

New Species of Late Eocene Feather-Winged Beetles (Coleoptera, Ptiliidae) from the Rovno and Baltic Amber

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Abstract—Fossil beetles of the family Ptiliidae are reviewed. Two new species, *Micridium groehni* sp. nov. and *Ptinella rovnoensis* sp. nov., are described from the Baltic and Rovno amber.

Key words: Coleoptera, Ptiliidae, feather-winged beetles, Eocene, Baltic, Rovno, amber, new species.

INTRODUCTION

Ptiliidae are the smallest beetles, from 0.25 to 2 mm long, and occur worldwide. The world fauna comprises more than 600 described species. The beetles inhabit leaf litter, manure, rotten wood, and other decaying organic matter.

The most ancient Ptiliidae are known from the Upper Cretaceous resins of Taimyr (Zherikhin, 1978) and Myanmar (Rasnitsyn and Ross, 2000; Grimaldi *et al.*, 2002). To date, three species have been recorded as fossils; the Aquitanian *Ptilium tertiarium* Horion (Statz and Horion, 1937) from the lagerstatt of Rott (Germany) and the Late Eocene *Ptinella oligocoenica* Parsons (Parsons, 1939) and *Microptilium geistausi* Dybas (Dybas, 1961) from the Baltic amber. Unidentified representatives of the family were mentioned from the Baltic amber (Helm, 1896; Klebs, 1911; Larsson, 1978; Bachofen-Echt, 1996; Kubisz, 2001) and Saxonian amber (Shumann and Wendt, 1989), as well as from the Miocene Mexican amber (Hurd *et al.*, 1962) and Dominican amber (Poinar, 1992). Considering that at present many geologists assign the Aquitanian to the Early Miocene, *P. tertiarium* cannot be distinguished from modern species on the basis of its description and probably belongs to one of them.

The discovery of Ptiliidae in the Late Eocene Rovno amber from northern Ukraine (Dlussky and Perkovsky, 2002) prompted the study of the feather-winged beetles from the coeval Baltic amber.

MATERIAL

We studied the material kept in the Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine (SIZ); Krylov's collection, Kaliningrad (KC); Gröhn's collection, Glinde (GC); and in the collection

of the Museum of Earth, Warsaw (MZ). The Rovno amber studied comes from the Klesov and Dubrovitsy deposits, Rovno Region (Perkovsky *et al.*, 2003a). The geological setting for the amber-bearing deposits of the north of Ukraine has been provided by Perkovsky *et al.*, (2003b).

In addition to the two species described here, five more specimens of the genus *Ptilium* Gyllenhal, 1827 have been found in the material studied; these are three beetles from the Baltic amber (GC-418, MZ-7493, KK-1) and two specimens from the Rovno amber (SIZ, UA-1551, UA-1552). However, these specimens remain unidentified, since we were unable to examine the minute characters of males that are used to distinguish recent species. It should be noted that all Eocene specimens of *Ptilium* are generally smaller than recent members of the genus; they are all less than 0.6 mm, and one of them is even 0.46 mm (GC-418). Additionally, two specimens of the genus *Ptenidium* Erichson, 1845 have been discovered (KC-2, KC-3), but they cannot be described due to their poor preservation. One more specimen (KC-4) has only been identified to family level.

Thus, of the 12 specimens that are reliably known from the Late Eocene, five represent *Ptilium*; three, *Ptenidium*; two, *Ptinella*; one, *Micridium*; and one, *Microptilium*. Most of the species of these genera now live in the Palearctic; however, more than a quarter of the present-day Palearctic fauna consists of species of the genus *Acrotrichis* Motschulsky, 1848, which occurs in 100% of collections, with an average abundance of 50–70%. The complete absence of *Acrotrichis* species from the Rovno and Baltic amber indicates a considerable difference between the Late Eocene and modern ptiliid faunas. Fossil remains of *Acrotrichis* are only known from the Pliocene of Alaska (Hopkins *et al.*,

