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Mass Production of *Corcyra cephalonica*

Devi, M.

Dept. of Agricultural Entomology, MIT College of Agriculture and Technology, Musiri, Mangalam, Tamil Nadu (621 211), India

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Corresponding Author

Devi, M.

e-mail: deviagri84@gmail.com

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Abstract

Among the various egg parasitoids that are known to exert considerable pressure on populations of insect pests, *Trichogramma* species are the most widely exploited and used for pest management across the world. There are 230 recorded species and the highest numbers of species have been described from the USA, India, Brazil, China, and Russia. Some of the important species that have been recorded from several insect eggs include *Trichogramma minutum, Trichogramma evanescens, Trichogramma chilonis, Trichogramma pretiosum*, and *Trichogramma dendrolimi.* At least four species have been recorded from over 50 host plant species: *T. chilonis* and *T. pretiosum* from 70 host plants each, *T. minutum* from 53 plants, and *Trichogramma deion* from 51 plants. Thus these are species that have been the most exploited for biological and integrated control of crop pests.

Introduction

Numbers of natural enemies, including spiders, have been recorded on eggs, larvae, and pupae of the sorghum shoot fly. Egg parasitoids of sorghum shoot fly are *Trichogrammatoidea bactrae*, *Trichogramma chilonis*, *Trichogramma evanescens, Trichogramma japonica, Trichogramma kalkae*, and *Trichogrammatoidea simmondsi* from India, Africa, and Europe. *T. chilonis* and *T. simmondsi* are important mortality factors of *A. soccata* in India. The egg parasitoids are extremely important in the management of shoot fly, because damage to the crop is a highly probable event once the larva enters the shoot. There are several species of parasitoids that attack shoot fly larvae. But the impact in terms of saving the crop from pest damage is almost nil, although it does have an influence on the population dynamics of the shoot fly.

Materials Required

Sterilized sorghum, Corcyra rearing boxes/ trays/ jars made up of plastic or wood with lid provided with wire mesh for aeration, Corcyra egg laying cage, Black cloth, Mosquito net, Table, Racks for placing Corcyra cages, Honey, Glycerin, Tubes for collecting Corcyra moth, Measuring cylinder, Plastic tubs for egg laying purpose, Brush, Roasted ground nut powder - 100 grams, Yeast - 5 grams, Wettable sulphur - 5 grams and Streptomycin sulphate - 0.05 gms.

Preparation of Egg Laying Cage of *Corcyra cepholonica*

Take a plastic bucket with lid. Cut the lid in circular shape leaving space for providing/ fixing wire mesh for egg laying purpose in the (circular wire mesh). Make a hole on the centre of bottom of the plastic bucket to pour the collected adults in the bucket. Keep bucket inverted in the plastic tub for egg laying purposes.

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E-mail: *bioticapublications@gmail.com*

Figure 1: Trchigramma rearing rack

Steps for Production of Corcyra cephalonica

Figure 2: Trichogramma eggs cleaning using plastic tray and trchogramma egg card

• Sterilize the rearing boxes (if wooden) in hot air oven for 100°C degree centigrade for 30 minutes.

• If plastic trays are used, wash them before use.

• Dry broken grains of jowar in sunlight properly.

• Pour sterilized grain - 2.5 kg/box/tray.

• Add 100 grams of roasted ground nut powder, 5 grams of yeast, 5 grams of wettable sulphur, 0.05 gms of streptomycin sulphate in each box or tray.

Figure 3: Chemical compounds found in Ashwagandha

Figure 4: Corcyra moth

• Mix well all ingredients, Sprinkle 1 cubic centimeter of *Corcyra* eggs /box/tray on the top of mixture (culture medium).

• Cover the box with lid, label the date of inoculation.

• Keep these boxes in racks protected by ant pans.

• Favourable temperature for rearing is 28±2 °C and Relative humidity, 75±5 %. The moth starts emerging on 40th day.

• Bring the boxes ready for moth emergence and collect moths inside the net by glass tubes, Transfer the moths to egg laying chamber.

