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Study of species composition and food specialization of useful insects on onions and garlic crops

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Abstract

Uzbekistan, based on its natural climate data, is one of the main producers of vegetable products. Some of the main vegetable crops in Uzbekistan are onions and garlic. Among vegetable crops, onions and garlic are most susceptible to damage by various harmful organisms. The lesion is observed in all phases and periods of plant development, both during vegetation and during storage. When carrying out protective measures against pests, it is necessary to take into account the presence of entomophages and acariphages, and their role in reducing the number of pests. Studies have examined the composition of useful entomofauna

on onions and garlic crops in Uzbekistan. 90 species of entomophages and acarithages of onions and garlic pests have been identified. They are represented by 2 classes, 9 squads and 21 families.

Keywords: onions, garlic, arthropods, pest, entomophage, acarithag.

In Uzbekistan, onions after tomatoes occupy the second place in the sowing area and gross harvest. Its share among vegetable crops is 23-24%, according to the gross harvest of 18-19% [Zuev and others., 2009; Mirziyatov, Mahamadaminov, 2016] and yield produced on average 35-40 tons per hectare in 2016 [M. Mirziyatov, Sh.Mahamadaminov, 2016] and 22-25 tons in 2019 [<https://agronet.uz/piyoz-yetishtirish/>, 2020].

The sowing areas of onions and garlic are the place of development of various pests due to favorable conditions of microclimate. Onion vegetables damage about 100 species of pests [Gerasimov, Osnitskaya, 1948, 1955, 1957; Pospilov, Arsenieva, Gruzdev, 1973]. Of these, 10-15 species are major pests that cause significant economic damage, while other species feed on onions and garlic additionally.

When developing pest control measures, it is necessary to study the importance of entomophages in reducing their numbers under natural conditions.

Consideration of the importance of natural entomophage populations in regulating the number of pests is an important condition for integrated protection.

Study and analysis of entomophages, their species composition, development, relationship with pests on onions and garlic plants - the basis for the development of an effective, environmentally friendly control system.

We can give several examples of the efficacy of natural entomophage populations. For example, equestrian of *Lysiphlebus fabarum* Mars. infects up to 71% lucerne. The importance of this entomophage in the pest settlement is further increased by taking into account the beetles of the ladybug, which destroy on a daily basis 161 ex. of the plant louses and larvae of the lacewing peephole gold feeding by 30-40 the plant louse, as well as other predatory and parasitic entomophages common in the colonies of the plant louse [Maxumov, Narzikulov, 1981].

According to some scientists, 250-300 entomophages per 100 plants in cotton fields can be avoided the use of chemicals. This indicator varies depending on the species composition of common pests. For example, if the parasites infect 30-35% of cotton owl caterpillars, 200 ex. predatory entomophages on 100 plants are considered satisfactory [Narzikulov et al., 1977], if the parasites infect 40-50%, the presence of 40-50 predators per 100 plants allows to eliminate the use of chemicals [Maksumov, Narzikulov, 1981; Hasanov, Eshmatov et al., 2002].

Methods of researches.

Surveys on the species composition of entomophages found on onions and garlic crops were conducted every 10 days at permanent sites where no treatment from pests was carried out at different stages of plant development. To study pest parasites, pest larva eggs were collected and fed before the parasite departed.

Fast-moving and jumping insects were caught by entomological sac, 10 samples (100 waves) on the diagonal of the field. [Vasilyev et al., 1975; Volodichev, 1986; Paly, 1966; Trakapitsyn, Shapiro, Shepetilnikov, 1965].

When collecting soil insects and pests, damaging ground parts of plants used the method recommended by V.P. Vasilyev et al. [1975] for collecting pests. On each field 8-16 soil samples were taken by chess method with size 50X50 cm.

Soil traps were used to study insects in the soil [Adaskiewicz, 1983]. For this purpose, 0.5 litre glass cans were installed on onions and garlic crops below the soil level by 1-2 cm. Glass cans were filled from below with wet soil with thickness of 3-4 cm and covered with film with a hole of 2 cm diameter. 10 such traps were placed diagonally on each stand. Soil traps were recorded every 5 days.

Parasites from infected samples were collected and stored in a mixture of 70% alcohol and 1% glycerol for identification. Species of predatory entomophages were collected and identified by entomological sacks, soil traps, and plant collections directly [Danube, 1997].

The types of entomophages and acarithages were determined by the determinants "Determinant of harmful and useful insects and mites of one-year-old and perennial herbs and legumes in the USSR" [1983], "Determinant of harmful and useful insects and mites of cotton in the USSR" [1987], "Determinant of harmful and useful invertebrates of closed soil" [2003], "Determinant of species *Trichogramma evanescens* Westw species. (HYMENOPTERA, Trichogrammatidae) of world fauna"[1993].

Results of researches.

The species composition of entomophages was studied in route surveys. Studies have shown that entomophages and acarithages, representing 90 species of spiders (Arachnida) and insects (Insecta), are found on onions and garlic crops.

Entomophages of the Arachnida class are 5 species belonging to the Arachnina unit, the Aranei family, which make up 5.6% of entomophages.

