

## A report on the occurrence of *Bangana dero* (Hamilton, 1822) from Deepor beel (Ramsar site no. 1207), Brahmaputra valley, Assam

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### Abstract

Deepor beel (Latitude: 26°05'26"N to 26°09'26" N; Longitude: 90°36' E to 90°41'25" E) located in Kamrup district, Assam is a large (water spread area of 589 ha) natural wetland and a Ramsar site of international importance (Site number 1207 declared in 2002) having enormous biological and environmental importance. The wetland receives water from surface run-off as well as from two hill streams (Basistha and Kalamoni) and drains into River Brahmaputra, through a small rivulet (Khanajan). The beel supports a number of endemic endangered and threatened animals and plants that are included under IUCN red-list. Past studies indicated the occurrence of 67 fin-fish species in the beel. In a recent survey conducted by us, the beel *Bangana dero* (Synonyms: *Cyprinus dero*/ *Labeo dero*), a cyprinid fish, was collected for the first time from the beel. We collected as many as 28 specimens of *B. dero* from the beel during October 2016. The total length of the reported specimens ranged from 8.77 - 10.14 cm and weight ranged from 6.74 - 10.61 g. The length-weight relationship of the species was worked out as  $W = 0.074 * L^{2.103}$ . *B. dero* reportedly inhabits upland rivers, torrential hill-streams; adults migrate to warm downstream regions during the winter season (December-February). Thus, the occurrence of this species in Deepor beel indicates its possible downstream migration from one or both the feeder rivers (Basistha and Kalamoni) or migration from Brahmaputra River through its connecting channel.

**Keywords:** Assam, *Bangana dero*, Deepor beel, Occurrence

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### INTRODUCTION

Floodplain wetlands are primarily formed by river meandering activity and are situated in the floodplains of rivers. India has a wealth of floodplain wetland ecosystems that support diverse and unique habitats. Floodplain wetlands are locally known as beels in Assam and cover an estimated area of over 100,000 ha (Das *et al.*, 2009, 2017, 2018). Deepor beel (26°05'26"N to 26°09'26" N Latitude and 90°36' E to 90°41'25" E Longitude) located 10 km south-west of Guwahati city,

Kamrup district, Assam is one of the large natural wetland with water spread area of 589 ha (Acharjee *et al.*, 2009), a Ramsar site of international importance (Site number: 1207) declared in 2002 and have great biological and environmental importance (Deka and Goswami, 1992). The wetland receives drainage from rainfall runoff and from Basistha and Kalamoni, which are torrential rivers and drains into the mighty Brahmaputra River, through a small rivulet called Khanajan. This wetland is a site of rich floral and faunal

diversity (Saikia, 2005). With regard to ichthyofaunal diversity, this wetland supports 54 indigenous and 5 exotic fish species (Saikia, 2005). Acharjee et al. (2009) reported the occurrence of 46 species belonging to 17 families. Bhattacharjya et al. (2014) reported a total of 67 fin-fish species from this wetland, an increase over the years. Cyprinids are the numerically most abundant primary freshwater family in the Indo-Burma region (Kottelat et al., 2012) and this holds true for this wetland too with 46.3% of the total fish species being represented by cyprinids. This paper records the occurrence of *Bangana dero* (Hamilton, 1822; Synonyms: *Cyprinus dero*/ *Labeo dero*) in Deepor beel, categorised as least concern as per IUCN (2017), commonly known as *Kalabans*, locally known as *Nepura* in Assam and comments upon the possible mode of introduction. Thus, the total number of fin-fish species recorded from Deepor beel stands at 68 and the total number of cyprinids at 32.

### MATERIALS AND METHODS

A total of 28 specimens of *Bangana dero* (Fig. 1) were collected from Azara landing centre (26° 13'03''N and 91° 58'28''E) of the Deepor beel (Fig. 2) during October 2016. The specimens were caught by fishers using dragnet of 5-10 mm mesh size and brought to the landing centre. The collected specimens were identified with the help of published manuals (Talwar and Jhingran, 1991; Vishwanath et al., 2007). Representative specimens are preserved in Aquatic Biology laboratory of ICAR-CIFRI Regional Centre, Guwahati in formalin (10%) and ethanol (70%) following Biswas (1992).

