

LOWER AND MIDDLE TITHONIAN MARINE GASTROPODS FROM THE NEUQUÉN-MENDOZA BASIN, ARGENTINA.

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**Boletín
del Instituto de
Fisiografía y Geología**

Gründel J. and Parent H., 2001. Lower and Middle Tithonian marine gastropods from the Neuquén-Mendoza basin, Argentina. [*Gastrópodos marinos del Tithoniano Inferior y Medio de la cuenca Neuquén-Mendoza, Argentina*]. *Boletín del Instituto de Fisiografía y Geología*, Volúmen 71, Números 1-2, pp. 13-18. Rosario, 25-12-2001. ISSN 1666-115X.

Abstract. Samples of marine Lower and Middle Tithonian gastropods from Picún Leufú, Cañadón de los Alazanes, Cerro La Parva (Neuquén) and Casa Pincheira (Mendoza) have provided three undescribed species. These are: *Exelissa? arcuatoconcava* nov. sp. (*Mendozanus* Biozone), *Sinuarbullina melehuensis* nov. sp. (*Zitteli* Biozone) and *Dicroloma? sp.* (*Mendozanus* Biozone).

Key-Words: Tithonian, Gastropods, Neuquén-Mendoza basin, Argentina.

Resúmen. **Gastrópodos marinos del Tithoniano Inferior y Medio de la cuenca Neuquén-Mendoza, Argentina.** Muestras de gastrópodos marinos del Tithoniano Inferior y Medio de Picún Leufú, Cañadón de los Alazanes, Cerro La Parva (Neuquén) y Casa Pincheira (Mendoza) contienen las siguientes especies: *Exelissa? arcuatoconcava* nov. sp. (*Mendozanus* Biozone), *Sinuarbullina melehuensis* nov. sp. (*Zitteli* Biozone) and *Dicroloma? sp.* (*Mendozanus* Biozone).

Palabras clave: Tithoniano, Gastrópodos, Cuenca Neuquén-Mendoza, Argentina.

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INTRODUCTION

Marine Upper Jurassic gastropods of the Neuquén-Mendoza basin are recorded only by sparse citations or descriptions in literature (e.g., Behrendsen 1922). Nevertheless, these mollusks are common in distal and proximal facies at several localities of the basin. Gastropods frequently occur associated with ammonites and bivalves (sometimes abundant and apparently diverse).

In the present report we describe gastropods from marine Tithonian sediments belonging to the *Mendozanus* and *Zitteli* Biozones which were collected in last years. The samples are dated by the associated ammonites.

Palaeoecological implications can not be drawn from this first study, mainly due to the unknown protoconch and thus data on the life histories of the new species.

MATERIAL

The gastropods studied come from four localities of the Neuquén-Mendoza basin, from South to North (Fig. 1):

Picún Leufú, Neuquén (Figs. 1-2).- These specimens were extracted from the bodychambers of specimens of the ammonites *Euvirgalithacoceras malarguense* (Spath), *Torquatisphinctes* cf. *mendozanus* (Burckhardt) and *Neochetoceras?* sp. Gastropods are relatively abundant in the bodychamber of many of the ammonites occurring associated within a single level, at the top of the Tordillo Fm. (= Quebrada del Sapo Fm., Digregorio 1972). This

level is a basal bed of the Lower Tithonian *Mendozanus* Biozone, approximately Hybonotum Zone in age.

Cañadón de los Alazanes (Figs. 1-2).- Four specimens obtained from nodules of level CA02 of the section described in Parent (2001), belonging to the *Zitteli* Biozone and containing the ammonite *Pseudolissoceras zitteli*, lamellaptychus, bivalves, and the gastropods.

Cerro de La Parva, Neuquén (Figs. 1-2).- These specimens were extracted from the bodychamber of a juvenil macroconch specimen of *Pseudolissoceras zitteli* (Burckhardt). The ammonite was collected at about 15 meters above the base of the Vaca Muerta Fm., in a bed of bituminous shales containing exclusively small specimens of *P. zitteli*; below, some Lithacoceratines occur in bituminous dark, fine sandstones. The vertical range of *P. zitteli* defines the homonymous biozone throughout the basin (Leanza 1980) and should be Semiforme Zone in age, although the age is expected to differ in distinct areas of the basin (Parent & Capello 1999).

