



PESTS OF MALOIDEAE ORCHARDS IN THE TASHKENT REGION

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Abstract: The article presents the results of the study on the species composition of pest insects during the growing season of Maloideae orchards in the Tashkent region, as well, the level of their damage is clarified.

Key words: Maloideae orchards, aphids, Heteroptera, mites, damage.

INTRODUCTION

Uzbekistan has a special place with the diversity and richness of fruit trees species. In recent years, large-scale work is being carried out in the country to increase the production of fruit products, the creation of new local and intensive orchards. In recent years, pest insects have begun to cause serious damage to fruit trees in Uzbekistan. Based on these tasks, one of the urgent tasks today is to comprehensively consider the species composition of pests in the fruit-growing areas of the republic, to reveal their geographical distribution and bioecological features, to determine the consequences of mass reproduction and biodegradation of major species, as well as to develop a special database on the organization of effective methods of combating them[4; 13;16].

In recent years, agricultural reforms, increasing the share of fruit and vegetable crops among exported agricultural products, and implementing consistent measures to introduce market mechanisms to this sector have become an urgent task of today. After all, the lack of

systematic implementation of effective mechanisms, especially in the development of horticulture, viticulture and vegetable growing in this direction, inadequate scientific approach leads to insufficient use of the available opportunities of the industry[11;8].

In particular, in recent years, Uzbekistan's horticulture has faced serious difficulties in the system of protecting fruit crops from harmful organisms. Many types of pests and diseases that were previously of no economic importance began to seriously damage orchards. However, in order to carry out an effective fight against pests of Maloideae orchards, the most important step is to determine which insects are causing damage in the orchards, their dynamic quantity, and their taxonomy. Also, information on the current state of orchards in the Republic, the composition of pests and their harmfulness, and the rate of their annual increase is needed [10;4].

Based on the above, in 2020, scientific research was conducted to study the species composition of the main pests of Maloideae orchards in the regions of

Tashkent region, as well as their biology and ecology.

MATERIALS AND METHODS

Field research methods. In order to study the species composition of insects damaging Maloideae orchards, field research work was carried out in the Tashkent region, in particular, in the apple and pear orchards in Kibrai district, in the apple and quince orchards in Ortachirchik district, in the apple orchards in Yangiyol district, in the apple and pear orchards in Okhangaron district, in the apple orchards in Tashkent district, in the apple, quince and pear orchards in Pskent district, in 2020.

During the field research, the species composition and economic value of Lepidoptera were studied according to the methods of N.Y. Kuznetsov, Z.I. Jurbitsky and V.N. Shchegolev [9; 7; 14]. Information on the type of pests and the level of their damage was obtained as a result of the observation of forest entomological taxa, in which the dynamics of damage to trees and the development of insects were determined. For thorough inspection, trees of different ages were observed in selected fields, and their exposure and other taxonomic characteristics were studied. Researches were carried out on route and stationary observed fields. Biomaterials of insect pests were collected in route field studies and brought to the laboratory for species identification.

In the stationary experiment, bioecological characterization, dynamic quantity, biology and ecology of pests in Maloideae orchards were studied. In this case, the development cycle of the pests was observed from April to autumn in the affected trees, in particular, the pupa stage, flight of the imago, egg-laying process, periods of embryonic development of the

eggs, adult stage and their wintering period were studied. Observations were carried out according to the methods of K.N. Fasulati [15].

Commonly accepted methods were used to study the development bioecology, distribution and level of damage and impact on fruit species of Lepidoptera pests [1, 2, 3]. In order to determine the distributional area of the pests, route inspections were carried out in orchards. Model trees were separated to estimate the number of pests. Their number was taken depending on the area of the orchard, 30 trees per 50 ha, and 10 trees in each variant if the area of the orchards is smaller. The spacing of the trees was determined diagonally at the same distance from each other. In the tree to be studied, the branches were checked, and the branches and fruits were examined. The soil is excavated to quantify the wintering population of the codling moth. Furthermore, the population of the codling moth that winters in the soil was also counted. Under the tree to be studied, 4 squares are marked 0.5-1 m away from the trunk on a 0.5x0.5 m square. In these areas, plant residues are carefully examined and a sample of the soil is taken at a depth of 10 cm. The soil is scooped out of the pit with a shovel and placed on plywood or oilcloth, and the pieces are crushed by hand and carefully looked at. The amount of the pupa of the codling moth and worms was determined in the apple orchard [12].

