



Review of the genus *Cystocnemis* (Coleoptera: Chrysomelidae: Chrysomelinae) with descriptions of two new species

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Abstract

Two new species of *Cystocnemis* (s. str.) Motschulsky, 1860 namely *C. levmedvedevi* sp. nov. and *C. zintshenkoi* sp. nov. are described from the Mongolian Altai (Mongolia, Hovd aimag) and Southern Altai (Kazakhstan, East-Kazakhstan region) respectively. Generic diagnosis as well as key to species and subspecies of *Cystocnemis* are provided. Zoogeographical affinities of Entomoscelini are discussed.

Key words: Chrysomelidae, *Cystocnemis*, *Entomomela*, new species, Mongolian Altai, Southern Altai, Dzhungaria

Introduction

The chrysomeline tribe Entomoscelini (sensu Kippenberg 2010) contains 12 genera, out of which *Entomoscelis* Chevrolat, 1836, *Cystocnemis* Motschulsky, 1860, *Xenomela* Weise, 1884 and *Oreomela* Jacobson, 1895, were considered as sister groups by Lopatin (1989) and are closely related. *Potaninia* Weise, 1889, *Suinzona* Chen, 1931 and *Taipinus* Lopatin, 2007 form another generic cluster (Ge *et al.* 2011) related to the previous group. However, elucidating precise relationships require further phylogenetic analysis within the Entomoscelini which is not addressed here.

Among the above genera, *Entomoscelis* has the widest Holarctic distribution, with just one species, *E. americana* Brown, 1942, occurring in the Nearctic Region. Occurrence of the remaining 12 species of *Entomoscelis*, including the newly described ones from China (Ge *et al.* 2009), and the residual genera, such as *Cystocnemis*, are limited to the Palaearctic Region. Within the Palaearctic, they are concentrated in the Central Asiatic Subregion of the Sahara-Gobian Desert Region and the Scythian Steppe Region (biogeographic subdivisions of Krivokhatsky & Emeljanov 2000).

Oreomela is the most speciose genus of Entomoscelini with over 80 species. It is distributed through out the high mountains of Central Asia, with the centre of diversity in Tien-Shan (Lopatin & Nesterova 2004) having the mountains of South Siberia as its northern limit (Mikhailov 2007). *Cystocnemis* and *Xenomela* occupy an intermediate position between the unspecialized *Entomoscelis* and the highly specialized *Oreomela* (Jacobson 1926; Lopatin 1989). *Xenomela* comprising 11 species, the subject of recent revisions (Lopatin 1989, 2010), is distributed only in Tien-Shan.

Cystocnemis has remained unrevised so far and the same three species that Jacobson (1926) attributed to this genus are included in the new *Catalogue of Palaearctic Coleoptera* (Kippenberg 2010). However, only two of the three described species are sufficiently well defined to be included here as the position of *Cystocnemis koslovi* Jacobson, 1926 is still unclear. This species is known only from a pair of specimens collected in 1908 by the Mongolian-Sichuanian expedition of Petr Kozlov from the Alashan Mountains in China. Moreover, black color with metallic tinge, as is the case in *C. koslovi* (Jacobson 1926), is atypical for the genus *Cystocnemis*. Lack of other known conspecific or at least congeneric representative in this region prevents us from treating this species here, which is also not included in the key.

New discoveries over the last two decades from Eastern Kazakhstan, Russian and Mongolian Altai have, nevertheless, made possible a better understanding of the genus. For example, Mikhailov (2013) suggested that the type species, *Cystocnemis discoidea* (Gebler, 1830), is geographically variable and is a mixture of four subspecies. The alpine subspecies *C. discoidea oreas* Mikhailov, 2013 displayed clear similarity with representatives of *Oreomela* from the subgenus *Entomomela* Jacobson, 1926, such that Mikhailov (2013) transferred this subgenus from *Oreomela* to *Cystocnemis*, which now consists of two subgenera.

The similarity of the alpine representatives of the two subgenera explains the difficulties in identification of *Cystocnemis* species from Mongolian Altai. The first record of *C. discoidea* from this region (Medvedev & Voronova 1977) was later considered as a misidentification (Medvedev 1982) and was corrected as *Oreomela* (*Entomomela*) *arnoldii* Lopatin, 1974. However, Dubeshko & Medvedev (1989) subsequently restored its initial position, which clearly is a mistake. Our studies confirmed the occurrence of two species of *Entomomela* in the Mongolian Altai but not that of *C. discoidea*.

New material collected by the Altai State University expeditions by the second author (EVG) in the poorly studied Dzhungarian macroslope of the Mongolian Altai (1999–2012) has provided the opportunity for a more complete review of *Cystocnemis*. Taxa collected include a new species of *Cystocnemis* from the Arshantyn-Nuruu mountains and an unusual form within the subgenus *Entomomela* from the Upper Kobdo Gol River. Additional material collected by R.V. Yakovlev (Barnaul) in the Southern Altai was useful to clarify issues within *Cystocnemis*.

Standard procedures were followed in the dissection of genitalic structures. The following measurements were made with an ocular grid mounted on an MBS–10 binocular microscope at 16x magnification: *Lb*—body length (from the anterior margin of pronotum to the elytral apices), *Wb*—body width (the widest part of elytra), elytral length, length and width of pronotum, length and width of fore tarsi. Morphology of the ventral hairy brush on tarsi of each species was studied. For ease of comparison of the character of pronotal and elytral punctation, types of punctures are designated by numerals: fine (0), medium-sized (1), large (2), very large (3) and crateriform (4).

Holotypes of the new species are deposited in the Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia (ISEA); paratypes are in the collections of Yuri Mikhailov, Yekaterinburg (YMC) and Elena Gus'kova, Barnaul (EGC). Other type material examined are in the collection of the Zoological Institute of the Russian Academy of Sciences, St.- Petersburg (ZIN).

Genus *Cystocnemis* Motschulsky, 1860

Cystocnemis Motschulsky, 1860: 179 (type species: *Chrysomela discoidea* Gebler, 1830, by original designation).

Cystocnemis: Jacobson 1895: 294–296 (redescription); Jacobson 1926: 233–235 (catalogue); Lopatin 1977: 170–171 (redescription, key to species); Lopatin & Kulenova 1986: 120 (diagnosis, key to species); Lopatin 2010: 246–247 (redescription, key to species); Warchałowski 2010: 541–542 (key to species); Kippenberg 2010: 428 (catalogue).

Oreomela subgen. *Entomomela* Jacobson, 1926: 267 (type species: *Oreomela* (*Entomomela*) *oirata* Jacobson, 1926, by monotypy). Transferred to *Cystocnemis* by Mikhailov 2013: 308.

Cystocnemis subgen. *Cystocnemis* s. str.: Mikhailov 2013: 311.

Cystocnemis subgen. *Entomomela*: Mikhailov 2013: 311 (key to subgenera and species).

Description (modified following Jacobson 1895 and Lopatin 2010).

Body oblong-ovate, more or less convex. Body length of males 4.3–7.1 mm, females 5.1–7.7 mm. Colour of pronotum either uniformly rufous or black or bicoloured: black with rufous edging of various width and shape; elytra usually black with rufous edging or rufous with elongate black spot on disc.

Head subprognathous, frons slightly depressed, delineated from clypeus by thin impression. Eyes elongate. Mandibles short, strongly curved, with sharp tooth on apex. Antenna filiform, slightly widened towards apex, antennomere 2 shortest, antennomeres 7–11 hairy.

