

*Simaspidoceras bauschi* sp. nov. (Ammonitina, Physodoceratinae).  
The evolutive meaning of Submediterranean *Simaspidoceras*

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With 2 text-figures and 1 plate

Kurzfassung

Die detaillierte Untersuchung der *Simaspidoceras*-Fauna, die im Kimmeridge der submediterranen Gebiete vertreten ist, führt zur Identifizierung von zwei Arten: *S. bucki* CHECA und *S. bauschi* sp. nov. Als Ergebnis wird das allgemeine evolutive Schema der Gattung *Simaspidoceras* durch das Ersatzmodell interpretiert, wobei *S. bucki* als gemeinsame Urform von *S. bauschi* und *S. argobbae-irregulare*, d. s. submediterrane bzw. äthiopische, vikariierende Formen, angesehen wird.

Abstract

The detailed study of the *Simaspidoceras* fauna present in the Kimmeridgian of the submediterranean province leads to the identification of two species: *S. bucki* CHECA and *S. bauschi* sp. nov.. As a result, the general evolutive scheme of the genus *Simaspidoceras* is interpreted through the vicariance model, *S. bucki* being considered as the common ancestor of *S. bauschi* and *S. argobbae-irregulare*, which are Submediterranean and Ethiopian vicariants respectively.

Introduction

The present work takes as its starting point the revision of the Aspidoceratinae and Physodoceratinae subfamilies recently carried out by CHECA (1985). During that phase of our research project the study of a great amount of material collected in various European institutions was necessary, to obtain as clear a view as possible of the association present in the different paleobiogeographical areas recognized during upper Jurassic. Within this material it has been possible to determine the existence of specimens belonging to the genus *Simaspidoceras* and distributed in two species, one of which, *S. bauschi*, turned out to be exclusively submediterranean. The aim will be, therefore, to present a detailed study of the Submediterranean fauna of *Simaspidoceras* and its contribution to our knowledge of the evolutive history of the group.

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## Abbreviations

Dm	Diameter in mm
U	Umbilicus in mm
H	Whorl height in mm
W	Whorl width in mm
T	Number of tubercles in a complete whorl

## Species description

Family Aspidoceratidae ZITTEL, 1895  
 Subfamily Physodoceratinae CHECA, 1985  
 Genus *Simaspidoceras* SPATH, 1925

*Simaspidoceras bauschi* sp. nov.

Plate 1; figure 1

1983 *Aspidoceras lallierianum schilleri* (OPPEL) – KASTLE: 36.

**Material:** 5 specimens. Two of them stored at the Bayer. Staatsslg. Paläont. hist. Geol. (München), 1980 XV 13 (Malm Delta, Petersbuch) and 1957 XVIII 14 (Malm Delta 1b, Wettelsheim); another with no registration number at the Geol. Paläont. Inst. (Tübingen) and registered as T398 in CHECA (1985), from Malm Delta 1 at Ringingen; an unregistered specimen at the Staatliches Museum Naturk. (Stuttgart), recorded as L308 in CHECA (1985), from an unknown locality in Baden-Württemberg; specimen 100728 (Univ. Claude Bernard, Dept. Sci. Terre, Lyon) from Middle Kimmeridgian at Grand Colombier de Culoz, “La Croix” (Southeastern France).

**Holotype:** 1980 XV 13 = plate 1. Belonging to the material collected by KASTLE (1983).

**Type locality, type stratum:** Middle Kimmeridgian (Malm Delta) of Petersbuch near Eichstätt, Südliche Frankenalb (Southern Germany).

**Derivatio nominis:** To Prof. Dr. H. Bausch (Institut für Geologie und Mineralogie, Erlangen-Nürnberg) for his great kindness and constant help.

**Diagnosis:** A new species of the genus *Simaspidoceras* of large to very large size and median involution; section with subpentagonal outline; coarse tubercles placed on the umbilical edge; wide ribs with radial tracing and little relief, markedly coarsened at lateroventral portion.

