

## Subfossil chironomids from Kamchatka

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The Kamchatka Peninsula shapes the eastern edge of Siberia and separates the Sea of Okhotsk from the Pacific Ocean (Fig. 1). It is one of the least studied regions in Eurasia. The diverse and variable climatic and ecological conditions in the study region are formed by a complex interplay between geographic position, relief, surrounding seas, the Pacific Ocean, and tectonic activities. The Kamchatka Peninsula belongs to the maritime and sub-oceanic sectors of the boreal zone, characterized by high humidity, relatively low temperatures, short growing seasons, and heavy snowfalls. Monthly mean July temperatures ( $T_{July}$ ) range between 12 and 16°C, monthly mean January temperatures ( $T_{January}$ ) between -18 and -20°C (New et al. 2002). Annual precipitation is around 350 mm (Krestov et al. 2008). The climate conditions are ideally suited for tundra in the north and at high elevations as well as widespread forests with dwarf alder (*Alnus fruticosa*), dwarf pine (*Pinus pumila*), and Ermann's birch (*Betula ermanii*) (Krestov et al. 2008).

In 13 investigated lakes from Kamchatka we identified 77 chironomid taxa. Most widely distributed taxa are *Tanytarsus mendax*-type (84.6 % of the lakes; mean 5.1%; max 13.7%), *Procladius* (76.9 % of the lakes; mean 3.2%; max 9.1%), *Psectrocladius sordidellus*-type (69.2 % of the lakes; mean 4.9%; max 16.3%), *Ablabesmyia* (61.5 % of the lakes; mean 4.8%; max 22.0%), *Limnophyes* – *Paralimnophyes* (61.5 % of the lakes; mean 3.7%; max 13.8%), and *Paratanytarsus penicillatus*-type (61.5 % of the lakes; mean 2.2%; max 5.8%). *Chironomus anthracinus*-type (mean 5.8%; max 24.6%), *Sergentia coracina*-type (mean 3.4%; max 14.0%), *Tanytarsus* no spur (mean 3.2%; max 12.3%), *Microtendipes pedellus*-type (mean 2.65%; max 12.3%), *Cladotanytarsus mancus*-type (mean 1.9%; max 8.9%), *Dicrotendipes nervosus*-type (mean 1.32%; max 4.9%) are found in 7 of 13 lakes (53.8 % of the lakes). *Allopectrocladius*, *Diamesa zernyi/cinerella*-type, *Eukiefferiella fittkau*-type, *Eurycnemus*, *Psectrocladius calcaratus* type, *Pseudodiamesa*, and *Rheocricotopus* were not found in other regions of Siberia (Nazarova et al. 2005, 2008, 2011, 2013a,b).

Earlier surveys have demonstrated similarities between the chironomid fauna of Far East and other parts of Siberia (Karationis et al. 1956; Ogay 1979; Salova 1993; Kiknadze et al. 1996). In total previous investigations (Makarchenko et al. 1999, 2005; Zorina 2001, 2003; 2006a,b; 2013) recorded 74 chironomid species for Kamchatka, which is comparable with the taxonomic richness that was found in our investigation. Most recorded species (60%) are Palaearctic and 40% of all species have Holarctic distribution. We observed a relatively high abundance of head capsules from the subfam-

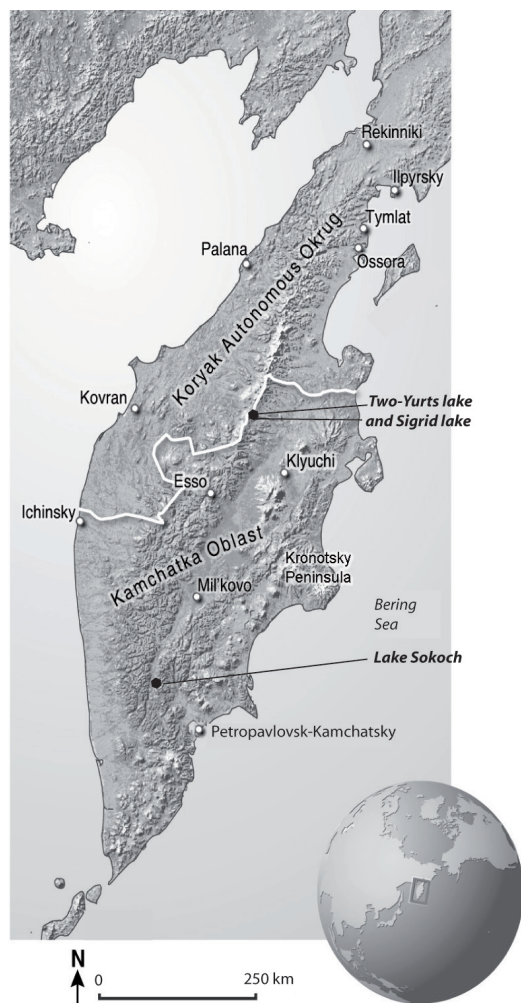


Figure 1. Location of Two-Yurts, Sigrid and Sokoch lakes in Kamchatka.

ily Diamesinae in Kamchatka, which corresponds to investigations of Makarchenko et al. (2005), who recorded 52 Diamesinae taxa in the chironomid fauna of the Russian Far East.

Some of the Tanytarsini specimens had a distinctive mentum with a small single median tooth and minute outer lateral tooth (Fig. 2). The larvae of this morphotype were not found in any modern sediments but were found in 20 sediment layers of the core of Two-Yurts Lake in abundances up to 8.1% (56°49,2'N; 160°06,3'E, Nazarova et al. 2013b), and in 5 sediment layers of the core of the lake Sokoch (53°15.133'N, 157°45.489'E) (Fig. 1). Interestingly this taxon was not found in the lake situated just a few meters away from the Two-Yurts Lake. Taking into account the frequency of the head capsules with this form of the mentum, this morphotype cannot be considered as just a morphological abnormality. None of the known Tanytarsini taxa have a similar mentum, so this taxon was treated as a new morphotype and was named 'Tanytarsini type klein'. The taxon appeared at low to moderate abundances throughout the cores and could not be associated with colder or warmer periods (Nazarova et al. 2013b).

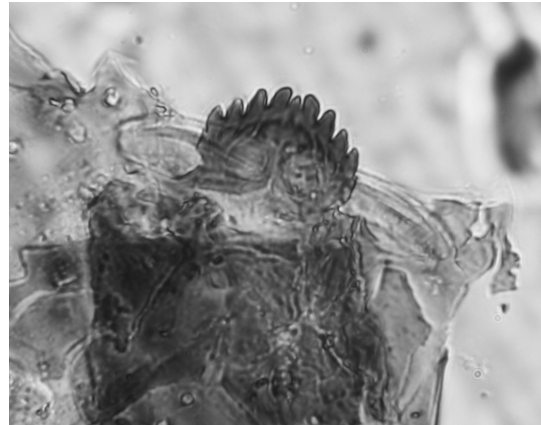


Figure 2. Morphotype *Tanytarsus* type klein from the sediment cores of the Two-Yurts and Sokoch lakes in Kamchatka. Photo: Larisa Nazarova.

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