

## OCCURRENCE OF PREDATORY MITES OF THE PHYTOSEIIDAE FAMILY ON TWO APPLE ORCHARDS IN ALBANIA

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### ABSTRACT

The aim of the study was to determine the abundance of predatory mites during 2014 – 2015 vegetation seasons in two apple orchards in Albania, with distinct meteorological conditions and pesticide application programs. Leaves were collected once a month from apple cultivars on each orchard from May to October 2014 - 2015. According to the results obtained on apple orchard in Durrës were found two predatory mites: *Amblyseius andersoni* (Chant) and *Typhlodromus pyri* (Scheuten) whereas on apple orchard in Pogradec was found only one predatory mite: *Amblyseius andersoni* (Chant). *Amblyseius andersoni* was the dominant species in apple orchard in Durrës whereas *Typhlodromus pyri* was less frequent. In 2015 vegetation season the abundance of predatory mites was higher (80%) than in 2014 (71%) in the orchard in Durrës , whereas in apple orchard in Pogradec the abundance of predatory mite, *Amblyseius andersoni* was higher in 2014 (29% ) than in 2015 vegetation season (20%). In total for both years the abundance of predatory mites was higher in apple orchard in Durrës (76%) whereas in the orchard in Pogradec was (24%).

**Keywords:** *Amblyseius andersoni*, *Typhlodromus pyri*, apple orchards, Albania.

### INTRODUCTION

Predatory mites of the Phytoseiidae family have been successfully used in the biological control of numerous agriculture pests worldwide [10,11]. This is the reason why this family containing more than 2100 species discovered and described so far is studied intensively all over the world [12]. Among them *Amblyseius andersoni* and *Typhlodromus pyri* are common species in apple orchards in different region of Europe. *Amblyseius andersoni* was found to be a dominant species in apple orchards in Northern Italy [3,4] and its aggressiveness in interspecific predation can explain the dominance within predatory mite communities [1]. Both mites are considered as generalist predator because of their ability to feed on various food sources other than mite preys ( pollen, fungi, honeydew and insects) [5], and these predatory mites tend to persist in the absence of the prey more readily than specialist predators [9]. The distribution and performance of phytoseiids occurring on apple orchards can be affected by several interacting factors as climate, habitat requirement and pesticide use [2]. The ability of phytoseiids to tolerate a certain amount of pesticide use may be a key factor in whether or not they can be used successfully to control phytophagous mites [2,6]. In Albania very few studies have been conducted on phytoseiid mites, mainly focused in vineyard. The aim of this study was to evaluate the abundance of predatory mites from the Phytoseiidae family on two apple orchards in Albania.

## METHODOLOGY

During the 2014 – 2015 vegetation seasons, we took samples of apple leaves from two apple orchards in the region of Durrës and Pogradec situated in different parts of Albania with distinct meteorological conditions and pesticide application programs. The sample collection is done monthly from May to October. Leaves were taken from five selected trees (ten leaves / tree) for each apple cultivar. The leaves were taken inside of the rows and in the middle of shoots. Mites were counted under the stereomicroscope and only mobile stages of mites (larva, nymph and adults) were considered for counting. Adult stage were mounted in Hoyer's medium on microscope slide and identified using a phase contrast microscope. The slides were dried in thermostat for a week in 55°C. The identification of phytoseiids mite was based in the determining keys of : Chant 1959 [3]; Athias Henriot [1]; Denmark 1966 [5]; Chant and Yoshida-Shaul 1987 [4]. Meteorological data were obtained from the 'Institute of Geoscience, Energy, Water and Environment' Tirana, Albania.

