

The performance of predatory mites in two grape cultivars Merlot and Trebbiano Toscano in Albania

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Abstract— The aim of this study was the performance of predatory mites populations of the Phytoseiidae family during 2014-2015, in two grape cultivars (*Trebbiano Toscano* and Merlot). Leaves sampling were done once a month for five months. The result of study showed that *Phytoseius finitimus* was only found in the vineyard under study. Larvae of *Ph.finitimus* were found in higher numbers than adult mites. The most populated cultivar with mites of Phytoseiid family was *Trebbiano Toscano* and during 2015 we found more phytoseiids than in 2014. Merlot cultivar was less populated with predatory mites and the highest number of mites per leaf was found in September. During the first year of study resulted that the most populated periods with predatory mites was September and in the second year of the study the most populated periods were July and September. Mites of the *Tydeidae* and *Tetranychidae* family were also present in these two grape cultivars.

Keywords— predatory mites, *Phytoseius finitimus*, *Trebbiano-toscano*, cultivars, grape.

I. INTRODUCTION

In nature phytophagous mites populations are kept under the economic damage levels by a considerable number of natural enemies such as predatory mites and insects[8]. The family Phytoseiidae is one of the most important mite groups from economical point of view, because several species are well known as natural enemies of mite and insect pests[17] Phytoseiid mites have a considerable economic impact because they are predators of several phytophagous mites, including spider mites (*Tetranychidae*)[18]. Predatory mites of Phytoseiidae family are able to keep under the damage levels the populations of Eriophyids and Tetranychids mites. These mites coexist with other Families like *Tydeidae* mites, etc. [7] Predatory mite of the Phytoseiidae family play a key role in controlling phytophagous mite of the

Tetranychidae and *Eriophyidae* family. [16] The presence of useful mites mainly the Phytoseiidae family on the grapevine shows a better management of pest and diseases of the grape vine. Some species of Phytoseiids mite are able to survive, and to remain in high levels even though phytophagous mites are few in number because of their ability to feed on other food sources as pollen, insect's melate and fungus[9].

The family Phytoseiidae includes many species of predators involved in the control of mite pests of crops all over the world. In European vineyards, these natural enemies play a key role in plant protection as their presence usually makes the use of acaricides unnecessary,[16] Unfavorable climate conditions and the application of broad spectrum pesticides lead to the decrease of predatory mite because they are generally more susceptible to pesticides than their prey [4], causing population outbreaks of tetranychids mites species [10, 11]. Most contact insecticides from different chemical classes are broad spectrum and so affect both prey and predator. [15]

The objectives of this study were to follow the progress of predatory mites populations (*Phytoseiidae* family) during a two-years period in two cultivars of grapes, Merlot and *Trebbiano Toscano*; to find the most populated cultivar with phytoseiid mites and most populated period.

II. MATERIAL AND METHODS

This study was conducted during 2014-2015 in two grape cultivars (Merlot and *Trebbiano Toscano*) in a vineyard located in Durrës Albania (41 ° 20'23.8 "N 19 ° 32'22.1" E). The vineyard is set on a field area in the village (Xhafzotaj) and has an area of 0.8 ha. During the two seasons of vegetation, for the disease and pest management, the farmer has used pesticides with these active substance: To protect them from downy mildew (*Plasmopara viticola*): Metiram, copper hydroxide + Metalaxyl, Metalaxyl + mancozeb, Dimetomorph + mancozeb, Copper hydroxide, Metalaxyl. To protect them from powdery mildew and

bunch rot (*Uncinula necator* and *Botrytis*. spp) are used these pesticides: Penconazole, Metrafenone, Krexosim-methyl. Against the grapevine moth (*Lobesia botrana*) Alphacypermethrin.

For this study we have taken leaves during vegetative period for five months. Sampling was done once a month in five periods. For each cultivar we took 15 leaves, leaves were taken inside of the rows and in the middle of sprig [7], (to avoid the first row and the first three plants in the second row), and were brought to the laboratory in plastic bags. Mites on the leaves were counted under the stereomicroscope and mounted in Hoyer's medium on microscope slide. To determine the species of phytoseiid mites we have worked with determining keys of many authors as: [Chant 1959] [3], [Athias Henriot 1960] [1], [Denmark 1966] [6], [Beglyarov 1981] [2], [Chant and Yoshida – Shaul 1987] [5], Nomenclatures of the crests was based in the systems of Lindquist and Evans 1964 and adopted for the phytoseiidae family from Rowell H.J., Chant D.A. & Hansell R.I.C. 1978 [14].

III. RESULTS AND DISCUSSION

During the two-year of study conducted in two grape cultivars (Merlot and Trebbiano Toscano) we found and identified only one species of predatory mites of Phytoseiidae family: *Phytoseius finitimus* (Ribaga 1904) or *Phytoseius plumifer* (Canestrini&Fanzago, 1876) and we also noticed the presence of mites of Tideidae and Tetranychide family, and symptoms of mites of Eriophyidae family. The grape vine cultivar Trebbiano Toscano was populated with predatory mites of Phytoseiidae family.

