



# *Pseudoteloceras*, a new stephanoceratid genus (Ammonitida) of the lower Humphriesianum Zone (lower Bajocian, Middle Jurassic) from western Tethys



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## ABSTRACT

The new dimorphic genus *Pseudoteloceras* (type-species: *P. crosillense* gen. et sp. nov.) is defined within the subfamily Stephanoceratinae. It constitutes the terminal step of an early Bajocian phyletic trend that produces *Teloceras*-like morphologies throughout the lower Humphriesianum Zone of the western Mediterranean-Caucasian Subrealm, at an older chronological interval and with morpho-structural features that stand apart from those of the best known genus *Teloceras* of the uppermost Humphriesianum and lower Niortense zones at the early/late Bajocian transition. Three new species are described: *P. crosillense*, *P. maerteni* and *P. boursicoti*. Their biochronostratigraphical ranges are confirmed by the distribution in expanded sections of the Subalpine Basin in Submediterranean Province (Digne area) and the taphonomic analysis of fossil assemblages from the condensed sections of the “Oolithe ferrugineuse de Bayeux” Formation in Calvados, North West European Province. The biochronostratigraphical range of *Pseudoteloceras* gen. nov. is limited to the Romani Subzone, lower Humphriesianum Zone. *P. crosillense* gen. et sp. nov. marks a well-defined biohorizon of the upper Romani Subzone in the Digne stratigraphical successions. The extreme degree of the cadiconic morphology in the inner whorls of *P. boursicoti* gen. et sp. nov., and the biostratigraphical gap separating the first appearance of the genus *Teloceras* in the upper Humphriesianum Zone, support its erection as a new taxon *Pseudoteloceras* gen. nov. A fourth species, *Pseudoteloceras geometricum* (Maubeuge), is interpreted as the earliest species of this phyletic lineage, derived from *Stemmatoceras* and widely distributed through western Tethys in the lower Humphriesianum Zone.

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## 1. Introduction

The pandemic family Stephanoceratidae Neumayr, 1875, one of the five families of the Middle to Late Jurassic superfamily Stephanoceratoidea Neumayr, 1875, evolves from the Otoitidae Mascke, 1907, at the Aalenian/Bajocian transition (Fernandez-Lopez, 2014; Fernandez-Lopez and Pavia, 2015) and ranges throughout the Bajocian and Bathonian. It consists of three classical subfamilies Stephanoceratinae Neumayr, 1875, Garantianinae Wetzel, 1937, and Cadomitinae Westermann, 1956, and in addition two new early Bajocian subfamilies were recently defined: Mollistephaninae Fernandez-Lopez and Pavia, 2015, and Frebolditinae Fernandez-Lopez and Pavia, 2015 (for diagnostic

features see Fernandez-Lopez and Pavia, 2015, p. 2, and references therein).

The subfamily Stephanoceratinae is characterized by serpenticonic, planorbiconic, platyconic and cadiconic shells and primary ribs with tubercles at the furcation points on the outer flank, and secondary ribs uninterrupted on the venter. Two dimorphs are differentiated: (1) microconchs [m] with lateral lappets and short body-chambers that are ribbed to the termination, and (2) macroconchs [M] with a simple aperture and relatively long body-chamber (in excess of 360°) that is smooth or distantly ribbed. The septal suture is usually complex with 1st lateral saddle E/L asymmetric and higher than the second lateral saddle L/U, dominant 1st lateral lobe, supplementary lobe (U<sub>2</sub>) on L/U, and well-developed, retracted umbilical lobe (U) (Arkell et al., 1957; Callomon, 1981, 1985; Page, 1993, 1996, 2008; Moyne and Neige, 2004; Howarth, 2013; Fernandez-Lopez, 2014).

