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Tuberosciponoceras: a new dimorphic ammonoid genus from the Upper Albian of Patagonia, Argentina

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with 3 figures

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Abstract: *Tuberosciponoceras insolitum* n. gen., n. sp. is a single dimorphic species in the Upper Albian of the Austral Basin, southern Patagonia. The short-lived genus was characterized by distinct ventral tubercles on all ribs and a deep, trifid internal lobe.

Keywords: Ammonitida • Baculitidae • sexual dimorphism • Albian • Patagonia • Argentina

Kurzfassung: *Tuberosciponoceras insolitum* n. gen., n. sp. ist eine dimorphe Art aus dem Oberen Albium des Australen Beckens in Südpatagonien. Die kurzlebige Gattung ist durch seitliche ventrale Tuberkeln auf allen Rippen und einen tiefen, trifiden Internlobus gekennzeichnet.

Schlüsselwörter: Ammonitida • Baculitidae • Sexualdimorphismus • Albium • Patagonien • Argentinien

Introduction

The Baculitidae are a distinctive Late Albian – Late Maastrichtian family of world-wide distribution, with nine genera (cf. KLINGER & KENNEDY 2001: 3–4).

In Patagonia, this family is represented by *Baculites* LAMARCK, 1799, *Eubaculites* SPATH, 1926, and *Sciponoceras* HYATT, 1894. *Baculites* and *Eubaculites* are relatively abundant in Santonian – Maastrichtian strata (PAULCKE 1907; WEAVER 1927, 1931; LEANZA 1964, 1967; HÜNICKEN 1965; CAMACHO 1967a, b; RICCARDI 1975, 1988, 2002; RICCARDI & AGUIRRE URRETA 1988; OLIVERO et al. 1990; CASADÍO & LEANZA 1992), but *Sciponoceras* is only known from two species, the Lower Turonian *S. santacrucense* LEANZA, and the Lower Cenomanian *S.* cf. *baculoide* (MANTELL), (LEANZA 1970; RICCARDI 1988, 2002; RICCARDI & AGUIRRE URRETA 1988). Albian material referred by LEANZA (1970) to *Lechites* NOWAK, 1908 belongs to *Rossalites* CASEY, 1961 (see AGUIRRE URRETA & RICCARDI 1988).

Fossil localities

The Baculitidae studied here were collected from three outcrops (Localities A, B, and C, see Fig. 1) of the Río Mayer Formation at Estancia La Vega, about 34 km NW of Tres Lagos, in Santa Cruz Province (Fig. 1).

Locality A

Ca. 700 m SE of Estancia La Vega.

The ammonoids were described and/or figured by LEANZA (1970), NULLO et al. (1981), LEANZA (1986), MEDINA & RINALDI (1986), RICCARDI et al. (1987) AGUIRRE URRETA & RICCARDI (1988), RICCARDI (1988) and MEDINA & RICCARDI (2005).

Succession:

Piedra Clavada Formation: 30 m of light greenish to yellowish sandstones and conglomerates. At base: *Puzosia vegaensis* LEANZA.

[c. 20 m unexposed]

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Río Mayer Formation: 30–35 m of dark gray to black shales with intercalated sandstones, 21 m above base: fossiliferous level with *Tuberosciponoceras insolitum* n. gen., n. sp., *Labeceras singulare* (LEANZA), *Labeceras crassetuberculatum magnum* AGUIRRE URRETA & RICCARDI, *Myloceras (Calliscaphites) andinus* LEANZA, *Koloceras talenkanum* RICCARDI et al., *Puzosia vegaensis*, *Eomarshallites espinosum* MEDINA & RINALDI, *E. hibridum* MEDINA & RINALDI, *Phyllopachyceras* sp., *Aucellina* spp., *Maccoyella* sp., other bivalves and gastropods.

30 m of dark gray to black shales with intercalated yellow-brown, medium to fine glauconite silty sands.

Locality B

Ca. 3 km S–SE of Estancia La Vega.

Succession:

Piedra Clavada Formation: 40 m of light greenish to yellowish sandstones and conglomerates. At base: *Eutrephoceras* sp.

Río Mayer Formation: 2 m of yellow-brown, medium silty sands.

8 m of dark-gray to black shales with calcareous concretions. At base: *Tuberosciponoceras insolitum* associated with *Myloceras (Calliscaphites) andinus*, *Puzosia vegaensis* and *Hypophylloceras lestai* LEANZA.

Locality C

7 km E of Estancia La Vega. Ammonoids were first discovered and described by MEDINA & MARTINIONI (1999) and MEDINA & RICCARDI (2005).

Succession:

Piedra Clavada Formation: <10 m of green to yellowish, medium- to coarse-grained sandstones.

Río Mayer Formation: 37 m of black to gray shales and massive silty sandstones. At 13–14 m above base *Puzosia vegaensis*, *Dipoloceras cristatum* (BRONGNIART), *D. elegans* HAAS, *Hysteroceras leanzai* MEDINA & MARTINIONI, *Eomarshallites espinosum*, *E. hibridum*, *Myloceras* spp., *Labeceras* spp., and *Tuberosciponoceras insolitum*.

