

A new species of *Leptochilus* de Saussure, 1853 (Hymenoptera, Vespidae, Eumeninae) from Kazakhstan and Russia

Новый вид *Leptochilus* de Saussure, 1853 (Hymenoptera, Vespidae, Eumeninae) из Казахстана и России

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Key words: Palaearctic region, taxonomy, solitary wasps, vespid wasps, nectar robbing.

Ключевые слова: Палеарктика, таксономия, одиночные осы, складчатокрылые осы, воровство нектара.

Abstract. *Leptochilus arkadyi* Fateryga, **sp.n.** is described from Kazakhstan and Russia. The female holotype and a male paratype are illustrated; diagnostic characters and differences of the new species from similar *L. alpestris* (de Saussure, 1855) and *L. leleji* Fateryga, 2019 are reported. *Leptochilus arkadyi* was observed in steppe and shrub habitats. Imagines of the new species performed primary nectar robbing from flowers of *Linaria popovii* Kuprian.

Резюме. Из Казахстана и России описан *Leptochilus arkadyi* Fateryga, **sp.n.** Приведены иллюстрации самки (голотипа) и самца (паратипа); указаны диагностические признаки и отличия нового вида от наиболее сходных с ним *L. alpestris* (de Saussure, 1855) и *L. leleji* Fateryga, 2019. *Leptochilus arkadyi* обнаружен в степных и кустарниковых местообитаниях. Имаго данного вида совершали первичное воровство нектара на цветках *Linaria popovii* Kuprian.

Introduction

Leptochilus de Saussure, 1853 is the largest genus of the subfamily Eumeninae s. str. (without Zethinae), with more than 200 species described so far [Fateryga, 2024]. It is distributed in most zoogeographical regions except the Australian; however, the genus is especially diverse in arid habitats of the Holarctic, where 95% of all species occur. *Leptochilus* belongs to a group of genera characterized by a basally obtuse second submarginal cell, the absence of cephalic foveae in the female, and a lamellate tergum 2 (a clade D sensu Bank et al. [2017] of the paraphyletic tribe Odynerini s. l.). The genus *Leptochilus* currently contains four subgenera: *Euleptochilus* Blüthgen, 1943 (17 species), *Leptochilus* s. str. (1 species), *Lionotulus* Blüthgen, 1938 (129 species), and *Zendalia* Robertson, 1928 (55 species) [Fateryga, 2024]. The subgenus *Zendalia* is well-defined by its

morphology (the reduction of the apical lamella of the tergum 2) and distribution: it is restricted to North America and partially South America too, while the remaining subgenera are distributed in the Old World. Palaearctic representatives of *Leptochilus* are the most understudied, with many still undescribed species and some further synonyms expected [Fateryga, 2024]. The purpose of the present contribution is to describe a new species of the genus revealed in Kazakhstan and Russia.

Material and methods

The acronyms for the institutions where the studied specimens are deposited are as follows: CAFK — Research collection of A.V. Fateryga, Feodosiya, Russia; FSCV — Federal Scientific Center of the East Asia Terrestrial Biodiversity of the Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia (registration number 2797657); ISEN — Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia; ZISP — Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia; ZMMU — Zoological Museum of the M.V. Lomonosov Moscow State University, Moscow, Russia.

Photographs of the specimens were taken with a Canon EOS 550D digital camera attached to an Olympus SZX16 stereomicroscope and a Yongnuo YN-14EX macro flash. Male genitalia were extracted after re-softening the specimens in a humid chamber and then were boiled in 10 % NaOH for 2–3 min until clarification. After that, they were immersed in 9 % acetic acid for neutralization of the base, and then rinsed in distilled water. Then, the genitalia were immersed in glycerin and dissected so that the parameres with the volsellae

were separated from the basal ring and the aedeagus. After examination and photographing, they were stored in glycerin in micro-vials pinned under the specimens. Focus stacking images were created with CombineZP software using the “Do Stack” algorithm for most photographs except those in glycerin for which the “Do Soft Stack” algorithm was applied. The final illustrations were processed with Adobe Photoshop CS2 software using the “Levels” tool and a 50%-opacity “Sharpen” filter.

