Breeding technology of Bracon hebetor and other entomophages in biofactories

Shoxnazar To`xtayev[1*]

[1]Bukhara State University, Street Mukhammad Ikbol, 11, 200118, Bukhara, Uzbekistan

Abstract. Currently, one of the main problems is the reform of the management system of the agricultural sector, the rational use of land and water resources, as well as the protection of harmful organisms by means of predatory and free-feeding and microbiological preparations. If we solve these problems and protect agricultural crops in a biological way, we will provide the population of our country with ecologically clean products with complete food safety. For this purpose, there are currently more than 700 bio laboratories operating in the republic, where mainly 4 types of entomophagous are bred (poacher, egg-eating Trichogramma, goldeneye, and The European mantis). Bracon hebetor paralyzes middle-aged and older hookworms and lays its eggs on their bodies. Hatched larvae feed on worms. There are 4 types of it in Uzbekistan. Bracon bites one hundred and fifty worms in one day and causes paralysis. Its many types of owlet moths damage 3-4 year old worms. After release, poachers spread to a distance of 100-150 m during the day. Bracon is highly effective for environmental and warm-blooded creatures in general

1 Introduction

Bracon hebetor paralyzes middle-aged and older hookworms and lays its eggs on their bodies. Hatched larvae feed on worms. There are 4 types of it in Uzbekistan. Bracon bites one hundred and fifty worms in one day and causes paralysis. Its many types of owlet moths damage 3-4 year old worms. After release, poachers spread to a distance of 100-150 m during the day. The female of each generation of the pest is wrapped 3 times for 5-6 days in the ratio of 1:20, 1:10, and 1:5, calculating the number of pests. A bream can lay up to 250-300 eggs when fed. One bollworm infested with poached worms can have up to 20-25 corn moth larvae, up to 15 large bee moth larvae, and up to 6-10 poached larvae. The optimum temperature for development should be 25-30 C, and relative air humidity should be 65-80%. 6-10 larvae are obtained from one wax moth worm. Bracon imago feeds on the hemolymph of flower nectar worms in nature. Bracon is highly effective for environmental and warm-blooded creatures in general. [1,2,3,6,7,8,9,10].

* Corresponding author: sh.h.to`xtayev@buxdu.uz

2 Materials and Methods

Creating a food base for Bracon hebetor consists of breeding wax moths, i.e. beeswax moths. For this purpose, 1 kg of food No. 1 and 1 g of wax moth eggs are placed in 3-liter clean and sterilized jars. Jars are kept at 33-35 C for 5-7 days, 13,000-14,000 worms appear in each jar. In order to get butterflies and eggs from worms, it is divided into 10 jars with the above-mentioned 1-mainly prepared worm feed and 100-150 g of the previously prepared 2-feed is added. Then, every 2-5 days, 50 g of feed is added to each jar. This work is continued until the butterfly emerges. Then put plastic canes (sticks) in the cans (4 in each can). Then those sticks are peeled from eggs and placed in jars. [4,5,11,12,13,14].

For this purpose, jars with No. 1 which food and eggs are put, kept for 15-17 days, are turned over into special containers, and thin No. 3 food is placed on top of it and covered with a thick cloth. The temperature should be +35 C. Adult worms are collected every day and used to breed Bracon [15,16,17,18,19,20,21,22]..

3 Results and Discussion

The process of reproduction of wax moth worms in Bio laboratories and Bio factories will continue from November of this year until August of next year.

Preparation of feed No.1. Ingredients: 10 kg of wheat flour (or 5 kg of wheat flour, 5 kg of corn flour); Method: 4 kg of sugar, 1 kg of beeswax, 3 kg of margarine, 4 kg of fruit pulp, 3 l of milk, these ingredients mix well and leave to soak (ferment) for 1 day. The next day, it is baked at a temperature of 120 °C for 45 minutes.

Preparation of feed No. 2. Ingredients: 10 kg of wheat flour (or 5 kg of wheat flour, 5 kg of corn flour). Method: 4 kg of sugar, 3 l of milk (fermented), 0.5 buckets of feed are mixed well and left to soak for a day. Then the mixture is cooked in a thermostat at a temperature of 120 °C.

Preparation of feed No. 3. Ingredients: 10 kg of wheat or (5 kg of wheat flour, 5 kg of corn flour) 4 kg of apple pulp 30 l of water (for boiling wheat) 1.5 kg of margarine 3 kg of sugar. Method: firstly, wheat and apple pulp are boiled in 30 liters of water until cooked, then margarine and sugar are added to it and boiled. The food is cooled and used for feeding worms in special containers.

When plowed wax moths are released into the field, they are collected in special containers and placed in 300 pieces in 3-liter jars. Folded special paper is placed inside them. The jars are covered with black cloth and left in a dark place for 4-6 hours. The worms are prepared in advance on special paper, fed with additional food for two days, and placed in jars with 150 adult ferns. After 10-12 days, the infected worms fly out. The chicks are fed honey and used for release or re-breeding.

