

## INDIAN LAC CULTURE – AN OVERVIEW

Article Id: AL202115

Anmol Kumar Mishra

ICAR-Indian Institute of Natural Resin and Gum, Ranchi, Jharkhand, India

Email: [eranmol12503@gmail.com](mailto:eranmol12503@gmail.com)

In an agricultural country like India, along with the cultivation of crops, insects are also cultivated. Beekeeping, silkworm rearing and lac insects are cultivated under the cultivation of these insects. With the need for a little technical knowledge and less time in lac insect rearing, it can be cultivated easily. Cultivation of lac pest farming in a large scale called lac cultivation.

The term lac seems to have been derived from the Sanskrit word “Laksha” meaning a hundred thousand (Ogle, 2006) and is suggestive of the large number of insects involved in its production. The description of the lac insect and its host plant– *Butea monosperma* (Lakshataru) is recorded in the Atharva Veda. It is also mentioned in the Mahabharata that Kauravas built the highly inflammable lakhshagriha or Jadugriha (Lac house) with a motive of physically eliminating Pandavas by setting the Lac palace on fire (Chattopadhyay, 2011).

### **Status of Raw Lac Production**

India is the leading lac producer in the world in terms of the production of raw lac, with an annual production of over 20,000 tons (Ogle, 2006). About 80 per cent of the world's total production is in India, and 75 per cent of it is exported to over a hundred countries, mainly in processed and semi-processed forms. After India, lac is produced more in Thailand. Along with these, lac is also produced in Indonesia, parts of China, Myanmar, the Philippines, Vietnam, and Cambodia etc. In India, lac production takes place in mainly restricted to the Chhota Nagpur region of Jharkhand state, Chhattisgarh state, Madhya Pradesh, West Bengal, Orissa, Uttar Pradesh and Maharashtra. Among the lac growing states, Jharkhand state ranks 1<sup>st</sup> followed by Chhattisgarh, Madhya Pradesh, Maharashtra and Odisha and the Contribution of these five states in national lac production is about 53%, 17%, 12%, 8% and 3%, respectively. These major lac producing five states contribute around 93% of the national lac production (Yogi, 2015).

## **Biology of Insect In Lac Cultivation**

Lac is a type of natural resin that is formed as a result of secretion by the female Indian lac insect, *K. lacca* (Kerr). It belongs to the Kerridae family, consists of nine genera, while the number of species reported vary from 87 to 100 species (Sharma and Ramani, 2011; Ben-Dov and Lit, ). Two generas are found in India, while genus *Kerria* is the most important and widely exploited insect for lac cultivation in India. Lac insect is a soft-bodied, round tiny creature, which completes its life cycle in four stages viz., egg, larva, pupa and adult on host plants within six months. The adult male lac insect lives for a very short duration, such as 3-4 days, while the female lac insects live longer. During the life cycle, this insect sucked the sap juices of tree branches through its mouth, and the female lac insect secretes lac around the branches of host plants by which sticklac obtained; thus, it plays a major role in the production of lac (Ogle, 2006).

## **Types of Raw Lac**

It is represented by two strains, i) Rangeeni strain and ii) Kusmi strain. Rangeeni strain thrives on hosts other than Kusum, while the Kusmi strain is grown on Kusum (Sharma, 2006; Mohanta, 2012). In the case of Rangeeni, two crops are such as-Katki and Baishakhi, and in case of Kusmi strain, two crops are-Jethwi and Aghani are harvested (Chattopadhyay, 2011).

## **Scientific method of lac cultivation**

To start lac cultivation, two things are mainly to be taken into consideration, such as the suitable host plant on which the lac insect thrives and the availability of healthy brood lac in time. Major lac cultivation operations/practices consist of six stages such as i) Selection of suitable host plants, ii) Inoculation of brood lac, iii) Removal of brood lac sticks, iv) Natural enemies of lac insect, v) Harvesting of lac sticks and vi) Scraping of raw lac from twigs.

## **Selection of Suitable Host Site for Lac Cultivation**

The sites for lac host plantation should be in such a place where open area, do not have fire susceptibility, free circulation of air around, the host is assured. When starting cultivation in new areas having a lac host pruned the selected host tree before infection to ensure good lac production. Selected lac hosts should have the following salient features: i)

Fairly fast-growing, ii) Lower sap density and iii) Well adapted to pollarding. Presently 113 varieties of host plants and 87 species of lac insect have been described worldwide in which two genera and 23 species are reported from India (Sharma and Ramani, 2011). Out of which, globally followings are very common in the different region such as Dhak (*Butea monosperma*), Ber (*Ziziphus mauritiana*) and Kusum (*Schleichera oleosa*) in India; Rain tree (*Albizia saman*) and Pigeon pea (*Cajanus cajan*) in Thailand; Pigeon pea (*Cajanus cajan*) and Hibiscus species in some part of China and Nepalensis species in Myanmar.

