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Author: Penney, David

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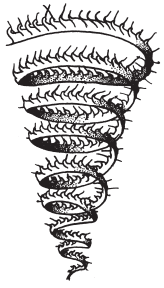
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# Paleontological Contributions

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## A FOSSIL RAY SPIDER (ARANEAE: THERIDIOSOMATIDAE) IN CRETACEOUS AMBER FROM VENDÉE, FRANCE

David Penney

Faculty of Life Sciences, University of Manchester, Manchester, M13 9PT, UK,  
david.penney@manchester.ac.uk

### ABSTRACT

A new species of fossil ray spider, *Baalzebub? mesozoicum* n. sp. (Araneae: Theridiosomatidae), is described from Mesozoic amber from the Cretaceous (Middle Cenomanian to Early Santonian) deposits of La Garnache, Vendée, NW France. The palpal structures, especially the highly sclerotized claw-shaped retrolateral 'paracymbium' originating as an outgrowth of the cymbium basally and the basal cymbial lamella, are considered sufficient to make a tentative placement of the new fossil species in the extant genus *Baalzebub* Coddington, 1986.

Key words: Arachnida, spider, Mesozoic, Late Cretaceous, France

### RÉSUMÉ

Une nouvelle espèce d'araignée fossile, *Baalzebub? mesozoicum* n. sp. (Araneae: Theridiosomatidae), est décrite de l'ambre mésozoïque des dépôts crétacés (Cénomaniens moyen à Santonien inférieur) de La Garnache, Vendée, nord-ouest de la France. Les structures des palpes, en particulier le 'paracymbium' rétrolatéral en forme de griffe et fortement sclérotisé, issu d'une croissance basal du cymbium, et la lamelle cymbiale basale, sont considérées comme suffisantes pour un placement possible de la nouvelle espèce fossile dans le genre moderne *Baalzebub* Coddington, 1986.

Mots-clés: Arachnide, araignée, Mésozoïque, Crétacé supérieur, France

### INTRODUCTION

The fossil record of spiders is diverse (Penney, Dunlop, & Marusik, 2012; Dunlop, Penney, & Jekel, 2013), particularly in Tertiary ambers. Within the last few decades, however, an increasing number of species have been described from the Mesozoic (Selden & Penney, 2010; Penney & Selden, 2011; Wunderlich, 2008, 2012; Penney, 2013). France has a diverse fossil spider fauna in both amber and rock (briefly summarized by Penney, 2004), including the oldest known fossil spider species (Selden, 1996). Amber spiders have been formally described and named from Tertiary deposits of Oise (Micropholcommatidae: Penney & others, 2007; Pholcidae: Penney, 2007a; Oonopidae: Penney, 2007b; see Nel & Brasero (2010) for a summary of this deposit) and Cretaceous Charentes amber (Mecysmaucheniidae: Saupe & Selden, 2009; see Perrichot, Néraudeau, & Tafforeau (2010) for a summary of this deposit).

Ray spiders (family Theridiosomatidae) are minute orb-weaving spiders with a worldwide distribution today. They are usually found in shady, humid places and are represented by 106 extant species in 18 genera (Platnick, 2013). In addition, fossil species have been described from Tertiary amber deposits: Dominican Republic (Wunderlich, 1988) (but note that the species described as *Theridiosoma incompletum* Wunderlich, 1988 is probably misplaced in that genus, see Penney (2006, 2008); Bitterfeld and Baltic (Wunderlich, 2004); Cretaceous amber from Myanmar (Wunderlich, 2012); and a single species, based on several specimens, has been described in rocks from the Cretaceous of Baissa, Transbaikalia (Selden, 2010). Here, a new species of ray spider is described from the newly discovered amber deposits of La Garnache, Vendée, France, possibly representing the only extant theridiosomatid genus known from the fossil record.

