

A new species of the genus *Menaccarus* from China (Hemiptera: Heteroptera: Pentatomidae)

Zhao-Hui LUO¹⁾ & Nikolai N. VINOKUROV²⁾

¹⁾Key Laboratory of Biogeography and Bioresource in Arid Land and Xinjiang Institute of Ecology & Geography, China Academy of Sciences, 818, South Beijing Road, Urumchi, Xinjiang, 830011, P. R. China; e-mail: luozhaohui@ms.xjb.ac.cn

²⁾Institute for Biological Problems of Cryolithozone, Siberian Branch of the Russian Academy of Science, Prospekt Lenina 41, Yakutsk 677980, Russia; e-mail: n_vinok@mail.ru

Abstract. The genus *Menaccarus* Amyot & Serville, 1843 is recorded for the first time from China and represented by a new species, *M. (Orocephalus) caii* sp. nov. The new species, collected in the Gurbantunggut Desert (Xinjiang), is similar to the Irano-Turanian *M. (Orocephalus) deserticola* Jakovlev, 1900 and it can be distinguished from the latter mainly by characters of the male genitalia.

Key words. Heteroptera, Pentatomidae, *Menaccarus*, new species, Xinjiang, China, Central Asia, Palaearctic Region

Introduction

The genus *Menaccarus* Amyot & Serville, 1843 includes 7 species belonging to three subgenera distributed in the arid regions of the Old World (RIDER 2006). The single member of the nominotypical subgenus, *M. (Menaccarus) piceus* Amyot & Serville, 1843, occurs in the Afrotropical Region (Nigeria, Sudan, Yemen). The remaining 6 species are classified into the subgenus *Oploscelis* Mulsant & Rey, 1852 (1 species) and *Orocephalus* Mulsant & Rey, 1866 (5 species), distributed in the Ancient Mediterranean Subregion of the Palaearctic Region. Three species are known from the territory of the former USSR, namely *Menaccarus (Oploscelis) arenicola* (Scholtz, 1847), *M. (Orocephalus) deserticola* Jakovlev, 1900, and *M. (Orocephalus) divaricatus* Jakovlev, 1877; these were redescribed and keyed by DERZHANSKY (1994) and ISAKOV (2006). PUTHSKOV (1965) recorded the Mediterranean species *M. (Orocephalus) dornianus* (Mulsant & Rey, 1866) from Middle Asia (Turkmenistan, Uzbekistan and Tajikistan) but DERZHANSKY (1994) claimed that it does not inhabit this territory.

No data on the genus *Menaccarus* have been published for the fauna of China. In 2011 the second author collected several specimens of this genus in Xinjiang. They are recognized as representatives of an undescribed species which is described in the present paper.

Material and methods

Specimens were swept in 2011 from grasses in Gurbantunggut Desert during a study on the biodiversity of the true bugs in North-Western China initiated by the Xinjiang Institute of Ecology and Geography of the Chinese Academy of Sciences. Descriptions and figures of the male genitalia were prepared using a Nikon Eclipse 80i upright microscope and a Nikon DXM1200C digital camera. All measurements are in millimeters.

The following abbreviations are used in figures: *a.th.* — apical part of theca; *b.th.* — basal part of theca; *g.s.* — secondary gonopore; *lam.m.* — medial plate of aedeagus; *l.vl.* — ventrolateral lobe of conjunctiva; *ram.l.* — lateral branch of ventrolateral lobe of conjunctiva; *ram.v.* — ventral branch of ventrolateral lobe of conjunctiva; *s.l.* — lateral sclerite of conjunctiva; *tub.d.* — dorsal tubercles of conjunctiva; *ves.* — vesica, *t8* — tergite VIII, *rc* — rectum, *S7* — sternite VII, *t* — tergite VIII, *X* — segment X, *vf8* — valvifers VIII, *vf9* — valvifers IX (after: ISAKOV 2005, TSAI et al. 2011).

The holotype and one paratype are deposited in the collection of the Zoological Institute of the Russian Academy of Science, St. Petersburg (ZISP), the remaining paratypes in the collections of the Xinjiang Institute of Ecology and Geography, Xinjiang, Urumqi (XJIEG) and the China Agricultural University, Beijing (CAU).

