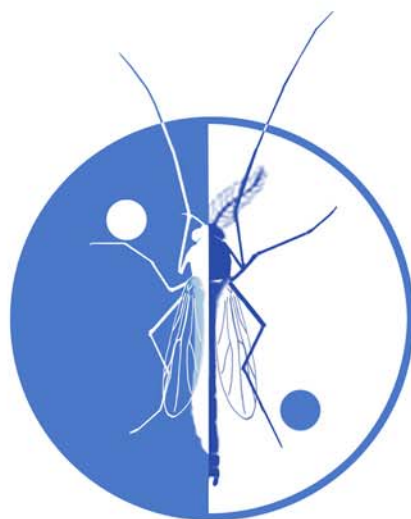




**XVII International Symposium
on Chironomidae**

第十七届摇蚊学国际会议



PROGRAM and ABSTRACTS

July 5-10, 2009

Nankai University, Tianjin, China

XVII International Symposium on Chironomidae

July 5-10, 2009

Nankai University, Tianjin, China

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College of Life Sciences, Nankai University
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ORGANIZED BY

College of Life Sciences, Nankai University

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Symposium Program

July 5-10 2009

Sunday July 5

Arrival and registration; social gathering in the evening

Monday July 6

9:00-9:30 Inauguration

9:30-10:30 The Thienemann Honorary Lecture

From bands to base pairs: Problems in the identification of *Chironomus* species, using the example of *Chironomus oppositus* Walker.

J. MARTIN

The University of Melbourne

10:30-11:00 Break, gathering for group photo

11:00-11:40 Oral communication session special:

Chair Person: P.H.LANGTON

11:00-11:20

Molecular phylogeny of *Micropsectra* and allies: indications of new generic synonyms (Diptera: Chironomidae)

T. EKREM¹, E. WILLASSEN² & E. STUR¹

¹Norwegian University of Science and Technology

² University of Bergen

11:20-11:40

Alpha, beta and gamma diversities of Chironomidae emergence from 20 spring-runs in the Saint Croix River Basin, Minnesota.

L. C. FERRINGTON Jr., M. WESTRICK & B. KARNS

University of Minnesota

12:00 Lunch

13:30-14:50 Oral communication session I-1:

Chair Person: **E.A. MAKARCHENKO**

13:30-13:50

Part 1 of a world catalogue of Chironomidae (Diptera)

P. ASHE¹ & J. P. O'CONNOR²

¹Trinity College, Ireland

²National Museum of Ireland

13:50-14:10

Chironomidae (Diptera) genera from Golpayegan River, Iran

M. EBRAHIMNEZHAD & E. ALLAHBAKHSHI

University of Isfahan, Iran

14:10-14:30

Comparative karyological analysis of the subfamily Diamesinae (Diptera, Chironomidae)

O. ERMOLAEVA

Novosibirsk State University, Russia

14:30-14:50

Interspecific hybridization between sibling species of *Chironomus plumosus* group (Diptera: Chironomidae)

V.V. GOLYGINA, A.G. ISTOMINA & I.I. KIKNADZE

Siberian Branch, Russian Academy of Sciences

14:50-15:30 Coffee Break

15:30-17:20 Oral communication session I-2:

Chair Person: **P. ASHE**

15:30-15:50

Variation and divergence of rDNA ITS-1 region in species of genus *Chironomus* (Diptera: Chironomidae).

L.I. GUNDERINA & A.V. KATOKHIN

Siberian Branch, Russian Academy of Sciences

15:50-16:10

Karyological study of *Chironomus* species from the Netherlands

I.KIKNADZE & A. ISTOMINA

Siberian Branch, Russian Academy of Sciences

16:10-16:30

***Hydrobaenus* sp. Tsugaru with extremely short male antennae from Tsugaru Peninsula, northern Japan (Diptera: Chironomidae)**

T. KOBAYASHI¹, A. OHTAKA², S. KASUYA³ and K. KAGA³

¹ Kawasak-shi, Kanagawa, Japan

² Hirosaki University, Japan

³ Gifu University, Japan

16:30-16:50

Identification of chironomid species by DNA sequence - Especially genus *Hydrobaenus* including *H. sp.* Tsugaru

K. KAGA¹, S. KASUYA¹, T. KOBAYASHI² and A.OHTAKA³

¹Gifu University, Japan

² Kawasak-shi, Kanagawa, Japan

³Faculty of Education, Hirosaki University, Japan

16:50 Poster Set up

Tuesday July 7

8:30-17:20 Oral communication session I-3:

Chair Person: **T. EKREM**

8:30-8:50

Pupal exuviae structure further elaborated.

P. H. Langton

University Museum of Zoology, Cambridge

8:50-9:10

Fauna and taxonomy of the Orthoclaadiinae (Diptera: Chironomidae) of the Russian Far East

E.A. MAKARCHENKO & M. A. MAKARCHENKO

Far East Branch, Russian Academy of Sciences

9:10-9:30

***Microtendipes* Kieffer prohumeral reversed setae – gratis mutation or functional asset?**

J. E. McBEAN

Northern Ireland, UK

9:30-9:50

Questioning feeding related factors in niche separation in chironomid larvae, in particular mentum profile of Orthoclaadiinae and Chironominae

S.F. McBEAN

Northern Ireland, UK

9:50-10:30 Coffee Break

10:30-11:20 Oral communication session I-4:

Chair Person: **I. WALKER**

10:30-10:50

Exploring unknown life stages of arctic Chironomidae (Diptera) with DNA barcoding

E. STUR & T.EKREM

Norwegian University of Science and Technology

10:50-11:10

A review of *Yaeprius isigaabeus* Sasa & Susuki, 2000 (Diptera: Chironomidae)

M. YAMAMOTO¹ & N. YAMAMOTO²

¹Kankyō-kagaku Kabushiki-gaisha, Osaka, Japan

²Osaka Prefecture University

11:10-11:20

The subgenus *Pentapedilum* of the genus *Polypedilum* (Diptera: Chironomidae) in Iriomote Island, the Ryukyus, Japan

N.YAMAMOTO¹, T. HIROWATARI¹ & M. YAMAMOTO²

¹Osaka Prefecture University

²Kankyō-kagaku Kabushiki-gaisha, Osaka, Japan

11:20-12:00 Poster communication session 1

12:00 Lunch

13:30-14:50 Oral communication session II-1:

Chair Person: **L. C. FERRINGTON Jr.**

13:30-13:50

Distribution of Chironomidae (Diptera) under the influence of several environmental parameters in polluted rivers of Juru river basin, Penang, Malaysia

S. A. AL-SHAMI, M. R. CHE SALMAHI, M.N.SITI AZIZAH & A.ABU HASSAN
Universiti Sains Malaysia

13:50-14:10

Hibernal emergence of Chironomidae in relation to stream size in Kansas

A.M. ANDERSON, R.W. BOUCHARD, & L.C. FERRINGTON
University of Minnesota

14:10-14:30

Occurrence and co-occurrence of stream chironomids: associations with environmental gradients and community characteristics

K. BRABEC, J.JARKOVSKY & K. KUBOSOVA
Masaryk University, Czech Republic

14:30-14:50

Community structure and species abundance distribution in chironomids collected in streams in different pollution levels

T.CHON¹, H. TANG¹, X. QU², M. BAE², M.SONG³&Y.PARK²
¹ Pusan National University
²KyungHee University
³National Fisheries Research & Development Institute, Korea

14:50-15:30 Coffee Break

15:30-17:00 Poster communication session 2

Wednesday July 8**Mid-conference tour: Tianjin sightseeing (Riverboat Cruise)****Thursday July 9****8:30-9: 50 Oral communication session II-2:**Chair Person: **T. CHON****8:30-8:50****Response of Chironomidae to multiple gradients of urban impact****S. E. GRESENS**

Towson University, USA

8:50-9:10**Structural analyses of silk and nesting tubes of chironomid larvae (Diptera)****E. INOUE, M. TSUKADA & K. HIRABAYASHI**

Shinshu University, Japan

9:10-9:30**Diversity and distribution of chironomids in natural and impacted springs in the Italian prealps and alps****V. LENCIONI¹, L. MARZIALI^{1,2} & B. ROSSARO³**¹ Natural Science Museum, Italy² Water Research Institute, National Research Council, Italy³ Milan University**9:30-9:50****Automatic detection of response behaviors of *Chironomus riparius* after exposure to toxic chemicals by using computational methods****Y. LIU, C. JI & T. CHON**

Pusan National University

9:50-10:30 Coffee Break

10:30-11: 50 Oral communication session II-3:

Chair Person: **A. Ali**

10:30-10:50

Temporal and spatial variability of chironomid assemblages in a large lowland river (Po River, northern Italy)

L. MARZIALI¹, B. ROSSARO² & A. BUFFAGNI¹

¹ National Research Council - Water Research Institute (CNR-IRSA), Italy

² University of Milan

10:50-11:10

Benthic macroinvertebrates (Chironomidae, Oligochaeta) in Italian lakes

B. ROSSARO¹, L. MARZIALI², A. BOGGERO³ & V. LENCIONI⁴

¹ University of Milano

² CNR IRSA Brugherio (MI) Italy,

³ CNR ISE Pallanza Italy

⁴ MTSN Trento Italy

11:10-11:30

Implications of hypoxic stress in *Chironomus ramosus* larvae with reference to iron

B. B. NATH & A. A. BABREKAR

University of Pune, India

11:30-11:50

Littoral chironomid communities of two small lakes in northern Karelia (Russia) studied by emergence traps: species composition and changes over a 30-years period

A. PRZHIBORO¹ & O.A. SÆTHER²

¹ Russian Academy of Sciences

² Bergen Museum, University of Bergen

12:00 Lunch

13:30-15:00 Forum Session:

Chair person: **O.A. SÆTHER**

O. Hoffrichter

University of Freiburg (Germany)

I. Walker

University of British Columbia Okanagan (Canada)

P. H. Langton

University Museum of Zoology, Cambridge (U.K.)

Free Speech

15:00-15:30 Coffee Break

15:30-17:00 Closing Session

Friday July 10

Post meeting excursion: Beijing sightseeing (the Great Wall, Imperial Palace, etc.)

Program for Accompanying Persons

July 7. Porcelain House, Antique Market and Shopping

July 9. Yangliuqing Folk Museum and Caozhuang Flower

Market

Abstracts of Oral Presentations

(Alphabetically by Lecturer's Surname)

The Thienemann Honorary Lecture

From bands to base pairs: Problems in the identification of *Chironomus* species, using the example of *Chironomus oppositus* Walker

J. MARTIN

The University of Melbourne
(j.martin@unimelb.edu.au)

Abstract The difficulty of identification of most species of *Chironomus* at any life stage is such that they are largely ignored as biological indicators in field studies. The problem largely arises because many of the species originally identified on the basis of morphology have turned out to be complexes, sometimes of many species. Each continent has its species complex, and in this work the Australian *Chironomus oppositus* species group is used to illustrate some of the problems involved in working with such species. The group comprises four recognized species: *C. oppositus* Walker, *C. maddeni* Martin & Cranston, *C. 'pseudoppositus'* and *C. 'jacksoni'*. Within *C. oppositus*, five forms have been recognized on the basis of the complement of inversion sequences and differences in ecological preferences, but their specific status is not clear. Within one of the form, form *whitei*, there are populations in which the chromosomal location of the dominant male determiner (MD) differs. These populations could indicate that MD location is an intraspecific polymorphism, or it could indicate the existence of additional cryptic forms. This talk will address these data in relation to the species concept in *Chironomus*. It will also consider the extent to which molecular barcoding might be useful for identifying *Chironomus* species, particularly where species complexes are an important component of the fauna of a study area.

