

SHORT COMMUNICATION

Mogharaeceras priscum (Douvillé, 1916) a peculiar Barremian ammonite (Desmoceratoidea, Barremitinae) from Northern Sinai (Egypt)

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Abstract: The type material of the poorly known and monotypic genus *Mogharaeceras* is revised. Relationship with Pulchelliidae, Engonoceratidae and Barremitinae are discussed. All the available evidence suggests that *Mogharaeceras* is an offshoot of *Barremitites* and that it should be classified in the Barremitinae. New material from Egypt allows us to establish the Late Barremian age of this taxon.

Key words: Cretaceous, Upper Barremian, Egypt, Sinai, paleontology, Barremitinae, Ammonitina.

Introduction

Since the early monographic work of Douvillé (1916), a limited number of paleontological studies have been published on the Lower Cretaceous ammonites of Northern Sinai. Most recent authors have concentrated efforts on the Late Aptian and Albian part of the successions (Aly & Abdel-Gawad 2001; Aly 2006, with references). The Barremian and Lower Aptian faunas are in need of a revision. Among the material described by Douvillé (1916), *Knemiceras priscum*, type species of the genus *Mogharaeceras* Breistroffer, 1940, remains a poorly understood species whose systematic position and age are uncertain. Access to Douvillé's original material and a new finding published by Abu-Zied (2008) allow a revision of the taxonomy of *Mogharaeceras priscum*.

Conventions: All dimensions of specimens are given in millimeters: Dmax = larger measurable diameter, D = diameter, Wb = whorl breadth, Wh = whorl height, U = umbilical diameter. Figures in parentheses are dimensions as a percentage of the diameter at the point of measurement.

The suture terminology is that of Korn et al. (2003): E = external lobe; A = adventive lobe; U = umbilical lobe, I = internal lobe.

The following acronyms are used to indicate the repositories of specimens mentioned in the text: FSL — Ecole des Mines now housed at Université Claude Bernard, Lyon; MNHNP — Collections de la Sorbonne, Université Pierre et Marie Curie, Paris VI, now housed at the Muséum National d'Histoire Naturelle, Paris.

Systematics

Superfamily: **Desmoceratoidea** Zittel, 1895

Family: **Desmoceratidae** Zittel, 1895

Subfamily: **Barremitinae** Breskovski, 1977

Genus: *Mogharaeceras* Breistroffer, 1940

Type species: *Mogharaeceras priscum* (Douvillé, 1916), by original designation of Breistroffer (1940).

Origin of the name: From Gabal Maghara, type locality of the original material.

Diagnosis: Small ammonites. Shell discoidal and involute. Whorl section subogival. Ventral area narrow, slightly grooved, bicarinate. Umbilicus small, with abrupt wall, almost carinate umbilical edge. Flanks convex. Surface smooth except for irregular flexuous striae and feeble flat costae. Suture simple marked by a lateral lobe divided by a very narrow and high saddle. This saddle is trifold and dissymmetric.

Content: As herein understood, the genus *Mogharaeceras* is monospecific.

Stratigraphic distribution: Despite the recent illustration of the fauna associated with *M. priscum* at El Tourkumanyia section (Gabal Lagama) (Abu-Zied 2008), the precise age of the species remains poorly constrained. The assemblage from bed 25 includes *Barremites* sp. [= *Barremites difficilis* d'Orb., fig. 5, N–Q, in Abu-Zied 2008], Hemihoplitidae gen. and sp. nov. [= *Paracrioceras hammatoptychum* (Uhlig), fig. 8, C–F in Abu-Zied 2008] and a fragment of heteromorph too poorly preserved for specific identification. The rest of the

