

**THE LONELY ENDEMIC PALNI HILLS
RUDRAKSHA TREE *ELAEOCARPUS BLASCOI*
WEIBEL (MAGNOLIOPSIDA: MALVALES:
ELAEOCARPACEAE), TAMIL NADU, INDIA**

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In India, the species of *Elaeocarpus* are confined mostly to northeastern and southern India and a few species in Andaman and Nicobar Islands. Six species, viz., *E. blascoi*, *E. gaussonii*, *E. glandulosus*, *E. munroii*, *E. recurvatus* and *E. venustus*, are endemic to southern peninsular India. A few species show restricted distribution in the subcontinent, viz.: *E. amoenus* located in southern India and Sri Lanka; *E. acuminatus* and *E. prunifolius* found in India and Bangladesh; *E. braceanus*, *E. bracteatus*, *E. grandifolius* and *E. helferi* in India and Myanmar and *E. sikkimensis* from northeastern India and Bhutan. The species generally prefer a warm humid climate and usually occur between 500–2000 m. Though widely distributed, they are never found in abundance in any particular locality. The fruits of *Elaeocarpus* are edible and the fruits of *E. sphaericus* are used as beads for rosaries, bracelets and necklaces and also for their purported magico-religious properties (Weibel 1968; Sharma & Sanjappa 1993).

Most of the members of the family Elaeocarpaceae have indolizidine alkaloid compounds, which have attracted a great deal of interest on account of their ability to inhibit the enzymatic activity of glucosidases. Hence, there is some potential to explore it further in the treatment of AIDS, diabetes and cancer (Wiaart 2006). The fruits of *Elaeocarpus* species are endowed with a hard and highly ornamental stony endocarp. In nature, the germination of nuts in most of the *Elaeocarpus* species is very low and erratic, since nuts are unable to imbibe water (Bhuyan et al. 2002). Poor or no germination coupled with prolonged dormancy owing to the hardness of the endocarp cause a significant reduction in the regeneration of several *Elaeocarpus* species (Khan et al. 2003).

Elaeocarpus blascoi, a large shola tree that was first discovered in Bear Shola of Palni Hills, Tamil Nadu in 1970 was later found to be extinct during the exploration of the flora of Palni Hills (Mathew 1999). Fortunately, it was rediscovered in another region of the Kodaikanal forests in 2000 with only one living individual. It is a strict endemic species to Palni Hills of Western Ghats found on the fringes of the moist evergreen forest above 2,150m and included under Endangered category (World Conservation Monitoring Centre 1998). *Elaeocarpus blascoi* is a canopy tree growing up to 20m tall in moist evergreen forests with short young branchlets appearing grey with silky hairs and fallen leaf scars (Images 1a–h).



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Elaeocarpus blascoi
Palni Hills Rudraksha Tree



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Tender parts are sericeous. Leaves simple, ovate-elliptic or elliptic, alternate in arrangement, clustered at twig apices, coriaceous, obscurely serrate, obtuse at base, acute at apex, glabrous above, sparsely appressed hairy or glabrescent beneath, with prominent veins beneath. Stipules caducous and petioles 1.5–2.5 cm long with sparsely appressed hairs. The midrib is slightly raised above; secondary nerves with seven pairs, branched with domatia in the axils beneath; tertiary nerves reticulate-percurrent. Inflorescence axillary or terminal racemes with 6–7 white flowers, flower-buds ovoid, acute, more or less densely short sericeous, glabrate. Sepals 10–11 mm long, lanceolate, acute, densely short sericeous outside, velvety along margin, petals 12 mm long, five, broader towards apex, lacinate into 11–14 segments, densely sericeous outside. Stamens, densely appressed hirtellous; filaments 2–3.3 mm long; anther 2.5–4 mm long, anthers bearded, not ciliate, anther tip produced into a subulate, 1 mm long awn. Disc annular, 10-lobed. Ovary densely sericeous, 2–3 loculed; ovules six in each locule; styles sericeous at base, 6–6.5 mm long. Fruits are drupes, 1.5 cm long, ellipsoid, round at base and apex, laterally scarcely compressed, one-seeded (Table 1). It flowers in the month of January and sets fruits in September (Image 1b). But we found some oscillation in the flowering and fruiting period from January to May.

