Larviculture of the sheepshead bream, Puntazzo puntazzo (Gmelin 1789) (Pisces Sparidae)

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Marine aquaculture finfish species diversification

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 16

1995
pages 41-46

Larviculture of the sheepshead bream, *Puntazzo puntazzo* (Gmelin 1789) (Pisces Sparidae)

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SUMMARY - Sagro Aquaculture, investigates, from 1993/94 the possibilities of intensive larviculture and ongrowing production of *Puntazzo puntazzo* in the south-west part of Cyprus. The natural spawning period of *P. Puntazzo* in our local conditions is from the middle of October to the middle of November. Water temperature is the most important factor conditioning the maturation and spawning of *P. puntazzo*. The spawning is sequential and takes place when the water temperatures decreases to 23 degrees Celsius. The spawning seems to be affected irreversibly when water temperatures fluctuations are important. From our brood-stock 800 gr of eggs, spawned naturally, were hatched and the larvae were rearing the green water technique. Feeding regime was based on rotifers, nauplii, enriched metanauplii of *Artemia salina* and artificial feed. At the age of 60 days the fish fry percentage of survival was oscillated between 18% and 22%, and the weight, between 0,15 gr. and 0,18 gr. The swim bladder inflation was higher than 99%. At the age of 127 days the fish fry presentes an average body weight of 3.8 gr. Preliminary results of P. puntazzo growth in offshore culture conditions were discribed and natural problems were mentioned.

Key words: *Puntazzo puntazzo*, larviculture, Cyprus, finfish diversification.

RESUME *- "Elevage larvaire du sar tambour Puntazzo puntazzo. (Gmelin 1789) (Pisces, Sparidae)." L'aquaculture à Sagro mène des recherches depuis 1993/94 sur les possibilités d'élevage larvaire intensif et de production ultérieure de Puntazzo puntazzo dans le sud-ouest de Chypre. La période naturelle de ponte de P. puntazzo dans nos conditions locales s'étend de la mi-octobre jusqu'à la mi-novembre. La température de l'eau est le facteur le plus important qui conditionne la maturation et la ponte de P. puntazzo. La ponte s'effectue de façon séquentielle et a lieu lorsque la température de l'eau baisse jusqu'à 23 degrés Celsius. Le processus de ponte semble être irréversiblement affecté lorsque les fluctuations de la température de l'eau sont importantes. A partir de nos propres reproductrices, il y eut éclosion de 800 gr d'oeufs, suite à une ponte naturelle, et les larves furent élevées en utilisant la technique de l'eau verte. Le régime alimentaire était basé sur des rotifères, des nauplius, des metanauplius d'Artemia salina enrichis et sur une alimentation artificielle. A l'âge de 60 jours, le pourcentage de survie des alevins oscillait entre 18% et 22%, et le poids, entre 0,15 gr et 0,18 gr. A l'âge de 127 jours, les alevins présentaient un poids corporel moyen de 3,8 gr. Des résultats préliminaires de la croissance de P. puntazzo dans des conditions de culture en mer ont été décrites et il a été fait mention des problèmes nutritionnels.*

Mots-clés : *Puntazzo puntazzo, élevage larvaire, Chypre, diversification piscicole.*

INTRODUCTION

Puntazzo puntazzo is one of the Mediterranean bream species represented by the family of *Sparidae*. In Cyprus, commercial value of *P. puntazzo* is competitive, even higher than sea bream and sea bass. Previous experiments in wild fry (Franicevic, 1989) and juveniles (Caggiano et al. 1992) of P. puntazzo showed the high culture potentials of this Sparidae. So, the simultaneus high commercial and culture potentials of P. puntazzo make this species very attractive for mass production.

Another advantage of *P. puntazzo* is its naturally spawning period (October-November) which is earlier than *S. auratus* (January-March), *D. labrax* (February-March), *P. pagrus* (February-April), *P. major* and *D. dentex* (April-May). This advantage permits a better utilization oft he hatchery' infrastructure as regards production planning and management.

The immediate objetive of this work is to examine the possibilities of P. puntazzo mass production and increases the diversification of the species presently in production.

