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Additions to the Eocene Fish fauna of Belgium

5. The discovery of *Mustelus* teeth in Ypresian, Paniselian and Wemmelian strata

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Abstract: Three Belgian localities have yielded *Mustelus* teeth. They are compared with the only Eocene species already described: *Mustelus whitei* Cappetta 1976, from the London Clay.

Résumé: Trois localités belges ont livrés dents de *Mustelus*. Elles sont comparées à l'unique espèce éocène présentement connue, *Mustelus whitei* Cappetta du London Clay.

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INTRODUCTION

The continuing study of the rich faunas collected at Egem, Flanders (Sands with *Venericardia planicosta*), Schepdael, Brabant (base of the Sables de Wemmel), and Zwevegem, Flanders (shelly sands with *Pseudamusium corneum*, upper Argile d'Ypres) has yielded some teeth referable to the genus *Mustelus*. As the fossil record of this genus is relatively unknown, it seemed useful to describe these new discoveries from the Belgian Eocene.

LOCALITIES

Egem (53W71) and Schepdael (87E8bis) were described in my previous paper concerning Eocene Fish Faunas (HERMAN 1979: 61-63). The absolute levels given for the Egem locality were wrong; 11 metres should be added to the published heights.

Zwevegem (97E64bis) is a temporary exposure along the Kortrijk-Bossuyt canal, at Knokke, Zwevegem commune, about 8 km south-east of Kortrijk. The slopes of the canal are in the upper part of the Argile d'Ypres which contains thin layers of shelly silty sand with *Turritella solanderi* and *Pseudamusium corneum*, oysters, nummulites and other molluscs. *Mustelus* teeth were discovered at the absolute level 29 m 50-30 m 00. The general geology of the area was published by HALET (1939).

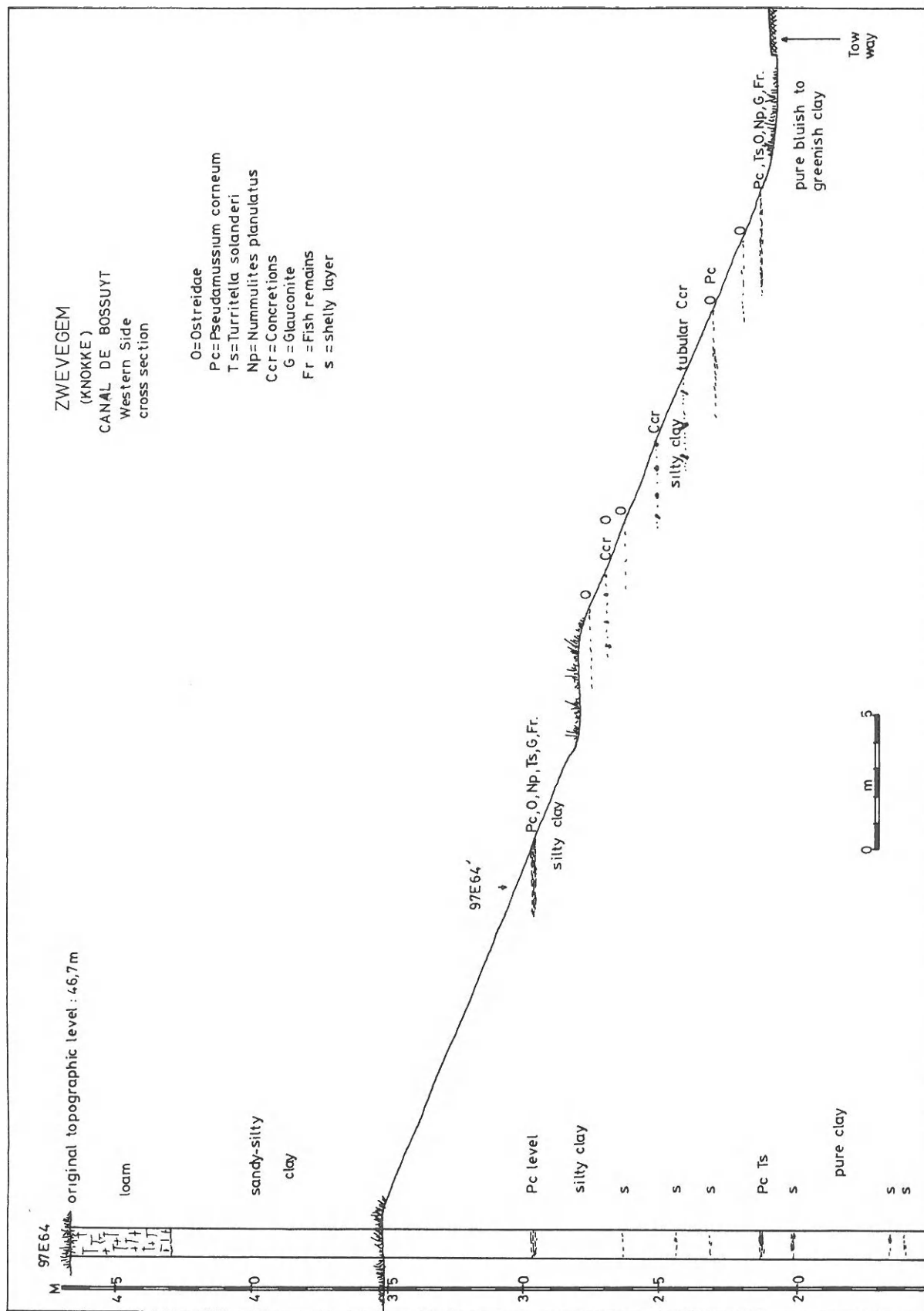
Systematic Palaeontology
Subclass Elasmobranchii
Order Carcharhiniformes
Family Triakidae (sensu Compagno 1973)
Genus *Mustelus* Linck 1790

