

FALLOMYRMA GEN. NOV., A NEW MYRMICINE ANT GENUS (HYMENOPTERA: FORMICIDAE) FROM THE LATE EOCENE EUROPEAN AMBER

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Abstract.— *Fallomyrma*, a new monotypic ant genus from the Rovno, Saxonian, and Danish ambers (Late Eocene), and a new species, *F. transversa*, are described. The taxonomic position and morphological similarity of the new genus to other genera is discussed.



Key words.— ants, Formicidae, Myrmicinae, *Fallomyrma*, taxonomy, new genus, new species, Rovno amber, Saxonian amber, Scandinavian amber, Late Eocene.

INTRODUCTION

The ant fauna of the European Late Eocene amber (primarily that of the Baltic amber) is reasonably well studied. The first descriptions of ants from Baltic amber were published during the third decade of the 19th century (Presl 1822, Holl 1829), with later additions by Giebel (1856). These authors described 9 species of the genus *Formica* Linnaeus; *F. cordata* Holl was transferred to the genus *Pheidole*, and *F. lucida* Giebel was suggested to be a member of the family Braconidae (Mayr 1868), while a 10th specific name, *F. cephalica*, erroneously attributed to Burmeister (1831) by Scudder (1891), is in fact *nomen nudum*. The remaining seven species were ignored by most subsequent authors, though Bolton (1995) formally placed them to the genus *Formica* (*F. gibbosa* Presl, *F. macrognata* Presl, *F. nigra* Presl, *F. parvula* Presl, *F. luteola* Presl, *F. quadrata* Holl, and *F. trigona* Presl). However, the types of all these fossil species seem to be lost, and the inadequate original descriptions make it impossible to assign them to any known extinct or extant ant genus, therefore we consider it more reasonable to make them *incertae sedis* in the family Formicidae.

The first comprehensive work, dealing with the Formicidae of the Baltic amber, was Mayr's (1868) paper, where he described 49 fossil ant species, belonging to 23 extinct and extant genera; later brief additions

to this list were published by André (1895) and Emery (1905). However, it was the momentous monographic revision of Baltic amber Formicidae published by Wheeler (1915) that became the classic treatise for subsequent generations of myrmecologists. For the last two decades one of us (GD) has made an intensive study of fossil ants, including those from Baltic amber. He has described some new species and compiled a modern key for identification of the ant genera of the Baltic amber (Dlussky 1967, 1997, 2002 a, b). Currently 97 species from 46 genera of ants have been found preserved in Baltic amber. However, a surprisingly low proportion of the genera belong to the subfamily Myrmicinae: there being only 13 genera of myrmicines known until now (see also Burnham 1978, Larson 1978, Poinar 1992). No new fossil myrmicine genera have been described from Late Eocene European ambers since Wheeler's (1915) revision.

Recently, a quite rich insect fauna, including 19 species from 13 genera of ants, was discovered in the Rovno amber (north-western Ukraine), which has the same age as the Baltic amber (Late Eocene, ca 40 Ma). Among this ant material were 9 new species and the first record of genus *Tapinoma* Förster from the Late Eocene (Dlussky and Perkovsky 2002, Perkovsky et al. 2003).

In the course of an investigation of the ants from Late Eocene European amber we have found 19 specimens, belonging to a previously undescribed myrmi-

cine genus. We were somewhat surprised that these specimens were found only in the Rovno, Saxonian and Scandinavian ambers, and were not in the "typical" Baltic amber (e.g. that from Poland and Kaliningrad Region of Russia [former East Prussia]). The fact that this genus was not found in Baltic amber, despite more than 13 thousands of the pieces of amber with ants being investigated by many scientists, suggests that this genus was never present in the forests that produced typical Baltic amber. Here we describe the new myrmicine ant genus and discuss its taxonomic position.

MATERIAL AND METHODS

Totally we examined 19 *Fallomyrma* workers in 17 pieces of amber: 4 workers (including the holotype) from Rovno amber, Institute of Zoology of the Ukrainian National Academy of Sciences, Kiev (IZANU); 2 workers from Saxonian amber, personal collection of Mr. Manfred Kutscher, Sassnitz, Rugen, Germany (MKC); 2 workers from Saxonian amber, Paläontologisches Museum (Humboldt Museum), Berlin Germany, (HM); 11 workers from Scandinavian amber, Zoological Museum of University of Copenhagen, Denmark (ZMUC).

The figures are based on original drawings of the specimens and photographs made using an Olympus Camedia C-3030 digital camera fitted to an Olympus SZX9 microscope in conjunction with the computer program CorelDraw 8; part of the figures were drawn by hand using the same microscope.

