

A revision of *Entomosericus* Dahlbom 1845 (Hymenoptera, Apoidea „Sphecidae“) with description of a new species

Christian Schmid-Egger 04.11.2003

Flemingstr. 10, D-10557 Berlin/Germany, E-mail: schmideggC@aol.com

Abstract: *Entomosericus* Dahlbom, 1845, is a palearctic genus with three species: *E. hauseri* **spec. n.** from Israel, Jordan and southern Turkey, *E. kaufmani* Radoszkowski from southern-central Asia, and *E. concinnus* Dahlbom from eastern and southern Mediterranean area, Ukraine and Russia. The gaster color is not suited to distinguish species. *E. concinnus rufescens* de Beaumont is synonymized with *E. concinnus* (**syn. n.**). A key to species identification is presented. A lectotype of *E. kaufmani* is designated.

Introduction

Entomosericus Dahlbom, 1845, is a palearctic genus of three species. Bohart and Menke (1976) and Menke (1997) placed it in its own subfamily because they could not associate it with any other sphecid group. Kazenas and Alexander (1993) suggested a relationship to the clade of Nyssoninae (now Bembecinae sensu Menke 1997), Philanthinae and Astatinae based on larval characters. Melo (1999) finally proposed a relationship to the Pemphredoninae. He considered *Entomosericus* as a sister subtribe to the Psenini (sensu Bohart and Menke 1976).

Two species of *Entomosericus* have been described: *E. concinnus* Dahlbom, 1845, from the Greek island Rhodos and *E. kaufmani* Radoszkowski, 1877, from central Asia. In current keys, the two species have been primarily distinguished through color.

According to Balthasar (1972), all of the terga are black in *E. concinnus* while the first two or three terga are red in *E. kaufmani*. Pulawski (1978) also described the respective form of antennal flagellomere XI as a distinguishing character.

De Beaumont (1965) noted a broad geographic variation in color and punctuation in these species. He noted that all males of *E. concinnus* from Rhodos, Corfu, mainland Greece, and Croatia have black terga (also Handlirsch 1888), while females from the mainland Greece have red terga I and II. Later, he (1967) reported two females of the species from Turkey with red basal terga, considering the presence of *E. kaufmani* in the western Palaearctic to be doubtful.

My own studies confirmed the observations of de Beaumont (1965, 1967). Additionally, a new species from the eastern Mediterranean area was found. Sternal and antennal characters allow males to be reliably distinguished and the geographical distribution of the species to be delineated. Females of the species remain difficult to distinguish and require comparison with determined material to be identified.

Sources of material

Specimens from the following institutions were examined (abbreviations used are given):

ZMHB	Zoologisches Museum der Humboldt-Universität, Berlin, Germany
CAS	California Academy of Sciences, San Francisco, California, USA
OLL	Oberoesterreichisches Landesmuseum, Linz, Austria
MCZL	Musée Cantonal der Zoologie, Lausanne, Switzerland
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany
NHMW	Naturhistorisches Museum, Wien, Austria
ZMUM	Zoological Museum of the Moscow State University
ZSM	Zoologische Staatssammlung, Muenchen, Germany

Arens	coll Werner Arens, Bad Hersfeld, Germany
Hartmann	coll Peter Hartmann, Bayreuth, Germany
Hauser	coll. Martin Hauser, Univ. Illinois, Urbana, USA
Niehuis	coll. Oliver Niehuis, Marburg, Germany
SE	coll. Christian Schmid-Egger, Berlin, Germany

Technical terms

The morphological terminology employed in this paper follows Bohart and Menke (1976).

Key to species of *Entomosericus*

Males

1. Flagellomere XI shovel-like, flattened (ventral surface is concave), narrower than more based flagellomeres, curved downwards (Fig. 3). Middle flagellomeres with ill-defined lateral tyloids (Fig. 3). Sternum VIII nearly flat, without lateral thickening, with long setae (Fig. 7). Inner (transparent) appendix of gonostylus twice as wide as outer (opaque) appendix, the latter with long setae (Fig. 6). Disk of sternum II with evanescent punctures that are 4-6 diameters apart, sternal surface shiny, unsculptured. Central Asia...***kaufmani* Radoszkowski**
- Flagellomere XI excavated beneath, nearly as wide as more basal flagellomeres. Flagellomeres with well-defined central tyloids (Fig. 1, 2). Sternum VIII uneven, with lateral thickening, aetose or with short setae (Fig. 10, 11). Inner (transparent) appendix of gonostylus half as wide as outer (opaque) appendix (Fig. 4), the latter aetose. Disk of sternum II with more densely arranged punctures that are 0.5-3 diameters apart. Eastern and southwest Mediterrean area.....**2.**
2. Flagellomeres VIII-XI reddish. Lateral thickening of sternum VIII with an oval concavity (Fig. 11). Sternum II unsculptured between punctures, with short setae. Tyloids on flagellomeres VII-VIII well-defined, flagellomere VI with pointed tyloid, flagellomere IX with ill-defined lateral tyloid (Fig. 1). At least tergum I red (southern Turkey to Israel, northwest Africa) or terga black (Europe to Turkey). France?, eastern Mediterranean area, southwest central Asia, northwest Africa.....***concinnus* Dahlbom**
- Flagellomeres black. Lateral thickening of sternum VIII evenly convex (Fig. 10). Sternum II microsculptured between punctures, nearly aetose. Tyloids on flagellomeres VII-VIII smaller, flagellomeres VI and IX both with a minute, ill-defined tyloid (Fig. 2). Terga black. Southern Turkey, Israel, Jordan.....***hauseri spec. n.***

