New data on the leaf beetle genus *Aphilenia* Weise in Reitter, 1889, with descriptions of two new species from Kazakhstan (Coleoptera: Chrysomelidae: Eumolpinae)

Новые данные по жукам-листоедам рода *Aphilenia* Weise in Reitter, 1889 с описанием двух новых видов из Казахстана (Coleoptera: Chrysomelidae: Eumolpinae)

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Ключевые слова: Coleoptera, Chrysomelidae, Eumolpinae, *Aphilenia*, новые виды.

Abstract. Descriptions of two new species of the genus *Aphilenia* Weise in Reitter, 1889, *A. lopatini* **sp. n.** and *A. mujunkumica* **sp. n.**, both from Kazakhstan, are given. Both new species belong to the subgenus *Pseudaphilenia* Lopatin, 1976. *Aphilenia interrupta gobica* Lopatin, 1970 is upgraded to species and recorded from China for the first time. *Aphilenia interrupta* Weise in Reitter, 1889 is recorded from Kazakhstan for the first time.

Резюме. В статье приведены описания двух новых видов из рода *Aphilenia* Weise in Reitter, 1889, *A. lopatini* **sp. n.** и *A. mujunkumica* **sp. n.**, обитающих в Казахстане. Оба новых вида относятся к подроду *Pseudaphilenia* Lopatin, 1976. Статус подвида *Aphilenia interrupta gobica* Lopatin, 1970 повышен до видового уровня. Этот вид впервые указан из Китая. *Aphilenia interrupta* Weise in Reitter, 1889 впервые указана из Казахстана.

Introduction

This paper supplements a review of the genus *Aphilenia* Weise in Reitter, 1889 [Moseyko, 2012]. It was supposed in the revision that specimens of *A. unicolor* Reitter, 1889 (former *A. hauseri* Weise in Hauser, 1894) from Kazakhstan probably belong to a taxon different from the typical form from Turkmenistan. A more detailed study of specimens of *A. unicolor* from Kazakhstan has shown the presence of at least two species similar to *A. unicolor* in Kazakhstan fauna. This paper is devoted to description of these species. Also, males of *A. interrupta gobica* Lopatin, 1970 remained unknown when the revision was made. Examination of a male of this subspecies in Lev Medvedev's collection allows upgrading this taxon to a species level. There are a number of the images of the general view (Fig. 1–6) and morphological details (Fig. 7–24) of specimens discussed and map with distributional data (Fig. 25) for 4 species in this paper.

The following acronyms are used for designation of the collections studied:

ZISP – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia;

ZMMU – Zoological Museum of Moscow State University, Moscow, Russia;

LM – Lev Medvedev's collection, Moscow, Russia.

Results

The two species described herein have narrow tarsal segments, similar to those in the species of the subgenus *Aphilenia* s. str. Also, they have elytral punctation with distinct rows of punctures and ill-defined lateral bordering of the pronotum, whereas in *A. unicolor* (subgenus *Pseudaphilenia* Lopatin, 1976) the punctation is completely confused and lateral bordering is absent. On the other hand, the species are similar to *A. unicolor* in having dense punctation of head, elongate aedeagus, longer and more erect pubescence than in species of the subgenus *Aphilenia* s. str. Thus, the two species described in this paper occupy an intermediate position between the two *Aphilenia* subgenera which may well be synonymized later. Formally, both new species are placed in the subgenus *Pseudaphilenia* because of their similarity to *A. unicolor*, especially in the form of aedeagus. Differences between two subgenera with regard to the extended composition of *Pseudaphilenia* are given in the key (see below).

Aphilenia lopatini **sp. n.**
(Color plate 11–12: fig. 1, 2, 9, 10, 16–19, 25)