The holotype is reported with reproduction of labels; a single slash (/) divides lines on the same label and a double slash (//) divides labels; text in square brackets is not present on the labels but represents some explanations of the label data. In morphological descriptions, “F” refers to antennal flagellomeres, “T” to metasomal terga, and “S” to metasomal sterna. The distribution map (Fig. 13) was created using the online tool SimpleMapp [Shorthouse, 2010]. For specimens for which no geographic coordinates were available on labels, the coordinates were estimated based on the approximate center of the most specific locality given. Field observations on the new species were carried out in the Jetisu and Almaty regions of Kazakhstan in 2024 and the Astrakhanskaya Oblast of Russia in 2026.

The present work is registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:8CDCE710-D305-465F-B95F-69363843D795

Results and discussion

Leptochilus (Lionotulus) arkadyi Fateryga, sp.n.

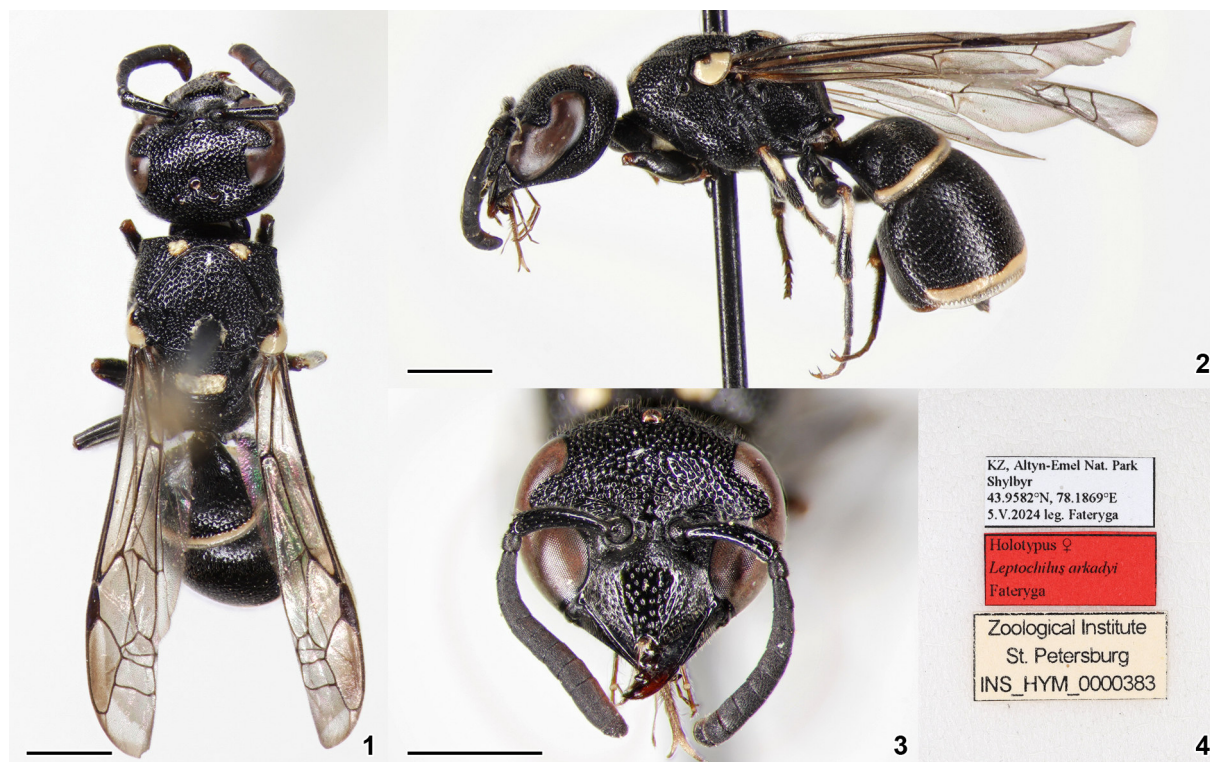
Figs 1–10.

