

A NEW SPECIES OF RHINOBATOS (ELASMOBRANCHII, BATOMORPHII) FROM THE UPPER MAASTRICHTIAN OF THE NETHERLANDS AND BELGIUM¹

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ABSTRACT

Bor, T. J. 1983 A new species of *Rhinobatos* (Elasmobranchii, Batomorphii) from the Upper Maastrichtian of The Netherlands and Belgium – Geol. Mijnbouw 62:297-300.

Teeth of a new species of Guitarfish (Elasmobranchii, Batomorphii), *Rhinobatos mariannae* nov.sp., are described from three exposures of the Maastricht Formation (Upper Maastrichtian, Cretaceous) in The Netherlands and Belgium.

INTRODUCTION

Guitarfishes of the genus *Rhinobatos* live in shallow tropical and subtropical coastal waters of all oceans. Some species penetrate into fresh water, and even breed there. The appearance of these rays is very characteristic, because the flattened head, the pectoral fins and the snout pass into a tapering body and tail (Fig. 1). Most Recent species reach a length of about 1 metre. The dermal denticles are minute, except for the dermal denticles (thorns) that are grouped along the dorsal midline, on the shoulder regions, around the eyes and spiracles, and in some species on the tip of the snout. Guitarfishes swim slowly near the bottom, or lie half buried in the sand or mud. Their food consists mainly of small fishes, crustaceans, molluscs and other benthonic animals, which they crush with their numerous small rounded teeth. Up to 60-65 series of teeth are present in each jaw in a pavement-like band. Some sexual dimorphism may be observed in the dentition of mature individuals. In that case females and immature males have low, rounded teeth without a cusp, while teeth in adult males have a low blunt cusp.

The genus *Rhinobatos* occurs for the first time in the Early Cretaceous. Its presence in the Maastrichtian type area of The Netherlands and Belgium was first recorded by CASIER (1964, p. 4: *Rhinobatus* sp.) from the lower part of the Maastricht Formation in a quarry near Eben-Emael, province of Liège, Belgium. Unfortunately he gave neither a description nor an illustration of this species. In 1977 HERMAN (p. 274; pl. 13, fig.2) described and illustrated *Rhinobatos* teeth from the

Maastrichtian type area. He left these specimens unnamed, because he did not have enough material. Additional material was recently collected by the present author. It is described below as a new species.

LOCALITIES

The lithostratigraphic terminology used is that of FELDER (1975).

Albert Canal, cutting of Caster.

Location: Incision of the Albert Canal, cutting of Caster, province of Liège, Belgium.

File number Geological Survey of Belgium: 108 W 330.

File number Geological Survey of The Netherlands: 61H-15.

Bibliography: FELDER, 1963, p. 169, 171-172.

Stratigraphic level: Layer of fossil grit at the base of the Valkenburg Chalk Member (IVa), Maastricht Formation (Upper Maastrichtian).

Remarks: In 1971 a well preserved and diverse elasmobranch fauna was collected from this locality by Dr J. Herman, (HERMAN, 1977).

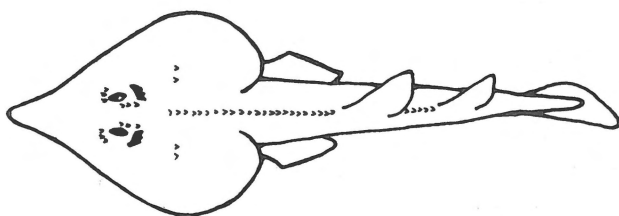


Fig. 1
Dorsal outline of the recent Guitarfish *Rhinobatos rhinobatos* (LINNAEUS, 1758). After Capapé et al., 1981, fig. 2.

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Berg en Terblijt, quarry Blom.

Location: Quarry Blom in the municipality of Berg en Terblijt, province of Limburg, The Netherlands.

File number Geological Survey of The Netherlands: 62A-19.

Bibliography: FELDER ET AL., 1978, p. 81-84.

Stratigraphic level: Layer of fossil grit at the base of the Nekum Chalk Member (IVe), Maastricht Formation (Upper Maastrichtian).