Distribution of Chironomidae (Diptera) under the influence of several environmental parameters in polluted rivers of Juru River Basin, Penang, Malaysia

S. A. AL-SHAMI, M. R. CHE SALMAHI, M.N.SITI AZIZAH & A.ABU HASSAN
School of Biological Sciences, Universiti Sains Malaysia, 11800 Penang, Malaysia
(alshami200@yahoo.com)

Abstract Six rivers in Juru River Basin; Ceruk Tok Kun River (CTKR), Pasir River (PR), Juru River (JR), Permatang Rawa River (PRR), Ara River (AR) and Kilang Ubi River (KUR) were studied for the influence of physical and chemical parameters on abundance and diversity of chironomids over a period of five months (November 2007-March 2008). Six species from the subfamily Chironominae; *Chironomus kiiensis*, *Chironomus javanus*, *Polypedilum* sp, *Microchironomus* sp, *Dicrotendipes* sp and *Tanytarsus formosanus* and three species from the subfamily Tanypodinae; *Clinotanypus* sp, *Tanypus punctipennis* and *Fittkauimyia* sp were identified. In CTKR and JR, *Tanytarsus formosanus* were the most dominant species with mean densities of 19.66 and 25.32 /m², respectively. In KUR, PRR, AR and PR, *Chironomus kiiensis* were the most dominant species with mean density of 34.32 and 1509.06, 23.99 and 73.972 /m², respectively.

The Canonical Correspondence Analysis (CCA) showed that *Tanytarsus formosanus*, *Dicrotendipes* sp and *Microchironomus* sp preferred environmental conditions characterized as having relatively, moderate to high water temperature, TOM, TSS, velocity, pH, phosphate and sulphate. The chironomid group of Tanypodinae including *Tanypus punctipennis*, *Fittkauimyia* sp, *Clinotanypus* sp and other species of Chironominae; *Polyoedilum* sp, *Chironomus kiiensis*, and *Chironomus javanus* were associated with higher DO, depth, ammonia-N and nitrate-N concentrations.

Key words chironomid larvae, Chironominae, physico-chemical parameters, CCA

Hibernal emergence of Chironomidae in relation to stream size in Kansas

A.M. ANDERSON, R.W. BOUCHARD & L.C. FERRINGTON

Department of Entomology, University of Minnesota, Saint Paul, MN, USA
(ande8267@umn.edu)

Abstract Historical data derived from 109 samples at 70 sample sites located on 62 springs, streams or rivers in Kansas were analyzed to determine patterns of winter-emergence of Chironomidae in relation to stream size. Fifty-three species emerged across all stream sizes during the months of December – February. Highest species richness (30) and greatest taxonomic diversity was detected in springs, spring runs, and groundwater-dominated small streams with maximum average widths of two meters. Twenty-four species emerged in small intermittent streams. Streams with average widths from 2 – 9 meters (with richness of 20 species) and were dominated by Orthoclaadiinae and Diamesinae. Larger rivers with average widths to 20 meters had lower richness (15 species). Only two Orthoclaadiinae taxa emerged in the largest rivers. Groundwater inputs at springs, and into spring runs and smaller streams significantly moderates winter water temperature of these habitats, producing reaches that are locally warm and rarely freeze. We conclude that the moderating influence of groundwater governs taxonomic composition and richness of winter-emerging Chironomidae at small spatial scales and imparts the greatest impact on species composition of springs and small streams.

Key words Winter emergence, hibernal, stream size, Diamesinae, Orthoclaadiinae

Part 1 of a world catalogue of Chironomidae (Diptera)

P. ASHE¹ & J. P. O'CONNOR²

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²National Museum of Ireland, Kildare Street, Dublin 2, Ireland

Abstract A 'World Catalogue of Chironomidae (Diptera)' aims to include all known taxa described since 1758. Part 1 includes nine of the 11 extant subfamilies currently recognised. These nine subfamilies (with the ratio of the number of valid genera and species in parentheses) are treated in the following order:- **Buchonomyiinae (1:3)**, **Chilenomyiinae (1:1)**, **Podonominae (15:158)**, **Aphroteniinae (3:8)**, **Tanypodinae (56:572)**, **Usambaromyiinae (1:1)**, **Diamesinae (22:223)**, **Prodiamesinae (4:23)** and **Telmatogetoninae (2:38)**. In Part 1 there is therefore 105 valid genera and 1027 valid species included as well as synonyms, *nomina dubia* and *nomina nuda*. Distribution data is included for each species. The number of genera and species known from each zoogeographical region is summarized in tables.

Key words World Catalogue, Chironomidae, valid taxa, distribution

Occurrence and co-occurrence of stream chironomids: associations with environmental gradients and community characteristics

K. BRABEC, J.JARKOVSKY & K. KUBOSOVA

Faculty of Science, Masaryk University, Brno, Czech Republic

(brabec@sci.muni.cz)

Abstract Role of chironomids in diversity and functional structure of stream macroinvertebrate communities is usually explained by niche concept, scale-dependent models of fluvial ecosystems, life strategies, and abundance models. General distribution patterns and taxa associations of stream chironomids were investigated based on records from the Czech Republic. Chironomid taxa being well represented in the dataset, consistently identified and covering different life strategies were selected. Multivariate methods (CART, NMDS, cluster analyses and Random Forest) were applied to find links among single taxa occurrence, coexistence, community patterns, and environmental factors. Study results contributed to understanding of macroinvertebrate communities' patterns, their predictability, environmental drivers and chironomids traits.

Key words chironomid coexistence, distribution, community pattern, streams

Community structure and species abundance distribution in chironomids collected in streams in different pollution levels

T. CHON¹, H. TANG¹, X. QU², M. BAE², M. SONG³, Y. PARK²

¹Department of Biological Sciences, College of Natural Sciences, Pusan National University, Busan 609-735, Republic of Korea;

²Department of Biology, KyungHee University, Seoul 130-701, Republic of Korea;

³Fisheries Resources Research Team, West Sea Fisheries Research Institute, National Fisheries Research & Development Institute, Incheon 400-420, Republic of Korea.

(tschon@pusan.ac.kr)

Abstract Benthic macroinvertebrate communities were collected with a Surber sampler in various streams in Korea from 1997 to 2002. Community structure and species abundance distribution in chironomids and total macroinvertebrates were comparatively analyzed to reveal ecological water quality pertaining to the sample sites. While species richness in the total macroinvertebrate communities decreased in the gradient with increase in the level of pollution, species richness in chironomids was somewhat stable at clean to intermediately polluted sites. The rank-abundance curves were also characteristic in chironomids: variation was decreased and species in low abundance was minimized compared with the total macroinvertebrate communities. Patterns of species abundance were efficient in revealing ecological states of the sample sites where physico-chemical indicators may not be easily differentiated in stressful conditions. The feasibility of species abundance distribution and ecological informatics was further discussed in revealing ecological water quality.

Key words Community structure, Species abundance, Chironomids, Streams, Pollution

Chironomidae (Diptera) genera from Golpayegan River, Iran

M. EBRAHIMNEZHAD & E. ALLAHBAKHSHI

Biology Department, University of Isfahan, Isfahan, Iran.
(m_brahim2002@yahoo.co.uk)

Abstract Little is known about the family in Iran. This article is the second of its kind on Chironomid larval identification in running waters in Iran, that has come out in English. Samples were collected in 5 sites from the Golpayegan River in about 50 km along the river course. The sampling was repeated for times: November and February 2003, May and July 2004. The samples were hand sorted in the laboratory and the larvae were identified to generic level, using available identification keys. Thirty five genera were identified in four subfamilies including 15 Chironominae, 13 Orthocladinae, 5 Tanypodinae and 2 Diamesinae, from which 17 genera are reported from the Golpayegan River, Iran, for the first time.

Keywords: Chironomidae, chironomid genera, Golpayegan River, Iran.

Molecular phylogeny of *Micropsectra* and allies: indications of new generic synonyms (Diptera: Chironomidae)

T. EKREM¹, E. WILLASSEN² & E. STUR¹

¹ Museum of Natural History and Archaeology, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway.

² Bergen Museum, University of Bergen, P.O. Box 7800, NO-5020 Bergen, Norway
(Torbjorn.Ekrem@vm.ntnu.no, Endre.Willassen@zmb.uib.no, Elisabeth.Stur@vm.ntnu.no)

Abstract The genus *Micropsectra* is species rich and widely distributed in fresh waters of the Holarctic region. More than 130 species have so far been described and species groups have been erected for European forms, based on diagnostic characters in the male adults. In this study we examine the phylogenetic evidence for these groups with DNA sequence data. We additionally examine the relationships of *Micropsectra* with regard to members of the putatively closely related genera *Krenopsectra*, *Parapsectra* and *Paratanytarsus*. We sequenced fragments of three mitochondrial (COI, COII, 16s,) and two nuclear genes (CAD and EF1-alpha). Highly variable EF1-alpha sequences within some species indicated paralogous gene copies and EF1-alpha sequences were therefore omitted from further phylogenetic analysis. Our concatenated data matrix of four genes encompasses 2700 nucleotide matrix positions from alignments of 75 specimens representing 49 morphologically distinct species. The data included seven species from the outgroup genera *Cladotanytarsus*, *Rheotanytarsus*, *Tanytarsus* and *Virgatanytarsus*. 1143 characters are parsimony-informative. A general time reversible substitution model with invariable sites and gamma correction for rate heterogeneity was employed in a Bayesian phylogenetic analysis of the final dataset. The resulting phylogeny displays a well supported, but paraphyletic *Micropsectra* with regard to *Krenopsectra acuta* and five *Parapsectra* species, indicating taxonomic synonymy of these genera with 100% posterior probability. The genus *Parapsectra* is clearly polyphyletic within *Micropsectra* while *Paratanytarsus* remains monophyletic although with a low

posterior probability. The evolution of morphological characters and delimitation of possible species groups within *Micropsectra* will also be discussed.

Key words *Parapsectra*, *Paratanytarsus*, *Krenopsectra*, Bayesian phylogeny, paralogous EF1-alpha, species groups, diagnostic characters

Comparative karyological analysis of the subfamily

Diamesinae (Diptera, Chironomidae)

O. ERMOLAEVA

College of Natural Sciences, Novosibirsk State University, Novosibirsk, Russia
(ksu@fen.nsu.ru)

Abstract Based on published and own data, comparative karyological analysis of 21 species from 6 Diamesinae genera of Diamesini tribe was carried out. The structure of karyotypes is detected, the organization of polytene chromosomes is described and chromosome number is defined ($n=4$). Analysis of the karyotype structure of the Diamesinae allows us to differ two evident groups. One of them includes species of the genera *Diamesa* Meigen, *Lappodiamesa* Serra-Tosio, *Potthastia* Kieffer and *Sympotthastia* Pagast. The other group includes the genera *Pseudodiamesa* Goetghebuer and *Pagastia* Oliver. These groups differ in the level of chromosomal polymorphism and, perhaps, in the trends of chromosomal evolution. The genera of second group include closely related species. The *Pagastia* includes species *P. orientalis* (Tshernovskij), *P. nivis* (Tokunaga), *P. altaica* Makarchenko et al.). Two groups of the sister species are found in *Pseudodiamesa*. The *nivosa* group consists of *P. nivosa* (Goetghebuer), *P. stackelbergi* (Goetghebuer) and *P. latistyla* (Makarchenko). Several chromosomal races have been revealed in *P. branickii* (Nowickii), which forms the *branickii* group.

Key words Diamesinae, karyological analysis, polytene chromosomes, sister species

Alpha, beta and gamma diversities of Chironomidae emergence from 20 spring-runs in the Saint Croix River basin, Minnesota

L. C. FERRINGTON Jr., M. WESTRICK & B. KARNS

College of Foods, Agricultural & Natural Resources Sciences, University of Minnesota, Saint Paul, Minnesota, USA

(ferri016@umn.edu)

Abstract Collections of surface-floating pupal exuviae taken seasonally at 20 spring-runs detected 75 species of Chironomidae. Individual spring-runs were not highly productive, and exuviae collected per site varied from 52 specimens to 792 specimens per sample. The cumulative number of species per site ranged from 16 species to 35 species. Five subfamilies were represented among the 20 spring-runs. The subfamily Orthocladiinae was most species rich with 46 species representing 61.3% of the fauna. Chironominae with 23 species representing 30.7% of the fauna was second in terms of species richness. The remaining three subfamilies, Diamesinae, Prodiamesinae and Tanypodinae, were each represented by 2 species and collectively accounted for only 8% of the fauna in the springs. The subfamily Orthocladiinae was most abundant (6,544 specimens representing 88.9% of total exuviae). Chironominae were second most abundant (643 specimens, 8.7% of exuviae), followed by Diamesinae (111, 1.5%), Prodiamesinae (51, 0.7%) and Tanypodinae (11, 0.2%).

