

Q.1 : Describe Species, Morphology, Biology and Host Plants of lac insect

Ans.: Lac insects belong to the order Hemiptera and family **Kerriidae**. They are commercially important because they secrete **lac resin**, which is processed into shellac used in varnishes, pharmaceuticals, cosmetics, and food coatings.

The most important lac insect species is *Kerria lacca*

- Belongs to **scale insects (Coccoidea)**, which are sap-sucking insects.
- Earlier classified under genus **Laccifer** (old name: *Laccifer lacca*).
- Now placed in genus **Kerria** based on modern taxonomic revisions.
- Family **Kerriidae** includes all **lac-producing insects**.

3. Morphology of Lac Insect

Lac insects exhibit **sexual dimorphism** (male and female differ significantly).

A. Female (Sessile Stage)

- Shape: Oval, sac-like
- Size: Larger than male
- Color: Reddish to crimson
- Wings: Absent
- Legs: Rudimentary (non-functional)
- Eyes: Reduced
- Mouthparts: Piercing and sucking (remain inserted in plant tissue)
- Body covered by **resinous secretion (lac crust)**

☞ Female is **economically important** as it secretes lac.

B. Male

- Shape: Slender
- Wings: One pair of functional wings
- Legs: Well developed
- Eyes: Prominent
- Mouthparts: Absent (do not feed)
- Life span: Very short (1–2 days)

☞ Male's function is only **fertilization**.

C. Nymph (Crawler Stage)

- Minute, active, reddish
- Possess functional legs and antennae
- Disperse and settle on tender plant parts

4. Biology (Life Cycle)

Lac insect shows **incomplete metamorphosis**.

Life Cycle Stages

1. Egg
2. Nymph (crawler)
3. Adult

Detailed Life Cycle

The life cycle of the lac insect, **Kerria lacca**, is characterized by incomplete metamorphosis and typically spans about six months. The egg stage is unique, as eggs are retained within the body of the female and hatch internally, exhibiting an ovoviviparous condition. This stage lasts for about **7–10 days**, after which minute, active first instar nymphs, known as crawlers, emerge.

The nymph or crawler stage is the most active dispersal phase and generally lasts for **2–3 days**. During this period, the crawlers move in search of suitable tender twigs, where they settle and insert their piercing-sucking mouthparts (stylets) into the phloem tissue. Once settled, they begin to feed on plant sap and start secreting lac.

Following settlement, the insects enter the lac secretion phase, which extends for a major portion of the life cycle, approximately **60–120 days**. During this period, resin is secreted from specialized dermal glands, gradually forming a protective covering known as the lac cell. This secretion thickens and hardens over time, forming a continuous encrustation over the insect body.

In the adult stage, females remain sessile, continuing to grow and secrete lac, whereas males undergo a pupal-like transformation within their cells. The male development phase, including this pupal-like stage, lasts about **20–30 days**. Fully developed winged males emerge, fertilize the females, and die shortly thereafter, typically surviving only for a few days.

Overall, the entire life cycle is completed in about **180 days (approximately 6 months)**, allowing for **two crops per year**, namely the **Kharif crop** and the **Rabi crop**, depending on the strain and host plant conditions.

Strains of Lac Insect

Strain	Crop Cycle	Host Preference
Kusumi strain	One cycle/year	Kusum tree
Rangeeni strain	Two cycles/year	Palas, Ber

5. Host Plants of Lac Insect

Lac insects are **polyphagous**, but prefer certain trees.

Major Host Plants

Common Name	Scientific Name	Importance
Kusum	<i>Schleichera oleosa</i>	Best quality lac
Palas (Dhak)	<i>Butea monosperma</i>	Widely used
Ber	<i>Ziziphus mauritiana</i>	Common host
Flemingia	<i>Flemingia semialata</i>	Bushy host

Other Host Plants

- *Acacia nilotica*
- *Albizia lebbbeck*
- *Cajanus cajan*

Host Suitability

- Tender twigs required for settlement
- High sap flow supports better lac production
- Host species influences **quality and yield of lac**

6. Economic Importance

- Source of **natural resin (lac)**
- Used in:
 - Varnish and polish industry
 - Pharmaceuticals
 - Cosmetics
 - Food glazing (confectionery)