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COCHIN, INDIA

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THE MARINE FISHERIES INFORMATION SERVICE: Technical and Extension Series envisages the rapid dissemination of information on marine and brackish water fishery resources and allied data available with the Fishery Data Centre and the Research Divisions of the Institute, results of proven researches for transfer of technology to the fish farmers and industry and of other relevant information needed for Research and Development efforts in the marine fisheries sector.

Abbreviation—Mar. Fish. Infor. Serv. T & E Ser., No. 44 : 1982.

CONTENTS

Cover photo: Damaged and grounded boats at Madhwad in Gujarat.

CYCLONE DEVASTATION ALONG SAURASHTRA COAST OF GUJARAT IN NOVEMBER 1982

G.Sudhakara Rao and K.K. Datta.

A severe cyclonic storm with a wind velocity of 150 km per hour swept through the coastal districts of Junagadh, Amreli and Bhavnagar of Saurashtra (Fig.1) on the afternoon of 8th November 1982 leaving behind a trail of destruction along its path. It is reported to be the worst of its kind in the living memory of the local people and has taken a toll of 550 human lives and 2 lakhs heads of livestock. About 2 lakh huts were completely damaged and about an equal number of pucca houses were either partly damaged or destroyed. Thousands of trees were uprooted and electric and telecommunication poles got twisted. Communication was totally disrupted and the three districts were plunged into darkness. Amreli district was the worst hit with a death toll of 265. The cyclone played havoc with the garden crops like banana, coconut and sugarcane. While the cyclonic winds and incessant rains inflicted heavy damage along the coast, flooding of lowlying areas due to overflowing and breaching of dams devastated the inland villages taking a heavy toll of human beings and livestock.

The course of the cyclone was monitored precisely by the Colaba Observatory since 5th November. The storm developed in the Arabian sea was to touch Bombay on 6th November. But it had changed its course by 6th evening and it was predicted that it would touch South Gujarat. A further change in the course indicated that it was picking up momentum and would cross the land somewhere along the Saurashtra coast by 8th November with wind velocity of 150-200 km per hour. By 8th morning it was certain that the storm would cross between Diu and Veraval by the forenoon of the same day. As predicted the cyclone touched the land at Madhwad, a fishing village about 50 km from Veraval, with a wind speed of 150 km and passed through Kodinar, Amreli and Bhavnagar. Its full force was felt between Jaffrabad and Veraval along the coast. The whole area had been experiencing intermittent heavy rains since 6th evening and the intensity increased by 8th noon. The entire town of Veraval was flooded with rain water and in some places as much as 5 feet of water was flowing

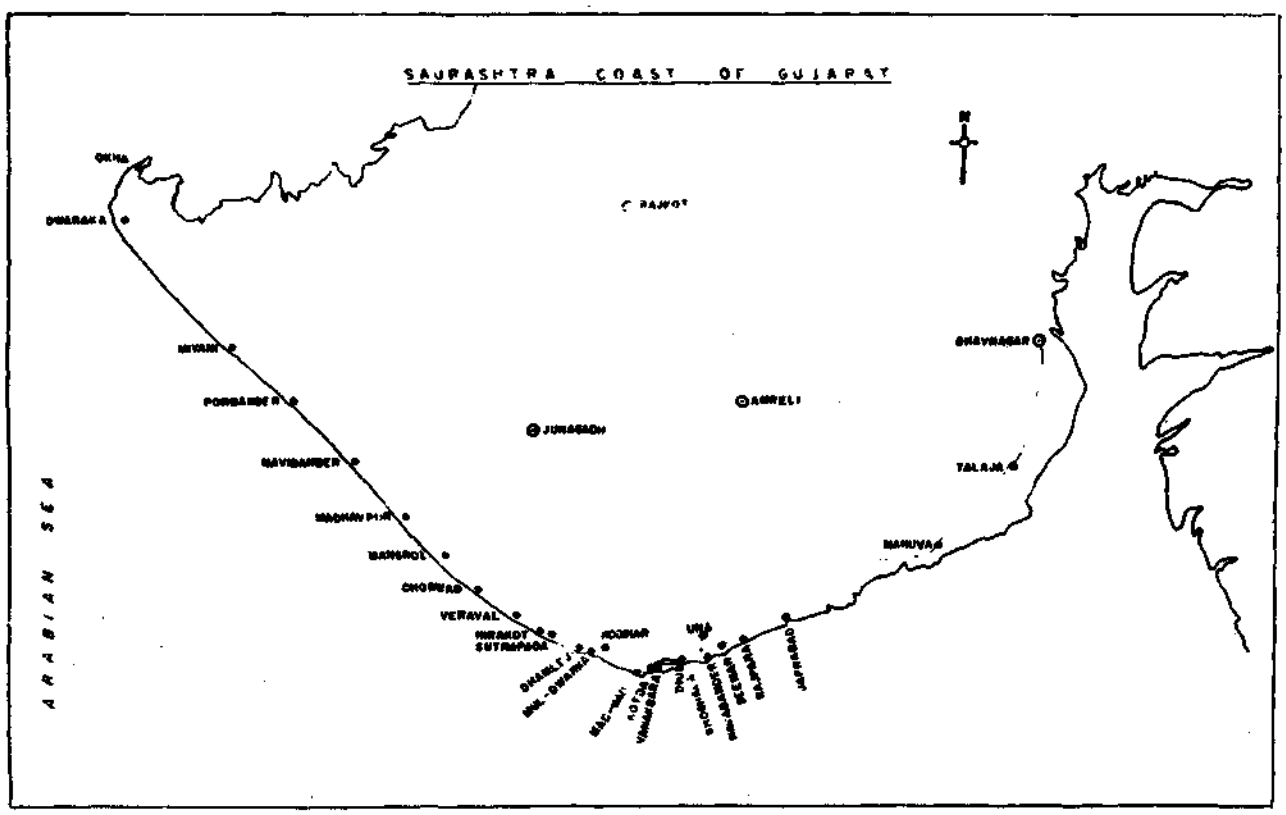

Fig. 1. Map showing the fishing villages affected by the cyclone along Gujarat coast.

Table.1. *Districtwise extent of loss and damage to small scale fisheries along the coast of Gujarat (Value in '000 Rs.)*

District	Loss of human lives	Damages to houses		Loss of boats		Damages to boats		Loss of nets		Loss of fish materials (Value)	Total loss (Value)
		No.	Value	No.	Value	No.	Value	No.	Value		
JUNAGADH	3	3210	5363	40	1213	433	1852	817	784	11082	20294
AMRELI	15	365	571	11	310	112	783	949	312	—	1976
DIU	6	330	230	10	383	59	204	5	32	80	929
Total	24	3905	6164	61	1906	604	2839	1771	1128	11162	23199

on the roads. Veraval had 23 cm rain fall on the 8th of November. The coastal areas had a sigh of relief by dusk as the wind subsided while the inland areas of Amreli and Bhavnagar districts continued to have rough weather in the night.

Government machinery was geared up to meet the eventuality. By 8th morning radio broadcast and local announcements were given to keep the people on the alert. The army and airforce were also informally alerted to stand by in the rescue and relief operations. In spite of all the precautionary measures, there was extensive damage to public and private properties due to the cyclone and the loss was estimated at Rs.260 crores. The loss to crops, livestock, fisheries and forestry alone would be to the tune of 150 crores.

There was extensive damage at Veraval as many of the houses collapsed and all communications got cut off. Port department suffered a damage of Rs.40 lakhs. Nine of the barges drifted to high seas and sank and heavy damages were caused to godowns and machinery. World Bank fishery harbour project lost about Rs.40 lakhs as 45 cm of western break-waters and 90 m of eastern break-waters were washed away because of wave action. The coffer dams built to facilitate dredging in the inner basin were breached. The auction hall and gear mending hall built under the scheme were heavily damaged.

Damages in fishing villages (Figs 2-13)

The fisheries sector is one of the worst affected in the cyclone especially in the districts of Amreli and Junagadh and the Union territory of Diu. The districtwise details of the damages are given in Table 1. The fish landing centres affected are shown in figure 1. 61 boats were lost and about 600 boats, mostly country crafts fitted with outboard engines or inboard engines, were damaged inflicting a loss of about Rs.47 lakhs. Gears, mostly gillnets and dol nets accounted for a loss of about Rs.11 lakhs. About 3900 huts were either blown off or damaged, the extent of damage being about Rs.62 lakhs. Processed fish material-dry fish, fish meal, prawns and squids-worth Rs.112 lakhs was spoiled because of godown collapses and power breakdown.

Madhwad, a fishing village in Amreli district, about 50 km south of Veraval, was the worst hit with 14 lives lost and damages to fishing boats and fishermen houses. About 25 houses were completely washed away because of tidal action. Some of the persons who ventured out of the villages to reach safer elevated places were swept away by tidal water and gales. Almost all the houses were damaged and the boats which were moored in the bay were let loose by the tidal action and drifted helter-skelter. Those that drifted to inland areas ran aground when the tidal water receded after the fury of the cyclone. The total loss was estimated at Rs.10 lakhs.

Mul-Dwarka, another fishing village in Amreli district about 40 km south of Veraval also suffered extensive damage with an estimated loss of Rs.5 lakhs. About 20 houses in the sea front were swept away along with the belonging of the fishermen because of erosion due to tidal action. About 790 pieces of gill net were also swept away.

