ISSN 0254-380 X

No. 227, January - March 2016

Marine Fisheries Information Service

Technical and Extension Series

Indian Council of Agricultural Research
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
P.B. No. 1603, Ernakulam North P.O., Kochi - 682 018, Kerala, India

Marine Fisheries Information Service

PUBLISHED BY

Dr. A. Gopalakrishnan
Director
ICAR-Central Marine Fisheries Research Institute, Kochi

Front Cover : *Pearl spot Etroplus suratensis*

Back Cover : *Harvest of pearl spot cultured in cages*

The Marine Fisheries Information Service *Technical and Extension Series* envisages dissemination of information on marine fishery resources based on research results to the planners, industry and fish farmers, and transfer of technology from laboratory to field.

From the Editorial Board.....

Warm greetings to all

In this issue the lead article highlights a simple but efficient method of raising seed of pearl spot for cage farming through captive hatchery technology. This technology has been assessed by ICAR-CMFRI as feasible for small scale fish farmer entrepreneurs of Kerala where there is a huge gap in the demand-supply of pearl spot in the domestic market. The added advantage is that the unsustainable exploitation of pearl spot seeds from the backwaters to stock the farms, which has led to reduced stocks in the wild will eventually be controlled and bring respite to small scale fishers who earn their livelihood through catching wild pearl spots of marketable size. The findings on the evaluation of the cichlid fish popularly known as orange chromide as a potential species for marine aquariums, documentation of marine biodiversity, interesting natural aberrations in fishes and notes on fishery resources exploited from various parts of the country are also included.

Marine Fisheries Information Service

No. 227, January-March 2016

Abbreviation - *Mar. Fish. Infor. Serv., T & E Ser.*

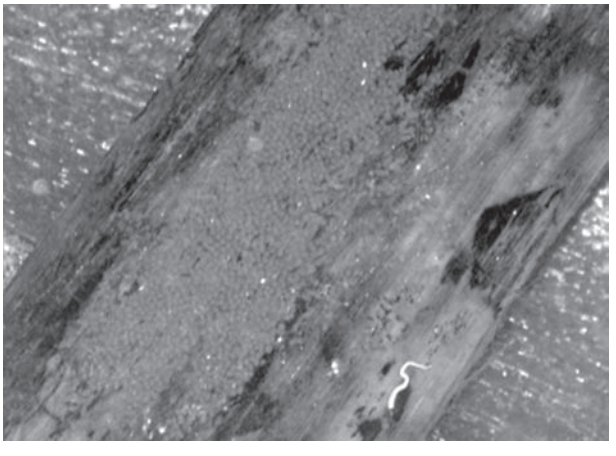
CONTENTS

Captive seed production of pearl spot in backyard hatcheries

Shoji Joseph and Boby Ignatius
ICAR-Central Marine Fisheries Research Institute, Kochi

Pearl spot, *Etroplus suratensis,* locally known as *Karimeen*, is one of the most important cultivable finfish in Kerala. In India, wild populations of pearl spot have been recorded from the states of Kerala, Tamil Nadu, Goa, Andhra Pradesh, Odisha and West Bengal. A fully grown fish can reach about 40 cm length and weigh about one and half kilogram. Though a brackishwater fish, it is also found in freshwater reservoirs, lakes and rivers but its breeding is limited in freshwater. It mainly feeds on algae like *Spirogyra* besides plankton, small worms and small prawns. Due to the ever increasing market demand that leads to overfishing and the threats of a deteriorating environment due to pollution, the natural harvest of pearl spot has reduced in recent times from 1252 to 200 tonnes only during the last three decades (Padmakumar *et al.*, 2012, *J. Biosci.*, 37: 925-931). The pearl spot is suitable for culture in confined, fresh and brackish waters. In Kerala it is cultured in the traditional '*Pokkali*' fields as a part of polyculture system along with other fishes like mullets, milk fish etc. However, the pearl spot has been identified as the one of the candidate species for high-density cage culture. With a number of water bodies that are underutilized in the state,cage culture of pearl spot can form an alternative livelihood through aquaculture. For this, production of quality seed on a large scale is needed at the earliest.

Reproductive behavior of *E. suratensis* is complex which includes pairing, nest making, pit nursing and parental care. The fish attains maturity at the end of the first year with visible sexual dimorphism only during the breeding season. A year round breeder in the natural brackishwater systems, off Kochi two peak breeding seasons, February – May and September – December (Boby and Shoji, 2012, *Handbook on Pearl Spot* (in Malayalam), Fisheries Department, Govt. of Kerala p. 22-25) have been identified. It shows 'asynchronous' ovary with the possibility of spawning many times during the breeding season and interventions in the environment are considered more effective than the method of hormonal manipulations for induced breeding (Padmakumar *et al.*, 2012). It is reported that it can be artificially bred in earthen ponds, cement tanks or specialized raceways with provision for artificial substratum. Yet, seed production is most erratic. The number of seeds recruited in nature is found to be very few and unpredictable,



Pearl spot eggs attached to substratum

Pearl spot larvae

mainly because of predation pressure on the delicate larvae as well as inadequate nutrition during early larval stages. The lack of required quantities of pearl spot seeds is the most serious constraint for expansion of cage culture activities. Hence, to develop suitable technology for increased seed production, investigations were carried out and the experience gained is described below.

Brooders collected from the wild were reared in ponds with a depth of 1 to 1.5 m or in tanks with the essential facilities for adequate water exchange and sunlight. The ponds were prepared at least a fortnight in advance, with the eradication of the weed fishes and adding of fertilizers to develop phyto and zoo plankton. The adult fishes weighing about 100 g size were stocked in the ponds at stocking densities between 15 and 20 numbers per cent in a pond of 2.5 cents. The water quality parameters of the pond were maintained as: salinity (around 15 ppt), dissolved oxygen (> 3.5 ppm), pH (7 - 8), temperature (24 - 32 ^{o}C), transparency (> 50cm), ammonia (< 1ppm) as shown in Table 1. Water level was maintained at 4-5' depth. As the fish is omnivorous, the fishes were reared by raising the natural plankton production through additional organic manuring and also by providing supplementary feeds. The food and feeding of the brooders was carefully attended as it is very important for quality seed production. Conventional artificial feed prepared with rice bran 45%, groundnut oil cake 40%, fish meal 15% fortified with vitamin and mineral mix was given @ 5 – 7 % of fish biomass daily either in pelleted or dough form, in feeding trays. Feeding trays were kept suspended

Table 1: Water quality parameters in the broodstock pond during the peak seasons

Parameters/months (Season 1)	**September**	**October**	**November**	**December**
Size of the brooders (g)	110 - 130	115 - 135	118 -137	120 -140
Stocking density/cent	15 to 20	15 -20	15 - 20	20 -23
Salinty (psu)	8 -9	10 -11	10 -12	12 - 14
pH	7.3- 8.1	7. 5- 8.7	7.8 – 8.8	7.8 - 8.9
Temperature (°C)	22 – 26	24 - 28	23 -28.5	22 - 29
Dissolved Oxygen (ppm)	3.6 – 5.2	4.8 – 5.3	4.6 – 5.1	4.1 – 4.7
Ammonia (ppm)	0.03 – 0.9	0.06 – 0.5	0.07 – 0.7	0.06 – 0.7
Transparency (cm)	40 - 50	50 - 55	50 - 58	60 - 65
Egg mass observed (numbers)	16	17	15	14
Egg mass collected (numbers)	7	5	7	9
Parameters/months (Season 2)	**February**	**March**	**April**	**May**
Size of the brooders (g)	145 - 150	147 - 152	150 -155	156 -164
Stocking density / cent	20 - 25	20 - 25	20 - 25	22 - 28
Salinity (psu)	16 -17	17 -18	17 -19	18 -19
pH	7.6- 8.5	7 – 8.5	7.5 – 8.8	7.8 - 8.9
Temperature (°C)	24 – 30	26 - 31	27 -31.5	28 - 32
Dissolved Oxygen (ppm)	4 – 5.5	3.8 – 5.2	3.6 – 5.1	3 – 4.5
Ammonia (ppm)	0.01 – 0.7	0.07 – 0.8	0.09 – 0.9	0.04 – 0.8
Transparency (cm)	40 - 60	50 - 70	60 - 70	40 - 50
Egg mass observed (numbers)	11	14	17	13
Egg mass collected (numbers)	5	6	5	7

in the corners of the pond just above the bottom. Excess feeding should be avoided and trays were cleaned every day to avoid eutrophication in the ponds. Pairing started over a period of two weeks to one month which is the first step in the breeding process. After the pair formation the breeding pair moved along the side of the pond in search of a suitable site for nesting in shallow areas with enough sunlight. In most cases, the three sides of the nesting sites were protected either by bunds or some other structures so that the protection of the eggs and larvae were ensured. This was followed by cleaning of dirt and attached algae from the substratum with both male and female actively engaged in nest preparation. This took 3 – 5 days depending on the sites. The female fish lays its eggs on any type of hard materials such as coconut husk, leaves, bamboo poles, stones, PVC pipes, bricks etc. Therefore, such material was made available on the pond bottom and along sides to function as the substratum when broodstock ponds were prepared. As the gonads mature, the female releases the eggs. These sticky eggs were attached carefully on to the nest surface one by one in different layers. After the extrusion of a batch of eggs, the male releases milt over it and fertilize them instantly. The female then repeats the process of egg extrusion followed by the release of milt by male until the whole process of spawning is completed, a process that extends from 40 minutes to 1 hour. The number of eggs per brood varies depending on the size and condition of the brooders. The eggs were oblong in shape, about 2 mm in diameter and attached at one end to the nesting object by means of a short stalk. The newly laid eggs were yellowish in colour and as the embryo developed, the yolk sac became pigmented and colour became brownish.

