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continued on the back inside cover

Cover: Stripe-necked Mongoose *Urva vitticolla* in poster colours, adapted from photograph by Ashni Dhawale, by Pooja Ramdas Patil.

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NOTE

New distribution record of fish *Clupisoma garua* (Hamilton, 1822) (Siluriformes: Ailiidae) from the Sarpang District in southern central part of Bhutan

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Clupisoma garua (Hamilton, 1822) falls under catfish group, which is widely known by different names as Neria (Assam in India), Ghaura (Bangladesh), Baikha/ Jalkapoor (Nepal) (Wang et al. 2016). It belongs to the Ailiidae family under Siluriformes order and it is widely distributed across the Indian rivers and reservoirs. Globally, Ailiidae familiey is native to Africa and Asia which comprises of 66 species that belongs to 14 genera. However, nearly half of the species (32 species) are known from Asian countries that comprises of five genera including *Clupisoma*, *Ailia*, *Horabagrus*, *Laides*, and *Pseudeutropius* (Wang et al. 2016). Among them, the *Clupisoma* genus has five species of which four are reported from the Indian region: *garua*, *bastari*, *naziri*, and *montana* (Hora 1937). Globally, *C. garua* is distributed around the Ganga River system in India and Nepal, Ganga-Brahmaputra River system in Bangladesh and Indus River system in Pakistan (Bhokta & Solanki 2020). In case of India, *C. garua* is widely distributed in Bihar, West Bengal, Odisha, Madhya Pradesh, and Assam (Brahmaputra and Barak drainage) (Bhokta & Solanki 2020). However, this species is threatened in some localities such as southwestern Bengal due to overfishing (Verma et al. 2014) and decline from natural water bodies (Patra et al. 2005; Mishra et al. 2009). Meanwhile, the recent record of *C. garua* from Ayechu River had set new distribution record from the Bhutan. As per the IUCN Red List, the species is categorized under 'Least Concern' (LC) IUCN Red List (2020). However, both CAMP (Molur & Walker 1998) and CAFF (2006) had declared it as Vulnerable (VU), due to the reduction of populations in their natural habitats; while, in Bangladesh, the species is recently kept under Critically Endangered (Hanif et al. 2015) due to restricted geographical distribution fueled by the increasing anthropogenic and natural hazards (Siddik et al. 2017).

Clupisoma garua is commercially important freshwater fish that has a potential species for aquaculture system (Saraswat et al. 2014). The studies of Bhuiyan (1964) and Memon et al. (2010) also reported that *C. garua* is mostly consumed by various group of people including the marginalized people due

