

RESEARCH ARTICLE

(Open Access)**The Inventory of Phytoseiid Mite on Apple Orchards in Durrës, Albania**AURELA SUPARAKU^{1*}, ARIS HUQI¹, NATASHA HAKA (DURAJ)¹¹Department of Plant Protection, Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania**Abstract:**

A survey to determine the presence and abundance of phytoseiid mite on apple orchards has been conducted in Durres (Shena-Vlash), Albania. Leaf samples were taken from five apple varieties: Pink Lady, Golden, Starking, Fuji, Gala and the phytoseiid were then extracted. As the result of the survey, two species belonging to the Phytoseiidae family were identified: *Amblyseius andersoni* (Chant) and *Typhlodromus pyri* (Scheuten). *Amblyseius andersoni* was found in all apple varieties analyzed in this study whereas *Typhlodromus pyri* was found in two apple varieties: Fuji and Gala. Differences in abundance of the phytoseiid mite among apple varieties and months on study were observed. Phytoseiids were more abundant in June with population declining in the middle of summer and remaining at very low levels through the fall. The most populated apple varieties with phytoseiids was Starking. *Amblyseius andersoni* was the dominant species whereas *Typhlodromus pyri* was found in lower numbers. In total through the whole investigation period we found 685 phytoseiids (92%) belonging to *Amblyseius andersoni* and 62 phytoseiids (8%) belonging to *Typhlodromus pyri*.

Keywords: Phytoseiid mite, Albania, apple varieties.

1. Introduction

Predatory mite of the family Phytoseiidae are the most important natural enemies of Tetranychid and Eriophid mite (Acari: Tetranychidae and Eriophyidae) [7,12]. They are the most common group of predatory mite inhabiting higher plants, and the increase in our knowledge during the last 40 years has been due to their importance as biological control agents of pests on many crops [8,7]. Among them, *Amblyseius andersoni* and *Typhlodromus pyri* are common species in apple orchards in different region of Europe. They are considered as generalist predator because their ability to feed on various food sources other than mite preys (e.g. pollen, honeydew, fungi and insects) [9]. Several species of the family Phytoseiidae are commercially available in many countries. Present and future studies may lead to the discovery of other promising species for pest control, which may be more effective than the species already in use. In Albania, faunistic surveys of the phytoseiid mite fauna have been more numerous on vineyards whereas on fruit trees very few studies have been conducted on phytoseiid mite [6], however research interest in phytoseiid mite has increased steadily in the last years. The objective of this study is the inventory of predaceous mite of the family Phytoseiidae on apple orchards in Durrës (Shëna-Vlash).

2. Material and Methods

The study was carried out between June to October 2013 in an orchard of 1 ha planted with five apple varieties: *Pink lady*, *Golden*, *Starking*, *Fuji* and *Gala*. This area is located in the district of Durrës (Shëna-Vlash), situated in the center of Albania. In this orchard during the vegetation period have been used this insecticides: Ramplan 20SP (1 treatment), Fastak 0.2% (2 treatment), Rogor B58 (2 treatment). The sample collection is done every month, were 20 leaves for each apple variety were taken randomly. Mites were extracted and counted under the stereomicroscope. Only mobile stages were considered for counting. They were mounted on Hoyer's medium on microscope slide and identified using a phase contrast microscope. The slides with the phytoseiid mite were dried in thermostat for a week in 55°C. The identification of phytoseiid was based in determining keys of: Chant 1959 [3], Athias Henriot [1], Chant and Yoshida Shaul 1987 [4]. The slides of the mounted specimens were deposited in the collection of the Laboratory of Entomology, Agricultural University of Tirana, Albania.

3. Results and Discussion

In the present study, two species belonging to the Phytoseiidae family of Mesostigmata (Acari) were identified:

1. *Amblyseius andersoni* (Chant)
2. *Typhlodromus pyri* (Scheuten)

