularly in younger parts. Leaves simple, alternate, basal and cauline, elliptic-oblongate, 1–10.5 × 0.6–4.5 cm, acute to shortly decurrent at base, irregularly crenate-dentate at margins, subacute to rounded at apex, lyrate lobed, densely hairy on both surfaces; petioles 0.5–2 cm; petioles upto c. 2.5 cm long, hairy. Capitula 5–6 × 5–10 mm, heterogamous, disciform, in large, terminal, corymbose panicles; peduncles 0.5–1.5 cm long, glandular pubescent. Phyllaries linear-lanceolate to oblong-lanceolate, 2–4 × 0.3–0.5 mm, usually tinged with purple, reflexed at maturity, villous, glandular. Receptacles

2.5–5 mm in diameter, alveolate, pilose around alveolate. Bisexual florets: Corolla, tubular 2–2.5 mm long, 5-lobed, yellow; lobes triangular, pubescent with colleters. Stamens sub-exserted, 1–1.2 mm long; filaments c. 0.5 mm long. Ovary oblong, c. 0.5 mm long, subangulate, puberulous; style c. 2.5 mm; stigma acute, puberulous. Female florets: Corolla 2.5–3 mm long, 2–3 lobed; minutely toothed. Ovary oblong, 0.5 mm, smooth or angled; style 3.5–4.5 mm; stigma subulate, bifid. Achenes oblong, angular, terete, 0.5–1 mm long, sparsely pubescent, yellowish-brown; pappus white, 2.5–3 mm long.

Flowering & Fruiting: February–March.

Habitat: On open areas and on forest beds.

Specimens examined: Jhalda MPCA, Kudagara, 315.50 m, 23.47226196 N, 85.91262803 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93415 (CAL); 595.49 m, 23.48275702 N, 85.91072903 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93467 (CAL).

Blumeopsis Gagnep.

Blumeopsis flava (DC.) Gagnep., Bull. Mus. Natl. Hist. Nat. 26: 76. 1920; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 264. 2016. *Blumea flava* DC., Prodr. 5: 439. 1836; Haines, Bot. Bihar Orissa: 472. 1922. *Laggera flava* (DC.) Benth. in Gen. Pl. 2(1): 290. 1873; Hook.f., Fl. Brit. India 3: 270. 1881; Prain, Bengal Pl. 1: 439. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 227. 1994; Sarv. Kumar in Hajra & al. (eds.), Fl. India 13: 145, t. 45. 1995.

Herbs, 15–45 cm high, erect; stems terete ribbed, glabrous. Leaves simple, alternate, obovate or obovate-elliptic, 2–9.5 × 1–4 cm amplexicaul at base, spinulose-dentate at margins, rounded at apex; glabrate or thinly hairy, sessile. Bracts linear c. 2 mm long hairy. Capitula terminal and axillary, golden yellow 5–6 mm long. Peduncle 5–6 mm long hairy. Phyllary / Involucral bracts 1 to 3 seriate, linear-lanceolate, 5–6 × 0.5 mm, acuminate at apex, glabrous. Corolla of disk florets 4.5–5 mm long. Anthers tailless. Stigma bifid; style 3–3.5 mm long. Corolla of marginal florets 2–3 mm long. Achenes very small, glabrous; pappus white, 3–3.5 mm long.

Flowering & Fruiting: November–December.

Habitat: On hilly slopes in shady places.

Specimens examined: Jhalda MPCA, Kudagara, 340.56 m, 23.47172 N, 85.91699 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92351 (CAL).



Chromolaena DC.

Chromolaena odorata (L.) R.M. King & H. Rob. *Phytologia* 20: 204. 1970; *Eupatorium odoratum* L., *Syst. Nat.* ed. 10, 2: 1205. 1759; Hook.f., *Fl. Brit. India* 3: 244. 1881; Prain, *Bengal Pl.* 1: 434. 1963 (Repr.), Sanyal, *Fl. Ankura Distr.* 220. 1994; Uniyal in Hajra & al., *Fl. India* 12: 354. 1995; Arti Garg in Ranjan & al. (Eds.), *Fl. West Bengal* 3: 231-232. 2016.

Vernacular name: *Boka putus* (Bengali), *Devilweed* (English), *Tivra gandha*, *Bagh dhoka* (Hindi).



Undershrubs or shrubs, 1–1.5 m high; stem terete, striated, purplish pubescent. Leaves simple, opposite, ovate, 2–11.5 × 1–5.5 cm, cunate or acute at base, distantly serrate at margins, acute at apex, sparsely pubescent on upper surface, pubescent beneath, prominent 3-veined from base; petioles 0.5–2 cm long, pubescent on both surface more beneath. Capitula ovoid, 10–12 × 3–5 mm, solitary, white, homogenous, corymbose, much-branched. Peduncle 0.5–1 cm long. Phyllaries 3 or 4-seriate, scarious, unequal; outer ovate, 7–10 × 1–1.2 mm acute at apex, scale on mid vein;

middle ones ovate-oblong to oblong, 10–12 mm long inner ones oblong to linear, 5 × 0.5–1 mm acute at apex. Receptacles flat or slightly convex, pitted. Bisexual florets: Corolla tubular-campanulate, white; tube gradually widened above, c. 12–15 mm long, 5-lobed; lobes ovate, c. 0.5 mm long acute at apex. Stamens 5, filaments filiform, linear, 0.5–0.8 mm long, anther adnate 1.5–2 mm long, base sagitate or with small tails. Ovary oval or roundish c. 1–1.5 mm long, angular, narrowed below; style 10–12 mm long, linearly 2-fid; stigma truncate, puberulous c. 1–2 mm long. Achenes linear-oblong, 3–4 × 0.5–0.8 mm, with 5 pale sparsely pubescent ribs, blackish; pappus of 1-seriate hairs, 8–9 mm long, white, barbellate.

Flowering & Fruiting: February–May.

Habitat: In open and waste land and on forest pathways and edges of forest.

Specimens examined: Jhalda MPCA, Kudagara, 319.49 m, 23.47178 N, 85.91206 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92306 (CAL).

Cyanthillium Blume

Cyanthillium cinereum (L.) H. Rob., Proc. Biol. Soc. Washington 103(1): 252. 1990. *Conyza cinerea* L., Sp. Pl.: 862. 1753. *Vernonia cinerea* (L.) Less., Linnaea 4: 291. 1829; Hook.f., Fl. Brit. India 2: 233. 1881; Prain, Bengal Pl. 1: 432. 1963 (Repr.); Haines, Bot. Bihar Orissa: 460. 1992; Uniyal in Hajra & al., Fl. India 13: 367. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 285. 2016.

Vernacular name: *Kuksim* (Bengali), *Little ironweed*, *Purple feabane* (English), *Dandotpala*, *Sahadevi* (Hindi).

Herb, 10–40 cm high; stems terete, finely striate, pubescent. Leaves simple, alternate, lanceolate 0.6–3.5 × 0.3–1.5 cm attenuate at base, repand-serrate at margins, acute at apex, pubescent on both surface more beneath, petioled or sessile. Capitula in terminal corymbose panicles, 6–8 × 6–10 mm; peduncles hairy, 0.3–2 cm long. Phyllaries linear-lanceolate, 3–4 seriate, 1-veined, acuminate with awned tip, pubescent, often purple tinged at apex, 3–5 mm long. Corolla 5–6 mm long, bluish mauve, pink or rarely white; lobes hairy, stamens 5, anthers 1.5 mm long, stigma bifid, style 4–5 mm long.



Achenes terete, 1.5–2 mm long, appressedly silky, sometimes dimorphic; pappus 2-seriate of hairs, whitish; outer ones 0.5–0.6 mm long; inner ones 4–4.5 mm long, hairy.

Flowering & Fruiting: September–March.

Habitat: On open areas and on grassland.

Specimens examined: Jhalda MPCA, Kudagara, 319.10 m, 23.47197 N, 85.91203 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92312 (CAL).

Cyathocline Cass.

Cyathocline purpurea (Buch.-Ham. ex D. Don) Kuntze, Revis. Gen. Pl.: 333. 1891; Hajra in Hajra & al., Fl. India 12: 111, t. 32. 1995. *Tanacetum purpureum* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal.: 181. 1825. *Cyathocline lyrata* Cass., Ann. Sci. Nat. Ser. 1, 17: 420. 1829; Hook.f., Fl. Brit. India 3: 246. 1881; Haines, Bot. Bihar Orissa: 463. 1922.

Vernacular name: Bandhaniya (Hindi).



Herbs, 20–50 cm high, strongly aromatic, glandular-hairy; stems branched, grooved, glandular-pubescent, reddish purple-tinged. Leaves alternate, sessile, 1 to 2-pinnatifid, 5–15 cm long; segments serrate-dentate to lobed at margins, acute at apex, glabrescent or thinly hairy. Heads in terminal corymbose panicles, heterogamous, disciform, 4–5 mm across; peduncles 2–5 mm long. Phyllaries linear-lanceolate, scarious and densely ciliate at margins, acute at apex, 2–2.5 mm long, pilose. Receptacles elevated with a contracted base and naked concave tip. Corolla of ray florets 1.2–1.5 mm long, purple. Corolla of disc florets c. 2 mm long

with glandular-hairy lobes. Achenes fusiform-oblong, c. 0.3 mm long, smooth; pappus absent.

Flowering & Fruiting: September–March.

Habitat: On hilly slopes on damp places and near the water source.

Specimens examined: Jhalda MPCA, Kudagara, 301.46 m, 23.47268801 N, 85.91492903 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93428 (CAL).

Eclipta L.

Eclipta prostrata (L.) L., Mant. Pl. 2: 286; H.J. Chowdhery in Hajra & al., Fl. India 12: 381, t. 103. 1995. *Verbesina prostrata* L., Sp. Pl.: 902. 1753. *V. alba* L., Sp. Pl.: 902. 1753. *Eclipta alba* (L.) Hassk., Pl. Jav. Rar.: 528. 1848; Hook.f., Fl. Brit. India 3: 304. 1881; Haines, Bot. Bihar Orissa: 480. 1922; Sanyal, Fl. Bankura Distr. 233. 1994; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 245. 2016.

Vernacular name: Kesud (Bengali), *Bhringaraj*, *Kesharaj* (Hindi).



Herbs, diffuse or erect, 10–15 cm high, much-branched, often rooting at nodes; stems appressed-pilose, reddish. Leaves subsessile, opposite, elliptic-lanceolate, 0.8–7 × 0.2–1.2 cm, attenuate or narrowed at base, subentire or obscurely serrate at margins, acute or subacute at apex, strigillose on both surfaces, 3-veined at base. Capitula heterogamous, solitary or fascicled, axillary, 1–1.5 cm in diameter, white; peduncles unequal, 0.5–3.5 cm long. Phyllaries 2-seriate, herbaceous, pubescent outside; outer ovate-obovate, 3.5–4 × c. 2 mm; inner ones oblong-lanceolate, 2.5–3 × c. 1.5 mm. Outer florets female; inner bisexual. Disk florets: Corolla shortly tubular-campanulate, 2.6–3 × c. 1 mm, 4-lobed; oblong, acute at apex. Stamens 4, subexserted; anthers linear, c. 1 mm long, basifixed, light blackish, filament c. 0.5 mm long. Ovary oblong, c. 1.5 mm long, pubescent above; stigma bipartite, style c. 1.5 mm long. Ray florets: Corolla shortly tubular, c. 3.5–4 mm long, white; ray oblong, c. 3 × 0.4 mm. Ovary oblong, c. 1.5 mm long, 3-quetrous, pubescent; stigma bipartite, style c. 2 mm long; thick. Achenes oblong, 2–2.8 × c. 1 mm, trigonous, minutely pubescent at apex; pappus very short at apex.

Flowering & Fruiting: August–March.

Habitat: In grassland on shady forest beds.

Specimens examined: Jhalda MPCA, Kudagara, 317.27 m, 23.47276 N, 85.91444 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92339 (CAL).

Elephantopus L.

Elephantopus scaber L., Sp. Pl.: 814. 1753; Hook.f., Fl. Brit. India 3: 242. 1881; Haines, Bot. Bihar Orissa: 461. 1922; Prain, Bengal Pl. 1: 433. 1963 (Repr.); Sanyal, Fl. Bankura Distr. 219. 1994; Uniyal in Hajra & al., Fl. India 13: 333, t. 102. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 285. 2016.

Vernacular name: *Hasti pod* (Bengali), *Elephant foot* (English), *Gobhi*, *Samdudri* (Hindi).



Herbs, 10–45 cm high, subscapose with creeping rhizomatous rootstock; stems terete, simple below, dichotomously branched at apex, appressed-strigose. Leaves oblanceolate or obovate-oblong, tapering at base into an obscure petiole, subentire or coarsely crenate-serrate at margins, subacute to obtuse at apex, 3–14 × 1–5 cm, chartaceous, ciliate, glabrescent above, densely appressed-pubescent and glandular-punctate below; cauline leaves sessile, shorter, ovate or oblong, semi-amplexicaul at base. Heads homogamous, disciform, sessile, aggregated in dense, stalked glomerules, c. 1 cm across, subtended by 3, ovate, floral leaves. Phyllaries 2-seriate, oblanceolate, scarious; outer 4, shortly acuminate, c. 7 × 1.5 mm, glabrous or sericeous outside. Florets 3–5. Corolla c. 4 mm across, purple; tube cylindric, c. 6 mm long, 5-lobed; lobes equal, oblong, acute at apex, c. 2.3 mm long, palmately spreading. Stamens 5, exserted; filaments filiform; anthers linear-oblong, auricled at base, c. 1.8 mm long; connectives acute. Ovary oblong, narrowed below, c. 3 mm long, faintly ribbed, hairy; style c. 8 mm long, dilated and hairy above, shortly 2-fid, recurved. Achenes c. 5 mm long, pubescent, finely 10-ribbed; pappus 1-seriate of 5 stiff, setose hairs, to 5 mm long, dilated at base.

Flowering & Fruiting: August–December.

Habitat: On forest beds on dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 324.25 m, 23.47567499 N, 85.90755204 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93595 (CAL).

Uses: Root is used to control vomiting.

Emilia Cass.

Emilia sonchifolia (L.) DC. in Wight, Contr. Bot. India: 24. 1834; Hook.f., Fl. Brit. India 3: 336. 1881; Prain, Bengal Pl. 1: 274. 1903; Haines, Bot. Bihar Orissa: 489. 1922; Sanyal, Fl. Bankura Distr. 240. 1994; Mathur in Hajra & al. (eds.), Fl. India 13: 212. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 213. 2016. *Cacalia sonchifolia* L., Sp. Pl.: 835. 1753.

Vernacular name: *Sadhimodi* (Bengali), *Hirankhuri* (Hindi).



Herbs, 20–30 cm high, glabrescent to sparsely pilose; stems much-branched at base, often decumbent-ascending; internodes to 3.5 cm long. Leaves simple, all sessile or basal and the lower ones petioled, lyrate pinnatifid with triangular-ovate terminal lobes and irregularly toothed lateral lobes, 2–7 × 1–3 cm, attenuate or cuneate at base, lobed at margins, rounded or acute at apex, membranous, glabrous to sparsely puberulous, pale green to dark blackish green; petioles winged, 2–5 cm long; cauline leaves obovate, auricled, acute to subobtuse. Capitula homogamous, discoid, 5–

12 mm long, peduncled; peduncles 2 or 3-bracteate; bracts cordate, clasping at base. Phyllaries cylindrical, 7–12 × 1–3 mm, glabrous to sparsely puberulous; bracts linear-lanceolate, c. 7 × 1 mm, narrow, scarious at margins, acute at apex, 3–5-veined. Disk florets 7–12 mm long. Corolla 7–8 mm long, pink 5 lobed; tube 5–7 mm long. Stamens 5; anthers c. 1.3 mm long. Ovary c. 1.5 mm long; style c. 5.5 mm long with dilated arms; stigma acute, hispid. Achenes 2.5–3 mm long, scabrid-ribbed, brown or reddish brown; pappus hairs copious, 0.5–0.8 mm long, soft, white.

Flowering & Fruiting: November–January.

Habitat: On hilly slopes and on open shady grassland.

Specimens examined: Jhalda MPCA, Kudagara, 320.03 m, 23.47191 N, 85.91166 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92302 (CAL).

Gnaphalium L.

Gnaphalium polycaulon Pers., Syn. Pl. 2(2): 421. 1807; P.C. Pant in Hajra & al. (eds.), Fl. India 13: 91. 1995; Sanyal, Fl. Bankura Distr. 229. 1994. *G. indicum* auct. non L., 1753: Hook.f., Fl. Brit. India 3: 289. 1881; Haines, Bot. Bihar Orissa 474. 1922; Prain, Bengal Pl. 1: 442. 1963 (Repr.); Arti Garg in Ranjan & al. (eds.) Fl. West Bengal 3: 239. 2016.

Vernacular name: *Dhali pui* (Bengali), *Kharsiya* (Hindi).

Herb prostrate; stems herbaceous, terete, much branched, white cottony tomentose. Leaves simple alternate, sessile, obovate to spatulate, 1-5 × 0.1–1 cm, attenuate at base, entire at margins, rounded with apiculate tip at apex, veins inconspicuous except mid vein; mid vein impressed to faintly raised on both surfaces, white cottony above, tomentose beneath. Capitula campanulate, 4–5 × 5–6 mm, disciform, covered by white cottony hairs, yellowish; phyllaries 2–3-seriate; outer ones, ovate-lanceolate, c. 1.5 × 0.6 mm, acute at apex, yellowish, glabrous; inner ones oblong-lanceolate, c. 2 mm long, otherwise same as outer ones. Disk florets: corolla white, tubular, 1–1.5 mm long, shallowly 2–3-lobed at apex, glabrous. Ovary light brown, oblong, 0.3–0.5 mm long small, pappus at apex, papillose; style slender, 0.8–10 mm long, glabrous; stigma bifid, slightly exserted, puberulent.



Bisexual: corolla green yellow, narrowly funnelform; tube c. 1.5 mm long, glabrous; lobes 5, triangular, small, acute and papillose at apex. Stamens 5, filaments filiform, 0.2–0.4 mm long, glabrous; anthers fused, 0.7–0.8 mm long, sagitate at base, acute at apex stigma c. 0.3 mm. Ovary oblong, c. 0.4 mm long, yellowish; style slender, c. 0.8 mm long, swollen at base, glabrous; stigma bifid, puberulent. Achenes yellowish, elliptic-oblong, 0.4–0.5 mm long, papillose; pappus, many, c.1 mm long, free at base, deciduous, white.

Flowering & Fruiting: December–March.

Habitat: On grassland and shady places.

Specimens examined: Jhalda MPCA, Kudagara, 314.76 m, 23.47259103 N, 85.91382497 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93420 (CAL).

Grangea Adans.

Grangea maderaspatana (L.) Poir. in Lam., *Encycl. Suppl.* 2: 825. 1812; Hook.f., *Fl. Brit. India* 3: 247. 1881; Haines, *Bot. Bihar Orissa*: 464. 1922; Prain, *Bengal Pl.* 1: 435. 1963 (Repr.); Hajra in Hajra & al. (eds.), *Fl. India* 12: 127, f. 37. 1995; Arti Garg in Ranjan & al. (eds.), *Fl. West Bengal* 3: 178s. 2016.

Vernacular name: *Namuti*, *Padan* (Bengali), *Mustaru* (Hindi).



Herbs, prostrate or ascending, aromatic; stems glandular and densely white-pubescent. Leaves oblong-lanceolate, decurrent at base, entire at margins, apiculate at apex, 0.5–1 × 0.3–0.5 cm, pinnatifid; pinnules opposite, chartaceous to thick, pubescent, penninerved. Heads globose, solitary, axillary and terminal, 5–8 mm, heterogamous, disciform. Phyllaries biseriate, oblong, scarious, fimbriate at margins, 4–4.5 mm long, herbaceous, pubescent; inner ones narrow. Outer florets female, 2 or 3-seriate; inner ones bisexual. Bisexual

florets: Corolla tubular-campanulate, c. 1.5 mm long, sessile-glandular outside, yellow, 5-lobed; lobes linear-ovate, acute at apex. Stamens 5, subexserted; anthers oblong, obtuse at base, c. 0.6 mm long; connectives acute. Ovary in both florets c. 2 mm long, angular, sessile-glandular outside; style c. 1.3 mm long; stigma triangular-ovate, acute. Male florets: Corolla c. 0.3 mm across; tube filiform, 1.5 mm long, sessile-glandular outside, lobes 2–4-cleft, sometimes 1 or 2 enlarged. Style c. 2 mm, shortly 2-fid; stigma linear, acute. Achenes oblong, truncate, 3–5-gonous; pappus c. 0.5 mm long, connate into a fimbriate cup, whitish.

Flowering & Fruiting: November–June.

Habitat: On open grassland and on fallow fields.

Specimens examined: Jhalda MPCA, Kudagara, 332.53 m, 23.47310702 N, 85.91155197 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93459 (CAL).

Uses: Seeds cake is used as fodder for cattle and as manure.

Mikania Willd.

Mikania micrantha Kunth, Nov. Gen. Sp. [H.B.K.] 4 (fol.): 105. 1818; Sanyal, Fl. Bankura Distr.: 221. 1994; B.P. Uniyal in Hajra & al. (eds.), Fl. India 12: 357. 1995, Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 233. 2016. *Mikania scandens* auct. non Willd.: 1803; Prain, Bengal Pl. 1: 434. 1963 (Repr.).

Vernacular name: Climbing Hempweed (English). Climbers, stem glandular-hispid.



Leaves simple, opposite, 5-8 × 4-6 cm, ovate, apex acute, base cordate, crenate, glabrate; petiole 2-4 cm long. Heads 5 mm long, in axillary panicles; bracts biseriate, outer 2 smaller, inner 3-5, 4 × 1.5 mm, ovate, obtuse. Flowers 3-5, similar, bisexual; corolla 3 mm long, tubular, lobes 5, glandular, white; anthers linear. Achenes 2 mm long, 5-ribbed, black, glabrous; pappus 4 mm long, many, hispid.

Flowering & Fruiting: Throughout.

Habitat: On forest edges and in open areas.

Specimens examined: Jhalda MPCA, Kudagara, 318.27 m, 23.47266 N, 85.91476 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92340 (CAL).

Sphaeranthus L.

Sphaeranthus indicus L., Sp. Pl.: 927. 1753; Hook.f., Fl. Brit. India 3: 275. 1881, p.p.; Haines, Bot. Bihar Orissa: 473. 1922; Sanyal, Fl. Bankura Distr.: 228. 1994; Sarv. Kumar in Hajra & al. (eds.), Fl. India 13: 160, t. 49. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 274. 2016.

Vernacular name: *Murmuriya* (Bengali), *Chhagul-nudi*, *Gorakhmundi* (Hindi).



Herbs, 10–25 cm high, aromatic; stems divaricately much-branched with irregularly toothed wings, glandular-pubescent. Leaves sessile, alternate, spatulate or obovate-oblong, decurrent at base, coarsely serrate-dentate at margins, spinulose-mucronate at apex, 1–5 × 0.5–2.5 cm, glandular-pubescent and spreading whitish pilose on veins. Heads sessile, heterogamous, disciform, aggregated on an elongated receptacle forming an ovoid-globose glomerule, terminal on branchlets, 1–1.5 cm across, few-flowered, pink to purple, subtended by a few, lanceolate bracts. Phyllaries a few, linear-lanceolate, c. 4 × 0.2–0.5 mm, narrowed below, ciliate; outer herbaceous; inner scarious. Outer florets male; inner bisexual, fewer than outer. Bisexual florets: Corolla tubular-campanulate, c. 1.2 mm across; lower part swollen, c. 3 mm long; upper part tubular, c. 5 mm long, sessile-glandular outside, 5-lobed; lobes ovate, acute at apex. Stamens 5, included, attached at base; anthers linear, sagittate at base, c. 5 mm long; connectives ovate, acute at

apex; stigma acute. Female florets: Corolla c. 0.2 mm across; tube c. 2.5 mm long, minutely lobed above. Ovary oblong, entire, c. 1 mm long, densely hairy; style c. 2.7 mm long, linearly 2-fid, acute at apex. Achenes smooth or angled, glabrous or villous; pappus absent.

Flowering & Fruiting: September–April.

Habitat: On open grassland and on fallow fields.

Specimens examined: Jhalda MPCA, Kudagara, 334.69 m, 23.47310099 N, 85.91169002 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93458 (CAL).

Synedrella Gaertn.

Synedrella nodiflora Gaertn., Fruct. Sem. Pl. 2: 456, t. 171. 1791; Clarke, Compos. Ind.: 139. 1876; Hook.f., Fl. Brit. India 3: 308. 1881; Sanyal, Fl. Bankura Distr.: 236. 1994; H.J. Chowdhery in Hajra & al. (eds.), Fl. India 12: 413, t. 117. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 249. 2016. *Verbesina nodiflora* L., Cent. Pl. 1: 28. 1755.

Herbs, 20–60 cm high, branched; stems much-branched, appressed-pilose. Leaves opposite, ovate, rounded or cuneate at base, shallowly serrate-dentate at margins, acute or shortly acuminate at

apex, 4–8 × 1.5 cm, strongly 3-nerved from base, appressed-pilose;

petioles 1–3 cm long, ciliate at base.

Heads

heterogamous,

radiate, subsessile in upper leaf-axils, 3–4 mm across.

Phyllaries 2-seriate, ovate-elliptic; outer 2 foliaceous, 1–1.3 cm long, pilose; inner ones 6–8 mm long. Outer florets male; inner bisexual.



Paleae lanceolate, c. 4 × 0.7 mm, finely dentate at margins, subacute at apex, scarious. Disc florets: Corolla c. 0.7 mm long, yellow; tube c. 3 mm long, narrowed below, campanulate above, 5-lobed; 2 (lobes) ± jointed, ovate, acute at apex. Stamens 5, included; anthers linear, sagittate, c. 0.7 mm long; connectives obtuse. Ovary lanceolate, c. 3 mm long, compressed, hairy; style c. 3 mm long; stigma linear, acute, recurved. Ray florets: Corolla yellow; tube c. 2 mm long; ray oblong, c. 1 × 0.7 mm, 2-toothed. Ovary oblong-obovoid, c. 3 × 1 mm; stigma linear, acute. Achenes of ray florets oblanceolate, 4–4.5 mm long, blackish with pale narrow wings bearing lacerate appendages; of disc florets narrowly oblanceolate, 4–4.2 mm long, compressed, puberulous; pappus of 2 awn, 2–4.5 mm long, puberulous.

Flowering & Fruiting: September–July.

Habitat: On the shady forest beds in the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 361.31 m, 23.480854 N, 85.90982798 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93531 (CAL).

Uses: Leaves are used as laxative.

Tridax L.

Tridax procumbens (L.) L., Sp. Pl.: 900. 1753; Hook.f., Fl. Brit. India 3: 311. 1881; Haines, Bot. Bihar Orissa: 486. 1922; Prain, Bengal Pl. 1: 455. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 239. 1994; H.J. Chowdhery in Hajra & al. (eds.), Fl. India 12: 418, t. 119. 1995; Arti Garg in Ranjan & al. (eds.), Fl. West Bengal 3: 278. 2016.



Vernacular name:
Kanaiya, Tridhara (Bengali),
Khohari, Kanphuli, Kumra
(Hindi).

Herbs, decumbent 20–40 cm high; stems, terete, hirsute. Leaves simple, opposite, elliptic-ovate or lanceolate, 1.5–4.5 × 0.5–2.5 cm, cuneate at base, distantly serrate to incised-dentate at margins, acute to acuminate at apex, coriaceous, hirsute on both surfaces; 3-veined prominent from base; petioles 2–4 mm long, hirsute. Capitula solitary, 0.8–1.2 × 0.7–1.5 cm, heterogamous; peduncles 12–25 cm long, slender, hirsute, glandular. Phyllaries 2–3 -seriate; outer ones lanceolate to oblong-ovate, c. 5 × 2–3 mm, short acuminate

at apex, hairy along margins, hirsute; inner ones obovate-oblong, c. 6 × 3 mm, hairy along margins, obtuse with apiculate tip at apex, innermost obtuse at apex, many veined, hirsute along veins only, otherwise glabrous. Ray florets female: Corolla obovate-oblong, ligulate, 5–7 × 2.5–3, pale yellow to creamy white, 2 or 3-lobed at apex. Ovary oblong, truncate, c. 1.5 mm long, pubescent outside; style c. 6 mm long, linearly 2-fid; stigma subulate. Disk florets: Corolla, yellow; 5-lobed; lobes oblong, ciliate, acute at apex, c. 5–6 mm long, spreading. Stamens 5, subexserted; anthers linear, c. 2.5 mm long, filaments c. 1.5 mm long. Ovary oblong, c. 2 mm long, pubescent; style c. 7.5 mm long, stigma linearly 2-fid, acute, pubescent. Achenes narrowly obconic, truncate at apex, 2–2.5 × 1 mm long, sericeous, blackish; pappus awns 15–20, unequal, 4–6 mm long, plumose.

Flowering & Fruiting: Throughout the year.

Habitat: Along the forest edges and on open grassland.

Specimens examined: Jhalda MPCA, Kudagara, 317.09 m, 23.47274 N, 85.91446 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92338 (CAL).

Vicoa Cass.

Vicoa indica (L.) DC. in Wight, Contr. Bot. India: 10. 1834; Haines, Bot. Bihar Orissa: 476. 1922; Sanyal, Fl. Bankura Distr.: 230.1994. *Pentanema indicum* (L.) Ling, Acta Phytotaxa. Sin. 10: 179. 1965; Gould in Hara, Enum. Fl. Pl. Nepal 3: 35. 1982; Sarv. Kumar in Hajra & al. (eds.), Fl. India 13: 28, t. 9. 1995.

Vernacular name: Bichhloo (Hindi).



Herbs, 20–60 cm high, rootstock woody, simple or branched at top; stems terete, hispid. Leaves simple, alternate, sessile, oblong-lanceolate, 0.7–4 × 0.1–0.8 cm, semi-amplexicaul at base, entire or serrate-dentate, recurved at margins, acuminate at apex, pubescent in both surface. Capitula heterogamous solitary, axillary or terminal, 1–1.5 cm across, yellow; peduncles 0.6–3.5 cm long, slender, spreading. Receptacle convex, pitted. Phyllaries linear-lanceolate, 3–4 × 0.5–1 mm, pubescent on midrib. Ray florets 1-seriate, female, 7–8 × 1–1.5 mm, shortly 3-toothed; corolla bright yellow, style 1.5–2 mm long, stigma bifid. Disk florets bisexual, 4.5–5 mm long, corolla c. 4 mm long, yellow, 5-lobed, stamens 5 epipetalous, anthers 1.5–1.8 mm long, basifixed, filament c. 0.5 mm long, stigma bifid, style 3–3.5 mm long. Achenes oblong, terete, c. 1–0.5 mm, appressed-pubescent, brown; pappus hairs few, c. 2.5–3 mm long, free at base, white.

Flowering & Fruiting: March–April.

Habitat: On the shady forest beds in the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara 365.97 m, 23.47017696 N, 85.91275603 E, 8.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93495 (CAL).

BEGONIACEAE

Begonia L.

Begonia picta Sm., Exot. Bot. 2: 81, t. 101. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 2: 638. 1879; Haines, Bot. Bihar Orissa: 400. 1922; Prain, Bengal Pl. 2: 385. 1963 (Repr.); K. Dilip Kumar & U.C. Bhattacharyya in T.K. Paul & al. (eds.), Fl. West Bengal 2: 406. 2015. *Begonia echinata* Royle, Ill. Bot. Himal. Mts. 3: 313, t. 80, f. 1. 1839.

Vernacular name: Pattharchatta (Hindi).



Herbs, 15–30 cm high, perennial with tuberous root-stock; tubers globose-ovoid. Stems absent or very short, hairy. Leaves broadly ovate, cordate at base, irregularly dentate at margins, acuminate at apex, c. 12.5 × 14 cm, sometimes 3-5-lobed, pilose on both sides; petioles c. 18.5 cm long. Inflorescences cymes, terminal, 6–15(– 21) cm long, pubescent; bracts ovate-lanceolate, abaxially pilose; peduncles c. 16 cm long; bracts ovate, c. 2.5 × 1.2 cm, foliaceous, variously lobed, pilose. Male flowers: Pedicels c. 2.5 cm long, slender and longer than those of female

flowers, pilose. Tepals 4, veined, pink; outer pair ovate-spathulate, c. 1.8 × 1.4 cm, pilose outside; inner pair obovate, c. 1.3 × 0.8 cm. Stamens numerous; filaments filiform, connate at base; anthers oblong, truncate, to 1.5 cm long; connective thickened and enlarged at apex to form an appendage. Female flowers: Pedicels c. 1.7 cm long, thick, pilose. Tepals 4–6, pink; outer 2 broadly ovate, obtuse at apex, c. 1.1 × 0.5 cm, pilose outside on the margins, distinctly veined; inner ones slightly smaller. Ovary inferior, c. 1.5 cm across, pilose, 3-winged; one wing larger and ascending; styles 3, free, 2-fid into 2 twisted stigmas. Capsules c. 3 cm across including wings; seeds many, oblong, minute, reticulate, pale brown.

Flowering & Fruiting: July–December.

Habitat: On the damp shady places.

Specimens examined: Jhalda MPCA, Kudagara, 364.20 m, 23.480898 N, 85.90998103 E, 13.09.2023, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93546 (CAL).

Uses: The plant juice is taken to be relieved from headache.

BORAGINACEAE

Cordia L.

Cordia dichotoma G. Forster, Fl. Ins. Austr. 18. 1786; Mahua Pal in Ranjan & al. (eds.), Fl. West Bengal 3: 452. 2016. *Cordia indica* Lam., Encycl. 7: 49. 1806. *C. myxa* auct. non L. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 136. 1883; Haines, Bot. Bihar Orissa: 574. 1922.

Vernacular name: *Boch* (Bengali), *Lasora* (Hindi).



Trees, 5-10 m high. Leaves alternate, ovate or elliptic, 8-12 x 4-8 cm, obtuse at apex, margin entire, acute to cuneate at base, glabrescent or puberulent beneath; petioles 2-5 cm long. Inflorescence dichotomous, terminal cymes. Flowers polygamous, bisexual or unisexual (only male), ebracteate; male flowers shorter than bisexual. Calyx campanulate, 5-7 mm long, irregularly 5-toothed. Corolla 8-10 mm long; lobes recurved. Drupes globose, pale orange, ovoid or globose, apiculate, up to 2-5 mm long, shining, with viscose 1-seeded pulp.

Flowering & Fruiting: February - August.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 315.68 m, 23.47264803 N, 85.91390099 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93421 (CAL).

Uses: Unripe fruits are made into pickles and ripe fruits are edible.

Cynoglossum L.

Cynoglossum lanceolatum Forssk., Fl. Aegypt.-Arab.: 41. 1775; C.B. Clarke in Hook.f., Fl. Brit. India 4: 156. 1883; Haines, Bot. Bihar Orissa 2: 610. 1961 (Repr.); Prain, Bengal Pl. 2: 535. 1963 (Repr.); Mahua Pal in Lakshmin. & al. (eds.), Fl. West Bengal 4: 454. 2019. *C. micranthum* Desf., Tabl. École Bot.: 1: 220. 1804; C.B. Clarke in Hook.f., Fl. Brit. India 4: 156. 1883.



Herbs, 40–120 cm high. Stems with long spreading branches, appressed-hispid. Leaves lanceolate to linear or linear-lanceolate, midrib prominent beneath, upper leaves sessile, lower leaf base narrowed to form petiole, up to 5.8×0.5 cm, thick. Petioles 3–4 cm long; nerves inconspicuous above, raised and prominent below; upper cauline ones sessile, much narrowed and reduced in size. Inflorescences dichotomously branched spreading scorpioid cymes, axillary and terminal, elongated in fruit. Calyx campanulate, 5-parted to base; lobes ovate, obtuse at apex, glabrous inside, densely hairy outside, c. 1 mm long, enlarged to 2 mm long and spreading in fruits. Corolla urceolate, c. 3 mm long, light blue, 5-parted; lobes ovate; throat appendages 5, crescent-shaped. Stamens 5, inserted on the throat; anthers subsessile, oblong, c. 0.7 mm long. Ovary 4-lobed, c. 0.4 mm long; ovules horizontal; style 1, gynobasic, persistent. Fruits a depressed pyramid of 4, rounded nutlets, adnate to conical carpophore, glochidiate on outer face; seeds flat.

Flowering & Fruiting: September–May.

Habitat: Grows beside streams or in wet places.

Specimens examined: Jhalda, MPCA, Kudagara, 322.13 m, 23.4718560202211 N, 85.9118679631501 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93585 (CAL).

Uses: Plants boiled in oil and applied to the body externally for fever.

CAPPARACEAE

Capparis Tourn. ex L.

Capparis zeylanica L., Sp. Pl. 2: 720. 1762; Sundararagh. in B.D. Sharma & N.P. Balakr. (eds.), Fl. India 2: 98. 1993; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 178. 1872; Haines, Bot. Bihar Orissa: 31. 1921; Prain, Bengal Pl. 1: 150. 1963 (Repr.); A. Bhattacharya, Fl. West Bengal 1: 207. 1997.



Vernacular name: *Ardanda* (Hindi).

Climbers, armed with spines; branchlets densely brown-tomentose. Leaves simple, alternate, variable, elliptic, obovate or oblong, subcuneate to obtuse at base, entire at margins, obtuse or retuse and mucronate at apex, 2–6 × 1.5–4.5 cm, coriaceous, glabrous, shiny

above; petioles to 8 mm long. Flowers to 5 cm across, borne in serial clusters on shoots; pedicels 1.2–1.5 cm long. Sepals 4 (2+2); outer 2 ovate-rounded, c. 1.5 × 1 cm, fulvous-tomentose; inner 2 elliptic or oblong, c. 1 × 0.7 cm. Petals oblong, c. 2 cm long, white or purplish. Stamens 40–45; filaments to 3.5 cm long, pinkish; anthers c. 2 × 1 mm. Ovary ellipsoid, c. 2 mm long, 1-loculed on a gynophores; gynophore 3–4 mm long, pubescent at base; style short; stigma capitate. Berries subglobose to ellipsoid, c. 5 × 4 cm, smooth, reddish; seeds many, obliquely reniform, c. 5 mm long, embedded in pulp.

Flowering & Fruiting: August–October.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 295.41 m, 23.47345403 N, 85.91435102 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93446 (CAL).

Cleome L.

Cleome viscosa L., Sp. Pl.: 672. 1753; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 170. 1872; Haines, Bot. Bihar Orissa: 29. 1921; Prain, Bengal Pl. 1: 149. 1963 (Repr.); A. Bhattacharya, Fl. West Bengal 1: 209. 1997.

Vernacular name: *Bagra* (Hindi), *Harhara* (Santal).

Herbs, to 1 m high, simple or sparsely branched, pubescent to glandular-hairy. Leaves digitately 3–5-foliolate; leaflets subsessile, elliptic-obovate, cuneate at base, ciliate at margins, acute or obtuse at apex, central one the longest, 2–4.5 × 1–2 cm, softly pubescent; lateral ones 1.5–3.5 × 0.8–1.5 cm; petioles to 4.5 cm long. Flowers 0.8–1.5 cm across, solitary in axils of reduced leaves, forming a terminal raceme to 30 cm long; pedicels to 1 cm long in flower, ascending. Calyx-tube oblong, 5–8 mm long. Petals oblong or obovate-oblong, 1–1.5 cm long, yellow. Stamens 10–20; filaments unequal, slightly dilated at top, 6–10 mm long; anthers bluish, c. 2 mm long. Ovary c. 8 mm long, glandular. Capsules 6–12 cm long, striate, glandular-pubescent; seeds small, granular, brown.

Flowering & Fruiting: August–October.

Habitat: On the shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 363.29 m, 23.48080999 N, 85.909847 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93524 (CAL).

Uses: Seeds are anthelmintic, carminative and stimulant. Poultice of seeds is efficacious in chronic painful joints.



COMBRETACEAE

Combretum Loefl.

Combretum album Pers., Syn. Pl. 1: 411. 1805; A. Bhattacharya & S.P. Banerjee in T.K. Paul & al. (eds.), Fl. West Bengal 2: 311. 2015. *Combretum roxburghii* Spreng., Syst. Veg. 2: 331. 1825; Ranjan, Fl. Parasnath Wildlife Sanct.: 95, t. 11. 2014. *Combretum decandrum* Roxb., Pl. Coromandel 1: 43, t. 59. 1796; C.B. Clarke in Hook.f., Fl. Brit. India 2: 452. 1878; Haines, Bot. Bihar Orissa: 357. 1922.

Vernacular name: *Alang* (Bengali), *Paibal* (Hindi).



Climbers; branches rusty-tomentose when young. Stems woody. Leaves simple, opposite, oblong, 5–12.5 × 3.5–5.5 cm, rounded at base, entire at margins, abruptly acuminate at apex, coriaceous, glossy above, glabrous or somewhat sparsely appressed-hairy beneath, whitish-yellow at apex when young; petioles 4–7 mm long. Spikes many in large axillary and terminal panicles, 1.2–3 cm long, rusty-villous. Flowers 5-merous, 5–6 mm long; bracteoles linear, 4–5 mm long, sub-persistent, tomentose. Calyx densely villous outside; tube urceolate, 4-lobed; lobes triangular, c. 1.5 mm long. Petals ovate-oblong, acuminate at apex, not much longer than calyx, hairy. Stamens 8(4+4), opposite and alternating with calyx lobes; anthers reddish. Ovary c. 3 mm long, 1-loculed; ovules 2–5, pendulous; style subulate or filiform, c. 4 mm long, puberulous. Disk short-hairy. Fruits oblongoid or ellipsoid, subquadrate, c. 3.5 cm long, nearly smooth with 5 membranous wings, pinkish green.

Flowering & Fruiting: November–March.

Habitat: On shady places in dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 396.70 m, 23.46967 N, 85.91499 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92357 (CAL).

CONVOLVULACEAE

Cuscuta L.

Cuscuta reflexa Roxb., Pl. Coromandel 2: 3, t. 104. 1798; C.B. Clarke in Hook.f., Fl. Brit. India 4: 225. 1883; Haines, Bot. Bihar Orissa: 605. 1922; P. Lakshminarasimhan & al. (eds.), Fl. West Bengal 4: 14. 2019.

Vernacular name: *Swarna lata* (Bengali), *Giant Dodder* (English), *Akashbel* (Hindi).



Parasitic, herbaceous annuals, leafless. Stems thick, wiry, twining, c. 2.5 mm across, pale green or yellowish green. Inflorescences cymes, paniculate. Flowers very shortly pedicellate; bracts broadly triangular, c. 1 mm long, fleshy. Calyx cupular, 5-lobed; lobes subequal, rounded-ovate, scarious at margins, obtuse at apex, 0.7–3 × 1.5–2.5 mm, overlapping, verrucose outside, green in bud, creamish in flower. Corolla campanulate-tubular, 8–10 mm long, fimbriate-scaly inside near base, ivory-white, 5-lobed; lobes narrowly ovate to ovate-triangular, obtuse to subacute at apex, erect, finally reflexed. Stamens 5; filaments linear, 2–3 mm long; anthers basifixed, slightly exserted from corolla. Ovary ovoid-conical, c. 2 mm long, glabrous, fleshy; style c. 0.5 mm long; stigma 2, divergent or more or less erect, thick. Capsules globose-conical, 6–7 mm long, circumscissile; seeds 2–4, suborbicular, 3–3.5 mm long, glabrous, dark brown to black.

Flowering & Fruiting: October–March.

Habitat: On forest edges and on hedges and bushes..

Specimens examined: Jhalda MPCA, Kudagara, 318.20 m, 23.47471702 N, 85.909242 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95025 (CAL).

Uses: Plant is a purgative and also used in liver complaints.

Evolvulus L.

Evolvulus alsinoides (L.) L., Sp. Pl. ed. 2, 1: 392. 1762; C.B. Clarke in Hook.f., Fl. Brit. India 4: 220. 1883; Haines, Bot. Bihar Orissa: 585. 1922; Prain, Bengal Pl. 2: 539. 1963 (Repr.); Mahua Pal in P. Lakshminarasimhan & al. (eds.), Fl. West Bengal 4: 19. 2019. *Convolvulus alsinoides* L., Sp. Pl. 1: 157. 1753.

Vernacular name: Sankhapushpi, Visnukrantha (Hindi).

Herb, spreading or prostrate, mostly covered with silky indumentum; root woody. Stems slender, densely pubescent. Leaves simple, alternate, elliptic, oblong to lanceolate, 3–7 × 1–4 mm, obtuse or rounded at base, entire at margins, acute or acuminate at apex, more or less densely appressed silky hairy; lateral veins 5 or 6 pairs; petioles more or less stout, c. 1 mm or less, silky whitish pubescent on both surfaces.



Inflorescence a cyme, axillary, 1 or 2-flowered; peduncles 3–5 mm long, densely silky hairy; pedicels slender, 1–5 mm long, sometimes more longer, densely hairy; bracts 2, subulate to linear-lanceolate, sharply acute at apex, c. 1 mm long, hairy, persistent. Calyx lobes 5, acute to gradually acuminate at apex, c. 4 × 1 mm. Corolla rotate, c. 1 cm across, blue with a central white portion, 5-lobed. Stamens 5, equal, exserted, c. 3 mm long; filaments filiform, adnate to base of corolla tube; anthers oblong, c. 1.5 mm long, sagittate at base. Ovary c. 0.8 mm long, glabrous; ovules 4; styles 2; each cleft into 2 subclavate stigmas. Capsules ovoid to globose, 3–5 mm across, glabrous, 2-loculed. Seeds mostly 3 or 4, triangular-obovoid, 1.5–2 mm long, glabrous, pale brown to black.

Flowering & Fruiting: July–March.

Habitat: On open grassland and in shady places.

