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## MULBERRY MOTH AND MODERN METHODS OF COMBATING IT

Ismatullaeva Diloram Adilovna,

Doctor of agricultural sciences,

Head of the laboratory of Sericulture research institute of

Tel: 90-8063182;

Begmatov Toir Muxtorovich,

PhD student,

Tel: 93-602-78-37.

**Аннотация.** В статье приведены результаты научных наблюдений по использованию 2 видов феромоновых ловушек против тутовой огнёвки *Glyphodes pyloalis*. Опыты проведены начиная с августа по октябрь месяцы, в течение 4 поколений жизненного цикла развития вредителя. Отмечена эффективность ловушек, наиболее лучшим оказались ловушки, сделанные из пластика треугольной формы, внутри застеленные липучкой, в центре которой имеется феромоновая капсула.

**Ключевые слова:** тутоводство, тутовая огнёвка, ловушка, феромон, вредитель, поколение.

**Annotation.** The article presents the results of scientific observations on the use of 2 varieties of pheromone traps against the mulberry moth *Glyphodes pyloalis*. The experiments were carried out from August to October, during 3 stages of development of the pest. The effectiveness of the traps was noted, the best were traps made of triangular-shaped plastic, lined with Velcro, in the center of which there is a pheromone capsule.

**Key words:** mulberry growing, mulberry moth, trap, pheromone, pest, generation.

### Introduction

Coir farming is one of the main industries in the economy of Uzbekistan, and the demand and attention to this industry is very high. Uzbekistan ranks 3rd in the world in terms of cocoon production. Silk production is one of the most profitable industries in many countries, and the demand for silk fibers is increasing day by day.

It is important to create a food base for silkworms in the production of high-quality and world-class silkworms. One of the main reasons for the slow development of silkworms in Central Asia is the lack of food sources. It is known that this tree (*Morus Alba*) is one of the oldest trees. A few thousand years ago, the Chinese raised silkworms and produced cocoons.

Mulberry moth (*Glyphodes puloalis*) is one of the most dangerous pests of mulberry trees in our Republic. Since 1993, this pest has spread in the southern region of Uzbekistan, especially in Surkhondaryo region, and then spread to many districts of Fergana, Andijon, Namangan and Kashkadaryo regions.

Mulberry moth is the main pest of not only mulberry trees, including mulberry leaves. This species has not been developed in the Central Asian region, including in the conditions of Uzbekistan. However, in the literature, there is information about mulberry moths being found in the upper zones of the Tianshan and Pamir mountains in Central Asia and feeding on the leaves of wild mulberry trees [3].

18,1 million in the fall of 1994 and in the season of 1995 in Surkhondaryo region. It was found that 11,4 million things of mulberry trees (62,8 %) and 2221 hectares (60,5 %) of 3674 hectares of mulberry plantations were infected with mulberry moth [4]. It is evident that this pest may spread to other districts and regions of our Republic.

In fact, in the season of 1999, it was found that this pest spread in all the southern farms of Fergana, Andijon and Namangan regions. Mulberry moth's damage is so strong that even in August-September, some trees become defoliated. In particular, this was clearly observed in the farms of Bogdod, Rishton, Uchkuprik, Dangara, Oltiariq and Kuva districts [5].

A number of scientific studies have been conducted to study the biology of this insect and to test and apply the methods of combating it. In this regard, the research conducted on the classification of natural enemies of mulberry moth in the climatic conditions of Uzbekistan and the use of their mulberry trees for protection against mulberry moth [1] was of great importance.

Due to the damage of the later grown leaves by the mulberry moth, the length and height of the shoots and the level of resistance to winter cold will decrease. If there is an average of 1 to 1 larva in each stem, the length of the stem can be shortened to 30 cm. In addition, the plant's winter hardiness decreases. Compared to the control, depending on the harshness of the winter, it is possible to build up to 30-40 %. The length of new shoots is reduced by 50-60 cm, the number of leaves is reduced by 20 %, and its weight is reduced by 21 %. If this situation is repeated, it will lead to the collapse [2].

### Material and methods

In a scientific study, 2 different pheromone traps specially developed against the mulberry moth were used. The first one is made of triangular plastic material, lined with paper coated with adhesive material, and the pheromone capsule is placed in the middle, and the second one is a plastic container with a pheromone capsule placed in the mouth of the handle (Figures 1-2).



**Figure 1. Triangular shaped pheromone capsule handle**



**Figure 2. A handle with a pheromone capsule in a plastic container with a lid**

Experiments were conducted in August, September, October and November 2022-2023 years at a mulberry plantation located under the Sericulture Research Institute in Tashkent.

Researches were conducted in 3 variants, each of them in 3 returns. For this purpose, the distance between them was 10:1, and mulberry trees of "Jarariq 2", "Jarariq 7" varieties were selected, which were almost equally affected by the mulberry moth. The first option was hanging triangular handles on mulberry trees. The second option was placed handles in the form of a container with a lid made of plastic. Option 3: Triangular traps without pheromone capsules were attached to mulberry trees, that is, they were used as a control option.