Alpha diversity of the 20 sites is slightly higher compared with another study of spring-run habitats of the Central Plains in the US, but was more strongly constrained to Orthocladiinae. The higher alpha diversity and predominance of Orthocladiinae are related to the higher latitude of this study and reduced anthropogenic and livestock disturbances. Beta diversity, however, is substantially higher, resulting in more similar communities across springs, that appear to be shaped by consistent flows and hydrologic patterns overlaid by differences in thermal regimes. Gamma diversity is lower, however, presumably because of the smaller geographic.

Several taxa of Chironomidae not commonly reported for the upper mid-west were encountered in this project, including species of: *Pagastia*, *Prodiamesa*, *Odontomesa*, *Heleniella*, *Hudsonimyia*, *Krenosmittia*, *Heterotrissocladius*, *Parachaetocladius*, *Rheosmittia*, *Stempellina* and *Stempellinella*. At least one presumably undescribed genus was collected, along with specimens that appear to be of three undescribed species.

Interspecific hybridization between sibling species of *Chironomus plumosus* group (Diptera: Chironomidae)

V. V. GOLYGINA, A. G. ISTOMINA & I. I. KIKNADZE

Institute of Cytology and Genetics SB RAS, Lavrentiev avenue, 10, Novosibirsk, 630090, Russia
(nika@bionet.nsc.ru)

Abstract Interspecific hybridization in natural populations is rather rare event. As a rule, hybridization may occur between closely related species on the borders of their allopatric ranges or in populations where they live sympatrically. Sympatric habitation is typical for sibling species of *Chironomus plumosus* group: 12 out of 14 species have fully or partially overlapping ranges. We have studied about 9000 specimens of 12 sibling species of this group from 170 Holarctic waterbodies: 7800 larvae from 125 waterbodies of Palearctic (species *C. agilis*, *Chironomus* sp. prope *agilis* (*C. agilis* 2), *C. balatonicus*, *C. borokensis*, *C. entis*, *C. muratensis*, *C. nudiventris*, *C. plumosus*, *Chironomus* sp. J, *Chironomus* sp. K, *C. suwai*, and *C. usenicus*) and 1200 larvae from 45 waterbodies of Nearctic (*C. plumosus* and *C. entis*). In 60 Palearctic and 24 Nearctic waterbodies 2 or more (up to 6) species occurred simultaneously. Cases of interspecific hybridization had been found in 11 Palearctic and 4 Nearctic waterbodies. Interspecific hybrids had been found between species *C. plumosus* and *C. borokensis*, *C. plumosus* and *C. sp. prope agilis*, *C. plumosus* and *C. entis* (in Nearctic only), *C. plumosus* and *C. usenicus*, *C. entis* and *C. agilis* x *Chironomus* sp. prope *agilis* hybrid. In all cases both *F1* hybrids and backcrosses with one or both parent species had been found. Homologous chromosomes of *C. plumosus* x *C. sp. prope agilis* and *C. plumosus* x *C. entis* hybrids mostly shown no conjugation. At the same time homologous parts of chromosomal arms in *C. plumosus* x *C. borokensis* and *C. plumosus* x *C. usenicus* hybrids were tightly paired and usually can form inversion loops if banding sequences of the species involved in hybridization differ by simple inversions. Comparison of hybridization frequencies between

different species have shown that the highest frequency of hybridization occur between most closely related species with highest extent of morphological and karyological similarity, such as *C. plumosus* and *C. borokensis*.

Key words *Chironomus plumosus* group, interspecific hybridization, karyological analysis, polytene chromosome

Financial support was provided by the grants from the Presidium of Russian Academy of Sciences: “Biodiversity and dynamics of gene pools” and “Origin and evolution of biosphere”.

Response of Chironomidae to multiple gradients of urban impact

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Abstract Twenty-five Baltimore (Maryland, USA) area streams were surveyed to determine the response of chironomid assemblages to the environmental effects of urbanization. Surface-floating chironomid pupal exuviae were collected in conjunction with data on nutrients, periphyton abundance, sediment particle size distribution, and concentration of sediment-bound metals. Richness of chironomids emerging during mid-June ranged from 57 to 8 species; richness showed a significant negative relationship to total phosphorus (TP), and a unimodal relationship to peak periphyton abundance. Ordination (non-metric multidimensional scaling) produced one axis strongly associated with landuse: forested streams having sandier beds were contrasted with urban streams having higher TP, algal abundance and conductivity. The second axis distinguished a subset of urban streams with high metal concentrations. Species richness of Tanytarsini was greatest in streams in forested catchments. *Cricotopus* and *Rheocricotopus* spp. were associated with urban streams having high metal concentrations, whereas *Polypedilum scalaenum* gr. sp., *Nanocladius* spp. and *Cryptochironomus* sp. characterized urban streams with lower sediment metal concentrations. Although richness of midsummer-emerging chironomids declined with urbanization, urban streams varied greatly in chironomid assemblage composition.

Key words: pupal exuviae, urbanization, nutrients, metals, algae

Variation and divergence of rDNA ITS-1 region in species of genus *Chironomus* (Diptera: Chironomidae).

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Abstract Internal transcribed spacer 1 (ITS-1) region of the ribosomal DNA locus is widely used for phylogenetic analysis, identification of morphologically similar species and development of diagnostic species-specific DNA markers. However there are scarce data on the ITS-1 sequences in species of genus *Chironomus*. The aim of this work was to study variation and divergence of ITS-1 sequences among species of genus *Chironomus*, to reconstruct the phylogenetic relationships between species and to detect characters, which could be used as species-specific diagnostic DNA markers.

The ITS-1 sequences of species of genus *Chironomus* determined in our work and those available from the GenBank were analyzed. Comparison of ITS-1 sequences in species of genus *Chironomus* revealed within-species and between-species variation in the number and location of insertion/deletion differences, variable and fixed nucleotide substitutions. The coefficient of ITS-1 sequences divergence correlates with the evolutionary distances between *Chironomus* species. The MEGA package was used to reconstruct the phylogeny of ITS-1 sequences of *Chironomus* species. The derived ITS-1 phylogeny of genus *Chironomus* was in line with previously obtained trees using cytogenetic, mtDNA and RAPD data. Fixed nucleotide substitutions between ITS-1 sequences of different *Chironomus* species were found. These characters could be used as diagnostic DNA markers to identify species of genus *Chironomus*.

Key words genus *Chironomus*, internal transcribed spacer 1 (ITS-1), ribosomal DNA, variation, divergence, phylogeny

This work was supported by the Program of the Presidium of the Russian Academy of Sciences “Dynamics of Plant, Animal and Human Gene Pools” (grants no. 24.4, 23.30).

Structural analyses of silk and nesting tubes of chironomid larvae (Diptera)

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Abstract Chironomid larvae often spin silk into nesting tubes to fix their body on the substrates, collect organic matter as their food and protect from their predators. We focused on the ecological property of chironomid silk as a potential material that can be used for water purification and observed the structure of the silk and nesting tubes. A preliminary observation with a scanning electron microscope (SEM) revealed that the diameter of the silk material for the nesting tubes, built by the fourth instar larvae of *Dicrotendipes pelochloris*, was ranged approximately from 250 to 700 nm, one of the finest natural fibers ever known. The diameter of the silk and microstructure of the nesting tubes of other species, e.g. *Chironomus yoshimatsui*, and an estimation of their ability to adsorb organic matter will be also shown in the presentation.

Key words silk, SEM, diameter, nesting tube, microstructure, biofiber

Karyological study of *Chironomus* species from the Netherlands

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Abstract During the last years the usage of biological tests for estimation of anthropogenic effects on water ecosystems are at the center of attention in West Europe. The midges' larvae are one of the suitable test-objects for estimation of purity of water and water bodies production. But species identification on larva stage meet with difficulties in connection with larvae morphological similarity. The karyotype structure is the only sure sign of species on larva stage.

During 2007-2009 years about 18 populations from The Netherlands and 2 populations from neighboring regions of Germany were studied.

19 species of genus *Chironomus* were identified and 4 species had unknown karyotype on the bases of karyological analysis. Morphological analysis of the same samples permit to identify only 7 species.

For The Netherlands population of 4 species – *Chironomus pseudothummi*, *C. aprilius*, *C. luridus*, and *C. uliginosus* the main factors of chromosomal polymorphisms were determined. They are number of banding sequences, number of genotypic combinations of banding sequences, % heterozygous individuals, and mean number of heterozygous inversions per 1 individual. On these parameters The Netherlands populations were compared with Siberian populations. The noticeable cytogenetic divergence between The Netherlands, Siberian and Eastern Europe populations was revealed. It was especially considerable for *C. uliginosus*.

Thus, comparative usage of morphological and cytological criteria in species identification in the genus *Chironomus* on the larvae stage shows the considerable advantage of cytological method.

Key words cytological identification, genus *Chironomus*, karyotypes

Financial support was provided by the grants from the Presidium of Russian Academy of Sciences:

“Biodiversity and dynamics of gene pools” and “Origin and evolution of biosphere”.

Identification of chironomid species by DNA sequence - especially genus *Hydrobaenus* including *H. sp. Tsugaru*

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Abstract Identification of species of chironomid midges is not so easy because of large number of the species and morphological similarities. We have already separated three species of Japanese *Hydrobaenus* Flies (*H. kondoi*, *H. biwaquartus* and *H. kisosecundus*) by variation in the sequences of the second internal transcribed spacer (ITS2) region of ribosomal DNA and suggested synonymy of *H. kondoi* with *H. biwaquartus* is refuted.

One more *Hydrobaenus* fly that has extremely short antennae with no difference in the male genital organ was reported by the third named author. Although it was named as *Hydrobaenus* sp. Tsugaru, identification between *H. biwaquartus* has not been clear. To clarify the problem, we sequenced ITS regions. Used primers were as follows: upper primer on 5.8s (5' - CGATGAAGACCGCAGCAAAC - 3'); the lower primer on 28s (5' - CCCGTTTCGTTCGCCACTAC - 3'). The lower primer has been modified for this time to improve the reliability. Among 427 bases, the difference between *H. kondoi* and *H. biwaquartus*, *H. kondoi* and *H.sp. Tsugaru* and *H.biwaquartus* and *H. sp Tsugaru* were 71 bases (16.6 %), 72 bases (16.9 %), and 46 bases (10.8 %), respectively. The sequence of *H. sp Tsugaru* was more similar to *H. biwaquartus* than others, however it was not concluded that the differences was within the same species.

From these data, we decided that *H. sp Tsugaru* is one more species among *Hydrobaenus* flies.

Key words ITS2, *Hydrobaenus.sp.Tsugaru*, *Hydrobaenus biwaquartus*, Tsugaru, Japan.

***Hydrobaenus* sp. Tsugaru with extremely short male antennae from Tsugaru Peninsula, northern Japan (Diptera: Chironomidae)**

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Abstract A previously unidentified orthoclad was discovered at Byobusan Lakes in the sand dune regions of Tsugaru Peninsula during a benthic invertebrate faunal survey conducted between 2005 and 2007 under the supervision of the second named author of this article. The Byobusan Lakes are comprised of approximately 100 large and small shallow lakes that stretch over 30 km from north to south along the Sea of Japan coast. The area is subject to strong periodic northwesterly winds from winter to early spring.

Male black orthoclads with extremely short antennae and flying close to the surface of the lakes were collected in late March with a sweeping net. The air temperature at the time of collection was 1-3°C. These orthoclads obtained from the Tsugaru Peninsula have been provisionally named *Hydrobaenus* sp. Tsugaru. Chironomids collected in Byobusan lakes in late March, except *H. sp. Tsugaru*, were only *Biwatendipes motoharui* Tokunaga, of which antennae not reduced (AR about 3.0).

Microscopic examination revealed that the hypopygium very closely resembled that of *Hydrobaenus biwaquartus* Sasa and Kawai. The gonostylus of both species exhibit rounded outer corners, a dark claw-like projection near the megaseta, and the SVo consisting of two low humps. The male antennal length of *H. biwaquartus* was 1,200±110µm, and that of *H. sp. Tsugaru* was 750±46µm, which is only 60% of that seen in *H. biwaquartus*. The plume of *H. sp. Tsugaru* is very much reduced in length and number, similar to that of the female of the species. However, the males of both species have 13 flagellomeres commonly. The wing length of *H. sp. Tsugaru* is 90% that of *H. biwaquartus*. It is well known that males of Chironomidae species

inhabiting coastal and mountain areas often exhibit reduced antennae and wing length due to low temperatures and strong windy conditions.

