

THE GENUS *RUTERIA* ROUDIER, 1954 (CURCULIONIDAE) IN SERBIASNEŽANA PEŠIĆ¹ and N. ILIĆ²¹Faculty of Science, 34000 Kragujevac, Serbia²Vidikovački Venac 83/102, 11000 Belgrade, Serbia

Abstract — The presence of *Ruteria graeca* (Caldara, 1973) and *R. hypocrita* (Boheman, 1837) (93 and 215 specimens respectively) was confirmed among other adult soil weevil material collected at 24 localities on the territory of Serbia between 1995 and 2003 for the most part using pitfall traps. *Ruteria hypocrita* was much more frequent. In both species, males were dominant (36.55 and 37.21%, respectively). Biogeographically, the new *Ruteria graeca* findings are an important supplement completing the picture of the mosaic distribution of this species, endemic to the Balkan Peninsula. Until now, the given species was completely unknown in Serbia, i.e., in the central part of the Balkan Peninsula. Our data show a new northern boundary of its distribution. In addition, we provide ecological details about the finding places of both species. Briefly, different deciduous and mixed deciduous-coniferous woods at various altitudes and on different geological substrates are host ecosystems for *Ruteria*.

Key words: Soil weevils, *Ruteria graeca*, *Ruteria hypocrita*, ecology, Balkan Peninsula, Serbia

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INTRODUCTION

The true weevils (Curculionidae) constitute the largest animal family in the world, which belongs to the superfamily Curculionoidea. Members of this superfamily are predominantly characterized by the presence of an elongated rostrum, geniculate antennae, and small (often concealed) palpi (Lyal, 1993)

This beetle family probably contains half a million species, but only one tenth of them have been described to date (Lyal & King, 1996; Poiras, 1998). Highly variable and adaptable, members of this phytophagous beetle group occupied many ecological niches during co-evolution with their host plants. Among other possibilities, some of them became soil dwellers. One of these soil groups is the subfamily Cryptorhynchinae.

Common morphological characteristics of the Cryptorhynchinae are as rostrum concealed in a groove on the prothorax between the fore coxae; fore tibiae ending in a curved horn on the outside; and an upper body side covered with scales, mostly brown and gray, which create a light and dark design

(Freude et al., 1983). Exceptionally, some New Zealand species are without the prosternal canal (Lyal, 1993).

In contrast to the Bagoinae and some Ceutorhynchinae, which also have a prosternal canal, the Cryptorhynchinae usually live hidden in dark habitats (litter, soil, under bark, etc.).

All Cryptorhynchinae species feed on dead or live plant material. Exceptions are species from Central America (which prefer psyllid larvae) and some from Australia (which feed on herbivore dung). However, the majority of Cryptorhynchinae feed on dead wood (Lyal, 1993).

The genus *Ruteria* Roudier, 1954 belongs to the subfamily Cryptorhynchinae, tribe Cryptorhynchini, subtribe Tylodina. In Europe, it includes 11 (sub)species (Alonso-Zaragoza, 2005) and is distributed all over the Continent, except in its northern part. Our data show that two of them - *R. hypocrita* (Boheman, 1837) and *R. graeca* (Caldara, 1973) (Fig. 1) inhabit Serbia.

A revision of *Ruteria* from the western Palaearctic was made by Wolf (2001). Originally, *Ruteria* was treated as a subgenus of the genus *Echinodera* Wollaston, 1864. On the basis of additional taxonomical characteristics, Smreczyński (1972) treated the earlier subgenera *Echinodera* s. str. and *Ruteria*, as well as the genus *Acalles*, as subgenera of the genus *Acalles*. Finally, Tempère (1978) listed all three groups as genera, which is widely accepted nowadays (Lachowska et al., 2004; Alonso-Zarazaga, 2005). With respect to all morphological characters, the genus *Ruteria* occupies a position between *Echinodera* and *Acalles* (Savitsky, 1997).

