

**RECKELLA CELTIS BAG. AND ACERIA BEZZI (CORTI) (ACARI:
ERIOPHYOIDEA) TWO NEW SPECIES IN THE BALKANS FAUNA**

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During two-year research on several localities in Serbia, Montenegro and FYR Macedonia in urban and natural sites of *Celtis australis* L. and *Celtis caucasiaca* Willd., two eriophyid species *Aceria bezzi* (Corti.) and *Reckella celtis* Bag. were recorded for the first time in these regions. *R. celtis* was recorded for the first time on a new host, as well as the characteristic leaf damage caused by this eriophyid species. According to observations to date, both species are relatively more abundant in urban than in natural sites.

KEY WORDS: eriophyids, new faunistic records, Balkan Peninsula

INTRODUCTION

In the flora of the Balkan Peninsula there are 4 species of the genus *Celtis* L. (Ulmaceae), of which three are autochthonous and one is allochthonous. Autochthonous species are *C. australis* L. (South European hackberry, Southern nettle-tree), *C. tourneforti* Lam. (European nettle-tree) and *C. caucasiaca* Willd. (Caucasian nettle-tree). Allochthonous species is *C. occidentalis* L. (common hackberry, Western hackberry).

C. australis is distributed in South Europe, Mediterranean, Asia Minor, Caucasus and North Africa. It is also present in Serbia and Montenegro (JOVANOVIĆ, 1970). It grows most often in pubescent oak forest and thickets in sub-Mediterranean regions, and less frequently in maquis. As a Tertiary species, it remained as a relict in some places outside its compact range of distribution. So it occurs in the gorge Djerdap, in the association *Celto-Juglandetum* Jov. Due to its very ornamental habit, it is a valuable horticultural species (VUKIĆEVIĆ, 1987).

C. tourneforti ranges in East Mediterranean (Balkan) and Asia Minor. It grows in the regions of Mediterranean and warmer sub-Mediterranean forests and it is largely applied in the afforestation of barren karst, and as an ornamental species in warmer regions.

C. caucasiaca is distributed over the Balkans (in Bulgaria and Macedonia), Asia Minor, Caucasus and Afghanistan, where it inhabits thermophilous thickets of continental regions (TUTIN *et al.*, 1964). On the Balkans, it is an autochthonous species with a unique site on the island Golem Grad (Ostrvo Kralja Petra) in the lake Prespansko Jezero (SOŠKA, 1931, BU).

C. occidentalis is a species originating from North America. It ranges over East and Central North America, mostly along the Mississippi and its tributaries. In Yugoslavia, it is present in parks, plantings and tree rows, especially in places with a stronger effect of continental climate (Vojvodina: Sombor, Subotica) and Belgrad (JOVANOVIĆ, 1970).

On the species in the genus *Celtis*, altogether 12 eriophyid species have been described to date in the world: *Aceria camdeboo* Smith Meyer and *Aculops africanae* Smith Meyer on *Celtis africana*, *Aceria bezzi* on *C. australis* L., *Reckella celtis* Bag. on *Celtis caucasiaca*, *Aceria celtis* (Kendall), *A. snetsingeri* K., *Aculops celtidis* (K.) and *Tegolophus ringsi* Styer on *Celtis occidentalis* L., *Tegonotus celtis* Kuang et Zhuo on *Celtis sinensis*, *Rhyncaphytoptus boczeki* Hall on *Celtis* sp., *Rhyncaphytoptus celtis* Kuang, Hong & Chen, on *Celtis tetrandia* and *Aculus indicus* Channabasavanna on *Celtis wightii*. North American species *Aceria celtis* and *A. snetsingeri* are synonymous (AMRINE & STASNY, 1994).

On the species in the genus *Celtis* L. present in the flora of the Balkan Peninsula, three eriophyid species have been described, causing visible morpho-anatomic changes on the hosts: *Aceria bezzi* on *C. australis*, causing bud deformation, *A. celtis* on *C. occidentalis* causing bud deformation and formation of "witches' brooms" and *Reckella celtis* on *C. caucasiaca*, designed in the original description as free living on the leaves.

