Zeitschrift: Mitteilungen der Schweizerischen Entomologischen Gesellschaft = Bulletin de la Société Entomologique Suisse = Journal of the Swiss Entomological Society

Band: 72 (1999)

Heft: 1-2

Artikel: Chironomidae (Diptera) collected in the forest reserve Sihlwald ZH, with 21 new records for Switzerland

Autor: Otto, Claus-Joachim / Schiegg, Karin

DOI: https://doi.org/10.5169/seals-402744

MITTEILUNGEN DER SCHWEIZERISCHEN ENTOMOLOGISCHEN GESELLSCHAFT
BULLETIN DE LA SOCIÉTÉ ENTOMOLOGIQUE SUISSE
72, 95 – 103, 1999

Chironomidae (Diptera) collected in the forest reserve Sihlwald ZH, with 21 new records for Switzerland

CLAUS-JOACHIM OTTO[1] & KARIN SCHIEGG[2]

[1] Schackendorfer Weg 3, D-23795 Fahrenkrug
[2] Professur für Natur- und Landschaftsschutz, Eidgenössische Forschungsanstalt für Wald, Schnee und Landschaft, CH-8903 Birmensdorf; karin.schiegg@wsl.ch

During an intensive investigation into saproxylic Diptera and Coleoptera in the Forest Reserve Sihlwald (Kt. Zurich, Switzerland), we collected 55 taxa of Chironomidae (Diptera); 21 species are recorded for the first time in Switzerland. The composition of subfamilies and tribes in our samples is characteristic for medium sized mountain streams which are frequent in our study area. The records are presented in a table and notes on the ecology of the species new to Switzerland are added.

Keywords: Chironomidae, Switzerland, faunistics, Diptera

INTRODUCTION

Chironomids are one of the most speciose families in Diptera and contribute significantly to secondary production in temperate streams (BERG & HELLENTHAL, 1991). Their larvae and pupae can be found in various types of aquatic habitats such as stagnant water or fast running streams. Some species of the subfamily Orthocladiinae are secondarily adapted to terrestrial habitats, mainly to humid and wet soils (FITTKAU & REISS, 1978). As IDINGER & KROMP (1997) point out, non-aquatic species largely depend on a sufficient supply of decomposing organic material and on soil humidity (see also HEALY & RUSSEL-SMITH, 1971; DELETTRE, 1983). The palaearctic fauna comprises 1290 species (ASHE & CRANSTON, 1990), 535 species have been recorded in Austria (MOOG, 1995) and 698 in Germany (SAMIETZ, 1996a). In Switzerland, the check list includes 290 species so far (LODS-CROZET, 1998). We present here the chironomid species collected in the course of an intensive ecological investigation into saproxylic Diptera and Coleoptera carried out by the junior author (DEMPEWOLF & SCHIEGG, 1998; SCHIEGG & MUNARI, 1999).

METHODS

The insects were sampled in the Forest Reserve Sihlwald (Kt. Zürich, 47°15' N; 8°33' E). The forest is dominated by beech (*Fagus sylvatica*) and spruce (*Picea abies*) and is situated at a north-eastern oriented slope at 400–700 m altitude about 20 km south of Zürich. We analysed the chironomid species collected with 56 trunk-window traps (KAILA, 1993) between April and September 1996. All traps were positioned within 50 m of running water. Only male individuals were considered because females cannot be identified to species level with certainty (SAMIETZ, 1996b). The material is deposited in the entomological collection of the Eidgenössische Technische Hochschule Zürich (Swiss Federal Institute of Technology, Zürich) and in the collection of the senior author.

Tab. 1. Chironomid species collected between April and November 1996 in the forest reserve Sihlwald. * new to the Swiss Fauna.

