Lower Aptian ammonites of the Sierra de Parras, Coahuila State, northern Mexico

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Abstract: We report an interesting Aptian ammonite record from the La Peña Formation in the Sierra de Parras, Coahuila State. This assemblage is analyzed from a paleoecological perspective. It contains the first reported occurrence of a macroconch of *Dufrenoyia* from Mexico, and the largest known specimen of '*Gargasiceras*' *adkinsi*. Such an assemblage yielding large ammonites is unusual in deposits of this age in Mexico. To properly document this ammonite record, we review '*Gargasiceras*' *adkinsi*, formerly misidentified as *Rhytidoplites robertsi*, and allied taxa. From our analysis, we conclude that '*Gargasiceras*' *adkinsi* exhibits strong intraspecific variability. We also analyze in detail the differences that exist between '*Gargasiceras*' *adkinsi* and *Rhytidoplites robertsi*, and emend the concept of the genus *Rhytidoplites*. These revisions are important from a biostratigraphic point of view since '*Gargasiceras*' *adkinsi* is an index species for the lower Aptian ammonite zonation of Mexico.

Key Words: Ammonite; *Dufrenoyia* macroconch; '*Gargasiceras*' *adkinsi*; *Rhytidoplites robertsi*; Lower Cretaceous; Aptian; Mexico.

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Résumé : ***Ammonites de l'Aptien inférieur de la Sierra de Parras, État de Coahuila, au nord du Mexique.-*** Ce travail fait état d'une intéressante faune d'ammonites de l'Aptien de la Formation de La Peña, dans la Sierra de Parras, État de Coahuila, analysée ici d'un point de vue paléoécologique. Il permet également de signaler pour la première fois au Mexique la présence d'un macroconque de *Dufrenoyia*, ainsi que le plus grand spécimen connu de '*Gargasiceras*' *adkinsi*. Une telle association livrant de grandes ammonites est inhabituelle dans les dépôts aptiens du Mexique. Afin de bien caractériser cette ammonitofaune, il est procédé à une révision de l'espèce '*Gargasiceras*' *adkinsi*, autrefois confondue avec *Rhytidoplites robertsi*, ainsi que des espèces proches. Notre analyse montre que '*Gargasiceras*' *adkinsi* présente une forte variabilité intraspécifique. Les différences entre '*Gargasiceras*' *adkinsi* et *Rhytidoplites robertsi* sont également analysées en détail, ce qui permet d'émender le concept du genre *Rhytidoplites*. Ces révisions sont importantes sur le plan biostratigraphique puisque '*Gargasiceras*' *adkinsi* constitue l'une des espèces-index de la zonation de l'Aptien inférieur du Mexique.

Mots-clefs : Ammonite ; macroconque de *Dufrenoyia* ; '*Gargasiceras*' *adkinsi* ; *Rhytidoplites robertsi* ; Crétacé inférieur ; Aptien ; Mexique.

I - Introduction

During fieldwork in 2013 in the Sierra de Parras, Coahuila State, we found an interesting ammonite assemblage in the La Peña Formation. This study is part of a campaign aimed at locating new Aptian ammonite-bearing sections in Mexico. The data collected from these new sections will be integrated with taxonomic reviews (*e.g.*, MORENO-BEDMAR & DELANOY, 2013) to develop a standard zonation for the Central Atlantic province (MORENO-BEDMAR *et al.*, 2013; REBOULET *et al.*, 2014). At one lower Aptian outcrop bed we discovered a macroconch of *Dufrenoyia*, which constitutes the first record of a macroconch genus from Mexico, and three more *ex situ* ammonite that include the largest known specimen of '*Gargasiceras*' *adkinsi*. In this study we analyze these discoveries from an environmental point of view. Recently, MORENO-BEDMAR *et al.* (2013) employed '*Gargasiceras*' *adkinsi* as an index taxon for the lower Aptian ammonite zonation of the La Peña Formation.

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'*G.*' *adkinsi* has previously been misidentified as *Rhy-tidoplites robertsi* and *Penaceras rursiradiatus* (*e.g.*, CANTÚ CHAPA, 1976; CONTRERAS Y MONTERO, 1977; BARRAGÁN, 2000, 2001; BARRAGÁN & MAURRASSE, 2008). In the "Systematic notes" (Section V) we address the taxonomic issues associated with '*Gargasiceras*' *adkinsi* and *Rhytidoplites robertsi*. An improved understanding of '*G.*' *adkinsi* and related forms not only leads to their taxonomic refinement, but is necessary for their proper use in a biostratigraphic framework.

II - Geological setting

The studied outcrop of the La Peña Formation is located in Juan Pérez Canyon (at coordinates: 25°18'35"N, 102°13'31"W), 15.5 km SSW of Parras de La Fuente, Coahuila State, in the core of the Sierra de Parras, which is one of the transverse ranges of the Mexican Fold Thrust Belt in northern Mexico (Fig. 1). The Sierra de Parras consists of WNW-ESE trending faults and asymmetric folds exposing Upper Jurassic and Cretaceous sedimentary marine rocks. Deposited in shallow-water conditions, the La Peña Formation consists of argillaceous carbonates and shales and grades upwards into deeper-water facies represented by calcareous lenses with nodules of chert; it is middle to late Aptian in age (SMITH & BLOXSOM, 1974; TINKER, 1982; GOLDHAMMER *et al.*, 1991; LEHMANN *et al.*, 1999).

