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Article

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Bembecia turanica (Erschoff, 1874) (Lepidoptera: Sesiidae) – a new species of clearwing moths for the fauna of Russia

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Abstract
The description and illustrations of *Bembecia turanica* (Erschoff, 1874) are given. In order to stabilize the species epithet, fix the taxonomic status and the type locality of this least studied species of clearwing moths (Lepidoptera, Sesiidae) of the Palearctic, the neotype is designated herein. A detailed analysis of the external morphology, as well as the structure of the male genitalia, showed that this species is very close to *B pallasi* O. Gorbunov, 2020, but differs from it quite clearly in the colouration of some body parts and the structure of the transparent areas of the forewing. In addition, these two species have slight differences in the structure of the male genitalia. It has been shown that *B. lavrovi* Knyazev, 2025, recently described from the Omsk Region of Russia, is a junior subjective synonym of *B. turanica*: *B. lavrovi* Knyazev, 2025, **syn. n.** This synonymization points out that *B. turanica* is recorded for the first time for the Sesiidae fauna of Russia.

Key words clearwing moths, Palearctic realm, Synanthedonini, *Bembecia turanica*, neotype, systematics, taxonomy, new record.

Introduction

The Palaearctic genus *Bembecia* Hübner, 1819 is one of the largest sesiid genus of the tribe Synanthedonini. *Bembecia* currently consists of more than one hundred species (Pühringer & Kallies 2004; Gorbunov *et al*. 2017; Gorbunov & Efetov 2018; Gorbunov 2019b, 2020, 2023a–b, 2024, 2025, in press). The majority of this number is in the Western Palearctic, including its southern parts. But, for example in Russia, which occupies a significant part of the Palaearctic, only 19 species of this genus are currently known (Herz 1903; Kozhantschikov 1936; Gorbunov 1994, 2008, 2018a, 2019a–b, 2020, 2024; Gorbunov & Tschistjakov 1995, 1999; Gorbunov & Arita 1995; Efetov *et al*. 2012; Gorbunov & Efetov 2016, 2018; Špatenka *et al*. 1999; Karalius *et al*. 2000). It is obvious that the territory of Russia has been studied very poorly and we should expect to find species that have not yet been described. In addition, it is very likely that some species will be found that are known from adjacent territories. Proof

of the correctness of these words is the discovery of the Central Asian species *Bembecia turanica* (Erschoff, 1874) in Southern Siberia presented below.

Bembecia turanica was described as a variety of *Sphinx chrysidiformis* Esper, 1782 from two specimens of indeterminate sex (Erschoff 1874a: 26–27). One of these specimens was collected by A.B. Golike in May in the city of Turkestan (now: Turkistan, Turkistan region, South Kazakhstan), and the second one was taken by A.P. Fedchenko's expedition "on June 3 between Iori and Pyandzhikent" (op. cit.: 26) (now: vicinity of Panjakent, Sughd province, Tajikistsn).

During the preparation of the monograph on the Palaearctic Sesiidae (Špatenka *et al*. 1999) we examined various museums in Europe and Japan in order to find and fix nomenclatural types (Špatenka & Laštůvka 1988, 1990; Arita 1991; Gorbunov 1992a–b; Špatenka 1992). As is known, all entomological collections made by A.P. Fedchenko's expedition in Turkestan were transferred to the collections of the Zoological Museum of Moscow University and the Zoological Museum in St. Petersburg (now the Zoological Institute of the Russian Academy of Sciences). Both of these collections were carefully worked through and a female collected in May in the city of Turkestan was found in the collection of the Zoological Institute. The second specimen indicated in the original description was not found, which led to the erroneous designation of the found female as the holotype (Gorbunov 1992b: 70), but according to article 73.2 of the ICZN (ICZN 1999) both of these specimens are syntypes.

In the monograph on the Palaearctic Sesiidae, a lectotype male was designated with the type locality "Uzbekistan [sic!], Pyandzhikend" and deposited in the collection of the Zoological Institute in St. Petersburg (Špatenka *et al*. 1999: 206). Accordingly, the second specimen listed in the original publication automatically becomes the paralectotype. The first author of this paper was against this nomenclature act, but the editor-in-chief C.M. Naumann insisted on its establishment. Unfortunately, this specimen (lectotype) was never found in any collection, including the Zoological Institute of the Russian Academy of Sciences and the Zoological Museum of Moscow State University, and therefore it should be considered irretrievably lost. In order to stabilize the species epithet, fix the taxonomic status and the type locality of this least studied species of clearwing moths of the Palaearctic, the paralectotype female is designated here as the neotype in full compliance with the requirements of Article 75 of the International Code of Zoological Nomenclature (ICZN 1999).

Quite recently, *Bembecia lavrovi* Knyazev, 2025, was described from the south of the Omsk Region of Russia. A fairly complete morphological description, as well as a relatively high-quality image of a female of this species (Knyazev 2025) indicate that the details of the colouration of the head and abdomen, as well as the colouration and structure of the transparent areas of the forewing in *B. lavrovi*, are almost completely identical to those in the neotype *B. turanica* (cp. Figs 1–2 in this article with figs 7–8 in Knyazev 2025). This fact indicates the conspecificity of these two taxa, and *Bembecia lavrovi* Knyazev, 2025, is established herein as a junior subjective synonym of *Bembecia turanica* (Erschoff, 1874): *Bembecia lavrovi* Knyazev, 2025, **syn. n.** This synonymization points out that *B. turanica* is recorded for the first time for the clearwing moth fauna of Russia.

