



Introduction to thematic volume "Fossil arthropods in Late Cretaceous Vendean amber (northwestern France)"

Vincent Perrichot, Didier Néraudeau

► To cite this version:

Vincent Perrichot, Didier Néraudeau. Introduction to thematic volume "Fossil arthropods in Late Cretaceous Vendean amber (northwestern France)". *Paleontological Contributions*, 2014, 10A, pp.1-4. insu-01093118

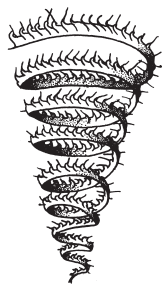
HAL Id: insu-01093118

<https://insu.hal.science/insu-01093118>

Submitted on 10 Dec 2014

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

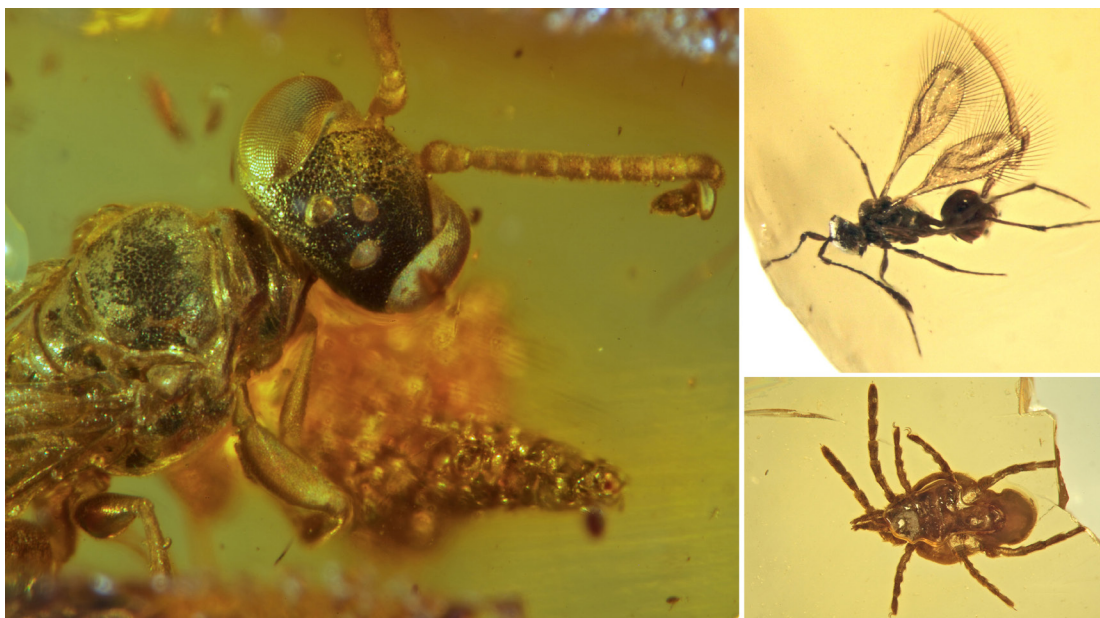


Paleontological Contributions

Number 10A

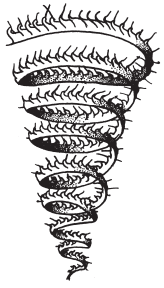
Introduction to thematic volume “Fossil arthropods in Late Cretaceous Vendean amber (northwestern France)”

Vincent Perrichot and Didier Néraudeau



KU PALEONTOLOGICAL
INSTITUTE
The University of Kansas

December 1, 2014
Lawrence, Kansas, USA
ISSN 1946-0279 (online)
paleo.ku.edu/contributions



Paleontological Contributions

December 1, 2014

Number 10A

INTRODUCTION TO THEMATIC VOLUME “FOSSIL ARTHROPODS IN LATE CRETACEOUS VENDEAN AMBER (NORTHWESTERN FRANCE)”

