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NEW EARLY APTIAN RUDISTS (BIVALVIA-HIPPURITACEA) FROM THE HUETAMO AREA IN SOUTHWESTERN MEXICO

Gloria Alencáster and*
*Jerjes Pantoja-Alor**

ABSTRACT

The new taxa of caprinid rudists *Pantojaloria sphaerica* and *Caprina massei* are described. They are derived from a thick sequence of carbonate sediments recurrently interlayered with volcanic rocks, and correspond to a recently discovered lower Aptian fauna from the Huetamo area in the State of Michoacán in southwestern Mexico. The Mexican species are comparable with rudists from Trinidad and Venezuela. They are also somewhat similar to species from Cuba and Texas. The occurrence of similar paleobiota in such distant regions, suggests the existence of a large faunistic province during the early Aptian.

Key words: Lower Aptian, Huetamo, Michoacán, caprinid rudists, Hippuritacea.

RESUMEN

Se describe los nuevos taxa de rudistas caprínidos *Pantojaloria sphaerica* y *Caprina massei*, provenientes de una gruesa secuencia de sedimentos calcáreos interestratificados recurrentemente con rocas volcánicas y que corresponden a una fauna del Aptiano inferior recientemente descubierta en el área de Huetamo, Estado de Michoacán, en el sudoeste de México. Las especies mexicanas son comparables con rudistas de Trinidad y Venezuela. También son similares a especies de Cuba y Texas. La presencia de paleobiota similar en regiones tan distantes sugiere la existencia de una gran provincia faunística durante el Aptiano temprano.

Palabras clave: Aptiano inferior, Huetamo, Michoacán, rudistas caprínidos, Hippuritacea.

INTRODUCTION

In southwestern Mexico, in the westernmost hills of the Sierra Madre del Sur, near the town of Huetamo in the State of Michoacán, there are well exposed outcrops of a thick sequence of Cretaceous rocks ranging from the Neocomian to the Cenomanian in age. The thickest sequence, which measures up to 450 m, contains an interesting fauna of early Aptian age that has been recently discovered by Jerjes Pantoja-Alor.

The discovery of this fauna has been reported already (Alencáster and Pantoja-Alor, 1992; Alencáster *et al.*, 1992; Alencáster and Pantoja-Alor, 1993; Pantoja-Alor *et al.*, 1994). A taxonomic paper on *Amphitriscoelus* was prepared (Alencáster and Pantoja-Alor, in press) and the present is the second taxonomic paper. Pantoja-Alor is the author of the geologic aspects and the collecting of the fauna, and Alencáster is the responsible for the paleontological study.

PALEOBIOGEOGRAPHIC IMPLICATIONS

Pantojaloria sphaerica nov. gen., nov. sp. and *Caprina massei* nov. sp. are associated in the Huetamo area with *Amphitriscoelus waringi* Harris and Hodson (1922), *Amphitriscoelus pluriloculata* Alencáster and Pantoja (in press), and probable new species of both *Offneria* and *Horiopleura.*

Caprina massei is closely related to *Caprina douvillei* Paquier (1905) from the Urgonian of France, and from the Sligo Formation of Texas (Skelton, 1982), and probably from Cuba (Rojas *et al.*, 1992; Rojas e Iturralde, 1993). *Pantojaloria sphaerica* is very similar *to Praecaprina? pennyi* Harris and Hodson, from the lower Aptian of Trinidad, so much that they could correspond to the same taxon.

Amphitriscoelus waringi is present in the lower Aptian of Trinidad (Harris and Hodson, 1922) and Venezuela (Masse and Rossi, 1987), in Cuba (Rojas *et al.*, 1992), in Texas (Dechaseaux and Perkins, 1969) and in some other Mexican localities (Alencáster and Pantoja, in press). There are also in these places common species of foraminifers and calcareous algae (Pantoja-Alor *et al.*, 1994). This ample distribution of the same or closely related paleobiota is a clear evidence of the existence during the early Aptian of a vast faunistic homogeneous province, comprising Texas, the whole Mexican territory, the Caribbean region and a small northern part of South America (Pantoja-Alor *et al.*, 1994; Alencáster and Pantoja-Alor, in press).

