



Psenulus meridionalis Beaumont, 1937, a digger wasp species new to the fauna of Poland (Hymenoptera, Crabronidae)

Piotr OLSZEWSKI¹, Bogdan WIŚNIEWSKI², Agata KOSTRO-AMBROZIAK³, Tadeusz PAWLIKOWSKI¹, Hanna PIEKARSKA-BONIECKA⁴

¹Chair of Ecology and Biogeography UMK, Lwowska 1, 87-100 Toruń, Poland;
e-mails: thecla@wp.pl; pawlik@biol.uni.torun.pl

²Ojców National Park, 32-047 Ojców, Poland; e-mail: bogdan@isez.pan.krakow.pl

³Institute of Biology, University in Białystok, Świerkowa 20 B, 15-950 Białystok, Poland; e-mail: ambro@uwb.edu.pl

⁴University of Life Science in Poznań, Dąbrowskiego 159, 60-594 Poznań, Poland; e-mail: boniecka@up.poznan.p

Abstract: The paper presents *Psenulus meridionalis* Beaumont, 1937 – the digger wasp new to Polish fauna. Three specimens were collected in the Podlasie region (Biebrza National Park) and another two in the Wielkopolska-Kujawy Lowland. The newly revealed localities define now the northern limit of the species range in Europe. Currently, six species representing the genus are known from Poland.

Key words: Hymenoptera, Crabronidae, *Psenulus meridionalis*, new record, Polish fauna

INTRODUCTION

The genus *Psenulus* Kohl, 1897 belongs to the family of digger wasps (Crabronidae) and is represented by 159 species occurring throughout the world (Pulawski 2013) with the greatest diversity in the oriental region (Bohart & Menke 1976). So far 10 species were found in Europe, including five in Poland: *Psenulus concolor* (Dahlbom, 1843), *P. fuscipennis* (Dahlbom, 1843), *P. laevigatus* (Schenck, 1857), *P. pallipes* (Panzer, 1798) and *P. schencki* (Tournier, 1889) (Barbier 2013, Macek et al. 2010, Wiśniowski 2004). Currently, we revealed the sixth species occurring in Poland – *P. meridionalis* Beaumont, 1937.

PSENULUS: MORPHOLOGY AND BIOLOGY

Description. The species is related to *P. pallipes*, initially described as its variety. Characteristics of *P. meridionalis* are as follows (Bitsch et al. 2007, Jacobs 2007):

The body length of females and males 5–7 mm.

Females: Mesopleuron transversely striate. Denticles on the lower edge of the clypeus are elongated and positioned close to each other. Clypeus entirely punctulate. The second recurrent cell (rec2) descends into the third submarginal cell. Sternites IV and V on the posterior edge with long bands consisting of hairs. Semioval area on the second sternite clearly separated.

Males: Mesopleuron transversely striate. Flagellar segments 3–7 (8) with elongated sutures. The scutellum slightly and finely punctulate, shiny. The second recurrent vein (rec2) descends into the third submarginal cell. The frons and vertex with striae. The last antennal segment is mostly dark.

Biology. The previous data on the biology of species from the genus *Psenulus* come from the observations of several species. In Central Europe, usually one or two generations develop in a year (Blösch 2000). Mating and insemination of females take place on the ground (Bohart & Menke 1976). Females build their nests either in shoots of shrubs or abandoned corridors of

beetles living in wood, some other use abandoned nests of other Aculeata (Wiśniowski 2003). A typical nest consists of a few or several larval cells. Larvae feed on Hemiptera from the suborder Sternorrhyncha, mostly aphids (Aphidoidea) or jumping plant lice (Psylloidea). The female can gather as many as 27 paralysed prey in a single larval cell. The female lays an egg after the last prey is delivered to a nest chamber (Bohart & Menke 1976). Pupation takes place in a residual or complete cocoon. Larvae are parasitized by Hymenoptera – representatives of cuckoo wasps (Chrysididae), ichneumon wasps (Ichneumonidae) and chalcid wasps (Chalcidoidea: Eurytomidae, Torymidae, Eulophidae), as well as dipterans (Diptera) from the family Sarcophagidae (Blösch 2000, Bohart & Menke 1976, Wiśniowski 2003).

MATERIAL AND RESULTS

A total of five specimens of *Psenulus meridionalis*: 2♀ and 3♂ were caught by Moericke traps (yellow pan traps) hung on trees or placed on the ground in two regions of Poland in the 2006–2009 (Fig. 1).



Fig. 1. Distribution of *Psenulus meridionalis* Beaumont in Poland.

