



Mass Production Procedure of *Trichogramma* spp (Trichogrammatidae : Hymenoptera)

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Abstract

Trichogramma species are famous as elite parasitoids for specific biological control purposes, especially for preventing or suppressing the lepidopterous pests of agricultural and forestry crops. Of these, *Trichogramma* and *Trichogrammatoidea* are most commonly used since they are suitable for large-scale laboratory rearing on factitious hosts such as rice moth, paddy moth and flour moth and have been employed for the biocontrol of lepidopterous pests of crops globally.

Keywords: Some of the necessary thematic areas are *Trichogramma*, Biology of *Trichogramma*, *Corcyra cephalonica* and the process of mass production.

Introduction

Trichogramma, a genus of minute wasps belonging to the family Trichogrammatidae, are among the most fascinating and economically significant parasitoids in the field of biological pest control. These tiny insects, often measuring less than 1 millimeter in length, have garnered considerable attention due to their ability to parasitize the eggs of a wide range of insect pests, making them invaluable allies in sustainable agriculture and integrated pest management (IPM) programs.

Trichogramma wasps exhibit an extraordinary life cycle and reproductive strategy. Female *Trichogramma* locate the eggs of host insects, such as lepidopterans (butterflies and moths), and deposit their own eggs inside. Upon hatching, the *Trichogramma* larvae consume the contents of the host egg, effectively preventing the development of the pest. This parasitic relationship significantly reduces pest populations without the need for chemical pesticides, offering an environmentally friendly alternative to traditional pest control methods.

One of the remarkable aspects of *Trichogramma* is their ability to adapt to various environmental conditions and host species. This adaptability makes them highly versatile and effective in controlling a wide array of pests across different agricultural settings. Researchers have identified and described over 200 species within the *Trichogramma* genus, each with unique characteristics and preferences for specific hosts.

Biology of *Trichogramma*

Trichogramma wasps, minute members of the family Trichogrammatidae, are key biological control agents. These parasitoids primarily target the eggs of various pest insects, notably lepidopterans. The lifecycle of *Trichogramma* begins when a female locates a host egg and deposits her own egg inside. The *Trichogramma* larva hatches and consumes the host egg contents, preventing the pest from developing. After pupating within the egg, an adult wasp emerges, ready to continue the cycle.

Trichogramma species exhibit remarkable adaptability, capable of thriving in diverse environmental conditions and targeting a broad range of host species. This adaptability is crucial for their effectiveness in pest management across different agricultural landscapes. Typically, a single generation can complete within a week, depending on temperature and host availability, allowing for rapid population growth and timely pest suppression. These wasps, despite their tiny size, play a significant role in reducing reliance on chemical pesticides, promoting sustainable agricultural practices.

Mass production of *Corcyra cephalonica*

Mass production of *Corcyra cephalonica*, commonly known as the rice moth, is a crucial process in the rearing of natural enemies used in biological pest control. This moth serves as a factitious host for the production of beneficial parasitoids like Trichogramma wasps. The process begins with the careful selection of high-quality grains, such as broken rice or sorghum, which are sterilized to eliminate contaminants. These grains are then inoculated with *Corcyra* eggs and maintained under controlled conditions, typically at a temperature of 28-30°C and relative humidity of 70-80%.

