BAY OF BENGAL PROGRAMME

DEVELOPMENT OF SMALL-SCALE FISHERIES

FURTHER FISHING TRIALS WITH BOTTOM-SET LONGLINES IN SRI LANKA

BOBP/WP/16

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BOB P/WP/16
(GCP/RAS/040/SWE)

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The trials of bottom-set longlining off Sri Lanka are an activity of the Bay of Bengal Programme (BOBP) for the Development of Small-Scale Fisheries, GCP/RAS/040/SWE. The work was carried out by the Research Division of the Ministry of Fisheries with technical guidance and assistance from the BOBP, which included the services of a fishing technologist (Mr. G. Pajot), a biologist consultant (Dr. G. H. P. De Bruin) and the Project Officer (Mr. B. W. Perera). The Ministry of Fisheries provided the services of a research officer, Mr. K. T. Weerasooriya, and other research staff. Messrs Samalanka provided a consultant masterfishermari (Mr. Sandvik) and fishing gear and equipment for monofilament longline trials. Several boat owners cooperated by providing boats and crews.

The Bay of Bengal Programme is funded by the Swedish International Development Authority and executed by the Food and Agriculture Organization of the United Nations. The main aims of the Programme are to develop,demonstrate and promote new technologies and methodologies to improve the conditions of small-scale fisherfolk and the supplies of fish from the small-scale sector in five countries that borderthe Bayof Bengal—Bangladesh, India, Malaysia, Sri Lanka and Thailand.

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CONTENTS

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1. INTRODUCTION

This working paper is the second report on a project to stimulate interest and effort in more intensive exploitation of Sri Lanka's bottom-dwelling marine fish resources. A previous working paper (BOBP/WP/6, October 1980) covered trials of the use of bottom-set longlines off the south west coast of Sri Lanka during the period October 1979 to March 1980. This report describes further trials, using the same method of capture, carried out on the east and west coasts between August 1980 and July 1981.

The results of the initial trials in 1979/80 were disappointing from a commercial point of view; the catch rates were far below those required for commercial viability. However, the trials were conducted in two areas only along the southwest coast. It was therefore decided to continue the longlining effort at different locations along the coast.

The main reasons for this development work are the indication of underexploited resources of demersal fish and the need for diversification of fishing to improve the economy of the fishing units.

A survey of fish resources in the coastal waters of Sri Lanka carried out by the Norwegian research vessel FRIDTJOF NANSEN indicates that the annual sustainable yield of demersal species of commercial interest may be more than twice the present catches as estimated by the official statistics. If this were so, it would be possible to produce something approaching 20,000 tonnes per year of additional supplies of such species as groupers, snappers, breams, skates and caranx (trevally).

The demersal fishery has become relatively less important in some parts of Sri Lanka than it was in former days. This has come about because of the rapid expansion of the pelagic driftnet fishery using motorised boats. While there is not yet any clear evidence that the fishing effort on the pelagic stocks is more than the economic optimum, either locally or in the fishery as a whole, it is nevertheless likely that, in the poor fishing season, the diversion of some of the present effort from the pelagic to the demersal stocks might benefit both the individual fisherman and the national economy.

Among the methods of capture that might be considered for an expanded demersal fishery are trawling, bottom-set gillnetting, pot or trap fishing and bottom-set longlining. Handlining is already practised extensively, particularly along the south and east coasts. There is limited scope for bottom trawling because of the rocky and rough bottom conditions. Furthermore, it is capital intensive and energy consuming and not likely to be of benefit to the small-scale sector. Bottom-set gillnetting is also an expensive method in terms of nets (heavy losses of nets getting entangled in coral reefs) and hauling equipment for use of nets in deeper waters. Trap fishing might offer good opportunities and trials will be taken up in due course under the BOBP demersal fishing activity. Bottom-set longlining is also a low cost fishing method and is therefore being pursued.

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2. OBJECTIVES

The main objective of the activities was to ascertain the commercial feasibility of 3½ ton boats undertaking bottom longlining for demersal fish species. To that end, the trials were designed to:

- locate suitable fishing grounds
- ascertain the best fishing seasons
- identify appropriate gear, equipment and methods including bait

3. ORGANIZATION

The BOBP entered into agreements with commercial fishermen who were contracted to provide 3½ ton boats and crew to undertake the trials. Initially, BOBP guaranteed a minimum income; if there was a shortfall, the BOBP met the difference — i.e. the difference between the guaranteed amount and actual earnings from fish sales. The commercial fishermen met all costs— i.e. wages, food, fuel and lubricants, etc. Subsequently different arrangements were agreed upon, whereby BOBP met the costs of fuel, lubricants and bait and the owners kept the proceeds of sale, meeting other costs — including remuneration of the fishermen — in the usual way.

A 38-footer used in monofilament trials was chartered on the basis of full compensation for owner and crew equal to their likely earnings over the period; BOBP met the costs of bait and ice and kept the proceeds from fish sales.

Work camps were set up for Ministry staff and vehicles; camp equipment etc., were provided by the Ministry. Capital and operating costs were covered partly by the Sri Lankan Government and partly by the BOBP.

The trials were supervised and monitored by research staff of the Ministry of Fisheries with technical guidance by BOBP staff and consultants. A masterfisherman consultant was provided by the manufacturer of monofilament longlines to participate in the monofilament trials.

Details of the fishing trip, the gear used, the catch, expenses and earnings were recorded daily. The data were processed each month for purpose of calculating payments and receipts in terms of the contracts with the vessel owners. The data on the catches included species, number and total weight.

The catch landed was sold on preference to the Government fish marketing agency (the CFC) at the ruling market prices in the area; or else to private traders at negotiated prices; or else it **was disposed of at** auctions.

The general intention was to cover as many areas of the coast and fishing seasons as the limited resources available for the work would allow. The 28 ft. boats were based at Kalkudah on the east coast, Silvathurai in the northwest and Negombo on the west coast. There were never more than two boats in operation at any one time at any location. It was originally intended also to work off Hambantota in the southwest, but this was not pursued since similar trials were planned to be undertaken by the Ministry together with another agency (NORAD) in connection with an integrated district development project.

The 38 ft. boat used for the monofilament trials was based in Colombo, where the necessary facilities for such a vessel were available and this type of fishing operation existed.

The choice of place to fish was made by using the echo-sounder to ascertain the presence of fish and the nature of the bottom. Sometimes the choice was also dictated by the depth of water or by prior knowledge of the location of productive areas. Confirmation of the availability of fish was obtained by handlining before shooting the longllne. Most of the fishermen participating in the trials had no great experience of line fishing.

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4. EQUIPMENT AND SUPPLIES

Boats

Five typical gillnetters of a popular size and type were chartered for the fishing trials: four of wooden construction and one FRP. All were 28 ft. in length and had a displacement of 3.5 tonne. They were powered by diesel inboard engines of 30—33 hp giving a speed of 6—7 knots. (Appendix 1).

For the monofilament trials, a 38 ft. vessel (length 11 m, beam 3 m, draught 1.2 m) with a displacement of about 10 tonrie was used. It was powered by a diesel inboard engine of 65 hp giving a maximum free running speed in calm water of about 7 knots. (Appendix 1)

Echo sounders

Portable battery-powered echo sounders were installed on the boats for depth sounding and to help in location of fish and in ascertaining the nature of the sea bed. The transducer was fixed to a steel pipe clamped to the side of the boat.

Line haulers

A hydraulically driven line hauler was used to facilitate hauling of the monofilament lines on the 38 ft. boat: the length of line, the number of hooks, and the difficulty of hauling monofilament by hand, made a line hauler necessary. Hauling of lines on the 28 ft. boats was by hand.

Fishing gear

In most of the trials the main line was of the multifilament type as were the snoods. The hooks used were both of the straight and of the Kirby type in size 5—7. See Appendix 2 for details.

On the 28 ft. boats the longlines were arranged in wooden or galvanized iron tubs and baskets; the hooks were hung on the rim of the tub or basket. The baiting of the hooks (whole fish or cut pieces) was done during the passage to the fishing grounds.

