Zootaxa 3753 (6): 542–548
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3753.6.2
http://zoobank.org/urn:lsid:zoobank.org:pub:BDEA06B1-084B-4492-87BA-FF51C40B1D43

A new paper wasp from Late Eocene of France (Hymenoptera: Vespidae: Polistinae)

ADRIEN PERRARD[1,3], ANDRÉ NEL[1] & JAMES M. CARPENTER[2]

[1]*UMR 7205, Muséum National d'Histoire Naturelle, 45 Rue Buffon, F-75005 Paris, France. E-mail: perrard@mnhn.fr; anel@mnhn.fr*
[2]*Division of Invertebrate Zoology, American Museum of Natural History, Central Park West at 79th Street, 10024, New-York City, NY, USA. E-mail: carpenter@amnh.org*
[3]*Corresponding author. E-mail: perrard@mnhn.fr*

Abstract

The new vespid genus and species *Palaeopolistes jattioti* **gen. et. sp. nov.** is described from the Late Eocene of Monteils (Gard, France). The new taxon has clear features of the Polistinae but its tribal assignment is uncertain.

Key words: Vespidae, Polistinae, Late Eocene, gen. nov., sp. nov.

Introduction

The Polistinae is the most diverse subfamily of social wasps with more than 950 extant species described from 26 recognised genera (Pickett & Carpenter 2010). These wasps are the subject of numerous studies on the evolution of social behaviour as they exhibit different forms of social organization (Noll *et al.* 2004; Noll & Wenzel 2008). However, this group is poorly represented in the fossil record with only nine described fossil species.

The oldest known Polistinae is *Polistes vergnei* Piton, 1940, described from the Menat formation in France (Paleocene). Unfortunately, the holotype of this species is lost, probably during the Second World War. Five other described fossils have been associated with *Polistes* Latreille, 1802 of the cosmopolitan tribe Polistini, viz. *P. attavinus* (Heer, 1849) (Early Miocene, Parschlug, Austria, see Bequaert 1930), *P. industrius* Théobald, 1937 (Middle Oligocene, Céreste, France), *P. signatus* Statz, 1936 (Late Oligocene, Rott, Germany), *P. kirbyanus* Cockerell, 1915 and *P. primitiva* Heer, 1865 (Late Miocene, Öhningen, Germany), the last one being a *nomen nudum*. Of the three remaining fossils, two from the Late Eocene—Early Oligocene of Isle of Wight (UK) were described as *Polybia* Lepeletier (*P. anglica* Cockerell, 1921a and *P. oblita* Cockerell, 1921b), a genus comprising swarming wasps of the tribe Epiponini with modern species restricted to the New World. These last identifications were disputed by Carpenter & Grimaldi (1997) and are under revision (Antropov, pers. com.). The last described fossils of Polistinae were specimens of a swarming wasp of the New World tribe of Epiponini, *Agelaia electra* Carpenter & Grimaldi, 1997, described from the Miocene Dominican amber. Finally, Kotthoff (2005) figured and briefly described three unnamed Polistinae gen. et sp. indet. from the Early Miocene of Randeck Maar (Germany).

Recently, two new fossils of Polistinae wasps were found in the lacustrine limestone of the Late Eocene Monteils formation in the south of France. As these fossils presented similar wing venation, dimensions, and coloration pattern, and as they were found in the same outcrops and layers, we considered them as belonging to the same species.

Material and methods

The two fossils were found at the Monteils formation in the south of France (44°05'9"N, 04°11'39"E). The first fossil is an almost complete print and counterprint of a specimen in lateral position with ventral part of the head,

 Accepted by A. Lelej: 9 Dec. 2013; published: 10 Jan. 2014

However, even if there is no evidence that Epiponini wasps were once distributed outside from the Neotropical area on the basis of its extant distribution (Carpenter 1993), we cannot exclude that an Eocene fossil from Europe could be closely related to this tribe. Other fossils from Europe Eocene were previously related to Neotropical groups. For example, the Bolcathoridae known from the Eocene of Monte Bolca (Italy) and the late Eocene—early Oligocene of Isle of Wight have the Neotropical family Polythoridae for closest relatives (Gentilini 2002). The position of *Palaeopolistes jattioti* is thus unresolved in the subfamily because Ropalidiini may be the sister group of all other Polistinae: Mischocyttarini + (Epiponini + Polistini) (Pickett & Carpenter, 2010). Further analyses with methods such as geometric morphometrics (de Meulemeester *et al.* 2012, Wappler *et al.* 2012) may help produce morphological evidence for the attribution of this fossil to Ropalidiini or Epiponini tribes.

Acknowledgements

We thank Romain Jattiot for bringing us the paratype of this wasp fossil and donating it to the MNHN. We are also grateful to A.P. Rasnitsyn and to the subject editor A.S. Lelej for their help and comments on this manuscript.

References

Bequaert, J. (1930) On the generic and subgeneric divisions of the Vespinae (Hymenoptera). *Bulletin of the Brooklyn Entomological Society*, 25, 59–70.

Carpenter, J.M. (1982) The phylogenetic relationships and natural classification of the Vespoidea. *Systematic Entomology*, 7, 11–38.
http://dx.doi.org/10.1111/j.1365-3113.1982.tb00124.x

Carpenter, J.M. (1993) Biogeographic patterns in the Vespidae (Hymenoptera): two views of Africa and South America. *In:* Goldblatt, P. (Ed.), *Biological relationships between Africa and South America.* Yale University Press, Haven, Connecticut, pp. 139–155.

