A new species of *Chiasmognathus* from Kazakhstan (Hymenoptera: Apidae)

by Michael S. Engel and Laurence Packer

2013

Journal *of* Melittology
Bee Biology, Ecology, Evolution, & Systematics *The latest buzz in bee biology*
No. 10, pp. 1–7 7 May 2013

A new species of *Chiasmognathus* from Kazakhstan (Hymenoptera: Apidae)

Michael S. Engel[1] & Laurence Packer[2]

Abstract. A new species of the ammobatine bee genus *Chiasmognathus* Engel (Nomadinae: Ammobatini) is described and figured from near Almaty, Kazakhstan. ***Chiasmognathus scythicus*** Engel & Packer, new species, is superficially similar to *C. gussakovskii* (Popov), also from Central Asia (Tajikistan, Kyrgyzstan), but differs most notably in the form of the male genitalia.

INTRODUCTION

Chiasmognathus Engel (Ammobatini) is one of the more distinctive of ammobatine bee genera, and although species have been known since at least 1937, most were included in *Parammobatodes* Popov (sometimes as a subgenus of *Pasites* Jurine) until 2006 (Engel, 2006). Aside from its minute body size, the genus can be recognized by the enlarged pedicel that is basally tightly adapted to the scape, long axes of the closed mandibles crossing orthogonally along the labral margins, antenna in both sexes with 10 flagellomeres, pronotum dorsally concealed by the mesoscutum, presence of two submarginal cells in the forewing, forewing venation generally contracted proximad, marginal cell broadly truncate and weakly appendiculate, absence of a jugal lobe in the hind wing, and first metasomal tergum dorsally broader than long (Engel, 2006, 2009). Where known, species are cleptoparasites of Nomioidini (Halictidae) (Engel, 2006; Rozen, 2008), and are being discovered wherever aggregations of nomioidine nests are present. It is very likely that the known distribution of the genus will expand considerably and that the number of species will continue to grow with more collecting. It is hoped that melittologists will make special efforts to look for these Lilliputian bees.

[1] Division of Entomology, Natural History Museum, and Department of Ecology & Evolutionary Biology, 1501 Crestline Drive – Suite 140, University of Kansas, Lawrence, Kansas 66045, USA (msengel@ku.edu).
[2] Department of Biology, York University, 4700 Keele Street, Toronto, Ontario M3J 1P3, Canada (xeromelissa@mail.com).

ISSN 2325-4467

Herein we provide a description and figures for a new species of *Chiasmognathus* recently recognized among material collected from around Almaty, Kazakhstan (Figs. 1, 2, 9, 10). The species superficially resembles *Chiasmognathus gussakovskii* (Popov, 1937), also from Central Asia, but can be distinguished most easily on the basis of the male terminalia.

MATERIAL AND METHODS

Material discussed herein is deposited in the following repositories: Zoological Institute, Kazakhstan Academy of Sciences, Almaty, Kazakhstan (KASC); Packer Collection, Department of Biology, York University, Toronto, Canada (PCYU); Division of Entomology, University of Kansas Natural History Museum, Lawrence, Kansas, USA (SEMC); and the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan (KUEC). Morphological terminology follows that of Engel (2001) and Michener (2007), while the format for the description is that used elsewhere for species of *Chiasmognathus* (*e.g*., Engel, 2007, 2008a, 2008b, 2009, 2010; Straka & Engel, 2012; Packer *et al*., in prep.). Measurements were made using an ocular micrometer on an Olympus SZX-12 stereomicroscope and are provided for the holotype, with those of the paratypes in parentheses. Photomicrography was done with a Canon 7D digital camera attached to an Infinity K-2 long-distance microscope lens.

