SUNSHINE AGRICULTURE
e-Newsletter

ISSN (E): 2583 – 0821

Sun. Agri.:e- Newsletter, (2023) *3*(4), 8-12

Article ID: 188

Mass Production Techniques of Bioagents

Vijay Kumar[1*], Prerna Bhargav[1], and Pooja[2]

[1]Assistant Professor, Deptt. of Agriculture, S.I.P.S., Dehradun, Uttarakhand
[2]M.Sc. Scholar, Deptt. of Statistics, A.N.D.U.A. & T., Kumarganj, Ayodhya,

Uttar Pradesh

Open Access

*Corresponding Author
Vijay Kumar*

Available online at
www.sunshineagriculture.vitalbiotech.org

Article History
Received: 9.04.2023
Revised: 17.04.2023
Accepted: 19.04.2023

INTRODUCTION

Bio-agents also known as Biological agents or Bio-weapons are pathogenic microorganisms which are used to control the various pests of plants. Bio-agents are widely used in agri-horticultural ecosystem as plant protectants which have profound impact on plant community through enhancing plant growth, biotic and abiotic tolerance to host.

The use of cultural, mechanical, and botanical bio-pesticides has been demonstrated in earlier Units as a method of managing pests. Moreover, in organic agriculture, biological management is a crucial tool for plant defence. To lessen the harm brought on by the population of pests, natural enemies are used. The two types of control are different in biology. When natural enemies keep the number of potential pests in check without human intervention, this is known as natural control.

This involves introducing new species of parasitoids, predators, and disease-causing bacteria into regions where they had not previously exist. They are permitted to grow and sustain themselves as much as they can once they have established themselves in the specific area. This type of introduction of predators and parasites is known as "classical biological control." For instance, domesticating cats to stop rats and other rodents from destroying stored goods can be seen as biological control.

Methodology for mass production of *Trichogramma chilonis* Ishii

Mass production of *Trichogramma chilonis* Ishii

Materials required: Glass jar/plastic bottles for keeping (exposed/parasitized) egg cards, egg cards, petri dishes, measuring cylinder, sieves, plastic trays, microscope, UV chamber, gum,camel hair brush, etc.

Methodology:

- The *Corcyra* eggs are obtained by confirming the moths in an oviposition cage.
- The eggs collected are passed through 25, 30 and 40 mesh sieves and run over a slope of paper to eliminate dust particles and scales of *Corcyra.*
- The eggs are exposed to ultra violet rays (15 Wt UV tube) for 30 minutes in UV chamber to kill the embryo.
- The sterilized egg are filled in plastic vial (9x5 cm) and closed with a lid of wire mesh (40 mesh) for uniform spreading on cards pasted with a thin layer of dilute gum, *Acacia.*
- The eggs are glued to Trichocards of 15 x 10 cm size which are perforated to obtain 10 pieces (measuring 2.5 cm) leaving uncovered one end to facilitate stapling.
- The cards are placed in plastic bottles in which freshly emerged parasitoids are present or place the parasitized egg cards from which adult emergence is expected in a day.
- Host parasitoid ratio of 6:1 is to be maintained to avoid super parasitism.
- The jars/bottles are kept at27± 2° C. Normally the eggs are exposed for parasitization for 24 to 48 hours. Parasitized eggs
- Start turning black on 3rd day after parasitization. Normally 80 to 90 % parasitization is expected in healthy culture.
- Parasitized egg cards can be stored in refrigerator at 12-15°C for 10 to 15 days.
- Prolonged storage will impair emergence, longevity and fecundity of the progeny.
- Only freshly laid eggs are preferred by *Trichogramma* female for oviposition.

Transport of egg cards:

The parasitized egg cards can be easily transported in the pupal stage (3 days after parasitization) by folding the cards and kept in polythene bags.

Release of *Trichogramma* in field:

The parasitoid may be released into the field as adults or as parasitized egg cards, and it may be stapled to the underside of the leaves of crop plants by maintaining the eggs oriented with their side towards the ground. For adult emergence, plastic release boxes fitted with wire mesh at the bottom can also be used to store the egg card. Both hanging from host plants and fixing the boxes to wooden poles are options. The trichocards can be cut into pieces by following the patterns and hung below a plant twig under a plastic cup that has been fastened in an upside-down way.

Precautions:

It is advisable to observe the following precautions during packaging and release of

***Trichogramma* for better results.**

- Trichocards should be packed keeping the surface with the parasitized eggs on the innerside.
- Emergence date should be specified on cards for the guidance of the end user.
- Cut pieces of Trichocards should be stapled on the inner side of leaf to avoid direct sunlight.
- Card pieces should be stapled in morning hours just before emergence to avoid predation.
- If adults of *Trichogramma* are to be released, the farmers should open the jar containing adult trichogrammatids and go on tapping the jar till all the adults fly out while walking in the field.
- Refrain from using pesticides for a week in the field where *Trichogramma* are released.
- If need arises use botanical or selective/safer insecticides.