Specimens examined: Jhalda MPCA, Kudagara, 324.62 m, 23.47202 N, 85.91218 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92315 (CAL).

Evolvulus nummularius (L.) L., Sp. Pl. ed. 2: 391. 1762; Mooney, Suppl. Bot. Bihar Orissa: 91. 1950; Prain, Bengal Pl. 2: 539. 1963 (Repr.); Mahua Pal in Lakshmin. (eds.), Fl. West Bengal 4: 19. 2019. *Convolvulus nummularius* L., Sp. Pl.: 157. 1753. *Volvulopsis nummularium* (L.) Roberty, Candollea 14: 28. 1952.



Herbs, perennial, branched, spreading or prostrate, rooting at nodes. Stems slender, terete, pilose, green or purplish. Leaves simple, alternate, oblong-suborbicular to suborbicular, 0.6–2.4 × 0.5–2 cm, cordate to rounded at base, entire at margins, rounded or slightly emarginate at apex, glabrous; lateral veins 3–5 pairs; petioles slender, 1–13 mm long, pubescent. Inflorescences a cyme, axillary, 1 or 2-flowered; peduncles absent. Flowers 5–7 mm across; pedicels slender, 2–3 mm long, pubescent, reflexed in fruits; bracts linear-elliptic, acute at apex, c. 1 mm long, sparsely hairy, persistent. Calyx lobes 5, elliptic-ovate to elliptic-oblong, 3–4 mm long; inner lobes slightly shorter than outer, ciliate at margins, acute at apex, pubescent. Corolla shortly tubular-campanulate or rotate, 5–9 mm wide, white. Stamens 5, sub-exserted; filaments c. 1.5 mm long; anthers c. 0.7 mm long. Ovary subglobose, c. 0.5 mm long; styles 2, free from base; each cleft into 2 linear stigmas. Capsules globose, 3–4 mm, 1-loculed, greenish or purplish. Seeds usually 4, often less in number, ovoid-trigonous to ellipsoid-trigonous, 1–2 × 1–1.5 mm, glabrous, brown.

Flowering & Fruiting: August–September.

Habitat: On open grassland and in forest beds.

Specimens examined: Jhalda MPCA, Kudagara, 429.04 m, 23.48229602 N, 85.91027196 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93472 (CAL).

Ipomoea L.

Ipomoea carnea Jacq., Enum. Syst. Pl.: 13. 1760; Haines, Bot. Bihar Orissa: 600. 1922.
Ipomoea carnea Jacq. subsp. *fistulosa* (Mart. ex Choisy) Austin, Taxon 26: 237. 1977;
Mahua Pal in Lakshmin. & al. (eds.), Fl. West Bengal 4: 26. 2019.

Vernacular name: *Behaya* (Hindi).

Shrubs, 2–2.5 m high; exudate white milky juice. Stems erect or ascending, woody at base, cylindrical and hollow; the mature parts lenticellate; the younger parts densely pubescent. Leaves ovate to ovate-lanceolate, or triangular, cordate to truncate at base, entire or slightly wavy at margins, acuminate at apex, 10–20 × 3.5–9 cm; lateral nerves 9–11 pairs. Inflorescences of 3–to several-flowered, cymose-paniculate clusters, axillary and



terminal; peduncles stout, terete, 5–15 cm long, pubescent; pedicels 1–3 cm long, pubescent; bracts ovate-oblong, obtuse at apex, c. 5 mm long, caducous. Calyx lobes suborbicular, subequal, or the outer ones slightly shorter, 5–6 mm long, subcoriaceous; inner sepals with scarious margins; nectaries 5, between the sepal bases. Corolla funnel-shaped, 7.5–9 cm long, light pink, dark purplish inside; tube and midpetaline bands minutely pubescent outside; limb 8–12 cm diam. Stamens 5, included; filaments very unequal, dilated and hairy at base; anthers c. 7 mm long. Ovary 2–4-loculed; ovules 4 or 6; style 1, filiform, included; stigma capitate, or 2- or 3-globulose. Capsules ovoid, ellipsoid, or somewhat pyriform, mucronate at apex, 1.5–2 cm long, finely pubescent in the basal portion, pale brown, 4-valved, 2-celled or incompletely 4-celled; seeds 4 or less, ovoid, slightly trigonal, or ellipsoid-angular, 8–9 mm long, blackish brown, densely sericeo-villose.

Flowering & Fruiting: November–February.

Habitat: On damp, wet localities.

Specimens examined: Jhalda MPC, Kudagara, 330.92 m, 23.480753 N, 85.90953997 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93489 (CAL).

Use: Plant is used as mild purgative.

Ipomoea nil (L.) Roth, Cat. Bot. 1: 36. 1797; Prain, Bengal Pl. 2: 546. 1963 (Repr.); Lakshmin. & al. (eds.), Fl. West Bengal 4: 30. 2019. *Convolvulus nil* L., Sp. Pl. 1: 219. 1762. *Ipomoea hederacea* sensu C.B. Clarke in Hook.f., Fl. Brit. India 4: 199. 1883, non (L.) Jacq., 1786; Haines, Bot. Bihar Orissa: 602. 1922. *Pharbitis nil* (L.) Choisy, Mem. Soc. Phys. Geneve 6(2): 439. 1834.

Vernacular name: Kaladana, Neelkalmi (Hindi).



Climbers. Stems twining, covered with dense or scattered large trichomes. Leaves ovate to broadly ovate or suborbicular or even lobed, cordate at base, entire at margins, acute to acuminate at apex, 4–10.5 × 3–9 cm, or 3(– 5)-lobed, thinly pubescent with appressed hairs; lateral nerves 7–9 pairs; petioles slender, 5.5–15.5 cm long, retrorsely hirsute. Inflorescences of 1–to 5-flowered cymes, often axillary and in dense clusters; peduncles 2.5–12 cm long, hirsute; pedicels 5–10 mm long, pubescent; bracts linear to filiform, 7–8 mm long, hirsute, caducous. Calyx lobes linear-lanceolate with a long linear acumen, almost equal, 1.5–2.3 cm long, patently hirsute, more dense at base, sparse above, sometimes mixed with shorter, softer hairs together. Corolla funnel-shaped, 5–7 cm long, glabrous, blue or purple, gradually turning reddish purple, throat often white. Stamens 5, included; filaments unequal, crisped-hairy at base; anthers c. 3 mm long. Ovary conical, c. 1.5 cm long, glabrous; style c. 3 cm long, included. Capsules subglobose to globose, mucronate by the presence of style base, c. 1 cm diam., glabrous, young fruit covered by the sepals, 3-valved, mostly 3-celled; seeds 5 or 6, pyriform, trigonous, 5–6 mm long, unevenly pubescent with short trichomes, black.

Flowering & Fruiting: August–December.

Habitat: On forest edges and on bushes..

Specimens examined: Jhalda MPCA, Kudagara, 315.12 m, 23.484781 N, 85.910868 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95028 (CAL).

Uses: Dried seeds are used as purgative.

Ipomoea pes-tigridis L., Sp. Pl. 1: 162. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 204. 1883; Haines, Bot. Bihar Orissa: 595. 1922; Prain, Bengal Pl. 2: 546. 1963 (Repr.); Mahua Pal in P. Lakshminarasimhan & al. (eds.), Fl. West Bengal 4: 26. 2019. *Ipomoea hepaticifolia* L., Sp. Pl. 1: 161. 1753. *Ipomoea pes-tigridis* L. var. *hepaticifolia* (L.) C.B. Clarke in Hook.f., Fl. Brit. India 4: 204. 1883.

Vernacular name: *Aanguli-lata* (Bengali), *Panchpatia* (Hindi).



Climbers. Stems slender to stout, trailing, less commonly twining, covered with long spreading yellow to brown bristly hairs. Leaves orbicular in outline, 3–7 × 2.5–9 cm, palmately divided somewhat to the base into 5–9 lobes, rarely entire, or 3 or 4-lobed and angular not up to the base; lobes elliptic, elliptic-lanceolate to obovate, entire at margins, mucronate at apex, 1.8–7.5 × 1.2–3.5

cm, each having a prominent midvein radiating from lamina base; lateral nerves 5 or 6 pairs to the smaller lobes and 7–9 pairs to the larger lobes; densely appressed pubescent to strigose on both the surfaces; petioles slender, 3–10 cm long, hairy alike to stem. Inflorescences of few-flowered involucrate cymose heads, axillary; peduncles terete, 3–12 cm long, hairy alike stem; outer bracts oblong to linear-oblong, 1.6–3 cm long; inner narrower and shorter; all foliaceous, pubescent, persistent. Calyx lobes lanceolate to narrowly lanceolate, subequal, 8–12 mm long, long-hairy, slightly enlarged in fruit. Corolla funnel-shaped, 3–4 cm long, white, pink or purple with darker throat. Stamens 5, to 1 cm long, included; filaments glabrous; anthers c. 1.5 mm long. Ovary conical, c. 1 mm long; style c. 1 cm long, included. Capsules ovoid to globular, 5–6 mm diam., 4-thin-valved, brown, 2-celled; seeds 4, obovoid-rounded, 3.5–4 mm long, unevenly grey-tomentose, black.

Flowering & Fruiting: July–October.

Habitat: Near water bodies and on moist localities.

Specimens examined: Jhalda MPCA, Kudagara, 363.28 m, 23.48082399 N, 85.90972303 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93537 (CAL).

Uses: Plant is used as cattle fodder.

CUCURBITACEAE

Diplocyclos (Endl.) Post & Kuntze

Diplocyclos palmatus (L.) Jeffrey in Kew Bull. 15: 352.1962; Babu, Herb. Fl. Dehra Dun 197. 1977; Sanyal, Fl. Bankura Distr.: 183. 1994; S.N. Biswas in T.K. Paul & al. (eds.), Fl. West Bengal 2: 380. 2015. *Bryonia palmata* L., Sp. Pl. 2: 1012. 1753; (excl. syn.).

Vernacular name: *Mala* (Bengali), *Marble Vine* (English), *Ban-kakra*, *Gargu-naru* (Hindi).



Climbing, stinking herbs; stems slender, much branched. Leaves up to 4 × 11 cm, scabrous above and glabrous beneath, margin undulate, crenulate or denticulate; petioles up to 6 cm long. Male flower 3–6 in fascicle; peduncle up to 1 cm long; Calyx 3–4 mm long, greenish yellow, slightly papillose; segment ovate, acute. Staminal filaments 1.5 mm long. Female flower fasciculate or solitary, ovary globose. Fruits spherical, deep-red, with white lines. Seeds pear shaped, up to 5 × 3 mm, grey.

Flowering & Fruiting: April-December.

Habitat: On hedges and bushes.

Specimens examined: Jhalda, MPCA, Kudagara, 313.10 m, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95029 (CAL).

Trichosanthes L.

Trichosanthes cucumerina L., Sp. Pl. 2: 1008. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 2: 609. 1879; Haines, Bot. Bihar Orissa: 388. 1922; Prain, Bengal Pl. 1: 377. 1963 (Repr.); S.N. Biswas in T.K. Paul & al. (eds.), Fl. West Bengal 2: 392. 2015.

Vernacular name: Chichinga (Bengali, Hindi).

Climbers, monoecious, annual. Stems slender, sulcate, pubescent; tendrils slender, 3–5-fid. Leaves reniform-suborbicular in outline, 5–7-angular or lobed, deeply cordate at base, 5–10 × 7–12 cm, puberulous above, pubescent or somewhat scabrous below; lobes obovate, distantly denticulate at margins, obtuse or subacute at apex; petioles 2–7 cm long. Male peduncles in pair, 8–15-flowered, the earlier 1-flowered, the later laxly racemed, ebracteate or minutely bracteate. Male flowers: pedicels erect, filiform, 1–2 cm long; calyx-tube 2–2.5 × c. 2.5 cm; lobes lanceolate, 1.2–1.5 mm long, erect or spreading; corolla 2–3 cm



across; lobes lanceolate, c. 8 × 2 mm, fimbriate at margins, white; staminal filaments slender, c. 1.5 mm long. Female flowers: Peduncles 3–10 mm long; ovary fusiform, 1-loculed; ovules numerous; style slender; stigma 3, bifid. Fruits ovoid-conical, rostrate, 3–7 × 2.5–4.5 cm, green with white stripes when young, turning red on maturity; seeds 8–10, ovate-oblong, 1–1.2 × 0.6–6.5 cm, corrugate.

Flowering & Fruiting: August–January.

Habitat: On forest edges and on hedges and bushes.

Specimens examined: Jhalda MPCA, Kudagara, 322.54 m, 23.47471098 N, 85.90938801 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95030 (CAL).

DIPTEROCARPACEAE

Shorea Roxb. ex C.F. Gaertn.

Shorea robusta Roxb. ex C.F. Gaertn., Suppl. Carp. 3: 48, t. 186. 1805; Dyer in Hook.f., Fl. Brit. India 1: 306. 1874; Haines, Bot. Bihar Orissa: 56. 1921; Prain, Bengal Pl. 1: 172. 1963 (Repr.), R.B. Ghosh & U.P. Samaddar, Fl. West Bengal 1: 281. 1997.

Vernacular name: *Sal* (Bengali); *Sarjam* (Santal).



Trees, 25–30 m tall; trunk to 3.5 m girth; bark usually furrowed, dark brown; braze tough and fibrous, red. Leaves ovate-oblong, cordate at base, acuminate at apex, 15–25 × 10–15 cm, glabrous; lateral nerves c. 12 pairs; petioles 2–2.5 cm long; stipules falcate, 7–12 mm long, covered with silvery peltate scales, pubescent. Panicles lax, on new shoots and from old wood, 12–25 cm long, pale velvety pubescent; branches unilateral, racemose. Flowers subsessile. Sepals 5, lanceolate. Petals 5,

lanceolate-acuminate with a twisted acumen, 1–1.2 cm long, 12 or 13-nerved, cream-coloured. Stamens many, usually c. 50; filaments swollen at base; connective tailed; cells usually apiculate. Ovary pubescent, 3-loculed; ovules 2 in each locule, pendulous; stigma 3-denticulate. Fruits indehiscent, ovoid, 1–1.2 cm long, densely pubescent, unequally 5-winged; wings linear-oblong or spatulate, more or less pubescent, 10-nerved, green; larger wings 3, c. 8 × 1.5 cm; smaller wings 2, c. 3 × 0.4 cm.

Flowering & Fruiting: March–May.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 389.26 m, 23.46976398 N, 85.91418296 E, 8.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93494 (CAL).

Uses: Wood was used chiefly for making railways sleepers; presently used in construction work. Leaves are used for making beedies, and for preparing platters and cups. An oleoresin obtained on tapping trunk was used for joining planks in boats making. This resin is also used in paints and varnishes and also as an incense.

EBENACEAE

Diospyros L.

Diospyros malabarica (Desr.) Kostel., Allg. Med.-Pharm. Fl. 3: 1099. 1834. *Garcinia malabarica* Desr. in Lam., Encycl. 3: 701. 1792. *Diospyros embryopteris* Pers., Syn. Pl. 2: 624. 1807; C.B. Clarke in Hook.f., Fl. Brit. India 3: 556. 1882; Prain, Bengal Pl. 1: 481. 1963 (Repr.). *Diospyros peregrina* (Gaertn.) Gürke in Engl. & Prantl, Nat. Pflanzenfam. 4(1):164, t. 87. 1891; V. Singh, Monogr. Indian Diospyros: 192. 2005.

Vernacular Name: Gab (Bengali, Hindi), Indian Persimmon (English).



Trees, dense spreading; young shoots and inflorescence brown tomentose while older parts glabrous. Leaves alternate, oblong, 9–24.5 × 3.2–7.2 cm, rounded or truncate at base, obtuse or subacute at apex; petioles 0.5–1.2 cm long. Male flowers 3–7, in short peduncled, tomentose, racemose cymes. Calyx c. 6 mm long; lobes 4, broadly ovate, apex obtuse, base subcordate. Stamens 20–60 in pairs; filaments short. Corolla c. 1 cm long, campanulate, lobe 1. Staminodes 2–10. Ovary glabrous, 8-loculed; styles 4; stigmas lobed. Berries 2.5–6 cm across.

Flowering & Fruiting: April–May.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 354.20 m, 23.481675 N, 85.90974701 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93476 (CAL).

Uses: In sore throats the infusion of fruits is used as gargle; for wounds and ulcers the juice is applied. Bark is used in intermittent fever and dysentery.

EUPHORBIACEAE

Croton L.

Croton bonplandianus Baill. in *Adansonia* 4: 339. 1864; Chakrab. & N.P. Balakr. in *J. Econ. Taxon. Bot.* 31:717. 2007; Chakrab. & N.P. Balakr. in N.P. Balakr. & al., *Fl. India* 23: 231. 2012; Chakrab. in Lakshmin. & al. (eds.), *Fl. West Bengal* 4: 522. 2019. *C. sparsiflorus* Morong in *Ann. New York Acad. Sci.* 7: 221. 1893; Prain, *Rec. Bot. Surv. India* 3(2): 276. 1905.



Vernacular name: *Ban Tulsi* (Bengali), *Kala Bhangra* (Hindi).

Herbs, young parts stellate-pubescent and viscous glandular. Leaves simple, alternate, 2–5 × 1–2 cm, ovate-lanceolate, apex gradually acute, base attenuate, margin faintly serrulate, densely stellate scaly on both sides when young, sparsely so below and glabrous above on aging; petiole to 1.5 cm long. Racemes to 10 cm long; pedicels glandular on either side. Male flowers 3–4 mm across; perianth 1-seriate, lobes 5; ovary subglobose, tomentose; style short; stigma 3, each forked to form 6 lobes. Capsule 5–6 mm across, ovoid, warty; seeds 3, globose, carunculate.

Flowering & Fruiting: Throughout the year.

Habitat: In open grasslands.

Specimens examined: Jhalda MPCA, Kudagara, 432.51 m, 23.48234204 N, 85.91026199 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93473 (CAL).

Uses: The root is used as a medicine against snake venom and the leaf extract used as a medicine for high fever, treatment of cuts and wounds.

Euphorbia L.

Euphorbia hirta L., Sp. Pl. 1: 454. 1753; Haines, Bot. Bihar Orissa: 147. 1921. Binojk. & N.P. Balakr. in N.P. Balakr. & al. (eds.), Fl. India 23: 287. 2012. Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 533-234. 2019. *Euphorbia pilulifera* L., Sp. Pl. 1: 454. 1753; Hook.f., Fl. Brit. India 5: 250. 1807; Prain, Bengal Pl. 2: 692. 1963 (Repr.).

Vernacular name: Barokarni (Bengali), Dudhi (Hindi).



Herbs, prostrate or erect-decumbent, 10–30 cm high. Stems terete, branched from base, hispid. Leaves simple, opposite, decussate, elliptic-lanceolate or oblong, 1–3 × 0.5–1.4 cm, obliquely or cuneate at base, serrulate at margins, acute at apex, sparsely puberulous above, more beneath; petioles 2–3 mm long, hairy; stipules subulate, 1–2 mm long. Cyathia 15–20 aggregated in a dense, axillary, pedunculate clusters; peduncles simple or dichotomously branched, 1–6 mm long; involucre subsessile,

campanulate, 0.5–1 × 0.5–0.6 mm, appressed-hairy outside; lobes deltoid, c. 1 mm long, acute; glands 4, cupular, 0.5–0.8 mm across; limbs minute or as large as the gland, rounded, hyaline, white with purple tinge. Male flowers 4–6; pedicels c. 0.5 mm long; anthers subglobose, c. 0.2 mm long, longitudinally dehiscent. Female flowers laterally pendulous; ovary c. 0.8 mm across, 3-loculed; styles 3, bifid halfway, erect, c. 0.4 mm long; stigma capitate. Capsules trigonous, 1–1.2 × 1–1.2 mm, smooth, adpressed-pubescent. Seeds subglobose-tetragonal or ovoid-quadrangular, c. 0.8 × 0.5 mm, with few shallow transverse ridges and furrows on each face, grey when mature, otherwise pinkish.

Flowering & Fruiting: Throughout the year.

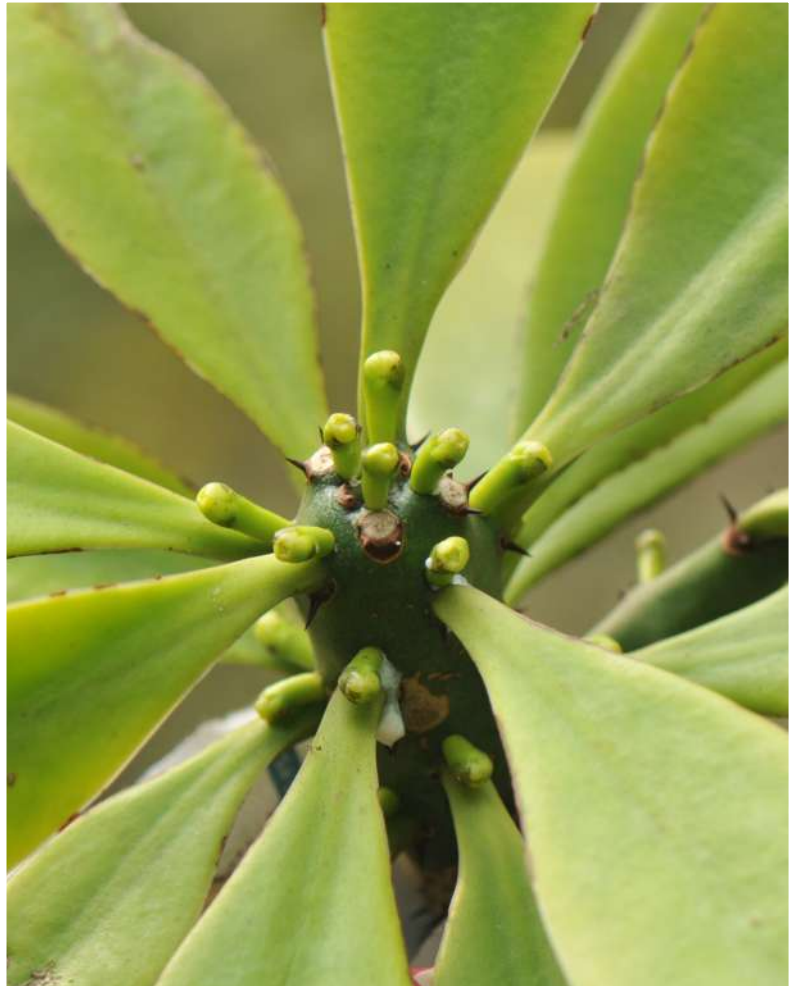
Habitat: In open grassland and on shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 319.37 m, 23.47266 N, 85.91472 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92341 (CAL).

Euphorbia nivulia Buch.-Ham. in Trans. Linn. Soc. London 14: 286. 1825; Hook.f., Fl. Brit. India 5: 255. 1887; Haines, Bot. Bihar Orissa: 142. 1921; Binojk. & N.P. Balakr., Gen. Euphorbia India: 315, f. 63, t. 18. 2010 & in N.P. Balakr. & al. (eds.), Fl. India 23: 324. 2012. *E. neriifolia* Roxb., Fl. Ind. 2: 467. 1832, non L. 1753.

Vernacular name: *Sij* (Bengali), *Katathohar*, *Senhur* (Hindi).

Shrubs or small trees, 2–4.5 m high with milky latex; main stem woody; branches whorled, subterete, conical, projecting, straight, brown or black; spines 2, divaricate or inserted on flat corky areas, 3–5 mm long. Leaves simple, alternate, subsessile, whorled at ends of branches, oblanceolate to subspathulate, 11–19 × 3–5 cm, narrowly cuneate at base, entire at margins, obtuse or apiculate at apex, fleshy, glabrous, deciduous; midrib stout and prominent beneath; lateral veins indistinct. Cyathia in axils of fallen leaves, solitary, in diads or triads; the primary and secondary peduncles c. 2.5 cm long, yellow;



involucre cup-shaped, c. 6 × 5 mm; bracts 2, broadly ovate, c. 3 × 2 mm; lobes 5, broadly orbicular, laciniate at margins; glands 5, broadly oblong, c. 4 × 3 mm, reddish yellow; bracteoles fimbriate, c. 1.5 mm long. Male florets: in 5 fascicles of 6 or 7 flowers each; pedicels c. 3 mm long; filaments c. 1 mm long; anthers subglobose, c. 1 mm long, yellow. Female florets: gynophores c. 1 mm long; ovary subglobose; styles connate up to middle, each minutely bifid at tip; stigma papillose. Capsules globose, c. 5 mm, trigonous, glabrous; cocci compressed, keeled. Seeds ovoid or subquadangular, c. 4 × 3 mm, smooth.

Flowering & Fruiting: February–April.

Habitat: On hilly slopes in dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 541.21 m, 23.48054 N, 85.91469 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92384 (CAL).

Euphorbia prostrata Aiton, Hort. Kew. 2: 139. 1789; Hook.f., Fl. Brit. India 5: 266. 1887; Sanyal, Fl. Bankura Distr.: 387. 1994; Binoj. & N.P. Balakr. in N.P. Balakr. & al. (eds.), Fl. India 23: 295. 2015; Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 536. 2019.



Herbs, annual, 15–19 cm tall. Root fibrous. Leaves opposite; stipules long triangular, easily fallen; petiole very short or sessile; leaf blade elliptic to obovate, 3–7 (– 8) × 2–4(–5) mm, adaxially green, sometimes with light red or red abaxially, margin entire or irregularly finely serrulate, apex rounded. Cyathia single, axillary or few clustered, peduncle 2–3 mm; involucre turbinate, c. 1 × 1 mm, usually glabrous, sometimes with some pubescence, marginal lobes 5, triangular or rounded; glands 4, appendages white, extremely narrow. Male flowers many, usually shorter than cup. Female flower pedicellate, exserted from involucre; ovary sparsely pubescent on angles; styles nearly connate at base; stigma 2-lobed. Capsule 3-angular, c. 1.5 × 1.4 mm, smooth, glabrous except for white hairs along angles. Seeds ovoid-tetragonal, c. 0.9 × 0.5 mm, yellow, each side with 6 or 7 transverse furrows; caruncle absent.

Flowering & Fruiting: Throughout the year.

Habitat: Moist places on roadsides and cultivated fields.

Specimens examined: Jhalda, MPCA, West Bengal-Jharkhand Border, Kudagara, 436.50 m, 23.4850690048187 N, 85.910932039842 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95050 (CAL).

Jatropha L.

Jatropha gossypifolia L., Sp. Pl. 2: 1006. 1753; Hook.f., Fl. Brit. India 5: 383. 1887; Haines, Bot. Bihar Orissa: 101. 1921. Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 592. 2019.

Vernacular name: Lal Bherenda. (Bengali), Ratanjoti (Hindi).



Perennial shrubs, 1.5–2 m high; branches dark purple-tinged. Leaves in close alternate spiral, cordate at base with stipitate viscid glands along margins, 7.5–13 × 6–15 cm, red to deep-pink, palmately 3–5-lobed; lobes obovate, acute at apex; petioles 6–10 cm long, glandular on abaxial sides; stipules lanceolate or filiform, usually glandular and persistent. Cymes 4–6 cm long; bracts lanceolate, 0.8–1 cm long, glandular at margins. Male flowers

6–8 mm across; pedicels 3–5 mm long; tepals 3, ovate, acute, glandular-ciliate, 2–2.5 mm long; purple or red, obovate, 4–5 × 3–4 mm. Stamens 8 (5+3); inner 3 longer; filaments connate at base. Female flowers 4–6 mm across; pedicels 1.5–2 mm long, stouter than in male; tepals ovate, glandular at margins, acuminate at apex, 4–6 mm long; ovary c. 2 × 1.5 mm; styles c. 1.5 mm long. Capsules obovoid-oblong, 1.2–1.8 × 1–1.5 cm, 3-lobed; seeds oblong-subtrigonal, 8–10 × 4–5 mm, greyish brown.

Flowering & Fruiting: April–October.

Habitat: On open localities and on forest edges.

Specimens examined: Jhalda MPCA, Kudagara, 314.08 m, 23.47259397 N, 85.91384601 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93419 (CAL).

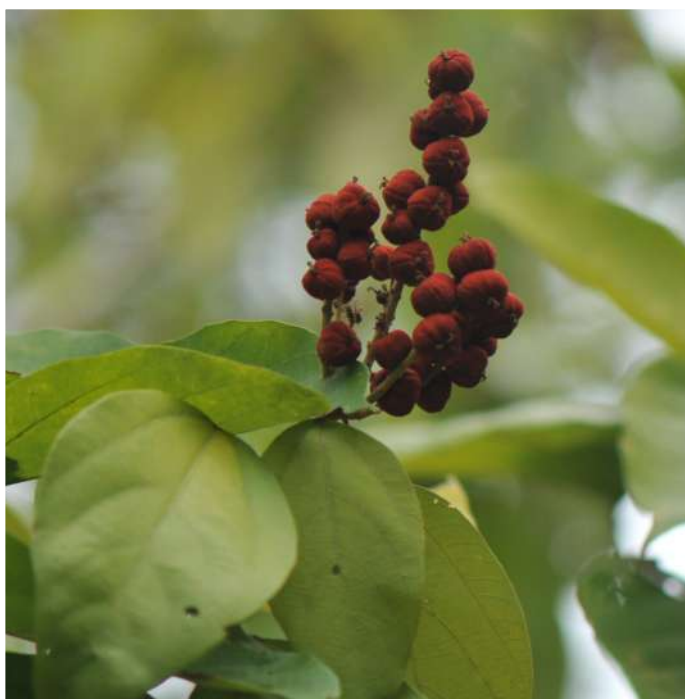
Uses: Decoction of leaves is used as purgative; leaf extract is applied in fevers; roots against leprosy; latex given in ulcers; seed oil as purgative.

Mallotus Lour.

Mallotus philippensis (Lam.) Müll. Arg. in *Linnaea* 34: 196. 1865; Hook.f., *Fl. Brit. India* 5: 442. 1887 ('*philippinensis*'); Haines, *Bot. Bihar Orissa*: 106. 1921; Prain, *Bengal Pl.* 2: 712. 1963 (Repr.); Susila & N.P. Balakr. in N.P. Balakr. & al. (eds.), *Fl. India* 23: 159. 2012; Chakrab. in Lakshmin. & al. (eds.), *Fl. West Bengal* 4: 560. 2019. *Croton philippensis* Lam., *Encycl.* 2: 206. 1786.

Vernacular name: Kamala (Hindi); Rhodhi, Rori (Kharwari); Sinduri.

Dioecious trees, evergreen, 6–12 m high, much-branched; bark smooth, grey; branchlets, young leaves and inflorescences rusty pubescent. Leaves simple, alternate, ovate or ovate-lanceolate, 3.5–21 × 2–11 cm, truncate to subcordate at base, entire at margins, acute to acuminate at apex, glabrous above, pubescent and red-glandular beneath, 3-veined at base; lateral veins 4–6 pairs; petioles 0.7–8 cm long, thickened at ends, fulvous-pubescent, often red-glandular. Flowers small, usually dioecious; male clustered and female solitary, in the bracts of simple paniced spikes or racemes.



Male racemes axillary and dense paniced at the end of branchlets or clustered in erect, terminal racemes of 15–25 cm long. Flowers sessile or shortly pedicellate, 4–4.5 mm across; bracts broadly ovate, 1.2–1.5 mm long, acute at apex; sepals 4, free, obovate, 3–5 mm long, acute, recurved, whitish yellow. Petals and disk absent. Stamens 20–30; filaments free; anthers with 2 unequal cells, c. 0.7 mm long, dorsifixed, longitudinally dehiscent. Pistillode minute or absent. Female flowers sessile, 3–4 mm across, in short racemes of 5–7.5 cm long; calyx lobes 3 or 4, lanceolate, thicker than male. Ovary tomentose, red-glandular, 2–4-loculed; ovules solitary in each locule; styles 3, spreading, free, plumose, stigmatiferous, yellowish red; stigma 3. Capsules 3-lobed or globose, 5–7 × 10–12 mm, pubescent, densely covered with red glands, 3-valved. Seeds subglobose, 5–6 mm, brownish.

Flowering & Fruiting: July–March.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 412.23 m, 23.48054 N, 85.91469 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92364 (CAL).

Microstachys A.Juss.

Microstachys chamaelea (L.) Müll.Arg. in *Linnaea* 32: 95. 1863; Chakrab. in Lakshmin. & al. (eds.), *Fl. West Bengal* 4: 562. 2019. *Sebastiania chamaelea* (L.) Müll. Arg., *Prodr.* 15(2): 1175. 1866; Hook.f., *Fl. Brit. India* 5: 475. 1887; Prain, *Bengal Pl.* 2: 716. 1963 (Repr.).



Erect or diffuse herbs. Leaves simple, alternate, 2-4.5 × 0.7-1 cm, oblong-lanceolate, apex obtuse or acute, base obtuse, margin minutely dentate; petiole to 3 mm long. Flowers in monoecious slender axillary spikes, 1.5-2.5 cm long. Male flowers minute, c. 1.5 mm across in clusters of 3; tepals 5, connate at base. Capsule 3-lobed each with two rows of soft prickles on the back, 4-6 mm across; seeds 1-1.5 mm long, oblong, carunculate.

Flowering & Fruiting: Throughout the year.

Habitat: On shady localities and hilly slopes.

Specimens examined: Jhalda MPCA, Kudagara, 368.45 m, 23.4712 N, 85.9165 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92356 (CAL).

Phyllanthus L.

Phyllanthus amarus Schum. & Thonn. in Kongl., Beskr. Guin. Pl.: 421. 1827; Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 566. 2019. *P. nanus* Hook.f., Fl. Brit. India 5: 298. 1887. *P. niruri* auct non L. 1753, Muell.-Arg. in Prodr. 15: 406. 1866; Hook.f., Fl. Brit. India 5: 298.1887; Sanyal, Fl. Bankura Distr.: 401. 1994. *P. niruri* L. var. *β. genuinus* Hook.f., Fl. Brit. India 5: 298. 1887.

Vernacular name: Bhui amla (Bengali, Hindi).



Annual, erect herb, 10–40 cm high; stem terete, smooth or scabridulous on younger part. Leaves oblong, elliptic-oblong, or obovate-oblong, 3–10 × 2–6 mm, subsessile, obtuse or minutely apiculate at apex, entire; lateral nerves obscure; stipules triangular, 1–2 mm long, acuminate. Flowers in axillary fascicles; proximal 2–3 axils with 1–3 male flowers, all succeeding axils with 1–3 males and solitary or two female flowers. Male flowers: Pedicels 1 mm long. Sepals 5, elliptic or oblong-elliptic, subequal, 0.4–0.7 × 0.3–0.4 mm, acute. Disc segments 5, roundish. Stamens 3; filaments connate into a column, 0.3 mm long. Female flowers: Pedicels 0.8 mm long. Sepals 5, more or less same as in male flowers. Disc flat, deeply 5 lobed; lobes subentire. Capsules globose, 2 mm in diam., glabrous.

Flowering & Fruiting: August-December.

Habitat: Waste places, beside streams.

Specimens examined: Jhalda, MPCA, Sewati, 322.68 m, 23.4746639616787 N, 85.9093880094587 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95055 (CAL).

Uses: The whole plant is used in gonorrhoea, menorrhagia and other genital affections. It is useful in gastropathy, diarrhoea, dysentery, intermittent fevers, ophthalmopathy, ulcers scabies and wounds.

Phyllanthus rheedei Wight, Icon. Pl. Ind. Orient. 5: 25, t. 1895, f. 1. 1852; Hook.f., Fl. Brit. India 5: 293. 1887; Chakrab. & al. in N.P. Balakr. & al. (eds.), Fl. India 23: 474. 2015; Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 571. 2019.

Herbs, 20–55 cm tall. Leaves 7–30 × 4–15 mm, acute at apex, cuneate at base, membranous, mostly glaucous beneath. Inflorescences axillary, in cluster of 1–3 males;



bracts lanceolate, linear to filiform. Male flowers: calyx lobes 6, white with faintly green midrib, oblong or rhomboid; stamens 3; disc glands 6. Female flowers: pedicels longer than male; calyx lobes 6, green, white margined, oblong or obovate; styles 3; disc annular. Capsules subglobose or depressed, smooth; seeds trigonous, longitudinally ribbed.

Flowering & Fruiting: March–December.

Habitat: In moist shaded places.

Specimens examined: Jhalda, MPCA, Sewati, 365.83 m, 23.4808850102126 N, 85.9099510218948 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93514 (CAL); Jhalda, MPCA, Kudagara, Arar Dungri, 336.82 m, 23.4748089686036 N, 85.9122859686613 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95018 (CAL).

Phyllanthus urinaria L., Sp. Pl.2: 982 1753; Hook.f., Fl. Brit. India 5: 293. 1887; Haines, Bot. Bihar Orissa 125. 1921; Chakrab. & al. in N.P. Balakr. & al. (eds.), Fl. India 23: 490. 2012.

Vernacular name: *Hazarmani* (Bengali), *Lal bhui-amlā* (Hindi).



Herbs, annual or sometimes perennial, decumbent or erect, c. 20 cm high. Stems terete, glabrous, sometimes puberulous or hispid. Leaves simple, alternate, very close to clustering at apex, broadly oblong, obovate or oblong-ob lanceolate, 0.7–2 × 0.3–1 mm, rounded at base, entire or whitish small-ciliate at margins, rounded and minute apiculate at apex; lateral veins c. 6 pairs, distinct, glabrous, whitish green beneath; stipules of the cataphylls lanceolate, c. 2 mm long, auriculate-sagittate, acuminate at apex; those of leaves triangular-lanceolate, c. 1 mm long, unequal, not auriculate, stramineous. Female cymules 1-flowered, at proximal axils; male cymules 5–7-flowered, at the distal axils or vice versa. Male flowers: pedicels articulate above middle. Sepals 6, obovate, c. 0.5 mm long, obtuse at apex, glabrous, pale yellow; disk-glands 6, rounded, papillose. Stamens 3; filaments united into a short column; anthers sessile but not fused together, erect, vertically dehiscent. Female flowers: pedicels very short and thick or sessile; sepals 6, oblong-lanceolate, c. 1 mm long, obtuse or subacute at apex, subglabrous, yellowish with a reddish olive midrib; disk flat, irregularly 9-lobed. Ovary subglobose, c. 1 mm across, verruculose; styles 3, very short, closely appressed to top of ovary, bifid, the segments recurved. Fruits subglobose, 2–2.5 mm across, sparingly beset with short transverse rows of flattened, triangular tubercles, stramineous or reddish. Seeds c. 1 × 1 mm, yellowish brown.

Flowering & Fruiting: August–December.

Habitat: In moist shaded places and on grassland.

Specimens examined: Jhalda MPCA, Kudagara, 322.20 m, 23.47714199 N, 85.90688199 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93554 (CAL).

Phyllanthus virgatus G. Forst., Fl. Ins. Austr.: 65. 1786; Sanyal, Fl. Bankura Distr.: 401. 1994. *P. simplex* Retz., Observ. Bot. 5: 29. 1788; Hook.f., Fl. Brit. India 5: 295. 1887; Haines, Bot. Bihar Orissa: 125. 1921; N.P. Balakr. & Chakrab., Fam. Euphorb. Ind.: 380. 2007; Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 573. 2019.

Vernacular name: *Bhui amra/ amla* (Bengali, Hindi).



Erect or ascending herb, 20–60 cm long; branches angled, glabrous. Leaves oblong or linear-oblong, 0.5–2.5 × 0.3–0.8 cm, subsessile, closely placed and often overlapping, apiculate, entire; veins not prominent; stipules triangular-ovate, 2 mm long, auricled at base. Flowers 1–4, in axillary fascicles, proximal axils with 2–3 males and a solitary female in a cluster; the distal nodes with solitary female. Male flowers: Pedicels 1–2 mm long. Sepals 6, 0.8–1 mm long, acute. Stamens 3, distinct; anthers didymous. Female flowers: Pedicels 4–6 mm long. Sepals 3, as in male flower but slightly larger in fruit. Ovary globose; style short, 2-fid. Capsules 2–2.5 mm in diam., minutely warted.

Flowering & Fruiting: August–November.

Habitat: Common in dry mixed deciduous forests.

Specimens examined: Jhalda, MPCA, Kudagara, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93587 (CAL).

Tragia Plum. ex L.

Tragia involucrata L., Sp. Pl. 2: 980. 1753; Hook. F., fl. Brit. India 5: 465. 1888, p.p. (excl. *Tragia hipida* Willd. & excl. vars.); Prain, Bengal Pl. 2: 714. 1963 (Repr.); Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 579. 2019.



Slender, twining herbs with stinging hairs. Leaves simple, alternate, 6–10 × 3–5.5 cm, ovate or elliptic, base acute or rounded, margin serrate, apex acuminate, hispidulous on both sides; petiole 2.5 cm long. Spikes axillary, monoecious, 2 cm long; male flowers above, female flowers 1–2, at the base. Male flowers c. 1.5 mm across; bracts spatulate; tepals 6, c. 1 mm long, ovate-lanceolate, enlarged and spreading in fruits; style 3, spreading. Capsule c. 0.6 × 1 cm, 3-lobed, hispid; seeds globose.

Flowering & Fruiting: March–December.

Habitat: Mostly under the shades of trees.

Specimens examined: Jhalda MPCA, Kudagara, 319.64 m, 23.47177 N, 85.91206 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92307 (CAL).

FABACEAE

FABACEAE: PAPILIONOIDEAE

Abrus Adans.

Abrus precatorius L., Syst. Nat. ed. 12, 2: 472. 1767; Baker in Hook.f., Fl. Brit. India 2: 175. 1876; Haines, Bot. Bihar Orissa: 247. 1922; Prain, Bengal Pl. 1: 262. 1963 (Repr.); N.R. Mondal in T.K. Paul & al. (eds.), Fl. West Bengal 2: 58. 2015.

Vernacular names: *Kunch* (Bengali); *Karjan, Rakit, Rati* (Hindi).



Climbing or twining slender shrub; root woody. Stems terete, much-branched, branches slender, glabrous or appressed-hairy. Leaves compound, 3–7 cm long, leaf-rachis hairy, pari-pinnate; petioles 6–12 mm long, thickened and hairy at base; stipules linear-subulate, 2.5–3.5 mm long, pubescent, deciduous; leaflets 10–16 pairs, oblong, linear-oblong or obovate

(terminal leaflets), 3–11 × 2–5 mm, rounded at base, entire at margins, truncate or rounded-truncate and mucronate at apex, puberulous at both surfaces; petiolules c. 0.5 mm long. Racemes axillary or terminal, 2.5–15 cm long; peduncles 5–15 cm long; pedicels 1–2 mm long. Bracteoles c. 0.5 mm long, hairy. Calyx cup-shaped, 2–3 mm long, obscurely toothed, appressed-hairy outside. Corolla exserted; standard broadly obovate, c. 1 × 0.4–0.5 cm; clawed, pale purplish-white; wings narrowly oblong-falcate, c. 8 × 3 mm, clawed, purplish-white; keels curved, c. 8 × 2 mm, clawed, whitish. Stamens 9; staminal sheaths c. 8 mm long. Ovary sessile, pubescent; ovules numerous; style short, incurved; stigma capitate. Pods oblong, truncate at base, with a sharp deflexed beak, 2–4 × 1–1.4 cm, silky pubescent. Seeds 3–5, ovoid, 5–6.5 × 4–5 mm, bicoloured, scarlet with a black, lateral blotch around the hilum.

Flowering & Fruiting: August–February.

Habitat: On hilly trails on the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 431.67 m, 23.52479202 N, 85.78187102 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92391 (CAL).

Butea Roxb. ex Willd.

Butea monosperma (Lam.) Taub. in Engl. & Prantl, Nat. Pflanzenfam. 3: 365. 1894. *Erythrina monosperma* Lam., Encycl. 2: 391. 1786. *Butea frondosa* Roxb. ex Willd., Sp. Pl. 3: 917. 1802, nom. superfl.; Baker in Hook.f., Fl. Brit. India 2: 194. 1876; Haines, Bot. Bihar Orissa: 279. 1922.

Vernacular name: Palash (Bengali), Dhak, Muruk (Hindi).

Trees, to 9 m tall, deciduous; branchlets densely tomentose. Leaves pinnately 3-foliolate; petioles 10–15 cm long; stipules linear-lanceolate; leaflets rounded and retuse at apex, coriaceous, glabrous above, finely silky and conspicuously veined below; terminal leaflet rhomboid or broadly obovate, cuneate at base, 10–20 × 8–17 cm; lateral leaflets obliquely ovate, rounded at base, 7–15 × 6–12 cm; petiolules stout, 4–5 mm long; stipels subulate. Racemes 8–15 cm long.



Flowers together on nodes of olive-green rachis; pedicels densely pubescent; bracts and bracteoles small, velvety. Calyx 1.2–1.5 cm long, densely velvety outside, silky hairy inside, dark olive-green; upper lip 4.5–5 mm long; lobes of lower lip equal, deltoid, 3.5–4 mm long. Petals silky-pubescent outside, bright red, tinged with orange; standard lanceolate, equal in length, *c.* 5.5 × 2.5 cm. Staminal sheath curved, 5.5–6 mm long. Stamens diadelphous. Ovary sessile or shortly stalked; ovules 2; style elongated, incurved; stigma terminal, very small. Pods rounded at base, 12–16 × 5–6 cm, thickened at sutures, velvety-brown; seeds ovoid, 2–3.5 cm long, compressed, brown.

Flowering & Fruiting: March–July.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 300.59 m, 23.47341699 N, 85.91438304 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93447 (CAL).

Uses: Leaves are used for making plates and cups.

Cajanus Adans.

