

A CASE STUDY

Size composition and exploitation pattern of *Labeo calbasu* (Hamilton 1822) from the lower stretch of the Yamuna river

SHEEBA IMRAN¹, SASYA THAKUR¹, D. N. JHA² AND AMITABH CHANDRA DWIVEDI²

¹Department of Biological Sciences, Sam Higginbottom Institute of Agriculture, Technology and Sciences (Deemed University), ALLAHABAD (U.P.) INDIA

²Regional centre, Central Inland Fisheries Research Institute (ICAR), ALLAHABAD (U.P.) INDIA

Email : sheeba.imran786@gmail.com

Article Info : Received : 16.05.2015; Accepted : 19.09.2015

Exploitation is an economic activity governed by social needs and pressures. Freshwater fishing is a major source of income and protein for the riverine populations of most tropical regions. *Labeo calbasu* is a herbivores and bottom feeder fish. It is distributed throughout India, Pakistan, Bangladesh, Burma and Nepal. It is economically important fish species in the Yamuna river and supports an important commercial fishery in rivers, reservoirs, lakes and even in ponds. During study period 176 specimens of *L. calbasu* were collected from the lower stretch of the Yamuna river at Allahabad, Uttar Pradesh. Size composition varied from 11.2 to 52.0 cm size group and indicated that the stock of *L. calbasu* in the river was in healthy condition. 32.1-35.0 cm size group was dominated (17.61%) compared to 29.1-32.0 (13.64%) and 26.1-29.0 cm (11.93%) in exploited population. Middle size group was maximum exploited at Allahabad. Higher size group shared minute proportion in exploited population. The exploitation pattern was not systematic in lower size group. Current exploitation pattern is alarming for future. Data also indicated that the fishing activities should be prohibited in breeding season.

Key words : Size composition, *Labeo calbasu*, Exploitation pattern, Yamuna river

How to cite this paper : Imran, Sheeba, Thakur, Sasya, Jha, D.N. and Dwivedi, Amitabh Chandra (2015). Size composition and exploitation pattern of *Labeo calbasu* (Hamilton 1822) from the lower stretch of the Yamuna river. *Asian J. Bio. Sci.*, **10** (2) : 171-173.

INTRODUCTION

Labeo calbasu (Hamilton, 1822) is commonly known as Kalbasu. *L. calbasu* is an economically important fish species in the lower stretch of Yamuna river at Allahabad (Singh *et al.*, 1998 and Imran *et al.*, 2014). It is very common in the commercial catch of the rivers Narmada, Godavari, Ganga and Yamuna (Chondar, 1999) and especially in the north-eastern region of Bangladesh (Alam *et al.*, 2000). In Allahabad region, it constituted 17.0 per cent (Gupta and Tyagi, 1992) and 14.2 per cent of the total landing (Singh *et al.*, 1998). It is often cultured in South Western China, India, Pakistan, Bangladesh and Thailand (Chondar, 1999). It is a large

size species with higher consumer preference. It is a bottom feeder, feeds on dead and decaying matter at the bottom so it acts as scavenger and improves the sanitation of rivers, reservoirs, lakes and ponds. It is a riverine fish but also well established in natural lakes and in several artificial reservoirs and ponds.

Riverine fisheries are important as it provides nutritional food and employment for millions of people around the world (Dwivedi *et al.*, 2014). The numbers and weight of individuals in each size group can represent the composition of population. The size composition of the stock, the relative strength of different size groups and the maximum life span, within certain limits, are species characteristic. Most wild stocks in Indian rivers

have been overexploited or have their maximum sustainable yield due to over fishing, habitat degradation and pollution (Gupta and Acosta, 2004; Dwivedi and Nautiyal, 2012). The present study was aimed to highlight the exploitation pattern and size composition of *L. calbasu* from the lower stretch of the Yamuna river at Allahabad, Uttar Pradesh. This study helps in formulating the fishery management policies.

RESEARCH METHODOLOGY

Climate :

The climate of this region is marked by mild cold during winters and intensive heat during summers. The monsoon season is July to September. Some times winter rainfall is also recorded.

