A NEW SPECIES OF THE GENUS *HIPPURITELLA* DOUVILLÉ, 1908 FROM THE MAASTRICHTIAN OF SOUTH YEMEN AND NORTHERN SOMALIA

José María Pons 1, Sandro Realí 2 and Dario Sartorio 2

ABSTRACT

*Hippuritella sharwaynensis* sp. nov. is described from the Maastrichtian (Sharwayn Formation) of Yemen; this species also occurs in the lower part of the Auradu limestones in northern Somalia, from where two badly preserved specimens were identified as *Hippuritella* sp. gr. *toucasi* (d’Orbigny) by the first author. The pore-canonical system of the left valve and the pattern of pillars and myo-cardinal apparatus relate this species with the *Toucasia* (1903-1904) group of *Hippuritella toucasi* (d’Orbigny), but the development of the ligamentary crest does not fit with the evolutive model currently accepted for this group of hippuritids. This species occurs together with *Hippurites cornucopiæae* De France and larger *Foraminiferia*, all of them indicating a late Maastrichtian age.

Key words: *Hippuritella*, *Hippuritella toucasi* (d’Orbigny), Maastrichtian, Yemen, Somalia, rudists.

RESUMEN

Se describe la especie nueva *Hippuritella sharwaynensis* del Maastrichtiano de Yemen. Esta especie también se encuentra en la parte inferior de la Caliza Auradu al norte de Somalia, donde fueron identificados dos ejemplares mal conservados de *Hippuritella* sp. gr. *toucasi* (d’Orbigny) por el primer autor. El sistema poro-canonal de la valva izquierda y el patrón de los pilares y del aparato mio-cardinal relacionan a esta especie con el grupo de Toucasia de *Hippuritella toucasi* (d’Orbigny), pero el desarrollo de la cresta ligamentaria no coincide con el modelo evolutivo generalmente aceptado para este grupo de especies de hippuritidos. Esta especie está asociada con *Hippurites cornucopiæae* De France y foraminíferos grandes que indican una edad de Maastrichtiano tardío.

Palabras clave: *Hippuritella*, *Hippuritella toucasi* (d’Orbigny), Maastrichtiano, Yemen, Somalia, rudistas.

INTRODUCTION

An interesting rudist assemblage from the lower part of the Auradu limestones, near Bosaso in northern Somalia (Figure 1), was recently described by Pons and coworkers (1992). This assemblage, of Maastrichtian age, includes several genera and among them two specimens referred to *Hippuritella* sp. gr. *toucasi* (d’Orbigny). The discovery in the opposite side of the Gulf of Aden, near Ras Sharwayn in southern Yemen, of a complete specimen of the same rudist with the left valve almost entirely preserved, gives more information about this form and allows to propose a new species of Hippuritidae.

GEOLOGICAL SETTING

South Yemen and northern Somalia belong to the same palaeogeographic domain: the Afro-Arabic Plate evolving under extensional tectonics leading to creation during the Tertiary of the Gulf of Aden. Ras Sharwayn is a promontory located in the Gulf of Aden near Quishn town, along the coast of southern Yemen. In this locality the type section of the Sharwayn Formation crops out.

1*Departament de Geologia*, Facultat de Ciències, Edifici C, Universitat Autònoma de Barcelona, 08193 Bellaterra, Barcelona, Spain.
2Agip SpA, 20097 San Donato Milanese, Milano, Italy.

This unit, defined by Wetzel and Morton (unpublished data, 1948; see Beydoun, 1964, 1966), is present in the eastern part of southern Yemen and Dhofar—Sultanate of Oman. At Ras Sharwayn it rests unconformably upon the Mukalla Formation, of Senonian age. The contact with the overlying Tertiary limestone is marked by another important regional unconformity (Beydoun, 1966; Plateel and Roger, 1989; Roger et al., 1989).

After the geological reconstruction proposed by Beydoun (1970), showing the relationships between southern Yemen and northern Somalia before the opening of the Gulf of Aden, it could be inferred that the sectors including Ras Sharwayn and Bosaso areas during the Cretaceous were very close. In fact, the Sharwayn Formation shows astonishing lithological affinities, besides the dominant yellowish and brown colours, with the Maastrichtian of northern Somalia—lowermost part of the Auradu limestones.

The Sharwayn Formation is correlated with the Sinsima Formation, cropping out around the Oman Mountains (Nolan et al., 1990; Skelton et al., 1990), and the Aruma Formation of Saudi Arabia. In fact, this unit testifies a transgressive event that affected many sectors of the Arabian Shield at the end of Maastrichtian and allowed the diffusion of typical foraminiferal assemblages dominated by *Loftusia* and *Pseudedonia*. This unit reaches about 60 m of thickness at Ras Sharwayn and surroundings. The lower part consists of yellowish and brown
Type species—Hippurites maestrei Vidal, 1877 from de Santonian of Serra del Montsec (Pyrenees, Catalonia, Spain).

Hippuritella sharwaynensis sp. nov.
(Plate 1, figures 1, 2; Figures 2, 3)

- 1949 Hippurites (Orbignya) radiosus des Moulinis: Tavani, p. 12, pl. 1, fig. 5; pl. 4, fig. 8.
- 1949 Hippurites (Orbignya) aff. radiosus des Moulinis: Tavani, p. 12, pl. 4, fig. 3.
- 1992 Hippuritella sp. gr. toucasi (d’Orbigny); Pons in Pons and coworkers, p. 223, text-figs. 6a-b, 7.

