Revista Mexicana de Ciencias Geológicas, volumen 12, número 2, 1995, p. 179-184.
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CAPRINULA AFF. *CEDRORUM* (BLANCKENHORN, 1890) FROM THE UPPER CENOMANIAN OF WESTERN ALGERIA

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ABSTRACT

Caprinid facies occur in the upper Cenomanian of Algeria as rich and diverse caprinid associations at the East (Constantinois and Hodna p.p.), already described by Douvillé (1910), Glaçon (1952), Van de Fliert (1955), Bär (1957) and Vila (1980), and as monogeneric (Caprinula) associations at the West (Djebel Zriga and Bechar), here reported for the first time. Caprinids from these two last localities are described and identified as *Caprinula* aff. *cedrorum* (Blanckenhorn). Discussion about this species lead to confirm the poor actual knowledge about the morphology of most *Caprinula* species and the uncertainties about their stratigraphical and geographical distribution.

Key words: upper Cenomanian, Algeria, *Caprinula*, *Caprinula* aff. *cedrorum*.

RESUMEN

Las facies de caprínidos están en el Cenomaniano superior de la parte oriental (Constantinois y Hodna p.p.) de Argelia como asociaciones ricas y diversas que han sido descritas por Douvillé (1910), Glaçon (1952), Van de Fliert (1955), Bär (1957) y Vila (1980); en la parte occidental (Djebel Zriga y Bechar) están presentes como asociaciones monogenéricas (*Caprinula*) que aquí son consignados por primera vez. Los caprínidos de estas dos últimas localidades son descritos e identificados como *Caprinula* aff. *cedrorum* (Blanckenhorn). El estudio de esta especie permitió constatar el escaso conocimiento que se tiene en la actualidad sobre la morfología de la mayor parte de las especies de *Caprinula* y la incertidumbre sobre su distribución geográfica y estratigráfica.

Palabras clave: Cenomaniano superior, Argelia, *Caprinula*, *Caprinula* aff. *cedrorum*.

INTRODUCTION

Caprinid facies crop out in rather small areas at the eastern and western parts of Algeria (Figure 1). Outcrops in the Constantinois are the best known (Douvillé, 1910; Van de Fliert, 1955; Bär, 1957; Vila, 1980), the fauna is diversified and similar to that described in many other Mediterranean areas like Tunisia, Italy, Sicily and Istria. Glaçon (1952, p. 80) reported the presence of *Caprinula* "reefs" around the Hadjar-el-Abiod massif in the eastern part of the Hodna.

At Djebel Zriga, in the southern part of the Hauts Plateaux, erosion sets off some mounds, of metric scale, completely built by big specimens of *Caprinula*. This level becomes laterally more massive and ferruginous, and the fauna disappears. This outcrop was pointed out by Cornet (1950) as an upper Albian caprinid bed.

Caprinula has been also found in the small ledge called "first barga", near Bechar, where specimens are rare and small. Deleau (1952, p. 56) mentioned "Hippurites" there.

No *Caprinula* was found in the part of the Saharian Atlas that separates these two outcrops; upper Cenomanian consists of limestones that include ammonites (*Vascoceras* gr. *gamai* Choffat) in the northern edge and radiolitids (*Durania arnaudi* Choffat) in the southern margin.

SYSTEMATIC PALAEONTOLOGY

Order Hippuritoida Newell, 1965

Superfamily Hippuritacea Gray, 1848

Family Caprinidae d'Orbigny, 1850

Genus *Caprinula* d'Orbigny, 1847

Type species—Caprina boissyi d'Orbigny, 1839 from the upper Cenomanian of Fourtoux, Corbières, southern France.

Caprinula aff. *cedrorum* (Blanckenhorn, 1890)

(Plate 1, figures 1, 2; Plate 2, figures 1-5)

Compare:

1910 *Caprinula cedrorum* (Blanckenhorn); Douvillé, p. 63, pl. 6, fig. 1.

1933 *Caprinula cedrorum* (Blanckenhorn); Keller, p. 46, fig. 12.

1943 *Caprinula cedrorum* (Blanckenhorn); Dechaseaux, p. 37, text-figs. 1-7.

Material—Ten sections and four internal molds (FC801-FC814) from Djebel Zriga and two sections of left valves (CD1-CD2) from Bechar. Dissolution is very important and well preserved specimens are rare. All specimens are housed in the Palaeontological Museum of the University of Algiers.

Description—The left valve is bigger than the right one. It is about 25 cm long and 8 cm in diameter. Only three specimens show the general shape, loosely coiled. The right valve is conical, straight or gently curved; it is about 10-12 cm high and 6-8 cm in diameter. External molds show that ornamentation consists of thin longitudinal ribs and transverse plications.