SYSTEMATICS

Genus *Chiasmognathus* Engel

Chiasmognathus scythicus Engel & Packer, new species

ZooBank urn:lsid:zoobank.org:act:F5C60D49-59D0-4772-A771-E77B712E8823

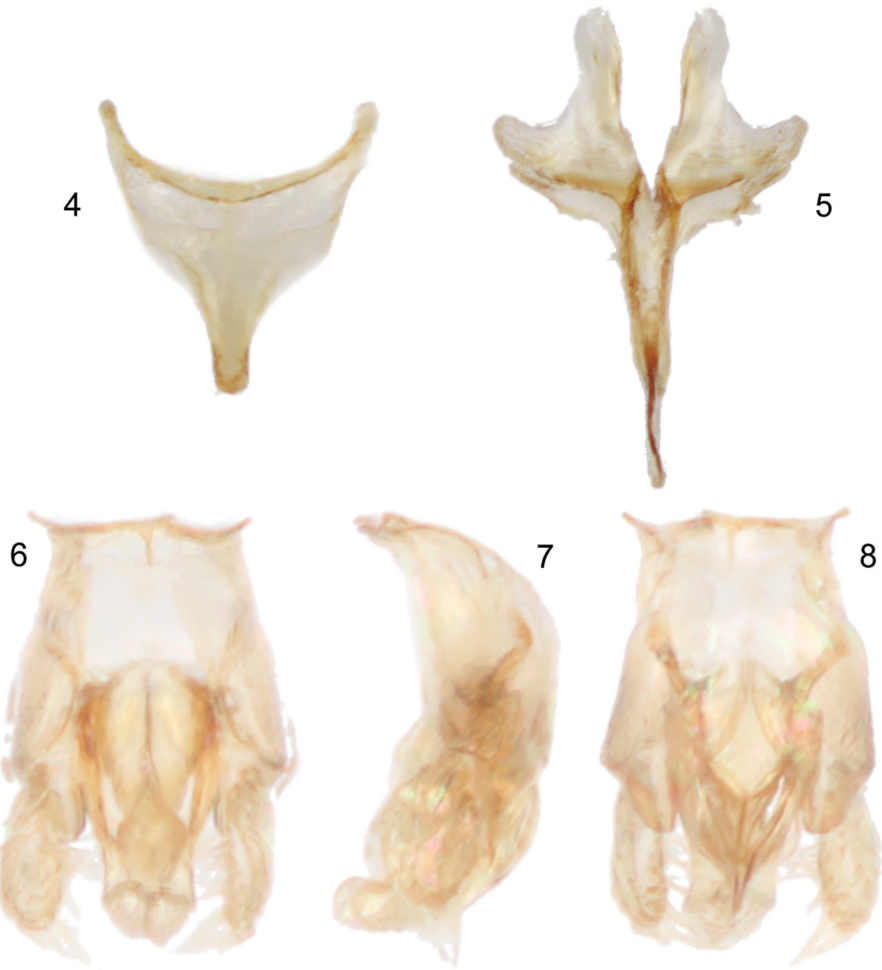
(Figs. 1–11)

DIAGNOSIS: Superficially the new species resembles *C. gussakovskii* but differs most notably by the shape of the hidden metasomal sterna (Figs. 4, 5: *cf*. Popov, 1937): seventh metasomal sternum broader apically before process, giving disc a rectangular or trapezoidal shape (more strongly narrowed apically and thereby triangular in *C. gussakovskii*), apical process glabrous (with short setae in *C. gussakovskii*); eighth sternum with discs reduced laterally and deeply concave basolaterally (discs broad laterally in *C. gussakovskii*), and lateral apodemes broad and rounded apically (narrowed with acutely rounded proximal angle and pointed apical angle in *C. gussakovskii*). The dorsal division between the gonocoxae is much deeper (extending half the length of the gonocoxae) than in *C. gussakovskii* (approximately ¼ the length according to Popov, 1937: fig. 2) resulting in more prominent dorsoapical lobes (Fig. 8). The sterna more closely resemble the shape observed in *C. orientanus* (Warncke, 1983) from Bulgaria, Crete, Cyprus, Turkey, and Israel (but likely spread throughout the Levant) (*cf*. Warncke, 1983), but differ in the shorter lateral apodemes of the eighth sternum, the disc more developed laterally, and more constricted apical process beyond the disc (broadly tapering from lateral apodemes to apical process in *C. orientanus*).

