Bull. Fish. Res. Stn., Ceylon. Vol. 20, pp. 79—85, 1969

A Preliminary Report on *Chanos* fry surveys carried out in the brackish water areas of Mannar, Puttalam and Negombo

S. Ramanathan

Brackish Water Fisheries Station, Pitipana, Negombo, Ceylon

Introduction

Chanos chanos (Milkfish—English, Weikka—Sinhalese, Pal meen—Tamil) is very popular for fish culture purposes in the Indo-Pacific region, and a ready market is always available for this fish. In early 1954 the Ceylon Department of Fisheries initiated the first systematic survey of the Island's coastal waters to locate the fry grounds of *Chanos chanos*, and since then surveys for fry have been carried out regularly. Knowledge of the distribution and estimation of the abundance of *Chanos* fry in the brackish waters is of basic importance to decide whether the culture of *Chanos chanos* in the brackish water areas could be made extensively.

This report deals specifically with the milkfish fry surveys conducted in the brackish water areas of Mannar, Puttalam and Negombo (on the West Coast of Ceylon) during 1967 and 1968 and gives an analysis of fry collected for farming. From the data collected during the past two years, together with the data of previous years, it is possible to determine the peak fry season and the important fry grounds of *Chanos chanos*, in Ceylon. An attempt has been made to obtain the figures for *Chanos* fry potential.

Occurrence of Milkfish in Ceylon

In Ceylon adult *Chanos chanos* over 12 inches in length have been reported from Mannar District (Pesalai and Talaimannar), Puttalam, Chilaw, Negombo, Kalutara, Batticaloa District (Kalmunai and Akkaraipattu), Trincomalee, Jaffna (Karayoor) and Point Pedro (Figure 1). Adult *Chanos* have been reported in large numbers in surface waters from November to February each year. In calm seas adult fish have been seen swimming at the surface with their tails skimming the surface.

Schuster (1951) and Ling (1962) indicated the occurrence of *Chanos* fingerlings at the mouth of Puttalam lagoon near Kalpitiya, and the importance of this species of fish for the future development of brackish water fish culture in Ceylon.

Capture of fry and fingerlings

Capture of fry and fingerlings of *Chanos chanos* is carried out mainly in the brackish swamps and tidal flats having connection with the sea. Table I gives the areas from which *Chanos* fry has been collected.

TABLE I

AREAS OF OCCURRENCE OF *CHANOS* FRY ALONG THE WEST COAST OF CEYLON

Mannar	..	South bar Vankalai Erukulampiddy Pallimunai Thallady Ammapaddukai
Puttalam	..	Kuringipiddi Thillaiady Elluvankulam
Negombo	..	Sea mouth region of Negombo lagoon Kimbulwala Taladuwa

