EFFECT OF REARING TECHNIQUES OVER, SURVIVAL GROWTH AND SKELETAL ABNORMALITIES DEVELOPMENT IN RED PORGY (*Pagrus pagrus*) LARVAE.

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ABSTRACT

Red porgy is one of the most interesting new species for Mediterranean countries, although no industrial procedures for fry production has been yet developed. The aim of this work was to develop an industrial scale larval rearing protocol, testing the viability of two different rearing techniques (semi-intensive *vs* intensive) in pilot scale facilities. The second objective was to obtain information about the contribution of rearing system to the apparition of morphological abnormalities such as lordosis, opercular deformities and upper/lower jaws shortening which are considered as quality descriptors in commercial marine fish fry production and seem to be related with larval culture conditions in early larval stages. For that purpose, two different larval rearing systems semi-intensive and intensive were compared using the same live feed enrichments. At 50 days post hatching six hundred fish per treatment were individually studied under stereoscope and abnormalities frequency recorded. An important improvement in the semi-intensive system, for growth and survival was obtained in 2005 trial associated with the increased in rotifers density from 2 to 4 rot/ml and the reduction in photoperiod from 24h to natural from 20dah.

MATERIAL AND METHODS

Two different cylindroconical fibre glass larval tanks designs were used, two 40 cubic meter tanks for semi-intensive system (7 eggs/l^{-1}) and 2 cubic meter tanks for intensive system (125 eggs/ l^{-1}). The feeding sequence, for both systems used is shown in figure 1.

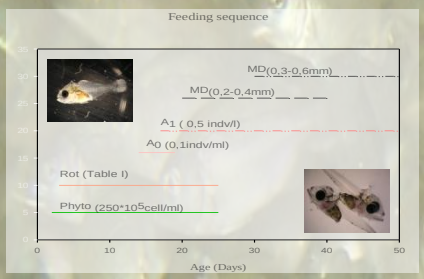

Figure 1

Table I: Rearing parameters in two production cycles (2004,2005).* From 30 dah.

Parameters	I 04	I05	SI04	SI05
Salinity (‰)	37±0,5	37±0,5	37±0,5	37±0,5
Temperature (°C)	20±1	20±1	20±1	20±1
Photoperiod (hour)	24	24-Nat*	24	24-Nat*
Rotifers density (Rot/ml)	5-10	5-10	1-2	4-5
Artemia density (Indv/ml)	0,5	0,5	0,5	0,5
Period (days)	0-50	0-50	0-50	0-50

Six hundred post-larvae (50dah) per treatment were sampled, the internal and external morphology were individually monitored under stereoscope. Observed abnormalities were recorded and classified according to Divanach *et al.*, (1996).The abnormalities considered as quality criteria were classified in 5 categories according to the type of the malformation. (Table II).

Table II: Definition of the different categories of abnormalities considered in this study.

Category	Description
Op.	Fish with gill cover anomalies.
Jaw.	Fish with pugheadeness, crossbite, lower jaw reduction, ventrally projected hyobranchial skeleton and pike jaw deformity.
Fu.	Fish affected by vertebral fusion, dislocation, shortening deformation or lack of the centra.
Lo.	Fish showing lordosis; (+) acute: deformation forming a marked angle of the vertebral column externally noticeable;, (-) light: deformation forming a curvature only detectable by radiography.
LSK.	Fish showing the association of lordosis, scoliosis and kyphosis

RESULTS

Figure 2,3: Total length evolution and survival in two production cycles (2004,2005).

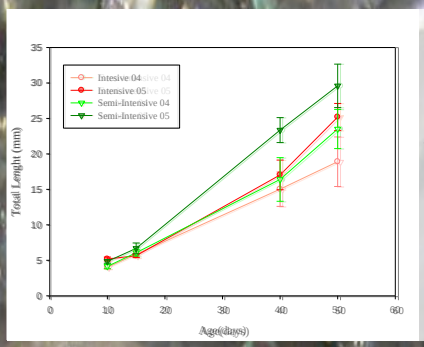

Figure 2

Figure 3

Table II: Results of the experimental trials in two production cycles (2004,2005).

	I 04	I05	SI04	SI05
Initial number of larvae	217.000	88.000	380.000	440.000
Final number of juveniles	10.442	4.092	16.724	85.000
Mean final weight (g)	5,1	3,0	6,2	4,5
Mean survival rate (%)	4,8	4,6	4,5	19,3
Mean percentage with functional swim bladder (%)	100	100	100	100
Sum of Skeleton anomalies (%)	5,3	2	5,5	2,3
Mean age (days)	95	77	95	95

Table III. Lenght specific growth rates for larval red porgy from 10 to 45 dah. Different letters in the same column within the same age denote significant differences (P<0.05).

System	Length-specific growth rate (%)			
	Age (days)			
	10-15	15-40	40-50	Total
Intensive 04	7,29±0,53	3,74±0,13	2,22±0,43	3,8±0,26 [a]
Intensive 05	3,66±0,16	4,05±0,1	4,95±0,01	4,16±0,14 [a]
Semi-Intensive 04	7,45±2,11	3,92±0,24	3,72±0,10	4,3±0,14 [a]
Semi-Intensive 05	7,14±1,35	4,66±0,04	2,97±0	4,5±0,08 [a]

DISCUSSION

- **The survival improvement in semi-intensive system from 4,5% to 19% indicate a successful application of the modifications in rotifers density (2 to 4 Rot/ml) suggested from the first trials (2004) for this rearing system.**
- **The changes in Photoperiod in combination with food availability seems to play and important role in survival from 20dah to the end of the larval phase, when eye structures are developing (Roo et al. 1999).**
- **Larvae growth in total length, is comparable to that achieved in previous trials of red porgy larval rearing and also sea bream (Hernandez Cruz et al. 1999, Roo et al. 2005).**
- **The final average wet weight attained 4g in 90dah is fourth fold times higher in comparison to sea bream for the same age.**
- **Fry quality in terms of skeleton anomalies was similar in both systems, being Vertebral fusion (Fu) the most common one.**

CONCLUSIONS

✓**Red porgy reared in both systems presents a better growth and fry quality than sea bream for the same age and size, that confirm the potential of the specie.**

✓**Semi-intensive system it could be a useful tool for industrial scale production of Red porgy, in 2005 trial 85.000 fry were transferred to a commercial farm where these juveniles will be on growth to commercial market size.**

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