Cajanus scarabaeoides (L.) Thouars in Dict. Sci. Nat. 6: 617. 1817; P. Satyanar. in T.K. Paul & al. (eds.), Fl. West Bengal 2: 141. 2015. *Dolichos scarabaeoides* L., Sp. Pl. 2: 726. 1753. *Atylosia scarabaeoides* (L.) Benth. in Miq., Pl. Jungh. 2: 242. 1852; Baker in Hook.f., Fl. Brit. India 2: 215. 1876; Haines, Bot. Bihar Orissa: 274. 1922; Prain, Bengal Pl. 1: 383. 1963 (Repr.). *Cantharospermum scarabaeoides* (L.) Baill. in Bull. Mens. Soc. Linn. Paris 1: 384. 1883.

Vernacular name: Ban kulatha, Ban kurti (Bengali), Bir Horee (Santal).



Vines, twining or trailing, woody; branchlets densely pubescent. Leaves pinnately 3-foliolate, c. 2.5 cm long, gland-dotted below; leaflets oblong-obovate, cuneate at base, entire at margins, obtuse at apex, 1–2 × 1–1.5 cm, velvety-pubescent; petioles c. 2 cm long; petiolules to 1 mm long; stipules c. 1 mm long. Raceme axillary, usually less than 2 cm long, 2–6-flowered; peduncles c. 3 mm long, densely brown-villous; pedicels to 4 mm long. Flowers c. 8 mm across. Calyx-tube to 2 mm long,

pubescent; lobes lanceolate; upper ones c. 2.5 mm long; lower ones c. 3.5 mm long. Corolla yellow; standard c. 7 × 4 mm; wings c. 6.5 mm long; keels c. 7 × 2 mm. Staminal sheath c. 7 mm long; filaments c. 1.5 mm long. Ovary sessile c. 5 mm long, densely woolly; ovules 3; style filiform, incurved, glabrous c. 6 mm long; stigma capitate. Pods to 1.5 × 0.7 cm, densely pubescent with transverse depression; seeds 3–5, oblong, c. 4 mm.

Flowering & Fruiting: August–November.

Habitat: On the shady areas on the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 385.79 m, 23.47344297 N, 85.92207603 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93435 (CAL).

Crotalaria L.

Crotalaria albida B. Heyne ex Roth, Nov. Pl. Sp.: 333. 1821; Baker in Hook.f., Fl. Brit. India 2: 71. 1876; Haines, Bot. Bihar Orissa: 231. 1922; Prain, Bengal Pl. 1: 266. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 103. 1994; A.A. Ansari in T.K. Paul & al. (eds.), Fl. West Bengal 2: 68. 2015.

Vernacular name: Ban-methi (Hindi).

Herb or undershrub, 20–50 cm high; rootstocks woody. Stems terete, branched at base silky whitish-pubescent; branches slender, terete. Leaves simple, alternate oblong or oblanceolate or oblong-elliptic, 1.5–3.8 × 0.5–1 cm, cuneate or attenuate at base, entire at margins, obtuse or rounded and mucronate at apex, chartaceous, pubescent above, appressed glaucous and silky beneath; petioles 2–3 mm long; stipule 0 or minute subulate. Racemes 5–12.5 cm long, 5–20-flowered. Flowers 8–10 mm long; pedicels 3–5 mm long, pinkish; bracts linear,



c. 1–1.5 mm long; bracteoles linear, 2–2.5 mm long, appressed to calyx. Calyx 7–8 mm long; 3 lower teeth linear, acuminate; 2 upper teeth oblong, obtuse, very silky. Corolla shortly exserted. Standard ovate-oblong or suborbicular, 8–15 × 6–7 mm, shortly clawed, sparsely pubescent beneath; wings oblong, c. 15 × 4 mm obtuse; keels ovate or oblong, with twisted beak, c. 8 × 4.5 mm. Staminal sheath c. 5 mm long. Carpel 5–6 mm, ovary oblong, c. 4 mm long, glabrous; style geniculate, 6–6.5 mm long, pubescent, stigma minute oblique. Pods oblong-cylindric, 8–10 × c. 5 mm apiculate at apex, glabrous, prominently veined, 6–8-seeded; seeds c. 1 mm, brown.

Flowering & Fruiting: November–March.

Habitat: On the forest beds on the shady places.

Specimens examined: Jhalda MPCA, Kudagara, 340.91 m, 23.4718 N, 85.91696 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92350 (CAL); 447.65 m, 23.48477 N, 85.91202 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92372 (CAL); 399.66 m, 23.47537802 N, 85.91718704 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93454 (CAL).

Crotalaria spectabilis Roth, Nov. Pl. Sp.: 341. 1821; Sanjappa, Leg. India: 130. 1992; A.A. Ansari in T.K. Paul & al. (eds.), Fl. West Bengal 2: 82-83. 2015. *Crotalaria sericea* Retz., Observ. Bot. 5: 26. 1788, non Burm.f. 1768; Baker in Hook.f., Fl. Brit. India 2: 75. 1876; Haines, Bot. Bihar Orissa: 232.1922; Prain, Bengal Pl. 1: 265, 1963 (Repr.).

Vernacular names: *Pipuli*, *Jhunjhun* (Bengali), *Dhundhuni*, *Jhumjhumo*, *Jhunjhuria* (Hindi).



Herbs or undershrubs, annual or biennial, to 2.5 m high. Branches stout, striate, subglabrous. Leaves simple, upper leaves smaller and linear or linear-lanceolate, lower leaves larger, obovate or oblanceolate-oblong, 4–14 × 1.5–7 cm cuneate or attenuate at base, entire at margins, obtuse or rounded and mucronate at apex, chartaceous, glabrous above, silky hairy beneath; petiole 4–6 mm long; stipules ovate, cordate at base, acuminate at apex, 5–10 × 5–7 mm, leafy, persistent. Racemes

terminal, 15–60 cm long; bracteoles subulate, 2–3 × c. 2 mm, inserted subapically on pedicel. Flowers 2.2–2.5 × c. 1.5 cm. Calyx 1–1.5 cm long, almost glabrous outside; upper 2 lobes large, triangular, acute at apex, 5–6 mm long; lower 3-lobes smaller, linear-lanceolate, acute at apex. Standard broadly ovate, 2–2.5 × 1–1.5 cm, retuse at apex strongly mid-ribbed on back, yellow with a purple tinge; wings obovate, 1.8–2 × 0.7–0.8 cm, yellow; keels falcate, c. 1.6 × 0.6 cm, spirally beaked. Staminal sheath 12–15 mm long. Ovary 6–8 × c. 2 mm, glabrous; style geniculate, 7–8 mm long, stigma minute, pubescent. Pods linear-oblong, 5–6 cm, long short-salked, glabrous, 20–30-seeded. Seeds c. 5 × 4 mm.

Flowering & Fruiting: November–December.

Habitat: Along the forest pathways.

Specimens examined: Jhalda MPCA, Kudagara, 508.83 m, 23.4726 N, 85.93112 E, 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93407 (CAL).

Grona Lour.

Grona heterocarpos (L.) H. Ohashi & K. Ohashi in J. Jap. Bot. 93: 112. 2018. *Desmodium heterocarpon* (L.) DC., Prodr. 2: 337. 1825; Ghora in T.K. Paul & al. (eds.), Fl. West Bengal 2: 108. 2015. *Hedysarum heterocarpon* L., Sp. Pl. 2: 747. 1753. *Desmodium polycarpum* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 227. 1834, ex parte; Baker in Hook.f., Fl. Brit. India 2: 271. 1876, p.p.; Haines, Bot. Bihar Orissa: 264. 1922. *D. polycarpum* Wight & Arn. var. *trichocaulon* (DC.) Baker in Hook.f., Fl. Brit. India 2: 172. 1876; Haines, Bot. Bihar Orissa: 264. 1922.



Herbs, 30–70 cm tall; stems densely appressed pubescent. Leaves 3-foliolate; leaflets 1.5–5 × 1–2.2 cm, cuneate at base, sparsely appressed pubescent to glabrous above, white appressed pubescent beneath; stipels filiform. Inflorescences rachis densely white, straight, appressed hairy; bracts ovate-lanceolate, ciliate, ribbed. Calyx 2-lipped; upper lobes obscurely 2-lobed; lower 3 lobes lanceolate, acuminate, ciliate. Petals violet-bluish, clawed; standard obovate-oblong; wings obovate, auriculate; keel extremely curved, obtuse. Stamens

diadelphous (9+1). Ovary linear, hairy; style curved; stigma capitate. Pods 1.2–2 cm long, with 3–4 segments, hooked hairy.

Flowering & Fruiting: April–November.

Habitat: Dry deciduous forests.

Specimens examined: Jhalda, MPCA, Kudagara, 320.10 m, 23.4717169644474 N, 85.9121610022753 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 93564 (CAL); Jhalda, MPCA, Kudagara, Arar Dungri, 365.90 m, 23.4757240209728 N, 85.9126039780676 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 95012 (CAL).

Grona triflora (L.) H. Ohashi & K.Ohashi in J. Jap. Bot. 93: 117. 2018. *Hedysarum triflorum* L., Sp. Pl. 2: 749. 1753. *Desmodium triflorum* (L.) DC., Prodr. 2: 334. 1825; Baker in Hook.f., Fl. Brit. India 2: 173. 1876; Haines, Bot. Bihar Orissa: 266. 1922; Prain, Bengal Pl. 1: 303. 1963 (Repr.); Ghora in T.K. Paul & al. (eds.), Fl. West Bengal 2: 116. 2015.

Vernacular name: Kudaliya (Bengali, Hindi), Motha (Hindi).

Herbs, prostrate, much branched from rootstock; stems c. 30 cm long, rooting from nodes, appressed-hairy

with white spreading hairs. Leaves 3-foliolate or lower sometimes 1-foliolate; petioles 5–6 mm long; stipules obliquely ovate, acuminate at apex, 3–4 mm long, persistent; leaflets obcordate-obovate, cuneate at base, entire at margins, shallowly retuse and mucronate at apex, 4–10 × 3.5–8 mm, membranous, glabrous above, appressed-hairy below; petiolules to 1.5 mm long, hairy; stipules subulate, 2–2.5 mm long. Flowers solitary or 2–5 in clusters, axillary; bracts ovate-lanceolate,



ciliate, persistent; bracteoles minute; pedicels 3–10 mm long. Calyx 4.5–5 mm long, appressed-hairy; teeth lanceolate, ciliate. Corolla pink to violet; standard broadly obovate, cuneate at base, c. 3 mm long; wings c. 2 mm long; keels c. 4 mm long. Staminal sheath 3.5–4 mm long. Ovary 3.5–4 mm long; style c. 2 mm long, incurved. Pods 5–13 mm long, nearly glabrous except hairy sutures, reticulately veined, 2–5-jointed; joints with straight upper edge and rounded lower edge, c. 2.5 × 2 mm, indehiscent.

Flowering & Fruiting: October–April.

Habitat: On forest beds and grasslands

Specimens examined: Jhalda MPCA, Kudagara, 315.57 m, 23.47223396 N, 85.91261999 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93416 (CAL).

Uses: Plants are used as fodder. Leaves are used in dysentery, diarrhoea and convulsions.

Indigofera L.

Indigofera glabra L., Sp. Pl. 2: 751. 1753. *I. pentaphylla* Murr., Syst. Veg. ed. 13. 564. 1774; Baker in Hook.f, Fl. Brit. India 2: 95. 1876; Haines, Bot. Bihar Orissa 238. 1922; Prain, Bengal Pl. 1: 310. 1963 (Repr.); S.K. Mondal in T.K. Paul & al. (eds.), Fl. West Bengal 2: 136. 2015.



Slender diffusely branched, hairy annual herbs, glabrous or with a few scattered glandless hairs. Leaf rachis up to 3 cm long; leaves imparipinnate, 5 foliolate, opposite, obovate, obtuse, apiculate, 1.5–3 cm long; leaflets elliptic obovate, 6–18 × 2–10 mm, slightly appressed hairy on both surfaces. Racemes short, 2–5-flowered, axillary. Calyx up to 3 mm long, teeth long, setaceous, incised to more than halfway. Corolla red. Pods straight, cylindrical, up to 2.6 cm long, 9–12 seeded.

Flowering & Fruiting: August–April.

Habitat: Commonly found in the sandy soil.

Specimens examined: Jhalda MPCA, Sewati Pahar, 317.72 m, 23.4778739791363 N, 85.9075470082461 E, 07.04.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 93491 (CAL).

Uses: Leaves used as a bitter tonic and febrifuge; also used as an emollient in external applications.

Indigofera linifolia (L.f.) Retz. in Observ. Bot. 4: 29. 1786 & 6: 33, t. 2. 1791; Baker in Hook.f., Fl. Brit. India 2: 92. 1876; Haines, Bot. Bihar Orissa: 237. 1922; Prain, Bengal Pl. 1: 309. 1963(Repr.); Sanyal, Fl. Bankura Distr.: 108. 1994; S.K. Mondal in T.K. Paul & al. (eds.), Fl. West Bengal 2: 137. 2015. *Hedysarum linifolium* L.f., Suppl. Pl.: 331. 1782.

Vernacular name: Bhangra (Bengali), Bhurbhura, Ratnamala, Torki (Hindi).



Herbs, much branched from woody rootstocks. Stems 15–45 cm long, canescent. Leaves simple, subsessile, linear, 5–30 × 2–4 mm, appressed-hairy; stipules subulate, c. 2 mm long. Inflorescences a raceme, axillary, to 2.5 cm long; bracts ovate-lanceolate, 1.3–1.5 mm long; pedicels 0.5–0.8 mm long. Calyx 2.2–2.5 mm long, appressed-hairy, deeply lobed; lobes linear-subulate, c. 1.5 mm long. Corolla bright red, clawed; standard ovate, mucronate at apex, c. 3 × 3 mm, appressed-hairy on back; wings oblong, c. 2 mm long, glabrous; keels 2.5–3 mm long, spurred; spur c. 1 mm long. Stamens diadelphous; staminal sheath c. 2 mm long; anthers apiculate or gland-tipped. Ovary sessile, c. 1 mm long; style glabrous, c. 2 mm long; stigma capitate. Pods ovoid-globose, 2.5–3 × c. 2 mm, appressed silvery-pubescent, 1-seeded; seeds globose, c. 1.5 mm.

Flowering & Fruiting: August–March.

Habitat: On the open grassland and moist localities.

Specimens examined: Jhalda MPCA, Kudagara, 349.35 m, 23.47368596 N, 85.92036998 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93429 (CAL).

Uses: Plant is given in skin eruptions. It is also used for fever.

Millettia Wight & Arn.

Millettia extensa (Benth.) Benth. ex Baker in Hook.f., Fl. Brit. India 2: 109. 1876. *Otosema extensa* Benth. in Miq., Pl. Jungh. 2: 249. 1852. *Millettia auriculata* Baker ex Brandis, Fore. Fl. Ind.: 138. 1874; Baker in Hook.f., Fl. Brit. India 2: 108. 1876; Haines, Bot. Bihar Orissa: 246. 1922; Prain, Bengal Pl. 1: 290. 1963 (Repr.); Thoth. in T.K. Paul & al. (eds.), Fl. West Bengal 2: 187. 2015.

Vernacular name: Gauj, Salangan (Hindi).



Climber, large, robust. Stem and branches terete, woody. Leaves 9–28 cm long; petioles 10–15 cm long; stipules 6–7 mm long, persistent; leaflets imparipinnate, 5–9, terminal leaflet obovate, lateral leaflet oblong-elliptic or lanceolate-oblong, 5.5–12 × 3–9 cm, obtuse to rounded at base entire at margins, acuminate at apex, glabrescent above, hairy beneath; lateral veins 8–12, strong; petiolules 5–7 mm long; stipels linear 3–4 mm long, deciduous. Raceme, 10–25 cm long, usually many, clustered on a stout axillary peduncles, densely

silky. Flowers 1–1.2 cm long, fascicled on rachis; pedicels 3–8 mm long; bracts linear, minute. Calyx 2.5–3 mm long, densely silky, teeth very short. Standard suborbicular, 10–12 mm long, auriculate at base, emarginated at apex, cream-coloured; wing linear-oblong, c. 8 × 3 mm, clawed, cream-coloured; keel obovate c. 8 × 3 mm, clawed, cream coloured. Stamens monadelphous; filaments filiform, unequal in length, c. 1.5 mm long; anthers c. 0.8 mm long, uniform, bearded at base. Ovary appressed-silky c. 6 mm long; style c. 2 mm long. Pods linear-oblong, 10–16.5 × 2–2.5 cm, straight, not septate, hard and woody, golden-brown tomentose, tardily dehiscent, brownish, margins thicken. Seeds 4, each c. 1.5 cm across, orbicular, flattend.

Flowering & Fruiting: March–August.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPC, Kudagara, 399.89 m, 23.4824 N, 85.91018 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92361 (CAL).

Mucuna Adans.

Mucuna pruriens (L.) DC., Prodr. 2: 405. 1825; Baker in Hook.f., Fl. Brit. India 2: 187. 1876; Prain, Bengal Pl. 1: 285. 1963 (Repr.); Ranjan & P.G. Pillai in T.K. Paul & al. (eds.), Fl. West Bengal 2: 163. 2015. *Dolichos pruriens* L., Herb. Amboin.: 23. 1754. *Mucuna prurita* Wight., Bot. Misc. 2: 348. 1831; Haines, Bot. Bihar Orissa: 283. 1922. *Mucuna minima* Haines, Bot. Bihar Orissa: 284. 1922.

Vernacular name: *Alkusi* (Bengali); *Kivach* (Hindi).

Climbing shrub. Stem and branches ribbed, densely pubescent when young. Leaves compound, pinnately 3-foliolate; petioles 7–15 cm long; leaflets ovate-elliptic or ovate-rhomboid, 7–11 × 7–10 cm, truncate or rounded at base, entire at margins, obtuse or retuse and mucronate at apex, finely pubescent more beneath, lateral veins 6 or 7, strong; petiolules 5–10 mm long; stipels subulate, 2–5 mm long. Raceme, axillary, 25–35 cm long. Flowers 8–9 cm long, solitary or 2 or 3 together; bracts lanceolate, 1–1.2 cm long; pedicels 4–6 mm long. Calyx 1.2–1.3 cm



long, clothed with few irritating bristles; lobes unequal, rounded at base, deltoid at apex, acute, upper 2-lobes connate, lowest lobe larger. Standard ovate, 2.1–2.5 × 1–1.5 cm, dark purplish, lower basal portion light purplish-white; wings linear-oblong 4–4.5 × 1.2–1.5 cm long, dark purplish, rounded at apex; keels linear 4–4.5 × c. 0.5 cm, incurved at apex, light purplish-white. Stamens diadelphous (9+1); staminal sheath 4–4.5 cm long curved, whitish; anthers dimorphous, alternate long and short, dorsifixed, dark purplish. Ovary 0.8–1 cm long hairy, greenish-white; style filiform c. 3 cm long, white, stigma capitate, white. Pods J- or S-shaped, 5–10 × 1.2–1.5 cm, turgid, densely covered with ferruginous irritating bristles, brownish, 3–10-seeded. Seeds transversely oblong.

Flowering & Fruiting: August–April.

Habitat: Climbing in the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 328.03 m, 23.47262 N, 85.91642 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92344 (CAL).

Pleurolobus J.St.-Hil.

Pleurolobus gangeticus (L.) J.St.-Hil. ex H.Ohashi & K.Ohashi in J. Jap. Bot. 93: 184. 2018. *Desmodium gangeticum* (L.) DC. var. *maculatum* (L.) Baker in Hook.f., Fl. Brit. India 2: 168. 1876; Haines, Bot. Bihar Orissa: 265. 1922; Sanjappa, Leg. India: 154. 1992; Sanyal, Fl. Bankura Distr.: 122. 1994.

Vernacular name: *Chalani, Salpani* (Bengali), *Dhruva, Dirghamuli* (Hindi).



Herbs, 30–100 cm tall; stems appressed pubescent. Leaves narrowly ovate, 3–11 × 1.5–5 cm, acute or shortly acuminate at apex, coriaceous; stipules ciliate. Inflorescences axillary or terminal panicles; bracts subulate, ribbed, ciliate. Calyx campanulate, pubescent outside, 5-lobed; upper 2 connate almost entire length with very short bidentate lip, lower lobes lanceolate. Petals white, pale pink; standard broadly obovate, emarginate at apex; wings oblong, clawed; keel incurved. Stamens diadelphous (9+1). Ovary shortly stipitate, linear, densely hairy; style short, bent; stigma capitate. Pods linear, 1.2–2.4 × c. 0.2 cm, pubescent, slightly indented on upper suture and deeply indented on lower suture to form 4–8 segments; segments oblong, reticulated on the surface, densely pubescent.

Flowering & Fruiting: March-October.

Habitat: In dry deciduous forest areas.

Specimens examined: Jhalda, MPCA, Kudagara, Arar Dungri, 365.92 m, 23.475705999881 N, 85.912584029138 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95013 (CAL); 322.54 m, 23.4747140016406 N, 85.9093949664384 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95022 (CAL).

Pseudarthria Wight & Arn.

Pseudarthria viscida (L.) Wight & Arn., Prodr. Fl. Ind. Orient. 1: 209. 1834; Baker in Hook. f., Fl. Brit. India 2:154.1876. *Hedysarum viscidum* L., Sp. Pl. 2: 747. 1753. *Desmodium viscidum* (L.) DC. in Prodr. 2: 336. 1825. Haines, Bot. Bihar Orissa 262. 1922; T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 121. 2015.

Vernacular name: Chapakno (Hindi).



Herbs or low shrubs, 60 to 90 cm high. Stems and branches slender, grey tomentose. Leaves 3-foliolate; leaflets rhomboidal to round, 5–9.5 × 4–7 cm, entire, obtuse or acute, bristly above, densely pubescent beneath; petioles 4–5.5 cm long, pubescent; petiolules 1–2 mm long, terminal petiolule 14–16 mm long; stipules 4–5 mm long, lanceolate; stipels 1–2 mm long, pubescent. Racemes up to 5 cm long, rachis glandular pubescent. Flowers solitary or in pairs; bracts 3 mm long, bracteoles 1 mm long,

lanceolate; pedicels 6–7 mm long, very slender, long hairy. Calyx 5-lobed, 3 lobes free, 2 lobes united at base, free only at top, lobes 1–2 mm long, scaly, long woolly outsides. Petals red; standard broad orbicular, 4 × 3 mm, long woolly outsides; wing-petals c. 3 × 2 mm; keel-petals adherent to wings, compressed, 3 × 2 mm. Stamens (9+1), diadelphous, filaments 6 mm long. Ovary 4 mm long, flat, woolly; style 3 mm long, persistent. Pods 10–12 × 5–6 mm, flat slightly hooked hairy, woolly at both joints, not septate inside, 4–5 seeded. Seeds reniform, c. 3 × 2 mm, glabrous, smooth.

Flowering & Fruiting: September–November.

Habitat: On the rocky creeks and hilly slopes, sometimes in shady areas of the forest.

Specimens examined: Jhalda MPCA, Kudagara, 532.36 m, 23.48303396 N, 85.91077597 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93466 (CAL).

Uses: Decoction or powder of roots is used for biliousness, rheumatism, diarrhoea, asthma, cardiac troubles, worms and piles. It is also used as a substitute of the roots of *Pleurolobus gangeticus*.

Spatholobus Hassk.

Spatholobus parviflorus (Roxb. ex G. Don) Kuntze, Revis. Gen. Pl. 1: 205. 1891. *Butea parviflora* Roxb. ex G. Don, Gen. Hist. 2: 373. 1832; Haines, Bot. Bihar Orissa 281. 1922; Prain, Bengal Pl. 1: 401. 1963 (Repr.); Ranjan & P.G. Pillai in T.K. Paul & al. (eds.), Fl. West Bengal 2: 164. 2015. *Spatholobus roxburghii* Benth. in F.A.W. Miquel, Pl. Jungh.: 238. 1852; Baker in Hook.f., Fl. Brit. India 2: 193. 1876.

Vernacular name: Lat-Palash (Bengali), Malini, Nasbel (Hindi).

Climbers, twining, Stem terete, woody. Leaves compound, alternate, pinnately trifoliolate; petioles 3.5–

19 cm long swollen at base; leaflets

imparipinnate,

terminal leaflet rhomboid, lateral

leaflet broadly ovate, 6–17.5 × 4–11.5 cm,

cuneate and lateral ones asymmetric at base, entire at

margins, acute to acuminate at apex,

pubescent at both surfaces; petiolules 5–

7 mm long, swollen. stipels linear, 3–4 mm long,

deciduous. Raceme large terminal and axillary panicles.

Flowers c. 8–10 mm long; pedicels 1–1.5

mm long; bracts orbicular, 2–3 mm, densely hairy. Calyx 6–8 mm, divided to middle into lanceolate teeth, densely pale pubescent. Standard obovate 3.5–4 × 3–4 mm long, cream-coloured, densely silky; wing oblong, 2–3 × 1–1.5 mm, cream-coloured, silky; keel oblanceolate or oblong 1.5–2 × 1 mm, cream-coloured. Stamens monadelphous; filaments filiform c. 1–1.5 mm long, anthers c. 1mm. Pods oblong not septate, 6.5–11 × 2–3.2 cm, brownish-pink, margins thickened, velvety roundish at apex flat with a orbicular terminal end.



mm long; bracts

orbicular, 2–3 mm, densely hairy. Calyx 6–8 mm, divided to middle into lanceolate teeth, densely pale pubescent. Standard obovate 3.5–4 × 3–4 mm long, cream-coloured, densely silky; wing oblong, 2–3 × 1–1.5 mm, cream-coloured, silky; keel oblanceolate or oblong 1.5–2 × 1 mm, cream-coloured. Stamens monadelphous; filaments filiform c. 1–1.5 mm long, anthers c. 1mm. Pods oblong not septate, 6.5–11 × 2–3.2 cm, brownish-pink, margins thickened, velvety roundish at apex flat with a orbicular terminal end.

Flowering & Fruiting: January–March.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 533.08 m, 23.48048 N, 85.91465 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92383 (CAL).

Vigna Savi

Vigna hainiana Babu, Gopin. & S.K. Sharma in Bull. Bot. Surv. India 27: 15. 1985 (1987); P. Singh & al., End. Vas. Pl. India: 194. 2015. *Phaseolus calcaratus* auct. non Roxb. 1832: Haines, Bot. Bihar Orissa 288. 1922.



Twining hirsute herbs; stems, petioles and peduncles clothed with deflexed, greyish or greyish-brown hairs. Leaves 3-foliolate; petioles 5–7 cm long; stipules elliptic-ovate, 8–10 × 3–4 mm, ciliate, hairy; leaflets asymmetric, ovate-deltoid, 5–10 × 4–5.5 cm, acuminate at apex, obtuse at apex, appressed long-hairy; stipels linear-lanceolate. Inflorescences axillary racemes, long peduncled; peduncles 8–15 cm long. Calyx 2-lipped, 5-toothed. Petals yellow; standard suborbicular, base appendaged; wings shorter than standard; keel subequal to wings, incurved, without horn. Stamens diadelphous. Ovary many ovuled; style filiform; stigma oblique. Pods linear, cylindrical, 1–2.2 cm long, setosely hairy; 6–12-seeded; seeds brown.

Flowering & Fruiting: August–November.

Habitat: Dry deciduous forests. Endemic.

Specimens examined: Jhalda, MPCA, Kudagara, Arar Dungri, 371.46 m, 23.4760299604386 N, 85.9127449616789 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95007 (CAL).

Zornia J.F.Gmel.

Zornia gibbosa Span. in *Linnaea* 15:192. 1841; Baker in Hook. f., *Fl. Brit. India* 2: 147. 1876, p.p.; Prain, *Bengal Pl.* 1: 146. 1963 (Repr.); Sanyal, *Fl. Bankura Distr.*: 114. 1994; T.K. Paul & al. (eds.), *Fl. West Bengal* 2: 64. 2015.



Diffuse or prostrate annual herbs. Leaves 2-foliolate; leaflets 8–25 × 2–8 mm, ovate or lanceolate, apex acute, apiculate, base rounded, punctate, petiole to 1.5 cm long; stipules 5–8 mm long, lanceolate, peltate, acuminate at both ends, punctate. Inflorescence terminal or axillary, bracteate racemes, 4–8 cm long; bracts peltate, 5–11 × 3–4 mm, ovate-lanceolate, acute, ciliated along margin, gland-dotted. Calyx c. 3 mm long: lobes subequal, membranous. Petals yellow, sometimes with red stripes; standard orbicular-cordate; wings obovate-obtuse; keels curved, oblong-obtuse, connate at base. Stamens monadelphous; anthers dimorphic. Ovary pubescent. Pods with 4–6-articulate, c.1.3 cm long, strongly reticulate with retrorsely barbed bristles.

Flowering & Fruiting: September–January.

Habitat: On shady localities and on grassland.

Specimens examined: Jhalda MPCA, Kudagara, 321.52 m, 23.47256899 N, 85.913169 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93566 (CAL).

FABACEAE: CAESALPINOIDEAE

Cassia L.

Cassia fistula L., Sp. Pl. 1: 377. 1753; Baker in Hook.f., Fl. Brit. India 2: 261. 1878; Haines, Bot. Bihar Orissa: 302. 1922; Prain, Bengal Pl. 1: 314. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 143.1994; T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 9. 2015.

Vernacular name: Amaltas (Bengali).



Trees, c. 8 m high, deciduous. Leaves compound, paripinnate, 25–40 cm long; stipules linear, caducous, pubescent; rachis pubescent; petioles 3–6 cm long; rachis and petioles eglandular; leaflets 4–8 pairs, (sub) opposite, broadly ovate or ovate-oblong, 5–12 × 2–6 cm, cuneate to obtuse at base, entire at margins, acute or acuminate at apex, glossy, glabrous above, pubescent beneath; lateral veins many; petiolules 0.5–1 cm long. Racemes many-flowered, to 50 cm long, pendulous, lax; bracts ovate, 7–9 mm long, caducous. Sepals ovate-elliptic, 8–10 × 4–6 mm, velutinous outside,

caducous, light green. Petals subequal, obovate, 2.5–2.8 × 1.4–1.7 cm, short-clawed, veined, bright yellow. Stamens 10 (3+4+3), antheriferous; lower 3 larger with C or G-shaped, curved, filaments 4–6 mm long, anthers c. 2 mm long; upper 3 short with 4.5–5 cm long straight filaments and minute anthers, dorsifixed; median 4 with 10–12 mm long straight filaments and 3–4 mm long anthers; anthers opening by apical pores. Carpel 4–4.5 cm, ovary appressed-pubescent. Pods cylindrical, 30–50 × 1–2.5 cm, beaked, pendulous, smooth, shining, brown-black, indehiscent, many-seeded; seeds broadly ovate, c. 8 × 7 mm, horizontally immersed in a dark-coloured pulp and completely separated by transverse partitions, brownish.

Flowering & Fruiting: April–July.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 531.96 m, 23.48031 N, 85.91455 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92386 (CAL); 346.30 m, 23.47529504 N, 85.91543798 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93451 (CAL).

Chamaecrista Moench

Chamaecrista pumila (Lam.) V. Singh in J. Econ. Taxon. Bot. 16: 600. 1992; V. Singh, Monogr. Ind. Cassiinae: 84, t. 15. 2001; T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 12. 2015. *Cassia pumila* Lam., Encycl. 1: 651. 1785; Baker in Hook.f, Fl. Brit. India 2: 266. 1878; Prain, Bengal Pl. 1: 315. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 146. 1994.



Herbs, 20–40 cm tall; stems appressed pubescent. Leaves 2–5 cm long; rachis hairy; petioles short; stipules 3–8 mm long, acuminate, ciliate, with longitudinal nerves; leaflets 2–5 × 0.5–1.25 mm, obtuse and mucronate at apex, ciliate at margins, obliquely truncate at base, chartaceous, mid nerve excentric. Flowers solitary or 2–3 in short raceme; pedicels short, pubescent; bracts stipule-like; bracteoles linear. Sepals ovate-oblong, 3.5–5 mm long, acute or acuminate, pubescent outside, membranous. Petals 5, yellow, obovate, 4–8 mm long; clawed. Stamens 5; filaments short. Ovary appressed hairy; style somewhat 4-gonous; stigma truncate or punctiform, ciliate. Pods strap-shaped, 0.5–3 cm long, flat, pubescent; seeds 5–10, oblong or obovate-oblong.

Flowering & Fruiting: August-October.

Habitat: Dry deciduous forests.

Specimens examined: Jhalda, MPCA, Kudagara, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 93586 (CAL).

Phanera Lour.

Phanera vahlii (Wight & Arn.) Benth. in Miq., Pl. Jungh.: 263. 1852; Sanyal, Fl. Bankura Distr.: 148. 1994. T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 16. 2015. *Bauhinia vahlii* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 297. 1834; Baker in Hook.f., Fl. Brit. India 2: 279. 1878; Haines, Bot. Bihar Orissa: 310. 1922.

Vernacular name: Chihurlata (Bengali), Mahu, Malian (Hindi).

Climbers/lianas, large with tendrils. Shoots and young parts clothed with fulvous- or rusty-tomentose, stem woody. Leaves suborbicular, 12.5–21.5 × 15–23 cm, deeply cordate at base, entire at margins, 1/5–1/3 bifid their length into broadly obtuse at apex, lobes entire at margins, obtuse at apex, veins 11–15 from base, prominent beneath, rigidly subcoriaceous, glabrous or nearly so above, persistently densely tomentose beneath; petioles 6–16 cm long brownish tomentose.

Racemes subcorymbose, terminal, dense, long-peduncled; Flowers 3–4.5 cm across; receptacle tubular, slender, 6–8 mm long, densely villous; pedicels 2–4 cm long; bracts linear-spathulate, 3–4 mm long, ferruginous-hairy; bracteoles 2, sub-opposite, linear, densely ferruginous-hairy, persistent. Calyx 1–1.2 cm long, splitting into 2 ovate lobes. Petals obovate with crisped margins, 1.5–2 cm long, densely villous on back, white. Fertile stamens 3; filaments c. 3 cm long, white, shortly connate at base, villous at base, anthers oblong c. 5 mm long, reduced stamens 2 shorter than the fertile stamens; staminodes 3–5. Ovary densely tomentose; style c. 2 mm long, hairy; stigma c. 1 mm in diameter, capitate. Pods oblong, 21–23 × 5–9 cm, compressed, woody, densely pubescent, brown, dehiscent, 7–13-seeded; seeds ovate to orbicular, 2–3.5 × 1–2 cm, compressed, shallowly notched near hilum, dark brownish.



Flowering & Fruiting: August–March.

Habitat: On dry deciduous forests.

Specimens examined: Jhalda MPCA, Kudagara, 370.63 m, 23.47345797 N, 85.92137204 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93433 (CAL).

Uses: Seeds are eaten raw or fried; when ripe they taste like cashew nuts.; leaves are used for thatching and for making umbrella.

Senna Mill.

Senna occidentalis (L) Link, Handb. 2: 140. 1831; T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 22. 2015. *Cassia occidentalis* L. Sp. Pl. 1: 377. 1753; Baker in Hook.f., Fl. Brit. India 2: 262. 1878; Prain, Bengal Pl. 1: 314. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 144. 1994.

Vernacular name: *Kalkashunda* (Bengali), *Kasunda*, *Bari kasondi* (Hindi).



Erect subshrubs up to 2 m tall. Leaves up to 22 cm long; leaflets 4-5 pairs, 2.5–7 x 1.5–3.5 cm, ovate-lanceolate, apex acute or acuminate, base rounded, glabrous or pubescent; rachis to 18 cm long with a sessile, hemispherical gland at base; stipules 4–7 mm long, linear-lanceolate, acuminate, caducous. Flowers c. 2 cm across, in terminal and axillary racemes, to 3 cm long: pedicels 0.8–1.2 cm long: bracts linear lanceolate. Sepals 6–10 mm long, ovate, obtuse, mucronate. Petals 5, yellow, 1–1.5 cm long, obovate. Stamens 10, unequal, only 7 fertile. Pods 5–9 x 0.6–0.8 cm, linear, compressed; seeds 20-25, 4-5x 3–4 mm, ovate or suborbicular, compressed, brown.

Flowering & Fruiting: July–December.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 363.82 m, 23.480826 N, 85.909904 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93522 (CAL).

Senna tora (L.) Roxb., Fl. Ind. 2: 340. 1832; T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 24-25. 2015. *Cassia tora* L., Sp. Pl. 1: 376. 1753; Baker in Hook.f., Fl. Brit. India 2: 263. 1873, p.p.; Haines, Bot. Bihar Orissa: 304. 1922; Prain, Bengal Pl. 1: 314. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 145. 1994.

Vernacular name: Panevar, Chakunda (Bengali), Panevar (Hindi); Chakoara (Santal).



Herbs, to 1 m high. Leaves 7–10 cm long; stipules linear-subulate, 1–1.5 cm long, caducous; rachis 2.5–4 cm long, grooved; glands subulate, between each of 2 lower pairs of leaflets, c. 2 mm long; petioles 1.5–4 mm long; petiolules 1.5–2 mm long; leaflets 3 pairs, obovate-oblong, obliquely cuneate-rounded at base, entire at margins, obtuse, broadly rounded or retuse and apiculate at apex, c. 2.5 × 1.5–2.5 cm, glabrous above, glaucous, appressed-pubescent below.

Flowers usually in pairs, subsessile, axillary, crowded towards apex; peduncles 5–10 mm long; bracts linear, 2–3 mm long; pedicels 4–10 mm long. Sepals ovate, subequal, 4.5–5 × 2–4 mm. Petals obovate, short-clawed, obtuse or rounded at apex, unequal, 8–10 × 5–6 mm, bright yellow. Fertile stamens 7 (3 larger, 4 smaller), nearly equal, poricidal; filaments 1.5–2 mm long; anthers 1.5–2.5 mm long; staminodes 3. Ovary densely pubescent. Pods shortly stipitate, linear, terete or subtetragonous, 12–20 × 0.4–0.5 cm, much curved when young, obliquely septate; seeds 15–30, uniseriate, rhombohedral, 3–4 mm long, brown.

Flowering & Fruiting: August–December.

Habitat: Along the forest pathways and in the open areas.

Specimens examined: Jhalda MPCA, Kudagara, 337.18 m, 23.47498398 N, 85.91526599 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93449 (CAL).

Uses: Leaves and seeds are used against ringworm and itch. Leaves are used as aperients.

Tamarindus Tourn. ex L.

Tamarindus indica L., Sp. Pl. 1: 34. 1753; Baker in Hook. f., Fl. Brit. India 2: 273. 1878; Prain, Bengal Pl. 1: 320. 1963 (Repr.); Haines, Bot. Bihar Orissa 311. 1922; Sanyal, Fl. Bankura Distr.: 149. 1994; T.K. Paul in T.K. Paul & al. (eds.), Fl. West Bengal 2: 25. 2015.

Vernacular name: Tentul (Bengali), Imli (Hindi).



Evergreen trees. Leaves 2.5–16 cm long, paripinnate; leaflets 10–20 pairs, oblong, obtuse, opposite, glabrescent, 1.2–1.8 × 0.3–0.5 cm. Stipules linear, caducous. Flowers in 10–15-flowered lax racemes at end of short lateral branchlets; calyx 1.2 cm long, tube turbinate, 2 lowest teeth connate; three upper petals developed, yellow with red veins, 0.8–1.5 cm long, two lower reduced to filamentous scales; stamens monadelphous, 3, perfect. Pods 8–15 cm long, about 2.5 cm wide, curved, linear, compressed, with thin crustaceous epicarp, indehiscent, 3–10-seeded.

Flowering & Fruiting: March–August.

Habitat: Commonly grown in villages, along roads, in abandoned places.

Specimens examined: Jhalda, MPCA, Sewati, 321.67 m, 23.4747200366109 N, 85.9091020189225 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95054 (CAL).

FABACEAE: MIMOSOIDEAE

Acacia Mill.

Acacia auriculiformis A. Cunn. ex Benth., London J. Bot. 1: 377. 1842; Haines, Bot. Bihar Orissa: 330. 1922; Sanyal, Fl. Bankura Distr.: 158. 1994; K.L. Maity & S. Murmu in T.K. Paul & al. (eds.), Fl. West Bengal 2: 27. 2015.

Vernacular name: Akashmani (Bengali).



Trees, 5–8 m high; unarmed, bark smooth, white. Branchlets slightly angular, glabrous, glaucous. Phyllodes simple, alternate, sickle shaped or falcate-oblong, 8–14.5 × 1.4–3.5 cm, attenuate at base, entire at margin, acute to rounded at apex, laterally compressed with 3 prominent sub-parallel principal veins, glabrous, glossy; petioles 3–7 mm long, glabrous. Inflorescences elongated spikes, axillary, 3.5–7 cm long, slender. Flowers 2–2.5 mm across. Calyx 0.5–0.6 mm long, minutely toothed. Petals 5, lanceolate, 2–3 × 0.5–1 mm, spreading, yellow. Stamens numerous; filaments 3–4 mm, basally united. Ovary subsessile, globose, c. 1 mm, pubescent; style c. 4 mm long. Pods 5–10 × 1–1.5 cm, spirally twisted, hard, woody much twisted with outer edge often sinuate, 4–6 seeded. Seeds oval or roundish, 5–6 × 4–5 mm, glossy smooth, brownish, attached with a linear long yellowish funicle.

Flowering & Fruiting: November–March.

Habitat: Commonly grown in the forest, along roads.

Specimens examined: Jhalda MPCA, Kudagara, 345.96 m, 23.47155 N, 85.90927 E, 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93411 (CAL); 365.83 m, 23.47652097 N, 85.91076298 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95001 (CAL).

Albizia Durazz.

Albizia lebbek (L.) Benth. in London J. Bot. 3: 87. 1844, *p.p.* 'lebbek'; Baker in Hook. f., Fl. Brit. India 2: 298. 1878; Prain, Bengal Pl. 1: 461. 1963 (Repr.); K.L. Maity & S. Murmu in T.K. Paul & al. (eds.), Fl. West Bengal 2: 35. 2015. *Mimosa lebbek* L., Sp. Pl. 1: 516. 1753.

Vernacular name: *Shiris* (Bengali), *Woman's tongue* (English), *Saras* (Hindi).



Deciduous trees; to 25 m high; bark 20–25 mm thick, surface yellowish-brown, rough, deeply fissured, exfoliating in irregular semi brittle scales. Leaves bipinnate, alternate, pinnae 1–4 pairs, 5.5–12 cm long, slender, glabrous, opposite, even pinnate, leaflets 8–20, opposite, even pinnate, petiolule to 1 mm long, a gland in between each leaflets, 2.7–5 × 1–2.5 cm, obliquely oblong, base of one half cuneate, other round, apex obtuse, margin entire, glabrous above

and slightly pubescent beneath, coriaceous; midrib towards distal margin, stipules small, free, lateral, cauducous; rachis 7–9 cm long, slender, grooved above, with a gland at its base, glabrous, pulvinate; lateral nerves 6–8 pairs, pinnate, slender, prominent, intercostae reticulate. Flowers bisexual, greenish-white, in subglobose heads, 3.5–3.7 cm long, solitary or 2–4 together in axillary corymbose racemes; peduncle 6–8 cm; bracts linear, cauducous; pedicels to 3 mm. Calyx tube funnel-shaped pubescent, 3–4.5 × 1.5–3 mm, teeth triangular. Petals united infundibuliform 7–10 mm long, greenish, lobes 5, lanceolate. Stamens many, filaments long exserted, green or pink; anthers very small. Ovary sessile, glabrous, style 2.5 cm, filiform; stigma minute. Fruit a pod 20–30 × 4–5 cm, flat, oblong, compressed, straw coloured, base and apex obtuse, turgid above the seeded region; seeds 8–12, 6–10 × 5–8 mm, ovate, dull dark brown, flattened.

Flowering & Fruiting: January–September.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 339.24 m, 23.47587397 N, 85.90704602 E, 8.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93501 (CAL).

Mimosa L.

Mimosa pudica L. Sp. Pl. 1: 518 1753; Baker in hook. F., Fl. Brit. India 2: 291. 1878; Prain, Bengal Pl. 1: 329. 1963 (Repr.); S.N. Biswas in T.K. Paul & al. (Eds.), Fl. West Bengal 2: 44-45. 2015.

Vernacular Name: *Lajjabati*
(Bengali).

Semi-prostrate, prickly course herb, or subshrub up to 0.5 m tall; root cylindrical, tapering rependant, with secondary and tertiary branches, varying in length up to 2 cm thick, surface more or less rough or longitudinally wrinkled; grayish-brown to brown, cut surface of pieces pale yellow, fracture hard, woody, bark-fibrous; odor, distinct; taste, slightly astringent; stem up to 2.5 cm in diameter; sparsely prickly, covered with long, weak bristles longitudinally grooved, external surface light



brown, internal surface grey, bark fibrous; easily separable from wood; leaf digitately compound with one or two pairs of sessile, hairy pinnae, alternate, petiolate, stipulate, linear lanceolate; leaflets 10–20 pairs, 0.6–1.2 cm long, 0.3–0.4 cm broad, sessile, obliquely narrow or linear oblong; obliquely rounded at base, acute, nearly glabrous; yellowish green; flower Pink, in globose head, peduncles prickly; calyx very small; corolla pink, lobes 4, ovate oblong; stamens 4, much exserted; ovary sessile; ovules numerous; fruit a lomentum, simple, dry, 1–1.6 cm long, 0.4–0.5 cm broad, with indehiscent segments and persistent sutures having two to five seeds with yellowish spreading bristle at sutures, 0.3 cm long, glabrous, and straw colored; seed compressed, oval-elliptic, brown to gray, 0–0.3 cm long, 2.5 mm broad, with a central.

Flowering & Fruiting: March–November.

Habitat: On dry deciduous forest floors.

Specimens examined: Jhalda MPCA, Kudagara, 322.31 m, 23.47714199 N, 85.90688199 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93553 (CAL).

Senegalia Raf.