Remarks: The elasmobranch material from this locality was collected by the present author in 1976.

't Rooth, quarry NEKAMI

Location: Quarry NEKAMI at 't Rooth, municipality of Margraten, province of Limburg, The Netherlands.

File number Geological Survey of The Netherlands: 62A-7.

Bibliography: FELDER ET AL., 1978, p. 74-80.

Stratigraphic level: Layer of fossil grit at the base of the Emael Chalk Member (IVd), Maastricht Formation (Upper Maastrichtian).

Remarks: The elasmobranch teeth described below from this locality were sorted from bulk samples, total weight approximately 250 kgs, collected by the present author in the years 1980-1981.

SYSTEMATIC PALEONTOLOGY

The systematic classification followed is that of COMPAGNO (1973) and CAPPETTA (1980).

Class	Chondrichthyes
Subclass	Elasmobranchii
Cohort	Euselachii
Superorder	Batomorphii
Order	Rajiformes
Suborder	Rhinobatoidei
Family	Rhinobatidae MÜLLER & HENLE, 1838
Genus	<i>Rhinobatos</i> LINCK, 1790
(type-species: <i>Raja rhinobatos</i> LINNAEUS, 1758)	

Rhinobatos mariannae nov. sp. Fig. 2-6

1977 *Rhinobatos* sp. – HERMAN (p. 274, pl. 13, fig. 2).

Derivation of name: This species is dedicated to Miss Marianne van den Berg.

Material: The registration numbers given below prefixed by SGB are of the Geological Survey of Belgium (Brussels); those prefixed by RGM are of the National Museum of Geology and Mineralogy (Leiden, The Netherlands); those prefixed by TJB are of the authors collection.

Holotype: SGB 108W330-P1, Albert Canal, cutting of Caster.

Paratypes: SGB 108W330-P2, Albert Canal, cutting of Caster.

RGM 176 667, Berg en Terblijt, quarry Blom.

TJB 001, 't Rooth, quarry NEKAMI.

TJB 002, 't Rooth, quarry NEKAMI.

Age: Late Maastrichtian. *Belemnitella junior* Partial-range-zone (cf. VAN DER TUUK & BOR, 1980).

Specific diagnosis: Fossil species of *Rhinobatos* thus far known only from isolated teeth, which are minute and typically rhinobatiform. The crown has a long, wide and digitate medio-internal uvula and strongly reduced latero-internal uvulas. In oral view the lateral edges of the crown are rather long and subparallel. The crown is wider than the root, which strongly points posteriorly.

Description: The oral surface of the crown is slightly convex. A transverse crest connects the lateral corners of the crown, but is easily abraded by functional use. A cusp is absent in the material studied. The medio-internal uvula of the crown is rather long, wide and digitate, in contrast to the latero-internal uvulas which are hardly developed. In oral view the lateral edges of the crown are rather long and subparallel. Just above the junction of the uvulas the crown is slightly constricted and shows some indistinct plications. The posterior side of the crown is at right or obtuse angles to the oral surface, which gives a subtriangular outline to the crown in lateral view. The rim of the crown is rounded. The outline of the anterior rim of the crown is usually polygonal, presenting a pair of plano-concave lateral segments and a relatively larger concave median segment. The antero-basilar surface of the crown is rather wide and may show some indistinct plications. The root/crown junction lies on a slight elevation of the postero-central part of the basilar surface of the crown. The maximum width of the teeth is reached near the crown. The root is holaulacorhizoid. Between the lobes of the bifid root a large central foramen is present, in an anterior position. A single latero-internal foramen is present on either side of the medio-internal uvula of the crown. A groove diverging from these latero-internal foramina divides each lobe into two sublobes. The central sublobes are much more extended and posteriorly directed than the lateral sublobes.

Dimensions:

L: Maximum antero-posterior distance across the rim.

H: Distance between the basal surface of the root and the oral surface taken perpendicular to the plane of the rim.

Wc: Maximum width of the crown.

Wr: Maximum width of the root.

