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PENSOFT

New records of *Hydraena schuleri* Ganglbauer, 1901 from Slovakia (Coleoptera, Hydraenidae)

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Abstract

Hydraena schuleri Ganglbauer, 1901 was rediscovered after 18 years in Starý Potok, a small stream in eastern Slovakia, and we recorded it, for the first time, from the small rivers Stará Rieka and Udava in southern and eastern Slovakia. Adults were collected mainly from submerged moss growing on rocks in shallow water, where they were found together with *Hydraena minutissima* Stephens, 1929, *H. pulchella* Germar, 1824, *H. pygmaea* Waterhouse, 1833; *Ochthebius colveranus* Ferro, 1979, *O. melanescens* Dalla Torre, 1877, and *O. metallescens* Rosenhauer, 1847. We provide illustrations of the habitus and aedeagus, and a distribution map.

Keywords

Distribution, moss, new records, species diversity

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Introduction

Hydraena schuleri Ganglbauer, 1901 (Coleoptera, Hydraenidae), one of the smallest European species of *Hydraena* Kugelann, 1794, was described from the town of Hranice in Moravia (Czechia) based on specimens from Bečva River or one of its tributaries. Hrbáček (1951) collected *H. schuleri* in nine other localities in the Bečva and Ostravice river basins. Due to anthropogenic pressures in the last 30 years, *H. schuleri* is currently restricted to higher elevations in Moravia, where it occurs in gravel or debris, and sometimes on exposed rootlets of small streams (Boukal et al. 2007; Straka et al. 2012).

Records from Slovakia are very scarce. They include specimens from Trenčín (Hrbáček 1951), Rajčianka River near Čičmany (Šporka et al. 1998), and several additional specimens discovered in eastern Slovakia in 1989 and 2003 (Kodada et al. 2003; Mišíková Elexová et al. 2010).

Recent sampling in central and eastern Slovakia yielded rich material of Hydraenidae, which included also three specimens of *H. schuleri*. These records are commented below.

Methods

We used a D-frame hand net applying a multi-habitat scheme to sample major habitats proportionally according

to their presence within a sampling reach. Additionally, we sampled microhabitats covering less than 5% of the studied area, such as submerged moss on stones and exposed submerged fine rootlets of *Alnus glutinosa* (L.) Gaertn. Generally, we sampled by positioning the net and disturbing the substrate for a distance that equals the square of the frame width upstream of the net. When taking samples from moss, we positioned the net immediately downstream of the moss, while the moss was very gently combed by hand, enabling the specimens to floated into the net. Submerged rootlets were similarly combed by hand or by a soft brush. After several replicates, we rinsed the collected material two or three times with stream water, and we sorted specimens directly in the field. Specimens were immediately preserved in 96% ethanol.

The material examined is deposited in the collection of Ján Kodada, Department of Zoology, Comenius University, Bratislava, Slovakia (CKB).

We examined specimens using a Leica M205C stereomicroscope with fusion optics and diffuse lighting at magnifications up to 160×. Habitus photographs were produced with a Zeiss Axio-Zoom.V-16 stereomicroscope with diffuse LED lighting and a Canon 5D Mark IV camera attached. The habitus photograph was created by using the image-stacking software ZereneStacker (https://zerenesystems.com/cms/stacker). The aedeagus was studied and photographed at magnifications up to 600× using a Zeiss Axioscope 5/7 KMAT microscope with a Zeiss Axiocam 208 camera attached.

Figure 1. Habitats of *Hydraena schuleri* Ganglbauer, 1901 in Slovakia. **A.** Adidovce env., Udava River. **B.** Hermanovce nad Topľou env., Starý Potok.

Results

Hydraena schuleri Ganglbauer, 1901

Type locality. Czechia, Moravia, Olomouc Region, Hranice (Mährisch-Weißkirchen).

Type material. Lectotype male (designated by Jäch 1990) and 17 paralectotypes, all deposited in the Naturhistorisches Museum Wien, Austria.