Derivation of name—After the promontory of Ras Sharwayn, the type locality.

Holotype—A complete specimen with both valves (PUAB-28.817), housed in the Palaeontological Collections of the Universitat Autònoma de Barcelona, from the Sharwayn Formation, late Maastrichtian, in a stratigraphical section (51°35'00" E, 15°22'36" N) cropping out at about 10 km NW from the promontory of Ras Sharwayn in South Yemen.

Additional material—Two fragments of right valves from the type locality (PUAB-28.818 and 28.819).

Diagnosis—Hippuritid with simple pore-canal system, polygonal pores, presenting spines (three to five) when well preserved, and developing pustules at the beginning of each canal, in the left valve. In the right valve, the three inner folds are very close together and develop, externally, well marked radial furrows. In the transverse section, the ligamentary crest appears poorly developed, triangular, normally pointing towards the anterior side and with truncated apex; the first pillar is short but longer than the ligamentary crest; the second pillar is pedunculated in fully developed specimens; teeth are located far from the ligamentary crest and from the antero-dorsal inner margin of the shell; the posterior myophore, long and thin, clearly passes the end of the first pillar.

Description—Total height of the shell, measured perpendicularly to the commissural plane, is 13 cm. As far as it can be deduced from right valve’s growth lines, at the beginning growth was faster at the antero-ventral side, and later at the postero-dorsal side; the result was the horn-shape of the valve. The outer surface, without any rib, is only affected by the growth lines and three deep radial furrows corresponding to the three inner folds. The transversal section is sub-circular, flattened at the side corresponding to the two pillars. The maximum diameter measures 7.7 cm; a diameter of 6 cm was reached at only 4 cm height.

Systematic Palaeontology

Order Hippuritoida Newell, 1965
Superfamily Hippuritaceae Gray, 1848
Family Hippuritidae Gray, 1848
Genus Hippuritella Douvillé, 1908

Plate 1. Figures 1, 2—Hippuritella sharwaynensis sp. nov. Palaeontological Collections of the Universitat Autònoma de Barcelona, PUAB-28.817, details of the pore-canal system of the left valve; 1, x 2.3, 2, x 4.6. Figure 3—Hippuritella sulcatisima (Douvillé). Palaeontological Collections of the Universitat Autònoma de Barcelona, PUAB-1.783, details of the pore-canal system of the left valve, Montsec, Pyrenees, Spain, upper Santonian, x 4.6.
The left valve, quite well preserved, is free of sediment on most of its ventral half (Plate 1, figures 1, 2). The pore-canal system is simple, the porose layer is very thin and the pores open directly to the radial canals. Canals can reach a width as much as 3 mm and new canals begin to develop over the old ones, until there is enough space to accommodate, forming pustules. The pores are polygonal, densely packed and do not present any particular arrangement. From six to eight pores can be counted along the width of a canal. The pores, when well preserved, present three to five inward growing small spines, provoking a star-shaped aperture. Osicles are not observable because the corresponding surface of the valve is covered by sediment.

The transverse section of the right valve (Figure 2), 1 cm below the commissure, shows that the three inner folds, marked externally by deep furrows, are very close one to another, covering less than one fifth of the total perimeter. The ligamentary crest is triangular and poorly developed, the apex is turned towards the anterior side and truncated. The first pillar is robust and short—length equals width—but longer than the ligamentary crest. The second pillar is pedunculated, the head is slightly thinner than the first pillar and turned towards it. The section of the anterior tooth is more than twice the area of the posterior one; both teeth are located far from the ligamentary crest and from the antero-dorsal inner margin of the shell. The posterior myophore is long and thin, it is centered between the posterior tooth and the first pillar and clearly passes the end of this last.

As can be observed in the seriate transverse sections (Figure 2), major variations, affecting the shape of the pillars, occur during growth. The first pillar, wider than long in the first sections, becomes squared. The second pillar, very similar to the first one at the beginning, becomes rectangular and long, and later, pedunculated. No variation is observed in the ligamentary crest.

Two other specimens have been sectioned (Figure 3); the first one corresponds to an adult specimen with the two pillars very close to each other, compared with the holotype, the myocardinal apparatus is still farther from the ligamentary crest and from the antero-dorsal inner margin of the shell; the ligamentary crest is a little bit more developed. The second section corresponds to a young specimen with the second pillar still not pedunculated.

**Remarks**—The left valve’s pore-canal system described above for *Hippuritella sharwayensis* sp. nov. shows no difference with that of the species of the Toucas’ (1903-1904) group of *H. toucasi* (d’Orbigny)—see detail of *H. sulcatisima* (Douvillé) in Plate 1, figure 3—the pattern of the pillars and the myocardinal apparatus is also very similar. Apparently, there is no problem including the new species in that group, as its Maastrichtian representative, but the ligamentary crest, although poorly developed, is triangular and presents a truncated apex, currently considered to be a primitive character. In the authors’ opinion, the succession of characters used in the evolutive models in hippuritids is not properly established and a completely new approach to the systematics of Hippuritidae is urgently needed.
BIBLIOGRAPHICAL REFERENCES


Manuscript received: May 18, 1994.
Corrected manuscript received: August 23, 1995.
Manuscript accepted: September 6, 1995.