Union territory of Diu also had severe damage. A trawler with 3 crew drifted into the sea, resulting in the loss of all of them. Another boat, a dolnetter, drifted with 3 crew and sank, killing all the occupants. The total losses at the four fishing cen-

tres of Diu, namely Diu, Ghoghakla, Seemar and Venakbara are to the tune of Rs.9 lakhs.

The dol net fishing zone mainly consisting of the three landing centres Jaffrabad, Rajpara and Nawabunder in Junagadh district has also suffered extensive damages, the loss being estimated at Rs.58 lakhs. Five boats and 84 dol nets were lost. About 2400 huts were blown away by the wind, exposing dry fish stock worth Rs.31 lakhs and resulting in their spoilage.

Damages in fishing harbours

The full fury of the cyclone was felt at Veraval where waves of 3-4 m hight lashed the coast tossing the fishing vessels in the harbour. Thirteen canoes were lost and 31 trawlers sank in the harbour due to a breach in the cofferdam and subsequent gushing of flood waters into the harbour. However all the 31 trawlers were refloated with the help of cranes and manual dewatering. About 131 boats were damaged inflicting a loss of Rs.9 lakhs to the industry. Unlike the 1981 cyclone, this year the brunt of the fury was felt by the fishing industry. Almost all the buildings and sheds of fish freezing plants, fish meal factories and dryfish traders were heavily damaged at Veraval with an estimated Rs.123 lakhs loss to the industry (Table.2). Buildings, machinery and freezing material worth Rs.63 lakhs were lost. A number of fish meal factories were damaged and the loss was estimated at 44 lakhs. Worst affected are the dryfish traders who lost all their godowns, sheds and dryfish, the loss estimated at Rs.17 lakhs.

The fishing industry at Porbandar and Mangrol which was greatly affected in 1981 cyclone felt only a fringe of the fury of the present cyclone and escaped with minor damages. At Porbandar a trawler sank in the sea and the crew managed to escape. About 5 boats were damaged. The loss was estimated at Rs.2 lakhs. At Mangrol about 70 boats were damaged incurring a loss of Rs.1 lakh.

Table.2. *Losses to the fishing Industry at Veraval (Value in '000 Rs)*

Item	Freezing Plants/ Ice factory	Fish meal factories	Dry fish Traders	Total
Buildings	1304	1759	365	3428
Machinery	327	262	—	589
Frozen material	4417	—	—	4417
Dry fish	—	—	1274	1274
Dry fish for fish meal	—	1350	—	1350
Fish meal	—	917	—	917
Others	243	78	38	359
Total	6291	4366	1677	12334

Loss due to suspension of fishing

Assuming that the catch trend during the period when fishing was suspended due to the cyclone remained the same as in few days prior to the havoc, the expected catches of fish were worked out for each district. The loss was estimated at Rs.442 lakhs (Table.3.)

Table. 3. *Expected loss due to suspension of fishing after Cyclone*

Name of the District	No.of days fishing suspended	Expected quantity lost (in tonnes)	Loss in Value ('000 Rs)
JUNAGADH	15	13170	36676
AMRELI	22	1914	4124
DIU	12	1428	3416
Total	—	16260	44216

Relief measures

The Government of Gujarat has taken prompt relief measures to rehabilitate the displaced persons, to provide essential commodities and to resume power supply. Prompt action was taken in clearing the roads to provide communication system and to supply essential goods to the affected persons. Fresh water was supplied by tankers in towns and villages. About 48 towns and 2,000 villages were in darkness for days together. Due to prompt action power supply has been restored to 38 towns and 1,343 villages within a fortnight. Power generators were pressed into service in remote towns to run flour mills and other essential units to avoid inconvenience to the public. However, it would take same more time to restore the normal power system as the damages were extensive. Medical teams were sent to all the areas to prevent spreading of epidemics. About 2 lakh doses of anticholeras vaccine have been despatched to the affected areas.

Government agencies have distributed Rs.3.5 lakhs as cash assistance to the families of the persons killed in the calamity and Rs.50 lakhs have been distributed as assistance in kind. Central

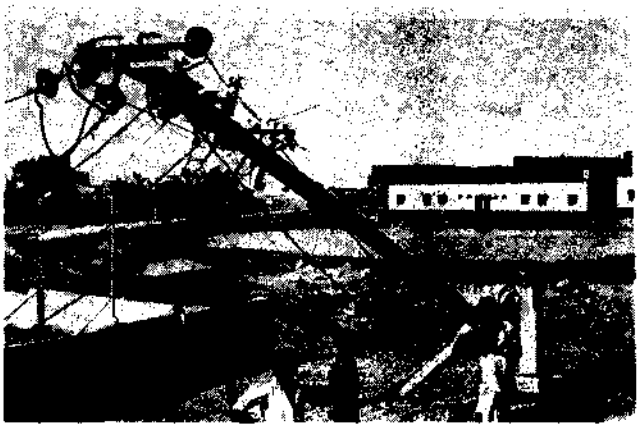

Fig. 2. Fury of the cyclone-bent electric poles.

Fig. 3. Road in Veraval after flood water receded.

Fig. 4. Damaged Municipal market of Veraval.

Fig. 5. Damaged roadside shops in Veraval.

Fig. 6. Boats damaged in Veraval fisheries harbour.

Fig. 7. Lifting sunken trawlers by crane at Veraval.

Fig. 8. Uprooted coconut trees.

Fig. 9. Gear mending Hall in Fishery Harbour Project.

Fig.10. Damaged building of a freezing plant.

Fig.11. Houses in heaps.

Fig.12. Boats among huts at Madhwad.

Fig.13. Grounded boats.

Severe cyclone may hit Bombay

Express News Service
PUNE, Nov 6
severe cyclonic storm is
acingly advancing towards
West Coast from the Ara-
Sea, and Bombay falls in
servatory, the severe storm will start adversely affecting the coast from Monday morning. It is still not clear which part of the coast it will strike, since storms tend to behave in the erratic manner,

Cyclonic storm heading for S. Gujarat

HMEDABAD, Nov 7
(PTI, UNI)

he activities in coastal
ages and towns of the
ith Gujarat came to
r standstill this even-
following imperiding

The rainfall was caused unde
the influence of severe cyclonic
storm which was situated abou
800 kms south-west of Bombay
at 1730 hours yesterday and
which is likely to cross the
South Gujarat coast between
Harnai and Bulsar tomorrow
afternoon.

Fishermen in coastal village
of South Gujarat and Saurast

Storm toll 487
76 still missing

By Our Staff Reporter
GANDHINAGAR, Nov 18
The death toll in last week's
clone in the State rose to
this morning.
Mating this here today,
ernment had so far disbursed
Rs 40 to Rs 42 lakhs as cash
doles and other reliefs to the
cyclone victims, Mr Raval said
that the Central team to assess
the cyclone damage was likely

Nature's fury haunts Amreli re

y SAIBAL DASGUPTA
press News Servile
AMRELI, Nov 18
cyclone victims of Amreli
know which of the two
final blow — the cyclone
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at gushed out of the ri-
they know is that they
denly exposed to the fu-
nature on the fateful
the walls of their houses
umbling. And the battle
d for survival.
Madha of Wankia village
ly braced up for the fight
d to pull out his family
through the roof, as the
jammed shut by the in-
e wind. The family of
quivering on a raised
nade by stacking sacks
ver a huge metal trunk

nished his task before
fall gave in. He broke
rooden plank that sun-
roof by banging his
it. On

Amreli not likely to forget the cyclone

Amreli Chamber of Commerce
sident Jakubhai Dalal put the
industries at over Rs one
industrial sheds
severely dam-

fected. About two km of railway
track has been completely washed
away and more than half of all
trees in the district have been
uprooted.

Officials estimated the losses
to roads at Rs 77 lakh while
damages to Government buildings
public sector establish-
work out to about

damage caused by the cyclone
The Minister said that Rs 1,000
would be given to the relatives of
the deceased and Rs 500 to
those injured. The worst hit in
Saurashtra were people belonging
to the weaker section who got
built houses on this land and had
100 square metres of land and had
5000 such houses have
sadly damaged die
and strong

ire.
ent factory at Jaffrabad
jetty constructed near it
ffered severe damages, ac-
to State Finance Minister
Mehta who is supervising
operations in the area.

ive damage railways

ress News Service
BOMBAY, Nov 12

ore gauge sections of
ern Railway between
unction and Khijadiya
adiya and Visavadar in
nagar division, have suf-
ensive damages due to
nic storm.

oad gauge trunk routes
Surat and Baroda and
and Ahmedabad have
ered extensive damages,
y to the overhead equip-
reports reach-

Damage in Saurashtra over Rs 100 crore

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Express News Service
RAJKOT, Nov 19
Damage due to cyclone in Saurashtra is estimated to be over Rs 100 crores, according to preliminary reports reaching here. According to experts, the dam
much worse
flash floods
it is

Government has already sanctioned Rs.20 crores as relief advance to the state. Several social organisations and individuals have been distributing utensils, clothes, blankets and foodgrains in the affected areas.

The state announced that fishermen who lost their boats will get a subsidy to the extent Rs.1/3 of the price of a boat upto a maximum of Rs.8,000/-. Those whose boats have been damaged will get a subsidy of 1/3 of the damage with a ceiling of Rs.2,500/-. Higher amounts were given to replace /repair trawlers.

