

Field Guide to Trees



Compiled by:

Aparna G. Agnihotri, Roopali Raghavan and Dr. Sudha Premnath.

Kaigal Environment Education Programme (KEEP),

Krishnamurthy Foundation India (KFI), Baireddipalli Post, Totakanama, Kaigal

517415.

Introduction

This is a compilation of information collected about plant species that occur in the reserve forests lying on the fringes of the Kaundinya Wildlife Sanctuary in the Palamner range of the Eastern Ghats. This data has been acquired from different sources and serves to act as a vegetation guide to trees, shrubs and herbs for those involved in ecological field studies.

In this guide we have provided the scientific names of species as the primary reference, synonyms have also been provided as far as possible. The information of each of these species provides details of the family, habit, habitat and some salient features. Local names (predominantly Telugu) have also been included.

On the left hand corner of the title for each species is provided an index number. This is constituted of the first four alphabets of the family name followed by exclusive numbers for different species and a code for the habit of the plant (T for tree, S for shrubs and H for herbs), e.g.: Anac 1 T, is a plant belonging to family Anacardiaceae, numbered 1, which is a tree. This index number is consistent across the field guides, the herbarium and the seed collection in the germplasm bank in Kaigal hence can be used to refer to any of these with ease.

Photo Credits: The photographs featured in the Field Guide have been taken by Aparna G.Agnihotri, Roopali Raghavan, Soumya Prasad, Sreshta Premnath, Santosh Kumar and Sudha Premnath.

Sketches: The sketches were done by Arjun Shankar.

ACKNOWLEDGEMENTS

We would like to thank the Krishnamurti Foundation India for giving us this opportunity to conduct this study at Kaigal.

We would like to thank the United Nations Development Programme who funded this project under the UNDP – GEF SGP.

This study was successfully completed only due to the help provided by the local tribal communities in the field. The villages we interacted with were Mugilurevu, Kaligutta and Namalavanka. The members of these villages were kind to share their immense knowledge of the forests with us.

We are very thankful to Dr. Ravikumar and his team at the Foundation of Revitalisation of Local Health Traditions and Practices (FRLHT), Bangalore, for their patient identification of our innumerable plant samples. Dr Balakrishna Gowda and his lab especially Mr. Srinivasulu and Dr. Haleshi at the University of Agricultural Sciences, GKVK, Bangalore, were also of great help in aiding collection of information and in identifying specimens. Mr. Suresh and Dr. Harish at the centre for Ecological Sciences, Indian Institute of Science, Bangalore, also helped in the initial identification of plant samples collected from field. We would like to thank Fr. Ambrose Pinto sj., Dr. F. Charles Suresh, Dr Haridasan and Dr. Koppikar all of St. Josephs College, Bangalore, for providing access to the information required for this compilation.

We are thankful Dr. Satish Inamdar for giving us the opportunity to conduct this study. We would like to thank ‘The Valley School’ for the administrative and infrastructural support provided through the course of this work, especially Mr. Jayaram whose expertise around the computer room was invaluable. Mr. C. Premnath was ever willing to help us in all aspects both in field as well as back in Bangalore. THANK YOU!

This report was prepared under the project titled ‘*In-situ conservation of indigenous and rare species of plants to support the livelihood of communities in the fringes of Kaundinya Wildlife Sanctuary, Palamner, Andhra Pradesh*’ funded by the UNDP-GEF/CCF Small Grants Programme - India.

CONTENTS

Family: Anacardiaceae

Anac 1 T	<i>Buchanania axillaris</i>	10
Anac 2 T	<i>Buchanania lanzan</i>	10

Family: Annonaceae

Anon 1 T	<i>Annona squamosa</i>	11
Anon 2 T	<i>Polyalthia cerasoides</i>	12

Family: Apocynaceae

Apoc 1 T	<i>Carissa carandas</i>	13
Apoc 2 T	<i>Wrightia tinctoria</i>	13

Family: Bignonaceae

Bign 1 T	<i>Dolichandrone artovirens</i>	14
Bign 2 T	<i>Stereospermum chelonoides</i> (Syn: <i>S. tetragonum</i> <i>S.personatum</i>)	

Family: Bombacaceae

Bomb 1 T	<i>Bombax ceiba</i> (Syn. <i>B.malabaricum</i>)	15
----------	--	----

Family: Boraginaceae

Bora 2T	<i>Cordia monica</i>	16
Bora 3 T	<i>Ehretia laevis</i>	16

Family: Burseraceae

Burs 1 T	<i>Boswellia serrata</i>	17
Burs 2 T	<i>Commiphora caudata</i>	

10

Family: Celastraceae

Cela 2 T	<i>Maytenus emarginatus</i>	19
----------	-----------------------------	----

Family: Cochlospermaceae

Coch 1 T	<i>Cochlospermum religiosum</i>	19
----------	---------------------------------	----

Family: Combretaceae

Comb 0 T	<i>Anogeisus latifolia</i>	20
Comb 2 T	<i>Terminalia arjuna</i> (Syn. <i>T.glabra</i>)	21
Comb 3 T	<i>Terminalia chebula</i>	22

Family Dipterocarpaceae

Dipt 1 T	<i>Shorea tumbuggaia</i>	23
----------	--------------------------	----

Family: Ebenaceae

Eben 1 T	<i>Diospyros embryopteris</i> (Syn. <i>D. peregrina</i>)	23
Eben 2 T	<i>Diospyros ferrea</i>	24
Eben 3 T	<i>Diospyros melanoxyton</i>	25
Eben 4 T	<i>Diospyros microcarpa</i>	25
Eben 5 T	<i>Diospyros montana</i>	26
Eben 6 T	<i>Diospyros sepieria</i>	26
Eben 7 T	<i>Diospyros spp.</i>	26
Eben 8 T	<i>Diospyros spp.</i>	26

Family: Euphorbiaceae

Euph 3 T	<i>Celeistanthus collinus</i>	27
Euph 7 T	<i>Givotia mollucana</i>	27

Family: Flacourtiaceae

Flac 1 T	<i>Flacourtia indica</i> (Syn. <i>Gmelina indica</i>)	28
----------	--	----

Family: Hernandiaceae

Hern 1 T	<i>Gyrocarpus americanus</i>	28
----------	------------------------------	----

Family: Leguminoseae

Legu 3 T	<i>Acacia prainiana</i>	29
Legu 4 T	<i>Acacia suma</i>	29
Legu 5 T	<i>Acacia sundra</i>	29
Legu 6 T	<i>Acacia spp.</i>	30
Legu 7 T	<i>Acacia spp.</i>	31
Legu 8 T	<i>Acacia spp.</i>	31
Legu 9 T	<i>Albizzia amara</i>	31
Legu 10 T	<i>Albizzia lebbek</i>	32
Legu 10 b T	<i>Bauhinia racemosa</i>	34
Legu 11 T	<i>Bauhinia retusa</i>	34

Family: Leguminoseae ...cont.

Legu 12 T	<i>Butea monosperma</i>	35
Legu 16 T	<i>Cassia fistula</i>	36
Legu 20 T	<i>Dalbergia latifolia</i>	37
Legu 21 T	<i>Dalbergia paniculata</i>	39
Legu 22T	<i>Delonix elata</i>	39
Legu 25 T	<i>Dichrostachys cinerea</i> (Syn.: <i>Cailliea cinerea</i>)	40
Legu 26 T	<i>Erythrina indica</i> (Syn. <i>E.variegata</i>)	40
Legu 27 T	<i>Pongamia glabra</i> (Syn. <i>P.pinnata</i>)	41
Legu 28 T	<i>Pterocarpus marsupium</i>	42
Legu 28 b T	<i>Pterocarpus santalinus</i>	43
Legu 31 T	<i>Tamarindus indica</i>	44

Family: Linaceae

Lina 1 T	<i>Erythroxylon monogynum</i> (Syn: <i>E.indicum</i> , <i>Sethia indica</i>)	46
----------	---	----

Family: Loganiaceae

Loga 1 T	<i>Strychnos nux-vomica</i>	46
----------	-----------------------------	----

Family: Rubiaceae

Rubi 1 T	<i>Adina cordifolia</i>	60
Rubi 2 T	<i>Canthium dicoccum</i>	61
Rubi 4 T	<i>Ceriscoides turgida</i>	61
Rubi 6 T	<i>Gardenia gummifera</i>	61
Rubi 7 T	<i>Gardenia latifolia</i>	62
Rubi 9 T	<i>Mitragyna parviflora</i>	62
Rubi 10 T	<i>Morinda pubescence</i>	63
Rubi 11 T	<i>Morinda tinctoria</i>	63

Family: Rutaceae

Ruta 1T	<i>Aegle marmelos</i>	63
Ruta 2 T	<i>Chloroxylon swietenia</i>	65
Ruta 3 T	<i>Citrus spp.</i>	65
Ruta 4 T	<i>Feronia elephantum</i> (Syn. <i>F.limonia</i> , <i>Limonia acidissima</i>)	65

Family: Santalaceae

Sant 1 T	<i>Santalum album</i>	66
----------	-----------------------	----

Family: Sapindaceae

Sapi 4 T	<i>Lepisanthes tetraphylla</i> (Syn. <i>Hemigyrosa canescens</i>)	67
Sapi 5 T	<i>Sapindus emarginatus</i>	68

Family: Sapotaceae

Sapo 1 T	<i>Madhuca latifolia</i>	69
Sapo 2 T	<i>Manilkara roxburghiana</i>	69

Family: Sterculiaceae

Ster 1 T	<i>Sterculia urens</i>	70
----------	------------------------	----

Family: Tiliaceae

Tili 3T	<i>Grewia spp.</i>	70
---------	--------------------	----

Family: Ulmaceae

Ulma 1 T *Holoptelia integrifolia* **71**

Family: Verbenaceae

Verb2 T *Premna tomentosa* **71**

Verb 3 T *Vitex altissima* **72**

Verb 7 T *Vitex spp.* **72**

Family: Anacardiaceae

Anac 1 T

Buchanania axillaris

Telugu: Sara

A medium sized tree having small round fruit very similar to *B. lanzan*. The seeds are edible and sold in the local market.

Family: Anacardiaceae

Anac 2 T

Buchanania lanzan (Syn: Buchanania latifolia)

Telugu: Sara

A sub-deciduous tree attaining a height of 12 to 15 m. The tree is identified by its dark grey crocodile bark and red blaze.

Leaf: The leaves are hard, having 15-20 pairs of nerves, which are stout and nearly straight. Petiole is 6 - 88 mm in length, stout and pubescent.



Flower: The flowers are sessile and greenish white in colour. Pyramidal panicles of flowers appear between December and March.

Fruit: The fruit is a drupe, sub-globose, slightly compressed, and black. The stone is hard and 2 valved. Fruits ripen from April to May and remain on the tree for quite a long time.

Distribution: This tree is widely distributed in deciduous forests of the Western peninsula, also from Sutlej eastward along the Himalayan forest hills and southwards through Central India.

Uses: The roots, leaves and fruits are used for medicinal purposes. The roots are reported to be acrid, astringent, cooling depurative and constipating and used in treating leprosy, skin diseases and diarrhoea.

The leaves are reported to be cooling, digestive, expectorant, purgative, depurative and aphrodisiac and are used in hyperdipsia, burning sensation, cough, bronchitis, dyspepsia, flatulence, constipation, leprosy, skin diseases and seminal weakness.

The fruits are reported to be useful in treating leprosy, skin diseases, gleet, inflammations, nervous debility, burning sensation, cardiac debility, abdominal disorders, constipation, cough, asthma, seminal weakness, fever, emaciation, ulcers, general debility and as a laxative.

Nursery notes: The tree is found mostly on eroded ravine lands, and occurs locally in clayey soils. It avoids waterlogged areas. As a moderate light demander, it prefers partial shade. It is very sensitive to frost.

It is found to regenerate naturally and can also be propagated using seeds as well as vegetative means.

Natural regeneration: Seeds freely regenerate under favourable conditions, provided they are quickly covered. The fruits fall immediately before or at the commencement of the rains. If they are quickly covered with earth or debris by the rain or are protected by grass or other low cover, germination soon commences and the seedlings have a chance of establishing themselves by developing slowly. Radicles may dry up or may be damaged by insects. It has poor coppicing capacity and produces root suckers sparingly. Part of natural regeneration is from root suckers on hilly ground where roots are liable to be exposed.

Seed propagation: Seeds are collected in April-May by mechanically depulping the fruit and extracting the seeds. Fresh seeds are not exposed to the sun; they are dried in the shade for a day. Seed viability is found to be variable, usually up to one year when stored properly. Seeds have a hard and stony seed coat; hence the following seed pre-treatment options are considered necessary:

1. Soaking in cold/tepid water for 4-6 days.
2. Immersion in hot water (80 – 100°C) and then allowing it to cool followed by soaking for 24 hours.
3. Mechanical disruption of seed coat.
4. Soaking in concentrated sulphuric acid.
5. 5. Soaking in Gibberlic Acid (GA3), 5ppm for 24 hours.

Seeds should be sown directly for better success than transplanting from nursery beds. Seeds can be sown in seed pans of trays or in polythene bags in June and a layer of hay spread over bags. Germination of seeds is completed in 15 – 25 days with 60-70% seeds germinating. About 80-85% seedlings survive. Development of the seedling is slow.

Vegetative propagation: Through cuttings. Hardwood cuttings of (1 x 15) cm with two nodes are used.

Threat Status: Data collected from Southern India show that this species falls under the IUCN “Lower Risk – least concern” category.

Family: Annonaceae

Anon 1 T

Annona squamosa

Common name: Custard apple
Telugu: Seethaphalamu

A slow, straggling, glabrous tree growing up to a height of about 3 m.

Leaf: Alternate, oblong, lanceolate, 5 – 15 cm long, smooth above and downy beneath. Pubescent when young, dotted with glands, giving a peculiar smell when crushed.

Flower: Greenish, single or in pairs, drooping, short stalked and pubescent. Sepals are narrow, oblong, pubescent, thick and fleshy.



Fruit: An etario of follicles. It is green, fleshy and irregularly globose, about 5 – 10 cm in diameter. There are numerous, oblong, shining, brown – black seeds that are embedded in a white, sweet, edible pulp.

Distribution: Native of tropical. S. America and West Indies, but has become naturalised in this country through extensive cultivation for the sake of its edible fruit. It has run wild, particularly near old inhabited

sites in several parts of central and western India and in the Deccan peninsula.

Uses: Fruits are edible and have medicinal properties.

Leaves, bark, seeds and root also have medicinal value. Leaves have insecticidal properties. The bark, leaves, unripe fruits and seeds contain the alkaloid Anonaine. Unripe fruit is an astringent. Root is a purgative.

Family: Annonaceae

Anon 2 T

Polyalthia cerasoides

Telugu: Gutthi

It is an evergreen, moderate sized tree, growing to about 3 m height, which usually branches low down. The tree is fairly straight but the bole is rarely cylindrical.



Leaf: Oblong, 7.5 – 18 cms long, lanceolate, membranous, smooth above and the base is more or less rounded. Petiole is long and stout.

Flower: Axillary, fragrant and dull green in colour. There are 6 petals (0.5 – 0.8 cm long), in two or three whorls.

Fruit: Fruits are about 1.0 cm long red resembling small cherries, ovoid on stalks 1.3 – 1.8 cm long.

Distribution: It is found distributed throughout the country.

Uses: Fruit is sweet and edible.

Family: Apocynaceae

Apoc 1 T

Carissa carandas

Telugu: Kalimbi, Vaka Kalimi
Kannada: Kavalae kai, Kaare kai
Tamil: Kalakai



The plant is a thorny, dense shrub or small tree. It is often branched above. Branches have stout straight twin thorns.

Leaf: Leaves are simple, smooth and shiny. Milky latex present.

Flower: Flowers are white, slightly fragrant in flat-topped clusters; they flower between January – April.

Fruit: Fruits are purplish-black berries. They are sticky, sweet and edible. Raw fruits are sour.

Distribution: Very common throughout dry, sandy and loamy soils in plains and low hills.

Uses: Fruits are processed into pickles and jams.

Family: Apocynaceae

Apoc 2 T

Wrightia tinctoria

Telugu: Veppeli



A small deciduous tree growing to a height of 7 m. Trunk and branches irregularly shaped. Bark smooth and scaly. Wood is white and even grained.

