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A Pygasteroid Echinoid from Cenomanian strata in the Mons Basin (Belgium)

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Abstract

A Pygasteroid specimen belonging to the genus *Pygaster*, from the Cenomanian Tourtia-deposits of Belgium is redescribed. SMISER's (1935) identification of the species concerned proves to be correct. The systematic position of the genus *Pygaster* is discussed.

Key-words: Echinoidea - Cretaceous - Belgium.

Résumé

Un spécimen d'échinide pygasteroïde, appartenant au genre *Pygaster* et provenant du Tourtia cénomanien de Belgique, est redécrit. L'identification spécifique du spécimen concerné, effectuée par SMISER (1935), est correcte. La position systématique du genre *Pygaster* est discutée.

Mots-clefs: Echinoidea - Crétacé - Belgique.

Pygasteroid echinoids are very rare in mid-Cretaceous strata of Belgium. They escaped detection until 1935, when SMISER described a single specimen of *Pygaster truncatus* from the Cenomanian Tournai Tourtia at Tournai, present in the collections of the Royal Belgian Institute for Natural Sciences. The whereabouts of this specimen are unchanged. It is still the only known representative of its order in the Cretaceous of Belgium.

Class Echinoidea LESKE, 1778
Subclass Euechinoidea BRONN, 1860
Superorder Diadematacea DUNCAN, 1889
Order Pygasteroida DURHAM & MELVILLE, 1957
Family Pygasteridae LAMBERT, 1900
Genus *Pygaster* AGASSIZ, 1836

Type species: *Clypeus semisulcatus* PHILLIPS, 1829 (Oxfordian, Upper Jurassic, England); subsequently designated by SAVIN, 1905.

Pygaster truncatus AGASSIZ, 1840

*.1840	*Pygaster truncatus*, AGASSIZ, p. 7 (spec. P. 49).
.1842	*Pygaster truncatus*, DESOR, p. 82, pl. 11, fig. 8-10 (P. 49).
.1847	*Pygaster truncatus*, AGASSIZ & DESOR, p. 144 (P. 49).
.1848	*Pygaster truncatus*, BRONN, p. 1066 (P. 49).
.1850	*Pygaster truncatus*, d'ORBIGNY, p. 179 (P. 49).
1851	*Pygaster truncatus*, d'ARCHIAC, p. 445.
.1857	*Pygaster truncatus*, DESOR, p. 167 (P. 49).
.1859	*Pygaster truncatus*, COTTEAU & TRIGER, p. 175-177, 410, pl. 30, fig. 12-16.
1859	*Pygaster truncatus*, COQUAND, p. 963.
1860	*Pygaster truncatus*, COTTEAU, p. 376.
.1861	*Pygaster truncatus*, COTTEAU, p. 70-73, pl. 1021, fig. 1-11.
.1871	*Pygaster truncatus*, GEINITZ, p. 77, pl. 18, fig. 3.
.1875	*Pygaster truncatus*, QUENSTEDT, p. 432-433.
(1883)	*Pygaster truncatus*, COTTEAU (a), p. 182.
.1883	*Pygaster truncatus*, COTTEAU (b), p. 87-88.
1914	*Pygaster truncatus*, LAMBERT & THIERY, p. 278.
1920	*Macropygus truncatus*, HAWKINS, p. 432.
.1928	*Pygaster truncatus*, LAMBERT & JEANNET, p. 155 (spec. P. 49).
.1935	*Pygaster truncatus*, SMISER, p. 37, pl. 3, figs. 4a-d.
.1948	*Pygaster truncatus*, MORTENSEN, p. 18-19, fig. 3 & 6.
?(1979)	*Pygaster truncatus*, FOURNIER, p. 87, 88.
(1984)	*Pygaster truncatus*, RIGOLLET, p. 175, 176

LOCUS TYPICUS: Ile d'Aix, Charente-Maritime, France

STRATUM TYPICUM: Grés vert, Cenomanian

OTHER OCCURRENCES OUTSIDE THE MONS BASIN

Cenomanian. France: Bouches-du-Rhône, Charente-Maritime, Sarthe (COTTEAU, 1861), Var (d'ORBIGNY, 1850), Charente (COTTEAU, 1883).
Germany: Elbe-Valley in Saxony (GEINITZ, 1871).
Spain: Viscaya (COTTEAU, 1860).
Aptian. France: Isère (COTTEAU, 1861).

SPECIMENS STUDIED

Tournai, prov. Hainaut, Belgium; Tournai Tourtia, Cenomanian: 1 spec. (KBIN IST-9126).

DIMENSIONS OF THE SPECIMEN (IST 9126)
(in mm)

h (height of the test)	12,8		
D (diameter, parallel to III-5)	25,1	h/D	0,51
d (diameter perpendicular to III-5)	28,0	d/D	1,11
P (diameter of peristome, parallel to III-5)	7,8	P/D	0,31
p (diameter of peristome, perpendicular to III-5)	9,7	p/P	1,24
A (diameter of periproct, parallel to III-5)	11,9		
a (diameter of periproct, perpendicular to III-5)	7,2	a/A	0,60

DESCRIPTION

Medium sized *Pygaster*. The corona is subpentagonal, longitudinally compressed and dorso-ventrally flattened. The adoral surface is flat, adapically the test is slightly convex.

The peristome is situated in the middle of the adoral surface. It is slightly oval, with its long axis perpendicular to the plane of symmetry III-5, and fairly large, its diameter being almost 1/3 of the overall diameter of the corona. The periproct is very large and teardrop-shaped. It is situated outside the apical system, between the apex and the ambitus, in interambulacrum 5.

