



# The Composition of Sucking Pests and Entomophages of Orchards

Bakhtiyor Nasirov\* <sup>1</sup>, Davlatbek Ruzikulov<sup>1</sup>,  
Orifjon Artikov<sup>1</sup>, Shakhnoza Khaidarova

<sup>1</sup>Tashkent State Agrarian University, Tashkent, 100140, Uzbekistan

\*konf.zara@gmail.com

**Abstract.** The article presents information about the susceptibility of aphids, spider mites and scale insects from sucking pests that cause serious damage to orchards, and the composition of entomophages in the fight against them. Obtaining a high-quality harvest in gardens is one of the pressing problems; it has been established that sucking pest cause serious damage. Since fruit trees are perennial, they create stable ecological conditions for the development of various pests. Measures to combat pests and diseases are one of the important reserves for increasing fruit yield [3]. Currently, these activities have become an integral part of fruit growing technology. As of 2016, the area of orchards in Uzbekistan was 261.8 thousand hectares, of which 120.5 thousand hectares are seed orchards. 44% of the total orchard area is occupied by apple trees. The natural conditions of Uzbekistan are considered the most favorable for fruit tree cultivation. In orchards and vineyards, it is impossible to obtain a high-quality harvest without protecting them from pests and diseases. More than 260 pests and more than 50 diseases have been recorded in fruit and grape orchards in Uzbekistan. One of the main pests causing significant damage to fruit tree yields is the reptile pests (even-winged aphids, scale insects, and spider mites). Sucking insects disrupt the physiological processes of plants during the feeding process. This weakens the plant, disrupts the metabolism of the plant, slows down its growth, and these negative consequences become apparent during the formation of shoots, leaves, flowering, and fruiting.

**Keywords:** Garden, pest, entomophage, sucker, scale insect

## 1 Introduction

As is known, harmful organisms such as pests, diseases and weeds cause significant damage to agricultural crops, drastically reducing their quality and quantity [1]. According to the UN, every year more than 30% of the agricultural products grown in the world and 50% of the products grown in undeveloped countries are lost from the influence of harmful organisms. Therefore, plant protection plays an important role in agricultural production.

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In the decree of the President of the Republic of Uzbekistan Shavkat Miromonovich Mirziyoyev No. UP-60 dated January 28, 2022 "Development Strategy for the five priority areas of development of the Republic of Uzbekistan in 2022-2026", it is noted in the tasks provided that improving the welfare of the people is directly related to obtaining high-quality, environmentally friendly and abundant crop of agricultural plants.

Currently, reforms are being carried out in all areas of agriculture and a number of works are being carried out to ensure the food security of our country. Comprehensive plant protection is widely carried out in our republic. The basis of this system is the complete protection of crops from harmful organisms in certain phytosanitary conditions and ensuring the stability of this agroecosystem. This does not mean the complete destruction of harmful organisms in nature, but the maintenance of a harmless balance in the agrobiocenosis. The basis of comprehensive plant protection is based on biological control. The essence of the biological method is the use of living organisms or their waste products against pests of agricultural crops [2].

During the period of transition of the Republic of Uzbekistan to market relations, it is required that all agricultural products produced have high-quality indicators that meet the requirements of the global market. Now it is necessary to carry out reforms in all sectors of agriculture, because in this work our generous land, which saturates us with agricultural benefits, is placed at the disposal of people - farmers who understand our agriculture well and use every piece of land carefully.

Uzbekistan has every opportunity to increase the number of fruit orchards, in particular, the natural and climatic conditions are favorable for growing fruit trees. However, since many fruit trees have been growing in one place for many years, the pests multiply and damage the trees, from the roots to the fruits.

