

Entomological Cottage Industries:

**Lac-culture
(Lac Production)**

MZM

Lac is the scarlet resinous secretion of a number of species of lac insects, of which the most commonly cultivated species is *Kerria lacca* and *Laccifer lacca* (India). The insect *Laccifer lacca*, living off the sap of certain trees, secretes *lac resin*. The processed resin is called **Shellac** and has numerous industrial applications including in the food and drug industries. India is a major producer of Shellac.



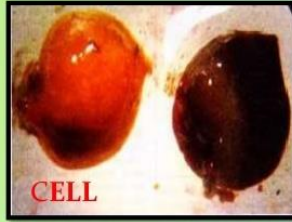
What is Lac?

- **Lac** is the scarlet red resinous secretion of a number of species of **lac insects**, of which the most commonly cultivated species is *Kerria lacca*.
- It is only known commercial resin of animal origin.
- Lac produced is a mixture of resin, dye and wax.



Lac Insect

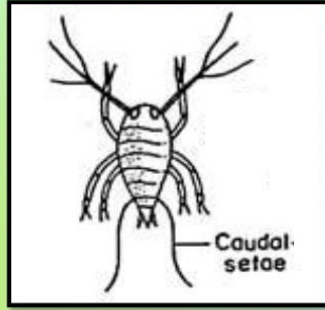
- Lac insect is a minute crawling scale insect with suctorial proboscis through which it sucks phloem saps of the host plant twigs.
- They secrete resin from hypodermal gland which gradually encases the body of the insect totally in a structure referred to as 'CELL'
- There are 9 genera of Lac insect out of which only 5 secrete lac and only one i.e., *Kerria lacca* secretes recoverable or commercial Lac.



BIOLOGY

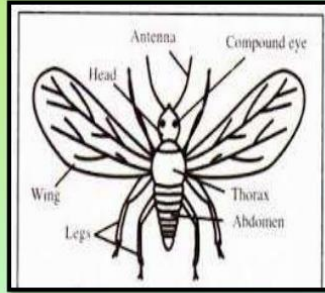
NYMPH

- **Color-** Crimson red.
- **SHAPE-** Boat shaped.
- **SIZE-** 0.5mm.
- Referred to as **Crawlers**.
- **SWARMING-** The emergence of lac insect in huge number.



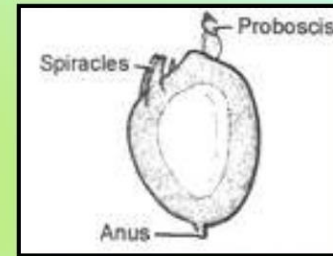
MALE

- **Colour-** Red.
- **Size-** 1.2- 1.5mm.
- **Eyes-** Reduced.
- **Mouth part-** Absent.
- **Wings-** 1 pair of hyaline wing.

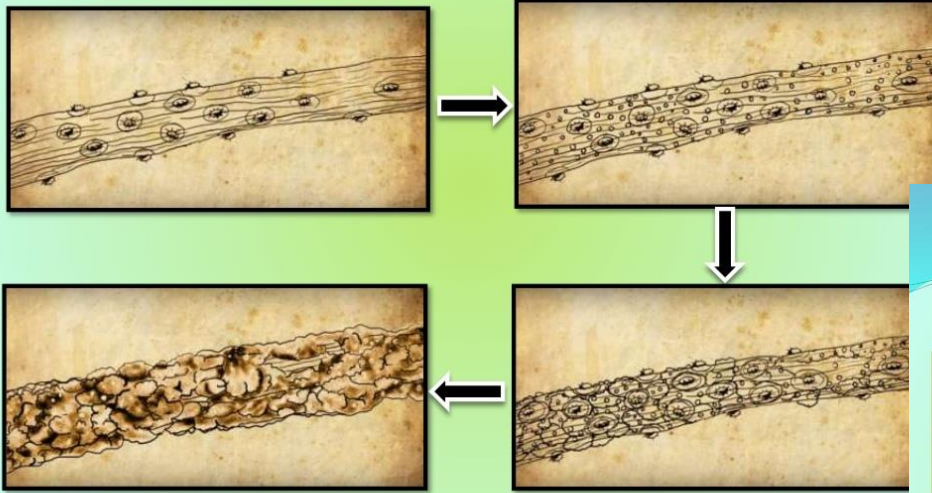


FEMALE

- **Shape-** Pyriform body.
- **Size-** 4-5mm
- **Antennae-** Degenerated.
- **Eyes-** Absent.
- **Mouth part-** Piercing & sucking.
- Posterior to mouth lie a pair of spiracles.
- **Wings-** Absent.
- **Legs-** Degenerated.