The species *R. hypocrita* (Stüben, 1998) belonged to the genus *Echinodera*, subgenus *Ruteria*, before Stüben's revision (Angelov, 1980; Tempère and Péricart, 1989; Abbazzi et al., 1995; Poiras, 1998). It is still treated as *Echinodera hypocrita* in many references and web presentations:

<http://www.koleopterologie.de/gallery/FHL11/fhl11.html>

http://sira.arpat.toscana.it/sira/MedWet/MDW_IT51288401.htm

http://sira.arpat.toscana.it/sira/MedWet/MDW_IT51287101.htm

http://www.labskepiskovce.cz/public/npcs_lp/cz/_biotopy/lesy/kvetnate_buciny.html http://www.labskepiskovce.cz/public/npcs_lp/cz/_flora_fauna/Bezobratli.html

http://www.npcs.cz/public/npcs_cs/img/assets/1097/PP_NPR_Ruzak.pdf

<http://www.curci.de/WeevNews/beitrag25/beitrag25.html>

<http://www.curci.de/Bahr/ungarn.htm>

http://www.inra.fr/opie-insectes/observatoire/listes/l_curcu.htm <http://www.cosys.ro/siculica/acta97/hu/termeszettudomany/kocs.htm>

<http://www.zin.ru/ANIMALIA/COLEOPTERA/>

[pdf/poiras_autoref_rus.pdf](http://www.poiras_autoref_rus.pdf)

<http://www.scienzemfn.uniroma1.it/faunait/F61.DOC>

The latest taxonomical view holds these three groups (*Echinodera*, *Ruteria*, and *Acalles*) to be equal - all of them are genera of the subtribe Tylodina (included in the tribe Cryptorhynchini, subfamily Cryptorhynchinae) (Alonso-Zarazaga and Lyal, 1999; Alonso-Zarazaga, 2005).

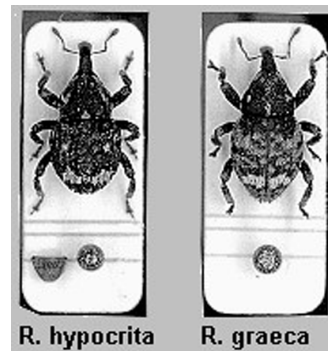


Fig. 1. Habitus of *Ruteria hypocrita* and *R. graeca* [combined from Behne (2002)].

Ruteria hypocrita has a wide distribution that includes almost all of Europe except its northern part and the Iberian Peninsula, whereas *R. graeca* is found on the Balkan Peninsula at the following localities: Ioannina in Greece (the type locality); Mt. Smolika in Greece; the Southern Peloponnesus in Greece; Mt. Durmitor in Montenegro; the Rila and Balkan Mountains in Bulgaria; Mt. Bjelasnica and Jahorina in Bosnia and Herzegovina; and Mts. Velika Kapela and Mala Kapela in Croatia (Behne, 2002; Alonso-Zarazaga, 2005).

MATERIALS AND METHODS

Adult weevil material was collected sporadically from 1995 onward, but much more intensively from 1999 to 2003, at 24 localities in Serbia (Fig. 2, Table 1).

Two collecting techniques were used.

Pitfall traps with acetic acid or red wine were predominantly used during the second part of the collecting period. Traps were buried in the humus

