

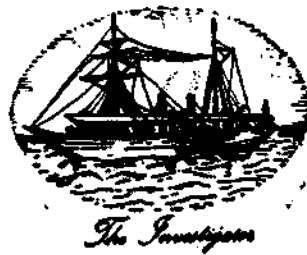
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STUDIES ON DIURNAL VARIATIONS IN THE OCCURRENCE OF GREY MULLET SEED AT MANDAPAM

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ABSTRACT

In order to study the diurnal variations in the occurrence of mullet seed, collections were made with a drag net once in a fortnight 3 to 6 days after the full moon and new moon days from August 1978 to July 1979 and also 2-3 days before full and new moon days from August 1979 to October 1979 in addition to the regular collections made on other days, at Theedaj near Mandapam along the Palk Bay.

The data indicate that the seed of the grey mullet *Liza vaigiensis* (10-90 mm) dominate the collections with *Liza macrolepis* (15-107 mm) and *Valamugil seheli* (15-95 mm) occurring in fewer numbers, occasionally. Other species of fishes which occurred along with mullets include *Therapon* sp., 20-30 mm total length; *Hemirhamphus* sp., 17-123 mm; *Chanos chanos*, 40 to 125 mm; *Allanetta* sp., 12-85 mm; *Sillago sihama*, 12-80 mm; *Tachysurus thalassinus*, 27-81 mm; *Nematalosa nasus*, 20-90 mm; *Lelognathus brevirostris*, 30-40 mm; gobids, 30-40 mm; belonids, 80-102 mm; *Gerres* sp., 14-84 mm; *Megalops* sp., 19-55 mm and *Plotosus* sp., 21-65 mm. Prawns were represented by *Penaeus indicus* (25 to 30 mm total length) and *Metapenaeus burkenrodi* (30 to 50 mm).

Quantitative studies revealed that greater quantities of seed were available in August and November 1978 and January, February, May, June and July 1979 than in other months. Better collections could be made during early morning and late night hours than at other times. Abundance of seed was observed usually an hour before the high tide reached its peak. It was found that tidal streams, pools and adjacent lagoon areas are suitable spots for collection of seed at the receding high tide.

INTRODUCTION

AQUACULTURE received considerable attention throughout the World in recent years because fish production cannot be increased by depending on capture fisheries only. Finfish, crustaceans and molluscs are now cultured in several countries, some of them very extensively and others on moderate or small scale. Of about 20 species of finfishes cultured at present, the fishes of the family Mugilidae are cultured mostly on small scale and in a few cases on large scale in several countries, especially in south-east Asia. Although efforts are being made on the artificial propagation of mullets in a number of countries, the fry or fingerlings used in culture are still collected from natural waters. In India, attempts have hitherto

been made to culture *Mugil cephalus*, *L. tade* and *L. dussumieri* and more recently, experiments were initiated by the Central Marine Fisheries Research Institute at Mandapam Camp and Cochin, both on artificial propagation and culture of various species of mullets, especially *M. cephalus*, *Liza vaigiensis*, *L. parsia* and *Valamugil seheli*. Since large scale culture of mullets still depends on naturally available stocks of seed, it was found necessary to assess the mullet seed resources in the area. From earlier observations, it is known that young ones of mullets and of other commercially important species and prawns are abundant in the Pillaimadam lagoon and adjacent coastal areas (Tampi, 1959; Luther, 1967). However, details of occurrence of various species,

their seasonal abundance and diurnal variations are not known. Therefore, a detailed study of the diurnal variations in the occurrence of mullet seed had been undertaken and the results are presented in this paper.

MATERIAL AND METHODS

For this study, collections of mullet seed were made in the sea, tidal stream and lagoon area at Theedai along the Palk Bay side, 3-6 days after the new and full moon periods from August 1978 to July 1979 and 2-3 days before the new and full moon periods from August to October 1979 in addition to the regular collections made once in a fortnight from August 1978 to April 1979. For the purpose of collections, each diurnal period of 24 hours was divided into four equal periods of 6 hours duration. Collections were made one hour before and after the high and low tides reached their maxima. The gear employed was a drag net made of nylon mosquito netting of the size 8 m in length and 2.5 m in breadth, with a cod-end like portion measuring 3 m in length. Each haul covered a distance of 10 m. Samples were analysed quantitatively and qualitatively. Data on salinity, oxygen and temperature were also collected.

