PRELIMINARY RESULTS ON *Octopus vulgaris* JUVENILE AND ADULT COLD-WATER ANAESTHESIA AND EUTHANASIA

Centre of Marine Sciences

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INTRODUCTION

The common octopus (*Octopus vulgaris*) is an important target species in many fisheries around the world. In order to validate daily deposition of the increments in ageing studies, by chemical fluorescence marking of octopus beaks, animals need to be anesthetized before the injection of the marker. The ideal anaesthetic should induce anaesthesia in less than 5 minutes, prevent injuries and stress, and promote a rapid recovery (in less than 10 minutes). Cold-water (Andrews & Tansey, 1981) and clove oil (Seol *et al*., 2007) are known to minimize handling stress and they were selected to minimize any growth alteration after marking. Latter observation and counting of beak marking require euthanasia and, according to Moltschaniwskyj *et al.* (2007), chilling is a rapid and suitable method for temperate water cephalopods. In this context, determination of correlations between animal weight, induction and recovery times are seen as vital to develop a methodology that will assure the most satisfactory results while causing minimum pain, suffering or distress to the animals (EU Directive 2010/63/EU).

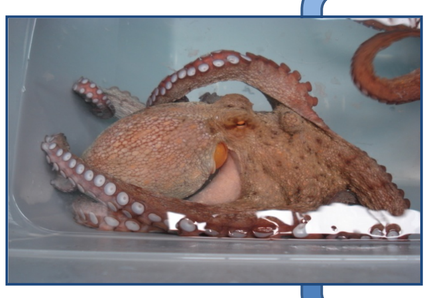
OBJECTIVES

- **To determine the effects of using cold-water as an anaesthesia and euthanasia agent for *Octopus vulgaris***
- **To compare cold-water and clove oil as anaesthetics for the common octopus.**

CONCLUSIONS

- **The anesthesia with cold water seems to be more effective than with clove oil**
- **Euthanasia with cold water was efficient but induction time did not linearly increase with weight.**

MATERIAL AND METHODS



Anaesthesia

COLD WATER (3.3 ± 0.3°C)
- **Juveniles** < 750g n=17
- **Adults** > 750g n=18

CLOVE OIL (1:10 in ethanol)
- **Adults** > 750g n=7

VERIFICATION OF INDUCTION TIMES
Loss of suction activity

VERIFICATION OF RECOVERY TIMES
Recovery of suction activity and normal mobility

Euthanasia

COLD WATER (0.9 ± 0.3°C)
- **Adults** > 750g n=9
- **Juveniles** < 750g n=6

VERIFICATION OF EUTHANASIA
Loss of activity/reaction after 10 minutes

RESULTS

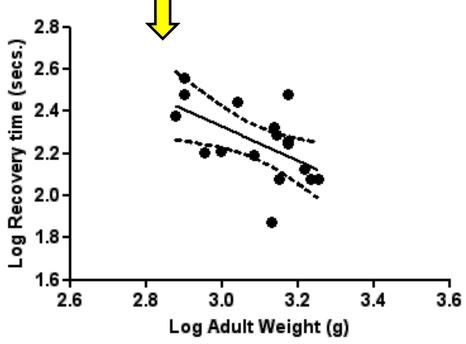
Anaesthesia

Table 1. Weight *vs* time

	Cold water		Clove oil
r^2 (Sig-*p*)	Adults	Juveniles	Adults
Induction (s)	0,064 (*0.310*)	0.245 (*0.037*)	0.027 (*0.698*)
Recovery (s)	0.315 (*0.019*)	0.000 (*0.944*)	0.061 (*0.556*)

Table 2. Induction *vs* recovery times

	Cold water		Clove oil
r^2 (Sig-*p*)	Adults	Juveniles	Adults
	0.028 (*0.507*)	0.026 (*0.519*)	0.067 (*0.537*)



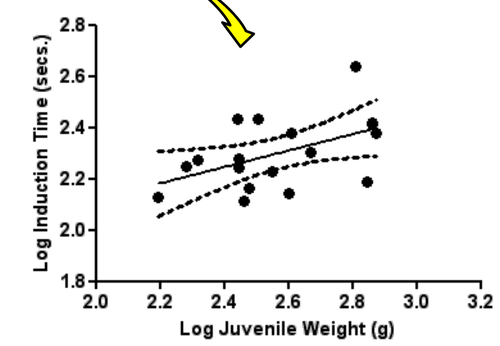


Fig 1. Significant regressions weight *vs* time

Figure 3. Cold water *vs* clove oil time comparisons in adults (t-Student)

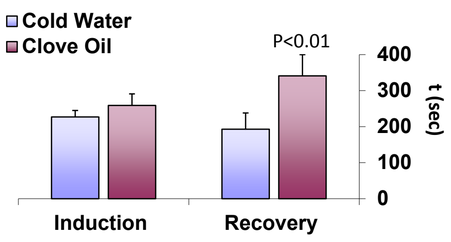
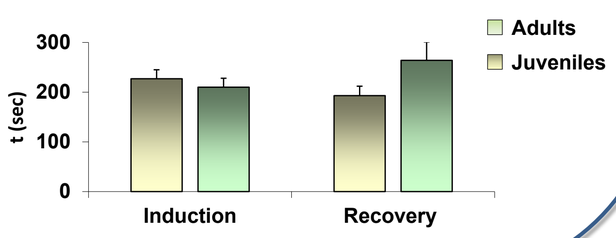


Figure 4. Adult *vs* juvenile time comparisons in cold water (t-Student)



Euthanasia

Figure 5. Adult *vs* juvenile time comparisons (t-Student)

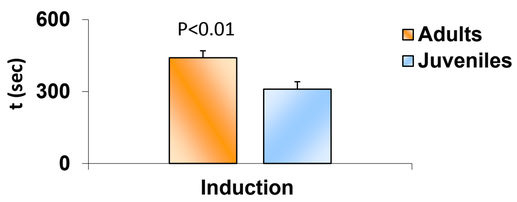


Table 3. Weight *vs* time

	Cold water	
r^2 (Sig-*p*)	Adults	Juveniles
Induction (s)	0.277 (*0.146*)	0.373 (*0.145*)

The cold water euthanasia was <u>significantly</u> longer in adults than in juveniles (Fig. 5), but <u>no significant</u> regressions were found between weight and time for juveniles and adults (Table 3).

1. **<u>Significant</u> regressions with weight were only obtained in cold water, for induction times in juveniles and for recovery times in adults (Table 1; Figure 1)**
2. **<u>No significant</u> regressions were found between induction and recovery times for any tested anaesthetic (Table 2)**
3. **Recovery times from cold water were <u>significantly</u> shorter than recovery times achieved with clove oil (Figure 3)**
4. **Anaesthesia times of induction and recovery were <u>not linearly correlated</u> to the increasing weight of octopus (Juvenile + Adults).**

References:

Andrews & Tansey, 1981. *Comp. Biochem. Bhysiol.*, 70C: 241-247

Seol *et al*., 2007. *Aquaculture Research*, 38: 45-49

Moltschaniwskyj *et al*., 2007. *Rev. Fish Biol. Fisheries*, 17: 455-476

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