GEOLOGIC SETTING

The Huetamo region is located at the north of the Balsas river, in the southeastern part of the Michoacán State, near the border with the State of Guerrero (Figure 1). Most of the southwestern part of Mexico corresponds to the Guerrero terrane (Campa and Coney, 1983) characterized by magmatic, volcaniclastic and sedimentary rocks typical of volcanic island arcs. The depositional framework of the Lower Cretaceous rocks corresponds to a complex tectonic process of uplifted

**Instituto de Geología, Universidad Nacional Autónoma de México, Ciudad Universitaria, Delegación Coyoacán, 04510 D.F., México*

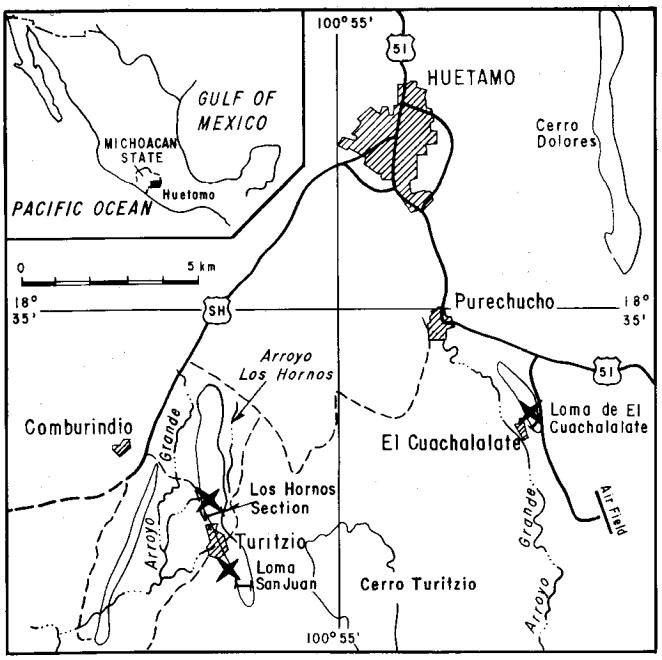

Figure 1. Locality map of the western Huetamo region, State of Michoacán, Mexico, showing collecting localities of *Pantojaloria sphaerica* Alencáster and *Caprina massei* Alencáster.

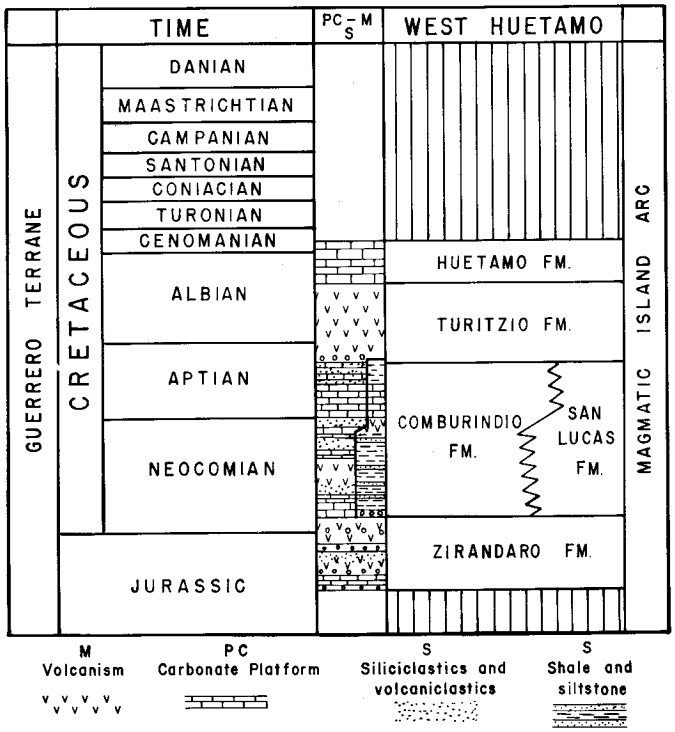

Figure 2. Stratigraphic column of the Cretaceous formations of western Huetamo region, State of Michoacán, Mexico.

and drowned tectonic blocks affected by volcanic constructive (endogenous) processes, and subaerial erosion, within a magmatic island arc in an active subduction margin. From the Late Jurassic to the Albian-Cenomanian, the region was overflowed by a regional transgression that affected the major part of southern Mexico. The Upper Jurassic and Lower Cretaceous sequences of the Huetamo region are the result of a transgressive system tract developed on a unstable tectonic shelf ramp which includes delta facies, shallow lagoon, carbonate platforms, reef environments, downdip talus turbidites, and basinal flysch facies. The Huetamo Quadrangle was divided by Pantoja-Alor (1993) in two parts, the western and the eastern Huetamo regions. The faunal assemblage of this investigation was collected in rocks of the western Huetamo region. The depositional systems were subdivided into five lithostratigraphic formational units (Figure 2). The lowest unit comprises rocks of Late Jurassic age and the other four belong to the Cretaceous, ranging from Berriasian to possibly Cenomanian.

LOCAL STRATIGRAPHY

The localities where the rudist material was collected were discovered by Pantoja-Alor. The specimens described here come from three outcrops of two complex biostromes. Two of the localities lay within the Comburindio Formation situated at the western flank of Cerro Turitzio and the third outcrop belongs to the upper part of the Terrero Prieto lower member of the San Lucas Formation and is located at the Loma El Cuachalalate, south of the town of Purechucho (Figure 1).

