

Lac Cultivation Technology

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Abstract

The lac insect, *Kerria lacca* Kerr (Coccoidea: Homoptera) is well known for its valuable resin. It grows well on a variety of host plants, including ber, kusum, flemingia, and palas. Pruning, inoculation, harvesting, removing phunki sticks, and lac scraping tools are all part of lac farming. Farmers carry out these tasks by hand using conventional tools including secateurs, sickles, spades, knives, axes, shaws, and scrapping devices. These tools need to be modified in order to improve labor productivity. Lac components are used in many different industries for a variety of purposes, including the pharmaceutical and cosmetic industries, mirror coating, shoe polish, post office sealing substance, and many more.

Introduction

The Sanskrit word "Laksha," which means "a hundred thousand" (Ogle, 2006), appears to have been the source of the term "lac," which suggests the vast number of insects used in its manufacturing. The Atharva Veda contains a description of the lac bug and its host plant, *Butea monosperma* (Lakshataru). The Mahabharata further states that the Kauravas intended to physically destroy the Pandavas by setting the Lac palace on fire when they constructed the extremely combustible lakhshagriha or Jadugriha (Lac house) (Chattopadhyay, 2011).

Biology of Insect in Lac Cultivation

The female Indian lac bug, *K. lacca* (Kerr), secretes a substance that forms lac, a type of natural resin. It is a member of the family Kerridae, with nine genera and between 87 and 100 species recorded (Sharma and Ramani, 2011). India is home to two genera, the most significant and extensively used insect for lac farming there being *Kerria*. The lace bug is a small, round, soft-bodied insect that takes six months to go through its four life phases on host plants: egg, larva, pupa, and adult. While the female lac insects have a longer lifespan, the adult male lac

insects only live for three to four days. This insect plays a significant role in the manufacturing of lac since it sucks the sap liquids from tree branches through its mouth during its life cycle and the female lac bug secretes lac around the branches of host plants, which is how sticklac is obtained (Ogle, 2006).

Host plants

About 113 varieties of host plants are mentioned as lac host plant.

1. *Butea monosperma* (Vern. Palas)
2. *Zizyphus spp* (vern. Ber)
3. *Schleichera oleosa* (Vern. Kusum)
4. *Acacia catechu* (Vern. Khair)

Strains of lac insect

There are two known strains of the Lac bug in India: Kusumi and Rangeeni. Using Kusumi brood, the kusumi strain is cultivated on Kusum or other host plants. Several than Kusum, several plants are suitable hosts for the Rangeeni strain. Since lac insects have a six-month life cycle, two crops can be produced annually. There are two crops in the Kusumi strain: i) Jethwi (June/July) and ii) Aghani (Jan./Feb.). The two crops in Rangeeni are Baisakhi (May/June) and Karrtiki (Oct./Nov.). The months in Hindi that the crops are harvested have been used to name them. Rangeeni crops are harvested before they reach maturity. About 90% of lac output comes from the major crops of baisakhi and aghani of the rangeeni strain; the remaining 10% comes from kusumi crops. Nonetheless, due of its lighter color and higher price, kusumi crop lac is regarded as superior resin (Yogesh et al., 2018).

Lac cultivation

The process of lac cultivation involves placing brood lac on carefully prepared, target plants. Gravid females that are ready to deposit eggs and give birth to young larvae are found in the brood lac. The juvenile larvae settle on new host plant twigs after

emerging from their mother cells, suck the plant sap, and develop into encrustations (Arvind et al., 2013; Ghosal et al., 2018).

Local practice

Lac cultivation is easy to perform, doesn't take a lot of money, and only needs occasional care. Lac is grown haphazardly in India, where the farmer is content with the yield because it is considered a minor crop. The following are some drawbacks of the indigenous lac cultivation methods: i) The same host plants are repeatedly used without a break for recuperation. ii) Inoculation only happens naturally. iii) A portion of the crop is harvested, but no trimming is done and a few branches are left unharvested for the next season's auto inoculation.

