

# Current knowledge of ammonite assemblages from the Štramberk Limestone (Tithonian–lower Berriasian) at Kotouč Quarry, Outer Western Carpathians (Czech Republic)

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## ABSTRACT

Forty-two species of perisphinctoid ammonites from the Štramberk Limestone at Kotouč Quarry near Štramberk (Moravia, Czech Republic) have been taxonomically assessed since 2013. Some of these species are contained in old collections at various Moravian-Silesian museums, while others are in the collections of two of us (ZV and PS); all are from Kotouč Quarry. In view of the fact that the Štramberk Limestone usually lacks distinct bedding, the stratigraphical position (ammonite zones) of the taxa identified is derived from literature data. Ammonite species identified document the entire Tithonian to the lower Berriasian. One taxon of early Berriasian age is described as new, *Neocosmoceras eliasi*. The Tithonian ammonite assemblage, with the exception of the uppermost portion of that stage, is close to those on record from the Mediterranean bioprovince in adjacent countries. In the uppermost Tithonian, a cosmopolitan species, *Substeuerocheras koeneni*, appears. In the lower Berriasian, in addition to Mediterranean representatives, taxa that are known from the Crimean Peninsula and, exceptionally, those from the Subboreal Russian Platform Basin, are present.

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## 1. Introduction

Since 2002 we have been concerned, within the framework of co-operation between the Kotouč Štramberk company Ltd. near Štramberk and the VŠB–Technical University of Ostrava, with palaeontological studies at Kotouč Quarry. Since the beginning of collecting, this locality has been famous for the abundance of fossils; it provides numerous fossils even at the present time. However, finds of ammonites are sporadic and specimens usually are imperfectly preserved. This is in contrast to well-preserved earlier finds of Štramberk ammonites that are now deposited in collections of several Moravian-Silesian museums (Ostrava, Opava and Nový Jičín) in the Czech Republic, of the Naturhistorisches Museum Wien (Vienna, Austria) and of the Bayerische Staatssammlung für Paläontologie und Geologie (Munich, Germany).

The historical collections of ammonites from the Štramberk Limestone at Vienna and Munich were assessed taxonomically by Zittel (1868) and Blaschke (1911). A common feature of these

collections is the absence of detailed locality data for specimens. On the original labels, only “Štramberg” or “Štramberk” usually is found; the same holds true for material contained at Moravian-Silesian museums. A rather small portion of the latter were identified (albeit without detailed description) and illustrated by V. Houša (e.g., Houša in Špinar et al., 1965) in the second half of the twentieth century. Three species of ammonites from Kotouč Quarry were described and illustrated by Eliáš and Vašíček (1995).

Ammonites collected by two of us (ZV and PS), the provenance of which is indicated by means of GPS co-ordinates, have been assessed taxonomically within the framework of projects focused on biostratigraphical studies of the Jurassic–Cretaceous (J/K) boundary. Simultaneously, we have been trying to revise ornate ammonites from the Štramberk Limestone that are housed in a number of Moravian-Silesian museums. Previously, results of these ongoing studies were published by Vašíček et al. (2013), Vašíček and Skupien (2013, 2014, 2016) and Vašíček et al. (2017).

The present contribution deals in detail with the taxonomic assessment of fourteen species of ammonites, out of a total of 42 species of ornate forms that are recorded to have been collected from Kotouč Quarry. In the present paper we try to provide a first synthesis

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of the ammonite assemblages from the point of view of species richness, quantitative abundance and palaeogeographical distribution. However, data on species abundance are only preliminary.

## 2. Geological setting

The Štramberk Limestone is exposed in the form of carbonate megablocks (in a wide range of sizes), breccias and conglomerates at several quarries (e.g., Kotouč, Municipal, Horní Skalka and Castle Hill) in the immediate vicinity of the town of Štramberk (Fig. 1). This unit represents a deposit that formed in a carbonate platform belt along the northern Tethyan margin during the latest Jurassic-earliest Cretaceous. Today can be traced in the area of the Outer Western Carpathians. Block accumulations of Štramberk Limestone form part of the continental-rise sediments of the Baška Facies in the Silesian Unit, which were deposited in the flysch trough of the Baška Subunit (for more details, see Picha et al., 2006).

According to Picha et al. (2006), the Štramberk carbonate platform was rimmed by coral reefs; these were the source of carbonate clasts. Gravitational slides and turbidity currents transported both small and large blocks and fragments of limestone from the edge of the platform to the bottom of the adjacent basin. However, during later (Neogene) tectonic thrusting of the Silesian Nappe, large tectonic pieces of the carbonate platform were separated from the softer, less resistant rocks situated on the slopes of the platform. The result is a mélangé in which larger blocks from the carbonate platform are suggestive of klippe characteristics.

The age of the Štramberk Limestone was previously assumed to be latest Kimmeridgian and Tithonian (e.g., Houša, 1990; Houša, in Houša and Vašíček, 2004). However, calpionellids (Houša, in Houša and Vašíček, 2004) and, above all, ammonites (Vašíček and Skupien, 2013, 2014, 2016; Vašíček et al., 2013) from the limestone bodies are indicative of the entire Tithonian and the lowermost Berriasian (Vašíček et al., 2017).