Females

1. Shiny area between lateral ocellus and eye extending to eye margin (Fig. 12). Clypeal free margin with five distinct teeth, median teeth prominent, distinctly larger than lateral teeth (Fig. 15). Sternum II with fine and scattered, similiary sized punctures, that are many diameters apart. Terga I and II red. Central Asia.....***kaufmani* Radoszkowski**
- Shiny area between lateral ocellus and eye smaller, and not extended to eye margin, or absent (Fig. 13, 14). Medial teeth of the clypeal free margin less prominent, not distinctly larger than lateral teeth (figs 16, 17). Sternum II with uneven sized punctures that are unevenly distributed and about 1-3 diameters apart. Terga I and II red or black. Eastern and southwest Mediterrean area.....**2.**
2. Shiny area between lateral ocellus and eye essentially absent (Fig. 14). Gaster black. Punctation of sternum II denser than in *concinnus*, punctures 0.5-1.5 diameters apart. Surface of sterna

more densely microsculptured, not shiny. Tergum II without a distinct step, or edge, at the base of the apical tergal depression. Apical tergal depression of tergum II markedly broader medially. Southern Turkey, Israel, Jordan.....*hauseri* spec. n.

- Shiny area between lateral ocellus and eye larger, about as large as lateral ocellus (Fig. 13). Gaster red basally (at least tergum I red in specimens from southern Turkey, Israel, Jordan) except all black in specimens from Rhodos Island (Greece) and western Turkey. Punctures of sternum II less dense arranged, separated by 1-3 diameters, interspaces shiny. Tergum II usually with a distinct step, or edge, at the base of apical tergal depression. France?, eastern Mediterranean area, southwest central Asia, northwest Africa.....*concinnus* Dahlbom

Entomosericus

Entomosericus Dahlbom 1845: 486. Type species *Entomericus* (sic) *concinnus* Dahlbom 1845, by monotypy. Spelled *Enthomosericus* by Dahlbom, 1845, on Tabula Examinationis Synoptica Generum Nyssonidarum.

Entomosericus hauseri spec. n.

(Figs. 2, 4, 5, 9, 10, 14, 16, 18)

Diagnosis and discussion: The male of *Entomosericus hauseri* is easily distinguished from *concinnus* by its different form of sternum VII. Also, the tyloids and setae of last sternum differ from those of *concinnus*. The female closely resembles *concinnus*, but punctures are denser than in that species. Also, both sexes are different in color from *concinnus* in the areas where they occur sympatrically. *E. hauseri* is black, while *concinnus* has red terga. Only in Turkey might black males of both species occur together.

Male: 9-11 mm. Body black, tarsal segments and lateral parts of tergum I reddish. Head densely punctate, including area on each side of lateral ocellus (cf. Fig. 14). Clypeal free margin with five small teeth, outer tooth minute, nearly rounded. Inner margin of eye and clypeus with long setal fascia. Face with long erect setae. Antenna black, with small, oblong tyloids on venter of flagellomeres VII-VIII and point-form tyloids on flagellomere VI and IX (Fig. 2). Tyloids smaller and less distinct than in *concinnus*. Thorax and upper part of head with long silver setae. Thorax including scutellum and propodeum densely punctate, interspaces shiny. Lower mesopleuron inpunctate, shiny. Gaster and legs only with short setae. Terga I and II without microsculpture, punctures 0.1-1 diameters apart. Terga III-VII rugulose. Sterna microscopically punctate, interspaces microsculptured, sterna II and III with dense, coarse punctation, punctures 0.1-1 diameters apart. Disk of sternum II of smaller specimens nearly unsculptured. Sternum VIII: Fig. 10. Setal fascia at distal margin of sterna III and IV small, setae very thin and short (half as long as in *concinnus*). Sterna VI and VIII (in profile) with very short, erect setae (Fig. 9). Genitalia: Figs. 4, 5. Inner translucent appendix of gonostylus half as wide as outer (opaque) appendage. Wing venation and stigma dark brown, costal venation yellowish, wing membrane slightly darkened, yellowish-brown.

