

UDC 595.764.1(517.3)

## A REVIEW OF THE SUBGENUS *CHILOTHORAX* OF THE GENUS *APHODIUS* (COLEOPTERA, SCARABAEIDAE) OCCURRING IN MONGOLIA, WITH DESCRIPTION OF NEW SPECIES

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Accepted 10 May 2000

**A Review of the Subgenus *Chilothorax* of the Genus *Aphodius* (Coleoptera, Scarabaeidae) Occurring in Mongolia, with Description of New Species.** Frolov A. V. — The Mongolian species of *Aphodius* Illiger belonging to the subgenus *Chilothorax* Motschulsky are reviewed. *A. kerzhneri* Nikolajev and *A. mongolaltaicus* Nikolajev are placed in the subgenus *Chilothorax*. Two new synonyms (*A. altaicus* Nikolajev = *A. puntsagdulamae* Nikolajev, syn. n.; *A. grafi* Reitter = *A. boreomongolicus* Nikolajev, syn. n.) are established. Three new species are described. A key to Mongolian species of *Chilothorax* is presented.

Key words: Coleoptera, Scarabaeidae, *Aphodius*, *Chilothorax*, taxonomy, new species, new synonyms, Mongolia.

**Обзор представителей подрода *Chilothorax* рода *Aphodius* (Coleoptera, Scarabaeidae) Монголии с описанием новых видов.** Фролов А. В. — Дан обзор обитающих в Монголии видов подрода *Chilothorax* Motschulsky рода *Aphodius* Illiger. В этот подрод помещены *A. kerzhneri* Nikolajev и *A. mongolaltaicus* Nikolajev. Установлена синонимия двух видовых названий (*A. altaicus* Nikolajev = *A. puntsagdulamae* Nikolajev, syn. n.; *A. grafi* Reitter = *A. boreomongolicus* Nikolajev, syn. n.). Описаны 3 новых вида. Приведена таблица для определения монгольских видов подрода *Chilothorax*.

Ключевые слова: Coleoptera, Scarabaeidae, *Aphodius*, *Chilothorax*, таксономия, новые виды, новые синонимы, Монголия.

### Introduction

The Mongolian fauna of *Aphodius* Illiger is not very rich, but does include a few apparently endemic species. Thanks to several entomological expeditions taken to Mongolia, a rather extensive amount of Aphodiinae material has been collected and deposited in several museums. Much of this material remains to be examined.

In the present article, the Mongolian species belonging to the subgenus *Chilothorax* Motschulsky are reviewed. This subgenus is very difficult taxonomically primarily because of great variability in diagnostic characters, particularly elytral pattern, used by previous authors. I have included in this review some species described by G. Nikolajev (Nikolajev, Puntsagdulam, 1984) from Mongolia as representatives of the subgenus *Pseudacrossus* Reitter, which belong to the subgenus *Chilothorax*. Three species are described as new.

Exact label data are cited in quotes for the type specimens. Author's remarks are in square brackets.

The following abbreviation identify the collections housing the material examined: DKCP — David Král's collection, Czech Republic, Praha; MLUH — Martin-Luther-Universität, Germany, Halle; NMPC — National Museum (Natural History), Czech Republic, Praha; ZISP — Zoological Institute, Academy of Sciences, Russia, St.-Petersburg.

### Key to the *Chilothorax* species from Mongolia

#### Таблица для определения видов подрода *Chilothorax* из Монголии

1. Eye relatively large: its diameter in dorsal view approximately two times longer than minimum distance between eye margin and gula (fig. 14); fore tibia of male relatively slender, its inner margin slightly convex (fig. 11); disc of metasternum not pubescent; elytral pattern consisting of a few small brown maculae; apices of parameres without feebly sclerotized extensions (fig. 23). ...  
..... *A. mongolaltaicus* Nikolajev