The oldest unit that crops out in the western Huetamo region is the Zirándaro Formation (Pantoja-Alor, 1993) of Late Jurassic age. This stratigraphic unit is a thick sequence of turbidites and deltaic red beds consisting of conglomerate, sandstone, and siltstone with interbedded reddish limestone and lava flows. The overlying Lower Cretaceous Comburindio Formation (Pantoja-Alor, 1993) consists of a 465 m thick sequence of quartzofeldspathic sandstone, argillaceous siltstones and interbedded volcaniclastics and lava flows, with four intercalated biostromal structures (Figure 3). An incomplete section 257 m thick, that includes three of these four biostromes, was measured in the Arroyo Los Hornos (Figure 1). Along the base of the third biostrome (Figure 3) of this section, the following samples were collected: JP-91264, JP-91268, JP-91303, JP-91304, JP-93392, and JP-93393. In the second biostrome (Figure 3), between the cemetery of Turitzio and the Arroyo Los Hornos, were collected two samples: JP-90235, and JP-91267. This reefal structure presents several vertical and horizontal facies. They vary from tightly packed (boundstone) to sparse rudists (floatstone) "bouquets" in fine-grained matrix (wackestone-packstone), and also colonies in high-energy environments (grainstone) and storm deposits (rudstones).

The other locality of the Comburindio Formation consists of several outcrops along a resistant rim of rudists (boundstone) with corals and sponges, that form a small hill known as Loma San Juan. At this area, a section of more than 90 m was measured (Figure 4). It shows the location of the collected sample JP-93-397.

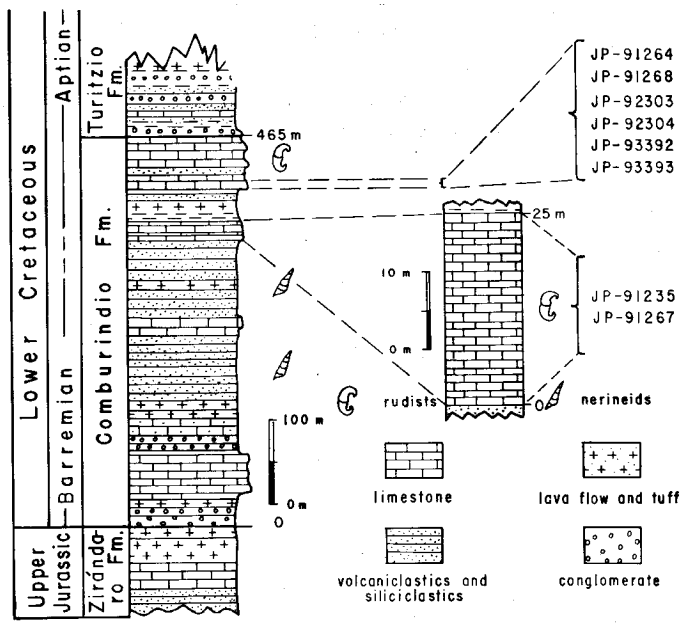

Figure 3. Stratigraphic column of the Los Hornos section, showing the horizons with *Pantojaloria sphaerica* Alencáster and *Caprina massei* Alencáster with the number of the samples.

In the eastern part of the western Huetamo region, the Lower Cretaceous is represented by the San Lucas Formation of Berriasian-Aptian age (Pantoja-Alor, 1959). This sequence of marine turbidites and flysch facies, including shale, siltstone, sandstone, conglomerate, and interbedded limestone, has been divided by Pantoja-Alor (1990) in two members: the Terrero Prieto member below and Las Fraguas member above. The Las Fraguas upper member does not crop out in the area of this research; its place is occupied by the volcanic and deltaic sediments of the lower part of the Turitzio Formation.

The lower Terrero Prieto member consists of shale, siltstone, fine- to medium-grained sandstone and conglomerate (turbidite) with lenses of argillaceous limestone, and biostromes of rudist reefs. There are a few horizons of explosive volcanic lava flows, and in other beds are observed evidences of soft-sediment deformation, such as syndepositional slumping, convoluted bedding and flame structures. The age of the lower part of this member was established by the ammonite *Taraisites bosei* Cantú and the aptychus *Lammelaptychus seranonis* Coquand of late Valanginian age, and by the ammonites *Subsaynella* and *Karsteniceras* of Barremian age, from the middle and upper part of this member (Gómez-Luna *et al.*, 1991).

The outcrop of the upper part of the Terrero Prieto lower member of the San Lucas Formation consists of four medium bedded (50 to 75 cm) biostromal structures. The specimens of two samples (JP-92354 and JP-92385) described from this locality were taken from a tightly packed rudist (boundstone) bed, 60 cm thick, that crops at the base of the biostromal complex (Figure 5).