These eggs attached to substrates were collected carefully from the broodstock ponds and transported to the hatchery for artificial hatching and larval rearing in the tanks. Here the mortality due to predation can be fully avoided and larvae can be reared in optimum conditions by giving them nutritious supplementary feed and other favourable conditions. While collecting the eggs care should be given to avoid the contact of eggs with air to minimize the physical or other stress to the eggs. For this, small containers can be used to transport the attached eggs along with the substrate. In the hatcheries, hatching tanks have to be set in advance with proper aeration, light and suitable bottom sand / soil in a thickness of about 2 to 3 inches. The water quality parameters like salinity, pH and temperature have to be set in almost the same conditions as the broodstock pond from where the eggs were collected. Water should be clean, clear and devoid of any contaminants and pollutants. The eggs with the substrates have to be carefully placed in the water (with minimum disturbance like shaking), facing eggs to the light. A small water flow is essential during incubation period to keep the eggs in oxygenated and slowly moving condition. This prevents settling of debris or dirt on egg surface which attract microbial infections when there are no parents to make water circulation in the tanks. In nature, after the eggs are laid, they are diligently guarded and aerated by the parent fishes with their continuous rhythmic fanning movement of the pectoral fins. The guarding female occasionally places its mouth gently against the eggs and sucks away adhering particles to clean these eggs. In hatcheries, this artificial water circulation can be effected using aerators or aquarium pumps of proper capacity.

The incubation period is 82 to 100 hours (3 – 4 days) after which the eggs hatch and larvae come out. During hatching, the egg membrane bursts first over the head of the larvae, which is at the free end, and this continues along the upper side by the waving of the tail. Water temperature, water movement and clarity of the water affect the hatching in the tanks. If the night temperature is very low, the incubation period extends and is not good for the larvae. In such cases, water temperature has to be adjusted to around 26-28 ^{o}C using aquarium heaters. These hatchlings are fully equipped with egg yolk for their nutrition. The newly hatched larvae, or the‘wrigglers’, are found to sink to the tank bottom. They congregate on the tank

floor by themselves by some natural instinct. The larvae are sluggish and without mouth opening, eye or fins for swimming. The larvae starts swimming only 4 – 6 days after hatching. Till then they remain at the bottom of the tank in a group and move very little by wriggling movements as a mass. They feed on the stored yolk during these days. As the yolk is fully utilized, in a week, the wrigglers develop the free swimming abilities and gradually come to the water surface. The early larval stage thus lasts for 7 days during which the larvae develops into a free-swimming individual. Now the eyes are opened and they can search for the food. The larvae feed on small live zooplankton and in the hatchery the larvae can be fed with *Artemia* nauplii. After one week, larvae can be transferred from the hatching tanks if needed. The larvae have to be fed at least twice a day @ 20 – 30 *Artemia nauplii*/ larvae for about two weeks. If *Artemia* is not available and the larval rearing system is near the ponds, small live zooplankton can be collected using zooplankton nets and fed to the larvae.

After two weeks the larvae can be fed with small particulate feeds. *Artemia* can be gradually reduced and finally stopped in one month when the larvae attain a size of about 1.5 – 2 cm. The larval mortality was negligible during the first month especially when *Artemia* nauplii was given as feed. In the late larval stage, though free swimming, larvae were quite different from the adult. Their tail remains long and the caudal fin is continuous with dorsal and anal fins. After a fortnight, the primary chromatophores on the back disappear and permanent colour bands begin to appear. At this time, the larvae measure about 18 mm and assume the form of adult at which larval mortality is relatively high. Hence the larval density has to be reduced if rearing is continued in tanks. Otherwise, they should be transferred to a bigger nursery pond for further rearing. The fry accepts supplementary feeds comprising ground nut oil cake, rice bran and commercial feed pellets.The young ones feed almost exclusively on zooplankton, the advanced fry on aquatic insect larvae, filamentous algae, vegetable matter and planktonic organisms. Worms, shrimps and insect larvae also form part of its food. Growth will be more in the pond systems during this stage. The nursery ponds have to be prepared well in advance for the growth of phytoplankton, zooplankton and filamentous algae. When they reach about 5 – 6 cm they can be considered as seed and sold to farmers through local seed banks. The seeds of pearl spot are always in demand due to its limited supply with no commercial hatcheries functioning for pearl spot seed production and seeds which are presently collected from wild are very limited in numbers. The scarcity of the seeds is mainly due to very low survival during its larval stages due to predation in spite of the parental care exhibited by these fishes. In nature, the fecundity of pearl spot normally varies from 750 to 3000 but the number of seeds produced from a single pair will be only 300 – 400 per spawning. However, through the captive seed production technology developed, it is possible to reduce the problems of predation and effectively produce more seeds as about 70% of the larvae can be reared to seeds without much problems (Table 2).

Table 2. Parameters of reproductive success during different spawning seasons

Parameters/Seasons	Sep - Dec	Feb - May
Fecundity (Numbers)	780 – 2955	820 – 2463
Hatching (%)	94 – 96	88 – 92
Larval survival (%)	86 – 90	92 – 94
Juvenile survival (%)	66 – 72	76 – 85
Seed produced (%)	68 – 70	64 - 69

In 2010 the fisheries minister of Kerala declared *Karimeen* as the official fish of Kerala state. The period 2010-2011 was observed as 'The Year of the *Karimeen*' with promotion of pearl spot farming through the Matsya Kerala programme of the Fisheries Department leading to a surge in pearl spot seed requirements of the fish farmers. Adequate sized (>20 mm) healthy seed supply on a steady basis is demanded by fish farmers.The advantages of this seed production technology over the existing routine pond seed production method is that the seed production per breeding can be

Pearl spot juveniles

Pearl spot seed

easily increased without extra infrastructure. It can be done by any pearl spot farmer who can periodically collect egg masses from their own ponds or farms. This collection of eggs saves the parent fishes from extending parental care which in turn enables the next spawning in a shorter gap of time which increases the total seed production from a pair of brooders. In certain parts of Kerala there is a targetted fishery for *Etroplus* (mainly the guarding parents) during the breeding season using indigenous gears since they will not move away from their nests after spawning, even if their life is in danger. The fishers who take advantage of this parental care habit of *Etroplus* to fish it during night hours thereby destroy large quantities of potential eggs and larvae in these areas. If these fishers are instead trained to collect the egg masses as well as small larvae in large numbers and do the nursery rearing it will enable conservation as well as seed production in a healthier way. In pond breeding programmes for pearl spot, the most difficult part is the collection of the seeds from the ponds which is mainly by cast netting or by pond drying. Both the methods are again expensive and cause mortality in a considerable quantity. In this aspect also the present method of captive seed production is a better alternative.

Orange Chromide (*Etroplus maculatus*): A promising indigenous fish for marine aquariums

M.T. Shilta, P. P. Suresh Babu and K. Vinod
Calicut Research Centre of ICAR-Central Marine Fisheries Research Institute, Kozhikode

Etroplus maculatus, commonly known as Orange chromide is a euryhaline fish endemic to brackishwater streams, lagoons, estuaries and the lower reaches of rivers in peninsular India and Sri Lanka. In India, it occurs in Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu. The Orange chromide at present is mainly utilized as freshwater and brackishwater ornamental fish as it is reported to survive in water close to 21‰ salinity after gradual acclimatization. The present study was conducted to determine the salinity tolerance of *E. maculatus* to know the scope of this species to be selected as a marine ornamental fish.