Aceria bezzi was described in 1903 in numerous colonies formed in the buds of *C. australis*. The material originated from the suburb of the town Sondrio in Italy, and it was collected in spring 1902 by Professor of the lyceum Dr. Mario Bezzi, after whom the species was named. Along with the description of the species, it is said that the symptoms remind of hazel big buds caused by *Phytoptu avellanae* and that bud size is 8 x 3-4 mm (CORTI, 1903). The species is also listed only in eriophyid catalogues where Corti is cited (1903) (NALEPA, 1929, DAVIS *et al.*, 1982, AMRINE & STASNY, 1994), and in keys for eriophyid species of Central Europe where its distri-

bution in Central Europe is considered (FARKAS, 1965). KENDALL (1929) in his description of a new species *A. celtis* on *C. occidentalis* mentions *A. bezzi* in a differential diagnosis.

Reckella celtis was described from the material originating from 1961 and 1965 from the Caucasian nettle-tree, *Celtis caucasiaca* found in the region Megri in Armenia (BAGDASARIAN, 1975). The species was recorded as free living on leaf surface. On that occasion, a new genus *Reckella* was established, which has remained monotypical to date. In addition to the original description, the species is cited in the world catalogues of eriophyids based on the cited work (DAVIS *et al.*, 1982 and AMRINE & STASNY, 1994).

MATERIAL AND METHODS

The samples of leaves, buds and branches of *Celtis australis* L. in natural and urban habitats were taken at 6 localities (few sites each) in the period 1995-1997 in Serbia, Montenegro and FYR Macedonia. Leaf samples of *Celtis caucasiaca* Willd. were taken from the unique habitat of the plant in the Balkans, at the locality Ostrvo Kralja Petra in Prespansko Jezero, FYR Macedonia. The samples of *C. occidentalis* L. were taken from an urban habitat in Novi Sad.

Dried and living eriophyids were prepared by usual methods applied for light microscopy (AMRINE & MANSON, 1996) and scanning microscopy observations (ALBERTI & NUZZACI, 1966).

The plant organs were inspected with a stereoscope for presence, density and distribution of mites.

Scanning electron micrographs were taken by JEOL JSM-35 SEM at the Institute of Biology of the Faculty of Natural Sciences in Novi Sad.

Photographs of symptoms, i.e. big buds and/or erineae have also been taken.

RESULTS AND DISCUSSION

During two-year research on several localities in Serbia, Montenegro and FYR Macedonia in urban and natural sites of host plants two eriophyid species: *Aceria bezzi* and *Reckella celtis* were recorded on *Celtis australis*. *R. celtis* was also recorded on *C. caucasiaca*, whereas eriophyids have not been recorded on *C. occidentalis*. The data on distribution and relative abundance have been shown in Table I and Figure 1. As neither of the species have been recorded again since the description, it is difficult to talk about their ranges or the specificity for plant species or ge-

nus. We can only suppose that *R. celtis* is probably present within the range of plant species *C. australis* and *C. caucasiaca*, and *A. bezzi* within the range of the species *C. australis*.

Table I

Distribution and relative abundance of *Reckella celtis* Bag. and *Aceria bezzi* (Corti)

ERIOPHYID SPECIES	HOST PLANT	LOCALITY						
		1	2	3	4	5	6	7
<i>Reckella celtis</i> Bag.	<i>Celtis australis</i> L.	R	A	R	M	-	/	A
<i>Reckella celtis</i> Bag.	<i>Celtis occidentalis</i> L.	/	-	/	/	/	/	/
<i>Reckella celtis</i> Bag.	<i>Celtis caucasiaca</i> Willd.	/	/	/	/	/	A	/
<i>Aceria bezzi</i> Corti.	<i>Celtis australis</i> L.	A	M	M	-	R	/	-

LOCALITIES AND SITES (IN PARENTHESIS)

1. Lepenski vir
2. Novi Sad
3. Beograd (Zemun, Novi Beograd)
4. Kotor (Kotorska tvrđava)
5. Ohrid (Sveti Naum)
6. Prespansko jezero (Ostrvo Kralja Petra)
7. Skopje (Vodno)

CLEARINGS:

- A - common species
- M - moderately common
- R - rare
- - presence of species not established
- / - no data

A. bezzi (Figures 2a, b) was first recorded in this region on the locality Lepenski Vir, in July 1995 in the buds of *C. australis*, a Tertiary relic in the association *Celto-Juglandetum* Jov. The buds from which eriophyids were isolated were not hypertrophic.

