



Tanytarsini (Diptera: Chironomidae) of the Kashubian Lakeland

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Abstract: Chironomids of the tribe Tanytarsini of the Kashubian Lakeland (N Poland) are represented by 52 species, amounting over half of the Polish and almost third part of the European fauna. Most abundant species in the studied region are *Cladotanytarsus mancus* (Walker) and *C. atridorsum* Kieffer and the most frequent – *C. mancus* and *Paratanytarsus inopertus* (Walker). Adult Tanytarsini fly from the beginning of April to the second decade of October, reaching four peaks with a higher number of species during a season – spring, late spring, summer and late summer, with a maximum at the end of July. Most of species are recognized as poly- or bivoltine and three species as univoltine. *Cladotanytarsus teres* Hirvenoja, *Micropsectra logani* (Johannsen), *Parapsectra styriaca* (Reiss), *Stempellinella flavidula* (Edwards), *Tanytarsus aberrans* Lindeberg, *T. multipunctatus* Brundin and *Thienemanniola ploenensis* Kieffer, recorded in the Lakeland, are annotated as rare in Poland and Central Europe. *Tanytarsus mancospinosus* Ekrem & Reiss and *T. nigricollis* Goetghebuer are new in the Polish fauna.

Key words: Diptera, Chironomidae, Tanytarsini, Kashubian Lakeland, Poland, faunistics, new records

INTRODUCTION

The Tanytarsini is a large, but still poorly known dipteran tribe of the family Chironomidae, grouping mainly those species that dwell and grow in freshwater habitats. The only comprehensive study based on data collected throughout Poland is a faunistic review of Polish Tanytarsini, the survey comprising information on geographic distribution and seasonal dynamics of the tribe (Gilka 2002). The data obtained hitherto from the Kashubian Lakeland show the region to support an exceptional Tanytarsini fauna, including northern and mountain species which are rarely found in Poland and Europe (Gilka 1997, 2001).

The present study focuses on the Tanytarsini of the Kashubian Lakeland, with a particular reference to the Kashubian Landscape Park and the Raduńskie Lakes, a group of the largest freshwater reservoirs in the area. The research presented was aimed at exploring the composition of the local Tanytarsini fauna and to provide additional data on biology of the rare species and those that have not been known from Poland to date.

STUDY AREA

The Kashubian Lakeland is the highest-lying (mean altitude 200 m a.s.l.) part of the Southern Baltic Lakelands sub-province. The Lakeland borders the Słupsk Plateau and Kashubian Coast to the north and east, while the Bytów Lakeland, Tuchola Forests, Starogard Lakeland, and Vistula Żuławy flanking the area to the west and south (Konracki 1978, Augustowski 1979). This is the coldest mesoregion of the East-Pomeranian Lake District: the mean annual air temperature is about 7° C (about 17 and –3° C being the mean monthly temperatures of July and January, respectively) (op. cit.). A considerable part (3320 km²) of

the Kashubian Lakeland is occupied by the Kashubian Landscape Park with as much as 10.3% of the area of which being covered by water bodies (Przewoźniak 2000). The diverse relief, extensive altitude differences, and a complex system of lake troughs trending NNE and NE are a net result of Pleistocene glaciations, particularly the last one of them, the Baltic glaciation. The Park hosts as many as 48 water bodies larger than 1 ha; the largest of them are the flow-through lakes of the upstream Radunia catchment: Lake Raduńskie Dolne and Lake Raduńskie Górne, which together with Lake Stężycie, make up a 22-km long Radunia trough. The Radunia Lakes, situated at the altitude of about 162 m a.s.l., with a total shoreline length exceeding 48 km, cover 1124.4 ha. The mean and maximum depths of Lake Raduńskie Dolne are 11.2 and 34.5 m, respectively; the respective depths of Lake Raduńskie Górne are 15.5 and 43.0 m. The lakes are mesotrophic, di- and tachymictic, their water being assigned to quality class II (Okulanis 1966, 1981; Jańczak 1997; Borowiak et al. 2000).