**Apple orchard in Durrës (Shëna-Vlash):** Located in the center of Albania ((41°18'40'' N; 19°26'21''E). The average temperature in 2014 during study period was 22.4°C, relative humidity 69% and rainfall 373.32 mm whereas in 2015 the average temperature was 22.5°C, relative humidity 60% and rainfall 300 mm. Leaf samples were taken from six apple cultivars: Starking delicious, Golden delicious, Pink lady, Royal gala Gala, Fuji and the age of trees was 15 years old. The farmer in 2014 during the vegetation season for the disease and pest management has used the following pesticides: Thiacloes (active substance: thiacloprid; dose applied 0.02%); Ramplan (active substance: acetamiprid 20%; dose applied 0.01%); Fastak EC (active substance: alphacypermethrin 4.75%; dose applied 30 ml in 100 liter water); Rogor L40 (active substance: dimethoate 38%; dose applied 75 ml in 100 liter water) and Nurelle D ( active substance: cypermethrin 20g/lt + chlorpyrifos 200g/lt; dose applied 125ml in 100 liter water). In the 2015 vegetation season the farmer has used the same pesticides with the difference that Pyrinex (chlorpyrifos) is used instead of Thiacloes (thiacloprid).

**Apple orchard in Pogradec (Starovë):** Located in the southeast of Albania (40° 54' 09''N; 20° 39' 09'' E). The average temperature in 2014 during study period was 17.2°C , relative humidity 70 % and rainfall 167.7 mm whereas in 2015 the average temperature was 18.4°C, relative humidity 60.4% and rainfall 923mm. Leaf samples were taken from four apple cultivars: Starking delicious, Baujade, Granny smith, Idared and the age of trees was 14 and 15 years old. In this apple orchard in 2014 the farmer has used two pesticides: Bordolez juice 0.8-1% active substance and Rogor L 40 (active substance: dimethoate 38%; dose applied 75ml in 100 liter water) whereas in 2015 vegetation season the farmer for the disease and pest management has used only Bordolez juice 0.8 1% active substance.

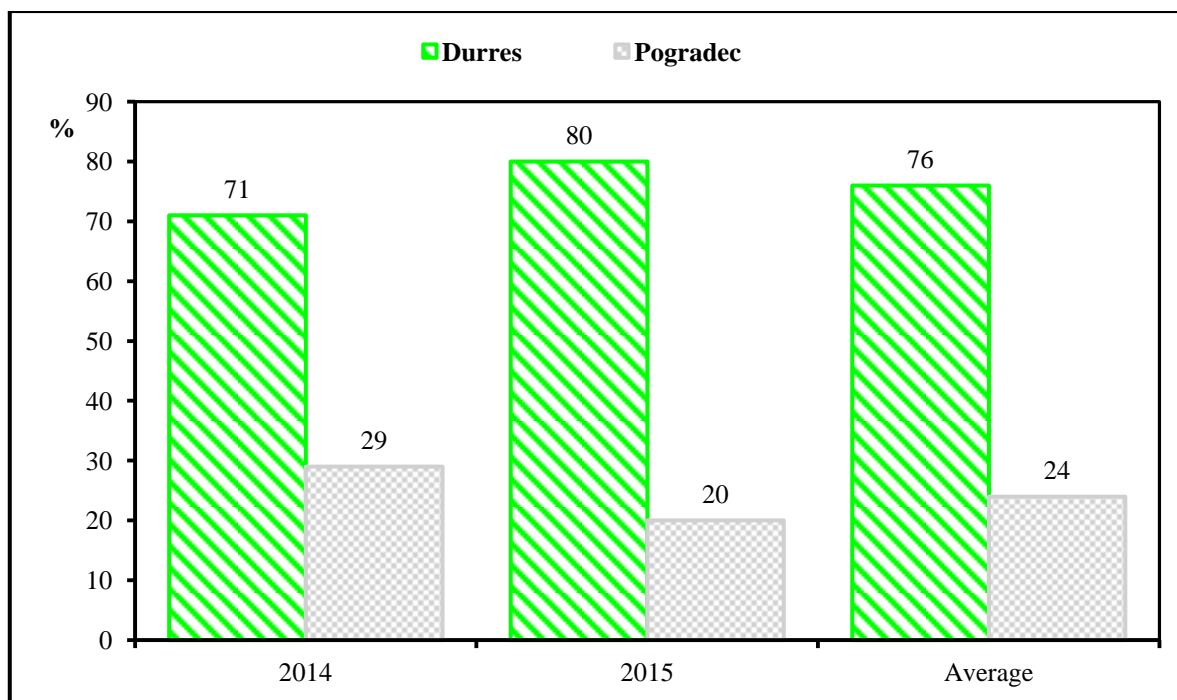
## RESULTS AND DISCUSSION

The numbers of predatory mites collected on apple leaves in two orchards during 2014 – 2015 vegetation seasons are presented in Table 1.

