NEWSLETTER OF CHIRONOMID RESEARCH

Co-Editors: **Ruth Contreras-Lichtenberg**
Naturhistorisches Museum Wien, Austria
Peter H. Langton
5 Kylebeg Avenue,
Mountsandel, Coleraine,
Co. Londonderry,
Northern Ireland BT52 1JN
Production editor: **Richard K. Johnson**
University of Agricultural Sciences, Sweden
Treasurer: **Trond Andersen**
University of Bergen, Norway

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13th International Symposium on Chironomidae Freiburg im Breisgau 5-9 September 1997

Once every three years many of the world's chironomists gather together in one place to give and hear papers, discuss and eat and drink together, renewing acquaintances and making new contacts. Last year this event took place in Germany at the Albert-Ludwigs-Universität, Freiburg im Breisgau, a beautiful old town, full of character and wonderfully safe. It was master-minded by Odwin Hoffrichter and Wolfgang Wülker who deserve the highest praise for a well-organized programme. Moreover, we must not forget in our thanks others who assisted: Katja Kukatz, Lars Wilker, Karen Lang, Sabine Teutsch, Thomas Ulrich, Wolf Haberer, Ulrich Hoffrichter, and Stefanie Rulfs who ran the Symposium office and provided refreshments; some pre-conference duties were undertaken by Irene and Albert Hoffrichter; Renate Rössler oversaw the catering team and helped in many ways as co-organizer; Tanya Franz assisted in the lecture hall and Prof. Josef Müller borrowed electronic equipment for use in the conference office and developed special software for its purposes. To everyone involved we express our gratitude.

There were 123 participants from 31 countries contributing about 130 papers/posters. The Thienemann lecture was delivered by Peter Cranston: "The modern day influence on biological science of August Thienemann".

The wide range of interests fostered by the study of Chironomidae was again very evident: karyosystematics, chromosomal evolution, biogeography, communities, systematics, morphology, development, ecotoxicology and physiology featured in the submissions. There was something there to stimulate every participant.

A break from the lecture hall was taken on the Sunday to tour the Black Forest and visit the lakes. A cruise on Titisee, wonderful scenery and the opportunity for some to do a bit of collecting made a very pleasant day out.

The conference ended with a farewell party at Jesuitenschloss on Schönberg, which included a wine tasting ceremony, accompanied by a memorable vocal performance by Berthold Janecek aided and abetted by Joel Moubayed, and a buffet meal.

For the Post-conference Tour we are indebted to Prof. Fittkau and a very knowledgeable guide. Upper Bavaria is very rich in restored Baroque and Rococo, often breathtakingly beautiful and we were introduced to a fine selection, culminating in the magnificent castle on Herreninsel on Chiemsee. Those with an insatiable need for collecting chironomids were also well catered for! On the final day the party was shown round the Zoologische Staatssammlung in Munich ending with lunch at the Museum.

PHL

ABOUT *CHIRONOMUS*

CHIRONOMUS is now more than 30 years old. It was founded in 1967 by E.J.Fittkau and F.Reiss. From 1982 to 1985 the newsletter was edited by E.J.Fittkau and F.Reiss and by J.E. and Mary Sublette. Over that time *CHIRONOMUS* was considered an important medium for communication and information for chironomid workers all over the world. Publication of *CHIRONOMUS* ceased in 1985.

At the 11th International Symposium on Chironomidae in 1991 it was decided to resurrect the newsletter and Ulrike Nolte took on the task as editor. One year after the Amsterdam Symposium the first issue of the new *CHIRONOMUS* newsletter appeared. Ulrike gave the newsletter a new face and structure. She dedicated much time to its production and it became a well-structured informative review appearing once a year. Ulrike managed also to motivate a team of regional representatives to contribute to the newsletter and she ensured for the first time that issues of *CHIRONOMUS* appeared continuously once a year, containing information on actual research and useful communications including the Current Bibliography by Odwin Hoffrichter. We all felt very sorry when she informed us of her decision not to continue with this job and we record here on behalf of chironomists world-wide our grateful thanks for all that she did. Her team included Richard Johnson, technical editor, and Endre Willassen followed by Trond Andersen, treasurers. Associate editors for special topics were Kees van de Guchte, Ecotoxicology, and Don R. Oliver and Mary Dillon, Directory of Chironomid Workers.

Meanwhile, complementary to the *CHIRONOMUS* newsletter, Luc Int Panis started the chironomid WWW pages in February 1995 at the University of Antwerp (UIA) in order to facilitate the exchange of information between scientists. In February 1997 the files were transferred to Ian Walker at Okanagan University College and he is still maintaining these files and updating them continuously.

Although many of us have access to the Chironomid Homepage and the Chironomid Listserver, these services are not available to all chironomid workers. Thus, it was decided to continue publishing *CHIRONOMUS* with new co-editors to take on Ulrike's task; Odwin Hoffrichter will continue publishing the Current Bibliography in the newsletter and Richard Johnson and Trond Andersen have agreed to continue with their jobs.

Peter H. Langton, Ruth Contreras- Lichtenberg

FAREWELL

Dear Colleagues,

After six years as editor of *CHIRONOMUS* I withdrew from the post last year. This decision was not easy but necessary due to the fact that I am not linked anymore to a university or any other institution, which renders it hard to edit an international newsletter. After moving to Australia, I decided to set up my own business. Happy about having a flying start as an environmental consultant in Queensland, we bought the lovely, old-established farm "Greylands", located in a most beautiful natural setting north of Brisbane. Due to this situation, which is quite different from my previous academic life, I felt that time had come to pass on the editor post to someone who is closer linked to the front-line of chironomid research. Timing for my resignation was certainly linked to the event of the 13th International Symposium, where the fate of *CHIRONOMUS* could be discussed.

At this point I would like to thank Dr. Ruth Contreras-Lichtenberg and Dr. Peter Langton very much for having taken over the editor's responsibility, a task far away from being just a by-the-way-job. No matter whether *CHIRONOMUS* will be produced and circulated in its good old paper-print version or whether it will appear exclusively in electronic form - a lively discussed issue at the Freiburg meeting - editors are needed in any case in order to bring a readable and interesting newsletter into existence.

To revive the newsletter seven years ago, was a major venture, requiring quite an input of time, energy and enthusiasm of many people such as the newsletter's board, the regional representatives, and many others - often students. Corresponding with so many colleagues from different countries and traditions and, thus, with a wide range of professional experience was always a pleasure to me. The often personal tone of letters made up for many long evenings I sat over a coming issue. ... I thank all of you for the interesting and also humorous contributions as well as for the numerous kind letters that reached me after the announcement of my resignation. Currently our newsletter is circulated in about 50 countries, scoring an ever growing circle of subscribers, a strong indication of how much *CHIRONOMUS* is appreciated as a forum to informally exchange news. I would be happy to see the active interest in the newsletter continue to be as high as it was in the last years.

Kind regards,

Ulrike Nolte
Greylands
Rocksberg Qld 4510
Australia

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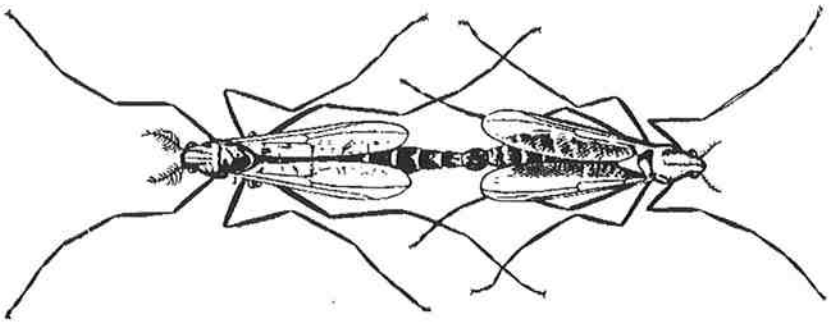

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Impressions on the Symposium

Freiburg is a wonderful town; I just wish I had had the time to stay longer, or the foresight to stay in self catering accommodation in order to sample the wonderful fresh produce on display in the markets early every morning. The Black Forest scenery was breathtaking and the shops definitely should have had a little more of my attention. The conference itself was wonderful. I enjoyed meeting new people and putting faces to names which I had been familiar with from research papers. During the paper presentations I made a lot of notes relating to my old and new projects. I left early in order to attend another conference back home in Ulster - big mistake! The contrast between the two conferences was quite obvious, from one casual, friendly and welcoming meeting of old friends and colleagues to a collection of suited policy makers who didn't really liven up till the last day. I'm going to regret missing the post conference dinner and tour for a very long time. My one lasting image of the trip will be the sight of Peter Langton hanging over the side of the boat collecting exuviae while everyone else was looking at the scenery!

