

**CENTRAL MARINE FISHERIES
RESEARCH INSTITUTE**

Activities and Achievements

Minicoy Research Centre



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Lakshadweep is a group of scattered islands in the Arabian Sea lying in between 8° and 12°30' N and 71° and 74° E. Of these, only ten islands are inhabited. An organised fishery for commercially important tunas such as skipjack and yellowfin are in vogue only at Minicoy and Agatti Islands, Suheli Pars and reef areas at Cheriya-panium and Baliyapanium. Monitoring of the trend of fishery, and collection and dissemination of information on the stocks of these species in and around the EEZ of Lakshadweep are of prime importance for the development of the existing small scale fishery in these islands. The coral islands of Lakshadweep group with their extensive coral reefs and lagoons harbour a variety of fauna with complex interrelationships in the reef ecosystem. Many of the ichthyofauna inhabiting these ecosystems are being used as "tuna live-baits" in the Pole and Line fishery which is the major fishing method employed in these islands for harvesting tunas.

In recent years, this Union Territory is receiving increased attention from the Government of India so as to bring about an accelerated pace of development in all spheres in the isolated islands. Fisheries form the major natural resource in Lakshadweep and these islands are well known for the rich resources of tunas, a variety of other consumable marine organisms and colourful ornamental fishes. Realising the need for careful planning and implementation of Fisheries Development Schemes, a Master Plan for Fisheries was drawn up recently, and the schemes are being implemented on that basis.

It is with the objective of investigating the problems and prospects of tuna fisheries in the Lakshadweep that the 'Research Unit' under the Central Marine Fisheries Research Institute (CMFRI) was established in 1958. Subsequently, with the addition of more research programmes and personnel over the years it has grown up into a full fledged Research Centre.

MAJOR ACTIVITIES AND ACHIEVEMENTS

The activities of the Research Centre have progressed from estimation of marine fish landings in the beginning to the present ones involving research projects in capture fisheries, resource assessment of tuna livebaits, their



Skipjack tuna *Katsuwonus pelamis*

holding and rearing, environmental monitoring and technological developments for conservation of the ecosystem. Monitoring the resource characteristics of tunas and baitfishes for stock estimates, biological investigations on skipjack and yellowfin tunas and baitfishes such as sprats, damsel fishes, cardinal fishes and hardy heads, evaluation of the live-bait potential in different lagoon systems in Lakshadweep, assessment of the status of coral reefs and reef ecosystem and experimental attempts with artificial habitats are covered in the research projects.



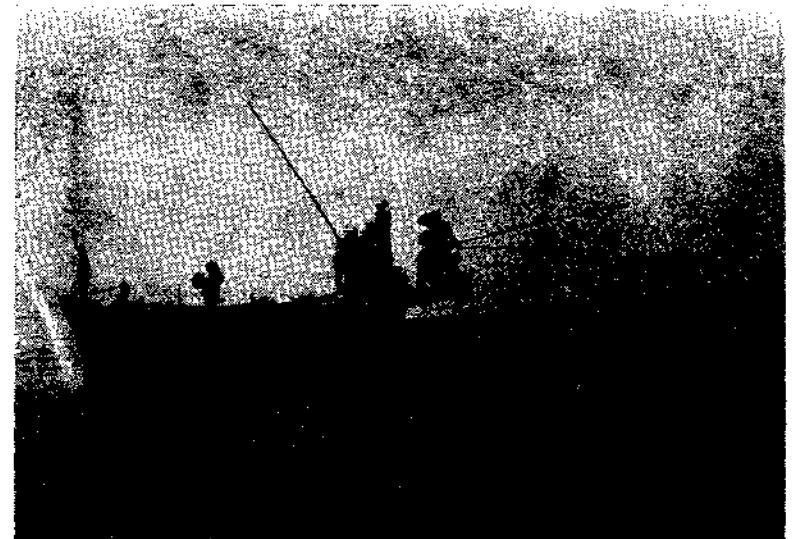
Skipjack tuna catch being brought to the shore

Notable achievements of the Research Centre are the stock status of tunas, development of effort based fishery

models, exploratory resources survey on live-baits from the lagoons, pangs and reefs, investigations on behavioural pattern and Artificial Reef Research. Reports prepared by the Research Centre on perspective planning for the development and management of tuna fishery in Lakshadweep have been accepted as baseline documents by the Administration of the Union Territory.