Not all features were easily visible and measurable on the specimens examined, hence we measured only visible details of the concrete specimens (accurate to 0.01 mm).

Morphometrics:

- HL – length of head in dorsal view, measured in a straight line from the anterior point of median clypeal margin to mid-point of the occipital margin;
- HW – maximum width of head in dorsal view behind the eyes;
- SL – maximum straight-line length of antennal scape seen in profile;
- AL – diagonal length of the alitrunk seen in profile, from the neck shield to the posterior margin of metapleural lobes;
- AH – height of alitrunk, measured from upper level of mesonotum perpendicularly to the level of lower margin of mesopleura;
- PNW – maximum width of pronotum from above;
- HTL – length of tibia of hind leg;
- PL – maximum length of petiole from above;
- PH – maximum height of petiole in profile;
- PW – maximum width of petiole from above;
- PPL – maximum length of postpetiole from above;

PPH – maximum height of postpetiole in profile;

Indices:

CI = HL/HW; SI₁ = SL/HL; SI₂ = SL/HW; PI = PL/PH; PPI = PPL/PPH; AI = AL/AH.

TAXONOMY

Fallomyrma gen. nov.

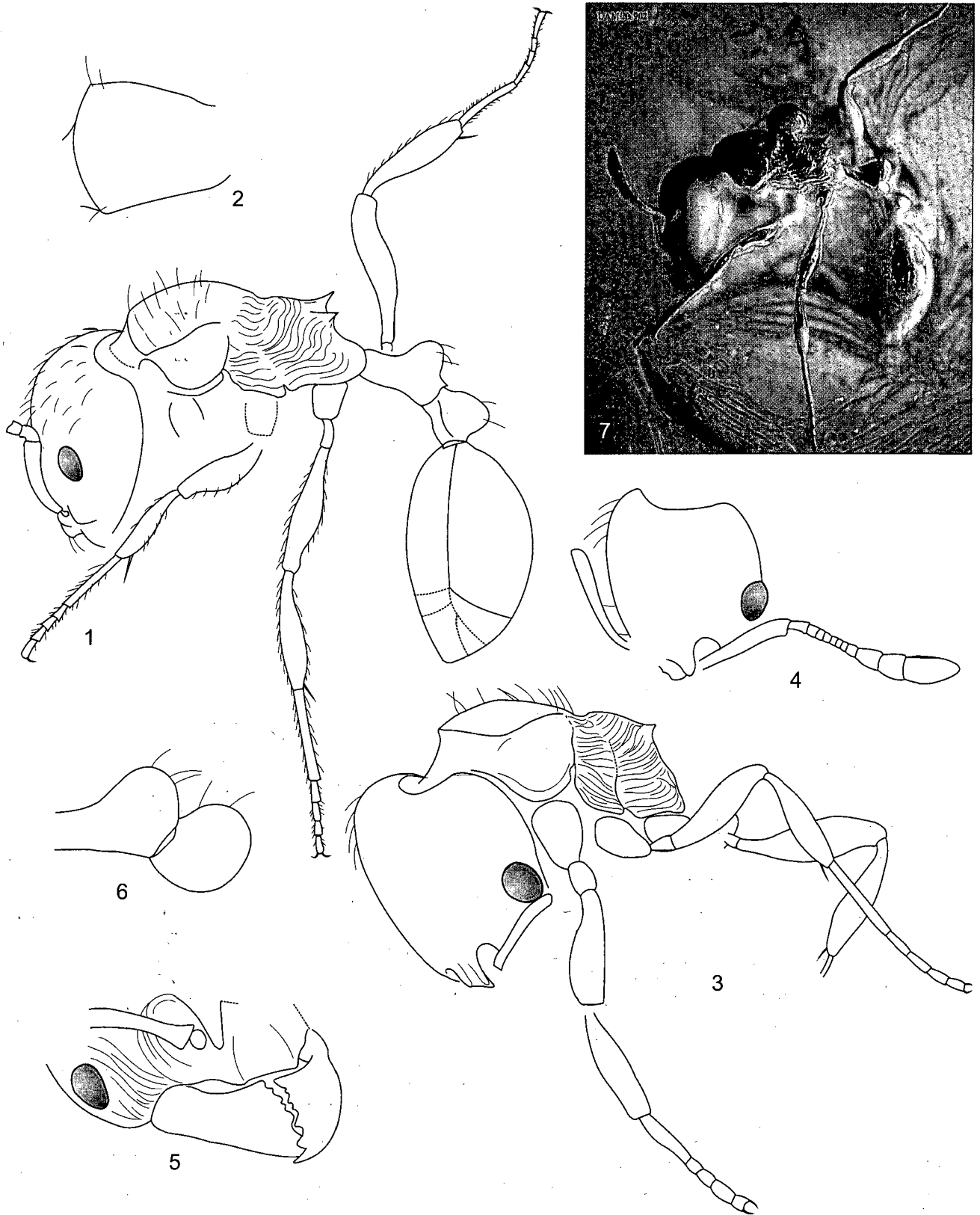
Type species. *Fallomyrma transversa* sp. nov.