Pronotum transverse, without lateral calli, anterior and lateral edges marginate. Basal edge of pronotum slightly arcuately protruding backwards (subgenus *Cystocnemis* s. str.) or slightly arcuately excised (subgenus *Entomomela*). Scutellum wide triangular, acute apically, impunctate.

Elytra ovate, fused along suture, at base not wider than pronotum. Punctation confused, distinctly dual: primary punctures larger and deeper than secondary. Intervals slightly convex, shiny, covered with fine wrinkles. Epipleura gradually tapering, disappearing before apex. Humeral calli absent. Hindwings reduced.

Anterior coxal cavities closed posteriorly. Prosternal process narrow proximally and strongly widening distally. Mesosternum short, prosternum not shorter than metasternum.

Legs thick, tibiae strongly widened towards flattened apices; outer apical angles of middle and hind tibiae roundly truncated, without spur. Claws simple.

Median lobe of aedeagus in dorsal view parallel-sided with trapeziform, sharpened or rounded apex, flagellum very small. Spermatheca U-shaped or falciform. Ovipositor flat, sclerotized.

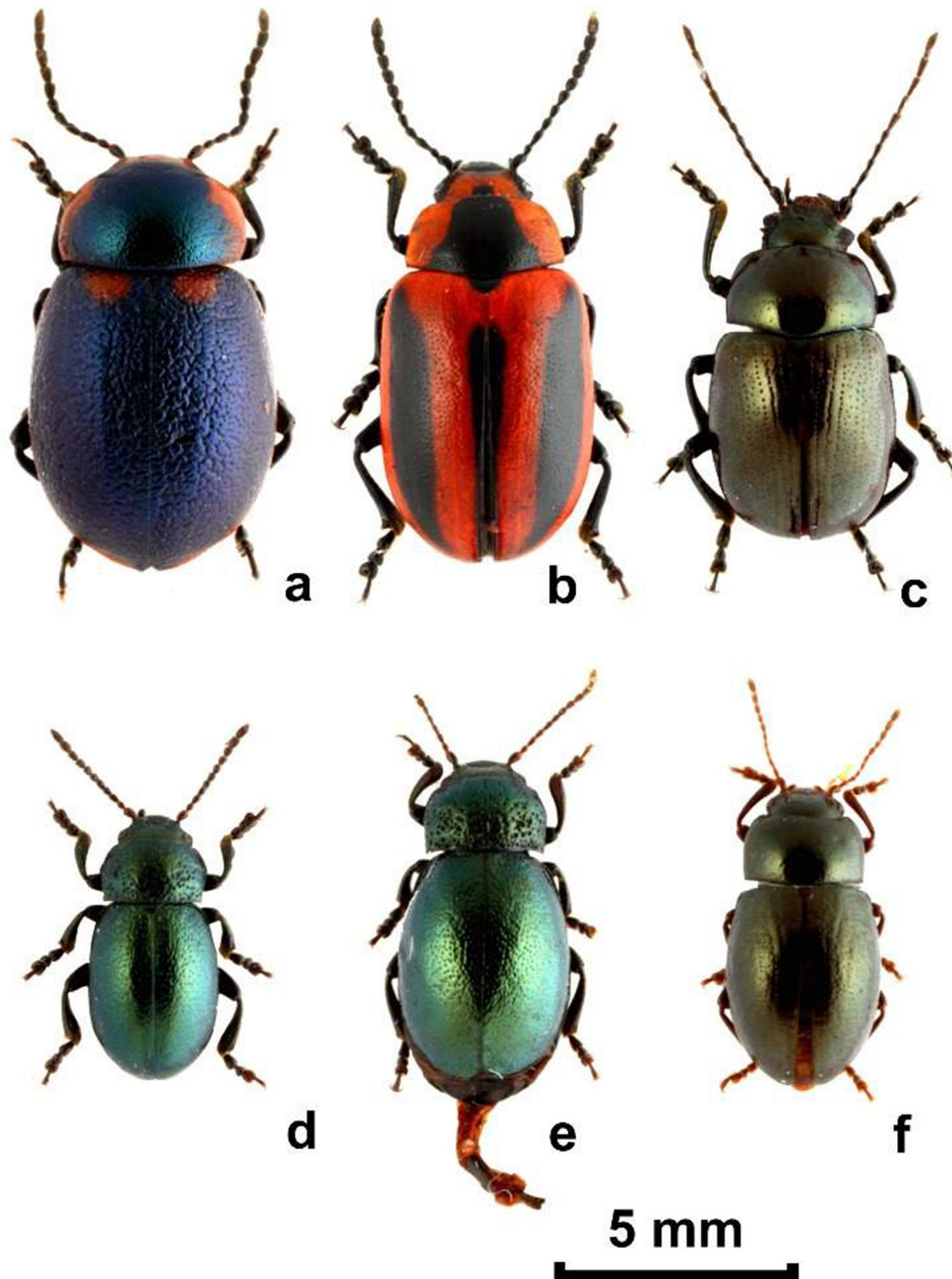


PLATE 1 (FIGURES 1A–F). Representatives of Entomoscelini genera related to *Cystocnemis*. a, *Xenomela kraatzi* Weise, 1884, female, Kyrgyzstan, Jelal-Abad region, Toskool-Ata; b, *Entomoscelis adonidis* (Pallas, 1771), male, Russia, Magadan region, near Ola; c, *Potaninia assamensis* (Baly, 1879), male, China, Yunnan, Gaoligong Shan; d, *Oreomela tuvensis* Mikhailov, 2007, male, paratype, Russia, SE Tuva, upper Ulin-Khan river; e, *Oreomela dudkorum* Mikhailov, 2007, female, paratype, Russia, Altai Mts., Terektinsky Range; f, *Suinzona potanini* (Lopatin, 2002), female (paratype of *Oreomela potanini*), China, Sichuan, W of Lijipin.

Sexually dimorphic with females larger and broader than males, outline slightly divergent posteriorly: in most species, fore and middle tarsi are dilated in males and narrow in females. In males, ventral pubescence reduced

only on hind tarsi, females have bare line on all tarsomeres. Posterior margin of last abdominal ventrite in males W-shaped with oblong depression in middle, last ventrite of females slightly truncated, convex. Male pygidium with truncated or excised apex and only narrow edge of metapygidium visible beneath it; female pygidium rounded or slightly subtriangular.

Differential diagnosis

Species of *Cystocnemis* are similar to those of *Xenomela* (Fig. 1a), but *Xenomela* species have metallic colouration on the upper side and their middle and hind tibiae are truncated so that their outer apical angle bears spur (*Cystocnemis* lacks metallic tinge; outer apical angles of middle and hind tibiae without spur, roundly truncated). Species of *Entomoscelis* (Fig. 1b) and *Potaninia* (Fig. 1c) can be readily distinguished from *Cystocnemis* by the fully developed hindwings and prominent humeral calli (hind wings are reduced and the humerus is flat in *Cystocnemis*).

Oreomela (Fig. 1d) is peculiar with brachelytry (pygidium exposed in both sexes), physogastry in fertile females (abdomen strongly enlarged so that shortened elytra cover it only partially) (Fig. 1e). Since the male pygidium is truncated, convex metapygidium is visible almost entirely beneath it. In *Cystocnemis*, elytra cover pygidium, abdomen in fertile females is not enlarged and in males only narrow edge of metapygidium is visible beneath the pygidium.