- Eye relatively small: its diameter in dorsal view approximately as long as minimum distance between eye margin and gula (fig. 15). ..... 2
- 2. Disc of head and pronotum dark brown to nearly black. .... 3
- Disc of head and pronotum brown to light brown. .... 5
- 3. Elytra entirely brown to dark brown; fore tibia relatively slender, its inner margin straight (fig. 12); parameres (fig. 22). ..... *A. kerzhneri* Nikolajev
- Elytra light brown with a few small dark brown maculae, or immaculate; fore tibia not slender, its inner margin concave. .... 4
- 4. Longer (5.2–6.0 mm); apical spur of fore tibia relatively long in male (fig. 10); disc of metasternum not pubescent; parameres relatively long (fig. 16). ..... *A. altaicus* Nikolajev
- Shorter (3.3–4.6 mm); apical spur of fore tibia relatively short (fig. 13); disc of metasternum pubescent in male; parameres relatively short (fig. 24). ..... *A. comma* Reitter
- 5. Metasternum not pubescent; parameres with long extensions (fig. 19). ..... *A. jacobsoni* W. Kosh.
- Metasternum pubescent. .... 6
- 6. Longer (6.4–6.7 mm); parameres (fig. 21). ..... *A. chandmanicus* Frolov, sp. n. ({} )
- Shorter (4.4–6.1 mm). .... 7
- 7. Scutellum with hairs posteriorly (hairs are best viewed with oblique lighting, but may be abraded in some individuals); parameres with long extensions (fig. 20). ..... *A. alexis* Frolov, sp. n.
- Scutellum without hairs posteriorly (only base of scutellum pubescent); parameres with short extensions (fig. 17, 18). .... 8
- 8. Apices of parameres more slender in lateral view (fig. 18); genae in females not protruding beyond eyes. .... *A. tanhensis* Frolov, sp. n.
- Apices of parameres less slender in lateral view (fig. 17); genae in females protruding beyond eyes. .... *A. grafi* Reitter

#### *A. (Chilothorax) altaicus* Nikolajev, 1984 (fig. 1, 10, 16)

= *A. gobiensis* Balthasar, 1967 (nom. praeocc.) – *A. puntsagdulamae* Nikolajev, 1984, **syn. n.**

**Material examined.** Holotype { labeled "Gobi-Altai, Ich Bogd, 2.VI.62, leg. Grebenscikov", "Aphodius (Volinus) gobiensis n. sp. {}, 66, Balthasar, Holotypus", "A. jacobsoni Kosh., det. dr. Endrodi 1968", "Aphodius jacobsoni gobiensis Blt., det. Grebenscikov 1971"; 6 paratypes { with the same data. One paratype in NMPC, holotype and other paratypes in MLUH.

*A. puntsagdulamae.* Holotype { labeled "Б.-Улг. р. Их-Джаралтын-Гол, 20 км СЗ Булгана [Bajan-Ulgij aimak, Ikh-Dzharaltyn-Gol river, 20 km NW from Bulgan] 4.VII.1980, Пунцагдулам [Puntsagdulam leg.]" (ZISP); paratypes: } with the same data and { labeled «Кобд. р. Дэд-Нарийн-Сала, приток р. Булгана [Hovd aimak, Ded-Narijn-Sala river, tributary of Bulgan river], 3.VII.1980, Пунцагдулам» (ZISP).

Gov'-Altaj: Tegreg, 19.06.1980, 3 spm. (Medvedev, ZISP).

**Differential diagnosis.** The species is very similar to *A. nigrivittis* Solsky, occurring in Central Asia and Kazakhstan; can be separated from it by paramere shape and elytral pattern.

**Distribution.** Mongolia.

#### *A. (Chilothorax) kerzhneri* Nikolajev, 1984 (fig. 2, 12, 22)

**Material examined.** Holotype { labeled «Монголия, Ара-Хангайский айм. [Mongolia, Arhangaj aimak], р. Хойт-Терин-Гол, 35 км ЮЗ Цахира [Hoit-Terhin-Gol riv., 35 km SW from Tsahir], 27–28.VI.1975, Сугоняев [Sugonyaev leg.]» (ZISP); 5 paratypes: { and } with the same data, and 3 { labeled «Монголия, Ара-Хангайский айм., [Arhangaj aimak], 7 км ЮЗ Тарята [7 km SW from Taryat], 24–26.VI.1975, Гурьева [Gur'eva leg.]» (ZISP).

**Differential diagnosis.** The species is similar to *A. praenubilis* Balth. (distributed in Tian-Shan mts.) and particularly to *A. exilimanus* Kabakov, recently described from European Russia (Ul'yanovsk Prov.); differing from both species by the entirely dark elytra and, additionally, from the first by the denser punctation of the pronotum and head.

**Distribution.** Mongolia: Arhangaj, Dzabhan, Bajan-Ulgij.

**Note.** The species was originally described as relating to subgenus *Pseudacrossus*. Known only from the type material.