On the basis of these morpho-structural features, Stephanoceratinae display diverse evolutionary trends interpreted as a

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monophyletic group. This subfamily clade brings together a morphologically complex group of lineages and supraspecific taxa throughout early to early-late Bajocian, such as:

- *Albarracinites* Fernandez-Lopez, 1985, planorbicones distributed in the Discites and Laeviuscula zones (type species *A. albarraciniensis* Fernandez-Lopez, 1985, p. 301, pl. 36, fig. 1, holotype from the Laeviuscula Zone, Albarracin, Spain).
- *Skirroceras* Mascke, 1907 (and synonyms proposed by Arkell et al., 1957), planorbicones or platycones to serpenticones distributed from the Laeviuscula to the lowermost Humphriesianum zones (type-species *Ammonites Humphriesianum macer* Quenstedt 1886, in 1883–1888, p. 528, pl. 65, fig. 11, lectotype designed by Buckman, 1921 in 1909–1930, pl. 248, from the “Humphriesianum-Oolith”, Swabia, Germany).
- *Stephanoceras* Waagen, 1869 (and synonyms proposed by Arkell et al., 1957), platycones to planorbicones distributed from the upper Laeviuscula to the lowermost Niortense zones (type species *Ammonites Humphriesianus* J. de C. Sowerby, 1825 in Sowerby and Sowerby, 1812–1846, pl. 500, holotype from the lower Bajocian, Osborne, Dorset, England).
- *Teloceras* Mascke, 1907, cadicones distributed from the uppermost Humphriesianum to the lower Niortense zones (type species *Ammonites blagdeni* J. Sowerby, 1818 in Sowerby and Sowerby, 1812–1846, p. 231, pl. 201, holotype from the uppermost Humphriesianum Zone, Osborne, Dorset).

With respect to this group of selected taxa, it is worth mentioning that the transition from *Stephanoceras* to *Teloceras* is represented by the subcadiconic to planorbiconic forms historically referred to as a branch of the genus *Stemmatoceras*, Mascke, 1907, but recently assembled into the subgenus *Teloceras* (*Pavicerus*) Gauthier, Rioult and Trévisan, 1996, from the upper part of the Humphriesianum Zone (type-species *Stemmatoceras hoffmanni* Schmidtil and Krumbeck, 1938, p. 348, pl. 13, fig. 6, lectotype designed by Pavia, 1983, p. 115, pl. 21, fig. 4, from the “Obere Humphriesi-Schichten”, North Bavaria, Germany).

Besides *Teloceras* (*Pavicerus*), a second lineage involving subcadiconic to planorbiconic stephanoceratins evolves into the subfamily Cadomitinae whose dimorphic partner is [M] *Cadomites* Munier-Chalmas, 1892 (type-species *Ammonites Deslongchampsii* Defrance in d’Orbigny, 1846 in 1842–1851, p. 405, pl. 138, figs. 1–2, holotype by original designation from the upper Bajocian of Calvados, France) and [m] *Polyplectites* Mascke, 1907 (type-species *Ammonites linguiferus* d’Orbigny, 1846 in 1842–1851, p. 402, pl. 136, figs. 4–5, neotype designed by Westermann, 1954, p. 338, on de Gossouvre, 1930, pl. 40, fig. 10, from the upper Bajocian of Calvados, France) span from the uppermost lower Bajocian Humphriesianum Zone to the upper Bathonian/lower Callovian transition (Sandoval, 1983; Fernandez-Lopez, 1985; Dietl and Herold, 1986; Fernandez-Lopez and Pavia, 2015). The genus *Lokuticeras* Galácz, 1994 (type-species *Lokuticeras rossbrunnense* Galácz, 1994, p. 165, pl. 1, fig. 1, holotype from the uppermost Humphriesianum Zone, Lókút, Bakony Mountains, Hungary) and its microconch counterpart *Masckeites* Buckman, 1920 in 1909–1930 (type-species *Masckeites densus* Buckman, 1920 in 1909–1930, pl. 152, holotype from the Humphriesianum Zone of Sherborne, Dorset) may be regarded as the ancestor of Cadomitinae in the uppermost Humphriesianum Zone (Galácz, 1994; Pavia and Zunino, 2012).

