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## New and rare subfossil records of Chironomidae (Diptera) in Poland

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Subfossylne znaleziska nowych i rzadkich taksonów  
Chironomidae (Diptera) w Polsce

### SUMMARY

Subfossil material isolated from the surface bottom sediment cores (length: 40–70 cm) collected in five shallow Polesie lakes was analysed for the presence of subfossil chironomids remains.

Amongst the recorded chironomid taxa *Labrundinia longipalpis* Goetghebuer, turned out to be new for Poland, and six taxa are new (*Corynocera ambigua* Zetterstedt, *Microchironomus* Kieffer, *Prosilocerus* Kieffer, *Stempellina* Thienemann and Basse, *Stenochironomus* Kieffer, *Zavreliella* Kieffer) or rare (*Lauterborniella agrayloides* Kieffer, *Limnophyes* Eaton, *Parakiefferiella* Thienemann) for Lublin Polesie. The paper presents ecology and distribution of the taxa, as well as the age of the sediment layers in which they were found.

### STRESZCZENIE

Analizowano rdzenie osadów dennych (dług. 40–70 cm) z pięciu płytkich jezior poleskich pod kątem zawartości subfossylnych szczątków Chironomidae. Wśród stwierdzonych taksonów jeden – *Labrundinia*, okazał się nowy dla Polski, 6 taksonów nowych (*Corynocera ambigua*, *Microchironomus*, *Prosilocerus*, *Stempellina*, *Stenochironomus*, *Zavreliella*) oraz 3 rzadkie (*Lauterborniella*, *Limnophyes*, *Parakiefferiella*) na Polesiu Lubelskim. W pracy podano ekologię i rozmieszczenie taksonów oraz wiek warstw osadów, w których je stwierdzono.

**Key words:** Chironomidae, paleolimnology new records, Lublin Polesie, Poland

## INTRODUCTION

The aim of this research was to reconstruct the past habitat conditions taking place in the selected lakes in the Lublin Polesie in the period of recent few centuries. An object of this study was subfossil remains of chironomids, which have been very seldom studied in Poland so far (9, 24, 13, 15). This paper presents new and rare taxa of chironomids from which one turned out to be new for Poland, six are new and three rare for the Lublin Polesie.

## STUDY AREA AND METHODS

The research was carried out in five lakes: Kleszczów, Rotcze, Sumin, Głębokie Uścimowskie and Syczyńskie located in the Łęczna-Włodawa Lakeland (51°30'N, 23°20'E) in 2005.

The lakes are relatively shallow (2.9–6.4 m) and small (6–50 ha), representing a trophic status from mezo- to hypertrophy (Tab.1). They differ in respect of the level of the development of submerged macrophytes, from lakes with extensive underwater meadows to one deprived of submerged vegetation (21).

Table 1. Morphometric characteristics of the lakes, Secchi Disc visibility (SD), development of submerged macrophytes, expressed as PVI coefficient (percent of lake water volume infested) and trophic status (according to Kornijów et al. 2002) (21)

Lake	Kleszczów	Rotcze	Sumin	G. Uścimowskie	Syczyńskie
Surface area [ha]	50	46	86	20	6
Max. depth [m]	3	4,3	6.5	6.4	2.9
SD [m]	2.4	2.5	1.6	0.9	0.3
PVI [%]	29.3	34.5	3.3	0.75	0
Trophic status	mesotrophy	mesotrophy	eutrophy	eutrophy	hypertrophy

Sediment cores of 0.4 m–0.7 m in length were taken from the deepest part of the lakes using a gravit Uwitec-corer equipped with a plexiglas tube of 120 cm in length and 6 cm in inner diameter.

The cores were sliced into 1 cm layers. Until the depth of 20 cm, every slice was analysed, below that – every fifth. The samples were treated following the procedures by Warwick (31). The subfossil material was sieved through a 180- $\mu$ m screen.

