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ECONOMIC IMPORTANCE AND MEDICINAL STRENGTH OF VIDANGA (EMBELIA RIBES) : AN ENDANGERED MEDICINAL PLANT OF WESTERN GHATS OF INDIA

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ABSTRACT

Embelia ribes Burm f. a medicinal woody climber belongs to the Myrsinaceae family. It is also commonly known as false black pepper or vidanga. *E. ribes* is one of the 32 medicinal plant species identified by the Medicinal Board, Govt. of India, New Delhi, as being important for large-scale cultivation because of its commercial use. It is an endangered medicinal plant valued for its digestive, thermogenic, carminative, depurative, anthelmintic and laxative property since time immemorial. It is also used in the treatment of tumours, asthma, bronchitis, diabetes, heart related problems, neural disorders, cancerous tumors and liver disorders. *E. ribes* contain quinine derivative Embelin which has various pharmacological and medicinal properties. It helps to bring a medicinal plants revolution in our country good health and prosperity to people.

Keywords: Endangered, western Ghats, vidanga, medicinal property and conservation.

INTRODUCTION

The Western Ghats in India is one of the most threatened biodiversity hot spots of the world. Among the 600 plant species considered to be rare or threatened in the flora of the peninsular India, about 90 per cent species are in the Western Ghats. More than 63 per cent of the plant species of low and medium elevation evergreen forests are endemic (Ramesh *et al.*, 1991). A greater fraction of these threatened species are medicinal plants. About 146 species are listed from Karnataka alone. Gowda *et al.* (2002) studied the habitats of Western Ghats and have revealed that, most of the eastern and western transition zones host a variety of RET species. *Embelia ribes* Burm f. is one such species. According to IUCN (International Union for Conservation of Nature and Natural Resources), Switzerland. *Embelia ribes* commonly known as False Black Pepper, White-flowered Embelia, *Vidanga*, *Vaividang*, or *Vai Vidang* (MMPD, 2009) is a species in the Primulaceae. It was originally described by Nicolaas Laurens Burman in his 1768 publication, *Flora Indica*

(IOPI). It is one of the 32 medicinal plant species identified by the Medicinal Board, Govt. of India, New Delhi, as being important for large-scale cultivation because of its commercial use

DISTRIBUTION

It is mainly distributed in warmer regions of northern and southern hemisphere. Most of the genera and species are tropical. Genus *Embelia*, represented by more than 100 species, is distributed in Tropical Asia, Africa and Australia and Pacific islands. Species of *Embelia* like *E. ribes* and *E. basaal* are known for their medicinal use since thousands of years in parts of Southeast Asia. *E. ribes* is an Indo Malayan species, distributed in India, Sri Lanka, Singapore, Malaysia and S. China. It is sparsely distributed in the evergreen to moist deciduous forests of Arunachal Pradesh, Assam, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu and is now confined to the informally protected 'sacred groves' and restricted to a few remnant forest pockets and MPCAs (Medicinal Plant Conservation

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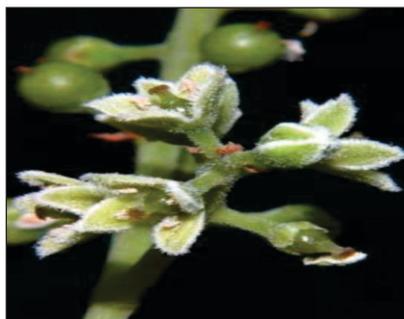
Areas) that Forest Department has established. Within India, it is found throughout up to an altitude of 1750 m amsl in these regions. It is 'Vulnerable- VU' in Karnataka and Tamil Nadu, 'Near Threatened – NT' in Arunachal Pradesh and Kerala and 'Data Deficient -DD' in Assam, Meghalaya, Sikkim and Maharashtra (CAMP, 2001). In Karnataka, *E. ribes* is distributed in evergreen forests. In northern parts of Western Ghats, *E. ribes* is distributed on

edges of disturbed evergreen and semi evergreen forests (Mhaskar *et al.*, 2011). Recently Hareesh *et al.* (2009) reported that in humid tropics of the central Western Ghats, only 8 individuals out of 24 identified in a 1 km transect bear fruits. Although size class distribution of lianas suggested a near 'reserve J' pattern, the regeneration was restricted to mildly disturbed spots.