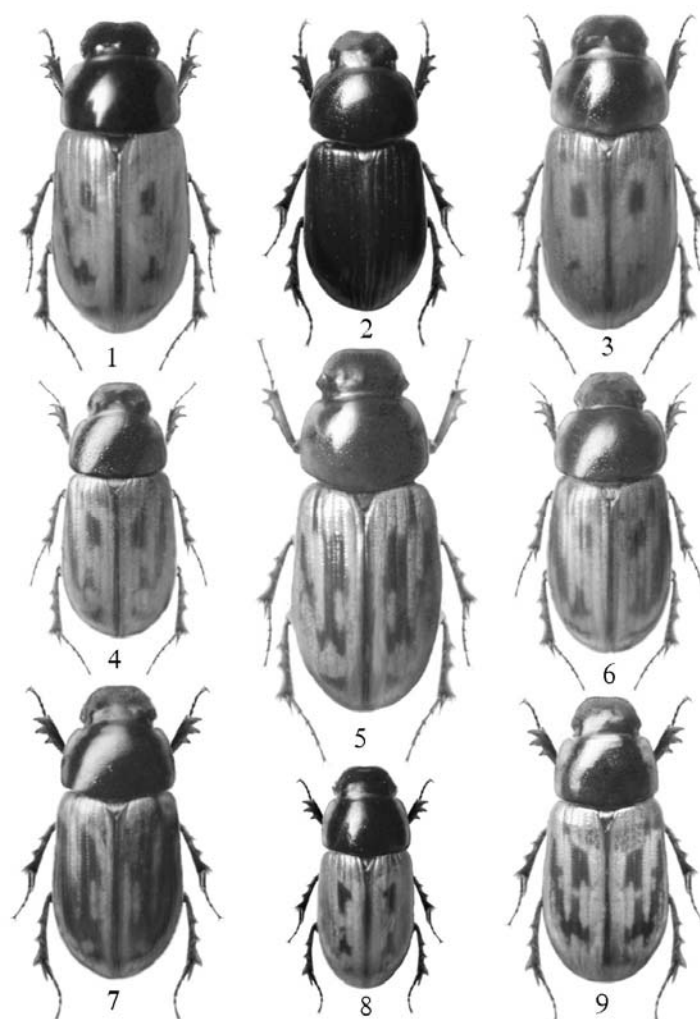


Fig. 1–9. *Aphodius*. Habitus of males: 1 — *A. altaicus*; 2 — *A. kerzhneri*; 3 — *A. mongolaltaicus*; 4 — *A. alexis*; 5 — *A. chandmanicus*; 6 — *A. jacobsoni*; 7 — *A. grafi*; 8 — *A. comma*; 9 — *A. tanhensis*.

Рис. 1–9. *Aphodius*. Габитус самцов: 1 — *A. altaicus*; 2 — *A. kerzhneri*; 3 — *A. mongolaltaicus*; 4 — *A. alexis*; 5 — *A. chandmanicus*; 6 — *A. jacobsoni*; 7 — *A. grafi*; 8 — *A. comma*; 9 — *A. tanhensis*.

***A. (Chilothorax) mongolaltaicus* Nikolajev, 1984 (fig. 3, 11, 14, 23)**

Material examined. Holotype { labeled «МНР [Mongolia], Ю. бер. оз. Дунд-Нур [south shore of Dund Nuur lake], окр. Цаган-Нура [near Sagaannuur], 2.07.1978, Гурьева [Gurjeva leg.]» (ZISP); paratype } labeled «МНР, р. Дзабхан, 45 км С. З. Дэлгера [Dzabkhan riv., 45 km NW from Delger], 23.8. 1978, Гурьева» (ZISP).

Bajan-Ulgij: Tolbo-nuur, 1.07.1968, 1 spm. (exp. Z. Kaszab, DKCP); Gov'-Altaj: 12 km E from Jesonbulag, h=2220 m, 1 spm. (exp. Kaszab, DKCP).

Differential diagnosis. The species differs from all Mongolian *Chilothorax* species by relatively big eye, and by the relatively slender fore tibia with slightly convex inner margin (except for *A. kerzhneri* Nikolajev).

Distribution. Mongolia, South-Western Siberia (Altai mts.).

Note. This species was originally described in the subgenus *Pseudacrossus* on the basis of having the lower spur of middle tibia truncate in the male. However, examination of available male specimens, including the holotype, has shown that the lower

spurs of middle tibiae are acute, not truncate, and at least half as long as the upper spur, or longer.