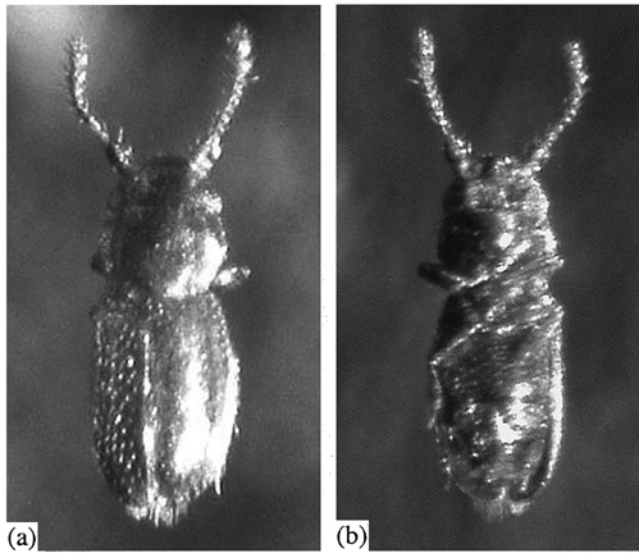


Fig. 1. *Micridium groehni* sp. nov., holotype, general appearance, $\times 86$; (a) dorsally and (b) ventrally.

1971). Modern species of beetle, in particular of Micropeplinae, are known from the same locality, with an estimated age of 5.7 million years (Matthews, 1970).

It is worth noting that Ptiliidae are rare in the Baltic amber: they are entirely absent from the collection of the Berlin Museum (Hieke and Pietrzeniuk, 1984) and constitute less than 1% of all beetles in the Copenhagen collection (Larsson, 1978); in contrast, they are quite numerous in burmite (nearly 11% in the collection of the American Museum according to Grimaldi *et al.*, 2002) and in the Stuttgart collection of Dominican amber.

In a representative collection (14.5 kg of Rovno amber were examined), the feather-winged beetles constitute 3.5% of the total number of beetles, which is less than in the burmite from the American Museum, but it is twice as much as in the burmite collection of The Natural History Museum (London) (Rasnitsyn and Ross, 2000). The fact that in the Rovno amber leaf-litter forms of the "Sciara" Zone, to which amber Ptiliidae

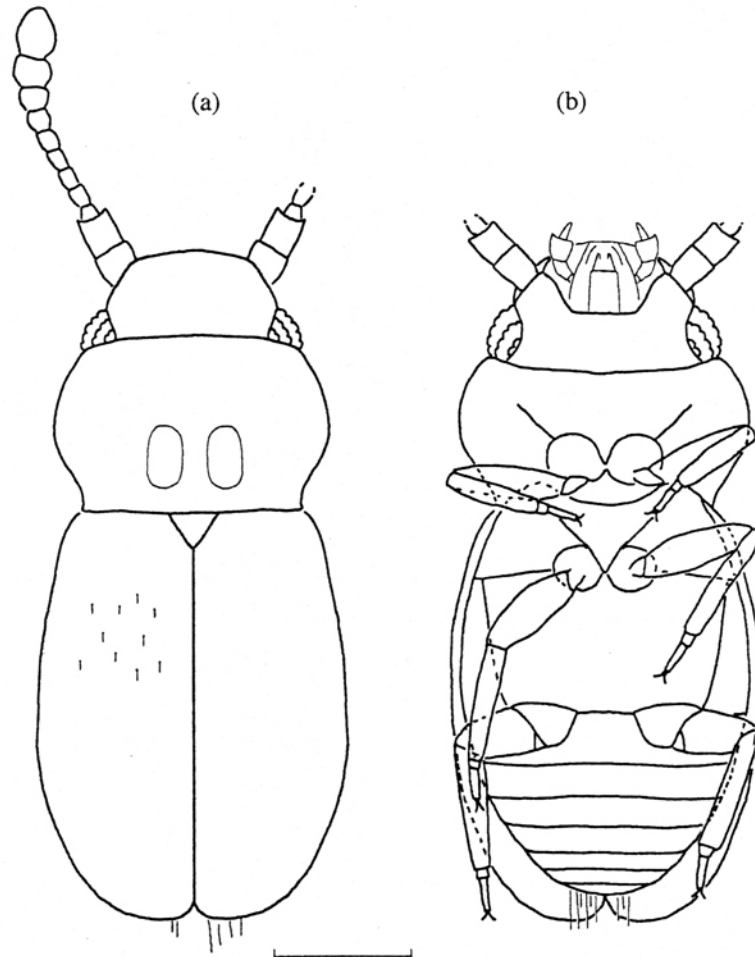


Fig. 2. Structural details of *Micridium groehni* sp. nov., holotype; (a) dorsally and (b) ventrally. Scale bar 0.1 mm in Figs. 2 and 4.

