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# Drift-Net Fishing in Ceylon Waters

By

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## INTRODUCTION

Drift-net fishing has been a traditional practice in inshore waters of Ceylon for at least a hundred years. The nets were made predominantly of cotton while a few hemp nets were also used to catch the large and more vigorous fish. In about the year 1950, synthetic nets came into use and have now almost completely replaced the cotton and hemp nets.

In the traditional pattern the nets were hung on a main line in such a manner as to entangle fish rather than gill them. This method was probably adopted to suit the comparatively weak tensile strength of cotton fibres. When a cotton net is hung taut in a manner such as to gill fish, the impact of a large fish tends to damage the net. Further, a gilled fish in its struggles may break the cotton fibres and escape. This, it is not likely to do when entangled. The popularity of entangling methods in drift-net fishing was no doubt because of considerations of this nature. As a result, this mode of hanging the net was used even when a new material, namely nylon, was introduced.

Nylon is a material of much higher tensile strength than cotton. It does not break so easily on impact with a fast-moving fish and, therefore, nylon nets can be hung more tautly than cotton nets. An added advantage is that nylon is more flexible than cotton and so has a greater natural capacity to entangle fish than a cotton net with the same tautness. Nylon is also unchanged on contact with water unlike natural fibres such as cotton and hemp which become taut after absorption of water and decompose if submerged for any length of time. A disadvantage of nets hung in a manner so as to gill fish is the possibility that the mesh of the net might not suit the opercular circumference of the fish. If the opercular circumference is smaller or larger than the mesh size the fish will not be gilled. The shape of the fish's head may also be such that gilling may not readily take place. However, experience will enable the operator to select a mesh size for a particular species or group of species of fish. However, on *a priori* grounds, a gill-net is much more efficient than an entangling net in capturing schooling fish and is the method adopted in other countries in capturing schooling fish such as mackerel, sardine, herring and salmon.

It seemed desirable, therefore, to carry out carefully designed experiments in the sea in order to determine the most suitable construction of drift-nets for Ceylon waters. Accordingly, gilling and entangling nylon drift-nets were tried out for efficiency on the east and west coasts of Ceylon. At the same time a survey was conducted of the local constructions of drift-nets in coastal waters. The species of fish caught by drift-nets and their relative abundance throughout the year was studied.

### Materials

Polyamide 66 or nylon, made from polyhexamethyene adipamide, is the most popular webbing in drift-net fishing operations and is imported mainly from Japan. Webbing, ranging from 7″ to 4″ in mesh-size and from 36 to 21 in ply is converted into drift-nets to capture the larger species of fish such as tuna, skip-jack, Spanish mackerel, horse-mackerel, marlin, sail-fin, devil ray and shark. Webbing ranging from $3\frac{3}{4}$″ to $\frac{3}{4}$″ in mesh size and from 15 to 2 in ply is used to catch the smaller species such as sardines, Indian mackerel, mackerel-tuna, and herring. The standard length of the webbing of the larger mesh sizes is 500 meshes and of the smaller mesh sizes 1,500 meshes. The mesh depth of these webbings, however, varied from 40 to 150 meshes and thus necessitated unnecessary labour on the part of fishermen to equalize depths when joining webbings of different mesh sizes.

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The webbing is hung on twisted kuralon rope which had been previously stretched to remove as much of the torsion as possible. The head-rope is from 6–8mm. in diameter while the foot-rope is 3mm. in diameter in the majority of cases. The twine used to secure the webbing to the rope is of polyamide nylon and is of the same ply as the webbing. Longitudinally-grooved plastic floats (F1), 6–7″ in length and 1½″ in central thickness are imported for attachment to the head-rope. Round stones or specially prepared concrete blocks of about half to one pound in weight and of a diameter greater than the mesh size of the webbing are used as sinkers. Large plastic floats, cylindrical in shape, 5½″ in diameter and 6½″ in length are used as surface floats for suspending the nets at different depths from the surface of the sea.

### Local Methods of Hanging Drift-Nets

The mode of hanging the webbing on to the head-line varies in different parts of Ceylon but in general the rope is passed through the meshes of the webbing and staplings are made every fathom or two-fathom interval. The meshes lying between the staplings are free-running giving the net its property of entangling. In nets ranging from 4½″ to 7″ mesh size, the length of the rope is generally half or a little less than half the length of the total stretched meshes of the net but in nets ranging from 3″ to ¾″ in mesh size the length of the rope is 6/10 to 7/10 the length of the total stretched meshes of the net. In the latter instance, the net losses some of its entangling properties.

In the Thalayaddy area of Jaffna, the mesh sizes of the nets are 4″, 4½″, 4¾″, 5″ and 6″ stretched mesh. Seventy six meshes of the webbing are hung directly on a part of the head-rope measuring thirty-six stretched meshes in length. The webbing is fastened on to the rope every eighteenth or thirty-sixth mesh. The head-rope is 8mm. in diameter and is of kuralon. The foot-rope, like the head-rope is single and is 3mm. diameter kuralon. Nine F1 floats, each 7′ in length, are attached equidistantly along the head-rope of a single net of 500 meshes in length. A round stone, larger than the mesh-size of the net, each approximately half a pound in weight, is attached to the foot-rope at intervals of eight fathoms. Large G7 floats, 5½″ in diameter and 6½″ in length, are attached to either end of the net, either directly or through the intermediation of a buoy-line. The length of this buoy-line is varied according to the depth of the sea-bottom and the depth at which fish are found in abundance. One end of the string of nets is fastened to the end of the boat while drifting. To prevent chafing of the net when the free-running nylon meshes move along the kuralon rope, some fishermen braid a single line of kuralon meshes on to the nylon edge of the net before hanging the net on to the rope. In some instances, the lower edge of the net is not attached to a rope. Instead, weights attached equidistantly along the lower edge cause this lower edge to assume the same length as the head-rope. In the Thalayaddy area, the species that are commonly caught are the Queen-Fish—*Chorinemus* spp., the Horse—Mackerel-*Caranx* spp., the Spanish-Mackerel—*Scomberomorus* spp., the Mackerel Tuna—*Euthynnus affinis*, and several species of shark of the genera *Carcharhinus* and *Sphyrna*.