When releasing poached beeswax moths into the field, they are collected in special containers and put 300 pieces in 3-liter jars. Folded special paper is placed inside them. Jars are closed with a black cloth and left in a dark place for 4-6 hours. Worms on special paper are prepared in advance, fed with additional food for two days, put in jars with 150 bracken imagos. After 10-12 days, the infected worms fly out. The hatchlings are fed with honey and used for release or re-breeding.

After finding the host worm, the female Bracon paralyzes it and lays up to 50 eggs on its body. The biology of poached poison was thoroughly investigated by the Japanese scientist M. Tamashiro. The female Bracon bites the body of the host worm wherever she wants. The owner's reaction is very fast. If the parasite bites from the front side, the worm's head suddenly turns, if it bites from the back, the host worm moves forward, turns its head and tries to bite the bite. After entering the poison, the coordination of the worms' movements is lost. His activity gradually decreases, and his movement does not stop. A

state of external lethargy is observed. In the last stage, the larvae are completely motionless except for the movement of their mouths. Regardless of where the worm bites, the paralysis starts from the back of the body and goes towards the head. The poison stops the body of the worm and kills it. The worms become desiccated, confused, and flattened dorso-ventrally (where death affects the erector muscles much later than the locomotor muscles. The heart and intestines of the paralyzed host continue to function for several days, and gradually, we assume, probably caused by poison). After the worms die, they harden, harden, and still die without turning into a cocoon. becomes light-brown. Sometimes the worms get rid of the poison and begin to turn into sponges, but they still die before turning into sponges. The poison is similar to water in its appearance and viscosity. After drying, it darkens and becomes amorphous. Even after dissolving in water, it paralyzes the body. The poison in dead parasites remains active for up to 6 months. Isolated sterile (pure) venom can be effective for up to 1 year (if stored at 4°C). The poison solution heated to 65-70°C loses its activity. The chemical composition of the poison has not yet been fully studied. Initially, it was believed to consist only of protease and trypsin, but later it was found that it consists of several enzyme complexes. M. Tomoshiro proved in his experiments that this poison is protein in nature. Formation of poison. Female roaches emerge from the tusks with fully developed venom-producing organs. Therefore, when they fly, they can bite and paralyze the owner. During the entire life of an insect, it contains poison, and even after death, a part of the poison remains in its body. The poison reserve does not run out even when the amount of khujain is very high. The experiments of M. Tomoshiro confirmed that the production of poison in female insects begins from the period of pupation (poison was found even 4 days after becoming a pupa). Paralysis rate of host worm. The effect of the poison after the sting of the Hymenoptera parasite on the host, the natural control of the parasite is important to determine the level of effectiveness of biological control. If the effect of the poison is delayed, the host will actively move and try to change its place, as a result, the parasite will not be able to find it to lay eggs. If the parasite stays in front of the host after biting, then the number of hosts will decrease dramatically. Therefore, the speed of the poison depends on the condition of the owner. It paralyzes the host, closely related to its diffusion rate. Brokon.hebetor females paralyze an average of 2 hosts per hour or 46.2 worms per 2 days under laboratory conditions. After biting 1 or 2 hosts, the parasite rests for half an hour or more. A single female poacher can infect 30 to 175 hosts during her lifetime. The maximum point of active time for brocon, hebetor paralysis is at 18, the minimum point is from 240 to 70 hours. Can paralyze up to 8 maggots in 1 hour. The number of paralyzed worms depends on the age of the parasite, the conditions and the density of the worms. On the first day, the female parasite that flies from the mushroom bites fewer worms than on other days. The main reason for the sharp difference in the total number of hosts bitten during the life of the parasite is not due to the lack of venom, but due to the length of life and the aggressiveness of the worms. If the parasite does not move quickly while it is paralyzed, the worm can kill it. Paralyzed moths have a maximum of 50 worms per day, and 300 in a lifetime. The amount of poison consumed by a female poacher in the Indian population for paralysis is 150 x 10 ml. During its lifetime, the parasite paralyzes up to 2,000 Soryra cephatarica insects. If a female parasite used 100% of its minimal venom to paralyze its host, it would paralyze 23,800 worms. Bracon. brevicornis can bite up to 100 insects per day (40 on average). The number of worms that can bite during the life of an imago is 1700. Vgacon to developing worms of Plodia interpanctella in laboratory experiments. brevicornis was studied. In this case, the poison was extracted from the braconid gland and injected into the worms in different amounts in dissolved form, as a result, it was determined what amount of poison paralyzes the host. Synthesis of poison (the morphology of which has been studied) in the gland is very intensive: it can be produced

eight times a day. The total amount of poison produced by the gland during the life of the imago is 0.1 - 0.25 million.