Casa Pincheira, Mendoza (Figs. 1-2).- These specimens were extracted from the bodychamber of specimens of *Euvirgalithacoceras malarguense* (Spath). These ammonites were collected in level G15 of the local section (Parent *in press*, Parent & Capello 1999). This level is a bed at the top of the Tordillo Fm., belonging to the base of the Lower Tithonian *Mendozanus* Biozone, approximately Hybonotum Zone in age.

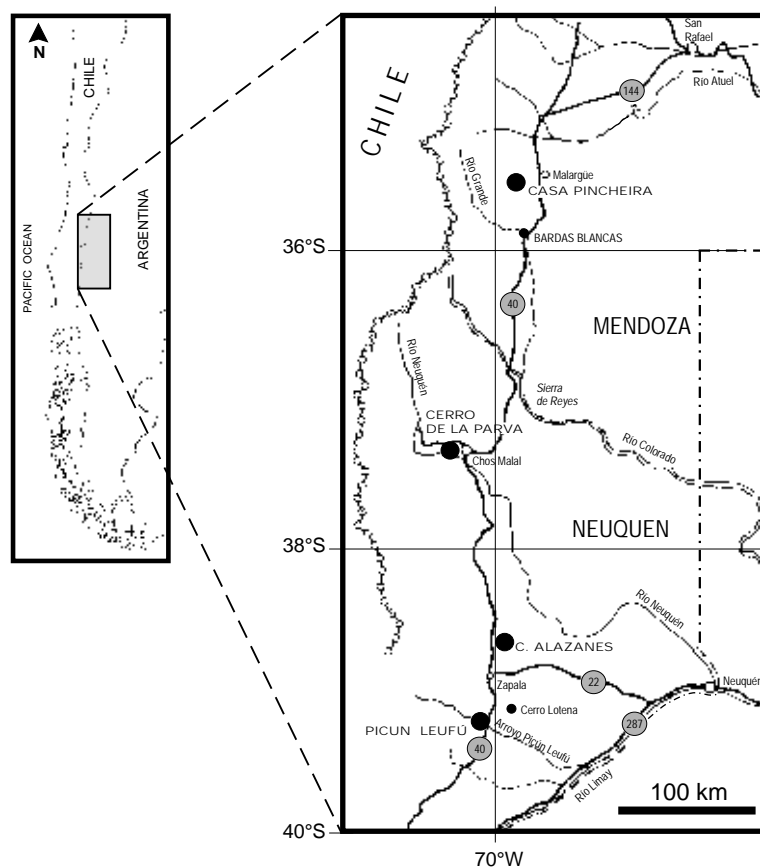


Figure 1. Reference map. Southern sector of the Neuquén-Mendoza basin. *Figura 1.* Mapa de referencia. Sector sur de la cuenca Neuquén-Mendoza.

SYSTEMATIC PALEONTOLOGY

The specimens are housed at Laboratorio de Paleontología y Biocronología (LPB), Universidad Nacional de Rosario, and Museo Olsacher (MOZP), Zapala, Neuquén.

Subclass Caenogastropoda Cox, 1959

Order Cerithimorpha Golikov & Starobogatov, 1975

Superfamily Cerithioidea Fleming, 1823

Family Procerithiidae Cossmann 1905

Genus *Exelissa* Piette, 1860*Exelissa? arcuatoconcava* nov. sp.

Fig. 3A-D

Derivatio nominis. Lat. *arcuatus* - bent and *concavus* - concave; after the opisthocyrt axial ribs.

Holotype. The specimen on Fig. 3A-C (MOZP 6419/1).

Locus typicus. Picún Leufú, Neuquén, Argentina.

Stratum typicum. Lower Tithonian *Mendozanus* Biozone.

Paratypes. Five specimens, one from Picún Leufú (MOZP 6419/1) and four from Casa Pincheira, Mendoza (LPB 193/1-4).

