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First record of the puzosiine ammonite genus *Pachydesmoceras* from the Middle and Upper Turonian of Poland

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ABSTRACT

Two gigantic individuals of the puzosiine ammonite genus *Pachydesmoceras*, from uppermost Middle and lower Upper Turonian strata in central and southwest Poland, are described and illustrated as the first examples of this genus to be recorded from Poland. Specific identification is problematic because of internal mould preservation and deformation to various extent; in addition, comparative material from other European localities is lacking. Representatives of *Pachydesmoceras* are typical of the Tethyan Realm; records from the European and Northwest Pacific provinces in the Boreal Realm are few. Both Polish specimens are referred to as *P.* cf. *pachydiscoide* Matsumoto.

1. Introduction

In the 1950s, a very large-sized (980 mm diameter) ammonite phragmocone was collected by Eugeniusz Strugalski (currently in the A. Krawczyk Collection, PGI unregistered) from lower Upper Turonian strata at the disused 'Gila' quarry, Opoczka Mała near Annopol (east-central Poland). Although for many years this specimen was referred to as the largest ammonite ever to have been found in Poland and was assigned either to *Lewesiceras peramplum* (Mantell, 1822) (see Jackowicz et al., 2009) or to *Parapuzosia* Nowak, 1913 (see Machalski and Stolarski, 1998, p. 67), it was never properly described and interpreted. In 2006, one of us (AK) collected an even larger (1180 mm diameter) specimen, with proportions and ornament closely similar to the Opoczka Mała individual, from the uppermost Middle Turonian (*Inoceramus lamarcki* Zone; sensu Walaszczyk, 1992; Walaszczyk and Cobban, 2000, 2007; Niedźwiedzki and Kalina, 2003) as exposed at the Odra Nowa quarry, Opole (southwest Poland).

We here consider these two specimens to be conspecific, and present a detailed description, plus a discussion of their relationships with other selected puzosiines of Turonian age which are known to achieve gigantic sizes. We also compare them to representatives of *Pachydesmoceras pachydiscoide* Matsumoto, 1954, which have closely similar morphological features and comparable sizes. We tentatively refer to both Polish examples as *P.* cf. *pachydiscoide*.

2. History of research

Following Stevens (1988), who referred to an ammonite as 'large' when its diameter exceeded 435 mm and as 'giant' when it was larger than 1 m, specimens that fall in the latter category are known in Poland mostly in strata of Turonian and Campanian age. The first studies of such material date back to the end of the nineteenth and the beginning of the twentieth centuries. Among other specimens, these dealt with an incompletely preserved *Pachydiscus stanislaopolitanus* Łomnicki, 1871 from the Lower Campanian near Stanisławów (currently Ivano-Frankivsk, western Ukraine), which might be conspecific with *Eupachydiscus levyi* (de Grossouvre, 1894) (compare Błaszkiewicz, 1980), with an estimated total diameter of almost 1 m, and with a specimen from the Turonian of eastern Ukraine which was assigned with a query to ? *Parapuzosia seppenradensis* (Landois, 1895) with a diameter of >1 m (Nowak, 1913). Note that Kennedy and Kaplan (1995) have subsequently shown *P. seppenradensis* to be an earliest Campanian species, with records only from Germany and Austria. The present whereabouts of the latter specimen are unknown. Abundant material of large-sized *L. peramplum* with diameters in excess of 500 mm has been recorded from the Upper Turonian of southwest

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Poland (Bolko quarry, Opole area; see Tarkowski, 1991). More recent records of large to gigantic ammonites include *L. peramplum* with diameters close to 600 mm (Olszewska-Nejbert, 1996; Kaczorowski, 1997) and several *L.* ex gr. *peramplum*, of which at least two specimens with diameters reaching 1140 mm have been collected (Kin, 2007) from uppermost Middle and lower Upper Turonian strata (*I. lamarcki* and *Inoceramus perplexus* zones). Large-sized individuals of *Anapachydiscus wittekindi* (Schlüter, 1872), measuring up to 670 mm in diameter, are known from the Upper Campanian (*Bostrychoceras polyplocum* and *Didymoceras donezianum* zones) in the Vistula River valley (Błaszkiewicz, 1980). In the collections of the Museum of the Earth (Polish Academy of Science, Warsaw) there is an even larger (diameter 820 mm) specimen of *A. wittekindi* from Ciszyca Kolonia (MZ VIII MC 660).

Numerous Polish researchers have cursorily noted the occurrence of large Cretaceous ammonites at several localities. Examples include Łuniewski (1936, p. 121) and Pożaryski (1948, p. 68), who recorded from the Lower Maastrichtian (sensu Walaszczyk, 2004) in the vicinity of Antoniów near Annopol, a specimen referred to as *Pachydiscus egertoni* (Forbes, 1846) (possibly conspecific with *Pachydiscus perfidus* de Grossouvre, 1894), c. 500 mm in diameter. Pożaryski (1956) also mentioned 'large ammonites' from the vicinity of Jakubowice, in the upper part of his *I. lamarcki* level, which potentially is the equivalent of the uppermost Middle Turonian. Other than from strata of Turonian and Campanian age, large or gigantic ammonites are uncommon in Poland. One of the very few exceptions is a large *Parapuzosia* (*Parapuzosia*) *daubreei* (de Grossouvre, 1894), 800 mm in diameter, from the lowermost Santonian (*Cladoceramus undulatoplicatus* Zone) at Kije near Busko-Zdrój (Remin, 2010).