Salinity tolerance studies

E. maculatus were reared in water with different salinities such as 0, 15, 25 and 35‰ respectively. Twelve plastic crates having a height of 30 cm and

60 litre (L) capacity each were filled with water (upto 20 ± 2 cm) of varying salinities.All the experimental tubs in triplicates, were provided with uniform aeration. Test individuals reared in freshwater (0 ppt) served as control. About 150 numbers of *E. maculatus* collected from the backwaters of Cherukunnu, Kannur were transported to the laboratory in oxygenated polythene bags. Their average initial length and weight was 6.5 ± 0.8 cm and 5.0 ± 0.6 g respectively. Ten numbers of *E. maculatus* were directly introduced to freshwater (0‰), brackishwater (15‰, 25‰) and seawater (35‰) and reared for 45 days. The study was carried out at room temperature (28.5^{o}C) and under natural photoperiods. Commercial pellet feed (Nutrila 1.2 mm, Growel Feeds Pvt Ltd. India) containing 40% protein was given at 5% of initial biomass twice a day during day time (0800 and 1600 hrs). Mortality of fishes in each salinity level was recorded with time over the period of experiment. *E. maculatus* tolerated the direct transfer to 15, 25 and 35 ppt without any mortality or visible stress symptoms.When exposed for long periods to higher salinities also they exhibited 100 % survival and showed no signs of loss of appetite, thereby indicating that there is no imbalance in the physiological processes of the fishes. The results thus conclude as a recommendation on its potential as a candidate species for marine ornamental fish culture.

Breeding trials in saline water

Breeding of *Etroplus maculatus* has been reported throughout the year in the backwaters of Kerala. Successful breeding and embryonic development of *E. maculatus* in freshwater was reported (Bindu and Padmakumar, 2012 *J. Mar. Biol. Ass. India,* 54 (1):13-19) but there are no reports of its breeding in sea water. This study aims to investigate their breeding behaviour, embryonic and larval development in sea water.

Brooders of *E. maculatus* were collected from backwaters of Cherukunnu, Kannur using stake nets and brought to the marine hatchery complex. About fifty numbers of fishes were stocked in FRP tanks (1 ton capacity) containing 15 ppt saline water maintained at a depth of 60 cm. They were fed with commercial pellet feed following same routine used in salinity tolerance studies. Two weeks after stocking the fishes started pair formation. The pairs exhibited a characteristic territorial behaviour. During pre-mating pair formation dark blotches appeared on the body of male fishes. In females, black spots and blotches appeared on the ventral side between pelvic and anal fins (Fig. 1).

The fishes that formed breeding pairs were transferred to plastic crates (60 L) filled with 30 ppt and 35‰ water. Feeding of brooders with the same commercial pellet feed, twice daily was continued. Since *E. maculatus* is a substrate spawner, piece of concrete slabs were introduced into the spawning tanks to facilitate spawning. Both male and female brooders cleared the surface of the substrate using their snout. After the courting process, the eggs attached one by one on to the

Fig. 1. *Etroplus maculatus,* male (Left) and female (Right)

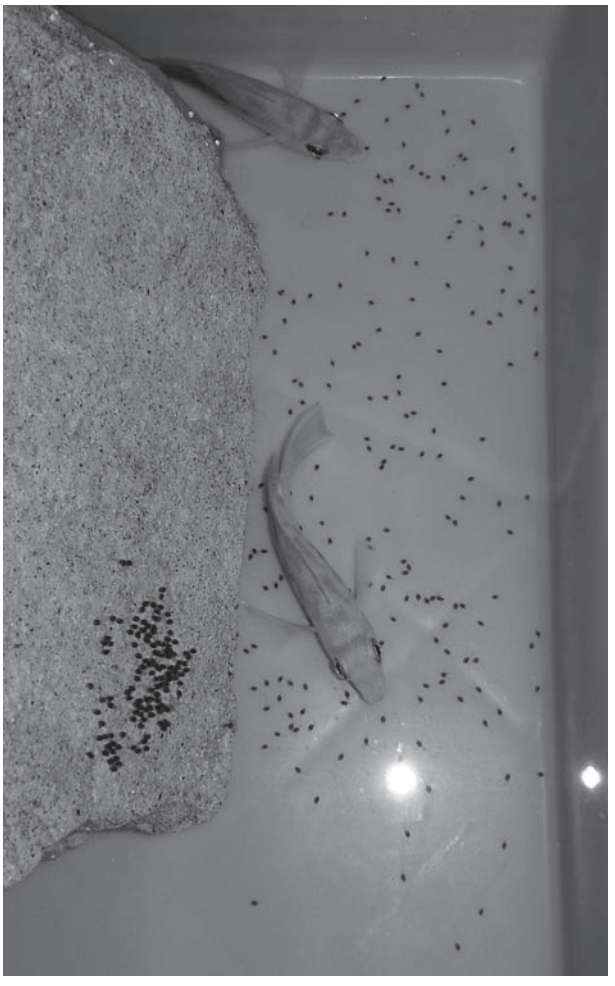


Fig. 2. One day old hatchlings in 30‰ seawater

substrate by the female were spontaneously fertilized by the male with the sprinkling of milt over them.

Spawning was observed in both 30 and 35‰ salinity with the process completed within 15-30 minutes. The fecundity observed was about 350 to 400 eggs per female. After spawning, both parents alternately guarded the eggs by fanning and mouth incubation by turns while one parent foraged. During the experiment, in a few tanks where the brooders were disturbed, they themselves consumed the developing eggs. The eggs of *E. maculatus* in the saline water hatched out within 72 hours. This is in contrast to the report that the eggs of *E. maculatus* in freshwater generally hatched out in 48 hours. The presence of parental care provided high hatching upto 99% and most of the hatchlings remained on the substrate itself (Fig. 2). After a few hours the hatchlings were found to sink to the bottom and were picked by the female in her mouth and transferred to one of the darker corner of the plastic crates. The hatchlings were swimming head down and tail up position with lashing movements.The newly hatched larvae were transparent with voluminous yolk sac containing large oil globules; large pigmented eyes and a prominent pulsating heart located between head and yolk sac (Fig. 3). Yolk absorption was completed in three days and after that the larvae accepted external feed.

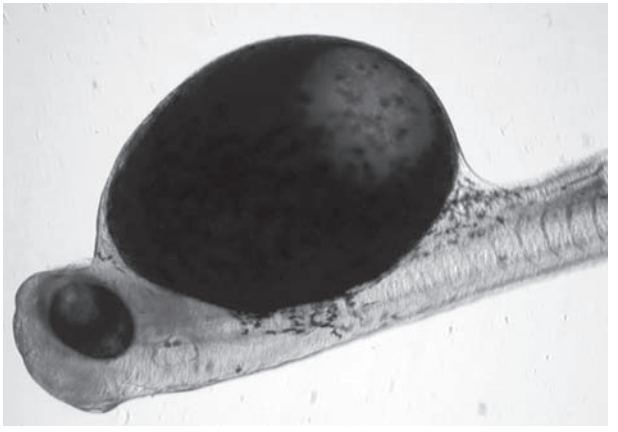


Fig. 3. Two days old *E. maculatus* larvae with yolk sac

In a few tanks it was observed that the two days old larvae were being devoured by the parents and they were immediately removed from each spawning tank. The fry become free swimming from the fourth day and congregated near the aeration points in swarms due to absence of parent in the tanks. Generally, fry move in shoals guided by the parents, swimming mostly underneath the parents. From fourth day immediately after the yolk sac absorption, fry were fed with *Artemia* nauplii, since the major feeding component of parental mucous protein was unavailable in the tanks. From tenth day onwards the amount of *Artemia* nauplii was reduced and *Artemia* flakes were added to the tanks. About 98% survival was observed after rearing for a period of 25 days when the fry had reached a size of 1.9 cm. The information obtained from above experiments reveals the possibility for seed production of *E. maculatus* in sea water and confirms its potential as a marine ornamental fish.