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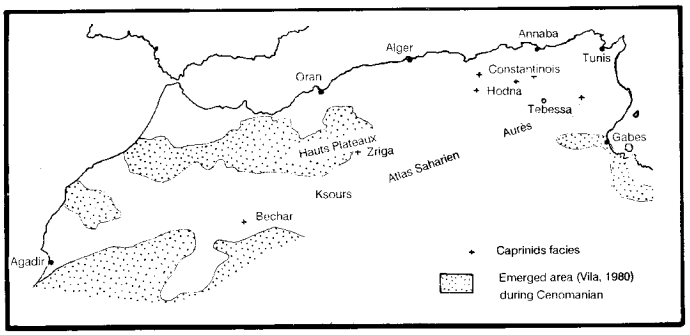

Figure 1. Geographic distribution of caprinid facies in the Maghrebian area.

The outer shell layer of the left valve presents the typical canal pattern of *Caprinula*. Canals of the inner row are big, polygonal and with more or less rounded angles; their size decreases towards the ventral part. Canals of the median row are smaller and rounded, those of the external one are pyriform.

The general cavity is divided by a plate which joins the anterior tooth to the ventral margin and delimits a medium-sized posterior accessory cavity, much smaller than the general cavity which is heart-shaped in section. The cardinal platform is partly preserved, the anterior tooth is well developed and rather polygonal in shape, sometimes showing a posterior crest; the posterior tooth is smaller. A plate connects them and divides the dental socket. Big accessory cavities develop at the external part of the anterior myophore.

Discussion—Although *Caprinula cedrorum* (Blanckenhorn) and *C. boissyi* d'Orbigny are very similar (Figure 2), the first species differs from the type-species in having a smaller posterior accessory cavity, sometimes divided at its posterior part, and a more oblique anterior tooth with a more or less protruding posterior crest.

Nevertheless, our attribution is still considered provisional because many uncertainties arise when carefully reviewing the literature concerning this genus:

Many species of *Caprinula* have been described by several authors but no comparative study among them has been done since Douvillé (1888), although it is well known that the morphology of canals and accessory cavities, used to identify them, depends on the position and orientation of the sections.

Even the holotype of the type-species *Caprinula boissyi* as figured by d'Orbigny (1847, p. 187, pl. 540, fig. 1) differs from the specimen figured by Douvillé (1888, p. 707, pl. 22, fig. 1).

It is not clear if *Caprinula brevis* Sharpe and *C. sharpei* Choffat are synonyms as suggested by Douvillé (1888), or how the internal characters of *C. dorbignyi* Sharpe are. The material from Portugal studied by Douvillé (1888, p. 708, pls. 22, 23) was not abundant and sufficiently preserved to conclude.

Caprinula subquadrata is represented only by one incomplete specimen (transverse section of the left valve). Similarity between this species and *C. cedrorum* (Blanckenhorn) was suggested by Polšak (1967).

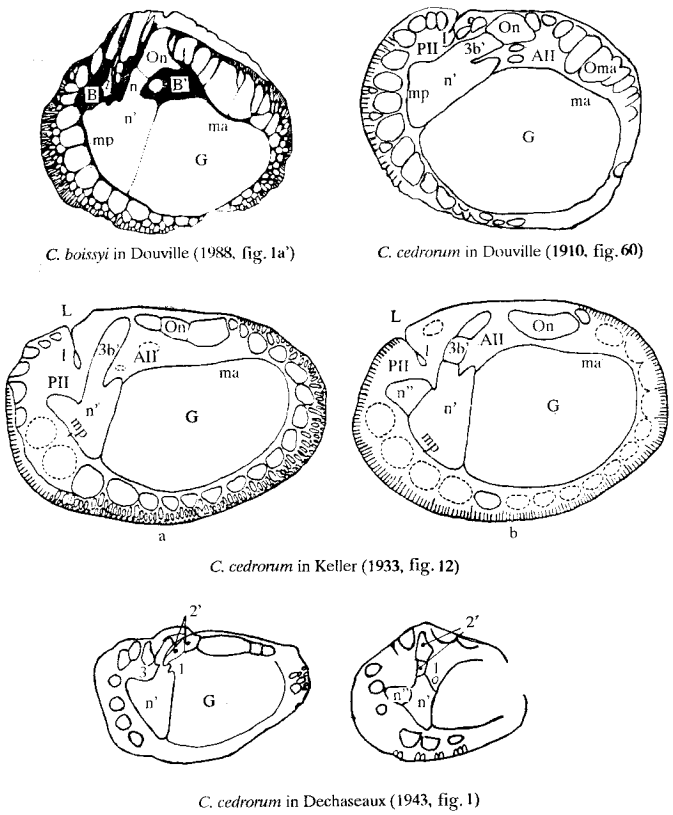

Figure 2. Comparison between left valve sections of *Caprinula boissyi* and those of different figured specimens of *C. cedrorum* from Lebanon. Notice the main differences: posterior crest of tooth 1 (=AII, =B'), transversal plates in the posterior cavity (n", n"') and in the dental socket (3b', 2').