	L	H	Wc	Wr
	(mm)	(mm)	(mm)	(mm)
SGB 108W330-P1	1.70	1.65	1.65	1.45
SGB 108W330-P2	2.00	1.90	2.05	2.00
RGM 176 667	1.45	1.35	1.50	1.45
TJB 001	0.95	0.95	1.05	1.00
TJB 002	1.45	1.20	1.40	damaged

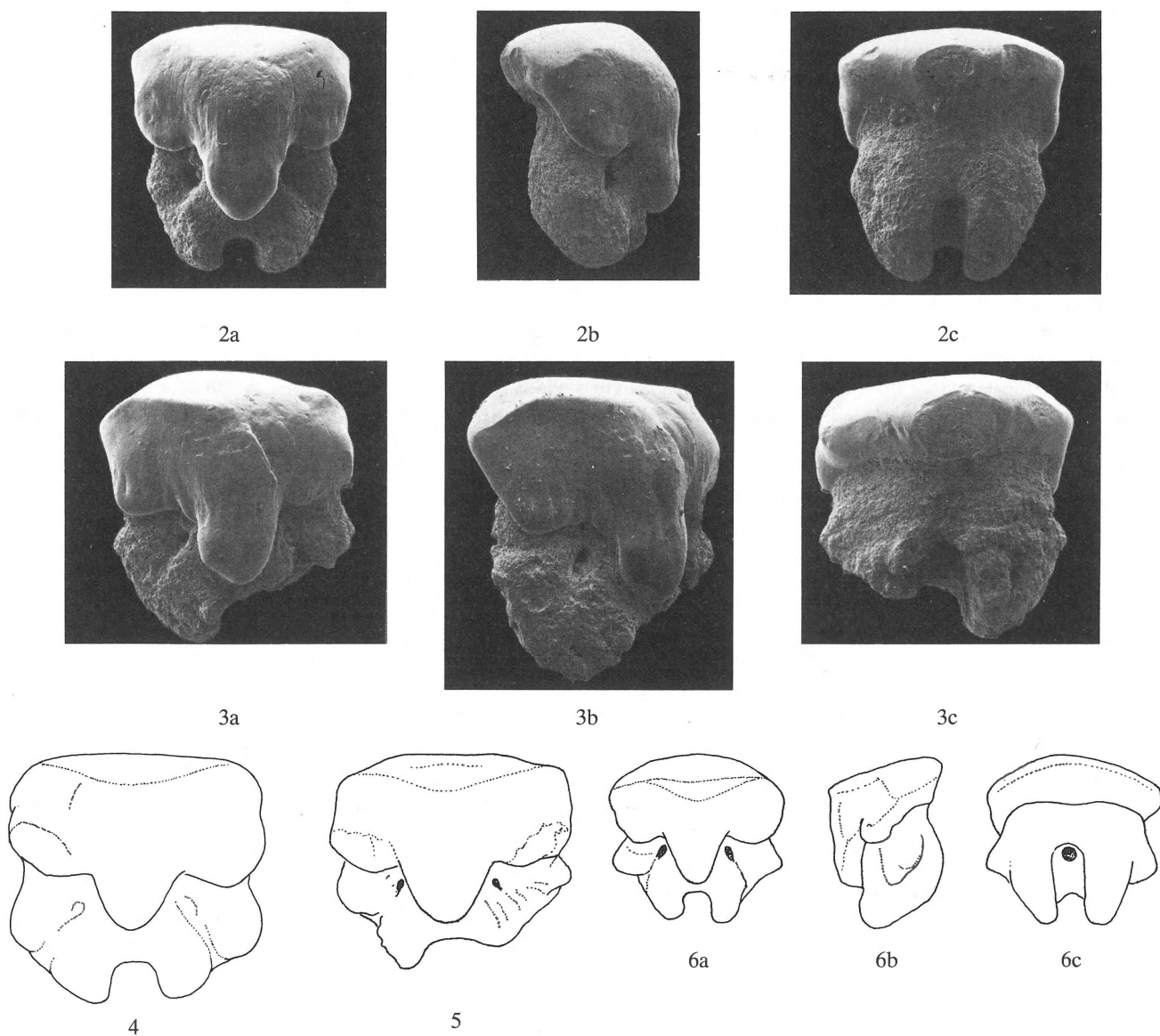


Fig. 2-6

Teeth of *Rhinobatos mariannae* nov. sp.

