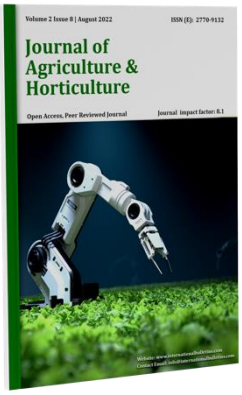

DEVELOPMENT DYNAMICS OF SPIDER MITES IN THE AGROBIOCENOSIS OF COTTON, MELON, AND CUCUMBER FIELDS OF KARAKALPAKSTAN AND ORGANIZATION OF COUNTERMEASURES AGAINST THEM.

Toreniyazov E.Sh.
doctor of agricultural sciences, professor.
Annakulov B.K.
Independent researcher
Karakalpakstan Institute of Agriculture and Agrotechnologies
Karakalpakstan Agricultural Research Institute.
https://doi.org/10.5281/zenodo.10682443

Annotation: In the article, the results of the scientific research carried out on the countermeasures against the spider mite, which develops and causes damage in cotton, melon, and cucumber plants grown in the agrobiocenosis of Karakalpakstan, taking into account the impact of external factors on its development bioecology and the dynamics of its spread in the fields are presented.

Keywords: Pest, sucker, distribution area, harmfulness, dynamics, temperature, humidity, chemical method, biological usefulness.

Relevance of the topic, importance in production: The spider mite species is one of the main pests in terms of its spread in agricultural crops in many regions and the degree of harm it causes. Even so, during the previous years, the degree of damage caused by the spider mite in the agriculture of the agrobiocenosis of Karakalpakstan was a little low, and in some years it appeared in the cotton fields, and the dynamic of entering the period of diapause was determined. In the last decade, the distribution area of the pest has expanded, the dynamics of development are increasing every year, and the level of damage it causes to many agricultural crops is increasing. As a result, it is required to carry out measures to combat the spider mite in agricultural crops, which have appeared since early spring, and to scientifically improve the measures used. For this, first of all, taking into account the changes in the elements of abiotic factors that affect the development bioecology of the pest, it is an urgent issue to determine the level of exposure and the best types, quantities and periods of using chemical preparations from the methods of combat [5, 6].

Research methods: To determine the elements of abiotic factors that affect the development of spider mite species in the conditions of the area, daily data were collected from the Shimbay weather station. The methods of B. P. Adashkevich [1], Sh. T. Khojaev [7] were used to determine the developmental bioecology of the pest and its dynamics, V. I. Tansky [4] - to determine the degree of harmfulness to plants, and Sh. T. Khojaev [6], K. A. Gar [2] - to determine the usefulness of used chemical preparations. Conducting experiments, determination of the accuracy of results, dispersion analysis, and mathematical processing was carried out by the methods of B. A. Dospekhov [3].

Research results: The fact that air temperature, considered the main element of abiotic factors in recent years in the conditions of the region, is not cold in the winter months, the average daily temperature in the summer is 30.0-34.0 ^{0}C, the maximum level increases to 40.0-46.0 ^{0}C, the decrease of relative air humidity to 30, 0-35, 0% affects the development bioecology of arthropods in biotopes. It has been found that in many of these biotopes, the distribution areas of the spider mite (*Tetranychus urticae* Koch.), tomato russet mite (*Aculops*

licopersici Massee.), garden spider mite (*Schizotetranychus pruni* Oudms.), brown fruit mite (*Bryobia redikorzevi* Reck), and European red mite (*Pononychus ulmi*) species belonging to the class of Arachnida (*Arachnoidea*), the group of acariformes (*Acariphormes*) have expanded and the degree of harm caused to many plants has increased (Khodjaev, 2010; 2015; Toreniyazov et al. 2018).

During our experiments aimed at studying the development bioecology of the spider mite among mite species, it was found that there are indeed changes in the air temperature in the conditions of the area. In the conditions of the northern districts of our republic, in 2016, the average daily temperature increased to 30 ^{0}C in 11 days, the maximum level increased to 40 ^{0}C in 2 days, and the minimum level of relative humidity decreased by 20% in 10 days, while it was noted that in 2021 the indicators were on 43, 25, 81, in 2022 - 20, 14, 70 and in 2023 - 29, 15, 73 days. As a result, in recent years, the increase in air temperature and decrease in relative humidity in the summer months have provided an opportunity for the mass development of the species due to its compatibility with the biology of the spider mite.

One of the conditions of the bio-ecological feature of the spider mite pest is that its progeny which has multiplied in mass during the growing season, overwinter in the adult phase in September, under the remains of plants, in the bark of trees and soil cracks, and when the average temperature in spring rises to 7,3°C, it comes out of its wintering places and begins to develop, accumulating on sprouted plants.

In the conditions of the northern regions of the agrobiocenosis of Karakalpakstan, the dates of the adult spider mite overwintering were recorded in the second ten days of March in 2016, 2020, 2022, 2023, in the third ten days of March in 2018, 2019, 2014, in the first ten days of April 2015, 2017, 2021. It was found out that the adult generations of the pest began to reproduce in the wild grasses in the spring, and as their number increased, they began to spread on the edges of the fields of cotton, and vegetable crops in May, reaching the middle in June-July, and completely spread to the fields in August, causing damage.