Vincent Perrichot^{1,2*} and Didier Néraudeau¹

¹CNRS UMR 6118 Géosciences & OSUR, Université Rennes 1, 263 avenue du Général Leclerc, 35042 Rennes, France, vincent.perrichot@univ-rennes1.fr, didier.neraudeau@univ-rennes1.fr

and ²University of Kansas Biodiversity Institute, Division of Entomology (Paleoentomology), Lawrence, Kansas 66045, USA;

There is growing knowledge of the insect and arachnid Cretaceous diversity worldwide, most notably as a result of the discovery, in the past twenty years, of numerous Konservat-Lagerstätten (highly fossiliferous deposits) that provide a plethora of fossil arthropods (Wang & Szwed, 2014). Early Cretaceous (Berriasian–Aptian) insects are known primarily from imprints in rocks, while fossiliferous amber yielding arthropod inclusions range mostly from the Albian to the Campanian – the sole exception being Hauterivian–Barremian amber of Lebanon and Jordan.

In France, only few (14) Cretaceous insect deposits are known, with their study still in a very nascent stage. Indeed, the first taxonomic descriptions of Cretaceous French insects did not appear before the 1970s, with 39 species recorded from amber of two Early Cenomanian localities in Anjou (Kühne, Kubig, & Schlüter, 1973; Schlüter, 1978, 1983; see detailed list of taxa in Perrichot & others, 2007: tab. 1). Investigations for additional paleoentomological material have been launched since the early 2000s, that have led to the discovery of twelve further localities (Fig. A1). Insect imprints are remarkably scarce, known only from two Early Cenomanian outcrops, and consisting of few wings or elytra of various Odonata and indeterminate Blattaria, Coleoptera, and Neuroptera, as well as one case of Trichoptera and coprolites of Isoptera (Nel & others, 2008, 2015; Colin & others, 2011; Vullo, Néraudeau, & Dépré, 2013). A significantly larger amount of data have been provided by amber inclusions from ten further localities, most of which from around the Early–Late Cretaceous boundary (Albian–Cenomanian), a crucial period in the evolution of insects (Szwed & Nel, 2014). A single locality was found from later in the Cretaceous (Santonian),

that has yielded relatively few insects (Choufani & others, 2013). All together, more than 2000 fossils of arthropods (arachnids, myriapods, hexapods, and crustaceans) are currently recorded from these outcrops, but mostly from Albian–Cenomanian Charentese amber, in southwestern France (Perrichot & others, 2007; Perrichot & Néraudeau, 2009; Perrichot, Néraudeau, & Tafforeau, 2010; Girard & others, 2013).

The present volume introduces systematic studies on fossil arthropods from a new amber deposit discovered in the early Late Cretaceous (Middle Cenomanian to Early Santonian, 97–85 Ma) of Vendée, a department in northwestern France (Fig. A1), and hereafter referred to as Vendean amber. The outcrop was accessible only briefly during work for enlargement of a road that took place between 2002 and 2005. The precise age of the amber is difficult to assess because the regional geology is rather complex: some boreholes around the outcrop have revealed three Cretaceous lignitic strata dated by palynological analyses as Middle–Late Cenomanian, Early Turonian, and Early Santonian, that sometimes lie unconformably on each other (Ters & Viaud, 1983; Legrand & others, 2006). Unfortunately, the sediment associated with amber yielded only few, poorly preserved palynomorphs without marker species, and the outcrop is currently inaccessible, preventing any stratigraphic correlation. Resolving this issue is still work in progress, and more details on the regional geology, chemical and taphonomical characteristics of the amber, the associated plant remains, and the plant source of the resin will be discussed elsewhere (Néraudeau & others, in prep.).