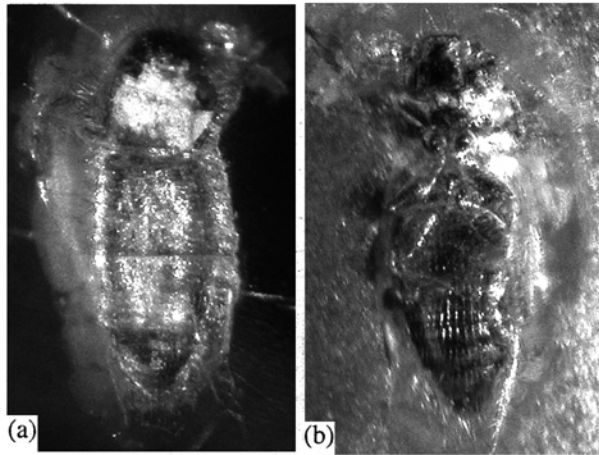


Fig. 3. *Ptinella rovnoensis* sp. nov., holotype, general appearance, $\times 54$; (a) dorsally and (b) ventrally.

were assigned by Larsson (1978), are abundant suggests that in general feather-winged beetles of the Rovno amber fauna are more abundant than those of the Baltic amber fauna.

The pictures were taken by the Canon digital camera and edited using Image-Scope software.

SYSTEMATIC PALEONTOLOGY

Family Ptiliidae Erichson, 1845

Genus *Micridium* Motschulsky, 1868

Micridium groehni Polilov et Perkovsky, sp. nov.

E t y m o l o g y. In honor of C. Gröhn.

H o l o t y p e. Geological and Paleontological Museum of the Hamburg University, Germany, no. 4334 (GC-1174), beetle inclusion; Baltic amber; Upper Eocene. Syninclusions: Braconidae, Aranei, and Acari.

D e s c r i p t i o n (Figs. 1, 2). Female. The body is oblong. The cuticle is light brown, with coarse irregular punctation and scarce short hairs. The eye consists of approximately 40 ommatidia. The antenna is short, 11-segmented, the length of middle antennomeres is only slightly greater than their width. The pronotum is slightly wider than the head and widest at its midlength (0.19 mm) and narrows backwards, its posterior corners are acuminate. There are two very weak depressions on the pronotum. The elytra are elongated oval and apically rounded. The elytra cover the entire abdomen. The pleurosternal sutures of the metathorax are complete and clearly distinguishable. The hind coxae are widely separated. The abdomen consists of seven visible sternites.

M e a s u r e m e n t s, mm. Body length, 0.49; pronotum length, 0.13; elytron length, 0.3; width of two elytra combined, 0.2.

C o m p a r i s o n. The new species differs from modern species of this genus in having clearly distin-

guishable complete pleurosternal sutures on the metathorax, and shorter antennae. Among modern species, it resembles *M. angulicolle* (Fairmaire, 1857) and *M. halidaii* (Matthews, 1868) but differs from the former in the length-to-width ratio of the pronotum and the more coarsely punctated elytra and from the latter in the body size and the less conspicuous depressions on the pronotum.

R e m a r k. The genus *Micridium* is of Holarctic distribution. Modern representatives of this genus occur in saproxylic fungi and in tree hollows and, more rarely, in decaying wood, in leaf litter, and in ant nests.

M a t e r i a l. Holotype.

Genus *Ptinella* Motschulsky, 1844

Ptinella rovnoensis Polilov et Perkovsky, sp. nov.

E t y m o l o g y. From the locality Rovno.

H o l o t y p e. SIZ, UA-1086, beetle inclusion; Rovno amber; Upper Eocene.

D e s c r i p t i o n (Figs. 3, 4). Female. The body is elongated and nearly parallel-sided. The cuticle is yellow brown, somewhat transparent, coarse but without clear microsculpture, and covered with decumbent hairs. The eye consists of approximately 30 ommatidia. The antennae are long and 11-segmented, their middle antennomeres are longer than wide, the apical antennomeres are slightly thickened. The pronotum is widest near its midlength (0.33 mm) and narrows posteriorly, its posterior corners are acuminate, longitudinal depressions are absent. The elytra are almost parallel-sided and somewhat blunt apically; three apical segments of the abdomen are exposed. The wings are absent. The metathoracic pleurites are narrow and hardly visible. The hind coxae are widely separated. The abdomen consists of six visible sternites. The spermatheca is small and spherical.

M e a s u r e m e n t s, mm. Body length, 0.91; pronotum length, 0.22; elytron length, 0.45; width of two elytra combined, 0.31; diameter of spermatheca, 0.06.

