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A new genus of the mantispid-like Paraberotherinae (Neuroptera: Berotheridae) from Burmese amber, with special consideration of its probasitarsus spine-like setation

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Abstract

Creagroparaberotha groehni **gen. et sp. nov.** (Neuroptera: Berotheridae: Paraberotherinae) is described from the earliest Cenomanian Burmese amber. The revised diagnosis of Paraberotherinae is provided. The specialized probasitarsi in Paraberotherinae, Rhachiberotherinae (Berotheridae) and Symphrasinae (Mantispidae) are considered as a homology (parallelism), i.e., convergent modifications of a homologous structure. The genus *Berotherone* Khramov, 2015 is considered to belong to the subfamily Mesithoninae (Berotheridae).

Key words: Paraberotherinae, Rhachiberotherinae, Symphrasinae, Burmese amber, Cretaceous

Introduction

The family Berotheridae is relatively small comprising approximately 130 extant species (including Rhachiberotherinae) (Oswald 2013). The fossil record is rich: fifty five fossil species in 35 genera (including Mesithoninae *in sensu* Makarkin *et al.* 2012) from the Middle Jurassic to late Eocene have been referred to Berotheridae (Makarkin *et al.* 2011, 2012; Azar & Nel 2013; Khramov 2015; Makarkin 2015; Makarkin & Ohl 2015). This family dominates the neuropteran assemblage in the mid-Cretaceous Burmese amber, both in number of specimen and species, with 13 described species (Engel 2004; Engel & Grimaldi 2008; Makarkin 2015). There are also many undescribed specimens, predominantly in private collections.

Most of the Burmese berotherids possess walking (cursorial) forelegs, a characteristic feature also observed in most extant berotherids. Three genera and four species belong to Paraberotherinae, a subfamily whose species possess raptorial forelegs: *Eorhachiberothera burmitica* Engel, 2004, *Eorhachiberothera* sp., *Scoloberothera necatrix* Engel et Grimaldi, 2008, *Micromantispa cristata* Shi *et al.*, 2015a, each are represented by a single specimen. In this paper, a new genus and species of this subfamily (*Creagroparaberotha groehni* **gen. et sp. nov.**) is described from Burmese amber. At least eight other undescribed specimens of Paraberotherinae are known from Burmese amber, deposited mainly in private collections (pers. obs.).

The subfamily Paraberotherinae occurs only in the Cretaceous. This is one of three berotherid subfamilies possessing raptorial forelegs. The others are Rhachiberotherinae known from the late Eocene Baltic amber to Recent (Makarkin & Kupryjanowicz 2010), and Mesithoninae with several species known from the Middle Jurassic to Early Cretaceous of Asia (Panfilov 1980; Makarkin 1999; Makarkin *et al.* 2012; Jepson 2015). In Mesithoninae, raptorial forelegs are preserved in one undescribed specimen from the Middle Jurassic of the Chinese Daohugou locality (pers. obs.) and in the Late Jurassic genus *Berotherone* Khramov, 2015 (**sit. nov.**) from Karatau (Kazakhstan). Up to date, the Paraberotherinae include thirteen species from Cretaceous ambers found in the Northern Hemisphere, i.e., in France, Lebanon, Myanmar, U.S.A. (New Jersey) and Canada (Alberta) (Table 1) (Schlüter 1978; Whalley 1980; Grimaldi 2000; Engel 2004; Nel *et al.* 2005; Engel & Grimaldi 2008; McKellar & Engel 2009; Petrulevičius *et al.* 2010; Makarkin 2015).

The protarsus spine-like setation are greatly developed in *Creagroparaberotha* **gen. nov.** as compared with the