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Q1. Write a paragraph on lac culture? Explain the life cycle of lac insect.

Q2. Write a note on pearl culture.

Q3. In which ascaris disease spread, Give reason and prevention.

Q4. Fixed action pattern and Action specific energy, Understand the concept with suitable example.

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Ans 1. Lac culture refers to the scientific cultivation and management of lac insects, specifically the species Kerria lacca, to produce a resinous substance called lac, which is valuable natural product used in various industries. This process involves carefully selecting host trees, inoculating them with healthy lac insect colonies, monitoring their growth and development, and harvesting the lac secretion at the optimal stage. Lac culture is primarily practised in regions with suitable climatic conditions, where farmers cultivate host trees like kusum and ber and actively manage the insect population to ensure a consistent supply of high-quality lac, which is further processed into shellac, a key ingredient in products like polishes, varnishes, and even food coating.

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• Key points about lac culture:

→ Lac insect :

The lac insect is a tiny scale insect that secretes a resinous substances as a protective covering.

→ Host trees

Specific trees like kusum, ber and peepal are used as host plants for the lac insect to feed on.

→ Inoculation :

The process of introducing young lac insects onto the host trees to initiate lac production.

→ Harvesting

Once the lac secretion hardens

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the infested branches are harvested and processed to extract the lac resin.

→ Processing :

The raw lac is cleaned and refined to produce shellac, a commercially valuable form of lac.

Life Cycle of lac.

Adults :-

(i) Female : The female lac insect has a pyriform body with 4-6 mm in length. The body is divided into head, thorax and abdomen. Head bears a pair of spiracles which uses smooth breathing of the insect during lac

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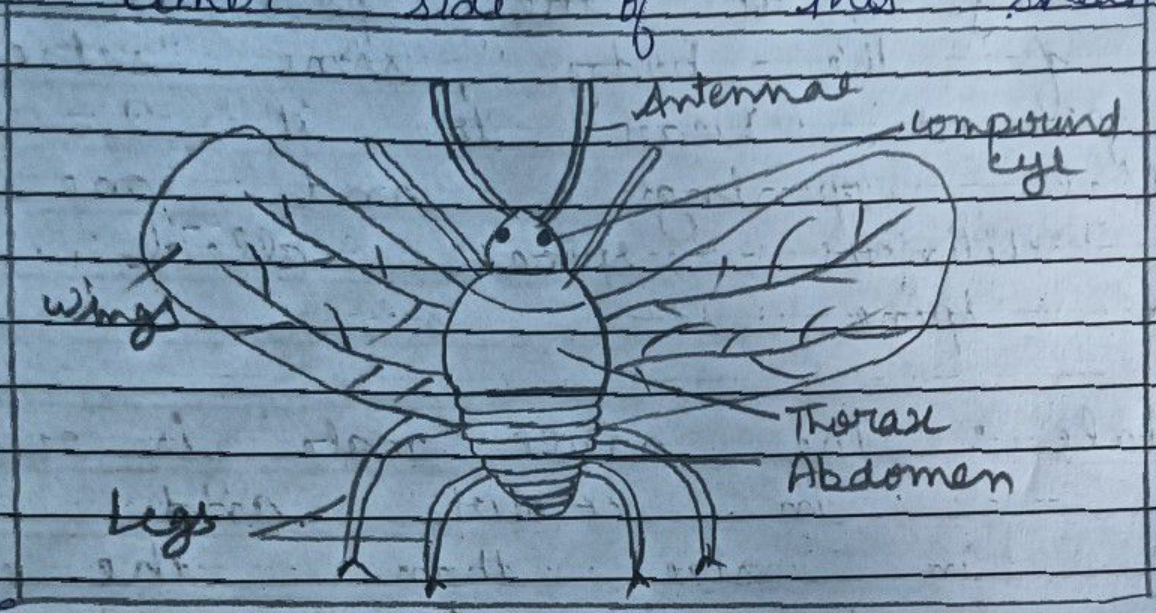
secretion.
Thorax has degenerated legs and lac wings. At the posterior part of the body, some setae is present. Near to it 2 branchial openings and one small chitinous spine called dorsal spine.

(ii) Male : The adult male is red in colour and smaller in size than the female insect with length about 1.2 - 1.5 mm Head bears reduced eyes and ten segmented antennae. Mouth parts are similar to that of the females. Thorax has 3 pairs of legs.
The male lac insect may be either winged with one pair of hyaline wing on its thorax or wingless (apterous). The eight - segmented abdomen ends into a short chitinous prominent sheath containing penis

A pair of white elongated caudal seta or filament is present on either side of this sheath.



