

## **A new fossil oribatid mite, *Ommatocephus nortoni* sp. nov. (Acariformes, Oribatida, Cepheidae), from a new outcrop of Lower Cretaceous Álava amber (northern Spain)**

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### **Abstract**

A new species of fossil oribatid mite, *Ommatocephus nortoni* sp. nov. (Acariformes, Oribatida), is described from the Spanish Lower Cretaceous. The fossil is preserved in amber found in a new outcrop near Salinillas de Buradón (Province of Álava, northern Spain). It represents the first bioinclusion found at this locality and the third oribatid species described from Spanish Cretaceous amber.

**Key words:** Mites, Oribatida, Cepheidae, Lower Cretaceous amber, Álava, new outcrop

### **Introduction**

The Lower Cretaceous amber in the province of Álava (northern Spain) has been known from two outcrops near Peñacerrada. The deposit belongs to the Escucha Formation and is believed to be of Albian age (c. 112–99 Mya) (Delclòs *et al.* 2007). The geochemistry of the amber suggests that it originated from the sap of an araucariacean tree, probably within the genus *Agathis* (kauri pines). This amber shows an impressive diversity, being present in 10% of the material obtained from recent excavations. Among the 2300 fossil arthropods collected are three oribatid mites belonging to two species: *Archaeorchestes minguezae* (Zetorchestoidea, Archaeorchestidae) and *Eupterotegaeus bitranslamellatus* (Cepheoidea, Cepheidae) (Arillo & Subías 2000, 2002). Very recently a third outcrop was discovered on one side of motorway N-124, close to the town of Salinillas de Buradón (around 10 km west of Peñacerrada). Only preliminary study has been done, but the amber is believed to be contemporaneous with Peñacerrada amber. The oribatid mite described below is the first bioinclusion found in it.

### **Materials and methods**

The piece of amber (2.7 x 1.1 x 0.7 mm) was embedded in artificial resin Epotek 301 prior to trimming and polishing to a piece sized 12 x 7 x 1 mm, as described by Corral *et al.* (1999). The specimen is generally well preserved although heavily distorted. Part of the setation is not preserved and left leg II and the left sensillus are lost. The ventral side is poorly visible due to turbidity in the amber. The fossil was examined using an Olympus BX50 microscope and the drawing was made with the aid of a camera lucida.

## Systematic paleontology

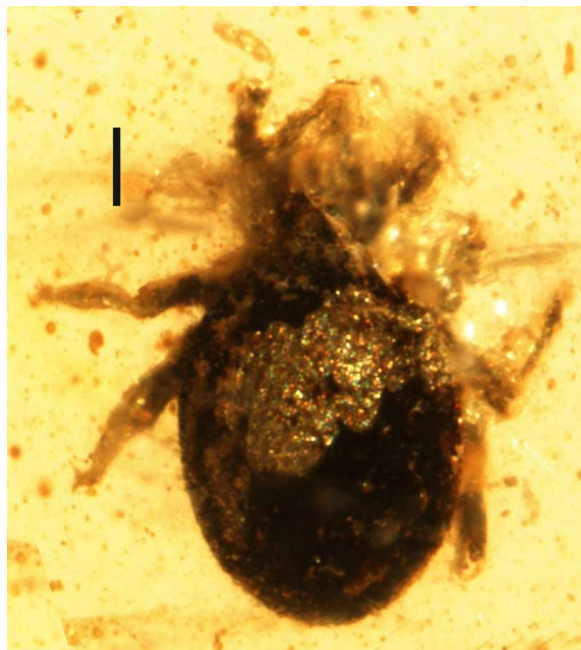
### Family Cepheidae Berlese, 1896

### Genus *Ommatocephus* Berlese, 1913

### *Ommatocephus nortoni* sp. nov. (Figs. 1–2)

*Holotype*. MCNA-13348 preserved in a piece of Spanish Lower Cretaceous (Albian) amber from Salinillas de Buradón outcrop (Álava province) and housed in the Álava Museum of Natural Sciences, Vitoria-Gasteiz (Álava, Spain).

*Etymology*. Named after our colleague and renowned acarologist Roy A. Norton (Syracuse, New York, USA).



**FIGURE 1.** *Ommatocephus nortoni* sp. nov. Holotype MCNA-13348. Photomicrograph of specimen in amber, dorsal view. Scale bar 100  $\mu$ m.