A third group of Stephanoceratinae includes two mid-lower Bajocian subcadiconic to planorbiconic genera whose phyletic position is still debated in relation to the taxa discussed above: (1) *Kumatostephanus* Buckman, 1922 (type-species *Kumatostephanus kumaterus* Buckman, 1922 in 1909–1930, pls. 345 a–b, holotype from the Propinquans Zone of Sherborne, Dorset) and (2)

*Stemmatoceras* Mascke, 1907 (type species *Ammonites Humphriesianum coronatus* Quenstedt, 1886 in 1883–1888, p. 539, pl. 66, fig. 11 = *Stemmatoceras frechi* Renz, 1904, holotype from the Humphriesianum-Oolith of Eningen, Swabia, Germany, refigured by Weisert, 1932, p. 23, pl. 18, fig. 4, as *Stemmatoceras coronatum*, Schlegelmilch, 1985, p. 77, pl. 27, fig. 6, and Ohmert, 1990, pl. 1, fig. 1), referred to as the passage between the Propinquans and the Humphriesianum zones, whose strong, club-like ribbing and less deeply incised suture lines do not support any clear connection to the most typical stephanoceratins, as indicated by many authors (e.g., Ohmert, 1994; Ohmert et al., 1995; Chandler et al., 2013; Dietze et al., 2015).

A further stock of subcadiconic to planorbiconic Stephanoceratinae consists of *Teloceras*-like forms in the inner whorls, with strong ribbing, large and depressed whorl-section, and crater-like umbilicus. Frequently referred to as *Stemmatoceras*, they are limited to the uppermost Propinquans and the basal Humphriesianum zones (Maubeuge, 1951; Mouterde, 1953; Morton, 1971; Parsons, 1976; Pavia, 1983; Fernandez-Lopez, 1985; Callomon and Chandler, 1990; Ohmert, 1988, 1990, 1994; Ohmert et al., 1995; Gauthier et al., 1996; Pavia and Martire, 2010; Pavia et al., 2013; Chandler & Whicher, 2015). Most of these records may be referred to the “*Ammonites Blagdeni* non Sowerby, 1818” described by d’Orbigny (1847 in 1842–1851) from the lower Bajocian of Les-Moutiers-en-Cinglais in Calvados. We focus our attention here on these particular *Teloceras*-like ammonites with supplementary field researches on the lower Bajocian of the Digne successions (Pavia, 1983) and of the area south of Caen (Pavia et al., 2013, 2015) where the presently unnamed species are fairly common and constitute a homogeneous morphological trend that is different from that of *Teloceras* s.s.

This study aims to (1) define the systematic status of these *Teloceras*-like stephanoceratins by erecting a new genus with new or renamed specific taxa, (2) characterize these taxa by morphostructural criteria by comparison with other Stephanoceratinae of the passage between the Propinquans and the Humphriesianum zones, (3) delineate possible phyletic relationships and palaeogeographical constraints.

## 2. Material and methods

This study is based on the ammonites collected from two different stratigraphical contexts pertaining to the Mediterranean and the north-western European Jurassic areas of the Mediterranean-Caucasian Subrealm (Fernandez-Lopez and Pavia, 2015):

- (1) The thick Bajocian successions of the Digne area (Subalpine Basin, SE France) where the sections of the “Marno-calcaires à *Cancellophycus*” Formation (Graciansky et al., 1982) are expanded and the fossils are preserved following resedimentation processes. Specimens come from the sections of the Ravin du Feston and the Ravin de la Coueste at Chaudon (Digne area, Alpes de Haute Provence: Pavia, 1983; Pavia and Zunino, 2012) (Fig. 1).
- (2) The thin Bajocian successions of the sector south of Caen (Calvados, NW France) where the condensed sections of the “Oolithe ferrugineuse de Bayeux” Formation (Rioult et al., 1991, and references therein) are reduced by recurrent discontinuities and the fossils are commonly preserved as reelaborated elements (i.e. exhumed and displaced before their final burial: Fernandez-Lopez, 1991, 1995, 2007, 2011; Fernandez-Lopez & Pavia, 2015). The specimens come from outcrops of Feuguerolles-sur-Orne, Bretteville-sur-Odon, Evrecy, Maizet and Les Fours à Chaux at Croisilles (Fig. 2) (Gauthier et al., 1996; Pavia and Martire, 2010; Pavia et al., 2013, 2015).

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