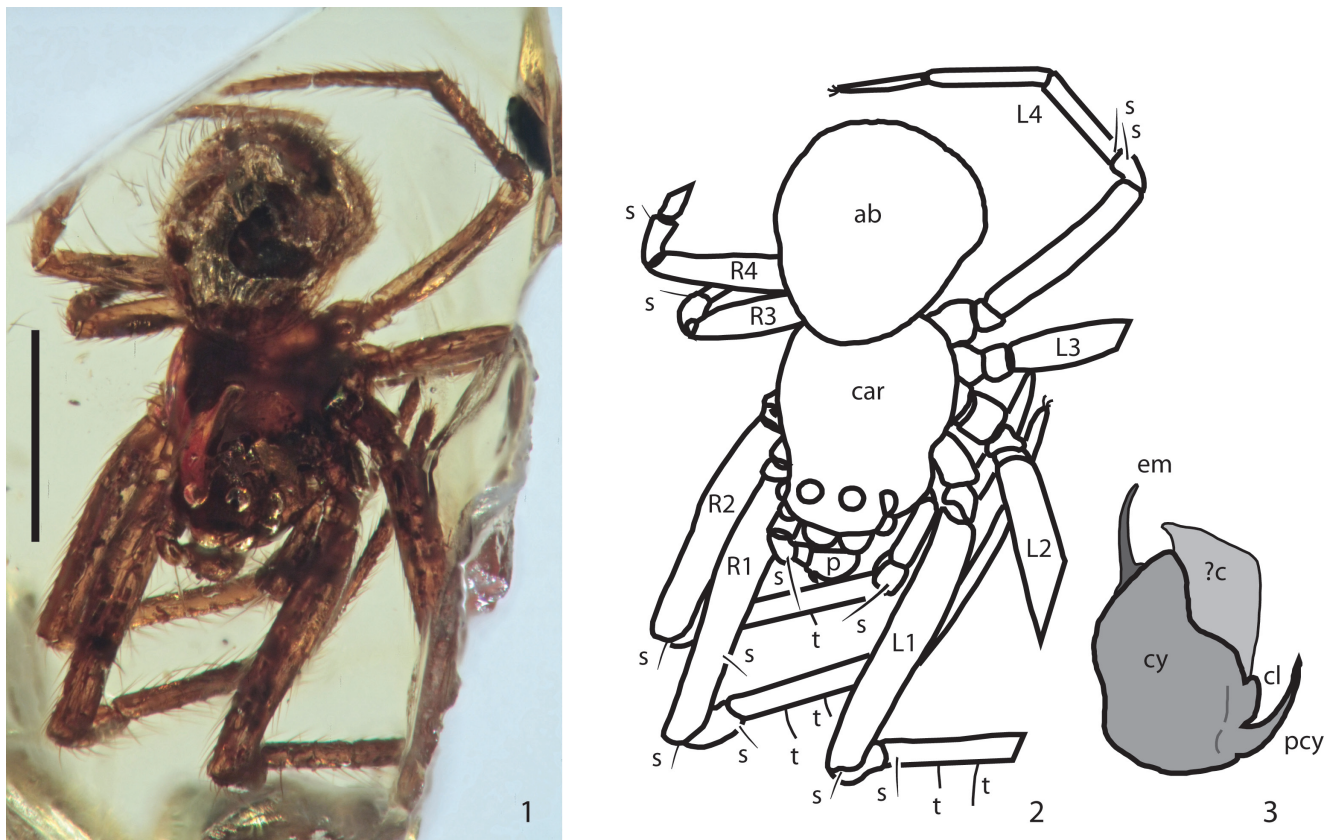


Figure B1. *Baalzebub? mesozoicum* n. sp. in Late Cretaceous amber from Vendée, France: 1, holotype male (IGR.GAR-91), scale bar = 0.5 cm; 2, explanatory drawing of 1; 3, right pedipalp in quasi-dorsal view.

