

UDK 565.796: 551.781.4

## A NEW SPECIES OF THE EXTINCT ANT GENUS *ELECTROMYRMEX* (HYMENOPTERA, FORMICIDAE)

A. G. Radchenko<sup>1</sup>, G. M. Dlussky†

<sup>1</sup>*Schmalhausen Institute of Zoology, NAS of Ukraine  
vul. B. Khmel'nitskogo, 15, Kyiv, 01030 Ukraine  
E-mail: rad@izan.kiev.ua*

urn:lsid:zoobank.org:pub:91160C40-2D19-47FD-B239-BC5F7D5B6055

**A New Species of the Extinct Ant Genus *Electromyrmex* (Hymenoptera, Formicidae).** Radchenko, A. G., Dlussky, G. M. —*Electromyrmex wheeleri* sp. n., which belongs to the extinct ant genus is described based on males from the Baltic and Bitterfeld Ambers (Priabonian stage, 33.9–37.2 Ma). Until now only one species of this specialized genus based on a single worker was described and taxonomic position of this genus in the subfamily Myrmicinae remains uncertain. By the forewing venation, males of *E. wheeleri* resemble *Aphaenogaster* Mayr, *Messor* Mayr and *Pheidole* Westwood, but differs from the first two genera by the presence of Mayrian furrows, and from the latter one — by the antennal structure. On the other hand, males of this genus have a set of specialized characters, e. g., subcylindrical petiole, mandibles with an only single apical tooth, quite peculiar shape of mesosoma, etc. and the morphological features of the males of *E. wheeleri* also do not shed light on its systematic position.

**Key words:** ants, Formicidae, Myrmicinae, *Electromyrmex*, Late Eocene, Baltic and Bitterfeld Ambers, palaeontology, taxonomy.

### Introduction

Wheeler (1915) established a fossil myrmicine ant genus *Electromyrmex* Wheeler from the Late Eocene Baltic amber (Priabonian stage, 33.9–37.2 Ma), based on a species, *E. klebsi* Wheeler, 1915. A single worker of this species was originated from the collection of Richard Klebs from Königsberg, and now it is believed to be lost in the World War II (A. Gehler, pers. comm., 2017). *Electromyrmex klebsi* is morphologically peculiar and can be easily recognized based on the description and figure provided by Wheeler (1915: 56, fig. 21). It is characterized primarily by the slender body, big and convex eyes situated very closely to the anterior head margin so that the genae are extremely short, long and narrow mandibles with serrate masticatory margin, slender, subcylindrical petiole without a distinct node, etc. Wheeler (1915: 56) emphasized: “This singular ant is so unlike any of the recent species ... in the structure of its mandibles, thorax and petiole that it evidently deserves to rank as the type of a new genus”.

For more than a hundred years after its description only a single specimen of this genus was known, but while revising the Late Eocene European ambers we found two males, which are quite corresponding the main diagnostic features of *Electromyrmex*. However, the body length of the holotype worker of *E. klebsi* is about 5.5 mm, whereas body lengths of the recently found males are only 2.5–2.9 mm. We do not know any example among both extinct and extant ant genera when males are nearly twice smaller than the conspecific workers. This fact leads us to describe these males as a new species rather than consider them to be the males of *E. klebsi*.

### Material and methods

Totally two specimens (males) were examined in two pieces of amber deposited in the Geologisch-Paläontologisches Institut der Universität Hamburg (GPIH) and Museum für Naturkunde Berlin, Germany (MNKB) (the former Zoological Museum of the Humboldt University).

The photographs were taken with Leica Z16 APO microscope equipped with Leica DFC 450 camera and processed by LAS Core software.

Some characters were not properly visible and measurable on the examined specimens, hence we measured only visible details (accurate to 0.01 mm), particularly:

HL — maximum length of the head in dorsal view, measured in a straight line from the anteriormost point of clypeus to the mid-point of occipital margin;

SL — maximum straight-line length of the scape from its apex to the articulation with condylar bulb;

OL — maximum diameter of the eye;

ML — length of the mesosoma in profile, measured from the anterior-upper margin of pronotum to the posterior margin of propodeal lobes;

MH — height of the mesosoma, measured from the upper level of scutum perpendicularly to the level of lower margin of mesopleuron;

PL — maximum length of the petiole, measured from the posterodorsal margin of petiole to the articulation with propodeum;

PH — maximum height of the petiole in profile, measured from the uppermost point of the petiolar node perpendicularly to the imaginary line between the tip of subpetiolar process and posteroventral points of petiole;

PPL — maximum length of the postpetiole between its visible anterior and posterior margins;

PPH — maximal height of the postpetiole in profile;

HTL — maximum length of the hind tibia.

