

TREES IN THE PREMISES OF INDIAN MUSEUM- A PICTORIAL GUIDE



भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

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Authors

**Debasmita Dutta Pramanick
Kangkan Pagag**



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MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

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**MINISTRY OF ENVIRONMENT, FOREST
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FOREWORD

The rapid pace of urbanization and the resulting loss of green spaces have posed significant challenges to urban biodiversity and ecosystem stability. In an era where concrete landscapes often overshadow our natural heritage, the preservation of botanical diversity within institutional spaces becomes a matter of national importance. In alignment with India's broader environmental goals, such as the 'Green India Mission', documenting and protecting our "Urban forests" is a critical step toward a sustainable future.

The Indian Museum, a premier institution of our nation's history and culture, serves as more than just a repository of artifacts. Its premises are a living sanctuary for a diverse array of flora and fauna. Recognizing the ecological and aesthetic value of these green verges, the publication of "Trees in the premises of Indian Museum – A Pictorial Guide" is a laudable and timely initiative. This volume offers an insightful journey through the botanical landscape of one of India's most iconic landmarks. By documenting the various tree species flourishing within the museum grounds, the book bridges the gap between historical heritage and natural science. The book provides comprehensive profiles of 44 tree species, ranging from indigenous ones to exotic varieties, belonging to 20 Angiosperm and two Gymnosperm families. Precise botanical data and distribution map along with high-resolution photographs make the book a valuable ready reckoner for botanists as well as the common visitors. This pictorial guide is not merely a catalogue, rather it is a sentinel to look up and appreciate the silent custodian of green wealth that have witnessed the Museum's storied past. It serves as a vital tool for awareness creation and underscores the importance of conserving urban green pockets.

I congratulate the authors for their excellent efforts towards popularization of science and promoting conservation awareness among common visitors. Their dedication ensures that the museum's living treasures are not only understood today but are also preserved as a lasting gift for future generations.


(Kanad Das)
22/04/2021

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Introduction-An Overview

The Indian Museum, the largest and oldest multipurpose museum in Indian subcontinent as well as Asia-Pacific region of the world, is a repository of zillions of rare and unique Indian and trans-Indian specimens, has achieved International fame and recognition of 'Pride of Nation'. Origin of this Museum is linked to the foundation of the Asiatic Society of Bengal by Sir William Jones in 1784. Keeping in mind the necessity of establishment of suitable place for continuous receiving of various objects and their preservation, members of the Asiatic Society started to think for a separate place in their building. The idea got definite shape when a land was allotted by the then Government for the Society for developing their own building at the corner of Park Street (1, Park Street). With the initial mandate to form a learning center for the development of socio-cultural activities, disseminating knowledge and preserving natural and cultural heritage for prosperity within the geographic boundary of Asia, the idea of collection and preservation of natural and man-made objects got a configuration under the stewardship of a Danish Botanist, Nathaniel Wallich on 2nd February, 1814, at the premises of Asiatic Society of Bengal and was named as 'Oriental Museum of the Asiatic Society'. Initially all the exhibits were categorized into two broad sections *viz.* Archaeology, Ethnology, Technical and Geology & Zoology. The former Section was assigned to the Librarian of the Asiatic Society while the later Section was allotted to Dr. Wallich. With Curatorship of Dr. Wallich, interesting and curious objects were being collected from various parts of the country, different Institutions and individual donors. Acknowledging huge response of donors and prodigious collection, the then Secretary of the Society, James Princep, took initiative to transform the Oriental Museum to 'National Museum' at the expense of the State (1837). Simultaneously with receiving more and more curious and interesting objects of biological, physical, historical and geological origin from different parts of the country and world, the museum movement achieved a significant momentum in India and simultaneously the journey of museum being continued with development of "Imperial Museum" in 1856 which afterward was familiarized by the name "Indian Museum" and popularly 'Ajabghar' among native people. In connection with accommodating newly opened Geological, Zoological and Archaeological Museum, discussion between members of Society and Government protracted till mid of 1865 resulting declaration of separate building within the premises of Asiatic Society of Bengal. However, inappropriate plan of the building of Asiatic

Society and above all unwillingness of the Board members of the Society abstained establishment of separate building in their premises for Indian Museum that was opened for public on 1862. Foundation of the present building of Indian Museum, designed by W. L. Grandville, was laid in front of Presidency Small Cause Court, Chowringhee and completed in 1875 followed by shifting of this museum from the premises of Asiatic Society to present campus and opened for public on 1st April, 1878. Although the museum, started its new voyages with only two galleries, viz. Archaeology gallery and bird gallery, very soon it flourished with other galleries where objects of Economic botany, Zoology, Geology, History & culture, Archaeology, Anthropology were being displayed. Earlier the economic plant products, collected from different parts of the country, were deposited in a temporary establishment known as 'Bengal Economic Museum' which had no permanent building. Following trend of that period, two International Exhibitions were arranged in 1881 and 1887 in Calcutta Maidan area under initiative of British Governor where huge number of exhibits including botanical collection were displayed. The grand success of these Exhibitions inspired the then British Government to establish separate permanent building for economically useful plant products. This way the 'Oriental museum of Asiatic Society', 'Imperial Museum' and 'Bengal Economic Museum' evolved to the famous 'Indian Museum'. From the opening of the door for general visitors, each and every day diversified crowd, coming from far corner of the country, no doubt are left with heartfelt realization of great visit of the place as countries best cultural heritage of great antiquity, artistic accomplishment and diversified marvelous untapped natural wealth. Due to prosperity and historical significance over time, the Indian Museum, declared as 'Heritage Building' under Ministry of Culture, Government of India, is encompassing with a vast repository of indigenous and foreign exhibits which are spread among six sections, viz. Art, Archeology, Anthropology, Botany, Geology, Zoology and 35 galleries. While Art, Archaeology and Anthropology Sections are controlled by Museum Directorate, other subordinate offices viz. Botanical Section, Zoological Section and Geological Section are governed by respective Survey of India offices. Beside the scientific and cultural Units, Museum directorate also coordinate eight subsidiary Unit services namely Education, Modelling, Photography, Presentation, Preservation, Publication, Library and Security. This multidisciplinary Institution with multifarious activities has been declared as Institute of National importance under Article 62 of seventh schedule of Constitution of India. Administrative wing of this Institute is governed under

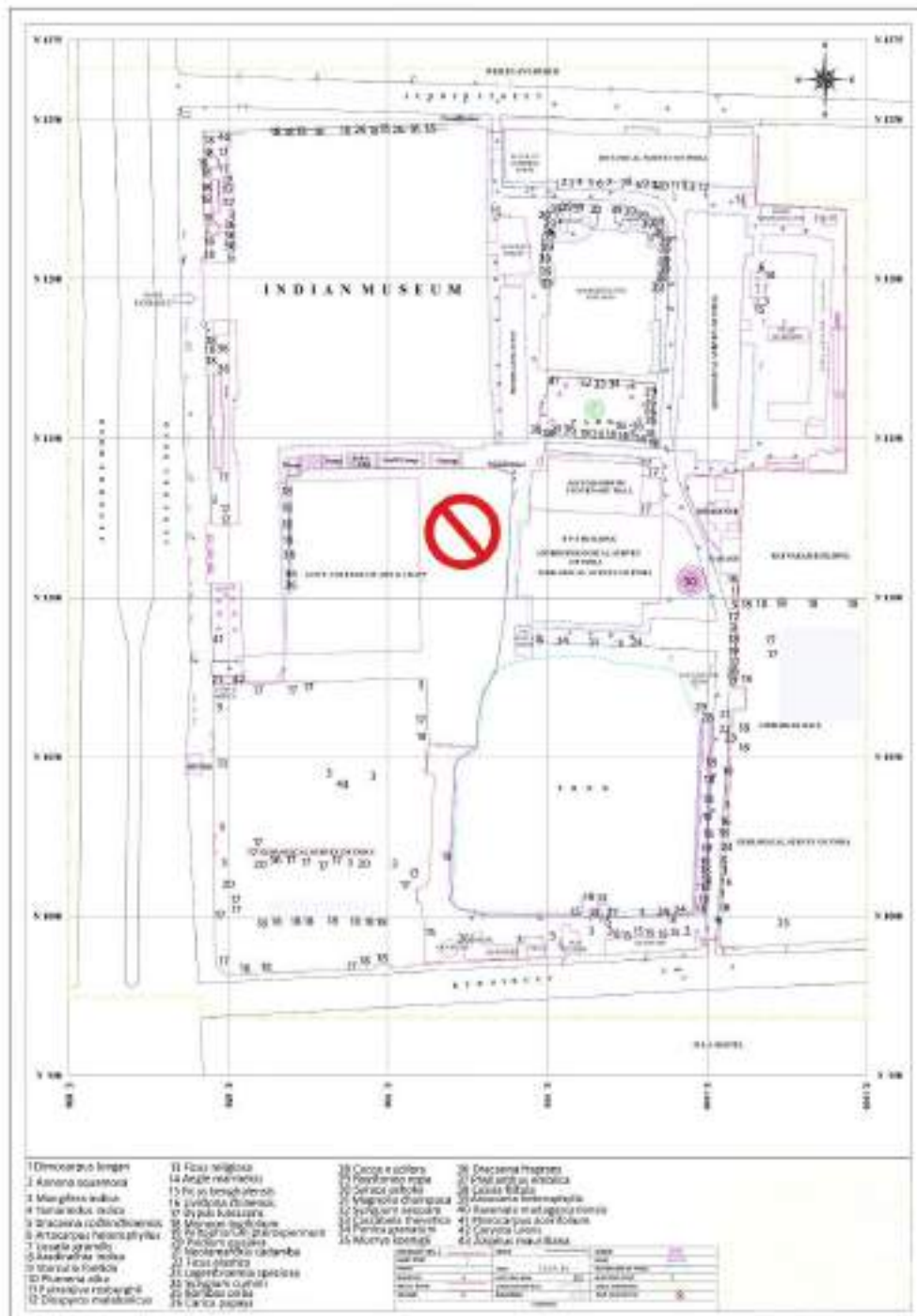
control of Indian Museum Act 1910, Indian Museum Rules, Laws and by laws. With the paradigm shift in the earlier mandate and concept of museum across the world, this Institution is also being engaged as an integral part of community, making it as an excellent center of more and more public participation, interaction, awareness, audio-visual display and dissemination of knowledge to different sectors of visitors with varied culture, taste and likings.

The campus of Indian Museum, covering an area of c. 12.11 acre, is situated at 22°33'27"N; 88°21'04"E, at an altitude of 9 m. a.s.l. It is surrounded by premises No. 2, Sudder Street and Sudder Street at North; Chowringhee Road and by the premises No.29, Chowringhee Road (formerly occupied by the then Bengal United Service Club and presently by Geological Survey of India) at West; on the southern side it is bounded by premises No. 29, Chowringhee Road and Kyd Street and on the eastern side by premises No. 15, Kyd Street and premises No. 4,3,2,1 and Chowringhee Lane. Major portion of this area was handed over to Board of Trustee of the Indian Museum and the rest portion was occupied by Geological Survey of India and Government College of Art and Craft, earlier known as 'Calcutta School of Art'. Beside heritage building of the Indian museum, offices of Industrial Section Indian Museum, Botanical Survey of India (popularly known as 'Lalbari'), Geological Survey of India, Zoological Survey of India, Anthropological Survey of India, Ashutosh Birth Centenary Hall, Ratnakar building, Ambedkar Hall, Government College of Art & Crafts, a pond (native name 'Jhinjherrie Talao'), Administrative building, Modelling Unit, CISF Quarter, Staff quarters, old staff quarter, Small park (Lawn), Canteen, Power station, garages etc. are in the jurisdiction of this Campus. The large pond of present day was reported to have access by outside public earlier towards Kyd Street which was later restricted by perforated boundary wall. However, from a drawing of Sir Charles Doyle, it appeared that the pond beside bungalow of Mr. Peter Speke, member of Supreme Council of Warren Hastings, was of much greater extent than present day.

In India, urban green verges, considered as part of ecological, aesthetic, and cultural tradition, include diverse ranges of plant species which are of economically important and having socio-cultural significance. Beside enriching the aesthetic framework of urban construction, the floristic wealth also contributes towards conservation and sustainable land management. With continuous expansion of construction, industries, transport, tourism etc., the natural urban vegetation facing terrific strain all over the India resulting wipe out of hundreds of wild as well

as ornamental plant species in metropolitan areas and impart several direct and indirect effects on mental and physical health of population. The ignorance and lack of complete knowledge about urban vegetation and their buffering role to mitigate environmental issues in overdensed cities are one of the major reasons of fast species disappearance in most of the big cities of India. To overcome this alarming situation and recover pollution free healthy urban life, mass engagement and awareness is required. The premises of Indian Museum, comprises of several tree species of seed plants which are of cultural as well as economic significance. As no previous reports on floristic study in the premises of Indian Museum has been conducted so far, a documentation of the tree species in the premises of Indian Museum may be helpful to aware several hundreds of general public come to visit the Museum each and every day. Tree spotting and their identification in this area has been proposed for better understanding and environmental awareness of visitors. A total of 44 tree species have been identified and labelled along with QR Code (Fig. 1). A map (Map 1) is provided which indicate location of the tree species in the Indian Museum premises.

TREES IN THE PREMISES OF INDIAN MUSEUM – A PICTORIAL GUIDE



Map 1. Location of trees in the premises of Indian Museum



Fig 1. Installed ACP Boards with QR codes

Objectives and scopes of the study

This directory will fulfill queries and provide knowledge of large number of general visitors of different sectors, ages, races and gender with different culture and taste about plants of cultural as well as economic significance in the premises of Indian Museum. This pictorial guide will also help the visitors in gathering information about common names, uses, origin, other curious facts and link to the museum display (if any). The map will show the exact location of the plants in the premises of Indian Museum which in turn may be effective means of conservation. The attached name plates with QR Code will be potential tools towards dissemination of basic information on tree species to general visitors.