Pair trawl fishery for oil Sardine in Palk Bay

S. Surya, R. Saravanan, A. K. Abdul Nazar, N. S. Jeena, M. Raj Kumar, L. Remya, Ramya Abhijith, B. Johnson, K. Shanmughanathan and S. Selvakumar
Mandapam Regional Centre of ICAR-Central Marine Fisheries Research Institute, Mandapam

Landings of Indian oil sardine, *Sardinella longiceps* were investigated at Rameswaram during November, 2015 – January 2016 period. It was exploited mainly by pair trawlers, which operate a trawl net, locally known as *Rettaimadi*. The oil sardine fishery by pair trawlers initiated was long back (Marichamy *et al*., 1992, *Mar. Fish. Infor. Serv. T & E Ser.*, 17:18-19) but lack of transportation and absence of marketing avenues for oil sardine did not encourage adoption of this fishing method. However the current trend of neighbouring states to access these landings, encouraged the fishers to operate about 200 pair trawlers during the fishing season of 2015 -16. There were about 12- 13 fishing days in a month as per the government records. The fish merchants and agents from Kerala and Karnataka came to the landing centres with ice and lorries for transporting and marketing oil sardine, both fresh as well as spoiled ones for fishmeal plants. The estimated catch of oil sardine from Palk Bay Rameswaram for the season was 1,03,200 t. The Catch per Unit Effort (CPUE) varied from 5 to 20 tonnes (t).

Pair trawling activity was initiated in Palk Bay area in 1980-81on an experimental scale under the Bay of Bengal Programme (BOBP) to develop the small scale fisheries sector (Pillai and Sathiadas, *1982, Mar. Fish. Infor. Serv. T&E Ser.*, 39:1-6). Earlier there was little interest among fishers to operate the pair trawl, because of the necessity of two boats and large quantities of fuel. However, later when catches of highly priced fishes like white pomfrets were obtained, they started pair trawling operations. Pair trawling facilitates harvest of a large volume of small and medium sized fishes which is considered to be to the detriment of fishermen using country boats. The Tamil Nadu Marine Fishing Regulation Act, 1983, prohibits fishing by pair trawling or purse-seine nets by any fishing vessel/ craft (irrespective of whether it is a country craft or mechanised boat), in its territorial waters, as a measure to conserve the fishery resources. The Fisheries Department has also stopped the diesel subsidy and recommended penalty to those fishers who violated the orders. Despite this, the fishers operate pair trawls every year during the peak season even by paying the penalty amount as the profits earned through pair trawling is huge and adequately compensates the fines imposed. Proper governance and control mechanisms are hence a requisite for regulating pair trawling at Rameswaram to sustain the fisheries sector.

Fishing operations

Mechanised units of 14 - 16 m OAL (160 - 180 HP diesel engines) conduct the pair trawling operations. The speed of the boat varies from 5-10 knots. The bottom trawl with an overall length (OAL) of 80 – 84 m is used for exploiting oil sardine. Locally these trawl net are called as 3000 mesh net (*Moovayiram kannivala*) because of the different mesh sizes at wing, belly, and cod end of the gear ranging from 30 mm (cod end) to 3000 mm (wings). The cost of

Fig. 1. Fresh oil sardine landings at Rameswaram

each net is estimated at ₹ 2 lakhs. It is so large in size that it requires two mechanised boats for its operation. The area of operation of pair trawlers is north and northeast off Rameswaram, which is around 80-90 km from shore. The depth of the fishing ground is 3 - 4 metres (m) and the bottom is muddy. They start from shore by 0400 hrs and return by next day morning by 0700 hrs with boats continuing to land up to 1000 hrs. Day – night pair trawling is thus practised at Rameswaram, Palk Bay. Once the operation is complete they return as early as possible to get better returns. Out of the 700 trawlers operating from Rameswaram Landing Centre, around 400 pair trawlers (as a set of 200 units) were targeting oil sardine during the current season.

Fishery

Pair trawling activity which started by November 2015 continued up to February 2016. The catch of oil sardine during recent past from Rameswaram Landing Centre is given (Table 1). Oil sardine constituted 90% of the pair trawler catch and rest was constituted by *Rastrelliger kanagurta, Dussumieria acuta, Gerres erythrourus, Sardinella albella, Sardinella gibbosa* and carangids. In addition, occasional bumper catches of *Eubleekeria jonesi* and *Anodontostoma chacunda* was also observed.

Table 1. Oil sardine catch trends

Year	Total Sardine Catch (tonnes)	Contribution of oil sardine to the total catch (%)
2010	58852	62.1
2011	71044	75.4
2012	27224	46.6
2013	113946	89.2
2014	40958	53.8
2015	113428	90.1

Biological aspects

From an analysis of 250 specimens of *S. longiceps* collected from Rameswaram during the period, size composition, sex ratio, maturity stages and feeding intensity were recorded. Their total length ranged from 123 to 215 mm, weighing 11.5 to 81.6 g each. The fishery in general was supported by 175 - 185 mm size groups. The sex ratio showed females outnumbered males in November, December and January but males dominated in February. The macroscopic appearance of the ovaries indicated that mostly spent recovering stage occurred during November to December and immature stages during January and February. The intensity of feeding determined by eye estimation of the gut contents indicated most of the fishes with poor feeding (Empty guts or traces of food). Only a few numbers showed moderate feeding with half full stomachs. Most of them were lean and showing a starved appearance with the head more prominent than the body (Fig. 2).

Fig. 2. Lean oil sardine

Catch disposal and Marketing

About 60% of the oil sardines landed by the pair trawlers were in an almost spoiled condition. Catches were weighed in large baskets of 40 – 50 kg capacity (Fig. 3). The fresh specimens were sorted and sold at the rate of ₹ 30 per kg while the decayed ones were disposed at the rate of ₹ 10 – 15 per kg. But, in February, when the catches declined, the price rose to ₹ 40 and ₹ 20 per kg for fresh and decayed categories respectively. A large number of fish traders from Kerala, Karnataka and Tamil Nadu arrived at Rameswaram Landing Centre to collect fresh as well as spoiled sardine in lorries loaded with ice blocks. About 95% of the catch was taken by these traders and less than 5% were sun-dried for selling in the local fish markets at Rameswaram.

The initial operation of pair trawlers in the Palk

Fig. 3. Decayed oil sardine landings used for fish meal production

Bay brought huge quantities of white pomfrets, and the gear became locally known as *'Vaval madi'*. Later the catch diversified and in 1992, oil sardines constituted about 71% of total landings (Jayasankar and Bose, 1992, *Mar. Fish. Infor. Serv., T&E ser.*, 118: 17-18). The marked increase in demand for oil sardine from Rameswaram by the neighbouring states recently has encouraged fishers to focus on the local, seasonal oil sardine fishery. The catch per effort of around 10 - 20 t per fishing day of fishing makes it a highly profitable venture. During the season, the trawlers operated quite near to the shore. Fishers disclosed that oil sardine is highly perishable and can remain fresh only for 3 hours without ice preservation. The lack of demand for oil sardine in the local and neighbouring fresh fish markets, except Kerala and the high cost of ice used for preservation lead the fishers to preserve only about 10% of the catch properly. Remaining catch is dumped as such on the main deck and brought to shore in a spoiled state which is usually purchased only by fish meal plants. Information collected from the boat owners indicate the operational expenditure for a day's fishing is around ₹ 1.25 lakhs with highly fluctuating and uncertain returns on any particular day.

An appraisal of Chinese dipnet fishery off Vypin, Kerala

S. Lakshmi Pillai[1], G. Maheswarudu[1], P. K. Baby[1] and A. P. Dineshbabu[2]
[1]*ICAR-Central Marine Fisheries Research Institute, Kochi*
[2]*ICAR-Mangalore Research Centre of ICAR-Central Marine Fisheries Research Institute, Mangaluru*

Among the fishing gears operated in the backwaters of Kerala, the Chinese dipnets are a familiar sight. Foreign in origin and commonly known as the '*cheenavala*' or Chinese dipnet, they were reportedly introduced in Kerala by the Portuguese. The different parts of the gear are named in the Portuguese dialect. This stationary fishing gear is operated in the Cochin backwaters that form the northern extension of the Vembanad Lake mainly in locations like Vypin, Fort Kochi and Cherai. Ten Chinese dip nets are operational off Vypin. Having a mesh size of 12 to 14 mm these are fixed in the tidal regions of the inshore waters with sinkers, floats and stakes and are operated up to depths of 5 m. The gear is operated from a wooden platform using lever system and is lifted at short intervals by using a 5 HP engine (Fig.1). The net is connected to ropes tied with boulders for balancing the net so that it can be dipped and lifted at short frequencies of 10-15 minutes based on the availability of catch. Net operation depends on the tide, as it is made functional during low tide and fishing is stopped as

Fig. 1. Chinese dip net operation at Vypin

the tidal level rises. At night, a lantern hung from rod is used to attract fish. Once the net is lifted, fish are removed using a scoop net.

