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An Annotated Bibliography (1803-1987) of the Indian Shad, *Tenualosa ilisha* (Ham.) (Clupeidae : Teleostei)

Syed Iftikhar Husain Jafri
and Gary Donald Melvin

April 1988

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AN ANNOTATED BIBLIOGRAPHY (1803-1987) OF THE INDIAN SHAD, *Tenualosa ilisha* (Ham.) (Clupeidae: Teleostei)

by

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TABLE OF CONTENTS

ADDENDA

2a. Agarwal, N., Sharma, R. 1987. Studies on a new monogenean, Leptomezocreas lucknowensis n. sp. from Hilsa ilisha (Ham.). Japanese Journal of Parasitology, 36(5), 298-301.

Leptomezocreas lucknowensis, a new species of monogeneean trematode has been found to infest the gill filaments of Hilsa ilisha.
Subject: PD

338a. Southwell, T., Prashad, B. 1918. Notes from the Bengal Fisheries Laboratory No. 4 Cestode parasites of Hilsa. Rec. Ind. Mus., 15, Part II(9), 77-78.

The abstract that appears with 339, Southwell and Prashad (1923), belongs with the above paper.

FOREWORD

The Indian shad, Tenualosa ilisha is an important fish species in the commercial catch in a number of countries bordering the Bay of Bengal, Indian Ocean, Persian Gulf and Arabian Sea. Bangladesh, India and Pakistan have major fisheries in this region mostly involving artisanal fishermen operating in the coastal zone as well as rivers and estuaries. This species was previously called Hilsa, a name that is still commonly used.

This bibliography was prepared as part of the IDRC funded research support on Hilsa to the Fisheries Research Institute in Chandpur, Bangladesh. The specific objectives of this project are:

(a) to establish a capable Hilsa team and supporting facilities including training of staff to carry out needed fisheries research in the future;

(b) to monitor catch, and catch per unit of effort, of various types of fishing gear, and to determine the effects of these efforts on the different races/stocks of Hilsa;

(c) to undertake regular sampling using experimental nets to provide information on size frequency, age, gonadal development stage, morphometric data, and seasonal abundance of Hilsa;

(d) to locate the Hilsa spawning grounds;

(e) to develop techniques for age validation of Hilsa;

(f) to investigate the seasonal migration of Hilsa through tagging;

(g) to identify the different fish stocks which are being harvested; and

(h) to collect information pertaining to regional catch trends and determine, if possible, the effects of various environmental and other factors on Hilsa catches.

IDRC hopes that this bibliography will provide a useful reference document for all interested Hilsa researchers. It is recognized that much of the literature is scattered and therefore an annotated bibliography may be more helpful to researchers wishing to focus on specific parts of Hilsa biology, fisheries or management. We hope that the authors have satisfactorily met this objective.

IDRC wishes to acknowledge the significant effort and initiative of Dr Jafri and Dr Melvin in preparing this bibliography. Readers wishing further information on Hilsa are requested to contact Dr Jafri or the Director, Fisheries Research Institute, P. O.Box Baburhat, Chandpur, Bangladesh.

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INTRODUCTION

The primary aim of this bibliography is to gather, under one cover, the mass of disseminated literature published on the biology and fisheries of the Indian shad, Tenualosa ilisha, during the past one hundred and eighty-four years. Previously two bibliographies were compiled by Jones (1952) and Sarker and Momen (1982). The former report provides an excellent list of available literature until 1952, whereas the latter which represents a more up-to-date review is somewhat restricted in its coverage.

Taxonomically the species has undergone a number of changes since it was first described, but not recognized, by Russel in 1803 as palasah. However, it was not until 1822 when Hamilton named the fish Clupanodon ilisha that it gained taxonomic status. Since 1822 the species has been described as Clupea palasah (Cuvier 1829; Gunther 1868), Alausa palasah (Valenciennes 1847; Jerdon 1849; Day 1865), Alausa ilisha (Cantor 1849; Bleeker 1852; Kner 1865), Clupea ilisha (Gunther 1868, Day 1878; Day 1889; Lloyd 1907; Tirant 1929), Clupea (Alosa)ilisha (Steindachner 1896), Hilsa ilisha (Regan 1971; Fowler 1934, Shaw and Shebbere 1937; Misra 1953), Macrura ilisha (Fowler 1941) and Tenualosa ilisha (Munro 1955; Fisher and Bianchi 1984). Although the nomenclature of Regan (1917) remained valid throughout the period when the majority of literature on this species was published, many researchers have adopted the current redesignation of Tenualosa ilisha (Fisher and Bianchi 1984).

The Indian shad (Tenualosa. ilisha), as it is most commonly referred to in the literature is an anadromous Clupeid of the Indian Ocean which ascends rivers flowing into the Persian Gulf, Arabian Sea, Bay of Bengal, and the Gulf of Tongking (Pillay 1963). However, the majority of stocks which support a lucrative oommercial fishery are concentrated in the coastal waters, estuaries and rivers of Bangladesh, India and Pakistan.

Prior to 1970 the hilsa fishery of most countries operated as a predominantly artisan fishery using traditional methods and was confined to inland waterways. In recent years mechanization, introduction of new and larger types of gear, and the possibility of increased returns has transformed the fishery into a rapidly expanding ooastal and marine conoentrated operation. Today fishing vessels travel some 50-100km into the open waters of the Bay of Bengal in pursuit of this and other species.

Increased exploitation, loss of spawning grounds due to construction of anicuts, barrages and dams, and the general deterioration of habitat by urban and rural pollution has generated some concern over the current status of this important historical fishery. Consequently, in 1986 the Government of Bangladesh with the assistance of the International Development Research Centre of Canada (IDRC) commenoed a comprehensive study to investigate many aspects of the Hilsa fishery in Bangladesh. This bibliography resulted from the need to review all available literature.

Compiled within this bibliography are 368 publications covering the period 1803-1986. Each paper has been listed alphabetically and indexed according to water body, country and

subject matter which cover all aspects of the species from taxonomy to landing statistics. Articles with self-explanatory titles and abstracts which contain little, if any, detailed information have not been annotated, but simply indexed for the general information of the reader. Most of the articles were published in India, a few from Pakistan and reoently several have appeared from Bangladesh. Very little information is available from the Middle East or South east Asian countries.

It is hoped that this bibliography will provide a useful tool for fisheries scientists involved or interested in Hilsa/Palla research. As in any survey of this kind some omissions and inaccuracies are unavoidable. The authors would like to offer their apologies for such short-comings.

S.I.H. Jafri

and

G.D. Melvin

Dated: April 30, 1988

BIBLIOGRAPHY

A

1. Agarwal, G.P., and R. Kumar. 1977. Faustula varanasiensis n. sp. from clupeid fishes. Indian Journal Parasitology 1(1): 67-68.

   The authors describe a new species of trematode, Faustala varanasiensis from the intestine of Hilsa ilisha collected in the Ganges near Varanasi.
   Subject: PD

2. Agarwal, G.P., and R. Kumar. 1978. On a new trematode Faustula sp. (Fellodistomidae Nicoll, 1913: Baccigerinae Yamaguti, 1958) from a clupeid fish Hilsa ilisha (Ham.). Asian Congress Parasitology, Feb 23-26, 1978 (Abstract): 238

   Abstract briefly describes the occurrence of a new trematode, Faustala sp. found in Hilsa ilisha.
   Subject: PD

3. Ahmad, N. 1949. Inland fisheries of Pakistan. A - East Pakistan. Pakistan Journal of Science 1(4): 120-121.

   A brief account of inland fisheries resources and the names of culturable fishes have been documented. The importance of the hilsa fishery has also been stressed.
   Subject: F, TX

4. Ahmad, N. 1952. Hilsa fishery of East Bengal. Proceedings of the Indo-Pacific Fisheries Council, Calcutta, India (1952). IPFC/C52/Tech. 24.

   This report is similar to the 1954 paper by Ahmed which briefly describes fishing grounds and gear, as well as migration, spawning and production.
   Subject: D, F, GB, MM, RS

5. Ahmad, N. 1952. Fishing-Gear of East Pakistan. Proceedings of the Indo-Pacific Fisheries Council. IFPC/C52/Tech 10:

   A detailed review of the fishing gear used in east Pakistan is presented in this technical report.
   Subject: GB

6. Ahmad, N. 1953. Fish fauna of East Pakistan. Pakistan Journal of Science 5(1): 18-24.

A family-wise list of fishes, with local names, has been provided. The fish fauna includes esturine, marine and freshwater species.
Subject: CL, TX

7. Ahmad, N. 1954. Hilsa fishery of East Bangal. Journal of the Asiatic Society, Science 20(1): 7-14.

A brief description of the fishing grounds and the gear used to capture hilsa is presented in this report. A short review of migration, spawning and production is also documented.
Subject: D, F, GB, MM, RS

8. Ahmad, N. 1954. Fishing crafts of East Pakistan. Proceedings of the Indo-Pacific Fisheries Council. IPFC/C54/Tech 20: 8p.

Report presents a detailed review of the fishing vessels, regional length variation, crew size, gear type, purchase price and rental fees of fishing boats in East Pakistan (Bangladesh) and the Bay of Bengal.
Subject: GB

9. Ahmad, N. 1963. Fish fauna of West Pakistan. Agriculture Pakistan 14(1): 77-82.

This paper describes the findings of a faunitic survey of fishes of West Pakistan. A family-wise list of scientific and local names are given.
Subject: CL, TX

10. Ahmad, N. 1980. Annotated bibliography of freshwater food and other fishes. Pakistan Science Foundation, Islamabad, Pakistan: 668p.

Bibliography provides several references to papers and reports on hilsa/palla.
Subject: BB

11. Ahmed, M. 1952. Hilsa fisheries in Sind. Agriculture Pakistan 3(1): 54- 57.

The author deals with the fisheries of Sind in general. Emphasis has been put on the improvement and conservation of the Palla (Hilsa) fishery of the river Indus.
Subject: GR

12. Ahmed, M. 1949. Inland fisheries of Pakistan: C - Sind. Pakistan Journal of Science 1: 122-124.

Report provides detailed information on various aspects of the hilsa fishery in the province of Sind, such as marketing, migration and nutritional value.
Subject: DO, F, MM

13. Ahmed, M., and S. Ahmed. 1960. A note on fish ladders or fishways. Irrigation Research Institute, Lahore, India. Technical Report No. 283/Hyd/1960.

A short note on the problems associated with the construction and fish utilization of fish passage systems is presented.
Subject: DO

14. Ahmed, M. F., and S. A. Khan. 1974. A checklist of freshwater fishes of Sind Province, Pakistan. Biologia (Pakistan) 22: 119-131.

Subject: CL

15. Ahmed, M.F., S.A. Khan, and M.R. Mirza. 1976. A checklist of freshwater fishes of the Indus Plain, Pakistan. Biologia (Pakistan) 22: 229-295.

Subject: CL

16. Ahmed, Q.J. 1960. A preliminary note on the hilsa of East Pakistan. Agriculture Pakistan 11(1): 165-172.

This report presents the results of a general survey of the hilsa fishery of East Pakistan. Nurtritional value of fish and the gears and crafts used in the fishery have also been described.
Subject: F, GB

17. Ahmed, Q.J. 1961. Study of vertebral column of Hilsa with reference to its racial investigation. Agriculture Pakistan 12: 65-76.

The results of a morphometric study initiated to investigate potential racial differences of hilsa are presented. Vertebrae counts from 383 fish indicate a homogenous stock of hilsa.
Subject: A, FB, SD

18. Ahmed, Samin. 1976. A morphometric study of populations of Hilsa ilisha of the river Padma and Meghna. M.Sc. Thesis. Dhaka University, Dhaka.

Subject: SD

19. Ahsanullah, M. 1964. Population dynamics of hilsa in East Pakistan. Agriculture Pakistan 15(3): 351-365.

Report presents the results of the hilsa investigations conducted between 1956 and 1962. Yield of hilsa was found to be variable from year to year but showed a gradual decline. Possible causes included indiscriminate fishing of Jatka (young hilsa) on the spawning grounds, decrease in river discharge, and the use of small-mesh nets. In East Pakistan (Bangladesh) hilsa was found to be caught year round in variable quantities.
Subject: F, J, SD

20. Ahsanullah, M. 1967. A note on length, weight, and length-weight relationship of hilsa. Agriculture Pakistan 18(1): 123-135.

The author summarizes seasonal variation by location of hilsa length - weight data from the river Padma. In general fish between 24-54cm migrate from the Bay of Bengal, however hilsa ranging from 33-45cm and 0.7-2.75 lb are most abundant.
Subject: FB, SD

21. Aitkin, E.H. 1907. Gazetteer of the Province of Sind: Freshwater Fisheries, Karachi, Pakistan. 71-77.

A general review of freshwater fisheries of Sind Province is presented with the importance of palla fishery elucidated. Local fishing methods, preservation and cooking practices are explained in some detail.
Subject: FP, GB

22. Ali, A. 1971. Study on the improvement over the existing methods of salting of hilsa, Hilsa ilisha. Proceedings 23rd Pakistan Science Conference. Peshawar, Pakistan. Part III Abstract: 8-22.

In the abstract, local methods of salting hilsa have been evaluated. Fish thus preserved could not be stored in edible condition for more than a month. However, details of an improved hygienic salting method, which enables hilsa to be stored for more than three months, is described.
Subject: FP

23. Ali, M.Y. and K.A. Haque. 1980. Country status report on Bangladesh. Proceedings of the Indo-Pacific Fisheries Council 19(3): 24-30.

In this report discussion centres around fishing crafts, gear, fish transport, marketing, Government Administration, the fishermen and their sociao-economic status.
Subject: FP, GB

24. Ali, Md.L. and A.Q. Chowdhury. 1987. Fish catch statistics of Bangladesh (1983-1984). Fisheries Resources Survey System. Department of Fisheries. Dhaka, Bangladesh: 26p.

Report details the 1983-84 catch statistics for important fisheries of Bangladesh. Catch data are presented by sector (ie. inland and marine) and district for each of the major fish species including hilsa. Total catch of hilsa for this period was estimated to be 146,082 tonnes.
Subject: F

25. Ali, Md.L. and A.Q. Chowdhury. 1987. Fish catch statistics of Bangladesh (1984-1985). Fisheries Resources Survey System. Department of Fisheries. Dhaka, Bangladesh: 15p.

Report details the 1984-85 catch statistics for important fisheries of Bangladesh. Catch data is presented by sector (ie. inland and marine) and district for all the major species including hilsa. Total catch of hilsa for this period was estimated to be 142,556 tonnes.
Subject: F

26. Amin, M.R. 1975. The morphology and histology of the alimentary canal of Hilsa ilisha (Ham.), with special reference to food and feeding habits. M.Sc. Thesis, Dhaka University, Dhaka, Bangladesh.

Subject: A, FD

27. Anon. 1940. Indian fishes of economic value. Nature. (London) 146: 657-658.

A short note is presented which discusses the importance of papers by Nair (1939) and Hora and Nair (1940), and reviews general knowledge on hilsa.
Subject: C, GR, RS

28. Anon. 1941. Preliminary guide to Indian fish, fisheries, methods of fishing and curing. Marketing Series No. 24. Simla. Government of India Press, Simla. Marketing Series Number 24: pp. 29, 135, 137, 143, and 145.

Subject: F, FP, GB

29. Anon. 1942. The hilsa fish. Indian Farming 3(9): 492-493.

This article provides a general review of hilsa as an important food source. Recommendations for conservation and management include artificial propagation, protection of the young and closed fishing seasons.
Subject: C, FP, GR, PM

30. Anon. 1955. Hilsa Investigations. Proceedings of the Indo-Pacific Fisheries Council 6(1): 98-99.

This report provides a very brief summary of research being conducted in Burma, India and Pakistan in 1955. General recommendations for future investigations are presented.
Subject: GR

31. Anon. 1957. Preliminary report on the Marine Fisheries of East Pakistan. CFD(E). Technical Report. No. 1: 32p.

Report provides a summary of the marine fisheries of the Bay of Bengal and includes a description of boats and gear used.
Subject: F, GB

32. Anon. 1970. The Chilka lake. Directorate of Fisheries, Government of Orissa, Cuttack, India: 171p.

The results of an extensive survey of Chilka lake are presented in this dooument. Details concern the physical characteristcis of the lake, hydrology, and the fish and fisheries as well.
Subject: D, F, GB, GR, PM

33. Anon. 1978. Successful artificial breeding of hilsa. B.N. Saigal (Ed.). Central Inland Fisheries Research Institute, Barrackpore, India. Newsletter 3 (1 & 2): 1.

The results of successful propogation of hilsa at Farakka and transfer of hatchlings to ponds at Bhagalpur are reported in this newsletter. After 18 and 31 days hatchlings had grown to 9-12cm and 23-25cm respectively.
Subject: AG, C

34. Anon. 1981. Hilsa culture in confined waters - No longer a remote possibility. B.N. Saigal, V.V. Sugunan, V.K. Unnithan, G.K. Vinci, and S. Paul (Ed.). Central Inland Fisheries Research Institute, Barrackpore, India. Newsletter 4(3): 2.

