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NEWS LETTER



Sri P.V. Jayakrishna, former Secretary, MoEF, visiting Indian Botanic Garden with the Director, and Officers of BSI.



Sri P.V. Jayakrishna, former Secretary, MoEF, Govt. of India, on a discussion with Dr. M. Sanjappa, Director, B.S.I. at C.N.H., B. Garden, during his visit to Central National Herbarium

EDITORIAL

ENVIS Centre on Floral Diversity, Botanical Survey of India, Kolkata has been identified as ENVIS-EMCB (Environment Management Capacity Building) node by the Ministry of Environment & Forests, Government of India. Botanical Survey of India is a National repository for the samples of floral wealth of India and a centre of inventorisation of plant wealth and dissemination of knowledge of floral diversity. A database was established at this ENVIS-EMCB centre for dissemination of knowledge on Rare and Threatened Plants of India, Ethnobotany, Indigenous medicinal plants, wetland flora and Mangroves. The database can be accessed through web-site and e-mail.

The current issue of ENVIS newsletter highlights some interesting articles on Wild Banana, Plant resources of Little Andaman, Traditional use of some plants, Case study on vegetation of Kawar Lake and terrestrial fern—DICRANOPTERIS.

Hope this issue would be useful to researchers and naturalists as well.

M. Sanjappa
Director
Botanical Survey of India

WILD BANANAS

The Genus *Musa* L. of the section *Rhodochlamys* in India

This review of the section *Rhodochlamys* has been prepared largely from original descriptions of the species involved, but it also draws extensive information from the first author's six-expedition trips to Southeast Asia, his studies of herbarium specimens at the Royal Botanic Gardens (RBG) Kew and RBG Edinburgh, and observations made in several botanical gardens around the world. This review also takes into consideration more recent information from morphological and cytogenetic studies and is based on the most up-to-date available knowledge. The section *Rhodochlamys* is one of the four sections into which the genus *MUSA* is divided (the others being *Australimusa*, *Callimusa* and *Eumusa*, which is sometimes called *Musa*). Members of the *Rhodochlamys* and *Eumusa* sections have a basic chromosome number of $2n = 22$ compared with $2n = 20$ of the *Australimusa* and *Callimusa*. Species in section *Rhodochlamys* are characterised

by having inflorescence that are erect, at least at the base, with fruit pointing towards the bunch apex. Most of the species also typically have relatively few fruit and are best known for their brightly coloured bracts, a feature that makes them popular as ornamental plants.

There are nine species in the section *Rhodochlamys* of which five species such as *Musa ornata*, *Musa velutina*, *Musa laterita*, *Musa sanguinea* and *Musa mannii* are well recognised and well described. Other four species such as *Musa aurantiaca*, *Musa rosacea*, *Musa rosea* and *Musa rubra* are less known and of somewhat less definite status. This paper focuses only on the five well-recognized species, which occur in India. The natural habitat of *Rhodochlamys* species is Northeast India, Bangladesh, Myanmar and Northwest Thailand, (see map). Much of the diversity in the section is located in areas that have been



Fig. 1



Distribution

This species is found growing wild in the sub-tropical evergreen forests of Arunachal Pradesh and Assam in India. This species was collected from Upper Assam by Gustav Mann and described by H. Wendland and O. Drude from a plant that flowered in the garden at Herrenhausen.

Note

A probable synonym of this species is *Musa dasycarpa* described by Kurz (1865/66) "*Musa dasycarpa* Kurz. Fruits hairy. (Assam)". Later Kurz noted that "Wendland and Drude published in Regel's Gartenzeitung for 1875, a supposed new species which they call *M. velutina*". The type specimen of *M. dasycarpa* is in Calcutta, but there is supposedly a drawing of it at the Royal Botanic Gardens, Kew. Cheesman while doing the revision noted "the drawing strongly suggests identity with *M. velutina*", but he was not prepared to confirm the identity of *M. dasycarpa* Kurz, hence *M. velutina* is still regarded as the accepted name.

M. velutina is one of only five known *Musa* species in which the fruit splits on maturity exposing the flesh, the other four species do not have such type of adaptation.

Musa laterita Cheesman (Fig.3).

A slender herb, growing to a height of 1-2 m, tillering freely, sending up suckers at long distance, forming sparse clumps. Inflorescence erect; peduncles densely hairy, velvet; bracts brick red inside and outside. Male flowers orange-yellow. Fruit bunch compact, deeply pressing against the rachis; fruits 8-10 cm in length peels becoming yellow during ripening.

Distribution

Native to Northeast India, Myanmar and Northern Thailand, cultivated as an ornamental plant throughout the world and commonly sold as "Bronze" or "Red Salmon", under the trade name *Musa ornata*.

Note

Cheesman noted that the plant has a strong general resemblance to *M. ornata* but, while it hybridises with it, it does not show a strong genetic affinity with that species and in other respects it approaches the section *Eumusa* species more closely than any other *Rhodochlamys*. The ability of the plant to hybridise with *M. ornata* suggests one possible origin of some of the plants commonly but sometimes erroneously known in tropical horticulture as cultivars of *M. ornata*.

Musa sanguinea Hook. f. (Fig.4).

A slender herb, growing to about 1 - 1.5 m high; pseudostem reddish in colour. Midribs of the leaves red on both sides when young, becoming green on the dorsal side at maturity. Inflorescence horizontal; bracts dark pink or pale crimson; male flowers orange-yellow. Fruit stalk is red and velvety; fruit greenish yellow when ripe.

Distribution

The species is a native of the Mahuni forests on the banks of the Booree Deling River in Upper Assam, India. It was described by J. D. Hooker in Curtis' Botanical Magazine 1872, and again by Baker in Annals of Botany, 1893 and by Cheesman in the Kew Bulletin, 1949. *Musa mannii* H. Wendl. ex Baker. Dwarf slender herb 40-50 cm tall. Leaves



elliptic-lanceolate, about 30-35 cm long, green, with a narrow purple border, unequal at base, acute at the apex, ending in a slender tendril-like point. Bracts purplish. Male flowers very short, yellow.

This species differ from *M. sanguinea* in having shorter pseudostem and longer leaves.

Distribution

Native of the Assam valley in India. Hook. f. 1892 and Curtis 1893 described the species from Assam as imperfectly known. Baker described the species in the Annals of Botany (1893).

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LITTLE ANDAMAN ISLAND

Out of the 348 islands that make up the Andamans, 5 big islands lying close together, constitute the Great Andaman group (North, Middle and South Andaman). The Little Andaman island covers an area of 739 sq.km. and lies a little away towards the south. It is separated from the Great Andaman group by the Duncan Passage, and from the Nicobars by the 10^o (Ten Degree) Channel. Geologically, the Little Andaman island is mainly of thick Eocene sediments deposited on pre-tertiary fine grey sandstone, shales and silt with intrusion of basic and ultrabasic igneous rocks. The calcareous sandstones are interspersed with conglomerates and intercalated clays. Serpentinites and Gabbro formations are found at higher elevations while the intertidal belts are characterized by recent coral reef formations. The soils are immature, loose in texture, poor in drainage and low in moisture retaining capacity. Sandy alluvial soil is found in creeks and sheltered coasts while the richer grey, brown and red soils are found in the inland forests. The island possesses warm and humid, tropical climate with a temperature range of 20^o to 32^oC and a mean relative humidity between 82 to 85 % throughout the year. It receives rainfall twice a year, like the rest of Andamans, May to September from the

Southwest (Advancing) monsoon and October to December from the Northeast (Retreating) monsoon. The average rainfall is 3000 to 3500 mm/year. Cyclones and thunderstorms are frequent during the prolonged wet season. Dry weather occurs from January to March. Though many Scientist (Prain; Parkinson; Thothathri; Dagar and Bala Krishnan) have studied the Little Andaman but due to inaccessibility, many parts of the island remain unexplored. The forest resource of the Little Andaman island possesses a very rich wealth of plant diversity, and its flora is very akin to Myanmar and Malaysian islands. The well-developed mangrove forests, littoral beach forests, dense moist evergreen forests and moist deciduous forests are the characteristics of its vegetation. The presence of well-represented endemic elements, epiphytic orchids and ferns is also remarkable.