### RESULTS

The present study reported that the total length of the reported specimens ranged from 8.77 – 10.14 cm and weight ranged from 6.74 – 10.61 g. Descriptive statistics of morphometric traits for the



Fig. 1. *Bangana dero* (Hamilton, 1822).

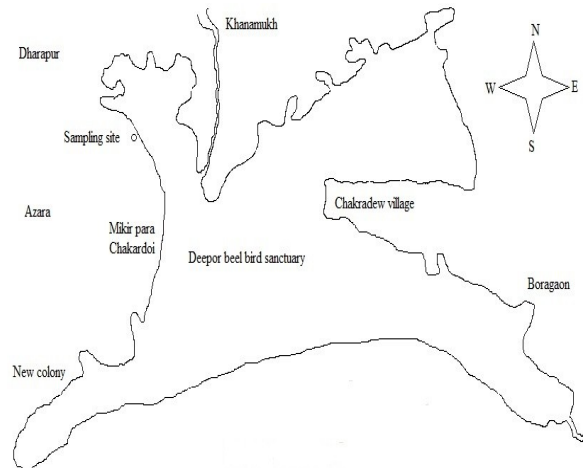


Fig. 2. Specimens collection site (Azara landing centre, Deepor beel, Guwahati, Assam).

collected specimens and respective body proportions in relation to total length (mean values) are presented in Table 1. With regard to the meristic characters, 41 – 44 scales were found along the lateral line and fin formula was found to be D ii-iii 10-12; A ii-iii 5-6; P i 14-16; V i 7-8. Frequency distributions of different meristic characters of the collected specimens are given in Table 2. The length-weight relationship was worked out as  $W = 0.074 \cdot L^{2.403}$ .

### DISCUSSION

*B. dero* is distributed throughout the Himalayan foothills in India, Nepal, and China as well as reported from Bangladesh (IUCN, 2017). It has been introduced in peninsular India and Sri Lanka. This species inhabits mainly in upland rivers, torrential hill-streams, particularly in shallow waters (Talwar and Jhingran, 1991) and is potamodromous by nature (Riede, 2004). These species migrate to warm regions such as downstream of rivers and warmer lakes during the winter season (Raina and Petr, 1999) to survive the low temperature in high altitudes. The lower and upper elevation limits for this species are reported to be 135 msl and 1424 msl, respectively (IUCN, 2017). The major river flowing into this water body is Basistha which is a shallow, torrential stream originating in the Meghalaya foothills and occurrence of this species in the beel might be due to such downstream winter migration from connecting rivers. However, it could not be verified whether *B. dero* is reported from Basistha river and adjoining hill streams draining into this wetland as limited work has been done on the ichthyofaunal diversity of these rivers and thus studies on fish diversity of these rivers is essential to ascertain the fact. *B. dero* is a commercially important minor carp of Brahmaputra river in Assam (Bhattacharjya et al., 2017) and there are also possibilities that this species might have migrated from the River Brahmaputra into

**Table 1.** Descriptive statistics of morphometric traits of *B. dero* collected from Deepor beel.

Traits (cm)	Maximum	Minimum	Mean±SE	Coefficient of variation (%)	% of total length (mean values)
Total length	10.14	8.77	9.61 ± 0.07	3.90	100.00
Head length	1.99	1.69	1.82 ± 0.01	3.87	18.94
Eye diameter	0.6	0.44	0.51 ± 0.01	7.63	5.31
Pre dorsal fin length	3.69	3.06	3.38 ± 0.03	4.63	35.17
Standard length	8.07	6.9	7.52 ± 0.05	3.77	78.25
Fork length	8.99	7.52	8.28 ± 0.07	4.21	86.16
Body depth	2.07	1.67	1.94 ± 0.02	4.84	20.19
Depth of caudal peduncle	0.9	0.72	0.81 ± 0.01	5.52	8.43
Snout length	0.59	0.38	0.49 ± 0.01	10.86	5.10
Pre pelvic length	4.1	3.6	3.88 ± 0.02	3.08	40.37
Pre pectoral length	1.91	1.52	1.74 ± 0.02	6.58	18.11
Pre anal fin length	6.16	5.28	5.71 ± 0.04	3.78	59.42
Height of the dorsal fin	1.91	1.37	1.70 ± 0.02	7.63	17.69

