Sindh Univ. Res. Jour. (Sci. Ser.) Vol. 43 (1) 13-18 (2011)

SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)

Ichthyodiversity of River Indus, at Jamshoro District, Sindh

N. UROOJ[1], G. A. SAHATO[1], K. H. LASHARI[1], A. L. KORAI[1], Z. A. PALH[1] AND H. S. NAQVI[2]

[1] Department of Fresh Water Biology and Fisheries, University of Sindh, Jamshoro
[2] Institute of Biotechnology and Genetic Engineering, University of Sindh, Jamshoro

*Corresponding author: N. UROOJ , Email: urooj_memon@yahoo.com Cell No. +92 3003310249

Received 08th January 2011 and Revised 20th February 2011

Abstract: The River Indus is key resource of fisheries potential and diversity as it covers the whole length of Pakistan. Present study deals with Ichthyodiversity of River Indus and reports 52 fish species belonging to 35 genera, 12 sub families, 16 families and 8 orders. Among these two species were exotic of teleostean fishes from Jamshoro district, Sindh.

Keywords: Ichthyodiversity, River Indus, Fish species.

INTRODUCTION

The study of fish and their stability is important. Fish population of any given aquatic habitat can vary significantly from year to year. Consequently, it would be necessary to carry out several studies in the consecutive years in order to get clear picture. The stability of fish is of profound importance due to urgent need of environmental management to know how much fish population naturally change over time William, (1998).

Biodiversity is essential for stabilization of aquatic ecosystem protection of overall environmental quality for understanding intrinsic worth of all species on the earth, Ehrlich and Wilson, (1991). Scientists have shown that habitats with greater biodiversity are more resilient, that is, they are better able to adjust to and recover from various disturbance because of different species may perform overlapping functions in a biological diverse and complex ecosystem, a disturbance that effects one species may have lesser impact on the ecosystem as a whole, Shinde, *et al*., (2009)

The word Indus is derived from the Sanskrit word, Sindhu, Greek, Sinthos and Latin, Sindus meaning divider, keeper or defender Gulhati, (1968). The Indus River in the North of Pakistan flows in a southerly direction through the entire length of the country and merges into the Arabian Sea at Karachi **(Fig. No. 1)**. The total length of the river is about 3180 Km (1976 miles), the estimated annual flow is 207Km^3 and the river has a total drainage area greater than 1,165,000km^2=450,000 square miles, Korai, (2010).

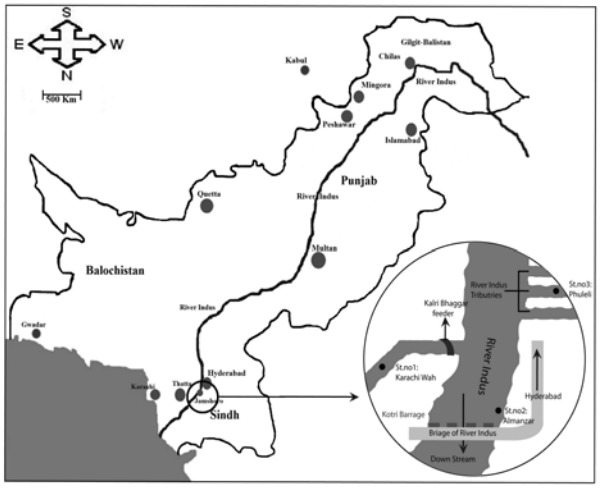

Fig. No. 1 Map of Pakistan showing flow of River Indus through the whole length of country.