Methodology of present work

The present study on spotting and identifying the tree species in and around premises of Indian Museum, Kolkata was started in 2021 for one year tenure. During this period, approx. 60 times local visit were conducted throughout the year to identify the tree species, spot their location, record flowering and fruiting time and for capturing good field photographs. The key methods followed during present work are as following:

- Identification and listing of tree species of seed plants (Angiosperm and Gymnosperm) in and around the premises of Indian Museum
- Documentation of listed plants comprising scientific name, family, common name, vernacular name, origin, distribution, ecology, population and common uses
- Recording of phenological data (Flowering & fruiting period)
- Capturing good quality photographs of habit, flowers and fruits
- Preparing a location map of plants in the premises of Indian Museum
- Preparing ACP boards for each species containing QR Code for Scientific name, family, common name etc.
- Compilation of final reports

Analysis of present study

The present study has described total 44 taxa under 40 genera and 22 families. Among these, 23 taxa are native to India while 19 are introduced and 02 are widely naturalized (Fig. 1). Analytical study reports that Arecaceae is the most dominant family followed by Fabaceae, Moraceae, Apocynaceae, Malvaceae, Myrtaceae, Annonaceae, Lythraceae, Rutaceae, Asparagaceae, Anacardiaceae, Ebenaceae, Magnoliaceae, Meliaceae, Phyllanthaceae, Putranjivaceae, Rubiaceae, Sapindaceae, Strelitziaceae, Caricaceae, Araucariaceae and Cycadaceae. (Table: 1 & Fig. 2).

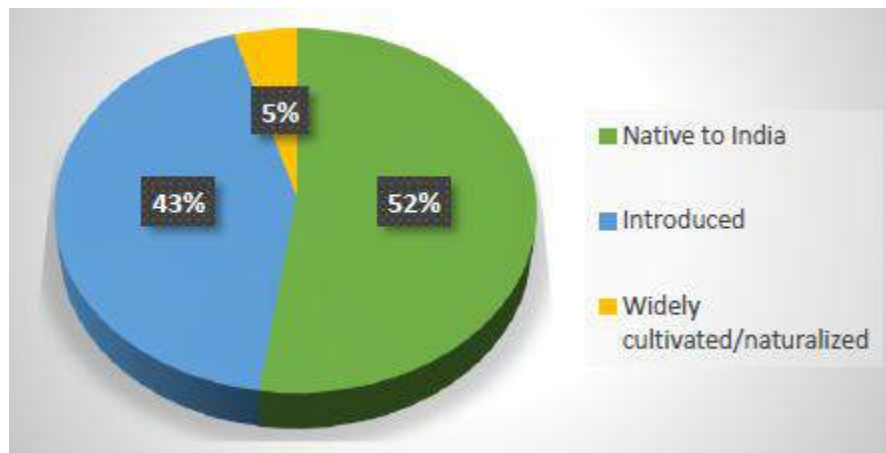


Fig. 1. Analysis of Taxa

The families and the genera under each family and species under each genus have been arranged in alphabetical order. For better understanding of the location of tree species spotted in and around Indian Museum, a site map has been provided along with landmark of occurrence. Field photographs of the tree species have been provided for easy identification of the taxa.

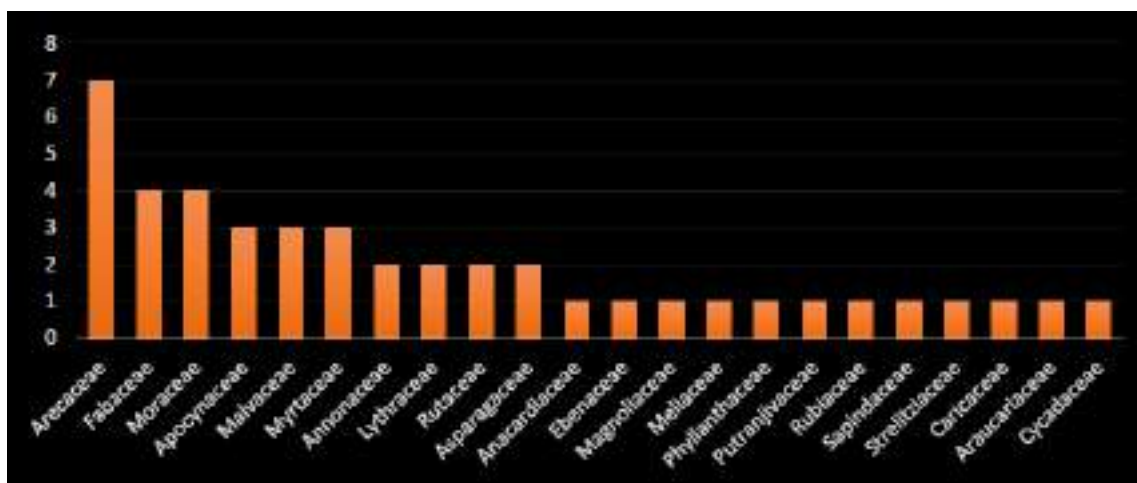


Fig. 2. Analysis of Families with No. of Taxa

Table 1: Analysis of Dominant family with no. of taxa

Sl. No.	Family	Number of the	
		Genera	Species
1.	Areaceae	07	07
2.	Fabaceae	04	04
3.	Moraceae	02	04
4.	Apocynaceae	03	03
5.	Malvaceae	03	03
6	Myrtaceae	02	03
7.	Annonaceae	02	02
8	Lythraceae	02	02
9.	Rutaceae	02	02
10.	Asparagaceae	01	02
11.	Anacardiaceae	01	01
12.	Ebenaceae	01	01
13.	Magnoliaceae	01	01
14.	Meliaceae	01	01
15.	Phyllanthaceae	01	01
16.	Putranjivaceae	01	01
17.	Rubiaceae	01	01
18.	Sapindaceae	01	01
19.	Strelitziaceae	01	01
20.	Caricaceae	01	01
21.	Araucariaceae	01	01
22.	Cycadaceae	01	01

ENUMERATION OF TAXA (SEED PLANTS)

ANGIOSPERM

Mangifera indica L.**ANACARDIACEAE****Common name** (Eng.): Mango**Vernacular name:** Beng. আম; Hind. आम

Diagnostic features: Large, evergreen tree, grows c. 10 - 45 m., with dense foliage in almost round canopy; leaves typically elliptic-lanceolate, undulate, spirally arranged. Inflorescences comprising of many tiny, whitish-red or yellowish coloured fragrant polygamous flowers in terminal panicles. Fruits drupe, ovoid-oblong, highly variable in size, form and colour, with skinny epicarp, thick yellow fleshy mesocarp and central stony endocarp (Plate 1).

Flowering & Fruiting: February – April; Fruiting: May – July**Distribution:** Indigenous to Southern Asia, especially Myanmar, Thailand and Assam state of India; also widely cultivated in India.

Uses: Fruits are edible, eaten raw, cooked or processed as jam, jelly, marmalade, pickles etc.; ripe fruits are refrigerant, laxative, emollient, cardiotoxic, aphrodisiac and tonic. Infusion of bark is used to treat asthma and diabetes. The stem is astringent, used to treat severe diarrhoea. The bark and the leaves are the source of a yellowish-brown dye used for silk. Wood is durable, hard, suitable for making indoor and outdoor furniture, flooring, wall panelling, kitchen appliances, musical instruments, chopping board etc. It is also a good source of fuel. Leaves are good fodder.

Notes (if any): It is the National fruit of India, grown in India for 4,000 years ago and one of the widely cultivated plants in the world. Apart from the Ramayana, reference of this plant is also observed from the sculpture on the Stupa of Bharhut dating back to ~110 BC. According to one legend, Lord Buddha meditated under the cool shade of a mango tree. The word '*Mango*' is probably derived from the Malayalam '*Manna*' which the Portuguese adopted as '*Manga*' when they came to Kerala in 1498 for trading spices. To commemorate this valuable fruits, India Government issued 50 paisa postal stamp on Mango in 1967.



Plate 1. *Mangifera indica* L.: **A.** Habit; **B.** Fruits

Monoon longifolium (Sonn.) Bxue & R.M.K. Saunders**ANNONACEAE****Common name** (Eng.): Indian Mast tree, Indian fir tree, False Ashoka, Buddha tree**Vernacular name:** Beng. & Or. देवदारु; Hind. अशोका

Diagnostic features: Evergreen medium size trees, with straight trunk and conical crown, to 20m high; branches pendulous; Leaves narrowly lanceolate, rounded at base, gradually long acuminate at apex, distinctly undulated along margin, glossy. Flowers numerous, star-shaped, greenish-yellow, in pendant umbellate to subumbellate clusters on stem. Fruits berry, borne in clusters of 10 – 20, ovoid to ellipsoid, smooth, dark purple at maturity, with solitary seed (Plate 2).

Flowering & Fruiting: February – March; April – August.

Distribution: Endemic to South India and Sri Lanka, often planted in gardens and as avenue tree. Widely introduced elsewhere in tropical Asia.

Uses: The tree is popularly grown as ornamental plant for its evergreen foliage; inner bark is bitter, cooling, acrid, febrifuge and yield a good bast fiber; it also used effectively in rheumatism, pyrexia, scorpion bite, diabetes, mouth ulcer etc. In Eastern Ghats culture, decoction of stem bark is used in combination with *Piper nigrum* and *Sesamum indicum* to treat bone fracture. Wood is used to make light articles such as pencils, match box, paintbrushes, scientific instruments, packaging boxes, musical instruments etc. Fruits are eaten by bats and birds. Leaves are used in decoration purposes in different festivals. Study of antioxidant, anticancer, anti-inflammatory, hepatoprotective, hypotensive and antimicrobial properties of different plant parts need further researches for practical implementation.

Notes (if any): Flowers last for only 2 – 3 weeks, easily not identifiable for their color. In British period, cultivation of this tree gained popularity as it was used for ships' masts.



Plate 2. *Monoon longifolium* (Sonn.) Bxue & R.M.K. Saunders.: **A.** Habit; **B.** Flowers; **C.** Fruits

Alstonia scholaris (L.) R.Br.**APOCYNACEAE**

Common name (Eng.): Devil's tree, Blackboard tree, Dita bark tree, Scholars tree, Milk wood tree, Black board tree

Vernacular name: Beng. ছাতিম, সপ্তপর্ণী; Hind. चतिवन

Diagnostic features: Evergreen medium to large tree, to *c.* 40 m high; with tessellated corky greyish white bark exuding milky latex when cut. Leaves 4 – 7 in a whorl, obovate to elliptic-lanceolate, rounded or shortly pointed at apex, tapering at base, coriaceous, bluntly acuminate, dark green above, pale beneath. Flowers greenish white or cream coloured, in much branched terminal panicle or umbel, strongly fragrant. Fruits pendulous, 2-lobed, dehiscent follicle, spindle shaped, containing many flat, oblong, brown seeds (**Plate 3**).

Flowering & Fruiting: September – October, extended to November

Distribution: Native to tropical and subtropical Asia to Indo-Malayan region. Throughout India. Australia, Bangladesh, China, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka.

Uses: The wood is soft, white and recommended for the manufacture of pencil, drawing board, packing box, paper, black boards, slate frames etc.; sometimes it is used as fuel wood; wood charcoal is used as gun powder. Bark (known as 'Dita bark') is bitter, used to treat asthma, fever, heart disease, diarrhoea, diabetes, chronic dysentery, effective in blood purification and skin disorder; also produce fibres. Milky latex provides a good quality chewing gum, also cures pyorrhoea and ulcerative wounds; flowers yield an essential oil.

Notes (if any): State tree of West Bengal. During convocation ceremony of Visva Bharati University, 'Chattim' leaf was offered to the Graduate and Post Graduate students by the Chancellor since decades. Supposedly to prevent excessive damage to environment, in recent days, the Vice Chancellor of the University accepts one *saptaparni* leaf from the Chancellor on behalf of all the students. This tradition was initiated by Gurudev, Rabindranath Tagore.



Plate 3. *Alstonia scholaris* (L.) R.Br.: **A.** Habit; **B.** Flowering twig

Cascabela thevetia (L.) Lippold

APOCYNACEAE

Common name (Eng.): Mexican oleander, Yellow oleander, Lucky nut

Vernacular name: Beng. কঙ্কে; Hind. पीली कनेर

Diagnostic features: A large shrub or small tree to 6 m high, with oleander like leaf mostly in whorls of three, long, linear lanceolate, glossy green. Flowers funnel-shaped, yellow, sometimes white or orangish-yellow. Fruits almost ovoid, with a ridge, green. Seed 2, highly poisonous (Plate 4).

Flowering & Fruiting: Throughout the year

Distribution: Native to Mexico to S. Tropical America; planted throughout India

Uses: Mostly cultivated as ornamental plant; root bark decoction and leaf sap used in scabies; utilization of toxicity study of the plant in biological pest control is in experimental stage. Flowers are offered to Gods in religious occasion.

Notes (if any): All parts of the *C. thevetia* plant are toxic to most vertebrates as they contain Cardiac glycosides: thevetin A, thevetin B, Cardenolides. Interestingly few bird species, namely Asian koel, Sunbirds, common myna, red-whiskered bulbul, red vented bulbul etc are known to feed on them without any fatality.



Plate 4. *Cascabela thevetia* (L.) Lippold.: **A.** Habit; **B.** Flowers; **C.** Fruits

Plumeria alba L.

APOCYNACEAE

Common name (Eng.): White Frangipani, Caterpillar tree, Pigeon wood

Vernacular name: **Beng.** কাঠ চাঁপা, কাঠগোলাপ; **Hind.** गुलचीन

Diagnostic features: Medium size tree, to 15 m high, with corky bark, oozing milky latex from wound. Leaves spirally aggregate, at end of branches, oblong-lanceolate, coriaceous, nerves impressed on upper surface. Flowers in terminal peduncled corymbs, creamish yellow or brick red, fragrant. Fruits follicle, linear oblong, with winged seeds (Plate 5).

Flowering & Fruiting: April – November.

Distribution: Native of Tropical America; widely cultivated in different parts of tropical India

Uses: Frequently planted as roadside ornamental and in gardens. The bark is abortifacient and purgative. Essential oil from the flowers is used in cosmetics. Latex is applied on tooth pain. Flower decoction in cough and constipation.

Notes (if any): The genus is named after a French botanist, Charles Plumier. The specific name ‘alba’ means white which refers to the white flowers.