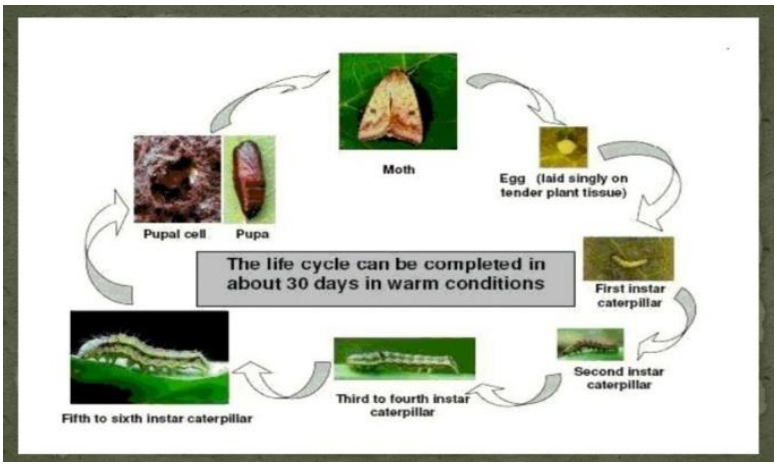
ISSN (E): 2583 – 0821

Mass production of *Corcyra cephalonica* (Stainton)*:*

Materials required: Round iron or galvanized trays or rectangular wooden trays, broken grains for sorghum or maize, yeast powder, muslin cloth, oviposition cage provided with an inlet to introduce the moths and the bottom fitted with 40 mesh wire net, moth collecting glass tubes with funnel mouth, plastic tube, wooden racks, petri dishes, oven, honey solution, etc.

Methodology:

- Broken sorghum or maize grains are first sterilized at 70^0C for 2 hours in a hot air oven. Thereafter, the same grain should be conditioned (keep grains for overnight in laboratory) before use.
- The sterilized grains are mixed with dried yeast powder @ 2 g/kg and 2.5 kg grains are kept in each tray.
- One cc eggs of *Corcyra* are sprinkled in each tray and kept for development.
- The tray are covered with a thick cloth or kept open in a low roofed rearing room.
- After emergence larvae feed on the grains and pupate inside the tray itself.
- The moth emergence starts from 30^{th} day onwards.
- The moths are collected daily and in oviposition cages for deposition.
- The moths lay most of the eggs within 3 days after emergence.
- The eggs are collected from the oviposition cages early in the morning and are used for the multiplication of *Trichogramma.*



Methodology for mass production of *Chrysoperla zastrowi sillemi*:

Sucking pests cause serious losses to many field, plantation and horticultural crops. Green lace wing (Aphid lion), *Chrysoperla zastrowi sillemi* is a potent predator of many sucking pests. The mass production technique of a predator is given below:

Materials required: *Corcyra cephalonica* rearing unit for the egg production, nucleus culture of *Chrysoperla spp.*, rearing trays, plastic jars, slotted angle iron racks, working tables, weighing balance, scissors, brushes, cotton wool, forceps, tissue paper, brown paper separators, Foam sheet, sponge, acrylic sheet, Fructose, protinex, honey, yeast, castor, pollen, etc.

Methodology: Steps involved in mass rearing of *Chrysoperla zastrowi sillemi*

- 200 adult pairs should be concealed in an oviposition box that is 75 x 30 x 30 cm in size. The sliding top cover is covered in black cloth to collect eggs, and the sides of the cage are lined with smooth nylon wire mesh (not recommended for egg laying). The top of the cage slides over combs installed on both sides to protect the eggs from injury. Beginning on the fourth day, the sliding top cover is changed on alternate days. The deceased adults are taken out of the oviposition cage every other day for 30 days.
- The adults in the oviposition cage are fed cotton wool swabs on alternate days that have been properly soaked with the components drinking water, honey 50% solution, and Protinex mixture (equal parts protinex, fructose, and yeast powder diluted in a tiny amount of water). With the aid of thread and fine iron wire, two swabs of each of the three liquids should be hung in the case. If such a case is occasionally not accessible, the adults that have emerged may be kept in desiccators or plastic jars with cotton wicks soaked in honey solution and covered with black cloth. Keep tissue paper, cotton leaves, brown paper, or black paper on the side for oviposition.
- One day old eggs (Egg chorion gets hardened) are dislodged from the black cloth top cover of oviposition cage by gently moving a piece of sponge. Thus, eggs collected can be used for further multiplication.
- Chrysopid larvae are cannibalistic, so you should grow them separately in hexagonal cells or plastic louvers/vials. Put a foam sheet in the raising tray made of plastic that is the right size for you. After that, place the foam on top of the paper separators with hexagonal cells. In each hexagonal cell, scatter 300 to 400 Corcyra eggs that have already been rendered inactive by an hour's exposure to 15 W UV radiations. Introduce 1-2 hexagonal cells or 3 day old Chrysopid eggs. The tray's lid can be used to assist secure the cover. A small wire mesh aperture for aeration should be installed in the middle of the lid.

Utilization for field release and dose: Normally Chrysopids are released in the fields in its 1st instar larval stage against different field crops at the rate of 50,000 to 1, 00,000 larvae/ha or 10-20 larvae/fruit plants. Depending upon pest saturations, 2 releases at fortnightly interval are recommended for control of sucking pests and early instar larvae of Lepidopteran pests.

Methods of release: The *Chrysopid* larvae can be released in the field by;

- Broadcasting larvae with saw dust on thick crop canopy.
- Stapling of Chrysopa card as per the methodology suggested for Trichocards.
- Dropping 1 or 2 larvae per plant on leaves or 10-20 larvae/tree placing corrugated paper strip on the plants/trees or the eggs mixed in saw dust are dropped on crop canopy.

Precautions:

- Rear the grub stage individually to avoid cannibalism.
- Release should be made in early

ISSN (E): 2583 – 0821

morning hrs to settle larvae on crop canopy.

- Avoid to release freshly laid eggs as they may be parasitized or predated in more numbers in the field.
- Do not use pesticides in the field where the predators are released: otherwise use selective/safer pesticides after or before 10-15 days of release following strip or staggered spray method.