The Little Andaman island was originally inhabited by the ethnic Onge community (a palaeolithic Negroid tribe) and the Nicobari

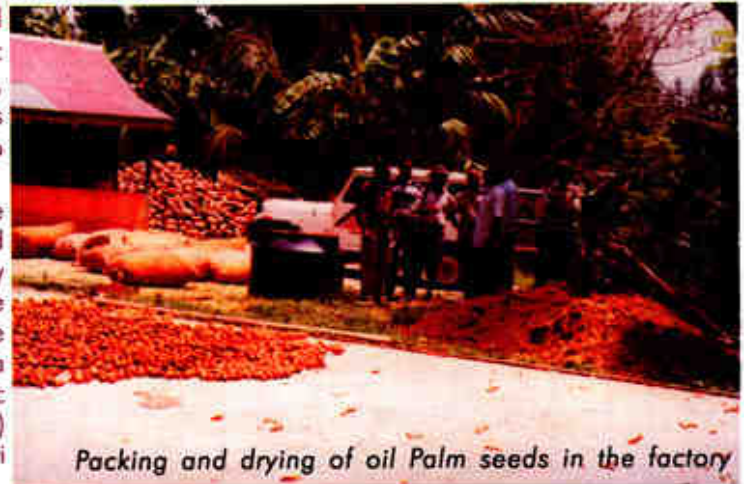
tribals (Neolithic mongoloids). Entire Little Andaman island was initially declared as a Tribal Reserve in the year 1957. In 1963 the entire forest area was declared as Reserve Forest. Up to 1965 the forests of Little Andaman were almost in virgin condition and almost all the plant resources recorded by D. Prain in the earliest botanical expedition were available till then. In 1965 and afterwards, some areas in the eastern part of the island were deforested for rehabilitation of refugees from East Pakistan (now Bangladesh) and repatriates from Sri Lanka and Myanmar under various rehabilitation schemes. In 1975 the Little Andaman forests were taken up as a separate division with the establishment of Headquarters at Hut Bay. At present the forest cover of this island is estimated to be about 706.49 sq.km.

The ENVIS team of the Botanical Survey of India alongwith the Forest & Plantation Development Corporation of Andaman & Nicobar studied the island, its plant resources, mangroves & beach

forests and the red oil palm cultivation. Much diversity, density and vigorous growth was noted in the mangrove forests located in areas that have been very difficult, sometimes even dangerous to travel and to work in. The data collected from this study is no doubt very informative.

PLANT RESOURCES OF LITTLE ANDAMAN

Some of the major commercial timbers used as ornamental wood, hard wood, soft wood and minor commercial timbers and non-timbers forest product of this island forests, concentrated in moist evergreen and deciduous zones are as follows.



Packing and drying of oil Palm seeds in the factory

MAJOR COMMERCIAL TIMBER

Used for Ornamental wood

Sagaraea elliptica (A.D.C) Hook. f. Thoms. (Anno)
Diospyros marmorata Parker (EBI)
Pterocarpus dalbergioides Roxb.
Murraya exotica L.
Terminalia bialata Steud.

Plants Used as Hard Wood

Terminalia procera Roxb.
Chukrasia tabularis A. Juss.
Mesua ferrea L.
Dipterocarpus alatus Roxb.
Pajanelia rheedii DC.
Mangifera andamanica King
Terminalia manii King
Albizia lebbek (L) Benth.
Amoora wallichii King
Parishia insignis Hook. f.
Madhuca butyracea = *Diploknema butyracea* (Roxb.) Lam.
Duabanga sonneratioides Buch-Ham
Lannea coromandelica (Houtt.) Merr.
Calophyllum inophyllum L. C. soulattri

Burm. f.
Lagerstroemia hypoleuca Kurz.
Terminalia bialata Steud.
Neonauclea gageana (King) Merr.
Artocarpus chaplasha Roxb.
Adenanthera pavonia L.
Plants Used as Soft Wood
Ailanthus triphysa (Dennst.) Alston.
Bombax insignis Wall.
Evodia glabra Bl.
Pterocymbium tinctorium (Bl.) Merr.
Canarium euphyllum Kurz.
Tetrameles nudiflora R. Br.

MINOR COMMERCIAL TIMBER

Used as Hard Wood

Spondias mangifera Willd.
Dracontomelum dao (Roxb.) Merr. Rolfe.
Ficus gibbosa Bl.
Syzigium samarangense (Bl.) Merr.
Antiaris toxicaria (Pers.) Lesch.
Ganophyllum falcatum Bl.
Pongamia pinnata (L.) Pierre.
Aglaia andamanica Hiern.
Pometia pinnata J. R. & G. Forst.
Bischofia javanica Bl.

Used as Soft Wood

Trema tomentosa (Roxb.) Hara.
Myristica andamanica Hook. f.
Garcinia cowa Roxb.
Dillenia pentagyna Roxb.
Sterculia villosa Roxb.
Xanthophyllum andamanicum King.

NON TIMBER FOREST PRODUCTS

Bamboo

Bambusa lineata Munro (native)
Oxytenanthera nigrociliata Munro (introduced)
Bambusa schyzostachyooides (Kurz.) Gamble (introduced)
Dinochloa andamanica Kurz. (introduced)

Canes

Calamus andamanicus Kurz.
Calamus fasciculatus Roxb.
Calamus palustris Griff.
Daemonorops manii Becc.

MEDICINAL PLANT RESOURCES

The Onge tribe of Little Andaman is known to use the following plant resources in their traditional medicine and for their domestic life support :

For body pain

Ardisia solanacea Roxb.

For constipation

Thespesia populnea (Linn.) Solkand ex Corr.

Donax Cannaeformis (Forst.f)

For cough

Premna obtusifolia R. Br.
Scaevola sericea Vahl.

For cuts

Chromolaena odorata (Linn.) King.
Wedelia biflora DC.

For fever

Cardiospermum halicacabum Linn.
Dendrolobium umbellatum (L.) Benth.
Eulophia andamanensis Reichb.f.
Garcinia nervosa Miq.
Pongamia pinnata (Linn.) Pierre
Glycosmis mauritiana (Lamk.) Tanaka,
Syzigium samarangense (Bl.) Merr. & Pery,
Scaevola sericea Vahl.

For stomach pains and disorders

Donax cannaeformis (Forst.f.) K. Schum
Mallotus peltatus var. *rubriflorus* T. Chakrab.

Macaranga peltata Muell-Arg
Horsfieldia glabra (Bl.) Warb.

As insect repellent

Orophaea katschallica Kurz.
Canarium euphyllum Kurz.

As bee repellent while collecting honey

Orophaea katschallica Kurz.
Zingiber squarrosum Roxb.

PLANT RESOURCES USED IN DOMESTIC LIFE SUPPORT

Bow making

Manilkara littoralis Dubard.

Arrow making

Desmos dasymaschalus (Bl.) Safford.

Canoe making

Calophyllum inophyllum L.
Canarium euphyllum Kurz.
Pterocymbium tinctorium (Bl.) Merr.

Frame of Cots

Desmos dasymaschalus (Bl.) Safford,
Aidia cochinchinensis Lour.

Netting of Cots

Donax cannaeformis (Forst.f.) K. Schum
Macaranga indica Wight.

Bed spread

Leea indica Merr.
Leea aculeata Bl. ex. Spreng.

Basket weaving

Claoxylon indicum (Bl.) Hassk.
Donax cannaeformis (Forst.f.) K. Schum

Umbrella making

Licuala peltata Roxb.
Licuala spinosa Wurmbr.
Garcinia xanthochymus Hook. f.
Pavettia indica L.

