



***Gudusia chapra* (Hamilton, 1822) [Clupeiformes: Dorosomatidae] in Dhansiri river: A new family record for Nagaland, India**

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ABSTRACT

Gudusia chapra, the Indian river shad recently placed in the family Dorosomatidae, formerly belonged to Clupeidae, is reported for the first time from the Dhansiri river in Dimapur, Nagaland, representing a new distribution record for the state. This species is widely distributed across Indian riverine as well as brackish water systems and is recognized for its ecological importance and contribution to local fisheries. A lot of morphometric, genomic and molecular studies on *G. chapra* have already been undertaken at different levels including length–weight relationships and heavy metal bio-accumulation studies in various river eco-systems of India and Bangladesh, there has been no prior documentation of its taxonomic account or occurrence in the Dhansiri river, Nagaland.

Key words: Dorosomatidae family, freshwater, *Gudusia chapra*, Nagaland, new record

INTRODUCTION

The Indian River shad, *Gudusia chapra* (Hamilton, 1822), is a freshwater species belonging to the family Dorosomatidae and placed in the subfamily Alosinae. It was originally described as *Clupanodon chapra* by Hamilton (1822) and its type locality was upper part of Ganges river in Saran, Bihar, India. It was originally described under the genus *Clupanodon* but is currently recognized as a valid species of the genus *Gudusia*, representing an important Clupeid component of riverine systems across the Indian subcontinent (Whitehead, 1985). The distribution of *G. chapra* is primarily concentrated in the Ganges and Brahmaputra river drainages flowing into the Bay of Bengal. Its range also extends to inland freshwater systems of Nepal and Pakistan (Menon, 1999; Shrestha, 1994).

Morphologically, *G. chapra* demonstrates considerable ecological plasticity, adapting to diverse

habitat types that include lotic riverine environments as well as lentic lacustrine and ephemeral floodplain systems. This adaptability allows it to inhabit varied freshwater ecosystems, indicating its ecological versatility (Ataur Rahman, 1989). The ecological plasticity of *G. chapra* coupled with its widespread presence underscores its biological importance as a staple resource in artisanal fisheries throughout its native range, where it is a significant bio-resource contributing to local livelihoods and fisheries economies (Jayaram, 2010; Talwar & Jhingran, 1991).

Gudusia chapra is a taxonomically distinct species with ecological and fishery importance in the Indian subcontinent experiencing wide distribution, habitat versatility. Hence, there is a possibility that this species might have been introduced to the Nagaland ecosystem. The well-being of an aquatic ecosystem is assessed by its biodiversity. In aquatic

ecosystems understanding of fish species diversity is complicated due to the existence of several factors and their combinations. Factors like the quality of fish resources, emigration, reproductive potential, physical and chemical characteristics of the aquatic environment are mainly responsible for the diversity and richness of species in aquatic systems (Dash et al., 2018). Moreover, ongoing environmental monitoring underscores the need for regulation to ensure sustainable fishery use and consumer safety in its native habitat.

MATERIALS AND METHODS

The map shows the distribution of *G. chapra* in India including the present study area in Nagaland (Fig. 1). The survey of fish diversity conducted in the Dhansiri river at Thaheku bridge, Dimapur, Nagaland, involved collecting fish specimens using cast-nets, which is a common method for catching a variety of fish species in freshwater environments. The collected specimens were labeled and fixed in 10% formalin for preservation, following

the protocol described by Jayaram (2010), which ensures long-term maintenance of morphological features for identification and study. Identification of fish species was based on systematic keys and descriptions provided by Jayaram (2010), well-recognized references in ichthyology; measurements were taken point-to-point with digital callipers on the left side of the specimens and recorded to the nearest 0.1 mm. Counts, measurements, and terminology follow the methodology adopted by Jayaram (2010). Fin rays and scale numbers were counted under a Leica stereo-zoom microscope M205A.

RESULTS AND DISCUSSION

Gudusia chapra is widely distributed across the South East Asia mainly along the river systems of the Indian subcontinent such as the Ganges, the Brahmaputra, the Mahanadi, the Godavari and the Krishna that drain mostly into the Bay of Bengal and few into Arabian Sea. It is commonly found in India in the states like West Bengal, Bihar, Uttar Pradesh, Odisha, Assam and Maharashtra. However, it has