Suinzona (Fig. 1f) can be distinguished by its fusiform body and the complicated shape of its robust flagellum of aedeagus (in *Cystocnemis* body oblong-ovate, flagellum of aedeagus is very small and invisible without inflation of endophallus).

Taipinus differs from all the above genera by its strongly convex, rounded body and strongly convex pronotum.

Distribution. Western and southern part of Altai in East Kazakhstan and Russia, Mongolian Altai, Saur-Tarbagatai Mountains and northern part of Dzhungarian Alatau.

One of the authors (Mikhailov 2013) has recently dealt with the previously known species in detail. Hence only descriptions of the new species are included here.

Key to the species and subspecies of *Cystocnemis* Motschulsky, 1860

- 1 Disc of pronotum convex, basal margin of pronotum slightly arcuately protruding backwards. Subgenus *Cystocnemis* Motschulsky, 1890. 2
- Disc of pronotum flattened, basal margin of pronotum slightly arcuately excised. Subgenus *Entomomela* Jacobson, 1926 . . . 8
- 2(1) Pronotum, ventral side and legs uniformly rufous. Male foretarsi narrow 3
- Pronotum bicoloured: black with rufous edging of various width and shape. Male foretarsi dilated 6
- 3(2) Elytral punctation appears homogeneous, as primary ones are only slightly larger than secondary. Elytra uniformly rufous, rarely with blurry dark spot on disc (Fig. 2a). Apex of aedeagus widely rounded, slightly narrowed before apex (Fig. 5). [Saur-Tarbagatai mountains, Dzhungarian Alatau] *Cystocnemis* (*Cystocnemis*) *concolor* (Kraatz, 1879)
- Elytral punctation visibly heterogeneous as primary ones larger and deeper than secondary. Elytra either black with narrow or wide rufous edging, or rufous with elongate black spot having clear-cut edges. Apex of aedeagus trapezoidal or somewhat triangular; if triangular, median lobe visibly narrowed before apex 4
- 4(3) Apex of aedeagus trapezoidal, faintly separated from the rest of median lobe (Fig. 6). Mountains of the Border Dzhungaria [Kazakhstan-China border] *Cystocnemis* (*Cystocnemis*) *discoidea gebleri* (Jacobson, 1897)
- Aedeagus visibly narrowed before its rounded-triangular apex. Southern or Mongolian Altai 5
- 5(4) Body length of males 6.7–7.1 mm. Elytra rufous with elongate black spot on disc (Figs 2c–d). Aedeagus broad with sharpened apex (Fig. 7). Southern Altai (Kurchumsky and Asutau mountain ranges) . . . *Cystocnemis* (*Cystocnemis*) *zintshenkoi* sp. nov.
- Body length of males 5.2–6.2 mm. Elytra black with narrow rufous edging (Figs 2e–h). Aedeagus narrow with rounded apex (Fig. 8). South-West of Mongolian Altai (Arshantyn-Nuruu mountain range). *Cystocnemis* (*Cystocnemis*) *levmedvedevi* sp. nov.
- 6(2) Body length of males 6.1–6.5 mm, females 7.4–7.7 mm, male foretarsi slightly dilated, legs black (Fig. 3a). Eastern Kazakhstan (Kalbinsky mountain range) *Cystocnemis* (*Cystocnemis*) *discoidea jacobsoniana* Mikhailov, 2013
- Body length of males 4.3–5.2 mm, females 5.1–6.0 mm, male foretarsi strongly dilated, legs bicoloured or rufous (Figs 3b–c). 7
- 7(6) Body broader, legs bicoloured (Fig. 3b). Piedmontane form. Western piedmonts of Altai, isolated localities in Central Kazakhstan *Cystocnemis* (*Cystocnemis*) *discoidea discoidea* (Gebler, 1830)

- Body elongate, legs uniformly rufous (Figs 3c-d). Alpine form. Western, Central and Southern Altai *Cystocnemis (Cystocnemis) discoidea oreas* Mikhailov, 2013
- 8(1) Upperside uniformly black (Figs 3e-f). South-Eastern Altai and North of Mongolian Altai *Cystocnemis (Entomomela) oirata* (Jacobson, 1926) - Typical form
- Head and pronotum (at least at sides) brick red, elytra black (entirely or except for lateral margins) 9
- 9(8) Pronotum black with brick red sides (Fig. 3i). Aedeagus with almost straight sides and straight truncated apex (Fig. 10). South of Mongolian Altai (system of Munkh-Khairhny-Nuruu mountains) ... *Cystocnemis (Entomomela) arnoldii* (Lopatin, 1974)
- Pronotum entirely brick red (Figs. 3g-h). Aedeagus with rounded apex and sides (Fig. 9) *Cystocnemis (Entomomela) oirata*—colour morph from North-West of Mongolian Altai

Descriptions of new taxa

Cystocnemis (Cystocnemis) levmedvedevi Mikhailov & Gus'kova, sp. nov.

(Figs 2e-h, 4a-b, 8, 11)

Type material. Holotype, ♂ labelled: 1) W Mongolia, Hovd aimag, Bulgan-gol basin, Arshantyn-Nuruu mts., h=2300 m, 19.07.2009, E. Gus'kova et R. Yakovlev leg., 2) Holotypus, *Cystocnemis levmedvedevi* sp. n., Yu. Mikhailov et E. Gus'kova design., 2012 (ISEA). Paratypes: 8♂♂, 8♀♀: same data as for holotype (YMC, EGC); 1♂: the same locality, 16.06.2012, R. Yakovlev leg. (YMC); 1♂: W Mongolia, Hovd aimag, Bulgan-gol basin, Arshantyn-Nuruu mts., Bayan-gol valley, middle stream of Ulyastain-Sala river, h=1700–2350 m, 11–12.07.2007, E. Gus'kova et R. Yakovlev leg. (EGC).

Description. Head with mouth parts, pronotum, scutellum, margins and epipleura of elytra, legs, antennomeres 1–3 completely and 4–11 basally rufous. Disc of each elytron, narrow margin on base of pronotum black. Rufous emargination of elytra narrowest along suture but considerably wider along lateral edge. Body jet-brown ventrally, antennomeres 5–11 dark brown except rufous base.

Male. Body length 5.2–6.2 mm, width 2.8–3.2 mm. Wingless, elongate, ovate (*Lb/Wb* 1.9). Antenna long, slender, slightly broadened apically; length ratio of antennomeres 1 to 5 equals 7-3-6-6-7. Pronotum transverse, 1.7 times as broad as long, widest at anterior third, sides rounded. Disc evenly covered with punctures of two types: shallow medium-sized (1) and fine (0), that only slightly differ from each other. Single large (2) punctures occur at sides of basal part. Scutellum wide triangular, apically obtuse, impunctate.

Elytra 1.3 times as long as broad at widest part, at base not wider than pronotum. Punctuation confused and consists of two types of punctures: shallow medium sized (1) primary, and fine (0) secondary ones. Almost all punctures connected with fine wrinkles, intervals slightly convex, shiny.

Last abdominal ventrite strongly arcuately protruding backwards in middle of apical edge with well pronounced round depression. Pygidium densely covered with small punctures, its apex truncated; visible apex of metapygidium arcuate, excised.

Fore- and middle tarsi moderately dilated (foretarsi 2.1 times as long as broad). Ventral pubescence of only hind tarsi reduced (see table 1).

