



***Kusum*- The Best Lac Host Tree for *Kusmi* Lac Production**

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Lac is a natural resin, secreted by a tiny insect known as lac insect. The Indian lac insect *Kerria lacca* (Kerr) (Homoptera: Tachardiidae) is cultured for commercial production on traditional host plants *palas* (*Butea monosperma*), *ber* (*Ziziphus mauritiana*) and *kusum* (*Schleichera oleosa*). Indian lac insect, *Kerria lacca* (Kerr), the most important and widely exploited insect for lac cultivation can further be distinguished into two strains or infra subspecies forms, the *rangeeni* and *kusmi* on the basis of differences in life cycle, host preference and quality of lac produced.

Introduction

Our country is the largest producer of lac (a resinous compound secreted by lac insect while feeding on phloem sap of certain plants called lac hosts) in the world, accounting for about 50–60% of the total world lac production. At present, annual production of raw lac in India is approximately 20,000 tons. The major lac producing states are Jharkhand, Chhattisgarh and West Bengal. Odisha, Gujarat, Maharashtra, Uttar Pradesh, Andhra Pradesh and Assam are minor lac producing states.

Kusum is a big, slow-growing deciduous tree with short stout bole, belonging to family Sapindaceae. Morphologically it looks like *Mahua* tree. The spacing for *kusum* has been recommended as 6 x 6 m. The tree is suitable for both winter and summer crop of *kusmi* lac. There are two crops from *kusmi* lac insect (i) *aghani* (winter crop) and *jethwi* (summer crop). The former begins its life cycle in June-July and mature in January-February while latter starts in January-February and matures in June-July. The *kusmi* insects rank very high on the productivity front by producing 2 to 3 times stick lac per meter shoot length on *kusum*.

The life cycle of *kusmi* lac crop has been presented in Table 1.

Table 1: Life cycle of *kusmi* lac crop

Crop	Inoculation Period	Harvesting Period	Duration
Winter crop	January/February	June/July	6 months
Summer crop	June/July	January/February	6 months

Lac Cultivation Operation

Pruning of tree

For lac cultivation on *kusum* tree, availability of tender shoots of sufficient length is necessary as lac insect survives on such shoots only. In case of old shoots, lac insect crawlers are unable to pierce the proboscis in order to suck phloem sap from shoots. In order to get tender shoots of appropriate age, the trees are pruned at proper time and method. Pruning is an essential step for lac cultivation in order to have large number of new, succulent and healthy shoots at the time of broodlac inoculation. The age of suitable shoots required for inoculation of lac insects are 18 months for *kusum*. Pruning of trees should be done in the months of January/February or June/July.

Inoculation or Infestation

Putting the bundles of broodlac (lac stick with mature mother cell) and allowing the young larvae (crawlers) to come out of this and settle on host plant is known as inoculation. New *kusum* tree takes about 12-15 years to take lac inoculation. Nearly 20 g broodlac is required per meter of tender shoots or per cut point. An average size *kusum* tree requires 4-6 kg of broodlac for complete inoculation and after six months, around 30-40 kg of broodlac yield is expected. At the time of inoculation, unwanted portion from broodlac sticks like leaves and petioles and part of twigs are removed. Broodlac stick of 15-20 cm length is cut. Sticks are bundled (about 100 g) with plastic *sutli* and a bit of plastic *sutli* is kept longer for tying on branches of tree. Bundles are tied on to the branches parallel of shoots on upper side. If broodlac is infested with insect predator and parasitoids which normally happen, then it can be checked by physical treatment. Broodlac sticks are kept in 60 mesh and these bags are tied on branches of tree. This allows lac insect crawlers to come out of synthetic net bag but lac insect predators and parasitoids are trapped inside, as these are larger in size.

