

## What is *Inoceramus peruanus* Brüggen, 1910 ?

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### ABSTRACT

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The figured holotype of the Lower Turonian *Inoceramus peruanus* BRÜGGEN, 1910 from Peru was found in the collections of the Goldfuss Museum in Bonn. Its general shape is close to that of *Mytiloides goppelnensis* (BADILLET & SORNAY) and *M. kossmati* (HEINZ), and is a *Mytiloides*. The ornamentation consists of the double-rugae typical of *M. kossmati*. The presence of *M. peruanus* in Peru, Ecuador and Colombia is discussed.

**Key-words:** Cretaceous, South America Lower Turonian, Bivalvia, *Mytiloides peruanus*.

### INTRODUCTION

Today, in Colombian and Peruvian palaeontological and geological literature the taxon *Inoceramus peruanus* BRÜGGEN, 1910 is frequently mentioned from Turonian-Coniacian strata. However, the taxon is rarely figured and never described.

*Inoceramus peruanus* BRÜGGEN, 1910 (p. 751, pl. 25, fig. 6) was first described from the Cuesta de Huanyamba (between Celendin and Sendamal, Peru) and the age BRÜGGEN suggested for it was "Lower Senonian".

STEINMANN (1929, p. 147) suggested a Turonian age for this Peruvian taxon and for the strata in which it was found, based on the presence of *Coilophoceras* (sic) *requieni* and *Inoceramus labiatus*. Unfortunately, in later literature the locality "Cuesta de Huanyamba" is not found. It is not indicated on the 1/100.000 map. Thus, today we have no way to locate it precisely.

BENAVIDES-CACERES (1956) mentioned *Inoceramus peruanus* from a few Peruvian localities, but they vary in age from the Early Turonian to the Late Coniacian (ibidem, p. 387, p. 397 – *Coilopoceras newelli* Zone and *Buchiceras bilobatum* Zone). None of the inoceramid specimens in the lists of BENAVIDES-CACERES (1956) were figured – therefore it is impossible to confirm what his concept of *Inoceramus peruanus* represents.

On the other hand, BENAVIDES-CACERES (1956, p. 473) also stated a strong similarity between *Coelopoceras* (sic) *requieni* in BRÜGGEN (1910) and his taxon *Coilopoceras jenksi* from the Lower Turonian Coñor Fm. *Inoceramus peruanus* BRÜGGEN, 1910 co-occurs with *Coelopoceras requieni* (D'ORBIGNY) in BRÜGGEN (1910) and STEINMANN (1929), making an early Turonian age probable.

In Colombia, BÜRL & DUMIT TOBON (1954) and BÜRL (1957) mentioned *Inoceramus peruanus* BRÜGGEN

from the “Coniaciano inferior and superior” in Girardot, Prov. Alto Magdalena, Alban, Guacheta and Ubaté (Prov. Bogota) Colombia. In these areas some strata containing “*Inoceramus peruanus*” are overlain with strata with *Didymotis* and are assigned to a middle Coniacian age by BÜRL (1957). It seems likely that the age assignment used in these Colombian publications is not completely accurate.

Possibly because of general poor understanding of Turonian inoceramids from Colombia, F. ETAYO-SERNA asked SORNAY (1981) to study inoceramids from Quebrada La Modelia (Cundinamarca, Colombia) of the La Frontera Fm., Lower Turonian. Amongst the specimens SORNAY studied he described a new taxon *Mytiloides modeliaensis* (SORNAY, 1981).

VILLAMIL & ARANGO (1998) on the stratigraphy of the latest Cenomanian and early Turonian facies of Colombia, and VILLAMIL (1998) on a sequence stratigraphic model for basinal Cretaceous facies of Colombia, also discussed and illustrated inoceramid taxa. Among others they mentioned and illustrated *Mytiloides kossmati*, *M. columbianus*, *M. modeliaensis*, *M. subhercynicus* all from the Lower-Middle Turonian, but suggested that *M. modeliaensis* is younger than the three others. They did not mention the taxon *M. peruanus*. VILLAMIL & ARANGO did not describe any of the taxa they illustrated, and unfortunately their illustrations are not ideal. This makes interpretation of these taxa and comparison between them difficult.

HEINZ (1935) introduced the new name *Orpheoceramus columbianus* to replace his former identification “*Inoceramus plicatus*” D’ORBIGNY, 1842 (in HEINZ 1928). The “*Inoceramus plicatus*” specimen from the 1928 publication came from Cachira in Colombia and HEINZ considered it Turonian. In 1935, he suggested a tentatively Early Cretaceous age for this specimen, but that is certainly erroneous.

