

Status of natural enemies of aphid and coccids insect pests in stone fruit trees in Tirana region, Albania

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Abstract:

*Cultivation of fruit trees has been increased in the recent years according to INSTAT, or a good fruit production and quality, there is a need for more knowledge on natural enemies of insect pests to establish effective biological methods for fruit tree protection through an appropriate strategy with the environmental friendly approach. During this study, except the inventory of scale insects that affect and damage stone fruit trees, there were extracted and created an inventory of natural enemies in terms of predators and parasitoids for aphids and scale insects of stone fruit trees. Study has been conducted in stone fruit tree orchards of Tirana region and adjacent areas starting from 2015 to 2016, furthermore continuing in 2017 in order to determine harmful scale insect species and their natural enemies. Collection of insects as natural enemies was carried out in certain periods throughout the year, mainly at the vegetation period but also during dormancy period. Through this inventory, there were defined kinds of insects that protect stone fruit trees from scale and insect pests. This study was conducted in seven representative areas of Tirana region, respectively: Laknas, Berzhita, Maminas, Ndroq, Preza, Tapiza and Vora. Species observed and determined in the Tirana region as natural enemies (predators) of aphids and scale insects in stone fruit trees, include: *Coccinella septempunctata*, *Chilocorus bipustulatus*, *Exochomus quadripustulatus*, *Syrphus* spp., *Chrysopa* spp, *Adalia**

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bipunctata, *Scymnus subvilosus*, etc. Moreover, insect species observed and determined as natural enemies (parasitoids) of aphids and scale insects in stone fruit trees, include: *Scutellista cyanea*, *Encyrtus* spp., *Coccophagus* spp., *Aphycus* spp., *Aphytis* spp., hymenoptera species of chalcidoidea and braconidae family, etc.

Key words: natural enemies, inventory, stone fruit trees, entomophag species, predators, parasitoids.

1. INTRODUCTION

Cultivation of fruit trees is very important not only for their own nutritional values, but also for their economic importance. Stone fruit trees are affected by many pests and diseases. The damage caused by insects affects not only the quantity but also the quality of fruit trees. 'Integrated Control' or 'Integrated Pest Management' uses all appropriate techniques, including pesticides, to reduce the density of pests below the limits of economic damage. The term 'biological control' was introduced by Smith (1919) to describe the use of natural enemies for insect pests control.

Biological control is defined as control through natural enemies of the density of another population of organisms to a lower average than would otherwise have occurred (DeBach, 1974).

Pest control below the level at which they can cause economic damage (the economic threshold) from the premeditated introduction of exotic natural enemies refers to classical biological control. The reduction of the pest population below the limits of economic damage is achieved through the harmonization of numerous techniques, such as host-plant resistance and cultivation, and the use of pesticides and natural enemies in a flexible system (Smith & Reynolds, 1972).

The inventory of native insect species has an effect in the population dynamics of insect pests that cause damage in

stone fruit trees would be a contribution to apply the biological method for pest protection. Consequently, there will be limited or stopped the chemical interventions of integrated pest management for insect pest control of stone fruit trees. Fruit tree growers are looking for an environmental friendly method for the pest management, for which the main factor is the inventory of the insect pest species as well as of their natural enemies (predator and parasitoids). In this way, protection of stone fruit trees can be done by biological protection method as a more effective and environment friendly method.

Thus, the results of some attempts to use the ladybugs for the reduction of the abundance of aphids and pathogenic coccids in the field indicate clearly that the coccidophagous ladybugs are more effective than the aphidophagous ladybugs (Dixon & Kindlmann, 1998).

Many biological control applicants consider scientific research as a skill/ability to be one of the most important attributes of an effective natural enemy (Nechols & Obrycki, 1989).

The cultivation and production of stone fruit trees in Tirana is becoming important because of suitable ecological conditions and geographical location of the region. Looking at the general trend for the cultivation of fruit trees, there was a high interest to perform this study. The aim was the presentation of an inventory of natural enemies (predators and parasitoids) of the insect pests (aphids and scale insects) in Tirana region. Consequently, this study has to be evaluated and used as a prerequisite for building programs and biological methods in the control of insect pests.

2. MATERIAL AND METHODS

This study has been conducted in Tirana region and adjacent areas, from 2015 to 2017 on stone fruit tree orchards, in order to determine harmful insect species and their natural enemies

(predators and parasitoids). Plant samples were transferred to plastic bags and brought to the laboratory. Some of the collected insects were preserved in 70% ethanol for subsequent identification. Inside the bag was placed a label with code number and key data. Insect natural enemies newly collected or dead are placed in a test tube with internal diameter of at least 7 mm, length 40 mm and round base with preservatives alcohol content 90-96 %. Collecting and preserving techniques used were based mainly on the method of HilleRisLambers (1950) [8].