***A. (Chilothorax) jacobsoni* W. Koshantschikov, 1911 (fig. 6, 15, 19)**

**Material examined.** Lectotype (here designated) { labeled «С. В. Монголия, хр. Хангай [North-Eastern Mongolia, Hangaj mts.], Потанин [Potanin leg.]», "A. Jacobsoni v. Georgi m." (ZISP); 10 paralectotypes: 6 { and 4 } with the same data (ZISP).

Bajanhongor: Orog nuur [lake], 3–14.06.1926, 2 spm. (ZISP); Uvurhangai: Hoolt, 16–27.07.26, 1 spm. (ZISP); Umnegov: Dalanzadgad, 06.1964, 1 spm. (Muche, ДКСР).

**Differential diagnosis.** The species is similar to *A. alexis* Frolov, sp. n. and *A. grafi*; differs from the first by the shape of the parameres, and by the glabrous disc of metasternum; and from the second by the shape of the parameres and angulate genae in female.

**Distribution.** Mongolia, Russia (Southern Siberia).

***A. (Chilothorax) alexis* Frolov, sp. n. (fig. 4, 20)**

**Type material.** Holotype { labeled «С. В. Монголия, хр. Хангай [North-Eastern Mongolia, Hangaj mts.], Потанин [Potanin leg.]», "A. Jacobsoni, v. Alexis {, m."; 9 paratypes: 3 { with the same data; 4 { labeled «С. В. Монголия, хр. Хангай, Потанин», "A. Jacobsoni, m. {"; } labeled «С. В. Монголия, хр. Хангай, Потанин», "A. Jacobsoni, v. Georgi {, m."; } labeled "Mongol. Changai geb. Potanin". All specimens deposited in ZISP.

**Description.** Holotype { (fig. 4). Head brown, shiny, punctures unequal, relatively dense. Frons not tuberculate, frontal suture widely broken at the middle. Clypeus very faintly sinuate at middle, widely rounded at sides. Genae angulate. Pronotum brown, shiny, with unequal punctures, widely light brownish on sides; sides and base bordered; hind angles rounded; lateral margins pubescent with sparse hairs. Scutellum brown, shiny, punctured, with hairs posteriorly (hairs are best viewed with oblique lighting). Elytra lightly brown, shiny, with brown spots on interstices 3–7. Striae deep, with large punctures; interstices feebly convex, finely punctured. Sides and apices of elytra finely covered with short hairs. Ventrums of body brown, femora and tibiae slightly lighter. Disc of metasternum pubescent. Apical spur of fore tibia acute and curved downward. Apical spurs of middle tibia slender and long; lower spur slightly more than half the length of the upper. First segment of hind tarsi as long as upper apical spur of tibia and a bit longer than two following segments together. Adjoining apical setae of hind tibiae short and equal except for some outermost ones. Parameres with auriculate extensions (fig. 20). Body length 5.4 mm.

Female can be separated from male by the narrower pronotum, denser punctures on pronotum and head, and by the presence of finer pubescence on the elytral apices.

Body length of paratypes 4.6–5.5 mm.

**Differential diagnosis.** The species is similar to *A. jacobsoni* and *A. grafi*; differs from first by the paramere shape, and by the pubescent disc of metasternum; and from second by angulate genae (female), and by the shape of parameres. From both species, it may be separated by scutellum possessing short light recumbent hairs posteriorly (the hairs may be abraded in some individuals and consequently this is probably not a reliable diagnostic character).

**Etymology.** The name of one variation, designated on the original labels by W. Koshantschikov, was used as the name of the new species.

***A. (Chilothorax) grafi* Reitter, 1901 (fig. 7, 17)**

= *A. boreomongolicus* Nikolajev, 1984, **syn. n.**

**Material examined.** *A. boreomongolicus*: holotype { and paratype { labeled "Uvs, Bukhmuren, 1978.VII.7, Puntsagdulam [leg.]" (ZISP).

