

# Role of beneficials in pear sucker control

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**Abstract:** *Biological characteristics of the pear psylla in Uzbekistan conditions are highlighted in the current paper. Yield losses due to this pest as well as its natural enemies that regulate pest numbers have been studied. The most frequent species among beneficials belonged to coccinellids (55% of total beneficials) and chrysopids (25%). It has become known that even all the natural enemies of pear psylla altogether could not regulate density of the pest. So, each of unprotected with insecticides trees has lost up to 65 kgs of fruit yields compared with treated ones.*

## 1. INTRODUCTION:

Pear sucker or pear psylla (*Psylla pyricola* Foerster) is widely spread insect in all regions of the Central Asia and as a specific pest of pear trees it has great economic important [2]. It is not possible to produce abundant and quality yields of pear fruits without applying active control measures against this pest. Moreover, applying only chemical or wrong use of insecticide for active control of the pest does not allow achieving a success. On this reason only using complex methods of the integrated pest management system can ensure a high efficacy in controlling pear psylla. This complex includes such cultural practices as creation of unfavorable conditions for a pest, which leads to decreasing its numbers, studying occurrence and role of natural enemies of the pest, combining their use with application of the chemical control method, selecting for this the most effective insecticides against pear psylla, and determination of the proper times and correct successions of treatments.

Pear sucker or pear psylla (*Psylla pyricola* Foerster) is a specific and economically important pest of pear trees widely spread throughout in Uzbekistan.

Currently it has become not possible to produce abundant and quality yields of pear fruits without applying active control measures against this pest. Moreover, applying only chemical or wrong use of insecticide for active control of the pest does not allow achieving a success. On this reason only using complex methods of the integrated pest management system can ensure a high efficacy in controlling pear psylla. This complex includes such cultural practices as creation of unfavorable conditions for a pest, which leads to decreasing its numbers, studying existence and role of natural enemies of the pest, combining them with chemical method, i.e. selecting the most effective insecticides against pear psylla, and applying all these activities in proper times and correct successions.

Pear psylla develops in 4 to 5 generations a year during its life cycle in our region [4, 6]. Its imagoes overwinter in cracks of the tree barks and a under fallen foliage. This pest is very resistant to cold, and it becomes active at exceeding a mean air temperature above 5°C in the early spring. Shortly after that it climbs up to the trees and starts to fly. It feeds on swollen buds of trees puncturing them and sucking their sap, and then it starts laying eggs. It especially prefers laying eggs on the terminal parts of shoots. It lays eggs on and in buds, and later – on leaves and young fruitlets. Hatched larvae have 5 instars, and then they become nymphs, then adults. At these periods miscellaneous parasitic and predatory insects feed on the pear psylla.

## 2. MATERIALS AND METHODS:

During 2013 to 2016 we have studied a species composition of parasites and predators on different growth stages of the pest. Observations and investigations have been carried out in young (5 to 7 years old, dwarf trees) and old (20 to 25 years old, tall trees) orchards in farms of the Tashkent and Middle Chirchik districts.

We have monitored changes in amounts of insects observed in the entomological coenosis of the pear trees during vegetation season in 2016. This monitoring has been conducted by monthly assessing their numbers on five 8-year old pear trees unprotected with insecticides. Each of assessments has been realized by careful visual inspection of 10 cm long terminal parts of 1-2-year old branches on all four sides of each tree for presence of pear psylla and its possible enemies.



Figure 1. Pear psylla. 1. Life stages: a – imago, b – egg, c – larva. 2. Shoot infested with a pest. 3. Damaged fruits.

We have determined that generally infestation of trees in young orchards has been lesser and that in old orchards was stronger. Pear psylla can be found and identified on infested trees starting from April. So, adults of psylla often can be met around buds or under them at the upper parts of shoots. Afterwards larvae hatched from eggs colonize young leaves and fruits, and start feeding. They suck sap in amounts more than they can digest, so, they exude its excessive part from mouths. This behavior is characteristic feature of insects that feed by puncturing / sucking sap, and this leads to pollution of plant leaves and stems. These exudates are colonized by saprophytic fungi resulting in blackening plant organs, and attract wasps and ants as well. If no active control measures are used then leaves early fall and amount and quality of yields decrease.

### 3. RESULTS AND DISCUSSIONS:

There are appropriate natural enemies of pear psylla in accordance with its specific life stages. We have determined that most of them are predatory ones. Those that appear on pear trees at the earliest times were ladybirds (*Coccinellidae*). Twin spot ladybird (*Adalia bipunctata* L.) has dominated amongst them followed by seven spot (*Coccinella septempunctata* L.) and five spot (*Coccinella quinquepunctata* L.) ladybirds. Generally coccinellids have dominated amongst all natural enemies of the psylla.

