THE EFFECTS OF LIGHT INTENSITY ON GROWTH AND SURVIVAL OF CUTTLEFISH (*Sepia officinalis*) HATCHLINGS AND JUVENILES

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Research Question:

How does light intensity influences my growth and survival?

Conclusions:

a) Light intensity is not an important factor for growth stimulation but rather survival and

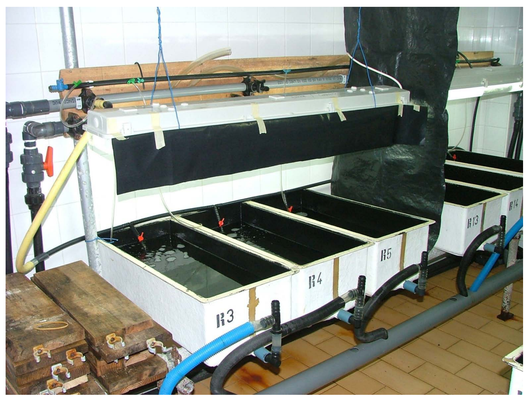
b) We require an optimal incident light intensity of about 100 lux during the first 50 days after hatching. Otherwise, we need sunglasses to hunt...

Material and Methods

2x 58W OSRAM DAYLIGHT COOL

100 Lux | **350 Lux** | **1200 Lux**

Triplicates of 30 hatchlings = 270 cuttlefish



Flow-through system

Temperature – 23.8±1.1°C

Salinity – 37.0±0.9‰

Dissolved O_2 – 98.2±1.3%

14h Daylight cycle

Fed live grass shrimp (*Palaemonetes varians*) for the first 25 DAH and frozen afterwards

50 days

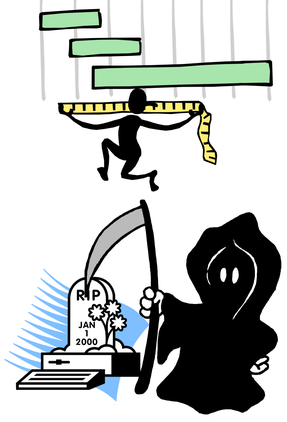
Sampling every 10 days:

Growth:

- Mean Wet Weight
- Instantaneous Growth Rate
- Biomass
- Mean Biomass Increase
- Feeding Rate
- Food Conversion

Mortality:

- Total Absolute
- Mean Cumulative



Results

Table 1 – Values calculated (at the end of the experiment) for Reflective Light Intensity, Mean wet weight (MWW), Mean Absolute IGR (MAIGR), Total Absolute Mortality (TAM), Biomass (B), Mean Biomass Increase (B%), Tank Feeding Rate (FR) and Tank Food Conversion (FC) for cuttlefish exposed to different light intensities.

Tank Light Intensity (lux)	100	350	1200
Reflective Light Intensity (lux)	2.9 ± 0.6[a]	8.3 ± 2.1[b]	19.9 ± 2.3[c]
MWW (g)	3.175 ± 1.309	2.772 ± 1.246	3.380 ± 1.522
MAIGR (%BW/d)	7.07 ± 0.826	6.90 ± 0.558	7.30 ± 0.702
TAM (cuttlefish)	17	27	40
B (g)	235.23	175.25	168.84
B% (%BW/d)	9.68 ± 1.676	8.94 ± 1.183	8.60 ± 2.503
FR (%BW/d)	208.16 ± 22.392	211.65 ± 17.770	215.79 ± 24.476
FC	0.466 ± 0.06	0.453 ± 0.04	0.442 ± 0.06

Superscript letters represent differences within the same row for P<0.001.

➢ **≠ Incident Light Intensities => ≠ Reflective Light Intensities**

➢ **Higher Light Intensities => Lower Biomass**

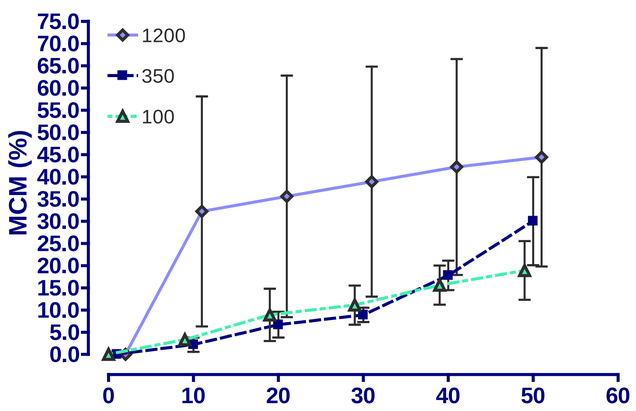


Fig. 1 – Variation of Mean Cumulative Mortality (MCM, %) for cuttlefish subjected to different incident light intensities (100, 300 and 1200 lx) for 50 days. Data is presented in offset. Vertical bars represent standard deviation.

➢ **Higher Light Intensities => Higher Mortality, specially on the first 10 DAH**

Table 2 - Statistical analyses of the effect of incident light intensity on different growth parameters of *Sepia officinalis* hatchlings.

VARIABLE	TEST	FACTOR	SS	df	Statistic	p	Post-Hoc	Homogeneous groups
$WW_{day\ 50}$	Nested ANOVA	Light	10.282	2	0.726	0.191	-	-
		Tank(Light)	44.066	6	3.840	0.115	-	-
MWW_{1-50}	2-Way ANOVA	Light	10.998	2	12.800	**<0.0001**	Scheffé	350<100, 1200
		Day	1387.445	5	645.919	**<0.0001**	Scheffé	D1, D10<D20<D30<D40<D50
		Interact.	10.210	10	2.377	**0.009**		
MAIGR	2-Way ANOVA	Light	1.219	4	1.051	0.362	-	-
		Day	126.693	2	54.769	**<0.001**	Holm-Sidak	D1<D10<D20<D30<D40, D50
		Interact.	14.951	8	3.225	**0.009**		
$B_{day\ 50}$	Welch	Light	n.s.[a]	2	0.528	0.632	-	-
B_{1-50}	2-Way ANOVA	Light	0.119	2	3.230	0.051	-	-
		Day	14.909	5	162.254	**<0.001**	Scheffé	D1<D10<D20<D30<D40, D50
		Interact.	0.044	10	0.240	0.990	-	-
B%	One-way ANOVA	Light	9.192	2	0.298	0.744	-	-
FR	Kruskal-Wallis	Light	n.s.[a]	2	0.430	0.807	-	-
FC	One-way ANOVA	Light	0.0265	2	0.128	0.881	-	-
MCM	One-Way ANOVA	Light	0.192	2	0.988	0.426	-	-

D- Day.
[a]n.s.: not supplied by the SPSS software.
RM Anova denotes "Repeated Measures Anova"; Tank(Light) denotes the variable "Tank" nested into the variable "Light".

➢ **Differences between light intensities were only found in MWW**

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