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Early Cretaceous decapod Crustacea from the Neuquén Basin, west-central Argentina

María Beatriz Aguirre-Urreta
Departamento de Ciencias Geológicas, Universidad de Buenos Aires, Ciudad Universitaria, 1428 Buenos Aires, Argentina

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Abstract

Marine deposits of the Neuquén Basin of west-central Argentina (southern South America) are richly fossiliferous; its Mesozoic invertebrate faunas, represented mostly by molluscs, have been extensively studied since the nineteenth century. However, Early Cretaceous decapod crustaceans are far less known, although part of the systematic framework has been published (Aguirre-Urreta, 1989). The aim of the present note is to provide updated information based on ongoing research into the systematics and taphonomy of this crustacean group in the Neuquén Basin.

Introduction

The Neuquén Basin is a retroarc basin that extends along the foothills of the Andes from 35°SL to 39°SL, expanding towards the eastern foreland forming a large embayment, where the marine Lower Cretaceous is represented by a major sedimentary cycle that encompasses a Pacific marine transgression of Tithonian (latest Jurassic) to Barremian age. The Lower Cretaceous sediments in the Neuquén Basin comprise both marine and terrestrial deposits. The marine Tithonian-Lower Valanginian is represented by rich organic, dark shales with calcareous nodules (Vaca Muerta Formation, Tithonian-Berriasian) and thinly laminated limestones (Quintuco Formation, Berriasian-Valanginian). During the Valanginian a regression occurred, and there was a coexistence of terrestrial and volcaniclastic beds interbedded with marine shales (Mulichinco Formation) and thick carbonate deposits (Chachao Formation). A transgressive phase occurred in the late Early Valanginian with the deposition of shales, silty shales and coquinas of the Agrio Formation (Early Valanginian-Early Barremian). The gypsum beds of the Huitrín Formation indicate the regression of the Pacific sea during the Barremian (Legarreta & Uliana, 1991).

Decapod fossils

The fossils studied for the present note are from the Agrio Formation. From north to south, localities are: 1 – Cerro La Parva, 2 – Cerro Pitrén, 3 – Mina San Eduardo, 4 – Lonco Vaca, 5 – Agua de La Mula, 6 – El Salado, and 7 – Río Agrio (Fig. 1). Decapod crustaceans from the Neuquén Basin are assignable to the Palinura, Anomura and Astacidea.

Palinura

In the Neuquén Basin, the palinurans are represented mainly by *Meyerella rapax* (Harbort), as recognised at Cerro La Parva and Mina San Eduardo, in the lower portion of the Agrio Formation (*Karakaschiceras attenuatus* and *Viluceras permolestus* ammonite subzones, late Valanginian). At Cerro La Parva specimens are highly abundant and preserved in incomplete calcareous nodules that have been reworked and redeposited at the base of a thin storm deposit. They occur together with ammonites and oysters. The preservation closely resembles that recorded by Simpson & Middleton (1985) for *Meyerella magna* in the Atherfield Clay Formation of England. Specimens of *M. rapax* from Cerro La