Senegalia pennata (L.) Maslin, Nuytsia 22(6): 466. 2012. *Mimosa pennata* L., Sp. Pl. 1: 522. 1753; Prain, Bengal Pl. 1: 459. 1963 (Repr.). *Acacia pennata* (L.) Willd., Sp. Pl. 4: 1090. 1806; Baker in Hook.f., Fl. Brit. India 2: 297. 1878, p.p.; Haines, Bot. Bihar Orissa: 326. 1922; K.L. Maity & S. Murmu in T.K. Paul & al. (Eds.), Fl. West Bengal 2: 30. 2015.

Vernacular name: Undaru (Santhal).



Scandent shrub, armed with numerous stout straight or slightly hooked prickles or rarely small trees; branches yellowish tomentose, more or less 5-angled. Leaves bipinnate, 8 – 12 cm long; petiole gland oblong, below middle of petiole; rachis with gland between upper pairs of pinnae; pinnae 8–14 pairs, 3–5 cm long; leaflets 40–50 pairs, crowded, mucronate at tip, ciliate at margin, obliquely round or truncate at base, 5 × 0.8 mm. Panicle 10–15 cm long. Heads up to 1.3 cm across, white or yellowish. Calyx campanulate, 1.5–2.5 mm long. Corolla 2–3 mm long. Pods strap-shaped, flat, stalked, horned at apex, 15–20 × 1.8–3 cm; seeds 8–14, ovoid-oblong, compressed, dark brown.

Flowering & Fruiting: June-February.

Habitat: Dry deciduous forests.

Specimens examined: Jhalda MPCA, Sewati, 321.93 m, 23.4771389700472 N, 85.9068910405039 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 93542 (CAL).

Uses: Bark is used for tanning, bark and pounded seeds are used as fish poison.

Vachellia Wight & Arn.

Vachellia nilotica (L.) P.J.H. Hurter & Mabb. subsp. **indica** (Benth.) Kyal. & Boatwr. in Bot. J. Linn. Soc. 172: 515. 2013. *Acacia nilotica* (L.) Willd. ex Delile subsp. *indica* (Benth.) Brenan in Kew Bull. 12: 84. 1957; K.L. Maity & S. Murmu in T.K. Paul & al. (eds.), Fl. West Bengal 2: 29. 2015. *A. arabica* (Lam.) Willd. var. *indica* Benth. in Hook., Lond. J. Bot. 1: 500. 1842. *A. arabica auct. non* (Lam.) Willd., 1806; Baker in Hook.f, Fl. Brit. India 2: 293. 1878; Haines, Bot. Bihar Orissa 324. 1922; Prain, Bengal Pl. 1: 458. 1963 (Repr.).

Vernacular name: Babul (Hindi), Babla (Bengali).



Deciduous trees; young branches pubescent; stem blackish-grey to brown with lenticels. Leaves up to 10 cm long; stipular spines 1–5 cm long, straight, white; rachis grey-pubescent, with a cup shaped gland at base of lowest, and generally also at the uppermost pair of pinnae; pinnae 5–7 pairs, up to 4 cm long; leaflets 7–25 pairs, subsessile, glabrous, obtuse at apex, 5 × 1.2 mm. Flowers in axillary peduncled globose heads, bright-yellow, 1 cm across; peduncle up to 3 cm long. Calyx campanulate. Corolla 2–3

lobes densely ciliate. Pods conspicuously stalked, up to 12 cm long, persistently grey pubescent, moniliform, 8–12 seeded.

Flowering & Fruiting: August-April.

Habitat: On dry deciduous forests and roadsides.

Specimens examined: Jhalda, MPC, Sewati, 321.93 m, 23.4771389700472 N, 85.9068910405039 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93552 (CAL).

Uses: The gum produced by the tree, though called ‘gum arabic’, is actually not so, the true ‘gum arabic’ being the product of *A. Senegal* Willd. Babul gum used for calico printing and dyeing, as sizing material for silk and cotton, and in paper industry; used also as a substitute for ‘gum arabic’. Pods used as fodder.

FLACOURTIACEAE

Casearia Jacq.

Casearia tomentosa Roxb., Fl. Ind. 2: 421. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 2: 593. 1879; Haines, Bot. Bihar Orissa: 39. 1921.

Vernacular name: *Churchu* (Santal).



Large shrubs or small trees, 5–10 m high; branchlets densely tomentose. Leaves oblong, obliquely subcuneate to rounded at base, serrulate or often nearly entire at margins, acute to subacuminate at apex, 7–17 × 2–5 cm, thin-coriaceous, minutely tomentose and densely so on midrib above, densely tomentose below; petioles to 1.5 cm long, tomentose; stipules minute, caducous. Flowers in axillary clusters on new shoots, 7–8 mm across, greenish-white; pedicels 3–4 mm long, jointed below; buds tomentose. Sepals 5, broadly ovate to elliptic, c. 3 mm long, green, pubescent, persistent. Petals absent. Stamens 6–10, alternating with staminodes, basally connate to form a short tube; staminodes 1.2–1.5 mm long, pubescent at apex; ovary 1-loculed, ovules many, parietal; style c. 1.5 mm long; stigma subglobose. Capsules broadly ellipsoid, 6-angular, 2–2.5 cm long, green, 3-valved; seeds numerous with scarlet aril.

Flowering & Fruiting: March–May.

Habitat: On the hilly slopes in dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 316.63 m, 23.471723 N, 85.91046098 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93413 (CAL).

Gentianaceae

Canscora Lam.

Canscora diffusa (Vahl) R. Br. ex Roem. & Schult., Syst. Veg. ed. 15, 3: 301. 1818; C.B. Clarke in Hook.f., Fl. Brit. India 4: 103. 1883; Haines, Bot. Bihar Orissa: 565. 1922; Prain, Bengal Pl. 2: 524. 1963 (Repr.); Sanyal, Fl. Bankura Distr. 271. 1994; Ranjan in Ranjan & al. (eds.), Fl. West Bengal 3: 436. 2016. *Gentiana diffusa* Vahl, Symb. Bot. 3: 47. 1794. *Canscora tenella* Wight, Icon. Pl. Ind. Orient. 4: 7, t. 1327. 1850. *C. diffusa* (Vahl) R. Br. var. *tenella* (Wight) C.B. Clarke in Hook.f., Fl. Brit. India 4: 103. 1883; Haines, Bot. Bihar Orissa: 569. 1922.

Vernacular name: *Bhuin neem* (Hindi).

Annual, 12–60 cm high, diffusely branched from above base. Stems angular, narrowly margined. Leaves simple, opposite; lower ones obovate, ovate or oblong-lanceolate, 0.5–5 × 0.3–2.2 cm, attenuate or narrowed at base into a short petiole, entire at margins, acute or shortly acuminate at apex; upper most ones smaller and passing into bracts, 3–5-veined at base. Cymes diffusely branched; pedicels quadrangular, 0.5–2 cm long, narrowly winged. Calyx tube 3–6 mm long, not winged, ribbed, 4-lobed; lobes linear-lanceolate, long-acuminate at apex, 1–2 mm long. Corolla



salverform, pink; tube as long as calyx, 4-lobed; lobes of upper lip oblong. Stamens 4; uppermost stamen c. 2.5 mm long; lower 3, c. 1.5 mm long. Ovary c. 4 mm long; style 2.5–3 mm long; stigma oblong-orbicular, 2-lamellate; lobes obtuse. Capsules linear-ovoid to oblongoid, 3–7 × 1–1.5 mm. Seeds many, c. 2 mm long, angular.

Flowering & Fruiting: Almost throughout the year.

Habitat: On damp localities and near the water logged areas and along streams.

Specimens examined: Jhalda MPCA, Kudagara, 340.68 m, 23.48110403 N, 85.90970602 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93481 (CAL).

LAMIACEAE

Anisomeles R.Br.

Anisomeles indica (L.) Kuntze, Revis. Gen. Pl. 2: 512. 1891; Haines, Bot. Bihar Orissa: 745. 1922; V.S.Kumar & Arti Garg in Lakshmin. & al. (eds.), Fl. West Bengal 4: 346. 2019. *Nepeta indica* L., Sp. Pl. 2: 571. 1753. *Anisomeles ovata* R. Br. in W.T. Aiton, Hortus Kew. ed. 2, 3: 364. 1811; Hook.f., Fl. Brit. India 4: 672. 1885; Prain, Bengal Pl. 2: 637. 1963 (Repr.).

Vernacular name: *Gobura, gopali, abang; Kala Bhangra* (Hindi).



Herbs, 1–1.5 m high. Stems acutely 4-angular, grooved on opposite sides, much-branched, densely soft-pubescent. Leaves broadly ovate, truncate, rounded or subcordate at base, rarely cuneate, acute at apex, 3–10 × 3–8 cm, pubescent; petioles 1–3 cm long, densely hairy. Flowers sessile, borne in few to many flowered verticillasters, the whorls distant below, approximate above in a spicate inflorescence; bracts linear, 4–6 mm long, pilose. Calyx campanulate, 5-lobed, 10-nerved, 5–6 mm long, hirsute, accrescent to

1 m in fruit; lobes equal, triangular-lanceolate, 2–3 mm long. Corolla 1.5 cm long, light purple; tube to 8 mm long; upper lip, flat, to 6 mm long, glabrous; lower lip much longer, 3-lobed, with midlobe laterally compressed and notched, to 1.2 cm long, sericeous outside. Stamens 4, straight, exserted; filaments to 1.2 cm; anthers of upper pair 2-celled, lower pair 1-celled. Ovary 0.5 mm; style slender, 2-fid; stigma lobes equal, subulate. Nutlets ovoid, sub compressed, black when ripe, 1.5–1.8 mm long.

Flowering & Fruiting: September–March.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 407.65 m, 23.47380096 N, 85.92581897 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93442 (CAL).

Uses: Plant is used as astringent and carminative. Oil extracted from the plant is useful in uterine affections.

Colebrookea Sm.

Colebrookea oppositifolia Sm., Exot. Bot. 2: 111, t. 115. 1805; Hook.f., Fl. Brit. India 4: 642. 1885; Haines, Bot. Bihar Orissa: 741. 1922; Prain, Bengal Pl. 2: 636. 1963 (Repr.). Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 323. 2019.

Vernacular name: *Bhamber, Bhirmoli* (Hindi).



Shrubs, 4–6 m high; branches stout, grooved, soft white-tomentose, swollen at nodes. Leaves oblong-lanceolate, acute at base, crenate or serrulate at margins, acute or acuminate at apex, 12–24 × 4–8 cm, soft-pubescent; petioles 2–4 cm long. Flowers in verticillasters, paniculate spike, terminal or axillary, unisexual; spikes slender, 5–10 cm long; bracts linear, minute, pubescent; sometimes a whorl of bracteoles present at the base of spike. Calyx 5-partite; lobes free, subulate, c. 0.8 mm long, feathery. Corolla tubular, c. 0.3 × 0.2 mm, white, 5-lobed (2+3); lobes imbricate; upper lobe broad, c. 1.5 mm across, pubescent

outside. Stamens 4, projecting straight forward, exserted; filaments to 3 mm long; anthers c. 0.4 mm long, 2-celled. Pistillode included. Ovary c. 0.3 mm long, hairy at apex; style gynobasic, c. 2 mm long, exserted; stigma 2-fid. Staminodes 4, minute, included. Disk subentire. Nutlets erect, basilar.

Flowering & Fruiting: November–June.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 489.55 m, 23.47258 N, 85.92855 E, 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93409 (CAL).

Coleus Lour.

Coleus strobilifer (Roxb.) A.J.Paton in PhytoKeys 129: 100. 2019. *Plectranthus strobilifer* Roxb., Hort. Bengal.: 45. 1814. *Anisochilus carnosus* (L.f.) Wall. ex Benth. in Wall., Pl. Asiat. Rar. 2: 18. 1830; Hook.f., Fl. Brit. India 4: 627. 1885; Haines, Bot. Bihar Orissa: 733. 1922. *Lavandula carnososa* L.f., Suppl. Pl.: 273. 1782.

Vernacular name: Panjiri (Hindi).



Herbs, 30–60 cm high; stems obtusely 4-angled, fleshy, glabrous or appressed-hairy, dull pinkish red. Leaves broadly ovate, rounded or subcordate at base, crenate-serrate at margins, subacute or obtuse at apex, 2–6 × 4–6 cm, glabrous above, densely scabrid below, rather fleshy; petioles 0.6–6.6 cm long, puberulous. Panicles diffusely branched; spikes subglobose to oblong-ovoid, 1.5–5 cm long; bracts broadly ovate, truncate at base. Calyx tubular, 5-lobed; tube variable in length, to 4 mm long in flower, to 7 mm long in fruit, glabrous or pubescent outside with minute hairs; upper lip deltoid-lanceolate, to 2.5 × 2 mm, erect in flower but deflexed in fruit; lower lip reduced. Corolla to 1.5 cm long, pinkish purple; tube truncate, c. 5 mm long, 5-lobed; lobes distinctly bilabiate (4+1); upper lip entire, c. 2.5 mm long; lower lip concave or boat-shaped, c. 4.5 mm long, pubescent outside. Stamens 4, declinate; filament pairs 3 and 4 mm long; anthers c. 0.5 mm long. Ovary c. 1.5 mm long; style branches subequal, glabrous. Nutlets c. 1 mm in diam., compressed, dark brown.

Flowering & Fruiting: October–November.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 341.02 m, 23.481157 N, 85.90977601 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93478 (CAL).

Uses: Plant extract is given in liver disorders also used after mixing with sugar-candy for cough and cold.

Hyptis Jacq.

Hyptis suaveolens (L.) Poit., Ann. Mus. Hist. Nat. 7: 472, t. 29, f. 2. 1806; Hook.f., Fl. Brit. India 4: 630. 1885; Haines, Bot. Bihar Orissa: 736. 1922; Prain, Bengal Pl. 2: 633. 1963 (Repr.). V.S. Kumar & Arti Garg in Lakshmin. & al. (Eds.) Fl. West Bengal 4: 303. 2019. *Ballato suaveolens* L., Syst. Nat. ed. 10: 1100. 1759.

Vernacular names: *Wilayati tulsi* (Hindi).

Herbs, 0.5–1 m high. Stems much-branched,

conglutated, patently hirsute. Leaves simple, opposite, broadly ovate or ovate-lanceolate, 1.5–8 × 1–6.2 cm, cordate to rounded at base, irregularly crenate-serrate to serrulate or double serrate at margins, subacute or acute at apex, pubescent on both surfaces, more so on veins beneath; petioles 0.3–5.5 cm long. Flowers in verticillasters or in short-stalked cymes, or both, 2–6-flowered, axillary; pedicels to 1 cm long. Calyx campanulate; tube 6–8 mm long, 10-ribbed, 5-lobed or toothed; lobes or teeth subequal, subulate or linear, 2–4 mm long,



acuminate. Corolla 6–8 mm long, blue or blue-purple; tube c. 4 mm long, 5-lobed; lobes sub-bilabiate (2+3); upper lip erect, c. 3 mm long; lower lip deflexed, saccate, short, bifid, membranous, finely hispid outside, pubescent beneath the stamens inside. Stamens 4, didynamous, declinate, descending into the lower lip, partly exerted; filaments c. 3 mm long, bearded; anthers c. 1 mm long, 2-celled. Ovary c. 1 mm long, one lobe slightly smaller; style gynobasic, c. 4.5 mm long; stigma minutely bifid. Disk anteriorly developed. Nutlets 2, ovoid or oblong, c. 4 × 2–2.5 mm, apically emarginated, with a white V-shaped attachment scar, brownish red.

Flowering & Fruiting: September–May.

Habitat: Along forest edges and in open areas.

Specimens examined: Jhalda MPCA, Kudagara, 321.97 m, 23.47186 N, 85.9118 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92305 (CAL).

Leucas R.Br.

Leucas decemdentata (Willd.) Sm. in A. Rees, Cycl. 20(2): 6. 1812; V. Singh, Monogr. Indian Leucas: 67, t. 10. 2001. V.S. Kumar & Arti Garg in Lakshmin. & al. (eds.), Fl. West Bengal 4: 352. 2019. *Leucas mollissima* Wall. ex Benth. in Wall., Pl. Asiat. Rar. 1: 62. 1830; Hook.f., Fl. Brit. India 4: 682. 1885; Prain, Bengal Pl. 2: 640. 1963 (Repr). *L. montana* (Roth) Spreng. var. *mollissima* (Wall. ex Benth.) Haines, Bot. Bihar Orissa: 748. 1922.



Herb or undershrub, perennial, 30–70 cm high; rootstocks woody. Stems 4-angular, erect, branched, densely retrorsely appressed-hairy. Leaves simple, opposite, ovate or ovate-oblong, 1–5.5 × 0.5–4 cm, cuneate to rounded at base, broadly and bluntly serrate at margins, obtuse to acute at apex, villous-tomentose on both surfaces, more so on lower surface; petioles 0.3–2 cm long, tomentose.

Verticillasters distant, in leaf axils, 8–12-flowered. Flowers 1.2–1.5 cm long; bracts linear, 2–3 mm long, villous. Calyx tubular or cupular, 7–8 × c. 3 mm, straight; teeth 10, triangular, mucronulate, 0.5–1.2 mm long, pubescent to densely pilose. Corolla 1–1.5 cm long, white; tube 7–8 mm long, puberulant near throat outside; upper lip straight or somewhat falcate, 4–5 mm long, densely white-bearded; lower lip 7–9 mm long; middle lobe largest. Stamens 4, didynamous; filaments 2–3 mm long; anthers c. 0.5 mm long, dorsifixed. Style shortly 2-lobed. Nutlets trigonous, 1.5–2 × c. 1 mm.

Flowering & Fruiting: November–February.

Habitat: On shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 472.91 m, 23.48267597 N, 85.91069802 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93468 (CAL).

LOGANIACEAE

Mitrasacme Labill.

Mitrasacme pygmaea R.Br., Prodr. Fl. Nov. Holland.: 453. 1810; Lakshmin. in Ranjan & al. (eds.), Fl. West Bengal 3: 431. 2016. *Mitrasacme pygmaea* var. *malaccensis* (Wight) H. Hara, J. Jap. Bot. 30: 24. 1955; N.P. Singh & al. (eds.), Fl. Bihar Anal.: 316. 2001. *M. malaccensis* Wight, Icon. Pl. Ind. Orient.: 1601. 1850. *M. polymorpha* auct. non R. Br. 1810: C.B. Clarke in Hook.f., Fl. Brit. India 4: 80. 1883, p.p.

Erect, annual herb, to 15 cm. Stems terete, densely white-hirsute in lower part. Leaf pairs spaced, upper 2 pairs rosulate at base of inflorescence; leaves ovate-elliptic, obtuse



or subacute at apex, hirsute along margin, cuneate at base, sub-glabrous to densely hirsute above and on midvein beneath, 5–8 × 2–3 mm. Inflorescences terminal, umbellate-paniculate, to 12 cm long; peduncle long, terete or grooved. Bracts oblong-lanceolate, ciliate along margin and midvein beneath, to 3 mm long; pedicels *c.* 4.5 mm in flower, to 1.3 cm in fruit. Calyx conical-campanulate, 1.4–2.5 mm long; lobes triangular. Corolla urceolate-campanulate, white, 3–5 mm long; lobes rounded. Filaments 1.5–2.5 mm long. Stigma 2-lobed, Capsule globular, 1.2–1.5 mm across, with styles remaining connate at apical part. Seeds angular-ellipsoid, warty.

Flowering & Fruiting: September–October.

Habitat: In wet places.

Specimens examined: Jhalda, MPCA, Kudagara, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93576 (CAL).

LORANTHACEAE

Dendrophthoe Mart.

Dendrophthoe falcata Blume in Roem. & Schult., Syst. Veg., ed. 15 bis 7(2): 1730. 1830; P.P. Ghosal in Lakshmin. & al. (eds.), Fl. West Bengal 4: 471. 2019. *Loranthus falcatus* L.f., Suppl. Pl.: 211. 1782. *Loranthus longiflorus* Desr. in Lam., Encycl. 3: 598. 1792; Hook.f., Fl. Brit. India 5: 214. 1886, Prain, Bengal Pl. 2: 682. 1963 (Repr.).
Vernacular name: *Banda* (Hindi).

Shrubs, hemiparasitic with haustoria, bearing surface runners; branches usually glabrous, greyish brown. Leaves simple, alternate or subopposite, elliptic-oblong, obovate or ovate



-lanceolate, 8–15 × 4.5–8 cm, cordate to rounded at base, entire at margins, obtuse or acute to obtuse at apex, coriaceous; petioles 5–8 mm long. Inflorescence a raceme, axillary, 3–8 cm long, to 50-flowered; pedicels 2–5 mm long; bracts cupular, c. 1 mm long, oblique, acute. Flowers 5-merous, 3–4 cm long; mature floral buds bright orange or red or orange-yellow with a dark green band below constriction. Sepals adnate to ovary, c. 1 mm long, entire or obscurely toothed. Petals bright orange, red or

orange-yellow, united into a tubular; tube c. 2.5 cm long, terete, ventricose, 5-lobed; lobes oblong, 1–1.2 mm long, reflexed. Stamens 5, adnate to corolla tube; filaments to 2 cm long, bright red; anthers 3–5 mm long, yellow. Ovary c. 3 mm long; style exserted, c. 2.5 cm long, slightly enlarged below stigma, reddish brown. Drupes ellipsoid, c. 1 × 0.5 cm, crowned by persistent calyx, pink. Seed solitary.

Flowering & Fruiting: November–March.

Habitat: Hemi-parasite on dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 359.18 m, 23.47140298 N, 85.91669803 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92354 (CAL).

Uses: Bark is used to heal wound and to cure menstrual problems.

LYTHRACEAE

Ammannia L.

Ammannia baccifera L. Sp. Pl. 1: 120. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 2: 569. 1879; Haines, Bot. Bihar Orissa: 379. 1922; Prain, Bengal Pl. 1: 363. 1963 (Repr.); T. Mathew & M.P. Nayar in T.K. Paul & al. (eds.), Fl. West Bengal 2: 348. 2015.

Vernacular name: *Dadmari, Banmarich* (Bengali, Hindi).

Herbs, 50–60 cm high, woody at base. Leaves opposite or sometimes alternate above, sessile, linear-oblong or oblong-lanceolate, narrowed at base, subacute or obtuse at apex, 1.5–7 × 0.5–1.5 cm, glabrous. Flowers in dense cymose clusters, axillary, 4 or 5-merous, minute; pedicels c. 1 mm long; bracts filiform, shorter than pedicels. Flower buds 4 or 8-angled. Hypanthium broadly campanulate or obconic, 1.2–1.5 mm long. Sepals broadly triangular, acute at apex, 0.8–1 mm long, colour. Petals absent. Stamens 4 or 5; filaments c. 0.5 mm long. Ovary 4-(or 5)-loculed; style to 0.5 mm long. Capsules depressed-globose, 1.5–2 mm across, slightly longer than calyx-tube, imperfectly circumscissile above middle, brownish red; seeds sub-hemispherical, c. 0.3 mm long, excavated on a plane face, red.



Flowering & Fruiting: November–April.

Habitat: On damp, moist localities and near streams and on grassland.

Specimens examined: Jhalda MPCA, Kudagara, 332.17 m, 23.47311398 N, 85.91150402 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93460 (CAL); Jhalda MPCA, Kudagara, 321.93 m, 23.47712103 N, 85.90689297 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93551 (CAL).

Uses: Leaves are used in the cure of skin infections; plant-extract is used against typhoid and bronchial tuberculosis.

Lagerstroemia L.

Lagerstroemia parviflora Roxb., Pl. Coromandel 1: 47, t. 66. 1795; C.B. Clarke in Hook.f., Fl. Brit. India 2: 575. 1879; Haines, Bot. Bihar Orissa: 375. 1922; Prain, Bengal Pl. 1: 366. 1963 (Repr.); T. Mathew & M.P. Nayar in T.K. Paul & al. (eds.), Fl. West Bengal 2: 350. 2015.

Vernacular name: Bakli, Dhaura, Sidi (Hindi).



Trees, 15–20 m high, deciduous; younger branches slightly pubescent; bark smooth, white. Leaves broadly elliptic-oblong, cuneate at base, entire at margins, obtuse or retuse and apiculate at apex, 3–8 × 1.5–3.5 cm, thin-coriaceous, shiny above, glaucous below; petioles 4–5 mm long. Raceme or panicle, 6–20 cm long, axillary; flower buds globose, 2–3 cm, puberulent; bracts elliptic-oblong, leafy; bracteoles 2; pedicels 0.5–1.5 cm long. Calyx cup-shaped, minutely puberulent, smooth, 4-lobed; lobes triangular, 4–5 mm long, equal to tube. Petals orbicular, undulate, 4–6 mm, white; claw c. 4 mm

long. Stamens numerous, inserted at base of calyx-tube. Ovary globose, glabrous; style bent, 6–7 mm long. Capsules oblong-ellipsoid, 1.5–3 × 0.8–1.5 cm, glabrous; stalks 2.5–5 cm long, rounded at apex; fruiting calyx 7–10 mm long; seeds 1.2–1.6 cm long.

Flowering & Fruiting: August–April.

Habitat: In dry deciduous forest, planted or escaped.

Specimens examined: Jhalda MPCA, Kudagara, 350.39 m, 23.47503796 N, 85.91680197 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93600 (CAL); 379.68 m, 23.47610196 N, 85.91005697 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93456 (CAL).

Uses: Leaves used as fodder; wood is used in construction.

Woodfordia Salisb.

Woodfordia fruticosa (L.) Kurz, J. Asiat. Soc. Bengal 40: 56. 1871; Haines, Bot. Bihar Orissa: 374. 1922; T. Mathew & M.P. Nayar in T.K. Paul & al. (Eds.), Fl. West Bengal 2: 355–356. 2015. *Lythrum fruticosum* L., Syst. Nat. ed. 10: 1045. 1759. *Woodfordia floribunda* Salisb., Parasd. Lond.: t. 42. 1806; C.B. Clarke in Hook.f., Fl. Brit. India 2: 572. 1879; Prain, Bengal Pl. 1: 364. 1963(Repr.).

Vernacular name: Dhawai (Hindi).

Shrubs, 3–5 m high, straggling; branches long, spreading; bark smooth, brown, peeling off in fibres; young shoots terete, finely white-pubescent. Leaves

opposite or subopposite, linear-lanceolate, rounded or subcordate at base, acute or subacuminate at apex, 5–9 × 1.2–2.5 cm, finely grey-pubescent below. Flowers numerous, 1.2–2 cm long, brilliantly scarlet; pedicels short; glandular-pubescent. Hypanthium long-tubular, 1.2–1.5 cm long, striate, dotted, oblique at mouth. Calyx curved, dilated towards apex, oblique at mouth, ribbed, gland-dotted, tube scarlet or red, 6-lobed; lobes ovate, 2–2.5 mm long, alternating with short appendages. Petals 6, subulate, slightly longer than calyx-teeth. Stamens 12 of two different lengths, inserted below middle of hypanthium, declinate. Ovary sessile, oblongoid, 2-loculed; ovules many, axile; style filiform. Fruits ellipsoid, c. 1 cm long, included within calyx, dry, thin-walled, irregularly breaking; seeds narrowly cuneate-obovoid, c. 0.8 mm long, smooth, brown.



Flowering & Fruiting: January–May.

Habitat: Along streams or on shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 408.63 m, 23.47380901 N, 85.92561998 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93441 (CAL).

Uses: A natural dye is prepared from the floral parts; Dried fruits and flower-buds are used in bowel complaints. Wood is used for making axe-handles and also as fuel.

MALVACEAE

Abelmoschus Medik.

Abelmoschus crinitus Wall., Pl. Asiat. Rar. 1: 39, t. 44. 1830; T.K. Paul in B.D. Sharma & Sanjappa (eds.), Fl. India 3: 302, t. 84. 1993; Sanyal, Fl. Bankura Distr.: 57. 1994; T.K. Paul, Fl. West Bengal 1: 287. 1997. *Hibiscus cancellatus* Roxb., Fl. Ind. 3: 201. 1832; Mast. in Hook.f., Fl. Brit. India 1: 342. 1874; Haines, Bot. Bihar Orissa: 64. 1921; Prain, Bengal Pl. 1: 181. 1963 (Repr.)



Herbs, 60–90 cm tall. Leaves palmately 3–5-lobed, broadly ovate, orbicular, 6–11 × 7–11 cm, cordate at base, 9-nerved from the base; lobes triangular, c. 3 × 2 cm, acute at apex, crenate-dentate at margins, hirsute with simple and stellate-bristle hairs; petioles 6.5–12 cm long, hirsute; stipules filiform, 2–4 cm long, hairy. Flowers solitary, axillary in terminal or axillary racemes by reduction of upper leaves; pedicels 1–3 cm long, shorter than petioles. Epicalyx 10–15, connate at base, large, linear, 2.5–4 cm long,

ciliate at margins, sparsely stellate-hairy, persistent. Calyx 3–4 cm long, pubescent; lobes ovate-oblong. Corolla large, yellow, tinged dark purple at base. Petals 5, broadly obovate, 4–9 × 2–4 cm. Staminal column c. 2 cm long, antheriferous all through. Styler branches 5; stigmas dark violet, capitate. Capsules ovoid-oblong or globose, 2–4.5 × 2–3.5 cm, short acuminate at apex, densely hirsute, 5-valved.

Flowering & Fruiting: October–December.

Habitat: On hill slopes.

Specimens examined: Jhalda, MPCA, West Bengal–Jharkhand Border, Kudagara, 434.11 m, 23.4843112193149 N, 85.9109840896416 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95052 (CAL).

Hibiscus L.

Hibiscus lobatus (Murray) Kuntze, Revis. Gen. Pl. 3(2): 19. 1898; Prain, Bengal Pl. 1: 182. 1963(Repr.); T.K. Paul, Fl. West Bengal 1: 297. 1997.



Erect annual herb, erect, 50–70 cm tall. Branchlets hairy. Stipules lance-like, to 3 mm, villous; petiole as long as or slightly longer than leaf blade. Leaf blade is membranous, dimorphic - blades on proximal part of stem ovate-circular, 1.5–3 cm, those in middle 3-parted, to 5 cm, on distal part of stem nearly divided or 3-foliate, margin roundly dentate. Flowers in few-flowered terminal heads, white to pale yellow, 1-2 cm in diameter. Epicalyx absent. Calyx 5–7 mm long; lobes shorter than the capsule, Sepal-tube cup-shaped, to 4 mm, membranous, lobes 5, lanceolate, abaxially pilose and strigose, persistent. Flowers white or yellow; petals 0.6–0.7 cm. Staminal column to 0.4 cm. Styles 5, extending. Capsule broadly ovoid, 7 mm, apex beaked; mericarps 5, endocarp thin, villous along ventral suture. Seeds with scalelike hairs.

Flowering & Fruiting: July–January.

Habitat: On shady areas in dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 330.23 m, 23.47594103 N, 85.90762102 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93593 (CAL).

Sida L.

Sida acuta Burm.f., Fl. Ind. (N. L. Burman) : 147. 1768; Haines, Bot. Bihar Orissa: 61. 1921; T.K. Paul in B.D. Sharma & Sanjappa (eds.), Fl. India 3: 281, t. 76. 1993; Prain, Bengal Pl. 1: 175. 1963 (Repr.); T.K. Paul, Fl. West Bengal 1: 308. 1997.

Vernacular name: Baraira (Hindi), Kureta (Santhali).

Herb, erect or ascending, 20–80 cm high; branches terete, slender, minutely stellate-pubescent and sparsely with simple hairs when young, glabrescent later. Leaves simple, alternate, oblong-lanceolate to linear-lanceolate, 2–8.5 × 0.6–4 cm, subacute, obtuse or rounded at base, serrate or dentate at margins, acute or subacuminate at apex, sparsely stellate-hairy, becoming glabrescent soon; petioles 3–6 mm long, stellate-pubescent; stipules in pairs, 5–12 × 1–1.5 mm; each pair different with one linear



to lanceolate, 3–6-veined and another linear to filiform 1–4-veined stipules. Flowers solitary or 2 or 3 together in clusters, axillary, c. 1.5 cm across; pedicels jointed above middle, accrescent, 0.5–1 cm long (longer in fruits), stellate-pubescent. Calyx campanulate, 5–8 mm long, divided almost half-way down, 5-lobed; tube c. 4 mm long; lobes triangular, sharply acute, to 3.5 mm long. Petals obliquely obovate, to 1 cm long, ciliate at base, truncate to emarginate at apex, yellow. Staminal column to 3 mm long, antheriferous towards apex. Ovary ovoid, c. 1 mm across, 5 or 6-loculed; style c. 5 mm long. Schizocarps globose, to 5 mm, wrinkled, glabrous; mericarps 6–10, tetrahedral, to 5 mm long, toothed on dorsal margins, reticulated, 2-awned; awns c. 3 mm long, glabrous, dehiscing apically. Seeds trigonous, 1.5–2 mm long, smooth, dark brown.

Flowering & Fruiting: September–May.

Habitat: Along forest edges and in open grassland and along roads.

Specimens examined: Jhalda MPCA, Kudagara, 324.31 m, 23.47258 N, 85.91397 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92324 (CAL).

Sida cordata (Burm.f.) Borss.Waalk., *Blumea* 14: 182. 1966; T.K. Paul in B.D. Sharma & Sanjappa (eds.), *Fl. India* 3: 283, t. 77. 1993; T. K. Paul in *Fl. West Bengal* 1: 309. 1997. *Melochia cordata* Burm.f., *Fl. Ind. (N. L. Burman)*: 143. 1768. *Sida veronicifolia* Lam., *Encycl.* 1: 5. 1783; Haines, *Bot. Bihar Orissa*: 59. 1921. Prain, *Bengal Pl.* 1: 175. 1963 (Repr.). *S. humilis* Cav., *Diss.*: 5, t. 134, f. 2. 1788; Mast. in Hook.f., *Fl. Brit. India* 1: 322. 1874.

Vernacular name: Bonaniyar (Hindi).



Herb, prostrate or ascending. Stems branched, terete with scattered long patent hairs, simple and minute stellate hairs. Leaves simple, alternate, orbicular to ovate, 0.7–2.5 × 1–2.7 cm, cordate at base, serrate or crenate-dentate at margins, acute, acuminate or rounded at apex, 5–7-veined at base, hairy on both surfaces; petioles 0.5–2.5 cm long, hairy; stipules filiform, 1–5 mm long, hairy. Inflorescence a raceme, axillary, few-flowered, either by development of accessory buds or by reduction of upper leaves. Flowers 6–8 × c. 10 mm; pedicels 1–1.2 cm long, hairy. Epicalyx

absent. Calyx campanulate, 5–6 mm long, 5-lobed; lobes triangular, ciliate at margins, acuminate at apex, 1-veined, hairy outside, glabrous inside. Petals obovate, 4–5 × c. 4 mm, yellow. Staminal column 3–4 mm long; filaments 1–1.5 mm long. Carpels 4–5 mm long; ovary ovoid or globular, c. 1 × 1 mm; style c. 1.5 cm long, slender; stigma 5-fid, 2–2.5 mm long. Schizocarps subglobose, c. 4 × 3 mm, enclosed in persistent calyx, brownish black; mericarps 5, c. 4 × 2 mm, slightly longitudinally keeled on the back, tetrahedral with rounded angles, awn-less. Seeds c. 2 × 1 mm, glabrous, dispersed by withering of wall, brownish black.

Flowering & Fruiting: August–September.

Habitat: On forest beds and in the shady places.

Specimens examined: Jhalda MPCA, Kudagara, 364.94 m, 23.48104997 N, 85.90989302 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93539 (CAL).

Sida cordifolia L., Sp. Pl. 684. 1753; Hook. F., Fl. Brit. India 1: 324. 1874; Prain, Bengal Pl. 1: 175. 1963 (Repr.); T.K. Paul in Fl. West Bengal 1: 309. 1997.

Vernacular name: *Berela* (Bengali), *Kharinta*, *Barial* (Hindi).

Erect, branched subshrubs to 1.5 m tall; stem green, densely tomentose with minute stellate and spreading simple hairs. Leaves simple, alternate, 1.5–5.5 × 1–3.5 cm, ovate, rarely suborbicular, apex subobtusate or acute, base cordate, margins serrate to the base; basally 3–5 nerved, densely stellate-tomentose beneath with simple hairs on nerves and soft tomentose above; petiole to 3.5 cm long, pubescent; solitary or aggregated terminally in to congested corymbiform inflorescence; pedicel to 3 mm long in flower, to 1.2 cm in



fruits, articulated above the middle. Calyx 6–7 mm long, prominently 10-ribbed, densely tomentose without. Petals to 8 × 6 mm, yellow, obliquely obovate, apex truncate or slightly emarginated. Staminal column c. 3 mm long. Ovary subglobose, pubescent; styles 8–10; stigma capitate, yellow. Schizocarp 6–7 mm diam., pubescent towards apex; mericarps 8–10, to 3 × 2 mm, trigonous with acute angles, apically 2-awned; seeds brownish or black.

Flowering & Fruiting: Throughout the year.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 325.94 m, 23.47224 N, 85.91258 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92319 (CAL); 322.96 m, 23.47232298 N, 85.91253298 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93580 (CAL); 336.07 m, 23.47224 N, 85.91731 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92345 (CAL).

Thespesia Sol. ex Corrêa

Thespesia lampas (Cav.) Dalzell & A. Gibson, Bombay Fl.: 19. 1861; Mast. in Hook.f., Fl. Brit. India 1: 345. 1874; Haines, Bot. Bihar Orissa: 70. 1921; Prain, Bengal Pl. 1: 184. 1963(Repr.); T.K. Paul in Fl. West Bengal 1: 311. 1997.

Vernacular name: *Jangli-bhendi, Bankapas* (Bengali), *Jangli bhindi* (Hindi).



Shrubs, 0.5–2.5 m high; stems densely stellate-tomentose, glabrescent on maturity. Lower leaves large, suborbicular, cordate at base, 6–12 cm across, deeply 3–5-lobed; lobes deltoid, acuminate at apex; upper leaves smaller, broadly ovate to oblong, shallowly cordate to rounded at base, entire at margins, acute to acuminate at apex, 5–12 × 2–22 cm, stellate-hairy above, densely stellate-tomentose below, 5–7-nerved at base; midrib raised below with a nectar at base; nectar linear, 3–7 mm long; petioles 0.5–15 cm long; stipules linear to subulate, 5–10 mm long, stellate-hairy.

Flowers solitary, axillary, or 1–5 in long-stalked racemes by reduction of upper leaves; pedicels 4–8 mm long, slightly accrescent, jointed above middle; hypanthium obconic, 2.5–6 × 5–7 mm. Epicalyx 4–6-lobed, free, subulate, 0.4–1 cm long, stellate-hairy. Calyx 6–8 mm long, slightly accrescent, 5-lobed; lobes subulate-triangular, stellate-hairy outside, sericeous inside at base. Corolla campanulate to infundibuliform; petals obovate, rounded at apex, 6–7 cm × 5–6 cm, stellate and glandular-hairy outside. Staminal column 1.5–2 cm long. Ovary conical, densely hairy, 5-loculed; style 1, undivided with a ribbed or lobed sigma. Capsules globose to ovoid, 5-angular, 1.8–3 × 1.8–2 cm, stellate-hairy, black, usually dehiscent; seeds 8–14 per locule, obovoid, angular, 3.5–4 mm long, densely hairy, black.

Flowering & Fruiting: August–December.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 465.20 m, 23.48390702 N, 85.91216099 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95042 (CAL).

Uses: Stems yield a fiber which is useful for fabrics, cordage and fishing nets. Roots and fruits are used for treating gonorrhoea and syphilis. Floral parts are used against cutaneous diseases.

Urena Dill. ex L.

Urena lobata L., Sp. Pl. 2: 692. 1753; Mast. in Hook.f., Fl. Brit. India 1: 329. 1874; Haines, Bot. Bihar Orissa: 62. 1921; Prain, Bengal Pl. 1: 228. 1963 (Repr.); T.K. Paul in B.D. Sharma & Sanjappa (eds.), Fl. India 3: 380, t. 109. 1993; Sanyal, Fl. Bankura Distr.: 54. 1994; T.K. Paul in Fl. West Bengal 1: 312. 1997.

Vernacular name: *Bon-okhra* (Bengali), *Bachita*, *Lapetua* (Hindi).

Herbs or undershrubs, perennial, to 1.5 m high, suffruticose, much-branched, stellate-hairy. Leaves polymorphic; upper ones ovate to oblong-lanceolate, sometimes rhomboid, variously lobed, rounded at base, crenate-serrate at margins, obtuse or acute at apex, 1–12 × 0.5–13 cm, 3–9-nerved at base; leaves in middle orbicular in outline, cordate at base, angular, palmilobed, palmatifid or palmatiparted; lower leaves orbicular, shallowly incised; petioles 6–12 mm long; stipules lanceolate, 2–4 mm long. Flowers axillary, solitary or 2 or 3 clustered together;



pedicels not jointed, 1–3 mm long in flower, elongated for 4–5 mm in fruit. Epicalyx 7–8 mm long, enveloping the calyx and shortly adnate to it; lobes linear-lanceolate, 3–5 mm long, minutely stellate-hairy outside. Calyx 5–6 mm long, divided half-way down; lobes ovate, to 3 mm long. Petals obovate, irregularly toothed or entire, 1.5–1.8 cm long, stellate-hairy outside. Staminal column usually bend; anthers purple. Styles divided from about middle into 10 arms; stigmas dark purple. Mericarps globose, 2.5–3.5 mm, glochidiate, glabrescent, brown; seeds reniform 2–3 mm across, brown, pubescent, glabrescent.

Flowering & Fruiting: October–December.

Habitat: In dry deciduous forests.

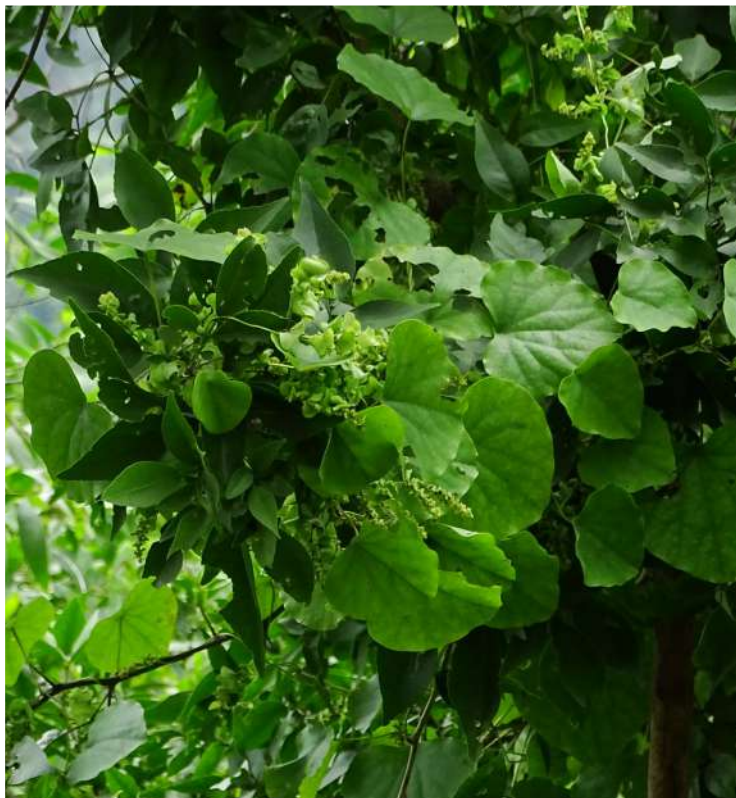
Specimens examined: Jhalda, MPCA, Kudagara, Arar Dungri, 336.98 m, 23.4748369641602 N, 85.9122950211167 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95017 (CAL).

MENISPERMACEAE

Cissampelos L.

Cissampelos pareira L., Sp. Pl. 2: 1031. 1753; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 103. 1872; Haines, Bot. Bihar Orissa: 16. 1921.

Vernacular name: Tejomela (Santal).



Climbers, herbaceous. Stems densely to sparsely pubescent to glabrous. Leaves ovate to orbicular, rounded, truncate or cordate at base, entire at margins, obtuse or slightly notched and with a mucro, to 7 × 5.5 cm, sparsely pubescent or puberulous above, tomentose to pubescent below, palmately 5–7-nerved; petioles 2–8 cm long, densely to sparsely pubescent, peltate. Male inflorescences: subcorymbose peduncled cymes of 2–4 cm long, solitary or a few in fascicles, axillary. Male flowers: green to yellowish on 1.2 mm long pedicels; sepals 4, obovate, 1.2–1.5 mm long, pilose

outside; petals 4, connate into a cupuliform corolla, c. 0.5 mm long, puberulous outside; stamens 4, connate in a peltate synandrium of 0.7–0.8 mm long. Female inflorescences: thyrse-like, to 16 cm long, composed of a pseudo-raceme of fascicles; bracts suborbicular, to 1.8 mm long, puberulous, accrescent; pedicels 1–1.5 mm long; sepal 1, broadly obovate, 1.2–1.5 mm long; petal 1, broadly cuneate-obovate, 0.7–0.75 mm long; staminode absent; ovary c. 0.5 mm long, pilose; style glabrous; stigma divaricately 3-lobed. Drupes obovoid with a basal stylar scar, c. 5 mm long, red; seeds horseshoe-shaped.

Flowering & Fruiting: August–October.

Habitat: On shady localities in dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 371.16 m, 23.47656003 N, 85.91100102 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95004 (CAL).

Uses: Leaf juice is used as refrigerant; also applied to eczema. Roots are laxative and demulcent, also used for bilious dyspepsia, rheumatism and stomach-ache in children.

MORACEAE

Artocarpus J.R.Forst. & G.Forst.

