

***Xenosphinctes* n. gen. (Ataxioceratidae, Lithacoceratinae), a new rare ammonite genus from the Lower Tithonian (Hybonotum Zone) of SW Germany**

Armin SCHERZINGER¹, Günter SCHWEIGERT²

Key words: ammonites, *Xenosphinctes berkai*, Early Tithonian, biostratigraphy, Germany.

Abstract. The new monotypic ammonite genus *Xenosphinctes* (type species: *Xenosphinctes berkai* n. sp.) is established. It is recorded from the Upper Jurassic, Early Tithonian, Hybonotum Zone, Riedense Subzone, *eigeltingense* α horizon from the Talmühle, N of Engen, Baden-Württemberg, SW Germany.

INTRODUCTION

The Hangende-Bankkalke Formation is the youngest formation in the Upper Jurassic of Swabia. Its base is usually formed by an unconformity with a marked change in lithology from coarse-grained bioclastic limestones or marlstones to pure mudstones (Schweigert, 1996). Its type locality is an abandoned limestone quarry near the village of Eigeltingen, and its base is best exposed in a nearby section along a railroad cut, NW of the Talmühle hamlet (Fig. 1). The most abundant macrofossils in these basal parts of the formation are ammonites. Many of them are fragmented due to predation, but some of them are quite well-preserved as steinkerns with superimposed sculpture of the outer shell. This section was one of the first from which the microconchiate passendorferiid *Berckhemeria* was recorded (Schweigert & Zeiss 1998). The stratigraphic age of the ammonite fauna is Early Tithonian (Hybonotum Zone, Riedense Subzone, *eigeltingense* α horizon).

AMMONITE FAUNA OF THE *EIGELTINGENSE* α HORIZON

The first comprehensive review of ammonites from the uppermost Jurassic in Swabia was provided by Berckhemer & Hölder (1959). However, therein the focus was on the ammonite fauna of the Late Kimmeridgian Beckeri Zone, and only very few taxa from higher levels have been reported. Ohmert & Zeiss (1980) started with a description of the ammonite fauna of the Hangende-Bankkalke Formation in the western part of the Swabian Alb. On that occasion several important taxa from the basal part of this formation which are typical of the former *eigeltingense* horizon were introduced, among them the index *Lithacoceras eigeltingense* Ohmert & Zeiss. However, at that time most taxa were only represented by single or very few specimens, and even the ammonite fauna of the entire formation comprised less than 100 specimens. This situation changed due to intensive sampling activities. In 1995 Schweigert and Scherzinger intro-

¹ Maurenstraße 26, 78194 Immendingen-Hattingen, Germany; Armin.Scherzinger@t-online.de.

² Staatliches Museum für Naturkunde Stuttgart, Rosenstein 1, 70194 Stuttgart, Germany; guenter.schweigert@smns-bw.de.