### Pruning of Host Trees

To get soft and juicy twigs in the nutritious trees, light pruning and pruning of trees is necessary at a certain time so that lac insects can be easily reared. Pruning and pruning for safflower tree is done in January-February and June-July. Pruning and pruning of the Palash tree should always be done before the new coplanes arrive in the fall.

### Inoculation of Brood Lac

Brood lac is mature lac from where the young insects are ready to come out within the time specified. To achieve the best result from lac cultivation, the work should be planned in systematic manners. In order to transmit the lacquer insect to the nutritious trees, a bundle of 6 to 9 inches long, 3 to 4 stalks (equivalent to a thick ring) of the lacquer is made, which is placed at several places of the lacquer tree. This operation includes allowing young lac larvae (crawlers) to come out of their mother cells and settle on the host plant. Ordinarily, this period complete will be in two to three weeks.

### Removal of Broodlac Sticks

Used up brood lac sticks after the baby moth is released from the seed lakhs, the lakhs of stalks are called " Phunki ". Generally, the emergence of lac larvae from the brood lac ceases after three weeks. This operation should be done to prevent access of the insect predators and parasitoids of lac insect to new lac crop and to avoid wastage of lac after drying up of phunki and prevent its falling on the ground. To stop the losses of raw lac phunki, bundles are pulled down from the trees by climbing on trees or with the help of pole mounted phunki hook.

	
Fig.- Pruning of Kusum tree	Fig.- Kusum tree with new leaves
	
Fig.- Inoculation of Brood lac	Fig.- Removed Phunki stick

### Natural Enemies of Lac Insect

Lac insect is mainly attacked by two types of natural enemies' such as i) Parasites and ii) Predators. Parasites: these are the living organism which nests in other living bodies. It depends on their host for their nutrition, growth and development. In the case of Lac insect, small tiny winged parasites such as *Tachardiaephagus tachardiae* and *Tetrastichus purpureus* are the most abundant lac associated parasites. They lay their eggs in the lac cells and the larvae (grubs) hatching outfeed on the lac insect within its cells. on the other hand, predators which directly involved in the consumption of their host. it is more serious and can be damage up to 30-35 % the cells in a crop. *Eublemma amabilis* and *Pseudohypatopa pulvera* are the most destructive key pests of lac insect.

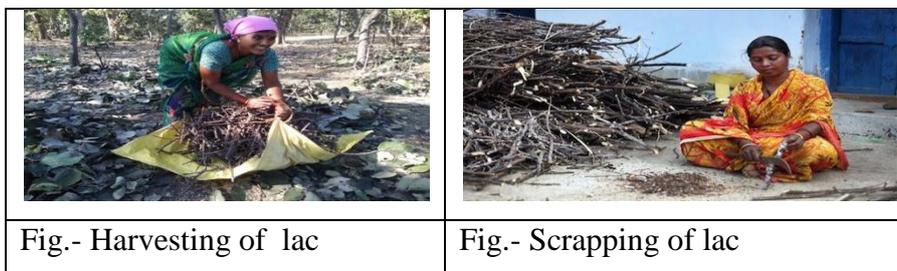
### Harvesting of Lac Crop

Harvesting is the process in which lac collected from the host trees. Two types of harvesting process is used in most of the regions; Ari lac harvesting and mature harvesting. It is done by cutting of the mature lac encrusted twigs from the host trees. It may be of two types: i) Ari lac harvesting and ii) Mature harvesting. Immature harvesting and collection of lac before swarming is known as 'Ari lac'. In India, in the case of range lac, it is found that ari lac gives better production. Hence, ari lac harvesting is recommended in case of rangeeni only and in mature harvesting lac is collected after swarming obtained lac is known as mature Lac. The different crops have different harvesting periods. The summer (Baisakhi) and rain carpet (Katki) crop of Rangini lac, matures after 8 and 4 months of transmission respectively.