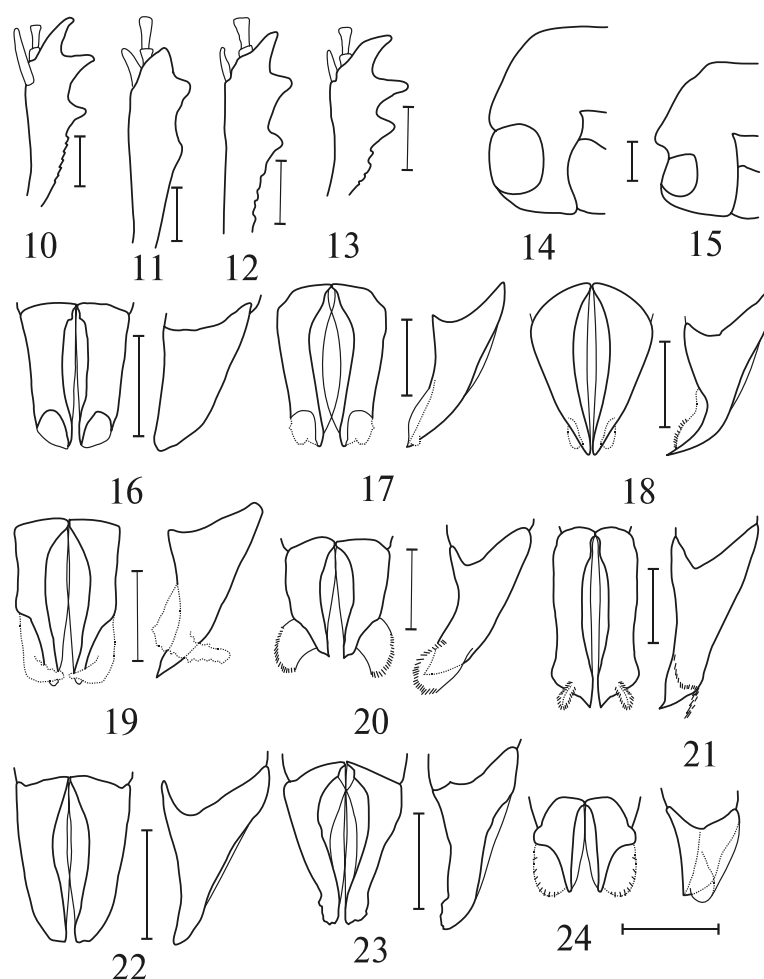


Fig. 10–24. *Aphodius*. 10–13 — fore tibiae of males: 10 — *A. altaicus*; 11 — *A. mongolaltaicus*; 12 — *A. kerzhneri*; 13 — *A. comma*. 14, 15 — head in ventral view: 14 — *A. mongolaltaicus*; 15 — *A. jacobsoni*. 16–24 — parameres in dorsal and lateral view: 16 — *A. altaicus*; 17 — *A. grafi*; 18 — *A. tanhensis*; 19 — *A. jacobsoni*; 20 — *A. alexis*; 21 — *A. chandmanicus*; 22 — *A. kerzhneri*; 23 — *A. mongolaltaicus*; 24 — *A. comma*.

Рис. 10–24. *Aphodius*. 10–13 — передняя голень самцов: 10 — *A. altaicus*; 11 — *A. mongolaltaicus*; 12 — *A. kerzhneri*; 13 — *A. comma*. 14, 15 — голова снизу: 14 — *A. mongolaltaicus*, 15 — *A. jacobsoni*. 16–24 — парамеры сверху и сбоку: 16 — *A. altaicus*; 17 — *A. grafi*; 18 — *A. tanhensis*; 19 — *A. jacobsoni*; 20 — *A. alexis*; 21 — *A. chandmanicus*; 22 — *A. kerzhneri*; 23 — *A. mongolaltaicus*; 24 — *A. comma*.

Bajan-Hongor: Holbogiin-nur, 30 km N Orog-nuur [lake], 4.07.1973, 2 spm. (Medvedev); Uvs: Bukhmuren, 1978, 1 spm.; Hovd: Zhargalant, 22.07.1926, 7 spm. (Kozlov); Umnegov: Huryn-Halha-nuru, 25 km W Nojon [Hovuun], 20.06.1973, 2 spm. (Medvedev); Hovsgol: Sumber, 13.07.1975 (Gur'eva). All specimens deposited in ZISP.

**Differential diagnosis.** The species is similar to *A. jacobsoni* W. Kosh., *A. alexis* sp. n., and *A. tanhensis* sp. n.; differs from the first by the pubescent disc of metasternum in both sexes. Males of these four species can easily be separated by the shape of parameres and their extensions. At best, females are difficult to identify.