C o m p a r i s o n. The new species differs from the only *Ptinella* species known from the Baltic amber, *P. oligocoenica*, in its body size, the shape of the pronotum, and the ratio between the lengths of pronotum and elytra. Among recent species, it resembles *P. limbata* (Heer, 1841); *P. johnsoni* Rütanen, 1985; and *P. denticollis* (Fairmaire, 1857) in habitus but differs from them significantly in the size and shape of the spermatheca. The new species is similar to *P. simsoni* (Matthews, 1878) and *P. tenella* (Erichson, 1845) in the structure of the spermatheca but differs substantially from both species in its body size. In addition, it differs from *P. simsoni* in the absence of longitudinal depressions on the pronotum and from *P. tenella* in the acuminate posterior corners of the pronotum.

R e m a r k s. The genus *Ptinella* is distributed worldwide. Modern representatives of this genus live under the bark and in the rotting wood of different tree

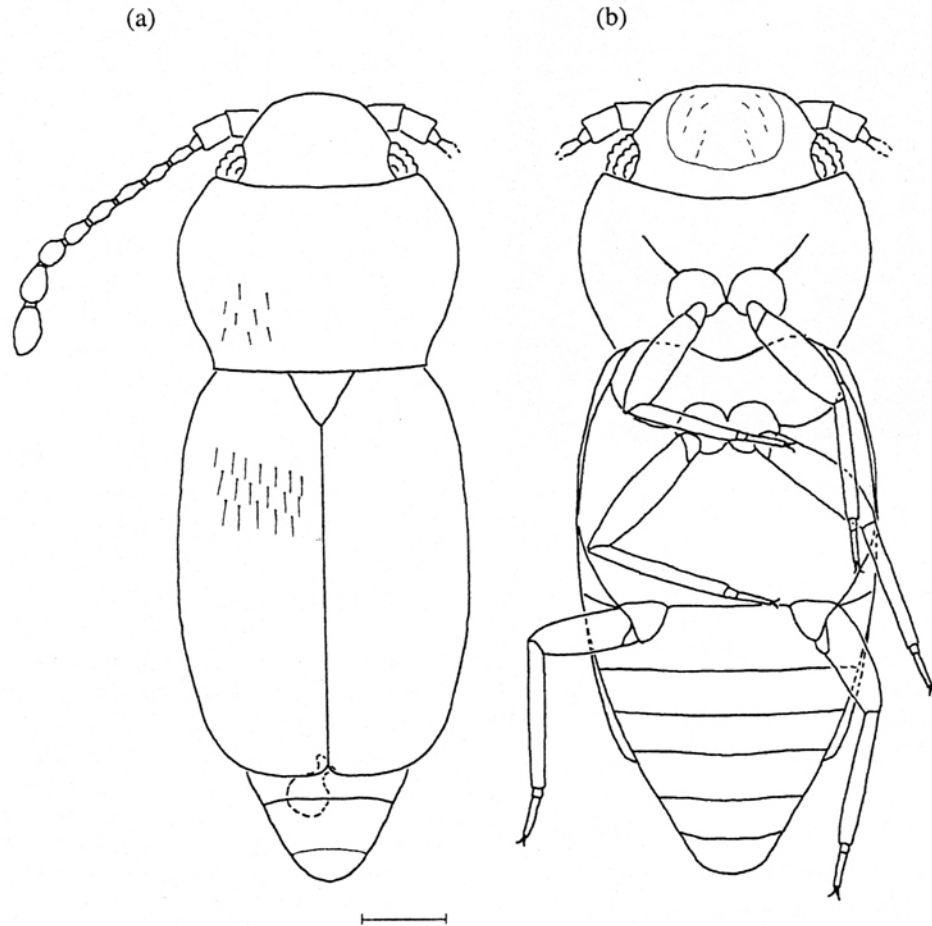


Fig. 4. Structural details of *Ptinella rovnoensis* sp. nov., holotype; (a) dorsally and (b) ventrally.

species. Taking into account the absence of the wings and the considerable length of the elytra, one may conclude that the specimen studied represents a vestigial morph, which is also known in modern species of four genera, including *Ptinella* (Dybas, 1978). This is the first description of a vestigial morph in the fossil record. Vestigial morphs of most modern species have no eyes, but this specimen has well-developed eyes, thus suggesting the primitive status of this species.

Material. Holotype.

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