85 species of entomophages (94.4%) turned out to be insects of the Insecta class.

The most common species are Hard-tailed, or beetles (Coleoptera), representing 41 species, made up 45.5% of the total number of entomophages. Of these, 31 species belong to the family Carabidae (34.4%), 9 species to the family Coccinellidae (10.0%) and 1 to the family Staphilinidae (1.1% or 1 species).

By type of food specialization, entomophages are divided into 2 groups: predators and parasites (Figure 1). 16.7% of entomophages are parasites, 82.2% are predators, and the species is *Aleochara bilineata* Gyll. (1.1%) feeds on mixed type, imago feeds on predation, and larvae are parasites.

Fig. 1. Separation of entomophages by type of food specialization, (%)

The main factor of entomofauna formation is plants, the secondary factor is a pest. A useful entomofauna is created from the relationship-based nutrition chain of these factors.

In determining the process of forming a useful entomofauna, it is important to study the nutritional selectivity of entomophages. The food chain is a key factor in this process and the definition of such dependency models is important for controlling the reproduction of pests.

Data on the preference of entomophages for different categories of pests are shown in Figure 2.

Entomophages of members of the flake squad (Lepidoptera) are the most numerous, 72.2% of entomophages feed on individuals of different phases of the flake. 45.6% of entomophages feed on flies, 44.4% -aphids, 42.2% -bugs. Mites prefer 32.2% of the species of acarifages.

Thysanoptera are the food of 30.0% of entomophages, and orthoptera are 4.4% of entomophages.

The main entomophages of ticks and trypses are predatory trypses, bedbugs, coccinellides Entomophages of wing scales are spiders, earwigs, some bugs and beetles, chrysopa, ichnevmonides, braconides, trichograms, and the number of homoptera is regulated by members of diptera, aphidiids, chrysopa, coccinellide, bugs, predatory, as well as chrysopa, larvae flies sirfid.

Fig. 2. Preferences of entomophages of different pest categories, (%)

The number of flies is greatly influenced by spiders, mantis, different beetles, larvae of Chrysopa, some hymenoptera. The numbers of orthoptera and beetles (Coleoptera) are reduced mainly by spiders, mantis and beetles.

Conclusions

According to the results of the studies, 90 species of entomophages and acaryphages of onions and garlic pests, representatives of 2 classes, 9 units and 21 families were identified. The largest class, the insect class (Insecta), includes 85 species (94.4%). 16.7% of entomophages are parasites and 82.2% are predators.

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Surzhik M.M., Mukhina N.V., Avramenko A.A., Naumova T.V., Falko V.V.
Ecological sustainable of agricultural soils of Russian Southern Far East

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Аннотация

На юге российского Дальнего Востока наиболее плодородными являются луговые черноземовидные, лугово-бурые, остаточно-пойменные и луговые глеевые осушенные почвы. Балл бонитета этих почв составляет 85-100. Многие из этих почв подвержены переувлажнению, деструкционным процессам природного и антропогенного характера. Основными их таких процессов являются склоновый сток, наводнения, снижение плодородия, переуплотнение, различные виды загрязнения. Потери гумуса ежегодно составляют 0,25-0,45 т, интенсивность смыва почвы 5-40 т/га в год, густота овражно-балочной сети 200-50 м²/год, загрязнение почв пестицидами превышает ПДК в среднем в 1,5 раза. Немаловажным фактором ухудшения экологического состояния почв являются стихийные свалки и карьеры. Под ними, до существующим данным, занято 1,6 тыс. га. Этот вид нарушения экологии почв является трудно контролируемым. В целом экологическое состояние почв юга Дальнего Востока считается удовлетворительным. Однако, на отдельных территориях она возрастает до критической.

Ключевые слова: юг российского Дальнего Востока, сельское хозяйство, экология, почва, деструкция.

Abstract

In the south of the Russian Far East, the most fertile are meadow chernozem-like, meadow-brown, residual-floodplain and meadow gley drained soils. The bonitet score of these soils is 85-100. Many of these soils are subject to waterlogging, destructive processes of a natural and anthropogenic nature. Their main processes are slope runoff, floods, decreased fertility, overconsolidation, and various types of pollution. Losses of humus annually amount to 0.25-0.45 t, soil leaching intensity is 5-40 t / ha per year, the density of the ravine-girder network is 200-50 m² / year, soil pollution with pesticides exceeds the MPC by an average of 1.5 times. An important factor in the deterioration of the ecological condition of soils are natural dumps and quarries. Under them, up to the existing data, 1.6 thousand hectares are occupied. This type of disturbance of soil ecology is difficult to control. In general, the ecological condition of soils in the south of the Far East is considered satisfactory. However, in some territories it increases to critical.

Keywords: south of the Russian Far East, agriculture, ecology, soil, destruction.

The soil of the southern Far East was formed in specific climatic, geological and landscape conditions. Agriculture is confined to the flat part of the territory, which occupies about 30% of the total area. The most accumulation of humus occurs in island and coastal zone of the southern Far East. With the increase in continentality of climate humus horizon