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# On the Chironomid fauna from Bulgarian inland waters

## [Chironomidae in Bulgarischen Binnengewässern]

Stefan Stoichev

With 1 table

**Schlagwörter**: Chironomidae, Diptera, Insecta, Bulgarien, Donau, Fluß, See, Baggersee, Stausee, Dominanz

**From a total of 151 chironomid species in various Bulgarian water bodies one is new for Bulgaria. The species found are relatively estimated by the dominant analysis on the base of 801 samples.**

**Von 151 Chironomiden aus verschiedenen bulgarischen Gewässern ist 1 neu für Bulgarien. Auf Grund von 801 Proben wird die relative Abundanz durch eine Dominanzanalyse berechnet.**

## 1 Introduction

*Chironomidae* is a widely distributed family of insects. Chironomid larvae inhabit various kinds of freshwater habitats, as well as the littoral of seas and oceans. They make up a considerable proportion of the benthic biomass. The density of their populations sometimes reaches several hundred thousand individuals per square meter (PANKRATOVA 1970).

Species of the family Chironomidae are interesting from both practical and theoretical points of view. Their larvae can be used as bioindicators of water contamination (SLADECEK 1964). Chironomids are also of great interest from a general biological point of view. They are models for establishing the general principles of speciation (role of chromosome rearrangements in speciation, intraspecific differentiation) (ACTON 1958, MICHAILOVA 1985a, 1985b, 1989). These widely distributed insects of importance to hydrobiology, ecology, genetics and cytogenetics have still not been fully studied from the systematic aspect.

General information about the chironomids in Bulgaria was given by RUSSEV (1966, 1967, 1984, 1994), KOVACHEV (1986) and UZUNOV & al. (1981). Recent information on the Bulgarian chironomids was reported in more details by STOICHEV (1994), STOICHEV (in press), KOVACHEV & STOICHEV (in press). The present paper gives new information on the chironomid fauna from various types of water basins according to the quantitative presence, frequency of occurrence and the distribution in the various habitats. A dominant analysis has also been made.

## 2 Material and methods

The basic part of the investigated material from Bulgaria is a collection of Prof. Valkanov and Prof. Russev gathered 1946-1993. To the collection were added the samples of the author from the rivers Danube, Jantra, Iskar, Vit, Ogosta, Rositsa, Mesta, Maritsa, Struma, Tunja, Kamchija, Ropotamo, Veleka, Rezovska, from the lakes Shabla-Ezerets, Srebarna, from the sand pit lakes near the villages of Dolni Bogrov, Chelopechene, Chepintsi, from the reservoirs Koprinka and Stambolijski, from the high mountain lakes Bliznaka, Babreka, Okoto in Rila mountain. A total of 801 samples

**Correction**

In accordance with Tab. 1 please add 1 to the number of each station on page 118: 1=2, 2=3.....36=37; 1 is omitted.

; 3. Vojnishka-23; ɔsta-25; 10. Iskar--7; 16. Mesta-21; Ropotamo-21; 23. ke, Rila mountain-

12; 27. Okoto lake, Rila mountain-8; 28. Argirovo lake, Pirin mountain-9; 29. Georgijsko lake, Pirin mountain-9; 30. Shabla lake-28; 31. Srebarna lake-36; 32. Dolni Bogrov lake-28; 33. Chelopechene lake-28; 34. Chepintsi lake-28; 35. Koprinka reservoir-24; 36. Batak reservoir-21.

The analysis of dominant quantitative presence (frequency of occurrence pF, frequency of dominance DF, range of dominance Dt in %) was made by the method of DE VRIES (1937). The determination and the presentation of the species was made according to PANKRATOVA (1970, 1977, 1983). The research of TESKEY (1981) has also been used.

## 3 Species composition

A total of 151 species from 38 genera and 5 subfamilies are included in the present study (Tab. 1). Compared to the chironomid fauna of Germany (KRETZSCHMAR & BÖTTGER 1994), of the European part of the former Soviet Union (PANKRATOVA 1970, 1977, 1983), of Romania (CURE 1964, 1985, 1989) and of Turkey (REISS 1986) the Bulgarian chironomid fauna has been recently well investigated. *Stictochironomus pictulus* is new for the Bulgarian fauna (marked by +).

