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USE OF PHYTOSEIULUS PERSIMILIS A.-H. IN THE FIGHT AGAINST TETRANYCHUS URTICAE K. IN GREENHOUSES

Abstract. Studies to determine the biological activity and voracity of predatory mite Phytoseiulus persimilis A.–H. were carried out in the laboratory. According to our observations, Phytoseiulus eggs turned out to be the most chosen category of victim. Also, both the adult and the predator nymph have a high selectivity of individuals of the postembryonic stages of the victim during the feeding period. When studying the biological activity of the predator against the phytophagus, we noted that the predator actively suppressed its number to 97%.

Keywords: biology, greenhouses, entomophages, pests, plant protection.

Introduction. Vegetables are one of the most valuable food products of the population. The share of their use is growing from year to year. In parallel, there is an active increase in the area under vegetable crops in the closed ground. The role of plant protection, which is one of the urgent problems of vegetable growing, is growing [1].

In terms of anthropogenic load, agriculture is among the leaders. Significant environmental damage is caused by land chemicalization [2]. About 2 million tons of pesticides are used in the world every year. Their remains are found in 40% of the studied samples of grain, berries, fruits and vegetables. In the world annually 25 million cases of poisoning by pesticides are registered, including 20 thousand with fatal [3, 4].

Intensification of agriculture around the world, including on the territory of Kazakhstan has now become an extremely urgent economic task at the national and international levels. In this task, the problem of crop and crop protection from pests plays an important role. The application of an integrated plant protection system using biological agents and bioinsecticides is one of the solutions to these problems, which deserve increasing attention as an alternative to chemical methods as their complete replacement, because biomethod has a selective effect on insect pests, harmless to humans and the environment [3].

Growing cucumbers in greenhouses is almost impossible without constant and intensive control of the spider mite (*Tetranychusurticae* K.) – one of the main pests. *Phytoseiuluspersimilis* A.-H. characterized by high fertility, a short period of development under favorable conditions and high voracity against spider mites.

The aim of our research was to determine the biological activity of the predatory tick *Phytoseiulus persimilis* in the fight against spider mites, which can be used in the fight against phytophages in protected areas, as well as to determine its voracity and selectivity of food.

Material and methods. Laboratory studies were performed at the laboratory of arthropods useful "KazRIPPQ named after J. Jiyembaev" LLP.

Imago and nymphs of the predatory mite *Phytoseiluspersimilis* A.-H. were used as a test object. all stages of development of the common spider mite *Tetranychusurticae* K were used as prey for predatory mites.

To maintain colonies of spider mites, bean leaves were used, which were grown in accordance with the standard practice of cultivating plants in pots of 2liters.with the same type of fertile soil without fertilization.

In experiments to determine the biological activity of the predatory mite phytoseiulusagainst phytophagus in all variants of the experiment was made the release of spider mite in the amount of: nymphs-20, adults-5 and eggs-30 pieces. The number of released predatory ticks was 5 adults (3 females, 2 males). Control without start Phytoseiulus. Accounts were carried out daily.

In an experiment to determine the voracity and selectivity of predator food, the voracity of 20 adults and 20 nymphs was taken into account. Exposure 5 hours.

The amount of feed offered: eggs – 30 pieces, larvae and nymphs – 20, adult spider mites – 5 individuals.

Laboratory experiments were carried out at a temperature of 26-27°C, relative humidity 70-80% and photoperiod 16:8 hours.

Experimental ticks were kept on leaf cuttings of beans 20x30 mm in size, which were placed on a sponge oasis in ditches with water. Statistical data processing was carried out by statistical complex of MS Excel program.

Results and discussion. In the experiment to determine the biological activity ofphytoseiulusagainst spider mites, we obtained the following results: the average number of spider mite eggs in the experiment gradually increased, the number of larvae, nymphs and adults remained relatively constant. On the 6th day the number of eggs and individuals of spider mites decreased significantly. The peak of growth of nymphs spider mite fell on day 7-146 individuals, the maximum number of adults on day 8 was 108 individuals, eggs about 1000 PCs. On day 12 of the experiment, there was a decrease in the number of eggs, nymphs and adult spider mites by 88.3; 97 and 77.8%, respectively.