The results of successful rearing of hilsa in ponds are reported in this article. Hilsa grew to 240-250gm in 448 days with low mortality.
Subject: C

35. Anon. 1981. Hilsa ilisha - a gourmet's dream. B.N. Saigal, V.V. Sugunan, V.K. Unnithan, G.K. Vinci and S. Paul (Ed.). Central Inland Fisheries Researoh Institute, Barrackpore, India. Newsletter 4(4): 6-7.

A general review of hilsa as a food source and the historical conservation measures instilled by religion restricting its consumption from October to January are

presented in this article. Other subjects briefly addressed include migration, food and fecundity.
Subject: FB, FD, GR, MM, PM

36. Anon. 1981. Hilsa - Has it come to stay in reservoirs. B.N. Saigal, V.V. Sugunan, V.K. Unnithan, G.K. Vinci and S. Paul (Ed.). Central Inland Fisheries Research Institute, Barrackpore, India. Newsletter 4(5): 3.

This report documents the successful stocking of hilsa in the Vallabh Sagar Reservoir on the Tapti river. Although only a few adult specimens, and subsequently fingerlings, were captured it implies that hilsa may breed in confined waters.
Subject: C, RS

37. Anon. 1981. All India census of marine fishermen, craft and gear: 1980. Marine Fisheries Information Service of FAO, Rome, Italy. T & E Series. 30: 1-30.

As per the title the findings of an all Indian census are summarized.
Subject: F, GB

38. Anon. 1982. Hilsa bounty from Hooghly. B.N. Saigal, V.V. Sugunan, V.K. Unnithan, G.K. Vinci and S. Paul (Ed.). Central Inland Fisheries Research Institute, Barrackpore, India. Newsletter 5(2): 1-2.

Newsletter article documents the unusually high (highest on record) landings (July-December) of hilsa from the Hooghly in 1981. The catch was reported to be 5 times the average in corresponding periods from 1972 to 1977. Dominant size of fish in the catch exceeded 40cm.
Subject: F

39. Anon. 1982. Trends in marine fish production in India - 1981. Marine Fisheries Information Service of FAO, Rome, Italy. T & E Ser. 41: 33p.

Subject: F

40. Anon. 1983. 1982 Statistical Yearbook of Bangladesh. Bangladesh Bureau of Statistics, Statistic Division, Ministry of Finance and Planning. Government of the People's Republic of Bangladesh, Dhaka, Bangladesh: 766p.

Yearbook provides a statistical review of commerically important fisheries of Bangladesh and includes an estimate of landings, boats, gear and the number of fishermen.
Subject: F, GB

41. Anon. Annual Reports, Central Inland Fisheries Research Station/Institute, Barrackpore, India: 1948 to 1986.

The Annual Reports of this institute present brief summaries of current research, results and future prospects for the institute. As hilsa is an extremely important species within the station's geographical coverage many references to the species are contained within these reports. In several instances specific articles are mentioned in the text of this bibliography.
Subject: GR

42. Anon. 1987. Hilsa investigations in Bangladesh. Report of the Bay Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36: 113p.

Report summarizes the results of a study initiated to investigate several aspects of the marine commercial fishery. Areas of study include size composition of the catch, maturity and spawning, exploitation and racial investigations in the Bay of Bengal. Annexed to this report are 6 papers which address the above topics.
Subject: F, GR, J, MM, PM

43. Arshad, M. 1984. Marine fish resources of Pakistan: An introduction. Fisheries newsletter - Marine Fisheries Department. Government of Pakistan, Karachi, Pahistan II (5-6): 38-44.

The author provides a detailed survey of Pakistan's marine fishery resources. Discussion centres around the distribution and abundance of fin fish, shell-fish, pelagic, mesopelagic and demersal fishes. An appended table provides a list of commercially important fish and their average annual landings. The catch of palla (Hilsa) was reported to be 7474 metric tonnes for the 1983-84 fishing season.
Subject: FB, SD, TX

44. Ataur-Rahim, M. 1983. Contribution of Muslim scientists during the 13th and 14th Centuries Hijri in Indo-Pakistan sub-continent. National Science Council, Pakistan. Vol. I and II: 1-321.

This report contains some interesting papers on hilsa.
Subject: BB

45. Azad, S.A., J. Hertel-Wullf, M.M. Hossain, M.S. Islam, Q.M. Huq and N.N. Das. 1987. Some observations on size groups in the fishery and migration of hilsa in Bangladesh waters during 1985-86. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36. Colombo, Sri Lanka: 46-63.

This report describes the seasonal changes in mesh size of fishing gear, length-frequency of fish and mean length at first capture in the marine, esturine, and riverine waters of Bangladesh. Size group differences are also discussed in terms of hilsa migration.
Subject: GB, F, MM

B

46. Banerjee, M.K., and R.D. Chakraborti. 1969. Drift gillnetting in lower Sunderbans, West Bengal. Indian Journal Fisheries 16: 75-81.

Details of fishing trails for three different mesh sizes of gill nets in the Lower Sundarbans are presented. Results indicate that the majority of hilsa were gilled in the 88mm mesh while many were entangled in the 101mm mesh net.
Subject: GB

47. Banerji, S.R. 1955. On occurrence of Hilsa ilisha and its fishery in Gorakpur (U.P.). Science and Culture 21(4): 217-218.

A brief description of the unusually high catches of hilsa from the Rapti and Rohin rivers during the 1954 fishing season is documented in this report. It is speculated that the abundance of hilsa in the rivers results from overflow of the unpresentented number of hilsa in the Ganges during the this season.
Subject: D, F

48. Bashirullah, A.K.M., and J. D'Silva. 1973. Two new parasites of the genus Lecethocladium (Luhe, 1901) (Family: Hemiuridae). Japanese Journal Parasitology 22(3): 108-110.

Description of a new species, Lecithocadium ilisha, from the stomach of Hilsa ilisha is presented.
Subject Code: PD

49. Basu, K.P., and H.N. De. 1938. Nutritional investigation of some species of Bengal fish. Part I Biological value of the proteins of (Labeo rohita) and hilsa (Clupea ilisha) by the nitrogen balance and growth methods. Indian Journal Medical Research 26: 191-196.

The author reports on the results of a biochemical analysis of hilsa flesh. Value of proteins in steam-dried fish by balance sheet method at 5, 10, and 15% levels of protein intake were found to be 78, 69.5, and 62.1% respectively. By growth method, the protein values

were 0.25, 1.32, and 1.48. The digestibility of sun-dried hilsa was higher than the steam dried fish.
Subject: FP, P

50. Basu, K.P., and H.N. De. 1938. Nutritional investigation of some species of Bengal Fish. Part II. Extraction and chemical analysis of the proteins of ruhae (Labeo rohita) and hilsa (Clupea ilisha). Indian Journal Medical Research 26: 191-196.

Chemical analysis of hilsa proteins are reported in this paper. In summary the flesh contains 93% total extractable nitrogen, water, salt, and alcohol extracts of 26.8, 9.9, and 2.5%,respectively, with alkali extract of 53.7% protein. Globulin and glutelin constituted the greater proportion of proteins. Cooled aqueous extract contained a small amount of albumin. Tyrosin and Tryptophane were also analysed for protein content.
Subject: P

51. Basu, K.P., and H.N. De. 1938. Nutritional investigation of some species of Bengal fish. Part III. Extraction of vitamin A contents of liver and body oils of ruhae (Labeo rohita) and hilsa (Clupea ilisha). Indian Journal Medical Research 26: 197-203.

Quantitative estimates of fish liver oil were attempted. One gram of liver oil from Hilsa was found to contain 120 I.U. of vitamin A.
Subject: P

52. Bhanot, K.K. 1973. Observations on the spawning of Hilsa ilisha (Ham) in the Hooghly estuary. Journal of the Inland Fisheries Society, India 5: 50-54.

This report discusses the seasonal occurrence of hilsa larvae in the Hooghly estuary. Evidence is presented to support year-round spawning of hilsa in the freshwater regions of the estuary.
Subject: J, RS

53. Bhimachar, B.S. 1962. Hilsa investigations in India during the period of 1961-62. Indo-Pacific Fisheries Council. Report of the Technical Committee: 1.

A brief review of hilsa research being conducted in India during 1961-62 is presented in this report.
Subject: F, GR

54. Bhuiyan, N. 1960. Hilsa fishing in the river Indus. Agriculture Pakistan 11(4): 510-519.

The findings of a general survey of the hilsa fishery in the river Indus are presented. Details concerning fishing grounds, types of gear and crafts used, and the number of fishermen employed are reported. The effect of barrages on fish production has also been discussed.
Subject: F, GB

55. Bhuyian, N. and G.B. Talbot. 1968. Fluvial migration, spawning, and fecundity of Indus river hilsa, Hilsa ilisha. Transactions of the American Fisheries Society 97(4): 350-355.

The authors have presented a general description of the the Indus river hilsa fishery. Migrating fish which enter the river range between 25 and 60cm in length. Males appear to be in their fourth year of life while females of 4 and 5 years are present. Fecundity estimates range between 755,000 and 2,917,000 eggs per female. There was also no evidence of a close relationship between length/weight and fecundity of hilsa.
Subject: FB, FE, MM, RS

56. Bilqees, F.M., and F. Haseen. 1985. Histopathology of Anisakis sp. and Porrocaecum sp in the liver of Hilsa ilisha. Proceedings of the 6th Pakistan Congress on Zoology. Abstract: Par.19.

The authors have studied the histo-pathology of the larvae of Aniskis sp. and Porroceacum sp. . in the liver of hilsa. Severe tissue damage due to infestation was noted.
Subject: PD

57. Biswas, J.C. 1954. Trends in hilsa prices in Calcutta markets. Journal of the Asiatic Society, Science 20(1): 29-31.

Report details the major sources of hilsa in Calcutta Fish Markets. Prices of hilsa from 1928-1953 and reasons for increases are discussed.
Subject: FP

58. Blecker, P. 1852. Bijdrage tot de kennis der haringachtige visschen den Soenda-Molukschen archipel. Verh. batavia. Genoot., (24): 48.

Subject Code: TX

C

59. Caius, J.F., H.M. McGusty and S.H. Prater. 1943. Can hilsa be taken with rod and line. Journal of the Bombay Natural Historical Society 43(3): 530.

This note is a reply to the question "Can hilsa be taken with a rod". The answer is "no" based on the feeding behaviour of hilsa - planktivorous.
Subject: GB

60. Cantor, T.E. 1849. Catalogue of Malayan fishes. Journal of the Asiatic Society, Bengal. 19: 983-1443.

Subject: CL, TX

61. Chacko, P.I. 1947. The migratory fishes of the inland waters of Madras. Current Science (Bangalore) 16(9): 289-290.

In this letter to the editor Chacko describes the movement and migration of several fish species, including hilsa, within the rivers of the state of Madras. Concern is expressed about the fishery related problems arising from man-made obstructions.
Subject: DO, MM

62. Chacko, P.I. 1949. Fisheries of the upper Godavari, with special reference to the Ramapadasagar Project. Proceedings of the 36th Indian Science Congress, Allahabad. Part III. Abstracts. Calcutta: 165.

Abstract implies that of the 78 identified species of fish in the upper Godavari only a few of the migratory species like hilsa will be effected by the Ramapadasagar Dam.
Subject: DO, MM

63. Chacko, P.I. 1949. The Krishna river and its fishes. Proceedings of the 36th Indian Science Congress, Allahabad. Part III. Abstract. Calcutta: 165-166.

This abstract provides a list of the important commericial fisheries, including hilsa, in the Krishna river.
Subject: CL, F

64. Chacko, P.I. 1952. A survey of the dams and migratory fishes of Madras. Contributions of the Freshwater Fisheries Biological Station, Madras, India: 4.

Subject: DO

65. Chacko, P.I. 1954. Past, present and future of the hilsa fisheries in Madras State. Journal of the Asiatic Society, Science 20(1): 55-58.

A historical review of the adverse effects of anicuts on hilsa runs in the rivers of the state of Madras is presented. Reference is also made to proposals for supplementing declining catches through artificial propagation and stocking.
Subject: C, D, DO.

66. Chacko, P.I. and D.V.H. Dixithulu. 1951. Further observation on the radii of scales of Hilsa ilisha (Ham.). Proceedings of the 38th Indian Science Congress, Calcutta 3(7): 227 (Abstract).

Scales of hilsa were used to investigate the age and growth of small fish. Each complete and incomplete radii was considered to represent one inch of growth in length.
Subject: AG, J

67. Chacko, P.I. and D.V.H. Dixithulu. 1951. An unusual occurrence of a fishery of Hilsa ilisha (Ham.) in the Godavari Coast. Proceedings of the 38th Indian Science Congress, Calcutta. 3(7): 227 (Abstract).

Abstract provides an explaination for the large shoals of hilsa observed along the Godavari coast in 1949. Low water levels and siltation are believed to have kept the fish out of the river thereby forcing them to move along the coast.
Subject: MM

68. Chacko, P.I. and S.V. Ganapati. 1949. On the bionomics of Hilsa ilisha (Ham.) in the Godavari River. Madras University Journal 18: 16-22.

Subject: DO, F, MM, PM

69. Chacko, P.I., S.V. Ganapati, and A.R.K. Zobairi. 1948. Hydrobiological investigations of the Godavari River with special reference to the Indian shad, Hilsa ilisha (Ham.). Proceedings of the 35th Indian Science Congress. Part III: 209.

Abstract provides a summary of the hydrobiological characteristics of the Godavari river during the spawning migration of hilsa (July-October). Size at maturity, egg size and species of plankton present in the river are documented.
Subject: F, FD, MM, RS

70. Chacko, P.I. and B. Kirshanamurthi. 1949. A preliminary note on the hilsa fishery investigations in South India. Proceedings of the 35th Indian Science Congress. Part III (Abstract): 204.

Subject: F

71. Chacko, P.I. and B. Kirshanamurthi. 1949. Hermaphroditism in the Indian shad, Hilsa ilisha (Ham.). Proceedings of the 35th Indian Science Congress Part III (Abstract): 167.

A specimen of natural intersex condition was collected from the Godavari delta. This hilsa was 17.5 inches long and weighed 3 lbs. The anterior 1/3 of the gonad consisted of testicular tissue while the remaining portion had an ovarian structure.
Subject: A, FB

72. Chacko, P.I. and B. Kirshanamurthi. 1950. A biometrical study of Hilsa ilisha (Ham.) in the Godavari River. Journal Bombay Natural Historical Society 49(2): 315-316.

A brief description of the length, height, weight and scale rings of the 1947-48 hilsa spawning run is presented. The significance of rings as growth checks on hilsa scales is also discussed in relation to the number of spawnings.
Subject: PM, RS

73. Chacko, P.I., A.R.K. Zobairi, and B. Kirshanamurthi. 1948. The radii of scales of Hilsa ilisha (Ham.) as an index of growth and age. Current Science 17(5): 158-159.

The authors present a good review of past investigations to develope a relationship between scale characteristics and age. They propose a direct correlation between the number of scale radii and fish length in inches.
Subject: AG.

74. Chakraborti, D., R.V. Nair, and G. Balakrishnan. 1973. Some characteristics of marine fish production in India. Proceedings of the Symposium of Living Resources of the seas around India. Special Publication of the Central Marine Fisheries Research Institute, Mamdapam Camp, Cochin, India: 102-113.

Subject: F

75. Chakraborti, R.K. 1986. Pelagic fisheries resources off the lower Sunderbans, West Bangel and its exploration by power boats. Seafood Export Journal (India), May: 17-19.

A brief review of the pelagic fishery in the Sunderbans of West Bengal is presented in this report. Details of annual landings by different boat sizes, species (including hilsa) and month are also documented.
Subject: F, GB

76. Chakravarty, M.M. 1950. Studies on Myxospordia from common food fishes of Bengal. Proceedings of the Indian Academy of Science B18(1): 21-35.

Subject: PD

77. Chakravarti, P.N., H.C. Mookerji, and B.C. Guha. 1933. Vitamin A in fish liver oils. Journal Indian Chemistry. Section X: 361-366.

The authors have compared vitamin A content of liver oil from hilsa with other edible fishes. Vitamin A potency of hilsa was only 59 (blue value in tintometric method) compared to 227 for Labeo rohita, 174 for Cirrihina mirgala, 109 for Catla catla, and 284 for Lates calcarifer.
Subject: P

78. Chandra, R. 1962. A preliminary account of the distribution and abundance of fish larvae in the Hoogly estuary. Indian Journal Fisheries 9(1): 48-70.