2. SGB 108W330-P1 (Holotype); a, oral view; b, lateral view; c, posterior view.

3. SGB 108W330-P2; a, oral view, b, oblique lateral view; c, posterior view.

4. RGM 176 667; oral view.

5. TJB 002; oral view.

6. TJB 001; a, oral view; b, lateral view; c, posterior view.

Differential diagnosis: Several *Rhinobatos* species have been described from the Upper Cretaceous, some on the strength of skeletons, others based on isolated teeth. The differences between these species and *R. mariannae* nov. sp. are discussed below.

The classic elasmobranch faunas from the Cenomanian and Upper Santonian of Lebanon, represented by skeletons, have been very well described and illustrated by CAPPETTA (1980). Eight *Rhinobatos* species were recorded by him from these deposits, namely: *R. hakelensis* CAPPETTA, 1980, *R. maronita* (PICTET & HUMBERT, 1866), *R. latus* (DAVIS, 1887), *R. whitfieldi*

(HAY, 1903), *R. tenuirostris* (DAVIS, 1887), *R. primarmatus* (WOODWARD, 1889) [junior synonym: *R. berytensis* (SIGNEUX, 1951)], *R. grandis* (DAVIS, 1887) and *R. intermedius* (DAVIS, 1887). The teeth of the three former species are easily distinguished from *R. mariannae* nov. sp. by a relatively short and at the base wide medio-internal uvula of the crown, and the absence of latero-internal uvulas. *R. whitfieldi* and *R. tenuirostris* are characterized by crowns having a pronounced cusp, which is absent in *R. mariannae* nov. sp. *R. primarmatus* is distinguished from *R. mariannae* nov. sp. by the relatively long latero-internal uvulas of the crown. Teeth of *R. grandis*

may be separated from *R. mariannae* nov. sp. by the relatively low root, the more pronounced latero-internal uvulas of the crown and the very convex medio-posterior part of the oral surface of the crown. *R. intermedius* differs from *R. mariannae* nov. sp. by the relatively narrow and short, but thick medio-internal uvula of the crown, the absence of latero-internal uvulas, and a very wide crown.

In 1973 CAPPETTA described teeth of *Rhinobatos* sp. and ?*Rhinobatos incertus* from Turonian deposits in South Dakota. The teeth of the former species are very massive and characterized by a very long and wide medio-internal uvula of the crown, which widens and flattens terminally, and rather short divergent latero-internal uvulas. This species cannot be mistaken for *R. mariannae* nov. sp. teeth of ?*R. incertus* are easily separated from *R. mariannae* nov. sp. by the pointed conical cusp.

HERMAN (1977) described some teeth as 'Rhinobatidae? indéterminé' from Turonian deposits in northern France and Campanian deposits in Belgium. According to HERMAN (o.c.) this very small form is characterized by the absence of almost any trace of latero-internal uvulas of the crown, the wide median groove and the slightly diverging lobes of the root, which is relatively low and equal to or less wide than the crown. Unfortunately the photographs are rather unclear, so it is difficult to get a good impression of the morphology of these teeth.

The teeth of *R. mariannae* nov. sp. are easily distinguished from *Rhinobatos casieri* HERMAN in CAPPETTA & CASE, 1975, which is described from the Santonian and Campanian of Belgium (HERMAN, 1977) and the Campanian of New Jersey (CAPPETTA & CASE, 1975), by the following characteristics: The crown is wider than the root, the latero-internal uvulas are less extended, the oral surface is relatively flat and lacks a median cusp. Moreover, the teeth of *R. mariannae* nov. sp. are generally smaller than those of *R. casieri*.

Rhinobatos tessellatus (VON DER MARCK, 1873) from the Campanian of Westphalia, is based on two complete skeletons, but unfortunately the dentition of this species is unknown.