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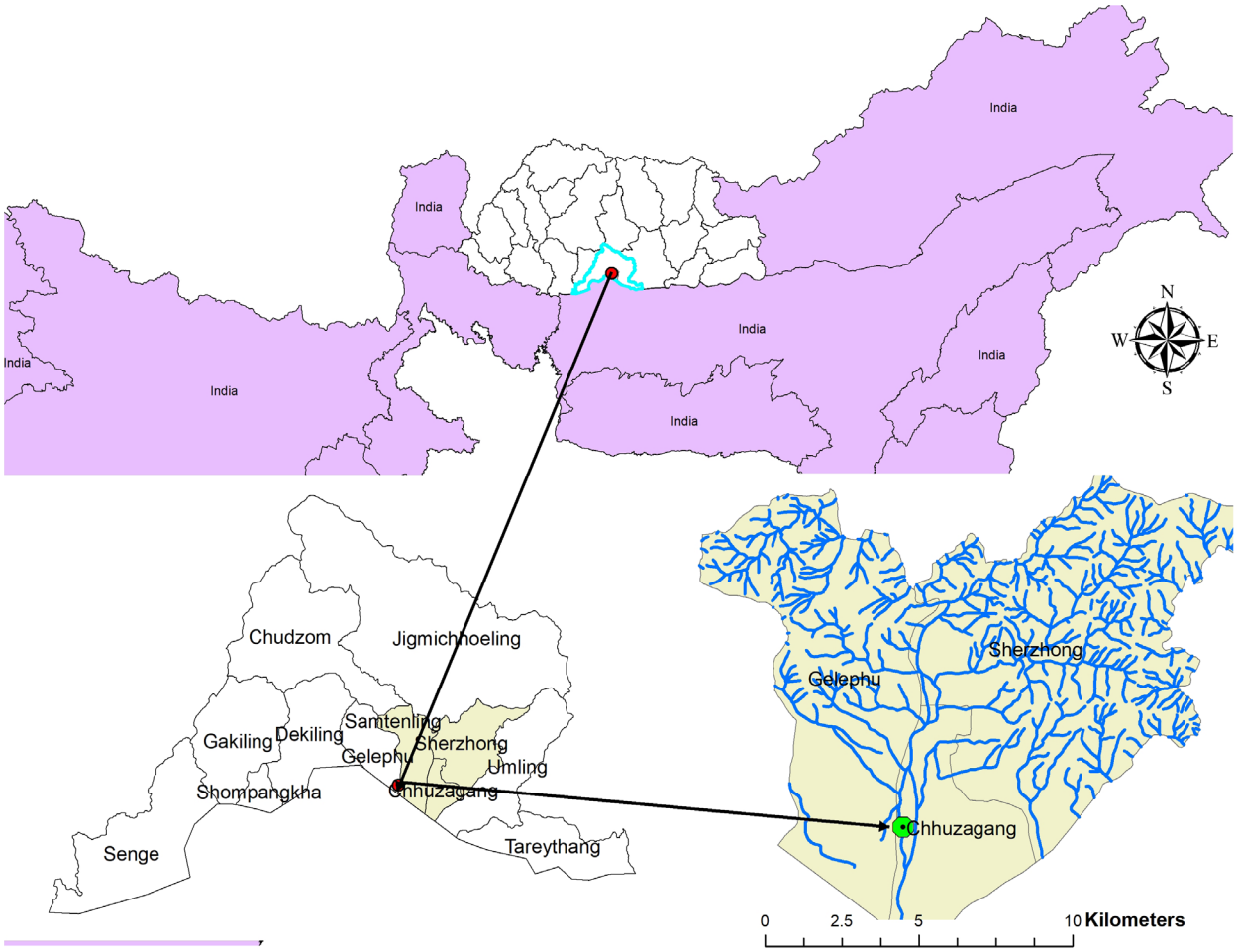

Figure 1. Bhutan map showing the location of Ayechu where *Clupisoma garua* was recorded in Sarpang District.

to high level of protein (18.40%) and fat (5.2%) content, followed by most abundant in some of the river system (Galib et al. 2009). Besides these, the species also has ornamental values that promotes livelihood of the coastal communities (Gupta et al. 2016).

Mouchhu basin in Gelephu is located between 26.923–26.847°N & 90.506-–90.504°E that falls under Sarpang District in the southern central part of Bhutan (Figure 1). Mouchu basin drains from the Black Mountain which is located at the central part of Bhutan that flows through Gelephu and exit towards India, which finally confluences with Brahmaputra River. In the case of Ayechu (26.875°N, 90.501°E), which is the diverted river of Mouchhu basin whereby *C. garua* was opportunistically recorded for the first time from this river in September 2020 using cast net. Since *C. garua* is a migratory species, it could have migrated from India during monsoon season through Mouchu basin as it hasn't been recorded during the past survey. With this new addition, Bhutan now has 126 fish species (DoFPS 2020), out of which 28 fish species are found in Sarpang District that belongs to 11 families (Tenzin 2022). Among 28 species, three species were categorized under Vulnerable, three Endangered, two Near Threatened and rest are Least Concern as per Tenzin (2022). The district falls within the convergences of three ecologically-diverse protected areas of Bhutan which are connected with each other by Biological Corridor No. 03 (Tenzin et al. 2021). Sarpang shares the southern border with the northeastern state of Assam in India which is further connected with the Royal Manas National Park (RMNP) and Indian Manas National Park (MNP) towards the east and Phibsoo Wildlife Sanctuary (PWS) in the west (Tenzin et al. 2021). Floristically, this area comprises of subtropical broad-leaved forests located at an elevation of 200 m and this area receives the average precipitation of 3,500–5,500 mm (Tenzin et al. 2022). The specimen was confirmed with professor D.B. Gurung from College of Natural Resources, Punakha District, Bhutan through morphometric measurements using digital caliper. The

