

The status of scale insects in stone fruit trees in Albania

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Abstract:

*Since the cultivation of fruit trees has been increased in the recent years, as is presented by INSTAT, in order to have a good fruit production and fruit quality, there is a need for in-depth studies on insect pests to establish effective methods for fruit tree protection through an appropriate strategy. During this study, an inventory of scale insects that affect and damage stone fruit trees, for example: *Parthenolecanium corni* (Bouché) was found in peaches, apricots, plums and almonds; *Parthenolecanium persicae* (Fabricius) was found in peaches, apricots, plums; *Quadraspidiotus ostraeformis* (Curtis) was found in plum, etc. The study has been conducted in stone fruit tree orchards of the Tirana region and adjacent areas from 2015, 2016, and continuing in 2017 in order to determine harmful scale insect species and their natural enemies. Collection of insect pests was carried out in certain periods throughout the year, mainly during the vegetation period but also in the dormancy period. Plant samples were transferred to plastic bags and brought to the laboratory. Some of the collected scale insects were preserved in 70 % ethanol for subsequent identification. Inside there were placed the label with code number and key data. Insect pests newly collected or newly 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*

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HilleRisLambers (1950). Through this inventory, there were defined kinds of scale insects that affect stone fruit trees. This study was conducted in seven representative areas of the Tirana region, respectively: Laknas, Berzhita, Maminas, Ndroq, Preza, Tapiza and Vora. Among scale insect species that were most prevalent in the Tirana region, which were found in all areas of study in stone fruit trees include: Pseudaulecaspis pentagona (Targioni-Tozzetti), Quadraspidiotus perniciosus (Comstock), Epidiaspis leperii (Signoret), Parthenolecanium persicae (Fabricius), Quadraspidiotus ostraeformis (Curtis), and Pseudaulecaspis pentagona (Targioni). There has been identified the entomophag species of scale insects in stone fruit trees in Tirana region. Further inventory of insect pests of stone fruit trees, in the future will help to implement in the most appropriate time of the measures to suppress them.

Key words: scale insects, inventory, stone fruit trees, entomophag species. *Parthenolecanium corni* (Bouché) *Parthenolecanium persicae* (Fabricius) *Quadraspidiotus ostraeformis* (Curtis), *Pseudaulecaspis pentagona* (Targioni-Tozzetti), *Quadraspidiotus perniciosus* (Comstock), *Epidiaspis leperii* (Signoret), *Parthenolecanium persicae* (Fabricius), *Quadraspidiotus ostraeformis* (Curtis), and *Pseudaulecaspis pentagona* (Targioni).

1. INTRODUCTION

Taking into consideration the large spread of fruit trees for their own nutritional values, economic importance as well as the sensitivity of these crops from pests, the inventory of species that host stone fruit trees would be a contribution to apply the oriented interventions, especially the chemical interventions. 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. Fruit tree growers are looking for an integrated pest management, for which the main factor is the inventory of the scale insect pest species as well as of their natural enemies. In this way, the protection of

stone fruit trees can be done by biological protection method as a more effective and environment friendly method. Types pests of insect class have been often object of studies and publications by different authors in Albania such as [1; 2; 4; 5; 6; 7; 9; 11]. The scale insects (that are insects belonging to the Coccoidea superfamily, and especially scale insects of family Coccidae and Diaspididae) from the world literature as well as from the studies conducted in Albania are one of the most important groups of stone fruit tree pests.

Many of scale insect species in our country are considered to be the main pests not only of fruit trees but also of other crops such as citrus, olives and vineyards. Scale insects can cause plant damages not only in the open field but also in the greenhouses. They are also transmitters of various plant diseases. From the first studies, in 1971 and 1977, a study was carried out on the olive culture of olive scale (*Saissetia oleae*) [1, 6]. A study is conducted on the biology, abundance and ways of protection of San Jose scale (Californian scale) in apple fruit tree in 1977 [2]. A study on the inventory of the scales has been finished in 1993 under the title "Contribution to the Study of the Suborder Coccinea of the Homoptera Order of the Hexapoda Class in Southern Albania with the bioecological data for the pest species" [4]. Another study on the spread of Coccoidea endemic species in Albania in doctorate level is conducted and completed in 1997 [5].

The lack of studies in the recent years, species diversity, multiple long-term overcrowding, ways of spreading, make obvious the conduction of studies, to provide more complete and frequent information about them.

The cultivation of stone fruit trees and especially fruit production day after day is increasingly important because of suitable ecological conditions and geographical location of the Tirana region. Looking at the general trend for the cultivation of fruit trees, was undertaken this study. The aim of this study is the presentation of an inventory of scale insects of the Tirana

region, which are causing damage to the stone fruit trees together with the natural enemies, as a prerequisite for building programs and integrated management strategies.