Shooting was done manually from the side of the boat if it was drifting and from the stern of the boat if it was under power, the speed in the latter case being 2 to 3 knots. Hauling of the longlines was done manually from the bow of the boat. The retrieved line was dropped on the deck or the tub and basket in coiled form and the fish caught were unhooked. The hooks devoid of suitable bait would then be rebaited and the lines readied for the next shooting.

The soaking time was usually about one and a half hours.

In the monofilament trials the main line and snoods were of PA mono 2 mm and 1 mm respectively. **See Appendix 3.**

Wide gap hooks were tested and their details are shown in Appendix 4.

Bait

Several varieties of bait were used in fresh, salted and frozen form. The type of bait used and the form in which it was used depended upon local availability and price, but the overriding consideration was to maintain supplies of bait so that fishing operations could continue, in order to obtain the maximum amount of experience and information.

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5. TRIALS FROM KALKUDAH

Trials were conducted during the period 17th August 1980 to 29th July 1981, including three monsoon months (October to December) when the weather was rough. Operations were continued during this period in order to determine the feasibility of fishing in such conditions, and the likely catches. The trials of wide gap hooks took place during the period 1 June to 29 July, 1981.

The approximate locations fished are shown in Appendix 5. Initially, fishing stations were chosen to give the widest possible coverage of the area. Later this strategy was abandoned in favour of locating the best fishing opportunities and determining the likely yields at these places and times. Fishing was normally done between 0500 and 1000 hours, if bait was available and it was otherwise convenient. The species used for bait were Indian herring (hurulla), squid and sardines (salaya); also from time to time cuttlefish and other sardine species. The bait was purchased locally and used fresh, salted and frozen.

The results can be summarized as follows:

No. of fishing trips	:	258
No. of sets	:	505
No. of hooks set	:	177,800
Total catch	:	9700 kg (3897 pcs)
Average catch rate	:	5.45 kg/i 00 hooks (2.19 pcs)
Average catch per trip	:	37.60 kg (15.10 pcs)

The catch data are recorded in Table 1.

Longline catches during the northeast monsoon were poor; driftnet catches at that time were relatively good.

During the first seven months, when the fishermen had guaranteed minimum earnings, the average hook rate was 1.75 pieces per 100 hooks (4.69 kg/i 00 hooks). During the last five months, the average hook rate was 2.49 pieces per 100 hooks (5.98 kg/i 00 hooks).

About 27 per cent of the catch consisted of breams; 26 per cent of snappers, 22 per cent of caranx, 6 per cent of groupers, 6 per cent shark; 4 per cent jack, 4 per cent reef cod and 5 per cent miscellaneous (Table 2).

Prices were generally low because of the small local demand, and varied with season, species and size of fish. Caranx fetched Rs. 8 to 9 per kg; breams and snappers Rs. 6 to 7 per kg; grouper Rs. 4 to 5 per kg.

During the period up to February 1981, earnings were not adequate to cover the costs of bait and fuel. After the decision to pay the fishermen according to normal commercial practice, there were net earnings of Rs. 13,400 over the succeeding five months of which Rs. 5,000 was made in the month of June.

Wide gap hooks were tested against straight hooks of equivalent size with 10 hooks of each type attached alternately to the main line using the same type of snood (Appendix 4). The wide gap hooks caught more fish than the conventional straight hooks of identical sizes. The results of the wide gap hook experiments are presented in Table 3.

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6. TRIALS FROM SILVATHURAI

These trials began in November 1980 and lasted less than one month because of an outbreak of cholera in the district.

Approximate locations fished are shown in Appendix 6. Fishing was done both in the morning and at night. The main species used for bait was cuttlefish and occasionally Indian herring. The bait was purchased locally and used fresh or frozen.

The results can be summarized as follows:

No. of fishing trips	:	15
No. of sets	:	27
No. of hooks set	:	10900
Total catch	:	545.70 kg (345 pcs.)
Average catch rate	:	5.00 kg/i 00 hooks (3.16 pcs.)
Average catch per trip	:	36.40 kg (23.00 pcs.)

Further details are given in Table 4.

7. TRIALS FROM NEGOMBO

Operations were conducted off Negombo from December 1980 to May 1981.

Locations fished are shown in Appendix 7. At some locations, echo sounders were used to enable the lines to be laid on the continental slope. Fishing was at night (1800 hrs. to midnight). The main species used for bait were cuttlefish, squid and Indian herring; flying fish, sardines and small prawns were also used. Except for the flying fish the bait was purchased locally and used fresh or frozen.

The results can be summarised as follows:

No. of fishing trips	:	116
No. of sets	:	220
No. of hooks set	:	58267
Total catch	:	4309 kg (1511 pcs.)
Average catch rate	:	7.40 kg/1 00 hooks (2.59 pcs.)
Average catch per trip	:	37.15 kg (13.02 pcs.)

Details are shown in Table 5. The fairly good catches obtained in the period March to May are of particular interest since this is the season of poorest catches with the driftnets.

During the first three months, under the guaranteed income agreement, the hook rate was 1.86 pcs./100 hooks (4.4 kg/1 00 hooks) ; during the remaining period, with normal methods of remuneration, the hook rate was 3.7 pcs./100 hooks (12.0 kg/100 hooks). During the latter period the fishermen always tested the response of the fish to the bait with a handline before shooting the longline.

Breams constituted about 44 per cent of the catches, snappers 35 per cent; caranx 7 per cent, groupers 3 per cent (Table 6).

Prices were high as a result of the demand in Colombo, but there was a sharp drop whenever there were heavy landings by driftnetters.

The good catches landed by the project during the second period led to several local fishermen taking up bottom longlining. Their performance is compared with that of the project boats in Table 7. The best fishermen, who had some knowledge of the most productive locations and times of day, were nearly 70 per cent better than the average.

8. MONOFILAMENT TRIALS FROM COLOMBO

These trials took place during a period of 52 days from 17th March to 7th May 1981. 48 fishing trips were made.

The lines were shot through a chute at the stern of the boat at a speed of 3 to 4 knots. They were retrieved, using the hydraulic line hauler, on the starboard side, at speeds of 30 to 40 metres per minute. The larger fish were gaffed as they reached the water surface and lifted to the fish separator attached to the line hauler.

From 6th April to 7th May 1981, the efficacy of the monofilament mainline was compared with that of standard multifilament line by connecting monofilament and multifilament in series, each line carrying 25 hooks (Appendix 3).

In case the width of the productive patches of bottom was small in relation to the length of line needed to carry 25 hooks, other lines were made up with alternate lengths of monofilament and multifilament, each carrying only 5 or 10 hooks. These lines proved difficult to coil down in the tubes and were prone to tangle during shooting; fewer operations were therefore carried out than with the standard 25 hook lines.

The fishing locations are shown in Appendix 8. Locations shown by experience to yield good catches were fished repeatedly; the continental slope, close to the edge, generally yielded the best results. The echo sounder was useful in locating these areas and in avoiding the danger of shooting in too deep water. Lines were usually shot between 0430 and 0530 hours and soaking times were about two hours.

The main species used for bait was squid. Indian mackerel, sardines and flying fish were also used. All were purchased from CFC in the frozen form.

The following is a summary of the operations:

No. of fishing trips	:	48
No. of sets	:	48
No. of hooks set	:	71031
Total catch	:	6424.6 kg (2419 pcs.)
Average catch rate	:	9.06 kg/i 00 hooks (3.40 pcs.)
Average catch per trip	:	133.80 kg (50.40 pcs.)

The comparative trials of monofilament and multifilament lines constituted only a part of the above operations and are recorded in Table 8.

During the second half of the operations, inter-monsoon weather conditions prevailed, which were not conducive to good catches. During the earlier period, from 17th March to 12th April, 24 trips averaged 12.17 kg/100 hooks.

The monofilament longline caught more fish of the same species, with the same weight frequency distribution, in the ratio of approximately 3: 1. However, the main lines and snoods of the monofilament and multifilament gear differed in thickness (visibility to the fish may depend on thickness and transparency of twine).

