

SPAWNING PERIODICITIES OF THE FRESH WATER EEL (*ANGUILLA BICOLOR BICOLOR*) AND ITS LARVAL ABUNDANCE IN THE NORTHERN BOLGODA LAKE, SRI LANKA

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Abstract

The adult mature eels (*Anguilla bicolor bicolor*) from the streams of the Southwestern region of Sri Lanka migrate to the Indian Ocean along with flood waters during rainy seasons of October to December and April to June. The elvers are abundant in the Northern Bolgoda Lake from about November to about February and from about May to about August, when the salinity of the Lake Water is low. The length of the larvae ranged from about 3.2 to about 7.3 cm and their weight ranged from about 0.4 gms to about 2.1 gms.

Introduction

Sri Lanka which was not a traditionally fish cultivating country has initiated fish cultivation around 1965 (Pillai, 1965). Since then among fin fish species like Tilapia, Chinese Carps and Milk fish and among shell fish species like Giant fresh water prawns and some Penaeid prawns have been cultivated on experimental ponds (Pillai, 1965, Fernando 1965). Eel cultivation has also been initiated recently by a private firm (Gamage, 1981, personal communication) but its progress has been relatively poor compared to that of other fin fish species. It was partly due to the insufficient knowledge on its biology and partly due to lack of an interest among Sri Lankans associated with the poor demand for eels both locally and abroad.

Munro (1955) had reported two species of fresh water eels in Sri Lanka of which *A. bicolor bicolor* inhabits the fresh water bodies of the coastal region and *A. nebulosa nebulosa* that of mountain waters. Both of these species are catadromous. Mendis (1962) reported that *A. nebulosa nebulosa* descends to seas during rainy seasons. He had further reported the presence of *Macronathus acculeatus* and *Mastacembelus armatus* in Sri Lankan waters and of which the former species is confined to the low country only whilst the latter species is distributed in the low country and in the hill country upto about 1300 meters.

The cultivation of *A. bicolor bicolor* in Sri Lanka was initiated by Gamage (1981). He collected larvae from the mouth of the Kelani river around the month of August.

