Santonian stage

(OTTILIA SZIVES)

Geology and stratigraphy

Historical background

The Santonian stage was introduced by COQUAND (1857a, b) and presumably was named after the town of Saintes, southwest France. The base of the Santonian stage is defined by the first occurence of *Cladoceramus undulatoplicatus*, an inoceramid bivalve (LAMOLDA & HANCOCK 1996). The end of the stage is defined by the extinction of crinoid Marsupites testudinarius (GRADSTEIN et al. 2004).

The Santonian stage lasts from 85.8±0.7 to 83.5±0.7 Ma (GRADSTEIN et al. 2004) and contains only one ammonite zone in the Tethyan region (KENNEDY 1984, 1995; HANCOCK 1991; GRADSTEIN et al. 2004).

Table 16. Biozonation of the Santonian in the Tethyan faunal province after HANCOCK (1991) and GRADSTEIN et al. (2004)

Stage	Tethyan ammonite zones (HANCOCK 1991)	Tethyan ammonite subzones (GRADSTEIN et al. 2004)
Santonian	*Placenticeras polyopsis*	*Placenticeras paraplanum*
		Placenticeras gallicus

Discussions on ammonite biozonation of the stage (Table 16) are still in process (BIRKELUND et al. 1984, KENNEDY 1984, SCHULTZ et al. 1984, HANCOCK 1991, LAMOLDA & HANCOCK 1996) and faunas show endemic zonations. Because of the high differentiation of faunal provinces it seems impossible to find a good marker to define the lower and upper boundaries by ammonites, and even the ammonite biozonation of the stage is problematic. According to KENNEDY (1984) "… the Santonian may correspond to the range zone of *Placenticeras polyopsis* (DUJARDIN, 1837)… [in the type area]".

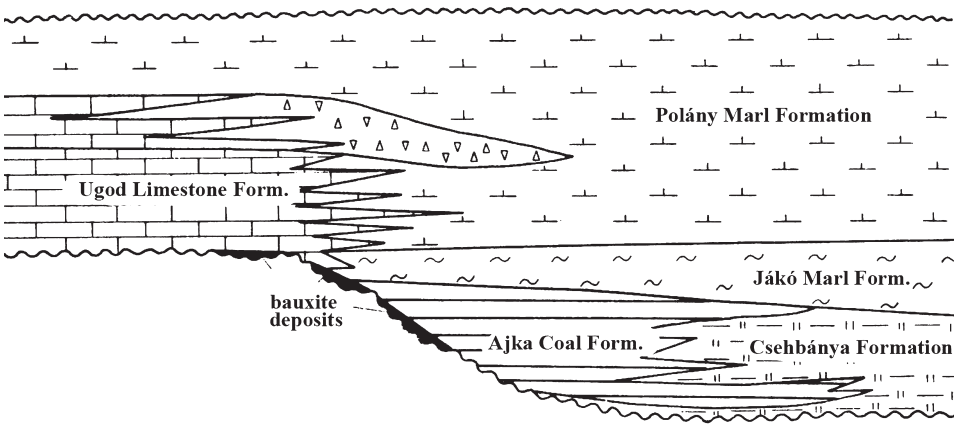
Santonian record in Hungary

The limited occurrence of Late Cretaceous ammonites in Hungary gives special interest to the fossil assemblage reported in the Santonian and Campanian chapters. Despite the relative abundance of other type of fossils, ammonites are extremely unique and rare in the Upper Cretaceous deposits of Hungary due to the Senonian sedimentation megacycle outlined in the introduction. Correlations of the Senonian formations mainly based on micropalaeontological data but no exact macrofossil record was given since the recent years.

Geological setting and stratigraphy

The presence of Upper Cretaceous sediments in Hungary was already known in the 19th century (HAUER 1862; J. BÖCKH 1874) and based mainly on recognition of Hippurites and Inoceramus specimens. Upper Cretaceous formations can be recognized on the surface in NW Hungary only in the Bakony Mountains.

The Hungarian Upper Cretaceous (Text-Figure 56), from the stratigraphical point of view, is represented by several formations but ammonites only were found in the Santonian Jákó Marl Formation and the Campanian – ?Maastrichtian (CSÁSZÁR [ed.] 1996) Polány Marl Formation. Hungarian Senonian sediments are rich in megafossils as gastropods, rudists and thin-shelled bivales. The Csabrendek Cr–2 borehole crossed the Jákó Marl Formation, where in the lower part, at 533.3 m depth a single ammonoid specimen was found. The Jákó Marl is blueish grey – grey marl usually called "Gryphean marl" due to its mollusc content. SUMMESBERGER (pers. comm) determined the fragment as an Upper Santonian *Placenticeras polyopsis* (DUJARDIN, 1837) published by PARTÉNYI (1986).