Material. Holotype, ♂ (ZISP): Kazakhstan, Aktyubinsk [Aqtobe] Province, Malye Barsuki Sands; near Kara-Chokat [Karashokat]; 47°25′N / 60°50′E, 24–26.06.1910, leg. N.I. Androsov. Paratypes: 16♂, same label as in holotype; same place and collector as in holotype, 24.06.1907, 1♀; 14.07.1907, 1♂; 19.07.1907, 1♂; 06.1910, 1♀; 25.06.1910, 3♂. Same place as in holotype, 21.07–12.08.1907, 1♂; 27.05.1908, 1♂; 7–25.07.1908, 1♂; 27–29.07.1908, 2♂; 8.08.1908, 1♂, leg. L. Bubyr'; 16.06.1910, 1♂, leg. Sumakov; 1♀, Aktyubinsk [Aqtobe] Province, Malye Barsuki sands, Koylibay [Chilybay], 47°26′N / 60°43′E, 15.07.1931, leg. Luppova; 4♂, Aktyubinsk [Aqtobe] Province, Bol'shie Barsuki sands, near Chelkar [Shalkar], 47°50′N / 59°38′E, 14.06.1907, leg. N.I. Androsov; same place and collector, 9.06.1907, 5♂; 10.06.1907, 3♂; 12–17.06.1907, 5♂; 19.06.1907, 2♂, 1♀; late 06.1907, 1♂ (altogether 52 paratypes in ZISP); 2♂, Aktyubinsk [Aqtobe] Province, Malye Barsuki Sands, approx. 47°25′N, 60°50′E (LM).

Additional material. Kazakhstan, South Kazakhstan [Shymkent]

Fig. 25. Map of distribution of *Aphilenia lopatini* **sp. n.** (●), *A. mujunkumica* **sp. n.** (▲), *A. unicolor* Reitter, 1889 (▼) and *A. gobica* Lopatin, 1970 (■).
Рис. 25. Карта распространения *Aphilenia lopatini* **sp. n.** (●), *A. mujunkumica* **sp. n.** (▲), *A. unicolor* Reitter, 1889 (▼) и *A. gobica* Lopatin, 1970 (■).

Province, Chardara [Shardara]. approx. 41°15′N / 67°55′E, 30.05.1936, 4♂, leg. D. Romashov (ZMMU). See "Remark".

Description. Body covered with erect hairs 0.05–0.1 mm long, longer on sides of pronotum and near humeral calli. Coloration pale yellowish brown, without pattern. Body elongate, parallel-sided or narrowing toward apex, 1.75–2.1 times as long as wide in males and 1.8–2 times in females.

Head extremely densely punctate, punctures merging to continuous rugosity. Very narrow ocular grooves running parallel to eye edge. Eyes large, fabiform, ratio of maximum width of head including eyes to minimum width of frons 2.43–2.8 for males from type territory and 1.86–2.07 for females. For males from South Kazakhstan this parameter being 2.72–2.85. Antennae fine, filiform, reaching hind coxae.

Pronotum 1.36–1.52 times as wide as long in males and 1.46–1.57 times in females. Sides without edging or with incomplete and feeble one. Disc of pronotum densely punctate; interspaces between punctures no more than half of puncture diameter. Narrow impunctate longitudinal stripe present in middle of disc. Ventral surface of prothorax, including hypomera, also densely punctate. Anterior margin of prosternum very narrowly and weakly deflexed downwards; notosternal sutures and suture-like traces of antennal cavities ill-defined and in some specimens almost invisible among punctation. Anterior setiferous pores situated on feeble convexities on anterior face of prothorax sides below their middle. Anterior setae as long as hairs on anterior margin and on sides of pronotum. General shape of anterior margin of "propleuron" convex in front of fore coxa and in area of lateral convexity, but with cavity near notosternal suture end.

Elytra of males 1.4–1.55 times as long as wide and 1.43–1.57 times as wide as pronotum. For females these parameters constituting 1.4–1.52 and 1.39–1.53, accordingly. Elytra widest near humeral calli. Punctures arranged in 13 nearly regular rows; very dense secondary punctation present, with diameter of punctures only 0.5–0.7 times that of punctures of primary punctation.

Width ratio of fore, middle and hind femora 2.5 : 2.5 : 2.9; their length ratio 9 : 9 : 10.2. All femora without teeth. Middle and hind tibia with preapical emargination; tibia narrower at apical end of emargination than at basal one. Tarsi narrow and elongate, ratio of length of claw-segment to combined length of other segments about 0.8. Second segment of fore tarsus 1.7–1.85 times as long as wide. Third segment narrowly bilobed, ventral side of 3 basal segments with glabrous median stripe occupying about half of their width.

Abdomen without distinctive formations, covered with hairs shorter than those on dorsal side of body. Aedeagus with comparatively short and wide apical tip.

Body length: males, 3.8–5.1 mm, females, 5.3–6 mm.

