

EXPERIMENT NAME

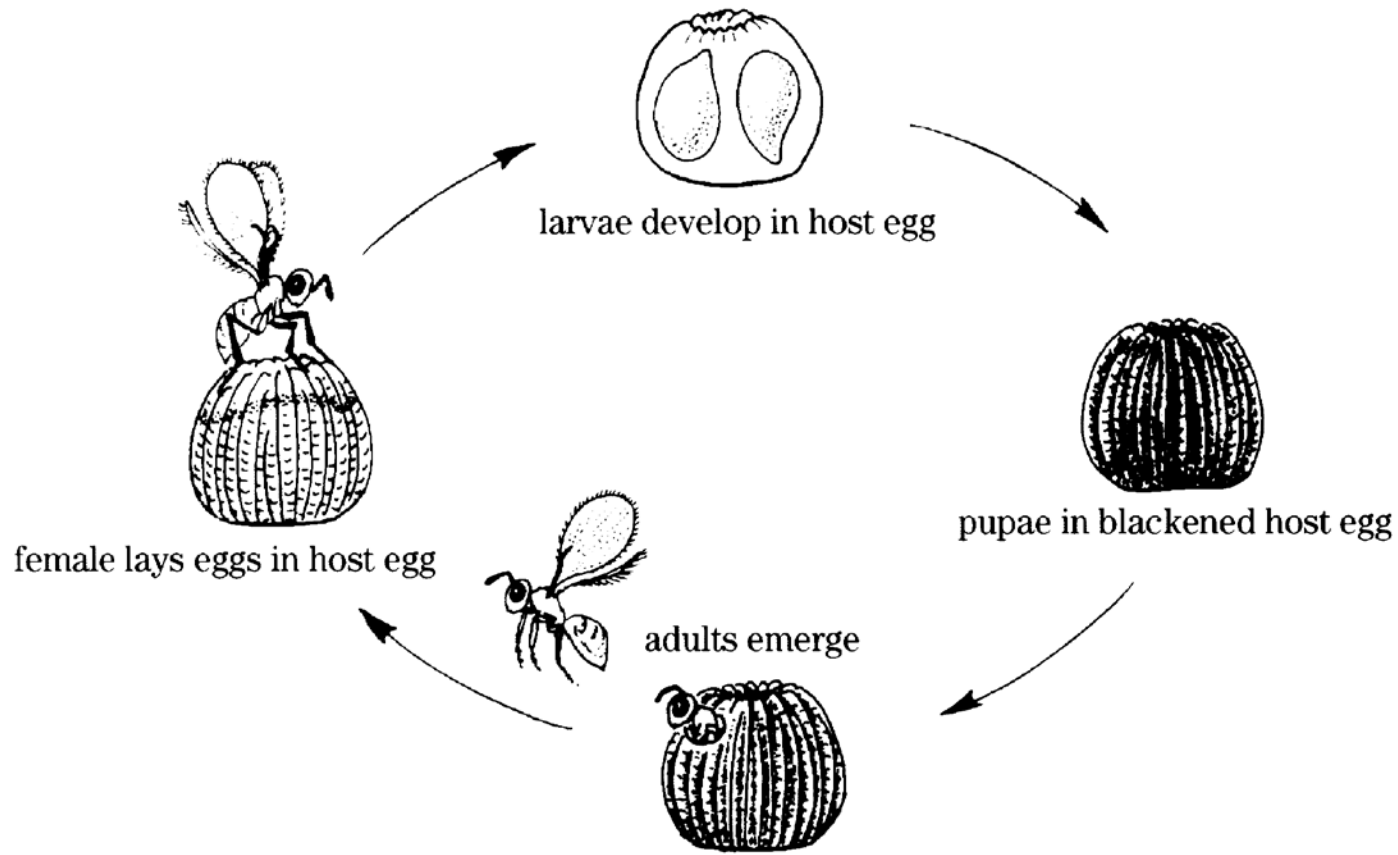
ACQUAINTANCE OF MASS
MULTIPLICATION TECHNIQUES OF EGG,
LARVAL AND PUPAL PARASITOIDS

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Objective:

To acquaint with the mass multiplication techniques of

- Egg parasitoid- Trichogramma Sp.
- Larval parasitoid- Bracon Sp.
- Pupal parasitoids- Tetrastichus Sp.