Breams constituted about 50 per cent of the catches; snappers 23 per cent; groupers 8 per cent; caranx 8 per cent; reef cod 4 per cent; and other miscellaneous varieties 6 per cent. (Table 9).

As with other fish caught off Negombo, prices were high as a result of the demand for good quality fish in Colombo.

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9. COMMENTS

Interpretation of the results

It is unrealistic to expect that the kind of trials described above will produce results that are always conclusive in the sense of producing figures and comparisons that will survive rigorous tests of statistical significance. As is so often the case in commercial fisheries development, the situations are far too complex for this to be a practical objective.

All that can be reasonably hoped for without expending vast amounts of effort and time is sufficient information on the potential of bottom-set longlining at specific fishing grounds and seasons, to enable commercial fishermen and vessel owners to come to their own decisions about whether they should try the method for themselves. At the same time the results should indicate to those responsible for fisheries development whether they ought to facilitate such efforts and perhaps provide some practical assistance.

At Negombo this stage has been reached: as many as 17 fishing boats took up this method of fishing and achieved acceptable rates of catch. This is the most important result of the present series of trials.

It must also be borne in mind that most of the fishermen who participated in the trials, and the research workers who supervised the trials, did not possess the thorough knowledge of the fishing grounds and conditions that would be possessed by an experienced and skilled local commercial bottom longline fisherman. Moreover, as the monofilament trials suggest, the fishing gear used may not be the best for the local conditions as regards materials, rigging and specifications. To reach conclusions on these questions would require trials extending over several seasons.

The results should therefore be taken as indications of the potential of the method, but for the reasons just adduced, it is probable that the full potential has not yet been demonstrated.

Viability of bottom longlining operation

As just remarked, a number of fishermen at Negombo have apparently concluded that bottom longlining has a reasonable chance of being financially viable, at some seasons of the year.

If longlining is regarded first and foremost as an alternative to driftnetting during the poor fishing season it is important to know whether it would be economic for a standard Sri Lanka 28 ft. driftnetter or at least that it would cover the operating costs.

The hook rate that would render longlining economic with a standard 28 ft. driftnetter has been estimated at 10 kg/bC hooks (see working paper BOBP/WP/6). This estimate depends in turn upon a judgement of how long a line and how many hooks can be handled on such a vessel. It is also sensitive to bait prices (bait fish are expensive and should therefore be used repeatedly) and to prices at first sales, distance between home base and the fishing grounds.

Meanwhile, it may be concluded that the method would probably be economical for somewhat smaller boats, propelled by smaller engines and by sail.

Further work

The results of these demersal fishing trials give encouragement for further efforts to develop bottom set longlining. Therefore furthertrials should be undertaken in other areas where previous surveys have indicated good concentration of bottom dwelling species.

To confirm the promising results in Negombo for instance it is necessary for commercial fishermen to try the method more extensively. Arrangements have already been put in hand by BOBP to make available to interested fishermen at Negombo up to 30 sets of appropriate fishing gear

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at cost. The Ministry of Fisheries monitored the fishing operations of this group of fishermen during the season (November to March). Catch performance, species composition and sizes, and costs and earnings were recorded.

As suggested above, more knowledge is desirable on such aspects as materials of lines, hook type and size, snood length and spacing, bait species, and so on. None of these factors may be as important as time and place. Knowledge on all of these aspects of the fishery is what distinguishes a successful fisherman from a less successful one, but it takes much time to accumulate. In order to accelerate this process, further trials are to be carried out to provide better indications of the most effective gear and tactics. As regards the use of monofilament longlines, the technical and economic feasibility of employing low cost echo sounders and line hauling devices of local manufacture, suitable for use on a 28 ft. boat or smaller, will be ascertained.

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Table 1

Record of bottom longline fishing trials from Kalkudah: August 1980-July 1981

	Aug. '80	Sep. '80	Oct. '80	Nov. '80	Dec. '80	Jan. '81	Feb. '81	Mar. '81	April '81	May '81	June '81	July '81	Total
No. of boats	02	02	02	01	01	01	01	01	01	01	01	01	
No. of fishing trips	21	43	31	13	16	20	19	12	23	20	18	22	258
No. of sets	33	92	51	25	34	34	29	33	52	45	33	44	505
No. of hooks	6575	19350	15243	4887	6034	11278	8965	11350	24238	23250	19390	27240	177800
Total catch, pcs.	121	345	247	21	58	219	257	323	500	584	614	608	3897
Total catch, kg	339.80	971.90	675.50	75.60	204.60	479.60	644.60	769.90	1360.80	1424.20	1435.20	1318.90	9700.60
Pcs./100 hooks	1.84	1.78	1.62	0.43	0.96	1.94	2.87	2.84	2.06	2.51	3.17	2.23	2.19
Kg/100 hooks	5.17	5.02	4.43	1.55	3.39	4.25	7.19	6.78	5.61	6.12	7.40	4.84	5.45
Bait used, kg	108.1	348.60	341.5	111.0	112.0	174.25	181.0	185.0	416.75	355.25	324.0	396.0	3053.5
Bait, kg/100 hooks	1.64	1.80	2.24	2.27	1.86	1.54	2.02	1.63	1.72	1.53	1.67	1.45	1.72
Catch per fishing trip, kg	16.18	22.60	21.79	5.8	12.78	23.98	33.93	64.16	59.16	71.21	79.73	59.95	37.60
Value of catch, Rs.	1198.45	5292.55	3704.20	389.35	1213.47	3419.75	3696.30	6000.00	12200.00	12800.00	12900.00	11200.00	74814.00
Fuel cost, Rs.	2544.80	4707.00	4208.65	1550.35	1687.00	3727.00	3726.00	2300.00	4830.00	4284.00	3528.00	4312.00	41404.00
Bait cost, Rs.	685.60	2320.00	1916.75	577.00	867.00	787.35	1254.00	2103.00	5809.00	4920.00	4320.00	5280.00	30839.00

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Table 2

Catch composition of bottom longline trials from Kalkudah : August 1980—July 1981

	Breams and Job fish		Snappers		Caranx		Groupers		Coral and Reef cod		Jack		Shark and Skate		Others	
	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%
August 1980	27.4	28.5	54.0	51.8	3.2	1.8	1.6	2.6	5.6	0.8	—	—	2.4	6.8	5.8	7.7
September	25.5	25.1	39.5	44.4	4.3	3.0	8.0	13.0	13.5	4.3	—	—	4.6	6.0	4.6	4.2
October	31.1	35.9	28.0	38.3	1,3	1.7	1.8	1.6	18.2	6.1	—	—	12.4	2.4	7.2	7.0
November	19.0	19.0	19.0	18.3	14.3	10.8	—	—	14.3	1.7	—	—	28.6	44.5	4.8	5.7
December	34.0	33.9	22.6	31.5	18.9	12.3	7.5	14.2	7.5	1.7	—	—	1.9	0.8	7.5	5.6
January1981	39.6	55.7	14.0	23.7	18.3	7.8	1.9	2.7	16.4	6.4	0.5	0.2	1.4	1.4	7.9	2.1
February	33.3	42.7	27.0	26.5	18.2	12.9	0.8	0.7	9.5	2.5	1.2	1.8	4.4	9.0	5.5	2.9
March	36.6	42.5	22.8	27.1	12.2	7.0	0.7	0.6	13.9	4.2	—	—	8.6	16.1	5.2	2.5
April	32.4	26.7	19.1	25.6	13.8	12.7	1.3	2.2	9.5	2.8	12.6	19.0	7.5	7.1	3.8	3.9
May	9.8	13.7	10.9	15.0	48.8	42.3	3.6	6.2	6.2	1.7	7.1	10.9	7.5	6.0	6.1	4.2
June	11.9	12.6	7.0	7.2	59.3	52.5	3.1	4.8	1.8	0.5	12.1	18.4	1.1	1.5	3.6	2.3
July	22.5	22.3	16.6	25.6	24.6	21.1	4.3	10.3	14.5	5.3	—	—	2.5	3.2	15.0	12.1
Average for the reported period	24.9	27.2	20.1	25.9	26.7	21.8	3.1	5.6	10.2	3.6	2.9	4.4	5.2	6.5	6.9	5.0