REPRODUCTION AND SPAWNING

P. puntazzo is an hermaphroditic sequential spawner. Its natural spawning period in Paphos area (South-West of Cyprus) the last 2 years was observed from the middle of October to the middle of November.

Water temperature looks to be the controlling factor of the spawning. In our local conditions spawning started at water temperature of 23°C and was stopped when water temperature was decreasing below 20°C.

During the spawning period, we observed that the degree of water temperature varation can perturb struongly the spawning process. In water temperatures higher than 23oC the viability of eggs was limited and the spawning didn't occur every day. When water temperature dropped down and after few days when up again, the spawning stopped suddenly and irreversibly. This happened when water temperature variations are + or - 4°C. After the high water temperature variations our female broodstock remained hydrated and few days later we observed 2 different reactions. The first one was the mortality of few speciment, the second one was the oocytes resorption of the females which remained alive. A similar phaenomenon was observed also in Meneou station (Goverment experimental station in Larnaca) and in other commercial hatcheries in Greece.

Our broodstock was selected from the fish fry which we produced during our preliminary experiments on the larval rearing *P. puntazzo*. Broodstock nutrition consisted of pellets ans squid twice a week.

The spawning of *P. puntazzo* was taken place always the same period of the day. From 12 to 3 pm. The eggs were collected as soon as possible after spawning to avoid any damages which could affect the viability or the normal development of the embryogenesis. After their collection from the breeder tanks overflow, eggs are placed into the incubators. Our incubation system consist of 150 lt cylindroconical fiberglass

tanks. Eggs are stocked in low concentrations and the water exchange was 100 % per hour. In 1993/94 a total number of 800 gr good quality eggs were stocked.

LARVAL REARING

Larval rearing techniques were similar to those techniques applied for *Sparus auratus*. They were based on frequent feedings, water quality and hygiene, live -food quality, HUFA enrichment diets, cleaning of the rearing tanks water surface.

After hatching, the larcae of *P. puntazzo* were stocked in rearing tanks of 2 and 3 m^3. The water temperature ranged between 20-23°C, the salinity 40 o/oo and the oxigen level 70 - 85 % of the saturation.

The feeding regime is given in Fig. 1. During the firts 30 days the green water technique was applied, using the algae *Chlorella sp*. This traditional technique, using microalgae, provides the larval tank with a direct food source for the larvae, a rotifers dietary conditioner, a water quality conditioner and an homogenous larval distribution.

Rotifers, *Brachionus plicatillis*, were distributed from day 3 to day 40. Rotifers were cultured on algae, baker's yeast and enriched inert food. Before they were distributed to the larvae, rotifers, were enriched with Clorella or commercial enrichment diets highly rich in unsaturated fatty acids (C 20 : 5n-3 and C 22 : 6n-3). The artificial enrichment of the rotifers provides the larvae with a constant quality nutrition. Algal nutritional value cannot be constant espetially if they are cultured in outdoor facilites where the temperature and light intensity fluctuations are very important.

From the day 3 to day 12, larvae were fed on small rotifers (80 - 125 um) and from day 12 to day 40 on mixed rotifers (80 - 250 um). Rotifers concentration in the rearing tanks were mantained at 5 - 7 Rot/ml. The proportion of the larvae fed was checked very often during the firdt days of feeding. The viability of the larvae depend stongly on the quality and the size of the first prey (Divanach and Kentouri, 1982; Franicevic, 1989).

Primary swim bladder inflation start from day 5-6 and ends on day 8-9. *P. puntazzo* larvae had an avarage of 95 % of primary swim bladder inflation.

From day 20 to day 40 the larvae were fed on freshly hatched artemia naup`lii and from day 30 to 60 they were fed on enriched artemia metanauplii. Inert food in addition to enriched rotifers, artemia nauplii and enriched artemia metanauplii was given on day 35. From day 40 until day 60 only dry food and enriched metanauplii were distributed. The feeding period was on a basis of 16 hours per day.

