Pre-growout and growout experiences with white seabream (Diplodus sargus sargus, Linnaeus, 1758) and sharpsnout seabream (Diplodus puntazzo, Cetti, 1977)

Abellán E., García-Alcázar A.

Marine aquaculture finfish species diversification

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 16

1995
pages 57-63

Pre-growout and growout experiences with white seabream (*Diplodus sargus sargus,* Linnaeus, 1758) and sharpsnout seabream (*Diplodus puntazzo*, Cetti, 1977)

E. ABELLAN
A. GARCIA-ALCAZAR
CENTRO OCEANOGRAFICO DE MURCIA
INSTITUTO ESPAÑOL DE OCEANOGRAFIA
CARRETERA DE LA AZOHIA, S/N
30860 MAZARRON
MURCIA
SPAIN

SUMMARY – Bream species offer good prospects for new fish culture in the Mediterranean. The aim of this work was to evaluate the possibility of rearing white seabream (*Diplodus sargus sargus*) and sharpsnout seabream (*Puntazzo puntazzo*) in pre–growout and growout phases. Results were compared with those of gilthead seabream (*Sparus aurata*).

The growth of the white seabream, reaching 58.03 ± 19.24 g of average weight and 13.54 ± 1.75 cm of average length (mean ± standard deviation; n = 40) in 13 months, renders this species not very appropriate for intensive aquaculture.

On the other hand, the sharpsnout seabream showed better results, reaching 121.99 ± 38.21 g and 18.24 ± 1.83 cm (mean ± standard deviation; n = 40) by the 13th month. The survival rate at the end of pre–growout was 84.1%, and food conversion less than 2. Poor global results of survival (47.6%) and food conversion (≈ 5) could be improved by adapting food characteristics and culture techniques to this species.

Key words: Fish culture, new species, bream, seabream, pre–growout, growout.

RESUME *– Dans l'élevage des nouvelles espèces de poissons, les sars offrent de bonnes perspectives de futur dans la zone méditerranéenne. Ce travail contribue à évaluer les possibilités d'élevage du sar commun (Diplodus sargus sargus) et du charax (Diplodus puntazzo), principalment en prégrossissement et grossissement. Les résultats obtenus sont comparés avec ceux de la daurade (Sparus aurata).*

Les résultats de croissance du sar commun, en attendant un poids de 58.03 ± 19.24 g et une taille de 13.54 ± 1.75 cm (moyenne ± écart type; n = 40) au treizième mois de vie, mettent en question l'interêt de l'élevage de cette espèce en Méditerranée. Le charax présente de meilleurs résultats: au bout de treize mois il atteint un poids de 121.99 ± 38.21 g et una taille de 18.24 ± 1.83 cm (moyenne ± écart type; n = 40). La survie durant le pregrossissement fut de 84.1%, et les taux de conversion de l'aliment composé inférieurs à 2. Ces résultats, ainsi que les résultats globales de survie (47.6%) et taux de conversion de l'aliment (≈ 5) pourraient être améliorés en adaptant les caractéristiques de l'alimentation et des techniques de culture aux besoins de cette espèces.

Mots-clés: *Elevage de poissons, nouvelles spèces, sars, prègrossissement, grossissement.*

INTRODUCTION

The fish culture in the Mediterranean area is mainly based on two species, gilthead seabream (*Sparus aurata*) and sea bass (*Dicentrarchus labrax*), with a basic well developed production technology.

In Spain, semi-extensive systems (earthen ponds) or intensive systems (ponds or floating cages) are used for producing gilthead seabream in the Mediterranean, South-Atlantic area and Canary Islands. The gilthead seabream production reaches 1 600 tons in 1992 (Larrazábal, 1993).

The culture of gilthead seabream has doubled its production yearly over recent years (Larrazábal, 1993) and, for that very reason, the gilthead seabream production is threatened by commercial and marketing problems that are affecting its economic return. Opposite to this situation, species diversification could be a good strategy for helping the increase of fish culture production in Mediterranean.

Although all the Mediterranean sparidae appear as potential interesting species for its culture, the bream species are specially considered because their satisfactory market price, good growth performance and easy adaptation to captivity. The fisheries catch of breams and gilthead seabream is similar (4 080 and 5 300 tons in 1991 respectively, FAO 1993) and the bream price is actually about 9-10 ECU /Kg. Among the breams, the sharpsnout seabream is one of the most interesting species: experiences on breeding, rearing larvae and growout in floating cages and ponds have been carried out in the Mediterranean area (García y Ortega, 1993) and its growth with dry feed (pellets) is similar to the gilthead seabream (Kentouri *et al*, 1992).