Female: 9-10 mm. Body black, with apex of tergites, sides of tergum I and tarsal segments slightly reddish. Punctures denser and larger than in *concinnus*. Head densely punctate, including area on each side of lateral ocellus (Fig. 14). Clypeus basally minutely, densely punctate, apically with longitudinal ridges (Fig. 16). Scutellum smooth and shiny basally, coarsely, longitudinally ridged apically. Punctures of tergum I 1-2 diameters apart, without punctures on disk. Punctures of terga II-V 2-3 diameters apart, punctures half as wide as in *concinnus*. Tergum II without a distinct step, or edge, at the base of the apical tergal depression. Apical tergal depression of tergum II markedly broader medially. Punctures of sternum II 2-3 diameters apart. Sterna II-VI finely and densely microsculptured, basolateral corner finely, densely punctate. Wings venation dark brown, wing membrane slightly darkened.

Habitat: In northern Israel, *hauseri* was found in the Mediterranean climate area with limestone substrate. The specimens were flying near the ground in grass on small paths and were collected by sweeping plants. There were unused fields and cattle pasture nearby.

Etymology: The species is dedicated to Martin Hauser, a friend and specialist of Stratiomyidae (Diptera), who supported the expedition to Israel in 1996.

Geographic Distribution (Fig. 18). Israel and Jordan to southern Turkey.

Type Material: HOLOTYPE male: ISRAEL, 40 km NE Haifa, 1 km E Hurfeish, 33.01°N 35.21° E, 16.05.1996 leg. SE (ZSM). PARATYPES: ISRAEL: 40 km NE Haifa, 1 km E Hurfeish, 33.01°N 35.21° E, 16 May 1996 8 males (SE, Hauser) - 15 km E Qiryat Shemona, Foothill of Hermon, 33.15° N 35.44° E, 17 May 1996 2 males (SE). JORDAN: Jarash 1 May 1996 1 male (OLL) - North Shuna 30 April 1996 1 female (OLL). TURKEY: Mardin, 23 May 1988 2 males (SE)- Urfa, 3 June 1988 1 female (MCZL) - 25km E Golbasi 7 June 1998 6 males 11 females (OLL) - 10km NW Gaziantep 20 June 1997 1 male (OLL) - N.of Akseki, 19 June 1998 7 males (OLL) - Tuzlagozu (Baykan) 4 June 1998 1 male (OLL) - Kahraman Maras, 40km SE, 10 June 1998 19 males 1 female (OLL) - 30km N Erdemli, Aslani 17 June 1998 1 male 1 female (OLL) - Gaziantep, Nizep 27 May 1978 1 male (CAS) - Kuzuzcebelen/Mersin 25 May 1998 1 male (OLL).

Entomosericus concinnus DAHLBOM 1845

(Figs. 1, 8, 11, 13, 17, 19)

Entomosericus concinnus Dahlbom, 1845: 486, male, Holotype or syntypes: Greece, Rhodos Island (Lund)

Entomosericus concinnus rufescens Beaumont 1950: 403. Holotype: female Algeria, Taouiala (MCZL). **New Synonym.**

Diagnosis and discussion: The male of this species is easily characterized by the form of sternum VIII and the flagellomeres. Females may be distinguished from the other species by punctuation and other characters (see key). *Entomosericus concinnus* has been confused with *kaufmani*. However, *concinnus* occurs only in the western Palearctic, whereas *kaufmani* is a central asian species. The ranges of the species overlap in the Ural river area in northern Kazakhstan and Russia. *E. concinnus* has two color forms. In Europe and northern and central Turkey the male gaster is all black, while in southern Turkey, Syria, Israel and northwest Africa the gaster base is red. Females of the species have a red gaster base except in specimens from Rhodos (the type locality) and western Turkey, where the gaster is all black. The isolated color form in the Dahlbom's type material might have caused confusion for earlier authors (Handlirsch 1888). Females with an all black gaster have not been found in other areas. The subspecies *concinnus rufescens* Beaumont, which was described from northwest Africa, is only a light color form of the species. It differs slightly from typical *concinnus* (see below), which itself is variable in the extend of gaster coloration in the eastern Mediterranean area. Males of *concinnus concinnus* from Syria and Israel are similar to males of *concinnus rufescens* from northwest Africa, while females of *concinnus rufescens* have a more light red gaster than females of *concinnus concinnus*. Therefore, the status of *rufescens* as a subspecies of *concinnus* is not justified due to the observed variability in *concinnus*.