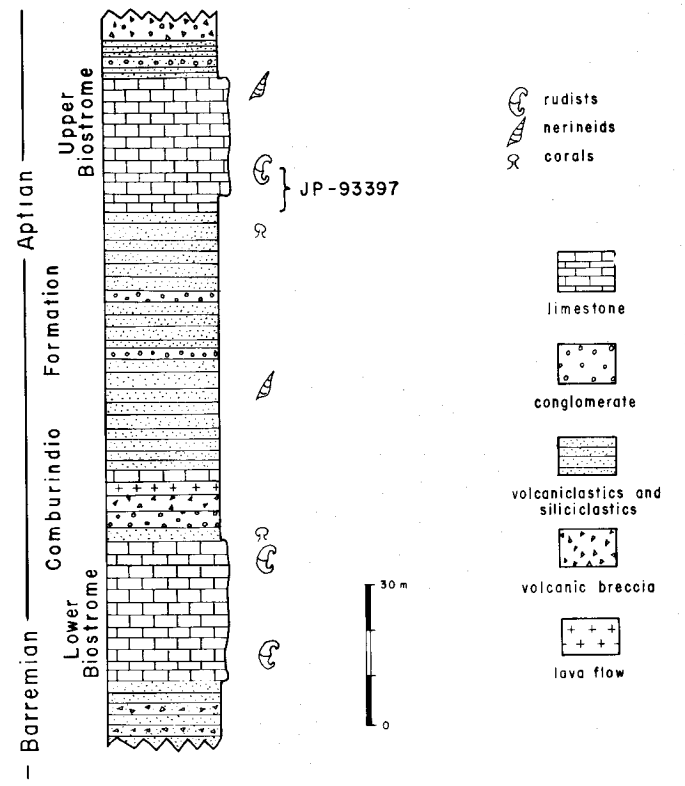

Figure 4. Stratigraphic column of Loma San Juan section, showing the horizon of *Pantojaloria sphaerica* Alencáster and *Caprina massei* Alencáster with the number of the samples.

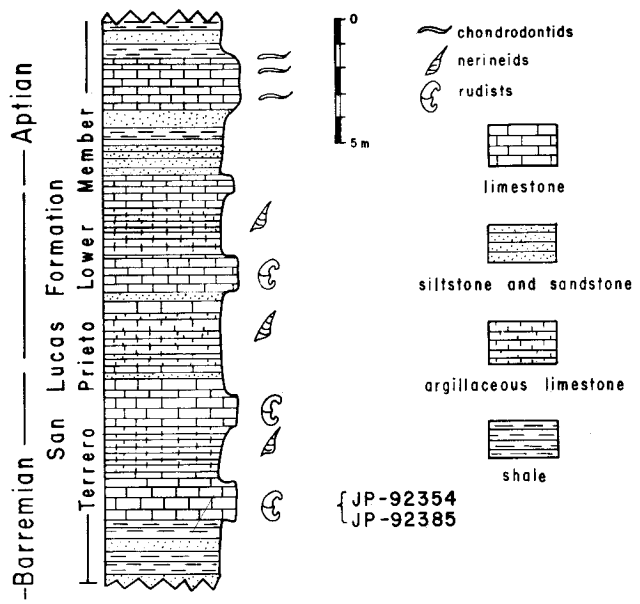

Figure 5. Stratigraphic column of the Cuachalalate section, showing the horizon of *Pantojaloria sphaerica* Alencáster and *Caprina massei* Alencáster with the number of the samples.

SYSTEMATIC PALEONTOLOGY

The repository of the studied specimens is the Museum of Paleontology of the Institute of Geology of the Universidad

Nacional Autónoma de México, in Ciudad Universitaria, Delegación Coyoacán, 04510 D.F., Mexico.

Order Hippuritoida Newell, 1965
Superfamily Hippuritacea Gray, 1848
Family Caprinidae d'Orbigny, 1850

Genus *Caprina* C. d'Orbigny, 1822

Type species—*Caprina adversa* A. d'Orbigny, S.D. Paquier, 1905, p. 69.

***Caprina massei* new species**
(Plate 1)

Diagnosis—Medium sized, hook-shaped species with valves joined at right angle; conical left valve loosely coiled with longitudinal ventral depression bordered by two ridges. Left valve with rectangular pallial canals separated by radial septa not bifurcated disposed all along the periphery except at posterior and dorsal margins of the posterior tooth. Right valve conical, straight, with small anterior dental socket and posterior accessory cavity narrow and long with the posterior dental socket expanded. There are neither pallial canals nor any other accessory cavities.

Description—Small to medium sized species, hook-shaped, with left valve conical, elongate, helicospirally twisted in a loose curve or a loose whorl and prosogyrate acute beak; high dyssymmetry between anterior and posterior flanks due to a flat longitudinal ventral depression bordered by two ridges or keels, being the anterior one, acute or rounded, more prominent than the posterior. Left valve cross section subtrigonal to subquadrate with the antero-ventral corner projected in an acute keel. The valves are joined in a right angle, with very oblique commissure.