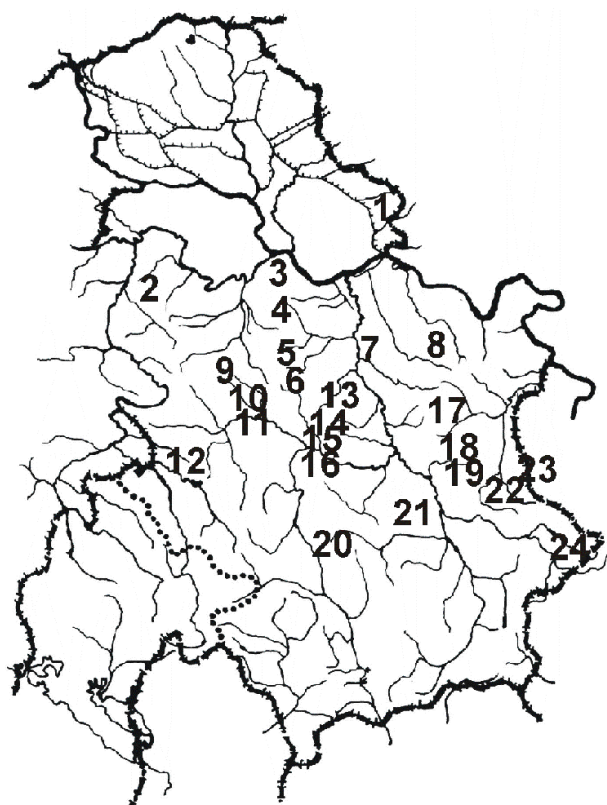


Fig. 2. Positions of researched localities: 1 Vrščko Brdo, 2 Cer, 3 Avala, 4 Kosmaj, 5 Bukulja, 6 Rudnik, 7 Svilajnac, 8 Homoljske Planine, 9 Suvobor, 10 Kablar, 11 Ovčar Banja, 12 Zlatibor, 13 Žeželj, 14 Gledičke Planine, 15 Gruža, 16 Goč, 17 Kučaj, 18 Rtanj, 19 Sokobanja, 20 Kopaonik, 21 Jastrebac, 22 Jalovik, 23 Stara Planina, 24 Vidlič.

layer in different kinds of woods (Table 1). This collecting technique was practiced by N. Ilić (the main collector), Z. Zlatić (who collected on Mts. Kosmaj, Avala, and Cer), Ivan Dimitrijević (who collected in Ovčar Banja), and S. Pešić (who collected in the Gledičke Mts.).

In addition to this, Pešić used Tulgren-Berlese apparatuses to separate living material from soil/litter samples collected in the Gledičke Mts. and on Mts. Suvobor, Rudnik, and Bukulja.

All material was preserved in 75% ethanol. The preparation of material included genitalia separation because the male genitalia are an excellent taxonomic characteristic in this case (Fig. 3).

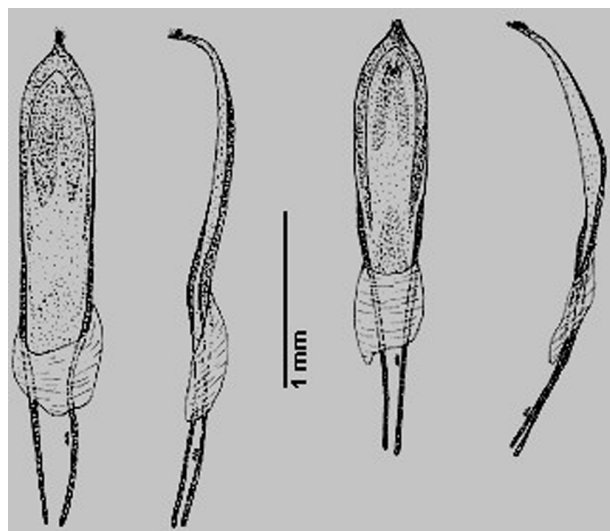


Fig. 3. Aedeagus of *Ruteria hypocrita* and *R. graeca*, dorsal and lateral views [combined from Behne (2002)].

Keys (Angelov, 1980; Freude et al., 1983; Behne, 2002) were used to identify species. Among other characteristics, form of the aedeagus was compared (Fig. 3).

RESULTS AND DISCUSSION

Using the described collecting methods, 308 adult weevil specimens were collected from 1999 to 2003 on the territory of Serbia. The finding places of both species are shown in Fig. 4.

Ruteria hypocrita was more than twice as numerous as *R. graeca* (their ratio was 215:93) (Table 1) and more frequent (it was registered in 19 out of 24 researched places, while *R. graeca* appeared in only nine) (Table 1, Fig. 4).

In comparison with the results of similar research conducted at three localities in Hungary from 1997 to 2000, our materials are much more abundant. In five studies, the investigators found only 16 specimens of *R. hypocrita* in Hungary (Bahr, 2005), mostly by using the sifting technique (13 specimens were collected in this way). Beech woods located between 200 and 900 m a.s.l. were home to 12 (75%) of the Hungarian specimens, while the rest were collected in a mixed beech-oak wood growing at an altitude of 450 m.

Table 1. Data on *Rutera* findings in Serbia. Abbreviations: bw - beech wood, bow - beech-oak wood, ow - oak wood, ohw - oak-hornbeam wood, hw - hornbeam wood, bsw - beech-spruce feer wood, bpw - beech-pine wood.