Diagnosis. Elytral punctation with distinct rows of punctures, but secondary punctation well developed. Sides of pronotum not or feebly bordered. Body coloration without pattern. Tarsi narrow, second segment 1.7–1.85 times as long as wide.

Remark. Specimens from Southern Kazakhstan are not included in the type series because they have small morphometrical differences from the rest material and distant habitation. They may represent a distinct subspecies but to describe it, examination of the females and search for intermediate populations are necessary.

Etymology. The species is named after the late Prof. I.K. Lopatin, an outstanding specialist on Chrysomelidae.

Aphilenia mujunkumica **sp. n.**
(Color plate 11–12: fig. 3, 4, 8, 11, 20–22, 25)

Material. Holotype, ♂ (ZISP): Kazakhstan, Jambyl Province, Mujunkum Sands, Baskul' [Baskol'] Lake, 43°09′N / 71°45′E, 12.07.1907, leg. J. Baeckmann. Paratypes: Kazakhstan, Jambyl Province, Mujunkum Sands, approx. 43°09′N / 71°45′E, 10.07.1907, leg. J. Baeckmann, 2♂ with the same data; 1♂, 3♀, Mujunkum Sands, approx. 43°09′N / 71°45′E, 11.07.1907, leg. E. Fischer; 1♂, as above, 18.07.1907 (altogether 7 paratypes, all in ZISP).

Description. Body covered with erect hairs 0.05–0.1 mm in length, longer on sides of pronotum and near humeral calli. Coloration pale yellowish brown to reddish brown, with blackish sutural stripe, meso- and metepisterna and mesepimera in males; elytral pattern consisting also of two short longitudinal stripes on each elytron between suture and humeral callus. Pattern in females can merge into transverse spot across both elytra. Body elongate, more or less parallel-sided, 1.83–1.91 times as long as wide in males and 1.87–2 times in females.

Head very densely punctate, punctures merging to continuous rugosity, especially between eyes. Very narrow ocular grooves running parallel to eye edge. Eyes large, fabiform, ratio

of maximum width of head including eyes to minimum width of frons 2.57–2.75 for males and 1.9–1.93, for females. Antennae fine, filiform, reaching first segment of abdomen in males and hind coxa, in females.

Pronotum 1.36–1.52 times as wide as long in males and 1.48–1.57 times in females. Sides with edging developed to varying extent, from complete to almost invisible one. Disc of pronotum densely punctate; interspaces between punctures no more than half of their diameter. In many specimens narrow impunctate longitudinal stripe or spot present in middle of disc, but in other specimens it is absent. All ventral surface of prothorax, including hypomera, punctate but less densely than pronotum. Anterior margin of prosternum very narrowly and weakly deflexed downwards; notosternal sutures and suture-like traces of antennal cavities ill-defined and in some specimens almost invisible among punctation. Anterior setiferous pores situated on convexities on anterior face of prothorax sides below their middle. Anterior setae as long as hairs on anterior margin and on sides of pronotum. General shape of anterior margin of "propleuron" convex in front of fore coxa and in area of lateral convexity, but with wide cavity near end of notosternal suture.

Elytra of males 1.36–1.48 times as long as wide and 1.37–1.51 times as wide as pronotum. For females these parameters being 1.45–1.54 and 1.4–1.49, accordingly. Elytra widest near humeral calli. Punctation of elytra looking confused because primary and secondary punctures have almost same size, with rows distinct near scutellum and on sides of elytra.

Width ratio of fore, middle and hind femora 2.9 : 2.8 : 3; their length ratio 9.5 : 9.7 : 10.5. All femora without teeth. Middle and hind tibiae with preapical emargination; middle tibia narrower at apical end of emargination than at basal one, hind tibia equally wide in these points. Tarsi elongate, ratio of length of claw-segment to combined length of other segments in fore tarsus about 0.9, and in hind tarsus, about 0.85. Second segment of fore tarsus 1.4–1.6 times as long as wide. Third segment narrowly bilobed, ventral side of 3 basal segments with glabrous median stripe occupying less than half of their width.

Abdomen without distinctive formations, covered with hairs shorter than hairs on dorsal side of body. Aedeagus with comparatively short and wide apical tip.

Body length: males, 4.5–4.8 mm; females, 5.3–6 mm.

