CIBTech Journal of Zoology ISSN: 2319–3883
Online, International Journal, Available at http://www.cibtech.org/cjz.htm
2021 Vol.10, pp.1-8/Somashekar et al.
***Research Article** (Open Access)*

FISHERY AND PRODUCTION OF CAT FISH, *SPERATA AOR* AND OTHER FISHES FROM BHADRA RESERVOIR, KARNATAKA

***D.S. Somashekar[1], M. Venkateshwarlu[2] and B.R. Kiran[3]**
[1]*Department of Zoology, I.D.S.G Government College, Chikmagalur-577101, Karnataka*
[2]*Department of Applied Zoology, Kuvempu University, Shankaraghatta-577451, Karnataka*
[3]*Department of Environmental Science, DDE, Kuvempu University, Shankaraghatta-577451, Karnataka*
**Author for Correspondence: drsomashekar7@gmail.com*

ABSTRACT
The fisheries of Bhadra reservoir mainly comprise of species native to river Bhadra. The current study deals with the fisheries and production of *Sperata aor* from Bhdara reservoir of Karnataka. The fish catches during the study period varied from 36.7 to 44.53 tones. The species that contributed to the catch were *Cyprinus carpio, Catla catla, Labeo rohithe, Cirrhinus mrighala*, among the carps and *Mystus cavaisius, Sperata aor, Mystus seenghala, Clarias batrachus, Ompok bimaculatus* and *Heteropneustes fossilis* among cat fishes. Species like *Osteobrama cotio cunma, Puntius spp., Oreochromis mossambica, Channa punctatus* were represented in small quantities. *Sperata aor* contributed an annual average forming 18.12%. Studies on fish catch in different sectors indicated variation in the distribution of species in time and space. *S. aor* has a wide distribution occurring in all the major river system from Ganga to Cauvery. The catches were relatively low during summer and there were two peaks in catches one during the flood season (June to August) and another during December to March. It is one of the larger catfishes which thrive well in the reservoir ecosystems. It forms a good fishery in Bhadra reservoir.

***Keywords**: Fishery, Yield, Catch, Sperata aor, Bhadra reservoir, Fish composition*

INTRODUCTION
Sperata aor, is a popular game fish of Bagrid family found in South Asia (Figure 1). It grows to a total length of 180 centimeters (71 inches) and is commercially used for human consumption (Froese *et al.*, 2011).

Reservoir fisheries development is most essential for quantum jump in inland fish production and socioeconomic up gradation of fishermen. However, the fish yield from the reservoir fisheries is frustratingly low, as observed by Sinha (2001). The strategy of enlargement of gear mesh size for capture, increases in fishing efforts and stocking support paid rich dividends in this area. The stocking necessitate the breeding population of economically viable species in the reservoirs. The opportunity needs to be used for establishing the native major food fishes that are compatible and hardy and amenable to the lentic environment of the reservoir, otherwise, the trash fishes multiply and occupy the large volume of water in grater abundance dominating the whole ecosystem. On the other side the native fish should find a natural place in the reservoir not only in point of view of adding to the total production and higher income but also as a biodiversity conservation measures.

Fishing in Bhadra reservoir commenced soon after the reservoir started filling up in 1963. Fishermen from Andhra state migrated and settled down around the reservoir in three major settlements; at dam top, Umblebyle bank near the dam and at N.R Pura towards the head end of the reservoir. After the construction of the reservoir some of the local people and others have also taken seasonal fishery.

In India reservoirs are massive potential for yield through capture fishery and widespread of aquaculture. Reservoirs in India inhabit a rich variety of fishes. This is basically a consequence of the rich faunal diversity of the parental lotic system (Krishna Rao, 2005). According to recent studies (Suganan, 1995; Vass, 2005), the country has total reservoir area is 3.15 million hectare out of which small reservoir occupy 1.49 million ha followed by large (1.14 million ha) and medium (0.52

million ha). Among the states Karnataka has 74 reservoirs which includes major, medium and small reservoir with a total water spread area of 2.10 lakh ha.

There is a seasonal market for dry fish of considerable magnitude. Fisher men of Dam top, Umblebyle camp and N.R. Pura camp who capture *Salmophasia untrahi, Puntius* sp, *Cirrhinus* sp., *Garra* sp., *Glossogobius giuris, Chanda nama* and some other dry species cater to the dry fish trade.

