

New data on clearwing moths (Lepidoptera: Sesiidae)
of the tribe Synanthedonini in Khabarovsk Krai,
with the description of a new species

Новые данные о бабочках-стеклянницах (Lepidoptera: Sesiidae)
трибы Synanthedonini Хабаровского края
с описанием нового вида

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KEY WORDS: Sesiidae, Synanthedoninae, clearwing moths, new species, new findings, Palearctic Region, Russia.
КЛЮЧЕВЫЕ СЛОВА: Sesiidae, Synanthedoninae, новый вид, новые находки, Палеарктика, Россия.

ABSTRACT. *Tipulia shivki* **sp.n.** from the south of Khabarovsk Krai is described and figured. This new species is morphologically very close to *T. tenuis* (Butler, 1878), from which it differs in the colouration of the forewing and abdomen and some details of the male genitalia. The female and the bionomy of the larvae are unknown. *Synanthedon ulmicola* Yang et Wang, 1989, which is recorded for the first time in Khabarovsk Krai, was established to belong to the genus *Paranthrenella* Strand, 1916. This genus is recorded for the first time both in Russia and in the Palearctic region as a whole. *Synanthedon cerskisi* O. Gorbunov, 1994 was recorded in Khabarovsk Krai for the first time. Illustrations of imagines and their genitalia of all these species are presented.

РЕЗЮМЕ. Приведено описание *Tipulia shivki* **sp.n.** с юга Хабаровского края. Этот новый вид морфологически очень близок к *T. tenuis* (Butler, 1878), от которого отличается окраской переднего крыла и брюшка и некоторыми деталями в гениталиях самца. Самка и биология гусениц неизвестны. Установлено, что впервые отмечаемый для Хабаровского края *Synanthedon ulmicola* Yang et Wang, 1989 принадлежит к роду *Paranthrenella* Strand, 1916. Этот род впервые отмечается как для фауны России, так и Палеарктики в целом. *Synanthedon cerskisi* O. Gorbunov,

1994 впервые отмечен для Хабаровского края. Даются иллюстрации имаго и их гениталии.

Introduction

Although a review of the clearwing moths of the Russian Far East has been published [Gorbunov, Tshistjakov, 1995], we believe that at present the fauna of this interesting group of Lepidoptera from an equally interesting faunistically region remains known only fragmentarily. Currently, 29 species from 13 genera are known for the Russian Far East [Gorbunov, 2025c]. Of them, 13 species from eight genera are known for Khabarovsk Krai [Gorbunov, 2025c].

The subfamily Synanthedoninae is the most numerous in the fauna of the Russian Far East, comprising 19 species in five genera. Unfortunately, most of them are currently included in the definitive collective taxon *Synanthedon* Hübner, 1819, from which the genera *Conopia* Hübner, 1819, *Thamnosphesia* Spuler, 1910 and *Tipulia* Králíček et Povolný, 1977 have been successfully and convincingly separated [Gorbunov, 2024b, d, e]. Species of all these genera are present in the fauna under study. In addition, below we describe a new species of the genus *Tipulia*, and after examining the morphology of *Synanthedon ulmicola* Yang et Wang, 1989

in detail, we conclude that this species should be transferred to the genus *Paranthrenella* Strand, 1916. As for the species currently included in the genus *Synanthedon*, there are sufficiently compelling morphological grounds for separation from the genus *Synanthedon* into several taxa at the genus level. However, this publication has somewhat different goals and we leave the species noted below in the genus *Synanthedon*.

As has been noted many times, sex pheromones and sex attractants are playing an increasingly important role in studies of some groups of Lepidoptera, as they allow researchers to discover new species, identify populations of pests or rare species in collections, and monitor and regulate the seasonal flight of some moths [Efetov *et al.*, 2024, 2025, 2026a, b; Efetov, Gorbunov, 2021, 2024; Gorbunov, 2015, 2016, 2017, 2018a–c, 2019a, 2022a–d, 2023, 2025a, b, 2026; Gorbunov, Efetov, 2018, 2024a, b, 2025a, b; Gorbunov *et al.*, 2025a].

This work is a continuation of a series of studies of the fauna of clearwing moths in Russia and adjacent regions conducted by the first author (e.g. Gorbunov *et al.* [2017, 2025b]; Gorbunov [2024c, 2025a, b], etc.), as well as a joint work on the study of the Sesiidae family in the Russian Far East [Gorbunov, Koshkin, 2023].

Material and methods

The specimens were attracted to artificial sex attractants produced by PHEROBANK®, Wijk bij Duurstede, the Netherlands. The morphological examinations were made using a Leica EZ4 stereomicroscope with LED illumination. All images of moths were taken with a Sony α450 DSLR camera equipped with a Minolta 50 mm f/2.8 macro lens. The photographs of the biotope was taken with a Sony SLT-A65 and a Sony DSC-HX60 Digital Cameras. The genitalia were photographed using a Keyence® VHX-1000 Digital Microscope. The processing of all illustrations was finalized using Adobe Photoshop CC software.

All labels of the types are cited verbatim. The labels with geographical data, data on photos and preparation numbers of the genitalia are printed on white paper, but the type label of the holotype is printed on red paper. Each label is separated by a semicolon (“;”) lines in a label are separated by a slash (“/”). All pictures of specimens are provided with a number consisting of letters and digits: the name of the family, two consecutive digits separated by an n-dash and a year following the m-dash (e.g. SESIIDAE pictures Nos 0019–0020–2026). These letters and digit codes correspond to the numbering system of the figured specimens in the first author’s archive. Each preparation of the genitalia is stored in a microtube with glycerol pinned under the specimen. The dissected genitalia are equipped with the corresponding number placed in the microtube. This number as a label (e.g. genitalia preparation No. OG-001–2026) is pinned under the specimen and listed in the first author’s archive.

The material studied or mentioned here is deposited in the following collections, abbreviated in the text as follows: COGM — collection of the A.N. Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences, Moscow, Russia; CBAU — insect collection of Beijing Agricultural University, Beijing, China; CEKK — collection of Evgeny S. Koshkin, Khabarovsk, Russia.

The names of plants were verified with the WFO [2026].

Taxonomic account

Tipulia shivki O. Gorbunov et Koshkin, **sp.n.**

Figs 1–4, 13–16, 25.

MATERIAL. **Holotype** ♂ (Figs 1–2) with labels: “Russia / Khabarovsk Krai, Bikin district / 8 km SE Boitsovo village / upper reaches of Shivki river / scientific station “Shivki” / (IWEP FEB RAS), 165 m / 46°55′06″ N, 134°23′04″ E / 26.07.2023 E.S. Koshkin leg.”; “in trap with pheromone of / *Synanthedon polaris* / (*S. rufibasalis*) / (produced by Pherobank BV, / Netherlands) / time of catch: 18.30–19.00”; “SESIIDAE / Pictures №№ / 0019–0020–2026 / Photo by O.G. Gorbunov”; “HOLOTYPUS ♂ / *Tipulia shivki* / O. Gorbunov et Koshkin, 2026 / O.G. Gorbunov des., 2026” [COGM].

Paratype: 1 ♂ with labels: “Russia / Khabarovsk Krai, Bikin district / 8 km SE Boitsovo village / upper reaches of Shivki river / scientific station “Shivki” / (IWEP FEB RAS), 165 m / 46°55′06″ N, 134°23′04″ E / 26.07.2021 E.S. Koshkin leg.”; “in trap with pheromone of / *Synanthedon polaris* / (*S. rufibasalis*) / (produced by Pherobank BV, / Netherlands) / time of catch: 18.30–19.00”; “SESIIDAE / Pictures №№ / 0021–0022–2026 / Photo by O.G. Gorbunov”; “Genitalia examined / by O.G. Gorbunov / Preparation № / OG-002–2026”; “PARATYPUS ♂ / *Tipulia shivki* / O. Gorbunov et Koshkin, 2026 / O.G. Gorbunov des., 2026” [COGM].

DESCRIPTION. **Male** (holotype) (Figs 1, 2). Alar expanse 18.8 mm; body length 10.2 mm; forewing 8.3 mm; antenna 6.0 mm.