Subfamily/Tribus/Species	Trophic level after Moog (1995), Wilson (1996)	Biotop after Mol (1984), Moog (1995)
Chironominae		
Chironomini		
Chironomus cf. cingulatus	detritivore	stagnant water
Microtendipes britteni	detritivore	running water
Parachironomus frequens	detritivore	running/stagnant water
Polypedilum (Pentapedilum) sp.	detritivore	stagnant water
Polypedilum (Polypedilum) albicorne*	detritivore	running water
Polypedilum (Polypedilum) convictum*	detritivore	running water
Polypedilum (Polypedilum) laetum	detritivore	running water
Tanytarsini		
Micropsectra atrofasciata	detritivore	running water
Micropsectra attenuata*	detritivore	running water
Micropsectra junci	detritivore	running water
Neostempellina thienemanni*	detritivore	running water
Stempellinella flavidula*	grazer	running/stagnant water
Virgatanytarsus arduennensis*	detritivore	running/stagnant water
Orthocladiinae		
Brillia modesta	scraper	running water
Bryophaenocladius cf. vernalis*	grazer	semiterrestrial
Bryophaenocladius cf. nidorum*	grazer	semiterrestrial
Camptocladius stercorarius*	detritivore	terrestrial
Corynoneura sp.	grazer	running/stagnant water
Cricotopus (Cricotopus) annulator	grazer	running water
Cricotopus (Cricotopus) tibialis*	grazer	running water
Cricotopus (Cricotopus) tremulus	grazer	running water
Cricotopus (Cricotopus) trifascia	grazer	running/stagnant water
Eukiefferiella brevicalcar	grazer	running water
Eukiefferiella claripennis	grazer	running water
Eukiefferiella gracei	grazer	running water
Gymnometrocnemus brumalis*	grazer	terrestrial
Gymnometrocnemus subnudus*	grazer	terrestrial
Heleniella ornaticollis	grazer	running water
Limnophyes habilis*	grazer	running water
Limnophyes minimus*	grazer	semiaquatic
Limnophyes pentaplastus*	grazer	running water
Metriocnemus albolineatus*	grazer	semiaquatic
Metriocnemus fuscipes*	grazer	running water
Orthocladius (Euorthocladius) rivicola	grazer	running water
Orthocladius (Orthocladius) sp.	detritivore	running water
Parakiefferiella cf. gracillima	detritivore	running water
Parametriocnemus stylatus	detritivore	all waters
Paraphaenocladius exagitans*	grazer	terrestrial?
Parasmittia carinata*	grazer	terrestrial
Paratrichocladius rufiventris	grazer	all waters
Paratrichocladius skirwithensis	grazer	running water
Pseudorthocladius curtistylus*	grazer	semiaquatic
Pseudosmittia curticosta*	grazer	terrestrial?
Rheocricotopus fuscipes*	detritivore	running water
Rheocricotopus tirolus*	grazer	running water
Smittia cf. pratorum*	grazer	semiterrestrial
Smittia cf. leucopogon*	grazer	semiterrestrial
Smittia sp.	grazer	
Synorthocladius semivirens	grazer	running water
Tvetenia calvescens	grazer	running water
Tvetenia verralli	grazer	running water
Prodiamesinae		
Prodiamesa sp.	detritivore	running water
Tanypodinae		
Nilotanypus dubius	predator	running water
Psectrotanypus (Psectrotanypus) varius	predator	stagnant water
Zavrelimyia sp.	predator	running/stagnant water

RESULTS

We collected 1678 individuals out of 55 taxa, 21 species are new to the Swiss fauna (Tab. 1). Additionally, we found 14 individuals belonging to the genus *Bryophaenocladius* (THIENEMANN, 1934), which we could not identifiy with certainty. Some are most probably *B. nidorum* (EDWARDS, 1929), others *B. vernalis* (GOETGHEBUER, 1921). Similarly, we are not sure about the identity of the individuals belonging to the genus *Smittia* (HOLMGREN, 1869), as this genus needs to be revised. We almost certainly found 40 specimens of *S. pratorum* (GOETGHEBUER, 1927) and most probably four specimens of *S. leucopogon* (MEIGEN, 1804). All these four species have not yet been recorded in Switzerland. Most species in our samples belong to Orthocladiinae (Fig. 1), which is the only chironomid subfamily with terrestrial representatives (PINDER, 1995). The composition of subfamilies and tribes present in our samples is characteristic of medium-sized mountain streams (LINDEGAARD, 1995). Consequently, the larvae of most species we collected are confined to running water (Fig. 2) and grazers and detritivore species are dominating the spectrum (Fig. 3). However, we also found a high proportion of terrestrial, semi-terrestrial and semiaquatic species (Fig. 2), about which ecological knowledge still is scarce. All non-aquatic species are new to Switzerland.