The present investigation was carried out to understand comprehensively all the above features, as it is crucial to gain better knowledge about the fish. The main objectives of the study is to know the production and catch composition of selected fishes *S. aor* in the study area.

Figure 1: *Sperata aor* fishes

MATERIALS AND METHODS

Study Area

Bhadra reservoir is located near Lakkavalli village of Tarikere taluk in Chikmagalur district (Figure 2).This reservoir has been constructed at an elevation of 601 m above MSL The dam is located at latitude 13°42'00" N and longitude 75°38'20"E. The Bhadra basin gets the rainfall ranging from 117 to 573 cm and the temperature varied from 30.1 to 18.8^{0}C. The reservoir is having 186 ft in depth. This is a multipurpose project for irrigation, drinking, fishery and hydroelectric power.

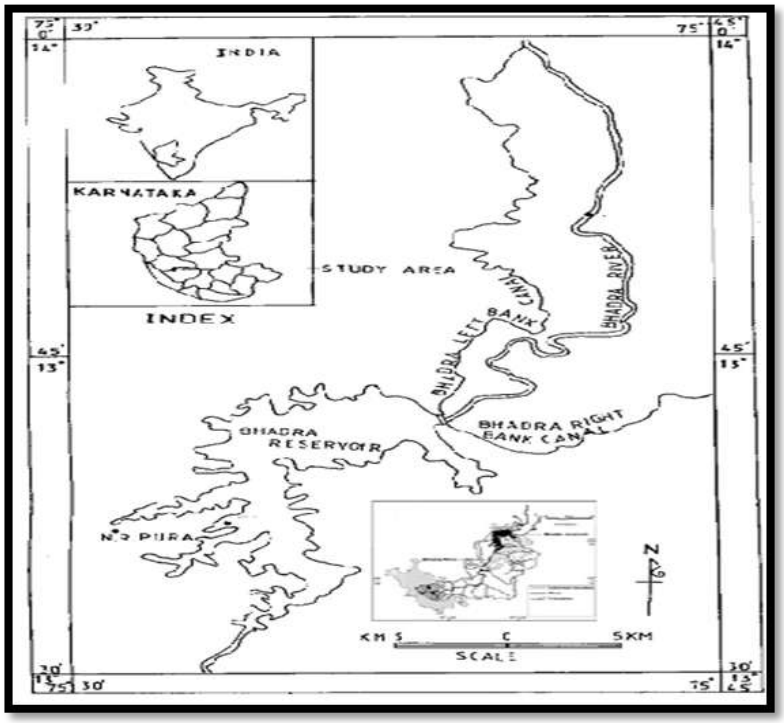

Figure 2: Location of the study area

Craft and Gear

The only craft used in the reservoir by the fisherman is the coracle. This is a shallow tub like paddled raft. It is operated by two fishermen. It is the most popular craft for fishing in the reservoir of peninsular India. The main types of gear used are gill nets , long lines, cast nets and dragnets are used as a small scale. Surface gill nets, bottom set gill nets , large shore seine , small shore drag net , cast nets, and hook and line are the commonly used fishing tackle. The gill nets of various sizes are used to catch all varieties of fishes from big to small catfishes and carp fishes. Small fishes are usually processed for drying.

Landing centers

There are four principal fish landing centers, Dam top, Aadrikatte, Umblebyle camp and N.R. Pura camp. There is direct sale by the fishermen at the landing centers such as at Dam top and N.R. Pura camp. The catches are also taken by merchants for marketing. The catches from the different landing centers are taken to the Bhadravathi city, where there is a good demand for the fresh fish. When catches are good, after meeting local demand the catch is transported to neighboring towns for sale.

Fish production and catch composition

Catches from Umblebyle camp were sampled once in a week and from N.R. Pura camp twice in a month. However Dam top and Aadrikatte centers were sampled continuously for 15 days in a month. After noting the total weight of the total catch, the individual species are sorted out and their total weights are recorded. Data on the daily catch were obtained from the fishermen and fish merchants to calculate total catch for the month. Total catch and percentage composition of different species were computed for each center as well as for the reservoir. Identification was done, based on keys for fishes of the Indian subcontinent (Talwar and Jhingran, 1991; Jayaram, 1999).

RESULTS AND DISCUSSION

Fish Composition

In the present study, Bhadra reservoir, harboured 33 species of fishes, which belonging to 6 orders, 11 families and 21 genera. Among 6 orders, Cypriniformes was represented by 17 species which was dominant in all the stations. It was followed by Siluriformes which was represented by 7 species. Perciformes represented by 5 species. Osteoglossiformes, Cyprinodontiformes, Synbranchiformes were represented by only 01 species (Table 1).