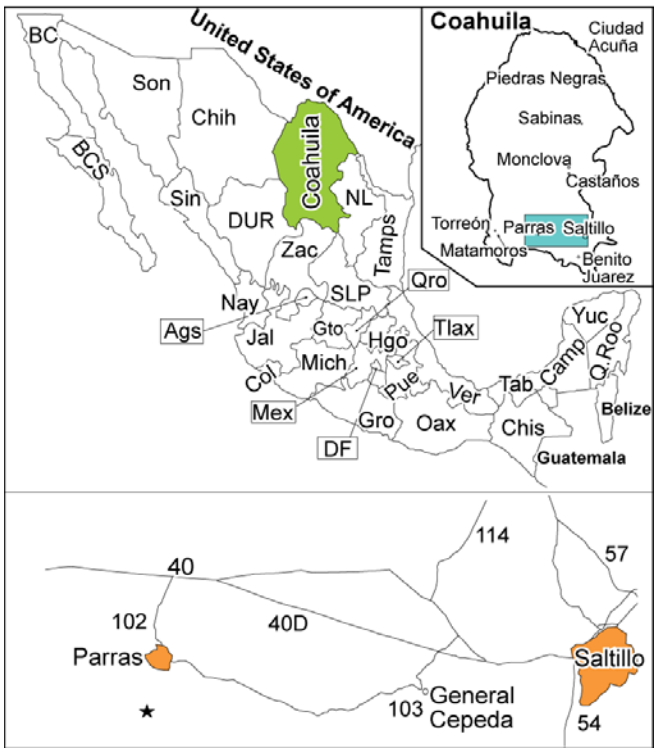

Figure 1: Geographic location of the State of Coahuila; the star indicates the location of the outcrop studied in Juan Pérez Canyon, Sierra de Parras.

In northern Mexico, the La Peña Formation marks a major transgression that drowned the Cupido ramp during the latest Early Aptian (GOLDHAMMER *et al.*, 1991; GOLDHAMMER, 1999; LEHMANN *et al.*, 1999; MORENO-BEDMAR *et al.*, 2012). It was deposited over a wide area, and has been correlated with the non-marine Las Uvas Formation in the Coahuila Block, north of the study area, the basinal Otates Formation in the Valles-Golden Lane in East Central Mexico, and the Pearsall Formation of the Texas Gulf Coast (WILSON & WARD, 1993).

III - Previous work

The ammonite record of the La Peña Formation in the Sierra de Parras is poorly known. IMLAY (1936) was the first author to report Aptian ammonites from this area. He reported but did not illustrate ten species from the Cuesta del Cura, namely, *Dufrenoya texana* BURCKHARDT, *Dufrenoya* aff. *dufrenoyi* ORBIGNY, *Dufrenoya* ? sp., *Parahoplites* sp. ind., *Parahoplites* sp., *Douvilleiceras* aff. *nodosocostatum* ORBIGNY, *Douvilleiceras* aff. *bigoureti* JACOB, *Douvilleiceras* sp., *Crioceras trispinosoides* BURCKHARDT and *Ammonitoceras* sp.

IMLAY (1940) then described *Saynoceras mexicanum* from the basal beds of the La Peña Formation of the Rancho El Angel, Sierra de Parras.

Subsequently, HUMPHREY (1949) reported eight species from the Cuesta del Cura, Sierra de Parras, and illustrated most of them: *Dufrenoya justinae* (HILL), *Dufrenoya dufrenoyi* (ORBIGNY), *Dufrenoya* sp. B, *Burckhardtites nazasensis* (BURCKHARDT), *Burckhardtites gregoriensis* (HUMPHREY), *Burckhardtites* sp. A and B, *Uhligella mullerriedi* (HUMPHREY). The most recent report of Aptian ammonites from the Sierra de Parras was by CANTÚ CHAPA (1976) who recognized and illustrated "*Caseyella reesidei* (HUMPHREY) and *Rhytidoplites robertsi* (SCOTT)".

IV - Sierra de Parras assemblage

We collected four ammonites from Juan Pérez Canyon, including *Pseudohaploceras* sp., *Dufrenoyia* sp. and '*Gargasiceras*' *adkinsi*. These specimens are currently housed in the IGM collection. The specimen of *Dufrenoyia* sp. shown in Figure 2 has a maximum diameter (= D) of about 20 cm, which is the largest specimen of this genus reported in Mexico. In Europe, CASEY (1963) reported several macroconchs that belong to the genus *Dufrenoyia* with a maximum diameter ranging from 7 cm to 38 cm (CASEY, 1963: Figs. 135, 138-139; Pls. 62, 1a-b & 65, 2a-b, 6). More recently, ROPOLO *et al.* (2006) reported a macroconch of this genus with a diameter of 16.9 cm, and MORENO-BEDMAR *et al.* (2010: Electronic annex IX, A)

Figure 2: *Dufrenoyia* sp. Lateral view of the specimen IGM 9838, Sierra de Parras [Scale bar 1 cm].

