



## Performance of Indian Pompano, *Trachinotus mookalee* in net cages

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### ABSTRACT

The Indian pompano, *Trachinotus mookalee* is considered as a promising species for mariculture in India. Indian pompano seed were obtained from Central Marine Fishery Research Institute, Vishakhapatnam. The seed were stocked in 1m × 1m × 2m diameter cages in closed bay at Suryalanka near Bapatla, Guntur. Fishes were stocked at 4 different stocking densities; T<sub>1</sub> (4 No/m<sup>3</sup>); T<sub>2</sub> (6 No/m<sup>3</sup>); T<sub>3</sub> (8 No/m<sup>3</sup>) and T<sub>4</sub> (10 No/m<sup>3</sup>) for a duration of 92 days. Feeding of the fish was done twice per day, with each daily ration divided into two equal halves. Feed was applied at the rate of 10% of body weight. A feed ring (0.5 × 0.5 m) was fixed at middle of each cage. Feed rings are enclosures that float at the water surface. They hold floating feeds and prevent the escape of feed out of cage and thus reduce wastage of feed. The mean body weight of fish at the time of stocking was T<sub>1</sub> (10.1g ± 0.69.); T<sub>2</sub> (10.6g ± 0.56); T<sub>3</sub> (10.7g ± 0.74) and T<sub>4</sub> (10.2g ± 2.62) whereas mean total length was T<sub>1</sub> (7.6 cm ± 1.02); T<sub>2</sub> (7.1cm ± 0.86); T<sub>3</sub> (6.8cm ± 0.88) and T<sub>4</sub> (6.9cm ± 1.45) The fish have grown from T<sub>1</sub> (10.1g ± 0.69.) T<sub>2</sub> (10.6g ± 0.56) T<sub>3</sub> (10.7g ± 0.74) T<sub>4</sub> (10.2g ± 2.62) to T<sub>1</sub> (34.1g ± 1.24.) T<sub>2</sub> (26.91g ± 1.54) T<sub>3</sub> (25.15g ± 1.22) T<sub>4</sub> (22.76g ± 1.14) weight and T<sub>1</sub> (12.75cm ± 1.35) T<sub>2</sub> (11.98cm ± 1.81) T<sub>3</sub> (11.5cm ± 1.44) T<sub>4</sub> (11.26cm ± 1.73) length were observed. Cent per cent survival was reported in all stocking densities. Growth reduced with increasing stocking densities. The water quality parameters like temperature, D.O, pH, salinity, NH<sub>3</sub>, NO<sub>2</sub>, NO<sub>3</sub>, alkalinity and hardness were analysed at every fortnightly interval and were within the optimum range for culture of Indian pompano.

**Key Words:** Net cages, Indian pompano, *Trachinotus mookalee*.

### INTRODUCTION

Among the many high value marine tropical finfish that could be farmed in India, the Indian pompano, *Trachinotus mookalee* is an important spp., mainly due to its fast growth and high market demand (Gopakumar *et al*, 2012). The species is ideal for mariculture because of its fast growth rate and easy weaning to pellet feeds. Indian pompano larvae, fingerlings and adult are hardy and can be easily acclimatized to lower salinities. Sampaio *et al* (2003) found that pompano tolerate wide range of salinity, between 7 and 58 ppt on acute exposure of individuals acclimated to seawater (35 ppt), and on gradual exposure to diluted seawater with even lower salinities. Farming can be successfully carried out in ponds, tanks and floating sea cages. The species is pelagic, very active and is able to acclimatise and

grow well even at a low salinity of about 8 per cent (Gopakumar *et al*, 2012). Length weight relation of *Trachinotus ovatus* was evaluated by Zhang *et al* (2016) for male and female separately.

Cage culture is the most predominant form of mariculture in the Asia-Pacific. Cage culture uses existing water resources (ponds, rivers, estuaries, open ocean, etc.) but confines the fish inside some type of mesh enclosure. Marine aquaculture is a growing industry worldwide (WRI, 1998) due to the increasing demand for marine products by the human population. The success in cage farming depends on the availability of seeds of appropriate size for stocking. The Central Marine Fisheries Research Institute (CMFRI) initiated research on captive brood stock development and seed production of silver pompano from 2008 and

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**Table 1. Water quality parameters in floating net cages with Indian pompano.**

Days of culture	Salinity	pH	Temperature	D.O	Alkalinity	Hardness	Ammonia	Nitrate	Nitrite
Initial Value	23	7.4	28	7.4	116	2500	0.2	0.03	0.01
15	25	7.6	29	7.5	118	2600	0.2	0.04	0.02
30	23	7.5	29	7.7	119	2800	0.3	0.04	0.03
45	22	7.7	28	7.6	112	2800	0.2	0.03	0.02
60	23	7.8	29	7.4	123	2900	0.4	0.04	0.02
75	24	7.5	28	7.3	117	2800	0.3	0.05	0.03
90	25	7.7	29	7.9	114	2900	0.4	0.05	0.02

the first successful induced breeding and larval production was achieved in 2011 (Gopakumar *et al*, 2012).

