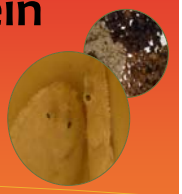
Sofia Engrola
Maria Teresa Dinis
Luís E.C. Conceição

CCMAR
Centro de Ciências do Mar do Algarve,
Universidade do Algarve,
Campus de Gambelas,
Faro, Portugal.

Senegalese sole is able to adapt protein metabolism when co-fed with *Artemia* replacement

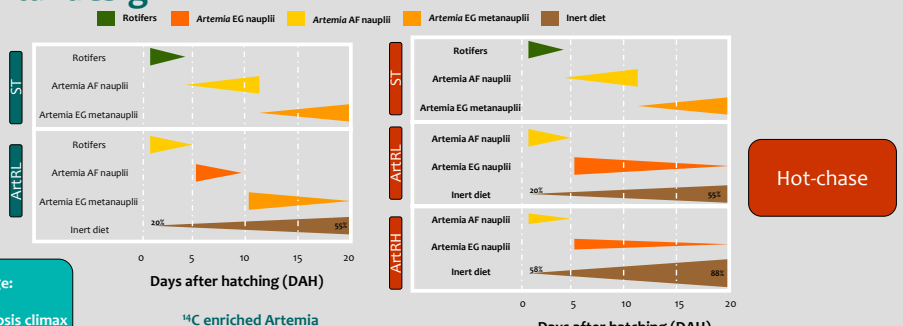


Objectives

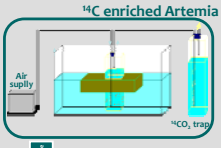
The aims of this study were to evaluate the effects of *Artemia* replacement by an inert diet on Senegalese sole growth performance, and understand how protein digestibility and protein retention efficiency may explain these effects.

Experimental design

Hot-chase vs Cold-chase



One larval age:
16DAH – metamorphosis climax



Cold-chase larva was re-fed with non-labelled *Artemia* (Cold) inside the incubation vial 2h after the incubation started.

Three larval ages:
6DAH – pre-metamorphic
15DAH – metamorphosis climax
21DAH – after metamorphosis

Results

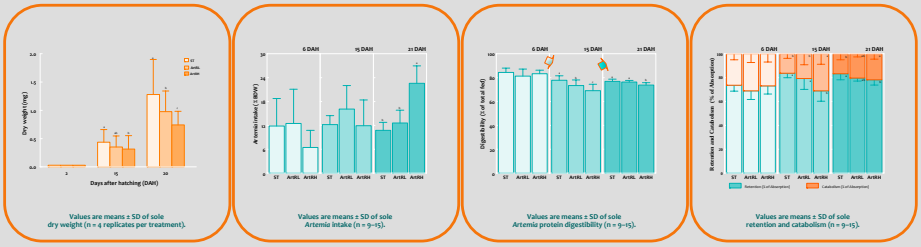
Hot-chase vs Cold-chase

Table 1 –Two-way analysis of variance (ANOVA) for protein metabolism of 16 days after hatching (DAH) sole larvae, fed one (1x, hot-chase) or two (2x, cold-chase) meals of a standard live feed feeding regime (ST) or live feed co-fed with inert diet from mouth opening (ArtRL).

	ST		ArtRL		Feeding Regime (FR)	Meal number (Mn)	Fr x Mn
	Hot-chase	Cold-chase	Hot-chase	Cold-chase			
Digestibility (% of total fed)	60.81 ± 3.82^{by}	65.30 ± 2.88^{ax}	56.97 ± 3.65^{by}	61.57 ± 4.00^{bx}	P<0.001	P<0.001	P=0.991
Catabolism fraction (% of Absorption)	16.13 ± 4.43^{y}	20.71 ± 5.79^{x}	16.38 ± 5.91^{y}	21.99 ± 6.51^{x}	P=0.631	P=0.002	P=0.748
Retention efficiency (% of Absorption)	83.87 ± 4.43^{x}	79.29 ± 5.79^{y}	83.62 ± 5.91^{x}	78.01 ± 6.51^{y}	P=0.719	P=0.004	P=0.755

Results are given as means ±SD (ST 1x, n= 10; ST 2x, n= 20; ArtRL 1x, n = 10; ArtRL 2x, n = 20). Different superscript letters indicate statistical differences by two-way ANOVA, in treatment (a, b), re-feeding (x, y), or interaction of both (p, q, r) on digestibility, retention efficiency, catabolism fraction of Artemia protein of 16 DAH larvae. Newman-Keuls test was used when interactions were found (P<0.05).

Hot-chase



Conclusions

Protein digestibility is reduced during sole metamorphosis, especially if a feeding regime with a high proportion of complex proteins is used. Therefore, a high co-feeding strategy impairs sole larvae protein utilization and thereby leads to lower larval growth.

Nevertheless, a co-feeding strategy may enhance sole larvae growth, when the relative amounts of live feed and inert diet are optimised.

Acknowledgments
This study benefited from funding by Project PROMAR/SP5.P117/03 (programme INTERREG IIIA, co-funded by FEDER, European Commission).
Sofia Engrola acknowledge financial support by Fundação para a Ciência e Tecnologia, Portugal, through grant SFRH/BPD/49051/2008.