Leaf: Smooth beneath, variable in shape, elliptic, ovate or oblong, leaf tip acuminate.

Flower: White, fragrant, in loose terminal clusters. Petals with a fringe, almost like double petals. Flowers bloom between March and May. Bracts are deciduous, pink or lilac in colour.

Fruit: Fruit is a pair of drooping, green, cylindrical, narrow follicles, 25 – 50 cm long. Follicles are smooth and distinct. They are joined at the tips and with the seeds at the base

Some varieties from the Godavari region have follicles growing up to 18 m length.

Distribution: Found in the deciduous forests, especially in peninsular India.

Uses: A paste of the bark is used for treating open wounds. The leaves give a blue dye. Wood useful for carving and making toys.

Family: Bignoniaceae

Bign 1 T

Dolichandrone artovirens
(Syn: *D.crispa*)

Telugu: Vaddi

A moderate sized tree with pretty white flowers. Bark is brown and rough.

Leaf: Leaves are opposite, pinnate; the leaflets are entire or obscurely toothed; they occur in 5 - 7 pairs, they are ovate and have an acuminate apex.

Flower: Flowers occur in few numbers, they are large, white occurring in terminal panicles. These flowers bloom at night.

Fruit: Fruits are long compressed capsules. Have seeds that are much compressed and almost rectangular in shape.

Distribution: Occurs in the dry deciduous forests throughout the country.

Family: Bignoniaceae

Bign 2 T

Stereospermum chelonoides
(Syn: *S. tetragonum S.personatum*)

Telugu: Vaddi

A large tree with a brown bark and the wood is hard, greyish - brown with dark patches.

Leaf: Leaves are compound, quite glabrous; the leaflets are elliptic, acuminate at the apex.

Flower: The tree bears yellow, bell-shaped flowers with red veins that occur in terminal panicles.

Fruit: Fruits are capsules growing up to 2 ft. in length. They are slender and somewhat spirally twisted.

Distribution: Occurs in scrub forests of Deccan Peninsula and in the moist forests of the Western Ghats. Chiefly found in deciduous forests up to about 3000 ft.

Uses: The leaves are lopped for fodder. Wood is reported to yield excellent charcoal.

Family: Bombacaceae

Bomb 1 T

Bombax ceiba

(Syn. *B. malabaricum*)

Common name: Silk cotton

Telugu: Adavi mullu booraga



Lofty deciduous tree armed with prickles. The branches are arranged in a whorled manner.

Leaf: The leaves are entire large, glabrous and palmately compound. They have 5 -7 leaflets.

Flower: The flowers are large, red in colour and silky.

Fruit: The fruit is a capsule. It is ellipsoid in shape. It contains numerous seeds, which are covered by dense floss.

Distribution: In India it occurs in the tropical and subtropical regions up to and altitude of 1500m.

Uses: The roots are reported to be used in cases of dysentery, influenza, burning sensation, haemorrhoids and blood impurities.

The bark is used for healing wounds. A paste of the bark is reported to be used against skin eruptions. The bark exudes a gum known as Mocharus, which is credited with astringent, tonic and demulcent properties and is used for dysentery and influenza. A paste made of the prickle is reported to be good for restoring skin colour especially on the face.

Flowers are used for skin troubles.

Young fruits are supposed to be used to treat chronic inflammations and ulceration of bladder and kidney.

The seeds are used to treat gonorrhoea and chronic cystitis.

The softwood is used in the match industry and the silk cotton is used for stuffing mattresses and pillows.

Nursery notes: Deep sandy loam soil derived from granite and alluvial soils having a considerable portion of sand and good moisture supply is conducive for the growth of this species.

Propagation:

It can be propagated both by seed as well as vegetative means.

Seed propagation:

Ripe capsules are collected between March and May before they open. They are dried in the sun. When the pods open the seeds with the cotton are collected. Seeds are separated from the floss by putting them in gunny bags and thrashing with a stick. Seeds remain viable for about 1 -2 years. Fresh seeds do not require pre-treatment. Seeds are sown in May directly on raised beds, 15 cm apart and covered with soil. Germination varied from 14 – 70 % within 30 – 35 days.

Vegetative propagation:

Air Layering. Air layered branches are treated with Seradix B3. Successful rooting was observed when layered in March.

When seedlings are 5 cm high they are transplanted into polybags. 1 -2 year old seedlings are planted in the field in July – August in pits having 30 cm sides.

Family: Boraginaceae

Bora 2T

Cordia monica

Telugu: Nunna gerigi

A small tree that bears white flowers and yellow fruits.

Leaf: Leaves are ovate; apex is obtuse or acute. They are often sub opposite; the upper surface of the leaf is rough with prominent whitish points, lower surface is tomentose or glabrous. Leaf size up to 4 inches long.

Flower: Flowers are white in colour, small occurring in short peduncled close clusters the calyx tube is cylindrical.

Fruits: Fruit is a yellow coloured drupe. It is ovoid in shape and has an acute tip. It measures up to 0.5 inches long.

Distribution: Occurs in the Deccan Peninsula and Southern India, chiefly in hilly regions.

Family: Boraginaceae

Bora 3 T

Ehretia laevis

Telugu: Moogi

Small medium sized tree, with a spreading crown and an irregularly shaped trunk attaining a height of 12 - 15 m and a girth of 0.9 – 1.5 m under favourable conditions. In drier localities it is a small tree or a large shrub. The crushed leaves and freshly cut bark have a peculiar foetid smell resembling that of *Holoptelia integrifolia*. Another characteristic feature of the tree is the exfoliating outer bark. The bark is pale, yellowish – brown or ashy white in colour and smooth with small raised lenticels.

Leaf: Smooth, bright glossy green when mature, 7.5 – 18 cm long. Margin is entire thin membranous. Petiole 1-2.5 cm. long

Flower: White, faintly scented, sessile or shortly pedicelled, in axillary and terminal dichotomously branched cymes. 5 – 10 cm across, appearing before or with young leaves.

Fruit: Globose, somewhat 2 – 4 lobed, orange when ripe.

Distribution: It is common in deciduous and monsoon forests almost throughout India and in S. Andamans. It is also very common along the base of the Himalayas especially in damp and shady places.

Uses: Inner bark of tree and the insipid fruit are eaten in times of scarcity.

Leaves are used as cattle fodder.

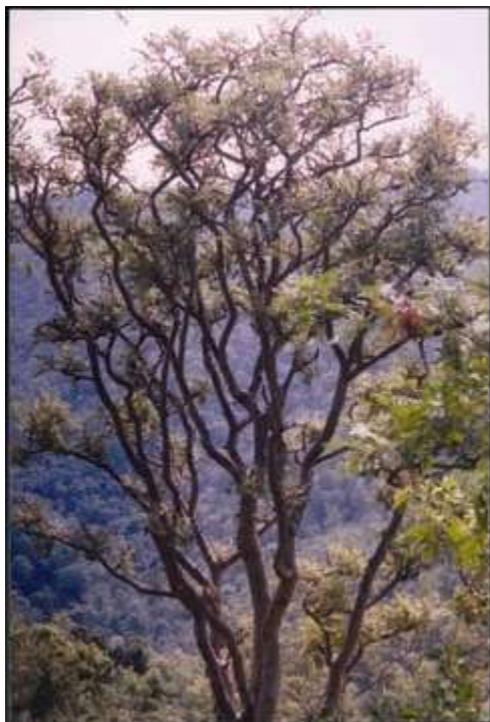
Bark is chewed like betel nut and colours teeth red.

Family: Burseraceae

Burs 1 T

Boswellia serrata

Telugu: Dhoopa



It is a moderate to large sized deciduous tree with a light spreading crown and somewhat drooping branches. The bark is very thin, grayish-green and papery. It is identified by its yellow papery bark that exfoliates regularly in the form of irregular flakes.

Leaf: The leaves are apically clustered, glabrous and have a rusty under surface.

Flower: The flowers are pale pink or white in colour.

Fruit: The fruits are pyrenes, one seeded which are winged along the margins. They are greenish yellow in colour and heart shaped.

Distribution: Within India the occurrence of this species is conspicuous in the dry hills in Central, Northwest and peninsular India. It is often found gregarious on the slopes and ridges of hills and attains large size on fertile soils.

Uses: The gum resin and bark are employed in drug formulations reported to be used in the treatment of ulcers, cystic breast, piles, skin diseases, diarrhoea and dysentery. The defatted gum exudate was found to poses marked anti-arthritis activity. It is reported to be useful in fevers, convulsions, dysentery, bronchitis, asthma, cough, chronic laryngitis, jaundice and arthritis. The gum resin is used as incense also.

The flowers and seed are edible.

Oleo-gum resin consists of 3 principle constituents namely turpentinic liquid, rosin like resin and gum. Oil resembles turpentine oil and serves as an excellent substitute for turpentine. Resin resembles fine quality rosin and is useful in soap industry. Gum is used in calico printing.

Nursery notes: It is planted in shallow ferruginous soils. It grows up to an elevation of about 1150 m and is a strong light demander with a good drought resistance. The optimum rainfall ranges from 750 to 1500 mm. The absolute maximum shade temperature varies from 40 to 47.5°C and the absolute minimum temperature from 0 to 10 °C.

Propagation: It can be propagated by seeds as well as by vegetative means.

Seed Propagation: Ripe seed are collected off the trees in May. Seeds should be soaked in water and only those, which sink in water, should be selected for sowing. Seeds have poor viability. They can be stored for no longer than 6 months. Seeding time is between March and June. Seeds should be directly sown immediately after collection at the beginning of monsoon, following overnight treatment in mild hot water (for 24 hours). Seeds germinate over a period of 7 to 15 days. About 50 % seed germination is observed.



Vegetative propagation: This can be done through cuttings as well as root suckers.

- a. Through cuttings: The cuttings should be 7.5 to 10 cm in diameter and about 1.8 m long. The basal end should be given a slanting cut and the tip should be coated with white oil paint. Pits should be 45 – 60 cm deep. The cuttings should be buried and the earth should be well pressed around the cuttings. Planting should be done about 2 months before the rains around the latter half of April or first week of May. About 76% of the cuttings sprout and 70 – 80% establish.
- b. Through root suckers: Suckers are selected from trees of 45 – 60 cm girth. Suckers are planted in June- July. Sprout initiation is observed in about a fortnight to 30 days.

Transplanting and After Care: Planting season for 8 – 10 week old seedlings is between April and May. This crop can be raised by planting in suitable containers. These establish readily, provided they are protected against browsers. Polythene bag raised seedlings of 10-12 weeks can be planted out in the field. This species does not tolerate transplanting since the root system is very delicate. About 45% of the seedlings survive field planting.

Family: Burseraceae

Burs 2 T

Commiphora caudate
(Syn: *Protium caudatum*)

Telugu: Nethi maamadi

A deciduous tree with papery bark and the wood is soft and greyish in colour. Branches often spinescent.

Leaf: Leaves are alternate and imparipinnate with 2 – 5 pairs of leaflets. Leaflets are glabrous, ovate with an acute or acuminate apex.

Flower: Flowers are many, they occur in long-peduncles that are up to 5 inches long.

Fruit: Fruits are drupes ovoid in shape and fleshy.

Distribution: Found in dry forests of the Deccan Plateau.

Uses: Gum resin obtained from the bark and leaves, is used in medicine, as incense and for embalming.

Fruits are edible and are often pickled.

Family: Celastraceae

Cela 2 T

Maytenus emarginatus

Telugu: Thella uppili

Family: Cochlospermaceae

Coch 1 T

Cochlospermum religiosum



Common name: Yellow silk cotton

Telugu: Aduvi booraga

It is a small to medium sized, more or less deciduous, fast growing tree with an open crown. It grows to a height of about 6 m or more. The tree is soft wooded with a fluted bark, which is fibrous with deep diagonal cracks and furrows. The tree is always conspicuous either when leafless but covered with large brilliant yellow flowers, or in full foliage with its green glossy, digitately - lobed leaves, or when the large capsules are opening to release the cotton covered seeds. A deep orange coloured juice exudes from near the cambium.

Leaf: Leaves are alternate and 7.5 - 20 cm in diameter. They are arranged towards the end of the branches. They are palmate, 3 - 7 lobed (commonly 5 lobed), membranous, and smooth above when mature and softly white tomentose beneath. Petiole is 5 – 23 cm long and pubescent when young.

Flower: Flower is large, odourless, golden yellow, 7.5 – 13 cm across, appearing before the leaves. Petals 5, up to 5 cm long deeply notched and broadly obovate.

Fruit: Pendulous pear shaped capsules, abruptly narrow at the base. They are 5 celled, furrowed, leathery with numerous seeds that are long, brown, kidney shaped, pitted and wrinkled, densely covered with pale brown or white silky floss.

Distribution: Distributed fairly well throughout India. Grows naturally in dry regions and rocky soils.

Uses: The bark exudes a gum, which has commercial uses. Locally it is taken to cool the body in summer.

The silky floss is used to stuff cushions, pillows, and mattresses.

Family: Combretaceae

Comb 0 T

Anogeisus latifolia (Syn: Conocarpus latifolia)

Telugu: Yalama

A large deciduous tree, it is conspicuous by its smooth grey bark and by the leaves turning red before being shed. Wood is grey hard with small purplish heartwood

Leaf: Leaves are alternate, elliptical, with an obtuse apex, measuring up to 3 inches long, and 2-2.5 inches broad.

Flower: Flowers occur in cymes with a rather short calyx tube.

Fruit: Fruits are packed in dense heads and compressed. They are broadly winged; the wings are rounded entirely. They are 1 seeded.

Distribution: It is distributed in the dry deciduous forests of the Deccan plateau.

Uses: The wood is used for agricultural implements. It yields a gum known as the ‘Ghati – gum’. This gum is used for calico painting and is a good substitute for the *Acacia* gum in pharmacy. The gum is extensively used in the petroleum industry as a drilling mud conditioner and in explosive industry as preferential water absorbent or descant. Also used in ceramics and food.

The leaves are used in tanning. Wood is used for making wheels, in textiles mills and making railway sleepers. Also used in papermaking, rayon grade pulp, cupboards, bent wood articles and for getting charcoal and wood alcohol.

Comb 2 T

Family: Combretaceae
***Terminalia arjuna* (Syn. *T.glabra*)**

Telugu: Yerra Maddi



It is a handsome, deciduous, large-sized tree with a broad crown and shallow roots. Bark is grey or pinkish-green, smooth, thick and exfoliating. Inner bark is smooth and white exuding red resin, which turns black when exposed. Branches are spreading and drooping.

Leaf: The leaves are simple, large, opposite, glabrous and thick with glands at the base. The margin is minutely crenate – serrate.

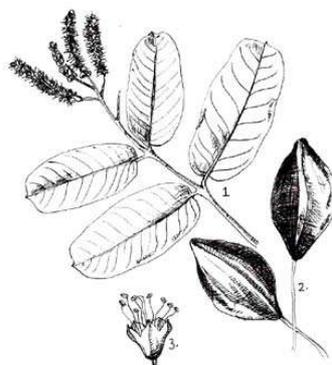
Flower: The flowers are bisexual, small, and white to creamy in colour, occurring in spikes, appearing in April – May.

Fruit: The fruits are long and dark brown to reddish brown in colour. They are woody, winged with 5-7 raised ribs, ripening from February to May. They have one seed. Trees start fruiting after 6 to 7 years and every third year is a good seed year.

Distribution: Within India it is found in the Sub-Himalayan tracts, Madhya Pradesh, Bihar and Peninsular India.

Uses: The bark is reported to be used in the treatment of heart diseases as a cardiac tonic, in bilious affections, for sores and as an antidote to poisons.

Fresh leaf juice is used against earache.



Nursery notes: Best growth is found on neutral, fertile soils, especially loose, moist alluvial loam with good water supply and drainage. It also grows in slight alkaline soils of pH up to 7.5. It requires a mean annual rainfall of 750 mm to 1750 mm. But in well-watered establishments, it will do well with 500 mm rainfall also. It is susceptible to drought and frost. It can be propagated both by seeds as well as vegetative means.