Lesley McLarnon, Dept. of Agriculture, Belfast

As a student, the component of the 13th international symposium on Chironomidae that impressed me the most was the friendliness and accessibility of the experts. I always look forward to meeting the senior researchers whose papers I have read again and again. There were many senior researchers at the symposium. Everyone was more than willing to take time to discuss chironomids with me. It may seem to some that this is what senior researchers are for, but I have found that this is not the case at meetings. And so, I truly appreciate the camaraderie of their behaviour. Furthermore I was empowered by the symposium (that is what meetings are for, isn't it?). I now want to study everything about chironomids. Who knows, maybe someday I shall.

Barbara Hayford, University of Kansas

14th International Symposium on Chironomidae 2000 Brazil

The symposium will be included in the official events of the 100th anniversary of the Instituto Osvaldo Cruz in Rio di Janeiro

The Post Post-Conference-Tour Tour

(A tale of 3 Irish, 3 Norwegians, 2 Ghanaians,
2 Brazilians, 2 Germans and 1 Englishman.)

Well - it seemed a good idea at the time: those staying the final night at Starnberger See to have a final meal out together in the centre of Munich. As I have said, it seemed a good idea at the time; my wagon can seat six adults including the driver and that's enough for a party. However, such a good idea was it that when I emerged from the Zoologische Staatssammlung I discovered NINE colleagues expecting a lift! There was some preliminary skirmishing with a number of males offering the lone female, Rosina, lap-top accommodation, which she graciously declined and resolutely climbed into the front passenger seat; the remaining eight squeezed into the back, one sitting on the cooler box containing all the specimens collected during the post-conference tour and one propping himself up as best he could at the back. Custodian of the map was Paddy Ashe, squatting on the cooler box, whose impeccable directions resulted in our finding the meeting place with Lisa and Sofia without difficulty.

Unexpected event No. 2: central Munich has a car parking problem ... or, at least, I had a car parking problem. It took a quarter of an hour to find a space just large enough to slip the wagon in between a car and a tree on the sidewalk. Unexpected event No. 3: I had totally lost my sense of direction and had no idea where I had dropped the others. Fortunately, the map was left behind

and I was able to find my way back to the ever patient Sofia and Lisa, wondering whether the space on which I had parked had been left for some purpose ... the others meanwhile had found their way to the restaurant and were already filling their crops with liquid that had had more than a passing acquaintance with a population of *Saccharomyces*. Unexpected event No. 4: the restaurant was Greek and the menu in German and thus incomprehensible to all but Lisa, whose choice of restaurant and sterling work in translation must not go uncommended; after many changes of mind which the waiter took in his stride all the various alimentary sensibilities were satisfied.

We found the wagon quite easily and to my relief it wasn't surrounded by a cordon of armed police. All was well for a few minutes, after which all was not at all well. The lettering on the map was so small and the lighting in the back of the wagon so dim that Paddy was unable to keep up with on-the-ground progress; direction became a committee process, but deductive powers can be diminished by a full stomach and a satisfaction of alcohol ... "turn right here", "NO, left", "we're on the wrong road" "that's the eighth time we've passed Einbahnstraße", "isn't that the airport?", "we must be off the map" ... which served to mightily confuse the driver and keep Rosina in fits of giggles. After touring the suburbs of Munich for about an hour, a corporate decision was made to make our way back to the centre of Munich and start again. Like magic it wasn't long before we were back at Starnberger See, sitting in the lounge, drinking farewells and watching late night television, joined later by Rosina in her nightie - wow! - did I say nightie? That gown could have been worn at a reception at Buckingham Palace and would have been the envy of the other ladies present!

Driving since then has been really rather tame in comparison ....
PHL

CURRENT RESEARCH

Chironomus riihimakiensis in Pskov region: Monomorphism or Genetical Drive?

by S. Zhirov

Forty-two larvae of *Chironomus riihimakiensis* WÜLKER were taken from a small pond in Pskov region in August 1996 and investigated. The pond is situated near Tereptino village. The substratum contains soft grey sediment.

The salivary glands were prepared using the classical aceto-orcein technique. Identification of the species was made by comparing photo images of karyotypes with the sibling species from Western Siberia (KIKNADZE et al., 1991). The population is characterized by mono-morphism. There were no macro aberrations found. So, the area for this species is wider than previously believed, but it is probably discontinuous.

Now two populations of *Chironomus riihimakiensis* are known:

i) the populations from Southern Finland and

ii) the population from North-West of Russia (Pskov region).

The analysis of data concerning the species allows us to suppose that the species is characterised by constant monomorphism. Statistical analysis leads us to the conclusion that in general larvae with aberrations in the investigated population do not exceed the value 0.087 (P=0.95) (PLOHINSKY, 1961).

Alternatively, it is possible that the population is a manifestation of the "founder effect". In this case monomorphism of the population arose primarily through genetic drive. So, geographical isolation may be the factor for diversity of the "*riihimakiensis*-group" of species. The sibling species *Chironomus sp.* B found in western Siberia differs from that found in Pskov region, having less centromeric heterochromatin. It is necessary to compare and discuss the next problem: populations of other species of the "*riihimakiensis*-group" are characterized by chromosomal polymorphism (KIKNADZE et al., 1996). What is happening: two different ways of adaptation and evolution within the same group of species, artifact as a result of genetic drive or something else ?

S. Zhirov
Dept. of Zoology
Pskov's Teachers Training Institute
Pskov. 180000. (Russia)

Chironomids as Model Species in Cytogenetic Monitoring

by P. MICHAILOVA

Many studies have been carried out with the aim of developing a genetic approach to studying the biological effects of pollution. Genetic monitoring has proved to be useful method for revealing changes in genetic structure of the species inhabiting polluted environments. Different types of mutations have appeared which could be expressed on different level: molecular, biochemical, cytogenetical, physiological and morphological. However, the frequency of the mutations, their expression depend very much on the species' biology, on its genotypes as well as on ecological conditions during development.

The family Chironomidae is one of the important groups of aquatic organisms for assessing environmental contamination. They possess different features which make them a suitable test system for cytogenetic monitoring. The salivary glands of chironomid larvae have excellent polytene chromosomes which make them subjects for cytogenetic monitoring: a small number (2n = 6 or 8) of chromosomes, a high level of polyteny of salivary gland chromosomes, species specific banding pattern, constancy of number and position of puffs, Balbiani rings and nucleoli at every stage. They can easily reveal whether genotoxic effects of chronic exposure to pollution can result in chromosome aberrations, asynaptic zones, alterations in standard banding pattern and puff activity. Also, there are standard chromosome maps of some species which can be used as a models. They form the basis for revealing mutagens, monitored by studying chromosome aberrations, puffing activity and appearance of heterochromatin.