	Locality	<i>Rutera hypocrita</i>			<i>Rutera graeca</i>			habitat*	altitude	leg.
		males	females	Σ	males	females	Σ			
1	Vršačko Brdo	6	6	12				bw	600 m	N. Ilić
2	Cer	0	1	1	0	1	1	-	600 m	Z. Zlatić
3	Avala	0	4	4				-	450 m	Z. Zlatić
4	Kosmaj	1	1	2				-	-	Z. Zlatić
5	Bukulja	1	1	2	1	3	4	bow	200 m	N. Ilić, S. Pešić
6	Rudnik	23	9	32	18	12	30	bow, ow	500-800 m	N. Ilić, S. Pešić
7	Svilajnac	1	0	1				ow	300 m	N. Ilić
8	Homoljske Pl.	8	7	15				bow	500 m	N. Ilić
9	Suvobor	1	0	1				bw	600 m	S. Pešić
10	Kablar	22	7	29				ohw	650 m	N. Ilić
11	Ovčar Banja	18	10	28	14	5	19	ow	600 m	I. Dimitrijević
12	Zlatibor				0	1	1	bpw	1180 m	N. Ilić
13	Žeželj	0	1	1				bow	450 m	S. Pešić
14	Gledičke Pl.	2	1	3				ohw	550 m	S. Pešić
15	Gruža	1	0	1				bw	350 m	S. Pešić
16	Goč	5	2	7	0	1	1	bsw	750 m	N. Ilić
17	Kučaj				6	0	6	bw	750 m	N. Ilić
18	Rtanj	24	8	32				bw	530 m	N. Ilić
19	Sokobanja	10	4	14				hw	400 m	N. Ilić
20	Kopaonik	0	3	3	5	9	14	bsw	1100 m	N. Ilić
21	Jastrebac	0	1	1				-	-	N. Ilić
22	Jalovik	4	3	7				ohw	510 m	N. Ilić
23	Stara Pl.	2	0	2	15	2	17	bw	800 and 1600 m	N. Ilić
24	Vidlič	6	11	17				ohw	900 m	N. Ilić
TOTALS		135	80	215	59	34	93			

Our collecting places were at different altitudes, from 200 m on Mt. Bukulja to 1600 m in the Stara Planina Mt. It is interesting that *R. graeca* was much more (more than three times!) abundant than *R. hypocrita* at altitudes above 800 m: 32 specimens (34.3%) of it were found there, as opposed to only 22 specimens (10.4%) of *R. hypocrita*. It is surprising that the southern species (*graeca*) was more present at higher altitudes, where chilly climates usually reign. However, if we take microclimatic conditions, exposures, and the complex of other ecological characteristics of our higher-placed localities into consideration, we can find a valid explanation. In terms of ecosystems, *R. graeca* often inhabits beech-coniferous forests, particularly beech-spruce woods (15 or 16%), while *R. hypocrita* was totally absent in a beech-pine forest and only 10 specimens (4.7%)

were collected in a beech-spruce forest. On the other hand, *R. graeca* was not registered at all in mixed oak-hornbeam and pure hornbeam woods, while *R. hypocrita* was quite numerous there, with 56 (26.5%) and 14 (6.6%) specimens, respectively. According to the results of Slovak colleagues (Holecová et al., 2002), *R. hypocrita* as a xylophagous decomposer inhabits 40- to 100-year-old oak-hornbeam forests. It is not dominant, but is a constant species in these forests (Holecová, 2006).

No data on the ecology of *R. graeca* have been presented in the literature to date. Our data constitute the first published remarks about the ecology of this species.

Smreczyński (1972) published some data on

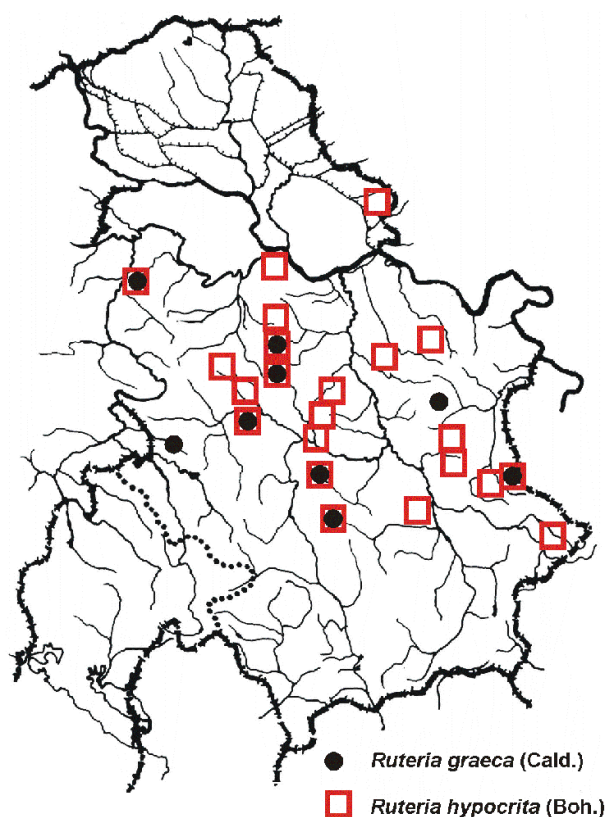


Fig. 4. Finding places of *Ruteria graeca* and *R. hypocrita* in Serbia.

