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## The Chironomidae (Diptera) fauna of Kırklareli Province

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**Abstract:** Larval and adult material collected from July 2012 to July 2013 and previously collected larval material were evaluated taxonomically to determine the Chironomidae (Diptera) fauna of Kırklareli Province. Accordingly, a total of 64 species belonging to the subfamilies Tanypodinae, Prodiamesinae, Orthocladinae, and Chironominae of the family Chironomidae were determined, of which *Camptocladius stercorarius* (De Geer, 1776), *Corynoneura* sp., *Paratanytarsus* sp., *Ablabesmyia* (*Ablabesmyia*) *phatta* (Eggert, 1863), *Chironomus semireductus* (Lenz, 1924), *Einfeldia carbonaria* (Meigen, 1804), *Metriocnemus* (*Metriocnemus*) *fuscipes* (Meigen, 1818), *Rheocricotopus* (*Rheocricotopus*) *fuscipes* (Kieffer, 1909), and *Stictochironomus* sp. were determined as new records for Kırklareli Province, *Acricotopus lucens* (Zetterstedt, 1850), *Brillia flavifrons* (Johannsen, 1905); *Cladopelma virescens* (Meigen, 1818), *Demicryptochironomus* sp., and *Harnischia curtilamellata* (Malloch, 1915) for Turkish Thrace; and *Paratanytarsus laetipes* (Zetterstedt, 1850) for Turkish Chironomidae fauna.

**Key words:** Larval midge, adult chironomid, *Paratanytarsus laetipes*, Turkish Thrace

While the individuals of Chironomidae spend their larval stages in aquatic habitats, the adults are found in terrestrial environments. The larval chironomids are used as indicator organisms to determine the quality level of aquatic habitats. Moreover, they are very important organisms in the food chain by being food of fish and other aquatic invertebrates (Armitage et al., 1995; Ardic and Uygun, 1996; Epler, 2001; Çakmak et al., 2002; Şanlı-Benzer et al., 2007). The adult chironomids flying around aquatic habitats are prey for many invertebrates, frogs, and birds. The studies performed on Chironomidae fauna in inland waters were generally based on their larval stages. However, because of the problems faced during species identifications based on larvae, recent studies started to evaluate the larval and adult individuals together (Sæther and Langton, 2011; Namayandeh and Beresford, 2012). In Turkey, while many studies were performed on larval chironomids, there is only one study on adult chironomids (Reiss, 1985). The present study was performed to determine the Chironomidae (Diptera) fauna of Kırklareli Province in Turkish Thrace and for this aim both larval and adult chironomids were evaluated together taxonomically.

Sampling was done between July 2012 and July 2013 to determine Chironomidae specimens in Kırklareli Province. The samples were collected from 66 different localities including all kinds of freshwater ecosystems like lakes, ponds, streams, dam lakes, swamps, and puddles using an

Ekman grab and hand mud ladle (Figure 1). The sampling localities are shown in Table 1. The mud samples were washed through mesh nets and preserved in 250-cc plastic bottles containing 70% ethanol. The adult chironomids materials were collected using a sweeping net and 70% ethanol was sprayed on the collected specimens to prevent them from flying. All adult chironomids kept in the sweeping net after alcohol spray were collected by the help of a fine-lead clamp and were preserved in 250-cc plastic bottles containing 70% ethanol. All materials were labelled and transferred to the laboratory for identification. Temporary slides of larval specimens were made in glycerin for initial data (presence, position and length of gills, setae, anal tubules, antenna structure) before permanent sliding and examined under a stereomicroscope (Epler, 2001). For identification of the larval specimens, Sæther (1980), Cranston (1982), Fittkau and Roback (1983), Pinder and Reiss (1983), Epler (2001), and Vallenduuk and Morozova (2005) were utilized. Temporary slides of the adult materials were made in glycerin for initial data (subfamily, antenna structure, body coloration, thorax structure) before permanent sliding and then examined under a stereomicroscope (Wiederholm, 1989). Sæther (1980), Saether (1985), Wiederholm (1989), Armitage et al. (1995), Kyerematen et al. (2000), Langton and Pinder (2007), Saether and Oyewo (2008), and Moubayed-Breil et al. (2012) were utilized for identification of the adult specimens.