Material end methods

The morphological examinations were made using a Leica® EZ4 stereomicroscope with LED illumination. All images of the moths were taken with a Sony® Alpha DSLR A-450 camera equipped with a Minolta® 50 mm f/2.8 Macro lens. The genitalia were photographed using a Keyence BZ-9000 Biorevo fluorescence microscope. Processing of all illustrations was finalized using Adobe® Photoshop® CC 2020 software.

All labels of the neotype are cited verbatim. All pictures of specimens are labelled with a number consisting of letters and digits: name of the family, two consecutive digits separated by an n-dash and a year following the m-dash (e.g. SESIIDAE pictures №№ 0001-0002–2025). These letter and digit codes correspond to the numbering system of the figured specimens in the 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 № OG–002-2025) is pinned under the specimen and listed in the author's archive.

The material mentioned below is kept in the following collections abbreviated in the text as follows: CAIC – private collection of A.V. Ivanov, Cheboksary, Russia; COGM – collection of A.N.

Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences, Moscow, Russia; ZISP – collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia.

Systematics

Order **Lepidoptera**
Family **Sesiidae**
Subfamily **Sesiinae**
Tribe **Synanthedonini**
Genus ***Bembecia*** Hübner, 1819 ["1816"]

***Bembecia turanica* (Ershoff, 1874)**
(Figs 1–14)

"*Sesia chrysidiformis* Esp. … var. *turanica* nov. Ersch.": Ershoff 1974a: 26, pl. V, fig. 74. Type locality: Turkistan, Turkistan Region, South Kazakhstan (by neotype, designated herein).

= "*Bembecia lavrovi* sp. n.": Knyazev 2025: 260, figs 1–12, 14. Type locality: "Russia, Omsk Region, Russko-Polyansky district, 2 km SE of Buzan village, 53°54′46.46″N, 73°57′51.32″E", **syn. n.**

Literature. Ershoff 1874b: 393 (*Sesia chrysidiformis* var. *turanica*); Staudinger 1901: 405 (*Sesia chrysidiformis* var. *turanica*); Bartel 1902: 297 (*Sesia minianiformis* var. *turanica*); Bartel 1912: 399 (*Chamaesphecia turanica*); Dalla Torre & Strand 1925: 76 (*Pyropteron chrysidiformis* var. *turanica*); Heppner & Duckworth 1981: 39 (*Bembecia chrysidiformis* var. *turanica*): Gorbunov 1992b: 70 (*Bembecia turanica*); Špatenka *et al*. 1993: 100 (*Bembecia turanica*); Špatenka *et al*. 1996: 9 (*Bembecia turanica*); Špatenka *et al*. 1999: 206, text-fig. 136, pl. 27, figs 215, 216 (*Bembecia turanica*); Pühringer & Kallies 2004: 36 (*Bembecia turanica*).

Material. Neotype (Figs 1–3): female, "Туркестанъ V [= Turkestan]"; "к. Ершова [coll. of Erschoff]"; "NEOTYPUS ♀ / *Sesia chrysidiformis* / var. *turanica* / Erschoff, 1874 / O.G. Gorbunov des., 2025" "SESIIDAE / Pictures №№ / 0507-0508–2019 / Photo by O. Gorbunov" (ZISP); 6 males (Figs 4–9), Russia, Omsk Region, Russko-Polyansky district, 2 km SE of Buzan village, 53°54′46.46″N, 73°57′51.32″E, 1.VII.2024, S.A. Knyazev leg. (5 males with Sesiidae pictures Nos 0003-0010–2025) (COGM and CAIC); 1 male with genitalia preparation No OG–002-2025); 1 male, with same locality, 20–21.VI.2024, S.A. Knyazev leg. (CAIC).

Description. **Female** (neotype) (Figs 1–2). Wing span 24.5 mm; abdomen eaten from inside and distally; forewing length 10.8 mm; antenna broken off.

Head: surviving part of flagellum and scapus dark brown to black; frons gray-brown with bronze sheen medially, laterally black; vertex black with few pale yellow scales; labial palpus black with admixture of yellow scales on mid and apical palpomeres; occipital fringe and neck plate dark brown with blue-violet sheen.

Thorax: dorsally dark brown with greenish sheen; thorax laterally dark gray-brown with bright greenish sheen; posteriorly, both metepimeron and metameron dark gray-brown with bright greenish sheen, densely covered with whitish, long, hair-like scales.

Legs dark gray-brown with greenish-violet sheen; mid and hind tibiae yellow-orange; spurs dark gray-brown with bronze sheen.

Forewing dorsally in basal part and costal margin up to tip of vein R_4 dark brown to black with bright green sheen; CuA-stem orange with several black scales with greenish sheen; anal margin orange; discal spot black with greenish-violet sheen and orange in distal third; veins within external transparent area orange; apical area orange with several dark brown scales distally; outer margin narrow, dark brown to black with violet sheen; cilia gray-brown with bronze sheen; ventrally costal margin up to tip of vein R_2 pale yellow to yellow with golden tint; CuA-stem, anal margin, distal part of discal spot, veins within external transparent area and apical area proximally orange; anterior margin of anterior transparent area distally, surface between veins R_1–R_4 and proximal two third of discal spot dark brown to black with dark violet sheen; outer margin dark brown with bronze-violet sheen; cilia gray-brown with bronze

sheen; transparent areas poorly developed, densely covered with translucent scales with light golden-greenish tint; anterior transparent area divided into two parts by extremely narrow scaled line; posterior transparent area short, slightly below level of discal spot of hindwing; external transparent area small, divided into three cells between veins R_{4+5} and M_3, level to vein M_2 about 0.7 times as broad as discal spot and about 0.35 times broader than apical area.