**Distribution.** Russia (Altai mts.), Mongolia.

**Note.** The original description of *A. boreomongolicus* was based on the series of three specimens from Bukhmuren, Uvs aimak. The species was conditionally placed in the subgenus *Nobius* Muls. et Rey. Having examined these type specimens I could not detect any essential characters, including in the shape of the parameres, which would

allow me to distinguish *A. boreomongolicus* from *A. grafi*, inhabiting the same regions of Mongolia and contiguous territories of Russia. According to the original description (Nikolajev, Puntsagdulam, 1984: 155) the main character to distinguish *A. boreomongolicus* from similar species (*A. grafi*, *A. kerzhneri*, *A. altaicus*) was the monotonous brown color of elytra. But having examined the large series of *A. grafi* I found that the elytral pattern of this species vary greatly. In this context, I suppose that the type specimens of *A. boreomongolicus* are in fact uncommonly melanized individuals of *A. grafi*.

***A. (Chilothorax) tanhensis* Frolov, sp. n. (fig. 9, 18)**

**Type material.** Holotype { labeled «МОНГ. [Mongolia] 21.V.[18]94 Нарасней [Narasnej-Zakh, Selenge aimak] Кш [Kashkarov leg.]», "Volinus nigrivittis Solsky, W. Koshantschikov det" (ZISP); 23 paratypes: { with the same data (ZISP); 5 { with the same data but without the labels of W. Koshantschikov (ZISP); { and 14 } labeled «кл. Танхе, с.-з. МОНГ. [NW Mongolia, Uvs aimak, Tanhe spring, near Ulaan-gom] 23.V.[19]23, Севко, Сизова [Sevko and Sizova leg.]» (ZISP); { and } labeled "Mongolia 27.6.[19]90 Ulaanbaatar airport D. Král lgt", "coll. D. Král" (DKCP).

**Description.** Holotype { (fig. 9). Head dark brown, shiny, densely punctate. Frons not tuberculate. Clypeus very feebly sinuate at middle, rounded at sides. Genae small, angulate. Pronotum dark brown on disc, light brownish on sides, shiny, with equal punctures; sides and base bordered; hind angles rounded; lateral margins pubescent with sparse short hairs. Scutellum brown, densely punctured. Elytra yellowish brown, shiny, with a pattern of longitudinal brown spots (of the same color or slightly lighter than pronotal disc) on interstices 3–8. Striae fine; punctures of striae bigger in diameter than width of the stria; interstices feebly convex, punctured. Sides and apices of elytra finely pubescent with very short, almost invisible hairs. Ventrums of body brown, femora and tibiae slightly lighter. Disc of metasternum slightly concave, pubescent with dense hairs. Apical spur of fore tibia acute and curved downward. Apical spurs of middle tibia slender and long; lower spur more than half the length of the upper. First segment of hind tarsi as long as upper spur of tibia and a bit longer than two following segments together. Most of adjoining apical setae of hind tibiae short and of equal length, but some setae relatively long. Parameres with short extensions, their apices slender and acute (fig. 18). Body length 5.5 mm.

Female can be separated from male by the narrower pronotum, and denser punctures on pronotum and head.

Body length of paratypes 5.2–5.6 mm.

**Differential diagnosis.** The species is similar to *A. grafi* Reitt. The only reliable character separating the two species is the shape of the parameres. In the series examined, females of *A. grafi* had the genae more protruding than the eyes, whereas females of *A. tanhensis* Frolov, sp. n. had the genae less protruding than the eyes; however, this character may prove to be unreliable.

**Distribution.** Mongolia. According to the figures of parameres of *A. grafi* in the work of Nikolajev and Puntsagdulam (1984: 139), which quite correspond to the parameres of *A. tanhensis* Frolov, sp. n., the data on distribution of *A. grafi* perhaps belong, at least partly, to *A. tanhensis* Frolov, sp. n., and the latter is distributed also in Hovd, Gov'-Altaj, and Bajanhongor aimaks.