OBSERVATIONS

During the month of August 1978 seed of the mullet *Liza vaigiensis* ranging from 30-85 mm were obtained, along with few numbers of those of *L. macrolepis*, of the size range 50-105 mm. Good numbers of *L. vaigiensis* were obtained during the new moon period late in the night and early in the morning. In September, the collection was very poor in the new moon period but in the full moon period, good numbers of *L. macrolepis* of the size range 50-98 mm were obtained in the early morning (high tide). During October, more seed of *L. vaigiensis* of the size 17-80 mm were obtained during full moon

period. In November, a good concentration of mullet seed of the species *L. vaigiensis* was noticed both in the new moon and full moon period, having a size range of 10-65 mm. They were abundant in the early morning and night during the new moon period and in the evening during the full moon period. In December, occurrence of seed was very poor and also the collection was very difficult both in the tidal stream as well as along the shore due to the rough condition of the sea.

During January 1979 large number of seed of *L. vaigiensis* (18-80) and *L. macrolepis* (17-55 mm) occurred. The abundance of the seed was more during early morning and night hours in the full moon period. During the month of February also, good number of seed of *L. vaigiensis* and *L. macrolepis* were collected from the tidal stream in the early morning and evening in the new moon period and *L. vaigiensis* alone in the night on full moon period. During the month, the sizes varied from 14-82 mm and 15-55 mm for *L. vaigiensis* and *L. macrolepis* respectively. In March, the seed of *L. vaigiensis* were obtained in good numbers in the evening in the new moon period and early morning in the full moon period. The size range of seed obtained during the month was 15-72 mm. On the other hand, in April better collections were obtained in the early morning in both new moon and full moon periods though small numbers were obtained in the noon and evening. During May, good numbers of seed of *L. vaigiensis* of the size range 12-90 mm were collected in the early morning of new moon and full moon periods. Particularly in the full moon period, the other three collections were also better. During the month, a small number of seed of *V. seheli* of the size range 33-41 mm were also obtained in the new moon period. The seed of *L. vaigiensis*, *L. macrolepis* and *V. seheli* were obtained in large numbers in June. Their occurrence was more in the receding high tide in the early morning in both the

periods. The size ranges obtained for the species during the month were 15-90 mm, 31-105 mm and 32-91 mm for *L. vaigiensis*, *L. macrolepis* and *V. seheli* respectively. The seed of *L. vaigiensis* were distributed equally in both new and full moon periods. On the other hand, seed of *L. macrolepis* and *V. seheli* were obtained in large numbers only during the full moon period. In July, good collections of seed of *L. vaigiensis* were obtained especially during the early morning (high tide) and night in the full moon period. Seed of *L. macrolepis* and *V. seheli* were also obtained in few numbers during the month. The size ranges of seed obtained were 15-82 mm, 35-107 mm and 34-95 mm for *L. vaigiensis*, *L. macrolepis* and *V. seheli* respectively.

From August 1979 onwards, the collections were made 2-3 days before the new and full moon periods and also an hour before the peak high and low tides, in order to see whether there is any variation in their occurrence. In August, *L. vaigiensis* ranged in size between 32-82 mm; *L. macrolepis*, 50-105 mm and *V. seheli*, 59-92 mm. In September, the size ranges were 12-75 mm, 103-105 mm and 42-48 mm for *L. vaigiensis*, *L. macrolepis* and *V. seheli* respectively; in October, the sizes of the three species were 15-81 mm, 73-107 mm and 45-95 mm in the same order. During September more seed were obtained in the new moon period whereas in October 1979, more seed were obtained in the full moon period. In general, the collections were not encouraging from August to October 1979. From these observations it could be inferred that the occurrence of seed was more during 3-6 days after the new moon and full moon than 2-3 days before the new and full moon periods. It was also inferred that one hour period before the highest high tide and lowest low tide is not suitable for seed collection.

Along with mullets, other species of fishes such as *Therapon* sp., 20-30 mm; *Hemirhamphus* sp., 17-123 mm; *Chanos chanos*, 40-125 mm;

