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# A New Genus and Species of Oribatid Mite, *Cretaceobodes martinezae* gen. et sp. nov., from the Lower Cretaceous Amber of San Just (Teruel Province, Spain) (Acariformes, Oribatida, Otocepheidae)

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**Abstract**—A new fossil genus and species of oribatid mite, *Cretaceobodes martinezae* gen. et sp. nov., belonging to the family Otocepheidae is described. The new species is preserved in a piece of amber from the San Just outcrop (Teruel Province, Spain), which is believed to be Albian in age. The new genus is compared with the extant genus *Carabocepheus* Berlese, 1910 and its relationships with the superfamilies Otocepheoidea and Carabodoidea are discussed. Carabocepheidae is regarded as a junior synonym of Otocepheidae. Ranking *Carabocepheus lounsbury latior* Balogh et Mahunka, 1966 as a separate species is proposed.

*Key words*: Oribatida, Otocepheidae, mites, new taxa, Lower Cretaceous amber; Albian, San Just, Spain.

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## INTRODUCTION

*Carabocepheus* is a rare South African genus described by Berlese (1910) as a subgenus of *Carabodes*. The type species *Carabocepheus lounsburyi* Berlese, 1910 was found close to the Cape of Good Hope (South Africa) and, later, Balogh and Mahunka (1966) studied a sample from Grahamstown, (Cape Province, South Africa) and proposed a new subspecies, *Carabocepheus lounsbury latior*. Mahunka (1986) redescribed the type species and suggested a closer relation to the superfamily Otocepheoidea than to carabodoids. In his paper, Mahunka described a new family, Carabocepheidae, to include this genus. Later, Subías (2004) included it again among Carabodoidea.

Below we describe the first fossil genus and species of the family Otocepheidae closely related to *Carabocepheus*. It is represented by a specimen preserved in a piece of amber from 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 scarce. Arthropod orders present as bioinclusions are: Acari, Araneae, Isoptera, Blattodea, Psocoptera, Homoptera, Thysanoptera, Diptera, Coleoptera, Neuroptera, and Hymenoptera, but only some of these fossils are published.

One species of oribatid mite, *Ametroproctus valeriae* (Cymbaeremaeoidea, Ametroproctidae), was previously described from this outcrop (Arillo et al. 2009) and three more taxa were described from, probably, contemporaneous Álava amber: *Archaeorchestes minguezae* (Zetorchestoidea, Archaeorchestidae), *Eupterotegaeus bitranslamellatus*, and *Ommatocepheus nortoni* (Cepheoidea, Cepheidae) (Arillo and Subías 2000, 2002; Arillo et al. 2008b). Co-ocurrence of ceratopogonid species in both ambers is known, hence, the same will probably occur with the oribatid mites fauna when further material is available (Arillo et al. 2008a).

## MATERIAL AND METHODS

The specimen examined was found in 2007 during an excavation of the Utrillas-Escucha area, at the site called San Just. The amber with insect inclusions was found in gray-black claystones with abundant plant remains in the La Orden Member (Escucha Formation, Albian) (Peñalver et al. 2007).

The specimen is very well preserved, although distorted. The ventral side is not visible due to the high

turbidity of the amber. It was necessary trimming the dorsal side up to reaching the cuticle to allow a correct vision, so probably some dorsal setae of the notogaster could have been lost. The fossil was embedded in epoxy resin (EPO-TEK 301) to permit optimal study, as described by Corral et al. (1999).

Camera lucida drawings were made using a drawing tube Olympus U-DA attached to a microscope Olympus BX50. Photomicrography used a digital camera attached to a microscope Olympus BX50.

The holotype is housed in the Fundación Conjunto Paleontológico de Teruel-Dinópolis (Teruel Province, Spain).

## SYSTEMATIC PALAEONTOLOGY

### Family Otocepheidae Balogh, 1961

### Genus *Cretaceobodes* Arillo, Subías et Shtanchaeva, gen. nov.

Type species. *Cretaceobodes martinezae* sp. nov.

Etymology. From the Cretaceous and the generic name *Carabodes*.