Internal structure of left valve with large and subquadrangular body cavity; wide and large posterior dental socket joined to the wider and larger posterior accessory cavity without a septum; anterior tooth larger than the posterior, triangular, with ventral acute edge projected, joined to the transversal septum separating body cavity and posterior accessory cavity. Fusiform anterior muscle insertion extended from the anterior tooth to the antero-ventral corner along the body cavity; posterior muscle insertion extended from the ventral half of the posterior accessory cavity, to a little farther of the transversal septum (Plate 1, figure 8). Pallial canals all along the peryphery, with exception of the dorsal and posterior margins to the posterior tooth. They are rectangular with a few pyriform ones, with the wider portion toward the interior, separated by medium to thick radial septa, never bifurcated. They measure from 3 to 5 mm in length and from 1 to 2 mm in width. The smaller are from five to six in a centimeter, the larger from four to five in a centimeter. At the level of the posterior accessory cavity they are rounded and smaller, they grow a little along the ventral margin and the largest are at the level of the antero-ventral keel and along the anterior margin.

Right valve conical, straight, with cross section quadrangular to oval, seldom subcircular; ventral side flat or concave, body cavity large, quadrangular to elliptical; posterior accessory cavity narrow and elongated, with the posterior dental socket a little or much expanded (Plate 1, figure 12) joined with or without a septum between them; anterior dental socket small and ligamental cavity very small, anchor or hook-shaped (Plate 1, figures 11, 12, 14). There are not other accessory cavities nor pallial canals. The dimensions of the studied specimens are given in Table 1.

Table 1. Measurements (mm) of *Caprina massei* Alencáster

Specimens	Sample	Height	Diameter	
			A-P	D-V
Paratype IGM-6448 Both valves	JP-91264	70	33	23
Holotype IGM-6450 Both valves	JP-91267	90	40	31
Paratype IGM-6793 RV, incomplete	JP-91264	92	42	27
Paratype IGM-6794 RV, frag. LV	JP-91264	130	38	30
Paratype IGM-6795 Cross section LV	JP-91235	75	37	31
Paratype IGM-6796 RV, frag. LV	JP-91264	110	41	29
Paratype IGM-6796 RV, frag. LV	JP-91264	110	41	29
Paratype IGM-6797 RV, cross section	JP-92354	-	37	29
Paratype IGM-6798 RV, cross section	JP-92385	-	31	26
Paratype IGM-6799 Both valves	JP-92303	50	38	28
Paratype IGM-6800 RV, LV, incomplete	JP-91264	72	40	38
Paratype IGM-6801 LV, complete	JP-91264	65	32	27
Paratype IGM-6802 RV, LV, incomplete	JP-91267	127	41	37
Paratype IGM-6807 RV, LV, incomplete	JP-92354	79	32	21
Paratype IGM-6808 RV, cross section	JP-92354	-	39	33

Abbreviations: IGM, Institute of Geology, Mexico; JP, Jerjes Pantoja; A-P, antero-posterior; D-V, dorso-ventral; RV, right valve; LV, left valve; frag., fragment.

Plate 1. *Caprina massei* Alencáster (all figures at natural size). Figures 1, 2—Paratype IGM-6448, both valves, posterior and anterior views. Figure 3—Paratype IGM-6807, both valves, left valve incomplete, postero-ventral view. Figure 4—Paratype IGM-6796, both valves, left valve incomplete, postero-ventral view. Figures 5, 6—Paratype IGM-6799, both valves incomplete, postero-ventral and dorsal views. Figure 7—Holotype IGM-6450, left valve cross section. Figure 8—Paratype IGM-6795, left valve cross section. Figure 9—Paratype IGM-6801, left valve cross section. Figure 10—Paratype IGM-6797, left valve cross section. Figure 11—Paratype IGM-6808, right valve cross section. Figures 12, 13—Paratype IGM-6800, right and left valves cross sections. Figure 14—Paratype IGM-6798, right valve cross section.

Derivation of name—*Caprina massei* sp. nov. is dedicated to Jean Pierre Masse, from the University of Provence at Marseille, France, in attention to his significative and interesting research on Lower Cretaceous rudists.

