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THE USE OF MOSQUITO NET FOR THE PROTECTION FROM TOMATO MOTH (*TUTA ABSOLUTA*)

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ABSTRACT

This article presents the results of experiments conducted to determine the effectiveness of various mosquito nets against tomato moth (*Tuta absoluta*) in order to produce ecologically pure products in the open field. For tomato moth, the favourite crop is tomato in open fields and greenhouses. It has been studied that if controlling measures are not implemented in time, 100% of the yield is lost by the damage of tomato moth. This pest infects plants from the germination period to the end of the growth period, infesting the leaves, stems, flowers and fruit of the plant at all stages of development, and causes the withering of damaged plants.

KEYWORDS: Tomato, tomato moth, pest, pheromone trap, monitoring, decade, protection, white, black, mosquito net.

1. INTRODUCTION

According to scientific sources, the origin of the tomato moth is South America, and in 1980 it was found to be present throughout this region. In recent years, it has become widespread in countries such as the Ukraine and Russia, causing great damage. In Uzbekistan, this pest began to damage tomato crops in 2014 in greenhouse conditions and by 2015 in the open field. In Jordan, the tomato moth of the 3rd species of the T. absoluta Gelechiidae family (*Tuta absoluta*, *Keiferia lycopersicella* and *Phthorimaea operculella*) was identified, the most dangerous of which is T. *absoluta*, which in some years caused the loss of 30-90% of the crop. In the Jordanian climatic condition, female butterflies of the tomato moth (T.Absoluta) were found to lay up to 260 eggs.[2,4,5]

In the references it was stated that the classification of tomato moth (*T. absoluta*) is based on the appearance of the moth.[3,6]

In Uzbekistan, monitoring revealed that this pest began to cause severe damage in greenhouses in 2015 and in the open field in 2019 in all regions.[1]

Tomato moth infects cultivated and wild crops belonging to the family of Solanaceae in open fields and greenhouses. Its favorite crop is tomatoes, and it was found to destroy up to 100% of the crop. This pest infects plants from seedling to the end of the growing season, damaging all developmental phases, its larvae penetrates into the leaves, stems, flowers and fruits of the plant, and the strongly damaged plants may wither.

When the chemicals were applied against tomato moth, the duration of treatment effect of chemicals did not exceed 5-6 days due to the high density of tomato moth. The difficulties in the control of tomato moth are that the larvae of this insect lives secretly in plant tissues, develops a rapid adaptation to the chemicals used, and has a large number of offspring. Therefore, during the development of plants it is necessary to carry out several chemical treatments against these insects, as well as to change the types of preparations. This leads to a negative impact on the external environment.

2. MATERIALS AND METHODS

In the studies in 2017-2018, when the mosquito net was used against tomato moth (*T. absoluta*) in greenhouses of the Research institute of vegetables, melons and potato growing, 100% yield was achieved without the use of

chemicals. Considering all of this, the following experiments were carried out to determine the effectiveness of various mosquito nets to obtain an ecologically pure product without the use of chemicals in the open field against tomato moth (*T. absoluta*).

In order to protect tomato seedlings from tomato moth in the open field, three types of mosquito nets were used: 1) agrovolokno (agricultural fabric) (Uzbekistan); 2) mosquito net (England); 3) mosquito net (Turkey, Uzbekistan) and 4) control – without mosquito net.

The experiments were performed on "Barlos" tomato variety. Seedlings prepared in greenhouses were transplanted in open ground on April 8.

3. RESULTS AND DISCUSSION

Based on the results from the experiments of 2017-2018, it was taken into account that the period of sharp increase of tomato moth (*T. absoluta*) in our conditions is observed in June. On May 10, in the open field (0.1 ha) tomato seedlings were covered with mosquito nets (Fig. 1).

Fig. 1: Using mosquito nets in open fields.

In the variants covered with mosquito net to determine the development of tomato moth, pheromone trap was placed by 1 piece and counting was performed every 3 days. The experimental fields were not chemically treated. According to table 1, in the field covered with agrovolokno (white agricultural fabric) to control the development of tomato moth, the number of tomato moth butterflies that were inviscated on pheromone traps constituted 67-73 pieces in the 1st decade of June and their number decreased from 7 to 16 in the 2nd decade of the month and by the end of the month, the number of the butterflies falling into pheromone traps had dropped from 37 to 19. In the first decade of July, the number dropped from 9 to 3, and by the end of the month, no any moth was found. It's because of difficulty for these insects to enter the greenhouse. Due to disadvantage of agrovolokno (agricultural fabric), that is, no air circulation and high internal temperature, the development of tomato seedlings and weeds was accelerated.

Table 1: Trapping tomato moth (*T. absoluta*) on pheromone in the variants covered with mosquito nets (in 2019).