Pillar for houses

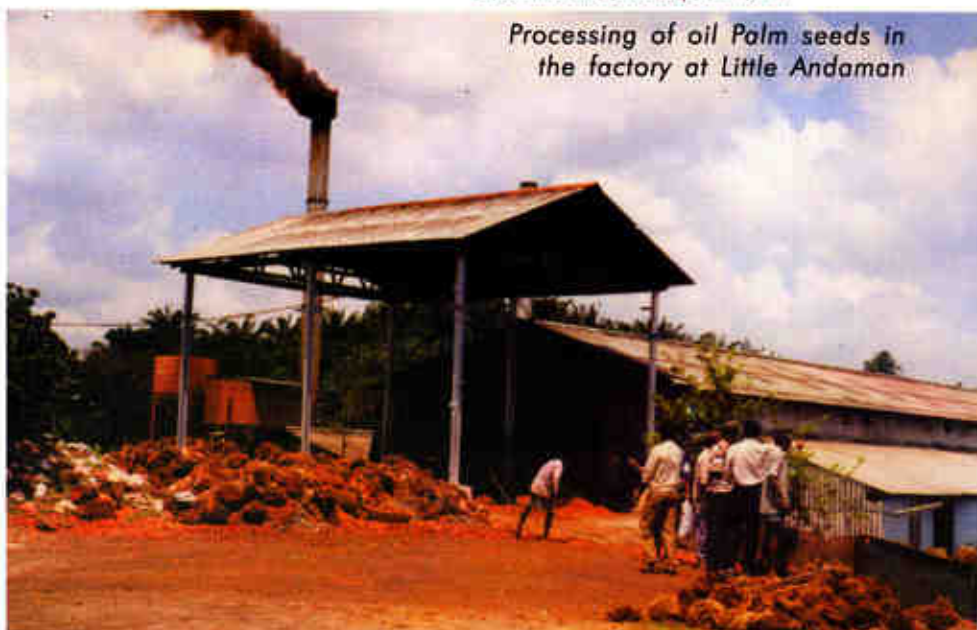
Desmos dasymaschalus (Bl.) Safford.
Garcinia andamanica King

MANGROVES AND BEACH FORESTS

Beach Forests

There are well-developed beach forests all around the island of Little Andaman and the dominant plant resources of these forests are:

Scaevola taccada Roxb.
Dendrolobium umbellatum (L.) Benth.
Hibiscus tiliaceus Linn.
Cycas rumphii Miq.
Manilkara littoralis Dubard.
Tabernaemontana crispa Roxb.
Ochrasia oppositifolia (Lamk.) K. Schum.
Chydenanthus excelsus (Bl.) Miers.
Hernandia peltata Meissn.
Heritiera littoralis Dryander ex W.Ait.
Sophora tomentosa L.
Thespesia populnea (L.) Solkand. ex. Corr
Barringtonia racemosa (L.) Spreng.
Barringtonia asiatica (L.) Kurz.
Syzigium samarangense (Bl.) Merr. & Pery
Calophyllum inophyllum L.
Glochidion calocarpum Kurz.



Processing of oil Palm seeds in the factory at Little Andaman

Ficus altissima Bl.
Pongamia pinnata (L.) Pierre.
Atalantia monophylla (Roxb.) Corr.
Glycosmis mauritiana (Lamk.) Tanaka
Triphasia trifolia (Burm. f.) F. Wils.
Ardisia solanacea Roxb.
Vitex diversifolia Kurz.
Centotheca lappacea (L.) Desv.
Ophiarrhiza mungos L.
Olax imbricata Roxb.
Ischaemum muticum L.
Cyperus kyllinga Endl.
Guettarda speciosa L.
Pemphis acidula J. R. & G. Forst.
Messerschmidia argentea (L. f.) Johns.
Vitex trifoliata L.
Scaevola sericea Vahl.
Pandanus andamanensis Kurz.
Pandanus leram Jones
Pandanus odoratissimus L. f.
Pandanus tectorius Soland. ex. Park.
A terrestrial orchid *Eulophia campestris* Lindl. is very common in the beach forests.

Mangrove forests

The mangroves of Little Andaman are distributed over four major areas; Dugong Creek (535 ha), Bomila Creek (1239 ha), Jackson Creek (1569 ha) and Cheneme Nullah (94 ha) at Butler Bay. These areas are very difficult to study due to inaccessibility. Out of these four creeks two are inhabited by the indigenous Onge tribe. The luxuriant growth of *Rhizophora apiculata* Bl., *Rhizophora mucronata* Lamk., *Bruguiera gymnorrhiza* (L.) Lamk., *Bruguiera parviflora* Wight & Arn., *Bruguiera cylindrica* (L.) Bl., *Avicennia marina* (Forsk.) Vierh., *Avicennia officinalis* L., *Ceriops tagal* (Perr.) C.B. Robinos and *Sonneratia griffithii* Kurz., alongwith *Intsia bijuga* (Colebr.) O. Kuntze, *Nypa fruticans* Wurmb. and *Cerbera manghas* L. are very remarkable and to some extent the density of these mangrove covers is more in comparison to that of the Great Andaman group. The forest also abounds in climbers and epiphytes like *Derris trifoliata* Lour., *Hoya parasitica* Wall., *Dischidia bengalensis* Colebr., *Dendrobium crumenatum* Sw., *Dendrobium anceps* Sw., *Cymbidium aloefolium* (L.) Sw., and the peculiar epiphytic plant *Hydnophytum formicarium* Jack.

RED OIL PALM CULTIVATION

In 1976 the Andaman Forest Department took up the Red Oil Palm (*Elaeis guineensis* Jacq.) plantation scheme in Little Andaman, covering an area of 160 ha. The feasibility report of this project was further revised by the Directorate of Coconut Development in the Ministry of Agriculture & Irrigation, Government of India, and approved by Government of India. Accordingly the newly established Little Andaman Forest Division planted Red Oil Palm in an area of 160 ha within 31 March 1977. This plantation grew up luxuriantly extending to 1593 ha till 1985. The production of oil in the Oil Palm factory in Little Andaman was mostly progressive in the early nineties, as seen in the statistical data (Basic Statistics, 1996: Directorate of Economics & Statistics; Andaman & Nicobar Administration).

YEAR	AREA (ha)	OIL (Metric tonnes)
1991-92	1593	562
1992-93	1693	712
1993-94	1593	1772
1994-95	1593	1745
1995-96	1593	1544

After 10 years of the initiation of Red Oil Palm Plantation, Government of India imposed a ban against introduction or expansion of any exotic plants in the virgin forests of the island. Therefore from 1987 the expansion of Oil Palm plantation in the forests of Little Andaman has been stopped.

Acknowledgement : Author are grateful to the Director, Botanical Survey of India for providing facilities and guidance.

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 BSI



Oil Palm, *Elaeis guineensis* Jacq.
 Plantation in Little Andaman

The name Ginkgo is derived from the Chinese "Yin-kuo" (Silver-fruit).

The Japanese pronunciation is "GINKO". Some authors have adapted the spelling "GINKO". *Ginkgo biloba* L. belongs to a monotypic order Ginkgoales and family Ginkgoaceae, founded on the genus GINKGO, is the only living representative of an ancient order Ginkgoales of conifer like trees. This only species of the one genus of the family and of the order probably flourished during the Mesozoic era, specially during the Jurassic period about 150 million years ago and was contemporaneous with the giant size reptiles, the dinosaurs. During the geological past, its distribution was worldwide and probably there was many species of the genus but today only one species, *G. biloba* is in existence. Due to this interesting history, Ginkgo, the living fossil is very important for establishment of natural history. Since the foliage of the tree resembles the fern, *Adiantum* sp. (maiden-hair fern), therefore, it is called Maiden-Hair tree.

Distribution

The tree is sacred to the Buddhist and has been cultivated for centuries in the temple ground of China and Japan. It is recorded as wild in east China on the border of Chekiang and Anhwei provinces. It is usually cultivated in cooler climate throughout the World. In India, it is found in cultivation at Darjeeling, Dehradun, Mussorie, Shimla, Ootacamund, Shillong and in other moist cooler climate. In the Indian Botanic Garden, some young seedlings are also planted in the nursery. It is planted in the avenues and parks in the USA.

Description

A deciduous tree, 15-20 m. tall with grayish bark. Leaves fan-shaped, glossy, green, resembling an enlarged pinnule of Maiden-hair fern, upper margin toothed, divided into 2 lobes. Male and female bears strobili on different trees; male strobili grows as catkins; female strobili stalked, arise from the axil of a scale like bracts. Fruits look-like false drupes with fleshy pericarp, plum-like about 3 cm. in length, orange in colour. Flowering & fruting ;March and Sep.-October.