Teeth of the following modern species were examined: *M. mustelus* (Linne 1758); *M. asterias* Cloquet 1821; *M. manazo* Bleeker 1854; *M. californicus* Gill 1864; *M. fasciatus* Garman 1913; *M. antarcticus* Gunther 1870; *M. dorsalis* Gill 1864; *M. lunulatus* Jordan & Gilbert 1882; *M. mosis* Ehrenberg & Emprich 1889; *Rhinotriakis henlei* Gill 1862. They all are very similar and characteristic. They show a true holaulacorhizid root (CASIER 1947) and a flattened quite uncusped crown; a result of a very old adaptation to durophagy. The sole remains of the ancestral pronounced cusp is preserved in the modern *Mustelus* (*Rhinotriakis*) *henlei* Gill 1862, consisting of a median enlargement of the crown.

The external side of the crown leans strongly forward over the root. Both internal and external faces of the crown show a basal striation, more or less extended, more or less accentuated.

Teeth in the same position of different species are only partly recognisable by the general proportions of the tooth, number and strength of crown striation, relative resorption of the median crown enlargement, the size of the median root groove and by the number and size of the secondary internal and external vascular pits of the root.

All these features show a relatively large variation, a function of both sex and age, so that the overlap of intraspecific variations is important. Some species are widely distributed though others may have very restricted distributional areas.



Text-fig. 1. Cross section of the Kortrijk-Bossuyt canal at Knokke.

Mustelus vanderhoefti n. sp.

Pl. 1. fig. 1-4

Specific diagnosis: *Mustelus* showing massive and thick set teeth, with a very strong and high crown striation, so that a lot of striae rise to the upper part of the crown.

Derivatio nominis: In honour of my friend Eric VANDERHOEFT, official collaborator of the Belgian Geological Survey.

Material: Egem 53W71, layer with *Venericor planicosta* lenses, absolute level + 39 m.: 5 teeth (Holotype + 4 Paratypes) S.G.B. Coll.

Holotype: The tooth illustrated in plate 1, fig. 2; no. 53W71 Pl.

Description and discussion: The holotype is a very well preserved anterior tooth of a total height of 1.30 mm., crown height 0.85 mm., 1.75 mm. long and 1.45 mm. wide.

The others are considered to be antero-lateral, two laterals and one extreme lateral tooth. The smallest is 1.50 mm. long, the largest 2.10 mm.

