

Full Length Research Paper

First ever record of a threatened onespot barb fish, *Puntius terio* (Hamilton) from Arunachal Pradesh, India: A biodiversity hot spot

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Arunachal Pradesh is geographically the largest state in North-East region of India with rich lentic and lotic water resources. The state has more than 7000 ha of lentic water and 2000 km of lotic water resources. Arunachal Pradesh is the 18th hot spot of the world in view of the richness of biological diversity. It constitutes high endemism and comparatively higher incidence of rare and threatened taxa. Available literature suggests that *Puntius terio* has not been reported earlier from the aquatic habitat of Arunachal Pradesh except in West Bengal, Assam, Manipur and Tripura in India, Bangladesh and Pakistan. This fish has incomplete lateral line with 22 to 24 scales on the lateral line, barbels absent, dorsal fin spine smooth and osseous and round golden-edged black blotch on 16th to 18th scales. The present finding of the threatened fish, *P. terio* requires its conservation in the water system of the biodiversity hot spot, Arunachal Pradesh.

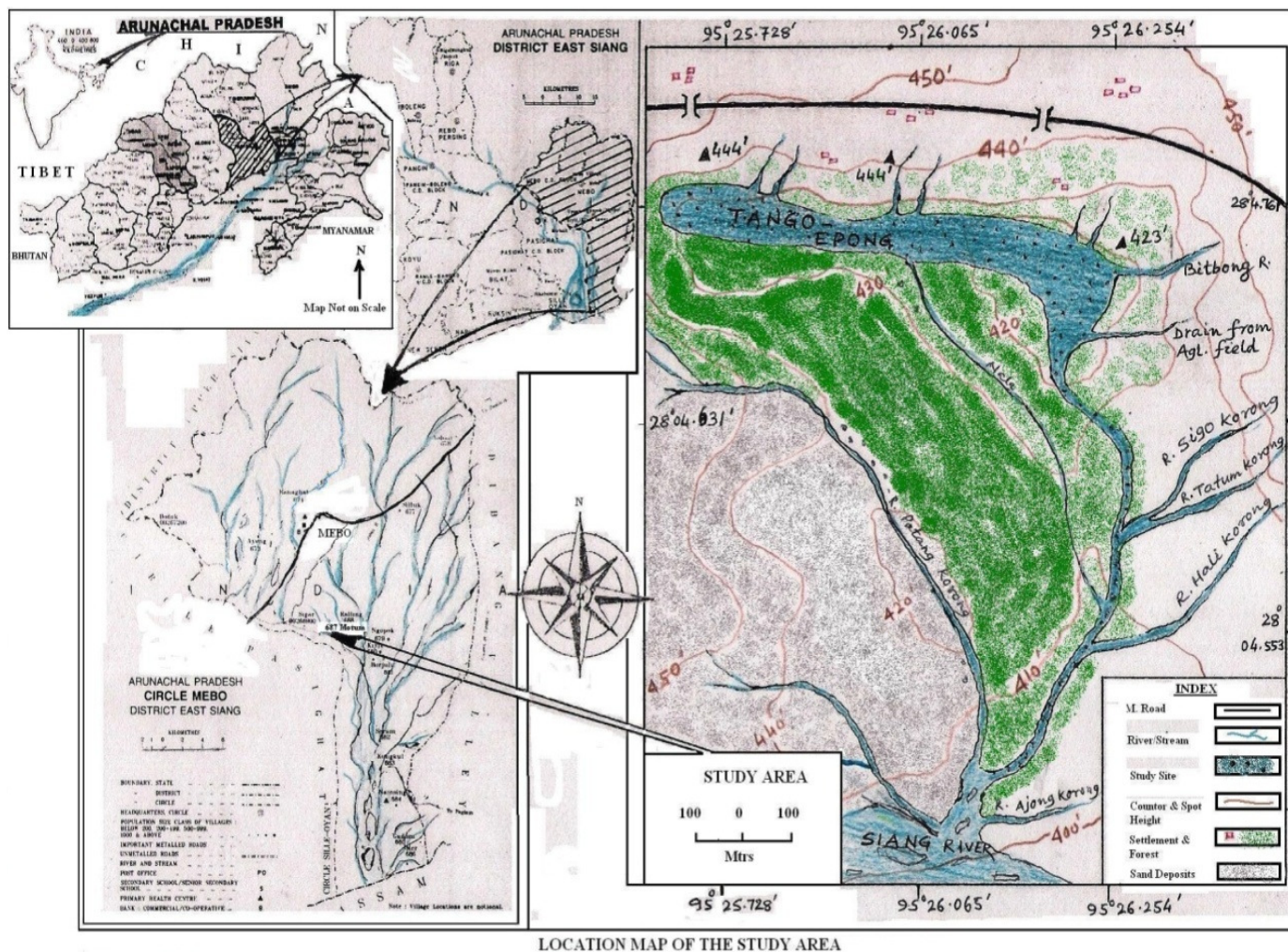
Key words: First ever record, threatened, *Puntius terio*, Tango Epong stream, Arunachal Pradesh.