Diagnosis. Elytral punctation looking mostly confused. Bordering of pronotum variable, from absent to clearly developed. At least elytral suture blackish. Tarsi not very narrow, second segment 1.4–1.6 times as long as wide.

Etymology. The species name refers to the Mujunkum [Mojynkum] Desert where the specimens were collected.

A key to subgenera of the genus *Aphilenia* and to the species of subgenus *Pseudaphilenia*

1(6). Punctation of elytra looking confused or at least secondary punctation between rows with punctures 0.7 times as large as those of primary punctation. Sides of pronotum mostly without bordering or with feeble and incomplete one. If bordering well developed, elytral punctation looking confused (Subgenus *Pseudaphilenia*)

2(3). Second segment of fore tarsus almost as long as wide, no more than 1.2 times as long as wide (Fig. 7). Tarsi widened, with very narrow ventral bare stripe. Elytral punctation completely confused. Body length 4.5–5.5 mm in males and 5.5–6.8 mm in females. Coloration variable, often with black pattern. Aedeagus with comparatively long tip (Fig. 12–15). Distribution: Turkmenistan, Uzbekistan (Fig. 25) .... *A. unicolor*

3(2). Tarsi not widened, second tarsal segment at least 1.4 times as long as wide, with median bare stripe occupying at least one-third of segment width.

4(5). Body coloration without pattern. Tarsi narrow, second segment 1.7–1.85 times as long as wide (Fig. 9). Elytral punctation with well-defined rows of punctures. Body length 3.8–5.1 mm in males and 5.3–6 mm in females. Distribution: Kazakhstan (Fig. 2) ..... *A. lopatini* **sp. n.**

5(4). At least elytral suture blackish. Tarsi not very narrow, second segment 1.4–1.6 times as long as wide (Fig. 8). Elytral punctation looking mostly confused. Body length 4.5–4.8 mm in males and 5.3–6 mm in females. Distribution: Kazakhstan (Fig. 25) ....*A. mujunkumica* **sp. n.**

6(1). Punctation of elytra arranged in rows, punctures of secondary punctation no more than half as large as primary punctures. Sides of pronotum distinctly bordered (Subgenus *Aphilenia* s. str.).

Aphilenia gobica Lopatin, 1970 **stat. n.**
Aphilenia interrupta gobica Lopatin, 1970
(Color plate 11–12: fig. 6, 23–25)

Material. Mongolia: South-Gobi Aimak [Ömnögovi Province], Nomgon Sum [District], 80 km SSE Nomgon, Bordzongiyn-Gobi, approx. 42°12′N / 105°37′E, 5–8.08. VIII. 1967, leg. A. Emeljanov, I. Kerzhner, 1♂ (LM). China: Inner Mongolia, Shardzan-Sume, Goidzo Valley, approx. 41°26′N / 103°08′E, Kozlov expedition, 15–17.05.1909, 3♀, 17–18.05.1909, 1♀ (ZISP); Inner Mongolia, Edzin-Gol River, Dzargalante, approx. 41°55′N / 101°01′E, Kozlov expedition, 17–22.06.1909, 3♀ (ZISP).

Examination of the form of aedeagus of *A. interrupta gobica* showed that this taxon is a distinct species. Morphologically the male of *A. gobica* resembles females of *A. interrupta*, particularly in the size of the eyes, and resembles in this aspect males of *A. astakhovi* Moseyko, 2012. Ratio of maximum width of head including eyes to minimum width of frons is 2.45 for studied male and 1.9–2.05 for females. It is interesting that the form of the aedeagus of *A. gobica* with an excavation on the apex also is quite similar to that in *A. astakhovi*. This is the first record of this species from China. Labels "Central Mongolia" in the material of Kozlov's expedition refer to the Chinese province Inner Mongolia.

Aphilenia interrupta Weise in Reitter, 1889
(Color plate 11: fig. 5)

Material. Kazakhstan: Kyzyl-Orda Province, Baigakum, Sands, approx. 44°19′N / 66°28′E, 2.07.1907, leg. N.I. Androsov, 12♂ (ZISP); Aktyubinsk [Aqtobe] Province, Malye Barsuki Sands, approx. 47°25′N / 60°50′E, 1–21.06.1908, leg. L. Bubyr', 4♂, 1♀ (ZISP).