Head: flagellum of antenna black with dark blue-violet sheen; scapus black with bright blue-violet sheen and several yellow scales ventrally; frons black with bright greenish-violet sheen and broad white stripe laterally; vertex black with bright greenish-violet sheen; labial palpus black with greenish-bronze sheen exterior-dorsally and white interior-ventrally; occipital fringe dorsally black with few white and yellow scales, laterally white; neck plate white with black scales with bright blue-violet sheen medially.

Thorax: patagium black with bright greenish sheen; tegula black with bright greenish-violet sheen; mesothorax black with bright greenish-violet sheen; metathorax black with bright greenish-violet sheen and tuft of white hair-like scales posterior-laterally; thorax laterally black with bright violet sheen and large yellow spot medially; posteriorly, both metepimeron and metameron black with greenish sheen, covered with white, long, hair-like scales.

Legs: fore coxa black with bright blue-violet sheen internally and white externally; fore femur black with greenish-violet sheen; fore tibia ventrally yellow, dorsally dark grey-brown with blue sheen and several pale yellow to white scales basally; fore tarsus ventrally pale yellow with golden hue, dorsally dark grey-brown with bronze sheen; mid coxa black with bright violet sheen; mid femur black with bright violet sheen and black, long, hair-like scales at posterior margin; mid tibia black with bright violet sheen and oblique pale yellow to white stripe in basal half externally; spurs white with golden hue and several dark grey-brown scales with bronze sheen externally; mid tarsus ventrally pale yellow with golden hue, dorsally dark grey-brown with bronze sheen and with several white scales with golden hue on basal tarsomere distally; hind coxa black with bright violet sheen; hind femur black with bright violet sheen and black, long, hair-like scales at posterior margin; hind tibia black with bright blue-violet sheen, long oblique pale yellow to white with golden hue stripe internally and small pale yellow to white with golden hue spot both at base of mid spurs and distally; spurs white with golden hue and several

dark grey-brown scales with bronze sheen externally; hind distal tarsomere pale yellow to white with golden hue, remaining tarsomeres ventrally pale yellow to white with golden hue, dorsally black with bright violet sheen and small pale yellow to white spot with golden hue on basal tarsomere distally.

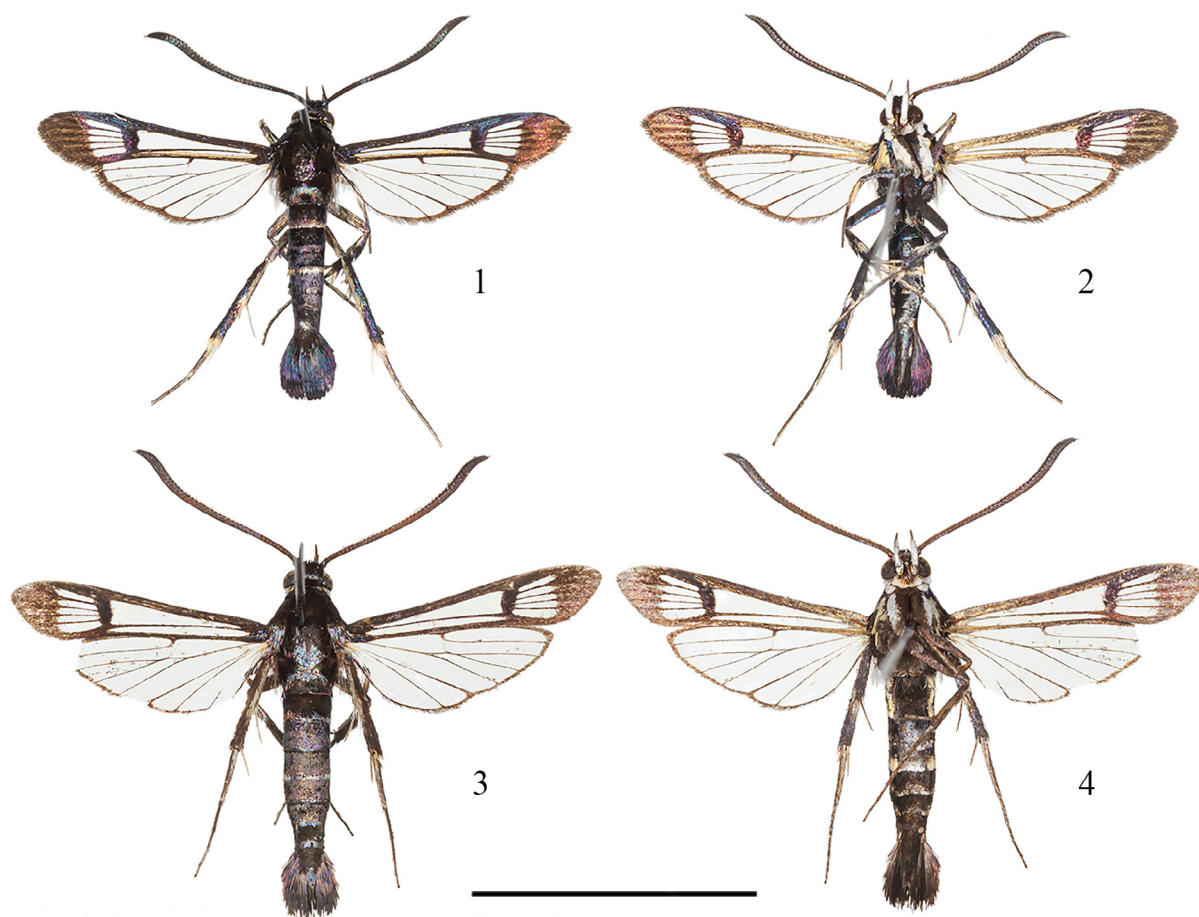
Forewing dorsally costal and anal margins, CuA stem, discal spot and veins within external transparent area black with dark violet sheen; apical area dark brown with bronze sheen and with few separate thin yellow scales between veins R_3 – M_3 ; cilia dark brown with bronze sheen; ventrally costal and anal margins and CuA stem yellow with golden hue and admixture of black scales with bright violet sheen; discal spot, surface between veins R_1 – R_3 and veins within external transparent area black with bright violet sheen; apical area dark brown with bronze sheen and dense admixture of yellow scales with golden hue between veins R_3 – M_3 ; cilia dark brown with bronze sheen; transparent areas well-developed with clear margins: posterior transparent area long, reaching middle of discal spot; external transparent area trapeziform with straight posterior margin, divided into five cells, level to vein M_2 about twice broader than discal spot and about as broad as apical area; discal spot with parallel margins.

Hindwing transparent; dorsally veins and discal spot black with dark violet sheen; outer margin and cilia dark brown with

bronze sheen; ventrally veins, discal spot and outer margin dark brown with bronze sheen; cilia dark brown with bronze sheen, white anally; discal spot short and narrow, reaching base of vein M_2 ; outer margin narrow, about 0.5 times as broad as cilia.

Abdomen dorsally black with dark bronze-violet sheen, tergites 2 and 4 each with narrow yellow stripe distally; ventrally abdomen black with greenish-violet sheen, basal sternite narrowly yellow laterally, sternite 4 with narrow yellow stripe distally, sternite 5 with few yellow scales distally; anal tuft well-developed, black with bright violet sheen.

Male genitalia (paratype, genital preparation № OG-002-2026) (Figs 13–16). Tegumen-uncus complex broad; scopula androconialis well-developed, long, about 0.8 times longer than length of tegumen-uncus complex (Fig. 13); crista gnathi medialis and crista gnathi lateralis rounded-rhomboid, long and nearly identical in size (Fig. 13); valva (Fig. 14) trapeziform-oval, crista sacculi small, oval, situated medioventrally and connected posteriorly with sensory field of setae, covered with thin flat-topped setae; saccus (Fig. 15) narrow, flattened basally, short, about 0.25 times as long as vinculum; aedeagus (Fig. 16) rather thin, slightly bisinuate, with short finger-like projection dorsodistally, about 0.6 times as long as valva; vesica with numerous extremely minute cornuti.



Figs 1–4. *Tipulia shivki* O. Gorbunov et Koshkin, sp.n.: 1–2 — holotype ♂, Sesiidae picture Nos 0019-0020–2026; 3–4 — paratype ♂, Sesiidae picture Nos 0021–0022–2026. 1, 3 — dorsal view; 2, 4 — ventral view. Scale bar: 10 mm.