Biostratigraphy and age

The ammonoid fauna from Estancia La Vega was included by A. LEANZA (1970) in the "*Parasilesites desmoceratoides* Zone" and dated as Late Albian. Later this fauna was placed in the *Puzosia vegaensis* Assemblage Zone, also dated as Late Albian, by RICCARDI (1984a, b), MEDINA & RINALDI (1986), GULISANO et al. (1987), RICCARDI et al. (1987), and MEDINA & RICCARDI (2005).

The *Puzosia vegaensis* Assemblage Zone is characterized by the nominal species, *Labeceras singulare*, *Labeceras crassetuberculatum magnum*, *Myloceras (Calliscaphites) andinus*, *Dipoloceras cristatum*, *D. elegans*, *Hysteroceras leanzai*, *Neokentroceras tardense* LEANZA, *Eomarshallites espinosum*, *E. hibridum*, *Koloceras talenkanum* and *Tuberosciponoceras insolitum*. Most taxa in this assemblage, i. e., *Myloceras*, *Labeceras*, *Koloceras*, *Neokentroceras*, *Eomarshallites*, *Tuberosciponoceras*, are restricted to the Southern Hemisphere (see WIEDMANN & NEUGEBAUER 1986; RICCARDI 1991).

AGUIRRE URRETA & RICCARDI (1988) concluded that this assemblage zone is early Late Albian in age, for correlation with Madagascar, Mozambique, and South Africa faunas (see also MEDINA & RICCARDI 2005), and approximately equivalent to the M. inflatum Standard Zone. Presence of *Diploceras cristatum* indicates (MEDINA & MARTINIONI 1999) that this assemblage zone is coeval with the *Dipoloceras cristatum* Subzone, *Mortoniceras inflatum* Zone.

Systematic paleontology

Terminology and dimensions (in mm): juv, juvenile; phr., phragmocone; b.ch., body chamber; MxWb, maximum whorl breadth; MxWh, maximum whorl height; MnWb, minimum whorl breadth; MnWh, minimum whorl height; D, distance along shell between maximum and minimum whorl height and breadth measurements; Wb/Wh, ratio of whorl breadth to whorl height; R & T, number of constrictions or tubercles per lenght equal to whorl height; Ti, taper index (after MATSUMOTO & OBATA 1963: 4) (Ti = MxWh – MnWh / D x 100); I, U, L, E, internal, umbilical, lateral, and external sutural lobes.

Repository: MLP, Dpto. Paleozoología Invertebrados, Museo de La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina.

Order Ammonitida ZITTEL, 1884
Suborder Ancyloceratina WIEDMANN, 1966
Family Baculitidae GILL, 1871

Genus *Tuberosciponoceras* n. gen.

Derivatio nominis: Latin, *tuber* = lump, bump, swelling, for the presence of tubercles, and for its resemblance to *Sciponoceras* HYATT, 1894.

Type species: *Tuberosciponoceras insolitum* n. gen., n. sp., Rio Mayer Formation, Upper Albian, La Vega, Santa Cruz Province, Argentina.

Diagnosis: Slightly compressed, rounded cross-section, with prorsiradiate deep constrictions, ribs, and two rows of minute tubercles on venter. Suture with bifid trigonal lobes and a trifid I almost as deep as L and E.

Comments: *Tuberosciponoceras* n. gen. resembles *Sciponoceras* in the regular presence of well marked