The significance of ichthyodiversity of River Indus and its tributaries has been conducted by several researchers, Ahmad, (1943, 1960, 1963); Ahmad and Khan, (1974); Ahmad and Mirza, (1964); Ahmad *et al*., (1976); Alcock, (1898); Banarescu and Mirza, (1965, 1972); Banarescu and Nalbant, (1966); Bashir and Mirza, (1975); Baquai *et al*., (1974 a and b); Butt and Butt, (1988), Butt and Mirza, (1981); Butt and Nawaz, (1977, 1978); Day (1871-72, 1878, 1880, 1889); Gulhati, (1968); Gunther, (1868); Hamilton, (1822); Hora, (1923, 1933,

1934, 1936); Hussain, (1973); Islam and Siddiqui, (1971); Jayaram, (1981, 1999); Khan, (1946); Leghari *et al*., (1997); Leghari *et al*., (2000); Leghari *et al*., (2005); Mahmood *et al*., (2000); McClelland, (1839); Mirza and Khan, (1988); Mukerji, (1936); Omer and Mirza, (1975); Parshad and Mukerji, (1930); Qureshi, (1965); Rafique and Qureshi, (1977); Sahato *et al*., (1997); Sahato and Arbani, (1997); Salam *et al*., (1997); Sheri and Saied, (1975); Siddiqui *et al*., (1973); Sufi, (1957, 1962); Talwar and Jhingran, (1991); Zugmayer, (1912). However recently less attention has been given to ichthyodiversity of the River Indus.

There are more than 186 freshwater fish species described from freshwater bodies in Pakistan. Substantial quantities of commercially important fish are caught from rivers annually. The inland commercially important native fish fauna comprises about 30 species of which the economically significant species are: *Labeo rohita, Gibelion catla, Cirrhinus mrigala, Cirrhinus reba, Channa straitus, Channa marulius, Sperata sarwari, Wallago attu, Rita rita, Bagarius bagarius, Tenualosa ilisha, Notopterus notopterus, Tor putitora, schizothorax spp.* and *Clupisoma nazirri* Peter, (1999).

The fish fauna of River Indus is poor as compared to other rivers of the Asia viz Brahamputra, Ganges, Mekong, Salween, Hwang Ho and Yandtze. All are originated from same geographical location of Tibetan highland Plateau except River Ganges. The length, drainage area, mean water discharge, slope, water temperature and sediment load of each river is variable, hence directly influencing on the diversity of Riverine ecosystem Wellcome, (1985). Human activities threaten the productivity, diversity and survival of fresh water resources. Some systematic studies were conducted on Ichthyodiversity Lake and Riverine ecosystem in recent past, Korai *et al*., (2008).

The Indus River is the key water resources for the fisheries economy of Pakistan. Therefore the present work was undertaken to explore the Ichthyodiversity of the River Indus at Jamshoro District, Sindh, Pakistan.

MATERIAL AND METHODS

Fish samples were collected from three stations of River Indus at Jamshoro, 1. Karachi Wah, 2. Al-Mazar, and 3. Phuleli, during January to December 2009 on monthly basis. Samples were collected from catch of fisher-men from three stations of Jamshoro Lake, by gill netting of small mesh size (2.0-2.5 cm). Samples were preserved in 10% formalin; 5 mL of formalin was injected in the belly of fish with disposable syringe (BD), packed in polythene bags and brought to the laboratory of the Department of Fresh Water Biology and Fisheries, University of Sindh, Jamshoro. Fish samples were identified with the help of following publications, Day, (1878) Mirza, (1990) Mirza and Shafique, (1996) Sahato, *et al*., (1997) Jayaram, (1999).

RESULTS

During the study 52 fish species were recorded. Among them 30 species were most popular as food and game fish, possessing high economic value. The species are classified in (**Table No I).**

Table no. I. List of fish species identified during present study, from the River Indus at Jamshoro.

Order	Family	Species	Karachi Wah	Al-Manzar	Phuleli
Cypriniformes	Cyprinidae	*Cirrhinus reba* (Hamilton)	++	+++	++
		Cirrhinus mrigala (Hamilton)	+++	+++	+++
		Catla catla (Hamilton)	+++	+++	+++
		Labeo calbasu (Hamilton)	+++	++	++
		Labeo fimbriatus (Bloch)	++	++	++
		Labeo rohita (Hamilton)	+++	+++	+++
		Labeo bata (Hamilton-Buchanan)	+	++	++
		Labeo sindensis (Day)	++	+	++
		Labeo gonius (Hamilton)	++	++	++
		Puntius ticto (Hamilton-Buchanan)	+++	++	+
		Puntius stigma (Hamilton)	+++	+	+
		Systomas sarana (Hamilton)	++	+	++
		Osteobrama cotio (Day)	++	-	+
		**Cyprinus carpio* (Linnaeus)	+++	++	+++
		Chela laubuca (Hamilton)	++	+	-
		Salmophasia bacaila (Hamilton)	+	-	++
		Devario devario (Hamilton)	++	-	+
		Rasbora daniconius(Hamilton)	-	++	++
		Esomus danricus (Hamilton)	++	-	+++
Clupeiformes	Clupeidae	*Gudusia chapra* (Hamilton)	+++	+++	++

