N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF AGRICULTURAL SCIENCES
ISSN 2224-526X
Volume 1, Number 43 (2018), 38 – 41

UDC 632.913.1

B. B. Toyzhigitova[1], S. Yskak[2], A. S. Dinasilov[2], Zh. B. Niyazbekov[2]

[1]«Kazakh National Agrarian University», Almaty, Kazakhstan,
[2]«Kazakh Research Institute of Protection and Plants Quarantine», Almaty, Kazakhstan.
E-mail: bayan.toyzhigitova.69@mail.r sapar1234@mail.ru; alhimzr@mail.ru

EFFICIENCY OF ENVIRONMENTALLY SAFE TECHNIQUES AND METHODS AGAINST THE MELON FLY *Myiopardalispardalina* (Bigot)

Abstract. At the density for mass catching the pheromone glue traps, food baits of 10 pieces/hectare, the significant effect on prevalence of fruits by the melon fly and productivity in the microplot experiments has not been noted. Technologies of pheromone disorientation of males practically do not influence on population of the melon fly due to low efficiency of dispensers. Installation of the pheromone traps in number of 20, 40 and 60 pcs/ha has shown that the quantity of the caught males has averaged 2.05 pcs on 1 trap.

Keywords: melon fly, imago, wrecker, pheromone traps, food baits.

Introduction. The developed control measures for the melon fly are so far ineffective and suggest spatial isolation of crops, early sowing of early ripening varieties, the use of 3-4-year-old seeds for sowing, control of weeds, removal of afterharvesting residues, fall plowing and a number of other agricultural techniques against the background of an intensive press of insecticide pest. Multiple treatment of crops with insecticides led to the formation of pest resistance to chemical preparations. Alternative methods of control have not yet been developed.

The evaluation of environmentally safe techniques and methods that were used to control other types of fruit flies, their advance to local conditions, as well as their combination with the intelligent use of biologically active substances, pheromones, sterilization and pesticides of the new generation, identification of promising entomophages will allow to develop effective and ecologically friendly methods of controling the melon fly and to reduce their harmful impact on the environment in integrated melon protection systems in the Republic of Kazakhstan.

In the conditions of Karakalpakstan, bordering of the Kyzylorda region and similar in soil and climatic conditions, based on the study of bioecological features, methods for protecting melons from this pest have been developed with the primary use of agrotechnical and chemical methods of struggle. However, the use of the recommended melon protection scheme does not solve the problem of eliminating the foci of this quarantine pest. Multiple treatment of crops with insecticides with the same active substances (chlorpyrifos, 500 g/l + cypermethrin, 50 g/l) leads to the formation of pest resistance to chemical preparations [1].

The most effective alternatives to the chemical method aimed at suppressing populations of flies, including the melon fly, are analyzed.

Materials and methods. Technology of the male vacuum. Mass catch, also called as male vacuum or elimination method, is based on the principle of intensive attraction of males to traps with an attractant. As a result of the removal of males from the population, females remain unfertilized. Mass catch is carried out with the help of a large number of traps, covering as much as possible the zone of action of natural pheromone produced by females of the natural population. On 1 hectare depending on the number of people from 5 to 50 traps are hanged.

When studying the effectiveness of catching flies on pheromone traps, the obtained results were compared with the results of mowing with insect net, 50 double strokes per passage along the diagonal of the field [2, 3].

Technology of pheromone disorientation of males of the melon fly. The method of disorientation: at the beginning of flowering, rubber rings with the content of pheromone (180-200 mg) are hung. Only 500 rings per 1 ha, which corresponds to 90-100 g of preparation per ha. In early summer, pests of the second and third generation (according to observations in control pheromone traps), the same number of rubber rings with pheromone are re-hung. A total of 270-300 g of pheromone is required for protection during the season [4].

Field works were carried out in the South Kazakhstan region and in the entomology laboratory of the plant quarantine department of the KazRIP&PQ.

Results of the research. During the growing season, experiments were conducted to determine the effectiveness of individual types of pheromone glue traps, food baits and their optimum density for mass fly catching.

Various types of pheromone traps have been tested: pheromone glue traps with a melon fly dispenser, colored glue traps, food baits in the form of solutions of attracting substances (melon syrup). The traps were set in the period of the mass appearance of the melon fly, from the end of flowering melons, at a distance of 20-30 m from each other in 4-fold repetition. Accounting was conducted every 5 days, taking into account the number of caught individuals and their total number for the season was determined (table 1).

