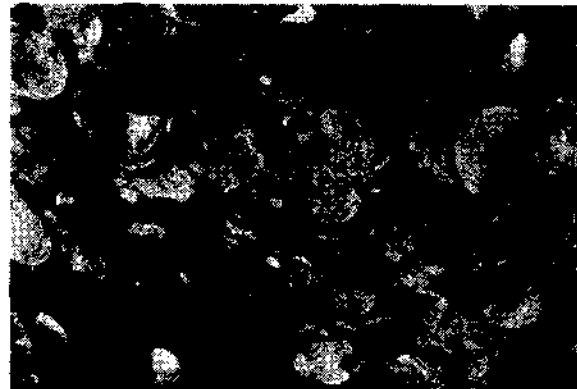


**CENTRAL MARINE FISHERIES  
RESEARCH INSTITUTE**

## **Activities and Achievements**

**Kakinada Research Centre**



The Kakinada Research Centre of Central Marine Fisheries Research Institute was established in 1965. The major objective of this Centre is to conduct research on marine fisheries of South Andhra Coast by monitoring the exploited resources and the environmental factors and by studying the biological characteristics and population dynamics of dominant and commercially important species to enable to suggest regulatory measures. The Centre has also been working for the development of suitable techniques for culture of shellfish.

#### MAJOR ACTIVITIES AND ACHIEVEMENTS

The various research programmes undertaken by this Research Centre are well coordinated with the research activities of the Institute. Research has been conducted on important finfishes, crustaceans and molluscs. In addition to collecting and analysing data on effort and catch, biological studies are carried out on important species. The important parameters such as growth and mortality have been estimated and stock assessment made.

Experiments on culture of *Penaeus monodon* in salt pan reservoirs and of the blood clam *Anadara granosa* in Kakinada Bay have been conducted.

#### CAPTURE FISHERIES

##### Pelagic fishery resources

The major programme of investigations includes studies on biology and stock assessment of ribbonfish and



*Carangids landed at Kakinada Fisheries Harbour*

carangids. Although six species of ribbonfish contribute to the fishery, only one species, *Trichiurus lepturus* is the most dominant one and accounts for about 90% by weight of the ribbonfish catch. Appearance of large shoals of this species with individuals measuring 50-80 cm in the in-shore waters and timely operation of boat seines, which are by far the most efficient gear to catch ribbon fishes, contribute to a successful season. There is scope for increasing production of this species by increasing the age at first capture and the effort.

Several species of carangids occur in the area; but *Decapterus russelli* contributes to 80-90% by weight of the catch of carangids by private trawlers. February-April is

the best period of abundance of this species in the trawling grounds. Studies on the biology of *D. russelli* have revealed that it spawns during December-August period with a peak during February. This species attains first maturity at a length of about 15.0 cm and average length of 16.0, 20.8 and 22.4 cm at the completion of I, II and III years respectively. There is scope to increase the cod end mesh size of the gears, in order to get increased and sustained yield from this species.

#### **Demersal Fishery Resources**

The research programmes under this division are aimed at understanding the biological characteristics of ex-

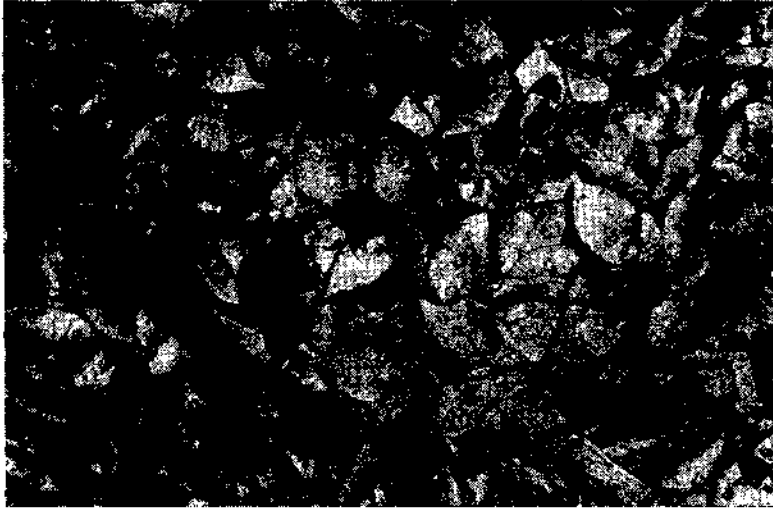


*Thread fin breams — an important demersal resource*



*Croakers — the most dominant demersal fin fish*

ploited populations of major demersal fin fish resources and their population dynamics. Since the introduction of trawling by mechanised boats in the sea off Kakinada during late sixties, the landings by these boats have increased considerably from 1,300 tonnes in 1969 to 22,500 tonnes in 1986. The total number of mechanised boats operating in the region also has increased considerably. Among the demersal fin fish landed, sciaenids, threadfin breams, silverbellies, lizard fishes, cat fishes, flat fishes and perches are most dominant, together contributing to about 30%



*Silver bellies landed at Kakinada fisheries harbour*

of the total trawl catches at Kakinada. Investigations have been carried out on various aspects of the biology of three species of sciaenids, two species of threadfin breams and two species of silverbellies.