Artocarpus lacucha Buch.-Ham. in Mem. Wern. Nat. Hist. Soc. 5: 333. 1826; Sanyal, Fl. Bankura Distr.: 406. 1994; G.K. Upadhyay & A.A. Ansari in Lakshmin. & al. (eds.), Fl. West Bengal 4: 639. 2019. *Artocarpus lakoocha* Roxb., Fl. Ind. 3: 524. 1832; King in Hook.f., Fl. Brit. India 5: 543. 1888; Haines, Bot. Bihar Orissa: 824. 1924; Prain, Bengal Pl. 2: 729. 1963 (Repr.).

Vernacular name: *Dephal*, *Dahu* (Bengali), *Lakuch* (Hindi).

Trees, 10–15 m tall; branchlets softly greyish tomentose. Leaves elliptic, oblong or ovate, rounded at base, entire at margins, cuspidate at apex, 10–18 × 6–10 cm, glabrous and shining above, softly pubescent below; lateral nerves 8–12 pairs; petioles 1–2.5 cm long; stipules lanceolate, 1–1.2 cm long. Receptacles short-peduncled, pubescent; bracteoles peltate. Male receptacles oblongoid or globose, 1–2.5 cm in diam., orange-yellow. Male flowers: Perianth 2 or 3-lobed; lobes triangular, puberulous; stamen 1, 0.5–0.8 mm long; anther 0.1–0.2 mm long. Female receptacles irregularly subglobose. Syncarps ± globose, lobulate, c. 7 cm in diam., velvety, yellow when ripe; seeds oblongoid, 1–1.2 cm long.



Flowering & Fruiting: March–July.

Habitat: In dry deciduous forest.

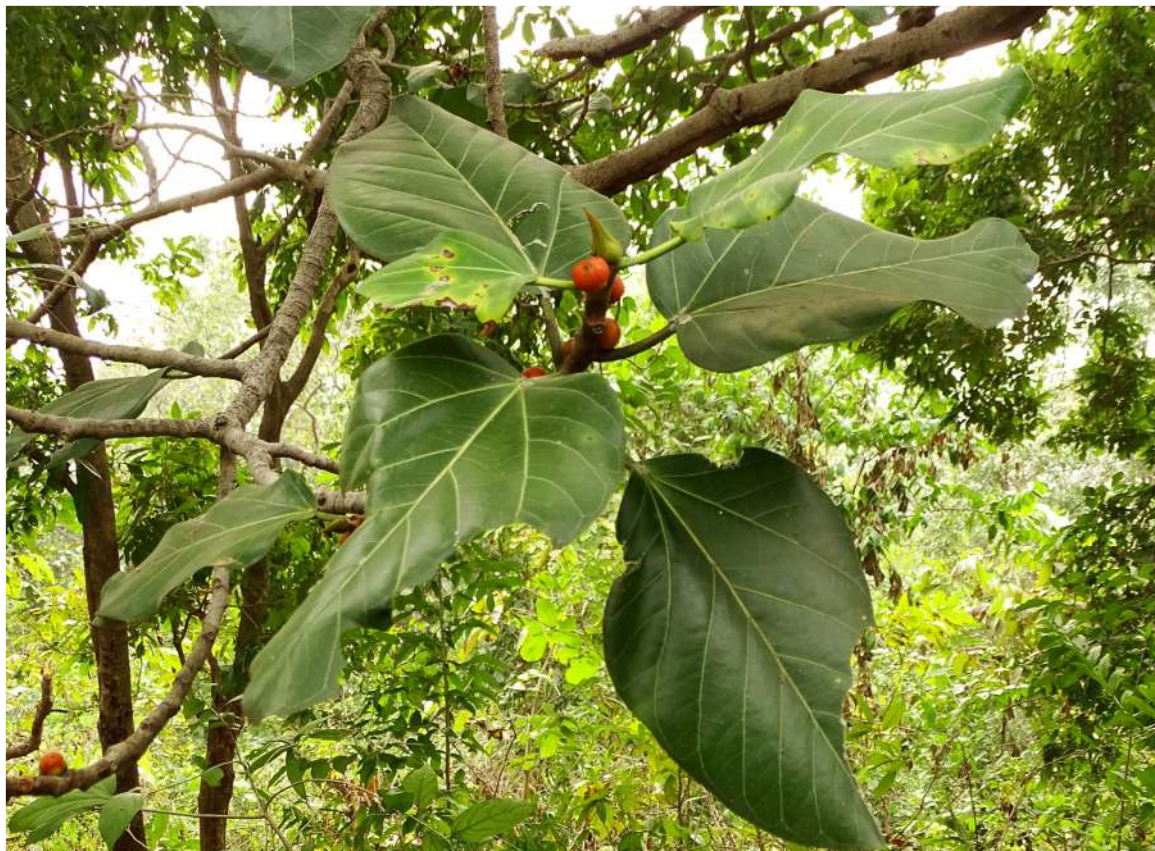
Specimens examined: Jhalda MPCA, Kudagara, 331 m, 23.480711 N, 85.90953997 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93487 (CAL).

Uses: Leaves are eaten by cattle. Unripe fruits are used as vegetable; ripe ones eaten fresh or preserved in syrup; seeds are eaten after roasting or boiling; wood is used in making furniture.

Ficus Tourn. ex L.

Ficus benghalensis L., Sp. Pl.: 2: 1059. 1753; King in Hook.f., Fl. Brit. India 5: 499. 1888; Haines, Bot. Bihar Orissa: 834. 1924; Prain, Bengal Pl. 2: 735. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 408. 1994; G.K. Upadhyay & A.A. Ansari in Lakshmin. & al. (eds.) Fl. West Bengal 4: 639. 2019.

Vernacular name: *Bat* (Bengali), *Barh* (Hindi).



Trees, to 18 m high with numerous aerial roots from branches forming additional props, well-branched. Leaves simple, alternate, ovate, 13.5–21 × 10.5–15 cm, subcordate or rounded at base, entire at margins, obtuse to acute or bluntly apiculate at apex, glabrous and shiny above, finely puberulous beneath when young, 3-veined at base; lateral veins 5 or 6 pairs, raised beneath; petioles 2–3.5 cm long, glabrous; stipules ovate-lanceolate, 2–2.5 cm long. Figs solitary or in axillary pairs, sessile, globose or subglobose, 1.5–2 cm in diam., finely pubescent, greenish turning reddish on maturity; basal bracts 3, rounded, c. 5 mm. Male flowers numerous near ostiole; tepals 4, free; stamen 1. Gall flowers: perianth as in male; style short. Female flowers: perianth shorter than male.

Flowering & Fruiting: May and December–January.

Habitat: In dry deciduous forest and along the roads.

Specimens examined: Jhalda MPCA, Kudagara, 497.15 m, 23.4799 N, 85.91367 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92389 (CAL).

NYCTANTHACEAE

Boerhavia Vaill. ex L.

Boerhavia diffusa L., Sp. Pl. 1: 3. 1753; D.D. Pramanick & Ghara in Lakshmin. & al. (eds.), Fl. West Bengal 4: 363. 2019.

Vernacular name: Punarnava (Bengali, Hindi).



Herbs with long trailing branches; stem reddish, tomentose. Leaves simple, unequal, ovate, obtuse, undulate along margins, truncate to subcordate at base, tomentose, very variable in size; petiole to 1 cm long. Flowers 4 mm long, 4–10 together, in axillary or terminal, peduncled umbels; bracts 5, ovate, glandular. Perianth pink. Stamens 3. Capsule 3 × 1 mm, clavate, 5-ribbed, glandular.

Flowering & Fruiting: Throughout the year.

Habitat: In damp and shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 341.58 m, 23.480711 N, 85.90953997 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93486 (CAL).

Uses: Liquid extraction of plants is diuretic.

OLEACEAE

Jasminum L.

Jasminum sambac (L.) Aiton, Hort. Kew. 1: 8. 1789; C.B. Clarke in Hook.f., Fl. Brit. India 3: 591. 1882; Haines, Bot. Bihar Orissa: 523. 1922; Prain, Bengal Pl. 1: 486. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 252. 1994; Suk. Chandra in Ranjan & al. (eds.), Fl. West Bengal 3: 363. 2016. *Nyctanthes sambac* L., Sp. Pl. 1: 6. 1753. *Jasminum sambac* var. *heyneana* Wall. ex C.B. Clarke in Hook.f., Fl. Brit. India 3: 592. 1882.

Vernacular name: Banmallika (Bengali).



Suberect shrubs, scandent with slightly pubescent branchlets. Leaves opposite or sometimes ternate, ovate-elliptic or broadly ovate, rounded at base, entire at margins, acute to obtuse at apex, 3.5–7.5 × 2–4 cm, thin-membranous; petioles 3–5 mm long, nearly glabrous, pubescent above. Cymes terminal, 3 to 5-flowered. Flowers 2–2.5 cm across when spreading; bracts linear-subulate, 2–4 mm long; pedicels 3–7 mm long. Calyx tube c. 2 mm long, 5–7-lobed; lobes linear, 6–11 mm long, pubescent or glabrescent. Corolla tube 1.5–1.7 cm

long, 10-lobed; lobes 2-seriate, oblong to orbicular, almost as long as tube. Stamens 2, included; filaments short; anthers attached at the back near the base. Ovary 2-celled; ovules usually 2 in each cell; style cylindrical; stigma 2-fid. Berries globose, c. 6 mm, surrounded by suberect calyx, black.

Flowering & Fruiting: June–April.

Habitat: Along the stream or on shady, moist localities.

Specimens examined: Jhalda MPCA, Kudagara, 342.63 m, 23.48120403 N, 85.909775 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93483 (CAL).

Uses: Roots and leaves are used in preparation of eye lotion; flowers are used for making garlands, and also used for production of scented hair oil.

Nyctanthes L.

Nyctanthes arbor-tristis L., Sp. Pl. 1: 6. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 3: 603. 1882; Haines, Bot. Bihar Orissa: 526. 1922; Prain, Bengal Pl. 2: 486. 1963 (Repr.); Suk. Chandra in Ranjan & al. (eds.), Fl. West Bengal 3: 366. 2016.

Vernacular name: Shefali, Shiuli (Bengali), Harsinghar, Parijat (Hindi).

Trees, 2–4 m high; young branches sharply quadrangular, hairy. Leaves simple, opposite, ovate, 3–11 × 1.5–6 cm, rounded or subcuneate at base, entire at margins, acute to subacuminate at apex, coriaceous, covered with stiff whitish hairs; lateral veins 3–5 pairs; petioles 2–7 mm long. Flowers c. 2.5 cm across, fragrant; bracts sessile, broadly ovate or suborbicular, 2–3 mm long, apiculate at apex, hairy. Calyx narrowly campanulate, 3–5 mm long, glabrous inside, hairy outside, 5-toothed, persistent. Corolla tube 6–9 mm long, glabrous, bright orange, 6-lobed; lobes



obcordate, 5–7 mm long, irregularly lobed at tip, white. Stamens 2, included. Ovary globose, 2 or 1-loculed; ovule 1 per locule, basal. Capsules nearly orbicular, slightly emarginate with a mucro at apex, 2–2.5 mm across, compressed, glabrous, reticulately veined, green, brownish when mature, 1-seeded; seed orbicular, 1–1.5 cm.

Flowering & Fruiting: September–January.

Habitat: In dry deciduous forests.

Specimens examined: Jhalda MPCA, Kudagara, 531.18 m, 23.47112 N, 85.93394 E, 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93404 (CAL).

ONAGRACEAE

Ludwigia L.

Ludwigia perennis L., Sp. Pl. 1: 119. 1753; Raven in Reinwardtia 6: 367. 1963; Sanyal, Fl. Bankura Distr.: 178. 1994; T.K. Paul & B.C. Banerjee in T.K. Paul & al. (eds.), Fl. West Bengal 2: 367 2015. *L. parviflora* Roxb., Hort. Bengal.: 11. 1814; Fl. Ind. 1: 440. 1820; C.B. Clarke in Hook. f., Fl. Brit. India 2: 588. 1879; Prain, Bengal Pl. 1: 369. 1963 (Repr.); Haines, Bot. Bihar Orissa 2: 339. 1961 (Rep.). *Jussiaea perennis* (L.) Brenan in Kew Bull. 8: 163. 1953.



Annual, erect herbs, up to 1 m high, puberulent; stem glabrescent. Leaves narrowly elliptic-lanceolate, 3–10 × 0.3–2.5 cm, base cuneate, margin crenate, apex sub-acute, membranous, glabrous above, laxly puberulent; hairs adpressed beneath; nerves 6–12 pairs; petioles 3–8 mm long. Flowers c. 6 mm across, 4-merous; pedicels c. 2 mm long; bracteole absent. Sepals 4, ovate-lanceolate, c. 3.5 × 1.5 mm, entire at margin, glabrous or minutely puberulent. Petals yellow, elliptic, c. 3 mm, rounded at apex, 1-nerved. Stamens 4, opposite sepals, cream-coloured; filaments c. 8 mm

long; anthers c. 0.5 mm long. Disc slightly elevated, glabrous. Ovary 4.5–6.6 mm long, 4-ridged, puberulent with white-adpressed hairs, 4-loculed; ovules 3 per locule; style thick, c. 1 mm long; stigma globose, c. 1.5 mm. Capsules terete, 8–15(–18) mm long, thin-walled, with 4 longitudinal ribs, puberulent when young but turning glabrous after maturity, greenish to purplish brown, irregularly loculicidal; seeds brown, pluriseriate in each locule, free, globose to ellipsoid, c. 0.4 × 0.2 mm.

Flowering & Fruiting: June–March.

Habitat: Grows beside streams and marshy places.

Specimens examined: Jhalda, MPCA, Kudagara, 317.45 m, 23.4727119840681 N, 85.9141650237143 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 93573 (CAL).

Use: Plants boiled in oil and applied to the body externally for fever.

OXALIDACEAE

Biophytum DC.

Biophytum sensitivum (L.) DC., Prodr. 1: 690. 1824; Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1: 436. 1874; Haines, Bot. Bihar Orissa: 156. 1921; Manna in Hajra & al. (eds.), Fl. India 4: 238, t. 57. 1997. *Oxalis sensitiva* L., Sp. Pl. 1: 434. 1753, Prain, Bengal Pl. 1: 204. 1963 (Repr.); Ghara in Fl. West Bengal 1: 372. 1997.

Vernacular name: *Lajalu* (Hindi).

Annual, 5–15 cm high. Stems terete, ribbed, pubescent, crowded at apex. Leaves compound, whorled; rachis 2–13.5 × 0.5–3 cm, hairy; petioles short; leaflets sessile, opposite, to 12 pairs, oblong or oblong-obovate, 2–16 × 1–11 mm, decreasing in size from upwards to downwards, rounded, oblique, unequal at base, entire at margins, obtuse to rounded at apex. Umbels several-flowered. Flowers 4–5 mm long; peduncles 2–7 cm long, hairy; bracts several, lanceolate, c. 2 mm long, densely crowded at apex of peduncle; pedicels 3–6 mm long, hairy. Sepals lanceolate, 3–4 × 0.8–1



mm, acute at apex, hairy. Petals 5, lanceolate, c. 3 × 1–2 mm, yellow. Stamens 10, free; outer 5 smaller, 2–2.5 mm long; anthers c. 0.3 mm long. Carpels 1.5–2 mm long; ovary 0.5–0.7 mm long; ovules 2–5 per locule; styles 5; stigma bifid, flattened. Capsules loculicidal, ellipsoid, 5-grooved, 3–4 × 2–3 mm, covered with persistent calyx. Seeds conical to oval, c. 1 mm long, tubercled, glossy, light reddish brown.

Flowering & Fruiting: September–January.

Habitat: On shady forest beds.

Specimens examined: Jhalda MPCA, Kudagara, 365.26 m, 23.48081603 N, 85.90991196 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93519 (CAL).

Biophytum umbraculum Welw., Apont. 590. 1859. *Biophytum petersianum* Klotzsch in Peters, Reise Mossamb. Bot. 1: 81, t. 15. 1862. *Oxalis apodiscias* Turcz. in Bull. Soc. Imp. Naturalistes Moscou 36: 595. 1863. *Biophytum apodiscias* (Turcz.) Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1: 437. 1874.



Herbs, stems to 13.5 cm long. Leaves 3–9 pairs; rachis 4.5–3 mm long, glabrous to appressed-pubescent mainly at nodes; leaflets overlapping; terminal ones obovate, 2–8 × 2–5 mm, midnerve eccentric; others triangular, orbicular or elliptic, rounded to obtuse at apex, glabrous or sparsely ciliate along margins, midnerve median. Pedicels 0.8–3 mm long with few bristly hairs. Sepals ovate-lanceolate, acute, 3–5 × 1–2 mm, sparsely hairy. Petals lanceolate, 5–6 × 1–2 mm, yellow. Ovary 1–2 × 1 mm; ovules 4–5 per locule; styles 1–2 mm long; stigma flattened, bifid. Capsules 3–4 × 2–2.5 mm.

Flowering & Fruiting: January–October.

Habitat: On shady forest beds and in shady grassland.

Specimens examined: Jhalda MPCA, Kudagara, 431.18 m, 23.48444598 N, 85.91139397 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95035 (CAL).

Uses: The plant is used for stomachache. In case of insomnia the roots and leaves are being used.

Oxalis L.

Oxalis corniculata L., Sp. Pl. 1: 435. 1753; Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1: 436. 1874; Haines, Bot. Bihar Orissa: 157. 1921; Manna in Hajra & al. (eds.), Fl. India 4: 242, t. 60. 1997; Ghara, Fl. West Bengal 1: 373. 1997.

Vernacular name: Amrul (Bengali, Hindi).



Herb, 5–20 cm high; roots bulbous or tuberous. Stems diffuse with procumbent branches, pubescent. Leaves compound, trifoliolate; petioles slender, 1.5–7 cm long, pubescent; stipules indistinct, sometimes conspicuous, c. 3 × 1 mm; leaflets obcordate or elliptic-obcordate, 0.5–2 × 0.2–1.3 cm, tapering at base, ciliate at margins, rounded or emarginate at apex, glabrous. Inflorescence cymose to pseudo-umbellate; peduncles to 20 cm long. Flowers c. 6 mm long; pedicels 6–10 mm long, hairy. Sepals 5, lanceolate, 2.5–3 mm long, green. Petals 5, oblong, 4–6 mm long, yellow. Stamens 10, united; longer ones c. 3 mm long; shorter ones c. 2 mm long; anthers oblong, 0.3–0.5 mm long, dehiscent longitudinally, dorsifixed. Carpels c. 3 mm long; ovary ellipsoid to cylindrical, c. 2 × 1 mm, puberulous; stigma minutely bifid; styles 4 or 5; ovules 5–11 per locule in a row. Capsules linear, cylindrical, 1–2 × 0.2–0.4 cm, hairy. Seeds 5–11 per locule, suborbicular or ovoid, 1–1.5 × c. 1 mm, light yellowish brown.

Flowering & Fruiting: Almost throughout.

Habitat: In wet places near the stream.

Specimens examined: Jhalda MPCA, Kudagara, 321.49 m, 23.47268 N, 85.91414 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92326 (CAL).

PAPAVERACEAE

Argemone L.

Argemone mexicana L., Sp. Pl. 1: 508. 1753; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 117. 1872; Haines, Bot. Bihar Orissa: 23. 1921; Prain, Bengal Pl. 1: 142. 1963 (Repr.); Debnath & M.P. Nayar in B.D. Sharma & N.P. Balakr. (eds.), Fl. India 2: 2. 1993; Debnath in Fl. West Bengal 1: 180. 1997.

Vernacular name: *Shiyal kanta* (Bengali), *Gokhula janum* (Hindi).



Herbs, 20–80 cm high, prickly. Stems with yellow milky juice. Lower leaves with distinct petioles, crowded in a rosette; upper ones sessile, sinuate-pinnatifid, semi-amplexicaul at base, spinulose-dentate at margins, 10–18 × 5–9 cm, prickly, especially on nerves, white-pruinose on veins, variegated with glaucous bands. Flowers sessile or shortly pedicelled, 4–5 cm across. Sepals oblong, to 10 × 7 mm, prickly outside. Petals obovate, 2–2.5 × 1.2–1.5 cm, bright yellow. Stamens 7–12 mm long.

Ovary 8–10 mm long, soft-spinous; stigma 3–6-lobed, dark red. Capsules terete, to 4 × 2 cm, prickly, glaucous or green, open by 3–6 valves from top; seeds numerous, globose, 1.5–1.8 mm, brownish black.

Flowering & Fruiting: August–October.

Habitat: In open areas and forest edges.

Specimens examined: Jhalda MPCA, Kudagara, 306.56 m, 23.47259103 N, 85.91461597 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93426 (CAL).

Uses: Seeds yield nauseous, bitter, non-edible oil which is used in cutaneous troubles; also used in paint industry and soap-making. Yellow juice of the plant is used in the treatment of scabies and ophthalmia.

PEDALIACEAE

Martynia L.

Martynia annua L., Sp. Pl. 2: 618. 1753; C.B. Clarke in Hook.f. Fl. Brit. India 4: 386. 1884; Haines, Bot. Bihar Orissa: 662. 1922; Sanyal, Fl. Bankura Distr.: 324. 1994; S.K. Mandal & M.K. Pathak in Lakshmin. & al. (eds.) Fl. West Bengal 4: 174. 2019. *Martynia diandra* Gloxin, Obsc. Bot.: 14, t. 1. 1785; Prain, Bengal Pl. 2: 590. 1963 (Repr.).

Vernacular name: *Baghnokhi* (Bengali), *Ulat-kanta* (Hindi).

Herbs, perennial, 1–2 m high, well-branched, glandular-pubescent. Stems subterete, fistular. Leaves broadly ovate, cordate at base, irregularly repand-dentate at margins, subacute to obtuse at apex, 20–30 cm across, pale green; petioles 4–13 cm long, fistular. Inflorescences



racemes, terminal, 6–15 cm long, 10–20-flowered. Flowers bright, 2.5–3 cm across; bracts ovate, clawed, 1.5–3 cm long, prominently veined, pale pink; pedicels to 2.5 cm long; bracteoles apiculate, 1.5–2.5 cm long, pale green. Calyx 1.5–2 cm long, yellowish white or greenish white. Corolla 5.5

–6.5 cm long, pale pink with stalked glands and yellow or purple dots on anterior side inside; lobes pink with dark purple blotch. Stamens 2, perfect; anthers cohering with widely divergent cells; filaments 1.5–1.7 cm long, white; staminodes 3; lateral staminodes 4–6 mm long; posterior one 1–2 mm long. Ovary globose, c. 2 mm, 1-loculed, falsely 4-celled; ovules 1 per cell on 2 intruding T-shaped parietal placentae; style c. 2 cm long. Disk larger than ovary. Drupes ovoid with upturned beak, 2–4 cm long; pericarp 2-valvate, deciduous; endocarp persistent with two clawed hooks, strongly 8-ribbed; seeds with thick and rugose testa.

Flowering & Fruiting: August–December.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 369.44 m, 23.48106396 N, 85.90984097 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93525 (CAL).

Use: Leaves are eaten as vegetable.

POLYGALACEAE

Polygala Tourn. ex L.

Polygala arvensis Willd., Sp. Pl. 3(2): 876. 1802; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 460, t. 87. 1993. Prain, Bengal Pl. 1: 157. 1963 (Repr.); R.N. Banerjee in Fl. West Bengal 1: 234. 1997. *P. chinensis* auct. non L. 1753: Bennett in Hook.f., Fl. Brit. India 1: 204. 1872, p.p.; Haines, Bot. Bihar Orissa: 41. 1921.

Vernacular name: *Kana Kori* (Bengali), *Sanjivani* (Hindi).



Herbs, procumbent or erect, 5–30 cm high. Stems and branches hairy. Leaves simple, alternate, subsessile, oblong, linear or linear-lanceolate, 1.5–2.5 × 2–2.5 mm, narrowed towards base, entire at margins, acute and mucronate at apex, glabrous, hairy at margins and on midrib; petioles 1–2 mm long. Flowers 5–6 mm long, solitary or in 3–15 in 0.5–2 cm long, axillary or lateral racemes, rarely subcapitate; bracts oblong-ovate, c. 1.5 × 1 mm, ciliate at margins, acute at apex, persistent; pedicels 1.5–2 mm long. Sepals persistent; outer sepals broadly ovate to ovate-lanceolate, 1.5–2 × c. 1 mm, acuminate, acute or mucronate at apex, pubescent outside, white-hyaline and

ciliate at margins, 1-veined; wings sepals obliquely ovate or falcate, c. 4 × 2 mm, narrowed at base, straight at upper margin, rounded at lower margin, acute or acuminate at apex, sparsely puberulous or glabrous, persistent. Petals yellow; middle lobe keeled, auricled at base, with a crest of shortly multifid or notched, to 1 mm long appendages; lateral lobes of petals suborbicular or broadly obovate, 3–4 mm long. Stamens 8, monadelphous; staminal sheath free, 4–4.5 mm long; free portion of filaments to 2 mm long, united at same level. Ovary obovoid, c. 1 mm across, hairy along margins; style curved, 4–5 mm long, flat, dilated and hooked at apex forming a hood with lateral broad capitate stigma at its concavity. Capsules ovoid, orbicular or obliquely obcordate, 4–5 × 2.5–4 mm, compressed, emarginate at apex, narrowly winged along margins, glabrous on walls, patently hairy along margins. Seeds oblong-ellipsoid, 2.5–3 × c. 1.5 mm, white-silky pilose; caruncle hood-shaped, 3-fid almost to base with short appendages.

Flowering & Fruiting: July–December.

Habitat: On forest beds and in shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 322.56 m, 23.47186198 N, 85.911832 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93561 (CAL).

POLYGONACEAE

Persicaria Mill.

Persicaria hydropiper (L.) Delarbre, Fl. Auvergne ed. 2: 518. 1800. *Polygonum hydropiper* L., Sp. Pl. 1: 361. 1753; Hook.f. in Hook.f., Fl. Brit. India 5: 39. 1886; Haines, Bot. Bihar Orissa: 779. 1924; Prain, Bengal Pl. 2: 664. 1963 (Repr.); S. Murmu & Bhaumik in Lakshmin. & al. (eds.) Fl. West Bengal 4: 406. 2019.

Vernacular name: *Packur mul* (Bengali).

Herbs, erect, 30–60 cm high, glabrous. Stems branched, slender above, glandular-punctate, pinkish. Leaves simple, alternate, subsessile or shortly petiolate, linear-lanceolate, 5–16 × 0.5–2.5 cm, attenuate at base, entire at margins, acuminate at apex, glabrous or scabrous on margins, glandular-punctate; petioles 2–8 mm long. Ocrea 1–3 cm long with few and usually deciduous setae of 1–2 mm long, glabrous, gland-dotted. Inflorescences a pseudo-spike, lax, slender or filiform, erect, flexuous or decurved, 2–5 cm long, often interrupted at base; peduncles 2–5 cm long. Flowers 3–3.5 × 3–4 mm; bracts truncate, 2.5–3 mm long, ciliate on upper margins, glabrous, gland-dotted or not; pedicels c. 1 mm long. Perianth ovate-rounded, 2.5–3 × 1–1.5 mm, glandular, pink or light pink, 5-lobed. Stamens 6, included; filaments c. 1 mm long, light pink; anthers oblong, c. 0.5 mm long, pinkish. Ovary c. 1 mm long, compressed; style 2, c. 1 mm long, united in the upper half, then free; stigma capitate. Nuts 3-angled, biconvex, c. 3 mm long, brown. Seeds c. 3 × 2, beaked at apex, shiny, smooth, brownish.



Flowering & Fruiting: Throughout the year.

Habitat: Along the streams and on damp and moist places

Specimens examined: Jhalda MPCA, Kudagara, 316.38 m, 23.47275 N, 85.91438 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92329; 367.12 m, 23.48092902 N, 85.909904 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93507 (CAL).

Uses: Plant is used as stimulant and diuretic; liquid extract is used as an oral contraceptive; infusion is used in uterine disorders; powder of dried herb used as fish-poison.

RHAMNACEAE

Ziziphus Mill.

Ziziphus mauritiana Lam., *Encycl.* 3: 319. 1789; Bhandari & Bhansali in N.P. Singh & al. (eds.), *Fl. India* 5: 233. 2000; M.A. Lawson in Hook.f., *Fl. Brit. India* 1: 632. 1875; Haines, *Bot. Bihar Orissa*: 194. 1921.

Vernacular name: *Ber* (Hindi).



Large shrubs or small trees, to 15 m tall; bark vertically fissured deeply, dark grey or nearly black, reddish and fibrous inside; branches drooping, rusty-tomentose when young; nodes slightly swollen around leaf-scars; stipules spinescent; spines solitary or in pairs, straight or one of them recurved. Leaves alternate, variable, broadly elliptic or obovate-orbicular, faintly denticulate or entire at margins, obtuse at apex, 2–9.8 × 1–4.3 cm, pubescent or glabrous above, tomentose to densely brown or white-silky-tomentose below, 3-nerved at base. Inflorescences a fascicle, 15–20-flowered, dense; peduncle to much

reduced, to 0.5 mm long; pedicels 2–4 mm long, hairy. Flowers 4–6 mm across. Calyx glabrous inside, pubescent outside, divided about halfway down; lobes 5, ovate, 1.2–1.5 mm long. Petals 5, spatulate, concave, 1.2–1.5 mm long, white. Stamens 5, 0.8–1 mm long, enclosed in the petals; filaments slightly dilated at the base. Ovary embedded in 10-lobed disk, 2-loculed; styles 2, connate to middle; stigmas bifid. Drupes globose, 1.2–2 cm, fleshy, smooth, turning yellow or orange when ripe; fruiting pedicels 5–8 mm long, pilose; endocarp thick-leathery, 2-loculed, 1 or 2-seeded; seeds 6–7 × 5–6 mm, compressed, shiny, red-brown.

Flowering & Fruiting: September–June.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 422.35 m, 23.48314603 N, 85.91092098 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95057 (CAL).

Uses: Fruits are eaten fresh, dried, candied or stewed. Kernels are used in nausea, vomiting and for abdominal pain in pregnancy. Seeds are given in diarrhoea. Wood is used for well, axe and hoe-handles, yokes and toys.

Ziziphus oenopolia (L.) Mill., Gard. Dict. ed. 8: 3. 1768; M.A. Lawson in Hook.f., Fl. Brit. India 1: 634. 1875; Haines, Bot. Bihar Orissa: 196. 1921; Bhandari & Bhansali in N.P. Singh & al. (eds.), Fl. India 5: 236, t. 53. 2000; G. Sengupta & B. Basu in Fl. West Bengal 1: 433. 1997. *Rhamnus oenopolia* L., Sp. Pl. 1: 194. 1753.

Vernacular name: *Siakul* (Bengali), *Makkay* (Hindi).

Shrubs, straggling, armed with spines; branchlets fasciculate, strigose, often densely rusty-tomentose, fluted;

nodes slightly swollen around leaf-scars; spines solitary or in pairs, recurved, 3–4 mm long. Leaves obliquely elliptic-ovate or ovate-lanceolate, 2.5–3.6 × 1.5–2.1 cm, obliquely cuneate at base, acute or acuminate at apex, greyish pubescent above, densely ferruginous-tomentose beneath, 3-veined at base. Inflorescence a fascicle or pendunculate cyme, axillary, to 1.2 cm long, 5–8-flowered. Flowers 3–3.5 mm across; pedicels c. 2 mm long, pilose. Calyx lobes thickened at margins, 1.5–2 mm long, glabrous inside, apparently hairy



outside, brown. Petals 5, obovate, emarginate at apex, 0.8–1 mm long, green. Stamens 5, 0.7–0.9 mm long. Disk 10-lobed, pitted or grooved, glabrous; lobes opposite each calyx lobe, emarginate. Ovary glabrous; style 2-cleft, united above the middle; stigma obtuse. Drupes 1–3 together, globose or ovoid, 6–8 mm in diameter, shiny, black when ripe; pedicels 3–4 mm long; endocarp cartilaginous with mealy acrid pulp. Seeds 1 or 2, globose, 5–6 mm, shiny.

Flowering & Fruiting: September–March.

Habitat: In dry deciduous forest often under shades of trees.

Specimens examined: Jhalda MPCA, Kudagara, 420.23 m, 23.48314213 N, 85.91092098 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95059 (CAL).

RUBIACEAE

Debia Neupane & N.Wikstr.

Debia ovatifolia (Cav.) Neupane & N.Wikstr. in *Taxon* 64: 315. 2015. *Hedyotis ovatifolia* Cav., *Descr. Pl. Ic.* 6: 52. 1802; Rao & Hemadri, *Indian Forester* 99: 377. 1973; Sanyal, *Fl. Bankura Distr.*: 212. 1994; R. Dutta & Deb, *Taxon. Revis. Hedyotis Indian Subcont.*: 112, pl. 38. 2004; Ranjan & al. in Ranjan & al. (eds.), *Fl. West Bengal* 3: 81. 2016. *Oldenlandia ovatifolia* (Cav.) DC., *Prodr.* 4: 427 1830. *Oldenlandia nudicaulis* Roth, *Nov. Pl. Sp.*: 95. 1821; Hook.f. in Hook.f., *Fl. Brit. India* 3: 70. 1880; Haines, *Bot. Bihar Orissa*: 449. 1922; Prain, *Bengal Pl.* 1: 409. 1963 (Repr.).

Herbs, 4–10 cm high. Stems terete, pubescent. Leaves ovate, elliptic-ovate or ovate-



oblong, rounded at base, obtuse at apex, 1.2–7 × 1–4.5 cm, whorls of 4, membranous, pubescent; lateral nerves 3–4 pairs; petioles 2–8 mm long, pubescent; stipules truncate c. 2 mm, 2–3 dentate above. Inflorescences terminal, dichotomously branched, loose corymbose cymes; peduncles 4–7 cm, very slender, terete, pubescent. Flowers 3–3.2 × 1–1.5 mm; pedicels 4–12 mm long, slender, terete, smooth. Hypanthium globose or ovoid, 0.5–0.8 mm long; calyx limb

short; lobes 4, 0.5–0.7 × 0.2–0.3 mm, triangular, acute. Corolla white; tube 0.5–1 mm, glabrous; lobes oblong, acute, 1.5–2 × 0.5–0.6 mm, pubescent at the middle of the inner surface. Stamens 4, inserted at sinus of corolla lobes; filaments 1–1.5 mm long, nearly equal to the corolla lobes; anthers oblong, 1–1.5 mm long. Ovary c. 0.6 mm long; ovules many on globose placenta; style stout, 3–3.5 mm long. Capsules ovoid, hemispheric above, globose at base, 1.5–2 × 2–3 mm, obtusely angular, dehiscent loculicidally, nerves prominent, glabrous; raphides dense; seeds 36–40, subglobose or angular c. 3 mm, deeply reticulate, purple to blackish.

Flowering & Fruiting: August–December.

Habitat: On moist localities in dry deciduous forests and along the slopes.

Specimens examined: Jhalda, MPCA, Sewati, 363.51 m, 23.4808700066059 N, 85.9099660255014 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93544 (CAL).

Mitracarpus Zucc.

Mitracarpus hirtus (L.) DC., Prodr. 4: 572. 1830. *Spermacoce hirta* L., Sp. Pl. ed. 2, 1: 148. 1762. *S. villosa* Sw., Prodr.: 29. 1788. *Mitracarpus villosus* (Sw.) Cham. & Schltdl. ex DC., Prodr. 4: 572. 1830; Paria & Chattopadhyay, Fl. Hazaribagh 2: 830. 2005.



Herbs, 30–70 cm high. Stems quadrangular, unbranched or few-branched with long-pubescent. Leaves simple, opposite, elliptic or lanceolate, 1–4.5 × 0.5–1.7 cm, cuneate or attenuate at base, entire at margins, acute at apex, puberulous on both surfaces more so beneath; petioles c. 1 mm long, pubescent; stipules connate with petioles into a broad truncate tube with unequal bristles, 1.5–4 mm long. Inflorescences 0.5–1.8 cm in diam., mostly present in the axils. Flowers sessile; bracteoles filamentous, 2–3 mm long. Calyx tube 1–1.5 mm long; lobes 4, 2 oblong-lanceolate, 1.3–2.5 mm long, green with hyaline margins, rather thick; other 2 hyaline, triangular-lanceolate, 0.5–1.5 mm long, all with ciliate margins. Corolla glabrous or slightly hairy outside, white; tube 1.5–2 mm long; lobes 4, ovate, 0.5–1 mm long. Stamens 4, varying in their degree of exsertion; anthers c. 0.3 mm long, dorsifixed. Ovary 2-loculed; style c. 2.5 mm long; stigma bifid, c. 1 mm across, hairy. Capsules ellipsoid-rectangular, c. 2 mm long, thin, circumscissile, straw-coloured. Seeds oval, c. 1 × 1 mm, minutely pitted and with cruciform or X-shaped attachment scar, brownish.

Flowering & Fruiting: August–November.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 326.27 m, 23.47217 N, 85.91246 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92318 (CAL).

Oldenlandia L.

Oldenlandia corymbosa L., Sp. Pl. 1: 119. 1753; Hook.f., Fl. Brit. India 3: 64. 1880; Haines, Bot. Bihar Orissa: 446. 1922. *Hedyotis corymbosa* (L.) Lam., Encycl. 1: 272. 1791.

Vernacular name: Pitpapra (Hindi).

Herbs, prostrate, diffusely branched. Stems acutely angular, ridges prominent, glabrous or scabrid. Leaves sessile, simple, opposite, linear to linear-lanceolate, 1–2.5 × 0.05–0.2 cm, narrowed at base, entire at margins, acute or apiculate at apex, flat or recurved, glabrous or sparsely to densely scabrid, particularly on the midrib; stipules 2–3 mm long with few unequal fine filiform appendages.

Inflorescences 1–4-flowered corymbs; peduncles axillary, c. 2 mm long; pedicels 3–6 mm long. Flowers 2–3 mm long. Hypanthium ovoid or ellipsoid, 0.8–1

mm long; calyx limb short; 4-toothed; teeth triangular or triangular-lanceolate, 1–2 mm long, hairy, green. Corolla tubular, infundibular-cylindrical, c. 2 mm long, glabrous or with a ring of pubescent hairs inside below sinus or middle of the lobes, white, 4-lobed; lobes oblong, 0.7–1 × c. 0.5 mm. Stamens 4, inserted; filaments 0.1–0.4 mm long, adnate to base of corolla tube; anthers subglobose, 0.3–0.4 mm long, basifixed. Ovary 0.5–1 mm long, 2-loculed; ovules many; style c. 2 mm long; stigma subglobose, 0.3–0.5 mm long, 2-lobed, fleshy, papillose. Capsules globose or ellipsoid, 1–2 × 1–2 with crown little raised, crown not projecting above the hypanthium. Seeds triangular, c. 0.5 mm, smooth, dark brownish.

Flowering & Fruiting: August–April.

Habitat: On forest beds in the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 322.21 m, 23.47189 N, 85.91175 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92304 (CAL).



Oldenlandia herbacea (L.) Roxb., Hort. Bengal.: 11. 1814 & Fl. Ind. (Carey & Wall.) 1: 445. 1820; Haines, Bot. Bihar Orissa: 447. 1922; R. Dutta & Deb, Taxon. Rev. Hedyotis 120. 2004. Ranjan & al. in Ranjan & al. (eds.), Fl. West Bengal 3: 117. 2016. *Hedyotis herbacea* L., Sp. Pl. 1: 102. 1753. *Oldenlandia heynii* R.Br. ex G. Don, Gen. Syst. 3: 531. 1834; Hook.f. in Hook.f., Fl. Brit. India 3: 65. 1880.



Annual or biennial erect herbs, 15–55 cm high; stems 4-angled, much branched, glabrous or scaberulous at angles, reddish black when dry. Leaves opposite, sessile or subsessile, stipulate; stipules triangular, 1.8–3.5 mm long, broadly fused with petiole at base, with 1–5 bristles at apex; lamina linear or linear-lanceolate, 0.5–4.5 × 3–5 mm, obtuse to acute at base, weakly to strongly revolute along margins, acute at apex, glabrous to scaberulous; secondary veins not visible.

Inflorescences axillary, 1–few-

flowered, pedunculate cymose; peduncles 1–2 mm long. Flowers white, pale purple, 3–4 mm long, pedicellate; pedicels very slender, 1–2.5 mm long. Calyx subglobose to ovoid, glabrous to puberulent; tube c. 1 mm long; lobes 4, narrowly triangular to linear, 0.5–1.5 mm long, scabridulous along margins. Corolla infundibuliform, glabrous outside; tube 2–3 mm long; lobes spatulate-oblong, c. 1 mm long, finely reticulate. Stamens 4; anthers exserted or included. Stigma bilobed. Capsules ovoid to subglobose, beaked.

Flowering & Fruiting: Almost throughout the year.

Habitat: On rocky crevices, near edge of moist area and on roadside.

Specimens examined: Jhalda, MPCA, West Bengal-Jharkhand Border, Kudagara, 347.25 m, 23.4847720339894 N, 85.911918003112 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95041 (CAL).

Richardia L.

Richardia scabra L., Sp. Pl. 1: 330. 1753. *Richardia pilosa* Ruiz & Pav., Fl. Peru. 3: 50. t. 279b. 1802. *Richardsonia pilosa* (Ruiz & Pav.) Kunth in F.W.H.von Humboldt, A.J.A. Bonpland & C.S. Kunth, Nov. Gen. Sp. 3: 350. 1819; Ranjan & al. in Ranjan & al. (eds.), Fl. West Bengal 3: 134. 2016.



Decumbent herbs, hirsute. Leaves ovate to elliptic-lanceolate, 1–6.5 × 0.5–1 cm, obtuse to acute at apex, attenuate at base, scabrous above and below. Capitula many-flowered; involucre leaves 1–2-paired, usually broadly ovate and exstipulate, the second pair smaller. Calyx lobes lanceolate, tinged reddish-brown and ciliated at margins, glabrous. Corolla white, funnel to salver shaped; lobes triangular. Stamens exerted. Fruits subglobose to obovoid; mericarps 3, more or less oblong to obovate, dorsally densely papillose and typically strigillose; ventrally with 1 narrow groove along length of face.

Flowering & Fruiting: July–November.

Habitat: In shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 309.48 m, 23.47165897 N, 85.90902398 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93412 (CAL).

Wendlandia Bartl. ex DC.

Wendlandia tinctoria (Roxb.) DC., Prodr. 4: 411. 1830; Hook.f. in Hook.f., Fl. Brit. India 3: 38. 1880; Prain, Bengal Pl. 1: 405. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 200. 1994; J.R.I. Wood in Grierson & D.G. Long, Fl. Bhutan 2(2): 754. 1999; A.P. Das & al. in A. P. Das (ed.), Persp. Pl. Biodiv. 269. 2002; Ranjan & al. in Ranjan & al. (eds.), Fl. West Bengal 3: 145. 2016. *Rondeletia tinctoria* Roxb., Fl. Ind. (Carey & Wall.) 2: 134. 1824.

Shrubs, 3–4 m high; branches brown, fissured, glabrescent. Leaves opposite, petiolate, stipulate; stipules triangular to ovate, 8–10 mm long, apex with fine erect point; petioles 0.5–1.5 cm long; lamina elliptic-ovate, elliptic, obovate, 5–13 × 2.5–5.5 cm, acute to cuneate at base, acute to shortly acuminate at apex, thickly papery or leathery on drying, glabrous and shining above, sparsely pubescent on veins below. Inflorescences large, spreading, panicles, densely brown pubescent. Flowers white, sessile; bracts lanceolate, 3–5 mm long. Calyx



obconic, densely brown pubescent; tube c. 1 mm long; lobes lanceolate. Corolla funnelform; tube slender, c. 3 mm long, white -hirsute inside; lobes forming capitate head, ovate, obtuse. Stamens slightly exserted. Stigma bilobed. Capsules subglobose, grey-pubescent.

Flowering & Fruiting: February–April.

Habitat: In dry deciduous forests.

Specimens examined: Jhalda, MPCA, Kudagara, 550.41 m, 23.4712269622832 N, 85.9351180214434 E, 27.01.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93402 (CAL).

RUTACEAE

Aegle Corrêa

Aegle marmelos (L.) Corrêa, Trans. Linn. Soc. London 5: 223. 1800; Hook.f., Fl. Brit. India 1: 516. 1875; Haines, Bot. Bihar Orissa: 167. 1921.

Vernacular name: *Bel* (Bengali, Hindi).



Trees, to 10 m tall, armed with spines; spines straight, 1–2.5 cm long, strong; young branchlets zigzag, compressed, green. Leaves alternate, pinnately 3-foliolate; petioles 2–5 cm long, slightly swollen at base; leaflets lanceolate or ovate-lanceolate, rounded at base, acute or subacuminate at apex, 4–7 × 2–4 cm, glabrous or grey-pubescent, the terminal one larger, long-petioled; the lateral ones sessile, usually with oblique base. Panicles short, 4–5 cm long, peduncle and pedicels minutely pubescent, pedicels 2–5 mm long.

Sepals broadly deltoid, puberulent, 1.2–1.5 mm long. Petals oblong-obovate, greenish white, glandular, 1–1.4 cm long. Stamens 30–50, in double or triple series, unequal, dull white; filaments glandular, 4–7 mm long. Ovary light green, 8–20-celled, each with many ovules in 2 series; style short, stout; stigma longitudinally furrowed. Fruits subglobose or oblate, depressed above, 5–10 cm across, 8–20-loculed; pericarp woody, grey or yellowish; pulp orange or yellowish; seeds many in a clear mucilaginous pulp, ovate, 8–10 mm long, woolly-pubescent.

Flowering & Fruiting: August–March.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 370.46 m, 23.47659004 N, 85.91094101 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95006 (CAL).

Uses: The leaves are considered as very sacred. Fruits are edible.

SAPINDACEAE

Cardiospermum L.

Cardiospermum halicacabum L., Sp. Pl.1: 366. 1753; Hiern in Hook.f., Fl. Brit. India 1: 670. 1875; Haines, Bot. Bihar Orissa: 211. 1921; Prain, Bengal Pl. 1: 241. 1963 (Repr.); Suk. Chandra in Fl. West Bengal 1: 456. 1997.