Median lobe of aedeagus distinctly narrowed towards rounded triangular apex (Fig. 8).

Female. Slightly larger and wider than male (*Lb/Wb* 1.8), body length 5.9–7.2 mm, width 3.1–4.0 mm. Coloration and punctuation similar to those in male but readily differs in having all tarsi narrow and all tarsomeres with different extent of reduction of ventral brush (see table 1). Scutellum forms equilateral triangle. Last abdominal ventrite with slightly curved apical edge and transverse depression. Pygidium convex, densely covered with deep medium-sized punctures, with subtriangular apex.

Variability. Rarely a black spot is found on disc of pronotum (Figs 2g-h) (in one male and one female among 19 specimens).

Differential diagnosis. *Cystocnemis (Cystocnemis) levmedvedevi* is characterized by the elongate-ovate body and unicolorous rufous pronotum while elytra are strongly melanized (Fig. 2e-f). Such characteristic colouration as well as aedeagus with rounded triangular apex (Fig. 8) readily distinguish the new species from *C. discoidea gebleri* known from Border Dzhungaria. The latter has uniformly rufous pronotum as well, but much less melanized elytra (i.e. rufous emargination wider and discal spot dark brown rather than black) and trapezoidal apex of aedeagus.

Distribution and ecology. (Figs 4a-b, 11). The species is known only from the Arshantyn-Nuruu mountain

range on the south-western slope of the Mongolian Altai. It may occur also on other ranges of similar elevation in the adjacent part of Chinese Altai. All beetles were collected under stones on mountain crests in the zone of highland steppes.

Etymology. The new species is dedicated to Lev Nikandrovich Medvedev, a well-known chrysomelid specialist, who took an active part in the Soviet-Mongolian Complex Biological Expedition from 1969 till 1979 and contributed greatly to the study of the Mongolian fauna.

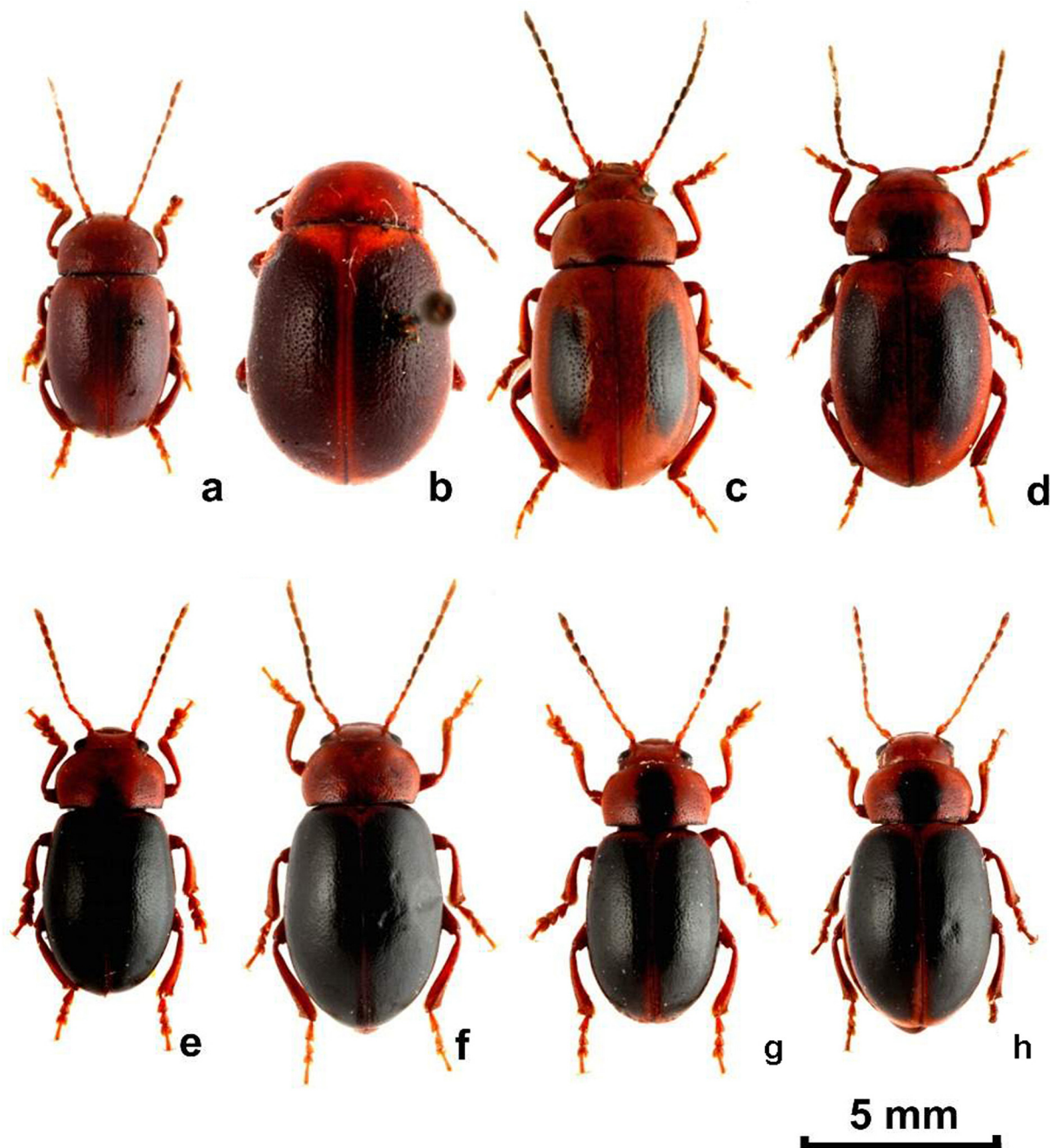


PLATE 2 (FIGURES 2A–H). *Cystocnemis* spp., habitus, dorsal view. a, *C. concolor*, male, Eastern Kazakhstan, Saur Mts., upper Dzhemeni (Zhemenei) river; b, *C. discoidea gebleri* (lectotype of *Cystocnemis gebleri*), female of *amplipennis* form, “Siberia occ.”; c, *C. zintshenkoi* sp. nov., male, holotype, Eastern Kazakhstan, Bukombai Mts; d, *C. zintshenkoi* sp. nov., female, paratype, Eastern Kazakhstan, Asutau Range, Mramornyi pass; e, *C. levmedvedevi* sp. nov., male, holotype, typical form, W Mongolia, Hovd aimag, Arshantyn-Nuruu Mts.; f, *C. levmedvedevi* sp. nov., female, paratype, typical form, the same locality; g, *C. levmedvedevi* sp. nov., male, paratype, colour variation, the same locality; h, *C. levmedvedevi* sp. nov., female, paratype, colour variation, the same locality.