		Gudusia variegata (Day)	+++	+++	++
		Tenualosa ilisha (Richardson)	+++	+++	+++
Osteoglo ssiformes	Notopteridae	*Chitala chitala* (Hamilton)	+++	+++	+++
		Notopterus notopterus (Pallas)	+++	+++	+++
Siluriformes	Bagridae	*Rita rita* (Hamilton)	+++	+++	+++
		Mystus cavasius (Hamilton)	+++	++	++
		Mystus bleekeri (Day)	++	+++	+++
		Mystus gulio (Hamilton)	+++	++	++
		Mystus vittatus (Bloch)	++	+	++
		Sperata seenghala (Sykes)	+++	+++	+++
	Siliuridae	*Ompok pabda* (Hamilton)	++	++	+++
		Wallago attu (Schneidr)	+++	+++	+++
	Schilbeilidae	*Clupisoma garua* (Hamilton)	++	+++	++
		Eutropiichthys vacha (Hamilton)	+++	++	+++
	Clariidae	*Clarias batrachus* (Linnacus)	++	++	-
	Heteropneustidae	*Heteropneustes fossilis* (Bloch)	++	++	++
Synbranchiformes	Mastacembelidae	*Mastacembelus armatus* (Lecepede)	++	++	++
		Mastacembelus pancalus (Hamilton)	++	++	++
		Macrognathus aral (Bloch)	++	+	++
Perciformes	Chandidae	*Ambassis nama* (Hamilton)	+++	++	++
		Ambassis ranga (Hamilton)	++	++	++
	Nandidae	*Badis badis* (Hamilton)	++	+	++
		Nandus nandus (Hamilton)	++	++	+
	Cichlidae	**Oreochromis mossambicus* (Peters)	+++	+++	+++
	Gobiidae	*Glossogobius giuris* (Hamilton)	++	-	++
	Belontidae	*Colisa fasciata* (Schneidr)	++	++	++
		Colisa lalius (Hamilton)	++	+++	++
Channiformes	Channidae	*Channa punctate* (Bloch)	+++	+++	+++
		Channa marulius (Hamilton)	+++	+++	+++
		Channa striata (Bloch)	+++	++	+++
		Channa gachua (Hamilton)	++	+++	++
Beloniformes	Belonidae	*Xenentodon cancila* (Hamilton)	+	++	++

* The exotic fish species identified from River Indus at Jamshoro District.

Nineteen species belonged to Cyprinidae, six species to Bagridae, four species to Channidae, three species each to Clupeidae and Mastacembelidae, two species each to Notopteridae, Siliuridae, Schilbeilidae, Chandidae, Nandidae and Belontidae, one specie each to Clariidae, Heteropneustidae, Cichlidae, Gobiidae and Belonidae, **(Fig.No.2)**. Two fish species, *Cyprinus carpio* and *Oreochromis mossambicus* were exotic. Cypriniformes, Siliuriformes and Perciformes constitute the major portion of fish species observed. Sub-families, Barbinae, Rasborinae and Cyprininae consisted 67 %, 28 % and 05 % respectively, of the order Cypriniformes, **(Fig. No. 3)**. The distribution of fishes of order Siliuriformes into families are as follows: family Bagridae consisted of 50 %, Siliuridae and Schilbeilidae consisted of 17 % each, Clariidae and Heteropneustidae consisted of 8 % each, **(Fig.No.4)**. The families belonging to order Perciformes are; Chandidae, Nandidae and Belontidae consisted of 25 % each, Gobiidae consisted of 13 % and family Cichlidae consisted of 12 %, **(Fig. No. 5)**.