Seed propagation: Ripe fruits are collected off the trees or swept off from the ground beneath the tree in April - May. They are dried in the shade for a month and the ribs are removed by rubbing with hands. Seeds are viable for one year when stored in dry gunny bags, but germination is reduced by 10-20%. As pre-treatment the seeds are soaked in cold water for 48 hours before sowing. Sowing is done in polybags, 2 seeds per bag, at 2.5 cm depth. However, in nursery beds seeds are sown in lines at 30 cm apart about 5 cm spacing between the seeds. Best time for sowing is February – March. Germination is initiated in 7 days and lasts up to 60 days. About 65% seeds germinate. Direct seed sowing is not recommended in dry areas unless irrigation is feasible to facilitate better germination.

Vegetative propagation: Vegetative propagation is through stump cuttings. Stumps can be made from roots as well as shoots. 20 cm long stumps from roots and 5 cm long stumps from shoots are made from 15-month-old seedlings. Planting is first done in polybags in the nursery.

Transplanting and Aftercare: Both seedlings and stump cuttings are maintained in nursery for 3 to 4 months and planted in July. Seedlings are transplanted when they grow up to 40cm in height. Deep planting should be avoided.

Threat Status: The IUCN Red List Status of this species has been assessed as “Lower Risk- near threatened” for both Karnataka and Kerala and “Lower risk – least concern” for Tamil Nadu.

Family: Combretaceae

Comb 3 T

Terminalia chebula

Telugu: Karakkaya

A tall, profusely branched semi-deciduous tree. Bark thick, dark-brown, marked with numerous vertical cracks. Reaches up to 15 m. Branches have a tendency to droop.

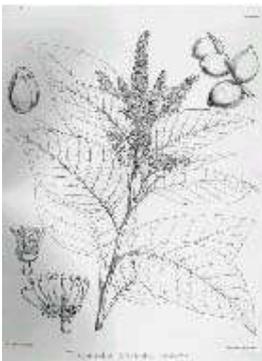


Leaf: Alternate or sub-opposite, elliptic to ovate in shape, usually pointed at the tip, and rounded at the base. Leaves shed in

February - March after turning red.

Flower: All flowers are bisexual, white to yellowish in terminal clusters, arranged in groups of 4-6 spikes flower between.

April - August.



Fruit: Small, not distinct, ellipsoid to obovate in shape, pendulous, and variable in size. It is 5 – ribbed.

Distribution: Common in forests all over the plains of India and up to 1500 m.

Uses: Fruits contain commercial tannins and are also useful in indigenous medicine. They are a component of the ayurvedic preparation ‘Triphala Churna’.

Family Dipterocarpaceae

Dipt 1 T

Shorea tumbergia
(Syn: *Vatica thumbergia*)



Hindi: Kala dammar
Telugu: Tamba jalory
Tamil: Tambagam
Malyalam: Tampakam

It is a large tall deciduous forest tree.

Bark is rough, longitudinally fissured and dark brown in colour. The bark exudes a white resin when cut freshly and it becomes brown on exposure.

Leaf: Leaves alternate, entire with large stipules

Flower: flowers are white and are known for their fragrance.

Fruit: fruit is an indehiscent nut with a leathery

pericarp Fruits are prominently winged

Distribution: The tree is endemic to drier parts of the southern Eastern Ghats. Found in Chittoor, Cuddapah and Nellore districts of Andhra Pradesh and North Arcot district of Tamilnadu. Due to the endemic nature and restricted distribution this species needs special conservation efforts.



Uses: The resin exuded by the bark is collected and marketed by the tribals. The oleoresin is used as an external stimulant.

Threat Status: Critically Endangered Globally. Categories (B1 & 2C) in the IUCN Red List.

Severely fragmented or known to exist at only a single location and is continuing to decline.

Family: Ebenaceae

Eben 1 T

Diospyros embryopteris
(Syn. *D. malabarica*, *D. peregrina*)

Telugu: Erra dimma /Nalla

It is a medium sized, ever-green tree, attaining up to 1.8 m in girth and 12 m in height with a trunk which is often much fluted and ribbed. The low spreading branches, which sometimes almost reach the ground, it forms a compact and rounded crown. It has so many branches that it often resembles a large shrub with a considerable girth.

Bark is dark grey, almost black, fairly smooth, with scattered small circular lenticels. Bark is thick, irregular with woody scales; blaze pink reddish or reddish brown. The juice from the bark turns purple on the blade of a knife.

Leaf: Leaves are oblong, with an acute or obtuse base, shiny and smooth on both surfaces, especially above where the dark green is relieved by the conspicuous paler mid rib. Petiole is 0.5 – 1.5 cm long, flattened above and often wrinkled or twisted.



Flower: Unisexual solitary, fragrant flowers that are white or cream coloured, with the male flowers smaller than the female flowers. Male and female flowers are found on separate plants; usually tetramerous, 1.0 cm long occurring in 2-7 flowered bunches.

Fruit: Yellowish globose fruits are supported on a persistent and much enlarged leathery calyx. Fruits are covered with a rusty scruf. Seeds are 4-8 in number embedded in a viscid and glutinous pulp.

Distribution: It is found throughout the greater part of India in swampy places and along streams, riverbanks and back waters. It is apparently absent in the eastern Sub-Himalayan tract, Assam, Gujrat and Punjab.

Uses: The fruit is used to fix fractures and tie plasters. The fruit is also used locally to catch fish.

Family: Ebenaceae

Eben 2 T

Diospyros ferrea

(Syn: *Ehretia ferrea* Maba *buxifolia*, *Ferreola buxifolia*)

Telugu: Ullingi



A small tree, it bears red fruits. The branchlets are glabrous. The bark is thin, grey to black in colour; wood is grey with dark streaks.

Leaf: Is alternate, entire, obovate and is rounded at the apex.

Flower: Minute, unisexual, cup shaped flowers, with male and female flowers occurring on different plants. They occur in dense axillary cymes.

Fruit: Fruits are fleshy, red in colour, globose in shape, and glabrous.

Distribution: Common near the coastal region also in the Deccan plateau. They normally occur in the dry evergreen forests of India.

Uses: Fruits are edible.

Family: Ebenaceae

Eben 3 T

Diospyros melanoxylon

(Syn: *D. tupru*, *D. dubia*, *D. wightiana*, and *D. exsculpta*)



English: Coramandel Ebony

Sanskrit: Dirghapatraka

Telugu: Tumuki

Kannada: Abanasi

Tamil: Tumbi Karai

Malayalam: Kari

This is a medium sized tree, which grows up to a height of 15 m with numerous branches forming a dense crown. The trunk is covered with dark brown or black bark, which peels in large rectangular pieces.

Leaf: Leaves are variable in size and have a leathery texture, shining base tapering to a wrinkled stalk.

Flower: Flowers are greenish and unisexual. Male occur in drooping clusters of 2-7 flowers; female occur single and are 2-3 cm. Flowers bloom between March – May.



Fruit: Fruits are brown to yellowish in colour, covered with rusty hair, roundish 4-6 cm in size, pulp sweetish, and edible.

Distribution: It is distributed throughout the Indian plains in deciduous forests.

Uses: Young leaves used for rolling *bidis*. Fruits are edible.

Family: Ebenaceae

Eben 4 T

Diospyros microcarpa

Telugu: Pedda Ullingi

Family: Ebenaceae

Eben 5 T

Diospyros montana

Telugu: Gota gota / Paaku / Yerragoda

A small or moderate sized, sometimes thorny; it is a deciduous tree with greenish flowers and reddish brown fruit. Bark is thin, grey or greyish black. Wood is grey, tinged with yellow or brown with darker patches, moderately hard.

Leaf: Leaves are ovate or elliptic in shape, 2-6 cm long, and 1-3 inches broad, obtuse at the apex, obtuse or sometimes nearly chordate at base, pubescent when young then smooth when older.

Fruit: Are reddish brown, globose, 1 – 1.5 inches in diameter.

Distribution: Occurs in deciduous forests in the north south western Andhra Pradesh, Deccan Peninsula and North western Tamil Nadu, Also occur on the Eastern slopes of the western Ghats at low levels. It is common, but nowhere very abundant.

Family: Ebenaceae

Eben 6 T

Diospyros sepieria

Telugu: Beera

Family: Ebenaceae

Eben 7 T

Diospyros spp.

Telugu:Nalla

Family: Ebenaceae

Eben 8 T

Diospyros spp.

Telugu: Paaku

Family: Euphorbiaceae

Euph 3 T

Celeistanthus collinus

(Syn: *Clutia collina*)

Telugu: Vadichili aaku

A small deciduous tree. The bark is dark brown and rough. The wood is dark reddish brown, hard and strong.

Leaf: Leaves are alternate, entire, elliptic-obovate in shape with a retuse apex. They measure up to 3.5 inches long and 1.5 inches broad.

Flower: Flowers are small unisexual with minute petals. Both male and female flowers are found in the same plant. They occur in axillary clusters.

Fruit: Fruit is a large, hard, woody capsule, dark brown in colour and shiny. The fruit measures up to 1 inch in diameter.

Distribution: Common in the dry forests of the Deccan Plateau.

Uses: Bark, leaves and green fruits are used in tanning.

The outer crust of the capsule is poisonous and is used to kill fish.

Writing and printing paper of satisfactory quality are reported to be made from this wood.

Family: Euphorbiaceae

Euph 7 T

Givotia mollucana

Telugu: Thella pollici



Family: Flacourtiaceae

Flac 1 T

Flacourtia indica

(Syn. *Gmelina indica*, *Flacourtia ramontchi*, *Flacourtia sepiaria*)

Telugu: Puli yelaka



The tree is very hardy. A much branched thorny shrub or small tree usually armed. The plant has spines at the base of the trunk.

Leaf: Leaves simple glabrous obovate-ovate apex is acute

Flower: Flowers are unisexual, rarely bisexual; petals vary from 4-6 in number.

Fruit: Fruits are edible, dark purple to black and is similar in texture to a European plum

Distribution: It is cultivated in Assam, Maharashtra and Bengal.

Family: Hernandiaceae

Hern 1 T

Gyrocarpus americanus

Telugu: Tanuku

A tall tree with thick branches. Bark thin greyish white with a silvery texture.



Leaf: Leaves are alternate, large, and long petioled. Entire or lobed clustered towards the end of the branches.

Flower: Flowers small unisexual occur in large cymes. Some flowers may be bisexual. Largely unisexual Male flowers numerous, female flowers are few in number

Fruit: Fruits are drupe-like crowned with the long wing like persistent lobes. Fruits bear a single seed.

Distribution: This large deciduous tree occurs in the deciduous forest of Eastern Ghats and the Deccan peninsula. They also occur on the eastern slopes of the Western Ghats.

Uses: The wood is soft, grey. It is in considerable demand for making catamarans, also for boxes, trays and toys.

Family: Leguminosae

Sub-family: Mimosaceae

Legu 3 T

Acacia prainiana

Telugu: Merugu seege

Family: Leguminosae

Sub-family: Mimosaceae

Legu 4 T

Acacia suma

(Syn: Acacia polycantha, Mimosa suma)

Telugu: Teel bobili

A medium sized pretty tree with a white bark, white flowers and pubescent leaves having leaflets. Branches are white and pubescent. Wood is dark brown in colour, hard and heavy.

Leaf: Leaves are 12 cm long; they have stipular spines; a petiole gland is present near the middle between the upper 3 – 4 pairs of pinnae, pinnae 15 – 23 pairs, up to 5 cm long, leaflets are 50 – 60 pairs; they have an obtuse apex.

Flower: Flowers occur in an inflorescence which is a white pubescent peduncle. The corolla is white, it is slightly larger than the calyx.

Fruit: The fruit is a pod; it is indehiscent and has many seeds. It is grey in colour measuring up to 10 – 15 x 1.5 cm.

Distribution: It is found in the dry forests of the Deccan Plateau and it is occasional in the dry deciduous forests and thorn scrubs in the rest of the country.

Uses: The bark is used as a tan.

Family: Leguminosae

Sub-family: Mimosaceae

Legu 5 T

Acacia sundra

(Syn: Mimosa chundra, Acacia chundra)

Telugu: Sundra

Moderate sized thorny, deciduous trees growing to a height of 3 m. The branchlets are glabrous. The heart wood of this tree is reddish brown, hard and rough. Bark is rough and black, young branches are dark brown.

Leaf: Leaves are bipinnate and its petiole and rachis possess glands.

Flower: Flowers are creamy white in cylindrical bunches.

Fruit: Pods are compressed, 6 – 10 cm long and 1.5 – 2.5 cm broad. They turn dark brown when ripe. Each pod contains 4 – 6 seeds. The seeds when ripe are brownish. The pods start to ripen from January onwards.

Distribution: In India this plant is known to be widespread. Found in Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. It is found in the dry tropical forests and tropical thorn forest regions.

Uses: The heartwood and bark are used for medicinal purposes against irritation of throat, cough, diarrhoea, chronic ulceration, epistaxis and eruption on the skin, leprosy, leucoderma and wounds. It is also reported to be used in the treatment of anaemia, diabetes, inflammations and intermittent fever.

The wood is used for beams, posts and agricultural implements. The heartwood also yields “Red Cutch” dye and “Katha” resin.

Nursery notes: This plant is suitable for planting in sandy and gravely alluvium, black cotton soil and shallow stony soil. It can be propagated using seeds. The pods that ripen in January should be collected from the tree before they begin to dry because the dry pods are prone to insect attacks. These pods should then be dried in the sun and threshed to separate the seeds. The seeds should be cleaned by willowing and then stored. The seeds are highly sensitive to fire and can be damaged by it easily. Seeds can be stored under ambient temperature for up to 2 years. The average seed viability is for 6 months.

Propagation with seeds: The seeds should be soaked in water for 24 hours or can also be soaked in boiled water for 6 hours. Seeds should be sown in February – March in raised beds 15 cm apart from one another or in polybags. Weeding and watering should be done regularly. Germination commences in a week and lasts for 15 days. About 40 – 80% germination is observed.

In June-July, i.e. 4 months from sowing the seedlings can be transplanted such that there is only one seedling per bag. Seedlings of 5 cm height can be transplanted to polythene bags. These can then be planted in the field after 2 months. Planting is done in pits having sides of dimension 60 cm each pits adopting a spacing of 6 x 6 m.

Threat Status: It is said to be “Moderately Threatened”.

Family: Leguminosae

Sub-family: Mimosaceae

Legu 6 T

Acacia spp.

Telugu: Gobba seege

Legu 7 T

Family: Leguminosae

Sub-family: Mimosaceae

Acacia spp.

Telugu: Chinta seege

Legu 8 T

Family: Leguminosae

Sub-family: Mimosaceae

Acacia spp.

Telugu: Seemannari

Legu 9 T

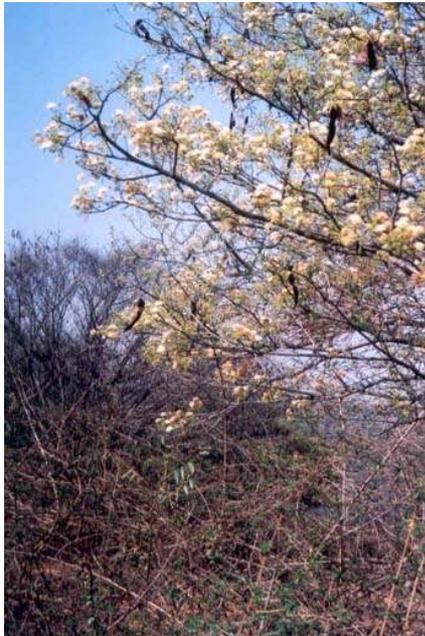
Family: Leguminosae

Sub-family: Mimosaceae

Albizzia amara

(Syn: A.wightii, Mimosa amara)

Telugu: Chigare



It is a small or moderate sized, much branched, deciduous tree with dark green bark. It reaches up to 9 m in height and 60-90 cm in girth with a crooked bole of 2.4 – 3 m. Occasionally trees attaining girths of 1.5 – 1.8 m may be seen. Bark thin, smooth, dark greenish, scaly. Branchlets, young shoots, petioles and inflorescence clothed with yellowish-grey pubescence.

Leaf: Abruptly bipinnate, rachis 5 –10 cm long, with a small gland in the middle of the petiole and another between the uppermost pair of pinnae. Leaflets 10 – 30 pairs, 6 – 8 x 1.2 – 2.5 cm in size, sessile.

Flower: Yellow and fragrant, occurs in 12 – 20 flowered globose heads, 2.5 – 4 cm in diameter.

Fruit: The fruit is a pod 12 – 30 cm long and 2 - 3 cm broad, distinctly stalked, thin, flat, veined, greyish brown, margins raised, having 6 – 8 undulate seeds.