In Trincomalee, the most popular drift-nets are 4½″ to 5″ stretched mesh. In a 4½″ meshed net, 28 meshes are hung loosely on a fathom-length of a 8mm. diameter kuralon rope. The lower edge of the net is hung in a similar manner on to a 3mm. diameter kuralon rope. Staplings are made either at one-yard or two-yard intervals. This reduction of the webbing and the free movement of the 28 meshes along the hanging lines gives the net its property of entangling. A weight, generally, a concrete cylinder, two pounds in weight, is attached to either end of the foot-rope. The unequal distribution of weights along the foot-rope causes the net to have its meshes closed when the net is viewed under-water. The fish commonly caught in the Trincomalee area are the Yellow-Fin Tuna *Thunnus albacares*, the Skip-Jack—*Euthynnus pelamis*, the Spanish-Mackerel—*Scomberomorus* spp., the Sail-Fin—*Istiophorus gladius*, the Marlins—*Tetrapturus audax* and *Xiphias gladius*, the Dolfin-fish *Coryphaena hippurus*, several species of *Caranx*, the Wahoo—*Acanthocybium solandri*, the Rainbow-Runner—*Elagatis bipinnulatus*, the Queen-Fish—*Chorinemus* spp., the Devil-Ray—*Mobula diabolus*, the Blue Bonito—*Sarda orientalis*, the Frigate Mackerel *Auxis thazard* and several species of shark of the genera *Carcharhinus* and *Sphyrna*.

Drift-nets designed to catch the smaller varieties of fish such as sardines and herrings are different from those described above and are hung more taut. In Chilaw and Negombo, where drift-net fishing for these varieties is wide-spread, the nets designed to catch sardines are $\frac{3}{4}''$ stretched mesh and are of 3 ply nylon. The rope is 3-4mm. kuralon and is generally 60-70% as long as the stretched length of the webbing. A similar construction is seen in nets designed to catch the clupeoid *Amblygaster sirm* and the scombrid—*Rastrelliger kanagurta*, but the mesh sizes are larger, being 1" and $2\frac{1}{2}''$ stretched mesh respectively and vary from 3-4 ply nylon.

It is clear, therefore, that local drift-nets designed to catch the larger varieties of fish are of an entangling construction. This design was, therefore, recommended for drift-net fishing off the 11-Ton boats of the Ceylon Fisheries Corporation as it was a prooved method of capture. Recommendations were also made to try out a method designed to gill fish instead of the entangling construction.

### Drift-Net Fishing Off 11-Ton Boats

The drift-nets used by the 11-Ton boats of the Ceylon Fisheries Corporation vary from 4" to 6" in stretched mesh and are chosen to catch the larger varietics of fish. The length and depth of the nets are as described earlier. Generally, the depth of the nets when rigged are twice or one and a half times the depth of the imported net. Details in the hanging of the net vary and is very much a fancy of the local fishermen who have been employed to carry out fishing activities. In a $4\frac{1}{2}''$ mesh net the number of free running meshes between staplings is twenty one and the distance between staplings is 7 feet. Eighteen F1 floats are attached to the 8mm. kuralon head-line and they are 9 feet apart. The number of floats and the distance betwwen floats is varied according to the anti-cipated catch. If a heavy catch is expected then the number of floats is increased and the distance between floats is correspondingly reduced. Six concrete weights are attached to the lower edge of the net which has been hung on to a 3mm. diameter kuralon rope. These weights ae attached equidistantly along the foot-rope. Each weight is $1\frac{1}{2}$ to 2 lb. In a 5" mesh net 21 meshes are hung between staplings and the distance between staplings is 9 feet. In other respects the construction is similar to that of the $4\frac{1}{2}''$ mesh net. A $5\frac{1}{2}''$ mesh net is hung in a manner similar to the hanging of the 5" mesh net. In a 6" mesh net 29 meshes are hung between staplings and the distance between staplings is 9 feet. The number of free-running meshes has been increased probably to accommodate the larger fish expected to be caught by the 6" mesh net. Experience has however proved that even a $4\frac{1}{2}''$ mesh net catches the largest fish that can be expected to be trapped in a drift-net. The number of floats in the 6" mesh net has been increased to 22, again, probably to accommodate the heavy weight of the expected larger fish. Glass floats 8" in diameter or G7 floats (as they are called) are used to suspend the nets from the surface of the sea, the distance between float and net varying from 0 to 25 fathoms. It is clear, therefore, that the major consideration in the construction of the drift-net is its capacity to entangle a fish rather than gill it.

### Method of Hanging Drift-Nets in Experimental Fishing Operations

Looseness in the hanging of a drift-net may be achieved either by varying the number of free running meshes on the head-line and the foot-rope or by reducing the length of the webbing of the net as compared to the length of the foot-rope or by both.

In the early experiments all the nets were constructed with the same degree of reduction of the webbing, but the number of free running meshes in the individual mets were varied. This was achieved by stapling the webbing to the rope at 18" and 36" intervals in a $4\frac{1}{2}''$ mesh net, at 15" and 36" intervals in a 5" mesh net and at 9", 18" and 36" intervals in a 6" mesh net.

F1 grooved floats, each of an approximate buoyancy of 6 ozs., were attached at $1\frac{1}{4}$ fathom intervals, to a single 8mm. kuralon rope which formed the head-line. The nets were hung to the head-rope either directly or through the intermediation of 75 ply nylon or 3mm. kuralon twine. The latter method of hanging enables the operator to repair damaged nets with greater ease. The lower meshes of the net were hung on to a 3mm. or an 8mm. kuralon foot rope in a manner similar to the hanging of the head-line meshes.

Strands of lead-filled nylon cord were used as sinkers-the total weight of the cord for each net was a pound heavier than the combined bnoyancy of the total number of floats attached to the head-line. These strands of weighted nylon cord were arranged equidistantly along the foot-rope.

When the nets, drifting with a 24ton boat, were viewed under water, the head-line was found to be extremely taut-the nets, however, were hanging at greater and greater depths from the surface of the sea as they lay at greater and greater distances from the boat. There was slight distortion of the meshes of the nets lying close to the boat. This was reduced to a considerable extent by increasing the length of the stout manila rope which secured the string of nets to the boat. The nets lying second from the boat and the others following them behind were seen to lie almost perpendicularly in the water without any visible signs of distortion and the meshes symmetrically open. In these nets the webbing was twice the length of the hanging line and the experiments here were designed to find out the effectiveness of increasing slackness of the webbing achieved by varying the number of free running meshes alone.