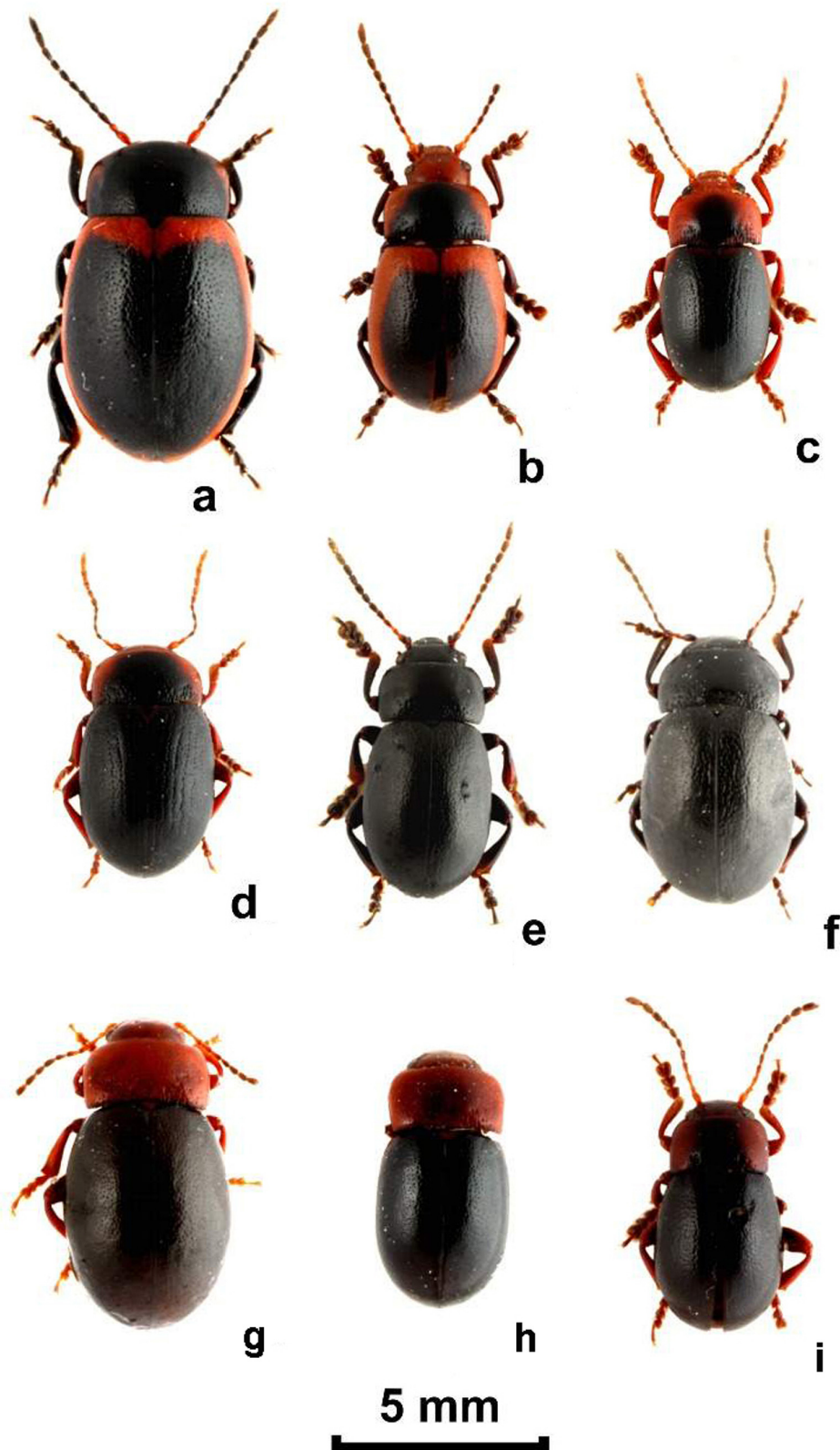


PLATE 3 (FIGURES 3A–I). *Cystocnemis* spp., habitus, dorsal view. a, *C. discoidea jacobsoniana*, female, paratype, Eastern Kazakhstan, Kalbinsky Range, Shubarshoky mt.; b, *C. discoidea discoidea*, male, Russia, Altai Province, Aley river valley; c, *C. discoidea oreas*, male, paratype, Eastern Kazakhstan, Upper Ulba Mt.; d, *C. discoidea oreas*, female, paratype, the same locality; e, *C. (Entomomela) oirata*, male, typical form, Russia, SE Altai, Ukok plateau, Muzdy-Bulak lake; f, *C. (E.) oirata*, female, typical form, the same locality; g, *C. (E.) oirata*, female, bicoloured form, W Mongolia, aimag Bayan-Ölgiy, Hovd river valley; h, *C. (E.) oirata*, male, bicoloured form, the same locality; i, *C. (E.) arnoldii*, holotype, W Mongolia, Hovd aimag, Munkh-Khairkhan Mts.

TABLE 1. Reduction of ventral pubescence on the tarsi in species of *Cystocnemis*.

Subgenus	Species / subspecies	Sex	Hind tarsi			Middle tarsi			Fore tarsi		
			Tarsomeres	I	II	III	I	II	III	I	II
<i>Cystocnemis</i>	<i>C. zintshenkoi</i>	♀	w	w	m	w	w	m	w	w	m
	sp. nov.	♂	w	w	m	m/2	–	–	–	–	–
<i>Cystocnemis</i>	<i>C. levmedvedevi</i>	♀	w	w	m	w	m	m	w	m	m
	sp. nov.	♂	w	m	n	–	–	–	–	–	–
<i>Cystocnemis</i>	<i>C. concolor</i>	♀	w	w	m	w	w	m	w	w	m
		♂	w	m	–	–	–	–	–	–	–
<i>Cystocnemis</i>	<i>C. discoidea</i>	♀	w	w	m	w	m	m	m	m	m
	<i>discoidea</i>	♂	m	n	–	–	–	–	–	–	–
<i>Cystocnemis</i>	<i>C. discoidea</i>	♀	m	m	m	m	m	m	m	m	m
	<i>oreas</i>	♂	m	n	–	–	–	–	–	–	–
<i>Entomomela</i>	<i>C. oirata</i>	♀	w	m	m/2	m	m/2	m/2	m/2	m/2	m/2
		♂	n/2	–	–	–	–	–	–	–	–

Note: Extent of reduction of tarsal ventral pubescence appears as a bare median line of differing width: w—wide, m—medium-sized, n—narrow (if along entire length of tarsomere) or m/2, n/2 (if only in the proximal part of tarsomere); dash (–) denotes ventral pubescence without reduction.

***Cystocnemis (Cystocnemis) zintshenkoi* Mikhailov & Gus’kova, sp. nov.**

(Figs 2c–d, 4c–d, 7, 11)

Type material. Holotype, ♂ labelled: 1) East Kazakhstan, Kurchum distr., Bukombai mts., h=550 m, 48°13’N, 84°43’E, 9–10.06.2012, R. Yakovlev leg., 2) HOLOTYPUS, *Cystocnemis zintshenkoi* sp. n., Yu. Mikhailov et E. Gus’kova design., 2012 (ISEA). Paratypes: 1♂ and 1♀, labelled: East Kazakhstan, Southern Altai, 12 km NE Alekseevka, near Mramornyi pass, 16.06.1997, R. Dudko, V. Zinchenko (YMC).

Description. Rufous with elongate black spot on each elytron; antennomeres 4–11 completely and 3 apically jet-black.

Male. Holotype: body length 7.1 mm, width 4.2 mm. Paratype: body length 6.7 mm, width 3.6 mm. Wingless, elongate-ovate, slightly flattened. Antennae long, slender, slightly broadened apically; length ratio of antennomeres 1 to 5 equals 8-4-7-6-7. Pronotum transverse, 1.7 times as broad as long, widest at basal third, slightly pillow-like, convex, sides evenly rounded, lateral calli absent. Anterior angles rounded, slightly protruding forward, posterior angles obtuse. Disc and lateral slopes finely shagreened, densely and evenly covered with shallow large (2) and medium sized (1) punctures. The groups of very large, but shallow crateriform punctures (4) occur at the sides of basal third.