Рис. 1–4. *Tipulia shivki* O. Gorbunov et Koshkin, sp.n.: 1–2 — голотип ♂, Sesiidae снимки №№ 0019-0020–2026; 3–4 — паратип ♂, Sesiidae снимки №№ 0021–0022–2026. 1, 3 — вид сверху; 2, 4 — вид снизу. Масштаб: 10 мм.

Female. Unknown.

INDIVIDUAL VARIABILITY. The second male (paratype) is not quite fresh, but it is indistinguishable from the holotype in the coloration of various body parts and wings, although it is noticeably larger. Its main dimensions are as follows: alar expanse 21.0 mm; body length 12.2 mm; forewing 9.5 mm; antenna 7.1 mm.

DIFFERENTIAL DIAGNOSIS. As previously noted, almost all species of the genus *Tipulia* are very similar to each other not only superficially, but also in the structure of the genitalia of both males and females [Gorbunov, 2024a].

Superficially, this new species is similar to *T. tenuis* (Butler, 1878) (type locality: Japan, Honshu, Yokohama), but it can be distinguished from the latter by the sheen of the vertex, patagium and tegula (greenish in *T. tenuis*, vs. greenish-violet in the new species), coloration of the apical area of the forewing dorsally (dark brown with bronze-violet sheen and dense admixture of yellow scales with golden hue between veins R_3 – M_3 in *T. tenuis*, vs. dark brown with bronze sheen and with few separate thin yellow scales between veins R_3 – M_3 in *T. shivki* sp.n.; cp. Figs 1 and 3 in this article with figs 1 and 2 in Arita & Gorbunov [1995] or with fig. 151 in Špatenka *et al.* [1999]) and by the coloration of the abdomen dorsally (black with bright greenish sheen, tergites 2, 4 and 6 each with narrow pale yellow stripe distally in *T. tenuis*, vs. black with dark bronze-violet sheen, tergites 2 and 4 each with narrow yellow stripe distally in *T. shivki* sp.n.; cp. Figs 1 and 3 in this article with figs 1 and 2 in Arita & Gorbunov [1995] or with fig. 151 in Špatenka *et al.* [1999]). In addition, the discal spot of the forewing in *T. shivki* sp.n. is relatively large (external transparent area level to vein M_2 about twice broader than discal spot in *T. tenuis*; cp. Figs 1 and 3 in this article with figs 1 and 2 in Arita & Gorbunov [1995]). Besides this, these two species have some differences in the structure of the male genitalia, especially in the shape of the crista sacculi, size of the sensory setae field of the valva and shape and relatively size of the saccus (cp. Figs 13–16 in this paper with figs 6a–6c in Arita & Gorbunov [1995]).

From *T. tipuliformis* (Clerck, 1759) (type locality: not stated [Europe?], which is also distributed in the Far East [Gorbunov, Tshistjakov, 1995; Gorbunov, Efetov, 2025c]), this new species can be distinguished by the coloration of the labial palus (black with bronze-violet sheen exterior-dorsally and yellow interior-ventrally in *T. tipuliformis*, vs. black with greenish-bronze sheen exterior-dorsally and white interior-ventrally in *T. shivki* sp.n.), occipital fringe (yellow with several black scales dorsally in *T. tipuliformis*, vs. dorsally black with few white and yellow scales, laterally white in *T. shivki* sp.n.), tegula (with narrow yellow inner margin in the species compared; cp. Figs 1 and 3 in this article with figs 1 and 3 in Gorbunov & Efetov [2025c]), apical area of the forewing dorsally (with distinct yellow stripes between veins R_3 – CuA_1 in *T. tipuliformis*), and abdomen dorsally (tergites 2, 4, 6 and 7 with narrow yellow stripe distally in the male of the species compared, vs. only tergites 2 and 4 each with narrow yellow stripe distally in the male of the new species).

BIONOMICS. The larval host plant is unknown. The type specimens were collected on July 26, but in different years. They were attracted to lures containing synthetic sex attractant for the European species *Synanthedon polaris* (Staudinger, 1877) or *S. aurivillii* (Lampa, 1883) in the early evening, between approximately 18:30 and 19:00.

HABITAT (Fig. 25). The type series of this new species was collected on a clearing in a mixed coniferous-broadleaf forest between the floodplain of the Shivki River and a base of a hill. The dominated trees and shrubs here are the following: *Juglans mandshurica* Maxim. (Juglandaceae), *Fraxinus mandshurica*

Rupr. (Oleaceae), *Acer tataricum* subsp. *ginnala* (Maxim.) Wesm. (Aceraceae), *Betula davurica* Pall. (Betulaceae), *Quercus mongolica* Fisch. Ex Turcz. (Fagaceae), *Pinus koraiensis* Siebold et Zucc. (Pinaceae), *Viburnum burejaeticum* Regel et Herder (Adoxaceae), and *Rubus crataegifolius* Bunge (Rosaceae). In addition, black currant is widely cultivated at the biological station (*Ribes nigrum* L. (Grassulariaceae)).

DISTRIBUTION. This new species is known from the type locality in Bikin District of Khabarovsk Krai, Russia.

ETHYMOLOGY. The name of this new species comes from the Shivki River, in the upper reaches of which the type series was collected.

Synanthedon cerskisi O. Gorbunov, 1994
Figs 5–8, 17–20, 26.

“*Synanthedon cerskisi* Gorbunov, spec. nov.”: Gorbunov *et al.*, 1994: 307, figs 1–4, col. pl. XIIIb, fig. 1. Type locality: “Russia: Far East, Maritime Prov., Khasan Distr., Gusevskiy Rudnik” [= Russia: Primorskiy Krai, Khasan District, 6 km NW of Zandavorovka, mine “Gusevskiy Rudnik”, 43°20′47″N, 131°33′47″E]. Holotype ♂ [COGM].

LITERATURE. Gorbunov, Tshistjakov, 1995: 12; Špatenka *et al.*, 1996: 5; Gorbunov, Tshistjakov, 1999: 300, figs 10–13; Špatenka *et al.*, 1999: 119 (key), 143, pl. 16, fig. 123, text-fig. 88; Pühringer, Kallies, 2004: 23; Gorbunov, 2008: 111; Tshistjakov, 2016: 215; Gorbunov, 2019b: 159.

A full morphological characterization of this species is provided in the original description (Gorbunov *et al.* [1994]) and is not required here. Here we present only illustrations of the specimens from Khabarovsk Krai, illustrations and a description of the male genitalia, and data on biological features, habitat, and distribution of this species. In addition, we clarify its differential diagnosis.

Male genitalia (genital preparation № OG–003–2026) (Figs 17–20). Tegumen-uncus complex narrow; scopula androconialis well-developed, short, about 0.5 times longer than length of tegumen-uncus complex (Fig. 17); crista gnathi medialis broad and long with numerous wrinkles; crista gnathi lateralis semioval, short, about 0.6 as long as length of crista gnathi medialis (Fig. 17); valva (Fig. 18) trapeziform-oval, crista sacculi long, pocket-shaped, upper margin with row of strong pointed setae cranially and flat-topped caudally; saccus (Fig. 19) slightly broadened subbasally, somewhat bifurcate at base, about twice as long as vinculum; aedeagus (Fig. 20) very thin, about 0.75 times as long as length of valva; vesica with numerous small cornuti. **Female.** Unknown.