In another experiment the drift-nets of similar mesh-size were hung with 40% reduction of webbing when compared with the head-line, The number of free-running meshes in the different nets were varied exactly the same as in the previous set of nets. The nets of different construction were assembled along the string in such a manner that each construction was given the same chance of capturing fish.

**Results of Drift-Net Fishing Experiments conducted off Trincomalee**

In the initial experiments, nets of $4\frac{1}{2}''$, 5″ and 6″ mesh were hung on to the framing lines in such a manner that the webbing was reduced to 33% of its original stretched length—a very loosely hung construction. The stapling interval was maintained at 36″ as in the local Sinhala type of construction. The locality selected for these experiments was East of Pigeon Island off Trincomalee at a depth of 16 fathoms. At hauling the nets were in 26 fathoms of water. These experiments were carried out in July 1966. Eight nets—each of mesh-sizes $4\frac{1}{2}''$ 5″, and 6″ were used.

The great disadvantage of the above slackness of webbing was demonstrated in the early experiments, for, at least five minutes' time was necessary to recover a fish from the net, so inextricably was the fish entangled among the meshes of the net. Moreover, in certain instances some meshes had to be cut before the fish could be extricated.

In the above experiments, the $4\frac{1}{2}''$ nets captured 1 specimen of *Euthyannus affinis* and 2 of *Thunnus albacares ;* the 5″ nets captured only 1 specimen of *T. albacares* and the 6″ nets took 1 specimen of *Carcharhinus* sp. and 1 of *Mobula diabolus.*

Further experiments were carried out at Trincomalee using the same mesh size of nets but varying in reduction of webbing and in the stapling interval. The composition of fish caught in these operations are shown in Table 1.

It is apparent from the results that fish were available in the sea in very poor concentrations during the period of these experiments. However, there was evidence to show that limiting the slackness of webbing to 50% did not reduce the efficiency of the net. Moreover, in nets hung with 50% slackness, limitation of the stapling interval to 9″ instead of the customary 36″ did not reduce the efficiency of the nets. Fish of such varied sizes and shapes as *Scomberomorus sp. Euthynnus affinis, Caranx* sp. and *Istiophorus gladius* were caught in these nets.

**Results of Drift-Net Fishing Operations conducted off Colombo**

As concentrations of fish off the East Coast of Ceylon were very poor in July and August operations were shifted to Colombo on the South-West Coast. Operations were begun in September 1966 using the same nets that were used off the East Coast.

The results of these experiments are given in Table II. These results show that limiting the stapling interval to 9″ in 6″ meshed nets hung with 50% slackness does not reduse the efficiency of the net, for, such nets were able to capture species that were difficult to gill-namely-sharks and the devil-ray.

Some nets were constructed with 40% slackness of webbing and a stapling interval of 15″. The results of experimental operations with such nets showed that slackness of webbing may be reduced even further without reduction of efficiency. The largest number of specimens captured by a

## TABLE I

### Composition of Fish Catches from Experimental Drift-Net Fishing

OPERATIONS OFF TRINCOMALEE—1966

| Mesh Size | No. of Nets | Reduction in Webbing | Stapling Interval | Composition of Catch—No. of Specimens | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Euthynnus affinis | Thunnus albacares | Auxis spp. | Carcharhinus spp. | Sphyrna spp. | Scoliodon spp. | Acanthocybium solandri | Scomberomorus spp. | Istiophorus gladius | Coryphaena hippurus | Caranx spp. | Sphyraena spp. | | |
| 4½″ | 54 | 50% | 18″ | 7 | | 1 | 1 | | 10 | | 2 | 1 | 1 | | | | |
| 4½″ | 45 | 50% | 36″ | 2 | | 5 | 1 | | 11 | 1 | | | 1 | 1 | | | |
| 5″ | 51 | 50% | 15″ | 3 | 3 | 2 | | | 2 | 1 | | 1 | 1 | 1 | | | |
| 5″ | 53 | 50% | 36″ | 1 | | 1 | | | 16 | | 1 | | 3 | | | | |
| 6″ | 57 | 50% | 9″ | 2 | 2 | | | | 4 | | 2 | 1 | 1 | | 1 | | |
| 6″ | 43 | 50% | 18″ | 1 | | 3 | 1 | | | 2 | 1 | 2 | 2 | | | | |
| 6″ | 46 | 50% | 36″ | 3 | 1 | | 1 | | 4 | 1 | 2 | 1 | 2 | | | | |

single net on any one occasion was by such a net, namely, 67 specimens of the Rainbow Runner—*Elagatis bipinnulatns*. Large specimens of the yellow-fin tuna—*Thunnus albacares*, the devil-ray, sail-fin and large sharks were also caught in nets of the above construction. Moreover, recovery of the fish from the net was very easy as entanglement among the meshes was negligible. There was no evidence of fish falling off the net at the time of hauling. In the instance when the specimens of Rainbow Runners were caught, they were all found to be alive. Yet, during the time of hauling, there was no loss of any specimens.

The superiority of this tautly-hung construction over the other types was indicated by the fact that the largest number of specimens captured by a single net of any other construction was eleven specimens of *Euthynnus affinis*.

### Species of fish caught by Drift-Nets in Experimental Fishing Operations

The species of fish captured by drift-nets are pelagic types which are found at the surface or in mid-water. In the experiments conducted off Trincomalee, no appreciable differences was observed whether the nets were set in the sea within the continental shelf or beyond it. Here the continental edge is quite close to the shore. Off Colombo, however, earlier long-line operations had indicated that certain species could be caught only if the long-lines had been set beyond the continental shelf. Careful observations were therefore made of the species captured in the drift-nets. It should be mentioned that the continental edge off Colombo lies about 30 miles from the shore.

Table III illustrates the species canght when the nets were set in the sea within the continental shelf and beyond it.

It is clear from the table that certain species are caught only when the nets are set beyond the continental shelf, namely, *Euthynnus pelanis, Thunnus albacares, Sphyraena sp., Naucrates ductor, Mobula diabolus, Isurus oxyrhinchus and Xiphias gladius*. These are the true oceanic species. Others are caught predominantly within the continental shelf, at its edge or slightly beyond. The species are *Euthynnus affinis, Istiompax indicus, Elagatis bipinulatus, Istiophorus gladius, Arius* sp. and *Caranx* sp. These are neritic types.