The first symptoms in the form of big buds appear in late summer and early spring, when a colony of more than 100 individuals is present in the bud. The maximal bud size is during spring (end of May) when they are full of all instars, i.e. several hundreds to several thousands of individuals (Figure 3). At that time, a great number of individuals are in the phase of migration to newly formed buds. These buds are infested by one or two individuals, they deform, dry out and fall, or are left on the branches till the next spring when mites migrate to newly formed buds.

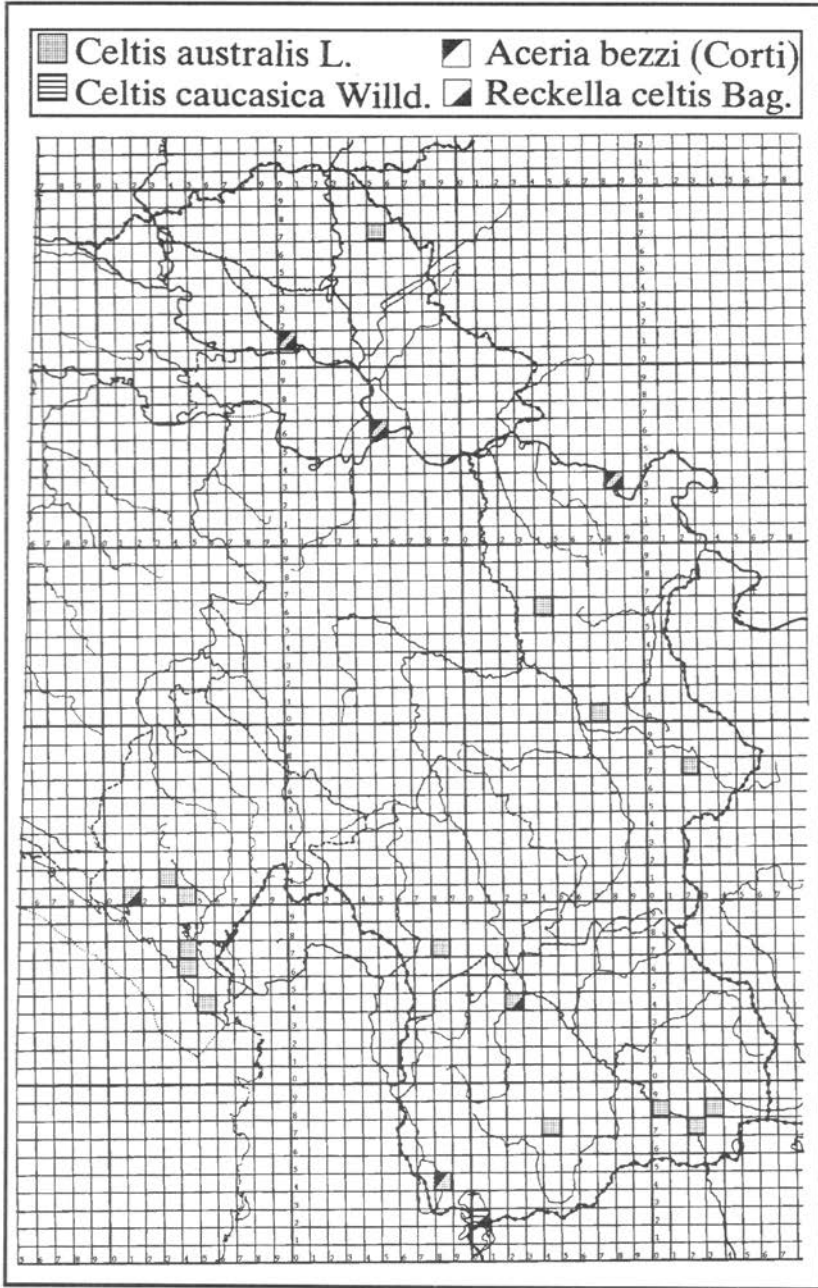


Fig. 1. A map of FRY and FYRM showing the position of sites where the samples of *Celtis australis* and *C. caucasica* were taken.