Among the sucking pests, apple aphids, spider mites and scabies cause great harm. They belong to a special group of insects that feed on plant sap. Thyroid glands often cause pathological changes in plant tissues, which leads to leaf and fruit loss, drying of some shoots and branches, and a decrease in the number and quality of crops. In some cases, this can cause the entire plant to dry out. In addition, due to feeding on scutes, red or dark orange spots appear on the bark and fruits of plants, which reduces the taste and quality of the fruit and they do not develop to normal size. Usually, the California shield causes such damage (it is an intra-quarantine facility).

Many aphids and scabies are very voracious insects, especially in the hot season and with low relative humidity, they absorb more cellular juice than their body can digest. This leads to the release of sewage containing large amounts of sugar. Viscous and juicy drops called "honeydew" cover the leaves, fruits and branches. Black fungi appear in these juicy wastes and interfere with the uniform flow of photosynthesis in the leaves, which leads to negative changes in the appearance and physiology of fruit trees.

Among the sucking pests of orchards, apple aphids, spider mites and scabies are of the greatest importance. They are found everywhere in Uzbekistan and cause significant damage to fruit production.

Currently, reforms are being carried out in all sectors of agriculture and a number of works are being carried out to ensure the country's food security. Pseudocytosis affects cherries, plums, apricots, cherries, almonds, walnuts, apple trees, pears, quinces and pomegranates. In addition, according to literature data, pseudococcus affects barberry, black pine, currant, wild walnut, rosehip, mulberry, red currant, elm, hawthorn and various types of poplar.

## 2 Materials and methods

Entomophages reduce the number of Turanian Pseudococcus, their activity is very diverse and is associated with various phases of pest development [4].

To identify the parasites, we cut off the branches of plums and apricots affected by Turanian pseudococcus and placed them with labels in a flask (or a liter jar). After the flight of the adult parasite, the exit holes of the parasite in the females were calculated. The formed exit holes were similarly observed in various farms in natural conditions.

The materials we have collected and the literature data indicate that many Hymenoptera parasitize the Turanian pseudococcus. For example, A.D.Argangelskaya (1937), M.N.Nikolskaya (1952), N.S.Borkhsenius (1957), B.B.Bozrov, T.Boboev (1971), S.N.Myartseva (1984) noted that the parasites of the Turanian pseudococcus are such species as *Microterus intermedius* Sugonjaev, *Microterus predator* Sugonjaev, *Microterus turanicus* Sugonjaev, *Blastothrix turanica* Sugonjaev, *Metaphicus disparus* Mecred, *Discodes emiliae* Sugonjaev, and *Cheilonourus claviger* Thomson. *microterus intermedius* Sug. - this species is widespread on fruit trees, especially on mountain cherry, walnut, hawthorn and apple. The internal parasite of female Turanian pseudococcus, in addition, affects wrinkled (*Eulecanium rugulosum* Arch.) and acacia pseudococcus (*Parthenolecaniumcorni* Bouche.).

In the foci of pseudococcus, female parasites appear in late April and persist until the end of September. The imago of the parasites hibernate separately from the host.

*Microterus predator* Sug. - Predator of Turanian false shield eggs. It is widespread in Uzbekistan, Tajikistan and in all wild fruit groves in the mountains of Central Asia, Transcaucasia, Turkey, Iran, Pakistan and Afghanistan. In Uzbekistan, it is more common in the foothill zone. It is mainly found on peaches, apricots, mountain cherries, quinces and others. The larvae of the first instar overwinter, pupate in early April, and at the end of April, the adults begin to fly, while the females make holes for flight that distinguish them from other parasites.

The total infection rate of the Turanian Pseudococcus with parasites was 13.7 - 29.6%, while one female pseudococcus develops up to 10 larvae of parasites. In the body of female Turanian Pseudococcus with one hole is 5.0 - 11.9%, with two flying holes - 1.2 - 7.0% or more, with more than three - 0.6 - 9.2%.