## MATERIALS AND METHODS

Present study was conducted in the closed bay near closed bay at Suryalanka near Bapatla., Guntur District, Andhra Pradesh during August to October, 2018 for a duration of 92 days. It lies between latitude- 15°51' 04.54"N and longitude 80°31'58.87"E.

### Experimental fishes and cages

Indian pompano seed were obtained from Central Marine Fishery Research Institute, Vishakhapatnam. The size of fish at the time of stocking was  $T_1$  ( $10.1g \pm 0.69$ )  $T_2$  ( $10.6g \pm 0.56$ )  $T_3$  ( $10.7g \pm 0.74$ )  $T_4$  ( $10.2g \pm 2.62$ ) mean body weight and  $T_1$  ( $7.6\text{ cm} \pm 1.02$ )  $T_2$  ( $7.1\text{ cm} \pm 0.86$ )  $T_3$  ( $6.8\text{ cm} \pm 0.88$ )  $T_4$  ( $6.9\text{ cm} \pm 1.45$ ) mean total length. Indian pompano seed was acclimatized for one week under laboratory conditions. Floating net cages of 1 x 1 x 2 m diameter were made with Bamboo of 3 inches diameter; 3 anchors of 25 Kg weight were provided. Polyethylene net materials were used for the net cages; Predatory and bird net were also provided. These nets were of HDPE materials. PVC drums filled with air were fixed to the cage frame for floatation. Fishes were stocked at four different stocking densities;  $T_1$  (4 No/m<sup>3</sup>);  $T_2$  (6 No/m<sup>3</sup>);  $T_3$  (8 No/m<sup>3</sup>) and  $T_4$  (10 No/m<sup>3</sup>).

### Feeding

During the experiment the fishes were fed 1 mm size extruded floating pellet feed for entire experiment; with CP 10% and 10% CF. Fish were fed twice a day at 7:00 am. and at 5:00 pm; each daily ration divided into two equal halves. Feed was applied at the rate of 10% of body weight. Feeding rings are enclosures that float at the water surface. They hold floating feeds and prevent the escape of feed out of cage and thus reduce wastage of feed. A feeding ring of 0.5 × 0.5m were providing in each cage and it was fixed at middle of each cage to hold floating feeds and prevent the escape of feed out of cage and thus reducing wastage of feed. Feeding was given manually to ensure ingestion of feed completely by the fish. Total fish in each treatment was sampled to obtain weight with simple balance (INFRA DIGI, digital weighing machine, and model IN300, Chennai)

### Water quality parameters

Water quality parameters like temperature (Celsius glass thermometer), Dissolved oxygen (Titrimetric, Winkler's method APHA, 1995), pH (Digital pH meter), salinity (Hand held Refractometer), Alkalinity, Ammonia, Nitrite and Nitrate were measured at 8.00 hrs. at fortnightly interval. Water samples were transported to the laboratory after collection and analysed. Fulton's condition factor was calculated according to Htunhan (1978).

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### Fish samplings

Periodic sampling was carried out every 15d for enumeration of growth parameters as below:

Weight increment = Final body weight (g) – Initial body weight (g).

Specific growth rate (SGR) =  $[(\text{Ln FBW} - \text{Ln IBW}) / \text{day}] \times 100$ ,

Where: - Ln = Natural logarithm, FBW = final body weight and IBW = initial body weight.

Survival Rate (%) =  $\text{Total number of fish survived} / \text{Total number of fish stocked} \times 100$

Biomass = Number of fish  $\times$  average body weight (g)

### Statistical analysis

The data obtained on growth, weight gain, survival and feed conversion ratio were treated statistically by applying two way ANOVA classifications according to (Snedecor and Cochran, 1989]. The results were presented as mean  $\pm$  standard error (SE).