All the material (5700 pieces of amber totaling 305 grams only) was provided to us by private collectors who discovered and exploited

*Guest Editor

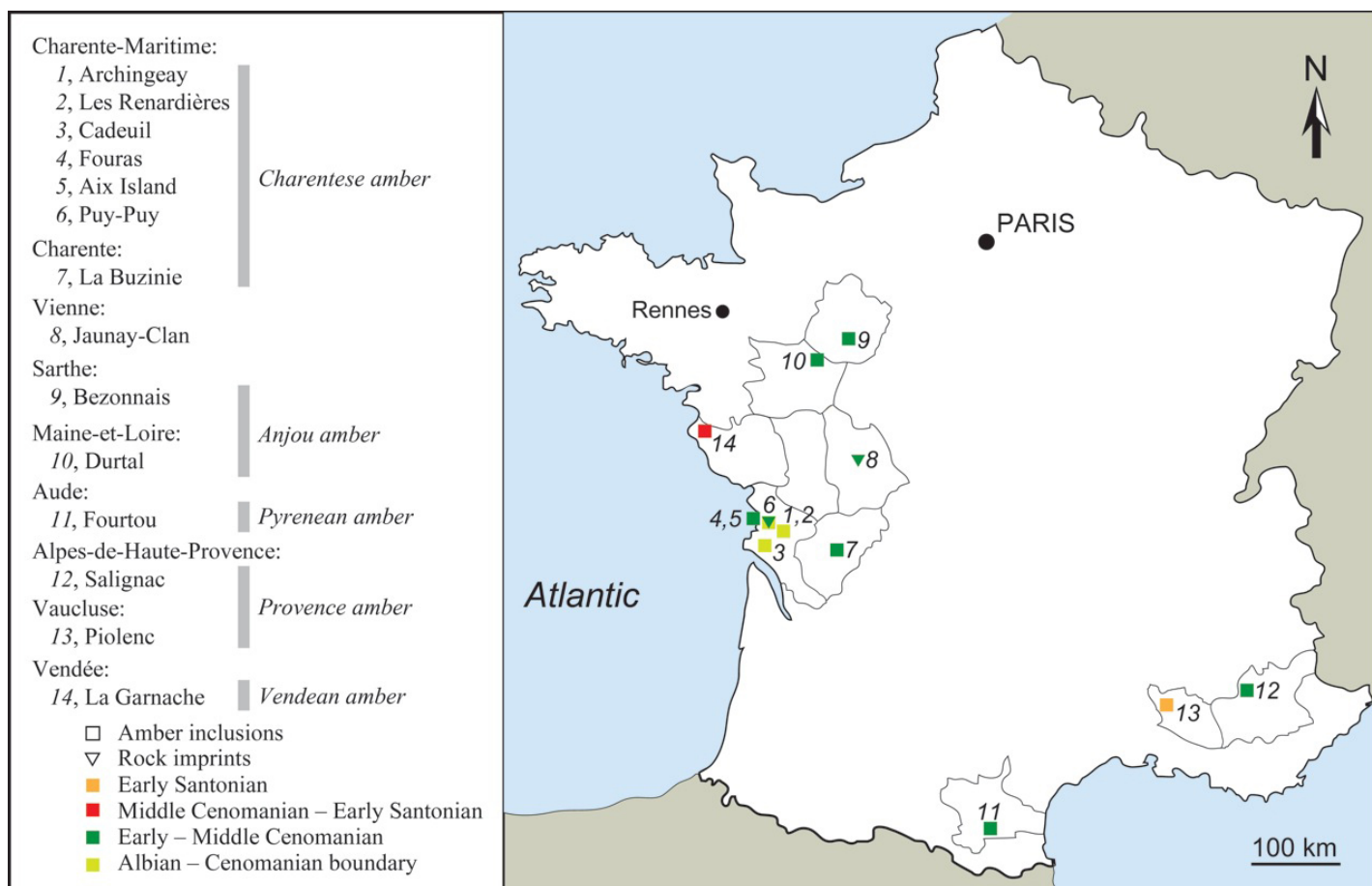


Figure A1. Location of the Vendean amber deposit and other known Cretaceous insect localities from France.

