GROWTH OF YOUNG CUTTLEFISH, *Sepia officinalis* AT THE UPPER END OF THE BIOLOGICAL DISTRIBUTION TEMPERATURE RANGE

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INTRODUCTION

Cephalopods are carnivorous, opportunistic and dynamic predators (Lee *et al*., 1998) that play a dominant role in the food chain in the marine ecosystem (Boletzky and Hanlon, 1983). They are being increasingly used in medical research due to their nervous system and sense organs (Koueta and Boucaud-Camou, 1999) and as research models in several areas such as physiology, neuroscience, aging, oncology, immunology or molecular biology (Oestmann *et al*., 1997). Since cephalopods present short life cycles, fast growth rates, high food conversion efficiencies (Forsythe and Van Heukelem, 1987) and a high market value, their potential for mariculture is high (Domingues, 1999). The cuttlefish *Sepia officinalis* is one of the most easily cultured cephalopods (Domingues *et al*., submited). It has been reared in aquaria for several years (Pascual, 1978; Forsythe *et al*., 1994; Lee *et al*., 1998). This species easily reproduces in captivity, has large eggs and hatchlings, high hatchling survival, resistance to disease and is very resistant to crowding and handling. These characteristics make *S. officinalis* a very promising species for aquaculture. The objective of this research was to determine individual data on growth and feeding rates, and food conversions for the cuttlefish, from hatchlings up to 25 g (2 months old in our experiments) at the upper limits of their biological distribution temperature range.

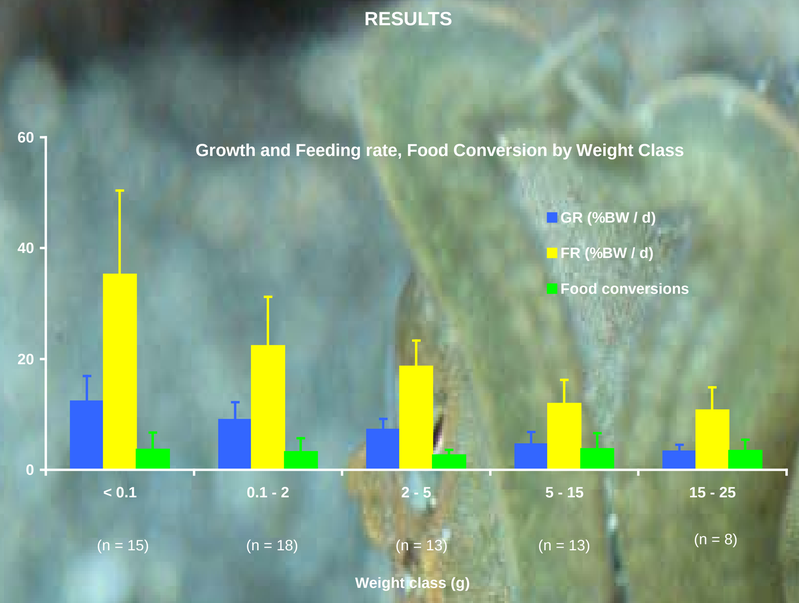
MATERIAL AND METHODS

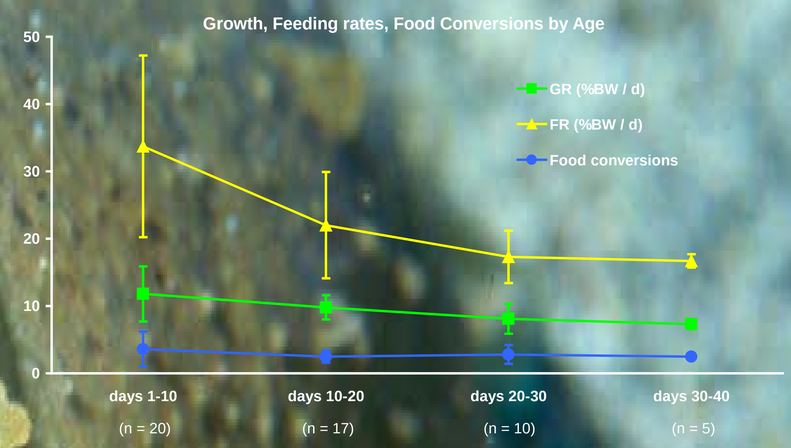
S. officinalis eggs were collected from the Ria Formosa (South Portugal). All cuttlefish up to 25 g were placed in individual chambers, in order to obtain individual data. Hatchlings were placed separately in baskets (water volume of 1.2 L). Bigger cuttlefish (from 0.5 to 25 g) were placed in bigger baskets (water volume of 5.2 L).