ARAMBOURG (1952) described some teeth as *Rhinobatus* sp. and *Rhinobatus* cf. *berytensis* SIGNEUX, 1951 from the Maastrichtian of the Ouled Abdoun Basin in Morocco. The teeth of the former species are characterized by a crown having a rectangular outline of the oral surface, a rather short and at the basis wide medio-internal uvula and the absence of latero-internal uvulas. These teeth might better be placed in the genus *Rhynchobatus* MÜLLER & HENLE, 1837. Teeth of the latter species have a crown with a long medio-internal uvula, and long strongly diverging latero-internal uvulas. Therefore this species is distinct from *R. mariannae* nov. sp.

Remarks:

Teeth of *Rhinobatos mariannae* nov. sp. seem to be fairly rare in the Upper Maastrichtian of the Maastricht area. They

represent less than 0.5% of the elasmobranch teeth content of the three localities mentioned earlier. Therefore it may be speculated that this species was only an occasional visitor in the Late Maastrichtian waters of the Maastricht region.

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REFERENCES

- Arambourg, C. 1952 Les vertébrés fossiles des gisements de phosphates (Maroc-Algérie-Tunisie) – Notes et Mém. Serv. Géol. Maroc. 92: 1-372.
- Capapé, C., J. P. Quignard & J. Zaouali 1981 Nouvelles descriptions de *Rhinobatos rhinobatos* (Linné, 1758) et de *Rhinobatos cemiculus* Geoffroy Saint-Hilaire, 1817 (Pisces, Rhinobatidae) – Bull. Off. Natl. Pêch. Tunisie, 5 (1): 1-27.
- Cappetta, H. 1973 Selachians from the Carlile Shale (Turonian) of South Dakota. – J. Paleontol. 47: 504-514.
- 1980 Les séliens du Crétacé supérieur du Liban. II: Batoides – Palaeontogr. Abt. A 168: 149-229.
- Cappetta, H. & G. R. Case 1975 Contribution à l'étude de séliens du Groupe Monmouth (Campanien-Maastrichtien) du New Jersey – Palaeontogr., Abt. A 151: 1-46.
- Casier, E. 1964 Contributions à l'étude des poissons fossiles de la Belgique. XIII. Présence de Ganopristinés dans la Glauconie de Loncée et le Tuffeau de Maastricht – Bull. Inst. Roy. Sc. Nat. Belg. 40 (11): 1-27.
- Compagno, L. J. V. 1973 Interrelationships of living elasmobranchs. In: Greenwood, P. H. et al. (eds.): Interrelationships of fishes – Suppl. no. 1 Zool. J. Linn. Soc. 53: 15-61.
- Felder, W. M. 1963 Krijtontsluitingen ten zuiden van Maastricht – Grondb. Hamer 17 (5): 162-190.
- 1975. Lithostratigrafie van het Boven-Krijt en het Dano-Montien in Zuid-Limburg en het aangrenzende gebied – Toel. Geol. Overzichtskaarten Nederland: 63-72.
- Felder, W. M., P. J. Felder & O. S. Kuyl 1978 Lithology and stratigraphy of the Maastrichtian and Dano/Montian Chalk in the type area of the Maastrichtian on both sides of the river Maas – Excursion-guide for field trip G of the joint annual meeting of the Paläontologisches Gesellschaft and the Paleontological Association (Maastricht) 1978: xxx pp.
- Herman, J. 1977 Les séliens des terrains néocrétacés et paléocènes de Belgique et des contrées limitrophes. Eléments d'une biostratigraphie intercontinentale – Mém. Expl. Carte Géol. et Min. Belg. 15: 1-401.
- Van der Tuuk, L. A. & T. J. Bor 1980 Zonering van het Boven Krijt in Limburg met behulp van Belemnitidae – Grondb. Hamer 34 (4): 121-132.
- Von der Marck, W. 1873 Neue Beiträge zur Kenntnis der fossilen Fische und andere Tierreste aus der jüngsten Kreide Westfalens, sowie Aufzählung sämtlicher seither in der westfälischen Kreide aufgefundenen Fischreste – Palaeontogr. 22: 55-74.