Fish Catch and Species Composition

The data on fish catch from the reservoir during the year 2003-04 and 2004-05 are presented in Table 2 to 3; Fig. 3 and 4. The total annual catch ranged from 36.7 tonnes in 2003-04 to 44.53 tonnes in 2004-05. The general pattern of total annual fish catch during the study period showed relatively high composition.

Seasonal Variation in Fish Catch

The month wise catch data in different sectors during the study periods is presented in Table 2. The catches were relatively low during summer (April and May) for various reasons. During this period the fishermen of Dam top and Aadrikatte camp migrates. Hence the catches were generally lower level in these sectors during summer.

There were two peaks in catches one during the flood season (June to August) and another during December to March. The good catchers during the latter period were due to exploitation of fishermen in all the landing centers.

The N.R Pura camp contributed the largest catches 41.70% and 41.93% respectively during the study period. The catches of Umblebyle camp accounted for 27.95% and 28.35% for the total catch and Dam top camp contribution was about 19.02% and 17.89% for the total catch. The Aadrikaae camp with about 140 days of intermittent fishing spread over the year contribute 11.33% and 11.82% respectively during the above years.

Species in the catch

The common species represented in the catches are *Cyprinus carpio, Catla catla, Labeo rohita, Cirrhinus mrighala,* among the carps and *Mystus cavisius, Sperata aor, Mystus seenghala, Clarias batrachus,*

Ompok bimaculatus and *Heteropneustes fossilis* among catfishes. Species like *Osteobrama cotio cunma, Puntius* spp., *Oreochromis mossambica, Channa punctatus* were represented in small quantities. Except the major carps, which have been introduced, all the other species are native to river Bhadra.

Table 1: Fishes of Bhadra reservoir with common name, vernacular names and IUCN status

Scientific name	***Common Name***	***Vernacular***	***IUCN status***
Order: Osteoglossiformes Family: Notopteridae			
Notopterus notopterus	Grey feather back	Chappali meeanu	VU
Order: Cypriniformes Family: Cyprinidae			
Catlo catla	Catla	Doddagende menu	Intr.
Cirrhinus mrigala	Mrigala	Mrigal meenu	Intr.
Cirrhinus fulungee	Deccan white carp	Ajamenu	NA
Labeo rohita	Rohu	Rohu menu	Intr.
Labeo confine	Pig mouth carp		NA
Osteobrama cotio cunma	Cunma osteobrama	Pattagara menu	NA
Gonoproktopterus. Kolus	Kolus	Kolus menu	NA
Garra kempi Hora	Kemp garra	Kemp garra	NA
Puntius chola	Swamp or chola barb	Pamke menu	LR-lc
Puntius anilius	Longfin barb	Aiuli	LR-nt
P. narayani	Narayan barb	Barb menu	NA
Puntius deccanensis	Deccan barb		NA
Puntius melanostigma	Wynaad barb	Barb menu	NA
Punitus sophore	Spotfin swamp barb		VU
Rasbora daniconius	Black line rasbora		NA
Botia striata	Tiger loach		LR-lc
Salmophasia untrachi	Mahanadi razobelly minnow	Bilachi menu	NA
Order: Siluriformes Family : Bagridae			
Sperata aor	Long whiskered catfish	Suragi menu	NA
Mystus. Cavasius	Gangetic mystus	Girlu menu	VU
Mystus. Seenghala	Giant river catfish	Bilisuragi menu	NA
Family Siluridae			
Ompok bimaculatus	Indian butter catfish	Godlu menu	LR-nt
Ompok pabda			NA
Family : Claridae			
Clarias batrachus	Magur	Murgodu menu	VU
Family : Heteropneustidae			
Heteropneustes. fossilis	Stinging catfish	Cheli mcnu	VU
Family : Ambassidae			
Chanda noma	Elongate glass perchlet	Gajina menu	VU
Order: Cyprinodontiformes			

Family : Belonidae			
Xenentodon Cancila	Freshwater garfish		LR-lc
Order: Perciformes			
Oreochromis mossambica	Jeelabi meenu	Tilapia	AIS
Family: Channidae			
Channa punctatus	Spotted snake head	Aul menu	LR-nt
Channa marulius	Giant snake head	Aul menu	LR-nt
Family: Gobiidae			
Glossogobius giuris	Tank goby	Bangi sidda	LR-Ie
Order: Synbranchiformes			
Family: Mastacembelidae			
Mastacembelu armatus	Tire-track spiny eel	Havu meenu	LR-ie

LR-lc —Low risk Least concern; LR-nt — Low Risk Near Threatened; AIS — Alien Invasive Species; VU — Vulnerable; Intr— Introduced; NA. = Not assessed.