Male: 9-12 mm. Body black, or with red basal terga. Tarsi red. Head densely punctate, shiny area between eye and lateral ocellus present (cf. Fig. 13). Clypeal free margin with five small teeth. Upper part of face with long erect setae. Dorsal side of flagellomeres VIII-XI, surface of flagellomere X-XI red. Flagellomeres VII-VIII with large and well-defined tyloids; flagellomere VI with small, pointed tyloid; tyloid at flagellomere IX indistinct, ventrolaterally situated (Fig. 1). Body sparsely punctate. Thorax with long, silver setae. Thorax surface and mesopleuron with shiny interspaces, punctures 1-2

diameters apart. Terga I-II coarsely punctate, punctures 0.2-1 diameter apart. Terga III-VI finely, densely punctate. Disk of sternum II shiny, coarsely and densely punctate, punctures 1-3 diameters apart. Sternum II laterally in specimens from Turkey, Europe with fine, dense punctation; in specimens from southern Turkey, Israel, Morocco with the same punctation as disk. Sterna III-VI more or less microsculptured, finely, densely punctate. Lateral thickening of sternum VII with an oval concavity (Fig. 11). Lateral edge of sternum III with long band of brown setae. Sternum VIII (in profile) with dense erect setae as long as fourth tarsal segment of hind leg, sterna V and VI with erect setae (Fig. 8). Genitalia similar to that of *hauseri* spec. n. Wings venation and stigma dark brown, costal and basal venation yellowish, wing membrane slightly darkened yellowish brown.

Female: 10-11 mm. Body black, or with red basal terga. Tarsi partly red. Head densely punctate, area beside lateral ocellus smooth and shiny (Fig. 13). Clypeal free margin with five rounded teeth (Fig. 17), often worn down. Clypeus apically longitudinally ridged. Mesoscutum with smooth spaces between longitudinal punctures. Punctation of thorax variable, but punctures of mesoscutum at least many diameters apart. Anterior part of scutellum smooth, posterior part longitudinally wrinkled. Mesopleuron densely punctate in upper part, punctures in lower part many diameters apart. Terga I-III distinctly and densely punctate, punctures 0.2-1 diameter apart. Base of terga III-IV with denser punctation than the apex. Apical margin of tergum II variable: in specimens from Europe and Turkey it is straight (or barely emarginated) and strongly stepped with keel basally (a step between disk of tergum II and apical tergal depression); in specimens from Israel and Jordan it is slightly rounded; in specimens from Morocco and Algeria it is barely stepped, with a rounded basal edge. Sternum II with a few deep punctures of variable diameter (1-2 diameters apart), with fine microsculptured between punctures. Wing venation dark brown except with yellowish basal venation in specimen not from southern Turkey.

Variation: North-west African specimens: Males and females from Morocco differ slightly from Turkish and Greek specimens: Diameter of punctures of the terga and sterna are half as wide. The apical margin of tergum II is barely dented with a rounded flat basal edge.

Color variation: Europe, northern and central Turkey, Russia and Ukraine: Males with all terga black; females with tergum I and II red. Rhodos island (Greece) and Western Turkey (Aegean coast): Males and females with all terga black. Syria, Israel, southern Turkey and Jordan: Males with tergum I red and tergum II black with red parts; females with terga I-II red. Northwest Africa: Males with tergum I and base of tergum II red. Females with terga I-III and base of tergum IV red, some specimens with tergum IV black.

Doubtful specimen: A single female from Jordan (20km S North Shuna, Tall al Arbatin 19 April 1998, coll. SE) could not be assigned to species. It has a black gaster (normally gaster base is red in Jordan), a shiny area with only few punctures between the lateral ocellus and the eye, the tergum II is as in average *concinus*. A male of *concinus* was collected on the same day at the same locality.

Geographic Distribution (Fig. 19). Eastern Mediterranean area to southern Russia and northwest Africa.

