

Oosterella (Ammonoidea, Early Cretaceous) from the Neuquén Basin, Argentina

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With 4 figures in the text

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Abstract: Two fragments of the ammonite genus *Oosterella* are recorded from the lower Agrio Formation of the Neuquén Basin, west central Argentina. *Oosterella* is typically a Mediterranean Province genus of Late Valanginian to earliest Hauterivian age. Its discovery in Argentina supports raising the Valanginian-Hauterivian stage boundary in the Neuquén Basin to the base of the *Holcoptychites neuquensis* Zone.

Zusammenfassung: *Oosterella* ist typisch für das späte Valanginium und das frühe Hauterivium der Mediterranen Faunen-Provinz. Die Entdeckung zweier Fragmente dieser Ammonitengattung im Neuquén-Becken hat paläogeographische Konsequenzen und spricht dafür, die örtliche Grenze zwischen Valanginium und Hauterivium an die Basis der Zone des *Holcoptychites neuquensis* zu legen.

Introduction

The purpose of this paper is to record and show the stratigraphical significance of the first *Oosterella* found in the Neuquén Basin, west-central Argentina (Fig. 1). This is a back-arc basin that expanded towards the eastern foreland, forming a large embayment where predominantly marine Lower Cretaceous sediments accumulated. The sediments are assigned to the Mendoza Group (GROEBER 1953), which encompasses a marine transgression from the Pacific during Tithonian to Neocomian times (Andean sedimentary cycle). Rich ammonite faunas occur at many levels to form one of the most important faunal successions in the southern hemisphere.

The Tithonian-Early Valanginian interval is represented by organic-rich, dark-coloured marine shales (Vaca Muerta Formation, Tithonian-Berriasian) and thinly laminated limestones (Quintuco Formation, Berriasian-Early Valanginian). The palaeogeography changed during the

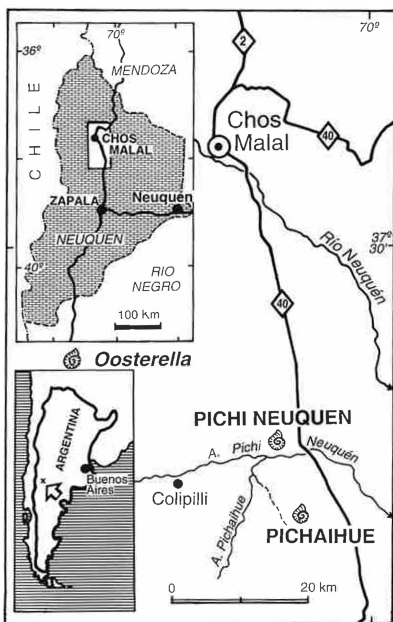


Fig. 1. Locality map.

late Early Valanginian, when a global eustatic sea-level fall took place (GULISANO, GUITIERREZ PLEIMLING & DIGREGORIO 1984, LEGARRETA & ULIANA 1991). As a consequence, the basin shrank and shallow marine sandstones of the Mulichinco Formation (WEAVER 1931) were deposited. A transgressive phase started in the mid Valanginian, when deposition commenced of the shales, siltstones and silty limestones of the Agrio Formation. The top of the Agrio sequence marks the retreat of the Pacific seas from the basin during Barremian times.

The fossils described here were recovered from black shales of the Lower Member of the Agrio Formation. Specimen CPBA 13969 was found (by PFR) in the Arroyo Pichi Neuquén, in the upper part of the *angulatifomis* Zone approximately 150 m below a level with *Holcoptychites neuquensis*. Specimen CPBA 13970 was found (by MBAU) in the Pichaihue section, in the first horizon with *Holcoptychites* sp., at the base

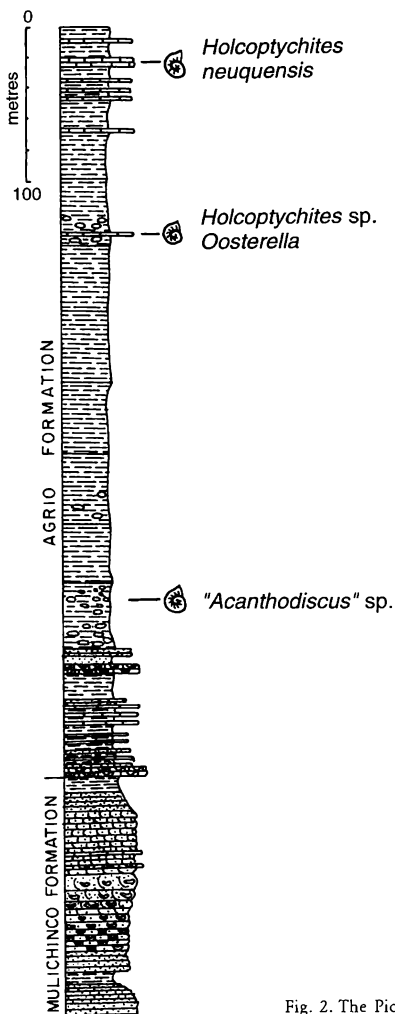


Fig. 2. The Pichaihue section.

of the *neuquensis* Zone (Fig. 2). Both specimens are fragmentary, but represent the first record of *Oosterella* from Argentina. Their occurrence provides important evidence for correlation with the Mediterranean Region of the Tethyan Realm, at a level where controls were previously lacking.



Fig. 3. *Oosterella* sp. a: lateral view of CPBA 13970; b-c: lateral and ventral views of CPBA 13969; all $\times 1$.

The specimens are housed in the collections of the Cátedra de Paleontología, Universidad de Buenos Aires.