Plate 5. *Plumeria alba* L.: **A.** Habit; **B.** Flowers

Borassus flabellifer L.**ARECACEAE****Common name** (Eng.): Palmyra palm, Toddy palm, Wine palm**Vernacular name:** Beng. তাল; Hind. ताड़, ताड़ी

Diagnostic features: Robust tree, to c. 30 m high, with cylindrical greyish trunk ringed with leaf scar. Leaves leathery, fan shaped, folded along the midrib, divided to centre into 60 – 80 linear-lanceolate marginally spiny segments; old leaves remain attached long to trunk before falling. Flowers white, in pendent clusters, arising from leaf axil; Male and female flowers are borne on different trees (dioecious). Male flowers small (less than 1/2"), forming semi-circular cluster. Female flowers larger (to 1"), solitary, golf ball shape. Fruits subglobose black to brown, with sweet, fleshy, fibrous pulp, to c. 18 cm wide, borne in clusters; each seed is enclosed within woody endocarp (**Plate 6**).

Flowering & Fruiting: April – August**Distribution:** Native to Southern Asia. India, Sri Lanka, Malaya, Indo-China, Jawa and Lesser Sunda Islands; cultivated as well as naturalized in India.

Uses: A sugary sap, called ‘toddy’, is tapped for use as a beverage. Fruits are edible, eaten raw or cooked, as ‘tal kheer’, ‘tal vadas’ etc. Sprouts are boiled, roasted and eaten. Leaves are used for thatching, making mats, hand fans, baskets, hats, umbrellas, writing materials etc.; skin of the stem can be peeled off and used to make ropes. White kernel of dried palm fruits are offered to Goddess Lakshmi in different parts of Bengal.

Notes (if any): This is official tree of Tamil Nadu and highly respected in Tamil culture. All the old Tamil literature are written in palm paper. In the Hindu epic Mahabharata, a palmyra tree is a chariot banner of Great Grandfather of Pandava, Bheeshma and Balarama.



Plate 6. *Borassus flabellifer* L.: **A.** Habit

Caryota urens L.**ARECACEAE****Common name** (Eng.): Fishtail Palm, Jaggery palm, Elephant's palm, Indian sago palm**Vernacular name:** Beng. গোল সাবু, বন সুপারি, ; Hind. बन खजूर, ताड़ी पाम, मरी**Diagnostic features:** Monoecious stout tall unbranched palm tree, to c. 20 m height, with regularly spaced leaf scar ring on smooth trunk. Leaves in terminal clusters, compound, bipinnate, leaf sheath large, clasping basally the trunk; pinnae 5 – 7 pairs, c. 1.5 m long; leaflets broadly cuneate, fan shaped, resembles lower fin of fish. Flowers numerous, unisexual, in large shortly stalked much branched pendulous spadix, with female flowers in the middle; spathes 3 – 5; spikelet closely arranged on rachillae. Flowers blooms first upward part of stem, followed by at lower parts, long plait like pending bunches. Fruits globose, reddish-purple (**Plate 7**).**Flowering & Fruiting:** February – May.**Distribution:** Native of Asia: India, Indonesia, Malaysia, Myanmar, Sri Lanka**Uses:** Flowers used to yield one type of jaggery, known as 'Kithul treacle' and palm wine which are used as sweetener in Western cooking. 'Toddy' is extracted from the inflorescence. Flowering branches contain high quality starches. Powdered pulp of mature plant is edible, considered as cool and nutritious in coastal districts of South India. Timber used for construction purpose. Leaves and pulp are good fodder for elephants. Leaves yield strong fibers which are useful in making basketry products. Fruits are used as wild edible in Assam.**Notes (if any):** The fishtail palm was named for its unusual leaves – shaped like a jagged fish's tail - which form thick, swirled layers of ruffled fronds.



Plate 7. *Caryota urens* L.: **A.** Habit; **B.** Inflorescence

Cocos nucifera L.**ARECACEAE****Common name** (Eng.): Coconut**Vernacular name:** Beng. নারকেল; Hind. नारयिल

Diagnostic features: Large erect palm, to 30m high, with single trunk having smooth, greyish bark, marked by ringed leaves scars. Leaves pinnate, 4 – 6m long; pinnae 60 – 90cm long; old leaves break away cleanly leaving trunk smooth. Inflorescences axillary, spadix, enveloped by carinate spathe. Flowers usually monoecious, sometimes polygamomonoecious i.e. both male and female flowers in the same inflorescence. Female flowers, borne basally, much larger than apical male flowers. Fruit a drupe, with 3 layers: exocarp (glossy outer skin, usually yellow green colour), mesocarp (fibrous husk) and endocarp (woody); endosperm partly liquid (coconut milk), partly solid (flesh) (**Plate 8**).

Flowering & Fruiting: Throughout the year

Distribution: Modern genetic studies have identified the centre of origin of Coconut as being the Central-Indo-Pacific, the region between Western South East Asia and Melanesia where it shows greatest genetic diversity. India: throughout. Indonesia, Philippines, Brazil, Sri Lanka, Vietnam, Papua New Guinea, Mexico, Thailand, Tanzania.

Uses: Grown throughout tropics for its culinary and non-culinary uses; literally every part of this plant can be used by human either as food or as husk or coir or as religious fruits. Coir made from husk is used in making rope, mattress, doormats, mats, brushes, cocopeat etc. Coconut oil and milk are used in manufacturing soap, body lotion, hair oil and other cosmetic products. Inner flesh of fruits, coconut water, oil and milk are staple food in tropics and subtropics; coconut oil is popularly used as cooking oil especially in south India. Leaves are woven to make basketry artifacts, also used in roofing; coconut wood is used to make bridge, huts etc. Coir, extracted from the husk, is used to make rope, mattress, mats, doormats, brooms, sacks etc., also useful as compost, fuel and source of charcoal. Root extract is used to treat diarrhoea and dysentery and has dyeing property. In Hindu culture, coconut forms the basis of all rituals and offered to Gods & Goddesses.

Notes (if any): The name ‘Coconut’ is derived from the 16th century Portuguese word ‘Coco’ meaning ‘head’ or ‘skull’ after three indentations on the coconut shell resembles facial structure; the specific epithet ‘nucifera’ is derived from Latin words ‘nux’ and ‘fera’ meaning nut-bearing. Owing to its versatile uses, Coconut is named as ‘Trees of life’.



Plate 8. *Cocos nucifera* L.: **A.** Habit; **B.** Young fruits

Dypsis lutescens (H. Wendl.) Beentje & J. Dransf.

ARECACEAE

Common name (Eng.): Golden cane Palm, Areca Palm, Butterfly Palm, Bamboo Palm, Yellow Palm, Golden Feather Palm

Diagnostic features: Perennial tropical palm, to c. 12 m high. Multiple stems grows in cluster from the base, with ringed bamboo like shoot, c. 5 – 7cm diam., with prominent leaf scar. Leaves compound, upward arching, 2 – 3 m long or more, green, with yellow midrib; 6 – 8 leaves per stem, leaflets 30 – 50 on each side, opposite, linear to lanceolate, with acute tip; petiole yellowish green, waxy texture. Male and female flowers borne on same panicle inflorescence, multi-branched, yellow coloured; Fruits oval, yellow to purple (**Plate 9**).

Flowering & Fruiting: March – June.

Distribution: Native to Eastern Madagascar. Introduced in India.

Uses: Planted as Avenue tree and garden ornamental in tropical and subtropical region; also has medicinal and environmental uses. Due to air purifying property, the plant is popularly used as indoor as well as outdoor plant. This palm improves indoor humidity level and prevent sore throat, skin dryness, eye itching etc. Antioxidant and anticancer activity are also attributed to the plant. Fruits are enjoyed by birds.

Notes (if any): This Palm tree has gained the Royal Horticultural Society's 'Award of Garden' merit.



Plate 9. *Dypsis lutescens* (H. Wendl.) Beentje & J. Dransf.: **A.** Habit; **B.** Inflorescence

Licuala grandis (T. Moore) H. Wendl.

ARECACEAE

Common name (Eng.): Ruffled fan palm

Vernacular name: Hind. पलाश पाम

Diagnostic features: Solitary upright stem, to *c.* 8 m high, with costapalmate leaves, with a stiff, entire, undulating blade, forming semicircle, costa extends almost 1/3rd the length of the leaf blade, both surfaces deep green, leaf bifid at apex. Inflorescence *c.* 2m, branched to third order, extend beyond the leaves. Flowers small, white, bisexual. Fruits small, spherical, red or reddish-orange at maturity (Plate 10).

Flowering & Fruiting: March – May; July – September.

Distribution: Native range is Santa Cruz Islands to Vanuatu. Introduced in India.

Uses: The plant has ornamental value, grown for beautification of landscapes, parks and gardens, also serves as shade tree. Big size umbrella shape leaves are used for thatching purpose. Fruits are eaten by bats and birds.



Plate 10. *Licuala grandis* H. Wendl.: **A.** Habit; **B.** Young fruits

Livistona chinensis (Jacq.) R.Br. ex Mart.

ARECACEAE

Common name (Eng.): Chinese fan palm, Fountain palm, Table Palm

Diagnostic features: Solitary erect palm, attaining a height of c. 15m, grey or brown stem, with closely spaced rings of leaf scars, disappearing with ages and imparting smooth surface. Leaves 40 – 60, in a globose to round crown, Costa-palmate, divided to about $2/3^{\text{rd}}$ their length into stiff segments, with drooping bifid tips, dull to green, non-waxy; petiole slightly arching, with strong marginal teeth at base. Flowers grows in clusters, both male and female, pale yellow. Fruits globose, subglobose, ellipsoid or oblate-ovoid, olive like, glossy, dark greenish or greyish blue at mature state (Plate 11).

Flowering & Fruiting: February – April; September – October.

Distribution: Native to Central China, Japan; India: cultivated

Uses: Leaves used to make hats, raincoats, brooms, often planted as avenue tree; in N.E. India, leaf midrib is used to make brooms for sweeping. Fruits, seeds, roots have antitumor, cell protective and antibacterial activity. In earlier days, leaves were bound to wooden stick to made durable broom; sometimes also used for thatching purposes.

Notes (if any): The generic name is given after the ‘baron of Livingston’ and the specific epithet stands for ‘of China’ in Latin.



Plate 11. *Livistona chinensis* (Jacq.) R.Br. ex Mart.: A. Habit; B. Fruits in Cluster

Roystonea regia (Kunth) O.F. Cook**ARECACEAE****Common name** (Eng.): Royal palm, Cuban Royal Palm, Florida Royal Palm

Diagnostic features: Tall tree, to c. 30m high, with straight, smooth, greyish-white, stout trunk, having characteristic bulge below a distinct green crownshaft. Leaves 15 – 20, very large, c. 5m long, with elongated leaf sheath, tightly enveloping vegetative cone; leaflets papyraceous, ensiform, quite straight, gradually narrow above, from middle, to a bifid, rigid apex. Spathe 2, exterior one tubular. Spadix 3 – 4, with distinctly swollen primary branches at bases, divided into several alternate flowering branchlets. Male flowers considerably larger than female one. Female flowers open shortly after male. Fruits globose-obovoid, spheroid to ellipsoid, gibbous, red or purplish black at maturity (Plate 12).

Flowering & Fruiting: March – June

Distribution: Native to South Florida and Cuba. India: Cultivated.

Uses: Planted as avenue palm; seeds are used as source of oil and livestock feed; leaves are used for thatching and the wood for construction, fibre extracted from the leaf sheath. Roots are diuretic and antidiabetic. In Roman Catholicism, this palm plays significant roles in ‘Palm Sunday Observances’.

Notes (if any): Recent phylogeny based plastid DNA studies raised doubt about traditional placing of this species in the subfamily Arecoideae of the family Arecaceae.



Plate 12. *Roystonea regia* (Kunth) O.F.Cook: **A.** Habit; **B.** Inflorescence

Dracaena cochinchinensis (Lour.) S.C. Chen**ASPARAGACEAE****Common name** (Eng.): Thai Dragon tree, Malaysian Dracaena, Dragon blood tree**Diagnostic features:** Evergreen shrubs or multi-branched short tree, to c. 8 m high, with smooth, greyish white bark, gradually becoming greyish brown with ages. Leaves sessile, broadly lanceolate or strap shaped, stiff but flexible, leathery, reddish at base, clustering at apex. Flowers in clusters of 2 – 5, green, borne on branched terminal inflorescence, bisexual, creamish-white. Fruits 1 – 3 seeded round berry, orange coloured, glossy (Plate 13).**Flowering & Fruiting:** April – May.**Distribution:** Native range of this plant is Southern China to Indo-China, Vietnam; cultivated in India.**Uses:** The plant is suitable for planting in Parks and garden. A resin obtained from the tree is often used in traditional Chinese medicine. The stem wood has been traditionally used in Chinese and Thai medicine for its antipyretic, pain relief and anti-inflammatory effects. The fragrant resin is also applied to manufacture incense, spiritual objects etc.**Notes (if any):** ‘Dragon Blood’ extracted from this plant has immense scope in herbal medicine system and being used in traditional system since long all over the world. As the resin is widely collected by cutting the plants, population of the plant is decreasing day by day. Because of overexploitation and illegal trade of the plants, the plant has been identified as potentially threatened amongst the 22 species in the workshop of specialists of Ethnobotany and Economic Botany held in 1997.



Plate 13. *Dracaena cochinchinensis* (Lour.) S.C. Chen: **A.** Habit

***Dracaena fragrans* (L.) Ker Gawl.**

ASPARAGACEAE

Common name (Eng.): Corn plant, Cornstalk plant, Ribbon plant, Striped Dracaena, Fragrant Dracaena

Diagnostic features: Slow-growing, upright, erect, shrubs or small trees, to 15m high, with unbranched, soft wooded stem. Leaves arching, broadly lanceolate to sword-shaped, flat, undulated, sessile, leathery in rosette tier, lush green; lower leaves shed with ages leaving scar on the stem. Flowers bisexual, in terminal panicle, peach pink initially, later whitish yellow, very fragrant. Fruits orange red berry (Plate 14).

Flowering & Fruiting: November – April

Distribution: Native throughout tropical Africa. Cultivated in India

Uses: This is common ornamental plant, typically grown in indoor and outdoor units. It increases humidity of air and also serves as air purifier.

Notes (if any): Flowers and fruits rarely develop in the indoor plants. The genus name came from the Greek word 'Drakaina' meaning a female dragon; the species name refers to the 'fragrant flowers'.



