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ENTO 131 - Fundamentals of Entomology (3+1)

Offense and defense behaviour in insects

- Insects exhibit several types of defense mechanisms to escape from their natural enemies. Insect defense can be grouped into four types as follows.

i Behavioural defense

ii Structural defense

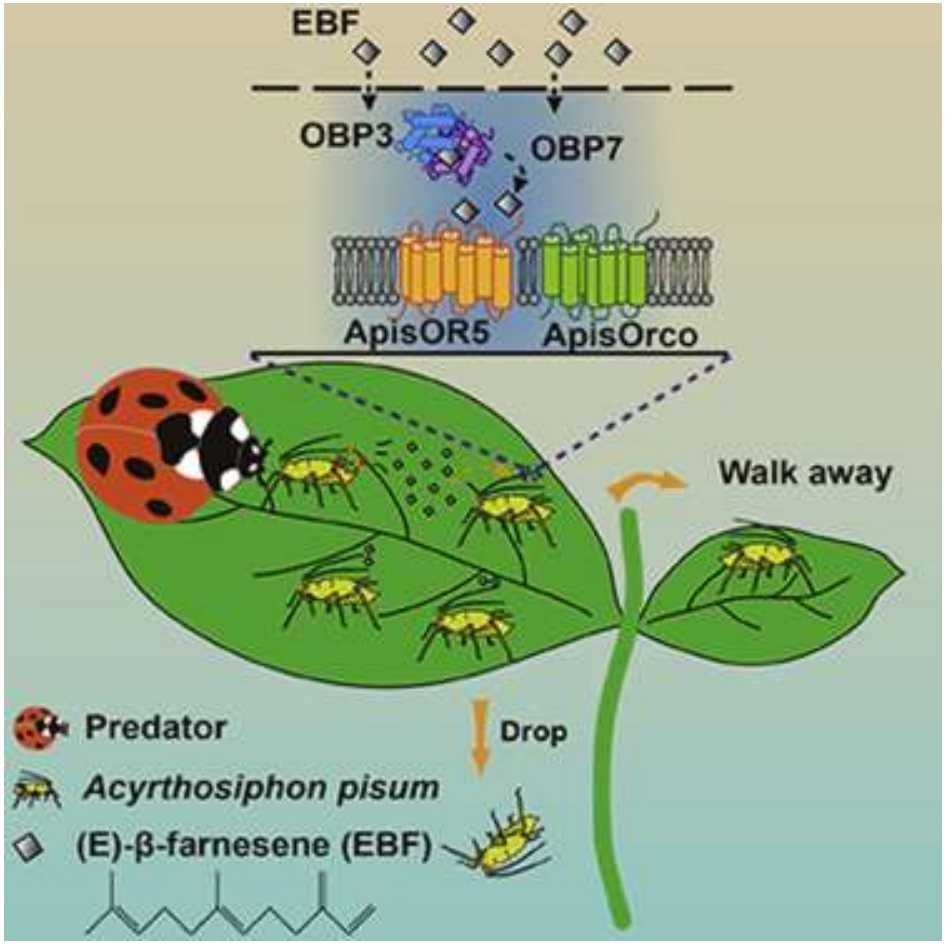
iii Chemical defense

iv Colourational defense

1. BEHAVIOURAL DEFENSE:

1. JUMPING: It is an effective form of escape

2. Reflex dropping: Caterpillars often drop from their food on a strand of silk when disturbed and reel themselves back up when the danger has passed. e.g. Mango shoot webber.



3. Thanatosis: Many beetles and weevils feign dead which is a form of defense against a predator which prefers live prey

4. Threatening pose: The insects frighten their enemies by threatening pose. e.g. gingelly sphingid and stag beetle.

5. Protective constructions

Eggs: Stalked eggs gain protection from predators. e.g. green lace wing fly

Nymph: Frothy secretions produced by the nymph of spittle bug protects it against predators and desiccation.

Larva: Bag worms live in portable cases made out of plant materials along which they move, feed and finally pupate inside the cases.

Pupa: several materials like silk, frass, soil, body hairs and fibres are used for forming protective cocoons. In flies the last larval skin hardens to form chitinous protective puparium. Mosquito pupa is unusually active thereby it escapes from aquatic predators.

Adult: In mealy bug, waxy threads covering the body afford protection. Hard shell like covering protects the soft bodied insects e.g. female scale insect.

II. STRUCTURAL DEFENSE

1. **Horny integument:** The integument is hard and highly sclerotised. Hence it can resist beak penetration by insectivorous brids,

   e.g. jewel beetle.

2. Sclerotised cerci: In earwigs, the cerci are forceps like which are organs of defense.

3. Raptorial leg: The grasping legs of preying mantis are also useful to attack its enemy.

4. Tentacles: Varying number of paired movable processes are present on the body of the larvae of butterflies grouped in the family Danaidae. They are useful to brush off the enemies.

III. CHEMICAL DEFENSE

ENDOGENOUS

1. Stink glands: In stink bugs and rice earhead bug, a stink gland is present in metathorax emanates a bad odour when handled.

2. Poisonous setae: They are present in the body wall of certain caterpillar e.g. castor slug. The setal tip breaks off issuing the poison from the poison gland cell.

EXOGENOUS:

1) Osmeteria: (Osmeterium - Singular) Odoriferous plant components accumulated in thoracic pouches are expelled by the eversion of a pair of coloured protrusible structures called osmeteria releasing a disagreeable odour in response to a disturbance.

IV. COLOURATIONAL DEFENSE

1. Cryptic colouration:

Homochromism: Colour is similar e.g. Preying mantis.

- **Homomorphism:** From is similar e.g. Preying mantis

Homotypism: Both colour and form are similar e.g. stick insect.

2. Revealing colouration: e.g. Giant silk worm. Forewings are crypticaly colured. Hind wings are attractively coloured. If once the bird locates the insect, the prey insect exposes the bright hind wings with eye spots to startle the predator.

3. Warning coloration

Batesian mimicry: Mimic is restricted to palatable species. Mimic alone gets protection because the predators are apparently misled.

Eg: Viceroy butterfly: *Liminitis archippus* - Mimic

Monarch butterfly: *Danaus plexippus* - Model

Mullerian mimicry: Both model and mimic are unpalatable and the ingestion of either by a predator results in the avoidance of both the species. This form of mimicry is advantageous to both the mimic and model. e.g. *Danaus chrysippus*, *D. genetua*.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