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Amblyseius andersoni was collected from all apple varieties that were subject of this study: *Pink lady*, *Golden*, *Starking*, *Fuji* and *Gala*. *Typhlodromus pyri* was collected from two apple varieties: *Fuji* and *Gala*. In apple variety: *Pink lady*, *Golden* and *Starking*, *Amblyseius andersoni* was the only phytoseiid species that was found whereas in two varieties: *Fuji* and *Gala*, *Amblyseius andersoni* was found associated with the colonies of *Typhlodromus pyri* which were less in number compared with *Amblyseius andersoni* which was the dominant species (Figure 1). Differences in abundance among months on study were observed. The highest population densities of the two phytoseiid species were recorded in June with 4.6 individual / leaf in apple variety *Golden* belonging to *Amblyseius andersoni* and 1.2 individual / leaf in apple variety *Fuji* belonging to *Typhlodromus pyri*. In July the population of phytoseiids started to decline. During this month the highest density of phytoseiid mite was recorded in apple variety *Starking* with 3.3 individual / leaf belonging to *Amblyseius andersoni* whereas the lowest number of phytoseiid mite was recorded in

apple variety *Gala* with 0.3 individual / leaf belonging to *Typhlodromus pyri*. In August the population of phytoseiid mite continued to decline, however the ratio between two phytoseiid species remained the same from June to August. One reason why phytoseiid mite started to decline during this months is the use of insecticides by the farmer to control pest species. Studies have demonstrated that most conventional insecticides and acaricides are inherently toxic to predaceous mite and may negatively impact their population [2,13,11]. In September when temperature started to decrease the number of phytoseiid mite per leaf has been very low. Thus, the population density of *Amblyseius andersoni* was higher in apple variety *Gala* with 0.4 individual / leaf whereas *Typhlodromus pyri* was found only in apple variety *Gala* with 0.05 individual / leaf. In October the highest population density was recorded in apple variety *Pink lady* with 0.4 individual / leaf belonging to *Amblyseius andersoni* whereas in two apple varieties, *Starking* and *Golden* none of phytoseiid were found (Figure 1).

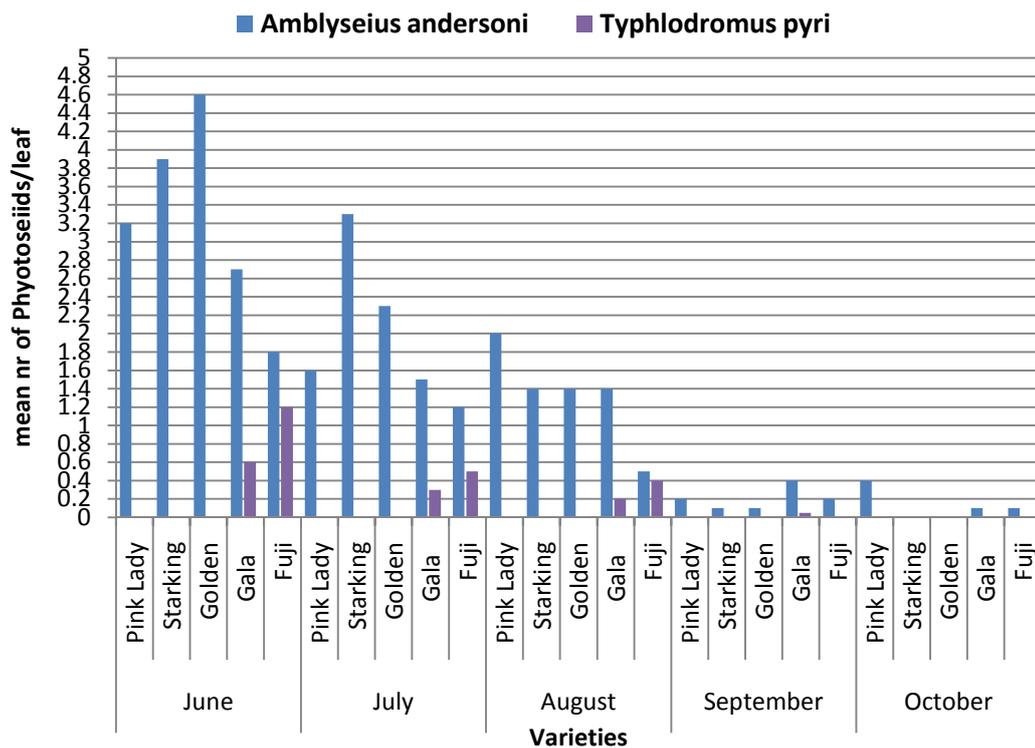


Figure 1. Distribution of phytoseiid mite during period of study. Figure shows mean number of phytoseiids (mobile stages) per 20 leaves.

Differences in abundance between apple varieties were also observed. The most populated apple variety with phytoseiids was *Starking* with 174 individual found in total through the period of study belonging to *Amblyseius andersoni*. The lowest number of

phytoseiid mite was found in apple variety *Fuji* with 116 individual found in total from which 76 individual belonging to *Amblyseius andersoni* and 40 individual belonging to *Typhlodromus pyri* (Figure 2).

