*Ambient Science*, 2018: Vol. 05(2); 06-08
DOI:10.21276/ambi.2018.05.2.ta02

ambient
SCIENCE
Vol. 05(2): 06-08
Year 2018

Published by: National Cave Research and Protection Organization, India

TECHNOSCIENCE ARTICLE

# Pioneer Attempt on Cage Culture of Giant Trevally, *Caranx Ignobilis* through Farmer Participatory Approach in Thiruthipuram Backwaters, Kochi, Kerala, India

**Daisy C. Kappen, Dinesh Kaippilly, Divya N. D.**

Kerala University of Fisheries and Ocean Studies, Panangad, Cochin-682506, Kerala, India

Study Area: Thiruthipuram Backwaters, Kochi, Kerala, India
Coordinates: 10°11'35"N; 76°13'25"E

Keywords: Fish harvesting, Sustainable fisheries development, Survival rate of fish, Capture Based Aquaculture

## Abstract

Cage aquaculture, a quite recently introduced aquaculture innovation in the field of fisheries has been recognized as an important means for increasing fish production from unit area. A large number of fishes have been recommended as suitable species for cage aquaculture practices. The present study was undertaken to establish the suitability of Giant trevally, *Caranx ignobilis* as a candidate species for capture based cage culture. The trials were carried out in Thiruthipuram backwaters of Kochi, Kerala State under the Rashtriya Krishi Vikas Yojana (RKVY) with the participation of local bodies and farmers. Young ones of Giant trevally measuring at 6 cm (+0.5) total length caught as by-catch in the Chinese dip nets during the post-monsoon season were stocked in the nylon net cages of size 2m$^3$ (mesh size 1/20mm) at a stocking density of 75 nos./m3 in 40 cages. The cages were fixed below the platform of the Chinese dip net and along both sides of a walkway leading to the dip net. The total duration of the culture was nine months. The fishes were size graded after a period of three months and the bigger ones of uniform size were transferred to another cage. The final average body weight (abw) of the harvested fish obtained was 1.388 kg. The technology was found to be cost-effective and less capital intensive.

## Introduction:

The production of farmed aquatic organisms in cage enclosures has been a relatively recent aquaculture innovation and has grown very rapidly during the past 20 years and presently undergoing rapid changes in response to pressures from globalization and growing demand for aquaculture products in both developing and developed countries (Tacon & Halwart, 2007). Low investment, high returns, simplified culture practices, and harvesting, low labour cost and resource flexibility make it more attractive compared to other aquaculture practices. Moreover, the harvesting of the stocked fishes can coincide with festive occasions so as to fetch the maximum price. Although the origin of the use of cages for holding and transporting of fish for short period can be traced back almost two centuries ago in Asia region (Pillay & Kutty, 2005) and might have originated even earlier as part of indigenous practices of fisherfolk living on boats on the River Mekong (Philips & De Silva, 2006). Marine commercial cage culture was pioneered in Norway in the seventies with the rise and development of salmon farming.

Among the maritime States of India, Kerala is particularly bestowed with rich and varied aquatic resources suitable for promoting cage aquaculture practices of a variety of species. It is pertinent in the present scenario of the State where 77% of the total available brackish water area suitable for promoting aquaculture is still left unused. If planned systematically, cage culture can offer great potential towards promoting aquaculture in an eco-friendly and sustainable manner with community participation which can play a pivotal role in maximizing the fish production and improving the livelihood of the stakeholders. A large number of fishes have been identified and recommended as suitable candidate species for cage aquaculture such as pearl spot, Asian sea bass, tilapia etc.

*Corresponding Author: *daisyckappen@yahoo.in*

ISSN- 2348 5191 (Print) & 2348 8980 (Electronic)

*Ambient Science*, 2018: Vol. 05(2); 06-08
DOI:10.21276/ambi.2018.05.2.ta02

*Caranx ignobilis*, (Forsskal, 1775) popularly known as Giant trevally is widely distributed throughout the tropical and subtropical waters of Indian and Pacific oceans. It grows to a maximum size of 170 cm and 80 kg and is known to tolerate low salinity waters of estuaries and rivers. Under the RKVY funded project-"Sustainable Fisheries Development for Rural Empowerment and Food Security in Puthenvelikkara Grama Panchayath, Ernakulam District, Kerala" (Samagramatsyagramam) during 2010-2014, Kerala University of Fisheries and Ocean Studies (KUFOS) has made a pioneer attempt to test the suitability of this fish as a candidate species for cage aquaculture through capture-based aquaculture (CBA) in Thiruthipuram backwaters of Kochi, Kerala with the participation of local self governments (LSGs), Department of Fisheries, Government of Kerala and the farming community.