Distribution: It is a tree of the dry forest of the Indian peninsula from Maharashtra in the west to Andhra Pradesh in the east, extending southwards to dry places in the west coasts up to an altitude of 900 m. It is common in the dry mixed deciduous and thorn forests of the Deccan peninsula, and South India. It is one of the most characteristic trees of the dry regions of Tamil Nadu, Andhra Pradesh and Karnataka often growing on very poor soil.

Uses: The wood is used locally in houses and buildings for posts, rafters and beams. It is also used for bent parts of ploughs and other agricultural implements, axles of carts, petty constructional works and to a small extent for carving and turnery.



The leaves are some times employed for washing hair, for this purpose they are dried, finely powdered and used alone or in mixture with soap nut powder.

The leaves form good fodder and are readily eaten by cattle.

The so-called Juree Tea is said to consist of ordinary tea mixed with especially prepared leaves of *Albizia amara*.

Family: Leguminosae

Sub-family: Mimosaceae

Legu 10 T

Albizia lebbek

(Syn: *Acacia lebbeck*, *Mimosa lebbeck*)

Telugu: Baage

A moderate to large sized deciduous tree, usually with a straight bole and broad crown. The tree is recognised by its pods, which remain long on the tree. The bark is thick, dark or brownish grey with numerous short irregular cracks.

Leaf: Leaves are bipinnate with 6-8 rachis, leaflets occur in 6-7 pairs and are sessile.

Flower: The flowers are greenish white and very fragrant. Flowering is from May to August.



Fruit: The fruit is a pale, straw coloured, large pod. The seeds are ovate or oblong, pale brown, smooth and with a hard testa. The pods are known to ripen between December and February and remain on the tree long after that.

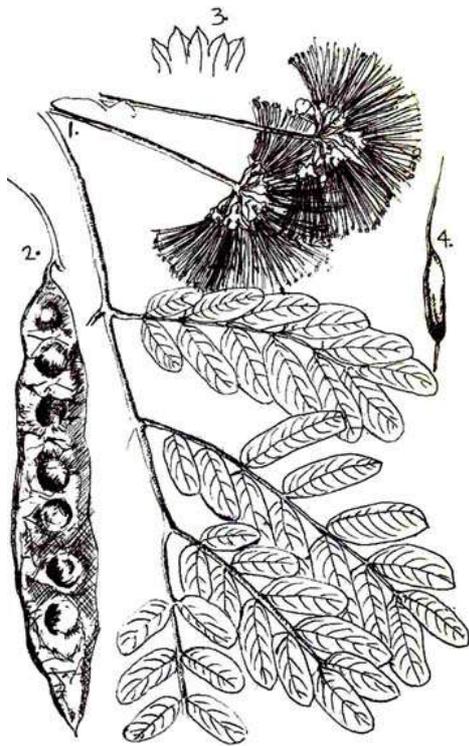
Distribution: It is distributed widely within India from the plains to 1500 m above sea level in the Himalayas. It occurs wild especially in moist and dry deciduous forests.

Uses: The wood of this tree is excellent for high quality furniture and internal decoration. It is also used for agriculture implements and construction purposes. The tree also yields a gum used as an adulterant of Gum Arabic.

The leaves, flower and fruit find major medicinal uses. They are employed in drug formulations prescribed for oedema, night-blindness, respiratory disorders, and diarrhoea caused by worm infestation. Externally it is

reported to be used for skin diseases and to treat cough and asthma, skin eruptions, leprosy, leucoderma and all types of poisoning. It is also reported to be used as a dentrifice in odontopathy.

This tree is a useful choice for saline soil afforestation by virtue of its tolerance to salinity up to 10 -11 pH.



Nursery notes: This species prefers arid and semiarid regions. It can stand extremes of climate. i.e. long hot and dry summers as well as cold winters. The rainfall requirement ranges between 600 to 2500 mm but also survives when planted in very dry tracts with an annual rainfall of only 300 mm because of its drought hardy nature. It grows on a wide variety of soils, preferring well-drained loam. It grows well on laterite and on clay or black cotton soils and can even tolerate soils with high salt content. Deep loamy soils with good moisture supply supports good growth while stiff clay, gravelly soils restrict the growth. This species tolerates high temperatures (up to 49°C) and also frost (-5°C). However, the seedlings are sensitive to frost and are killed even by a light fire. This tree is a strong light demander. It can be propagated both by seeds as well as by vegetative means.

Seed propagation: Between January and March pods are collected from the tree, dried, thrashed and winnowed to get clean seeds. Best time for seed collection is February. Seeds should be stored in sealed containers with insecticidal protection. They can also be stored in paper packets. The seeds retain their viability for one year.

Several pre-treatment methods are recommended for uniform and high seed germination. Seeds can be scarified by immersing in sulphuric acid for 5 minutes or by soaking in water for 48 hours or for 24 hours in boiled water that is allowed to cool. Pre-treated seeds are sown in primary beds about 1cm deep in lines 15 cm apart, between February and July (preferably around March-April). Spacing of 2-3 cm within lines is to be maintained. Germination is initiated in 7 to 30 days and completed in about 60 days. 60 – 94% germination is reported. Care should be taken to avoid seedling mortality, which can be high due to drought, browsing and trampling. Sap-sucking insects affect the seedlings as well. After 2 to 3 months the seedlings are picked out into polybags. The seeds can also be sown directly into bags – about 2 per bag.

Vegetative propagation: Root and shoot cuttings made from 15 month old plants are used for vegetative propagation. About 80% establishment of cuttings has been observed.

Transplanting and Aftercare: Field planting of seedlings and cuttings is done in 30 x 30 x 30 cm pits during July. Establishment of plants varies from 40 – 75%. Weeding and protection from browsers are essential for the first two years by which time it attains sufficient growth beyond browsing level.

Family: Leguminosae

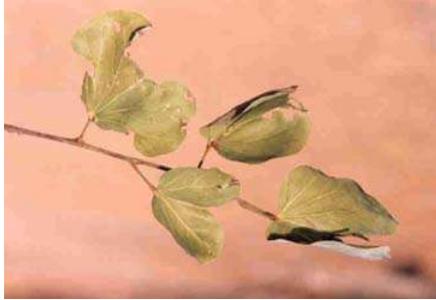
Sub family: Caesalpineaceae

Legu 10 b T

Bauhinia racemosa

(Syn: *Piliostigma racemosa*)

Telugu: Ari



Small deciduous rather crooked bushy tree growing up to 8 m in height. Bark rough nearly black wood brown.

Leaf: 4 x 5 cm in size lobed with a deep cleft

Flower Pale yellow many in lax racemes. Buds spindle shaped calyx spathaceous.

Fruit: Fruit is a pod, indehiscent, glabrous, thick, turgid and falcate. 6 – 12 inches long and 0.7 – 1 inch broad.

Distribution : Frequent in dry deciduous and semi-evergreen forests. Found up to an altitude of 4000 ft. above sea level.

Uses: Inner bark gives a good fibre used for rough ropes. Flower buds and fruits edible

Family: Leguminosae

Sub family: Caesalpineaceae

Legu 11 T

Bauhinia retusa

(Syn: *Lasiobema retusum*)

Telugu: Ari

A moderate sized deciduous tree. Bark dark brown wood red hard and of good quality.

Leaf: Broader than long, 9 – nerved, glabrous, deeply chordate at base.

Flower: Small, in terminal panicles, petals yellow with purple streaks and twice as long as sepals.

Fruits: Pod 5-6 inches long and 1.5 inch broad, flattened, glabrous, gradually widening to an obtuse tip.

Distribution: Found in the hills of North India and on the slopes of the Eastern Ghats. Rare in Deccan Peninsula.

Uses: It gives a clear gum like gum Arabic, which is used for sizing cloth and paper.

Family: Leguminosae
Sub Family: Papilionaceae

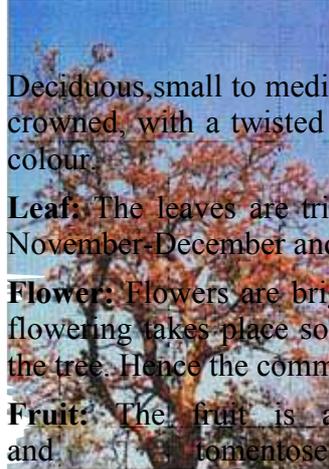
Legu 12 T

Butea monosperma

(Syn: *B. frondosa*, *Erythrina monosperma*, *Plaso monosperma*)

Common name: *Flame of the Forest*

Telugu: Moduga



Deciduous, small to medium sized tree with showy, flame coloured flowers. The tree is open crowned, with a twisted and gnarled trunk. The bark is fibrous and grey or light brown in colour.

Leaf: The leaves are trifoliate, rough textured and large. The tree sheds its leaves during November-December and new leaves appear in April.

Flower: Flowers are bright, flaming scarlet or orange in colour. The tree is leafless when flowering takes place so the flowers form a gorgeous canopy covering all the branches of the tree. Hence the common name for this tree “flame of the forest”.

Fruit: The fruit is a single seeded pod, which is flat, woody pendulous and strongly nerved and covered with silvery brownish.



single seeded pod, which is flat, woody pendulous and strongly nerved and white hair. Seeds are compressed and

Distribution: It occurs in the dry deciduous forests, open grasslands and scrub chiefly found in the dry India. It is more common in the plains and ascends to an elevation of 900 m in the outer Himalaya and up to 1500 m in Southern India.

in the dry deciduous forests, open forests of the tropical zone. In India it is deciduous forests of central and western in the plains and ascends to an elevation Himalaya and up to 1500 m in Southern

Uses: The seeds, bark, leaf, flower and gum from this plant all have medicinal value. Seeds and gum are considered useful in curing worm infestation and in the treatment of ringworm, boils and pimples.

The bark is reported to be used to treat dyspepsia, diarrhoea, dysentery, intestinal worms, bone fractures, rectal diseases, gonorrhoea, ulcers, tumours and diabetes.

The leaves are reported to be useful to treat pimples, boils, and flatulence, colic, worm infestation and inflammations.

Flowers are reported to be used to treat leprosy, skin diseases and bone fractures. These are considered to be very efficacious in birth control.

This tree is valued as a host for the lac insect.

Green leaves are used for making cups and dried leaves are used as beedi wrappers.

Flowers yield a brilliant, but very fugitive yellow colouring matter.

Wood pulp is suitable for newsprint manufacture. The wood lasts well underwater and is used for well curbs and water scoops.



Nursery notes: This tree is recommended for afforestation in waterlogged areas. It grows on a wide variety of soils including shallow gravelly sites, black cotton soils, clay loams and even on saline soils or water logged situations. Its temperature tolerance ranges from -4 to 49°C. It survives in areas with as little as 450 mm annual rainfall or as much as 4500 mm. It is drought resistant. It can be propagated both by seeds as well as vegetative means.

Seed propagation: The seeds ripen in May and are collected off the trees. The seeds require to be sown soon after collection, as they lose viability within 5-6 months. No pre-treatment is generally required. However pre-treatment of seeds with “cerasan wet” before sowing provides protection against fungal infection. In nursery a spacing of 15 x 15 cm is adopted. Seeds or even segments of pods containing the seed can be directly sown in lines or in polybags. Germination ranges from 75 – 100%. Normally the germination is completed in about 15 days.

Vegetative propagation: Vegetative propagation is through stump plantings. Stumps with about 4 cm of shoot and about 23 cm of root obtained from one-year-old seedlings, are very successful. Stumps are prepared at the outbreak of monsoon rains. These give high percentage of survival (80%) and satisfactory growth.

Transplanting and after care: Planting is carried out in July-August and an average of 52 – 80% establishment can be observed. Young seedlings suffer badly when shaded by competing weeds, as the species is a light demander.

Family: Leguminosae

Sub family: Caesalpineaceae

Legu 16 T

***Cassia fistula* (Syn. *C. rhombifolia*)**

Telugu: Rala

A medium-sized, open branched, hardy, deciduous tree reaching up to 10 m high. Bark smooth and ash coloured in young trees, rough and dark brown in old trees. Branches are slender and drooping.

Leaf: Compound, coarsely pinnate, large 20 – 40 cm long bearing 4-8 pairs of leaflets. Leaflets are smooth, bright green above and covered with silvery hair below. The fresh leaves are often of a rich copper colour with a soft downy under surface, and remain pendulous and folded until fully grown. The tree sheds its leaves and is completely leafless between February and March. New leaves appear between April and May.

Flower: Arranged in drooping racemes 30 – 45 cm long bearing bright yellow fragrant bunches of flowers. Flower during April – June. The tree is nearly leafless at the time of flowering, the first flowers appear as the last of the old leaves are shedding and flowers continue to remain till the new leaves develop.



Fruit: Straight, cylindrical pods, 30 – 100 cm long and about 2-3 cm in diameter. The pods are smooth and green and turn dark brown or black with age. They contain 4- 100 oval shining yellowish-brown seeds embedded in a dark sweetish pulp.

Distribution: Native to India, it is found commonly throughout the deciduous forests and plains of the county ascending to the foothills of the Himalayas up to an altitude of 1500 m.

Uses: Various parts of the tree are used in indigenous medicine. The wood is hard and used in making carts and agricultural implements.

The bark is used for tanning. The dark-brown sweetish pulp is laxative. It is also used in Bengal to flavour tobacco.

The Santhals in Bihar feed on the flowers. They are conspicuous due to their golden-yellow patches of flowers when the forest is almost leafless.

Nursery Notes: It is commonly propagated from seed. It is advisable to plant more seeds, even if only a few plants are required since germination is poor. Germination is hastened by boiling the seeds for five minutes before sowing to soften the hard seed coat. The seedlings are transferred to baskets in the first rains.

Caterpillars often defoliate these trees. It is advisable to keep a watch on young trees and remove the caterpillars when found.

It is a hardy xerophytic tree not eaten by goats or cattle. Hence it can be grown in places invaded by livestock. It is also suitable for dry districts.

The trees are slow in growth and attain good proportions only after about ten years. Under favourable conditions the young trees begin to flower after five years of planting.

Family: Leguminosae

Sub family: Papilionaceae

Legu 20 T

Dalbergia latifolia

Common name: Rose wood

A tall straight deciduous tree up to 20 m in height. The greyish bark is marked with short irregular cracks and peels off in thin longitudinal flakes.

Leaf: Alternate compound, divided in 5-7 roundish leaflets.

Flower: White, small in axillary clusters. Flowers from April to August.

Fruit: Flat, oblong, 1-4 seeded pods.

Distribution: Indigenous in south India, Madhya Pradesh and lower Himalayan ranges. Often cultivated as a shade tree because of its dense foliage.



Uses: Tannins from the bark are used to produce medicines for the treatment of diarrhoea, worms, indigestion, and leprosy. These tannins also produce an appetizer. Yields a very valuable hard timber suited for furniture and woodcarvings.

Nursery notes: The annual rainfall in its native habitat ranges from 750-5000 mm. As a seedling it is shade tolerant but sensitive to drought and fire. In maturity, it is tolerant of drought and ground fire, but susceptible to crown fire. It is classified as a moderate light demander. Establishment is restricted by frost. It survives maximum temperatures of 37°-50° C, minimum temperature of 15° - 0° C, and relative humidity of 40-100%. It occurs from the low plains to roughly 1500 m above mean sea level.

This species grows on a variety of soil formations including; gneiss, trap, laterite, alluvial, and boulder deposits. It grows best on well-drained, deep, moist soils. It is common on deep loams or clays containing lime. It also grows well on black cotton soils. Shallow dry soils and poor drainage stunt tree growth.

Propagation: Under natural conditions, it reproduces by seed, root sucker or coppice. Artificial reproduction is common by seed, root cutting, and stump sprout.

Seed propagation: Fresh seed germinates at 50-75% within 7-21 days of sowing. Stored in gunny sacks or earthen pots, seed remains viable for six months. Seed viability can be extended to 9-12 months by drying seeds to 8% moisture content and storing them in airtight containers, however, germination will decrease to 30-40%. Direct planting is possible under moist conditions with good weed control. Although no seed treatment is necessary, soaking seed in cool water for 12-24 hours will hasten germination. Nursery grown seedlings are transplanted to the field after 12 months.