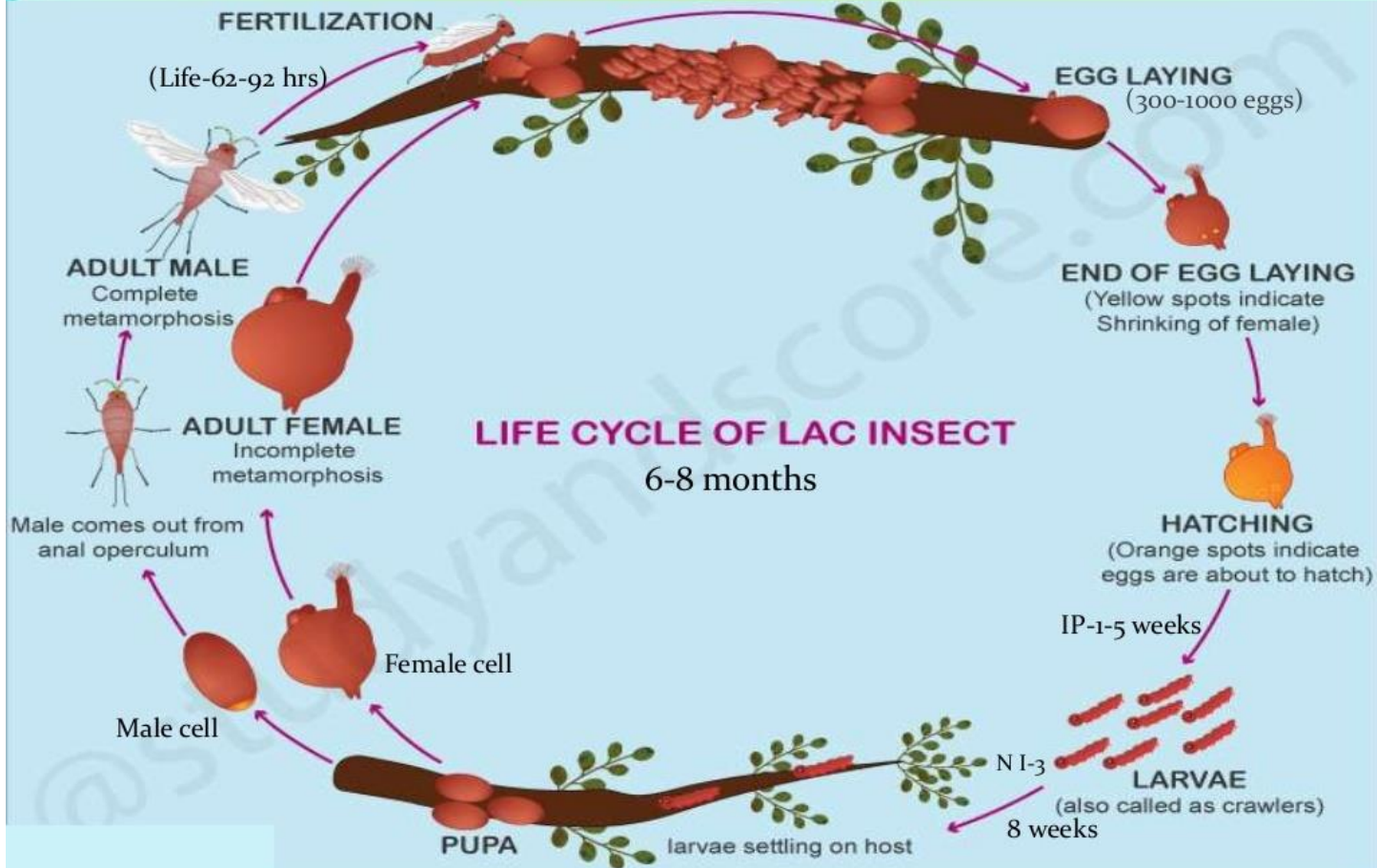
Deposition of Resinous Encrustation Around the Body as Insect Grows