Diagnosis. This genus is characterised by the following combination of the features:

- antennae 12-segmented, with remarkable 3-segmented apical club, which is clearly separated from the rest of funiculus; antennal scape short, far not reaching to the occipital margin;
- promesonotal dorsum distinctly narrowing posteriorly, subtrapezoidal, markedly delineated anteriorly and laterally by the sharp ridge, its anterior margin convex (seen from above); dorsal and lateral surfaces of promesonotum meet at a right or even somewhat acute angle;
- propodeum with short sharp denticles;
- eyes well developed, quite big, situate in front (lower) of the midlength of the sides of head;
- median portion of clypeus longitudinally concave, and this concavity delineated laterally by the longitudinal carinae; anterior clypeal margin slightly emarginated medially;
- frontal lobes not closely approximated, so that median portion of clypeus posteriorly (where it passes between frontal carinae) wider than the width of one frontal lobe;
- mandibles with 7 teeth on the masticatory margin;
- middle and hind tibiae with one simple spur;
- petiole with long peduncle, its node high, with rounded dorsum;
- whole body smooth, only propodeum dorsally with conspicuous transversal sinuous rugosity, sides of propodeum and mesopleura with sinuous longitudinal rugosity (the latter feature, probably, is just the character of the described species).

Remarks. By the combination of the features mentioned above, *Fallomyrma* differs from any known Late Eocene ant genera. Superficially, by the shape and sculpture of the head, alitrunk and waist, it is similar to the extant Neotropical genus *Oxyepoecus* Santschi. However, the latter genus differs from *Fallomyrma* by 11-segmented antennae, by the mandibles having 3 teeth on masticatory margin, and by the closely approximated frontal lobes, so that median portion of the clypeus is posteriorly (where it passes between frontal carinae) distinctly narrower than the width of one frontal lobe.

We do not assume that these two genera are closely related; more probably such astonishing superficial similarity is the result of convergence. There are many



Figures 1–7. Details of structure of *Fallomyrma transversa* (holotype, worker). (1) Body in profile; (2) pronotum from above; (3) head and alitrunk, anterior-lateral view; (4) part of head with antenna; (5) anterior part of head with mandibles; (6) petiole and postpetiole in profile; (7) specimen in amber.

examples of the amazing similarity between non-relative ant genera, such as *Cataglyphis* Förster (Old World) and *Myrmecocystus* Wesmäl (New World), *Messor* Forel (Old World) and *Pogonomyrmex* Mayr (New World), etc., caused by the similarity of the morphological adaptations during the evolutionary history of these genera.

Etymology. This genus named after Latin word "fallo" – deceive, and Greek word "myrmica" – ant. Gender: feminine.

Fallomyrma transversa sp. nov.
(Figs 1–6; Tables 1, 2)

Material examined. Holotype worker, Rovno amber, IZANU No 902; Paratypes: Rovno amber: 2 workers in the same piece of amber, IZANU No 971; 1 worker, IZANU No K-28-o; Saxonian amber: 2 workers in the same piece of amber, MKC No F-162; 1 worker, HM No 11/375; 1 worker, HM No 7/219; Scandinavian amber: 1 worker, ZMUC No 317, G.V. Henningsen, 21.xi.1960; 1 worker, ZMUC No 318, G. V. Henningsen, 19.VI.1964; 1 worker, ZMUC No 319, G.V. Henningsen, 26.ii.1965; 1 worker, ZMUC No 320, G.V. Henningsen, 1.v.1967; 1 worker, ZMUC No 321, Borge Mordensen, 21.iii.1961; 1 worker, ZMUC No 322, Borge Mordensen, 21.iii.1961; 1 worker, ZMUC No 324, J. Flauensgaard, 2.iv.1960; 1 worker, ZMUC No 325, J. Flauensgaard, 8.vi.1960; 1 worker, ZMUC No 326, J. Flauensgaard, 28.i.1961; 1 worker, ZMUC No 323, Min. Mus., Nordjyll. Vestkysd, Ravarh. Nielsen, 22.ii.1899; 1 worker, ZMUC No 327, Thorv. Hansen, 16.xii.1954.