If the population of the phytophage, we noted the decline in densities, in populations of the predator contrary, recorded an increase (figures 1–3).

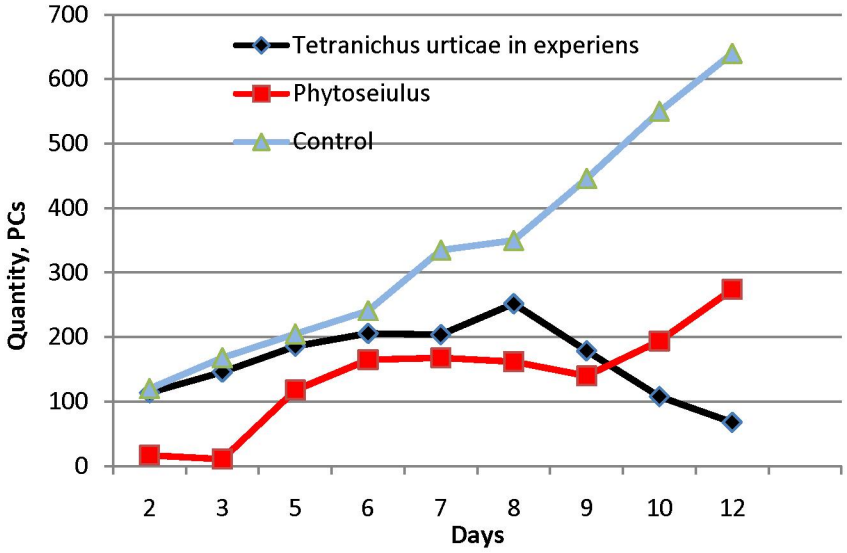

Figure 1 – Biological activity of *Phytoseiulus persimilis* against *Tetranychusurticae*

Thus, the yield of Phytoseiulus on day 12 was 180 individuals of nymphs, 94 individuals of adults. In the control variant, the number of phytophagus reached more than 1000 individuals.

Figures 2 and 3 show the dynamics of spider mite and predator abundance in experimental variants.