This is the first record of this species for Kazakhstan. Whereas the subgenus *Pseudaphilenia* is represented in Kazakhstan by species distinct from *A. unicolor*, *A. interrupta* is distributed much farther northward and does not differ there morphologically from Turkmenistan and other Middle Asian populations.

Conclusion

Beetles of the genus *Aphilenia* are quite rare outside Turkmenistan and Uzbekistan, where they are common and abundant. Their more extensive speciation in the neighbouring countries probably is due to wider isolation of the northern populations because the sands are less continuous there. Population structure and bionomics of these species are still unknown. It is noteworthy that there is very significant misbalance of the sex ratio in samples from northern populations. For example, *A. lopatini* **sp. n.**

is described from 51 males and only 4 females. The number of males of *A. ornata* Reitter, 1889 in the ZISP collection is twice that of females. *Aphilenia astakhovi* was described from 2 males. Also, *A. interrupta* from Kasakhstan is represented in collection mostly by males. On the other hand, specimens of *A. gobica* collected in China by Kozlov's expedition are all females. Only *A. interrupta* from Turkmenian populations and *A. parvula* Weise in Hauser, 1894 are represented in the collections by subequal number of the males and females. The misbalance can result from collecting method: it is known that N.I. Androsov and L. Bubyr' often collected insects at light. But females also fly to the light; for example, A.N. Luppova collected a female by this method. There may be other explanations of the sex ratio: for example, the sexes can differ in the period of activity, or the sexes can have different positions on the plant. This question needs additional study, as also the distribution of *Aphilenia* species in general.

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References

Moseyko A.G. 2012. Comments on the Genus *Aphilenia* Weise in Reitter, 1889 (Coleoptera, Chrysomelidae, Eumolpinae), with a Description of a New Species from Russia // Entomologicheskoe Obozrenie. 91(1): 99–105 (in Russian).

