CENTRAL MARINE FISHERIES
RESEARCH INSTITUTE

# Activities and Achievements

## Visakhapatnam Research Centre

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Editing & Production: Mrs. Jancy Gupta, Scientist; Technical Assistance : Mr. A. Kanakkan.

The Visakhapatnam Research Centre of Central Marine Fisheries Research Institute was established in 1947 as a Survey Centre to collect catch statistics along Andhra, Orissa and West Bengal coasts. It was elevated to the status of a Research Unit in 1956 and to the present status in 1965. The Research Centre has been built up over the years including addition of a shore laboratory facility at the Fishing Harbour in 1980. Field Centres at Srikakulam, Palasa, Gopalpur, Puri and Contai which are collecting catch statistics are under the administrative control of this Research Centre.

## MAJOR ACTIVITIES AND ACHIEVEMENTS

During 1950's, attention was given to the study of the pelagic fishery resources landed by artisanal gears. With the advent of exploratory trawling along the north-east coast of India by the Government of India vessels, charting of the fishing grounds was undertaken. This had paved the way for the commencement of commercial trawling by small mechanised boats towards the end of 1967, introduction of big trawlers in late 1970's and the entry of 'mini' trawlers and 'sona' boats in mid 1980's to harvest prawns of near and distant areas. With this, the emphasis was shifted to investigations on demersal fishery resources. The biological and population characteristics of the dominant species of pelagic and demersal groups as well as investigations on their environment have been taken up.

## CAPTURE FISHERIES

Annual fish landings in the artisanal sector amount to about 700 tonnes at Lawson's Bay and 900 tonnes at the Outer Harbour, bulk of these catches coming during February-August and November-January respectively at these two centres. The important groups of fishes

*Oil sardine catch off Visakhapatnam.*

in the artisanal sector are seerfishes 18%, tunas and billfishes 13%, mackerels 13%, sardines 11%, catfishes 9%, jacks 7%, whitebait 5% and sharks 5%. Good catches of oil sardine are being obtained since 1985 particularly in the vicinity of Visakhapatnam Harbour area.

Shrimp trawl landings by the small mechanised trawlers amount to about 7,000 tonnes annually, the catch rates ranging between 18.4 kg/hr and 34.4 kg/hr. July-October is the main shrimp trawl fishery season. The maximum sustainable yield (MSY) and the equivalent fishing effort (FMSY) have been estimated as 7668 tonnes and 383,988 trawling hours respectively in the currently exploited zone. The important groups landed in the mechanised sector are prawns 13%, threadfin breams 13%, lizard fishes 9.5%, croakers 7.6%, ribbonfishes 7.4%, silverbellies 6%, crabs 5.7%, goatfishes 5.5%, other perches 4.4%, clupeids 3.7%, carangids 3.2% and cephalopods 3%.

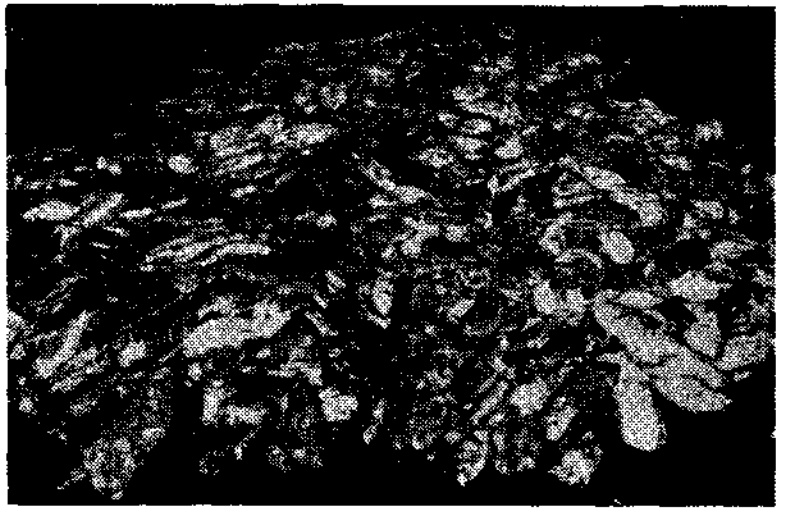
Threadfin bream *(Nemipterus mesoprion)* landings by small trawlers.

