

Chapter 2

ECOLOGICAL, CULTURAL AND MEDICINAL VALUES OF SAL (*Shorea robusta*): A MULTIFACETED NATIVE TREE OF INDIA

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Abstract: *Shorea robusta* stands as one of the most important tree species on the Indian subcontinent. The tree species not only play a vital role in the dry and moist deciduous forest ecosystem but are also closely linked to the indigenous tribal communities of Odisha. The present study aims to showcase the less-known prospects of ecological, cultural, and therapeutic values of *S. robusta* through a literature survey. The study proves that the species has a multifaceted role in serving the needs of humans and providing livelihood through its plant parts, medicinal uses, providing habitat for wildlife, maintaining a relationship with associated insects to protect from pests, etc. The tribal communities conserved the species by worshipping, performing restoration activities, and utilizing it sustainably. Restoration and conservation of the species could be extended to other sections of people for the best use of the species along with the ecological benefits.

Key words: *Therapeutic, worship, vegetation, red weaver ants, tribal communities*

INTRODUCTION

Shorea robusta or Sal tree is an important tree of the dry or moist deciduous forest of India. The tree has contributed tremendous ecological services and human day to day needs till today. It is a large tall deciduous tree belonging to the family Dipterocarpaceae that can reach the height of 50 m. *S. robusta* is distributed from the Himalayas like Himachal, Uttarakhand, foothills of Himalayas like Sikkim, Arunachal Pradesh, Tripura, Meghalaya towards the plains and valleys of Assam, West Bengal, Haryana, Uttar Pradesh, Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, Odisha, etc. It is also distributed in neighbouring states like Nepal,

Bhutan, Bangladesh, Myanmar (Mishra et al. 2021). The importance of Sal tree increases moving towards the plains and valleys. The NTFPs from Sal tree include its leaves, seed oils and more importantly its resins having good economic values (Figure 7). It has a moderate regeneration rate in most deciduous forest. In other country like Bangladesh, this tree species has been reported threat by anthropogenic activities for its use as fuel, timber, construction materials, fodder, deforestation for agricultural purposes, etc (Rahman et al. 2010). On the other hand, this tree species could be infected by about 346 insects that target the roots, seeds, seedlings, leaves, full grown timber, etc. resulting in the wood rotting, wood wastage, faulty wood, etc (Chaubey and Sharma 2013). The study attempts to document to consolidate the information of ecological, medicinal and cultural uses of *S. robusta* through literature survey.

Ecological values

S. robusta prefers the moist or dry deciduous forest or tropical regions of India and play an important role with associated species. The species can grow in variable elevation ranging from 1-1500 m MSL (Chhetri et al. 2021). It is a host plant for root parasite like *Aeginetia indica* and stem hemiparasite like *Cassytha filiformis* and *Dendrophthoe falcata*. Overgrowth of such parasitic plants could lower the yield of wood (Paramanik et al. 2023). It has been reported that the species is associated to the habitat of ground orchids like *Spiranthes himalayensis* in the state of Assam (Das et al. 2021). The species has also exhibited a rich diversity of lichens and so far around 64 species of lichens has been reported (Satya et al. 2005). Sal tree is associated with habitat of many minor fauna. Kumar and his team mates have reported nesting of Indian Giant Squirrel on Sal trees from Bonai Forest Division of Odisha (2022). Red weaver ants (*Oecophylla smaragdina*) make nest by swirling the leaves making a cup shape. Nesting of red weaver ants benefits the tree as it acts as a pest control as the red weaver ants feed on the pest maintaining a symbiotic relationship (Figure 2) (Rout and Kumar 2023). The species is also considered a hardy and tolerant to stress like forest fire especially like surface fire. Forest fire is common in deciduous forest mostly surface fires occurs in such regions. The heat does less harm to the tree even if the fire reaches more than 10 ft.