In the following section we briefly describe the species new to Switzerland in alphabetic order. The number of individuals is given after the species name.

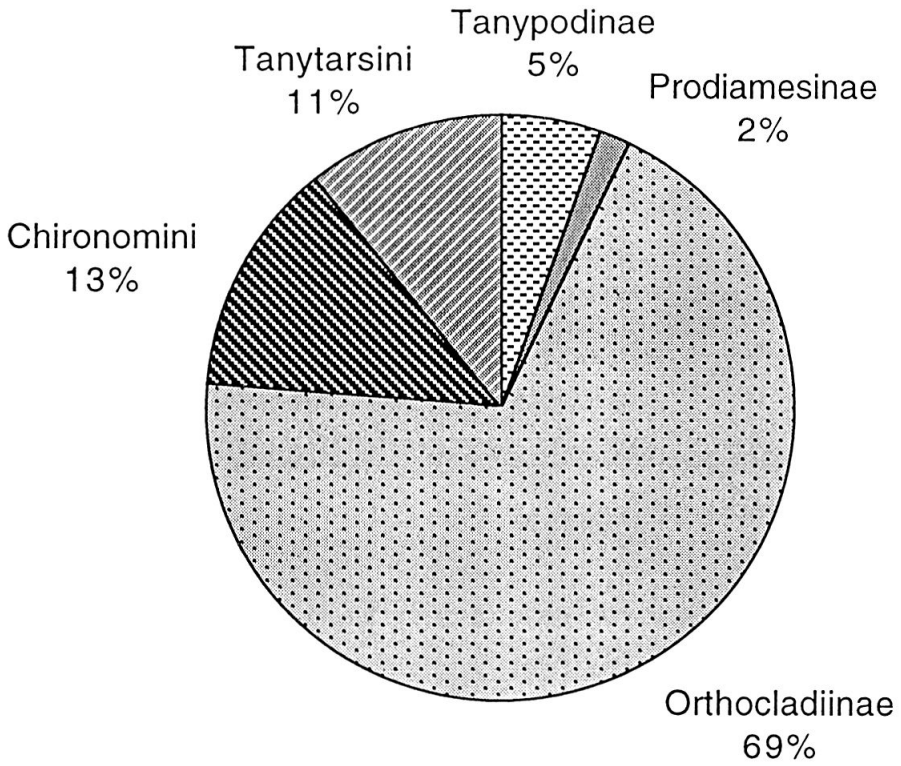

Fig. 1. Proportions of families and tribes. n=55 taxa.

