ISRAEL JOURNAL OF ENTOMOLOGY, Vol. 39, 2009, pp. 99–103

Monomorium kugleri n. sp., a new fossil ant species (Hymenoptera: Formicidae: Myrmicinae) from the late Eocene Rovno Amber (Ukraine)

ALEXANDER G. RADCHENKO AND EUGENY E. PERKOVSKY
Schmalhausen Institute of Zoology of the National Academy of Sciences of Ukraine, 01-601, Kiev-30, B. Khmelnitsky str., 15, Ukraine
E-mails: rad@izan.keiv.ua, agradchenko@hotmail.com

ABSTRACT

Monomorium kugleri n. sp. is described based on a single worker from the late Eocene Rovno Amber, Ukraine. The new species is characterized by a 12-segmented antenna and a completely smooth body. It differs from *M. pilipes* Mayr and *M. mayrianum* Wheeler by the absence of longitudinal rugulosity on the mesopleura and propodeum and by its 12-segmented antenna (11-segmented in *M. mayrianum*).

KEYWORDS: ants, Formicidae, *Monomorium kugleri*, Rovno Amber, late Eocene, palaeontology

INTRODUCTION

The ant faunas of the late Eocene European ambers, i.e., the Baltic, Bitterfeldian (also called Saxonian), Scandinavian, and Rovno Ambers, ca. 35 Ma, are the best studied among all known fossil ant faunas in the world. Despite the fact that the study of ants of the Rovno Amber (north of Rovno Region, Ukrainian Polesye) began less than 10 years ago, 54 ant species from 29 genera have already been recognized, including 18 new species and a new genus. Among the 12 recorded myrmicine species, seven have not yet been found in Baltic Amber (Dlussky, 2002, 2008a,b; Dlussky and Perkovsky, 2002; Dlussky and Radchenko, 2006; Dlussky and Rasnitsyn, 2009; our unpublished data). Despite the high general similarity that was observed between the faunas of the Baltic and Rovno Ambers, these ambers have different origins (Perkovsky et al., 2003, 2007).

Of all myrmicine genera, the genus *Monomorium* Mayr is the best represented in terms of number of identified specimens that were found in the late Eocene European ambers. In the Baltic, Bitterfeldian, and Scandinavian Ambers, they constitute 0.9, 3.1, and 2.2% of all ant specimens, respectively (Dlussky and Rasnitsyn, 2009). However, until recently, only two fossil *Monomorium* species were known—*M. pilipes* Mayr and *M. mayrianum* Wheeler. Both were found in the Baltic and Rovno Ambers, and the for-

mer species is the only myrmicine species to be found in all late Eocene ambers. Specimens of *M. pilipes* are 3.7 times more abundant than *M. mayrianum* in all late Eocene ambers other than the Rovno Amber, where five specimens of *M. mayrianum* and only two specimens of *M. pilipes* have been recorded. This makes *M. mayrianum* the most common myrmicine in the Rovno Amber after *Fallomyrma transversa* Dlussky and Radchenko. These findings support the hypothesis of the different origins of the Rovno and other European late Eocene ambers. Recently, we discovered in the Rovno Amber a worker specimen of *Monomorium* that clearly differs from both previously described species, which we describe below as *M. kugleri*.

MATERIALS AND METHODS

We studied one piece of amber, containing one worker, kept at the Schmalhausen Institute of Zoology, Kiev, Ukraine (SIZK). Photos of the holotype were taken using an Olympus E410 digital camera fitted to an Olympus SZX12 stereomicroscope in conjunction with the computer programs Quick Photo Micro 2.3 and Helicon Focus Pro 4.80.

Morphometrics. The specimen was measured to an accuracy of 0.01 mm using a stereomicroscope Leica MZ6, and the measurements were used to calculate the various indices (see below).

Measurements. AL—diagonal length of the mesosoma seen in profile, measured from the anterodorsal margin of pronotum to the posterior margin of propodeal lobes; HL—length of head in full-face view, measured in a straight line from the anterior point of the median clypeal margin to mid-point of the posterior margin; HW—maximum width of head in full-face view posterior to the eyes; HTL—length of tibia of hind leg; OL—maximum diameter of eye; PH—maximum height of petiole in profile; PL—maximum length of petiole in profile from posterodorsal margin of petiole to articulation with propodeum; PW—maximum width of petiole in dorsal view; PPH—maximum height of postpetiole in lateral view; PPL—maximum length of postpetiole in dorsal view; PPW—maximum width of postpetiole in dorsal view; PNW—maximum width of pronotum in dorsal view; SL—maximum straight-line length of antennal scape in lateral view.