Allanetta sp., 12-85 mm; *Sillago sihama*, 12-80 mm; *Tachysurus thalassinus*, 27-81 mm; *Nematalosa nasus*, 20-90 mm; *Leiognathus brevirostris*, 30-40 mm; gobids 30-40 mm; *belonids*, 80-102 mm; *Gerres* sp., 14-84 mm; *Megalops cyprinoides*, 19-55 mm; *Plotosus* sp., 21-65 mm and prawns represented by *Penaeus indicus*, 25-30 mm and *Metapenaeus burkenrodi*, 30-50 mm were also found to occur. Young ones of *Sillago sihama* occurred during October 1978, June, August, September and October 1979 with peak abundance during August, September and October 1979 in the full moon period with peak occurrence in April, the night collection during the month being composed exclusively of *C. chanos* in the tidal stream and lagoon. *Allanetta* sp., occurred throughout the period with peak abundance in August and September 1979 both in the full and new moon periods. However, its occurrence was restricted to coastal waters only, few of them entering the tidal stream. *M. cyprinoides* was recorded during the months of June, September and October 1979 with peak abundance in October 1979 with equal distribution in both the new and full moon periods. Young ones of *N. nasus* occurred in August 1978, June, July, August, September and October 1979 with peak abundance in October 1979, both during new and full moon periods. *T. thalassinus* was obtained in fewer numbers in the tidal stream during April, June, July, August and September 1979. But in the full moon period in October 1979 good numbers were obtained in the noon (high tide). Their occurrence was restricted in the muddy areas only. During day time, schools of cat fish seed were observed in surface water. *Gerres* sp. occurred in all the months with peak abundance during June and August 1979. Among prawns, *M. burkenrodi* seed were obtained in most of the months with peak abundance during August 1978, June and October 1979 during the new moon period. Good numbers could be collected in the early morning hours and at night. They were more abundant in the tidal stream

and lagoon than in coastal waters. Their numbers gradually decreased during day time. The month-wise, species-wise data for the new and full moon periods and also for the periods between new and full moon periods are given in Tables 1 to 6.

DISCUSSION

In West Bengal, drag nets or dip nets are used for capturing mullet seed. In Taiwan, two types of gear are used to catch the mullet fingerlings, a small floating drag net in deeper water, and a small beach seine in shallow water (Chen, 1976). In the present studies, a standard drag net made of nylon mosquito netting was used throughout the period. Sarojini (1958) and Luther (1967) stated that collections of mullet fry were richest during the period 4-6 days after the full and new moon period. Results of the present investigation are also in agreement with their view and in addition, it was also noticed that an hour before the high tide reaches its peak, good number of fry entered the tidal stream and also congregated near the shore line. Even then, collections were possible at the receding high tide only. Jhingran (1975) stated that mullet seed can best be collected from shallow pits, dug up in the intertidal zone. The receding tide invariably leaves behind a large crop of mullet fry in the pits. In almost all seed collection studies high tide collections were better than those made during low tides (Bhanot, 1971).

Observations during August, September and October 1979 revealed that abundance of mullet seed was more during 3-6 days after the full and new moon period than 2-3 days before and also that one hour before the peak high and low tide is not suitable for seed collection. It was observed during the present studies, the mullet seed which entered the area at high tide remain in the tidal stream and lagoon at low tide, making the collections easier at low

tide. This observation is in agreement with the earlier findings of Pillay (1949) who stated that the high water brings in numerous fry ranging from three quarters of an inch to 2 inches size and when the tide recedes, a good number of them remain in the burrow pits and pools.

It was also noticed in the present investigation that abundance of mullet seed depends on the peak breeding season of the particular species. The seed of *V. seheli* appeared in large numbers during June, July and August 1979. Adults of the species in advanced stages of maturity appeared in the commercial catch from April onwards in this area. In the case of *L. vaigiensis*, the seed occurred in good numbers over a prolonged period from May to September 1979. This may be a result of the prolonged spawning of the species with peak spawning immediately prior to May. The observations also indicate that the growth rate of this species appears to be slower when compared to other species of grey mullets. Similarly, the seed of *L. macrolepis* occurred in good numbers throughout the year except in few months, showing that the spawning season of this species is also prolonged.

Luther (1968) found that the seed of *L. vaigiensis* occur in the coastal and adjacent areas of the Palk Bay and Gulf of Mannar during November-February. But the present studies revealed that the seed of the above species were obtained throughout the years; with peak abundance during August and November 1978 and June and July 1979. Tampi (1959) stated that although the occurrence of mullet is a regular feature throughout the year, there is a noticeable abundance from December to March and again in June and July. The present observations revealed that one or the other species appeared in the collections throughout the year. From the observations made on the commercial catches in the area, it was found that the adults of

TABLE 1. *Month-wise occurrence (number/haul) of seed of L. vaigiensis during new and full moon periods*