In the spring, before the budding of fruit trees, control was carried out in the orchards and the amount of overwintering pests was determined. In the fall, it was checked in the same way, but the number of model trees was two times less. After harvesting, pests were introduced into heated rooms (at a temperature of 18-20°C)

to determine their condition. The mortality rate was determined by counting the number of live and dead larvae from eggs to hatch or to release worms from diapause. To determine the death of eggs, 20-30 branches were cut, with pests and the lower end immersed in moist soil or water (at room temperature) and kept until the eggs emerged from the worms, and calculations were carried out [5;6].

In order to study the degree of damage to fruits, the damage of the harvested and fruit drop yield was determined. For the calculation, 10 trees of two zoned varieties of apple, pear and quince were separated, after two weeks (after flowering) damage to the fruits was determined. 50 fruits were observed by all four branches (200 fruits per tree). Worms were counted and the percentage of infestation was determined. Damage level was determined by finding fruit drop every 8-10 days after shedding of excess nodes (June) and until harvest.

Codling moths in them were counted during harvest. When the harvest was low (1000 fruits per tree), all fruits were examined, when the harvest was high, half or 1/4 of the harvest, but not less than 500 fruits from each tree, were analyzed by the average sample method [5;7].

Monitoring of the dynamics of the development of the second generation of the apple codling moth was carried out with the help of a catch belt. In this case, a belt with a handle was tied to the trunk of 20 apple trees (late variety) (20 cm wide paper was used). After every 7-8 days, samples were taken and worms and pupa were counted. Using the formula $N(n/k) \cdot t$, the number of worms that came to the population was calculated (N - the number of worms in the ring; k - the number of pupae in the ring, t - the number of worms in the

ring). The two are added, from these data the pupa stage of the first generation was calculated [5;12].

In mid-August, the handle-belt inspection was discontinued. After harvesting, the number of overwintering worms in them and in the bark of the trunk was determined. The use of pheromone traps to monitor the dynamics of apple, plum, oriental codling moth gave good results. We identified pests of fruit trees by monitoring the level of infestation of all species. For this, 100 fruits were taken from 10 model trees. The percentage of infected fruits was determined by dividing them into 25 branches from each side [5;6].

THE RESULTS OF THE RESEARCH

According to the results of scientific research carried out in Maloideae orchards from early spring to late autumn, a total of 12 species of pests belonging to 2 families, 4 order, 5 families, and 9 genera were identified: *Aphis pomi* Degeer, *Eriosoma lanigerum*, *Psylla vasilievi* Suts., *Tetranychus urticae*, *Tetranychus viennensis* Zacher, *Lepidosaphes ulmi*, *Diaspidiotus perniciosus*, *Parlatoria oleae*, *Stephanitis oshanini* Vas., *Stephanitis pyri* Fabricius., *Yponomeuta malinellus*, *Carpocapsa pomonella* L., *Grapholita molesta* (table; Fig. 1, 2 and 3).

Aphids- HOMOPTERA

Aphids belong to the *Aphidinea* subfamily of the Homoptera family. They are usually small insects (0.5-8 mm) that usually live on the growth points and leaves of plants. Their body is egg-shaped, oval or more elongated, bulging from the shoulder. The body is soft and delicate, some are covered with fine powder or white fluff. The color of its body varies from blue to brown, even black, and some are reddish or

light inky in color, usually similar to the environment in which it is fed. Eggs are shiny black, elongated oval shape. Aphids can develop completely (monoecious or dioecious) and incompletely. The following types of aphids were recorded in our research:

***Aphis pomi* De Degeer, 1773** – Green apple aphid appears on apple, pear, quince and other trees. It is a widespread species and can be found in almost all areas where apples grow. Leaves and branches affected by aphids stop growing and even dry up.

Damage from green apple aphid was observed in all districts of Tashkent region: Tashkent region, in particular, in the apple and pear orchards in Kibrai district, in the apple and quince orchards in Ortachirchik district, in the apple orchards in Yangiyol district, in the apple orchards in Okhangaron district, in the apple orchards in Tashkent district, in the apple and quince orchards in Pskent district.

Damage. In our observations, apple varieties Rosemary, Candil sinap, and Simirenko are more damaged. Female lice of the last generation lay eggs after mating. Each female louse lays 1-5 eggs on young branches; in the fall, after the leaves of the tree fall, the black eggs of aphids are clearly visible. The eggs hatch into larvae only in the next year's nest.