Diagnosis. The slender shell has convex teleoconch whorls with distinct sutures. Last whorl with about 10 axial ribs. The ribs are strongly and asymmetrically opisthocyrt and are apically thickened and bend abapical strongly toward the aperture. On the abapical part of the whorls and on the base 8-10 spiral furrows are developed.

Description. The material is badly preserved. Only the holotype shows details of the sculpture. It consists of 5 teleoconch whorls (the top of the shell is lacking) and is 4.2 mm high and 1.6 mm broad. The shell is slender and has convex whorls with distinct sutures. On the whorls about 8-10 axial ribs are developed. The ribs are strongly and asymmetrically opisthocyrt and strongest in their apical third. On the last whorl they have nodes on their apical end. Abapically the ribs weaken and become indistinct. The

growth lines run parallel to the axial ribs. In the abapical part of the whorls 4-5 spiral furrows are recognizable. Two furrows above the suture are particularly clear visible. The base is convex and without axial ribs but with further 4-5 spiral furrows. The growth lines are prosocyrt on the base. The aperture is not preserved.

Remarks. The assignment of the species to the genus *Exelissa* is provisional. The teleoconch sculpture is unusual for the genus, but some *Exelissa* species have a similar pattern of axial and spiral ribs [for example, *E. costaminuera* Gründel, Péliissié & Guérin, 2000 from the Middle Jurassic of France, or *Procerithium (Rhabdocolpus) carbonarium* (F.A. Roemer) according to Huckriede 1967 from the Wealden of northwestern Germany (= *Exelissa*?)]. The last mentioned species has higher whorls and more (nearly 20) spiral furrows. *Cerithium diadematum* Quenstedt, uppermost Jurassic of Germany, has straighter whorl flanks, the axial ribs are more numerous and the spiral furrows cover the whole whorl surface (Kuhn 1939). The taxonomical position of *E.? arcuatoconcava* remains unresolved since the protoconch and the aperture are unknown.

Occurrence. Lower Tithonian *Mendozanus* Biozone.

Order "Meta-Mesogastropoda" Bandel, 1994

Superfamily Stromboidea Rafinesque, 1815

Family Aporrhaidae Philippi, 1836

Genus *Dicroloma* Gabb, 1868*Dicroloma? sp.*

Fig. 3E-G

Material. A single specimen from Picún Leufú, Neuquén.

Description. The incomplete shell consists of 3.5 whorls and is 11.5 mm high and 8.0 mm wide. The early whorls of the shell and the adult aperture are missing. The specimen is a steinkern with some remains of the shell preserved. The

Andean Biozonation	Picún Leufú	Cañadón de los Alazanes	Chacay Melehué (Cerro de la Parva)	Casa Pincheira
Zitteli Biozone		Gastropods: ? <i>S. melehuensis</i> n. sp. Ammonites: <i>P. zitteli</i> [M&M] Semiforme Zone	Gastropods: <i>S. melehuensis</i> n. sp. Ammonites: <i>P. zitteli</i> [M&M] Semiforme Zone	Ammonites: <i>P. zitteli</i> Semiforme Zone
Mendozanus Biozone	Gastropods: <i>E.? arcuatoconcava</i> n. sp., <i>Dicroloma?</i> sp. Ammonites: <i>E. malarguense</i> [M&M], <i>T. cf. mendozanus</i> , <i>Neochetoceras?</i> sp. Hybonotum Zone		Ammonites: <i>Euvirgalithaceras</i> sp. <i>Choicensisphinctes?</i> sp. Hybonotum-Darwini? Zones	Gastropods: <i>E.? arcuatoconcava</i> n. sp. Ammonites: <i>E. malarguense</i> [M&M] Hybonotum Zone

Figure 2. Summary of stratigraphic and geographic distribution of described gastropods and the associated ammonites. **Figura 2.** Sumario de la distribución estratigráfica y geográfica de los gastrópodos descriptos y de los amonites asociados.

flanks of the whorls have a strong keel at about mid-whorl. The part of the whorl apically of the keel is bent against the apex and is not ornamented. The part between keel and abapical suture is nearly vertical and concave. On it two weak spiral ribs are recognizable. Growth lines are strongly opisthocyrt and weakly opisthoclinal. Their abapical section is strongly bent forward. A second keel forms the transition to the convex base that, apparently, is unsculptured.

