

## FISHES OF PULICAT LAKE

K. REMA DEVI, T. J. INDRA AND M. B. RAGHUNATHAN

*Zoological Survey of India, Southern Regional Station, Chennai-600 028, India*

### INTRODUCTION

Pulicat lake located north-east of Chennai between latitudes 13°24' and 13°47' N and longitudes 80°2' and 80°16' E is one of the largest brackishwater lagoons in India. The waterspread is about 350 km<sup>2</sup>. It is a shallow lake with an average depth of 1 m. The opening into the sea is at the narrow southern end with the main body extending north and north-west. The lake mouth is very shallow and has a maximum width of about 200 m. The lake mouth gets silted up and closed for varying periods from June-July and Nov-Dec. A peculiarity of the lake is the presence of man made navigational canal (Buckingham canal) traversing the entire length of the spit formation (Sriharikota spit) separating the lake from the sea. This canal is connected with the lake here and there and in the northern mud flats. These connections have developed into fairly extensive shallow water bodies which support atleast some sustainable fishery. About 70 km north of Pulicat and in the east of Buckingham canal there is a wide shallow opening into the sea near Duggirajapatnam which remains open during the major part of the year. The salinity of this lake ranges between 0.75 to 57.0 ppt.

Earlier reports on studies on fishes of Pulicat lake are those of Chacko *et al* 1953, Kaliyamurthy and Janardhana Rao 1972, Ramamohana Rao and Kaliyamurthy 1974 and Rangasamy 1975, Raman *et al* 1975a, 1975b and Kaliyamurthy *et al* 1986. Various aspects of the Lake have formed the subject matter of several Doctoral Theses.

However this is the first comprehensive list of the Ichthyofauna of this lake during its glorious undisturbed period. This information is expected to form the basis for future comparative studies. Identifications are based on Day 1875-1878, 1889, Talwar and Kacker 1984 and FAO identification sheets.

### MATERIAL AND METHODS

The present report on the fishes of Pulicat lake is based on earlier collections by the Zoological Survey of India parties during 1963 and from 1971-75 (Table 1). The bulk of the collections from Pulicat lake deposited in Southern Regional Station, is by late Shri. T. Venkateswarlu, Scientist SE. A total of 2533 specimens have been identified as belonging to 88 species under 33 families and 11 orders. The classification of fishes listed here is based on Nelson 1994. Against each species, the serial number of the collection localities (chronologically arranged and serially numbered as in Table 1) is cited in parenthesis along with the number of specimens collected.

**Table 1.** Collection dates and species richness in Pulicat Lake.

<b>No.</b>	<b>DATE</b>	<b>COLLECTOR</b>	<b>No. OF SPECIES</b>
1.	27.07.1963	Shri T. Venkateswarlu	1
2.	13.10.1971	Dr. K. V. Ramarao	1
3.	22.04.1972	"	2
4.	24.04.1972	"	1
5.	29.04.1972	"	2
6.	02.12.1972	"	7
7.	07.10.1973	Shri T. Venkateswarlu	1
8.	27.04.1974	Dr. A. G. K. Menon & Dr. M. B Raghunathan	10
9.	27.09.1974	"	16
10.	11.02.1975	Shri T. Venkateswarlu	5
11.	12.02.1975	"	2
12.	13.02.1975	"	6
13.	14.02.1975	"	2
14.	15.02.1975	"	4
15.	19.02.1975	"	5
16.	21.02.1975	"	7
17.	22.02.1975	"	17
18.	22.03.1975	"	12
19.	26.03.1975	"	16
20.	26.04.1975	"	4
21.	09.05.1975	"	7
22.	22.05.1975	"	1
23.	04.06.1975	"	15
24.	26.09.1975	"	1
25.	13.12.1975	"	1
26.	16.12.1975	"	1
27.	04.02.1976	"	31
28.	21.02.1976	"	12
29.	30.04.1976	"	1
30.	04.06.1976	"	8
31.	26.06.1976	"	3
32.	17.07.1976	"	9
33.	17.08.1976	"	12
34.	14.09.1976	"	8

**LIST OF SPECIES**

Class PISCES

Division TELEOSTEI

Subdivision ELOPOMORPHA

Order ANGUILLIFORMES

Suborder CONGROIDEI

Family MURAENESOCIDAE

1. *Muraenesox bagio* (Ham.) 17(2). 2 exs.

