

SOME OBSERVATIONS ON THE GROWTH AND SPAWNING  
BEHAVIOUR OF THE COMMON PEARLSPOT IN THE  
POLYETHYLENE-LINED PONDS AT CALICUT

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In the polyethylene-film-lined ponds at Calicut, *Etroplus suratensis* has yielded an instantaneous growth rate varying between 0.01168 and 0.02262 and spawned comparably with those cultured in other systems, though the production and survival rates were not equal to the latter, indicating that the ponds can, with proper monitoring, be used, besides as a culture system, as an effective hatchery system for raising the seed of the fish.

To test whether the polyethylene-film-lined ponds excavated in the sandy beach adjacent to the CMFRI Research Centre, Calicut (Lazarus et al MS), could be effectively utilized to culture and raise successive broods of the common pearlspot, *Etroplus suratensis* (Bloch), experiments were conducted during 1981-82, the results of which are summarised in this note.

A brood stock consisting of 48 numbers of *Etroplus suratensis*, with a mean size of 64.8 mm, which had been maintained for nearly 5 months in one of the polyethylene-lined ponds, was transferred to a pond A, having 78 m<sup>2</sup> water area, at a stocking rate of 0.6 m<sup>2</sup>, on 27-8-81 (I brood). In order to

provide sticking surfaces for the spawn, drumstick-tree stems were suspended just below the water surface with the aid of stones. Some underwater enclosures were also provided by arranging fire bricks at the bottom.

In the first week of January 1982 the first spawning took place in pond A and a brood numbering 200 young ones emerged. Out of this brood, 96 numbers were stocked in a pond B, having 135 m<sup>2</sup> water area on 8-1-1982 at a stocking density of 0.7 m<sup>2</sup> (II brood). In the first week of March 1982 the fish in the pond A spawned for a second time, this time giving three different broods. These broods were stocked separately in three different ponds (C, D and E) respectively with 78 m<sup>2</sup> (III brood), 165/m<sup>2</sup> (IV brood) and 60/m<sup>2</sup> (V brood) water area under different stocking densities. Broods II and V were stocked on 23-3-1982 and IV was stocked on 22-3-1982.

The first brood was harvested on 22-3-82, after 208 days of stocking, and the third brood on 17-10-82, after 204 days of stocking. The experiments were discontinued in ponds D and E owing to some unavoidable reasons. The second brood, in pond B, were allowed to grow and spawn, and they spawned in the first week of February 83, after about 390 days of stocking, giving 250 yoiingones.

Sample measurements on length and weight of fish were taken once a month. Environmental parameters such as salinity, oxygen and pH were recorded twice weekly and temperature twice daily, at 1000 hrs and 1400 hrs, (But, the data collected on the measurement days only are taken into consideration, which are presented in Table 1.

*Feed and feeding method:* A feed made out of coconut oilcake, groundnut oilcake and rice bran mixed in the ratio of 1 : 1 : 1 was given as feed once daily at a rate of 10% body weight. The feed thus compounded contained 28.13 to 30.47% carbohydrate, 24.15 to 28.00% protein, 5.71 to 7.59% fat, 8.62 to 11.40% ash and 8.48 to 8.74% moisture. Feeding was done by keeping the feed in trays kept in the corners of the ponds.

*Environmental characters of the culture system:* Environmental characters recorded in different ponds on the measurement days are also given in Table I. In pond A, the temperature varied within a narrow range of 29.7° to 32.8° C, the minimum temperature was recorded in August and the maximum in March. Salinity was found varying from 0.2 to 20.2 ‰. The lower salinity level was found during the first half of the experiment and the higher during the second half. Like temperature, oxygen and pH values also had only a narrow range. The oxygen and pH values fluctuated between 3.8 ml/l and 4.8 ml/l and 7.4 and 8.3, respectively. In pond C the maximum temperature (35.0°C) was recorded in August and the minimum (3,1.5°C) in February and December. The salinity values were found between 15.7‰ and 18.7‰, in the first five months

TABLE 1. *Stocking and harvest details of Etroplus suratensis along with environmental conditions of the ponds.*

Ponds	A	B	C	D*	E*
Brood No.	I	II	III	IV	V
Pond area (M <sup>2</sup> )	78	135	78	165	60
Date of stocking	27-8-81	8-1-82	23-3-82	22-3-82	23-3-82
No. stocked	48	96	200	510	76
Rate of stocking (No/M <sup>2</sup> )	0.6	0.7	2.6	3.0	1.3
Mean length at stocking (mm)	64.3	9.0	14.4	27.1	41.3
Mean weight at stocking (g)	3.900	0.001	0.075	0.450	1.600
No. harvested	29	—	93	—	—
Survival rate (%)	60.4	—	46.5	—	—
Quantity harvested (kg)	1.9	—	3.6	—	—
Production (kg/ha)	240	—	500	—	—
Mean length at harvest (mm)	138.7	—	117.9	—	—
Mean weight at harvest (g)	64.7	—	39.4	—	—
Duration of the experiment (days)	208	401	204	—	—
Temperature (°C)	29.7-32.8	31.5-35.0	30.5-37.1	—	—
Salinity (‰)	0.2-20.2	1.2-18.7	0.2-17.8	—	—
Oxygen (ml/l)	3.8-4.8	3.8-4.9	3.3-4.5	—	—
pH	7.4-8.3	8.1-9.1	8.2-9.0	—	—

Environmental parameters are given in ranges

\* Experiment discontinued after stocking.

of the experiment. From June onward the pond water got more diluted due to rain, and the salinity was 12‰ in August. From September 82 onward, salinity gradually increased and reached its maximum (14.6‰) in February 83, when the spawning of the fish took place. Oxygen and pH values ranged between 3.8

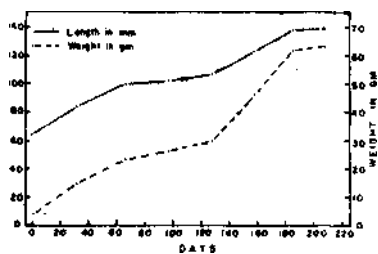


FIG. 1. Growth of *Etroplus suratensis* in Pond A.