**Dried resinous encrustation around the
body as Insect Grows**



LIFE CYCLE



Cultivation begins when a farmer gets a stick (**broodlac**) that contains eggs ready to hatch and ties it to the tree to be infested. Thousands of lac insects colonize the branches of the host trees and secrete the resinous pigment. The coated branches of the host trees are cut and harvested as **sticklac**.

The harvested sticklac is **crushed and sieved** to remove impurities. The sieved material is then repeatedly **washed** to remove insect parts and other soluble material. The resulting product is known as **seedlac**. The prefix seed refers to its pellet shape. Seedlac which still contains 3-5% impurities is processed into **shellac** by **heat treatment** or **solvent extraction**



Cultivation and pruning of host plant

The quality of Lac depends upon the quality of host plant. So there should be suitable host plant according to environmental condition.

When the host plant reach a proper height they undergo pruning. Branches less than 2.5 Cm diameter are selected for pruning. Branches less than 1.2 Cm in diameter are cut at a distance, but branches more than 3.8 Cm from their base.



Inoculation

The process by which lac insects are introduced to the new host plant is called ***inoculation or infection***. This may be of two types-

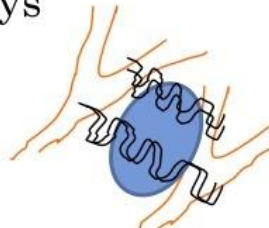
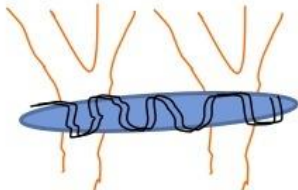
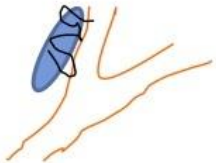
(A) Natural inoculation- Occur by natural movement of swarming larvae from one plant to other

(B) Artificial inoculation- Lac insects are introduced to new host plant in a planned and scientific manner by the cultivators.

About two weeks before swarming, the lac bearing sticks are cut into pieces and kept for two weeks in cool place

When the larvae starts emerging, the sticks are tied with the help of strings to the branches of new host tree.

The stick of brood lac may be tied in three ways



Forecast of Swarming

Cultivators must have accurate knowledge of time of swarming because methods are directly related with the swarming of larvae.

The eggs become *orange coloured* before hatching.

At the time of swarming the upper surface of female cell has *yellow spot* on the anal region.



Harvesting or Reaping of Crop

The process of scrapping lac from branches of host tree is called Harvesting or Reaping.

Harvesting is of two types-

(A) Immature harvesting- Scarping of lac before swarming, collected lac is called **Ari Lac**.