In JAILLARD & al. (1999), *Mytiloides* specimens from SW Ecuador (Carmelo Fm. in the Celica Basin, fig. 9) are mentioned. By re-studying these specimens we have come to the conclusion that some of the better preserved ones undoubtedly belong to *M. peruanus*.

Based on material from outside South America several authors discussed these taxa and suggested comparisons with taxa from other regions. HEINZ in BESAIKIE (1930) first listed the taxon *Inoceramus kossmati* from the Turonian of Madagascar, which he regarded as a variety of *Inoceramus naumanni* YOKOHAMA. He described it as a separate species in 1933, which he referred to the genus *Striatoceramus* (*S. kossmati*).

WALASZCZYK (1992) discussed the species *Mytiloides kossmati* (HEINZ, 1930) and indicated (p. 10) that *M. opalensis* (sensu SEITZ non BOESE, 1934), *M. goppelnensis* (BADILLET & SORNAY, 1980) and *M. modeliaensis*

(SORNAY, 1981) are synonymous with *M. kossmati* (HEINZ). He also considered *M. columbianus* (HEINZ, 1935) to be very close to *M. kossmati*. In the same paper, he suggested that *M. subhercynicus* (SEITZ, 1934) is not an independent taxon but includes extreme forms of several other taxa such as *M. kossmati* (HEINZ), *M. hercynicus* (PETRASCHECK, 1903) and *M. opalensis* (BOESE, 1923).

Based on the rich and collected bed-by-bed material from the Pueblo section, US Western Interior, WALASZCZYK & COBBAN in KENNEDY & al. (2000, pp. 322-323) re-discussed some of these Lower Turonian taxa. This resulted in a slightly different interpretation from that in WALASZCZYK (1992). Thus in 2000, *M. kossmati* includes *M. columbianus* (HEINZ, 1935) and *M. modeliaensis* (SORNAY, 1981), but *M. goppelnensis* (BADILLET & SORNAY, 1980) and *M. subhercynicus* (SEITZ, 1934) are considered as distinct taxa.

## TAXONOMY

Mollusca  
Class Bivalvia

Inoceramidae ZITTEL, 1881 (ICZN 473)

*Mytiloides* BRONGNIART in CUVIER, 1822

TYPE SPECIES: *Ostracites labiatus* VON SCHLOTHEIM, 1813

*Mytiloides peruanus* (BRÜGGEN, 1910)  
(Text-figs ?1.3, 1.4-1.6, ?1.7)

v.\* 1910. *Inoceramus peruanus* n.sp., BRÜGGEN, p. 751, pl. 25, fig. 6

1928. *Inoceramus plicatus* D’ORB.; HEINZ, p. 63, pl. 4, fig. 4.

1929. *Inoceramus peruanus* BRÜGG.; STEINMANN, p. 147

non 1954. *Inoceramus peruanus* BRUEGGEN; BÜRL & DUMIT TOBON, p. 32.

? 1957. *Inoceramus peruanus* BRÜGGEN; BÜRL, p. 138, 139, 140, pl. 15, fig.

HOLOTYPE: Bonn University (Rheinische Friedrich-Wilhelms Universität, Paläontologisches Institut, Goldfuss Museum), Bonn, Germany: n° Brüggén 4.

LOCUS TYPICUS: Cuesta de Huanyamba (between Celendin and Sendamal), Peru.

STRATUM TYPICUM: In BRÜGGEN (1910) the age given is “Untersenen”; STEINMANN (1929) re-interpreted this age as “Turonian”.