Also, for some species we have developed a method for breeding in laboratory conditions - a modification of Fisher's technique: the males and females are narcotized and then used for copulation. However, a great proportion of males loose their activity under narcosis. That is why it was necessary to modify the method in order to bring back the male's activity after narcosis. The head of the males is strongly pressed, releasing the effect of narcosis, allowing impulses to reach its genitalia, so activating them to clutch the genitalia of the female. Copulation lasts for 2 - 3 seconds. The fertilized female is carefully placed in a vessel covered with gaze. Dechlorinated water is poured into the vessel to cover the bottom. The female lays an egg mass 1 - 2 days later. When all larvae from the egg mass hatch they are transferred to a bigger plastic vessel and cultured on cellulose (obtained from filter paper soaked in water and whipped with a mixer), sterilized mud suspended in water, yeast diluted in water and dechlorinated water which continuously aerated. It is important that in one plastic container there is only one egg mass, as at higher density larval development is slower and mortality rises. Larval development takes 25 - 30 days. The breeding of larvae is carried out at the temperature of 20C and a photoperiod of 16h light. Using such cultures we can perform dose response experiments to validate and calibrate responses observed in field populations.

The following aspects of the polytene chromosomes we suggest are used in cytogenetic monitoring:

A. STRUCTURE - FUNCTIONAL CHANGES

1. An appearance of specific puffs. Variation in the puffing pictures reflects periodical cell reprogramming. The specific puffs in the polytene chromosomes are structural manifestations of gene activation. Changes in gene expression can also be triggered by a wide variety of gene activity in the induction or enhancement of the synthesis of specific proteins. Very important is the change of Balbiani Rings (BR) activity. The Balbiani rings system is an interesting model to study the response of the genome to different factos. The rings have a significant role in the development of the species. Under stress condition BR may collapse or show enhanced expression.

2. Change in morphological appearance of the polytene chromosomes. Many condensed bands appear as grains. The transcription activity of the genome has changed.

3. Increase in ectopic contacts. Ectopic contacts can be observed between bands of different morphology. In ectopic contact threads connect, as a rule, separate bands. These contacts make possible the association of telomere - telomere, telomere - centromere and telomere - intercalary sections, as well as the association of chromosome intercalary sections only. The increase of contacts between chromosomes ensure the normal function activity of the cells, thus enhancing the functional activity of the whole genome.

4. Change in the activity of the nucleolar organizer. It can be observed from a very high activity till completely collapsed. The nucleolus, considered to be a special type of puff can be used as indicator of rRNA synthesis inhibition and this implies general impairment of metabolic functions.

B. CHROMOSOME STRUCTURE REARRANGEMENT

1. The appearance of different types of chromosome aberrations. The appearance of specific chromosome aberrations could be used as markers in polluted biotopes. For instance, in *Chironomus riparius* from a heavy metal polluted station by the Po river (Italy) we found in chromosome G ten types of deletions, some of which lead to the formation of the so - called "pompon like" chromosome. Also, in *Glyptotendipes barbipes* treated with lead acetate we observed a high frequency of pericentric heterozygous inversions. These rearrangements indicate the presence of genotoxic concentrations of some polluting agents.

2. Changes in the appearance of the heterochromatin. Heterochromatin appeared as a less condensed highly vacuolated structure, very often as a pseudopuff, resulting from a structural modification following exposure to some external agents. The agents might exert some inhibiting effects of the synthesis of those proteins which participate in chromatin condensation.

C. GENOME ALTERATIONS

The appearance and the frequency of the "B" chromosome is often correlated with environmental variability, especially with stress conditions.

Changes at cytological level can be considered to be a response to contamination at lower levels of biological organization and we propose to use them as an early warning of contamination. Permanent stress conditions provoke the mobilisation of the genome as expressed by different functional and structural aberrations. eukaryotic chromosome.

CONCLUSION

Cytogenetic changes in salivary gland chromosomes of chironomid larvae can be used as an inexpensive and sensitive monitor to different kind of pollution in freshwater ecosystems.

P. Michailova
Institute of Zoology
Bulgarian Academy of Sciences
1 Tzar Osvoboditel boulv.
Sofia 1000, Bulgaria
Fax + 358 2 882897
e-mail Zoology@BGCICT.ACAD.BG

Larvae of *Chironomus* can have a different susceptibility to the entomopathogenic bacterium *Bacillus thuringiensis* subsp. *israelensis* depending on different Inversion Genotypes

by BURLAK V.A.*, GOLYGINA V.V. and KIKNADZE I.I.

Inversion polymorphism is wide spread in natural chironomid populations. However, experimental evidence of adaptive value of such inversion polymorphism is very scanty. We have tried to study experimentally the role of some inversion genotypes on survival of *Chironomus* larvae after infection by *Bacillus thuringiensis* subsp. *israelensis* (Bti). This bacterium is used to limit the size of natural populations of mosquitoes and simuliids - carriers of numerous human diseases. Earlier (BURLACK, 1979 a,b) it was shown that *Anopheles messeaee* larvae with various inversion genotypes have different susceptibilities to Bti infection. The pathogen-related mortality was higher in larvae with inversion sequences 2R1, 3R1, 3L1 and Xl1(2) as well as heterozygotes 2R01 and 3R01.

We have used two sibling species of the plumosus-group - *Chironomus plumosus* L. and *C. balatonicus* DEVAI, WULKER & SCHOLL (1983) in our laboratory experiment to investigate the role of heterozygous inversion on the survival of larvae under Bti infection. *C. plumosus* and *C. balatonicus* 4th instar larvae were collected sympatrically from a waterpool in the suburbs of Novosibirsk (Russia). Only healthy larvae without natural virus infection (larvae without white and iridescent spots on the integument) were selected for this experiment. Selected larvae were put in five small containers (21-10-5 sm3) filled with tap water (500 ml water in each container); 50 larvae per container. Bti (serotype H14, clone P(36) from the collection of the Institute of Systematics and Ecology of Animals, Novosibirsk) was added to three containers at 0.142 mg/ml. Two containers were without Bti (control). The experiment lasted for 24 hours ab 15° - 17° C. Dead and surviving experimental larvae were fixed separately. Control larvae were fixed at the same time. A mixture of 96° ethanol and clacial acetic acid (3:1) was used for fixation. Squashes of salivary gland polytene chromosomes were prepared by the routine method (KIKNADZE et al., 1991). It was found that chromosome banding structure was good enough in surviving as well as dead larvae for the identification of inversion sequences. Mapping af vanding sequences was done according to KEYL (1962) and DEVAI et al. (1989).

It was shown that there was high larval mortality among infected larvae: 70.7±7.1 % in *C. balatonicus* and 41.3±4.8 % in *C. plumosus*. There were no dead larvae in the control. These data show that *C. balatonicus* is more sensitive to infection than *C. plumosus* (χ^2=9.02, f.d.=1, p<0.01).

Changes in the frequencies of some genotypic combinations of inversion sequences were observed among *C. plumosus* larvae infected by Bti. First of all these changes were noted in arms A and D. As shown in fig. 1, frequencies of heterozygotes pluA1.2 are significantly higher in dead larvae in comparison with surviving and control larvae (χ^2=4.49, f.d.1, p <0.05; homozygous combination pluA1.1, in contrast, was lower among dead larvae. In total, all homozygous combinations (pluA1.1 plus plu A2.2) were less susceptible (χ^2=6.2, f.d.=1, p<0.05). In arm C homozygotes pluD1.1 and pluD2.2 were also less susceptible than heterozygotes pluDl.2 (χ^2=5.73, f.d.=1, p<0,05) (fig. 2).

According to Hardy-Weinberger formula there was clear-cut pathogen-dependent decrease of deficit of heterozygotes pluB1.2 and homozygotes pluB2.2 among infected larvae in comparison with homozygotes pluB1.1 (Table 1):

Table 1

	dead			survive			control		
	frequency	t	χ^2	frequency	t	χ^2	frequency	t	χ^2
pluB1.1	0.68±0.07	0.57		0.74±0.06	0.65		0.80±0.05	0.71	
pluB2.2	0.16±0.06	0.06		0.13±0.04	0.04		0.11±0.04	0.02	
pluB1.2	0.16±0.06	0.37	3.69	0.13±0.04	0.32	4.99	0.09±0.04	0.26	5.19

It is possible to suggest that the inversion sequence pluB2 can be responsible for the lower susceptibility of these genotypic combinations.