CAPTURE FISHERIES

The fishery resources comprise mainly of skipjack tuna, yellowfin tuna, rainbow runner, seerfish, pelagic sharks, sailfish, barracuda, dolphin fish and carangids. In



Pole and line fishing at Minicoy

the pole and line fishery, tunas constitute nearly 93% of total catch followed by rainbow runner, pelagic sharks and carangids. In the troll line fishery, apart from tunas, seerfish, rainbow runner, pelagic sharks, sailfish, carangids and barracuda are the major constituents. The Pole and Line fishing in vogue for tuna fishery employs specialised mechanised boats of 7.9 m and 9.7 m OAL with 10-40 HP engines. Poles of 3-4 m long with polythene lines and barbless lead-coated hooks are used for fishing. The fishing season is from September to May. Average annual landing of tunas for the last one decade at Minicoy is around 682 tonnes.

Investigations on the biological and resource characteristics including effort, catch composition, length frequency, sex ratio and age and growth of tunas are carried out with a view to assess the stock structure and effect of fishing over the years. Data on the economics of tuna fishery and utilisation of tunas are collected and processed for deriving at management of the stocks.

Live-baits play a pivotal role in the pole and line tuna fishery and their scarcity or abundance is the key factor responsible for the development of this fishery. Detailed investigations were carried on the fishing effort, catch rate, species composition, distribution, seasonality and abundance of both migrant and resident live-baits such as sprats, caesionids, apogonids, pomacentrids, atherinids and mugilids at the Centre. Further, extensive ex-



Bait fishing at Minicoy

ploratory live-bait resource surveys were conducted in all islands, paar areas and submerged reef areas of Lakshadweep during 1986-88 by the Scientists from the Centre. Results of the surveys on these resources have revealed exploitable stocks of suitable live-baits other than sprats (which is commonly used in the northern islands) in all the islands. During these surveys and the holding and rearing experiments conducted at the centre, the behaviour pattern of live-baits, their handling methods, survival in captivity and transportation, reduction of mortality by experimental means and finer aspects of their

population characteristics as well as biological aspects were studied and reported.

Feasibility studies on alternative live-baits are being carried out in the lagoon and in the laboratory.

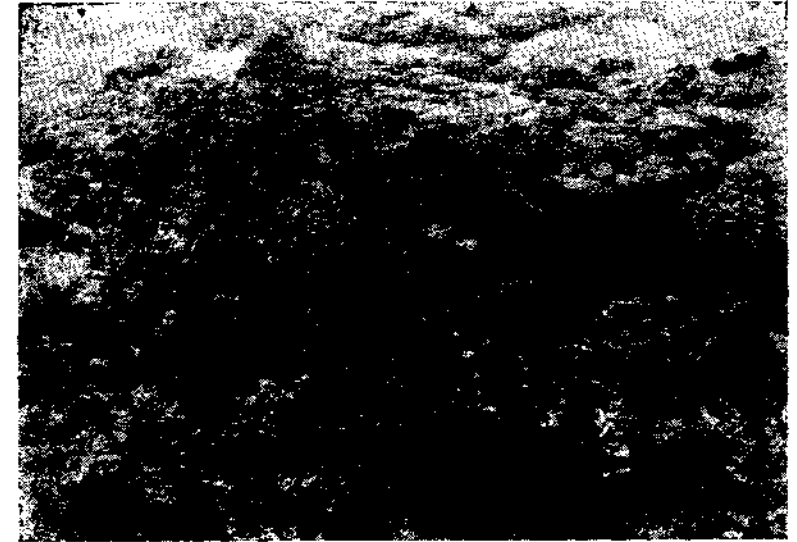
The hook and line fishery practised during the SW monsoon and occasional operation of shore seine, caught a variety of perches, goatfishes, sciaenids, carangids, halfbeaks, belonids and sharks. Sixteen species of ornamental fishes belonging to the families Acanthuridae, Holocentridae, Mullidae, Labridae, Pomacentridae, Zanclidae and Balistidae were recorded from Minicoy.

ANCILLARY MARINE RESOURCES

The Centre has participated in the survey carried out to assess the marine living resources of the Union Territory of Lakshadweep and assessed the status of the coral reef ecosystem.

1. Corals and Coral Reefs

A total of 73 species of scleractinian corals belonging to 28 genera and 4 species of non-scleractinian corals belonging to 2 genera have been recorded from Minicoy. In the studies conducted so far on the status of reef ecosystems, factors such as siltation, mortality of corals and bioerosion were dealt with.

