

# IMPORTANT GUM YIELDING SPECIES *STERCULIA URENS ROXB.:* ETHNOBOTANY AND MANAGEMENT

Dr. R.P.Sagar

Guest Lecturer Department of Botany  
Govt. Kamla Nehru Girls College Balaghat (M.P.)

**ABSTRACT:-** *Sterculia urens Roxb.* is a moderate sized tree found in Central India forest and other parts of the India and also in the world. It is principal tree of hilly areas of Central India and Coromandel Coast. Natural gum is an important forest produce, which provides livelihood to the forest dwellers and also forms a vital raw material for various industries. India is one the major producers of gum as it endows with high diversity of gum yielding tree species. However, these tree species are less studied, especially with respect to their indigenous uses of gums, and also the existing information on gum yielding species are scattered. In this context, the present study aims to study three important gum yielding species such as *Sterculia urens Roxb.* with respect to their indigenous uses, harvesting practices, population density and management interventions. An extensive literature survey and fieldwork carried out in the central Indian states resulted in documentation of various indigenous uses of the selected species. Among The results of the study are further discussed with respect to the management and conservation of these important tree species. The species should be protected from the over exploitation and should be managed silviculturally or the better regeneration and maintenance in the nature.

**KEYWORDS:** natural gums and resins, indigenous uses, industrial applications, management, conservation.

## INTRODUCTION:-

Forests provide various ecosystem services to human beings, including ethnobotanical species for food, medicine and other human needs (Kala et.al., 2013). Historically, natural gum is one of the important forest produces which contributes in the livelihood and health care of rural communities (Varghese et.al. 2008). In plants, the natural gums are formed through a process called gummosis in which internal plant tissues, mostly

cellulose, are disintegrated and decomposed. They ooze out from the plant stems either naturally or when plant stems are wounded by external force (Purkayastha; 1959). They are insoluble in alcohol and ether but soluble in water (Langenheim ; 2003). Being important commodity humans have not only employed gums for ceremonial, esthetic and therapeutic uses but also in arts and industry, as a result they have been traded as the most sought material between the different cultures around the world from the earliest times (Lardos et.al., 2011). Commercially, they are sold in the form of dried exudations.

In India, natural gums have been used traditionally for multiple purposes (CSIR 1985 & Kala; 2010). With due course of time, their industrial applications have been conceived in food, pharmaceutical and other industries. Unlike other non-timber forest produce, gums being a low volume high value produce, transportation is not a major problem for its gatherers in developing countries. It is relatively easy to transport such low volume gums even from the remote forest areas where road connectivity is poor.

Having produced annually about 281,000 tons of gums and about 1,500 tons of gum-resins, India ranks one the major producing countries of this important commodity (Giri et.al., 2008). About 120 gum and resin yielding plant species are known to grow in India, and they inhabit different eco-climatic zones. The forests in central India support a rich diversity of tree species, many of them provide valuable gums (Kala; 2011). However, these tree species are less studied, especially with respect to their indigenous uses of gums, and also the existing information are scattered. Being an important commodity for livelihood generation, there are unsustainable harvesting issues, which impact the population of these species. At present, understanding the complex relationships between harvest and conservation of these species is a need of hour. In this context, the present study aims to document various uses

and survey some selected gum yielding tree species in the central Indian states. Besides, the different harvesting and management practices of the selected gum yielding species are also studied.

**SURVEY METHODS:-**

An extensive literature survey was carried out for compilation of ethnobotanical information on selected gum yielding woody plant species *Sterculia urens* Roxb. The data were compiled on the traditional uses of various plant parts of these species along with industrial applications and various management practices as adopted by the local communities and the concerned state departments. The fieldwork was conducted in Satna forest division Madhya Pradesh of India. An ethnobotanical survey was conducted eliciting information through personal interviews of villagers with the help of local assistants and also through direct and indirect observations made during the field surveys. Locals who practice traditional medical practices and local elder and knowledgeable people were interviewed for information on medicinal uses and availability of

selected gum yielding species in both the Indian states. The morphological characteristics of selected species were noted down during the survey period. Various gum harvesting practices from the selected species were also recorded.

**RESULT AND DISCUSSION:-**

**Ethnobotanical Significance**

The selected plant species *Sterculia urens* maximum height. The bark colour of species varies from yellowish or pinkish to grey white and reddish (Table 1). Traditionally, the gums of species have been used by local communities for different purpose [CSIR ; (1976 & 1980), Jain (1991)]. Though they are used for curing different diseases, their use for curing dysentery is common. Apart from general tonic, the gum of *Sterculia urens* is used to cure blisters, joint pain, stomach disorder and infection in throat (Table 2).