## GEOLOGICAL SETTING

The amber originates from deposits of early Late Cretaceous age, either Middle Cenomanian, Turonian, or Early Santonian. The regional geology is rather complex, resulting in difficulties obtaining a precise age, and resolving this issue is still work in progress. For further details see the foreword paper in this volume (Perrichot & Néraudeau, 2014: 10A).

## MATERIAL AND METHODS

One specimen, coll. Fanny Dupé (IGR.GAR-91) held in the collections of the Geological Institute and Museum of the University Rennes 1, Rennes, France. The fossil spider is preserved in a tiny sliver of amber which, prior to receipt by the author, was embedded in clear synthetic resin; total dimensions of the resin matrix: 6 × 3 × 0.5 mm. There are no syninclusions. Abbreviations used in the text and figures are as follows: ab = abdomen; AME = anterior median eyes; c = conductor; car = carapace; cl = cymbial lamella; cy = cymbium; em = embolus; L/R1–4 = left and right walking legs 1–4; p = pedipalp; pcy = paracymbium; PME = posterior median eyes; s = spine; t = trichobothrium.

## SYSTEMATIC PALAEOONTOLOGY

ARANEAE Clerck, 1757  
 OPISTHOTHELAE Pocock, 1892  
 ARANEOMORPHAE Smith, 1902  
 THERIDIOSOMATIDAE Simon, 1881  
 BAALZEBUB Coddington, 1986

*Type species*.—*Baalzebub baubo* Coddington, 1986 by original designation.

*Included species*.—*B. albonotatus* (Petrunkevitch, 1930) (Puerto Rico), *B. baubo* Coddington, 1986 (Costa Rica, Panama, Brazil); *B. brauni* (Wunderlich, 1976) (Australia); *B. nemesi* Miller, Griswold, & Yin, 2009 (China); *B. rastrarius* Zhao & Li, 2012 (China); *B. youyiensis* Zhao & Li, 2012 (China). Coddington (1986) referred to 10–20 additional undescribed species, including additional geographic records from Mexico, Guatemala, Colombia, South Africa, Malaysia, New Guinea and New Zealand.

**BAALZEBUB? MESOZOICUM n. sp.**

Figure B1

*Etymology.*—The specific epithet relates to the Mesozoic Era, from which the fossil originates.

*Material.*—Holotype male (IGR.GAR-91) held in the collections of Geological Institute and Museum of the University Rennes 1, Rennes, France. The only known specimen.

*Diagnosis.*—Pedipalp of male with claw-shaped retrolateral ‘paracymbium’ fused to the cymbium basally and with a basal cymbial lamella; ‘conductor’ large and embolus extending distally beyond the cymbium. The palpal structure is similar to *B. albonotatus* (Petrunkevitch, 1930) but differs in having the embolus directed anteriorly rather than laterally.

*Description.*—Tiny spider, total body length approximately 1 mm. Carapace approximately 0.6 mm, not distinctly raised in the ocular area, and with a low clypeus. Eight eyes in two rows, anterior row recurved, posterior row straight. AME largest, contiguous, remaining eyes subequal, laterals contiguous, PME separated by slightly less than their diameter (Fig. B1). Sternum with promarginal sternal pits characteristic of the family, shield-shaped, as broad as long and extending between fourth coxae. Labium and maxillae broader than long. Leg formula (longest first) 1243, lacking unusual modifications. Femur 1 with distinct prolateral spine in distal half (Fig. B1); patellae 1 and 2 with both proximal and distal spine; patellae 3 and 4 with only distal spine. Tibia 1 and 4 with single dorsal spine close to patella; absence of similar spines on legs 2 and 3 cannot be confirmed with absolute certainty. Trichobothria difficult to see, but visible as follows: two on tibia 1, one on tibia 2, one on tibia 4. Tarsus with three claws; paired claws without teeth.

Abdomen lacking scuta, approximately 0.6 mm, damaged but was probably subspherical in life and overlapping carapace slightly; adorned with short setae. Spinnerets not clear, but appear short, compact and unmodified.