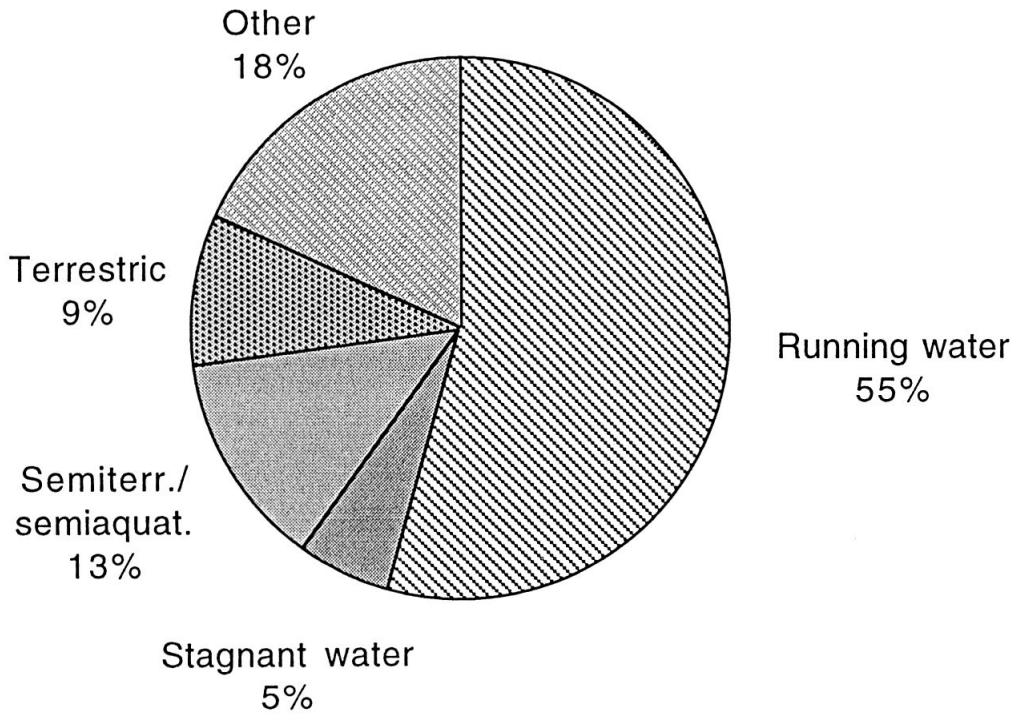

Fig. 2. Number of aquatic, terrestrial and intermediate species. n=55 taxa.

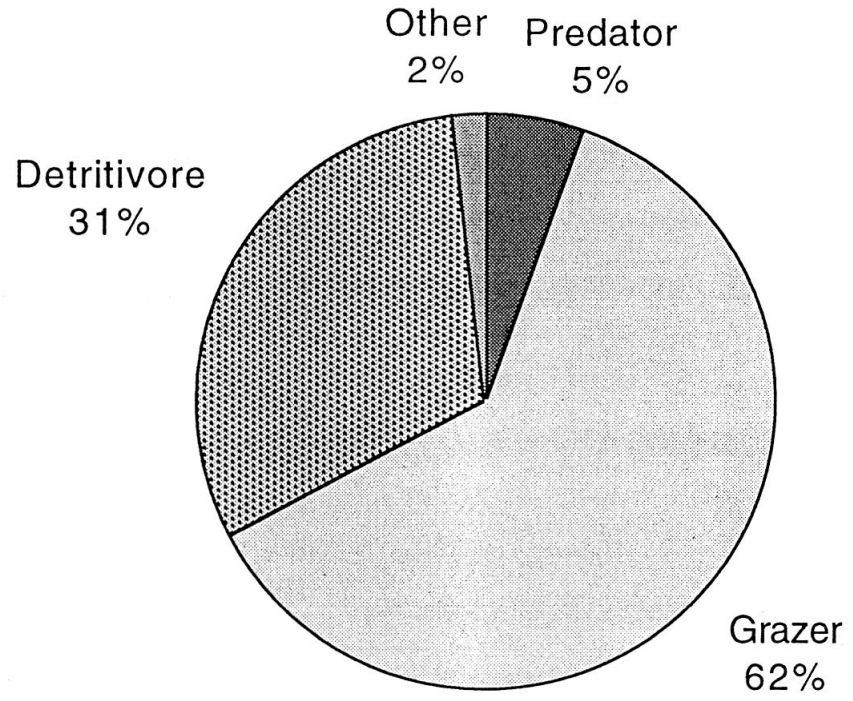

Fig. 3. Number of species according to their trophic level. n=55 taxa.

Subfamily Chironominae

Micropsectra KIEFFER, 1909

Micropsectra attenuata REISS, 1969 –2–

PINDER (1995) attributes this genus a large ecological diversity. *M. attenuata* is temperature sensitive and confined to cold and oxygen rich springs and streams (REISS, 1969).

Neostempellina REISS, 1984

Neostempellina thienemanni REISS, 1984 –1–

According to REISS (1984) the larvae of this recently described species live in the moss cover near springs and the upper part of streams.