H. sp. Tsugaru was assumed to be a new species based on its specialized morphological and ecological characters. We tentatively examined the relationship among several nuclear ITS sequences of *H. sp. Tsugaru* and its related species, which suggests that *H. sp. Tsugaru* may be sister to *H. biwaquartus*, or derived from it. Further gene analyses in the future will make their divergence process clearer.

Key words *Hydrobaenus.sp.Tsugaru*, *Hydrobaenus biwaquartus*, male reduced antennae, speciation, Tsugaru, Japan.

Pupal exuviae structure further elaborated.

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Abstract Some structures of little significance so far in chironomid exuviae systematics are investigated: the tentorial and mesosternite invaginations, the facial ecdysial creases, and the rectum and rectal spines.

Diversity and distribution of chironomids in natural and impacted springs in the Italian prealps and alps

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Abstract Diversity and distribution of chironomids was studied in spring habitats in the Italian Prealps and Alps (Trentino and Veneto Provinces). 130 springs were selected in order to cover a long altitudinal gradient (62-2790 m a.s.l.), different basin lithology (calcareous and siliceous), different hydromorphological types (rheocrene, limnocrene and helocrene) and different levels of human pressures. Chironomid larvae and pupae were collected in submerged rocks, bottom sediments and submerged mosses. During survey, water temperature, conductivity, dissolved oxygen, pH, nutrients, anions and cations were recorded. Adults were also collected with emergence traps in selected springs. About 39,000 individuals were collected, mostly juveniles. More than 100 taxa were identified, from 1 to more than 30 per spring. Overall, Orthocladiinae prevailed as number of individuals and genera/species, followed by Chironominae, Diamesinae, Tanypodinae and Prodiamesinae. The most frequent and abundant taxa were *Tvetenia calvescens*, *Metriocnemus hygropetricus* gr., *Micropsectra radialis*-type, *Rheocricotopus effusus* and *Corynoneura* sp.A. No crenobiontic nor endemic species were detected, whereas crenophilous taxa dominated. Rheo-elocrene springs were the most diverse and richest ones. The chironomid community composition highlighted different levels of endangering.

Key words orthoclads, crenophilous, human impact, mountain regions

Automatic detection of response behaviors of *Chironomus riparius* after exposure to toxic chemicals by using computational methods

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Abstract Automatic detection of response behaviors of indicator specimens could be efficiently used as an *in situ* monitoring tool in aquatic ecosystem management. Positions of *Chironomus riparius* were continuously monitored in two-dimension from the top-view in 0.25 second intervals by using an automatic image recognition system. The behavioral changes of *C. riparius* were observed after the specimens were individually treated with an organo-phosphorus insecticide, diazinon, at low concentrations (e.g., 0.001 mg/L). Self-Organizing Map (SOM) was used for patterning response behaviors. Abnormal behaviors were accordingly detected on the trained network. The image of the movement tracks were additionally analyzed by fractal dimensions to reveal changes in data structure in responding to the chemicals. Toxic effect was verified by decrease in fractal dimensions after the treatments of diazinon. Computational methods used for analysis of response behaviors could be useful for detecting the presence of toxic chemicals in aquatic conditions.

Keywords Automatic detection, *Chironomus riparius*, Diazinon, Self-Organizing Map

Fauna and taxonomy of the Orthocladiinae (Diptera: Chironomidae) of the Russian Far East

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Abstract New list of Orthocladiinae species with additions, corrections and distribution for the Russian Far East is given and discussed. Three hundred forty nine species of 65 genera are recorded for the region. During the period from 2006 to 2009 eight new genera for the Russian Far East and 25 new species for science were recorded and described. The most species (191) in the South part of Far East were found in Amur River basin, streams and lakes of Sea of Japan basin (181 species), Sakhalin and Moneron Islands (111 species), and the least species (57) in Kurile Islands. In the North part of Far East the most species (72) were recorded for Okhotsk Sea basin and Chukotka region (54 species), and the least species (23) in Kamchatka. The most recorded species (63%) are Palaearctic and 37% of all species have Holarctic distribution. Sixty one Palaearctic species have amphieuroasiatic distribution, 63 species with East Palaearctic continental distribution, 45 species are distributed in continental and island's parts of the Russian Far East, 25 species are known only from islands. Other types of distribution are rare.

Key words Orthocladiinae, list of species, distribution, Russian Far East

Temporal and spatial variability of chironomid assemblages in a large lowland river (Po River, Northern Italy)

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Abstract Po is the largest river in Italy supporting many urban areas and economic activities. Biological quality assessment is demanded by European Water Framework Directive but at present macrobenthic communities are scarcely known. Four sampling campaigns were realized in 15 years (1989-90; 1995-96; 1996-97; 2004-05) covering a 600 km long longitudinal transect and comprising a total of 22 sites, some located downstream the confluence of principal tributaries. Macroinvertebrates were collected in different seasons using modified Hester-Dandy multiplate artificial multistrate samplers and hand nets along the shore. Water temperature, conductivity, pH, nutrients and heavy metals were measured. A total of 86 Chironomid taxa were identified, of which 39 Chironominae, 35 Orthocladiinae, 8 Tanypodinae, 4 Diamesinae and 1 Prodiamesinae, accounting for about 30% of the total number of macroinvertebrate species. Multivariate analysis was used to describe temporal and spatial changes in Chironomid assemblages. Taxa composition shifted from dominant Chironomini (e.g. *Glyptotendipes* sp., *Microtendipes* sp.) in 1989-90 to prevailing Orthocladiinae, Tanypodinae and Tanytarsini (e.g. *Orthocladus* spp., *Conchapelopia* sp. and *Micropsectra* spp.) in 2004-05. A seasonal trend with dominant Orthocladiinae in spring and Chironomini in summer was found. The longitudinal gradient allowed the identification of different reaches. Strong alterations were found for downstream of Lambro river, with high density of *Chironomus riparius* and *Cricotopus* spp.. A slight increase of ecological quality along the time set was due to the realization of

urban treatment plants. Selected Chironomid taxa may be indicators of anthropogenic modification for this important riverine ecosystem.

Key words Chironomidae, artificial substrates, WFD, large rivers, indicators

Benthic macroinvertebrates (Chironomidae, Oligochaeta) in Italian lakes

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Abstract A large dataset from about fifty Italian lakes was collated to analyze the relationships between species of benthic macroinvertebrates and environmental factors.

The lakes have different morphology (volume, surface, depth), origin (alpine, glacial, volcanic), chemistry (conductivity, pH) and anthropogenic pressures (eutrophication, hydromorphological alteration). Two hundred and seventy six species (276) were found of which 189 belonged to the family of Chironomidae and 30 to the class of Oligochaeta; 2404 samples and 83 species were selected for data analysis. A self organizing map (SOM) from artificial neural network (ANN) followed by a k-mean clustering were used to order and classify sites. Environmental variables were included in the analysis as supplementary variables. Natural variables well separated lakes into different groups, but clusters of macroinvertebrate species did not match with the types erected according Water Framework Directive (WFD) system B classification. Altitude, depth, volume, conductivity used in system B influenced the community structure, but other factors as water temperature, dissolved oxygen, total phosphorous were important in determining species composition in different lakes. SOM analysis gave a map of 240 cells, a k-mean cluster analysis grouped cells into 12 clusters: cluster 4 was characterized by species preferring high altitude and low water temperature, cluster 5 by species tolerating high TP and low dissolved oxygen; cluster 2 clustered species preferring high conductivity, cluster 1 high pH, cluster 10 high water temperature, cluster 3 included species with optimum response in sublittoral

stations of large lakes, whereas cluster 8 included species preferring profundal stations of large lakes; cluster 7 and 11 were defined by a characteristic species composition but no environmental variables could be associated. To sum up there was no agreement between the WFD system B classification and the one suggested by macroinvertebrates.

Key words Chironomids, Oligochaeta, benthic macroinvertebrates, SOM analysis

***Microtendipes* Kieffer prohumeral reversed setae – gratis mutation or functional asset?**

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Abstract In many *Microtendipes* spp. Some of the prohumeral setae are spinose and inclined basad. These setae in the pharate adult face apicad in common with the rest of the leg setae, but spring over on eclosion. The existence, shape and socket adaptation for reversal all indicate functionality. An investigation into the possible functions of this structure is reported.

Questioning feeding related factors in niche separation in chironomid larvae, in particular mentum profile of Orthocladiinae and Chironominae

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Abstract Questions raised in the author's undergraduate dissertation 30 years ago appear largely still unanswered. These questions will be outlined and briefly discussed in the light of subsequent publications to indicate potentially fruitful and novel lines for future research. The paper questions the functional morphology of the mentum, quantifying the curvature of the uncompressed mentum profile of a number of species. It is proposed that the shape of the mentum, to date largely ignored by chironomists, is a specialisation for browsing/scraping in a crowded microhabitat, allowing more species to co-exist than would otherwise be the case.

Implications of hypoxic stress in *Chironomus ramosus* larvae with reference to iron

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Abstract Natural population of chironomid midges exhibit amazing ability to survive under extreme environmental conditions. *Chironomus* larvae are also unique in possessing hemoglobin (Hb) as respiratory pigment. Present study has been undertaken in *Chironomus ramosus* larval population in order to elucidate the role of iron and Hb in hypoxic stress. Two batches of larval cultures were generated using variable amount of iron components in the diet. An increment of iron content in the diet led to corresponding elevation of Hb level in Fe-H larvae (reared in high iron containing diet) compared to Fe-L larvae (reared in low iron containing diet). A comparison of respiratory rate showed that Fe-H larvae consumed more oxygen than Fe-L larvae. Under hypoxic conditions, Fe-H individuals survived longer than Fe-L counterparts. Several other biological functions were found to be affected *viz.* heterochrony in the larval development of Fe-L population. Cytogenetic analysis of puffing patterns in the salivary gland polytene chromosomes indicated that Fe-L individuals were more susceptible to hypoxic stress than Fe-H larvae. Further, analysis of major antioxidant enzymes revealed relatively higher specific activity of superoxide dismutase and catalase in Fe-L larvae compared to Fe-H larvae under hypoxic conditions. These findings and other data obtained from Fe-L and Fe-H larval populations suggested homeostatic role of iron and Hb during hypoxic stress in *Chironomus*.

Key words *Chironomus ramosus*, hemoglobin, iron, hypoxia, homeostasis

Littoral chironomid communities of two small lakes in Northern Karelia (Russia) studied by emergence traps: species composition and changes over a 30-years period

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Abstract Chironomid communities were studied by emergence traps in the shallow littoral zone (0.2-1.2 m) in two model northern oligotrophic lakes (Russian Karelia, 66°21'N 33°35'E). Conic emergence traps were installed on three sites that were different in conditions. The study was conducted during two seasons (1996-97) resulting in about 3500 chironomid specimens collected. A total of 56 species in 29 genera and 3 subfamilies have been recorded. Sixteen species were found from European Russia for the first time; larval habitats of 4 species are discovered for the first time. Diagnoses of 9 species are supplemented or improved. Faunal composition and structure of chironomid communities differ dramatically between the sites. Habitat 1 (0.2-0.7 m; abrasion zone of littoral; sparse stands of *Carex rostrata*; sand and with gravel and pebbles) is characterized by *Corynoneura edwardsi* and *Cladotanytarsus* cf. *mancus* predominant in numbers of chironomids collected by traps, and by *Ablabesmyia monilis*, *Conchapelopia melanops*, *Cryptochironomus supplicans* and *Stenochironomus fascipennis* predominant in biomass. Habitat 2 (0.4-1.2 m; flat upper accumulative zone of littoral; very sparse stands of *Phragmites*; sand covered with a 1-5 cm layer of detritus with colonies of Cyanobacteria) is characterized by predominant *C. edwardsi* and *Tanytarsus recurvatus*. Habitat 3 (0.3-1.0 m; flat accumulative littoral; organic silt with a dense turf of *Nuphar* covered with a 2-4 cm layer of detritus with colonies of Cyanobacteria) is characterized by predominant *Procladius flavifrons*, *Parakiefferiella bathophila*, *Stempellinella*

edwardsi and *Cladotanytarsus nigrovittatus*. Seasonal dynamics of emergence is described. We compared our results with the published data (Alimov, Finogenova, 1975; Pankratova, 1975) and with the material of littoral chironomids in the same lakes in 1968-69 (re-examined). Our comparison showed serious changes in species' composition and in the structure of chironomid communities. However, indicator taxa (Sæther, 1979) testify to the retaining of oligotrophic status of both the lakes.