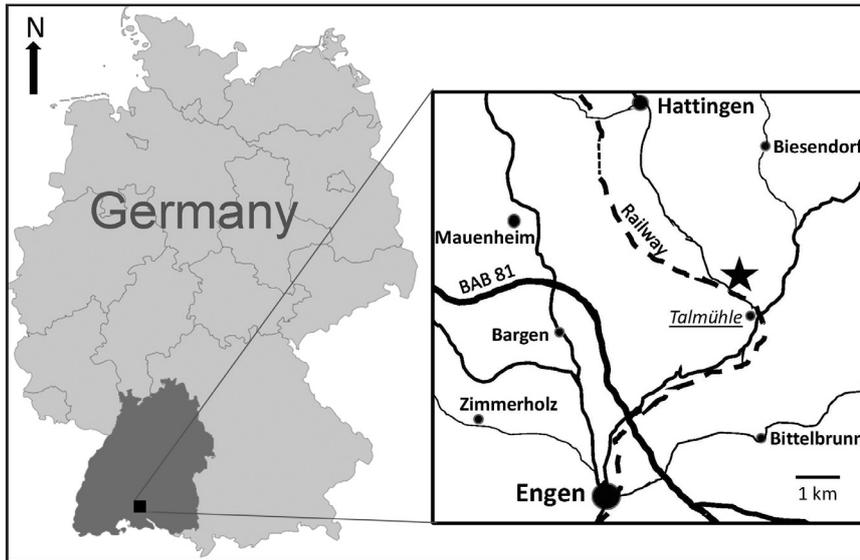


Fig. 1. Studied type locality (asterisk) in the southern part of Baden-Württemberg, SW Germany

duced the *eigeltingense* horizon as the oldest horizon assigned to the Lower Tithonian Hybonotum Zone of Southern Germany. Schweigert (1996) and Schweigert, Zeiss (1998) then provided more faunistic details about this horizon. Subsequently this faunal horizon was subdivided into two further horizons (Schweigert *et al.*, 2013; Schweigert, 2015; Scherzinger *et al.*, 2015; Scherzinger, Schweigert, 2016). The main difference between these is that the passendorferiids *Presimoceras heteromorphum* (Quenstedt) and *Berckhemeria scherzingeri* Schweigert & Zeiss have their acme and last occurrence in the *eigeltingense* α horizon (Schweigert *et al.*, 2013). For a correlation of this horizon see Tab. 1. In all older faunal horizons, the latter taxa are extremely rare or

even unrecorded, and in younger horizons they are missing as well. The *eigeltingense* α horizon occurs in the following localities: Eigeltingen, Talmühle near Engen, Hattingen, Grabenstetten, Buchheim (all Swabian Alb), and Rögling in adjacent Franconia. The bulk of the ammonite fauna of the *eigeltingense* α horizon is represented by Submediterranean taxa and a few generalists such as the dimorphic couple *Physodoceras/Sutneria*. In contrast to other faunal horizons of the Lower Tithonian in SW Germany ammonites of Subboreal affinity are obviously missing (but see below). Both *Presimoceras heteromorphum* (Quenstedt) and *Berckhemeria scherzingeri* Schweigert & Zeiss have not been recorded yet outside the Upper Jurassic of Southern Germany.

The ammonite fauna of the *eigeltingense* α horizon from the Talmühle section yields the following taxa: *Presimoceras heteromorphum* (Quenstedt) [M], *Berckhemeria scherzingeri* Schweigert & Zeiss [m], *Physodoceras* cf. *hoplisum* (Oppel) [M], *Sutneria apora* (Oppel) [m], “*Neochetoceras*” *praecursor* Zeiss [M], *Lingulaticeras* cf. *solenoides* (Quenstedt) [m], *Subplanites* n. sp. [m], *Subplanites postrueppellianum* Ohmert & Zeiss [m], *Lithacoceras riedense* (Schneid) [M], *Silicisphinctes* sp. [m].

Below we describe an additional perisphinctid from this horizon: *Xenosphinctes berkai* Scherzinger & Schweigert n. g., n. sp. [M]. Since this extremely rare new taxon is based on a single specimen, this description will possibly help in identifying additional material in future research.

Table 1

High-resolution subdivision of the Hybonotum Zone in southwestern Germany, modified after Schweigert *et al.* (2013), Schweigert (2015), Scherzinger *et al.* (2015) and Scherzinger, Schweigert (2016)

Stage	Zone	Subzone	Faunal Horizons
Tithonian (pars)	Hybonotum	Moernsheimensis	<i>moernsheimensis</i>
		Rueppellianus	<i>rupeppellianus</i>
			<i>laisackerensis</i>
			intermediate beds
			<i>riedlingensis</i>
		Riedense	<i>eigeltingense</i> β
<i>eigeltingense</i> α			

SYSTEMATIC PALAEOLOGY

Superfamily **Perisphinctoidea** Steinmann, 1890

Family **Ataxioceratidae** Buckman, 1921

Subfamily **Lithacoceratinae** Zeiss, 1968

Genus ***Xenosphinctes*** nov.