the wetland through the connecting channel. This species has not been reported from this wetland prior to the present findings. *B. dero* prefers a water temperature range of 19.5-25.5°C (Nath, 1994). As per air temperature data collected from Regional Meteorological Centre, Guwahati, the monthly mean air temperature in Guwahati station during September 2016 was 29.4°C which decreased to 27.6°C in October and further dropped to 23.4°C during November 2016. The drop in air temperature corresponds to drop in water temperature and there is a possibility that temperature decline in the hill streams beyond its favourable range has resulted in the downstream migration of this species to warmer waters of the wetland, where water temperature on the date of sampling date was found to be within its favourable range (23.3°C). Another aspect is the feeding cessation due to drop in temperature in *B. dero* and subsequent downstream migration to warmer waters. This has been observed in *L. dyocheilus*, another similar migratory hill stream fish which showed highest body weight gain owing to higher feeding intensity in the temperature range of 20-22°C as compared to 18-20°C and 16-18°C when reared in captivity (Verma, 2015). It should be noted that the species might have migrated to this wetland in the years before as well, but it is the first instance of this species being reported from Deepor beel. A number of studies have been made on the length-weight relationship of fin-fish species from Brahmaputra basin, Ganga basin and Peninsular rivers of India (Nath et al., 2017; Baitha et al., 2018; Koushlesh et al., 2018; Borah et al., 2018; Nath et

al., 2019; Mol et al., 2019; Borah et al., 2019). Studies on the length-weight relationship showed *b* value of 2.403 and *a* value of 0.074. The value of *b* is outside the normal range of 2.5-3.5, as suggested by Froese (2006). The multitude of factors either singly or in combination such as a number of specimens examined; fish habitat; the degree of stomach fullness; sex; stage of gonadal maturity; and differences in the observed length range of the specimens cause variations in observed *b* values (Froese, 2006). In the present study, *b* value which is outside the normal range may be attributed to being a limited sample size, narrow variations in size groups in observed specimens and limited sampling period. Length-weight relationship of 6 indigenous fish species from Deepor beel with larger sample size, revealed *b* value within the normal range of 2.778 to 3.215 (Borah et al., 2017).

### Conclusion

*B. dero* is a commercially important minor carp of Brahmaputra River in Assam. It is an important food and game fish and has a ready demand in the local market with a better price than Indian major carps. The occurrence of this species in Deepor beel indicates its possible downstream migration from one or both the feeder rivers (Basistha and Kalamoni). There are also possibilities that this species might have migrated from river Brahmaputra into the wetland through the connecting channel. This species has not been reported from this wetland prior to the present findings. Thus, the present finding adds to a num-

**Table 2.** Frequency distribution of meristic characters of *B. dero* from Deepor beel, Assam.

	Dorsal fin ray		Anal fin ray		Pelvic fin ray		Pectoral fin ray									
	BR	UBR	BR	UBR	BR	UBR	BR	UBR								
	Lateral line scales															
	41	42	43	44	2	3	4	5	6	7	8	1	14	15	16	
<b>Frequency</b>	2	5	13	8	24	4	4	24	4	28	20	8	28	4	4	20
<b>Percent (%)</b>	7.1	17.9	46.4	28.6	85.7	14.3	14.3	85.7	14.3	100	71.4	28.6	100	14.3	14.3	71.4

\*BR = Branched Ray; UBR = Unbranched Ray

ber of fin-fishes recorded from wetland with the total number standing at 68 and the number of cyprinids at 32. The findings of the study will be helpful in conservation of fish diversity from this important Ramsar site.

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