Low interest loans are being provided to rehabilitate cyclone affected industrial units by Gujarat State Finance Corporation and Gujarat Industrial Investment Corporation. The latter has decided to open depots at Veraval, Junagadh and Amreli to supply cement and galvanised iron sheets to the affected units. Government has also decided to defer the recovery of sales tax and electricity tariff from the affected units for one year period. Already about 36 affected units have received loans over Rs.4 lakhs. Under the special scheme, loans of upto Rs.25,000 at 4.5% interest would be granted to the small units affected. The loan requirements between Rs.25,000 and Rs.50,000 carrying an interest of 9% would be financed by the State Finance Corporation. Loans exceeding Rs.50,000 upto 5 lakhs would also be financed to the needy units but at normal rate. Moreover, the State Government has formulated a proposal that Banks should extend loans of upto Rs.50,000 which would be guaranteed by the Government.

Overall effects of Cyclone

The marine catches of Saurashtra coast comprise mainly Bombay duck,sciaenids, pomfrets, elasmobranchs, clupeoids, seer fish, cat fish, ribbon fish and prawns. For about 15 days immediately after the cyclone, no fish was landed due to suspension of fishing consequent to the cyclone havoc, resulting in an estimated loss of Rs.442 lakhs. The loss due to damages to crafts, gears, fish materials and houses in the fishing villages of Junagadh, Amreli and Diu districts was estimated at Rs.232 lakhs. The fishing industry at Veraval suffered a loss of about Rs.123 lakhs. In addition Rs.9 lakhs were estimated to be the loss due to damages to the boats anchored in the harbour. The damages to the fishing harbour at Veraval were estimated to be about Rs.80 lakhs. The loss at Porbander and Mangrol worked out to Rs.3 lakhs. Thus the total loss to the marine fishery sector due to the cyclone is estimated at Rs.889 lakhs.

About 13,000 fishermen engaged in fishing in Saurashtra coast were rendered jobless for a period of 15 days. Another 1,500 persons engaged in allied activities like transportation of ice and marketing of fish also could not take up any work during the same period. Moreover, these fishermen are not in general benefited by institutional credit agencies. They take advances from traders and sell their catches to them. The traders charge heavy interest through purchasing the fishes at rates much less than the open market price. The fishermen generally repay their loans during the season. But due to the cyclone and the subsequent lay off it was impossible for them to clear off their debts. In addition, these fishermen took advances for repairing their boats and huts damaged, by which their debts are further getting accumulated resulting in their bondage to those traders. This will have social repercussions.

After cyclone it is reported that there was a decrease in catches. This has brought ill-luck not only to the fishermen but also to others involved in fishing industry like merchants, traders and owners of freezing plants. In Saurashtra coast, most of the freezing plants run below capacity but after cyclone this un-utilization further increased and aggravated the unemployment problem.

The boats that got damaged during cyclone period were attended by a heavy influx of carpenters, machanics and other labour force from the mainland. This has accelerated the repair works.

The Government is doing its best to rehabilitate the victims. While the fishing operations are fast reaching normalcy it would take a few more months before the freezing plants and fish meal factories would be able to process fish at the normal level. Inspite of the will and determination on the part of fishermen, fishing industry, government and social organisations, it would take at least another three months to put the system back on the wheels.

TRAWL FISHERY OF SOUTH KANARA WITH SPECIAL REFERENCE TO PRAWNS AND BY-CATCHES*

Introduction

Mechanised trawling for prawns has assumed great significance in recent years due to the increasing demand for prawns from export industry. Prawns are also caught in traditional gears like cast net, kanthabale (bottom set gill net) and kairampani net (shore seine) during monsoon months, but contributing to negligible quantities. Hence, although prawns form less than 15 percent of the trawl catches, the export oriented industry is largely dependent on trawl fishery.

Karnataka contributes around 2.1 percent of the total prawn landings in our country amounting to 3863 t (based on the average for 1971-80).

By way of by-catch large quantities of fishes consisting of both cheap trash fish and quality fishes are landed from shrimp trawling. The total by-catch forms as high as 85 percent of the trawl landings.

Karnataka has got a coast line of 300 km. An appraisal of the trawl fishery is being attempted based on the data collected from Mangalore and Malpe during the fishing seasons 1980-81 and 1981-82.

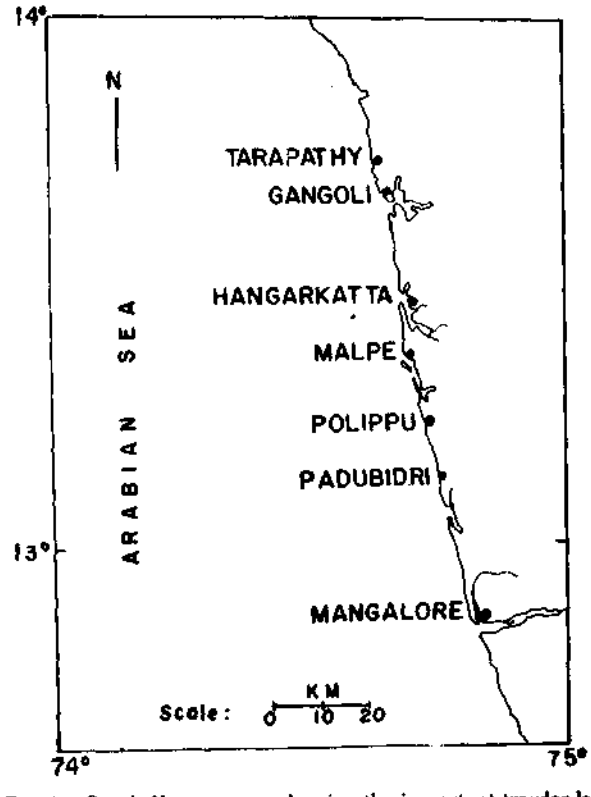


Fig. 1. South Kanara map showing the important trawler landing centres.

Craft and gear

Boats of varying lengths from 6.7 m to 10.97 m fitted with 20 to 96 H.P. engine using otter trawl with head rope length of varying lengths are operated from this area. A few large vessels (13.2 m) fitted with 120 H.P. engine are pressed into service during peak seasons.

Around 1500 trawl units are operating along this coast. Of this, 1161 units are in South Kanara alone, and most of them are centred around Mangalore (425 boats), Malpe (342 boats) and Gangoli (219 boats) mainly due to the infrastructural facilities (storage, transport, market etc.) available there. In addition, some boats are operated from Padubidri (33 units), Polippu (40 units), Hangarkatta (94 units) and Tarapathy (8 units) (Fig.1).

Fishing season

Normally the trawling starts in September after the south west monsoon and lasts till May end or early June. With the onset of monsoon the fishing with mechanised vessels is suspended and the indigenous fishery takes over.

Fishing operations.

Generally the trawl units set out for fishing at dawn and return around mid-day. Sometimes, the landings are continued upto 2-3 p.m. at Mangalore, whereas, at Malpe, this is continued till late in the evening during peak seasons.

The smaller boats (6.7 m to 9.75 m) usually fish in 10-25 m depth. During January to April, the larger boats go for 1-2 days' night fishing. These units generally operate the net upto a depth of 40 m for catching larger varieties of prawns which are brought to the landing centre in large ice boxes. A few big vessels after 3-4days' fishing bring the catch in their fish-holds in crushed ice.

The number of hauls made by each unit vary from 1 to 1-3 per day with an average of 2 hauls, each lasting normally 2-3 hours.

Fishing grounds lie within 15 km from the shore.

*Prepared by K.K.Sukumaran, K.Y.Telang and O.Thippeswamy.

Table.1. *Estimated month wise landings (in tonnes) of the important groups by trawl nets at Mangalore during 1980-81 & 1981-82.*

Categories	September		October		November		December		January	
	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82
Prawns	79.7	8.4	0.2	0.3	2.2	120.2	78.6	152.9	127.9	61.2
Fishes	27.8	20.0	—	1.5	31.2	677.9	263.8	377.0	241.3	271.7
Stomatopods	—	—	—	—	9.5	147.3	383.8	326.1	441.2	362.2
Crabs	—	—	—	—	—	0.2	21.3	8.7	20.5	14.5
Cephalopods	—	—	—	—	0.8	3.8	1.8	14.2	1.4	5.2
Total	107.5	28.4	0.2	1.8	43.7	949.4	749.3	878.9	832.3	714.8

February		March		April		May		June		Grand Total	
80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82
89.6	140.1	47.7	168.2	117.0	148.7	132.8	183.7	—	0.9	675.7	984.6
456.0	326.8	334.6	954.4	617.3	546.3	528.2	898.7	—	11.9	2500.2	4086.2
500.2	272.2	163.5	627.3	220.3	758.2	168.7	80.8	—	4.2	1887.2	2578.3
31.4	19.0	19.8	24.2	26.5	20.1	28.5	7.8	—	0.4	148.0	94.9
3.3	2.6	1.6	21.7	0.8	7.8	0.9	5.2	—	0.1	10.6	60.6
1080.5	760.7	567.2	1795.8	981.9	1481.1	859.1	1176.2	—	17.5	5221.7	7804.6

Catch and catch composition

The annual landings at Mangalore was estimated at 5221.7 t (196.7 kg/boat day) and 7804 t (228.2 kg/boat day) during 1980-81, 1981-82 respectively. At Malpe, it was 5256.0 t (212.1 kg/boat day) during 1981-82 (Table 1 and 2). Though the trawling season is spread from September to May, the bulk of the catch was realised during the latter half January-May. The landings, generally low during October-November, increased to a peak during February-March and thereafter, declined marginally during the following months (Fig.2).