Type species. – *Xenosphinctes berkai* n. gen., n. sp.

Etymology. – After Greek *xenos* = alien, guest, because of the unique occurrence and combination of characters of this new ammonite, and *-sphinctes*, a common ending in perisphinctid ammonites.

Diagnosis. – See diagnosis of type species (monotypic).

Xenosphinctes berkai n. gen., n. sp. Fig. 2

Holotype. – Specimen illustrated in Fig. 2, SMNS no. 70413 (leg. A. Scherzinger).

Etymology. – In honour of our friend Roland Berka (Engen-Bittelbrunn), who is an enthusiastic expert in the geology, archaeology and biology of his home area.

Type locality. – Engen, Hegau area; section E of the railway cutting, ca. 1 km NW of the Talmühle hamlet (Fig. 1; for geological context see also Schreiner, 1961).

Type horizon. – Basal parts of the Hangende-Bankkalke Formation; Hybonotum Zone, Riedense Subzone, *eigeltin-gense a* horizon.

Occurrence. – Only known from the type locality in the Upper Jurassic of SW Germany.

Measurements. – Maximum diameter: 265 mm; whorl height: 67 mm; whorl width: 65 mm; umbilical width: 130 mm; number of primaries on last half whorl: 13; in previous whorls: 18, 19, 16.

Diagnosis. – Macroconchiate, moderately large-sized perisphinctid with smooth mouth border. Inner whorls with wide-spaced sharp, radiate, supposed biplicate ribs, with high furcation point covered by succeeding whorl. First ribbing stage followed by high polyfurcating stage that persists until the first half of the adult bodychamber; final stage with coarse prorsiradiate primaries. Constrictions weakly developed. Whorl section high-oval.

Description. – The holotype and sole specimen is a completely preserved macroconchiate steinkern with superimposed sculpture; coiling is evolute. Inner whorls rather coarsely ribbed, with regular wide-spaced primaries. Bifurcation point is covered by succeeding whorls until the penultimate stages. Ribs are quite coarse in the beginning and become thickened in later ontogeny. About two weak constrictions per whorl are developed. At the positions of these constrictions, a regularly spaced primary rib is immediately followed by an incomplete one forming an angle, and then next primaries follow parallel to the capped one with normal interspaces. During ontogeny the primaries become coarser and thicker. About in the middle of the penultimate whorl the primaries become significantly wider spaced, with radiate polyfurcating ribs (three or four secondaries per primary rib) and occasional intercalates. This stage persists for the length of a half whorl. Then only very coarse prorsiradiate primaries occur on the flank. Venter is smooth in this adult stage. The mouth border is smooth and prorsiradiate.

Discussion. – *Xenosphinctes* n. gen. differs significantly from all other perisphinctid genera known from Southern Germany and neighbouring areas, especially by its evolute coiling and high diverging polyfurcating ribbing stage which is unique in this combination:

Euvirgalithacoceras Zeiss *et al.*, 1996, s.str. (group of *E. supremum*): Large-sized, with adult diameters of more than 500 mm. Primaries in inner whorls denser spaced. Coiling more involute, whorl section broader and more trapezoidal, less rounded. Very significant virgatome ribbing in the preadult stage; adult stage still with coarse ribbing.

Euvirgalithacoceras Zeiss *et al.*, 1996, s.l. (group of *E. eystettense*): Primaries of inner whorls denser than in the *E. supremum*-group and in *Xenosphinctes* n. gen. Coiling more involute.

Lithacoceras Hyatt, 1900: Very densely spaced sharp ribs in inner whorls. Preadult stage with relatively deep diverging fascipartite ribbing units. More involute coiling. Ribbing stage in adult stage variable, sometimes becoming smooth, or with coarse simple ribs.

