The oldest lobsters (Middle Triassic, Anisian) from the Netherlands

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Abstract

Records of fossil lobsters from the Netherlands are rare. Here, we present the oldest marine lobsters from the Netherlands from Middle Triassic (Anisian, Muschelkalk) sediments cropping out in the Winterswijk quarry complex. Other, younger lobsters from the Netherlands include Mezochirus ornatus from the Hauderian, the late Maastrichtian Oncopeaia breda, Hoploparia beyrichi and Jagtia kunradensis as well as unidentified taxa from the Eocene (Bartonian-Lutetian). The lobsters collected from the Winterswijk quarries are Clytiopsis argentoratensis, Oosterinkia neerlandica n. gen., n. sp. and Pseudoglyphea cf. P. spinosa. At least some of these specimens more than likely represent moults.

The lobsters lived in a low-energy, stressed environment with fluctuating salinity levels. This might explain the smaller size of specimens of Clytiopsis argentoratensis (15–17 mm) compared to related, stratigraphically younger and older lobsters. Specimens of the presumed precursor and descendant of Clytiopsis spp., the late Permian Protoclytiopsis antiqua and the Carnian Paracytiopsis hungarica, are notably larger than Clytiopsis spp. (62 and 23 mm, respectively). Förster (1967) recorded a length of 13.2 mm for the only other species of Clytiopsis, C. thuringica. The limited number of specimens collected over recent decades and the paucity of crustacean species may well be related to a combination of environmental features and a low preservation potential. Predators feeding on lobsters must have been either fish (similar to today) or various aquatic reptiles which inhabited the Winterswijk area at the time. The lobsters themselves may have fed on various bivalves and gastropods and/or stromatolites (?) collected at the Winterswijk quarry complex.

Taphonomy

At least some of the specimens are very likely to be moults. Pseudoglyphea cf. P. spinosa (lower right) and Clytiopsis argentoratensis (upper left) have their cephalothoraxes and abdomina misaligned and the abdomen is facing upwards while the cephalothorax is upside down. Furthermore, one specimen of C. argentoratensis (upper right) has its cephalothorax split along the median line, which is a way some lobsters molt (Glaessner 1969, R431). One other specimen, Oosterinkia neerlandica, has its abdomen misaligned with the cephalothorax as well, typically known as the Saltier’s position (Schäfer 1951). The majority of the lobsters exhibits no cuticle, implying that the exoskeleton has been dissolved due to diagenesis. The preservation potential was interpreted to be low. The sedimentation rates were most likely low to intermediate given the incomplete preservation of the lobsters, ample evidence of bioturbation and the sediments deposited in thin layers. Wear was also found indicating at least some transport, thereby decreasing the preservation potential.

Paleoenvironment

Fossil footprints, mudcracks and wave ripples imply a shallow sea with periods of exposure. Salinities are interpreted to have been fairly high and/or fluctuating. This is based on the presence of the minerals dolomite, celestite and gypsum, and the absence of corals, echinoids and crinoids. Pyrite crystals, which are commonly found in the quarry, suggest that the environment might have been dysoxic/anoxic as well. Gall (1971) noted that the early Anisian fauna found in the French Vosges Mountains also consisted of small specimens and attributed it to high salinities. The environmental stresses altogether are probably the cause of the small-sized specimens of Clytiopsisargentoratensis. Moreover, stresses might be one of the reasons for the low number of crustacean specimens collected over the last decades.

Differences with other members of the Eumidae family are observed. The median furrow is continuous in Clytiopsis thuringica and C. argentoratensis instead of turning into an intercalated plate. The intercalated plate cannot be found in Paracytiopsis and Clytiella. Differences with Enoploclyta, Palaeostacus, Erymo, Lissocardia, Galicia and Pustulina can be found in the gastric and cardiac regions, the ornamentation and the branchiocardiac and postcervical grooves.