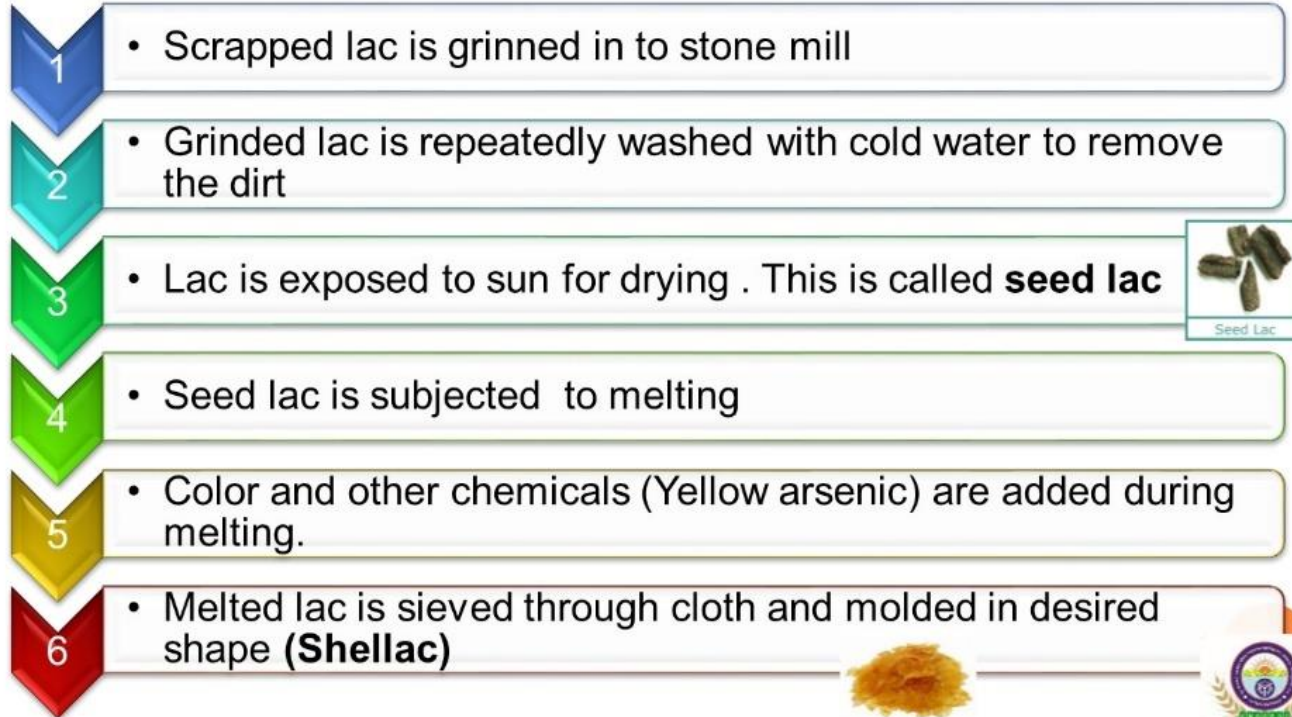
(B) Mature harvesting- Scraping of lac after swarming, Obtained lac is called **Phunki Lac**. It is the most common method.

Lack bearing twigs are cut in to pieces called **Stick Lac** (Brood lack for next generation). Then the lac encrustation is scrapped from the stick with the help of knife.



Processing of Lac

Processing of scrapped lac into the commercial lac is given below in graphic manner-



Composition of Lac

Lac is reddish, brittle, solid, rich in resin (68-90%)

Wax, minerals, sugar, dye, water are also present in small amount.

The quality and color of lac depends on gum and resin present in host plant.

Lac is insoluble in water but soluble in alcohol.

Bad conductor of heat and fuses easily on heating

It has adhesive property.



Importance of Lac Insect

- Lac is the only known commercial resin of animal origin.

- The lac insects yields :

1. Resin-

- ✓ Natural polymer.
- ✓ Made of hydroxy fatty acids. Principally it consists of-
 - Aleuritic acid (9,10,16 trihydroxyhexadecanoic acid)
 - Hydroxy sesquiterpenic acids.



Shellac made from resin

2. Lac dye- erythrolaccin and laccic acid.

3. Lac wax- benzene extract of stick lac , extracted with alcohol.



Dye



Wax

Use of Lack

- (i) Used in preparation of varnishes, paint, toys, bangles, gramophone records and buttons.
- (ii) Consumed as sealing agents.
- (iii) Used in the preparations of electrical goods, lac is used as insulating agents.
- (iv) Also used for silvering the back of mirror and filling ornaments.
- (v) Nail polishes and dyes are by products of lac industries.



Lac enemies

Insects-Small winged insects called *chalcid* are common predator, their larvae feed on lac insect causing death.

White moth & Gray Moth are major predators.

Rats, bats, squirrels, monkeys & some birds also destruct the lac crop in many ways.

Climatic factors as excess heat, excess cold, heavy rain, high humidity and storm cause damage to the lac crop.