Subdivision CLUPEOMORPHA

Order CLUPEIFORMES

Suborder CLUPEOIDEI

Family ENGRAULIDAE

Subfamily COILIINAE

2. *Thryssa hamiltonii* (Gray) 12(1), 14(14), 15(13), 17(1), 28(2). 31 exs.  
 3. *Thryssa kammalensis* (Bleeker) 19(2). 2 exs.  
 4. *Thryssa malabarica* (Bloch) 19(29). 29 exs.  
 5. *Thryssa mystax* (Schneider) 12(28), 28(2). 30 exs.  
 6. *Thryssa purava* (Ham.) 9(1), 10(1), 16(1), 17(1), 18(7), 21(2), 27(1). 14 exs.

Subfamily ENGRAULINAE

7. *Stolephorus andhraensis* Babu Rao 9(1), 16(1), 17(3), 18(2), 19(2)  
 27(7), 32(7) 23 exs.

Family CLUPEIDAE

Subfamily CLUPEINAE

8. *Herklotsichthys quadrimaculatus* (Ruppell) 27(1). 1 ex.  
 9. *Sardinella* sp. 9(1). 1 ex.

Subfamily ALOSINAE

10. *Hilsa kelee* (Cuvier) 30(1). 1 ex.

Subfamily DOROSOMATINAE

11. *Anodontostoma chacunda* (Ham.) 8(1). 1 ex.  
 12. *Nematalosa nasus* (Blkr.) 4(5), 9(1), 10(1), 11(123), 12(23), 14(33),  
 17(116), 18(3), 19(3), 20(44), 21(66), 26(75), 27(42), 28(6), 30(5). 546 exs.

Subdivision EUTELEOSTEI

Superorder OSTARIOPHYSI

Order SILURIFORMES

Family BAGRIDAE

13. *Mystus gulio* (Ham.) 8(1), 15(4), 18(1). 6 exs.

Family ARIIDAE

14. *Arius arius* (Ham.) 10(1). 1 ex.

15. *Arius caelatus* (Val.) 6(1), 8(1), 9(1). 3 exs.

16. *Arius maculatus* (Thunberg) 28(1). 1 ex.

Family PLOTOSIDAE

17. *Plotosus canius* (Ham.) 10(1). 1 ex.

Superorder CYCLOSQUAMATA

Order AULOPIFORMES

Suborder ALEPISAUROIDEI

Family SYNODONTIDAE

Subfamily HARPADONTINAE

18. *Saurida thumbil* (Bloch) 27(4). 4 exs.

Superorder ACANTHOPTERYGII

Series MUGILOMORPHA

Order MUGILIFORMES

Family MUGILIDAE

19. *Liza parsia* (Ham.) 6(2), 18(3), 23(2), 24(7), 33(7). 21 exs.

20. *Liza subviridis* (Val.) 19(2), 27(4). 6 exs.

21. *Liza tade* (Forsskal) 27(2). 2 exs.

22. *Liza vaigiensis* (Quoy & Gaimard) 30(1). 1 ex.

23. *Mugil cephalus* (Linnaeus) 8(2), 19(7), 20(8), 23(11), 27(25), 31(16), 32(28). 98 exs.

24. *Valamugil cunnesius* (Val.) 6(2), 27(1). 3 exs.

25. *Valamugil seheli* (Forsskal) 17(2), 28(1), 30(1). 4 exs.

Series ATHERINOMORPHA

Order ATHERINIFORMES

Suborder ATHERINOIDEI

Family ATHERINIDAE

26. *Atherinomorus duodecimalis* (Val.) 19(1). 1 ex.  
 27. *Hypoatherina temminckii* (Blkr.) 27(1). 1 ex.

Order BELONIFORMES

Suborder BELONOIDEI

Family BELONIDAE

28. *Strongylura strongylura* (V. Hasselt) 12(2), 13(1), 21(3), 32(1). 7 exs.  
 29. *Xenentodon cancila* (Ham.) 32(1). 1 ex.

