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FIRST RECORD OF *Berosus geminus* (Reiche et Saulcy, 1856) AND *Enochrus affinis* (Thunberg, 1794) (COLEOPTERA: HYDROPHILIDAE) FOR CROATIAN FAUNA

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Research on aquatic beetle fauna was conducted in the aquatic habitats of Kopački rit Nature Park during the year 2005. One species of water scavenger beetle (Coleoptera, Hydrophilidae) *Berosus geminus* Reiche et Saulcy, which had not been recorded in Croatia before, was found during this inventory research. Although endangered in Europe, the species *Berosus geminus* has an optimal habitat in Kopački rit, as has been proven by the collection of 17 specimens. *Enochrus affinis* Thunberg, was also found during the study, representing the first documented occurrence in Croatia. Both species were found in the unique flooded areas of Kopački rit. Some morphological, biological and distributional features of these two species are discussed.

Hydrophilidae, *Berosus geminus, Enochrus affinis,* first record, flooded area, Kopački rit, Croatia

N. TURIĆ, E. MERDIĆ, Z. CSABAI – *Berosus geminus* (Reiche et Saulcy, 1856) i *Enochrus affinis* (Thunberg, 1794) (Coleoptera: Hydrophilidae) nove vrste u hrvatskoj fauni. Entomol. Croat. Vol. 12. Num 2: 79-86.

Tijekom 2005. godine obavljena je fauna vodenih kukaca u vodenim staništima područja Parka prirode Kopački rit. Tijekom tog istraživanja uzorkovana je vrsta *Berosus geminus* Reiche et Saulcy (Coleoptera, Hydrophilidae), koja do sada nije bila zabilježena u fauni Hrvatske. Vrsta *Berosus geminus,* iako je na europskoj razini ugrožena, na području Kopačkog rita ima optimalno stanište, na što upućuje uzorak od 17 uhvaćenih jedinki. Vrsta *Enochrus affinis* Thunberg, koja je također uzorkovana tijekom tog istraživanja, potvrda je nalaza za Hrvatsku. Staništa obje vrste karakteristična su poplavna područja Kopačkog rita. U radu su prikazana neka morfološka i biološka obilježja i rasprostranjenost obje vrste.

Hydrophilidae, *Berosus geminus, Enochrus affinis,* prvi nalaz, poplavno područje, Kopački rit, Hrvatska

Introduction

Aquatic beetle fauna is poorly explored in Croatia. The fauna of aquatic Heteroptera has been more thoroughly explored than that of aquatic Coleoptera. Despite the fact that the Coleoptera are the most numerous order in Croatia, only a small number of entomologists deal with it. The current list of Coleoptera present in Croatia, published in 1882 is completely obsolete and unreliable (Milošević, 2002). The documentation for the list was lost, it anyway covered only certain parts of Croatia, and the nomenclature is now obsolete. The first and only published research dates from the beginning of the 20th century and was performed by Koča Gjuro from Vinkovci. In the Papuk region he discovered a few species of the families Dytiscidae, Gyrinidae and Hydrophilidae (Koča, 1900). Six years later he published a list of several species of Coleoptera beetles found near Vinkovci. The list also included a few species of aquatic Coleoptera from the families Noteridae, Dytiscidae, Gyrinidae and Hydrophilidae (Koča, 1906). The aquatic beetle fauna of Kopački rit Nature Park is still almost completely unknown. One recent survey found 12 water scavenger beetle (Hydrophilidae) species from four sampling sites (Merdić et al., 2005).

Materials and methods

Sampling was performed in the flooded areas of Kopački rit during the year 2005. The sampling stations included Novi Kanal channel and two stations in the Channel of Čonakut (Figure 1).

The samples were collected using a hand net 60 cm in diameter. The net was attached to a 3-metre long wooden handle. This method enabled the collection of the greatest amount of material with the greatest diversity in the shortest amount of time. Each sampling consisted of five strokes on the waterline affecting the aquatic and subaquatic vegetation of the littoral zone, so that a sampling area of 3 m^2 would be achieved.