MATERIAL AND METHODS

Breeders were caught as juveniles in the Mar Menor (SE Spain) and kept in captivity for 3 years. The broodstock was formed by 58 individuals of sharpsnout with an average weight of 1 098 ± 54.8 g and an average length of 38.52 ± 0.70 cm (20% male and 80% female) that were transfered to a 45 m^3 fibre glass tank, and by 50 individuals of white seabream (50% male and 50% female) weighing about 250 g each that were placed in a 25 m^3 fibre glass tank.The temperature in the spawning tanks was maintained between 16-17 ºC. Eggs were obtained by spontaneous spawning and fertilization and hatching rates were determined.

Larval rearing was carried out in 1 m^3 circular fibre glass tanks starting with a concentration of 70 larvae/l. Techniques used for egg incubation and fry rearing were similar to those used with gilthead seabream (temperature: 20 ± 0.5 ºC; dissolved oxygen: 70-80% of saturation; salinity: 36%; daily water exchange: 1/3 of volumen of the tank once a day from day 4 to day 35; from day 35 onwards the renewal was continuous and increased progressively.

Larvae were feed on rotifers and *Artemia* until day 35, when artificial feeding was started. Rotifers were cultured with algae (*Chlorella* sp.) and bakers yeast, and both rotifers and *Artemia* were enriched with a commercial enrichment product (SELCO) in order to increase their contents in fatty acids.

Larvae were measured every two days in order to get the larval growth and, when fry reached 3 g of average weight, the following phase (pre–growout) started stocking fish in fibre glass tanks of 1 and 2 m^3 .

The period between 3 g and 20 g was considered as the pre–growout phase, and from 20 g to onwards the growout phase. At these phases fish were stocked at a density of 4.5–5 Kg/m^3 and the oxygen levels were maintained about 70% of saturation, adjusting the water flow to renew the whole water volume every hour.

Commercial fish feeds were used in both phases, and daily feeding rate and pellet size were adjusted each two weeks. Mortality was registered daily and instantaneous growth rate (IGR) and food conversion rate were calculated.

RESULTS AND DISCUSSION

Breeding and rearing larvae.–Results about breeding and rearing larvae were as follows:

Species	Nº of eggs	Fertilization rate (%)	Hatching rate (%)	Weight after 90 days (g)
Puntazzo puntazzo	800.000	42	75	0.19 ± 0.12
Diplodus sargus	3.500.000	75	80	0.86 ± 0.3

Fig. 1 shows the growth for the first 90 days of life in both kinds of seabream, and its comparation with the same stage of the gilthead seabream. Through the larval period, growth rate was higher in white seabream than in sharpsnout seabream and similar than the gilthead seabream (1g at 90 days). Survival in all the species was similar.

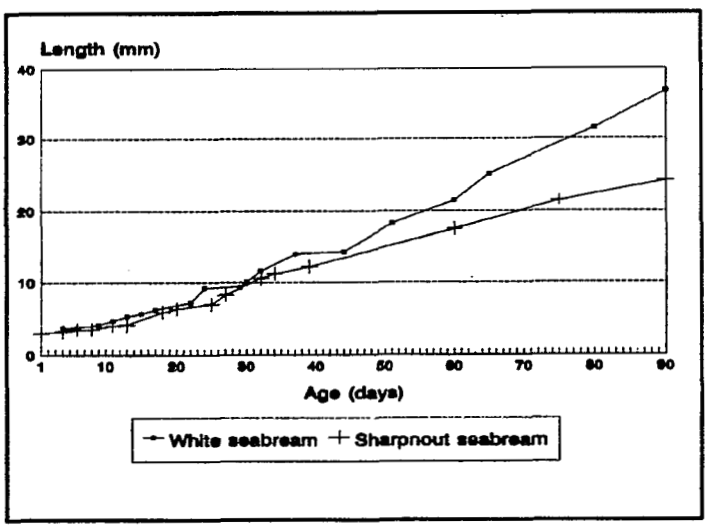

Fig. 1. White seabream and sharpnout seabream larval growth

Pregrowout and growout.– Fig. 2 shows the growth results in weight from 90 days of life onwards, for both seabreams, and compared with gilthead seabream. It can be observed a change in the pattern in relation with the larval stage: the sharpsnout seabream presents better growth results than the gilthead seabream.