Revision of all the species is needed to demonstrate the intraspecific variability in *Caprinula* and to establish the probable synonymies among many of the described species. Then the stratigraphic and palaeogeographic distribution of the different species can be attempted and it will be possible to elucidate if *Caprinula boissyi* is a widespread species that represents an European fauna, while *C. cedrorum* belongs to an African one, or what are the relations with the species from Portugal.

Distribution—*Caprinula cedrorum* occurs in Lebanon in upper Cenomanian beds (Douvillé, 1910; Keller, 1933). *Caprinula* aff. *cedrorum* in Bechar area is associated with upper Cenomanian benthic foraminifera, *Pseudolituonella reicheli* Marie, *Chrysalidina gradata* d'Orbigny, *Nezzazata* sp. and *Trochospira* sp., as are *Caprinula* species in Portugal (Berthou, 1984).

In Table 1, the distribution of some caprinids in the Cenomanian of the Mediterranean area is given according to bibliographic data (Douvillé, 1888, 1910; Parona, 1921; Van de Fliert, 1955; Bär, 1957; Polšak, 1967; Carbone *et al.*, 1971; Philip, 1978; Iannone and Laviano, 1980; Sirna, 1982; Berthou, 1984; Philip *et al.*, 1989) and taking into account the taxonomic revision of Bonanno and Sirna (1995). Caprinid fauna from Algeria appears as highly diversified, although genus *Neocaprina* and *Schiosia* are not reported until now.

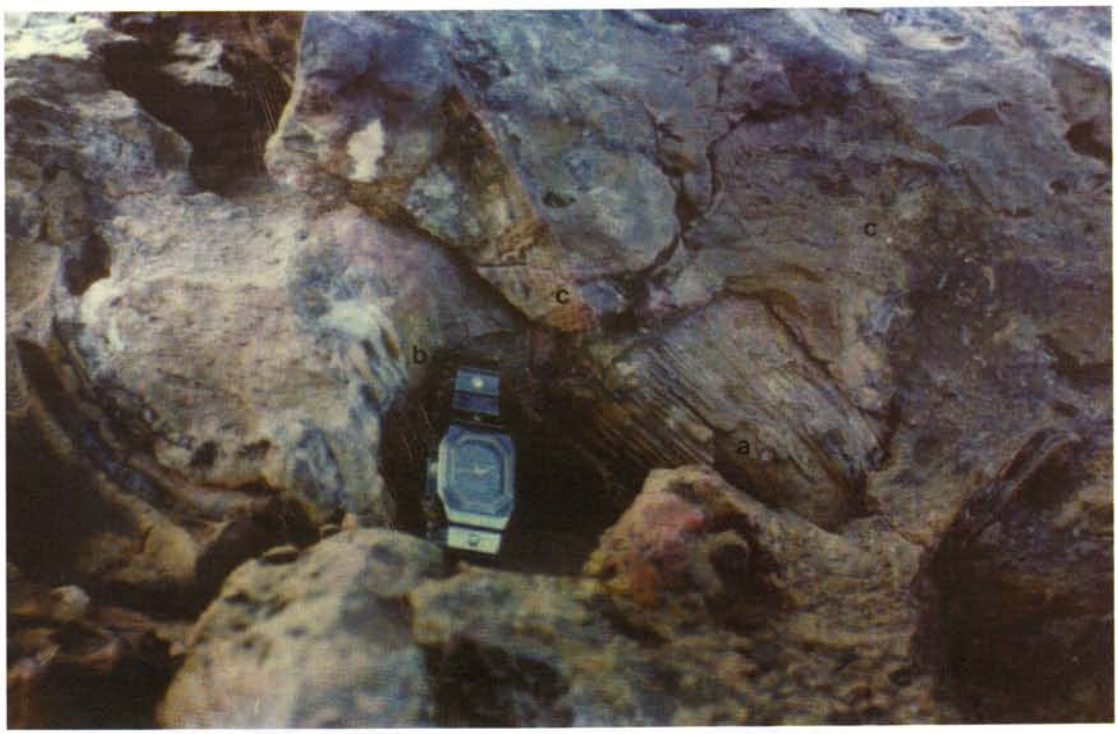

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Plate 1. Figures 1-2. *Caprinula* aff. *cedrorum* (Blanckenhorn), from the upper Cenomanian of Djebel Zriga. Field photographs. *1*, internal mold of the attached valve (a) with thin canals; internal mold of the free valve (b) more developed; external mold showing the ornamentation (c). *2*, section of the attached valve (a).