Discussion—*Caprina massei* sp. nov. is very similar to *Caprina douvillei* Paquier (1905, p. 69, pl. 11, figs. 10-14) from the Urgonian of Provence, France, in the distribution, size and shape of the pallial canals, as well as in the shape and relative size of the body and posterior accessory cavities. They differ because *C. douvillei* is a smaller species with left valve short and a reduced beak, and the pallial canals show some bifurcated septa, while in *C. massei* the radial septa are never bifurcated. However, the main differences are in the right valve. In *C. douvillei* the posterior accessory cavity is frequently divided in several smaller cavities and there are also anterior accessory cavities. In *C. massei* there are only the entire posterior accessory cavity and the anterior dental socket. In the left valve of *C. douvillei* there is an anterior accessory cavity, which is lacking in *C. massei.*

Caprina andersoni Harris and Hodson (1922, p. 134) from the lower Aptian of Trinidad (Masse and Rossi, 1987, p. 355) differs from *C. massei* in the trochospiral mode of coiling and in the polyfurcation of radial septa in the ventral corners. *Caprina plumensis* Harris and Hodson (1922, p. 134) also from the lower Aptian of Trinidad (Skelton, 1982, p. 147; Masse and Rossi, 1987, p. 354) is similar to *C. massei* in the helicospiral mode of coiling of left valve but differs greatly because it has about four or five large quadrangular divisions of the posterior accessory cavity and very small quadrangular canals anteriorly and irregular cavities in the ligamental region.

Caprina cf. *adversa* C. d'Orbigny, from Cerro Escamela in Orizaba, Mexico (Boehm, 1898, p. 326, figs. 2, 3) seems to be *Planocaprina* (Coogan, 1977, p. 52) or *Coalcomana*. Other species of *Caprina* are not comparable to *C. massei.*

Occurrence and stratigraphic position—Western Huetamo region, State of Michoacán, Mexico, Cerro Turitzio, Los Hornos section (JP-91235, JP-91264, JP-91267), Comburindio Formation of early Aptian age; eastern part of western Huetamo region, in Sierrita del Cuachalalate (JP-92-354, JP-92385), Terrero Prieto lower member of the San Lucas Formation, early Aptian age.

Genus *Pantojaloria* gen. nov.

Type species—*Pantojaloria sphaerica* sp. nov., by original designation.

Diagnosis—Shell large, inequivalve; left valve tightly coiled in a whole whorl with beak prosogyrate and ventral side prominently convex; right valve subconical and straight with ventral side slightly convex. Internal structure similar in both valves; muscle insertions separated from shell wall by a posterior row and an antero-dorsal row of a few, large pallial canals; ventral margin without canals. Body cavity large, trigonal in the left valve and elliptical in the right valve with a short longitudinal ridge near the anterior side of the ventral floor. Large ligamental cavity. Posterior accessory cavity of coalcomaninid shape in both valves.

Derivation of name—*Pantojaloria* gen. nov. is dedicated to Jerjes Pantoja-Alor, who studied geologically the Huetamo region, where he discovered the lower Aptian rocks and collected the material of the new taxon.

Discussion—*Pantojaloria* gen. nov. is comparable to *Praecaprina* Paquier (1905) and to *Amphitriscoelus* Harris and Hodson (1922) by the presence of a posterior row of large pallial canals that increase in size from the dorsal to the ventral region, an antero-dorsal row of smaller and more numerous pallial canals and absence of canals in the ventral region. *Pantojaloria* and *Praecaprina* are similar also because the left valve is coiled in a whole whorl and the right valve is conical; besides, in both genera there is a short rib in the ventral floor of the body cavity. *Amphitriscoelus* is also similar to *Pantojaloria* in the fact that the internal structure is the same in both valves and the posterior accessory cavity is of coalcomaninid type.

Praecaprina is the closest related genus to *Pantojaloria.* The main difference between these two genera is the existence in both valves of *Praecaprina*, of a longitudinal ventral depression bordered by two swellings or ridges, while the ventral region of the new genus is prominently convex. This flat ventral surface and ridges or keels is a constant feature common in many genera of Caprinidae, as *Caprina, Amphitriscoelus, Coalcomana, Caprinuloidea, Mexicaprina, Kimbleia,* etc. As this character is of suprageneric level, its absence in *Pantojaloria* might be significative.

The second remarkable difference of the new genus with *Praecaprina* and *Amphitriscoelus*, refers to the size; these two genera have small shells, and *Pantojaloria*, the contrary, has a large, gigantic shell.

Another difference between *Pantojaloria* and *Praecaprina* is the internal structure, which in the new genus is equal in both valves, while in *Praecaprina* is different in each valve, having in the right valve, besides the two dental sockets, a large anterior accessory cavity which is not present in *Pantojaloria,* and a large, elongated posterior accessory cavity not of coalcomaninid shape, which can be entire or divided in two, three, or more small cavities.

Regarding *Amphitriscoelus*, it differs from *Pantojaloria* in having a short, slightly prosogyrate not coiled beak and a pentagonal, body cavity without ventral rib. *Amphitriscoelus* lacks a ligamental cavity, because the open ligamental groove does not give rise to a cavity at any stage of growth. *Pantojaloria* is in a lesser degree, comparable to the Caprotinidae *Pachytraga* (Paquier, 1905) from the Urgonian of Provence,

France, in the trigonal body cavity and in the ventral rib of the cavity. They differ because *Pachytraga* has a ventral depression with ridges, and by the absence of pallial canals.