New records. SLOVAKIA – **Banská Bystrica Region** • Horné Strháre env., Stará Rieka; 48°16′24.0″N, 019° 21′17.9″E; 250 m alt.; 18.VIII.2021; J. Kodada & K. Ondrejková leg.; 1 ♀ (CKB 20211) – **Prešov Region** • Adidovce env., Udava River; between 49°01′34.0″N, 022° 02′40.8″E and 49°01′26.2″N, 022°02′35.2″E; 210 m alt.; 9–10.IX.2021; J. Kodada & D. Selnekovič leg.; 1 ♀ (CKB 20212) – **Prešov Region** • Hermanovce nad Topľou env., Starý Potok, 48°57′57.2″N, 021°29′05.4″E; 500 m alt.; 12.IX.2021; J. Kodada & D. Selnekovič leg.; 1 ♂ (CKB 20213).

Additional material examined (from Mišíková Elexová et al. 2010). SLOVAKIA – **Prešov Region** • Hermanovce nad Topľou env., Starý Potok; 48°57′57.2″N, 021°29′05.4″E; 500 m alt.; 18.X.2003; 3 ♀ (CKB).

Identification. Body 1.6–1.8 mm long, ratio of elytral length/elytral width = 1.27, ratio of pronotal width/pronotal length = 1.30, and ratio of pronotal width/elytral width = 0.72 (Trizzino et al. 2013). Body uniformly reddish-brown to pale brown (Fig. 2A). Anterior margin of labrum notched. Frons irregularly punctate medially and laterally; puncture diameters moderately larger than one ocellus diameter. Pronotum cordiform with lateral margins denticulate; pronotal disc relatively convex, punctation similar to that on head, rather dense anteriorly and posteriorly and sparser along midline and in sublateral sulci. Elytra slightly convex and elongate, parallel-sided in proximal half, apically convergent in both sexes. All male tibiae simple; without typical fringe of long setae and teeth along mesal face.

According to Trizzino et al. (2013), males of *H. schuleri* are easily distinguished from the other species of the "*Haenydra*" lineage by the absence of the fringe of setae in the male metatibiae and by the shape of the male genitalia (Fig. 2B).

Interestingly, living specimens of *H. schuleri* had a very intense reddish-brown color, which distinguished them from other co-occurring *Hydraena* species. After fixation and preparation, the specimens rapidly became paler.

Habitat. According to Jäch et al. (2005), this species occurs in different types of flowing water from hypocrenal to epipotamal.