Hindwing transparent, basally covered with orange scales; veins and discal spot dark brown to black with dark violet sheen and with admixture of individual orange scales on discal spot and veins CuA-stem, CuP and 1A; discal spot narrow, cuneiform, reaching base of common stem of veins M_3–CuA_1; outer margin dark brown with bronze sheen, orange anally, about 0.5 times as broad as cilia; cilia brown with bronze sheen.

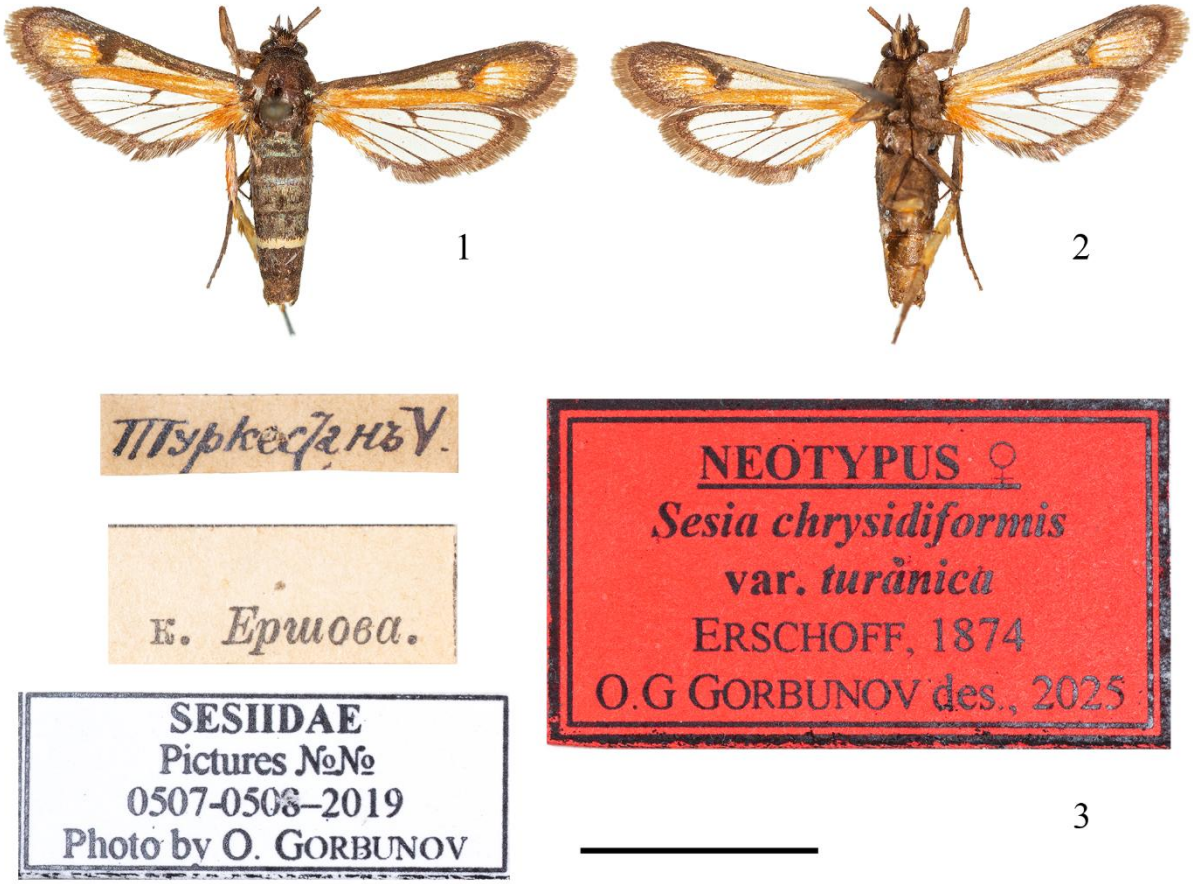
Abdomen dark brown to black with greenish sheen; dorsally tergite 4 with rather broad yellow stripe with golden tint distally.

Female genitalia. None. Possibly eaten by a carpet beetle larva.