ADDITIONAL MATERIAL: Six relatively poorly pre-

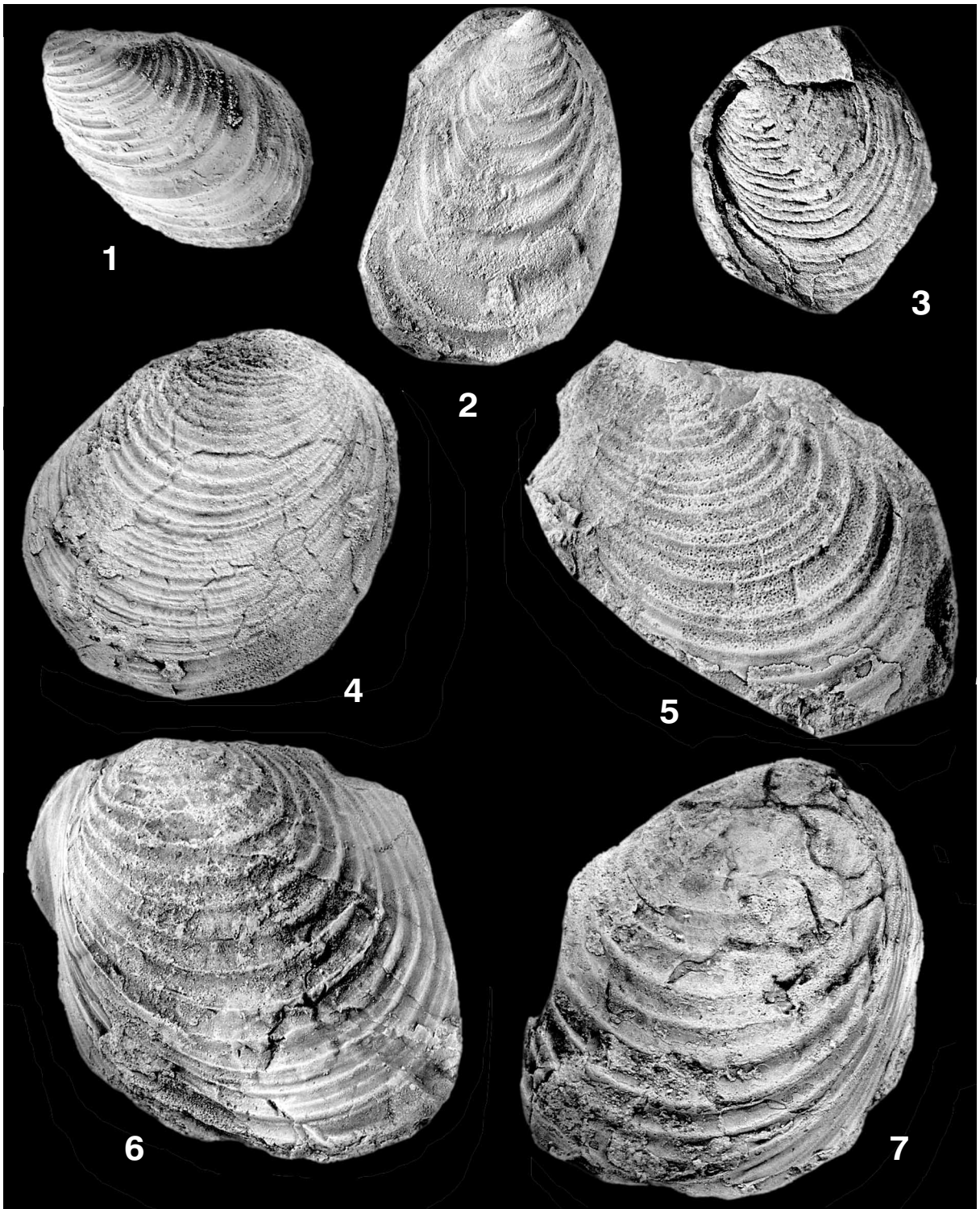


Fig. 1. IRSNB MI: Institut royal des Sciences naturelles de Belgique, Mesozoic Invertebrates ; 1 – *Mytiloides* cf. *ratonensis* (WALASZCZYK & COBBAN, 2000), IRSNB MI 11000 from the Girardot-Nariño section, 4 km NW of Girardot (Cundimarca, Colombia, Lat. 4°21' 31", Long. 74° 12'), Hondita Fm., Upper Turonian,  $\times 1$ ; 2 – *Mytiloides scupini* (HEINZ, 1930b), IRSNB MI 10999, from the Girardot-Nariño section, 4 km NW of Girardot (Cundimarca, Colombia, Lat. 4°21' 31", Long. 74° 12'), Hondita Fm., Upper Turonian;  $\times 1$ ; 3 – *Mytiloides* ?*peruanus* (BRÜGGEN, 1910), IRSNB MI 11001, from Yamana, NW of Catamayo (Ecuador) Carmelo Fm., Celica Basin: Jaillard Coll. 96-2,  $\times 1$ ; 4 – *Mytiloides peruanus* (BRÜGGEN, 1910) (Bonn Goldfuss Museum, Brügggen A1) from the upper Lower Turonian of Cuesta de Huanyamba (between Celendin and Sendamal), Peru,  $\times 1.5$ ; 5 – *Mytiloides peruanus* (BRÜGGEN, 1910) (Bonn Goldfuss Museum, Brügggen A3) from the upper Lower Turonian of Cuesta de Huanyamba (between Celendin and Sendamal), Peru,  $\times 1.5$ ; 6 – *Mytiloides peruanus* (BRÜGGEN, 1910) holotype (Bonn Goldfuss, Brügggen 4), from the upper Lower Turonian of Cuesta de Huanyamba (between Celendin and Sendamal), Peru,  $\times 1.5$ ; 7 – *Mytiloides* ?*peruanus* (BRÜGGEN, 1910) (Bonn Goldfuss Museum, Brügggen A4) from the upper Lower Turonian of Cuesta de Huanyamba (between Celendin and Sendamal), Peru,  $\times 1.5$



served specimens from the same locality and collection as the holotype – right valves Brü A1, Brü A4; left valves Brü A2, Brü A3, Brü A5, Brü A6. Four specimens from Yamana and El Carmelo, NW of Catamayo (Ecuador) Carmelo Fm., the Celica Basin: Jaillard Coll. 96-2.