Records: ALGERIA: Taouiala [33°54'N 01°51'E], Holotype of *E. concinns rufescens* (de Beaumont 1950, in British Museum London). Not seen, but other specimens of type series examined. ARMENIA: Urcadzor 14 June 1988 1 male (gaster black) (OLL). BULGARIA Melnik 23 May 1985 3 males 22 June 1997 2 males (OLL) - Slancev Brjag 15 June 1997 1 male (OLL) - Sandanski 14 July 1979 2 females (CAS) - Slancev Brjag July 1972 1 female 2 males (OLL) (males: gaster black, females: terga I and II red) - Albena 17 July 1978 1 female (OLL) - Ivanski near Schumen 15-30 July 1969 1 male (coll. Burger). ?FRANCE: Gallia mer., Ancy, 1897 1 male (NHMW, gaster black). Specimen probably mislabeled. GREECE, MAINLAND: Alexandropoulos 16 June 1994 1 female (NHMW) - Alt Korinth 28 May 1996 1 male; 7 June 1997 2 males 1 female (Arens) - Korinth 15 May 1970 (ZMHB) - Attika 1 male (NHMW) - Cephalonia 4 males 1 female (NHMW) (det. Maidl as *kaufmani*) - Graecia, Argostoli? 26 May 1908 1 male 1 female (NHMW) (female det. Maidl als

kaufmani) - Attika 1 female (NHMW) (det Maidl als *kaufmani*) - Olympia 10 June 1961 1 female (CAS) - Olympia, Alfios-Tal 4 June 1995 1 male (Arens) - Kalamata, Avia 14 May 1995 2 females; 10 June 1996 2 females (Arens) - Peloponnes, Midea 19 June 1996 1 female (Arens) - Peloponnes, Sparta, Amyklai 5 June 1996 1 female 1 male (Arens) - Peloponnes, Sparta, Menelaion 26 May 1997 3 males; 21 May 1997 2 males 1 female; 4 June 1996 6 males 6 females (Arens) - Peloponnes, Sykion 8 June 1997 2 females (Arens); Olympia 19 June 1961 1 female; 1 June 1963 1 female 1 male (MCZL) - Pyrgos 11 June 1961 3 females (MCZL) - Kalamata 15 May 1964 2 females 5 males (MCZL) - Nea Kefissia 19 June 1957 1 female 2 males (MCZL) (males: gaster black, females: terga I and II red). - GREECE, RHODOS ISLAND: Kritinia, 2 May 1990 9 males 1 female (SMNS) - Salakos, Kamiros 3 May 1990 2 males 2 females (SMNS) - Rhodos, no specific locality, June 1939 3 males (MCZL) - Rhodus, no specific locality, 1869 4 males 2 females (NHMW) - W Apolakkia, N Monolithos 23 April 1998 1 male 1 female (Hartmann) (gaster black). HUNGARY: male, without date and exact locality, may be today's Romania (ZMHB, also referred by Handlirsch 1895: 850 gaster black) - 'Ungarn coll. Hindlmayer' 1 male (ZSM). ISRAEL: Lehavim junction, 11 km N Be'er Sheva, 27 March 1991, 2 males (SE) (gastral base red). JORDAN: Petra 14 May 1995 3 males (OLL) (gastral base red) - North Shuna 29 April 1996 1 female (OLL) - 20km S North Shuna, Tall al Arbatin 19 April 1998 1 male (OLL) (gastral base black). MOROKKO: Agadir, 15 April 1947 1 male 1 female (MCZL, Paratype of *E. c. rufescens* de Beaumont) - Iftilt, 15 June 1962 1 male (MCZL, Paratype of *E. c. rufescens* de Beaumont) - 50 km NE Taroundannt, 5 km E Kreuzung Tizn-Test/Aoulouz 12 April 1996 4 females (Niehuis, SE) - 10km N Rich, 23 May 1995 1 female (OLL) - 10km S Bouarfa 20 May 1995 1 female (OLL) - 40km S Guercif 15 May 1995 1 female (OLL). ROMANIA: Dobrogea, Camaraua Fetii 26 June 1993 3 males (OLL) (gaster black) - Tultscha [= Tulcea] 1859 1 female (leg. Mann, NHMW, terga I and II red) - Mehadia [leg] Mann 1859 2 females (NHMW, gastral base red). Scobiola-Palade (1966) mentions *E. concinnus* and *E. kaufmani* from Romania, but the latter is probably the red form of *E. concinnus*. RUSSIA: Southern Ural, Kargala b. Orenburg, 1915-1917 1 male (ZMHB, gaster black). SYRIA: Mezzé near Damascus 21 May 1954 2 males 3 females (CAS, MCZL) - Damascus, road to Kissoue 2-18 May 1960 2 males 1 female (MCZL) - Marbi, 9 May 1996 1 male (OLL) - 30 km s Suwayda, Dibbin 15-17 May 1996 1 male - 10km SE Suwayda, Kafr 19 May 1996 1 male (OLL) - Anata, 50km SE of Suwayda 20-21 May 1996 1 female (OLL) (gastral base red). TURKEY: **First terga of males black, tergum I and II of females red:** Horasan, 18 km E Delibaba 25 June 1993 2 males (OLL) - 30 km N Kutahya, Porsuk Baraji 15 June 1997 2 males (OLL) - Gürün 7 June 1970 1 female (CAS) - Konya, Karaman 11 June 1979 1 male (CAS) - Urfa 21 May 1972 1 female (CAS) - Sille, Konya, 16 June 1968 1 male (MCZL) - Amasya 1,400ft, 9 June 1959 1 male (MCZL) - Asia minor 11 July 1852 1 female (ZSM); Osmaneli 14 June 1997 3 males 1 female (OLL) - 40km E Mut, Cornelek 29 May 1996 4 males 1 female (OLL) - Capadocia, Ürgüp 13 June 1998 8 males 1 female (OLL) - Capadocia, 10 km NW Ürgüp 15 June 1998 1 male 1 female (OLL) - Tuzlagozu (Baykan) 4 June 1998 1 male (OLL) - Bozkir 26 May 1998 1 male (OLL) - Agri 27 June 1993 1 male (OLL) - Göreme 23 June 1993 1 male (OLL) - Konya, 30km S of Aksehir 24 June 1998 1 male (OLL) - 20km SE Horasan, Delibaba 3 July 1997 1 female (OLL) - Bolu, 17km S Seben 17 June 1998 1 female (OLL) - Manisa, 30km E 20 June 1998 1 female (OLL) - Hop Gecidi, Mardin 6 June 1998 1 female (OLL) - Ankara, 40km W Ayas 26 June 1998 1 female (OLL) - Sivas, 45km E Yarhisar 24 June 1993 1 female (OLL) - Taskesigi/10km E Antalya 1998 18 males (OLL) - Gevas/Van Gölü 29 June 1993 1 female (OLL) - **Terga I and II of males red:** Elazig 7 June 1980 1 male (SE) - Urfa 20 May 1967 1 male (MCZL) - Halfeti (Birecik) 31 May 1998 1 male (OLL) - Tuzlagozu (Baykan) 4 June 1998 1 male (OLL) - Halfeti 3-5 May 1994 1 male (OLL). **Gaster of females black:** W-Turkey, SSO Milas, Camköy lake 20 June 1998 1 female (Niehuis) - W-Turkey, SO Milas, Akyoi 19 June 1998 1 female (Niehuis). UKRAINE: Falzfeinowo a. Dnipr 12 May -7 June 1914 1 male (gaster black) (ZMHB) - Otuzysches Tal, auf *Teucrium polium*, leg. Wuczeticz, 4 July 1926 1 female (NHMW, det Maidl als *kaufmani*, tergum I and 2 red) (=probably Otuzy Valley or Otuzskaya Dolina in Crimea, Ukraine) - Umg. Tokluk, near Sudak, at *Reseda lutea* 4 June 1924 1 male Wuczeticz [leg] (NHMW, gaster black) (=probably Sudak in Crimea, Ukraine)