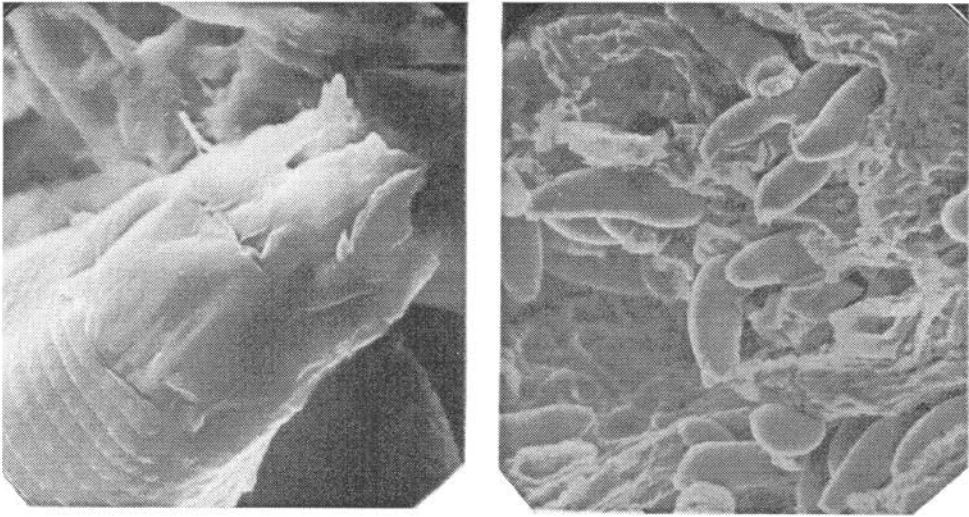


Fig. 2. Scanning electron micrograph of *Aceria bezzi*: a) detail of dorsal shield; b) population of mites inside a big bud.

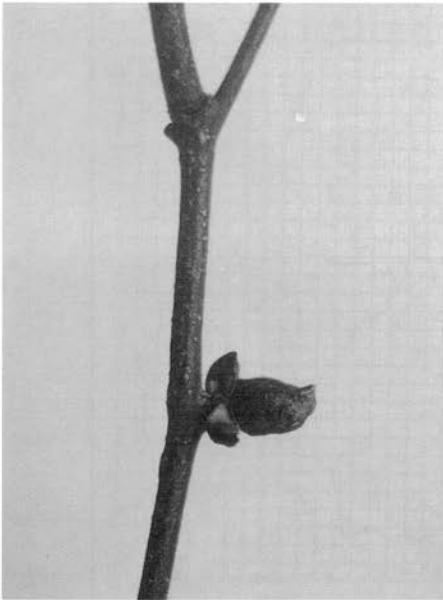


Fig. 3. Big bud of *Celtis australis* caused by *Aceria bezzi*.

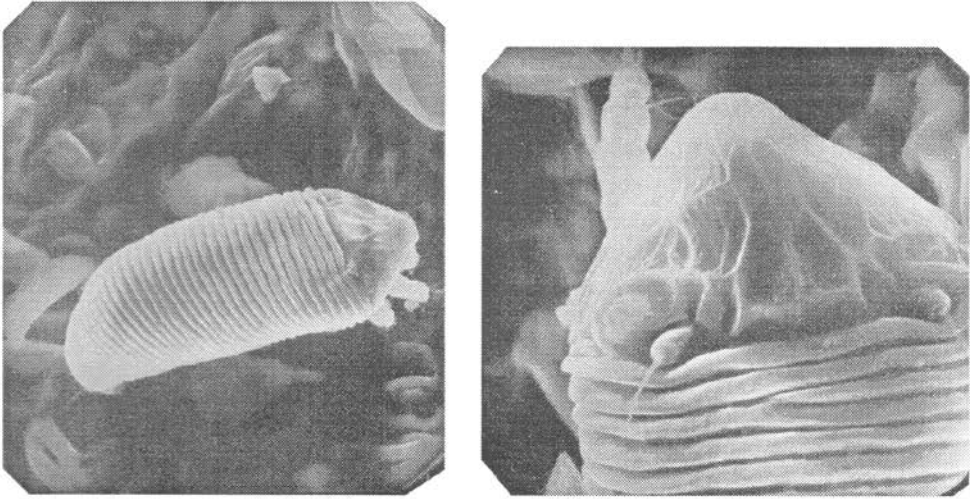


Fig. 4. Scanning electron micrograph of *Reckella celtis*: a) dorsolateral view b) detail of dorsal shield.