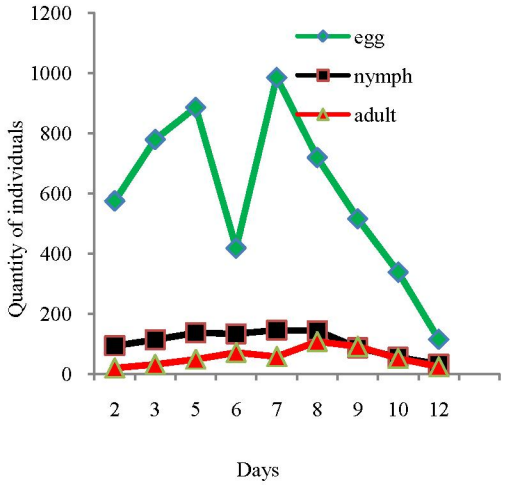

Figure 2 - Dynamics of *Tetranychusurticae* population in the experiment

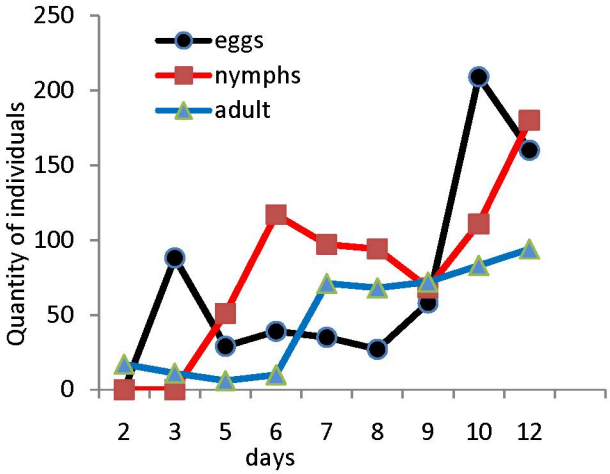

Figure 3 - dynamics of Phytoseiulus abundance in the experiment

According to the results of the data, released in the amount of 20 individuals (total predator) at the beginning of the experiment by the end of the experiment increased to 180 individuals (all age stages) and actively suppressed the growth of spider mites in the experiment in a short time. The predator also laid 152 eggs. A predator who preys actively, discourages, and actively inhibits the growth of spider mites. The maximum amount of egg laying by females of Phytoseiulus was observed on the 10th day after its settlement, after it went down, as the decrease in the amount of feed began.

In the experiment to determine the voracity and selectivity of Phytoseiulus adult predatory mite offered the opportunity to eat equally different-aged individuals spider mite: eggs, nymphs and adults.

Data on gluttony and selectivity of Phytoseiulus when feeding by different-aged individuals of the spider mite are presented in figure 4.

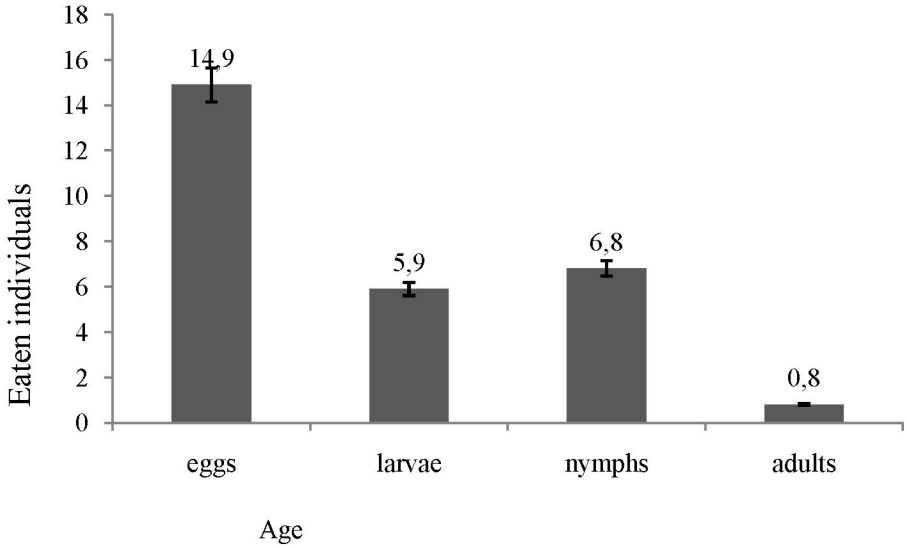

Figure 4 – Evaluation of gluttony and selectivity power of adults Phytoseiulus against spider mites

As can be seen from figure 4, the imago of Phytoseiulus attacked all age stages of spider mites, but gave preference to the balls. So, at an exposure of 5 hours adult predatory mites used in an average of 14.9 eggs; larvae 5,9; 6,8 specimens of nymphs and adults of 0.8 individuals of the phytophage.

In our studies, it was found that Phytoseiulus adults prefer nymphs to larvae, whereas predator nymphs prefer larvae (figure 5). According to some literature data [5, 6], such behavior is typical for female predators. It consumes mainly nymphs and spider mite adults, leaving larvae and phytophagous eggs to feed its offspring.