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Table 3

Record of wide gap hook trials from Kalkudah
June—July 1981

	June1981		July1981		Total	
	Wide gap hooks	No. 6 hooks	Wide gap hooks	No. 6 hooks	Wide gap hooks	No. 6 hooks
No. of fishing trips	18	18	22	22	40	40
No. of sets	32	32	44	44	76	76
No. of hooks	6220	6220	9495	9495	15715	15715
Total catch, pcs.	253	172	265	176	518	348
Total catch, kg	596.30	363.40	589.70	330.10	1186.00	693.50
Pcs./100 hooks	4.07	2.76	2.79	1.85	3.30	2.21
Kg/i00 hooks	9.60	5.80	6.20	3.50	7.55	4.40

Table 4

Record of bottom longline fishing trials from Silvathural
November—December 1980

No. of boats	01
No. of fishing trips	15
No. of sets	27
No. of hooks	10090
Total catch, pcs.	345
Total catch, kg	545.70
Pcs./100 hooks	3.16
Kg/i 00 hooks	5.00
Bait used, kg	122.00
Bait,kg/ioohooks	1.12
Catch per fishing trip, kg	36.40
Value of catch, Rs.	2554.60
Fuel cost, Rs.	2980.00
Bait cost, Rs.	1192.50

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Table 5

Record of bottom longline fishing trials from Negombo December 1980—May 1981

	December '80	January '81	February '81	March '81	April '81	May '81	Total
No. of boats	02	02	02	01	01	01	
No. of fishing trips	24	43	14	15	15	05	116
No. of sets	32	71	22	47	38	10	220
No. of hooks	9963	19015	6579	10550	8710	3450	58267
Total catch, pcs.	244	281	138	356	387	105	1511
Total catch, kg	621.60	632.70	326.10	1137.30	1254.60	337.30	4309.00
Pcs./iOO hooks	2.45	1.48	2.09	3.37	4.44	3.04	2.59
Kg/i 00 hooks	6.23	3.32	4.96	10.78	14.40	9.78	7.40
Bait used, kg	281.40	511.00	180.50	252.00	169.50	46.25	1440.65
Bait, kg/i 00 hooks	2.82	2.69	2.74	2.39	1.95	1.34	2.47
Catch per fishing trip, kg	25.90	14.71	23.29	75.82	83.64	67.47	37.15
Value of catch, Rs.	5124.00	5737.00	2812.50	10376.00	10482.00	3435.00	37966.00
Fuel cost, Rs.	4500.00	5000.00	2700.00	3190.00	2970.00	990.00	19350.00
Bait cost, Rs.	3473.00	5400.00	1420.00	2859.50	2852.00	925.00	16929.00

<<

Table 6

Catch composition of bottom longline trials from Negombo: December 1980—May 1981

	Breams		Snappers		Groupers		Coral & reef cod		Caranx		Others	
	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%
December 1980	54.3	54.3	16.9	25.3	3.70	4.2	10.7	3.0	2.1	3.2	12.3	10.0
January 1981	50.5	47.2	15.3	25.7	2.4	4.5	ii.8	3.9	6.6	i2.7	13.4	6.0
February 1981	50.7	39.3	17.4	27.5	2.2	2.7	3.6	0.7	10.1	13.7	16.0	16.1
March 1981	58.5	58.4	20.8	28.0	1.4	1.3	3.7	0.6	9.6	10.4	6.0	1.3
April 1981	51.7	48.7	26.1	32.8	3.9	5.3	1.6	0.5	3.9	5.7	12.8	7.0
May 1981	61.5	58.0	26.7	27.7	1.9	3.3	4.8	1.2	0.9	1.2	4.2	8.6
Average for the reported period	56.4	44.3	21.8	34.9	3.i	2.7	6.0	1.2	3.6	6.7	9.1	10.2

Table 7

Comparison of catch rates obtained by project boats and other private boats in bottom longline fishing from Negombo : March—April 1981

Fishing Unit	No. of fishing operations	Total no. of hooks used	Average no. of hooks used per day	Total catch in kg	Catch per fishing day in kg	Catch per 100 hooks in kg
Project boat						
March	15	10,950	730	1142	76.1	10.4
April	14	8,710	622	1255	89.6	14.4
16 local fishermen's boats						
April	39	24,525	629	2908	74.6	11.9
Local fisherman L. B. Fernando's boat						
April	ii	6,400	582	1397	127.0	21.8

Note:—Local fishermen took up bottom longlining after seeing the catches from the BOBP boat.

<<

(b) 10 hook lengths each, connected alternately in series

Date	POLYESTER (PE)					MONOFILAMENT (PA)				
	No. of hooks	Catch		Catch/ 100 hooks		No. of hooks	Catch		Catch/ 100 hooks	
		pcs.	kg.	pcs.	kg.		pcs.	kg.	pcs.	kg.
05-4-81	100	02	6.3	2.00	6.3	100	05	15.1	5.00	15.10
10-4-81	80	02	2.9	2.50	3.62	80	10	32.3	12.50	40.37
15-4-81	80	04	1.3	5.00	1.62	80	04	1.3	5.00	1.62
18-4-81	150					150	04	14.2	2.67	9.47
19-4-81	150	03	3.4	2.00	2.27	150	10	40.1	6.67	26.73
21 -4-81	150	01	0.2	0.67	0.13	150	14	35.4	9.33	23.60
Total	710	12	14.1	1.69	1.98	710	38	138.4	5.35	19.49

(c) 5 hook lengths each, connected alternately in series

Date	POLYESTER (PE)					MONOFILAMENT (PA)				
	No. of hooks	Catch		Catch/ 100 hooks		No. of hooks	Catch		Catch/ 100 hooks	
		pcs.	kg.	pcs.	kg.		pcs.	kg.	pcs.	kg.
24-4-81	170	04	20.2	2.35	11.89	170	05	13.2	2.94	7.76
25-4-81	164	12	5.8	7.32	3.54	164	06	2.4	3.66	1.46
26-4-81	164	—	—	—	—	164	02	0.5	1.22	0.30
28-4-81	120	—	—	—	—	120	—	—	—	—
29-4-81	120	—	—	—	—	120	02	3.8	1.67	3.17
02-5-81	100	—	—	—	—	100	03	12.1	3.0	12.0
03-5-81	65	01	3.0	1.54	4.61	60	02	0.2	3.33	0.33
04-5-81	125	—	—	—	—	125	03	8.4	2.40	6.72
05-5-81	‘100	04	11.0	4.0	11.0	100	02	3.1	2.00	3.1
06-5-81	100	02	5.8	2.0	5.8	100	03	3.0	3.0	7.2
07-5-81	100	03	5.0	3.0	5.0	100	03	9.4	3.0	9.6
Total	1328	26	50.8	1.96	3.82	1323	31	60.3	2.34	4.56

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Table 8

Catch records of trials with monofilament versus conventional bottom longline: Colombo, April—May 1981

