JOURNAL OF CRUSTACEAN BIOLOGY, 30(3): 413-416, 2010

ONE MORE FOSSIL NIPHARGID (MALACOSTRACA: AMPHIPODA) FROM BALTIC AMBER

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ABSTRACT

Niphargus cf. *groehni* is described from a piece of Eocene Baltic amber. This is the third case when a fossil niphargid amphipod has been discovered. Morphological peculiarities of this specimen and its affinities with other niphargids are discussed.

KEY WORDS: Amphipoda, Baltic amber, *Niphargus*

DOI: 10.1651/09-3259.1

INTRODUCTION

Fossil remnants of amphipod crustaceans are rarely recorded and described. Bousfield (1982) and Bousfield and Poinar (1994) suggested that the beginnings of the order Amphipoda should be dated back to the Carboniferous. Alonso et al. (2000) illustrated a possibly really old fossil record for an amphipod from the lower Cretaceous period. However, Vonk and Schram (2007) demonstrated that these inclusions in amber from the Aptian/Albian deposits are in fact the remnants of Tanaidacea, and not of Amphipoda. The majority of true fossil amphipod records are those from Eocene-Oligocene times and come from the pieces of amber of around 30-50 My in age. Altogether, in various Tertiary deposits, and inevitably in amber, nearly 30 amphipod taxa have been described (Hurley, 1973; Karaman, 1984; Mukai and Takeda, 1987; Bousfield and Poinar, 1994, 1995; Karasawa, 1997; Coleman and Myers, 2001; Jażdżewski and Kulicka, 2000a, b, 2002; Coleman and Ruffo, 2002; Weitschat et al., 2003; Coleman, 2004, 2006). It is quite interesting that all specimens of Amphipoda in amber, except for two representatives of terrestrial talitroids (Bousfield and Poinar, 1994, 1995), are of entirely aquatic members of the families Crangonyctidae (Zaddach, 1864; Lucks, 1928; Just, 1974; Coleman and Myers, 2001; Jażdżewski and Kulicka, 2000a, b, 2002; Coleman, 2004, 2006) and Niphargidae (Coleman and Myers, 2001; Coleman and Ruffo, 2002). The present note adds a further niphargid amphipod to this list.

MATERIAL AND METHODS

Our fossil amphipod was discovered in a piece of Eocene Baltic amber by the second author and was purchased by the Museum of the Earth, Polish Academy of Sciences. This piece comes probably from the Sambian (Samland) Peninsula on the Baltic Sea, but the precise locality is unknown. The age of the piece is approximately 45 My (Late Eocene). This amber fragment at present is a transparent, yellow triangular piece, some $21 \times 12 \times 10$ mm in dimensions. The piece has been polished so that the surfaces are more or less parallel to the animal's body. Drawings and photos were done using a stereomicroscope NIKON SMZ 800 according to the method described by Coleman (2003).

The total length of the specimen was measured from the anterior head margin to the end of urosome.

SYSTEMATICS

Order Amphipoda Latreille, 1803
Suborder Gammaridea Latreille, 1803
Niphargidae Karaman, 1962
Niphargus cf. *groehni*
(Figs. 1A-D)

Material.—MZ 24278, Museum of the Earth, Polish Academy of Sciences.

Description.—Head a bit longer than the first pereiomere, lateral head lobe not very prominent, rounded. Pereional segments 1-4 of more or less equal length, coxal plates comparatively large, more or less of the same depth as their pereionites (Fig. 1B). First coxal plate distally widened with anteriorly produced lobe, hind margin of coxal plates 2-4 slightly concave and plates are postero-distally produced in small rounded lobes. Coxal plate 5 ventrally incised.

Metasome and urosome segments naked, or at most with single setules; at least one setule visible on urosomites 1 and 2 dorsally near posterior margins. Third epimeral plate widely rounded postero-distally, with 2 setules on anterior part of its ventral margin (Figs. 1D, 2H).

Uropods 1 and 2 with protopod and branches more or less of equal length; protopods with several groups of spiniform setae along hind margins, with 3-4 such setae apically; exo- and endopods also with 3-4 apical spiniform setae (Figs. 1D, 2H).

Telson (clearly visible only from its lower side) cleft to at least ¾ of its length, with 3 apical spiniform setae on each widely rounded lobe (Fig. 2I).