**Etymology.** The name of the new species was derived from the toponym "Tanhe".

***A. (Chilothorax) comma* Reitter, 1892 (fig. 8, 13, 24)**

**Material examined.** Tov: Songino, SW Ulaanbaator, 18.06.1967, 14 spm. (Zaitsev); northern slope of Bogdo Uula mts., near Ulaanbaator, 15.06.1967, 1 spm., 29.06.1967, 1 spm. (Zaitsev), 29.06.1967, 1 spm. (Kerzhner); Ulaanbaator, 11.06.1967, 1 spm (Emel'yanov), 19.06.1967, 1 spm. (Kerzhner); Nalajh, 25.06.1967, 3 spm. (Kerzhner); Kerulen, 1.06.1976, 5 spm. (Kerzhner), 1 spm. (Gur'eva); Hovsgol: Achimag nur, 25 km E Muren, 27.06.1968, 1 spm. (Kozlov); Uvs: Hyargas nuur, 3.07.1978, 1 spm. (Puntsagdu-

lam); Dornod: 15 km N Hoh nor, 28.06.1976, 4 spm. (Gur'eva); Herlen gol, near Hulen-Bujra, 3.06.1976, 6 spm. (Gur'eva); Galin gol, 33 km SE Halh gol, 10.06.1976, 6 spm. (Gur'eva); Numregin gol, 32 km SE Salhid Ondor mts., 16.06.1976, 5 spm. (Gur'eva); Bulgan: 5 km W Bajannuur, 16.06.1976, 5 spm. (Gur'eva); Tuul gol, Zaamryi uuliaas, 23.06.1978, 1 spm. (Puntsagdulam); Gov'-Altaj: 45 km SW Bajan, 17.06.1980, 1 spm. (Puntsagdulam); Dzabhan: Songino, 12.06.1980, 1 spm. (Puntsagdulam); Uverhangaj: 50 km W Arvajheer, 13.06.1980, 3 spm. (Medvedev); Ongijn Gol, 14.07.1926, 1 spm. (Kirichenko). All specimens deposited in ZISP.

**Differential diagnosis.** The species differs from all other Mongolian *Chilothorax* species by the shape of parameres and the relatively small size.

**Distribution.** Northern Kazakhstan, Transbaical region, Mongolia.

#### **A. (*Chilothorax*) *chandmanicus* Frolov, sp. n. (fig. 5, 21)**

**Type material.** Holotype { labeled «Монголия СВ, Чандмань [North-Eastern Mongolia, Hovd aimak, Chandman'], 10.VII.1980, Г. Медведев [G. Medvedev leg.]» (ZISP); 3 paratypes: 2 { with the same data (ZISP); { labeled "Mongolia, Chovd aimak, Jamatin Dolon, cca 40 km N von Somon Manchan am SW Ecke des Char us nuur 1200 m, Exp. Dr. Z. Kaszab, 1966", "Nr. 673, 11.VII.1966" (DKCP).

**Description.** Holotype { (fig. 5). Head brown, shiny, sparsely punctured. Frons not tuberculate. Clypeus sinuate at middle, rounded at sides. Genae angulate. Pronotum brown, shiny, sparsely irregularly punctured, lightly brownish on sides; sides and base bordered; hind angles rounded; lateral margins pubescent with long hairs. Scutellum triangular, brown, shiny, with sparse punctures. Elytra lightly yellowish brown, shiny, with longitudinal brown spots on interstices 3–7. Striae deep, with big punctures; interstices feebly convex, punctured. Sides and apices of elytra finely pubescent with minute hairs. Ventrums of body light brown. Disc of metasternum pubescent. Fore tibia slender, its apical spur acute and curved downward. Apical spurs of middle tibia slender and long; lower spur more than half the length of the upper. First segment of hind tarsi as long as or a bit longer than upper tibial spur and as long as two following segments together. Adjoining apical setae of hind tibiae unequal, relatively short. Parameres with extensions (fig. 21). Body length 6.7 mm.

Female unknown.

Body length of paratypes 6.4–6.7 mm.

**Differential diagnosis.** The species differs from all Mongolian *Chilothorax* species by its larger size and by paramere shape.

**Etymology.** The name of the new species was derived from the toponym "Chandman".

#### **Acknowledgements**

I would like to thank Dr. Hans Fery (Berlin), Dr. Oleg Kabakov (St. Petersburg), Dr. Izyaslav Kerzhner (St. Petersburg), Dr. David Král (Praha), Dr. Georgy Nikolajev (Almaty), Dr. Karla Schneider (Halle), and Dr. Alexey Solodovnikov (St. Petersburg) for valuable help. Special thanks are due to Dr. Paul Lago (University of Mississippi) for linguistic review of the manuscript and to Mr. Kirill Dowgailo (Minsk) for help in preparation of photographs of the beetles.

*Nikolajev G. V., Puntsagdulam Z. Platinchatousye Mongol'skoi Narodnoi Respubliki // Nasekomye Mongolii. — 1984. — 9. — P. 90–294 (in Russian).*