

# First records of the non-biting midges *Orthocladius* (*Eudactylocladius*) *fuscimanus* (KIEFFER) and *Paratanytarsus grimmii* (SCHNEIDER) (Diptera: Chironomidae) for Denmark, with notes on their ecology and distribution in artificial habitats

[Erstnachweise der Zuckmücken *Orthocladius* (*Eudactylocladius*) *fuscimanus* (KIEFFER) und *Paratanytarsus grimmii* (SCHNEIDER) (Diptera: Chironomidae) für Dänemark, mit Bemerkungen zu ihrer Ökologie und Verbreitung in künstlichen Lebensräumen]

by

Ladislav HAMERLÍK, Klaus Peter BRODERSEN and Skjalm BIBA

Bratislava (Slovakia)

Hillerød (Denmark)

Hillerød (Denmark)

<b>Abstract</b>	The Chironomid species <i>Orthocladius</i> ( <i>Eudactylocladius</i> ) <i>fuscimanus</i> (KIEFFER, 1908) and <i>Paratanytarsus grimmii</i> (SCHNEIDER, 1885) are recorded in Denmark for the first time. They were collected from the artificial habitats of fountains in Copenhagen and from waterworks in North Zealand. Details of these records, with additional notes on distribution, are given.
<b>Key words</b>	Chironomidae, Palaearctic Region, Denmark, first records, pest species, artificial habitats, fountains, waterworks
<b>Zusammenfassung</b>	Die Chironomiden-Arten <i>Orthocladius</i> ( <i>Eudactylocladius</i> ) <i>fuscimanus</i> (KIEFFER, 1908) und <i>Paratanytarsus grimmii</i> (SCHNEIDER, 1885) werden erstmals in Dänemark nachgewiesen. Sie wurden in künstlichen Biotopen, wie Trinkwasserbrunnen in Kopenhagen und Wasserwerken in Nord-Seeland, gesammelt. In diesem Beitrag werden die Funddaten zusammengefasst und Bemerkungen zur Verbreitung gemacht.
<b>Stichwörter</b>	Chironomidae, paläarktische Region, Dänemark, Erstfunde, Schädlingsarten, künstliche Lebensräume, Trinkwasserbrunnen, Wasserwerke

## Introduction

The family Chironomidae (Diptera: Chironomoidea) is the most widely distributed and frequently the most abundant insect group in freshwaters, with representatives in both terrestrial and marine environments. The most realistic estimation of the global species richness is more than 10,000 species (ARMITAGE et al. 1995); nearly 1,200 species are known from Europe (SÆTHER & SPIES 2004).

The Danish chironomid fauna is well studied with almost 300 species listed (LINDEGAARD 1997). With 432 species expected (PETERSEN & MEIER 2001), first faunistic records are still possible, especially when less common or artificial aquatic habitats such as fountains and waterworks are surveyed, because these types of water bodies have so far been largely overlooked.

## Material and methods

The chironomid assemblages of four fountains in Copenhagen and two waterworks in North Zealand, Denmark, were studied in 2008. For coordinates and basic characteristics of the sites see Tables 1 and 2. From the fountains, pupal exuviae were collected from the water surface by

drift net (300  $\mu\text{m}$ ). Kajak samples ( $\varnothing = 5.2$  cm) were taken from the filter beds of waterworks which consisted of anthracite sand of 0.2–0.3 cm size. Pupae and pupal exuviae mounted on slides were identified using the key by LANGTON (1991). Specimens are deposited at the Fresh-water Biological Laboratory, University of Copenhagen.

**Tab. 1:** Basic parameters of the studied fountains located in downtown Copenhagen measured monthly between June and October 2008.

Fountain	N-coordinate	E-coordinate	approx area (m <sup>2</sup> )	min–max T (°C)	mean T (°C)
Fountain 1	55°40'54.94"	12°34'40.13"	28.3	11.5–21.0	17.5
Fountain 2	55°40'54.19"	12°34'39.76"	28.3	11.5–22.0	18.5
Fountain 3	55°40'33.98"	12°34'38.30"	213.8	10.5–22.5	17.6
Fountain 4	55°42'11.95"	12°35'09.15"	15.9	10.5–22.0	17.6

**Tab. 2:** Basic characteristics of the surveyed waterworks situated in North Zealand. Environmental variables were measured in November 2008.