• Provide cotton soaked 20% honey + vitamin E solution as adult food in the egg laying chamber, Collect the eggs daily.

• Pour the eggs in a paper by tilting slightly downward so eggs come down side where as dust particles remain in upper side.

• Clean the eggs further by passing through different size sieves to 10, 15 and 40 meshes, discard the moth after 4 days.

• Utilize the *Corcyra* eggs for *Trichogramma* production (or) host culture or store them in refrigerator at 10 °C for 7 days, if required.

• *Corcyra* eggs, Nucleus culture of *Trichogramma,* Polythene bags, Rubber bands and Scissors.

Mass Production of *Trichogramma* spp.

Materials Required

• Gum, Brush, Tea strainer, Tricho cards, 50% honey solution, Stapler, Refrigerator and UV lamp.

Methodology

Clean fresh *Corcyra* eggs by passing through 15, 30 and 45 mesh sieves. Prepare "Trichocard" by cutting card board sheet to the size of 10 cm × 10 cm which can accommodate 1 cc of eggs. Apply gum on the card and sprinkle the cleaned eggs uniformly. Remove the excess eggs from the cards by using brush. Allow the card for shade drying for 30 minutes. Treat the eggs under UV lamp for 30 minutes. Take polythene bag, insert UV treated "Trichocard"

and nucleus card at the ratio of 6:1 (6 *Corcyra* egg cards: 1 *Trichogramma* nucleus card) and provide 50% honey vitamin E in a soaked cotton swab. Remove the Tricho cards after 2 days *Corcyra* eggs changes black colour on 3rd day indicates the parasitization of eggs. Release the parasitized egg cards immediately in the fields (or) store them in refrigerator at 10 °C to 21 days. Place/ tie/ staple parasitized cards on leaf sheath of plant.

Figure 5: Trichogramma eggs and wasp

Precautions

Poor quality of mass reared *Trichogramma* can result in control failures. The artificial conditions of mass rearing can select for genetic changes that reduce the effectiveness of the *Trichogramma* in the field. Such rearing conditions include rearing multiple generations on unnatural host eggs, the absence of plants, crowding and interference, rapid generation time, and failure to rejuvenate genetic stock. Except for obvious problems such as lack of adult emergence or wing deformities, growers and pest consultants cannot detect poor quality *Trichogramma* prior to release. Commercial suppliers are responsible for maintaining desirable characteristics necessary for good performance in the field. Production colonies should be periodically replaced with individuals from a stock culture maintained on the natural or target host. Suppliers also should assess the per cent host egg parasitization, adult emergence, and the sex ratio of emerged adults to be sure they are within acceptable standards. Standards for established cultures on *Corcyra*are 95±5 % egg parasitization, 90±5 % adult emergence, and a sex ratio of 1 to 1.5 females per male.

Delivery

Tricho cards are delivered for use in the field. The cards in volumes of 6 cc as per TNAU method of production are assembled in aerated polythene bags and packed in paper cartons for transport. The cards have to be transported by the most rapid method of transport to reach the destination. During transport and holding the cartons should not be exposed to extreme conditions like toxic fumes, open sunlight, high temperature areas as the consignment could be damaged leading to mortality of the *Trichogramma* stages.

Field Release

The parasitoids are released in the pharate stage or when few adults begin to emerge from the host egg during the evening hours. The cards are cut into bits neatly along the grids with least damage to the eggs and stapled beneath the foliage in the upper canopy level. To maximize the field parasitization it is recommended to release the parasitoids is as many locations as possible. Recently scientists are beginning to advocate the release of cards @ 1/5 m row length.

Conclusion

In farmers point of view if they are using egg card for the crop pest they will control the more pest using less cost and get the more economical yield. This egg card is eco-friendly. There is no harmful residues target specific and safe to beneficial organisms like pollinators, predators, parasites *etc*., growth of natural enemies of pests is not affected, thus reducing the pesticide application environmental friendly and cost effective.

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