DIFFERENTIAL DIAGNOSIS. By the conformation of the male genitalia, *S. cerskisi* forms a well-defined species group together with *S. flaviventris* (Staudinger, 1883) (type locality: Germany, Mecklenburg – Western Pomerania, Friedland). These two species can be distinguished from each other by the coloration of the labial palpus (yellow interior-ventrally in *S. flaviventris*, vs. yellow-orange interior-ventrally in *S. cerskisi*), discal spot of the forewing dorsally (black with dark violet sheen, sometimes with several yellow-orange scales at distal margin in *S. flaviventris*, vs. black with dark violet sheen and with large yellow-orange spot distally in *S. cerskisi*; cp. Figs 1 and 3 in this article with fig. 113 in Špatenka *et al.* [1999]) and abdomen (tergites 2, 4 and 6 with narrow yellow stripe distally in *S. flaviventris*, vs. tergite 2 and 4 with narrow yellow or yellow-orange stripe distally in *S. cerskisi*; cp. Figs 1 and 3 in this article with fig. 113 in Špatenka *et al.* [1999]). In addition, these two species differ very well from each other in the shape and relative size of the external transparent area of the forewing (extremely narrow, usually cell between veins R_3 – R_4 longer than others, level to vein M_2 about as broad as discal spot and about 0.5 times as broad as apical area in *S. flaviventris*, vs. cells of approximately same length, level to

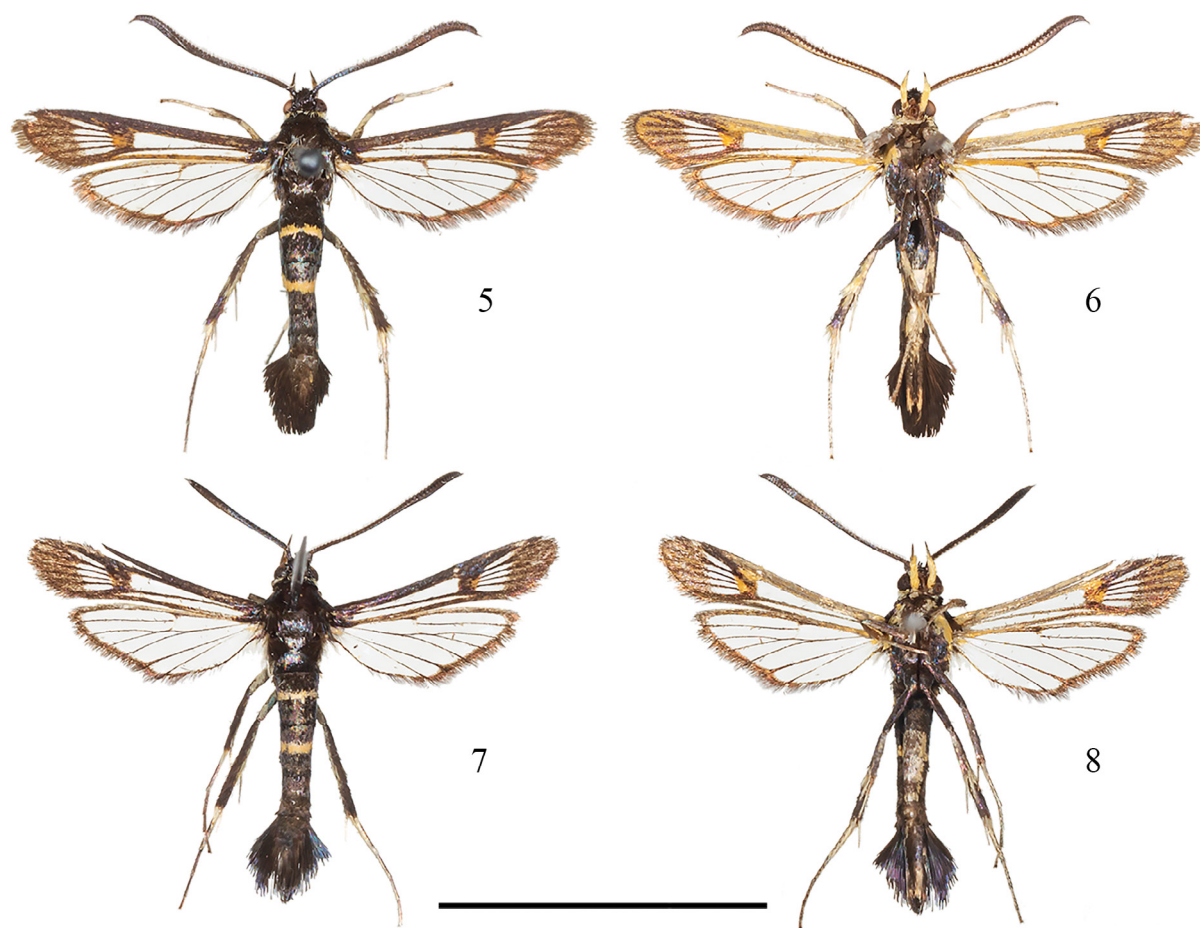
vein M_2 about twice as broad as discal spot and about as broad as apical area in *S. cerskisi*; cp. Figs 1 and 3 in this article with fig. 113 in Špatenka *et al.* [1999]).

From *S. martjanovi* Sheljuzhko, 1919 (type locality: Russia, Krasnoyarsk Krai, Minusinsk), which is also distributed in the Far East [Gorbunov, Tshistjakov, 1995; Špatenka *et al.*, 1999], *S. cerskisi* can be distinguished by the colouration of the labial palpus (white interior-ventrally in *S. martjanovi*, vs. yellow-orange interior-ventrally in *S. cerskisi*), forewing dorsally (discal spot black with dark violet sheen; apical area yellow between veins *S. martjanovi*, vs. black with dark violet sheen and with large yellow-orange spot distally in *S. cerskisi*; cp. Figs 1 and 3 in this article with fig. 127 in Špatenka *et al.* [1999]) and abdomen dorsally (tergites 2 and 4 with narrow lemon-yellow stripe distally in *S. martjanovi*, vs. tergite 2 and 4 with narrow yellow or yellow-orange stripe distally in *S. cerskisi*; cp. Figs 1 and 3 in this article with fig. 127 in Špatenka *et al.* [1999] or with figs 1 and 2 in Onodera *et al.* [2016]). Besides this, these two species differ very well in the structure of the male genitalia, as they belong to different species groups (compare Figs 17–20 in this article with text-fig. 91 in Špatenka *et al.* [1999]).

BIONOMICS. The larval host plants are unknown. All known specimens, including the type series, were collected using artificial sex pheromones. As noted in the original description [Gorbunov *et al.*, 1994], a total of 65 males were trapped in sticky traps. 13 males were collected with butterfly-net at the trap with the most efficient attractant. Only those specimens have been used for the description and considered as types. All specimens were attracted to baits containing mixtures with the common component Z2,Z13-18:OAc, although the chemical alone was not attractive. Most of the males (61) were captured in traps baited with a mixture of E2,Z13-18:OAc and Z3,Z13-18:OAc in a ratio of 9:1. Only three males were attracted by the same mixture in a ratio of 1:1, and one male was trapped with E2,Z13-18:OAc and Z2,Z13-18:OAc in a ratio of 1:9.

The specimen from Khabarovsk Krai was attracted to the artificial sex pheromone specific to European populations of *Synanthedon flaviventris* (Staudinger, 1883) in the afternoon, between approximately 14:00 and 16:00.

HABITAT (Figs 25, 26). A clearing in a mixed coniferous-broadleaf forest with the following dominated trees and shrubs: *Juglans mandshurica* Maxim. (Juglandaceae), *Fraxinus mandsh-*



Figs 5–8. *Synanthedon cerskisi* O. Gorbunov, 1994: 5–6 — paratype ♂, Russia: Primorskiy Krai, Khasan District, 6 km NW of Zanadvorovka, mine “Gusevskiy Rudnik”, 43°20′47″N, 131°33′47″E, J. Miatleuski leg., Sesiidae pictures Nos 0023–0024–2026 [COGM]; 7–8 — Sesiidae pictures Nos 0025–0026–2026. 5, 7 — dorsal view; 6, 8 — ventral view. Scale bar: 10 mm.

Рис. 5–8. *Synanthedon cerskisi* O. Gorbunov, 1994: 5–6 — паратип ♂, Россия: Приморский край, Хасанский район, 6 км СЗ Занадворовки, “Гусевский рудник”, 43°20′47″ с.ш., 131°33′47″ в.д., Я. Миятлеуски leg., Sesiidae снимки №№ 0023–0024–2026 [COGM]; 7–8 — Sesiidae снимки №№ 0025–0026–2026. 5, 7 — вид сверху; 6, 8 — вид снизу. Масштаб: 10 мм.

urica Rupr. (Oleaceae), *Acer tataricum* subsp. *ginnala* (Maxim.) Wesm. (Aceraceae), *Betula davurica* Pall. (Betulaceae), *Quercus mongolica* Fisch. ex Turcz. (Fagaceae), *Pinus koraiensis* Siebold et Zucc. (Pinaceae), *Viburnum burejaeticum* Regel et Herder (Adoxaceae), and *Rubus crataegifolius* Bunge (Rosaceae).