Collected specimens were fixed in 70 % ethanol, dried, pinned and identified. The following keys were used for the identification: Csabai et al. (2002), Hebauer & Klausnitzer (1998), Klausnitzer (1996), Schödl (1993) and Drost et al. (1992). All specimens were labelled and stored in the Department of Biology at the Josip Juraj Strossmayer University in Osijek.

Figure 1. Sampling sites where *Berosus geminus* (1 Čonakut I, 2 Čonakut II, 3 Novi kanal) and *Enochrus affinis* (3 Novi kanal) were found in Nature Park Kopački rit

Results

Berosus geminus (s.str.) Reiche and Saulcy, 1856

Material examined: Croatia, Osijek-Baranya County, Kopački rit Nature Park, 15 km NE of Osijek, Čonakut I /N 45º 36' 35" E 18º 48' 24"/ 21.04. 2005, 1 spec. ♀, 06. 05. 2005, 7 spec. 6 ♀, 1 ♂, 20. 05. 2005, 1 spec. ♀, leg. Turić &

Merdić, det. Turić & Csabai; Čonakut II / N 45º 36' 17" E 18º 49'/ 06. 04. 2005, 1 spec. ♀, 21. 04. 2005, 1 spec. ♂, 29. 07. 2005, 1 spec. ♀, leg. Turić & Merdić, det. Turić & Csabai; Novi kanal / N 45º 36' 11" E 18º 47' 90"/ 06. 05. 2005, 5 spec. 2 ♂, 3 ♀, leg. Turić & Merdić, det. Turić & Csabai

a

b

Figure 2. *Berosus geminus* (Reiche and Saulcy, 1856) habitus. a - dorsal view; b - lateral view (photo Turić)

Description: The body is short and oval and widens in the back (Figure 2a). Its length is 4.5-6.0 mm, the dorsal part is a yellow-brownish colour, while the head is metallic-green, sharp and densely punctuated (Schödl, 1993, Csabai et al., 2002). The pronotum has black punctuations and a dark metallic mark. The elytra have punctual series forming longitudinal striae and between these striae are fields with less distinctive punctuations (Figure 2b). Larger punctuations are on the third field. On either side of the middle of the elytra there is one noticeable dark spot. There are dark spots also from the eighth to tenth fields. The female's elytra edges are sharp and the male's are rounded. The ventral side of body is dark brown to black. Mentum is glossy with a few punctuations. Lateral endings of the metasternum in males are wider and the metasternal spine has a broad keel. The fifth sternit is concave on the edge with two sharp teeth. The apex of the parameres is narrow in the upper quarter.

Differential diagnosis: This species is similar to the species *Berosus signaticollis*. One difference between these two species inheres in the distribution of the punctuations on the elytra. The punctuations on *Berosus signaticollis* are not so evenly distributed as on *Berosus geminus*. The species *Berosus signaticollis* is characterized by multi-striped punctuations after the fourth striae while fields 3, 5 and 7 disclose rougher and more distinctive punctuations (Csabai et al., 2002). Another difference is the appearance of the fifth sternit and aedeagus. *Berosus signaticollis* does not have a keel on the sternit; it has uplift in the form of a hump and the aedeagus parameres are wide (Schödl, 1993, Hebauer & Klausnitzer, 1998).

Biology: The habitat of the species consists of the detritus of stagnant waters and ditches. The developmental stage of the beetle starts with the laying of eggs in spring or early summer, common to all the species belonging to the Hydrophilidae family. The Hydrophilidae are characterized by the production of a case protecting eggs using the female genitalia and appendage glands. The females of the *Berosus* genus weave a cocoon where they lay three eggs and stick them to stones, trees or fallen leaves (Wichard, 2002). After a week or two a larva emerges from an egg and transforms into a pupa that digs itself into the ground. Finally, after moulting an adult beetle is grown from the pupa. Hibernation occurs only in the adult stage (Nilsson, 1996).

