Youngest occurrence of the genus Microphorites (Diptera: Dolichopodidae): A new species in Late Cretaceous Vendean amber
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INTRODUCTION

The family Dolichopodidae, or long-legged flies, is the world’s fourth largest dipteran family and one of five major lineages within the superfamily Empidoidea. The traditional concept of the family comprises 15 subfamilies and is referred to as Dolichopodidae s. str. This concept was expanded to Dolichopodidae s.lat. to include Microphorinae and Parathalassiinae (Sinclair & Cumming, 2006), two small subfamilies for a time placed in Empididae (Negrobov, 1978; Evenhuis, 1994), but also considered at family rank by some authors (Chvála, 1983; Moulton & Wiegmann, 2004) or left unplaced as sister to Dolichopodidae (Hennig, 1971; Moulton & Wiegmann, 2007). Indeed, both clades have dolichopodid characteristics such as the Rs vein originating at or near the level of crossvein h, crossvein r-m situated in the basal fourth of the wing, and the male

*Corresponding author.
terminalia rotated forward beneath the preceding segments of the abdomen (Wiegmann, Mitter, & Thompson, 1993). Microphorinae and Parathalassiinae are distinguished from other dolichopodids by the presence of an additional basal crossvein (bm-cu) and crossvein dm-cu connected to the base of M2. Recent molecular analyses even suggest that Parathalassiinae are part of Dolichopodidae s.str., with Microphorinae as sister group to the latter (Germann & others, 2011).

The subfamily Microphorinae is comprised of the modern genera Microphor Macquart and Schistostoma Becker and the extinct genera Avenaphora Grimaldi & Cumming and Microphorites Hennig, with the fossil record extending back to the Early Cretaceous. Microphorites is the most speciose one of the extinct genera and is known exclusively from the Cretaceous. The new fossil described here is the sixth species of Microphorites, and the latest occurrence of the genus which was otherwise known exclusively from Early to mid-Cretaceous amber of Lebanon, France, and Spain (Hennig, 1971; Grimaldi & Cumming, 1999; Nel & others, 2004; Arillo, Peñalver, & Delclòs, 2008).

**SYSTEMATIC PALEONTOLOGY**

**Family** DOLICHOPODIDAE Latreille, 1809  
**Subfamily** MICROPHORINAE Collin, 1960  
**Genus** MICROPHORITES Hennig, 1971

*Type species.*—*Microphorites extinctus* Hennig, 1971, p. 16, figs. 2, 3, 19–25.

*Included species.*—*Microphorites deploegi* Nel & others, 2004,  

The generic diagnosis by Grimaldi and Cumming (1999), with supplements by Nel and others (2004), is followed.

**MICROPHORITES MAGALIAE** new species

Figures G1–G2

Figure G1. *Microphorites magaliae* n. sp., holotype male IGR.GAR-106a, in Late Cretaceous amber of Vendée, NW France. 1, habitus in right lateral view; 2, detail of antennae; 3, detail of the genitalia.
Type material.—Holotype male, IGR.GAR-106a (ex coll. Weigandt), in Late Cretaceous (Middle Cenomanian to Early Santonian, 97–85 Ma) Vendean amber; deposited in the Geological Department and Museum of the University Rennes 1, France.

Type locality.—La Robinière, departmental road D32, about 2.5 km south-west of La Garnache, Vendée, France.

Etymology.—The specific epithet is a matronym honoring Magali Weigandt who collected the amber piece containing the specimen.

Diagnosis.—The new species has the following unique combination of characters within the genus: compound eyes encompassing most of head, touching each other along inner margins, bare; flagellomere I with bulbous base and abruptly tapering to slender apex; thorax strongly hump-backed; mesoscutum with pair of elongate posterior setae; mesoscutum with pair of strong, elongate setae; wing vein C terminating just beyond R_4+5; Sc curved posteriorly towards R_1, not contacting R_1 along length but closely parallel, apically nebulous such that it appears to terminate before C; Rs originating just immediately beyond tangent with crossvein h (= c-sc); R_2,3 slightly shorter than R_1,5, the latter reaching to wing apex and near midpoint between R_2,3 and M_; rs-m in basal quarter of forewing, about 1.75x its length from R_2,3-R_5 fork; M₁ straight; M₅ present; bm-cu separated from dm by distinct and complete bm-cu; CuA₁ straight; CuA₂ arched posteriorly, joining A₁ and creating small basal cell [cu-p]; short A₁ present as nebulus furrow; anal lobe rounded.

Abdomen short, less than 0.5x wing length. First five pregenital segments each with 6–8 erect setae dorsally. Hypopygium large, rounded, rotated and lateroflexed to right (Fig. G1.3, G2); posterior half strongly setose; left lamella with rounded dorsal lobe, apex of lobe with hooked tooth; right lamella with small dorsal flange; phallus long, curled.

DISCUSSION

Placement of this species within Microphorites is easily established owing to the bare compound eyes, wing with complete crossvein bm-cu, and antenna with two-segmented arista. Given the discovery of a species of Microphorites in Cenomanian–Santonian amber, thereby pushing the lineage into the Late Cretaceous, the genus should be sought in other deposits of similar age. For example, it seems possible that the genus may be discovered eventually in the Campanian amber of Canada or Turonian of New Jersey, both rich sources of Late Cretaceous insect inclusions and in close paleogeographic proximity to those Eurasia localities. The mid-Cretaceous amber of Myanmar and Santonian amber of Siberia are also strong candidates to eventually reveal species of Microphorites, unless, of course, the genus had a more restricted distribution which confined species to the western archipelagos and landmasses of Eurasia during this period. Hopefully, continued paleoentomological investigation will give us a greater understanding of the biogeography and phylogenetic relationships of the genus.

The following key, updated from that of Arillo, Peñalver, and Delclòs (2008), will permit recognition of Microphorites from its congeners. It applies to both males and females although all but one species (M. deploegi) are known by a single gender only. The size of the compound eye relative to the head, as proposed in Arillo’s key, was removed because it appears to vary between male and female of a same species, i.e. males have larger eyes than females.
Key to species of Microphorites

1. Basal flagellomere abruptly tapered, with base bulbous and tubular apex ............................................. 2
   Basal flagellomere more evenly tapering from base to apex ...... 3
2. Wing vein C terminating at R<sub>5</sub>; R<sub>5</sub> closer to M than to R<sub>2</sub>; along wing margin; mesoscutum without posterior pair of strongly elongate setae [Barremian; Lebanon] .......... M. oculeus Grimaldi & Cumming
   Wing vein C terminating just beyond R<sub>5</sub>; R<sub>5</sub> approximately equidistant between R<sub>2</sub> and M along wing margin; mesoscutum with posterior pair of strong, elongate setae [Cenomanian–Santonian; France] .......... M. magalae Perrichot & Engel n. sp.
3. Wing vein C terminating beyond R<sub>5</sub> .................................. 4
   Wing vein C terminating at R<sub>5</sub> [Barremian; Lebanon] .............. M. similis Grimaldi & Cumming
4. Antennal arista long, around twice basal flagellomere length; forewing vein R<sub>5</sub> clearly shorter than R<sub>5</sub> ................. 5
   Antennal arista short, as long as basal flagellomere; forewing vein R<sub>5</sub> clearly shorter than R<sub>5</sub> [Lower Albian, Spain] .............. M. utrillensis Peñalver in Arillo & others
5. Four strong setae on mesoscutellum [Barremian; Lebanon] ..........
   .......................................................... M. extinctus Hennig
   Two strong setae on mesoscutellum [Upper Albian; France] ........
   .......................................................... M. deploegi Nel & others

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