**Production procedure for
Egg parasitoid: *Trichogramma* Sp
(Hymenoptera, Trichogrammatidae)**

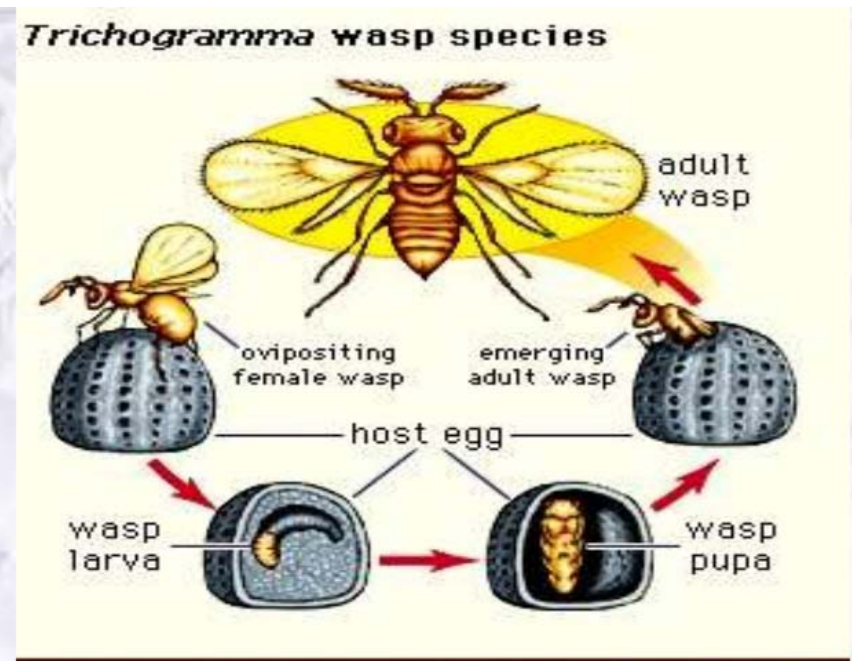
- *Trichogramma* sp are of common occurrence and distributed through out the world.
- They parasitise eggs of Lepidopteran mainly but are also reported from Coleoptera, Neuroptera and Diptera.
- In India it is commercially available for the pest suppression of sugarcane, cotton, sorghum, maize and paddy borers.

a) Biology :

- Incubation period : 24-36 days
- Larval period : 2-3 days
- Pupal period : 3-4 days
- Adult longevity
 - Male : 5-7 days
 - Female : 5-20 days
- Fecundity : 35-300 eggs

b) Equipment and facilities required :

- Refrigerator, B.O.D. incubators, eggs of *Corcyra cephalonica* (rice meal moth), glass tubes, sieve (40 mesh size), paper cards, UV lamp, table lamp etc.



c) Rearing :

- In India, *Trichogramma* sp are reared on the eggs of rice meal moth.
- Freshly collected eggs of *Corcyra* are cleaned of the scales, mites and other foreign matter associated with these and are glued on the Trichocard with uniformly thin layer using 2 per cent gum Arabic in distilled water (W/V).
- The sprinkling of the eggs is done either with camel hair brush or a fine sieve which does not allow more than one or two eggs to pass through its hole at a time. Thus 18000-72000 (1 ml) frozen host eggs are glued on a trichocard (15x7.5 cm).
- If the eggs were not frozen the trichocard should be exposed to UV lamp for about 10 minutes.

- The card is further divided through punching into 6 strips each of 7.5x2.5 cm size which can be easily pressed and separated. A strip containing glued eggs on it was inserted into a glass tube (10x2.5 cm) having newly emerged adults.
- The adult parasitoids are provided with honey streaks (50% honey dissolved in water) drawn on inner side of the tube and secured tightly with muslin cloth and rubber bands.
- The card is changed after 24 hrs and replaced with fresh card. Thus continuity of change over is maintained for 3 to 4 days or till female survive and remain productive.
- The host eggs oviposited by female turns black after 3 days of parasitization. The parasitoid completes its life cycle in 7-9 days at $27 \pm 2^{\circ}\text{C}$ and $75 \pm 5\%$ RH.



Precautions :