Vernacular name: *Kanphutki, Kapalphodi, Lataphatkari* (Hindi).

Climbers, herbaceous. Stems and branches slender, 5- or 6-grooved, glabrous or sparsely hairy, green. Leaves biternate, 5–6.5 cm long; petioles 2–3.5 cm long; leaflets subsessile, ovate or ovate-lanceolate, rounded at base, sparsely serrate or pinnately parted at margins, acute to acuminate at apex, 4–4.5 × 1–2.5 cm, thin-membranous, sparsely villous on midrib and lateral veins below, subglabrous or sparsely pilose above. Inflorescences cymes, axillary, bearing tendrils basally, 3-flowered; peduncles c. 6.5 cm long. Flowers unisexual. Sepals 4;



outer 2 ovate, c. 2 mm long; inner 2 oblong-ovate, 3–4 mm long, glabrous. Petals 4, white: upper 2 with crested, inflexed appendages. Male flowers: Stamens 8, slightly longer than petals; filaments hairy; pistillodes present. Female flowers: Ovary obovoid, 2–2.5 mm long, hairy; style 3-fid, lobes bearing inner stigmatic surface; staminodes 8. Capsules turbinate-obtriangular, 1–1.5 × 2–3 cm, shortly stalked, winged at angles, inflated, sac-like, 3-loculed; seeds 1 in each locule, globose, 4–5 mm, smooth, glabrous, black; aril cordate, 3–4 mm long, white.

Flowering & Fruiting: Throughout the year.

Habitat: In open grasslands and near the stream.

Specimens examined: Jhalda MPCA, Kudagara, 273.44 m, 23.47314499 N, 85.91396403 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93445 (CAL).

Uses: Roots have diuretic, diaphoretic, emetic and laxative properties. Plants are used for rheumatism and nervous diseases.

Schleichera Willd.

Schleichera oleosa (Lour.) Oken, Allg. Naturgesch. 3: 1341. 1841; Suk. Chandra in Fl. West Bengal 1: 461. 1997. *S. trijuga* Willd., Sp. Pl., ed. 4. 4: 1096. 1806; Hiern. in Hook.f., Fl. Brit. India: 681; Prain, Bengal Pl. 1: 243. 1963 (Repr.).

Vernacular name: Kusum (Bengali, Hindi).



Deciduous trees. Up to 20 m high, bole fluted; bark 10–12 mm thick, surface grey, smooth, brittle. Leaves parioinnate, alternate, exstipulate; leaflets 4–6, opposite or subopposite, 5–15 × 1.8–4.5 cm, elliptic-oblong, ovate or obovate, apex acute or obtuse, base oblique or rarely obtuse, margin entire, coriaceous, glabrous; rachis 5.5–1.5 cm, stout, glabrous, swollen at base; lateral nerves 10–23 parallel, prominent, intercostae reticulate, faint. Flowers polygamodious, 5–6 mm across, greenish-yellow, in axillary spicate panicles. Male flowers: calyx lobes 5, valvate or obscurely imbricate; stamens 7 or 8, free, inserted within the disc; filaments 1.5 mm, pillose; anthers oblong; pistillode small. Bisexual flowers: ovary 2 mm, superior, 3-celled, ovule 1 in each cell; style rigid, terete; stigma 2 or 3 lobed. Fruit a drupe, 16–18 mm across, subcrustaceous, pointed, often echinate with stout rather prickles; seed 1 or 2, enclosed in a pulpy aril which has a pleasant acid taste; testa smooth, brown.

Flowering & Fruiting: March–August.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 408.53 m, 23.47384597 N, 85.92672497 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93443 (CAL).

Uses: Timber yielding tree. Seeds are edible. Bark cure leprosy, skin disease and ulcers.

SAPOTACEAE

Madhuca Buch.-Ham. ex J.F.Gmel.

Madhuca longifolia (J. König ex L.) J.F. Macbr. var. **latifolia** (Roxb.) A. Chev., Rep. Bot. Appl. 23: 149. 1943; Debika Mitra in Ranjan & al. (eds.), Fl. West Bengal 3: 344. 2016. *Bassia latifolia* Roxb., Pl. Coromandel 1: 20, t. 19. 1795; C.B. Clarke in Hook.f., Fl. Brit. India 3: 544. 1882; Haines, Bot. Bihar Orissa: 511. 1922. *Madhuca latifolia* (Roxb.) J.F. Macbr., Contr. Gray Herb. 53: 18. 1918.

Vernacular name: Mahua, Mahul (Bengali), Mahua, Mohwa (Hindi).

Trees, 20–40 m tall, deciduous; branchlets usually thickened in nodes, sericeous or tomentose. Leaves confined at apex of branchlets, sometimes seemingly in whorls,



broadly elliptic, elliptic-obovate, oblong or oblanceolate, cuneate or rounded at base, entire at margins, acute or obtusely acuminate at apex, 7–20 × 2–9 cm, coriaceous, tomentose when young, glabrous on age; lateral nerves 9–18 pairs, ascending; petioles 1.5–4 cm long, flat or grooved above, thickened at base. Flowers 3–many in each fascicle, erect when young, pendulous later; pedicels angular, 2.5–7.5 cm long, tomentose. Calyx lobes ovate-lanceolate or elliptic, 1.2–1.7 × 0.6–0.9 cm, woolly-pubescent. Corolla 1–2 cm long, glabrous, 5-lobed; lobes ovate-elliptic, irregularly serrate at apex, obtuse at apex, 6–12 × 2

–5 mm, cream-white. Stamens 16–30 in 2 or 3 whorls, 4.5–9 cm long; filaments subulate, c. 1 mm long; anthers ovate-lanceolate; connectives prolonged with 1–3 teeth. Ovary 8–11-celled. Berries obovoid-ellipsoid or subglobose with a remnant of style at apex, 2–5 × 1.8–4 cm, fleshy, woolly; seeds 1–4, ellipsoid, 2–3.5 × 1.2–1.5 cm, brown with ovate scar.

Flowering & Fruiting: February–July.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 315.18 m, 23.47218501 N, 85.91227801 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93414 (CAL).

Uses: Corollas are eaten raw or cooked and a spirit is distilled from them. Seed oil is edible and also used for soap-making. Wood is very hard and proper for naves of wheels.

SCROPHULARIACEAE

Bonnaya Link & Otto

Bonnaya ciliata (Colsm.) Spreng. in Syst. Veg., ed. 16. 1: 41. 1824. *Gratiola ciliata* Colsm., Prodr. Descr. Gratiol. 14: 1793. *Lindernia ciliata* (Colsm.) Pennell in Brittonia 2: 182. 1936; Malick & Bhaumik in Lakshmin. & al. (eds.), Fl. West Bengal 4: 113. 2019. *Bonnaya brachiata* Link & Otto, Icon. Pl. Select. 2: 25, t. 11. 1820; Hook.f., Fl. Brit. India 4: 284. 1884; Prain, Bengal Pl. 2: 573. 1963 (Repr.). *Vandellia brachiata* (Link & Otto) Haines, Bot. Bihar Orissa: 632. 1922.



Herbs, 3–15 cm high. Stems much branched, 4-angular, often rooting below, glabrous except short-hairy angles near nodes. Leaves sessile, ovate to elliptic or oblong, rounded to cuneate at base, sharply dentate with aristate-tipped teeth at margins, obtuse or subacute at apex, 1–2 × 0.3–1 cm, glabrous above, finely hirsute below, pinnately nerved. Inflorescences racemes, terminal, lax, each subtended by a linear, ciliate bract of 3–6 mm long; pedicels slender, 3–10 mm long. Calyx 3–5 mm long, lobed to middle; lobes linear-lanceolate, scarious-margined, ciliate towards apex. Corolla 5–8 mm long, white, pink or red; upper lip slightly emarginated; lower lip with rounded lobes. Stamens 2, fertile; 2-staminodes short. Ovary c. 1 mm long, narrow, 2-celled; style c. 2 mm long, slender; stigma 2-lamellate. Capsules cylindrical, linear, 0.7–1.2 cm long, up to more than twice as long as calyx; seeds truncate at ends, c. 0.4 mm across, yellow.

Flowering & Fruiting: July–December.

Habitat: On forest beds and on damp grassland.

Specimens examined: Jhalda MPCA, Kudagara, 342.76 m, 23.47171696 N, 85.912161 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93582 (CAL).

Limnophila R.Br.

Limnophila rugosa (Roth) Merr., *Interpr. Herb. Amboin.*: 466. 1917; Malick & Bhaumik in Lakshmin. & al. (eds.), *Fl. West Bengal* 4: 108. 2019.



Erect, semi-aquatic, fragrant, perennial herbs, growing up to 50 cm tall. Stem simple or branched, rooting at lower nodes, then ascending up to 16 cm high, bristly. Leaves ovate-lanceolate to ovate-elliptic, 1.6–4 × 0.7–1.7 cm, tapering to base, somewhat pointed at tip, entire to rounded toothed-minutely toothed, penninerved, with nerves impressed above, hairless to rough above, hairy on nerves beneath; leaf-stalk 7–10 mm long, densely hairy. Flowers solitary in leaf-axils, sessile, up to 1 cm long, hairy outside, blue with yellow in throat. Sepals divided to base, unequal, lanceolate, up to 7 × 1 mm, tapering, minutely bristly without. Capsule broadly ovoid, 5 mm long, invested by longer sepals.

Flowering & Fruiting: August–January.

Habitat: In moist and shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 364.57 m, 23.48084997 N, 85.90989302 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93516 (CAL).

Mecardonia Ruiz & Pav.

Mecardonia procumbens (Mill.) Small, Fl. S.E.U.S.: 1065. 1903; Malick & Bhaumik in Lakshmin. & al. (eds.), Fl. West Bengal 4: 119. 2019. *Erinus procumbens* Mill., Gard. Dict. ed. 8: n. 6. 1768. *Bacopa procumbens* (Mill.) Greenm., Field Columb. Mus. Bot. Ser. 2: 261. 1907; N.P. Singh & al. (eds.), Fl. Bihar Anal.: 350. 2001.



Herbs, 10–30 cm high. Stems sometimes rooting at lower nodes, quadrangular, slightly twisted. Leaves subsessile, opposite, ovate-lanceolate, narrowed, subequal or unequal at base, serrate at margins, acute at apex, 1–2.5 × 0.8–1.2 cm, glabrous. Flowers 1 or 2, axillary; bracteoles 2, linear or linear-lanceolate, c. 5 mm long; peduncles 1.3–1.8 cm long. Calyx 4-lobed; lobes free,

unequal, foliaceous; outer 3 oblong-cordate, obtuse or acute at apex, c. 6 × 1.5 mm, imbricate. Corolla c. 4 mm across, yellow; tube c. 3 mm long, 4-lobed, obscurely 2-lipped (2 + 3), subequal, obtusely acute at apex, c. 1.5 mm long, pubescent below the upper lip. Stamens 4, didynamous; filament pairs c. 1 and 2.2 mm long; anthers disjunct, parallel, unequal in shorter pair, oblong, c. 0.6 mm long. Ovary oblong-cylindric, c. 1.7 mm long, obscurely 2-loculed; style c. 0.5 mm long; stigma 2-lamellate. Capsules oblong-cylindric, c. 6 mm long, 2-valved, septicidal; seeds reticulate.

Flowering & Fruiting: September–December.

Habitat: In damp and moist localities and near the stream.

Specimens examined: Jhalda MPCA, Kudagara, 302.35 m, 23.47267401 N, 85.914852 E, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93427; 437.42 m, 23.48509801 N, 85.91119397 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95046 (CAL).

Scoparia L.

Scoparia dulcis L., Sp. Pl. 1: 116. 1753; Hook.f., Fl. Brit. India 4: 289. 1884; Haines, Bot. Bihar Orissa 2: 667. 1961 (Repr.); Prain, Bengal Pl. 2: 575. 1963 (Repr.), Malick & Bhaumik in Lakshmin. & al. (eds.), Fl. West Bengal 4: 127. 2019.

Vernacular name: *Bon Dhoney* (Bengali), *Ghoda tulsi* (Hindi).

Herbs, 10–40 cm high, often with a woody base. Stems divaricately branched, terete, glabrous. Leaves simple, opposite, obovate-oblong to oblanceolate or elliptic, $0.8\text{--}3.2 \times 0.2\text{--}1.1$ cm, attenuate or cuneate at base, coarsely crenate-serrate at margins, acute at apex; petioles 1–5 mm long, glabrous, penni-veined. Flowers 1–3 together, often forming leafy racemes, 4–6 mm across; pedicels 3–7 mm long, glabrous. Calyx 2–2.5 mm long, almost divided to base, 4-lobed; lobes subequal, ovate-oblong, ciliate at margins, 2-veined, pubescent outside. Corolla bearded at throat, white, 4-lobed; lobes oblong, $3\text{--}5 \times 2\text{--}3$



mm, obtuse at apex. Stamens 4, equal, exserted; filaments filiform, c. 2 mm long, whitish light violet; anthers oblong, c. 1 mm long, dorsifixed, yellowish, 2-celled. Ovary globose, 1.2–1.5 mm, glabrous; style c. 2 mm long; stigma truncate. Capsules globose, 2–3 mm, septicial, tipped by withered style, pale brown. Seeds truncate, 0.4–0.5 mm long, dull brown.

Flowering & Fruiting: June–November.

Habitat: Along the stream and moist and damp localities.

Specimens examined: Jhalda MPCA, Kudagara, 319.29 m, 23.47263 N, 85.91489 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92342 (CAL).

Torenia L.

Torenia crustacea (L.) Cham. & Schltld. in *Linnaea* 2: 570. 1827. *Capraria crustacea* L., *Mant. Pl.* 87. 1767. *Vandellia crustacea* (L.) Benth., *Scroph. Ind.* 35. 1835; Hook.f. in Hook.f., *Fl. Brit. India* 4: 279. 1884; Haines, *Bot. Bihar Orissa* 631. 1922; Prain, *Bengal Pl.*, 2: 572.1963 (Repr.); Sanyal, *Fl. Bankura Distr.*: 309. Bhaumik in Lakshmin. & al. (eds.), *Fl. West Bengal* 4: 113. 2019.



Erect or ascending, annual herbs, 8–20 cm high; stems sub-quadrangular, deeply sulcate. Leaves ovate, 0.6–2 × 0.5–1.1 cm, obtuse at apex, shallowly crenate or serrate at margins, rounded at base. Flowers in terminal racemes. Calyx urn-like, sparsely pubescent outside. Corolla purple-white; upper lip ovate, shallowly 2-lobed; lower lip 3-lobed, middle lobe larger and slightly longer than upper lip. Ovary 2-locular; stigma lamellate. Capsules ovoid; seeds many, subglobose.

Flowering & Fruiting: July–December.

Habitat: On forest beds in the dry deciduous forests.

Specimens examined: Jhalda, MPCA, Sewati, 365.63 m, 23.4808669891208 N, 85.9099920094013 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93515 (CAL); Kudagara, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93582 (CAL); Jhalda, MPCA, West Bengal-Jharkhand Border, 465.10 m, 23.4839969594031 N, 85.9121830388903 E, Kudagara, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95044 (CAL).

SOLANACEAE

Solanum L.

Solanum americanum Mill. Gard. Dict., ed. 8. 1768; *Solanum nigrum* L., Sp. Pl. 1: 186. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 229. 1885; Prain, Bengal Pl. 2: 555. 1963 (Repr.); Sanyal, Fl. Bankura Distr.: 294. 1994; A. Pramanik in Lakshmin. & al. (eds.), Fl. West Bengal 4: 81. 2019.

Vernacular name: Chirpoti, Gurkamai (Hindi).



Branched, annual herbs growing to 60 cm tall, taprooted; stems cylindrical, erect with much branched. Leaves ovate, up to 6 cm × 4 cm wide and pointed at the tip, with the margin wavy or indented into deeper, round teeth and a wedge-shaped base, narrowed gradually into the 1–2 cm stalk.

Inflorescences arise from the stems between leaves, not from leaf axils consisting of 3–7 flowers in small

umbellate cymes. Flowers c. 5 mm across; sepals 5, obtuse to subacute; petals 5 spreading when young, later curved backwards; stamens 5, forming a yellow projection at the mouth of the corolla tube. Ovary many seeded; fruits round, freshly berry up to 5 mm or more in diam., blackish when ripe.

Flowering & Fruiting: Throughout the year.

Habitat: In shady localities.

Specimens examined: Jhalda MPCA, Kudagara, 369.82 m, 23.48093899 N, 85.90974801 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93543 (CAL).

Use: Extraction of leaves is useful for skin disease and to cure ulcers.

STERCULIACEAE

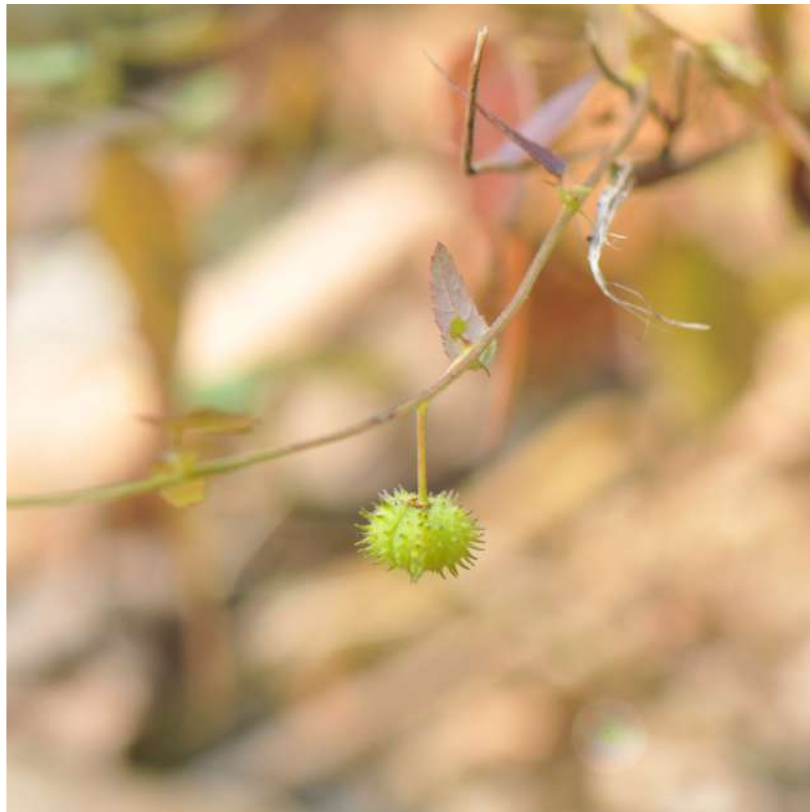
Byttneria Loefl.

Byttneria herbacea Roxb., Pl. Coromandel 1: 28, t. 29. 1795; Mast. in Hook.f., Fl. Brit. India 1: 376. 1874; Haines, Bot. Bihar Orissa: 83. 1921 ('*Buettneria*'); Malick in B.D. Sharma & Sanjappa (eds.), Fl. India 3: 412, t. 115. 1993; Paria & Chattopadhyay, Fl. Hazaribagh 1: 173. 2000; N.P. Singh & al. (eds.), Fl. Bihar Anal.: 72. 2001; T.K. Sharma & A.K. Sarkar in N.P. Singh & P.S.N. Rao (eds.), Fl. Palamau: 111. 2002.

Vernacular name: *Deku sindur* (Santal).

Herbs, prostrate, fruticose with a perennial woody rootstock; branchlets minutely stellate-pubescent. Leaves ovate-

lanceolate, rounded to subcordate at base, dentate at margins, acuminate at apex, 2–6.5 × 1–2 cm, thin-coriaceous, puberulous above, glabrous below, 3–5-nerved at base, usually with a linear gland at base on lower side of midrib; petioles 0.5–1.5 cm long, pubescent; stipules linear-subulate, 1–1.5 mm long. Inflorescences cymes, to 2 cm across; peduncles 2–5 mm long. Flowers 6–8 mm across; pedicels slender, 2–4 mm long; bracts 1–3, subulate, 0.8–1.2 mm



long. Sepals linear-lanceolate, 3.5–4 mm long, reflexed. Petals ovate-lanceolate with c. 4 mm long 2-fid appendages at apex, purple. Staminal tube terminated by 5 shortly stalked anthers alternating with 5 staminodes. Capsules globose, 6–8 mm, horned apically, septically 5-valved; seeds ovoid, 4–5 mm across, angular, muricate.

Flowering & Fruiting: June–October.

Habitat: On the shady areas in the dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 535.44 m, 23.46997 N, 85.92785 E, 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92397 (CAL).

Uses: Pulverised root-stock is used on swellings, also in cholera and diarrhoea in combination with other drugs.

Helicteres Pluk. ex L.

Helicteres isora L. Sp. Pl. 2: 963. 1753; Hook. f., Fl. Brit. India 1: 365. 1874; Prain, Bengal Pl. 1: 189. 1963 (Repr.); Malick in Fl. West Bengal 1: 323. 1997.

Vernacular name: *Antamora* (Bengali), *Marorphali* (Hindi).



Large shrubs or small trees; bark pale greyish, finely wrinkled; young shoots stellate-tomentose. Leaves simple, alyernate, 5–12 × 3–8 cm, obovate to suborbicular, apex acute or acuminate, base cordate, margin irregularly crenate-serrate; 3–5-nerved at the base, scabrous above and stellately tomentose below; petioles to 1.2 cm long. Flowers axillary, solitary or in few-flowered cymes; bracts 2–3 mm long, linear, 2 brown glands present in the axil of bracts; pedicel to 6

mm long. Calyx slightly yellow, persistent, tubular, splitting in to 5 irregular lobes; tube 1.5–2 cm long, cylindric; stamens 10; staminodes 5. Ovary 2–2.5 mm long, placed at tip of gynophore, 5-lobed, 5-celled; ovules many; style 5; stigma subulate. Follicles 5, 4–6 cm long, spirally twisted, stellate-tomentose, beaked; seeds 2–3 mm long, angular, black, wrinkled.

Flowering & Fruiting: April–December.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 518.44 m, 23.48226 N, 85.91278 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92377 (CAL).

Uses: Juice of the root is beneficial in empyema and stomach affections, also used in diabetes.

Sterculia L.

Sterculia urens Roxb., Pl. Coromandel 1(1): 25, t. 24. 1795; Mast. in Hook.f., Fl. Brit. India 1: 355. 1875; Prain, Bengal Pl. 1: 187. 1963 (Repr.); Malick in Fl. West Bengal 1: 332. 1997.



Deciduous trees, to 15 m high, bark 10–12 mm, white or greenish-grey, smooth, exfoliating in large, thin, papery flakes; blaze red; exudation yellowish-white, sticky; branches horizontal; branchlets pubescent. Leaves simple, palmately 3–5 lobed, alternate, clustered at the tips of branches; stipules free, lateral, cauducous; petiole 8–18 cm long, stout, pubescent; lamina 15–30 × 18–30 cm, orbicular, base cordate or sagittate, lobe apex acuminate or cordate-acuminate, margin entire, glabrous above, velvety pubescent beneath, coriaceous; 3–5-ribbed from base, palmate, prominent, lateral nerves 5–7 pairs, pinnate, prominent, intercostae subscalariform, faint. Flowers polygamous, greenish-yellow, in axillary panicles, covered with sticky tomentose of glandular, stellate hairs; calyx yellow, campanulate, hairy on both surfaces, lobes 5, a small hairy gland at the base of each lobe; petals absent; male flowers; staminal column short with 10 anthers at its tip; bisexual flowers; carpels usually 5, free, superior, on a short stout gynophore; style short, thick, hairy; stigmas 5; stamens in a ring round the carpel. Fruit an aggregate of 4–6 follicles, red densely pubescent, mixed with stinging hairs; seeds 3–6, brown or black, oblong.

Flowering & Fruiting: November–March.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 23.48453 N, 85.91217 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92373 (CAL).

Melochia L.

Melochia corchorifolia L., Sp. Pl. 2: 675. 1753; Mast. in Hook.f., Fl. Brit. India 1: 374. 1875; Haines, Bot. Bihar Orissa: 82. 1921; Prain, Bengal Pl. 1: 190. 1963 (Repr.); Malick in B.D. Sharma & Sanjappa (eds.), Fl. India 3: 441. 1993; Malick in Fl. West Bengal 1: 325. 1997.

Vernacular name: *Bon-pat* (Bengali), *Bilpat* (Hindi).



Herbs or undershrubs, 40–90 cm high. Stems terete, a few hairs to glabrous, reddish brown. Leaves simple, alternate, ovate, ovate-lanceolate, lanceolate, oblong-ovate or orbicular, 0.6–3.5 × 0.5–2 cm, rounded or cuneate to tapering at base, irregularly serrate at margins, acute at apex, 3–5-veined at base, glabrous, slightly punctate; petioles 0.1–3.5 cm long. Inflorescence clustered or terminal peduncled, small heads surrounded by 4 or 5 bracteoles. Flowers 5–6 mm long. Sepals 5, lanceolate, 1–2 mm long, connate at base, ciliate at margins, hairy outside. Petals 5, obovate to spatulate, 5–6 mm long, white. Stamens 5, connate beneath; filaments 1–2.5 mm long; anthers c. 1 mm long, basifixed, extrorse. Carpels 2–2.5 mm long; ovary sessile, 1–1.5 mm long, hairy, 5-loculed; styles short; stigma 5 or 6 fid. Capsules globose or subglobose, 5–6 mm across, pubescent, loculicidally 5-valved. Seeds 1 in each locule, trigonous, c. 1.5 × 2 mm, reddish brown.

Flowering & Fruiting: September–November.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 358.09 m, 23.47559201 N, 85.912507 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95014 (CAL).

TILIACEAE

Corchorus L.

Corchorus olitorius L., Sp. Pl. 1: 529. 1753; Mast. in Hook.f, Fl. Brit. India 1: 397. 1874; Haines, Bot. Bihar Orissa: 86. 1921; Prain, Bengal Pl. 1: 197. 1963 (Repr.); P. Daniel & Chandrab. in B.D. Sharma & al. (eds.), Fl. India 3: 487. 1993; Sanyal, Fl. Bankura Distr.: 70. 1994; R.N. Banerjee in Fl. West Bengal 1: 336. 1997.



Suffrutescent, annual herbs, 80–120 cm tall. Stems glabrous. Leaves elliptic-lanceolate, ovate-lanceolate or ovate-oblong, basally 3–5 nerved, acuminate at apex, serrulate at margin, rounded at base, glabrescent, 6–10 × 3–4 cm; basal sinatures with filiform appendages; petiole 1.5–2 cm long, pubescent. Stipules 0.5–1 cm long. Flowers 7–8 mm across, in 1–3-flowered leaf-opposed cymes; bracts and bracteoles filiform, 2.5–3 mm long. Sepals 5, oblong, apiculate, 4.5–5 mm long. Petals 5, yellow, oblong-spathulate, 5–6 mm long. Stamens many; filaments 5–6 mm long. Ovary c. 4 mm across; style short; stigma minutely papillose. Capsule linear, terete, ribbed, 4–6 cm long, with undivided erect beak, glabrous, 5-valved. Seeds 3-gonous, wedge-shaped, blackish-brown, 1.4–2 mm long and 1–1.2 mm broad.

Flowering & Fruiting: July–December.

Habitat: In waste places and in the moist places.

Specimens examined: Jhalda, MPCA, Kudagara, Arar Dungri, 322.45 m, 23.4746959805488 N, 85.9094259794801 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95023 (CAL).

Triumfetta Plum. ex L.

Triumfetta rhomboidea Jacq., Enum. Syst. Pl.: 22. 1760; Mast. in Hook.f., Fl. Brit. India 1: 395. 1874; Haines, Bot. Bihar Orissa: 85. 1921; Prain, Bengal Pl. 1: 196. 1963 (Repr.); R.N. Banerjee in Fl. West Bengal 1: 343. 1997.

Vernacular name: *Ban okra* (Bengali), *Chikti* (Hindi).



Herbs, 10–100 cm high, simple or branched, stellate-pubescent. Leaves ovate-rounded to orbicular; lower ones deeply 3-lobed, 5–8 cm across; upper ones lobed or entire, rounded or cuneate at base, chartaceous, 5-nerved at base; petioles to 5 cm long; stipules 3–3.5 mm long. Flowers fascicled in terminal and leaf opposed cymes, 3.5–4 mm across, yellow; peduncles c. 2 mm long; pedicels 1–1.5 mm long; bracts linear-lanceolate, 2.2–2.5 mm long. Sepals narrowly oblong-lanceolate, apiculate at

apex, 5–6 mm long, stellate-pubescent outside. Stamens 10–15, to 4 mm long. Ovary globose, 4-loculed; stigma 2–4-fid. Capsules ellipsoid or subglobose, 4–5 mm across, prickled; prickles c. 1.5 mm long; seeds 1 per locule, 2.5–3 × c. 2 mm.

Flowering & Fruiting: October–January.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 551.64 m, 23.483054 N, 85.91081704 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93465 (CAL); 320.44 m, 23.47271185 N, 85.9141652 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93577 (CAL).

Uses: Leaves and flowers are used in leprosy. Bark yields a fibre used for cordage. It is also used in diarrhoea and dysentery.

URTICACEAE

Holoptelea Planch.

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat., Bot. ser. 3, 10: 259. 1848; Hook.f. in Hook.f., Fl. Brit. India 5: 481. 1888; Haines, Bot. Bihar Orissa: 807. 1924. Prain, Bengal Pl. 2: 719. 1963 (Repr.); Ghara & M.K. Pathak in Lakshmin. & al. (eds.), Fl. West Bengal 4: 635. 2019. *Ulmus integrifolia* Roxb., Pl. Coromandel 1: 56. 1795 & Fl. Ind. 2: 68. 1832.

Vernacular Names: *Nata karanja* (Bengali), *Chilbil*, *Papri* (Hindi).

Trees, to 20 m high, deciduous; bark smooth, whitish grey; branchlets pubescent. Leaves simple, alternate, elliptic or ovate, 3–10 × 2.5–5.5 cm, rounded or subcordate at base, entire at margins, acute to acuminate at apex; lateral veins 4–7 pairs; stipules lateral, scarious; petioles stout, 5–12 mm long. Inflorescence a short raceme or fascicle on leafless branches. Flowers polygamous, 5–8 mm across; pedicels c. 1 cm long, jointed. Tepals 4 or 5, hairy, light purplish green.



Stamens 4–8, pubescent; anthers c. 1 mm long. Female flowers with longer pedicels; ovary superior, compressed, long-stipitate, 2-winged, 1-loculed; ovule 1; style 2-fid. Samaras broadly elliptic or orbicular, c. 2.8 × 2.5 cm; wings papery, notched, glabrous, reticulate-veined, yellowish brown. Seed one.

Flowering & Fruiting: January–May.

Habitat: On dry deciduous forest and on forest edges.

Specimens examined: Jhalda MPCA, Kudagara, 291.72 m, 23.47277401 N, 85.90954802 E, 6.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93463 (CAL).

VERBENACEAE

Clerodendrum L.

Clerodendrum infortunatum L. Sp. Pl. 2: 637. 1753 (*'infortunata'*); C.B. Clarke in Hook.f., Fl. Brit. India 4: 594. 1885; Haines, Bot. Bihar Orissa: 721. 1922.

Vernacular name: *Bhant* (Bengali, Hindi), *Ghetu* (Bengali).



Shrubs, 1–2 m high; branchlets obtusely 4-angled, densely white-villous. Leaves cordate, ovate-cordate or orbicular sometimes, cordate or subtruncate at base, entire or rarely faintly serrate at margins when young, abruptly short-acuminate at apex, 9–25 × 4–23 cm, thin, smooth, sparsely yellowish pubescent above, densely so below, dark green; venation sub-palmate; petioles 3–12 cm long, densely yellowish pubescent. Inflorescences a decussately branched cymose panicle, terminal, 10–25 cm long; peduncles obtusely 4-angled, 1–6 cm long, red or purplish;

bracts foliaceous, ovate-elliptic, acuminate at apex, c. 3 × 1.5 cm, densely yellowish pubescent, usually aduceus; bractlets caducous. Flowers fragrant; pedicels slender, to 2 cm long, red or purple. Calyx green, 5-lobed; lobes not overlapping, lanceolate, c. 1.5 × 0.5 cm, distinctly mid-nerved, densely pubescent. Corolla hypocrateriform, 2.5–3 cm long, white, purple-tinged at mouth; tube narrow, 1.2–1.6 cm long, 5-lobed; lobes ovate-oblong, subequal, obtusely apiculate at apex, 6–1.2 cm long. Stamens 4, didynamous; filaments filiform, 1.8–2 cm long, glabrous, cream-coloured; anthers elliptic, c. 2 mm long, yellow. Ovary oblong, depressed at apex, c. 2 mm long, glabrous; style slender, c. 3 cm long; stigma 2-lobed; lobes equal, subulate. Drupes subglobose, to 1.2 × 1 cm, green, bluish black when mature, enclosed by accrescent, bright red calyx; pyrenes 4.

Flowering & Fruiting: February–July.

Habitat: On forest edges and in open areas.

Specimens examined: Jhalda MPCA, Kudagara, 316.14 m, 23.47253404 N, 85.91423099 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93423 (CAL).

Uses: Leaves used as tonic, vermifuge and laxative. Poultice of leaves and root applied externally to treat tumours.

Lantana L.

Lantana camara L., Sp. Pl. 2: 627. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 562. 1885; Haines, Bot. Bihar Orissa: 705. 1922; Prain, Bengal Pl. 2: 615. 1963 (Repr.). T.K. Paul in Lakshmin. & al. (eds.), Fl. West Bengal 4: 270. 2019. *Lantana camara* L. var. *aculeata* (L.) Moldenke in Torreya 34: 9. 1934; N.P. Singh & al. (eds.), Fl. Bihar Anal.: 401. 2001.

Vernacular name: Putus (Bengali), Raimuniya (Hindi).

Shrubs, 2–3 m high; stems 4-gonous, much branched, armed with recurved prickles. Leaves ovate, rounded to subcuneate at base, crenate or serrate along margins, acute to short acuminate at apex, 2–9 × 2–6 cm, chartaceous, dark green scabrous above, paler densely resinous-punctate; lateral nerves 4–5 pairs, distinct below; petiole slender, 0.5–3 cm long, with conspicuous prickles. Inflorescences axillary, pseudo umbellate or subumbellate, c. 0.5 × 1 cm; peduncles slender, 3–8 cm long, with inconspicuous prickles; bracts lanceolate-oblong, 3–5 nerved,



appressed hairy, 4–6 mm, ciliate along margins, pubescent outside. Flowers fragrant, sessile, in cymes. Calyx truncate, entire, sinuate, 2–3 mm, pubescent outside. Corolla hypocrateriform, 2-lipped, 5-lobed, orange, pinkish red, yellow, rose, crimson or purplish pink; upper lip 2-lobed; lobes subrotund; lower lip 3-lobed; midlobe subrotund, recurved, c. 4 × 3 mm; lateral lobes obtuse, c. 2 × 1 mm; tube narrow, curved, c. 1 × 0.1 cm, pubescent outside. Stamens 4, didynamous; filaments c. 1 mm long; anthers ovoid, c. 5 mm long, basifixed. Ovary conical, c. 3 mm long; style stout, c. 3 mm long; stigma obliquely subcapitate. Drupes obovoid, c. 3 mm, fleshy, greenish or purple.

Flowering & Fruiting: April–June.

Habitat: On the waste land and in the open areas and in the forest edges and along the pathways.

Specimens examined: Jhalda MPCA, Kudagara, 306 m, 23.47258701 N, 85.914563 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93425 (CAL).

Uses: Plant is used as green manure.

Tectona L.f.

Tectona grandis L. f., Suppl. Pl.: 151. 1782; C.B. Clarke in Hook.f., Fl. Brit. India 4: 570. 1885; Haines, Bot. Bihar Orissa: 710. 1922; Prain, Bengal Pl. 2: 618. 1963 (Repr.); T.K. Paul in Lakshmin. & al. (eds.), Fl. West Bengal 4: 281. 2019.

Vernacular name: *Segun* (Bengali), *Sagun*, *Sagwan* (Hindi).



Trees, to 25 m tall; branches and branchlets 4-angular; nodes annulate. Leaves ovate-elliptic, abruptly cuneate or long-attenuate and prolonged into a petiole, entire or repent-denticulate at margins, acute or short-acuminate at apex, 12–50 × 6–30 cm, subcoriaceous, scarbid, muricate above, densely yellow-pubescent below; lateral nerves 8–12 pairs, ascending, arcuate at apex, distinct below; petioles acutely 4-angular, canaliculate, 1.5–6 cm long, grey-tomentose. Inflorescences cymose panicles, terminal and axillary, 8–28 × 7–25 cm, yellow-tomentose throughout; primary peduncles 8–10 cm long; secondary

peduncles 2–5 cm long, acutely 4-angular; bracts lanceolate, acute or acuminate at apex, c. 10 × 2 mm; bractlets linear, c. 5 × 1 mm. Flowers fragrant; pedicels terete, 5–8 mm long, grey-tomentose. Calyx campanulate, c. 4 × 3 mm, shortly 6–8-lobed; lobes acute, c. 5 × 1 mm, pubescent outside. Corolla hypocrateriform, 5–7-lobed, white; limb patent or reflexed; lobes oblong-lanceolate, acute at apex, c. 6 × 2 mm; tube c. 1 mm long, glabrous. Stamens as many as corolla lobes, inserted at corolla throat; filaments slender, 2–4 mm long, white; anthers subglobose, 1–1.5 mm long, black. Ovary globose, c. 2 mm, pubescent, 4-loculed; style slender, 4–5 mm long, glabrous; stigma subequally 2-lobed. Drupes globose, to 1.5 cm, densely tomentose; fruiting calyx to 2.5 cm long, wide, inflated, chartaceous, bladder-like, light brown and brittle when dry.

Flowering & Fruiting: June–January.

Habitat: On dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 344.44 m, 23.47501298 N, 85.91233098 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95016 (CAL).

Uses: One of the best durable timber yielding plant, fatty oil extracted from the plant is used to cure scabies and to promote hair growth.

Vitex L.

Vitex negundo L. Sp. Pl. 2: 638. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 538. 1885; Haines, Bot. Bihar Orissa: 711. 1922; Prain, Bengal Pl. 2: 622. 1963 (Repr.); Chakrab. in Lakshmin. & al. (eds.), Fl. West Bengal 4: 283. 2019.

Vernacular name: Nishinda (Bengali), *Nirgundi*, *Sindvar* (Hindi).

Shrubs, 3–5 m high; stems and branches obtusely 4-angular, slender, white, grey or purple-pubescent. Leaves 3–5 foliolate; petioles 2.5–9.5 cm long, canaliculate, pubescent; leaflets lanceolate, elliptic-lanceolate, acute or cuneate at base, entire or sometimes coarsely serrate along margins, acuminate at apex; middle leaflets 5–15 × 2.5–4 cm; petiolules 1–3 cm long; lateral leaflets 3–4 × 0.8–1 cm; petiolules sessile, chartaceous, dark green sparsely pubescent above, grey pubescent beneath; lateral nerves 12–18 pairs, subparallel, arcuate at margin, distinct on both surfaces .



Inflorescences panicles, terminal, 15–20 cm long; peduncles obtusely 4-angular, sulcate between angles, 3–7 cm long, pubescent; bracts foliaceous, lanceolate, caducous. Flowers fragrant; pedicels 1–3 mm long, pubescent. Calyx campanulate or obconic, c. 3 × 2 mm, 5-toothed; teeth acute, c. 1 mm long, pubescent outside. Corolla hypocrateriform, 2-lipped, 5-lobed, violet, blue with pink tinge or purple; upper lip 2-lobed ovate, c. 1 mm long; lower lip 3-lobed; midlobe obovate, subentire, concave, c. 3 mm long; lateral lobes ovate, acute, c. 1 mm long; tube narrow, ampliate towards apex, c. 3 × 1 mm, densely villous at throat, pubescent outside. Stamens 4, didynamous; filaments slender, 4–5 mm long, exserted, white or purple, glabrous above, densely villous at base oblong, c. 1 mm long, divaricate, basifixed, black. Ovary oblong, c. 2 mm long, glabrous; style slender, c. 8 mm long, exserted, glabrous, blue; stigma 2-lobed; lobes subulate, subequal. Drupes subglobose, 3–5 mm across, glabrous, shiny, black; fruting-calyx cupular, 3–3.5 × 4–5 mm, shallowly toothed, densely pubescent.

Flowering & Fruiting: Throughout the year.

Habitat: In dry deciduous forest and along roads.

Specimens examined: Jhalda MPCA, Kudagara, 340.25 m, 23.47587397 N, 85.90704602 E, 8.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93500 (CAL).

Violaceae

Hybanthus Jacq.

Hybanthus enneaspermus (L.) F. Muell., *Fragm.* 10: 81. 1876; S.P. Banerjee & Pramanik in B.D. Sharma & N.P. Balakr. (eds.), *Fl. India* 2: 343, t. 64. 1993; Prain, *Bengal Pl.* 1: 152. 1963 (Repr.); S.P. Banerjee & Pramanik in *Fl. West Bengal* 1: 214. 1997. *Viola enneasperma* L., *Sp. Pl.* 2: 937. 1753. *Ionidium suffruticosum* (L.) Roem. & Schult., *Syst. Veg.* 5: 394. 1819; Hook.f. & Thomson in Hook.f., *Fl. Brit. India* 1: 185. 1872; Haines, *Bot. Bihar Orissa*: 33. 1921.

Vernacular name: *Munbora* (Bengali), *Ratanpuras* (Hindi).



Herbs, annual or perennial, diffuse or semi-erect, 10–30 cm high, woody at base. Stems angular, more or less pubescent. Leaves simple, alternate, linear-lanceolate, 0.5–3 × 0.2–0.7 cm, decurrent at base, entire to remotely serrate at margins, acute at apex, glabrous, pellucid-punctate; stipules subulate, 1–2 mm long, gland-tipped. Flower solitary, axillary, 6–8 mm across; pedicel filiform, c. 7 mm long. Sepals triangular to lanceolate, subequal, 2–4 mm long, glabrous or ciliate. Petals purple-rose; posterior pair 2.5–3.5 mm long; middle pair 2.8–4 mm long; anterior

one 5–15 mm long, clawed; claw c. 3.5 mm long; limb ovate or orbicular, 1.5–5 mm wide. Stamens 2–3 mm long; anterior stamen with a small recurved appendage, glabrous or hairy. Ovary to 1.2 mm wide. Capsules subglobose, 4–5 mm across, green, 3-lobed, c. 10-seeded. Seeds c. 2 mm long, ribbed, straw-coloured or off-white.

Flowering & Fruiting: Throughout the year.

Habitat: In shady localities of the forest.

Specimens examined: Jhalda MPCA, Kudagara, 364.91 m, 23.48107 N, 85.90988204 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93540 (CAL).

VITACEAE

Ampelocissus Planch.

Ampelocissus latifolia (Roxb.) Planch., Vigne Amér. Vitic. Eur. 8: 374. 1884; J. Bhattacharya & T.K. Paul in Fl. West Bengal 1: 434. 1997. *Vitis latifolia* Roxb., Hort. Bengal.: 18. 1814; M.A. Lawson in Hook.f., Fl. Brit. India 1: 652. 1875; Prain, Bengal Pl. 1: 337. 1903; Haines, Bot. Bihar Orissa: 203. 1921.

Vernacular name: *Ghoralidi* (Hindi).

Climbers; branches terete, striate, hollow, glabrous. Leaves simple, broadly cordate-ovate, 3–5-lobed, usually deep-cordate at base, serrate at margins, acute to acuminate at apex, 10–25 × 10–24 cm, glabrous, 5-nerved at base; petioles 5–15 cm long, upper half deeply grooved. Inflorescences thyrsoid cymose panicles; peduncles 5–10 cm long, glabrous, bearing tendrils; tendrils branched, 10–15 cm long, puberulous. Flowers c. 2 mm long, 5-merous, reddish brown; pedicels c. 1 mm long; primary branch of inflorescences 1.5–5 cm long; thyrses 3–7 cm long, puberulous. Calyx saucer-shaped, entire, glabrous. Petals oblong, slightly incurved at apex, c. 1.5 × 0.8 mm, glabrous. Stamens 4–5, c. 1.2 mm long; anthers globose. Disk enclosing about half of ovary, 5-grooved. Ovary c. 1 mm across, glabrous; stigma sessile. Berries globose, 7–9 mm, black when ripe, 2–4-seeded; seeds elliptic-oblong, 6–7 × 4–5 mm; adaxial surface with a broad longitudinal ridge and a groove on either side.



Flowers c. 2 mm long, 5-merous, reddish brown; pedicels c. 1 mm long; primary branch of inflorescences 1.5–5 cm long; thyrses 3–7 cm long, puberulous. Calyx saucer-shaped, entire, glabrous. Petals oblong, slightly incurved at apex, c. 1.5 × 0.8 mm, glabrous. Stamens 4–5, c. 1.2 mm long; anthers globose. Disk enclosing about half of ovary, 5-grooved. Ovary c. 1 mm across, glabrous; stigma sessile. Berries globose, 7–9 mm, black when ripe, 2–4-seeded; seeds elliptic-oblong, 6–7 × 4–5 mm; adaxial surface with a broad longitudinal ridge and a groove on either side.

Flowering & Fruiting: July–October.

Habitat: On dry deciduous forest and near the streams.

Specimens examined: Jhalda MPCA, Kudagara, 364.29 m, 23.48097596 N, 85.90979499 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93536 (CAL).

Uses: Fruits are edible. Juice of tender leaves is used in dental troubles and as detergent for ulcer. Decoction of leaves used in dysentery.