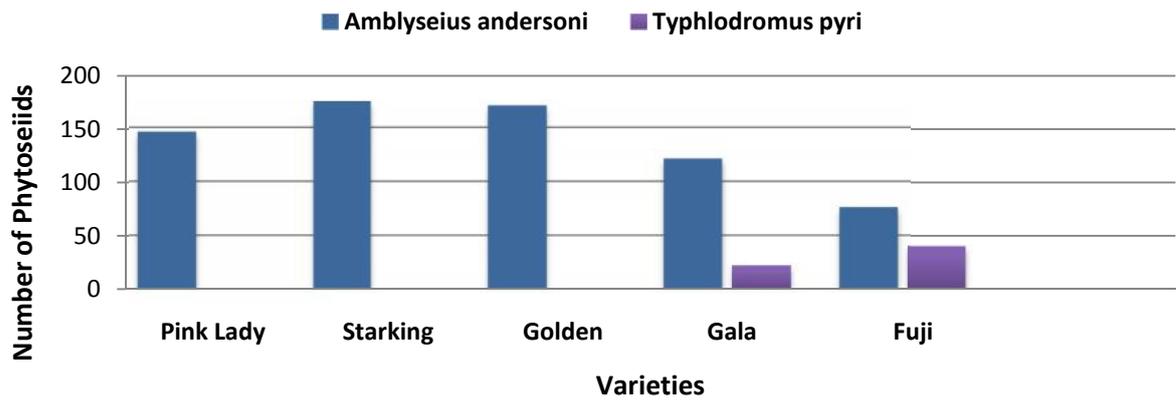


Figure 2. The number of phytoseiid mite found in 100 leaves in each apple variety during the whole investigation period

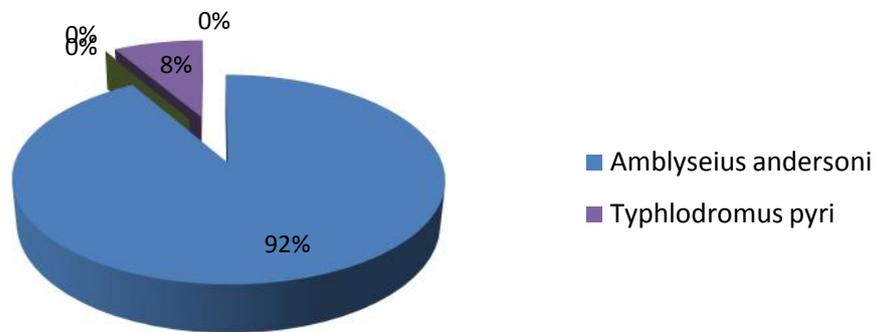


Figure 3. Total number of phytoseiid mite found through the whole period of study in five apple varieties

The total number and density of phytoseiid mite found on five apple varieties during the period of study were estimated at 685 individual (92%) for *Amblyseius andersoni* and 62 individual (8%) for *Typhlodromus pyri* (Figure 3).

The highest population of phytoseiid and tetranychid mite were recorded in June. During this month phytoseiid mite has been more numerous

compared to tetranychid mite. This ratio remained the same until September where we had a slight increase of tetranychid due to the lower number of phytoseiids that has been found during this month. In October we have again a slight dominance of tetranychid mite, however in total the number of phytoseiids and tetranychid mite found during this month has been lower (Figure 4).