2. MATERIAL AND METHODS

The study is being conducted in stone fruit tree orchards of the Tirana region and adjacent areas from 2015, 2016, and continuing in 2017 in order to determine harmful scale insect species and their natural enemies. Plant samples were transferred to plastic bags and brought to the laboratory. Some of the collected scale insects were preserved in 70% ethanol for subsequent identification. Inside there was placed the label with code number and key data. Insect pests newly collected or newly 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 the Tirana region, there were found these types of scale insect pests: *Parthenolecanium corni* (Bouché), *Parthenolecanium persicae* (Fabricius), *Parlatoria oleae* (Colvee), *Pseudaulacaspis pentagona* (Targioni-Tozzetti), *Epidiaspis leperii* (Signoret), *Saissetia oleae* (Bernard), *Quadraspidiotus ostraiformis* (Curtis), *Quadraspidiotus perniciosus* (Comstock), *Sphaerolecanium prunastri* (Boyer de Fonscolombe).

List no. 1. Host plants of scale insect pests in the area of Tirana

Parthenolecanium corni (Bouché) is found in peach, apricot, plum and almond.

Parthenolecanium persicae (Fabricius) is found in peach, apricot and plum.

Parlatoria oleae (Colvee) is found in peach, apricot, plum and cherry.

Pseudaulacaspis pentagona (Targioni-Tozzetti) is found in peach, apricot, plum and cherry.

Epidiaspis leperii (Signoret) is found in peach, plum, cherry and almond.

Saissetia oleae (Bernard) is found in plum.

Quadraspidotus ostraeformis (Curtis) is found in plum.

Quadraspidotus perniciosus (Comstock) is found in peach, apricot, plum, cherry and almond.

Sphaerolecanium prunastri (Boyer de Fonscolombe) is found in plum.

From the above mentioned species only *Quadraspidotus perniciosus* (Comstock) is found in all the stone fruit trees in the study.

List No. 2. The prevalence of scale insect pests according to the study areas in the Tirana region

Parthenolecanium corni (Bouché) is found in peach (Laknas, Prezë, Vorë); apricot (Laknas, Maminas, Ndroq), plum (Laknas) and almond (Ndroq, Bërzhitë).

Parthenolecanium persicae (Fabricius) is found in peach (Laknas, Prezë, Vorë), apricot (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë) and plum (Laknas).

Parlatoria oleae (Colvee) is found in peach (Laknas, Bërzhitë), apricot (Laknas), plum (Laknas) and cherry (Laknas).

Pseudaulacaspis pentagona (Targioni-Tozzetti) is found in peach (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë), apricot (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë), plum (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë) and cherry (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë).

Epidiaspis leperii (Signoret) is found in peach (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë), plum (Laknas, Prezë, Maminas), cherry (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë) and almond (Ndroq, Bërzhitë).

Saissetia oleae (Bernard) is found in plum (Laknas).

Quadraspidotus ostraeformis (Curtis) is found in plum (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë).

Quadraspidiotus perniciosus (Comstock) is found in peach (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë), apricot (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë), plum (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë), cherry (Laknas, Bërzhitë, Maminas, Ndroq, Prezë, Tapizë, Vorë) and almond (Ndroq, Bërzhitë).

Sphaerolecanium prunastri (Boyer de Fonscolombe) is found in plum (Laknas, Ndroq).

From the above mentioned scale species, the most prevalent species in all the studying areas of Tirana region were: *Pseudaulecaspis pentagona*, *Quadraspidiotus perniciosus* and *Epidiaspis leperii* in peach; *Parthenolecanium persicae*, *Pseudaulecaspis pentagona* and *Quadraspidiotus perniciosus* in apricot; *Pseudaulecaspis pentagona*, *Quadraspidiotus perniciosus* and *Quadrispidiotus ostraeformis* in plum; *Epidiaspis leperii*, *Quadraspidiotus perniciosus* and *Pseudaulecaspis pentagona* in cherry.

5. CONCLUSIONS

The types of scale insects found in stone fruit crops during the current research, shows that in our orchards there are almost the same species that are found throughout the Balkan region and the European region *Parthenolecanium corni* (Bouché), *Parthenolecanium persicae* (Fabricius), *Parlatoria oleae* (Colvee), *Pseudaulecaspis pentagona* (Targioni-Tozzetti), *Epidiaspis leperii* (Signoret), *Saissetia oleae* (Bernard), *Quadraspidiotus ostraeformis* (Curtis), *Quadrispidiotus perniciosus* (Comstock), *Sphaerolecanium prunastri* (Boyer de Fonscolombe). This diversity expresses the great importance of in-depth studies not only in continuing for the useful entomofauna (natural enemies) but also for the integrated management programs. We regard this study as only a preliminary step in the description of the scale insects-natural enemy complex of Tirana region.

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