Table 1. Determining the norm of using Brakon in biological control against bollworm in the farmer's field in the cotton field per 100 hectares

The offspring of the bollworm	Number of worms (by the pieces)		Bracon release procedure		Bracon hebetor required for a total area of 100 hectares (by the pieces)
	100 plants (by the pieces)	1 hectare area (by the pieces)	pest and parasite ratios	In 1 hectare area	
I.	1.	1000.	1:20 1:10 1:5	50 100 200	35000
II.	2.	2000.	1:20 1:10 1:5	100 200 400	70000
III.	3.	3000.	1:20 1:10 1:5	150 300 600	105000

*The number of Bracons is taken in relation to females. The information of the deceased scientist, Professor H. Mirzaaliyeva came in handy in compiling this table.

To obtain mature bracon, adult worms and bracon are obtained in March from the eggs of the wax moth, which were put into development in early February.

Adult worms and bracon are obtained in April from wax moth eggs, which are laid for development in early March.

Worms and bracons are obtained from wax moth eggs that are left to develop in early April.

Adult worms and bracons are obtained in June from wax moth eggs, which are laid in development in early May.

Wax moth eggs, which are laid for development in early June, produce adult worms and larvae in July.

Wax moth eggs that develop in early July produce adult worms and larvae in August.

Wax moth eggs, which are laid for development in early August, produce adult worms and beetles in September.

The duration of the work cycle in the breeding of wax moth worms was 30-40 days for obtaining adult worms from eggs: 50-60 days for obtaining wax moth eggs: 13-15 days for obtaining poultices. Based on this technology, more than 700,000 bracon can be grown from 9-10 kg of feed.

To store Bracon, in the stage of mature insects, the temperature is gradually lowered to 27-16 °C by feeding it with honey for 5-6 days.

Bracon can also be stored in a refrigerator. Mature bracon are fed with honey and the temperature is lowered from 27 °C to 16 °C, and then the bracon is placed in jars with wood shavings. Honey-coated gauze is hung on the lids of the jars. Then it is stored in a refrigerator at +8 °C, every 15-30 days it is taken out of the refrigerator, the parasite is fed at 25 °C for two days, then the temperature is lowered to 16 °C, and the jars are placed in refrigerator chambers. In the 2nd decade of February, poached eggs that have come out of

the winter are brought out and poured for reviving at 25-30 °C and used for the desired purpose.

Bio factory and Bio laboratories for the use of Bracon are supplied on the basis of a contract concluded with farms. Distribution of poachers to the field is carried out in the following order. Bracon entomophages against middle-aged and adult worms of the bollworm, according to the information of the field supervisors, against each generation of pests 3 times with an interval of 4-5 days, in the ratio of 1:20 for the first time, 1:10 for the second time, and 1:5 for the third time.

distributed. Bracon is placed taking into account the density of the bollworm, for example, if there are 5 bollworms in 100 plants, then there are 5000 pieces per 1 g, where 250 pieces of bracon in a ratio of 1:20, 500 pieces in a ratio of 1:10, 1: When it is 5, 1000 pieces of poachers should be placed. When releasing the entomophagus of bream to the field, put 1 g of it in 2 or 3 l jars, open the mouth of the jar every 20-30 m for 2-3 seconds until the intended bream completely flies away. Distribution of brakon (from 16:00 to 19:00) and in the morning (from 6:00 to 9:00) works well.

Green lacewings are very delicate insects with a golden light green color. They have rather broad, nacreous or iridescent wings that range from 19 to 55 mm when spread. His mustache is fluffy, his forehead is flat. It flies well towards the light. Newly laid eggs are light green in color, and then gradually darken. The female lays her eggs singly or in clusters on the branch, leaves or bolls of the cotton and lays them on a fine silky base. There are 5 types of golden eyes in the cotton crop. They are distinguished from other insects by the presence of very thin, clear green wings and golden eyes. They fly over the plant and lay their eggs in clusters of plant lice (aphids) and spider mites. The eggs are small green in color and are firmly attached to plant organs with thin stalks. The larvae are light yellow in color and have well-developed sickle-shaped jaws. They are very aggressive and destroy more than 50-60 plant lice, 200 spider mite larvae and hairs, and 800 pest eggs in 1 day. In addition to aphids and spider mites, green lacewing larvae eat bollworm eggs, young caterpillars and 17 other pests.

Mantis religiosa is an insect belonging to the true Mantidae family. A large carnivorous insect with front legs adapted to receive food. Length 42-52 mm (male) or 48-75 mm (female). The largest and most common species in Europe. It is highly variable in colour and can range from green to yellow or brown-grey to dark brown. In addition to feeding, it also uses its front shovels for movement. The hind legs are considered running.

Wings are well developed in both males and females (females are very poor flyers due to their large size and do not want to fly). The abdomen is ovoid and fairly large.

4 Conclusion

This entomophage is distributed against bollworm eggs at the rate of 1 gram per hectare. For this purpose, if there is a 1-litre jar, 1 gram should be placed and used per hectare, in a 2-litre jar, 2 grams per 2 hectares, and in a 3-litre jar, 3 grams per hectare. The jars are filled with crumpled pieces of paper, and then a specified amount of animated trichogram is placed. After the trichogram settles on the paper, it is released into the field. The Trichogramma should be placed at 400 points per hectare in a 5x5 m scheme

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