DISTRIBUTION. Currently, this species is known only from the type locality in the Khasan District of Primorskiy Krai and in the vicinity of Bikin in Khabarovsk Krai, Russia. This species is reported for the Khabarovsk Krai for the first time.

MATERIAL EXAMINED. Russia: Khabarovsk Krai, Bikin Distr., 8 km SE Boitsovo, upper reaches of Shivki river, "Shivki" scientific station, 46°55'4.55"N, 134°23'2.97"E, h = 165 m, 3.VII.2021, 2 ♂, E.S. Koshkin leg. (Sesiidae pictures №№ 0025–0026-2026) (genitalia preparation № OG-003-2026) [CEKK, COGM].

Paranthrenella Strand, 1916

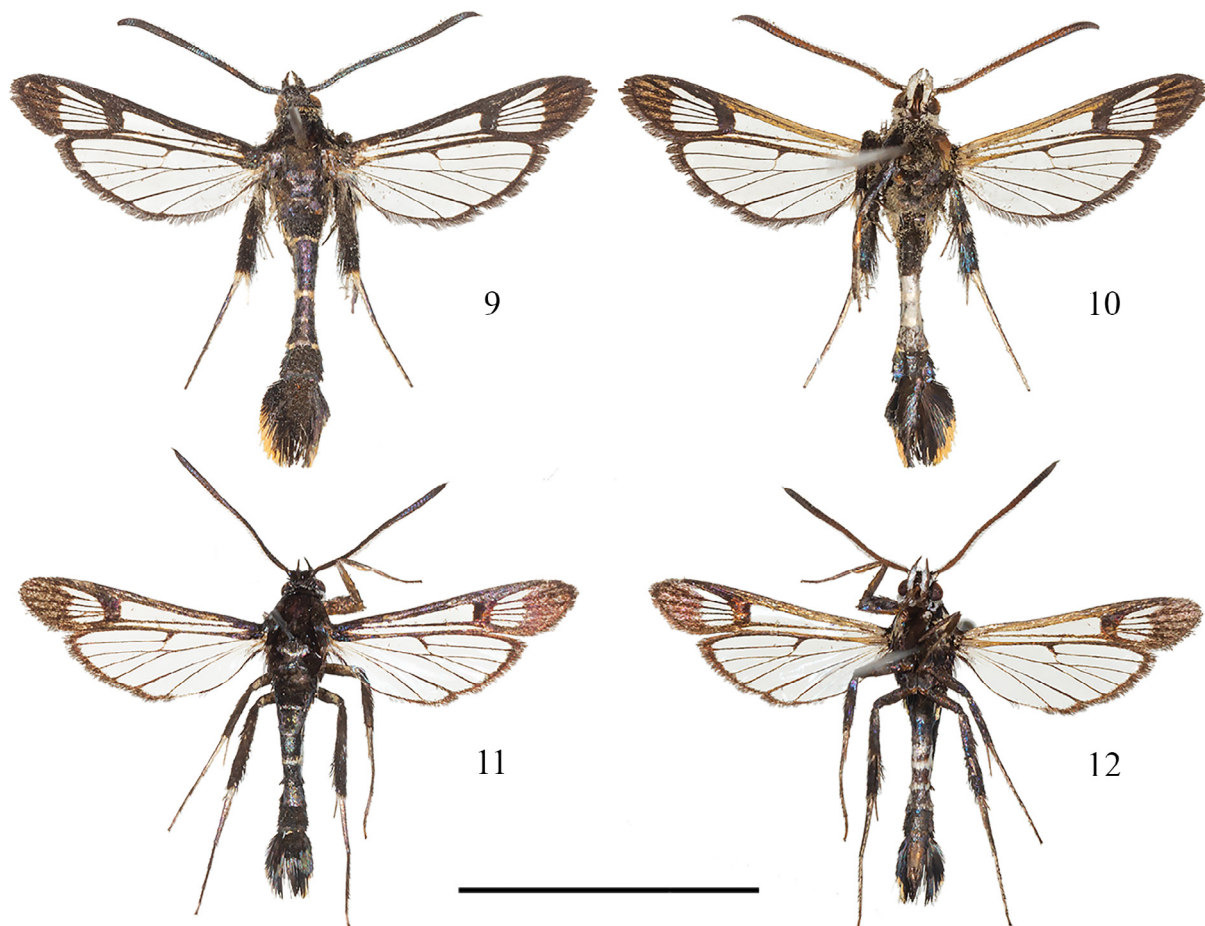
"*Paranthrene* (*Paranthrenella*)... Strand n. sp.": Strand, 1916: 47. Type species: *Paranthrene* (*Paranthrenella*) *formosicola* Strand, 1916, by monotypy.

LITERATURE. Dalla Torre, Strand, 1925: 154 (as a subgenus of *Paranthrene* Hübner, 1819); Fletcher, 1929: 163 (as a

synonym of *Paranthrene* Hübner, 1819); Gaede, 1933: 796 (as possibly a distinct genus); Naumann, 1971: 22 (as a subgenus of *Paranthrene* Hübner, 1819); Heppner, Duckworth, 1981: 23 (as a synonym of *Paranthrene* Hübner, 1819); Fletcher, Nye, 1982: 119 (as a subgenus of *Paranthrene* Hübner, 1819); Arita, 1982: 97 (as a synonym of *Paranthrene* Hübner, 1819); Arita, Gorbunov, 1998: 151 (as a distinct genus); Pühringer, Kallies, 2004: 30.

The taxon *Paranthrenella* was formally described as a subgenus of the genus *Paranthrene*, although the author noted, "Will man deswegen eine generische Trennung vornehmen, so könnte die durch unsere neue Art vertretene Gattung den Namen *Paranthrenella* m. bekommen [If one wants to make a generic distinction, the genus represented by our new species could be given the name *Paranthrenella* m.]" [Strand, 1916: 47]. For a long time, *Paranthrenella* was listed either as a subgenus of the genus *Paranthrene* or as its synonym, but after revision of its type species it became obvious that this taxon represents a morphologically well-defined distinct genus in the tribe Synanthedonini [Arita, Gorbunov, 1998].

Paranthrenella is very clearly distinguished from all *Synanthedon*-like genera of the tribe by a combination of characters, the main ones being the metepimeron and metameron are



Figs 9–12. *Paranthrenella ulmicola* (Yang et Wang, 1989), **comb.n.:** 9–10 — Sesiidae pictures Nos 0027–0028-2026; 11–12 — Sesiidae pictures Nos 0033–0034-2026. 9, 11 — dorsal view; 10, 12 — ventral view. Scale bar: 10 mm.

Рис. 9–12. *Paranthrenella ulmicola* (Yang et Wang, 1989), **comb.n.:** 9–10 — Sesiidae снимки №№ 0027–0028-2026; 11–12 — Sesiidae снимки №№ 0033–0034-2026. 9, 11 — вид сверху; 10, 12 — вид снизу. Масштаб: 10 мм.

smooth-scaled without any hair-like scales, the presence of a small transverse crista with flat, wide scales in the distal part of the crista sacculi in the male genitalia, and the well-sclerotized tubular long antrum in the female genitalia.