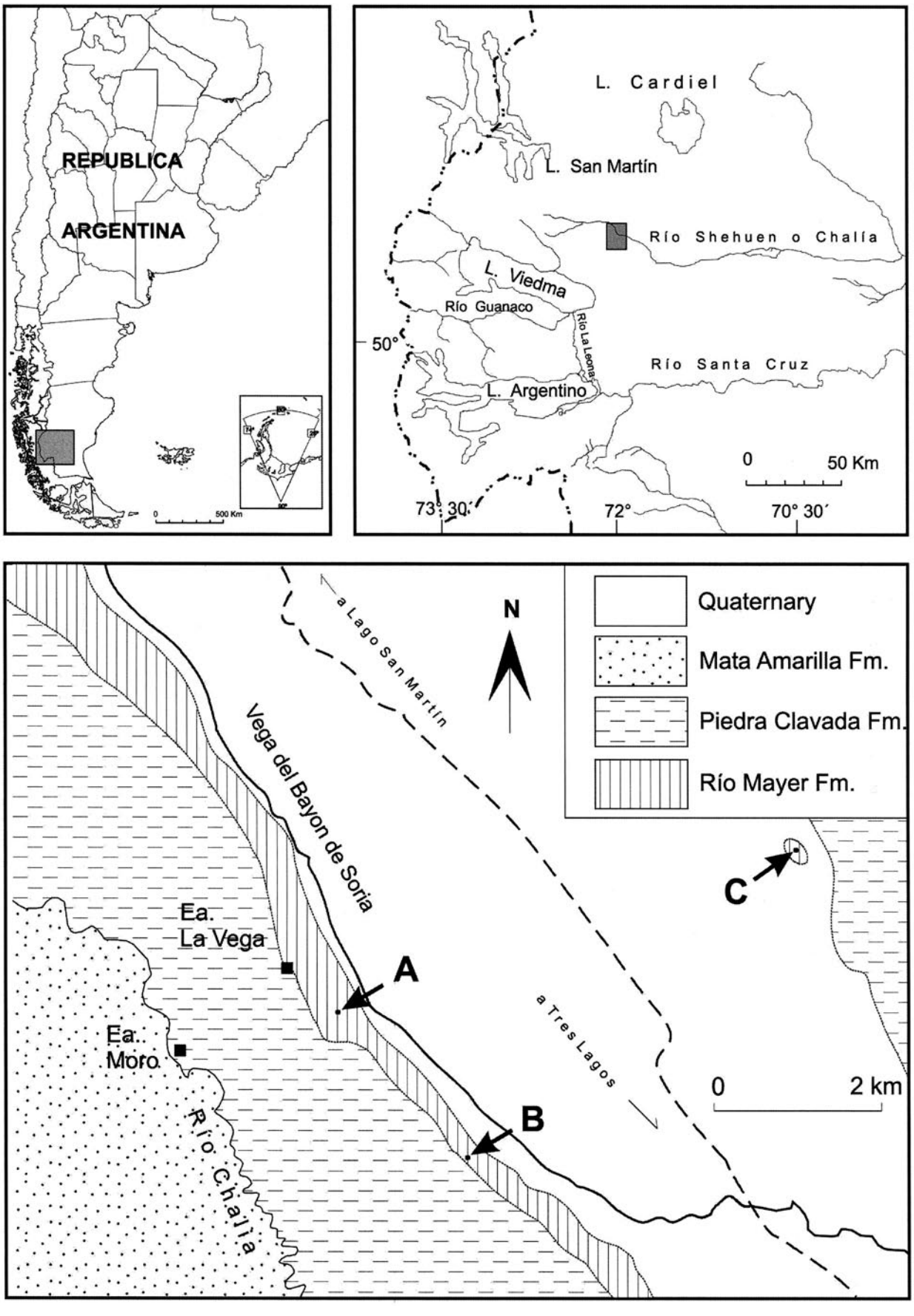

Fig. 1. Geological map showing ammonite localities (A–C).

constrictions, and in cross-section and ribbing. It differs in the presence of two rows of ventral tubercles.

Two rows of ventral tubercles are also present in the type species *Tuberolechites regifex* COOPER & KENNEDY (1977: 654, figs. 8, 1–15; see KLINGER & KENNEDY 2001: fig. 173; including "*Lechites gaudini nodosus*" SCHOLZ, 1979: 15, pl. 1 figs. 11–16) of *Lechites* (*Tuberolechites*) COOPER & KENNEDY from the Upper Albian of England, France and Hungary, but that subgenus lacks the well marked constrictions of *Tuberosciponoceras*.

The trigonal lobes and saddles (Fig. 2) of *Tuberosciponoceras* resemble those of the oldest representatives of *Sciponoceras*, as figured by MEDINA (1999: figs. 2E, G) from the Late Albian of Antarctica, and by KLINGER & KENNEDY (2001: 37–38, figs. 24A–D) from the Early Cenomanian. But both of the latter have a shallower I.

SCHOLZ (1979: 12–16) discussed the taxonomic significance of tubercles in *Tuberolechites* and regarded their origin as iterative, rather than as a unique monophyletic event. On that basis he separated tuberculated and non-tuberculated *Lechites* of *L. gaudini* PICTET & CAMPICHE, 1861, at subspecific level. KLINGER & KENNEDY (1997: 6–7) remarked on the relative rarity of tuberculated specimens within large numbers of specimens belonging to single species of *Lechites*, but considered the presence of ventral tubercles as a subgeneric feature.

This contrasts with the Patagonian occurrence of the type species of *Tuberosciponoceras*, which is not associated with specimens that could be ascribed to *Sciponoceras*. In Antarctica, however, MEDINA (1999) has found two specimens of *Tuberosciponoceras* sp., originally described as "*Sciponoceras* (subgen. nov.) sp.", together with two specimens of *Sciponoceras* sp. A. The fact that the Patagonian material comes from levels in which not a single true *Sciponoceras* has been found, and that both genera are associated in similar numbers in Antarctica, suggests that the presence of ventral tubercles is not an intraspecific variation in *Sciponoceras*, but a distinctive generic feature.

Tuberosciponoceras n. gen. is only known through several specimens consisting of straight shell fragments. One of them (Figs. 3A–H) is a mature body chamber of a microconch with a slight hood and oblique aperture, which compares well with other Baculitidae representatives (see KLINGER & KENNEDY 2001: 64–67, figs. 46–49), whilst another (Fig. 3S) includes part of the initial or juvenile stages of a phragmocone. On the basis of its straight shell and resemblance in whorl section and ornament to genera such as *Sciponoceras* and *Tuberolechites*, *Tuberosciponoceras* is placed within the Baculitidae, as its earliest representative.

It is not clear if *Tuberosciponoceras* derived from *Hamites* NOWAK, a genus placed (see COOPER & KENNEDY 1977: 643; KLINGER & KENNEDY 2001: 3) at the rooth of the Baculitidae. Thus far *Hamites* has not been found in Patagonia, and has only been recorded from the uppermost Albian of Antarctica (KELLY & MONCRIEFF 1992), well above the record of *Tuberosciponoceras*. This issue, as well as the phylogenetic relationships among *Tuberosciponoceras*, *Tuberolechites*, *Lechites* and *Sciponoceras*, requires additional research and is beyond the scope of this paper.