Scutellum wide triangular, apically obtuse, impunctate.

Elytra fused along suture, with no humeral callus, elliptic, 1.35 times as long as broad at widest part, slightly wider basally than pronotum. Punctures confused, distinctly dual: primary ones shallow and large (2), secondary ones medium-sized (1). Intervals slightly convex, shiny, with slender wrinkles.

Last abdominal ventrite with posterior margin nearly W-shaped, with well pronounced oblong depression in middle. Pygidium densely covered with small punctures, apex of pygidium as well as visible apex of metapygidium truncate.

Tarsi long, very slightly dilated (foretarsi 2.9 times as long as wide). Mesotarsomere 1 and metatarsomeres 1, 2 with broad glabrous line beneath.

Median lobe of aedeagus broad, apex elongate triangular (Fig. 7).

Female. Body length 7.2 mm, width—4.1 mm. Coloration similar to that in male but more reddish. Pronotum covered by shallow large (2) and small (0) punctures. Punctuation of elytra similar to that of male but rather shallow.

Last abdominal ventrite evenly convex longitudinally, with truncated apex. Pygidium convex, with rounded apex.

All tarsi narrow, all tarsomeres with different extent of reduction of ventral pubescence (see table 1).

Differential diagnosis. *Cystocnemis zintshenkoi* sp. nov. can be readily differentiated from other members of the genus by the shape of aedeagus, especially its elongate triangular apex (Fig. 7). In all other species the apex of aedeagus is either somewhat trapezoidal (*C. discoidea*, *C. oirata* and *C. arnoldii*) or more or less rounded-triangular (*C. concolor* and *C. levmedvedevi* sp. nov.).

Among the species with unicolored rufous pronotum, the long and very slightly dilated tarsi distinguish males of *C. zintshenkoi* sp. nov. from *C. discoidea gebleri*, and the pale elytra, with strongly reduced dark spots, distinguish this species from *C. levmedvedevi* sp. nov. having elytra strongly melanized.

Distribution and ecology. (Figs 4c–d, 11) Known only from two localities in Eastern Kazakhstan: Bukombai mountains and Asutau mountain range (Mramornyi pass), both situated on the southern periphery of the Southern Altai at the northern edge of Zaisan Depression. The species may occur on other spurs of Southern and Chinese Altai on the edge of Dzhungarian basin. Type specimens were collected at altitudes ranging from 550 m to 1350 m; holotype collected on the soil of the dry stony steppe slope.

Etymology. Dedicated to Vadim Konstantinovich Zintshenko (ISEA, Novosibirsk) who has contributed considerably to our knowledge of the fauna of Eastern Kazakhstan.