**Table 1. Morphological characteristics of *Sterculia urens* Roxb**

Morphological characteristics	<i>Sterculia urens</i> Roxb.
Habit	Tree
Height	Upto 15 m
Bark	Grey white or reddish
Leaf	Palmately 5 lobed, 20-30 cm; crowded at the end of the branches
Flower	Greenish yellow, small in terminal pinnacles
Fruit	Follicle 2-5 cm diameter, red, covered with stinging hairs; seeds black

**Table 2. Indigenous and industrial uses of gum and stem bark of the selected gum yielding tree species in India**

Species	Part used	Indigenous uses	Industrial use
Latin name: <i>Sterculia urens</i> Roxb. Local name: Salai Family: Sterculiaceae	Gum	Blisters, blood dysentery, dysentery, joint pain, stomach disorder, throat infection, tonic, jam, confectionary	Thickening agent in the preparation of printing-paste for the textile industry. Pharmaceutical industry – medicines preparations such as lozenges, emulsions, lotions, sprays and paste; denture fixation powder; cosmetics Paper industry – pulp binder Leather industry – ingredient of dressing compositions
	Stem bark	Cordage, facilitate child delivery	

### **Industrial Applications**

Since the water soluble gums of plant origin have enormous industrial applications, the gums of selected plant species are also used by industries for multiple purposes. The gum of *Sterculia urens* is used as thickening agent, especially in printing-paste for the textile industry. Being a good pulp binder it is used in paper industry. It is also used in pharmaceutical, cosmetic and leather industries (CSIR; 1976). It is used as tablet binder and gelling agent in pharmaceutical industries (Nath et. al., 2013). The gum of *Sterculia urens* is also used commercially as food additives (Anderson et.al., 1994). (Table 2).

### **Harvesting Practices**

For extraction of gums from the mother plants, people have adopted different harvesting practices. Traditionally, for tapping gums from *Sterculia urens* artificial incisions are made in the tree trunk and the bark is slashed. The debarked area is freshened at the regular interval of 5-6 days. However, the quantity of gum increases when the holes made in the tree trunk is treated with ethephon. It can be 10 times higher than the gum tapped by using traditional method. Also the gum yielded by treating ethephon has high quality (Nair, 2003). Annually, about 50 tons of gum is harvested from *Sterculia urens* in India, which is comparatively low than the other two gum yielding species. The production of gums from all three species varies from year to year. The gum tapping from *Sterculia urens* is started in November, which is continued to the end of May. The continuous overharvesting of these species may be critical not only for the survival of the species but also for the community dependent on these commodities.

### **Management of Gums**

The gums extracted by all three plant species were notified in the state of Madhya Pradesh as the 'specified forest produce' under the Madhya Pradesh Van Upaj Act 1969. Being the nationalized minor forest produce, the monopoly of collection and trade in gums lies with the state government or its authorized agent. Madhya Pradesh states have their own federation named as Madhya Pradesh State Minor Forest Produce (Trading & Development) Cooperative Federation Ltd. and Chhattisgarh State Minor Forest Produce (Trading & Development) Co-operative Federation Ltd.

In order to facilitate the collection of gums, the forest area earmarked for collection is divided into different units. Federations sell these units in advance through tenders and auctions. The purchaser deposits 10% of the

sale value as security deposit which is calculated based on the quantity to be collected as mentioned in the tender notice. The purchaser pays to the collectors at the rates fixed by the state government. Primary Forest Produce Cooperative Societies and the District Unions collect gums for the Federations in Madhya Pradesh, as these Federations are authorized to collect and sell the gums, which they sell through invitations of tenders and auctions on behalf of the state government.

### **Rarity and Conservation Issues**

Earlier, the gum was only tapped from the mature individuals of species, especially from *Sterculia urens*. With the commercialization of gums, local people began to tap gums from young and immature individuals, as well, which has subsequently declined the number of individuals of species (Kala, 2009). The faulty method of tapping gums, which include chopping out and debarking major parts of these tree species, is one of the factors responsible for declining populations. Apart from gum and resin these species are collected for other purposes, including fuel wood, medicine, timber etc. The multiple uses of these species impose serious threats on the existing plant populations as they are frequently collected for one or other uses ( Kala, 2016).

*Sterculia urens* are considered vulnerable as per the International Union for Conservation of Nature (IUCN) category for threatened medicinal plant species of central India (FRLHT ; 2010). Merely anthropogenic activities are not accountable for making these species threatened but there are natural causes, as well. The flowers of *Sterculia urens* do not produce nectar (Vogel; 2000), hence the insect activities remain limited even during the peak flowering season, which hinders the process of pollination and so that the setting of fruits (Sunnichan et.al., 2004). Apart from lack of successful pollination, there are other causes of low fruit set in *Sterculia urens*, including adjustment of maternal investment to match available resources (Bawa et. al., 1984). Though, *Sterculia urens* blossom simultaneously during December-March. There are many inherent problems in management and conservation of these high value species, at present. There is continuous decline in following traditional management principles but the use of such commodity has been expanded over the years. Besides, there are conflicts among society for early collection of species. The lack of knowledge is another factor which needs to be looked into. The *Sterculia urens* species being very important for livelihood generation

and health care, it is important to conserve such species, undoubtedly, in their natural habitats. Besides, restoration programme of these species must be launched at large scale by applying ex-situ conservation tools, including micro-propagation technology. The awareness campaign in the community on the dwindling plant populations and the resultant impacts on their livelihood may insist people to participate in the restoration and conservation programme.