**Tab. 1: Qualitative composition, frequency of occurence and a dominant analysis of chironomid species found (Abbreviations see chapter 2 above)**

| Taxon | Station | pF % | DF % | Dt % |
|---|---|---|---|---|
| CHIRONOMINAE | | | | |
| Beckidia zabolotzkyi (GOETGHEBUER) | 12-16 | 1.12 | | |
| Chironomus gr. plumosus KIEFFER | 8-26, 29-37 | 78,52 | 62,42 | 79,49 |
| Ch. riparius MEIGEN | 2-37 | 96,25 | 72,40 | 75,22 |
| Ch. halophilus KIEFFER | 22-25 | 0,37 | | |
| Chironomus salinarius KIEFFER | 22-25 | 0,24 | | |
| Cryptochironomus defectus KIEFFER | 2-37 | 98,00 | 76,27 | 77,82 |
| Cryptochironomus gr. defectus KIEFFER | 11-14, 16-37 | 74,03 | 61,54 | 83,12 |
| Cr. fridmanae TSCHERNOVSKIJ | 11-14, 16 | 0,62 | | |
| Cryptochironomus sp. | 2 | 0,12 | | |
| Demeijerea sp. | 12 | 0,12 | | |
| Demicryptochironomus vulneratus (ZETTERSTEDT ) | 12-15, 17-21 | 0,62 | | |
| Demicryptochironomus sp. | 2 | 0,12 | | |
| Dicrotendipes gr. nervosus (STAEGER) | 10-18, 26 | 1,37 | | |
| D. nervosus (STAEGER) | 10-17, 27, 33 | 1,87 | | |
| D. tritomus (KIEFFER) | 2, 11-13 | 0,49 | | |
| D. dubia CURE | 10-12 | 0,37 | | |
| Dicrotendipes sp. | 22 | 0,12 | | |
| Einfeldia pagana (MEIGEN ) | 11, 12 | 0,12 | | |
| Endochironomus tendens FABRICIUS | 10-15, 33 | 1,20 | 0,99 | 79,83 |
| E. dispar (MEIGEN ) | 12-15 | 0,74 | | |
| Endochironomus sp. | 2 | 0,12 | | |