It is very probable that the factor which delimits the two categories of species is the extinction coefficient for the former varieties have been captured in large numbers only when the water was very clear.

### Species of fish caught in drift-net fishing operations conducted by 11-ton boats

Drift-Net fishing operations have been conducted by the 11-ton boats of the Ceylon Fisheries Corporation since 1966 as recommendations were made that this would be the most lucrative method of fishing. Operations were conducted off Colombo, Kalpitiya, Trincomalee, Valaichenai, Tangalle and Galle. At the beginning, an average of twenty nets were used in a single commercial operation but today the number has increased to an average of thirty five nets. The nets were set towards sun-set and hauled in at dawn. It was found that some species of fish, especially those of the blood-fish variety, were partially decomposed on recovery from the sea, This was no doubt due to the long period of exposure to sea water after death. The operators were, therefore, advised to reduce the fishing time or increase the number of fishing operations during a twelve-hour period to two. This has been followed and the quality of fish has improved.

The results obtained in experimental fishing reported in earlier paragraphs have been confirmed by the experience of the 11–ton boat operators. The species of fish caught within the continental shelf were found to be different from those caught beyond the shelf. Moreover, fish were more abundant beyond the shelf than within it. On occasions the nets contained fish from both regions as a esult of drifting from one area to the other.

## TABLE II

### Results of Experimental Drift-Net Fishing Operations off Colombo—1966

| Mesh Size | No. of Nets | Net Reduction | Stapling Interval | Composition of Catch—No. of Specimens | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Euthynnus pelamis | Euthynnus affinis | Thunnus albacares | Auxis sp. | Carcharhinus spp. | Sphyrna spp. | Scoliodon sp. | Alopias vulpinus | Isurus oxyrhinchus | Acanthocybium solandri | Scomberomorus spp. | Xiphias gladius | Istiompax indicus | Sphyraena spp. | Caranx spp. | Mobula diabolus | Istiophorus gladius | Seriola nigrofasciata | Trigger-fish | Snapper | Elagatis bipinnulatus |
| 4½″ | 31 | 50% | 18″ | 22 | 13 | 1 | 3 | 7 | 2 | 11 | 1 | | 2 | | | 1 | 1 | 2 | | | | | | |
| 4½″ | 86 | 50% | 36″ | 54 | 23 | 4 | 5 | 9 | 5 | 24 | | | | | | | | 41 | 3 | 1 | 4 | 4 | 1 | |
| 5″ | 20 | 40% | 15″ | 5 | 2 | 3 | 1 | 3 | | 1 | | | | | | 1 | 1 | | 4 | | | | | 67 |
| 5″ | 24 | 50% | 18″ | 11 | 1 | 2 | | 3 | 2 | 2 | | | | | | | 3 | | 2 | | | | | |
| 5″ | 48 | 50% | 36″ | 38 | 18 | 5 | 4 | 4 | | 13 | | | | | | | 3 | 1 | 3 | | 1 | | | |
| 6″ | 118 | 50% | 9″ | 48 | 8 | 10 | 23 | 10 | 3 | 2 | | 1 | | | | | | 1 | 11 | | 1 | | 1 | |
| 6″ | 108 | 50% | 18″ | 44 | 33 | 3 | 71 | 17 | 3 | 3 | | | | | | 1 | | 4 | 2 | | | | | 1 |
| 6″ | 120 | 50% | 36″ | 42 | 18 | 3 | 14 | 11 | 4 | 3 | | | | | 1 | | 4 | | 4 | | | | | 1 |

## TABLE III

### Drift-Net Fishing Operations conducted off Colombo between 18.9.66–25.10.66

| *Species* | *Number of Specimens on the Continental Shelf* | | | | | | | | | | *Number of Specimens beyond the Conteinteal Shelf* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Euthynnus affinis* | .. | — | .. | 2 | .. | 20 | .. | 4 | .. | 5 | .. | — | .. | 26 | .. | 18 | .. | 3 | .. | — | .. | — |
| *Euthynnus pelamis* | .. | — | .. | — | .. | — | .. | — | .. | 89 | .. | 60 | .. | 44 | .. | 2 | .. | 40 | .. | 21 | .. | — |
| *Thunnus albacares* | .. | 1 | .. | — | .. | — | .. | — | .. | 6 | .. | 3 | .. | — | .. | — | .. | 5 | .. | 18 | .. | — |
| *Auxis thazard* | .. | — | .. | — | .. | — | .. | 11 | .. | 1 | .. | — | .. | 5 | .. | 34 | .. | — | .. | 1 | .. | |
| *Scomberomorus sp.* | | | | | | | | | | | | | | | | | | | | | | |
| *Arius sp.* | .. | 3 | .. | — | .. | — | .. | 10 | .. | 1 | .. | — | .. | — | .. | — | .. | — | .. | 1 | .. | — |
| *Sphyraena sp.* | .. | — | .. | — | .. | — | .. | — | .. | 4 | .. | — | .. | 6 | .. | 1 | .. | 7 | .. | 1 | .. | 1 |
| *Istiompax indicus* | .. | — | .. | — | .. | 1 | .. | — | .. | — | .. | — | .. | — | .. | — | .. | 1 | .. | — | .. | — |
| *Caranx sp.* | .. | — | .. | — | .. | 1 | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — |
| *Elagatis bipinnulatus* | .. | — | .. | — | .. | 67 | .. | 1 | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — |
| *Coryphaena hippurus* | .. | — | .. | — | .. | — | .. | 2 | .. | — | .. | — | .. | — | .. | — | .. | 1 | .. | — | .. | — |
| *Istiophorus gladius* | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — |
| *Xiphias gladius* | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | 1 |
| *Snapper* | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | 1 |
| *Trigger Fish* | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | 2 |
| *Naucrates ductor* | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — | .. | 3 | .. | 7 | .. | — | .. | — | .. | — |
| *Shark* | .. | — | .. | — | .. | — | .. | — | .. | 2 | .. | 10 | .. | — | .. | — | .. | — | .. | — | .. | 1 |
| *Mobula diabolus* | .. | — | .. | — | .. | — | .. | — | .. | 1 | .. | 6 | .. | 2 | .. | 1 | .. | 5 | .. | — | .. | — |
| *Scolidon sp.* | .. | 7 | .. | 1 | .. | 7 | .. | 3 | .. | 13 | .. | — | .. | 4 | .. | 14 | .. | 10 | .. | 2 | .. | — |
| *Alopias vulpinus* | .. | — | .. | — | .. | — | .. | — | .. | 1 | .. | — | .. | — | .. | — | .. | — | .. | — | .. | — |
| *Sphyrna sp.* | .. | — | .. | — | .. | — | .. | — | .. | 4 | .. | 1 | .. | — | .. | 2 | .. | — | .. | 1 | .. | — |
| *Isurus oxyrhinchus* | .. | — | .. | — | .. | — | .. | — | .. | — | .. | 1 | .. | — | .. | — | .. | — | .. | — | .. | — |