DESCRIPTION: ♂: Total body length 2.42 mm (2.14–2.87 mm); forewing length 1.61 mm (1.38–2.03 mm). Head wider than long, width 0.86 mm (0.82–0.95 mm), length 0.70 mm (0.64–0.76 mm); inner margins of compound eyes straight, convergent below; apex of clypeus at lower tangent of compound eyes; ocelli above upper tangent of compound eyes, ocellar triangle prominent, slightly swollen above curvature of head,

Figures 1–3. Photomicrographs of male of *Chiasmognathus scythicus*, new species. **1.** Lateral habitus. **2.** Dorsal habitus. **3.** Facial view.

vertex weakly concave between lateral ocelli; clypeus weakly convex, nearly flat, apicolateral corners of clypeus with small patches of tightly packed, elongate, curved setae; malar space vestigial posteriorly, 0.7X diameter of median ocellus anteriorly; mandibles simple, crossing in repose but not covering labrum; frontal line distinct from just below lower tangent of antennal toruli to median ocellus, raised below, impressed above. Mesoscutum with median and parapsidal lines weakly impressed, median line extending to just before mesoscutal midlength. Intertegular distance (*i.e.*, distance between inner margins of tegulae) 0.47 mm (0.43–0.60 mm). Forewing mar-



Figures 4–8. Male terminalia of *Chiasmognathus scythicus*, new species. **4.** Seventh metasomal sternum. **5.** Eighth metasomal sternum. **6.** Genital capsule, ventral view. **7.** Genital capsule, lateral view. **8.** Genital capsule, dorsal view.

ginal cell broadly truncate; both m-cu crossveins entering second submarginal cell. Terminalia as depicted in figures 4–8.

Integument generally shining (Figs. 1–3). Labrum with punctures irregular in size and spacing, surface smooth; clypeus with small punctures separated by 0.5–2 times a puncture width centrally, punctures closer laterally, with a few scattered larger punctures, apex impunctate; face and vertex with small punctures separated by 0.25–2 times a puncture width (in a few places where punctures are particularly close they can be nearly contiguous), integument between punctures smooth, punctures on vertex posterior to ocelli somewhat weaker; punctures on gena and postgena separated by 0.5–2 times a puncture width, integument otherwise smooth and shining. Mesoscutum sparsely punctate on central disc, punctures small and separated by 1–4.5 times a puncture width, punctures closer on margins, integument otherwise smooth and shining; mesoscutellum with punctures slightly larger and deeper than those of mesoscutum, separated by 0.5–2 times a puncture width; metanotum with punctures sepa-

Figures 9–11. Photomicrographs of female of *Chiasmognathus scythicus*, new species. **9.** Lateral habitus. **10.** Dorsal habitus. **11.** Facial view.

rated by a puncture width; pleura with small punctures separated by 0.5–2.5 times a puncture width, integument otherwise smooth; propodeum with short and narrow basal area coarsely imbricate and impunctate, otherwise integument with punctures separated by less than or equal to a puncture width except medially around pit on posterior surface smooth. Metasomal terga and sterna faintly and finely imbricate, with fine, scattered punctures (T1 and T2 almost devoid of sculpture in some specimens).

Integument of head and mesosoma black to dark brown and shining except yellowish to reddish brown on mandibles (which have reddish apices), yellowish to reddish brown on labrum, light brown to brown on labiomaxillary complex, light brown

to yellow on scape and pedicel, light yellow brown on flagellum, translucent amber on tegula, and light brown on legs except lighter on tarsi and at femorotibial and tibiobasitarsal joints. Wing veins amber except C and Sc+R darker; membranes hyaline. Metasoma dark chestnut brown; apical impressed areas lighter in color.

Pubescence silvery white. Head with numerous, fine, appressed to subappressed plumose setae, such setae nearly obscuring integument of face around and below level of antennal toruli, and intermingled with a few suberect to erect finer, simple setae; appressed plumose setae present on gena. Setae of mesosoma like those of head although more sparse centrally on mesoscutum and mesoscutellum; setae similar to those of gena on pleura (although longer and more diffuse to sparse centrally on mesepisternum), metanotum, and dorsolateral portions of propodeum, obscuring underlying integument especially on metanotum. Metasoma with sparse, erect to suberect, short simple setae, without prominent apical fasciae; first metasomal tergum with small, weak apicolateral patches of appressed to subappressed plumose setae (rubbed off in some specimens); succeeding terga with similar patches although often more diffuse or smaller than those of first tergum.