Quality fishes such as *Pennahia macrophthalmus, Pseudosciaena aneus, Lactarius lactarius, Polynemus sextarius, Pomadasys hasta, Ilisha filigera* and *Arius tenuispinis* have now become rare in demersal fish catches in the currently exploited fishing grounds off Visakhapatnam, while the low quality fishes such as silverbellies, bullseyes, goatfishes and stomatopods are on the increase. In the case of lizard fishes, the catches and catch rates have decreased considerably over the years. Further, *Saurida tumbil* which used to be the dominant lizardfish has yielded its place to *S. undosquamis.* These could be indications of overexploitation of the present demersal fishing grounds off Visakhapatnam. Based on the studies carried out, it is found out that most of the finfishes spawn during January-June, followed by the abundance of young ones upto October.

The prawn fishery is mainly supported by *Metapenaeus monoceros, Penaeus indicus, P. monodon* and *P. semisulcatus* in that order. Main fishing season for prawns is July-December. Although mature prawns are

met with throughout the year, they are abundant only during July-October and juveniles are common during October-December. Prawn landings by small trawlers ranged between about 500 and 1280 tonnes with an estimated MSY of about 730 tonnes, although a steady decline in catch per hour is evident since 1984-85. The studies have revealed that not more than about 135 small trawlers are needed to harvest this resource at this MSY level as against 200 and odd numbers employed at present. An increase in the mesh size of the shrimp trawl from 15 mm to 25 mm is likely to improve the catch rate. Prawn landings by big trawlers ranged between about 1780 and 4400 tonnes with a catch per hour of 10 - 20 kg. The MSY for this section on prawn resource was estimated as 4500 t. To harvest this amount only 104 large trawlers are needed as against 160 trawlers of this kind and 100 mini trawlers now in operation. There are indications of overexploitation of this resource in the northeast coast.

Cephalopod fishery resource comprise of the squid *Loligo duvaucelii* (42%) and the cuttlefishes *Sepia pharaonis* (24%) and *S. aculeata* (21%). Good catches of cuttlefishes are landed during September-December and squids during February and June - September. Young ones are abundant during February - March.



*Cephalopod landings by small trawlers.*

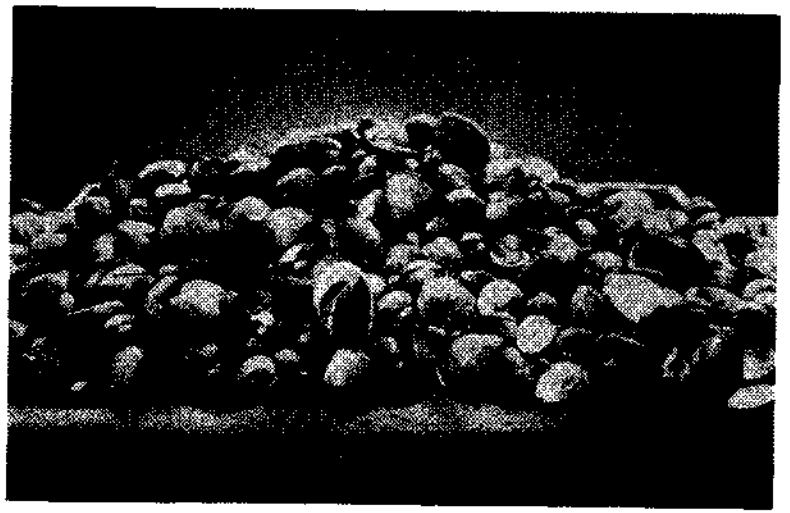
**Charting of Fishing Grounds**

Based on the exploratory fishing surveys conducted during 1961-85 by the Government of India vessel, certain fishing grounds have been charted and the potential yields are estimated for the various groups of fishes. The potential yield for the continental shelf area of 81,684 km$^2$ off the northeast coast is about 150,920 tonnes, the statewise potential yields being Andhra Pradesh 74,733 tonnes, Orissa 52,065 tonnes and West Bengal 24,121 tonnes. Richest grounds exist off Orissa with an abundance of 2.13 t/km$^2$ followed by Andhra Pradesh 1.76 t/km$^2$ and West Bengal 1.63 t/km$^2$. The potential

yield estimates for Orissa and West Bengal are far in excess of the present landings indicating the possibility for increasing the landings of sharks, skates, rays, catfishes, mackerels, threadfin breams and carangids which are underexploited at present in this region. But, studies indicate that lizard fishes and croakers have already reached the optimum level of exploitation.