An attempt has been made to evolve mixed fisheries assessment of dominant demersal fin fish species (*Nemipterus japonicus*, *Johnius carutta*, *Secutor insidator*, *Leiognathus bindus*) exploited by trawlers in Kakinada region. The results indicate that the current fishing effort in the

present fishing grounds has reached a level that gives maximum sustainable yield and any increase in the effort in the same area without modifying the gear is not likely to yield increased returns. It is also observed that the present cod end mesh size of trawl nets is small for the major demersal fin fish resources to sustain increased effort. Hence there is need to increase the cod end mesh size of trawl nets by 30% of the present size to enable getting increased and sustainable yield even at increased effort level (by about 10% of the present).

#### **Crustacean Fishery Resources**

In the trawl catches off Kakinada, prawns are an im-

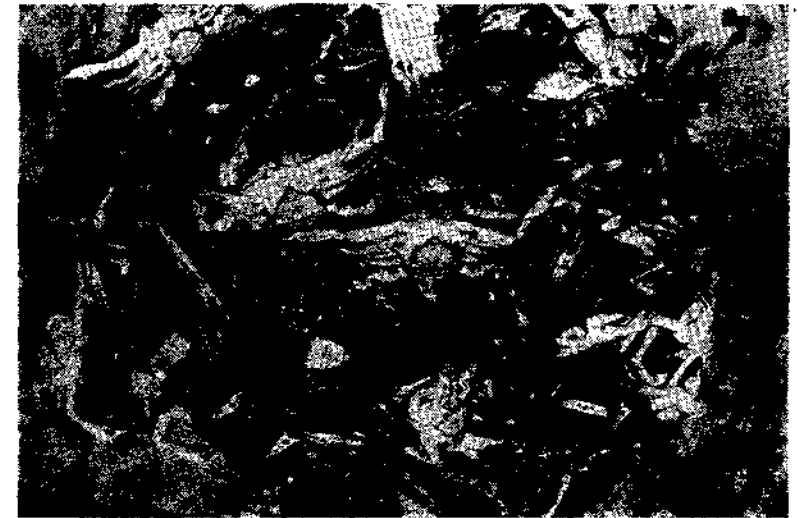


*Squids and cuttle fishes at Kakinada Fisheries Harbour*

portant group with an average annual landing of 3,500 tonnes contributing about 20% of it. Among prawns, those belonging to the family Penaeidae contribute to over 60%. The population dynamics of four penaeid species namely *Penaeus monodon*, *P. indicus*, *Metapenaeus monoceros* and *M. dobsoni* have been studied. The yield per recruit analysis in both the sexes of *P. monodon* and *P. indicus* shows that increased yield can be obtained by increasing the effort. In *M. monoceros* though there is scope to get increased yield by increasing effort in males,



*Penaeid prawns — the most sought after shellfish*



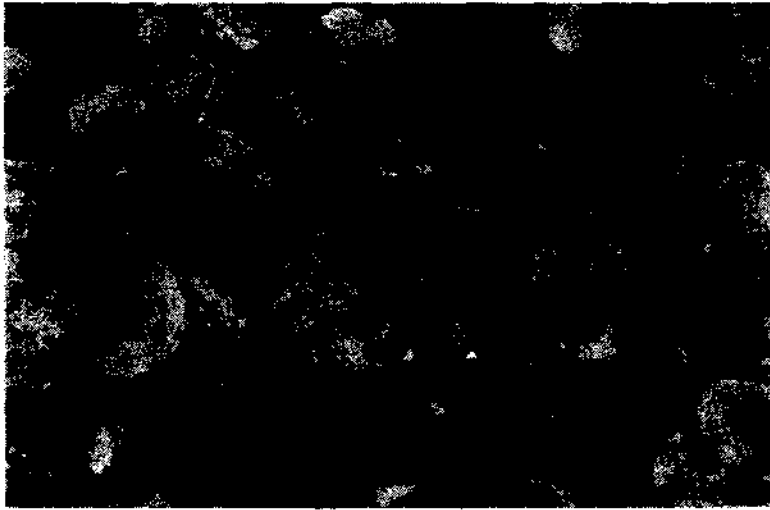
*Portunus pelagicus at Kakinada Fisheries Harbour*

the current effort is only slightly less than the one at which maximum yield is obtained. In the case of *M. dobsoni* there is not much scope to increase the effort further. At the current rate of fishing, the yield in weight per recruit of *P. indicus* is 23.05 g in females and 31.74 g in males. There is scope to increase the yield of this species by increasing the effort.