Cyphostemma (Planch.) Alston

Cyphostemma auriculatum (Roxb.) P. Singh & B.V. Shetty, *Taxon* 35: 596. 1986.
Cissus auriculata Roxb., *Fl. Ind.* 1: 411. 1820; M.A. Lawson in Hook.f., *Fl. Brit. India* 1:
658. 1875 *Vitis erythroclada* (Roxb.) Kurz in *J. Asiat. Soc. Bengal*, Pt. 2, *Nat. Hist.* 41:
301. 1872.



Scandent shrubs; bark on older stems deeply cracked, branches terete, succulent, softly pubescent; tendrils branched. Leaves digitate, 5-foliolate, soft-pubescent when young. Petioles 7–15 cm long; stipules falcate, c. 1 × 0.5 cm; terminal leaflet obovate to rhomboid or elliptic, cuneate at base, serrate at margin, acute to short acuminate at apex, 10–13 × 5.5–8.5 cm; petiolules 1–2 cm long; lateral leaflets 7–12 × 4–7 cm; petiolules c. 1 cm long. Inflorescences axillary or pseudoterminal much branched divaricate cymes, 11–26 cm long; peduncles 7–19 cm long, pubescent. Flowers contracted in middle, pubescent; pedicels 2–3 mm long. Calyx cupular, truncate. Petals oblong, c. 2.5 × 1.5 mm. Disc of 4 glands, covering most of ovary. Ovary pyramidal, hairy. Berries globose, c. 1 cm, 1-seeded; Seed oblong-obovoid to subglobose, with a crest on dorsal side.

Flowering & Fruiting: July–November.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 363.90 m, 23.48081703 N, 85.90981599 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93533 (CAL).

Leea D.Royen

Leea asiatica (L.) Ridsdale in K.S. Manilal, Bot. Hist. Hort. Malabaricus: 189. 1980. *Phytolacca asiatica* L., Sp. Pl. 1: 441. 1753. *Leea crispa* L., Mant. Pl.: 124. 1767; M.A. Lawson in Hook.f., Fl. Brit. India 1: 665. 1875; Haines, Bot. Bihar Orissa: 208. 1921; R.N. Banerjee in Fl. West Bengal 1: 452. 1997.

Vernacular name: *Banchalita* (Bengali, Hindi).



Undershrubs, up to 3 m high. Stems usually fluted, crispate-winged. Leaves 1 or 2-pinnate; rachis 4–12 cm long; petiolar stipules represented by a narrow wing; petioles 1–4 cm long; leaflets 3–7, broadly ovate to elliptic or ovate-oblong to elliptic-oblong, 10–20 × 4–9 cm, rounded to cordate at base, sharply serrate at margins, acute or acuminate to caudate at apex, chartaceous to subcoriaceous, glabrous or sparsely hairy above and densely below with sparse globular pearl glands; petiolules 5–15

mm long; lateral nerves 8–16 pairs, prominently parallel, each one running into serrature in margin; veins prominent beneath. Inflorescences cymose, 2–12 cm long, glabrous or pubescent; flowers greenish-white; bracts ovate to linear-lanceolate, to 6 mm long, subpersistent; bracteoles lanceolate, c. 3 mm long; peduncles to 6 mm long. Calyx campanulate, c. 2 × 3 mm, glabrous to pubescent; lobes triangular, gland tipped. Corolla tube along with staminodal lobes 3–4 mm long; corolla lobes 2.5–3 × 1–1.5 mm, cream-coloured. Staminodal lobes deeply bifid. Stamens 5, free. Ovary 4–8-loculed; style 1–2 mm long, grooved; stigma capitate. Berries depressed-globose, c. 12 mm across, purple-black; seeds usually 6, c. 5 × 3 mm.

Flowering & Fruiting: August–December.

Habitat: In dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 330.16 m, 23.47446204 N, 85.91221497 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95019 (CAL).

Uses: Fruits edible; tuberous roots used against guinea worms.

ARACEAE

Colocasia Schott

Colocasia esculenta (L.) Schott in Schott & Endl., Melet. Bot.: 18. 1832. *Arum esculentum* L., Sp. Pl. 2: 965. 1753. *Colocasia antiquorum* Schott in Schott & Endl., Melet. Bot.: 18. 1832; Hook.f., Fl. Brit. India 6: 523. 1893; Haines, Bot. Bihar Orissa: 867. 1924.

Vernacular name: *Banakachu* (Bengali), *Taro* (English), *Arvi*, *Kachalu* (Hindi).



Herbs, c. 70 cm high, tuberous. Leaves ovate or subtriangular, cordate or sagittate at base with a triangular basal sinus, subentire-repand at margins, acute-apiculate at apex, to 40 × 30 cm, glabrous, dull above, paler or coloured below; petioles to 75 cm long. Inflorescences spadix; peduncles to 50 cm long. Spathe tube 3.5–5 × 1.2–1.5 cm, green; limb lanceolate or elliptic, acuminate at apex, 10–19 × 2–5 cm, cream-coloured to golden yellow, open proximally. Spadix 8–20 cm long, 1–1.5 cm diam., appendaged; pistillate part 2.5–4 cm long, pistils intermixed with several whitish pistillodes;

ovaries ovoid or oblong, 1-celled; stigmas sessile, flat, 3–5-rayed; ovules several to many; staminate part 3–4 cm long; appendix 2–4 cm long. Staminate flowers orange; stamens 3–6, connate in obpyramidal synandrium; anthers open by short slits. Berries oblong, c. 4 mm long, green, red when ripened; seeds oblong, 1–1.5 mm, elongate, grooved.

Flowering & Fruiting: August–December.

Habitat: Along edges of forests and water bodies, in moist shady places.

Specimens examined: Jhalda MPCA, Kudagara, 436.25 m, 23.48513899 N, 85.91351602 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95049 (CAL).

Uses: Tubers are edible, eaten boiled or fried. They are also used for production of industrial alcohol.

ASPARAGACEAE

Asparagus Tourn. ex L.

Asparagus racemosus Willd., Sp. Pl. 2: 152. 1799; Hook.f., Fl. Brit. India 6: 316. 1862; Haines, Bot. Bihar Orissa: 1089. 1924.

Vernacular name: *Satamuli* (Bengali & Hindi), *Buttermilk Root*, *Climbing Asparagus* (English).

Undershrubs, perennial, scrambling or scandent, suffruticose, spinous, much-branched with tuberous rootstock; branches angular. Leaves linear-subulate, acuminate at apex, 4–6 mm long, reduced to spinescent scales. Cladodes in groups of 2–6, falcate, trigonous, entire at margins, acuminate at apex, 1.2–2.5 cm long, green. Inflorescences racemes, 5–15 cm long, simple or branched; rachis triquetrous. Flowers white, fragrant, 5–6 mm across; pedicels filiform, 2–3 mm long; bracts ovate-triangular, acute at apex, 1.3–1.6 mm long. Perianth lobes 6, linear-oblong, obtuse at apex, c. 2.5 × 0.8 mm, white. Stamens 6, adnate to base of perianth lobes; filaments free; anthers subglobose. Ovary obovoid, 3-celled; ovules 4; style very short; stigmas 3, spreading. Berries globose, 3.5–6 mm, green, scarlet when ripe; seeds 3–6, c. 2 mm across.



Flowering & Fruiting: September–December.

Habitat: In open, disturbed places along edges of forests.

Specimens examined: Jhalda MPCA, Kudagara, 316.54 m, 23.47594103 N, 85.90762102 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93592 (CAL).

Uses: Root juice is mixed with honey and given in dyspepsia; roots are also used in nervous and rheumatic complaints. Plant is also used as diuretic.

COLCHICACEAE

Gloriosa L.

Gloriosa superba L., Sp. Pl. 1: 305. 1753; Hook.f., Fl. Brit. India 6: 358. 1892; Haines, Bot. Bihar Orissa: 1093. 1924; Karthik. & al., Fl. Ind. Enum. Monocot.: 95. 1989.

Vernacular name: *Ulatchandal*, *Agnisikha* (Bengali), *Glory Lily* (English), *Karihari*, *Langali* (Hindi).



Climbers with stout, tuberous rhizomes, perennials; tubers fleshy, cylindric. Stems slender, glabrous, scandent, sometimes branched. Leaves cauline, alternate, opposite, or whorled, subsessile, ovate-lanceolate, rounded or subcordate at base, entire at margin, cirrhose at apex, 8–15 × 2–5 cm, glabrous; parallel-veined; mid vein prominently impressed above. Flowers large, showy, long-pedicelled, single or in a corymb; pedicels 6–8 cm long, bend backwards at apex. Tepals 6 (3+3), oblong-lanceolate, narrowed at base, crisply wavy at margins, acuminate at apex, 5–8 × 1–1.5 cm, glabrous, yellow and red mixed, purely scarlet-red later. Stamens 6, inserted at base of tepals; filaments 4–6 cm long; anthers 1–1.2 cm long, dehiscing by longitudinal slits. Ovary 3-loculed; ovules many per locule; style to 5 cm long; apically 3-lobed; stigmatic arms 5–6 mm long. Capsules oblong, 3–5.5 × 1–2.5 cm, smooth, green; seeds many, dorsally compressed, subglobose, 3.5–4 mm across, warty.

Flowering & Fruiting: July–October.

Habitat: In the dense thickets near the water source.

Specimens examined: Jhalda MPCA, Kudagara, 320.27 m, 23.47437504 N, 85.91228203 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93550 (CAL).

Uses: Tubers possess several alkaloids, chiefly colchicines, which are used in treatment of gout and rheumatism, and also in the laboratory to induce polyploidy.

COMMELINACEAE

Commelina Plum. ex L.

Commelina benghalensis L., Sp. Pl. 1: 41. 1753; Hook.f., Fl. Brit. India 6: 370. 1892; Haines, Bot. Bihar Orissa: 1077. 1924.

Vernacular name: Bengal Dayflower (English), Kanchara (Hindi).



Herbs, perennial, decumbent or ascending. Stems usually creeping and rooting, well branched, striate, sparsely pubescent. Leaves sessile ovate or ovate-elliptic or suborbicular, rounded, subtruncate or subacute and slightly oblique at base, ciliate at margin, obtuse or rounded at apex, 1–8 × 1–4 cm, subglabrous; petioles 4–5 mm long; sheaths with an oblique, long-ciliate mouth, 1–1.5 cm long. Spathes 1–3 together, subsessile, turbinate, auricled at base on one side, 0.8–1.5 cm long, hairy outside. Cymes 2-nate; upper branch 2 or 3-flowered; lower ones usually 1 or 2-flowered; peduncles 1–1.5 cm long; pedicels 3–4 mm long. Sepals 3, unequal; outer one ovate-lanceolate, 3–3.2 × 1.3–1.5 mm; inner ones suborbicular, c. 3.2 mm across. Petals 3, c. 4 × 4.5 mm, blue; larger ones broadly ovate; smaller one shallowly notched, c. 2.5 × 1.5 mm. Stamens 3, perfect, to 3.5 mm long; staminodes 2–3; filaments filiform, often beared with joint hairs; anthers oblong. Cleistogamous flowers ovoid, 4–6 mm long. Capsules short-stalked, trigonous, c. 6 × 4 mm, membranous, 3-loculed, 3-valved; 2 anterior cells larger, 2-seeded each; posterior cell smaller, 1-seeded; seeds subquadrate to oblong, 2–3 mm long, pitted, brown.

Flowering & Fruiting: June–November.

Habitat: Near water bodies in open moist forest floor.

Specimens examined: Jhalda MPCA, Kudagara, 363.47 m, 23.48077596 N, 85.90971499 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93535 (CAL).

Uses: Rhizomes are cooked and eaten; plant extract is used in leprosy.

Cyanotis D. Don

Cyanotis cristata (L.) D. Don, Prodr. Fl. Nepal.: 46. 1825; Hook.f., Fl. Brit. India 6: 385. 1892; Haines, Bot. Bihar Orissa: 1081. 1924; N.P. Singh & al. (eds.), Fl. Bihar Anal.: 533. 2001. *Tradescantia cristata* L., Sp. Pl. 1: 42. 1753.

Vernacular name: Crested Dew-Grass (English).



Annual herb; stem creeping below; branches slender, ascending, glabrous or patently ciliate. Leaves ovate-oblong, 3–8 × 1.5–2.5 cm, fleshy, apex subacute to obtuse, margin ciliate, base rounded or subcordate; sheath short, margin ciliate. Cymes scorpioid in the axil of an ordinary leaf like terminal spathe; bracts 2-seriate, imbricate, falcate, 0.5–1.5 × 0.4–0.8 cm, acute, ciliate on midrib. Corolla blue or purple; tube not much exceeding sepal length. Capsules 2.5–3.5 mm long, trigonous, subglabrous; seeds trigonous, dark brown to black, with a pair of pits on two lateral faces.

Flowering & Fruiting: Throughout the year.

Habitat: Rocky

outcrops, usually in moist crevices or shallow soil, under trees and shrubs, thicket edges, near streams; sun exposed or in partial shade.

Specimens examined: Jhalda, MPCA, West Bengal-Jharkhand Border, Kudagara, 437.01 m, 23.4847290348261 N, 85.911577027291 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95037 (CAL).

Murdannia Royle

Murdannia nudiflora (L.) Brenan in Bull. Misc. Inform. 1952: 189. 1952; Karthik. & al., Fl. Ind. Enum. Monocot.: 29. 1989; Sanyal, Fl. Bankura Distr.: 443. 1994. *Commelina nudiflora* L., Sp. Pl. 1: 41. 1753, p.p. *Aneilema nudiflorum* Wall. ex Hook.f., Fl. Brit. India 6: 378. 1892; Haines, Bot. Bihar Orissa: 1080. 1924.

Vernacular name: Doveweed (English), Kansura (Hindi).



Erect or decumbent, annual herbs, often rooting from lower nodes, 10–30 cm long. Leaves linear-lanceolate or oblong, 5–10 × 0.5–1 cm, acute, base rounded; sheath up to 1 cm long, patent hairy along margin, ciliate on mouth. Flowers 2–5 in terminal or leaf opposed paniculate cymes; peduncles 2–9 cm long; bracts 2 mm long, membranous. Sepal and petals obovate to rounded, 4–5 mm long, lilac, mauve or pale blue. Fertile stamens 2; filaments bearded. Staminodes 3–4. Capsules subglobose; seeds 2 in each chamber, trigonous, 1 mm long, tuberculate, brown.

Flowering & Fruiting: August–November.

Habitat: In moist, open places along with grasses.

Specimens examined: Jhalda, MPCA, Sewati, 366.18 m, 23.4808980021625 N, 85.9099670313298 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93512 (CAL).

Murdannia spirata (L.) G. Bruckn. in Engler & Prantl., Pflanzenfam. ed. 2, 15a: 173. 1930; Sanyal, Fl. Bankura Distr.: 443. 1994. *Commelina spirata* L., Mant. Plant. 2: 176. 1771. *Aneilema spiratum* (L.) R. Br. ex Sweet, Hort. Suburb. Lond.: 12.1818; Hook.f., Fl. Brit. India 6: 377. 1892; Haines, Bot. Bihar Orissa: 1079. 1924.



Procumbent or ascending herbs, much branched, annual, 10–20 cm long; roots fibrous. Leaves oblong or somewhat ovate or lanceolate, 1.5–3.5 × 0.5–1 cm, subacute to acute, base rounded or subcordate. Spathe ciliate on margins and mouth. Flowers in terminal, paniculate cymes; bracts ovate, persistent. Petals ovate, rounded, blue. Fertile stamens 3. Capsules oblong, acutely trigonous, 3.5–4.5 × 2–2.5 mm; seeds 3 to more in each locule, trigonous, pale brown, slightly rugulose.

Flowering & Fruiting: August–November.

Habitat: Common along the roadside, ditches, rocky outcrops, open flats, stream margins, waste lands, in cultivation fields, full or partial shade.

Specimens examined: Jhalda, MPCA, West Bengal-Jharkhand Border, Kudagara, 430.18 m, 23.4846789948642 N, 85.9109039604663 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95034 (CAL).

COSTACEAE

Hellenia Retz.

Hellenia speciosa (J.Koenig) S.R. Dutta in *Pleione* 7: 228. 2013. *Banksea speciosa* J.Koenig in A.J. Retzius, *Observ. Bot.* 3: 75. 1783. *Costus speciosus* (J. Koenig) Sm., *Trans. Linn. Soc. London* 1: 249. 1791; Baker in Hook.f., *Fl. Brit. India* 6: 249. 1892; Haines, *Bot. Bihar Orissa*: 1145. 1924; Sanyal, *Fl. Bankura Distr.*: 423. 1994. *Cheilocostus speciosus* (J. König) C.D. Specht, *Taxon* 55: 159. 2006.

Vernacular name: Keu (Bengali & Hindi), *Crepe Ginger* (English).



Tuberous herbs, perennials, to 1.5 m high. Leaves spirally arranged, elliptic-oblong or elliptic-obovate, acuminate at apex, narrowly rounded at base, appressed-hairy above, silky below, 5–13 × 3–5 cm; sheaths coriaceous. Inflorescences terminal globose spikes; bracts bright red, ovate, 1–2 cm long, acute at apex, densely pubescent. Calyx red, funnel-shaped, 3-lobed; lobes ovate, acute at apex. Corolla lip white, sub-orbicular, c. 5 × 3 cm long, concave, plicate, crisped. Stamen 1; filament broad forming an oblong petaloid process. Ovary 3-locular; stigma funnel-shaped. Capsules red, globose, c. 2 cm across, crowned with persistent calyx; seeds black, asymmetrical.

Flowering & Fruiting: August–October.

Habitat: As an undergrowth in forests and in moist slopes.

Specimens examined: Jhalda, MPCA, Sewati, 422.54 m, 23.4830809850245 N, 85.9108649846166 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95056 (CAL).

CYPERACEAE

Cyperus L.

Cyperus brevifolius (Rottb.) Endl. ex Hassk., Cat. Hort. Bot. Bogor. (Hasskarl) : 24. 1844. *Kyllinga brevifolia* Rottb., Descr. Icon. Rar. Pl.: 13. t. 4. f. 3. 1773; Hook.f., Fl. Brit. India 6: 588. 1893; Haines, Bot. Bihar Orissa: 907. 1924.



Perennial herb, 5–30 cm high, rhizome horizontally creeping. Stems distantly or closely arranged in a row, triquetrous, smooth. Leaves simple, usually well developed, radical or subradical, narrowly linear, 2–20 × 0.1–0.3 cm usually shorter than stems, entire at margins, gradually acuminate at apex, wide; sheaths membranous, brownish or purplish, lowest 1 or 2 bladeless.

Inflorescence a terminal, globose or ovoid head, 4–10 × 5–8 mm, greenish, ultimately stramineous, rarely with 1 or 2 smaller heads from the base, densely bearing numerous spikelets. Involucral bracts 3–4, leafy, unequal in size; lowest 2–10 cm long; often erect. Spikelets strongly compressed, elliptic-oblong or oblong-lanceolate, 2–3.5 × c. 1 mm, 1-flowered. Glumes elliptic-ovate to boat-shaped, membranous; first glume 0.5–1 mm long; second c. 1 mm; third and fourth mucronate at apex, 2.5–3.5 mm long, strongly compressed, acutely keeled, with 2–3-veined sides; keel usually spinulose. Stamens 1–2; filaments c. 2 mm long; anthers linear, c. 0.5 mm long. Style c. 1 mm long; stigmas 2, c. 1 mm long. Nut biconvex, laterally compressed, obovate or elliptic, 1–1.5 × 0.5–0.8 mm, apiculate at apex, ultimately brownish.

Flowering & Fruiting: September–November.

Habitat: In open, sunny places near waterbodies.

Specimens examined: Jhalda MPCA, Kudagara, 380.47 m, 23.47100803 N, 85.91977403 E, 8.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93497 (CAL).

Cyperus compressus L., Sp. Pl. 1: 46. 1753; Hook.f, Fl. Brit. India 6: 605. 1893; Prain, Bengal Pl. 2: 1143. 1903; Haines, Bot. Bihar Orissa: 896. 1924; Mooney, Suppl. Bot. Bihar Orissa: 144. 1950; Karthik. & al., Fl. Ind. Enum. Monocot.: 44. 1989.

Annual, 6–20 cm high, with fibrous roots. Culms triquetrous, smooth, striate, glabrous. Leaves simple, linear, 4–12 × 0.1–0.3 cm, flat or folded, entire at margins, gradually narrowed to an acute apex, glabrous, usually scabrous on the margins towards apex; sheaths striate, brownish towards base. Inflorescence simple, open, at times reduced to a single cluster of spikelets. Involucral bracts 3–5, lower ones overtopping the inflorescence, up to 12 cm long. Rays to 5,



patent, 1.5–5 cm long. Spikes broadly ovoid, with 4–12 spikelets subdigitately on a short axis, 2–5 cm across. Spikelets patent or spreading, strongly compressed, oblong-lanceolate to linear, 1–1.5 × 2–3 mm, subacute at apex, usually yellowish-green; rachilla flexuous, with caducous wings. Glumes ovate, 1.5–3 × 1.5–2 mm, hyaline at margins, acute and mucronate at apex, mucro 1–1.5 mm long, often slightly excurved, keeled, veins prominent on both sides, somewhat rigid, green. Stamens 3; filaments c. 1 mm long; anthers linear-oblong, c. 0.5 mm long, with slightly produced connective appendage. Style c. 1 mm long; stigmas 3, linear, c. 1 mm long. Nuts trigonous, broadly obovoid, often slightly oblique, obtuse, minutely apiculate at apex, 1.2–1.4 × c. 1 mm, light brown.

Flowering & Fruiting: September–December.

Habitat: In marshy localities.

Specimens examined: Jhalda MPCA, Kudagara, 367.40 m, 23.48089297 N, 85.90988799 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93506; 367.23 m, 23.480826 N, 85.90989656 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93526; 437.64 m, 23.48513899 N, 85.91111602 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95048 (CAL).

Uses: Used as fodder.

Cyperus squarrosus L., Cent. Pl. 2: 6. 1756. *C. aristatus* Rottb., Descr. Pl. Rar. Progr. 22. 1772; Hook.f., Fl. Brit. India 6: 606. 1893; Haines, Bot. Bihar Orissa: 895. 1924 (Repr. ed. 3: 938. 1961). *Mariscus squarrosus* (L.) C.B. Clarke in Hook.f., Fl. Brit. India 6: 623. 1893; Prain, Bengal Pl. 2: 1146. 1903; Haines, Bot. Bihar Orissa 909. 1924 (Repr. ed. 3: 952. 1961).



Mariscus aristatus (Rottb.) Cherm. in Bull. Soc. Bot. France 85: 366. 1938.

Annuals with fibrous roots, to 15 cm high. Stems triquetrous, almost 3-winged, 0.5-1.5 mm thick, smooth. Leaves shorter than to nearly equalling the stem, flat, linear, gradually acuminate to apex; sheaths membranous, basal ones purplish. Inflorescence simple, often reduced to a single, hemispherical spike. Involucral bracts 2-4, lowest 1 or 2 much overtopping the

inflorescence, up to 7 cm long. Rays when developed up to 3, slender, up to 2.5 cm long, smooth. Spikes oblong-ovoid to subglobose, 4-19 × 4-9 mm, more or less echinate; rachis 1-4.5 mm long. Spikelets numerous, densely spicate, spreading, flattened, oblong, 4.5-9.5 × 2-3.5 mm, 5-25-flowered: rachilla straight, wingless. Glumes membranous, oblong-ovate or elliptic-oblong, tapering into a strong recurved awn, 1-2 × 0.5-1 mm (without awn), strongly 7-9-veined, ferruginous to reddish-brown: awn 0.5-1.1 mm long. Stamen 1; filament to 1.5 mm long; anther c. 0.6 mm long. Style c. 0.6 mm long; stigmas 3, shorter than style. Nut variable, trigonous, broadly to narrowly oblong-obovoid, 0.5-0.9 × 0.2-0.4 mm, obtuse and minutely apiculate at apex, brownish.

Flowering & Fruiting: July--November.

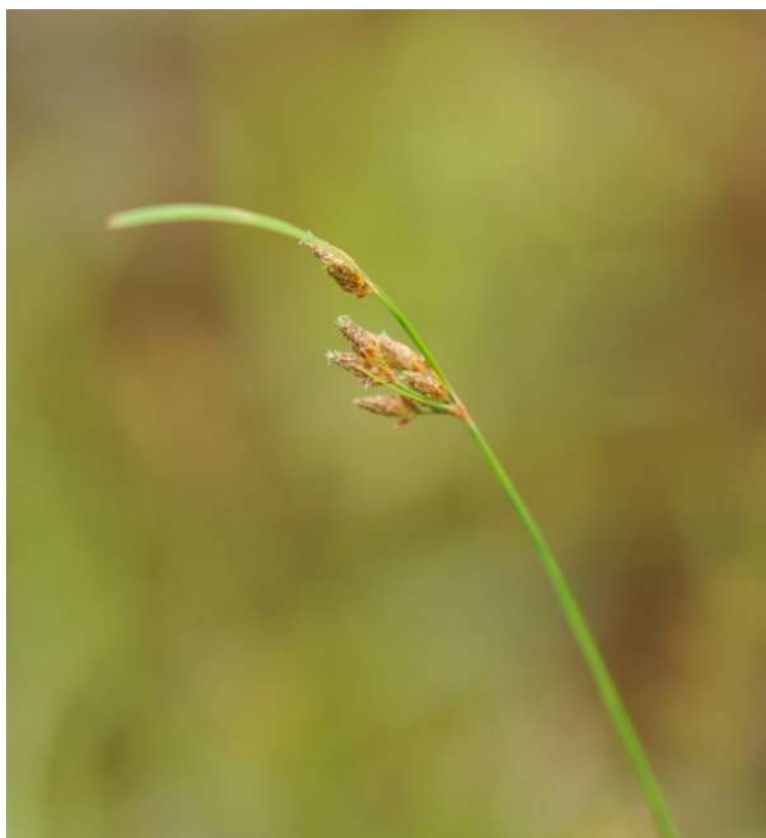
Habitat: In marshy areas and in crevices on rocks.

Specimens examined: Jhalda MPCA, Kudagara, 322.31 m, 23.471924 N, 85.91183896 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93559; 435.14 m, 23.48431103 N, 85.91098401 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95051 (CAL).

Fimbristylis Vahl

Fimbristylis ferruginea (L.) Vahl, Enum. Pl. 2: 291. 1805; Hook.f., Fl. Brit. India 6: 638. 1893; Prain, Bengal Pl. 2: 1154. 1903; Haines, Bot. Bihar Orissa: 921. 1924 (Repr. ed. 3: 965. 1961). Karthik. & al., Fl. Ind. Enum. Monocot. 52. 1989. *Scirpus ferrugineus* L., Sp. Pl. 1: 50. 1753.

Perennial herbs, rhizome woody, short, to 80 cm high. Stems tufted, stiff, glabrous, striate, 1.5–2 mm thick. Cauline leaves much shorter than stem, 5–32 × 0.1–0.2 cm; basal sheaths coriaceous, glabrous, shining brown; ligule a dense fringe of short hairs. Inflorescence simple or often decompose, with few to many spikelets, 2–6 (–12) cm long. Involucral bracts usually 3, shorter than inflorescence; lowest stiff, dilated at base. Primary rays compressed, 1–2.5 (–8) cm long. Spikelets solitary, terete, ovoid, acute at apex, 3.5–13.5 × 2.5–5 mm, densely many-flowered, dull brown; rachilla winged. Glumes spiral, ovate or oblong-ovate, obtuse and apiculate at apex, c. 5 × 3 mm, slightly keeled, puberulous towards apex. Stamens 3; filaments c. 3 mm long; anthers linear-oblong, 1.5–2 mm long. Ovary oblong, c. 1 mm long, distinctly stipitate; style flat, c. 3 mm long, densely ciliate, faintly dilated at base; stigmas 2, c. 1.5 mm long. Nut biconvex, compressed, broadly obovate, obtuse-truncate at apex, c. 1.2 × 1 mm, smooth, shortly stipitate.



Flowering & Fruiting: Throughout the year.

Habitat: Drying ponds, dry areas with clayey soil; also near fresh water, among grasses and in running water.

Specimens examined: Jhalda MPCA, Kudagara, 366.70 m, 23.48090404 N, 85.90990299 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93509; Jhalda MPCA, Kudagara, 321.74 m, 23.47262104 N, 85.91479601 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93571 (CAL).

Kyllinga Rottb.

Kyllinga nemoralis (Forst.) Dandy ex Hutchins. & Dalziel, Fl. W. Trop. Africa 2: 487. 1936; Karthik. & al., Fl. Ind. Enum. Monocot.: 60. 1989. *K. monocephala* Rottb., Descr. Ic. Rar. Nov. Pl. 13, t. 4, f. 4. 1773, *nom. illeg.*; Hook.f., Fl. Brit. India 6: 588. 1893; Prain, Bengal Pl. 2: 1135. 1903; Haines, Bot. Bihar Orissa: 907. 1924 (Repr. ed. 3: 950. 1961). *Thryocephalon nemoralis* J.R. Forst. & G. Forst., Char. Gen. Pl. 130. 1776. *Cyperus kyllinga* Endl., Cat. Hort. Acad. Vindb. 1: 94. 1842.



Perennials rhizome creeping, to 50 cm high; rhizome slender, 1–2 mm thick, with brownish scales. Stems triquetrous, 1–1.5 mm thick, smooth. Leaves basal and sub basal, linear 1.5–4 mm wide; sheaths brown to purplish. Inflorescence a head of one terminal spike, usually long with 1–3 lateral spikes; terminal spike subglobose or broadly ovoid, 4.5–10 × 3.5–8 mm; lateral ones much smaller. Involucral bracts 3–4, spreading or reflexed, lowest to 25 cm long. Spikelets many, densely packed, strongly compressed, ovate-elliptic or elliptic-lanceolate, 2–3.5 × 1–1.5 mm, 1 or 2-

flowered. Glumes 4 or 5, lowest two smaller, narrow, 1–1.5 mm long; remaining glumes strongly compressed, boat-shaped, apiculate or mucronulate at apex, broadly winged on the acute keel; third glume 2.5–3 mm long, enclosing the female flowers; fourth glume 3–3.5 mm long; fifth glume if present, small, sterile. Stamens 3; filaments longate up to 3 mm; anthers linear, 0.5–1 mm long. Style up to 1 mm long; stigmas 2, longer than style. Nut laterally compressed, biconvex, oblong or oblong-obovate, 1–1.5 × 0.6–1 mm, yellowish to brownish.

Flowering & Fruiting: May–January.

Habitat: Open moist grasslands, wet shady areas near water, moist soils in shady areas of forests and waste lands.

Specimens examined: Jhalda MPCA, Kudagara, 367.23 m, 23.480826 N, 85.90989656 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93526 (CAL); Jhalda MPCA, Kudagara, 316.54 m, 23.47271185 N, 85.9141652 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93574 (CAL).

DIOSCOREACEAE

Dioscorea Plum. ex L.

Dioscorea bulbifera L., Sp. Pl.: 1033. 1753; Haines, Bot. Bihar Orissa: 1122. 1924; Karthik. & al., Fl. Ind. Enum. Monocot.: 73. 1989; Sanyal, Fl. Bankura: 428. 1994. *D. sativa* Thunb., Fl. Jap.: 151. 1784, non L. 1753; Hook.f., Fl. Brit. India 6: 295. 1892.

Vernacular name: *Kukurulu* (Bengali), *Aerial yam* (English), *Zimikand* (Hindi).



Climbers, tuberous; tubers globose or elongate, large. Stems terete, unarmed, glabrous, bulbiferous in leaf-axils, bulbils warted. Leaves opposite and alternate, simple, broadly ovate, sagittate at base with rounded lobes, acuminate at apex, variable in size, 6–12 × 5.5–14 cm, membranous, dark green, glaucous below, 7–9-nerved at base; petioles 2–10 cm long, narrowly margined. Male flowers in spike, 2–5 cm long, unilaterally 2 or 3-nate, lax-flowered; bracts ovate, acute at apex, 0.8–1 mm long, glabrous. Perianth base very broad; outer perianth lobes more or less free, oblong, scarious at margins, obtuse at apex, 1.4–1.6 mm long; inner ones elliptic-oblong, serrulate at apex, nearly as long as outer ones. Stamens 6; filaments

short; anthers minute, didymous; pistillodes 3-lobed. Female flowers solitary or in fascicles, axillary, c. 15 cm long, lax, nodding. Outer perianth lobes oblong, rounded at apex, 0.8–1 mm long; inner ones obovate, 0.6–0.8 mm long. Staminodes 6. Ovary triquetrous; styles 3, very short; stigmas 3, very short, recurved. Capsules ovate-oblong, slightly widened upwards, 1.5–2.5 × 1–1.5 cm, olive green; narrowed at base into a stalk; stalk 4–5 mm long; seeds irregularly orbicular, winged at base only.

Flowering & Fruiting: September-March.

Habitat: Scrub jungles, hedges, forests edges, forest clearings and slopes of low hills.

Specimens examined: Jhalda, MPCA, Sewati, 421.75 m, 23.483085008338 N, 85.910874037072 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95058 (CAL).

Use: Boiled tubers are eaten.

ERIOCAULACEAE

Eriocaulon L.

Eriocaulon quinquangulare L., Sp. Pl.: 87. 1753; Hook.f., Fl. Brit. India 6: 582. 1893; Mooney, Suppl. Bot. Bihar: 198. 1950; R. Ansari & N.P. Balakr., Eriocaul. India: 104. f. 42. 1994. *E. argenteum* Mart., Pl. Asiat. Rar. 3: 28. 1832.

Herb 6–15 cm high, on wet ground. Leaves simple, radical forming a tuft or rosette, linear or lanceolate, 1.5–5 × 0.2–0.5 cm, tapering at base, entire at margins, acute at apex, glabrous. Heads globose or ovoid 2–9 × 2–6 mm, grey or white, intruded at base; receptacle globose or

columnar covered with fine villi; peduncles few or densely crowded 5–15 cm long, glabrous; sheaths 2–4 cm long, usually turning purple on drying; involucre bracts pale concave reflexed, oblong-ob lanceolate or broadly obtuse c. 1.5 × 1 mm; floral bracts hyaline 2 mm long broadly obtuse shortly pubescent in upper half suddenly cuspidate. Male

flowers: subsessile, sepals connate into a 3-lobed spathe, hoary

towards apex, black; petals 3, subequal with a black gland in each, hoary; stamens 6; anthers black. Female flowers: shortly pedicelled or subsessile, narrowly linear-clavate, hairy in upper half; sepals 3, spatulate, hoary towards apex, black; petals 3, unequal, spatulate with a black gland in each, hoary; ovary stalked, ovoid or globose; style 3-fid. Seeds ovoid or oblong, c. 0.4 × 0.2 mm; cells of seed coat transversely elongated; appendages 2–4, rectangular or ribbon-like arising from transverse radial walls.

Flowering & Fruiting: February – April.

Habitat: Found on the bank of streams.

Specimens examined: Jhalda MPCA, Kudagara, 314.64 m, 23.47268902 N, 85.91443802 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92330 (CAL).



HYPOXIDACEAE

Curculigo Gaertn.

Curculigo orchoides Gaertn., Fruct. Sem. Pl. 1: 63. t. 16. 1788; Hook.f., Fl. Brit. India 6: 279. 1892; Haines, Bot. Bihar Orissa: 1112. 1924.

Vernacular name: *Talamuli* (Bengali), *Orchid palm grass* (English), *Kalamusali* (Hindi).



Herbs, to 20 cm high, tuberous; tubers elongate with conspicuous fleshy roots, crowned with remains of old leaves. Leaves sessile or narrowed into a short petiole, lanceolate-oblong to elliptic, acute or acuminate at apex, 15–50 × 2–6 cm, plicate, glabrous or thin-hairy; petioles to 2.5 cm long. Leaf-sheaths persistent, fibrous, imbricate. Scapes 4–7 cm long, clavate-hairy, hidden by leaf-sheaths; bracts lanceolate, acuminate, 1.5–6 × 0.2–0.8 cm, spathaceous, densely imbricate, membranous, glabrous, whitish. Perianth lobes 6, lanceolate-oblong, acute at apex, 0.8–1.6 cm long, pilose outside, yellow. Stamens 6, shorter than

perianth lobes; anthers 2-celled. Ovary narrowly oblongoid, c. 4 mm long, densely hairy, 3-celled; ovules 2 or more in each cell; style stout. Berries subfusiform with a slender beak and spongy septa, 1.5–2 cm long, hairy at apex; seeds globose, c. 2.5 mm, beaked (beak c. 3 mm long), dark brown or black.

Flowering & Fruiting: April–September.

Habitat: In moist shady places of inland forests.

Specimens examined: Jhalda MPCA, Kudagara, 323.49 m, 23.47566904 N, 85.90756997 E, 15.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93596 (CAL).

Uses: Tuberous roots are used in piles, diarrhoea, jaundice, skin ailments and asthma.

JUNCACEAE

Juncus L.

Juncus articulatus L., Sp. Pl. 1: 327. 1753. *J. lamprocarpus* Ehrh. ex Hoffm., Deutschl. Fl. Bot. Taschenb. 3: 166. 1800; Hook.f., Fl. Brit. India 6: 395. 1892.

Herbs, 5–20 cm high, with fibrous roots. Stems stiff, erect, reddish green at base. Leaves simple, linear or tubular, 2–5 × 0.2–0.3 cm, entire at margins, gradually tapering into an acute apex, septate; sheaths slightly inflated, auricled, acute, free parts c. 2 × 1 mm, membranous, pale brown.

Inflorescence terminal, branched, with 6–20-flowered capitula, subtended by a bract; bract stiff, erect, leaf-like, to 2 cm long; bracts of main inflorescence branches oblong, aristate or sometimes trifid, ribbed, straw-coloured. Tepals lanceolate, subequal or inner longer, 3–4 mm long, membranous at margins, pale brown. Stamens 6, shorter than tepals;



filaments c. 1.5 mm long, flat, whitish; anthers oblong, c. 0.5 mm long, cream-coloured. Ovary ovoid, tapering into a beak, to 2 mm long; style c. 0.2 mm long; stigmatic lobes spreading, c. 0.9 mm long. Capsules oblong-ovoid or ellipsoid, strongly trigonous, 3–4 × 1.5–2 mm, usually contracted abruptly into a short beak, conspicuously exceeding the perianth, brownish to greenish, many seeded. Seeds ovoid or ellipsoid, brownish, c. 0.5 mm long, yellowish.

Flowering & Fruiting: March–April.

Habitat: In moist places near edges of waterbodies.

Specimens examined: Jhalda MPCA, Kudagara, 342.76 m, 23.47256002 N, 85.91472703 E, 8.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93499 (CAL); Jhalda MPCA, Kudagara, 341.58 m, 23.48111199 N, 85.90978104 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93484 (CAL).

ORCHIDACEAE

Vanda R.Br.

Vanda tessellata (Roxb.) Hook. ex G.Don in Loud., Hort. Brit.: 372. 1830; Haines, Bot. Bihar Orissa: 1181. 1924. *Epidendrum tessellatum* Roxb., Pl. Coromandel 1: 34, t. 42. 1795. *Vanda roxburghii* R. Br., Bot. Reg. 6: t. 506. 1820; Hook.f., Fl. Brit. India 6: 52. 1890.

Vernacular name: Rasna (Bengali), Checkered Vanda (English), Banda (Hindi).



Herbs, epiphytic. Stems 30–60 cm long, lower part sheathed with remnants of old leaves. Leaves equitant, strap-shaped, 12–20 × 1.5–2.5 cm, obtusely keeled, praemorse with two unequal lobes and a short pointed one in between. Inflorescences racemes, suberect, 2–20 cm long, 6–10 flowered; peduncles stout with a few sterile, brownish green bracts; floral bracts broadly triangular-ovate, clasping the rachis, 2–2.5 mm long, 1-nerved. Sepals obovate, yellowish green, tessellated with brown on inner side, whitish outside, many-nerved; dorsal one faintly 3-fid with crispate margins, 2–2.5 × 1.2–1.6 cm. Petals similar to sepals, clawed. Lip 3-lobed; lateral lobes erect, obliquely oblong, acuminate at apex, c. 10 × 5 mm; middle lobe

panduriform, constricted below bifid apex, c. 1.6 × 1.2 cm, violet or crimson; disk swollen, having curved ridges; spur conical, 6–7 mm long. Column c. 8 mm long. Pollinia 2, grooved. Capsules clavate, c. 6.2 cm long, sharply winged, ribbed with a short pedicel.

Flowering & Fruiting: April–July.

Habitat: Epiphytic on moist trunks of *Shorea robusta* in inland forests.

Specimens examined: Jhalda MPCA, Kudagara, 327.42 m, 23.48047002 N, 85.90926597 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93488 (CAL).

Uses: Roots are used in bronchitis.

POACEAE

Alloteropsis J.Presl

Alloteropsis cimicina (L.) Stapf in Fl. Trop. Afr. 9: 487. 1919; Haines, Bot. Bihar Orissa 1009. 1924. *Milium cimicinum* L., Mant. Pl. Altera: 184. 1771. *Axonopus cimicinus* (L.) P. Beauv., Ess. Agrostogr.: 12. 1812; Hook.f., Fl. Brit. India 7: 64. 1896.

Annual. Culms 20–60 cm high, ribbed, sparsely tuberculate hairy. Leaf sheath keeled towards apex, ribbed, sparsely tuberculate hairy; ligule c. 0.3 mm long, membranous, fimbriate at apex. Leaf blades ovate to lanceolate, 2–8 × 0.4–1.8 cm, rounded to semiamplexicaul at base, ciliate at margins, acute to acuminate at apex, scabrid, midrib hairy. Racemes 4–8, whorled or subdigitate, 6–20 cm long, villous white hairy on apical node; peduncle elongate, 9–30 cm long, ribbed. Spikelets solitary, ovate to elliptic, 3–3.5 × 1.5–2 mm, acuminate; rachis triquetrous, scabrid; pedicels 2–3 mm long. Glumes unequal, lower



glume lanceolate, c. 3 × 1.5 mm, 3-veined; upper glume ovate-lanceolate, 3–3.5 × 1.5–2 mm, 5-veined, cartilaginous, ciliate. Florets 2; lower male, upper bisexual. Lemma similar, ovate or boat shaped, 2.4–3 × 0.7–1.5 mm, acute, awned, 5-veined, arista straight, c. 1 mm. Palea ovate-lanceolate, 1.2–2.5 × 0.5–1 mm, acute or acuminate, 2-veined, 2-keeled greenish. Lodicules 2, c. 0.2 mm long, membranous, hyaline. Stamens 3, exerted; anthers 0.6–0.8 mm long, brownish purple; filaments 0.2–0.4 mm long. Ovary dorsally compressed, ovate to elliptic, c. 0.4 × 0.2 mm, greenish; style 0.8–1 mm, hyaline; stigma plumose, c. 1 mm, purplish. Caryopsis dorsally compressed, oblong-elliptic to ovate, c. 1–1.5 × 0.8–1 mm, obtuse, brownish.

Flowering & Fruiting: August–September.

Habitat: In dry open places along forest edges.

Specimens examined: Jhalda MPCA, Kudagara, 322.60 m, 23.47195602 N, 85.91186796 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93562 (CAL).

Aristida L.

Aristida setacea Retz., *Observ. Bot.* 4: 22. 1786; Hook.f., *Fl. Brit. India* 7: 225. 1896; Haines, *Bot. Bihar Orissa*: 977. 1924; Bor, *Grasses Burma, Ceylon, India & Pakistan*: 412. 1960; Sanyal, *Fl. Bankura*: 509. 1994.



Tufted perennial, base rhizomatous; culms 70–143 cm high; internodes solid, smooth; nodes with purple dots below. Leaves mostly basal, linear-lanceolate, 10–35 × 0.5–0.7 cm, acuminate to attenuate at apex, inrolled at margins, rounded at base, scabrid, pilose hairy above at base; ligule membranous, fimbriate at apex with brownish white hairs; leaf sheath 10–12 cm long, smooth. Panicle contracted; peduncle 40–50 cm long. Racemes 2–6 in a node, 7–10 cm long; rachis flat or triquetrous. Spikelets paired, one long pedicelled and other shortly pedicelled, oblong to linear-lanceolate, greenish yellow; pedicel triquetrous with scabrid margins. Lower glume ovate to linear-lanceolate, acuminate, 2-lobed

or not, aristate, chartaceous, prominently 1-nerved, 1-keeled, scabrid on keel, margins flat or inrolled, hyaline; arista barbellate, yellowish with purple dots when young. Upper glume similar to lower glume, aristate. Floret 1, bisexual; callus usually pungent, whitish hairy. Lemma oblong-lanceolate, acute to rounded or truncate at apex, scabrid, granulate or shiny, nerves faint, margins involute; awns 3, barbellate, purple towards apex when young. Palea oblong to elliptic-lanceolate, acute, chartaceous, nerveless. Lodicules 2, oblanceolate, membranous, hyaline, ciliate dorsally or not, faintly 2-nerved. Stamens 3; anthers yellowish brown; filaments hyaline. Ovary narrowly elliptic, brown; style short; stigma plumose, purple to brownish. Caryopsis oblong, brownish to black.

Flowering & Fruiting: Almost throughout the year.

Habitat: Common on gravelly ground, sandy soil and open wastelands.

Specimens examined: Jhalda, MPCA, Kudagra, 335.95 m, 23.4710289817303 N, 85.9107570257037 E, 08.04.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93493 (CAL).

Chrysopogon Trin.

Chrysopogon lancearius (Hook.f.) Haines, Bot. Bihar Orissa 5: 1036. 1924 (Repr. ed. 3: 1083. 1961); Bor, Grass. Burm. Ceyl. Ind. Pak.: 118. 1960. *Andropogon lancearius* Hook.f., Fl. Brit. India 7: 190. 1896.