Tuberosciponoceras insolitum n. sp. M/♀ & m/♂

Figs. 2A–C, 3A–S, Tab. 1

Derivatio nominis: Latin, for the uncommon presence of this genus and species in Patagonia, and the unusual ventral tubercles in the Baculitidae.

Holotype: The incomplete body chamber of a macroconch (MLP 31469), figured on Figs. 3O–R.

Type locality: Estancia La Vega, Santa Cruz Province, Argentina.

Type stratum: Upper part of the Rio Mayer Formation, 8 to 24 m below contact with Piedra Clavada Formation, lower Upper Albian.

Material: Holotype (MLP 31469) and paratypes: 1 almost complete body chamber of a microconch (31470, loc. A and B), 2 incomplete juvenile phragmocones with body chambers (MLP 31471, loc. B; MLP 31473, loc. C), 1 incomplete juvenile phragmocone (MLP 31472), and 1 external mold (MLP 31474), from same level and locality as the holotype.

Diagnosis: As for the genus.

Description: This species includes specimens with large difference in size, representing a dimorphic pair, plus small septate juveniles.

Juvenile shell straight, with slightly compressed oval cross-section. Compression remains constant (Wb/Wh = 0.89 → 0.88) or decreases (Wb/Wh = 0.90 → 0.75) with growth. Ornament is barely visible on internal mold. The shell has simple ribs with a dorsal adaperturally concave arc, strongly projected on flank, and almost straight or weakly concave on venter; small clavi-like tubercles occur on both sides of the median ventral line. Constrictions are well marked and are regularly distributed along the shell. Ribs become more conspicuous ventrally, and on both sides, especially adorally of constrictions. One shallow constriction occurs between every two deep constrictions. There are 3–5 ribs with tubercles and one constriction per length equal to whorl height. The suture (Fig. 2) consists of four lobes, E, L, U,

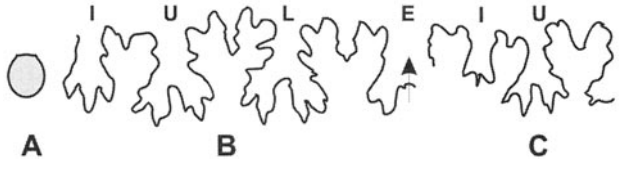

Fig. 2. *Tuberosciponoceras insolitum* n. gen., n. sp. **A**: MLP 31469 (Fig. 3O–R), cross-section. **B**: MLP 31471 (Fig. 3I–N), suture at Wh = 5.2 and Wb = 4.3. **C**: MLP 31473 (Fig. 3S), suture at Wh = 4.5 and Wb = 4.0.

Tab. 1. Measurements (in mm), symbols and abbreviations as in the text.

	MxWb	MxWh	MnWb	MnWh	Wb/Wh	D	R	T	Ti
MLP 31469, M, b. ch.	10.7	13.3	9.3	10.6	0.80–0.87	60	4	4	4.5
MLP 31470, m, b. ch.	7	7.4	5.5	6.4	0.94–0.86	18	5	5	5.5
MLP 31471, juv.,inc. phr. and b. ch.	5	6.6	4.8	5.3	0.75–0.90	21.8	–	–	6
MLP 31472, juv.,inc. phr.	5.9	6.7	5	5.6	0.88–0.89	13.6	5	5	8
MLP 31473, juv.,inc. phr. and b. ch.	5.3	5.7	4.9	5.4	0.93–0.91	8	3	3	3.7