Post-infestation management of lac culture

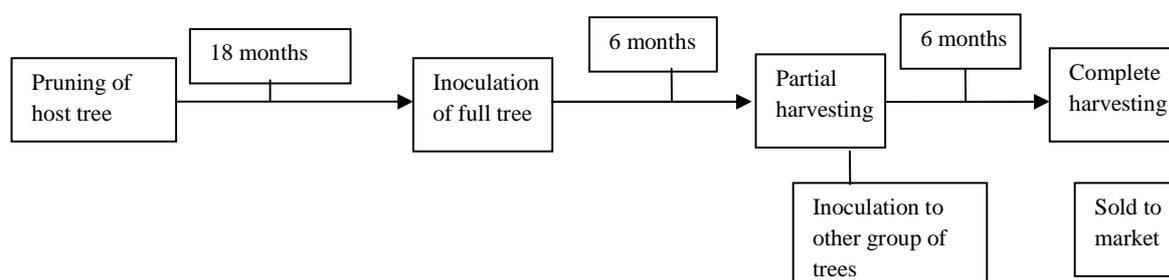
Removal of used-up broodlac sticks (popularly known as *phunki*) is done as soon as emergence is over and not later than 21 days after infestation. After complete emergence of lac larvae from broodlac, the used-up bundles are to be removed from trees. This is an essential operation in order to minimize attack of predators and parasitoids to new lac crop because this used-up broodlac sticks are the source of predators and parasitoids which normally emerge in large number after emergence of lac larvae from broodlac is over. This is also necessary to avoid wastage of lac after drying of lac encrustation on *phunki* sticks which normally fall on the ground.

The management of lac crop is undertaken based on prevailing environmental condition and time of adult male emergence which varies both in winter and summer crop. For winter crop, the adult male emergence takes place between 45-60 days of inoculation. No pesticide is applied during this period. The winter season lac crop is vulnerable mainly to *Chrysopa* spp. and fungus attack due to high humidity during the crop developmental period. For controlling *Chrysopa*

spp., *Eublemma amabilis* (white caterpillar), *Pseudohypatopa pulverea* (black caterpillar), spray of 0.02% ethofenprox 10 EC (Nukil) is recommended. However, there is frequent incidence of fungal attack on lac culture during this period. Hence, carbendazim 50% WP 0.01% (3 g powder in 15 lit of water) is also added in the same insecticidal solution for better result and applied between 25-30 days of inoculation. Same mixture of insecticide and fungicide is again applied between 38-40 days of inoculation. Third spray of ethofenprox and endosulfan 0.05% (1.5 ml per lit of water) with fungicide for control of *Chrysopa* spp. and lepidopteran is applied between 62-65 days.

For raising summer lac crop, inoculation is done in January-February and harvested in June-July (six months). The adult male emergence begins 65-70 days of inoculation and continues for next 15 days. Mating takes place during this period and no pesticide should be applied between 65-90 days of inoculation. Major problems associated during this season are incidence of *Chrysopa* spp., lac crop mortality due to direct sun rays and high temperature and incidence of white and black caterpillar. For protection of lac crop from these enemies, spray of ethofenprox 0.02% and carbendazim 0.01% between 28-30 days of inoculation to control specially *Chrysopa* and other lepidopteran predators as wells as protection against fungal attack is essential. Second spray of above mixture between 60-62 days if incidence of *Chrysopa* is visible otherwise endosulfan 0.05% with carbendazim is applied.

Kusum trees are ready for re-inoculation only after 18 months of crop harvesting. In order to maintain the crop cycle, the total trees are divided into groups. All trees are divided into 4-5 groups as per need. Each group of trees is pruned at the interval of six months. The trees are inoculated with broodlac at the rate of 20 g per meter of tender shoot when broodlac is available. First time inoculation can be carried out 12 months after pruning but subsequently after 18 months. The partial harvesting of broodlac crop is carried out, six months after inoculation, when larval emergence begins. Complete harvesting is carried out six months after partial harvesting or one year of inoculation and trees are simultaneously pruned. Broodlac is harvested only when larval emergence begins. Broodlac harvested partially after six months of inoculation, are utilized for inoculating trees of other group and those obtained by complete harvesting sold to market. However, it is to be sold in the market when own requirement is fulfilled.



(Source: Jaiswal and Singh, 2010. How to culture lac insect on *Schleichera oleosa* (*Kusum*) Tree? Lac Production Technical Bulletin-02)



A well grown *kusum* tree

Conclusion

It is concluded that the best quality of commercial lac is prepared from stick lac obtained from the *kusmi* lac insect grown on *kusum*. The beautiful light colour, good life and better flow, superior to any indigenous or exotic lac insects reported so far, form the specialty of the *kusmi* shellac, thus commanding higher market price. To sum up, the profitability offered by the technology for broodlac production on *kusum* holds great promise not only in boosting the lac production of quality resin and export earnings but also in raising the socio-economic status of lac cultivators belonging to mostly tribal and economically weaker sections.