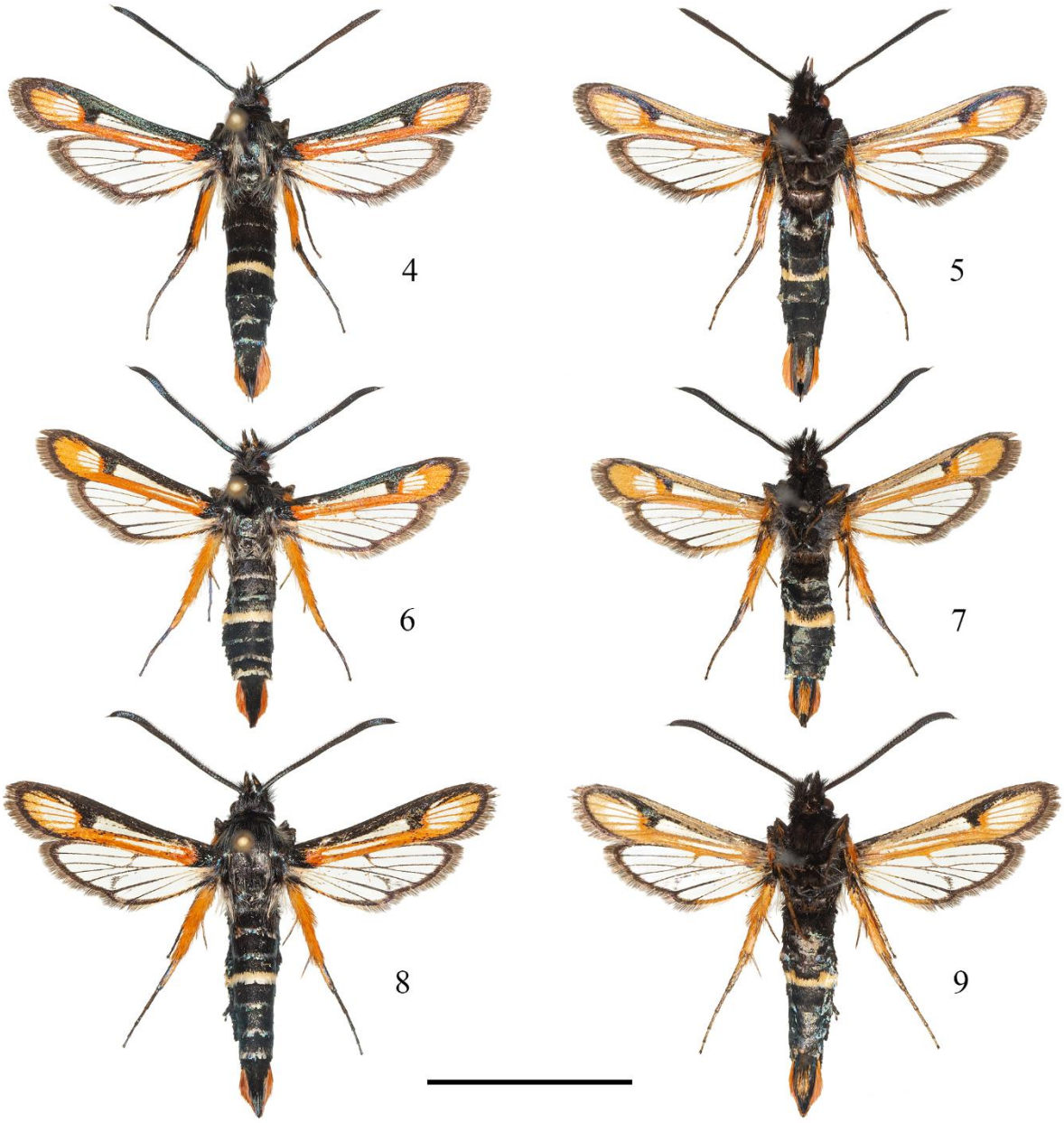
Male (Figs 4–5). Wing span 23.8 mm; body length 16.0 mm; forewing length 11.0 mm; length of antenna 7.1 mm.

Head: flagellum and scapus black with dark greenish-bronze sheen; frons gray-brown with bronze sheen medially, laterally black with greenish-violet sheen; vertex black with dark greenish sheen and few white, long, hair-like scales; labial palpus black with greenish-violet sheen and with admixture of yellow scales with golden tint on apical palpomere; occipital fringe black with greenish-violet sheen; neck plate black with bright blue-violet sheen.

Thorax: patagium black with bright greenish-violet sheen; tegula, meso- and metathorax black with greenish sheen, but densely covered with whitish, long, hair-like scales masking background colouration; thorax laterally black with bright greenish-violet sheen; posteriorly, both metepimeron and metameron black with bright violet sheen, densely covered with whitish, long, hair-like scales.



