

2022

FTFNIPM Trip Report

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PLANT PROTECTION OFFICER, GANDAKI PROVINCE, NEPAL

Country and Places Visited:

- Bangladesh (Dhaka, Uttara and Bangladesh Agricultural Research Institute, Gazipur)

Name of the traveler and her designation:

- Sushma Marahatta
- Plant protection officer
- Plant protection laboratory, gandaki province, pokhara, Nepal.

Period of Travel:

- 21th of July to 28th of July

Purpose of Travel:

- To attend the training program on "Mass rearing of different parasitoid and their field application as a component of IPM".

Description of Activities:**1. Mass rearing technique of *Habrobracon hebetor* in waxmoth larvae in laboratory. The steps include;**

- Parent stock of wax moth developed in honeycomb jar. Sterilized and maintained.
- Preparation of artificial diet:
 - Wheat flour- 2kg
 - Maize flour-2kg
 - Milk-1 litre
 - Fat-250 grams
 - Sugar- 800grams
 - Wax- 300 grams
 - Yeast- 1.5 tea spoon

The mixture of milk, sugar, fat and wax were boiled together and made syrup. This solution was then mixed to the mixture of wheat flour, maize flour and yeast. Then, the mixture was kept in autoclave at 125°C temperature and 15 PSI for one hour.

- First to second instar larvae of waxmoth were reared in artificial diet.
- After 18 to 20 days, full-fed 200 larvae were transferred in a plastic bottle with corrugated paper sheet.
- Adults (60 female and 40 male) of *Habrobracon hebetor* released in plastic bottle with honey in one face of the jar.
- Then the jars were covered with black cloth and kept on the rack for parasitism, egg laying, pupation and adult emergence of the parasitoid *Habrobracon hebetor*.
- After 8-10 days, adults of the parasitoid emerged from the parasitized larvae and ready for field release.

2. Mass rearing technique of *Trichogramma* spp in rice grain moth (*Sitotroga cerealella*) and in rice moth (*Corcyra cephalonica*) in laboratory.

In entomology laboratory of BARI, *Trichogramma* were mainly produced in *Sitotroga cerealella* in huge quantity and in *Corcyra cephalonica* in less quantity. The following procedures was adopted;

- First, to develop the host of *Trichogramma*, *Sitotroga cerealella* culture was maintained on wheat grains. For it, grains were boiled in water for 2-3 minutes to sterilize and prevent the growth of mold.
- The grains were then air dried and poured in trays at the rate of 2.5 kg per rearing tray.
- Then, each tray was infested with 2.5 cc of eggs of rice meal moth and kept untouched for 5-6 days. After that some quantity of water was added to soften the grain and stirred.
- Trays were examined for adult emergence. After 22-25 days, the moths started to emerge and infest the wheat. Then it was transferred to the mass rearing chamber for adult emergence.
- Thousands of adults were collected from *sitotroga cerealella* from the chamber and kept in glass cylinder and covered with 32 meshes net for egg collection.
- Adults were kept in cylinder for one day for mating and subsequent egg laying inside the cylinder.
- On consecutive day, the eggs laid inside the wall of cylinder were brushed and sieved by the sieve to collect fresh eggs.
- In this eggs, the body parts of adult are also collected so to remove it exhaust fan was used.

- Five grams of fresh eggs of *Sitotroga cerealella* were spread over in a moist glass cylinder. Then a vial containing one grams parasitized eggs with *Trichogramma* were kept inside the glass cylinder.
- The glass cylinder kept continuously in flurescent light at $25 \pm 2^{\circ}\text{C}$ for 9-11 days.
- Within 9-12 days, parasitism of almost all eggs of *S.cerealella* happened.
- Then one part of parasitized eggs in *Trichogramma* culture are stored in refrigerator for future use and the other part of parasitized eggs can be used for field release.
- After 4-7 days, adult *Trichogramma* emerged from the parasitized eggs and is ready for field release.

Preparation of trichocards;

- A coat of 10% gum Arabic was applied on the cards and the eggs of *Sitotroga* or *Corcyra* are sprinkled uniformly in a single layer with the aid of a strainer.
- The excess eggs pasted were removed by gently passing a brush over the card after sufficient air drying under the fan.
- Label information on the species of parasitoid and date of parasitization are given in the left over space.
- The eggs cards were placed in test tubes /glass cylinder of suitable size and the nucleus card of *Trichogramma* were introduced in it.
- Within 7-8 days of parasitization *Trichogramma* adults emerge out from the cards.
- To delay the emergence of *Trichogramma* these parasitized eggs can be stored in refrigerator at $5-10^{\circ}\text{C}$ for 10 to 15 days. On removing the cards to room temperature, the parasitoid emerges normally.
- The emerging parasites readily parasitize the fresh eggs.

Also, to avoid the natural predation of parasitized eggs, the adult parasitoid are released in the field.

Precaution to be taken;

- If host eggs are not treated with UV rays to kill the embryo, the moth larvae may hatch out from the non-parasitized eggs. These larvae should be brushed out gently since they may eat the parasitized eggs.
- Production colonies should be periodically replaced with individual from a stock culture maintained on the natural or target host.