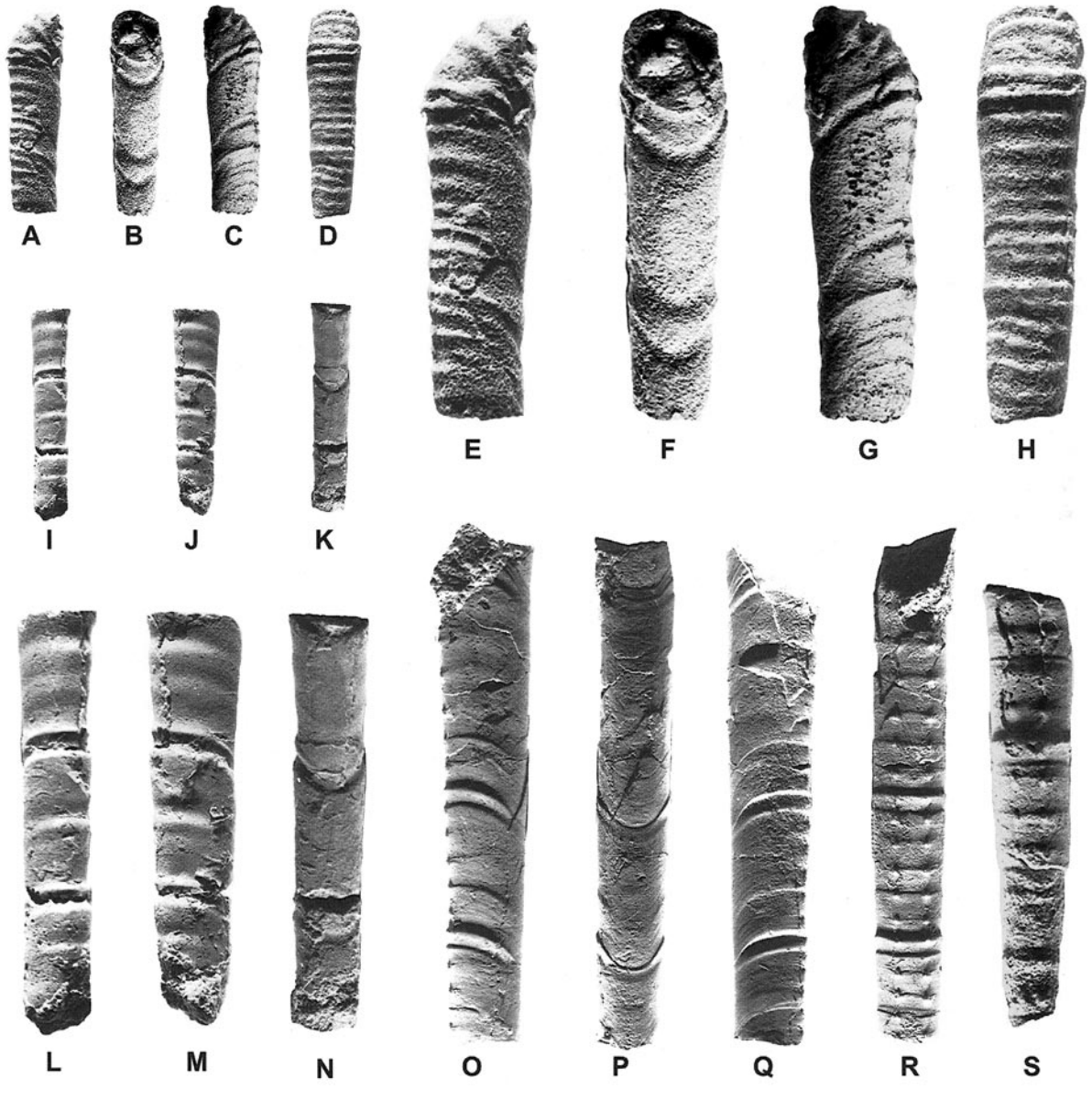

Fig. 3. *Tuberosciponoceras insolitum* n. gen., n. sp. **A–H**: Paratype, MLP 31470, microconch (m/♂) body chamber, lateral, dorsal, lateral and ventral views. Locality A. A–D x1, E–H x2. **I–N**: MLP 31471, juvenile, ventral, lateral and dorsal views. Locality B. I–K x1, L–N x2. **O–R**: Holotype, MLP 31469, macroconch (M/♀), lateral, dorsal, lateral and ventral views. Locality B. x1. **S**: MLP 31473, juvenile, ventral view. Locality C. x2.

and I, which are narrow and trigonal in shape, asymmetric, and with similar depth. The saddles are constricted at the base and almost symmetrically bifid.

Macroconch (*M*/♀): The body chamber has an oval section, becoming more compressed with growth (Wb/Wh = 0.87 → 0.80). Ornament is similar to that of the phragmocone, but blunter and slightly sparser, consisting of simple ribs, with dorsal concave adapertural arc, strong projection on lower flank, becoming almost straight on upper flank and venter, and two ventral rows of small, clavi-like tubercles. Rib prominence increases from dorsum to venter and mainly on the adapertural side of deep and relatively wide constrictions. There are four ribs with tubercles per length equal to whorl height, and, on the entire body chamber, six alternating, deep and shallow, constrictions.

Microconch (*m*/♂): The body chamber, almost complete, has an oval to rounded section, becoming less compressed with growth (Wb/Wh = 0.86 → 0.94). Ornament consists of ribs relatively more prominent and closely spaced than on the phragmocone. They are very weak on dorsum where they form an adapertural concave arc, slightly projected on lower flank, and become straight and more prominent on upper flank and venter. There are two ventral rows of minute, clavi-like tubercles. Ribs on both sides of relatively deep and wide constrictions are slightly more prominent. There are five ribs and tubercles per length equal to whorl height, and seven ribs between every two constrictions. There are three constrictions at a length of 18 mm. Near its end the body chamber bends adorally and the aperture, which is incomplete, is oblique to shell length.

Comments: *Tuberosciponoceras insolitum* n. gen., n. sp. resembles some Late Albian *Sciponoceras* from Australia and Antarctica described, respectively, by HENDERSON (1990) and MEDINA (1999).

T. insolitum is closest to "*Sciponoceras* (subgen. nov.) sp." of MEDINA (1999: 291, pl. 1 figs. I–N, text-figs. 2A–D), from Antarctica, which also has two rows of ventral tubercles and a suture with bifid, trigonal lobes and saddles and deep I. *T. insolitum* differs by its clavi-like, not rounded, tubercles, and the simpler lobes and saddles. MEDINA'S Antarctic material belongs in *Tuberosciponoceras*, probably to a new, hitertho unnamed species.

The five specimens from the Northern Territory, Australia, described by HENDERSON (1990: 130, fig. 12N–P) as *Sciponoceras* sp., resemble *T. insolitum* in cross-section, with similar Wb/Wh, and in the form and number of ribs and constrictions. They differ in the lack of ventral, clavi-like tubercles, and in the suture that, according to HENDERSON (1990: 130), has a small I.