#### **Molluscan Fishery Resources**

A comprehensive study of the molluscan fisheries resources of Kakinada Bay which has a waterspread of 146

sq. km. has been completed. In India, a major fishery for the windowpane oyster *Placenta placenta* exists only in Kakinada Bay with a production of 5,000 tonnes per year. This species is distributed in about 40 sq. km. area in the Bay and the total stock is estimated at 12,500 tonnes. The life span is 3-4 years and it is estimated that the yield increases with increase in effort. It is recommended that the present effort and age at first capture can be maintained with advantage. The pearls of the windowpane oyster are in great demand in the Unani system of medicine and a few years back these were priced at Rs. 5,000/kg. In



*Catch of window pane oysters at Kakinada*



*The blood clam Anadara granosa harvested in the culture experiments at Kakinada*

Kakinada Bay at present, these pearls are not extracted and it is suggested that their extraction on the same lines as followed in the Gulf of Kutch would augment the income from the shellfishes.

*Anadara granosa* popularly known as the blood clam forms a fishery of considerable magnitude in Kakinada Bay. Although this species occurs at several other centres along the coastline, it does not form a fishery elsewhere. In the Kakinada Bay, *A. granosa* is distributed along the southern and western sides in about 47 km<sup>2</sup> area where the depth is below 2 m. This species prefers a soft muddy

bottom which is sheltered from strong wave action. The total stock in the bed has been estimated at 6,000 tonnes and the actual landings at present are 2,000 tonnes/year. The potential for additional landings is estimated at another 500-1000 tonnes above the current yield. The life span of the blood clam is estimated as 5.6 years and in the present state of the fishery the age at first capture is one year. The yield in weight per recruit increases with increased effort with the current age at first capture unchanged. It has been observed, however, that increased effort from the present level will only result in marginal increase in the yield, and it may not be remunerative.

#### **Fishery Environment Management**

Investigations on mangroves in relation to fishery is an important activity of the Centre and ecological study on the mangroves of Kakinada, comprising hydrography and nutrients of the waters, organic carbon of the sediments and zooplankton composition with particular emphasis on the postlarvae and juveniles of commercially important prawns, has been carried out.

### **CULTURE FISHERIES**

#### **Prawns**

In the vicinity of Kakinada there are several hundred hectares of salt pans. Culture experiments are conducted in the salt pan reservoirs with *Penaeus monodon*. The mean stocking length and weight are 5.4 cm and 1.04 g respectively and the effective stocking density is 30,040 No/ha. At harvest after 168 days the mean length and weight are

12.3 cm and 10.9 g respectively. The survival rate is 79%. A production of 259 kg per hectare in 168 days has been obtained. The study has demonstrated the feasibility of prawn culture in salt pan reservoirs during the off season. The advantage in the system is that there is no capital investment for pond construction. Intensive prawn culture, however, cannot be developed in salt pan reservoirs because of the adverse environmental conditions and poor biological production which affect the growth and survival of prawns.

#### **Clams**

The blood-clam *Anadara granosa* has been successfully cultured in pens in Kakinada Bay. By transplantation of the clams (average weight 3-7 g) in an area enclosed with split bamboo screens, production rates of 38.1-41.6 tonnes/ha/5-7 months are obtained. At harvest, the clams have an average weight of 25-30 g and flesh weight is about 20% of total weight and the retrieval is over 80%. Without the pen enclosure, the production has been so low as 21 tonnes/ha/6 months with the retrieval at only 41.5%.

### **STAFF STRENGTH AND DISTRIBUTION**

The Centre is manned by 4 Scientists, 6 Technical Assistants, 1 Motor Driver, 2 Ministerial Staff and 5 Supporting Staff. In addition, there is one Technical Assistant each at the Narsapur and Machilipatnam Field Centres that come under the administrative control of Kakinada Research Centre.

### **INFRASTRUCTURE FACILITIES**

Although housed in a rented building the Research Centre is well-equipped to meet the requirements of the ongoing research programmes. Equipments such as spectrophotometer, pH meter, calorimeter, autoclave, incubator, hot air oven, muffle furnace, electric balance, distilled water still, microtome, water bath, refrigerator, deepfreezer, automatic slide projector, SLR camera, binocular and monocular microscopes and facilities for reprography are available. For field work a jeep and 13' fibreglass dinghy fitted with 7.5 HP outboard motor are also available.

The library has a holding of about 900 books and subscribe to many scientific journals dealing with fisheries and aquatic sciences in India.

### **FUTURE PROGRAMMES**

Research in exploited fisheries resources aims at understanding the effect of fishing on the stocks so that suitable advice to the industry and the government on the maximum sustainable yield can be given. This can be achieved by monitoring the resources on a continual basis. Hence the research programmes in capture fisheries will be continued and extended to cover all the exploited species in the region. Particular emphasis will be given to multispecies stock assessment of exploited resources.





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