THREE NEW TANAID SPECIES (CRUSTACEA, PERACARIDA, TANAIDACEA) FROM THE LOWER CRETACEOUS ÁLAVA AMBER IN NORTHERN SPAIN

RONALD VONK1 AND FREDERICK R. SCHRAM2

1Zoological Museum Amsterdam, Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, Mauritskade 57, 1092 AD Amsterdam, The Netherlands, <vonk@science.uva.nl> 2Burke Museum, University of Washington, Seattle, <fschram@u.washington.edu>

INTRODUCTION

MARINE CRUSTACEANS were not known as inclusions in amber from upper Aptian–middle Albian deposits in Northern Spain. The publication of a photograph of a purported fossil amphipod (Alonso et al., 2000) among many other arthropods promised to be of high interest because the fossil record of the amphipods does not extend further than Upper Eocene (Schram, 1986; Coleman and Myers, 2000). The Museum of Natural Sciences of Álava in Vitoria-Gasteiz (AMNS), northern Spain, kindly sent us the material with the presumed amphipods, as our intention was to investigate its affinities to other fossil amphipods. The fossil crustaceans of this assemblage were found among 15 orders of insects, spiders, and mites—i.e., mainly terrestrial arthropods.

Upon close investigation, however, we learned that the samples contained not amphipods but tanaids. This means that the fossil age of amphipods remains unchanged for the moment and other questions emerge, such as: how can a common looking, marine, subtidal tanaid end up in a 100–120 my piece of amber from a sedimentary environment in northern Spain? And how does it relate to the numerous insects and plant pollen enclosed in other pieces of amber from the same site?

The sedimentary environment in the south of the Basque-Cantabrian Basin around Álava in Lower Cretaceous times was marked with distributary channels, crevasse splays, and interdistributary bays, evolving towards an open marine platform (Alonso et al., 2000; Portero and Ramirez del Pozo, 1979, personal commun. V. Pujalte). Where waters became stagnant in this environment and could no longer carry large particles in suspension, amber lumps of nearby forests were deposited. Flooding of the delta occurred from both marine incursions, as indicated by the presence of silt and dinoflagellate cysts in a coastal area, and fluvial influxes. It is under these floodplain conditions that tanaids, probably present in their typical interstitial and endobenthic microhabitats from which they occasionally crawl out, apparently became enclosed in Araucariceae tree resin. The amber taphonomy includes a process in which a bolus of resin falls from tree branches directly into water or following erosion of the soil, as illustrated in a resin fossil diagenesis diagram by Martínez-Delclòs et al., 2004.

We recognize three new species belonging to two new genera, and one new family, and we summarize the fossil record of the Tanaidae.

SYSTEMATIC PALEONTOLOGY

Class MALACOSTRACA Latreille, 1802
Order TANAIDACEA Hansen, 1895
Suborder TANAIDOMORPHA Sieg, 1980
Family ALAVATANAIDAE new family

Type genus—Alavatanais new genus.

Diagnosis.—Small tanaidaceans (up to 2.5 mm); eyes present, not prominent. Ischium present in first pereiopod but lacking in subsequent pereiopods. Pleotelson from short and rounded to elongate and ending abruptly. Uropods of variable segmentation, from one to two segmented exopods and two to three segmented endopods, to three segmented uniramous uropods.

Genus ALAVATANAIS new genus

Type species.—Alavatanais carabe new species.

Diagnosis.—Genus of Alavatainidae with pleotelson short.

Etymology.—Genus is named after the Álava region where the fossils were found.

ALAVATANAIS CARABE new species

Figures 1.1, 1.2, 1.5, 1.7, 2.1–2.6

Diagnosis.—Body medium-sized, 1.7–2.0 mm. Head shield triangular in dorsal view (Fig. 2.3), eyes present, slightly bulging, implanted antero-lateral on cephalothorax. First pereiopod with ischium and long dactylus, other pereiopods apparently lacking an ischium. Pleopods with long setae on exopod.

Description.—Body cylindrical. Cephalothorax longer than first three pereiopods taken together. Pereonites 1 to 3 narrow but increasing in length successively; pereonites 4 to 6 broader, of equal size. Pleon with pleonites 1 to 5 of similar size. Pleotelson broadly rounded. Uropods not observed. Antennule (Fig. 2.5) with first article twice as long as second and third article in a total of seven articles. In another instance (Fig. 2.2), second article much longer than first and third article in a total of five articles. Antenna and eyes not observable. Maxilliped (Fig. 2.1) with three palp articles and basis. Cheliped (Fig. 2.1, 2.2) with triangular sclerite, propodus medium-sized. Pereiopod 1 (Fig. 1.1, 2.1) with small but distinct coxa. Basis long and slender. Ischium small. Merus longer than carpus. Carpus with two distal setae. Propodus longer than carpus with four apical setae. Dactylus curved and long. Pereiopod 2 to 5 not visible. Sixth pereiopod (Fig. 2.6) without ischium, sturdy form, no setae or spines. Pleopods (5) bundled together in a pointed process sticking out from under the pleon (Figs. 1.1, 2.1, 2.4).

Etymology.—The suffix carabe is the Basque word for amber lumps, so named by the miners of the jet works in the area.

Types.—Holotype 1.7 mm, AMNS 9537, paratype 2.0 mm, AMNS 9088.

Occurrence.—Alavatanais carabe is found in the amber that is found in black shales and sandstones of the Nogroaro Formation at the Peñacerrada I and II sites (Sierra de Cantabria, Álava), approximately 30 km south of the city of Vitoria-Gasteiz near the village of Peñacerrada.

Discussion.—Alavatanais carabe is represented in the material available to us by two specimens. The holotype, AMNS 9537, has a complete and clear outline of all body segments due to a blackening of the cuticle for unknown reasons. A modest transparency could be achieved by beaming a strong light on the antennules, highlighting the long second article and also, curiously, a copepod-like individual caught at the tip of the antennule (Fig. 1.5). Other well-preserved features are the pleopods (Fig. 1.7), pressed flatly against the pleon, showing rows of setae on the lower margins of the endopods. Towards the middle these setae form a pointed, ventrally diverted bundle, although a pleural origin cannot be discarded, and especially the last pleopod seems to have more than just setae sticking upwards from under the pleon (Fig. 2.4). In all tanaid fossil remains in the Álava amber, these pleopods form a bundle. This behavior has been observed in live specimens of Leptocheilia cf. dubia (Krayner, 1842) from the Amsterdam Artis Zoo Aquarium. When individuals are at rest, clinging to a piece of shell or seaweed, or trying to hide between coarse sand grains, the pleopods hold still, forming a small triangle under the body. As the animals start moving, the pleopods are set to wave in a coordinated fashion. The bundle resembles very much the process seen in the fossils. The paratype AMNS