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First record of *Rheocricotopus* (s. str.) *reduncus* Sæther & Schnell, 1988 (Diptera: Chironomidae) from Slovakia: a new glacial relict found in the Tatra Mountains

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With 2 figures and 1 table

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Pupal exuviae of *Rheocricotopus reduncus* Sæther & Schnell were firstly recorded in Slovakia from the subalpine Tatra lake (Vyšné Furkotské pleso). The finding is indeed interesting considering the very rare and patchy distribution of *R. reduncus* in the Palaearctic: it has only been recorded in Norway, Finland and NW Russia and Wrangel Island. The recent northern distribution and the new record suggest that *R. reduncus* could be a relict of the glacial fauna that existed in this region during the last glaciation.

1 Introduction

Glacial relicts are organisms that have survived from the ice age on a certain territory in isolated habitats owing to a particularly favourable microclimate of the habitats. Lakes of glacial origin in the Tatra Mountains, due to their high altitude and cold temperature, can serve as ideal environment for hosting glacial relicts, such as the fairy shrimp *Branchinecta paludosa* O. F. Müller, 1788. Recently is *B. paludosa* widely distributed in the fishless lakes of the Arctic tundra of Eurasia between latitudes of 60 and 77 north; further populations exist as far south as the Tatra Mountains in C Europe (Saunders et al. 1993). It is very likely that *B. paludosa* is not the only aquatic macroinvertebrate that survived in alpine lakes of the Tatra Mts. after the last glaciation. In the present paper we report on a Chironomidae species with a distribution pattern indicating that it is most likely a relict of the last ice age in Slovakia. Interestingly it was recorded in the same lake as *B. paludosa*.

2 Material and methods

The study lake, Vyšné Furkotské pleso (Fig. 1), is situated in the High Tatra Mountains (the West Carpathians; 49°10′ N, 020°10′ E). Comprehensive description of the relevant hydrology, soil and vegetation attributes of the Tatra Mountains can be found in Bitušík et al. (2006). For basic parameters of the study lake see Tab. 1.

Chironomid pupal exuviae were collected from the water surface using a circular net (mesh size 0.25 mm). The collected material was preserved with 4 % formaldehyde and transferred to laboratory where organisms were hand sorted. After mounting exuviae on slides, specimens were identified using a compound microscope (400× magnification with phase contrast). Langton (1991) and Langton & Visser (2003) were used as identification literature. The material is deposited in the Department of Biology and Ecology, Matej Bel University, Banská Bystrica, Slovakia.

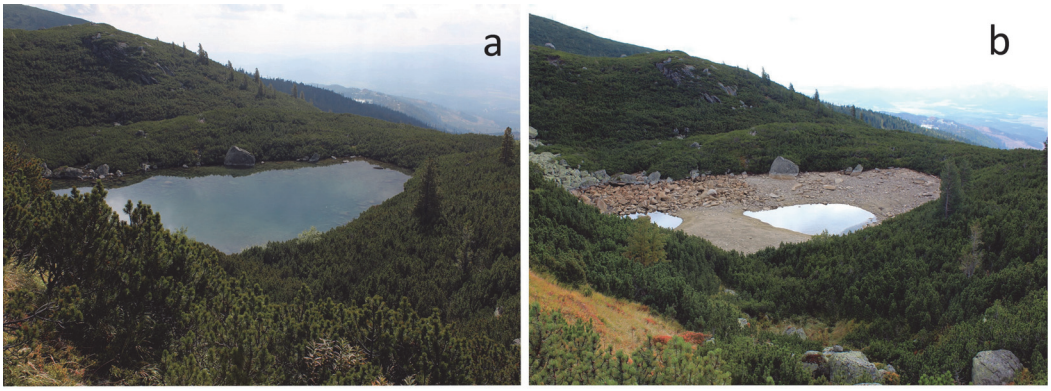

Fig. 1: View of Vyšné Furkotské pleso lake, Furkotská valley, in the Tatra Mountains. a = standard condition, b = drought condition (September 2009)

Tab. 1: Basic parameters of Vyšné Furkotské pleso (Novikmec et al. 2013)

Variable	Value
Coordinates	49°08′38" N
	20°01′54" E
Altitude (m)	1698
Lake area (m²)	4080
Volume (m³)	3306
Maximum depth (m)	2.4
Average depth (m)	0.8

3 Results and discussion

Diptera: Chironomidae: Orthocladiinae: *Rheocricotopus* (s. str.) *reduncus* Sæther & Schnell, 1988

Material: 15 pupal exuviae (12-06-2011), leg. P. Bitušík, det. L. Hamerlík, P. Bitušík. Figure 2 shows details of the exuvia of *R. reduncus*.