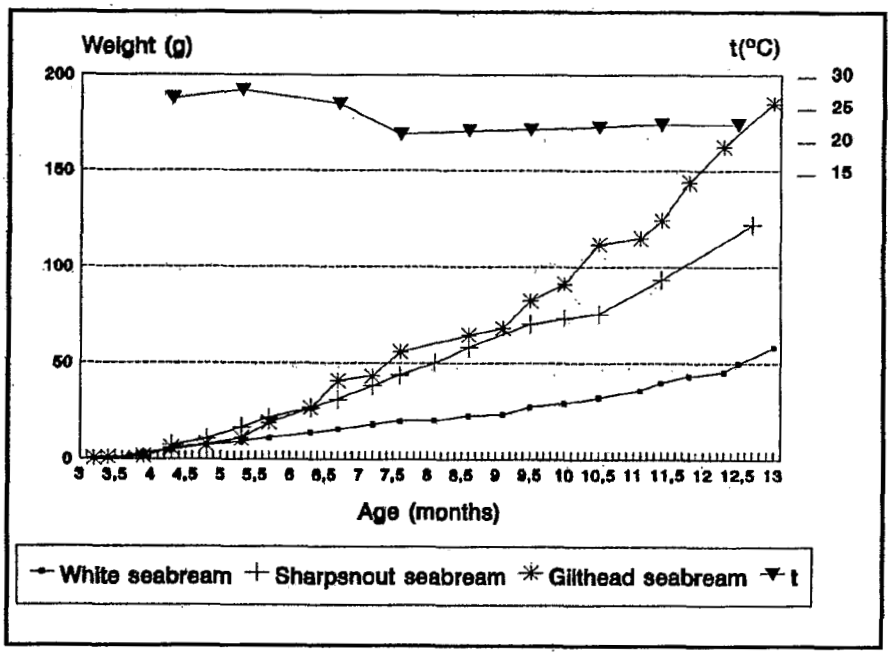

Fig. 2. White seabream, sharpsnout seabream and gilthead seabream growth in pre–growout and growout phases

Pre–growout.– Fig. 3 shows the survival results and the length of the pre–growout phase (from 3 to 20 g). Final survival was 47% for the white seabream and 84% for the sharpsnout, but both values are low if compared with those of the gilthead seabream, wich presents practically no mortality at the same phase. It can also be observed a different length of the pre–growout stage for the three species: the white seabream takes 4,5 months to growth from 3 g to 20 g, the sharpsnout 2,5 months and the gilthead a little less of 2 months.

The food conversion rate fluctuates between 1.8 and 2, whereas with the gilthead seabream reaches around 1.1

Growout.– After six months of growout, the final survival was 61.9% for white seabream and 47.6% for sharpsnout, sligthly lower than in the pre–growout phase, and much lower if compared with those of the gilthead seabream (100%) (Fig. 4). Food conversion rates for the six months of growout laid between 5 and 5.5. These values are excessively high when compared with those of gilthead seabream (1.5).

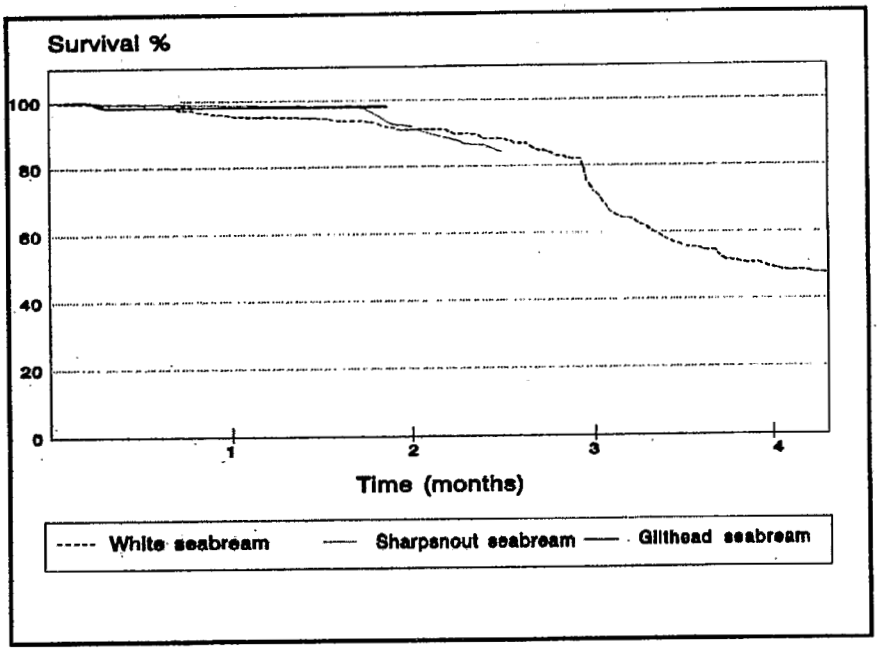

Fig. 3. White seabream, sharpsnout seabream and gilthead seabream survival in the pre-growout phase

