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DESCRIPTION OF *PAGASTIA (PAGASTIA) KADI* SP. N. (DIPTERA: CHIRONOMIDAE: DIAMESINAE) FROM THE AMUR RIVER BASIN

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Summary. An illustrated description of a new chironomid species *Pagastia (Pagastia) kadi* sp. n. from the Amur River basin (Russian Far East) is given based on the adult male and pupa. The new species is closely related to *Pagastia (P.) orthogonia* Oliver, known from North America and Japan, but differs from it in the shape of the gonostylus, the size of the basal lobe of male gonocoxite, and the absence of the median setae of the anal lobe in the pupa. The absence of median setae of the anal lobe was recorded for pupae of the genus *Pagastia* Oliver for the first time and this character must be included in the diagnosis of genus.

Key words: Diptera, *Pagastia*, taxonomy, new species, Russian Far East.

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Резюме. Приведено иллюстрированное описание по имаго самцу и куколке нового вида хирономид *Pagastia (Pagastia) kadi* sp. n. из бассейна реки Амур (российский Дальний Восток). Новый вид наиболее близок к известному из

Северной Америки и Японии *Pagastia (P.) orthogonia* Oliver, но хорошо отличается от него формой гоностилия, размером базальной лопасти гонококсита самца и отсутствием у куколки медиальных щетинок анальной лопасти. Отсутствие медиальных щетинок анальной лопасти впервые зарегистрировано для представителей рода *Pagastia* Oliver и этот признак необходимо внести в диагноз рода.

INTRODUCTION

In this article we continue to publish the data obtained as a result of the revision of the subfamily Diamesinae, namely of the genus *Pagastia* Oliver, 1959 (Makarchenko, 2019; Makarchenko & Hansen, 2020, Makarchenko *et al.*, 2021). The genus *Pagastia* was described by Oliver (1959) from North America. Currently, *Pagastia (Hesperodiamesa)* includes a single Nearctic species, *P. (H.) sequax* (Garrett), while *Pagastia* s. str. includes 12 valid species (Ashe & O'Connor, 2009; Makarchenko *et al.*, 2021). One additional undescribed species known only from larvae is recorded from Kirgizstan in Central Asia (Makarchenko & Makarchenko, 2000), and two undescribed species are recorded from Nepal (Roback & Coffman, 1987).

In earlier works I indicated finding of *P. (P.) orthogonia* Oliver in the territory of the Russian Far East, namely in basin of the Amur River, based on the adult male extracted from the pupa (Makarchenko, 2006, 2019). However, an additional revision of this material, in particular the pupa, showed that it has different structures from that of the *P. (P.) orthogonia*, and it should be classified as a new species.

Below illustrated description of adult male and pupa of new species from Kadi River of the Amur River basin is provided as well as comments on the presence of feature in the pupa that are absent in the diagnosis of the genus *Pagastia*.

MATERIAL AND METHODS

The material was preserved in 70% ethanol and mounted in the polyvinyl lactophenol. The morphological terminology and abbreviations used below generally follow Sæther (1980). The photographs were taken using an Axio Lab.A1 (Karl Zeiss) microscope with an AxioCam ERc5s digital camera, and then stacked using Helicon Focus software. The final illustrations were post-processed for contrast and brightness using Adobe® Photoshop® software.

Holotype and paratypes are deposited in the collection of the Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far East Branch of the Russian Academy of Sciences, Vladivostok.

DESCRIPTION OF NEW SPECIES

***Pagastia (Pagastia) kadi* Makarchenko, sp. n.**

<https://zoobank.org/NomenclaturalActs/90D86438-E4F8-44C0-BF8E-F4D213EA822A>

Figs 1–9

TYPE MATERIAL. Holotype: 1 pharate adult ♂ extracted from mature pupa, **Russia**: Khabarovsk Territory, Ulchsky District, Kadi River of the Amur River basin, 51.758528°N, 140.985861°E, 13.VIII 2004, leg. N. Yavorskaya. Paratypes: 3 mature pupae, the same data as holotype.

DESCRIPTION. *Pharate adult male* (n=1). Total coloration brown to dark-brown; head, thorax, legs, and abdomen brown to dark brown; antennae light brown.

Head. Eyes bare and extended dorsomedially. Temporal setae 15. Clypeus with 13 setae. Antenna with 13 flagellomeres and well developed plume; pedicel with 4 setae 48–50 µm long; terminal flagellomere with 1 subapical setae 40 µm long. AR 1.43–1.45. Palpomere lengths (in µm): 40; 76; 150; 140; 160.

