



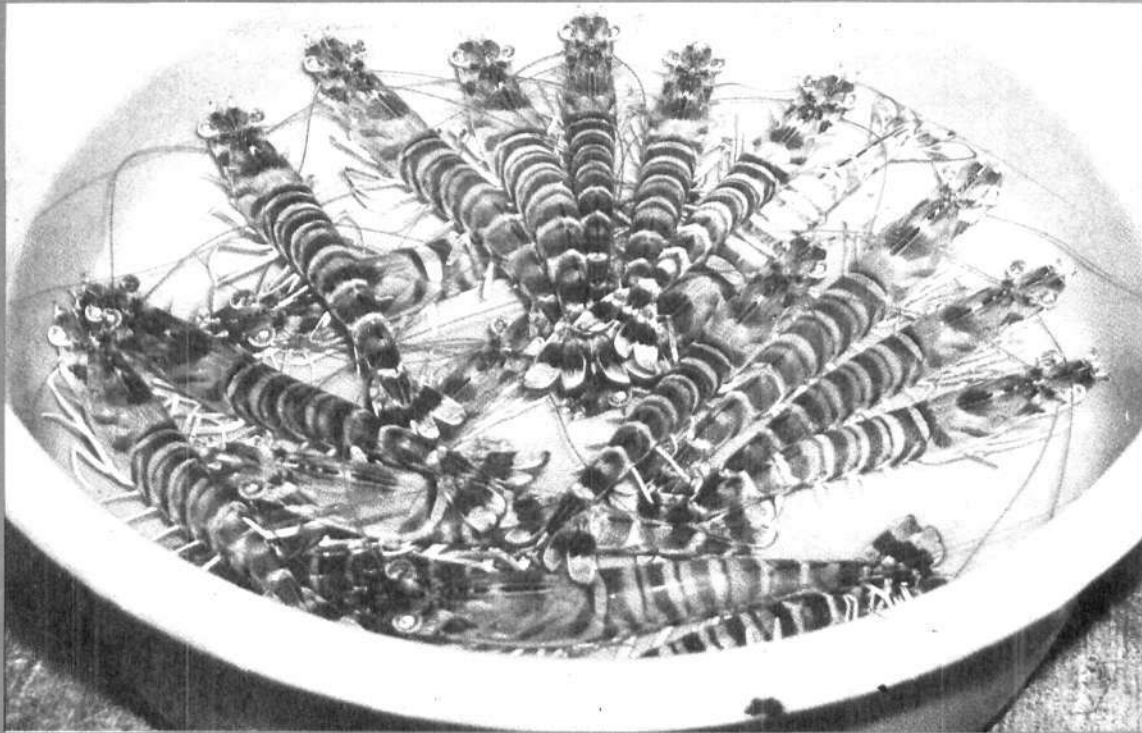
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824 SOME OBSERVATIONS ON LIGHT FISHING OFF THIRUVANANTHAPURAM COAST

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The artisanal fisheries of the Thiruvananthapuram coast are of considerable importance in the fisheries of Kerala State due to their significant contributions to the catch of resources like tunas, anchovies, ribbonfish, carangids, perches and cephalopods. The motorisation of traditional crafts with outboard motors from the mid eighties could be regarded as one of the milestones in the development of the small-scale fisheries of Thiruvananthapuram District. In the late

eighties fishing with light emerged to a significant level in the District. The salient aspects of fishing with light and its impact on the fisheries of Thiruvananthapuram coast for the 5 year period 1991-'95 are outlined in this article.

Light fishing

The aggregation of fish in response to artificial lights was known from ancient times and this has led to the development of fishing with light in

many parts of the world. The simple method adopted earlier was to light a big fire on the beach as close as possible to water. This would attract certain varieties of fish which would eventually be caught. The next step was the use of torches made of almost anything that burns (e.g. dried leaves of coconut tree or banana, or split bamboo). Fishing with torches was subsequently improved with the use of lamps with kerosene, fuel gas and electricity. Presently light fishing exists in many forms in many parts of the world. Light is being used in fishing by beach seine, gill net, purse seine, lift net, drift net, scoop net, hooks and line and trap. The important among them are surrounding nets (purse seine), lift nets and hand lines. Apart from lights generated from kerosene pressure, gas and electricity, underwater lamps are also commonly in use.

There are different explanations for the attraction of fish to artificial light such as positive phototaxis, preference to certain optimum light intensity, investigatory reflex, feeding, schooling and disorientation. The major groups of fishes which possess light attraction response are sardines, mackerel, anchovies, carangids and squids. Tunas are not directly attracted to light. The Japanese light fishing is mainly aimed at squids, mackerel, sardine and horse mackerel and it accounts for 20-25 % of the country's total fish production. The most important squid fishing method in Japan, namely, handlining or jigging depends entirely on the principle of light attraction.