## RESULTS AND DISCUSSION

### Growth performance

During the 92 days culture period, the fishes had grown from T<sub>1</sub> (10.1g  $\pm$  0.69 to 34.1g  $\pm$  1.24) T<sub>2</sub> (10.6g  $\pm$  0.56 to 26.91g  $\pm$  1.54) T<sub>3</sub> (10.7g  $\pm$  0.74 to 25.15g  $\pm$  1.22) T<sub>4</sub> (10.2g  $\pm$  2.62 to 22.76g  $\pm$  1.14) in weight and as T<sub>1</sub> (7.60 cm  $\pm$  0.21 to 12.75cm  $\pm$

0.35) T<sub>2</sub> (7.12 cm  $\pm$  0.87 to 11.98cm  $\pm$  1.81) T<sub>3</sub> (6.8 cm  $\pm$  0.74 to 11.5cm  $\pm$  1.44) T<sub>4</sub> (6.9 cm  $\pm$  0.62 to 11.26cm  $\pm$  1.73) in length.

The details of the water quality parameters recorded during the study period in the floating cages are given in Table 1. Temperature, dissolved oxygen, pH, salinity, alkalinity, hardness, ammonia, nitrite and nitrate recorded in the cages were in the range 28°C to 29°C, 7.4 to 7.9 mg/l, 7.4 to 7.7, 23 to 25 ppt, 114 to 116 mg/l, 2500 to 2900 mg/l, 0.2 to 0.4 mg/l, 0.03 to 0.05 mg/l and 0.01 to 0.02 mg/l, respectively. In the present study temperature and salinity were fluctuated. These changes due the heavy to rains in that particular period and heavy inflow water into the bay. Increments of growth and biomass were shown in Fig 3. Water quality parameters estimated during the experiment were in the optimum range for the growth of Indian pompano. Cent per cent survival rate was observed in all treatments. Maximum SGR was recorded in T1 (0.60 $\pm$ 0.02) and minimum SGR was observed in the T4 (0.39 $\pm$ 0.04). In other treatments SGR is T2 (0.54 $\pm$ 0.03) and T3 (0.44 $\pm$ 0.03). The maximum average daily weight gain (ADWG) was observed in T1 (42.0 $\pm$ 0.02g) and the minimum ADWG was observed in the T4 (22.7 $\pm$ 0.04 g). The other treatments T2 and T3 recorded ADWG of 36.7 $\pm$ 0.03 and 27.8 $\pm$ 0.04, respectively. The Maximum biomass was recorded in T4 (194.5 $\pm$ 0.25) and the minimum biomass was observed in the T1 (146.8).

**Table 2. Growth performance, survival, weight gain, specific growth rate, condition index and biomass of Indian pompano (*Trachinotus mookalee*) in floating net cages.**

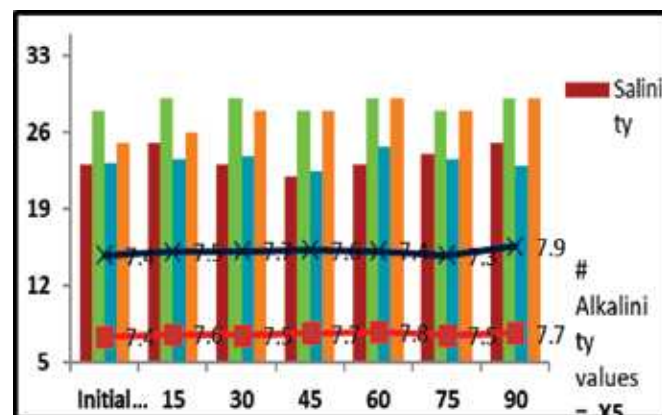
Parameter	T1	T2	T3	T4
Stocking Density	4/m <sup>3</sup>	6/m <sup>3</sup>	8/m <sup>3</sup>	10/m <sup>3</sup>
Initial Weight (g)	10.1	10.6	10.7	10.2
Final Weight (g)	52.1	47.3	38.5	32.4
Survival Rate(%)	100	100	100	100
Weight Gain ( g)	42	36.7	27.8	22.2
SGR	0.60	0.54	0.44	0.39
Condition Index	2.06	2.64	2.90	3.22
Biomass	146.8	166.8	177.6	194.5

The other treatments T2 and T3 recorded net yield of  $166.8 \pm 0.11$  and  $177.6 \pm 0.20$  respectively. The condition factor of Indian pompano during the experiment. The maximum condition index was recorded in the T4 ( $3.22 \pm 0.12$ ) and the minimum SGR was observed in the T1 ( $2.06 \pm 0.74$ ). The other treatments SGR is T2 ( $2.64 \pm 0.43$ ) and T3 ( $2.90 \pm 0.23$ ).