The distribution of *M. deserticola* is mapped based on materials in the collection of ZISP kindly communicated by Dr. V. V. Derzhansky (Institute of Zoology, Academy of Sciences of Moldova, Kishinev).

Taxonomy

Menaccarus (Orocephalus) caii sp. nov.

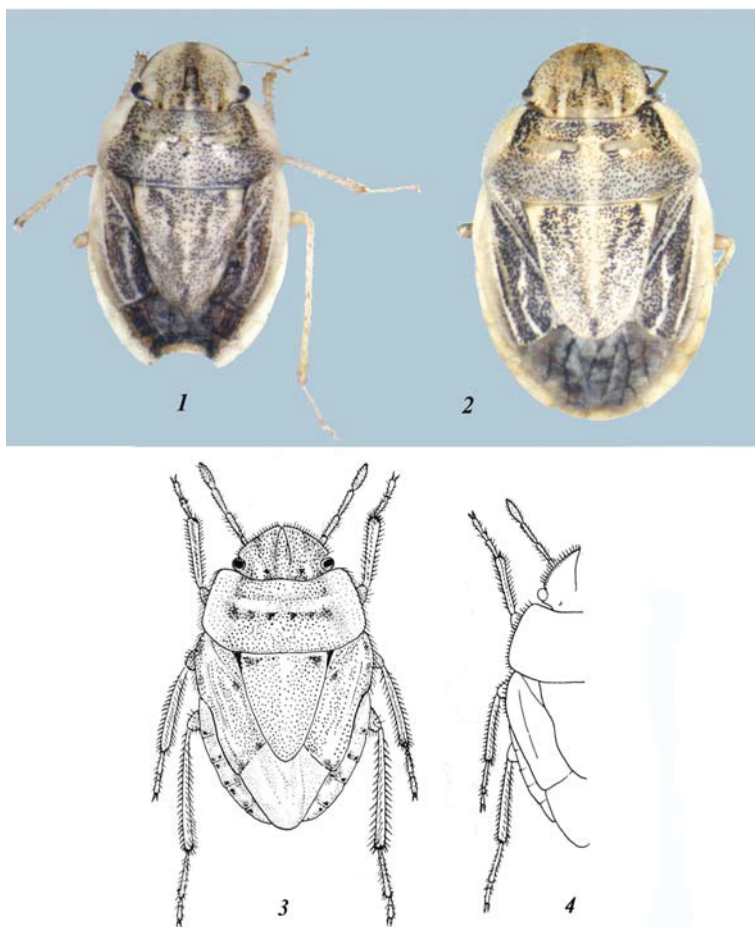
(Figs 1, 2, 5–8, 17–19, 22)

Material examined. HOLOTYPE: ♂, China, Xinjiang-Uyghur Autonomous Region: ‘Gurbantunggut Desert: Road 216 (44°47'N; 88°47'E), 460 m, 26.VI.2011, leg. N. Vinokurov’ (ZISP). PARATYPES: 7 ♀♀, China, Xinjiang-Uyghur Autonomous Region: ‘Gurbantunggut Desert: 25 km N of Fukang (44°27'N; 87°52'E), 25.VI.2011, leg. N. Vinokurov’ (ZISP, XJIEG); 1 ♀, China, Xinjiang-Uyghur Autonomous Region: ‘149tuan, 80 km N of Shihezi (44°46'N, 86°14'E), 290 m, 7.VII.2011, leg. N. Vinokurov’ (CAU).

Description. For measurements see the Table.

Male (Fig. 1). Body oval, flattened, 1.7 times as long as wide, dull sandy yellow, with rather dense brownish black and reddish punctation, without pubescence except for erect bristles on lateral margins of head and pronotum.