• Fertilization :- Lac insects are oviviparous types in nature. So the laid eggs contain fully developed embryos within it. About 300-1000 such eggs are laid in the chambers (cell) in which females encased. The egg laying period may last from 7 to 10 days. But egg laying cases if the temperature falls below 17°c in summer and 15°c in winter.

• Fertilization :- Lac insects are ovipiparous

in nature. The female get attached to the host plant inside the resinous mass. The male insects comes out of its resinous mass by pushing the operculum of anal opening and then walks over the resinous covering of the females. This walking fertilize female with in

- Egg - laying :- After the fertilization the females grows rapidly until it begins to lay eggs. Female starts to lay the eggs, its body contracts on the ventral side. After about 14 weeks, female completes shrinks in size allowing the light to pass into the cell and onto the eggs.

- Egg hatching :- After six weeks, the eggs are hatched into first instar larvae called crawlers. This larvae emerge out in very huge number and this emergence

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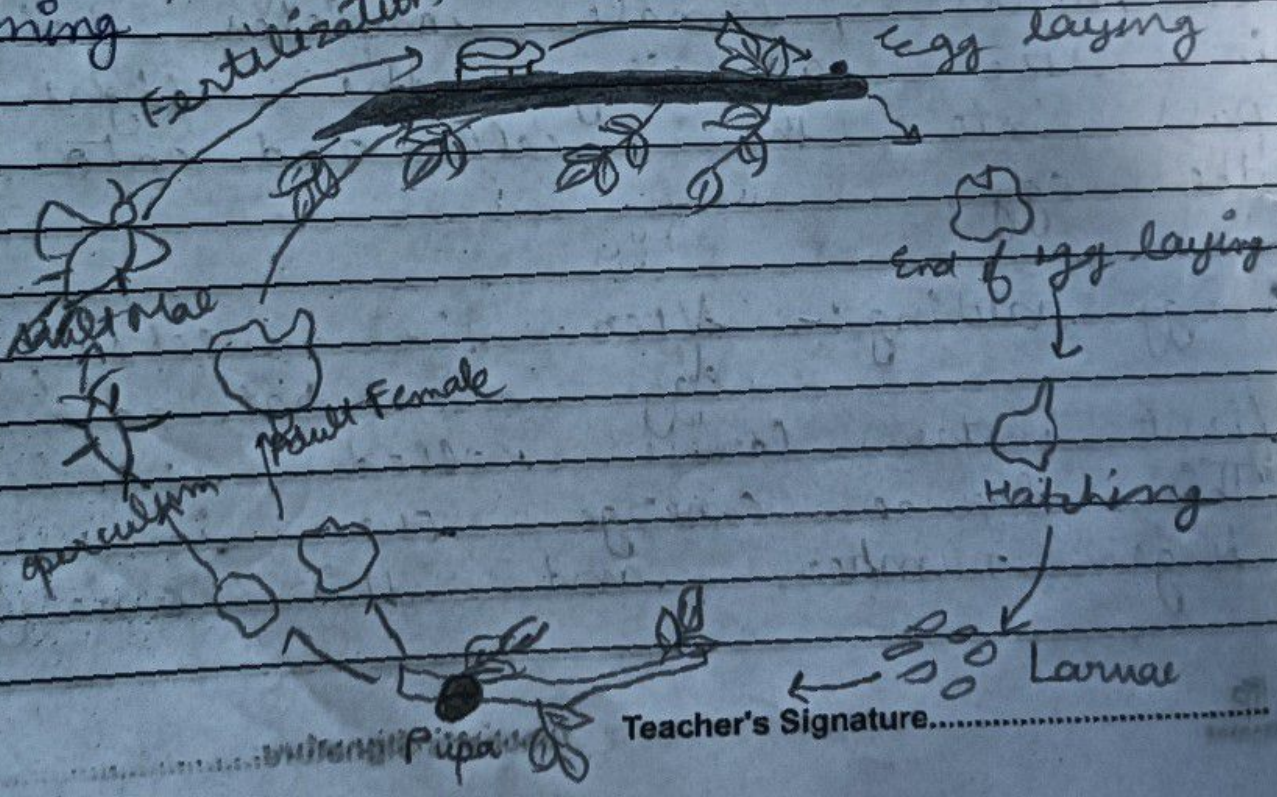
is termed as swarming. The settled larvae suck the sap from the host and start to secrete resinous substance all over their body.