Landing per haul comprises fish and shrimp depending on the season and time of fishing. Observations on the landings along Vypin carried out for a period of two years (January 2013 to December 2014) revealed *Mugil cephalus* dominates (34%) the catch during most of the months followed by *Megalops cyprinoides* 12%, *Johnius glaucus* 8.8%, *Stolephorus indicus* 8%, *Scatophagus argus* 8%, *Arius caelatus* 5% and *Gerres filamentosus* 4%. Analysis of data employing Univariate Diversity Indices of Primer software 6 revealed maximum Species Diversity in May (3.0) and minimum in December (1.7). Margalef Species Richness was highest during July (5.8), closely followed by May (5.8). The high species diversity found during May - July, most probably relates to the southwest monsoon period (June – July), when the fishes migrate to the backwaters for their nursery phase. The minimum number of species as well as evenness recorded during December may be attributed to the migration of the fishes back to the sea to mature and spawn.

During the study period, size frequency of the various fishes caught was recorded (Table 1).The size range of some of the fishery resources caught in the gear during the study period along with L_m or the Length at First Maturity (size at which 50% of the fish are mature) as available in Fish Base (www.fishbase.org) was analysed. It is observed that important commercial species like *Stolephorus indicus, Leiognathus brevirostris* and shrimps such as *F. indicus*, *M. dobsoni* and *M. monoceros* caught are mostly juveniles. Since majority of the species spend a part of their life cycle in the backwaters (post larval/juvenile phase) they are easily caught in the gear. Estuarine phase in the life cycle of fishes and crustaceans is often overlooked even though it plays a decisive role in marine fisheries management. A mesh size of 24 mm (Vijayan *et. al.*, 2000 *Naga, The ICLARM Quarterly,* 23(3):6-8) was recommended for stake nets to control juvenile fishing. Similarly, an increase in the mesh size of dipnets from the present 12 mm should be explored to reduce fishing morality of juveniles. Maps of the juvenile/post larval season of abundance of the dominant commercial fish species on a GIS platform can serve as the basis in defining seasonal closure.

Species	Local name	Length range (cm)	L_m (cm)	Period of maximum occurrence of juveniles
Scatophagus argus	Nachara	8-16.5	14	++
Mugil sp.	Kannambu	7-26.5	-	-
Gerres filamentosus	Pranjil	10-16.8	19	May
Cynoglosssus sp.	Nangu	7-15.5	11.5	++
Alepes kleinii	Vattapara	7.2-21	12.9	++
*Stolephorus indicus**	Kozhuva	5-7	7	July
*Leiognathus brevirostris**	Kurichil	7.3-9.5	18.1	May
Secutor insidiator	Kurichil	5.5-14.5	7.5	++
Anodontostoma chacunda	Thodi	8.5-14.5	14	++
*Fenneropenaeus indicus**	Naran chemmeen	8-12	13	May-June
Leiognathus bindus	Kurichil	7.2-10.5	7.4	++
Ambassis ambassis	Nandan	5.2-12.5	5	++
Thryssa mystax	Manangu	6.0-18.0	13	++
*Metapenaeus dobsoni**	Poovalan chemmeen	4-7.5	6	June
Sillago sihama	Kathiran	8.5-23.2	22.5	++
*Metapenaeus monoceros**	Kazhanthan chemmeen	6.5-10	9	June-July
Johnius carutta	Kuttan	10-17	14	++
Johnius glaucus	Kuttan	3.5-22	18	July

* >50% caught (in numbers) are juveniles

++ percentage of juveniles<20%

Field identification of yellowfin and bigeye tuna

Subal Kumar Roul, T. B. Retheesh, D. Prakasan, and E. M. Abdussamad
ICAR-Central Marine Fisheries Research Institute, Kochi

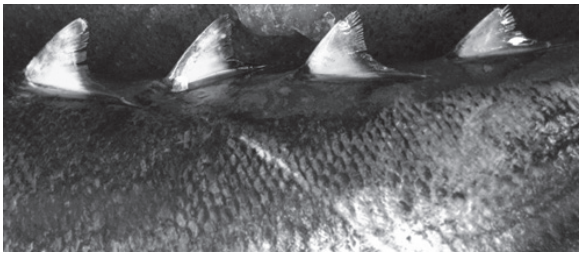
Tunas are commercially important food fishes exploited from all the world oceans. Of the 9 species contributing to the Indian tuna fisheries, yellowfin and bigeye tuna grow to big sizes, and with superior meat quality have high export demand. Identification of these tuna species are comparatively easier in fresh condition than the iced or frozen condition due to discolouration, fin and skin damage during handling and storage process. In such cases certain internal characteristics such as length of air bladder, liver shape and striation are used. Misidentification of yellowfin and bigeye tunas occurs in several cases. The present study is based on field observations at Cochin Fisheries Harbour and uses an easy field identification key for yellowfin and bigeye tuna based on external characteristics developed by Itano (2005) and IOTC (2013). Bigeye tuna are landed stray numbers along with yellowfin tunas, at Cochin Fisheries Harbour. Due to lack of proper identification in the field, bigeye tunas are sometimes misidentified and included along with yellowfin tuna catch, leading to erroneous estimates of species-wise catch volumes in the tuna fishery. A large sized bigeye

Fig. 1. Bigeye tuna landed at Cochin Fisheries Harbour

tuna measuring 149 cm fork length (FL) and weighing 66 kg caught by Hook and line was observed at Cochin Fisheries Harbour on 16th April 2013 (Fig.1). All the morphometric measurements were taken and compared with yellowfin tuna of same fork length. The main characters (in % of FL) that distinguished it from yellowfin tuna was the Head length (28.2% versus 23.2%), Eye diameter (3.9% versus 3%), Pectoral fin length (25 % versus 23%), 2nd Dorsal fin height (15% versus 27%) and Anal fin height (15% versus 31%). The tissue sample which was DNA barcoded was confirmed as bigeye tuna and submitted in GenBank with accession number KF541748.1. Properly distinguished yellowfin and bigeye tuna catch will improve the catch statistics reporting.

1. Body morphology	
Yellowfin tuna	**Bigeye tuna**
• Body elongate with comparatively long tail • Body outline flat towards posterior region 	• Body deep, rounded with short tail • Body outline rounded, forms a smooth dorsal and ventral arc between snout and caudal peduncle 

2. Head and eye morphology • Shorter head length and smaller eye diameter compared to bigeye tuna of same fork length 	• Greater head length and eye diameter 
3. Pectoral fin length • Short and reaching before or up to the second dorsal fin origin (in adults) 	• Long and reaching beyond second dorsal fin origin in adults 
4. Second dorsal and anal fin length • Second dorsal and anal fin greatly elongated in adults 	• Second dorsal and anal fin short 

5. Caudal fin fork shape	
• Central portion of caudal fin fork region forms V" or "M" notch	• Central portion of caudal fin fork region forms a flat or slightly crescent shaped area
	
6. Finlet colouration	
• Bright yellow with thin black margins	• Yellowish colour with distinct and thick black margins
	

First record of the sclerectinian coral *Echinopora lamellosa* from Minicoy, Lakshadweep

Miriam Paul Sreeram[1], S. Jasmin[2], L. Ranjith[3], K. S. Shobana[1], S. Ramkumar[4] and Jose Kingsley[2]
[1]*ICAR-Central Marine Fisheries Research Institute, Kochi*
[2]*Vizhinjam Research Centre of ICAR-Central Marine Fisheries Research Institute, Vizhinjam*
[3]*Tuticorin Research Centre of ICAR-Central Marine Fisheries Research Institute, Thoothukudi*
[4]*Mumbai Research Centre of ICAR-Central Marine Fisheries Research Institute, Mumbai*

The sclerectinian coral *Echinopora lamellosa* (Esper, 1795) has been recorded from the Minicoy lagoon (8°18'10.7"N; 73°00'58.3"E) during an underwater survey on 3rd December 2015. This is a new record for the coral fauna of Minicoy island, Lakshadweep. The genera *Echinopora* and *Montipora* were considered to be absent from the coral fauna of Minicoy by earlier workers (Venkataraman and Ch. Stayanarayana, 2012 *Coral Identification Manual*. Zoological Survey of India,

Kolkata, India. p. 7), giving it a distinct composition when compared to that of the northern islands of the Lakshadweep archipelago, from which it lies separated by the Nine Degree Channel. However, *Montipora* was reported in an earlier study from Minicoy (Pillai and Jasmine, 1989, *CMFRI Bulletin No. 43*: 184). The current record of *Echinopora lamellosa* establishes that the coral faunal composition of Minicoy is similar to that of other Lakshadweep islands. *E. lamellosa* has a wide distribution in the Indian and Pacific Oceans.