INTRODUCTION

Arunachal Pradesh is geographically the largest state in North-East region of India with rich lentic and lotic water resources. The state has more than 7000 ha of lentic water and 2000 km of lotic water resources. Arunachal Pradesh is the 18th hot spot of the world in views of the richness of biological diversity. It constitutes high endemism and comparatively higher incidence of rare and threatened taxa. North-eastern India is a mega-biodiversity centre and hotspot (Myer et al., 2000). Area wise, Arunachal Pradesh is the largest state in the north-east region of India. The state is 18th biodiversity hot spot (Baishya et al., 2001). It is a land of lush green

forests, deep river valley and beautiful places (Jha, 2008). It is a Zoological Paradise. The geography of the state is varied with variation of mountaineous ranges. The East Siang District with its headquarter at Pasighat is located between 27° 43'N and 29° 20'N latitude, 94° 40' E to 95° 35' E longitude. It is bounded by West Siang District in the west, Upper Siang District in the north, Lower Dibang Valley and Dibang Valley Districts in the east of Arunachal Pradesh and south to Dhemaji District of Assam. Down the middle of East Siang District, the mighty river Siang flows and thereby gives its name to the District. The altitude of the District varies from 13 to

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LOCATION MAP OF THE STUDY AREA

Figure 1. A detailed location map of study area.

273 m from the sea level.

As regards the information of fish fauna of Arunachal Pradesh, works of Jayaram (1963), Jayaram and Mazumdar (1964), Dutta Choudhary and Sen (1977), Dutta Choudhary (1978, 1980, 1981, 1994), Jhingran and Sehgal (1978), Sinha (1994), Nath and Dey (1985, 2000), Nath et al. (2010), Sarkar and Ponniah (2000), Sen (2000, 2006), Tamang et al. (2006), Nebeshwar et al. (2007), Jha et al. (2008, 2012) and Bagra et al. (2009) are worth mentioning. A perusal of the available literature suggests that *Puntius terio* (Hamilton) has not been reported earlier from the aquatic habitat of Arunachal Pradesh.

In the present study the fish species *P. terio* has been collected from Tango Epong. On the basis of its different morphometric characteristics, the fish has been identified as *P. terio* (Hamilton). The fish is locally known as Gali Metak by Adi Tribals. The specimens were further confirmed as *P. terio* (Hamilton) as descriptions given by Barman (2007) of Zoological Survey of India (ZSI), Kolkata.

The threatened status of *P. terio* is used as per the IUCN (2012).

MATERIALS AND METHODS

Fishes were collected from the Tango Epong stream situated between the N28°04.318' to 28°04.831' longitude and E095°26.121' to 095°26.778' latitude and elevation varied from 423 ft to 444 ft in Mottum village under Mebo Block of East Siang district of Arunachal Pradesh (Figure 1). The collected specimens were fixed in 6% formalin. In order to avoid damage to the caudal fin, the fixed specimens were kept in cylindrical transparent containers in an upside down position. Some of the specimens have been kept in the Fish Germplasm Explorations Research Laboratory, Department of Zoology, Jawaharlal Nehru College, Pasighat, Arunachal Pradesh and few in Ichthyological Research Laboratory, P.G Department of Zoology, T. M. Bhagalpur University, Bhagalpur. The identification has been made with the help of meristic and morphometric characteristics and identified following Jayaram (1991, 1994), Sen (1985), Talwar and Jhingran (1991), Menon (1999) and further confirmed as *P. terio* (Hamilton) as descriptions given by Barman (2007) of Zoological Survey of India (ZSI), Kolkata.



Figure 2. A specimen of one spot barb fish, *Puntius terio* (Hamilton).

Table 1. Morphometric observation of *Puntius terio* (Hamilton).

Characteristics observed	Mean \pm SD in mm (n=6)
Snout length	3.1 \pm 0.99
Head length	11.45 \pm 0.28
Predorsal length	24.65 \pm 0.78
Standard length	45.3 \pm 2.83
Total length	56.4 \pm 2.69
Eye diameter	3.7 \pm 0.70
Body depth	20.45 \pm 1.34
Length of dorsal fin	11.3 \pm 1.27
Length of pectoral fin	8.15 \pm 0.07
Length pelvic fin	7.65 \pm 0.64
Length of anal fin	8.10 \pm 0.14
Height of dorsal fin	7.2 \pm 1.41

RESULTS

Puntius terio (Hamilton)

Systemic account

Order: Cypriniformes
 Family: Cyprinidae
Puntius terio (Halminton)

1822. *Cyprinus terio* (Hamilton), *Fish. Ganges*, pp.389
 1822. *Cyprinus puntio* (Halminton), *Fish. Ganges*, pp. 318.389.
 1839. *Systemus gibbous* (Mc Clelland), *Asiat. Res.*, 19: 286, 385, Pl. 44, fig. 7.
 1853. *Systemus puntio* (Bleeker), *Verh. Bat. Gen.*, 25: 62.
 1853. *Systemus terio* (Bleeker), *Verh. Bat. Gen.*, 25: 62.
 1868. *Barbus Puntio*, Day, *Proc. Zoo. Soc. Lond.*, p. 100.
 1868. *Barbus terio* (Gunther), *Cat. Fish. Brit. Mus.* 7: 154.