The median cusp is quite imperceptible, a good reason to consider this fossil form a true *Mustelus* and not as a member of the *Rhinotriakis henlei* group. The internal and external basal striations of the crown are very strong and their strength reduces progressively near the upper face (occlusal) of the crown, where they are tenuous and more or less undulated. They are relatively more elongated than those of modern species examined. They seem larger on lateral than anterior teeth.

The root is massive, deeply hollowed and shows numerous lateral pits on both faces. Teeth of modern species seem to have significantly reduced this number of secondary rootpits. These teeth differ from *M. whitei* Cappetta 1976 by their stronger and more expanded ornamentation, by their more massive aspect and by their larger size.

Mustelus cf whitei Cappetta 1976

Material: Zwelegem 97E64bis: One crown from the *Pseudamusium* and *Turritella* layer absolute level + 30 meters. Upper Argile d'Ypres. HERMAN Coll.

Description: The size, proportions and ornamentation of this small crown approach those of the teeth described by CAPPETTA (1976: 563, pl. 2, figs. 16-17). The crown is 1.25 mm long and 0.65 mm wide. The uniqueness of this specimen makes it impossible to confirm the specific determination.

Mustelus sp.

(Pl. 1, figs. 5-6)

Material: Schepdael 87E8bis; base of the Sables de Wommel; two teeth S.G.B. Coll.

Description and discussion: These two teeth of 1.60 mm and 1.25 mm length have an ornamentation consisting of a very few but very large and strong striae which are anastomosed in their upper part. Their respective thicknesses are 1.50 mm and 1.00 mm; their total height: 1.00 mm and 1.05 mm. The root of the lateral tooth (fig. 5) is relatively short and shows a particularly large median groove. The strength and clear anastomosis of the ornamentation distinguish this species from *M. whitei* Cappetta and *M. vanderhoefti* n. sp. It is quite certain that these two teeth belong to a new species of which I hope to collect more specimens before describing.

CONCLUSIONS

Recent species of *Mustelus* are cosmopolitan. They prefer warm to warm temperate, coastal to shallow waters. The different Recent species have more or less overlapping distribution areas. Some of them live on both sides of an ocean, while others have a very restricted distribution. Everywhere they occur they are fairly or very common. This abundance contrasts with the scarcity of the fossil forms. The smallness of the teeth is not the only feature responsible for the rarity of European fossil forms, because many of the classical localities have been recently carefully collected. CAPPETTA (1976) was the first to find *Mustelus* teeth in European Eocene (London Clay). In Belgium, *Mustelus* teeth occur in three Eocene localities but they are extremely rare. They represent, in fact, less than 0.05% of the population and must be considered as occasional visitors.

More curious is the fact that we have found *Mustelus* in the Oligo-Mio-Pliocene of Belgium, a period in which only a few episodes of the upper Pliocene show too low water palaeotemperatures. This situation is more inexplicable by the large abundance of the *Mustelus* teeth in both the Pacific and Atlantic Miocene of

Northern America (HERMAN, SMITH and WELTON collections). Since LERICHE's work (1940, 1942), it is well known that since the Eocene strong affinities exist between the American and European fish faunas. This similarity is the more obvious during the Miocene period. The absence or scarceness of *Mustelus* in western European Eocene-Miocene deposits remains surprising.

The distribution of Belgian Eocene *Mustelus*

	<i>M. cf. whitei</i>	<i>M. vanderhoefti</i>	<i>M. sp.</i>
Sables de Wemmel (base of)			+
Sables de Egem (<i>V. planicosta</i> level)		+	
Argile d'Ypres (upper part)	+		

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1-4. *Mustelus vanderhoefti* n. sp. Egem (53W71) *Venericor planicosta* layer.

1. external profile and internal views. Coll. S.G.B. 53W71 P3.

2. external profile and internal views, holotype. Coll. S.G.B. 53W71 P1.

3. external view. Coll. S.G.B. 53W71 P4.

4. external and internal views. Coll. S.G.B. 53W71 P5.

All the external faces are 30× enlarged.

5-6. *Mustelus* sp. n. sp? Schepdael (87E8bis) Base of Sables de Wemmel.

5. internal, basilar and profile views; profile 35× enlarged. Coll. S.G.B. 87E8 P1.

6. profile, external and occlusal views; profile 30× enlarged. Coll. S.G.B. 87E8 P2.