The genus *Echinopora* is placed under the family Merulinidae and has 17 species of which four species, namely, *E. gemmacea, E. horrida, E. hirsutissima* and *E. lamellosa* are recorded from India. *Echinopora lamellosa* is characterized by laminar colonies bearing circular, cylindrical or markedly conical plocoid corallites, 2.5 to 4 mm in diameter. Septa are exsert and irregular. A ring of palliform lobes is present. Uniform, closely packed spines on and between corallites gives it a characteristic "furry" appearance (Fig.1).

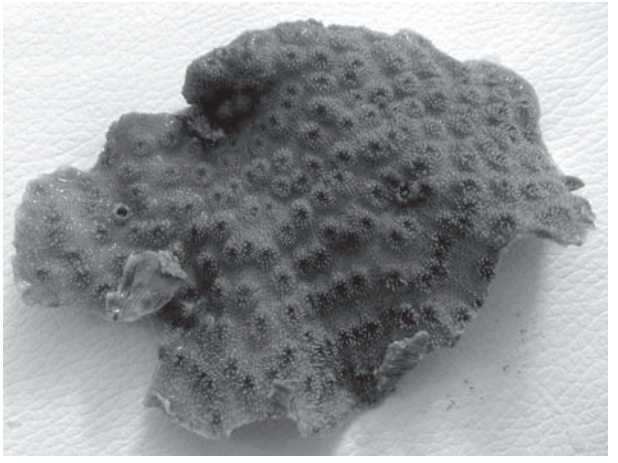


Fig. 1. *Echinopora lamellosa* colony showing corallites

Neoplasia in sawtooth barracuda

D. Ajay Nakhawa, Anulekshmi Chellappan, Swapnil Tandel and V. V. Singh
Mumbai Research Centre of ICAR- Central Marine Fisheries Research Institute, Mumbai

Sawtooth barracuda, *Sphyraena putnamae* is a common species of barracuda in the pelagic fish landings of Maharashtra. In 2015, 166 specimens of *S. putnamae* (301-857 mm Standard length) were collected from trawl landings at Sassoon Dock, Mumbai and examined as part of routine, specieswise biological studies on commercially important marine fishes landed in Maharashtra for developing the state's Fishery Management Plans. On 9th December 2015, a single specimen of *S. putnamae* measuring 685 mm in total length (TL) and weighing 1.2 kg having neoplasia was found among the sampled fishes. There were multiple tumor outgrowths in the mouth, with two on the roof of mouth and one on the inside of the lower jaw (Fig.1). The texture of the oral tumors observed

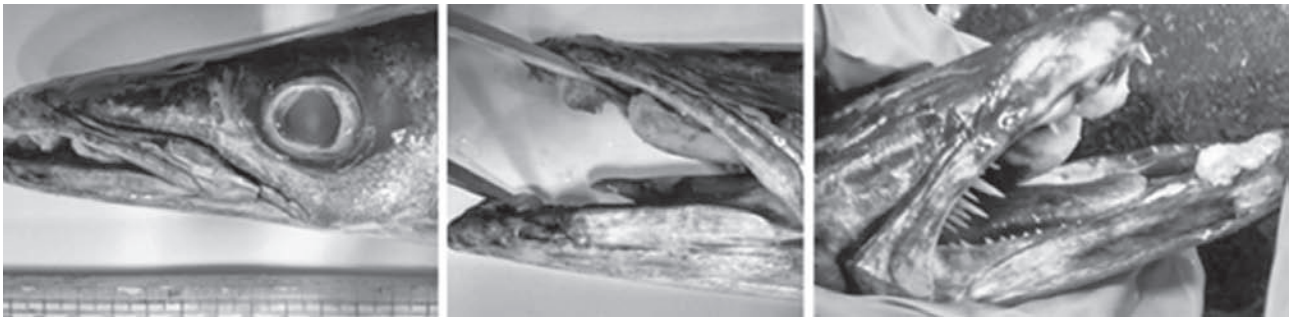


Fig. 1. Tumor outgrowth in the mouth region of *S. putnamae*

was hard and its colour pale. The tumour outgrowths on upper roof region measured 39.18 and 10.41 mm in diameter weighing 4.69 and 1.45 g respectively. The growth on the lower jaw measured 8.28 mm in diameter and 0.65 g in weight. There was no other deformity or endo-tumour observed in the specimen. Stomach had only traces of food, which might have been due to the inability of the fish to consume food due to the tumour outgrowths on the jaws. Similar type of tumour has been reported in the oil sardine and barracudas such as *S. barracuda* and *S. jello* from south east coast of India (Gopalakrishnan *et al.,* 2011, *Journal of Fish Diseases,* 34: 881–885; Vijayakumar *et al.,* 2014, *Diseases of Aquatic Organisms,* 108 (1): 53-60). However, this is the first report of neoplasia in *S. putnamae*.

Observations on the mass mortality of molluscs in Karapad Bay, Thoothukudi

M. Kavitha, I. Jagadis, J. Padmanathan and I. Sivanesh
Tuticorin Research Centre of ICAR-Central Marine Fisheries Research Institute, Thoothukudi

The western bank of the shallow Tuticorin Bay is deeply indented in two places one at Karapad and the other at Uppar. The Karapad Creek is situated 2 km south of Thoothukudi having an area of 0.29 km^2. The shore is sandy and silty in nature and harbours variety of molluscan groups apart from other interstitial fauna. The bay area is devoid of any macro algal vegetation. On its north side, the bay is having a rock built wave breaker. The tidal amplitude of this area is 1 m and during low tide this small bay is extensively exposed. The bay has got its natural recruitment of diverse bivalves and gastropods. The bay is used for culture of edible oysters and clams. It also supports the livelihood for a group of fishers who, regularly collect live and dead shells for the lime industry. The average annual clam exploitation was estimated to be 50 tonnes per year.

Thoothukudi experienced an unprecedented heavy rainfall during the period of Northeast monsoon in 2015. Starting from the third week of November 2015 it continued till the end of December 2015 with the total rainfall recorded during the period being 370 mm. The incessant heavy rain fall in the catchment area lead to continual flushing of rain water into the drain channels that discharged into the Karapad Bay resulting in heavy inundation of the Bay. The salinity profile monitored indicated a drop from 30.5 to 0 ppt (Fig. 1). The low salinity situation which persisted for a couple of weeks in the Bay resulted in the mortality of diverse molluscan groups.

In order to understand the extent of molluscan mortality in the Karapad Bay, sampling was carried out on 15th December 2015. Soil samples were collected at six different places in the Bay from 1 m^2 quadrates up to a depth of 30 cm. The soil samples were sun dried, washed thoroughly and sieved through a velonscreen of 2 mm mesh size. The shells retained were collected and sun dried for couple of days. The shells were segregated, identified and its percentage composition was calculated. The analysis revealed that a mass mortality of molluscs had taken place. The molluscs

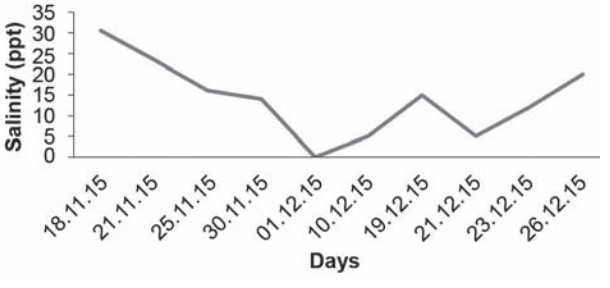


Fig. 1. Salinity fluctuation in the Karapad Bay

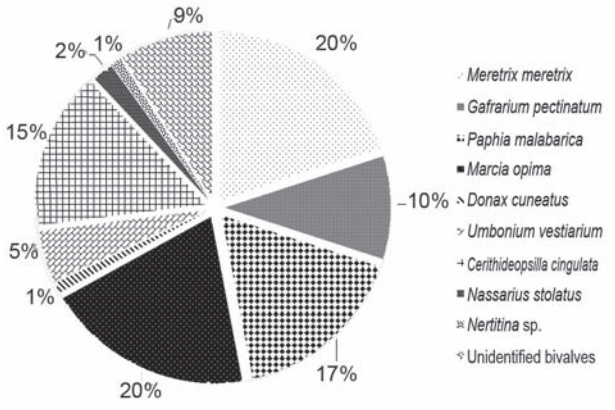


Fig. 2. Percentage composition of dead molluscs in Karapad Bay

comprised 8 species of bivalves such as *Meretrix meretrix, Gafrarium pectinatum, Paphia malabarica, Marcia opima, Donax cuneatus* and 3 species of unidentified bivalves along with gastropods such as *Umbonium vestiarium, Cerithidea cingulata, Nassarius stolatus* and *Neritina* sp (Fig. 2).Out of the 12 species recorded, 4 species such as *M. meretrix, P. malabarica, M. opima* and *C. cingulata* alone contributed 72%. The Bay is now continuously monitored every fortnight by obtaining soil samples to ascertain the recovery process and the time taken for re-establishment.