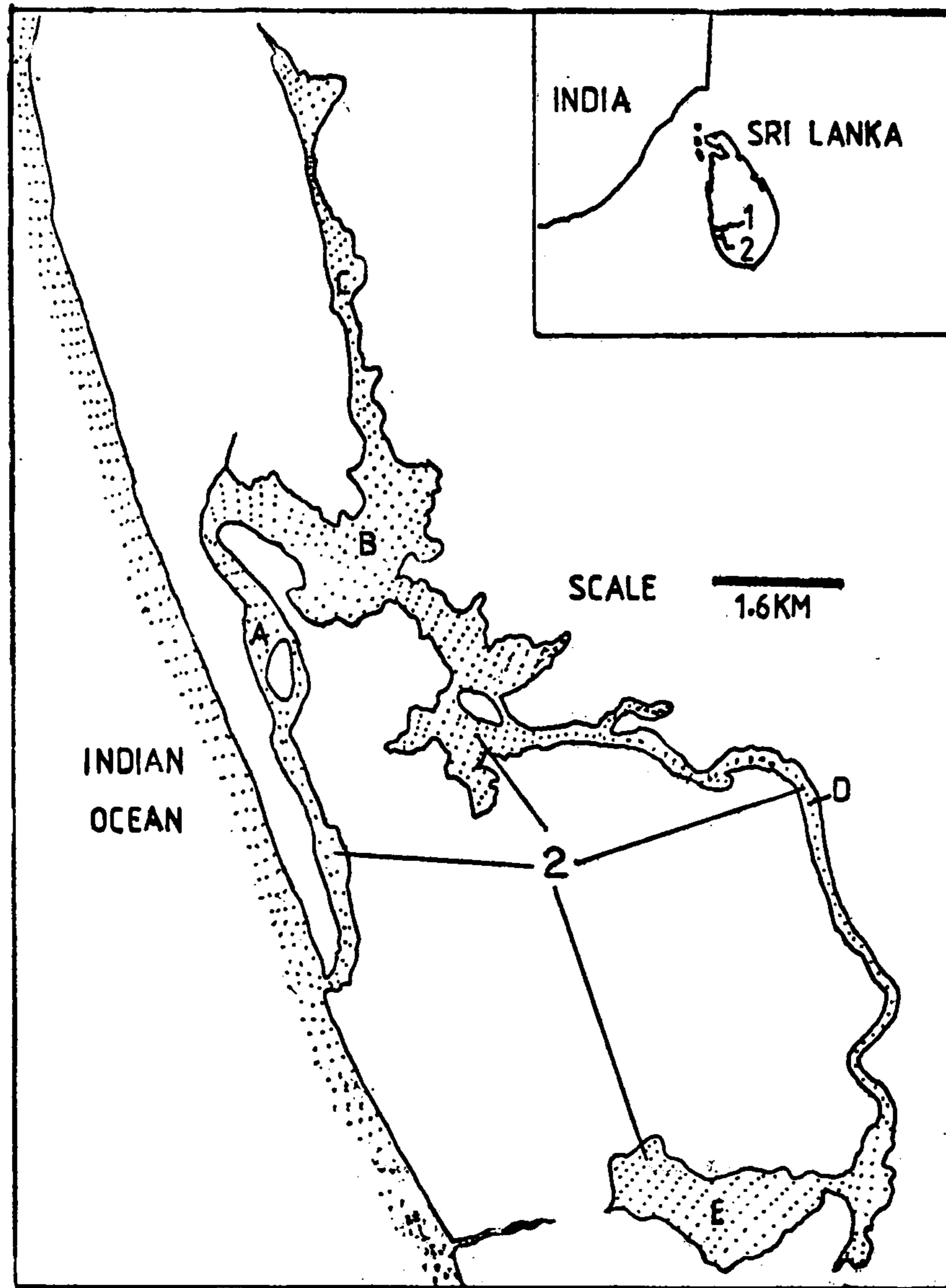


Figure 1. 1. Kelani River where Larvae were collected
 2. Bolgoda Lagoon System—Main Study Area
 A. Panadura Ganga, B. Northern Bolgoda Lake
 C. Veras Ganga, D. Bolgoda Ganga
 E. Southern Bolgoda Lake

The purpose of the present paper is an attempt to study spawning periodicities of *A. bicolor bicolor*, its larval abundance and to correlate them with the salinity, temperature and rain fall of the Northern Bolgoda Lake of Sri Lanka.

Materials and Methods

Collections of eel larvae (elvers) and water samples were made at the Northern Bolgoda Lake, which is a part of the Bolgoda Lagoon system of Sri Lanka (Figure 1). Lures described by Delmando and Rabanal (1969) were used to collect the larvae. But instead of weeds, paddy hay was used to construct the lure. Water samples were collected using an Ekman water sampler. Eel larvae, fish larvae, penaeid prawn larvae, *Macrobrachium* sp. larvae and other caridina larvae were collected using the lure according to the following method. Bundles of paddy hay were tied to coir ropes at an interval of one meter. Five such lines each with about 10 bundles of hay were stretched just below the surface of the water from the middle of the lake to the bank at an interval of five meters using planted bamboo poles. The lines were set in the lake in the evening. On the following day morning from a wooden dug out canoe the bundles of hay were collected. The larvae in the bundles were transferred to a bucket of water by shaking the bundles inside it. The water in the bucket was filtered through a plankton net and the total number of larvae of eels, fish, penaeid prawns and others were sorted and counted in each of the lines separately. The weight, length and breadth of each of the eel larvae were recorded. Water samples from the surface and the bottom were also collected from the same place at the same time. Their temperature was measured, and the salinity was determined according to McLusky (1971). Collections and measurements were made twice a month from January 1981 to June 1983. The rainfall data of the area for the same period was obtained from the meteorological Department.