Indices. CI = HL/HW; HTI = HTL/HW; OI_1 = OL/HL; OI_2 = OL/HW; PI_1 = PL/PH; PI_2 = PL/HW; PI_3 = PW/HW; PPI_1 = PPL/PPH; PPI_2 = PPL/HW; PPI_3 = PPW/HW; PPI_4 = PPW/PW; SI_1 = SL/HL; SI_2 = SL/HW.

TAXONOMY

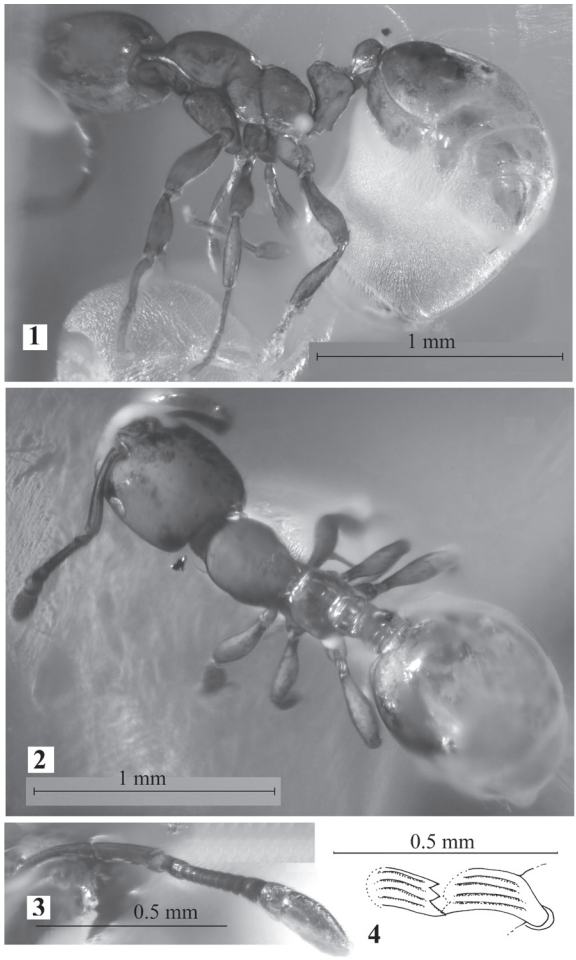
Monomorium kugleri Radchenko and Perkovsky, n. sp.

(Figs. 1–4)

Description

Worker

Total length: ca. 2.4 mm. Head distinctly longer than broad, with very weakly convex



Figs. 1–4. *Monomorium kugleri* n. sp., holotype (☿). 1. Body, lateral view; 2. Body, dorsal view; 3. Antenna; 4. Mandibles, frontal view. (all photos by V.G. Radchenko).

sides, narrowly rounded occipital corner, and very feebly concave occipital margin. Median portion of clypeus sharply raised and delineated laterally by longitudinal carina (anterior clypeal margin invisible). Frontal carina very short, reaching posteriorly to the lower level of eye. Frontal lobes quite narrow, only partly cover antennal sockets, not closely approximated, so that median portion of clypeus posteriorly (between frontal carinae) is wider than frontal lobe. Eye well developed, situated in front of mid-length of sides of head. Mandible longitudinally costulate, quite narrow, elongate, although with distinct masticatory margin and only three sharp teeth. Antenna 12-segmented, with

remarkable 3-segmented apical club that is distinctly longer than rest of funiculus. Scape relatively short, far from reaching occipital margin.

Alitrunk slender, with moderately convex promesonotum and distinct, quite deep and abrupt metanotal groove. Pronotum with rounded anterolateral corner in dorsal view. Propodeum gradually rounded, without trace of angle, dorsal surface distinctly longer than posterior (declivous) surface. Petiole higher than long, with long peduncle, its node high, with widely-rounded dorsum. Postpetiole lower than petiole, subglobular. Middle and hind tibiae with one simple spur.

Body completely smooth, without rugosity, only posterolateral part of postpetiole coarsely punctated. Integument does not seem shiny, possibly with dense microsculpture but the dull appearance may be an artefact caused by the specificity of fossilization in amber.

Body with scattered, long, thin, erect hairs. Scape and tibiae with decumbent pubescence. Whole body ochreous-red (color of amber specimens often not retained during fossilization; see Wheeler, 1915, for characteristics of *Monomorium* species). However, as a spider in the same piece of amber is bicolored (black with yellow legs), it is highly probable that the color of the holotype specimen is genuine.

