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Discussion

A remarkable new genus of Mantispidae (Insecta, Neuroptera) from Cretaceous amber of Myanmar and its implications on raptorial foreleg evolution in Mantispidae: A comment

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ABSTRACT

Micromantispa cristata Shi et al., 2014 from Burmese amber belongs to Paraberothinae (Berothidae), not to Mantispidae.

The paper of Shi et al. (2014) described the 'mantispid' species *Micromantispa cristata* from lower Cenomanian Burmese amber. However, the new species might actually belong to other taxa that are closely related to Mantispidae and also possess raptorial forelegs, i.e., two subfamilies of Berothidae, Rhachiberothinae and Paraberothinae (often considered as subfamilies of Rhachiberothidae, e.g., Nel et al., 2005). The diagnosis of Paraberothinae as provided by Nel et al. (2005) and Makarkin and Kupryjanowicz (2010) clearly shows that this genus should be assigned to this subfamily.

The Paraberothinae hitherto included eleven Cretaceous species: *Chimerhachiberotha acrasarii* Nel et al., 2005, *Paraberotha acra* Whalley, 1980, *Raptorapax terribilissima* Petrulevičius et al., 2010, and *Spinoberotha mickaelacrai* Nel et al., 2005 (all from Lebanese amber; Lower Cretaceous); *Alboberotha petrulevicii* Nel et al., 2005 (Charentese amber; uppermost Albian); *Retinoberotha stuermeri* Schlüter, 1978 (French amber at Bezonnais; lower Cenomanian); *Eorhachiberotha burmitica* Engel, 2004, *Scoloberotha necatrix* Engel et Grimaldi 2008, and *Rhachibermissa phenax* Engel et Grimaldi, 2008 (all from Burmese amber); *Rhachibermissa splendida* Grimaldi, 2000 (New Jersey amber; Turonian), and *Albertoberotha leuckorum* McKellar et Engel, 2009 (Canadian amber; Campanian).

The diagnosis of Paraberothinae is as follows (after Makarkin and Kupryjanowicz, 2010, p. 661): small berothids (forewing 2.9–4.0 mm long); postocular lobe reduced; scapus long to very long (up to 10 times longer than pedicel); forelegs raptorial; tarsus of male 5-segmented; tibia with numerous spine-like setae on inner edge; Sc and R1 fused distally in both wings; intermediate subcostal crossveins 2sc-r1 absent in the forewing; and CuP present in the hind wing.

We can see that all available character states agree with those of Paraberothinae. Unfortunately, the scapus of *M. cristata* is not described, and its hind wings are incompletely preserved.

The presence of spine-like setae on the inner ('ventral') edge of the foreleg tibia found in *M. cristata* is considered a synapomorphy of Paraberothinae (Nel et al., 2005; Makarkin and Kupryjanowicz, 2010). These spine-like setae are absent in Rhachiberothinae and Mantispidae.

Other distinguishing characters of *M. cristata* unknown in any Mantispidae is the presence on two proximal tarsomeres of a long distal curved spine-like seta on the outer ('ventral') edge, and two long spine-like setae on the inner ('dorsal') edge of the basal tarsomere. However, these spine-like setae occur in the foretibia and foretarsus of the paraberothine *Rhachibermissa splendida* (see Grimaldi, 2000, fig. 17). The single significant difference in this regard between *R. splendida* and *M. cristata* is the presence of one spine-like seta (not two) on the inner edge of the basal tarsomere in *R. splendida*.

Mantispidae and Berothidae, together with the highly specialized Cretaceous family Dipteromantispidae, form a well-

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established clade (Winterton et al., 2010; Makarkin et al., 2013). The wing venation of Mesozoic Mantispidae and Berothidae is often hardly distinguishable. However, Mantispidae has the significant autapomorphy of the pronotum posterior to the forelegs being prolonged so that the forelegs appear to attach to the pronotum in its anterior part (Aspöck and Mansell, 1994). This condition was recently confirmed to occur in these Mesozoic mantispids in which the body is preserved (see Jepson et al., 2013). But unfortunately, this character state cannot be determined in *M. cristata* due to poor preservation of the holotype.

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