The author describes the results of a larval fish survey of the Hooghly estuary. Information pertaining to hilsa concerns specific periods of occurrence which supports the belief of a prolonged spawning season. Peak periods of abundance of hilsa larvae occur in August and October. The results also provide evidence for hilsa not spawning in the lower estuary.
Subject: J, RS

79. Chandra, R., V.R. Desai and S.K. Das. 1984. Observations on the bathymetric distribution of hilsa larvae in middle stretches of river Ganga near Allahabad. Journal Bombay Natural Historical Society 80(2): 427-429.

Subject: D, J, LH

80. Chandra, R. 1985. Breeding and nursery management of endemic Hilsa ilisha (Ham.). Annual Report 1985. Central Inland Fisheries Research Institute, Barrackpore, India: 54-55.

Abstract summarizes the results of continuing work on the breeding and nusery management for hilsa. General information is presented on the timing of spawning runs, fish size and results of artificial propagation of hilsa.
Subject: C, MM, RS

81. Chandrasekhar, K. 1961. The structure of the kidney of some teleostean fishes. Proceedings of the Indian Museum. 59: 479-495.

Subject: A, P

82. Chaudhuri, B.L. 1916. Fauna of the Chilka Lake. Fishes Part I. Memorandum of the Indian Museum 5(4): 403-439.

Report establishes hilsa as permenant residents of Chilka lake, but suggests it does not spawn in the lake.
Subject: CL

83. Cuvier, G. 1829. Regne animal. Paris 2: 320.

Subject: TX

84. Cuvier, G., and A. Valenciennes. 1847. Histore Naturalle des Piossons. XX: 443.

Subject Code: TX

D

85. Das, N.N. 1985. Factors affecting timing and size of runs of hilsa shad (Hilsa ilisha) in Bangladesh and Pakistan. M.Sc. Thesis. University of British Columbia, Vancouver, British Columbia, Canada: 106p.

The relationship between changing environmental factors and seasonal variation of hilsa landings are discussed in this thesis. A significant inverse relationship between rainfall, two years earlier, and annual landings is reported.
Subject: B, F, MM

86. Das, N.N., T. Nishida, S.A. Azad, M.S. Islam, M.M. Hossain and Q.M. Huq. 1987. Analysis of some morphometric and meristic characters of Hilsa ilisha of Bangladesh waters. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36: 96-109.

No significant differences in the mean values between sampling stations were found for the 6 morphometric and 2 meristic characters examined.
Subject: SD

87. Das, S., and A. De. 1986. List of CIFRI publications: 1977-1984 (index from 1948 to 1984). Central Inland Fisheries Research Institute, Barrackpore, India. Bulletin Number 44: 170p.

Bulletin provides a complete list of reports published by the Central Inland Fisheries Research Institute, Barrackpore, India. The index also covers a previous report by De (1976).
Subject: BB

88. Datta, N.C.A., A. Das. , and S. Deb. 1982. Olfactory apparatus in two Indian Clupied fishes. Vest. Cesk. Spol. Zool. 46(1): 1-4.

Subject: A, FB

89. David, A. 1954. A preliminary survey of the fish and fishes of a five mile stretch of the Hooghly river near Barrackpore. Indian Journal Fisheries 1: 231-255.

This report presents the results of a fishery survey conducted near Barrackpore, India, and includes information on, fishing gear, timing of the various fisheries, size of fish, and the importance of the hilsa fishery in relation to the other fisheries.
Subject: CL, F, GB

90. Day, A. 1865. Fishes of Malabar. Quaritch. London: 235

Subject: CL, TX

91. Day, F. 1873. Report on the Freshwater Fish and Fisheries of India and Burma. Calcutta: 22, 23, 35-36.

Details are presented on the spawning movement of hilsa into the rivers which flow into the Bay of Bengal. Variation in the timing of the spawning migration between rivers is also discussed.
Subject: F, GB, MM

92. Day, F. 1873. Report on the Sea Fish and Fisheries of India and Burma. Calcutta: 24-25.

Report speculates about the marine movement of hilsa in relation to their year round presence in the fishery. Furthermore it is believed that hilsa do not migrate far from shore.
Subject: F, GB, MM

93. Day, F. 1877. The fish and fisheries of Bengal, Introduction. A statistical account of Bengal. London: 20 6, 15.

Subject: F, GB, GR

94. Day, F. 1878. The Fishes of India. Vol. I and II, (Reprinted, 1958). William Dawson & Sons Ltd., London: 638-640.

Subject: GR, TX

95. Day, F. 1889. The Fauna of British India including Ceylon and Burma. Fisheries I. London: 12

Subject: CL, TX

96. De, Anjali. 1976. List of publications of the Central Inland Fisheries Research Institute (1948-1976). CIFRI Bulletin Number 22: 101p.

As per title. See publication by Das and De (1986) for index.
Subject: BB

97. De, D.K. 1980. Maturity, fecundity and spawning of post-monsoon run of hilsa, Hilsa ilisha (Ham.) in the Upper stretches of the Hooghly estuarine system. Journal of the Inland Fisheries Society, India 12(1); 54-63.

Hilsa gonad maturity, fecundity and spawning behaviour are discussed in this paper. Reproductive stages are described in detail.
Subject: FB, FE, RS

98. De, K.C. 1910. Report on the fisheries of eastern Bengal and Assam. Calcutta: 17-18.

This report provides a brief summary on the availability of hilsa, spawning seasons and comments about the fishermen in the area. It should be note that the fishery in the Assam region of India has all but vanished therefore the information in this report has an historical value.
Subject: D, F, RS

99. Desai, A.K. 1967. Histophysiological observations on the cyclic changes in certain organs and tissues of the anadromous fish, Hilsa ilisha (Ham.). Ph.D. Thesis. University of Baroda, Baroda, India.

Details of thesis results are published in the following four papers by Desai.
Subject: A, P

100. Desai, A.K. 1978. Histological studies of the liver of migratory fish, Hilsa ilisha, and non-migratory Hilsa toli. Journal Animal Morphology and Physiology 25 (1-2): 119-123.

Subject: A, P

101. Desai, A.K. 1978. Distribution of cholinesterase in the liver and stomach of the migratory fish, Hilsa ilisha and non-migratory Hilsa toli. Journal Animal Morphology and Physiology 25(1-2): 124-131.

Differences in the presence of acetyl and butyll - cholinesterase in the stomach and liver tissues of Hilsa ilisha and H. toli are discussed in relation to feeding during the spawning migration of the former.
Subject: A, P

102. Desai, A.K. 1979. Comparative structural changes in the kidney of Hilsa ilisha and Hilsa toli as related to migratory habits. Journal Animal Morphology and Physiology 26(1-2): 220-227.

Subject: A, P

103. Desai, A.K. 1979. Histological observations on the cat-cholamine secretary cells in the heart of migratory Hilsa ilisha and non-migratory Hilsa toli. Journal Animal Morphology and Physiology 26(1-2): 252-256.

Subject: A, P

104. Devanesan, D.W. 1939. Research work on the hilsa. Current Soienoe 8(3): 126.

Comments are made by the author concerning several ommissions of Jenkin's (1938) in his review of Hora's (1938) paper. It is stressed that the review refers only to work in the state of Bengal and omits much of the important research conducted by the Department of Fisheries in Madras.
Subject: GR, RS

105. Devansean, D.W. 1942. Weirs in South India and their effect on the bionomics of the hilsa in the South Indian rivers - The Godavari, the Krishna and the Cauvery. Current Science 11(10): 398-399.

This letter to the editor discusses the negative impaot of dam and weir construction in several rivers of southern India. More importantly though is its exposure of the uselessness of fish passages for hilsa and the problems which accompany reduced spawning area in the rivers and increased exploiatation. Recommendations for protection of hilsa include closure of certain areas of the river and restricting fishing to a few days a week.
Subject: DO, PM, RS

106. Devasundaram, M.P. 1954. Report on the fisheries of Chilka Lake during the years 1948-52. Government Press, Cuttack, India.

Subject: F

107. Dharmamba, N. 1959. Studies on the maturation and spawning habits of some common clupeoids of Lowson's Bay Waltair. Indian Journal Fisheries 6(2): 374-382.

Subject: RS

108. Dixithulu, D.V.H. and P.I. Chacko. 1962. Studies on Hilsa ilisha (Ham.) in Madras State. Government of Madras Fisheries Statistical Report and Yearbook 1957-58, Madras, India: 108-127.

Subject: C, DO, F, GR, MM, RS

109. Dunn, I.C. 1982. Hilsa resources development and management in Bangladesh. FI:DP/BDG/72/016, Field document 2, FAO, Rome, Italy: 47p.

Besides a general review of the fishery, recommendations are given for the development and management of hilsa in Bangladesh. Recommendations include not only fishery related approches, which might be adopted, but also the establishment of competent research unit to investigate many aspects of the fishery.
Subject: F, GR, PM

110. Dunn, I.C. 1982. The hilsa fishery of Bangladesh, 1982: An investigation of its present status with an evaluation of current data. FI:DP/BDG/81/034. Field Document 2. FAO, Rome, Italy: 71p.

Using the records of hilsa shipped by the Bangladesh Railway, Dunn found that the catches have remained relativey stable over the past 10 years. Details of the fishery and sources of anecdotical information are

documented. Some evidence for the existance of a five year cycle is also presented.
Subject: AG, B, F, GB, GR, MM, PM

111. Dutt, S. 1966. The Indian shad, Hilsa ilisha (Ham.) in the sea. Current Science 35(13): 329-330.

After presenting a general review of hilsa distribution and spawning the author suggest three ecotypes with possibly represent three races; fluvial anadromous, fluvial and marine. Assuming the former to normal he discusses the possible existance of all three.
Subject: D, FB, P, RS, SD

112. Dutta, P. 1973. Fishery resources of the Hooghly-Matlah estuarine system. Central Inland Fisheries Research Institute, Barrackpore, India. Bulletin Number 19: 24p.

Details of the physical and chemical characteristics of the Hooghly-Matlah estuary are given as well as general information on the fishery resources and species composition. Specific reference is made to the importance of the hilsa fishery in terms of gear, catch, migration, obstructions and exploitation.
Subject: DO, F, GB, MM, PM

F

113. FAO. 1970. Report to the Government of Burma on some aspects of Burmese fisheries. Based on the work of Dr. A.D. Druzhinin. Food and Agriculture Organization of the United Nations, Rome, Italy. Document FAO/TA 2781: 57 + viipp.

Subject: F

114. Fischer, W., and G. Beanchi (eds.). 1984. FAO species identification sheets for fishes. Vol. I, Tenualosa ilisha (Clupidae). Food and Agriculture Organization of the United Nations, Rome, Italy.

Report contains classification information for the redescription of Tenualosa ilisha formally known as Hilsa ilisha.
Subject: TX

115. Fowler, H.W. 1934. Description of new fishes obtained (1907-1910) chiefly in the Philippines and adjacent seas. Proceedings of the Academy of Natural Science, Philadelpha, U.S.A. 85 (1933): 233-267.

A brief summary of new fishes identified from the Philippine fish collection contained in the U.S. National Museum is presented. Tenualosa is included.
Subject: TX

116. Fowler, H.W. 1941. Contributions to the biology of the Philippine archipelago and adjacent regions. Bulletin of the U.S. National Museum 100(13): 633.

Report provides a summary of hilsa nomenclature and details taxonomic characteristics.
Subject: TX

G

117. Ganapati, S. V. 1973. Ecological problem of man-made lakes of south India. Archeology, Hydrology, and Biology 71: 363-380.

This article documents the physical, physio-chemical, siltation and current characteristics of several major man made reservoirs in southern India. In addition, the effects on migratory species, including hilsa, are discussed in general with recommendations for future investigations.
Subject: DO, J

118. Ghosh, A. N. 1965. Observations on the hilsa fishery of the river Jamna during the years 1955-62 at Allahabad. Journal of the Zoological Society of India. 17(1&2): 135-149.

This report describes the seasonal and annual fluctuations of hilsa landings in the Jamna river during 1955-66. Discussion centres the changes in total catch, size differences and general decline in landings during the period of study.
Subject: F

119. Ghosh, A.N., R.K. Battacharya, and K.V. Rao. 1968. On the identification of the sub-population of Hilsa ilisha (Ham.) in the Gangetic system with a note on their distribution. Proceedings of the National Academy of Science, India. Section B 34(1):44-57.

Using analysis of covariance the authors identified three sub-populations of hilsa; broad, broader, and slender. Discriminant scores were developed with two variables, total length and body height. The equations were then applied to samples from different areas of the Ganges and indicated a wide distribution of the three forms of hilsa.
Subject: D, SD

120. Ghosh, A.N., and T.D. Nangpal. 1970. On the winter breeding of Hilsa ilisha (Ham.) in the Ganga river system. Proceedings of the Indo-Pacific Fisheries Council 13(2): 132-142.

Results from this investigation support the hypothesis of post-winter spawning of hilsa in the freshwater sections of the Ganges. Discussion centres around the possible relationship of water temperature, current velocity and standing crop of plankton to spawning. Observations indicate "slender" variety of hilsa is resident and responsible for post-winter spawning.
Subject: B, J, LH, MM, RS

121. Ghosh, K.K. 1976. Inland fishery resources of India, their estimation and utilization. Publication of the Central Inland Fisheries Research Institute, Barrackpore, India.

Report summarizes the major inland fisheries resources of India, including hilsa.
Subject: F

122. Gobindan, V. 1916. Fishery statistics and information. West and east coasts, Madras Presidency. Madras Fisheries Bulletin, Madras, India: 115.

Report provides a general review of fisheries and landings statistics for commerically important species including hilsa.
Subject: F, GR

123. Gopalakrishnan, V. 1969. Observations on the present status of hilsa fisheries in the Hooghly-Matlah esturine system (West Bengal, India). Proceedings of the 56th Indian Science Congress 56(3): 539-540.

This abstract discusses the decline in hilsa catches in the Hooghly-Matlah estuary. Landing estimates from 1958-59 to 1967-68 fishing season are presented and discussed.
Subject: F

124. Gopalakrishnan, V. 1973. Fishery resources of the Hooghly-Matlah esturine system in relation to fisheries of the Bay of Bengal. Proceedings of the Sympossium on the Living Resources of the sea around India. Special Publication of the Central Marine Fisheries Research Institute, India: 373-386.

The results of a fisheries resource survey of the Hooghly-Matlah estuary in relation to the fisheries of the Bay of Bengal are discussed. Of the migratory species hilsa is deemed the most important, comprising 40-70% of the total fish landings. Factors affecting migration and spawning such as temperature, current velocity and volume of discharge are also discussed.
Subject: F, GB, MM, RS

125. Gopalakrishnan, V., and A.N. Ghosh. 1971. Observations on the abundance of Hilsa ilisha (Ham.) in the Hooghly estuary during 1971 moonsoon season. Journal Inland Fisheries Society of India 3: 139-142.

This report speculates about the abundance of hilsa in the Hooghly estuary during 1971.
Subject: F

126. Gopalakrishnan, V., and R.N. Pal. 1964. Advancement in the study of parasites of migratory fishes. Prooeedings of the Zoological Society of India 17: 63-66.

Differences in the parasitic fauna of hilsa originating from West Bengal and Chilka Lake are discussed in relation to their possible use for estimating the degree of inter-stock mixing.
Subject: P

127. Gunther, A. 1868. Cataloge of fishes of the British Museum. London 7: 445.

Subject: TX

H

128. Hafeezullah, M. 1975. Two new trematodes (Digenea: Humiuridae) of marine fishes from east coast of India. Zoological Society of India, Orissa, India. Dr. B.S. Chauhan Commemoration Volume 1975: 203-210.

The author describes a new species, Lecithocladium chauhani, from the stomach of Hilsa ilisha, collected in the Bay of Bengal.
Subject: PD

129. Halder, D. D. 1968. Observations on the food of young Hilsa ilisha (Ham.) around Nabadwip in the Hooghly estuary. Journal of the Bombay Natural Historical Society 65(3): 796-798.

This paper describes the findings of a study undertaken to investigate the feeding intensity of young hilsa from March to June. Results indicate the stomach fullness index to be much higher in March/April than in May/June. Speculations are made concerning the influence of river flow and plankton production during the study period.
Subject: FD, J

130. Halder, D.D. 1969. Observations on the food of young Hilsa ilisha (Ham.) of the Hooghly estuarine system. Journal of the Bombay Natural Historical Society 67(3): 578-583.

This report presents the results of a detailed study on the stomach content of young hilsa. Differential feeding behaviour of fish sizes is also discussed.
Subject: FD, J

131. Hamilton, F. 1822. An account of the fishes found in the river Ganges and its branches. Archibald Constable and Company. Edinburgh: 243-246.

The book contains the first recognized description of Hilsa ilisha. The life cycle of the species is also compared with the American shad, Alosa sapadissima.
Subject: GR, TX

132. Helaluddin, M.D. 1976. Biometric studies on populations of Hilsa ilisha of the river Magna and observations of food of young. M.Sc. Thesis. Dhaka University, Dhaka, Bangladesh.