the outcrop before it was sealed by the construction of a paved road. Most of the pieces are 3 to 10 mm in size, but rare larger pieces up to 35 mm were also found (Fig. A2). Amber grains are clear yellow to orange in colour, with only a thin weathered surface, and biological inclusions are generally exquisitely preserved, with only few distortion or alteration. Despite the small amount of amber, investigation for its fossiliferous content revealed a high biotic diversity, with 171 arthropod inclusions recorded (Table A1) together with various microinclusions such as spider webs (Saint Martin & others, 2014), bacterial filaments, fungal hyphae, sponge spines, fern spores, and diatoms (Saint Martin & others, 2015). Vendean amber is therefore exceptionally rich in arthropod inclusions compared to similar amber deposits with a majority of small-sized pieces. Ambers from the Triassic of Italy and the Santonian of southeastern France, for example, are very similar in aspect but contain only a handful of arthropods each (Schmidt & others, 2012; Choufani & others, 2013).

Contributions in this volume provide new insights on the taxonomic diversity of Cretaceous insects and spiders, their morphological disparity, paleoecology, paleobiogeographical distribution, and their relationships with modern lineages. It also enlightens the entomofauna from the Late Cretaceous of western Europe which is otherwise poorly known. Newly described taxa include one species of spider (Penney, 2014: 10B in this volume) and six genera and eleven species of various insects – barklice (Azar, Nel, & Perrichot, 2014: 10C in this volume); earwigs (Engel & Perrichot, 2014a:

10D in this volume); termites (Engel, 2014: 10E in this volume); dustywings (Perrichot & others, 2014: 10F in this volume); flies and midges (Choufani & others, 2014: 10H in this volume; Perrichot & Engel, 2014: 10G in this volume); and wasps (Bennett, Perrichot, & Engel, 2014: 10I in this volume; Engel & Perrichot, 2014b: 10J in this volume).

All specimens described in this volume or to be described elsewhere were kindly donated to the Geological Department of Rennes University by private collectors. We are grateful to all of them: Fanny Dupé who first discovered the Vendean amber, as well as Arlette Boulo, Thérèse Corgnet, Dominique Doyen, Anne-Marie Guèdes, Gérard Guérineau, Alain Guillet and brothers, Didier Graves, Luc Lucas, and Magali Weigandt. This special volume is dedicated to the late André Dupé who also participated in amber collection with his wife Fanny, and sadly passed away before we could publish this work; André and Fanny have long provided tireless efforts and tremendous interest for this fossil deposit. We are also grateful to the Conseil Général de Vendée and the Agence Routière Départementale de Challans for assistance during field work; to colleagues and friends who contributed the different papers or identification of all fossil inclusions; to the many referees for the critical reviews of the manuscripts; and to the chief and technical editors of this volume, Prof. Paul Selden and Denise Mayse for great support in editing of this work.



Figure A2. A sample of Vendean amber showing the size and color of various pieces.