Diagnosis. Narrow lamellae running marginally and almost reaching rostral edge. Sensilla smooth. Interlamellar area triangular. Probably ten pairs of notogastral setae.

Species composition. Type species.

Comparison. The new genus differs from *Carabocepheus* in the presence of probably only ten pairs of notogastral setae (*Carabocepheus* has 14); distinctly narrower lamellae; the clavate trichobothria, with smooth heads (in the trichobothria of *Carabocepheus*, the head is small and covered with thorns), and the smaller size (less than 600 μm), whereas *Carabocepheus* is much larger (780–1450 μm).

#### *Cretaceobodes martinezae* Arillo, Subías et Shtanchaeva, sp. nov.

Etymology. After our colleague myrmecologist Dr. Maria Dolores (Lola) Martínez.

Holotype. CPT-SJ07-05, housed in the Fundación Conjunto Paleontológico de Teruel-Dinópolis (Teruel Province, Spain); complete specimen present in a clear but quite turbid piece of amber of $1.7 \times 0.8$ mm in an epoxy resin preparation of $22 \times 16 \times 1$ mm; Spain, Teruel Province, municipality of Utrillas, near the village of Escucha, San Just locality; Lower Cretaceous, Lower–Middle Albian, Escucha Formation, La Orden Member.

Description (Fig. 1). The integument of the body is well sclerotized, dark reddish brown.

Prodorsum. The prodorsal surface is foveolated. The rostral margin is broad and slightly flexed down. The rostral setae are thin and smooth. The lamellae are narrow, well developed, running marginally, almost reaching the rostral edge. The lamellar setae are short (or broken?), arising on the cuspis of the lamellae. The interlamellar area is triangular, with two slightly convex areas on each side connecting the lamellae with the bothridia. Condyles are absent. Interlamellar setae are not preserved, but alveoli seem to be on these protuding areas. The sensillus has a short stalk, the head is clavate and smooth. The exobothridial setae are not visible.

Notogaster (Fig. 1). The dorsosejugal suture is complete and straight medially, with two triangular humeral projections. Condyles are absent. The entire integument is densely foveolate. Eight pairs of notogastral setae are present; however, due to the trimming process, a pair of dorsal setae (*lm* and *lp*) could have been lost and it most likely has a usual notogastral formula with ten pairs of setae ($c_2$ and a series of *l*, *h*, and *p*). All the notogastral setae are long and smooth with pair $c_2$ positioned on the humeral projections.

The ventral side is not visible because of the turbidity of the amber.

Legs. Only left Leg I is visible, it is monodactylous and probably with two tibial solenidia. The tarsus is very short.

Remarks. Mahunka (1986) erected the family Carabocepheidae without a diagnosis to include the genus *Carabocepheus* and proposed to include the new family among Otocepheoidea. In fact, *Carabocepheus* is closely related to Otocepheidae due to the presence of lamellar costulae (not true lamellae) and very short tarsi. However, other features that Mahunka proposed to differentiate *Carabocepheus* from other otocepheids (sensillum, notogastral condyles, and lamelliform expansion) vary widely among otocepheids and are not useful at all for the diagnosis. Therefore, we propose to consider Carabocepheidae as a junior synonym of Otocepheidae and to include *Carabocepheus* in the family Otocepheidae. In fact, after the redescription of the type species *Carabocepheus lounsbury* by Mahunka (1986), it is evident that this species lacks notogastral condyles. Taking into account that the other subspecies *Carabocepheus lounsbury latior* actually has notogastral condyles, it seems reasonable to consider it as a separate species, *Carabocepheus latior* Balogh et Mahunka, 1966 stat. nov.

To date, the oldest fossils belonging to Carabodoidea and Otocepheoidea come from Baltic amber and no Mesozoic record of any of these superfamilies has previously been known. As Carabodoidea and Otocepheoidea are probably sister groups, it is expected to find also Carabodoidea in Mesozoic ambers.

Measurements, μm. Body length, 570; body width, 270.

Material. Holotype.