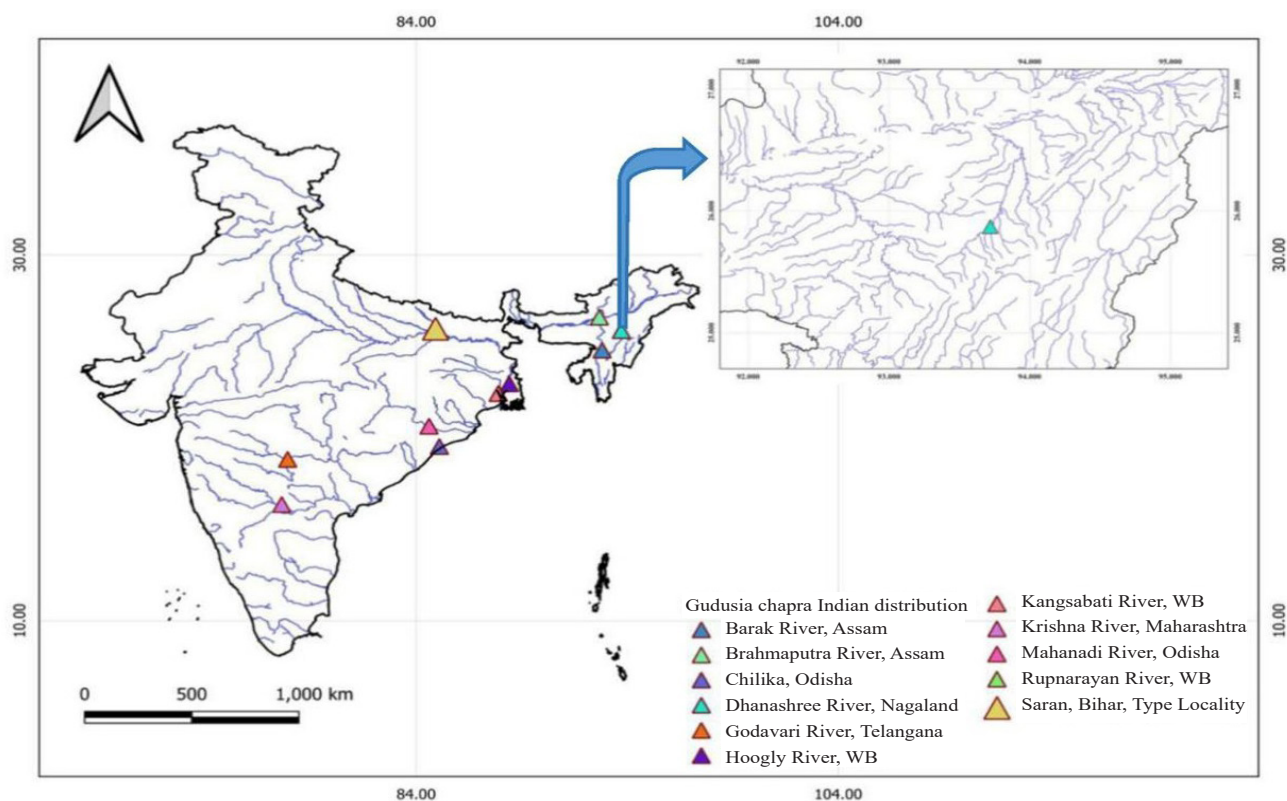


Fig. 1. Map showing distribution of the *Gudusia chapra* in India and present study undertaken in Nagaland

not been reported so far from Nagaland. This species is formally recognised under different scientific synonyms mentioned below.

Clupanodon cagius (Hamilton, 1822). An account of the fishes found in the river Ganges and its branches. Edinburgh & London. i-vii + 1-405, Pls. 1-39.

Clupea indica (Gray, 1834). An account of the fishes found in the river Ganges and its branches. Edinburgh & London. i-vii + 1-405, Pls. 1-39.

Clupea champil (Gray, 1834). Illustrations of Indian zoology; chiefly selected from the collection of Major-General Hardwicke, F.R.S., 20 parts in 2 vols. Pls. 1-202.

Alausa microlepis (Valenciennes, 1847). Histoire naturelle des poissons. Tome vingtième. Livre vingt et unième. De la famille des Clupéoides. v. 20: i-xviii + 1 p. + 1-472, Pls. 591-606.

Clupea suhia (Chaudhuri, 1912). Descriptions of some new species of freshwater fishes from north India. Rec. Indian Mus., Calcutta. v 7 (pt. 5) (art. 35): 437-444, Pls. 38-41

Gudusia godanahia (Srivastava, 1968). Fishes of eastern Uttar Pradesh. Vishwavidyalaya Prakashan, Varanasi, India. i-xxii + 1-163

Material examined

ZSI FF 11062, 2 exs., 102.1-108.3 mm SL, India, Nagaland, Dhansiri river, Thaheku bridge Dimapur, 25.86564° N and 93.71722° E, 152 m, 31.01-2025 (Fig. 2).

Distinguishing characters

Gudusia chapra is distinguished from all other species of *Gudusia* by the combination of presence of scutes along the belly; a distinct median notch in the upper jaw. The dorsal fin is positioned approximately equidistant between the snout tip and caudal fin base, with its depressed tip extending behind the vertical from the anal fin origin; single triangular pectoral axillary scale; presence of lateral series. The pelvic fins have seven rays (i7), typically inserted just before the dorsal fin origin, and the anal fin is short and located well behind the dorsal fin base; dark blotch behind gill-opening, often followed by a series of spots along flank.