The region of Podlasie: Biebrza National Park, alder woods by Carska Droga (Tsar's Road; FE01), 8 VII 2006 – 1♀, a yellow pan trap at a height of ca. 2 m, leg. A. Kostro-

Ambroziak; Biebrza National Park, Bagno Ławki (swamp) by Carska Droga (Tsar's Road; FE01), 8 VII 2006 – 1♂, succession of birch in the sedge meadow, a yellow pan trap at a height of ca. 2 m, leg. A. Kostro-Ambroziak; Biebrza National Park, *Salix* thickets by Grobla Honczarowska (dyke); FE00, 22 VI 2006 – 1♀, a yellow pan, leg. J. Sawoniewicz.

Wielkopolska-Kujawy Lowland: Gorzyczki (XT27), the edge of the orchard covered with forest *Quercus-Ulmetum*, thickets of *Euonymo-Prunetum spinosae* and tall-herb communities, 20–30 VII 2009 – 1♂, leg. H. Pickarska-Bonicka; Ruda Milicka ad Milicz (XT61), Milicz Ponds, 29 VI 2008 – 1♂, leg. M. L. Borowiec.

The specimens are preserved in the collections of the first two authors.

DISCUSSION

Morphology. Representatives of the genus *Psenulus* resemble species from the genera *Psen* Latreille, 1796, *Mimesa* Shuckard, 1837 and *Mimumesa* Malloch, 1933, which they are closely related and included in the tribe of *Psenini* A. Costa, 1858 (Jacobs 2007). The body length of species occurring in Poland ranges from 4.5 to 8.0 mm. The body colouration of European species is black. The characteristic feature is presence of 3 submarginal cells in the fore wings; the second cell is sometimes quadrilateral or petiolate. The cubital vein in the posterior wings begins behind the tip of the anal cell. On the frons, there is a double, curved suture surrounding a confined areola of a shape characteristic for the species (Noskiewicz & Puławski 1960, Wiśniowski 2003). The lower part of the head is covered with short silvery hair. The clypeus is slightly convex, and its lower edge is equipped with two tiny denticles. The metasoma is connected with the mesosoma by the petiole developed from the first sternite. The pygidial area on the sixth tergite in females is poorly developed or absent (Lomholdt 1984).

Biology. This species is found mainly in waterlogged areas, e.g. wetlands and wet meadows (Herrmann 2005, Macek et al. 2010). Four out of the five specimens collected in Poland confirm the association of this species with wetlands overgrown with reed *Phragmites australis*, as *P. meridionalis* probably builds nests within the reed stems (Herrmann 2005).

Distribution. The species occurs in southern and central Europe from the Iberian Peninsula to South-West Asia. Species was first recorded in the southern part of Europe and according to Bitsch et al. (2007), it is rare and occurs locally. Since the end of the 20th century, the growing number of localities of *P. meridionalis* in Central Europe has been observed, what may indicate the expansion of its distribution range in a northerly direction. Up to date *P. meridionalis* is known from the following countries: Austria, Azerbaijan, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Iran, Iraq, Italy, Jordan, Russia, Serbia, Slovakia, Spain, Switzerland, Syria, Turkey, Ukraine (Artmann-Graf 2006, Bitsch et al. 2007, Blösch 2000, Dollfuss 2004, Herrmann 2005, Mingo & Gayubo 1984, Mokrousov et al. 2011, Murai & Amr 2011, Puławski 2013, Veprek & Straka 2007, Yildirim & Ljubomirov 2005).

The initial range of occurrence included the Mediterranean region. In 1994 and 1995 for the first time it was detected in Dübener Heat in Saxony.

The localities recorded from Poland define the northern boundary of its occurrence in Europe.

ACKNOWLEDGEMENTS

The authors thank Mr Marek Borowiec and Prof. Janusz Sawoniewicz for providing material studied.