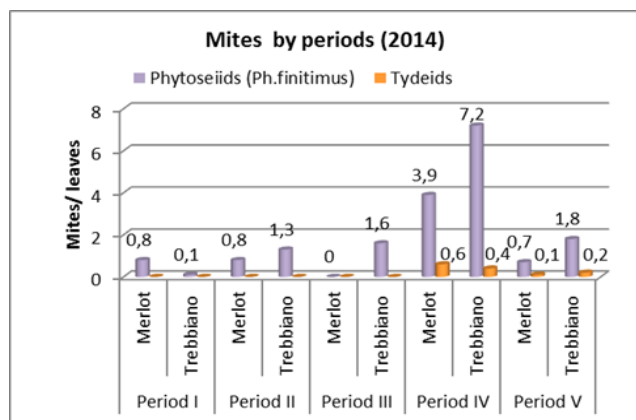


Fig.1. The performance of the predatory mite populations during 2014.

During the first year of study (2014) we have found predatory mites of *Phytoseiidae* family and mites of *Tydeidae* family. The most populated periods with mites was period four that corresponds with September in Trebbiano-tosciano cultivar, in this period we have found the highest number of Phytoseiid mites belonging to *Ph.finitimus* (7.2 mites per leaves), and mites of *Tydeidae* family (0.6 mites per leaves) In this

period in Merlot cultivar we have found 3.9 mites per leaves (figure 1).

The less populated period with mites of *Phytoseiidae* family was the first period, in this period we have found the maximum in the Merlot cultivar (0.8 mites per leaves). In the same period in Trebbiano Toscano cultivar were found (0.1 mites per leaves) (figure 1).

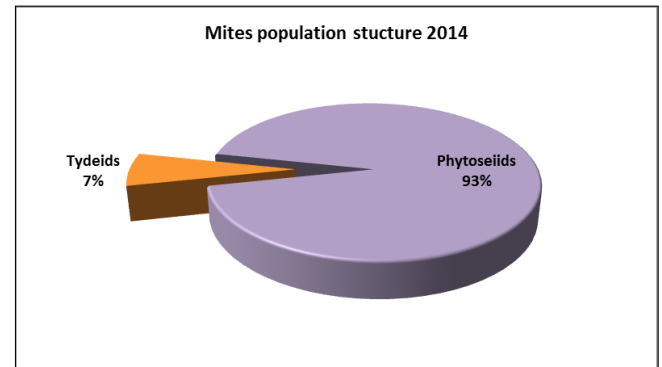


Fig.2. The structure of the mites population (2014) +\

From the total of mites found in these two grape cultivars ,mites of *Phytoseiidae* family occupied 93% of the population and mites of *Tydeidae* family occupied 7%(figure 2).

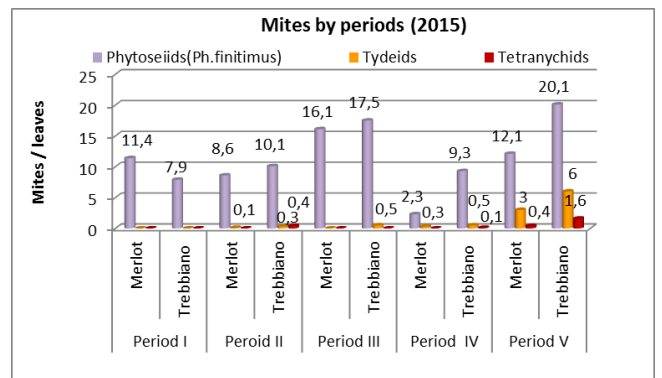


Fig.3. The performance of the mite populations during 2015.

During the second year of the study (2015) we have found predatory mites of *Phytoseiidae* family, *Tydeidae* mites family and phytophagous mite of *Tetranychidae* family. During this year of study we have found a high number of predatory mites of *Phytoseiidae* family that belong to *Phytoseius finitimus* species .

The most populated grape cultivar with mites of *Phytoseiidae* family was *Trebbiano Toscano* in which in September we were found 20.1 mites per leaves of species *Phytoseius finitimus*. In Merlot cultivar in this period was found 12.1 mites per leaves. The less populated period with mites of *Phytoseiidae* family was fourth period belonging to August where were found more mites per leaf in cultivar Trebbiano Toscano (9.3 mites per leaves), whereas in Merlot cultivar were found 2.3 mites per leaves. Most populated periods

with Phytoseiid mites for 2015 was the third period (July) and the fifth period (September). In the period of July we found 17.5 mites per leaves in Trebbiano Toscano cultivar and 16.1mites per leaves in Merlot cultivar. Regarding Tydeidae mites family, the highest number of them per leaf is found in the fourth period which coincides with the period of September to Trebbiano Toscano cultivar we found 6 mites per leaves and in merlot we found 3 mites per leaves. In the first period of study we have not found tydeidae mites. Mites of Tetranychidae family appeared primarily in the second period (June) 0.4 mites per leaves in Trebbiano Toscano cultivar, in Merlot are found only in the fifth period (September). The highest number of Tetranychidae per leaves was found in September period in Trebbiano Toscano cultivar (1.6 mites per leaves)(figure 3).