Summarizing these data we can underline that the results obtained show the higher susceptibility of *C. plumosus* genotype with inversion heterozygotes in arm A and D to Bti infection. However, we did not find such clear correlation between genotype structure and larval susceptibility to Bti infection in *C. balatonicus*.

Earlier, BURLAK (1997a) had shown the high level of larval mortality under Bti infection in four *Anopheles* species. In his experiments the susceptibility of *Anopheles* larvae to Bti infection was 3 orders higher than that of *Chironomus* larvae. This discrepancy can be explained by several circumstances: different larval size, different temperature during the experiment etc. However, it is important to note the identical reaction of *A. messeae* and *C. plumosus* populations to Bti infection. In both cases the clear-cut correlation between genotype structure and susceptibility to Bti infection was observed. Two autosomal arms from seven arms in *C. plumosus* (arms A and D), and two autosomal arms from six arms in *A. messeae* (arms (2R and 3L) have shown the main changes in inversion sequences changes. It is possible to suggest some analogy between *C. plumosus* arm A and *A. messeae* arm 2R as more susceptible to Bti infection, *C. plumosus* arm D and *A. messeae* 3L as less susceptible to this infection.

Thus, different reactions of larvae with different genotypes to Bti infection were observed both *in C. plumosus* and *A. messeae*, but it is interesting that inversion heterozygotes were more susceptible *in C. plumosus*, while heterozygotes were less susceptible in *A. messeae*. We need further experiments to explain these differences.

In conclusion it is important to note that Chironomidae and Culicidae often inhabit the same waterbodies. Consequently, using Bti infection against Culicidae can lead to death of not only of culicids but also of Chironomidae.

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Burlak V.A.*, Golygina V.V. and **Kiknadze I.I.**
*Institute of systematics and Ecology of Animal,
630090, Novosibirsk, Russia
Institute of Cytology and Genetics,
630090, Novosibirsk, Russia

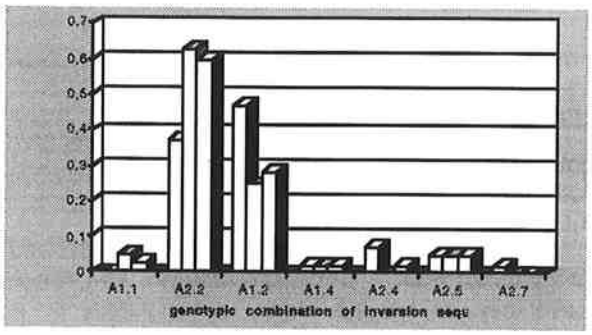


Fig. 1 Genotypic combination of inversion sequences in arm A of *C. plumosus*.

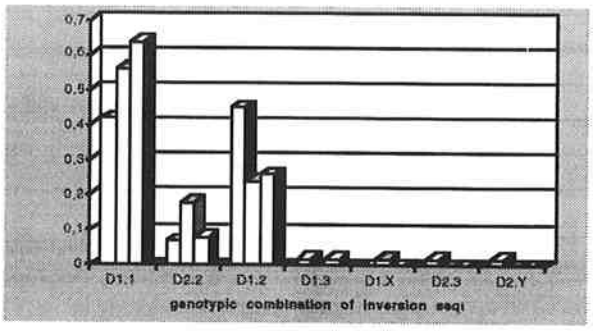


Fig. 2 Genotypic combination of inversion sequences in arm D of *C. plumosus*.

Chironomidae from the Volga River

by Irina V. Sergeeva & Elena E. Morozova

According to published works chironomid species composition is critical for reservoir bioindication. Several benthos studies of the Volga River and its tributaries before 1959 recorded 50 larval chironomid taxa and 37 over the period 1966 - 1969. These included 17 Tanypodinae, 9 Chironominae genus *Cryptochironomus* and others (KONSTANTINOV 1953, 1956, 1960; BELYAVSKAYA 1962; MISEIKO 1966; NETCHVALENKO 1977).

During 1983 - 1998 we examined the Volga riverside zone near Saratov: small rivers, lakes and reservoirs. We studied the larvae, pupae and imagines of Tanypodinae and *Cryptochironomus* using morphological and karyotype analysis, along with determination of species composition for these groups (BELYANINA 1983; MOROZOBA 1995; SERGEEVA 1995). It was found that in the Volga River and small rivers *Procladius* species dominated, in particular *P. choreus*, along with *P. ferrugineus*, *Tanypus punctipennis*, *T. vilipennis* and *Ablabesmyia* gr. *monilis*; and in the genus *Cryptochironomus*, *C. obreptans* dominated It was discovered that during this period, before 1995 there was a considerable reduction in the chironomid fauna as a result of anthropogenic environmental pollution. In reservoirs we recorded mostly species of *Procladius* and *Tanypus*; the number of oxyphilic species - *C. redekei*, *C. ussouriensis*, and *C. psittacinus* - distinctly decreased.

Over 1996 - 1998 the number of species in reservoirs increased because of reduction in industrial pollution of the Volga River. In the Taypodinae we found a great number of pupae of *Psectrotanypus varius*, *Macropelopia nebulosa* and *Natarsia punctata*. Also we discovered for the first time since 1993 *Tanypus kraatzi*. The number of *Cryptochironomus defectus* larvae increased.

Species found 1983 -1998:

Tanypodinae:

Clinotanypus nervosus (MEIGEN)
Tanypus punctipennis MEIGEN
Tanypus vilipennis (KIEFFER)
Tanypus kraatzi (KIEFFER)
Anatopynia plumipes (FRIES)
Psectrotanypus varius (FABRICIUS)
Procladius choreus (MEIGEN)
Procladius ferrugineus (KIEFFER)
Ablabesmyia monilis (LINNAEUS)
Ablabesmyia phatta (EGGER)
Ablabesmyia longistyla FITTKAU
Macropelopia nebulosa (MEIGEN)
Natarsia punctata (FABRICIUS)
Thienemannimyia geijkesi (GOETGHEBUER)

Chironominae:

Cryptochironomus defectus KIEFFER
Cryptochironomus obreptans WALKER
Cryptochironomus supplicans MEIGEN
Cryptochironomus albofasciatus STAEGER
Cryptochironomus psittacinus MEIGEN
Cryptochironomus redekei KRUSEMAN
Cryptochironomus ussouriensis GOETGHEBUER
Demicryptochironomus vulneratus ZETTERSTEDT

Sergeeva, Irina V.
Medical University of Saratov
st.Novousenskay 46 / 52, 16,
410017, Saratov Russia
E-mail: ssv@mail.saratov.ru

Morozova, Elena E.
State Pedagogical Institute of Saratov
Chapaeva st.6 -A, 70
410056, Saratov Russia
E-mail: moroz@fannet.ru

How long will chironomids tolerate catchment deforestation ?

by Jackie T. Hrabok

In 1990, the Ontario Ministry of Natural Resources, Centre For Northern Forest Ecosystem Research, developed "The Coldwater Lakes Experimental Watersheds Project". This study will measure lentic ecosystem responses to clearcut logging in the boreal forest, and assess the effectiveness of shoreline reserves (riparian buffer strips) in preventing undesirable effects of timber management around lakes. The summer of 1998 marks the half way point of the project completion date (year 2005). To date, six years of pre-harvest data and 1.5 years of post-harvest data were collected at five oligotrophic experimental lakes, 250 km north-west of Thunder Bay, Ontario, Canada. During the fall of 1996 approximately 80 % of the watershed at Lake 42 was clearcut to the shoreline. The remaining shoreline reserves of standing timber (*Pinus banksiana* and *Picea mariana*) will be cut summer 1998.

One component of this biological, chemical and physical monitoring program entails the surveillance of aquatic insects at Lake 42. During the ice-free period from May to late September 1995 (pre-harvest), and 1997-98 (post-harvest), funnel emergence traps (basal area = 0.28 m^2) were deployed along linear transect lines extending perpendicular from the shoreline into the profundal zone. As benthic macroinvertebrates (most importantly Chironomidae) emerge from lake sediment into winged Diptera they are trapped within an air bubble in the sampling jar (see figure 1). Male chironomids representative of each weekly catch will be sorted by taxa, dissected and mounted in Euparal. The hypothesis of interest is whether Chironomidae community composition at Lake 42 will differ between the uncut catchment (1995 emergence data) and the clearcut to shoreline catchment (1997 and 1998 emergence data).