studies of Bhokta & Solanki (2020) was also referred for confirmation. Meanwhile, the specimen was collected and euthanized using 0.001 percent clove oil and treated in 10% formalin for fixation as per Gurung et al. (2012) and Tenzin & Dhendup (2017) and it is currently deposited in the Laboratory of the Southern Wildlife Rescue and Rehabilitation Centre (SWRRC) in Sarpang District. Fin formula is the key feature been used for identification and comparison as tabulated (Table 1).

The studies of Jayaram (1977) found that *Clupisoma garua* is a herring-shaped fish that gradually tapers toward both ends and abdominal edge between pelvic fins and vent (Image 1, 2 & 3). Talwar & Jhingran (1991) also substantiated that the adipose dorsal fin is absent in adults, while, caudal fin is deeply forked with lower lobe longer than upper with black edged dorsal, pectoral and caudal. On other hand, the eyes are large with circular adipose eyelids and their mouth is wide and terminal.

Table 1. Morphometric measurement of Fin formula of *C. garua* species and compared with morphometric studies of Bhokta & Solanki (2020).

	Variables of fin formula (cm)	Specimen of current study	Specimen Fin formula of Bhokta & Solanki (2020)
1	D	1/7	1/6
2	A	27	3/28
3	P	1/11	1/11
4	V	1/5	1/5
5	C	18	17–20
6	Maximum length (TL)	16.6 cm	60.9–100 cm
7	Colour of fin	Yellowish-orange	Yellowish-orange
8	Presence of adipose fin	No.	No.

D—Dorsal fin | A—Anal fin | P—Pectoral fin | V—Ventral/Pelvic fin | C—Caudal fin.

Image 1. Ventral view of *Clupisoma garua* species. © Sangay Dorji 2020.

Image 2. Lateral view, mouth and head view of *Clupisoma garua* species. © Sangay Dorji 2020.

Image 3. Head and mouth view of *Clupisoma garua* species. © Sangay Dorji 2020.

Nonetheless, body is coloured with silvery grey on the back which is lighter on the sides and abdomen with tinted grey color fins and black edged dorsal, pectoral and caudal fin respectively (Talwar & Jhingran 1991). The present *C. garua* specimen has a total length (TL) of 16.60 cm; however, it can grow up to maximum TL of 60.90 cm (Bhokta & Solanki 2020).

The species is mainly found in lacustrine habitat in larger rivers and reservoirs with stagnant impoundments (Bhokta & Solanki 2020). The studies of Froese & Pauly (2013) and Saraswat et al. (2014) reported that *C. garua* is potamodromous that migrates within streams & rivers and travels a long distance (>100 km) for feeding as well as for seeking suitable breeding habitat in new water bodies. Further, *C. garua* is a carnivorous fish that exploits food resources in the surface guild and also feeds along the margins of the river. Feeding intensity is higher during the September–October months (Bhokta & Solanki 2020).

As per IUCN Red List (2020), the species is categorized as 'Least Concern' (LC). However, it's categorized under Critically Endangered in Bangladesh IUCN Bangladesh (2000) and Vulnerable in India (Molur & Walker 1998; Lakra et al. 2010). In several parts of the range country, the populations are reported to be declining from the natural habitat (Bhokta & Solanki 2020). Biswa et al. (2018) also substantiated that over exploitation, habitat loss, human interference, climate change, pollution, and siltations are the main causes of the population decline, besides overfishing in range countries. However, in-depth ecology and pertinent conservation threats from Bhutan is still unknown, due to recent occurrences which may require separate ecological studies along the Mouchu River in future.

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