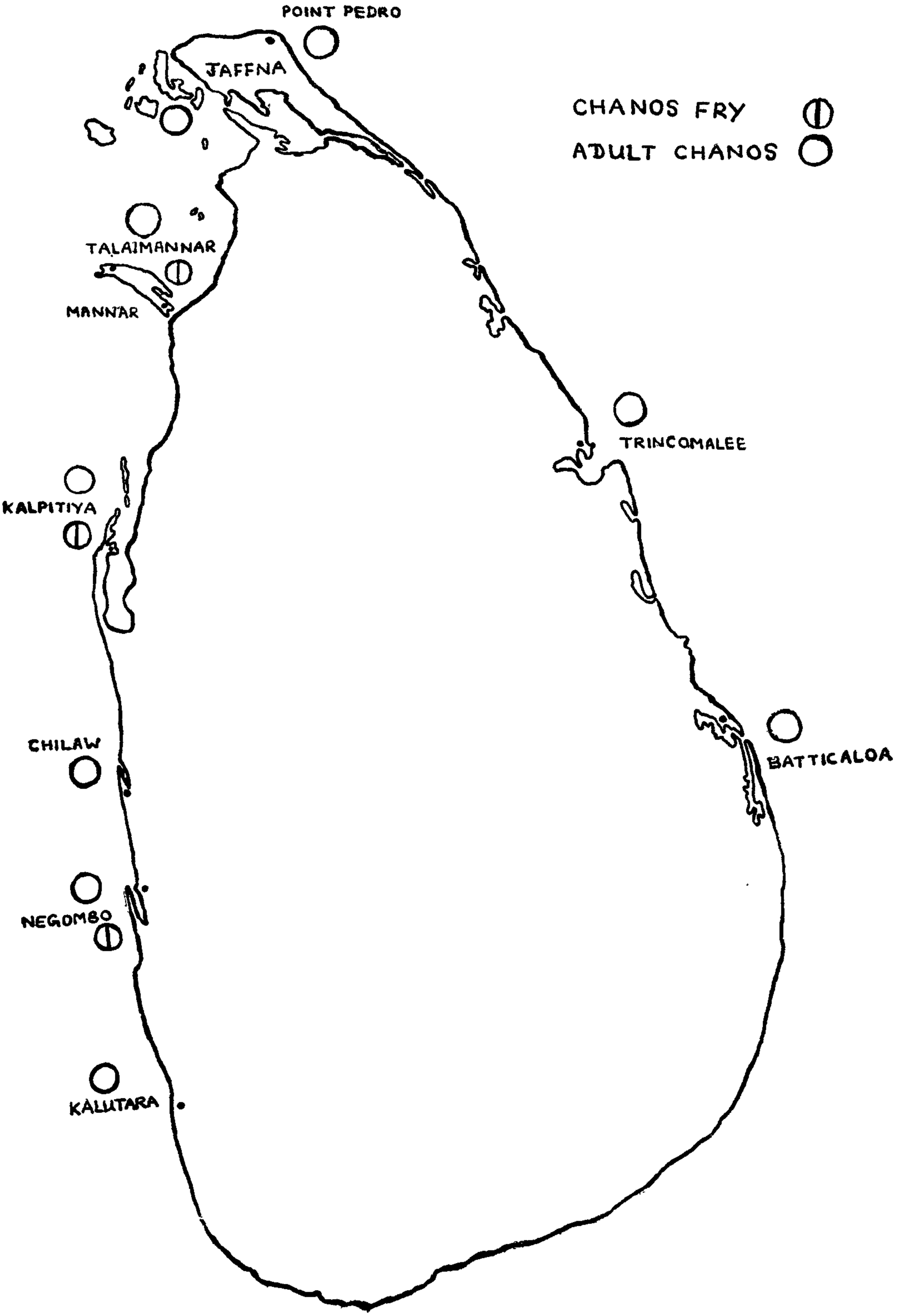

Fig. 1. Areas of occurrence of *Chanos* fry and adult *Chanos*.

Chanos larvae characteristically swim all in the same direction and the larvae collected are almost translucent, so that even the gut contents could be determined by observation. The gear used to capture the translucent larval stage (10 mm. in length) and fry of *Chanos* is a simple " Drag-net " (Kaddipuva) made of two wooden sticks and a piece of Nylon organdi material of 45 inches width and 4 feet in length. The net is handled manually by two men. The fryar e bailed out from the net with a white bi-valve shell (Matti-kattu) after each haul and transferred to a polythene bag filled with clean sea water of relatively low salinity. The bags containing the fry are transported under oxygenated conditions. *Chanos* fry are very often found with the fry of *Elops, Megalops* and *Tllapia,* the fry are sorted out and as far as possible the fry of *Chanos* are stocked separately.

Abundance of fry from three main collecting Areas

Up to 1968 *Chanos* fry for stocking purposes have been collected from three brackish water areas, namely Mannar, Puttalam and Negombo. Observations and data of collection from these areas are given in Table II and are discussed below.

TABLE II

NUMBER OF CHANOS FRY CAPTURED IN CEYLON (1961 TO 1968)

Year	*Fry captured*	*Season*	*Year*	*Fry captured*	*Season*
1961	9,000	April–May	1965	31,000	April–June
	3,000	Oct.–Nov.		Nil	Oct.–Nov.
1962	18,000	April–May	1966	*2,000	April–May
	Nil	Oct.–Nov.		Nil	Oct.–Nov.
1963	68,000	April–June	1967	45,000	April–June
	2,000	Oct.–Nov.		*Nil	Oct.–Nov.
1964	56,000	April–June	1968	46,000	April–May
	Nil	Oct.–Nov.		1,000	Oct.–Nov.

