

# Growth of juvenile fish from Douro estuary, Portugal, based in microincrement count

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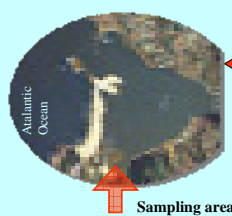
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## INTRODUCTION

The study of fish community of the Douro estuary only recently started. The growth of young fish in this important estuary 20 Km long was not studied before this work. Four species, the most abundant young fish in the sampling area, were chosen to study the growth: *Chelon labrosus* (thicklip grey mullet), *Liza ramada* (thinlip mullet), *Liza aurata* (golden grey mullet) and *Atherina presbyter* (sand smelt).



Douro estuary (white bar = 1 Km)



Europe and Douro river

## METHODS

Sampling at the end part of Douro estuary with a beach-seine collected only small (20-82 mm) fish. After cleaning and storing in plastic vials, *sagitta* otoliths were prepared to examination in a JEOL JSM-6301-F scanning electron microscope: mounting in Struers Specifix-20 resin, abrasion with Silicon carbide paper 1000 and 4000, polishing with Struers AP-Fin 0.3 µm, etching with 0.1% HCl and cathodic gold spraying.

From all prepared otoliths, the best images were selected and increments were counted in 13 *A. presbyter*, 20 *C. labrosus*, 18 *L. ramada*, and 16 *Liza aurata* and were related to total length to access growth equations.

## RESULTS

The growth of young fish is well described by straight lines, as displayed in graphs. Other lines were fitted with no better  $R^2$ . The results are as follows:

### growth equations (t=days; L=cm):

$$L. aurata \quad L_t = 0.0175 t + 1.093 \quad (r^2 = 0.9133; p < 0.05)$$

$$L. ramada \quad L_t = 0.0152 t + 1.682 \quad (r^2 = 0.9409; p < 0.05)$$

$$C. labrosus \quad L_t = 0.0175 t + 1.093 \quad (r^2 = 0.9138; p < 0.05)$$

$$A. presbyter \quad L_t = 0.0085 t + 4.987 \quad (r^2 = 0.8911; p < 0.05)$$

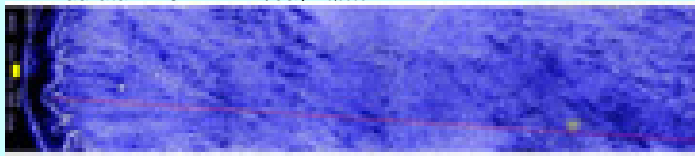
### Average growth rates:

$$A. presbyter \quad 0.456 \text{ mm/day} \pm 0.0020$$

$$L. ramada \quad 0.324 \text{ mm/day} \pm 0.0012$$

$$C. labrosus \quad 0.240 \text{ mm/day} \pm 0.0017$$

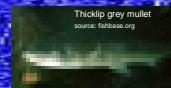
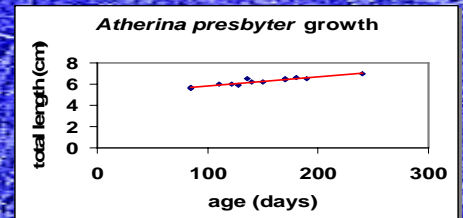
$$L. aurata \quad 0.222 \text{ mm/day} \pm 0.0003$$



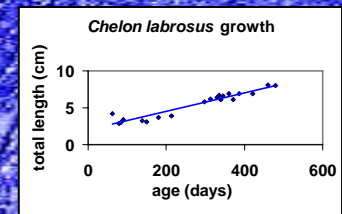
Partial view of otolith (*sagitta*) with microincrements; yellow bar= 10µm (*L. aurata*)



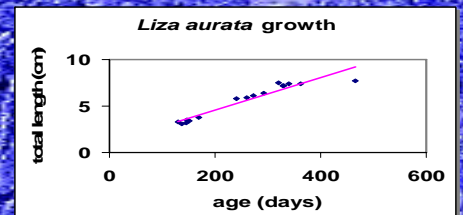
Sand smelt source: fishbase.org



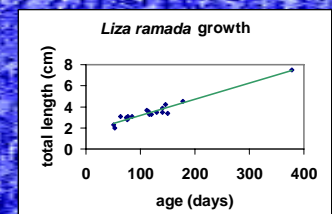
Thicklip grey mullet source: fishbase.org



Golden grey mullet source: fishbase.org



Thinlip mullet source: fishbase.org



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