Hegovisphinctes Zeiss *et al.*, 1996: Inner whorls with a similar ornamentation, but then followed by preadult and adult stages with very coarse bipartite and occasional simple ribs. Coiling more involute.

Hoelderia Ohmert & Zeiss, 1980: Inner whorls with relatively densely spaced bipartite primaries. Polyfurcating, fascipartite or virgatome ribbing stage lacking. Whorl section markedly broader than in *Xenosphinctes* n. gen.

Pseudogravesia Hantzpergue, 1987: Ribbing is coarser but with a similar rib density. During ontogeny this rib density rapidly decreases. Coiling is much more involute, like in *Gravesia* s. str. (see Scherzinger, Schweigert, 2016).

Lithacoceras (Virgalithacoceras) alienum Ohmert & Zeiss, 1980: At first glance this taxon looks close to *Xenosphinctes* n. gen., because it shares a polyfurcating ribbing style in the outer whorl. However, the primaries are much more densely spaced and radiate, and never prorsiradiate. Moreover, the coiling is much more involute and the polyfurcating ribbing stage starts earlier in ontogeny. Sculpture of innermost whorls unknown. This taxon strikingly resembles *Pseudogravesia* and could represent a chronospecies of the latter genus. This would be the only Subboreal element of the ammonite fauna of the *eigeltin-gense a* horizon.

Several Mediterranean perisphinctid genera from the Upper Jurassic (Lower Tithonian) of the Southern Alps newly introduced by Sarti (2017), such as *Dorsomorphites*, *Virgamorphites*, *Pseudopallasiceras* and *Pseudosubplanitoides*, exhibit much denser ribbing in the inner whorls followed by a virgatome ribbing stage.

DISCUSSION AND CONCLUSIONS

Xenosphinctes n. gen. must be a very rare ammonite genus. Despite more than 200 years of intensive collecting and research of ammonites all over Europe, no further specimen