## Methodology:

BThe cage culture trials were carried out at Thiruthipuram backwaters after ascertaining the suitability of the area for farming. To start with, the willing farmers were selected and thoroughly trained. The simple and uniform sized cages (40 nos.) with dimensions of 2m x 2m x 2m or 2m3 (lbh) were made of nylon nets, having varied mesh sizes in tune with the size of the fish stocked. These cages were fixed below the platform of the Chinese dip net and along both sides of the walkway leading to it. Fishes having the size of 6±0.5cm (TL) at a stocking density of 75/m3 were stocked during the month of October 2014 and fed with small–sized, low- value fishes collected from the same net. Thereafter, the fishes were size-graded during January 2015 and the bigger ones of uniform size were stocked in another cage with the same size. Thus, the stocking density was effectively reduced to half. Feed was given @ 15-20% of the biomass for a period of seven days which were later reduced gradually to the level of 3-4% of the biomass. Rations were given twice a day. Periodic monitoring of the operations was carried out throughout the culture period and advisory services were rendered by the University whenever required. The parameters of water quality inside and outside the cages were periodically monitored. The webbings were cleaned thoroughly at weekly intervals using brushes of varying bristle strength. The stocked fishes were harvested after a period of nine months.

## Results:

The results were encouraging and are presented below. Table-1 depicts the overall performance of the culture trial and Table-2 contains the details of water quality parameters during the experiment.

The harvest of culture trials yielded 297.69 kg/cage achieving a production of 37.210 kg/ m3 within a period of nine months with proper monitoring and management. The average body weight was 1.388 kg and the weight of the fishes ranged between 1.250 kg and 1.550 kg. The FCR was 1:1.6. As a result, a total income of Rs.1,04,192/cage was realized at a selling price of Rs. 350/kg which clearly indicates that the technology is cost-effective. It can be seen that during the entire period of study water quality parameters were conducive for the species. Fig.-1 shows the growth rate of the experimental fish on a monthly basis.

Table-1: Details of cage aquaculture of Giant trevally, *C.ignobilis* through Capture Based Aquaculture (CBA)

| Cage# | FIS* | SR*. | FASG* | AS(kg)* | QFH/C* | P (kg/m³)* |
|---|---|---|---|---|---|---|
| 1. | 600 | 75% | 225 | 1.320 | 297.000 | 37.125 |
| 2. | 600 | 71% | 213 | 1.350 | 287.550 | 35.943 |
| 3. | 600 | 70% | 210 | 1.450 | 304.500 | 38.062 |
| 4. | 600 | 70.3% | 211 | 1.430 | 301.730 | 37.716 |

FIS*-Survival rate; SR*-No.of fishes kept/cage after size grading; FASG*-No.of fishes kept/cage after size grading; AS(kg)*-Average size; QFH/C*-Quantity of fish harvested (kg)/cage; P (kg/m³)*-Production

Table-2: Water parameters to access quality during the cage aquaculture of Giant trevally *C.ignobilis*

| Parameter | | Range:- Minimum | Maximum |
|---|---|---|---|
| 1. | Salinity | 18 ppt | 28 ppt |
| 2. | pH | 7.2 | 8.3 |
| 3.. | Temperature | 25 o C | 310 C |
| 4. | Turbidity | 18 cm | 28 cm |
| 5. | Dissolved Oxygen | 3.8 ppm | 6.3 ppm |
| 6. | Alkalinity | 110 ppm | 155 ppm |
| 7 | Hardness | 140 ppm | 280ppm |
| 8. | Ammonia | 0 | 0.001 ppm |
| 9. | Nitrite | 0.001 ppm | 0.01 ppm |
| 10. | Nitrate | 0.01 ppm | 0.1 ppm |