Measurements: HL 0.68, HW 0.49, OL 0.11, SL 0.38, PnW 0.35, HTL 0.38, PL 0.29, PW 0.17, PH 0.22, PPL 0.17, PPW 0.18, PPH 0.20 mm.

Indices: CI 1.39; HTI 0.76; OI_1 0.16; OI_2 0.22; PI_1 1.29; PI_2 0.58; PI_3 0.34; PPI_1 0.87; PPI_2 0.34; PPI_3 0.37; PPI_4 1.08; SI_1 0.56; SI_2 0.76.

Comparative diagnosis

Monomorium kugleri differs from *M. pilipes* Mayr and *M. mayrianum* Wheeler by the absence of longitudinal rugulosity on the mesopleuron and propodeum; additionally, it differs from the latter species by the 12-segmented antenna (11-segmented in *M. mayrianum*).

Material examined

Holotype ☿, No K-4655, complete specimen, Klesov, Rovno Amber, Ukraine, late Eocene (SIZK); syninclusion: Zodariidae (Aranei). Holotype embedded in a large transparent piece of amber (6.5 grams after primary treatment).

Etymology

This species is dedicated to the memory of the eminent Israeli myrmecologist and entomologist, Prof. Jehoshua Kugler.

Comments

The percentage of myrmicines found in the myrmecofauna of Europe from the late Eocene ambers is very low (within single digits), and most fossil myrmicine species are

represented by only one or two individuals. However, the total number of ant species in relation to studied material in the Rovno Amber is unexpectedly high compared to those in the Baltic Amber. Thus, 620 specimens found in the Rovno Amber belong to 58 species, whereas more than 13,000 specimens from the Baltic Amber represent little more than 100 species (Dlussky and Rasnitsyn, 2009). Therefore, if the accumulation of specimens from the Rovno Amber Lagerstätte continues at the present rate, one can expect a considerable increase in the total number of species still to be discovered and a large increase in the number of myrmicine species. Given that the Rovno Amber ant-*assemblage* currently includes three *Monomorium* species—more than in any other fossil fauna—we expect the total of myrmicine species recorded to eventually surpass the 27 species that have so far been found in the Baltic Amber.

ACKNOWLEDGMENTS

We are grateful to Prof. Vladimir G. Radchenko (Kiev, Ukraine) for the photos of the holotype and to Prof. Alexander P. Rasnitsyn and Prof. Gennady M. Dlussky (Moscow, Russia) for valuable comments on the manuscript. We also thank two anonymous reviewers for their comments on the manuscript, and Dr. Graham Elmes (UK) for the English editing.

REFERENCES

Dlussky, G.M. 2002. Ants of the genus *Dolichoderus* (Hymenoptera, Formicidae) from the Baltic and Rovno Amber. *Paleontological Journal* 36: 50–63.

Dlussky, G.M. 2008a. Ants of the tribe Formicini (Hymenoptera, Formicidae) from Late Eocene amber of Europe. *Paleontological Journal* 42: 500–513.

Dlussky, G.M. 2008b. New data on ants of the genus Dolichoderus Lund (Hymenoptera, Formicidae) from Late Eocene ambers of Europe. *Vestnik Zoologii* 42(6): 497–514 (in Russian).

Dlussky, G.M. and Perkovsky, E.E. 2002. Ants (Hymenoptera, Formicidae) from the Rovno Amber. *Vestnik Zoologii* 36(5): 3–20 (in Russian).

Dlussky, G.M. and Radchenko, A. 2006. *Fallomyrma* gen. nov., a new myrmicine ant genus (Hymenoptera: Formicidae) from the Late Eocene European amber. *Annales Zoologici* 56: 153–157.

Dlussky, G.M. and Rasnitsyn, A.P. 2009. Ants (Insecta: Vespida: Formicidae) in the Upper Eocene amber of Europe. *Paleontological Journal* 43: 1024–1042.

Perkovsky, E.E., Zosimovich, V.Yu., and Vlaskin, A.P. 2003. A Rovno Amber fauna: a preliminary report. *Acta Zoologica Cracoviensis* 46(Supplement—Fossil Insects): 423–430.

Perkovsky, E.E., Rasnitsyn, A.P., Vlaskin, A.P., and Taraschuk, M.V. 2007. A comparative analysis of the Baltic and Rovno Amber arthropod faunas: representative samples. *African Invertebrates* 48: 229–245.

Wheeler, W.M. 1915 (1914). The ants of the Baltic Amber. *Schriften der Physikalisch-ökonomischen Gesellschaft zu Königsberg* 55: 1–142.