MATERIAL AND METHODS

The materials studied consisted of more than 6600 adult males of the Tanytarsini chironomids, which were identified. The specimens were collected in 1975–2006. Systematic collections were in 2001 and 2002 conducted at six sites on the Raduńskie Lakes. The adult Tanytarsini were being caught there from early April until the second decade of October, once a month in 2001 and twice a month in 2002. The insects were collected with a net and were attracted by light at 27 sites distributed within the Kashubian Lakeland, including 13 sites within the Kashubian Landscape Park and 8 on the Raduńskie Lakes. The sites were coded by the UTM grid quadrants (reported in parentheses): Babi Dół near Żukowo, at River Radunia (CF22); Borowo near Żukowo, at Lake Karlikowo (CF22); Borucino at Lake Raduńskie Górne (XA91); Borzestowo near Chmielno, at Lake Długie (XA92); Borzestowska Huta at Lake Raduńskie Dolne (CF02); Chrustowo at Lake Raduńskie Górne (XA91); Czarlino near Stężycia (XA81); Czysta Woda near Stężycia (XA81); Gołubie near Stężycia, at Lake Dąbrowskie (CF01); Gostomie near Stężycia (XA80); Kożyczkowo near Chmielno, at Lake Osuszyno (CF02); Lipowiec at Lake Raduńskie Dolne (CF02); Łączyno at Lake Raduńskie Dolne (CF01); Łubiana near Kościerzyna, at Lake Graniczne (XV89); Mirachowo near Chmielno on Mirachowska Stream (CF03); Niesiołowice near Stężycia, at lakes Długie and Skrzynka (XA81); Ogonki near Sulęczyno, at Lake Sumino (XA80); Osowa near Gdańsk, at Lake Wysockie (CF33); Otałżyno lake near Szemud (CF13); Pałubice near Sierakowice (XA83); Parchowski Młyn near Sulęczyno, at Lake Mausz (XA71); Przewóz at Lake Raduńskie Dolne (CF01); Stężycia at Lake Raduńskie Górne (XA91); Sulęczyno near Bytów, at Lake Guścierz Mały (XA81); Śnice near Stężycia, gravel-pit (XA90); Zgorzałe at Lake Raduńskie Górne (XA91); Żakowo near Sulęczyno, at Lake Martwe (XA81). Information on geographic distribution completed with recent records (Gilka 2006, Stur & Ekrem 2006) follow the Fauna Europaea database (Sæther & Spies 2004). The material examined is available in the Department of Invertebrate Zoology of University of Gdańsk.

RESULTS

The results, presented below, evidence the area studied to feature the highest Tanytarsini diversity in Poland. Of the 169 species recorded in Europe and 100 in Poland (Sæther & Spies 2004; Gilka 2005, 2006; Gilka & Abramczuk 2006; Stur & Ekrem 2006), as many as 52 were found in the Kashubian Lakeland, including 42 in the Kashubian Landscape Park and 33 on the Raduńskie Lakes. The most abundant species in the Kashubian Lakeland included *Cladotanytarsus mancus* (Walker) (over 33% examined specimens), *C. atridorsum* Kieffer (ca. 17%), *Micropsectra notescens* (Walker) (ca. 6%), *Paratanytarsus inopertus* (Walker) (ca. 6%) and *Tanytarsus sylvaticus*

(van der Wulp) (ca. 5 %), the first two being clearly dominant at the Raduńskie Lakes as well. The species most frequently recorded in the Lakeland included *Cladotanytarsus mancus* and *Paratanytarsus inopertus*, found at 13 out of the 27 sites sampled, as well as *Micropsectra junci* (Meigen) and *Tanytarsus verralli* Goetghebuer (found at 11 sites) and *Paratanytarsus tenuis* (Meigen) (10 sites). The species most frequently recorded on the Raduńskie Lake were *Paratanytarsus inopertus* and *P. tenuis* and also *Tanytarsus usmaensis* Pagast, *T. mendax* Kieffer and *T. inaequalis* Goetghebuer, found at 7 out of the 8 sites sampled (Table 1).

Table 1. Tanytarsini recorded in the Kashubian Lakeland, Kashubian Landscape Park and Lakes Raduńskie; *N* – number of examined specimens, *k* – number of sampling sites.