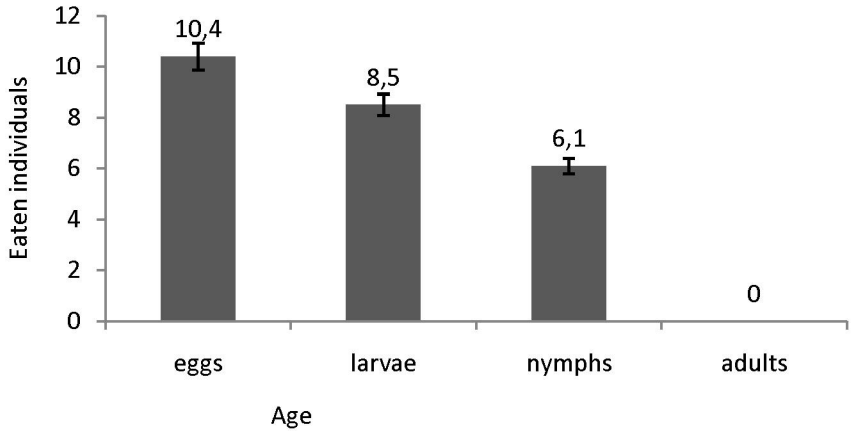

Figure 5 – assessment of the voracity and power of the selectivity of nymphs of Phytoseiulus against spider mites

Phytoseiulusis known to consume 24 spider mite eggs per day [6]. In our experiments, the average nymph Phytoseiulus (figure 2) destroyed 10.4 eggs in 5 hours. Also during this time, they used the food of 8.45 specimens of larvae and nymphs of 6.1 individuals of the phytophage.

Conclusion. According to our observations, Phytoseiulus eggs turned out to be the most chosen category of victim. The predator's food selectivity remained stable for both adults and nymphs.

Imago Phytoseiulus persimilis A.-H. found a tendency to feed on larger-sized individuals of the spider mite. Most of the elected stage of the food for predatory mites appeared to be spider mite eggs. Also, both the adult and the predator nymph have a high selectivity of individuals of the postembryonic stages of the victim during the feeding period.

When studying the biological activity of the predator against the phytophagus, we noted that the predator actively develops in the presence of abundant food and can suppress its number up to 97%. Due to the accumulation of acariphage during its active predatory activity, there is no need for the use of acaricides.

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ЖАБЫҚ АЛАҢ ЖАҒДАЙЫНДА TETRANYCHUS URTICAE K. ҚАРСЫ КҮРЕСТЕ PHYTOSEIULUS PERSIMILIS A.–H. ПАЙДАЛАНУ

Аннотация. Phytoseiulus persimilis A.–H. жыртқыш кенесінің биологиялық белсенділігі мен өсімталдылығын анықтау мақсатында зертханалық жағдайда зерттеулер жүргізілді. Біздің бақылауымыз бойынша фитосейулюс фитофаг жұмыртқалары қоректенгенді жөн көреді. Сондай-ақ, жыртқыштың имагосы да, нимфасы да қорекретінде құрбанның эмбрионалды кезеңіндегі дарақтарды таңдайды. Жыртқыштың фитофагқа қарсы биологиялық белсенділігін зерттеу кезінде жыртқыштың зиянкестің сан мөлшерін 97%-ға дейін жоятындығына көз жеткіздік.

Түйін сөздер: биология, жабық алаң, энтомофагтар, зиянкестер, өсімдік қорғау.

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ИСПОЛЬЗОВАНИЕ PHYTOSEIULUS PERSIMILIS A.–H. В БОРЬБЕ ПРОТИВ TETRANYCHUS URTICAE K. В ЗАКРЫТОМ ГРУНТЕ

Аннотация. Исследования по определению биологической активности и прожорливости хищного клеща *Phytoseiulus persimilis* A.–H. проводили в лабораторных условиях. По нашим наблюдениям для фитосейулюса наиболее избираемой категорией жертвы оказались яйца фитофага. Также и у имаго, и у нимфы хищника высокая избирательность особей постэмбриональных стадий жертвы за период питания. При изучении биологической активности хищника в отношении фитофага нами было отмечено, что хищник активно подавил его численность до 97%.

Ключевые слова: биология, закрытый грунт, энтомофаги, вредители, защита растений.

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