fauna is either not illustrated or composed of stratigraphically non significant Lytoceratidae. This view is confirmed by the occurrence, at a slightly higher level (bed 33) of a single *Colchidites* sp. (Abu-Zied 2008: fig. 8, L-N). In our opinion, and if the specimen is not affected by post-mortem distortion, this specimen should rather be identified as *Kutatissites* sp. and indicate a level close to the Barremian/Aptian boundary. It should also be noted that Abu-Zied (2008: fig. 8, I-J) reported *Acrioceras zulu* Klinger & Kennedy, 1992 from a slightly lower level (bed 22). The specimen illustrated superficially matches the finely ribbed South African forms (Klinger & Kennedy 1992: p. 111, fig. 26) but is too worn and fragmentary to assume identification. In any case, the Early Aptian age generally accepted for *Mogharaeceras* (Wright et al. 1996) must be dismissed, and its Late Barremian age is now retained. By comparison with the successions of the western Tethys, this assemblage indicates the Late Barremian and most likely a level between the *Gerhardtia sartousiana* Zone and the *Imerites giraudi* Zone *sensu* Reboulet et al. (2009).

Geographical distribution: The genus was never reported outside Northern Sinai (Gabal Lagama).

Systematic position: When introduced, *Knemiceras priscum* was classified as a Pulchelliidae *sensu* Douvillé (1890). In its original concept, this family grouped all the Cretaceous genera characterized by a suture with wide, shallow and feebly denticulate elements. Since this family was emended (Vermeulen 2003), it is now understood as a phylletic lineage that ranges from the base of the Upper Hauterivian (*Subsaynella sayni* Zone) to the middle part of the Upper Barremian (*Gerhardtia sartousiana* Zone). Despite the revision of the Pulchelliidae, *M. priscum* was rarely mentioned in the literature. It was usually maintained in the Pulchelliidae. This is the case of Wright et al. (1996) who consider *Mogharaeceras* as a younger subjective synonym of *Subpulchellia* Hyatt, 1903. In contrast to previous authors, Vermeulen & Klein (2006) consider *M. priscum* as a primitive member of the Engonoceratidae Hyatt, 1900 of uncertain origin.

The concept of *Subpulchellia* has evolved since its introduction by Hyatt (1903). As herein understood, it is restricted to *Subpulchellia oehlerti* (Nickles, 1894) [with *Subpulchellia castellanensis* Hyatt, 1903 as a junior synonym] and *Subpulchellia argoti* Vermeulen, 1999. *Subpulchellia oehlerti* shows superficial similarities with *Mogharaeceras* but differs in its fasciculate ribs that develop in ventrolateral clavi — a feature that is unknown in *Mogharaeceras*. Moreover, the steep wall with sharp umbilical seam of *Mogharaeceras* is not represented in *Subpulchellia*.

Most species formerly included by authors in *Subpulchellia* were transferred since to *Kotetishvilla* by Vermeulen (1997, 2003). As a matter of fact, the general morphology and ornamental features of *M. priscum* show similarities with species of *Kotetishvilla* Vermeulen, 1997 such as *Kotetishvilla sauvagei* (Hermite, 1879). Nevertheless, there are significant differences that distinguish *Mogharaeceras* from any species of *Kotetishvilla*: the whorl section is more ogival, the venter is larger and more concave, the external falcate ribs are less prorsiradiate and regularly spaced, and the umbilicus is always larger. Moreover, *M. priscum* is characterized by its steep umbilical wall, sharp umbilical edge and intercalary ribs that are unknown in *Kotetishvilla*. The suture, though simplified in both genera, does not

show the same number of saddles and the first lateral saddle is more asymmetrical in *Mogharaeceras*. Because of the differences listed above, *Mogharaeceras* cannot be included in the Pulchelliidae and its synonymy with *Subpulchellia* is rejected.

