



A new fossil species of oribatid mite, *Ametroproctus valeriae* sp. nov. (Acariformes, Oribatida, Ametroproctidae), from the Lower Cretaceous amber of San Just, Teruel Province, Spain

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ABSTRACT

A new fossil species of oribatid mite, *Ametroproctus valeriae* sp. nov., belonging to the family Ametroproctidae is described. The new species is preserved in a piece of amber from the San Just outcrop in Teruel Province, Spain, which is believed to be Albian in age. Comparison is made between the new species and extant species of the family.

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1. Introduction

Ametroproctus is a small genus described by Higgins and Woolley (1968) to include a new species, *A. oresbios*, found in several localities in the United States. The new genus was placed in the family Charassobatidae. Aoki and Fujikawa (1972) described a new genus and species, *Coropoculia reticulata*, from Japan and considered it as a mosaic taxon exhibiting both the characteristic features of the families Cymbaeremaeidae and Charassobatidae. They also recognized a species described by Schweizer (1956) from Switzerland, *Cymbaeremaeus lamellata*, as belonging to *Coropoculia*. Suzuki (1978) considered *Coropoculia* to be a junior synonym of *Ametroproctus*, retaining the genus in the Charassobatidae. Behan-Pelletier (1987) redescribed both genera considering *Coropoculia* as a subgenus of *Ametroproctus*. She placed the genus in the family Cymbaeremaeidae and described several new species from Canada, the United States, and the Russian Far East. Finally, Subías (2004) proposed a new family, Ametroproctidae (superfamily Cymbaeremaeoidea), to include the known species of *Ametroproctus* (s. str.) and *Ametroproctus* (*Coropoculia*). He also considered the genus *Scapuleremaeus* described by Behan-Pelletier (1989) from Canada as belonging to the new family.

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Here we describe the first fossil species belonging to the family Ametroproctidae. It is represented by a specimen preserved in a piece of amber from the San Just outcrop near the village of Utrillas, Teruel Province, Spain.

San Just amber was discovered very recently (Peñalver et al., 2007; Delclòs et al., 2007), and the number of specimens yielded up to now is few. Arthropods orders present as inclusions are: Acari, Araneae, Isoptera, Blattodea, Psocoptera, Homoptera, Thysanoptera, Diptera, Coleoptera, and Hymenoptera. Most of these fossils are still undescribed, and only some Diptera and a spider web with its prey have been described (Peñalver et al., 2006; Arillo et al., in press A).

Although this is the first fossil record of the family Ametroproctidae, two fossil species belonging to Cymbaeremaeidae were already known: *Jureremus foveolatus* Krivolutsky, 1977 described from the Upper Jurassic of Bureya River basin, Russia (Krivolutsky and Krassilov, 1977) and *Jureremus phippii* Selden et al., 2008 described from the Jurassic of the Oxford Clay, United Kingdom (Selden et al., 2008).

Fossil oribatids have been described in Lower Cretaceous Spanish amber from Álava Province (outcrops Peñacerrada I and II, and Salinillas de Buradón) probably contemporaneous with San Just amber. Three new species have been described from this amber: *Archaeorchestes minguezae* (Zetorchestoidea, Archaeorchestidae), *Eupterotegaeus bitranslamellatus*, and *Ommatocephus nortoni* (Cepheoidea, Cepheidae) (Arillo and Subías 2000, 2002; Arillo et al., in press B). Co-occurrence of ceratopogonid species in

both ambers is known and the same will probably occur with oribatid fauna when additional material becomes available (Arillo et al., in press A).

2. Material and methods

The specimen was found in 2007 during an excavation of the Utrillas-Escucha area, at the site called San Just. The main outcrops of amber of the Utrillas-Escucha area are located in the northern margin of the Aliaga sub-basin. The amber with insect inclusions was found in grey-black claystone with abundant plant remains in the La Orden Member of the Escucha Formation (Albian) (Peñalver et al., 2007), which represents fluvial delta plains (Querol et al., 1992).

The specimen is very well preserved, barely distorted, although left leg I is lost. It was embedded in epoxy resin to permit optimal study, as described in Corral et al. (1999).

3. Systematic paleontology

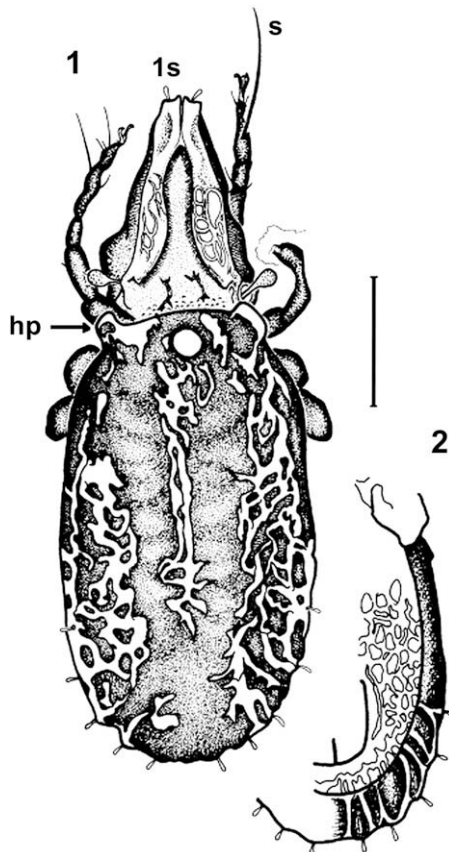
Family: Ametroproctidae Subías, 2004

Genus: *Ametroproctus* Higgins and Woolley, 1968

Ametroproctus valeriae sp. nov.
(Figs. 1–3)

Derivation of name. After our colleague and renowned acarologist Valerie Behan-Pelletier (Ottawa, Ontario, Canada).