Month and year	3-6 days after the full moon and new moon periods											2-3 days before the full and new moon periods			Total	
	Aug. 1978	Sep. 1978	Oct. 1978	Nov. 1978	Dec. 1978	Jan. 1979	Feb. 1979	March 1979	April 1979	May 1979	June 1979	July 1979	Aug. 1979	Sep. 1979		Oct. 1979
<i>New Moon</i>																
Size range (mm)	.. 30-85	21-62	50-58	14-65	33-65	23-80	14-82	15-72	28-72	20-90	21-90	15-82	35-68	12-75	23-81	12-90
High tide (EM)	.. 343	13	—	150	5	15	62	3	41	74	150	42	1	67	36	1001
Low tide (N)	.. 26	4	—	4	—	4	22	15	16	6	19	20	1	—	19	156
High tide (E)	.. —	—	—	—	—	15	65	69	3	3	24	23	5	4	—	211
Low tide (Nt)	.. 197	3	3	126	—	23	—	36	1	—	19	20	3	—	—	314
<i>Full Moon</i>																
Size range (mm)	.. 31-81	28-82	17-80	10-35	36-51	18-57	25-57	21-68	26-75	12-75	15-77	26-75	32-82	16-74	15-73	10-82
High tide (EM)	.. 78	—	161	6	1	57	18	52	70	131	134	135	16	—	5	864
Low tide (N)	.. 58	2	3	7	—	14	—	13	35	33	34	45	14	1	36	295
High tide (E)	.. 15	—	—	99	3	30	2	—	—	58	61	9	5	12	50	344
Low tide (Nt)	.. 22	5	24	—	—	45	56	—	10	31	—	200	5	—	56	454
Total	.. 739	27	191	392	9	203	225	188	176	335	441	494	47	87	202	3756

EM : Early morning ; N : Noon ; E : Evening ; Nt : Night.

TABLE 2. *Month-wise occurrence (number/haul) of seed of L. macrolepis during new and full moon periods*

Month and year	3-6 days after the full and new moon periods											2-3 days before the full and new moon periods			Total	
	Aug. 1978	Sept. 1978	Oct. 1978	Nov. 1978	Dec. 1978	Jan. 1979	Feb. 1979	March 1979	April 1979	May 1979	June 1979	July 1979	Aug. 1979	Sep. 1979		Oct. 1979
<i>New Moon</i>																
Size range (mm)	.. 50-105	60-102	92	—	—	—	15-55	34-103	75-84	105	81-105	35-76	50-105	103-105	73-105	
High tide (EM)	.. 52	18	—	—	—	—	58	3	1	1	4	—	2	1	2	142
Low tide (N)	.. —	12	1	—	—	—	—	7	—	—	1	7	—	1	2	31
High tide (E)	.. —	8	—	—	—	—	46	9	—	—	—	2	—	—	—	65
Low tide (Nt)	.. —	—	—	—	—	—	—	8	—	—	2	—	—	—	—	10
<i>Full moon</i>																
Size range (mm)	.. 93-103	50-98	—	—	—	17-55	—	51-64	73-90	—	31-98	65-107	105	—	102-107	
High tide (EM)	.. 4	46	—	—	—	63	—	3	3	—	72	7	—	—	5	203
Low tide (N)	.. 4	2	—	—	—	26	—	—	—	—	25	4	—	—	—	61
High tide (E)	.. —	—	—	—	—	25	—	—	—	—	—	—	1	—	—	26
Low tide (Nt)	.. —	—	—	—	—	56	—	—	—	—	26	10	—	—	—	92
Total	.. 60	86	1	—	—	170	104	30	4	1	130	30	3	2	9	630

EM : Early morning ; N : Noon ; E : Evening ; Nt : Night.

TABLE 3. Month-wise occurrence (number/haul) of seed of *V. seheli* during new and full moon periods

Month and year	3-6 days after the full and new moon periods											2-3 days before the full and new moon periods			Total		
	Aug. 1978	Sep. 1978	Oct. 1978	Nov. 1978	Dec. 1978	Jan. 1979	Feb. 1979	March 1979	April 1979	May 1979	June 1979	July 1979	Aug. 1979	Sep. 1979		Oct. 1979	
<i>New Moon</i>																	
Size range (mm)	..	—	—	—	41	—	15-44	—	—	—	33-41	32-59	55-95	-90	42-48	—	
High tide (EM)	..	—	—	—	—	—	3	—	—	—	4	7	24	2	9	—	49
Low tide (N)	..	—	—	—	1	—	3	—	—	—	1	—	20	—	—	—	25
High tide (E)	..	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	2
Low tide (Nt)	..	—	—	—	—	—	—	—	—	—	—	—	9	—	5	—	14
<i>Full Moon</i>																	
Size range (mm)	..	40-42	—	—	-36	38-41	—	—	—	—	—	32-91	34-80	55-92	42-	45-95	
High tide (EM)	..	—	—	—	—	1	—	—	—	—	—	22	43	22	—	10	98
Low tide (N)	..	—	—	—	—	—	—	—	—	—	—	10	3	—	—	—	13
High tide (E)	..	—	—	—	1	3	—	—	—	—	—	3	—	—	1	—	8
Low tide (Nt)	..	6	—	—	—	—	—	—	—	—	—	—	7	10	—	—	23
Total	..	6	—	—	2	4	6	—	—	—	7	42	106	34	15	10	232