Herbs, a large coarse grass to 1.5 m high with very leafy stems minutely downy above. Leaves 40–60 × 2–2.5 cm with minutely spinulose cutting edges; panicles oblong 20–30 cm long with whorls of numerous capillary sub-erect branches long which exhibit the characteristic clavate oblique brown-bearded tips on the fall of the spikelets. Ligule of short hairs. Spikelets 6 mm long very narrow. Pedicelled-spikelet-with compressed pedicel about half as long as the spikelet, subterete, glume with a slender awn over 6 cm. Sessile spikelet with an awn 3–4.5 cm long silky.

Flowering & Fruiting: September–November.

Habitat: Often in shady, moist places on rocky slopes.

Specimens examined: Jhalda MPCA, Kudagara, 363.73 m, 23.48082298 N, 85.90978699 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93534 (CAL).

Uses: Used as a good fodder.

Cynodon Rich.

Cynodon radiatus Roth ex Roem. & Schult., Syst. Veg. ed. 15. 2: 411. 1817. *C. arcuatus* J. Presl in C. Presl, Reliq. Haenk. 1: 290. 1830; Bor, Grass. Burma Ceylon India Pakistan: 469. 1960.



Perennials Stoloniferous. Culms decumbent, c. 30 cm, smooth; lower nodes rooting. Leaf blade linear-lanceolate, 6.5–12.5 × c. 0.2 cm, acuminate to attenuate, sparsely hairy within, margins finely serrulate especially towards apex; ligule 0.3–0.4 mm, fimbriate at apex; leaf sheath terete to keeled, 2.5–3 cm. Inflorescence digitate with 4 or 5 spicate racemes; peduncle 10.5–23 cm. Raceme 3.5–9.5 cm. Spikelets subsessile, compact, ovate to elliptic, 1.5–2 × c. 1 mm, rounded at base, acute at apex,, greenish brown. Glumes persistent, divergent, upper glume slightly shorter than lemma. Lower glume lanceolate, 1–1.2 × c. 0.2 mm, acute, slightly bent, chartaceous, greenish, prominently 1-nerved, keeled, finely serrulate on keel. Upper glume 1.3–1.8 × c. 0.2 mm, as in lower glume but straight. Floret one, bisexual. Lemma ovate to elliptic lanceolate, 1.7–2 × c. 0.8 mm, acute, chartaceous to subcoriaceous, greenish brown, 3-nerved, midnerve keeled, ciliate or ciliolate, with clavellate hairs, ciliate on margins and lateral nerves. Palea ovate-lanceolate, 1.6–2 × c. 0.6 mm, acute, chartaceous, 2-nerved, 2-keeled, finely serrulate on keel, margins infolded; rachilla 0.6–1 mm, stalk like. Stamens 3; anthers c. 0.5 mm, brown; filaments c. 0.4 mm. Ovary ovate to elliptic, 0.2–0.3 mm, acute, brown; style c. 0.4 mm, hyaline; stigma plumose, c. 0.5 mm, purplish. Caryopsis oblanceolate, c. 0.8 × 0.3 mm, truncate at apex and narrowly acute at base, brownish.

Flowering & Fruiting: July–Februray.

Habitat: Usually in hilly slopes, on dry rocky places.

Specimens examined: Jhalda MPCA, Kudagara, Kudagara, 363.73 m, 23.48082298 N, 85.90978699 E, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93570 (CAL).

Dactyloctenium Willd.

Dactyloctenium aegyptium (L.) Willd., Enum. Pl. 2: 1029. 1809; Bor, Grasses Burma, Ceylon, India & Pakistan: 489. 1960; Sanyal, Fl. Bankura: 516. 1994. *Cynosurus aegyptius* L., Sp. Pl. 1: 72. 1753. *Eleusine aegyptia* (L.) Desf., Fl. Atlant. 1: 85. 1798; Hook.f., Fl. Brit. India 7: 295. 1896; Haines, Bot. Bihar Orissa: 970. 1924.

Vernacular name: Crowfoot Grass (English), Makra (Hindi).



Tufted annual; culms 10–70 cm high. Leaves linear, 5–20 × 0.2–0.6 cm, acute/acuminate at apex, tuberculate-pilose; leaf sheaths ciliate. Spikes 2–9, digitate. Spikelets broadly ovate, densely imbricate in 2 rows. Glumes deciduous, 1-nerved, 1-keeled; lower narrowly lanceolate, acute/obtuse; upper oblong, awned. Florets 2–5, bisexual. Lemmas ovate, 3-nerved, 1-keeled, awned. Paleas similar to lemmas, 2-nerved, 2-keeled. Lodicules 2. Stamens 3. Styles 2. Caryopsis obovoid-globose, transversely rugose.

Flowering & Fruiting: June–October.

Habitat: In exposed edges of forests on moist surfaces.

Specimens examined: Jhalda, MPCA, Sewati, 364.22 m, 23.480848968029 N, 85.9099169913679 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93517 (CAL).

Dendrocalamus Nees

Dendrocalamus strictus (Roxb.) Nees, *Linnaea* 9(4): 476. 1835; Hook.f., *Fl. Brit. India* 7: 404. 1896; Haines, *Bot. Bihar Orissa*: 947. 1924.

Vernacular name: *Calcutta Bamboo* (English), *Bans* (Hindi), *Bamsa*, *Karali* (Bengali).



Perennials, deciduous. Culms robust, 6–15 m tall, 2.5–8 cm in diam.; internodes 30–45 cm long, hollow in wet and solid in dry climate, glaucous when young, dull green or yellowish when old; nodes swollen; culm sheaths variable, slightly auricled, ciliate on margins, rounded at apex, 7–30 cm long, striate, covered on the back with golden-brown stiff hairs, sometimes glabrous; imperfect blade triangular, hairy; ligules narrow. Leaf blades linear-lanceolate, rounded at base into a short petiole, scabrous at margins, terminating above in a sharp acuminate twisted point, 2.5–25 cm long; leaf sheaths striate, hairy, ending in a prominent callus and short auricle with a few wavy, caducous cilia; ligules narrow. Inflorescences a large, branched panicle with dense, glabrous, spaced globose heads; rachis rounded, smooth. Spikelets 5.8–12 mm long, more than one floret, spinescent, hairy, fertile and sterile mixed. Empty glumes 2 or more, ovate, spinescent, many-nerved. Lemma ovate, ending in a sharp spine, surrounded by ciliate tufts of hairs. Palea ovate or obovate, emarginate, 6–8-nerved; keels ciliate. Anthers apiculate, 4–5 mm long, yellow. Ovary ovoid, shortly appendage at apex; style 6–10 mm long, undivided; stigma feathery, purple. Pericarp ovoid-subglobose, beaked with persistent style, 7–8 mm long, free, shining, brown.

Flowering & Fruiting: November–April.

Habitat: In dry open places of inland forests.

Specimens examined: Jhalda MPCA, Kudagara, 402.36 m, 23.47353701 N, 85.925033 E, 5.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93440 (CAL).

Uses: Culms are used for making rafters, battens, baskets, sticks, furniture, fishing rods and paper-pulp. Leaves are used as fodder.

Eragrostiella Bor

Eragrostiella bifaria (Vahl) Bor, Indian For. 66: 270. 1940 & Grass. Burm. Ceyl. Ind. Pak.: 494. 1960; Mooney, Suppl. Bot. Bihar Orissa: 161. 1950. *Poa bifaria* Vahl, Symb. Bot. 2: 19. 1791. *Eragrostis coromandeliarta* (Koen. ex Rottl.) Trin. in Mem. Acad. Sci. Petersb. ser. 6, 1: 415. 1830; Hook.f., Fl. Brit. India 7: 326. 1896; Haines, Bot. Bihar Orissa: 961. 1924.

Annual or perennial. Culms ribbed, 35–70 cm high. Leaf sheath 3–4.5 cm long, auricled at mouth; ligule oblong, c. 0.2 × 0.5 cm, fimbriate at apex. Leaf blade filiform, linear-lanceolate, 2–15 × 0.1–0.2 cm, rounded at base, inrolled or folded inward at margin, narrowed and serrulate at apex, glabrous, sparsely long ciliate along margins. Spikes terminal, erect, 9–22 cm long, with alternate sessile spikelets, usually compactly arranged. Spikelets oblong to ovate-lanceolate, 5–10 × 1.5–2 mm, straw-coloured or off white. Lower glume ovate-lanceolate, 2–2.5 × 0.5–2 mm, acute to acuminate, chartaceous, prominently 1-veined, keeled, serrulate on keel, yellowish. Upper glume ovate-lanceolate, 2–2.5 × 0.5–1 mm, acute, chartaceous, prominently 1-veined, greenish. Florets usually 7–14; palea persistent for sometime before falling finally. Lemma ovate-lanceolate, boat shaped, 2–2.5 × 1–1.5 mm, acute or retuse with emarginate apex, chartaceous, greenish, faintly 3-veined, 1-keeled. Palea ovate to elliptic, 1.8–2 × 0.5–1 mm, narrowly truncate at base, rounded at apex, chartaceous, hyaline, 2-keeled, keels broadly winged, wings 0.2–0.3 mm broad, ciliate on wings, margins infolded. Lodicules 2, obovate, c. 0.2 × 0.1 mm, truncate, more or less 2-ridged, membranous, hyaline. Stamens 3; anthers 0.7–0.8 mm, slightly divergent at apex, yellowish purple; filaments c. 0.3 mm, hyaline. Ovary ovate, c. 0.5 × 0.1 mm, stipitate, greenish; style 0.5 mm, hyaline; stigma plumose, 0.5–0.8 × 0.2 mm, greenish purple. Caryopsis sub-globose to globose, 0.5–0.6 × 0.2–0.4 mm, obtuse at apex.



Photo: N. Sasidharan@efloraoindia

Flowering & Fruiting: August–September.

Habitat: In exposed edges of forests on moist surfaces.

Specimens examined: Jhalda MPCA, Kudagara, 465.16 m, 23.48398497 N, 85.912177 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95043 (CAL); 436.23 m, 23.48509801 N, 85.91119397 E, 16.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 95047 (CAL).

Eragrostis Wolf

Eragrostis coarctata Stapf in Hook.f., Fl. Brit. India 7(22): 313. 1896; Haines, Bot. Bihar Orissa: 956. 1924; Bor, Grass. Burm. Ceyl. Ind. Pak.: 507. 1960.



Perennial. Culms 5–40 cm high, internodes hollow. Leaf sheath ribbed, 2.2–5 cm, glabrous, ciliate at margin on one side, mouth bearded; ligule whitish hairy, hair c. 0.4 mm long. Leaf blade oblong to linear-lanceolate, 4–20 × 0.5–0.6 cm, truncate to rounded at base, incurved at margins, acuminate at apex. Inflorescence a spiciform panicle, oblong to linear, 1–5 × 0.5–1 cm, compact with short racemes. Racemes 0.5–1 cm, many, compactly arranged with few to many subsessile to pedicelled spikelets. Spikelets lanceolate, 2–2.2 × 1–2 mm; pedicels 0.2–0.4 mm long. Lower glume lanceolate, 0.8–1.2 × c. 0.8 mm, acute at apex, chartaceous, greenish yellow, prominently 1-veined, 1-keeled, margins ciliate below middle. Upper glume 1.2–1.6 × c. 0.6 mm, similar to lower glume. Florets

3–12, bisexual, closely imbricate; rachilla 0.3–0.4 mm, zigzag. Lemma oblong-lanceolate, boat shaped, 1.3–1.5 × c. 0.5 mm, acute to acuminate with mucronulate apex, chartaceous, greenish yellow, prominently 3-veined, 1-keeled, keel scabrid towards apex, margins ciliate to hispid hairy. Palea oblong-elliptic, 1.2–1.4 × 0.2–0.3 mm, acute at apex, chartaceous, 2-veined, 2-keeled, keels long ciliate hairy, margins infolded, ciliate. Lodicules 2, yellowish. Stamens 3; anthers 0.3–0.4 mm, brown to purple. Ovary narrowly elliptic, c. 0.4 mm, acute at apex, brownish; stigma plumose, c. 0.8 mm, yellowish brown. Caryopsis oblong-elliptic to ovoid, 0.5–1 × c. 0.5 mm, brownish.

Flowering & Fruiting: July–March.

Habitat: In shady edges of forests.

Specimens examined: Jhalda MPCA, Kudagara, 412.05 m, 23.48223802 N, 85.91035897 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93475 (CAL).

Heteropogon Pers.

Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 836. 1817; Haines, Bot. Bihar & Orissa: 1040. 1924; Bor, Grasses Burma, Ceylon, India & Pakistan: 163. 1960; Sanyal, Fl. Bankura: 502. 1994. *Andropogon contortus* L., Sp. Pl. 2: 1045. 1753; Sanyal, Fl. Bankura: 503. 1994.



Tufted annual; culms 50–70 cm high. Leaves mostly at base of culms, linear-lanceolate, 4–16 cm long; leaf sheaths keeled, ciliate at tip. Racemes spiciform, solitary. Spikelets sub-secund; lower male/neuter, 2–6 pairs, homogamous, not awned; upper one female, heterogamous, awned. Sessile spikelets awned. Lower glume chartaceous, 3.5–5.5 mm long, 7–9-nerved; upper glume similar, 3-nerved, deeply grooved on both sides of midrib. Lemmas hyaline, epaleate; upper awned. Lodicules 2. Stamens 3. Caryopsis cylindric. Pedicelled spikelets dorsally compressed, often twisted, imbricate. Lower glume lanceolate, densely hispid, 2-keeled, keel winged. Upper glume 5-nerved. Lemmas hyaline.

Flowering & Fruiting: July-January.

Habitat: In open, waste places, moist areas.

Specimens examined: Jhalda, MPCA, Kudagra, 323.96 m, 23.4724880196154 N, 85.9129290282726 E, 25.01.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 92323 (CAL).

Oplismenus P.Beauv.

Oplismenus compositus (L.) P.Beauv. in Ess. Agrostogr.: 54. 1812; Hook.f., Fl. Brit. India 7: 66. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan: 317. 1960. *Panicum compositum* L., Sp. Pl. 1: 57. 1753.

Perennial Culms
stoloniferous, straggling,
branching then ascending to
20-80 cm long, rooting at the
nodes, sparsely hairy; leaf
blades 4–10 × 1–2.5 cm, leaf-
sheath 1.5-2 cm long. Leaf
blade margins armed with
small teeth which are visible
with a lens or can be felt with
finger tips running down from
the apex. Short, white, erect
bulbous-based hairs visible
with a lens on the underside of
the leaf blade. Lamina base
oblique. Ligule densely
clothed in white hairs 1–4 mm
long. Leaf sheath
longitudinally ribbed and
clothed in short pale hairs;
inflorescence axis 5-15 cm,
glabrous to tuberculate-hairy;
rachis triquetrous and very
hairy; racemes 3–6, 2–6 cm,
ascending to erect. Spikelets
in 7–14 widely spaced,
sometimes patent pairs,
lanceolate, glabrous to thinly
pilose; pedicels hairy and with
a few very long hairs at the
base; glumes covered in short
silky hairs, awned, the awns
stout, green or purple, viscid;
lower glume awn 5-10 mm and
viscid (sticky); upper glume
keeled and 5–7 -nerved; awn
to 0.5–2 mm or occasionally
absent; lower lemma
subcoriaceous, 7-9-veined,
acute or with a stout 0.3–1
mm mucro; upper lemma
subcoriaceous, c. 2.5 mm,
smooth; caryopsis terete in
cross-section, with acute apex,
one side flattened off, testa
very smooth and glossy.



Flowering & Fruiting: December–February.

Habitat: In shady, moist inland forest floor.

Specimens examined: Jhalda MPCA, Kudagara, 510.68 m, 23.47246 N, 85.93175 E 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93405 (CAL).

Panicum L.

Panicum notatum Retz., *Observ. Bot.* 4: 18. 1786; Bor, *Grasses Burma, Ceylon, India & Pakistan*: 701. 1960. *P. montanum* Roxb., *Fl. Ind.* 1: 315. 1820; Hook.f., *Fl. Brit. India* 7: 53. 1896.



Perennials. Culms to 2 m tall, erect; nodes glabrous. Leaves 7–20 × 1–3.5 cm, lanceolate, base subcordate, apex acuminate, flat, midrib prominent; sheaths to 10 cm long, ciliate along one margin; ligules membranous with a few long hairs behind. Panicles 15–30 cm long, lax; branches to 21 cm long. Spikelets 2.5–3 mm long, ovate-oblong, acute; pedicels to 1.5 cm long. Lower glume c. 2 × 1 mm, ovate-lanceolate, acute. Upper glume c. 2 × 1 mm, ovate. Lower floret barren. Upper floret bisexual. First lemma c. 2.5 × 1 mm, ovate. Palea absent. Second lemma c. 2 × 1.5 mm, ovate, subcoriaceous. Palea c. 2 × 1 mm, ovate, subcoriaceous. Stamens 3; anthers yellow. Ovary elliptic; stigmas c. 1 mm long, violet. Grains c. 1.5 mm long, ovate.

Flowering & Fruiting: September–October.

Habitat: Along the margins of forests in moist, shady places.

Specimens examined: Jhalda MPCA, Kudagara, 540.03 m, 23.47111 N, 85.93437 E, 27.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93403 (CAL).

Paspalum L.

Paspalum scrobiculatum L., Mant. Pl. 1: 29. 1767; Hook.f., Fl. Brit. Ind. 7: 10. 1896; Haines, Bot. Bihar Orissa: 1000. 1924 (Repr. ed. 3: 1046. 1961); Bor, Grass. Burm. Ceyl. Ind. Pak.: 340. 1960. *P. commersonii* Lam., Tab. Encycl. 1: 175. t. 43/1. 1791.

Vernacular names: *Kodoa dhan* (Bengali), *Kodo Millet*, *Rice grass* (English), *Kodo* (Hindi).



Annuals or perennials. Culms to 90 cm high, densely tufted and erect or creeping and rooting at the lower nodes, rarely trailing or geniculate; nodes glabrous. Leaves lanceolate, linear-lanceolate or linear, 2–40.5

× 0.2–1.4 cm, rounded or shallowly cordate at base, acute, or acuminate at apex, midrib prominent. Sheaths slightly keeled. Ligules membranous, narrow, fimbriate or not. Racemes usually 2, rarely 3 or 4, 1–10.5 cm long; rhachis flat. Spikelets ovate, obovate or orbicular, 2–3 mm long. Pedicels 0.4–1 mm long. Lower glume absent. Upper glume ovate or orbicular, 2–3 × 1.5–2 mm, membranous, 3–5-veined. Lower floret barren. Upper floret bisexual. First lemma ovate or orbicular, 2–3 × 1.5–2 mm, membranous, 3-veined. Second lemma ovate, 2–2.5 × 1–1.5 mm, crustaceous, faintly 3–7-veined. Palea ovate-oblong or orbicular, 1.5–2 × 1–1.5 mm, crustaceous, inflexed. Stamens 3, anthers, 0.5–1 mm long, yellow or brownish. Ovary c. 0.5 mm long; styles 0.5–1 mm long; stigmas 0.5–1 mm long cream yellow, reddish-brown or violet.

Flowering & Fruiting: Throughout the year.

Habitat: Along moist open places near edges of streams.

Specimens examined: Jhalda MPCA, Kudagara, 321.93 m, 23.47712104 N, 85.90689296 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93556 (CAL).

Perotis Aiton

Perotis indica (L.) Kuntze, Rev. Gen. Pl. 2: 787. 1891; Karthik. & al., Fl. Ind. Enum. Monocot.: 246. 1989. *Anthoxanthum indicum* L., Sp. Pl. 1: 28. 1753. *Perotis latifolia* Aiton, Hort. Kew. ed. 1: 85. 1789; Hook.f., Fl. Brit. India 7: 98. 1896; Haines, Bot. Bihar Orissa: 978. 1924.

Vernacular name: *Jaal Kete Ghas* (Bengali), *Indian Comet Grass* (English).

Annual. Culms, 30–45 cm high, ribbed. Leaf sheaths 1.3–3 cm long, terminal one enclosing peduncle; ligules 0.2–0.5 mm long, membranous. Leaf blades, lanceolate, 1.5–4.5 × 0.4–0.8 cm, rounded to semiamplexicaul at base, scabrid or long ciliate at margin sometimes cartilaginous, acute at apex, glabrous, veins riblike. Inflorescence a single spike like raceme, fox tail like, 5–17.5 × 1–1.5 cm, central axis pubescent throughout on ribs. Spikelets many, compactly arranged, sessile, oblong-lanceolate, 1.4–2 × 0.2–0.3 mm, acute to emarginate, 2-awned, hispidulous to pubescent, yellowish white to purplish; pedicels 0.2–0.5 mm long. Lower glume linear-lanceolate, 1.3–2.2 × c. 0.4 mm, awned, chartaceous, 1-veined, keeled, keel serrulate, scabrid; awn 5–6.5 mm, barbellate, whip like. Upper glume linear-lanceolate, 1.5–2.2 × c. 0.3 mm, 1-veined, keeled or not, margins flat to inrolled, pubescent, awned; awn 3.5–4 mm. Floret one, bisexual. Lemma 0.8–1 mm, veins obscure. Palea similar to lemma. Lodicules 2, c. 0.2 mm, obovate, truncate at apex. Stamens 3; filaments c. 0.2 mm; anthers c. 0.4 mm, yellow. Ovary c. 0.3 × 0.2 mm; style c. 0.2 mm, hyaline; stigma plumose, 0.3–0.5 mm, purplish. Caryopsis linear, 1.3–1.5 mm long, terete, greenish to brownish.



Flowering & Fruiting: September–December.

Habitat: Along edges of forests in open dry areas.

Specimens examined: Jhalda MPCA, Kudagara, 385.02 m, 23.47197304 N, 85.91081201 E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93557 (CAL).

Pogonatherum P.Beauv.

Pogonatherum crinitum (Thunb.) Kunth, Enum. Pl. 1: 478 1833; Hook.f., Fl. Brit. India 7: 141. 1896; Prain, Bengal Pl. 2: 1197. 1963 (Repr.); Bor, Grass. Burm. Ceyl. Ind. Pak. 200. 1960. *Andropogon crinitus* Thunb., Fl. Jap. 40. t. 7. 1784.

Vernacular name: Bamboo Grass (English).



Perennials. Culms densely tufted with thick woody root-stock, 10–40 cm high, erect; nodes sparsely villous or glabrous. Leaves elliptic-lanceolate or lanceolate, 1–8 × 0.1–0.4 cm, narrowed at base. Sheaths slightly keeled, villous towards mouth along one margin. Ligules membranous, thin, fimbriate. Raceme solitary, 0.5–3.5 cm long, slender; joint turbinate, 0.5–1 mm, densely ciliate along the angles. Sessile spikelets lanceolate, 1.5–2 mm long, awned, cream-yellow; lower glume oblong, 1–1.5 × 0.5 mm, truncate and ciliate at apex, chartaceous, slightly 2-keeled, 2-nerved; upper glume boat-shaped or ovate-lanceolate, 1.5–2 × 0.5–1 mm, awned, chartaceous, 3-nerved, awns 15–25 mm long; lower floret empty; upper floret bisexual; first lemma ovate-oblong, c. 1 × 0.5 mm, obtuse at apex, hyaline, 1-nerved; palea absent; second lemma notched, 1–1.5 × 0.5 mm awned delicate, 1-

nerved; awn 20–30 mm long pale yellow ovary elliptic, 0.1–0.2 mm long, style 0.5–1 mm, stigmas c. 1 mm long, cream coloured. Pedicelled spikelets similar; callus hairs 2–4 mm long.

Flowering & Fruiting: Throughout the year.

Habitat: On moist rocky places and wet hilly slopes in shaded places.

Specimens examined: Jhalda MPCA, Kudagara, 341.07 m, 23.48113102 N, 85.90979001 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93477 (CAL).

Saccharum L.

Saccharum spontaneum L. in Mant. Pl.: 183. 1771; Hook.f., Fl. Brit. India 7: 118. 1896; Haines, Bot. Bihar Orissa: 1011. 1924; Bor, Grass. Burm. Ceyl. Ind. Pak.: 214. 1960.

Vernacular name: *Kansh* (Bengali), *Kaans* (Hindi).

Perennials, tufted, rhizomatous. Culms 2–6 m high, solid, smooth; nodes many, glaucous below when young. Leaf blades linear-lanceolate to narrowly elliptic-lanceolate, acuminate and capillary-like at apex, scabrid and involute at margins, 45–70 × 0.4–0.5 cm, rigid; ligule ovate, 2–3 mm long, membranous; sheaths auricled, 15–28 cm long, wooly on margins and towards throat, more or less



ribbed, bearded with elongate white hairs at mouth. Inflorescences panicles, 25–45 cm, basal racemes whorled, silver colored; peduncle 12–28 cm, white villous hairy up to 6 cm below lower raceme node. Racemes 6–9 cm long, spreading; rachis fragile. Spikelets paired, one sessile and other pedicelled, both more or less similar; joints 3–5.5 mm, thickened towards apex, very fragile, with long white hairs of 10–13 mm throughout; pedicels 2–2.6 mm, hairy, thickened at apex. Sessile spikelet ovate-lanceolate, 3.2–4 × c. 1.2 mm, acute to acuminate at apex, narrowly truncate at base, greenish brown to purplish; entire spikelets disarticulating along with fragile joints and pedicels; callus long silvery hairy. Lower glume lanceolate, shallowly inturred at margins, entire or 2-toothed, 2-nerved. Upper glume oblong-ovate, ciliate at margins, keeled, 1-nerved. Lower floret empty; lemma ovate-lanceolate, 3–6 mm long, ciliate, nerveless; upper floret hermaphrodite; lemma usually reduced, nerveless; palea small, ovate, ciliate. Lodicules ciliate at margins. Stamens 3; filaments c. 0.6 mm long, hyaline; anthers 1.5–2 mm long, yellowish. Ovary oblong, 0.3–0.6 × c. 0.2 mm, brownish; style 0.7–1.3 mm long, hyaline; stigma plumose, 1.2–1.6 mm long, purplish to brownish. Caryopsis narrowly lanceolate, c. 3 mm long.

Flowering & Fruiting: September–November

Habitat: In open moist places along edges of waterbodies.

Specimens examined: Jhalda MPCA, Kudagara, 323.29 m, 23.47258198 N, 85.91393502E, 14.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93591 (CAL).

Uses: Young parts are used as fodder. It is also a source of paper-pulp. Culms are used for thatching.

Setaria P.Beauv.

Setaria pumila Roem. & Schult. in Syst. Veg. 2: 891. 1817. *Panicum pumilum* Poir. in J. Lamarck & al., Encycl. 4: 273. 1816. *Setaria pallide-fusca* (Schumach.) Stapf & C.E. Hubb. in Bull. Misc. Inform. Kew 1930(6): 259. 1930; Bor, Grass. Burm. Ceyl. Ind. Pak.: 363. 1960.

Vernacular name: Yellow Foxtail, pigeon grass (English), Bandri, Ban kauni (Hindi).



Annual. Culms 20–30 cm high, erect. Leaf sheaths 1.5–2 cm, ribbed, hairy along margins, glabrous; ligule 1.5 mm, fimbriate hairs at apex. Leaf blades linear to elliptic-lanceolate, 6–10 × 0.3–0.4 cm, narrowly rounded at base, entire at margins, acuminate at apex, midrib prominent. Inflorescence of spikes or spiciform panicles, compact, 0.5–1.5 × 0.5–0.8 cm, cylindrical; rachis pilose hairy; involuncral bristles 4–10 per whorl, antrorsely barbed, persistent, 2–3 mm, barbellate. Spikelets in a cluster or solitary, ovoid to subglobose, 1.2–c. 2.2 × 2 mm, acute at apex, deciduous; pedicel minute, pilose hairy. Lower glume ovate, boat shaped, c. 1 × 0.5 mm, 3-veined. Upper glume ovate, boat shaped, c. 1.8 × 0.8 mm, 5–7-veined. Florets 2; lower male, upper bisexual. Lower lemma broadly elliptic to ovate, c. 2 × c. 1 mm, acute, 5–7-veined. Lower palea ovate to elliptic, c. 2 × 0.8 mm,

2-veined, 2-keeled, keels winged, margins infolded. Upper lemma ovate or boat shaped, c. 2 × 1 mm, acute and beak like at apex, rugose, 3–5-veined within, margins inrolled, thick. Upper palea ovate to elliptic, c. 1.5 × c. 0.8 mm, rugose dorsally, 2-veined, 2-keeled, margins infolded and winged along margins. Lodicules 2, obovate, c. 0.3 mm, truncate. Stamens 3; anthers c. 0.5 mm long; filaments c. 0.3 mm long. Ovary ovate to oblong c. 0.5 × 0.1 mm; style 2, c. 0.5 mm long; stigma c. 0.5 mm, plumose, violet to purplish. Caryopsis ovate-elliptic or rarely oblanceolate, c. 0.6 × 0.4 mm, acute or obtuse.

Flowering & Fruiting: September–November.

Habitat: Along roadsides and margins of forests in open wet places.

Specimens examined: Jhalda MPCA, Kudagara, 364.21 m, 23.480898 N, 85.90998103 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93545 (CAL).

Sporobolus R.Br.

Sporobolus diandrus (Retz.) P. Beauv. in Ess. Agrostogr.: 26. 1812; Hook.f., Fl. Brit. India 7: 247. 1896; Haines, Bot. Bihar Orissa: 973. 1924. *Agrostis diandra* Retz., Observ. Bot. 5: 19. 1789.

Tufted annual or perennial; culms geniculate, 20–80 cm high. Leaves linear-lanceolate, 8–30 cm long, attenuate and inrolled at apex; leaf sheaths basally fastigiate, keeled towards apex. Panicles pyramidal. Spikelets paired, narrowly elliptic or oblong to ovate. Glumes membranous, muticous; lower obovate or ovate, obtuse or truncate to shortly 2 or 3-lobed at apex, 0–1-nerved; upper ovate to oblong-lanceolate, faintly 0 or 1-nerved. Floret 1, bisexual. Lemma chartaceous, lanceolate, acute, faintly 1–3-nerved. Paleas chartaceous, ovate to elliptic-lanceolate, acute to obtuse at apex, narrowly truncate at base, faintly 0–2-nerved. Lodicules 2. Stamens 2 or rarely 3. Styles 2. Caryopsis brown, oblanceolate, minutely raised and truncate at apex, narrowly acute at base, turgid, flat on dorsal and lateral sides.



Flowering & Fruiting: May–October.

Habitat: Along edges of streams, in moist places.

Specimens examined: Jhalda, MPCA, Sewati Pahar, 439.83 m, 23.4850710164755 N, 85.9112099837511 E, 26.01.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92369 (CAL).

Thysanolaena Nees

Thysanolaena latifolia (Roxb. ex Hornem.) Honda in J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 312 1930. *Melica latifolia* Roxb. ex Hornem., Suppl. Hort. Bot. Hafn.: 117. 1819. *Agrostis maxima* Roxb., Fl. Ind. 1: 319. 1820. *Thysanolaena agrostis* Nees, Edinburgh New Philos. J. 18: 180. 1835; Hook.f., Fl. Brit. India 7: 61. 1896; Haines, Bot. Bihar Orissa: 982. 1924.

Vernacular name: *Fuljharu* (Bengali), *Tiger Grass*, *Asian broom grass* (English), *Naktura* (Hindi).



Perennials, tufted, rhizomatous, reed-like. Culms 1–3 m high, hard, glabrous. Leaf blades lanceolate, subcordate to semiamplexicaul at base, acuminate at apex, 20–45 × 2–4 cm, tessellate veined, glaucous below; ligule c. 1.5 mm, truncate, membranous with hairs behind; leaf sheath when young with dense yellowish pubescent hairs, margins at times ciliate, collar ciliate; hairs 0.5–1.5 mm long, falling when mature. Inflorescences panicles, 30–60 cm long, drooping, glabrous; branches erect to suberect, filiform. Spikelets pedicellate, paired or not, ovate-lanceolate, acuminate at apex, 1.2–1.6 mm long. Glumes subequal, shorter

than florets. Lower glume ovate, acute at apex, 0.5–1 mm long, chartaceous, 1-nerved. Upper glume c. 1 mm long, more or less similar to lower one. Florets usually 2 or 3; lower sterile; median one bisexual; upper male or sterile; rachilla prolonged beyond the base of second floret and often bearing rudimentary florets. Lower lemma lanceolate, 1–1.5 mm long, chartaceous, glabrous, 1–3-nerved. Lower palea absent. Fertile lemma lanceolate, long-ciliate at margins, c. 1.5 mm long, chartaceous, 3-nerved. Palea oblong-lanceolate, 0.5–1 mm long, membranous, hyaline, 2-nerved. Lodicules 2, truncate at apex. Stamens 2 or 3; anthers c. 0.5 mm long. Stigma plumose, purplish. Caryopsis elliptic, c. 0.5 mm long.

Flowering & Fruiting: February–June.

Habitat: In moist shady places of inland forests.

Specimens examined: Jhalda MPCA, Kudagara, 340.45 m, 23.48113798 N, 85.90976 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93482 (CAL).

Uses: Young leaves and culms are used as fodder. Culms along with inflorescences are made into brooms.

Urochloa P.Beauv.

Urochloa panicoides P. Beauv. in Ess. Agrostogr.: 52. t. 11. 1812; Bor, Grass. Burm. Ceyl. Ind. Pak.: 372. 1960. *Panicum javanicum* Poir., Encycl. [J. Lamarck & al.] Suppl. 4: 274. 1816; Hook.f., Fl. Brit. Ind. 7: 35. 1896.

Annuals. Culms turfted to 50 cm high, erect or creeping and decumbent rooting at the lower nodes- nodes sparsely bearded. Leaves ovate-lanceolate, lanceolate or linear-lanceolate 1–7.5 × 0.2–1.2 cm, acute or acuminate, rounded or cordate at base, tubercle-based on one side. Sheaths keeled, tubercle-based hairy. Ligules row of hairs. Racemes 3–5, each 1–3.5 cm long, rachis flat, narrowly winged, bearing solitary or paired spikelets; pedicels with white glassy hairs. Spikelets biseriate, elliptic, 3–3.8 × 1.5–2 mm, acute, densely pubescent. Lower glume ovate, 1–1.5 × c. 1.5 mm, chartaceous, 3-5-nerved. Upper glume broadly ovate, 3–4 × 1.5–2.5 mm, acute, chartaceous, 7–9-veined, densely pubescent. Lower floret male. Upper floret bisexual. First lemma



broadly ovate, 3–4 × 1.5–2 mm, acute, chartaceous, 5–7-veined. Palea ovate-elliptic, 3–3.5 × 1.5–2 mm, delicate, hyaline, 2-keeled, 2-veined. Stamens 3, anthers 1–1.5 mm long. Second lemma ovate-oblong or elliptic, 2–3 × 1.5–2 mm, crustaceous, transversely rugose, mucronate. Palea ovate, 2–2.5 × 1–1.5 mm, obtuse or rounded, crustaceous, rugose, 2-keeled. Stamens 3, anthers 1–2 mm long. Ovary oblong; styles 1–1.5 mm long; stigmas 1–1.5 mm long.

Flowering & Fruiting: July–December.

Habitat: Occasional along moist edges of forests.

Specimens examined: Jhalda MPCA, Kudagara, 420.23 m, 23.48227004 N, 85.91033701 E, 7.4.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93474 (CAL).

SMILACEAE

Smilax L.

Smilax ovalifolia Roxb. ex D. Don, Prodr. Fl. Nepal.: 49. 1825. *Smilax macrophylla* Roxb., Fl. Ind. 3: 793. 1832, non Willd. 1806; Hook.f., Fl. Brit. India 6: 310. 1892; Haines, Bot. Bihar Orissa: 1087. 1924.

Vernacular name: *Ram datan* (Bengali), *Kumarika* (Hindi).

Prickly lianas. Stems sometimes *c.* 2.5 cm diam., terete or 4 ridged or angled, striate when dry, armed with few small distant prickles; flowering branches almost unarmed. Leaves broadly elliptic or orbicular, 7.5–18 × 8–16 cm, rounded or subcordate at base, cuspidate at apex, glossy above, usually 7-costate; petiolar sheaths with large incurved wings; petioles 1–2 cm long, narrowly sheathing below.

Inflorescences axillary, short cymes, 1–3, rarely 5, many-flowered, pedunculate; peduncles 1.4–2.8 cm long; bracts below peduncles ovate, 3–4 mm long; pedicels in both male and female flowers arising from an aggregation of numerous minute bracts.

Staminate flowers: Pedicels 2.6–3 mm long; tepals 6, erect when young, reflexed later, *c.* 7 mm long; outer 3, *c.* 2 mm across; inner 3, *c.* 1.4 mm across; stamens 6, 5–6 mm long; anthers linear-oblong, 1.8–2 mm long. Pistillate flowers: Pedicels 6–8 mm long, slightly elongated in fruits; tepals rather shorter than in male, reflexed; outer 3, ovate-oblong, *c.* 2 mm across; inner 3, *c.* 1 mm across. Ovary 3-celled; ovules 1 or 2 in each cell; style short; stigmas 3, recurved. Berries globose, *c.* 1 cm in diam., green, turning red, densely packed; seeds 1–3, biconvex.

Flowering & Fruiting: April-January.

Habitat: Dry deciduous forests.

Specimens examined: Jhalda, MPCA, Kalma, 545.29 m, 23.4705150034278 N, 85.9330650418996 E, 27.01.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty, 92399 (CAL).



VISCACEAE

Viscum L.

Viscum articulatum Burm.f. in Fl. Ind.: 211. 1768; Hook.f., Fl. Brit. India 5: 226. 1886; Haines, Bot. Bihar Orissa: 804. 1924; Prain, Bengal Pl. 2: 683. 1963 (Repr.); P.P. Ghosal in Lakshmin. & al. (eds.), Fl. West Bengal 4: 481. 2019. *Viscum nepalense* Spreng., Syst. Veg. 4(2): 47. 1827. *Viscum articulatum* var. *dichotomum* Kurz., Forest Fl. Burma 2: 325. 1877.

Vernacular name: Mandala (Bengali), Leafless Mistletoe (English), Budu (Hindi).



Shrubs, epiparasitic, monoecious, pendulous. Stems slender; branches leafless, opposite and decussate or dichotomous, sometimes whorled, flattened, yellowish green; internodes longitudinally 3-ridged; basal internodes usually rounded; succeeding internodes decussately flattened, 0.6–5.5 × 0.1–0.7 cm, longitudinally striate. Leaves absent or rudimentary. Inflorescence a cyme, axillary, 3-flowered; central female flower subtended by a pair of small scaly bracts united into a cup, then a pair of lateral male flowers, one on either side below the upper bracteal cup and in the axils of another pair of lower decussately

developed bracts, c. 0.5 mm long. Male flowers sessile, globose in bud, 0.5–1 mm; perianth lobes 4, free, ovate or triangular, connate with each other inside, c. 0.5 × 0.4 mm; stamens 4; anthers sessile, attached to perianth lobe, c. 0.3 × 0.4 mm, dehiscing by pores. Female flowers ellipsoid in bud, 1–1.5 mm long; bracts annular; perianth lobes 4, triangular, c. 0.5 mm long; ovary inferior; style short; stigma nipple-shaped. Berries globose or subglobose, 2–5 mm across, smooth, green, turning yellowish on maturity. Seeds bright green.

Flowering & Fruiting: November-February.

Habitat: Epiphyte in dry deciduous forest.

Specimens examined: Jhalda MPCA, Kudagara, 441.16 m, 23.48512 N, 85.91158 E, 26.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92370 (CAL).

PTERIDACEAE

Adiantum L.

Adiantum philippense L. in Sp. Pl. 2: 1094. 1753; R.D. Dixit, Census Indian Pterid.: 75. 1984; Fraser-Jenk. & al., Annot. Checkl. Ind. Pterid. 1: 208. 2017.



Rhizome short, erect, apex scaly, scales brown concolorous, linear-lanceolate, acute at apex, entire at margins. Stipes black-brown, tufted, 10–30 cm long, glabrous, glossy, scaly at base; rachis glabrous, ends with terminal pinnae or sometimes extended and then with an apical vegetative bud. Lamina pinnate, lanceolate or oblong-lanceolate, 12–30 × 4–9 cm long (or longer when rachis is extended), glabrous or sparsely hairy; pinnae 5–15 pairs (or more if rachis is extended), 1–4.5 × 1–2 cm, alternate, long petiolate, smaller ones on the extended rachis, shape varies from base to apex as semi orbicular, lunate, subdimidiate, outer margin rounded, almost entire or with very shallow and remote incisions lobed in to 6–7 lobes. Veins numerous, free, forked, slightly raised. Sori pseudoinduciate, entire or interrupted according to the outer margin, oblong-linear, marginal; indusium false, membranous, glabrous. Spores dark-brown, tetrahedral, trilete, non-perinate, exine smooth to slightly verrucose.

Habitat: Terrestrial and lithophytic; grows among wet and shady rocks, rock crevices, road side exposed walls.

Specimens examined: Jhalda, MPCA, Sewati, 365.37 m, 23.4808030351996 N, 85.9099179971963 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93518 (CAL).

Hemionitis L.

Hemionitis tenuifolia (Burm.f.) Christenh. in *Global Fl.* 4: 22. 2018. *Cheilanthes tenuifolia* (Burm.f.) Sw., *Syn. Fil.*: 129. 1806. *Trichomanes tenuifolium* Burm.f., *Fl. Ind.* (N. L. Burman): 237. 1768.



Rhizome short, creeping to ascending, scaly. Fronds distant; stipes 5–25 cm, scaly at base, sparsely hairy above, purple-black, chestnut brown; naked above; lamina 10–50 × 5–20 cm, ovate to deltoid-lanceolate, submembranous, glabrous; ultimate segments of the primary and secondary divisions the largest, pinnatifid; pinnae petiolate, apex acuminate, basal one largest, pinnae margin deeply cut to costae into 5–10 pairs of pinnules, basioscopic pinnule larger than acrosopic ones, margin cuts costule and costule into pinnulets and ultimate segments respectively; segments of various shapes; margins crenate. Sori marginal confluent, indusiate; indusia elongated, denticulate, wrinkled. Throughout the state in hilly regions.

Habitat: Terrestrial and lithophytic. Abundant in forest floor along

roadsides; rooting in rock crevices in open sunny situations.

Specimens examined: Jhalda, MPCA, Sewati, 337.70 m, 23.4716049861162 N, 85.9126240108162 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93532 (CAL).

SCHIZAEACEAE

Lygodium Sw.

Lygodium flexuosum (L.) Sw. in J. Bot. (Schrader) 1800(2): 106. 1801; Bedd., Ferns S. India: t. 63. 1863 & Handb. Ferns Brit. India: 457, t. 283. 1883; C.B. Clarke in Trans. Linn. Soc. London Bot. 1: 534. 1880; Haines, Bot. Bihar Orissa 3: 1264. 1924; Baishya & Rao, Ferns Fern-allies Meghalaya: 37. 1982. *Ophioglossum flexuosum* L., Sp. Pl. 2: 1063. 1753.



Climbing ferns; rhizomes short, erect with filiform stipe and rachis, glabrous or slightly hairy. Primary rachis-branches not elongated; secondary rachis-branches opposite, 6–20 cm long, bearing alternate pinnules; pinnules lanceolate to linear-lanceolate, 3–10 cm long, cuneate to cordate or auricled at base, serrulate at margins, acute at apex, deeply cut into 2 or 5 distinct basal lobes, appearing pinnate, coriaceous or chartaceous, hairy on the veins and midrib; terminal pinnule longer and larger than the lateral ones. Fertile pinnules slightly contracted, narrower. Spikes on marginal protruding lobes, oblong-cylindrical; indusium covered with few slender hairs.

Flowering & Fruiting: September–November.

Habitat: Along forest edges in moist, open places.

Specimens examined: Jhalda MPCA, Kudagara, 363.12 m, 23.47134 N, 85.9166 E, 25.1.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 92355 (CAL).

SELAGINELLACEAE

Selaginella P.Beauv.

Selaginella repanda (Desv. ex Poir.) Spring in Voy. Bonite Bot. 1: 329. 1846; R.D. Dixit, Cens. Indian Pterid.: 16. 1984; R.D. Dixit, Selaginellaceae India: 62. t. 27. 1992; Fraser-Jenk. & al., Annot. Checkl. Ind. Pterid. 1: 44. 2017. *Lycopodium repandum* Desv. ex Poir. in Lam., Encycl. Méth. Bot., Suppl. 3, 3: 558. 1814.



Plant mesophyte; stems sub-erect, 5–25 cm long, glabrous, branched from base; branches erecto-patent, lax, pinnately compound; rhizophores restricted at the base only. Rhizophore 3–5 cm long, restricted at base, cylindrical and branched dichotomously. Leaves heteromorphic, contiguous, compact on the stems and branches, drying brown in colour; lateral leaves ovate-lanceolate, c. 4×1.3 mm, oblique, membranous, acute at apex, cordate and ciliate towards base, dentate to denticulate towards apex at margins; median leaves broadly ovate, 2×1.1 mm, oblique, membranous, acute to acuminate at apex, cordate and ciliate at base, remaining denticulate at margins; axillary leaves ovate-lanceolate, c. 2×1 mm, membranous, acute at apex, cordate and ciliate at base and remaining dentate towards apex at margins. Strobili $5-8 \times 1-15$ mm, tetragonous. Sporophylls isomorphic, ovate, oblique, membranous, acuminate at apex, dentate at margins. Megaspores 4 per sporangium, pale yellow, globose, tetrahedral, warty. Microspores orange red with irregular elevation shady and wet.

Habitat: Terrestrial and lithophytic, grows in rock crevices of moist mossy cover over rock boulders along streams.

Specimens examined: Jhalda, MPCA, Sewati, 320.25 m, 23.4743758374764 N, 85.9122820291669 E, 13.09.2022, K. Karthigeyan, A. Bhattacharjee, P.P. Ghoshal, S. Biswa & K. Chakraborty 93555(CAL).

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