According to Franicevic (1989) that 1 gr of eggs corresponds to 2250 eggs, our final larval survival until day 60 ranged between 18 % - 22 %. From a total of 800 gr eggs we obtained 330 000 fish fry in 1994.

P. puntazzo fry, looks very sensitive to handling especially during gradings. We graded our fry on a average body weight ranging between 0,5 - 1 gr.- For this we applied a triple procedure: floating test (by hypnotising the fish), grading and counting through

an automatic counting machine. From the floating test we obatined less than 1 % fry fish without swim bladder. After counting, a treatment with antibacterial drugs was applied.

On day 60, *P. puntazzo* fry of 0,15 gr was transferred in prefattening facilities until day 127. From day 60 to day 127 the fry body weight had risen from 0,15 gr to 3,8 gr (Fig. 2). After day 127 the juveniles were transferred for fattenin in our offshore culture cages.

FATTENING (Preliminary results)

Our ongrowing system consist of open sea cages located 2,5 km from the shore. Our site is very exposed and during winter time raft conditions are a very usual phenomenon.

In March 1994 there were stocked 70 000 *P. puntazzo* fry. After 16 month period the average body weight varied between 200 and 300 gr. On this point we must take into consideration that during a production year fro approximately 30 days we cannot distribute any food and for another 30 - 40 days the population of *P. puntazzo* was fed only once a day. The weather conditions very often change after 10 am and becomes very windy making working conditions very difficult. So as a result of the above facts we believe that the growth must be higher.

In March 1995, *P. puntazzo* speciments presented ulcers on their body and some mortalities. A treatment with oxytetracycline an a diet enrichment with vitamin C resulted in the recovering of the fish. Compared with sea bream, *P. puntazzo* looks more sensitive to a temporaty nutritional deficiency.