Polypedilum KIEFFER, 1912

Polypedilum albicorne (MEIGEN, 1838) –1–
Polypedilum convictum (WALKER, 1856) –7–

The species of *Polypedilum* have been reported to feed on submerged wood (DUDLEY & ANDERSON, 1982). Both *P. albicorne* and *P. convictum* occur in various types of aquatic habitats (FITTKAU & REISS, 1978; MOOG, 1995), the latter species, however, is most frequently found in fast running streams (REIFF, 1994).

Stempellinella BRUNDIN, 1947

Stempellinella flavidula (EDWARDS, 1929) –1–

The larvae of this species are encountered in various kinds of stagnant waters (FITTKAU & REISS, 1978).

Virgatanytarsus PINDER, 1982

Virgatanytarsus arduennensis (GOETGHEBUER, 1922) –5–

According to FITTKAU & REISS (1978) the larvae of *V. arduennensis* occur in the upper part of streams as well as in stagnant waters.

Subfamily Orthocladiinae

Camptocladius VAN DER WULP, 1874

Camptocladius stercorarius (DE GEER, 1776) –2–

The larvae of this genus are detrivore and mostly found in cow dung and rotting vegetable matter (STRENZKE, 1950, MOLLER PILLOT & BRUSKENS, 1990)

Cricotopus VAN DER WULP, 1874

Cricotopus tibialis (MEIGEN, 1804) –1–

Many species of this genus are scrapers and therefore have well-developed mandibles (BERG, 1995). *C. tibialis* has only been recorded so far from rivers and springs (HIRVENOJA, 1973).

Gymnometriocnemus GOETGHEBUER, 1932

Gymnometriocnemus brumalis (EDWARDS, 1929) –10–
Gymnometriocnemus subnudus (EDWARDS, 1929) –18–

The genus *Gymnometriocnemus* is entirely terrestrial and little is known about its ecology. *G. subnudus* is characteristic of deep soils of meadows and deciduous woods (STRENZKE, 1950).

Limnophyes EATON, 1875

Limnophyes habilis (WALKER, 1856) –8–
Limnophyes minimus (MEIGEN, 1818) –113–
Limnophyes pentaplastus (KIEFFER, 1921) –7–

Limnophyes habilis is mostly found in swamps and wet soils (FITTKAU & REISS, 1978), whereas the facultatively parthenogenetic *L. minimus* occurs on banks of small streams (SAETHER, 1990). *L. pentaplastus* prefers moss layers on stones and hygropetric zones (the film of water and algae or detritus on stones and rocks, e.g. ILLIES, 1978).

Metriocnemus VAN DER WULP, 1874

Metriocnemus albolineatus (MEIGEN, 1818) –3–
Metriocnemus fuscipes (MEIGEN, 1818) –2–

The genus *Metriocnemus* includes species that occupy a wide range of habitats. Both *M. albolineatus* and *M. fuscipes* are found in and along running waters (FITTKAU & REISS, 1978; MOOG, 1995).

Paraphaenocladius THIENEMANN, 1924

Paraphaenocladius exagitans (JOHANNSEN, 1905) –14–

P. exagitans is terrestrial as are most species of this genus. It occurs in wet woody debris, in leaves and weed (*Phragmites* sp.).

Parasmittia STRENZKE, 1950

Parasmittia carinata STRENZKE, 1950 –7–

The genus *Parasmittia* is terrestrial and usually encountered in humic soils. STRENZKE (1950) describes *P. carinata* as typical for deep soils of meadows and deciduous woods.

Pseudorthocladius GOETGHEBUER, 1932

Pseudorthocladius curtistylus (GOETGHEBUER, 1921) –2–

As a typical representative of its genus, *P. curtistylus* occurs in stagnant waters and hygropetric zones (see above) in meadows and swamps (STRENZKE, 1950).

Pseudosmittia GOETGHEBUER, 1932

Pseudosmittia curticosta (EDWARDS, 1929) –25–

The species of *Pseudosmittia* are frequently encountered in soil or damp peat (LANGTON, 1995). According to STRENZKE (1960), *P. curticosta* occurs in forest soil.