Subject: FD, SD

133. Hora, S.L. 1938. A preliminary note on the spawning grounds and bionomics of the so-called Indian shad, Hilsa ilisha (Ham.), in the river Ganges. Records of Indian Museum 40(2): 147-158.

The introduction of this report provides an exoellect review of historical literature on hilsa's life history. Discussion centres around the results of investigations undertaken in the water works tanks at Pulta and in the Hooghly. Information is presented on spawning season, growth, food and hatcheries for hilsa. This report is also acknowledged by most papers dealing with growth rates of hilsa.
Subject: AG, F, FB, LH, MM, RS

134. Hora, S.L. 1941. Life history and wanderings of hilsa in Bengal waters. Journal Royal Asiatic Society, Science (Bengal) 6(2): 93-112.

The author has discussed the migratory habits of hilsa and its wanderings in the Bay of Bengal and adjacent rivers. Information is reported on the life history and spawning grounds in the river Hooghly. The possibility of more than one race of hilsa and fluctuations in the fishery have also been discussed.
Subject: F, LH

135. Hora, S.L. 1941. Dams and the problems of migratory fishes. Current Science 9(9): 406-407.

A short general review of the problems associated with dams and migratory fish in Asia compared to North America is presented. Hilsa is used as the Asian example.
Subject: DO

136. Hora, S.L. 1942. The effects of dams on the migration of hilsa fish in Indian waters. Current Science 11(12): 470-471.

This note discusses the effects of dams, anicuts and other obstructions on the biology of migratory fishes. It emphasizes that before planning and construction of dams and barrages, fishery experts should be consulted to carry out a thorough survey in order to safeguard against deleterious effects on fish.
Subject: DO, F, GR

137. Hora, S.L. 1942. Interim recommendiations for the protection of immature hilsa and carp fisheries of Bengal. Bengal Government Press, Calcutta, India.

This report express concern over the harvesting of large quanties of young hilsa and makes recommendation for its protection.
Subject: F, J, PM

138. Hora, S.L. 1943. Sources of fish supply to Calcutta markets. Journal Bombay Natural Historical Society 43(4): 665-671.

Miscellaneous note provides information concerning the source of fish, including hilsa, in Calcutta fish markets. Seasonal availability of species is also discussed.
Subject: F, GB

139. Hora, S.L. 1952. Report of Sub-Committee on hilsa. Proceedings of the Indo-Pacif Fisheries Council 4(1): 62-65.

See report by Hora (1954).
Subject: GR

140. Hora, S.L. 1954. Biology of hilsa. Journal of the Royal Asiatic Society, Science 20(1): 15-18.

A historical review of information on hilsa as well as changes which are occuring in the fishery and marketing of catches are described in this report. The impact of changing patterns of Hindus eating hilsa from "Bijoya Dasami" is also discussed in relation to total landings and social conservation.
Subject: C, F, GR, RS, SD

141. Hora, S.L. 1954. Symposium on hilsa and its fisheries - A Review. Journal of the Asiatio Society, Science 20(1): 1-5.

This report summarizes the research papers and current knowledge of hilsa biology and was presented to the Hilsa Sub-Committee of the Indo-Pacific Fisheries Council in 1953. Many problems areas are identified and recommendations made for future research, on a priority basis are given.
Subject: AG, C, DO, DV, F, FD, GB, GR, LH, MM, PM

142. Hora, S.L. 1954. Proverbs and popular sayings concerning hilsa fish current in Bangel. Journal of the Royal Asiatic Society, Science 20(1): 19-28.

Publication documents many of the interesting proverbs and sayings about hilsa. Discussion centres around popular beliefs and scientific knowledge.
Subject: GR, P

143. Hora, S.L., and K.K. Nair. 1940. Further observations on the bionomics and fishery of the Indian shad, Hilsa ilisha (Ham.), in Bengal waters. Records of the Indian Museum 42(1): 35-50.

This report summarizes the growth and seasonal abundance data collected from hilsa confined in the Pulta Water Works tanks. Discussion centres around spawning periods and migration into the river as well as the possibility of a five year cycle in peak landings.
Subject: AG, J, MM, RS

144. Hora, S.L., and K.K. Nair. 1940. The jatka fish of Eastern Bengal and its significance in the fishery of the so-called Indian shad, Hilsa ilisha (Ham.). Records of the Indian Museum 42(4): 553-565.

This report discusses the historical information on "Jatka" and confirms that the fish so-called is the young of Hilsa ilisha. Some information on the seasonality of jatka is also presented.
Subject: J, LH

145. Hora, S.L., and K.S. Misra. 1943. On the small collection of fish from Iraq. Journal of the Royal Asiatic Society 9(1): 2.

Report describes the occurrence of fish species in a fish collection from the Persain Gulf, Hors, and the rivers Shatt-al-Arab, Tigris, and the Euphrates in 1941. Only two specimens of hilsa were collected.
Subject: D, TX

146. Hornell, J. 1924. The fishing methods of the Ganges. Memorandum of the Asiatic Society, India 8: 201-237.

Report provides a detailed summary of fishing methods and gear used in the Ganga River system.
Subject: F, GB

147. Hornell, J. 1950. Fishing in many waters. Cambridge University Press, London: 88, 108-113.

In this book the author provides details of the method and gear used to capture hilsa in the Ganges.
Subject: F, GB

148. Hossain, M.M. 1971. The commercial fisheries of the Bay of Bengal. United Nations Development Programme (UNDP), Rome, Italy. Project 22. Publication Number 1: 60p.

A general summary of the commercial fisheries of the Bay of Bengal is present in this report.
Subject: F

149. Hossain, M. M. 1975. Studies on some aspects of biology of Hilsa ilisha (Ham.) of the river Padma. M.Sc. Thesis. Dhaka University, Dhaka, Bangladesh.

150. Hossain, M. M. 1985. Spawning times and early life history of Hilsa ilisha in Bangladesh. M.Sc. Thesis. University of British Columbia, Vancouver, B. C. Canada: 90p.

This thesis investigates methods of aging hilsa, and the identification of spawning periods. Daily growth from otoliths of juvenile hilsa, length frequency analysis, and gonado-somatic index were used to identify peak spawning periods. The seasonal distribution of young hilsa is also discussed.
Subject: AG, J, LH, MM, RS

151. Hossain, M.M., S.A. Azad, Q.M. Huq, M.S. Islam and N.N. Das. 1987. Hilsa fishery of Bangladesh in 1985-86. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36: 14-31.

Details of seasonal variation in catch of hilsa at five sampling stations, Chandpur, Chittagong, Cox's Bazar, Mohipir, and Nayahata are presented. Observations note an inverse relationship between salinity and catch rate. Total hilsa production was estimated to be 230,000 tonnes; 140,000 marine and 90,000 tonnes esturine and riverine.
Subject: F, GB

152. Howard, S. 1938. The Hilsa. Statesman, Calcutta. September 7th.

A brief, but relatively good description of the inshore movement of adult and juvenile hilsa is presented in this newspaper article.
Subject: J, MM, RS

153. Huq, H.S., and S.F. Rubbi. 1978. Study of the fatty acid composition of hilsa oil. Proceedings of the Indo-Pacific Fisheries Council 18(3): 262-266.

Subject: P

154. Huq, Q.M., M.S. Islam, S.A. Azad, M.M. Hossain and N.N. Das. 1987. Notes on experimental fishing for hilsa shad in 1985-86. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36: 32-45.

Report discusses the results of experimental fishing for hilsa using multimesh experimental gillnets and commercial gear. Commerical catches are also given. Selectivity of several commonly used mesh sizes are presented for the 4 sampling locations. No relationship between soak time and number of fish captured was noted.
Subject: F, GB

155. Husain, Z. 1973. Fish and fisheries of lower Indus Basin (1966-67). Agriculture Pakistan 24(3): 297-322.

The author, after presenting information on the geographical limits of the lower Indus basin, briefly describes the commercially important species of the area. Problems of riverine and lucustrine fisheries have been identified with emphasis on palla.
Subject: CL, F, TX

156. Husain, Z. and M.S.K. Sufi. 1962. Hilsa ilisha (Ham.) and fish ladders at Ghulam Mohammed Barrage on the river Indus, West Pakistan. Agriculture Pakistan 13: 335-345.

This report describes the behaviour of palla/hilsa when it reaches the fish ladders at G. M. barrage (Jamahoro) during its fluvial migration. In general the fish avoid rapid current and if confronted with an obstacle, turn back. Repeated observations have shown that not a single palla passed through the ladder to the upstream side. Even when the gates are open, during monsoon floods the fish do not cross due to rapid turbulent water. It was thus concluded that the design of the ladder was not suitable for palla.
Subject: B, DO

157. Husain, Z., and M.S.K. Sufi. 1962. Biological and economic effects of barrages on Hilsa ilisha (Ham.) and its its fisheries in the Indus. Agriculture Pakistan 13: 346-349.

The biological and economic impact on fisheries of the Sukkur and Ghulam Mohammed barrage on the Indus River are discussed in this report. Although water level has decreased and access to 295 miles of river denied to migratory species the present evidence suggests no adverse effects to date. Some concern is however expressed for the future.
Subject Index: DO

I

158. Islam, M.S., Q.M. Huq, M.M. Hossain, S.A. Azad and N.N. Das. 1987. Maturity and spawning of hilsa shad, Hilsa ilisha, of Bangladesh. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36: 82-95.

The results of a year long investigation (1985-86) into the maturity and spawning are presented. A major spawning period was identified in October/November and subsidiary periods in June/July and January/March from gonado-somatic index. No significant difference in over all sex ratio was found. Size at first spawning is reported to be 26-29cm for males and 31-33cm for females.
Subject: RS

J

159. Jafri, S.I.H. 1982. Palla - Sind ki sailani machli (in Urdu). Daily newspaper 'Jang', Karachi. Dated 7th May, 1982.

This popular article describes the salient features of the hilsa fishery in the river Indus.
Subject: GR

160. Jafri, S.I.H. 1987. Morphology of the digestive tract of river shad, Tenualosa ilisha (Clupeidae:Teleostei). Sind University Research Journal 19(1): 000-000. (In press).

The paper describes the feeding adaptions of river shad from a digestive tract study. Absence of teeth, presence of an efficient filtering mechanism in the form of long fine gill rakers, pharyngeal organ and the modification of the stomach into a gizzard, indicates that the mode of feeding is of strainer type in which food is ingested by size rather than by kind. These adaptions support the planktivorous habit of palla.
Subject: A, FB

161. Jafri, S.I.H. 1987. A review of the biology and fishery of river shad, Tenualosa ilisha (Ham.). Pakistan Journal Agriculture 00: 000-000. (In press).

This review presents a detailed survey of the scattered information on hilsa. The topics of morphology, taxonomy, anatomy, feeding habits, age/growth, parasites, physiology, reproduction, migration, and fishery have been included. Areas of poor knowledge have been identified for future research.
Subject: A, AG, C, DO, F, FB, GR, RS

162. Jafri, S.I.H. and S.A. Sheikh. 1987. Histology of alimentary canal of the river shad, Tenualosa ilisha (Ham.). Bangladesh Journal Fisheries (Accepted for publication).

Gross histology of the digestive track in presented. Intestinal mucosa is characterized by the presence of ciliated columnar epithelium. Submucosa of the intestine contains "stratum compactium". The function of this structure in palla, a planktivorous fish, is yet to be resolved.
Subject: A, FB

163. Jaleel, S.A. and M. Khaliluddin. 1981. A checklist of marine fishes of Pakistan. Directorate of Marine Fisheries. Government of Pakistan, Karachi, Pakistan: 18p.

A family-wise list of cartilagenous and bony fishes inhabiting the North Arabian Sea is presented in this report. It includes common and varnacular names as well as scientific nomenclature.
Subject: Cl, TX

164. Jenkins, J.T. 1910. Notes on fish from India and Persia with description of new species. Records Indian Museum, Calcutta 5(2): 138-140.

Subject Index: TX

165. Jenkins, J.T. 1938. Spawning of hilsa. Current Science 7:251-252.

The author presents a critical review of Hora (1938) report "A preliminary note on the spawning grounds and the bionomics of the so-called Indian shad" and emphases the uncertainity about spawning ground location. Discussion centres around distribution in the rivers.
Subject: D, MM, RS

166. Jenkins, J.T. 1940. Hilsa investigations in Bengal. Current Science 9(5): 241-242.

Report discusses the contribution of publications by Nair and Hora (1939) and Nair (1940) to current knowledge on hilsa biology. Topics addressed include spawning, migration, feeding and racial differences.
Subject: FD, MM, RS, SD

167. Jerdon, T.C. 1849. On the freshwater fishes of Southern India. Madras Journal Scientific Literature 15: 345.

Subject: CL, TX

168. Jhingran, V.G. 1956. The capture fishery of River Ganga at Buxar (Bihar, India) in the years 1952-54. Indian Journal of Fisheries 3: 197-215.

A summary of catch statistics for all commerically exploited fishes, including Hilsa, landed at Buxar is presented. Details of catch composition and seasonality are discussed in relation to the dominance of hilsa in the region.
Subject: F

169. Jhingran, V.G. 1957. Some observations on the hilsa fishery at Buxar (Bihar, India). Indian Journal Fish 4(2): 336-343.

This note discusses the commerical landings of hilsa, its seasonality, size composition of catches, sex ratio, and price at source. An unusual abundance of hilsa, believed to have originated from the 1950-51 spawning season is also reported for 1954.
Subject: F, MM

170. Jhingran, V.G. 1985. Fish and fisheries of India. 2nd Ed. Hindustan Publisher Co., New Delhi, India: 666p.

Textbook provides an excellect review of both marine and freshwater fishes and fisheries, including hilsa, of India. Details are present on most aspects of the hilsa's life cylce and changes in the fishery with time. Additional information is reported on the effects of dams, physio-chemical characteristics of major Indian rivers, fishermen and types of gear used throughout the country.
Subject: D, DO, F, FP, GB, GR, PD, PM, TX

171. Jhingran, V.G., and A.V. Natarajan. 1966. Final report on the fishes of Chilka Lake (1957-65). Central Inland Fisheries Research Institute, Barrackpore, India. Bulletin Number 8(12): 1p.

A brief note on the findings of the extensive study conducted in Chilka lake is repsented in this article.
Subject: GR

172. Jhingran, V.G., and A.V. Natarajan. 1969. A study of the fisheries and fish populations of the Chilka Lake during the period 1957-65. Journal of the Inland Fisheries Society, India 1: 49-126.

Subject: F, GR, PM, RS

173. Jhingran, V.G., and A.V. Natarajan. 1973. Fishery resources of the Chilka Lake and its bearing on fisheries in adjacent areas of Bay of Bengal. Proceedings of the Sympossium on Living Resources of the Seas around India. Central Marine Fisheries Research Institute, India. Special Publication: 365-372.

During a survey of Chilka Lake a total of 152 species of fish and 21 species of prawns were found. A list of the commercially important species is given. Two peak periods of hilsa were identified; one at the end of the winter season and the other at the commencement of the monsoon. Rate of exploitation of hilsa was estimated to be 82%. A table of mean length at first capture and minimum size at maturity is also included.
Subject: CL, F, MM, PM

174. Job, T.J. 1942. Hilsa investigations in Bengal waters. Science and Culture 7(9): 427-429.

This article provides a general review of the hilsa fishery and its importance to the area. Future considerations for exploitation and preservation are also discussed.
Subject: F, GR

175. Jones, S. 1952. A bibliography of Indian shad, Hilsa ilisha (Ham.). Journal of the Zoological Society of India 4(1): 89-99.

This bibliography represents the first comprehensive listing of scientific papers, government reports and newspaper articles on hilsa from 1822 - 1951.
Subject: B

176. Jones, S. 1954. Hilsa investigations at the Central Inland Fisheries Research Station - Aims and achievements. Journal of the Asiatic Society, Science 20(1): 65-67.

A general review of past research conducted on hilsa by the Central Inland Fisheries Research Station in Barrackpore, India is presented in this article.
Subject: GR

177. Jones, S. 1957. On the late winter and early spring migration of the Indian shad, Hilsa ilisha (Ham.) in the Gangetic delta. Indian Journal Fisheries 4(2): 304-314.

Movement of hilsa into the rivers of the Gangetic Delta is discussed in relation to landings at Goalundo and Lalgola ghat. The authors consider raising water temperatures as the controlling factor for stimuli of late winter and early spring migrations of hilsa into the rivers.
Subject: D, MM, RS

178. Jones, S. 1959. Fishing methods for the Indian shad, Hilsa ilisha (Ham.) in the Indian region. Part. I. Journal of the Bombay Natural Historical Society 56(2): 250-275.

An extensive review of the fishery and fishing gear used to capture hilsa is reported in this document.
Subject: GB

179. Jones, S. 1959. Fishing methods for the Indian shad, Hilsa ilisha (Ham.), in the Indian region. Part II. Journal of the Bombay Natural Historical Society 56(3): 423-448.