Observations: The present study on exploration and observations on individuals of *E. blascoi* was conducted throughout Palni Hills from July 2012 to May 2014. The results from the study confirmed that there was only one mature individual at present in the wild at Vattakanal Shola (10°12'29.602°N & 77°28'50.328°E) at an altitude of 2,011 m. Two individuals are under the conservation of an NGO. One individual planted in the NGO garden (Vattakanal Conservation Trust, Pambarpuram, Kodaikanal), and the other one planted by the road side (on the way to Dolphin Nose, Vattakanal, Kodaikanal). *Elaeocarpus blascoi* also has a very slow growth rate. It takes more than 15 years to start flowering.

Leaf: During the emergence of the young shoot tips, tender shoots were infected by unidentified insects (aphids/ticks) which affect the growth of new branches (Images 1d,e). As it is a shola tree there is no leaf shedding. Mature leaves fall when they attain a deep red color as in other *Elaeocarpus* species.

Flowers and fruits: During the peak flowering period, preliminary studies on 50 inflorescence of *E. blascoi* were marked for successful natural fruit setting. The total number of flowers per inflorescence was counted and the number of flowers that formed fruit were analyzed. There was no premature fruit fall during fruit development. The

fruit development takes place from the month of February along with leaf flushing. The fruit matures in the month of June and gets detached continuously from the stalk.

Seeds: Seeds from various years were found under the tree canopy (Image 1c). Seeds are highly ornamented as in other species of *Elaeocarpus* with a hard endocarp. Some of the seeds fully lost their viability within one year after the detachment from mother plant. The preliminary seed biological studies showed only 48% of seeds were viable. Seeds consist of three carpels and only two of the three embryos successfully developed even though they were affected by some unknown fungal infection inside. Seedlings were not found in the natural habitat near the tree.

Seedlings were not found in the natural habitat near the tree. The tree in the natural habitat faces severe threats due to various factors such as loss of natural habitat due to the extension of social forestry and monoculture of exotic trees, and extension of agricultural land in the natural forest area. Alien trees like *Acacia mearnsii*, *A. decurrans*, *A. dealbata*, *A. melanoxylon*, *Pinus radiata*, *P. ponderosa*, *P. sabiniana*, *P. roezlii*, *Eucalyptus grandis* and *E. saligna* create severe damage to the tree and its seedlings.

The preliminary studies on seed propagation and conservation of species in the natural habitat did not yield good results. But the periodical effort on the propagation of this little known species have produced a few saplings and only one individual survives at present in the wild. An air layering trial was also conducted by Pavendan et al. (2012) on *E. blascoi*, which showed that the pre-monsoon season (mid-March to mid-June) seems to be the best period for air layering in *E. blascoi*. Air layering was

Table 1. Floral characters

Floral Characters	Observation
Inflorescence	Axillary or terminal racemes
Mean no. of flowers per inflorescence	5.2 ± 0.7
Flower	Hermaphrodite, Actinomorphic
Flowering period	December to January
Flower color	Silky white, corolla with segmented tip
Odour	Absent
Flower opening	Between 0700–1100hrs
Anther dehiscence	2–4 hours after anthesis
Mean no. of anthers per flower	26 ± 6
Pollen grain shape	Spherical
Pollen type	Tri-colporate
Stigma type	Wet type



Image 1a. Adult tree of *Elaeocarpus blascoi*



Image 1c. Mature seeds



Image 1b. Flowering twig



Images 1d - Infested tender shoot; 1e - Infested tender shoot inner view

successfully established in *E. blascoi*, although there has been no effective action taken to raise the tree saplings. The saplings are conserved in green house, Department of Biology, Gandhigram Rural Institute.