3. RESULTS AND DISCUSSION

In the study carried out during the years 2015, 2016 and 2017, in Tirana region, there were found these insects as natural enemies (predators and parasitoids): *Coccinella septempunctata*, *Chilocorus bipustulatus*, *Exochomus quadripustulatus*, *Syrphus* spp., *Chrysopa* spp, *Adalia bipunctata*, *Scymnus subvilosus*, *Scutellista cyanea*, *Encyrtus* spp., *Coccophagus* spp., *Aphycus* spp., *Aphytis* spp. ect.

List no. 1. Relationships of scale insect pests - natural enemies (parasites / predators) at the level of Stone Fruit Trees.

1- Brown scale - *Parthenolecanium corni*

Parasit: *Scutellista cyanea*.

Parasitoid : *Encyrtus* spp., *Coccophagus* sp., *Aphycus* spp.

Predators: *Coccinella septempunctata*, *Chilocorus bipustulatus*, *Exochomus quadripustulatus*.

2- Peach scale - *Parthenolecanium persicae*

Parasit: *Scutellista cyanea*.

Parasitoid: *Encyrtus* spp., *Coccophagus* sp., *Aphycus* spp.

Predators: *Coccinella septempunctata*, *Chilocorus bipustulatus*.

3- Olive scale - *Parlatoria oleae*

Parasit: *Aphytis* sp..

Parasitoid: *Coccophagoides* sp.

Predators: *Chilocorus bipustulatus* and *Exochomus quadripustulatus*.

4- White peach shale - *Pseudaulacaspis pentagona*

Parasit: *Encarsia* (= *Prospaltella*) *berlesei*, *Aphytis* spp.

Parasitoid: *Aphytis diaspidis*

Predators: *Chilocorus bipustulatus*, *Exochomus quadripustulatus*, *Lindorus lophanthae*.

5- Grey pear scale - *Epidiaspis leperii*

Parasit: *Aphytis* spp.

Predators: *Chilocorus bipustulatus*

6- Ostraeformis scale - *Quadraspidiotus ostraeformis*

Parasit: *Aphytis* spp.

Parasitoids: *Coccophagus* sp.

Predators: *Chilocorus bipustulatus*.

List No. 2. Relationships of aphid insect pests - natural enemies (parasites / predators) at the level of Stone Fruit Trees.

1- Mealy plum aphid - *Hyalopterus pruni*

Parasitoids: *Praon volucre*, *Aphidius* sp.

Predators: *Adalia bipunctata*, *Harmonia conglobata*, *Scymnus subvillosus*.

2- Black cherry aphid - *Myzus cerasi*

Predators: *Coccinella septempunctata*, *Syrphus* sp., *Chrysopa* sp.

3- Green peach aphid - *Myzus persicae*

Parasitoids: Hymenopteran species of chalcidoidea and brachonidae families.

Predators: *Adalia bipunctata*, *Harmonia conglobata*, *Scymnus subvilosus*, *Episyrphus balteatus*, *Syrphus ribesii*; *Chrysoperla carnea*, *Allothrombium fuliginosum*.

4- Peach leaf-roll aphid - *Myzus varians*

Predators: *Adalia bipunctata*, *Coccinella septempunctata*, *Syrphus ribesii*, *Episyrphus balteatus*, *Syrphus vitripennis*, *Chrysopa vulgaris*.

As it is noted in the List no. 2. Relationships of aphid insect pests - natural enemies (parasites / predators) at the level of Stone Fruit Trees, for two aphid species respectively: *Myzus cerasi* and *Myzus varians*, during the study there were found only predators of these two insect pests in Tirana region.

5. CONCLUSIONS

During the study, they were observed:

In the scale insect pests a numer of 3 parasits (1 parasit of Pteromalidae family, Hymenoptera order and 2 parasits of Aphelinidae family, Hymenoptera order); 6 parasitoids (2 parasitoids of Encyrtidae family, Hymenoptera order and 4 parasitoids of Aphelinidae family, Hymenoptera order) and 5 predators (5 predators of Coccinellidae family, Coleoptera order.

In the aphid insect pests a numer of 1 parasitoid of Braconidae family, Hymenoptera order and 12 predators (4 predators of Coccinellidae family, Coleoptera order; 4 predators of Syrphidae family, Diptera order; 3 predators of Chrysopidae family, Neuroptera order and 1 predator of Trombidiidae family, Acarida order).

The study notes a considerable variety of natural enemies of the aforementioned pests insects. In general, the density of the populations of these pest species, scales and

aphids, in natural conditions is above the economic threshold of the damage, without being easily controlled by their natural enemies.

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