Report provides details of fishing gear used in various countries throughout Asia for fishing hilsa. An excellent glossary of common and local names of fishing gear and a brief description of the gear is also included.
Subject: GB

180. Jones, S., and P.M.G. Menon. 1950. Spawning of Hilsa ilisha (Ham.) in the Hooghly River. Science and Culture 15(11): 443-444.

A short note on the spawning period and location in the Hooghly is presented.
Subject: RS

181. Jones, S., and P.M.G. Menon. 1951. Observations on the life history of the Indian shad, Hilsa ilisha (Ham.). Proceedings of the Indian Academy of Science 33(3): 101-125.

This report provides an excellent review of the early life history of hilsa. Details and drawnings are presented for development from embryonic to larval stage 18mm in 2mm increments. A general discussion of seasonal variability in spawning habits and migratory movements in relation to fish size is also presented.
Subject: AG, LH, RS

182. Jones, S., and K.H. Sujansingani. 1951. The hilsa of the Chilka lake. Journal of the Bombay Natural Historical Society 50(2): 264-280.

This report summarizes the results of an extensive hilsa investigation of Chilka Lake. Topics discussed include the fishery, seasonality of catches, size, sex ratio, reproduction, food, coastal fisheries and conservation possibilities.
Subject: AG, B, D, F, FP, GR, J, MM, R

183. Jones, S., and K.H. Sujansingani. 1954. Fish and fisheries of the Chilka lake with statistics of fish catches for the years 1948-50. Indian Journal of Fisheries 1(1&2): 256-344.

Documented in this report is a detailed listing of the many fish and fisheries of Chilka Lake. Very little is presented about hilsa except to refer to the paper Jones and Sujansingani (1951) for details of the hilsa findings. The report however does contain good coverage of the lake topography, hydrology, fishing grounds, gear, and some catch statistics.
Subject: CL, F, GB, GR

184. Joseph, M.M. 1967. A histophysiological study of the red and white muscle of a migratory (Hilsa ilisha) and non-migratory (Hilsa toli) fish. Ph.D. Thesis, University of Baroda, Baroda, India.
Subject: P

K

185. Kapoor, B.G. 1954. The anatomy and histology of the pharyngeal organ in Hilsa ilisha (Ham.) Journal of the Zoological Society of India 6: 167-172.

The author has provided detailed anatomy and histology description of the pharyngeal organ in hilsa. The organ is a pair of pockets having a canal and a blind sac. The inner walls are lined with rows of fine hairs like cilia. Apparently the organ is an accessory to the gustatory system of fish.
Subject: A, FB, FD

186. Karamchandani, S.J. 1961. On the location of spawning grounds of Indian shad,Hilsa ilisha (Ham.), in freshwater regions of the Narbeda River. Current Science 30(10): 373-375.

Location of the freshwater spawning grounds of Hilsa on the Narbeda river are reported in this paper. Characters pertaining to season, length frequency, sex ratio, and river flow are presented. The occurrence of differential spawning behaviour of large vs small mature Hilsa is also discussed.
Subject: B, C, MM, RS

187. Karamchandani, S.J., and M.D. Pisolkar. 1976. On the location of spawning grounds of Indian shad, Hilsa ilisha (Ham.), in Tapti River. Science and Culture 42(11): 563-564.

The locations of hilsa spawning grounds in the Tapti river were identified from egg oollections, hatching times and current velocity. Movement into the river was found to coincide with tide height.
Subject: MM, RS

188. Kashem, A. and S.F. Rubbi. 1968. Seasonal variations of essential nutrients of hilsa fish. Proceedings of the 20th Pakistan Soience Conference, Dacca, Bangladesh. Part III. Abstract: A-166.

Seasonal variations of protein, fat, water and minerals in the body of hilsa are briefly described in the abstract. Protein content remains at about 14%, while fat and water content vary inversely throughout the year.
Subject: P

189. Kashem, A., and M.R. Khan, and S.F. Rubbi. 1968. The quality of fresh hilsa and its preservation in ice. Proceedings of the 20th Pakistan Science Conference, Dacca, Bangladesh. Part III Abstract: A-165.

This abstract briefly describes some chemical parameters of hilsa preserved in ice for a period of 10-12 days. Total volatile base (TVB) and trimethylamine nitrogen (TMA-N2) were estimated in the flesh and considered as quality indices of freshness. Presence of high bacterial count on the body of hilsa sold in the market indicates the low hygeinic condition of handling and marketing.
Subject: FP

190. Kaushiva, B.S. 1954. A preliminary note on the hilsa fisheries of Utter Pradesh. Journal of the Asiatic Society, Science 20(1): 45-46.

The article presents a brief note on the distribution and seasonal catches of hilsa in the Uttar Pradesh region of India. Types of fishing gear are also discussed.
Subject: D, F, GB

191. Khan, A.K., and P.P. Karyakarte. 1982. A new species of monogenetic trematode, Mazocraes (Polyopisthocotyiea: Diclidophoridae) from the fish Clupae ilisha (Russel) in India. Rivista di Parasitologia 43(1): 51-55.

Subject: PD

192. Khan, I. 1962. Final progress report of hilsa investigation scheme. West Pakistan Marine Fisheries Department. Government of Pakistan, Karachi, Pakistan: 1-30.

The report presents the results of a 7 year (1955-1962) hilsa investigation. Detailed information on the biology, gear, crafts, manpower, landing statistics, effects of barrages and conservation measures are given.
Subject: DO, F, GB, MM, RS

193. Khanna, S.S. 1961. The hyobranchial skeleton of some fishes. Indian Journal Zootom. 2(1): 1-55.

The author describes the hyobranchial skeleton of hilsa and compares it with other teleost fishes.
Subject: A

194. Khin, U. 1948. Fishes in Burma. Rangoon, Burma.

Subject: GR, TX

195. Kner, R. 1865. Fische-Reise der osterreichischen Fregatte um die Erde in den Jahren 1857-1859. Zoologica, Vienna: 1-3.

Subject: TX

196. Kowtal, G.V. 1967. Occurrence and distribution of pelagic fish eggs and larvae in the Chilka lake during the years 1964 and 1965. Indian Journal Fisheries 14(1&2): 198-214.

The information collected during a study of fish eggs and larvae in Chilka lake are presented. Data were used to identify spawning periods with respect to time and space of 44 fish species, including hilsa. The breeding season of hilsa was found to extend from August to November with a peak in the months of September and October.
Subject: RS

197. Kowtal, G.V. 1967. Studies on the juvenile fish stock of Chilka lake. Indian Journal Fisheries 14(1&2): 31-40.

Report provides a review of juvenile fish stocks, including hilsa, in Chilka lake.
Subject: D, J

198. Kulkarni, C.V. 1950. Breeding habits, eggs and early life history of Indian shad, Hilsa ilisha (Ham.) in the Narbada river. Proceedings of the National Institute of Science, India B16(3): 169-176.

General discussion centres around the movement of hilsa into the rivers on the west coast of India for spawning. Egg and early embryonic development stages are diagramatically illustrated.
Subject: LH, MM, RS

199. Kulkarni, C.V. 1951. Hilsa fishery in the Narbeda river. Journal Bombay Natural Historical Society 49: 615-623.

A general description of the hilsa, which includes both H. ilisha and H. toli, fishery of the Narbeda river is presented. Taxonomic differences between the two are also discussed.
Subject: D, GB, MM, PM, TX

200. Kulkarni, C.V. 1958. Hilsa ilisha (Ham.) on the West Coast of India. Journal of the Asiatic Society, Science 20: 47-53.

Migration distance and natural boundaries which limit inland movement of hilsa in the Narbeda river are discussed in this report. It is suggested that annual total catch is related to the intensity of monsoon floods with the general decline in catches being attributed to over-fishing.
Subject: F, MM

201. Kyaw, B.A. 1953. Information on the hilsa fishery of the Mergui District, Union of Burma. Indo-Pacific Fisheries Council. IPFC Communication.

Subject: F

L

202. Laha, G.C., P.M. Mitra and R.N. Pal. 1971. A note on the association of parasites of Hilsa ilisha (Ham.) of the Hooghly estuary. Journal of the Inland Fisheries Society of India 3: 133-134.

In this study the authors use chi-square test of signifance of pairs of parasite species found on or in hilsa to investigate their asscoiation in the marine, esturine, and riverine habitats. Significant differences were noted between environments.
Subject: PD

203. Lakshminarayana, JournalS. 1965. Studies on the phytoplankton of the river Ganges, Varanasi, India. Pt. IV. Phytoplankton in relation to fish populations. Hydrobiologia 25: 171-175.

A section of this paper deals with the analysis of gut content of selected fishes including hilsa. The gut of hilsa showed a large percentage of blue-green algae, Merismopedia sp., various species of diatoms and a few zooplankton, confirming its planktivorous habit. An appendixed table details the gut content for Hilsa ilisha, Gadusia chapra and Barbus stigma in percent.
Subject: FB, FD

204. Lloyd, R.E. 1907. Notes on a collection of marketable fish from Akyab, with a description of a new species of Lactarius. Records of the Indian Museum 45(4): 377-431.

A short note on hilsa as a marketable fish on page 221 of this report. No additional information is available.
Subject: CL

M

205. Malhotra, J.C. 1972. Hilsa - its breeding and possibilities of culture. Souvenir Publication, Silver Jubilee of the Central Inland Fisheries Research Institute, Barrackpore, India: 85-89.

Report provides a general review of hilsa breeding and the possibilities for culture. Past, present and future prospects are noted.
Subject: C

206. Malhotra, J.C. 1982. Artificial propagation of Hilsa ilisha (Ham.). Taranga, Annual Number 1981-82: 37-40.

Subject: C

207. Malhotra, J.C., P.K. Mathur, M.Y. Kamal, R. Chandra and V. R. Desai. 1969. Successful artificial propagation of Hilsa ilisha (Ham.) near Allahabad. Current Science 38(18): 419-430.

Report details the first successful artificial propagation of hilsa. Hatchlings were reared for a maximum of 65 days with death being attributed to an intense cold period. Transportation and induced breeding are also investigated.
Subject: C, RS

208. Malhotra, J.C., P.K. Mathur, M.Y. Kamal and S.N. Mehrotra. 1970. Observations on the hatching of fertilized eggs of Hilsa ilisha (Ham.) in confined waters. Current Science 39(23): 538-539.

The results of a study to investigate hatching of artificially fertilized eggs in confined waters are presented in this letter to the editor. Physio-chemical characteristics of fluvial, pool and nusery ponds are documented. Hatching rates varied from 5-80% depending on the habitat. Low water temperature and Ca concentration are believed to have contributed to the poor hatching rates in nusery ponds.
Subject: C

209. Malhotra, J.C. and K.L. Shah. 1979. Hilsa - its breeding and possible culture. Souvenir in commemoration of the Indian Council of Agriculture Research (ICAR) Golden Jubilee Year. Central Inland Fisheries Research Institute, Barrackpore, India. Pt. 2: 175-178.

Report details the procedures and water requirements for artificial propagation of hilsa in river, pond and laboratory water. Successful results were obtained in that hilsa reared from fertilized eggs survived in captivity for two years, 4 months, and grew to an average size of 345mm (range 325-360mm). Results from fertilization and transportation studies are also discussed.
Subject: C, DO

210. Malhotra, J.C., P.K. Mathur, S.N. Malhotra and M.Y. Kamal. 1973. Successful rearing of Hilsa ilisha (Ham.) in freshwater for years. Proceedings of the National Academy of Science, India (B) 43(3): 207-210.

Details of artificial propogation of hilsa are presented in this report. Striped eggs were hatched in hapas fixed in a river pool. Approximately 42,000 hatchlings (2.5-3.0mm length) were stocked into three nursery ponds and attained a size of 15 and 32cm by the end of the first and second year of captivity, respectively.
Subject: C, RS

211. Malhotra, J.C., P.C. Sherief, M.P. Mohammad and P.K.R. Paniker. 1981. A preliminary test on the qualitative assimilation of thiqmine and pyridoxine by Hilsa ilisha (Ham.) hatchlings. National Academy of Science, India. Letters 4(7): 297-298.

An investigation was undertaken to determine if pyridorine and thiamine were essential to pond-reared hilsa hatchlings. The absence of these vitamins resulted in loss of appetite, growth retardation and mortality. Quantitative requirements of the vitamins were not determined.
Subject: C, FD, P

212. Mathur, P.M. 1964. Studies on the maturity and fecundity of the hilsa, Hilsa ilisha (Ham.) in the upper stretches of the Ganga. Indian Journal of Fisheries 11(1): 423-448.

Based on ova diameter measurements eight arbitrary stages of maturity were developed and compared with gonado somatic index to identify spawning periods. The first period occurred from February to April with a peak in March and the second from August to November with a peak in October. Estimates of ova number per female are presented and the relationship of number to fish length and weight discussed.
Subject: F, RS

213. Mathur, P.M., J.C. Malhotra, S.N. Mehnotna and K.L. Shah. 1974. Experiments on the nursery rearing of spawn of Hilsa ilisha (Ham.) in freshwater ponds. Journal of the Inland Fisheries Society of India 6: 205-210.

Subject: C

214. Maxell, F.D. 1911. Report on inland fisheries in the Thogu Myaungaya and Bassein District, Rangoon: 61-196.

This report was not available to the authors at the time of preparation of this document and may be difficult to obtain.
Subject: F

215. Melvin, G.D. 1984. Investigation of the hilsa fishery of Bangladesh, 1983. A report prepared for the Fishery Advisory Service, Phase II. Food and Agriculture Organization of the United Nations, Rome, Italy. Project Number, FAO. FI:DP/BGD/81/034, Field Doument 5: 56p.

The current status of the hilsa fishery of Bangladesh is summarized from the railway transhipment records in this field document. A brief note on the historical nature of the fishery and the potential impact of expansion through mechanization is also discussed. Speculation on alternative hypothesis for migratory stimuli and the existance of broad and slender types of hilsa is presented.
Subject: B, F, GB, MM, PM

216. Memon, M.A.S. 1956. On a third collection of fish from Iraq. Records of the Indian Museum 54: 139-158.

Report provides details of fish collected from the Persian Gulf by the Zoological Society of India during 1950, 1953 and 1954.
Subject: CL, TX

217. Menon, M.D. 1954. Determination of age and growth of fishes of tropical and sub-tropical waters. Journal of the Bombay Natural Historical Society, Vol 51: 623-635.

This Report stresses the problems associated with the determination of age and growth of tropical and sub-tropical fishes. A detailed review of the controversial studies on hilsa ageing is also presented.
Subject: AG

218. Mirza, M.R. 1978. History of Ichthyology in Pakistan. Biologia (Pakistan) 24(2): 305-348.

A historical review of Ichthyological research is presented with reference to a few papers on hilsa.
Subject: GR

219. Mirza, M.R. 1980. The systematic and Zoogeography of the freshwater fishes of Pakistan and Azad Kashmir. Proceedings of the Ist Pakistan Congress on Zoology: 1-41.

The author discusses the geographical distribution of fresh water fishes in Pakistan. A family-wise list with original and current scientific names is also provided.
Subject: CL, TX

220. Misra, K.S. 1953. A checklist of the fishes of India, Burma and Celyon. Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scolepiformes and Atelleiformes. Records of the Indian Museum 45(4): 377-431.

Subject: CL

221. Misra, K.S. 1959. An aid to the identification of common commercial fishes of India and Pakistan. Records of the Indian Museum 57: 320p.

Article provides a summary of taxonomic changes in hilsa and a general description of commericial fish.
Subject: TX

222. Mitra, G.N. and M.P. Devasundaram. 1954. On the hilsa of the Chilka lake with a note on the Hilsa in Orissa. Journal of the Asiatic Society, Science 20(1): 33-40.

This report analyses hilsa export data from Chilka lake between 1946 and 1954. The data is used to confirm hilsa's year round occurrence in the lake. Peak exports occur between January and June. Size of hilsa ranges from 50-500mm.
Subject: D, F, GB, MM

223. Mitra, P.N., and D.K. De. 1981. A regression model for estimating fecundity of Hilsa ilisha (Ham.) of the Hooghly Estuary. Journal of the Inland Fisheries Society of India 13(2): 1-5.

Multiple regression analysis was used to determine the best estimators of fecundity for hilsa from the river Hooghly. Fecundity was estimated by X1= -7134.89 + 39.23X2 + 26.23X3, where X1= fecundity in hundreds, X2= gonad weight (grams) and X3= total length in mm.
Subject: FB, FE

224. Mitra, P.N. and K.K. Ghosh. 1979. Seasonal patterns in the fish landings from the Hooghly-Matlah estuarine system. Journal of the Inland Fisheries Society of India 11(1): 49-55.