DESCRIPTION: Shell small to medium-sized, prosocline, subcircular to subovate, moderately unequivalved with slight convexity, umbo small and not prominent.

Ornamentation consists of double-ridged rugae, very closely situated near the umbo and progressively more widely spaced towards the ventral margin, but never very far apart. Auricles small and poorly developed.

Dimensions (see Text-fig. 2 for explanations):

spec.	Illustr.	h	l	H	L	s	$\alpha$	$\delta$	valve	$h_{\max}$
Brü 4		33	28	-	-	(18)	-	55	LV	35
BrüA1		26.5	23.5	-	-	(15.5)	85	-	RV	36
BrüA2	not	26.7	24.5	-	-	19.5	93	40	LV	28.5
BrüA3		28.5	23.5	-	-	17.5	78	50	LV	33.5

DISCUSSION: *Mytiloides peruanus* in the general shape and the double-ridged rugae is morphologically very close, and possibly conspecific with *Mytiloides kossmati* (HEINZ, 1930) [which includes *M. modeliaensis* (SORNAY, 1980) and *M. columbianus* (HEINZ, 1935) – fide WALASZCZYK & COBBAN in KENNEDY & al. 2000]. However, as the holotype and other topotypic material of the species is poorly preserved, we don't want to make any

formal taxonomic decision. Such conclusion should be preceded by studies in the original locality.

A number of forms, which in general outline and ornamentation closely resemble BRÜGGEN's species were reported from Columbia by VILLAMIL (1998) and VILLAMIL & ARANGO (1988). This concerns particularly their *Mytiloides subhercynicus* (see VILLAMIL & ARANGO 1988, figs 4, 6E, 7B, 8B amd 24 and VILLAMIL 1998, figs 8, 20E), *M. columbianus* (VILLAMIL & ARANGO 1988, figs 6F, G), and partly *Mytiloides kossmati* (VILLAMIL & ARANGO 1988, figs 2-4, 6B, 24 and VILLAMIL 1998, figs 11, 17J, 19).

OCCURRENCE: Lower Turonian of South America (Peru, Ecuador, Colombia).

ADDENDUM

From the Girardot-Nariño section, 4 km NW of Girardot (Cundimarca, Colombia, Lat. 4°21' 31, Long. 74° 12), in the middle valley of the Magdalena one of us (N.T.) in the Hondita Fm. (defined by J. DE PORTA 1966) collected specimens of mytiloid inoceramids – together with the following Foraminifera: *Whitenella gigantea*, *W. archaeoretacea*, *W. inornata*, *Concavatotruncana primitiva* and *C. concavata*.

These inoceramids, on preliminary identification, are *Mytiloides scupini* (HEINZ, 1930b) (see TRÖGER 1999) and *M. cf. ratonensis* (WALASZCZYK & COBBAN 2000) taxa that co-occur in the Upper Turonian of the Western Interior. They are illustrated on. Text-fig. 1.1 (*M. scupini*) and 1.2. (*M. cf. ratonensis*).

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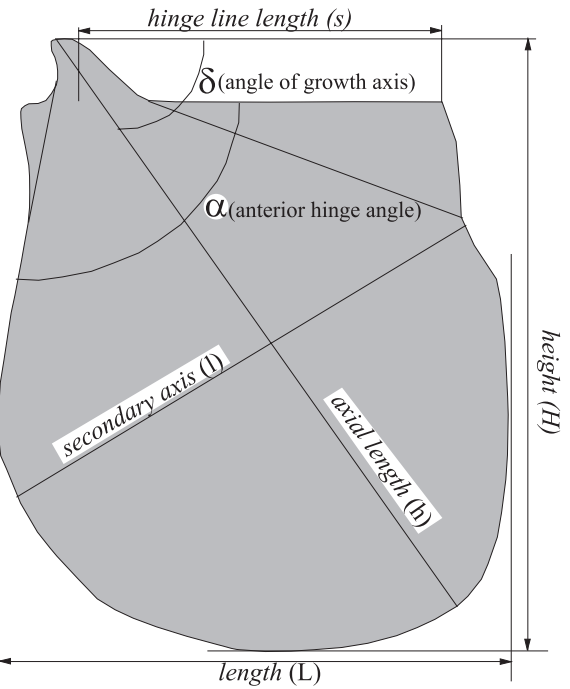


Fig. 2. Basic measurements on inoceramid specimens

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