

# About a particular metamorphosis in a Carapidae species

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## Introduction

The early developmental stages of Carapidae are roughly known. This family has planktonic larvae called 'vexillifer', due to the elongation of the dorsal fin's ray, the vexillum (Fig. 1). This larva transforms itself into another type of larva, which is called 'tenuis', by regressing this vexillum whilst the body lengthens considerably. During this stage, the tenuis larva of the Carapini tribe shifts from the pelagic to the benthic areas to search for its first invertebrate host. It then undergoes a substantial reduction in size at the end of which the juvenile status is reached. By increasing again its body size and completing sexual maturity, the juvenile becomes an adult Carapidae. The transition from the tenuis larva to the juvenile period seems consist in a real metamorphosis. The purpose of this study is to provide a view of changes in the skeletal axis.

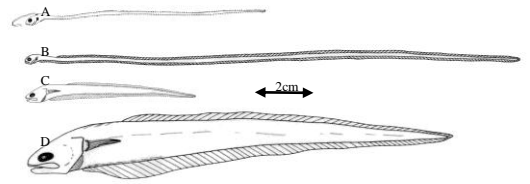
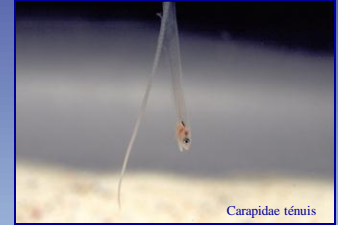


Fig.1 Four developmental stages of *C. homei*. A. Vexillifer, B. Tenuis, C. Juvenile, D. Adult

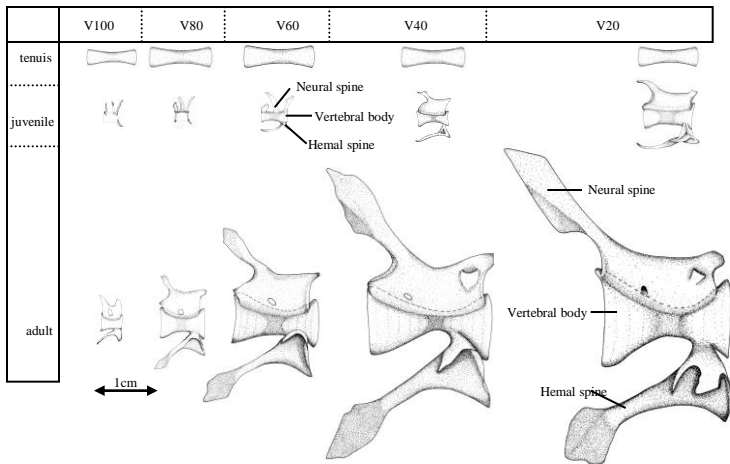


Fig.2 Lateral view of different vertebrae in *C. homei*. V# = number of the vertebra

## Material and Method

Six tenuis (TL :149-183mm) were caught at night as they arrived on the reef crest in waters around the island of Moorea (French Polynesia) while three juveniles were found in the respiratory trees of *Bohadschia argus* (Holothurid). Different juvenile and tenuis specimens were stained with alizarin Red S or with Blue Alcyan according to Taylor et Van Dyke's method (1985). Cross sections were realised in the body and the tail of both stage to ascertain the cartilaginous and/or the osseous nature of the different vertebrae.

## Results

The skeleton of the vertebral column is made of 177 to 196 osseous vertebral bodies with a length situated between 0,8 and 1,2mm. The juveniles possess 124 to 125 vertebrae with different developmental states (fig.2). The anterior vertebrae are were developed with the presence of osseous neural and hemal archs. In the posterior part of the body, the tenuis vertebral elements are more and more short and reduced to single elements shorter than their homologues in the tenuis larva (fig.2 and 3). Cross sections (fig.4) in the tenuis reveal that the osseous vertebra surrounds the notochord and is in relation with the thin neural and hemal spines. In the juvenile, the osseous tissue is more thick and developed around the neural and hemal archs.

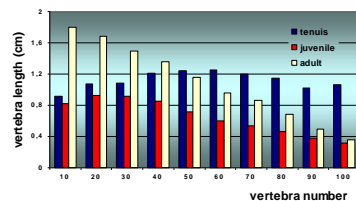


Fig. 3 Vertebra length in *C. homei* specimens

## Discussion

The size reduction from the tenuis to the juvenile results from the combination of two features : a reduction of the vertebra number and a more or less pronounced reduction of the vertebra length. This seems in relation with the development of the anterior skeleton around the main organs in the juvenile. This mode of development of the axis skeleton is unique among Teleosteans :

1. The formation of the vertebral body is privileged to that of the archs. The usual mode of development occurs only in the posterior part of the body and after the metamorphosis.
2. A body shortening happens in other fishes like leptocephalus larvae but osseous vertebrae appear only at the end of the metamorphosis. The gelatinous matrix of the leptocephalus body larva could play a role in providing for the nutritional needs of the metamorphosis. In a self way, the breakdown of vertebrae components of the tenuis larvae could provide the required metabolites for the development of the anterior part in the juvenile.

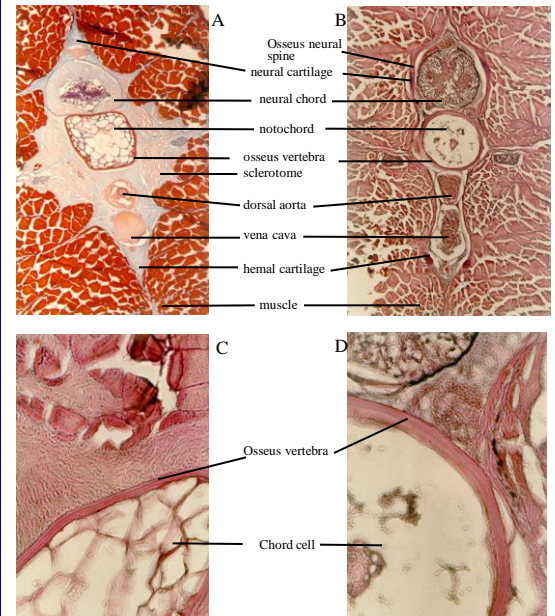


Fig.4 Cross section in the posterior part of the vertebral column in a tenuis (A,C) and a juvenile of *C. homei*.