In this paper we do not abbreviate the various indices, simply using ratios of various measurements (e. g. SL/HL instead of SI) what might be more convenient for readers.



Fig. 1. *Electromyrmex wheeleri* sp. n., holotype male, body in lateral view (photo by E. Martynova).

## Results

### *Electromyrmex wheeleri* sp. n.

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*Electromyrmex* sp. A: Dlussky, Rasnitsyn, 2009: 1031; Perkovsky, 2016: 116.

Material examined. Holotype ♂: Baltic Amber, Late Eocene, GPIH number 4937, coll. Gröhn No. 6737, paratype ♂: Bitterfeld amber, Late Eocene, Germany (MNKB No. 10/216).

Males (figs 1–9). Total length: ca. 2.5–2.9 mm. Despite width of head is not properly measurable, head seems distinctly elongate, much longer than broad. Occipital margin straight, sides of head very feebly convex, occipital corners moderately rounded. Clypeus convex (seen in profile), its anterior margin narrowly rounded, but not prominent and not notched medially. Antennal sockets quite deep. Eyes rather big, their maximal diameter ca. 2.5 times smaller than length of head. Ocelli well developed, though not too big. Antennae 13-segmented, with 4-segmented club, scape relatively short, subequal to total length of 1st to 4th funicular segments. Mandibles not very long, elongate-triangular, with distinct masticatory margin, which is with only single sharp apical tooth. Palp formula seems 5, 3 (these characters are not proper visible, palp formula may be less, but definitely not more than 5, 3).

Scutum relatively short and high, strongly convex, Mayrian furrows well developed. Propodeum very low and quite long, lays much lower than dorsal levels of scutum and scutellum (shape of mesosoma similar to that of males of several *Aphaenogaster* species), its dorsal and posterior surfaces subequal in length, almost straight, meet at an rounded angle, without any denticles or tubercles (seen in profile). Propodeal lobes widely rounded.

Petiole remarkable, very long and low, without node, subcylindrical, slightly curved dorsoventrally. Postpetiole small, higher than petiole, subglobular.

Legs long and slender. Mid and hind tibiae without spurs, pretarsal claws simple.

Head, mesosoma and waist finely though densely punctated, mesopleuron and sides of propodeum additionally with fine longitudinal striation. Gaster smooth and shiny.



Fig. 2. *Electromyrmex wheeleri* sp. n., holotype male, head and antennae in lateral view (photo by E. Martynova).



Fig. 3. *Electromyrmex wheeleri* sp. n., paratype male, body in lateral view.

Head, mesosoma and waist with dense, silverish decumbent pubescence. Head (including its ventral surface), scutum and propodeal dorsum with sparse long suberect hairs, gaster with more abundant similar hairs. Scape without hairs, femora and tibiae with non-abundant, fine, fairly short semierect hairs, tarsi with short bristles.

Forewing with closed cells  $1r+2r$ ,  $rm$  and  $mcu$ , cell  $3r$  open; cell  $1r+2r$  quite big, ca. twice longer than width, cell  $rm$  pedicellate.

Measurements (in mm). Holotype: HL 0.53, SL 0.26, OL 0.22, PL 0.33, PH 0.078, PPL 0.20, PPH 0.14, ML 1.07, MH 0.65, HTL 0.65, total length ca. 2.9.

Ratios: SL/HL 0.49, OL/HL 0.42, PL/PH 4.17, PL/HL 0.61, PPL/PPH 1.36, PPL/HL 0.37, ML/MH 1.64.

Paratype: HL 0.44 SL 0.20, OL 0.18, PL 0.26, PH 0.077, PPL 0.14, PPH 0.10, ML 0.90, MH 0.50, HTL 0.50, total length ca. 2.5.

Ratios: SL/HL 0.46, OL/HL 0.41, PL/PH 3.38, PL/HL 0.59, PPL/PPH 1.40, PPL/HL 0.32, ML/MH 1.80.

Workers and queens are unknown.

### Taxonomic position and discussion

Based on the main diagnostic features of the worker, *Electromyrmex* looks to be highly specialized extinct myrmecine genus that cannot be considered neither as an ancestor, or as a descendant of any known extinct or extant ant genera; its taxonomic position within the subfamily Myrmecinae is uncertain (Bolton, 2013; Ward et al., 2015).