Systematic palaeontology

Superfamily Perisphinctaceae STEINMANN, 1890

Family Oosterellidae BREISTROFFER, 1940

Genus *Oosterella* KILIAN, 1911

(? = *Pseudoosterella* SPATH, 1924)

Type species: *Ammonites cultratus* D'ORBIGNY 1841, by subsequent designation (ROMAN 1938: 345).

Discussion: COMPANY (1987: 190–191) suggested that the relatively evolute, small forms that SPATH (1924) separated as *Pseudoosterella* could belong to *Oosterella*. THIEULOY & BULOT (1992) and the present authors

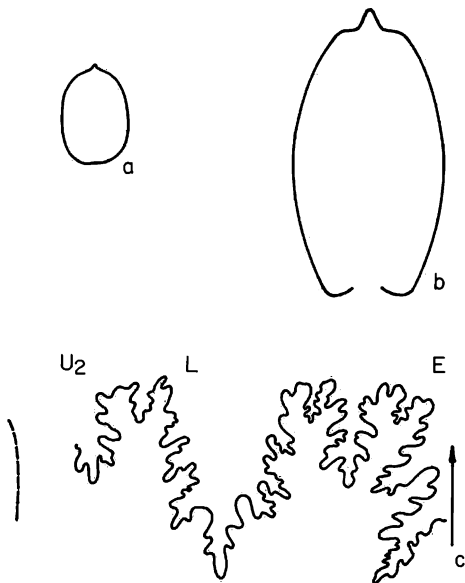


Fig. 4. a: restored whorl section of CPBA 13969; b: restored whorl section of CPBA 13970, $\times 0.8$; c: external suture line of CPBA 13969; $\times 2.5$.

provisionally follow this. This would mean that the family Oosterellidae is limited to the nominate genus.

THIEULOY & BULOT (1992) agreed with VERMEULEN (1972) and COMPANY (1987) in deriving *Oosterella* from *Paquiericeras* (SF Platylenticeratinae). They suggested that the structural and ornamental diversity of *Oosterella* indicates that it is a phylogenetically composite genus formed from independent lines of the *Paquiericeras* stock. The latter genus has not been found in the Neuquén Basin.

Oosterella sp.

Figs. 3-4

Material: Two corroded internal moulds; the smaller consists of half a whorl of phragmacone (CPBA 13969) and the larger a fragment comprising the end of a phragmacone and part of a body chamber (CPBA 13970).

Description: The smaller specimen has a moderately compressed whorl section ($H/W = 1.54$) and flat flanks converging to a rounded venter. The ventral keel is abraded. There are traces of faint, broad, falcoid ribs. The larger fragment also has a moderately compressed whorl section ($H/W = 1.53$) with a sharp umbilical edge, the slightly curved flanks converging to a flattish venter. The keel is high, strong and serrated. The venter at both sides of the keel is flat. Traces of six falcoid, broad ribs are present. The suture line is partially preserved: it has a broad lateral lobe (L) and an external lobe (E) as long as the lateral lobe, both separated by a wide, bifid lateral saddle. The first umbilical lobe (U2) is much shorter than L.

Discussion: Although our specimens are fragmentary and indifferently preserved, the simple suture shows that they belong to *Oosterella* rather than to an oppelliid ammonite. It is possible that they represent two different species as the larger fragment appears to be less evolute than the smaller specimen. Because of their poor preservation they are difficult to compare with previously described species, but they lack the sinuous keel of the *cultratus* group. The serrations on the keel of the larger specimen distinguish them from most described *Oosterella*, though similar serrations occur on some "*Pseudoosterella*". The smaller specimen may be close to the Colombian ammonite described by HAAS (1960: 45) as *O. colombiana*; it has a similarly stout, rather evolute whorl.

Oosterella is known mainly from the West Mediterranean Province of the Tethyan Realm (Tunisia, SE Spain, SE France, through the Jura and as far east as the Caucasus). It is also recorded from north Germany (KEMPER, RAWSON & THIEULOY 1981), Colombia (HAAS 1960) and Mexico

(COMPANY 1987). It is essentially of Late Valanginian age, but extends into the basal Hauterivian (lower *radiatus* Zone in SE France: BULOT et al. 1992). MEMMI's (1970) records from the supposed Lower Hauterivian of Tunisia are associated with ammonites that appear to be of Late Valanginian age, to judge from some of the listed names.

Stratigraphic significance

The Early Cretaceous ammonite faunas of the Neuquén Basin are composed of both typical Tethyan genera and taxa of more restricted geographical distribution. The latter include forms found also in the Indo-Malagasian Province as well as genera limited to the Andean basins or endemic to the Neuquén Basin alone. The Tethyan forms allow some correlation with the "standard" sequences of the Mediterranean area and their spasmodic appearance in Argentina appears to be related to levels of global sea-level rise (RAWSON 1993). For example, the *Karakaschiceras-Neohoplloceras-Olcostephanus* faunas (late Early to early Late Valanginian) of both regions are nearly identical. Higher in the sequence the earliest Late Hauterivian faunas show some strong links too. Between these levels the faunas of the *Pseudofavrella angulatiformis* and *Holcoptychites neuquensis* Zones are of more limited distribution and difficult to correlate with the standard sequences.

Both the *angulatiformis* and *neuquensis* zones have traditionally been placed in the Hauterivian. However, AGUIRRE-URRETA & RAWSON (1995) suggested that the *angulatiformis* Zone should be transferred to the Upper Valanginian as some of the characteristic neocomitids of this zone appear close to *Besaireiceras* of the Indo-Malagasian Province. The discovery of the Late Valanginian to earliest Hauterivian genus *Oosterella* either side of the boundary between these two zones supports this age dating. We therefore provisionally place the Valanginian-Hauterivian boundary at the base of the *neuquensis* Zone.

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