#### CONCLUSION:-

Thus it is finally concluded from the study that the *Sterculia urens* Roxb. Plant is of a great economic as well as ecological significance. The species should be protected from the over exploitation and should be managed silviculturally or the better regeneration and maintenance in the nature.

#### REFERENCES:-

1. Anderson DMW, Wang WP. 1994. The tree exudate gums permitted in foodstuffs as emulsifiers, stabilisers and thickeners. *Chemistry and Industry of Forest Products* 14 (2): 73-83.
2. Bawa KS, Webb CJ. 1984. Flower, fruit and seed abortion in tropical forest trees: implications for the evolution of paternal and maternal reproductive patterns. *American Journal of Botany* 71: 736-751.
3. Conservation of Medicinal Plants, Foundation for Revitalization of Local Health Traditions,
4. CSIR, 1976. The Wealth of India. New Delhi: Publication and Information Directorate, Council of Scientific and Industrial Research, Volume X.
5. CSIR, 1988. The Wealth of India, Revised edition. New Delhi: Publication and Information Directorate, Council of Scientific and Industrial Research, Volume 2, B.
6. CSIR. 1985. The Wealth of India, Revised edition. New Delhi: Publication and Information Directorate, Council of Scientific and Industrial Research, Volume I, A.
7. FRLHT, 2010. Medicinal Plant species of conservation concern identified for Madhya Pradesh. Bangalore: ENVIS Centre on.
8. Giri SK, Prasad N, Pandey SK, Prasad M, Baboo B. 2008. Natural Resins and Gums of Commercial Importance – At a Glance. Indian Institute of Natural Resins and Gums, Ranchi, Jharkhand. 38 pp. <http://envis.frlht.org/documents/madhyapradesh-medicinal-plants-conservation.pdf>.
9. Jain SK. 1991. Dictionary of Indian Folk Medicine and Ethnobotany. New Delhi: Deep Publication.
10. Kala CP, Silori CS. 2013. Biodiversity, Communities and Climate Change. New Delhi: The Energy and Resources Institute. 330 pp.
11. Kala CP. 2009. Aboriginal uses and management of ethnobotanical species in deciduous forests of Chhattisgarh state in India. *Journal of Ethnobiology and Ethnomedicine* 5: 1-12.
12. Kala CP. 2010. Medicinal Plants of Uttarakhand: Diversity, Livelihood and Conservation. Delhi: Biotech Books, 188 pp.
13. Kala CP. 2011. Indigenous uses and sustainable harvesting of trees by local people in Pachmarhi Biosphere Reserve of India. *International Journal of Medicinal and Aromatic Plants* 1 (2): 153-161.
14. Kala CP. 2016. Medicinal plants used for gastrointestinal diseases in Garhwal region of Uttarakhand. *Australian Journal of Herbal Medicine* 28 (1): 15-21.
15. Langenheim JH. 2003. Plant Resins: Chemistry, Evolution, Ecology and Ethnobotany. Portland, Oregon: Timber Press. 586 pp.
16. Lardos A, Prieto-Garcia J, Heinrich M. 2011. Resins and gums in historical iatrosophia texts from Cyprus – A botanical and medico-pharmacological approach. *Frontiers in Pharmacology* 2: 32.
17. Nair MNB. 2003. Gum tapping in *Sterculia urens* Roxb. (Sterculiaceae) using ethephon. Paper submitted in XII World Forestry Congress 2003, Quebec, Canada.
18. Nath B, Nath, LK. 2013. Evaluation of *Sterculia urens* gum as novel carrier for oral colon targeted drug delivery system. *Journal of Advanced Pharmaceutical Science and Technology* 1 (2).
19. Purkayastha SK. 1959. An anatomical study of the effect of scarification in *Sterculia urens* Roxb. trees. *Indian Forester* 85: 126.
20. Sunnichan VG, Mohan Ram HY, Shivanna KR. 2004. Floral sexuality and breeding system in gum karaya tree, *Sterculia urens*. *Plant Systematics and Evolution* 244: 201-218.
21. Varghese A, Ticktin T. 2008. Regional variation in non-timber forest product harvest strategies, trade, and ecological impacts: the case of black dammar (*Canarium strictum* Roxb.) use and conservation in <http://www.fao.org/docrep/ARTICLE/WFC/XII/0148-B4.HTM>.

the Nilgiri Biosphere Reserve, India. *Ecology and Society* 13 (2): 11.

22. Vogel S. 2000. The floral nectaries of Malvaceae sensu lato – a conspectus. *Kurtziana* 28: 155-171.