* Regular surveys were not carried out.

1. Mannar

Chanos spawns in coastal waters and the fry remains in shallow waters for a considerable period of time. There are comprehensive records available concerning the occurrence of *Chanos* on the Indian side of the Gulf of Mannar and this area seems to serve as a natural nursery for *Chanos* fry. Here the fry appear to stay in the shore area for a much longer period of time than they are said to do in Indonesian waters. Hence the capture of fry and fingerlings in the Gulf of Mannar both on the Indian and on the Ceylonese side can go on for a relatively longer period than in Indonesia.

In Mannar, fry is collected from shallow tidal pools of South bar, Vankalai, Erukalampiddy, Pallimunai, Thallady and coastal areas of Pesalai and Ammapaddukai (Table I). Periodical surveys for *Chanos* fry throughout the year were carried out in these areas to know the peak season and fry potential.

In Mannar *Chanos* fry could be collected in appreciable quantities during two fry seasons. The first season is from April to June and fry have been collected on a large scale during this season, particularly during April and May (Figure 2). The second season is during October–November wheu fry could be collected on a very much smaller scale than during the first season particularly because fry catching operations are rendered difficult at this time of the year, due to the onset of rainy season in Mannar.

In 1967 *Chanos* fry were collected only during the April–June season. About 26,000 *Chanos* fry ranging from 15 mm. to 20 mm. were collected in four days during April and 19,000 in June. In 1968 approximately 34,000 *Chanos* fry ranging from 15 mm. to 30 mm. were collected from tidal pools of Erukalampiddy and South bar during May (Fig 2). It would be possible to get much more if regular intensive surveys and capturing operations are conducted.

