Zootaxa 3847 (4): 583–589
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3847.4.8
http://zoobank.org/urn:lsid:zoobank.org:pub:1F82ABF9-75C4-42B6-9394-BDC1B89540AB

A fossil Paratrombiinae mite (Actinotrichida: Trombidioidea) from the Rovno amber, Ukraine

MARTA KONIKIEWICZ & JOANNA MĄKOL[1]
Institute of Biology, Department of Invertebrate Systematics and Ecology, Wrocław University of Environmental and Life Sciences, Kożuchowska 5B, 51–631 Wrocław, Poland
[1]Corresponding author. E-mail: joanna.makol@up.wroc.pl

Abstract

The first description of a fossil representative of Paratrombiinae from the Rovno amber, *Paratrombium rovniense* sp. nov., based on an unengorged larva, is provided. The discovery results in a re-definition of the Paratrombiinae and of *Paratrombium*, which also comprise species with two pectinalae on coxa I.

Key words: Trombidiidae, new species, larva, fossil resin, Rovno

Introduction

Though the studies of fossil fauna have a long history, prehistoric invertebrates, with few exceptions pertaining especially to molluscs, are still poorly known. An increasing interest in studies of fossil inclusions has been observed quite recently (Perrichot 2004). Of various deposits it is amber, a fossilized vegetal resin, which is regarded as an excellent material favouring bioaccumulation (Azar 2007). Most of the described fossil mites are amber inclusions, since the small size and overall poor sclerotisation make them unlikely to be preserved in other deposits (Dunlop 2007; Judson & Mąkol 2009; Sidorchuk 2013). The studies on fossil acarofauna started in the 19th c., but they became intensified only recently due to the development of study techniques and the discovery of new, inclusion-rich amber beds (Azar 2007; Perrichot 2004; Perrichot & Girard 2009; Vercammen-Grandjean 1973). In spite of this, the knowledge of fossil acarofauna, and especially of terrestrial Parasitengona, is still scanty because of the consequent difficulties posed by morphological analyses.

Twenty four representatives of terrestrial Parasitengona have been recorded from fossil deposits to date (Dunlop *et al.* 2014). Three of those have only been identified to the family level (Erythraeidae sp.: Aoki 1974; Smarididae sp.: Kulicka 1990; Erythraeoidea sp.: Zacharda & Krivolutsky 1985). Eighteen species described by Koch and Berendt (1854) in six genera († *Arytaena* Menge, 1854; *Balaustium* von Heyden, 1826; *Erythraeus* Latreille, 1806 (10); *Leptus* Latreille, 1796; *Allothrombium* Berlese, 1903; *Trombidium* Fabricius, 1775 (4)) should be regarded as *species inquirendae.* The status of only three species (*Proterythraeus southcotti* Vercammen-Grandjean, 1973, *Pararainbowia martilli* Dunlop, 2007 and *Atanaupodus bakeri* Judson & Mąkol, 2009) is not questioned at present because of the detailed descriptions and the accessibility of the type material (Mąkol & Wohltmann 2012). Only one of these species, *Pararainbowia martilli* Dunlop, 2007, is based on a specimen from a mineral deposit and is the only fossil representative of Erythraeidae described from outside amber (Dunlop 2007).

The Ukrainian amber comes from a mine near Rovno. Its abundance of inclusions and the wide range of taxa make it interesting from palaeobiological point of view. It has been very intensely studied during the recent years (Kosmowska-Ceranowicz 2012). The age of the deposits is estimated as Upper Eocene (Kupryjanowicz & Makarkin 2008; Perkovsky *et al.* 2003, 2007). Formerly, the Rovno amber was regarded as a kind of Baltic amber – succinite – because of its similar age and structure (Katinas 1971, 1987; Kharin *et al.* 2004). Recent studies on the history of the Ukrainian amber indicate an independent origin of its beds in Ukraine (Kosmowska-Ceranowicz 1999; Kosmowska-Ceranowicz *et al.* 1990). The revised opinions on the origin of the Ukrainian amber, and

Accepted by O. Seeman: 21 Jul. 2014; published: 11 Aug. 2014

Etymology. The specific epithet refers to the place of origin of the first parasitengone species described from the Rovno amber.