This data will be analyzed and submitted as partial fulfilment towards the degree of Master of Science in Biology. If you are interested in further information, feel free to contact me:

Jackie T. Hrabok
Aquatic Entomology Graduate Student
Centre For Northern Forest Ecosystem Research
c/o Lakehead University
955 Oliver Road P7B 5E1
Thunder Bay, Ontario
E-mail: jhrabok@ice.lakeheadu.ca

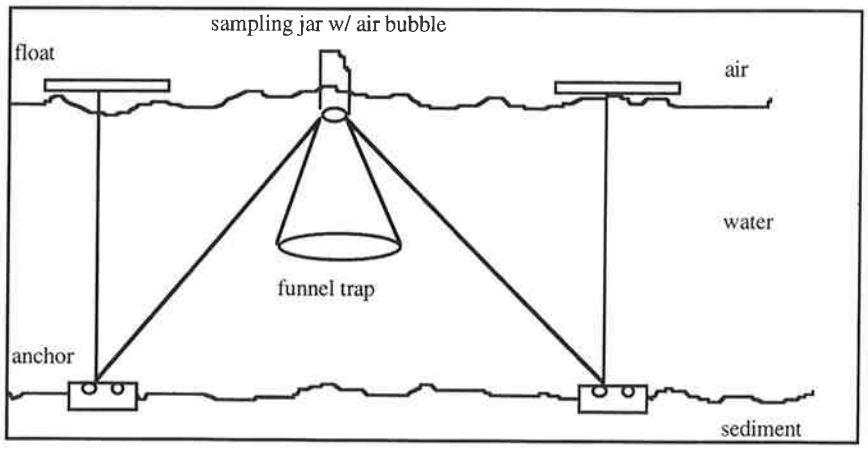


Figure 1. Aquatic insect lentic emergence trap (basal area = 0.28 m^2)

THESES

Chironomid populations of Lough Neagh with reference to the internal loadings of phosphorus (1997)

Lesley Ann McLarnon, University of Ulster at Coleraine.

Supervisors Prof.R.B.Wood and Dr. C.E.Carter.

Regular samples of chironomids were taken during 1994/5 from 5 to 25 metres depth in Lough Neagh (Northern Ireland) along a transect from Traad Point to the deepest part and identified as far as possible using keys and by rearing. The chironomid community had changed little since 1978, although some differences in abundance and distribution were noted. One new species to Ireland was identified.

Attempts to improve the water quality of Lough Neagh by removal of phosphorus at point sources appear to have had no effect on the chironomid community. Short term effects, e.g. a period of drought and calm weather in 1995, on the chironomid community suggest care is needed when applying water quality indices. The need to survey a range of habitats and consider chemical data is emphasised, as well as the importance of long term study of the chironomid population in order to assess changes in the lough.

Laboratory investigation showed that the density of *Chironomus anthracinus* larvae was positively correlated with the release of phosphate from resettled sediment cores. Phosphate release due to both the density of *C. anthracinus* larvae and the process of diffusion was increased in low oxygen conditions. Increased densities of *C. anthracinus* larvae in conditions of reduced oxygen saturation accelerated the onset of anoxia. If the input of phosphate to the lough could be reduced below the level of output, the process of removal of phosphate from the sediment would be hastened by the actions of *C. anthracinus* larvae, thereby speeding the recovery of the lough.

Morphological deformities in chironomid larvae (Chironomidae: Diptera): biomarkers of urban polluted sediments (1998)

William A. Aston, Staffordshire University, England

Supervisor Dr. Paul Mitchell

Four rivers were surveyed, not polluted by industry or urban discharge providing a base line level of deformity of 0-3 % in populations not stressed by pollution. These values were used for comparison with surveys conducted on three urban polluted rivers where the frequency of deformity lay between 5 and 75 %. Four genera were studied to evaluate their relative sensitivities and seasonal differences in the number of deformed individuals: *Chironomus*, *Stictochironomus*, *Prodiamesa* and *Thienemannimyia*. Deformed individuals were scored and catalogued using a proposed method of deformity quantification. This and other methods devised to quantify deformities were evaluated in order to find the most effective way of expressing deformity data.

Chironomus riparius cultures were used in laboratory-based bioassay studies using sediment and pore water collected from known contaminated sources. A lower level of deformity was observed than found in the field. It is shown that exposure time and the instar used in these experiments had an effect on the results.

Contribution to the study of chironomid larval deformities (Diptera, Chironomidae) and their relationship with environmental stress in Galician freshwater systems (NW Spain) (1996)

María J. Servia, University of Santiago de Compostela, Spain.

Supervisors Dr. Fernando Cobo and Dr. Marcos A. González.

A total of 4766 larvae and 296 pupae with larval head capsules attached were collected from 8 sites. Deformities in the head capsule of *Chironomus riparius* larvae were found to be very similar to those described previously and those of *Prodiamesa olivacea* are described for the first time; these are very similar to those described for *C. riparius*, but are less frequent. It is shown that physical stress can induce the presence of larval deformities and that high levels of stress induce a large number of affected structures, so the analysis of the frequency of deformed larvae and affected structures can be used to determine the relative level of stress at different sites. Temporal fluctuations were observed in the relative frequency of deformed larvae, but they were not very important, so it is possible to compare sites visited at different seasons. Application of the "Toxic score" (Lenat, 1993) to *C. riparius* demonstrates that there is evidence of toxicity when the result is higher than 12, and that temporal fluctuations are important, so care must be exercised in the use of the "Toxic Score" alone. The "Toxic Score" is applied to *P. olivacea* and the same variability is apparent. There is no evidence of different teratogenic tendency between males and females and there were no signs of deformity in any pupae, even if they came from a deformed larva. However, there were differences in the relative frequency of deformed larvae that emerged as adults and in the larvae that remained in the sediment, showing that stress can induce differences in development expressed as a loss of synchronization in the period of emergence.

An ecological study of the chironomid larvae (Insecta: Diptera) in streams of the Atlantic Forest (Rio de Janeiro State, Brazil) (1997)

[Estudo da ecologia de larvas de Chironomidae (Insecta: Diptera) em riachos de Mata Atlântica (Rio de Janeiro, Brasil)]

(in Portuguese).

A. M. Sanseverino,

Master thesis, Federal University of Rio de Janeiro
Lab. Entomologia, Depto. Zoologia

IB - UFRJ, CP 68044, CEP 21944-970, Rio de Janeiro, RJ.

Supervisor: Prof. Dr. Jorge L. Nessimian

Eleven streams were qualitatively investigated for chironomid larval habitats. Each habitat was divided into two categories: a general category for environment and flow (lotic/erosional, lotic/depositional; lentic/reservoir) and a specific category for substratum (aquatic plants, rocks, sediments, submerged litter). Chironominae and Orthocladiinae were identified to genus

and 37 taxa were found. *Cryptochironomus*, *Fissimentum* and *Lopescladius* commonly occurred on sediments (mainly sand) in reservoirs and depositional zones; *Endotribelos*, *Lauterborniella*, *Phaenopsectra* and *Stenochironomus* were associated with accumulations of litter attached to stones in erosional zones and submerged litter in reservoirs and depositional zones.

The chironomid fauna of submerged litter was quantitatively sampled from a first-order stream located on the coastal range (c. 1100 m) during winter, spring, summer and autumn. The litter fragmentation was estimated and the presence of leaves, wood, roots and fruit was investigated to determine litter structure (by area). Gut content analyses were made in order to study feeding habits. Twenty-three genera of Chironominae and Orthocladiinae were documented. *Lauterborniella*, *Polypedilum* and *Tanytarsus* were the most abundant. Larvae consumed algae, pollen, fungi, particulate organic matter, silt and plant fibers. The litter structure, chironomid faunal structure and feeding habits showed seasonal variation. The effect of climate on vegetation, and physical stream characteristics were discussed to elucidate organic matter dynamics and their influence on chironomid community structure.