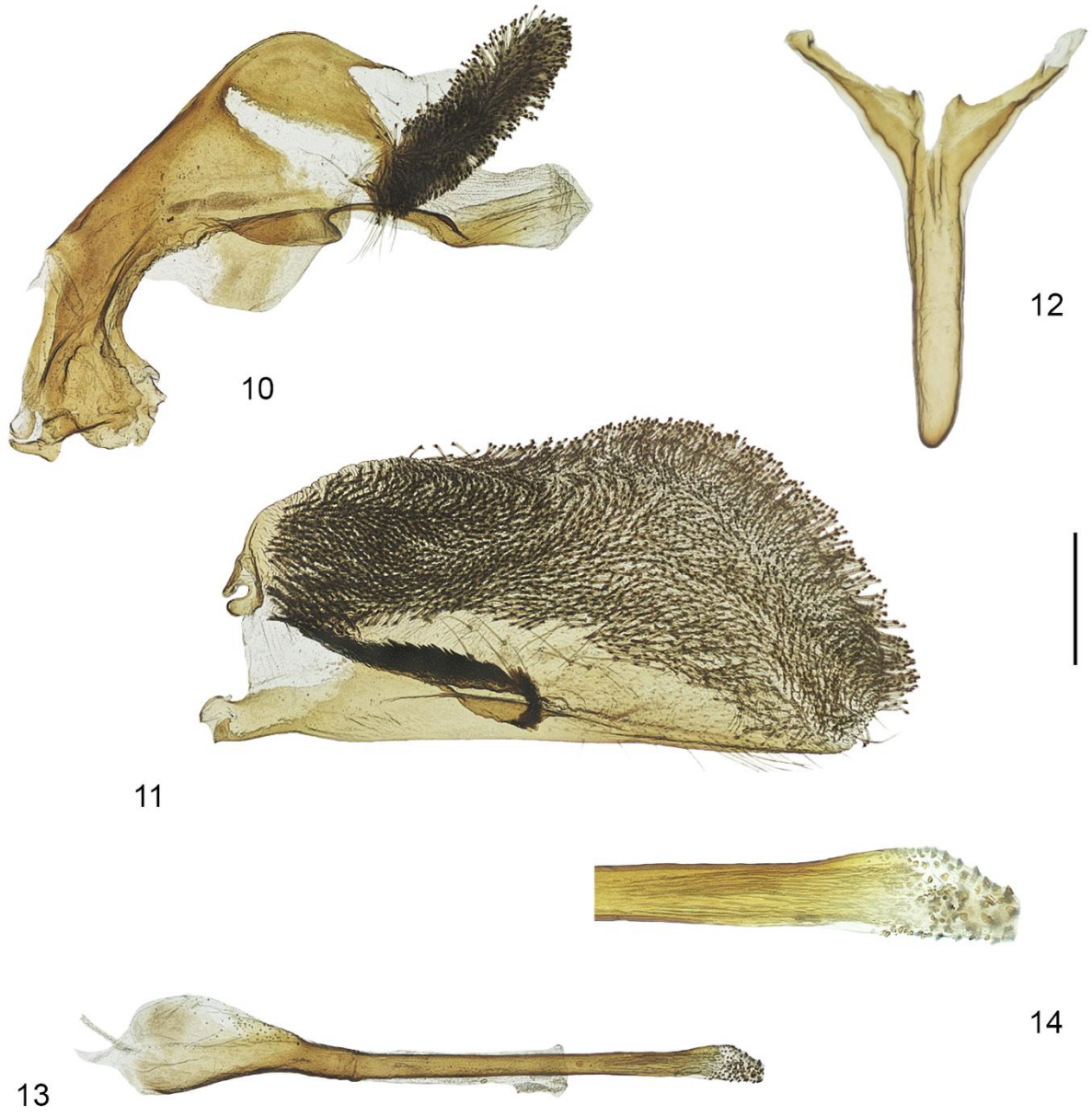
Figures 1–3. Moths. *Bembecia turanica* (Erschoff, 1874): 1–2. Neotype, female, Sesiidae pictures №№ 0507-0508–2019; 3. Labels. Dorsal view (1) and ventral view (2). Scale bar 10.0 mm.



Figures 4–9. Moths. Variability of males *Bembecia turanica* (Erschoff, 1874): 4–5. Sesiidae picture №№ 0001–0002-2025; 6–7. Sesiidae picture №№ 0003–0004-2025; 8–9. Sesiidae picture №№ 0007–0008-2025. 4, 6, 8 — dorsal view; 5, 7, 9 — ventral view. Scale bar: 10.0 mm.

Legs: fore coxa black with bright greenish-blue sheen, densely covered with whitish, long, hair-like scales; fore femur black with bright violet sheen and with whitish, long, hair-like scales at posterior margin; fore tibia ventrally orange, dorsally black with violet sheen; fore tarsus yellow with golden tint ventrally and dark gray-brown with bronze sheen dorsally; mid coxa black with bright greenish-violet sheen; mid femur black with bright violet sheen and with whitish, long, hair-like scales at posterior margin; mid tibia black with bright violet sheen and with large orange spot exteriorly; spurs yellow with golden tint; mid tarsus ventrally yellow with golden tint, dorsally basal tarsomere black with bright violet sheen, remaining tarsomeres dark brown with bronze-violet sheen. Hind coxa black with bright greenish-violet sheen; mid femur black with bright violet sheen and with whitish, long, hair-like scales at posterior margin; hind tibia orange, narrowly black with bright blue-greenish sheen basally and several black scales dorsodistally; spurs externally dark brown with bronze sheen, internally yellow with golden tint; hind tarsus ventrally yellow with golden tint, dorsally basal tarsomere black with bright violet sheen, remaining tarsomeres dark brown with bronze-violet sheen.

Forewing dorsally in basal part and costal margin up to tip of vein R_3 black with bright green sheen; CuA-stem orange with several black scales with greenish sheen; anal margin orange; discal spot black with greenish-violet sheen and orange in distal third; veins within external transparent area orange; apical area orange with several black scales with violet sheen on veins R_4, R_5, M_1 and M_3; outer margin narrow, black with violet sheen; cilia gray-brown with bronze sheen; ventrally costal margin up to tip of vein R_2 pale yellow to yellow with golden tint; CuA-stem, anal margin, distal part of discal spot, veins within external transparent area and apical area orange; anterior margin of anterior transparent area distally, surface between veins R_1–R_4 and proximal two third of discal spot black with dark violet sheen; outer margin dark brown with bronze-violet sheen; cilia gray-brown with bronze sheen; transparent areas rather well-developed, but densely covered with translucent scales with light golden-greenish tint; anterior transparent area divided into two parts by extremely narrow scaled line; posterior transparent area short, only slightly extending distad to level of discal spot of hindwing; external transparent area rather small, rounded distally, divided into five cells between veins R_3 and CuA_1, level to vein M_2 about 1.5 times as broad as discal spot and about 1.2 times broader than apical area.



Figures 10–14. Male genitalia. *Bembecia turanica* (Erschoff, 1874). Genitalia preparation №. OG–002-2025: 10 — tegumen-uncus complex; 11 — valva; 12 — saccus; 13 — aedeagus; 14 — vesica. Scale bar: 0.5 mm for 10–13 and 0.2 for 14.

Hindwing transparent; veins and discal spot black with dark violet sheen and with admixture of individual orange scales on discal spot and veins CuA-stem, CuP and 1A; discal spot narrow, cuneiform, reaching base of common stem of veins M_3–CuA_1; outer margin dark brown with bronze sheen, orange anally, about 0.5 times as broad as cilia; cilia brown with bronze sheen.