Uses

In Japan and China, it is used for making Chess-men, Chess-board. The seeds are eaten roasted during feasts as digestive.



GINKGO L.- Maiden-Hair Tree

Ginkgo biloba L.

It is also reported that the roasted seed diminishes the effect of drinking wine (Dallimore and Jackson, 1966). The raw kernels are reported to be toxic and contain sucrose, starch, protein, pantosans, fiber and sterols. Globulin of the kernel is rich in tryptophane. Seeds are also reported to use for washing cloths in China. A detergent cosmetic is prepared by digesting the seed in wine or oil (Anon. 1956). Fruit pulp is bitter and astringent. It contains a volatile oil and a number of fatty acid of aliphatic series. Raw fruit juice causes erythema, oedema, papules, pustules and intensive itching (Anon. 1956). The Plant, Ginkgo gained world-wide interest as a herbal extract to treat dementia (Loss of memory and mental weakness) and claudication (cramp like pain in one or both calves). In Germany, where most of the research has been conducted by Federal Health Authorities concluded that treatment with Ginkgo extract is safe. Current research would suggest that flavonoids, glycosides and terpenelactones in Ginkgo could act as free-radicals scavengers. It is also reported that it can mitigate the smoke-pollution and has got the capacity to tolerate low water supply.

Propagation :

It can be propagated with the help of seed germination or by cutting and grafting.

Conservation :

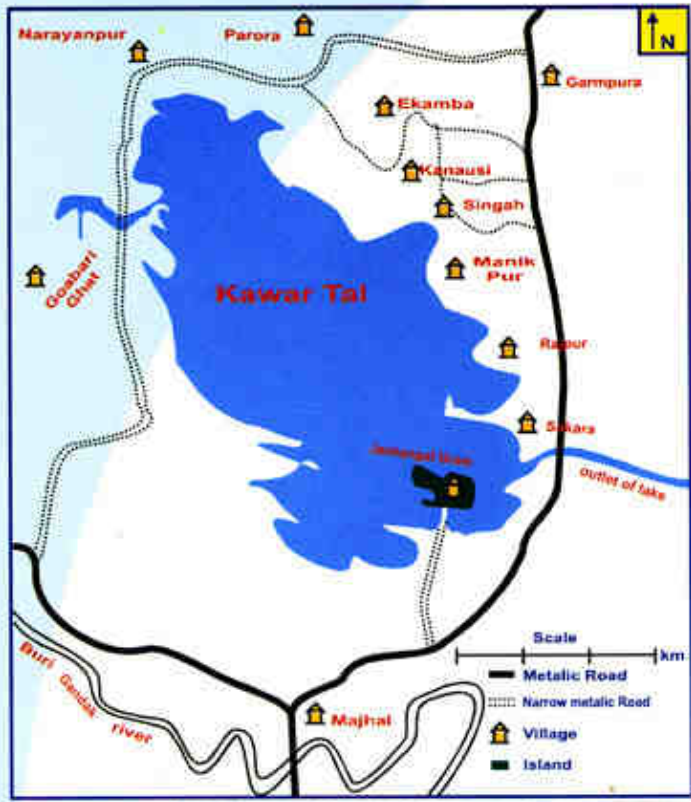
The tree is believed to live for over thousand years. Therefore, this interesting living fossil may be selected for every ceremonial plantation in cooler climates and may be protected as a sacred-tree in various temples and palaces as the practice is followed in Japan and China where the conservation efforts are being maintained by Buddhist monks.

Acknowledgement : The Author is grateful to The Director, Botanical Survey of India for all facilities and guidance.

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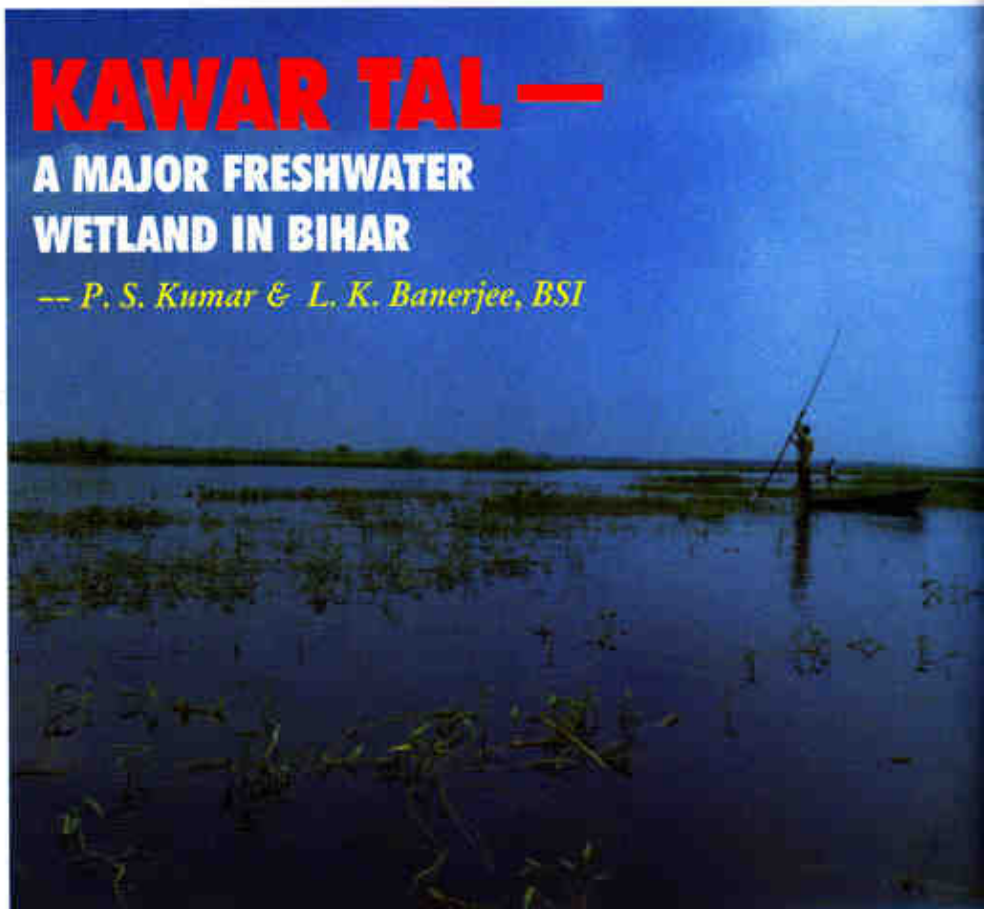
An inhabitant surrounding the lake, engaged to carry the grasses for fodder.

such as during summer the lake is dominated with *Caldesia oligococca* Buch., *Limnophila heterophylla* (Roxb.)Bent., *Phragmites karka* Steud., *Oryza rufipogon* Griff., *Euryale ferax* Salisb., *Nymphaea nouchali* Burm. along with *Najas* sp and *Ceratophyllum* sp. During post monsoon the lake is beautifully covered with the vigorous growth of *Nelumbo nucifera* Gaertn., *Nymphoides indica* (L.) Kuntz., *Myriophyllum indicum* Willd., *Utricularia aurea* Lour., *U. stelaris* L., *Hydrilla verticillata* (L.) Royle and *Najas minor* Allioni ; during winter *Potamogeton nodosus* Poir., *P. crispus* L., *Eleocharis spiralis* (Rott.) Roem. et Schul., *Nymphaea nouchali* Burm. are dominant. Climate of the lake is

The Kavar Lake, in the district of Begusarai of North Bihar, covering an area of 67.37 sq.km, within 25°30' & 86°10' is an oxbow lake formed by the cut off meander of the river Buri-Gandak which is a distributary of the river Ganges. The lake is mostly rain fed or by over flowing Buri-Gandak and Bagmati rivers. This oxbow lake has a curvature in the middle and two hooks like connections are present towards the Buri-Gandak at the southwest side of the lake. The characteristic of the lake is that, though it is rain fed but it remains wet if there are no rain for successive 2-3 years. This condition may be for very low evaporation rate of the lake due to presence of dense aquatic vegetation covering the surface of water in different session as well as in different depth of the lake. Seasonal dominance of the fresh water aquatic plant species is very interesting. Near about 55% of the total fresh water aquatic macrophytes in India are available in this lake. The seasonal growth of different macrophytes with flowers and fruit dominating in different parts of the lake is a very unique feature;

KAWAR TAL — A MAJOR FRESHWATER WETLAND IN BIHAR

— P. S. Kumar & L. K. Banerjee, BSI



warm and humid. Water depth of the lake varies from 3 to 6 metre. pH ranges from 6.5-7.5. Water quality is good for both cooking and drinking except in some parts where utropication is more. Water temperature of the lake ranges from 17°-30°C and the air temperature ranges from 18°-32°C. Average rainfall varies from 1300mm-2000mm. Soil is alluvial type. At the pH 7.5 water analysis of the lake shows Ammonium - 0 mg/L, Nitrate-150 mg/L, Nitrite - 0.025 mg/L, Carbonate hardness -2.4 mmol/L, Total hardness - 0.9 mmol/L, Phosphate - 0.25 mg/L and Dissolved oxygen 7.6 mg/L.