Key words Lake littoral, emergence trap, community, species composition, long-term changes, new records.

Exploring unknown life stages of Arctic Chironomidae (Diptera) with DNA barcoding

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Abstract Chironomidae species are likely the most frequent and diverse macroinvertebrates in arctic freshwater ecosystems and species level identifications of immatures, in particular larvae, are important for both biomonitoring and paleolimnological studies. Nevertheless, knowledge of larvae belonging to arctic species is limited and no up-to-date identification keys and literature for arctic Chironomidae exists today. Here, we present results from our project on Spitsbergen and Bear Island where the goal is to provide genetic and morphological identification keys to all present species. So far we have collected, sequenced and identified adults of 45 species. By sequencing partial COI gene sequences, we have associated larvae of 20 of these, including four of the five currently known Tanytarsini species: *Micropsectra insignilobus*, *Micropsectra radialis*, *Paratanytarsus austriacus* and the parthenogenetic *Tanytarsus heliomesonyctios*. Larvae of the fifth tanytarsine, *Micropsectra logani* only recorded from Bear Island, were not sampled here but have been described previously. We describe the larval stages of *M. insignilobus*, *M. radialis* and *T. heliomesonyctios* and discuss their morphology particular in relationship with characters preserved in subfossil material. Of particular interest is the mandible and mentum of *T. heliomesonyctios* which show close resemblance to the tentatively associated larvae of *Corynocera oliveri*. An overview over *Tanytarsus* species with “*lugens*-type” larvae is given and the phylogenetic value of mandibular accessory teeth is briefly discussed.

Key words Tanytarsini, *Tanytarsus*, *Micropsectra*, Svalbard

A review of *Yaeprius isigaabeus* Sasa & Susuki, 2000

(Diptera: Chironomidae)

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Abstract During the recent survey of the Yaeyama Islands which are located in the southernmost part of Japan near Taiwan, we collected a curious chironomid species. This species was identified as *Yaeprius isigaabeus* Sasa et Suzuki, 2000. The genus *Yaeprius* was erected by above-mentioned authors based on a single male specimen. In the keys to males of Chironomidae of Palaearctic region by Sæther et al. (2000), the male of this species runs to the genus *Lauterborniella* as stated by Sasa and Suzuki. The egg-guide (=gonapophyses VIII), and the gonocoxapodeme of the female genitalia are also similar to those of *Lauterborniella*. The species, however, is clearly separable from the species of *Lauterborniella* by having the fused tibial combs with one spur, hardly recognized anal tergite band on 9T, two pairs of extremely long setae on 9T and a frontoclypeal apotome on dorsal surface of the larval head.

Key words *Yaeprius*, review, all stages, Yaeyama

**The subgenus *Pentapedilum* of the genus *Polypedilum*
(Diptera: Chironomidae) in Iriomote Island, the Ryukyus,
Japan**

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Abstract The subgenus *Pentapedilum* Kieffer, 1913 is one of five subgenera in the genus *Polypedilum* Kieffer, 1912, and is distinguished from the others by the character that wing bears macrotrichia. The monophyly of this subgenus is largely supported, with three relatively distinct apical groups of the *convexum* group, the *sordens* group and the apparently paraphyletic *uncinatum* group (Oyewo & Sæther, 2008). However, the subgenus only defined by the macrotrichia may not be monophyletic. As a result of several-years survey, we recognized three *Pentapedilum* species including a new species, from Iriomote Is., one of main islands of the Yaeyama islands located in the subtropical region in southernmost part of Japan, between Taiwan and Okinawa Island. The new species is similar to *P. (Pe.) sordens* (van der Wulp, 1874) in the general habitus of adult male genitalia, but distinguished from it by the body size and antennal ratio.

In the present study, we record three species including a new species from Iriomote Island, the Ryukyus, Japan. Monophyly of the subgenus *Pentapedilum* is also discussed.

Key words *Pentapedilum*, new species, monophyly, Iriomote Island

Abstracts of Poster Presentations

(Alphabetically by Presenting Author's Surname)

P01 Chironomidae investigations in selected Florida wetlands

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Abstract A two-year population survey of pestiferous Chironomidae was conducted in three wetlands in central Florida by randomly collecting 20-30 benthic mud samples from each habitat at 3-4 weeks interval. Geocoordinates, water depth, and description of substrate materials at each sample location were recorded. Nine New Jersey light traps, placed in the area, were weekly monitored for adult midge prevalence. Chironominae and Tanypodinae larvae occurred in the samples; a few Orthoclaadiinae were also collected. Among Chironominae, Chironomini (mostly *Polypedilum* spp., *Cryptochironomus* spp., *Glyptotendipes paripes*, and *Goeldichironomus carus*) and Tanytarsini (mostly *Tanytarsus* spp.), were identified. Tanypodinae were relatively few in all habitats. Overall, *Tanytarsus* spp. larvae were the most predominant in all 3 habitats in both years. The annual mean and range of larval density of total chironomids in 2007 amounted to 1,416/m², range: 7-12,332/m² with a peak in May, and in 2008, 1,075/m², range: 0-5,924/m² and peaking in April. Water depth at the sampled locations ranged from 0.3 to 9.5 m (mean: 1.8 m); 54% of the total larvae occurred at < 1 m and 46% at > 1 m depths. Of the total larvae, 73, 17, and 10% occurred in sand, mixed substrates, and muck, respectively. Among all locations, 51, 27, and 22% predominated with sand, mixed substrates, and muck, respectively. Sand and mixed substrates were conducive to supporting the numerically dominant *Tanytarsus* spp. Adult midges emerged throughout the year with *Tanytarsus* spp. predominating. Monthly mean of total adults collected per trap per night in 2007 ranged from 23.3 in February to 211 in October, and in 2008, 6.8 in

December to 48.1 in April. In particular, *G. paripes* and *G. carus*, with the biggest body size (as larvae and as adults) compared to other midge species, were more noticeable as pests. A comparison of total midge larval density in each sampled habitat with the captured adults around that habitat did not show a consistent correlation. Temephos, *Bacillus thuringiensis* serovar. *israelensis* (*Bti*), and the insect growth regulator, *s*-methoprene, were tested in the laboratory against field-collected larvae of predominant species/genera of midges.

Key words man-made lakes, nuisance midges, seasonal populations, larval bioassays

P02 An updated check-list of Brazilian Chironomidae (Diptera)

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Abstract Brazil is home to 5 of the 11 subfamilies of Chironomidae. Altogether about 310 species are recorded from the country and one-third of the species (111) have been described after the publication of the Neotropical and Mexican catalog (Spies & Reiss 1996). Podonominae was the last subfamily to be discovered; in 2004 a hygropetric species, *Podonomus pepinelli* Roque *et* Trivinho-Strixino, was described from a mountain area in Minas Gerais. The subfamily Telmatogetoninae is restricted to intertidal habitats and is represented by two genera, but only *Telmatogeton* with described species. Together, these two subfamilies account for 1% of the known fauna. The remaining three subfamilies are far more species-rich (Chironominae 74%, Orthocladiinae 16%, and Tanypodinae 9%). The subfamilies Tanypodinae and Chironominae are dominant in low-land freshwater habitats. Orthocladiinae is more species rich in mountainous areas at higher altitudes, and in semi-terrestrial and terrestrial environments. In South and Southeast Brazil the number of species recorded is much higher in the States of São Paulo, Rio de Janeiro, and Santa Catarina than in the neighboring States Espírito Santo, Minas Gerais, Paraná, and Rio Grande do Sul. From North Brazil about 170 species are recorded; most records are from the States of Pará and Amazonas, while from the remaining States, Acre, Amapá, Rondônia, Roraima, and Tocantins there are very few records. The faunas in the Central-Western and Northeastern States are the least known;

except for Mato Grosso with 22 species, there are hardly any records from these areas. Of the major Brazilian biomes the Amazon Rainforest have the highest number of recorded species, but most species have only been taken along the main rivers. The fauna in the southeastern parts of the Atlantic Rainforest, Mata Atlântica, is also comparatively well known. The fauna in areas with Cerrado, Pampas, Pantanal and Caatinga is on the other hand much less well studied.

Key words Neotropics, Brazil, checklist, Chironomidae

P03 **A bibliography, with dates of publication, of J. J. Kieffer's publications on Chironomidae (Diptera)**

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Abstract Of all the entomologists who have worked on Chironomidae the most prolific in terms of taxa described is J. J. Kieffer who authored over 140 chironomid genus-group names and about 1,900 species-group names. Current work on compiling a World Catalogue of Chironomidae includes dating as much of the taxonomic literature as possible. Kieffer described some taxa as new on more than one occasion and some species have several Kieffer synonyms. In order to determine which taxa have priority it is essential to confirm both the year of publication and the date of publication of each of his publications. A brief account of Kieffer's life and work on Chironomidae is given.

P04 A novel pupa of *Pseudorthocladius* Goetghebuer, new nearctic record for *Doithrix villosa* Sæther & Sublette, and variation in *Doithrix dillona*e Cranston & Oliver

(Diptera: Chironomidae)

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Abstract A recently collected pupal exuviae of *Pseudorthocladius* that was problematic to identify generated interest in review of this and closely related taxa in the author's collection. Characterized by several distinguishing features, the exuviae could not be associated with any species known in the pupal stage, but fits best in *Pseudorthocladius*. In reviewing closely related genera, an unreported new state distribution record was discovered for *Doithrix villosa* in Maine. Also, males of *Doithrix dillona*e from North Carolina were compared to the original description of Nova Scotia males to assess intraspecific variation, and were found to differ slightly in some measurements, ratios, and setal counts.

Key words *Pseudorthocladius*, *Doithrix*, pupal exuviae, Nearctic, new record

P05 *Ablabesmyia* Johannsen (Diptera: Chironomidae: Tanypodinae) from China

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Abstract The genus *Ablabesmyia* Johannsen from China is revised. Three new species, *A. longshengica* sp. n., *A. ningxianica* sp. n. and *A. pengensa* sp. n., from both Oriental and Palaeartic China are described and figured as males. *A. longistyla* Fittkau is recorded from Oriental China; *A. annulata* (Say) is recorded from Palaeartic China; *A. alba* Chaudhuri, Debnath & Nandi, *A. monilis* (Linnaeus), *A. phatta* (Egger) and *A. rhamphe* Sublette are recorded from both Oriental and Palaeartic China. The generic diagnosis given by Murray and Fittkau (1989) is emended, and a key to the males of *Ablabesmyia* in China is presented.

Keywords Chironomidae, Tanypodinae, *Ablabesmyia*, new species, key, China

P06 Bionomics and taxonomy of *Tanytarsus recurvatus***Brundin, 1947**A. PRZHIBORO², T. EKREM¹ & E. STUR¹

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Abstract *Tanytarsus recurvatus* Brundin is found to develop in the shallow littoral zone (depths 0.4-1.2 m) of two small oligotrophic lakes situated in northern Russian Karelia, near the Polar Circle. Larvae are common on three littoral sites, which strongly differ from each other in major bottom conditions. At one of these sites, *T. recurvatus* is one of most abundant chironomid species and the only Tanytarsini species found. This habitat is composed of silted sand covered with 1-5 cm layer of detritus with macroscopic colonies of Cyanobacteria. According to our laboratory and field observations, the larvae of *T. recurvatus* are active tube-builders, which probably play a substantial role in structuring and transformation of bottom littoral substrates. We discuss various aspects of the species' bionomics and also review the current knowledge on the morphological and molecular diagnostics of *T. recurvatus*. An association of immature stages and the adult male is achieved by comparing partial COI gene sequences (so-called DNA barcodes) and individual pharate males. The male, pupa and larva of *T. recurvatus* are described in detail, and morphology and DNA barcodes are compared with the presumably most closely related species *T. allicis* Sublette & Sublette and *T. buckleyi* Sublette & Sublette. The presence of accessory teeth on the larval mandible will place *T. recurvatus* in the «lugens-type» group used in palaeolimnological studies although the species taxonomically is not related to the *lugens*-group.

Key words *Tanytarsus recurvatus*, lake littoral, larva, DNA barcodes, lugens-type.