The classification in the Engonoceratidae proposed by Vermeulen & Klein (2006) cannot be accepted either. It should first be noted that it is now established that the age of the older Engonoceratidae is now well established as (?) topmost Aptian to basal Albian (Bulot 2010; Latil 2011). Even if the origin of Engonoceratidae remains unknown, none of the known Aptian ammonites link *Mogharaeceras* with the first *Parengonoceras* Spath, 1924 (= *Platinknemiceras* Bataller, 1954) and *Knemiceras* Böhm, 1898 of the Iberian Plate, Arabian Plate, and southern margin of the Tethys (Egypt, Tunisia and Algeria).

From a morphological point of view *Mogharaeceras* shows superficial similarities to *Parengonoceras*. The feebly ornamented *Parengonoceras* species, such as *Parengonoceras bassei* (Bataller, 1954), differ mainly by their early whorls with subtriangular whorl section and flat sides, indistinct flexuous ribs and suture line that is typically engonoceratid with frilled bifid saddles.

Among the Late Barremian genera (*Gerhardtia sartousiana* Zone and above), *Mogharaeceras* shows similarities with some Barremitinae, such as *Barremitites* of the *strettostoma* (Uhlig, 1883) group. The two genera share the same type of ogival whorl section, involute umbilicus, steep umbilical wall and sharp umbilical edge, and ribbing. The main differences concern the shape of the venter and the suture line. Many specimens of the *Barremitites strettostoma* group show a narrow ventral area that is similar to that of *Mogharaeceras* at a younger stage. Development of a bicrenate concave venter from a sharp flat venter is not uncommon in Cretaceous ammonites and has already been observed in Oosterellidae (Company, 1987) and Pulchelliidae (Vermeulen, 2003). The additional saddle in *Mogharaeceras priscum* could have evolved from the distinctive small adjacent saddle that marks the internal side of the first lateral saddle of the Barremitinae complex suture line. Additionally, Avram (1997) showed the existence of specimens with simplified suture line in the *Barremitites strettostoma* group. As a consequence, we suggest that *Mogharaeceras* should be included in the Barremitinae and is most likely an offshoot of *Barremitites*.

Mogharaeceras priscum Douvillé, 1916

Figs. 1-3

1916 *Knemiceras priscum* nov. sp., Douvillé, pl. 16, fig. 7a-b, 8a-b; text-figs. 36, 37

1996 *Subpulchellia prisca* (Douvillé) — Wright et al., Fig. 85, 4a-c; (reproduction of Douvillé, 1916, pl. 16, fig. 7a-b)

2008 *Subpulchellia oehlerti* (Nicklès) — Abu-Zied, figs. 2Q, 6P-Q

Lectotype: *Knemiceras priscum* Douvillé, 1916, pl. 16, fig. 7a-b, herein designated.

Type locality: Bir Lagama, Gabal Maghara, Northern Sinai, Egypt.

Material: 5 specimens including the lectotype (FSL.EM1871), all from the original collection studied by Douvillé (1916).

Diagnosis: Small to middle size, discoidal, involute ammonites with convex flanks. Subogival whorl section truncat-

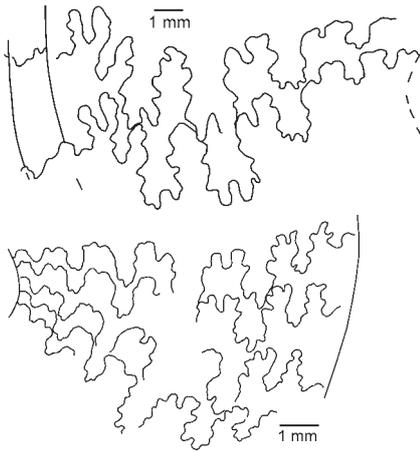


Fig. 1.
MNHNP.J10143:
2 last sutures at
D = 15 mm.

Fig. 2.
MNHNP.J10144:
last sutures at
D = 9.2 mm.