Common macrophytic association in different depth of the lake are, *Hydrila verticillata* (L.) Royle, *Ceratophyllum demersum* L., *Utricularia stellaris*, *Ipomoea aquatica* Forssk., *Nymphaea nouchali* Burm, *Eleocharis spiralis* (Rott.) Roem, *Spirodella polyrhiza* (L.) Schl, *Eichhornia crassipes* (Mart.) Solm - Laubach, *Luffa echinata* Roxb. etc. (0-1 mt.) *Nechamendra alternifolia* Roxb.ex.Wight, *Najas minor* Allioni, *Hygrohiza aristata* (Retz.) Nees ex Wright et Arnott *Myriophyllum indicum* Willd, *Hydrila verticillata* (L.)Royle, *Utricularia aurea* Lour., *Nymphaea rubra* Roxb. exAndr., *N. pubescens* Willd., *Ludwigia adscendens* (L.) Hara, *Potamogeton nodosus* Lour.etc. (1-2 mt.) *Phragmites karka* Steud, *Nelumbo nucifera* Gaert., *Nymphoides indica* (L.)

Phragmites karka growing on the side of the lake



Kuntz, *Utricularia aurea* Lour etc. (2-3 mt.). *Nelumbo nucifera* Gaert. fully dominated (3-5 mt.) and there have no vegetation above from 5 mt depth.. Among the above mention vegetation the *Hydrocharis dubia* (Bl.) Back., *Apanogeton apendiculatus* Bruggen, *Utricularia australis* R.Br., *U. stellaris* L., *Najas graminea*, *Luffa echinata* are very interesting.

Socio-economic condition of the lake basin

There are 9 villages viz. Majhol, Jaimanglagarh, Sakara, Rajour, Kanosi, Sripur, Ekmba, Parora and Narainpiper surrounding the lake and all the people belong to backward class and below poverty line. Most of them belong to Sahani community. Their main occupation is fishing in the lake and trapping birds. Now the bird trapping has been stopped and they now depend totally on fishing, cultivation of wild paddy, collection of fodder and plucking and selling of lotus leaves and flowers.

Major problem for management of the lake :

- 1) The growth of *Phragmites karka* Steud. should be managed immediately, otherwise the entire lake will be filled up with its root system.
- 2) The aquatic vegetation is so dense that no motor boat transportation is possible. For quick transportation to prevent illegal activities in the different parts of the lake Air boat is necessary.
- 3) The mesh size of the fishing net should be strictly regulated so that various young fish seed could be saved.
- 4) Local people for cultivation purposes illegally use the elevated banks of the lake. This practice should be stopped as the chemical fertilizers and insecticides may cause serious damage of Lake Water for aquatic flora and fauna.
- 5) The Core zone of the lake should be strictly protected from fishing and other activities.
- 6) Cultivation of *Oryza rufipogon* Griff. (Wild paddy) should be restricted along the fringe zone of the lake.
- 7) The lake was proposed as one of the Ramsar Site in India on 22 May, 2000, however Government of India and Government of Bihar should take further initiation for including this lake as a Ramsar site.

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General view of the Lake Kavar

***Amomum hypoleucum* Thw.**

- a rare/ threatened aromatic plant needs conservation

— S. C. Majumder and H. S. Pandey

The genus *Amomum* of the family Zingiberaceae is an aromatic herb growing usually in tropics and subtropics and comprises about 1000 species of which 30 species are found to occur in India and Myanmar.

Amomum hypoleucum Thw. Was discovered by the Director of the Royal Botanic Garden, Paradenia, Sri Lanka Dr. G. H. K. Thwaites in 1861 and described on the basis of Type. C. P. 3532, housed at PDA, K., BM & Cal herbaria. Its occurrence in India was also not known until Fischer (1929) recorded its availability from Anamalai Hills (1800-3500 ft.) Subsequently reported as rare from South W. India (Kanchankumari State Forests, Hassan District, Karnataka) (Saldanha & Nicolson 1976) and Anamalai Hills, Coimbatore, Tamil Nadu (Henry, Chithra & Bala Krishnan 1989) Apart from India, it has been also listed as very rare and endemic to damp forests of Alagalla Sri Lanka (Trimen 1898) and Candy District of Sri Lanka (Dassanayake & Fosberge 1993).

Introduction :

This plant was introduced in the experimental Garden & National Orchidarium, Yercaud, Shevaroy Hills during January 1975 by Mr. K. Vivekananthan from Nilgiris. At Shevaroy Hill this species used to grow and flower during month of July. This plant was collected from Shevaroy Hill (Banerjee & Basu) during May 1998 under Ex-situ conservation programme. Plants with straight leafy stem, densely flowered spikes look beautiful for its yellowish purple flowers and newly emerging yellow colored leaves. This rare/endangered taxon is growing well in the climatic condition of lower Bengal since the day of its introduction in the Indian Botanic Garden with vegetative growth during the month of March-April. Flowering can be observed from the 3rd week of April, and fruits can be collected at the end of July onwards from this Garden plants.



Germplasm of *Amomum hypoleucum* at Indian Botanic Garden, Howrah

Propagation /multiplication:

This species can be propagated through seeds and offsets. At the end of fruiting it can be multiplied by dividing the Rhizomes and planting them separately.

Use & Utilisation :

Literature hunt does not yield an clue on the use and utilization of this particular taxon. The spicy seeds of some of the *Amomum*, also called Cardamon, are cheaper substitutes for true Cardamon (*Elettaria Cardamomum*) which they resemble. This taxon having aromatic fruits can be attempted to grow in Indian Botanic Garden to find out its potentiality of other cultivated ones like *A. aromaticum* and *A. sbulatum*.

Conservation:

Possible reason for rarity & endangerment might be the removal of covering trees in primary forests which has reduced the population of species. This *Amomum* grows as under growth are the worst sufferer because they are sensitive to exposure and once the humid habitat is destroyed they suffer much. Second reason may be over exploitation of natural resources. Land utilization for cultivation of coffee, cassava, Pine apple and fruit plants & forest fire.

To conserve the species ex-situ cultivation is essential which can be done by growing them in the Botanical garden of different agroclimatic regions of our country. At Anamalai hills two areas covering 117. 11 & 919.95 sq. kms declared as Indira Gandhi (Anamalai) national Park & Indira Gandhi

(Anaimalai) Wild life Sanctuary respectively may serve as in-situ conservation measure or this taxon but to confirm its living condition in wild a survey of this park and sanctuary is suggested.