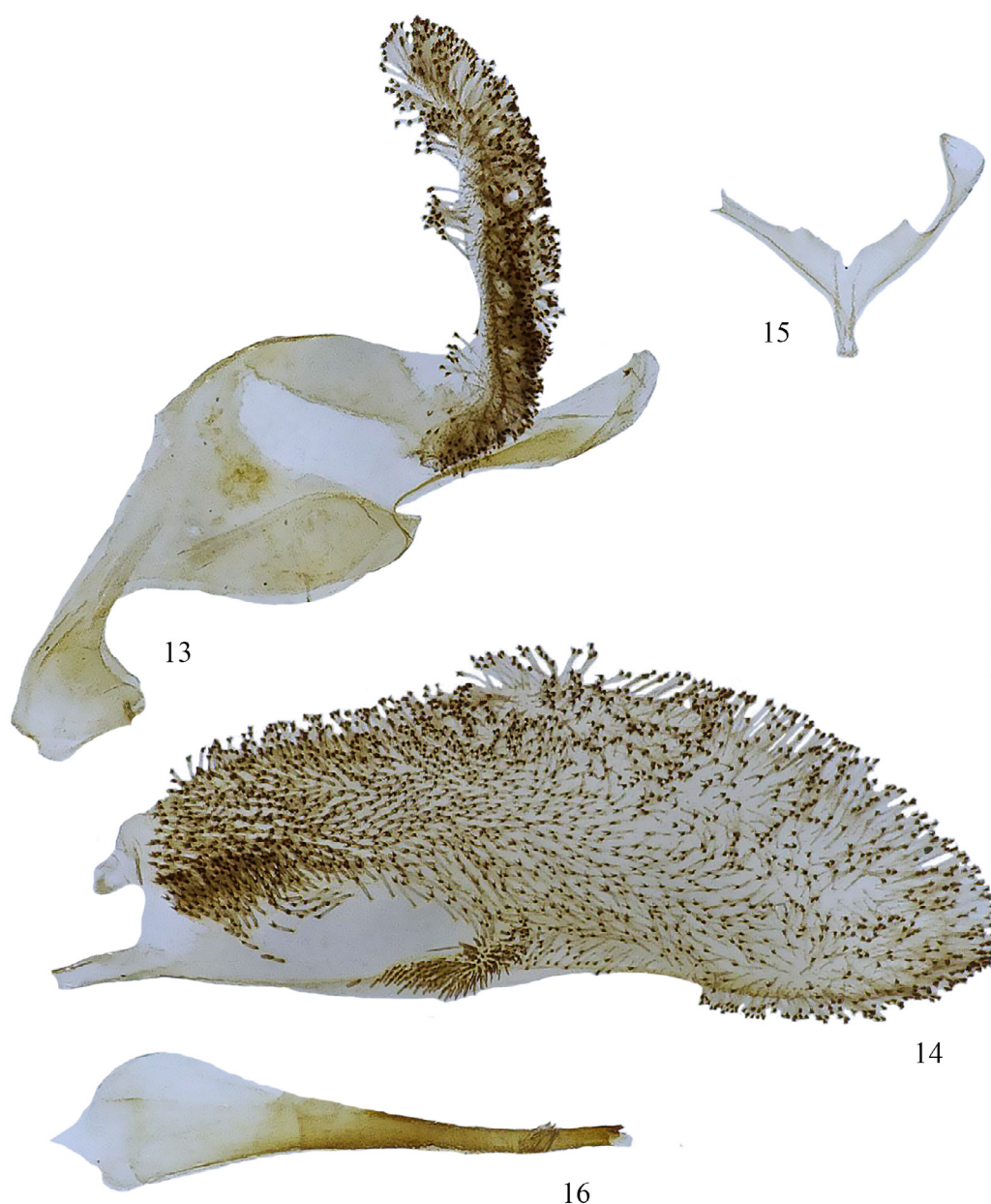
The genus currently comprises up to two dozen species distributed across the Oriental and Australian regions [Gorbunov, Arita, 1999, 2000; Liang, Hsu, 2015, 2019; Kallies, 2020; Gorbunov, 2024a]. The taxonomic position of the recently described *Paranthrenella pinoakula* Kim, 2024 from South Korea is not entirely clear due to the very poor quality of the illustrations, but it is clear that this species does not belong to the genus in question [Kim *et al.*, 2024]. Thus, the transfer of *Synanthedon*

ulmicola Yang et Wang, 1989 to the genus *Paranthrenella* significantly expands the range of the genus northwardly and marks its first occurrence in the Palearctic region.

Paranthrenella ulmicola (Yang et Wang, 1989),
comb.n.

Figs 9–12, 21–24, 26.

“*Synanthedon ulmicola* Yang et Wang, 新种 [species nov.]”: Yang, Wang, 1989: 136, figs 4A–D. Type locality: “Ningxia: Yinchuan, ...” [= China: Ningxia Hui Autonomous Region, Yinchuan]. Holotype ♂ [CBAU].



Figs. 13–16. Male genitalia of *Tipulia shivki* O. Gorbunov et Koshkin, **sp.n.** Paratype. Genital preparation No. OG-002-2026: 13 — tegument-uncus complex; 14 — valva; 15 — saccus; 16 — aedeagus. Scale bar: 0.5 mm.

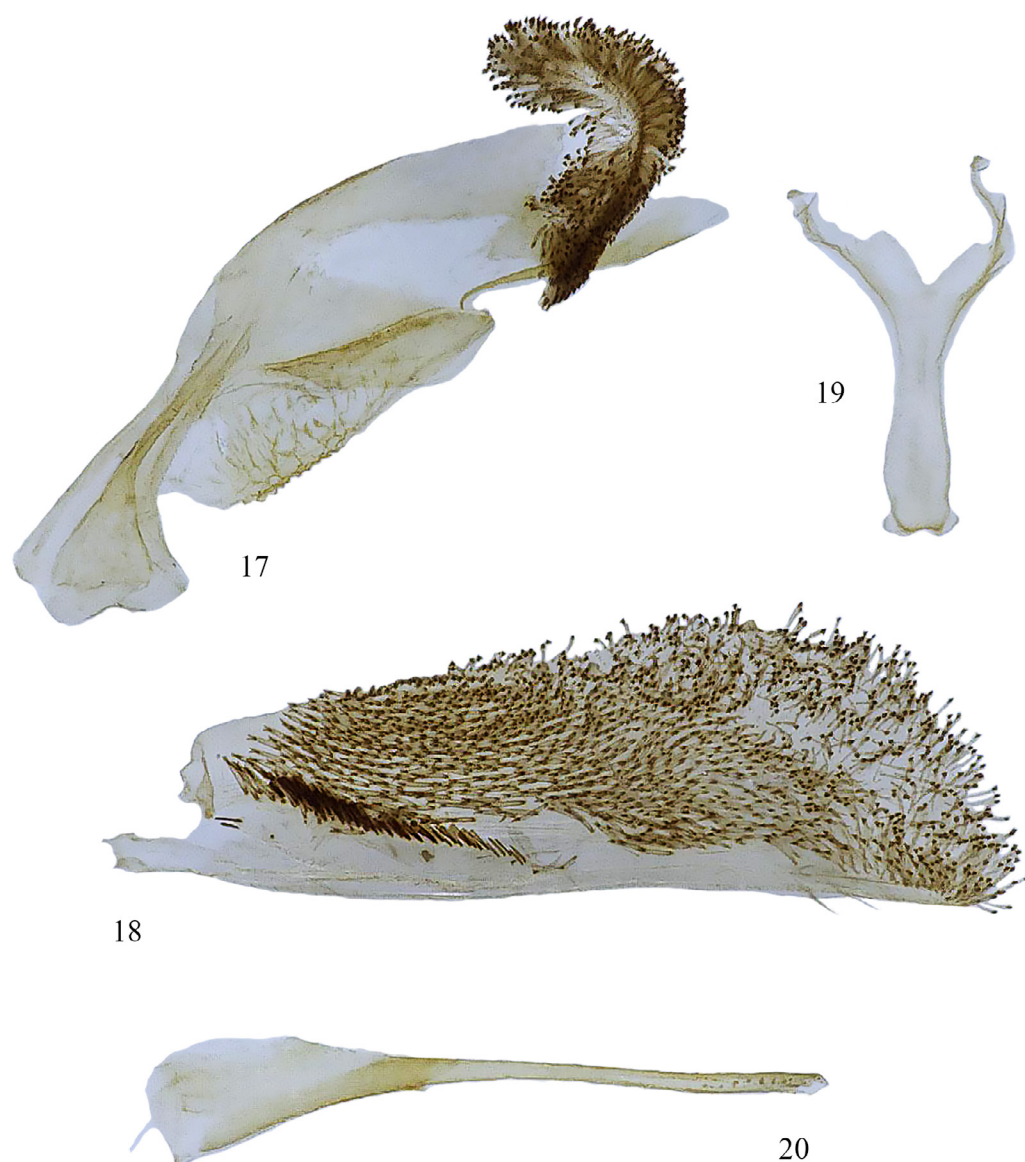
Рис. 13–16. Гениталии самца *Tipulia shivki* O. Gorbunov et Koshkin, **sp.n.** Паратип. Препарат гениталий № OG-002-2026: 13 — тегумент-ункусный комплекс; 14 — вальва; 15 — саккус; 16 — эдеагус. Масштаб: 0,5 мм.