Vegetative propagation: Root cuttings can be planted directly in the field or raised in a nursery for future transplanting. Root cuttings should be taken from trees that are at least 5 years old. Recommended length of cuttings is 20 cm with a diameter of 1-2 cm. Keep cuttings at room temperature for three days before planting them in either nursery beds or polyethylene bags. Eighteen cm of the cutting should be planted below the soil surface with 2 cm above. Transplant cuttings to the field after 6 months in the nursery.

Dalbergia latifolia can be quickly established by stump sprouts. Stumps are made from seedlings of seed or cutting origin. Stump roots and shoots should be 4.5 cm and 2.5-4.0 cm long, respectively. Root-collar diameter should be 0.5-1.5 cm. Planting must coincide with heavy rains or survival will be low.

Family: Leguminosae
Sub Family: Caesalpineaceae

Legu 21 T

Dalbergia paniculata

Telugu: Pachare



It is a deciduous tree, 10 – 15 m in height. It is conspicuous due to its smooth grey bark. The wood is rather soft and yellowish white in colour.

Leaf: The leaves are 12 – 15 cm long and compound. The leaflets are oblong or obovate and smooth.

Flower: Occur in dense panicles. The calyx or the flowers are pubescent. Corolla is white or bluish-white and papilionaceous.

Fruit: The fruit is a pod. It is glabrous and indehiscent.

Distribution: It is common in the interior dry deciduous forests of India.

Family: Leguminosae
Sub Family: Caesalpineaceae

Legu 22T

Delonix elata
(Syn: *Poinciana elata*)

A medium sized, pretty tree

Leaf: Leaves are compound, abruptly bipinnate, the leaflets are many and they have small stipules.

Flower: Flowers are large showy and occur in terminal corymbs. They have yellowish white petals, which turn orange when old.

Fruit: Fruit is an elongate pod it is woody and dehiscent.

Distribution: This is distributed throughout India, although it does not occur commonly in any region. It is grown as an ornamental for its yellowish-white flowers.

Family: Leguminosae

Sub Family: Mimosaceae

Legu 25 T

Dichrostachys cinerea

(Syn.: *Cailliea cinerea*)

Telugu: Eduthili

A thorny pubescent shrub or a small tree. This resembles dwarf *Acacias* when not in bloom. Bark light grey, or whitish, longitudinally furrowed, armed with axillary and terminal spines.

Leaf: Leaves are feathery, 2.5 to 6 cm long, bi-pinnate, ending in a bristle. There are 5-9 pairs of pinnae each bearing 8 – 15 pairs of leaflets. The leaflets are dark green about 0.25 cm long.

Flower: Flowers minute, dense, in axillary spikes, upper flowers fertile and with yellow stamens, lower – pink and sterile.

Fruit: Pods, 5 – 7 cm x 0.6 cm in size, irregularly twisted, and articulated between the seeds. Seeds about 10, brown, polished and somewhat compressed.

Distribution: The plant is found on dry, strong ground in the arid regions of Northern, Western, Central and Southern India, in the states of Rajasthan, Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu. In dry regions where it is commonly found, the forest is usually an open scrub, situated both on hilly and on flat ground. It is frequent on black cotton soil.

Uses: The leaves are used as fodder and is of great value as a cover plant in dry soils. It is said to be good as a fuel wood. The bark yields a yellowish white fibre. The wood is used for walking sticks and tent pegs, and is excellent for tool handles. Is one of the recorded hosts for the lac insect.

Family: Leguminosae

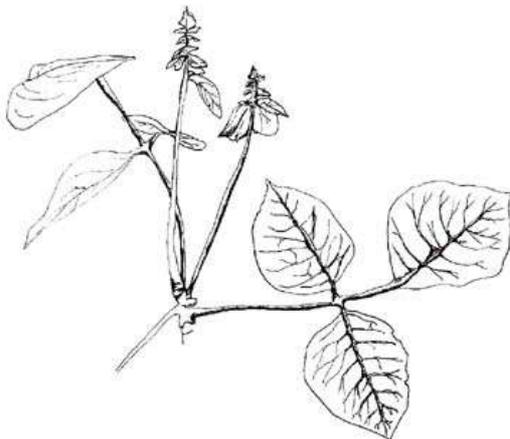
Sub Family: Papilionaceae

Legu 26 T

Erythrina indica

(Syn. *E.variegata*)

Telugu: Varajeepu



A fast-growing, small, spiny deciduous tree with beautiful coral-pink flowers. Bark is smooth and green when young, exfoliating in papery flakes. When old it becomes thick, corky and deeply fissured. The prickles are minute, conical and usually black.

Leaf: Leaves are compound, bright emerald green, trifoliate, leaflets long and nearly as broad, rhomboid and ovate.

Flower: Flowers are coral-red in colour and short lived. Flowers appear between January and April.

Fruit: The fruit is a pod. It appears soon and grows quickly to attain a large size. They contain up to 12 seeds. The seeds are dark purple or brown.

Distribution: This tree is found throughout India in deciduous forests.

Uses: The bark is bitter and used as an emmenagogue, for anti-abortion treatment, amenorrhoea, malaria and gall bladder or liver problems. It is reported to be useful in inflammations, conjunctivitis, insomnia, flatulence, dyspepsia, colic, cough, strangury, leprosy, skin diseases and fever. The leaves are reported to be bitter, diuretic, laxative, emmenagogue, stomachic, antihelminthic and used in gastropathy and helminthiasis. The leaf paste is used by some tribals to treat fresh cuts and wounds.

Nursery notes: It occurs in a wide range of soils, but more frequently on deep alluvial loams, silts and clays but also on gravelly skeletal soils where growth is stunted back but quickly regrows. Its occurrence is restricted to areas with annual rainfall ranging from 500 to 1500 mm as high rainfall zones are not conducive for its growth. It is drought resistant. It grows up to an altitude of 750 m. It can be propagated both by seeds as well as by vegetative means.

Seed propagation: The pods should be collected in June. Pods are threshed and sieved or sorted by hand and the seeds are separated out. Seeds can be stored for a long time if kept in a cool and dry place free from insect attack. Direct sowing succeeds easily. Seeds are sown in June-July. About 60-80% seeds germinate in over 10 – 35 days.

Vegetative propagation: Vegetative propagation is through cuttings. Branch cuttings root readily and grow well. Cuttings planted into moist ground quickly root and may flower in the same year.

Transplanting and After care: One year old seedlings can be planted as stumps.

Family: Leguminosae

Sub family: Papilionaceae

Legu 27 T

Pongamia.pinnata

(Syn. P. glabra, Cytisus pinnatus, Galedupa indica, Derris indica)

Telugu: Kanugu

It is a dwarf deciduous tree with a short bole and spreading, shady crown having smooth grey bark.

Leaf: Compound, imparripinnate, leaflets are bright green and glossy. Leaves often are eaten by insects.



Flower: Half an inch long, mauve or lilac coloured, borne in the axis of leaves. Flowers when the tree is in a leafless condition in the last week of April-May.

Fruit: Woody pods, yellowish-grey turning dark-grey finally and indehiscent. Pods ripen in March-May of the following year.

Distribution: It is a very common tree growing wild in almost all parts of India, especially along streams and the seacoast. It is very common in the forests of Central and South India.

Uses: Leaves provide green manure and drive away termites.

The seed powder with honey is used for whooping cough. Seed oil is used for skin infection and worm infection. Seed oil is also used for soap preparation, for lighting and also as fuel substitute for diesel engines.



Nursery notes: Raised from seeds in rains.

Pre-treatment: Seeds soaked in cold water for 24 hours. Seeds are sown in raised nursery beds. Germination takes place in 10-15 days. Seedlings can be transplanted to polythene bags after 2 months.

Seedlings can be planted in the field in 6-8 months.

Can be propagated by cuttings too. It is a fast growing tree.

Family: Leguminosae

Sub-Family: Papilionaceae

Legu 28 T

Pterocarpus marsupium

Telugu: Netta ragi

A large deciduous tree grows up to 15 – 20 m in height. It has a straight bole with spreading branches covered by thick yellowish-grey, corky bark the bark has longitudinal fissures.

It exfoliates in heavy scales exposing rusty inner bark from which a blood red gum (Gum Kino or Malabar kino) exudes.

Leaf: Alternate, compound leaflets 5-7, elliptic-oblong, shiny.

Flower: Yellowish, scented. Occur in large panicles 8 -11cm long. Appear in May- June. They are visited by large swarms of bees. At dusk the flowers fall forming a thick yellow carpet under the trees by morning.

Fruit: Orbicular, flat like a big coin, with a circular wing, up to 5 cm in diameter, with 1 -2 convex bony seeds.

Distribution: Indigenous to India. Common in deciduous forests all over India. Prain recognized two varieties of this species occurring in different geographical regions. The variant 'typica' generally found in the southern region has obtuse leaflets. The variant

'acuminate' has ovate, cuspidate or acuminate leaflets, much longer pods and distributed in the northern parts.

Uses: The gum (Kino) is used in dyeing, tanning and printing. The gum is also used for diarrhoea and tooth ache. Crushed leaves are applied on sores and boils. Flowers and seeds are edible; and also finds an application in dyeing, tanning and printing.

Family: Leguminosae

Sub-family: Papilionaceae

Legu 28 b T

Pterocarpus santalinus

Common name: Red sanders

Telugu: Raktagandhamu / Chandanamu

A deciduous medium-sized tree. Stem erect and dense, rounded crown. Bark blackish brown exuding a copious red gum. Branchlets drooping, glabrous.

Leaf: The leaves are compound having 3 leaflets, rarely 4-5 leaflets occur. They are broadly ovate or orbicular. The apex is obtuse or emarginate. The margin is entire, shiny and glabrous.

Flower: The flowers are yellow, bisexual and axillary in position. They occur in simple or sparingly branched racemes. They are fragrant.

Fruit: The fruits are pods, which are obliquely orbicular and flat. They have 1-2 seeds, which are reddish-brown having a smooth leathery testa.

Distribution: It is almost endemic to Cuddapah regions of Andhra Pradesh and sporadically exists in some of its adjoining areas.

Uses: The heartwood is reported to be used for treating intrinsic haemorrhage, fracture, chronic fever, diarrhoea, spider poisoning and freckles.



Nursery notes: It prefers areas of dry and hot climate with daily mean temperature ranging from 30 to 40°C with around 100 mm of rain in each of the two annual monsoons and relative humidity ranging from 32 to 79%. It grows on rocky soils consisting of quartzite, limestone and laterite. It requires very good drainage otherwise the trees fail to stand stiff. It can be propagated using seeds and vegetative means.

Seed propagation: The dry pods are collected from trees in February-June. They are dried in the sun for 3 days and stored in bamboo baskets of gunny bags till required. Seeds retain their viability for atleast 8 months. Soaking of pods in cold water for 3 days increases the germinative capacity as also when the pods are immersed in cow dung slurry for 48 hours

before sowing. The entire pod with wings are sown during July-September on raised or flat beds of 12 x 1.2 m prepared with well drained soil and covered by a thin layer of soil or hay and profusely watered. If the seeds are removed from the pods their germinative capacity diminishes considerably. Germination takes 15 – 20 days and germination success varies from 10 – 80%.

Vegetative propagation: Vegetative propagation is through cuttings. The cuttings are planted in polythene bags with sandy-loam soil mixed well with farmyard manure. They are watered daily and kept in bags till they are one year old.

Transplanting and After Care: The seedlings when 4 – 10 cm high are transplanted into polythene bags and the bags are kept under shade and duly watered for a month. Then the shade is removed and daily watering is continued for another 3-4 months. At the end of this period the roots develop to about 20 – 30 cm length. These are planted out during the rainy season. One year old cuttings are field planted at a spacing of 3.5 to 4.5 m in pits that are 30x30x03cm in size. Both water logged sites and overshadowing by other trees must be avoided. One or two hoeings around the plant to a radius of 1m and 15 cm depth are done in the first two years.

Threat Status: Its IUCN Red List Status has been assessed as “Endangered (Golbally)”.

Family: Leguminosae

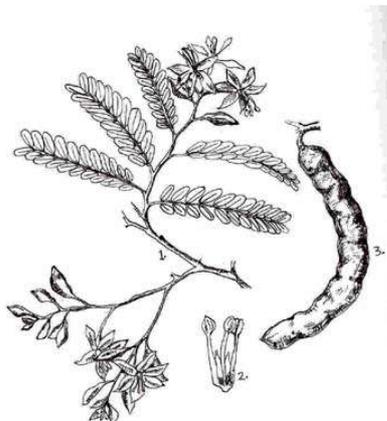
Sub-family: Caesalpineaceae

Legu 31 T

Tamarindus indica

Common name: Tamarind

Telugu: Chinta



A large evergreen tree of great importance. The bark is dark grey.

Leaf: The leaves are compound and abruptly pinnate, leaflets 10-20 pairs.

Flower: The flowers are small and yellow striped with red.

Fruit: The fruit is a pod, which is brownish ash coloured, slightly curved with many seeds. The seeds are enveloped by a tough leathery membrane and pulpy meso-carp. The testa is shining and hard.

Distribution: Native of Southern India, it is extensively naturalized and also widely cultivated.

Uses: The root bark is reported to be used against asthma, amenorrhoea, gingivitis and ulcers.

Leaves are useful for ulcers, fever, helminthiasis, wounds, jaundice, scabies, tumours, ringworms, boils, smallpox and conjunctivitis.

Flowers are a good source of honey, which has slight acidity.

Fruits are laxative and also used in ophthalmopathy. Due to the acidic nature of the fruit they are used in the preparation of sauces, chutneys and beverages.

Seeds are reported to be used to treat dysentery, burning sensation, giddiness, inflammations, chronic ulcers, abscess, haemorrhoids, vaginopathy, diabetes and general debility. Seeds yield oil used in paints and varnishes. Tamarind kernel Powder finds extensive use as a sizing material in the textile industry.

Wood is used for agricultural implements, tool handles and wheels.

Nursery notes: It has been recorded to growing in areas receiving low mean annual rainfall of 600 mm and extending to high mean annual rainfall areas of 4200 mm. It grows well in tropical and sub-tropical zones with mean annual temperatures ranging between

20 and 29 °C. It requires light, well-drained soil and performs well in sandy and alkaline soil. It can be propagated by seeds, vegetative means and also by micro-propagation.

Seed propagation: Fruits are harvested in April – May by shaking the branches of the tree. The pods should be allowed to ripen on the tree till the outer shell is dry and can be separated from the pulp. Seeds collected from the trees are found to be superior to the seeds collected from the ground. Seeds are separated from the pulp by hand kneading, washing in water and drying. Seeds retain their viability for more than a year. They should be stored in paper bags or gunny bags. Seeds are soaked in water for 24 hours before sowing in nursery beds or polybags. Sowing is done in the month of July. Nursery spacing should be 15 x 15 cm. Germination duration varies from 5 – 10 days or may even go up to 20 days. 70 – 75% of the seeds are seen to germinate.

Vegetative propagation: Vegetative propagation can be done using cuttings, air layering, grafts or budding.

Through cuttings: Terminal cuttings of the tree from current year growth with their new flush of leaves are collected early in the morning. These soft-stemmed cuttings are treated with IBA for better rooting.

Through air layers: The stem is girdled or slit at an upward angle. The injured portion is enclosed with a rooting medium, which is kept continuously moist. The percentage of rooting is enhanced if hormones (Indol Butyric Acid, Indol Butyric Acid +Naphthalene Acetic Acid) at a concentration 7500 ppm are used.

Through grafts: Approach grafting is the ideal method. A year old root stock plant raised in a polybag is grafted to an identified plus tree on a healthy and vigorous growing branch matching in diameter. 75% of grafts establish.

Through budding: Patch budding is the ideal method. For raising root stock seeds are soaked in water for 2-3 days. Imbibed seeds are collected and used for sowing. It takes 5 – 7 days for seeds to germinate in sand beds. The appearance of first pair of leaves takes about 10 days from the date of sowing. Scion (known as the bud wood or bud stick) should be collected from healthy disease free mother plants. Diameter of the scion and the rootstock should preferably be about the same size (5-6 mm diameter.). From the root stock a rectangular patch is removed at a height of 10 cm from soil level. A similar patch with a sprouting bud is removed from the bud wood. This is then placed where the patch is

removed from the rootstock. This should then be wrapped with a polythene sheet about 5 –6 mm wide and the bud should be kept exposed. Bud sprouts in 30 – 40 days. Budded plants should be kept in mist chambers. After three months budded plants can be shifted and kept under shade for a month. Later the budded plants are fully exposed and hardened. 70 – 90% of the plants budded during wet monsoon are successful.