The results obtained by the 11-ton boat operators beyond the continental shelf are illustrated in Tables IV A to D. It is clear that the bulk of the catch obtained beyond the shelf are the true oceanic types such as *Euthynnus pelamis, Thunnus albacares, Auxis rochei, Auxis thazard, Xiphias gladius, Sphyraena spp., Mobula diabolus* and species of sharks of the genus *Carcharhinus*. The former constitute nearly 75% or more of the total catch while sharks contribute 25% or more to this figure. There were several species of shark but one species was most abundant and constituted nearly 75% of the shark landings, namely, *Carcharhinus falciformis*. The other shark species were *C. albomargina tus, Isurus oxyrhinchus*, and three varieties of hammer-head shark of which one was definitely *Sphyrna blochii* (Cuvier)—the other two species were probably *S. mokarran* (Ruppell) and *S. lewini* (Grifith & Smith) Sivasubramaniun (1967) has reported *Sphyrna zygaena* (Linnaeus) to be present in Ceylon waters. This is extremely unlikely as *S. zygaena* has an anti-tropical distribution, occuring in cooler water of both the southern and northern hemispheres but apparently absent from the intervening areas. (Gilbert, 1967, p. 36). This is very likely a mistaken identity and confusion with *S. lewini*—its closest relative.

The bulk of the catch obtained within the continental shelf consisted of the blood-fish *Euthynnus affinis*, sharks of various species, marlin and sail-fin. These constituted nearly 75% of the total catch. On the average *Euthynnus affinis* contributed 25%, sharks 30% and sail-fin and marlin 10% of this total.

The phenomenon of species dominance and ecological separation of species is demonstrated in the pelagic espcies sepecially in the genus *Euthynnus* and seems to be a very common phonomenon among marine animals (De Bruin 1969). *Euthynnus pelamis*, the skip-jack tuna, is the dominant species beyond the continental shelf while *E. affinis* is dominant within the shelf. Moreover, there appears to be a clear separation of these two species, as there is hardly any movement of either species from one area to the other. The presence of an oceanographical front separating these two species is indicated.

The yellow-fin tuna, *Thunnus albacares*, is an oceanic species but it freqently moves into waters within the continental shelf especially when the water is extremely clear. Young specimens, each weighing ten pounds, are frequently found in large schools followed by sharks such as *Carcharhinus falciformis* and *Isurus oxyrhinchus* within the waters of the shelf but close to the continental edge.

## Fluctuations in the catch per unit effort in the waters around Ceylon

### (a) "Total Catch"

The results of drift-net fishing operations conducted by the 11-ton boats of the Ceylon Fisheries Corporation are illustrated in Tables IV A to D. It is clear, as was shown in experimental fishing operations using both drift-nets and long-lines, that the seas off the south and west coasts are much richer in pelagic fish than the seas off the north-east and east coasts. The average catch per operation beyond the continental shelf off Colombo, Kalpitiya, and Tangalle is 1,000 lbs., while the corresponding catch off Valaichenai and Trincomalee is 600 lbs. and 400 lbs. respectively. It must be mentioned, however, that fishing was not conducted off Trincomalee during the monsoon months. It is likely that, had this been done, the average catch would have been approximately 600 lbs. since the average catch at Valaichenai on the east coast is much higher during the months of the north-east monsoon.

### (b) "Blood-Fish"

It is believed that concentrations of blood-fish are much greater in the sea off the south of Ceylon and off Batticaloa and that the concentrations are much less as one moves towards either side of this point. (Sivasubramanium, 1965). This idea may have gained acceptance before drift-net fishing operations were conducted on a large scale off Colombo and Kalpitiya. Table V below shows that the catch per unit effort does not vary very much whether the operation is conducted off the south coast at Tangalle or off the west coast at Colombo. This, of course, applies to the major blood-fish group—*Euthynnus affinis, Euthynnus pelamis* and *Thunnus albacares*.