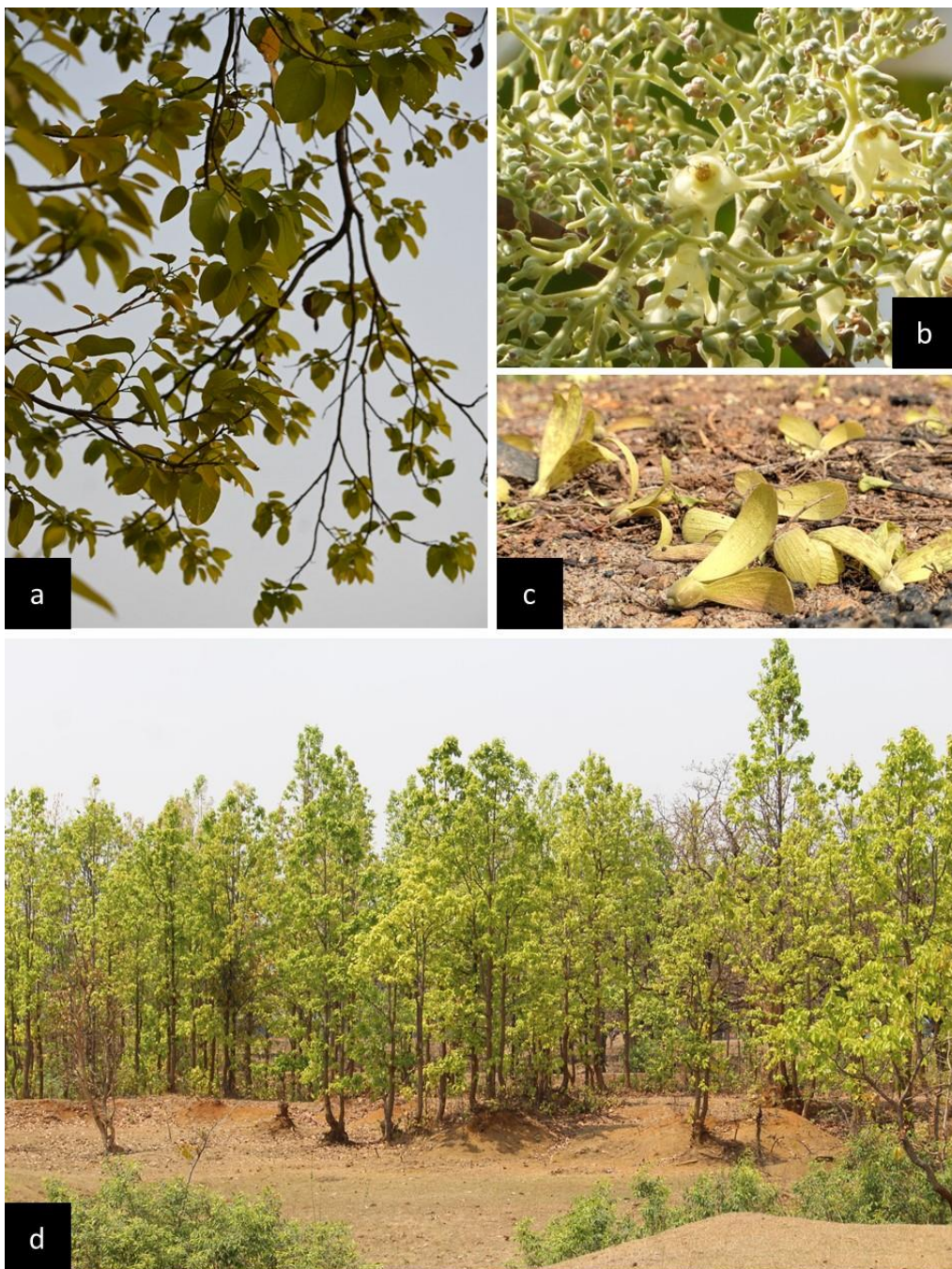


Plate 1: *Shorea robusta*: a) leaves b) flowers c) seeds with wings d) Sal Forest of Odisha