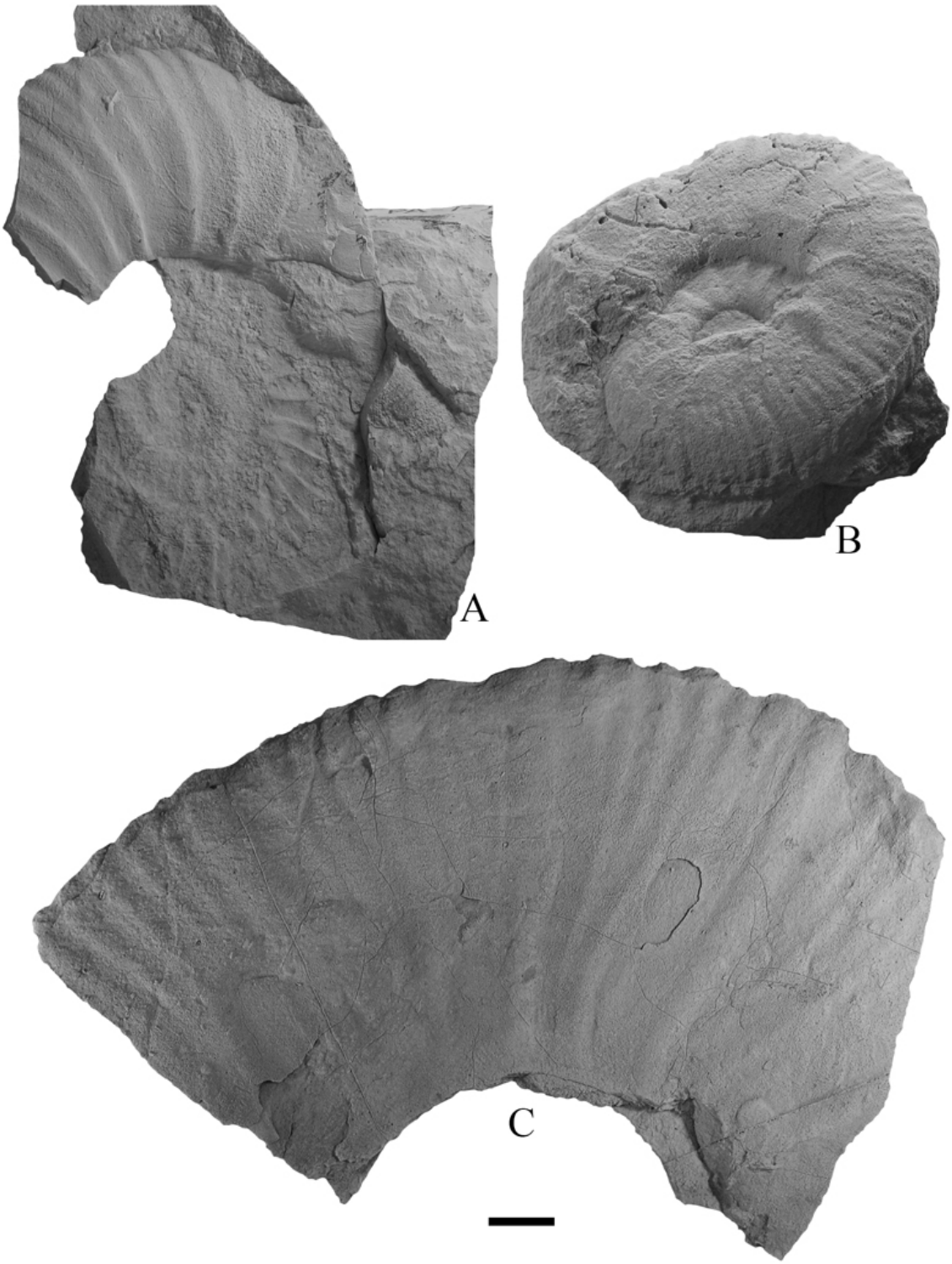

Figure 3: A: '*Gargasiceras*' *adkinsi*. Lateral view of the specimen IGM 9839, Sierra de Parras. B: *Pseudohaploceras* sp. IGM 9840, Sierra de Parras. C: *Pseudohaploceras* sp. Lateral view of the specimen IGM 9841, Sierra de Parras [Scale bar 1 cm].

illustrated a macroconch of 33 cm in diameter. Several authors recognize the presence of macroconchs and microconchs in the Family Deshayesitidae, which includes the genus *Dufrenoyia* (CASEY, 1963; WRIGHT *et al.*, 1996; KELLY & WHITHAM, 1999; MORENO & COMPANY, 2007; MORENO-BEDMAR *et al.*, 2009, 2014; GARCÍA & MORENO-BEDMAR, 2010). In the Family Deshayesitidae, the macroconch has an involute shell with fine ribs and high rib density. In some species, the ornamentation disappears in the adult stage. In contrast, the microconch is strongly ornamented, with an evolute shell and robust angular ribs with low costation density. The Mexican specimen of Figure 2, with a large, involute shell and high costation density, can be confidently regarded as a macroconch.