Family HEMIRAMPHIDAE

30. *Hyporhamphus limbatus* (Val.) 8(2), 9(2), 12(168), 13(99), 19(2), 21(22), 25(98), 27(3), 28(4), 33(1). 401 exs.

Order SCORPAENIFORMES

Suborder PLATYCEPHALOIDEI

Family PLATYCEPHALIDAE

31. *Grammoplites scaber* (Linn.) 27(1). 1 ex.  
 32. *Platycephalus indicus* (Linn.) 18(1), 28(2). 3 exs.

Order PERCIFORMES

Suborder PERCOIDEI

Superfamily PERCOIDEA

Family CHANDIDAE

33. *Ambassis commersoni* Cuvier 9(1). 1 ex.  
 34. *Ambassis gymnocephalus* (Lacepede) 6(2), 19(1), 23(12), 27(2), 33(3). 20 exs.  
 35. *Chanda ranga* (Ham.) 20(1). 1 ex.

Family SERRANIDAE

Subfamily EPINEPHELINAE

36. *Epinephelus morrhua* (Val.) 19(1). 1 ex.  
 37. *Epinephelus salmoides* (Lacepede) 30(1). 1 ex.

## Family SILLAGINIDAE

38. *Sillago sihama* (Forsskal) 17(20), 18(2), 19(4), 27(2), 28(2), 30(2), 32(3). 35 exs.
39. *Sillago vincenti* Mckay 9(1). 1 ex.

## Family LACTARIIDAE

40. *Lactarius lactarius* (Schneider) 32(8). 8 exs.

## Family LEIOGNATHIDAE

41. *Gazza minuta* (Bloch) 9(1), 23(9), 27(4). 14 exs.
42. *Leiognathus brevirostris* (Val.) 17(1), 18(1), 27(6). 8 exs.
43. *Leiognathus dussumieri* (Val.) 8(8). 8 exs.
44. *Leiognathus equulus* (Forsskal) 19(2), 27(2). 4 exs.
45. *Leiognathus splendens* (Cuv.) 9(2), 17(20), 27(4), 33(142), 34(39). 207 exs.
46. *Secutor insidiator* (Bloch) 9(7), 19(1), 23(87), 27(1), 33(21). 117 exs.
47. *Secutor ruconius* (Ham.) 17(1), 23(12), 34(3). 16 exs.

## Family LUTJANIDAE

## Subfamily LUTJANINAE

48. *Lutjanus argentimaculatus* (Forsskal) 17(3), 33(1). 4 exs.
49. *Lutjanus kasmira* (Forsskal) 8(1). 1 ex.

## Family GERREIDAE

50. *Gerres abbreviatus* (Blkr) 18(2), 23(5), 30(1). 8 exs.
51. *Gerres filamentosus* (C & V.) 7(1), 15(2), 16(1), 17(2), 27(6), 32(8). 20 exs.
52. *Gerres lucidus* (= *G. limbatus*) Cuv. 6(2), 9(1), 14(2), 15(6), 17(41), 23(3), 27(4), 28(7). 66 exs.
53. *Gerres oyena* (Forsskal) 9(1), 19(1), 21(1), 23(43). 46 exs.
54. *Gerres poeti* Cuv. 23(1). 1 ex.
55. *Gerres setifer* (Ham.) 22(10). 10 exs.

## Family HAEMULIDAE

56. *Pomadasys hasta* (Bloch) 23(8). 8 exs.
57. *Pomadasys kakkan* (Cuv.) 27(1), 28(1). 2 exs.

## Family SPARIDAE

58. *Acanthopagrus berda* (Forsskal) 33(2). 2 exs.

59. *Rhabdosargus sarba* (Forsskal) 27(1). 1 ex.  
 60. *Crenidens crenidens indicus* Day 23(1). 1 ex.

## Family LETHRINIDAE

61. *Lethrinus nebulosa* (Forsskal) 17(2). 2 exs.