Plate 14. *Dracaena fragrans* (L.) Ker Gawl.: **A.** Habit

Carica papaya L.**CARICACEAE****Common name** (Eng.): Melon tree, Papaya**Vernacular name:** Beng. পেঁপে; **Hind.** पपीता

Diagnostic features: Small, sparsely branched tree, usually with a single stem, to 10m high, lower part thinly marked with horizontal fallen leaf scar. Leaves simple, large, spirally arranged, confined to the top of the trunk, deeply palmately lobed, 7-fid, olive green above, whitish beneath; petiole very long. Flowers dioecious, borne in leaf axils, highly dimorphic, scented, night blooming; male flowers, borne in lax, densely pubescent cymes at the end of pendulous fistular rachis; stamens fused to petals, yellow; female flowers, borne solitary or in few flowered racemes, with loose contorted petals at base, yellow to white. Fruits large, oblong, or pear-shaped, fleshy berry, green initially, orange at maturity; seeds many. Milky juice exudes from laciferous ducts of cut parts (Plate 15).

Flowering & Fruiting: Throughout the year**Distribution:** Native to South Mexico to Venezuela. Cultivated in India.

Uses: Fruits are edible, eaten either raw or as vegetables; green fruits used to tender meat soft; it is effective in liver complaint, dyspepsia, and other digestive disorders. Ripe fruits are carminative, diuretic, stomachic, tonic, sedative, expectorant and effectively cure chronic diarrhea, dysentery, bleeding piles, ringworms etc. The unripe fruits are laxative, diuretic, abortifacient and having antibacterial activity. Seeds are carminative, paste is applied to treat psoriasis and ringworms. Leaves and roots are effective to treat asthma, piles, beriberi, fever, liver complaints etc. Flowers are febrifuge. In traditional medicine, papaya leaves have been effectively used in malaria, asthma and as purgative. Recent investigation proves effectiveness of papaya leaf in dengue fever. It is a rich source of Vitamin A, E & C.

Notes (if any): To commemorate enormous nutrition value of the papaya fruit, USA, Cameroon, Aruba, Kenya, Suriname, Bangladesh, Singapore, Thailand, Ghana and Papua & New Guinea issued postal stamp on Papaya.



Plate 15. *Carica papaya* L.: **A.** Habit; **B.** Flower & Immature fruits

Diospyros malabarica (Desr.) Kostel.**EBENACEAE****Common name** (Eng.): Indian Persimonn, Malabar Ebony, Gaub tree**Vernacular name:** Beng. গাউ; Hind. गाब

Diagnostic features: Evergreen, dioecious, medium to large tree, to c. 25 m high, with much branched spreading crown. Bark smooth, dark grey or black, exfoliating in rectangular flakes; young parts covered with tawny tomentum. Leaves simple, distichous, alternate or subopposite, oblong or narrowly oblong, coriaceous, glabrous, with prominent venation, pink when young, glossy green later. Flowers unisexual, 4-merous; male flowers 3 – 5, in drooping cymes; female flowers solitary, sessile. Fruits round or egg shaped, pulp glutinous, initially densely hairy, glabrous later, seated on persistent sepals, peach coloured when matured, with 4 – 8 compressed seeds (Plate 16).

Flowering & Fruiting: May – July; March – April.

Distribution: Native to Indian subcontinent and South east Asia. India: Karnataka, Kerala, Odisha, Tamil Nadu, West Bengal. Bangladesh, Cambodia, Indonesia, Laos, Myanmar, Malaysia, Nepal, Sri Lanka, Thailand.

Uses: Unripe fruits and leaves were traditionally used as tan and dyes to color cloth and extracting gum; ripe fruits serve as wild edible in the state of Assam. It is bitter, acrid, cooling, carminative and digestive. Flowers diuretic and aphrodisiac. Leaves have multifarious uses as ophthalmic, carminative, diuretic, effective in flatulence, tubercular glands, wounds, scabies etc. Bark is astringent, acrid, cooling, anti-inflammatory, depurative and febrifuge, effective in the treatment of dysentery, diabetes, burning, dyspepsia, boil and leprosy. Wood is sometimes used to manufacture musical instruments. Seed oil is used to cure dysentery and diarrhea.

Notes (if any): The plant, mentioned as ‘Tinduka’ in ancient Sanskrit literature and Nighantu, has various application against multifarious illness.



Plate 16. *Diospyros malabarica* (Desr.) Kostel.: **A.** Habit; **B.** Fruits

Cassia fistula L.**FABACEAE**

Common name (Eng.): Golden shower tree, Golden Rain, Indian laburnum, Pudding Pipe tree, Purging Cassia

Vernacular name: **Beng.** অমলতাস, বাঁদরলাঠি, সোন্দল, সোন্দালা, সোনালী; **Hind.** अमलतास, सयिर की लाठी, गरिमलाह

Diagnostic features: Medium size deciduous tree, to 10 m high, with open branching; bark pale greenish grey, smooth initially, dark brown, rough at ages. Leaves alternate, compound, pinnate, smooth; leaflets 3 – 8 pairs. Flowers bisexual, zygomorphic, bright yellow in terminal, drooping racemes. Fruits an indehiscent pod, cylindrical, pendulous and terete, containing 25 – 100 ovate or lenticular light brown seeds, embedded horizontally in dark coloured sweet pulp, separated by phragmatas (Plate 17).

Flowering & Fruiting: April – May, extended to June.

Distribution: Dry deciduous forests of lower altitude, open grasslands. Native to India: Andhra Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Maharashtra, Odisha, Uttar Pradesh; Bangladesh, Myanmar, Pakistan, Sri Lanka

Uses: Bark used to treat inflammatory swelling, root bark, leaves, flowers and fruit pulp are mild laxatives; seed powder cure intestinal amoebiosis; aqueous extract of bark is anti-oxidant and anti-inflammatory; pod paste used as remedy for malaria, dysentery and diabetes; pod pulp taken to remove kidney stone; bark and leaf paste are used in skin diseases; bark yields tannin and dye; seed is commercial source of seed gum, used in pharmaceutical industry. Wood hard and durable, used to make cabinet, decorative paneling, fine carvings and agricultural implements. Flowers edible. The plant is an ornamental tree, widely planted as avenue tree for its excellent yellow blooming .

Notes (if any): The tree is host plat for caterpillars of yellow butterflies. The tree is associated with some mythological believes in Bihar and Karnataka where stakes are fixed in the ground and worshipped. A postal stamp was issued by the Indian Postal Department to commemorate this tree on 1st September, 1981 and 20th November, 2000.

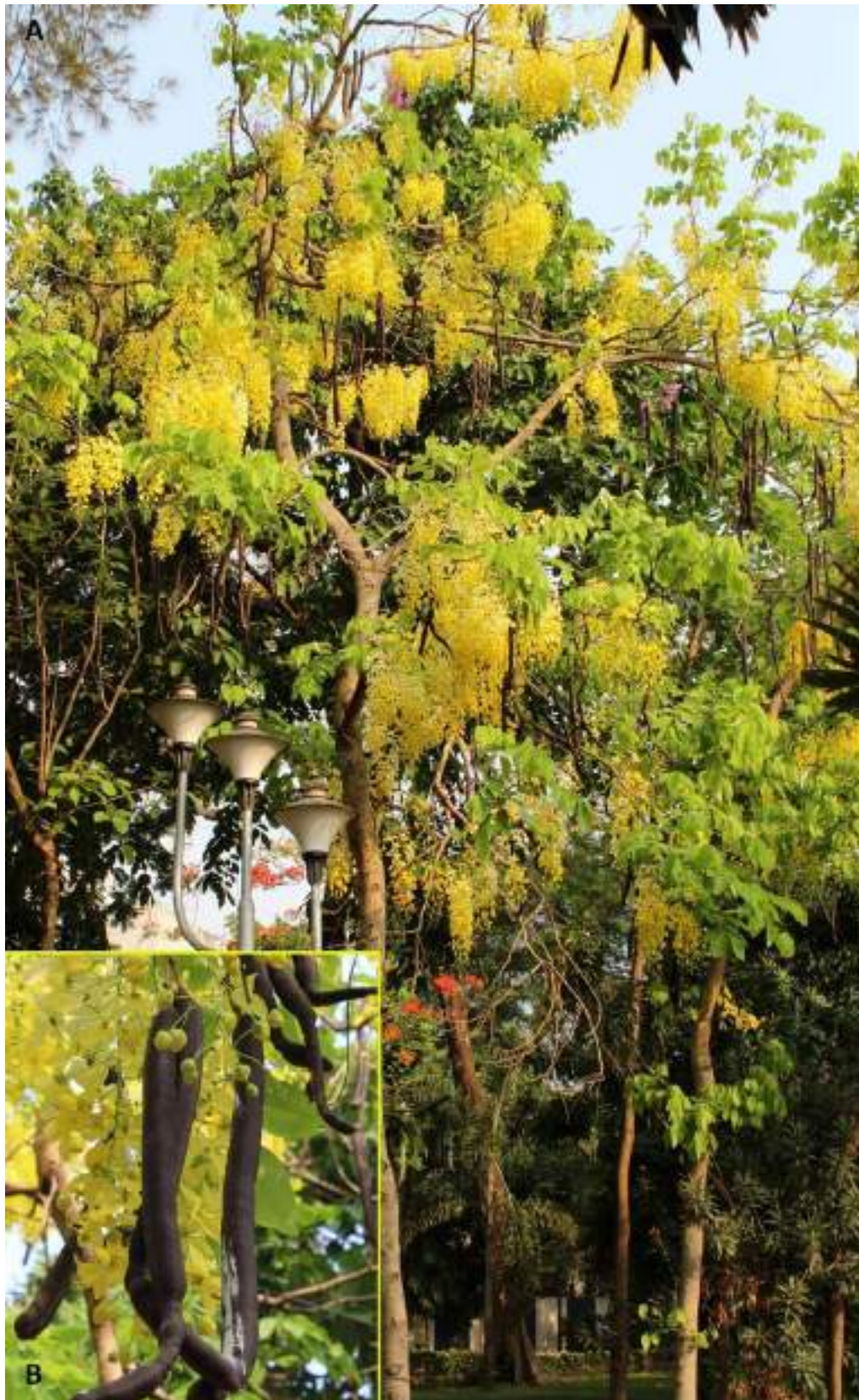


Plate 17. *Cassia fistula* L.: **A.** Habit; **B.** Fruits

Peltophorum pterocarpum (DC.) Backer ex K. Heyne**FABACEAE**

Common name (Eng.): Yellow flame tree, Copper Pod, Yellow Gold Mohur, Rain tree, Rusty Shield Bearer

Vernacular name: Beng. কনকচূড়া, অরুনজ্যতি; Hind. पीला गुलमोहर

Diagnostic features: Large, deciduous tree, to 25 m high, with dense spreading crown. Bark smooth, grey. Branches spreading. Leaves large, bipinnate, with 8 – 20 pairs of pinnae, each bearing 20 – 30 pairs of opposite, oblong, dark green leaflets. Flowers borne in large terminal panicle at the end of branches, cupped in a coppery-red downy calyx; petals crinkled, bright golden-yellow, fragrant. Fruit pod, flat, indehiscent, rust coloured, black when ripen. Seeds broadly winged (Plate 18).

Flowering & Fruiting: March – May; September – November.

Distribution: Native range is tropical Southeastern Asia and Northern Australia. Originally introduced in India, now widely grown as roadside ornamental.

Uses: The tree is widely planted as avenue or ornamental tree along roadside, in garden, parks etc. Due to wide dense crown this plant serves as good shade tree. The copper pods is a good source of green manure and improves soil profile. Bark has been an important component of the black ‘Soga’ dye, used for Batik works. The heartwood is fairly hard and are useful in making cabinet, panel, woodcurving etc. Leaves are good fodder. In India, it is a source of pollen of Dammer bee (*Trigona iridipennis*). Timber is a source of fuel wood. In traditional medicinal system, different parts of the plant used as astringent, in relieving labor pain, bruises, swelling, muscular strains, eye troubles, intestinal disorder etc.

Notes (if any): The generic name ‘*Peltophorum*’ stands for ‘shield-bearing’ in Greek whereas the species name ‘*pterocarpum*’ alludes to its winged seeds.



Plate 18. *Peltophorum pterocarpum* (DC.) Backer ex K. Heyne: **A.** Habit; **B.** Flowering twig

Saraca asoca (Roxb.) W.J. de Wilde**FABACEAE****Common name** (Eng.): Ashoka, Sorrow less tree**Vernacular name:** **Beng.** অশোক; **Hind.** सीता अशोक

Diagnostic features: Small evergreen tree, up to 9m high, with spreading branches in all directions, forming a dense crown; bark smooth, with transverse ridges and circular lenticels, dark green to greenish grey. Leaves paripinnate, shortly petiolate; young leaves thin, flaccid, pinkish-brown, drooping; leaflets 4 – 6 pairs, oblong-lanceolate, with intra-petiolar stipules, dark green. Flowers many, in axillary corymbs; petals yellow to orange red to red at maturity, fragrant; stamens very long. Fruits pods, flat, leathery, smooth, brown, tapered at both ends, with 6-8 ellipsoid-oblong, slightly compressed seeds (Plate 19).

Flowering & Fruiting: February – March; April – June.**Distribution:** Native of Asia. India: Throughout, its original distribution was in the Central areas of Deccan plateau and Western Ghats.

Uses: Bark powder is effective in leucorrhoea, dysentery, fever and skin infection; flower is effectively used in lowering blood pressure, type 2 diabetes, treat scabies, atopic dermatitis, and eczema; it is an ingredient of Ashoka powder, Pradarantak churna, Female Health Support etc. The plant is the most sacred tree of Hindus and worshipped on 13th day of the month of Chaitra. Flowers are used in temple decoration.

Notes (if any): The Ashoka tree is considered sacred throughout Indian Subcontinent, especially in India, Nepal and Sri Lanka. Many folklores and tales are literally associated with this plant. Lord Buddha is said to have been born under this tree, hence regarded as holy tree to Buddhist. Legend says that when Sita was abducted by Ravana, Sri Ramchandra moved from one tree to another in the Asoka Ban and prayed for her safe return. It is the State flower of Indian state of Odisha.

Comments: This small tree has become threatened in some parts of its range mainly through the loss of its habitat and overexploitation for medicinal use. It is classified as 'Vulnerable' in the IUCN Red List of Threatened Species (2011).