Entomosericus kaufmani RADOSZKOWSKI 1877

(Figs. 3, 6, 7, 12, 15, 19)

Entomosericus kaufmani Radoszkowski 1877: 46. Male, female. Misspelled 'kaufmanni' in most subsequent publications. Lectotype, male: Kasachstan, Kyzylkum [desert], 28 April 1871 (A.P.Fedchenko coll.) [appr. 43°13'N-71°35'E]. Designed as lectotype by A. Antropov (ZMUM).

Diagnosis: The male of *Entomosericus kaufmani* is easily recognizable by its flat sternum VIII and its ventrally concave flagellomere XI. Females have a large shiny area between the lateral ocellus and eye. The species is smaller and more slender than *concinus*. It occurs only in southern-central Asia from Kazakhstan to Turkmenistan (Kazenas and Alexander 1993). An isolated record comes from Uralsk in northern Kazakhstan. All examined 'kaufmani' (det. Madl or Handlirsch, coll. NHMW) from Europe or Turkey are misidentifications of the red colored form of *concinus*.

Male: 8-9 mm, Body black, tergum I and parts of tergum II red. Legs red except tibiae. Face covered with a dense silver pubescence in lower part and erect setae in upper part. Area between eye and lateral ocellus only with few punctures near eye (cf. Fig. 12). Clypeal free margin with 5 teeth, median tooth and lateral teeth distinctly smaller than mediolateral teeth. Flagellomere XI with a concave ventral surface which is ventrally curved. Ventral surface of flagellomeres V-IX with indistinct lateral tyloids and with half moon shaped red spots. Ventral surface of flagellomeres X-XI completely red, flagellomere XI also partly red on dorsal surface (Fig. 3). Punctuation of body less dense than in *concinus*, spaces between punctures shiner than in *concinus*. Punctures of terga I and II 0.5-2 diameters apart. Sterna II and III unsculptured with only few scattered punctures, that are separated by many diameters. Disk of sterna IV and V finely and densely punctate, laterally only with a few coarse punctures. Sternum III with long band of setae (as in *concinus*), medial setae of band half as long as lateral setae. Sterna VI and VIII (sometimes V) with long silver setae (Fig. 7). Sternum VIII nearly flat, without lateral thickening. Inner transparent appendix of gonostylus twice as wide as outer opaque appendage (Fig. 6). Wings venation and stigma dark brown except yellowish costal and basal venation. Wing membrane slightly darkened.

