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Terminalia chebula Retz.

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Terminalia chebula Retz.

Taxonomy and nomenclature

Species name: *Terminalia chebula* Retz.

Family: Combretaceae

Vernacular / common name : Harra, Haritaki (India), Arura (Tibetan) heji (chinese), chebulic myrobalan (trade name).

Distribution and habitat

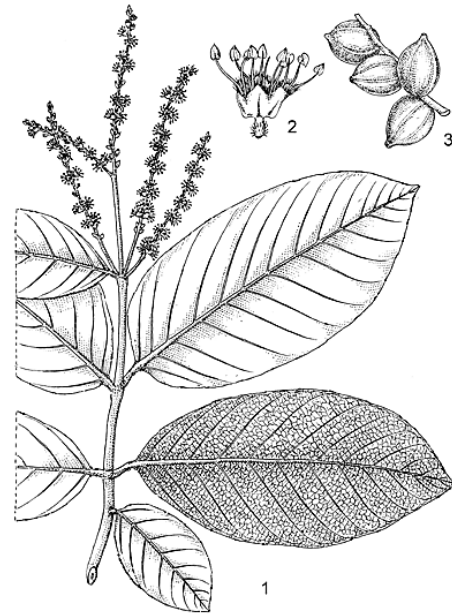
The tree is native to southern Asia distributed in India, Pakistan, Nepal, Bangladesh, south China, Sri Lanka, Malaysia, Vietnam and Myanmar and also growth in tropic Africa. In India it is found up to an altitude of 1500m covering northern tropical wet evergreen forests, North Indian moist deciduous forests, tropical seasonal swamp forests, southern and northern tropical deciduous forests, southern sub-tropical broad-leaved hill forests and sub-tropical pine forests. The maximum and minimum shade temperature of its natural habitat varies from 36-47.5°C and 0-15.5°C and rainfall 750-3300 mm. The tree can grow in sandy, clayey, deep or shallow loam soil. It is found in a wide variety of geological formations such as on metamorphic rocks, granites, gneisses, shale, mica, schist, tertiary sandstones, and conglomerate. It is a strong light demander, though young plants thrive better by protection from direct sunlight. It is frost-hardy and drought resistant. It also withstands fire well and exhibited a good recovery from scars and burns after a fire. Natural regeneration is good in open forest with good drainage.

Use

The timber is rather poor quality. It is mainly used as posts, beams, for frames, axels and shafts of carts, tool handles etc. The important product of the tree is the fruit known as *myrobalan of commerce* or *chubulic myrobalan*. The dry pulp surrounding the seed contains 30-32% tannin, the content of which depends on the season and site of collection. Myrobalans are used in tanning of leather, purification of petroleum, making ink and dyes. The tree has medicinal properties. Bark is used as diuretic and cardiogenic. Fruit is astringent, laxative, stomachic, also used externally for healing wounds and scalds, and a gargle in inflammation of mucous membrane of mouth. It also gives relief in asthma, eye, teeth and gum problems.

Botanical description

It is a moderate to large deciduous trees attaining a



height of 15 to 30 m and a girth of 1.5 to 2.4m (50-75 cm DBH) with a short cylindrical bole (4-9 m) and rounded and spreading crown. In moist regions it has a larger dimension, whereas in dry areas it is a small tree. Bark is 5-6 mm thick, surface dark brown to black, fissures shallow, vertical, exfoliating in thick woody scales; blaze soft and yellowish-brown; young shoots densely pubescent; branchlets brownish or greyish, glabrous. Leaves are simple, alternate or subopposite, exstipulate; petiole 12-25 mm long, stout, grooved above, pubescent, 2 sessile glands at the top; lamina 9.5-28 x 4-13 cm, ovate, elliptic, to elliptic-obovate, base round, obtuse, oblique or subtruncate, apex acute, acuminate, obtuse or apiculate, margin entire, glabrous above tawny villous beneath, coriaceous; lateral nerves 6-12 pairs, pinnate, ascending, prominent, arched towards the margin, intercostae reticulate, prominent. Flowers bisexual, greenish-white, 5-6 mm across, in terminal and axillary spikes with offensive smell; bracts 2-3 mm long; calyx tube 1.5-2.5 x 0.8-1 mm, villous, constricted above the ovary, lobes 5, creamy, triangular, 1.5 mm; petals absent; stamens 10; filaments 4-6 mm; disc 5-lobed, villous; ovary 2 mm long, inferior, densely villous, 1-celled; style long and thick, subulate.