(a) 25 hook lengths each, connected alternately in series

Date	POLYESTER (PE)					MONOFILAMENT (PA)				
	No. of hooks	Catch		Catch/ 100 hooks		No. of hooks	Catch		Catch/ 100 hooks	
		pcs.	kg.	pcs.	kg.		pcs.	kg.	pcs.	kg.
6-4-81	475	11	26.6	2.32	5.6	475	33	69.9	6.94	14.71
8-4-81	375	08	12.3	2.13	3.28	375	40	52.6	10.67	14.03
9-4-81	450	08	12.7	1.78	2.82	425	43	133.2	10.12	31.34
10-4-81	300	15	40.4	5.0	13.47	300	26	88.2	8.67	29.4
11-4-81	600	04	28.7	0.67	4.78	600	21	70.4	3.50	11.73
12-4-81	425	07	9.8	1.65	2.30	425	33	63.3	7.76	14.89
14-4-81	400	03	3.0	0.75	0.75	400	20	36.2	5.00	9.05
15-4-81	450	09	8.3	2.0	1.84	450	14	50.3	3.11	11.18
16-4-81	375	06	14.9	1.6	3.97	350	12	16.6	3.43	4.74
17-4-81	600	04	25.5	0.67	4.25	575	11	35.1	1.91	6.10
18-4-81	400	ii	19.2	2.75	4.8	400	21	37.0	5.25	9.25
19-4-81	425	12	24.0	2.82	5.65	400	28	60.9	7.00	15.22
20-4-81	450	05	15.8	1.11	3.51	450	14	34.7	3.11	7.71
21-4-81	300	05	7.9	1.67	2.63	300	16	29.5	5.33	9.83
22-4-81	400	01	3.4	0.25	0.85	400	11	32.9	2.75	8.22
23-4-81	450	09	33.8	2.9	7.51	450	18	57.6	4.00	12.80
24-4-81	425	12	34.3	2.82	8.07	425	31	77.6	7.29	18.26
25-4-81	575	06	3.8	1.04	0.66	575	24	39.4	8.73	14.33
26-4-81	425	06	24.6	1.41	5.79	425	18	45.0	4.23	10.59
28-4-81	275	09	11.4	3.27	4.14	275	06	14.9	2.75	5.42
29-4-81	425	11	21.6	2.59	5.08	425	13	17.6	3.06	4.14
1-5-81	700	06	16.9	0.86	2.41	700	32	81.1	4.57	11.58
2-5-81	225		—	—	—	225	01	2.8	0.44	1.24
3-5-81	425	02	6.6	0.47	1.55	425	08	15.6	1.88	3.67
4-5-81	225	—	—	—	—	225	04	5.1	1.78	2.27
5-5-81	275	04	11.5	1.45	4.18	275	11	34.6	4.00	12.58
6-5-81	275	01	3.2	0.36	1.16	275	08	21.7	2.91	7.89
7-5-81	475	04	8.3	084	1.75	475	09	19.2	1.89	4.04
	11600	179	428.50	1.54	3.69	11500	526	1243.0	4.57	10.80

<<

Table 9

Catch composition of trials with monofilament versus conventional bottom longline: Colombo, April—May 1981

	Breams		Snappers		Caranx		Groupers		Coral & reef cod		Others	
	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%	Pcs%	Kg%
17-3-81 to 12-4-81	38.7	52.4	17.3	21.5	4.7	8.5	3.3	7.9	20.5	3.5	15.5	6.2
‘14-4-81 to 07-5-81	36.0	47.6	22.0	26.9	3.7	7.0	3.4	9.1	21.4	4.6	13.5	4.8
Average for the reported period	37.8	50.9	18.9	23.2	4.3	8.1	3.3	8.3	20.8	3.8	14.9	5.7

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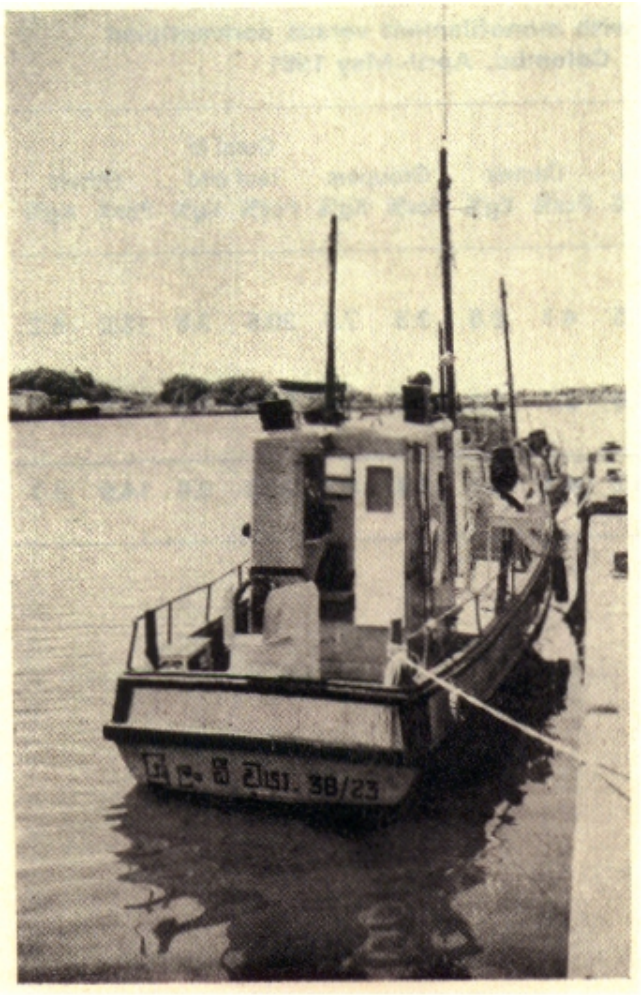
Appendix 1

FISHING BOATS USED IN THE TRIALS



Left: The 38 ft. boat based in Colombo, and used for monofilament trials.

Below: One of the 28 ft. boats used for the experiments with bottom long/ines.

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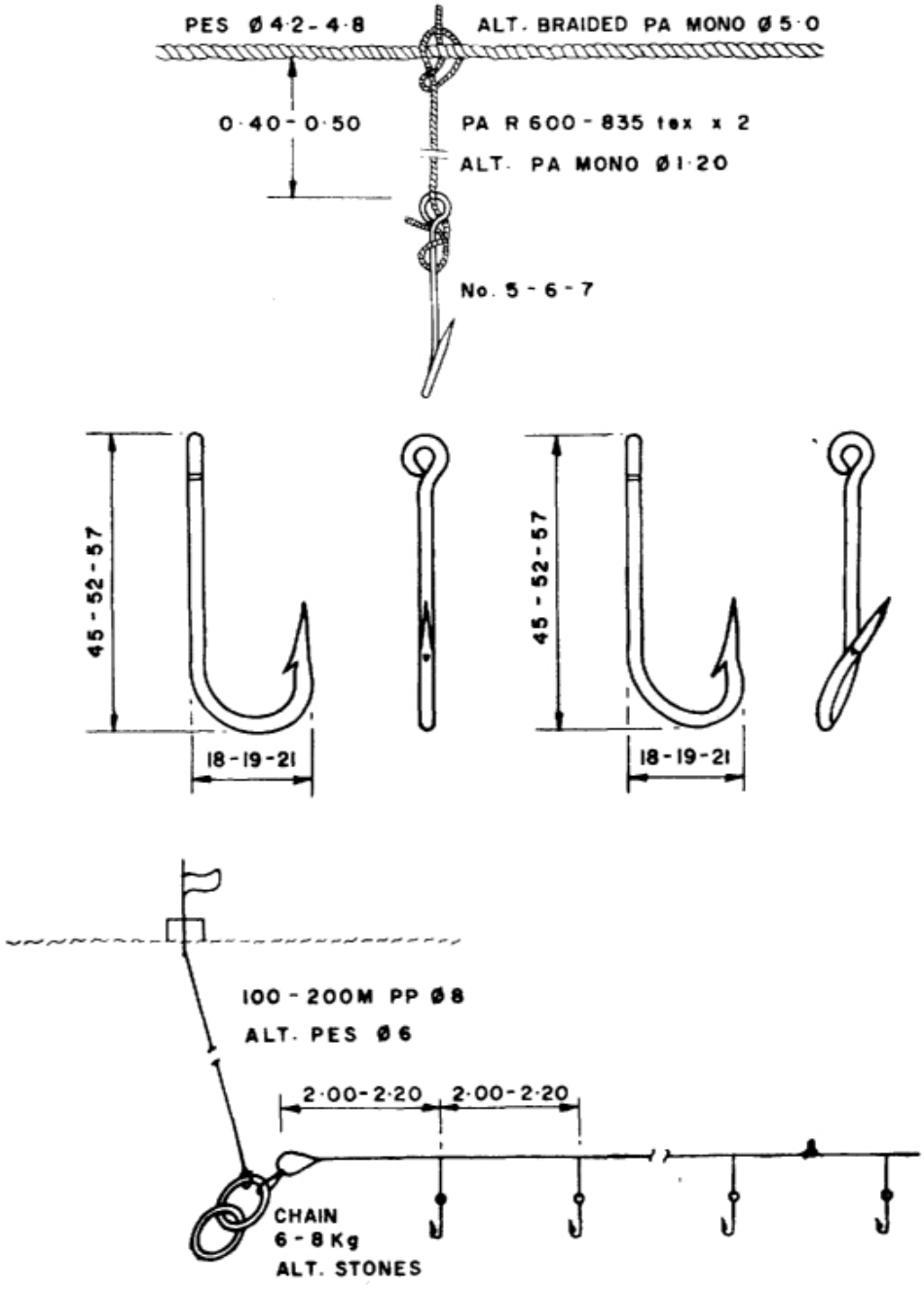
Appendix 2