Table 2: Month wise catch (kg) in different fish landing sectors of Bhadra reservoir

	Dam Top		**Aadrikatte Camp**		**Umblebyle Camp**		**N.R Pura Camp**	
Months	2004-05	2005-06	2004-05	2005-06	2004-05	2005-06	2004-05	2005-06
June	960.4	914.3	860.9	846.3	1280.6	1318.3	1892.8	2432.3
July	998.1	1240.3	1321	1684.4	1400.2	1714.4	2040	2448
August	924	985.6	978.5	1256.8	1378.2	1678.8	2096.7	2140
September	624.7	786.5	650.6	885.4	1156.7	1432.7	1671.9	2241.4
October	598.8	789.1	347.8	468.3	952.4	1115	1602.6	1989.9
November	485	595.3	-	124.3	819	1212.2	1452.8	1798.8
December	494.8	498.6	-	-	754.6	978.8	1214.3	1319.7
January	512	488.4	-	-	714.2	987	958.7	987.6
February	412	464.8	-	-	498.4	698.2	798	989.4
March	417.8	473.1	-	-	448.7	549.5	543.9	894.5
April	286.9	386	-	-	456.4	483.3	513.7	785.1
May	268.7	345.5	-	-	400.5	456.8	522.6	645.3
Total	6983.2	7967.5	4158.8	5265.5	10259.9	12625	15308	18672
%	19.02	17.89	11.33	11.82	27.95	28.35	41.70	41.93

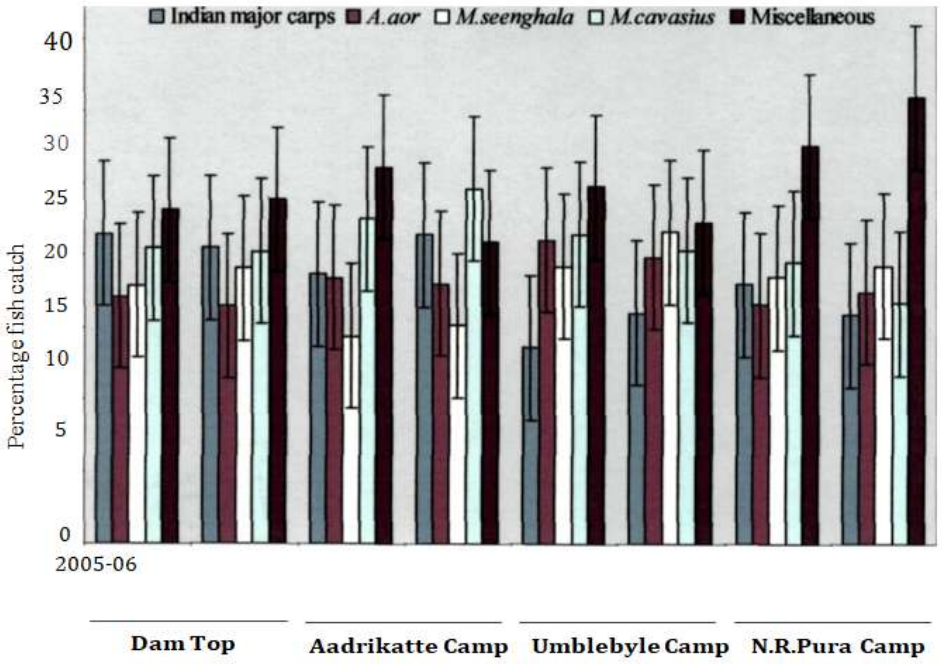

Figure 3: Sector wise species in the catch (kg in %) in Bhadra reservoir, Karnataka

Table 3: Sector wise species in the catch (kg in %) in Bhadra reservoir

Landing centers	**Dam Top**		**Aadrikatte Camp**		**Umblebyle Camp**		**N.RPura Camp**	
Species	2004-05	2005-06	2004-05	2005-06	2004-05	2005-06	2004-05	2005-06
Indian major carps	21.42	20.46	18.64	21.39	13.61	15.98	17.96	15.82
M.seengala	17.11	16.42	18.41	18.01	21.03	19.84	16.52	17.41
S.aor	17.89	19.09	14.37	15.12	19.21	21.61	18.47	19.23
M.cavacius	20.48	20.24	22.48	24.59	21.44	20.32	19.49	16.64
Miscellaneous fishes	23.10	23.79	26.10	20.89	24.71	22.25	27.56	30.90