New Ph.D. thesis from the Freshwater Biological Laboratory, University of Copenhagen (1998)

Klaus Peter Brodersen has just finished his Ph.D. project under supervision of Professor Claus Lindegaard. The following titles are included in the thesis and a number of copies are available from the address below. Macroinvertebrate communities in Danish lakes. Classification and trophic reconstruction. Introduction, summary and perspectives

[1] Brodersen K.P. & Lindegaard C. (1997) Significance of subfossil chironomid remains in classification of shallow lakes. Hydrobiologia, 342/343, 125-132.
[2] Brodersen K.P. & Lindegaard C. Chironomid assemblages from Danish lakes. Classification, assessment and reconstruction of lake trophic state using a chironomid based chlorophyll a transfer function. Manuscript
[3] Brodersen K.P. Chironomid stratigraphy in the shallow and eutrophic Lake Søbygaard, Denmark. Chironomid-macrophyte relations. Manuscript
[4] Brodersen K.P. & Lindegaard C. Mass occurrence and sporadic distribution of *Corynocera ambigua* Zetterstedt (Diptera, Chironomidae) in Danish lakes. Neo- and palaeolimnological records. Journal of Paleolimnology, In press
[5] Brodersen K.P., Whiteside M.C. & Lindegaard C. Reconstruction of trophic state in Danish lakes using subfossil chydorid (Cladocera) assemblages. Canadian Journal of Fisheries and Aquatic Sciences, In press
[6] Brodersen K.P. (1994) Subfossile dansemyg i sø-sedimenter. Miljøforskning, 12, 12-15, (in Danish)
[7] Brodersen K.P. (1995) The effect of wind exposure and filamentous algae on the distribution of surf zone macroinvertebrates in Lake Esrom, Denmark. Hydrobiologia, 297, 131-148.
[8] Brodersen K.P., Dall P.C. & Lindegaard C. (1998) The fauna in the upper stony littoral of Danish lakes: macroinvertebrates as trophic indicators. Freshwater Biology, 39, 577-592.
[9] Lindegaard C., Brodersen K.P., Wiberg-Larsen P. & Skriver J. (1998) Multivariate analyses of macroinvertebrate communities in Danish springs and springbrooks. Studies in crenobiology - The biology of springs and springbrooks (ed. L. Botosaneanu), pp. 201-219. Backhuys Publishers, Leiden

Klaus Peter Brodersen Freshwater Biological Laboratory
University of Copenhagen, 51 Helsingorsgade DK-3400 Hillerød
DENMARK
E-mail: brodersen@ibm.net http://www.zi.ku.dk/zi/fbl/kb/index.html

INDIA

Investigation of the faunistics and ecology of the chironomid communities of the mangrove ecosystem of West Bengal (1997)

Avijit Mazumdar, University of Burdwan, India. Supervisor Dr. P.K. Chaudhuri.

Morphology and Biology of some major orthoclads of the Himalayas of West Bengal (1997)

Dipak K. Som, University of Burdwan, India. Supervisor Dr. P.K. Chaudhuri.

SHORT - COMMUNICATIONS

INDIA

Dr. Chaudhuri reports that a new project "Cyto-taxonomic categorization of chironomid species of West Bengal" funded by the University Grants Commission, Govt. of India is in progress under Dr. T. Midya at the Department of Zoology, Presidency College, Calcutta, with Ms. Basuli Maitra as research student. The categorization is being made through the study of polytene chromosomes. So far, *Chironomus circumdatus* Kieffer, *C. javanus* Kieffer, *C. striatipennis* Kieffer, *C. samoensis* Edwards and *Polypedilum nubifer* (Skuse) have been analysed and show characteristic polymorphic features that indicate differential c-banding of polytene chromosomes. This pattern may be used cytotaxonomi–cally in chironomids. Details will be found in papers awaiting publication.

.K. Chaudhuri and J.R.B. Alfred (Director, Zoological Survey of India, Calcutta) have prepared a **Directory of Chironomid Midges of India**, updating the previous conspectus published in 1987 (CHAUDHURI, P.K. & GUHA, D.K. Ent.scand.Suppl. 29:23-33) and adding new taxa.

New Address of the Chironomidae Homepage

The chironomid page has recently been moved to a new server (as of May 1998); it currently resides at **www.ouc.bc.ca/fwsc/iwalker/intpanis/.**

Several old WWW addresses exist that may work temporarily, or may connect to outdated versions of our pages.

We ask that subscribers check the **directory** **www.ouc.bc.ca/fwsc/iwalker/intpanis/director.html** and list of **regional representatives** **www.ouc.bc.ca/fwsc/iwalker/intpanis/regrep.html** to ensure that their entries are still correct.

ARGENTINA

Temperate rainforest Field Station Puerto Blest-Patagonia Argentina

In the last couple of months, a group of researchers form the Universidad Nacional del Comahue had a brain wave! Yes, the possibility of offering a working environment within the singular setting provided by Northern Patagonia has begun. Based on a refurbished-to-be building located close to Bariloche city, across the huge Nahuel Huapi lake (1 hr. boat trip) and in the heart of the first and largest National Park of Argentina, a field station offering researchers and students a place to carry out their work in this fascinating environment.

The temperate rainforest, offers one of the most pristine and unpolluted systems in the world, rich in plant animal species (as well as in need of research!). However, there is something for everyone. Added to an ecologically remarkable terrestrial ecosystem, the aquatic environments are also an outstanding feature to which the field station offers immediate access. You may even find mosquitoes!

Puerto Blest field station is a perfect balance between untouched nature and a safe "Cheeseburger-round-the-corner" working conditions. It is intended for researchers and students of the environmental and biological sciences from all over the world, who are interested in research, educational or project work. The station will be also open to individuals, institutions or "green" organizations who may even wish to interact with an established research team or are keen in the natural history of this "end" of the planet.

Sorry, not allowed taking "Fuegians" back home.... in any case, there aren't many around any longer!!!!!!.

Those interested may contact:

Dr. Julieta Massaferro or **Dr. Juan Corley** - both at PROGEBA(CONICET) Ap. Postal 47 - 8400 SC de Bariloche-Rio Negro-Argentina. E-mails: julieta (a)prgeba.edu.ar; or Jcorley (a)inta.gob.ar.

MEA CULPA
(The CHIRONOMUS confessional.)

However carefully I check a manuscript during its preparation, however intensely it is scrutinized by editor and referees and the proof checked word for word, when the work appears in print immediately a mistake jumps out of the page and hits me in the eye! I know that I am not the only one to experience this phenomenon. Hence this new section: a chance for the lofty as well as those new to publishing to ease their consciences ....

To start things off, here are some of mine:

LANGTON & MCLARNON (1998). The AR for the adult female *Monodiamesa ekmani* is given as 6/7; it should be 0.6/0.7.

(There is an extremely embarrassing late editorial 'correction' in this paper where the double singular 'exuvium' has been inserted in place of 'exuviae' (singular and plural).)

LANGTON & ARMITAGE (1995). The pupa of *Rheotanytarsus rioensis* is stated to be unusual in the genus for possessing extensive shagreen on the abdominal tergites; this is true of known species with transverse point patches, but not for those with circular point patches.

MOUBAYED & LANGTON (1996). Dr. Reiss points out that the lateral setation of *Micropsectra auvergnensis* can be 5 not 4 as stated - reassessment of the material shows that both variants occur though 5 is more usual.

References:

LANGTON, P.H. & ARMITAGE, P.D. 1995 *Rheotanytarsus rioensis* (Diptera: Chironomidae), a new species of the *pentapoda* group from the Canary Islands. Br. J. ent. nat.Hist. 8:11-17.