P07 **Comparative karyological analysis of the subfamily Prodiamesinae (Diptera, Chironomidae)**

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Abstract Comparative karyological analysis of 4 species from two Prodiamesinae genera (*Prodiamesa* Kieffer and *Monodiamesa* Kieffer) was carried out. The structure of karyotypes is detected. The organization of polytene chromosomes is described. Chromosome number is defined ($n=3$). The polytene chromosomes from salivary glands of both genera form chromocenter which is destroyed during squash preparations are made. Pompon-like chromosomes are found out only in the karyotypes of the *Prodiamesa* species. Possible trends of chromosomal evolution are discussed.

Key words *Prodiamesa*, *Monodiamesa*, karyological analysis, polytene chromosomes

P08 *Paratrichocladus* Santos Abreu from Patagonia**(Diptera: Chironomidae: Orthoclaadiinae)**Y. FU^{1,2}, T. ANDERSEN² & H. F. MENDES²¹College of Life Sciences, Nankai University, Tianjin 300071, China²Department of Natural History, Bergen Museum, University of Bergen, P.b. 7800, N-5020 Bergen, Norway

Abstract The orthoclad genus *Paratrichocladus* Santos Abreu, 1918 is listed from the Neotropical Region, but no named species are assigned to the genus. Based on type material *Spaniotoma (Trichocladus) latiforceps* Edwards, 1931 from Chile and Argentina and *Spaniotoma (Trichocladus) luteibasis* Edwards, 1931 from Argentina are transferred to *Paratrichocladus* and redescribed as male and female, respectively. Four other species from Chile are described, one as male, female and pupae, the other three as males only. Two specimens identified by F. W. Edwards as *Spaniotoma (Trichocladus) lateralis* (Walker, 1837) were also examined and found to belong to two different species; the holotype of this species from southern Chile still needs to be examined.

Key words Orthoclaadiinae, *Paratrichocladus*, new species, Chile, Argentina

P09 Horizontal distribution of chironomid larvae (Diptera) in Lake Saiko, Japan

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Abstract Lake Saiko (location of the center: 35°30' N, 138°41' E; surface area: 2.1 km²; maximum depth: 72 m; altitude: 900 m above sea level) is one of the Fuji Five Lakes (FFL: Lakes Kawaguchi, Motosu, Saiko, Shoji and Yamanaka) that is located at the north foot of Mt. Fuji (3,776 m a.s.l.). Miyadi (1932) investigated the composition of benthic macroinvertebrate community in FFL and reported that an oligochaete species, *Tubifex* sp., and several chironomid species were the major taxa in Lake Saiko. In this study, we collected benthic macroinvertebrates at 19 sites that selected from the littoral to profundal area in Lake Saiko on 8 March, 2009, to clarify the current status of the benthic community in Lake Saiko and examine the difference from the last quantitative data by Miyadi (1932) that reported in 80 years ago. As a result, Oligochaeta was the most abundant taxon that accounted for 92.7% of the total abundance, followed by Chironomidae (6.5%). The chironomid density varied greatly among the sites and ranged from 0.0 to 4,474.1 ± 2,304.8 ind./m². Chironomid adults obtained by sweeping and larval rearing were identified and *Micropsectra chuzeprima* was the major species. We will also show the relationships between the chironomid larval density and several environmental measurements to discuss the change in the lake bottom condition in the last 80 years.

Key words benthic macroinvertebrate community, Lake Saiko, Fuji Five Lakes, density, horizontal distribution

P10 Chironomidae (Diptera) diversity in lowland rivers of different orders in central Poland

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Abstract Biodiversity is still the main theme in ecology. Recent research in diversity partitioning has resulted in the first formally coherent and intuitively correct system, in which γ -diversity (regional diversity of multiple communities) is multiplicatively decomposed into independent α - and β -diversity parts. The method is here applied to chironomids, the prevalent group of benthos, inhabiting 10 sites in four rivers of different orders in central Poland, the sites being located at distances of several dozen kilometers from each other. Results obtained indicated that the average mean annual chironomid diversity of the region was 13.7 of Hill's N1 species. The observed pattern of increase in chironomid α -diversity together with increase in stream order, and of increase in β -diversity between a given river and the other studied rivers of the region with stream order was disturbed by inflows of almost constant temperature (range 12.2-15.3°C) ground water from the largest European brown coal strip mine (Bełchatów). This inflow significantly increased the discharge of a nearby 5th order stream.

Key words: riverine chironomids, α -, β -, γ -diversity, partitioning,

P11 Population dynamics of benthic macroinvertebrates in a eutrophic-mesotrophic lake, Lake Kawaguchi, Japan

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Abstract Annual and seasonal changes in the density of benthic macroinvertebrates, oligochaetes and chironomid larvae were studied in a shallow eutrophic-mesotrophic lake, Lake Kawaguchi (35°31'N, 138°45'E) at the center of lake; surface area, 5.96 km²; mean depth, 9.3 m; altitude above sea level, 832 m; eutrophic-mesotrophic lake), for 11 years from April 1993 to March 2004. Monthly monitoring data obtained at Lake Center bottom layer are discussed. Annual mean densities of oligochaetes significantly differed ($F = 8.89$; $df = 10, 119$; $P < 0.01$ in analysis of variance: ANOVA), there was a significant difference between 2003 and 1993-2000, 2002 and 1993-1998, 2001 and 1996-1998, and 2000 and 1997 ($P < 0.05$, Tukey's test). In total chironomid larvae, there was a significant difference between 1994 and 1997-2003, and 1995 and 1997-2003 ($P < 0.05$, Tukey's test). As a result, the annual mean densities of total benthic macroinvertebrates changed in 1998. The difference was significant between 2003 and 1993-1999, 2002 and 1993-1998, 2001 and 1994-1998, and 2000 and 1996-1997 ($P < 0.05$, Tukey's test). The percentage of total chironomid larvae was about 20 % almost all years. The predominant species of chironomid larvae were *Chironomus plumosus* and *Prosilocerus akamusi*. They are among the most ubiquitous species in Japanese eutrophic lakes, ponds and reservoirs. The seasonal population fluctuation of oligochaetes was very large. Densities tended to be highest in spring and winter, compared with summer. The maximum number

was 7792.6 ind. m⁻² in March of 1995. Especially since 1999, densities of oligochates have tended to decrease. Densities of total chironomid larvae tended to be highest during winter to spring compared with summer. There were several peaks, i.e., in January 1994 in February 1995 (max. 1881.5 ind. m⁻²) and 1998, in March 1999, and in May 2001 and 2002. After 1995, larval densities have decreased so that only a few individuals could be collected in 2002 and 2003. The nutrient levels, especially in phosphate concentrations in surface layers in 1995 were higher than in other years. As a result, *Peridinium bipes* grew explosively and formed a freshwater 'red tide' in the early summer of 1995. Phosphate and inorganic nitrogen were sufficient for *P. bipes* growth in 1995. However, after 1995, total phosphate concentration tended to decrease and the modified Carlson's trophic state index (TSI-TP; based on total phosphorus) also decreased. This suggested that the basic conditions necessary for benthos habitats, especially quality and quantity of food, seem to be changing in Lake Kawaguchi as water quality improves. Thus, the numbers of benthic macroinvertebrates are recently decreasing in this lake.

Key words benthic macroinvertebrates, chironomid larvae, Lake Kawaguchi, long-term population dynamics, oligochate

P12 A case study for effects of bt rice on non-biting midges in paddy field

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Abstract *Tryporyza incertulas*, *Chilo suppressalis*, *C.auricilius*, and *Sesamia inferens* are major Lepidopteran pests that cause the serious damage for the rice production in China. A rice variety containing genetically engineered Bt gene, Bt rice, is a promising means to reduce the damage caused by these pests. Ecological risks of Bt rice is a major concern for its commercial releasing. Thus, we are conducting a field trial to detect the potential ecological risks on its non targeted insect group, non-biting midges which is abundant in rice field and plays an important role in rice ecosystem. Our hypothesis of Bt rice may affect on non-biting midges through the direct and/or indirect ways. The direct way includes the Bt protein might be toxic to non-biting midges. The indirect way includes many mechanisms. For example, Bt rice might affect on their shared predators such as spiders. As a generalist, spiders consume both midges and lepidopterans in rice field. Thus, spiders might put much higher pressure on the midges because of lacking lepidopterans in rice field. Another indirect way might be the changed physical characters of Bt rice plants which leads midges prefer to or dislike it. Currently, we are collecting adults emerged from Bt rice field and its control by the emergence traps. The purpose of collecting was to detect any difference of the population dynamics of dominant midge species emerged from Bt field and its control. The following steps aimed to figure out the potential mechanisms through the direct and indirect means.

Key words non biting midge, ecological risk, Bt rice

P13 Density dynamics of chironomid larvae (Diptera) in the middle reaches of the Shinano River, Japan: the response to floods

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Abstract In the Shinano River, the longest river in Japan, an excessively strong flood occurred in mid-July, 2006. In order to clarify the response of macroinvertebrate community to the flood, we investigated the density dynamics of benthic and drifting chironomids at two riffle sites in the middle reaches of the Shinano River from April to December in 2005 and 2006. The density of total benthic chironomids was highest in April or May ($> 20,000$ ind./m²), then tended to decrease in June both in 2005 and 2006. In 2006, the flood in July depopulated chironomids to the densities of less than 15 ind./m² (10 days after flood), but in August (40 days after flood), the density recovered to nearly the same level as June in 2006 and was higher than that in June in 2005. Among the four most abundant taxa that accounted for 73-100% of the total benthic chironomid abundance from June to July in 2005 and 2006, *Tvetenia* sp. and *Eukiefferiella* sp. were abundant in June and then decreased from July to August both in 2005 and 2006. On the other hand, *Polypedilum* spp. and *Tanytarsini* spp. were rare from June to August in 2005, whereas after the flood in July they increased in August in 2006. The density of total chironomid drift was also highest in April or May, and then rapidly decreased from June to July both in 2005 and 2006. After the flood in July, 2006, the drift density became nearly 0 ind./discharge m³. However, it increased in August in 2006 much greater than that in August in 2005. The drift densities of *Tvetenia* sp., *Eukiefferiella* sp., *Polypedilum* spp. and *Tanytarsini* spp. were decreased or low from June to August in 2005, whereas the density became nearly 0 ind./discharge m³ in July, then rapidly increased in August in 2006.

Key words flood, benthic community, drift, recolonization, Shinano River

P14 A fundamental study on range expansion of chironomids

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Abstract Mechanisms of range expansion were studied for a common chironomid species in Japan, *Cricotopus sylvestris*, by examining genetic relationships between specimens from 31 sections in Hiroshima Prefecture, Japan, using Random Amplified Polymorphic DNA (RAPD) method, in relation to some environmental factors. In a dendrogram on the basis of RAPD analysis, most clades were constructed by specimens of the tributaries of multiple river basins. There were no significant relationships between geographic and genetic distances. With respect to the sections on the Setouchi Plane, the lowest one of the 3 upheaval planes in the Chugoku Region, however, there is a significant positive relationship between geographic and genetic distances. With respect to the sections in the western part to a large earth fault of northeast to southwest direction in the western Chugoku Region, where active topographical changes had frequently occurred up to date, furthermore, there is a significant negative relationship between geographic and genetic distances. These results suggest the involvements of airborne dispersal of adults and a reproductive separation by topographical changes in range expansion of *C. sylvestris*.

Key words *Cricotopus sylvestris*, genetic distance, range expansion, topographical change

P15 Chironomids of springs, rivers and lakes in five provinces and in the Beijing municipality of the People's Republic of China

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Abstract This study focused on Chironomid fauna of four springs, seven rivers and four lakes in five China Provinces (Jiangsu, Zhejiang, Jiangxi, Guizhou, Guandong) and in the Beijing Municipality of the People's Republic of China. Study sites are located in the East Palaearctic and Oriental zoogeographical regions. Larvae, pupal exuviae and adults were collected between 2003 and 2007, once per site. Two rivers originate from caves, all lakes are urban, one is artificial. Extra-samples of adults were collected by means of Malaise traps in villages close to flooded cultivated (rice) fields, especially in Guizhou and Guandong. More than 800 specimens were identified, mostly belonging to the subfamilies Chironominae and Tanypodinae. Low water quality, presence of garbage and other human impact (industrial and agriculture waste waters, dam, outlet of hydroelectric power plan) characterizing most study sites, justify the prevalence of high tolerant and euriecious genera such as *Chironomus* Meigen and *Polypedilum* Kieffer. Most species we found were previously reported as typical of the East Asia zoogeographical subregion. The genus *Chironomus* was found with several species; these captures stimulate the revision of the genus.