It is remarkable that the specimen of '*Gargasiceras*' *adkinsi* studied here (Fig. 3.A) with D = 8.9 cm, is the largest specimen known from Mexico. Despite the scarcity of ammonites collected, we found unusually large specimens of *Gargasiceras* and *Pseudohaploceras* (Fig. 3) and the macroconch of *Dufrenoyia* described above (Fig. 2). This assemblage is quite different from the one studied by MORENO-BEDMAR *et al.* (2013), which contains mostly small forms (microconchs, juveniles, *etc.*), an assemblage interpreted as being deposited along the most distal part of the outer continental shelf. Other authors have reported European assemblages similar to the one detailed in this work, with an abundance of macroconchs and larger shells (*e.g.*, CASEY, 1963; ROPOLO *et al.*, 2006; MORENO-BEDMAR *et al.*, 2010). This kind of assemblage has been found to be associated with more proximal marine external platform environments. Such Aptian ammonite assemblages are poorly known in Mexico, so that a return trip will be made to Juan Pérez Canyon to conduct a systematic bed-by-bed sampling of the section.

V - Systematic notes of the species '*Gargasiceras*' *adkinsi* and *Rhytidoplites robertsi*

Repositories:

IGM = Museo María del Carmen PERRILLIAT MONTOYA, Colección Nacional de Paleontología, Instituto de Geología, UNAM, Mexico D.F.

BEG = Bureau of Economic Geology. The specimen is in the Types Collection at the University of Texas.

UMMP = University of Michigan, Museum of Paleontology.

Superfamily Acanthohoplitoidea STOYANOW, 1949

Family Acanthohoplitidae STOYANOW, 1949

Subfamily Colombiceratinae TOVBINA, 1979

Genus *Gargasiceras* CASEY, 1954

'*Gargasiceras*' *adkinsi* (HUMPHREY, 1949)

(Figs. 3.A - 4.A-D & I-N - 5.A-E)

v. 1925 *Parahoplites* sp. BURCKHARDT, p. 23, Pl. 4, figs. 19-23.

v. 1949 *Acanthoplites* ? *adkinsi*, HUMPHREY, p. 139, Pl. 13, figs. 2-3.

v. 1949 *Acanthoplites* ? *sandidgei*, HUMPHREY, p. 140, Pl. 13, figs. 1, 4.

1976 *Rhytidohoplites robertsi*, CANTÚ CHAPA, p. 15, Pl. 1, figs. 4, 4a, 6, 6a, 7.

1977 *Rhytidohoplites robertsi*, CONTRERAS Y MONTERO, p. 14, Pl. 6, figs. 2-3.

v. 1989 *Acanthoplites* ? *adkinsi*, CARREÑO *et al.*, p. 182, Fig. 61h.

v. 1989 *Acanthoplites* ? *sandidgei*, CARREÑO *et al.*, p. 182, Fig. 61j.

v. 1992 *Acanthohoplites* ? *adkinsi*, CONTRERAS Y MONTERO *et al.*, p. w.n. (= without number), Fig. w.n.

v. 1992 *Acanthohoplites* ? *sandidgei*, CONTRERAS Y MONTERO *et al.*, p. w.n., Fig. w.n.

1992 *Rhytidohoplites robertsi*, CONTRERAS Y MONTERO *et al.*, p. w.n., Fig. w.n.

1996 *Rhytidoplites robertsi*, WRIGHT *et al.*, p. 275, Fig. 215, 3a-3b.

? v. 2000 *Acanthohoplites acutecosta*, BARRAGÁN, p. 110, Pl. 56, figs. 6 ?, 7-9.

? v. 2000 *Acanthohoplites protreritensis*, BARRAGÁN, p. 115, Pl. 57, figs. 1, 2 ?.

v. 2000 *Penaceras rursiradiatus*, BARRAGÁN, p. 122, Pl. 58, figs. 1-3.

v. 2000 *Rhytidoplites robertsi*, BARRAGÁN, p. 125, Pl. 58, figs. 4-13.

v. 2001 *Rhytidoplites robertsi*, BARRAGÁN, p. 192, Fig. 4, 3-4.

v. 2003 *Acanthohoplites acutecosta*, MÉNDEZ-FRANCO, p. 72, Pl. 7, figs. 4-6.

? v. 2003 *Rhytidoplites robertsi*, MÉNDEZ-FRANCO, p. 80, Pl. 8, figs. 1-2, 3 ?.

v. 2005 *Acanthohoplites aschiltaensis*, AVILA LICONA, p. 38, Pl. 2, figs. 5A, 5B.

v. 2005 *Rhytidoplites* sp., AVILA LICONA, p. 40, Pl. 2, fig. 6.

v. 2005 *Penaceras rursiradiatus*, AVILA LICONA, p. 42, Pl. 2, fig. 7.

v. 2008 *Penaceras rursiradiatus*, BARRAGÁN & MAURRASSE, p. 152, Fig. 3g.

v. 2013 *Gargasiceras* ? *adkinsi*, MORENO-BEDMAR *et al.*, p. 154, Figs. 4, C-G, I.

