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FIRST RECORDS OF SCOLEBYTHIDAE AND CHRYSIDIDAE (HYMENOPTERA, CHRYSIDOIDEA) IN ROVNO AMBER

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First Records of Scolebythidae and Chrysididae (Hymenoptera, Chrysidoidea) in Rovno Amber. Perkovsky E. E., Rasnitsyn A. P. — Recorded from the Late Eocene Rovno amber (Ukraine) are above 300 families of Arthropoda. One hundred, seventy-four new species, 35 new genera and one new tribe have been described there in 45 families, including 42 species, 9 genera and one tribe of Hymenoptera. The first record of Scolebythidae is documented herein along with more detail information about Chrysididae which was only mentioned there before. Chrysidids are diverse and not very rare in the Rovno amber: four known inclusions represent at least three species in two genera. This makes a contrast with the Baltic amber: of 34 specimens known to Brues (1933), 30 represent only two species. Genera *Pristapenesia* Brues**,** *Palaeobethylus* Brues and *Palaeobethyloides* Brues and species *Palaeobethylus politus* Brues and *Pristapenesia primaeva* Brues, previously known in Baltic amber only, are recorded in Rovno amber as well.

Key words: Hymenoptera, Scolebythidae, Chrysididae, *Pristapenesia, Palaeobethylus, Palaeobethyloides,* Rovno amber, Baltic amber, Late Eocene, Ukraine, Russia.

Первые находки Scolebythidae и Chrysididae (Hymenoptera, Chrysidoidea) в ровенском янтаре. Перковский Е. Э., Расницын А. П. — Из позднеэоценового ровенского янтаря известно уже более 300 семейств артропод. Из ровенского янтаря были описаны 174 новых вида и 35 родов и одна триба из 45 семейств, в том числе 42 вида, 9 родов и одна триба перепончатокрылых насекомых. В данной работе впервые приводится находка семейства Scolebythidae в ровенском янтаре. Информация о ровенских осах-блестянках (Chrysididae) ранее ограничивалась упоминанием в списке семейств. Блестянки оказались разнообразными и не слишком редкими в ровенском янтаре: в четырех известных включениях представлены по крайней мере три вида из двух родов, в то время как из 34 экземпляров, известных Брюсу (Brues, 1933) из балтийского янтаря, 30 принадлежали лишь к двум видам. Роды *Pristapenesia* Brues**,** *Palaeobethylus* Brues и *Palaeobethyloides* Brues, виды *Palaeobethylus politus* Brues и *Pristapenesia primaeva* Brues, ранее известные только из балтийского янтаря, впервые отмечены для ровенской фауны.

Ключевые слова: Hymenoptera, Scolebythidae, Chrysididae, *Pristapenesia, Palaeobethylus, Palaeobethyloides,* ровенский янтарь, балтийский янтарь, поздний эоцен, Украина, Россия.

Introduction

The present publication continues our series on the composition of Rovno amber fauna (Perkovsky et al., 2012, and references therein) and syninclusia (Perkovsky et al., 2012, and references therein). Rovno amber from northern Ukraine and south-western Belarus is a southern coeval counterpart of the Baltic amber and other European succinites. More than 300 arthropod families are recorded from the Rovno amber by now. Most of them are listed by Perkovsky et al. (2010), but the list keeps growing each year. The year 2012 alone has brought the order Phasmoptera (Gorokhov, Perkovsky, in prep.) and two families only in the order Pseudoscorpiones (Henderickx, Perkovsky, 2012; Henderickx, Perkovsky, in prep.).