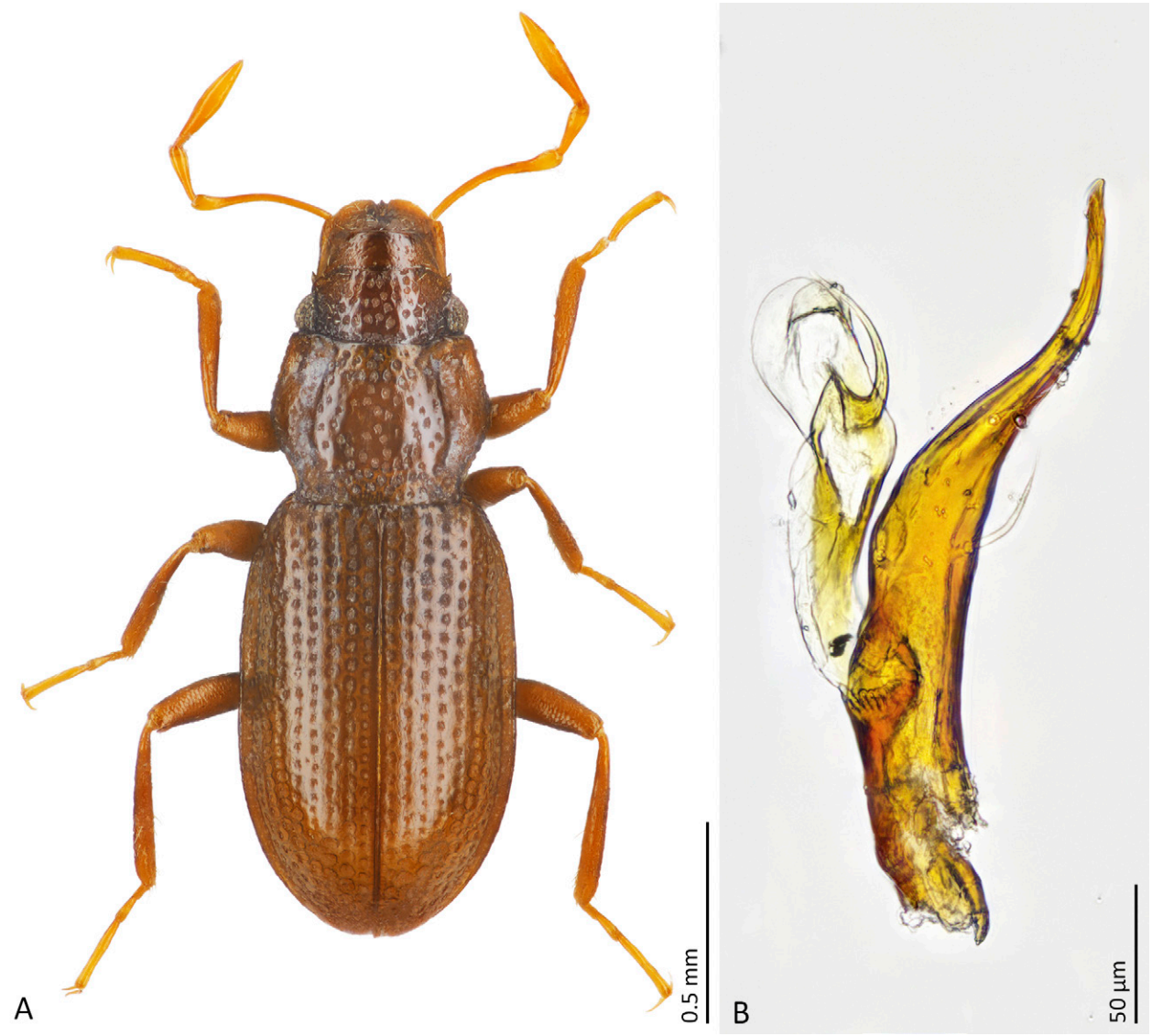

Figure 2. *Hydraena schuleri* Ganglbauer, 1901. **A.** Habitus, male, length 1.8 mm. **B.** Aedeagus, lateral view, base partly damaged.

Distribution (Fig. 3). A generally Central and Eastern European species recorded from southeastern Germany, southern Poland, Czechia, Slovakia, eastern Austria, northeastern Italy, northern Croatia, Slovenia, Romania, and the western Ukraine (Trizzino et al. 2013; Jäch and Skale 2015).

Discussion

Data on the distribution of *Hydraena schuleri* are somewhat scattered, and Trizzino et al. (2013) listed only 95 records/specimens from 80 localities. In Slovakia, hydrobiological and entomological research started mainly after the Second World War during the era of the Czechoslovak Republic. We assume that additional suitable localities are still present in the less industrialized areas in eastern and central Slovakia.

The record from Rajčianka River (Šporka et al. 1998) is somewhat questionable. In table 1 (p. 43), they listed three *H. riparia* Kugelann, 1794 and 40 specimens of *H. schuleri*. Unfortunately, the specimens are not available, and verification of the data is therefore impossible. Usually, the most common *Hydraena* species in Slovakia is *H. gracilis*, which was not listed by Šporka et al. (1998) at all. Thus, a misidentification cannot be ruled out.

The microhabitats of *H. schuleri* in all examined localities are mainly submerged moss on stones. In all the localities, we collected *H. schuleri* together with *H. minutissima* Stephens, 1929, *H. pulchella* Germar, 1824, and *H. pygmaea* Waterhouse, 1833. In the Udava River and Starý Potok, we also recorded *Ochthebius colveranus* Ferro, 1979, *O. melanescens* Dalla Torre, 1877, and *O. metallescens metallescens* Rosenhauer, 1847.