Mouthparts not visible. Gnathopods barely visible except for propodus and dactylus of G2 (Figs. 1C, 2A); propodus distally very wide, armed with numerous long setae along posterior and palmar margins.

Pereiopods 3 and 4 with visible distal elements (Fig. 1A). Merus oval-shaped, hind margin with 2-3 setae;

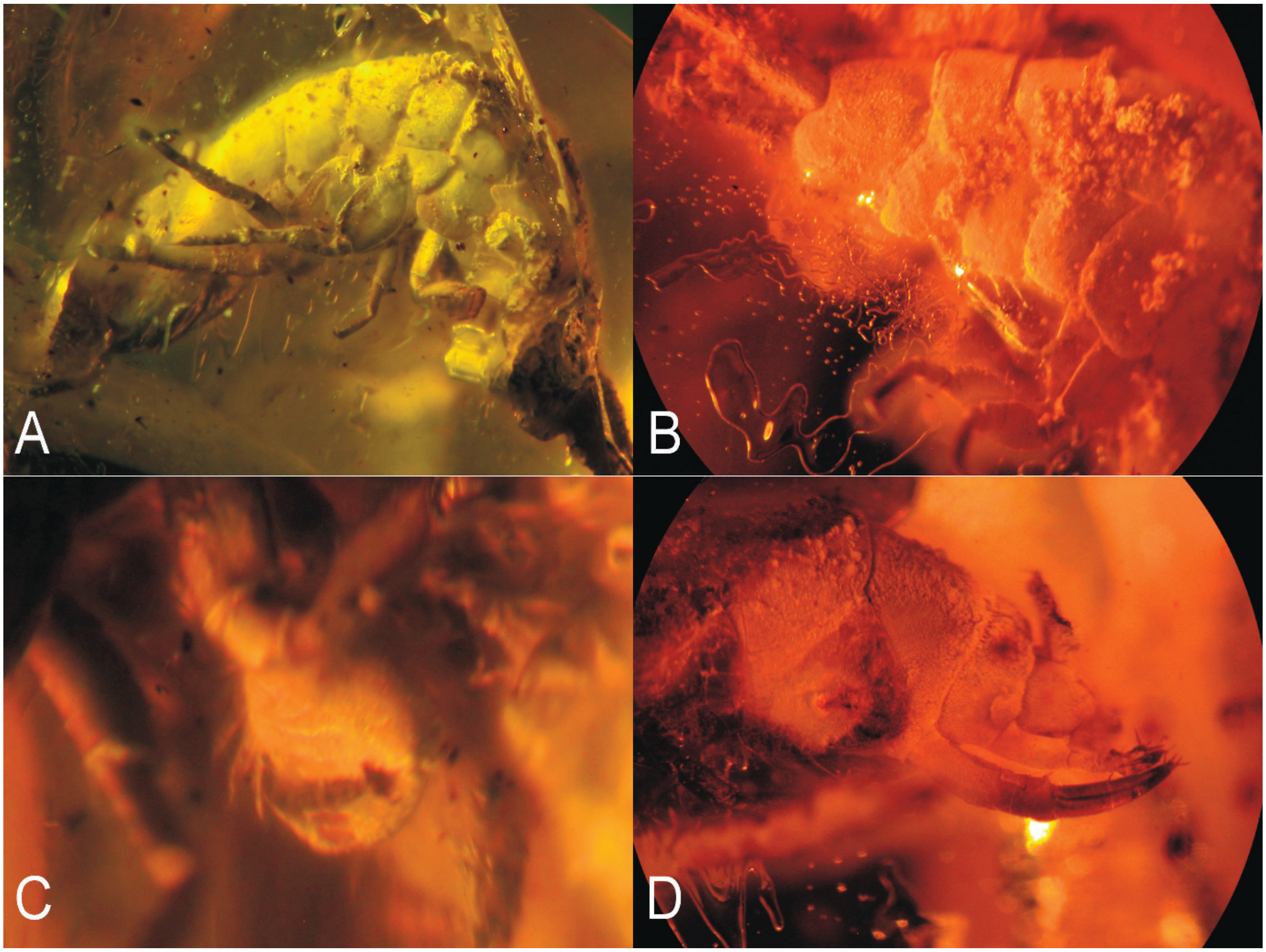

Fig. 1. *Niphargus* cf. *groehni*, Baltic amber, Eocene. A, general view, right side; B, head and anterior pereion segments, left side; C, right gnathopod 2; D, last metasomal segment and urosome, left side.

carpus slightly shorter than propodus, also with several postero-marginal setae; propodus comparatively long, with 2 short setae on anterior margin and 6-7 pairs of setae on the posterior margin; dactyls comparatively robust, with strong apical nail, inner margins with 3-5 spinifirm setae (Figs. 2B, C).

