



NOTE ABOUT THE GROSS ANATOMY OF A FEMALE RABBIT FISH (*CHIMAERA MONSTROSA* L.) [HOLOCEPHALI: CHIMAERIDAE].

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Abstract: This work describes and illustrates the gross anatomy of a female Rabbit fish (*Chimaera monstrosa* L.).

key words: gross anatomy – splanchnology -rabbit fish - *Chimaera monstrosa*.

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Introduction

The Rabbit Fish (*Chimaera monstrosa* L.) is a chondrichthyan species of the class Holocephali, family Chimaeridae (Lund and Grogan, 1997). It is a poorly known species, not readily accessible for study (Lund and Grogan, 1997). Usually found at depths of 100 to 1500 m (Ehrich, 1983; Lorance *et al.* 2000), Rabbit fish are occasionally caught by fishermen in the Northern Atlantic, and sold beheaded in fish markets across Western Europe, but are the subject of renewed biological and limited fisheries interests (Lund and Grogan, 1997). Even though rabbit fish are known to possess a peculiar internal anatomy, especially that of the cranial nerves (Janvier, 1996), their overall anatomy, especially soft organs, has rarely been described and illustrated. Goodrich (1909, 1930) provided some drawings and data about some regions of chimaerids, but none about splanchnology and general organisation of the digestive tract and related organs. Maisey (1984 a, b and 1986) and Lund and Grogan (1997) studied in details the skeleton structures of these animals. Dean (1895) described the gross anatomy (page 100, figure 104) of a North-Eastern Pacific species, the spotted ratfish (*Hydrolagus colliei* (Lay & Bennett, 1839)), and the skeleton (page 102, figure 105) of the European species,

Chimaera monstrosa. The internal anatomy of *Chimaera monstrosa*, however, is not documented in the literature. Our purpose here is to illustrate this point.

Material and Methods

We had the opportunity to realise radiographs and dissection of a specimen of a Rabbit fish for veterinarian teaching purposes. The specimen, which was a female, 60 cm TL, fished in the Celtic Sea and is being preserved in the collections of the Laboratoire d'Anatomie Comparée of Ecole Nationale Vétérinaire de Nantes (Nantes, France).

Observations

The Rabbit Fish, like other chimaerids, has no teeth, but possess tooth plates which are fused with jaw cartilage. The palatopterygo-quadrates are fused with the neurocranium (Fig. 1). This holostylistic disposition is not homologous to the autostyly present in Dipnoa, and considered as an adaptation to a durophagous diet (Janvier, 1996). Unlike other chondrichthyans, gill arches are surrounded by fleshy gill-cover, a mobile and poisonous dorsal spine (Fig. 2) and a unique branchial opening are present (Maisey, 1984 a, b and Janvier, 1996).

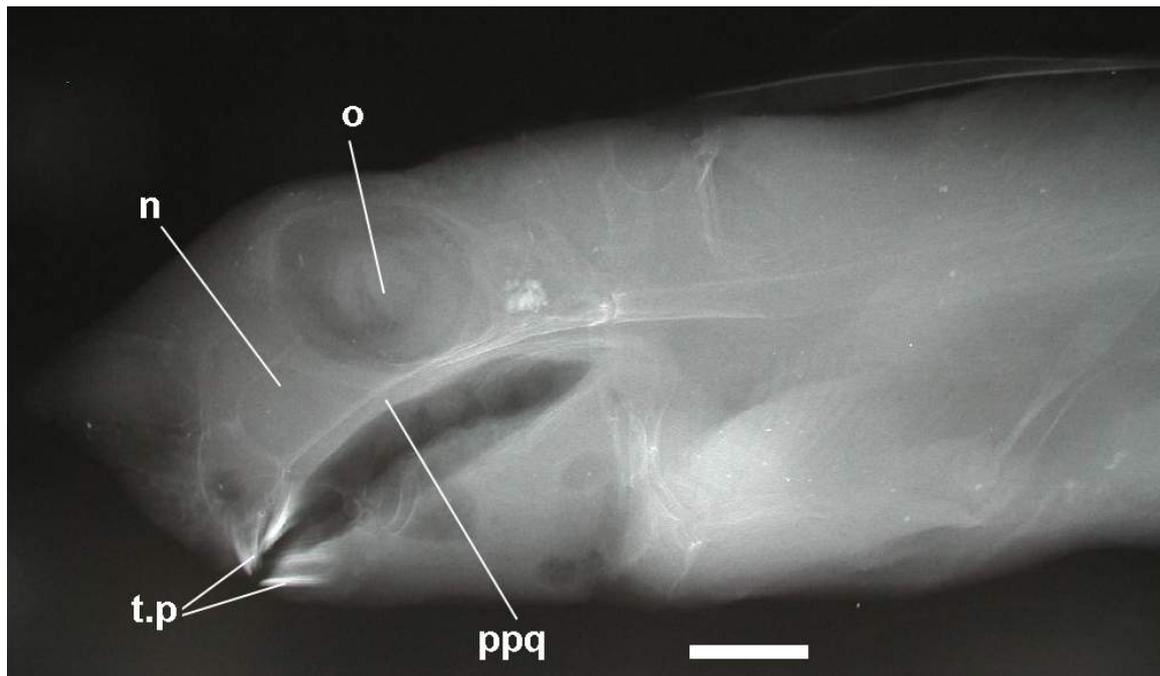


Figure 1. Radiograph of a head of a Rabbit fish (*Chimaera monstrosa* L.) showing the holostylic disposition of the palato-pterygo-quadrates. n: neurocranium, o: orbit, ppq: palato-pterygo-quadrates, t.p: tooth plates. Scale bar = 1 cm.