Key words East Palaearctic, Oriental, Chironominae, eutrophication

**P16 Cold resistance in *Pseudodiamesa branickii* (Nowicki):
physiological, molecular and biochemical aspects**

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Abstract Cold resistance has been investigated with a multidisciplinary approach in the cold stenothermal midge *Pseudodiamesa branickii* (Nowicki). Four instar larvae were collected in a glacier-fed stream (Italian central-eastern Alps), in winter 2008 and 2009 (water temperature range 1-4 °C). Firstly, the Supercooling Point (SCP), the CPIF (Cumulative Proportion of Individual Freezing) and the Lower Lethal Temperatures (LLTs) were determined. On the basis of the SCP (-6.37 ± 0.23 °C), LLT₅₀ (-9.14 ± 1.21 °C), LLT₁₀₀ (-16.20 °C), and CPIF vs. the proportion of mortality at the test temperatures, *P. branickii* larvae may be defined as freeze tolerant. Secondly, the expression levels of four candidate genes as determinants of such cold resistance (*hsc70*, *hsp70*, *hsp90* and *afp*) have been analysed in stressed and control larvae (RT-PCR). Furthermore, the sugars and membrane lipid composition have been established through spectroscopic methods. Preliminary results will be presented.

Key words Diamesinae, freeze tolerance, heat shock proteins, antifreeze proteins

P17 Indian species of *Glyptotendipes* Kieffer (Diptera: Chironomidae) with a short account of some aspects of biology

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Abstract Research on Indian Chironomid has been extensive during the last 30 years and the systematic statuses of a large number of species have been confirmed and quite a good number of new species have been described. The nuisance midges of *Glyptotendipes* Kieffer (1913) emanate from the urban and suburban aquatic situations and swarm frequently causing inconvenience and economic problems to the nearby residents. Human allergens have also been reported from the larval haemoglobins of the epidermis of adults and through inhalation of fragments resulting conjunctivitis, rhinitis, hay fever or asthma. Out of the 16 oriental species, 7 have previously been known from the Indian subcontinent. They are *atrophus* (Kieffer), *barbipes* (Staeger), *melanostolus* (Kieffer), *oriplanus* (Kieffer), *orissae* (Kieffer), *pilosus* Dutta & Chaudhuri and *verrucosus* (Kieffer). The present paper describes three life stages of three new species, *Glyptotendipes (Glyptotendipes) crassispinus*, *G. (Phytotendipes) fumilatus* and *G. (P.) sinusus* from India. A brief account of aspects of biology like, habitat, construction of dwellings, food and feeding of the larva and behavior of the pupa and emergence of the adult is presented in the paper. A new dichotomous key to the identification of the Indian species is also designed in the present paper.

Key words. *Glyptotendipes*, new species, biology, India.

P18 *Pseudodiamesa nivosa* (Goetghebuer, 1928) is not
synonym of *Pseudodiamesa arctica* (Malloch, 1919) (Diptera:
Chironomidae)

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Abstract During a long time I am studying taxonomy and systematics of Holarctic Diamesinae and therefore some scientists asked my opinion on synonymy of *Pseudodiamesa nivosa* (Goetgh.) to *P. arctica* (Mall.) which they found in Fauna Europaea web site.

In my mind both are a good and valid species, mistake must be correct. Males of these species can be separated by some features adduced below. More detail in my presentation.

HR 1.5; LR₁ 0.52-0.54. Basal lobe of gonocoxite with narrow and triangular or roundish triangular apex. Tergite IX with projection in posterior-lateral angle. Gonostylus in apical 1/3 of finger-shaped, with roundish apex*P. arctica* (Mall.)

HR 1.6; LR₁ 0.65-0.69. Basal lobe of gonocoxite with wide and roundish apex
Tergite IX without projection in posterior-lateral angle. Apical 1/3 of gonostylus
different shape, with beak-shaped apex*P. nivosa* (Goetgh.)

Key words *Pseudodiamesa*, taxonomy, synonymy

P19 Chironomid drift behavior (Insecta, Diptera) in an arctic stream (Svalbard Islands) under natural and induced light conditions

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Abstract Drift pattern of Chironomids was analyzed in the non-glacial fishless Svalbard stream Westbyelva during the arctic summer (August 2003). Twelve-hour dark-light cycles were induced within three days by covering a 50 m long stream reach with a dark netting. Drift samples were collected every 3 hours upstream (U) and downstream (D) the cover. Water temperature, pH, conductivity and current velocity were recorded. U vs. D and dark vs. light periods comparisons were performed. A total of about 12,300 midges ascribed to 39 taxa were found, mostly belonging to Orthocladiinae (29 taxa), followed by Diamesinae (6, accounting >80% of the collected specimens) and Chironominae (4). Drift pattern was different between the two stations according to density and taxa composition. In U, maximum drift rate occurred between 12 am and 3 pm, when water temperature was higher, while in D drift rate increased during the artificial night. Taxa showed a different natural trend (in U) and a different response to the experiment (in D). For example, the artificial dark-light cycles seemed to enhance the drift rate of *Diamesa bohemani*, *Diamesa aberrata*, and *Orthocladius* cfr. *decoratus* and suppressed that one of *Euorthocladius* cfr. *telochaetus*. Light manipulation was more effective on young larval stages (I and II) for Orthocladiinae and on mature stages (III and IV) for Diamesinae. Results suggested an active species-specific drift behavior induced by the experiment. A genetically determined response to photoperiod is supposed in midges, which may be

induced in arctic species by light variation, mimicking the natural dark-light cycle we have at temperate latitudes. Different responses of taxa may reflect different evolution in behavioral patterns according to their ecological and biological traits.

Key words Chironomidae, active drift, light manipulation, Spitzbergen

P20 **New species of the genus *Onconeura* Andersen & Sæther, 2005 (Diptera, Chironomidae) from Brazil**

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Abstract The genus *Onconeura* was erected by Andersen & Sæther (2005) for the species *O. semifimbriata* (Sæther 1981) from the Caribbean and Mexico, and *O. undecimata* Andersen & Sæther (2005) from Chile. Paggi (2007) transferred the Argentinean species *Thienemanniella desertica* Paggi, 1985 to the genus. Larvae of *Onconeura* were also found in New Mexico and Arizona, in USA (Krestian et al., in press), extending its biogeographical distribution to the Nearctic region. The occurrence of *Onconeura* in Brazil has been mentioned by several authors, but no species has so far been recorded. In the present paper four new species and three pupal morphotypes are described. The larvae of reared species were obtained by scraping stones from streams and debris of dams. Larvae were kept in small boxes (1cm x 1cm) half filled with stream water. The species are described as male, female, pupa and larva. The material studied was collected in Mato Grosso, Minas Gerais, Rio de Janeiro, São Paulo and Rio Grande do Sul. Keys to the known species are given for all stages.

Key words Chironomidae, *Onconeura*, new species, systematics, Brazil

P21 The diversity of chironomid assemblages of streams in Lake Balaton's catchment area

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Abstract The family Chironomidae is the largest group at the Balaton catchment area: 156 species were found in inflows of the lake during 2006 and 2007. It is poorly investigated whether there are different chironomid assemblages in three geographical region of the catchment area (northern and southern inflows and river system of Zala). We analyzed the diversity of these streams by multivariate statistical methods (hierarchical cluster analysis, principal coordinate analysis). The chironomid fauna of the three geographical areas were not different. However, we detected two groups of streams to be distinct: (1) stream sections near a standing water (Lake Balaton or reservoirs), and (2) larger, permanent and fast flowing stream sections. We can conclude that the diversity of streams in Lake Balaton's catchment area is not affected by their geographical location. The effects of other geographical and hydrological conditions and human impacts are more significant.

Keywords faunistics, exuviae, larvae, α -diversity, β -diversity, taxonomic distinctness

P22 **Three new neotropical species of *Fissimentum* Cranston et Nolte, 1996 (Diptera: Chironomidae: Chironominae)**

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Abstract The genus *Fissimentum* was erected by Cranston and Nolte (1996) based on *Fissimentum desiccatum*, from Mato Grosso State, Central Brazil. Up to now, this is the only species described. Larvae of the genus have been recorded from southern USA and throughout Central and South America, including the Peruvian Andes, and tropical and subtropical lowland areas in Brazil, as well as Australia. Three new species are described based on adult males only. All specimens were collected near low order streams and organically enriched ponds in North and Southeast Brazil.

Key words *Fissimentum*, taxonomy, new species, Brazil

P23 Chip – chironomid identification program: build your own determination key

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Abstract In studying larval chironomids it is most difficult to organize all literature, references, images and descriptions of scientific publications properly. A program based on interactive, flexible website creation is provided to deal with those tasks. Using free programming languages and database systems PHP and MySQL it is licensed under “Creative Commons Attribution-Noncommercial-Share Alike” for the usage of everybody's interest with the possibility of further open-source-development. Numerous features listed below provide a suitable working environment for scientists:

- image comparison: determination by categorized image comparison in browsing from subfamily level down to species level (e.g. the mentum). At the lowest level all morphological characters can be compared. The genus level instead provides the storing of information in a local website.
- creating structured text: numbered lists as keys; sortable tables for numerical characters; determination keys are better and rather easily readable by using mouse-over effects combined with pictures or colouration of text
- image measurements: gathering distances, ratios, coordinates from images
- creating distribution maps with different map types from the Open Layer project
- basic outline analysis by normalized elliptic Fourier analysis of prepared b/w-pictures
- reference management: citing, bibliographic lists, categorization and BibTeX output

- simple searching in other taxonomic or online databases or the internet
- determination by numeric characters with OpenOffice BASE as graphic user interface is possible

Key words interactive determination key, scientific determination tool, larval Chironomidae, open source, PHP, MySQL

P24 Preliminary results of the use of chironomid pupal exuviae technique in oceanic islands: Azores Archipelago

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Abstract Oceanic island freshwater systems differ greatly to their continental counterparts due to their volcanic origin, oceanic situation, catchment morphology and the presence of distinct and sparse freshwater communities, that tend to be highly endemic. In accordance with the objectives of the Water Framework Directive the Azorean government launched a monitoring study of streams in 2003; results indicated that more traditional biotic indexes (FBI, BMWP, ASPT and BBI) were unsuitable due to the low level of taxonomic resolution (family level).

In order to establish a regional monitoring method for biological assessment of water quality pupal exuviae were sampled seasonally between January and November 2008 in 15 streams in Azores archipelago, situated in three different islands. These were used to test the use of chironomid assemblages for stream classification and water-quality assessment in Azores. Downstream reaches of the streams are organically enriched to different extent, but most of the headwaters are protected. We studied the quality gradients along streams as related to biological continuum in chironomid assemblages' composition. Twenty seven species belonging to three subfamilies were identified in the streams. The relations between Chironomid data and water chemistry along quality gradients was analysed. No chironomidae were found in streams with strong natural contamination by heavy metals from volcanic activity.

Results indicate that CPET could be a possible tool for the biomonitoring of lotic systems for Azores and other oceanic islands.

Key words: Azores, CPET, oceanic islands

P25 Fauna and ecology of the Russia Tanypodinae (Diptera, Chironomidae)

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Abstract For the Russia is detected 80 species, of which 6 holarctic, 3 nearctic and 71 palaeartic species. The zoogeographical analysis of the Tanypodinae fauna showed the diversity of the spreading of species: the Circumpolar tundra Region - 19 species, the Eurosiberiaii taiga (boreal) region - 48 species, the European nemorose Region - 21, the Stenopean nemorose Region - 31, the Scythian steppe Region - 12, the Sethian desert region - 18 species. The 3 large territories of Tanypodinae is presented: West of Palaeartic, Siberia and East of Palaeartic. The Tanypodinae will form 7 ecological complexes: psammophilous, lithophilous, lithopsammophilous, pelophilous, argylophilous, phytophilous, eurytopic.

Kew words: Thanypodinae, zoogeography, area, ecological complexes.