**Table 1. Abundance of predatory mites of the Phytoseiidae family in two apple orchards**

Phytoseiid mites (Species)	Year				Total	
	2014		2015		Durrës	Pogradec
	Durrës	Pogradec	Durrës	Pogradec		
<i>Amblyseius andersoni</i>	1630	697	1774	473	3404	1170
<i>Typhlodromus pyri</i>	61	-	166	-	227	-
<b>Total</b>	1691	697	1940	473	3631	1170

During the two seasons we identified two species of predatory mites belonging to Phytoseiidae family : *Amblyseius andersoni* (Chant) and *Typhlodromus pyri* (Scheuten) and in total we counted 4801 individuals of predatory mites. In orchard in Pogradec, *Amblyseius andersoni* was the only phytoseiid species found on apple leaves and its abundance was higher in 2014 (697 individuals). In orchard in Durrës we found and collected two species of phytoseiid mites, *Amblyseius andersoni* and *Typhlodromus pyri*. *Amblyseius andersoni* was the dominant species in both years and its abundance was higher in 2015 (1774 individuals). The number of predatory mites was considerably different between two orchards. Percent abundance of annual totals is presented in Graph 1. During the 2014 season, we found 1691 individuals (71%) of predatory mites in apple orchard in Durrës and 697 individuals (29%) in apple orchard in Pogradec. During the 2015 season, we found 1940 individuals (80%) of predatory mites in apple orchard in Durres and 473 individuals (20%) in the orchard in Pogradec. In total for both years the abundance of predatory mite was higher in apple orchard in Durrës (76% )whereas in the orchard in Pogradec was only 24%. Both predatory mites identified in this study can be found in many apple orchards in different part of Europe and these species are mentioned by many authors. In some studies the dominance of *Amblyseius andersoni* is similar to our result, e.g experiments carried out in Austrian apple orchards showed that *A. andersoni* was more aggressive than *T.pyri*, showing a tendency to displace competitors when coexisting [7,8] and this predatory mite can also survive longer without food than other predatory mites [8]. Apple orchard in Durrës is located in an area with a warmer climate, compare with the orchard in the region of Pogradec, whereas relative humidity was almost the same for both regions. Climate conditions in apple orchard in Durrës had favors the development of predatory mites more than in the orchard in Pogradec, thus the number of predatory mites found in the orchard in Durrës was considerably higher for both years even though the number of pesticide application was higher in this orchard. This means that the use of pesticide by the farmer have had a low impact in the abundance of predatory mites. Predatory mite identified in this study are generalist predators that feed on a variety of food sources, including mite, fungi, insects and dead organic matter, may further explain their higher abundance in this sprayed orchard.



**Graph 1. Abundance (% of total) of predatory mites of the *Phytoseiidae* family in two apple orchards in Albania**

## CONCLUSIONS

Based in the study that was conducted during 2014 – 2015 vegetation seasons in two apple orchards in Albania we identified two species of predatory mites belonging to the Phytoseiidae family: *Amblyseius andersoni* (Chant) and *Typhlodromus pyri* (Scheuten). *Amblyseius andersoni* was found in both apple orchards whereas *Typhlodromus pyri* was found only in apple orchard in Durrës. Comparing the orchards, the number of predatory mites found in the orchard in Durrës was considerably higher than in the other orchard for both years. *Amblyseius andersoni* was the dominant species whereas *Typhlodromus pyri* was less frequent in apple orchard in Durrës . In 2014 the abundance of *Amblyseius andersoni* was higher than in 2015 in the orchard in Pogradec whereas in apple orchard in Durrës the abundance of both predatory mites was higher in 2015. From data collected we came to the conclusion that climate conditions may play an important role in the abundance of predatory mites.

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