the ecology of *R. hypocrita*: it inhabits submountainous and mountainous deciduous woods, specifically litter, tree-stumps, dead trunks and fallen branches of beech, hazel, and other deciduous trees; in addition to this larvae were found in ash branches. Savitsky (1997) repeats this information in his comparative work on five *Ruteria* species in Russia. Hoffman (1958) gave more data based on his own experience and that of his colleagues: the adult is active from March till September; the larva develops in ash branches; and adults are observed on beech trees and among branches of hazel and dead branches of laurel. It is interesting to note that this species has strong stridulatory capability.

As decomposers of dead wood, *Ruteria* species are highly dependent on the forest cover and wood composition. It can be concluded that wingless soil weevils, including *Echinodera hypocrita* (= *R. hypocrita*), are important indicators of *Fagion*-type forest continuity and stability, as maintained by B e n d a

and Tr ý z n a (2005) (http://www.labskepiskovce.cz/public/npcs_lp/cz/_flora_fauna/Bezobratli.html). In other words, *R. hypocrita* cannot exist without fallen trunks and punks (Holecová et al., 2002; Poiras, 2006), i.e., old trees (Schmidl and Bussler, 2004).

Since the year 1950, *R. hypocrita* has been on the red list of protected species in Bavaria (Sprick et al., 2003).

Biogeographically, it is clear (Fig. 4) that the rivers Sava and Danube are natural barriers in the distribution of *R. graeca* to the north. No soil samples collected on Mt. Fruška Gora, located between these two rivers, contained any *Ruteria* specimens. This confirms that Mt. Fruška Gora, placed like an island on the Pannonian plain between the indicated large rivers, well isolated by these water barriers from all other mountain massifs, both biologically and geographically. The northernmost finding place of *R. graeca* in our research was Mt. Cer and we can conclude that the Sava River itself represents the boundary of the northern distribution of this species. On the other hand, *R. hypocrita* was found on the mountain Vršacko Brdo, which is far to the west and the lowest final spur of the Carpathians.

Finally, the sexual ratio attracts our attention: in both species, males dominate in a ratio of approximately 5:3 (*R. hypocrita*, 135:80; *R. graeca*, 59:34) (Table 1).

Acknowledgment: We are indebted to the collectors, Z. Zlatić and I. Dimitrijević.

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ПОД *RUTERIA* ROUDIER, 1953 (CURCULIONIDAE) У СРБИЈИСНЕЖАНА ПЕШИЋ¹ и Н. ИЛИЋ²¹Природно-математички факултет, 34000 Крагујевац, Србија²Видиковачки Венац 83/102, 11000 Београд, Србија

У периоду од 1995-2003. године на 24 локалитета у Србији утврђено је присуство две врсте из рода *Rutera*: *Rutera graeca* (Caldara, 1973) и *R. hypocrita* (Boheman, 1837). Углавном је коришћена метода клопки са атрактантом. Сакупљено је 93 примерка прве, и 215 друге врсте. *R. hypocrita* је и много фреквентнија. У оквиру сваке врсте је сакупљено више мужјака него женки (удео женки у материјалу прве врсте је био 36,55%, а друге 37,21%). У биогеографском погледу нови подаци за налазе *Rutera graeca* су битни за упот-

пуњавање мозаика распрострањења ове врсте, која је ендем Балканског полуострва. До сада је ова врста била потпуно непозната за територију Србије, тј. централног дела Балканског полуострва. Наши подаци представљају нову северну границу ареала *R. graeca*. Осим тога, изложени су еколошке особености о местима налаза за обе врсте. Најкраће, станишта *Rutera* су различите листопадне и мешовите листопадно-четинарске шуме, на разним надморским висинама и геолошким подлогама.