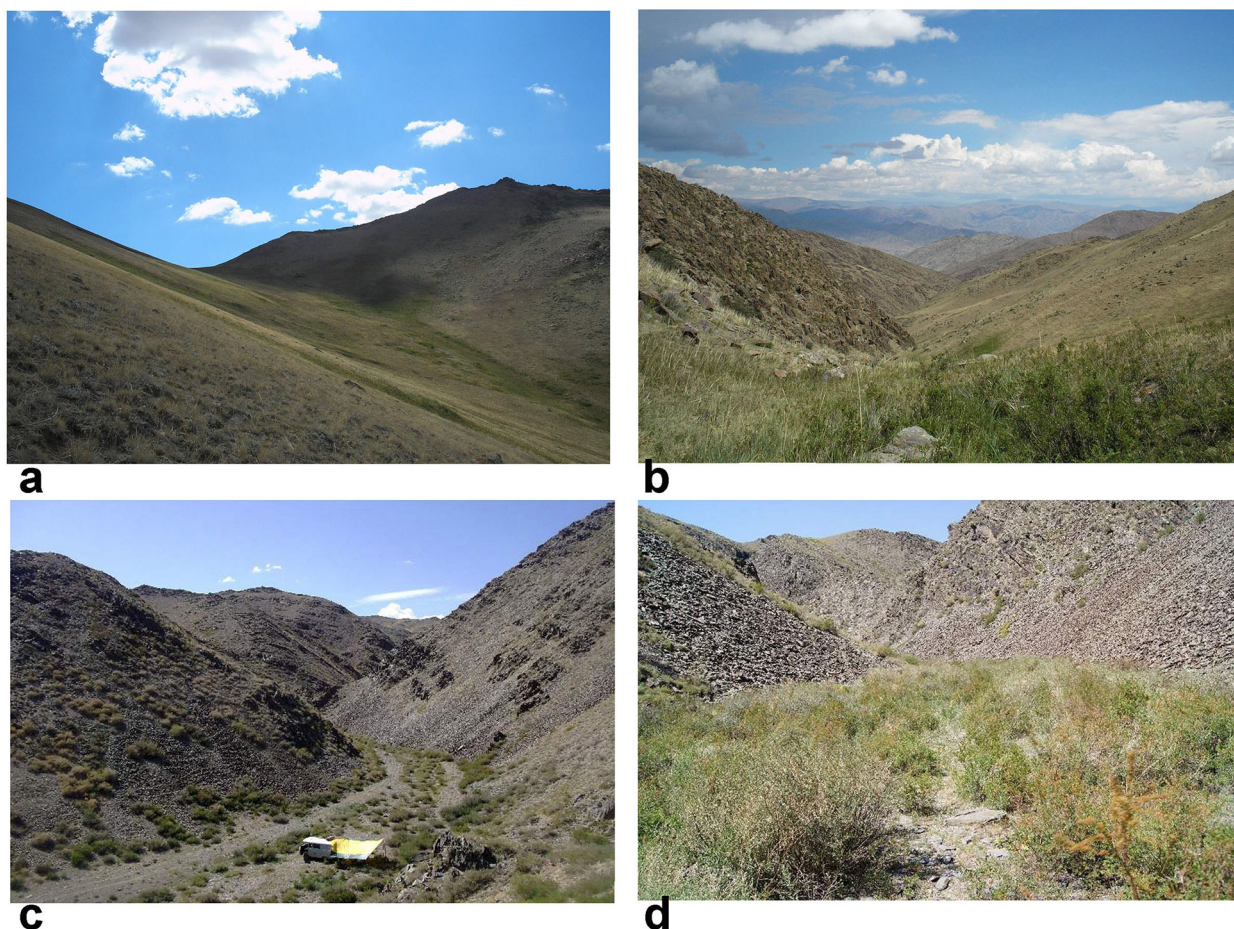


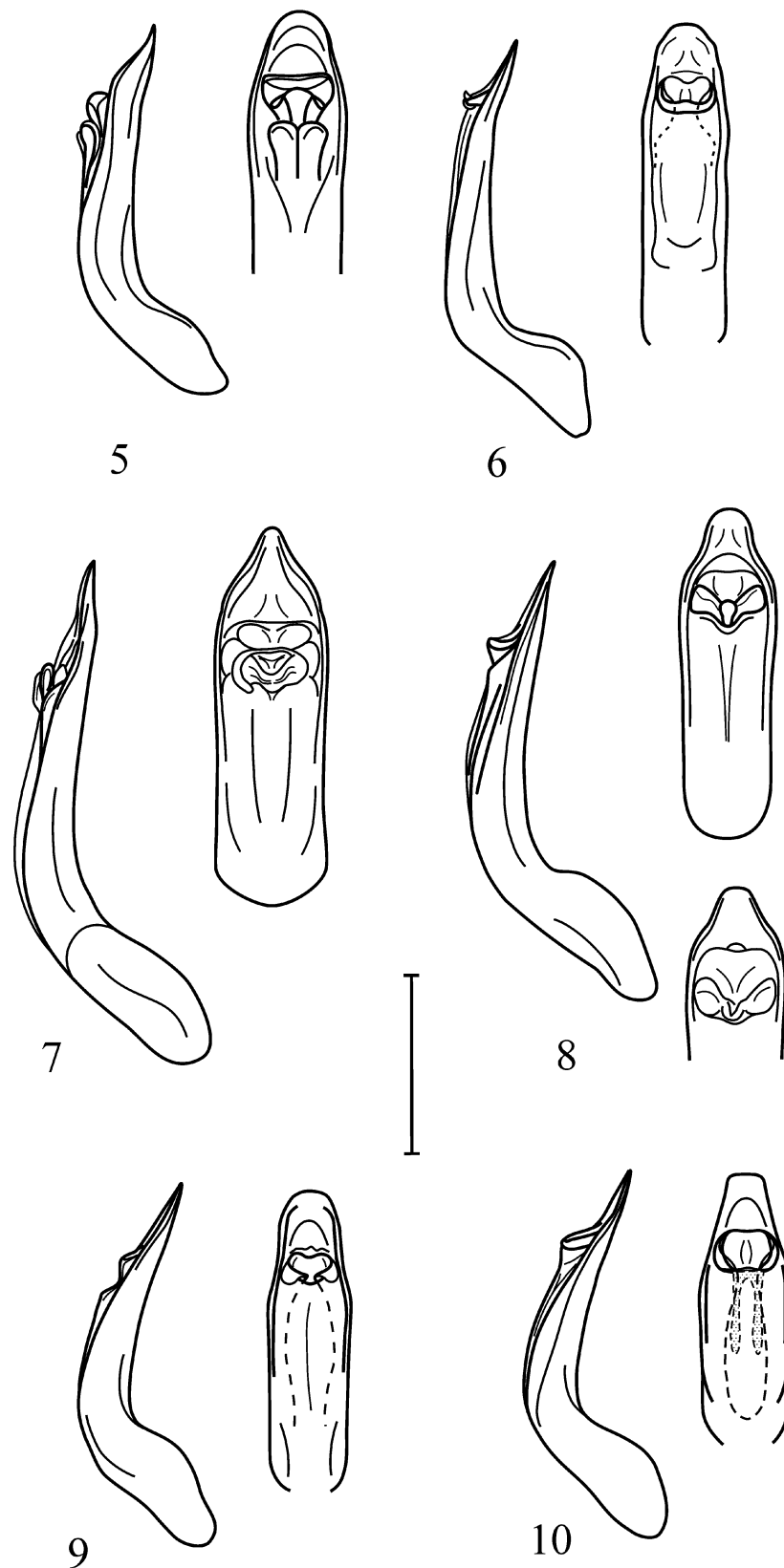
PLATE 4 (FIGURES 4A–D). Habitats in type localities of newly described taxa of *Cystocnemis*. a, b, Arshantyn-Nuruu Mts. (Mongolian Altai, Hovd aimag)—type locality of *C. levmedvedevi* sp. nov.; c, d, Bukombai Mts in Eastern Kazakhstan—type locality of *C. zintshenkoi* sp. nov.

Note on *Cystocnemis* (*Entomomela*) *oirata* (Jacobson, 1926)

(Figs 3e–h, 9, 11)

Material. Typical colour form:

Lectotype (designated in Mikhailov & Dudko 2010), 1♂ labelled: 1) Саксай, прав. прит. Кобдо, Эктаг-Алтай, С.-з. Монголия. Г.Е. Гр.—Гржим. 30.VI–4.VII. 903 [Saksai, right tributary of Kobdo River, Ektag-Altai,



FIGURES 5–10. Aedeagi of *Cystocnemis* spp. in dorsal and lateral view. 5, *C. concolor* (Saur Mountain Range, Karaungir river valley); 6, *C. discoidea discoidea* (Eastern Kazakhstan, Ul'binsk); 7, *C. zintshenkoi* sp. nov., holotype (Eastern Kazakhstan, Bukombai Mts.); 8, *C. levmedvedevi* sp. nov., holotype (W Mongolia, Hovd aimag, Arshantyn-Nuruu Mts.); 9, *C. (Entomomela) oirata*, lectotype (Mongolian Altai, Sagsai river valley); 10, *C. (Entomomela) arnoldii*, holotype (Mongolian Altai, Munkh-Khairkhan Mts.). Scale bar—1.0 mm. (5, 6, 9, 10—from Mikhailov 2013; 7, 8—orig.).

NW Mongolia. G.E. Gr.- Grzhim. 30.VI–4.VII. 903] [handwritten], 2) *oirata* Jobs. [handwritten], 3) Lectotypus *Oreomela* (*Entomomela*) *oirata* Jacobson, 1926, Yu. Mikhailov design., 2008” [red, printed] (ZIN).

2♂♂, W Mongolia, aimag Bayan-Ölgiy, Mongolian Altai, 20 km W Altai, 2850-2950 m, 23.07.1976, L. Medvedev, N. Voronova leg. (LMC); 1♂, 4♀, Russia, Resp. Altai, South-Chuya mt. range, lower Tara river valley, 2200–2400 m, 30.06–4.07.2006, R. Dudko leg. (ISEA, YMC); 2♂♂, 1♀, Russia, Resp. Altai, Ukok plateau, Muzdy-Bulak lake, 2400 m, mt. tundra, 26.06–2.07.2005, A. Barkalov, V. Zinchenko (ISEA, YMC); 1♂, 1♀, Russia, Resp. Altai, Ukok plateau, Kara-Chad river, left tributary of Kalguty river, 2250 m, 12.07.2008, R. Dudko (YMC); 1♂, Eastern Kazakhstan, 15 km NNW of Berel Vill., watershed of Yazovaya and Belaya Berel rivers, 2300–2520 m, alpine belt, 13–14.06.2006, R. Dudko, I. Lyubechanskii (YMC);

New colour form: 1♂, 2♀♀ labelled: W Mongolia, aimag Bayan-Ölgiy, (Kobdo-gol) Hovd river valley, 20 km SW Tsengel, h=1800 m, under stones in the Kobresia mountain tundra, 26–30.07.2009, E. Gus’kova, R. Yakovlev (EGC).

Only a single color form of *C. oirata*, with uniform black dorsum, was so far known from its entire range of distribution (Medvedev 1982; Mikhailov & Dudko 2010; Mikhailov 2013) (Figs 3 e–f). An unusual colour morph with contrasting bichromatic colouration (Figs 3 g–h) was found at Hovd river valley in 20 km SW Tsengel at the comparatively low altitude of 1800 m while the previous material was collected at altitudes of 2200–3000 m.

The new colour form has only elytra black while head, pronotum, prosternum, legs, antennomeres 1–3 completely and 4–6 basally, epipleura and lateral border of elytra, abdominal ventrite 5 and pygidium rufous. Median lobe of aedeagus is similar to that of the lectotype (Fig. 9).