1974. *Puntius terio* (Menon), *Inland Fish. Soc. India*. Spl. Pub., 1: 42.

1981. *Puntius terio*, Jayaram, *HBEW Fish India*, 103.
 1981. *Puntius terio* (Sen), *Rec. Zool. Sur. India, Occasional. Pap.*, 64: 85.

1985. *Puntius terio*, Talwar and Jhingran, *Inland Fish.*, 1: 290, Fig. 100.

1991. *Puntius terio* (Jayaram), *Rec. Zool. Sur. India, Occasional. Pap.* 135: 20

2007. *Puntius terio*, Fishes of North East India, Vishwanath, Lakra and Sarkar, P. 64, Fig. 74.

Material examined

Diagnostic characters: D.2-3/8; P.14- 15; V.9; A 2-3/5; C. 19

Dorsal profile arched greatly, ventral profile slightly. Head small and blunt. A moderately deep bodied fish without any vertical colour bands on body, without barbels, dorsal ray ossified, smooth and lateral line incomplete with 23 to 24 scales. Dorsal fin spine smooth and osseous; round golden-edged black blotch over anal fin from which a fine dark line runs back to the base of caudal fin. Mouth antero-superior, its width greater than inter-nostril distance. Both lips reflected equally (Figure 2).

Morphometric observation

The Morphometric of *Puntius terio* was observed and details are mentioned in Table 1.

Colour

The male are yellowish all over with their anal and ventral

fins touched with orange, female silvery with clear fins. A black blotch on the side, dorsal with a median band.

Distribution

Asia: Pakistan, India, Bangladesh and Myanmar. India: Odisha, West Bengal, Assam, Manipur, Bihar and Punjab.

DISCUSSION

The earlier workers such as Dutta Choudhary (1978, 1980, 1981 and 1994), Dutta Choudhary and Sen (1977), Jhingran and Sehgal (1978), Tamang et al. (2006), Nebeshwar et al. (2007), Jha et al. (2008), Bagra et al. (2009), Nath et al. (2010) and Jha et al. (2012) during their investigation did not report *P. terio* from Arunachal Pradesh. From Assam and the neighbouring North-Eastern state, 187 fish species have been reported (Sen, 1985). In Arunachal Pradesh, 131 ichthyospecies were reported (Nath and Dey, 2000) whereas 171 fish species were reported in the water system of seven north-eastern states (Sinha, 1994). Silas (2006) reported 136 endemic finfish species from North-Eastern India, whereas Bagra et al. (2009) reported 138 species of fishes from Arunachal Pradesh. From different districts of Arunachal Pradesh, 143 ichthyospecies were reported (Sen, 2006), but none of the investigators have reported the presence of *P. terio* in any type of water in Arunachal Pradesh.

The presence of *P. terio* in the water system of West Bengal is reported (Sen, 1992). From seven North-East states of India, 230 fish species were reported and out of which 139 species were reported from Arunachal Pradesh. With regards to the family Cyprinidae of species *P. terio*, Sinha (1994) reported its presence in only from Assam, Manipur and Tripura among the seven states of North-Eastern region of India. The presence of *P. terio* is also reported from the state of Assam, Meghalaya, Mizoram and Tripura (Sen, 2000) and Manipur (Vishwanath et al., 2007). *P. terio* is only found in Western Himalaya (WH), Indian Himalaya (IH) and Himalaya (H), whereas it is absent in Eastern Himalaya (EH), Central-Nepal Himalaya (C-NH), Central Highland (CH) and Western Ghats (WG) (Nautiyal, 2005).

Conclusions

Arunachal Pradesh once described as the "Hidden Land" by virtue of its geographical position, climatic conditions and altitudinal variations is a biodiversity rich region in the top of the North-Eastern part of India. The entire state is almost wholly a rugged mountainous terrain, with beautiful green vallies drained by innumerable streams, rivulets descending down from upper elevation to the plains of Assam to meet the mighty river Brahmaputra.

Arunachal Pradesh is the 18th hot spot of biological and habitat diversity (Baishya et al., 2001). Till date, limited work has been done in relation to fish faunal diversity in the state. Barman (2007) reported that the *P. terio* is in near threatened condition (IUCN, 2012) given the status of threatened species. The present findings of *P. terio* require its conservation in its natural habitat and more investigation should be done in the field of ichthyofaunal diversity so that real gene pool, germplasm exploration, cataloguing and conservation can be done in the future.

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