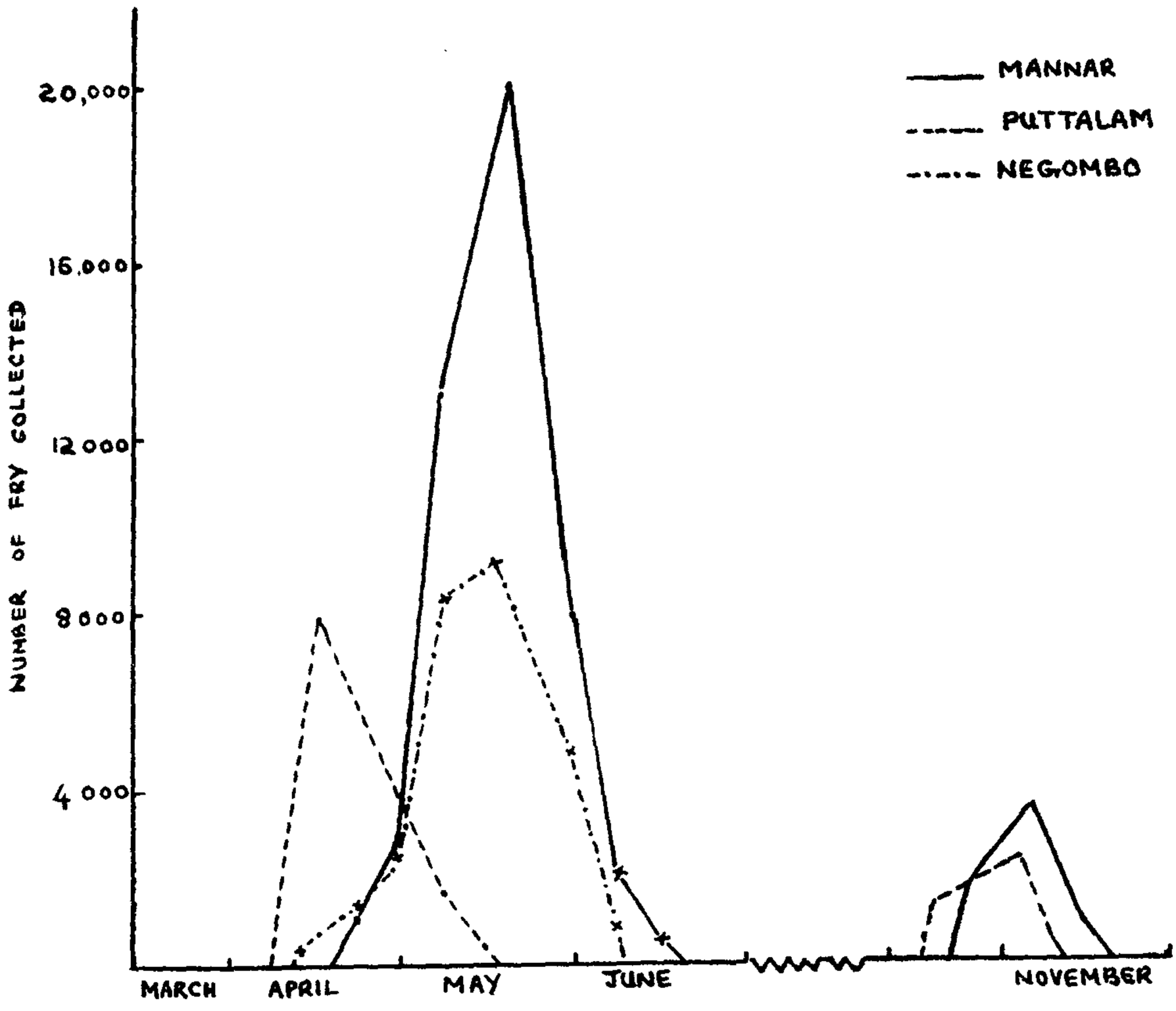

Fig. 2. *Chanos* fry collected from Mannar, Puttalam and Negombo in 1968.

About one hectare of shallow tidal flat is exploited during each survey, for the capture of fry. It has been found, after a four-year survey in the Mannar area that the average catch per man hour per hectare of tidal pools is 500 and that a hectare could yield about 4,000 fry per day (Pillai, 1965). There are about seven square miles of tidal flats in the Mannar area of which about 1,000 hectares are shallow tidal pools which can be exploited. These figures are in agreement with the findings of Pillai, 1965, who estimated that during the four-month period (April, May, June and November) the total number of fry that could be produced from Mannar area is about 400,000,000 fry per annum. Therefore it is evident that taking into consideration errors in the method of estimation, that the fry requirements of the fish farm could possibly be get from the Mannar area. However, other places like Puttalam and Negombo are also available.

2. Kalpitiya-Puttalam lagoon

Chanos fry surveys were conducted in the Puttalam lagoon area in 1968. *Chanos* fry and fingerlings were collected during April–May, from the middle section of the lagoon, which extends from the town of Kalpitiya down to Kalmunai point. Thillaiady and Kuringipitti (Table I) were found to be the suitable locations where fry collections could be made.

The difficulty experienced in this area is that during May–June the salinity of the water increases, the shallow tidal pools dry up and the earth cakes up, resulting in large-scale mortality of fry. *Chanos* fry was also observed in Dutch Bay region of the Kalpitiya–Puttalam lagoon during April–May.

From the quantity of fry collected and the extent of exploitable areas, it has been estimated that the *Chanos* fry potential of the Puttalam lagoon is about 200,000,000 fry/annum. Intensive fry collection methods should be adopted during April–June season, in order to collect sufficient quantity of *Chanos* fry.

3. Negombo

Since 1967, regular checks have been made for *Chanos* fry, in the Negombo lagoon. Surveys were conducted in the lagoon system adjoining the Pitipana Fish Farm, near the sea mouth region and in the area around the Island patches of Kimbulwala and Taladuwa (Table I). The most suitable places for collection are found to be the gently sloping areas with sandy bottoms, near the sea mouth region. During high tides, all the mud pools in the Taladuwa area gets filled up, and water is retained even during low tides. *Chanos* fry could be collected in sufficient quantities during April and May.

During the early part of April the fry captured were in the Yolksac stage of development. Due to the close proximity of the Pitipana station from the fry collecting grounds some of these delicate fry were easily transported to experimental tanks. They were rared in these tanks on an adequate net planktonic diet and they grew up to 30 mm. length in about three weeks.

Schuster (1952) states that there is a definite lunar periodicity in the availability of fry, the largest catches being made at the full-and-new-moon periods. *Chanos* fry catches made during April–May 1968 are in accordance with his statement (Fig. 3).