Discussion: In 2013, MORENO-BEDMAR *et al.* began employing the name *Gargasiceras* ? *adkinsi*, previously identified by several authors mostly as *Rhytidoplites robertsi* or *Penaceras rursiradiatus* (*e.g.*, CANTÚ CHAPA, 1976; CONTRERAS Y MONTERO, 1977; BARRAGÁN, 2000, 2001; BARRAGÁN & MAURRASSE, 2008), as an ammonite biozone for the uppermost lower Aptian of the La Peña Formation. They neither explained the reason for using the name *Gargasiceras* ? *adkinsi* nor defined this species, and we will now address these issues in detail, comparing the holotypes and other specimens of the relevant species housed in several collections.

According to SCOTT (1940: p. 1035) and our own observations, the lower Albian species *Rhytidoplites robertsi* (holotype, BEG 34825, herein illustrated in Fig. 4.F-H) is characterized by a shell with a sub-rectangular whorl section, and flattened venter. The ornamentation consisting of primary and secondary ribs is well developed on the flanks, especially on the lower third where they are quite prominent. The secondary ribs are weaker than the primaries and appear approximately at midflank. On the venter, the primary and secondary ribs are indistinguishable. Three or four secondary ribs are intercalated between the primary ribs. Though *Rhytidoplites robertsi* and the Aptian ammonites have quite similar ornamentation, the morphology of the shells is clearly different, as was previously mentioned by HUMPHREY (1949: p. 139). Whereas *Rhytidoplites robertsi* has a more involute shell with a sub-rectangular whorl section, the Aptian forms are more evolute and have an elliptical whorl section, and are clearly distinguishable.

HUMPHREY (1949) described two Aptian species with ornamentation quite similar to *Rhytidoplites robertsi*: *Acanthoplites* ? *adkinsi* and *Acanthoplites* ? *sandidgei*. According to HUMPHREY (1949: p. 139) and our own observations, *Acanthoplites* ? *adkinsi* (holotype UMMP 22681, herein illustrated in Fig. 4.A-D) is characterized by an evolute shell with an elliptical whorl section. The ornamentation consists of primary and secondary ribs. One or two secondary ribs are regularly intercalated between the primary ribs. The primary ribs are well developed in the flanks, especially in the lower third where they are quite prominent. The secondary ribs appear in the last third of the flank. Along the ventral region, the primary and secondary ribs are undifferentiated. According to HUMPHREY (1949: p. 140) and our own observations, *Acanthoplites* ? *sandidgei* (holotype, UMMP 24297; herein illustrated in Fig. 4.J-K) has the same form and whorl section as *Acanthoplites* ? *adkinsi*. The pattern of ornamentation consists of primary and secondary ribs. One or two secondary ribs are regularly intercalated between the primary ribs. The primary ribs are well developed on the flank, especially in the lower third where they are quite prominent. The secondary ribs usually appear on the last third of the flank, but some of them appear in the middle of the flank. On the venter, primary and secondary ribs are identical. The differences that HUMPHREY used to separate the two species are related to the scarce and indistinct bifurcations of secondary ribs in *Acanthoplites* ? *sandidgei*. He also observed that the secondary rib pattern of *Acanthoplites* ? *sandidgei* is more irregular than that of *Acanthoplites* ? *adkinsi*. In our opinion the uncommon and indistinct bifurcation pattern is not only present in *Acanthoplites* ? *sandidgei* but can also be observed in *Acanthoplites* ? *adkinsi*. We agree that the secondary rib pattern of *Acanthoplites* ? *sandidgei* is more irregular than *Acanthoplites* ? *adkinsi*, but we attribute this difference to intraspecific variation. We therefore consider '*G.*' *sandidgei* a junior synonym of '*G.*' *adkinsi*, with the name '*Gargasiceras*' *adkinsi* taking priority for this species, since it was first described by HUMPHREY (1949: p. 139-140).

The generic reference of '*Gargasiceras*' *adkinsi* remains unclear. HUMPHREY (1949) used the genus *Acanthoplites* with a question mark, and we agree that this species should not be assigned to this genus, according to the current concept of the genus *Acanthohoplites* SINZOW, 1907. The early whorls of the genus *Acanthohoplites* have a very conspicuous tuberculation that is not present in the Mexican specimens. In addition, the subadult and adult stages of *Acanthohoplites* do not show the characteristic prominent primary ribs on the lower third of the flank of the Mexican species. MORENO-BEDMAR *et al.* (2013) also used a question mark with the genus *Gargasiceras* because of some differences between '*G.*' *adkinsi* and the more typical members of the genus. The generic assignment will be clarified in a forthcoming work comparing these Mexican species with other similar Aptian ammonites. For the present, we use the generic name *Gargasiceras* with quotation marks.