Plate 19. *Saraca asoca* (Roxb.) W.J. de Wilde: **A.** Habit; **B.** Flowering twig

Tamarindus indica L.**FABACEAE****Common name** (Eng.): Tamarind**Vernacular name:** Beng. তেঁতুল; Hind. इमली

Diagnostic features: Large evergreen tree, to c. 30 m high; with dense dome or umbrella shaped crown; bark rough, fissured, greyish brown. Leaves compound, alternate, with 10 – 18 pairs of opposite leaflets; leaflets narrowly oblong. Flowers borne in lax spike or small racemes, pale yellow with pink streaks, small. Fruits indehiscent pods, subcylindrical, straight or curved, velvety, rusty brown, shell brittle; seeds 3 – 10, irregularly shaped, embedded in sticky edible acidic pulp, testa hard, shiny, smooth (Plate 20).

Flowering & Fruiting: May – July; September – October.

Distribution: Indigenous to tropical Africa including Sudan and Madagascar, naturalised in Asia; in India it has been introduced very long ago and often reported as indigenous one.

Uses: Fruit pulp is edible, relishly consumed raw or cooked; sweet chutuney made from the fruits is popular in India and Pakistan. Tamarind paste has culinary uses in making curries, rasam, sambar daal, pickles, sarbat etc. in South Indian cuisine. Bark is astringent, tonic; powdered seeds effective in dysentery and diarrhoea; leaves yield a red dye which is used with indigo to give a yellow tinge. the foliage has a high forage value. In Southern India, cooked seeds are fed to draught animals. Flowers are reported as good source of honey. Wood provides good firewood and also excellent source of charcoal. Timber, due to durability and hardness, is suitable for general carpentry works, manufacturing boat planks, agricultural tools, panels, furniture etc. Seed oil is used in making paints and vernishes.

Notes (if any): As the dark brown pulp made from the fruit resembles dried dates, the Arabs called it ‘tamar-u’l-Hind’, meaning ‘date of India’, and this inspired Linnaeus when he named the tree in the 18th century. Etymology of the specific epithet ‘indica’ has given owing to the misleading information of Indian origin of the species.



Plate 20. *Tamarindus indica* L.: **A.** Habit; **B.** Fruit bearing twig

Lagerstroemia speciosa (L.) Pers.**LYTHRACEAE****Common name** (Eng.): Pride of India, Queen of flowers, Queen Crape Myrtle**Vernacular name:** **Beng.** জারুল; **Hind.** जरुल, जारल**Diagnostic features:** Deciduous or semi-deciduous, small to medium sized tree, to c. 15m high, having bushy appearance. Bark peels off in thin, irregular flakes, light brown to dark grey. Leaves opposite, distichous, oblong, oval to elliptic, coriaceous, with or without minute stipules. Inflorescence panicle. Flowers in large terminal panicle, stands upright distinctly, showy; sepals persistent; petals clawed, crinkled, mauve, purplish pink to purple. Fruits round, ellipsoid, subglobose to globular capsule, seated on the persistent calyx, split in 6 pieces on maturity. Seeds winged (Plate 21).**Flowering & Fruiting:** April – June; July – September.**Distribution:** Native to tropical Southern Asia. India: Assam, West Bengal, Maharashtra, Western Ghats.**Uses:** For its beautiful purple blooming, mostly planted as avenue tree along roadside and in garden. Wood is used for house construction, boat-building, flooring, interior decoration, making of tool handles etc. The old leaves and ripe fruits are regarded as good hypoglycaemic agents. Bark and leaves have purgative property; also are good source of tannin and dye. A decoction of bark is used to cure abdominal pain and diarrhoea. Root is stimulant and astringent. Seeds possess narcotic properties. The tree has a dense and wide spreading root system which is effectively used in soil erosion control management.**Notes (if any):** The plant is very much appreciated in horticultural market for beautiful vigorous purple blooming. Owing to its ornamental flowers, Indian Postal Department issued a postal stamp on this flowers. It is state flower of Maharashtra.



Plate 21. *Langerstroemia speciosa* (L.) Pers.: **A.** Habit; **B.** Flowering twig

Punica granatum L.**LYTHRACEAE****Common name** (Eng.): Pomegranate, Tree of knowledge**Vernacular name:** Beng. ডালিম; Hind. अनार

Diagnostic features: Small deciduous tree or woody shrub, with multiple stems, often spiny, to c. 5m high; bark smooth, dark grey. Canopy open, crown base low. Leaves simple, opposie, oblong or obovate, shining. Flowers solitary, or in fascicle at apices, brilliant orange-red trumpet shaped, with ruffled petals. Hypanthium coloured, 5 – 8 lobed. Fruits berry, rounded hexagonal shape, red or orange-red, bearing outer hard epicarp, inner spongy mesocarp containing distinct chamber. Seeds numerous, angular, fleshy, emerged within mesocarp (Plate 22).

Flowering & Fruiting: April – June; September – October.

Distribution: Originally native of Iranian plateau and the Himalayas in North Pakistan and India. Now-a-days Pomegranate is widely cultivated throughout Mediterranean areas, throughout India and drier parts of S.E. Asia

Uses: Seeds are edible, can be eaten raw or juiced; seed extract used in skin care products; the pomegranate has a long history of herbal use dating back more than 3,000 years; The flowers are used in the treatment of dysentery, stomach ache and cough; The seeds are demulcent and stomachic; The fruit is a mild astringent, cardiac, stomachic and refrigerant in some fevers and especially in biliousness; The dried rind of the fruit is used in the treatment of amoebic dysentery, diarrhoea etc.; both the stem and the root barks are used to expel tapeworms; A red dye is obtained from the flowers and also from the rind of unripened fruits. The bark can also be used as a source of tannin. The yellow wood is very hard, compact, close grained, durable, used for making agricultural implements, domestic wodge, handles, small implements etc. The leaves are used as fodder for domesticated animals. Branches often used as firewood.

Notes (if any): Pomegranate tree was present in Biblical time, hence thought as ‘Forbidden fruits’ in the garden of Eden. To commemorate the tree, Afghanistan, Ozbekistan, Vietnam, Georgia, Armenia and USA issued postal stamp on Pomegranate fruits.



Plate 22. *Punica granatum* L.: **A.** Habit; **B.** Fruit

Magnolia champaca (L.) Baill. ex Pierre

MAGNOLIACEAE

Common name (Eng.): Golden champa, Champak, Joy Perfume tree, Fragrant Himalayan Champaca

Vernacular name: Beng. চাঁপা, চম্পা; Hind. चम्पा

Diagnostic features: Evergreen large tree, to 50m high, with smooth grey bark; young branches covered with grey hairs. Leaves ovate. Flowers inverted, lence shaped, pale yellow, becoming orangish later, strongly fragrant. Fruits composed of 3 – 20 brown follicles, in cluster, appear like grape, split at one side when dry. Each follicle contains 2 – 6 reddish seeds (Plate 23).

Flowering & Fruiting: March – July.

Distribution: Native to India, Himalayas to N.E. India, Odisha, west Bengal, South India, often planted.

Uses: This is an ornamental tree, planted in garden and near temples, fragrant flowers are offered to Gods. The tree was traditionally used to make fragrant hair and massage oils. Flower extract is widely used in perfume industry which yield premium quality perfumes. Bark, leaf, flowers have medicinal property, all plant parts are used in Ayurveda; heartwood light, durable, suitable for making cabinet and building works; a yellow dye is obtained from flowers; flowers and leaves yield essential oils such as champaca oil and Michelia oil respectively.

Notes (if any): The fragrance of Champaka flowers is unique. It is used in the worship of all Gods except Lord Shiva.



Plate 23. *Magnolia champaca* (L.) Baill. ex Pierre: **A.** Habit; **B.** Flowering twig

Bombax ceiba L.**MALVACEAE**

Common name (Eng.): Silk Cotton tree, Red Kapok, Kapok tree, Red Silk Cotton tree, Malabar Semul

Vernacular name: Beng. শিমূল; Hind. सेमल, शालमली

Diagnostic features: Large deciduous tree, with spiny or transversely corky trunk, with buttresses, having horizontal branches in whorls. Bark smooth, upto midge, becoming rough with irregular vertical cracks at maturity, pale ash to silver grey. Leaves palmately compound, with 3 – 7 elliptic-obovate leaflets, digitate, spreading, large. Flowers axillary, cup shaped, clustered near end of branches, very showy with bright red, fleshy corolla; stamens numerous in two whorls, long. Fruits capsules, oblong-oval, angular, locucidally 5-valved, valves woody, downy outward, lined with silky hairs within. Seeds numerous, obovoid, smooth, embedded in fibre like cotton, easily blown about by wind (Plate 24).

Flowering & Fruiting: February – March; fruiting extended to April

Distribution: Native to India; wide distributed except extremely arid regions, at an altitude of 1200m. Bangladesh, Java, Myanmar, Pakistan, Sri Lanka, Sumatra.

Uses: Widely planted along roadside, garden, temple premises for its ornamental flowers. Roots stimulants, tonic in male impotency; gum exuded from trunk is stimulant, tonic, demulcent, effective in diarrhoea and dysentery; timber used to make boat, packing box, match box, plywood etc. In India, almost entire annual yield of Semul is reserved for matchwood industry. The floss, popular as ‘Kapok’, produced from fruit, is extensively used for filling bed, pillows, quilts etc. The bark exudes, ‘Mocha ras’, used for various medicinal purposes. Young flowers and calyx are eaten as vegetables. Since Semal tree is very large, serve as favourite roosting and resting sites for large birds especially vulture.

Notes (if any): To commemorate the beautiful flowers, Postal Department of Bangladesh issued postal stamp on *Bombax ceiba*.

Ecological notes and conservation: As in Hindu custom, vulture is considered as symbol of ill-fate, people do not like to keep Semal tree in the vicinity resulting sharp decline in population of vulture as well as Semal tree. With keeping all these facts, Nepal Government put it in the list of Protected tree species since 1999 and banned all kind of harvesting.



Plate 24. *Bombax ceiba* L.: A. Habit; B. Flowering twig; C. Fruit cluster

***Pterospermum acerifolium* (L.) Willd.**

MALVACEAE

Common name (Eng.): Dinner plate tree, Karnikara tree, Maple leaved Bayur tree, Bayur tree

Vernacular name: Beng. কনক চম্পা, মুক্কানদা; Hind. मुचकुन्द, पद्म पुष्प

Diagnostic features: Evergreen large tree, to 30 meter high, with irregular crown, reddish grey bark, having rusty appearance on its new and youngest parts. Leaves polymorphous, rectangular to hexagonal, orbicular or obovate, palmately ribbed, stipulate, edges dentate or toothed, often peltate at base, rough, rubbery, dark green above, bottom side silver to rust coloured. Flowers axillary, solitary or 2 – 3-flowered cymes, bisexual, white or pale yellow, fragrant. Capsules stalked, oblong, 5-angled, woody, brown tubercled. Seeds obliquely ovoid, compressed, with large membranous wings (Plate 25).

Flowering & Fruiting: February – May.

Distribution: Native of Southeast Asia to Indo-Burmese region; Bangladesh, China, India and Nepal to Peninsular Malaysia. India: Throughout, often cultivated.

Uses: Timber is valued for plunking, often grows as shade tree. Mature leaves are stitched and used to make dinner plate, soup bowls etc.; these are also used in packaging or storage by wrapping materials inside. Flowers are used in perfumery industry. It is used to treat severe headache, skin infection, piles and act as analgesic. Wood is used for making packing case, planks, turnery articles and plywood. Flowers are good repellent and disinfectant for bugs and insects. Flower paste is also used in the treatment of inflammation, blood pressure, tumour, ulcer and leprosy.

Notes (if any): To commemorate the flowers, India Government issued a postal stamp.



Plate 25. *Pterospermum acerifolium* (L.) Willd.: **A.** Leaves; **B.** Flowering twig

Sterculia foetida L.**MALVACEAE**

Common name (Eng.): Java Olive, Wild Indian Almond, Bastard poon tree, Hazel Sterculia, Wild Almond tree, Skunk tree, Fetid Sterculia, Star Chestnut, Poon tree, Bangar Nut

Vernacular name: Beng. জঙ্গলি বাদাম; Hind. जंगली बादाम

Diagnostic features: Large, deciduous, dioecious tree, to 40 m high, with a large canopy; bark smooth, greyish; branches almost horizontal, arranged in verticils (3 or more inserted on the same node). Leaves are palmately compound, crowded at the ends of the branches, on long petioles; leaflets 7 – 9, elliptic, elliptic-lanceolate or oblanceolate, with unpleasant smell. Flowers many, in subterminal panicle, unisexual, bell-shaped with a foul smell, turns red on maturity, with foul smell. Fruits composed of 1 – 5 ellipsoid follicle, woody, initially green, turning scarlet red at maturity, split along longitudinal suture. Seeds 10 – 15, placed along border of opening of fruits, oblong, slate-grey coloured, with rudimentary yellow aril (Plate 26).

Flowering & Fruiting: February-August (extended to October); fruits ripe after c. 11 months of flowering.

Distribution: Originally from East Africa and North Australia, Myanmar and Sri Lanka; India: Andhra Pradesh, Bihar, Kerala, Maharashtra, Odisha, Tamil Nadu, West Bengal

Uses: Seeds are edible, eaten after roasting; an oil is obtained from the seeds, having insecticidal property and potential source of biodiesel; this oil may also be used as cooking oil. Leaves and flowers are employed in traditional medicine. Fruit is astringent and mucilaginous; cordage is obtained from bark. Wood is soft but hard, easy to work and finish, is employed in construction of light furniture, musical instrument etc. A gum resembling ‘gum tragacanth’ is obtained from the trunk, used in book binding. Leaves, due to high protein, calcium, and phosphorous content, are often utilized as good fodder.

Notes (if any): The genus "*Sterculia*" is named after the Roman God ‘Sterculus’, the God of manure. The species name "*foetida*" means ‘foul-smelling’, indicative of the smell while flowering.

