

A note on species identification in the genus *Libycoceras* Hyatt, 1900 (Ammonitina, Late Cretaceous)



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ABSTRACT

Species of the sphenodiscid genus *Libycoceras* are widely used for correlation of Campanian–Maastrichtian strata in West and North Africa and the Middle East (Levant). Five valid species are discussed herein, viz. *L. crossense* Zaborski, 1982, *L. dandense* (Howarth, 1965), *L. afikpoense* Reyment, 1955, *L. acutodorsatus* (Noetling, 1897) and *L. ismaelis* (von Zittel, 1884), the last named being the most widely cited. However, a systematic review of this species has shown that the holotype of this species is lost, and that many subsequent records were erroneous. Other species of *Libycoceras* are described briefly, inclusive of a discussion whether or not *L. charginense* (Blanckenhorn, 1900) could be regarded as a synonym of *L. acutodorsatus*. An identification key which lists the main features on which these five species can be differentiated is provided in order to enable correct assignment even by non-palaeontologists. On the basis of these adjusted taxonomic concepts, the five species of *Libycoceras* turn out to be suitable for long-distance correlation, in contrast to other coeval oxycone ammonites.

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1. Introduction

In recent years, the systematics of Late Cretaceous ammonoids have been discussed in detail in seminal papers by authors such as W. James Kennedy, William Cobban, Herbert Summesberger, Neil H. Landman and Herbert Klinger. With these revisions in hand, species concepts can be thoroughly applied and biostratigraphical correlations over large distances, not possible before, became available. For example, the synonymisation of *Nostoceras hyatti* Stephenson, 1941 with *Heteroceras conradi* Morton, 1834, and *Didymoceras* sp. nov. Sornay, 1951 by Cobban (1974) and with *Nostoceras* (*N.*) *pozaryskii* Błaszkiwicz, 1980 by Kennedy (1986) made correlation of the upper Campanian throughout lower and middle latitudes possible. Many more examples could be cited here.

Only few species and genera have escaped the thorough systematic reviews of the above-mentioned authors. One such example is presented here, with the aim to raise the awareness of biostratigraphers and to enable them to compare similarities amongst their index fossils and also identify particular diagnostic features.

Ammonoid biozonation in shallow-water deposits is more difficult than in deep-water facies, because life in proximal settings

led to specialisation within otherwise open-marine Ammonoidea. In addition to a lesser specific diversity, shallow-water ammonoids also present a wide intraspecific morphological variability. Such specialised faunas may produce successions that permit local zonation to be introduced, but their constituent species are less useful for large-distance correlations, e.g., in the Western Interior Seaway of North America (see e.g. discussion in Zaborski, 1982; Landman et al., 2004b; Ifrim et al., 2005; Ifrim and Stinnesbeck, 2010). In contrast, members of the genus *Libycoceras* are widely used for correlations in Campanian–Maastrichtian strata of West and North Africa to the Middle East (Levant). One widely cited species is *Libycoceras ismaelis*. However, a systematic review of earlier records of this taxon shows that there is no valid type available and that numerous records of this species are in fact misidentifications. Whereas other species of *Libycoceras* are well defined (see Zaborski, 1982; Zaborski and Morris, 1999; Ahmad et al., 2015), *L. ismaelis* has not been reviewed in recent years. Here a systematic discussion of this species is provided; congeners are characterised in brief to allow distinction between the various forms.

2. Systematic palaeontology

Abbreviations. D – diameter (in mm); E – external lobe; A – adventive lobe of Korn et al. (2003); U – umbilical lobes.

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Order Ammonoidea von Zittel, 1884
 Suborder Ammonitina Hyatt, 1889
 Superfamily Acanthoceratoidea de Grossouvre, 1894
 Family Sphenodiscidae Hyatt, 1900
 Subfamily Sphenodiscinae Hyatt, 1900

Genus *Libycoceras* Hyatt, 1900

Type species. *Sphenodiscus ismaelis* von Zittel, 1884, p. 451, fig. 631.
 For an extensive discussion of the genus reference is made to Zaborski (1982). Further details can be found in Zaborski and Morris (1999), while poorly known records were summarised by Wiese et al. (1996).

***Libycoceras ismaelis* (von Zittel, 1884)**

Fig. 1, 2X–AA.

1883 *Ammonites Ismaëlis* Zitt.; von Zittel, p. 74 (*nomen nudum*).

1883 *Ammonites* (*Buchiceras*) *Ismaëlis*; von Zittel, p. 75 (*nomen nudum*).

*1884 *Sphenodiscus Ismaelis* Zittel; von Zittel, p. 451, fig. 631.

1895 *Indoceras ismaëli* (Zitt.); von Zittel, p. 462, fig. 1207.

1900 *Libycoceras Ismaeli* (Zitt.); Blanckenhorn, p. 44.

1902 *Libycoceras Ismaëli*, Zitt.; Quaas, p. 302, pl. 29, figs 3–7; pl. 30.

1910 *Indoceras Ismaëli* Zitt.; von Zittel, p. 499, fig. 1218.

1915 *Sphenodiscus ismaelis* Zittel; Greco, p. 227, pl. 22, fig. 4; text-fig. 4.

1920 *Indoceras* (*Libycoceras*) *ismaelis* (Zittel); Di Stefano, p. 14, pl. 3, fig. 1; pl. 4, figs 1–4.

