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A new record of *Chironomus* (*Chironomus*) *acidophilus* Keyl (Diptera, Chironomidae) from the Uzon volcanic caldera (Kronotsky Reserve, Kamchatka Peninsula, Russia), its karyotype, ecology and biology

OKSANA V. OREL (ZORINA)[1,4], LUDMILA E. LOBKOVA[2], SERGEY V. ZHIROV[3] & NINEL A. PETROVA[3]

[1]*Institute of Biology and Soil Science, Russian Academy of Science, Far East Branch, 100-letya Vladivostoka av. 159, Vladivostok, 690022, Russia. E-mail: zorina@biosoil.ru*

[2]*Kronotsky State Biosphere Reserve, Ryabikova st. 48, Elizovo, Kamchatka Territory, Russia. E-mail: lel47@mail.ru*

[3]*Zoological Institute, Russian Academy of Sciences, Russia. E-mail: chironom@zin.ru*

[4]*Corresponding author. E-mail: zorina@biosoil.ru*

Abstract

Morphology, cytology, ecology and biology of Holarctic *Chironomus* (*Chironomus*) *acidophilus* Keyl, 1960 (Diptera, Chironomidae) was examined from material collected in the geothermal Vosmerka Lake (pH=2.0–2.5). An illustrated re-description of *C. acidophilus* is given on the basis of adult males reared from field-collected pupae, and of simultaneously collected larvae. Additional larvae belonging to the pseudothummi-complex were identified as *C. acidophilus* on the basis of their karyotype. The karyotype of *C. acidophilus* (2n=8) and detailed mapping of the 4 chromosome arms A, E, D and F are provided. The population of *C. acidophilus* from Kamchatka was found to be karyologically monomorphic. Information on distribution and ecology of *C. acidophilus* from Vosmerka Lake (total mineralization 1583.5 mg/l) is also given. *Chironomus acidophilus* is the only species of aquatic insects recorded in this lake. Lack of competition and a richness of food resources contribute to the high abundance (35161 ind./m^2) and biomass (11.342 g/m^2) of the larvae of *C. acidophilus* in Vosmerka Lake.

Key words: *Chironomus acidophilus*, non-biting midge, taxonomy, karyotype, acidic water

Introduction

The Uzon volcanic caldera is located in the Uzon-Geysernaya tectonic depression within the central area of the Eastern tectonic belt of Kamchatka, where about 40 thousand years ago Uzon-Geyser hydrothermal system formed. On the south, west, and north the caldera is outlined with terraces 200–800 m high; its flat bottom measuring 8×12 km lies at 650 m above sea level. Temperature anomaly zones in the caldera occupy a total area of 61000 m^2 and produce a total heat efflux of 268 MW (Leonov *et al*. 1991). The most typical geothermal phenomena in the Uzon volcanic caldera are various hot and boiling pots and funnels which unite in some places to form thermal lakes. Larvae of midges of the genus *Chironomus* were discovered in the peripheral zones of the acidic lakes Fumarolnoe, Sernoe, Vosmerka, and Khloridnoe (pH=1.5–2.5) containing intermittent bottom springs and giving out strong hydrogen-sulfide odor (Lobkova & Chebanova 2010; Lobkova 2014). Our study of the polytene chromosomes of these chironomids from the Vosmerka Lake has shown them to be identical to those of *C. acidophilus* Keyl, 1960.

Chironomus (*Chironomus*) *acidophilus* was described by Keyl (1960) from Germany based almost exclusively on the giant chromosomes in the salivary glands of the larvae. The description of the male imago by Keyl (1960) is very brief ("Merkmale der Färbung und des Hypopygbaues stimmen mit denen von *Ch. pseudothummi* Str. überein.") and insufficient to identify this species. Earlier, Thienemann & Strenzke (1951) had treated the male of this species under the name *C. meigeni* Kieffer, but this was a misidentification (see the following paragraph). The pupa of *C. acidophilus* was described for the first time by Langton & Visser (2003). The description of larval morphology by Keyl (1960) was very brief: "Thummityp, appendices laterales fehlen". The detailed morphology

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