Measurements

Cat. N°	Dmax	D	Wh	Wb	U	Wb/Wh	U/Wh
FSL.EM1871	73.0	66.0	39.0 (0.59)	18.0 (0.27)	4.9 (0.07)	0.46	0.13
FSL.EM1870	30.8	24.0	12.8 (0.53)	6.5 (0.27)	3.0 (0.13)	0.51	0.23
MNHNP.J10143	28.2	25.2	14.7 (0.58)	7.3 (0.29)	3.2 (0.13)	0.50	0.22
MNHNP.J10144	22.1	18.5	9.8 (0.53)	4.0 (0.22)	2.4 (0.13)	0.41	0.25
MNHNP.J10145	15.2	15.2	8.1 (0.53)	3.8 (0.25)		0.47	

ed on the venter. Ventral area bicrenate and grooved. Umbilicus small, with abrupt wall, almost crenate umbilical edge. Composite ornamentation of flexuous striae and feeble flat costae. All costae and striae show a marked bending on the outer part of the flank while the primaries flatten. Uppermost part of the flank almost smooth. Suture simple marked by a lateral lobe divided by a very narrow and high saddle. This saddle is trifid and dissymmetric.

Description: The lectotype FSL.EM1871 is the larger specimen at our disposal (Dmax = 73 mm) (Fig. 3.1). It is an adult specimen with the body chamber. On the body chamber the whorl section is clearly ogival with the larger whorl breadth on the lower quarter of the flanks. The venter is narrow, bicrenate and clearly grooved. Ornamentation raises just above the umbilical area. It remains straight and prorsiradiate until the middle of the flanks. On the lower part of the flank, the striae and costae are dense, low, and poorly marked. Some are single, others are bifurcate or fasciculate. All shows a concave arc at about mid flank, bending backward first, then forward. Some of the costae get stouter and could almost be regarded as primary ribs. They show a distinct flattening that fades progressively to-