## Measurements

	Dm	U	H	W	T
1980 XV 13	220,2	63,3	93,8		10–11
L 308 (in CHECA, 1985)	197,6	55,5	89,5	109,0	9

**Description:** An infrequent species including large to very large forms with median involution. The section is rounded, more or less depressed and with a subpentagonal outline, due to the presence of ornamentation coarsened at the lateroventral band. The flanks are slightly convex and convergent. The umbilical edge is sharp and the umbilical wall approximately vertical. The ornamentation is composed of coarse tubercles placed on the umbilical edge and directed inwards over the umbilicus, obliquely to the flank. There are also wide ribs with radial tracing and little relief, placed on the flank; they are markedly coarsened at the lateroventral portion and cross the ventral region without interruption. The relation between both types of ornamental

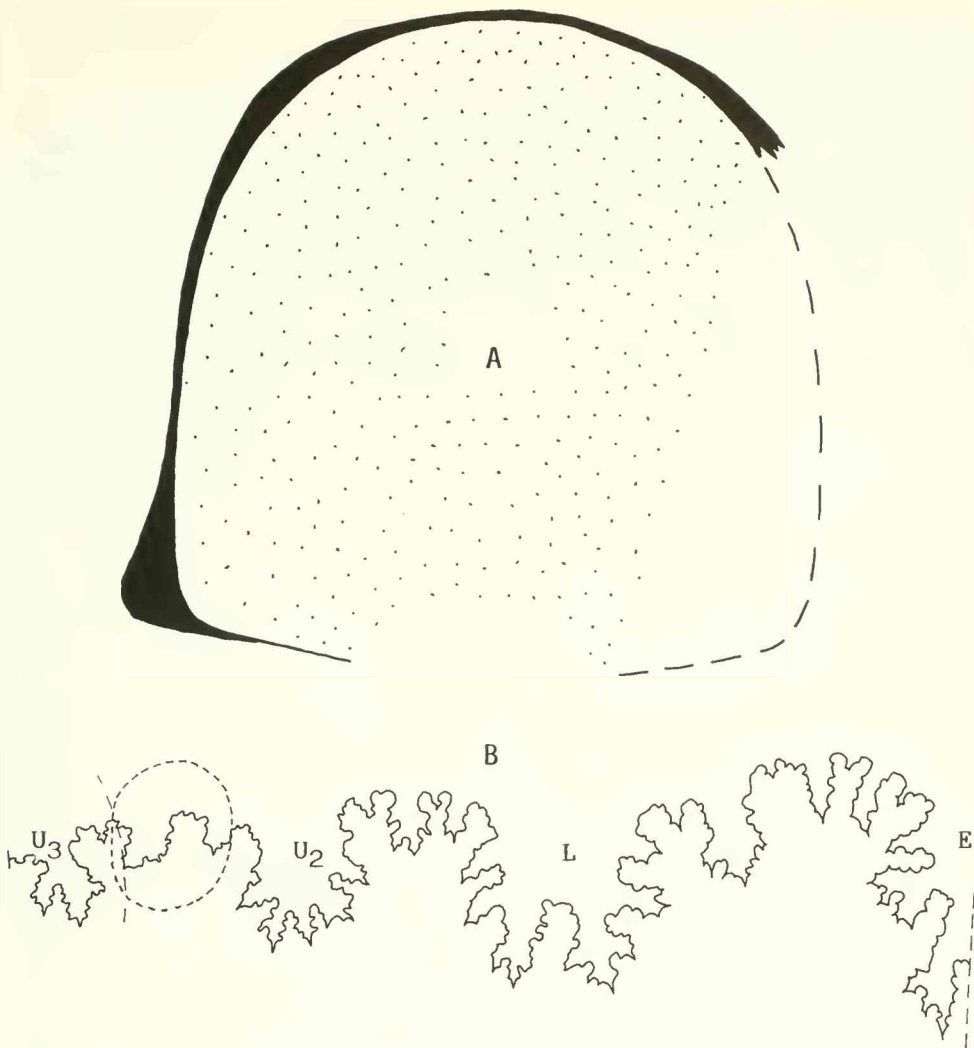


Figure 1: Section (A) and suture (B) of the holotype (1980 XV 13) of *Simaspidoceras bauschi* sp. nov.. Broken lines show both the umbilical edge and tubercle location. Natural size.

elements is not constant, but when they coincide ribs seem to grow from periumbilical tubercles, those that are left taking on the appearance of intercalary ribs.

The suture line clearly agrees with the model previously observed in the genus *Simaspidoceras*, although its elements are not so deep and indented; the outer saddle stands out due to its considerable size.

Observations: The specimen designated as the holotype corresponds to an adult, almost complete phragmocone, somewhat laterally deformed following the symmetry plane. Even though it is not the best preserved specimen, it is certainly the only one which allows a complete identification of specific characteristics, together with a precise biostratigraphical and geographical assignment. In spite of the wide biostratigraphical range (Malm Delta) facilitated by

KÄSTLE (1983), it could be attributed to the lower part (*Acanthicus* zone) of this interval, according to the species list given by this author (pages 36 and 37) and the demonstrated existence of this species within the said interval.