Holotype: CPT-3341 housed in the Fundación Conjunto Paleontológico de Teruel-Dinópolis, Teruel Province, Spain. Quite



Figs. 1–2. *Ametroproctus valeriae* sp. nov. Holotype CPT-3341. (1) Dorsal view (2) Ventral view. *ls* lamellar seta; *s* solenidium; *hp* humeral projection. Scale bar 100 μ m.



Fig. 3. *Ametroproctus valeriae* sp. nov. Microphotography. Holotype CPT-3341. Dorsal view. Scale bar 100 μ m.

complete specimen present in a transparent, clear piece of amber of 3×2 mm into an epoxy resin preparation of $21 \times 15 \times 1$ mm.

Type locality and Stratigraphy: Specimen collected in San Just outcrop, in the municipality of Utrillas, near the village of Escucha, Teruel Province, Spain. Escucha Formation (La Orden Member), Lower Cretaceous (lower-middle Albian).

Description: Measurement: 510 μ m long and 195 μ m wide.

Integument: The body is well sclerotized, dark reddish brown. Prodorsum (Fig. 1): Well developed lamellae with reticulate integument. Lamellar setae short and somewhat flattened. Lamellar cuspis with a small tooth on each edge. Prodorsal surface foveolate at the interlamella region with two parallel costulae. Sensillus with a short stalk, head clavate and barbed. Rostral, interlamellar, and exobothridial setae not visible. Notogaster (Fig. 1): Dorsosejugal suture complete. Elongated and flattened with lobe-shaped humeral projections and a well developed lenticulus. The posterior margin falls steeply and ends in a forward-directed projection so it is clearly visible in ventral view (Fig. 2). Irregular sculptured surface arranged in three rows. All the integument is densely micro-foveolate. Five pairs of notogastral setae in the posterior margin of the body are well preserved being short and somewhat flattened. Ventral side (Fig. 2): Poorly visible due to the presence of a desiccation veil inside the amber piece, but the shape of anal and genital valves agrees with that of the species belonging to the family. Legs: All legs tridactylous heterodactylous, being the median claw thicker and shorter. Leg chaetotaxy only partially preserved, with well developed solenidia on right tibia I and on the tibia and tarsus of left leg II.

Remarks: The new species is differentiated from the other species of *Ametroproctus* by the very elongated shape of the body (less than 200 μ m wide), by the presence of a well defined notogastral lenticulus, and by the shape of the posterior margin of the notogaster. As the number of genital setae is not visible it is difficult to decide if it is more closely related to *Ametroproctus* (*s. str.*) with four pairs of genital setae or to *Ametroproctus* (*Coropoculia*) with six

pairs of genital setae. The new species seems more likely related with the subgenus *Coropoculia* because of the presence of humeral projections, the flattened notogaster and the complete dorsosejugal suture. Although species belonging to the subgenus *Ametroproctus* lack a lenticulus, several species have a clear spot in the same position and probably represents a homologue structures (the presence of lenticulus is also a labile evolutionary feature among Cymberemaeidae). So as the configuration of genital setae is still unknown, the assignation to either of two subgenera is not possible with confidence.

The genus *Ametroproctus* has a Holarctic distribution (as extant relatives of the fossil species described from Álava amber: *Archaeorchestes minguezae*, *Eupterotegaeus bitranslamellatus* and *Ommatocephus nortoni*). To date, seven extant species of *Ametroproctus* have been described: (1) *Ametroproctus (Ametroproctus) aridus* Behan-Pelletier, 1987, USA (Oregon); (2) *Ametroproctus (Ametroproctus) oresbios* Higgins and Woolley, 1968, Canada and USA; (3) *Ametroproctus (Ametroproctus) tuberculosus* Behan-Pelletier, 1987, Canada (Alberta); (4) *Ametroproctus (Coropoculia) beringianus* Behan-Pelletier, 1987, Canada (Yukon) and Russian Far East; (5) *Ametroproctus (Coropoculia) canningsi* Behan-Pelletier, 1987, Canada (British Columbia and Alberta); (6) *Ametroproctus (Coropoculia) lamellatus* (Schweizer, 1956), Switzerland; and (7) *Ametroproctus (Coropoculia) reticulatus* (Aoki and Fujikawa, 1972), Japan, Canada, and USA.

Little is known about biology of extant species of Ametroproctidae; they are sampled on dry environments and they have usually a high altitude distribution. The fossil species probably lived over tree bark as the highly sclerotized integument, the shape of the sensillus, and the presence of a lenticulus suggests.

Extant species of Ametroproctidae are quite uncommon, and probably they were also rare in the past. For example, the family is not recorded from the very common and fossiliferous Baltic amber, which was produced in a temperate coniferous forest where the family could have been expected. Therefore, few paleogeographic inferences could be obtained with only this single Cretaceous record.

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