***Eriosoma lanigerum* (Hausmann, 1802)** is one of the most serious pests of apples, rarely damages pears and quinces. It was recorded in apple and quince orchards of Ortachirchik district of Tashkent region, apple orchards of Qibray district of Tashkent region, and apple orchards of Yangiyol district.

Damage. This aphid sucks the sap from apple trunk and branches, weakening the trees. Lumps appear in the places where

the louse sucks, which then crack and rot. Young trees affected by these aphids often wither, and old trees become weak, and the yield is greatly reduced. Branches with a lot of aphids dry up.

***Quadraspidiotus perniciosus* (Comstock 1869)** – the damage by *Quadraspidiotus perniciosus* was observed in: apple and pear orchards in Qibray district, in apple and quince orchards in Pskent district.

Damage. It is round, rather flat, light brown, gray in color. It is a serious pest of apple, pear, peach, cherry, sweet cherry, plum and other Maloideae trees, as well as a total of 270 types of plants. Larvae and adults cause great damage by sucking sap from the branches and bushes of trees, when they multiply, they crack the bark of the tree, the quality of the fruit deteriorates, i.e. red-purple spots fall on the fruit, and even dry up the whole tree.

***Parlatoria oleae* (Colvee, 1980)** – It was observed in pear orchards in Kibrai district of Tashkent region, in apple orchards in Ortachirchik district; in the apple orchards of Yangiyol district; in the apple orchards of Ukurochirchik district, in the apple and pear orchards of Okhangaron district; in apple orchards in Tashkent district; in apple and pear orchards in Pskent district.

Damage. They suck the sap of the trees, weaken them, often kill some branches and especially young ones, and sometimes completely dry the trees. They stain fruits and reduce their quality. For example, 20 or more spots were found in approximately 50 percent of some apple varieties affected by *Parlatoria oleae* at the Kibrai farm in Tashkent region. It was determined that 90% of the fruits have spots.

***Lepidosaphes ulmi* Linneas, 1758**

-. Infestation by *Lepidosaphes ulmi* was observed in apple orchards in Kibrai district, in apple orchards in Yangiyol district, and in apple orchards in Okhangaron district of the Tashkent region.

Damage: They sometimes damage figs, pistachios, citrus fruits, olives, grapes, and greatly reduce their market value. Trees and bushes affected by this insect do not grow well, branches die, sometimes trees and bushes (especially at a young age) may completely dry up.

SPIDER MITES-TETRANYCHIDAE

Spider mites are serious pests of agricultural crops, Cucurbitaceae crops and fruit trees. About 100 species of spider mites are known, such as the common spider mite, the Atlantic spider mite, the garden spider mite, the brown fruit mite, and the red fruit mite. Common spider mites are omnivorous pests common in the irrigated farming regions of Central Asia, two species were noted in our research:

***Tetranychus viennensis* Zacher, 1920** - Its infestation was observed in apple orchards in Kibrai district of Tashkent region.

Damage. The spider mite usually damages the apple tree, but it also affects other fruit trees with seeds and grains. Leaves that have been heavily absorbed by the spider mite turn brown, lose their absorption properties, and sometimes die and shed a lot.

***Tetranychus urticae* C. L. Koch, 1836** (synonym: *Tetranychus tellarius*) - Common spider mite. Common spider mite infestation was detected in apple and quince orchards in Ortachirchik district of the Tashkent region.

Damage. It causes severe damage to the apple tree, but also to other fruit trees

with seeds and grains. Infected leaves turn yellow at first, and then turn brown and fall off. The tree is severely damaged, the harvest becomes small, poor quality and few, productivity can decrease up to 35–70%.

TRUE BUGS- HETEROPTERA LATRELE, 1810

They belong to the class Insecta, order Hemiptera. Fruit trees can be damaged by 2-3 species of insects belonging to the Tingidae family: apple bug - *Stephanitis oshanini* Vas. and pear bug *Stephanitis pyri* Fabricius. Both are widespread insects in Central Asia, including Uzbekistan and neighboring countries, and are found mainly in apple, pear, and other plants of the Maloideae family. Reproduction is bisexual. Development is incomplete. Adults overwinter in fallen leaves. It produces 1-2 generations per year, and causes great damage to apple and pear trees.

***Stephanitis oshanini* Vas. Stal, 1873** - Apple bugs. Infestation by apple bug was recorded in apple and quince orchards of Ortachirchik district of Tashkent region.

Damage: The apple bug sometimes grows too much, contaminates and discolors the leaves of fruit trees, especially apple trees, and destroys their absorption properties. The yield of severely affected trees is reduced, some even do not bear fruit at all.