Composition of Arthropoda is similar but not identical in the Rovno and Baltic ambers. At the generic and species level, dominants are usually the same, and yet 174 new species, 35 new genera and one new tribe have been described in 45 families during the first 12 years of research of arthropods in the Rovno amber, including 42 species, 9 genera and one tribe of Hymenoptera. Out of 7 species described from the Rovno amber and then found in Baltic amber, 6 are hymenopterans (four ants and two parasitic wasps). Rovno ants comprise 78 species, with 15 of them (plus almost a dozen of those prepared for publication) unknown in the better explored

Baltic fauna (Dlussky, Radchenko, pers. com., 2013). Among these, two species of *Dolichoderus* Lund were recorded additionally in the Danish amber (Dlussky, 2008; Dlussky, Rasnitsyn, 2009). The genus *Fallomyrma* Dlussky et Radchenko, 2006 is represented in the Rovno amber with all four its species, including three undescribed ones (Radchenko, pers. com., 2012), and with the type species additionally in the Saxonian and Danish ambers. In contrast, it is not found in the Baltic amber (Dlussky, Radchenko, 2006; Perkovsky, 2011). The ichneumonid *Pherhombus dolini* Tolkanitz et Narolsky, 2005 (Tolkanitz et al., 2005) and *Astigmaton ichneumonoides* Kasparyan, 2001 (Narolsky et al., 2005) are similarly known in the Rovno and Saxonian ambers and not in the Baltic one.

The inference about the age and indigenous origin of the Rovno amber is based largely on the data from ants and other Hymenoptera (Perkovsky et al., 2007, 2010; Dlussky, Rasnitsyn, 2009; Perkovsky, 2008, 2011). This provides important information about two hymenopteran families little or not at all known in the Rovno amber. Scolebythidae are recorded there for the first time, and Chrysididae have been only listed with no other details (Perkovsky et al., 2010). All these records refer to larger amber pieces formed most probably at the base of a tree suffered from beetle borings. The only ant syninclused with these wasps represents the tropical genus *Gesomyrmex* Mayr.

All Rovno amber specimens are housed in Schmalhausen Institute of Zoology of the National Academy of Sciences of Ukraine (SIZK). Photographs were taken at the Paleontological Institute, Russian Academy of Sciences (Moscow) using Leica M 165C stereomicroscope and Leica DFC 425 camera.

Superfamily CHRYSIDOIDEA
Family SCOLEBYTHIDAE

The family is a small relict group of chrysidoid wasps (Carpenter, 1986) with six extant and nine extinct species in ten genera (Cai et al., 2012). Extant species are found in Central and South America, South Africa, Madagascar, Asia (China, Thailand), Australia, and Fiji. Fossils are recorded in the Lower Cretaceous of China (Yixian Fm.) and Lebanese amber, Upper Cretaceous New Jersey amber, Eocene and Miocene ambers of France (Oise), Baltic area, and Dominican Republic, always as a minor faunal component. Scant biological data is available for the family, although species are apparently gregarious ectoparasitoids of wood-boring beetles in the families Cerambycidae and Anobiidae (Brothers, 1981; Melo, 2000).

Genus *Pristapenesia* Brues, 1933
Pristapenesia primaeva Brues, 1933 (fig. 1)

Material. SIZK UA−5060, male, Rovno amber, Late Eocene. Syninclusions: UA−5061, Cecydomyiidae (Heteropizidi); Coleoptera (larva). Found in a big amber piece weighing 14.1 g before preliminary treatment.

Remarks. The prosternal transverse groove is not very strongly developed, and could just not be visible in this view. The tubular section of the free section of Rs, extending