Results and Discussions

The distributions of the monthly rainfall of the area, salinity and the temperature of the surface and the bottom water of the Northern Bolgoda lake are shown in Figure 2 from which it is seen that the rainfall has two peaks, one in May and the other in November. Both periods are during the intermonsoon rainy periods of Sri Lanka. The dry periods are from December to February and July to September, which are the monsoon periods. Associated with the above rainy and the dry periods the surface and the bottom salinity show two troughs and two peaks. The surface and the bottom temperatures increase during the dry periods and decline in the rainy periods.

The total number of eel larvae collected per line of the lures is shown in Figure 3 from which it is seen that the larvae could be caught from about November to about February, with a peak catch around January and once

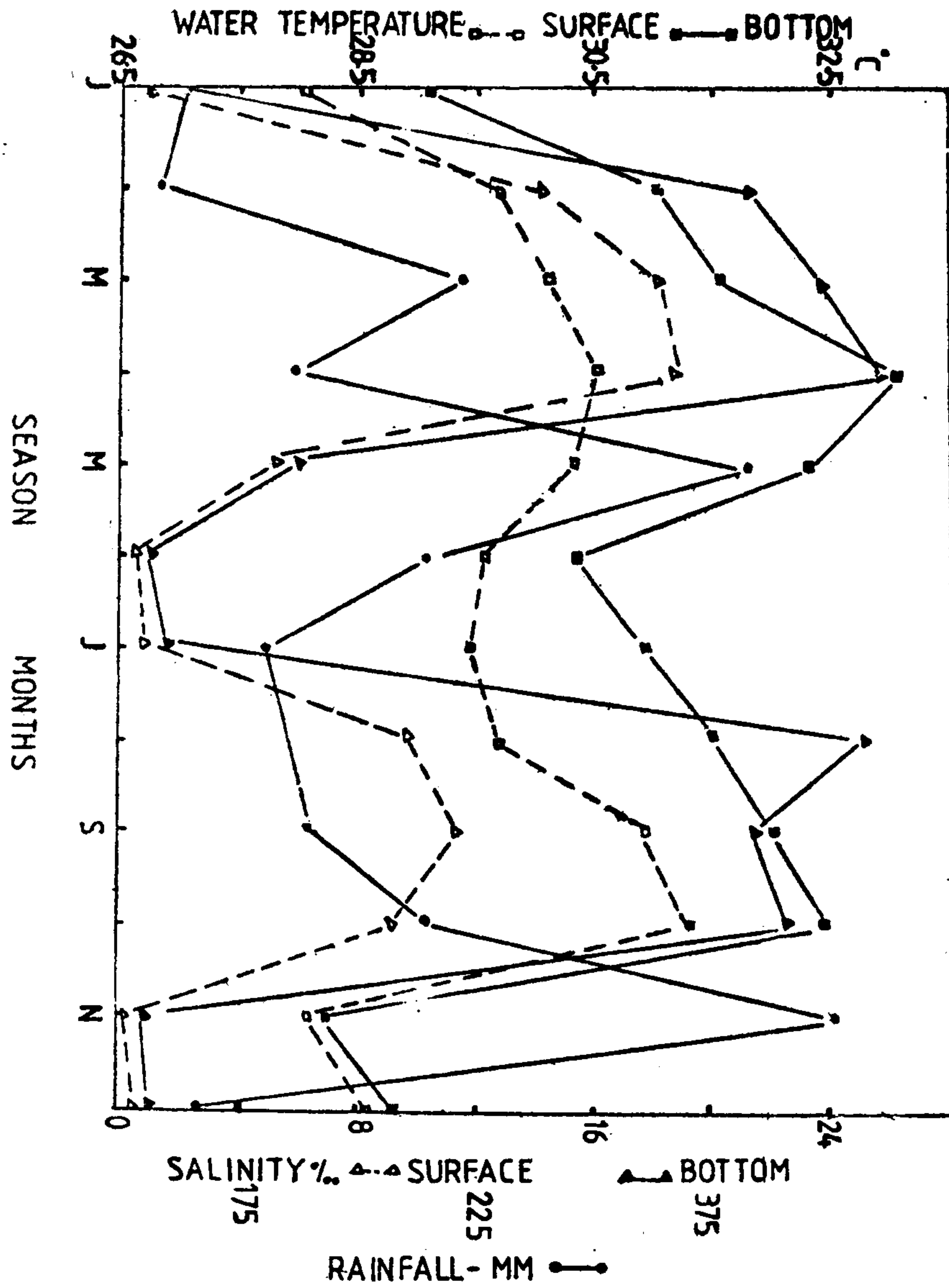


Figure 2. Monthly distributions of Temperature Salinity of the Northern Bolgoda Lake and the Rainfall for the Area.

