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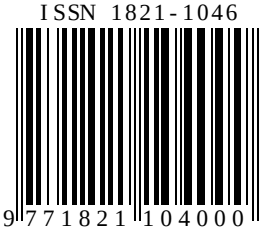

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Preliminary communication

SPIDER MITES AND PREDATORY MITES (ACARI: *TETRANYCHIDAE, PHYTOSEIIDAE*) ON OAK TREES IN THE CITY OF BELGRADE AND ITS VICINITY

Katarina MLADENOVIĆ[1], Bojan STOJNIĆ[2], Miroslava MARKOVIĆ[1]

Abstract: *This paper presents preliminary research of diversity of fam. Tetranychidae and fam. Phytoseiidae on different oak species in the city of Belgrade and its vicinity in the period from 2010 to 2011. The study covers six different tree species from genus Quercus, four indigenous and two introduced species. The presence of two species of mite from Tetranychidae family, and three species from Phytoseiidae family has been verified so far.*

Key words: Tetranychidae, Phytoseiidae, *Quercus*

PAUČINARI I PREDATORSKE GRINJE (ACARI: TETRANYCHIDAE, PHYTOSEIIDAE) NA HRASTOVIMA ŠIREG PODRUČJA BEOGRADA

Sažetak: *U rada su izneta prelaminarna istraživanja diverziteta vrsta fam. Tetranychidae i fam. Phytoseiidae na različitim vrstama hrasta u Beogradu i njegovoj široj okolini u periodu 2010-2011. godine. Pregledom je obuhvaćeno šest različitih biljnih vrsta iz roda Quercus od čega su četiri autohtone a dve alohtone. Do sada je utvrđeno prisustvo dve vrste grinja iz fam. Tetranychidae i tri vrste iz fam. Phytoseidae.*

Ključne reči: Tetranychidae, Phytoseiidae, *Quercus*

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Translation: Galina Perišić

1. INTRODUCTION

Problems with mites as pests emerged in mid-20th century as a result of changes in environmental conditions, particularly apparent in urban areas due to the huge impact of the human factor. In urban conditions, due to unstable soil moisture, increased air pollution and temperature, plants become physiologically weakened and more susceptible to development of phytophagous mite, while in natural conditions plants rarely suffer severe damage since the numbers of mites are controlled by their natural enemies.

In Serbia, the studies of spider mites (Acari: Tetranychidae) and their predators (Acari: Phytoseiidae) have so far been mainly focused on agricultural ecosystems since the diversity of these mite species is less apparent on forest trees. A number of papers discuss occurrence of spider and predatory mites on forest plant species (Tomašević, 1964; Kropczynska and Petanović, 1987; Petanović and Stojnić, 1995; Stojnić and Petanović, 1994; Stojnić, 1993; Stojnić et al., 2002; Mladenović at al., 2010a, 2010b).

Oaks typically inhabit temperate region of the northern hemisphere. The *Quercus* genus includes around 450 tree and shrub species but only about ten of those 450 are present in our region. Oaks are one of the most important groups of forest plants in our country.

2. MATERIALS AND METHODS

Oak tree samples were collected during the vegetation period in the years 2010 and 2011, in autochthonous plant associations and in urban areas of Belgrade.

Belgrade is situated within the southern rim of the Pannonian basin and the northern border of the Balkan Peninsula. The northern part of the city area is located within the Pannonian plain, and the southern part lies on the rolling hills of Central Serbia. Mountains Avala (511 m) and Kosmaj (628 m) stand out in the relief of Šumadija region. The terrain gradually declines from south to north and is patched with river valleys. Belgrade hills (Banovo, Lekino, Topčidersko, Julino, Petlovo etc.) are located to the south of the Sava and Danube rivers, and alluvial planes and loess plateaus stretch to the north of the Sava and Danube. The city's average altitude is 132 m, with the lowest elevation in Grocka (71 m) and the highest elevation on Mt. Kosmaj. Belgrade has a temperate continental climate. Average annual temperatures vary from year to year due to the human factor impact and global warming (Faculty of Geography, Belgrade, 2011).

Samples were collected from six oak species: *Quercus robur* L., *Q. petraea* Liebl., *Q. frainetto* Ten., *Q. cerris* L., *Q. borealis* Michx. f., *Q.trojana* Webb.

Each sample contained 50 leaves. The samples were collected during the vegetation period. Separation of Tetranychidae and Phytoseiidae was carried out in laboratory by exposing the leaves to ethyl-acetate for 20 minutes, after which the leaves were shaken off and mites were recognized by means of a stereomicroscope. Isolated mite organisms were placed in solution of ethyl alcohol and lactic acid (Evans & Browing, 1955). After illumination, permanent preparations were made using Hoyer's medium (Baker & Wharton, 1964).

The appropriate keys were used to determine Tetranychidae (Prichard and Baker, 1955; Mitrofanov at al., 1987; Rota, 1961-62; Manson, 1967; Reeves, 1963) and Phytoseiidae (Begljarov, 1981; Karg, 1993). Permanent preparations were kept in storage at the Department of Entomology and Agricultural Zoology of the Faculty for Agriculture, University of Belgrade.

3. RESULTS AND DISCUSSION

Examination of the plant material showed the presence of two species of spider mites fam. Tetranychidae on two studied oak species: *Q. robur* and *Q. cerris*. Predatory mite species from Phytoseiidae family were found on all six studied oak species: *Q. robur, Q. petraea, Q. frainetto, Q. cerris, Q. borealis* and *Q. trojana*. Table 1 presents the Tetranychidae species found on oak tree species. Table 2 presents the Phytoseiidae species found on oak tree species.