<https://zoobank.org/NomenclaturalActs/76473A5E-6CE2-4F55-AD8E-B680C1A7F76D>

Holotype. ♀, labeled “KZ [Kazakhstan], Altyn-Emel Nat[ional]. Park / Shylbyr / 43.9582°N, 78.1869°E / 5.V.2024 leg. Fateryga // Holotypus ♀ / *Leptochilus arkadyi* / Fateryga [red label] // Zoological Institute / St. Petersburg / INS_HYM_0000383 [pale yellow label]” (ZISP).

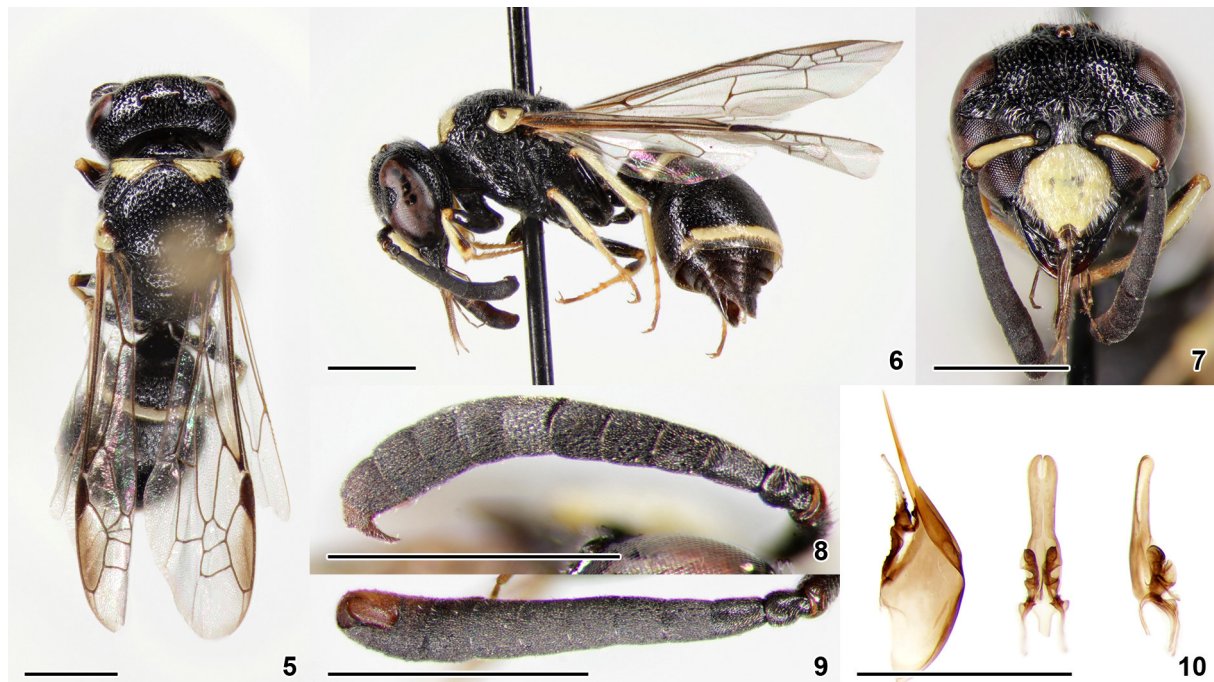
Paratypes. Russia, *Astrakhanskaya Oblast*: Baskunchak Lake, 48.1661°N, 46.8193°E, on *Tanacetum achilleifolium*, 20.V.2026, A. Fateryga leg. — 1♂ (CAFK); *ibid.*, 21.V.2026, M. Proshchalykin leg. — 2♂♂ (CAFK, FSCV). Kazakhstan, *Mangystau Region*: Mangyshlak Peninsula, Tauchik, salt river canyon, 19.V.1977, V. Rikhter leg. — 1♀ (ZISP). *Kyzylorda Region*: Karataugebirge, bei Djulek, Balamurun, Koshantschikow leg. — 1♀ (ZMMU); *ibid.*, 7.V.1913, Koshantschikow leg. — 1♀ (ZISP); *ibid.*, 12.V.1913, Koshantschikow leg. — 2♀♀ (ZISP); *ibid.*, 18.V.1913, Koshantschikow leg. — 1♀ (ZISP). *Jetisu Region*: Altyn-Emel National Park, near Mt. Ayak-Kalkhan, 43°52'N, 78°43'E, 23–30.IV.2012, A. Barkalov, Yu. Danilov leg. — 1♀ (ISEN); *ibid.*, yellow-pan traps, 1–4.V.2012, A. Barkalov, Yu. Danilov leg. — 1♂ (ISEN); Altyn-Emel National Park, Taygak, 43.8999°N, 77.8626°E, 8.V.2024, A. Fateryga leg. — 1♀ (FSCV). *Abmaty Region*: Charyn National Park, Canyon, 43.3496°N, 79.0811°E, 16.V.2024, on *Linaria popovii*, A. Fateryga leg. — 1♀, 1♂ (CAFK), 1♂ (ZISP).