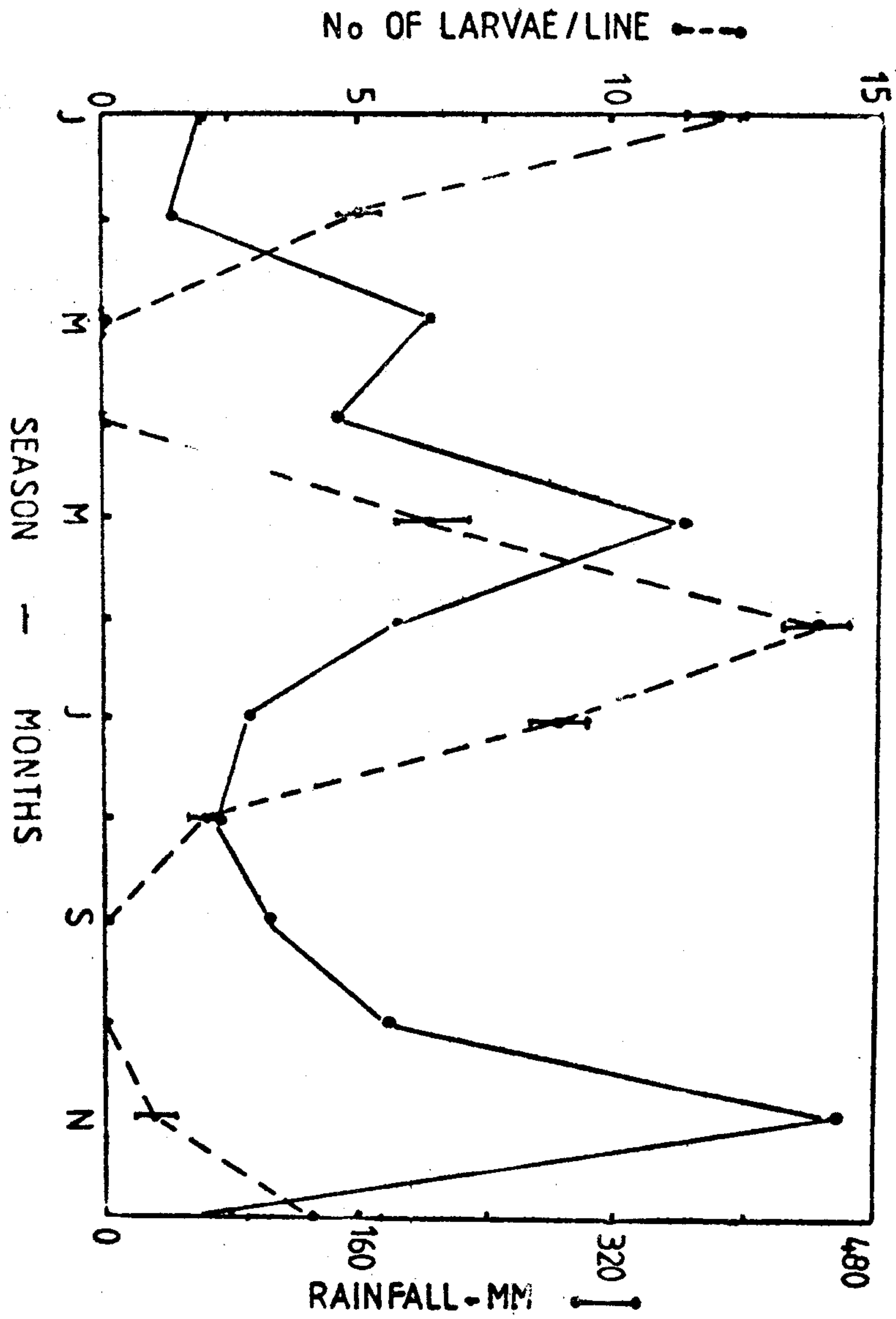


Figure 3. Monthly distributions of the catch per unit effort of the Larvae and the rainfall of the area.

again from about May to about August with a relatively bigger peak catch around June. Further, the first peak larval catch lags two months from the peak rainy month in November and that of the second about a month from the second peak rainy month in May.

During the first larval season the salinity of the surface and the bottom waters range from about 2‰ to 3‰ (Figure 2). However, it rises to about 20‰ towards the end of the season. During the second larval season, both the surface and the bottom salinities range from about 6‰ to about 2‰. Here too it rises to about 24‰ in the bottom and to about 10‰ in the surface water at the end of the season. During both larval seasons the low salinity is due to heavy—intermonsoon rains.

The temperature of the bottom water varies from about 28°C to about 31°C during the first larval season and rises beyond 31°C at the end of the season (Figure 2). The temperatures of the surface water too showed a similar trend with slightly lower values. The temperature of the bottom water declined from about 32°C to about 30.3°C and gradually increased to about 32.5°C towards the end of the second larval season and beyond. The surface temperature too followed an identical pattern with relatively lower values.

The range in length of the larvae caught according to months is shown in Table 1. From which it is seen that the length of the larvae caught vary from about 3.2 cm to about 7.3 cm within the year. However, the length of the majority of them vary from about 4.0 cm to about 5.5 cm (4.72 — 0.137). Their weight vary from about 0.4 gms to about 2.1 gms. All the larvae caught are circular, transparent without pigmentation and their heads are slightly wider than the rest of the body.

