



# New insight on the genus *Nolaniceras* Casey, 1961 (Ammonoidea, Cretaceous) and its consequences on the biostratigraphy of the Aptian Stage

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## ABSTRACT

*Nolaniceras nolani* (Seunes, 1887) has been widely quoted in the Upper Aptian literature over the years. Re-examination of the holotype of the species shows that it has always been misidentified and that this taxon is represented by a single specimen, the holotype, of uncertain age. As a consequence, its use as an index species for the Upper Aptian should be reconsidered and abandoned.

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## 1. Introduction

This paper originates from the examination of the type material of *Nolaniceras nolani* (Seunes, 1887) as a contribution to the forthcoming revision of the Acanthohoplitinae from the Late Aptian of South Eastern France.

The revision of the holotype of this largely quoted ammonite species, that is also the index of one the ammonite zones of the Upper Aptian, has shown us that none of the specimens described and illustrated by subsequent authors belong to Seunes' taxon. The implications of this revision of the type material with respect to the validity of the genus *Nolaniceras* will be discussed as well as the consequence on the Upper Aptian ammonite biostratigraphy.

## 2. Origin and age of the material studied

*Hoplites nolani* Seunes, 1887 is based on a single specimen that was collected at the historical locality of Clansayes (Drôme, France). As the great majority of the ammonite specimens from that locality it is preserved as a phosphatized nucleus. It shows the

typical preservation of the “*horizon principal de Clansayes*” of Kilian and Leenhardt (1890) and Jacob (1905).

The fauna that was listed by Breistroffer (1947), indicates that the “*horizon principal de Clansayes*” is of late Late Aptian age. Outcrops are now mostly covered by the vegetation and new collections are impossible. Based on the literature (Hébert and Toucas, 1875; Kilian and Leenhardt, 1890; Jacob, 1905) it is well established that there is more than one phosphatic nodule bed (Bréheret, 1995 and fig. 1). As a consequence the fauna merely represents polyzonal condensed and/or *remanié* beds that span a time interval that includes the middle and upper part of the Upper Aptian. It has also been claimed (Delamette in Bréheret, 1995) that Lower and Middle Albian ammonites occur in the assemblage. This is based on historical collections whose exact stratigraphic position is unclear.

Lacking new collections, all that we know of the Clansayes fauna and its age is based on historical material and its exact distribution in the Aptian ammonite sequence can only be deduced by comparison with the expanded sequences of the Vocontian basin.

## 3. Systematic palaeontology

Abbreviations: All dimensions of specimen are given in millimetres: D = diameter; Wb = whorl breadth; Wh = whorl

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height; U = umbilical diameter. Figures in parentheses are dimensions as a percentage of the diameter at the point of measurement. Unless otherwise mentioned the classification retained in this paper is the one of Wright et al. (1996).

The acronym FSL is used to indicate the repositories of the specimen mentioned at Université Claude Bernard, Lyon.

Suborder Ancyloceratina Wiedmann, 1966

Superfamily Deshayesitoidea Stoyanow, 1949

Family Parahoplitidae Spath, 1922

Subfamily Acanthohoplitinae Stoyanow, 1949

Genus *Nolaniceras* Casey, 1961

Type species: *Hoplites nolani* Seunes, 1887, p. 564, pl. 13, figs. 4 a, b, by original designation of Casey (1961, p. 598).

*Nolaniceras nolani* (Seunes, 1887)