Pheromone traps	Trapping moths on pheromone, day										
	3	6	9	12	15	18	21	24	27	30	31
June											
1.Agrovolokno (white)	67	73	7	13	16	20	28	37	31	19	
2.Mosquito net (white)	10	12	13	13	9	8	11	14	10	7	
3.Mosquito net (black)	12	3	3	6	7	10	10	7	4	8	
4.Control (without mosquito net)	86	114	152	152	169	174	184	208	215	222	
July											
1.Agrovolokno (white)	9	6	3	3	1	0	0	0	0	0	0
2.Mosquito net (white)	5	7	3	2	2	0	0	0	0	0	0
3.Mosquito net (black)	7	3	3	2	2	2	1	1	1	0	0
4.Control (without mosquito net)	206	213	209	209	212	215	206	202	201	202	211

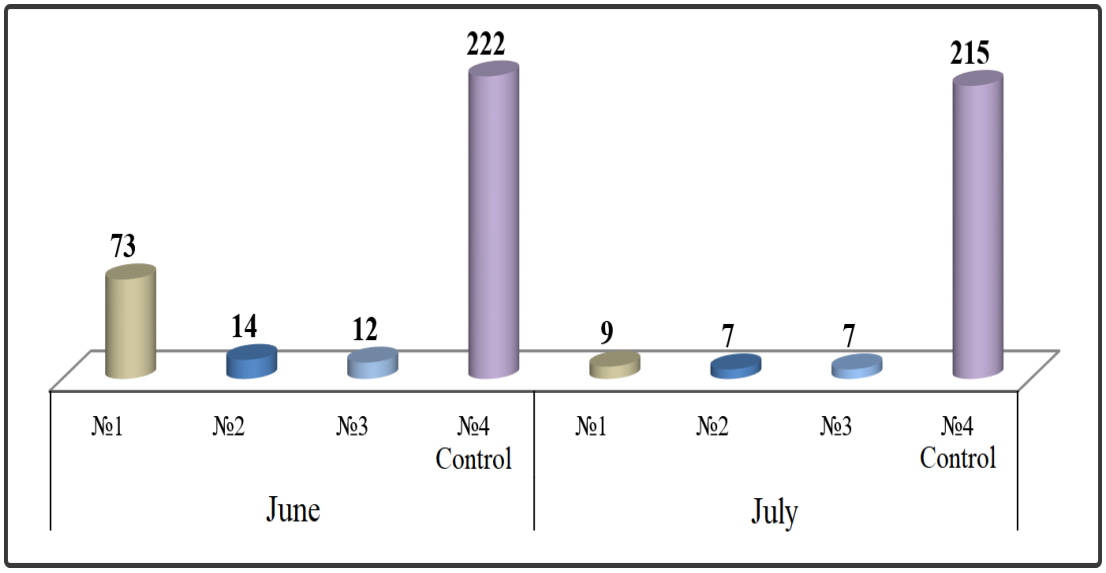

Fig. 2: Trapping tomato moths on pheromone in the variants covered with mosquito nets.

In the variant covered with mosquito net (white) to control development of tomato moth (*T. absoluta*), the number of tomato moth butterflies trapped on pheromone made 10-13 pieces on the 1st decade of June, by the 2nd decade of the month they decreased from 9 to 11 pieces, and by the end of the month it was observed that the number of butterfly drops on pheromone traps decreased from 14 to 7. In the first decade of July, the number dropped from 7 to 2, and by the end of the month, the number of butterflies had dropped to zero.

Fig. 3: Experiments with mosquito nets (in 2019).

According to the results, it was observed that in the field covered with mosquito net (white), there was a significant reduction of tomato moth butterflies compared to the field without mosquito net. In July, there was a sharp decline in the incidence of tomato moth butterflies relative to the control field. These fields were not chemically treated.

In the variant where the field was covered with mosquito net (black) to control the development of the tomato moth, the number of tomato moth butterflies fell to pheromone traps in the 1st decade of June to was 12-6 pieces, by the 2nd decade of the month the number was from 10 to 7, and by the end of the month it was observed that the number of butterfly drops on pheromone traps decreased by from 8 to 4. According to the results obtained, in the field covered with mosquito net (black) a sharp decrease in the number of tomato moth butterflies was observed compared to the open field of control variant and the crop was prevented from damage by tomato moth. In the first decade of July, the number of butterflies dropped from 7 to 3, and by the end of the month, the number of trapped butterflies made 1-0, in this way the crop was prevented from the damage of tomato moth.

4. CONCLUSIONS

Due to the fact that the fields are covered with mosquito net (black), the butterflies of the tomato moth cannot penetrate inside, which makes it possible to obtain 90-

98% ecologically pure products without the use of chemical pesticides.

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