P26 Fundamental study of fish effectiveness to control chironomid mass emergence

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Abstract Since 1957, Chironomid midges have emerged in a large mass flow the Lake Kojima, Okayama, Japan. Major species are *Chironomus plumosus* and *Prosilocerus akamusi*. Residential people have been annoyed by midges because they form large swarms around houses and stores. So, we tried to control chironomid mass emergence using species fish predation.

We carried out laboratory predation experiment using combinations of 14 species of fish and 2 species of chironomid larvae, and examined stomach contents of wild fish to research a predation capacity of fish. As a result, *Hemibarbus barbus* is the most efficient predator, *Pseudorasbora parva* is the second, and *Squalidus chankaensis tsuchigae* is the least. *Acanthogobius flavimanus*, *Lepomis macrochirus*, *Squalidus chankaensis tsuchigae*, *Gnathopogon elongates elongates*, *Carassius* sp. preyed on chironomid larvae in the field.

These results suggest that stocking of the lake with *Hemibarbus barbus* and *Pseudorasbora parva*, be able to control chironomid mass emergence.

Key words fish effectiveness, mass emergence, prey capacity

P27 Chironomidae assemblage from four Brazilian watersheds under different anthropogenic pressure

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Abstract The increasing human population and its impacts over the environment may be observed worldwide. The aquatic resources have their components altered frequently by effluent addition, clear cut of riparian vegetation, entrance of sediment instream, all those changes have effects over the biota and several studies focusing this theme are found. Our main objective was to analyse the influence of anthropogenic activities on the community structure of Chironomidae. The hypothesis is that the land use upstream a sample site would influence on Chironomidae's community structure. To achieve this goal, artificial substrates baskets were left 44 days in field during the drought period (August to October/2002) in six rivers belonging to four watersheds under different degree of human occupation of São Paulo State, Southern Brazil. The anthropogenic influence was analysed in terms of the surrounding land use on rural areas upstream the sample reaches. Land uses, slope and physical and chemical variables of water and sediment data were statistically analysed and correlated to the biota using Pearson's correlation, ANOVA and correspondence analysis. The analysis of satellite imagery showed an increasing gradient of pasture land use with related decrease of natural vegetation cover. The Alto Paranapanema basin (Paranapanema, Taquari and Apiaí-Guaçu Rivers) showed the higher proportion of natural vegetation cover while Aguapeí River and São José dos Dourados River basins are in the other extreme with less degree of vegetation coverage, and Peixe River conditions were in an intermediate situation. Twenty-six genera and three unknown taxons of Chironomidae were identified; besides the differences between the community structure of all rivers, the diversity index

(Shannon-Wiener index) was quite similar but for the Peixe River community. As expected, land use was the main factor on distribution of the Chironomidae genera whereas some variables of water also showed influence of the main land use on the watershed.

Key words community structure, land use, anthropogenic pressure, river, Southern Brazil

P28 Spatio-temporal distribution of phytal-dwelling chironomid assemblages (Diptera: Chironomidae) in submerged vegetation of two Hungarian backwaters

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Abstract The backwaters of Tisza (Hungary) came into being during the regulation of river way in the 19th century or on natural way. Backwaters are special type of Hungarian waters in view of nature conservation because of their unique flora and fauna. Rich and diversified vegetation characterizes the most of them with emerge and submerge macrophytes. Our aim was to compare phytal-dwelling chironomid larvae assemblages of submerged macrophytes of two backwaters of the Tisza. We investigated differences in the composition of chironomid assemblages in connection with the development of the vegetation. Our samples were taken monthly from June to September in 2008, from four types of submerged vegetation. The identified chironomid taxa belonging to three subfamilies (Chironominae, Orthoclaudiinae, Tanypodinae) were identified. Differences between vegetation types were less conspicuous because of the mixed occurrence of plant species. However, variances were found between the months within a vegetation types; these variances appeared in the species composition of assemblages and in the relative abundance of species.

Keywords vegetation types, chironomid larvae, backwater, spatial and temporal occurrence

P29 A fundamental study to control adult chironomid midges by using the light traps

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Abstract From Lake Kojima, Okayama Prefecture, Japan, Chironomid midge have emerged in a large mass after the construction of a flash-waterized dike (1959) and residential people in this area have been annoyed by adult midge's swarm. Three species, *Chironomus plumosus*, *Nilodorum tainanus* and *Prosilocerus akamusi* are major components (We collected 32 species).

Adult midges swarm lake side lights at night. So, major surround electric lights are very important. The number and species composition was compared among 12 types of fluorescent lights. Some types were tried change of wattage.

In composition among 5 mono-peaked lights (350, 440, 530, 600, 650nm), the number of attracted midges formed an arc with the peak of 440nm to 530nm. In common white lights (It has compound waves.), number of attracted midges are proportional to the content of 440-530nm waves. Strength is less important than property of light.

Key words phototaxis, mass emerge, taxonomy, *Chironomus plumosus*, *Prosilocerus akamusi*

P30 A taxonomic discussion on a valid species of *Harnischia longispuria* Wang & Zheng, 1993 (Diptera: Chironomidae)

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Abstract *Harnischia longispuria* was erected by Wang and Zheng (1993) based on the material from Hainan Province in China. Wang (1999) treated it as a junior synonym of *H. curtilamellata* (Malloch). Based on the re-examination of the holotype, the species of *H. longispuria* Wang & Zheng (1993) should be regarded as a valid species. After checking the holotype of *H. okilurida* Sasa (1993), it should be regarded as a new junior synonym of *H. longispuria* Wang & Zheng (1993). The detailed descriptions and 16 illustrations are provided.

Key words Chironomidae, *Harnischia longispuria*, new synonym

P31 Responds of the river chironomid communities (inflows of the hypersaline lake Elton, the Low Volga, south of Russia) to high mineralization

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Abstract The size of gradient of impact factors, defining the rate of change of biological variety and functioning of communities in ecosystem, was investigated on the example of macroinvertebrate community structure of 5 small saline streams of area lake Elton, a unique natural-territorial complex of arid region of the Low Volga river basin. The number of species macrozoobenthos communities decreases due to the increase of mineralization from 37 in the river Hara (14 gL⁻¹) to 9 taxa in the river Chernavka (31,6 gL⁻¹). Most macroinvertebrates species found in saline streams are euryhaline species with a broad range of salinity tolerance. In 2007-2008 there were discovered new species of chironomids for science: *Tanytarsus kharaensis* Zinchenko et Zorina and *Cricotopus salinophilus* Zinchenko, Makarchenko et Makarchenko. An autecological characteristic is given. It is established that *Cricotopus salinophilus* dominate in the rivers with mineralization above 27,6 gL⁻¹ and at mineralization up to 14 gL⁻¹ - *Tanytarsus kharaensis*, *Chironomus salinarius*, *Chironomus aprilinus* prevail. Adaptation to high mineralization level of halophilic and halobiont species appears in the peculiarities of chironomids' life cycles.

There were distinguished the environmental aspect (gradient mineralization, ionic composition, pH, T°C, oxygen, macrophytes overgrowth degree), causing structural changes of macroinvertebrate community. It was shown that in saline rivers with natural water relationships the specific structure, diversity, abundance of individuals

and biomass of macrozoobenthos organisms depend on water mineralization level. Canonical axes from the CCA analysis pointed to a high percentage of variability in the samples of bottom-dwelling communities along the environmental variables. Mineralization was the first factor determining community composition and structure in saline small streams followed by the type of habitat.

Key words Saline rivers, macroinvertebrate community, *Tanytarsus kharaensis*, *Cricotopus salinophilus*

Abstracts of Non-attending Colleagues

(Alphabetically by Author's Surname)

Diversity of chironomids (Diptera) in urban lakes at Aurangabad, India

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Abstract The present communication deals with the studies on diversity of Chironomids in urban lakes and part of the Kham River at historic metropolitan city Aurangabad. The family Chironomidae (Diptera) includes commonly known insects the non-biting midges whose developmental stages are aquatic. They are so diverse and wide spread that they can live in most climates and wide range of water qualities. Some species of midges are very tolerant to pollution, where another species are very sensitive to pollution. These characteristics make them excellent for testing water for its pollution status. In present work the larval forms of the midges from water of various lakes and river at Aurangabad were collected to determine what species they are, and from that information we can determine the water quality of the stream or lake. From various sub families of Chironomidae, the larval forms of only two sub- families, namely Chironominae and Orthocladiinae were recorded from lakes and Kham river at Aurangabad.

Key words Chironomids, Diversity, water quality, Aurangabad

***Tanytarsus rexilius*, new species, from oligotrophic marshes in the Florida everglades**

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Abstract *Tanytarsus rexilius*, new species, is described from adults, pupae, and larvae collected from oligotrophic marshes with extensive periphyton growth in Everglades National Park, Florida, U.S.A. The larvae were previously keyed and illustrated as *Tanytarsus* sp. R by Epler (1992, 1995, 2001). The pupa was keyed and illustrated as *Tanytarsus* sp. D in Jacobsen (2008). *Tanytarsus rexilius* is associated with the calcareous periphyton that is characteristic of nutrient-limited open slough, wet prairie, and marl prairie marshes in the Everglades. Distribution records indicate that *T. rexilius* is intolerant to phosphorus enrichment in the Everglades and is useful as an indicator of excellent water quality.

Ecologically-morphological Analysis of *Cryptochironomus* Kieffer (Diptera: Chironomidae) species of the Volga River

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Abstract *Cryptochironomus* species composition in the water bodies of Volgograd reservoir of the Lower Volga basin is discovered: *C. defectus* (Kieffer, 1913); *C. obreptans* (Walker, 1856); *C. psittacinus* (Meigen, 1830); *C. redekei* (Kruseman, 1933); *C. rostratus* Kieffer, 1921; *C. supplicans* (Meigen, 1830); *C. ussouriensis* (Goetghebuer, 1933); *C. sp.n.* Perennial (1988-2008) trend of *Cryptochironomus* species composition degrade (8 - 4 species) is found out.

Mass species *C. obreptans* and *C. defectus* are highly polymorphic: 90,0-95,7% larvae of *C. obreptans* and 56,0-70,8% larvae of *C. defectus* are heterozigot in the inversions. *C. obreptans* species develop maximum population of the places of protected and open shallow waters of the reservoir, *C. defectus* – in ponds and protected shallow waters. *C. obreptans* species is capable of developing maximum population in temporary time scale, population indicators of *C. defectus* are unstable in temporary time aspect.

The connection between dynamics of chironomid mass species population with temperature mode and biogenic elements of water bodies: *C. defectus* \leftrightarrow T°C, N_{com}; *C. obreptans* \leftrightarrow P_{com}. *C. defectus* population change is accounted for by 7 statistically significant ($p < 0,05$) abiotic parameters (temperature of water, general mineralization of water, concentration of dissolved oxygen, easily oxidized substance (БПК₅), iron, nitrogen, phosphorus), *C. obreptans* – 4 (temperature, of water, concentration of heavily oxidized organic substance, (ХПК), phosphorus, nitrogen).

Fossil midges (Diptera: Chironomidae) as paleoecological indicators in Chinese lakes

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Abstract Chironomids(non-biting midges)-based Paleoenvironmental studies has made tremendous progress over the past decade, but related studies in China remain relatively scarce, this mainly because of lack of taxonomical and ecological knowledge of chironomid faunas in China. The recent advances in subfossil chironomid studies from Chinese lakes showed strong potentials to study past environmental changes and events related to anthropogenic activities such as eutrophication. Subfossil chironomid assemblages in surface sediments from Chinese lakes have strong regional characters. The performance of the transfer functions illustrates that chironomid assemblages from the investigated Tibetan Plateau lakes are clearly sensitive indicators of salinity. The models have been used to quantitatively reconstruct past 1000yrs water salinity changes for Sagan Lake located in the north part of Tibetan Plateau, which have important implications for future hydrological research in the region. Subfossil chironomid assemblages in surface sediments from lakes in the middle and lower reaches of the Yangtze River show a strong, statistically significant relationship with nutrient gradient. An enlarged training set was built and new TP inference models were developed. Using this model the quantitative records of past water quality for several typical lakes across the middle and lower reaches of the Yangtze River during past 100yrs were studied, which could provide reference conditions of those lakes and has important implications for future lake management and ecological restoration.. Other subfossil chironomid studies from different areas of China are still on the way but show clear patterns, the subfossil chironomid assemblage from northern China lakes are affected by salinity and anthropogenic activities, while midges from southwest China lakes mainly distribute along the gradient of temperature and nutrient.