Type material. The holotype (K-8284-A) contained in a lump of Ukrainian amber, originating from the "Pugach" mine in Klesov, is deposited in the collection of the Schmalhausen Institute of Zoology NAS, Kiev, Ukraine.

Discussion

For two genera presently assigned to Paratrombiinae Feider, 1959, i.e. *Paratrombium* Bruyant, 1910 and *Pollicotrombium* Southcott, 1986 both larvae and active postlarval forms have been described. The newly described species remains known exclusively from the larva. The general body shape, structure of chelicerae, setae AM, presence of bent, sickle-like seta on palp tarsus, presence of modified (pectinate) medial coxala I as well as leg chaetotaxy support the affiliation of *Paratrombium rovniense* **sp. nov.** with Paratrombiinae and with *Paratrombium* Bruyant, 1910. The latter genus comprises 36 extant species, including 13 known either exclusively from larvae or from larvae and active postlarval forms, whereas 23 are known only from deutonymphs and/or adults (Mąkol & Wohltmann 2012).

The specimen that served for description was in an unengorged state, as the idiosoma was not enlarged and coxal plates remained located very close to each other. Several characters and character states, such as the setation pattern on the dorsal side of the idiosoma, the presence and shape of the hypostomalae and the specialized setae (solenidion (ω) on palp tarsus, the microsetae (κ) on leg segments, except for genu I, famuli on tarsi I–II) could not be detected due to the condition of the specimen. Also, the leg chaetotaxy should be treated as tentative, as it includes only the clearly visible setae. Although the characteristics of the newly described taxon are incomplete, the presence of pectinate lateral coxala I is not known in any extant members of the Paratrombiinae. This feature demonstrates the separate specific affiliation of *Paratrombium rovniense*, and its novelty suggests a new genus could be warranted. However, as the other visible characters are indicative of *Paratrombium*, we tentatively included the species within that genus.

Acknowledgements

We wish to express our gratitude to Dr. Evgeny E. Perkovsky, for making the specimen available for studies. Our sincere thanks go to Dr. Andreas Wohltmann and to two anonymous referees, who kindly helped to improve the quality of the manuscript.

References

Aoki, J. (1974) On the fossil mites in Mizunami amber from Gifu Prefecture, Central Japan. *Bulletin of the Mizunami Fossil Museum*, 1, 397–399.

Azar, D. (2007) Preservation and accumulation of biological inclusions in Lebanese amber and their significance. *Comptes Rendus Palevol*, 6, 151–156.
http://dx.doi.org/10.1016/j.crpv.2006.10.004

Dunlop, J.A. (2007) A large parasitengonid mite (Acari, Erythraeoidea) from the Early Cretaceous Crato Formation of Brazil. *Fossil Record*, 10, 91–98.
http://dx.doi.org/10.5194/fr-10-91-2007

Dunlop, J.A., Penney, D. & Jekel, D. (2014) A summary list of fossil spiders and their relatives. *In*: Platnick, N.I. (Ed.), *The world spider catalog, version 15*. American Museum of Natural History. Available from: http://research.amnh.org/entomology/spiders/catalog/index.html (accessed 6 July 2014)

Judson, M. & Mąkol, J. (2009) A mite of the family Tanaupodidae (Arachnida, Acari, Parasitengona) from the Lower Cretaceous of France. *Geodiversitas*, 31, 41–47.
http://dx.doi.org/10.5252/g2009n1a4

Katinas, V.I. (1971) *Amber and amber-bearing sediments in the southern Baltic area*. Mintis, Vilnius, 156 pp.