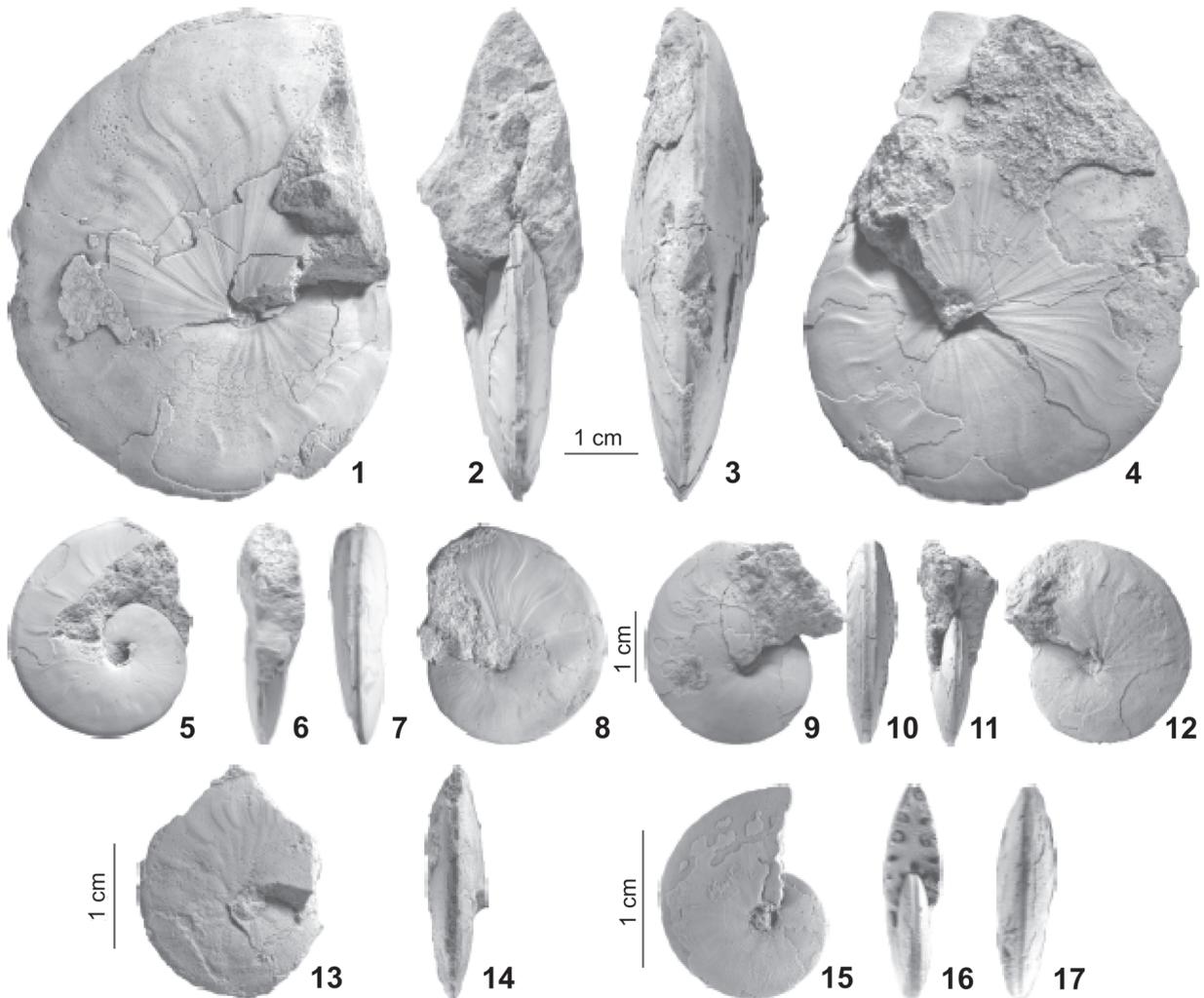


Fig. 3. 1-4 — FSL.EM1871, the lectotype, Bir Lagama, Sinai, Bartoux collection. 5-8 — FSL.EM1870, paralectotype, Bir Lagama, Sinai, Bartoux collection. 9-12 — MNHNP.J10143, paralectotype, Bir Lagama, Sinai, Bartoux collection. 13-14 — MNHNP.J10144, paralectotype, Bir Lagama, Sinai, Bartoux collection. 15-17 — MNHNP.J10145, paralectotype, Bir Lagama, Sinai, Bartoux collection.

ward the upper part of the flank. On the last half whorl of the shell, there are 15 of those primary costae. The intercalary striae are minute and their number varies from 1 to 3 between two successive costae. The suture (Figs. 1, 2) is conform to the figures of Douvillé (1916: figs. 36, 37). The lateral lobe is divided in two parts (l'v et l'd in Douvillé 1916) separated by a high, narrow, trifold and dissymmetric saddle.

The remaining specimens allow a better understanding of the ontogenetic and intraspecific variation of the species. The younger stages, until D=5 mm, are smooth and truncation of the venter seems to occur on the earliest growth stages (Fig. 3.15-17). The appearance of the flat principal costae varies from one specimen to the other (5 to 10 mm) (Fig. 3.5-17). This is also the case of the strength and density of ornamentation. Slight variation of the whorls and ventral breadth can also be observed.

Discussion: Since its original description by Douvillé (1916), no new specimen of *Mogharaceras priscum* was described or illustrated under that name in the literature. Most recently, Abu-Zied (2008: figs. 2Q, 6P-Q) illustrated a single specimen of what he believed to be *Subpulchellia oehlerti*. Comparison with the material at our disposal (MNHN.P.10143 and 10144) leaves no doubt that Abu-Zied's specimen is conspecific with *Mogharaceras priscum*.

Stratigraphic distribution: Upper Barremian (interval between the *Gerhardtia sartousiana* Zone and the *Imerites giraudi* Zone sensu Reboulet et al., 2009).

Geographic distribution: As for the genus, Northern Sinai (Gabal Lagama, Maghara area).

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