BOTANICAL DESCRIPTION



Flowers



Fruits

It is a dioecious woody climber with lenticular bark with whitish grey stem and long, slender, flexible, terete branches. The roots are brownish grey with hairy reddish rootlets; leaves are simple, alternate, elliptic-lanceolate, coriaceous, gland-dotted, entire, shiny above and silvery beneath; flowers are small, white or greenish borne in panicles; fruits are globular berries, small like that of a pepper, wrinkled or warty, dull red to black, 1- or 2-seeded; seeds are globose, hollowed at the base, white-spotted. (Kirtikar KR *et al.* 1993)

CHEMICAL CONSTITUENTS

Major constituents: Embelin

Other constituents: Vilangin, Quercitol, Tannins, Volatile Oil

FLORAL BIOLOGY

Flowers are small, white or greenish borne in panicles. Petiole is 1.0cm, midrib is prominent, racemes type of inflorescences shown & flower buds are small globules greenish yellow before maturing, after maturing in sunshine the sepal from calyx and the Petiole is greenish yellow & petal from corolla is whitish pink in which one of the corolla is bigger than 4 number. Stamens are dark yellowish-pink arranged radially which is cone shape and spiny structure is inclined & broad structure shows divided into two anthers as projected tapering styloid which is attached dorsifixed stamens with the filament attached at 45° angle The sepals shows attached to the petiole with a marking above the neck at 45° angle shows a shape of hand

as 3 fingers as dentate and short toes. (Syed Asadulla *et al.* 2012)

PARTS USED: Berries (fruit), leaves, root bark.

MEDICINAL USES

Embelia ribes is also one among the top 20 ayurvedic drugs of the country. It is effectively used in the treatment of ascariasis Sore throat, abdominal, inflammatory and mental disorders, constipation, headache, flatulence, indigestion, jaundice, snake bite, skin diseases, leprosy, nervous debility, dyspepsia, colic, tumors, asthma, and general debility. (Shah CS *et al.* 1961)

Embelia root bark is acrid, astringent and has anthelmintic, antifertility, antioestrogenic, carminative, digestive, laxative, soothing, stimulant, stomachic, and thermogenic properties. It is effective against intestinal parasites and intestinal worms. It is used in abdominal disorders, fungal skin infections, flatulence, constipation indigestion, headache, hemorrhoids, lung diseases, obesity, piles, pneumonia, mouth ulcers, toothache and sore throat. Its decoction is useful in insanity and heart diseases. The root of *E. ribes* is boiled in water and the decoction is effective against chest pains. Besides, paste of powdered leaves, mixed with honey is consumed to treat ulcers of mouth (Sharma GK *et al.* 1997). Roots are ground with lime juice and taken orally with honey against cough. The roots and leaves are astringent; thermogenic and stomachic. Leaves are astringent, thermogenic, demulcent and depurative in nature. It is useful in skin diseases and leprosy. Fruits are

acrid, astringent, anthelmintic, bitter, brain tonic, carminative, contraceptive, diuretic, febrifuge, laxative, stimulant, and thermogenic.

TRADITIONAL USES

Embelia ribes has numerous traditional medicinal uses. The main preparations employing the drug are Vidangaadi chruna, Vidangarishta, sarvajwara louha, Agnitundi vati, Yograja gugglu Kaishor gugglu, Chandraprabha Vati and Vidanga taila (Balakrishna Gowda, et al.2010). In olden days, dried fruits were considered for anthelmintic, astringent, carminative and used as an alternative and stimulant and usually administered as powder along with milk, followed by a purgative. It was also effective for the treatment of ascariasis better than Santonin and as good as Oil of *Chenopodium*. This product provides all the Rasayan benefits (Charak Samhita, 1998). The persons using Rasayan treatment in early ages lived very long life unaffected by old age, debility, illness untimely death.