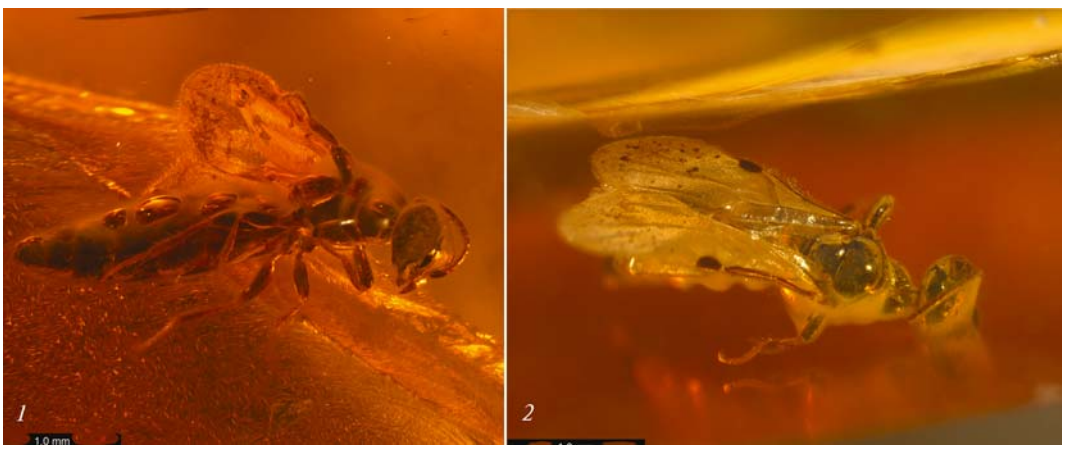

Fig. 1. *Pristapenesia primaeva* (SIZK UA−5060): *1* — lateral; *2* — dorsal.

Рис. 1. *Pristapenesia primaeva* (SIZK UA−5060): *1* — вид сбоку; *2* — вид сверху.

from the stigma is more than two times as long as stigma.

The genus has been established based on *Pristapenesia primaeva* Brues, 1933 as a member of Bethylidae and later transferred to Scolebythidae by Prentice and Poinar (Prentice et al., 1996). It was also recorded (as *Dominibythus* Prentice et Poinar) in the Middle Miocene Dominican amber, and eventually as living insects in south-eastern Brazil and E. Asia (Azevedo et al., 2011). The only known scolebythid from the Early Eocene of Oise in France is preliminary attributed to Scolebythidae as well (Engel, Grimaldi, 2007). The Ukrainian record of *P. primaeva* indicates wide distribution of the species comparable with that of the living *P. asiatica* Azevedo, Xu et Beaver, 2011 (from N. China to N. Thailand; Azevedo et al., 2011) and *P. stricta* Azevedo, 1999 (Brasil: from Federal District to Rio de Janeiro). With the present specimen, the total number of male *Pristapenesia* found in the amber reaches 24, in contrast to one known female (Brothers, Janzen, 1999). Unlike numerosity in succinites, scolebythid males are very rare in modern collections (Brothers, Janzen, 1999) and unknown in Oise amber (only two females found; Lacau et al., 2000). Strangely, no male is known from extant *Pristapenesia* (20 females are known; Azevedo, 1999; Azevedo et al., 2011); the only fossil males from "*Pristapenesia* group" other than those of *P. primaeva* are the holotypes of *P. inopinata* (Prentice et Poinar, 1996) (Middle Miocene Dominican amber; Brothers et Janzen, 1999) and *Uliobythus terpsichore* Engel et Grimaldi, 2007 (Lower Cretaceous Lebanese amber; Engel, Grimaldi, 2007). The only known hosts of the living *Pristapenesia* are Anobiidae beetles (Melo, 2000); this family is abundant both in the Rovno and Baltic ambers.

Family CHRYSIDIDAE

Medium sized family (some 2500 species), distributed worldwide and diverse both morphologically and bionomically (cleptoparisites in Aculeate nests, ectoparasites in sawfly cocoons, and endoparasites in stick insect eggs), with only modest fossil record. The most common and characteristic fossil chrysidids, *Palaeobethylus* Brues, 1923 and *Palaeobethyloides* Brues, 1933, were described as Bethylidae and only recently identified as Chrysididae (Sorg, 1988). They were ascribed to the subfamily Amiseginae known as endoparasites of the stick insect eggs. However, the above two genera differ from Amiseginae in many respects including some features inferring a different bionomics. *Palaeobethylus* and *Palaeobethyloides* are flattened, have their head not at all narrowed toward mouthparts (amisegine adaptation to making a small opening in the host chorion to permit oviposition), and possess very narrow oviposition tube (known for *Palaeobethylus*). These observations jointly suggest oviposition on/into unknown dweller of underbark space or similar environments. Ergo, we suggest these two genera to represent a distinct subfamily of Chrysididae. Stick insects are rare in ambers, with only two being recorded in Rovno amber, both belonging to taxa known in the Baltic amber (Gorokhov, Perkovsky, in prep.). Only one of them comes from Klesov, the area that produced the vast majority of available material (the specimen in V. A. Gusakov private collection, Zvezdnyi Gorodok in Russia). At the same time, chrysidids are diverse and not very rare in Rovno amber: four known inclusions represent at least three species in two genera. This contrasts with Baltic amber: of 34 specimens known to Brues (1933), 30 represent only two species (17 — *Palaeobethyloides longiceps* Brues, 1933, and 13 — *Palaeobethylus longicollis* Brues, 1923), and the other two species account for the remaining four inclusions. In that fauna, there is little chance existing for a sample of four specimens to represent at least three different species (including one undescribed), as we can see in the Rovno hymenopteran assemblage. Indeed, the Baltic amber collection kept at the A. A. Borissiak Paleontological Institute, RAS (Moscow) also have four chrysidids of the same group, all of which apparently belong to *P. longicollis*.