Carpenter, J.M. (2004) Synonymy of the genus *Marimbonda* Richards, 1978, with *Leipomeles* Möbius, 1856 (Hymenoptera: Vespidae; Polistinae), and a new key to the genera of paper wasps of the New World. *American Museum Novitates*, 3465, 1–16.
http://dx.doi.org/10.1206/0003-0082(2004)465<0001:sotgmr>2.0.co;2

Carpenter, J.M. & Grimaldi, D.A. (1997) Social wasps in amber. *American Museum Novitates*, 3203, 1–7.
http://dx.doi.org/10.1206/0003-0082(2006)3541[1:fwidah]2.0.co;2

Carpenter, J.M. & Nguyen, L.P.T. (2003) Keys to the genera of social wasps of South-East Asia (Hymenoptera: Vespidae). *Entomological Science*, 6, 183–192.
http://dx.doi.org/10.1046/j.1343-8786.2003.00016.x

Cockerell, T.D.A. (1915) Miocene fossil insects. *Proceedings of the Academy of Natural Science, Philadelphia*, 66, 634–648.

Cockerell, T.D.A. (1921a) Fossil arthropods in the British Museum 5. Oligocene Hymenoptera from the Isle of Wight. *Annals and Magazine of Natural History,* (9), 7, 1–25.
http://dx.doi.org/10.1080/00222932108632485

Cockerell, T.D.A. (1921b) Fossil arthropods in the British Museum 7. *Annals and Magazine of Natural History,* (9), 8, 541–545.
http://dx.doi.org/10.1080/00222932108632615

De Meulemeester, T., Michez, D., Aytekin, A.M. & Danforth, B.N. (2012) Taxonomic affinity of halictid bee fossils (Hymenoptera: Anthophila) based on geometric morphometrics analyses of wing shape. *Journal of Systematic Palaeontology*, 10, 755–764.
http://dx.doi.org/10.1080/14772019.2011.628701

Gentilini, G. (2002) Fossil damselflies and dragonflies from the Eocene of Monte Bolca, Italy (Insecta: Odonata). *Studi e Ricerche sui Giacimenti Terziari di Bolca, Museo Civico di Storia Naturale di Verona*, 9, 7–22.

Heer, O. (1849) Die Insektenfauna der Tertiärgebilde von Œningen und von Radoboj in Croatien. Zweite Abtheilung: Heuschrecken, Florfliegen, Aderflüger, Schmetterlinge und Fliegen. *Neue Denkschriften Allgemeinen Schweizerischen Gesellschaft für die Gesammten Naturwissenschaften*, 11, 1–264.
http://dx.doi.org/10.5962/bhl.title.2469

Heer, O. (1865) *Die Urwelt der Schweiz*. F. Schulthess, Zurich, 622 pp.

Kotthoff, U. (2005) Über einige Hymenoptera (Insecta) aus dem Unter-Miozän des Randecker Maars (Schwabische Alb, Südwestdeutschland). *Stuttgarter Beiträge zur Naturkunde*, (B), 355, 1–25.

Lepeletier, A.L.M. (1836) *Histoire naturelle des Insectes Hyménoptères. I.* Roret's Suites à Buffon, Paris, 547 pp.

Latreille, P.A. (1802) *Histoire naturelle, générale et particulière des Crustacés et des Insectes. Ouvrage faisant suite aux œuvres de Leclerc de Buffon et partie du cours complet d'Histoire naturelle rédigé par C.S. Sonnini. Tome 3, an X. Familles naturelles et genres.* F. Dufart, Paris, 467 pp.

Pickett, K.M. & Carpenter, J.M. (2010) Simultaneous analysis and the origin of eusociality in the Vespidae (Insecta: Hymenoptera). *Arthropod Systematic and Phylogeny*, 68, 3–33.

Piton, L. (1940) Paléontologie du gisement éocène de Menat (Puy-de-Dôme), flore et faune. *Mémoire de la Société d'Histoire Naturelle d'Auvergne*, 1, 1–303.

Noll, F.B. & Wenzel, J.W. (2008) Caste in the swarming wasps:"queenless" societies in highly social insects. *Biological Journal of the Linnean Society*, 93, 509–522.
http://dx.doi.org/10.1111/j.1095-8312.2007.00899.x

Noll, F.B., Wenzel, J.W. & Zucchi, R. (2004) Evolution of Caste in Neotropical Swarm-Founding Wasps (Hymenoptera: Vespidae; Epiponini). *American Museum Novitates*, 3467, 1–24.
http://dx.doi.org/10.1206/0003-0082(2004)467<0001:eocinw>2.0.co;2

Snelling, R.R. (1981) Systematics of social Hymenoptera. *In*: Hermann, H.R. (Ed.), *Social insects. Vol. 2*. Academic Press, New York, USA, pp. 369–453.

Statz, G. (1936) Ueber alte und neue fossile Hymenopterenfunde aus der tertiären Ablagerungen von Rott am Siebengebirge. *Decheniana,* 93, 256–312.

Théobald, N. (1937) Les insectes fossiles des terrains oligocènes de France. *Mémoires de la Société des Sciences de Nancy*, 2, 1–472.

Wappler, T., De Meulemeester, T., Aytekin, A.M., Michez, D. & Engel, M.S. (2012) Geometric morphometric analysis of a new Miocene bumble bee from the Randeck Maar of southwestern Germany (Hymenoptera: Apidae). *Systematic Entomology*, 37, 784–792.
http://dx.doi.org/10.1111/j.1365-3113.2012.00642.x