Pereiopods 5-7 clearly visible (Fig. 1A); basal articles comparatively robust, at most twice as long as wide; with widely rounded, prominent postero-distal lobe. Anterior and posterior margins armed with several small setae, more numerous on posterior margins. Ischium rectangular; merus, carpus and propodus of somewhat increasing lengths in P5 and more clearly visible in P7. Distal setae on propods nearly as long as dactyls, comparatively robust, but more slender than in P3 and P4 (Figs. 2D-G). Dactyls of posterior pereiopods pectinate with 5-6 setae on their inner margins (Figs. 2E-G).

Remarks.—The specimen is approximately 18 mm in length. Anterior and posterior parts of the body are better visible from the left side, whereas the central part - from the right side. Antennae, except for the basal articles as well as third uropods are lacking; no trace of eyes are visible (Figs. 1A-D). The shape and armament of the propodus and dactylus of the gnathopod are definitely *Niphargus*-like.

Because of the oblique position of telson in the amber piece studied, the true length of this structure and of its apical spines can be somewhat underestimated in the drawing. Due to the oblique position of some appendages against the polished surfaces of the amber piece the true shape and article proportions in the drawings can be somewhat misshapen; for instance the true length (slenderness) of pereiopod dactyls may be somewhat underestimated.

Discussion

Those clearly visible elements of the above described niphargid appear very similar to the morphological details of *Niphargus groehni* Coleman and Myers, 2001. These similarities consist of: the shape of head interantennal lobe; the shape of the fourth coxal plate; the shape, article proportions, and armament of pereiopods; and the telson shape and armament.

The differences lie in the shape of third epimeral plate that in *N. groehni* is a bit acutely produced, whereas in our specimen it is broadly rounded. Also, our specimen