The trawls being primarily operated for prawns, the catches could be broadly grouped into prawns and by-catches, including 1) fishes 2)stomatopods 3) crabs and 4) cephalopods.

On an average, around 50% of the catch was contributed by fishes, 13% by prawns, 34.5 % by stomatopods, 2% by crabs and the rest by cephalopods (0.5%) (Fig.3).

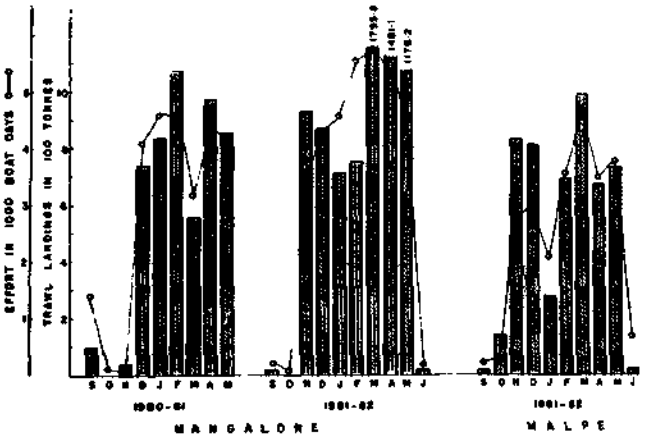


Fig. 2. Monthwise trawl landings and effort in boat days during 1980-81 and 1981-82 at Mangalore and during 1981-82 at Malpe.

Table.2. *Estimated monthwise landings (in tonnes) of the important groups by trawl nets at Malpe during 1981-82*

Categories	September	October	November	December	January
Prawns	9.2	0.2	150.6	87.7	21.2
Fishes	9.5	135.3	379.8	235.3	123.4
Stomatopods	—	—	313.3	475.4	118.0
Crabs	—	—	1.4	0.3	16.6
Cephalopods	—	—	1.1	20.0	3.2
Total	18.7	135.5	846.2	818.7	282.4

February	March	April	May	June	Grand total
79.8	69.6	98.6	46.9	5.3	569.4
314.9	403.0	375.8	676.9	18.9	2672.8
249.8	505.4	189.9	15.0	2.1	1868.9
54.0	10.5	11.6	9.4	0.8	104.6
1.8	12.0	2.2	—	—	40.3
700.3	1000.5	678.4	748.2	27.1	5256.0

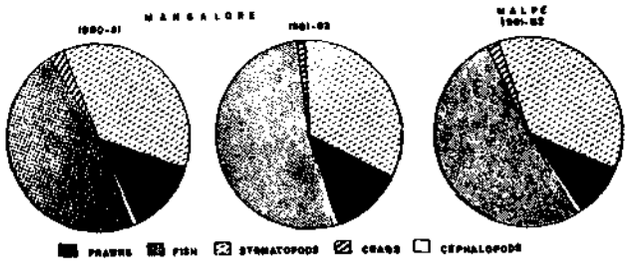


Fig. 3. Distribution pattern of the major categories in the shrimp trawlers at Mangalore (1980 81 & 1981-82) and Malpe (1981-82).

Prawns

The prawns are represented by *Metapenaeus dobsoni, M.affinis M.monoceros, Parapenaeopsis stylifera, Penaeus indicus* and *P.monodon*. Among them, *P.stylifera* and *M.dobsoni* were the dominant species contributing around 80-85% of the annual prawn catch (Fig.4). The estimated landing of prawns was 675.7 t and 984.6 t respectively during the two seasons at Mangalore. At Malpe, it was 569.4 t during 1981-82.

It may be seen that generally October-November is the lean period for prawns. The landings were fairly high during the latter half of the season particularly during May at Mangalore and during November at Malpe (Fig.5).

M.dobsoni,locally known as 'Poovalan', formed 53.5% of the prawn catch (361.4 t) during 1980-81 at Mangalore. In the following season, the landings decreased by 19.3% and accounted for only 29.6% (291.5 t) at the same centre.At Malpe, it contributed 20.5% (116.0 t). Landings were generally high

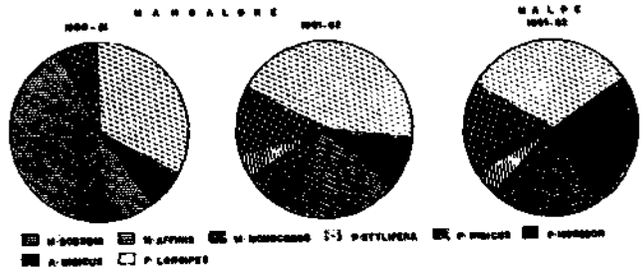


Fig. 4. Species composition of prawns landed by shrimp trawlers at Mangalore (1980-81 &1981-82) and Malpe (1981-82)

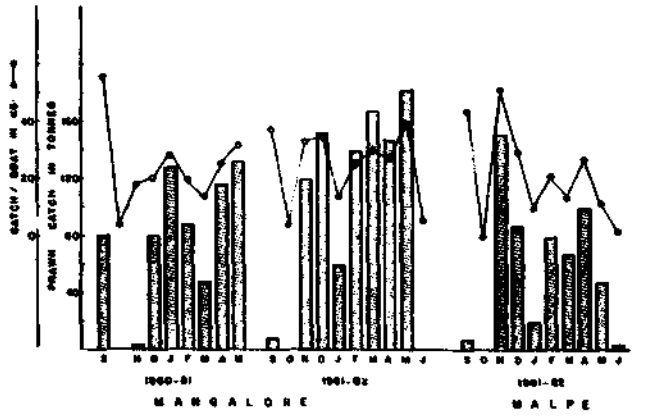


Fig. 5. Monthwise prawn catch and catch rate during 1980-81 and 1981-82 at Malpe.

during September and January- May at both the centres.

The catches of *M.affinis* (brown shrimp) were very poor during 1980-81 forming 0.9% of the annual prawn catch (6.3 t) at Mangalore. However, in the following season, the catches were better and amounted to 46.2 t (4.7 %). At Malpe, it formed 5.2% (29.6 t). The best catches were obtained during February at both the centres.

M.monoceros, also known as brown shrimp, contributed to 5.9% of the annual prawn catch (40.2 t) during 1980-81 at Mangalore. The landings improved considerably during the following season forming 12.2 % (120.3 t). It formed 16.7% (94.5 t) at Malpe. Landings were fairly good during March at Mangalore and in December at Malpe.

P.stylifera, locally known as 'karikadi', contributed to 33.3% during 1980-81 (225.3 t) at Mangalore. The catches improved in the following year and formed 44.2% (434.9 t). It contributed to 32.0% (181.7 t) at Malpe during 1981-82. The catches were generally high during April-May at both the centres.

The catches of *P.indicus* (white shrimp) was 35.2 t (5.2%) and 49.3 t (4.1%) respectively during the two seasons at Mangalore. At Malpe, it formed 4.3% (24.6 t). March-May seems to be the best season for this prawn.

P.monodon (Tiger shrimp) is very important from the commercial point of view as it grows to very large size. However, it formed only 1 % or less of the annual average landings at Mangalore and Malpe. The catches amounted to 4.6 t and 9.2 t respectively during the two seasons at Mangalore and, it was 4.6 t at Malpe.

Parapenaeus longipes, although growing to comparatively smaller size, is potential resource occuring during April-May and the annual catch was 2.7 t during 1980-81 at Mangalore.

Acetes indicus was seldom caught in trawl nets in large quantities. The landings were fairly high during November 1981 forming 4.3 % of the annual average prawn catch (42.2 t) at Mangalore and, 20.5% (116.2 t) at Malpe.

By-catches

Fishes

Fishes, contributing to about 50% of the trawl catches, are represented by a number of groups of species. Their abundance vary from season to season and month to month. Fig.6 shows the percentage composition of the important fish groups during 1981-82 at Mangalore and Malpe.

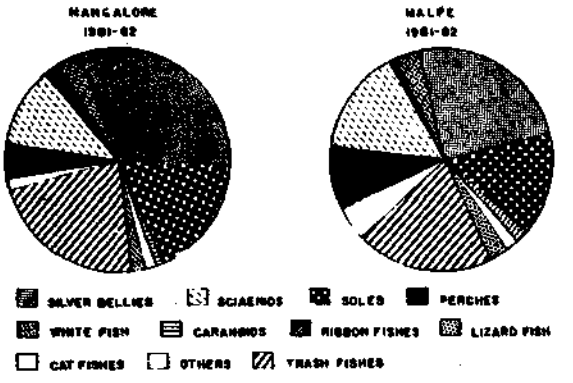


Fig. 6 Distribution pattern of the important category of fishes during 1980-81 and 1981-82 at Mangalore and 1981 82 at Malpe (Others - includes all those variety of fishes which contributed less tha 1 percent.

Silver bellies, are the dominant group among fishes, contributing to 31.2% and 24.5% at Mangalore and Malpe respectively during 1981-82. Though a number of species of *Leiognathus* and a single species of *Gazza* occur regularly in trawl catch, *Gazza minuta, Leiognathus splendens, L.bindus* and *Secutor insidiator* are the abundant species, maximum catch was recorded during September- October.