Fruit and seed description

Fruits: The fruit is a drupe, ellipsoid or ovoid, 2-4cm long, 2-2.5cm in diameter, with a greenish brown or dark brown slightly shiny surface when young; rough,

hairless, hard, yellowish or blackish brown and usually 5 longitudinal ridges when mature. It has a round fruit stalk scar at the base. The fruit pulp (exo- and meso-carp) is hard and fibrous.

Seeds: The functional seed is the pyrene (stone) containing one seed in each fruit. Narrowly spindle-shaped, about 1cm long, 0.2-0.4cm in diameter; with a yellowish brown surface. There are two interweaving cotyledons. Seed weight varies from 140 to 790 per kg depending on source of collection.

Flowering and fruiting habits

Flowering occurs during April-June. In areas receiving enough north-east monsoons, flowering may take place in July-August. The fruits ripen from November to March depending on the locality and fall soon after ripening. Generally two good seed years are followed by one or two poor ones. The quantity of seeds produced by a tree varies considerably.

Seed collection

Fully mature seeds are collected as soon as they have fallen. Premature collections have low germination capacity. The effective way of collection is to spread a tarpaulin under the tree and collect the fruits after shaking the branches of the tree. The optimum period for collection is when the fruit colour turns greenish brown and the moisture content is less than 10%. Fruits on the ground may be damaged by insects or rodents. Therefore mature greenish brown seeds are dried on cement floor or table top till the moisture content has reduced to 4-5%.

Processing and handling

The fruits are soaked 24-48 hrs in water to soften the fibrous pulp, which can then be removed by macerating the fruits and washing thoroughly under water. Clean seeds (pyrenes) are then dried under shade.

Dormancy and pretreatments

Terminalia chebula seeds have physical dormancy. Alternate soaking and drying was found effective in breaking dormancy and improving germination. Seven days soaking in cold water and drying for two days under sun gave better germination (65-70%); soaking and drying period depends on the source of collection. As soon as the pericarp crack appears, seeds should be sown immediately in moist soil. Another method of seed pretreatment is to clip the broad end in such a way that

the embryo is not damaged. Such seeds are soaked in cold water for about 36 hours and sown in nursery beds under shade. This gives about 70-80% germination.

Storage and viability

Seeds are of orthodox type and can tolerate desiccation to 4-5% moisture content; hence the. The seed remain viable for more than five years if stored at freezing temperature (0 to minus 20°C) with 4-5% moisture content. At ambient temperature (15-35 °C) seed viability can be maintained up to two years with the same moisture content.

Sowing and germination

The tree can be raised by direct sowing, transplanting of nursery raised seedlings and planting root and shoot cuttings. However, direct sowing is not very successful due to poor germination, insect and rodent damage. For raising seedlings at nursery, the pretreated seed is sown in shaded nursery beds covered with clayey loam or sandy loam soil. The young plants need regular watering during the hot season. One year old seedlings are transplanted at a distance of 1.8 x1.8m under shade. Plantation areas should be fenced as the young plants are susceptible to browsing. The plant grows rather slowly.

Pests and diseases

Ascotis infixasia, *Hyblaea puera*, *Aswra dharma* and *Selepa celtis* are the major defoliators. The beetle and larvae of *Attagenus alferii* and *A. gloriosae* damage dry stored fruits. Among the pathogenic fungi, *Uredo terminaliae* attacks leaves, *Phyllactinia terminaliae* causes powdery mildew and *Cercospora catappae* causes leaf spots.

Selected readings

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