Katinas, V.I. (1987) The amber-bearing terrigenous–glauconitic formation of the Paleogene of Baltic area and Belorussia. *In*: *Tectonika, fatsii i formatsii zapada Vostochno-Evropeyskoy platformy (Tectonics, facies and formation of the western part*

of East European Platform). Minsk, Navuka i tekhnika, pp. 184–189. [in Russian]
Kharin, G., Emelyanov, E.M. & Zagrodnich, V.A. (2004) Paleogene mineral resources of the SE Baltic Sea and Sambian Peninsula. *Zeitschrift für Angewandte Geologie*, 2, 63–72.
Koch, C.L. & Berendt, G.C. (1854) *Die im Bernstein befindlichen Crustaceen, Myriapoden, Arachniden und Apteren der Vorwelt*. Edwin Groening, Berlin, 124 pp.
Kosmowska-Ceranowicz, B. (1999) Succinite and some other fossil resins in Poland and Europe (deposits, finds, features and differences in IRS). *Estudios del Museo de Ciencias Naturales de Alava*, 14, 73–117.
Kosmowska-Ceranowicz, B. (2012) *Bursztyn w Polsce i na świecie. Amber in Poland and in the World*. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa, 299 pp.
Kosmowska-Ceranowicz, B., Kociszewska-Musiał, G., Musiał, T. & Müller, C. (1990) The amber-bearing Tertiary sediments near Parczew. *Prace Muzeum Ziemi*, 41, 21–35. [in Polish with English summary]
Kulicka, R. (1990) The list of animal inclusions in Baltic amber from collection of the Museum of Earth in Warsaw. *Prace Muzeum Ziemi*, 41, 144–146.
Kupryjanowicz, J. & Makarkin, V.N. (2008) *Archiconiocompsa prisca* Enderlein (Neuroptera: Coniopterygidae): The first neuropteran fossil in Rovno amber (Ukraine). *Entomologica Fennica*, 19, 25–31.
Mąkol, J. (2007) Generic level review and phylogeny of Trombidiidae and Podothrombiidae (Acari: Actinotrichida: Trombidioidea) of the World. *Annales Zoologici*, 57, 1–194.
Mąkol, J. & Wohltmann, A. (2012) An annotated checklist of terrestrial Parasitengona (Actinotrichida: Prostigmata) of the World, excluding Trombiculidae and Walchiidae. *Annales Zoologici*, 62, 359–562.
http://dx.doi.org/10.3161/000345412x656671
Newell, I.M. (1958) Specific characters and character variants in adults and larvae of the genus *Paratrombium* Bruyant, 1910 (Acari, Trombidiidae), with descriptions of two new species from Western North America. *Pacific Science*, 12, 350–370.
Perkovsky, E.E., Zosimovich, V.Yu. & Vlaskin, A.Yu. (2003) Rovno amber fauna: a preliminary report. *Acta zoologica cracoviensia*, 46 (Supplement–Fossil Insects), 423–430.
Perkovsky, E.E., Rasnitsyn, A.P., Vlaskin, A.P. & Taraschuk, M.V. (2007) A comparative analysis of the Baltic and Rovno amber arthropod faunas: representative samples. *African Invertebrates*, 48, 229–245.
Perrichot, V. (2004) Early Cretaceous amber from south-western France: insight into the Mesozoic litter fauna. *Geologica Acta*, 2, 9–22.
Perrichot, V. & Girard, V. (2009) A unique piece of amber and the complexity of ancient forest ecosystems. *Palaios*, 24, 137–139.
Sidorchuk, K. (2013) A new technique for the preparation of small-sized amber samples with application to mites. *In*: Azar, D., Engel, M.S., Jarzembowski, E., Krogmann, L., Nel, A. & Santiago-Blay, J. (Eds.), *Insect Evolution in an Amberiferous and Stone Alphabet. Proceedings of the 6th International Congress on Fossil Insects, Arthropods and Amber*. Brill, Leiden, Boston, pp. 189–201.
Vercammen-Grandjean, P.H. (1973) Study of the "Erythraeidae, R.O.M. No.8" of Ewing, 1937. *In*: Daniel, M. & Rosicky, B. (Eds.), *Proceedings of the 3rd International Congress of Acarology, Prague 1971*. W. Junk publishers, The Hague, pp. 329–335.
Zacharda, M. & Krivolutsky, D.A. (1985) Prostigmatic mites (Acarina: Prostigmata) from the Upper Cretaceous and Paleogene amber of the USSR. *Věstnik československe Společnosti zoologicke*, 49, 147–152.