DESIGN & SPECIFICATION OF
CONVENTIONAL BOTFOM LONGLINES USED IN THE TRIALS



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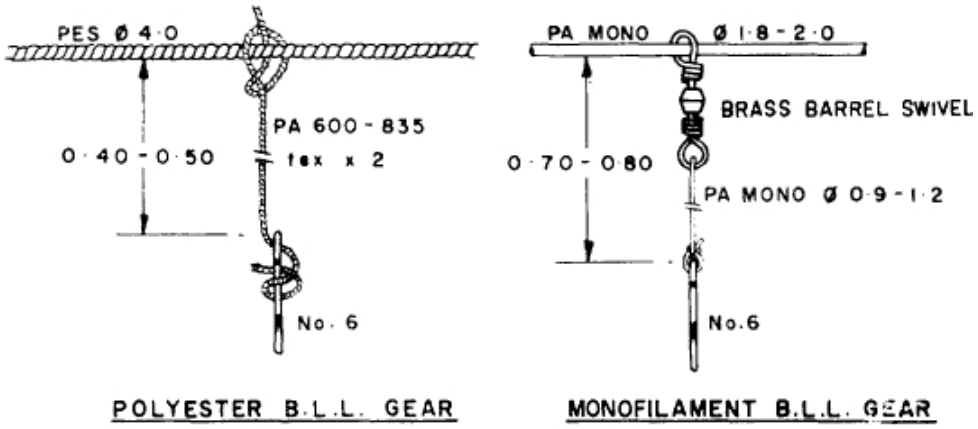
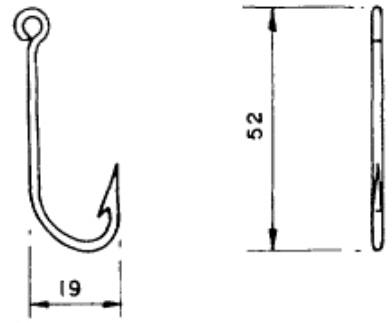
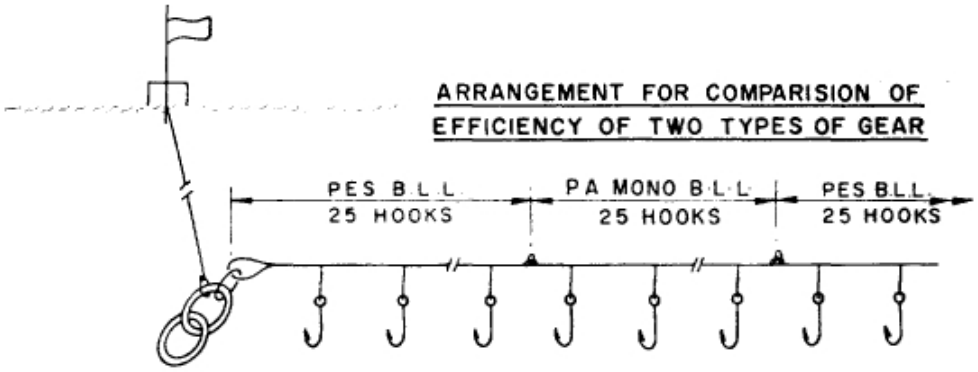
Appendix 3

DESIGN & SPECIFICATION OF BOTTOM LONGLINES
USED IN MONOFILAMENT TRIALS







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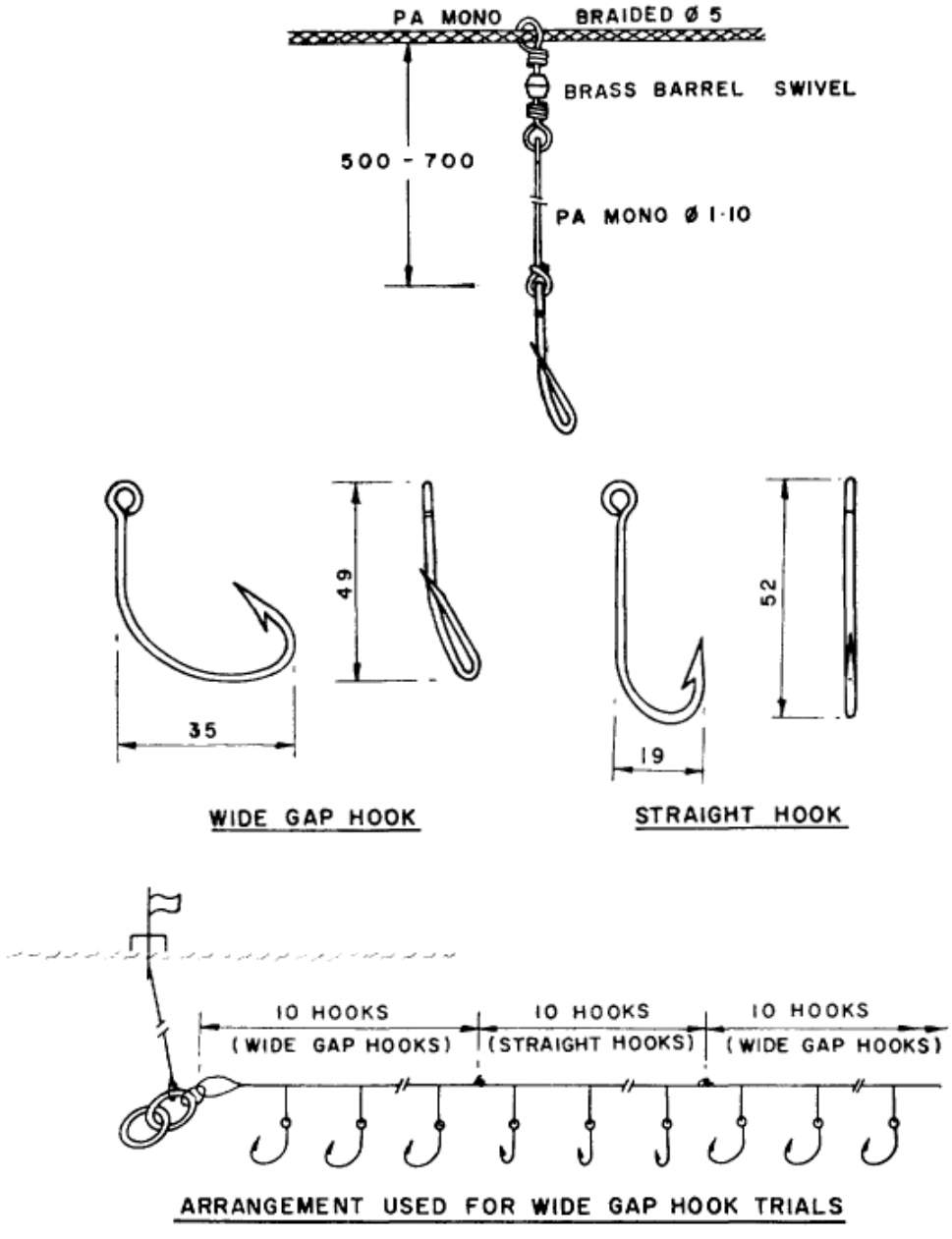
Appendix 4