1921 *Libycoceras Ismaeli* Zitt.; Blanckenhorn, p. 65.

1928 *Libycoceras Ismaelis* (Zittel); Douvillé, p. 34.

non 1929 *Libycoceras ismaeli*, Zitt.; Picard, p. 447, pl. 9, fig. 12; text-figs 7–9 (= sp. indet.).

1931 *Libycoceras Ismaeli* (Zittel), nov. var. *soudanense* (Zittel); Pérébaskine, p. 130, pl. 11, figs 1a–b, 2.

1931 *Libycoceras Ismaeli* (Zittel); Pérébaskine, p. 130, pl. 11, fig. 3a–b.

1932 *Indoceras ismaeli* (Zittel); Sorrentino, p. 199, pl. 5, figs 3–4, 7.
 1959 *Libycoceras* sp. ex gr. *ismaeli* (Zittel); Sornay, p. 221, pl. 7, figs 1a–b, 72.

?1962 *Libycoceras ismaeli* (Zittel); Reiss, pp. 7–8, 11.

1970 *Indoceras africanense* Iljin; Iljin et al., p. 111, pl. 5, figs 1–2; text-fig. 2.

non 1977 *Libycoceras ismaele* (Zittel); Lewy, p. 246, pls 9–12; text-fig. 3a–c, f–g, j (= *L. crossense* and *L. afikpoense*).

non 1989 *Libycoceras* ex gr. *L. ismaeli* (Zittel, 1884); Luger and Gröschke, p. 396, pl. 48, figs 3–6; text-fig. 10d (= *L. crossense*).

non 1996 *Libycoceras ismaeli hadense* Kassab and Hamama, p. 438, pl. 1, figs 1–4; pl. 2, figs 1–5; pl. 3, figs 1–4; text-figs 2–11 (= *Manambolites piveteaui* Hourcq, 1949).

?1996 *Libycoceras ismaelis* (Zittel, 1883 *nomen nudum*; 1885); Wiese et al., p. 109, pl. 2, fig. 1 (with additional synonymy).

1996 *Libycoceras ismaeli* (Zittel); Amard, p. 661, figs 3–4 (with synonymy).

1999 *Libycoceras ismaelis* (Zittel); Zaborski and Morris, fig. 4.9–4.10.

?2009 *Libycoceras* cf. *ismaelis* (von Zittel, 1884); Lehmann and Herbig, p. 79, text-fig. 8a–b (= sp. indet.).

non 2013 *Libycoceras ismaeli* (Zittel); Galmed et al., p. 575, figs 3, 8 (= *L. crossense*).

non 2013 *Libycoceras ismaeli* (Zittel); Galmed et al., p. 575, figs 4–5, 7 (= *L. afikpoense*).

Name of the species. Of the species name two spellings occur, *L. ismaeli* and *L. ismaelis*. However, since the first valid record of the species is *Sphenodiscus Ismaelis* by von Zittel (1884), this spelling has priority.

Types. Holotype, by monotypy, of *Sphenodiscus Ismaelis* is the original of von Zittel (1884, p. 451, fig. 631); it is from the

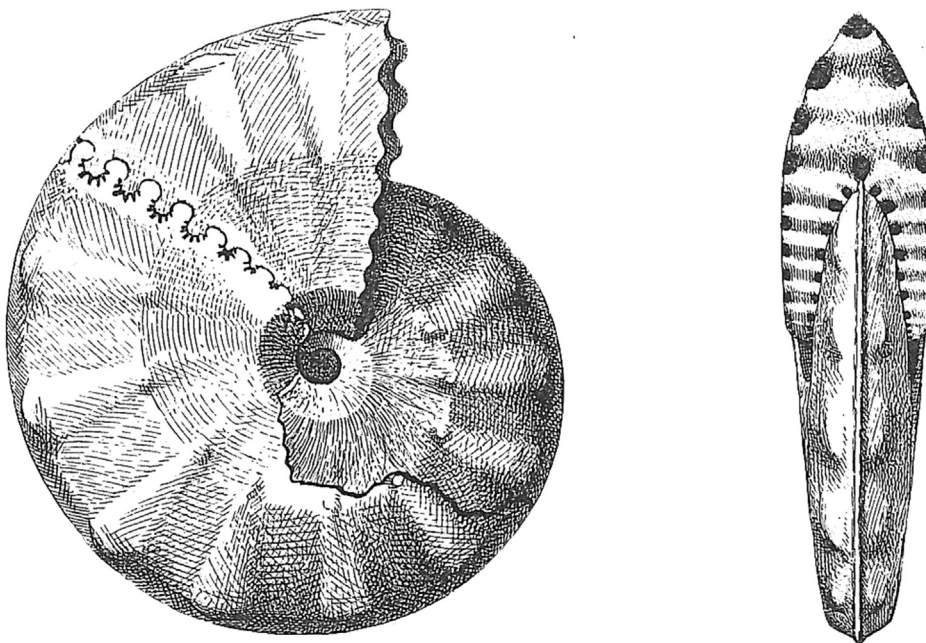


Fig. 631.

Sphenodiscus Ismaelis Zittel. Ob. Senon. Libysche Wüste westlich von der Oase Dachel.

Fig. 1. Reproduction of the first illustration of *Libycoceras ismaelis* (von Zittel, 1884, p. 451, fig. 631), as *Sphenodiscus Ismaelis*. The type series has since been lost.

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