Abdomen black with greenish sheen; dorsally tergite 4 with rather broad yellow stripe with golden tint distally; tergite 2 with few white scales at distal margin; ventrally sternite 4 with narrow yellow stripe with golden tint distally; anal tuft black with greenish sheen medially, orange laterally and with few yellow-orange scales ventromedially.

Male genitalia (genital preparation No OG–002-2025; Figs 10–14). Tegumen-uncus complex relatively broad; scopula androconialis well-developed, about 0.5 times as long as length of tegumen-uncus complex (Fig. 10); crista gnathi medialis broad, semi-rhombic; crista gnathi lateralis narrow and short (Fig. 10); valva (Fig. 11) trapezoid, crista sacculi complex, with two distinct parallel ridges: ventral ridge short connected with dorsal one cranially; dorsal ridge long, densely covered with strong, pointed setae, caudally with flat-topped setae forming common group with flat-topped setae of ventral ridge; saccus (Fig. 12) relatively broad, with rounded base, long, about 1.5 times as long as vinculum; aedeagus (Fig. 13) rather narrow, straight, about as long as length of valva; vesica with numerous stout cornuti (Fig. 14).

Individual variability (Figs 6–9). Unknown for females. Males slightly vary in the number of yellow scales on the labial palpus and hind tarsus, and yellow and white scales on the abdomen dorsally. There is a male (Figs 6–7) which has a very thin pale yellow to yellow stripe on tergites 2, 6 and 7 distally. The size of the external and posterior transparent areas also varies slightly (cp. Figs 4, 6 and 8). Individual size is variable as follows: wing span 21.5–24.3 mm; body length 14.0–16.0 mm; forewing length 9.5–11.0 mm; length of antenna 7.0–8.8 mm.

Differential diagnosis. This species seems to be the closest to *B pallasi* O. Gorbunov, 2020 (type locality: Kazakhstan, Atyrau region, 60 km NE Kulsary, Imankara, 47°25′N, 54°30′E), *B. viguraea* (Püngeler, 1912) (type locality: China, Xinjiang, Aksu) and *B. alaica* (Püngeler, 1912) (type locality: Kyrgyzstan/Tadjikistan, Pamir-Alay, Alay Range). *B. turanica* can be distinguished from the former species compared in the colouration of the frons (entirely dark brown to black with blue-violet sheen in *B pallasi*, *vs*. black with greenish-violet sheen and with admixture of yellow scales with golden tint on apical palpomere in *B. turanica*), fore tibia (dark brown to black with greenish sheen dorsally and pale yellow ventrally in *B pallasi*, *vs*. black with violet sheen dorsally and orange ventrally in *B. turanica*), fore tarsus (entirely dark brown to black with greenish sheen in the species compared, *vs*. dark gray-brown with bronze sheen dorsally and yellow with golden tint ventrally in *B. turanica*), hind tarsus (entirely dark brown to black with greenish sheen in the species compared, *vs*. ventrally yellow with golden tint, dorsally basal tarsomere black with bright violet sheen, remaining tarsomeres dark brown with bronze-violet sheen in *B. turanica*; cp. Figs 1–2, 4–9 in this article with figs 17–26 in Gorbunov 2020), CuA-stem of the forewing dorsally (CuA-stem orange in *B pallasi*, *vs*. orange with several black scales with greenish sheen in *B. turanica*; cp. Figs 1–2, 4–9 in this article with figs 17–26 in Gorbunov 2020) and abdomen (dorsally dark brown to black with bright greenish-violet sheen; tergite 4 with row of white scales distally, tergite 6 with several white scales distally; ventrally entirely dark brown to black with bright greenish sheen in *B pallasi*, *vs*. black with greenish sheen; dorsally tergite 4 with rather broad yellow stripe with golden tint distally; tergite 2 with few white scales at distal margin; ventrally sternite 4 with narrow yellow stripe with golden tint distally in *B. turanica*; cp. Figs 1–2, 4–9 in this article with figs 17–26 in Gorbunov 2020), as well as the conformation of the forewing; cp. Figs 1, 4, 6, 8 in this article with figs 17, 19, 21, 23, 25 in Gorbunov (2020). In addition, these two species have slight differences in the structure of the male genitalia. Compare Figs 10–14 in this article with figs 27–30 in Gorbunov (2020).

B. turanica is separable from *B. viguraea* in the colouration of the abdomen dorsally (tergite 4 with a broad pale yellow to white stripe distally in male and tergites 2, 4 and 6 each with a broad pale yellow to yellow stripe distally in female of *B. viguraea*, instead tergite 4 with rather broad yellow stripe distally in female and tergite 4 with rather broad yellow stripe distally and tergite 2 with several white scales at distal margin in male of *B. turanica*; cp. Figs 1, 4, 6, 8 in this article with pl. 27, fig. 217 in Špatenka *et al*. 1999), by the structure of the external transparent area of the forewing (external transparent area divided into four cells between veins R_{4+5} and CuA_1, level to vein M_2 about twice as broad as discal spot in *B. viguraea, vs.* divided into five cells between veins R_3 and CuA_1, level to vein

M_2 about 1.5 times as broad as discal spot in male and divided into three cells between veins R_{4+5} and M_3, level to vein M_2 about 0.7 times as broad as discal spot and about 0.35 times broader than apical area *B. turanica*), as well as by the shape of the crista gnathi and crista sacculi in the male genitalia (compare Figs 10 and 11 in this article and text-fig. 137 in Špatenka *et al*. 1999).