The apical system is tetrabasal, genital 5 being absent. Some plates of the apical system (genitals 2 and 4, ocelars V and I) are still in contact with the periproct. Genital 3, as well as ocelars II, III and IV are excluded. Genital 2, the madreporite, bearing numerous hydropores, is larger than the other plates and can be easily distinguished.

Ambulacra are moderately narrow and correspond to arcs of 21°. Poriferous zones are straight, unsunken, non-petaloid and simple throughout. Pores are very small, almost circular in outline and arranged in slightly oblique pairs, with extremely narrow interporous partitions. All ambulacral plates are primaries. Compound plates are absent. Every third plate carries tubercles, the scrobicules of which extend over both adjacent plates. These tubercles are perforate, non-crenulate. They are arranged in two vertical series of almost equal size, only the most adradial of which is continuous throughout, from peristome to apex. The scrobicules are circular, moderately deep and non-confluent. Moderately wide perradial extrascobicular surfaces are covered by a dense and coarse granulation.

Interambulacra are more than twice as wide as ambulacra and correspond to arcs of 51°. They are covered by numerous perforate, non-crenulate tubercles, which are arranged in five vertical series on each half interambulacrum. Size and shape of tubercles and scrobicules are similar to those on ambulacra. A clearly outlined, granulated interradial extrascrobicular surface is absent.

DISCUSSION

Pygasteroid echinoids were fairly well represented in the Jurassic, but from the Lower Cretaceous onwards, they became much less common. Living during the mid-Cretaceous and being known to occur in Aptian and Cenomanian strata, *Pygaster truncatus* is the last survivor of its order. The species may be considered a Jurassic relic in Cretaceous faunas.

P. truncatus is so different from other Cretaceous echinoids, that it can hardly be confused with any of them. Hence, the status of this species is well established since the middle of the 19th century, without having been seriously questioned. Confusion with similar or

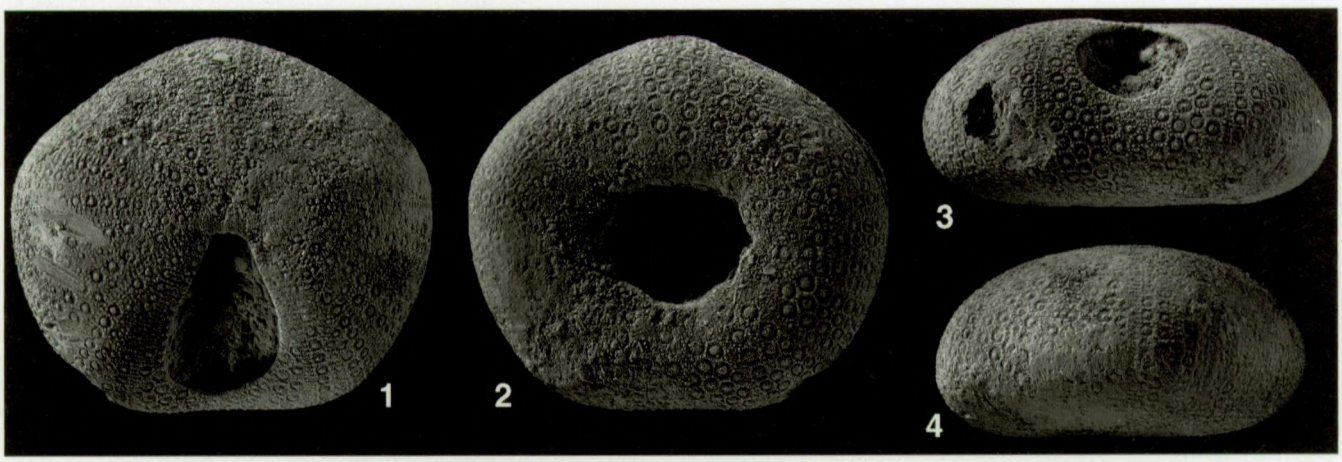

Fig. 1. — *Pygaster truncatus* AGASSIZ, 1840. Tournai, prov. Hainaut, Belgium ; Tournai Tourtia, Cenomanian ; KBIN IST-9126.
1. Adapical view, x 2.
2. The same specimen. Adoral view, x 2.
3. The same specimen. Posterior view, x 2.
4. The same specimen. Lateral view, x 2.

related species is hardly possible. Misidentifications and misinterpretations are indeed extremely rare in literature.

Three synonyms of the generic name *Pygaster* have been mentioned by FELL (1966) : *Echinoclypus, Macropygus* and *Megapygus*. *Echinoclypus* has been introduced by POMEL (1869) and disclaimed as an error by the same author (POMEL, 1883). The name *Macropygus* has been introduced by DESOR (1857), mentioning a letter by COTTEAU, in which the the latter announces his intention to described and to name a new genus for *P. truncatus*. However, *Macropygus* has never been formally described. After having changed his mind, COTTEAU decided to maintain the species in the genus *Pygaster* (COTTEAU & TRIGER, 1859), disclaiming *Macropygus* as a valid name.

Yet, the name *Macropygus* was revived by HAWKINS (1912), based on the presumed presence of a fifth genital plate in some species of *Pygaster*. Moreover, the same author introduces yet another new name, *Megapygus*, for a new genus, split off from *Macropygus*. The only point of difference between both genera, mentioned by HAWKINS, is the size of the ambulacra. In my opinion, this is a fairly meagre criterion to distinguish generic taxa. Examining the specimen at my disposal, as well as several published figures of the type species of *Macropygus* and *Megapygus* (resp. *P. truncatus* and *P. umbrella*), no evidence for the existence of a fifth genital pore was found. Hence, *Macropygus* and *Megapygus* can be safely considered to be junior synonyms of *Pygaster*. This opinion is shared by MORTENSEN (1948) and by FELL (1966).

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