

**STUDY OF CHIRONOMIDAE NATURAL POPULATIONS  
OF THE FORMER SEMIPALATINSK TEST SITE WATER BODIES**

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**ИЗУЧЕНИЕ ПРИРОДНЫХ ПОПУЛЯЦИИ ХИРОНОМИД ВОДОЕМОВ  
БЫВШЕГО СЕМИПАЛАТИНСКОГО ИСПЫТАТЕЛЬНОГО ПОЛИГОНА**

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The open water bodies as a component of the biosphere serve as the accumulators of artificial radionuclides generated during the nuclear explosions; therefore their radioactive contamination needs to be registered. The assessment of the environmental radioactive contamination consequences for the natural populations of organisms living in water bodies is of particular importance.

Chironomini (*Diptera, Chironomidae*) play an important role as they are a significant component of water and air biospheres and provide the self-cleaning of water bodies and food chains of industrial fish and bird. Chironomini have been chosen to be a model for the UNESCO International Program titled "Man and Biosphere" and are used as the bioindicator for biocenological and ecological studies of anthropogenic influence on water bodies.

The study of Chironomini natural mutagenic process and its alteration due to the radioactive contamination of water bodies is of extreme scientific interest and can serve as the indicator of the scale of genetic damage of water organisms.

This work presents the data on natural populations of Chironomini of former STS water bodies: Shagan Lake, Balapan Lake, the artificial water body on the Karazhyra Coal Field, the backwater near the Shagan River, Balykty col Lake, etc. The characteristics of Chironomini species is also given. For the first time the cytophotomaps of caryotypes, the cytogenetic data on analysis of chromosome polymorphism, the spectra and frequency of inverse sequences of discs in each of chromosome arms of two species - *Camptochironomus sp.* and *Gluptotendipes salinus* are presented.

The analysis of morphology and caryotype of *Camptochironomus sp. S* (S - larvae have been sampled from the Semipalatinsk Test Site) showed that this is a new species as compared to caryologically studied species (*C. tentans*, *C. pallidivittatus*) of *Camptochironomus* subfamily. The caryotype *Camptochironomus sp. S* differs sharply from the caryotypes of other *Camptochironomus* species due to its strong heterochromatization of centromeric discs.

The immediate molecular analysis of genome DNA of *Camptochironomus sp. S* larvae sampled from Shagan Lake was performed: the total DNA of larvae of this species was obtained, nucleotide sequences of genes of cytochrome B (Cyt B) and cytochromidase I (COI) were determined using methods of amplification and sequence; the comparison of nucleotide sequences of Cyt B and COI genes of *Camptochironomus sp. S* with known nucleotide sequences of these genes from populations of Siberia, Altay, Yakutia and North America was performed. As a result of the comparison it was found that the species under study (*Camptochironomus sp. S*) is not a populational variant but a new species. COI gene of *Camptochironomus sp. S* showed a deletion of three nucleotides that led to the replacement of one amino acid residue and the loss of the other one. Since no one of previously studied Chironomini species has showed the deletion, it can be supposed that this deletion is due to the radioactive exposure.

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