When compared to many other parts of the world, there is no well developed light fishing technique in the western parts of Indian Ocean including the Arabian Sea. However, scientific expeditions in the area have shown that large aggregations of sardines, horse mackerel, mackerel and rainbow sardine are attracted by light.

Data source

The major portion of data used in this article was collected from Vizhinjam fish landing centre during 1991-'95 and observations from four fish landing centres south of Vizhinjam, viz., Pulluvila, Puthiathura, Poovar and Parithiyoor and four centres north of Vizhinjam, viz. Poonthura, Valiathura, Vallaveli and Marianad.

Fishing gear

Eventhough boat seine, drift gill net, hooks and line, shore seine, *chala vala*, *netholi vala* and *disco vala* are the common gear employed along the Thiruvananthapuram coast, light fishing is done mainly with hooks and line. However, in some centres light fishing by boat seine was also carried out occasionally.

Fishing lamps

Kerosene pressure lamps and gas lamps are commonly used for fishing with light.

Fishing season

The major fishing season in the Thiruvananthapuram District is from May to October when about 67 % of the total fish catch of the District is caught. November to February which is a lean period for the fishery in this area is the main season for light fishing. Only 15 % of the total hooks and line units engage in light fishing during the period. The average monthly effort, catch and catch rate of the different groups of fish landed by hooks and line with light attraction at Vizhinjam are given in Table 1.

TABLE 1. Catch (kg), fishing effort (no. of units) and catch rate (kg) in respect of hooks and line operated with light attraction system at Vizhinjam .

Groups	Nov.	Dec.	Jan.	Feb.	Total	%
Big-eye scad	54,961	37,643	28,887	39,739	1,61,230	77.2
Mackerel	—	689	34,294	5,554	40,537	19.4
Perches	422	1,619	1,395	394	3,830	1.8
Squids	—	1,690	—	1,229	2,919	1.4
Other carangids	—	124	194	—	318	0.2
Total catch	55,383	41,765	64,770	46,916	2,08,834	
Total effort	490	676	697	534	2,396	
Catch rate	113.0	61.8	93.0	87.9	87.2	

The effort ranged from 490 to 697 units with the average for the season at 599 units. The catch ranged from 41.8 to 64.8 t with the average at 52.2 t. The catch rate per unit ranged from 61.8 to 113.0 kg with the seasonal average at 87.2 kg.

The big-eye scad, *Selar crumenophthalmus*, locally known as *kannankozhuchala* or *kannanpara* or *peringampara*, formed the bulk of the

catch (77.2 %) followed by mackerel (19.4 %), perches (1.8 %), squids (1.4 %) and other carangids (0.2 %). The average monthly effort, catch and catch rate of the different groups of fishes caught by hooks and line operated without light attraction during the same period are given in Table 2 for making a comparative assessment of the two types of fishing.

TABLE 2 Catch (kg), fishing effort (no. of units) and catch rate (kg) in respect of hooks and line operated without light attraction system at Vizhinjam.

Groups	Nov.	Dec.	Jan.	Feb.	Total	%
Tunas	1,89,917	1,22,444	1,11,839	1,14,055	5,38,256	46.1
Perches	27,510	51,091	84,318	59,429	2,22,348	19.1
Other carangids	62,291	51,251	50,513	54,900	2,18,956	18.8
Squids	27,658	12,282	14,394	13,623	67,957	5.8
Mackerel	13,720	15,777	23,113	9,398	62,008	5.3
Others	14,034	6,113	12,857	9,495	42,499	3.6
Big-eye scad	1,558	11,993	172	923	14,646	1.3
Total catch	3,36,689	2,70,951	2,97,206	2,61,823	11,66,669	
Total effort	5,008	4,882	6,228	5,426	21,544	
Catch rate	67.2	55.5	47.7	54.2	54.2	

The effort ranged from 4,882 to 6,228 units with the average at 5,386 units. The catch varied from 261.8 to 336.7 t with the average for the period at 291.7 t. The catch rate fluctuated from 47.7 to 67.2 kg and the average was at 54.2 kg. The tunas formed the dominant catch (46.1 %) followed by perches (19.1 %), other carangids (18.8 %), cephalopods (5.8 %), mackerel (5.3 %), big-eye scad (1.3 %) and others (3.6 %).

It could be seen that the average catch rate by light fishing units was 87.2 kg as compared with 54.2 kg in non-light units. Percentagewise it indicates that the species composition of the catch significantly differed in the two types of units. In the light fishing units fishes which are attracted towards artificial light are mainly caught. Here, it is evident that the big-eye scad is the species which exhibits maximum attraction towards artificial light followed by mackerel. However, it is seen that cephalopods, especially, squids, which are known to have attraction, have not contributed appreciably to this method of fishing. One of the reasons for this is that the November-February period is not a major fishing season for squids along this coast. Another reason appears to be that the size of hooks, which are employed for catching big-eye scad, may not

be suitable for squids.