Incidents of ingestion of plastic by marine fishes

M. Sivadas, K. Suresh Kumar and K. Kannan
Tuticorin Research Centre of ICAR-Central Marine Fisheries Research Institute, Thoothukudi

Although impacts of plastic pollution on fish through entanglement in discarded fishing gear and direct ingestion have been reported, the reports from India especially on ingestion of plastic by marine fishes are rare. Two instances of plastics observed in the stomachs of fishes caught from Gulf of Mannar off Thoothukudi, south-east coast of India are reported below.

During a routine biological analysis of a sample of pompano dolphin fish *Coryphaena equiselis,* the stomach of one of the fishes contained a plastic piece of 10.5 cm length and 6 cm breadth which weighed 0.65 g (Fig. 1). The stomach was otherwise empty. The fish landed on 30.11.2015 at Tharuvaikulam, Thoothukudi by the *murrelvala* (a gill net targeting belonids) was a male in advanced stage of maturity. It measured 30.5 cm in Fork length (FL) and weighed 359 g.The fish is normally carnivorous in nature, with the adults feeding on small fishes and squid.

In another instance, a piece of plastic having a length of 51 mm and width of 27 mm weighing

Fig. 1. *Coryphaena equiselis*

0.043 g was found inside the stomach of a sharp nose sardine *Amblygaster clupeoides* (Fig. 2). The fish was a male measuring 20 cm in length and was in the fully spent stage. Out of 103 numbers of these fishes analysed, stomachs of thirteen fishes contained food such as small gastropods, small crabs, megalopa larvae etc. The fish is normally a zooplankton feeder. The fishes were landed at Tuticorin Fishing Harbour on 21.12.2015 after being caught in a trawl net.

On examination of various species of fish with plastic debris in their stomachs from the coastal waters of southern New England it was found that

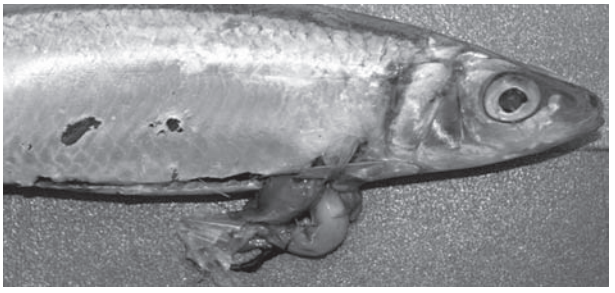


Fig. 2. *Amblygaster clupeoides*

only white opaque plastic spherules had been ingested indicating that they feed selectively (Carpenter *et al*., 1972, *Science* 178 (4062): 749-750). In the present observations, the plastic pieces found in *C. equiselis* were white and opaque and those found in *A. clupeoides* were white and transparent. These pieces were in folded conditions. In both the cases, the fishing grounds were around 25 nautical miles away from the shore.

Occurrence of macro plastic in the stomach of flat needlefish

Subal Kumar Roul, D. Prakasan, M. M. Sadik, A. S. Aswathy, T. B. Retheesh, R. Gireesh and E. M. Abdussamad
ICAR-Central Marine Fisheries Research Institute, Kochi

On 6th January *2016,* biological samples of *Ablennes hians* were collected from the hook and line fishing boats based at Munambam Fishing Harbour, Kochi. While analysing the gut contents in the laboratory, the stomach of one specimen (weight 380 gm, total length 687 mm) contained macro plastic material having about 0.02 gm weight. Stomach also contained partially digested shrimps, sea snails *(Diacavolinia longirostris, Cavolinia tridentata)* and digested matter.

Information collected from the fisherman indicated these fishes were caught by hook and line (hook no. 12) and fishing operation was done at a distance of 10 km from the shore. Flat needlefishes are carnivorous and feed on small surface-dwelling fish. This plastic material may have been ingested during feeding.The risk associated with the transfer of chemicals to biota from ingested debris is not yet clearly understood.

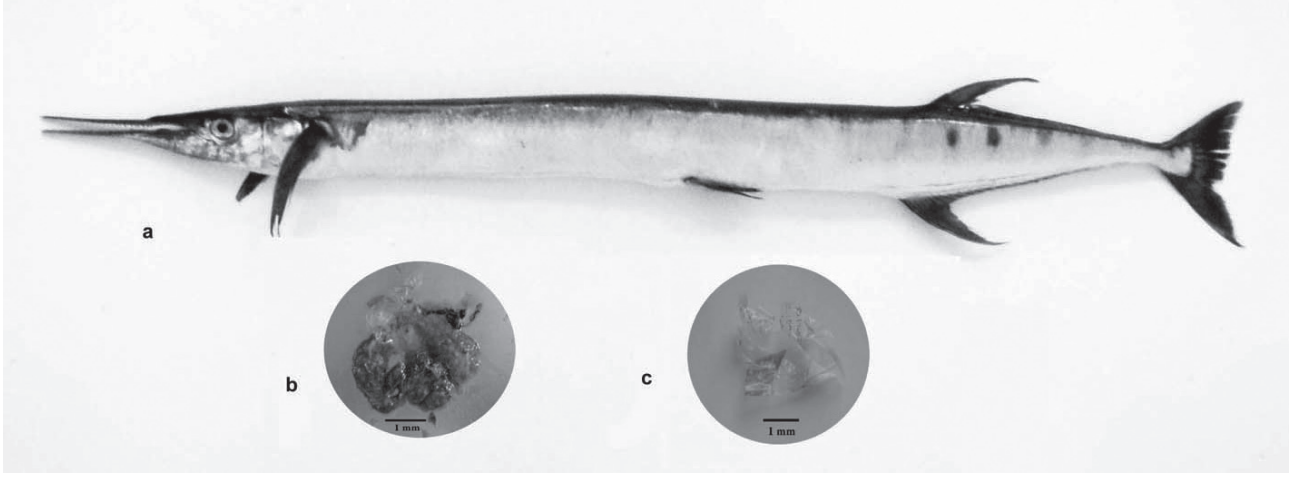


Fig. 1. *Ablennes hians* (a) stomach content (b) macro plastic (c)

Note on an abnormal specimen of golden snapper

Swatipriyanka Sen Dash, K. Mohammed Koya, Gyanranjan Dash, Sangita A. Bharadiya and Jayshree Gohel
Veraval Regional Centre of ICAR-Central Marine Fisheries Research Institute, Veraval

Morphological deformities or abnormalities are well documented in many fishes from several parts of the world, including Indian waters. Several reasons such as genetic aberrations, pollution, environmental stress, accidental injury during the growing period of the fish etc. have been attributed to the presence of abnormalities in fishes. Deformity in the lower jaw of Malabar red snapper, *Lutjanus argentimaculatus* due to the dislocation of the hyoid bones (Sethi, 2012 *Marine Fisheries Information Service T&E Ser*., 213:14) has been reported. In the present note, an abnormal specimen of *Lutjanus johnii* (Bloch, 1792) (Fig. 1) collected from by-catch of a single day trawler that was operating in Gujarat waters is described. In this specimen, the posterior part of the body behind the dorsal and anal fins was completely absent as compared to a normal fish. Morphometric and meristic data of the abnormal specimen were recorded and the specimen preserved in the museum for future reference (Fig. 1). A radiograph was also taken to study the osteological features (Fig. 2).