| Taxon | Station | pF % | DF % | Dt % |
|---|---|---|---|---|
| Glyptotendipes glaucus (Meigen ) | 12, 14, 31 | 0,49 | | |
| G. gripekoveni Kieffer | 11-14, 31 | 0,49 | | |
| G. pallens (Meigen) | 2, 3, 12-15 | 1,49 | | |
| G. caulicola (Kieffer) | 31 | 0,12 | | |
| Glyptotendipes sp. | 2 | 0,12 | | |
| Microtendipes tarsalis (Walker) | 12, 13 | 0,24 | | |
| Microtendipes gr. chloris (Meigen) | 12-17 | 2,12 | 0,12 | 5,66 |
| M. chloris (Meigen) | 12-15 | 1,12 | | |
| M. pedellus (De Geer) | 12-14 | 0,24 | | |
| M. viridiscutellata (Goetghebuer) | 12-14 | 0,37 | | |
| M. junci (Meigen) | 11-13 | 0,12 | | |
| Microtendipes sp. | 22 | 0,12 | | |
| Neozavrelia fuldensis Fittkau | 12 | 0,12 | | |
| Parachironomus kuzini Shilova | 12, 13 | 0,24 | | |
| Paratanytarsus sp. | 13 | 0,12 | | |
| Paratendipes nudisquama (Edwards) | 2-17, 19, 20 | 4,86 | 0,99 | 20,37 |
| P. albimanus Meigen | 10-14 | 3,87 | | |
| P. fuscimanus Kieffer | 10, 11 | 0,24 | | |
| P. transcaucasicus Tschernovskij | 17-19 | 0,37 | | |
| P sordens(Van der Wulp) | 17, 25 | 0,24 | | |
| Paratendipes sp. | 2 | 0,12 | | |
| Polypedium scalaenum(Tschernovskij) | 2, 3, 12, 13 | 0,87 | | |
| P aberrans Tschernovskij | 3, 12, 13 | 0,37 | | |
| P. gaedii (Meigen) | 10, 11, 13-15 | 0,99 | | |
| P. convictum (Walker) | 2, 12, 14 | 0,37 | | |
| P. pedestre Meigen | 13,14 | 0,24 | | |
| P. tetracrenatum Hirvenova | 2, 14 | 0,12 | | |
| Polypedilum gr. nubeculosum (Meigen) | 2, 11, 14 | 0,37 | | |
| P nubeculosum (Meigen) | 2, 12, 14, 31 | 0,37 | | |
| P bicrenatum Kieffer | 2 | 0,12 | | |
| Stictochironomus pictulus (Meigen) + | 29 | 0,12 | | |
| Tanytarsus gr. gregarius Kieffer | 10, 11, 13-15, 17-21, 23-27 | 22,84 | 15,10 | 66,11 |
| T. gregarius Kieffer | 11-14, 16, 18-24 | 14,85 | | |
| T longipes Akhrorov | 2-11 | 11,36 | | |
| T mancus Walker | 3-7, 11-13 | 8,23 | 6,36 | 77,27 |
| T. sexdentatus (Tschernovskij) | 14,15 | 2,74 | 0,74 | 27,00 |
| T medius Reiss & Fittkau | 11, 13-15, 17, 19-23 | 24,84 | 0,24 | 0,96 |
| T. mendax Kieffer | 12 | 0,24 | | |
| T. pallidicornis (Walker) | 2 | 0,12 | | |
| Tanytarsus sp. | 25 | 0,12 | | |
| ORTHOCLADIINAE | | | | |
| Acrycotopus lucens (Zetterstedt) | 12-16, 18 | 21,72 | 15,60 | 71,82 |
| Brillia gr. modesta (Meigen) | 2 | 0,12 | | |
| B. modesta (Meigen) | 2 | 0,37 | | |
| B. longifurca Kieffer | 2 | 0,24 | | |
| Crycotopus gr. algarum (Kieffer) | 2-11, 13-25, 29 | 62,17 | 39,70 | 63,85 |
| Cr. algarum (Kieffer) | 2-8, 11, 31 | 37,57 | 6,36 | 16,92 |
| Cr. alpestris Goetghebuer | 2, 28 | 0,62 | 0,49 | 79,03 |
| Cr curtus (Hirvenoja) | 12, 16-19 | 1,62 | | |
| Cr. fuscus (Kieffer) | 12, 16, 17, 20, 21 | 1,12 | 0,87 | 77,67 |
| Cr. trifascia Edwards | 2 | 0,24 | | |
| Crycotopus gr. silvestris (Fabricius) | 2, 4, 6, 7, 11-17, 19-26, 32-37 | 75,15 | 61,42 | 81,72 |
| Cr. silvestris (Fabricius) | 2-37 | 81,14 | 48,81 | 60,15 |
| Cr. bicinctus (Meigen) | 22-24 | 0,87 | | |
| Cr. tremulus (Linné) | 22-25 | 1,37 | | |
| Cr. vierriensis (Goetghebuer) | 2 | 0,24 | | |
| Cr. ornatus (Meigen) | 31, 32 | 0,62 | | |
| Crycotopus sp. | 31 | 0,12 | | |
| Eukiefferiella cf. similis Goetghebuer | 3-7, 11, 14, 15, 17, 18, 20-23 | 12,23 | 4,11 | 33,61 |
| E. gracei (Edwards) | 2, 3, 10, 14-17 | 9,61 | 3,87 | 40,27 |
| E. ilkleyensis (Edwards) | 3-6 | 1,74 | | |
| E. tschernovskii Pankratova | 3, 5 | 0,62 | | |
| E. claripennis Lundbeck | 3-7 | 0,49 | | |
| E. oxoniana Pankratova | 2 | 0,24 | | |
| E. lobifera Goetghebuer | 22-24 | 0,62 | | |
| E. alpestris (Goetghebuer) | 22, 24 | 0,74 | | |
| E. clypeata (Kieffer) | 2 | 0,37 | | |
| E. longipes Tschernovskij (sensu Pankratova 1970) | 3-6, 17-20 | 1.37 | 1.12 | 81,75 |
| E. brevicalcar (Kieffer) | 2 | 0,24 | | |