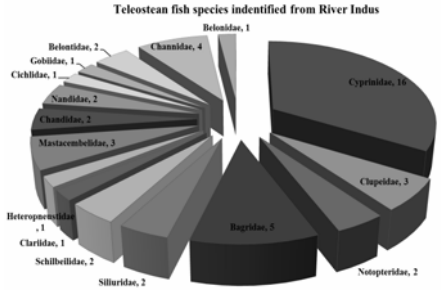

Fig. No. 2. The Teleostean fishes identified during present study from River Indus at Jamshoro district.

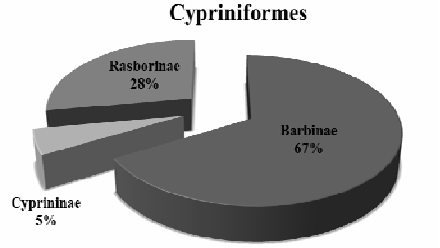

Fig. No. 3. The percentage distribution of order Cypriniformes, collected during present study.

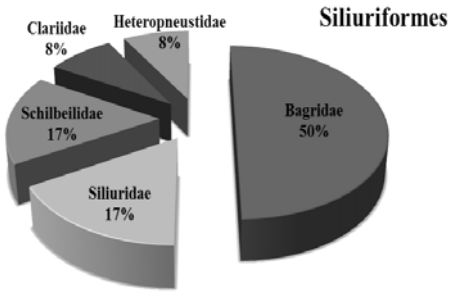

Fig. No. 4. The percentage distribution of order Siliuriformes, collected during present study.

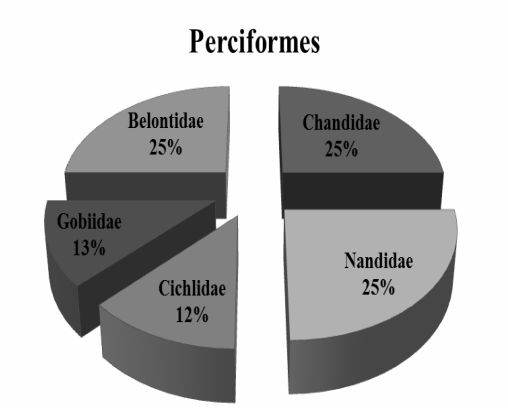

Fig. No. 5. The percentage distribution of order Perciformes, collected during present study.

DISCUSSION

A survey of fish fauna of River Zhob (Baluchistan) was conducted by Asmat & Juma (2004), who found twenty two fish species belonging to fifteen genera, four families and three orders of teleostean fishes. Out of these, ten species were new record form the River Zhob while *Mastacembelus pancalus* was new record from Baluchistan and *Discognathus lamta* and *Discognathus modestus* were the new records from Pakistan. The number of fish species observed from the River Indus during present study is much greater than those reported by Asmat and Juma (2004), from Zhob River.

Forty three fish species were reported by Shinde *et al*., (2009) from from Pravara River at Pravara Sangam, Ahmednagar (M.S.) India, among them eighteen species were commercially important. During present study fifty two fish species were reported; including thirty species possess good economic value.

In the study of fish funa of Keenjhar Lake, Korai *et al*., (2008) reported fifty one fish species including thirty species which are popular as food as well as game fishes and possess and high economic value. The fishes reported by Korai *et al.,* (2008) included two exotic, two species comprising to each family *Clupeidae* and *Notopteridae*; nineteen species belonging to family *Cyprinidae*; six species belonging to family *Bagridae*; two species each belonging to family *Siluridae* and *Schilbeidae*; one specie each of family *Claridae*; *Heteropneusitidae* and *Belonidae*; three species belonging to family *Mastacembelidae*; two species each belonging to family *Chandidae* and *Nandidae*; one specie each belonging to family *Cichlidae* and *Gobiidae*; two species belonging to family *Belontidae*; and four species belonged to family *Channidae*.

Thirty two fish species have been recorded by Mahar *et al*., (2000), thirteen fish species were commercially valuable and harvested on regular basis, there were less than reported during present study.