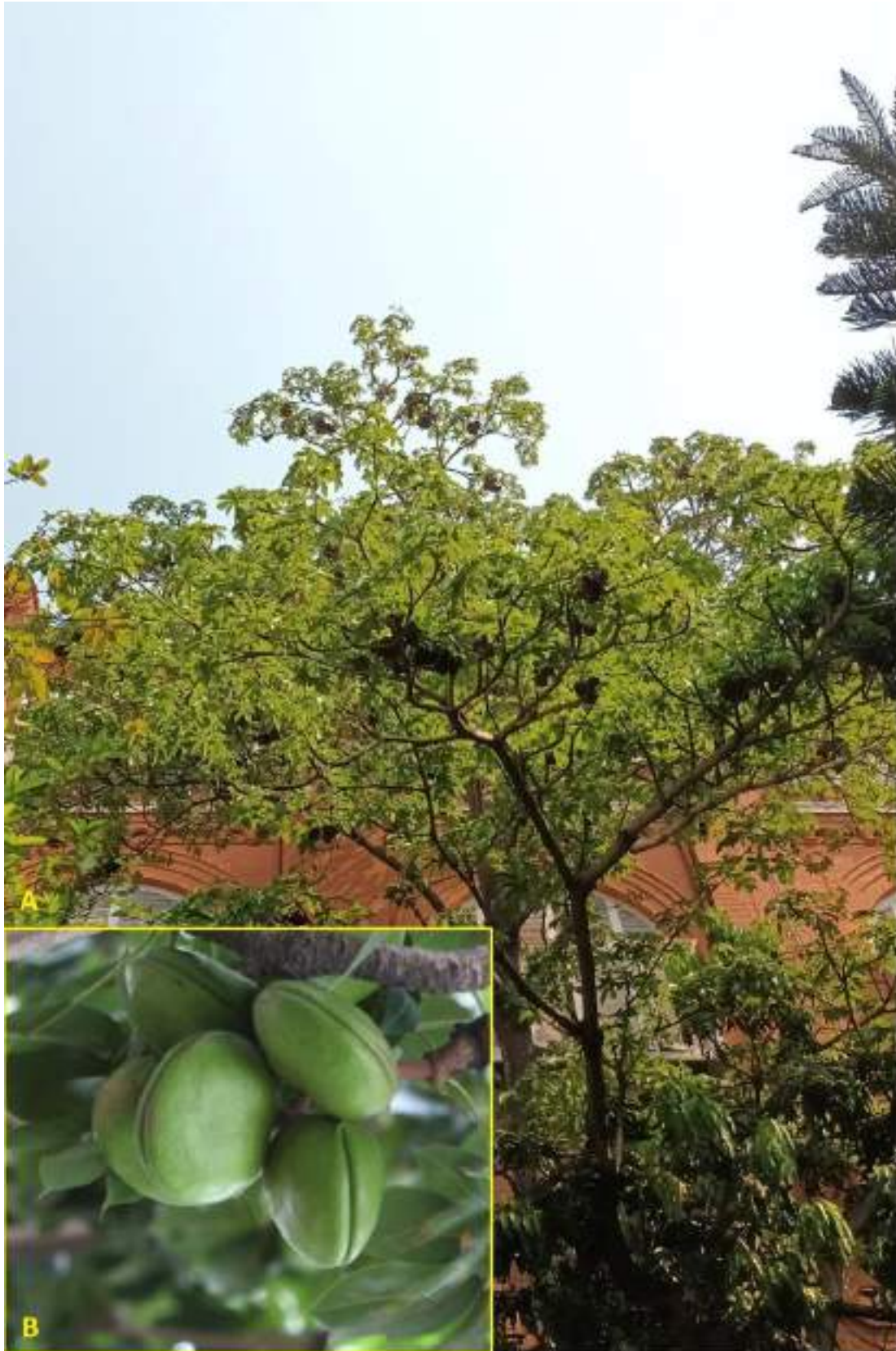


Plate 26. *Sterculia foetida* L.: **A.** Leaves; **B.** Young fruits

Azadirachta indica* A. Juss.*MELIACEAE****Common name** (Eng.): Neem, Indian lilac, Margosa tree**Vernacular name:** Beng. নীম; Hind. नीम

Diagnostic features: Evergreen tree, to 20 m high rarely upto 40 m, with spreading branches, providing fairly dense roundish crown; bark hard, fissured, with deep vertical lines, peeling in small flakes, whitish-grey to reddish brown. Leaves pinnately compound; leaflets 9 – 19, narrowly ovate, with serrated margin, dark green. Flowers many, in axillary lax, more or less drooping racemose panicles, protrandrous, white, fragrant, small. Fruits elongate, oval or roundish, olive like drupe, with thin pulp, smooth. Seed usually 1, elongated, with brown seed coat (Plate 27).

Flowering: March – April; **Fruiting:** May – June.**Distribution:** Native to Indian Subcontinent, probable origin is Myanmar. Throught India.

Uses: Nearly all parts of Neem tree are useful. Tender leaves and shoots are cooked and eaten as vegetables in India. A soup like dish ‘Veppampoo charu’ is prepared from Neem flowers in Tamil Nadu. It is well-known for its hard, strong, durable wood, suitable for making furniture, agricultural implements and handicrafts. This is a good source of charcoal and is used in manufacture of essential oil. Leaf, bark, flower, fruit, twig, gum, seed, pulp, oil have immense medicinal properties. Products made from neem trees have been used in the traditional medicine in India for centuries. Neem oil is key ingredient in Non Pesticidal Management (NPM), effective eco-friendly pesticide that prevent termite attack. Neem cake may be used as fertilizer. In India, Neem leaves are dried and kept in cupboards to prevent insect attacks. Tender twigs have teeth cleaning property and are used in villages. Flowers are used in many Indian festivals like Ugadi. Afforestation of Neem tree helps in desertification, deforestation, soil erosion and reduce global warming. Neem oil is source of biodiesel.

Notes (if any): It is believed that the name ‘Nemai’ was given to saint Chaitanya Mahaprabhu as he took birth under a neem tree. This is State tree of Andhra Pradesh.



Plate 27. *Azadirachta indica* A. Juss.: **A.** Habit

Artocarpus heterophyllus Lam.**MORACEAE****Common name** (Eng.): Jack fruit, Jack tree, Jacquir**Vernacular name:** Beng. কাঁঠাল; Hind. कटहल

Diagnostic features: Large, evergreen trees, to 25m high with dense, irregular, spreading branches providing dome shaped crown. Bark rough, uneven, reddish or greyish brown, exfoliating, somewhat scaly. Leaves simple, alternately arranged on horizontal branches, spirally arranged on ascending branches with 2/5th phyllotaxy, elliptic to broadly obovate, entire or lobed in young shoots, leathery, dark green, glossy above; stipules fused around stem, leaving an encircling scar after they fall off. Flowers unisexual, of four kinds, male, female, gall and neuter, borne on an elongated axis, forming a racemoid inflorescence; male spikes produced singly, whitish-green; female spikes solitary or paired, light or dark green. Fruits multiple consisting of several achenes i.e. Syncarp, massive, green tuberculate, oblong-globose, hanging on the trunk, fruiting perianth yellow to light orange, fleshy with a strong odour, weighing 4 – 50 kg; fruitlets composed of waxy, firm, fleshy sweet, aromatic, aril and seeds. Seeds reniform (Plate 28).

Flowering: March – April; **Fruiting:** June – August.**Distribution:** Native of rain forests of Western Ghats, India, wild and cultivated widely

Uses: Jackfruit is considered as staple food crop in South and Southeast Asia. Fruits and seeds are edible, eaten raw or cooked as vegetables. Leaves used as fodder. Inner part of bark or bast fibre is employed to make cloth or cordage. Wood is resistant to termite attack, any sort of fungal or bacterial decay and easy to season, also take polish beautifully. In India, timber is widely used in making furniture, other construction, masts, musical instruments etc. The latex, exuded from all parts are good source of varnishes and substitutes of rubber. The bark yield water soluble yellow dye used for silk and cotton robes of Buddhist Priests. Different parts of the tree has immense medicinal properties.

Notes (if any): The generic name come from the Greek word ‘artos’ (bread) and ‘Karpos’ (fruits), the species name came from Latin ‘heterophyllus’ (leaves of various sizes and shape). The common name ‘jackfruit’ derives from Portuguese ‘Jaca’, which in turn believed to come from Malayalam ‘Chakka’ means ‘fruits, vegetables.’ To commemorate the tree, Bangladesh Government issued a postal stamp of Kathal fruit in 1976.



Plate 28. *Artocarpus heterophyllus* Lam.: **A.** Tree; **B.** Fruits

Ficus benghalensis L.**MORACEAE****Common name** (Eng.): Banyan tree, Indian Banyan, Banyan Fig**Vernacular name:** Beng. বট ; Hind. बरगद, बर

Diagnostic features: Tall, evergreen large tree, to c. 30 m high, with wide spreading branches. Trunk branched, producing numerous aerial roots, go down to develop accessory trunks and touch ground, protect original trunk, spreading over a large area and look like a small forest. Bark smooth, greyish. Leaves simple, alternate, leathery, ovate-cordate, broadly elliptic, obtuse-subacute. Male and female flowers are enclosed in spherical or elliptical hypanthodium, developing from the leaf axil. Fruits (cyconia) are axillary, sessile, globose, orange-yellow when ripen (Plate 29).

Flowering & Fruiting: February – June; September – May.**Distribution:** Native to Indian subcontinent, extremely popular everywhere in India.

Uses: The tree is intimately related to Hindu mythology. Bark and leaves are good sources of tannin. Leaves can be used in making plates. Bark is a good tonic and has astringent, diuretic, cooling and diuretic properties, used in diarrhea and dysentery. Seeds and fruits are cooling and tonic. Young buds and milky latex are astringent, while root fibers are employed in gonorrhoea. Bark of aerial root is also used in making rope. Stems are used to make tent poles. Fruits are wild edible. Leaves are good fodder. Due to giant crown, the tree is planted along roadside and in garden as shade tree.

Notes (if any): The tree was named after Hindu traders, called '*Banyans*' who favored the tree for rest purposes. As per another legend, this tree gave protection to Lord Krishna. The curious way in which the aerial hanging developing from the tree to serve as fresh trunks and the tree grows indefinitely was noticed in earlier days and named as 'Tree of immortality' or 'Akshaya Vat'. The curious fact is that this giant tree starts its life as epiphyte in seedling stage, frequently found to grow in the crevices of old world, covering Palmyra Palm etc. A postal stamp was issued by Indian Postal Department to commemorate the plant.

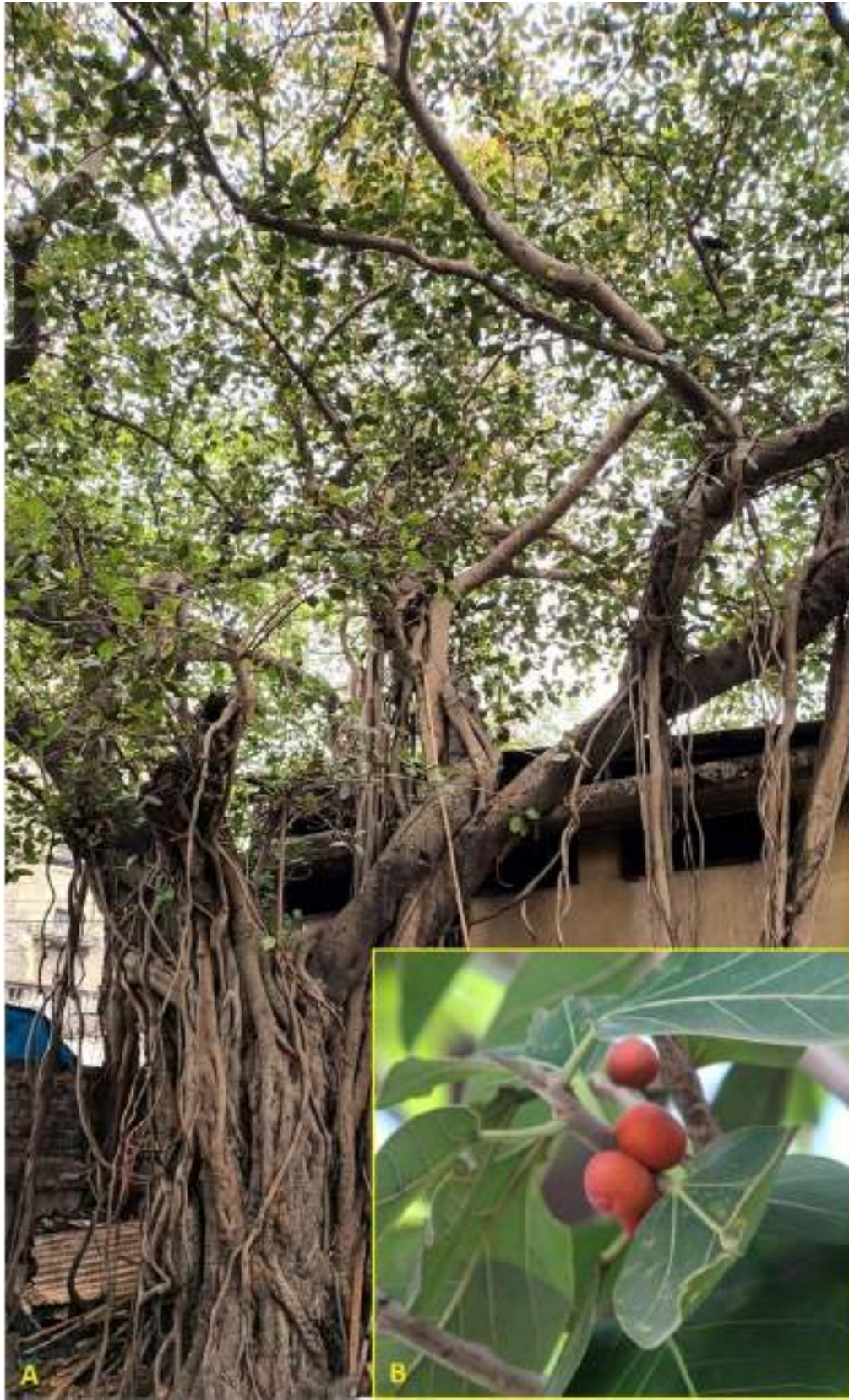


Plate 29. *Ficus benghalensis* L.: **A.** Habit; **B.** Figs

Ficus elastica Roxb. ex Hornem.

MORACEAE

Common name (Eng.): Rubber tree, Rubber plant, India Rubber-Fig, Rubber Bush

Vernacular name: **Beng.** রবার; **Hind.** रबर का पौधा

Diagnostic features: Large evergreen tree, to 40m high, having dense symmetrical oval crown. Trunk stout, forms aerial and buttressing roots to anchor it to the soil and help support of heavy branches; bark smooth, reddish-brown. Leaves simple, alternately arranged, broadly ovate or elliptic, glossy, leathery, midrib prominent, initially red, turning blackish green at ages. All parts secrete latex at wounds. Young buds enclosed with pinkish foliaceous stipules. Flowers small, white, solitary, very rare. Figs not seen under cultivation (Plate 30).