In our opinion, '*Gargasiceras*' *adkinsi* exhibits strong intraspecific variability, especially in the secondary rib pattern. In the Sierra de Parras specimen IGM 9839 (Fig. 3.A), we can see an irregular secondary rib pattern, with some of them appearing approximately in the middle of the flank and others appearing in the outer third of the flank. In this work, we also illustrate two additional specimens of this species from the University of Michigan collection, UMMP 21845 and UMMP 41880 (Fig. 4.E, I & L-N), with UMMP 21845 (Fig. 4.E & I) showing a unique secondary rib pattern. In this case, the secondary ribs are less prominent than the primaries, whereas usually they are equally prominent. In addition, the maximum

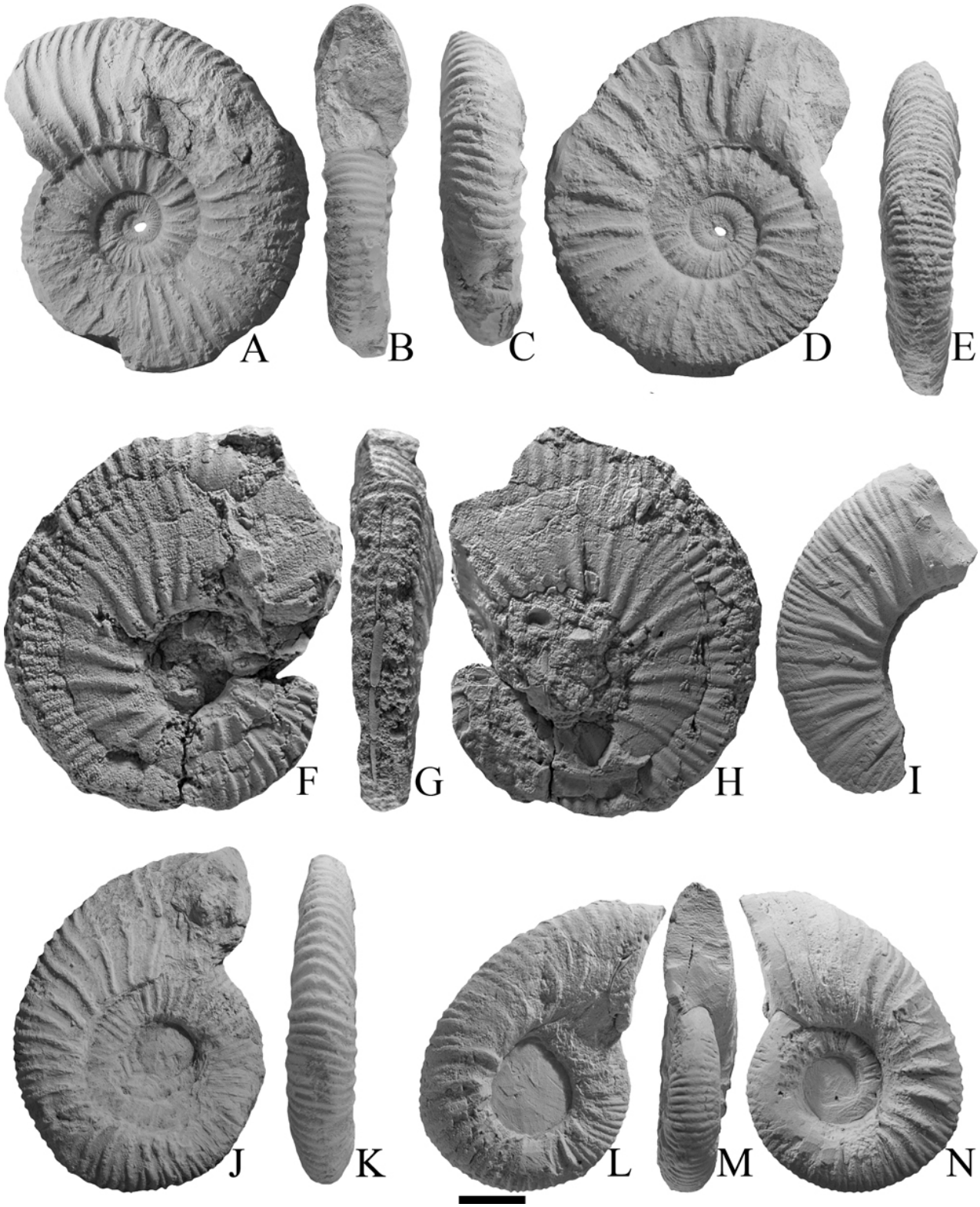

Figure 4: A-D: '*Gargasiceras*' *adkinsi*. Lateral, ventral and frontal views of UMMP 22681, Rincon de los Potreritos, San Jose, Coahuila. E, I: '*Gargasiceras*' *adkinsi*. Ventral and lateral views of UMMP 21845. F-H: *Rhytidhoplites robertsi*. Lateral and ventral views of BEG 34825, Mayfield Canyon, Hudspeth Country, Texas. J-K: '*Gargasiceras*' *adkinsi.* Lateral and ventral views of UMMP 24297, Rincon de los Potreritos, San Jose, Coahuila. L-N '*Gargasiceras*' *adkinsi.* Lateral and frontal views of UMMP 41880, Rincon de los Potreritos, San Jose, Coahuila [Scale bar 1 cm].