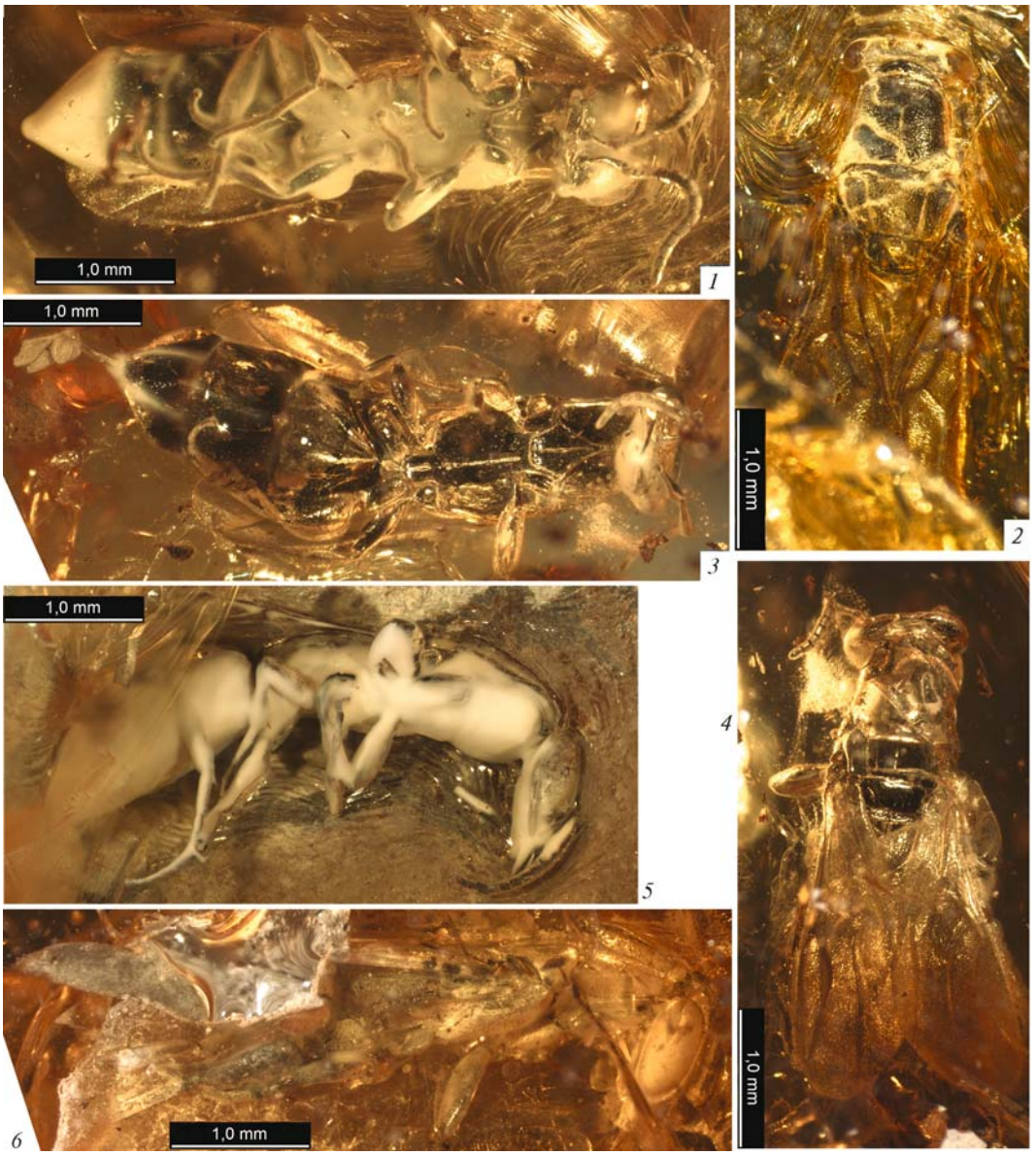

Fig. 2. Ckrysidids from Rovno amber: *1*, *2* — *Palaeobethylus* sp. n. (SIZK K−7193); *3*−*4* — *Palaeobethylus politus* (SIZK K−7190); *5* — *Palaeobethylus* sp. (SIZK K−2267); *6* — *Palaeobethyloides* sp. (SIZK K−5701).

Рис. 2. Хризидиды из ровенского янтаря: *1*, *2* — *Palaeobethylus* sp. n. (SIZK K−7193); *3*−*4* — *Palaeobethylus politus* (SIZK K−7190); *5* — *Palaeobethylus* sp. (SIZK K−2267); *6* — *Palaeobethyloides* sp. (SIZK K−5701).

Genus *Palaeobethylus* Brues, 1923

Palaeobethylus politus Brues, 1933 (fig. 2, 3–*4)*

Material. SIZK K-7190, Klesov, Rovno amber, Late Eocene. Syninclusions: K−7191 — Psocoptera, K−7191 — *Praedendrothrips avus* Priesner, 1924 (Thysanoptera), K−7193 — *Palaeobethylus* sp. n. (see below). Weight of the piece — 12. 2 g (after preliminary treatment).

Specimen generally similar with the description but needs additional study.

***Palaeobethylus* sp.** (fig. 2, *1, 2, 5*)

Material. SIZK K−7193 (for syninclusia see above), possibly also SIZK K−2267 (specimen of poor preservation state), both Klesov, Rovno amber, Late Eocene. Syninclusions to SIZK K−2267: 7 Acari [K−2267, K−2269 (Parasitengona), K−2270, K−2271 (2 larvae of Erythraeidae), K−2272 (Parasitengona), K−2273 (Parasitengona)]; K−2268 — incertae sedis; weight of the piece before preliminary treatment — 13.7 g.

This species is similar to *P. brevicollis* Brues, 1933, but differs in weak surface sculpture and possibly in other characters. This is an undescribed new species deserving formal description.