- 1887 *Hoplites nolani*, Seunes, 564, pl. 13, Figs. 4a–b.  
 non 1905 *Parahoplites* sp. cf. *Nolani* (Seunes); Jacob, 409, pl. 13, Fig. 1.  
 non 1907 *Acanthohoplites Nolani* (Seunes); Sinzow, 503, pl. 8, Figs. 1–2a, 3, 5.  
 non 1937 *Acanthoplites Nolani* (Seunes); Collignon, 125, pl. 3, Figs. 6, 6a, 7, 7a–b, 8, 8a–b.  
 non 1949 *Acanthoplites nolani* (Seunes); Luppov et al., 231, pl. 58, Figs. 5, 6a–c, Text-fig. 60.  
 non 1953 *Acanthoplites nolani* (Seunes); Glazunova, 32, pl. 4, Figs. 1a–c, 2a–c, 3.  
 non 1955 *Hypacanthoplites nolani* (Seunes); Eristavi, 104, pl. 4, Fig. 8, pl. 5, Fig. 1.  
 non 1960 *Acanthohoplites nolani* (Seunes); Drutschitz and Kudriavtsev, 326, pl. 13, Figs. 1a–b, 2a–b, 3a–b, 4, text-figs. 115–117.  
 non 1961 *Acanthoplites nolani* (Seunes); Eristavi, 56, pl. 2, Fig. 8.  
 pars. 1961 *Nolaniceras nolani* (Seunes); Casey, 598.  
 1965 *Nolaniceras nolani* (Seunes); Casey, 457, text-fig. 171a–b.  
 non 1965 *Nolaniceras nolani* (Seunes); Casey, 456, text-fig. 171c–g.  
 non 1965 *Nolaniceras* aff. *nolani* (Seunes); Casey, 456, pl. 70, fig. 5a–c.  
 non 1965 *Acanthohoplites nolani* (Seunes); Egoian, 131, pl. 7, Figs. 2–6, pl. 8, Figs. 1–5.  
 non 1968 *Acanthohoplites nolani* (Seunes); Wiedmann and Dieni, 8, pl. 9, Figs. 10, 17, text-fig. 63a–c.  
 non 1969 *Acanthohoplites nolani* (Seunes); Egoian, 154, pl. 10, figs. 3a–c, 4a–b, pl. 11, Figs. 2a–c, 3a–b, 4a–c, 5a–c, pl. 23, Figs. 28, 29.  
 non 1971 *Acanthohoplites nolani* (Seunes); Kvantaliani, 31, pl. 3, Fig. 5a–c.  
 non 1976 *Acanthohoplites nolani* (Seunes); Fülöp, pl. 50, Fig. 19.  
 non 1978 *Nolaniceras nolani* (Seunes); Obata, pl. 2, Fig. 1.  
 non 1980 *Nolaniceras* cf. *nolani* (Seunes); Seyed-Emami, 727, pl. 3, Fig. 4a–b.  
 non 1982 *Acanthohoplites nolani* (Seunes); Leshchukh, 133, pl. 11, Figs. 2.  
 non 1982 *Acanthohoplites nolani* (Seunes); Renz, 29, pl. 2, Fig. 5a–b, Text-fig. 18a–b.  
 non 1987 *Acanthohoplites nolani* (Seunes); Leshchukh, 125, pl. 14, Figs. 2–15, pl. 15, Figs. 3, 4.  
 non 1994 *Acanthohoplites (Nolaniceras) nolani* (Seunes); Delamette, 298, pl. 4, Fig. 10.  
 non 1996 *Nolaniceras nolani* (Seunes); Wright et al., 275, Fig. 215 1a–b.  
 non 1997 *Acanthohoplites (Nolaniceras) cf. nolani* (Seunes); Delamette et al., 298, pl. 4, Fig. 10.  
 non 2001 *Nolaniceras nolani* (Seunes); Aly and Abdel-Gawad, 40, pl. 3, Fig. 6, Text-fig. 9.  
 non 2002 *Nolaniceras nolani* (Seunes); Arnaud et al., 44.  
 non 2004 *Acanthohoplites nolani* (Seunes); Sharikadze et al., 401, pl. 85, Fig. 2.  
 non 2006 *Acanthohoplites nolani* (Seunes); Abu-Zied, 147, pl. 10, Figs. 5–7.  
 non 2007 *Nolaniceras nolani* (Seunes); Szives et al., 69, pl. 10, Figs. 4, 20, 21, pl. 13 Fig. 8.  
 non 2008 *Acanthohoplites nolani* (Seunes); Abu-Zied, 606, Fig. 2X, Figs. 9G–I.  
 non 2008 *Acanthohoplites nolani* (Seunes); Joly and Delamette, 8, Fig. 7D.  
 non 2010 *Nolaniceras nolani* (Seunes); Bulot, 188, pl. 9, Figs. 2, 3.