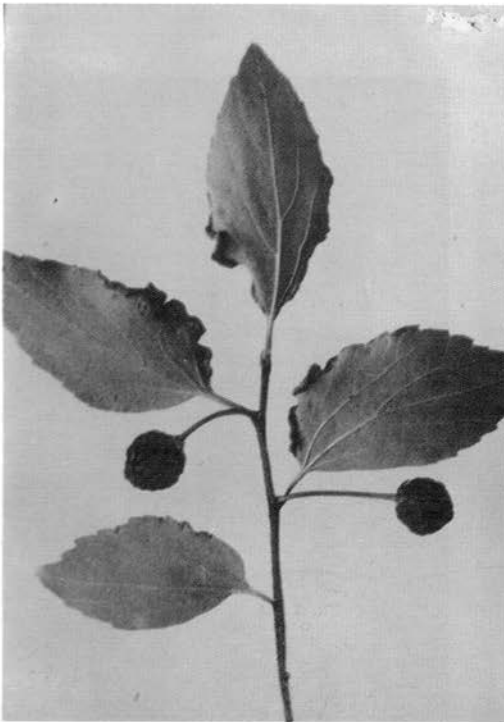


Fig. 5. Erineum and leaf margin rolling of *Celtis caucasiaca* caused by *Reckella celtis*.



Fig. 6. Upper surface leaf view of *C. australis* erinea caused by *R. celtis*.

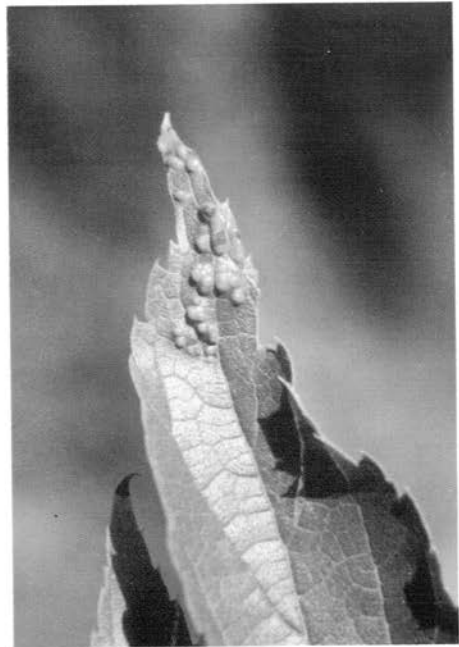


Fig. 7. Tip leaf erinea caused by *R. celtis* (detail).

At the localities Lepenski Vir and Ohridsko Jezero, in big buds, a predator mite species in the family Phytoseiidae, *Kampimodromus aberrans* (Ouds.) was recorded.

Reckella celtis (Figures 4a and b) was first recorded in this region at the locality Vodno in Skopje (FYR Macedonia) in November 1995 in the herbarium leaves with erineae symptoms on *Celtis australis*. It was soon found in Novi Sad and Belgrade (Zemun and Novi Beograd), Lepenski Vir and at Kotor on *C. australis* and on Ostrvo Kralja Petra in the lake Prespansko Jezero (FYR Macedonia) on *C. caucasiaca*. The finding of this species can be considered the second record after the description.

On this occasion, *R. celtis* was found for the first time on *C. australis*, and also the symptoms were recorded for the first time on both hosts, *C. australis* and *C. caucasiaca*. The symptoms are basically similar, or slightly different. *R. celtis* causes primarily localized erineae symptoms, i.e. proliferation of hairs on leaf abaxial with dense colonies of several hundreds of individuals, rusting and "downiness" of leaf veins and leaf petioles and the rolling of leaf margins at places of marginal erineae. In *C. caucasiaca*, erineae are primarily distributed along the leaf margin, and only at places deeper towards the main leaf vein in the leaf base, causing partial or complete rolling of leaf margins (Figure 5).

On *C. australis*, young erineae are at places formed along the leaf margin, which rolls in the middle of the leaf between the main vein and the leaf margins. In the beginning, they are pale green with delicate white hairs on the abaxial side and blister-like evaginations on adaxial side (Figures 6 and 7). Later on during vegetation, erineae are yellow to brown, full of eriophyids, and they necrose in the course of leaf aging. In autumn period, eriophyids leave such erineae and distribute throughout the leaf blade or migrate to uninfested leaves.