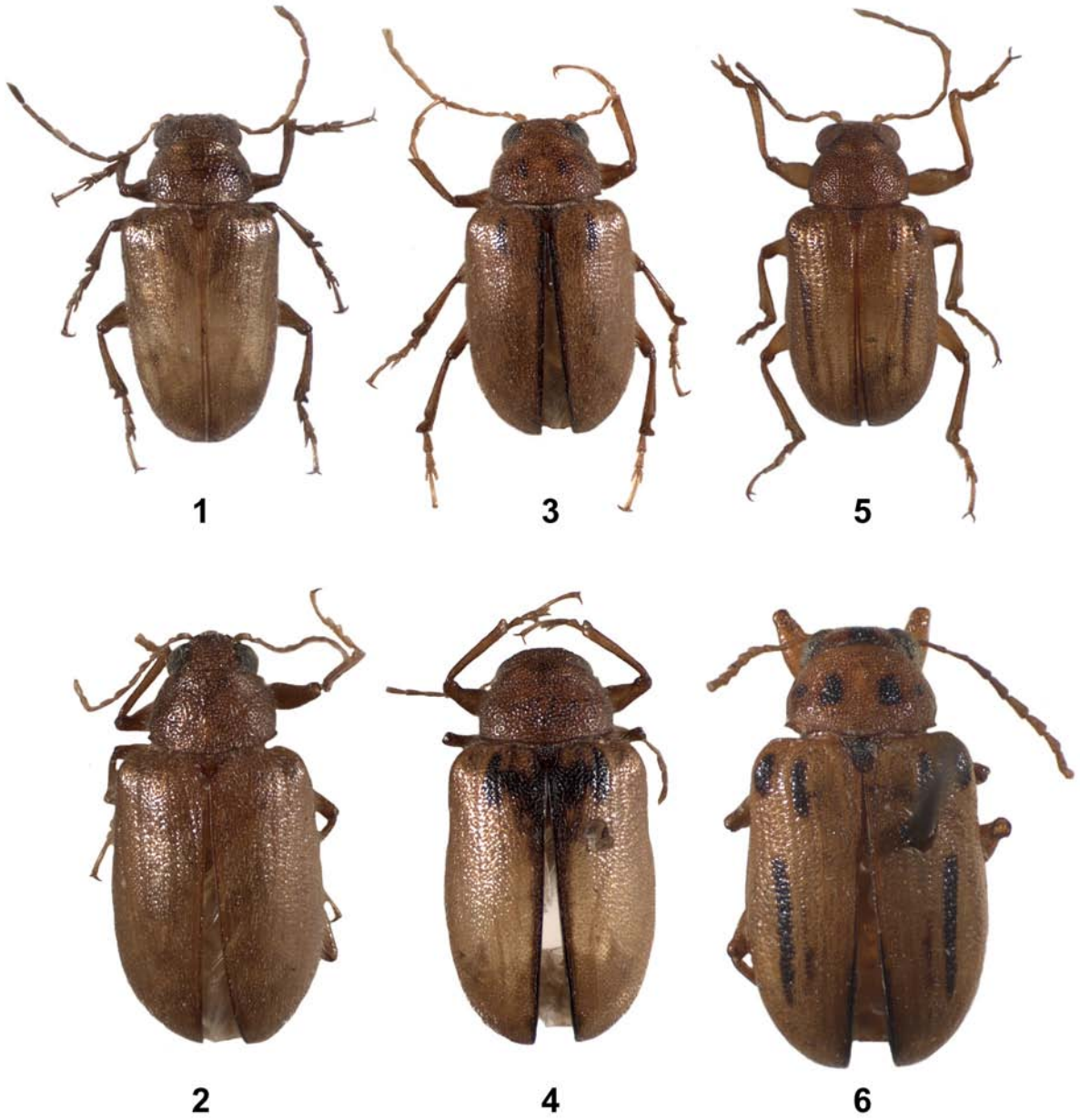

Fig. 1–6. Species of the genus *Aphilenia* Weise in Reitter, 1889, general view.

1 – *A. lopatini* **sp. n.**, holotype, male; 2 – the same, paratype, female; 3 – *A. ujunkumica* **sp. n.**, holotype, male; 4 – the same, paratype, female; 5 – *A. interrupta* Weise in Reitter, 1889, male from Kazakhstan; 6 – *A. gobica* Lopatin, 1970, male from Mongolia.

Рис. 1–6. Виды рода *Aphilenia* Weise in Reitter, 1889, общий вид.

1 – *A. lopatini* **sp. n.**, голотип, самец; 2 – то же, паратип, самка; 3 – *A. mujunkumica* **sp. n.**, голотип, самец; 4 – то же, паратип, самка; 5 – *A. interrupta* Weise in Reitter, 1889, самец из Казахстана; 6 – *A. gobica* Lopatin, 1970, самец из Монголии.

Fig. 7–24. The genus *Aphilenia* Weise in Reitter, 1889, details of structure.

7, 12–15 – *A. unicolor* Reitter, 1889 (12 – specimen from Uzbekistan, Sairob, 13 – specimen from Uzbekistan, Djar-Kurgan, 14, 15 – specimen from Turkmenistan); 8, 11, 20–22 – *A. mujunkumica* **sp. n.**; 9, 10, 16–19 – *A. lopatini* **sp. n.** (16 – specimen from Chardara, 17 – paratype from Chelkar, 18, 19 – paratype from Kara-Chokat); 23, 24 – *A. gobica* Lopatin, 1970; 7–9 – fore tarsus; 10, 11 – spermatheca; 12–14, 16–18, 20, 21, 23 – aedeagus, view from above; 15, 19, 22, 24 – aedeagus, lateral view.

Рис. 7–24. Род *Aphilenia* Weise in Reitter, 1889, детали строения.

7, 12–15 – *A. unicolor* Reitter, 1889 (12 – экземпляр из Сайроба, Узбекистан, 13 – экземпляр из Джар-Кургана, Узбекистан, 14, 15 – экземпляр из Туркменистана); 8, 11, 20–22 – *A. mujunkumica* **sp. n.**; 9, 10, 16–19 – *A. lopatini* **sp. n.** (16 – экземпляр из Чардары, 17 – паратип из Челкара, 18, 19 – паратип из Кара-Чоката); 23, 24 – *A. gobica* Lopatin, 1970; 7–9 – передняя лапка; 10, 11 – сперматека; 12–14, 16–18, 20, 21, 23 – эдеагус, вид сверху; 15, 19, 22, 24 – эдеагус, вид сбоку.

References

Moseyko A.G. 2012. Comments on the Genus *Aphilenia* Weise in Reitter, 1889 (Coleoptera, Chrysomelidae, Eumolpinae), with a Description of a New Species from Russia. *Entomologicheskoe Obozrenie.* 91(1): 99–105 (in Russian).