Rheocricotopus THIENEMANN & HARNISCH, 1932

Rheocricotopus tirolus (LEHMANN, 1969) –2–
Rheocricotopus fuscipes (KIEFFER, 1909) –4–

Most representatives of this genus are shredders, with "chewing, mining, gouging or rasping" methods to acquire food (BERG, 1995). *R. tirolus* feeds on algae in the upper part of streams and rivers (FITTKAU & REISS, 1978; BERG, 1995), *R. fuscipes* is found in springs and lakes (FITTKAU & REISS, 1978).

DISCUSSION

Most studies and surveys focusing on Chironomidae are carried out in aquatic habitats (e.g. MURRAY, 1980; LODS-CROZET, 1992; BÄNZIGER, 1995) as most chironomid species are confined to water in some form and many species can be used as indicators of water quality (e.g. REIFF, 1994; LANG & LODS-CROZET, 1997). According to LINDEGAARD (1995), the composition of subfamilies and tribes present in our samples is typical for middle sized mountain streams. Our study area, the Forest Reserve Sihlwald, is characterized by small streams running in little valleys. Although our traps were not placed along these waters, our collections reflect the communities present in these streams. Apparently, wind is the main factor inducing males to land (SYRJÄMÄKI, 1964; PAASIVIRTA, 1972; DELETTRE, 1984), although some species have been shown to stop swarming when wind speed exceeded 0.8 ms^{-1} (DELETTRE, 1984). Despite the design and position of our traps, we could therefore expect to catch a considerable number of aquatic species. On the other hand, the occurrence of non-aquatic species is favoured by the shady and humid conditions in our study forest, providing large amounts of decomposing organic material. Detritus in its many forms as well as algae are the most common food types in chironomids (e.g. BAKER & MCLACHLAN, 1979; MACKEY, 1979; HILDREW *et al.*, 1985; WARD & WILLIAMS, 1989). Diatoms, fungal hyphae and parts of vascular plants also belong to chironomid diet, but only in small quantities (TAVARES-CROMAR & WILLIAMS, 1997). Generally, little is known about the distribution and ecology of terrestrial chironomid species. It is not surprising therefore, that all 10 non-aquatic species in our samples have not been recorded in Switzerland so far.

ACKNOWLEDGEMENTS

Many thanks are due to R. SAMIETZ (Gotha, Germany) for the verification of some of our determinations and an anonymous referee for comments on the manuscript. We thank the Swiss National Foundation for the financial support of this study (Grant 31–45911.95).

ZUSAMMENFASSUNG

Im Laufe einer Studie über Totholzinsekten im Sihlwald (Kt. Zürich) wurden mit Fensterfallen 55 Taxa von Zuckmücken (Diptera, Chironomidae) gefangen, 21 Arten wurden zum ersten Mal in der Schweiz nachgewiesen. Das gefundene Artenspektrum ist charakteristisch für mittelgrosse Bäche der montanen Stufe, wie sie im Sihlwald in grosser Zahl zu finden sind.

REFERENCES

ASHE, P. & CRANSTON, P.S. 1990. Family Chironomidae. *In*: SOÓS, Á. & PAPP, L. (eds), *Catalogue of Palaearctic Diptera*, vol 2, pp. 113–335. Budapest, Akademiai Kiado & Amsterdam, Elsevier.

BÄNZIGER, R. 1995. A comparative study of the zoobenthos of eight land-water interfaces (Lake of Geneva). *Hydrobiologia 300/301*: 133–140.