Genus Palaeobethyloides Brues, 1933
***Palaeobethyloides* sp.** indet. (fig. 2, *6*)

Material. SIZK K−5701, Klesov, Rovno amber, Late Eocene. Syninclusions: K−5695 (*Gesomyrmex hoernesi*, spider web), K−5696 (Ichneumonidae), K−5697 (Cecydomyiidae (*Peromyia*), Dolichopodidae), K−5698 (Cecydomyiidae (*Peromyia*), 6 Acari (Parasitengona), K−5699 incertae sedis, K−5700, 2 Acari (1 Parasitengona), K−5701 (Chironomidae, 2 Acari (1 Oribatei). The piece weght — 8.5 g (after preliminary treatment).

The genus is monotypic, so most probably the fossil represents *P. longiceps* Brues, 1933. However, the fossil is not entirely visible due to a white cloud and cracks in the amber; we feel the most responsible action at the present time is to refrain from species-level identification. At the same time, the characteristic general contour and large eye leave little doubt in the generic identification.

Pristapenesia primaeva represents a tropical element in the Baltic fauna (as defined by Dlussky, Rasnitsyn, 2009; Perkovsky, 2011), and its finding in the Rovno assemblage is expected based on our earlier inference that Rovno environments were warmer than Baltic climates (Perkovsky, 2011). At the very least *Palaeobethyloides* could have also had tropical connections, as its occurence as a syninclusion with tropical *Gesomyrmex* might suggest.

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