Micro propagation: Axillary buds collected during the month of May are used as explants. Explants are cultured in Murashige and Skoog medium.

Family: Linaceae

Lina 1 T

Erythroxylon monogynum
(Syn: *E.indicum*, *Sethia indica*)

Telugu: Deodari

Kannada: Devadaram

Tamil: Devdara

Small trees with a dark brown, rough bark and very hard reddish-brown wood.



Leaf: Usually obovate, obtuse, under 2 inches long, glabrous, alternate and entire.

Flower: Is solitary, axillary, small and whitish with 5-6 sepals and petals.

Fruit: A small one seeded drupe, which turns red when ripe.

Distribution: Found to occur in the drier forest in the country.

Uses: Leaves and young shoots are edible and cooked as food locally.

Family: Loganiaceae

Loga 1 T

Strychnos nux-vomica

Telugu: Mushti

A medium-sized tree with a short, crooked, thick trunk. The wood is white, hard, close-grained, and durable; the root is very bitter. Branches are irregular, covered with a smooth ash-coloured bark; young shoots are deep green and shiny.



Leaf: Opposite, short stalked, oval, shiny, and smooth on both sides, about 4 inches long and 3 inches broad.

Flower: Small, greenish-white, funnel shape, occurs in small terminal cymes. Blooming in the cold season and have a disagreeable smell.

Fruit: The fruit is about the size of an apple with a smooth hard rind or shell which when ripe is a lovely orange colour. It is filled with a soft white

jelly-like pulp containing five seeds covered with a soft woolly-like substance, white and horny internally. The seeds have the shape of flattened disks densely covered with satiny hairs, radiating from the centre of the flattened sides and giving the seeds a characteristic sheen. They are very hard, with a dark grey horny endosperm in which the small embryo is embedded. They have no odour, but have a very bitter taste.

Distribution: A tree occurring throughout tropical India.

Uses: The seeds are a source of drug “nux vomica” which is used as a tonic, stimulant and in treatment of paralysis and nervous disorders.

Seeds are also added to beverages to make them intoxicating.

Seeds are collected from the southern states mainly Andhra Pradesh, Tamil Nadu and Kerala. They are removed from the fruit when ripe, cleansed, dried and sorted and then exported from Cochin, Madras and other Indian ports.



Family: Loganiaceae

Loga 2 T

Strychnos potatorum



Telugu: Chilla

Medium sized, glabrous tree with fluted branches and corky black and scaly bark. It is a shade bearer and is drought resistant.

Leaf: Elliptic, acute and shiny.

Flower: White in colour occurs on axillary, sessile cymes. Appear from February to May.

Fruit: The fruit is a globose berry, black when ripe, with two seeds. The fruits are known to ripen between October and March. Seeds are fleshy and round, shining with short oppressed silky hairs.

Distribution: It is found in Central, Eastern and Peninsular regions of the country.

Uses: Seeds are reported to be used as a local application in case of eye diseases. They are rubbed along with honey and camphor and the mixture is applied to the eyes to treat copious watering.

A paste of the seeds is reported to be consumed internally along with little tender coconut milk to treat urinary disorders and retention of urine.

Seeds are also used in medicines for acute diarrhoea, diabetes and gonorrhoea.

They are also used to clear turbid water.

As a rich source of a polysaccharide gum the seeds are suitable for use in paper and textile industry.



Nursery notes: Plants are propagated by seeds as well as vegetative means.

Seed propagation: Seeds are collected during February-March. The pulp is washed off to obtain the seed and dried in the shade. Seed viability is very low. Mild boiled water treatment and soaking in water for 48 hours hastens germination. Seeds do not tolerate water logging. Temperature of 30-35°C and humidity of 60-70% are favourable

for germination. Seeds are sown in polybags in April and continuously watered. About 40% of seeds germinate. Root growth is faster than shoot growth and longer polythene bags are required. Germination takes 30-40 days. Nursery duration is 60 days.

Vegetative propagation: Through cuttings. Hardwood cuttings of size 1 x 15-20 cm with 2-6 nodes treated with 500 ppm IBA produce good sprouts.

Family: Malvaceae

Thespesia populnea

Malv 3 T



Telugu: Gangarana

A large evergreen tree. 10 – 15 m high. Trunk straight with greyish fissured bark. Branches closely set forming a dense crown.

Leaf: Broad, heart-shaped, with a pointed tip. Dark green in colour, flecked beneath with minute rusty scales.

Flower: Large, bell-shaped, yellow with a purple centre completely changing to orange when about to wither. Flowers almost throughout the year. They appear singly. Peak flowering is in cold weather.

Fruit: Globular capsule cupped by calyx, with minute numerous white papery seeds.

Distribution: Common in the southern states of India it grows wild along beaches and tidal forests of coastal regions. Often planted in gardens and on roadsides for its shade.

Uses: The root extract is taken as a tonic.

The juice of the fruit is used for external application to cure cutaneous diseases.

The leaves are used for wrapping food.

The seed yields thick oil.

The bark yields a strong fibre.

The wood is tough, with fine grains and is used in making gunstocks and cart wheels.

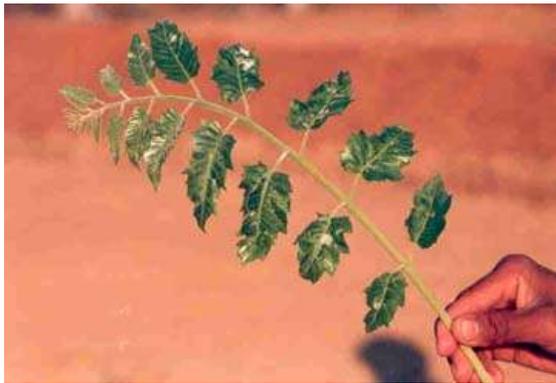
Nursery notes: It is easily raised from seeds or from cuttings. The growth is rapid. The plant prefers light porous soil and is extremely salt resistant. Hence it is very suitable for saline soils. On account of its hardy nature it can grow in all states of India excepting the hills.

Family: Meliaceae

Meli 1 T

Ailanthus excelsa

Telugu: Petaru



A large, deciduous, graceful indigenous tree growing up to 30m in height with a light grey intact bark.

Leaf: leaves are compound, long, with 8-14 pairs of leaflets, which are very variable in shape. Each leaflet is lance shaped, neem-like, serrate, oblique at base. Smell bitterish.

Flower: Small and yellowish in large bunches. Flowers in April – May.

Fruit: Is brown, flat, pod-like and winged. It is tapering at both ends and twisted at the base.

Distribution: Occurring in deciduous forests. Often planted on roadsides. It is suitable for growing as windbreaks and shelterbelts.

Uses: The wood is used for packing cases, fishing floats, matchboxes and splints. It is also used for writing and newsprint paper.

Family: Meliaceae

Meli 2 T

Azadirachta indica

Telugu: Vepa

A medium to large sized tree 15-20 m in height, with a clear bole of 7 m having greyish to dark grey tubercled bark. Its imparipinnate, shining, deeply serrate leaves identify this tree.

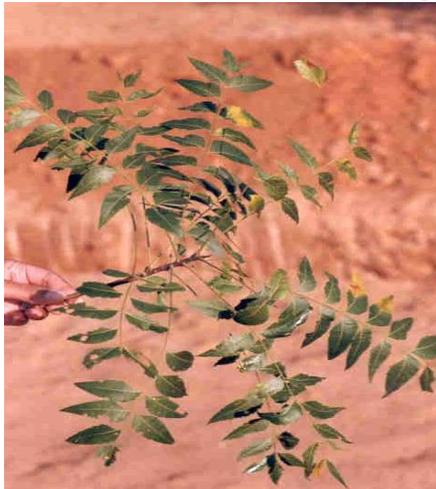
Leaf: The leaves are compound and imparipinnate. The leaflets are sub-opposite and very oblique at the base.



Flower: The flowers are cream or yellowish white. They occur in axillary panicles, which are elongate. They are scented. Flowers appear during March – April.

Fruit: The fruits are one - seeded drupes, 1 to 2 cm long, with woody endocarp. They are greenish-yellow when ripe. Fruits ripen between June and August. The seeds are ellipsoid, with thick, fleshy, oily cotyledons.

Distribution: This species occurs practically all over India from arid to moist regions, but more common in drier parts and deciduous forests. It is also cultivated throughout the country.



Uses: The bark and the leaves are reported to be used against skin diseases, leucoderma, intermittent and malarial fevers, wounds, ulcers, tumour, vomiting, intestinal worms, inflammation, cough and bronchitis.

Flowers are also reportedly useful in treating burning sensation, colic, dyspepsia, intestinal worms, and general debility.

Seeds are said to be effective in treating tumours, leprosy, skin diseases, intestinal worms, tuberculosis, wounds, ulcers, constipation, antenatal diseases, urorrhea and diabetes. The seeds yield oil used for leucoderma, skin affections, intestinal and ringworms, scabies, chronic malarial fever and leprosy.

Nursery notes: It grows on a variety of soils, from sandy to clayey including black cotton soils. Neem grows well on flat ground having high sub-soil water level and good drainage. It tolerates temperatures ranging from 0°C to over 40°C, altitudinal variation of distribution from sea level to 1500 m above mean sea level. It is also known to occur in regions having an extremely low annual rainfall of even 130mm. It also possesses certain amount of drought hardness. It can be propagated using seeds.

Seed propagation: Fruits when fully ripe are collected or even swept from the floor under the trees. The pulp is washed off; seeds dried in shade and kept in airtight containers. Seeds have a short viability of about 2 weeks. For obtaining higher germination, seeds are soaked for 24 hours in cold water and the endocarp is removed or the seed coat at the round end is

cut off with a sharp knife. De-pulped seeds should be sown in nursery beds made of fine river sand preferably in 15 – 20 cm apart and seeds 2.5 to 5 cm apart, at a depth of 1 – 2 cm and is lightly covered by the soil. The beds are sparingly watered to prevent caking. Germination takes about one to two weeks and 70-90% of the seeds are observed to germinate.

Transplanting and Aftercare: Seedlings about 7 – 10 cm height with taproot of about 15 cm length are transplanted into polybags. Field planting is done after 1 – years at a spacing of 4.5 – 5.5 m. They usually watered once in a while during summer months for the first 5-6 years.



Family: Moraceae

Mora 1 T

Ficus amplissima (Syn. F. tsiela)

Telugu: Aduvi Ragi

They are large trees, often with aerial roots.

Leaf: Petiole 2.5 – 6 cm long. Leaf blade elliptic or ovate, rounded at base with 3 basal nerves, lateral nerves 7 – 10 pairs.

Flower: Flowers inconspicuous inside figs.

Fruit: Figs occur in axillary pairs, sessile, pubescent when young. They are globose, 1.5 cm across having 4 basal bracts.

Distribution: This species is found in deciduous forests of Southern India and Sri Lanka.

Family: Moraceae

Mora 2 T

Ficus arnottiana

Telugu: Aduvi raagi

Small deciduous trees

Leaf: Leaves are broadly ovate having 8-10 pairs of lateral nerves. Leaves occur on long petioles up to 14 cm long

Flower: Flowers inconspicuous inside figs.

Fruit: Fruits are figs 4-7 mm in diameter, occurring in pairs on 4 mm long peduncles. They are globose and glabrous

Distribution: They occur commonly in Southern India in the moist deciduous forests, open grassy slopes and in rock crevices.

Family: Moraceae

Mora 2 b T

Ficus benghalensis

Sanskrit: Vata



Common name: Banyan

Telugu: Marri

Kannada: Aladamara

Tamil: Al

Malayalam: Peral

A huge spreading tree with branch and trunk smooth, milky, bears a large number of hanging or column-like roots, which extend the growth of the tree indefinitely (up to 20m tall).

This is a sacred tree to the Hindus.

by conical stipule.

Flower: Inconspicuous, inside the figs which grow between the upper part of the leaf stalk and the stem. Flowers bloom between March and April.

Fruit: Figs in axillary pairs, sessile, globose, silky and pubescent 1.5 cm across. The fig turns red and becomes soft on maturity. The tree looks very elegant when the branches are studded with ripe fruits, and is visited by numerous birds.

Distribution: Common through India. Generally planted all over the plains of India, wild only in the sub-Himalayan forests.

Family: Moraceae

Mora 2 c T

Ficus glomerata
(Syn: *Ficus racemosa*)

Telugu: Atthi

A common tree growing up to 50 m with age. The trunk is whitish, and smooth and straight in younger trees, which may get gnarled when old.

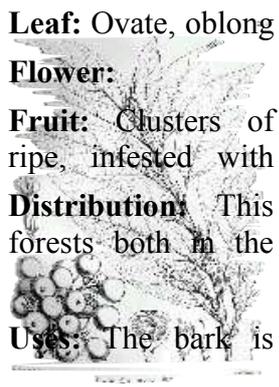
Leaf: Ovate, oblong

Flower:

Fruit: Clusters of ripe, infested with

Distribution: This forests both in the

Uses: The bark is



or lance-shaped when ripe covered by galls.

Inconspicuous, inside the unripe fruits.

figs on the trunk and main branches, reddish when insects.3 cm across.

tree is common to deciduous and semi evergreen hills and plains. It is frequently found near water.

considered useful in indigenous medicine.

Family: Moraceae

Mora 2 c

Ficus hipsida
(Syn: *F. Oppositifolia*, *F.daemona*)

Telugu: Bembedi chettu



Small trees or shrubs. Youngparts hispid, inter node hollow.

Leaf: Leaves opposite, 27 x 11 cm., petiole 4.5 cm long, leaf blade obovate, apex acuminate, margin entire or dentate.

Flower: Inconspicuous, inside the unripe fruits

Fruit: Fruits are globose figs occurring in clusters on tubercles of the stem or on separate, leafless, rooting runners arising from the trunk. Fruits turn yellowish on ripening.

Distribution: Distributed throughout India. It is common in secondary moist forests, near streams.

Family: Moraceae

Mora 3 T

Ficus microcarpa

(*Syn. F. retusa*)

Telugu: Jugi /Erra Jugi /Pal Jugi

A large glabrous evergreen tree with aerial roots that grows in rocky areas and near water bodies.



Leaf: Short petioled, elliptic wide, apex blunt, glabrous.

Flower: Inconspicuous, inside the unripe fruits Male flowers numerous.

Fruit: Figs glabrous 1 cm in diameter, sessile and globose, occurring in axillary pairs. Yellowish when ripe. No characteristic smell.

Distribution: Common in deciduous and semi evergreen forests of India.

Uses: Roots are reported to be used to treat dental caries. Bark and leaves are astringent and used for wounds, ulcers, bruises, colic, dysentery, diabetes, burning sensation and ulcerative stomatitis.

Nursery notes: Grows in wide varieties of soils ranging from shallow, dry hill soils to deep alluvium along stream banks. It is a light demander and a frost hardy species. Propagation can be by seeds and vegetative means.



Seed propagation: Seeds are sown in soil mixed with compost. Seed is slightly covered with fine sand and watered with a fine watering- can.

Vegetative propagation: 2-3 m long cuttings are planted. Planting can be done during January-February under irrigation or in July-August during monsoon.

Transplantation: Seedlings are transplanted in beds at a spacing of 20 x 20 cm in July – August.

Family: Moraceae

Mora 4T

Ficus Mollis

(*Syn: F. tomentosa*)

Telugu: Jeegi

These are medium sized trees. The young branclets are tomentose.

Leaf: Leaf 3.5 cm long, glandular patch found at the junction of the leaf with the petiole. Leaf blade obovate, apex acute or acuminate. Leaf subcoriaceous, grey tomentose beneath.

Flower: Inconspicuous, inside the unripe fruits

Fruit: Fruits are ovate, tomentose, globose figs. Sessile in axillary pairs and 1 cm in diameter.

Distribution: Common in India. Frequent in deciduous forests across the Deccan peninsula.

Family: Moraceae

Mora 4 bT

Ficus religiosa

Telugu: Ragi

A sacred tree for the Hindus, this tree often occurs as an epiphyte on palm trees, on rocks, precipitous hills and walls. Normally it grows up to 15 m with a smooth handsome trunk, and fibrous aerial roots.