According to our previous observations, the percentage of erinotic leaves ranged between 5% at Kotor to 94,3% in Novi Sad (Table II). The degree of expression of symptoms in urban sites (Novi Sad and Belgrade) where the number of leaves with symptoms was the highest, has been shown in Table III. In erineae and on leaf surfaces the species of predator mites in the family Phytoseiidae and Stigmeidae and euryphagous Tydeidae and Tarsonemidae, are associated with *R. celtis*. The species *Kampimodromus aberrans* (Ouds.) in the family Phytoseiidae was found in the localities Lepenski Vir and Kotor, and in the localities Novi Sad and Belgrade, the species *Euseius finlandicus* (Ouds.)

Table II

Degree of infestation of *Celtis australis* expressed in percentage of leaves with erinea caused by *Reckella celtis*.

LOCALITY	DATE	TOTAL NUMBER OF LEAVES	NUMBER OF LEAVES WITH ERINEA	%
Lepenski vir	27.5.1997	100.	9	9.0
Novi Sad	25.6.1997	70	66	94.3
Kotor	26.7.1997	200.	10	5.0
Novi Sad	17.9.1997	121	90	74.4
Belgrade-Zemun	15.10.1997	596	298	50.0

Table III

Presence and distribution of erinea on *Celtis australis* leaves (Novi Sad, Belgrade).

DEGREE OF EXPRESSION OF SYMPTOMS	NUMBER OF LEAVES			%
	A	B	A	
whole leaf with erinea	18	107	14.9	17.95
1/2 leaf surface with erinea	25	101	20.6	16.94
only tip of the leaf with erinea	47	90	38.8	15.1
no erinea	31	298	25.6	50
Total	121	596	99.9	99.9

A- Novi SAd, 17.9. 1997.

B - Belgrade-Zemun, 15.10.1997.

CONCLUSIONS

1. Species *Aceria bezzi* and *Reckella celtis* were recorded for the first time in the region of the Balkan Peninsula (Serbia, Montenegro, and FYR Macedonia).

2. *R. celtis* was recorded for the first time on host plant *Celtis australis* L.

3. According to previous research, both species are relatively more abundant and frequent in parks and tree rows in urban sites, than in natural sites.

4. The characteristic leaf damage of *C. caucasiaca* and *C. australis* was recorded for the first time in the form of erinea, caused by the species *R. celtis*.

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RECKELLA CELTIS (BAG) И ACERIA BEZZI (CORTI)
(ACARI:ERIOPHYOIDEA), ДВЕ НОВЕ ВРСТЕ У ФАУНИ БАЛКАНСКОГ
ПОЛУОСТРВА

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И з в о д

У раду су приказани први подаци о ериофидама на врстама рода *Celtis* L. на простору Србије, Црне Горе и БЈР Македоније.

У природним и урбаним стаништима *Celtis australis* L. на 3 локалитета у Србији, 2 локалитета у БЈР Македонија и 1 локалитету у Црној Гори регистроване су врсте *Aceria bezzi* (Corti) и *Reckella celtis* Bag. *R. celtis* регистрована је и на јединственом локалитету *C. caucasiaca* на овим просторима, острву Краља Петра на Преспанском језеру.

У раду се износе подаци о распрострањености и релативној бројности обе врсте ериофида, детаљном опису и развоју симптома, великих пупољака које изазива *A. bezzi* и еринозних симптома које изазива *R. celtis*. Према досадашњим опсервацијама обе врсте су релативно бројније и чешће у парковима и дрворедима у урбаним стаништима, него у природним стаништима.

У хипертрофираним пупољцима *C. australis*, изазваним густим колонијама *A. bezzi* на локалитетима Лепенски вир и Охрид регистрована је и предаторска врста из фамилије Phytoseiidae, *Kampimodromus aberrans* (Ouds.)

У еринозама и на површини листова *C. australis* на локалитетима Лепенски вир и Котор регистрована је предаторска врста из фамилије Phytoseiidae, *Kampimodromus aberrans*, а на локалитету Нови Сад и Београд, *Euseius finlandicus* (Ouds.).

Будући да је *R. celtis* описана као слободноживећа врста, први пут су регистрована карактеристична оштећења и на *C. caucasiaca* и на *C. australis*.

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