

New species of Polycentropodidae (Insecta: Trichoptera) from the Taymyr amber locality Nizhnyaya Agapa, upper Cenomanian

Новый вид Polycentropodidae (Insecta: Trichoptera) из верхнесеноманского таймырского янтаря местонахождения Нижняя Агапа

S.I. Melnitsky¹, V.D. Ivanov¹
С.И. Мельницкий¹, В.Д. Иванов¹

¹ St. Petersburg State University, Faculty of Biology, Department of Entomology, Universitetskaya nab. 7/9, St.Petersburg 199034, Russia. E-mail: simelnitsky@gmail.com, v--ivanov@yandex.ru

¹ Санкт-Петербургский государственный университет, биологический факультет, кафедра энтомологии, Университетская наб.7/9, Санкт-Петербург 199034, Россия.

KEY WORDS: Trichoptera, caddisflies, Polycentropodidae, *Archaeopolycentra*, paleontology, taxonomy, new species.

КЛЮЧЕВЫЕ СЛОВА: Trichoptera, ручейники, Polycentropodidae, *Archaeopolycentra*, палеонтология, таксономия, новый вид.

ABSTRACT. New caddisfly species *Archaeopolycentra longesilentia* sp.n. (Polycentropodidae) from Cretaceous Taymyr amber (Cenomanian, Dolgan Formation, 95 Ma) is described and illustrated. With new species the list of caddisflies from Taymyr amber includes 14 species, and the family Polycentropodidae is represented by 6 species.

РЕЗЮМЕ. Описан новый вид ручейников *Archaeopolycentra longesilentia* sp.n. (Polycentropodidae) из мелового таймырского янтаря (сеноман, долганская свита, 95 млн. лет). Список ручейников из таймырского янтаря теперь включает 14 видов, а семейство Polycentropodidae представлено 6 видами.

Introduction

Fossil caddisflies are diverse in Eurasian (Burmese, Lebanese, Taymyr) and North American (Alberta, New Jersey, Tennessee) Cretaceous ambers. Sixty-five species of Trichoptera found in Cretaceous ambers, 39 of which were recorded from Burmese amber [Wichard, 2020; Wichard et al., 2021]. More than 260 species of caddisflies are known from the Late Eocene ambers of Europe: Baltic, Saxonian, and Ukrainian [Ivanov et al., 2016; Wichard et al., 2018; Melnitsky et al., 2021a–c].

The family Polycentropodidae is worldwide distributed with over 900 species and some 30 genera in

recent and fossil fauna [Morse, 2022]. The family Polycentropodidae is especially rich and comprises up to 75% of all Trichoptera specimens found in ambers [Ivanov et al., 2016]. The oldest specimen of this family, *Styxowia predponimania* Melnitsky et Ivanov, 2020 is known from the Cretaceous deposits of Siberia, the Khasurty locality [Kopylov et al., 2020]. The list of caddisfly species from Taimyr amber includes 13 species from 7 families [Botosaneanu, Wichard, 1983; Ivanov, Melnitsky, 2017; Melnitsky, Ivanov, 2021]. The genus *Archaeopolycentra* is represented by 4 species (*Archaeopolycentra zherikhini* Botosaneanu et Wichard, 1983, *Archaeopolycentra yantardakh* Ivanov et Melnitsky, 2017, *Archaeopolycentra achupomotet* Melnitsky et Ivanov, 2021, *Archaeopolycentra turvalsia* Melnitsky et Ivanov, 2021) from the well-known Yantardakh locality. We describe here new species from the fossil genus *Archaeopolycentra* from another locality called Nizhnyaya Agapa. The latter fossil site with age estimated as approximately 95 Ma is 20 million years older than Yantardakh [Zherikhin, 1978]. Thus the described species is among the oldest known Polycentropodidae remnants.

Material and Methods

The species description is based on material found during expeditions of the Paleontological Institute of the Russian Academy of Sciences to the Taimyr Penin-



Figs 1. Map of Yantardakh and Nizhnyaya Agapa localities.