Similarly, summer (Jethvi) and winter (Aghani) crops of Kusmi are ready in June-July and January-February, respectively. Estimated yields obtained from per tree in India are about 6–10 kg for kusum, 1.5–6 kg for ber, and 1–4 kg for dhak. The insect life cycles can produce two sticklac yields per year, though it may be better to rest for six months to let the host tree recover.

### Scrapping of Raw Lac from Twigs

Scraping is a process in which incrustation lac resin removed from lac host stick. After harvesting of matured lac and sometimes immature lac is needed to be scraped as primary processing for long time storage. This practice is done with the help of a scraping knife or crusher for different applications in the processing area.



### Composition and Their Properties

The surmised level of various constituents of lac is: resin 68 to 90%, dye 2 to 10%, wax 5 to 6%, mineral substances 3 to 7%, albuminous substances 5 to 10%, and water 2 to 3%. Lac called as multipurpose resin due to possess so many desirable properties. The important properties of lac are such as i) it is soluble in alcohol. ii) It has adhesive nature. iii) Resistance to water. iv) Possess high scratches hardness. v) It consist capacity of forming a uniform durable film. vi) it allows quick rubbing with sandpaper without gumming or slicking.

### Lac and Its Forms

Lac can be obtained in different form such as Stick lac, Seed lac, Shellac, Button lac, Garnet lac and Bleached lac which is present below with their name and photographs.

		
<b>Stick lac</b>	<b>Seed lac</b>	<b>Shellac</b>
		
<b>Button lac</b>	<b>Garnet lac</b>	<b>Bleached lac</b>

### Uses of Lac

Lac due to unique combination of properties, lac finds a wide variety of application in manufacturing of lac bangles, glazed paper, printing and waterproofing inks, dental plates, optical frames; also used for finishing different commercial products such as playing cards, oil cloth; and also used for preserving archaeological and zoological specimen; in the electrical industry used as coating of insulator, coating of spark plugs, cement of sockets of electrical lamp, anti-tracking insulating; in Pharmaceutical industry used in coating of tablets, micro-encapsulation of vitamins and coating of medicines; also used in automobile paint cosmetic and leather industry. Lac earlier about half of the total output was consumed in the gramophone industry. It has long been in use both for decorative and insulating varnishes, usually used as a first coating on wood to fill the pores. **Bleached lac** widely used in the coating of confectioneries and medicinal tablets. **Lac dye** widely used in India as a dye for wool and silk and skin cosmetic. **Lac wax** has widely used in the manufacturing of lipstick and shoe polishes.

### Conclusion

The present text has been highlighted to expose the skill and need in the lac cultivation it will be helpful to get a superficial idea about the lac culture. The result of the present findings will not only help in understanding the life stages of lac insect during lac cultivation but will also provide an opportunity in the region to increase the plant population of suitable lac host to enhance lac cultivation as well as lac productivity in the country. Lac cultivation is the need of the day in order to preserve environmental biodiversity.

## References

Chattopadhyay, S. (2011). Introduction to lac and lac culture. Tech. Bull. FBTI: 01/2011, Department of forest Biology and Tree improvement, Faculty of forestry, Birsa Agricultural university, Kanke, Ranchi, India, May 2011. Online available at [http://www.wkfinetools.com/wWorking/z\\_recipes/LacCulture/0\\_imgpdf/IntroductionToLac&LacCulture.Pdf](http://www.wkfinetools.com/wWorking/z_recipes/LacCulture/0_imgpdf/IntroductionToLac&LacCulture.Pdf).

Mohanta, J., Dey, D.G. and Mohanty, N. (2012). Performance of lac insect, *Kerria lacca* Kerr in conventional and non-conventional cultivation around Similipal Biosphere Reserve, Odisha, India. *Bioscan*, 7: 237-240.

Ogle, A., Thomas, M. and Tiwari, L. M. (2006). Strategic development of lac in Madhya Pradesh. Final Report, Department for International Development (DFID), MPRLP-TCPSU, India, June 2006, pp: 1-34.

Sharma K.K. and Ramani R. (2010). Recent advances in lac culture. IINRG, Ranchi, 1-391 pp.

Sharma, K.K., Jaiswal, A.K., Kumar, K.K., (2006). Role of lac culture in biodiversity conservation: issue at stake and conservation strategy. *Current Science* 91 (7), 894e898

Yogi R.K., Bhattacharya A., Jaisawal A.K. and Kumar A. (2015). Lac, Plant Resins and Gum Statistics 2014: At a glance, Bulletin no. 07/2015, ICAR-IINRG Ranchi, 1-68pp.