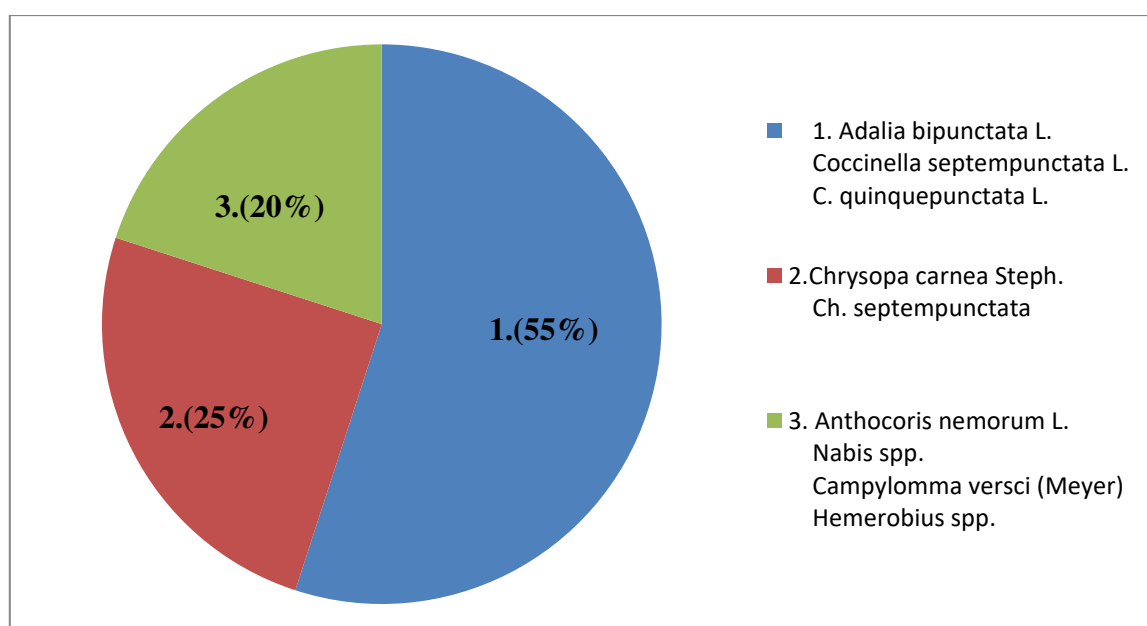


Figure 2. Three groups of the enemies of pear psylla and their occurrence.

Neuropterous green lacewings (*Chrysopidae*) have occupied the second position amongst enemies of the pest (25% of total beneficials). They have appeared later than ladybirds and their predatory stage were their larvae. Several bug species have appeared after lacewings and they have fed by sucking eggs, larvae and nymphs of the pear psylla (20% of total beneficials).

Generally, if insecticides killing beneficials would not be used in orchards then there is no any doubt that density of beneficials would be high. At the same time it had been apparent that if density of the pear psylla has grown fast these beneficials could not decrease numbers of the pest, and infested trees could not produce abundant and quality fruit yields. All the insects inhabiting on trees start to be prepared for overwintering by the end of the fall.

Some of them overwinter on the same trees or hereabouts (as pear psylla, bugs, coccinellids a. o.). We have noted that, except beneficials mentioned above, several species of wasps, ants, and birds have fed on pear psylla as well.

Generally speaking, complex of natural enemies of the pear psylla have certain importance in regular decreasing its numbers. But their effects are not sufficient for clearing trees fully of the pest and securing production of pear fruit yield sizes and its quality. Our calculations have shown that each of trees in our experimental orchard have produced fruits in average by 65 kg lesser comparing with trees that have been treated with insecticides 5 times during this season. Results of assessments are presented in Fig. 3, and the following **conclusions** have been drawn on their base.

#### 4. CONCLUSION:

- Pear psylla has started its development in early March in conditions of 2016. Its numbers have reached a maximum by July to August, and then began to decrease. Adult psylla individuals started to prepare themselves for overwintering in October to November. There were no clear limits between separate (5 to 6) generations, so individuals of various generations could be seen at the time.
- Coccinellids have been the most frequent amongst beneficials and dominant species of them was twin spot Adalia and seven spot ladybirds (55% of total enemies of the psylla). These have appeared in April and their numbers have decreased sharply after October.
- Eggs and larvae of the green lacewing have appeared amongst psylla suckers in May and their numbers have decreased after September.
- Several species of predatory bugs have fed on pear psylla and they decreased pest numbers at least with some little efficacy.

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