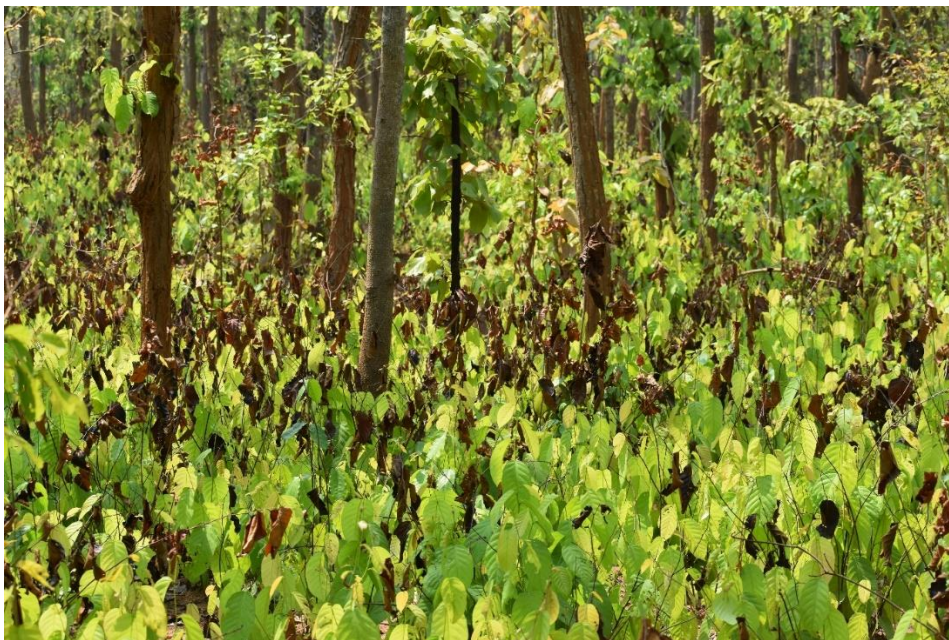


Figure 1: Regeneration post forest fire in early monsoon



Figure 2: Red Weaver Ants nest on Sal leaves

In the process, regeneration rate post forest fire on subsequent rains reportedly revealed to have good population in dry deciduous regions of Odisha (Figure 1) (Devi et al. 2021). The plant parts of *S. robusta* is illustrated hereunder (Plate 1).



Figure 3: Jahera: a sacred forest area of Santhal tribes of Odisha mostly of Sal trees



Figure 4: Santhal tribes worshipping Sal tree inside Jahera



Figure 5: Traditional food prepared using Sal leaves by Santhal tribes of Odisha



Figure 6: Dried Sal leaves ready to be marketed for preparing ecofriendly plates and bowls



Figure 7: Resins of *S. robusta* sold in local market at Majurbhanj district



Figure 8: Red Weaver Ants harvested from Sal trees at market of Mayurbhanj district

Medicinal values

The different plant parts of *S. robusta* have revealed to use for various purposes especially for therapeutic reasons. The old Indian therapeutic system stands strong and are play a key role for the potential source drugs in the market today. Resins

are considered as brain tonic, a good blood purifying agent, maintains the body temperature. It has been used to treat wounds, prevent seeping and also been used for the treatment of dysentery, fractures, vaginal discharges, etc. The resins are also described in Unani to be used for the treatment of obesity, spleen enlargement, eye problems, toothache, menorrhagia, etc. In Indian Ayurveda, the leaves and bark are described to be used in the treatment of ulcers, wounds, cough, leprosy, gonorrhea, etc. The seed oils help in digestion and also used in skin diseases like scabies and the seed used in the treatment of pus formation. The Sal flowers are used in leprosy, diarrhoea and gonorrhea (Bainsal et al. 2020). Singh and Kumar in 2018 describes the use of resins mixed with boiled milk and used for the treatment of piles, cough, leucorrhoea and bronchitis. Paste prepared out of bark can be applied to stop bleeding. Consuming the fruits help to treat diarrhoea. This tree species has been reported to have a rich source of flavonoids, saponins, steroids, tannins, phenols, triterpenoids, etc (Singh and Kumar 2018). Bainsal and his coworkers in 2020 reported that the leaves contain phytochemical compounds like Bergenin, Urosolic acid, Trimethylsilyl 3-methyl 1-4 [(trimethylsilyl) oxy] benzoate; resin contains compounds like Caryophyllene oxide, Lupeol, Calarene epoxide, Spathulenol, β -humulene, etc; flowers contain β Caryophyllene and seeds contain compound like Hexamethylcyclotrisiloxane. Other pharmacological activity of Sal tree parts as anesthetic activity, anti-inflammatory, antidiabetic activity, anti-oxidant, anti-cancer, anti-hyperlipidemic, anti-convulsant have also been reported.

Cultural values

Sal tree plays a high cultural and religious value when it comes to the Santhal tribal community of Odisha. They worship Sal tree and even maintain a sacred place where mostly Sal tree is planted known as "Jahera" (Figure 3 & 4). They also celebrate Baha Bonga during the flowering season of Sal. They maintain a ritual of plantation of Sal trees involving all individuals of the community irrespective of gender and age. The occasion is enhanced by performing folk music and folk songs in Jahera. The tribal communities of Mayurbhanj collect leaves of Sal tree and twigs from the forest. The leaves are either used in the traditional cooking (Figure 5) system or dried in sunlight for making ecofriendly plates (Figure 6). Many of these tribal communities make their livelihood by collecting leaves of Sal. Resin collection

practices have been found not only naturally but also through various methods of tapping barks and exposing the wood surface (Mishra et al. 2021). People prefer cleaning their teeth by chewing twigs of Sal in such regions (Devi 2021; Annual Report 2021-2022). Again, Red Weaver Ants collected from Sal trees are consumed as chutneys by tribal people and even marketed well (Figure 8) (Devi et al. 2021-2022; Rout and Kumar 2023).

CONCLUSION

S. robusta contributes vast ecological services, providing medicinal values, livelihood to many inhabitants near forest areas, etc. Conservation approaches of *S. robusta* through plantation, sustainable utilization and collection of plant parts, maintenance of Sal trees to overcome pest could be done. Plantation of Sal associated species may create a healthy ecosystem for the Sal Forest.

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