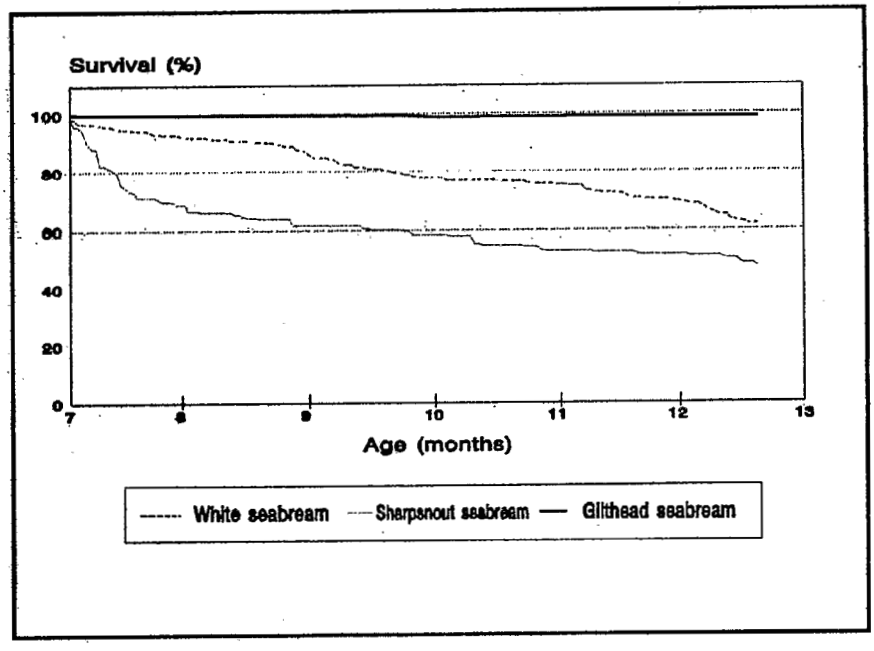

Fig. 4. White seabream, sharpsnout seabream and gilthead seabream survival in the growout stage

Table 1. Characteristics of the two phases, pre-growout and growout, in the two bream species compared with those of the gilthead seabream.

	PRE-GROWOUT			GROWOUT		
	Weight	Days	IGR	Weight	Days	IGR
White seabream	from 3 to 20 g	127	1.45	from 20 to 58 g	147	0.72
Sharpsnout seabream	from 3 to 20 g	80	2.46	from 20 to 122 g	225	0.80
Gilthead seabream	from 3 to 20 g	57	3.41	from 20 to 185 g	219	1.02

Table I shows the duration of the two phases, pre-growout and growout, and the instantaneous growth rates for both species and its comparison with those of gilthead seabream.

The sharpsnout seabream growth results can be considered better than those obtained previously in cages in the same geographic area (instantaneous growth rate = 0.53; Bermudez *et al.*, 1989). Survival and food conversion rate are considerably lower. This bad results could be improved by going on with the research in order to adapt the feed characteristics and culture techniques to this species

The results of growth in the white seabream (29.80 ± 10.35 g and 10.41 ± 1.32 cm average length; mean ± standard deviation; n = 40) after 300 days of life are similar to those obtained in Canary Islands (Cejas *et al.*, 1993), and seems to confirm the low growth rate of this species in culture (Kentouri *et al.* 1992).

CONCLUSIONS

According to the results of this experience the white seabream does not seem to be a good choice as a cultivable species in the Mediterranean. On the other hand the sharpsnout seabream offers better possibilities for its culture.

Taking into account that culture techniques, type of pellet feed and feeding methodology used in the culture of the sharpsnout have been the same as used in gilthead seabream culture, it could be interesting to continue the research in order to fit the culture tecniques to this species, trying to lower the mortality rate in the growout phase, increase the growth rates and improve the food conversion rate.

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