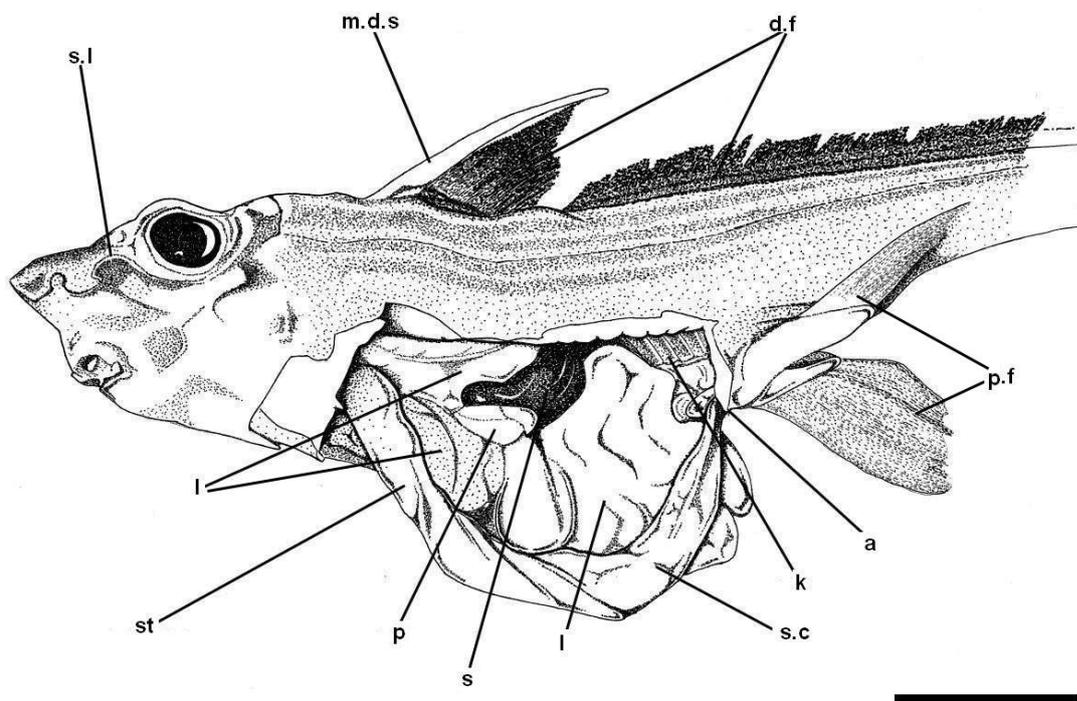


Figure 2. Drawing of the dissection of a female Rabbit fish (*Chimaera monstrosa* L.). a: anus, d.f: dorsal fins, k: kidney, l: liver, m.d.s: mobile dorsal spine, p: pancreas, p.f: pelvic fins, s: spleen, s.c: spiral colon, s.l: sensory line, st: stomach, Scale bar = 5 cm. Scale bar = 5 cm.

The position of the organs is illustrated in figure 2. The abdominal cavity is posteriorly elongated. As in other chondrichthyan fishes, a large liver, composed of three hepatic lobes, occupies the main part of this cavity. The digestive tract forms a black and soft duct; the stomach does not present thicker and muscular walls. The spleen is voluminous and forms a black pouch dorsal to the intestine; this organ is connected with the intestine by a fine spleen duct. The posteriormost part of the intestine is the spiral colon, containing a spiral valve. Kidneys occupy the dorsal part of the abdominal cavity. The black colour of the digestive tract is often present in bathypelagic species, and may be interpreted as an adaptation to consuming light-producing preys. Once bioluminescent preys have been swallowed, the light they produce is hidden by the dark lining of the digestive tract. The dissected specimen was an immature female and thus possessed neither clearly visible ovaries, nor frontal and pelvic claspers, the latter being only present in males (Maisey, 1984 a, b and Janvier, 1996).

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References

- Dean B (1895) *Fishes, living and fossil*. Mac Millan (ed.), New York. 300 pp.
- Ehrich S (1983) On the occurrence of some fish species at the slopes of the Rockall Trough. *Archiv für Fischereiwissenschaft*. **33(3)**: 1-105.
- Goodrich E S (1909). *Vertebrata Craniata*. First fascicule: Cyclostomes and fishes. In: *A treatise on zoology* (ed. E.R. Lankester), Vol. **9**. London, 518 pp.
- Goodrich E S (1930) *Studies on the structure and development of vertebrates*. MacMillan, London, 837 pp.
- Janvier P (1996) *Early Vertebrates*. Oxford Science publications, New York, 393 pp.
- Lorance P, Latrouite D, Seret B (2000) Observations of chondrichthyan fishes (sharks, rays and chimaeras) in the Bay of Biscay (North-Eastern Atlantic) from submersibles. *Proc. 3rd European Elasmobranch Association Meeting*, Boulogne-Sur-Mer, Séret B. & J.-Y. Sire, eds, Paris. La Societe Francais d'Ichthyologie & IRD :29-45.
- Lund R, Grogan E D (1997) Relationships of the Chimaeriformes and the basal radiation of the Chondrichthyes. *Reviews in Fish Biology and Fisheries*, **7(1)**: 65-123.
- Maisey J.G (1984a). Chondrichthyan phylogeny: a look at the evidence. *Journal Vertebrate Paleontology*, **4**: 33-54.
- Maisey J.G (1984b). Higher elasmobranch phylogeny and biostratigraphy. *Zoological Journal of the Linnean Society*, **82**: 33-54.
- Maisey J G (1986) Heads and tails: a chordate phylogeny. *Cladistics* **2(3)**: 210-256.

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