No.	Species	Kashubian Lakeland		Kashubian Landscape Park		Lakes Raduńskie	
		<i>N</i>	<i>k</i>	<i>N</i>	<i>k</i>	<i>N</i>	<i>k</i>
1	2	3	4	5	6	7	8
1	<i>Cladotanytarsus atridorsum</i> Kieffer, 1924	1097	9	1073	7	1067	5
2	<i>Cladotanytarsus difficilis</i> Brundin, 1947	8	1	-	-	-	-
3	<i>Cladotanytarsus mancus</i> (Walker, 1856)	2193	13	1581	8	1564	6
4	<i>Cladotanytarsus nigrovittatus</i> (Goetghebuer, 1922)	14	3	2	1	-	-
5	<i>Cladotanytarsus teres</i> Hirvenoja, 1962	1	1	1	1	-	-
6	<i>Cladotanytarsus wexionensis</i> Brundin, 1947	9	4	4	2	4	2
7	<i>Micropsectra apposita</i> (Walker, 1856)	124	5	124	5	25	4
8	<i>Micropsectra atrofasciata</i> (Kieffer, 1911)	145	5	128	2	1	1
9	<i>Micropsectra attenuata</i> Reiss, 1969	25	2	3	1	3	1
10	<i>Micropsectra junci</i> (Meigen, 1818)	95	11	43	8	31	5
11	<i>Micropsectra logani</i> (Johannsen, 1928)	2	2	2	2	1	1
12	<i>Micropsectra notescens</i> (Walker, 1856)	390	7	299	5	262	4
13	<i>Micropsectra pallidula</i> (Meigen, 1830)	22	3	4	2	-	-
14	<i>Micropsectra recurvata</i> Goetghebuer, 1928	69	7	37	4	31	3
15	<i>Parapsectra nana</i> (Meigen, 1818)	3	1	3	1	-	-
16	<i>Parapsectra styriaca</i> (Reiss, 1969)	9	3	8	2	8	2
17	<i>Paratanytarsus austriacus</i> (Kieffer, 1924)	1	1	1	1	-	-
18	<i>Paratanytarsus bituberculatus</i> (Edwards, 1929)	117	8	82	4	79	2
19	<i>Paratanytarsus dimorphus</i> Reiss, 1965	147	7	108	6	92	5
20	<i>Paratanytarsus dissimilis</i> (Johannsen, 1905)	68	6	68	6	52	5
21	<i>Paratanytarsus inopertus</i> (Walker, 1856)	368	13	314	10	303	7
22	<i>Paratanytarsus laetipes</i> (Zetterstedt, 1850)	22	4	7	3	7	3
23	<i>Paratanytarsus lauterborni</i> (Kieffer, 1909)	7	4	7	4	7	4
24	<i>Paratanytarsus tenellulus</i> (Goetghebuer, 1921)	4	2	4	2	3	1
25	<i>Paratanytarsus tenuis</i> (Meigen, 1830)	134	10	114	7	114	7
26	<i>Rheotanytarsus curtistylus</i> (Goetghebuer, 1921)	170	3	30	2	1	1
27	<i>Rheotanytarsus pentapoda</i> (Kieffer, 1909)	2	1	-	-	-	-
28	<i>Rheotanytarsus ringei</i> Lehmann, 1970	142	1	142	1	-	-
29	<i>Stempellina bausei</i> (Kieffer, 1911)	42	1	42	1	42	1
30	<i>Stempellina subglabripennis</i> (Brundin, 1947)	6	1	-	-	-	-
31	<i>Stempellinella edwardsi</i> Spies & Sæther, 2004	3	2	1	1	-	-
32	<i>Stempellinella flavidula</i> (Edwards, 1929)	1	1	-	-	-	-
33	<i>Tanytarsus aberrans</i> Lindeberg, 1970	1	1	-	-	-	-
34	<i>Tanytarsus debilis</i> (Meigen, 1830)	14	5	14	5	14	5
35	<i>Tanytarsus dibranchius</i> Kieffer, 1926	6	1	-	-	-	-
36	<i>Tanytarsus excavatus</i> Edwards, 1929	54	6	30	4	15	2
37	<i>Tanytarsus gregarius</i> Kieffer, 1909	1	1	1	1	-	-
38	<i>Tanytarsus heusdensis</i> Goetghebuer, 1923	1	1	-	-	-	-
39	<i>Tanytarsus inaequalis</i> Goetghebuer, 1921	120	8	119	7	119	7
40	<i>Tanytarsus mancospinosus</i> Ekrem & Reiss, 1999	1	1	1	1	1	1
41	<i>Tanytarsus medius</i> Reiss et Fittkau, 1971	2	2	1	1	1	1
42	<i>Tanytarsus mendax</i> Kieffer, 1925	182	8	181	7	181	7
43	<i>Tanytarsus miriforceps</i> (Kieffer, 1921)	14	3	14	3	14	3
44	<i>Tanytarsus multipunctatus</i> Brundin, 1947	10	1	-	-	-	-