	Site 1	Site 2
N-coordinate	55°57'	55°57'
E-coordinate	11°51'	11°51'
Filter-type	open	open
Temperature (°C)	11.9	12.4
Dissolved oxygen (mg.l <sup>-1</sup> )	6.9	5.5
pH	8.0	7.9
Conductivity (mS.m <sup>-1</sup> )	94	127
Organic material (g.m <sup>-2</sup> )	0.049	0.039

## Results

### *Orthocladius (Eudactylocladius) fuscimanus* (KIEFFER, 1908)

**Material:** Fountains 1, 3 and 4; 8. June, 4. July, 31. August, 5. October 2008; 1–7 pupal exuviae.

**Ecology and distribution.** The species has been described under different names by different authors, firstly as *Dactylocladius fuscimanus* by KIEFFER in 1908 from adults reared from larvae living in the hygropetric habitat on an East German island (KIEFFER & THIENEMANN 1908). Considerable taxonomic and nomenclatural confusion concerning the species was resolved by CRANSTON (1984). *Orthocladius fuscimanus* is one of the few madicolous chironomid species restricted to this biotope (OLIVER & SINCLAIR 1989). Madicolous species are dwellers of films of water less than 2 mm thick (VAILLANT 1956) and this is also known as a hygropetric habitat. Such habitats occur where a thin trickle of water runs over a rock face. Usually the substratum is partly or entirely covered with a film of algae or with thin layer of a fine detritus. Madicolous biotopes are often associated with seepages or ground-water that provide a constant flow; however they can also occur along stream margins (ARMITAGE et al. 1995). CRANSTON (1984) noted

the occurrence of *O. fuscimanus* in sewage lagoons and in the percolating filter beds of sewage works. This can be regarded as the ecological equivalent of natural hygropetric biotopes and a number of other obligate macrolous species have also been found in sewage filters. Preimaginal stages of *O. fuscimanus* were also recorded in the littoral zones of oligotrophic alpine lakes (BITUŠÍK et al. 2006).

*Orthocladius fuscimanus* is a widely distributed Palaearctic species, recorded in most European countries. In the Scandinavian region it is known from Norway, Sweden, Iceland and the Faroe Islands (LINDEGAARD 1997; SÆTHER & SPIES 2004). According to PETERSEN & MEIER (2001) the species is likely to occur in Denmark according to distribution data; however, it has not yet been recorded (LINDEGAARD 1997).

### *Paratanytarsus grimmii* (SCHNEIDER, 1885)

**Material:** Fountains 1–4; 4. July, 31. August, 5. October 2008; from 3 to several hundred pupal exuviae per sample. Waterworks 1, 2; 11. November 2008; 2 pupae and 2 pupal exuviae along with almost a thousand unidentified *Paratanytarsus* larvae that most likely belonged to the same species.

**Ecology and distribution.** *Paratanytarsus grimmii* is a parthenogenetic species. Even though the species was described under different names from various parts of the world, LANGTON et al. (1988) concluded that there is a single species with an almost worldwide geographic range of distribution. *Paratanytarsus grimmii* has achieved notoriety as a pest through its capacity to breed in water distribution systems. Some of its clones are capable of laying eggs within the pupal cuticle, and as they do not eclose, they do not need an air space above the water in which they live. It is possible that in nature the species is hyporheic in habitat (ARMITAGE et al. 1995). RICCIARDI (1994) assumed that the *Paratanytarsus* larvae found in the mantle cavity of dreissenid mussels as well as in unionid bivalves were *P. grimmii*. He considered a co-occurrence as a form of inquiline commensalism. All specimens found were, however, larvae that prevented the identification to species level.

*Paratanytarsus grimmii* is known from the Australopacific, Neotropical, Palaearctic, and Nearctic Regions, but is unknown from the Afrotropical Region (LANGTON et al. 1988). From Scandinavia it was recorded only in Finland (SÆTHER & SPIES 2004); however, several pupal exuviae found in an Icelandic lake also most probably belonged to *P. grimmii* (LINDEGAARD, pers. comm.).

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### Authors’ addresses

Dr Ladislav HAMERLÍK  
Freshwater Biological Section  
University of Copenhagen  
Helsingørsgade 51  
3400 Hillerød  
Denmark  
E-mail: [ladislav.hamerlik@savba.sk](mailto:ladislav.hamerlik@savba.sk)

Institute of Zoology  
Slovak Academy of Sciences  
Dúbravská cesta 9  
84506 Bratislava  
Slovakia

Dr Klaus Peter BRODERSEN  
Freshwater Biological Section  
University of Copenhagen  
Helsingørsgade 51  
3400 Hillerød  
Denmark  
E-mail: [kpbrodersen@bio.ku.dk](mailto:kpbrodersen@bio.ku.dk)

MSc Skjalm BIBA  
Freshwater Biological Section  
University of Copenhagen  
Helsingørsgade 51  
3400 Hillerød  
Denmark  
E-mail: [skjalmbiba@hotmail.com](mailto:skjalmbiba@hotmail.com)

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