Sampling :

The Yamuna river is a right bank tributary of the Ganga river. *Labeo calbasu* was collected using a variety of methods including drag netting (mahajal, chaundi, darwari), cast netting, gill netting and hook and line. The 176 samples were collected at random during the months July 2013 to January 2014 from the Sadiapur fish market. This market represents the fishes of lower stretch of the Yamuna river at Allahabad. Sizes of fishes were measured by simple measuring scale. Total length (TL) of fish was measured from tip of the snout to the largest rays of caudal fin. Collected data were classified at 3 cm intervals and size composition varied from 11.2 to 52.0 cm size groups. The number of samples calculated according to size group then converted into percentage.

RESEARCH FINDINGS AND ANALYSIS

Size composition of *L. calbasu* varied from 11.2 to 52.0 cm size group from the lower stretch of the Yamuna river at Allahabad. The large size of fishes also recorded in the Yamuna river. The maximum exploitation was observed in 32.1-35.0 cm (17.61%) size groups. Minimum exploitation was recorded with 0.57 per cent in 44.1-47.0 and 50.1-53.0 cm size groups each. Fish was not recorded in 47.1-50.0 cm size group. Lower size group 11.1-14.0, 14.1-17.0, 17.1-20.0 and 20.1-23.0 were exploited 3.98 per cent, 6.82 per cent, 11.36 per cent and 9.09 per cent, respectively. Middle size group 23.1-26.0, 26.1-29.0, 29.1-32.0 and 32.1-35.0 cm were shared in exploitation 7.95 per cent, 11.93 per cent, 13.64 per cent

and 17.61 per cent, respectively. Higher size group, 38.1-41.0 and 41.1-44.0 cm were contributed in exploitation 3.98 per cent and 2.27 per cent, respectively (Fig. 1). On the basis of data, it is observed that middle size group was maximum exploited (51.13%) at Allahabad. Lower size group was exploited 31.25 per cent. Higher size group shared sizeable proportion with 17.62 per cent in exploited population (Fig. 2). Results also indicated that the exploitation was not systematic in lower size group to middle size group. If lower size group exploitation is not systematic then it is an alarming sign for future population of *L. calbasu*.

Middle size group was maximum exploited compared to lower and higher size groups from the lower

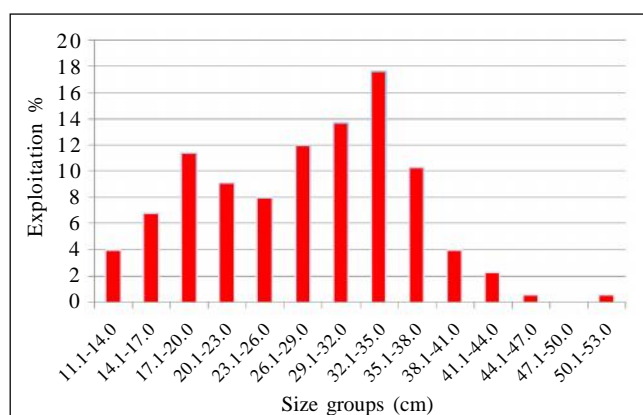


Fig. 1 : Exploitation pattern of *L. calbasu* from the Yamuna river

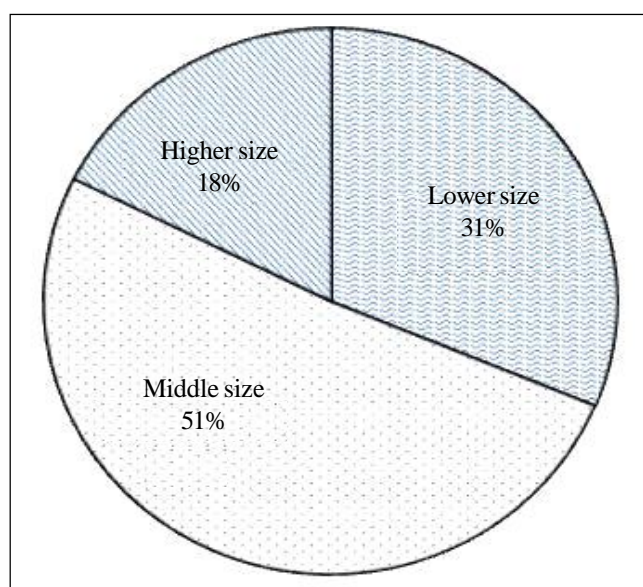


Fig. 2 : Exploitation pattern according to major group-wise

stretch of the Yamuna river at Allahabad. Exploitation is an economic activity governed by social needs and pressures. Over exploitation and non-targeted fishing is the biggest problem of riverine fishery. Dwivedi *et al.* (2006) recorded lower size group of *L. calbasu*, maximum exploited in the Ghaghara river at Faizabad. Kamal (1969) estimated lower and middle age groups of *Cirrhinus mrigala* were highly exploited from the river Yamuna at Allahabad. Seth and Katiha (2001) also reported lower and middle size group were highly exploited in *Aorichthys seenghala* from the rivers Ganga and Yamuna. Fishing affects the population by the exploited section of the stock. Optimum exploitation is the level of maximum catch at which the population remains stable (Nikolskii, 1980). According to Gupta and Tyagi (1992), *Labeo calbasu* is presently exploited above maximum sustainable yield (MSY) at Allahabad. According to