REFERENCES

- Azar, D., A. Nel, & V. Perrichot. 2014. Diverse barklice (Psocodea) from Late Cretaceous Vendean amber. *Paleontological Contributions* 10C:9–15.
- Bennett, D. J., V. Perrichot, & M. S. Engel. 2014. A new genus and species of pemphredonine wasp in Late Cretaceous Vendean amber (Hymenoptera: Crabronidae). *Paleontological Contributions* 10I:41–45.
- Choufani, J., V. Perrichot, V. Girard, R. Garrouste, D. Azar, & A. Nel. 2013. Two new biting midges of the modern type from Santonian amber of France (Diptera: Ceratopogonidae). In D. Azar, M. S. Engel, E. Jarzembowski, L. Krogmann, A. Nel, & J. Santiago-Blay, eds., *Insect Evolution in an Amberiferous and Stone Alphabet*. Proceedings of the 6th International Congress on Fossil Insects, Arthropods and Amber. Brill, Leiden. p. 71–95, DOI: 10.1163/9789004210714_007.
- Choufani, J., V. Perrichot, D. Azar, & A. Nel. 2014. New biting midges (Diptera: Ceratopogonidae) in Late Cretaceous Vendean amber. *Paleontological Contributions* 10H:34–40.
- Colin, J.-P., D. Néraudeau, A. Nel, & V. Perrichot. 2011. Termite coprolites (Insecta: Isoptera) from the Cretaceous of western France: A palaeoecological insight. *Revue de Micropaléontologie* 54:129–139, DOI: 10.1016/j.revmic.2011.06.001.
- Engel, M. S. 2014. A termite (Isoptera) in Late Cretaceous amber from Vendée, northwestern France. *Paleontological Contributions* 10E:21–24.
- Engel, M. S., & V. Perrichot. 2014a. An earwig in Late Cretaceous Vendean amber (Dermaptera). *Paleontological Contributions* 10D:16–20.
- Engel, M. S., & V. Perrichot. 2014b. The extinct wasp family Serphitidae in Late Cretaceous Vendean amber (Hymenoptera). *Paleontological Contributions* 10J:46–51.
- Girard, V., G. Breton, V. Perrichot, M. Bilotte, J. Le Loeuff, A. Nel, M. Philippe, & F. Thévenard. 2013. The Cenomanian amber of Fourtou (Aude, Southern France): Taphonomy and palaeoecological implications. *Annales de Paléontologie* 99:301–315, DOI: 10.1016/j.annpal.2013.06.002.
- Kühne, W. G., L. Kubig, & T. Schlüter. 1973. Eine Micropterygide (Lepidoptera, Homoneura) aus mittelcretazischem Harz Nordwestfrankreichs. *Mitteilungen der Deutschen Entomologischen Gesellschaft* 32:61–64.
- Legrand, J., J.-M. Viaud, D. Pouit, & D. Pons. 2006. Upper Cretaceous woody structures and associated microfloral data from western France. 7th European Paleobotany-Palynology Conference, Prague, abstract volume p. 80.
- Nel, A., D. Néraudeau, V. Perrichot, V. Girard, & B. Gomez. 2008. A new dragonfly family from the Upper Cretaceous of France. *Acta Palaeontologica Polonica* 53:165–168, DOI: 10.4202/app.2008.0113.
- Nel, A., G. Fleck, G. Garcia, B. Gomez, P. Ferchaud, X. Valentin. 2015. New dragonflies from the lower Cenomanian of France enlighten the timing of the odonatan turnover at the Early – Late Cretaceous boundary. *Cretaceous Research* 52:118–126, DOI: 10.1016/j.cretres.2014.08.005.
- Néraudeau, D., V. Perrichot, Y. A. Nohra, A. Boura, J.-P. Colin, V. Daviero-Gomez, V. Girard, B. Gomez, L. Jeanneau, S. Saint Martin, J.-P. Saint Martin, A. R. Schmidt, R. Thomas, & F. Dupé. Late Cretaceous