The material from the Upper Albian of Antarctica, described by MEDINA (1999: 289, pl. 1 figs. O–P, text-figs. 2E–H) as *Sciponoceras* sp. A, differs from *T. insolitum* in the absence of ventral clavi-like tubercles, the less compressed cross-section (Wb/Wh = 0.93–0.97 vs. 0.75–0.93), more closely spaced constrictions and the suture with rectangular lobes and saddles and small I.

There is also some resemblance to *Sciponoceras roto* CIESLINSKI (1959: 39, 75, 89, fig. 14, pl. 4 figs. 10a–c; KENNEDY 1971: 10, pl. 3 fig. 7; KENNEDY et al. 1979: 10, pl. 1 figs. 4a–c), *Sciponoceras baculoide* (MANTELL) (1822: 123, pl. 23 figs. 6–7; KENNEDY 1971: 9, pl. 1 figs. 12–18, pl. 2 figs. 1–5, pl. 3 figs. 1–2, 8, 11, pl. 4 fig. 14; KENNEDY & JUIGNET 1983: 19, figs. 11a–y, 12a–bb, 13a–w, 14a–n, with synonymy) and *Sciponoceras gracile* (SHUMARD) (1860: 596; COBBAN & SCOTT 1972: 47, pl. 17 figs. 9–29, text-fig. 18; WRIGHT & KENNEDY 1973: 227, pl. 1 figs. 2–6; HATTIN 1975: pl. 6 figs. A–B and N; COOPER 1978: 70, figs. 12B–D; KENNEDY et al. 1981: 30, pl. 8 figs. 9–10, pl. 10 figs. 1–4; WRIGHT & KENNEDY 1981: 112, pl. 31 figs. 1–3, pl. 32 figs. 8, 11, text-figs. 38A–Q; and KENNEDY & JUIGNET 1983: 22, figs. 18a–d, 32i–p). *T. insolitum* differs by its clavi-like tubercles and the deep trifid internal lobe I (see Fig. 2).

T. insolitum resembles *Tuberolechites regifex* COOPER & KENNEDY (1977: 654, figs. 8, 1–15; SCHOLZ 1979: 15, pl. 1 figs. 11–16; KLINGER & KENNEDY 2001: fig. 173), in the presence of ventral tubercles, but the latter lacks constrictions.

Lechites moreti BREISTROFFER (1936: 66, = *Baculites gaudini* PICTET & CAMPICHE 1861: pl. 55 figs. 10–11; RENZ 1968: pl. 16 fig. 10; WIEDMANN & DIENI 1968: 64, pl. 6 fig. 10 and HORVATH 1983: pl. 2 fig. 11) resembles *T. insolitum* (see Fig. 3F) in the type of constrictions, but lacks ribs and ventral tubercles.

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References

AGUIRRE URRETA, M.B. & RICCARDI, A.C. 1988. Albian heteromorph ammonoids from southern Patagonia, Argentina. – Journal of Paleontology **62** (4): 598–614.

BREISTROFFER, M. 1936. Les subdivisions du Vraconien dans le sud-est de la France. – Bulletin de la Société Géologique de France (5) **6**: 63–68.

CAMACHO, H.H. 1967a. Consideraciones sobre una fauna del Cretácico superior (Maestrichtiano) del Paso del Sapo, curso medio del río Chubut. – Ameghiniana **5** (4): 131–134.

CAMACHO, H.H. 1967b. Acerca de la megafauna del Cretácico superior de Huantraico, provincia del Neuquén (Argentina). – Ameghiniana **5** (9): 321–332.

CASADIO, S. & LEANZA, H.A. 1992. *Eubaculites argentinicus* (Weaver) (Cephalopoda-Ammonoidea) del Maastrichtiano del oeste central de la Argentina. – Revista de la Asociación Geológica Argentina **46** (1/2): 26–35.

CASEY, R. 1961. A monograph of the Ammonoidea of the Lower Greensand. II. – Palaeontographical Society Monographs **114** (493): 45–118.

CIESLINSKI, S. 1959. The Albian and Cenomanian in the northern periphery of the Swiety Krzyz Mountains. – Travaux du Service Géologique de la Pologne **28**: 1–95.

COBBAN, W.A. & SCOTT, G.R. 1972. Stratigraphy and ammonite fauna of the Graneros Shale and Greenhorn Limestone near Pueblo, Colorado. – United States Geological Survey, Professional Paper **645**: 1–108.

COOPER, M.R. 1978. Uppermost Cenomanian – Basal Turonian ammonites from Salinas, Angola. – Annals of the South African Museum **75** (5): 51–152.

COOPER, M.R. & KENNEDY, W.J. 1977. A revision of the Baculitidae of the Cambridge Greensand. – Neues Jahrbuch für Geologie und Paläontologie, Monatshefte **1977** (11): 641–658.

GILL, T. 1871. Arrangement of the Families of Mollusks. – Smithsonian Miscellaneous Collections **227**: 1–49.

GULISANO, F.; RINALDI, C.A. & MEDINA, F.A. 1987. Geología de los alrededores de la estancia La Vega y Tres Lagos, provincia de Santa Cruz. – Instituto Antártico Argentino, Contribución **337**: 1–37.

HATTIN, D.E. 1975. Stratigraphy and depositional environment of Greenhorn Limestone (Upper Cretaceous) of Kansas. – Kansas University Geological Survey, Bulletin **209**: 1–128.