LITERATURE. Špatenka *et al.*, 1993: 96 (*Synanthedon*); Gorbunov *et al.*, 1994: 308, col. pl. XIIIb, fig. 3 (*Synanthedon*); Gorbunov, Tshistjakov, 1995: 12 (*Synanthedon*); Špatenka *et al.*, 1996: 7 (*Synanthedon*); Gorbunov, Tshistjakov, 1999: 302 (*Synanthedon*); Špatenka *et al.*, 1999: 157 (*Synanthedon*); Arita *et al.*, 2004: 8, figs 22–24 (*Synanthedon*); Pühringer, Kallies, 2004: 25 (*Synanthedon*); Jin *et al.*, 2008: 509 (*Synanthedon*); Gorbunov, 2008: 111 (*Synanthedon*); Tshistjakov, 2016: 215 (*Synanthedon*); Xu *et al.*, 2019: 102 (*Synanthedon*); Gorbunov, 2019b: 159 (*Synanthedon*); Arita *et al.*, 2021: 315, figs 34–43, 83, 100, 113 (*Synanthedon*).

REDESCRIPTION. **Male** (Figs 9, 10). Alar expanse 19.5 mm; body length 12.7 mm; forewing 8.9 mm; antenna 6.4 mm.

Head: flagellum of antenna black with dark greenish sheen; scapus black with greenish sheen dorsally and yellow ventrally; frons dark brown with bright violet sheen and white stripe laterally; vertex black with bright greenish-violet sheen; labial palpus black with greenish-blue sheen exterior-dorsally and white interior-ventrally; occipital fringe dorsally black mixed with yellow scales, laterally white; neck plate black with bright greenish-violet sheen and several silvery-white scales exterior-basally.

Thorax: patagium, tegula, meso- and metathorax black with violet sheen; metathorax with tuft of white hair-like scales posterior-laterally; thorax laterally black with bright violet sheen and large yellow spot anteriorly; posteriorly, both metepimeron and metameron smooth-scaled, black with violet sheen and few silvery white scales ventrally.

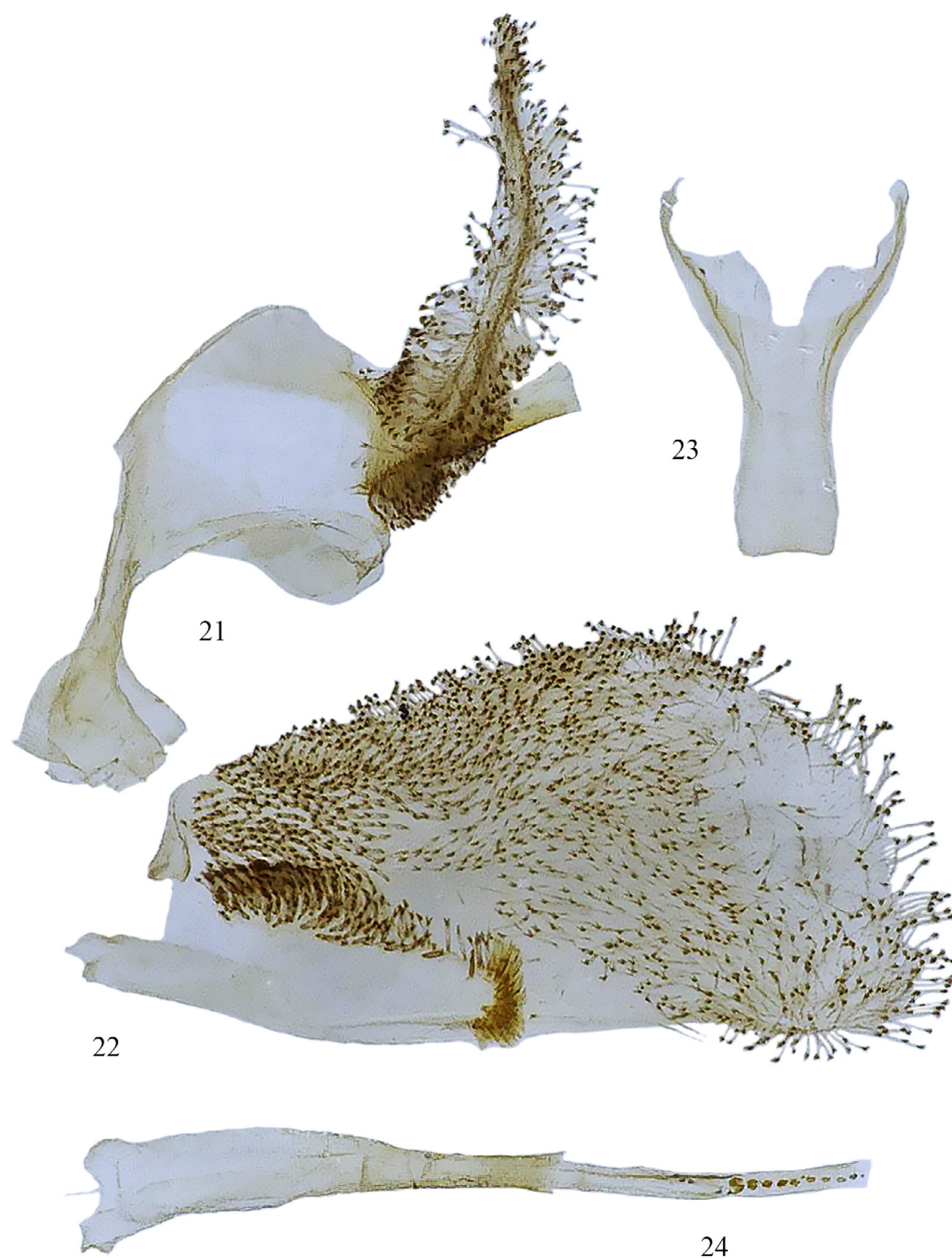


Figs. 17–20. Male genitalia of *Synanthedon cerskisi* O. Gorbunov, 1994. Genital preparation No. OG-003-2026: 17 — tegument-uncus complex; 18 — valva; 19 — saccus; 20 — aedeagus. Scale bar: 0.5 mm.

Рис. 17–20. Гениталии самца *Synanthedon cerskisi* O. Gorbunov, 1994. Препарат гениталий № OG-003-2026: 17 — тегумен-ункусный комплекс; 18 — вальва; 19 — саккус; 20 — эдегус. Масштаб: 0,5 мм.

Legs: fore coxa black with violet sheen and few white scales interior-basally; fore femur black with violet sheen and few white scales interior-distally; fore tibia yellow ventrally and black with violet sheen dorsally; fore tarsus dark grey-brown with bronze sheen, slightly lighter ventrally; mid coxa black with bright violet sheen; mid femur black with bright violet sheen; mid tibia black with bright violet sheen and small spot

of elongated white scales both exterior-medially and dorso-distally; spurs white with golden hue; mid tarsus ventrally white with golden hue, dorsally dark grey-brown with bronze-violet sheen and with several white scales with golden hue on basal tarsomere basally; hind coxa black with bright violet sheen; hind femur black with bright violet sheen; hind tibia black with bright violet sheen and small spot of elongated white scales both at



Figs. 21–24. Male genitalia of *Paranthrenella ulmicola* (Yang et Wang, 1989), **comb.n.** Genital preparation No. OG-004-2026: 21 — tegument-uncus complex; 22 — valva; 23 — saccus; 24 — aedeagus. Scale bar: 0.5 mm.

Рис. 21–24. Гениталии самца *Paranthrenella ulmicola* (Yang et Wang, 1989), **comb.n.** Препарат гениталий № OG-004-2026: 21 — тегумент-ункусный комплекс; 22 — вальва; 23 — саккус; 24 — эдеагус. Масштаб: 0,5 мм.



Fig. 25. Habitat of *Tipulia shivki* O. Gorbunov et Koshkin, **sp.n.**: Russia, Khabarovsk Krai, Bikin district, 8 km SE Boitsovo village, scientific station "Shivki" (IWEP FEB RAS), 165 m, 46°55' N, 134°23' E, 18.05.2022.