| Taxon | Station | pF % | DF % | Dt % |
|---|---|---|---|---|
| E. quadridentata TSCHERNOVSKIJ (sensu PANKRATOVA 1970) | 12, 13 | 0,24 | | |
| Eukiefferiella sp. | 2 | 0,12 | | |
| Limnophyes gr. prolongatus KIEFFER | 9, 10, 12, 16-22 | 2,24 | | |
| L. prolongatus Kieffer | 15-19, 21 | 4,86 | 3,12 | 64,19 |
| L. septentrionalis TSHERNOVSKIJ (sensu PANKRATOVA 1970) | 11-14, 16-20 | 2,62 | | |
| L. carelicus TSCHERNOVSKIJ | 22-24 | 2,12 | | |
| Limnophyes sp. | 2 | 0,27 | | |
| Metriochnemus gr. higropetricus KIEFFER | 11, 12, 18-21 | 1,12 | | |
| Orthocladius barbatus KIEFFER | 11,12, 16-21, 23 | 2,37 | | |
| O. murvanidzey TSCHERNOVSKIJ | 11, 12, 16-18, 25-28 | 1,99 | | |
| Orthocladius gr. saxicola KIEFFER | 9, 10, 13-15, 19, 20, 23 | 3,12 | | |
| O. saxicola KIEFFER | 9, 10, 13-15 | 2,24 | | |
| O. thienemanni KIEFFER | 3-7, 32 | 1,74 | | |
| O. frigidus (ZETTERSTEDT) | 11, 13-15, 19, 20 | 1,62 | | |
| O. olivaceus (KIEFFER) | 11, 13-15, 20-22, 24 | 1,49 | | |
| O. saxosus (TOKUNAGA) | 11-15 | 0,99 | | |
| Orthocladius sp. | 2 | 0,12 | | |
| Parartocladius nudipennis KIEFFER | 11, 13-15, 17,18, 20 | 3,87 | 3,12 | 80,62 |
| Parakiefferiella bathophila (KIEFFER) | 15, 17-20, 36, 37 | 3,74 | | |
| Psectrocladius psilopterus (KIEFFER) | 13, 17, 18 | 2,49 | | |
| Reocricotopus effusus (WALKER) | 3-7, 18 | 1,37 | | |
| Sinotrocladius semivirens KIEFFER | 11, 16-19, 25 | 1,99 | | |
| Simposiocladius xyloptila (BOTH & CURE) | 15-17 | 1,74 | | |
| Smitta septentrionalis TSCHERNOVSKIJ (S. PANKRATOVA 1970) | 11-15, 17-21 | 3,62 | | |
| S. zavreli FITTKAU | 13, 18, 19 | 0,99 | | |
| S. contingens (WALKER) | 11, 12, 16-18 | 1,49 | | |
| S. sedula KONSTANTINOV | 11, 14, 16, 17 | 0,49 | | |
| Tvetenia gr. calvescens (EDWARDS) | 2-7, 9, 11, 16-25 | 12,23 | 4,36 | 35,65 |
| Tv. calvescens (EDWARDS) | 2-9, 11 | 8,98 | 2,62 | 29,17 |
| Tv. bavarica (GOETGHEBUER) | 12-15, 18, 19 | 4,49 | 0,99 | 22,04 |
| Tv. discoloripes (GOETGHEBUER) | 3-6, 8, 9, 12, 13 | 2,62 | | |
| Tvetenia sp. | 11 | 0,12 | | |
| Thienemanniella gr. clavicornis(KIEFFER) | 2, 11-15 | 1,37 | | |
| T clavicornis (KIEFFER) | 2 | 0,37 | | |
| T. acuticornis (KIEFFER) | 12-15 | 0,87 | | |
| Thienemanniella sp. | 11 | 0,12 | | |
| TANYPODINAE | | | | |
| Ablabesmyia gr curticalcar KIEFFER | 2-11, 15, 19-20, 23-24, 26-32 | 43,44 | 18,85 | 43,39 |
| A. curticalcar KIEFFER | 2-37 | 46,44 | 20,34 | 43,79 |
| A. longistyla FITTKAU | 2 | 0,12 | | |
| A. gr.monilis LINNÉ | 2, 11-15 | 1,87 | | |
| A. monilis LINNÉ | 2 | 0,24 | | |
| Ablabesmyia sp. | 0,22 | 0,12 | | |
| Anatopynia plumipes FRIES | 2, 11-15, 19-26 | 4,74 | 0,74 | 15,61 |
| Apsectrotanipus trifascipennis (ZETTERSTEDT) | 2 | 0,24 | | |
| Clynotanipus nervosus MEIGEN | 13, 15, 18, 19 | 1,12 | | |
| Clynotanipus sp. | 2 | 0,12 | | |
| Macropelopia nebulosa (MEIGEN) | 12, 13 | 0,37 | | |
| Macropelopia sp. | 12, 13 | 0,12 | | |
| Procladius choreus MEIGEN | 2, 12, 13 | 0,99 | | |
| P ferrugineus (KIEFFER) | 8-15 | 3,62 | | |
| P nigriventris KIEFFER (sensu PANKRATOVA 1978) | 11 | 0,24 | | |
| Procladius sp. | 31 | 0,12 | | |
| Tanipus kratzy (KIEFFER) | 13,14 | 0,24 | | |
| T punctipennis MEIGEN | 10, 12-15 | 1,24 | | |
| Thienemannimyia lentiginosa FRIES | 2 | 0,24 | | |
| Zavrelimia melanura MEIGEN | 11,12 | 0,49 | | |
| Z. tetrasticta (KIEFFER) | 11 | 0,12 | | |
| DIAMESINAE | | | | |
| Diamesa latitarsis GOETGHEBUER | 12 | 0,24 | | |
| D. pseudostylata TSCHERNOVSKIJ | 11, 13-15 | 0,99 | | |
| D. insignipes KIEFFER | 12 | 0,12 | | |
| PRODIAMESINAE | | | | |
| Prodiamesa olivacea MEIGEN | 12 | 0,24 | | |
| P rufovittata GOETGHEBUER | 2 | 0,37 | | |