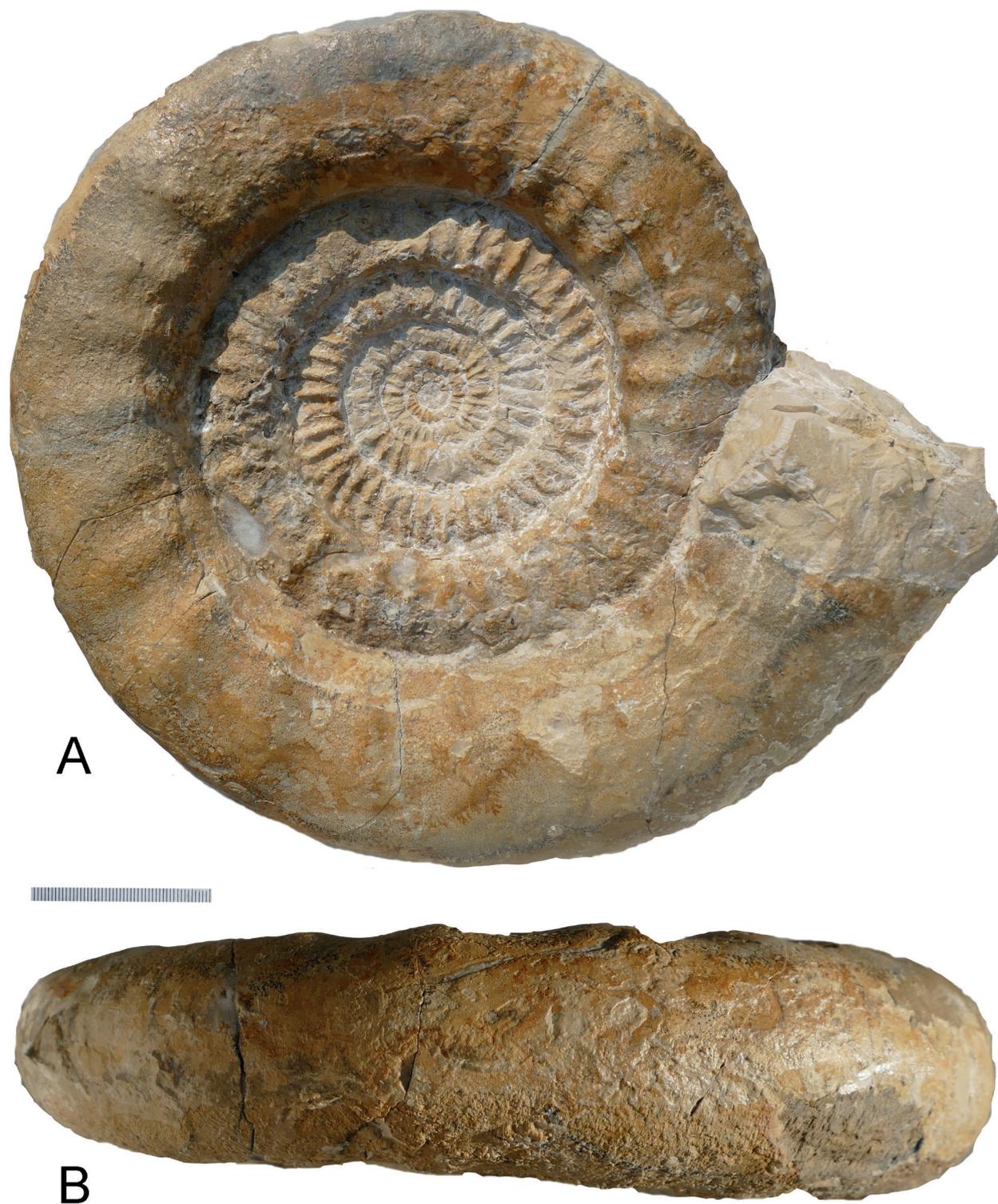


Fig. 2. *Xenosphinctes berkai* n. gen., n. sp. Specimen SMNS no. 70413, leg. A. Scherzinger, in lateral (A) and ventral (B) views. Section close to railway, 1 km NW of Talmühle hamlet, N of Engen, SW Germany; Hangende-Bankkalke Formation, Lower Tithonian, Hybonotum Zone, Riedense Subzone, *eigeltिंगense* α horizon. Scale bar = 50 mm

assignable to this genus has been recorded. In the Subboreal Province (S England, W France, N Germany, Central Poland, Central Russia) there exist expanded outcrops spanning the Upper Kimmeridgian and time equivalents of the Lower Tithonian (Volgian), and large ammonite collections have been sampled. Perisphinctid ammonites in that area, however, are endemic and a most likely Mediterranean genus such as *Xenosphinctes* n. gen. cannot be expected there except as an exotic immigrant. In the Mediterranean Province, the sections are mainly characterised by strongly condensed Ammonitico Rosso lithologies. Therein, ammonites are generally badly preserved, not easily accessible and hence poorly studied; especially adult macroconchiate forms have hardly been recorded yet. Mediterranean sections covering the Kimmeridgian-Tithonian boundary usually show hiatuses, and only a few perisphinctid taxa have been sampled from biostratigraphically well-dated beds around this boundary. The uncondensed boundary sections in the Submediterranean Province (e.g., Crussol and Canjuers in SE France; Schamhaupten and Painten in Franconia) are comparably rich in ammonites, but there is no any record of *Xenosphinctes* n. gen.

Acknowledgements. We like to thank Horacio Parent, University of Rosario, Argentina, for numerous fruitful discussions on perisphinctid systematics and correlation. The paper benefitted from the helpful suggestions of the reviewers, Horacio Parent, Rosario, Argentina and Carlo Sarti, Bologna, Italy. Martin Kapitzke, Staatliches Museum für Naturkunde Stuttgart, Germany, skillfully prepared the holotype of *Xenosphinctes berkai* n. gen., n. sp.