Pantojaloria sphaerica sp. nov.
(Plates 2, 3, 4)

Diagnosis—As for genus.

Description—Shell large to gigantic with valves of similar size or taller the right valve. Left valve spherical, coiled in a whole tightly close whorl with a wide and convex, strongly prosogyrate acute beak. Cross section semicircular, anteroposteriorly longer; dorsal margin straight or concave, anterior, ventral and posterior margins forming a continuous semicircular curve; anterior and posterior corners as wide and round ridges.

Teeth large of trigonal basis, the anterior with ventral acute edge joined to the transversal septum separating the body cavity from the posterior accessory cavity, as in all Coalcomaninae. Body cavity large of trigonal shape, with the interior of the ventral wall provided with a short, acute longitudinal rib or fold—cordon or saillie of Paquier, 1905, p. 63, 66, 73—near the anterior side, from where the cavity narrows down by the projecting anterior muscle insertion into a curved and acute ending in the antero-ventral corner, corresponding to the main round ridge of the valve. This oval, incompletely closed canal was considered by Paquier (*op. cit.*, p. 66) as a probable rectum tract in *Pachytraga.*

Muscle insertions separated from shell wall by single rows of pallial canals with radial thin or thick not bifurcated septa between them, being the posterior row formed by a few—five to eight—large, oval, circular or quadrangular pallial canals, regularly increasing in size from the dorsal to the ventral side; they measure from 5 to 15 mm. Antero-dorsal row with smaller and more numerous—about seven to 12—pallial canals irregularly disposed in size and of variable shape from circular to quadrangular; they measure from 3 to 10 mm. Ventral margin without canals. Posterior accessory cavity of coalcomaninid shape, like a bottle with the narrow neck joined to the ventral wide portion without a dividing septum.

Right valve straight, subconical, outer surface smooth, sometimes provided with a few subdued transversal, wide growth ridges. Narrow ligamental groove in a slightly concave smooth band. Cross section elliptical, elongated antero-posteriorly, with dorsal margin flat and ventral margin slightly convex. Body cavity larger than in the left valve, elliptical to oval, with the longitudinal ventral rib continuing from the left valve only near the commissure. Posterior accessory cavity smaller than in the left valve, of coalcomaninid shape near the commissure, circular to oval far from the commissure. In well-preserved specimens, the posterior and anterior pallial canals are continuous from the left to the right valve. Usually they are obliterated by recrystallization. The anterior dental socket is large, oval to circular, provided in the ventral margin with a few, acute prongs. The dimensions of the studied specimens are given in Table 2.

Table 2. Measurements (mm) of *Pantojaloria sphaerica* Alencáster.

Specimens	Sample	Height	Length along the coil	Diameter	
				D-V	A-P
Holotype IGM-6446 Both valves	JP-92304	200	511	-	140
Paratype IGM-6447 LV	JP-92304	115	-	80	100
Paratype IGM-6449 Cross Section LV	JP-92304	-	-	80	-
Paratype IGM-6360 RV	JP-91264	175	-	53	95
Paratype IGM-6781 LV	JP-93392	-	-	77	85
Paratype IGM-6782 RV	JP-93397	225	-	65	105
Paratype IGM-6783 LV, incomplete	JP-93397	85	-	58	80
Paratype IGM-6784 LV, complete	JP-93393	155	520	65	110
Paratype IGM-6785 LV, complete	JP-91268	160	430	90	90
Paratype IGM-6786 LV, complete	JP-92393	160	330	70	110
Paratype IGM-6787 LV, fragment RV	JP-91268	160	400	78	93
Paratype IGM-6788 RV, incomplete	JP-91264	233	-	37	78
Paratype IGM-6789 LV, incomplete	JP-91264	140	360	73	110
Paratype IGM-6790 LV, complete	JP-93393	160	460	75	100
Paratype IGM-6791 LV, complete	JP-93392	150	540	55	100
Paratype IGM-6792 Both valves	JP-93392	205	-	60	85
Paratype IGM-6805 RV, incomplete	JP-93392	140	-	75	96
Paratype IGM-6806 RV, incomplete	JP-93392	220	-	63	102

Abbreviation: IGM—Institute of Geology, Mexico; JP—Jerjes Pantoja; DV—dorso-ventral; AP—antero-posterior; incomp.—incomplete; compl.—complete; frag.—fragment; LV—left valve; RV—right valve.


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Derivation of the name—The specific name of *Pantojaloria sphaerica* refers to the spheric, round form of the left valve.