Sciaenids, popularly known as 'Jew fishes', are generally caught in shrimp trawls throughout the year in varying quantities. In the annual fish catch, it formed 11.6% and 15.1% respectively at Mangalore and Malpe during 1981-82. Though this group is represented by several species, *Otolithoides cuvieri* together with a few species of the genus *Johnius* formed the bulk of the sciaenid catch.

Soles occurred round the year and contributed 17.5% and 15.0% respectively at Mangalore and Malpe. This group is mainly represented by a single species *Cynoglossus semifaciatus* and mostly consisted of smaller sizes 8-12 cm.

Perches formed 5.0% at Mangalore and 8.6% at Malpe during 1981-82. *Nemipterus japonicus* contributed to the bulk of the catch. Maximum catch was recorded during May.

White fish *Lactarius lactarius* is one of the quality fishes caught in small quantities round the year. It formed 3.2% and 3.8% respectively at these centres. The size ranging from 7 to 18 cm generally supported the fishery.

Carangids occur throughout the year and formed 1.2% and 2.0% respectively at these centres. It is represented by several species of *Caranx* and allied forms. Of these, *Selar calla* is the chief species contributing to around 80-90% of the carangid catch.

Ribbon fishes, represented by two species *Trichiurus lepturus* and *T.savala*, formed 2.1% respectively at Mangalore and Malpe. Bulk of the catch was obtained during April-May and September - October.

Lizard fish *Saurida tumbil* formed 1.9% and 3.0% respectively at these centre. Catches were fairly good during March-May.

Cat fishes occured fairly in good quantities during March-May and contributed to 1.4% and 1.8% respectively at Mangalore and Malpe. *Arius tenuispinus* (size ranging from 15 to 35 cm) was the abundant species.

Among fishes, pomfrets are more in demand and hence highly priced. It occured as stray numbers and formed less than 1 percent. It is represented by *Apolectus niger* (black pomfret) and *Pampus argenteus* (silver pomfret).

Anchovies are caught in small quantities during April-May and contributed less than 1 percent. *Stolephorus battaviensis* was the most common species.

Elasmobranchs (sharks, rays and skates) and clupieds *(Anadontostoma chacunda, Dussumieria acuta, Hilsa ilisha* and *Sardinella longiceps)* occur in stray numbers regularly.

In addition, several species of trash fishes of demersal and mid-pelagic nature, are landed in large quantities round the year and formed 22.6% and 20.0% respectively at Mangalore and Malpe.

Stomatopods

This group is represented by a single species, *Oratosquilla nepa*. The catches amounted to 1887.2 t and 2578.3 t during 1980-81 and 1981-82 respectively forming 36.1% and 33.0% of the annual trawl landings at Mangalore. At Malpe, the catch was to the tune of 1868.9 t forming 35.5% during 1981-82. The landings were very high during February-April.

Crabs

Though this group is represented by a number of species along this coast, *Portunus sanguinolentus* and *P.pelagicus* are only commercially important. These species together formed around 2% of the annual average catch by trawls. The estimated landings amounted to 148.0 t (1980-81) and 94.9 t (1981-82). At Malpe, it was 104.6 t during 1981-82. Landings were generally good during February-March at both the centres.

Cephalopods

Squids *(Loligo duvacelli)* and cuttle fish *(Sepia aculeata, Sepiella inermis* and *Sepia pharaonis)* represent this group in the order of their abundance. Cephalopods contributed less than 1% in the annual trawl landings at both the centres. The annual catch was 10.6 t and 60.6 t at Mangalore and 40.3 t at Malpe. Better catches were obtained during December–March.

Marketing and disposal.

To facilitate auctioning, different category of prawns, quality fishes, crabs etc. are sorted out on board before arriving at the landing site. The catches, immediately on arrival, are taken out for disposal. If the boats are financed by Government agencies, auctioning is conducted by South Kananra Co-operative Fish Marketing Federation and 50% of the amount realised is adjusted towards the repayment of the loan, provided the prawn catches are heavy. Instead, if the prawn catches are low, only 5% of the return is taken as commission by Federation. Auctioning is generally done to fix the price of prawns (per kg) landed by different boats, separately. This is done since the quality and size of prawns vary from boat to boat. Even the rates of a single species differ from boat to boat in a day. The monthly average auctioning rates for different category of prawns are presented in Table 3. It is seen that the rate ranged from Rs.5 to 14 for *P.stylifera*, and from Rs.17 to 71 in the case of *P.indicus/P.monodon*.

Table.3. *The average auctioning rates (in Rupees) of different category of prawns at Mangalore during 1980-81 and 1981-82*

		M.dobsoni	*M.affinis*	*M.monoceros*	*P.stylifera*	*P.indicus*	*P.monodon*
September	1980-81	10.96	—	—	—	36.94	—
	'81-82	16.00	—	—	—	—	—
October	'80-81	—	—	—	—	—	—
	'81-82	—	—	—	—	—	—
November	'80-81	—	—	—	—	—	—
	'81-82	13.55	27.70	27.70	13.30	32.50	42.50
December	'80-81	10.90	—	—	11.80	17.00	—
	'81-82	11.75	28.75	28.75	10.75	37.00	45.60
January	'80-81	12.10	23.00	23.00	10.60	25.00	—
	'81-82	13.00	28.00	28.00	11.00	40.00	55.00
February	'80-81	14.20	29.00	18.80	12.80	39.45	48.35
	'81-82	16.00	29.00	29.00	14.00	42.00	58.00
March	'80-81	13.20	25.50	26.45	12.65	39.80	44.50
	'81-82	13.00	26.00	26.00	10.50	43.00	55.00
April	'80-81	14.35	25.00	26.40	12.95	40.00	—
	'81-82	13.50	30.00	30.75	10.25	57.75	—
May	'80-81	12.00	—	—	5.00	38.00	—
	'81-82	16.40	38.00	—	10.00	71.00	—
June	'80-81	—	—	—	—	—	—
	'81-82	16.50	—	—	9.40	—	—

In addition, there are a good number of boats owned by private parties (In Mangalore, more than 100 units are private and at Malpe, except a few, all the boats are owned by private agencies). Prawn catches of these units are booked by agents by financing huge sums. Normally, they take the prawn catch at a reduced rate. Later, the prawns are sold to local freezing plants at higher prices by some agents, while others send them to Cochin by train in crushed ice in bamboo baskets reinforced on sides by coconut leaves/mats made of palmyra leaves.

Crabs and quality fishes are auctioned by Federation/fishermen in the landing centre itself immediately on arrival. Generally a few baskets are taken out and auctioned as a lot. These fishes /crabs are purchased by fisherwomen/merchants /cycle venders etc., who in turn take them to the nearby markets or transport them in crushed ice to interior markets for immediate consumption. If the catches are heavy, some of the fishes like silver bellies, soles, *Lactarius*, carangids, cat fish, anchovies etc., are salted and dried/sun dried for future sale.

The stomtopods are purchased by agents who supply them to fish meal plants nearby. At Malpe, this is sundried and packed in gunny bags before selling them to fish meal plants/as manure at a premium.

Similarly, cephalopods are purchased by agents directly from the boats and supplied to processing units.

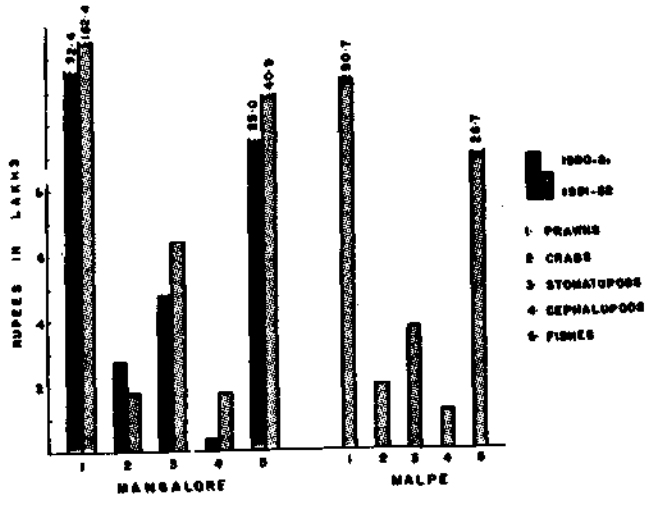


Fig. 7. Value of the major categories lnded by shrimp trawlers during 1980-81 & 1981-82 at Mangalore and 1981-82 at Malpe.

Based on the average price, the total estimated value realised in rupees was 12.5 million during 1980-81 at Mangalore. During 1981-82, the total amount realised was 21.3 million which was 70.3% more than that obtained during the previous season (Fig.7). This was due to enhanced catches of prawns and other fish groups resulting in better returns. At Malpe, the total value realised was 12.4 million rupees. In the total value, prawns alone contributed upto 75% at Mangalore and 72.3% at Malpe. The next important group was fishes fetching around 20% of the total value followed by stomatopods, crabs and cephalopods.

General Remarks

It is interesting to note that prawns alone contributed around 70-75% of the total value realised, although it formed only 13% of the annual average trawl catch. Due to the ever-increasing demand for prawns from the processing industry, there has been a tendency to increase the number of trawl units since the beginning of seventies resulting in a two-fold increse in fishing effort within a decade. The heavy exploitation of prawn resources is continuing and although there has not been any serious depletion of the resources, considerable strain on the exploited stock is evident, resulting in wide fluctuations in the catches. However, prawns being an annual stock, it may be possible for the resource to recover by the strength of the new recruits every year despite heavy fishing. The breeding migration of females of prawns, annual forced closure of the fishing during the period of the south west monsoon and the limited period of the fishing season (December-May) together with the restricted operations of trawls within 40 m depth are some of the biological and fishery controlled factors favourable for the resources to replenish its stock. In view of all these, although there has been fluctuation of the catches, showing very low returns in some years, it may not lead to any serious depletion of the resources, atleast in the near future, necessitating any urgent conservatory measures. However, a close monitoring of the situation is essential.