Sufi (1957) recorded thirty three fish species representing 24 genera and 14 families from Keenjhar Lake. Ahmad (1963) recorded thirty nine fish species, and Siddiqui *et al*. (1973) forty six fish species from the same water body. Fifty two fish species were identified during present study, more than those reported by Sufi, (1957); Ahmad, (1963); Siddiqui *et al*., (1973).

CONCLUSION

Present study was the part of ongoing studies on Ichthyodiversity of River Indus. An increased number of fish species were recorded from River Indus; there might be further increase in the fish species after the flood from River Indus and its tributaries. No parasitic or fungal infection was found from the fishes of River Indus.

REFERENCES

Ahmad, M., (1943) Fauna of Lahore, 5. Fishes of Lahore. Bull. Dept. Zoology, Punjab University Lahore, (**1**): 253-37 4.

Ahmad, M. F., and S. A. Khan (1974) Checklist of freshwater fishes of Sindh Province, Pakistan. Biologia Pak., (**20**): 119-131.

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

Ahmad, N., (1960) Fauna of Lahore. 5. Fishes of Lahore. Bull. Zool Punjab Univ. Lahore, (**1**): 253-374.

Ahmad, N., (1963) Freshwater fish fauna of West Pakistan. Agri. Pakistan, (**14**): 77-82.

Ahmad, N. D. and M. R. Mirza, (1964) Some fishes from the Kurram River near Parachinar. Pakistan J. Scientific Res., (**16**): 44-46.

Alcock, A. W. (1898) Report on the Natural History Results of the Pamir Boundary Commission. Government Printing Press Calcutta.

Asmat, S. K. and K. K. Juma (2004) Additions to the fish fauna of river Zhob, Baluchistan. Pak. J. Biol. Sci., 4 (**3**): 293-297.

Banarescu, P. and M. R. Mirza (1965) *Noemachelius lindbergi* n. sp., a new loach from Afghanistan and West Pakistan. Senckenberg. Biol., (**46**): 265-269.

Banarescu, P. and M. R. Mirza (1972) *Noemachelius alepidota lanbanti* nova, subsp., a new loach from Rawalkot, Azad Kashmir Biologia (Pakistan), (**18**): 121-123.

Banarescu, P. and T. T. Nalbant (1966) The 3rd Danish Expedition to Central Asia, Zoological results-34. Cobitidae (Pisces) from Afghanistan and Iran. Vid. Medd. Dansk. Natural Foren., (**129**): 149-186.

Bashir, K. A. and M. R. Mirza (1975) Fishes of the River Sutlej in Lahore District with the description of a new subspecies. Bull. Hydrobiol. Res., (Rawalpindi), (**1**): 91-104.

Baquai I. U., V. A. Zuberi, and M. Iqbal (1974 a). Limnological studies of Kalri Lake. Agri. Pak., 25 (**2**): 119-135.

Baquai I. U., A. S. Perwaiz and M. Iqbal (1974 b) Limnological studies of Haleji Lake. Agri. Pak., 25. (**4**): 321-344.

Butt, J. A. and A. A. Butt (1988) An addition to the Fishes of Azad Kashmir. Scient. Khyb., (**1**): 77-84.

Butt, J. A. and M. R. Mirza (1981) Fishes of the Vale of Peshawar, North-West Frontier Province, Pakistan, Biologia, (**27**): 145-163.

Butt, J. A. and M. Nawaz (1977) Two new records of fishes from Dera Ismail Khan District, North West Frontier Province, Pak. Pak. J. Zool., (**9**): 248-252.

Butt, J. A. and M. Nawaz (1978) Fishes of Dera Ismail Khan District, North West Frontier Province, Pakistan. Biologia Pak., (**24**): 281-296.

Day, F., (1871-72) Monograph of Indian Cyprinidae I-VI, J. Asia. Soc, Bengal, (**40**): 95-143, 277-336, 337-367, (**41**): 1-29, 171-198, 318-327.

Day, F., (1878) The fishes of India; being a natural history of the fishes known to inhibit the seas and fresh waters of India, Burma, Ceylon text and atlas in 4 Pts. (London).