The head capsules were identified according to Brooks (5), Wiederholm (32), and Rievadevall and Brooks (28). The majority of identifications were done to the genus level. The numbers of head capsules (HC) were converted into 10 g dry weight of the sediments. The age of the sediments was calculated on the basis of a constant rate of supply of unsupported  $^{210}\text{Pb}$  model by Gąsiorowski (12).

## RESULTS

## New taxon for Poland

*Labrundinia longipalpis* Goetghebuer, 1921

*Labrundinia* head capsules were found only in mesotrophic Lake Rotcze in six sediment layers (Tab. 2).

Table 2. Distribution of *Labrundinia* remains found in sediment profile from Lake Rotcze

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
Rotcze	1	31	1.8	2002
	2	24	1.7	
	5	35	1.6	
	6	30	1.9	
	8	13	5.2	
	15	23	6.0	1955

Habitat requirements of the larvae of *Labrundinia* are known very little. They are usually found in small, standing water bodies, but also in streams and rivers (32). Kornijów found the larvae in the Hudson river on the surface of *Trapa natans* (22). According to Fittkau & Roback (11), the European species prefers bogs but lives in lake sediments samples, too. It is assumed to be an indicator of warm waters (1).

#### New taxa for Lublin Polesie

##### *Corynocera ambigua* Zetterstedt, 1838

Larval remains of *Corynocera* were encountered in four lakes: Kleszczów, Rotcze, Sumin and Głębokie Uścimowskie. Only in one profile from Lake Rotcze the taxon was present up to the top layers of the sediments. It may suggest that the species is still present in the lake. The detailed information about abundance of remains in the profiles and the time of their deposition are given in Halkiewicz (14).

Larvae of *Corynocera* occur in cold oligotrophic lakes in Norway and interstadial and early Holocene sediments from Scotland, Scandinavia and central Europe (5). For very long time the larvae have been considered as cold stenothermal glacial relic (27). However, the recent findings of the larvae in different types of lakes have put in doubt this opinion (2, 1).

##### *Microchironomus* Kieffer, 1918

The remains were present in sediments of three lakes: Rotcze, Sumin and Głębokie Uścimowskie. In Lake Rotcze the remains occurred solely in one layer and in a few ones in lakes Sumin and Głębokie Uścimowskie (Tab. 3).

*Microchironomus* usually occurs in the profundal of warm mesotrophic and eutrophic lakes (3, 4, 6, 16). Its ecology is known very little (10).

##### *Prosilocerus lacustris* Kieffer, 1923

The species was found only in one hypertrophic, phytoplankton-dominated Lake Szczyńskie in the following sediment layers: 1, 2, 7, 8, 14, 15 cm. The detailed information about abundance of the remains in the profile is presented

in Kornijów and Halkiewicz (20). The authors suggest that *P. lacustris* might be a good indicator of hypertrophic conditions.

Table 3. Distribution of *Microchironomus* remains in sediment profiles from lakes: Rotcze, Sumin and Głębokie Uścimowskie

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
Rotcze	14	12	6	1961
Sumin	9	10	25	1997
	13	8	7	
	15	11	10	
	17	19	14	
	20	8	11	1982
	25	6	3	
	30	8	6	1965
	35	4	4	
G. Uścimowskie	50	15	7	ca. 1810
	11	4	2	1985
	14	8	4	1975
	15	9	6	
	17	2	1	
	18	6	2	
	19	7	3	1949

#### *Stempellina* Thienemann and Basse, 1913

Taxon found only in two mesotrophic lakes: Kleszczów and Rotcze. In Lake Rotcze remains were present in one, while in Kleszczów in three layers (Tab. 4).

It is considered as a warm stenotherm (7, 30) abundantly occurring especially in oligotrophic lakes (7, 3) including oligotrophic tropical dam reservoirs (23).