B. turanica differs from *B. alaica* in the colouration of the abdomen dorsally (tergites 2 and 4 each with very narrow white stripe distally in *B. alaica*, *vs*. tergite 4 with rather broad yellow stripe distally in female and tergite 4 with rather broad yellow stripe distally and tergite 2 with several white scales at distal margin in *B. turanica*; cp. Figs 1, 4, 6, 8 in this article with pl. 26, fig. 209 in Špatenka *et al*. 1999) and in the structure of the male genitalia (compare Figs 10–14 in this article and text-figs 133 in Špatenka *et al*. 1999).

Bionomics. The host plant of the larvae is not known. Males are easily attracted to artificial sex pheromones. Moths fly from the end of May to the beginning of July.

Habitat. Various types of grassland formations, such as mixed-grass steppes and semi-deserts with the obligatory presence of perennial legumes.

Distribution. Currently, this species is known from southern Kazakhstan and the south of the Omsk region of Russia, which is the first record of this species for the fauna of Sesiidae of Russia.

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References

Bartel, M. (1902) II. Familie. Sesiidae H.-S. *In*: Rühl, F. (Ed.) *Die Palaearktischen Grossschmetterlinge und ihre Naturgeschichte. Zweiter Band: Nachtfalter*. Johannes Paul, Leipzig, pp. 239–383.

Bartel, M. (1912) 24. Familie: Aegeriidae (Sesiidae). *In*: Seitz, A. (Ed.) (1907–1913) *Die Gros-Schmetterlinge der Erde. Die Palaearktischen Spinner & Schwärmer. Band 2*. A Kernen Verlag, Stuttgart, pp. 375–416, pls 50–52.

Dalla Torre, K.W. & Strand, E. (1925) Aegeriidae. *In*: Strand, E. (Ed.) *Lepidopterorum Catalogus. Bd. 31*. W. Junk, Berlin, 202 pp.

Efetov, K.A., Gorbunov, O.G. & Ruchko, P.V. (2012) *Bembecia uroceriformis* (Treitschke, 1834) (Lepidoptera: Sesiidae) in Ukraine. *Tavricheskiy Mediko-biologicheskiy Vestnik*, 15, (2), 336–337 [in Russian].

Erschoff, N.G. (1874a). Cheshuyekriliya [Lepidoptera]. *In*: Fedtchenko, A.P. [Travels in Turkestan], fascicle 2. [Zoogeographical Studies], part 5, section 3. Petersburg and Moscow, 128 pp, VI pls. [in Russian].

Erschoff, N.G. (1874b) Lepidopteren von Turkestan. *Entomologische Zeitung Stettin*, 35 (10–12), 386–417.

Gorbunov, O.G. (1992a) Revision of the types of the Sesiidae (Lepidoptera), preserved in the collection of the Zoological Museum of Kiev State University. *Revue d'Entomologie de l'URSS*, LXXI (1), 121–133 [in Russian].

Gorbunov, O.G. (1992b) Designation of lectotypes of clearwing moths (Lepidoptera, Sesiidae) from the collections of the Zoological Institute of the Russian Academy of Sciences and the Zoological Museum of the Taras Shevchenko University of Kiev. *Vestnik zoologii*, 1992 (3), 69–71 [in Russian].

Gorbunov, O.G. (1994) A new species of the genus *Bembecia* Hübner, [1819] from the European part of Russia. *Atalanta*, 25 (3/4), 563–566.

Gorbunov, O.G. (2008). Sesiidae. *In*: Sinev, S.Yu. (Ed.). *Catalogue of the Lepidoptera of Russia*. KMK Scientific Press, Moscow, St. Petersburg, pp. 110–112 [in Russian].

Gorbunov, O.G. (2018a) New data on the clearwing moth fauna of the Altai Mountains, Russia, with the description of two new species (Lepidoptera, Sesiidae). *Zootaxa*, 4425 (2), 263–282. https://doi.org/10.11646/zootaxa.4425.2.4

Gorbunov, O.G. (2019a) Sesiidae. *In*: Sinev S.Yu. (Ed.). *Catalogue of the Lepidoptera of Russia*. *Edition 2*. Zoological Institute RAS, St. Petersburg, pp. 158–161 [in Russian].

Gorbunov, O.G. (2019b) A new species of the genus *Bembecia* Hübner, 1819 ["1916"] from the European part of Russia (Lepidoptera, Sesiidae), with remarks on the *Bembecia dispar* (Staudinger, 1891) species group. *Zoologicheskii Zhurnal*, 98 (4), 393–406. https://doi.org/10.1134/S0044513419040081

Gorbunov, O.G. (2020) A new and poorly known clearwing moths of the genus *Bembecia* Hübner, 1819 ["1816"] from the European part of Russia and northwestern Kazakhstan (Lepidoptera, Sesiidae). *Zootaxa*, 4729 (4), 551–565. https://doi.org/10.11646/zootaxa.4729.4.6

Gorbunov, O.G. (2023a) A new species of the genus *Bembecia* Hübner, 1819 ["1816"] (Lepidoptera: Sesiidae) from the Gissar Mountain Range. *Russian Entomological Journal*, 32 (1), 68–75. https://doi.org/10.15298/rusentj.32.1.08

Gorbunov, O.G. (2023b) Two new species of the genus *Bembecia* Hübner, 1819 ["1816"] (Lepidoptera: Sesiidae) from Western Mongolia. *Russian Entomological Journal*, 32 (2), 198–206. https://doi.org/10.15298/rusentj.32.2.10