1	2	3	4	5	6	7	8
45	<i>Tanytarsus nemorosus</i> Edwards, 1929	1	1	1	1	-	-
46	<i>Tanytarsus nigricollis</i> Goetghebuer, 1939	1	1	-	-	-	-
47	<i>Tanytarsus occultus</i> Brundin, 1949	129	5	124	3	124	3
48	<i>Tanytarsus pallidicornis</i> (Walker, 1856)	4	3	3	2	1	1
49	<i>Tanytarsus sylvaticus</i> (van der Wulp, 1858)	333	5	201	4	201	4
50	<i>Tanytarsus usmaensis</i> Pagast, 1931	94	9	83	7	83	7
51	<i>Tanytarsus verralli</i> Goetghebuer, 1928	196	11	102	8	89	6
52	<i>Thienemanniola ploenensis</i> Kieffer, 1921	35	1	-	-	-	-
	Total	6639	27	5107	13	4540	8
	Number of species		52		42		33

The seasonal distribution of adult Tanytarsini in the Kashubian Lakeland is well comparable with previous observations (Gilka 2001) and completes results obtained from whole Poland (Gilka 2002). A flight period of the adult Tanytarsini in the Kashubian Lakeland starts in the beginning of April and lasts to the second decade of October (Table 2). At least four peaks of abundance with a distinctly higher number of species were observed during a season. The spring peak occurs in April and includes early spring species of the genera *Thienemanniola* Kieffer, *Micropsectra* Kieffer and *Tanytarsus* van der Wulp. Most of species start their flight in May reaching a late spring peak in the beginning of June. The next generation (or generations) occurs in summer, reaching maximum at the end of July (summer peak). At least 18 species can occur at the first two decades of September (late summer peak), of which only a few are still recorded in October. Three species recorded in the Kashubian Lakeland were recognized as spring univoltine (*Th. ploenensis* Kieffer, *Tanytarsus miriforceps* Kieffer and *T. sylvaticus* (van der Wulp)). Basing on records from other sites in Poland and Central European countries, six species (*Parapsectra nana* Meigen, *Paratanytarsus austriacus* (Kieffer), *P. lauterborni* (Kieffer), *Tanytarsus multipunctatus* Brundin, *T. nemorosus* Edwards and *T. nigricollis* Goetghebuer) were recognized as producing probably more than one generation per year. Most of species known from the Kashubian Lakeland are bi- or polyvoltine (35 species), producing at least two, three or four generations per year (Table 2, Fig. 1).

Annotations on rare and new species in Poland

Cladotanytarsus teres Hirvenoja, 1962

Material examined: 1 ♂, Kozyczkowo near Chmielno, netting at Lake Osuszyno, 1 June 1997, leg. E. Sontag.

Distribution and biology: Data on this northern species have been provided by Gilka (1997). The Kashubian Lakeland is the only area inhabited by *C. teres* outside of the Scandinavian Peninsula.

Micropsectra logani (Johannsen, 1928)

Material examined: 1 ♂, Lipowiec, netting, 12 May 2002, leg. P. Dominiak; 1 ♂ Mirachowo, netting on helocrene, 16 April 1998, leg. W. Gilka.

Distribution and biology: *M. logani* is a Holarctic species, known mostly from the lakes of Fennoscandia (Brundin 1949, as *M. groenlandica* Andersen; Stur & Ekrem 2006) and seldom reported from central Europe, mostly from the profundal of deep lakes and from rivers. In the Kashubian Lakeland, the adults were caught at helocrenic habitats in April and May. In addition to the area sampled in this study, *M. logani* is known in other four sites in Poland: from the Kujawy (adults collected in July), the Mazurian Lake District, and from the Świętokrzyskie Mountains, where the larvae were found in a muddy sediment lining a lenitic section of a river (Gilka 2002, as *M. groenlandica*). In Poland, *M. logani* produces at least two generations per year.