Remarks. The shape and sculpture of the shell are very similar to those of *Dicroloma* and *Bicorempterus* (Gründel 2001). But the protoconch and first teleoconch whorls are unknown, therefore the generic assignment is uncertain.

Occurrence. Lower Tithonian *Mendozanus* Biozone.

Subclass Heterostropha Fischer, 1885
Order Opisthobranchia Milne-Edwards, 1848
Superfamily Cyndrobullinoidea Wenz, 1947
Family Cyndrobullinidae Wenz, 1947

Genus *Sinuarbullina* Gründel, 1997

Remarks. The genus is known with a few species from the Lower and Middle Jurassic of Central Europe. The main diagnostic feature in relation to *Actaeonina* and *Cyndrobullina* are the growth lines with their strong opisthocyrt sinus below the apical suture. The known species from Europe are completely smooth. Only the growth lines may be partly strengthened. In contrast, the here described species has spiral furrows on the base.

Differences. Very similar is *Ptychostylus* Sandberger, 1870. This genus is known from brackish water sediments (Arkell, 1941; Huckriede, 1967; Bandel, 1991). The type species has a columellar fold and axial ribs.

***Sinuarbullina melehuensis* nov. sp.**
 Fig. 3H-N

Derivatio nominis. After the type locality.

Holotype. The specimen in Fig. 3K-N (LPB 418/1).

Locus typicus. Cerro La Parva, Chacay Melehué area, Neuquén.

Stratum typicum. Middle Tithonian *Zitteli* Biozone.

Paratypes. Two specimens (LPB 418/2-3).

Diagnosis. The shell is rather broad for the genus. The teleoconch whorls have a broad and sloping ramp. The base

of the shell is covered with more than 10 spiral furrows. The aperture is apically narrowly rounded.