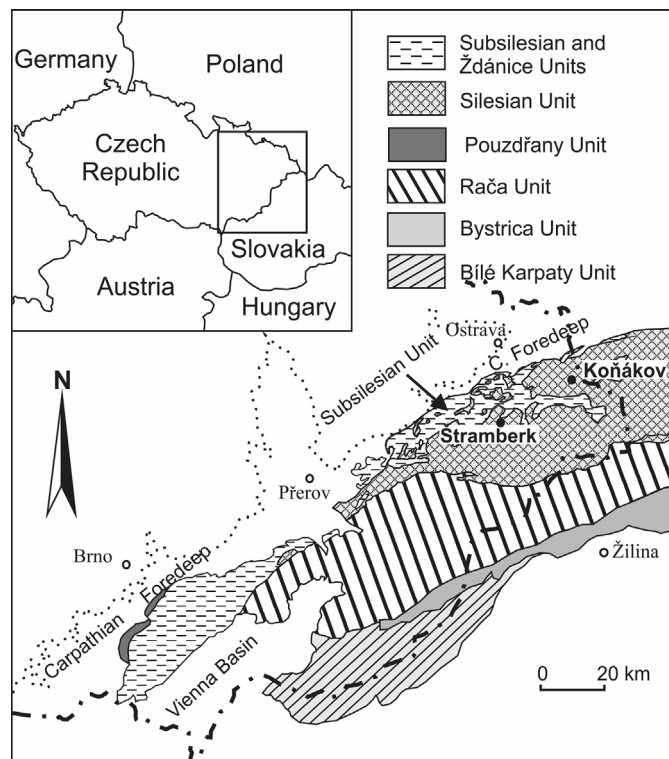


Fig. 1. Tectonic map of the Outer Western Carpathian area of the Czech Republic (according to Skupien and Smaržová, 2011).

## 3. Material

In general, ammonites from the Štramberk Limestone are fairly well preserved and undeformed. For the present paper we have selected specimens that retain at least half of the ultimate whorl, so that all size parameters can be measured, whorl cross section assessed and rib density on half a whorl counted. Juvenile whorls usually are not preserved.

To indicate the repositories of material illustrated and/or described below, the following abbreviations are used: AS III – Zittel's Collection, Bayerische Staatssammlung für Paläontologie und Geologie, Munich (Germany); B – Museum of Ostrava, Ostrava, Czech Republic; PL – Nový Jičín Regional Museum (NJRM), Czech Republic; Z – Silesian Museum, Opava, Czech Republic.

## 4. Ammonite taxonomy

As far as suprageneric levels are concerned, the taxonomy of Late Jurassic ammonites adopted herein is conservative. We follow Donovan et al. (1981), Tavera Benitez (1985), Zeiss (2001) and some recent papers such as Sarti (2017); for the lower Berriasian we refer to Nikolov (1982), Hoedemaeker et al. (2016), Frau et al. (2016 a,b,c) and others.

All measured dimensions are in millimetres: D – diameter, H – whorl height, B – whorl breadth, U – diameter of umbilicus. Ratios of parameters to diameter (H/D, U/D, B/D) are shown in brackets; whorl breadth to height (B/H) ratio is also indicated. Wherever possible, the number of inner (primary) ribs at the umbilicus (UR) and of ventrolateral ribs (VR) are indicated for half a whorl.

The stratigraphical provenance of Tithonian species with reference to ammonite zones is adopted from data presented by Zeiss (2001, 2003), Scherzinger and Schweigert (2003, 2016), Wimbledon et al. (2013) and Frau et al. (2015, 2016c). In principle, early Berriasian ammonite biostratigraphy follows Reboulet et al. (2014). Wherever in the descriptions below the indication 'Occurrence' is missing, the particular specimen is from an older museum collection, lacking specific provenance data.

Superfamily Perisphinctoidea Steinmann, in Steinmann and Döderlein, 1890

Family Ataxioceratidae Buckman, 1921

Subfamily Lithacoceratinae Zeiss, 1968

Genus *Pseudopallasiceras* Sarti, 2017

Type species: "*Subplanitoides*" *mediterraneum* Cecca, 1990b, by original designation.

Remarks. Cecca (1990a–b) drew attention to the temporary generic placement of some of Zeiss's (1968) species, referred to *Torquatisphinctes* Spath, 1924 (i.e., *T. guembeli* and *T. regularis*) and of the species '*mediterraneum*' to the subgenus *Subplanitoides* Zeiss, 1968, using quotation marks. These taxonomic uncertainties were resolved by Sarti (2017), who erected the genus *Pseudopallasiceras*.

***Pseudopallasiceras mediterraneum* (Cecca, 1990b)**

Fig. 2A–B.

1870 *Perisphinctes contiguus* Catullo sp.; Zittel, p. 110, pl. 35 (11), fig. 2 (non pl. 35, fig. 1).

\*1990b "*Subplanitoides*" *mediterraneus* Cecca, p. 58, text-fig. 1c, e; pl. 1, figs. 1–4 (with additional synonymy).

2017 *Pseudopallasiceras mediterraneum* (Cecca); Sarti, p. 43, text-figs. 5–6; pl. 5, fig. 2 (with additional synonymy).

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