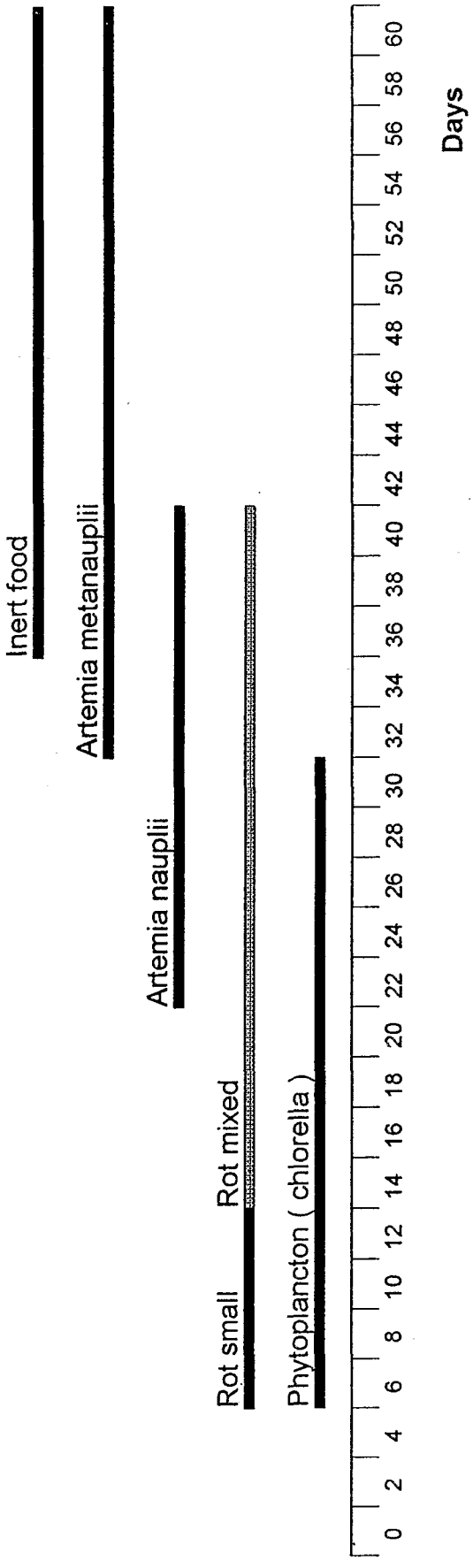

Fig.1 : FEEDING SCHEDULE OF PUNTAZZO Sagro Aquaculture 1994

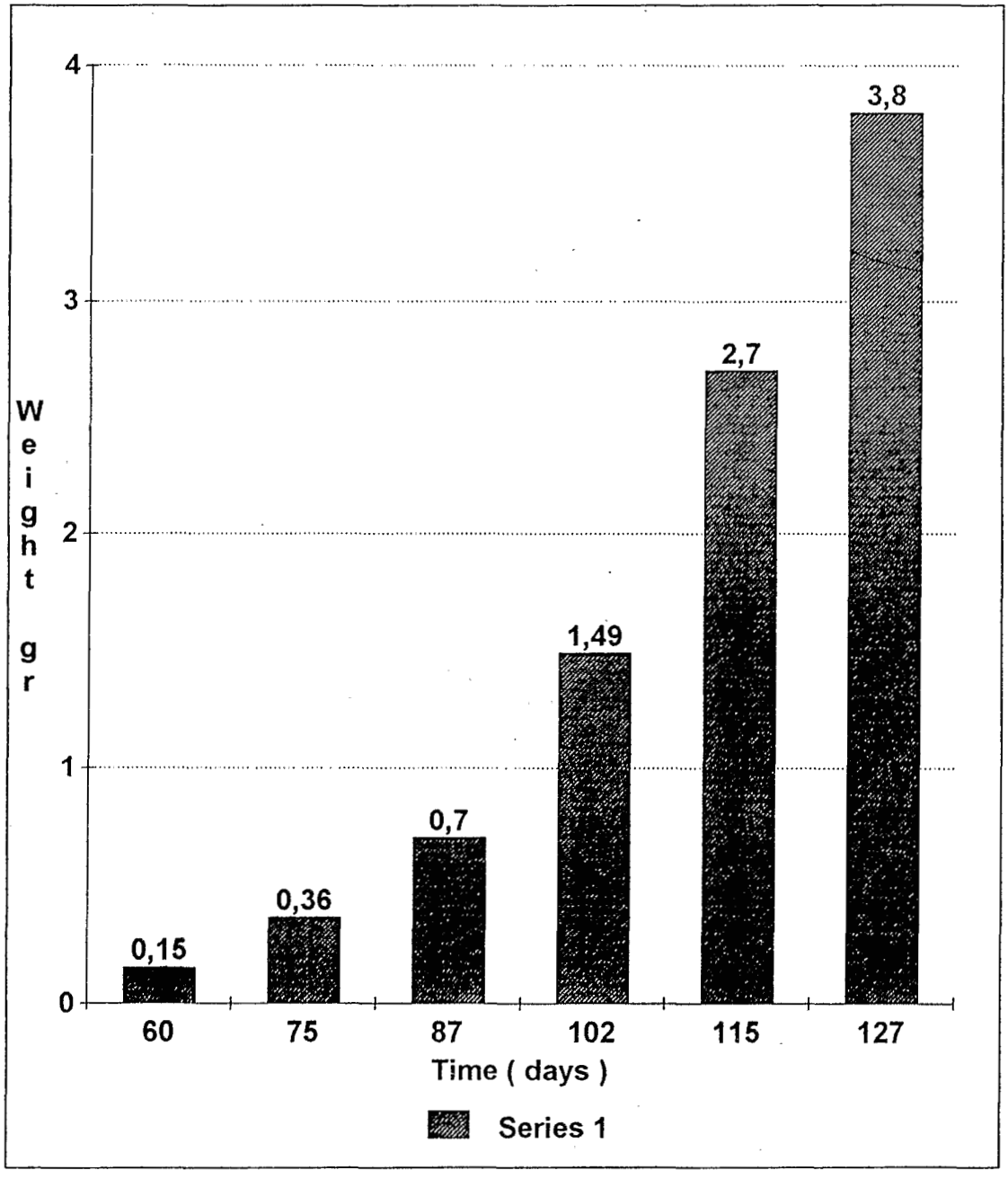

Fig. 2 : GROWTH OF P. PUNTAZZO