Diagnosis. *Leptochilus arkadyi* belongs to a group of species with the occipital carina not forming an angle at the lower part of the gena, the pronotal carina weakly lamellate, the metanotum sharply edged posteriorly, the hind trochanter rounded posteriorly, the hind basitarsus of the male not thick-



Figs 1–4. *Leptochilus arkadyi* Fateryga, sp.n., holotype, ♀: 1 — habitus, dorsal view; 2 — habitus, lateral view; 3 — head, frontal view; 4 — labels. Scale bars = 1 mm.

Рис. 1–4. *Leptochilus arkadyi* Fateryga, sp.n., голотип, ♀: 1 — габитус, вид сверху; 2 — габитус, вид сбоку; 3 — голова, вид спереди; 4 — этикетки. Масштабные линейки = 1 мм.



Figs 5–10. *Leptochilus arkadyi* Fateryga, sp.n., paratype, ♂: 5 — habitus, dorsal view; 6 — habitus, lateral view; 7 — head, frontal view; 8 — flagellum, lateral view; 9 — flagellum, ventral view; 10 — genitalia (left paramere and volsella in medial view, aedeagus in ventral view, and aedeagus in lateral view). Scale bars = 1 mm.

Рис. 5–10. *Leptochilus arkadyi* Fateryga, sp.n., паратип, ♂: 5 — габитус, вид сверху; 6 — габитус, вид сбоку; 7 — голова, вид спереди; 8 — жгутик усика, вид сбоку; 9 — жгутик усика, вид снизу; 10 — гениталии (левая парамера и вольселла, вид изнутри, эдегус, вид снизу, и эдегус, вид сбоку). Масштабные линейки = 1 мм.

ened, and the apical lamella of T2 not sclerotized, with rather fine basal punctures. Among Central Asian representatives of this group, the new species is the most similar to *Leptochilus* (*Lionotulus*) *alpestris* (de Saussure, 1855) and *L. (L.) leleji* Fateryga, 2019. *Leptochilus arkadyi* can be separated from both *L. alpestris* and *L. leleji* by the apical lamella of T2 with a basal row of punctures strongly elongated longitudinally (up to 1/2 but usually about 1/3 of the lamella length) (vs. rather rounded or just slightly elongated punctures in *L. alpestris* and *L. leleji*). *Leptochilus arkadyi* can be also separated from *L. alpestris* by the propodeal concavity less concave and not outlined by a strong carina (vs. outlined by a strong carina in *L. alpestris*). The male of *L. arkadyi* can be also separated from *L. leleji* by F11 strongly narrowing toward the apex and rather pointed apically (vs. rather parallel-sided and rounded apically in *L. leleji*) and a long narrow digitus, similar to that in *L. alpestris* (vs. a short digitus rounded apically in *L. leleji*). The male of the new species can be also separated from *L. alpestris* by the ventral lobe of the aedeagus small and rounded, similar to that in *L. leleji* (vs. a long ventral lobe, which is rather pointed apically and highly sclerotized along the posterior margin in *L. alpestris*).