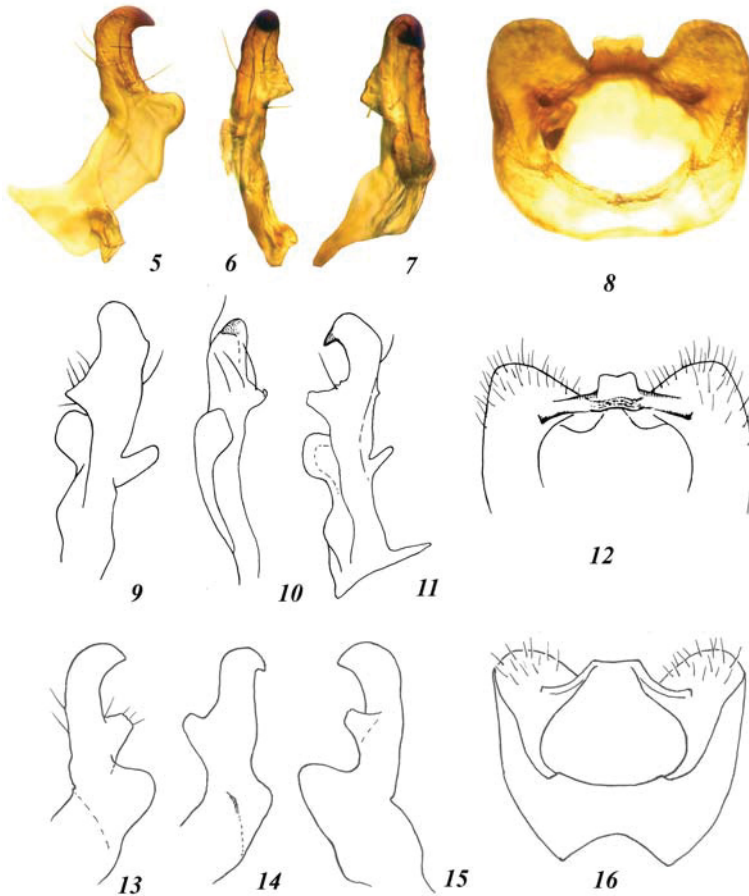
Head large, semicircular, flattened, its length equal to length of pronotum, width across eyes 1.5 times as long as median width, equal to width of scutellum, with sparse and irregularly dispersed punctures; basal part of clypeus with narrow black stripes laterally; eyes transverse, blackish brown; ocelli reddish, with a small longitudinal depression anterior of them and dark, obliquely directed strokes posterior of them; base of head with a pair of small transverse dark brown submedian spots. Antennae thin, sandy yellow, covered with short pale setae (apparently with long erected setae on segments 2 and 3 broken off in studied specimens); segment I cylindrical, slightly narrowed subapically; segment II cylindrical with



Figs 1–4. Habitus of *Menaccarus* spp. 1, 2 – *M. caii* sp. nov. (1 – male, 2 – female), 3 – *M. divaricatus* Jakovlev, 1877, 4 – *M. deserticola* Jakovlev, 1900 (3, 4 – after ISAKOV 2006).

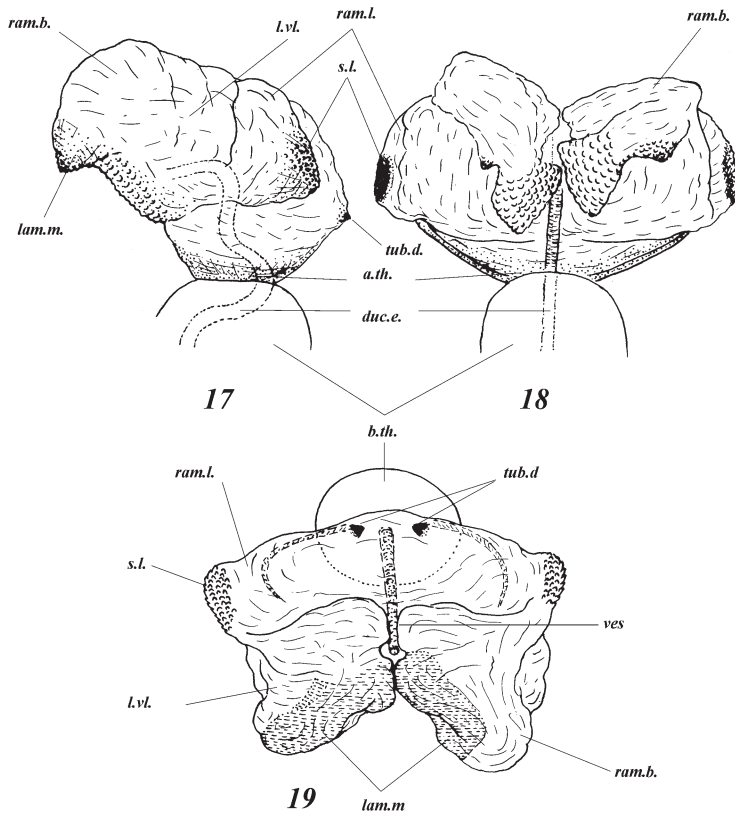
weakly thickened apex; segment III thickened apically; segments IV and V lacking in studied specimens. Ventral part of head white, bucculae low. Labium yellowish white, reaching mid coxae, segment II slightly extends beyond posterior end of bucculae.