**TABLE IV A**

**Results of Drift-Net Fishing Operations conducted by 11-ton boats beyond Continental Shelf off Colombo—1968**

| SPECIES | TOTAL CATCH FOR THE MONTH | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total Catch | Catch per Operation | % |
| *Euthynnus affinis* .. | 39 | — | 35 | 6 | 2,691 | 3,815 | 5,217 | 1,010 | 5,884 | 721 | 169 | 2 | 19,589 | 44 | 5 |
| *Euthynnus pelamis* .. | 595 | 392 | 1,569 | 4,308 | 3,525 | 7,820 | 31,480 | 31,983 | 51,351 | 8,328 | 6,713 | 223 | 148,287 | 331 | 35 |
| *Thunnus albacares* .. | 689 | 266 | 898 | 3,286 | 1,694 | 5,643 | 10,360 | 6,881 | 12,840 | 4,440 | 10,804 | 82 | 57,883 | 129 | 14 |
| *Auxis rochei & Auxis thazard* .. | — | — | — | — | 73 | 723 | 969 | 3,252 | 3,159 | 128 | 47 | 62 | 8,413 | 19 | 2 |
| *Istiompax indicus, Tetrapturus audax and Tetrapturus angustirostris* | — | 98 | 799 | 2,518 | 1,719 | 507 | 1,051 | 3,511 | 3,761 | 1,489 | 4,981 | 576 | 21,010 | 47 | 5 |
| *Istiphorus gladius* .. .. | — | 192 | — | 35 | 45 | 224 | — | 123 | 470 | 134 | 56 | 347 | 1,626 | 4 | 0.4 |
| *Xiphias gladius* .. .. | 80 | 281 | — | 30 | 145 | — | 40 | 71 | 214 | 157 | 40 | — | 1,058 | 2 | 0.2 |
| *Acanthocybium solandri* .. | 84 | 54 | — | 185 | 284 | 419 | 70 | 257 | 339 | 170 | 143 | 245 | 2,250 | 5 | 0.5 |
| *Scoliodon spp.* .. .. | — | — | 13 | 73 | 117 | 452 | 1,418 | 592 | 1,029 | 262 | 118 | 147 | 4,221 | 9 | 1 |
| *Carcharhinus spp., Sphyrna spp. and Isurus spp.* | 1,851 | 1,234 | 4,862 | 12,798 | 17,664 | 10,538 | 13,102 | 10,919 | 11,933 | 10,858 | 15,530 | 2,213 | 113,502 | 253 | 27 |
| *Mobula diabolus* .. .. | — | — | 1,252 | 370 | 640 | 951 | 998 | 4,597 | 1,924 | 782 | 7,591 | 228 | 19,333 | 43 | 4 |
| *Sphyraena spp.* .. .. | 166 | 690 | 590 | 425 | 141 | 106 | 20 | 122 | 135 | 324 | 1,701 | 159 | 4,579 | 10 | 1 |
| *Other species* .. .. | 28 | 95 | 37 | 242 | 1,687 | 614 | 2,847 | 3,363 | 6,639 | 3,676 | 2,712 | 81 | 22,021 | 49 | 5 |
| *Total Catch* .. .. | 3,532 | 3,302 | 10,055 | 24,276 | 30,425 | 31,912 | 67,572 | 66,681 | 99,678 | 31,469 | 50,605 | 21,365 | 423,772 | | |
| *No. of operations* .. .. | 8 | 9 | 22 | 39 | 30 | 39 | 45 | 56 | 82 | 53 | 55 | 10 | 448 | | |
| *Catch per operation* .. | 441 | 336 | 456 | 622 | 1,014 | 815 | 1,501 | 1,190 | 1,215 | 593 | 920 | 436 | 946 | | |

**TABLE IV B**

**Results of Drift-Net Fishing Operations conducted by 11-ton boats beyond Continental Shelf off Valaichenai—1968**

| SPECIES | TOTAL CATCH FOR THE MONTH | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total Catch | Catch per Operation | % |
| *Euhynnus affinis* .. .. | 26 | 359 | 68 | 36 | 4 | — | 844 | 390 | 66 | 59 | — | — | 1,852 | 6 | 1 |
| *Euthynnus pelamis* .. | 620 | 3,379 | 1,545 | 4,979 | 2,319 | 175 | 980 | 782 | 1,034 | 2,172 | 3,876 | 8,317 | 30,181 | 94 | 15 |
| *Thunnus albacares* .. .. | 2,425 | 5,588 | 5,709 | 10,779 | 3,122 | 199 | 235 | 303 | 519 | 369 | 829 | 2,179 | 32,246 | 100 | 16 |
| *Auxis rochei and Auxis thaszard* .. | — | — | — | — | — | — | — | 50 | — | 11 | — | — | 61 | 0.2 | 0.03 |
| *Istiompax indicus, Tetrapturus audax and Tetrapturus angustirostris* | 1,108 | 6,432 | 9,971 | 6,463 | 1,569 | 118 | 430 | 605 | 503 | 666 | — | 517 | 28,381 | 88 | 14 |
| *Istiophorus gladius* .. | 36 | 63 | — | 34 | 51 | — | 53 | — | 61 | — | — | — | 298 | 1 | 0.1 |
| *Xiphias gladius* .. .. | 326 | 1,532 | 1,944 | 912 | 159 | — | 156 | 67 | — | 14 | — | 267 | 5,377 | 17 | 3 |
| *Acanthocybium solandri* .. | 150 | 477 | 280 | — | 112 | 37 | 45 | 97 | 168 | 128 | 38 | 312 | 1,944 | 6 | 1 |
| *Scoloidon spp.* .. .. | — | 357 | 385 | — | — | — | — | — | 6 | — | — | — | 748 | 2 | 0.4 |
| *Carcharhinus spp., Sphyrna spp. and Isurus spp.* | 2,254 | 7,813 | 8,649 | 7,477 | 2,397 | 654 | 244 | 796 | 2,742 | 9,367 | 10,944 | 25,695 | 79,032 | 246 | 40 |
| *Mobula diabolus* .. .. | — | — | 929 | 729 | 774 | — | — | — | — | — | — | — | 2,432 | 7 | 1 |
| *Sphyraena spp.* .. .. | 1,657 | 4,885 | 2,668 | 1,395 | 2,244 | 496 | 174 | 89 | 1,084 | 1,328 | 207 | 101 | 16,328 | 51 | 8 |
| *Other spectes* .. .. | 2 | 189 | 199 | 45 | 31 | — | 114 | 122 | 6 | 40 | 43 | 54 | 845 | 2 | 0.4 |
| *Total Catch* .. .. | 8,604 | 31,074 | 32,347 | 32,849 | 12,780 | 1,679 | 3,275 | 3,301 | 6,292 | 14,154 | 15,937 | 37,433 | 199,725 | 622.19 | |
| *No. of operations* .. .. | 13 | 62 | 44 | 41 | 32 | 7 | 6 | 16 | 20 | 32 | 9 | 39 | 321 | | |
| *Catch per operation* .. | 661 | 501 | 735 | 801 | 399 | 239 | 545 | 206 | 314 | 442 | 1,770 | 959 | 622 | | |