Table 4: Sector wise species in the catch (kg in %) in Bhadra reservoir, Karnataka

Sectors	**Dam Top**	**Aadrikatte Camp**	**Umblebyle Camp**	**N.R.Pura Camp**
C. catla	9.14	7.72	5.31	7.48
L. rohita	7.71	8.56	7.29	6.39
C. mrigala	4.09	3.75	2.19	3.02
M. seenghala	18.49	14.74	20.44	16.96
M. cavasius	20.36	23.53	20.88	18.85
S. aor	16.76	18.21	20.41	18.07
Miscellaneous fishes	23.45	23.49	23.48	29.23

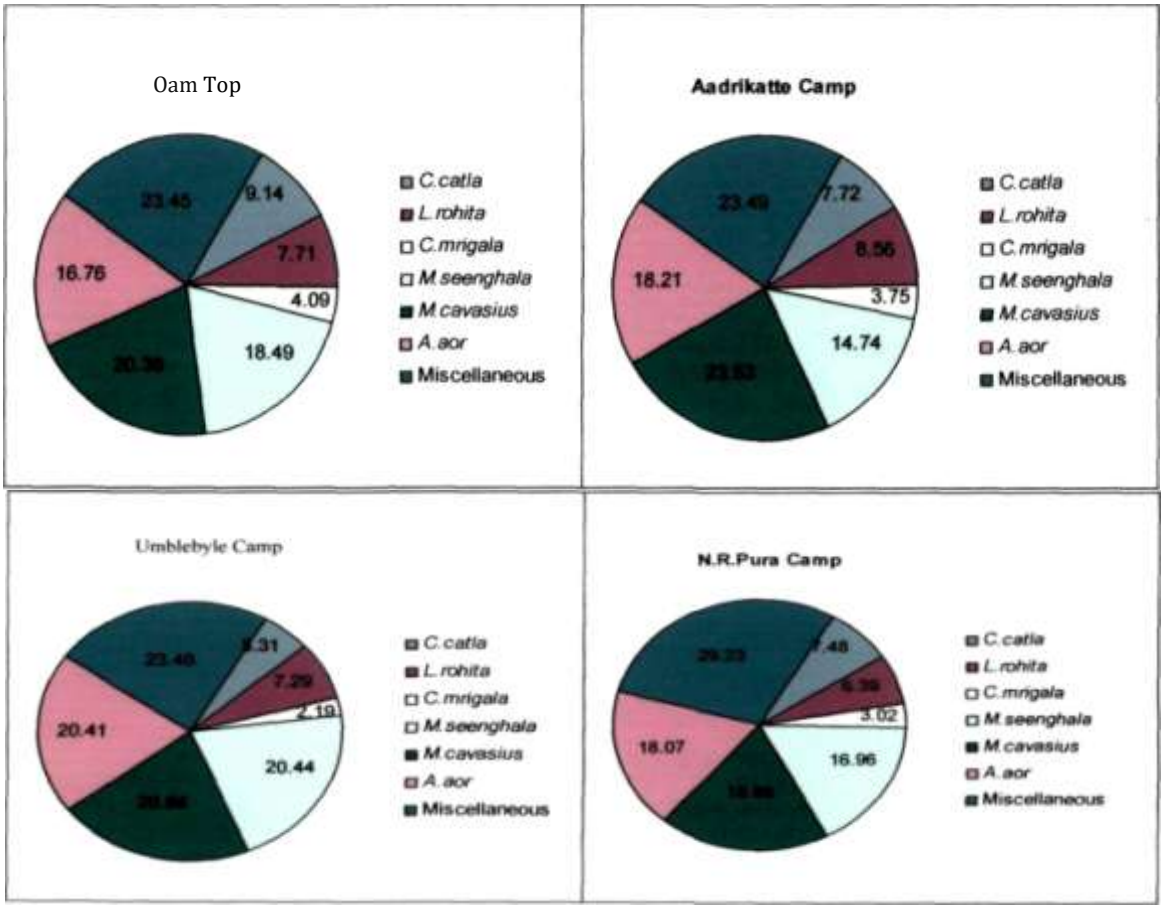

Figure 4: Sector wise species in the catch (kg in %) in Bhadra reservoir, Karnataka