Table 1 provides information on determining the dynamics of the pest's spread and development in various crop fields over several years.

As a result, in 2015-2016, spider mite generations were collected in 5-13% of plants in cotton fields, the average number of them in one leaf was 12.5-16.3, in 18-14% of cucumbers - 18.2- 25.3, in 15-26% of melon 19.6-31.4 dynamics were determined. In 2021-2022, when the spread areas of the pest expanded and the number of reproduction in plants increased, it was noted that it increased to 18.5-126.8 individuals on the leaves of 21-36% of cotton plants, 123.6-232 on 24-39% of cucumber plants, 334.3-456.5 on 28-42% of melon. During 2023, which was recorded as the hottest year in the conditions of the countries of the world, including Karakalpakstan, 135.6-186.3 pests were found on the leaves of 19-38% of cotton, 196.5-268.4 were found on 25-42% of cucumbers, 401.5-627.8 on 24-49% of melons and it has been proven that the spreading areas and the number of pests on plant leaves have been increasing over the years.

Even if the spider mite appears in plants with the beginning of the vegetation period in the indicated years, in 2021-2023, it starts developing in the fields of agricultural crops in the first and second ten days of May, and its number increases during July. until the end of August, 154.1-162.0 individuals were found in the developing leaves of 29.3-36.4% cotton plants, 474.8-564.2 individuals in 39.1-45.2% melons, and 36.6 -40.2% in cucumber it was reported that it increased to 248.0-257.9.

Even if the spider mite appears in plants with the beginning of the vegetation period in the indicated years, in 2021-2023, it started developing in the fields of agricultural crops in the first and second ten days of May, and its number increased during July and it was noted that until the end of August, 154.1-162.0 were found in the developing leaves of 29.3-36.4% of cotton plants, 474.8-564.2 in 39.1-45.2% of melons, and 248.0-257.9 in 36.6-40.2% cucumbers.

In July, when the pest's offspring began to spread and multiply, the mentioned crop species were treated with chemical preparations against the pest. As a result, when using special acaricides and insect-acaricides against pests, the biological usefulness of the preparations is 81.8-87.8% after 1 day, and 95.2-97.7% of the pests in the field are killed after 14 days, due to the effect of the measures taken, no restoration of the number of pests was recorded until the end of the vegetation period. Through the indicated method pests were killed by treating with preparations in the amount of 1,8 % e.c. vertimek 0,4 l/ha, 30 % a.p. Uzmayt 3,0 l/ha, 55 % e.c. Agrofos 1,5 l/ha, 55 % e.c. Nurell-D 1,5 l/ha, a measure which helps to fully preserve the expected yield was proposed to produce.

Conclusion: in the conditions of the agrobiocenosis of Karakalpakstan in recent years, the warm air temperature in the winter months, its rise to the peak during the growing season, a slight decrease in relative humidity are considered favorable for the development of mite species, and it was found that their spread areas, development in plants are increasing. It was noted that the spider mite, a dangerous type of mite that damages many agricultural crops, in recent years has increased to186.3 individuals on the leaves of 38% of cotton fields, 268.4 individuals on 42% of cucumbers, and 627 individuals on 49% of melons causing dangerous damage to the crop.

To save the damaged crop, the processing requirement was confirmed in the conducted experiments, where before the number of pests in one plant reaches 18,9-71,4 and the number of damaged plants reaches 12,3-21,7 %, one of the preparations of 1.8% e.c. vertimek, 30% a.p. Uzmayt, 55% e.c. Agrofos, 55% e.c. Nurell-D should be chosen, and 200-300 liters of water should be used per hectare with the help of sprinkler units attached to tractors. As a result of the correct management of the number of pests, when this method is used in the production of cotton, and vegetable fields of farms, it is determined that the crop is fully preserved, and the measures are being taken to implement in all areas every year.

References:

1. Adashkevich B.P. "Biological protection of cruciferous vegetable crops from harmful insects." –Tashkent: “FAN”, 1983. –P. 180-188.
2. Gar K.A. Testing the effectiveness of insecticides in natural and field conditions. –M., 1967. –P. 14-92.
3. Dospehov B.A. Field experiment methodology. –M.: Agropromizdat, 1986. –P. 25-110.
4. Tansky V.I. Biological basis for studying the harmfulness of insects. –M.: “Agropromizdat”, 1988. –P. 132-157.
5. Toreniyazov E.Sh., Khojaev Sh.T., Kholmurodov E.A. Protection of plants. -Tashkent: "Navroz", 2018. -876 p.
6. Khojaev Sh.T. Methodological guidelines for testing insecticides, acaricides, biologically active substances and fungicides (II edition). -Tashkent, 2004. -p. 5-98.

7. Khojaev Sh.T. Modern methods and means of integrated protection of plants from pests. - Tashkent: "Navroz", 2015. -552 p.