Day, F., (1880) On the fishes of Afghanistan. Proc. Zool. Soc. London, 224-232.

Day, F., (1889) The Fauna of British India including Ceylon and Burma, Fishes, volumes 2, London.

Ehrlich, P. R. and E. O. Wilson (1991) Biodiversity studies science and policy. Sci. (**253**): 758-762.

Gulhati, N. D., (1968) The Indus and its tributaries. In: Mountains and rivers of India (ed. B. C. Law), 348-355, National Committee for Geography, Calcutta, 21st International Geography Congress India.

Gunther, A., (1868) Catalogue of fishes in the British Museum, London.

Hamilton, F., (1822) An account of fishes found in the River Ganges and its tributaries, Edinburgh and London.

Hora, S. L., (1923) Fish of the Salt range, Punjab. Rec. Indian Mus., (**25**): 277-386.

Hora, S. L., (1933) Fish of Afghanistan, J. Bombay Nat. Hist. Soc., (**34**): 688-706.

Hora, S. L., (1934) The fish of Chitral. Rec. Ind. Mus., (**36**): 279-320.

Hora, S. L., (1936) Yale North India Expedition. Article XVII, reports on fishes, Part-I, Cobitidae. Mem. Conn. Acad. Arts. Sci., (**10**): 99-321.

Hussain, Z., (1973) Fish and fisheries of the lower Indus basin (1966-67), Agric. Pakistan, (**24**): 170-188.

Islam, A. and M. N. Siddiqi (1971) Fishes of Jhelum with some new records from the Punjab, Biologia, Pakistan, (**17**): 27-44.

Jayaram, K. C., (1981) The freshwater fishes of India, Pakistan, Bangladesh, Burma and Sri Lanka–A Handbook, Zoological Survey of India, Calcutta.

Jayaram, K.C., (1999) The fresh water fishes of the Indian Region. Narendra Publishing House Delhi-110006 (India).

Khan, H., (1946) A fishery surveys of River Indus. J. Bombay, Nat. His. Soc., (**46**): 529-535.

Korai, A. L., (2010) Histological studies and effects of heavy metals on major carps of Keenjhar Lake, Department of Fresh Water Biology and Fisheries, Ph.D. dissertation, University of Sindh.

Korai, A. L., G. A. Sahato, K. H. Lashari and S. N. Arbani (2008) Biodiversity in relation to physicochemical properties of Keenjhar Lake, Thatta, Sindh, Pakistan. Tur. J. Fisher. Aq. Sci., (**8**): 259-268.

Leghari M. K., G. A. Sahato, S. N. Arbani and M. Y. Leghari, (1997) Ecological survey of phytoplankton in fresh water Lake Bakar district Sanghar Sindh, Pakistan. S. U. Res. J., (Sci. Ser.) Vol. 29 (**2**): 83-94.

Leghari, S. M., S. I. H. Jafari, M. A. Mahar, K. H. Lashari, S. S. Ali, T. M. Jahangir and M. Y. Khuhawar (2000) Limnological study of Sonharo, Mehro, Pateji and Cholari Lakes of district Badin, Sindh Pakistan. Pak. J. Biol. Sci. 3 (**11**): 1904-1909.

Leghari, M.K., M.Y. Leghari and S.N. Arbani (2005) Monthly variation in physico-chemical properties of fresh water Lake Makhi, Sanghar, Sindh, Pakistan. Int. J. Phycol. Phycochem., 1 (**2**): 135-142.

Mahar, M. A., S. I. H. Jafari, S. M. Leghari and M. Y. Khuhawar (2000) Studies on water chemistry and fish production of Manchar Lake, Dadu, Sindh, Pakistan. Pak. J. Biol. Sci., 3 (**12**): 2151-2153.

Mahmood, G., M. Javed and M. Hassan (2000) Assessment of river Ravi for the physico-chemistry and heavy metals toxicity of water. Pakistan J. of Biological Sci., 3 (**11**): 1962-1964.

McClelland, J., (1839) Indian Cyprinidae, 19, Asiatic Researchers Calcutta, Bishop Collage Press, 217-248.

Mirza, M.R., (1990) Fresh water fishes of Pakistan. Urdu science board Lahore, 128Pp.