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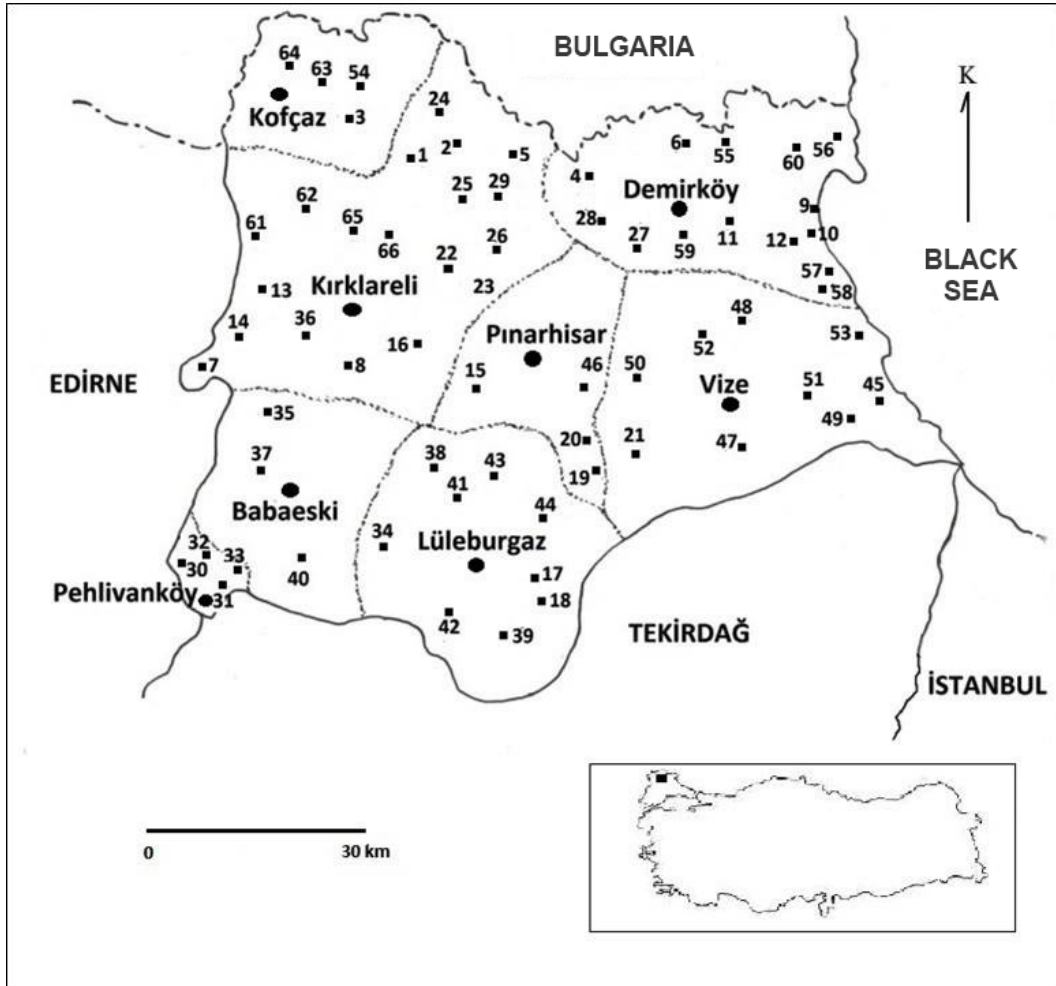


Figure 1. Map showing the sampling localities (the numbers in the figure show the locality number in Table 1).

A total of 64 species belonging to Tanypodinae, Prodiamesinae, Orthoclaadiinae, and Chironominae were identified. A total of 40 were represented by only larval individuals, 17 by only adult individuals, and 7 by both larval and adult individuals (Table 2). *Ablabesmyia (Ablabesmyia) phatta* (Eggert, 1863), *Chironomus semireductus* (Lenz, 1924), *Einfeldia carbonaria* (Meigen, 1804), *Metriocnemus (Metriocnemus) fuscipes* (Meigen, 1818), *Rheocricotopus (Rheocricotopus) fuscipes* (Kieffer, 1909), and *Stictochironomus* sp. identified from larval specimens and *Camptocladius stercorarius* (De Geer, 1776), *Corynoneura* sp., and *Paratanytarsus* sp. identified from adult specimens were given as new records for the Chironomidae fauna of Kırklareli Province; *Acricotopus lucens* (Zetterstedt, 1850), *Brillia flavifrons* (Johannsen, 1905), *Cladopelma virescens* (Meigen, 1818), *Demicryptochironomus* sp., and *Harnischia curtilamellata* (Malloch, 1915) identified from adult specimens were determined as new records for Turkish Thrace; and

*Paratanytarsus laetipes* (Zetterstedt, 1850) was determined as a new record for Turkey.