number of secondary ribs between primary ribs (up to six) is uncommonly high, and one secondary rib appears to be bifurcated. BURCKHARDT (1925) illustrated two specimens (BURCKHARDT, 1925: Pl. 4, figs. 19-23) from east of Rancho el Mulato, Rio Nazas, Durango State. These specimens are currently housed in the IGM collection (IGM 1881 and 1882) and herein illustrated in Figure 5A-E . BURCKHARDT gave a detailed description of both specimens, commenting that they have an evolute shell with a rib pattern of primary and secondary ribs. He wrote that one or two secondary ribs are intercalated or sometimes bifurcated between the primary ribs, and added that the secondary ribs can appear on the last third of the flank and less commonly in the middle of the flank. In the ventral region, primary and secondary ribs are undifferentiated, but in IGM 1881, the primary ribs are stronger than the secondary ribs. BURCKHARDT (1925) identified these specimens as a *Parahoplites* sp., but remarked on their similarity to *Gargasiceras gargasense* (ORBIGNY, 1841), the type species of the genus. In our opinion, these two specimens should be assigned to the species '*Gargasiceras*' *adkinsi*. BURCKHARDT (1925) failed to describe an important feature that can be seen in both specimens: the primary ribs are well developed on the flank, especially in the lower third where they are quite prominent. This feature is apparent in BURCKHARDT 's original illustrations and Figure 5 of this work. It is important to note that the primary ribs in ventral region of IGM 1881 (Fig. 5.C) are stronger than the secondary ribs. We attribute this to intraspecific variation.

Superfamily Deshayesitaceae STOYANOW, 1949

Family Parahoplitidae SPATH, 1922

Subfamily Acanthohoplitinae STOYANOW, 1949

Genus *Rhytidoplites* SCOTT, 1940

Rhytidoplites robertsi (SCOTT, 1940)

(Fig. 4.F-H, holotype)

v. 1940 *Rhytidoplites robertsi*, SCOTT, p. 1035, Pl. 61, fig. 11; Pl. 63, fig. 7; Fig 159 (holotype).

v. 1974 *Rhytidoplites robertsi*, YOUNG, p. 213, Pl. 12, fig. 3; Pl. 13, figs. 10, 15; Fig. 5d (holotype).

non 1976 *Rhytidohoplites robertsi*, CANTÚ CHAPA, p. 15, Pl. 1, figs. 4, 4a, 6, 6a, 7.

non 1977 *Rhytidohoplites robertsi*, CONTRERAS Y MONTERO, p. 14, Pl. 6, figs. 2-3.

v. 1992 *Rhytidohoplites robertsi*, CONTRERAS Y MONTERO *et al.*, p. w.n., Fig. w.n. (holotype)

non 1992 *Rhytidohoplites robertsi*, CONTRERAS Y MONTERO *et al.*, p. w.n., Fig. w.n.

non 1996 *Rhytidoplites robertsi*, WRIGHT *et al.*, p. 275, Fig. 215, 3a-3b.

non v. 2000 *Rhytidoplites robertsi*, BARRAGÁN, p. 125, Pl. 58, figs. 4-13.

non v. 2001 *Rhytidoplites robertsi*, BARRAGÁN, p. 192, Fig. 4, 3-4.

non v. 2003 *Rhytidoplites robertsi*, MÉNDEZ-FRANCO, p. 80, Pl. 8, figs. 1-3.

Discussion: Our analysis of *Rhytidoplites robertsi* and '*Gargasiceras*' *adkinsi* indicates that there were several errors in previous identifications of these taxa, as noted above. One of these misidentifications (WRIGHT *et al.*, 1996: p. 275, based on the misidentification of CANTÚ CHAPA, 1976) has important consequences on the identification of the genus *Rhytidoplites*. An amended concept of this genus is as follows:

Rhytidoplites is characterized by a shell with a sub-rectangular whorl section with flat flanks and flattened venter. The ornamentation consists of primary and secondary ribs. Primary ribs are well developed along the flanks, especially on the lower third where they are quite prominent. The secondary ribs are weaker than the primaries, and appear approximately in the middle of the flank. In the ventral region, the primary and secondary ribs are indistinguishable. Three or four secondary ribs are intercalated between the primary ribs. This genus is represented by a single species, *Rhytidoplites robertsi,* from the lower Albian of Texas which is the type species by original designation.

According to SCOTT (1940), a second species belongs to this genus: *Rhytidoplites fasciculatus*. However, the general form of the shell and the ornamentation of this taxon are not appropriate to the genus, *Rhytidoplites*. The ventral zone is clearly different, *R. fasciculatus* having a rounded venter and genus *Rhytidoplites* a flat venter. *R. fasciculatus* has an umbilical nodes branching into two or three low ribs. The ribs, which are quite straight, continue to the ventral region. Secondary ribs are few and appear in the upper part of the flank where the primary ribs bifurcate. *Rhytidoplites* has very unusual features in the prominence of the primary ribs in the middle of the flank and in their slight sinuosity. In addition, *Rhytidoplites* has well develop intercalated secondary ribs that appears approximately at midflank.

The flattened ventral region of the genus *Rhytidoplites* is similar to those of the European genus *Hypacanthoplites* (SPATH, 1923) and the American genus *Immunitoceras* (STOYANOW, 1949).