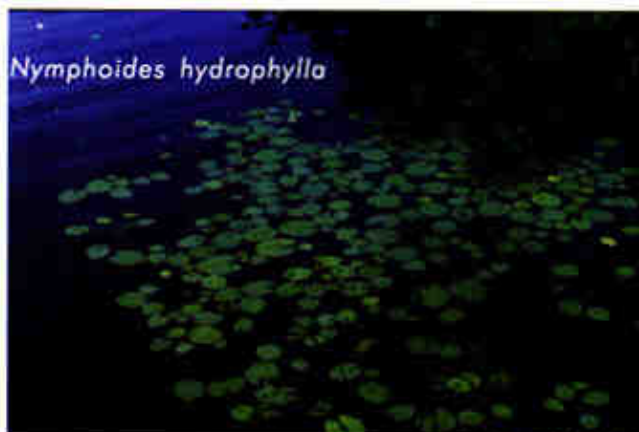
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Nymphoides hydrophylla



A Review on the Medicinal Potentialities of Macrophytes in India

India is very rich in aquatic floral due to its varied wetland system. A good number of wetland macrophytes have immense medicinal potentialities with profound knowledge of their traditional use in the indigenous system of medicine. Recently more attention has been paid to wards the traditional medicines and plant derived drugs all over the world through the application of biotechnology that opens up an unlimited scope to enhance the yield of bioactive agents and cultivation practices of medicinal plants. Wetland macrophytes also create interest in the medicinal world. In spite of the vast scope of aquatic medicinal macrophytes for human kind, little attention was paid for its medicinal aspect. To generate the base line data on wetland medicinal plant resources for immediate scope in



Enhydra fluctuens

search of their hidden potentialities, the present work was undertaken.

Out of about 1500 species of medicinal plants (Jain, 1996) in India, 79 Species are growing in wetland system under 40 families. The above mention plant species and their medicinal uses are given in the tables:



Spirodela polyrhiza

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BOTANICAL NAME	FAMILY	USED PARTS	USED AS/USED IN
1. <i>Acorus calamus</i> L.	Araceae	Rhizome	Diarrhoea, Dysentery, Fever
2. <i>Aeschynomene aspera</i> L.	Fabaceae	Root	Jaundice
3. <i>Alloteropsis cimicina</i> (L.) Stapf.	Poaceae	Root	Toothache
4. <i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Amaranthaceae	Whole Plant	Galactagogue, Night Blindness, Snake bite, Anthelmintic
5. <i>Ammania baccifera</i> L.	Lythraceae	Leaf	Skin Eruption
6. <i>Aponogon appendiculatus</i> Bruggen.	Aponogonaceae	Leaf	Checking Excess Saliva Secretion
7. <i>Arundo donax</i> L.	Poaceae	Rhizome	Diuretic, Dropsy
8. <i>Bacopa mannieri</i> (L.) Pennell	Scrophulariaceae	Leaf/Whole Plant	Nerve Tonic, Epilepsy, Bronchitis, Skin Disease, Biliusness, Dyspepsia, Flatulence, Diuretic, Asthma, Rheumatism, Cardiotonic
9. <i>Bergia ammannioides</i> Roxb. ex Roth	Elarfinaceae	Whole plant	Anthelmintic, Scabies, Wounds and cuts
10. <i>Bergia copensis</i> L.	Elarfinaceae	Leaf	Fever due to cold
11. <i>Blyxa octandra</i> Planch. ex Thw.	Hydrocharitaceae	Leaf	Scabies, Wounds and Cuts
12. <i>Canna indica</i> L.	Cannaceae	Root, Rhizome and Scape	Diaphoretic, Diuretic, Dimulcent, Stimulant, Dropsy, fever
13. <i>Centella asiatica</i> (L.) Urban.	Apiaceae	Leaf	Antidysenteric, mouth and Throat ulcers, Appetizer, Leprosy, Eczyma, Psoriasis,
14. <i>Centipeto minima</i> [L.] Braun et Ascherson	Asteraceae	Cervicitis etc. Leaf Whole Plant Seeds	Nasal congestion, Ophthalmia, Vermifuge
15. <i>Ceratophyllum demersum</i> L.	Ceratophylloceae	Whole Plant (Plant Paste)	Antidote to scorpion sting.
16. <i>Ceratopteris thalictroides</i> (L.) Brogn.	Parkeriaceae	Whole plant	Tonic, Stiptic, Poulitica, Skin complaints.
17. <i>Coldenia procumbens</i> L.	Boraginaceae	Whole plant	Rheumatic swelling, supportive for boils
18. <i>Colocasia esculenta</i> (L.) Scott.	Araceae	Petiole	Styptic, Astringent
19. <i>Commelina benghalensis</i> L.	Commelinaceae	Whole plant	Leprosy, Demulcent, Refrigerent, Laxative, Dropsy

BOTANICAL NAME	FAMILY	USED PARTS	USED AS/USED IN
20. <i>Commelina diffusa</i> Burm.	Commelinaceae	Whole plant	Burns, Itches and boils
21. <i>Cryptocoryne retropiralis</i> (Roxb.) Kunth.	Araceae	Rhizome	Vomiting, Cough, Fever, Abdominal complaints
22. <i>Cyperus irira</i> L.	Cyperaceae	Whole plant	Stimulant, Astringent, Stochic
23. <i>Cyperus rotundus</i> L.	Cyperaceae	Tuber	Cooling agent
24. <i>Dentella repens</i> (L.) Forst.	Rubiaceae	Whole plant	Poulticing sores
25. <i>Drosera peltata</i> J.E. Smith ex Willd.	Droseraceae	Whole plant	Antisyphilic
26. <i>Echinochloa colona</i> (L.) Link.	Poaceae	Root, Leaf	Toothache, goiter, Internal Haemorrhage
		Whole plant juice	Indigestion
27. <i>Eclipta prostrata</i> (L.) L.	Asteraceae	Leaf and Whole plant	Jaundice, Hairtonic, Anti-inflammatory, Anthelmintic, Anodyne, Vulneary, Ophthalmic, Digestive, Carminative, Diuretic, Aprodisiac, Deobstruent, Depurative, Anaxia, Skin disease
28. <i>Eichhornia crassipes</i> (Mart.) Solms.-Lauback	Pontederiaceae	Plant juice	Stomachic, Toothache, Goitre
29. <i>Enhydra fluctans</i> Lour.	Asteraceae	Root	
		Leaf	Laxative, Antibilious, Demulcent, Cutaneous and nervous affection
30. <i>Eriocaulon quinquangulare</i> L.	Eriocaulaceae	Leaf	Throat pain
31. <i>Euryale ferax</i> Salisb.	Nymphaeaceae	Seeds	Tonic, Astringent and Obstruent.
32. <i>Grangia moderatopata</i> (L.) Poiret	Asteraceae	Leaf	Antispasmodic, Stomachic, Deobstruent, Menstrual disorder. Ear ache
33. <i>Heliotropium indicum</i> L.	Boraginaceae	Whole plant	Skin disease, Eye complain
		Leaf Root	Urticaria, Fevers Cough and fever
		Flower	Emmenagogue, Abortifacient
34. <i>Hydrocotyle sibthorpioides</i> Lamk.	Apiaceae	Whole plant	Rheumatism, Pulmonary & digestive troubles, Syphilis, Skin disease, Vermifuge, Diuretic
35. <i>Hydrolea zeylanica</i> (L.) Vahl.	Hydrophyllaceae	Leaf	Scabies, wounds and cuts
36. <i>Hygrophila schulli</i> M.R. et S.M. Almeida	Acanthaceae	Whole plant, Stem, Leaf	Aphrodisiac, Anti-inflammatory, Hyperdypsia, Jaundice, Flatulence, Dysentery, Urogenital disease, Anaemia, Cough
37. <i>Hygryza aristata</i> (Retz.) Nees. ex Wight et Arnott.	Poaceae	Whole plant	Fever, Headache, Cooling
38. <i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Leaf & Stem	Piles, Ring worm, Blood purification,
		Flower juice	Antidote to opium and arsenic poisoning
39. <i>Lemna perpusilla</i> Torre	Lemnaceae	Whole plant	Diuretic, Cooling, astringent, Wash for ophthalmia
40. <i>Limnophita indica</i> (L.) Druce	Scrophulariaceae	Leaf	Filariasia, Diarrhoea, Dysentery, Flatulence, Galactogue
41. <i>Lindenbergia muraria</i> (Roxb. ex D.Don.) Bruff	Scrophulariaceae	Whole plant	Bronchites, Skin eruption
42. <i>Lindernia ciliata</i> (Colsm.) Pennell.	Scrophulariaceae	Whole plant	Gonorrhoea
43. <i>Lindernia crustacea</i> (L.) Muller	Scrophulariaceae	Whole plant	Biliousness, Dysentery, Poultices, Against ring worm
44. <i>Lindernia oppositifolia</i> (Retz.) Mukherjee	Scrophulariaceae	Root	Fever
45. <i>Ludwigia adscendens</i> (L.) H. Hara	Onagraceae	Whole plant	Anthelmintic, Astringent, Febrifuge, Carminative, Diuretic
46. <i>Ludwigia perennis</i> L.	Onagraceae	Leaves	Tooth ache
		Whole plant	Fever
47. <i>Mersilea minuta</i> L.	Mersiliaceae	Leaf	Sedative
48. <i>Manochoira hastata</i> (L.) Solms.-Laubach.	Pontederiaceae	Whole plant	Cooling agent, Tooth ache, Bails
		Root Leaf	Asthma
		Rhizome	
49. <i>Monochoria vaginalis</i> (Burm. f.) Persl.	Pontederiaceae	Leaf Root	Cough, Stomach & Liver complain, Asthma, Tooth ache
50. <i>Murdania nudiflora</i> (L.) Brennan	Commelinaceae	Whole plant	Asthma ?
51. <i>Nelumbo nucifera</i> Gaertner	Nelumbonaceae	Root Rhizome	Diuretic, Spermatorrhoea, Leucoderma,
		Leaf Flower	Diarrhoea, Dysentery, Diuretic, Anthelmintic, Leprosy, Fever, Haemorrhoides, Ophthalmia, Aphrodisiac, Stomatitis, Menorrhagea, Leucorrhoea.