Replacement of the dominant colour form (typical form) commonly occurs in peripheral populations, where a variety of isolation mechanisms operate simultaneously (Novozhenov & Mikhailov 1997). This may explain the occurrence of the bichromatic morph in the valley of the Saksai-Gol river, which is not too far away from the type locality, where the black form alone occurs.

Discussion

The material described above represents the first record of Entomoscelini from the south-western Dzhungarian macroslope of the Mongolian Altai. The majority of previous material was collected on the watershed range and eastern macroslope of the Mongolian Altai, facing the Great Lakes Basin, which represent Tuvinian-Mongolian province of the Steppe Subregion, following botanic-geographical subdivisions of Altai (Kamelin *et al.* 2005). Both new species were found within the separate Altai-Dzhungarian mountain province of the same subregion. In addition to them, the unusual colour form of *C. oirata* was found at the border of the two provinces.

Zoogeographical affinities of the insect fauna, especially Lepidoptera, of the Arshantyn-Nuruu mountains was noted by Yakovlev (2012a). It differs markedly from that of the adjacent parts of Altai, and Yakovlev (2012b) sought to establish it as a distinct zoogeographical district. The peripheral location of the Arshantyn-Nuruu on the north-eastern edge of the Dzhungarian desert, and its isolation from the Mongolian Altai watershed ridge with its south-western spurs by the extensive lowlands of the Bulgan-Gol river valley, may provide an explanation for the uniqueness of the fauna. *Cystocnemis arnoldii* (a rather highland species) was found only to the east from the Bulgan-Gol valley, whereas only the endemic *C. levmedvedevi* sp. nov. occurred in the Arshantyn-Nuruu. The latter species may occur in other ranges of the southern Chinese Altai, still very poorly studied, as it was suggested by Yakovlev (2012a) for other endemic taxa of Arshantyn-Nuruu mountains. Another new species *C. zintshenkoi* sp. nov. was characteristically found at the edge of Dzhungarian Basin as well, but in its north-western part, where the lower ranges of the Southern Altai are situated.

Together with other species, whose distributions are limited by Dzhungarian Gobi and surrounding mountains, both new species form the Dzhungarian faunal complex, as distinguished by Medvedev (1982). This complex also includes the following mountain-steppe species: *Cryptocephalus* (*Asionus*) *stackelbergi* Lopatin, 1971, *Pachybrachis latipes* Lopatin, 1971, *Acolastus lopatini* (Medvedev et Voronova, 1977), *A. medvedevi* (Lopatin, 1977) and one dubious alpine species *Oreomela* (s. str.) *dubeshkoe* Medvedev, 1977. This latter species was described from a single immature female found in the extreme south-west of the Mongolian Altai on the isolated Baitag-Bogdo-Nuruu mountain range (Medvedev & Voronova 1977). Within the large genus *Oreomela* differentiation of species is mainly based on male genitalia and hence, under ICZN, Art. 75.5, it should be regarded

as a *nomen dubium*. Furthermore, *O. dubeshkoae* is the sole representative of *Oreomela* s. str. in the Mongolian Altai, while *Cystocnemis* species are common there. Its generic attribution may thus be doubtful. This can only be clarified with additional material from the Baitag-Bogdo Mountains.

Medvedev (1982) was unsure whether the species of *Entomomela* belonged to the Dzhungarian or Central-Asian faunal complex. Our data suggest that the nominate subgenus *Cystocnemis* belongs to the Dzhungarian (exactly Altai-Dzhungarian) faunal complex while the subgenus *Entomomela* belongs to the Tuvinian-Mongolian.

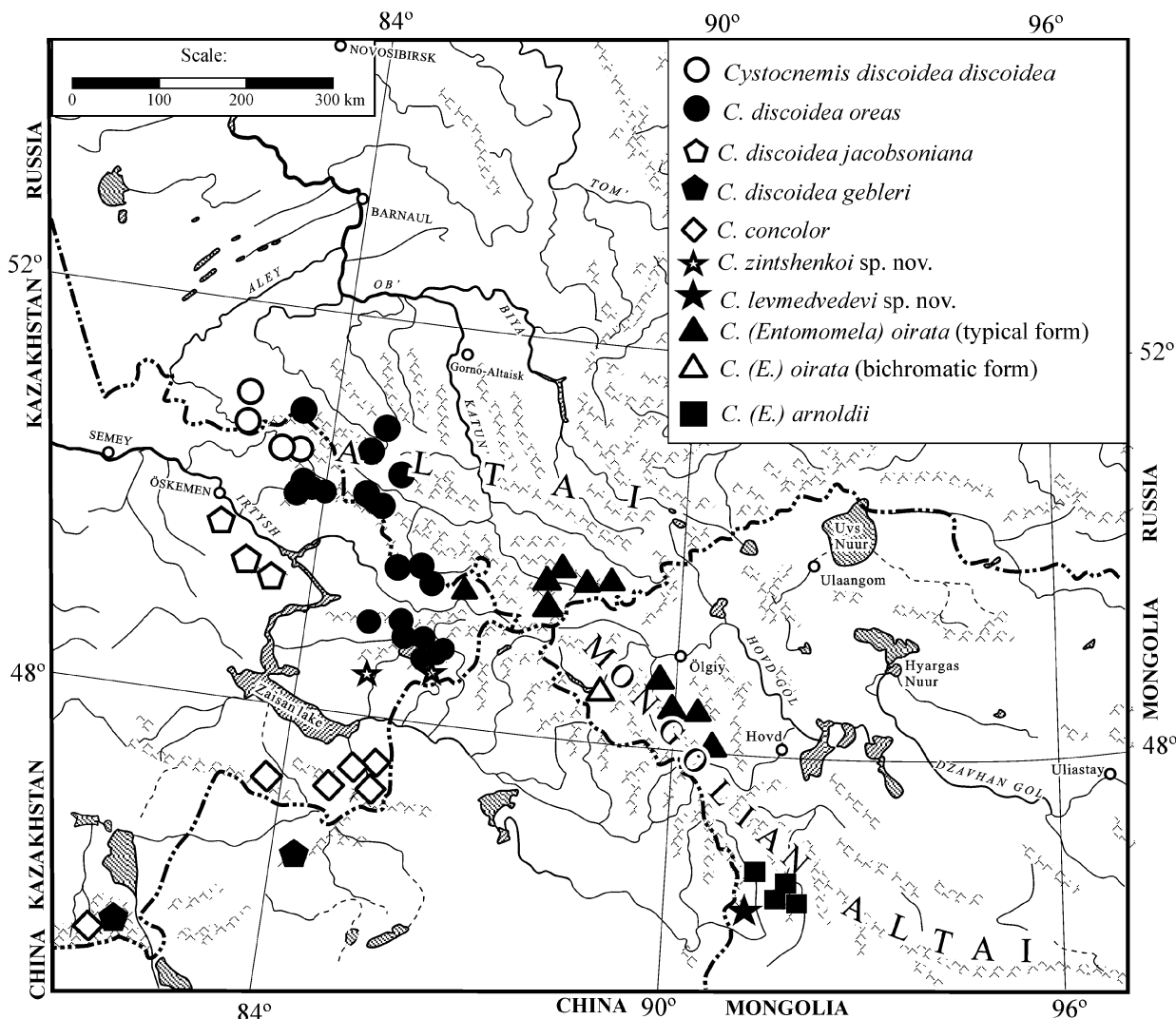


FIGURE 11. Distribution map of *Cystocnemis* species.

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