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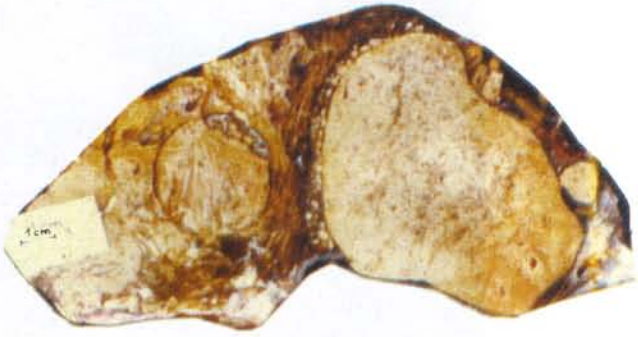

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Table 1. Geographical and stratigraphical distribution of *Caprinula* and some other Cenomanian caprinids in the Mediterranean area. Lower Cenomanian records shaded. P = Portugal, A = Algeria, T = Tunisia, S = Sicily, IT = Italy, IS = Istria, O = others (F = France, LE = Lebanon, LI = Libya). Data from several authors.

	P	A	T	S	IT	IS	O
Caprinula boissyi (d'Orbigny)		X			X	X	F
Caprinula brevis Sharpe	X						F
Caprinula cedrorum (Blanckenhorn)		X					LE
Caprinula distefanoi Boehm					X	X	
Caprinula dorbignyi Sharpe	X						F
Caprinula olisiponensis Choffat	X	X					
Caprinula sharpei Choffat	X						LI
Caprinula subquadrata Polšak						X	
Caprina baylei (Gemmellaro)		X		X	X	X	
Caprina schiosensis Boehm		X			X	X	LI
Neocaprina gigantea (Gemmellaro)			X	X	X	X	
Neocaprina nanosi Plenicar			X	X	X	X	
Neocaprina panormitana Sirna				X			
Schiosia schiosensis Boehm			X		X	X	LI
Schiosia carinatoformis Polšak			X		X	X	
Sphaerucaprina forojuliensis Boehm		X	X		X	X	
Sphaerucaprina woodwardi Gemmellaro		X		X			
Orthoptychus striatus Futterer		X	X	X	X	X	

Caprinula species are found associated with other caprinids, *Caprina baylei* (Gemmellaro), *C. schiosensis* Boehm, *Sphaerucaprina woodwardi* Gemmellaro, *S. forojuliensis* Boehm and *Orthoptychus striatus* Futterer, in the Constantinois, in Djebel Grouze (Van de Fliert, 1955). These caprinids occur without *Caprinula* in SE Constantinois, in Djebel Felten (Van de Fliert, 1955) and in Djebel Umsettas (Bär, 1957). These species are well known in many Mediterranean outcrops (Tunisia, Sicily, Italy, Istria) and generally are considered from the upper Cenomanian, except in Tunisia, where they have also been reported from the lower Cenomanian (Philip *et al.*, 1989).

The presence of caprinids in the lower Cenomanian of Azerou Kebir, in the northern part of the Hodna, has been mentioned (Coiffait and Vila, 1976), but they are not yet described.

Thus, if *Caprinula* is considered a very good marker of the upper Cenomanian as pointed out by some authors (such as Philip, 1978), a better knowledge of the different species will allow us to delimit, in a better way, the bioprovinces during this period. Algeria seems to be an ideal area to understand the distribution of Cenomanian caprinids because three sorts of caprinid communities are found there:

Monogeneric communities of *Caprinula*, as in Portugal, in Hodna, Djebel Zriga and Bechar.

Association of *Caprinula* with other caprinids, as in Italy and Istria, in Djebel Grouze (Constantinois).

Diversified caprinid communities without *Caprinula*, as in Tunisia, in Djebel Felten and Djebel Umsetas (SE Constantinois) and in Hodna.

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Plate 2. Figures 1-5. *Caprinula* aff. *cedrorum* (Blanckenhorn), from the upper Cenomanian of Djebel Zriga. *1*, FC801, free valve, loosely coiled, x 1/2. *2*, FC802, section of free valve. *3*, FC803, section of free valve. *4*, FC804, section of free valve. *5*, FC805, section of the attached valve, x 1/2. General cavity (G), posterior accessory cavity (n'), anterior (1) and posterior (3) teeth, anterior (ma) and posterior (mp) myophores, accessory cavities (On).

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Manuscript received: July 4, 1994.
Corrected manuscript received: May 16, 1995.
Manuscript accepted: May 23, 1995.