Gorbunov, O.G. (2024) A new species of the genus *Bembecia* Hübner, 1819 (Lepidoptera: Sesiidae) from the Volga region. *Russian Entomological Journal*, 33 (3), 387–396. https://dx.doi.org/10.15298/rusentj.33.3.11

Gorbunov, O.G. (2025) On the morphology and systematics of *Bembecia jakuta* (Herz, 1903) (Lepidoptera, Sesiidae). *Acta Biologica Sibirica*, 11, 197–209. https://dx.doi.org/10.5281/zenodo.14945738

Gorbunov, O.G. (in press) A revision of *Bembecia strandi* (W. Kozhantschikov, 1936) (Lepidoptera: Sesiidae). *Zoosystematica Rossica*, 34 (1).

Gorbunov, O.G. & Arita, Yu. (1995) Review of the genus *Scalarignathia* Capuse, 1973 (Lepidoptera, Sesiidae) from the far East of Russia. *Tyo to Ga*, 45, (4), 255–262.

Gorbunov, O.G. & Efetov, K.A. (2016) The biology and distribution of *Bembecia puella* Z. Laštůvka, 1989 (Lepidoptera, Sesiidae) in the Crimea. *Tavricheskiy Mediko-biologicheskiy Vestnik*, 19 (3), 21–24 [in Russian].

Gorbunov, O.G. & Efetov, K.A. (2018) The clearwing moth genus *Bembecia* Hübner 1819 ["1816"] (Lepidoptera, Sesiidae) in Crimea, with the description of a new species. *Zoologicheskii Zhurnal*, 97 (7), 812–839. https://doi.org/10.1134/S0044513418070085

Gorbunov, O.G., Krupitsky, A.V. & Marusov, A.A. (2017) A new species of *Bembecia* from China, with a catalogue of Chinese species of the genus (Lepidoptera: Sesiidae). *Zootaxa*, 4273 (4), 559–575. https://doi.org/10.11646/zootaxa.4273.4.6

Gorbunov, O.G. & Tschistjakov, Yu.A. (1995) A review of the clearwing moths (Lepidoptera, Sesiidae) of the Russian Far East. *Far Eastern Entomologist*, 10, 1–18.

Gorbunov, O.G. & Tschistjakov, Yu.A. (1999) 44. Fam. Sesiidae – Clearwing Moths. *In*: Lehr, P.A. (Ed.). *Key to the insects of Russian Far East. Vol. V. Trichoptera and Lepidoptera. Pt. 2*. Dal'nauka, Vladivostok, pp. 292–307 [in Russian].

Heppner, J.B. & Duckworth, W.D. (1981) Classification of the Superfamily Sesioidea (Lepidoptera: Ditrysia). *Smithsonian contributions to zoology*, 314, i–iii, 1–144.

Herz, O. (1903) Lepidopteren-Ausbeute der Lena-Expedition von B. Poppius im Jahre 1901. *Öfversigt af Finska Vetenskaps-Societetens Förhandlingar*, 45 (15), 1–20.

ICZN [The International Commission on Zoological Nomenclature] (1999). *International Code of zoological nomenclature. 4th edition*. The International Trust for Zoological Nomenclature, London, xxix + 309 pp.

Karalius, V., Mozūraitis, R., Būda, V. (2000) Attractiveness of octadecadienols and their acetates for clearwings (Lepidoptera, Sesiidae) from Altai Mountains. *Acta Zoologica Lituanica*, 10 (4), 89–93.

Kozhantschikov, W.[D.] (1936) Lepidopterologisches aus Zentral-Sibirien. *Folia zoologica et hydrobiologica*, 9 (1), 22–29.

Knyazev, S.A. (2025). A new species of the genus Bembecia Hübner, 1819 (Lepidoptera, Sesiidae) from Omsk Region of Russia (West Siberia). *Acta Biologica Sibirica*, 11, 259–267. https://doi.org/10.5281/zenodo.15009803

Pühringer, F. & Kallies, A. (2004) Provisional check list of the Sesiidae of the world (Lepidoptera: Ditrysia). *Mitteilungen der Entomologischen Arbeitsgemeinschaft Salzkammergut*, 4, 1–85.

Špatenka, K., Gorbunov, O.G., Laštůvka, Z., Toševski, I. & Arita, Yu. (1996) Die Futterpflanzen der paläarktischen Glasflügler (Lepidoptera: Sesiidae). *Nachrichten des entomologischen Vereins Apollo*, 17 (1), 1–20.

Špatenka, K., Gorbunov, O., Laštůvka, Z., Toševski, I. & Arita, Yu. 1999. Sesiidae, Clearwing Moths. *In*: Naumann, C.M. (Ed.). *Handbook of Palaearctic Macrolepidoptera*. *Vol. 1*. Gem Publishing Company, Wallingford, 569 pp., 57 pls.

Špatenka, K., Laštůvka, Z, Gorbunov, O.G., Toševski, I. & Arita, Yu. (1993) Die Systematik und Synonymie der paläarktischen Glasflügler-Arten (Lepidoptera, Sesiidae). *Nachrichten des entomologischen Vereins Apollo*, 14 (2), 81–114.

Staudinger, O. (1901) I. Theil: Famil. Papilionidae – Hepialidae. *In*: Staudinger, O. & Rebel, H. *Catalog der Lepidopteren des palaearktischen Faunengebietes*. R. Friedländer & Sohn, Berlin, xxx + 411 pp.