HENDERSON, R.A. 1990. Late Albian ammonites from the Northern Territory, Australia. – Alcheringa **14**: 110–148.

HORVATH, A. 1983. Ammonite stratigraphy of the Pénzeskut Marl Formation. – In: KOLLMAN, H., ed., Contributions to the stratigraphy and paleogeography of the Middle Cretaceous in Central Europe. – Schriftenreihe der Erdwissenschaftlichen Kommissionen. Österreichische Akademie der Erdwissenschaften **7**: 149–171.

HÜNICKEN, M. 1965. Algunos cefalópodos supracretácicos de Río Turbio (Santa Cruz). – Revista de la Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba **26** (1/2): 49–99.

HYATT, A. 1894. Phylogeny of an acquired characteristic. – Proceedings of the American Philosophical Society **32**: 349–647.

KELLY, S.R.A. & MONCRIEFF, A.C.M. 1992. Marine molluscan constraints on the age of Cretaceous fossil forests of Alexander Island, Antarctica. – Geological Magazine **129**: 771–778.

KENNEDY, W.J. 1971. Cenomanian ammonites from southern England. – Special Papers in Palaeontology **8**: 1–133.

KENNEDY, W.J. & JUIGNET, P. 1983. A revision of the ammonite faunas of the type Cenomanian. 1. Introduction, Ancyloceratina. – Cretaceous Research **4**: 3–83.

KENNEDY, W.J.; CHAHIDA, M.R. & DJAFARIA, M.A. 1979. Cenomanian cephalopods from the Glauconitic Limestone southeast of Esfahan, Iran. – Acta Palaeontologica Polonica **24** (1): 3–50.

KENNEDY, W.J.; JUIGNET, P. & HANCOCK, J.M. 1981. Upper Cenomanian ammonites from Anjou and the Vendée, Western France. – Palaeontology **24** (1): 25–84.

KLINGER, H.C. & KENNEDY, W.J. 1997. Cretaceous faunas from Zululand and Natal, South Africa. The ammonite Family Baculitidae Gill, 1871 (Excluding the genus *Eubaculites*). – Annals of the South African Museum **105** (1): 1–206.

KLINGER, H.C. & KENNEDY, W.J. 2001. Stratigraphic and geographic distribution, phylogenetic trends and general comments on the ammonite Family Baculitidae Gill, 1871 (with an annotated list of species referred to the Family). – Annals of the South African Museum **107** (1): 1–290.

LAMARCK, J.P.B.A. DE M. DE 1799. Prodrome d'une nouvelle classification des coquilles. – Mémoires de la Societé d'Histoire Naturelle de Paris (for 1799): 63–90.

LEANZA, A.F. 1964. Los estratos con "Baculites" de Elcain (Rio Negro, Argentina) y sus relaciones con otros terrenos supracretacicos argentinos. – Revista de la Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba (Serie Ciencias Naturales) **25** (3/4): 93–107.

LEANZA, A.F. 1967. Los *Baculites* de la Provincia de La Pampa con notas acerca de la edad del Piso Rocanense. – Boletin de la Academia Nacional de Ciencias **46**: 49–59.

LEANZA, A.F. 1970. Ammonites nuevos o poco conocidos del Aptiano, Albiano y Cenomaniano de los Andes Australes con notas acerca de su posición estratigráfica. – Revista de la Asociación Geológica Argentina **25**: 197–261.

LEANZA, H.A. 1986. Un nuevo Mortoniceratido (Cephalopoda Ammonoidea) del Albiano superior de Santa Cruz, Argentina. – Ameghiniana **22** (3/4): 249–254.

MANTELL, G.A. 1822. Fossils of the South Downs. – 320 p., London (Lupton Relfe).

MATSUMOTO, T. & OBATA, I. 1963. A monograph of the Baculitidae from Japan. – Memoirs of the Faculty of Science, Kyushu University, Geology (D) **13**: 1–116.

MEDINA, F.A. 1999. El género *Sciponoceras* en el Cretácico de la Isla James Ross, Antártida. – IV Jornadas sobre Investigaciones Antárticas **2**: 288–293.

MEDINA, F.A. & MARTINIONI, D. 1999. Los géneros *Hysteroceras* Hyatt y *Dipoloceras* Hyatt (Ammonoidea) en el Albiano Superior de Patagonia, Argentina. – Ameghiniana **36** (4): 411–418.

MEDINA, F.A. & RICCARDI, A.C. 2005. Desmoceratidae, Silesitidae and Kossmaticeratidae (Ammonitida) from the Upper Aptian–Albian of Patagonia (Argentina). – Revue de Paléobiologie **24** (1): 251–286.

MEDINA, F.A. & RINALDI, C.A. 1986. Ammonoideos del Albiano superior en la Formación Río Mayer de la Estancia La Vega, Provincia de Santa Cruz. – Instituto Antártico Argentino, Contribución **324**: 1–35.

NOWAK, J. 1908. Untersuchungen über die Cephalopoden der oberen Kreide in Polen. I. Teil. Genus *Baculites* Lamarck. – Bulletin International de l'Académie des Sciences de Cracovie (Classe des Sciences Mathématiques et Naturelles) **1908** (4): 326–353.

