

DISCUSSION

MELITTOSPHEX (HYMENOPTERA: MELITTOSPHECIDAE), A PRIMITIVE BEE AND NOT A WASP

by GEORGE POINAR Jr

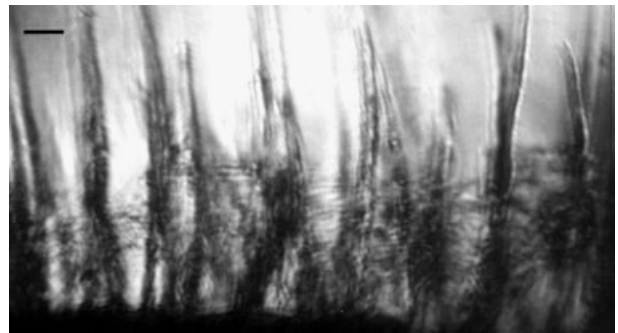
Department of Zoology, Oregon State University, Corvallis, Oregon 97331, USA; e-mail: poinarg@science.oregonstate.edu

IN an article published in this journal by Sarzetti *et al.* (2008), some material was erroneously presented regarding the systematic position of the primitive bee *Melittosphex*. The authors misquoted a paper by Ohl and Engel (2007) and stated (Sarzetti *et al.* pp. 938–939) ‘More recently, however, Ohl and Engel (2007) have indicated that this insect body fossil (*Melittosphex*) is not of a bee; moreover, they stated that *Melittosphex burmensis* is a synonym of *Cretospilomena* (Hymenoptera: Crabroninae), also described from Burmese amber (Antropov, 2000)’.

Those statements are **not** included in Ohl and Engel (2007). No formal taxonomic decisions were made in that paper and Ohl and Engel did not synonymize *Melittosphex* with *Cretospilomena*. Moreover, Ohl reported to the present author (personal correspondence) that he is convinced the two genera are not synonymous.

Many characters distinguish *Melittosphex* from *Cretospilomena*. *Cretospilomena* has simple claws, a minute arolium, a midtibia with one apical spur and very slight body pubescence (Antropov 2000). *Melittosphex* has cleft claws, a large arolium, midtibia with two apical spurs and the body is covered with dense pubescence of plumose hairs (Poinar and Dancroft 2006a, b). In addition, *Melittosphex* lacks the elongate pronotum and propodeum of *Cretospilomena*. The wing venation of the two is also quite different. Both genera possess propodeal spines; however, *Cretospilomena* has small, acutely pointed spines and *Melittosphex* has rounded, blunt spines (Danforth and Poinar, in preparation). Whereas neither Ohl nor Engel examined the *Melittosphex* fossil, B. Danforth did examine the fossils of *Cretospilomena* in the Natural History Museum (London) and can confirm that the differences originally inferred from Antropov’s (2000) description and illustrations exist. Overall, there are a sufficient number of differences between *Melittosphex* and *Cretospilomena* (as well as modern pemphredonine wasps) to conclude that they are not the same.

Poinar and Dancroft (2006a, b) erected the family Melittosphecidae to emphasize that *Melittosphex* is not within the monophyletic group that currently includes all living bees, but a transitional form that bridges the gap between crabronid wasps and extant bees. On the basis of the above-mentioned characters,



TEXT-FIG. 1. Dense covering of branched hairs on *Melittosphex burmensis* Poinar and Danforth. Scale bar represents 24 μ m.

especially the dense covering of branched hairs (Text-Fig. 1) and the bee-like habitus, Poinar and Dancroft (2006a, b) considered *Melittosphex* to represent a pollen-carrying, primitive bee.

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REPLY

by LAURA C. SARZETTI*, CONRAD C. LABANDEIRA† and JORGE F. GENISE*

*CONICET, Museo Paleontológico Egidio Feruglio, Avenida Fontana 140, 9100 Trelew, Chubut, Argentina; e-mail:lsarzetti@mef.org.ar

†Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20013, USA

IN our article, 'Leafcutter bee trace fossils from the middle Eocene of Patagonia, Argentina, and a review of megachilid Hymenoptera) ichnology', we erroneously used the word, 'state', on pages 938–939 when we mentioned that Ohl and Engel (2007) synonymized *Melittosphex* with *Cretospilomena* (Hymenoptera: Crabronidae). Our error is because a formal taxonomy was not presented in Ohl and Engel (2007), as noticed by Poinar.

Nevertheless, the larger and more relevant issue resulting from this lapse does not involve formal synonymy or typification, but is rather an empirical one, namely that *Melittosphex* is not a bee based on the published evidence. The most parsimonious conclusion is that *Melittosphex* either is congeneric with or alternatively the sister taxon to *Cretospilomena*. Assignment of *Melittosphex* to the bees would necessitate a redefinition of the Anthophila, the well-diagnosed clade comprising the bees (Michener 2000). The original description that Poinar and Danforth presented (2006) mentioned the presence of pollen in their Burmese amber specimen. However, the presence of body pollen is a feature that is not diagnostic for bees, as many sphecoid wasps, including masarids and crabronids, bear pollen on their bodies (Gess 1996), a feature that extends to nonhymenopterous insects during the earlier Mesozoic (Labandeira 2005). Additionally, their listing of the presence of branched hairs is not a definitive feature of the Anthophila as well because some basal and even derived bee taxa bear simple, unbranched hairs (Aguiar and Melo 2007) and some aculeate wasps, such as the Mutillidae, bear branched hairs (Michener 2000).

Perhaps a restudy of the important *Melittosphex* would provide additional documentation that could bring closure to this most important fossil involving the early evolution of one of the most iconic lineages of insects, the bees.

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