♀: As described for male except in usual gender differences (Engel, 2006, 2009) and as follows: Total body length 2.13–2.77 mm; forewing length 1.60–2.00 mm. Head wider than long, width 0.79–0.99 mm, length 0.56–0.81 mm. Ocellar triangle not as prominent as in male. Intertegular distance 0.45–0.60 mm.

Sculpturing as in male except punctures of mesoscutellum closer, separated by 0.5–1.5 times a puncture width.

Coloration as in male except sometimes lighter brown throughout on those areas where male is black, especially face below antennae (Figs. 9–11), and nearly black around ocellar triangle regardless of background color of integument (lighter colors likely due to fading of integument).

Pubescence more dense on clypeus and lower paraocular area.

HOLOTYPE: ♂, Kazakhstan: Almaty, Taūqum Sands, 20 km [North] of Aydarly, 550 m, 44.0343°N, 79.5184°E, 30.vii.1988 [30 July 1988], Kazenas (KASC). The type locality is in southeastern Kazakhstan east of the Kapshagay Reservoir and around the Altyn Emel National Park, and generally part of the xeric to mountainous ecoregion of Kazakhstan.

PARATYPES: 1♂♂, 4♀♀, same data as holotype (KASC except one female at each of KUEC and PCYU); 2♂♂, 1♀, same data as holotype except 24.vii.1988 [24 July 1998] (female at KASC one male each at of KUEC and PCYU); 1♂, Kazakhstan: Almaty, Ilie River, 30 km S [South-Southeast] of Koktal, 44.1339°N, 79.8064°E, 600 m, 6.vii.1993 [6 July 1993], Kazenas (KASC); 1♂, 1♀, Kazakhstan: Almaty, 30 km [East] of Chilik, Borandrusy, 43.5474°N, 78.0766°E, 13.vi.1997 [13 June 1997], Kazenas (SEMC). The type series is in less than desirable condition, with many of the specimens poorly mounted, glued to cards so that various portions are embedded and obscured (and the glue has deteriorated into a crystalline matrix rendering it virtually impossible to separate specimens). One male collected 24 July (in KASC) has been decapitated.

VARIATION: There is variation in metasomal coloration among the available specimens. For example, in some males the first and other terga are lighter in their apical two-thirds, resulting in a somewhat banded appearance. Females seem to vary in the degree to which the first tergum is red and the degree to which it is differentiated in color from the succeeding terga. The degree to which pubescence is developed on the metasoma is variable (perhaps due to the degree to which individuals are worn), with patches of appressed to subappressed plumose setae apicolaterally on the terga some-

what larger and more dense in some individuals. As noted above, there is variation in the degree of sculpture on T1 and T2.

Etymology: The specific epithet is a reference to the ancient region of Scythia (8th Century BC to 2nd Century AD), which encompassed much of modern-day Kazakhstan (particularly the Kazakh steppe and Saka tigrakhaude) as well as bordering regions in Central Asia (Sakastan, Ponto-Caspian steppe) and easternmost Europe (Sarmatia, Scythia Minor).

ACKNOWLEDGEMENTS

We are grateful to O. Tadauchi for access to the material considered herein, to I.A. Hinojosa-Díaz for assistance with photography, to two reviewers for their constructive comments, and to M. Cheryomina for transliteration of the Cyrillic locality data into English. LP's visit to KUEC was support by the Global COE Program, MEXT, Japan (Center of Excellence for Asian Conservation Ecology, T. Yahara). A grant-in-aid for scientific research (KAKENHI), JSPS Japan (No. 14405025, O. Tadauchi) supported the work of O. Tadauchi in Central Asia. Lastly, we are grateful to the late V. Kastcheev (KASC), who offered valuable Kazakh bees to KUEC among which were the specimens considered herein. This is a contribution of the Division of Entomology, University of Kansas Natural History Museum.