Its eggs, larvae, and predators feeding on adult pseudocots have played a major role in reducing the number of Turanian pseudocots. These include the two-pointed chilocorus (*Chilocorus bipustulatus* L.) and Exochomus (*Exochomus quadripustulatus* L.). Both species occur together and have a similar lifestyle. Beetles are light-loving, oriented towards the sunny side, very voracious insects. One beetle eats 300-500 larvae and imago pseudocytosis within a month. This is equivalent to a single beetle destroying 700-800 false shields.

The violet scale (*Parlatoria oleae* Colvee). The female's body shape is broadly oval (ovate), almost pentagonal, uniformly segmented, purple, with a wide rounded front. Body segments are well-formed, the pygidium is broadly formed, the proboscis ring is long, the antennae are segmented, the parts of the pygidium have one hair of 3 pairs, the length of the undivided body is 1-1.3 mm, the female's scale is white or white-gray, short-ovate in shape with a convex oval, sometimes round, length 2-2.5 mm, width 1-1.5 mm, the larval skin is large, dark green, brown or almost black, eccentrically located on the edge of the scale. The males are reddish-purple, with well-developed forewings,

body length up to 1 mm, and the female's shield is smooth, elongated, white, 1.5 mm long. The dark green larval skin is clearly visible.

In the studied farms, the degree of violet scale insect damage to fruit trees reaches 1.3%, and in large trees (gardens) - up to 2%. As can be seen from Table 4, among fruit trees, the most commonly affected are peaches - 1.71% followed by apricots - 1.55%, plums - 0.84%, and cherries - 0.7%.

The area of pest distribution in fruit orchards in the regions of the republic was studied on the basis of directed observations. In laboratory conditions, phenological observations of pests are carried out, the conditions of their wintering, the optimal air temperature and relative humidity for development, the fertility of pests and the plant on which they feed and develop well are studied. The following entomophages are effective against sucking pests in orchards.

### 3 Results

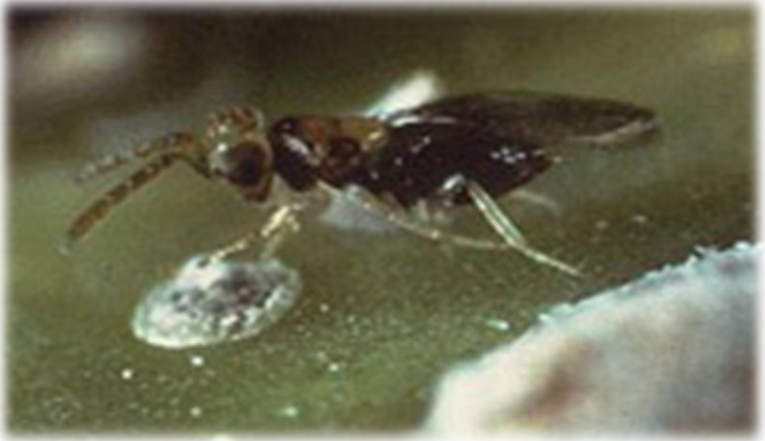
The seven-pointed ladybug is known for its bright red wings and black dots on the wings. It mainly destroys aphids, mites, and insect eggs. During the years of mass reproduction of beetles, the Khan's daughter, after harvesting grain crops, in June-July, a large number of beetles penetrate the orchards, destroying first aphids and mites, and then scale insects. During this period, 500 or more hanqizis can be observed on a single tree. Khan's daughter's beetles destroy shield beetles in all phases, leaving only the shield beetle's abdominal layer after feeding. Khan's daughter's beetles develop within 10-12 days, after which they enter diapause. The larva of the seven-spotted ladybug does not feed on the scale.



**Figure 1.** *Coccenella sempenpunctata* L.

*Prospaltella* - (*Prospaltella perniciosi*) This type of parasite develops only within the body of the California scale insect. In some countries, it is used as a biological remedy against scale insects. It has been established that in our conditions, this parasite affects only 10-18% of the scale insect. The parasite \**Prospaltella*\* affects 1st and 2nd instar larvae and immature females.