BAKER, A.S. & MCLACHLAN, A.J. 1979. Food preferences of Tanypodinae larvae (Diptera: Chironomidae). *Hydrobiologia 62*: 283–288.
BERG, M.B. 1995. Larval food and feeding behaviour. *In*: ARMITAGE, P., CRANSTON, P.S. & PINDER, L.C.V. (eds), *The Chironomidae*, pp. 136–168. Chapman & Hall, London.
BERG, M.B. & HELLENTHAL, R.A. 1991. Secondary production of Chironomidae in a north temperate stream. *Freshwater Biol. 25*: 497–505.
DELETTRE, Y.R. 1983. Sur le régime alimentaire des larves de deux Chironomides (Diptera) des landes armoricaines. *In*: LEBRUN, P.H., ANDRÉ, H.M., DE MEDTS, C., GRÉGOIRE-WIBO, C. & WAUTHY, G. (eds), *New Trends in Soil Biology*, pp. 616–617. Dieu-Brichard, Louvain-la-Neuve.
DELETTRE, Y.R. 1984. *Recherches sur les Chironomides à larves édaphiques: biologie, écologie, méchanismes adaptifs*. Doctorat d'Etat, Université de Rennes I.
DEMPEWOLF, M. & SCHIEGG, K. 1998. Pipunculid flies collected in the Forest Reserve Sihlwald ZH (Diptera, Pipunculidae): Three species new to Switzerland. *Mitt. Schweiz. Ent. Ges. 71*: 111–114.
DUDLEY, T. & ANDERSON, N.H. 1982. A survey of invertebrates associated with wood debris in aquatic habitats. *Melanderia 39*: 1–21.
FITTKAU, E.J. & REISS, F. 1978. Chironomidae. *In*: ILLIES, J. (ed.), *Limnofauna Europaea*. 2nd edition, pp. 404–440. Fischer Verlag, Stuttgart.
HEALEY, J.N. & RUSSEL-SMITH, A. 1971. *Abundance and feeding preferences of fly larvae in two woodland soils. IV. Colloquium pedobiologia*, pp. 177–191. Dijon 1970.
HILDREW, A.G., TOWNSEND, C.R. & HASHAM, A. 1985. The predatory Chironomidae. *Ecol. Entomol. 10*: 403–413.
HIRVENOJA, M. 1973. Revision der Gattung *Cricotopus* VAN DER WULP und ihrer Verwandten (Diptera, Chironomidae). *Ann. Zool. Fenn. 10*: 1–36.
IDINGER, J. & KROMP, B. 1997. Ground photoeclector evaluation of different arthropod groups in unfertilized, inorganic and compost-fertilized cereal fields in Eastern Austria. *In*: KROMP, B. & MEINDL, P. (eds): *Entomological Research in Organic Agriculture*, pp. 171–176. A B Academic Publishers, London.
ILLIES, J. 1978. *Limnofauna Europaea*. A checklist of the animals inhabiting European inland waters, with an account of their distribution and ecology. 2nd edition. Fischer Verlag, Stuttgart.
KAILA, L. 1993. A new method for collecting quantitative samples of insects associated with decaying wood or wood fungi. *Ent. Fenn. 29*: 21–23.
LANG, C. & LODS-CROZET, B. 1997. Oligochaetes versus Chironomids as indicators of trophic state in two Swiss lakes recovering from eutrophication. *Arch. Hydrobiol. 139*: 187–195.
LANGTON, P. 1995. The pupa and events leading to eclosion. *In*: ARMITAGE, P., CRANSTON, P.S. & PINDER, L.C.V. (eds), *The Chironomidae*, pp. 169–193. Chapman & Hall, London.
LINDEGAARD, C. 1995. Classification of water-bodies and pollution. *In*: ARMITAGE, P., CRANSTON, P.S. & PINDER, L.C.V. (eds), *The Chironomidae*, pp. 385–404. Chapman & Hall, London.
LODS-CROZET, B. 1992. Étude des larves de Chironomides (Diptera) du Léman. 1. Systématique et faunistique. *Mitt. Schweiz. Ent. Ges. 65*: 5–23.
LODS-CROZET, B. 1998. Chironomidae. *In*: MERZ, B., BÄCHLI, G., HAENNI, J.-P. & GONSETH, Y. (eds), *Diptera Checklist*, pp. 92–101. Fauna Helvetica 1.
MACKEY, A.P. 1979. Trophic dependencies of some larval chironomidae (Diptera) and fish species in the river Thames. *Hydrobiologia 62*: 241–247.
MOL, A.W.M. 1984. Limnofauna Neerlandica. *Nieuwsbrief European Invertebrate Survey Nederland 15*: 1–24.
MOLLER PILLOT, H.K.M. & BRUSKENS, R.F.M. 1990. Larven der Nederlandse Chironomidae (Diptera). Deel C: Autoekologie en verspreiding. *Nederlandse Faunistische Mededelingen 1C*: 1–87.
MOOG, O. 1995. *Fauna Aquatica Austriaca*. Wasserwirtschaftskataster, Bundesministerium für Land und Forstwirtschaft Wien.
MURRAY, D.A. (1980). *Chironomidae*. Pergamon Press, Oxford.
PAASIVIRTA, L. 1972. Taxonomy, ecology and swarming behaviour of *Tanytarsus gracilentus* HOLMGR. (Diptera, Chironomidae) in Valassaaret, Gulf of Bothnia, Finland. *Ann. Zool. Fenn. 9*: 255–264.
PINDER, L.C.V. 1995. The habitats of Chironomid larvae. *In*: ARMITAGE, P., CRANSTON, P.S. & PINDER, L.C.V. (eds), *The Chironomidae*, pp. 107–135. Chapman & Hall, London.
REISS, F. 1969. Revision der Gattung *Micropsectra* KIEFF 1909 (Diptera, Chironomidae). 1. *attenuata*-Gruppe der Gattung *Micropsectra*. Beschreibung 5 neuer Arten aus Mitteleuropa und Nordafrika. *Dtsch Ent. Z. N.F. 16*: 431–449.
REISS, F. 1984. *Neostempellina thienemanni* n. gen., n. sp., eine europäische Chironomidae mit gehäusetragenden Larven. *Spixinia 7*: 203–210.
REIFF, N. 1994. *Chironomidae (Diptera: Nematocera) oberbayerischer Seen und ihre Eignung zur Trophieindikation*. Diss. Ludwigs-Maximillian-Universität München.