*Measurements*. 650  $\mu$ m long, 353  $\mu$ m wide.

*Integument*. The body is well sclerotized, reddish brown.

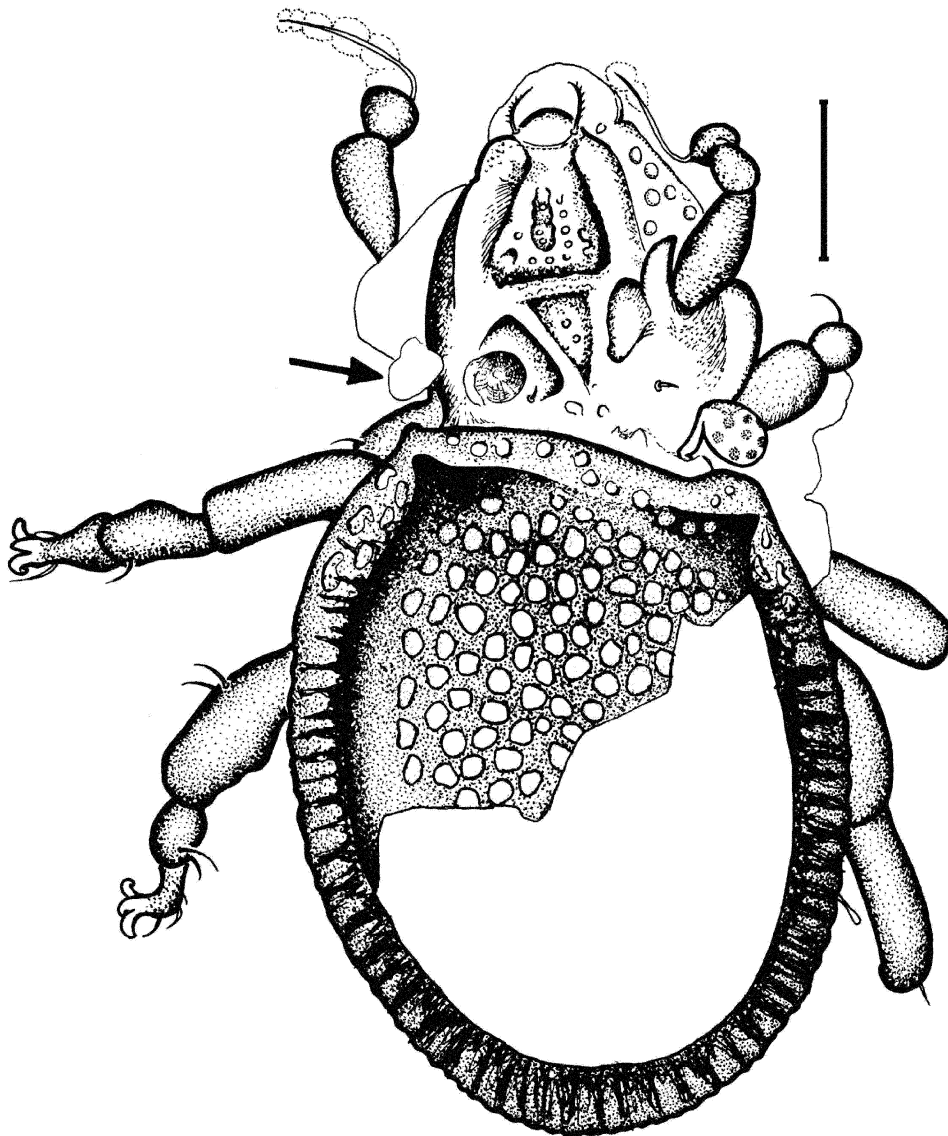
*Prodorsum*. The rostrum is rounded. The rostral setae are separated, arched and slightly barbed. The lamellae are of nearly equal width throughout, overlying the lateral margins of the prodorsum, and with rounded cusps lacking expanded sickle-shaped structures. The lamellar setae are not preserved, although one alveolus on the left lamella is visible. One translamellar structure is present, extending between the lamellae at the mid-level of the prodorsum. This translamella, together with the lamellae, delineates a triangular-shaped concavity in the distal half of the prodorsum. This concavity is slightly foveolated and a small central depression is present. A second triangular concavity is defined in the basal half of the prodorsum by the translamella and two ridges converging towards the base of the prodorsum. This second concavity is also slightly foveolated. The interlamellar setae are short and, although difficult to see, seem smooth. Due to the taphonomic process, the cuticular cap enclosing each bothridium is broken, so the sensilli are out of position. The

left sensillus is lost, with its bothridial cap preserved close to the body (Fig. 2, arrow). The deep left bothridial cavity is visible. The right sensillus, although displaced from its bothridium, is preserved. It has a short pedicel and large, spherical head, spotted rather than uniformly pigmented. Exobothridial setae are not visible (probably not preserved).