EM : Early morning ; N : Noon ; E : Evening ; Nt : Night.

TABLE 4. Pooled data on the occurrence (number/haul) of seed of *L. vaigiensis*, *L. macrolepis* and *V. seheli* during new and full moon periods

Nature of the tide	<i>Liza vaigiensis</i>			<i>L. macrolepis</i>			<i>V. seheli</i>			All the species combined		Grand total
	NM*	FM	Total	NM	FM	Total	NM	FM	Total	New moon	Full moon	
High tide (EM)	1001 (55.70)	864 (44.15)	1865 (49.65)	142 (57.25)	203 (53.14)	345 (54.76)	49 (54.44)	98 (69.02)	147 (63.36)	1192 (55.78)	1165 (46.96)	2357 (51.04)
Low tide (N)	156 (8.65)	295 (15.08)	451 (12.01)	31 (12.50)	61 (15.98)	92 (14.60)	25 (27.78)	13 (9.15)	38 (16.38)	212 (9.92)	369 (14.87)	581 (12.58)
High tide (E)	211 (11.71)	344 (17.57)	555 (14.78)	65 (26.21)	26 (6.81)	91 (14.45)	2 (2.22)	8 (5.63)	10 (4.31)	278 (13.01)	378 (15.24)	656 (14.21)
Low tide (Nt)	431 (23.94)	454 (23.20)	885 (23.56)	10 (4.04)	92 (24.07)	102 (16.19)	14 (15.56)	23 (16.20)	37 (15.95)	455 (21.29)	569 (22.93)	1024 (22.17)
Total	1799	1957	3756	248	382	630	90	142	232	2137	2481	4618

* NM : New moon ; FM : Full moon.

EM : Early morning ; N : Noon ; E : Evening ; Nt : Night.

TABLE 5. Occurrence (number/haul) of seed of *L. vaigiensis*, *L. macrolepis* and *V. seheli* between full and new moon periods

Name of the species	Aug. 1978	Sep. 1978	Oct. 1978	Nov. 1978	Dec. 1978	Jan. 1979	Feb. 1979	March 1979	April 1979	Total
<i>L. vaigiensis</i>										
Size range (mm)	20-77	38-73	38-80	12-88	18-68	17-88	17-68	18-81	25-75	
High tide (EM)	356	18	63	168	3	108	168	58	107	1030
Low tide (N)	16	4	13	13	—	35	11	3	11	106
High tide (E)	22	3	13	—	3	37	9	9	18	202
Low tide (Nt)	296	21	50	176	—	21	51	116	20	731
Total	690	46	139	357	6	201	239	186	156	2078
<i>L. macrolepis</i>										
Size range (mm)	—	—	63-93	—	—	61-90	23-63	36-98	70-93	
High tide (EM)	—	—	6	—	—	49	39	6	1	101
Low tide (N)	—	—	3	—	—	13	—	4	2	22
High tide (E)	—	—	3	—	—	22	—	1	—	26
Low tide (Nt)	—	—	37	—	—	36	24	6	—	103
Total	—	—	49	—	—	120	63	17	3	252
<i>V. seheli</i>										
Size range (mm)	—	—	—	15-32	—	16-28	—	—	—	—
High tide (EM)	—	—	—	3	—	3	—	—	—	6
Low tide (N)	—	—	—	1	—	—	—	—	—	1
High tide (E)	—	—	—	—	—	—	—	—	—	—
Low tide (Nt)	—	—	—	8	—	1	—	—	—	9
Total	—	—	—	12	—	4	—	—	—	16

EM : Early morning ; N : Noon ; E : Evening ; Nt : Night.