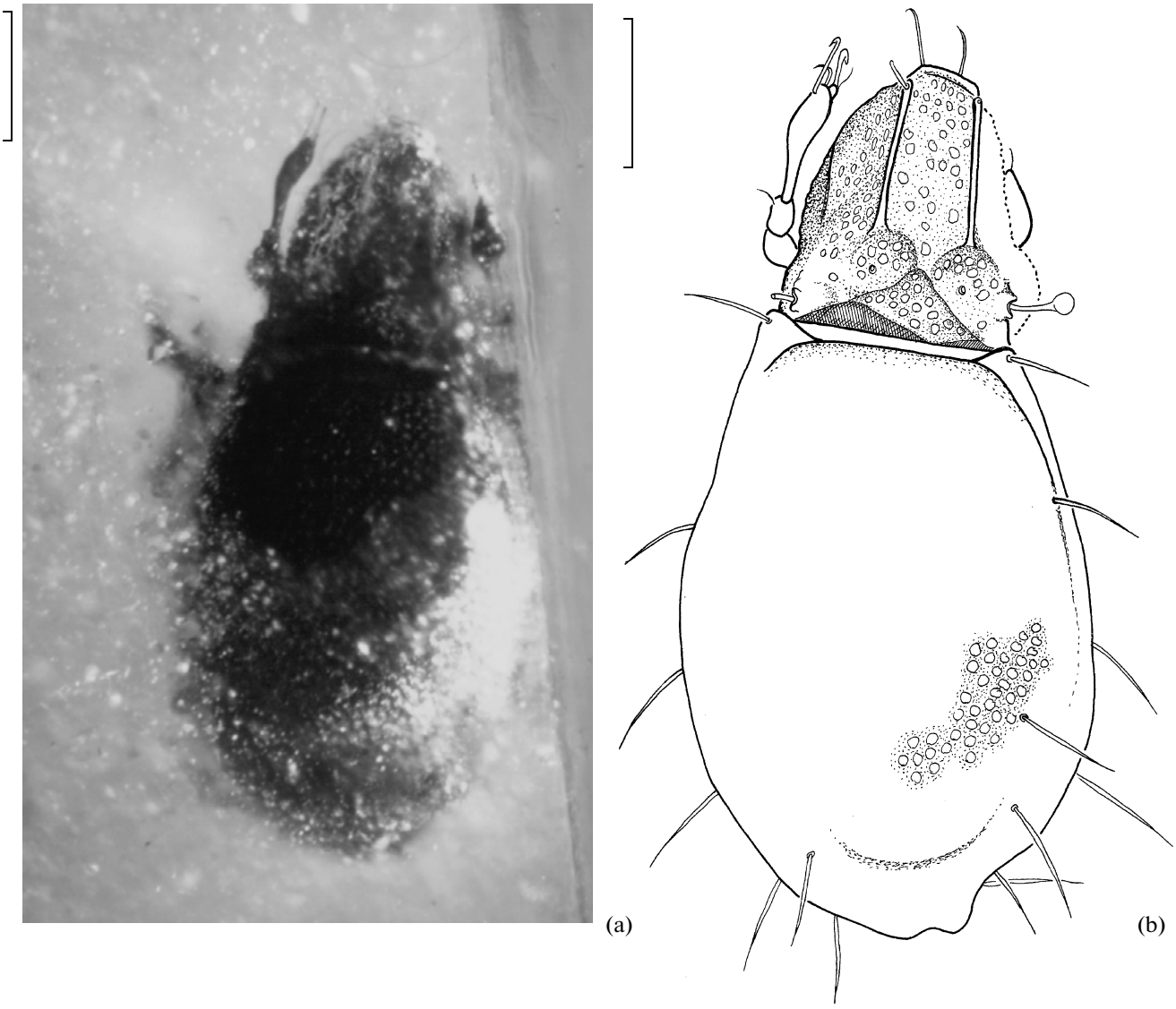


**Fig. 1.** *Cretaceobodes martinezae* gen. et sp. nov., holotype CPT-SJ07-05, dorsal view: (a) general appearance and (b) structural details. Scale bar, 100 μm.

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