NUCLEIC ACID DERIVED INDICES AND INSTANTANEOUS GROWTH RATE AS TOOLS TO DETERMINE DIFFERENT NUTRITIONAL CONDITION IN CUTTLEFISH (*Sepia officinalis* L.), HATCHLINGS

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INTRODUCTION

When culturing any species in intensive aquaculture, time of first feeding is of extreme importance. Food should be available when larvae or hatchlings are finishing the absorption of the inner yolk reserves and starting to feed externally. The only way to determine optimal time tables for first feeding, thus optimizing cuttlefish production, is the use of condition analysis. Condition is a measure of the physical status or well-being of an animal and may be used to evaluate growth or survival rates (Bolger & Connoly, 1989; Ferron & Leggett, 1994).

Biochemical methodologies have been proposed to evaluate condition in post-hatch and juvenile cuttlefish (Clarke *et al*., 1989; Pierce *et al*., 1999; Koueta *et al*., 2000). One of those is the RNA/DNA nutritional condition ratio. However, until now, only RNA concentrations in the muscle were shown to be directly correlated with growth in *Octopus vulgaris* (Houlihan *et al*., 1990) and *Sepia officinalis* (Castro & Lee, 1994).

The objective of this research was to determine:

- ► how long cuttlefish hatchlings could survive on inner yolk reserves, after hatching, using nucleic acid derived indices (RNA/DNA ratio, [DNA]/g and [RNA]/g) and instantaneous growth rates (IGR) as ways to describe their growth and condition;
- ► the best describer for condition, based on a compromise of money spent and results achieved, and when to apply it.

MATERIAL & METHODS

► 20 newly hatched cuttlefish

► 100 fed cuttlefish hatchlings ► 100 starved cuttlefish hatchlings

7 days

23±2ºC

37±2 ppt

► **IGR**

$$IGR = \frac{(LnW2 - LnW1)}{\Delta t} x100$$

► **Nucleic Acid Determinations**

[adapted from Esteves *et al.* (2000) and Chícharo *et al.* (2001)]

► **DNA**

► **RNA**

RESULTS

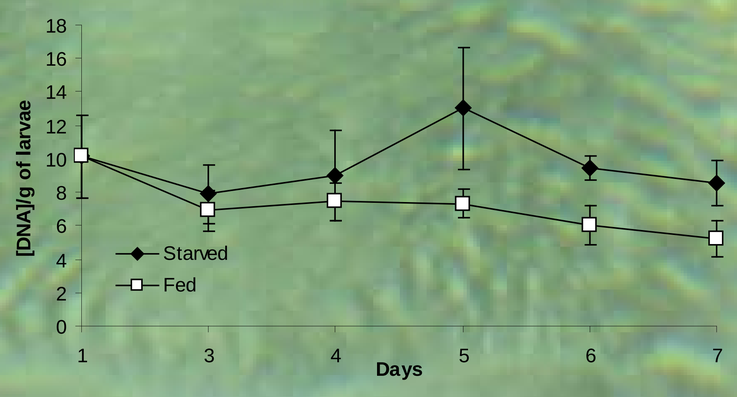

Fig. 1 – [DNA]/g of cuttlefish starved and fed live grass shrimp during 7 days.

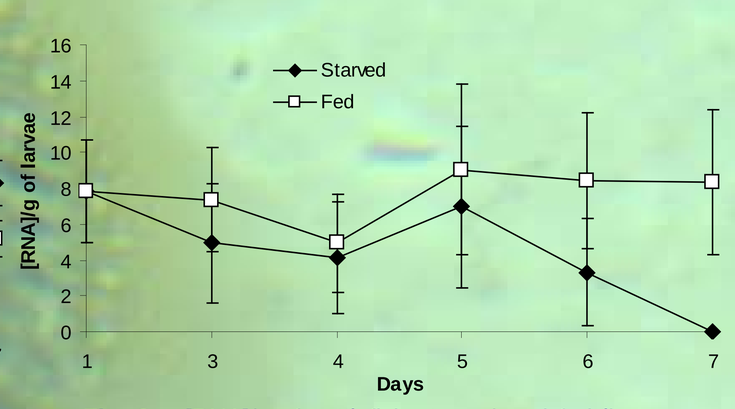

Fig. 2 – [RNA]/g of cuttlefish starved and fed live grass shrimp during 7 days.

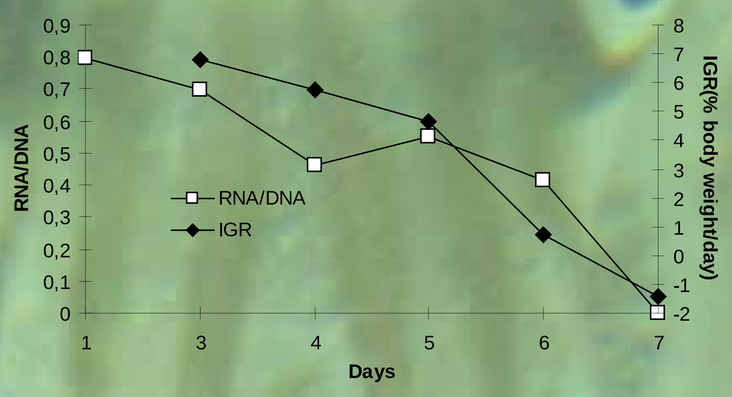

Fig. 3 – RNA/DNA *vs* IGR of cuttlefish starved during 7 days.

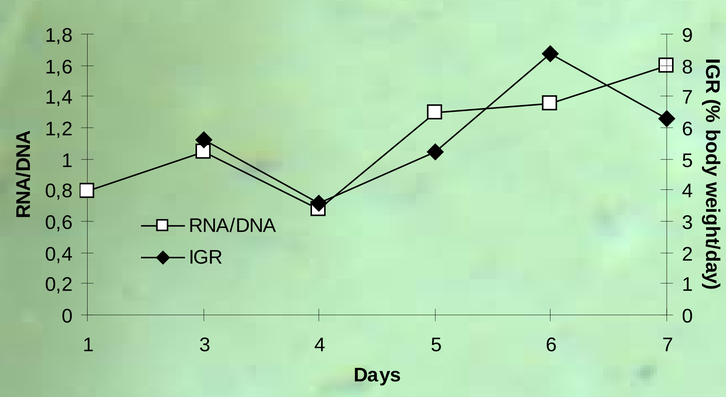

Fig. 4 – RNA/DNA *vs* IGR of cuttlefish fed during 7 days.

CONCLUSIONS

- ► **Inner yolk reserves should last at least to the fourth DAH (23±2ºC);**
- ► **Time for the first feeding should be establish for the third day after hatching because of cuttlefish energy consumption when capturing grass shrimp**;
- ► **[DNA]/g seems to be inversely correlated with IGR only in fed hatchlings;**
- ► **No correlation between any other Nucleic Acid Derived Indices and IGR was found;**
- ► **Nucleic Acid Derived Indices can describe differences between fed and starved larvae, but are not accurate enough to describe growth or condition**
- ► **Laboratory determination of nucleic acid derived indexes standards could provide some answers and clues about cuttlefish condition in the wild, and the associated recruitment. Nevertheless, they can not be used as precise tools to evaluate cuttlefish condition during the first stages of their life, as they are not accurate enough.**

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