*Notogaster*. Round, with a truncate dorsosejugal suture and small shoulder-like projections on the anterolateral margins. The central field of the notogaster is foveolate. A submarginal, circumferential line delineates a marginal region with radiating ridges. Only one notogastral seta is preserved, in the right margin of the body, being short and somewhat flattened.

*Ventral surface*. Difficult to see due to the presence of turbidity and small fractures. The anal and genital plates are large and close together, as is common in this genus.

*Legs*. All preserved except left leg II. All are homotridactylous, with stout claws. Some leg setae are preserved, especially two long solenidia on tarsi I.



**FIGURE 2.** *Ommatocephus nortoni* sp. nov. Holotype MCNA-13348. Dorsal view. Scale bar 100  $\mu$ m.

## Discussion

Collectively, members of *Ommatocepheus* have a Holarctic and Macaronesian distribution. Five extant species (and one subspecies) are currently known (Subías 2004):

*O. ocellatus* (Michael, 1882). Palearctic.

*O. clavatus* Woolley & Higgins, 1964. USA.

*O. clavatus japonicus* Aoki, 1974. Japan and Kuril Islands.

*O. crassisetosus* Pérez-Íñigo & Peña, 1996. Fuerteventura, Canary Islands.

*O. parvilamellatus* Pérez-Íñigo & Pérez-Íñigo jr., 1996. Azorean Islands.

*O. reticulatus* Pérez-Íñigo & Peña, 1997. Gran Canaria, Canary Islands.

The new species differs from all extant species by having a well-developed translamellar costula and probably also by the absence of a well-developed internal tooth on the lamellar cuspis (none discernable in the fossil). It also differs from *O. ocellatus*, *O. clavatus* and *O. crassisetosus* by the shape of the lamellae (being more separated and more nearly parallel) and by its more densely foveolated notogaster (with smaller foveolae). *Ommatocepheus nortoni* **sp. nov.** differs from *O. reticulatus* by having wider lamellae and lacking the notogastral reticulation. The most similar extant species is *O. parvilamellatus*, but it bears a very small internal tooth on each lamellar cuspis and its notogastral foveolae are bigger.

Living species of *Ommatocepheus* are usually found on tree bark, and probably the fossil species had a similar behaviour as bark species are more likely to be trapped in fresh resin and thus preserved in amber.

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## References

- Arillo, A. & Subías, L.S. (2000) A new fossil oribatid mite, *Archaeorchestes minguezae* gen. nov., sp. nov. from the Spanish Lower Cretaceous amber. Description of a new family, Archaeorchestidae (Acariformes, Oribatida, Zetorchestoidea). *Mitteilungen aus dem Geologisch-Paläontologischen Institut der Universität Hamburg*, 84, 231–236.
- Arillo, A. & Subías, L.S. (2002) Second fossil oribatid mite from the Spanish Lower Cretaceous amber. *Eupterotegaeus bitranslamellatus* n. sp. (Acariformes, Oribatida, Cepheidae). *Acarologia*, 42(4), 403–406.
- Corral, J.C., López del Valle, R. & Alonso, J. (1999) El ámbar cretácico de Álava (Cuenca Vasco-Cantábrica, Norte de España): su colecta y preparación. *Estudios del Museo de Ciencias Naturales de Álava*, 14, 7–21.
- Delclòs, X., Arillo, A., Peñalver, E., Barrón, E., Soriano, C., López del Valle, R., Bernárdez, E., Corral, C. & Ortuño, V.M. (2007) Fossiliferous amber deposits from the Cretaceous (Albian) of Spain. *Comptes Rendus – Palevol*, 6, 135–149.
- Subías, L.S. (2004) Listado sistemático, sinónimo y biogeográfico de los ácaros oribátidos (Acariformes, Oribatida) del mundo (1758-2002). *Graellsia*, 60 (número extraordinario), 3–305.

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