INDUCED SPAWNING AND LARVAL REARING OF *CRASSOSTREA MADRASENSIS* (PRESTON) IN THE LABORATORY*

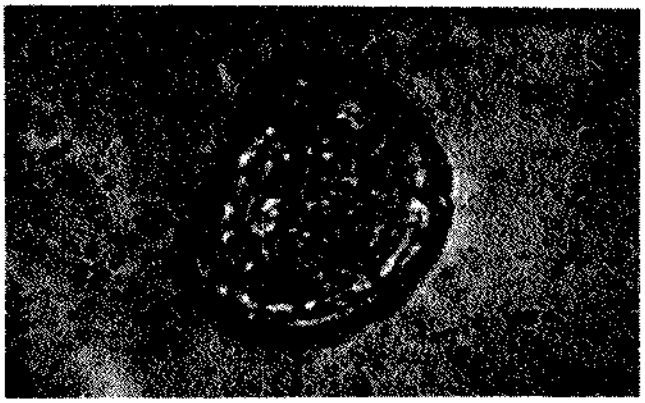
The technology of culturing the edible oyster *Crassostrea madrasensis* by rack-and-tray method has been developed by the Central Marine Fisheries Research Institute at Tuticorin. For carrying out oyster culture more effectively it is necessary that hatchery techniques are evolved so that oyster seed could be adequately produced and supplied for a continuous culture system.

Investigations on induced spawning and rearing of the oyster have been taken up at the Institute's hatchery laboratory at Tuticorin. For the first time in India spat of *Crassostrea madrasensis* have been produced on a large scale in August, 1982 in the laboratory.

Spawning: Oysters selected for spawning are conditioned for 24 to 48 hours at temperatures of 20°C to 22°C in an air-conditioned room. During this period the oysters are fed with phytoplankters (a mixed culture of diatoms and *Chlorella).* The oysters are then transferred to water at temperature above ambient level i.e., 30°C-32°C. When so treated the oysters usually spawn. To ensure spawning in females, sperm suspension from a ripe male is provided in the medium as an additional stimulus. The spawning process is generally over within 5 to 20 minutes which depends on the condition of the gonad. The gametes are transferred to a 10-1 beaker containing seawater specially filtered through cartridges. The fertilised eggs settle at the bottom and undergo further development.

*Larval rearing:*The first cleavage of the egg follows immediately after the appearance of the second polar body and successive divisions occur quickly. At the end of 3½ hours the morula stage is

*Prepared by K.Nagappan Nayar, M.E.Rajapandian, A.Deivendra Gandhi and C.P.Gopinathan.



A

B

C

Fig. 1. Larval stages and spat of edible oyster *Crassostrea madrasensis* A.Stright-hinge stage. B.Umbone stage. C.Eyed stage. D.Pediveliger stage. E.Spat.

D

E

reached. After further development, the straight-hinge or 'D' shell larval stage is reached at the end of 20 hours (Fig.1A). The larva is semi-transparent with the velum creating a strong ciliary current which directs minute particles of food into the stomodaeum. On an average the larva measures 50 µ along DVM (dorsoventral measurement) and 66 µ along APM (anteroposterior measurement) on the first day. On the 3rd day the larva becomes slightly oval in shape and measures 95 µ along DVM and 100 µ along APM. On the 7th day the larva attains the umbone stage and measures more along DVM than APM and the shell grows by addition of ridges. The larva measures on an average 150 µ along DVM and 110 µ along APM at this stage (Fig.1B).

The larva attains eyed stage on the 17th day. The foot is slightly developed with a tuft of cilia at the tip (Fig.1C). The larva measures between 295 µ and 310 µ along DVM and between 250 µ and 275 µ along APM. On the 18th day the larva starts crawling with the foot and becomes pediveliger (Fig.1D). The larva measures 350 µ along DVM and 310 µ along APM. Subsequently the pediveligers settle to lead a sessile life. The velum totally disappears and the labial palps and gills start appearing. This is known as plantigrade stage. Thereafter the larvae develop the characteristic adult features and metamorphose into spat (Fig.1E). The young spat measures 450 µ along DVM. On the whole, the development is completed within 19 days after fertilisation.

The larvae from straight-hinge stage were fed with *Isochrysis galbana* cultured in the laboratory under controlled temperature. Further work is in progress to standardise methods for producing oyster spat on a large scale.

DESTRUCTION OF EGGS OF CATFISH, *TACHYSURUS TENUISPINIS* BY PURSE SEINERS AT KARWAR*

The unwarranted destruction of huge quantities of eggs of catfish, *Tachysurus tenuispinis* by purse seiners in 1980 at Mangalore, Malpe and Gangoli of Dakshina Kannada District of Karnataka and its grave consequences was highlighted earlier in these columns (Mar. Fish. Infor. Serv. T&E Ser.,24 1980). In view of this, it was expected that due care would be exercised in the fishery by purse seiners, especially during September and October which happens to be the spawning season for *T.tenuispinis*. But this year also the same catastrophe is being repeated. There seems to be no regulation on the purse seine fleet operating in Uttar Kannada region in order to avoid indiscriminate fishing.

During September 1982 these seiners operating from Karwar landed catfish *T.tenuispinis* along with eggs in large quantities. The eggs landed amounted to 3.9 tonnes between 23rd and 29th September and again weighing 2.3 tonnes from 8th to 21st October. The catch details are given below:

These fishes were caught in the region 45–50 km north and south, almost equidistant from

Date			Catch of *T.tenuispinis* Adults (kg)	Eggs *(kg)*
22nd	September	1982	200	—
23rd	"	"	4,000	175
24th	"	"	3,500	120
25th	"	"	9,000	775
26th	"	"	61,000	2,050
27th	"	"	5,000	175
29th	"	"	14,000	575
30th	"	"	14,000	—
8th	October	"	2,000	225
9th	"	"	1,000	110
10th	"	"	7,100	525
11th	"	"	7,200	550
14th	"	"	100	15
21st	"	"	8,000	850
	Total		1,36,100	6,145

*Prepared by M.H.Dhulkhed, S.Hanumantharaya and N.Channappa Gowda.

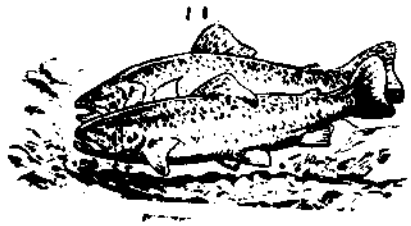
Fig. 1. Catch of catfish *T.tenuispinis* with incubating eggs landed by purse seiner at Karwar.

Fig. 2. Eggs of *T.tenuispinis* in baskets for disposal.

Karwar in the depth range of 20-30 m. The total length ranged from 210 mm to 390 mm with modes at 310 mm, 330 mm and 350 mm, about 3,000 nos weighing 1 tonne (Fig.1). The price varied from Rs.22 to Rs.50 per 100 nos. The fishermen had better financial returns initially. Later the prices slumped because of catch of other fishes. As there is a limited local market for consumption in fresh condition, practically all the catches were packed in ice and transported by lorries to Mangalore and further south. Some found their way to Bombay markets also.

Almost all the catch consisted of males, most of them carrying eggs in their mouth. The maximum number of eggs counted in the mouth of a single fish was as high as 46, with diameter varying from 10 to 12 mm. The estimated catch of eggs amounted to 4.5% of the total catch of *T.tenuispinis*. It is likely that large quantities of eggs must have escaped through the meshes of the seines during the operations. It was the first time that eggs in mouth incubating condition in such huge quantities were landed at Karwar (Fig.2). There being no demand for these eggs, their disposal posed a problem and this was solved easily by discarding them either on the wharf or dumping them into the Baithkal cove.

It was estimated that 4.3 million eggs were destroyed in this process, and the enormity of the destruction to the resource could very well be imagined. In view of this, it is felt that the indiscriminate fishing of these catfishes with incubating eggs should be curbed without any further delay, in order to save the resource from complete depletion. Steps may have to be taken on priority basis in educating the fishermen about the adverse effects this sort of indiscriminate destruction of mature fishes and incubating eggs might have on the resource.



SCIENTIFIC, COMMON AND LOCAL NAMES OF COMMERCIALLY IMPORTANT MARINE FISHES AND SHELL FISHES OF MAHARASHTRA AND GUJARAT COASTS*

Very often many fishery entrepreneurs and workers seek information on the scientific, popular and local names of commercially important fishes in the different regions in connection with their trade or studies. Kulkarni *(Jour. Bomb. Nat. Hist. Soc. 51, 1953)* gave an account of these names of fishes of Maharashtra and Gujarat rigion. Since then, with the advent of mechanisation of crafts and gear, the fishing operations have extended to deeper and distant waters which have added many species of fishes to those already recorded. This has necessitated preparation of a fresh account incorporating the latest scientific names and widely used popular and local names of fishes, crustaceans and molluscs commonly occurring in the Maharashtra and Gujarat regions. It is felt that the present account would meet the long felt need and fill up the gaps in the information available to the industry. The scientific names of fishes are mostly as given in F.A.O. identification sheets (1974). The species listed below are given in the alphabetical order, under 28 major groups. The author is greatly thankful to all his colleagues at the Bombay Research Centre for their co-operation in preparing this list. He is also deeply thankful to the Director, CMFR Institute, Cochin for his encouragement, valuable suggestions and guidance in the preparation of this article.