## 4 Dominant analysis

Tab. 1 shows that the *Chironomus riparius, Cryptochironomus defectus, Crycotopus silvestris* and *Ablabesmyia curticalcar* could be found in all Bulgarian water basins. *Chironomus gr. plumosus, Cryptochironomus gr. defectus, Crycotopus gr. silvestris, Crycotopus gr. algarum, Ablabesmyia gr. curticalcar* and *Tvetenia gr. calvescens* could be found almost everywhere. The results from the dominant analysis of the species are given in Tab. 1.

According to the obtained frequency of occurrence the following classification, proposed for the first time by STOICHEV (1994), could be applied:

1. Very frequently found species (pF > 50%): *Chironomus gr. plumosus, Ch. riparius, Cryptochironomus defectus, Cryptochironomus gr. defectus, Crycotopus gr. algarum, C. gr. silvestris, C. silvestris*. Total: 7 species.
2. Frequently found species (pF 20-50%): *Tanytarsus gr. gregarius, T. medius, Acrycotopus lucens, Crycotopus algarum, Ablabesmyia gr. curticalcar, Ablabesmyia curticalcar*. Total: 6 species.
3. Rarely found species (pF 1-20%): *Beckidia zabolotzkyi, Dicrotendipes gr. nervosus, D. nervosus, Endochironomus tendens, Microtendipes gr. chloris, M. chloris, Paratendipes nudisquama, P. albimanus, T. gregarius*. Total: 51 species.
4. Very rare species (pF < 1%): *Chironomus chalophilus, Ch. salinarius, Cryptochironomus fridmanae, Dicrotendipes tritomus, D. dubia, Einfeldia pagana, Endochironomus dispar*. Total: 87 species.

A comparison of the index pF and the range of the dominance Dt shows that the very frequent species dominate also qualitatively in the zoobenthic complex in various water bodies in Bulgaria (Tab. 1).

Beside with the species of high pF and Dt values (*Chironomus gr. plumosus, Chironomus riparius, Cryptochironomus defectus, C. gr. defectus, C. silvestris*), species of high values of the range of dominance and of low presence and dominance frequency could be found (*Endochironomus tendens, Paratendipes nudisquama, Tanytarsus gr. gregarius, Acrycotopus lucens, Crycotopus alpestris, Crycotopus fuscus, Eukiefferiella gracei, E. longipes, Limnophyes prolongatus, Pararthocladius nudipennis*; Tab. 1).

The presented data establish the stenobiontic character of some species as well. The abundant development of these species is possible only in narrow limits of the environmental conditions. Out of these limits they can not be found or they are quantitatively scanty. It is most probable that the more polluted stretches of the rivers and influenced lakes cause instability of the environment. At the places with great selfpurificational capacity a well composed and usually constant qualitative composition can be found.

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*Anschrift des Verfassers*: Stefan Stoichev, Bulgarian Academy of Sciences, Institute of Zoology, boul. 1 Zar Osvoboditel, 1000 Sofia, Bulgaria

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