

EFFECT OF DIFFERENT LIGHT COLORS ON THE *Octopus vulgaris* PARALARVAL CULTURE

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Introduction

Common octopus (*Octopus vulgaris*) is an excellent candidate for aquaculture diversification; however, to succeed in its culture it is necessary to overcome the massive mortalities found in paralarvae, which are probably related to zootechnical and/or nutritional aspects. Concerning to zootechnical aspects, light could affect paralarvae performance, since the use of artificial light in the first stages of cephalopod culture, differs in many aspects from the natural light to which paralarvae are biologically adapted. In *O. vulgaris* paralarvae both natural and artificial light photoperiods have been tested, with light phase duration varying between 12 and 24 hours (De Wolf et al., 2011; Iglesias et al., 2004). Also different illuminance levels have been used, ranging from 60 lx (De Wolf et al., 2011) to 7.500 lx (Okumura et al., 2005), finding different results. Although cephalopods do not distinguish colors (Hamasaki 1968), they can see under a wide light spectrum, even under red light. They have a sophisticated visual system which allows detecting different light features such as brightness, contrast and edges (Aza, 2014). In this sense, the effect of light color on growth, survival or stress response in paralarvae has not been studied. Therefore, the aim of present study is to assess the effect of light colors on growth, survival and corticosterone levels in reared paralarvae.

Materials and methods

In the present study, the paralarvae were obtained from wild adult octopus captured in Tenerife coastal waters and maintained in the facilities of the Oceanographic Centre of Canary Islands (Spanish Institute of Oceanography). A total of 1800 hatchlings, at a density of 3 individuals·L⁻¹ (300 paralarvae·tank⁻¹), were reared during 14 days in 100 L black fiberglass cylinder-conical tanks with a flow-through seawater system at 10 mL·s⁻¹ flow (from 18:00h to 8:00h). Paralarvae were fed with 0.5 Artemia·mL⁻¹ (Sep-Art AF INVE Aquaculture, Belgium) enriched with freeze dried *Isochrysis galbana* (easy algae®, Cádiz, Spain) and *Nannochloropsis sp* (PhytoplanktonGreen Formula®, Olhão, Portugal) during 20h after eclosion.

The effects of red-orange vs white light were tested using LED lamps. The measurement of light variables (intensity and spectrum) was carried out using a spectrograph AvaSpec-ULS2048x16. In both groups, intensity was reduced by 75% from 20 pm to 8 am. All treatments were carried out in triplicate. At the end of the experiment, dry weight, specific growth rate and survival were quantified. Samples of 15 paralarvae were collected from each treatment, homogenized and centrifuged to collect the supernatant. Corticosterone levels were determined by radioimmunoassay using an ELISA kit.

Results

In experiment 1, non-significant differences in dry weight and specific growth rate (SGR) (Table I) were found. Survival (Figure 1) tended to be significantly higher in paralarvae reared under red-orange light (p=0.071). Corticosterone levels (Table II) did

not show significant differences between paralarvae reared with red-orange or white light.

Table I. Dry weight (DW) and specific growth rate (SGR) of 14 days-old *O. vulgaris* paralarvae reared with red-orange or white light.

	Red-orange	White
DW (mg)	0.39 ± 0,01	0.38 ± 0.05
SGR (% DW·d ⁻¹)	4.30 ± 0.09	4.27 ± 0.66

Data are expressed as mean ± standard deviation.

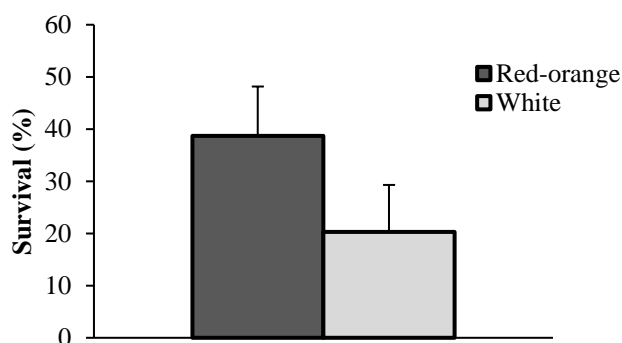


Figure 1. Survival of 14 days-old *O. vulgaris* paralarvae reared with red-orange or white light. Data are expressed as mean ± standard deviation.

Table II. Corticosterone levels (ng mg prot⁻¹) of 14 days-old *O. vulgaris* paralarvae reared with red-orange or white light.

	Red-orange	White
Corticosterone	37.14 ± 9.22	47.82 ± 8.47

Data are expressed as mean ± standard error.

Discussion and conclusion

In the present study the survival tended to differ between treatments. Therefore, our results suggest that red-orange light may have an effect on the survival of *Octopus vulgaris* paralarvae and could improve the culture of paralarvae of this species. However, more studies about the effect of other light spectra on the culture of this species paralarvae are necessary to confirm these tendencies.

References

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