

## SIZE STRUCTURE AND EXPLOITATION PATTERN OF *AILIA COILA* (HAMILTON, 1822) FROM THE GANGA RIVER AT ALLAHABAD, INDIA

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**ABSTRACT :** Two stressors viz. fishing pressure and invasion of exotic species are the most alarming threat for economically important fish species of freshwater. The small sized minor catfish species belonging to family schilbeidae (order Siluriformes), contribute a major portion of the catches from rivers. *Ailia coila* is one of the small sized catfish, which is regularly found in the catches from river Ganga at Allahabad. However, the biology of this fish has not been studied so far. With an aim to study the present status of *Ailia coila*, the study on selected parameters of fish biology were undertaken from the catches of river Ganga and Yamuna river at Allahabad. The fish samples were obtained randomly during the months of July 2015 to June 2017 from the Ganga river at Allahabad. The collected fishes were grouped into different size group with 10 mm size interval. Exploitation pattern of the small catfish *Ailia coila* in river Ganga was studied. Maximum exploitation was recorded in 141-150mm size group with 16.22% and minimum in 91-100 mm size group with 3.68% in the collected samples. In the wake of diminishing population of indigenous fish groups of river year after year, the exploitation pattern indicated that the middle sized group fishes are overfished as they are preferred fish used as cheap food by fishermen and consumers. It was observed that middle sized groups of fish stock of mature fishes is very healthy in the Ganga river at Allahabad, India.

**Key words :** Size structure, exploitation pattern, *Ailia coila*, Ganga.

### INTRODUCTION

*Ailia coila*, one of the small sized catfish, belonging to family Schilbeidae (order : Siluriformes) is a common fish in the commercial catches from Indian riverine waters. In Allahabad, it is recorded as a major portion of miscellaneous fish catch including other Schilbeids like *Clupisoma garua*, *Eutropiichthys vacha*, *Ompak pabda*, *Ompak bimaculatus* etc. Riverine fishes are important as it provide nutritional food and sustenance to million of people around the world (Dwivedi *et al*, 2014). The fisheries of river Ganga at Allahabad has undergone a vast change during last few decades (Gupta and Tyagi, 1992; Singh *et al*, 1998; Dwivedi *et al*, 2016). While population of indigenous major carps here declined during last two decades due to various factors like over-exploitation, habitat degradation due to climate and pollution, invasion of hardy exotic species like common carp, *Tilapia*, *Cyprinus carpio* etc (Table 1, Fig. 1) the yield of miscellaneous catch, including *Ailia coila*, if not increased has remained more or less constant. As such these species seem to be more viable during the changes in aquatic condition.

Commercially important freshwater catfish which are widely distributed in India, Bangladesh, Nepal and Pakistan (Chondar, 1999) are recorded to be confined to Jamuna, Ganga, Brahmaputra and Mahanadi rivers in India (Talwar and Jhingran, 1991; Menon, 1999). It is commonly known as 'Banspatti or suti' at Allahabad, and is largely utilized as a food fish (Dwivedi *et al*, 2016; Patra *et al*, 2005; Mishra *et al*, 2009). It is one of the most desirable food fish species used by majority of consumers. Although, reports of some studies on *Clupisoma garua* and *Eutropiichthys vacha* (Mijkherjee *et al*, 2002; Lakra *et al*, 2010; Rahman *et al*, 2012; di Sungai *et al*, 2013; Froese and Pauly, 2014; Jha *et al*, 2016) are available, no report of *Ailia coila* is available at present. However, the parameters or the biology of this fish like size composition, exploitation pattern etc are unexplored. Present investigation is aimed to carry the investigation on the fish aims to update the information on the size composition and exploitation pattern of *Ailia coila* from the stretch of the river Ganga at Allahabad, India. The observation are reported for the first time.

## MATERIAL AND METHODS

Specimen of *Ailia coila* (Hamilton, 1822) were collected from one of the fish landing sites of Allahabad, i.e Teliarganj. Samples were collected during April 2015 to March 2017. Total 302 fish specimens were analysed for this study.

## RESULTS AND OBSERVATION

*Ailia coila* is one of the commercially exploited fish species in the river Ganga at Allahabad. In this study, the total length of fishes was found to range 79-200 mm. Maximum exploitation was recorded in 141-150 mm size groups with 16.22% and minimum exploitation was recorded in 91-100 mm size group with 3.68% in the stock (Table 2). Overall, middle size group of fish contribute maximum percentage in total fish stock examined i.e. 51.31% then small size group with 32.8% and large size group with 15.93% (Figs. 2, 3). It is observed that the middle sized group was highly exploited as compared to lower and higher size group of fishes. Stock of mature fishes was observed to be very healthy in the Ganga river at Allahabad.