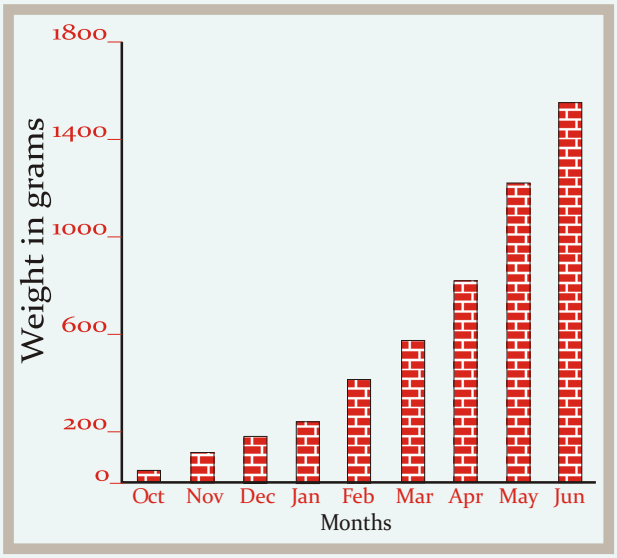


Figure-1: Growth rate of Giant Trevally (*Caranx ignobilis*) against culture period

*Ambient Science*, 2018: Vol. 05(2); 06-08
DOI:10.21276/ambi.2018.05.2.ta02



## Discussion:

Cage aquaculture of Giant trevally, *C.ignobilis* in the backwaters is a pioneer attempt. The total cost of fixing one net was approximately Rs.7,000/-. It can be adopted by the fisherfolk, on a small scale basis without much capital investment for generating additional income. The survival rate of the fishes was high as the seeds were introduced immediately in the vicinity of the cages fixed in the water body having the same physicochemical parameters from where they were collected. Capture-based aquaculture can cause significant positive social and economic changes at the regional level, particularly in those regions with depressed and marginal local economics, characterized by high rate of unemployment (Rao *et. al* ., 2013). It has been realized as an economic activity that is likely to continue to expand in the short term, both with finfish species currently under exploitation and probably with others that will be selected for rearing in the future (Patel & Narayan, 2010). Further, since cage aquaculture is a group activity, it encourages togetherness among the local community. The study indicates the scope for further promoting cage aquaculture of the Giant trevally as a means to increase the fish production in suitable backwaters of Kerala during the right season where an adequate number of seeds are available. It may be noted that severe conflicts of interest are existing among the various sectors of people on using the public waters and this aspect has to be taken care of while the cage culture projects are implemented. While the cage culture is expanded to wider dimensions, the eco-friendly commercial feed has to be given to the animals for better growth rate and maintaining the sustainability factor. Likewise, artificial propagation of the Giant trevally and similar species has to be developed by the scientific community for ensuring the seed supply to the farming community.

## Acknowledgements:

The authors are grateful to the Hon. Vice Chancellor, Kerala University of Fisheries and Ocean Studies (KUFOS) and President, Puthenvelikkara Grama Panchayath for their support and cooperation for conducting the study. The financial support rendered by Rashtriya Krishi Vikas Yojana (RKVY) and the technical support by the Department of Fisheries, Govt. of Kerala are also gratefully acknowledged. .

## References:

Beveridge, M.C.M. (2004):**Cage Aquaculture**, 3rd edition. Pub. by: Wiley-Blackwell Publishing Ltd., Oxford, England. 380 p.

Patel, A. & Pathak, S.N. (2010): **Introduction to Aquaculture.** Pub. by: Pacific Books International, Delhi, India. 296 p.

Phillips, M. & De Silva, S. (2006): Finfish cage culture in Asia: an overview of status, lessons learned and future developments, pp. 49–72. In M. Halwart and J.F. Moehl (eds). **FAO Regional Technical Expert Workshop on Cage Culture in Africa**. Entebbe, Uganda, . FAO Fisheries Proceedings. No. 6. Pub. by: FAO Rome. 113 p.

Pillay, T.V.R. & Kutty, M.N. (2005): **Aquaculture: Principles and Practices**, 2nd. Edition. Pub. by: Wiley-Blackwell Publishing Ltd., Oxford, England. 620 p.

Rao,G.S., Joseph, I., Philippose , K.K & Sureshkumar, M. (2013):Cage culture and sustainable capture based aquaculture, 91-101. In: **Cage Aquaculture in India.** Pub. by: Central Marine Fisheries Research Institute, India. 173 p.

Tacon, A.G.J. & Halwart, M. (2007): Cage aquaculture: a global overview. In M. Halwart, D. Soto and J.R. Arthur (eds). **Cage aquaculture – Regional reviews and global overview,** pp. 1–16. Pub. by: FAO Fisheries Technical Paper. No. 498. Rome, FAO. 2007. 241 p.