TABLE IV C

Results of Drift-Net Fishing Operations conducted by 11-ton boats beyond Continental Shelf off Kalpitiya—1968

| SPECIES | TOTAL CATCH FOR THE MONTH | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total Catch | Catch per Operation | % |
| *Euthynnus affinis* .. | 56 | — | 29 | — | — | — | — | — | — | 367 | 499 | 257 | 1,208 | 5 | 1 |
| *Euthynnus pelamis* .. | 10,341 | 8,681 | 1,543 | 740 | 21 | — | — | — | — | 6,600 | 7,164 | 7,032 | 42,122 | 175 | 20 |
| *Thunnus albacares* .. | 9,820 | 2,220 | 2,092 | 690 | 5 | — | — | — | — | 12,431 | 12,013 | 9,438 | 48,709 | 202 | 23 |
| *Auxis rochei & Auxis thazard* .. | — | — | — | — | — | — | — | — | — | 197 | — | — | 197 | 0.8 | 0.1 |
| *Istiompax indicus, Tetrapturus audax and Tetrapturus angustirostris* | 3,209 | 1,327 | 1,141 | 123 | — | — | — | — | — | 1,805 | 3,978 | 3,063 | 14,446 | 61 | 7 |
| *Istiophorus gladius* .. .. | 128 | — | — | — | — | — | — | — | — | 53 | 78 | — | 259 | 1 | 0.1 |
| *Xiphias gladius* .. .. | 110 | — | — | — | — | — | — | — | — | — | 46 | — | 156 | 0.6 | 0.1 |
| *Acanthocybium solandri* .. | 441 | 113 | 50 | 43 | — | — | — | — | — | 584 | 595 | 933 | 2,759 | 11 | 1 |
| *Scoliodon spp.* .. .. | 29 | 68 | — | — | — | — | — | — | — | 60 | 4 | — | 161 | 0.7 | 0.1 |
| *Carcharhinus spp., Sphyrna spp. and Isurus spp.* | 18,988 | 17,904 | 6,818 | 7,560 | 358 | — | — | — | — | 16,508 | 15,709 | 13,709 | 97,554 | 406 | 46 |
| *Mobula diabolus* .. .. | 1,431 | 184 | — | 225 | — | — | — | — | — | 86 | 197 | — | 2,123 | 9 | 1.00 |
| *Sphyraena spp.* .. .. | 252 | 89 | 97 | 39 | — | — | — | — | — | 42 | 19 | 16 | 554 | 2 | 0.3 |
| *Other species* .. .. | 208 | 23 | 31 | 10 | 16 | — | — | — | — | 968 | 551 | 344 | 2,151 | 9 | 1 |
| *Total Catch* .. .. | 45,013 | 30,609 | 11,801 | 9,430 | 400 | — | — | — | — | 39,701 | 40,853 | 34,792 | 212,599 | 885.82 | |
| *No. of operations* .. .. | 50 | 45 | 17 | 15 | 1 | — | — | — | — | 31 | 46 | 35 | 240 | | |
| *Catch per operation* .. | 900 | 680 | 694 | 628 | 400 | — | — | — | — | 1,280 | 888 | 994 | 885.82 | | |

**TABLE IV D**

**Results of Drift-Net Fishing Operations conducted by 11-ton boats beyond Continental Shelf off Tangalle—1968**

| SPECIES | TOTAL CATCH FOR THE MONTH | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec . | Total Catch | Catch per operation | % |
| *Euthynnus affinis* .. .. | 64 | 65 | 198 | 1,847 | 1,700 | 200 | 185 | 359 | 886 | 199 | — | 330 | 6,953 | 18 | 2 |
| *Euthynnus pelamis* .. | 1,716 | 2,466 | 1,620 | 13,913 | 6,809 | 2,959 | 50,454 | 42,951 | 18,208 | 2,258 | 344 | 1,917 | 145,615 | 390 | 35 |
| *Thunnus albacares* .. | 1,080 | 1,513 | 2,790 | 7,375 | 2,053 | 2,351 | 17,326 | 24,136 | 7,739 | 1,074 | 731 | 3,224 | 71,392 | 192 | 17 |
| *Auxis rochei & Auxis thazard* .. | — | 644 | 65 | 68 | 2,082 | 2,400 | 17,771 | 9,905 | 9,985 | 332 | 12 | 495 | 43,759 | 118 | 11 |
| *Istiompax indicus, Tetrapturus audax and Tetrapturus angustiorostris* | 405 | 613 | 865 | 3,636 | 742 | 307 | 1,669 | 3,519 | 1,673 | 1,309 | — | 399 | 15,137 | 41 | 4 |
| *Istiophorus gladius* .. | — | 177 | — | 344 | 32 | — | 24 | — | 48 | 63 | — | 60 | 748 | 20 | 0.2 |
| *Xiphias gladius* .. .. | — | — | 94 | 44 | 163 | — | 125 | — | 47 | 13 | — | 12 | 498 | 1 | 0.1 |
| *Acanthocybium solandri* .. | 230 | 91 | 220 | 446 | 51 | 85 | 32 | 10 | 334 | 25 | — | — | 1,524 | 4 | 0.1 |
| *Scoliodon spp.* .. .. | 113 | 58 | — | 22 | — | — | 8 | 36 | 495 | 92 | — | — | 824 | 2 | 0.2 |
| *Carcharhinus spp., Sphyrna spp. and Isurus spp.* | 470 | 2,353 | 3,716 | 4,384 | 2,807 | 9,941 | 19,202 | 21,857 | 34,998 | 7,500 | 1,878 | 7,043 | 117,043 | 316 | 28 |
| *Mobula diabolus* .. .. | 900 | 1,461 | 200 | 1,880 | 275 | — | — | — | 297 | 195 | — | 24 | 5,232 | 14 | 1 |
| *Sphyraena spp.* .. .. | 43 | 108 | 248 | 352 | — | — | 58 | 73 | 13 | — | — | 44 | 949 | 2 | 0.2 |
| *Other species* .. .. | 16 | 331 | 104 | 285 | 20 | 14 | 181 | 717 | 626 | 199 | — | 1,005 | 3,498 | 9 | 1 |
| *Total Catch* .. .. | 5,037 | 10,780 | 10,120 | 34,606 | 16,734 | 18,257 | 108,035 | 103,557 | 75,349 | 13,179 | 2,965 | 14,553 | 413,172 | — | — |
| *No. of operations* .. .. | 16 | 24 | 36 | 64 | 25 | 14 | 58 | 63 | 40 | 13 | 2 | 15 | 370 | — | — |
| *Catch per Operation* .. | 314 | 449 | 281 | 540 | 669 | 1,304 | 1,862 | 1,643 | 1,883 | 1,013 | 1,482 | 970 | 1,116 | — | — |

**Table V.—Catch per Unit Effort of 11-ton boats operating off fishing centres**

| | *Colombo* | *Kalpitiya* | *Valaichenai Batticaloa* | *Tangalle* |
|---|---|---|---|---|
| Total Catch .. .. | 256,013 | 102,255 | 91,875 | 240,747 |
| No. of Operations .. | 550 | 333 | 539 | 441 |
| Catch per Operation .. | 465 | 307 | 170 | 546 |

However, it must be mentioned that drift-net fishing was not conducted off Kalpitiya during the months of the southwest monsoon—a period during which "blood-fish" are found in their greatest abundance. This would account for the low average value of " blood-fish " for the year. In, reality, therefore, there may not be a significant difference in the average catch of " blood-fish " for the different areas around the West Coast of Ceylon.