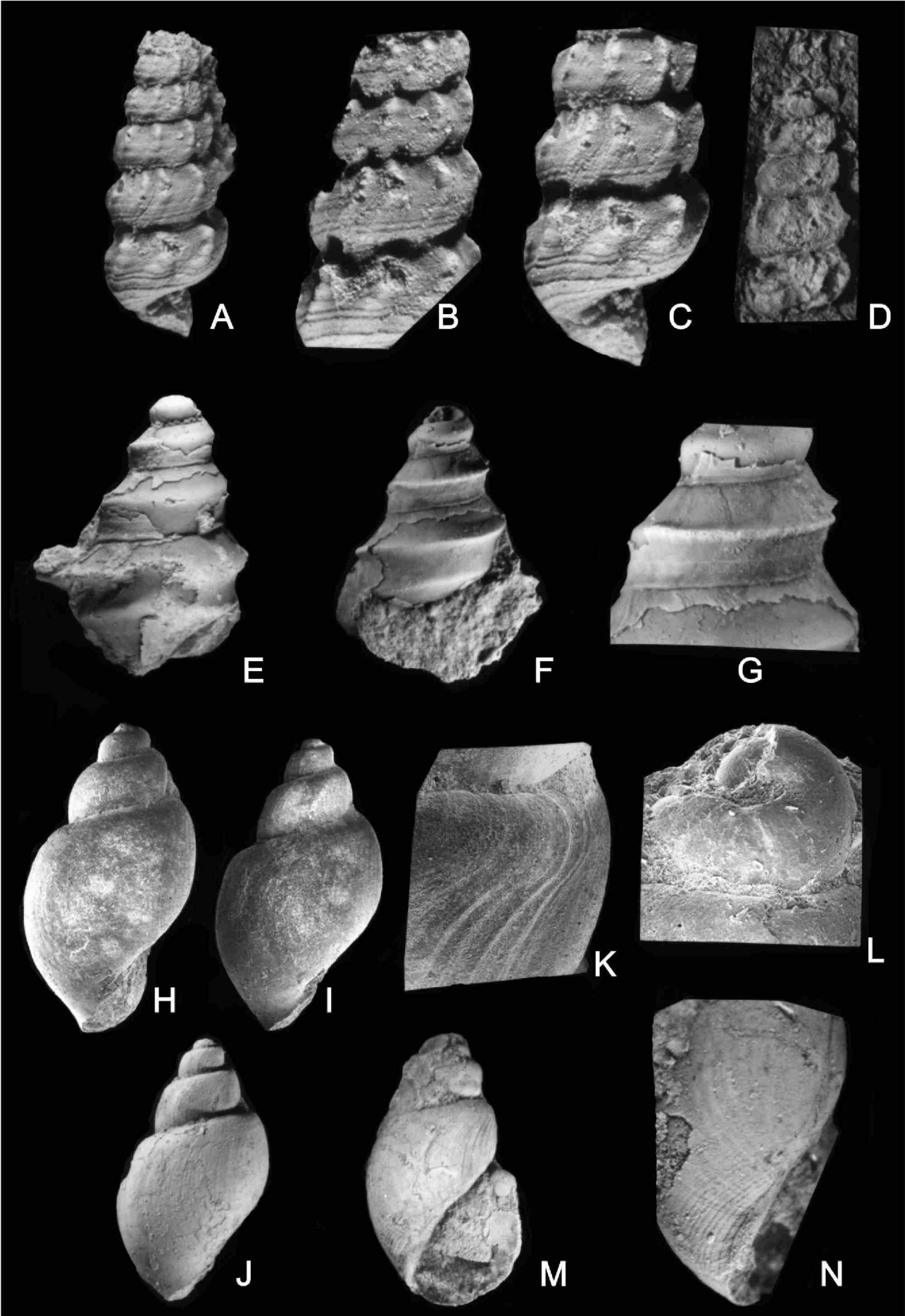
Description. The shell with about three teleoconch whorls is nearly 4.5 mm high. The width is variable, the specimens are slender to rather broad. The heterostrophic protoconch forms an angle with the axis of the teleoconch. Its diameter is 0.4 mm. The teleoconch whorls have a distinct and sloping ramp. A rounded edge forms the transition to the flanks of the whorls which are weakly convex. Sculpture is missing on this part of the shell; only the growth lines are somewhat strengthened. They are strongly opisthocyrt in their apical part and form here a distinct sinus. More abapically and on the base they are prosocyrt. The base is strongly convex and covered with more than 10 spiral furrows. The apical furrows are only weakly developed and they become stronger near the centre of the base. The aperture is highly oval and apically narrowly rounded. The outer lip is only weakly convex. The inner lip is divided in a parietal and a columellar part. A fold is not recognizable, but the aperture is filled with matrix.

Remarks. A concretion from the *Zitteli* Biozone of Cañadón Los Alazanes, Neuquén yielded a steinkern with external mold and an external mold of a specimen which almost certainly belongs to *Sinuarbullina melehuensis*; but growth lines and spiral furrows are not visible, thus the identification with *S. melehuensis* is uncertain.

Differences. *Sinuarbullina ansorgi* Gründel, 1997 is similar but older (Bathonian), smaller (about 1.6 mm high) and has no spiral sculpture. *Sulcoactaeon leblanci* (Loriol, 1875) from the uppermost Jurassic of Europe, is smaller, has no ramp; moreover *S. leblanci* has a sub-sutural spiral furrow and the shape of the aperture is different (Hägele 1997). *Acteonina collina* according to Thurman & Etallon (1881-1884) (Kimmeridgian) is very similar but has no sculpture. *Cyndrobullina miliola* d'Orbigny, from the Oxfordian of Europe, is smaller, the ramp is indistinct and spiral furrows are lacking (Cossmann 1895). *Ptychostylus guimarotensis* Bandel, 1991 (transition Jurassic / Cretaceous, brackish water sediments) is smaller, the greatest width of the whorls is situated near the ramp, the growth lines are not so strongly sinuous, spiral furrows are lacking and a columellar fold is developed.

Occurrence. Middle Tithonian *Zitteli* Biozone.