Conclusion: In this situation, *E. blascoi* needs the attention of conservation biologists for the application of modern conservation tools. Various propagation

techniques and tissue culture techniques are required to raise the saplings in mass. Reproductive biological studies are also very important to identify their reproductive constraints, mode of pollination, reproductive capacity, which will be helpful to identify the problems that they face in their natural habitat. Seed biological studies are also needed for the faster regeneration. By taking



Image 1f. SEM of anthers

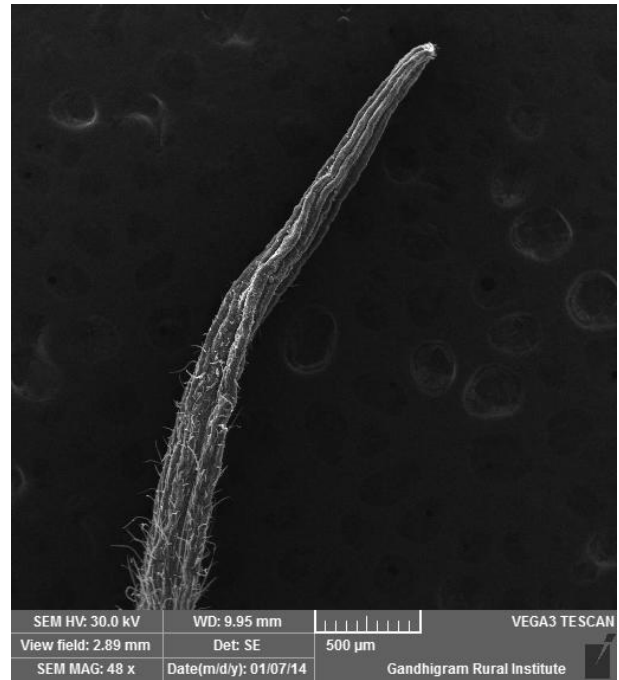


Image 1g. SEM of style

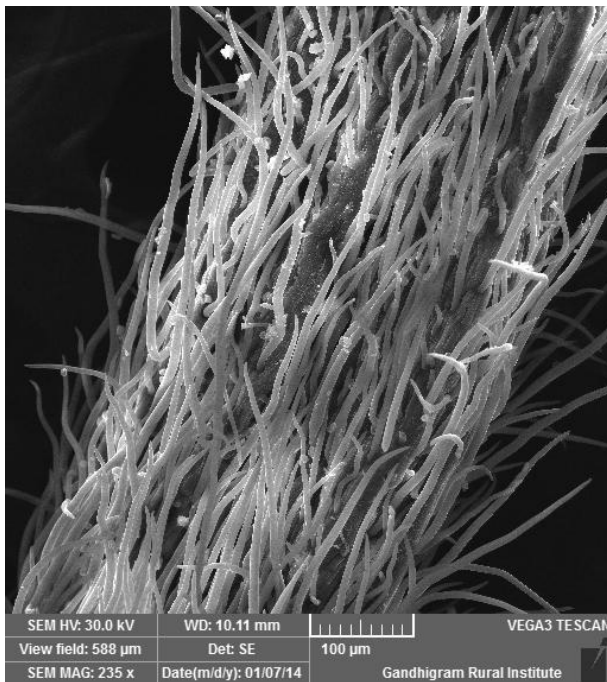


Image 1h. SEM image of style: closer view

effective strategies to conserve this valuable endemic tree *E. blascoi*, it can be protected from extinction and for the benefit of our future generations. The conservation status based on the present knowledge of the species indicates that it is Critically Endangered and not just Endangered as

the assessment shows. The status needs to be reassessed and updated on the IUCN Red List immediately, with only one known mature individual surviving in the wild. If urgent conservation measures are not undertaken the species could become extinct due to threats and unknown limiting factors.

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