The species has probably Palaearctic distribution: it is very rare in Europe, only known from Norway (Sæther & Schnell 1988), Finland (Paasivirta 2014) and NW Russia (Krasheninnikov 2014); it has also been recorded in East Palaearctic (Makarchenko & Makarchenko 2005). Prior to the discovery on Wrangel Island the species was known only from Norway, from a glacier-fed stream close to the Jostedal Glacier, and it was considered endemic (Makarchenko & Makarchenko 2005).

The new record in Slovakia is noteworthy not only because it was found far south of the other known localities but also, because the site does not suit completely the species' original biotope: this time it was collected from a lake. Lake Vyšné Furkotské pleso is unique among other Tatra lakes: due to its sandy bottom the lake is permeable and the water level is maintained by a strong subsurface inlet (Fig. 1a). During dry seasons, such as autumn and winter, however, the inlet sometimes dries out and the lake surface level drops dramatically (Fig. 1b).

Exuviae of *Limnophyes* sp., *Pseudorthocladius* sp. and *Paratanytarsus austriacus* were also recorded from the lake during the sampling. The first two taxa are semi-terrestric and thus their occurrence is not surprising for a lake alternating wet and dry phases. Presence of *Pseudodiamesa nivosa* in the lake (Krno et al. 2006) is, however, surprising, given the fact that it is characteristicfor very cold ultraoligotrophic lakes and Vyšne Furkotské pleso is a subalpine lake with milder temperature regime. We cannot exclude though, that, as other alpine and arctic species, it can cope not only with cold temperature but also with freezing and drying out of its biotope. The

common factor driving the occurrence of *B. paludosa, P. nivosa* and *R. reduncus* can be thus the special hydrological regime of lake Vyšné Furkotské pleso.

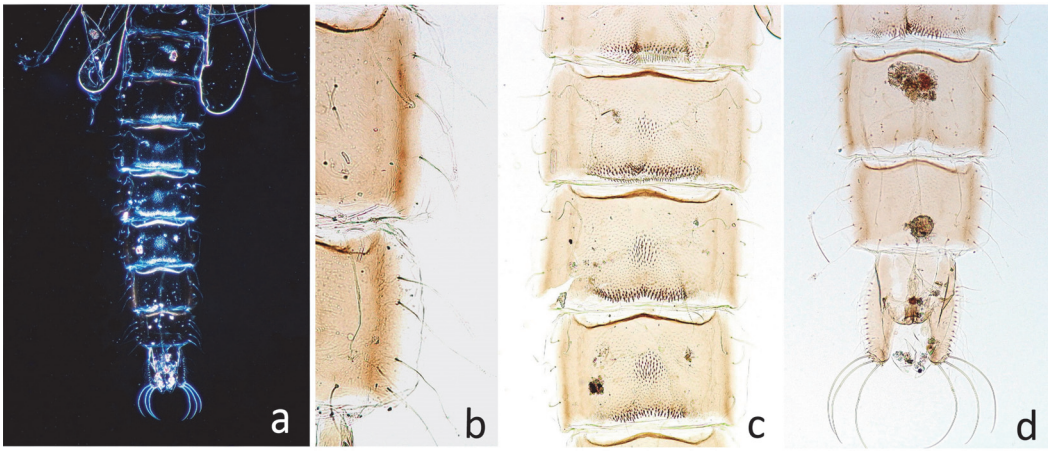

Fig. 2: *Rheocricotopus reduncus*. a = abdominal tergits I-IX (phase contrast), b = lateral setation of segments VII (3 filaments) and VIII (4 filaments), c = circular median point patches on tergits IV-VI, d = anal lobe with lateral setae and macrosetae

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