3. Field release technique of parasitoid.

There are two release techniques of *Trichogramma spp.*

- Release at pupal stage through paper strips/Trichocards methods: Trichocards were stapled on the inner side of the leaf to avoid direct sunlight. Card should be stapled in morning hours and just before emergence to avoid predation and
- Release at adult stage through paper chocolates chip method. For this, emerged adults and parasitized eggs of *Trichogramma* placed in a plastic container containing about 300 paper chips. Within 3-4 hours all *Trichogramma* emerged and took shelter in the paper chips. These paper chips were distributed in the field.

4. Visit to Ispahani Agro Limited, Konabari, Gazipur

It was the most respected and successful company run by Ispahani group. In Agriculture the wings are mainly focused in **seeds, biotech and Agro-processing.**

The product basket includes;

S.N	Bio- products	Effective against	No. of products
1.	Sex pheromone lures	Cucurbit fruit fly, Oriental fruitfly, Brinjal fruit and shoot borer, cutworm, Fallarmy worm, tomato fruit borer, yellow rice stem borer, tomato leaf miner	11
2.	Bio- Insecticides	Mite, thrips, fall armyworm, different sucking pest	12
3.	Bio- fungicides	Different soil borne diseases, antracnose, canker, scab, rice sheat blight, fusarium wilt, powdery mildew, downy mildew, rice blast	5

4.	Bio-bactericide	Bacterial leaf blight, bacterial wilt, scab, soft rot etc	1
5.	Bio-viricide	Leaf curl virus, mosaic virus	2
6.	Bio-nematicides	Nematodes	1
7.	Biocontrol Agents	Non- hairy caterpillar	2
8.	Fruit bag	Different insect of mango and banana	2
9.	Color sticky trap	Yellow blue and white to control whitefly thrips and aphid	3
10.	Pheromone trap	Cucurbit fruit fly, Oriental fruitfly, Brinjal fruit and shoot borer, cutworm, Fallarmy worm, tomato fruit borer, yellow rice stem borer, tomato leaf miner	2
11.	Public health product		1
	Total		42

5. Sight seeing around Dhaka.

Participation in meetings/lectures/visits:

S.N	Topic	Presenter	No. of Participants	Method
1.	Strengthening bio control by transboundary exchange of tools and expertise amongst south asian countries	Dr. Rangaswami Muniappan	10	lecture
2.	Bio-rational based integrated pest management.	Dr. Syed Nurul Alam	10	lecture

3.	Biocontrol of insect pests and mass rearing protocol development and field release techniques.	Dr. Syed Nurul Alam	10	lecture
4.	Orientation of ipm laboratory and briefing on training program.	Dr. Nirmal kumar Dutta	10	lecture
5.	Role of BARI in agricultural development in Bangladesh: an overview	Dr. Debasish Sarker	10	lecture
6.	Mass rearing protocol of different eggs and larval parasitoid in Bangladesh.	Dr. Kohinoor Begum	10	lecture
7.	Mass rearing of fictitious host (<i>Corcyra cephalonica</i> and <i>Sitotroga cerealella</i>) for egg parasitoid mass production	Dr. Kohinoor Begum	10	Lecture+ Practical
8.	Storage of host eggs preparation of trichochard and different methods for <i>Trichogramma</i> mass rearing and their field release.	Dr. Kohinoor Begum	10	Lecture+ Practical
9.	Preparation of artificial diet for mass production of wax moth.	Dr. Syed Nurul Alam / Dr. Kohinoor Begum	10	Practical

10.	Mass production protocols of larval parasitoid <i>Habrobracon hebetor</i> on wax moth larva.	Dr. Nirmal kumar Dutta	10	Practical
11.	Field release techniques and efficacy study of larval parasitoid.	Dr. Kohinoor Begum	10	Practical
12.	Field release techniques and efficacy study of egg parasitoid.	Dr. Kohinoor Begum/ Dr. Syed Nurul Alam	10	Practical
13.	Visit to Ispahani Agro limited, konabari, Gazipur.	Dr. Nirmal kumar Dutta/ Dr. Syed Nurul Alam/ Mr. Madhab chandara Das/ Dr. Rangaswami Muniappan	10	visit

List of people met:

S.N	Name	Designation	Email address
1.	Dr. Debasish Sarker	Director General, BARI	
2.	Dr. Syed Nurul Alam	Senior consultant, CIMMYT	
3.	Dr. Rangaswami Muniappan	Chief investigator, IPMA, VT	
4.	Dr. Nirmal kumar Dutta	Head, Entomology Division, BARI	nk Dutta83@yahoo.com

5.	Dr. Kohinoor Begum	Principal scientific officer, BARI	kohinoor.ento@gmail.com
6.	Mr. Madhab chandara Das	IPMA, Bangladesh	
7.	kbd. Md. Ibrahim Khalil	Chief scientific officer, ISPAHANI Agro Limited	ibrahim_ibt@yahoo.com
8.	Dr. Md. Kafil Uddin	Senior scientific officer, BARI	mkafil77@yahoo.com

Recommendations/comments:

It was a fruitful learning opportunity yet it would be better if more exposure visit session was incorporated.