REFERENCES

Engel, M.S. 2001. A monograph of the Baltic amber bees and evolution of the Apoidea (Hymenoptera). *Bulletin of the American Museum of Natural History* 259: 1–192.

Engel, M.S. 2006. A new genus of minute ammobatine bees (Hymenoptera: Apidae). *Acta Entomologica Slovenica* 14(2): 113–121.

Engel, M.S. 2007. A new species of *Chiasmognathus* from southeastern Pakistan (Hymenoptera: Apidae). *Journal of the Kansas Entomological Society* 80(2): 169–174.

Engel, M.S. 2008a. New species and records of ammobatine bees from Pakistan, Kyrgyzstan, and Sri Lanka (Hymenoptera: Apidae). *Acta Entomologica Slovenica* 16(1): 19–36.

Engel, M.S. 2008b. A new species of *Chiasmognathus* from Iran, with a note on *Chiasmognathus aegyptiacus* in Israel (Hymenoptera: Apidae). *Beiträge zur Entomologie* 58(2): 223–226.

Engel, M.S. 2009. The bee genus *Chiasmognathus* in the Arabian Peninsula (Hymenoptera: Apidae). *Fauna of Arabia* 24: 237–247.

Engel, M.S. 2010. A new species of the bee genus *Chiasmognathus* from southwestern Niger (Hymenoptera: Apidae). *Acta Entomologica Musei Nationalis Pragae* 50(1): 273–278.

Michener, C.D. 2007. *The Bees of the World* [2nd Edition]. Johns Hopkins University Press; Baltimore, MD; xvi+[i]+953 pp., +20 pls.

Popov, V.B. 1937. Zur Kenntnis der Bienengattung *Parammobatodes* Popov (Hymenoptera, Apoidea). *Konowia* 16(1): 10–14.

Rozen, J.G., Jr. 2008. Biology and immature stages of the bee *Nomioides patruelis* (Halictidae: Halictinae: Nomioidini) and of its cleptoparasite, *Chiasmognathus pashupati* (Apidae: Nomadinae: Ammobatini), with a preliminary phylogeny of Halictidae based on mature larvae (Apoidea). *American Museum Novitates* 3604: 1–23.

Straka, J., & M.S. Engel. 2012. The apid cuckoo bees of the Cape Verde Islands (Hymenoptera: Apidae). *ZooKeys* 218: 77–109.

Warncke, K. 1983. Zur Kenntnis der Bienengattung *Pasites* Jurine, 1807, in der Westpaläarktis (Hymenoptera, Apidae, Nomadinae). *Entomofauna* 4(21): 261–347.

ZooBank: urn:lsid:zoobank.org:pub:2A491D5E-45DB-4D83-8137-AB1EA6B49523

A Journal of Bee Biology, Ecology, Evolution, & Systematics

The *Journal of Melittology* is an international, open access journal that seeks to rapidly disseminate the results of research conducted on bees (Apoidea: Anthophila) in their broadest sense. Our mission is to promote the understanding and conservation of wild and managed bees and to facilitate communication and collaboration among researchers and the public worldwide. The *Journal* covers all aspects of bee research including but not limited to: anatomy, behavioral ecology, biodiversity, biogeography, chemical ecology, comparative morphology, conservation, cultural aspects, cytogenetics, ecology, ethnobiology, history, identification (keys), invasion ecology, management, melittopalynology, molecular ecology, neurobiology, occurrence data, paleontology, parasitism, phenology, phylogeny, physiology, pollination biology, sociobiology, systematics, and taxonomy.

The *Journal of Melittology* was established at the University of Kansas through the efforts of Michael S. Engel, Victor H. Gonzalez, Ismael A. Hinojosa-Díaz, and Charles D. Michener in 2013 and each article is published as its own number, with issues appearing online as soon as they are ready. Papers are composed using Microsoft Word® and Adobe InDesign® in Lawrence, Kansas, USA.

Journal of Melittology is registered in ZooBank (www.zoobank.org), archived at the University of Kansas and in Portico (www.portico.org), and printed on demand by Southwestern Oklahoma State University Press.

http://journals.ku.edu/melittology
ISSN 2325-4467