Female: 9-10 mm. Body, including legs, black, terga and sterna I-II red. Head finely and densely punctate (punctures 0.5-1 diameter apart). Clypeus apically indistinctly longitudinal ridged, without punctuation, basally finely punctate. Clypeal free margin with five well developed teeth. Shiny area between lateral ocellus and eye large, extending to eye, sometimes with scattered punctures (Fig. 12). Thorax unsculptured, shiny, coarsely punctate. Upper part of mesopleuron densely, finely punctate, lower part only with few punctures. Punctures at disk of terga I-II 1-2 diameters apart, punctures of succeeding terga more densely arranged. Edge between disk of tergum II and apical tergal depression rounded, apical margin of tergum II slightly dented. Disk of sterna II-III nearly unsculptured, sternum II with only a few scattered punctures that are many diameters apart. Wings venation dark brown, wing membrane slightly darkened.

Life History: Kazenas and Alexander (1993) described the nest architecture and larva of *kaufmani* from southeastern Kazakhstan, Talas River. The females dig nearly vertical burrows in sandy soil and fill each cell with eight to 18 leafhoppers (Homoptera, Cicadellidae).

Type Material: PARALECTOTYPES (Lectotype see above): All designed as paralectotypes by A. Antropov. The type series is deposited in ZMUM and includes the following specimens: Zeravshan valley 9 May 1869 2 males (A.P. Fedchenko coll.) [appr. 39°33'N-63°40'E] - Zeravshan valley 23 May 1869 1 male (A.P. Fedchenko coll.) - Chardara, 25 April 1871 2 males (A.P. Fedchenko coll.) [41°15'N-67°58'E] - Chardara 27 April 1871 1 female 1 male (A.P. Fedchenko coll.) - Kyzylkum [desert] 28 April 1871 1 female (A.P. Fedchenko coll.) [appr. 42°40'N-63°37'E] - Kyzylkum [desert] 1 May 1871 2 males (A.P. Fedchenko coll.) - Syutkent, 3 May 1871 1 male (A.P. Fedchenko coll.) [41°55'N-68°5'E] - Bayrakum [Baygakum] 4 May 1871 1 male (A.P. Fedchenko coll.) [44°18'N-66°28'E] - Karakskaya steppe 6 May 1871 1 female (A.P. Fedchenko coll.) [appr. 49°18'N-69°50'E].

Geographic Distribution (Fig. 19). Southern-central Asia from Kazakhstan to Turkmenistan.

Records: KAZAKHSTAN: 2 females 1 male from coll Radoszkowski (ZMHB), [male without locality, females from Chardara and Kyzylkum (in russian letters), all labelled as 'Type', probably belonging to the syntypes serie, not designated as paralectotypes] - 10 km E Ddambul 31 May 1994 6 males 3 females (OLL) -Darbaza 40km N Tachkent 30 May 1994 4 males 8 females (OLL) - Vanovka, 80km E Djambul 1 male (OLL) - Alma Ata 1 May 1994 1 female (OLL) - 10km N Chayan 1 male (CAS) - vicinity of village Togusken on Talas River 1 female (CAS) - vicinity of Uralsk 1 female (CAS). TADJIKISTAN: 3km W Dusti, 130 km S Duchanbe 15-16 May 1991 1 female (OLL). TURKMENIA: Sandikazi 3-13 May 1993 18 males 3 females (OLL) - Askahbad 22 May 1964 1 male (CAS) - Star. Nisa/Ashabad 28 April 1977 1 male (OLL). UZBEKISTAN: Samarkand 19-21 May 1994 ca. 200 males ca. 40 females (OLL) - Czirczik 28 May 1994 14 males 5 females (OLL) - 5 km W Ddjizak 23 May 1994 9 males 6 females (OLL) - Djuma 1 male 1 female (CAS)- Samarkand: Chupan-Ata-Mountain 2 males 2 females (CAS)- Sary-Agach in Tashkent Distrikt 1 male (CAS).