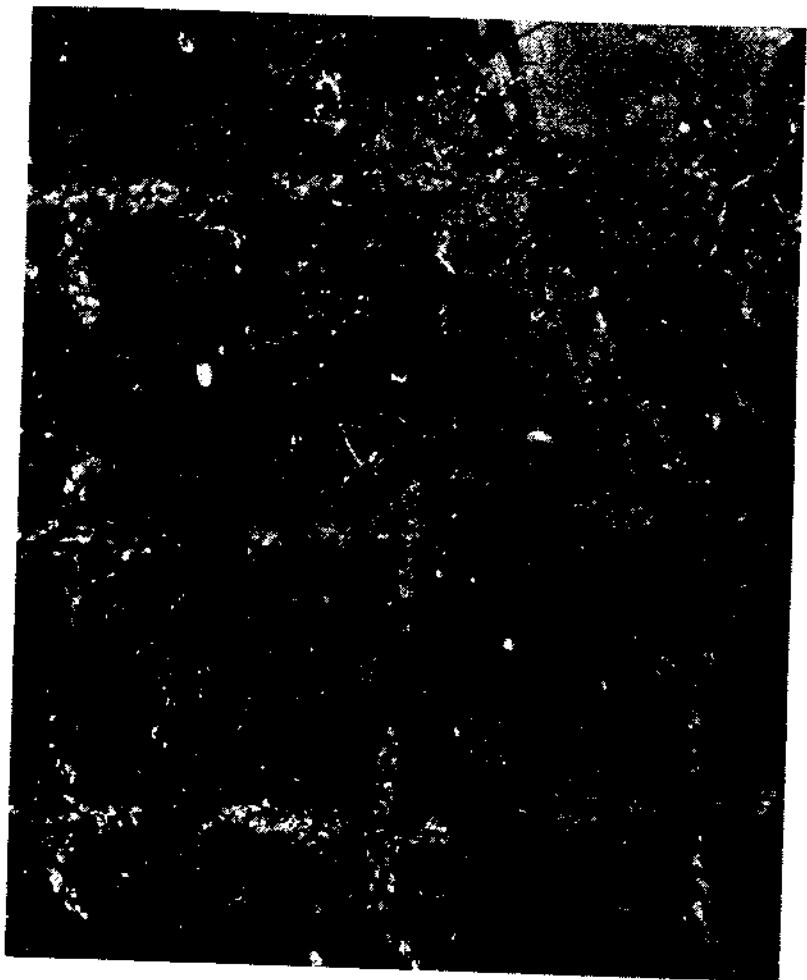


Live coral bed in the lagoon at Minicoy

2. Marine Algae

A total of 52 species of marine algae belonging to 38 genera of *Chlorophyceae*, *Phaeophyceae*, *Rhodophyceae*, and *Cyanophyceae* have been recorded from Minicoy. In addition, 4 species of sea grasses belonging to the Genera *Halodule*, *Cymodocea*, *Syringodium* and *Halophila* are also observed in the ecosystem.

Other marine resources recently recorded from Minicoy include 51 species of molluscs, 28 species of echinoderms (including 13 species of holothurioids), 58 species of sponges, 3 species of lobsters, 2 species of marine turtles and 2 species of marine mammals.



30 days growth of *G. edulis* in 2 x 2 m size coir rope net.

Seaweed culture

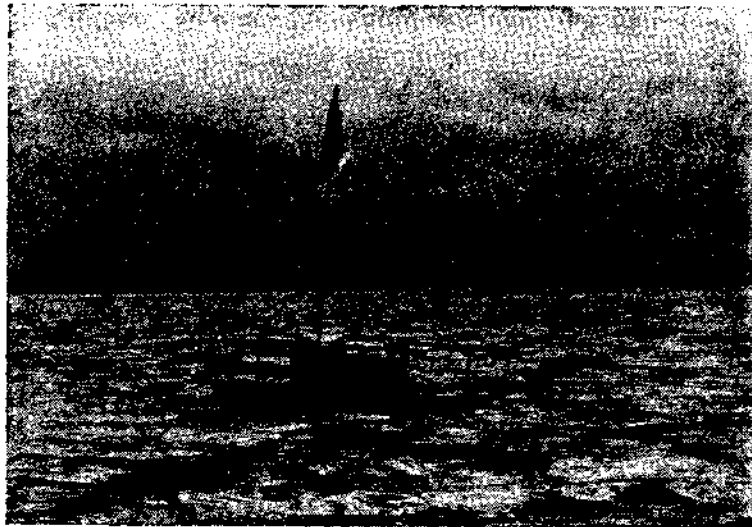
Recently attempts were made by CMFRI to explore the possibility of cultivating *Gelidiella acerosa* and *Gracilaria edulis* in the lagoon at Minicoy island. The plants of *G. acerosa* growing at Minicoy were used and *G. edulis* were transported from the Mandapam and Kavaratti island. The seed material of these species introduced on 2 x 2 m size coir rope nets and 1" thick long line coir ropes reached harvestable size in 45-60 days. The remnants of the plants on the nets and long line coir ropes, after the first harvest, grew into harvestable size again within 60 days. The maximum yield of crop obtained from these experiments were having seven fold increase over the quantity of seed material introduced, in a culture period of 60 days.