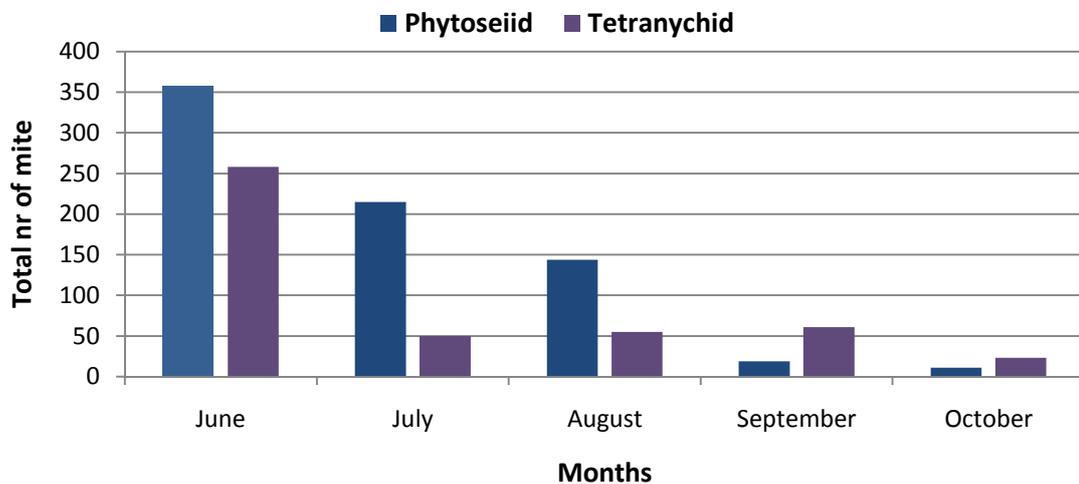


Figure 4. Total number of Phytoseiid and Tetranychid mite found during period of study.

4. Conclusions

Based in the inventory of Phytoseiid mite conducted on apple orchards in the district of Durrës (Shëna- Vlash), two species belonging to the Phytoseiidae family were identified:

1. *Amblyseius andersoni* (Chant)
2. *Typhlodromus pyri* (Scheuten)

Analysis of leaf samples collected during the period of study showed greater abundance of phytoseiid mite in June whereas the lowest number of phytoseiid was recorded in October. *Amblyseius andersoni* preserved the status as the dominant species throughout the whole investigation period whereas *Typhlodromus pyri* was less abundant. The highest density of phytoseiid mite was found in apple variety *Starking*. The ratio between phytoseiid and tetranychid mite remained the same with the dominance of phytoseiid mite from June to September where we had a slight increase of tetranychid compared to phytoseiid mite. Inventory of phytoseiid mite on apple orchards should be considered as one of the first step to develop effective biological control programs for managing pest species. In Albania studies on phytoseiid mite should be more numerous because of their importance as biological control agents and their effectiveness to preserve the natural balance.

6. References

1. Athias- Henriot C., 1960- *Acarologia*, 2 (3): 288-299.
2. Bostanian, N., J.M.Hardman,G.Racette, J.Franklin and J.Iasnier 2006. **Inventory of predaceous mite in Quebec commercial apple orchards where integrated pest management programs are implemented.** *Ann.Entomol.Soc.Am.* 99:536-544.
3. Chant,D.A; Phytoseiid mites (Acarina: phytoseiidae). Part II. **Ataxonomie review of the family Phytoseiidae, with description of 38 new species.** *Can.Ent.*,91 Supplement 12: 45-166.
4. Chant, D.A; Yoshida-Shaul,E; 1990. **The identities of *Amblyseius andersoni* (Chant) and *A.potentillae* (Garman) (Acari: Phytoseiidae).** *Inter. J. Acarol.* 16:5-12.
5. Denmark,H.A., 1996- **revision of the genus *Phytoseius Ribaga, 1904* (Acarina: Phytoseiidae)** Florida Dept. Agric., Bull.No.6:105pp.
6. DurajN, Kashifi B.1997. **Këpushat fitoseide në pemë frutore dhe në hardhi.** Buletini ishkencave bujqësore N2.f 69-75.
7. Gerson,U.,Smiley, R.L and Ochoa, R.2003. **Mites (Acari) for pest control.** Blackwell Science Ltd.,UK.539pp.
8. Helle, W.& Sabelis,M.W.,1985. **Spider mites: their biology natural enemies and control.** World crop Pests, Vol.1B. Elsevier. Amsterdam. 458pp.
9. McMurtry,J.A,Croft B.-A1997. **Life styles of phytoseiid mite and their roles in biological control.** *Annual review of Entomology* 42.291-321.
10. McMurtry, J.A. Moraes,G.J. de FamahSourassov,N.(2013). **Revision of the life styles of phytoseiid mite(Acari:Phytoseiidae) and implications for biological control strategies.** *Systematic & Applied Acarology*, 18,297-320.
11. Raudonis,L.,E.Surveliëne, and A.Valiuskaite, 2004. **Toxicity of pesticides to predatory mites and insects in apple tree site under field condition.** *Environ.Toxical*, 4:291-295
12. Sabelis,M.W.(1996). Phytoseiidae.In:E.E.Lindquist,M.W.Sabelis&J. Bruin(eds). **Eriophyoid Mites- Their biology, Natural enemies and Control.** World crop Pest series Vol.6, Elsevier Science Publishers, Amsterdam, The Netherlands,pp.427-456.
13. Thistlewood,H.M.A 1991. **A survey of predatory mites in Ontario apple orchards with diverse pesticide programs,** *Can.Entomol.*123:1163-1174.