Type: The holotype by monotypy is FSL.IM2034 (Fontannes collection, formerly in the Ecole des Mines de Paris), a juvenile specimen preserved as a phosphatized internal mould, with the shell present on certain parts of the mould. The original drawing by

Seunes (1887) is re-illustrated herein (Fig. 2a, b) and is photographed for the first time (Fig. 2c–e)

Dimensions:	D	Wb	Wh	U	Wb/Wh
Holotype	29 (100)	10 (34)	11 (38)	10 (34)	(91)

Description of the holotype: Coiling is relatively evolute, the umbilicus comprising 34% of the diameter, with a low, convex umbilical wall. The whorl section is compressed (Wb = 0.34), suboval with the greatest breadth at about mid flanks. The inner flanks are convex, the outer flanks are strongly convergent, the venter is narrow, flat to feebly convex, with rounded shoulders.

On the inner whorls, ornament is feeble and consists of primary ribs arising on the umbilical wall while the intercalatories rise on the inner flank. On the last whorl, the ornament is made of numerous, thin, flexuous ribs. The primary ribs rise on the umbilical wall, tending to strengthen on the umbilical shoulder. One or two long intercalatories, between two successive primaries, rise just above the umbilical shoulder, giving the wrong impression that they originate from bifurcation of the primaries. The ribs are radial, slightly projected onward on the umbilical shoulder, feebly projected backward at about mid flank and onward again on the outer flank. They cross the ventral area transversally, coarsened and attenuated. There are a total of 41 ribs on the last half whorl. Despite what was said in the original description, there is no trace of tubercles on any part of the shell at any growth stages.

The suture line is unknown

Discussion. *Nolaniceras nolani* differs from all other late Late Aptian Acanthohoplitinae. It is characterized by a highly distinctive low and convex umbilical wall and most unusual ornamental style. Moreover, comparison between the photograph of the holotype (Fig. 2c–e) and the original figure of Seunes (1887) (Fig. 2a, b) shows clearly that the latter is idealized. This contributed to a long series of misidentifications of the species by authors as shown by the synonymy list.

The treatment of the species by Casey (1965) provides a good example of the misunderstanding of *Nolaniceras nolani*. Based on the study of the holotype, and what he assumed to be topotypes, Casey (1965) considered that: “The species exhibits considerable variability in density of ribbing and in the inflexion of ribbing on the venter” (p. 457). In our opinion appraisal of the intraspecific variation of *Nolaniceras nolani* is impossible since the holotype originates from a condensed horizon. By no means can contemporaneity between the holotype and the “topotypes” be assumed.

Among the three specimens from Clansayes illustrated by Casey (1965, p. 457), two specimens (Text-fig. 171g–f) correspond to the younger whorls of an acanthohoplite which cannot be identified at the specific level. In any case neither its umbilical wall nor its ribbing match the holotype at an equivalent diameter. The largest specimen (Text-fig. 171c–d), about the same diameter of the holotype, differs by its steeper umbilical wall and low rib density. Moreover, and despite its moderate preservation, it clearly shows umbilical tubercles on the outer part of the last whorl.

This discussion of Casey's topotypes illustrates well the problem of other specimens identified as *Nolaniceras nolani* in the literature. As early as 1949, Stoyanow (p. 116) already pointed out that the specimens illustrated by Sinzow (1907) were distinct from Seunes' type. As most other specimens from the former USSR (Glazunova, 1953; Eristavi, 1955, 1961; Egoian, 1965, 1969), Sinzow's specimens belong to a group of taxa referred in the literature as *Hypacanthohoplites* of the *rubricosus-subrectangulatus* group (Casey, 1961, p. 598; Casey, 1965, p. 456; Casey, 1999). Those specimens can easily be distinguished by their clearly tabulate venter bordered by two rows of tiny tubercles, a feature that never exists in *Nolaniceras nolani* at equivalent growth stage.

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