Discussion—*Pantojaloria sphaerica* new species is represented by many specimens, some of them complete, which permitted to know the external and internal characteristics of the species. However, the outer shell wall is preserved only in small portions, having been destroyed by bioerosion, caused by clionid boring sponges (Buitrón and Pantoja-Alor, 1995). As a consequence, the pallial canals are seldom preserved, besides being recrystallized, mainly in the right valve. Only in a few specimens it was possible to see the continuation of the structures through both valves, especially the pallial canals, the ventral rib, the teeth and the dental sockets. It is a very interesting feature that these structures change at different levels of growth. The internal structures of the left valve are continuous to the right valve only near the commissure. Far from the commissure the pallial canals and the ventral rib gradually disappear and the body cavity grows larger and elliptical while the posterior accessory cavity is reduced to an oval or circular small cavity. Near the commissure, this cavity is of coalcomaninid shape in both valves.

In 1922, Harris and Hodson described a rudist caprinid assemblage from the lower Aptian of Trinidad, composed of the new taxa *Amphitriscoelus waringi, Kipia trinitaria, Caprina plumensis, Praecaprina andersoni* and *Praecaprina? pennyi. Praecaprina andersoni* was based only in left valves and is provided with canals in the ventral margin (Skelton, 1982), being probably a species of *Caprina* (Masse and Rossi, 1987). Regarding *Praecaprina? pennyi*, which was doubtfully assigned by the authors to this genus, it was based on coarsely recrystallized material (Skelton, 1982, p. 151) insufficiently described. On account of the paper by Harris and Hodson (1922), Mac Gillavry (1937, p. 139) considered that the occurrence of *Praecaprina* was not proved in America. However, in spite of poorly described and illustrated, *Praecaprina? pennyi* (Harris and Hodson, 1922, p. 135, pls. 10, 11) can be recognized as a large species with a thick shell wall, a conical right valve and a rounded and coiled left valve with prominently prosogyrate beak, and with a few, large anterior and posterior pallial canals, which are absent in the ventral margin. This species is very similar to *Pantojaloria sphaerica* in many aspects. It is possible that the specimens of Mexico and Trinidad belong to the same taxon. The largest specimen from Trinidad measures 186 mm of length and 55 mm of diameter, corresponding to the size of some of the Mexican specimens. The specific name cannot be used to designate the Mexican species because there is not the absolute certainty that they are conspecific, and besides, due to the scarce description, *Praecaprina? pennyi* has not been accepted as a valid name (Masse and Rossi, 1987, p. 355).

Nevertheless, in support of the assumption that the specimens of the two regions may belong to the same species, there is the fact that the associated paleobiota is similar in both places, as it was mentioned above.

Occurrence and stratigraphic position—Western Huetamo region, State of Michoacán, Mexico, Cerro Turitzio, Los Hornos section (JP-91264, JP-91268, JP-92304, JP-93392, JP-93393) and Loma San Juan (JP-93397); Comburindio Formation of early Aptian age.

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Plate 2. *Pantojaloria sphaerica* Alencáster. Figures 1, 2—Holotype IGM-6446; *1*, profile posterior view (x 0.60); *2*, profile anterior view (x 0.40). Figures 3, 4—Paratype IGM-6782; *3*, right valve cross section, apertural view (x 0.75); *4*, right valve ventral view (x 0.50). Figure 5—Paratype IGM-6788, incomplete right valve (x 0.45), posterior profile. Figure 6—Paratype IGM-6793 (x 1), right valve cross section, apical view.


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Plate 3. *Pantojaloria sphaerica* Alencáster. Figure 1—Paratype IGM-6360 (x 0.70), incomplete right valve, dorsal view. Figure 2—Paratype IGM-6449 (x 1), left valve cross section, apical view, showing pallial canals, teeth, and posterior accessory cavity, apical view. Figure 3—Paratype IGM-6785 (x 0.50), left valve cross section showing the teeth. Figure 4—Paratype IGM-6792 (x 0.45), both valves, posterior view. Figure 5—Paratype IGM-6784 (x 0.45), left valve ventral view. Figure 6—Paratype IGM-6783 (x 0.70), left valve cross section. Figure 7—Paratype IGM-6780 (x 1), right valve cross section showing body cavity, and anterior and posterior accessory cavities.

Plate 4. *Pantojaloria sphaerica* Alencáster. Figure 1—Paratype IGM-6787 (x 0.45), left valve and part of right valve, postero-ventral view. Figure 2—Paratype IGM-6447 (x 0.75), left valve tangential cross section, apical view. Figure 3—Paratype IGM-6447 (x 0.50), left valve cross section, apertural view, showing posterior pallial canals, body cavity and posterior accessory cavity. Figure 4—Paratype IGM-6790 (x 0.50), left valve anterior view. Figure 5—Paratype IGM-6789 (x 0.45), left valve posterior view. Figure 6—Paratype IGM-6788 (x 0.45), right valve, anterior profile. Figure 7—Paratype IGM-6781 (x 0.75), left valve cross section, apical view. Figure 8—Paratype IGM-6360 (x 0.75), right valve cross section, apertural view.