Рис. 1. Карта местонахождений Янтардах и Нижняя Агапа.

sula in 1973. Amber was collected from the upper horizons of the Dolgan Formation, the Nizhnyaya Agapa locality in Taymyr Peninsula, northern Siberia. This material was supposed to be Cenomanian, 94–101 Ma [Zherikhin, 1978]. The locality Yantardakh and Nizhnyaya Agapa are shown in the map (Fig. 1). The amber deposits were found on the right bank of the Nizhnyaya Agapa river (N 70°07'04"; E 86°46'43"), 40 km below its source. The type is deposited in Borissiak Paleontological Institute (Moscow, Russia) collection of insects.

The fossil resins of Taymyr localities are very fragmented to small pieces with corrugated surface. These pieces are difficult to polish because of high fragility of the resin. The preparation of resins for study includes partial embedding of natural fragments to an artificial resin with subsequent careful polishing. Nevertheless the remaining surface defects and internal cracks obscure the outlines of insect inclusions. The postmortem deformations might affect the visible structures. We retain the shapes as in the inclusion without correction and restoration of original structure. The study of this fossil was accomplished with Nikon SMZ1500 microscope provided with a digital camera. Photographs have been postprocessed with graphics software to reveal details of the structures. In this paper, we use the interpretation of genital structures of genus *Archaeopolycentra* previously proposed by the authors [Ivanov, Melnitsky, 2017].

Taxonomy

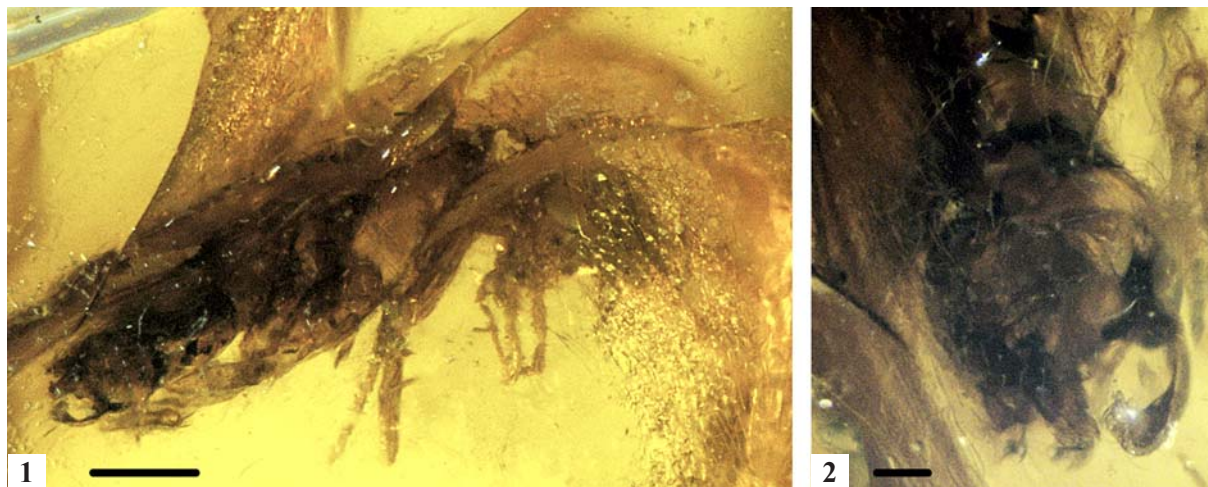
Order Trichoptera Kirby, 1813
 Suborder Annulipalpia Martynov, 1924
 Family Polycentropodidae Ulmer, 1903
 Genus *Archaeopolycentra*
 Botosaneanu et Wichard 1983
Archaeopolycentra longesilentia
 Melnitsky et Ivanov, **sp.n.**

Figs 2 – 4.

MATERIAL. Holotype: ♂. PIN 3426/223. Russia, Krasnoyarskiy Krai, Western Taymyr, right bank of the Nizhnyaya Agapa river, Taymyr amber, Dolgan formation, Cenomanian. The whole body with male genitalia, parts of legs and head; wings are poorly preserved.

DESCRIPTION. Body length 3.3 mm. Legs, head and its appendages yellowish. Thorax and abdomen brown. The head with long light hairs. Eyes large. The third segment of labial palp long, more than twice as long as any previous segment. This segment has numerous long thick-walled gustatory trichoid sensilla. Similar sensilla are present in lesser numbers also on the last (5th) segment of maxillary palps. The second segment of the maxillary palps has numerous strong setae. Medial warts of pronotum elongated.