• Pupa :- As the secretion come in contact with the air, it becomes hard and forms a coating over the body of the larvae and now this covering is called cell. The female once inside the cell will never move on the other hand the male comes out through the operculum of the anal opening



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Ans 2. Pear culture, also known as cultured pearl production, is a process where humans intentionally induce the formation of pearls within the mantle of pearl oyster by surgically implanting a foreign nucleus (usually a small shell bead) which triggers the oyster to secrete layer of nacre (mother-of-pearl) around the irritant, resulting in a cultured pearl.

→ Key aspects of pearl culture:

• Pearl-producing molluscs:

The most commonly used species for pearl culture are marine bivalve molluscs, primarily from the genus Pinctada (e.g. Pinctada fucata), which are found in warm tropical waters.

• Nucleus implantation:

1) Surgical procedure: A small incision

is made in the mantle of the oyster and a prepared nucleus (a small, round bead made from shell material) is inserted along with a small piece of mantle tissue from a donor oyster (graft).

2) Grafts : The mantle tissue acts as a stimulus, encouraging the oyster to secrete nacre around the nucleus.

→ Growth and Harvesting :

- Caging : After surgery, the oysters are placed in cages and suspended in the water column to allow for optimal growth conditions.
- Pearl formation : The oyster will gradually deposit layers of nacre around the nucleus forming a pearl over a period of several months to years, depending on the species and water conditions.

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• Harvesting: When the pearls reach the desired size, oysters are harvested and the pearls are carefully removed.

Important factors in pearl culture

Water quality:

Clean, warm, and well-oxygenated water is essential for optimal oyster health and pearl production.

Oyster selection:

Health, mature oysters of appropriate size are chosen for pearl culture.

Grafting technique:

The surgical technique used to implant the nucleus is critical for successful pearl formation.

Types of cultured pearls:

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Akoya pearls:

Produced by the Japanese pearl oyster (Pinctada fucata) known for their high quality and luster.

South Sea pearls:

Large, lustrous pearls produced by the pearl oyster Pinctada maxima found in the waters of Australia and Indonesia.

Tahitian Pearls:

Dark coloured pearls produced by black lipped pearl oyster (Pinctada margaritifera) from French Polynesia.

→ Historical significance:

• Kokichi Mikimoto: considered the "father of pear culture", Mikimoto developed the first commercially viable technique for cultivation pearl in the late 19th century in Japan.

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Ans 3. Ascariasis, or ascariasis is a disease caused by the ascaris worm parasite that spreads through contaminated soil, water or food.

Ascariasis is a common intestinal worm infection caused by consuming food or drink contaminated with roundworm eggs.

Reason :-

How its transmitted → consuming food or drink contaminated with roundworm eggs.

Risk factors → Poor sanitation, living in a warm climate raising pigs, or eating raw liver from pigs or chicken

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To prevent ascariasis, you can:

- Wash hands: wash your hands with soap and water after using the bathroom and before handling food.
- Wash fruits and vegetables: Wash, peel, and cook raw fruits and vegetables especially if they grew in manure fertilized soil.
- Avoid contaminated soil and water: Avoid touching soil or water contaminated with human feces.
- Use bottled water: Use only bottled water, and avoid raw vegetables unless you can peel and wash them.
- Inspect food preparation spaces: When visiting a region with a

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lack of sanitary facilities inspect food preparation spaces for cleanliness.

- Avoid common bathing areas:

Avoid unclean common areas for bathing.

- Launder clothing:

Launder clothing exposed to unsanitary conditions.

- Clean cooking surfaces:

Clean cooking surface well.

Ans 4. Fixed action pattern (FAPs) are a series of instinctive behaviors that are triggered by a stimulus, while action specific energy is a type of motivated energy

that accumulates until released

3 Fixed action patterns

A series of behaviors that are triggered By a stimulus, such as color, shape, odor or sound. FAPs are a type of innate behaviour that are not learned, and are performed to completion even if the stimulus is removed. Example of FAPs include:

- Graylag geese: When an egg rolls out of the nest, the mother goose will perform a series of movement to roll it back in.
- Herring gulls: The chicks peck at the red spot on their parents beaks.
- Male sticklebacks:

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They display aggressive behaviour towards other males with red belly coloration

→ Action specific energy.

A type of motivational energy that builds up until it is released by a stimulus.

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