The previous studies performed on the family Chironomidae in the studied area were based only on larval stages of chironomids (Özkan, 2006; Özkan, 2009; Çamur-Elipek et al., 2012) and a total of 101 species were reported within these studies. In this present study, 15 species identified based both on larval and adult specimens were given as new records for Kırklareli Province, increasing the species number of Kırklareli Chironomidae fauna from 101 to 116. Among the 15 new records, *Acricotopus lucens* (Zetterstedt, 1850), *Brillia flavifrons* (Johannsen, 1905), *Camptocladius stercorarius* (De Geer, 1776), *Corynoneura* sp., *Cladopelma virescens* (Meigen, 1818), *Demicryptochironomus* sp., *Harnischia curtilamellata* (Malloch, 1915), *Stictochironomus* sp., *Paratanytarsus* sp., and *Paratanytarsus laetipes* (Zetterstedt, 1850) were identified based only on adult specimens. Larval stages of these species were not encountered during the study

**Table 1.** Name and coordinates of the sampling localities.

No.	Localities	Coordinates	No.	Localities	Coordinates
1	Dereköy Pond	-	34	Kırıkköy Pond	41°26'49"N, 27°15'55"E
2	Dereköy Stream	41°55'48"N, 27°22'14"E	35	Karacaoğlan Pond	41°32'19"N, 27°5'24"E
3	Koçfaz Stream	41°57'49"N, 27°8'13"E	36	Kavaklı Pond	41°40'13"N, 27°7'41"E
4	Armutveren Village	-	37	Oruçlu Pond	41°30'57"N, 27°4'37"E
5	Şükrüpaşa Village	41°56'3"N, 27°30'42"E	38	Çeşmekolu Pond	41°31'52"N, 27°16'46"E
6	Dupnisa Cave	-	39	Evresekiz Pond	41°40'18"N, 26°33'4"E
7	Arızbaba Stream	-	40	Çiğdemli Stream	41°40'18"N, 26°33'40"E
8	Üsküpdere Stream	41°41'15"N, 27°21'50"E	41	Tatarköy Pond	41°29'14"N, 27°21'3"E
9	Hamam Lake	41°49'36"N, 27°57'24"E	42	Alacaoğlu Stream	41°40'18"N, 26°33'40"E
10	Hamam Stream	-	43	Celaliye Pond	41°32'0"N, 27°21'0"E
11	Pedina Lake	-	44	Ahmetbey Stream	41°40'18"N, 26°33'40"E
12	Küçük Deep-spot	-	45	Kazandere Stream	41°37'57"N, 28°5'12"E
13	İnce Stream	41°40'32"N, 27°4'36"E	46	Poyralı Stream	41°37'19"N, 27°38'39"E
14	Ürünlü Stream	41°40'19"N, 26°59'29"E	47	Müsellim Pond	41°28'29"N, 27°45'17"E
15	Manastır Stream	41°40'5"N, 27°26'13"E	48	Kömürköy Stream	41°40'18"N, 26°33'40"E
16	Şeytan Stream	41°42'36"N, 27°15'43"E	49	Kazandere Dam Lake	41°37'49"N, 28°5'14"E
17	Sakızköy Stream	41°26'25"N, 27°28'27"E	50	Soğucak Stream	41°37'16"N, 27°51'39"E
18	Sakızköy Pond	41°28'23"N, 27°30'33"E	51	Pabuçdere/Kıyıköy	41°39'55"N, 27°57'30"E
19	Cevizköy Stream	41°32'48"N, 27°35'37"E	52	Katırsa Stream	41°40'18"N, 26°33'40"E
20	Tozaklı Pond	41°34'51"N, 27°34'44"E	53	Pabuçdere/Hamidiye	41°39'55"N, 27°57'30"E
21	Topçuköy Pond	41°32'34"N, 27°39'9"E	54	Terzidere Pond	41°57'49"N, 27°8'13"E
22	Yörükbayırı Village	41°49'36"N, 27°20'27"E	55	Bulanık Stream	41°49'30"N, 27°40'40"E
23	Yörükbayırı Village	41°49'40"N, 27°20'40"E	56	Erikli Lake	41°49'3"N, 27°46'40"E
24	Geçitağzı Stream	41°56'16"N, 27°19'8"E	57	Saka Stream	41°48'42"N, 27°57'2"E
25	Düzorman Stream	41°50'59"N, 27°21'55"E	58	Saka Lake	41°48'0"N, 27°59'40"E
26	Armağan Village	41°52'31"N, 27°25'43"E	59	Balaban Stream	41°49'30"N, 27°46'40"E
27	Sarpdere Village	41°52'00"N, 27°35'16"E	60	Mert Lake	41°52'57"N, 27°59'56"E
28	Armutveren Village	41°53'45"N, 27°33'20"E	61	Dolhan Pond	41°47'21"N, 27°2'20"E
29	Karadere Stream	41°55'22"N, 27°26'23"E	62	Kayalıköy Dam Lake	41°48'38"N, 27°7'27"E
30	Pehlivan köy Pond	41°22'8"N, 26°57'34"E	63	Kanara Stream I	41°55'26"N, 27°9'52"E
31	Kanlıdere Stream	41°20'38"N, 26°55'19"E	64	Kanara Stream II	41°55'45"N, 27°9'31"E
32	Kuştepe Stream	41°22'9"N, 26°57'32"E	65	Kadıköy Stream	41°43'14"N, 27°2'18"E
33	Doğanca Pond	41°23'35"N, 26°58'26"E	66	Kırklareli Dam Lake	41°44'58"N, 27°17'2"E