Seasonality of landings of various important fishes from the Hooghly-Matlah estuary are investigated in this report using indices based on a 12 month moving average trend approach.
Subject: F

225. Mitra, P.N., G.C. Laha and K.K. Ghosh. 1977. Projections of expected fish catches from Hooghly-Matlah estuarine system during 1976-80. Journal of the Inland Fisheries Society of India 9: 131-137.

Projections of total yeild from the Hooghly-Matlah esturine system have been estimated by fitting second degree trend lines to annual catch data for the fishing seasons of 1959-60 to 1974-75. Because of the fluxuating nature of the hilsa fishery predictive equations were estimated by removing hilsa catches.
Subject: F, PM

226. Mohanty, S.K. 1975. The breeding of economic fishes of the Chilka lake - A review. Bulletin of the Department of Marine Science, University of Corchin, Corchin, India 7(3): 543-559.

Information on the breeding behaviour of commercially important fishes of Chilka lake are reviewed and discussed. A good review of seasonal spawning of hilsa is contained within this report.
Subject: RS

227. Mohiuddin, M.S., G. Kibria, M.M. Hossain and L. Ali. 1980. Bangladesh - Status paper on coastal fishery resources. Report of the consultation on stock assessment for small-scale fisheries in the Bay of Bengal. Bay of Bengal Programme, Colombo, Sri Lanka. Vol. 2, BOBP/REP/10.2: 1-22.

Coastal fisheries of Bangladesh are described with reference to location, area and physio-chemical characteristics of coastal waters, potential fishing grounds, extent of standing stock, yeild, species composition, method of exploitation, fishing effort, stock assessment and catch statistics.
Subject: F, GB, PM

228. Mojumdar, C.H. 1939. Culture of hilsa. Modern Review: 293-297.

Although the title of the paper is " Culture of hilsa" very little reference to this topic is made. Instead a detailed review of the problems associated with the capture of large quantities of jatka and the need for its protection are discussed. Culture of hilsa is mentioned only with respect to the potential of pond and tank rearing of jatka.
Subject: C, J, MM, PM, RS

229. Mojumdar, C.H. 1939. Foreshore fishing in the eastern parts of the Bay of Bengal. Science and Culture 5(4): 219.

A general discussion of the coastal fishery for hilsa and its seasonality is presented in this report.
Subject: F, GR

230. Moona, J.C. 1958. The skull of Hilsa ilisha. Science and Culture 24(2): 97-98.

A detailed account of the cranial skeleton has been illustrated with drawnings. The structure of the branchial arches is also discussed.
Subject: A

231. Moses, T.S. 1932. The Hilsa. Madras Mail. Madras, dated the 24th December.

Subject: GR

232. Moses, T.S. 1942. Fisheries of Gujarat Coast. Journal of the Gajarat (India) Research Society 4(2): 61-82.

Subject: F

233. Motwani, M.P., V.G. Jhingran and S.J. Karamchandani. 1957. On the breeding of the Indian shad, Hilsa ilisha (Ham.), in freshwater. Science and Culture 23(1): 47-48.

This brief note provides evidence of hilsa breeding in the Ganges river system. Fertilized eggs collected from the river were successfully hatched in the laboratory.
Subject: C, RS

234. Munro, I.S.R. 1955. The marine and freshwater fishes of Ceylon. Report of the Department of External Affairs, Canberra, Ceylon: 23-25.

This book is an excellect aid for the identification of freshwater and marine fishes generally found in the Indian sub-continent. Photographic plates contained at the end of the book facilitate quick comparison.
Subject: TX

235. Munshi, J.D. 1960. The cranial muscles of some freshwater teleosts. Indian Zootom. Mem. 3: 1-73.

A detailed and illustrated account of the musculature of hilsa and other teleosts is presented in this report.
Subject: A

N

236. Naidu, M.R. 1934. Report on a survey of the fisheries of the Bay of Bengal. Government Press, Calcutta, India.

Subject: F, GB

237. Naik, I.U. 1968. Palla fishery in West Pakistan. Pakistan Fish. Ind. Inter. 2(3): 21-25.

The author presents an overview of the palla fishery and suggests several conservation measures.
Subject: F, G, RS

238. Nair, K.K. 1939. On some early stages in the development of the so-called Indian shad, Hilsa ilisha (Ham.). Records of the Indian Museum 41(4): 409-418.

This report describes in detail the developmental stages of hilsa. The specimens were collected from Pulta water works, Calcutta. For vertebral count the fish were treated with caustic potash and stained in alizarin. Fourteen stages of young fish (14-27mm) are described.
Subject: A, LH

239. Nair, K.K. 1948. Osteology of the so-called Indian shad, Hilsa ilisha (Ham.). Ph.D. Thesis, University of Madras, Madras, India.

Subject: A

240. Nair, K.K. 1954. Dams and Hilsa fisheries. Journal of the Asiatic Society, Science 20(1): 77-79.

This article provides a general review of the problems associated with dams and hilsa, the inefficiency of fishways and the lack of basic knowledge of hilsa biology. Recommendation for preservation include closed seasons and water where hilsa oongregate.
Subject: DO, MM, PM

241. Nayudu, M.R. 1920. A statistical analysis of an inshore fishing experiment at Madras, 1919. Administration Report 1918-1919. Madras Fisheries Department, Madras, India : 129.

Report presents information on the seasonal occurrence of Hilsa near Madras.
Subject Index: MM, RS

242. Nair, P.V. 1958. Seasonal changes in the gonads of Hilsa ilisha (Ham.). Philippine Journal of Science 87(3): 255-276.

A detailed monthly summary of histological changes in the gonads of hilsa is presented in this report. Although findings indicate bimodal growth of ovaries and testis during development, the first cylce (February/March) turn atretic and are re-absorbed. The development of August/September continues to full reproductive condition suggesting a single yearly spawning period. A possible relationship between gonad ripeness and water temperature is also discussed in relation to this phenomenon.
Subject: RS

P

243. Pajot, G. and T.K. Das. 1981. Trials in Bangladesh of large-mesh drift-nets of light construction. Development of Small-scale fisheries in the Bay of Bengal. Bay of Bengal Programme, Madras, India. BOBP/WP/12: 15p.

The rationale, mechanics and findings of experiments with large-mesh driftnets of thin twine conducted near Chittagong from October 1980 to February 1981 are presented in this report.
Subject: GB

244. Pajot. G. and T.K. Das. 1984. Fishing trials with small-mesh drift-nets in Bangladesh. Development of small-scale fisheries in the Bay of Bengal. Bay of Bengal Programme, Madras, India. BOBP/WP/28: 15p.

This paper reports the results of experiments to improve the small-mesh drift fishery in Bangladesh. The catch of hilsa in variuos size gill nets is documented.
Subject: GB

245. Pal, R.N. 1963. A new Acanthocephalan parasite, Acanthosentis hilsai, from the Indian shad, Hilsa ilisha (Ham.). Indian Journal of Helminthology 15(2): 96-99.

Report describes a new species, Acanthoecentis hilsai, found in the intestine of hilsa colleoted from the Ganges.
Subject: PD

246. Pal, R.N. 1963. Observations on fluctuation in parasitesation of the Indian shad, Hilsa ilisha, (Ham.) of the Hooghly estuary. Indian Journal of Helminthology 15(2): 119-126.

Based on data collected from three habitats, marine, estuarine and freshwater the author describes the seasonal variation of parasitic fauna in relation to the movement of hilsa into and out of the Hooghly river.
Subject: PD, MM

247. Pandit, C.G. and S.L. Hora. 1951. The probable role of Hilsa ilisha (Ham.), in maintaining cholera endemicity in India. Indian Journal of Medical Science 15(7): 343-356.

Subject: PD

248. Panikkar, N.K. 1954. Progress of hilsa investigations from 1938 - 1950. A review. Journal of the Asiatic Society, Science 20(1): 61-64.

As per the title this report presents a general review of hilsa researoh between 1938 and 1950. Topics discussed concern spawning grounds, seasonal migration and management.
Subject: GR, MM, PM, RS

249. Pantulu, V.R. 1966. Contributions to the study of the biology and fishery of some estuarine fishes. Ph.D. Thesis, Calcutta University, Calcutta, India.

In his study of several esturine species Pantulu suggests the decline in hilsa catches is related to the failure of migration, which results from the absence or reduction of a directive factor or factors. Significiant directive factors for hilsa include temperature, current velocity and volume of discharge. In the Hooghly estuary hilsa take 1-2 months to reach their spawning grounds in the upper zone of the estuary.
Subject: B, MM, RS

250. Parsons, R.E. 1943. Can hilsa be taken with rod and line? Journal of the Bombay Natural Histicoral Society 43(2): 266-267.

Note simply poses the question "Can hilsa be taken with a rod and line". No significant information is contained in this one paragraph note.
Sugject: GB

251. Pati, K.C. 1970. Observations on fishing at the mouth of lake Chilka. Directorate of Fisheries, Government of Orissa, Cuttack, India: 96-102.

Subject: F, GB

252. Pati, S. 1982. The influence of temperature and salinity on the pelagic fishery in the northern part of the Bay of Bengal. Journal Cons. Int. Explor. Mer. 40: 220-225.

This report discusses the relationship between low salinity/moderate temperature and peak catches of hilsa as well as several other important commercial fishes.
Subject: B, F

253. Pati, S. and D.K. Pati. 1982. The role of rainfall on the hilsa fishery of Orissa Coast (India). Indian Journal of Fisheries 29(1/2): 234-240.

This study investigates the relationship between rainfall and the rate of gill net landings and demonstrates a positive correlation. Explaination of this relationship is based on river discharge, nutrient availability, and plankton bloom.
Subject: F, FD

254. Pillay, S.R. 1964. Maturation and spawning of the hilsa, Hilsa ilisha (Ham.), of the Saurashtra coast. Proceedings of the National Institute of Science, India, Section B 30(1): 8-14.

Details of maturity stages for both male and female hilsa are presented. Based on the presence of both mature and spent fish in a marine environment, distant from possible spawning rivers, the author suggests that hilsa on the Saurashtra coast may be marine spawners.
Subject: RS

255. Pillay, S.R. and K.V. Rao. 1962. Observations on the biology and fishery of hilsa, Hilsa ilisha (Ham.), of the river Godavari. Proceedings of the Indo-Pacific Fisheries Council 10(2): 37-61.

Report discusses the biology and fishery of hilsa and concentrates on the feeding behaviour, fecundity, maturation stages, sex ratio and growth rates. Total landings and CPUE are discussed in relation to declining numbers and the need for conservation measures.
Subject: AG, F, FE, LH, RS

256. Pillay, S.R., K.V. Rao and P.K. Mathur. 1962. Prelimin-ary report on the tagging of the hilsa, Hilsa ilisha (Ham.). Proceedings of the Indo-Pacific Fisheries Council 10(2): 28-36.

This report presents the results of a tagging study conducted in the Hooghly, Padma and Ganga river. In total 5875 hilsa were marked with a recovery rate of 10.8, 4.13 and 3.48% respectively. Migratory patterns are discussed in relation to tag returns.
Subject: MM

257. Pillay, S.R. and H. Rosa Jr. 1963. Synopsis of biological data on hilsa, Hilsa ilisha (Ham.) 1882. Food and Agriculture Organization of the United Nations. FAO Fish Biology Synopsis 25: 64p.

The authors present one of the most extensive literature reviews on Hilsa ilisha available even today. Discussion covers almost every aspect of hilsa biology.
Subject: AG, B, BB, C, D, F, FD, FE, LH, MM, PD, PM, RS, TX.

258. Pillay, T.V.R. 1948. Marine fisheries of Kodinar in Kathiawar. Journal of the Bombay Natural Historical Society 48(1): 47-61.

Details of the boats, gear, number of fishermen, and important fish species are presented in this report. Very little information on hilsa is given except the amount of fresh and salted fish exported from Kotda Bunder in 1946-46.
Subject: F, GB

259. Pillay, T.V.R. 1951. Hilsa catches on the Kodinar (Kathiawar) coast. Journal of the Bombay Natural Historical Society 50(2): 415-416.

A breif note rebutes a paper by Kulkarni (1951) which suggests errors in the catch data presented by T.V.R. Pillay (1948). Confussion centres around regional vernacular names for Hilsa ilisha and H. toli.
Subject: F, TX

260. Pillay, T.V.R. 1952. A preliminary biometric study of certain populations of hilsa, Hilsa ilisha (Ham.). Proceedings of the Indo-Pacific Fisheries Council 4(2): 181-193.

Subject: SD

261. Pillay, T.V.R. 1954. Investigation of the racial characteristics and Biology of the hilsa of the River Hooghly. Proceedings of the Indo-Pacific Fisheries Council 5(2&3): 143 (Abstract).

Abstract summarizes observations on morphometric characters, blood proteins, fecundity and spawning of hilsa in the river Hooghly.
Subject: FE, P, RS, SD

262. Pillay, T.V.R. 1955. Morphological and serological characters of the hilsa, Hilsa ilisha (Ham.) with special reference to racial investigations. Journal of the Asiatic Society, Science 20(1): 69-74.

This paper reports the results of analysis of covariance of morphometric characters used to investigate the differences between fish collected from East and West Bengal, Allahabad, and Orissa. An excellect review of previous racial studies is also presented.
Subject: SD

263. Pillay, T.V.R. 1955. The biology and fisheries of the hilsa, Hilsa ilisha (Ham.) - A review. Proceedings of the Indo-Pacific Fisheries Council 6(2): 211-219.

This review provides an excellent summary of the literature on the biology and fisheries of hilsa up to 1955.
Subject: A, B, D, DO, F, FD, FE, GR, J, LH, MM, P, PD, PM, RS, SD

264. Pillay, T.V.R. 1957. On the abundance of the hilsa, Hilsa ilisha (Ham.) in the Hooghly and Padma rivers, during 1955. Indian Journal of Fisheries 4(1): 150-159.

Discussion centres around the unusual abundance of hilsa in the Gangetic system of rivers during 1955. Length frequency data reveiled a dominant year class probably originating from 1950 as illustrated from model movements in the river Hooghly from 1952-55. The composition and significance of relatively deep bodied fish is also discussed.
Subject: F

265. Pillay, T.V.R. 1957. A morphometric study of the populations of hilsa, Hilsa ilisha (Ham.) of the river Hooghly and the Chilka lake. Indian Journal of Fisheries 4(2): 344-386.

This paper summarizes the results of a study on meristic and morphometric character differences between Hilsa from the River Hooghly and Chilka Lake. Analytical procedures and detailed tables of the data are presented.
Subject: SD

266. Pillay, T.V.R. 1958. Biology of hilsa, Hilsa ilisha (Ham.) of the river Hooghly. Indian Journal of Fisheries 5(2): 201-257.

An excellent summary on the biology of the hilsa of the river Hooghly is presented in this report. Topics covered include length-weight relationships, seasonal variability of gonadal stages, fecundity, movement, growth, culture and the fishery.
Subject: AG, C, F, FE, GR, MM, RS

267. Pillay, T.V.R. 1958. Morphological and physiological charcaters of the blood of hilsa, Hilsa ilisha (Ham.) of the river Hooghly. Proceedings of the Indian Academy of Science B47(3): 155-162.

Parameters of hilsa blood such as red blood cell count, haemoglobin content, coagulation period and measurement of cell and nuclei are documented in this report. Red blood cell count was found to lower than other teleosts.
Subject: P

268. Pillay, T.V.R. 1959. An inexpensive tag for marking hilsa. Current Science 28(5): 212-213.

This article describes the construction of an inexpensive nylon streamer tag for marking hilsa using materials available in India. Procedures for fixing the tag on the fish are also provided.
Subject: GR, MM

269. Pillay, T.V.R. 1960. The collection of esturine capture fisheries statistics. Science and Culture 26: 6-10.

Report deals with the experimental design and associated problems of collecting and estimating catch statictics in the Hooghly-Matlah estruary.
Subject: F, PM

270. Pillay, T.V.R. 1960. The occurrence of hilsa, Hilsa ilisha (Ham.), in the Vembanad backwaters (Kerala). Science and Culture 26(1): 48.

A brief note is presented to document the occurrence of hilsa in the backwaters of Vembanad. The magnitude of the landings though to be small because of the type of gear used in the area. Report recommends test fishing with hilsa nets.
Subject: D, F

271. Pillay, T.V.R. and A.N. Ghosh. 1958. A note on the hilsa fisheries of Assam. Journal of the Bombay Natural Historical Society 55(1): 174-178.

This brief note describes the historical hilsa fishery of the Assam region of India. Information on the fishing areas and seasons, as well as methods and length of fish captured is documented. The hilsa fishery described in this report has now collapsed.
Subject: D, F, GB

272. Pillay, T.V.R. and K.K. Ghosh. 1962. The bagnet fishery of the Hooghly-Matlah estuarine system (West Bengal). Indian Journal of Fisheries. A 9(1): 71-99.