Description. Female. Body length (from head to apical margin of T2) 4.5–6 mm; forewing length 4–5.5 mm. Head about 1.15× as wide as long in frontal view. Mandible with four teeth. Labial palpus not modified. Clypeus about 1.2× as wide as long, its apical emargination shallow, about 0.4× as deep as wide, taking nearly 1/5 of clypeal width, apical teeth triangular, weakly carinate. Distance between lateral ocellus and occipital margin equal to distance between lateral ocellus and eye. Occipital carina not forming angle at lower part of gena. Anterior pronotal carina strongly developed, weakly

lamellate, shoulders rectangular. Tegula with outer margin rounded posteriorly, shorter than scutellum. Scutellum rather flat. Metanotum slightly raised above scutellum, sharply edged posteriorly. Hind trochanter rounded posteriorly. Propodeum with indistinct dorsal surface only; propodeal concavity with rounded lateral margins; median carina developed at lower 3/4 of propodeal concavity. Projection of submarginal carina of propodeum approximately as long as wide, bluntly rounded apically; valvula nearly rectangular, with rounded angles. S2 in lateral view roundly elevated at base, in ventral view with weak longitudinal furrow.

Clypeus coarsely punctate, interspaces reaching two or rarely three puncture diameters, from shining to dull, with micropunctures and reticulate microsculpture; macropunctures becoming smaller and denser toward base and lateral margins. Punctures on frons and vertex somewhat larger than those on clypeus, interspaces much less than one puncture diameter, shining; gena with somewhat finer punctures than those on frons and vertex and similar interspaces. Punctures on pronotum (except pale white spots), scutum, and scutellum (except pale white band) very slightly larger than those on frons and vertex, interspaces less than puncture diameter, moderately shining, with some distinct micropunctures. Pale white spots on pronotum and pale white band on scutellum with sparser indistinct punctures, interspaces exceeding puncture diameter. Tegula shining, with indistinct micropunctures and weak reticulation. Dorsal and ventral mesepisterna and mesepimeron punctate similarly to pronotum, scutum, and scutellum, but interspaces slightly larger. Epicnemium shagreened, mostly without punctures. Metanotum with coarse punctures on upper part of posterior side and fine punctures on lower part. Metapleuron longitudinally rugose. Dorsolateral surface of



Figs 11–12. Habitats of *Leptochilus arkadyi* Fateryga, sp.n.: 11 — Shylbyr Place, Altyn-Emel National Park, Jetisu Region, Kazakhstan (type locality); 12 — Bogdo-Baskunchak Nature Reserve, Astrakhanskaya Oblast, Russia.

Рис. 11–12. Местобитания *Leptochilus arkadyi* Fateryga, sp.n.: 11 — урочище Шыбыр, национальный парк Алтын-Эмель, Жетису́йская обл., Казахстан (типовое местонахождение); 12 — Богдинско-Баскунчакский заповедник, Астраханская обл., Россия.

propodeum rather shining, punctate similarly to frons and vertex. Lateral surface of propodeum dull, longitudinally rugose but with hardly visible rows of sparse punctures between longitudinal rugosity in upper part. Propodeal concavity rather dull, with finer and sparser punctures than those on dorsolateral surface, interspaces sometimes exceeding several puncture diameters, with very fine rugosity. T1 and T2 deeply punctate, interspaces usually reaching one or two puncture diameters, dull, with clear reticulation. S1 coarsely rugose longitudinally. S2 punctured somewhat sparser than T2, interspaces with few distinct micropunctures besides reticulation. Apical lamella of T2 semitransparent, with basal row of fine punctures elongated longitudinally up to 1/2 but usually about 1/3 of lamella length, interspaces not sclerotized. T3 and S3 with sparse shallow punctures besides microreticulation. Following terga and sterna without distinct punctures, with dull microsculpture only.

Posterior side of mandible with straight golden setae about as long as F1. Clypeus with pale setae as long as diameter of F1 at base. Frons with straight setae somewhat shorter than F1. Scapus with setae shorter than diameter of F1 at base. Labial palpus with setae as long as diameter of F1 at distal end. Gena with very short indistinct setae only. Vertex and dorsal surface of mesosoma with straight setae about as long as diameter of F1 at base. Ventral surface of mesosoma and whole metasoma with short appressed setae only.