Figure 3. A-C: *Exelissa? arcuatoconcava* nov. sp., holotype (MOZP 6419/1), Picún Leufú, Neuquén, Argentina; Lower Tithonian *Mendozanus* Biozone. **A:** Shell in side view (height 4.2 mm); **B-C:** Part of the shell in side views (heights of the sections 3.7 mm and 3.2 mm). **D:** *Exelissa? arcuatoconcava* nov. sp., paratype (LPB 193/2), Casa Pincheira, Mendoza, Argentina; Lower Tithonian *Mendozanus* Biozone. Shell in side view (height 4.0 mm). **E-G:** *Dicroloma?* sp. (LPB 622), Picún Leufú, Neuquén, Argentina; Lower Tithonian *Mendozanus* Biozone. **E-F:** Shell in two side views (height 11.2 mm); **G:** Part of the shell enlarged with sculpture details (width of the teleoconch whorl 4.3 mm). **H-J:** *Sinuarbullina melehuensis* nov. sp., paratype (LPB 418/2), Cerro La Parva, Chacay Melehué area, Neuquén, Argentina; Middle Tithonian *Zitteli* Biozone. Shell in three side views (height 5.0 mm). **K-N:** *Sinuarbullina melehuensis* nov. sp., holotype (LPB 418/1); Cerro La Parva, Chacay Melehué area, Neuquén, Argentina; Middle Tithonian *Zitteli* Biozone. **K:** Growth lines (height of the section 0.9 mm); **L:** Protoconch (diameter 0.4 mm); **M:** Shell in side view (height 4.0 mm); **N:** Last whorl with sculpture (spiral furrows) on the base (height of the section 2.5 mm). **Figure 3. A-C:** *Exelissa? arcuatoconcava* nov. sp., holotipo (MOZP 6419/1), Picún Leufú, Neuquén, Argentina; Tithoniano Inferior, Biozona *Mendozanus*. **A:** Vista lateral de la concha (altura 4.2 mm); **B-C:** Vistas laterales de parte de la concha (alturas de las secciones 3.7 mm y 3.2 mm). **D:** *Exelissa? arcuatoconcava* nov. sp., paratipo (LPB 193/2), Casa Pincheira, Mendoza, Argentina; Tithoniano Inferior, Biozona *Mendozanus*. Vista lateral de la concha (altura 4.0 mm). **E-G:** *Dicroloma?* sp. (LPB 622), Picún Leufú, Neuquén, Argentina; Tithoniano Inferior, Biozona *Mendozanus*. **E-F:** Vistas laterales de la concha (altura 11.2 mm); **G:** Ampliación parcial de la concha mostrando detalles de la ornamentación (ancho de la vuelta de teleoconcha 4.3 mm). **H-J:** *Sinuarbullina melehuensis* nov. sp., paratipo (LPB 418/2), Cerro La Parva, Chacay Melehué area, Neuquén, Argentina; Tithoniano Medio, Biozona *Zitteli*. Tres vistas laterales de la concha (altura 5.0 mm). **K-N:** *Sinuarbullina melehuensis* nov. sp., holotipo (LPB 418/1); Cerro La Parva, Chacay Melehué area, Neuquén, Argentina; Tithoniano Medio, Biozona *Zitteli*. **K:** Líneas de crecimiento (altura de la sección 0.9 mm); **L:** Protoconcha (diámetro 0.4 mm); **M:** Vista lateral de la concha (altura 4.0 mm); **N:** Última vuelta con ornamentación (surcos espirales) en la base (altura de la sección 2.5 mm).



Acknowledgements

S. Cocca, R. Cocca and A. Carlini (Zapala) have helped kindly during the field-work. O.D. Capello and L.S. Filippi (Rosario) collaborated in laboratory work. O.A. Albert (Rosario) made all the editorial work for this paper. We thank K. Bandel (Hamburg) and A. Nützel (Erlangen) for reviewing an earlier version of the manuscript. Facultad de Ciencias Exactas, Ingeniería y Agrimensura (Universidad Nacional de Rosario) sponsored part of the field-work.

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