DESIGN & SPECIFICATION OF BOTTOM LONGLINES USED IN WIDE GAP HOOK TRIALS



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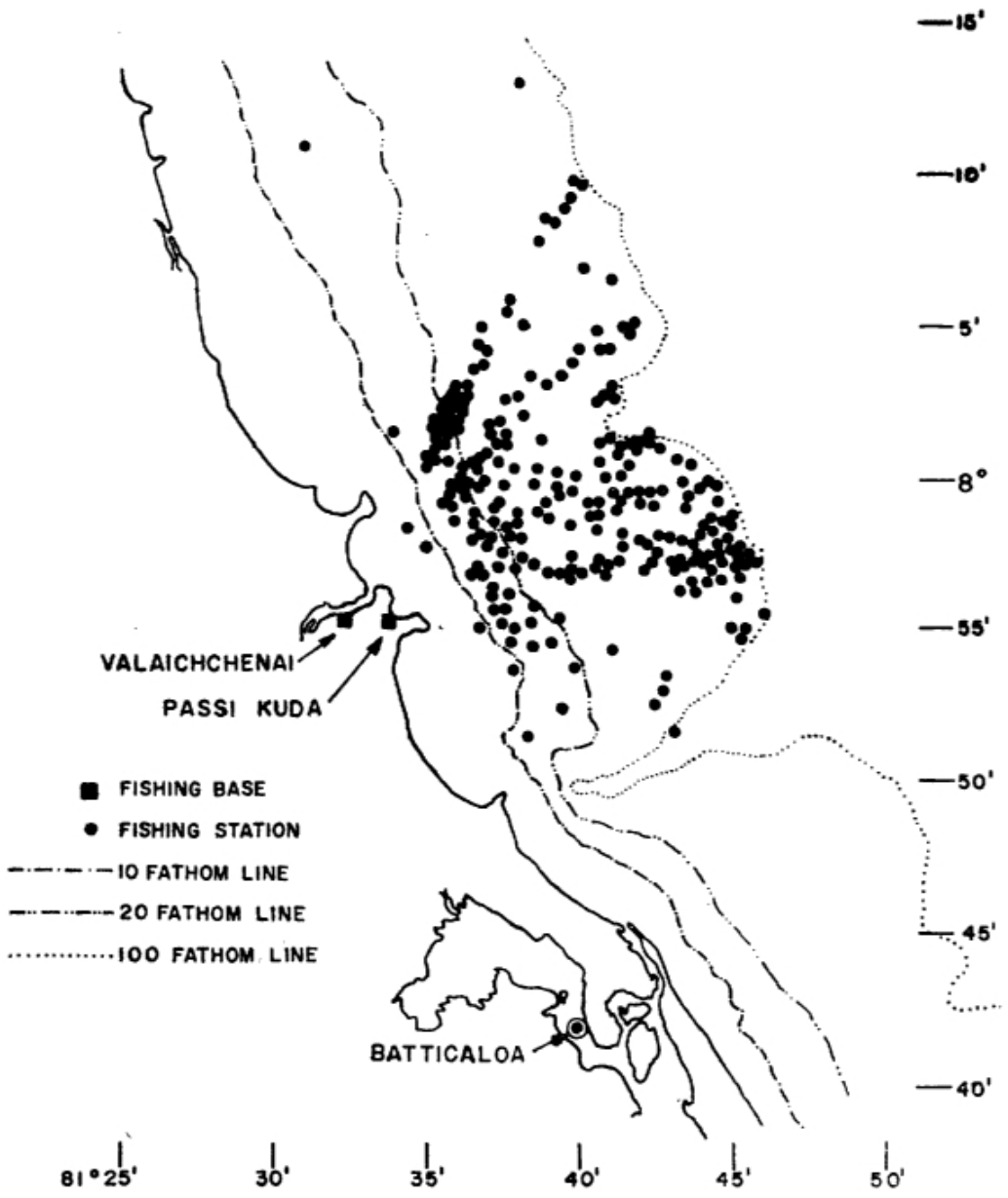
Appendix 5

GEOGRAPHIC LOCATION OF BASES & FISHING GROUNDS: EAST COAST OF SRI LANKA



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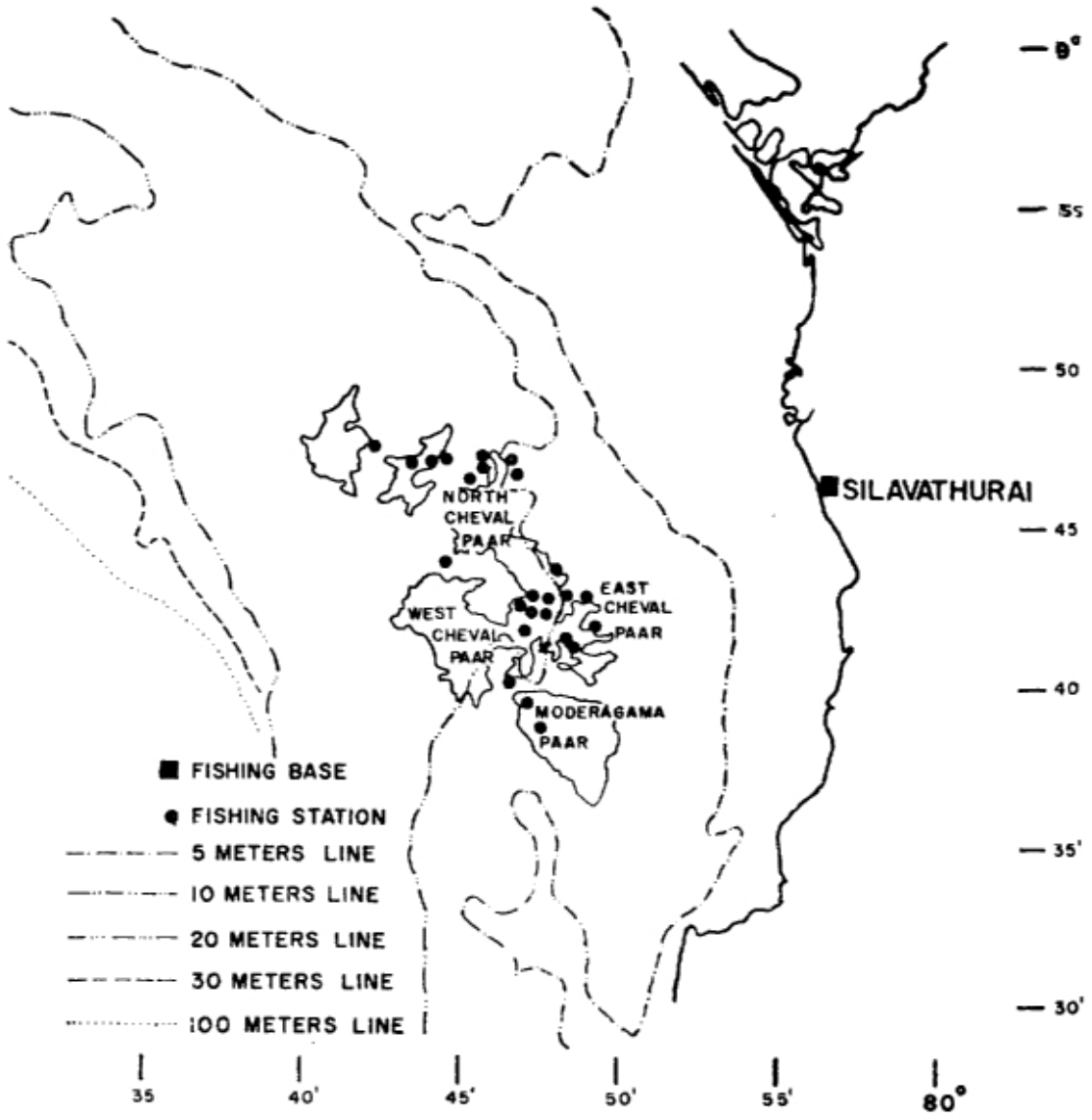
Appendix 6