Leaf: Alternate, heart-shaped, on a long stalk. Veins are prominently raised. The bud is covered by stipules, which turn pinkish.

Flower: Borne inside tender figs.

Fruit: Figs in axillary pairs, sessile, globose 1 cm in diameter. Birds relish the figs when ripe

Distribution: A common tree all over India known to survive for very long time. Also very widely cultivated.

Family: Moraceae

Mora 5 T

Ficus rumphii

Telugu: Konda raagi

Family: Moraceae

Mora 6 T

Ficus virens

(Syn: *F. infectoria*)

Telugu: Konda raagi



These are huge trees with aerial roots.

Leaf: Leaves are elliptic, with an acuminate apex and a rounded base. Petioles up to 7 cm long.

Flower: Inconspicuous, inside the unripe fruits.

Fruit: Fruits are glabrous, globose figs 1.5 cm in diameter that occur in axillary pairs, sub sessile.

Distribution: A common tree all over India. Frequent in deciduous to evergreen forests of Western Ghats and occasional on the Deccan Plateau.

Family: Moraceae

Mora 6 b T

Ficus tsjakela
(*Syn: F. tsjahela*)

Telugu: Juvi / Jevi

A large spreading tree without aerial roots, with an uncommonly dense crown and irregular thick trunk covered with rough dark brown bark. It is easily distinguishable by large purplish-red, red or scarlet scaly stipules.



Leaves: Alternate, very long petioled, surface dark greenish grey, smooth and glossy.

Flowers: Few, sessile. Inconspicuous, located inside figs.

Fruits: Sessile figs 2-6 clustered on short tubercles in axils of leaves, yellowish-white to dull grey-purple, with pale dots when ripe.

Distribution: Distributed in wet deciduous forests of Southern India and Sri Lanka.

Uses: Bark is astringent and slightly bitter. It has been found to have anti-microbial properties and is reportedly being used to wash or clean sores.

Nursery notes: It is a light demander and cannot grow under shade. It is also drought resistant and frost hardy. It grows even in stony sites and rocky crevices but does best on deep well drained loams. Also thrives on saline soils with adequate moisture. Seeds from bird droppings alone germinate. Seedlings are planted 12 m apart. Can also be propagated through cuttings.

Family: Moraceae

Mora 7 T

Ficus spp.

Telugu: Saali

Family: Myrtaceae

Myrt 1T

Syzygium cumini

Telugu: Neradi

Tamil: Naval

Kannada: Nerale

This tree can be identified by its fibrous red blaze. It is a big evergreen tree reaching a height of 4.5 – 9 m. The tree has a spreading crown and a light grey exfoliating bark.



Leaf: The leaves are opposite, dotted with glands, coriaceous, oval or elliptic-oblong, an acute intra-marginal nerve is present. The trees start shedding its leaves in January, which continues till February – March.

Flower: The flowers are white and small and fragrant. Flowering occurs between March and April.

Fruit: The fruit is a juicy berry with persistent calyx. It is one seeded. The fruits when unripe are green but turn purple when ripe. Fruits ripen from June to August.

Distribution: This tree is found throughout India. Commonly distributed in the moist evergreen forests of South India.

Uses: The fruits are edible. The seed are said to have medicinal value. They are used to cure diabetes. The leaves of the tree are used as fodder and green manure. The bark is used for tanning and dyeing.

Nursery notes: Can be propagated using seeds as well as vegetative methods.

Seed propagation: Ripe fruits are collected either from the tree or from those fallen on the ground under the tree. The pulp is rubbed off to separate the seeds. The seeds are then washed and dried in the sun. No pre-treatment is required before sowing the seeds. The seeds can be sown directly in the fields where the soil is worked beforehand in lines about 30 cm apart and 15 cm deep. Seeds are sown in these in rows 3 m apart from each other. Side shade is beneficial particularly in dry hot localities. Alternatively the seeds can also be sown in raised nursery beds which contain sand, soil and farmyard manure mixed in a ratio of 1:1:1. Watering should be done twice a day with a fine spray can. Germination commences after 15 days and continues till 2 months. Weeding is essential in the initial stages. The seedlings can be transferred to polythene bags after they acquire their first 3 pairs of leaves or after four months.

Vegetative propagation: Young stem cuttings are used for vegetative propagation. These cuttings should be dipped in Indol Butyric Acid (IBA) solution of 500 ppm for five minutes and planted in polyhouses during January – February. The polyhouses should be maintained at a temperature of 30 – 35°C and humidity levels of 80-90%. Rooting is initiated after three months.

Transplantation: Seedlings can be transplanted into the field when they reach a height of three feet or after 12 months. For large plantations pits should be made with a spacing of 20 m. Pits should contain red soil and farmyard manure in the ratio 1:1 and should be allowed

to stabilize for atleast 2 showers of rain. The seedlings can be transplanted during the monsoon. The soil around the roots should be loosened during the first five years of growth. Cuttings can be transplanted into field during the monsoon season after they are established. Direct sowing in the field is recommended, as the seedlings do not stand transplantation well. The season for planting is in July.

Family: Ochnaceae

Ochn 1 T

Ochna obtusa

(Syn. *O. squarrosa* *O. jabotapita*)

Telugu: Chittu soma

A small handsome tree with a thin brown bark and reddish brown wood.

Leaf: Membraneous, green, lanceolate and obovate in shape petiole small leaf tip acute.

Flower: Large yellow with persistent sepals, occurring in racemes.

Fruit: drupe seated on an enlarged disc.

Distribution: Found in Assam, Bihar, Orissa and Deccan peninsula. Fairly common in moist deciduous to semi evergreen forests. It is often cultivated

Uses: The bark can be used to make a digestive tonic. A decoction of the root is reported to be used in menstrual complaints and asthma.

The wood is used for walking sticks.

Family: Rhamnaceae

Rham 3 T

Zizyphus mauritiana



Hindi: Ber

Telugu: Reni

Tamil: Elanthai

Kannada: Yalaci

A small, thorny evergreen tree, variable in size up to 10 m in height, with grey or dull black, rough, cracked bark.

Leaf: Variable, oblong-elliptic, ovate, closely serrate or entire, prominently 3-nerved with stipular spines, one of which is hooked. The leaves are smooth above and have buffy hair below.

Flower: Small, greenish, yellow found in axils.

Fruit: Drupe, oblong, globose, ovoid, red, orange or yellowish with one hard seed.

Distribution: Found to occur both wild and cultivated throughout the greater part of India for both fruits and timber. It occurs naturally in the dry and scrub forests all over the country.

Uses: The fruit is edible and is a rich source of Vitamin C and sugars. The bark is used for tanning and leaves are given as fodder for livestock. The leaves are laxative and given for throat troubles. It also serves as a host for lac insect.

Family: Rhamnaceae

Rham 5 T

Zizyphus xylopyros

A small, deciduous, shrub-like tree with straggling branches and a wide spreading crown, attaining a height of 7.3 m. The slender branches are rusty with spines in pairs, one straight the other curved. Bark thin, dark brown or blackish, rough, exfoliating in small woody scales. The cut wood is bright reddish.

Leaf: Small and elliptical, and pubescent beneath, white and woolly when young and nearly glabrous when old.

Flower: Long, yellowish-green in colour, flowering in November.

Fruit: Is a dark red, round, drupe, dry and woody. The seed is enclosed in a hard covering which is thick and furrowed.

Distribution: Found widely distributed in the different parts of the country.

Uses: The bark and fruits are rich in tannins and are employed for tanning and for dyeing leather black. One of the chief uses of the tree is for the propagation of the lac insect as it is one of the important hosts for this insect.

Family: Rubiaceae

Rubi 1 T

Adina cordifolia

(Syn: *Haldina cordifolia*)

Telugu: Pasupa kadamba



A stout tree up to 10 – 20 m high. Trunk erect, branches horizontal, bark brownish-grey and furrowed.

Leaf: Heart shaped at base with a pointed tip. 20- 25 cm long, almost as broad. Crown shaped stipules covering a young bud at the tip of the branch.

Flower: flowers occur in buff-coloured spheres of 2-4 cm. containing numerous small flowers. Flowers between March and May.

Fruit: Round, black, ball like structures.

Distribution: Found in dry forests throughout the hilly parts of India. It is indigenous. The wood is valuable.

Family: Rubiaceae

Rubi 2 T

Canthium dicoccum

Telugu: Nalla bolici

It is a small or medium sized evergreen tree attaining up to 9 m in height with spreading or drooping branchelets. The stem is often crooked. The bark is dark grey, deeply cleft, with vertical fissures often warty.



Leaf: Dark green and lanceolate or ovate, smooth and glossy.

Flower: Pentamerous, white, fragrant, occurring in dense axillary often-umbellate cymes sessile or shortly peduncled.

Fruit: Is a drupe which is black and wrinkled when ripe.

Uses: The bark is used in the treatment of fevers and is also prescribed as an external application on fractures.

The leaves are reported to contain hydrocyanic acid.

The wood is used for making agricultural implements, combs, toys, bowls and jars, table legs, posts and rafters. Large shuttles particularly those employed in weaving silk are made from this wood.

Family: Rubiaceae

Rubi 4 T

Ceriscoides turgida

Telugu: Bajji manga

Family: Rubiaceae

Rubi 6 T

Gardenia gummifera

Telugu: Chinna bikki

A small tree with rough twisted branches. Bark smooth and grayish brown. Deciduous in nature.

Leaf: Sessile, opposite, obovate, often with narrow cordate base, apex obtusely acute, margin entire, the lateral nerves have a distinct dot like gland known as “domatia” at the axil of each nerve.

Flower: The flowers are white in colour, turning yellow. They are bisexual and solitary.

Fruit: The fruit is a berry. It is oblong with a thin endocarp. It is smooth and not ribbed. Seeds are many and minute in size.

Distribution: This species is reported only from Peninsular India. It grows naturally in dry and hot localities with laterite soil.

Uses: The gum from this plant is antispasmodic, antiseptic, antihelminthic and reportedly useful in cases of splenomegaly, odontalgia, foul ulcers, wounds and obesity. Also used in veterinary medicine to keep off flies from sores.

Nursery notes: It can be propagated by vegetative means.

Vegetative propagation: The plant is propagated vegetatively through cuttings. Both semi-hardwood stem cuttings and rooted air layers are used as propagates. Stem cuttings must be 15 – 20 cm long and are planted in clayey loam soil. Shaded nursery beds are preferred and regular watering should be done. Cuttings root in 20 – 30 days and 40% of them are known to establish.

Transplanting and Aftercare: Cuttings are maintained in the nursery beds until they root and are transplanted in the field during November – December.

Threat Status: The IUCN Red List Status of this species has been assessed as “Vulnerable (Globally)”

Family: Rubiaceae

Rubi 7 T

Gardenia latifolia

Telugu: Pedda bikki

A small deciduous tree with large leaves and flowers. Bark is greenish grey, exfoliating and leaving rounded depressions. Yields a yellow resin.



Leaf: Broadly elliptic, attenuate at base to a short petiole.

Flower: Large, white changing to yellow, terminal or axillary.

Fruit: Globose, nearly an inch long, with 4-5 placenta. Seeds are 0.2 inches long.

Distribution: Northeastern Andhra Pradesh and Deccan Peninsula extending to the dry deciduous forests in the lower hills of the Ghats

Family: Rubiaceae

Rubi 9 T

Mitragyna parviflora

(Syn: *Stephegyne parviflora*, *Nauclea parviflora*)

Telugu: Kavada / Alijeegi

These are large deciduous trees. Bark light grey and smooth. The wood is light pinkish brown in colour

Leaf: Variable in shape and size, usually obtuse. Stipules large and fall off early

Flower: Light yellow flowers occur in heads.

Fruit: A globose head of capsules many seeded seeds are flat and winged.

Distribution: Found widely distributed in dry deciduous forests, occasionally in evergreen forests, also cultivated.

Uses: Bark fibre is used for cordage. Wood pulp is used for paper wood is used for furniture, implements and utensils.

Family: Rubiaceae

Rubi 10 T

Morinda pubesence

Telugu: Motu manga

Family: Rubiaceae

Rubi 11 T

Morinda tinctoria

M. exerta, M. citrifolia

Telugu: Erra vaddi

A moderate sized deciduous tree.

Leaf: Leaves opposite, usually pubescent and tomentose, up to 6 inches long, varied in shape.

Flower: Tubular, occur in axillary or terminal heads.

Fruit: Pyrene, usually less than 0.75 inches in diameter.

Distribution: Normally found in dry forests, seen to occur in low altitudes. Cultivated in Bihar and Madhya pradesh.

Uses: Roots are a source of a red dye, which is used for colouring linen, and woollen .Raw fruits are edible.

Family: Rutaceae

Ruta 1 T

Aegle marmelos

Telugu: Bilva patre

Middle sized, evergreen tree up to 10 m high, thorny, with rough greyish bark, which is slightly corky. Branches are armed with strong axillary spine about 1 -3 cm long.



Leaf: Alternate compound trifoliate, rarely pentafoliate. Each leaflet is smooth, lance shaped 3-8 x 1.5 - 4 cm. lateral or side leaflets are sessile.

Flower: Small, greenish-white, sweet-scented. Bloom between April- May.

Fruit: Greenish-yellow, spherical with a hard woody shell, 5 – 13 cm in diameter, pulp sweet-sour, edible. Seeds are numerous, oblong, compressed with a woolly mucoid testa.

Distribution: Wild in dry and moist deciduous forests of the Eastern and Western Ghats. Do not thrive at all on hills above 1000 m. Cultivated throughout India in plains, particularly near Shiva temples

Uses: Fruits, roots and leaves all have medicinal value. Ripe fruit pulp is laxative and is reported to be good for the heart and brain and in dyspepsia. Unripe fruits are reported to be useful in diarrhoea, dysentery and stomachalgia. Ripe fruits used as a refreshing drink in summer, Roots are reported to be useful in cases of seminal weakness, uropathy, swellings, intermittent fever and gastric irritability in infants. Root bark is reported to be useful in hypochondriasis, melancholia, palpitations of the heart and stomach pain.

Leaf juice extract is applied externally in abscess.

Nursery notes: Grows in areas with mean annual rainfall ranging from 500-2000 mm. Drought hardy, it is found often in dry localities in stiff, dry, clayey, as well as alluvial soils.

It can be propagated using seeds and by vegetative means. Seed viability is very short. Regeneration by root suckers is the chief mode of propagation.

Seed Propagation: Ripe fruits are collected during March and May. Seeds are separated, washed thoroughly to remove the mucilage completely and then dried in the sun for a few days. Seeds cannot withstand storage for long and have to be sown immediately after collection in raised or flat beds.

Pre-treatment: Soaked in water for about 12 hours and then dibbled in polybags or beds. Spacing of 20 x 10 cm is adopted. Germination is observed in 10 – 15 days. Duration of nursery 3 – 12 months.

Vegetative propagation: Propagation using root suckers is the most common method. Ring grafting is also another technique.

Transplanting and After Care: The seedlings are ready for planting out in the next season. It may be desirable to retain seedlings with undergrowth for 1 -2 years since they grow very slowly. Protection should be provided against grazing.

Threat Status: The IUCN Red list status of the species has been assessed as Vulnerable for Karnataka and Tamil Nadu. Locally the plant has become rare in the last 10 years.

Ruta 2 T

Family: Rutaceae
Chloroxylon swietenia

Telugu: Billi

A large beautiful tree occurring in Peninsular India. It is also known as the Indian Satinwood tree.



Leaf: The leaves are compound having 20-40 leaflets. They are oblong, oblique and dotted with glands.

Flower: Flowers are greenish white. Calyx and petals hairy. They flower in March – April.

Fruit: The fruit is a capsule, oblong, dark brown having winged seeds.

Distribution: It is common tree found in areas having dry deciduous vegetation in India.

Uses: The leaves are applied to wounds. Wood is of high value and it is by far the first timber trees used in India and Ceylon.

Ruta 3 T

Family: Rutaceae

Citrus spp.

Telugu: Aduvi nimma

Ruta 4 T

Family: Rutaceae

Feronia elephantum
(Syn. *F.limonia*, *Limonia acidissima*)

Common name: Wood apple

Sanskrit: Kapitha

Telugu: Velaga

Tamil: Velangai

Kannada: Beladakai

A large, glabrous tree armed with spines.

