Effect of larval density and feeding sequence on meagre (*Argyrosomus regius* Asso, 1801) larval rearing

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Introduction

Meagre, has been proposed as a candidate for marine finfish diversification on commercial aquaculture (Quémèner, 2002, Mateos, 2007). Despite of the elevated on growing potential, the most important bottleneck of this specie is related to the limited production of fry. Larval rearing of this species, is performed mainly adapting seabream culture techniques with different success (Roo et al., 2007) However, since limited information about the optimal feeding sequences and nutritional requirements of meagre is available, more research is needed on larval rearing protocols and nutrition.

Materials and methods

• Effect of larval density

Intensive System (50 vs 100 larvae.l^{-1})

- Experimental conditions.
- 18 tanks 250 l volume.
- Filtered and sterilized seawater.
- Salinity: 37‰
- Ph: 8,25
- Tª: 20,3 ± 0,07 ºC
- O2: 5,61 ± 0,14 ppm
- Light: Natural - artifitial (1000-3500 Lux)
- Fotoperiod 12h till 30dah

• Effect of feeding sequence(T1,2,3)

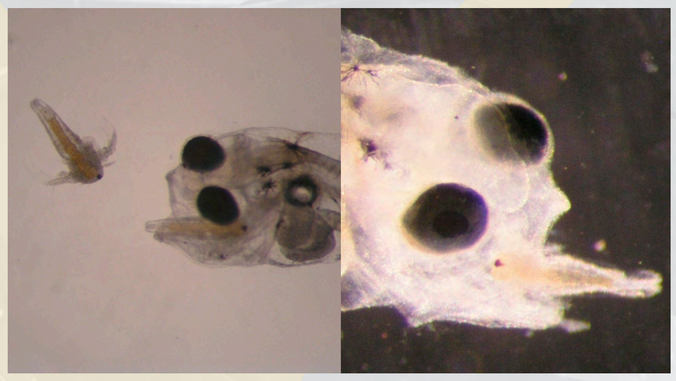
Table I Summary of different feeding sequences.

	Period (dah)			
Live preys	**T1**	**T2**	**T3**	**Concentration**
Phytoplancton (*Nannochloropsis* sp.)	2-11	2-15	2-19	250-300.000 cells.ml^{-1}
Enriched rotifers (*Brachionus* sp.)	2-11	2-15	2-19	5-10 Indv.ml^{-1}
Nauplii A$_0$ (*Artemia* sp.)	8-11	12-15	16-19	0,5-0,25 A0 Indv.ml^{-1}
Enriched metanauplii (*Artemia* sp.)	10-30	14-30	18-30	0,25-1,0 A1 Indv.ml^{-1}
Microdiets	20-30	20-30	20 - 30	10-15% Biomass. day^{-1}

Results

Table II Sumary results of growth and survival at 30dah in meagre larvae.

			30 dah Mean ± SD	30 dah P		30 dah Mean ± SD	30 dah P
TREATMENT	T1	SL (mm)	8.00±0.87^a	P < 0.01	DRY WEIGHT (mg)	1.45±0.39^a	P < 0.01
	T2		7.25±1.17^b			1.05±0.52^b	
	T3		6.91±0.84^c			0.91±0.31^b	
DENSITY	High		6.75±0.93^a	P < 0.01		0.81±0.40^a	P < 0.01
	Low		8.02±0.79^b			1.45±0.27^b	
INTERACTION			YES	P < 0.01		YES	P < 0.01
TREATMENT	T1	BH(mm)	1.04±0.17^a	P < 0.01	SURVIVAL (%)	36.75±3.62^a	P < 0.05
	T2		0.94±0.20^b			50.90±14.30^b	
	T3		0.93±0.15^b			50.93±8.78^b	
DENSITY	High		0.85±0.13^a	P < 0.01		53.24±12.03^a	P < 0.05
	Low		1.09±0.14^b			40.92±8.09^b	
INTERACTIÓN			YES	P < 0.01		YES	P < 0.05



Picture 1 Meagre larvae fed artemia at 8dah.

Picture 2 Meagre larvae at 20dah.

Table III Biochemical composition of larvae at 30dah in meagre larvae.

		PROTEIN Mean ± SD	PROTEIN P	LIPID Mean ± SD	LIPID P	ASH Mean ± SD	ASH P
TREATMENT	T1	9.16±0.68	P < 0.48	3.17±0.45	P = 0.87	2.42±0.28	P = 0.14
	T2	8.42±1.92		3.09±0.32		2.61±0.58	
	T3	8.48±1.50		3.17±0.39		2.06±0.42	
DENSITY	High	7.69±1.43^a	P < 0.01	3.08±0.43	P = 0.68	2.17±0.49	P < 0.25
	Low	9.53±0.77^b		3.19±0.30		2.43±0.48	
INTERACTION		NO	P = 0.12	NO	P = 0.16	NO	P = 0.40
Fatty acids (% TFA)		ARA		EPA		DHA	
TREATMENT	T1	2.29±0.18	P = 0.43	5.44±1.16	P = 0.50	9.81±2.23	P = 0.46
	T2	2.42±0.09		6.20±0.51		11.52±1.36	
	T3	2.38±0.16		6.01±0.17		10.89±1.57	
DENSITY	High	2.37±2.37	P = 0.88	5.68±0.97	P = 0.33	11.19±1.83	P = 0.42
	Low	2.37±2.38		6.22±0.93		10.29±1.57	
INTERACTIÓN		NO	P = 0.29	NO	P 0 0.65	NO	P = 0.56

Discussion

• The lower larval density, promotes better growth in SL, BH and dry weight. Generally, lower larval density was related with higher growth in most of reared species, being associated, to rearing parameters such as food availability and vital space (Kentouri *et al*., 1994; Roo *et al*., 2005a,b; Faulk *et al*., 2007).

• The best final survival (53.4±12.03%) was obtained in high larval density treatment, and was significantly higher than data reported by Estévez *et al*. (2007) with 13.66 % and Rodriguez-Rua *et al*. (2007) with 16,2 %.

• Early introduction of Artemia (T1) was reflected in a lower survival rate and higher larval length, which could be related to a natural selection of the bigger size larvae that quickly adapts to Artemia feeding while weak larvae not adapted to Artemia feeding died shortly when rotifers were remove from the diet.

• Significantly higher protein content was measured in larvae reared under low density conditions that results must be correlated to the higher fish size obtained under low density treatment which is associated to a higher muscle proportion on this larvae.

Conclusion

Present results (elevated larval growth rate, high survival, short rotifers period) are very promising for a successful implementation at industrial scale, which helps to solve the continues lack of fry of this specie in the Mediterranean and Canary islands.

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