REFERENCES

- ARTMANN-GRAF G. 2006. Neue und seltene Grabwespen (Hymenoptera: Sphecidae) in der Nordwest- und Zentralschweiz. *Bembix* 23: 4–7.
- BARBIER Y. 2013. Fauna Europaea: Psenulus. Fauna Europaea version 1.0 available from: <http://www.faunaeur.org/> (April 2013).
- BITSCH J., DOLLFUSS H., BOUCEK Z., SCHMIDT K., SCHMID-EGGER C., GAYUBO S. F., ANTROPOV A. V. & BARBIER Y. 2007. Hyménoptères Sphecidae d'Europe occidentale. Volume 3. Faune de France, France et régions limitrophes. 86. (seconde édition). Fédération Française des Sociétés de Sciences Naturelles. Paris, 86, 479 pp.
- BLÖSCH M. 2000. Die Grabwespen Deutschlands. Goecke & Evers, Keltern, 480 pp.
- BOHART R. M. & MENKE A. S. 1976: Sphecid Wasps of the World. A generic revision. University of California Press, Berkeley, ix + 695.
- DOLLFUSS H. 2004. The Pemphredoninae wasps of "Biologiezentrum Linz" collection in Linz, Austria (Hymenoptera, Apoidea, Crabronidae). *Linzer Biologische Beiträge* 36/1: 105–129.
- HERRMANN M. 2005. Neue und seltene Stechimmen aus Deutschland (Hymenoptera: Apidae, Sphecidae, Vespidae). *Mitteilungen des entomologischen Vereins Stuttgart*, 40: 3–8.
- JACOBS H.-J. 2007. Die Grabwespen Deutschlands. Ampulicidae, Sphecidae, Crabronidae. Goecke & Evers, Keltern, 207 pp.
- LOMHOLDT O. 1984. The Sphecidae (Hymenoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* 4, part 1, 224 pp.
- MACEK J., STRAKA J., BOGUSCH P., DVOŘÁK L., BEZDĚČKA P. & TYRNER P. 2010. Blánokřídli České republiky I. – Žahadloví. Academia, Praha, 524 pp.
- MINGO E. & GAYUBO S. F. 1984. Sphecidae de España. II. Pemphredoninae (Hymenoptera). *Graellsia*, 40: 99–117.
- MOKROUSOV M. V., BEREZIN A. Yu. & EGOROV L. V. 2011. Royushchiye osy (Hymenoptera: Ampulicidae, Sphecidae, Crabronidae) Chuvashii – The digger wasps (Hymenoptera: Ampulicidae, Sphecidae, Crabronidae) of the Chuvash Republic [In Russian]. *Eversmannia* 27–28: 62–86.
- MURAI M. N. & AMR Z. S. 2011. Sphecidae and Crabronidae of the Al Thawrah Nature Reserve, northern Syria, with a checklist of the species known from Syria. *Zoology in the Middle East* 53: 107–120.
- NOSKIEWICZ J. & PULAWSKI W. 1960. Grzebaczowate – Sphecidae. *Klucze do oznaczania owadów Polski, Grzebaczowate – Sphecidae*. PWN, Warszawa, 24, 67, 185 pp.
- PULAWSKI W. 2013. Catalog of Sphecidae *sensu lato*. Available from: http://research.calacademy.org/ent/catalog_sphecidae (April 2013).
- VEPŘEK D., STRAKA J. 2007. Apoidea: Spheciformes (kutilky). In: BOGUSCH P., STRAKA J. & KMENT P. (eds), Annotated checklist of the Aculeata (Hymenoptera) of the Czech Republic and Slovakia. *Acta Entomologica Musei Nationalis Pragae, Supplementum* 11: 191–239.
- WIŚNIEWSKI B. 2003. Sekcja: Spheciformes – Grzebacze. In: DYLEWSKA M., WIŚNIEWSKI B.: *Żądłówki (Hymenoptera, Aculeata) Ojcowskiego Parku Narodowego*. Wyd. OPN, Ojców: 129–179.
- WIŚNIEWSKI B. 2004. Annotated checklist of the Polish digger wasps (Hymenoptera: Sphecidae). *Polskie Pismo Entomologiczne* 73: 33–63.
- YILDIRIM E. & LJUBOMIROV T. 2005. Contribution to the knowledge of Sphecidae and Crabronidae (Hymenoptera, Aculeata) fauna of Turkey. *Linzer Biologische Beiträge* 37/2: 1785–1808.

STRESZCZENIE

[*Psenulus meridionalis* Beaumont, 1937, nowy dla fauny polskiej gatunek grzebacza (Hymenoptera: Crabronidae)]

Psenulus meridionalis BEAUMONT, 1937 to gatunek z rodziny grzebaczowatych (Crabronidae) nowy w faunie Polski. W latach 2006–2009 odłowiono pięć osobników tego gatunku na pięciu stanowiskach w Polsce: trzech na Podlasiu w Biebrzańskim Parku Narodowym oraz dwóch na Nizinie Wielkopolsko-Kujawskiej (Gorzyczki, Ruda Milicka). Cztery z pięciu znalezionych okazów *P. meridionalis* schwytano na mokradłach porośniętych trzciną, co potwierdza ścisły związek gatunku z tym środowiskiem. Aktualnie podane stwierdzenia wyznaczają w Europie najdalej wysunięte na północ stanowiska tego gatunku.

Accepted: 28 November 2013