3.1. Tetranychidae family

Table 1. *Species from Tetranychidae family found on Q. robur and Q. cerris*

Oak Species	**Tetranychidae Species**	**Location**
Quercus robur	*Schizotetranychus garmani*	Ada Ciganlija
	Oligonychus brevipodus	Ada Ciganlija, Banovo Brdo Park, Banjica Forest, Pionirski Park
Quercus cerris	*Oligonychus brevipodus*	Košutnjak Park Forest

Schizotetranychus garmani Pritchard & Baker, 1955

Typical distribution location of this species is in the USA and its typical host is *Salix sp.* It is also found worldwide on eight hosts: *Acer sp., Quercus robur*, *Populus tremula*; *Salix caprea*; *Salix humilis*; *Salix petiolaris*; *Salix sp.*; *Salix tristis*.

Distribution of this species encompasses Nearctic: USA; Palaearctic: Iran, Poland, Russia and Switzerland.

In Serbia it was first found on *Q. robur, Salix alba, Acer negundo* and *Corylus avellana* (Stojnić, 1993). During this research it was also found on *Q. robur*.

Oligonychus brevipodus Targioni Tozzetti, 1878

sin. *Oligonychus quercinus* Berlese, 1886

This species has not been sufficiently studied. Its typical distribution location is in Italy, while the typical host is *Quercus ilex*. It is also found worldwide on *Quercus ilex*; *Quercus pubescens*; *Quercus sp.*

Distribution of this species includes the Australian region: Australia, New Zealand, Tasmania; Palaearctic**:** France, Italy, Holland and the United Kingdom.

In Serbia it was first found on *Q. robur* and *Q. cerris* (Stojnić, 1993). During this research, the finding was confirmed both on *Q. robur* and *Q. cerris*.

3.2. Phytoseiidae Family

Table 2. *Species from Phytoseiidae family found on Q. robur, Q. cerris, Q. frainetto, Q. petraea, Q. trojana and Q. borealis*

Oak Species	Phytoseiidae Species	Location
Quercus robur	*Euseius finlandicus*	Košutnjak Park Forest, Ada Ciganlija, Rit, Progarska Ada, Bojčin Forest, Barajevo-Šiljakovac, Banjica Forest, Kalimegdan Park, Lazarevac-REIK
	Kampimodromus aberans	Banjica Forest
Quercus cerris	*Euseius finlandicus*	Lipovica –Bivolje Swamps, Košutnjak Park Forest, Miljakovac Forest, Sremački Rit, Bojčin Forest
Quercus frainetto	*Euseius finlandicus*	Lipovica – Bivolje Swamps, Topčider Park, Košutnjak Park Forest, Sremački Rit, Lazarevac-REIK
	Amblyseius andersoni	Lazarevac-REIK
	Kampimodromus aberans	Lazarevac-REIK
Quercus petraea	*Euseius finlandicus*	Miljakovac Forest
Quercus trojana	*Euseius finlandicus*	Faculty of Forestry Arboretum
Quercus borealis	*Euseius finlandicus*	Savski Venac-Emergency Center

Euseius finlandicus Oudemans, 1915

This species is a distinct cosmopolite, distributed across Europe, Asia, Africa, North and South America. It is observed in Serbia on numerous hosts (Radivojević and Petanović, 1984; Kropczynska and Petanović, 1987; Stojnić, 1993; Stojnić and Petanović, 1994; Stojnić, 2001; Mladenović at al, 2010b). It can be assumed that this species is dominant in Phytoseiidae habitats. It occurs on many plant species. During this study it was identified on all six oak species: *Q. robur, Q. petraea, Q. frainetto, Q. cerris, Q. borealis* and *Q. trojana*.

Amblyseius (Amblyseius) andersoni Chant, 1957

This species is present in most of Europe, Algeria, Canada, USA and former Soviet Republics. It is found in Serbia as well (Radivojević and Petanović, 1984; Kropczynska and Petanović, 1987; Mladenović at al, 2010b). It is found on numerous woody and herbaceous plants. During this research its presence was confirmed on *Q. frainetto.*

Kampimodromus aberrans Oudemans, 1930

This species is present in most of Europe, Algeria, Canada, USA and former Soviet Republics. It is found in Serbia as well (Radivojević and Petanović, 1984; Kropczynska and Petanović, 1987; Stojnić, 1993; Stojnić and Petanović 1994; Mladenović at al, 2010b). It is found on numerous woody and herbaceous plants. During this research its presence was confirmed on two oak species *Q. robur* and *Q. frainetto.*

4. CONCLUSIONS

This paper presents preliminary research of mite species diversity from fam. Tetranychidae and fam. Phytoseiidae on different oak species in the city of Belgrade and its vicinity.

The study covered six oak species: *Quercus robur* L., *Q. petraea* Liebl., *Q. frainetto* Ten., *Q. cerris* L., *Q. borealis* Michx. f., *Q. trojana* Webb., four species of which are indigenous (Sessile oak, English oak, Turkey oak and Hungarian oak) and two of which are introduced species (Macedonian oak and red oak).

The study confirmed the presence of two species of spider mites fam. Tetranychidae on English oak and Turkey oak, and three species of predatory mite fam. Phytoseiidae on all six examined oak species.

Tetranychidae are present on oak trees in the inner city central area, while Phytoseiidae were mostly found in natural plant associations in the vicinity of Belgrade.

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