***Stephanitis pyri* (Fabricius 1775)** - Pear bug. The damage of fruit and seed orchards by pear bugs was observed in pear orchards in Okhangaron district of Tashkent region and pear orchards in Pskent district.

Damage: Pear bug damages apples, quinces, pears, plums, cherries, apricots. It causes the greatest damage

during drought years. Adult insects and larvae intensively suck the juice of plant leaves. Affected leaves become discolored, dry and fall off. Trees stop growing, fruit buds do not form, which drastically reduces the yield. Economically harmful pest is similar to leaf gnawing pest complex and occurs when 25% of plant leaves are affected.

***Yponomeuta malinellus* Zell. 1838.** - Apple moth. Apple moth damage to seed orchards was observed in apple orchards in Kibrai district of Tashkent region and in apple orchards in Pskent district.

Damage. Moths eat apple, hawthorn, many ornamental trees, sometimes the apricot buds, and later leaves. Severely infested trees will not bear fruit and produce less next year. Damaged trees do not grow well.

LEAFROLLERS - TORTRICIDAE

***Carpocapsa pomonella* (Linnaeus 1758).** Apple worm. (synonym: *Carpocapsa pomonella* L.) Apple worm damage was recorded in apple orchards in Kibrai district of Tashkent region, apple and quince orchards in Ortachirchik district, apple orchards in Yukorichirchik district, apple orchards in Akhangaron district, apple orchards in Tashkent district, and apple orchards in Pskent district.

Damage. In Central Asia, the apple worm is the main pest of fruit trees, especially apples, and partly pears and quinces. About 50 percent of the apple and pear harvest is damaged by the apple worm (Nevsky). Every year, a large part of the fruit nodes are lost due to the damage of the apple worm. Fruits affected by the apple worm often rot and cannot be saved.

***Grapholita molesta* (Busk.1916)**

- Oriental fruit moth. When we studied the degree of infestation of orchards from the oriental fruit moth, it was noted that there was damage in the apple orchards of “Kharamon” farm, Okhangaron district, Tashkent region.

Damage: Oriental fruit moth damages apple and quince fruits in the same way as appleworm (*Carpocapsa pomonella* L.). The oriental fruit moth causes great damage to peaches, plums, and apricots. Peach sprouts are damaged and gradually dry out.

Thus, in 2020, according to the results of the field research conducted in connection with the study of the species composition of harmful insects in fruit orchards in 7 districts of Tashkent region, it was found that there are 12 types of insect damage (Table).

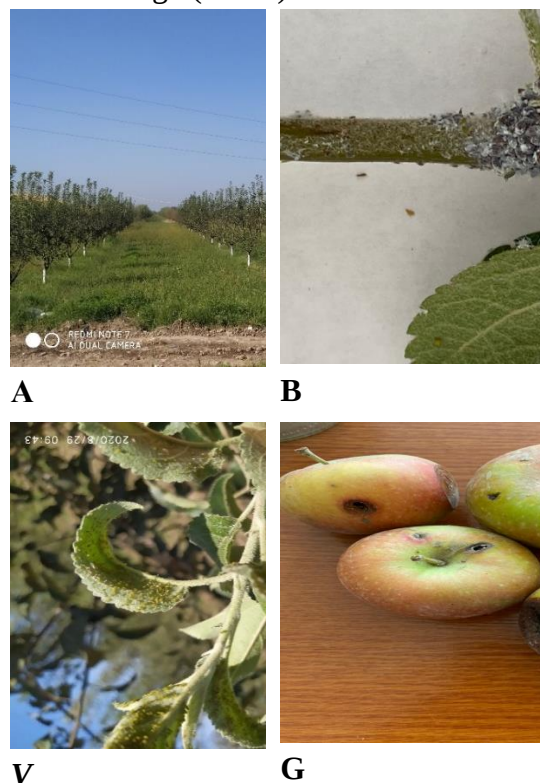


Figure 1. A–Apple orchard; damage of apple orchards, apple leaves, branches and fruits by B - the red San Jose Scale (*Quadraspidiotus*

perniciosus), V- the apple aphid (*Aphis pomi* Deg.) and G- the codling moth (*Carpocapsa pomonella* L.)

The following insects were identified as the most common dominant species: green apple aphid (*Aphis pomi* Deg. (Figure 1)) was found in almost all

apple, quince and pear fields in the 7 studied districts, it was noted that this insect had the highest result in the total damage index - 22%; damage from apple worm (*Carpocapsa pomonella* L.) was 16%; the next damage was made by *Parlatoria oleae* Colve-13%.