Flowering & Fruiting: November – January.

Distribution: Native to North-East India and eastern Himalayas; widely cultivated. China, Nepal, Indonesia, Malaysia, Sri Lanka, Burma.

Uses: The tree yield a milky latex which is a source of rubber. Also used as ornamental plant along roadside.

Notes (if any): Despite its common name ‘Rubber tree’, the tree is not used in production of commercial rubber. To commemorate the tree, Ivory coast issued a stamp on *Ficus elastica*.



Plate 30. *Ficus elastica* L.: A. Habit

Ficus religiosa L.**MORACEAE****Common name** (Eng.): Sacred fig tree, Wisdom tree, Bodhi tree, Peepal**Vernacular name:** Beng. অশ্বথ; Hind. पीपल, पीपली**Diagnostic features:** Large deciduous or semi-evergreen tree, to c. 20m high. Trunk light brown, with irregular branches, often with low buttresses, without aerial roots; bark smooth, brownish-grey, peeling in irregular rectangular flakes. Leaves simple, alternate, ovate-round to cordate, glossy, light-dark green, long acuminate with unusual tail like apex, pink when young. Flowers axillary, unisexual, in hypanthodia appear on leafless branchlets, sessile or in pairs. Fruits small round or depressed globose; initially green, red or dark purple at maturity, with red dots (Plate 31).**Flowering & Fruiting:** February – July.**Distribution:** Native to Indian Subcontinent (Bangladesh, Bhutan, Nepal, Pakistan and INDIA) and part of Indo-China. Wild throughout India, lower Himalayas, Andaman & Nicobar Island.**Uses:** Various parts of Peepal tree cure atleast fifty types of ailments. Bark and latex are used in traditional system medicine in treatment of skin diseases, asthma, nausea, cough etc. Young bark is astringent and also good source of tannin. Ripe fruits are cooling, relieves biliousness, thirst, heart and blood related diseases, sometimes used as famine food. It serves as laxative and help in digestion. Dried fruits cure asthma. Seeds are useful in urinary discharge. Bird lime can be prepared from latex. Wood is moderately hard, heavy and durable, used in manufacturing packing box, cheap board, yokes, spoon, bowls etc. Often it is used as firewood. Leaves are lopped as fodder for camel, elephants, cattle, goats etc.**Notes (if any):** The species name 'religiosa' alludes to the religious significance attached to the tree. Peepal, unrivalled for its antiquity and religious importance, live very life with full vigor. It is believed that Prince Siddhartha sat in meditation under Bodhi tree and found enlightenment from when the tree considered as sacred to Buddhists. Hindus associate the tree with three Gods, Brahma, Vishnu and Shiva. Peepal is the State tree of the Indian States of Bihar, Haryana and Odisha.



Plate 31. *Ficus religiosa* L.: **A.** Habit; **B.** Fruit bearing twig

Psidium guajava L.**MYRTACEAE****Common name** (Eng.): Guava, Lemon guava, Apple guava, Yellow guava**Vernacular name:** Beng. পেয়ারা; Hind. अमरूद

Diagnostic features: Evergreen shrub or small tree, to 10 m high, with spreading branches. Bark smooth light reddish brown, peels off in flakes, exposing greenish layer beneath. Branches hairy, 4-angled. Leaves simple, oppositely arranged, ovate-elliptic or oblong-elliptic, dull green, pubescence beneath, with prominent central vein. Flowers borne in upper leaf axil, solitary, white, faintly fragrant. Fruits globose, ovoid or pyriform, green at young, turns yellow when mature, pulp juicy, white, pink or yellow, with persistent sepals. Seed numerous, kidney shaped, yellow, embedded in pulp (Plate 32).

Flowering & Fruiting: February – March; June – September.**Distribution:** Native of Tropical and subtropical America and adopted as nutritious crop in Tropical Asia and Africa. In India, guava is mostly cultivated, often grown as wild.

Uses: Fruit is edible, eaten raw or cooked; often jam, jelly, marmalade is prepared from the pulp. Guava fruit is an excellent source of Vitamin C. Leaves are good fodder. Leaves extract mixed with warm water applied to get relief from toothache. Fruits are antibacterial, hypoglycemic, treats cholesterol, diarrhea, dysentery, stomachache etc. Wood can be implemented in manufacturing poles, tool handles, handicrafts and as a source of cgarcoal and firewood.

Notes (if any): To commemorate the tree, Bangladesh and Portugal Postal Department issued postal stamps on Guava.



Plate 32. *Psidium guajava* L.: **A.** Habit; **B.** Flowers; **C.** Fruits

Syzygium aqueum (Burm.f.) Alston**MYRTACEAE****Common name** (Eng.): Watery rose apple, Water apple, Rose apple**Vernacular name:** Beng. গোলাপ জাম; Hind. गुलाब जामुन

Diagnostic features: Evergreen tree, to 10m high, with dense, spreading crown. Bark brown, cracked. Leaves simple, opposite, lens shaped, oblong-lanceolate or ovate-oblong or ovate-lanceolate, cordate at base, acuminate at apex, entire, chartaceous to coriaceous, glabrous, with very short petioles. Inflorescences both terminal and axillary, 3 – 7-flowered. Flowers showy, bisexual, carry a large number of long stamens that give the flowers a fluffy appearance, greenish-white, faintly fragrant. Fruits berry, pear shaped, depressed at apex, light pinkish red or white, fleshy, edible, with mild rosy scent, crowned by 4 fleshy calyx lobes. The fruit skin is shiny, thin and waxy, while the flesh is white, juicy and crisp. Fruits are often seedless, but sometimes have 1 – 4 small seeds (Plate 33).

Flowering & Fruiting: March – June.

Distribution: Native range is Malaysia to N. Queensland; Australia, Bangladesh, Cambodia, Indonesia, New Guinea, Sri Lanka, Thailand, Vietnam. India (Cultivated): Andaman & Nicobar Island, Assam, Karnataka, Kerala, Meghalaya, and West Bengal.

Uses: Fruits edible, sweet, with slightly astringent taste, eaten raw or made a syrup, quench thirst, fruit skin is rich source of Vitamin A. In the past, Malaysian women who had given birth would eat a ceremonial salad containing the fruit. Dried leaves are eaten with vegetables, or the fresh leaves are eaten raw, as a treatment for malaria and pneumonia; infusion of the leaves is used in the treatment of stomach aches and dysentery; wood is hard, durable and used for musical instruments, tool handles, furniture components, ship building, heavy carpentry, flooring, joinery etc. Bark is applied as ingredient of herbal medicine. Fresh leaves are often used to wrap food products by street vendors.

Notes (if any): The taste of fruit is like mixture of apple and watermelon.



Plate 33. *Syzygium aqueum* (Burm.f.) Alston: **A.** Habit; **B.** Flowering twig; **C.** Fruits

Syzygium cumini (L.) Skeels

MYRTACEAE

Common name (Eng.): Black plum, Malabar plum, Indian Blackberry, Jambolan, Java plum

Vernacular name: Beng. কালোজাম; Hind. जामुन

Diagnostic features: Medium size evergreen tree, to 30m high, with greyish brown bark, smooth or with shallow depression, exfoliating in scales. Leaves elliptic to oblong or ovate, glossy, smooth, leathery, with distinct midrib, green. Flowers borne in panicle on leafless branches, white or pale yellow, fragrant. Fruits berry, globular-oblong, shining, green when young, purplish black when ripe, with fleshy pulp. Seed 1 in each berry (Plate 34).

Flowering & Fruiting: April – May; June – September.

Distribution: Native to tropical and subtropical Asia. Wild as well as cultivated throughout India.

Uses: Fruits and seeds are edible, acrid, sour and effective in type 2 diabetes. Leaves are antibacterial, strengthen teeth and gums; bark is astringent, diuretic, digestive and anthelmintic. Jambolan fruits have a sweet or slightly acidic flavor, are eaten raw, and may be made into sauces or jam; inferior fruits may be made into juice, jelly, sorbet, syrup or fruit salad. Fallen fruits are relishly eaten by jackal, fruit bats, civets etc.

Notes (if any): As majority of the Jamun trees occur in Indian subcontinent, this is described as ‘Jambudweep’ in Indian mythology. Different mythological tales are associated with this tree in the states of Andhra Pradesh, Maharashtra, Tamil Nadu.



Plate 34. *Syzygium cumini* (L.) Skeels: **A.** Habit; **B.** Flowering twig

Phyllanthus emblica L.**PHYLLANTHACEAE****Common name** (Eng.): Indian gooseberry, Myrobalan, Emblic, Emblic myrobalan,**Vernacular name:** Beng. আমলকি; Hind.: आँवला**Diagnostic features:** Deciduous small tree or shrub, to 20m high; trunk crooked with spreading branches; young branches reddish-brown, hairy. Bark smooth, greenish grey, peeling off in flakes. Leaves simple, alternate, distichous, on short deciduous branchlets, closely overlapping, subsessile, strongly appearing pinnate, oblong or linear-oblong, membranous, glabrous, glaucous below. Flowers unisexual, borne on same tree, in densely axillary cluster, greenish yellow; male flowers numerous, oblanceolate, on short slender pedicel; female flowers few, obtuse-oblanceolate. Fruits a berry, globose, with fleshy exocarp, faintly ridged, yellowish green when ripe. Seeds 3 – 6, trigonous (Plate 35).**Flowering & Fruiting:** March – May; October – December.**Distribution:** Native to tropical and subtropical Asia. Bangladesh, Borneo, Cambodia, China, Jawa, Laos, Lesser Sunda Is., Malaya, Myanmar, Nepal, Pakistan, Sri Lanka, Sumatera, Taiwan, Thailand, Vietnam. India: Throughout except Jammu & Kashmir and Himachal Pradesh**Uses:** Fruits, leaves, oil and seeds are edible; fruits are eaten raw with salt, sugar or chilies to moderate the taste; the fruits are more commonly used to make jams, jellies, tarts, chutneys, murabbah etc. It is rich source of Vitamin C. Emblic is of great importance in traditional Asiatic medicine, used as antidiarrheal, antipyretic, antitumour, antitussive, astringent, diuretic, hypoglycaemic, expectorant, laxative, ophthalmic, purgative and tonic. Dried fruit is the key ingredient of Ayurvedic preparation ‘Triphala’.**Notes (if any):** The tree is considered sacred by Hindus as God Vishnu is believed to dwell in it.

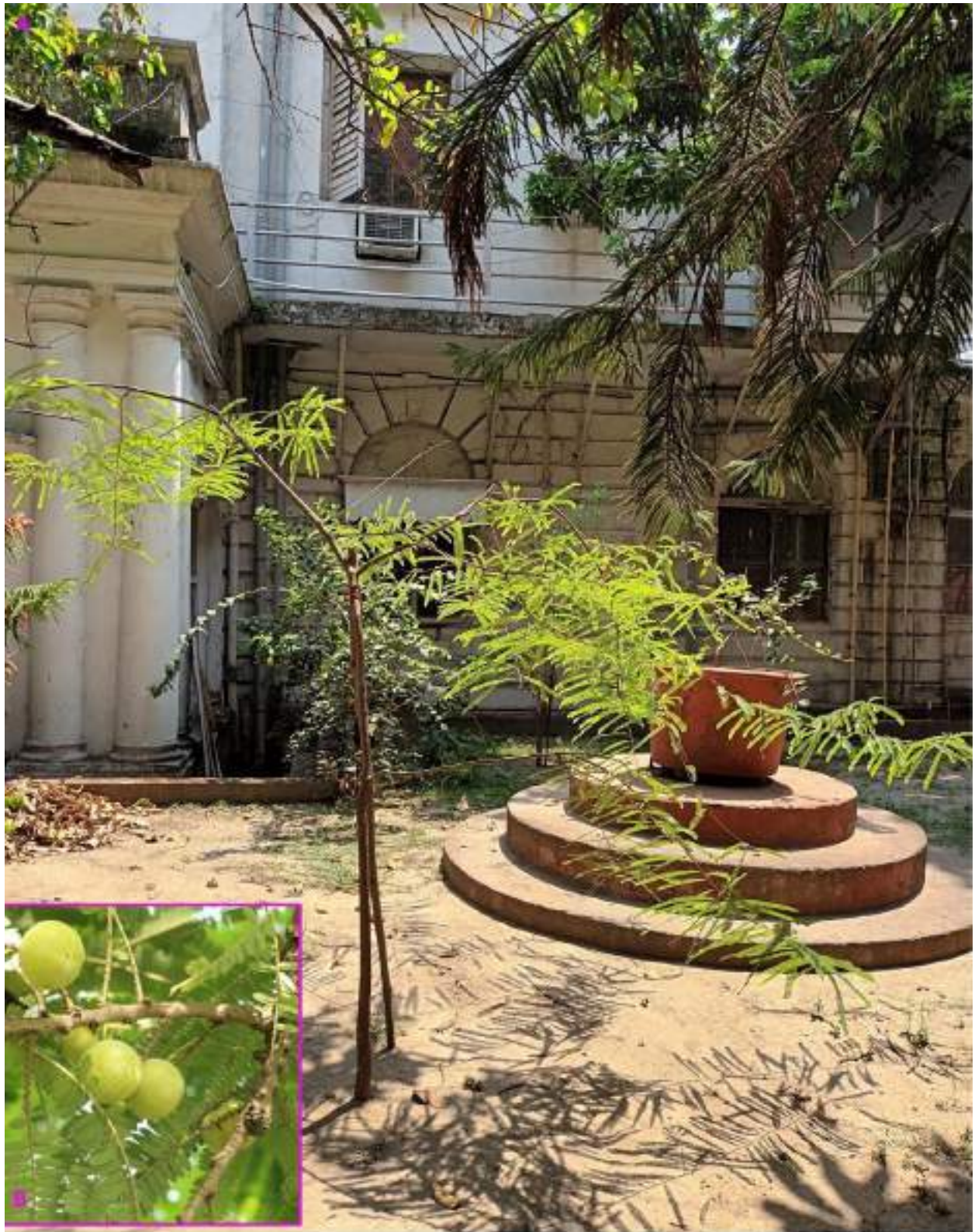


Plate 35. *Phyllanthus emblica* L.: **A.** Habit; **B.** Fruits

Putranjiva roxburghii L.**PUTRANJIVACEAE****Common name** (Eng.): Lucky Bean tree, Child life tree, Wild Olive, Putrajiva tree**Vernacular name:** Beng. পুত্রঞ্জীবা; Hind. पुतीजीआ, जीवापुत्रक**Diagnostic features:** Moderate size evergreen dioecious trees, to 12m high, with pendulous branches. Bark dark grey, with horizontal lenticels. Leaves simple, distichous, elliptic-oblong to elliptic-ovate, chartaceous, serrated along margin, glossy green, with caducous stipules. Flowers unisexual, small, yellowish; male flowers in axillary spikes; female flowers axillary, solitary or 2 – 3. Fruits ellipsoid or rounded or ovoid drupes in clusters, whitish green, velvety, with persistent style. Seed single, stony (Plate 36).**Flowering & Fruiting:** March – August; October – November.**Distribution:** Native to tropical Asia; found throughout India. Africa, Bangladesh, Borneo, Jawa, Laos, Lesser Sunda Is., Malaya, Maluku, Myanmar, Nepal, New Guinea, Pakistan, Sri Lanka, Sulawesi, Thailand, Vietnam.**Uses:** The plant is said to be the best healer of infertility in men and women. Fruit, seed, leaves are commonly used to cure different ailments. Decoction of leaves and fruit is used for the treatment of liver complaints, colds, fevers and rheumatism. Hard seeds are threaded into necklace and tied in the waist of children for protection from diseases. An olive-brown fixed oil is obtained from the seed, used in burning. Seed paste is applied to treat eye complaints, headache, skin rashes etc. Wood is used for construction purposes.**Notes (if any):** This plant is worshipped by Hindu women wishing to give birth to a child.