Thorax. Pronotum wide, 2.3 times as broad as long; anterior margin straight; lateral margins broadly explanate, convex, not punctured; anterior angles protruded to posterior margin of eyes, rounded; humeral angles obtuse; disk with sparse dark and reddish punctation in central part, punctures confluent into black stripes in lateral part; with an indistinct pale longitudinal medial stripe prolonged on scutellum; posterior margin with a narrow black stripe interrupted medially; ventral surface of thorax white, smooth, weakly shining. Scutellum

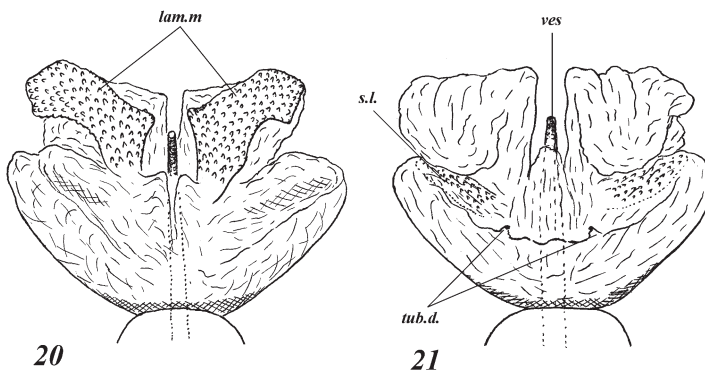


Figs 5–16. Male genitalia of *Menaccarus* spp. 5–8 – *M. caii* sp. nov., 9–12 – *M. deserticola* Jakovlev, 1900 (Bossaga, Turkmenistan), 13–16 – *M. divaricatus* Jakovlev, 1877 (Termez, Uzbekistan). (5–7, 9–11, 13–15 – left paramere in various positions, 8, 13, 16 – male genital capsule, dorsal view).

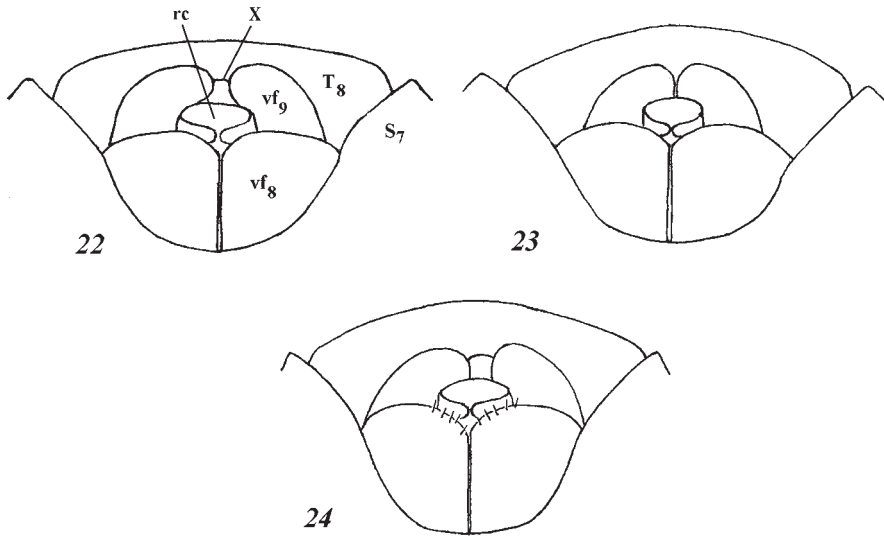
of subequal length and width, with a large V-shaped pattern, anterior angles smooth, shiny, with a narrow short black stripe close to apex. Legs unicolorous pale yellow; fore and mid femora with two series of 7–10 long erect brown spines ventrally, with sparse short dark spines laterally; hind femora with very short setae; fore tibia with numerous short dark brown spines, inner (posterior) side with 6–7 very long dark setae; spines on mid and hind tibia longer than diameter of tibia; tarsi pale yellow, hind tarsus very long, segment I twice longer than combined length of segments II and III. Hemelytra semibrachypterous, not extending beyond apex of abdomen; costal margin of corium smooth, not punctured, regularly broadly rounded, apical part surpasses apex of scutellum, veins white, cells brown, with dense dark punctures; membrane transparent.



