

Lac Insect and Its Importance

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Insects provide useful services to mankind and the environment in a number of ways. They produce useful substances, such as honey, wax, dye, shellac, lacquer and silk. Honeybees, silkworm moths, Indian lac insects and cochineal insects etc are the best examples of semi domesticated insects, bred by man for the sake of different commercial products obtained from them.

Lac (also called Laksha) is a sticky substance made by tiny insects called *Laccifer lacca*. These insects attach themselves to certain plants and trees, drink their sap and create lac as a protective covering. The insects are so small they often look like tiny spots on plants with no legs, covered in the sticky substance. Sometimes, you can only see the resin they produce, not the insects themselves. When this secretion dries, it is scraped off and is commonly called lac or resin. The great Indian epic 'Mahabharata' also mentions an incident of 'Laksha Griha', an inflammable house of lac, cunningly constructed by 'Kauravas' through their architect 'Purocha' for the purpose of burning their great enemy 'Pandavas' alive. Since ancient times, Greeks and Romans were also using lac. Lac is the hardened resin secreted by tiny lac insects belonging to a bug family. To produce 1 kg of lac resin, approximately 300,000 insects are killed. The lac insects yield resin, lac dye and lac wax. Still find extensive use in Ayurveda and Siddha systems of medicine. Lac culture is a main source of livelihood of poor and tribal people inhabiting forest and sub-forest areas. With increasing universal environment awareness, the importance of lac has assumed special relevance in the present age, being an eco-friendly, biodegradable and self-sustaining natural material. Since lac insects are cultured on host trees which are growing primarily in wasteland areas, promotion of lac and its culture can help in ecosystem development as well as reasonably high economic returns.

These insects are of very fine size. The male lac worm (*Laccifer lacca*) is about 1.2 to 1.5 mm long, while the female moth (*Kerria lacca*) is larger, measuring 4 to 5 mm. Although lac is produced only by the secretion of female insects, this process is incomplete without male insects. Usually, the female sticks to the trees and does not move from there again in her lifetime. During this time, she secretes a thick secretion of lac. In this process the female loses her eye pair and wings. She lays her eggs inside this secretion. The insects emerging from these eggs get nutrition from this secretion. When these insects grow up, they come out of this lac covering. Generally, the red-coloured male insects have



stopped taking food because they have lost their mouth by the time they reach adulthood. After coming out, the male insects return to the process of fertilization and this cycle continues. The natural resin is an important source of livelihood for many tribal communities, particularly in regions like Madhya Pradesh, Jharkhand, Bihar, Odisha, and Chhattisgarh. Lac collection is a generational practice, passed on by mothers to their children from ages.

Habit and Habitat:

The lac insects are distributed in South-East Asian countries like India, Thailand, Malaya, Lao Myanmar and Yuan province of China. Among these countries India and Thailand is the main lac producing areas in the world. India has prime position in relation to lac production. It gives Indian foreign exchange of 90 crores of rupees per annum approximately. Lac culture provides part-time occupation to approximately 5 million cultivators. In India over 90% of lac produced comes from the states of Bihar, Jharkhand, West Bengal, Madhya Pradesh, Chhattisgarh, Eastern Maharashtra and northern Orissa. Lac cultivation also exists in some parts of Andhra Pradesh, Punjab, Rajasthan, Mysore, Gujarat, and Mirzapur and Sonbhadra districts of Uttar Pradesh. 3 Host plants Lac insects grow on twigs of certain host plants species, feeds on the plant sap, and secrete lac resin from their bodies. Although lac insect is a natural pest on host plant but they are not considered as pest because they produce a useful product. Although there are numerous host plants of lac insect but *Butea monosperma* (Palash), *Zizyphus* spp (Ber), *Schleichera oleosa* (Kusum) and *Acacia catechu* (Khair), are

major host plants. The market demand of Kusumi lac is more and have higher price in market. The ber tree, siris (*Albizia* sp.), *Prosopis juliflora* are identified as good host for kusumi brood lac. Some other common host plants in India are *Acacia arabica* (Babool), *Acacia auriculiformis* (Akashmani), *Zizyphus xylopyrus* (M.P. & U.P.), *Shorea talura* (Mysore), *Cajanus cajan* (Pigeon-pea or Arhar), *Grewia teliaefolia* (Assam), *Albizia lebbek* (Siris), *Flemingia macrophylla* (Bholia), *Ficus benghalensis* (Bargad), *Ficus religiosa* (Peepal) etc.