period most probably due to the bioecological features of the species (fertility, time of leaving pupa, preference of habitat, and environmental factors). Therefore, we conclude that taxonomical evaluation of chironomids considering both the larvae and adults together will provide more reliable results.

In the present study, we were able to sample only adult forms of *Cricotopus (Isocladius) sylvestris*, *Harnischia fuscimana*, *Microchironomus tener*, *Paralauterborniella nigrohalteralis*, *Polypedilum* sp., *Polypedilum (Tripodura*

*bicrenatum*, *Polypedilum (Uresipedilum) convictum*, and *Microspectra* sp., whose larval stages have previously been recorded in other studies. On the other hand, although *Camptocladius stercorarius* differs from the other species by its terrestrial larvae, we were unable to sample its larvae since it lives in cow dung (Armitage et al., 1995), a relatively rare material in the study area.

In addition, it was found that the species *Paratanytarsus laetipes* (Zetterstedt, 1850) is a new record for Turkey.

**Table 2.** Chironomidae species identified from Kırklareli Province and their locality numbers (◆ New records for Kırklareli, ■ New records for Turkish Thrace, ● New record for Turkey).

Family: Chironomidae	Larva	Adult
Subfamily: Tanypodinae		
<i>Ablabesmyia (Ablabesmyia) monilis</i> (Linnaeus, 1758)	1	-
<i>Ablabesmyia (Ablabesmyia) phatta</i> (Eggert, 1863) ◆	1	-
<i>Apsectrotanypus trifascipensis</i> (Zetterstedt, 1838)	29	-
<i>Macropelopia nebulosa</i> (Meigen, 1804)	2	-
<i>Procladius (Holotanypus) sp.</i>	1, 5, 6, 9, 23, 25, 45, 55, 61	8, 16
<i>Psectrotanypus varius</i> (Fabricius, 1787)	8, 26, 42	-
<i>Tanypus (Tanypus) kraatzii</i> (Kieffer, 1912)	11, 12, 17, 26	-
<i>Tanypus (Tanypus) punctipennis</i> Meigen, 1818	8, 17, 21, 34, 44	15, 17, 39
<i>Zavreliomyia melanura</i> (Meigen, 1804)	10	-
Subfamily: Prodiamesinae		
<i>Prodiamesa olivacea</i> (Meigen, 1818)	1, 2, 50	-
Subfamily: Orthocladiinae		
<i>Acricotopus lucens</i> (Zetterstedt, 1850) ■	-	14
<i>Brillia flavifrons</i> (Johannsen, 1905) ■	-	59
<i>Camptocladius stercorarius</i> (De Geer, 1776) ◆	-	61
<i>Corynoneura sp.</i> ◆	-	39
<i>Cricotopus (Cricotopus) bicinctus</i> (Meigen, 1818)	52	13, 31, 32, 34, 36, 42, 44, 46, 48, 52
<i>Cricotopus (Isocladius) sylvestris</i> (Fabricius, 1974)	-	35, 38, 39, 40, 41, 58
<i>Cricotopus (Isocladius) intersectus</i> (Staeger, 1839)	4	-
<i>Halocladius (Halocladius) fucicola</i> (Edwards, 1926)	52	-
<i>Halocladius (Halocladius) millenarius</i> (Santos Abreu, 1918)	4	-
<i>Metriocnemus (Metriocnemus) fuscipes</i> (Meigen, 1818) ◆	6	-
<i>Orthocladius (Euorthocladius) thienemanni</i> Kieffer, 1906	52	-
<i>Paracladius conversus</i> (Walker, 1856)	2	-