Table. Pest infestation of Maloideae orchards in different districts of Tashkent region

	species of pests	Kibray district	Urta Chirchik district	Yangiul district	Yuqorichirchik district	Akhangaran district	Tashkent district	Pskent district
Family Aphididae								
1.	<i>Aphis pomi</i> De Geer, 1773	+++++	++++	++	+	++	+	+++
2.	<i>Eriosoma lanigerum</i> (Hausmann, 1802)	+++	++	+	+			
Family Diaspididae								
3	<i>Quadraspidiotus perniciosus</i> (Comstock 1869)	++++				+		+++
4	<i>Parlatoria oleae</i> (Colvée, 1880)	+++	+	++	+	++		+++
5	<i>Lepidosaphes ulmi</i> Linnaeus, 1758	++	++	+		+		
Family Tetranychidae								
6	<i>Tetranychus viennensis</i> Zacher, 1920	+	++					
7	<i>Tetranychus urticae</i> C. L. Koch, 1836		+++	++		+		
Family Tingidae								
8	<i>Stephanitis oshanini</i> Vas. Stal, 1873			+	+			
9	<i>Stephanitis pyri</i> (Fabricius, 1775)	+	++++		+	+	+	+
Family Tortricidae								

10	<i>Cydia pomonella</i> (Linnaeus, 1758)	+++ ++	+++ +	++	+	+	+	+
11	<i>Grapholita molesta</i> , (Busk, 1916)					+		
12	<i>Yponomeuta malinellus</i> ZELLER, 1838	+						+

+ An indicator of the amount of fields, in which the pest has been encountered.

The average damage is caused by *Stephanitis pyri* Fabricius- 10%; *Quadraspidiotus perniciosus*- 9%; and *Tetranychus urticae* Koch - 7% and *Lepidosaphes ulmi* L.. Among all pests,

the lowest rate was found for the following insects: *Tetranychus viennensis* Zacher - 3%; *Stephanitis oshanini* Vas. and *Yponomeuta malinellus* - 2%; *Grapholita molesta* was noted to have 1% damage (Table; Fig. 2 and 3).