Nautiyal and Negi (2004), a continuously exploited population needs to be monitored for its ecological health, through its age structure or size structure, even after following the norms of sustainability (MSY).

Conclusion :

It may be concluded that the research provides an important baseline study of this fish. Size composition indicated that the stock of *L. calbasu* in the Yamuna river was in healthy condition but exploitation disturbed. Present condition (disturbance) was recorded due to overexploitation of this fish in past.

Acknowledgement :

The first author is highly thankful to Dr. K.D. Joshi, Head, Regional centre, Central Inland Capture Fisheries Research, Allahabad for allowing to use the lab facilities.

LITERATURE CITED

- Alam, M., Amin, S.M.N. and Haroon, A.K.Y. (2000). Population dynamics of *Labeo calbasu* (Hamilton) in the Sylhet basin, Bangladesh. *India J. Fish.*, **47**(1): 1-6.
- Chondar, S.L. (1999). *Biology of finfish and shellfish*. SCSC Publishers (India), Howrah, pp. 1-514.
- Dwivedi, A.C., Mayank, P., Tripathi, S., Khan, S., Imran, S. and Mishra, A.K. (2014). Age composition and growth parameters of *Labeo calbasu* (Hamilton, 1822) from the middle stretch of the Ganga river, India. *J. Kalash Sci.*, **2**(2) : 39-42.
- Dwivedi, A.C. and Nautiyal, P. (2012). Stock assessment of fish species, *Labeo rohita*, *Tor tor* and *Labeo calbasu* in the rivers of Vindhyan region, India. *J. Environ. Biol.*, **33** (2): 261-264.
- Dwivedi, A.C., Srivastava, S., Rawat, A. and Singh, K.R. (2006). Size composition of highly exploited fish species *Labeo calbasu* in the river Ghaghara (Saryoo). *Aquaculture*, **7** (1) : 137-140.
- Gupta, M.V. and Acosta, B. (2004). A review of global tilapia farming. *Aquaculture Asia*, **9** (1): 7-16.
- Gupta, R. A. and Tyagi, R.K. (1992). Analytical approach to analysis of fish stocks of the Ganga River System. *J. Inland Fish. Soc. India*, **24** (2): 20-27.
- Imran, S., Nagar, S. and Jha, D.N. (2014). Food and feeding habit of *Labeo calbasu* (Hamilton, 1822) from different habitat. *J. Kalash Sci.*, **2**(1) : 71-73.
- Kamal, M.Y. (1969). Studies on the age and growth of *Cirrhinus mrigala* (Hamilton) from the commercial catches at Allahabad. *Proc. Nat. Inst. Sci. India*, **35B** (1) : 72-92.
- Nautiyal, P. and Negi, R.S. (2004). Population structure, dietary resources utilization and reproductive strategies of sympatric *Barilius bendelisis* and *B. vagra* in lesser Himalayan mountain streams. In: B. N. Pandey (Ed.), *fish research 21th centaurry*. APH Publishing Corporation, Delhi. pp. 43-68.
- Nikolskii, G.V. (1980). *Theory of fish population dynamics as the biological background for rational exploitation and management of fishery resources*. Bishen Singh Mahendra Pal Singh Dehra Dun (India) and Otto Koeltz Science Publishers Koenigstein, W. Germany, pp. 1-323.
- Seth, R.N. and Katiha, P.K. (2001). The riverine fisheries of large sized silurides with special reference to *Aorichthys seenghala* (Sykes). *J. Indian Fish. Assoc.*, **28** : 1-9.
- Singh, H.R., Payne, A.I., Pandey, S.K. and Singh, P.R. (1998). Time scale changes in the catch structure of fishery in Allahabad. *Proc. Natl. Acad. Sci. India*, **68B** : 15-21.