Thorax. Anteprenotum with 4–5 median and 4 lateral setae. Acrostichals 16 (in 1 row), dorsocentrals 11–12 (in 1–2 rows), prealars 8, scutellars 43 (in 2–3 rows).

Wings and legs absent.

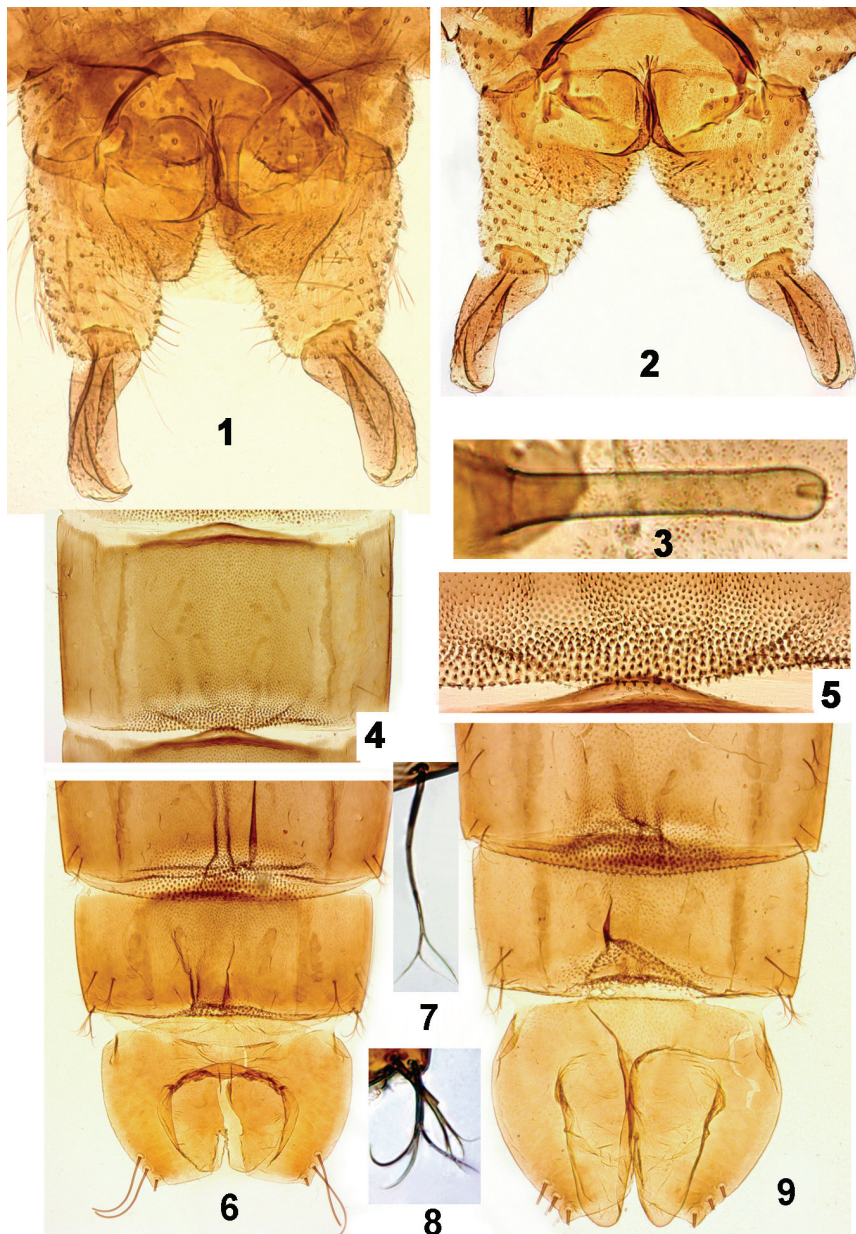
Hypopygium (Figs 1–3). Tergite IX with 12–15 setae on each side and with anal point 80 µm long, parallel-sided, with rounded apex and pore in apical part (Fig. 3). Laterosternite IX with 7–14 setae. Transverse sternapodeme narrow, arcuate, 232 µm long. Phallapodeme 48 µm long. Median aedeagal lobe absent; lateral aedeagal lobe 80–88 µm long. Gonocoxite 232 µm long, with basal plate and lobe-like median field. Gonostylus 160 µm long, apical part angular-rounded, with megaseta 10 µm long. HR 1.45.

Pupa (n=3). Total length 4.9–5.0 mm (♂) and 5.8 mm (♀). Exuviae light brown.