<i>Psectrocladius (Psectrocladius) limbatellus</i> (Holmgren, 1869)	2	-
<i>Psectrocladius (Psectrocladius) sordidellus</i> (Zetterstedt, 1838)	29	-
<i>Rheocricotopus (Rheocricotopus) fuscipes</i> (Kieffer, 1909) ◆	65	-
Subfamily: Chironominae		
<i>Chironomus (Chironomus) anthracinus</i> Zetterstedt, 1860	1, 3, 4, 5, 27, 39	-
<i>Chironomus (Chironomus) aprilinus</i> Meigen, 1818	4	-
<i>Chironomus (Chironomus) plumosus</i> (Linnaeus, 1758)	9, 11, 12, 13, 42	-
<i>Chironomus (Chironomus) riparius</i> Meigen, 1804	2, 5, 26, 36	-
<i>Chironomus semireductus</i> (Lenz, 1924) ◆	8	-
<i>Chironomus (Chironomus) viridicollis</i> (van der Wulp, 1877)	2, 4, 5, 7, 23, 27	-
<i>Cladopelma virescens</i> (Meigen, 1818) ■	-	18, 66
<i>Cryptochironomus (Cryptochironomus) defectus</i> (Kieffer, 1913)	14, 18, 30, 33, 35, 46, 47, 49, 51, 53, 57, 62	-
<i>Cryptotendipes holsatus</i> Lenz, 1959	19, 55	-
<i>Demicryptochironomus sp.</i> ■	-	51

Table 2. (Continued).

<i>Dicrotendipes tritonus</i> (Kieffer, 1916)	9, 45, 54	-
<i>Einfeldia carbonaria</i> (Meigen, 1804) ♦	5	-
<i>Endochironomus albipennis</i> (Meigen, 1830)	33	-
<i>Endochironomus tendens</i> (Fabricius, 1775)	9	-
<i>Harnischia curtilamellata</i> (Malloch, 1915) ■	-	43
<i>Harnischia fuscimana</i> Kieffer, 1921	-	19
<i>Kiefferulus (Kiefferulus) tendipediformis</i> (Goetghebuer, 1921)	33	-
<i>Microchironomus tener</i> (Kieffer, 1918)	-	20
<i>Microtendipes chloris</i> (Meigen, 1818)	28, 46, 48	-
<i>Paralauterborniella nigrohalteralis</i> (Malloch, 1915)	-	13
<i>Paratendipes albimanus</i> (Meigen, 1818)	8	53
<i>Polypedilum</i> sp.	-	6
<i>Polypedilum (Tripodura) bicrenatum</i> Kieffer, 1921	-	38, 43
<i>Polypedilum (Uresipedilum) convictum</i> (Walker, 1856)	-	40, 46, 58
<i>Polypedilum (Polypedilum) nubeculosum</i> (Meigen, 1804)	18, 35, 37, 43, 45, 49, 53, 66	-
<i>Polypedilum (Polypedilum) nubifer</i> (Skuse, 1889)	30, 33, 63	-
<i>Polypedilum (Polypedilum) pedestre</i> (Meigen, 1830)	28, 40, 57, 58, 64	-
<i>Polypedilum (Tripodura) scalaenum</i> (Schrank, 1803)	19, 22, 28, 40, 48, 50, 59	-
<i>Stictochironomus</i> sp. ♦	2, 3, 19, 28, 32, 44, 53	-
<i>Cladotanytarsus (Cladotanytarsus) mancus</i> (Walker, 1856)	2, 18, 19, 34, 38, 41, 45, 46, 54, 58, 61, 62, 66	8, 15, 16, 18, 22, 35, 36, 37, 38, 39, 41, 43, 53, 54, 61, 62, 63, 65, 66
<i>Micropsectra</i> sp.	-	2
<i>Micropsectra junci</i> (Meigen, 1818)	23, 24	-
<i>Micropsectra notescens</i> (Walker, 1856)	1, 6	-
<i>Micropsectra curvicornis</i> (Chernovskij, 1949)	2, 6	-
<i>Paratanytarsus</i> sp. ♦	-	44, 56
<i>Paratanytarsus laetipes</i> (Zetterstedt, 1850) ●	-	58
<i>Paratanytarsus lauterborni</i> (Kieffer, 1909)	1	-
<i>Rheotanytarsus</i> sp.	65	9
<i>Virgatanytarsus arduennensis</i> (Goetghebuer, 1922)	20, 60	46, 65