Sagitaria sagittifolia and *S. moutevidensis*



Exhibition on World Environment Day at CNH organised by BSI

BOTANICAL NAME	FAMILY	USED PARTS	USED AS/USED IN
52. <i>Nepenthes literata</i> Lax.	Foliaceae	Whole plant	Emetic, Syphilis.
52. <i>Nymphaeaouchellii</i> (Rumf.)	Nymphaeaceae	Flower, Seeds	Astringent, Gastric tonic. Cooling medicine and cutaneous disease.
54. <i>Nymphaea pubescens</i> Willd.	Nymphaeaceae	Do	Do
55. <i>Nymphaoides hydrophylla</i> (Lour.) Kuntze	Menyanthaceae	Whole plant, Petiole.	Jaundice Ulcer and insect bite Anthelmintic.
56. <i>Nymphaoides indica</i> (L.) Kuntze	Nymphaeaceae	Do	Do
57. <i>Ottelia alismoides</i> (L.) Pers.	Hydrocharitaceae	Leaves	Poultices, Fever.
58. <i>Oxystelma esculentum</i> (L. f.) R.Br. Schultes	Asclepiadoceae	Whole plant, Latex, Root	Antiseptic, Depurative, Galactagogue, Throat and mouth infection, Antiperiodic Jaundice
59. <i>Persicaria barbata</i> (L.) Haro	Polygonaceae	Root, Leaf	Astringent, Cooling Ulcer Veterinary (fly infected wounds of goat)
60. <i>Persicaria glabra</i> (Willd.) Maza	Polygonaceae	Leaf	Jaundice, Fever, Colic
61. <i>Persicaria hydropiper</i> (L.) Spach	Polygonaceae	Whole plant	Stimulant, Diuretic, Styptic, emmenagogue, Oral contraceptive, Uterine disorder, Haemostatic, Bone fracture
62. <i>Phragmites karka</i> (Retz.) Trin. ex Steud	Poaceae	Root	
63. <i>Phylla nodiflora</i> (L.) Greene	Verbenaceae	Whole plant	Ischuria, Boils, Swollen, Cervical glands, Ulcer, Antibacterial cooling agent, Asthma, Bronchitis, Diarrhoea, Antiseptic, Antidysenteric, Asthma, Skin disease.
64. <i>Pistia stratiotes</i> L.	Araceae	Leaf	Pneumonia and Bowel complaints Migraine
65. <i>Polygonum plebejum</i> R. Br.	Polygonaceae	Whole plant	
66. <i>Rotala pentandra</i> (Roxb.) Blatter et Hallb.	Lythraceae	Leaf	
67. <i>Sagittaria sagittifolia</i> L. ssp. <i>leucopetala</i> (Miq.) Hartog.	Alismataceae	Stem, Leaf	Skin disease, Poultice for boils abscesses Antidote to snake and insect bite, Sore throat, infection of breast
68. <i>Salvinia cucullata</i> Roxb.	Salviniaceae	Leaf	Antiseptic, Dysentery
69. <i>Schoenoplectus articulatus</i> (L.) Palla	Cyperaceae	Tuber	Diarrhoea and vomiting
70. <i>Sphaeranthus indicus</i> L.	Asteraceae	Plant juice Root, Flowers seeds	Styptic, Liver and gastric disorder Anthelmintic, Chest pain, Cough & bowel complaints Depurative tonic Anthelmintic
71. <i>Spilanthes calva</i> DC.	Asteraceae	Whole plant	Tooth ache, Dysentery, Local anesthetic, Sialagogue, Stimulant, Diuretic, Scabies, Scoriasis
72. <i>Spilanthes paniculata</i> Wall. ex DC.	Asteraceae	Whole plant	Tooth ache, Diuretic, Rheumatism, Scabies, Piloniasis, Vulnerary, poultice. Externally used in case of ascites
73. <i>Tanningia axillaris</i> (L.) Kuntze	Commelinaceae	Whole plant	
74. <i>Tropis natans</i> L. var. <i>bispinoso</i> (Roxb.) Makino	Trapaceae	Root Seed	Antibilius, Deodorant, Diuretic, Poultices and Diarrhoea.
75. <i>Typha angustifolia</i> L.	Typhaceae	Rhizome/ Fruit/ Inflorescence	Astringent, Diuretic, Dysentery, Measles.
76. <i>Vallisneria spiralis</i> L.	Hydrocharitaceae	Whole plant	Stomach ache for menstruation
77. <i>Veronica anagallis-aquatica</i> L.	Scrophulariaceae	Whole Plant	Antiscorbutic
78. <i>Vetiveria zizanioides</i> (L.) Nash.	Poaceae	Root Root	Gargle Diaphoretic, Stimulant, Refrigerant, Flatulence, Obstinate vomiting, Rheumatism, Lumbago, Sprains.
79. <i>Xyris indica</i> L.	Xyridaceae	Whole plant	Ringworm, itch and Leprosy.

Due to rapid urbanization, industrialization, expansion of agricultural lands and pollution, wetlands are suffering in ecological insecurity. The biodiversity of wetland system with their potential / actual use are in great concern and macrophyte community in particular. To sustain the potential resources in wetland habitat, they are to be conserved and managed properly.

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Habitat assessment of *Dicranopteris linearis* (Burm.f.) Underw. a terrestrial fern species of Great Nicobar Biosphere Reserve

Dicranopteris linearis (Burm.f.) Underw. is ecologically and medicinally important fern collected from Great Nicobar Biosphere Reserve. The genus DICRANOPTERIS has 10 species recorded from the tropics. In India the genus is represented by only 2 species and 8 varieties. Among these *D. linearis* of the family Dicranopteridaceae is found frequently through out India. The luxuriant growth of the species in Andaman and Nicobar group of Islands, specially in the Great Nicobar Biosphere Reserve is of interest. The present aim of this study is to establish a species habitat relationship through observation and to create a awareness for such interesting species.

The stem of the plant is edible and are used for epileptic or fits treatment. Rhizomes are used for antihelminthic treatment and fronds are used for cure of asthma and fever (Dixit, 1984).

D. linearis is a terrestrial fern with long creeping, hairy, rhizomes; fronds pinnate, useally branched at the top showing repeated pseudodichotomoy at times, hairy; scales absent; veins 1-3 times forked. The sori are placed near the costae of each segment bearing 10-15 sporangia.

It prefers to grow along the road side forest fringes on moist soil and in sunny conditions. Rich population patch of this species are found along the East - West road reserve of the Great Nicobar island in undisturbed evergreen forest zone, associated with *Selaginella*

biformis, *S. dicipiens* and *Lygodium circinnatum*.