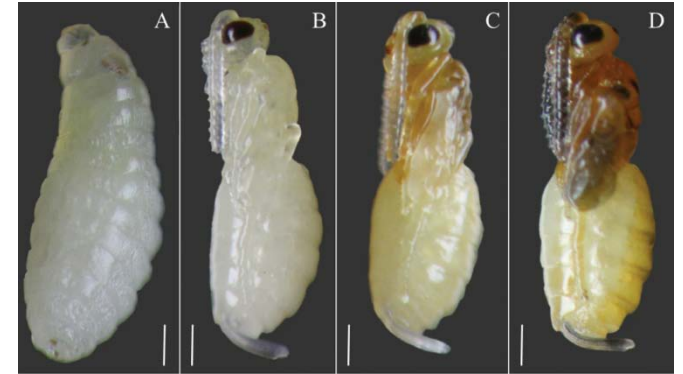
1. If host eggs are not frozen/treated with UV rays to kill the embryo, the moth's larvae may hatch out from the unparasitised eggs. These larvae should be brushed out gently since they eat away the unparasitised eggs.
2. Avoid super parasitism either by exposing host eggs upto 8 hrs or providing 6 eggs for one parasitoid.
3. Maintain pure species of different species of Trichogrammatids through proper handling and regular examination.
4. Do not offer frozen eggs to *T. japonicum* as it does not develop well on such eggs.
5. Do not rear *T. brasiliensis* at the temperature exceeding 26⁰C where undesired male formation is more.
6. Do not cold store parasitized eggs at 5-10⁰C for more than 15-20 days as beyond this storage biological attributes of the parasitoids are affected.
7. Use healthy eggs of host for healthy parasitoid.
8. Do not put excess gum while sprinkling the host eggs.
9. Do not rely on super parasitized parasitoids as they are normally weak and unfit for the production of healthy progeny.



EGG



LARVA



PUPA

Production procedure for *Larval parasitoid : Bracon hebetor* (Braconidae: Hymenoptera)



ADULT

It is a well known external, gregarious larval parasitoid of several of the lepidopterans.

a. Biology:

- Egg period : 24-36 hrs
- Larval period : 4-6 days
- Pupial period : 3-7 days
- Adult longevity : 15-25 days
- Average fecundity : 130-200 eggs

b. Equipment and facilities required:

- B.O.D. incubator or air conditioned room, larvae of rice meal moth, room humidifier with humidistat, oviposition cages, glass plates, rubber bands, forceps etc.

c. Rearing :

- The adult parasitoids soon after emergence are ready for mating and hence are held in a glass jar (10x7.5 cm) and fed with honey (5%) as food. The female parasitoid lays 8 to 12 eggs on the ventral surface of the host larvae after paralyzing it through stinging.
- The mouth of the jar containing the parasitoids is covered by a marking cloth over which 80-100 full grown larvae of *Corcyra* are kept in position with the help of rubber bands.
- After one day, the parasitized larvae are removed gently with the help of forceps and kept on paper plates (3x8 cm) as to avoid falling of the eggs from the host body and left undisturbed till cocoon formation.
- After cocoon formation, the remains of dead host larvae are removed. The cocoons are placed in glass jar (19 x 19 cm) for emergence. The optimum rearing conditions are $27 \pm 2^{\circ}\text{C}$ and $60 \pm 5\%$ RH with a photoperiod of 12-14 hours.

d. Precautions :

1. Provide sufficient light and high RH (60+80%) to adult parasitoids to ensure proper mating.
2. Avoid infestation of mite, *Pediculoides ventricosus* in the culture.
3. Sterilize all equipment and cloths in hot air at 110°C for 1 hr. also remove the dead larvae regularly.
4. Do not cold store parasitoid cocoons for more than one month at $5-10^{\circ}\text{C}$ as beyond this period the biological attributes of the parasitoid are adversely affected.





**Production procedure for
Pupal parasitoid : *Tetrastichus israeli*
(Eulophidae: Hymenoptera)**

The pupal parasitoid was observed to parasitise the pupae of *Opisina arenosella* and an average 90 adult parasitoids emerged from a single pupa under natural conditions. It can be mass reared on fresh pupae of *S. litura*, *H. armigera*, *Plusia* sp., or *Ergolis* sp.

a. Biology

- Egg period : 20-24 hrs
- Larval period : 4-6 days
- Pupal period : 6-10 days
- Longevity : 10-15 days
- Fecundity : 50-150 days

b. Equipment and facilities required :

- B.O.D. incubator, A.C. room, glass tubes, fresh pupae of hosts, honey, rubber bands, marking cloth etc.

c. Rearing :

- Mass rearing of the parasitoid on *Opisina* is done in some places.
- The adult parasitoids (newly emerged) are fed with honey offered as fine droplets on waxed paper and held in glass vials. Fresh pupae (0-1 day old) are offered at the rate of 3-4 females/big pupa or 1-2 females for smaller pupa.
- The parasitoids are allowed to parasitise and die in the vials and the parasitized pupae are kept for development at $27 \pm 2^{\circ}$ and $65 \pm 5\%$ RH.

d. Precautions :

1. Provide fresh host pupae.
2. Some times it may realize breaking the outer shell of host pupa for easy emergence of parasitoids.
3. Maintain cleanliness.

Record Work:

- 1) Observe and note down identification marks of different parasitoids in the laboratory and draw neat labeled diagrams of the specimens.
- 2) Collect different parasitoids and arrange them with labels in the insect box given.

THANK YOU