This possibility is borne out by the summary of the catches of " blood-fish " made off Colombo, Kalpitiya and Tangalle during the calm months of the year. Table VI shows a higher average catch off Kalpitiya as compared with Colombo and Tangalle during the calm months.

**Table VI.—Summary of " blood-fish " catches off Colombo, Kalpitiya and Tangalle during the calm months**

| | *Colombo* | *Kalpitiya* | *Tangalle* |
|---|---|---|---|
| No. of operations .. | 257 | 331 | 210 |
| Total Catch .. | 50,928 | 102,559 | 52,477 |
| Catch per operation .. | 198 | 310 | 250 |

**Monthly fluctuations in Drift-net catches**

It is clear from Tables IV (A–D) that there is a seasonal abundance of fish off the South-West, South and East coasts of Ceylon. On the South-West and West coasts fish are most abundant during the months of the South-West monsoon while on the East coast fish are most abundant during the North-East monsoon. It is very likely that this sbundance is associated with upwelling and subsequent enriching of waters that probably occurs during the monsoon months.

Table VII gives the catch per operation in pounds for the months of April and August, 1968 off Tangalle. These two months were chosen for comparison since the number of operations for these two months were the same.

**Table VII.—Catch per operation in pounds for the months of April and August off Tangalla.**

| *April* | | | | | | | |
|---|---|---|---|---|---|---|---|
| 359, | 656, | 168, | 239, | 50, | 67, | 484, | 475, |
| 863, | 511, | 424, | 396, | 353, | 433, | 59, | 234, |
| 178, | 203, | 421, | 461, | 174, | 767, | 431, | 503, |
| 94, | 1077, | 973, | 191, | 473, | 292, | 504, | 490, |
| 52, | 15, | 789, | 655, | 818, | 166, | 1315, | 373, |
| 412, | 342, | 949, | 310, | 486, | 693, | 932, | 639, |
| 417, | 312, | 130, | 222, | 67, | 290, | 302, | 106, |
| 684, | 520, | 964, | 799, | 1008, | 794, | 784. | |

| *August* | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1046, | 2127, | 312, | 1085, | 2485, | 3963, | 3055, | 1128, |
| 1694, | 2028, | 1746, | 965, | 1264, | 4367, | 2034, | 5345, |
| 2773, | 598, | 971, | 2091, | 1659, | 1075, | 586, | 3787, |
| 2612, | 1282, | 1095, | 2699, | 1346, | 1364, | 1367, | 1100, |
| 1294, | 1370, | 163, | 860, | 222, | 771, | 1519, | 3399, |
| 2470, | 492, | 1309, | 452, | 1252, | 867, | 2121, | 314, |
| 960, | 1080, | 966, | 3268, | 2037, | 3446, | 1234, | 1125, |
| 660, | 1414, | 800, | 1296, | 1198, | 1629, | 651. | |

Applying student's test to verify whether the difference between the mean catches for April and August is significant, it is seen that :

$$\text{Mean Difference} = 1180$$
$$\text{S. E.} = 150.7$$
$$t = \frac{1180}{150.7} = 7.8 \text{ (62° freedom).}$$

The difference in means is highly significant, showing a real difference in mean catch between the months of April and August, 1968.

The seasonal abundance also indicates that certain species are migratory—the migration is very probably from oceanic water towards waters of the continental shelf. There is also the possibility

that the migration takes place from the west to the east coast and vice versa. Future work with the aid of fish tags and experimental fishing in deeper oceanic waters during the non-monsoon months should indicate which migration actually occurs.

It is also apparent from the catch statistics that sharks follow schools of skip-jack and yellow-fin tuna in these migrations, as there is a corresponding abundance and scarcity of sharks and tuna during the monsoon and non-monsoon months respectively.

## SUMMARY

Drift-nets used by local fishermen employ an entangling technique of capture. This construction, is, on a priori grounds, inefficient, since many meshes are utilized in capturing a fish and recovery of the fish from the net is difficult. Experimental operations with gill-nets indicated that a more tautly hung net with less free-running meshes is quite as efficient if not more efficient than that employing an entangling construction. Moreover, recovery of the fish from the net is very easy.

The species of fish caught in drift-nets are pelagic types. In areas around Ceylon where the continental edge is at a distance from the shore (approximately 20 miles from the shore as off Colombo), the varieties of fish caught within the continental shelf were different from those caught beyond the shelf. The major species within the continental shelf were *Euthynnus affinis, Scomberomorus spp., Istiophorus gladius, Istiompax indicus, Tetrapturus audax* and *Tetrapturus angustirostris*, while the major species beyond the continental shelf were *Euthynnus pelamis, Thunnus albacares, Acanthocybium solandri, Xiphias gladius, Isurus oxyrhinchus*, and *Mobula diabolus*. The presence of an oceanographical front separating these species was also indicated—the operating factor is probably the extinction coefficient. Fishing with drift-nets beyond the continental shelf was more profitable than fishing within the continental shelf. Fishing operations conducted over the year beyond the shelf yielded an average catch approximately 1000 lbs. per operation while fishing within the shelf yielded an average catch of 400 lbs. per operation. The seas off the south-west and south coasts were found to be much richer in pelagic fish than the seas off the east coasts. The average catch per operation off Colombo, Kalpitiya and Tangalle was approximately 1,000 lbs. while the average catch off Trincomalee and Valaichenai was approximately 400 and 600 lbs. respectively.

There was a seasonal abundance of fish off the south-west, south and east coasts of Ceylon. On the south-west and south coasts fish were more abundant during the months of the south-west monsoon while on the east coast fish were more abundant during the months of the north-east monsoon. It is likely that this abundance is associated with upwelling and subsequent enrichment of waters that probably occurs during the monsoon months.

Drift-net fishing proved to be a more lucrative method of capturing fish than trolling, long-lining and trawling in the seas off Ceylon, and has contributed to an increase in the gross catch in Ceylon waters.

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