- amber from Vendée (NW France): geology, paleontology, and chemical characteristics. In prep.
- Penney, D. 2014. A fossil ray spider (Araneae: Theridiosomatidae) in Late Cretaceous amber from Vendée, France. *Paleontological Contributions* 10B:5–8.
- Perrichot, V., & M. S. Engel. 2014. Youngest occurrence of the genus *Microphorites* (Diptera: Dolichopodidae): A new species in Late Cretaceous Vendean amber. *Paleontological Contributions* 10G:30–33.
- Perrichot, V., R. Garrouste, D. Azar, D. Néraudeau, & A. Nel. 2014. A new genus of dustywings (Neuroptera: Coniopterygidae) in Late Cretaceous Vendean amber. *Paleontological Contributions* 10F:25–29.
- Perrichot, V., & D. Néraudeau. 2009. Foreward. Cretaceous ambers from southwestern France: geology, taphonomy, and palaeontology. *Geodiversitas* 31:7–11, DOI: 10.5252/g2009n1a1.
- Perrichot, V., D. Néraudeau, A. Nel, & G. de Ploëg. 2007. A reassessment of the Cretaceous amber deposits from France and their palaeontological significance. *African Invertebrates* 48:213–227.
- 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.
- Saint Martin, J.-P., S. Saint Martin, S. Bolte, & D. Néraudeau. 2014. Spider web in Late Cretaceous French amber (Vendée): The contribution of 3D image microscopy. *Comptes Rendus Palevol* 13:463–472, DOI: 10.1016/j.crpv.2014.03.005.
- Saint Martin, S., J.-P. Saint Martin, A. R. Schmidt, V. Girard, D. Néraudeau, & V. Perrichot. 2015. The intriguing marine diatom genus *Corethron* in Late Cretaceous amber from Vendée (France). *Cretaceous Research* 52:64–72, DOI: 10.1016/j.cretres.2014.07.006.
- Schlüter, T. 1978. Zur Systematik und Palökologie harzkonserverter Arthropoda einer Taphozönose aus dem Cenomanium von NW-Frankreich. *Berliner Geowissenschaftliche Abhandlungen (A)* 9:1–150.
- Schlüter, T. 1983. A fossiliferous resin from the Cenomanian of the Paris and Aquitanian Basin of northwestern France. *Cretaceous Research* 4:265–269.
- Schmidt, A. R., S. Jancke, E. E. Lindquist, E. Ragazzi, G. Roghi, P. C. Nascimbene, K. Schmidt, T. Wappler, & D. A. Grimaldi. 2012. Arthropods in amber from the Triassic Period. *Proceedings of the National Academy of Sciences of the USA* 109:14796–14801, DOI: 10.1073/pnas.1208464109.
- Szwedo, J., & A. Nel. 2014. The Cretaceous insects: a promising state of the art. *Cretaceous Research*, in press, DOI: 10.1016/j.cretres.2014.07.008.
- Ters, M., & J.-M. Viaud. 1983. Challans. Notice de la carte géologique de la France à 1/50 000 n° 1125, B.R.G.M. éd., Orléans, 99 p.
- Vullo, R., D. Néraudeau, & E. Dépré. 2013. Vertebrate remains from the Cenomanian (Late Cretaceous) plant-bearing Lagerstätte of Puy-Puy (Charente-Maritime, France). *Cretaceous Research* 45:314–320, DOI: 10.1016/j.cretres.2013.06.002.
- Wang B., & J. Szwedo. 2014. Introduction to thematic issue, “Cretaceous insects: Diversity, palaeoecology and taphonomy”. *Cretaceous Research*, DOI: 10.1016/j.cretres.2014.07.007.

Class Order	Suborder/Family	Number of specimens
Crustacea		
Isopoda	indet.	28
Tanaidacea	Alavatanaidae	1
Diplopoda		
Polyxenida	Polyxenidae	1
Arachnida		
Acari	Mesostigmata	2
	Prostigmata	8
	‘Hydracarina’?	1
	indet.	17
Araneae	Theridiosomatidae*	1
	indet.	8
Opiliones	indet.	1
Entognatha		
Collembola	indet.	1
Insecta		
Blattaria	indet.	1
Coleoptera	Ptinidae	2
	indet.	2
Dermaptera	Neodermaptera*	1
Diptera	Cecidomyiidae	4
	Ceratopogonidae*	10
	Chironomidae	5
	Dolichopodidae*	1
	Anisopodidae	3
	indet.	9
Hemiptera	Eriococcidae	1
	Fulgoromorpha	2
	indet.	2
Hymenoptera	Crabronidae*	1
	Megaspilidae	1
	Mymaridae	4
	Mymarommatidae	5
	Platygastridae	8
	Serphitidae*	2
	indet.	3
Isoptera	‘Meiatermes-grade’*	1
Neuroptera	Berothidae	1
	Coniopterygidae*	1
Orthoptera	Grylloidea	1
Psocodea	Archaeatropidae*	3
	Amphientometae*	1
	Mesopsocidae*	2
	indet.	3
Thysanoptera	Merothripidae	1
	indet.	1
Indet.		14
Arthropoda	indet.	6
Total Arthropods		171

Table A1. Arthropod taxa recorded from Vendean amber (*denotes taxa described in the present volume)