## BRACKISHWATER AQUACULTURE

Vast stretches of low lying areas (4000 hectares) suitable for brackishwater aquaculture were identified along north Andhra coast. The survey has also revealed the occurrence of good quantities of seed resources of clams, mussels, edible oysters, prawns and grey mullets. The edible oyster *Crassostrea madrasensis* attains a growth of 82 mm in a year. The prevalence of very low values of salinity during northeast monsoon is found to be the greatest constraint for commercial culture of molluscs in the backwaters. Adult oysters and clams exhibited remarkable tolerance to low salinity than their spat. About 1220 tonnes of the sea urchin, *Stomopneustes variolaris* has been estimated to occur in the sheltered rocky areas along the 30 km stretch of the Visakhapatnam coast. Among the seaweeds occurring in the region between Visakhapatnam and Chilka Lake, the agar yielding *Gracilaria corticata* and the edible species *Ulva fasciata* are found to be relatively more abundant. The other seaweeds met with are *G. verrucosa, Sargassum vulgare, Porphyra vietnamensis, Enteromorpha compressa* and *Hypnea valentiae.*



Clam — *Meretrix casta*

## ENVIRONMENTAL STUDIES

Temperature, salinity, dissolved oxygen and inorganic micronutrients of the inshore waters are being monitored. Primary productivity (using radio-carbon method and plant pigments) and the influence of hydrobiological parameters on primary production are being investigated. Productivity is low during December-February and high during March-July. Upwelling of cold water from 30-50 m to 5-10 m depth occurs in varying intensities during March-July. Fishes like *Nemipterus mesoprion, Decapterus dayi, D. lajang* and *Psenes indicus* become dominant in the fishery during

this period. Benthos in the non-trawling grounds was found to be much higher than that of trawling grounds. Polychaetes, which form the most abundant among the thirty different benthic groups rank only fourth among the twenty different food items met with in the demersal fishes.

## INFRASTRUCTURE AND STAFF STRENGTH

The Research Centre is equipped with such oceanographic equipment as Nansen's bottles, Vandorn bottles, batheythermograph, temperature-salinity-oxygen bridge, current meter and Petersen's grab; laboratory equipment consisting of various types of microscopes, microtome, chemical physical and electronic-balances, centrifuge, pH meter, distilled water still, vacuum pump with filtration system, deep freezer, refrigerator, hot-air-oven, culture tanks, aerators, etc. Also an air conditioned instrumentation room housing the spectro-photometer, Geiger-Muller Counter and calorimeter is available. The centre has audio-visual equipments like slide

*A view of the Hydrography Laboratory*

*R.V. CADALMIN - V at Visakhapatnam Fishing Harbour*

projector and photographic camera. There is a museum with four hundred displays and a library with a holding of 230 books and 2800 issues of different periodicals. One 13.4 m research vessel RV CADALMIN—V, one 2.8 m F.R.P. utility dinghy, and two jeeps with trailer add to the infrastructure of the Research Centre.

The present complement of staff is as follows : scientific 7, technical 18, auxiliary 2, ministerial 3, and supporting 8, besides the 10 technical and 1 supporting staff at the five field centres. There are 8 ongoing research projects handled at this Research Centre besides collection of catch statistics carried out at the Field Centres.

## CURRENT APPROACHES TO FISHERIES INVESTIGATIONS

With a view to assess the present status of the fisheries based on trawling by small and big trawlers and a variety of artisanal gears, several inter-divisional projects have been undertaken. These investigations are expected to generate information on (i) the trends of landings in different sectors, (ii) the effect of exploitation on the stocks of different species in the multi-species fisheries, and their interaction, (iii) the effect of environment on the fishery and biological characteristics of commercial species of fishes, prawns and cephalopods, (iv) their abundance in the fishing grounds, and (v) the MSY for different species/groups and the optimum effort to harvest these resources economically. Since diversification of fishing in this area is on the anvil, the effects of introduction of new types of boats and gears on catches of the existing ones will be monitored to suggest measures for development of a balanced fishing industry.