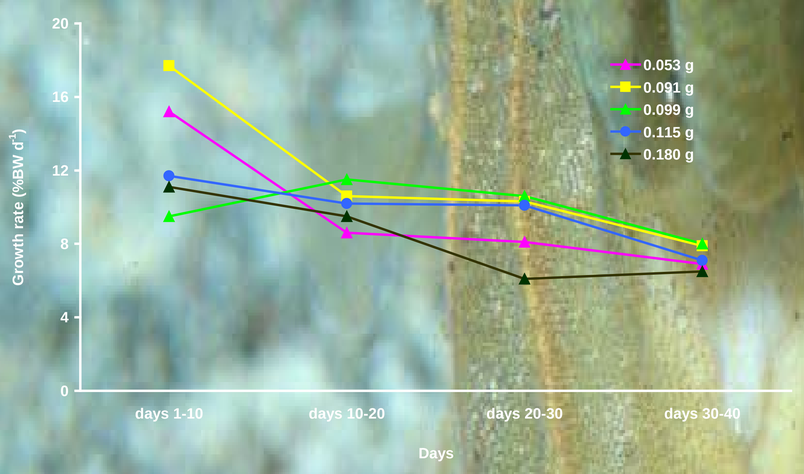
Hatchlings were fed live mysid shrimp (*Paramysis nouveli*), weighing 0.006±0.0008 g each. Bigger hatchlings and juvenile were fed live grass shrimp (*Paleomonetes varians*) of three sizes (0.012±0.008 g; 0.036±0.009 g and 0.084±0.018 g) as they grew bigger. Each day food eaten was determined by counting the number of mysids and grass shrimp eaten by each cuttlefish. For all experiments, a flow-through system was used with water flow of 120 L h^{-1}. Water temperature varied between 27±3ºC, salinity varied between 37±3 PSU and lights were kept on 14 hour a day.

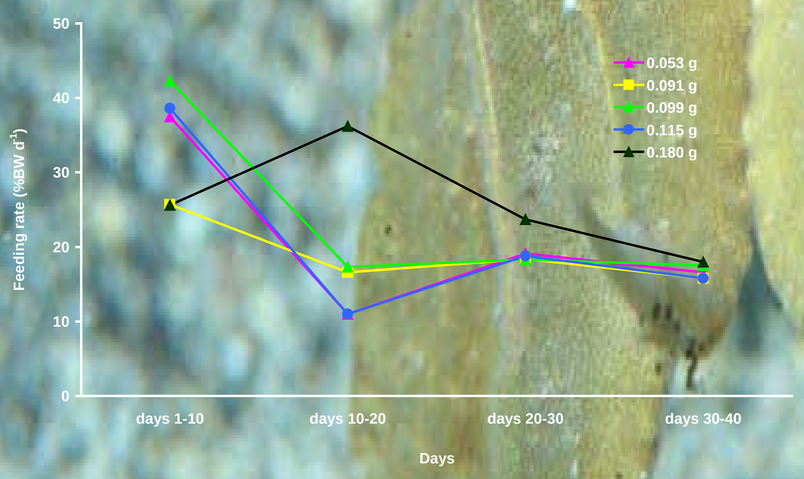
Cuttlefish were weighed every 10 days and data were used to calculate: 1) Instantaneous Growth Rate (GR) (% Body Weight d^{-1}) = ((LnW2-LnW1)/t*100, where W2 and W1 are the final and initial weight of the cuttlefish, respectively, Ln the natural logarithm and t the number of days of the time period; 2) Feeding Rate (FR) (% Body Weight d^{-1}) = (FI/Average W(t))*100, where FI is the food ingested and average W(t) is the average wet weight of the cuttlefish during the time period (t); and 3) Food Conversion (FC) = (W2-W1)/FI, where W2-W1 is the weight gained by the cuttlefish during the time period.

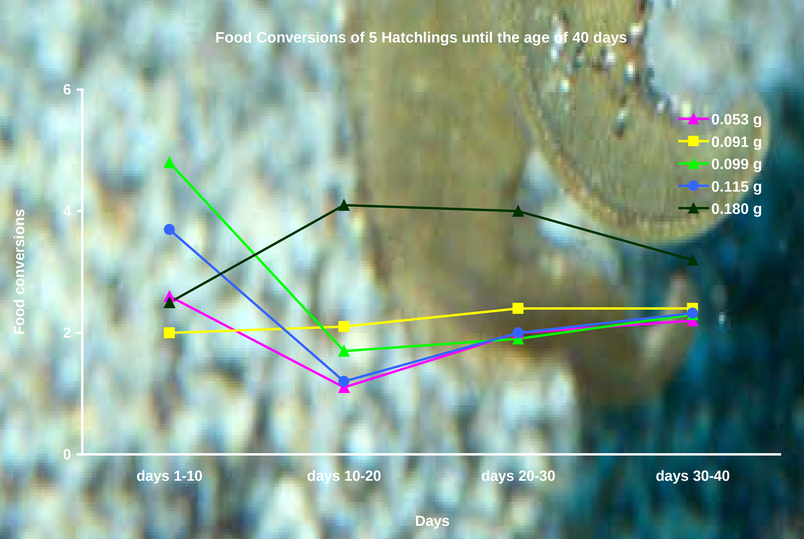
RESULTS











CONCLUSIONS

Growth Rates
Feeding Rates
Food Conversions → HIGH INDIVIDUAL VARIATION

Hatchlings → HIGH GROWTH RATES
HIGH FEEDING RATES

Food Conversions around 3 (33% of Conversion Efficiencies)

Growth Rates → DECREASE WITH INCREASING AGE AND SIZE OF CUTTLEFISH

Feeding Rates → DECREASE WITH INCREASING AGE AND SIZE OF CUTTLEFISH

Food Conversions → NO CLEAR PATTERN

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