	GROUP	SL. NO.	SCIENTIFIC *NAME*	POPULAR NAME	LOCAL NAME/NAMES MARATHI	GUJARATI
I	ELASMO—BRANCHS	1.	*Chiloscyllium indicum*	Ridge-back cat-shark	Mushi	Musia
	a.Sharks	2.	*Carcharhinus melanopterus*	Black finned shark/ Black tip shark	Mori	Mossikhada
		3.	*Galeocerdo cuvieri*	Tiger-shark	Waghbeer	Pattari
		4.	*Rhincodon typus*	Whale-shark	Massa	Barrel
		5.	*Scoliodon laticaudus*	Sharp nosed shark/ Yellow dog-shark	Sonmushi	Sandho
		6.	*Rhizoprionodon acutus*	Grey dog-shark	Balda/Pisori	Pisori
		7.	*Sphyrna zygaena*	Round-headed hammer head shark	Kan mushi/ Kaner/Kaneri	Kan moosi/ Kaner
		8.	*Stegostoma fasciatum*	Zebra shark	Mushi/shinavale	Musia
	b.Skates	9.	*Anoxypristis cuspidata*	Pointed saw-fish	Nali/Win	Chhurio/veher
		10.	*Rhynchobatus djiddensis*	Guitar fish/white spotted shovelnose ray	Ranja/Lanj/Pok	Bhuther/ Dhons
		11.	*Rhinobatus granulatus*	Granulated shovel nose ray	—do—	—do—
	c.Rays	12.	*Aetobatus narinari*	Spotted eagle ray	Wagali	Wagaliu
		13.	*Aetomylaeus maculatus*	Bat ray	Bolad	Wagaliu
		14.	*Himantura uarnak*	Marbled sting ray	Whaghya pakat	Tarabla/Boor/ Warkhol Patari
		15.	*Himantura bleekeri*	Whip-tail sting ray	—do—	—do—
		16.	*Mobula diabolus*	Devil ray	Karaj	Warala/ Waraloo

*Prepared by J.P.Karbhari

II	EELS	17.	*Congresox talabonoides*	Common eel/Indian pike-conger	Wam	Wam
		18.	*Gymnothorax pseudothyrsoidea*	Black eel	Kilis	Kalas/Naro
III	CATFISHES	19.	*Batrachocephalus mino*	Frog headed cat fish	Shingala	Khagadi
		20.	*Tachysurus sona*	Dusky catfish	Shingala	Khaga/Shingada
		21.	*Tachysurus jella*	Small eye catfish	Shingala	Dharawa
		22.	*Tachysurus dussumieri*	Marine catfish	Shingati	Shingati
IV	CLUPEOIDS					
	a.Wolf Herring	23.	*Chirocentrus dorab*	Silver bar/Dorab wolf-herring	Datali/Karli	Dai/Lapadi
	b.Oil Sardine	24.	*Sardinella longiceps*	Indian oil sardine	Tarali/Haid/Kanat	Tarali
	c.Other Sardines	25.	*Sardinella fimbriata*	Fringe-Scale sardine	Pedwa	Pedvi·
	d.Hilsa shad	26.	*Hilsa ilisha*	Indian shad/ Hilsa shad	Palla/Pala	Chakshi/ Chaski
	e.Other shads	27.	*Hilsa toli*	Giant herring/ Toli shad	Bhing	Modar/Palwa
	f.Anchovies	28.	*Coilia dussumieri*	Golden anchovy	Mandeli	Mandeli
		29.	*Stolephorus bataviensis*	Batavian anchovy/ White bait	Katali	Phansti
		30.	*Thryssa mystax*	Mustached anchovy/ Mustached thryssa	Kati	Palli
		31.	*Thryssa malabarica*	Malabar anchovy/ Malabar thryssa	Kati	Palli
	g.Other Clupeoids	32.	*Escualosa thoracata*	White sardine	Bhiljee	Motwa/Bhanjee
		33.	*Ilisha elongata*	Slender Shad/ Elongate ilisha	Katali/Kati	Phansti/Palee
		34.	*Ilisha megaloptera*	Jewelled shad/ Bigeye ilisha	Kati	Kati/Paturdo
		35.	*Opisthopterus tardoore*	Long-finned herring/Tardoore	Kati	Kati
		36.	*Pellona ditchela*	Indian pellona	Kati	Kati
V	BOMBAY DUCK	37.	*Harpodon neherеus*	Bombay duck	Bombil	Bumla/Gulchi
VI	LIZARD FISHES	38.	*Saurida tumbil*	Greater Lizard/ -fish	Chor Bombil	Chor Bumla
VII	HALF BEAKS & FULL BEAKS	39.	*Rhynchorhamphus georgii*	Half beak gar fish	Sumb/Tol	Toli/Kagada/ Kunga
		40.	*Strongylura strongylura*	Full beak gar fish	-do-	-do-
VIII	FLYING FISHES	41.	*Cypselurus comatus*	Flying fish	Kathala	Jira
		42	*Exocoetus volitans*	Two winged flying fish	-do-	-do-
IX	PERCHES					
	a.Rock Cods (Groupers)	43.	*Epinephelus tauvina*	Greasy grouper	Hekru/Gobra	Wekhru/ Wekhali
		44.	*Epinephelus malabaricus*	Speckled grouper	-do-	-do-
		45.	*Epinephelus fario*	Spotted grouper	-do-	-do-

		46.	*Promicrops lanceolatus*	Giant grouper	-do-	-do-
	b.Snappers	47.	*Lutianus johni*	Snapper	Chavari tamb	Gurka tamb
		48.	*Lutianus argentimaculatus*	Red snapper	Tambusa	Ratado
	c.Pig-face Breams (Emperors)	49.	*Lethrinus frenatus*	Bridled pig-face bream	Dhamil	Dhamil/ Chuncha
	d.Threadfin breams	50.	*Nemipterus japonicus*	Japanese threadfin bream	Rani/Bamni	Rani
	e.Other Perches	51.	*Argyrops spinifer*	Long-spined red bream	Kishi/Lal Kishi	Kishi/Chayo
		52.	*Drepane punctata*	Moon-fish/Spotted bat-fish	Chand	Chand
		53.	*Ephippus orbis*	Spade fish	Vada	Vada
		54.	*Lates calcarifer*	Cock-up/Giant sea perch	Fitadar/Khajura	Bekti/Gariyu
		55.	*Lobotes surinamensis*	Triple tail	Katkola	Katkola
		56.	*Mylio berda*	Black sea bream/ picnic sea bream	Khadak palu/ Kali kishi	Kharapla/ Kali Kishi
		57.	*Pomadasys maculatus*	Spotted grunter	Karkara	Karkara
		58.	*Pomadasys hasta*	Lined silver grunter	Karkara	Karkara
		59.	*Scatophagus argus*	Spotted butter fish	Kaski	Kaski
	Therapon	60.	*Therapon jarbua*	Crescent perch/ Tiger-perch	Naveri hajam	Naida/ Garangeta
X	GOATFISHES	61.	*Upeneus sulphureus*	Yellow goat-fish	Chiri/Rana	Chiri
XI	THREADFINS	62.	*Eleutheronema tetradactylum*	Indian Salmon/Four thread tassel fish	Rawas	Rawas
		63.	*Polynemus indicus*	Monk fish/Giant threadfin	Dara/Darha	Dara/Dadha
		64.	*Polynemus heptadactylus*	Seven thread tassel fish	Shende	Shiri
XII	CROAKERS (DRUMS)	65.	*Johnieops sina*	Drab jew fish	Dhoma/Dhomi	Dhoma
		66.	*Johnieops macrorhynus*	Jew fish	Dhoma/Dhomi	Dhoma
		67.	*Johnius dussumieri*	Croaker	Dhoma/Dhomi	Dhoma
		68.	*Johnius vogleri*	Croaker	Dhoma/Dhomi	Dhoma
		69.	*Otolithes cuvieri*	Lesser tiger toothed croaker	Dhoma/Dhomi	Dhoma
		70.	*Otolithoides biauritus*	Dori/Bronze croaker	Koth	Koth
		71.	*Protonibea diacanthus*	Jew-fish/Spotted croaker	Ghol	Ghol
XIII	RIBBONFISHES (HAIRTAILS)	72.	*Lepturacanthus savala*	Sliver ribbon fish/ small headed hairtail	Wagti/Bala	Patti/Ribbon
		73.	*Trichiurus lepturus lepturus*	Grey ribbon fish/ Large headed hair tail	Baga	Baga
XIV	CARANGIDS a.Horse mackerel	74.	*Megalaspis cordyla*	Horse mackerel/ Torpedo trevally/ Hardtail scad	Kati bangada	Khadwo/Kati bangada
	b.Scads	75.	*Decapterus russelli*	Russell's scad	Pilla bangada	Pira bangada
	c.Leather-Jackets (Queenfish)	76.	*Scomberoides lysan*	Port-hole fish/ leather skin	Dagol/Falai	Sug/Chabia