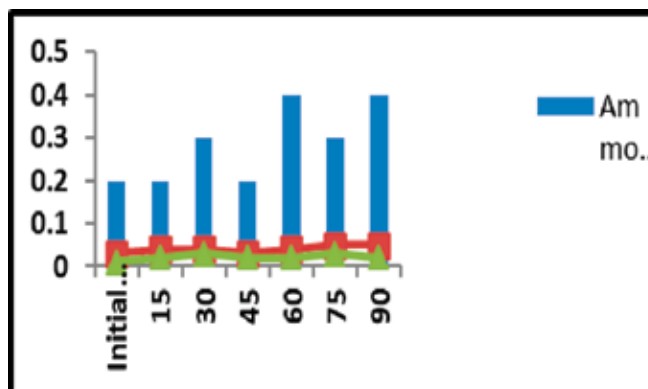
In the present study fishes at stocking density  $4/\text{m}^3$  (T1) resulted in high final body weight, weight gain and SGR. Hannibal *et al* (2011) studied on the effect of stocking density on growth performance, survival and production of silver pompano in marine floating cages, and reported that silver pompano of 12-15g initial size can be stocked at 25 pcs.  $\text{m}^3$  to 25 pcs  $\text{m}^3$  resulted in 100% Survival rate. Jayakumar *et al* (2014) studied on the growth and production performance of hatchery produced silver pompano *Trachinotus blochii*, fingerlings under brackish water ponds and reported that silver pompano of  $2.0 \pm 0.04$  g has grown to  $464.65 \pm 10.25$  g. in 8 months. Results indicated that this species was suitable for Open cage farming, readily accepts pellet feed and tolerates varying salinities between 8 to 24 per cent in conformity with Kalidas *et al* (2012) and has reasonable growth rate.

### Survival rate

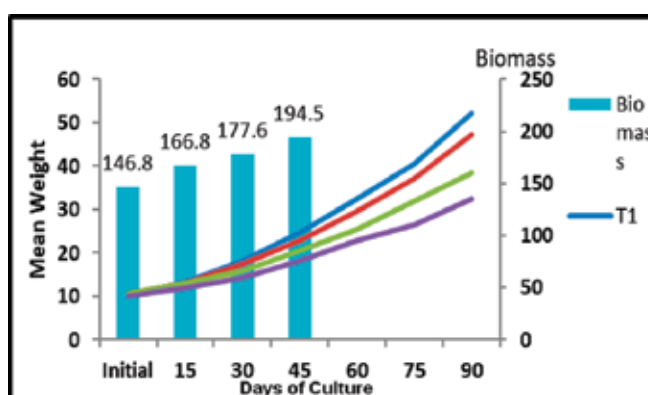
In the present study 100% survival was recorded at all stocking densities. Cremer *et al*



**Fig. 1** Salinity, Temperature, Alkalinity, Hardness, D.O, pH parameters in floating net cages with Indian pompano (*Trachinotus mookalee*)



**Fig. 2** Ammonia, Nitrate, Nitrite parameters in floating net cages with Indian pompano (*Trachinotus mookalee*)



**Fig. 3** Growth increment in floating net cages with Indian pompano (*Trachinotus mookalee*)

(2003) reputed a survival rate of 81.2 – 90.8% in golden fin pompano, *Trachinotus ovatus* at stocking densities of  $250/\text{m}^2$  or  $375/\text{m}^3$ . Cremer and Jim (1992) reported 72% survival in the same species when stocked at  $400/\text{m}^3$  (Initial weight 2.7g). higher survival rate in the present study may be due to bigger initial size of fish (10+ g)

### Growth

Cremer *et al* (2003) reported that there was no significant difference in growth performance of *Trachinotus ovatus* grows at stocking density of  $250/\text{m}^3$  or  $375/\text{m}^3$ . and observed significant difference in gross production; higher stocking densities resulted in higher production (32.8% more fish biomass. Jayakumar *et al* (2014) reported a survival rate of 91.32% in Silver pompano (*T.blochii*) grown in B.W ponds. Cunha *et al* (2013) reported a

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survival rate of 97.3 – 100 per cent in *Trachinotus marginalis*, cultured in tanks; the initial weight was 4.1 g. Cunha *et al* (2013) reported an SGR of  $2.61 \pm 0.1 - 3.37 \pm 0.1$  when *Trachinotus marginalis* was fed at different feeding rates (4 -20% body weight) and different feeding frequencies (2- 10/ day).

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