REFERENCES

- BERCKHEMER F., HÖLDER H., 1959 – Ammoniten aus dem Oberen Weißen Jura Süddeutschlands. *Beihefte zum Geologischen Jahrbuch*, **35**: 1–135.
- HANTZPERGUE P., 1987 – Les ammonites kimméridiennes du haut-fond d'Europe occidentale (Perisphinctidae, Aulacostephanidae, Aspidoceratidae). Thèse de Doctorat d'Etat, Université de Poitiers, 447.
- OHMERT W., ZEISS A., 1980 – Ammoniten aus den Hangenden Bankkalken (Unter-Tithon) der Schwäbischen Alb (Südwestdeutschland). *Abhandlungen des Geologischen Landesamtes Baden-Württemberg*, **9**: 5–50.
- SARTI C., 2017 – New ammonite genera from the Lower Tithonian (Upper Jurassic) of the Southern Alps (Northern Italy). *Studi Trentini di Scienze Naturali*, **96**: 33–61.
- SCHERZINGER A., SCHWEIGERT G., 2016 – The ammonite genera *Gravesia* Salfeld and *Pseudogravesia* Hantzpergue in the Tithonian of S Germany and their correlation value with Western Europe. *Proceedings of the Geologists' Association*, **127**: 288–296.
- SCHERZINGER A., PARENT H., SCHWEIGERT G., 2015 – A new species of the ammonite genus *Neochetoceras* Spath (Oppeliidae: Taramelliceratinae) from the Hybonotum Zone (Lower Tithonian) of Southern Germany, with comments on the phylogeny of the genus. *Boletín del Instituto de Fisiografía y Geología*, **85**: 1–12.
- SCHREINER A., 1961 – Über den Weißen Jura im Hegau. *Jahreshefte des Geologischen Landesamtes Baden-Württemberg*, **5**: 243–277.
- SCHWEIGERT G., 1996 – Die Hangende Bankkalk-Formation im schwäbischen Oberjura. *Jahresberichte und Mitteilungen des oberrheinischen geologischen Vereins, Neue Folge*, **78**: 281–308.
- SCHWEIGERT G., 2015 – Biostratigraphie der Plattenkalke der Südlichen Frankenalb. In: Solnhofen – Ein Fenster in die Jurazeit (eds. G. Arratia). 57–60, München (Verlag Dr. Friedrich Pfeil).
- SCHWEIGERT G., SCHERZINGER A., 1995 – Erstnachweis heteromorpher Ammoniten im Schwäbischen Oberjura. – *Jahresberichte und Mitteilungen des oberrheinischen geologischen Vereins, Neue Folge*, **77**: 307–319.
- SCHWEIGERT G., ZEISS A., 1998 – *Berckhemeria* n.g. (Passendorferiinae), eine neue Ammonitengattung aus dem Unter-Tithonium (Hybonotum-Zone) von Süddeutschland. *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte*, **9**: 559–576.
- SCHWEIGERT G., SCHERZINGER A., DIETL G., 2013 – Miscellanea aus dem Nusplinger Plattenkalk (Ober-Kimmeridgium, Schwäbische Alb). 14. Die Ammonitengattung *Berckhemeria* Schweigert & Zeiss. *Jahresberichte und Mitteilungen des oberrheinischen geologischen Vereins, Neue Folge*, **95**: 347–354.
- ZEISS A., SCHWEIGERT G., SCHERZINGER A., 1996 – *Hegovisphinctes* n. gen. eine neue Ammonitengattung aus dem Unter-Tithonium des nördlichen Hegaus und einige Bemerkungen zur Taxonomie der Lithacoceratinae. *Geologische Blätter für Nordost-Bayern und angrenzende Gebiete*, **46**: 12–144.

