

Where the rare species hide: a new record of *Parachironomus monochromus* (van der Wulp, 1874) for Slovakia from artificial urban waterbodies

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Abstract

Parachironomus monochromus (van der Wulp, 1874) was recorded for the first time in Slovakia in an urban pond and a city fountain along with a total of 27 other chironomid taxa recorded both as larvae and pupal exuviae. Our finding emphasizes the role of urban waterbodies as habitats for rare species and for maintaining and documenting aquatic biodiversity in cities.

Introduction

Urban waterbodies are common but usually neglected habitats by limnologists (Davies et al. 2009). Knowledge on the exact number and distribution of urban ponds in cities on a global scale as well as contribution of these waterbodies to biodiversity remains fragmentary (Hassall et al. 2016). Even though there is a general pattern of biodiversity decline from rural areas to the urban core (McKinney 2008), previous studies have shown that ponds within urban areas can provide considerable biodiversity habitat (Hassall and Anderson 2015). Even city fountains, as extremely simple temporal aquatic habitats, can support high diversity and unusual communities (for review see Čerba and Hamerlík 2022). To emphasize the importance of small urban waterbodies and how they harbour unknown diversity, here we present a new record of *Parachironomus monochromus* for Slovakia from an urban pond and a city fountain.

Material and methods

The study sites are located in the city of Banská Bystrica, Slovakia, central Europe. With about 80 thousand inhabitants, it is the sixth most populous city in Slovakia. The pond is located in the suburbs, in the garden of the Matej Bel University and is surrounded by a meadow and scattered apple trees (Fig. 1, left). It harbours a population of Koi carp (*Cyprinus carpio haematopterus* Martens, 1876) and aquatic plants (genera *Myriophyllum*, *Nymphaea* and *Typha*) fill up most of its water volume.

The fountain is located in the historic centre of the city on the main square surrounded by historic buildings and impermeable stone pavement (Fig. 1, right). Basic characteristics of the sites are presented in Table 1.

Chironomid pupal exuviae (CPET, Wilson and Ruse 2005) were collected from the water surface using a circular net (mesh size 0.5 mm) from the end of April to the end of October in weekly (pond) or biweekly (fountain) intervals. Larvae collected accidentally in the drift samples were also processed in the study. The



Figure 1. View of the urban pond (left) and city fountain (right) in Banská Bystrica, where *Parachironomus monochromus* exuviae were collected. Photo: S Bartóková and L Hamerlík.

Table 1. Basic characteristics of the study sites.

		Pond	Fountain
Latitude		48°44'29.03"N	48°44'07.1"N
Longitude		19°07'26.30"E	19°08'42.5"E
Altitude (m a.s.l.)		401	357
Max depth (cm)		100	60
Area (m ²)		15	62
Temperature (°C)	mean	15.8	17.4
	max.	22.5	22.9
	min.	5.4	12.3
pH	mean	7.7	8.5
	max.	8.6	8.9
	min.	6.4	6.8
Conductivity (mS cm ⁻¹)	mean	259	531
	max.	343	664
	min.	45	412
No. of chironomid taxa		18	16

material collected was preserved with 4% formaldehyde and transferred to the laboratory where organisms were hand sorted. Pupal exuviae were mounted on permanent slides and identified using a compound microscope (400 × magnification) with a reference to Langton and Visser (2003). The material is deposited at the Department of Biology and Ecology, Matej Bel University, Banská Bystrica, Slovakia.

Results and discussion

The surveyed urban waterbodies harbored 16 to 18 chironomid species (see Table 2). In the pond, Chironomini, such as *Chironomus* spp., *Dicrotendipes lobiger* and *Paratanytarsus laccophilus* dominated, while in the fountain orthoclads, especially *Psectrocladius limbatellus* and *Cricotopus sylvestris* prevailed.

An important discovery was the documentation of *Parachironomus monochromus* (van der Wulp, 1874) which is the first record of this species in Slovakia. A total of 19 pupal exuviae of *P. monochromus* were recorded in an urban pond between 12 May and 7 September, 2021. Additionally, 4 pupal exuviae were collected in a city fountain on 27 August, 2021.

Parachironomus monochromus belongs to the *P. arcuatus* group sensu Moller Pillot (1984). *P. monochromus* has Palaearctic distribution and occurs in the majority of European countries (Sæther and Spies, 2013). The species has been recorded mainly from small waterbodies, such as pools and ditches, however few records are known from oligotrophic to eutrophic lakes and flowing waters (Moller Pillot 2013 and references therein). In terms of pH, Moller Pillot (2013) suggest the species is mostly known from waterbodies with generally high pH, with only one record from a pool with pH between 5 and 6.

Table 2. List of chironomid taxa found in the surveyed urban waterbodies. PE = pupal exuviae, L = larvae.