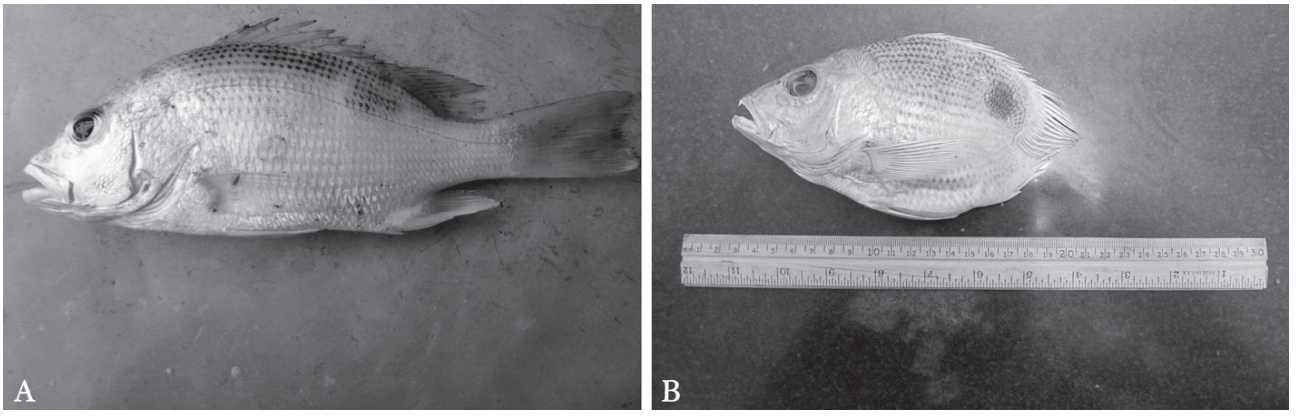


Fig. 1. Normal (A) and abnormal (B) *Lutjanus johnii*

The fish identified as *Lutjanus johnii* was moderately deep, with convex head profile. The head length was slightly shorter than body depth. The dorsal fin was continuous without any incision. The caudal peduncle along with fin was completely absent in the specimen. In the absence of caudal peduncle, both the dorsal and anal fins converged together at the posterior end of the body. The bases of both dorsal and anal fins were with scales.

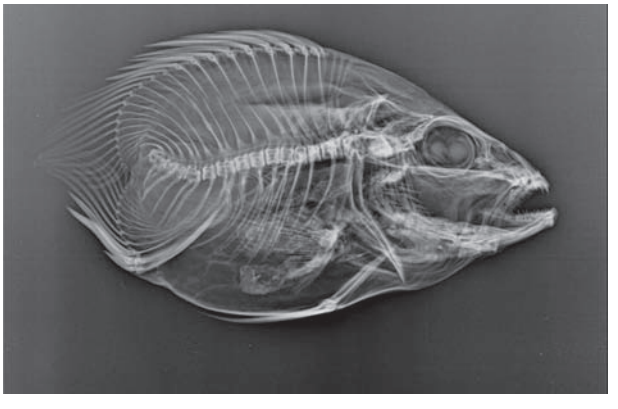


Fig. 2. Radiograph of abnormal specimen

Longitudinal rows of scales, on both sides of the body, above and below the lateral line had a distinct brownish/dark spot which was more prominent in the dorsal portion of the body. The body was bronze

in colour while all the fins were yellowish and a large black spot was present above the lateral line. From the radiograph it was evident that only 18 (10+8) vertebrae were present in this abnormal specimen, while the lutjanids normally have 24 (10+14) vertebrae (Nelson, 2006 *Fishes of the World, John Wiley & Sons*). The vertebral column of the deformed specimen was not normal in shape and alignment with the posterior vertebrae was totally absent. The defect in the vertebral column of the present specimen could be an anomaly in development due to some congenital disorder rather than due to some predator attack. In the case of survivors of predator attacks, signs of regeneration such as scar tissue, missing scales on the skin, missing or regenerating appendages can be seen which was not observed in the present specimen. Any anomaly in the caudal fin will impair the flexibility of the tail, which can hinder the performance of the fish not only during capturing its prey but also while escaping from its predators. The present specimen, despite being deprived of entire caudal region showed no sign of emaciation or predated upon. The fish is therefore, believed to have suffered mortality due to fishing, along with other fishes during the trawling operation.

Note on a deformed Indian mackerel

P. T. Jinesh, N. Beni, D. Prakasan and U. Ganga
ICAR-Central Marine Fisheries Research Institute, Kochi

An Indian mackerel (*Rastrelliger kanagurta*) with deformed snout was collected from the landings at Kalamukku fish landing centre on 30.12.2015. Out of 50 specimens of *R. kanagurta*, collected for the biological studies, only one fish was observed with a deformed snout. An annotated bibliography with reports of deformities in *R. kanagurta* (George *et al.*, 1959; Jones and Silas, 1962; Bapat and Radhakrishnan, 1966; Noble 1971) indicate relatively rare occurrences (Noble and Geetha, 1992, *CMFRI Special Publication 52*, 126 p). Morphologically the deformed upper snout was blunt shaped while lower jaw protruded out in front. When compared with the normal specimens, the abnormal specimen differed only in the snout region.

Fig. 1. Mackerel with deformed (above) and normal snout (below)

Record sized longnose trevally landed

T. B.Retheesh,D. Prakasan, R. Gireesh, P.T. Jinesh, Subal Kumar Roul and E.M. Abdussamad
ICAR-Central Marine Fisheries Research Institute, Kochi

A large sized longnose trevally *Carangoides chrysophrys* (Cuvier, 1833) was landed at Cochin Fisheries Harbour on 19th September 2015. Belonging to the family Carangidae, it was caught by a hook and line unit operated near Lakshadweep waters. The fish measured 800 mm in Total length (TL) and 725 mm in fork length (FL), weighing 5.77 kg. The species is distributed throughout the tropical and subtropical waters of the Indian and west Pacific Oceans from South Africa to New Zealand and Japan.

Carangoides chrysophrys

The species is considered as a good table fish and has commercial importance.

A bumper catch of carangids in purse seines

Narayan G. Vaidya
Karwar Research Centre of ICAR-Central Marine Fisheries Research Institute, Karwar

An unusual bumper catch of carangids was observed in the purse seine landings at Karwar Fishery Harbour on 23.10.2015. Although carangids are landed in stray numbers by the purse seine units operated from this harbour, they have never formed a major catch. During the month of October 2015, 210 purse seiners (20 m OAL with 350 HP engine) were operated from Karwar Fishery Harbour. Fishing operations were mainly in the 20 to 60 m depths off Karwar(14^0 44'N and 73^0 33' E). The total weight of the catch landed was 19 tonnes (t) with carangids forming 94% of the catch besides a few numbers of milk fish, barracudas, cobia and tuna (Table 1). The total revenue realized was ₹ 28,34,602 with prices from ₹ 15 to ₹ 164 per kg received by the fishermen, depending on the species and size of the fish.

Bumper catch of carangids spp. in a purse-seine net

Table 1. Composition of purse seine landings

Species	Percentage contribution	Price/Kg (₹)
Caranx heberi	49.2	164
Caranx ignobilis	32.9	164
Carangoides praeustus	6.5	100
Scomberoides tol	3.6	55
Scomberoides tol (small size)	0.5	15
Alepes djedaba	1.1	40
Chanos chanos	2.5	49
Sphyraena barracuda	1.7	50
Rachycentron canadum	1.5	150
Euthynnus affinis	0.8	20

Olive Ridley turtle washed ashore

K. M. Sreekumar, Aju K. Raju, K. A. Divya, M.Sethulakshmi, Thobias P. Antony and Miriam Paul Sreeram
ICAR-Central Marine Fisheries Research Institute, Kochi

A carcass of an olive ridley turtle, *Lepidochelys olivacea* (Eschscholtz, 1829) was found washed ashore on Cherai beach on 12.01.16. It was in a badly decomposed state, with only the head, front flippers and part of the carapace intact, making it difficult to take morphometric measurements. Enquiries with local fishers indicated that a small number of turtled had laid eggs on this beach 12-15 years ago but there is no evidence of nesting here for the past 10 years.

Carcass of Olive Ridley turtle

Note on a stranded Indo-Pacific humpback dolphin

P. K. Asokan and K. Vinod
Calicut Research Centre of ICAR-Central Marine Fisheries Research Institute, Kozhikode

A dead specimen of the Indo-Pacific humpback dolphin, *Sousa chinensis* was found washed ashore at Konad beach (11^0 16' N; 75^0 45' E), Kozhikode on 21st February, 2016. The specimen was an adult female and measured 243 cm in Total Length (TL), having characteristic 36 and 34 pairs of teeth in the upper and lower jaws respectively. The morphometric characters were recorded (Table 1). An injury was found on the ventral region close to the vent but cause of its death could not be ascertained.

Fig. 1. Beached *Sousa chinensis*

Table 1. Morphometric measurements of the stranded Indo-Pacific humpback dolphin

Morphometrics	**Measurement (cm)**
Snout to melon	25
Snout to angle of mouth	36
Snout to blowhole	44
Snout to centre of eye	42
Snout to anterior insertion of dorsal fin	95
Snout to tip of dorsal fin	140
Snout to fluke notch	239
Snout to anterior insertion of flipper	53
Snout to centre of genital aperture	162
Snout to centre of anus	173
Flipper length	32
Flipper width (maximum)	44
Fluke width	67
Dorsal fin height	6
Girth (axillary)	140
Girth (at the level of origin of dorsal fin)	144
Girth (at level of anus)	90

MFIS