Due to one generation of the pest, two generations of the parasite can develop. Inside the overwintering larva's body, the parasite's eggs also overwinter. With the appearance of a 2-year-old larva of the parasite, the surface of the scale's body darkens and hardens. The development of the larva lasts 15 days.



**Figure 2.** *Prospaltella* (*Prospaltella perniciosi*)

After flight, the adult insect leaves holes in the host's body and shield. The parasite *Prospaltella* lays very few seeds. In laboratory conditions, it was found that this parasite lays down up to 20 seeds.

Short-walled aphid - *Aphitis praclia*\* Two species of this parasite are known. *Architis proclia* and *Architis mytilaspidis* Varon. *Architis proclia* is a common parasite. It can be used as a biological remedy against scale insects. This parasite, unlike *propaltella*, also affects other shieldworms. In one season, it produces 3-4 generations. The buckthorn larva overwinters under the shell of the female scale insect. In the first ten days of May, they pupate, and in the third ten days, adult parasites hatch from the eggs.

In laboratory conditions, aphid reproduces very well, but very rarely, laying up to 10 seeds. *Aphitis* affects not only young females but also males. *Architis mytilaspidis* Varon This species is also very similar to the previous one, but it affects the California scale insect less.



**Figure 3.** *Aphis praecia* imago

Currently, the female California scale insect pheromone has been isolated in the USA and its structure, composition, and biological activity have been studied. Feromon and its components, synthesized in the USA, were brought to the Russian Federation for scientific research. The results of scientific research have shown that the given feromon substance has high biological effectiveness and can be used to detect pest foci. In 1981, this feromon was synthesized by scientists from the Institute of Organic Chemistry and the N.D. Zelinskiy International Institute for Biological Plant Protection of the Russian Academy of Sciences. The arms of the male California scale insect are made of 9x25 cm paper covered with film and are bent. A special glue is applied to the inner side of such a handle. The holder is attached to the columns, and a capsule with a feromon is placed in the center of the glue. The handles are placed between the branches of the middle tier of the tree, with each hectare.

As soon as the beef blossoms, handles are placed, which coincides with the flight of male shellfish. For this purpose, starting from April 20th, the male shrimps are regularly checked, and as soon as nymphs appear, traps are set up. Approximate flight times of the male scale insect during the season: approximately at the end of April - beginning of May and until the end of May, the first generation flies, from the first ten days of July until the end of October - the second and third.

**Table 1.** Sexual productivity of the Turanian false shield in various fruit tree species

Species of forage plants	Average number of laid eggs, pcs.	Minimum number of eggs, pcs.	Maximum number of eggs, pieces
Cherry	2040	1896	2205
Mountain cherry	1822	1085	2035
Peach	1127	1011	1301
Apricot	862	611	993
Average	1462,7	1157,5	1633,5

The exact flight time of male shellfish can be determined by controlled traps. The number of captured men is counted every 7 days. Since the males of the California scale insect are very small, it is convenient to count them in the laboratory. With a small number of male insects, the insect on the trap surface is counted completely, and with

a large number - each half of the adhesive surface of the trap is divided diagonally into three parts, and counting fields are allocated. The size of one computing platform is 1 cm<sup>2</sup>, a total of 6 cm<sup>2</sup>.

To determine the number of insects, the total number of insects is divided by 6 counting areas, then multiplied by the total area of the trap (9x25=225 cm<sup>2</sup>). Fields where male scale insects are found are studied to determine the degree of tree damage: First in May - during the flight of the first generation, then from mid-July to early August - during the flight of the second generation, and at the end of the season - during the period of cessation of the flight of the second and third generations.

The degree of damage is determined by the scale developed by A.N. Kirichenko for living insects. First of all, varieties and varieties that are strongly affected by the scale insect, including all varieties of quinces, pears, and apples, are considered. In fields where male shellfish are found, the degree of their infection during harvesting is also determined. The obtained data can be used for field marking. If the insect falls into traps from clean areas for the first time, the traps must be placed in paper cardboard boxes and sent to the laboratory. At the same time, each pen must have a label indicating the region, district, farm, and the surname, first name, patronymic, and date of the inspector. The use of pheromone traps is a very reliable method for detecting new thyroid lesions.