Report provides an extensive review of the bag-net fishery of the Hooghly-Matlah estuary. Information includes details of catch for the 1958-59 fishing season with discussion on seasonality of catch, including hilsa, and species composition for specific areas. General information on CPUE in each zone is also presented.
Subject: F, GB, PM

273. Pillay, T.V.R. and J.S. Shaw. 1949. The inland fisheries of Kodinar in Kathiawar. Journal of the Bombay Natural Historical Society 48 (3/4): 775-781.

Report provides a general description on the inland fishery of Kathiawar with respect to boats and gear. A list of species captured is also presented. Otherwise very little additional information on hilsa is documented.
Subject: F, GB

274. Pillay, T.V.R., S.N. Dutta and S. Rajagopal. 1954. The vibrio flora of fishes, water and silt in the Hooghly estuary, with special reference to cholera endemicity. Bull. Al. Assoc., A.I.I.H.P.H. 1(2): 27-31.

Subject: PD

275. Pillay, T.V.R., S.R. Pillay and K.K. Ghosh. 1963. A comparative study of the populations of hilsa, Hilsa ilisha (Ham.) in Indian waters. Proceedings of the Indo-Pacific Fisheries Council 10(2): 62-104.

Detailed analysis of meristic and morphometric characters of several Hilsa populations were examined using regression, covariant, and D2 analysis. Results indicate the heterogenity of these populations and support previous findings and suspecions.
Subject: SD

276. Prashad, B. 1919. Annual report of the Department of fisheries, Bengal, Bihar and Orissa for the year ending 31st. March, 1919. Calcutta, India.

Subject: F

277. Prashad, B., S.L. Hora and K.K. Nair. 1940. Observations on the seaward migration of the so-called Indian shad, Hilsa ilisha (Ham.). Records of the Indian Museum 42(4): 529-552.

This report provides an excellent review of the limited literature available on the seasonal migrations of hilsa in the sea. After reviewing the literature the authors conclude that hilsa do not move into the deep off-shore waters, but remain near the mouths of their native rivers. They also suggest that hilsa below 12cm are not found in the sea.
Subject: AG, B, D, FD, J, MM, RS

Q

278. Quddus, M.M.A. 1982. Two types of Hilsa ilisha and their population biology from Bangladesh waters. Ph.D. Thesis, University of Tokyo, Tokyo, Japan: 180p.

The content of this thesis is described in the three papers by Quddus, Makoto and Yukio (1984).
Subject: AG, F, RS, SD

279. Quddus, M.M.A. 1983. Hilsa shad of Bangladesh. Bangladesh Portrait 26: 42-44.
A general review of hilsa and its fishery are presented in this report.
Subject: GR

280. Quddus, M.M.A., S. Makoto and N. Yukio. 1984. Meristic and morphometric differences between 2 types of Hilsa ilisha in Bangladesh waters. Bulletin of the Japanese Society Science and Fisheries 50(1): 43-49.

The results of a comparative study of the meristic and morphometric differences of hilsa from the Dhalesvari, Jamuna, Meghna and Padma rivers are presented. Evidence for the existance of two types of hilsa is also documented.
Subject: SD

281. Quddus, M.M.A., S. Makoto and N. Yukio. 1984. Comparison of age and growth of 2 types of Hilsa ilisha in Bangladesh waters. Bulletin of the Japanese Society of Science and Fisheries 50(1): 51-58.

Age and growth of the two types of hilsa from the Padma and Meghna river using otolith readings are discussed. Significant differences in the body lenght/otolith size relationship are noted between the types.
Subject: AG

282. Quddus, M.M.A, S. Makoto and N. Yukio. 1984. Spawning and fecundity of 2 types of Hilsa ilisha in Bangladesh waters. Bulletin of the Japanese Society of Science and Fisheries 50(2): 177-181.

Publication discusses the difference between spawning season, fecundity and sex ratio of the two types of hilsa. Values for each character are presented in the text.
Subject: F, RS

283. Qureshi, M.R. 1954. Palla of Sind. Journal of the Asiatic Society, Science 20(1): 59-60.

This brief note presents an account of palla and its migration in the river Indus. The faulty design of the fish ladders at Kotri barrage, which was under construction, is also discussed.
Subject: DO, F, MM

284. Qureshi, M.R. 1955. Some fisheries problems concerning Sind. Proceedings of the 7th Pakistan Science Conference. Bahawalpur, Pakistan. Pt. III, Abstract: 32.

The author describes the various problems of Sind province fisheries in relation to its topography. Concern for the palla fishery due to the construction of Kotri barrage at Jamshore is also expressed.
Subject: DO, F

285. Qureshi, M.R. 1965. Common freshwater fishes of Pakistan. Agriculture Research Council of Pakistan, Karacki, Pakistan: 1-61.

This book provides a well illustrated account of fresh water fishes, their habits and taxonomic status.
Subject: CL, TX

286. Qureshi, M.R. 1968. Problems concerning fishery of hilsa, Hilsa ilisha (Ham.) in the river Indus. Pakistan Journal of Science and Industrial Research 11(1): 85-94.

Various aspects of the river Indus hilsa fishery are discussed in this report. Specific attention is given to fecundity, maturation, spawning, sex ratio, age and growth, effects of barrages, gear and crafts, and the conservation of hilsa.
Subject: AG, F, GR

287. Qureshi, M.R. 1968. Hilsa fishery in East Pakistan. Pakistan Journal of Science and Industrial Research 11(1): 95-103.

Details of the hilsa fishery of the Bay of Bengal and its rivers are presented in this report. Discussion centres around fecundity, maturation, spawning, age and growth, importance of Jatka, migration and the fishery.
Subject: AG, F, GR, RS

R

288. Rahman, M., A.Q. Chowdury and W.M. Baily. 1980. Report on the hilsa fishing of the Feni river. Directorate of Fisheries, Government of Bangladesh/Snell Environmental Group Inc. Michigan, USA. Working Document No. 39.

Report provides details of the hilsa fishery of the Feni river and the impact of a barrage constructed for irrigation.

Subject: DO, F

289. Raj, B.S. 1917. On the habits of hilsa (Clupea ilisha) and their propagation in the Coleroon. Journal of the Proceedings of the Society Bengal 13: 184.

Subject: C

290. Raj, B.S. 1932. Madras Fisheries Department Administration Report for 1930, 1930-31. Madras, India.

Report documents the existance of a hilsa fishery in Palk Bay from November-May and proposes investigations to be undertaken to study movement and growth in the sea.
Subject: D, FP

291. Raj, B.S. 1937. Madras Fisheries Department Administration Report for 1935-36. Madras Fisheries Bulletin, 1935-36: 37-38.

Subject: F

292. Raj, B.S. 1942. Dams and fisheries: Mettur and its lessons for India. Proceedings of the Indian Academy of Soience 14(4): 341-361.

This report provides an indepth review of the pros and cons of developing mechanisms for fish passages in India. Pre and post Mettur dam fish studies are used as examples of the inadverse effeots of dam construction on fisheries. The only exception was hilsa which unlike what was predicted have not disappeared, but their numbers have been reduced. Recommendations are to supple-

ment the detrimental effects on man-made barrages with hatcheries and avoid fish passage systems in India.
Subject: DO

293. Raj, B.S. 1951. Are scales an index to the age and growth of the hilsa? Proceedings of the National Institute of Science, India 17(1): 1-6.

In the absence of annual growth rings in hilsa scales the author speculates about the signifance of the relationship between transverse radii and fish length in inches.
Subject: AG

294. Raja, B.T.A. 1985. A review of the biology and fisheries of Hilsa ilisha in the upper Bay of Bengal. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/WP/37: 66p.

This report describes the hilsa fishery of the upper Bay of Bengal which includes Orissa, West Bengal, Bangladesh and Burma. It reviews current knowledge on the biology and fishery of Hilsa ilisha, sets out the findings of field observations in these areas and makes recommendations on future work needed to better understand the nature of stocks exploited in India and Bangladesh.
Subject: AG, D, F, FB, FE, GB, GR, J, LH, MM, PM, RS, SD

295. Rajyalakshmi, T. 1973. The population characteristics of the Godavari hilsa over the years 1963-1967. Indian Journal of Fisheries 20(1): 78-94.

Differences between the migratory and non-migratory populations of hilsa of the Godavari River are discussed in detail. The paper covers many topics relating to both the biology and the fishery of this area.
Subject: AG, C, D, DO, F, FE, SD

296. Rajyalakshmi, T. and D.K. De. 1979. The fisheries of open estuaries of India. Souvenir Publication, Central Inland Fisheries Research Institute, Barrackpore, India. Pt. II: 187-192.

Physio-chemical parameters of eatuaries are discussed in relation to species composition. The fluctuating nature of the hilsa fishery is mentioned in relation to seasonal and general decline of the monsoon fishery because of a reduction of downstream flow by dams and obstructions. Recommendations are made to utilize articical propagation and seeding of new streams to offset the damages.
Subject: CL, DO, F, RS

297. Ramakrishnaiah, M. 1972. Biology of Hilsa ilisha (Ham.) from Chilka lake with an account on its racial status. Indian Journal of Fisheries 19(1&2): 35-53.

This report summarizes the general biological characteristics of Chilka Lake hilsa. Evidence is presented to illustrate that this group differs significantly from the river Hooghly stock.
Subject: AG, FD, FE, J, RS, SD

298. Raman, K. and K.V. Ramakrishna. 1979. Fisheries of brackishwater lakes - Chilka, Pulicat and Vembanad. Souvenir Publication, Central Inland Fisheries Research Institute, Barrcakpore, India: 193-197.

A general review of the fishes present, including hilsa, catch structure and gear used in brackishwater lakes is given.
Subject: F, GB

299. Rao, K.V. and S.C. Pathak. 1972. A note on the occurrence of spawning of Hilsa ilisha (Ham.) in the Brahmaputra (Assam). Proceedings of the National Academy of Science, India. B 42(2): 231-233.

This short note reports the finding of post larval hilsa in the upper reaches (Assam) of the Brahmaputra. Post larvae between 15-17mm were first collected on the 24-5-1969 and comtinued in catches until early July. Large hilsa, between 391 and 250mm dominated the catches and represented greater than 90% of the catch.
Subject: J, RS

300. Rao, M.B. 1969. Some observations on the juveniles of Hilsa ilisha (Ham.) (Pices:Clupeidae) from Godavari Estuary. Journal of the Bombay Natural Historical Society 66(1): 116-131.

Length-weight relationship and biometric studies were conducted on juvenile hilsa from the Godavari estuary. Analysis of covariance and 't' test on length-weight data indicated that the juveniles of each year class differ significantly.
Subject: AG, FB, J

301. Rao, S.N. and T. Rajyalakshmi. 1977. Investigations on the fisheries of the Godavari, Andhra Pradesh, India. Proceedings of the Indo-Pacific Fisheries Council 17(3): 162-166.

Subject: F

302. Regan, C.T. 1917. A revision of the clupeoid fishes of the genera Pomolobus, Brevoortia, and Dorosoma, and their allies. Ann. Mag. nat. Hist. 19(18): 304.

Subject Index: TX

303. Reintjes, J.W. 1974. Five spot herring Hilsa kelee and other marine Clupeoid species of south India. Journal of the Marine Biological Association of India 16(2): 523-527.

Characteristics which distinguish Hilsa kelee from H. ilisha and other clupeoid fishes are presented.
Subject: TX

304. Rizvi, S.S.H. 1971. Study of parasites in fishes of the Sind River. 1. Trematodes of Hilsa ilisha (Ham.). Sind University Research Journal of Science 5(2): 189-200.

Report presents a review of the Trematode fauna of hilsa of the river Indus.
Subject: PD

305. Roy, J.C. and S. Roy. 1974. Observations on the pelagic and semipelagic fishery of the Balasore Coast, India. Proceedings of the Indo-Pacific Fisheries Council 15(3): 40-55.

Subject: F

306. Roy, J.C. and N. Sahoo. 1962. Chilka Fisheries, 1949-55. Bulletin on the development of Chilka lake No.5, Orissa Government Press. Cuttack, India: 63p.

Report presents a review of the fisheries of Chilka lake, including hilsa, between 1949-55. Information on catch, seasonality and gear are documented.
Subject: F, GB

307. Russel, P. 1803. Description and figures of two hundred fishes collected at Vizagapatam on the coast of Coromandal. W. Bulmer and Co., London: 77-78.

Subject Index: TX

S

308. Saigal, B.N., P.M. Mitra, H.C. Karmakar and D.K. De. 1985. Ecology and fisheries of Hooghly-Matlah esturine system. Annual Review. Central Inland Fisheries Research Institute, Barrackpore, India: 72-76.

Preliminary results of this program are reported in the 1985 annual review of the CIFRI, Barrackpore, India. Topics covered include total catch, species composition and CPUE, especially for hilsa gears and bagnets. Additional information on the physio-chemical parameters of the estuary are also presented.
Subject: F, GB, PM

309. Sarkar, H.L. 1957. Composition of hilsa catch in the Sundarbuns of West bengal during the winter month. Indian Journal of Fisheries 4(2): 340-343.

Paper describes the catch statistics of different size hilsa for two consecutive years. Although the number of specimens was too small to reach a definite conclusion it appears that there were more than one size group. The prominent group remains in the river year round while the other two groups appear in the river during January and February.
Subject: FB, SD

310. Sarkar. H.L. and A. Momen. 1982. Bibliography of hilsa fisheries of Bangladesh. Hilsa fishery investigation and management unit Chandpur, Bangladesh. FAO/UNDP Fisheries Advisory Service, Rome Italy: 18p.

Bibliography cites 131 papers and reports on hilsa.
Subject: BB

311. Sarker, N.K., and S. Majumder. 1983. Myxosporidian Sphaeromyxa dighae sp. n. (Myxozoa: Myxidiidae) from the gallbladder of Hilsa ilisha (Clupeidae). Acta Protozoologica 22: 257-260.

Figures and descriptions of a new species, Sphaeromyxa dighae, from the gallbladder of hilsa are documented.
Subject: PD

312. Sathyanasen, A.G. 1963. On the structural peculiarities of the pituitary in some Clupoid fishes with a note on their probable evolutionary significance. Ant. Rec. 146: 109-115.

Subject: P

313. Saxena, R.K.A. and R. Chandra. 1968. On the introduction of Phasla Jal, a gill net for catching hilsa in the Ganges and Jumna Near Allahabad. Journal of the Bombay Natural Historioal Society 65(2): 496-497.

A short discussion on the advantages of using the "Phasla jal" (gillnet) in a region of the Ganges where it has not been used before is presented.
Subject: GB

314. Sen, P.R., D.K. De and A.K. Datta. 1985. Breeding, culture, and transport of Hilsa ilisha. Annual report of Central Inland Fisheries Research Institute, Barrackpore, India: 62.

Abstract briefly summarizes the results to date of studies on breeding, culture and transportation of hilsa being conducted at the Central Inland Fisheries Research Station, Barrackpore, India.
Subject: C

315. Sengupta, S.K. and S.C. Giri. 1970. On the canning of Hilsa ilisha. The Chilka lake, Directorate of Fisheries, Government of Orissa, Cuttack (India): 150-152.

Subject: FP

316. Shafi, M. and M.M.A. Quddus. 1974. The length-weight and length-girth relationship and condition in Hilsa ilisha (Ham.)(Clupeidae). Bangladesh Journal Zoology 2(2): 179-185.

Subject: FB

317. Shafi, M. and M.M.A. Quddus and M.R. Amin. 1976. The morphology and histology of the alimentary tract of Hilsa ilisha (Ham.-Buchanan) with special reference to food and feeding habits. Proceedings of the First Bangladesh Science Conference, Dhaka, Bangladesh. Abstract: B-44.

Subject: A, FD

318. Shafi, M., M.M.A. Quddus and M. Hossain. 1976. Studies on some aspects of biology of Hilsa ilisha (Ham.-Buchanan) of the river Padma. Proceedings of the First Bangladesh Science Conference, Dhaka, Bangladesh. Abstract: B42/43.

Subject: FB

319. Shafi, M., M.M.A. Quddus and M. Hossain. 1976. Problem concerning the determination of age and growth of Hilsa ilisha (Ham.-Buchanan). Proceedings of the First Bangladesh Science Conference, Dhaka, Bangladesh. Abstract: B43/44.

Subject: AG

320. Shafi, M., M.M.A Quddus and M. Hossain. 1977. Observations on the food and feeding habits of young Hilsa ilisha (Ham.-Buchanan) from the river Dhaleswari. Proceedings of the Second Bangladesh Science Conference, Dhaka, Bangladesh. Abstract: A-40.

Subject: FD, J

321. Shafi, M., M.M.A. Quddus and M. Hossain. 1977. A morphometric study of the population of Hilsa ilisha (Ham.-Buchanan) from the river Meghna. Proceedings of the Second Bangladesh Science Conference, Dhaka, Bangladesh. Abstract: A-40.