Observation

D. linearis is found to grow densely at a stretches of 3-5 m on the undisturbed road side of forest fringes, preferring exposed sunlight in open areas. Density of population decreases according to the distance from the open road side towards the interior, shady forest habitat. It is observed that at a distance of 20-50 m from the road side, the number of species is very low and at a distance of 1-5 m from the road side the number of species is maximum. It is also observed that maximum growth of the species is always within the vicinity of evergreen forests formation rather than other forest types. The study concludes that *D. linearies* may be a good indicator fern for open sunlight habitat and grows in the vicinity of evergreen forest type for protecting soil erosion and frequent land slide. It also provide indications regarding good health of the forests, because in any anthropogenic or natural disturbance of the areas, the plants are not found in proper growth. The data will be very much helpful for correlation between interspecies interaction and the related habitat for preparation of spatial data base vegetation maps.

Acknowledgement

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BSI scientist interacting with the students on International Biodiversity Day



Land slide due to creek erosion



Indigenous rain-coat made from the leaves of *Bauhinia vahlii* Wight & Arn.

A. M. Soren, P. R. Sur, A. C. Halder and S. Bandyopadhyay

The indigenous rain-coats made from the leaves of *Bauhinia vahlii* Wight & Arn. (Leguminosae: Caesalpinioideae) drew our special attention when we saw the local inhabitants wearing them in Ajodhya and Ranibandh in the districts of Purulia and Bankura, West Bengal. The said species is referred to as "Chihar" or "Ghungu Arak" and the rain-coats are called "Ghong" by the local inhabitants. To make the rain-coats, the mature leaves are first collected from the nearby forests. The pulvinised hypopodium is removed by cutting the petiole obliquely near its base with a sharp knife. They are then kept in the shade inside their huts by hanging them on a rope in bunches by tying their petioles with a string or by placing them between the bamboo frameworks and the straw covering of the roofs. The leaves get folded along their mid-ribs when they dry. The dried and the folded leaves are then placed partly one upon the other and fastened by inserting their obliquely cut sharp ends of the petioles through holes made in the leaves with the help of porcupine's quill. The weaving of the rain-coat is made first from its apex and continued downwards till the desired length is obtained. The soft leathery texture of the leaves on its lower surface makes it comfortable to wear. Further, due to symmetrical placement of the leaves, the rain-coats not only look beautiful but facilitate easy drainage of rain water too. The local inhabitants make these rain-coats mainly for their own use. Sometimes they sell them in the markets at a varying cost of 15-50 rupees per piece. Their durability is for a couple of years if maintained properly. We are obliged to the local inhabitants of Ajodhya and Ranibandh for sharing their traditional knowledge and skill with us.



Established
Subject Area
Contact person
Address

Telephone
Fax
E-mail
Website

Activities of the Centre

Future plan

List of Publications
broughtout so far

April, 1994.
Floral Diversity.
Dr. M. S. MONDAL
ENVIS Centre-in-Charge & Joint Director
Botanical Survey of India, Central National Herbarium, 3rd Floor
Indian Botanic Garden, Howrah - 711 103.

(033) 2668 0677, (033) 2248 5634
(033) 2242 4922

envis@cal2.vanl.net.in

<http://www.envisbsi.org> • <http://envfor.nic.in/bsi>

The centre has enormous data on many areas and wants to create database and publish the following information.

- i) Dry & wet coastal ecosystem in India : Vegetation pattern, floristic component, their values in Assessment of Floristic Diversity of Angiosperm in regard to different ecozones in India
- ii) Data base on indigenous medicinal and aquatic plants of India.
- iii) User service will continue.

Thrust area of the ENVIS Centre, BSI is the task of disseminating information on Floral Diversity from different eco-regions of India. Entry of data and scanning of photographs and illustrations of the plants included in the Red Data Book of Indian Plants will be continued. Economic and medicinal plants included in red list categories will be given special emphasis. An identification manual of CITES plants will be prepared and published from the ENVIS centre.

Books :

1. Mangroves, Associates and Salt Marshes of the Godavari and Krishna Delta.
2. Diversity of Coastal Plant Communities (in Press).

Newsletters :

Vol. 9 (in press).

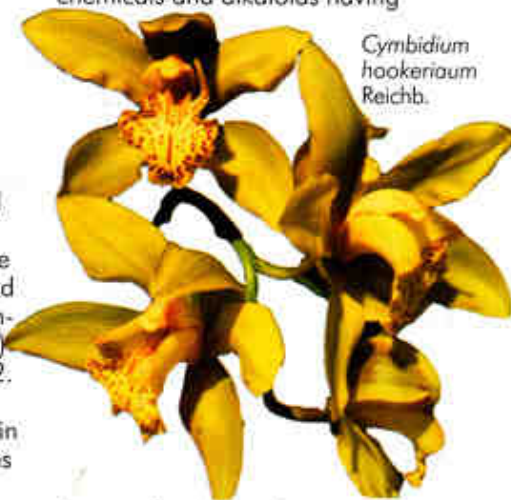
Orchid-Flower of superlatives

—H.J. Chowdhery, CNH, BSI

Orchids—the most exotic, most beautiful, most diversely shaped, most brilliantly coloured, having the tiniest seeds in the whole plant kingdom and belonging to the largest family of the flowering plants in the world, are no doubt a superlative class. Ever since the first artificial orchid hybrid produced in 1856 in England, today the number of registered orchids have swelled to more than 1,00,000 and many new ones are being registered as each day passes.

Orchids are among the most evolutionary advanced of all the Monocotyledons having remarkable specialization for pollination, water uptake and storage. Their charm and glamour have fascinated and lured humans for centuries. The orchids were in cultivation as early as 500 B.C. and the first book on orchids entitled "Ran-Pin" (meaning the varieties of orchids) was written in Japan in the year 1772. With an estimated 25,000-30,000 species distributed all over the world in almost every conceivable habitat types except oceans. They are found from tropical rain forests to seashore scrubs, from semi-deserts to Tundra and from high mountains to famous ancient ruins of Roman and Mayan civilization. Orchid flowers which come virtually in all the colours of the rainbow, are one of the most bizarre and diverse on this earth. They are shaped like slippers, buckets, helmets, scorpion, or may appear like a monkey or a dancing girl or a flying duck or mimic female bees or wasps so well that the males try to mate the

flowers thus facilitating pollination. Even the floral fragrance is equally diverse from pleasantly sweet like Vanilla to most foul. As a result they are highly valued in commerce as cut flowers and pot-plants for their stunningly attractive, beautiful and brilliantly coloured flowers, which remains fresh for several weeks. Orchids are also rich in phytochemicals and alkaloids having



Cymbidium hookerianum Reichb.

therapeutic value and many of them are therefore used in the indigenous system of medicine for the treatment of a variety of ailments. The overexploitation of orchids from the wild, their habitat destruction due to urbanization and large-scale deforestation has rendered them vulnerable and threatened. In order to restrict their unplanned commercial exploitation in international trade, the entire family Orchidaceae has been placed in the Appendix-II of the



Cymbidium hookerianum Reichb.

"Convention on International Trade of Endangered Species of Wild Fauna and Flora" (CITES), while a large number of selected species have been placed in Appendix-I of CITES which is meant to include plant species that are totally banned for International Trade. Species of Lady's Slipper Orchids, Blue and Red Vanda from India are included in Appendix-I of CITES. In India, orchidaceae with more than 1,350 species is also the largest family followed by Poaceae and Fabaceae. The maximum diversity of orchids in India is found in the Himalayan and Peninsular (particularly Western Ghats) region respectively. In India, a large number orchid genera like CALANTHE, COELOGYNE, CYMBIDIUM, DENDROBIUM, PAPHIOPEDILUM, PLEIONE, VANDA, etc. have a high potential to be exploited for commercial purpose. The impact of various biotic and abiotic factors and the large scale collection of popular ornamental and medicinally important species have already rendered a large number of orchids rare and threatened. It is high time to priorities the survey to inventories the plant resources in order to conserve these species before they are lost forever.

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Shri Dash Dipak Varma, IAS, Joint Secretary, MoEF, is keen to observe the century old paintings of orchid painted with natural dyes in the type section, during his visit to Central National Herbarium, BSI.



Sir Ghillean Tolmie Prance, F.R.S., Ex-Director, Royal Botanic Garden, Kew, U.K., eminent Taxonomist, Environmentalist & Ethnobiologist visit Indian Botanic Garden with Director & Scientists of Botanical Survey of India.