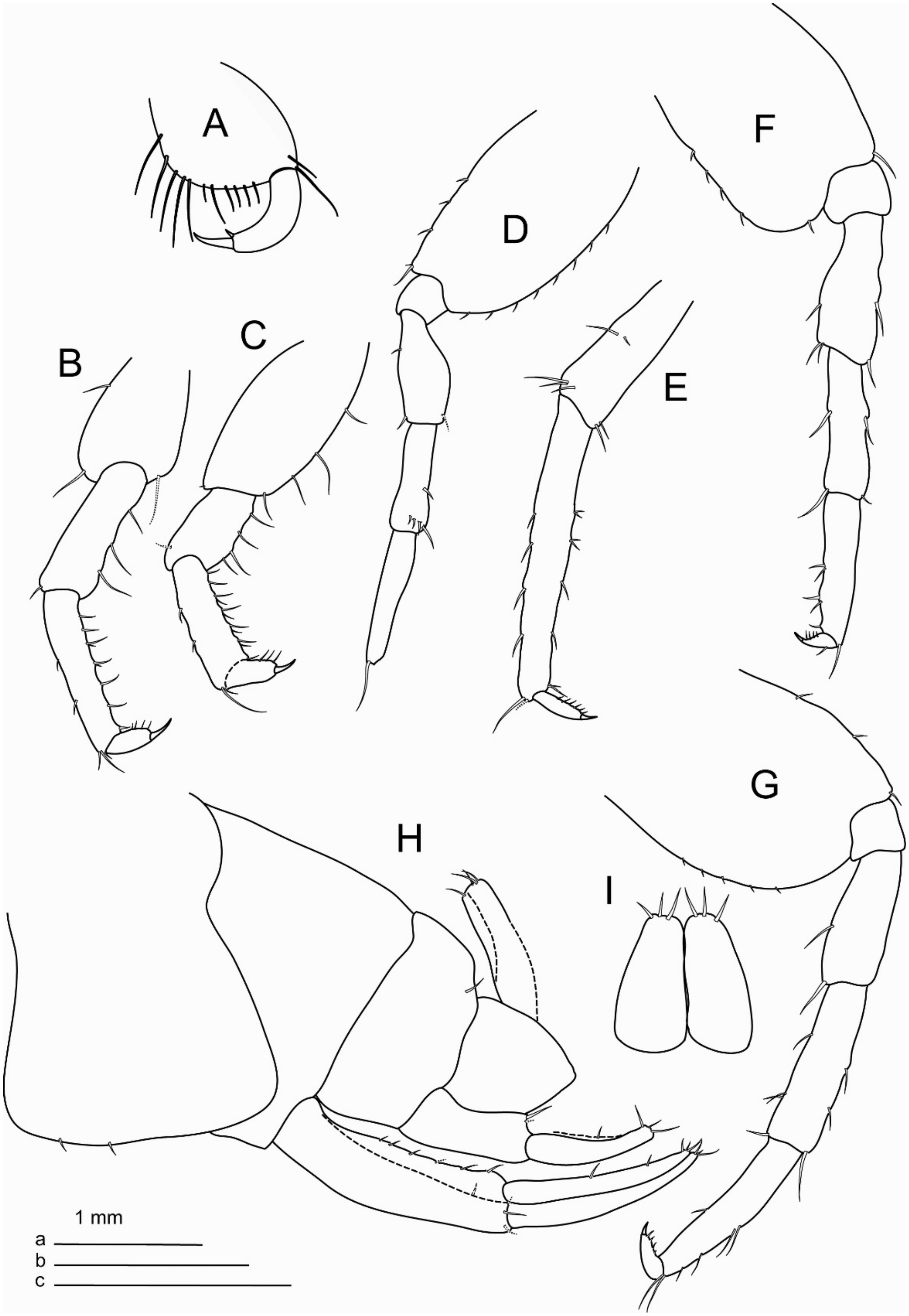

Fig. 2. *Niphargus* cf. *groehni*, line drawings. A, right gnathopod 2; B, left pereiopod 3; C, left pereopod 4; D, left pereiopod 5; E, distal articles of left pereiopod 7; F, right pereiopod 5; G, right pereiopod 7; H, last metasome segment and urosome, left side; I, telson, lower side. B, C, D, F, and G - scale a; H and I - scale b; A and E - scale c.

possesses a denser armament with spiniform setae on the pereiopodal dactyli. However, this last feature can be age/size dependent, and the niphargid of Coleman and Myers was distinctly smaller (approximately 12 mm in length) than our specimen. Because the age of their *N. groehni* is roughly estimated by Coleman and Ruffo (2002) to be approximately 50 My, both amber pieces originate most probably from the same Baltic area and because the morphological similarities are rather evident, we propose at this time to refer to our specimen as *Niphargus* cf. *groehni* Coleman and Myers, 2001.

Niphargus groehni was assigned to the subgenus *Phaenogammarus*. However, recent studies using comprehensive morphological (122 characters) and biochemical (nuclear 28S and mitochondrial 12S rDNA sequences) features from over 100 species of *Niphargus* by Fiser et al. (2008) inclined these authors to reject all earlier subdivisions of this genus.

The inclusion of water dwelling arthropods - especially Amphipoda - in the resin that eventually became amber appears to be not so rare as one might expect. Already several records of crangocyctids enclosed in Baltic amber (Zaddach, 1864; Lucks, 1928; Just, 1974; Jazdzewski and Kulicka, 2000a, b, 2002; Coleman and Myers, 2001; Coleman, 2004, 2006) and 3 records of niphargids (Coleman and Myers, 2001; Coleman and Ruffo, 2002; present data) that suggest such amphipods that lived very near the water surface, e.g., as occurs with the extant crangonyctid *Synurella*, or some epigean niphargids, e.g., *Niphargus valachicus* (see Fiser et al., 2009), would have had more ''opportunities'' to become amber fossils.

The location of all three hitherto described amber-entombed niphargids in the central Baltic area (all pieces from the Sambian Peninsula) are situated far north of the present distribution area of *Niphargus*. This clearly shows how the distribution of this genus extended more to the north during the much warmer middle Tertiary period.

Acknowledgements

Thanks are due to Dr. Cene Fiser (University of Ljubljana, Slovenia) for his professional, precious discussion and also to Prof. Boris Sket (the same institution) for his comments. We acknowledge with thanks the help of two colleagues from the University of Lodz: Prof. Michal Grabowski for taking photos, and especially the help of Mr. Piotr Jozwiak, M. Sc., in the preparation of the definitive drawings.

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Received: 27 November 2009.
Accepted: 22 December 2009.