Description. Workers. Head longer than broad, with weakly convex sides, slightly concave occipital margin, and narrowly rounded occipital corners. Median portion of clypeus longitudinally concave and this concavity delineated laterally by longitudinal carinae; anterior clypeal margin slightly emarginated medially. Frontal carinae short, reaching posteriorly at most to the upper level of the eyes, frontal lobes not closely approximated, so that median portion of clypeus posteriorly (where it passes between frontal carinae) wider than the width of one frontal lobe.

Eyes well developed, quite big, situate in front (lower) of the midlength of the sides of head. Mandibles with 7 teeth on the masticatory margin. Antennae 12-segmented, with remarkable 3-segmented apical club, which is clearly separated from the rest of funiculus. Antennal scape short, very feebly curved at the base, far not reaching occipital margin.

Alitrunk rather short, with distinct, quite deep and abrupt metanotal groove. Promesonotal dorsum distinctly narrowing posteriorly, subtrapezoidal, markedly delineated anteriorly and laterally by the sharp ridge, its anterior margin convex (seen from above); dorsal and lateral surfaces of promesonotum meet at a right or even somewhat acute angle. Propodeum with short sharp denticles. Petiole with long peduncle, its node high, with rounded dorsum. Postpetiole is subequal to, or slightly higher than its length, subglobular.

Middle and hind tibiae with one simple spur.

Body smooth, only propodeum dorsally with conspicuous transversal sinuous rugosity, sides of propodeum and mesopleura with sinuous longitudinal rugosity.

Table 1. Measurement (in mm) of the holotype and paratypes of *Fallomyrma transversa*.

Specimens examined	HL	HW	SL	AL	AH	PNW	HTL	PL	PH	PW	PPL	PPH
Holotype, IZANU No 902	0.73		0.43	1.06	0.42		0.45	0.31	0.22		0.14	0.14
IZANU No 971 (1)	0.70	0.59	0.42				0.39	0.34	0.24			
IZANU No 971 (2)	0.69	0.57	0.42				0.42					
IZANU No K-28-o	0.78	0.65	0.48	1.05	0.38	0.40	0.46					
HM No 11/375		0.59	0.45	0.85	0.31		0.36	0.31	0.22		0.15	0.15
HM No 7/219				0.97								
MKC F-162 (1)				0.92			0.39					
MKC F-162 (2)			0.45	0.87						0.14		0.17
ZMUC No 317	0.71	0.59		0.84	0.31							
ZMUC No 318				0.87	0.32			0.34	0.24		0.17	0.18
ZMUC No 319	not measurable											
ZMUC No 320	0.74			0.87	0.32		0.42	0.34	0.22			
ZMUC No 321	0.76	0.62	0.49	0.91	0.36		0.48	0.34	0.24			
ZMUC No 322	0.90	0.77	0.56	1.04	0.41		0.48	0.42	0.31		0.24	0.24
ZMUC No 323				0.85	0.32		0.43	0.34	0.24		0.17	0.18
ZMUC No 324	0.67	0.50	0.42	0.87		0.31	0.38	0.31	0.21	0.13		
ZMUC No 325		0.56	0.41	0.88	0.34	0.34		0.34	0.22		0.17	0.18
ZMUC No 326	not measurable											
ZMUC No 327	not measurable											

Table 2. Morphometric indices of the holotype and paratypes of *Fallomyrma transversa*.

Specimens examined	CI	SI ₁	SI ₂	PI	PPI	AI
Holotype		0.60		1.38	1.00	2.53
IZANU, No 971 (1)	1.19	0.60	0.71	1.41		
IZANU, No 971 (2)	1.20	0.61	0.73			
IZANU, No K-28-o	1.19	0.61	0.73			
HM, No 11/375			0.76	1.38	1.00	2.77
HM, No 7/219	nothing to count					
MKC F-162 (1)	nothing to count					
MKC F-162 (2)	nothing to count					
ZMUC No 317	1.21					2.73
ZMUC No 318				1.41	0.92	2.70
ZMUC No 319	not measurable					
ZMUC No 320				1.50		
ZMUC No 321	1.23	0.65	0.80	1.41		2.50
ZMUC No 322	1.16	0.63	0.73	1.36	1.00	2.55
ZMUC No 323				1.41	0.92	2.65
ZMUC No 324	1.33	0.63	0.83	1.47		
ZMUC No 325			0.73	1.50	0.92	2.63
ZMUC No 326	not measurable					
ZMUC No 327	not measurable					

Whole body with long, thin, pointed, not very abundant erect to suberect hairs. Antennal scape and tibiae with sparse subdecumbent hairs (in the holotype and paratype specimens in the same piece of amber hairs on the scape and legs are barely visible).

Total length ca. 4 mm, but this species seems to be quite variable in size (see Table 1).

Etymology. The species named after Latin word "transversus" – transversal, what means character of the rugosity on the propodeal dorsum.

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