LANGTON, P.H. & MCLARNON, L. 1996 *Monodiamesa ekmani* Brundin (Diptera: Chironomidae), confirmed new to Britain and Ireland. Br.J.ent.nat.Hist. 10:196-202

MOUBAYED, J. & LANGTON, P.H. 1996 *Krenopsectra nohedensis* n.sp. and the pupal exuviae of *Micropsectra auvergnensis* REISS (Diptera: Chironomidae) from the eastern Pyrenees. Br. J. ent. nat. Hist. 9:77-86.

PHL

NOTICE BOARD

BOOK NOTICE

Ecological State of the Chapayevka River Basin under anthropogenic load (Biological Indication)

Vol.3, Togliatti 1997, 337 pp. (in Russian)

ZINCHENKO T.D. & G.S.ROSENBERG (eds.)

The book deals with an integral evaluation of the state of the Chapayevka river basin. Complex studies of the river in question have been conducted by the Institute of Ecology of the Volga River Basin, RAS (Togliatti) starting in 1990. Chapayevka is the most polluted stream in the Volga Basin. It is a first-order tributary of the Saratov reservoir. It is of lowland type with the catchment area of more than 4,000 sq.km. Its length is 290 km. The Chapayevka locality is referred to as a zone of ecological disaster: at its average long-term discharge of 7.7 m^3/s, the flow of sewage amounts to 3.8 m^3/s. As the town of Chapayevsk is situated on the bank of Chapayevka River, its territory is classified as a territory of ecological crisis. Upstream of Chapayevsk, the river receives all kinds of agricultural waste, so that its water is essentially eutrophic, whereas downstream there are numerous inflows of effluents from large petro - chemical enterprises.

Particular attention has been paid to eco - faunistic studies in chironomids, the first for the lowland mid - Volga streams. The identification of species was based mainly on larval chironomids, more rarely on pupa and imago. Chironomids were studied in different biotopes (both in the river bed and adjacent to the banks) from the source to the mouth. The ecological component covers the relation of organisms to different hydrological, hydrochemical and biological parameters. The book presents data on 98 chironomid taxa belonging to 4 subfamilies: Tanypodinae - 18, Orthocladiinae - 26, Chironominae - 53 (Chironomini - 44, Tanytarsini - 9), Diamesinae - 1.

A generalized pattern of variations in the aquatic and terrestrial ecosystems of the Chapayevka river was, as well as indicator capabilities of versatile components and parameters of the ecosystem under the conditions of eutrophication and pollution of the river.

The investigations were carried out jointly by the workers of the Institute of Ecology of the Volga River Basin, RAS Togliatti, Koltsov Institute of Biology of Development, Moscow, MGU, including scientists from other Moscow Institutes.

I believe our foreign colleagues would be interested in the results of our investigations on non - traditional subjects such as mycobiotoc activity, aquatic mites (Hydrachnidia, Acariformes) and meiofauna. The integral evaluation both of terrestrial and aquatic organisms under critical anthropogenic loads should also be of interest.

The book is published in Russian and is available from:

Institute of Ecology of the Volga River Basin,
Russian Academy of Sciences
10 Komzin St.,
Togliatti 445003, Russia

We would greatly appreciate publications on studies of smaller lowland rivers.

Tatiana D. Zinchenko

NEW PUBLICATION

Lista faunística y bibliográfica de los quironómidos (Diptera, Chironomidae) de la Península Ibérica e Islas Baleares, published by Asociacion Espanola de Limnologia (1997). 210 pages.
This extremely useful work by O. SORIANO, F. COBO, M. RIERADEVALL and N. PRAT comprises two main sections: a catalogue of all published chironomid records for the Iberian peninsula by territory and a check list that includes the unassociated pupal taxa in Langton 1991. A complete bibliography and index are appended.

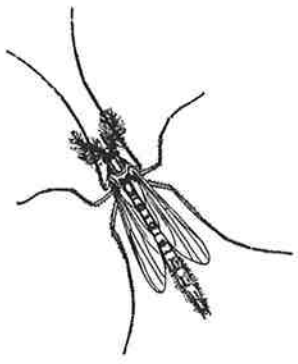
PHL

Deadline for *CHIRONOMUS* is the 1st of July 1999

Hard copy *CHIRONOMUS*

Having a paper copy of the information in the *CHIRONOMUS* newsletter is something I consider essential. I am not looking forward to the day when all books are available only in electronic format. A journal supplied in electronic format is a good idea, for it would save on printing costs, be easier to distribute and take up less shelf space. However, I have noticed that while subscribing to electronic mailing lists and the like, I read and/or save only that information of interest to me at the time. Many web pages and articles which would be relevant to interests developed later may well be gone, a paper copy provides a readily accessed permanent record. I know that the majority of these lists are archived so that a particular subject may be reviewed at a later date, but the means to access these may be limited. The production of an electronic version of *CHIRONOMUS* would, in my opinion, take just as much time and effort as a paper copy. It would cost money to download and this is an important consideration for those without 'free' net access. Although at a well funded university in the UK, I had web access only last year; if I had this problem, how are those in third world countries ever to access an electronic newsletter? When I first received *CHIRONOMUS* as a postgrad four years ago, I read it from cover to cover. It gave me the same sense of community that I found at the Freiburg conference: friendly, interested, interesting and helpful. Without the newsletter in its present form I could get out of touch with Chironomidology, so KEEP HARD COPY *CHIRONOMUS*!

Lesley A. McLarnon



PERSONALIA

List of Regional Representatives updated by Ian Walker 16 June 1998

Argentina
Julieta MASAFERRO, progeba - conicet, Apartado 47, 8400 S.C. de Bariloche, Prov. de Rio Negro - Argentina
Phone: 0944 42056; Fax: 0944 23654

Australia
Peter S. CRANSTON, Division of Entomology, CSIRO, P.O.Box 1700, Canberra, ACT 2601 - Australia
Phone: +61 6 2464282; Fax: +61 6 2464000.

Austria
Ruth CONTRERAS-LICHTENBERG, Naturhistorisches Museum, 2.Zoologische Abteilung, Burgring 7,P.O.Box 417 - AustriaPhone: +43 01 52177/317; E-mail: Ruth.Contreras@nhm-wien.ac.at

Belgium
Boudewijn GODDEERIS, Koninklijk Belgisch Instituut voor Natuurwetenschappen, Vautierstraat 29, B-1040 Brussel - Belgium
Phone: +32 2 6274314; Fax: 32 2 6464433

Brazli
Mirian A. da Silva Serrano, Laboratorio de Entomologia -IB, Universidade Federal de Mato Grosso, Avenida Fernando Correa s/n, 78060-900 Cuiaba - MT. - Brazil
(Phone: (065) 315 8872.

Britain
LANGTON Peter H. 5 Kylebeg Avenue,
Mountsandel, Coleraine, Co. Londonderry,
Northern Ireland BT52 1JN
Tel/fax: +44 01265 328028

Canada
Ian R. WALKER, Department of Biology, Okanagan University College, 3333 College Way, Kelowna, British Columbia V1V 1V7 - Canada
Phone: (250) 762-5445 Ext. 7559; Fax: (250) 470-6004; E-mail: iwalker@okanagan.bc.ca

P. R. China
Xinhua WANG, Dept. of Biology, Nankai University, Tianjin, 300071. - P. R. China
Fax: +86 22 344853

Denmark
Claus LINDEGAARD, Freshwater Biological Laboratory, University of Copenhagen, 51 Helsingorsgade, DK-3400 Hillerød - Denmark

Finland
Esa KOSKENNIEMI, National Board of Waters and the Environment Water and Environment District of Vaasa, Vaasan Vesi, Ja Ymparistopiiri, P.O. Bo. 262, SF-65101 Vaasa - Finland
Fax: +358 (9)61 256601

France
Henri LAVILLE, Laboratoire d'Hydrobiologie, Universite Paul Sabatier, 118. Route de Narbonne, F-31062 Toulouse Cedex - France
Fax: +61 55 6470 or +61 55 6000

Germany
Fiedrich REISS, Zoologische Staatssammlung München, Münchhausenstrasse 21, D-81247 München - Germany
Fax: +49 89 8107300