In Poland, *H. schuleri* is confirmed from the Western Beskids and the Bieszczady Mountains (Przewoźny and Ruta 2010). From Hungary, only two females from the Mátra and Pilis mountains have been recorded (Lőkkös et al. 2011). Straka et al. (2012) published Czech records from three localities in the Bílé Karpaty Protected Landscape Area.

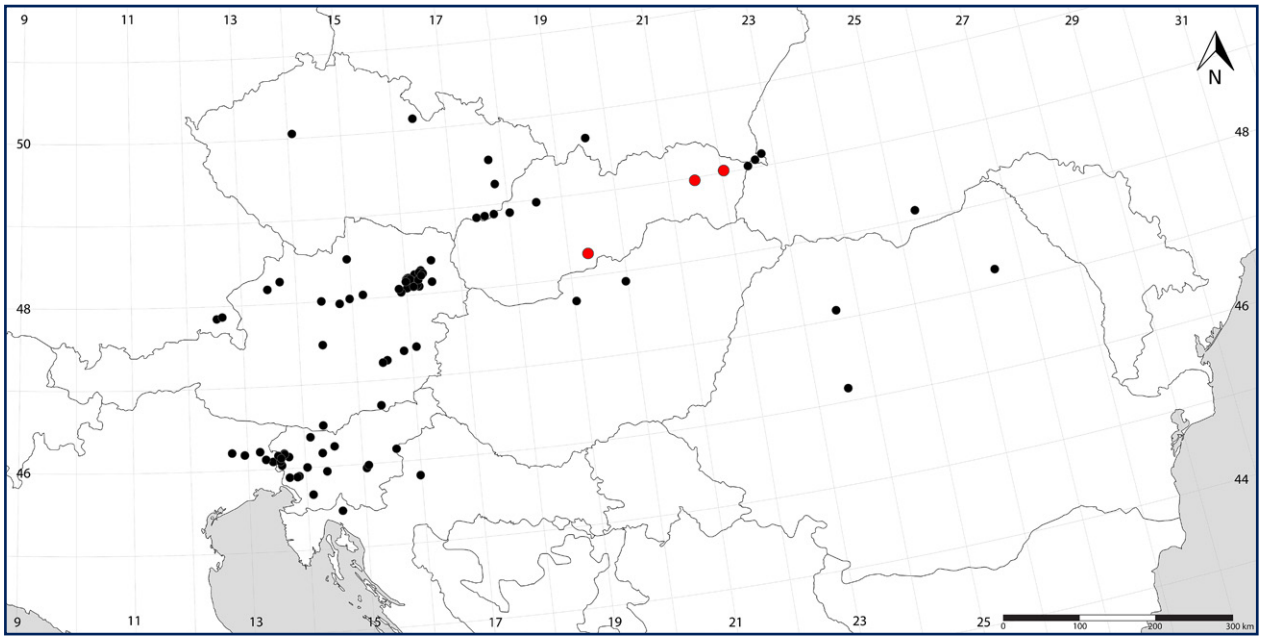

Figure 3. Distribution of *Hydraena schuleri* Ganglbauer, 1901. Recent records from Slovakia are highlighted in red. The other records were taken from Hrbáček (1951), Šporka et al. (1998), Przewoźny and Ruta (2010), Lőkkös et al. (2011), Straka et al. (2012), Trizzino et al. (2013), and the database of the Naturhistorisches Museum Wien.

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The Slovak Research and Development Agency (project APVV-19-0076) and VEGA (project 1/0515/19) partly supported the study. Alica Christophoryová helped preparing the habitus photograph. We would like to thank the reviewers, Helena V. Shaverdo (Naturhistorisches Museum Wien, Austria), and Michal Straka (Faculty of Science, Masaryk University in Brno), for their comments, which have improved the quality of the manuscript.

Authors' Contributions

Conceptualization: JK, MAJ. Funding acquisition: JK. Project administration: JK. Writing – original draft: JK. Writing – review and editing: MAJ, DS, KO.

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