## DISCUSSION

Most of the wild stocks in Indian rivers have been overexploited or have their maximum sustainable yield due to over fishing, habitat degradation or pollution resulting from anthropogenic activities (Gupta and Acosta, 2004; Dwivedi and Nautiyal, 2012). *Ailia coila*, one of the minor small sized catfish has been a constant part of catch from rivers of U.P. They were included among miscellaneous group of fishes captured from rivers. The numbers and net of individuals in each size group represent the composition of population. The size composition of stocks, the relative strength of different size groups and the maximum life span, within certain limit are species characteristic (Sheeba *et al*, 2015) to be considered while studying their biology.

The size structure of fishes indicate the status of food supply and suitability of the environmental condition (Tripathi *et al*, 2015; Vilizzi *et al*, 2015). It is also the indicator of the fishing pressure and stressors (Pathak *et al*, 2015; Jackson *et al*, 2016). Although, the non-targetted fishing is the biggest problem of riverine sector of fishery, in river Ganga at Allahabad, it seems that large sized fishes are targetted as these are considered economically more important. Imran *et al* (2015) have reported exploitation of middle sized group of *Labeo calbasu* at Allahabad (Sheeba *et al*, 2015). Middle sized group of *Cirrhinus mrigala* was found to be highly exploited from river Yamuna at Allahabad (Kamal, 1969), same was observed in case of *Eutropiichthys vacha* from river

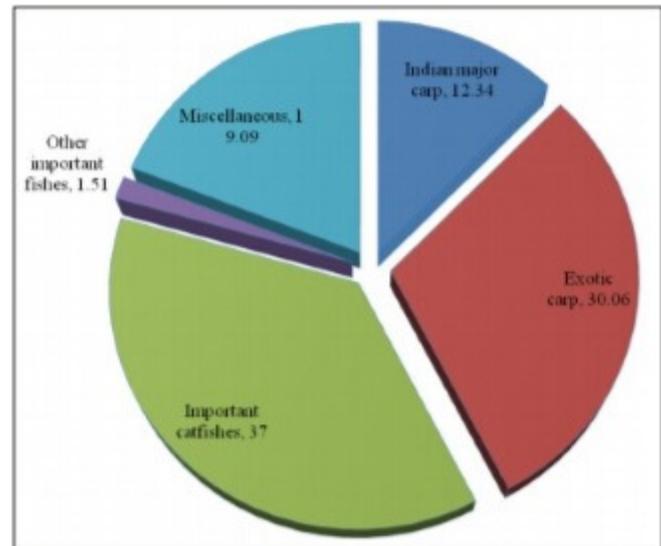


Fig. 1 : Annual landing of various groups from the Ganga river at Allahabad (From Tripathi *et al*, 2017).

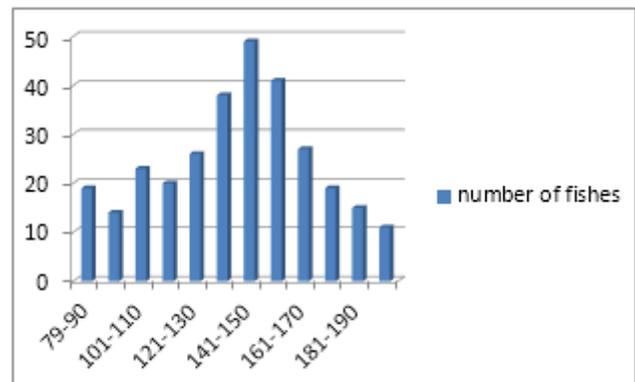


Fig. 2 : Showing number of fishes in each size group.

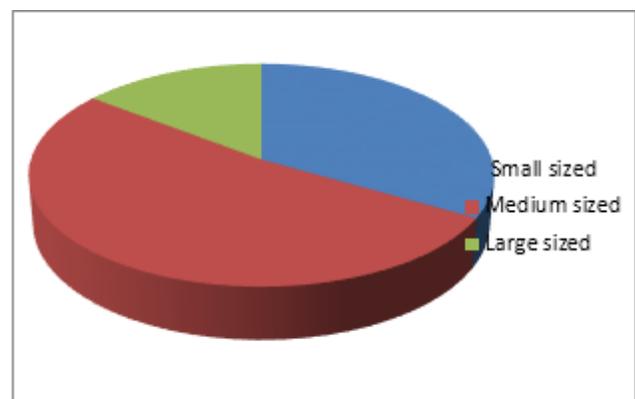


Fig. 3 : Showing percentage of fishes in different size groups of groups out of total percentage of fishes investigated.