Pedipalp (Fig. B1) with highly sclerotized claw-shaped retrolateral ‘paracymbium’ fused to cymbium basally and with a basal cymbial lamella; ‘conductor’ large and embolus extending distally beyond cymbium. Palpal patella with single, long spine distally.

**DISCUSSION**

Theridiosomatidae is a poorly known or understood, exotic, cosmopolitan family of tiny spiders, usually less than 2 mm in total body length (Coddington, 1986) with a relatively long geological history. Their true extant diversity far exceeds that which is known at present. The same is true for the constituent genera, including *Baalzebub*, considered in this paper (see previously under species included in the genus). This can make the placement of new fossil species in extant genera uncertain, especially when details of the pedipalps are obscured, and this is particularly true for older fossils from the Mesozoic.

Unfortunately, the bulbus structures are not clearly visible in the specimen described here, so it is not possible to differentiate between structures such as the tegulum, subtegulum and conductor. Nonetheless, the remaining palpal structures, especially the highly

sclerotized claw-shaped retrolateral ‘paracymbium’ originating as an outgrowth of the cymbium basally and the basal cymbial lamella are considered sufficient to make a tentative placement of the new fossil species in the extant genus *Baalzebub*. Indeed, there are no particular characters that could be identified to exclude the fossil from this genus and to warrant the description of a new genus. Extant species of this genus prefer dark habitats and are often found in the interior of hollow logs or under large, fallen trees, a behaviour that would make them susceptible to becoming trapped in any secreted resin that may be present.

Interestingly, this Cretaceous French fossil shares features used in the diagnoses of Wunderlich’s (2012) new Cretaceous genera, e.g. the presence of a single prolateral bristle on femur 1 (*Leviunguis* Wunderlich, 2012) and a very long and pointed paracymbium (*Hypotheridiosoma* Wunderlich, 2012). However, the overall palpal configuration excludes it from either of these genera. *B.? mesozoicum* represents the first Mesozoic fossil theridiosomatid assigned to an extant genus, suggesting a considerable antiquity for this spider lineage.

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**REFERENCES**

- Clerck, C. 1757. Araneae suecici, descriptionibus et figuris oeneis illustrati, ad genera subalterna redacti speciebus ultra LX determinati. L. Salvii. Stockholm. 154 p., 6 pl. [In Swedish and Latin].
- Coddington, J. A. 1986. The genera of the spider family Theridiosomatidae. *Smithsonian Contributions to Zoology* 422:1–96.
- Dunlop, J. A., D. Penney, & D. Jekel. 2013. A summary list of fossil spiders and their relatives. In N. I. Platnick, ed., *The world spider catalog*, version 13.5. 271 p. American Museum of Natural History, online at <http://research.amnh.org/entomology/spiders/catalog/index.html>
- Miller, J. A., C. E. Griswold, & C. M. Yin. 2009. The symphytognathoid spiders of the Gaoligongshan, Yunnan, China (Araneae, Araneoidea): Systematics and diversity of micro-orbweavers. *ZooKeys* 11:9–195.
- Nel, A. & N. Brasero. 2010. Oise Amber. In D. Penney, ed., *Biodiversity of Fossils in Amber from the Major World Deposits*. Siri Scientific Press. Manchester. p. 137–148
- Penney, D. 2004. A palaeoarachnological trip to Paris. *Newsletter of the British Arachnological Society* 101:13–14.
- Penney, D. 2006 for 2005. An annotated systematic catalogue, including synonymies and transfers, of Miocene Dominican Republic amber spiders described up until 2005. *Revista Iberica de Aracnologia* 12:25–52.
- Penney, D. 2007a for 2006. The oldest fossil pholcid and selenopid spiders, in lowermost Eocene amber from the Paris Basin, France. *Journal of Arachnology* 34:592–598.
- Penney, D. 2007b. A new fossil oonopid spider, in lowermost Eocene amber from the Paris Basin, with comments on the fossil spider assemblage. *African Invertebrates* 48:71–75.
- Penney, D. 2008. Dominican Amber Spiders: a comparative palaeontological-neontological approach to identification, faunistics, ecology and biogeography. Siri Scientific Press. Manchester. 178 p.