Table 1 – Effectiveness of catching on pheromone, colored and food traps of the melon flies, their effect on melon damage and yield, Maktaaral district, 2017

Experiment variants	Frequency	Caught, for the season	Percentage of affected melon fruit	Yielding, c/ha
Pheromone traps, 2 pcs/ha	1	16	13	112
	2	13	16	156
	3	28	11	176
	4	43	15	164
Average		25.0	13.8	152.0
Pheromone traps, 10 pcs/ha	1	61	12	167
	2	47	9	157
	3	58	3	183
	4	67	11	158
Average		58.3	8.8	166.3
Glue traps, 2 pcs/ha	1	12	16	167
	2	3	14	137
	3	9	16	156
	4	15	17	167
Average		9.8	15.8	156.8
Glue traps, 10 pcs/ha	1	16	18	167
	2	17	19	154
	3	15	16	137
	4	14	17	178
Average		15.5	17.5	159.0
Food baits, 2 pcs/ha	1	18	16	167
	2	7	17	173
	3	6	11	164
	4	7	18	149
Average		9.5	15.5	163.3
Food baits, 10 pcs/ha	1	32	16	171
	2	14	18	165
	3	26	19	170
	4	17	12	146
		22.3	16.3	163.0

The works were conducted in the Maktaaral and Shardara districts of the South Kazakhstan region in stationary fields.

Stationary field N1. Maktaaral district, Kyzylzhar rural district. GPSN $40^{0}51^{1}38.74^{11}$, E $068^{0}18^{1}24.1^{11}$, H 250. "Kirov" field.

Stationary field N 2. Maktaaral district, Kyzylzhar rural district. GPSN $40^{0}53^{1}15.1^{11}$, E $068^{0}18^{1}56,8^{11}$, H 255. Akimat's field.

Stationary field N 3. Maktaaral district, Kyzylzhar rural district. GPSN $40^{0}49^{1}29,4^{11}$, E $068^{0}15^{1}25.8^{11}$, H 220. Field N3.

Stationary field N4. Shardara district, GPSN $40^{0}53^{1}18,1^{11}$, E $068^{0}18^{1}56,8^{11}$, H 309. Field N4.

Stationary field N5. Shardara district, GPSN $40^{0}51^{1}17,2^{11}$, E $068^{0}21^{1}56,9^{11}$, H 288. Field N5.

For the primary comparative assessment of the pheromone disorientation of males for the melon fly pest population, the pheromone traps produced in Moldova for trapping the melon fly in the Maktaaral district of the South Kazakhstan region in the amount of 20, 40 and 60 pcs/ha were installed. Accounting conducted on the 30th day after installation showed that the number of trapped males averaged 3.9; 2.7 and 0.9 pcs. per 1 trap, respectively (table 2).

Table 2 – Effectiveness of melon fly catching on pheromone traps (South-Kazakhstan region, Saryagash district, 2017)

Frequency	Quantity of traps per 1 ha, pcs.		
	20	40	60
1	10	11	10
2	9	5	5
3	9	4	5
4	13	9	13
Average	2.05	0.72	0.55

Pheromone traps established in the background of a low number of flies and two-fold processing with Angio 247 S.C. in a dosage of 0.15 l/ha showed catch of individual pests. At 20, 40 and 60 traps per 1 hectare, the males of melon fly practically did not fall into traps of white and yellow color with a dispenser.

Conclusions. At the density for mass catching with pheromone glue traps, food baits of 10 pcs/ha, there was no significant effect on the affected fruits by melon fly and yield in micro-plot experiments. Technologies of the pheromone disorientation of males have practically no effect on the population of the melon fly due to the low effectiveness of dispensers. The installation of the pheromone traps in the amount of 20, 40 and 60 pcs/ha showed that the number of trapped males averaged 0.55-2.05 pcs on 1 trap.

Thus, the technologies of the pheromone disorientation of males have practically no effect on the population of the melon fly, due to the low effectiveness of the dispensers.

REFERENCES

[1] Toreniyazov E.Sh. et al. Bioecology of development of the melon fly and recommendations for fighting. Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, Nukus Branch of the Tashkent State Agrarian University. – Nukus, 2010. – 32 p. (in Russ.).

[2] Suleimenov S.I., Abdrakhmanov M.A., Amerguzhin R.Sh., Butaev K.M., Suleimenova Z.Sh., Mukhyshov A.A., Palinka A.P., Tokmurzina Z.Kh., Abdugalieva G.H., Tleubaev N.K. Methodical instructions for the registration and identification of quarantine objects. – Astana, 2009. – 75 p. (in Russ.).

[3] Fursov V.N. How to collect insect-entomophages // Recommendation. – Kiev: Institute of Zoology, 2003. – 68 p. (in Russ.).

[4] Lebedeva K.V., Miniyailo V.A., Pyatnova Yu.B. Pheromones of insects. – Moscow: Nauka, 1984. – 269 p. (in Russ.).