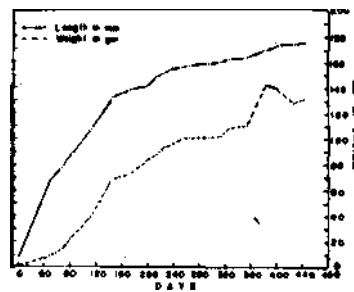


FIG. 2. Growth of *Etroplus suratensis* in Pond B.

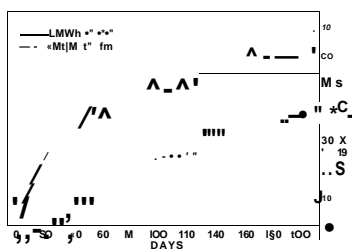


FIG. 3. Growth of *Etroplus suratensis* in Pond C.

TABLE 2. The estimated parametre values

Pond	No. of animals stocked	Duration of the experiment (days)	Instantaneous mortality rate	Estimates of	Length	Weight
	48	208	0.002423	a	72.06801	7.17964
				b	0.00341	0.01168
				R <sup>2</sup>	93.80	87.46
B	96	401	0.003095	a	42.24331	1.92300
				b	0.00501	0.01524
				R <sup>2</sup>	55.52	50.19
C	200	204	0.003753	a	33.46372	0.96087
				b	0.00762	0.02262
				R <sup>2</sup>	66.57	65.31

(R<sup>2</sup>-' Coefficient of determination in percentage)

and 4.9 ml/l and 8.1 and 9.1, respectively. In pond C the temperature was found to vary between 30.5°C and 37.7°C. Salinity ranged from 0.2 to 17.8‰ with high values in the first three months. Like in the other ponds oxygen and pH values fluctuated only slightly, varying between 3.3 and 4.5 ml/l and 8.2 and 9.0, respectively.

*Growth:* Length and weight increments of the fish recorded for the ponds A, B and C are given in Figs. 1, 2 and 3, respectively. The instantaneous growth rates of fish were studied using the following model:

$$Y_t = ae^{bt}$$

Where  $a$  is the starting value,  $b$  is the instantaneous rate of growth,  $t$  is the time in days,  $Y_t$  is the length or weight at time  $t$  as the case may be.

- The values obtained for the ponds A, B and C are given in Table 2, from where it may be seen that the third brood has shown an instantaneous growth rate of 0.02262, which is followed by broods II and Ij- with instantaneous growth rates respectively of 0.01524 and 0.01168! The second brood, which was designed for spawning, has shown an acceleration in the growth after 355 days of stocking (Fig 2). This acceleration was seen up to spawning, which occurred in the first week of February, around 390 days after stocking. After this a sudden reduction in the weight of the fish was seen. This acceleration in the growth, might be attributed to the process of gonadal maturation just before spawning leading to the increase in the weight of the fish.

*Spawning, survival and production:* As has been already stated, the brood I, in pond A, spawned in the 1st week of January 82, producing 200 young ones and of which a part becoming brood II in pond B. The brood I spawned a second time in the 1st week of March 82, this time producing three batches respectively of 76, 20 and 510 youngones. These respectively formed broods III, IV and V (Fig. 4; A, B). The brood II, a product of brood I, spawned in Feb. 83, after 390 days of stocking, when it had a mean size of 170 mm (Fig. 2), giving 250 youngones. Thus, though the number of fish that had taken part in each spawning could not be determined, it was clear that the fish could successfully spawn in the ponds, indicating that the polyethylene-lined ponds, apart from their being able to form a feasible culture system for pearlspot, would also serve to be a hatchery for large-scale raising of its seed, N

Among the two ponds harvested, namely A and C, the latter gave comparatively better production (Table 1). As far as survival rate is concerned, pond A was better, with 60.4%, whereas in pond C the survival rate was only 46.5%, though its production rate was almost twice that of A. This might be due to the different stocking rates followed in these ponds, that is, 0.6 /m<sup>2</sup> in

pond A and 2.6/m<sup>2</sup> in pond B. However, these values of survival and production are in no way comparable to the high values reported (Anon 1978) from the farm of the Kerala Agricultural University at Vytilla, which is essentially because the system under report, only recently developed, has yet to go a long way to attain perfection.

According to Jayaprakash and Nair (1981), pearlspot spawns twice a year, once in June-July and then in November-March, as against January-March observed in this system. These authors have also given the size at maturity as 144 mm for females and 140 mm for males. But in the present system the spawning took place only when the fish reached 170 mm.

The authors thank Dr. E. G. Silas, former Director, CMFRI, for the encouragements.

#### REFERENCES

- ANON. 1978. *All India Coordinated Research Project: Brackishwater Prawn and Fish Farming; Third Workshop*. CIFRF and Kerala Agricultural University, Cochin, Nov. 9-10, 1978.
- JAYAPRAKASH, K. AND N. B. NAIR. 1981. *Proc. Indian natn. Sci. Acad.* B 47, No. 6, 828-836.