Text-Figure 56. Upper Cretaceous formations of NW Hungary after HAAS 1994

According to microfossil — sporomorph (GÓCZÁN & SIEGL FARKAS 1990), foraminifer (SIDÓ 1980) — data, the age of the formation is Campanian.

Systematic descriptions

Ordo Ammonoidea ZITTEL, 1884
Subordo Ammonitina HYATT, 1889
Superfamily Hoplitaceae DOUVILLÉ, 1890
Family Placenticeratidae HYATT, 1900
Genus *Placenticeras* MEEK, 1876
Type specimen: *Ammonites placenta* DEKAY, 1828

Placenticeras cf. *polyopsis* (DUJARDIN, 1837)

Text-Figure 57

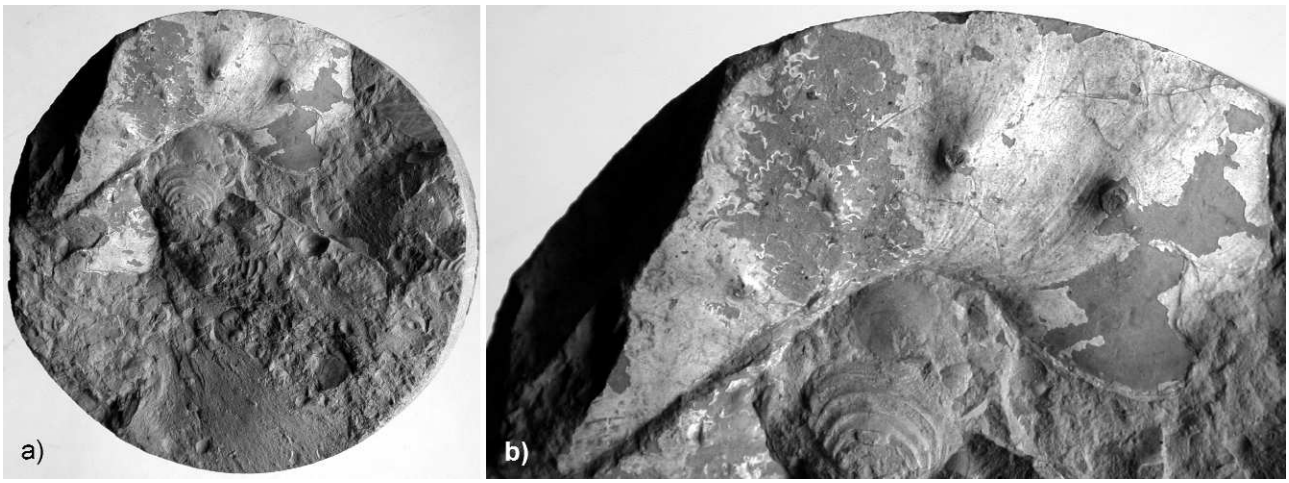
1983 *Placenticeras polyopsis* (DUJARDIN) — KENNEDY, WRIGHT, p. 856, Pls. 86–88, Text-Figures 1–4 (with full synonymy)
1986 *Placenticeras polyopsis* (DUJARDIN) — PARTÉNYI, p. 519–521, Figures 1, 2 (in Hungarian)
1995 *Placenticeras polyopsis* (DUJARDIN) — JAGT et al., p. 127, Pl. 1, Figures 3–6

Material. A single fragment from Csabrendek Cr–2 borehole at 533.3 m.

Description. Fragment of the outer whorl of a phragmocone. No ornamentation is visible apart from strong tubercles on the inner lateral region.

Discussion. Placenticeras polyopsys is an index species, ranges almost through the whole Santonian.

Occurrence. The first record of the species from Hungary is from the Late Santonian sequence of Csabrendek Cr–2 borehole; otherwise it is reported from the Santonian worldwide.



Text-Figure 57. *Placenticeras polyopsis* (DUJARDIN, 1837). Csabrendek Cr–2 borehole, 533.3 m. a) 0.5×, b) 1.5×