Distribution: The species range is still uncertain because of the difficult identification. *Berosus geminus* was for a long time identified as *Berosus signaticollis*. The species has been noted in Austria, Hungary, Germany, Romania,

Italy, Czech Republic and Slovakia (Schödl, 1993, Hansen, 1999, Löbl & Smetana, 2004). Until recently, only one Hungarian habitat of the species was known, in Kaposvár, but in 2002, it was registered at two other localities (Csabai et al., 2002).

Enochrus affinis Thunberg, 1794

Material examined: Croatia, Osijek-Baranya County, Kopački rit Nature Park, 15 km NE of Osijek, Novi kanal /N 45º 36' 11'' E 18º 47' 90''/ 06.04. 2005, 1 spec., ♀, leg Turić & Merdić, det. Turić & Csabai

Description: The body is 3.0-3.9 mm long, oval and yellow-brownish or dark-brownish in colour, lighter on the sides and apex (Hansen, 1987, Csabai et al., 2002). The whole dorsal side of the body is densely punctuate and shiny among the punctures. From one half to all of the last segment of the maxillary palpus is black and shorter than the previous segment. The middle of the protonum is widely dark, without a punctuate ellipse. The band of elytral sutura is black. The points of the ventral side of the elytra are visible in dorsal view. The elytra are without stronger point-rows; aedeagus has a long narrow median lobe; apex of parameres sharply pointed and characteristically bending out (Hansen, 1987, Csabai et al., 2002). The penis is long and narrow (Csabai et al., 2002).

Differential diagnosis: This species is similar to the species *Enochrus nigritus*. One main difference is the slightly sparser punctuation of the dorsal surface on the average, especially on the pronotum of the species *Enochrus nigritus*. In addition, the aedegus of both species has a long narrow median lobe, but the apex of the parameres is more bluntly rounded in *Enochrus nigritus,* not bending outwards (Hansen, 1987).

Biology: This is an acidophilic species, which populates mainly wetlands, temporary flooded areas, stagnant fresh waters, slow running waters and shaded waters in woodlands (Hansen, 1987, Csabai et al., 2002). It prefers variably eutrophic waters abundant with species of the genera *Carex* and *Sphagnum* (Csabai et al., 2002). The eggs are laid in spring or early summer adults appear in the middle or at the end of summer and hibernation occurs only in the adult stage. (Nilsson, 1996).

Distribution: A very common species, widespread throughout Denmark and Fennoscandia (Hansen, 1987). As a Palaearctic species, the beetles are spread

from southern to northern Italy and from France to the Black Sea (Csabai et al., 2002).

Discussion

A list of Croatian insect fauna is available on the official webpage of the Croatian Entomologic Society (www.agr.hr), but a list of Coleoptera has not yet been compiled. According to all available data prior to this study, there are 222 species of aquatic beetles in Croatia, and *Berosus geminus* and *Enochrus affinis* were not previously recorded. In a previous study, conducted in 2005, neither species was found in Kopački rit (Merdić et al., 2005).

Berosus geminus was abundant in the flooded research area and backwater depressions, both of which are temporary water habitats. This species was recorded during April and May. According to Betzer (Betzer et al., 2003), species of the genus Berosus are founded in flooded wetlands with highest population density during spring. This finding is significant, because *Berosus geminus* is noted in the red list of the endangered species of Germany, Hungary and the Czech Republic. According to the IUCN (International Union for Conservation of Nature) categorization it is an endangered species (EN), belonging to the second category of endangerment, with a very high risk of extinction (Hebauer et. al., 2003). In Hungary this species is regarded as extremely rare (Csabai, 2003).

Enochrus affinis is mentioned as possibly occurring in Croatia in a catalogue by Hansen (1999). Our data confirm its occurrence for Croatian fauna.

The confirmation of both these species by our research, and particularly that of *Berosus geminus,* indicates the need for future targeted investigation of the group Coleoptera in Croatia.

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