Trends in the catches of individual species

Introduced carps

The Gangetic major carps catla, rohu and mrigala are highly esteemed as food fishes. Because of their fast rate of growth they are the most popular species for culture in ponds and for stocking reservoirs. Though they are native to Ganga river system they have been transplanted in more river systems and have established themselves in peninsular Indian rivers like Godavari and Krishna. In Bhadra reservoir these species are stocked. Catches were maximum in 2004-05 with 21.42 % contribution to the total catch. In the next year 2005-06 it was 20.46%. Their percentage in different centers varies from 14.79% to 20.94% with an average of 18.14% (Table 3 and 4; Fig. 4).

Catfishes

M. cavasius contributed an annual average during the period forming 20.70% of total catches. About 20.97% of catch occurred in 2004 to 2005 year and 20.44% in 2005 to 2006 Year. *S. aor* contributed an annual average forming 18.12% next to *M. cavasius.* The percentage in the catches increased from 17.48% (2004-05) to 18.76% (2005-06) (Table 3 and 4). *M. seenghala* contributed an average 18.09 % of all the landing sectors. Peak catches (18.26%) occurred during 2004-05 and minimum (17.92%) was in 2005-06 (Fig. 4).

Miscellaneous fishes

Includes some of the fast growing commercial fishes like murrels smaller species like *Salmostroma untrachi* and Barilius species, *Puntius* sp., *Cirrhinus* sp., *Garra* spp., *Glossogobius giuris* and *Chanda nama.* They occur seasonally and their individual proportion in the catches is also low. Together they

contributed on an average 25.28 % of the catch. About 25.20% of catch occurred in 2004 to 2005 year and 25.36% in 2005 to 2006 (Table 3 and 4; Fig. 4).

Distribution of Fishes

Studies on fish catch in different sectors indicated variation in the distribution of species in occasion and habitat. The data on species wise catches for different sectors for the year 2004-05 and 2005-06 are given in Table 2 and Fig. 3. There is a distinctive difference in the abundance of various species in different sectors and months.

Sperata aor was the dominant species in the catches of Umblebyle sector. It accounted about 16.76% to 20.41% of the catches. In the sector Umblebyle it formed 20.41% being dominant and it is poor in Dam top forming about 16.76%.

Carp-catfish ratio

From the foregoing account it was clear that the catfishes have 20.69% more dominant in the reservoir than carps with 18.16%. It is well known that catfishes being at higher tropic level bring down the productivity. Hence, elucidating respective proportion of carps and catfishes through the years would be useful in understanding the fish production of Bhadra reservoir.

CONCLUSION

Sperata aor fish is hardy in nature and it can tolerate to great extent of adverse environmental condition when a few carps will survive (Chondar 1999). So it can be a good species to culture in captivity (Sandipan Gupta, 2015). Until now fishery of *S. aor* mainly depends on capture from nature.

REFERENCES

Chondar SL (1999). Biology of Finfish and Shellfish. India: *SCSC Publishers*. 272-280.

Froese, Rainer and Pauly, Daniel, eds. (2011). *Sperata aor* in Fish Base. December version.

Jayaram KC (1999). *The fresh water fishes of the Indian region.* Narendra Publishing House, Delhi-6, p. 551.

Krishna Rao DS (2005). Strategies for enhancement of fish production from Indian reservoirs. *Fishing Chimes*, **25**(1) 86-90.

Sandipan Gupta (2015). A Review on *Sperata aor* (Hamilton, 1822), a popular food fish of Indian Sub continent . *Sains Malaysiana* **44**(9) 1217–1222.

Sinha M (2001). Inland Fisheries Resources of India and their utilization. *Proceedings of an Experience Sharing Workshop. Organized by the Fisheries Commissionerate, Government of Gujarat in 1998 at the Indian Institute of Management, Ahmedabad*, 73-86.

Sugunan VN (1995). Reservoir fisheries of India. *F.A.O. Fisheries Tech. Paper No. 345 F.A.O. Rome*, 1-424.

Talwar PK and Jhingran (1991). Inland fishes of India and adjacent countries. *Oxford and IBH*, Vol. I and II. 1158.

Vass KK (2005). Inland capture fisheries status and challengers. Proceedings of The Seventh Indian Fisheries Forum. 44-49.