Basal color black. Medio-lateral spots on pronotum, tegula (except medial margin), broad posterior band on scutellum, upper outer parts of tibiae, narrow apical bands on T1 and T2 (enlarged laterally in one specimen), and rarely also central spots on T3–T5 (present in one specimen) pale yellow. Wings fuscous, particularly in marginal cell; veins brown.

Male. Body length (from head to apical margin of T2) 4–5 mm; forewing length 4–4.5 mm. Structure resembles that in female except the following: clypeus about 1.1× as wide as long, its apical emargination taking more than 1/5 of clypeal width; F11 narrowing toward apex and rather pointed apically, reaching apical margin of F8; F9 with deep depression housing apex of F11. S7 with most area flattened. Genitalia as in Fig. 10. Digitus long and narrow; aedeagus with comparatively small and rounded ventral lobe.

Sculpture similar to that in female but clypeus very dull, with indistinct shallow punctures, wrinkles, and microreticulation. Setation mostly as in female but clypeus covered with

dense white appressed setae as long as diameter of F1 at distal end; labial palpus without long setae. Coloration mostly as in female but clypeus completely or partially yellow or pale yellow (with central black spot in two specimens and with black lateral margins in one specimen), anterior surface of scapus yellow or pale yellow, spots on pronotum sometimes significantly enlarged (in two specimens), scutellum always black, outer surface of tibiae and also whole tarsi sometimes completely yellow (in two specimens), S2 sometimes with small pale yellow postero-lateral spots (in three specimens). Depression of F9 and entire F10 and F11 ferruginous.

Etymology. The species is named in honor of a prominent entomologist Arkady S. Lelej (FSCV), in recognition of his significant contribution to the taxonomy of aculeate Hymenoptera and on the occasion of his 80th birthday anniversary.

Distribution. Russia (Astrakhanskaya Oblast), Kazakhstan (Mangystau, Kyzylorda, Jetisu, and Almaty regions).

Remarks. The dates of the specimens from the Karatau Mts. were present on the underside of the geographical labels. I indicated here dates of the specimens from ZISP only. The specimen from ZMMU probably also had a date on the geographical label but I forget to examine its underside. All specimens from the Karatau Mts. were also labeled by G. Kostylev as either “*nanus* Typ.,” “*nanus*, n. sp.,” or “*nanus* m.,” and those from ZISP additionally by N.V. Kurzenko as “*Leptochilus nanus* sp.n.”. One specimen of this series collected on 12.V.1913 is without the head.



Fig. 13. Distribution of *Leptochilus arkadyi* Fateryga, sp.n.

Рис. 13. Распространение *Leptochilus arkadyi* Fateryga, sp.n.

Field observations. *Leptochilus arkadyi* was observed in steppe and shrub habitats (Figs 11–12). One female and two males of this species were observed making holes in flower spurs of *Linaria popovii* Kuprian. (Plantaginaceae) in the Charyn River canyon, Kazakhstan, to uptake nectar (primary nectar robbing sensu Inouye [1980]). In addition, one male was observed performing a regular visit to a capitulum of *Tanacetum achilleifolium* (M. Bieb.) Sch. Bip. (Asteraceae) in the Bogdo-Baskunchak Nature Reserve, Russia. The genus *Linaria* Mill. is already known as a nectar source for other species of *Leptochilus* performing primary nectar robbing. Particularly, *Leptochilus (Euleptochilus) limbiferus* (Morawitz, 1867) was observed robbing nectar from *Linaria markotchensis* Popovich & Zernov in the Caucasus and *Leptochilus (Lionotulus) membranaceus* (Morawitz, 1867) from *Linaria genistifolia* (L.) Mill. in Crimea [Fateryga et al., 2020; Fateryga, Fateryga, 2025].

Acknowledgements

I thank Sergey Belokobylskij and Yulia Astafurova (ZISP), Anatolij Barkalov and Yuriy Danilov (ISEN), and Maxim Proshchalykin (FSCV) for providing specimens for this study. The research was carried out within the state assignment of the Ministry of Science and Higher Education of the Russian Federation (No. 124030100098-0).

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Поступила в редакцию 3.8.2026