This is a very frequently used method and has had a positive effect. As a result, it was possible to identify new foci of the scale insect. Feromon traps are of great importance and also serve as indicators for determining the number of shields. Thanks to this, it is possible to predict the degree of damage to the future harvest. Allows you to identify fields that cannot be detected with the naked eye. Feromon traps can be used not only for control, but also as a means of combating the scale insect. This is especially effective when used against the first generation, as shellfish begin to fly en masse within 6-7 days. The female scale insect reproduces only sexually. In nature, the number of rocks is usually 1:1. The loss of 50-60% of males leads to 70% of females remaining unfertilized.

Among the natural entomophages of the violet scale insect, parasitic and predatory insects have been identified, some of which feed only on the violet scale insect, while others feed on other species of coccids. Three species of parasites were identified on the violet scale: *Anthemus aspidioti* Nikolskaya, *Aphytis mytilaspidis* Le Baron, and *Habrolepis tergrigorianae* Trjapitzin. All of them feed on various species and damage many species of coccids, reducing their numbers and playing a positive role. The parasite *Anthemus aspidioti* Nik affects the violet scale insect, the Turan scale insect (*Duaspidotus prunorum* Laing), the poplar scale insect (*Quadraspidiotus slavonicus* Green), and the Transcaspian scale insect (*Duaspidotus transcaspianus* Marl). The parasite is widespread in oases, especially in populated areas of Uzbekistan and other Central Asian republics. The first instar larvae overwinter in the host organism, less commonly the second instar larvae, and the imago's flight continues from April to October. It develops 3 generations per year.



**Figure 4.** Hylocorus - Imago and larva of the entomophage Hylocorus

Chilocorus - Chilocorus, Exterminates aphids, mites and pseudocots. If there is a colony of scabies on the tree, he prefers this particular colony of scabies. During the season, the hylorus gives two generations. Beetles overwinter in gardens, among fallen leaves, among bark and in other protected places. In addition, the larvae and imagos of the seven-point golden-eye (*Chrysopa septempunctata* Wegrn), common golden-eye (*Chrysopa carnea* Steph) and ladybirds are of great benefit by feeding on eggs and larvae of sucking pests.

#### 4 Conclusion

For timely control of the spread of apple aphids, spider mites and scabies, which are the main sucking pests of orchards, and to reduce the damage caused, it is necessary to control the level of infection, taking into account each damaged tree in the areas where these pests are distributed, and on this basis, timely and efficiently carry out organizational and economic measures from early spring to late autumn, as well as agrotechnical pest control measures, in particular, row spacing, high-quality autumn plowing, and winter irrigation, effective use of mineral and organic fertilizers, especially top dressing of damaged trees, destruction of weeds and plant remains under trees [5].

The violet scale is a serious pest of many fruit and ornamental trees. It is widespread in the countries of the Mediterranean Sea, the Middle East, and the Middle East: Pakistan, India, Brazil, Argentina, Australia, and America. It is widespread in Uzbekistan, Tashkent, Syrdarya, and Samarkand. It has been identified in Andijan, Jizzakh, Kashkadarya, Surkhandarya, and Fergana regions. The larvae and females attach to the leaves, branches, and shoots of cherries, mountain cherries, peaches, plums, apricots, cherries, and other fruit trees, absorbing the cell sap. This leads to the weakening of the tree, a decrease in yield, and a deterioration in fruit quality. At the points of absorption, especially on the fruits, reddish rings (spots) appear, which reduces the quality and taste of the fruits. A severely damaged tree withers.

Among the sucking pests of fruit trees, apple aphids, spider mites and scabies are of the greatest importance. They are found everywhere in Uzbekistan and cause significant damage to fruit production.

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