Figs 17–19. Aedeagus of *Menaccarus caili* sp. nov. (Gurbantungut Desert) (17 – lateral view, 18 – frontal view, 19 – dorsal view). For abbreviations see Material and methods.



Figs 20, 21. Aedeagus of *Menaccarus deserticola* Jakovlev, 1900 (Annau, Turkmenistan) (20 – frontal view, 21 – dorsal view). For abbreviations see Material and methods.



Figs 22–24. Apex of abdomen of *Menaccarus* spp. (ventral view). 22 – *M. caii* sp. nov. (Gurbantunggut Desert), 23 – *M. deserticola* Jakovlev, 1900 (20 km NW of Bugdaili, Turkmenistan), 23 – *M. divaricatus* Jakovlev, 1877 (Iran, Shakhrud). For abbreviations see Material and methods.

Abdomen pale yellow ventrally, weakly shining, connexivum not punctured.

Male genitalia. Posterolateral angles of genital segment produced into a pair of broadly spatulate processes, median process wide, with parallel sides (Fig. 8); body of paramere slender and straight, with hooked apex and a large, triangular lateral process with a sharp tip (Figs 5–7); medial plate of aedeagus partially sclerotized, provided with several minute sclerotized teeth at its apical and ventral portion; lateral lobes of conjunctiva sclerotized, provided with many denticles, dorsal tubercles of conjunctiva small, black (Figs 17–19).

Female (Fig. 2). Body larger, 1.6–1.7 times as long as wide, coloration as in male. Head with reddish and dark brown punctures, longitudinal impression anterior of ocelli deeper and shiny. Antennae brownish yellow; segment I white, segments II–V brown; segment II cylindrical, with thickened apex, covered with very long, erect setae, 2–3 times as long as diameter of segment; segment III thickened at apex, also with long erected setae; segments IV–V with short, white, thin semi-erect setae, adpressed laterally; segment IV conical, segment V fusiform. Genital segments (Fig. 22): valvifers VIII large, length and width subequal, mesal margin straight, lateral margin weakly convex; lateral margin of valvifers IX arcuate; tergite VIII arcuately curved.

Differential diagnosis. *Menaccarus caii* sp. nov. is similar in habitus to the other members of the subgenus *Orocephalus* externally and can mainly be recognized by characteristics of the genitalia, as follows. Male: lateral projection on the body of paramere triangular with a sharp tip (Figs 5–7), lateroapical lobes of the genital capsule spatulate, medial process broad with parallel sides (Fig. 8); medial plates of aedeagus sclerotized apically and provided with

Table 1. Measurements of *Menaccarus caii* sp. nov. (Gurbantungut Desert).

Body		Antennae					Head		Distance between ocelli
length	width	I	II	III	IV	V	length	width	
Male									
4.8	2.75	0.28	0.46	0.30	–	–	1.05	1.58	0.92
Female									
5.8	3.6	0.30	0.66	0.40	0.45	0.55	1.25	2.05	0.90
6	3.7	0.30	0.55	0.35	0.45	0.54	1.30	2.00	0.90
5.9	3.5	0.30	0.60	0.35	0.45	0.56	1.25	1.95	0.90
6	3.75	0.30	0.60	0.35	0.45	0.54	1.30	2.05	0.90
5.5	3.5	0.30	0.50	0.30	0.40	–	1.30	1.95	0.90
5.8	3.5	0.30	0.55	0.35	0.40	0.51	1.40	1.95	0.85
5.6	3.4	0.30	0.50	0.40	–	–	1.25	1.95	0.85
6.0	3.65	0.35	0.55	0.40	0.45	0.54	1.25	2.10	0.90
5.6–6.0	3.5–3.75	0.30–0.35	0.5–0.66	0.35–0.40	0.40–0.45	0.51–0.56	1.25–1.40	1.95–2.05	0.85–0.90