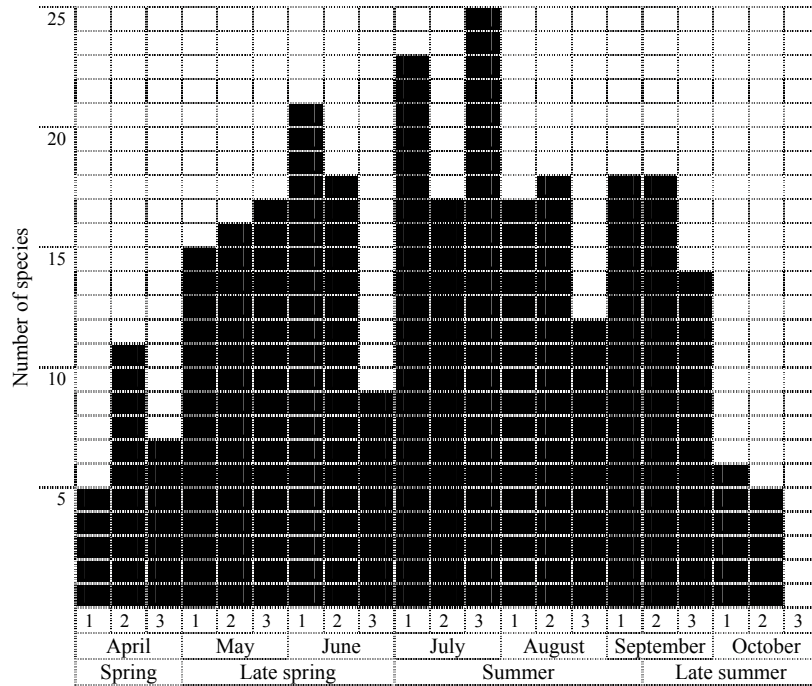


Fig. 1. Diagram of seasonal distribution of adult Tanytarsini in the Kashubian Lakeland

Parapsectra styriaca (Reiss, 1969)

Material examined: 2 ♂♂, Borzestowska Huta, netting, 30 July 2001, leg. P. Dominiak; 1 ♂, Czysta Woda, netting on spring of stream, 7 June 1997, leg. W. Gilka; 1 ♂, Lipowiec, netting, 12 May 2001, leg. P. Dominiak; 4 ♂♂, netting, 30 July 2001, leg. P. Dominiak; 1 ♂, netting, 12 May 2002, P. Dominiak. Additional data: 1 ♂, Czarna Hańcza near Słupie, netting, at peat bog, 24 May 2006, leg. P. Dominiak.

Distribution and biology: *P. styriaca* is a rarely reported species, known primarily from mountains and uplands in western and central Europe. Its oligo- and stenothermal larvae develop in lakes, swamps and springs (Reiss 1969, Langton 1991). In Poland, *P. styriaca* emerges at least twice per season. The species was collected from May until the end of July, mainly at the helocrene and peat bogs. In addition to the Kashubian Lakeland, the Polish records of *P. styriaca* originate from the region of Suwałki (NE Poland).

Stempellinella flavidula (Edwards, 1929)

Material examined: 1 ♂, Babi Dół, reserve "Jar Rzeki Raduni", netting on river, 8 May 1983, leg. R. Szadziewski.

Distribution and biology: Solitary records of *S. flavidula* originate from sites scattered throughout Europe. The habitats supporting larval developments include lakes and small stagnant water bodies as well as trickles, rivulets and springs (Langton 1991). The only specimen of *S. flavidula* known from Poland was found in sample containing abundant males of *Rheotanytarsus curtistylus* (Goetghebuer), collected from a gorge-forming section of River Radunia.

***Tanytarsus aberrans* Lindeberg, 1970**

Material examined: 1 ♂, Borowo, netting, 10 May 1997, leg. E. Kaczorowska.

Distribution and biology: *T. aberrans* is a limnophilous species known primarily from oligotrophic lakes of the Scandinavian Peninsula. The species has also been collected at sites scattered in central Europe, mainly in uplands and mountains. Adults and pupal exuviae of *T. aberrans* were recorded from May until August (Koskenniemi & Paasivirta 1987, Bitušik 1996). The male specimen found in this study was caught in May at a small eutrophic lake. It may be presumed that, in Poland, the species appears as imago also later in the season.

***Tanytarsus mancospinosus* Ekrem & Reiss, 1999**

Material examined: 1 ♂, Chrustowo, netting, 20 Oct. 2001, P. Dominiak. Additional data: 2 ♂♂, Southern Baltic Coastlands, Choczewskie Lake near Żarnowiec (XA86), netting, 18 June 1979, leg. R. Szadziewski.

Distribution and biology: *T. mancospinosus* is a recently discovered species that develops in meso- and eutrophic lakes. In Germany and Denmark, adults of this species emerge from June until August (Ekrem et al. 1999). In Poland, *T. mancospinosus* was recorded at a shallow embayment of the Raduńskie Lake in the second decade of October. Outside of the Kashubian Lakeland it was found in mid-June. This is the first Polish record of *T. mancospinosus*.