CULTIVATION PRACTICES:

SOIL AND CLIMATE

The plant can be grown in variety of soils including light black cotton soil, sandy/rocky in different agro-climatic conditions in tropical regions up to 800-1500 m. altitude.

CLIMATE

Earlier attempts to plant *E. ribes* in areas outside the natural range were attempted by TBGRI (Tropical Botanical Garden Research Institute), Thiruvananthapuram, IFGTB (Institute of Forest Genetics and Tree Breeding), Coimbatore, UAS (University of Agricultural Sciences), and FRLHT (Foundation for Revitalization of local Health Tradition), Bangalore. Personal visits to these sites indicate that except in TBGRI which is in natural zone of *E. ribes*, all other attempts did not yield positive results. Only one surviving plant exists in FRLHT while the Botanical Garden of UAS Bangalore contains *E. tsjeriamkottam* and not *E. ribes*. In FRLHT, though flowering was observed after 4 - 5 years of planting, but fruiting and seed setting was not observed although plant contains bisexual flowers.

PROPAGATION

Natural regeneration of *E. ribes* is poor due to overharvesting and exploitation, more fragmented populations resulting in inbreeding, development of abortive embryos, and the slow germination of fertile seeds that are small in size. On the other hand, artificial regeneration of this species is difficult due to its poor seed viability, low rate of germination, and poor rooting from stem cuttings.

Habitat loss, Jhum cultivation, forest fire and agriculture expansions are also some factors for its decrease in

population. The regeneration from seedling of this plant is very poor³. The embryos of *E. ribes* are very small when present and most of the seeds are abortive. For the survival and growth of *E. ribes* specific habitat conditions are essential. Regeneration of *E. ribes* is very poor and slow. The ideal time for seed collection is from June to August. Mature seeds of *E. ribes* are purple to black unlike red colored seeds of *E. basaal*. Propagation can be achieved through seed germination and through stem cuttings.

BY SEEDS

Matured and ripened fruits are packed in polythene covers and placed under the artificial light source for 8 h per day. The cycle is continued for a period of 4-5 days. Pre sowing treatment of (10 per cent) H₂SO₄ for 10 min + GA₃ (4000 ppm) is the best treatment for *Embelia ribes*. By this method, 40 per cent seed germination can be achieved successfully. Sand media are sufficient to achieve the seed germination. Sand bed with at least 9 cm thickness prepared in large tray is sufficient for raising seedlings under nursery conditions. Seeds are sown in a row inside the handmade furrows. Uniform and thin layer of sand should be spread over the seeds. Immediate watering should be done. Seed germination starts after 50 days of sowing with 40 per cent germination.

BY STEM CUTTING

Pencil sized stem cuttings of 1.0-1.5 cm thickness bearing 3 nodes are planted 3 cm deep in polybags and kept in shade. Cuttings are treated with two types of root regulators such as Indole Butyric Acid (IBA) (200ppm) and commercial quick root solution before planting. Post-Monsoon season is the best time for collection of stem cuttings.

Pre treated stem cuttings are placed in root trainers and transferred to poly chambers. Rooting media is prepared from sand, coir pith and perlite. Microclimate with ambient condition is created inside the micro-poly chambers. By this method nearly 10 per cent of the stem cuttings sprout immediately. The rooting commences only after 35-40 days and within 3 weeks one or two axillary buds above the leaf scars develop and grow into branches. After the formation of healthy root system, it is ready for transplanting. semi hardwood cuttings with two or three leaves, treated with IBA in 3000mg/l concentration in season I (January – April) appeared to be a successful method for vegetative propagation (100% rooting) for producing sufficient number of propagules of this species (Saumya M.T et al. 2014).

MANURE/FERTILIZER

Compost/Vermi compost, organic manure is preferred.

IRRIGATION

The plantation can be irrigated usually at an interval of 15 days.

HARVESTING/POST HARVESTING OPERATION

Harvesting is done after two years. Generally, fruiting starts in August-September after 2 years of transplantation and fruit ripens during November to January. The fruits are collected, dried in shade and stored in clean porous Jute-bags. The fruits are collected manually and the plant is allowed to grow further.

YIELD

The dry fruits of about 25-q/h hectare can be collected.

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