	d.Other Carangids	77.	*Alepes djeddaba*	Djeddaba scad	Kakari bangada	Khadwo bangada
		78.	*Alepes Kalla*	Golden scad	Lalbi-Shitap	Lal bangada
		79.	*Atropus atropus*	Kuweh trevally	Zhat bangada	Khadwo bangada
		80.	*Coryphaena hippurus*	Dolphin-fish	Himra massa	Himra machhi
		81.	*Caranx sexfasciatus*	Six banded trevally/Dusky jack	Kala bangada	Kala bangada
		82.	*Rachycentron canadus*	Black king-fish	Sakla/Muddus	Modasa
		83.	*Selar crumenopthalmus*	Big-eye scad	Karaba bangada	Karaba bangada
XV	SILVERBELLIES (PONY FISHES)	84.	*Leiognathus splendens*	Splendid ponyfish	Katali/Kappi	Katali
XVI	BIG-JAWED JUMPER (FALSE TREVALLY)	85.	*Lactarius lactarius*	Big-jawed jumper/ False trevally/white fish	Saundala	Dhangari/Katli
XVII	POMFRETS a.Black Pomfret	86.	*Apolectus niger*	Black pomfret	Halwa	Halwa/Adadio
	b.Silver Pomfret	87.	*Pampus argenteus*	Silver pomfret	Saranga/Paplet	Vichuda/Paplet
	c.Chinese Pomfret	88.	*Pampus chinensis*	Chinese pomfret	Kalwad/Kafri	Pathu/Kafri
XVIII	MACKERELS	89.	*Rastrelliger kanagurta*	Indian mackerel	Bangada	Bangada
XIX	SEER FISHES					
	a.Narrow-Barred Spanish mackerel	90.	*Scomberomorus commerson*	Barred seer fish	Surmai/Towar/ Anjari	Surmai/Chhapri
	b.Indo-Pacific Spanish mackerel	91.	*Scomberomorus guttatus*	Spotted seer fish	-do-	-do-
	c.Streaked Spanish mackerel	92.	*Scomberomorus lineolatus*	Streaked seer fish	-do-	-do-
XX	TUNNIES					
	a.Little Tuna	93.	*Euthynnus affinis*	Little tuna/Mackerel tuna	Bugudi/Kuppa/ Gedar	Gedara
	b.Frigate and Bullet Mackerel	94.	*Auxis thazard*	Frigate mackerel	-do-	-do-
	c.Skipjack Tuna	95.	*Katsuwonus Pelamis*	Skipjack tuna/ Striped tuna	-do-	-do-
	d.Other Tunnies	96.	*Thunnus albacares*	Yellow-fin tuna	-do-	-do-
XXI	BILLFISHES	97.	*Istiophorus gladius*	Indian sail fish	Tadmasa	Kunga/ Tadmachhi
		98.	*Xiphias gladius*	Sword fish	-do-	-do-
XXII	BARRACUDA	99.	*Sphyraena jello*	Banded Barracuda/ Sea pike	Badri/Ghalse	Bhungar
XXIII	MULLETS	100.	*Mugil cephalus*	Flathead Grey mullet	Boita/Sherto/ Boi/Pilas	Boi/Bhomat/ Gandhia
		101.	*Valamugil speigleri*	Speigler's Grey mullet	Mangin/Boir	Mangan/Boi

XXIV	UNICORN COD	102. *Bregmaceros Macclellendii*	Unicorn cod/ Indian cod	Tenali/Netali	Chirii
XXV	FLATFISHES				
	a.Halibut	103. *Psettodes erumei*	Indian turbot/ Indian halibut	Zhipali/Bhakas	Hario/Dataro
	b.Flounders	104. *Pseudorhombus arsius*	Largetooth flounder	Lepti/Lep/ Jeebhti	Jipti/Jeebhti
	c.Soles	105. *Cynoglossus dubius*	Tongue sole	Gipti/Lep/Shivra	Gipti/Jeebhti
		106. *Cynoglossus macrostamus*	Malabar tongue sole	Shivra/Lep	Gipti/Jeeb
XXVI	GOBIES AND MUDSKIPPERS	107. *Awaous stamineus*	Scribbled goby	Kharbi/Nevta	Nevta/Lepta
		108. *Boleophthalmus dussumieri*	Mud skipper	Nivti	Levti
		109. *Boleophthalmus boddaerti*	-do-	-do-	-do-
		110. *Parachoeturichthys ocellatus*	Gobies	Kharbi/Nevta	Nevta/Lepta
XXVII	CRUSTACEANS				
	a.Penaeid Prawns; Littoral species	111. *Metapenaeus monoceros*	Indian prawn	Chamari/Kapsi	Chamari/Kapsi
		112. *Metapenaeus affinis*	Indian prawn	Medium Kolabi	Medium Samadi
		113. *Metapenaeus brevicornis*	Yellow prawn	-do-	-do-
		114. *Metapenaeus kutchensis*	Kutch prawn	-do-	Kutchii zhinga (Confined to Gujarat only)
		115. *Parapenaeopsis hardwickii*	Spear prawn	Kolbi	Kolami
		116. *Parapenaeopsis sculptilis*	Rainbow prawn	-do-	-do-
		117. *Parapenaeopsis stylifera*	Kiddi prawn	Karkari	Karkari
		118. *Penaeus indicus*	Indian white prawn	Zinga/Safet	Jimbo
		119. *Penaeus monodon*	Tiger prawn	Tiger	Tiger
		120. *Penaeus japonicus*	Kuruma prawn/ Flower	Kuruma kolabi	Kuruma kolami
		121. *Solenocera crassicornis*	Coastal mud prawn	Goinar	Goinar
	b.Non Penaeid Prawns	122. *Acetes indicus*	Paste shrimp	Jawala (Kutta)	Jawala (Kuto)
		123. *Hippolysmata ensirostris*	Hunter shrimp/ pink prawn	Ghobi	Ghobi
		124. *Palaemon tenuipes*	Shrimp	Ambadi/Kardi	Ambadi/Karadi
		125. *Palaemon stylifera*	Shrimp	-do-	-do-
	c.Lobsters; Littoral species	126. *Panulirus polyphagus*	Rock lobster/ Spiny lobster	Shevand	Titan
		127. *Thenus orientalis*	Sand lobster	Phatphati	Kako
	d.Crabs	128. *Charybdis cruciata*	Cross crab	Ghodi/Khekhada	Sandaria/ Karachla
		129. *Portunus pelagicus*	Reticulate crab/ Blue crab	-do-	-do-
		130. *Portunus sanguinolentus*	Spotted crab	-do-	-do-

		131. *Scylla serrata*	Stone crab/ Giant green crab	Chimbori	Karachli
	e.Stomatopods	132. *Oratosquilla nepa*	Mantis shrimp	Hijada	Hijara
XXVIII	MOLLUSCS				
	a.Bivalves	133. *Crassostrea gryphoides*	Edible oyster	Kalaw	Kalu
		134. *Crassostrea cucullata*	-do-	-do-	-do
		135. *Crassostrea discoidea*	-do-	-do-	-do-
		136. *Meretrix meretrix*	Clams	Shivali/Tigri	Chhipla
		137. *Paphia malabarica*	-do-	-do-	-do
		138. *Tapes spp.*	-do-	-do-	-do
	b.Cephalopods	139. *Loligo duvauceli*	Squid	Nala/Makul	Narsinga/ Ranga
		140. *Sepia aculeata*	Cuttle fish	Makul/Bahi	Narsinga/ Rangara
		141. *Sepia pharaonis*	-do-	-do-	-do
		142. *Sepiella inermis*	Cuttle fish	Makali	Dedaki

NEWS-INDIA AND OVERSEAS

Age determination of shrimp by measuring cellular garbage

Scientists have long sought a foolproof method for determining the age of insects and crustaceans. A possible solution has been reported by an Australian Zoologist, Dr.George Ettershank from Monash University in Melbourne. He has developed a new technique for determining the age of animals as diverse as fleas and shrimps. It involves measuring the level of some fluorescent pigments called *lipofuscins*, which gather in the cells of the animals as a byproduct of metabolic processes. In other words lipofuscins are the "cellular garbage" that collects in the cells of aging animals.

The lipofuscins in an insect or a crustacean tissue could easily be extracted by solvents and measured by a spectrofluorimeter. The level of this would indicate the physiological age of the animal. Thus, according to Dr. Ettershank, whose research was sponsored by the Victorian Economic Development Corporation, an age old problem of insect age determination has been solved by choosing the level of lipofuscins as a metabolic marker. The technique is equally applicable to crustaceans and this would be of far reaching consequence as it would be useful in assessing the stocks and resources of shrimps including the potential krill resources of Antarctica.

Fishing harbour development in Tamil Nadu

Government of Tamil Nadu has approved the construction of a fishing harbour at Chinnamuttam in Kanyakumari district with berthing facilities for 240 mechanised boats and 10 trawlers at a cost of Rs.23.4 million and another at Valinokkam in Ramanathapuram district with landing facilities for 150 mechanised boats costing Rs.7.7 million. These projects are expected to be completed in 1985 and 1983 respectively.

Proposals have also been made to construct a fishing harbour at Pazhayar in Thanjavur district at a cost of Rs.6 million and another at Thondi in Ramanathapuram district at a cost of about Rs.9 million. Plans to acquire more mechanised fishing boats, in view of the possibilities of increasing the exploitation and production from the marine sector, are under consideration.

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Compiled and prepared by M.J.George, G.Subbaraju and S.K.Dharmaraja.
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