## Family SCIAENIDAE

62. *Daysciaena albida* (Cuv.) 10(1). 1 ex.  
 63. *Nibea maculata* (Sch.) 33(15). 15 exs.

## Family MULLIDAE

64. *Upeneus sulphureus* (Cuv.) 23(1). 1 ex.

## Family DREPANIDAE

65. *Drepane punctata* (Linn.) 27(1). 1 ex.

## Family NANDIDAE

## Subfamily NANDINAE

66. *Nandus nandus* (Ham.) 16(2). 2 exs.

## Family TERAPONIDAE

67. *Terapon jarbua* (Forsskal) 16(2), 18(2), 19(1), 23(3), 28(1), 32(1). 10 exs.  
 68. *Terapon puta* (Cuv.) 9(1), 15(3). 4 exs.  
 69. *Terapon theraps* (Cuv.) 8(1), 18(2). 3 exs.

## Suborder LABROIDEI

## Family CICHLIDAE

70. *Etroplus suratensis* (Bloch) 33(5). 5 exs.  
 71. *Oreochromis mossambica* (Peters) 21(27) 27 exs.

## Suborder TRACHINOIDEI

## Family URANOSCOPIDAE

72. *Uranoscopus guttatus* (Cuv.) 16(1) 1 ex.

## Suborder GOBIOIDEI

## Family GOBIIDAE

## Subfamily OXUDERCINAE

73. *Boleophthalmus boddarti* (Pallas) 33(1). 1 ex.

## Subfamily AMBLYOPINAE

74. *Ctenotrypauchen microcephalus* (Blkr) 5(47) 47 exs.

## Subfamily GOBIINAE

75. *Acentrogobius cyanomos* (Blkr.) 27(25), 34(4). 29 exs.  
 76. *Acentrogobius viridipunctatus* (C. & V.) 31(19). 19 exs.  
 77. *Ctenogobius criniger* (C. & V.) 1(26), 3(80), 5(2), 9(13), 34(4). 125 exs.  
 78. *Favonigobius reichei* (Blkr) 27(40), 34(8). 48 exs.  
 79. *Glossogobius biocellatus* (C. & V.) 2(1). 1 ex.  
 80. *Glossogobius giuris* (Ham.) 3(1), 16(2), 23(3), 27(3), 28(1), 34(3). 13 exs.  
 81. *Oxyurichthys microlepis* (Blkr.) 7(71), 29(31), 30(15), 31(19), 32(35), 33(25), 34(39). 235 exs.  
 82. *Parachaeturichthys polynema* (Blkr.) 27(2), 34(14). 16 exs.

## Order PLEURONECTIFORMES

## Family SOLEIDAE

83. *Euryglossa orientalis* (Bloch) 18(2). 2 exs.

## Order TETRAODONTIFORMES

## Suborder TRIACANTHOIDEI

## Family TRIACANTHIDAE

84. *Triacanthus biaculeatus* (Bloch) 6(1), 8(1), 14(5), 17(30), 19(1), 20(19), 21(1). 58 exs.

## Suborder TETRAODONTOIDEI

## Superfamily TETRAODONTOIDEA

## Family TETRAODONTIDAE

## Subfamily TETRAODONTINAE

85. *Chelonodon patoca* (Ham.) 17(2) 2 exs.  
 86. *Lagocephalus lunaris* (Bloch & Sch.) 6(1), 33(1). 2 exs.  
 87. *Takifugu oblongus* (Bloch) 9(1), 17(1). 2 exs.  
 88. *Tetraodon cutcutia* (Ham.) 8(2). 2 exs.

## DISCUSSION

It is observed that the collections comprise mainly marine fishes and a few secondary freshwater fishes, chiefly constituted by the order Perciformes (56.82%). Other major orders encountered are Clupeiformes (12.5%), Mugiliformes (7.95%), Atheriniformes (5.68%) and Tetraodontiformes (5.68%). Of the Perciformes collected, the single large group was constituted by the gobioids (11.36%) represented by 10 species, followed by groups having about 8 or lesser number of species representatives belonging to the families Leiognathidae and Gerreidae.