The connection between the sea and the Negombo lagoon is being gradually blocked up by silting processes. If this area is dredged periodically it would possibly ensure greater number of fry entering the lagoon system.

Discussion

Recent observations of the habits of *Chanos* in waters around Ceylon indicates that spawning takes place from March to June each year. These observations show that the fry collecting period in Ceylon waters would be from April to July which is the same as that for Ramnad District in South India, as stated by Schuster (1951).

The surveys conducted so far are of a preliminary nature, and the estimates are based on small samples. More accurate figures for assessing the *Chanos* fry potential could only be obtained when more regular and intensive surveys are done.

Surveys conducted in 1967 reveal that *Chanos* fry in sufficient quantities could be collected from Mannar, Puttalam and Negombo brackish water areas during April and May. There is a second season in October–November; it is uneconomical to depend on the October–November fry season in a point of commercial fry fishery.

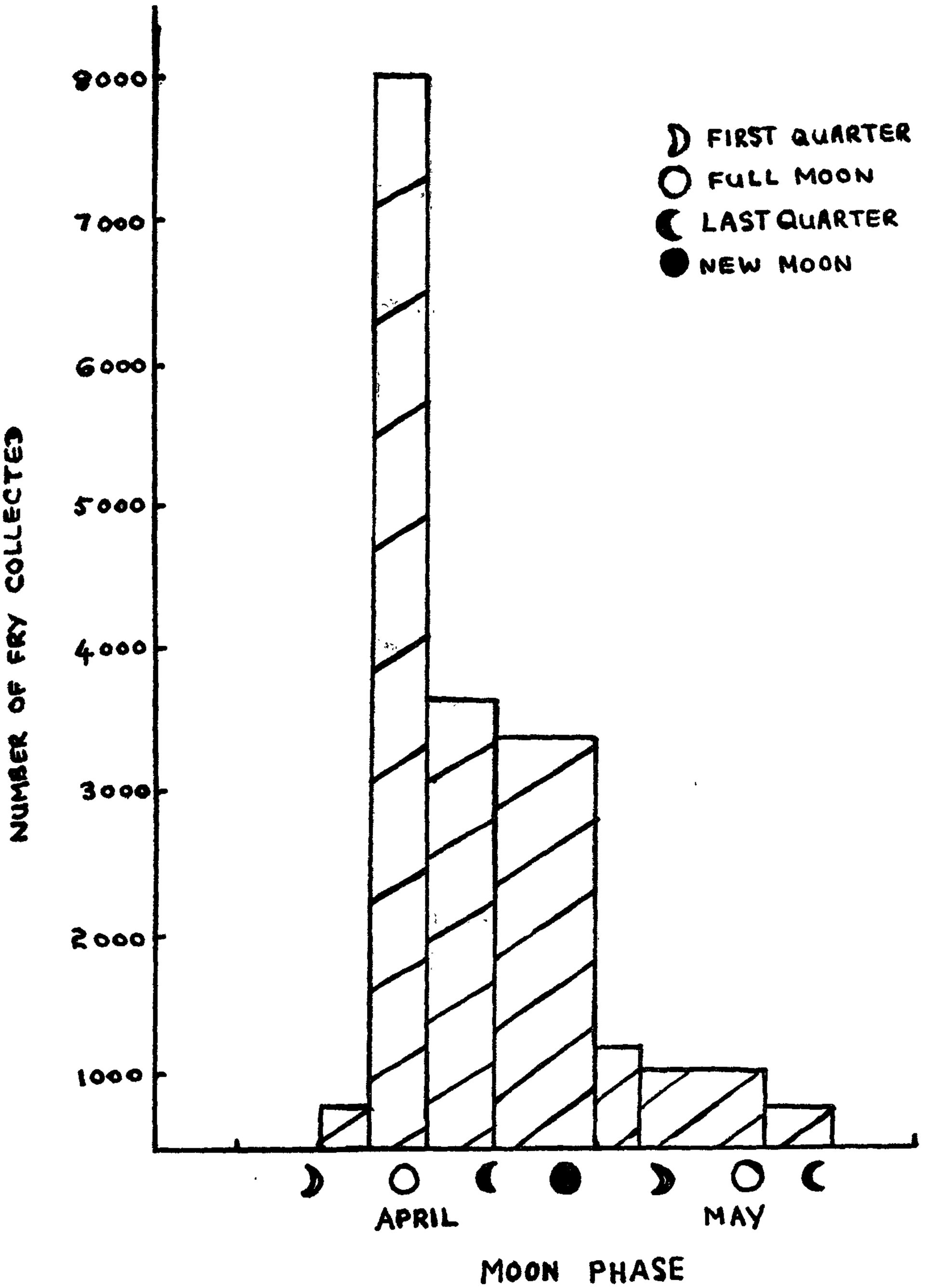

Fig. 3. Availability of *Chanos* fry in relation to the Moon-phase.

The suggestions is, therefore, to make full utilization of the April–May *Chanos* fry season. Simultaneous, intensive and efficient capturing operations should be carried out in the Brackish Water areas of Mannar, Puttalam and Negombo so that fry requirements for the whole year (two harvests) for Pitipana, Mannar and private fish farms could be met. Taking into consideration mortalities, fry requirement per acre will be 6,000. Fry required for the second harvest could be over wintered in the Nursery Ponds of the Fish Farm until the first harvest is over.

Summary

1, This paper records the results of the *Chanos* fry surveys carried out in Mannar, Puttalam and Negombo lagoon areas since 1967, and gives a summary of the earlier surveys.

2. Maximum amount of *Chanos* fry was obtained from Mannar area during April and May. All three areas have their main commercial fry season in April and May with a second commercially negligible season in October–November.