Pronotum		Scutellum		Tibia	Length of tarsus 3		
length	width	length	width		total	segment 1	segments 2+3
Male							
1.05	2.45	2.00	1.65	2.25	0.98	0.68	0.38
Female							
1.25	3.10	2.00	1.90	3.08	–	–	–
1.35	3.30	2.00	2.10	2.65	–	–	–
1.3	3.20	2.05	2.10	2.85	1.15	0.70	0.40
1.35	3.25	1.95	2.05	2.90	1.20	0.70	0.40
1.25	3.10	1.90	1.90	2.90	1.10	0.65	0.35
1.30	3.10	2.0	1.95	2.80	1.10	0.65	0.35
1.25	3.10	1.85	1.95	2.75	1.00	0.65	0.35
1.40	3.30	1.95	2.05	2.95	1.15	0.70	0.40
1.25–1.40	3.10–3.30	1.85–2.05	1.95–2.10	2.65–3.08	1.10–1.20	0.65–0.70	0.35–0.40

several minute denticles ventrobasally; lateral lobes of the conjunctiva also provided with several denticles, dorsal tubercles of conjunctiva small and black (Figs 17–19). Female: valvifers VIII large, its length and width almost equal, mesal margin straight, lateral margin weakly convex; lateral margin of valvifers IX arcuate; tergite VIII arcuately curved (Fig. 22).

The new species is similar to the Turanian *M. (Orocephalus) deserticola* in the connexivum lacking black punctures confluent to black patches, but in the latter species the lateral process of the paramere is narrower and bent inwards in apical part (Figs 9–11), lateroapical lobes of the genital capsule are triangular with rounded apex, medial process is narrow (Fig. 12), medial plates of aedeagus are extensively sclerotized and provided with several denticles, lateral lobe of conjunctiva is also sclerotized and provided with denticles, and dorsal tubercles

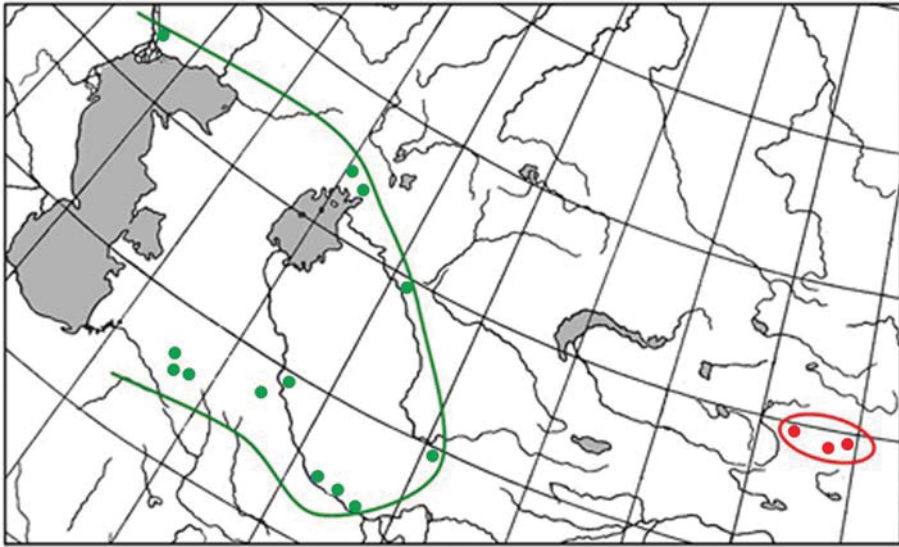


Fig. 25. Distribution of *Menaccarus deserticola* Jakovlev, 1900 (green) and *M. caii* sp. nov. (red).