Table 4. Distribution of *Stempellina* remains in sediment profiles from lakes Kleszczów and Rotcze

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
Kleszczów	45	35	8	ca. 1735
Rotcze	20	14	2	1925
	40	12	4	> before 1860
	45	8	7	> before 1860

#### *Stenochironomus* Kieffer, 1921

Remains were found in three lakes: Kleszczów, Rotcze and Sumin. In Lake Sumin the taxon was present in only one layer, in Rotcze in four, and in Sumin in two layers (Tab. 5).

The larvae mine living and dead macrophytes and also wooden debris (26). They occur in mesotrophic and eutrophic lakes (3).

Table 5. Distribution of *Stenochironomus* remains in sediment profiles from lakes Kleszczów, Rotcze, and Sumin

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
Kleszczów	40	15	6	ca. 1770
	6	31	2	1991
Rotcze	12	13	3	
	17	23	6	
	19	22	5	1931
Sumin	20	8	11	1982
	60	7	1	> before 1810

*Zavreliella* Kieffer, 1920

The remains were found only in Lake Głębokie Uścimowskie on the one level (Tab. 6).

Table 6. Distribution of *Zavreliella* remains in sediment profile from Lake Głębokie Uścimowskie

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
G. Uścimowskie	6	10	5	1997

The genus is worldwide in distribution, with the greatest number of species in tropical South America. The larvae live amongst macrophytes (26). *Z. marmorata* is the only species of this genus known in Europe (29).

## Rare taxa for Lublin Polesie

*Lauterborniella agrayloides* (Kieffer, 1911)

Larvae remains of *Lauterborniella agrayloides* were found in three lakes: Rotcze, Sumin and Głębokie Uścimowskie.

Table 7. Distribution of *Lauterborniella agrayloides* remains in sediment profiles from lakes Rotcze, Sumin, and Głębokie Uścimowskie

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
Rotcze	18	22	8	1939
Sumin	55	7	0.7	< 1810
G. Uścimowskie	15	9	6	1989
	16	7	4	1988

*Lauterborniella* lives in littoral habitats, in relatively warm, eutrophic lakes (6). Larvae can also be found in oligotrophic lakes (3). *L. agrayloides* is the only species known in Holarctic (29).

In Polesie region the species was found on submerged vegetation in mesotrophic Lake Piaseczno and in eutrophic Lake Głębokie near Cyców (17, 18, 19).

*Limnophyes* Eaton, 1875

The remains were found in Lake Głębokie Uścimowskie in two, and in Lake Syczyńskie lakes, in two and in one sediment layers respectively (Tab. 8).

Table 8. Distribution of *Limnophyes* remains in sediment profiles from lakes Głębokie Uścimowskie and Syczyńskie

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
G. Uścimowskie	7	5	3	1995
	11	4	2	1985
Syczyńskie	20	4	3	1948

The genus inhabits both streams and shallows in lake littoral (16). It can be useful to reconstruct water level fluctuations in lakes (25). The larvae of some species dwell aquatic macrophytes (3), others live in terrestrial or semiterrestrial habitats (8). In the Lublin Polesie it was found only in Lake Piaseczno (17).

*Parakiefferiella* Thienemann, 1936

Larval remains of *Parakiefferiella* were found in two lakes: Rotcze and Głębokie Uścimowskie, in each of them only once (Tab. 9).

Table 9. Distribution of *Parakiefferiella* remains in the sediment profiles from lakes Rotcze and Głębokie Uścimowskie.

Lake	Sediment layer (cm)	HC/10g DW sediments	Relative abundance (%)	Age 210 Pb
Rotcze	20	14	2	1925
G. Uścimowskie	40	37	4	ca. 1640

Species of *Parakiefferiella* occur in littoral of temperate lakes (5) and in lotic habitats (32). There is very little information on its ecology (5). In Polesie lakes it was found only in mesotrophic Lake Piaseczno on submerged macrophytes (17, 19).

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