On the other hand, any comment on intraspecific variability is hardly significant at the present time given the scarcity of material, although it is possible to point out a certain fluctuation in section shape (common in *Physodoceratinae*) and in the prominence of ribbing, sometimes very slightly marked.

Affinities: *S. bucki* CHECA shows a very reduced size, denser tuberculation and, usually, more marked ribbing, even though within its specific spectrum some morphologies are ornamentally very close to the present species.

In *S. argobbae* (DACQUÉ) – *irregulare* (DACQUÉ) the ornamentation is more prominent, although some extreme forms may be erroneously taken for *S. bauschi* sp. nov. (see VENZO, 1959).

*O. liparum* shows a coarser and more spaced tuberculation and it only develops a certain swelling (which disappears at the middle flank) as a continuation of tubercles.

Biostratigraphic and geographic distribution: Malm Delta 1 (lower *Acanthicus* zone) of Petersbuch, Wettelsheim and Ringingen (Southern Germany). Uncertain levels (possibly equivalent) of Grand Colombier de Culoz (Southeastern France).

### The evolutive significance of Submediterranean *Simaspidoceras* (Figure 2)

Following the studies by DACQUÉ (1905), SCOTT (1943) and VENZO (1959), the genus *Simaspidoceras* was interpreted as representing a set of forms linked exclusively to the Ethiopian province. Later (OLÓRIZ, 1976), its presence in the Betic Cordillera was recognized, although under specific denominations previously assigned to the Eastafrican material. In CHECA (1985) Mediterranean forms are individualized as *S. bucki* (also present in Southern Germany) and their place as the possible evolutive basis of the Ethiopian stock is established. From the data presently available, *S. bucki* is considered as the first species of *Simaspidoceras*, originating in the lower *Divisum* zone of the Mediterranean province from the genus *Orthaspidoceras* (specifically *O. zieglei*). Likewise, and in spite of the inaccuracy of the Ethiopian record, *S. argobbae* and *S. irregulare*, whose specific segregation is not presently clear, would derive from *S. bucki*, so making up a set with a really remarkable paleobiogeographic characterization.

The origin of *S. bauschi*, even though open to diverse interpretations, seems also to be related to Mediterranean representatives of the genus, given that, as has already been shown (CHECA, 1985), the presence of *S. bucki* has been recognized at the lower-middle Kimmeridgian (Gamma-Delta) boundary in Southern Germany (Ries area). On the other hand, the increasing morphological distance and the absence of the Ethiopian species of this genus in the Submediterranean province, makes the solution of a direct relation between *S. bauschi* and *S. argobbae-irregulare* highly improbable.

The evolutive process originating the morphology of *S. bauschi* from that of *S. bucki* looks to be parallel to that adduced in the case of *S. argobbae-irregulare* (CHECA, 1985). Although it is not possible to give more precise information due to the scarcity of material, the result is a recapitulation (sensu GOULD, 1977), with which is associated or implied (depending on the detailed consideration of the result) a marked increase in size, even greater than in the case of the Ethiopian forms.

From what has been stated above it can be deduced that, within the evolutive history of the genus *Simaspidoceras*, *S. bauschi* may be considered as a Submediterranean vicariant of *S. argobbae-irregulare*, both originating from the same ancestor by means of a similar evolutive pro-



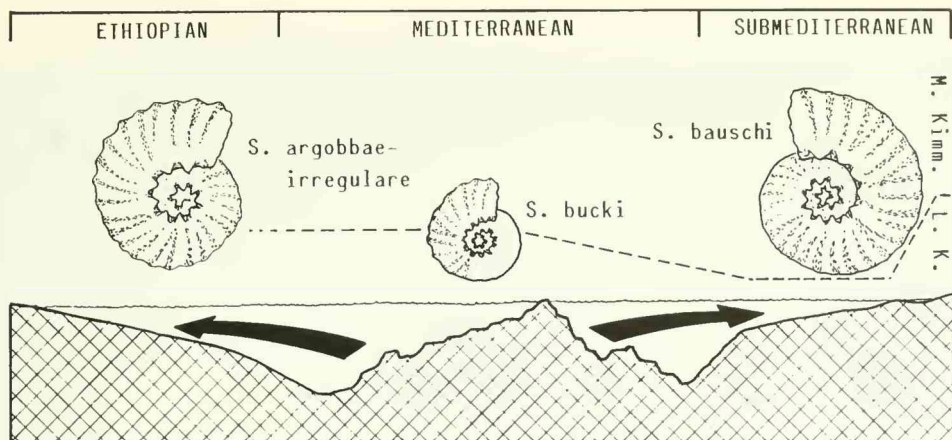


Figure 2: Schematic representation of the evolution and paleobiogeography of the genus *Simaspidoceras*.

cess. On the other hand, their respective positions within the evolutive framework of Physodoceratinae seem to be equivalent, for they occupy, in morphological terms, the space of the genus *Orthaspidoceras*, which will later take over their place on these shelves.