Leaves: The leaves are alternate, compound tri-foliolate. The leaflets are membranous, having a toothed margin and glabrous.

Flowers: The flowers are white or dull red in colour. Occur in axillary panicles and appear in February - March.



Fruit: The fruit is large berry, globose or ovoid. The rind of the fruit is smooth and woody. The seeds are numerous and imbedded. The cotyledons are thick and fleshy. The fruit takes several months to develop and is fully ripe in the months of November-December.

Distribution: This plant is found to occur in the dry open regions of India. It is also commonly cultivated.

Uses: The edible fruits are considered as a tonic and anticorbatic. The leaves are aromatic, carminative, astringent and yield as essential oil.

Nursery notes: This species is suitable for cultivation in open plains. It is recommended for plantation in black cotton soils. It can be propagated both by seeds as well as by vegetative means.

Seed propagation: Seeds should be collected from fully ripe fruit by breaking the hard rind and continuously washing the pulp to get the seeds. The collected seeds are sown as quickly as possible after collection because they have a short viability. Seeds are mixed with ash and then dried. Seeds, soaked in cold or tepid water for

24 hours. They are sown in October – November in polybags and a thin layer of hay is spread over the polybags. Germination occurs within 10 – 15 days and 70% success rate in germination is observed. About 63% of the seedlings establish. The growth of the seedling is slow and hence cow dung slurry is recommended to boost the growth.

Vegetative propagation: Vegetative propagation is through approach grafting or softwood grafting. For softwood grafting root stocks should be raised in polybags and seedlings of 3-4 months should be used. Scion should be 8 – 15 cm long. Wedge shaped scions should be inserted in the rootstock and firmly tied with polythene strips. Successful grafts can be planted withing 6 – 8 months.

Transplanting and Aftercare: The seedlings are field planted after they attain a height of 30 – 45 cm.

Family: Santalaceae

Sant 1 T

Santalum album

Telugu: Srigandham

A small evergreen usually semi parasitic glabrous tree. Bark dark grey, rough. Wood hard, sapwood is white and scentless, heartwood is yellowish brown and strongly scented.

Leaf: Elliptic or ovate up to 3 inches long , 1.5 inches broad, glaucous beneath.



Flower: Flowers are brownish purple, bisexual and tubular.

Fruit: Fruits are sub-globose drupes, which turn black when ripe.

Distribution: Occur in dry open scrub forests in peninsular India south of the Vindhyas. Common in Karnataka and Tamil Nadu. Has been planted in Uttar Pradesh, Rajasthan Madhya Pradesh and Orissa.

Uses: The heart wood contains an essential oil used for perfumery and various other cosmetic purposes. The wood and the oil are used in medicines for cooling, diuretic and expectorant purposes. Paste of the wood is applied to burns and for fevers and headaches. Oil

from the seeds is used for curing skin troubles.

Wood is used for carving artefacts; saw dust is used for making incense sticks

Family: Sapindaceae

Sapi 4 T

Lepisanthes tetraphylla

(Syn. *Hemigyrosa canescens*, *Molinoa canescens*, *Cupania canescens*)

Telugu: Mabbu gotti



A shrub or moderate sized rather crooked evergreen tree with white heartwood

Leaf: alternate, compound, paripinnate. Leaflets 2-3 pairs, elliptic - oblong 3 - 10 inches long with an obtuse or emarginated leaf tip.

Flower: Flowers are small unisexual with male and female flowers found on separate plants.

Fruit: Yellow-velvety tomentose, depressed at the apex when ripe

Distribution: Found in Deccan Peninsula up to an altitude of 300ft.

Uses: The fruit has sweetish pulp and is edible. The local communities eat only the seeds dropped by the birds.

Family: Sapindaceae

Sapi 5 T

Sapindus emarginatus

English: Soapnut

Telugu: Koogati

Its shiny, rough, grey bark and abruptly pinnate leaves help identify this tree. It is a deciduous tree reaching up to a height of 18 m and 1.5 m girth.

Leaf: Alternate compound, paripinnate, leaflets 2-3 pairs, oblong, emarginate at apex. Dull green in colour above and softly pubescent on nerves as well as on the ventral side.



Flower: The flowers are white. The trees flower in October – December.

Fruit: The fruits are fleshy indehiscent drupe. The drupe is lobed, with single pea-sized, smooth, blackish seed in each of the lobe. Fruits ripen on trees in February – April.

Distribution: The tree is common in the Indian Peninsula chiefly cultivated in West Bengal, Madhya Pradesh, Uttar Pradesh, and Bihar.

Uses: The fruit is used as a substitute for washing detergent. Especially used to wash silk and woollens. It is also used as a shampoo. Jewellers use it to wash and restore brightness to tarnished ornaments. The bark is decorative and is suitable for cabinetwork and turnery.

Nursery notes: Seeds as well as stumps can be used to propagate these plants.

Seed propagation: Fruits are collected from the ground below the tree during the months of February – April. They are dried for 3-4 days and stored in gunny bags. As pre-treatment they are soaked in water or in cow dung for 24 hours. Seed coats should be removed from the seeds before sowing. Seeds can be directly sown in the fields in mounds at a distance of 3-4 m between pits and 5 m between rows. Seeds can alternatively also be sown in elevated nursery beds prepared by mixing sand, soil and farmyard manure in a ratio of 2:1:1. These should be watered daily after sowing. Germination is observed to take place after two months. Direct sowing is recommended as the seeds are big, easy to sow and the seedlings establish themselves well. August-September is the season for planting.

Vegetative propagation: Vegetative propagation is done by using stump cuttings.

13 – 14 month old seedlings are used for making stump cuttings. The cuttings can be made from root or shoot. 10 cm of shoots or alternatively 12-25 cm of root are used.

Transplanting: Seedlings can be transplanted into the field after 13 – 14 months. Stumps can be transplanted directly into the field during monsoon. Watering is essential during the first year of growth. Plantations are well established within 2 – 5 years.

Family: Sapotaceae

Sapo 1 T

Madhuca latifolia

(Syn: *Bassia latifolia*)

Telugu: Vippa

A large deciduous tree that can grow very tall. Trunk with a short bole and numerous branches forming a thick leafy crown. Bark dark coloured, cracked and exuding milky latex.

Leaf: Clustered near the ends of branches, Leathery, elliptic, hairy when young, coppery-brown when tender.

Flower: Pendulous, in dense clusters at the ends of branches. Calyx rusty. Corolla creamy. Corolla is fleshy, sweet, and edible. Flower between February and April. The tree blooms at night and the flowers are shed and found on the ground at dawn.

Fruit: Fleshy, green, juicy ovoid berry. Densely rusty, 4-5cm in diameter, having 1-4 seeds. The fruits ripen in June-July and are edible.

Distribution: Common throughout the Indian plains, particularly in Central India often cultivated near *Adivasi* habitations.

Uses: Both flowers and seeds are rich in oil. Flowers are used as a vegetable and also used in distillation of alcoholic beverage. Flowers are used in cough and bronchitis.

Seed oil is used for cooking and soap making. Oilcake makes good manure and is also used as feed for cattle.

Decoction from the bark is used for curing bleeding gums and ulcers

Family: Sapotaceae

Sapo 2 T

Manilkara roxburghiana

(Syn: *Mimusops roxburghiana*)

Telugu: Nunna paal

It is a large evergreen tree. Wood is reddish brown and strong

Leaf: Leaves are glabrous, elliptic-oblong in shape; the apex is variable and rounded or acute at the base.

Flower: The flowers have lanceolate petals; they bloom in April.

Fruit: Fruits are globose and can have a diameter up to 2.5 cm

Distribution: Occasional in the deciduous forests of Southern India.

Family: Sterculiaceae

Ster 1 T

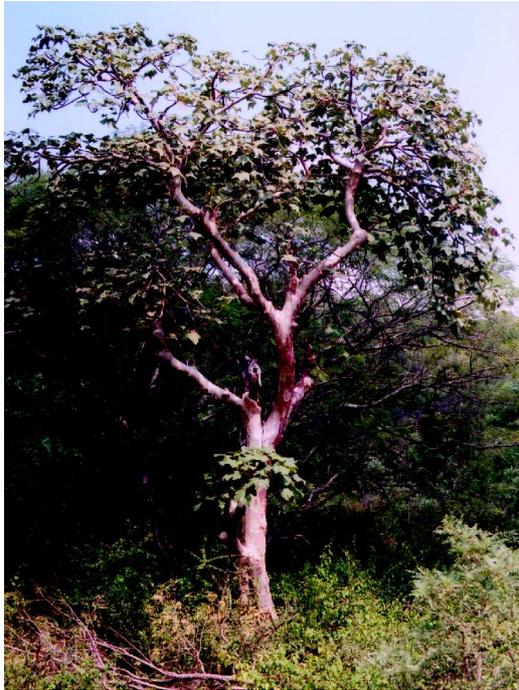
Sterculia urens

Telugu: Errapolici

A medium sized, deciduous tree up to 10 m with white or pinkish papery bark; often grows on rocky precipices.

Leaf: Large, 5-lobed, soft and velvety grey beneath, 30 – 45 cm, plate like, stalk as long as leaf, stipules fall off early.

Flower: Unisexual green or yellow tubular with purple throat occur in star-shaped clusters.



It is strong smelling and sticky. Bloom when the tree is leafless in March – April.

Fruit: 5 boat shaped follicles, woody fruitlets from one flower cluster looking like a starfish.

Crimson-velvet coloured when young. Woody brown when old. Have hairs that are bristly and stinging. The seeds are liked by birds for their fleshy sweetish covering (aril).

Distribution: Common in most jungles. Occurs in Uttar Pradesh, Madhya Pradesh, Rajasthan, Assam and Bihar southwards to the Western peninsula. It is indicative of rocky exposures.

Uses: Also known as Karaya Gum tree. The gum from the stem is used as a substitute for gum tragacanth and is used as a thickening agent in preparation of printing pastes for textile industry. The gum also finds application in cosmetics industry, paper industry as pulp-binder, in leather industry as an ingredient of dressings

compositions, in food, baking and dairy industries in dressings and spreads.

The bark yields a fibre, which is used for ropes and coarse cloth. It is also used in pharmaceutical and medicinal preparations including lozenges, emulsions, lotions, sprays, pastes, and laxatives.

The seeds are roasted and eaten. The wood pulp is suitable for wrapping paper.

Family: Tiliaceae

Tili 3 T

Grewia spp.

Telugu: Narepu

Family: Ulmaceae

Ulma 1 T

Holoptelia integrifolia
(Syn: *Ulmus integrifolia*)

English: Indian Elm

Telugu: Tabissi

A tall deciduous tree commonly found in deciduous forests all over India. It is 15 - 20 m high, sometimes with buttressed base. The bark is grey with pustules. The branches are spreading. The crushed leaves and freshly cut bark have a peculiar foetid smell.



Leaves: Elliptic in shape, leaf tip elongated, margin entire and smooth, leaf base rounded.

Flowers: Unisexual, male and female flowers mixed in pyramidal clusters. Flower around February – March.

Fruit: Almost rounded 2 - 3 cm. Flat like a coin, winged with centre containing a seed. The fruits are dispersed by wing

mainly during May – June.

Distribution: common in deciduous forests in the plains of India. Occasionally found in the hill forests of the Deccan Peninsula and on the eastern slopes of the Western Ghats.

Uses: wood is used for furniture. Wood pulp is used for paper making. The fibre from this tree is strong and is used locally to thatch huts.

Family: Verbenaceae

Verb2 T

Premna tomentosa

Telugu: Naarava



A moderate sized deciduous erect tree with greenish yellow flowers. Bark light greyish – brown, wood light brown in colour.

Leaf: Cordate, densely tawny – yellow (like the branches and inflorescence). It is up to 8 inches long and 5 in broad, petiole 1 – 2 inches long

Flower: Pyramidal panicles up to 4 inches broad, Calyx short, 5 lobed. Corolla is tubular

Fruit: A drupe sub globose. Calyx is persistent somewhat enlarged and widened.

Distribution: Common in deciduous forests, up to about 4000 ft.

Uses: decoction of leaves is used after childbirth and decoction of roots is given to cure stomachache. Wood is smooth and close-grained, of good quality and used for furniture.

Family: Verbenaceae

Verb 3 T

Vitex altissima

Telugu: Nemmiladi

A large and lofty tree with yellowish grey bark, wood grey to yellowish brown.



Leaf: Compound having usually 3, occasionally 5 leaflets. The leaflets up to 6 inches long; are sessile or sub sessile, lanceolate in shape and have an acuminate apex. Leaflets nearly smooth above and thinly pubescent beneath. Petiole is angular or winged. The winged petioles are most conspicuous in young plants and coppicing shoots.

Flower: Flowers occur in racemose inflorescence. They are white tinged with blue and violet. Bracts are small, corolla very small scarcely 2 inches long

Fruit: Drupes, small 2 inches in diameter.

Distribution: found in all forest districts in deciduous and dry forests of the Deccan Peninsula and southern India. Scarce in evergreen forests regions, occurs up to an altitude of 4000 ft. above mean sea level.

Uses: The seeds have a market. They are used as a pepper adulterant.

Wood grey to yellowish brown hard and close grained valuable for buildings, furniture, carts etc.

Family: Verbenaceae

Verb 7 T

Vitex spp.

Glossary

Aril: An appendage more or less enveloping the seed.

Axillary: Situated in an axil which is the angle between the leaf and its point of attachment on the main stem.

Bipinnate: Used to refer to compound leaves where the mid rib bears pinnae which in turn bear leaflets. Leaflets arranged on an axis, and many such arrangements are arranged on a common rachis like in a feather.

Blaze: The colour of the wood as seen when the tree is cut.

Bole: The main stalk or trunk of the tree.

Capsule: A dry dehiscent fruit.

Coriaceous: Leathery texture.

Drupe: A fruit with a more or less succulent flesh enclosing the stone.

Glabrous: Without any kind of hair.

Hispid: With rough or bristly hairs.

Imparipinnate: Pinnate with an odd terminal member.

Inflorescence: The flower cluster as a whole

Lenticellate: Corky spots shaped like a bi-convex lens seen on young barks.

Ligule: A narrow transverse appendage at the inner side of the base of the leaf.

Panicle: A repeatedly branched inflorescence.

Papilionaceous corolla: Five petals having one standard, two keel and two winged petals, typical of sub-family Papilionaceae in family Leguminosae.

Paripinnate: Pinnate with an equal number of members on each side of the axis and no odd terminal leaflet.

Peduncule: The common stalk of two or many flowers or of a complete inflorescence.

Pinnate: Leaflets arranged on each side of a common axis as in a feather.

Pubescent: Clothed with soft, rather short hair or down.

Pyrenes: A nut-let; often seen as one of the small stones of a drupe or similar fruit.

Retuse: A shallow notch in a rounded apex.

Salver: Shaped like a platter.

Samara: An indehiscent winged fruit or winged parts of a dehiscent fruit.

Sessile: Without a stalk.

Stone: A hard endocarp enclosing a seed.

Tomentose: Densely matted with woolly hair.

Umbel: An inflorescence in which a cluster of pedicels springs from the same point. It appears like an open umbrella.

Viscid: Sticky or clammy owing to an exudation.

REFERENCES

1. Flora of the Presidency of Madras – Volumes I, II and III, 1997, By J.S. Gamble, Published by: Bishen Singh Mahendra Pal Singh, Dehradun, India.
2. A Text Book of Systematic Botany, 6th Edition, By. R.N. Sutar, Published by Khadayata Book Depot, Ahmedabad, India.
3. Field Guide to the Common Trees of India, 2nd Edition, 1998, By P.V. Bole and Yogini Vaghani, Published by: World Wide Fund For Nature India, Oxford Univ. Press, Bombay, India.
4. Dictionary of Economic Plants in India, 2nd Edition, 1983, By Umrao Singh, A M Wadhvani and B M Johri, Published by Indian Council of Agricultural Research, New Delhi, India.
5. Flora of Karnataka, Volume I, 1976, By Cecil J. Saldhana sj. Published by Bangalore Press, Bangalore, India.
6. Silviculture of Indian Trees, Volume I to VII, 1975, R.S. Troup's, Published by Government of India, New Delhi, India.
7. Illustrated Field Guide, 100 Red Listed Medicinal Plants of Conservation concern in Southern India. By K. Ravikumar and D k Ved, 2000. Published by FRLHT, Bangalore.