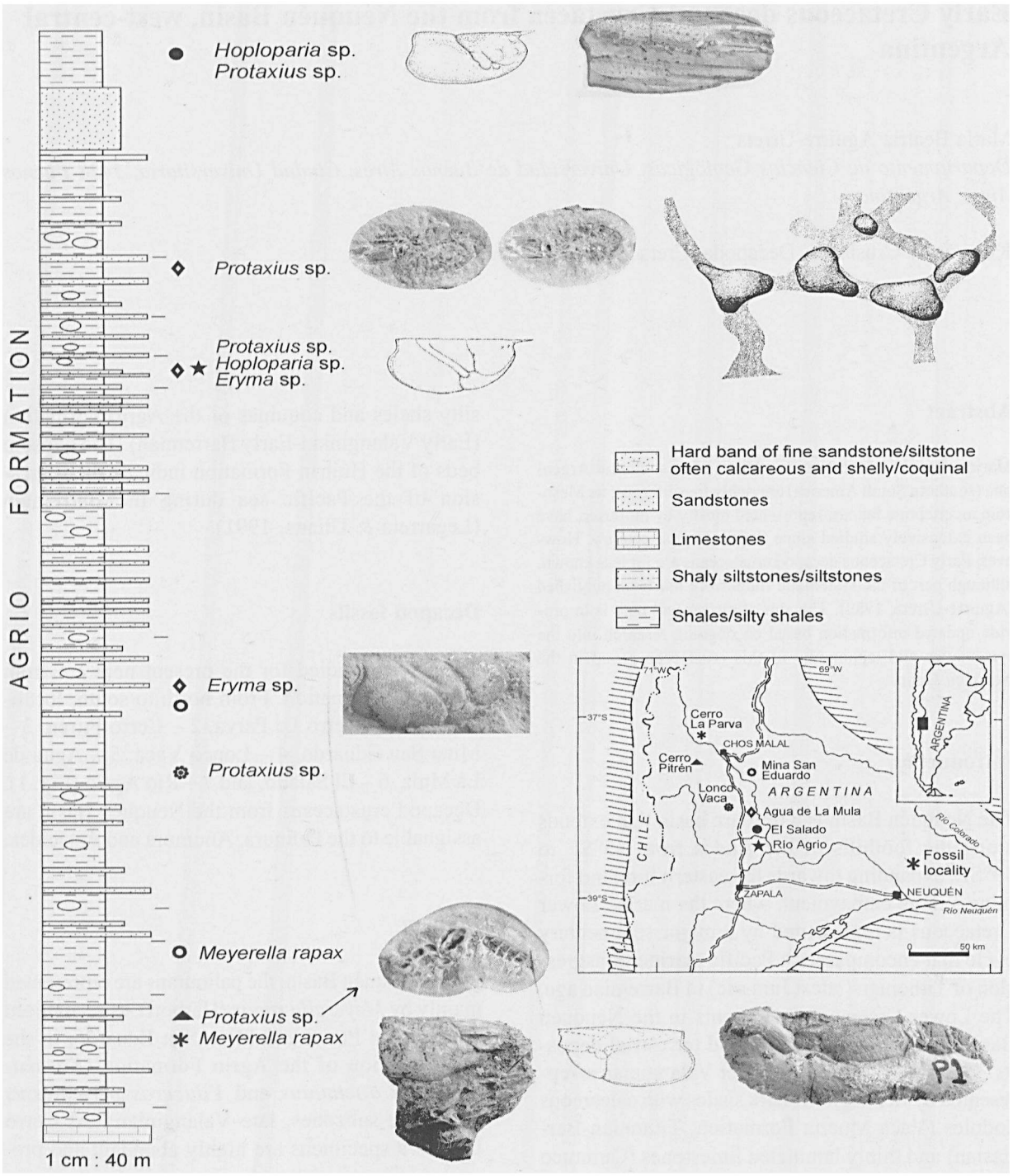

Fig. 1. Composite section of the Agrio Formation with the various horizons that have yielded decapod crustaceans, and a locality map of the Neuquén Basin (inset). Fossils are not to scale.

Parva are articulated with the calcareous matrix not completely enclosing the carapace, thus producing a lateral compression of the fossil. Simpson & Middleton (1985) documented the presence of epizoans on *M. magna*, such as the bivalves *Anomia laevigata* and *Aetostreon* sp., and suggested an epibenthic way of life for this lobster species. Our material shows the oyster *Ceratostreon* sp. to be common,

but it cannot be determined whether the oysters settled on the specimens while alive, or attached to the already formed nodules.

Following the death of the animals, the preservation of *M. rapax* from Cerro La Parva probably included an initial stage of shallow burial of corpses to produce the incomplete nodules, a relatively extended period of exposure of nodules on the seafloor to allow settlement and growth to adulthood of *Ceratostreon* sp., and the reworking and final deposition of nodules at the base of a coquina. At Mina San Eduardo, specimens are enclosed in their entirety in flattish, ovoid, sandy calcareous concretions.

Anomura

This group is the most abundant in the Agrio Formation, being represented by *Protaxius* sp. With only chelipeds present, assignment to *Protaxius* sp. is problematic; part of the material may belong to *Protocallianassa.* Material has been recovered from different stratigraphic levels and localities, ranging from the Upper Valanginian at Cerro Pitrén to the Lower Hauterivian at Lonco Vaca, Agua de La Mula, El Salado, and Río Agrio. The commonest state of preservation corresponds to small, near-spherical calcareous nodules with only the cheliped pair preserved; less often, just one of the chelipeds is preserved. The nodules are invariably embedded in dark shales typical of a calm environmental setting.

However, at Agua de La Mula, there are two distinctive levels with nodules yielding *Protaxius* sp. in the *Hoplitocrioceras gentilii* ammonite zone (early Hauterivian). Here the specimens are articulated and near-complete, with the body parallel to main axis of the nodule. At one level, the nodules, ovoid to irregular in shape, are preserved in silty shales and fine sandstones associated with burrowing systems corresponding to the ichnogenus *Thalassinoides*. Although nodules were not found to be confined to the thalassinoid burrowing system, it is most probable that the decapod did indeed inhabit those galleries comparable to the example documented by Bromley & Asgaard (1972) for the palinuran *Glyphea rosenkrantzi.* At the other level, the same nodules are reworked and redeposited at the base of a storm deposit.

Astacidea

This group is represented in the Neuquén Basin by erymids and nephropids. *Eryma* sp. is known from the *Neocomites* beds (late Valanginian) and also associated with olcostephanid ammonites (*Olcostephanus laticosta* ammonite subzone, early Hauterivian). *Hoploparia* sp. has been recorded from this zone as well but is more abundant in the *Spitidiscus riccardii* ammonite zone (early Hauterivian). Their mode of preservation differs. In *Eryma* sp., the carapace of the cephalothorax is normally preserved, as well as isolated chelipeds, both in calcareous nodules and silty shales, but the abdomen is rarely found. On the other hand, all records of *Hoploparia* sp. correspond to chelipeds preserved in calcareous nodules within dark shales.

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