The Adult eels are also caught in seines and Jaakotu in the Lake. The observations of their catches indicated that the catch per unit effort is about 2 to 3 eels per seine per day during the May and November and it is much less during the rest of the year indicating that they are most abundant in the Lake during the rainy seasons. Their length range from about 45 cm to about 75 cm and that of weight from about 400 gms to about 900 gms. Their presence in the Lake during the rainy season is a clear indication that they descend to the Lake from the streams along with the flood waters.

From the above results it can be concluded that the mature adult eels descend to the Lake from streams and rivers along with flood waters during October to December and April to June with peaks around November and May. They then migrate to the sea (Indian Ocean ?) for spawning. During these periods the salinity of the Lake water is lower than the rest of the year.

TABLE 1. The distribution of the length range of the elvers caught according to months (1981-83)

<i>Month</i>	<i>Length range (cm)</i>
January	.. 4.5 - 6.8
February	.. 4.1 - 5.2
March	.. Nil
April	.. Nil
May	.. 3.2 - 4.9
June	.. 4.0 - 4.8
July	.. 4.2 - 5.6
August	.. 7.0 - 7.3
September	.. Nil
October	.. Nil
November	.. 5.6 - 6.8
December	.. 6.1 - 7.0

However, the temperature of the Lake water seems to increase during the first season and decrease during the second season. Therefore, it cannot have an effect on the spawning of eels. The low salinity due to heavy rains can be the only factor that attract the eels to the Lake. The larvae are abundant in the Lake from about November to about February with a peak around January i.e. two months after peak spawning season, and from about May to about August with a prominent peak around June, i.e. one month after the spawning season. Of the two spawning seasons, the latter is the dominant one which extends over a wider period of time, which is attributed to the prolonged rainy season with floods extending over a period of five months, compared to the shorter rainy season with less floods which reduce the spawning season to about three months. The elvers are abundant in the Lake twice during a year.

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