Plate 36. *Putranjiva roxburghii* L.: **A.** Habit; **B.** Fruiting twig

Neolamarckia cadamba (Roxb.) Bosser**RUBIACEAE****Common name** (Eng.): Burflower tree, Laran**Vernacular name:** Beng. কদম; Hind. कदम्ब, करम

Diagnostic features: Large evergreen tree, to 45m high, with horizontally spreading branches appearing as a broad umbrella shaped crown. Bark greyish black, peeling off in thin rectangular scales. Leaves simple, ovate-oblong, shining green, with impressed nerves. Flowers borne in terminal dense globose heads, bisexual, sweet fragrant, orange, with exerted filiform style and club shaped stigma, appearing as hairy golf balls. Fruits small capsule, packed closely to form fleshy yellow or orange coloured infructescence containing numerous small, seeds with rough projection (Plate 37).

Flowering & Fruiting: June – August; July – September.

Distribution: Native to South and Southeast Asia; Africa, Bangladesh, Jawa, Laos, Lesser Sunda Island, Malaya, Myanmar, Sri Lanka, Thailand, Vietnam. India: Andaman Is., Assam, Bihar, Chhattisgarh, Himachal Pradesh, Manipur, Uttarakhand, West Bengal.

Uses: The fruit and inflorescences are reportedly edible by humans. Dried bark is used to get relieve from fever and as tonic, leaf extract is a good mouth gargle. The plant is astringent, digestive, expectorant, and febrifuge. A yellow dye can be obtained from the root bark. The flowers are the source of an essential oil which are an important raw material in the production of ‘attar’, which are Indian perfumes with sandalwood. Fruits are edible and leaves are good fodder. Wood is soft, brittle and used as fuel or to make ceiling board, match boxes, packing box etc. The fresh leaves are fed to cattle. The tree is frequently planted along roadside, garden and near temple.

Notes (if any): In Hindu mythology, kadam tree was mentioned as favorite of Lord Krishna. The tree is mentioned in the Bhagavata Purana. In India, ‘Karam-Kadamba’ is a popular harvest festival, celebrated on the eleventh lunar day of the month Bhadra. The kadamba tree is also associated with a tree deity ‘Kadambariyamman’. A postal stamp was issued by Indian Postal Department to commemorate this tree.



Plate 37. *Neolamarckia cadamba* (Roxb.) Bosser: **A.** Habit; **B.** Flower

Aegle marmelos (L.) Correa**RUTACEAE****Common name** (Eng.): Stone apple, Golden apple, Bengal quince, Japanese bitter orange**Vernacular name:** **Beng.** বেল; **Hind.** बेल, बलिव

Diagnostic features: Medium size deciduous tree, to 15m high, with smooth, brown or silvery-white barks, exfoliating in irregular flakes in old trees; branches thorny, slender, drooping, providing rather open, irregular crown, often with slimy sap oozing out from cut parts, resembling ‘gum arabic’, which exudes from wounded branches and hangs down in long strands, becoming gradually solid. Leaves trifoliate, alternate, unequal, ovate-lanceolate, untoothed or with shallow rounded teeth, young leaves are pale green or pinkish, finely hairy while mature leaves are dark green and completely smooth. Flowers borne in axillary raceme, bisexual, initially greenish-yellow, turning purplish later, fragrant. Fruits berry, globose, sometimes pear-shaped, with 8 – 15 inner compartment, green when young, turning to yellowish-grey when ripe, with thin, hard, woody or soft rind, dotted with minute aromatic oil glands, enclosing orange sweet pulp. Seeds flattened-oblong, embedded in yellow pulp (Plate 38).

Flowering & Fruiting: April – May; July – September.**Distribution:** Native to Indian subcontinent and Southeast asia. India: Almost throughout. Bangladesh, Egypt, Malaysia, Myanmar, Pakistan, Sri Lanka, Thailand.

Uses: Different parts of the tree are potentially used in medicinal system, culinary and cultural festivals. Fruits are rich source of Vitamin C, can be eaten either fresh or after being dried or as candy. A sweetened syrup is made from fruit extract, known as ‘Bal pana’ in Bengal and Odisha is cooling and taken as sarbat. The leaves, bark, roots, fruits, and seeds are used in various illness. Leaves are mild laxative, febrifuge, expectorant, ophthalmic, used in conjunctivitis, bronchitis and inflammation of body parts; leaf juice applied in oedema. Decoction of root and stem bark is useful in intermittent fever; root is an ingredient of Ayurvedic medicine ‘Dashamoola’ prescribed for loss of appetite. Distillation of flowers is antidiabetic, antidiabetic, diaphoretic, local anesthetic and used in epilepsy. Ripe fruit promotes digestion, unripe fruits are astringent and used in diarrhea, dysentery etc. wood and leaves are utilized in Hindu rituals.

Notes: This is the most sacred tree in Hindu mythology. It is believed that Lord Shiva is fond of bael trees and its leaves and fruit still play key role in his worship, because the leaf's triple shape symbolises his trident.



Plate 38. *Aegle marmelos* (L.) Correa: **A.** Habit; **B.** Fruits

Murraya paniculata (L.) Jack**RUTACEAE****Common name** (Eng.): Chinese box, Orange jasmine, Mock orange, Sain wood, Sumatra box**Vernacular name:** Beng. কামিনী; Hind. कुन्ती, कामनी, बबिसार, जुटी**Diagnostic features:** Evergreen, large shrub or small tree or woody vine, to c.7m high, with smooth, pale white to ash coloured bark. Branches tufted. Leaves compound, imparipinnate, with 5 – 9 egg-shaped to elliptical or ovate-elliptic or rhomboid leaflets, arranged alternately, glabrous, glandular, dark glossy green. Flowers loosely arranged in small corymbs, axillary or at the end of branches, campanulate, cream coloured, highly fragrant, night-blooming. Fruit small berry, tapering at both ends, orange-red at maturity (Plate 39).**Flowering & Fruiting:** February – May; June – October.**Distribution:** Native to South and South East Asia; China, India, Malesia, Myanmar, N. Australia, Pakistan, Philippines, Sri Lanka, Thailand. In India, grows in Assam, Gujarat, Punjab, Tamil Nadu, Uttar Pradesh**Uses:** Cultivated in garden for hardy nature and extremely fragrant flowers. Flowers add scent to tea; leaves are astringent, stimulant and tonic, also used in toothache, dropsy, diarrhoea and dysentery. Leaf paste is also used as an antidote to snake bite. Both stem and root barks are astringent. Wood is used for walking sticks and engraving works. An essential oil, used in perfumery, is obtained from the flowers. Fruits are wild edible. Bark is used in cosmetics industry, hence the plant often called as ‘Cosmetic Bark Tree’.**Notes (if any):** A myth exists that snakes are attracted by the strong aroma of Kamini flowers.



Plate 39. *Murraya paniculata* (L.) Jack: **A.** Habit; **B.** Flowering twig

Dimocarpus longan Lour.**SAPINDACEAE****Common name** (Eng.): Longan, Dragon's Eyes, Longan eyeball tree**Vernacular name:** Beng. আঁশফল ; Hind. नागालीची**Diagnostic features:** Large evergreen buttressed trees, to c. 30m high, with symmetrical round crown, branches typically drooping. Bark rough, corky. Leaves compound, usually imparipinnate, sometimes paripinnate, alternate, spiral, clustered at twig ends; leaflets 6 – 9 [airs, narrow elliptic oblong, dark glossy green upsode. Flowers in axillary or terminal brown tomentose panicle or raceme, polygamous, staminate, pistillate and hermaphrodite, yellowish-white, small. Fruits schizocarp, of 1 – 2 cocci, hanging in drooping clusters, globose, with rough light brown peel; flesh whitish. Seeds solitary, covered by fleshy aril (Plate 40).**Flowering & Fruiting:** May – July.**Distribution:** The longan is believed to originate from the mountain range between Myanmar and Southern China. As per another reports, it is native to E. Himalayas to S. China and N.W. Peninsular Malaysia; India: Western Ghats**Uses:** Fruit is sweet, juicy and edible, apart from being eaten raw like other fruits, longan fruit is also often used in Asian soups, snacks, desserts and sometimes preserved and canned in syrup; however seeds and peels are not recommended for consuming. Longan may be used in traditional system of medicine as antioxidants, immunity booster, digestive, antiinflammatory, antianxiety.**Notes (if any):** This fruit is similar to ‘litchi’ and is being referred as ‘little brother of lychee’.



Plate 40. *Dimocarpus longan* Lour.: A. Habit; B. Flowering twig

Ravenala madagascariensis Sonn.

STRELITZIACEAE

Common name (Eng.): Traveller's tree

Vernacular name: Beng. পাহুপাদপ

Diagnostic features: Tree, medium to tall, c. 10m high. Bark brown. Stem long, nodes prominent. Leaves large, oblong, banana-like, arranged on two opposite sides forming a fan shape, parallel veined; petioles long. Inflorescence spadix. Flowers many, held in erect boat-shaped bracts, showy (Plate 41).

Flowering & Fruiting: September – May.

Distribution: Native to North & East Madagascar. Cultivated in India.

Uses: Planted as avenue tree. Also used as animal food.

Notes (if any): The tree has been given the name "traveller's palm" because the sheaths of the stems hold rainwater, which supposedly could be used as an emergency drinking supply for needy travellers. In wild quench the thirst of animals and travellers as the sheaths of the stem holds rain water.



Plate 41. *Ravenala madagascariensis* Sonn.: A. Habit

B) GYMNOSPERM

Araucaria heterophylla (Salisb.) Franco

ARAUCARIACEAE

Common name (Eng.): Norfolk Island Pine, Star Pine, Living Christmas tree

Diagnostic features: A conical, dioecious or monoecious tree, to 70 m high, with straight vertical trunk; bark slightly flaky, with circular scar, greyish brown. Branches arise horizontally from erect trunk, sometimes pendant; branchlets in whorl of 4 – 7, more open. Foliage dimorphic; young leaves awl shaped, soft, mature ones needle like, pointed, incurved, densely arranged, bright dark green. Cones globose; male cone borne in cluster, elongated, yellowish-brown; female cone broader. Seeds nut like, winged, edible (Plate 42).

Flowering & Fruiting: Not recorded

Distribution: Endemic to Norfolk Island, Australia. Cultivated in India.

Uses: Young plants are often grown as indoor plants and sometimes used as ‘Christmas tree’. It is a good ornamental plant and planted as avenue tree. Light pink gummy resin, oozes from the cut end of bark, may be effectively applied in toxoplasmosis.

Notes (if any): The plant has gained the Royal Horticultural Society’s Award of Garden Merit.

Conservation status: IUCN has reported that this plant is facing high risk of extinction at the wild due to limited and severely fragmented distribution coupled with ongoing decline of habitat. Vulnerable (IUCN 3.1)



Plate 42. *Araucaria heterophylla* (Salisb.) Franco: **A.** Habit; **B.** Leafy branch; **C.** Gummy resin exude from stem

Cycas beddomei Dyer**CYCADACEAE****Common name** (Eng.): Beddome's cycas, Cicas di Beddome**Vernacular name:** Tel. Perita

Diagnostic features: Small dioecious trees; bark exfoliating in rectangular scales. Leaves up to 1 m long; rachis quadrangular; petiole up to 15 cm long with minute spines on upper portion, base clothed with tufted tomentum; leaflets narrow, linear, margins revolute, apex pointed. Male cone oblong-ovoid, microsporophyll oblong, deltoid, tapering, acuminate at apex, lower erect, upper strongly recurved. Megasporophylls ovate-lanceolate; ovules usually 2 – 4. Seeds globose (Plate 43).

Flowering & Fruiting: April – June.**Distribution:** Global endemic to Tirumala hills (Cudappah), AndhraPradesh

Uses: Seeds edible. The seeds are processed and eaten in mixture with 'Ragi' cereal. Crude flour made out of the endosperm of the seeds of this plant is used as one of the ingredients in the preparation of Sweets and Dhosa. The male cones are pruned away by local tribals for its professed medicinal properties and are used as a major ingredient in rejuvenating tonics. The male cones of this plant are also considered to possess the narcotic properties like that of *C. circinalis*. Further, this plant is horticulturally valued due to the palm-like appearance. The male cones of this plant are used by local herbalists as a cure for rheumatoid and muscle pains. The seeds are ground to a paste with coconut oil and are used as a poultice to treat skin complaints such as wounds, sores and boils.

Notes (if any): Listed in Appendix II on 4.2.1977, included in Appendix I *w.e.f.* 22.10.1987. Also included in 'Schedule VI' of the Wild Life (Protection) Act 1972 of India.



Plate 43. *Cycas beddomei* Dyer: A. Habit

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