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Kundu, Maitreyee; Schmidt, Lars Holger

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SEED LEAFLET

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Terminalia arjuna (Roxb. ex DC) Wight & Arn

Taxonomy and Nomenclature

Species Name: *Terminalia arjuna* (Roxb. ex DC) Wight & Arn.
Synonym: *Pentaptera arjuna* Roxb. ex DC.
Family: Combretaceae
Vernacular (Common name): Tropical almond, arjuna (English), Koha, arjun, vellai maruthu (India)

Distribution and habitat

Terminalia arjuna is a native species of tropical dry and moist deciduous forests of India and Sri Lanka growing along the rivers, streams, ravines and dry water courses up to an elevation of 1500 m. It is distributed in the greater part of India from sub-Himalayan tract especially in Bihar, West Bengal, Jharkhand, southwards to Orissa and Madhya Pradesh. It is also found abundantly in the west coast. It is planted as an exotic in Thailand and Indonesia. The species is extensively planted in India for shade and ornament in avenues or parks in dry and hot regions. The tree is a characteristic of dry tropical riverine forests and riparian fringe forests. The mean annual rainfall of its natural habitat is 750-1750 mm. The absolute maximum shade temperature varies from 38° to 48°C and minimum 1°C to 15°C. It grows on a variety of soil with good moisture supply. However, it thrives best in fertile, loose, alluvial or red lateritic soil along river bank. Its shallow root system prevents its establishment in dry areas. The tree is a moderate shade-bearer.

Uses

The timber is very hard, strong and moderately heavy, used in agricultural implements, boat-making, mine props, house building and plywood industry. The wood is excellent firewood and produces good charcoal. It yields rayon grade pulp after mixing with other hardwoods. Leaves are used as livestock fodder and also for raising *tassar* silkworms. The tree is a good avenue and shade tree for roadside plantation and as an ornamental. It can also be intercropped with coconut and citrus and used as shade tree in coffee plantation. The tree is planted along the river bank to prevent soil erosion. The most useful part of the species is the bark which is used as medicine for the treatment of heart diseases, cancer, dermatological and gynecological problems and urinary disorders. The bark is used as an astringent and tonic and also as tannin material.

Botanical description

Terminalia arjuna is a large evergreen tree with a spreading crown and drooping branches, buttressed and fluted stem. The tree may reach up to 40 m in height and girth of 3.6m (115 cm DBH). Bark is thick, smooth, exfoliating in thin irregular sheets, green when freshly exposed, turning grey or pinkish green. Leaves are sub-opposite oblong or elliptic, coriaceous, usually, 5-25 cm long and 4-9 cm wide; apex cordate, shortly acute or obtuse, base rounded. The petiole is short, sericeous, with one or two glands. Flowers are arranged in short axillary spikes or small terminal panicles, 9-13 cm long with 2.5-6cm long side branches. The rachis is short, white pubescent, lower receptacle is short, sericeous, upper receptacle long glabrous except at base where it is slightly pubescent. Flowers are small, regular, sessile, polygamous, white creamy or greenish white and strongly honey-scented, petals absent; the 5-lobed cup-shaped calyx forms the prominent component of the flower, stamens 10.

Fruit and seed description

Fruits are 2.5 – 5.0 cm long, ovoid or ovoid-oblong, dark brown to reddish brown, fibrous, woody, indehiscent drupes, glabrous with 5-7 equal, hard raised ribs (wings), single seeded. Since seeds are not extracted, the fruits are functionally the same as the seeds. About 175 to 450 fruits weight one kg.

Flowering and fruiting habit

The tree starts bearing fruits 6-7 years after planting when they are 4-6 meters high. Flowering occurs shortly after fruit fall. The spikes of flowers appear from April to July depending on the regions, and the fruits ripen in the following February to May, nearly a year after flowering. Generally, good seed crop occur every 3 years. Pollination is entomophilous.

Seed collection

Fruits are collected during April when they turn brown and moisture content reach 6-7%. The method of collection is to clean the forest floor under the tree and collect the fruits by shaking or lopping the branches. Collection can also be done 1 to 3 weeks before natural shedding, when the moisture content of the fruit is still as high as 30-40%. In that case seeds should be dried in shade with proper aeration on cement floor or table top until the moisture content reach 3-5%.

Processing and handling

After collection, fruits are separated from twigs, chaff, etc. The seeds are not extracted from the fruits.

Storage and viability

Terminalia arjuna seeds are orthodox. They can tolerate 2-5% moisture content. The seeds can be stored for longer period (more than 5 years) if stored at freezing temperature (0 to -20°C) with low moisture content. Even hermetic storage at room temperature (15-35°C) with 5% moisture content retains their viability up to 2 years.

Dormancy and pretreatment

Seeds are mildly dormant. Overnight soaking with Indole-3 acidic acid (IAA) at the dose of 500 ppm induce better germination capacity and speed. Pretreatment can also be done by soaking 8 hrs in cold water and placing them in a germinator at 40°C after wrapping them in a moist paper towel. Pretreated seeds take 8-12 day to start germination and complete within one month, whereas in untreated seeds germination starts in about 20 days and completes in two months. Germination capacity of treated seeds is 60-70%.

Sowing and germination

The species can be propagated by direct sowing or planting nursery raised seedlings. Large (heavier) seeds show better germination. In direct sowing, fruits are sown in lines 3-4m apart in June-July with the onset of monsoon rains. Seedlings can also be raised in nursery from pre-germinated seeds sown in polythene bags or in lines.

Phytosanitory problems

The fungi, *Polystrictus affinis* causes white fibrous rot and *Phyllactinia terminalae* powdery mildew disease. The insect *Trioza fletcheri minor* that breeds April to December feeds and damages the leaves. Spraying Bidrin 0.1% and dimethoate 0.2% during the non-breading season proved to be effective in its control. The larvae of *Apoderus tranquebaricus* feed in nursery and young ones and destroy the entire flush of new leaves. Seed can be damaged by the bird *Psittacula Krameri* (Rose-ringed parakeet).

Selected readings

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Author: Maitreyee Kundu, E-mail: spalliwest@yahoo.co.in
Ed: Lars Schmidt
For further information: Director, Tropical Forest Research Institute, P.O. R.F.R.C., Mandla Road, Jabalpur 482021, India.

Seedleaflets are a series of species wise extension leaflets for tropical forest species with special emphasis on seed technology. Leaflets are compiled from existing literature and research available at the time of writing. In order to currently improve recommendations, IGN encourage feedback from users and researchers who have experience with the species. Comments, corrections, improvements and amendments will be incorporated into future edited leaflets. Please write your comments to lsc@ign.ku.dk