***Paratanytarsus laetipes* (Zetterstedt, 1850)**

**Material:** Demirköy-Saka Lake, 41°48'0"N, 27°59'40"E, 07.07.2013, 1♂.

**Distribution in the world:** Austria, Belgium, France and Corsica, Finland, Germany, Hungary, Italy, Netherlands, Poland, Romania, Slovakia, Sweden, Switzerland (Serra-Tosio and Laville, 1991; Tatole, 2000; Arnold and György, 2004; Ekrem et al., 2007; Gilka and Dominiak, 2007; Paasivirta, 2014).

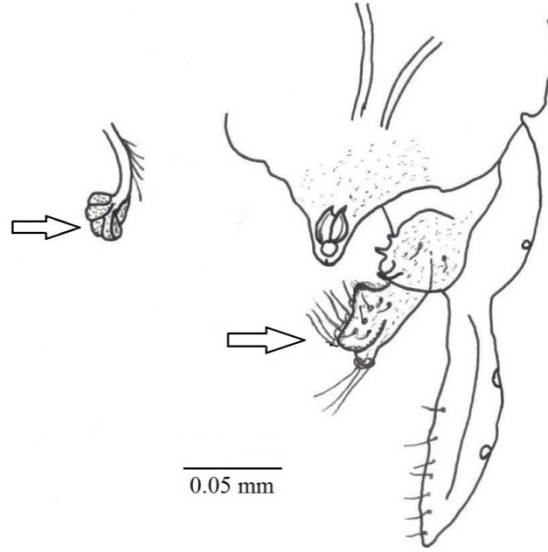
**Habitat:** It was collected among greenery near the lake.

**Remarks:** This species was identified from the adult form and its larvae were not encountered. The wing membrane of the species bears macrotrichia and always

squama is bare. Combs of hind tibia with 2 spurs. The distinguishing features of the species are inner margin of inferior vorsella expanded in the distal half and flattened setae of median vorsella club-shaped (Figure 2).

In the present study, *Cladotanytarsus (Cladotanytarsus) mancus* was the most prevalent species, in terms of both larval and adult samples, as expected, since it is a multivoltine species. When the identified species were evaluated on the basis of their subfamilies, most of the species were found to belong to Chironominae (61%), followed by Orthocladiinae (23.4%), Tanypodinae (14.1%), and Prodiamesinae (1.5%).

*Chironomus plumosus*, *Chironomus viridicollis*, *Chironomus anthracinus*, and *Chironomus riparius* are



**Figure 2.** Hypopygium of *Paratanytarsus laetipes*.

known as bioindicator species (Epler, 2001; Armitage et al., 1995) and they were commonly sampled during our study period. This finding about the bioindicator species led us to think that a pollution load occurred in the research area.

In conclusion, larval and adult chironomids were evaluated together taxonomically. We conclude that, in order to obtain reliable data on taxonomical positions of Chironomidae, particularly for some members of the family, a simultaneous identification of both larval and adult specimens will provide valuable data for a clear

and better understanding of the taxonomic positions of chironomids. We think that further large-scale studies examining the ecology, distribution, and life history of chironomids will provide a good data set to contribute to knowledge of the fauna of the region as a whole.

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