Рис. 25. Биотоп *Tipulia shivki* О. Горбунов и Коскин, **sp.n.**: Россия: Хабаровский край, Бикинский район, 8 км ЮВ Бойцово, научная станция "Шивки" (ИВЭП ДВО РАН), 165 м, 46°55' с.ш., 134°23' в.д., 18.05.2022.

base of mid spurs externally and dorso-distally; spurs white with golden hue; mid tarsus ventrally white with golden hue, dorsally dark grey-brown with bronze-violet sheen.

Forewing dorsally at base black with bright violet sheen; costal and anal margins, CuA stem and veins distally if discal spot black with dark violet sheen; discal spot black with dark bronze-violet sheen; apical area between veins dark brown to black with dark bronze-violet sheen; cilia dark brown to black with dark bronze sheen; ventrally costal margin up to mid of discal spot yellow with golden hue; CuA stem and anal margin yellow with golden hue and admixture of black scales with dark violet sheen distally; discal spot, surface between veins R_1 – R_3 and veins distally of discal spot black with dark violet sheen; apical area between veins dark brown with bronze-violet sheen and dense admixture of yellow scales with golden hue between veins R_3 – M_3 ; cilia dark brown to black with dark bronze sheen; transparent areas well-developed with clear margins: posterior transparent area long, reaching distal margin of discal spot; external transparent area trapeziform, divided into five cells, level to vein M_2 about 2.5 times broader than discal spot and 1.5 times as broad as apical area; discal spot with nearly parallel margins.

Hindwing transparent; veins, discal spot and outer margin black with dark violet sheen; ventrally common CuA stem

with admixture of yellow scales; cilia dark brown to black with dark bronze sheen, white anally; discal spot short and narrow, reaching base of vein M_2 ; outer margin narrow, about 0.5 times as broad as cilia.

Abdomen tapered noticeably from base to segment 4 and then widened to segment 6; dorsally black with dark violet sheen; tergites 2 and 4 each with narrow yellow stripe distally; tergite 6 with black and yellow scales at distal margin; ventrally black with greenish sheen; basal sternite narrowly yellow laterally; sternites 4 and 5 white; sternite 6 with admixture of white scales; anal tuft well-developed, in shape of blunt spear, black with dark violet sheen dorsally and blue sheen ventrally and with yellow-orange lateral margins.

Male genitalia (genital preparation № OG-004-2026) (Figs 21–24). Tegumen-uncus complex broad; scopula androconialis well-developed, about as long as length of tegumen-uncus complex (Fig. 21); crista gnathi medialis semioval, small and low, about 0.5 times as long as crista gnathi lateralis, crista gnathi lateralis semi-cordiform, long (Fig. 21); valva (Fig. 22) trapeziform-oval, crista sacculi form of low swelling, distal part of which directed towards ventral edge and covered with wide, flat setae, which form separate transverse crista; saccus (Fig. 23) broad, slightly bifurcated basally, short, about as long as vinculum; aedeagus (Fig. 24) rather thin, slightly bisinuate,

about as long as length of valva; vesica with numerous rows of minute cornuti.

Female. Unknown for us.

INDIVIDUAL VARIABILITY. Slightly variable in the number of yellow and white scales on the abdomen. The main dimensions of the studied specimens remain virtually unchanged.

DIFFERENTIAL DIAGNOSIS. First of all, this species may be very clearly distinguished from all species of the genera *Synanthedon* Hübner, 1819, *Conopia* Hübner, 1819, *Thamnosphexia* Spuler, 1910 and *Tipulia* Králíček et Povolný, 1977, by the absence of hair-like scales on the posterior margin of all femora and the metepimeron and metameron of the abdomen. Surprisingly, this species is very similar in the appearance to the western Palearctic *Synanthedon andrenaeformis* (Laspeyres, 1801) (type locality: Hungary) (cp. Figs 9 and 11 in this article with fig. 118 in Špatenka *et al.* [1999]), but they are not related and belong to different genera. This species is easily distinguished from all its relatives in the Oriental and Australian regions by its very characteristic appearance (cp. Figs 9–12 in this article with corresponding figs in Gorbunov, Arita, 1999, 2000; Liang, Hsu, 2015, 2019; Kallies, 2020; Gorbunov, 2024a).

BIONOMICS. Larvae live under the bark in trunks and large branches of elm trees (Ulmaceae). In China, they were found in *Ulmus pumila* L., and in Korea in *U. davidiana* var. *japonica* (Rehder) Nakai and *Hemiptelea davidii* (Hance) Planch. The host plant of the larvae in Russia is unknown, but may be any species of the genus *Ulmus*, of which four species grow in the Russian Far East [Czerepanov, 1995].

The specimens from Khabarovsk Krai were attracted to the artificial sex pheromone specific to European populations of *Pennisetia hylaeiformis* (Laspeyres, 1801) in the afternoon, between approximately 14:00 and 15:00.

HABITAT (Figs 25, 26). A clearing in a mixed coniferous-broadleaf forest with the following dominated trees and shrubs: *Juglans mandshurica* Maxim. (Juglandaceae), *Fraxinus mandshurica* Rupr. (Oleaceae), *Acer tataricum* subsp. *ginnala* (Maxim.) Wesm. (Aceraceae), *Betula davurica* Pall. (Betulaceae), *Quercus mongolica* Fisch. Ex Turcz. (Fagaceae), *Pinus koraiensis* Siebold et Zucc. (Pinaceae), *Viburnum burejaticum* Regel et Herder (Adoxaceae), and *Rubus crataegifolius* Bunge (Rosaceae).

DISTRIBUTION. Currently, this species is known from Ningxia and Liaoning provinces in China, Gyeonggi-do and Chungcheongbuk-do provinces in Korea, Spassk district of Primorsky Krai, and Bikin and Khabarovsk districts of Khabarovsk Krai in Russia. This species is reported for the Khabarovsk Krai for the first time.

MATERIAL EXAMINED. Russia: Khabarovsk Krai, Bychikha, 48°18'N, 134°49'E, 22.VII.2006, 1 ♂, O.G. Gorbunov & A.V. Kartashova leg. (Sesiidae pictures №№ 0029–0030–2026) (genitalia preparation № OG-001–2026) [COGM]; Khabarovsk Krai, Kazakevichevo, 48°17'N, 134°46'E, 26.VII.2006, 1 ♂, O.G. Gorbunov & A.V. Kartashova leg. (Sesiidae pictures №№ 0027–0028–2026) [COGM]; Khabarovsk Krai, Bikin Distr., 8 km SE Boitsovo, upper reaches of Shivki river, “Shivki” scientific station, 46°55'06"N, 134°23'04"E, h = 165 m, 4.VIII.2024, 2 ♂, E.S. Koshkin leg. (Sesi-



Fig. 26. Habitat of *Synanthedon cerskisi* O. Gorbunov, 1994, and *Paranthrenella ulmicola* (Yang et Wang, 1989), **comb.n.:** Russia, Khabarovsk Krai, Bikin district, 8 km SE Boitsovo village, scientific station “Shivki” (IWEP FEB RAS), 165 m, 46°55' N, 134°23' E, 20.05.2021.

Рис. 26. Биотоп *Synanthedon cerskisi* O. Gorbunov, 1994 и *Paranthrenella ulmicola* (Yang et Wang, 1989), **comb.n.:** Россия: Хабаровский край, Бикинский район, 8 км ЮВ Бойцово, научная станция “Шивки” (ИВЭП ДВО РАН), 165 м, 46°55' с.ш., 134°23' в.д., 20.05.2021.

dae pictures №№ 0033–0034-2026) (genitalia preparation № OG-004-2026) [CEKK, COGM].

Compliance with ethical standards

CONFLICT OF INTEREST: The authors declare that they have no conflict of interest.

Ethical approval: No ethical issues were raised during our research.

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Field studies in the Shivki river basin were conducted using the research infrastructure of the Shivki Research Station, operated by the Institute of Water and Ecology Problems, Far Eastern Branch of the Russian Academy of Sciences (a division of the Khabarovsk Federal Research Center, FEB RAS).

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