Subject: PM, SD

322. Shafi, M., M.M.A. and M. Hossain. 1978. Studies on Lenght-girth relationship, sex ratio, size composition, gears and abundance of Hilsa ilisha (Ham.-Buchanan) in the river Padma. Dacca University Studies B26(1): 123-127.

Subject: F, FB, GB, RS

323. Shafi, M., M.M.A. Quddus and N. Islam. 1976. Maturation, spawning, sex-ratio, and fecundity of Hilsa ilisha (Ham.-Buchanan) of the river Padma. Proceedings of the First Bangladesh Science Conference, Dhaka, Bangladesh. Abstract: B-45.

Subject: FE, RS

324. Shafi, M., M.M.A. Quddus and N. Islam. 1977. Studies of gonad weight, sex-ratio and fecundity of Hilsa ilisha (Ham.-Buchanan) from the river Meghna. Journal of the Asiatic Society, Science (Bangladesh) 2(2): 51-58.

Subject: FE, RS

325. Shafi, M., M.M.A. Quddus and N. Islam. 1978. Maturation and spawning of Hilsa ilisha (Ham.-Buchanan) of the river Meghna. Dacca University Studies B26(2): 63-71.

Subject: RS

326. Shahidullah, M. 1978. Preservation and transportation of fish in Bangaldesh. Proceedings of the Indo-Pacifio Fisheries Council 18(3): 81-85.

This report summarizes the current preservation methods used to retain and transport fish including hilsa in Bangladesh and the problems of spoilage. Reoommendations are presented to reduce wastage.
Subject: FP

327. Shahidullah, M. 1983. Present status of marine fisheries. Country paper, Bangladesh. 1st. meeting of the Technical Liaison Officiers, Madras, India. 16-20th August, 1983. Bay of Bengal Programme, Madras, India. RAS/81/051: 16p. (Mimeo).

Subject: F

328. Shamsuddoha A.K.M. and A. Aminulhaque. 1968. Biometric studies on certain populations of hilsa, Hilsa ilisha (Ham.) of the Padma. Proceedings of the 20th Pakistan Science Conference, Dacca, Pakistan. Part III. Abstract: A-164.

Abstract briefly discusses the contriversies of whether or not jatka is the juvenile of hilsa. Biometric studies indicate the need for conservation of Jatka to preserve the hilsa fishery.
Subject: F, RS

329. Shamsudoha, A.K.M. and M. Abdulhye. 1970. Fecundity of Padma river hilsa, Hilsa ilisha (Ham.) Pakistan Journal Science 22(3/4): 176-184.

The fecundity of hilsa from the river Padma was studied during the spawning. For fish of fork length 27.3-42.0cm the fecundity ranged from 348,318 - 1,465,695 ova. Regression of length-weight data showed that both variables have a linear relationship with fecundity. Egg diameter was found to range from 0.43 - 0.79mm with no significant difference in size from anterior, middle or posterior regions of the ovary, which indicates simultaneous release of all eggs at the time of spawning.
Subject: FB, FE, RS

330. Shamsul-huda, A.K.M. 1962. Study on fat content of East Pakistan Fishes. Agriculture Pakistan 13(2): 607-614.

Fat and water content of 64 different species of fish, including hilsa, are presented in tabular form. It was noted that water content decreased with increasing fat. The fat content of hilsa was higher than the other species examined.
Subject: FB, P

331. Shaw, G.E. and E.O. Shebbeare. 1937. The fishes of Northern Bengal. Journal of the Asiatic Society (Bengal), Science 3: 13

A checklist of fishes from Northern Bengal is presented in this report.
Subject: CL

332. Sheri, A.N. 1974. Selected bibliography of fishes and fisheries of Pakistan (1864-2966). Department of Science, Agriculture University, Lyallpur, Pakistan: 1-51.

Bibliography contains a small section on hilsa.
Subject: BB

333. Shetty, H.P.C., and S.B. Saha. 1971. On the significance of the occurrence of blooms of the diatom Hemidiscus hardmannionus (Greville) in relation to the Hilsa fishery in Bengal. Current Science 40(15): 410-411.

In this report the author speculates about the coincidental occurrence of diatom blooms and large catches of hilsa in the Hooghly-Matlah estuary. Insufficient data were available to develop a relationship.
Subject: B, F

334. Siddiqui, P.A. 1975. Freshwater fisheries of Sind: Resources and Conservation. Journal of Science, Karachi University, Karachi, Pakistan 3: 66-79.

This report documents the results of a general survey of freshwater fisheries resources of Sind. Important fisheries of the area are described. Reference is made to the palla fishery and its conservation.
Subject: F, GR

335. Singh, G.P. 1960. The structure of the heart of some freshwater teleosts. Indian Zootom. Mem. 1: 1-23.

The structure of the heart of hilsa was compared with that of the major Indian carp. Illustrations show that the auriculo-ventricular valve and the bulbus-arteriosus are similar but the sinus-venosus is comparatively smaller in hilsa.
Subject: A, FB

336. Southwell, T. 1914. Report on hilsa hatching opertaions conducted at Monghir during August-October, 1912. Bulletin of the Department of Fisheries for Bengal, Bihar and Orissa. Calcutta, India. Number 4: 1-5

Subject: C

337. Southwell, T. 1920. Notes on estuarine fisheries in Sundarbuns. Bulletin of the Department of Fisheries for Bengal, Bihar and Orissa. Calcutta, India. Number 15: 1-10.

Subject: F

338. Southwell, T. and B. Prashad. 1918. On hilsa investigations in India. Bulletinof the Department of Fisheries for Bengal, Bihar and Orissa. Calcutta, India 11: 1-12.

Subject: C, F, GR, RS

339. Southwell, T. and B. Prashad. 1923. A further note on Ilisha parthenogenetica, a cestode parasite of Indian shad. Records of the Indian Museum 25: 197-198.

The authors report the presence of cestode cysts in the flesh of partly digested hilsa from the stomach of a shark. The larvae which emerge from these cysts belong to two species of cestodes, Syndesmobothrium filicelle and Rhyncobothrium ilisha.
Subject: PD

340. Srivastava, H.D. 1935. New Hemiurids (Trematode) from Indian freshwater fishes. Part 1 - New diatoms of the Genus Lecithaster Lute 1901 from Clupea ilisha. Proceedings of the Academy of Science of Upper Preshad 4: 381-387.

This article documents the occurrences and characteristics of Lecithaster indicus and L. extralobus in the intestine and stomach of hilsa. Seasonal changes in parasitic fauna are also discussed.
Subject: PD, TX

341. Srivastava, H. D. 1935. New parasites of the genus Orientophorus n. gen. (family Fellodistomidae) from an Indian freshwater fish Clupea ilisha. Parasitology 27(3): 374-382.

Report describes the taxonomic features of 4 species of trematodes of the genus Orientophorus which were found in hilsa.
Subject: PD, TX

342. Srivastava, H.D. 1935. New Hemiurids (Trematoda) from Indian marine fishes, Part III. Zeit. Parasit. 8(1): 135-138.

Subject: PD, TX

343. Srivastava, H.D. 1941. New Hemiurids (Trematoda) from Indian marine fishes, Part II: Two new parasites of the genus Stirrhurus (Loose 1907). Indian Journal Veternary Science 2: 45-48.

Report describes taxonomic characteristics of the common trematode Stirrhurus monolecithus in the stomach of Clupea ilisha from Allahabad, Puri and Karachi.
Subject: PD, TX

344. Steindachner, F. 1896. Clupea (Alsoa) ilisha Ann. Hofmus. Wein 11: 228.

Subject: TX

345. Sujansinghani, K.H. 1957. Growth of the Indian shad, Hilsa ilisha (Ham.) in the tidal stretches of the Hooghly. Indian Journal of Fisheries 4(2): 315-335.

Report details the results of a three year study conducted on the growth of hilsa in the Hooghly estuary. Growth increments were estimated to be 15-20mm/mon in the first 2-3 months after hatching, thereafter decreasing to approximately 10mm/mon. Yearly differences in mean lenght and length-wieght relationship of annual samples are also discussed.
Subject: AG, FB, J

346. Swarup, K. 1958. The hilsa fishery at Allahabad. Proceedings of the National Academy of Science, India 28: 379-394.

A general review of the hilsa fishery at Allahabad is presented in this report. Details include, landing statistics for 1954-56, export information, gear, spawning and feeding of hilsa. The findings indicate that hilsa are present throughout the year, have two spawning periods (August-November/February-April), and they feed during breeding period, although food consumption decreases after spawning.
Subject: F, FB, FD, GB

347. Swarup, K. 1958. Certain interesting abnormalities in the gonads of hilsa ilisha (Ham.). Proceedings of the National Academy of Science, India 28: 406-409.

The author describes gonad abnormalities such as hermaphroditism, single ovary, fused ovaries and testis which were found during several of his investigations.
Subject: P, RS

348. Swarup, K. 1959. The morphology and histology of the alimentary tract of Hilsa ilisha (Ham.). Proceedings of the National Academy of Science, India 29: 109-126.

This article presents the results of an extensive study of the stomach of hilsa. Seasonal variation in stomach content is discussed and detailed histological review of the alimentary track given. Contrary to popular belief hilsa were found to feed intensely during their spawning migration.
Subject: A, FD, P

349. Swarup, K. 1959. Seasonal variations in the ovary of Hilsa ilisha (Ham.) found at Allahabad. Proceedings of the National Academy of Science, India 29(3): 127-133.

Report provides a detailed summary of seasonal changes in ovary of hilsa, histological plates illustrate differences. Peak spawning periods were identified as August-November and February-March. Results indicate that hilsa spawnings several times during a spawning season.
Subject: P, RS

350. Swarup, K. 1959. Seasonal cycle in the spermary of Hilsa ilisha (Ham.). Proceedings of the National Academy of Science, India 29(5): 230-239.

A detailed report of the seasonal cycle of spermary of hilsa, as well as histological plates and description of testes stages are presented. Two breeding seasons were identified; August/November and February/March.
Subject: P, RS

351. Swarup, K. 1961. The fecundity of the Indian shad, Hilsa ilisha (Ham.). Journal of the Zoological Society of India 13(2): 108-112.

Subject: FE

352. Swarup, K. 1965. Biometric studies of Hilsa ilisha (Ham.) of Allahabad waters (1): Length-weight relationship. Japanese Journal of Ichthyology 11(316): 82-88.

This paper examines the functional relationship between length and weight. Length/weight relationships for males, females and juveniles are presented.
Subject: AG

353. Swarup, K. 1967. Biometric studies of Hilsa ilisha (Ham.) of Allahabad waters (11): Relative condition. Proceedings of the National Academy of Science, India. B 37(3): 257-263.

Report discusses differences in length/weight relationships of hilsa by sex and season using various condition indexes.
Subject: PM

T

354. Talbot, G.B. 1959. Report to the Government of Pakistan on hilsa fishery and fish passes.Food and Agriculture Organization of the United Nations, Rome, Italy. FAO/ETAP Report (1008): 12p.

Subject: DO, F

355. Talwar, P.K. and P.J.P Whitehead. 1971. The clupeoid fishes described by Francis Day. Bulletin of the British Museum of Natural Histry (Zoology) 22(2): 1-85.

Subject: TX

356. Tietze, U. 1984. Marine small-scale fisheries of Orissa: A general description. Bay of Bengal Programme, Madras, India. BOBP /INF/7: 15p.

This document details the resources, fleet, infrastructure of service facilities, production, processing, distribution, socio-economic conditions, administration, institutions, and government policy and development plans for the Orissa marine fishery. Landing data for hilsa is also included.
Subject: F, FP, GB, PM

357. Tirant, G. 1929. Oeuvre ichthyologique de G. Tirant. Reimpression. Notes Serv. Oceanogr. Pech., Saigon 6: 118.

Subject: TX

358. Tripathi, Y.R. 1952. Studies on parasites of Indian fishes: Protozoa, together with a check list of parasitic Protozoa described from Indian fishes. Records of the Indian Museum 50(1): 63-68.

This document provides a check list of parasitic protozoa described from Indian fishes.
Subject: CL, PD

359. Tripathi, Y.R. 1954. Some observations on parasites of hilsa. Journal of the Asiatic Society, Science 20(1): 75.

Brief report indicates differences in parasitic fauna of hilsa from the Ganges and Chilka lake, and suggests their use for investigation of of stock or racial differences.
Subject: PD, SD

360. Tripathi, Y.R. 1959. Studies on parasites of Indian fishes: 3. Acanthocephala. Records of the Indian Museum 54: 61-93.

Subject: CL, PD

361. Tin, U. Maung Maung. 1972. Report on the fisheries situation of Burma (1970-71). Department of Fisheries, Rangoon, Burma: 8p.

Report was not available at the time of preparation of this bibliography.
Subject: F

U

362. Uddin, Md.M. 1986. Role of hilsa fishery for community development. The New Nation, Bangladesh. Oct 22 issue: 5.

Discussion centres around the importance of hilsa to the national economy, its life cycle and recommendations for management and development of the fishery.
Subject Index: C, GR, PM

V

363. Van Den Eelaart, A. 1954. Report to the Government of Iraq on the development of Inland Fisheries. Food and Agriculture Organization of the United Nations, Rome Italy. FAO/ETAP Report (270): 38p.

Report not available at the time of preparation of this bibliography.
Subject: F

364. Van der Knaap, H., K. Sivasubramaniam, S.A. Azad, M.S. Islam, M.M. Hossain and Q.M. Huq. 1987. Results of the analysis of hilsa ilisha length frequencies. Bay of Bengal Programme, Colombo, Sri Lanka. BOBP/REP/36: 64-81.

Estimates of growth parameters, recruitment, mortality, mean length at first capture, exploitation rate and relative yield per recruit are presented and discussed in this report. Two broods, summer and winter, were identified with estimates of L between 57-57cm and k-value of 1.05-1.15 and 0.90-0.95 respectively. Modal

groups using Bhattacharya method were 247, 343, and 393mm for males and 265, 391 and 436mm for females.
Subject: AG, PM

365. Varma, C.P. 1954. Hilsa fishery in Bihar. Journal of the Asiatic Society (Bengal), Science 20(1): 41-43.

A brief description of the hilsa fishery in Bihar region of India is presented. Seasonal and annual flucuations of landings are also discussed.
Subject: F, MM

W

366. Whitehead, P.J.P. 1965. A preliminary revision of the Indo-Pacific Alosinae (Pisces: Clupae). Bulletin of the British Museum of Natural History (Zoology) 12(4): 115-156.

As per the title this paper provides a review of the Indo-Pacific Alosinae which includes; Hilsa macrura, H. toli, H. ilisha, H. Kelee, H. reevesii, Gadusia chapra and G. variegata. Classification characteristics are also presented.
Subject: TX

367. Whitehead, P.J.P. 1972. A synopsis of the clupeoid fishes of India. Journal of the Marine Biological Association of India 14(1): 160-256.

A detailed review of the clupeiod fishes of India is presented in this synoposis.
Subject: CL, TX

368. Wilson, H.C. 1909. Articicial propagation of hilsa in the Coleroon. Government of Madras, Revenue Department, Govermment Order Number 1219, 5th May, 1909.

Report summarizes the limited success of the first attempt to artificially propagate hilsa. Difficulties arose with the rearing of larvae.
Subject: C, R

Definitions for Index Key

A - (Anatomy) : contains information on anatomy of various organs.

AG - (Age and Growth) : contains information on age determination and growth rates.

B - (Behaviour) : includes information pertaining to observed responses to environmental or induced stimuli.

BB - (Bibliography) : previous bibliography.

C - (Culture) : contains information on artificial propagation and rearing.

CL - (Check list) : Check list of fishes.

D - (Distribution) : includes information on the geographical distribution.

DO - (Dams and obstructions) : includes information on the impact of dams and obstructions.

F - (Fisheries) : contains information on commercial fisheries including methods, catch statistics and surveys.

FB - (Fish Biology) : contains information on general biology.

FD - (Food) : includes information on food and feeding habit.

FE - (Fecundity) : includes information on fecundity estimates and reproductive potential of female Hilsa.

FP - (Fish Processing) : includes information pertaining to post harvest processing and marketing.

GB - (Gear and Boat Type) : contains information of the gear and boat types involved in the fishery.

GR - (General Review) : contains information of a general nature.

J - (Juvenile) : includes information on juvenile Hilsa (Jatka).

LH - (Life History) : contains information on life history.

MM - (Migration and movement) : contains information on migration and movements as determined by seasonality of catches and tagging.

P - (Physiology) : includes information dealing with physiological functions, and vital processes.

PD - (Parasites and Disease) : contains information on parasites and disease.

PM - (Population Dynamics and Management) : includes information on population dynamics and management.

RS - (Reproduction and Spawning) : contains information on natural propagation.

SD - (Stock Discrimination) : includes information on racial differences and stock discrimination.

TX - (Taxonomy): oontains information on classification.

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WATER BODY INDEX