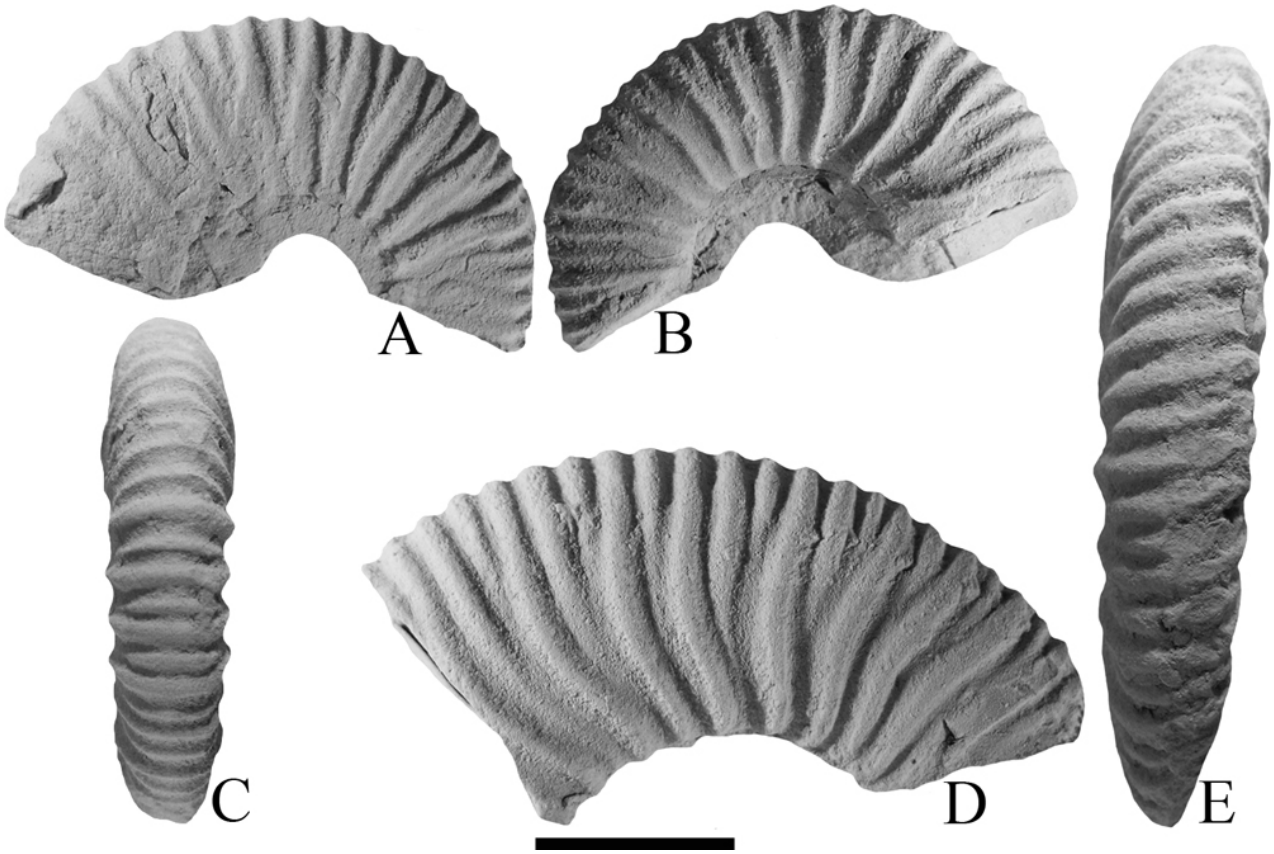

Figure 5: A-C: '*Gargasiceras*' *adkinsi.* Lateral and ventral views of IGM 1881, Rancho el Mulato, Durango State. D-E: '*Gargasiceras*' *adkinsi*. Lateral and ventral views of IGM 1882, Rancho el Mulato, Durango State [Scale bar 1 cm].

VI - Conclusions

We report an interesting lower Aptian ammonite record in the Sierra de Parras, Coahuila State, Mexico, that contains a macroconch of *Dufrenoyia*, which constitutes the first such report from Mexico, and the largest known specimen of '*Gargasiceras*' *adkinsi*. This assemblage, containing one macroconch and several large ammonites, is associated with a proximal region within a marine external platform environment. This type of Aptian ammonite assemblage is poorly known in Mexico, prompting us to return to the locality to conduct a systematic bed-by-bed sampling of the section.

The species '*Gargasiceras*' *adkinsi*, which has been misidentified in the literature generally as *Rhytidoplites robertsi* and *Penaceras rursiradiatus*, exhibits intraspecific variability, especially in the secondary ribs. '*Gargasiceras*' *adkinsi* includes the nominal species *Acanthoplites ? sandidgei*. We analyze in detail the differences between '*Gargasiceras*' *adkinsi* and *Rhytidoplites robertsi*, permitting us to emend the concept of the genus *Rhytidoplites*. These taxonomic improvements of '*Gargasiceras*' *adkinsi*, and related forms, will also allow effective biostratigraphic use of this taxon.

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