Ghana:
Josef S. AMAKYE, Institute of Aquatic Biology (C.S.I.R.), PO.Box 38, Achimota, Accra, Ghana - West Africa Phone: +233 ? 775511

India
P.K. CHAUDHURI, Department of Zoology - Entomology, University of Burdwan, Burdwan - 713104 -W.B. IndiaPhone: +91 BDN 2371-75 [37]

Ireland
Declan MURRAY, Department of Zoology, University College Dublin, Belfield, Dublin 4 - Ireland
Phone: +353 1 706 2336; Fax: +353 1 706 1152; E-mail: DMURRAY@ollamh.ucd.ie

Iceland
Jon Sigurdur OLAFSSON, University of Iceland, Institute of Biology, Grensasvegi 12, 108 Reykjavik - Iceland
Email: jsol@rhi.hi.is

Italy
Bruno ROSSARO, Univ. of Milano, Dept. Biology, Sect. Ecology, via Celoria 26, I 20133, Milano - Italy
Fax: +39-2-26604261

Japan
Toshio IWAKUMA, National Institute for Environmental Studies, 16-2 Onogawa, Tsukuba, Ibaraki 305 - Japan
Phone: 0298 51 6111; Fax: 0298 51 4732

The Netherlands
Dick GROENENDIJK, Section of Aquatic Ecology, University of Amsterdam, kruislaan 320, NL-1098 SM, Amsterdam - The Netherlands
Fax : +31 20 6659125

New Zealand
Ian K.G. BOOTHROYD, National Institute of Water and Atmospheric Research, P. O. Box 11-115, Hamilton, - New Zealand Phone: 07 8561737; Fax: 07 8560151; Email: (work) I.boothroyd@niwa.cri.nz (home) Ian.b@xtra.co.nz

Norway
Endre WILLASSEN, Museum of Zoology, University of Bergen, Museplass 3, N-5007 Bergen - Norway
Fax: +47 5 321153

Poland
Adrzej KOWNACKI, Institute of Freshwater Biology - Polish Academy of Sciences, ul.Slawkowska 17, PL-31-016 Krakow - Poland
Phone: +48 12 222115

Russia
Engelsina ERBAEVA, Institute of Biology, University of Irkutsk, P.O.Box 24, 664003 Irkutsk - Russia,Lake Baikal and River Angara, South Siberia Phone +7? 243079 or 242186
.

Tatiana ZINCHENCO, Institute of Ecology of the Volga River Bassin, Russian Academy of Sciences, 445003 Togliatti, Russia - Volga River Catchments and Basin

Far East of Russia
Eugenyi A. MAKARCHENKO, Institute of Biology and Pedology, Far Eastern Branch of the Russian Academy of Sciences, 690022 Vladivostok, Russia - Far East of Russia
Fax: 0423 225 8484

Spain
Narcis PRAT, Department d'Ecologia, University of Barcelona, Avgda. Diagonal 645, ES-08028 Barcelona - Spain
Fax: +34 3 4111438

Sweden
Richard K. JOHNSON, University of Agricultural Sciences, P.O. Box 7050, S-75007 Uppsala - Sweden
Fax: +46 18673156

Switzerland
Brigitte LODS-CROZET, Laboratoire d'Ecologie et de Biologie Aquatique, 18 Chemin des Clochettes, University of Geneva, CH-1206 GENEVE - SWITZERLAND
Tel: (+41 22) 705 71 00; fax (+41 22) 789 49 89; E-mail: Brigitte.Lods@leba.unige.ch

NEW REGIONAL REPRESENTATIVE FOR SWITZERLAND

United States
Leonard C. FERRINGTON Jr., Kansas Biological Survey, Unversity of Kansas, 2041 Constant Avenue, Lawrence, Kansas, 66047-2906 - U.S.A. Phone: +1 913 864 7725; Fax: +1 913 864 5093

United States - Central America
Carlos DE LA ROSA, Director, Riverwoods Field Laboratory, 100 Riverwoods Circle, Florida, FL 33857,United States - Central America Phone: (941) 462 5330; Fax : (941) 462 5331; Email: delarosa@strato.net

CHANGES:

ASTON, William, 3, Canterbury Close, Garstang, Preston, Lancashire. PR3 1DJ, England.Email:W.A.ASTON@Staffs.ac.uk

CALLISTO, Marcos, Universidade Federal de Minas Gerais, ICB, Depto. Biologia Geral, Lab.Limnologia/Ecologia de Bentos, CP. 486, CEP. 30.161-970, Belo Horizonte, MG, Brazil. Tel: +55 31 499 25 95. Fax: +55 31 499 25 67. Email : callisto@mono.icb.ufmg.br

GARCIA, Xavier-François, Laboratoire d'Hydrobiologie, Université Paul Sabatier, 118, route de Narbonne, F-31.062, Toulouse Cedex, France. Fax: (33) 05 61 55 60 96. Email: xgarcia@cict.fr

INT PANIS, Luc, J. Coverliersstraat 7, B-2540 Hove, Belgium. E-mail: luc.intpanis@aquafin.be

NOLTE, Ulrike, "Greylands", Rocksberg, Qld 4510, AUSTRALIA Tel: ++7 54 97 00 74. Email: haase@mail.cth.com.au

PORINCHU, David F., Department of Geography, University of California at Los Angeles (UCLA), 1255 Bunche Hall, Los Angeles, California 90095-1524, U.S. Tel: (310) 825-6658. Email: porinchu@ucla.edu

LANGTON Peter H. 5 Kylebeg Avenue, Mountsandel, Coleraine, Co. Londonderry, Northern Ireland BT52 1JN Tel/fax: +44 01265 328028

WOLFRAM, Georg new e-mail address: donabaum.wolfram@netway.a

NEW:

CWYNAR, Les, Department of Biology, University of New Brunswick, Bag Service No. 45111, Fredericton, New Brunswick, Canada E3B 6E1 Tel: (506) 452-6197. Fax: (506) 453-3583. E-mail: cwynar@unb.ca

HANSEN, Oddvar, Norwegian Institute of Nature Research (NINA), Tungasletta 2, N- 7004 Trondheim, Norway. Fax: +47 73 915433. Email: Kaare.Aaagaard@nina.no Interests: Benthic ecology, conservation biology.

PRENNER, Monika, Giesshueblerstrasse 13, A-2344 Maria Enzersdorf, Austria. Email: a8900723@unet.univie.ac.at Interests: Biomonitoring, Biological indicators.

RAMAGE, Deborah L., Department of Zoology,

The University of Queensland, Queensland 4072, AUSTRALIA Tel: +617 3365 5649. Fax: +617 3365 655. Email: dramage@zoology.uq.edu.au Interest: The culture of chironomids as food for finfish in aquaculture

The directory of chironomid - workers is permanently updated at the www: www.ouc.bc.ca/fwsc/iwalker/intpanis/regrep.html

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by Odwin Hoffrichter

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SPRINGS THROUGHOUT THE WORLD NEED PROTECTION

country.....

1. Are you involved in studying springs in your country
   yes

   no

   other

2. OBJECTIVES
a - Data base
b- Conservation
c- Restoration
d- Evaluation

3. AVAILABLE DATA BASE
- Hydrological
- Chemical

- Physical
- Aquatic Plants
- Hydrobiological

- lowland / coastal

- montane

f- Typology
g- Classification
h- Modelling
i- other criteria:.
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.....
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- Macroinvertebrates
- Main groups:.....
.....
- Plankton

4. REMARKS:

Name.....
fax.....
Tel.....
e-mail.....

Address.....
.....
.....
.....
.....

CO-ORDINATORS:
J..MOUBAYED (France)
Environnement counsel. Les Muriers
Bat A 3, Impasse Enclos de l`Herbette,
34000, Montpellier, France.

Cl. ORENDT (Germany)
Umweltforschungszenrum Leipzig-Halle GmbH (Ufz)
Permoserstrasse 15
04318 Leipzig, Germany.
Fax: (+49) 341 2352401.