Thus, the evolutive history of the genus *Simaspidoceras*, as it is interpreted here, fits in with the vicariance model, as a result of parallel evolutions from a Mediterranean ancestor on separate shelves that give rise to very similar morphological products.

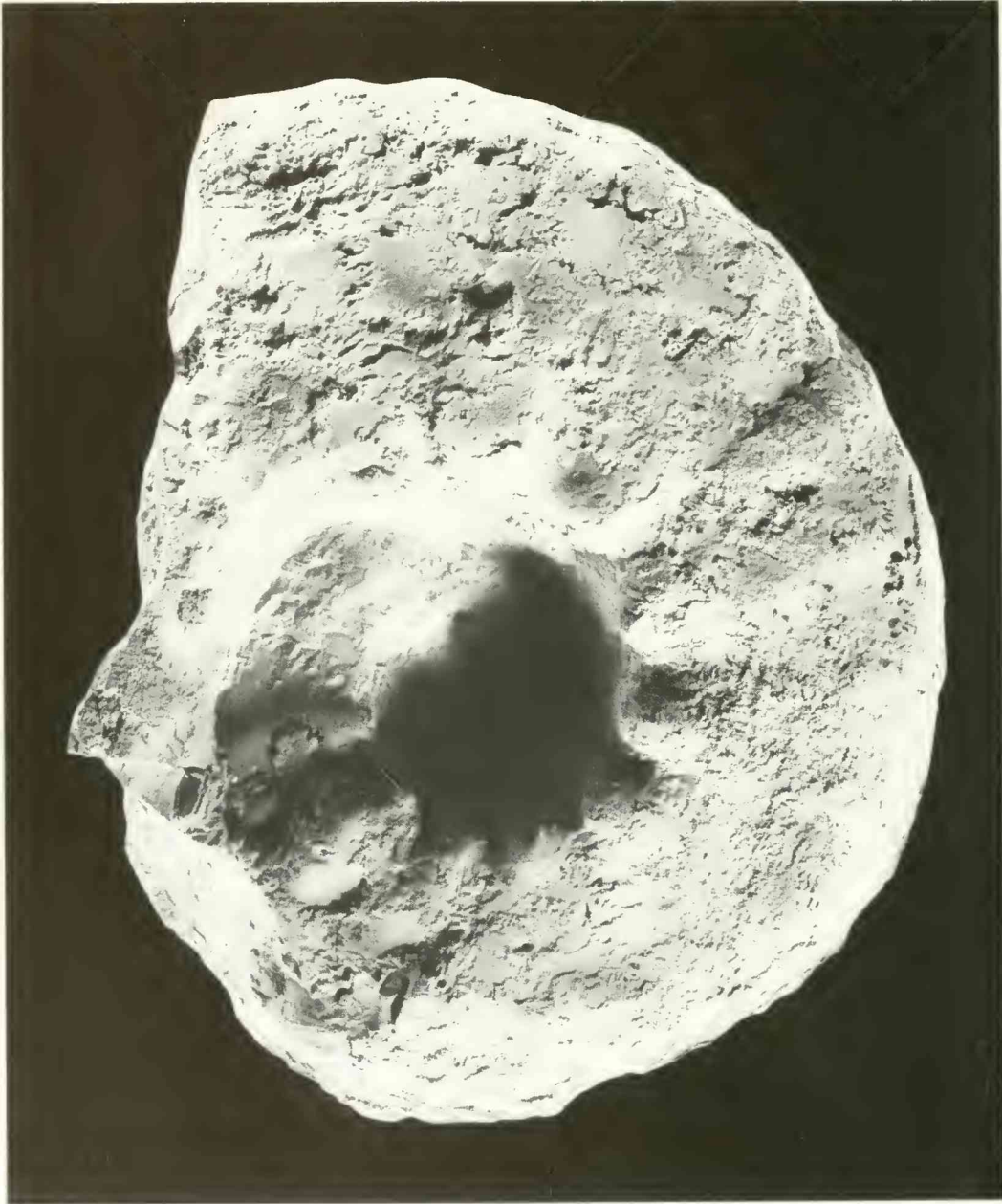
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*Simaspidoceras bauschi* sp. nov. (Holotype). BSP 1980 XV 13. Middle Kimmeridgian (Malm Delta), Petersbuch.  $\times 0,7$ .

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