TABLE 6. Occurrence (number/haul) of other fish seed during new and full moon periods

Name of species	Aug. 1978	Sep. 1978	Oct. 1978	Nov. 1978	Dec. 1978	Jan. 1979	Feb. 1979	March 1979	April 1979	May 1979	June 1979	July 1979	Aug. 1979	Sep. 1979	Oct. 1979
<i>Sillago sihama</i>	.. 28-58+ (52)*	—	15-41 (49)	20-80 (14)	—	—	—	—	—	15-36 (78)	38-77 (7)	—	12-38 (25)	12-35 (49)	14-39 (358)
<i>Allanetta</i> sp.	.. 15-81 (251)	21-60 (52)	13-48 (62)	16-72 (35)	—	12-56 (10)	26-68 (43)	16-32 (18)	—	32-75 (60)	30-80 (120)	30-85 (75)	15-70 (558)	12-60 (165)	16-24 (150)
<i>Gerres</i> sp.	.. 21-35 (141)	19-38 (148)	—	16-28 (4)	—	15-32 (5)	21-48 (7)	19-45 (13)	—	21-67 (4)	26-73 (311)	33-84 (223)	26-63 (179)	15-74 (24)	14-75 (73)
<i>Tachysurus thalassinus</i>	.. 31-68 (6)	—	48-76 (18)	—	61-74 (7)	—	—	—	65-68 (15)	—	67-77 (4)	27-55 (5)	65-74 (8)	68-75 (6)	65-81 (10)
<i>Megalops cyprinoides</i>	.. —	—	—	—	—	—	—	—	—	—	48-55 (6)	—	—	30-35 (36)	19-55 (543)
<i>Hemirhamphus</i> sp.	.. 122 (1)	—	—	—	—	—	—	—	—	—	89-114 (27)	53-20 (27)	80-120 (3)	87-90 (2)	17-123 (225)
<i>Nematalosa nasus</i>	.. —	—	20-99 (6)	—	—	—	—	—	—	60-90 (6)	42-60 (38)	50-83 (27)	53-65 (5)	—	—
<i>Chanos chanos</i>	.. 112 (1)	—	—	—	—	—	—	—	40-80 (200)	70-110 (21)	120-125 (3)	—	—	—	—
<i>Plotosus</i> sp.	.. —	—	—	—	—	—	—	—	—	—	—	35-65 (45)	—	—	21-31 (38)
<i>Therapon</i> sp.	.. 24-27 (5)	—	22-30 (11)	21-29 (6)	20-30 (5)	20-28 (3)	—	—	25-29 (3)	—	23-30 (6)	21-29 (2)	25-30 (3)	23-27 (5)	20-29 (9)
<i>P. indicus</i>	.. —	—	—	—	—	25-30 (16)	—	—	—	—	—	—	—	—	—
<i>M. burkenrodi</i>	.. 30-42 (251)	—	33-40 (42)	30-35 (35)	—	30-33 (35)	—	—	30-35 (106)	31-48 (615)	30-50 (850)	32-45 (150)	34-50 (73)	30-50 (19)	36-44 (1147)

+ Size range (mm) ; * Total number ; — No occurrence.

V. seheli were caught between Pillaimadam to Thonithurai area along the Palk Bay near Mandapam. Consequently, the diurnal studies and regular seed collections revealed that the seed of this species were also obtained in large numbers in the same area.

During the present investigations, large number of mullet seed were obtained during the months of August and November 1978 and January, February, May, June and July 1979. Their distribution was more or less equal in both new and full moon periods. It was also found that the tidal stream and the lagoon are suitable areas for mullet seed collection at the time of receding high tide. Moreover, the seed which enter these areas at high tide remain there till the next high tide, providing opportunity for intensive collections. Early morning and night hours were found to be the most suitable times for obtaining large collections. Collections were also possible at low tide during day time. The present investigation also revealed that the variations in the occurrence of mullet seed in this region are

not related to lunar periodicity but are influenced by the tides since the regular seed collection also showed good numbers of mullet seed in all the months. Prabhakara Rao (1972) stated *C. chanos*, *Elops saurus* and mullet fry exhibit diurnal periodicity in abundance. The present studies also indicate that there are diurnal variations in the occurrence of mullet seed as better collections were obtained during the early morning and late night hours than during day time. There were no significant variation in their distribution between new moon and full moon periods. During the present studies, it was observed that seed of *Mugil cephalus* were not obtained throughout the period.

Along with mullet seed, seed of large number of other commercially important fishes and prawns were also obtained in most of the months. Of these, the occurrence of seed of *C. chanos*, *S. sihama*, *T. thalassinus* and prawns is noteworthy. The seed of these fishes and prawns could be made use of for large scale culture in the area.

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