- Penney, D. 2013. Palaeontology: interpretation and application of the spider fossil record. In D. Penney, ed., *Spider research in the 21st century: trends and perspectives*. Siri Scientific Press. Manchester. 34 p.
- Penney, D., M. Dierick, V. Cnudde, B. Masschaele, J. Vlassensbroeck, L. Van Hoorebeke, & P. Jacobs. 2007. First fossil Micropholcommatidae (Araneae), imaged in Eocene Paris amber using X-Ray Computed Tomography. *Zootaxa* 1623:47–53.
- Penney, D., J. A. Dunlop, & Y. M. Marusik. 2012. Summary statistics for fossil spider species taxonomy. *ZooKeys* 192:1–13.
- Penney, D., & P. A. Selden. 2011. *Fossil Spiders: the evolutionary history of a mega-diverse order*, 128 pp. Monograph Series, Volume 1. Siri Scientific Press, Manchester.
- Perrichot, V., & D. Néraudeau. 2014. Introduction to thematic volume "Fossil arthropods in Late Cretaceous Vendean amber (northwestern France)". *Paleontological Contributions* 10A:1–4.
- Perrichot, V., D. Néraudeau, & P. Tafforeau. 2010. Charentese Amber. In D. Penney, ed., *Biodiversity of Fossils in Amber from the Major World Deposits*. Siri Scientific Press. Manchester. p. 192–207.
- Petrunkovitch, A. 1930. The spiders of Puerto Rico, II. *Transactions of the Connecticut Academy of Arts and Sciences* 30:159–355.
- Platnick, N. I. 2014. The world spider catalog, version 15.5. American Museum of Natural History, online at <http://research.amnh.org/entomology/spiders/catalog/index.html>.
- Pocock, R. I. 1892. *Liphistius* and its bearing upon the classification of spiders. *Annals and Magazine of Natural History (Series 6)* 10:306–314.
- Saupe, E. E., & P. A. Selden. 2009. First fossil Mecysmaucheniidae (Arachnida, Chelicerata, Araneae), from Lower Cretaceous (uppermost Albian) amber of Charente-Maritime, France. *Geodiversitas* 31:49–60.
- Selden, P. A. 1996. First fossil mesothele spider, from the Carboniferous of France. *Revue Suisse de Zoologie* volume hors série 2:585–596.
- Selden, P. A. 2010. A theridiosomatid spider from the Early Cretaceous of Russia. *Bulletin of the British Arachnological Society* 15:61–69.
- Selden, P. A., & D. Penney. 2010. Fossil spiders. *Biological Reviews* 85:171–206.
- Simon, E. 1881. *Les arachnides de France*. Paris, 5:1–180.
- Smith, F. P. 1902. The spiders of Epping Forest. *Essex Naturalist* 12:181–201.
- Wunderlich, J. 1976. Spinnen aus Australien, 1: Uloboridae, Theridiosomatidae, und Symphytognathidae (Arachnida: Araneida). *Senckenbergiana Biologica* 57:113–124.
- Wunderlich, J. 1988. Die Fossilen Spinnen im Dominikanischem Bernstein. *Beiträge zur Araneologie* 2:1–378.
- Wunderlich, J. (ed) 2004. *Fossil spiders in amber and copal*. *Beiträge zur Araneologie* 3:1–1908.
- Wunderlich, J. 2008. Fossil and extant spiders (Araneae). *Beiträge zur Araneologie* 5:1–870.
- Wunderlich, J. 2012. *Fifteen papers on extant and fossil spiders (Araneae)*. *Beiträge zur Araneologie* 7:1–364.
- Zhao, Q. Y., & S. Q. Li. 2012. Eleven new species of theridiosomatid spiders from southern China (Araneae, Theridiosomatidae). *ZooKeys* 255:1–48.