Ganga at Allahabad (Sheeba *et al*, 2015). Seth and Katiha (2001) also reported lower and middle size group to highly exploited in *Aorichthyes seenghala* from the rivers Ganga and Yamuna (Seth and Katiha, 2001). It has been a general observation that the middle size groups are maximum exploited in riverine or natural stocks as compared to other size groups (Tripathi *et al*, 2015;

**Table 1** : Annual landing scenario (July 2015 to June 2016) of fishes from the Ganga river at Allahabad.

| Groups/Fish species           | Average catch/day (kg.) | Total catch of the year (kg.) | Percentage |
|-------------------------------|-------------------------|-------------------------------|------------|
| <b>Indian major carps</b>     |                         |                               |            |
| <i>Catla catla</i>            | 1.74                    | 639                           | 1.41       |
| <i>Labeo rohita</i>           | 3.20                    | 1171                          | 2.58       |
| <i>Cirrhinus mrigala</i>      | 10.35                   | 3787                          | 8.35       |
| <b>Exotic carps</b>           |                         |                               |            |
| <i>Cyprinus carpio</i>        | 19.22                   | 7033                          | 15.50      |
| <i>Oreochromis niloticus</i>  | 18.05                   | 6608                          | 14.56      |
| <b>Important catfishes</b>    |                         |                               |            |
| <i>Sperata seenghala</i>      | 16.21                   | 5934                          | 13.08      |
| <i>Sperata aor</i>            | 6.78                    | 2481                          | 5.47       |
| <i>Clupisoma garua</i>        | 8.07                    | 2955                          | 6.51       |
| <i>Eutropiichthys vacha</i>   | 4.09                    | 1496                          | 3.30       |
| <i>Wallago attu</i>           | 5.06                    | 1851                          | 4.08       |
| <i>Rita rita</i>              | 2.91                    | 1065                          | 2.35       |
| <i>Bagarius bagarius</i>      | 2.74                    | 1001                          | 2.21       |
| <b>Other important fishes</b> |                         |                               |            |
| <i>Labeo calbasu</i>          | 1.20                    | 441                           | 0.97       |
| <i>Mastacembelus armatus</i>  | 0.67                    | 246                           | 0.54       |
| <b>Miscellaneous</b>          | 23.67                   | 8663                          | 19.09      |

**Table 2** : Showing range of different size groups of total length (mm) and number of fishes in each group.

| S. no.       | Range (in mm) | Number of fishes | Percentage (%) |
|--------------|---------------|------------------|----------------|
| 1.           | 79-90         | 19               | 6.29           |
| 2.           | 91-100        | 11               | 3.68           |
| 3.           | 101-110       | 23               | 7.61           |
| 4.           | 111-120       | 20               | 6.62           |
| 5.           | 121-130       | 26               | 8.60           |
| 6.           | 131-140       | 38               | 12.58          |
| 7.           | 141-150       | 49               | 16.22          |
| 8.           | 151-160       | 41               | 13.57          |
| 9.           | 161-170       | 27               | 8.94           |
| 10.          | 171-180       | 19               | 6.29           |
| 11.          | 181-190       | 15               | 4.96           |
| 12.          | 191-200       | 14               | 4.68           |
| <b>Total</b> |               | <b>302</b>       | <b>100</b>     |

Pathak *et al*, 2015; Nikolskii, 1980; Mayank and Dwivedi, 2015). This type of exploitation indicates a stable stocks in the river. Present investigation provides a baseline record of *Ailia coila* from river Ganga at Allahabad and it is suggestive of a stable population in the river.

Large sized economically important fishes are targeted by the fishermen from rivers (Welcomme, 2008; Tripathi *et al*, 2017), but the exploitation pattern observed in the present investigation revealed the fact of over

exploitation of the middle sized group of fishes. In the wake of diminishing population of indigenous fish groups from our rivers, the demand for these small sized fishes is increasing and is hoped to increase in future times. The size composition and productivity of fish species in the river is changing drastically (Dwivedi, 2009), which needs to be addressed to improve the fish population in river Ganga and special attention is needed for conservation and population of small sized catfishes including *Ailia coila*.

In Allahabad region the fish *Ailia coila* contributed a significant portion of the catches from the river Ganga and Yamuna as a miscellaneous group of fish from freshwater. Excessive harvesting of the fish could be a threat to its population (Patra *et al*, 2005; Mishra *et al*, 2009).

However, with the decline in the population of indigenous species and increased demand of these small sized catfish species, it is necessary to take precautionary measure to conserve the population of natural stock of the fish and at same time measure are needed to formulated the policies for enhancement of the population undertaking culture practices of the small sized catfishes, including *Ailia coila*.

It is hoped that present study will help in formulation of fishery management strategies for *Ailia coila* in river Ganga and in culture sector which is need of hour to ensure and enhance the biodiversity of this river for future.

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