Host Plant Management

There are two ways for the cultivation of host plants

- 1) Host plants are grown in their natural way and lac culturist have to protect and take care for proper growth of plants
- 2) Systematic plantation of host plants is done on a particular piece of land and proper care of plants is done by timely visits to the field and proper ploughing and hoeing, regular irrigation and suitable use of artificial manure and proper protection of field.

Strains of lac insect In India:

Mainly there are two distinct strains of Lac insect: kusumi and rangeeni. The life cycle of lac insects takes about six months, hence, two crops a year can be obtained. KUSUMI STRAIN and RANGEENI STRAIN. This strain is grown on kusum or on other host plants using kusumi brood. This strain thrives on host plants other than kusum. The crops have been named after Hindi months during which these are harvested.

In case of kusumi strain, two crops are:

- i) Jethwi (June / July)
- ii) Aghani (January/ February).

In case of rangeeni, two crops are:

- i). Karrtiki (October/ November)
- ii). Baisakhi (May/ June).

The lac of kusumi crops is harvested after maturing. The lac of rangeeni crops is harvested while it is still immature. 10% of lac production is contributed by kusumi crops. It contributes about 90% of lac production. 5 Lac cultivation Method of cultivation Lac cultivation is a simple process and very limited labour is required for this; the yield is fairly remunerative to the cultivators. Cultivators should have complete, systematic, scientific knowledge for success.

The main steps involved in the cultivation of lac are: (1) Pruning, (2) Inoculation, (3) Harvesting and (4) Proper care for elimination of the enemy insects (Pest management).

Pruning In this step Pruning is done which means cutting away old, weak and diseased twigs. It induces host

plants to throw out new succulent twigs and is as important in lac culture as ploughing is for seed sowing in agriculture. Pruning should be done with a sharp instrument (scateur, pruning Shaw and pruning knife) to give a sharp and neat cut. Only light pruning should be carried out. Proper pruning is extremely important as it helps the growth of new and short shoots suitable for settlement of lac insects. Old and hard branches can never give a satisfactory production. The Palas tree is mature and ready for the production of lac at an age of eight to ten years.

The following points should be borne in mind during the pruning.

There should be no excessive pruning in order to maintain the good health and strength of the tree.

Proper cutting should be done in such a way that there should be a good shape of the tree for plenty of space for the growth of new shoots.

Branches exceeding 2" in diameter should not be cut.

The most satisfactory results are obtained by cutting at a thickness of 1-2" in diameter and the thin branches under 1/2" diameter should be cut.

Dead and diseased branches should be removed and split or broken branches should be cut below the split or break.

Normally, the time of pruning is January-February and April-May. Kusumi crop lac is considered of superior quality resin, because of the lighter colour of resin, and it fetches better price. In comparison to Kusumi crop, rangeeni lac is considered inferior quality resin, and it's got lesser price.

Lac Insect products and their use

Lac dye: Lac dye of colour varies between purple red, brown and orange is obtained from lac insect. This dye is used for colouring various products like wool, threads, silk and food and beverages industry.

Lac wax: Lac wax is a mixture of higher alcohols, acids and their esters. It is used in various products like polish of shoes, floor, automobiles etc, Food and confectionary, and drug tablet finishing, lipsticks, children colourful Crayons.

Shellac: Commercial lac is called as Shellac. It is a natural, nontoxic, hard, tough, amorphous, brittle, physiologically harmless and edible resin. Shellac is a resin containing small amount of wax and a substance responsible for its characteristic pleasant odour. It is insoluble in water, glycerol, hydrocarbon solvents and esters, but dissolves readily in alcohols and organic acids and slightly heavier than water and its natural colour vary 9 from dark red to light yellow. When slowly heated, it softens at 65-70°C and melts at 84-9°C.

It is used in various commercial products because of the following extra ordinary properties:

1. It is thermoplastic and also used for various applications in the food industry.
2. It is UV-resistant and has excellent dielectric properties.
3. Shellac is a powerful bonding material with low thermal conductivity.
4. Shellac film shows excellent adhesion to wide variety of surfaces and possesses high gloss, hardness and strength
5. Shellac under tropical conditions of storage, may soften and form a solid block, without adverse effects on its properties.

Use:

1. Lac is used as a filling material in the ornaments by jewellers and goldsmiths.
2. It is used in different edible products like fruit coatings, e.g. for citrus fruits and apples, parting and glazing agents for sweets, marzipan, chocolate etc.
3. It is also used in preparation of toys, buttons, pottery and artificial leather.
4. It is used as binder for mascara, nail varnish additive conditioning shampoo, film forming agent for hair spray, micro-encapsulation for perfumes.
5. It is used as coatings for medicinal tablets
6. It is used in manufacturing of photographic material, lithographic ink and for stiffening felt and hat material.