## Research results

In options 1-2, paper coated with adhesive and capsules containing pheromone were renewed every 15 days during the experiment. During the observations, the number of mulberry moth butterflies caught on the handles was recorded twice a day for 5 months, that is, at 8 in the morning and at 7 in the evening. No other types of insects caught on the handles were recorded. The results of the number of butterflies caught are presented in Table 1.

Table 1

Quantities of mulberry moth butterflies caught on pheromone traps (August-November 2022 y.)

N	Variants	Return	The number of male butterflies hung		
			during the day	at night	common
III-stage (from August 1 to August 31)					
1	Handle with triangular pheromone capsule	1	28	41	69
		2	25	48	73
		3	22	43	65
		average	25	41	66
2	A plastic container with a lid and a handle with a pheromone capsule	1	11	30	41
		2	15	27	42
		3	22	30	52
		average	16	29	45
3	Triangular handle (control)	1	0	1	1
		2	0	2	2
		3	0	3	3
		average	0	2	2
IV-stage (September 1 to September 30)					
1	Handle with triangular pheromone capsule	1	39	81	120
		2	28	75	103
		3	35	78	113
		average	34	78	112
2	A plastic container with a lid and a handle with a pheromone capsule	1	19	38	57
		2	21	45	66
		3	14	43	57
		average	18	42	60
3	Triangular handle (control)	1	0	3	3
		2	0	5	-
		3	0	1	-
		average	0	3	3
V-stage (from October 1 to October 31)					
1	Handle with triangular pheromone capsule	1	11	42	53
		2	13	37	50
		3	12	41	53
		average	12	40	62
2	A plastic container with a lid and a handle with a pheromone capsule	1	8	16	24
		2	-	12	12
		3	5	17	22
		average	4	15	19
3	Triangular handle (control)	1	0	0	0
		2	0	0	0
		3	0	0	0
		average	0	0	0

As can be seen from this table, at all stages of scientific observation, more butterflies were hung in the experimental variants than in the control. That is, it was found that, as

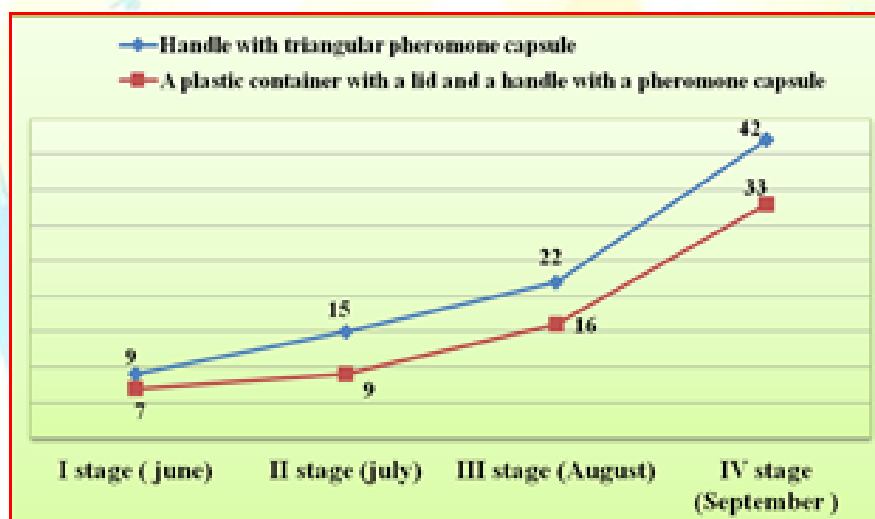


expected, a large number of male butterflies were caught in the variants with the pheromone capsule in the traps.

In options 1 and 2, this indicator was 45-60 pieces in the III stage (August) and 2 pieces in the control, 60-112 pieces in the IV stage (September), and 3 pieces in the control and in the V stage (October) In the range of 19-62 pieces, it was found that in the control (without pheromone capsule) it was not hung at all. In option 1 (a trap with a triangular pheromone capsule), a total of 234 butterflies were caught in three stages.

The number of butterflies caught at night is about 2 times more than the number of butterflies caught during the day. The number of butterflies caught in the triangular pheromone traps was almost 1,5-2 times more than in the pheromone capsule trap with a plastic lid.

The results of studies conducted in 2023 are presented in graph form for clarity (figure 3).



**Figure 3. Quantities of mulberry moth butterflies caught on pheromone traps (June-September 2023 y).**

This achievement may be due to the structure of this handle, as the butterflies are easily accessible due to the fact that both sides are open. We believe that despite the presence of a pheromone capsule in a container with a lid, it was more difficult for the butterflies to land.



As can be seen from the above table, an average of 88 butterflies is attached to one triangular handle in 4 stages. In turn, it can be concluded that the mating process of one male butterfly with one female butterfly has decreased. If each butterfly lays an average of 50-60 eggs, the death of an average of 65-88 male butterflies per year will result in a reduction of 3250 to 5280 mulberry moth butterflies.

## Summary

There are a number of toxic chemical pesticides available to combat the mulberry moth. But their use makes mulberry leaves unusable as food for silkworms. Therefore, pheromone captures the male progeny of the mulberry moth, and by eliminating the male progeny of the pest, a drastic reduction of the pest population and protection from the pest is achieved. If we take into account that the mulberry moth gives 7-8 generations in one year in our Republic, it can be seen that the result is high if the handles are used based on this method (10:1 scheme).

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