Figs 26–27. Biology of of *Menaccarus caii* sp. nov. 26 – habitat in the Gurbantunggut Desert (25 km N of Fukang); 27 – *Aristida pennata* Trin. – host plant of *Menaccarus caii* sp. nov.

of conjunctiva are small and weakly sclerotized (Figs 20, 21); in females the lateral margins of valvifers VIII and tergite VIII are more convex (Fig. 23).

The Irano-Turanian *M. (O.) divaricatus* differs in the emarginated costal margin of the corium and punctured dorsal connexivum (Fig. 3); the lateral process of paramere is bent towards apex and its apical hook is bent inwards (Figs 13–15), lateroapical lobes of the genital capsule are broadly rounded, medial process is wide with its lateral sides gradually arcuately progressing to the base (Fig. 16). Valvifers VIII of female are wide with exterior margins straight, curved outwards at an obtuse angle, tergite VIII is slightly curved (Fig. 24).

Etymology. The species is named in honor of Chinese entomologist Professor Wanzhi Cai (China Agricultural University, Beijing) recognizing his contributions to the study of insects of Xinjiang.

Bionomics. *Menaccarus caii* sp. nov. is associated with *Aristida pennata* Trin. (Poaceae) (Figs 26, 27).

Distribution. *Menaccarus caii* sp. nov. is known from the central part of Xinjiang, the southern areas of the Gurbantungut Desert (Fig. 25).

Discussion

So far the easternmost border of the area of *Menaccarus* (*Orocephalus*) was the Turanian Plane where this subgenus is represented by two species: *M. divaricatus* and *M. deserticola* (DERZHANSKY 1994, ISAKOV 2005). The new species *M. caii* sp. nov. is an eastern vicariant of the former two species distributed in Dzungaria (North-Western China), thus separated from the area of the above two species by about 1600 km (Fig. 17). The unexpected discovery of this new species extends the known range of the genus *Menaccarus* far away from Central Asia.

We emphasize that the occurrence of *M. (Oploscelis) arenicola*, a species widely distributed in the Western Palaearctic, Kazakhstan, south of West Siberia (Altay) and Middle Asia (Kyrgyzstan) (RIDER 2006, DERZHANSKY 1994), in Northern Xinjiang would also not be unexpected. Targeted collecting in suitable habitats might result in discovery of further endemic Dzungarian species as well.

Acknowledgements

The authors are grateful to F. V. Konstantinov (St. Petersburg State University, Russia), V. V. Derzhansky (Kishinev, Moldova), D. A. Gapon (ZISP), P. Kment (National Museum, Prague, Czech Republic) for valuable advices, useful comments and copies of important literature. We are also grateful to Dávid Rédei (Nankai University, Tianjin, China) for correction of English translation of the manuscript. The research was supported by a Visiting Professorship for Senior International Scientists provided by the Chinese Academy of Sciences (No. 2010T2Z31) and partially by the Russian Fund for Basic Research, project No 13-04-00660-a.

References

- DERZHANSKY V. V. 1994: Species of the genus *Menaccarus* in the fauna of the former USSR (Heteroptera: Pentatomidae). *Zoosystematica Rossica* **3**(2): 263–264.
- ISAKOV Y. M. 2005: O shchitnikakh roda *Menaccarus* (Heteroptera, Pentatomidae) na territorii byvshogo SSSR. Soobshchenie 1. Imago. [About pentatomid-genus *Menaccarus* (Heteroptera, Pentatomidae) on the territory of the former USSR. Communication 1. Imago]. *Vestnik Zoologii* **39**(4): 15–27 (in Russian).
- PUTSHKOV P. V. 1965: *Shchitniki Sredney Azii* (Hemiptera, Pentatomoidea). [*Shield-bugs of Middle Asia* (Hemiptera, Pentatomoidea)]. Ylim, Frunze, 331 pp (in Russian).
- RIDER D. A. 2006: Family Pentatomidae Leach, 1815. Pp. 233–402. In: AUKEMA B. & RIEGER CH. (eds.): *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 5. Pentatomomorpha II*. The Netherlands Entomological Society, Amsterdam, xiii + 550 pp.
- TSAI J. F., RÉDEI D., YEH G. F. & YANG M. M. 2011: *Jewel bugs of Taiwan* (Heteroptera: Scutelleridae). National Chung Hsing University, Taichung, 309 pp.

