



PALEOBIOGEOGRAPHY OF CRETACEOUS AND PALEOGENE DECAPODS FROM THE HIGH SOUTHERN LATITUDES

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Examination of fossil decapod crustaceans and summaries of their occurrences from high southern latitude localities in New Zealand (1), Antarctica (2), and Chile (3) has established that this southern circum-Pacific region has served as the site of origin of species known to inhabit modern assemblages in deep water and lower latitude areas (4). Furthermore, some close biotic relationships have been established between decapods in widely separated areas in the southern circum-Pacific.

Collections of Cretaceous and Paleogene decapod fossils in Chile, in the area from Navidad to Tierra del Fuego, have yielded nine species of decapods. These are arrayed in the families Callianassidae, Homolidae, Raninidae, Geryonidae, Goneplacidae, and Pinnotheridae. Major faunal changes occurred at the end of the Miocene, probably in response to cooling of the southern seas. As a result, some groups were displaced from the most southern latitudes, and others were restricted to deeper water. Eurytopic taxa were favored along the shore during these transitional paleoceanographic stages, whereas stenothermic taxa, tolerant of low temperatures, were favored in deeper water. Continued temperate paleoceanographic conditions and the development of larger continental shelves during the Paleogene and part of the Miocene allowed the widespread

distribution of endemic fossil genera, such as *Lebucarcinus*.

In the James Ross Basin, along the eastern margin of the Antarctic Peninsula, 29 species of decapods have been recognized in Cretaceous and Paleogene rocks. They have been placed in the families, Nephropidae, Glypheidae, Mecochiridae, Polychelidae, Palinuridae, Callianassidae, Paguridae, Galatheidae, Retrorsichelidae, Homolodromiidae, Prosopidae, Poupiniidae, Raninidae, Torynommidae, Calappidae, Portunidae, Goneplacidae, and Majidae. All but four of the species, in the three last-named families, are macrurans, anomurans, and the more primitive crabs. The composition of this suite of organisms is similar to those from New Zealand and Chile. With the exception of one Miocene occurrence of the Homolodromiidae in Miocene rocks of King George Island (5), the known record of decapod crustaceans in Antarctica ends in the Eocene.

However, the affinities of the decapods collected in Chile, Antarctica, and New Zealand, with those in Cretaceous and Paleogene rocks of Argentina and the nature of introduction of decapods into eastern South America, particularly with reference to the influence from the enlarging Atlantic seaway, is far less clear. Weaver (6) envisioned the possibility of post-Senonian introduction of faunal elements, probably with primary reference to molluscs, from Europe into South America; but, he believed that most of the fauna

of the Late Cretaceous/Paleocene age Roca Formation was endemic to South America.

Several exposures of the Roca Formation in the Neuquén Basin, in the west-central provinces of La Pampa and Río Negro, Argentina, were visited during 1993. Although the Neuquén Basin was connected to the Pacific during the early Mesozoic, it was separated from the Pacific by an emergent volcanic area along its western margin and was connected to the Atlantic Basin in Campanian-Danian times for the first time (6).

Prior to this work, the only published record of a decapod crustacean from the Roca Formation was that of *Xanthilites gerthi* Glaessner. Preliminary study of the specimens collected during the field season of 1993, coupled with a specimen, previously unstudied, from the Museo de Ciencias Naturales de La Plata has resulted in the recognition of ten distinct species, including one lobster, three mud shrimps, and six true crabs. Although the fauna is still under study, it is possible to make some preliminary observations regarding the affinities of this large fauna, which represents, the first diverse decapod assemblage known from Argentina.

The only species which bears close affinities with high latitude species is the lobster *Hoploparia* sp. Representatives of this genus have been collected in Campanian, Maastrichtian, and Danian rocks in the James Ross Basin of Antarctica (2), as well as southernmost Argentina (7). The three species of mud shrimps, represented largely by partial claws, are known to occur in a variety of Cretaceous and Paleogene sites throughout the world and, therefore, must be considered cosmopolitan. There is no clear indication from the morphology of the organisms that they are particularly closely related to those from the high southern latitudes. All of the crabs

tentatively referred to the families Portunidae, Xanthidae, Goneplacidae, Hexapodidae, and Retroplumidae, are characteristic of low latitude, generally warm-temperate to tropical habitats. None is closely related to decapod species previously described from Chile, Antarctica, or New Zealand, and the only one species, *Xanthilites gerthi*, has previously been described from Argentina. *Costacopluma* has recently been identified in Brazil (8); however, all other occurrences of this genus are from northern hemisphere localities in the Atlantic and Tethyan basins. Thus, it is clear that the Atlantic influence on the distribution of decapod crustaceans was strong in west-central Argentina, at least through the Danian.

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