GEOGRAPHIC LOCATION OF BASES & FISHING GROUNDS: NORTH WEST COAST OF SRI LANKA



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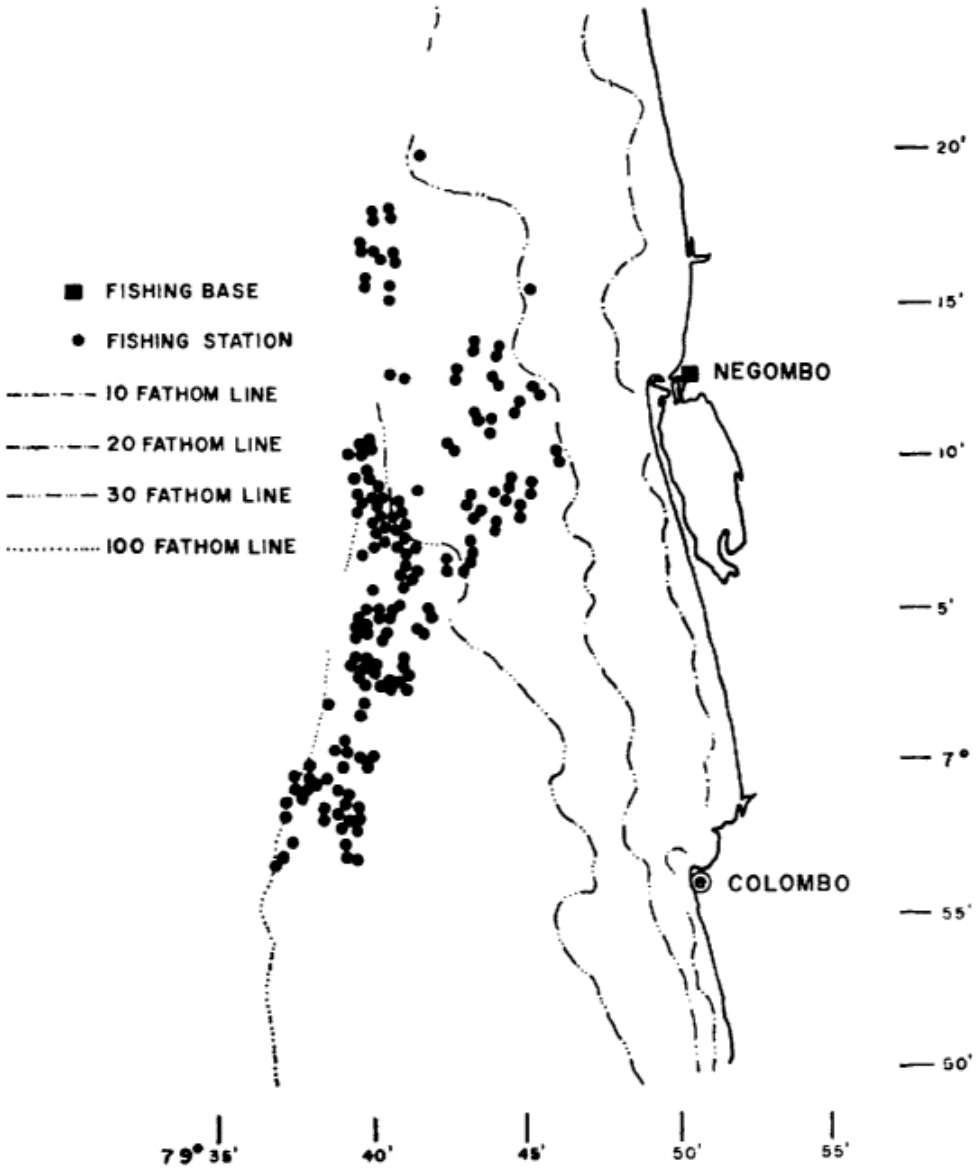
Appendix 7

GEOGRAPHIC LOCATION OF BASES & FISHING GROUNDS: WEST COAST OF SRI LANKA



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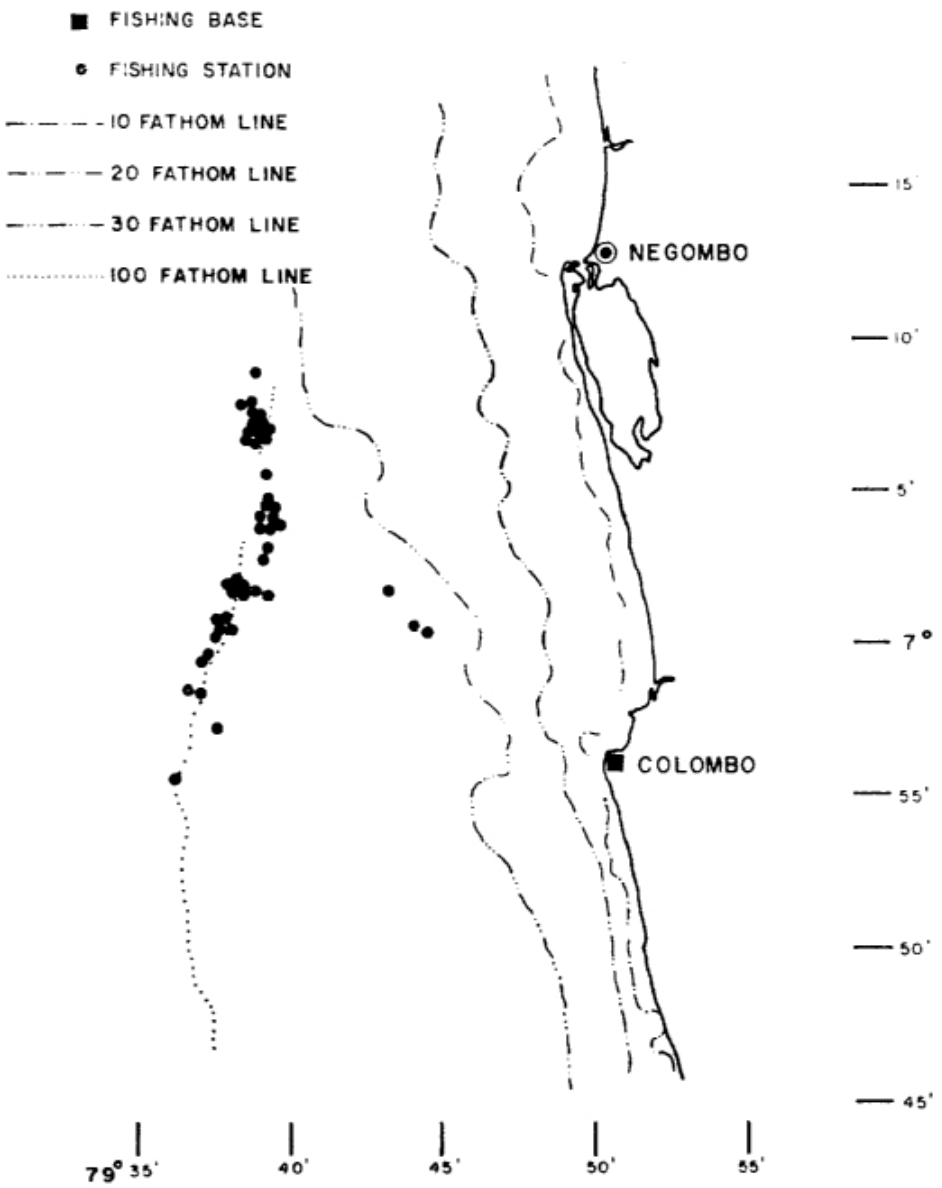
Appendix 8

GEOGRAPHIC LOCATION OF BASES & FISHING GROUNDS: WEST COAST OF SRI LANKA MONOFILAMENT TRIALS



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