3. Geographic and stratigraphic setting

Fossil-poor opokas [siliceous marls] with marls, or opokas with chert intercalations (total thickness 13 m), of early Late Turonian age, are exposed over a distance of 1.5 km along a steep scarp of the Vistula River valley in the vicinity of Opoczka Mała near Annopol, central Poland (see Fig. 1C). The rare fauna is dominated by the inoceramid bivalve *I. perplexus* Whitfield, 1877 (= *Inoceramus costellatus* Woods, 1911, sensu Pożaryski, 1948; Walaszczyk, 1992; see also Walaszczyk and Cobban, 2000) and also includes rare ammonites (e.g., *Hyphantoceras* sp.; see Walaszczyk, 1992). At the Odra Nowa quarry (Opole, southwest Poland), about 25 m of Middle and Upper Turonian strata are exposed (Fig. 1B) (compare Walaszczyk, 1988, 1992; Kędzierski and Uchman, 2001). Three informal lithostratigraphic units are recognised, viz. the Lower Argillaceous Marls, Lower Marls and Marly Limestones (Alexandrowicz and Radwan, 1973; Alexandrowicz, 1974). The specimen of *Pachydesmoceras* cf. *pachydiscoide* described below was collected about 0.5 m below the boundary between the

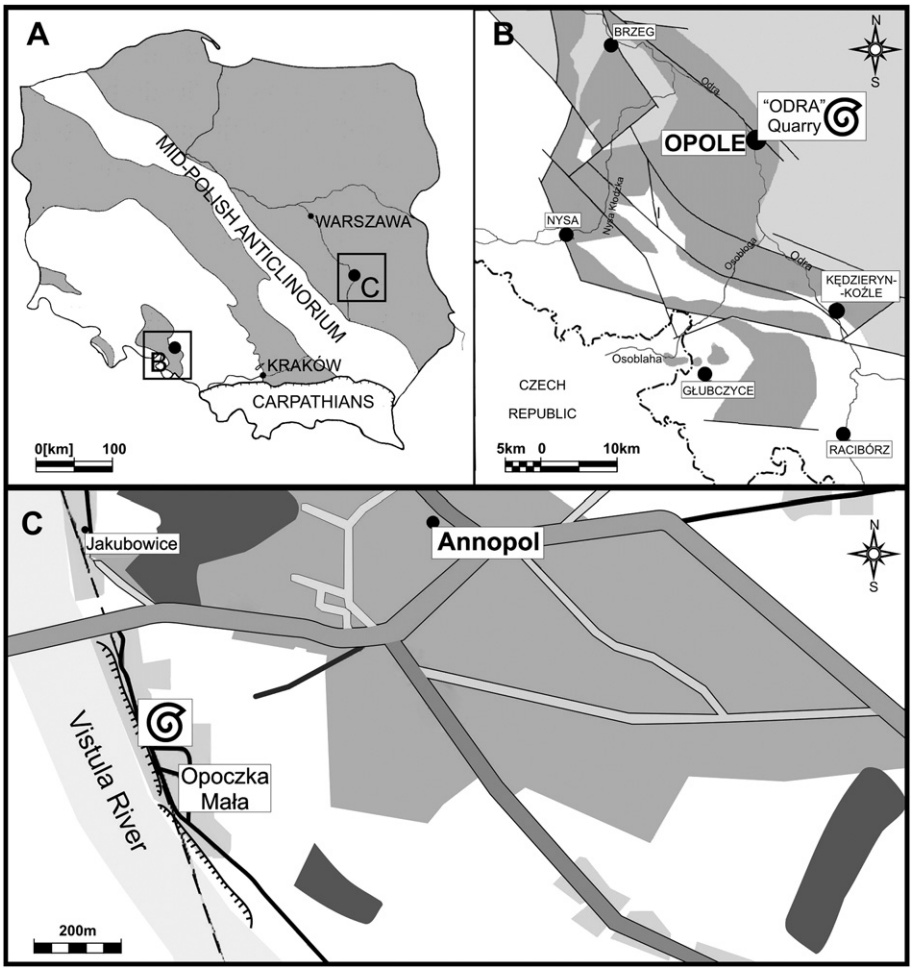

Fig. 1. Map of Poland, with grey-shaded areas showing the distribution of Upper Cretaceous strata in extra-Carpathian Poland; B. Map of the Opole area, with the Odra Nowa quarry marked; dark grey-shaded is Cenomanian–Coniacian, light grey is Middle Triassic (Muschelkalk) (modified after Kotański and Radwański, 1977); C. Map of the Annopol area, with the Opoczka Mała quarry marked.