***Tanytarsus multipunctatus* Brundin, 1947**

Material examined: Żakowo, netting at Lake Martwe, leg. E. Kaczorowska: 4 ♂♂, 22 August 1994; 2 ♂♂, 08 July 1995; 3 ♂♂, 12–13 August 1995.

Distribution and biology: The species is known from oligotrophic lakes of central Europe and Fennoscandia where it was reported in May as well as from July until September (Brundin 1947, Ekrem 2004). The males examined in this study were caught in the closest proximity to a small eutrophic lake in July and August. It may be expected that the species occurs in Poland also in spring period. The Kashubian Lakeland is the only area of *T. multipunctatus* occurrence known so far in Poland.

***Tanytarsus nigricollis* Goetghebuer, 1939**

Material examined: 1 ♂, Śnice, netting at gravel-pit, 13 May 2006, leg. W. Gilka & J. Naumowicz.

Distribution and biology: *T. nigricollis* is a rare and poorly known species reported from a few sites in western Europe. Its larvae inhabit lakes (Goetghebuer 1939, Reiss & Fittkau 1971). In this study, the species was collected from the vicinity of submerged gravel-pit together with an abundant sample consisting of *Tanytarsus excavatus* Edwards. The German and Belgian data indicate *T. nigricollis* to produce at least two generations per year, as the species was recorded in mid-May and mid-June as well as in late September (op. cit.). This is the first record of *T. nigricollis* in Poland.

***Thienemanniola ploenensis* Kieffer, 1921**

Material examined: 20 ♂♂ and 2 ♀♀ adults, pairs *in copula*, pupae, Niesiołowice, at bank, water surface, 17 April 1998; 11 ♂♂, 2 ♀♀, water surface, plants and stones at bank, 18 April 1998; 15 ♂♂, water surface, 14 April 2005; leg. W. Gilka.

Distribution and biology: *Th. ploenensis* is a European temperate species, developing in fresh waters, from lakes to small natural and artificial water bodies (Lehmann 1973, Janecek 1995). *Th. ploenensis* produces a single, spring generation of adults. They lack the ability to fly and glide on the water surface by using their shortened wings and strongly elongated fore legs set wide apart. Wave action and air jets enhance concentrations of adults and push them towards the shore. Some specimens were observed transported by the wind above the water surface. The *Th. ploenensis* adults aggregate on riparian plants and boulders in search for

a mating partner. Copulating pairs were observed, as well copulation attempts of male-male pairs. A small eutrophic lake in Niesiołowice is one of the few known European sites of *Th. ploenensis*.

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STRESZCZENIE

[Tanytarsini (Diptera: Chironomidae) Pojezierza Kaszubskiego]

Na Pojezierzu Kaszubskim odnotowano 52 gatunki Tanytarsini, z których 42 wykazano na obszarze Kaszubskiego Parku Krajobrazowego, a 33 nad Jeziorami Raduńskimi. Charakterystyczne cechy klimatu oraz ukształtowanie terenu na Pojezierzu Kaszubskim sprzyjają występowaniu zimnolubnych gatunków północnych i górskich (*Cladotanytarsus teres*, *Micropsectra logani*, *Parapsectra styriaca*). *Tanytarsus mancospinosus* i *Tanytarsus nigricollis* to gatunki dotychczas nie notowane w Polsce. *Cladotanytarsus teres*, *Micropsectra logani*, *Parapsectra styriaca*, *Stempellinella flavidula*, *Tanytarsus aberrans*, *T. multipunctatus* i *Thienemanniola ploenensis* to gatunki rzadkie, znane w środkowej Europie z nielicznych stanowisk. Na Pojezierzu Kaszubskim postaci dorosłe Tanytarsini pojawiają się od początku kwietnia do drugiej dekady października, przy wyraźnie wyższej liczbie gatunków w połowie kwietnia, na początku czerwca, w końcu lipca (maksimum) i w pierwszej połowie września. Większość spośród notowanych gatunków należy do wielopokoleniowych, wydających dwa lub więcej pokoleń w sezonie. Imagines trzech gatunków pojawiały się tylko wiosną – *Thienemanniola ploenensis*, *Tanytarsus miriforceps* i *T. sylvaticus*.

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