Of the 88 species collected, the bulk was constituted by the species *Nematalosa nasus* (21.54%) which incidentally has also been observed to be the most frequently encountered species being represented in 52.94% of the collections made. This was followed by *Hyporhamphus limbatus* forming 15.83% of the collections with a frequency of occurrence of 32%. Other frequently encountered species (20–23%) were viz. *Gerres lucidus*, *Thryssa purava*, *Mugil cephalus*, *Sillago sihama*, *Oxyurichthys microlepis* and *Triacanthus biaculeatus*.

Maximum number of species were encountered mostly during the post monsoon period (Table 1) when moderate salinity prevails in the lake. Extreme salinity values during premonsoon period may be a limiting factor in the species abundance.

This was the species composition of Pulicat Lake 25 to 30 years ago. Now with reports of increasing pollution and changes in the physico-chemical and hydrological parameters, species composition of the lake cannot be the same or as rich as it was a few decades ago.

## SUMMARY

Faunistic surveys of the Ichthyofauna of Pulicat Lake by the scientists of ZSI a few decades ago, revealed a rich biodiversity represented by 88 species under 33 families and 11 orders. Though called a lake, its connection to the sea results in seasonal fluctuations of salinity of its waters. This ecosystem harbours many euryhaline species and serves as nursery for several marine species especially gobioids, which group was also well represented in Pulicat Lake. This was the scenario in yester years before pollution took its toll of the fauna of this large ecosystem.

## ACKNOWLEDGEMENT

We wish to thank the Director, Zoological Survey of India, Dr. J. R. B. Alfred and the Additional Director of Southern Regional Station, Dr. P. T. Cherian, for providing necessary facilities. We are indebted to late Mr. T. Venkateswarlu, Scientist SE, on whose collections this study was based. We thank Dr. P. T. Cherian and Dr. A. G. K. Menon, Emeritus Scientist for going through the manuscript.

## REFERENCES

- Chacko, P. I., Abraham, J. G. and Andal, R. 1953. Report of the survey of the flora, fauna and fisheries of the Pulicat Lake, Madras state, India. 1951-52. *Contr. Freshw. Fish. Biol. Stn.*, **8** : 20.
- Day, F. 1875-1878. The Fishes of India : being a natural history of the fishes known to inhabit the seas and freshwaters of India, Burma and Ceylon, Taylor & Francis, London, 778 pp.
- Day, F. 1889. The Fauna of British India including Ceylon and Burma. *Fishes* Vol. I & II, Taylor & Francis, London.
- Fischer, W. (Ed). 1978. FAO species identification sheets for Fishery purposes western Central Atlantic. Vol. (1-7). Rome : FAO.
- Kaliyamurthy, M. and Janardhana Rao, K. 1972. Preliminary observations on the food and feeding habits of some fishes of the Pulicat Lake. *J. Inland Fish. Soc. India*, **IV** : 115-121.
- Kaliyamurthy, M., Singh, S. K. and Singh, S. B. 1986. Distribution of *Gerres lucidus* Cuv. in the Pulicat Lake. *Matsya*, **12** : 45-51.
- Ramamohana Rao, G. and Kaliyamurthy, M. 1974. The abundance and distribution of juveniles of two Beloniform fishes in Lake Pulicat. *Indian J. Anim. Sci.*, **44**(5).
- Raman, K., Kaliyamurthy, M. and Rao, G. R. M. 1975a. Studies on the Biology of *Ambassis gymnocephalus* (Lac.) from Pulicate and Vembanad Lake. *Matsya*, **1** : 49-52.
- Raman, K., Ramakrishna, K. V., Radhakrishnan, K. V and Rao, G. R. M. 1975b. On the hydrobiology and benthic ecology of Pulicat Lake. (Abstract) *3rd All India Sym. Estuarine Biol. Cochin*.
- Rangaswamy, C. P. 1975. Maturity and spawning of *Mugil cephalus* of lake Pulicat. Recent Researches in Estuarine Biology. Ed. Natarajan, R. Hindustan Publishing Co. Delhi. pp. 47-60.
- Talwar, P. K. and Kacker, R. K. 1984. Commercial sea Fishes of India. pp. 1-997. *Zool. Surv. India*, Calcutta.