3. The quantity of fry collected have been utilized to evaluate the potential fry production figures. Mannar—400,000,000 fry/annum. Puttalam—200,000,000 fry/annum. It would be extremely difficult to estimate the number of eggs laid, the larvae hatched and the fry available each year along the coastal areas of Ceylon. It is necessary to obtain biological, meteorological and oceanographical data so as to provide a basis for the prediction and estimation of fry populations in the coastal waters of Ceylon.

4. The suggested ideal season for commercial catches of *Chanos* fry is April–May ; operations to be carried out simultaneously all along the west coast.

Acknowledgments

I wish to express my sincere thanks to Mr. T. Gottfried Pillai, Manager, Brackish Water Fisheries (presently attached to the United Nations Development Programme, Indonesia), for his invaluable guidance and suggestions and to all others who took part in the surveys for their co-operation in the collection of *Chanos* fry and fingerlings. I also wish to thank Mr. A. S. Mendis, Research Officer, Ceylon Fisheries Corporation, for going through the manuscript and for making useful suggestons.

References

DURAIRATNAM, M. 1963. Studies on the seasonal of sea surface temperature, salinities and phytoplankton in Puttalam lagoon, Dutch Bay and Portugal Bay along the west coast of Ceylon. *Bull. Fish. Res. St., Ceylon*, Vol. 16, No. 1, pp. 9–24.

HICKLING, C. F. 1951. Report on the Fisheries of Ceylon. *Government Publications Bureau, Ceylon. Sessional Paper No. VI.* pp. 3–16.

LING, S. W. 1962. Report to the Government of Ceylon on a project of Inland Fisheries. *FAO Report No. 1527, CEY/TE/FI–FAO, Rome*, pp. 1–43.

LIN, S. Y. 1968. Milkfish farming in Taiwan. A Review of practics and problems. *The Taiwan Fisheries Research Institute, Fish Culture Report No. 3*, pp. 1–63.

PILLAI, T. G. 1965. Brackish water fishery resources, *Bull. Fish. Res. Station, Ceylon, Vol. 18, No. 2*, pp. 1–11.

SCHUSTER, W. H. 1951. Surveys of the Inland Fisheries of Ceylon. *Govt. Pub. Bureau, Ceylon. Sess. Pap. No. XXIV*, pp. 4–15.

———1952. Fish culture in brackish water ponds of Java. *IPFC, Special Publication No. 1*, pp. 1–43.

———1960. Synopsis of biological data on milkfish, *Chanos chanos* (Forskal), *FAO Fisheries Biology Synopsis No. 1.*