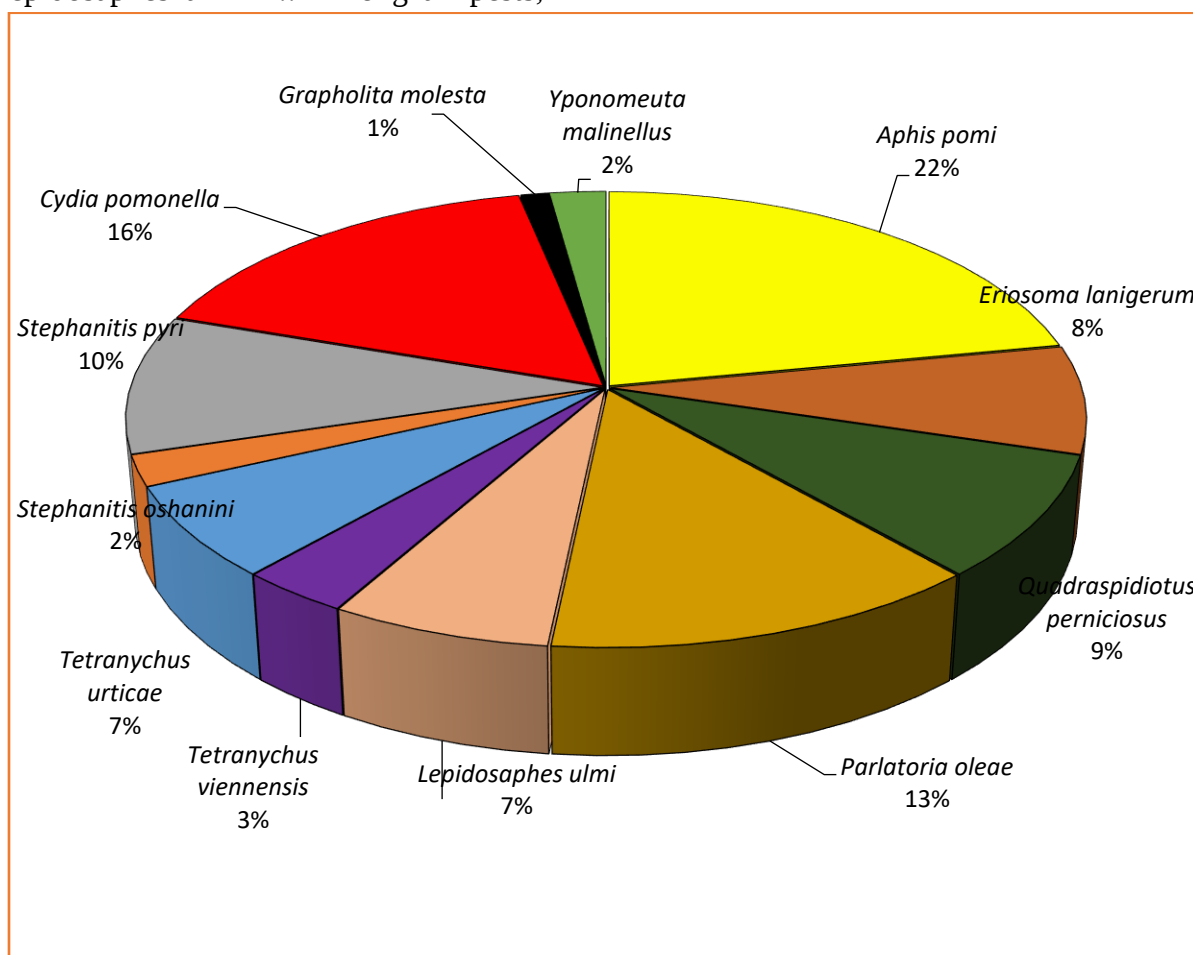
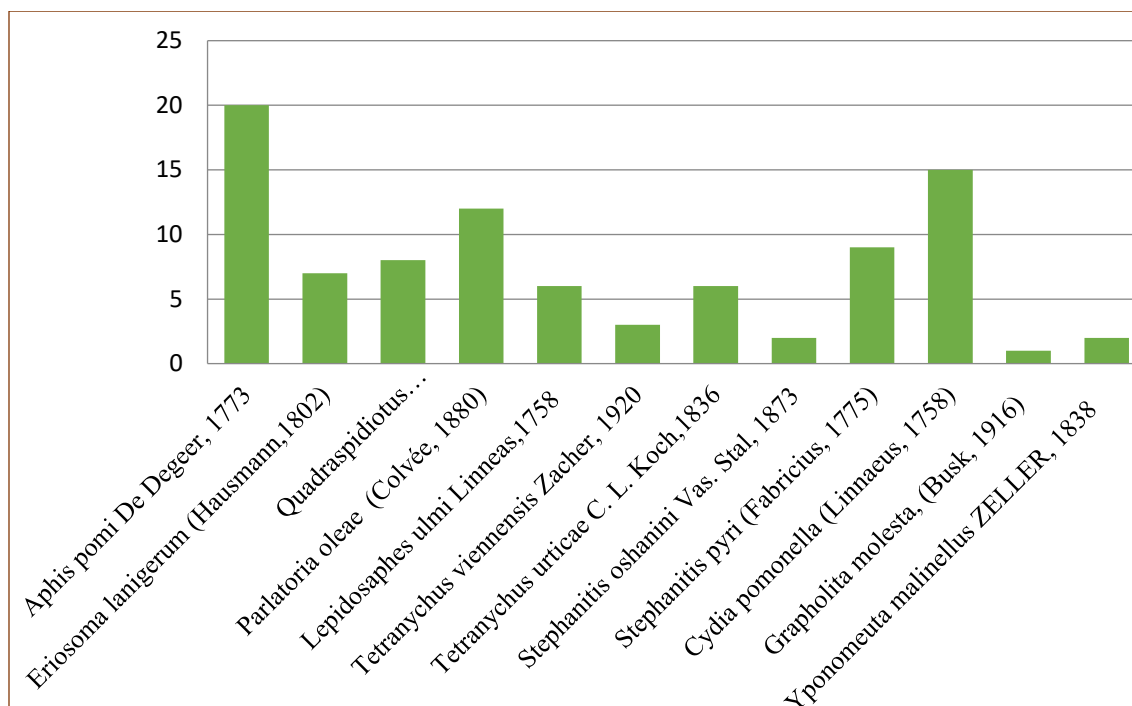


Figure 2. The degree of pest infestation of Maloideae orchards in the autumn (in %)



3- Picture. The dynamics of pest infestation in Maloideae orchards of the Tashkent region in the autumn

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