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Literature cited

- Balthasar, V. 1972. Grabwespen - Sphecoidea. *Fauna CSSR* 20. 471 pp. Prag, Academia Verlag.
- Bohart, R. M. and A. S. Menke 1976. Sphecid wasps of the world. A generic revision. *University of California Press, Berkeley*. ix + 695 pp.
- De Beaumont, J. 1950. Sphecidae Hymenoptera récoltés en Algérie et au Maroc par M. Kenneth M. Guichard. *Bulletin British Museum Natural History Entomology*, 1: 391-727.
- De Beaumont, J. 1965. Les Sphecidae de la Grèce Hym. *Mitteilungen Schweizer Entomologische Gesellschaft* 38: 1-56.
- De Beaumont, J. and P. Roth 1967. Hymenoptera from Turkey. Sphecidae, I. *Bulletin British Museum Natural History Entomology* 19: 251-382.
- Dahlbom, A.G. 1843-1845. Hymenoptera Europaea praecipue borealia; formis typicis nonnullis Specierum Generumve Exoticorum aut Extraneorum propter nexum systematicus associatis. Tomus *Sphex* in sensu Linneano. *Officina Lundbergiana, Lundberg fasc.* 3: 353-528, 1845 dating after Menke 1974.
- Handlirsch, A. 1888. Monographie der mit Nysson und Bembex verwandten Grabwespen. II. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe* 96: 219-311.
- Handlirsch, A. 1995. Nachträge und Schlußwort zur Monographie der mit Nysson und Bembex verwandten Grabwespen. *Sitzungsberichte der Akademie für Wissenschaften, Wien Abteilung 1*, 104: 801-1079 + Tafeln.
- Kazenas, V.L. and B.A. Alexander 1993. The nest, prey, and larva of *Entomosericus kaufmani* Radoszkowski. Hymenoptera: Sphecidae. *Journal of Hymenoptera Research* 2: 221-226.
- Menke, A. S. 1974. The dates of publications of A.G. Dahlbom's Hymenoptera Europaea, vol. 1, *Polskie Pismo Entomologia* 44: 315-317.
- Menke, A. S. 1997. Family-group names in Sphecidae Hymenoptera: Apoidea. *Journal of Hymenoptera Research* 6: 243-255.
- Melo, G.A. 1999. Phylogenetic relationships and classifications of the major lineages of Apoidea Hymenoptera, with emphasis on the Crabronid wasps. *Scientific Papers. Natural History Museum of the University of Kansas* 14: 1-55.

- Pulawski, W. 1978. Nadsem. Sphecoidea, p. 173-279 in G.S. Medvedev Editor. Opredelitel' nasekomykh yevropeyskoy chasti SSR, Tom III. Pereponchatokrylyye, Pervaya chast' [Keys to the Identification of insects of European USSR, Vol. 3, part 1]. *Nauka, Leningrad* 584 pp.
- Radoszkowskii, O. 1877. „Sphegidae., in: Voyage au Turkestan d'A.P. Fedchenko, fasc. 14, tome 2, partie 5. *Bulletin société Impèrialis Amis Sciences Naturalis* 26: 1-87.
- Scobiola-Palade, X. 1966. Données nouvelles concernant les Hyménoptères du delta du Danube. *Travaux Musée Histoire naturalis Griorgi Antipa* 6: 389-396.

Figures:

1. *E. concinnus* male: antennal flagellum; a: ventral view; b: lateral view
2. *E. hauseri* male: antennal flagellum; a: ventral view; b: lateral view
3. *E. kaufmani* male: antennal flagellum; a: ventral view; b: lateral view
4. *E. hauseri* male: gonostylus, lateral view
5. *E. hauseri* male: gonostylus, ventral view
6. *E. kaufmani* male: gonostylus, lateral view
7. *E. kaufmani* male: sterna VI-VIII, lateral view
8. *E. concinnus* male: sterna VI-VIII, lateral view
9. *E. hauseri* male: sterna VII-VIII, lateral view
10. *E. hauseri* male: sterna VII-VIII, ventral view
11. *E. concinnus* male: sterna VII-VIII, ventral view
12. *E. kaufmani* : punctation of female between eye (left) and lateral ocellus
13. *E. concinnus*: punctation of female between eye (left) and lateral ocellus
14. *E. hauseri*: punctation of female between eye (left) and lateral ocellus
15. *E. kaufmani*: clypeal free margin of female
16. *E. hauseri*: clypeal free margin of female
17. *E. concinnus*: clypeal free margin of female
18. Collecting localities of *Entomosericus hauseri*.
19. Collecting localities of *Entomosericus concinnus* and *E. kaufmani*

Schmid-Egger, C. (2000): A revision of *Entomosericus* Dahlbom 1845 (Hymenoptera, Apoidea „Sphecidae“) with description of a new species. J. Hym. Res. 9: 352-362.