Improved practice

By implementing enhanced farming techniques, reliable returns and sustained lac production can be attained. The fundamental idea behind the enhanced lac cultivation approach is to provide the host plants the much-needed relaxation they require following harvest. The coupe system of lac cultivation is used for this reason. Given that the word "couple" refers to a chamber, the host plant trees are arranged into groups called coupes, or specific numbers of trees. In reality, not all of the trees in a coupe receive the inoculation. After harvest, some trees are left to rest and restore their strength, while other trees that have been resting up until now are prepared to be inoculated with succulent twigs. As a result, several groups of trees are subjected to lac cultivation in a coupe system. In this approach, full cropping and full inoculation are mandatory. Better lac insect breeds, giving host plants enough of a break, using high-quality brood lac in the right amounts, managing the lac crop after harvest, host plant management, and lac pest management are all desirable aspects of enhanced lac production. A suitable inoculation along with prompt harvesting of ripe crops will significantly lower the danger of lac insect loss.

Propagation of lac insects

Propagation means the spread of lac insects on the same or different host plants. This is done by

inoculation of newly hatched (Brood) nymphs. Inoculation is of two types.

Natural or self/auto - inoculation:

This kind of immunization happens organically. The technique by which the swarming nymphs re-infect the same host plant is quite straightforward and frequent. Natural inoculation weakens the host plant when it occurs repeatedly on the same plant, depriving nymphs of the nourishment they need. It's uncertain whether a consistent inoculation sequence occurs during spontaneous inoculation as well. Therefore, it is not recommended to use natural inoculation.

Artificial Inoculation:

Artificial inoculation is the result of human agency. The primary goal of artificial inoculation is to evaluate the shortcomings of natural inoculation. The host plants in this manner are first clipped in January or June. Pruning is the process of removing weak, aged, and unhealthy twigs. It is just as crucial to lac culture as ploughing is to agricultural seed sowing because it causes host plants to shed their young, succulent branches. To get a clean and precise cut, pruning should be done using a sharp tool (pruning knife, pruning saw, or secateurs). Pruning should only be done sparingly. For artificial inoculation, brood twigs are chopped to a length of 20 to 30 centimeters. The chopped sections of brood twig are then connected to new tree twigs so that each stick makes many contacts with the fragile tree branches. From the brood, the nymphs swarm, move, and infest fragile, succulent twigs. The brood twigs should be cut off from the host plant after the swarming process to reduce the likelihood of a pest infestation.

Inoculation period

Both the Kusumi and Rangeeni strains of lac insects produce two crops annually: the Kusumi strain produces Jethwi and Aghani, while the Rangeeni strain produces Kartiki and Baisakhi. All four types of crops have different inoculation periods: Kartiki is in June or July; Baisakhi is in October or November; Agahani is in June or July; and Jethwi is in January or February.

Harvesting of lac

Gathering ready lac from host trees is called harvesting. When the crop is fully grown, the lac-encrusted branches are harvested (Jaiswal et al., 2011). There are two possible kinds:-

Immature harvesting:

"ARI LAC" is the term for lac that is obtained when it is collected prior to swarming. There are disadvantages to gathering lac insects too young since they could be harmed during the process. But it turns out that ARI Lac produces more when it comes to palas lac (Rangeeni lac). Thus, it is advised to harvest ARI lactogen solely in cases involving palas.

Mature harvesting

Lac is gathered following swarming. Mature Lac is the name given to the obtained lac. To determine the precise day of the nymph's emergence and swarm, On the back of the lac cell, a yellow patch appears when the crop reaches maturity. This area grew forward, filling in half of the cell. While the yellow spot takes up one-third to one-half of the cell area, twigs can be cut for harvesting at any point during the phases. various crops have various harvesting times. Aghani is harvested in January/February, Jethwi in June/July, Baisakhi in May/June, and the Kartiki crop in October/November. The stick lac, also called the phunki lac, is what's left over after the nymphs have fled the brood lac. These sticks should be knotted into bundles and submerged in water for three to four days, preferably with running water. Heavy stones will help keep the sticks submerged. After that, the stick lac needs to be dried in the shade. Sticks should be scraped of their raw lac while they are still wet.

Conclusion

It will be beneficial to gain a cursory understanding of lac culture by highlighting the skills and needs in the current text. The current findings will aid in comprehending the life stages of the lac insect

during lac cultivation and present a chance for the region to boost the number of suitable lac host plants, thereby improving both lac cultivation and lac productivity nationally. Nowadays, lac farming is essential to maintaining the biodiversity of the ecosystem.

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