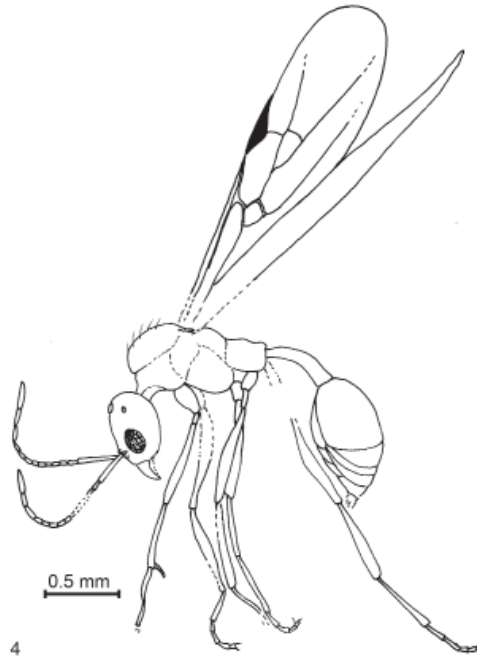


Fig. 4. *Electromyrmex wheeleri* sp. n., line drawing of holotype male based on photo, body in lateral view.

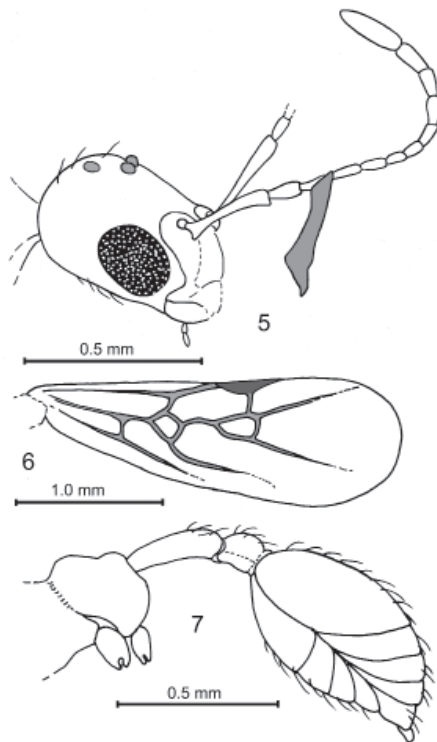


Fig. 5–7. *Electromyrmex wheeleri* sp. n., line drawings of holotype male made based on photos: 5 — head and antennae in lateral view, 6 — forewing, 7 — propodeum, waist and gaster in lateral view.

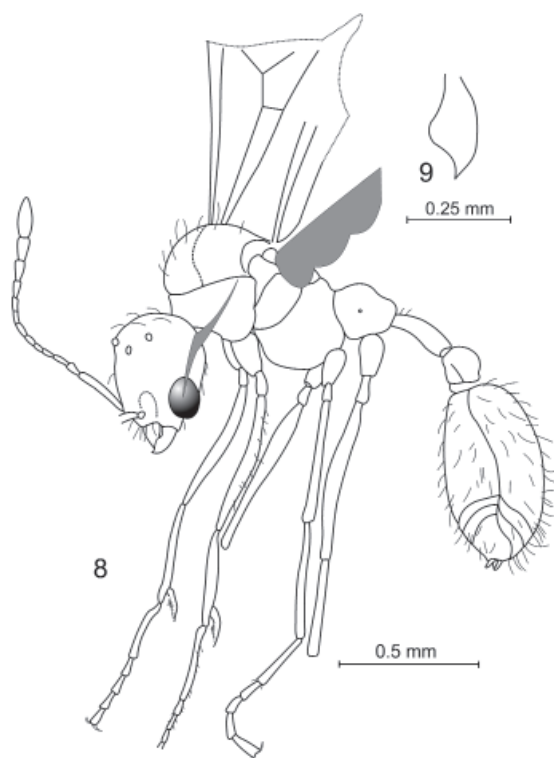


Fig. 8–9. *Electromyrmex wheeleri* sp. n., line drawings of paratype male made based on photos: 8 — body in lateral view, 9 — mandible.

The morphological features of the males of *E. wheeleri* also do not allow shedding light to the systematic position of this genus. Thus, they share several characters with some modern Myrmicinae genera resembling *Aphaenogaster*, *Messor* and *Pheidole* by the forewing venation, but differing from the first two genera by the presence of Mayrian furrows, and from the latter one — by the antennal structure. Additionally, males of *E. wheeleri* have a set of specialized characters, e. g., subcylindrical petiole, mandible with an only single apical tooth, quite peculiar shape of mesosoma, etc., so taxonomic position of *Electromyrmex* remains unresolved.

**Etymology.** The species name is dedicated to W. M. Wheeler, famous American myrmecologist, who established the genus *Electromyrmex*.

We are sincerely grateful to Carsten Gröhn (Glinde, Germany) and Evgeny E. Perkovsky (Kyiv, Ukraine) for providing us with material and Ekaterina Martynova (Kyiv, Ukraine) for taking images of the holotype specimen of *E. wheeleri*.

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Received 14 February 2018

Accepted 7 May 2018