Male genitalia. Projections of the segment X shorter than aedeagus, with two flat blades and a long spike between them at the apex. Four strong setae are visible on a thin flat blade of right projection of the segment X. Inferior appendages are long with strongly curved and expanded apex and a few short setae along ventral margin and on



Figs 2–3. *Archaeopolycentra longesilentia*, sp.n.: 2 — general view, ventrolateral, with mouthparts and male genitalia; 3 — genitalia, ventro-lateral. Scale bars: 0.5 mm (2), 0.1 mm (3).

Рис. 2–3. *Archaeopolycentra longesilentia*, sp.n.: 2 — общий вид, вентролатерально, с ротовыми придатками и гениталиями самца; 3 — гениталии, вентролатерально. Масштаб: 0,5 мм (2), 0,1 мм (3).

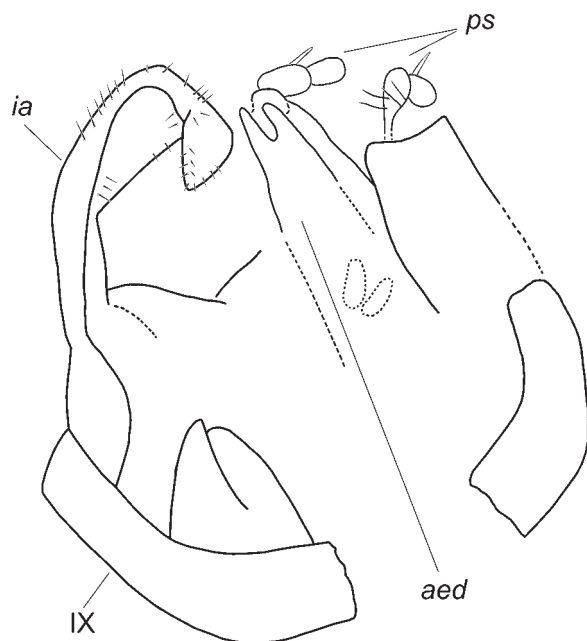


Fig. 4. *Archaeopolycentra longesilentia*, sp.n.: genitalia, ventro-lateral. Abbreviations: IX — segment IX; aed — aedeagus; ia — inferior appendages; ps — projections of the segment X.

Рис. 4. *Archaeopolycentra longesilentia*, sp.n.: гениталии, вентро-латерально. Обозначения: IX — сегмент IX; aed — эдеагус; ia — нижние придатки; ps — отростки X сегмента.

internal surface. Subdivision on gonocoxite and gonostyle is not clearly visible; it is not unlikely that the damaged right gonopod (inferior appendage) was broken along the faint hinge of the two parts of inferior appendages. Aedeagus sclerotized, elongate with several small processes at apex. There are two black sclerotized fragments below the aedeagus.

ETYMOLOGY. From Latin longe (far) and silentium (silence).

COMPARISON. The new species differs from other species of the genus *Archaeopolycentra* in the shape of inferior appendages and projections of the segment X. The inferior appendages of the new species are not divided into two branches, with an expanded apex. Projections of the segment X have two lobes and one spine at the apex contrary to other species of the genus having smaller curved apical structures.

REMARKS. Aedeagus and processes of aedeagus shifted to the right because of overall deformation of the specimen. We include this new species into the genus *Archaeopolycentra* because of similarity of male genital structures to other species of this genus. Other findings might clarify its taxonomic position by characters of the wing venation. Previously, the authors noted that numerous thick-walled gustatory trichoid sensilla are often found on the terminal segments of the maxillary and labial palps in Trichoptera [Ivanov et al., 2018]. These sensilla are rarely visible on fossils. These structures in *Archaeopolycentra longesilentia* sp.n. provide a basis for further comparative studies of extant and fossil species to investigate the evolution of sensilla.

Acknowledgements. This work has been supported by the grants the Russian Science Foundation, RSF № 22-24-00259. We are grateful to colleagues in the Paleontological Institute of Russian Academy of Sciences (Moscow) for amber collecting and the treatment of amber.

Competing interests. The authors declare no competing interests.

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