Mirza, M. R. and J. A. Khan (1988) Fishes of Marala, Sialkot, district. Biologia (Pakistan), (**34**): 151-153.

Mirza, M. R. and H. M. Shafique (1996) A key to the fishes of Punjab. Ilmi Kotab Khana Lahore, 32Pp.

Mukerji, D. D., (1936) Yale North India Expedition, XVII. Report on fishes. Part-II. Sisoridae and Cyprinidae. Mem. Conn. Acad. Arts. Sci., (**10**): 323-359.

Omer, T. and M. R. Mirza (1975) A checklist of the fishes of Hazara District, Pakistan, with the description of new subspecies, Biologia, (**21**): 199-209.

Parshad, B. and D. D. Mukerji (1930) On the fishes of Manchar Lake J. Bombay Nat. His. Soc. (**34**):164-169.

Peter, T., (1999) Coldwater fish and fisheries in Pakistan. FAO Fisheries, Rome. Technical Paper. (**385**): 122-137.

Qureshi, M. R., (1965) Common freshwater fishes of Pakistan. Agri. Res. Council. Karachi, 01-61.

Rafique, M. R. and M. Y. Qureshi (1997) A contribution to the fish and fisheries of Azad Kashmir. In: Biodiversity of Pakistan (eds S. A. Mufti, C. A. Woods and S. A. Hasan), 335-343. Pak. Mus. Nat. Hist. Islamabad and Fl. Mus. Nat. Hist. USA.

Sahato, G. A., M. K. Leghari and S. N. Arbani (1997) Fresh water algae of Sindh-IV an ecological survey of phytoplankton (Oscillatoriaceae) of Phoosna Lake, district Badin, Sindh, Pakistan. Sindh Uni. Res. J., (Sci. Ser.) Vol. 29 (**2**): 51-56.

Sahato, G. A. and S. N. Arbani (1997) Quantitative distribution and percentage density of planktonic algae of fish hatchery ponds at Chillia district Thatta. Sindh. Sindh Uni. Res. J., (Sci. Ser.) Vol. 29 (**1**): 127-135.

Salam A. A., A. Chowdhry, A. Ansari and S. Nadeem (1997) Studies on the effect of seasonal variations of physico-chemical parameters of Indus River. Sindh Uni. Res. J., (Sci. Ser.) Vol. 29 (**1**): 41-50.

Sheri, A. N. and T. Saied (1975) Revised list of freshwater fish fauna of Pakistan. Pakistan J. Agri. Sci., (**12**): 69-76.

Shinde, S. E., T. S. Pathan, K. S. Raut, R. Y. Bhandare and D. I. Sonawane (2009) Fish diversity of Pravara River at Pravara Sangam District Ahmednagar, (M. S.) India. World J. Zool., 4 (**3**): 176-179.

Siddiqui P. A., I. U. Baquai and M. Iqbal (1973) Check list of fishes of Keenjhar (Kalri) Lake with notes on environmental conditions and fisheries potential. Agri. Pak., 24 (**2**): 201-220.

Sufi, S. M. K., (1957) Fish fauna of the Kinjhar Lake (West Pakistan) with an account of the major fishing implements employed by local fisher man. Agri. Pakistan, 8 (**3**): 208-229.

Sufi, S. M. K., (1962) Checklist of fishes of the Manchar Lake (West Pakistan) with a note on the effect of Sukkur Barrage and canalization of the feeding channel on the fauna of the lake. Agri. Pakistan. (**13**): 499-503.

Talwar, P. K. and A. G. Jhingran (1991) Inland fishes of India adjacent countries, vol. 2. Oxford and IBH Publishing Co., New Delhi, Bombay, Calcutta, India.

Wellcome, R. L., (1985) River fisheries. FAO fisheries technical paper No. 262. Food and Agriculture Organization of United Nations, Rome.

William, M., (1998) Patterns in fresh water fish ecology. N. Y. International Thompson publishing.

Zugmayer, E., (1912) Eight new fishes form Balochistan. Ann. Mag. Nat. Hist., 10 (**8**): 595-599.