Cephalothorax. Frontal apotome with 2 setae, 192–220 µm long. Thorax slightly granulated, with 2 dorsocentral setae, 40–48 µm long. Anteprenotum with 2 median setae, 108–160 µm long and 1 lateral seta, 140 µm long. Precorneal setae lengths (µm): Pc₁ 96, Pc₂ 140, Pc₃ 140. Bases of three precorneals in form of triangle.

Abdomen. Tergite I without shagreen. Tergite II with easily visible fine shagreen in anterior part and more extensive shagreen of larger spinules along posterior edge; middle part of tergite with very small and sparsely located spinules. Tergites III–VIII fully covered with shagreen of spinules which become larger near the posterior edge (Figs 4, 6, 9). Spinules of the shagreen of tergites III–VII along posterior edge are directed anteriorly (Fig. 5). Tergite IX with fine shagreen only anteriorly. Sternites without shagreen. Segment I with 3 pairs of lateral setae: L₁ simple, 40 µm long; L₃ divided into 2–3 branches, 80 µm long and L₄ divided into 3 branches, 112 µm long. Segments II–VI with 4 pairs of lateral setae: L₁ simple, 40–48 µm long; L₂ divided into 2–3 branches, 56–60 µm long; L₃ simple, 32–44 µm long; L₄ divided into 3–5 branches, 88–109 µm long. Segment VII with 4 pairs of lateral setae, located in posterior half and divided into 5–7 branches, 60–64 µm long. Segment VIII with 4 pairs of lateral setae, located in posterior 1/3 and divided into 3–5 branches, 72–84 µm long. Anal lobe 394 µm long (♂) and 328 µm long (♀), with triangular apical tubercle in apical part, and with 3 anal macrosetae 144–160 µm long and without median setae (Figs. 6, 9). Male genital sac not or only slightly extending beyond anal lobe (Fig. 9).

DIAGNOSIS. Antenna with 13 flagellomeres and well developed plume, AR 1.43–1.45. Anteprenotum with 4–5 median and 4 lateral setae. Acrostichals 16 (in 1 row),



Figs 1–9. Adult male (1–3) and pupa (4–9) of *Pagastia (P.) kadi* sp. n. 1 – hypopygium with tergite IX in dorsal view; 2 – hypopygium without tergite IX in dorsal view; 3 – anal point; 4 – tergite IV; 5 – spinules of posterior edge shagreen of tergite IV; 6 – tergites VII–VIII and anal lobe (♀); 7 – L₄ of segment III; 8 – L₃₋₄ of segment VIII; 9 – tergites VII–VIII and anal lobe (♂).

dorsocentrals 11–12 (in 1–2 rows), prealars 8, scutellars 43 (in 2–3 rows). Tergite IX with 12–15 setae on each side and with parallel-sided and rounded apex anal point, 80 μm long, with pore in apical part. Transverse sternapodeme narrow, arcuate, 232 μm long. Lateral aedeagal lobe 80–88 μm long. Gonocoxite with basal plate and lobe-like median field. Apical part of gonostylus angular-rounded, HR 1.45. Thorax of pupa slightly granulated, with 2 dorsocentral setae. Tergite I without shagreen. Tergite II with easily visible fine shagreen in anterior part and more extensive shagreen of larger spinules along posterior edge. Tergites III–VIII fully covered with shagreen of spinules which become larger near the posterior edge and directed anteriorly. Segment I with 3 pairs of lateral setae, segments II–VIII with 4 pairs of lateral setae, from which L_1 and L_3 of segments II–VI mostly simple while other lateral setae are divided into several branches. Lateral setae of segment VII are located in posterior half, lateral setae of segment VIII are located in posterior 1/3. Anal lobe with triangular apical tubercle in apical part, and with 3 anal macrosetae, without median setae.

The new species is closely related to *Pagastia (P.) orthogonia* Oliver, but differs well from it in the shape of the gonostylus, size of basal lobe of male gonocoxite, and absence of median setae of anal lobe in pupa. The absence of median setae of anal lobe was recorded for pupae of the genus *Pagastia* Oliver for the first time and this character must be included in the diagnosis of genus.



Fig. 10. Locality of *Pagastia (P.) kadi* sp. n. Russia: Khabarovsk Territory, Ulchsky District, Kadi River (Amur River basin).

ECOLOGY. Pupae were collected from large, small and medium pebbles, mixed with detritus, at a flow rate of 0.8–1 m/s, with water temperatures 5.9°C, at a depth of 0.5–1.2 m.

DISTRIBUTION. Known only from the type locality in Kadi River (Fig. 10).

ETYMOLOGY. The species is named as *kadi* after the type locality in Kadi River. The name is a noun in apposition.

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