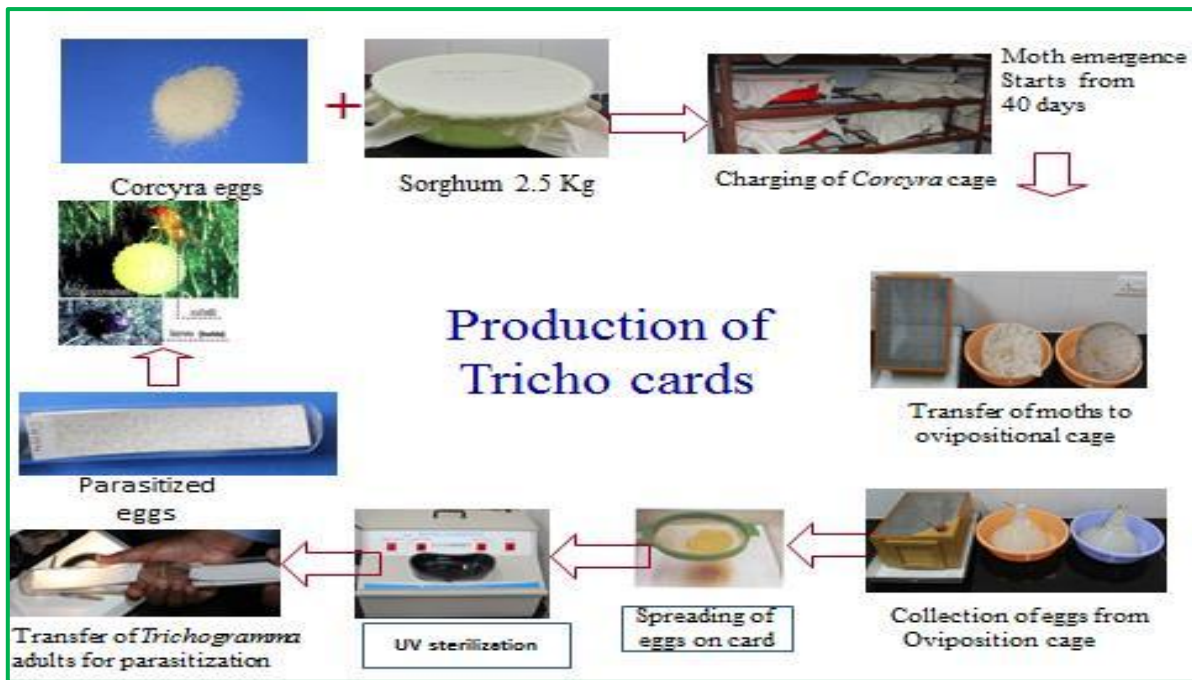
The larval stage, which lasts about 25-30 days, involves the larvae feeding on the grains. Once mature, the larvae pupate and eventually emerge as adult moths. These adults are then collected for egg production. The eggs laid by adult females are harvested and used to propagate parasitoids like Trichogramma. Efficient mass production of *Corcyra cephalonica* requires meticulous management of environmental conditions and hygiene to ensure a consistent and high-quality supply of host eggs, thereby supporting the successful rearing of biocontrol agents essential for integrated pest management programs.

Materials required for *Corcyra* rearing

1. Sterilized crushed Maize/Sorghum/Rice/Crushed ground nut
2. *Corcyra* rearing boxes/trays made up of wood with provision of wire mesh for aeration
3. *Corcyra* egg laying cage
4. Black muslin cloth
5. Mosquito net
6. Wettable Sulphur
7. Streptomycin sulphate
8. Table for placing of *Corcyra* cages and also to make convenient for moth collection
9. Honey
10. Tubes for collecting *Corcyra* moth
11. Measuring cylinder
12. Plastic bucket of 10 liter for egg laying purpose
13. Brush.

Steps for production of *Corcyra cephalonica*

- ✓ Pour sterilized crushed Maize/Sorghum/Rice of 2.5 kg per box
- ✓ Heat/deep sterilized in hot air oven 100°C for 30min.
- ✓ Take 2.5 kg of jowar grain +0.05 Streptomycin sulphate+5gm yeast+5gm Sulphur + 100gram roasted groundnut in each box or tray.
- ✓ Sprinkle 1CC *Corcyra* egg / box on the top of mixture.
- ✓ Cover the box with lid /cloth & placed@ temp. 28±2°C & RH 65±5%.
- ✓ Moth start emerging within 45-50 days.
- ✓ Collect moth in net by glass tube& transfer to egg laying chamber.
- ✓ Provide cotton soaked 20% Honey +vite E solution as adult food in chamber
- ✓ Collect eggs daily by using brush.



Preparation of Trichords

- 1cc egg of *C. Cephalonica* are uniformly spread pasted on the cards with tea strainer.
- Take polyethene bag, insert UV sterilized 15-20 min to kill the embryo of *Corcyra* eggs. containing Tricocard & nucleous seed ratio 6:1.
- Cards are placed in glass tube.
- Remove after 24 hours when *Corcyra* egg have changed to black colour & indicate the parasitisation.
- Release the trichocard in the field when at least 5% adult emergence observed.
- Release Trichards by stappling under leaves.

- **Size-18*9cm**
- **Contains- (18000-20000) parasitized egg.**
- **15 to 20 Tricho-card are required to released in one hectare area.**

Risk factors during rearing

- Scales of laboratory host *Crysoperla* may cause the respiratory problems; it is advised to wear a mask while rearing *Crysoperla*.
- Farmers should refrain from using pesticides in the field where *Trichogramma* are released. If need arises selective / safer pesticides can be used and it is to be ensured that pesticides are used 15 days before or after release of *Trichogramma*.

Conclusion

Pheromone dispersion and sustainability for any biological management method, more especially for egg- stage lepidopterous pests of agricultural crops, needed humongous amounts of egg parasitoids, particularly *Trichogramma/ Trichogrammatea* spp. To any forthcoming pest management operation, there are certain necessary requirements that must be met: in particular, if the target is a parasitic bug, it is intended must be mass production before any pest management operation can being. Used here is a combination of the existing technology in culture and rearing of *Trichogrammatid* parasitoids for biological control agents and the new invented innovative technology depending on the species. As pointed out earlier, none of the *Trichogramma/ Trichogrammatea* species accept a specific in host, this is probably the one suitable for mass production in the laboratory.

References

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