Almost similar trend was noticed from the observations at other centres in that the catch rate of hooks and line operated with lights south of Vizhinjam was 117.6 kg and the same for north of Vizhinjam was 95 kg. Boat seines operated at some centres with light attraction devices yielded a catch rate of 145 kg. The bulk of the catch (88.2 %) was constituted by squids followed by carangids.

Impact of light fishing on other types of fishing

Some of the groups fished by the light fishing units are also caught by other units operated without light, such as hooks and line, drift gill-net, shore seine and boat seine. The percentage composition of the different groups of fish in these units is furnished in Table 3.

TABLE 3 Percentage composition of different groups taken by various gear without light attraction (the first five groups are also taken in light fishing)

Groups	Percentage			
	Hooks & line	Drift gill net	Shore seine	Boat seine
Mackerel	2.4	17.1	1.9	-
Big-eye scad	3.2	5.7	1.2	-
Other carangids	14.3	11.3	15.5	9.2
Perches	18.0	3.1	-	-
Squids	1.4	-	2.1	11.2
Tunas	47.8	46.1	3.5	-
Seerfish	-	6.3	-	-
Barracuda	-	2.9	-	-
Ribbonfish	-	-	-	54.7
Whitebaits	-	-	24.9	11.1
Silverbellies	-	-	16.2	4.5
Sardines	-	-	14.5	-
Cuttlefish	3.9	-	-	-
Juvenile fish	-	-	4.5	-
Others	9.0	7.5	15.7	9.3

It is seen from the table that the dominant groups caught by these units are not caught by light fishing units. However, since some of the groups are caught by both light fishing units as well as by non-light fishing units, it is necessary to analyse the extent to which fishing with light affects the regular catch of the other units. It is clear from the species composition of the light fishing units that they are mainly operated for the big-eye scad. The fishery season for this species is from November to March with a peak during November-January. It is found that the big-eye scad forms only 5.7 % of the total catch

by drift gill net, 3.2 % by non-light hooks and line, 1.2 % by shore seine and does not form significant portion of the catch from boat seine. The next important species caught by light fishing units is mackerel, Eventhough mackerel is available throughout the year in the area, its peak season is March-June but even when the light fishing units were not in operation, mackerel did not form a significant portion in the catch of drift gill net, hooks and line, shore seine and boat seine during these months. The magnitude of other groups namely perches, other carangids and squids caught in the light fishing units, are not significant. Hence, it could be concluded that the light fishing at Thiruvananthapuram coast is intended mainly for big-eye scad and it cannot have any adverse impact on the catches by other types of gear in the area.

Recommendations

1. Generally November-March is a lean period for the fishery in the Thiruvananthapuram coast. Light fishing during the period by hooks and line exploits mostly resources of big-eye scad as well as mackerel. These two species are not caught significantly during this period in the gear operated without light attraction. It is evident that if they are not caught by light fishing method, these species may be lost to the fishery during these months. Hence, any fishing with light that augments the fish catch in the area needs to be encouraged. The common advantages relevant to artisanal fishermen in light fishing by hooks and line is that they can use inexpensive hooks from the crafts which they own; on the other hand they are not incurring any additional expenditure for their fishing operations.

2. Observations on the few light fishing trips with boat seine in the area showed that squids were caught in good quantities. Hence, light fishing for squids could be developed further which will be highly profitable. The peak season for squids in this area is August-September and light fishing by boat seine as well as by hooks and line could be tried for squids during these months.

3. The crude type of fishing with light practised now can be improved further. As a preliminary step suitable frames could be fixed in the fish-

ing crafts itself for operating proper light attraction devices so that scattering of light can be minimised.

4. Comparative fishing experiments and experience of commercial fishing from other parts of the world indicate that underwater fishing lamps are more efficient than surface lamps. A surface lamp loses part of its illumination due to reflection at the water surface. With choppy water, light becomes unsteady or flickering and this may scare off certain fish. By the use of underwater lamps illumination remains steady for light attraction. But underwater electric lamps may cost more than gas or kerosene pressure lamps. Hence, the feasibility of using electric underwater lamps may be studied.

5. Since light fishing is a recent introduction in our coasts, various aspects of this type of fishing relevant to our fisheries, which are listed below, may be investigated.

a. It may be studied whether all species of fishes behave alike irrespective of age, sex and physiological conditions or not.

b. Whether positioning of the artificial light (surface or underwater), its colour, and nature (steady, flickering etc.) can have significant effect on response of fishes.

c. Research input into all the above aspects should be undertaken on a priority basis for the development of this fishing method by the artisanal fishery sector in this area.

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