NULLO, F.E.; PROSERPIO, C.A. & BLASCO DE NULLO, G. 1981. El Cretácico de la Cuenca Austral entre el lago San Martín y Río Turbio. – In: VOLKHEIMER, W. & MUSACCHIO, E.A., ed., Cuencas Sedimentarias del Jurásico y Cretácico de América del Sur: 181–220, Buenos Aires (Comité Sudamericano del Jurásico y Cretácico).

OLIVERO, E.B.; MEDINA, F.A. & CAMACHO, H.H. 1990. Nuevos hallazgos de Moluscos con afinidades australes en la Formación Lefipán (Cretácico superior, Chubut): significado paleogeográfico. – V Congreso Argentino de Paleontología y Bioestratigrafía, Actas **1**: 129–135.

PAULCKE, W. 1907. Die Cephalopoden der oberen Kreide Südpatagoniens. – Berichte der Naturforschenden Gesellschaft zu Freiburg im Breisgau **15**: 167–248.

PICTET, F.J. & CAMPICHE, G. 1858–1864. Description des Fossiles du Terrain Crétacé des environs de Sainte-Croix. – Matériaux pour la Paléontologie Suisse **1**: 1–752.

RENZ, O. 1968. Die Ammonoidea im Stratotyp des Vraconnien bei Sainte-Croix (Kanton Waadt). – Schweizerische Palaeontologische Abhandlungen **87**: 1–97.

RICCARDI, A.C. 1975. *Eubaculites* Spath (Ammonoidea) del Cretácico superior de Argentina. – Ameghiniana **11** (4): 379–399.

RICCARDI, A.C. 1984a. Las asociaciones de amonitas del Jurásico y Cretácico de la Argentina. – 9 Congreso Geológico Argentino, Actas **4**: 559–595.

RICCARDI, A.C. 1984b. Las zonas de amonitas del Cretácico de la Patagonia (Argentina y Chile). – 3 Congreso Latinoamericano de Paleontología, Memoria: 396–405, Mexico.

RICCARDI, A.C. 1988. The Cretaceous System of Southern South America. – Geological Society of America, Memoir **168**: 1–161.

RICCARDI, A.C. 1991. Jurassic and Cretaceous marine connections between the Southeast Pacific and Tethys. – Palaeogeography, Palaeoclimatology, Palaeoecology **87**: 155–189.

RICCARDI, A.C. 2002. Invertebrados del Cretácico superior. – In: HALLER, M.J., ed., Geología y Recursos Naturales de Santa Cruz: 461–479, Buenos Aires (XV Congreso Geológico Argentino).

RICCARDI, A.C. & AGUIRRE URRETA, M.B. 1988. Bioestratigrafía del Cenomaniano–Santoniano en la Patagonia Argentina. – 5 Congreso Geológico Chileno, Actas **2**: C375–C394.

RICCARDI, A.C.; AGUIRRE URRETA, M.B. & MEDINA, F.A. 1987. Aconoceratidae (Ammonitina) from the Hauterivian – Albian of Southern Patagonia. – Palaeontographica (A) **196** (4/6): 105–185.

SCHOLZ, G. 1979. Die Ammoniten des Vracon (Oberalb, *dispar*-Zone) des Bakony-Gebirges (Westungarn) und eine Revision der wichtigsten Vracon-Arten der westmediterranen Faunenprovinz. – Palaeontographica (A) **165**: 1–136.

SHUMARD, B.F. 1860. Description of new Cretaceous fossils from Texas. – Transactions of the Academy of Sciences of St. Louis **1**: 590–610.

SPATH, L.F. 1926. On new ammonites from the English Chalk. – Geological Magazine **63**: 77–83.

WEAVER, C.E. 1927. The Roca Formation in Argentina. – American Journal of Science (5) **13**: 417–434.

WEAVER, C.E. 1931. Paleontology of the Jurassic and Cretaceous of West Central Argentina. – University of Washington, Memoirs **1**: 1–595.

WIEDMANN, J. 1966. Stammesgeschichte und System der posttriadischen Ammonoideen, Ein Überblick (2. Teil). – Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen **127**: 13–81.

WIEDMANN, J. & DIENI, I. 1968. Die Kreide Sardiniens und ihre Cephalopoden. – Palaeontographia Italica **64** (N.S. **34**): 1–171.

WIEDMANN, J. & NEUGEBAUER, J. 1978. Lower Cretaceous ammonites from the South Atlantic Leg 40 (DSDP), their stratigraphic value and sedimentologic properties. – Initial Reports of the Deep Sea Drilling Project **40**: 709–734.

WRIGHT, C.W. & KENNEDY, W.J. 1973. Paléontologie Systematique. – In: JUIGNET, P.; KENNEDY, W.J. & WRIGHT, C.W., La limite Cénomanien – Turonien dans la région du Mans (Sarthe): stratigraphie et paléontologie. – Annales de Paléontologie **59**: 207–242.

WRIGHT, C.W. & KENNEDY, W.J. 1981. The Ammonoidea of the Plenus Marls and the Middle Chalk. – Palaeontographical Society Monographs **134**: 1–148.

ZITTEL, K.A. von 1884. Cephalopoda. – In: ZITTEL, K.A. von, Handbuch der Palaeontologie: 329–522, Munich & Leipzig (Oldenbourg).

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