SAETHER, O.A. 1990. A review of the genus *Limnophyes* from the Holarctic and Afrotropical regions (Diptera: Chironomidae, Orthocladiinae). *Ent. Scand. Suppl. 35*: 1–135.
SAMIETZ, R. 1996a. Kommentiertes Verzeichnis der auf dem Gebiet der Bundesrepublik Deutschland nachgewiesenen Chironomiden-Arten (Insecta, Diptera). *Abh. Ber. Mus. Nat. Gotha 19*: 36–70.
SAMIETZ, R. 1996b. Die Zuckmückenfauna der Ulster (Diptera, Chironomidae). *Abh. Ber. Mus. Nat. Gotha 19*: 24–35.
SCHIEGG, K. & MUNARI, L. 1999. Sphaeroceridae (Diptera) collected in the forest reserve Sihlwald ZH. *Mitt. Schweiz. Ent. Ges. 72*: 65–73.
STRENZKE, K. 1950. Systematik, Morphologie und Ökologie der terrestrischen Chironomiden. *Arch. Hydrobiol. Suppl. 18*: 207–414.
STRENZKE, K. 1960. Terrestrische Chironomiden. XVIII. *Pseudosmittia curticosta* (EDW.). *Abh. Naturw. Ver. Bremen 35*: 464–476.
SYRJÄMÄKI, J. 1964. Swarming and mating behaviour of *Allochironomus crassiforceps* KIEFF. (Diptera, Chironomidae). *Ann. Zool. Fenn. 1*: 125–145.
TAVARES-CROMAR, A.F. & WILLIAMS, D.D. 1997. Dietry overlap and coexistence of chironomid larvae in a detritus-based stream. *Hydrobiologia 354*: 67–81.
WARD, A.F. & WILLIAMS, D.D. 1986. Longitudinal zonation and food of larval chironomids (Insecta: Diptera) along the course of a river in temperate Canada. *Holarctic Ecol. 9*: 48–57.
Wilson, R.S. 1996. *A practical key to the genera of pupal exuvies of the British Chironomidae (Diptera, Insecta)*. Qedmore.

(received January 21, 1999; accepted after minor revision March 9, 1999)