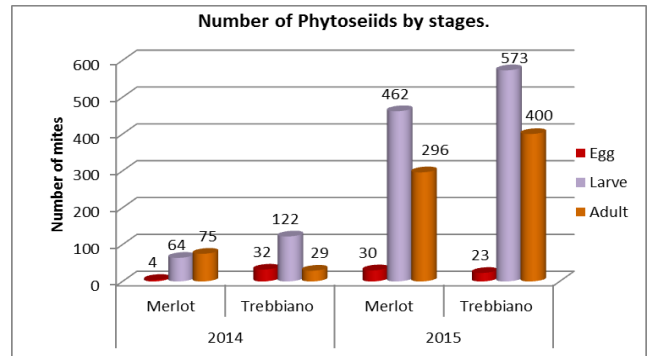


Fig.6. Phytoseiids population structure (Ph.finitimus) during 2014-2015.

During the two-year study it resulted that in the structure of mite population (Ph.finitimus) dominated the larvae stage mites and in Merlot cultivar in the first year of study dominated the adult stage. In total in the first year of study in Merlot cultivar we have found: 4 eggs, 75 larvae and 64 adults, and in Trebbiano Toscano cultivar we have found 32 eggs, 29 larvae and 122 adults of *Phytoseius finitimus* species. During the second year of study in Merlot cultivar we have found: 30 eggs, 462 larvae and 296 adults and in Trebbiano Toscano cultivar we have found 23 eggs, 573 larvae and 400 adults, of *Phytoseius finitimus* species (figure 6).

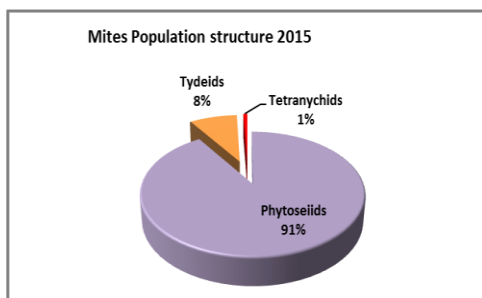


Fig.4. The structure of the mites population (2015)

From the total of mites found in these two grape cultivars, mites of Phytoseiidae family occupied 91% of the population, mites of family Tydeidae occupied 8%, while the mites of the family Tetranychidae occupied 1%(figure 4).

IV. CONCLUSIONS

During the two-year study conducted in two grape cultivars it was noticed the presence of Phytoseiidae, Tydeidae and Tetranychidae mites family. During this study we have found and identified one species of mites Phytoseiidae family *Phytoseius finitimus* (Ribaga 1940) or *Phytoseius plumifer* (Canestrini & Fanzago, 1876). The performance of mites during the two years of study in two cultivars of grapes has been so: in the second year of the study we have found a higher number of useful mites of Phytoseiidae family compared with the first year of study. During the two years of study the most populated cultivar with Phytoseiids mites was Trebbiano Toscano cultivar , where in the first year of the study were found in maximum 7.2 Phytoseiids per leaf, and in the second year of the study were found 20.1 Phytoseiids per leaf. In Trebbiano Toscano cultivar we have found a higher number of phytoseiid mites per leaves compared with Merlot cultivar.

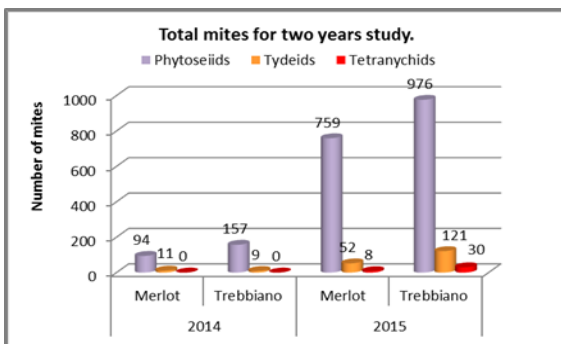


Fig.5. The total number of mites found during two years of study.

From the data collected from this study resulted that mites in larvae stage were found in higher number than in the adult stage mites.

From two-year study resulted that for the first year, the most populated periods with Phytoseiids mites was September and in the second year of the study the most populated periods were July and September.

The presence in the high number of populations of predatory mites Phytoseiidae makes a full control of the Phytophagus mites, and therefore makes it unnecessary treatment with acaricide.

During the two years of study in two grape cultivars, resulted that the highest number of mites of Phytoseiidae family was found in the second year of study (2015), most populated cultivar was Trebbiano Toscano where we counted 976 mites and in Merlot cultivar we have counted 759 mites. In 2014 we found the lowest number of mites than 2015.(figure.5) Tydeidae family mites were found in higher numbers in 2015 Trebbiano Toscano cultivar (121mites). While the Tetranychidae family mites were found only in the second year of the study with the highest number in Trebbiano Toscano cultivar (30 mites)(figure.5).

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