ENVIRONMENTAL INVESTIGATIONS

Monitoring of hydrobiological characteristics such as temperature, salinity, dissolved oxygen and zooplankton distribution has been conducted in the Minicoy Lagoon. Variations in the standing crop of zooplankton and seasonal changes in the distribution of component organisms are reported. Correlation between sea surface temperature and tuna fishery based on data collected from tuna fishing grounds off Minicoy has been studied.

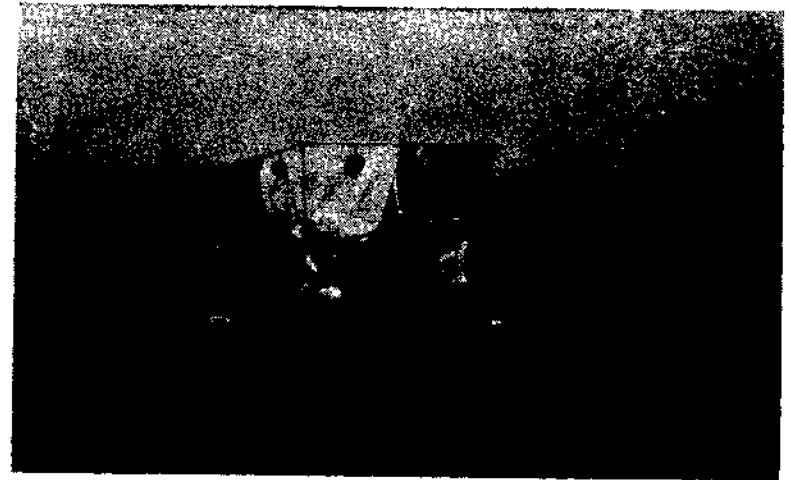
ARTIFICIAL REEF RESEARCH

For the first time in the Indian coral reef ecosystem, artificial reef research was initiated by the Research Cen-



*Artificial reef installed in the Minicoy lagoon —
— A view during high tide.*

tre. Low-cost technology was adopted in the construction of a 2m dia x 1.2 m ht reef structure utilising discarded tyres and wooden materials. The ARs installed in the southern part of the Minicoy Lagoon have been found to be successful in attracting and holding live-baits and ornamental fishes. Epiphytic and planktonic succes-



Floating cages employed in the field studies on tuna live baits at Minicoy lagoon during 1986 to 1988

sion as well as the harbouring nature of the artificial reef habitat has been monitored.

ESTABLISHMENT ATTACHED TO THE CENTRE

Realising the significance of Agatti Islands and the adjacent oceanic areas in the tuna fishery, a Field Station has been established there. The Station is functioning in the office of the Department of Fisheries, Lakshadweep and is in charge of a Scientist. Major aspects of investigations being undertaken at the Station are resource characteristics of tunas, their biology and

utilisation of catch and economic aspects. Resource position of live bait "Sprats", which are extensively exploited for tuna fishery is monitored.

GENERAL

The Research Centre provides facilities for research work leading to Ph.D. degree for Senior Research Scholars under the Post Graduate Programme in Mariculture of CMFRI. Presently two research programmes are pursued at the Centre viz., field and experimental studies on ornamental fishes and on tuna live-baits.

The Centre provides working facilities for visiting Research Fellows attached to the "ICAR Adhoc Project on Seaweeds".

STAFF STRENGTH AND INFRASTRUCTURE FACILITIES

The present complement of staff attached to this Research Centre includes 4 Scientists and 5 supporting staff.

There are three major research projects handled by the Research Centre. The laboratory is provided with sea

water supply and is equipped with hydrographic analytical equipments, equipments for plankton analysis and fishery biological studies, microscopes, physical and chemical balances, seawater filtering unit, deepfreezers, air compressor, aeration system, waterlift pump, indoor culture tanks, spectrophotometer and photographic camera.

The centre has a library with a holding of 200 books and several recent scientific periodicals and extension literature. A fibreglass boat (18 feet) with 15BHP OB engine and a wooden mechanised boat (30 feet) are the facilities for field work.

FUTURE PROGRAMME

The monitoring projects under Pelagic Fisheries Division and Fishery Environment Division will continue with emphasis on stock assessment of tunas and environmental ecology of bait-fishes and tuna fishing grounds respectively. The thrust areas proposed to be taken up for future investigations include population and growth studies of tunas, breeding of selected live-bait species, tuna-environmental investigations and expansion of Artificial Reef Research.