Taxon/ Site	Urban pond		City fountain	
	PE	L	PE	L
Tanypodinae				
<i>Monopelopia tenuicalcar</i> (Kieffer, 1915)	-	+	-	-
<i>Macropelopia nebulosa</i> (Meigen, 1804)	-	-	+	-
<i>Procladius (Holotanypus) choreus</i> (Meigen, 1804)	+	-	+	-
<i>Zavreliomyia</i> sp.	-	+	-	-

Taxon/ Site	Urban pond		City fountain	
	PE	L	PE	L
Orthocladiinae				
<i>Acricotopus lucens</i> (Zetterstedt, 1850)	+	+	+	-
<i>Corynoneura scutellata</i> gr.	-	+	-	-
<i>Cricotopus (Isocladius) ornatus</i> (Meigen, 1818)	-	-	+	-
<i>Cricotopus (Isocladius) reversus</i> Hirvenoja, 1973/ <i>intersectus</i> (Staeger, 1839)	+	-	+	-
<i>Cricotopus (Isocladius) sylvestris</i> (Fabricius, 1794)	-	-	+	-
<i>Cricotopus (Isocladius) trifasciatus</i> (Meigen, 1813)	+	-	-	-
<i>Eukiefferiella coerulescens</i> (Kieffer, 1926)	-	-	+	-
<i>Limnophyes</i> sp.	-	+	-	-
<i>Orthocladius (Eudactylocladius) fuscimanus</i> (Kieffer and Thienemann, 1908)	+	-	+	-
<i>Paracricotopus niger</i> (Kieffer, 1913)	-	-	+	-
<i>Paratrachocladius rufiventris</i> (Meigen, 1830)	-	-	+	-
<i>Psectrocladius (Psectrocladius) limbatellus</i> (Holmgren, 1869)	+	+	+	-
Chironominae				
<i>Chironomus</i> spp.	+	+	+	-
<i>Dicrotendipes lobiger</i> (Kieffer, 1921)	+	+	-	-
<i>Dicrotendipes modestus</i> (Say, 1823)	+	-	-	-
<i>Glyptotendipes (Glyptotendipes) cf. scirpi</i> (Edwards, 1929)	-	+	-	-
<i>Parachironomus monochromus</i> (Wulp, 1858)	+	-	+	-
<i>Polypedilum cf. nubeculosum</i> (Meigen, 1804)	-	-	-	+
<i>Polypedilum nubifer</i> (Skuse, 1889)	-	-	-	+
<i>Polypedilum (Pentapedilum) cf. uncinatum</i> (Goetghebuer, 1921)	+	-	-	-
<i>Micropsectra lindrothi</i> (Goetghebuer, 1931)	-	-	+	-
<i>Paratanytarsus laccophilus</i> (Edwards, 1929)	+	-	-	-
<i>Paratanytarsus bituberculatus</i> (Edwards, 1929)	+	-	-	-
<i>Tanytarsus mendax</i> (Kieffer, 1925)	-	-	+	-

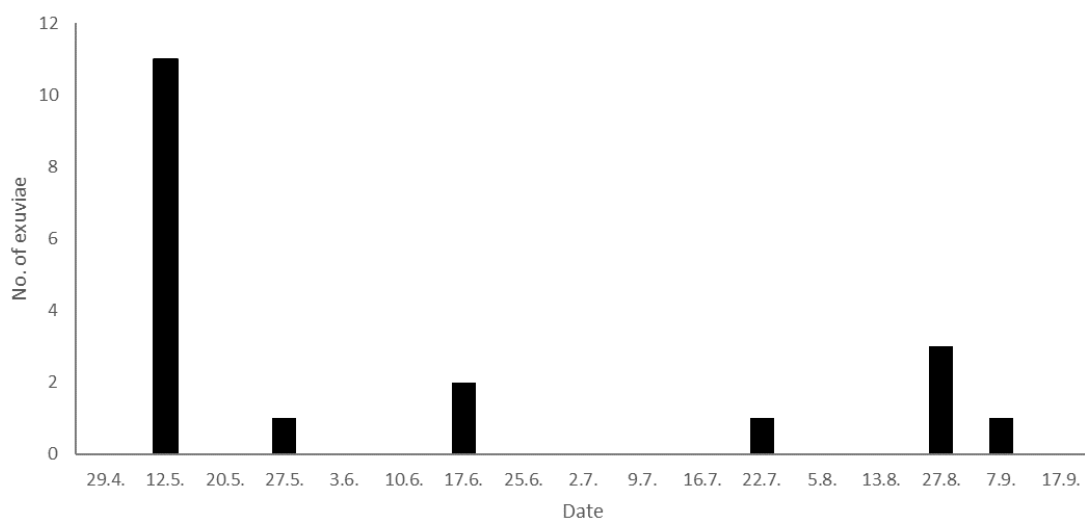


Figure 2. Number of *Parachironomus monochromus* exuviae recorded in the urban pond during the study period. Dates on x-axis refer to sampling dates. Dates after 17. 9. 2021 are not shown due to the absence of the species in the samples.

In the urban pond, pupal exuviae were recorded on several occasions between May and September with the highest numbers collected in May (Fig. 2). In the fountain, the species was collected at the end of August. This emergence pattern is in accordance with references in Moller Pillot (2013) reporting emergence of *P. monochromus* adults from April to September. In some cases, however, the highest density was documented in the summer, while in the case of our urban pond, summer emergence was scarce.

All in all, the documentation of a new species from two different urban water bodies within the same city - in a country with relatively well-studied chironomid fauna - emphasizes the importance of urban ecosystems as valuable habitats for not only aquatic biota in general, but also for rare species. This stresses the significance of including these habitats in more intense ecological research.

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