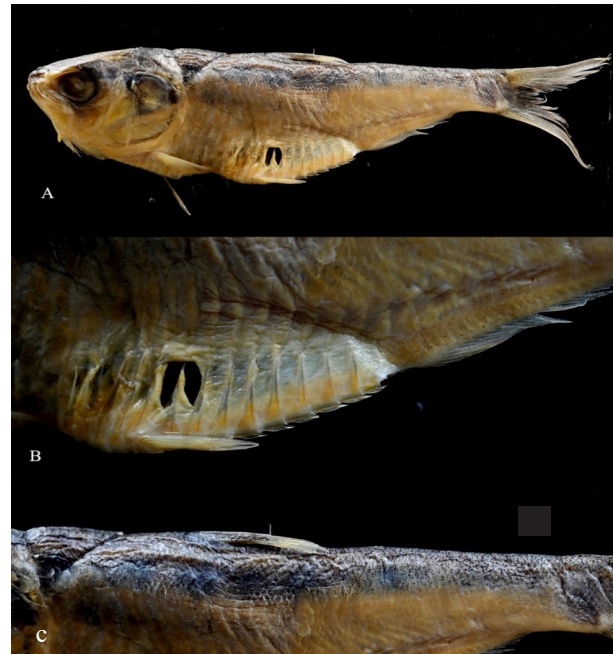


Fig. 2. A. Lateral view, B. Scutes and C. Shadles of *Gudusia chapra* (Hamilton, 1822), ZSI FF 11062, 108.3 mm SL

Body is deep, strongly compressed bearing a keel prepelvic scutes 17-19 and post pelvic scutes 11 along the belly; dorsal fin rays iii11-iii12; pectoral fin rays i13; pelvic fin rays i7; with 86 to 89 scales in the lateral line in series; gill rakers are numerous and fine, 170 to 180; branchiostegal rays count is six. Additionally, the scale rows are somewhat irregular except along the upper body, and the scales themselves are very small; body with back brown, flanks silvery or golden; blotch behind gill-opening, often followed by a series of spots along flank. The specimen was received from the Platyhelminthes section of ZSI, Kolkata to study the fish parasites. For the purpose, the specimen was dissected. Some tissues from the lateral side were damaged and few scales were also removed. So, the fish specimen although little distorted, the identifying characters were significantly feasible for the studies. The morphometric and meristic measurements have been provided in Table 1. The present specimens match with the general description provided by Talwar & Jhingran (1991). The morphological and meristic characteristics of the two examined specimens corroborate with the earlier studies (Jayaram, 2010; Sani et al., 2010 and Shil et al., 2022), with little variations possibly due to geographic differences.

Table 1. Morphometric characters (in mm) and meristic counts of the *G. chapra* from the Dhansiri river, Thaheku bridge, Dimapur, Nagaland, India. Ranges include values of recorded specimens (N = 2). SD, standard deviation

Morphometry	Ranges	Mean	SD
Standard length (SL) in mm	102.8-108.8	105.8	4.2
In percent of standard length			
Fork length	108.92-111.67	110.29	1.9
Head length	33.55 - 44.36	38.95	7.6
Head depth	30.15-12.74	21.45	12.3
Dorsal fin length	15.37-18.47	16.92	2.2
Pectoral fin length	19.30-20.04	19.67	0.5
Pelvic fin length	10.41-11.31	10.86	0.6
Anal fin length	20.53-23.35	21.94	2.0
Predorsal distance	49.63-51.65	50.64	1.4
Post dorsal distance	38.60-38.81	38.71	0.1
Pre anal distance	71.51-72.08	71.79	0.4
Dist. between pect and pelvic	22.18-24.17	23.18	1.4
Dist. between pelvic and anal	23.54 - 24.17	23.86	0.4
Base of dorsal fin	10.66 - 11.19	10.92	0.4
Base of anal fin	17.90 - 19.58	18.74	1.2
Max. body depth	32.17- 32.30	32.23	0.1
Min. body depth	9.56 - 9.63	9.59	0.1
Length of caudal peduncle	9.34-9.56	9.45	0.2
Length of caudal fin	27.85 - 28.31	28.08	0.3
In percent of head length			
Eye diameter	18.86 - 23.84	21.35	3.5
Pre orbital distance	14.47-17.26	15.87	2.0
Inter orbital distance	16.67-22.19	19.43	3.9
Meristic			
Dorsal	iii 11- iii 12		
Pectoral	i 13		
Pelvic	i 7		
Anal	iii 21- iii 22		
Caudal	10 + 9 10 + 9		
Lateral line/series	86-89		
Pre pelvic scutes	17-19		
Post pelvic scutes	11		
Abdominal scutes	28 -30		
Caudal peduncle	30-31		

This species collected from the Dhansiri river at Thaheku bridge, Dimapur, Nagaland, which is the longest and a crucial aquatic habitat of Nagaland supporting rich fish biodiversity. The presence of *G. chapra* in this river underlines the ecological significance of this habitat for sustaining a variety of fish species. *G. chapra* adapts well to these varied habitats and plays an important role in the local aquatic ecosystems in its native South Asian river scape (Sani et al., 2010).

The family-level classification in Clupeidae has undergone various revisions. In this finding is consistent with the higher-level phylogenetic framework of clupeid fishes inferred from mitogenomic data by Lavoué et al. (2013). The data suggests that the lineage I comprising the dorosomatins (*Dorosoma* spp., *Nematalosa* spp., *Clupanodon* spp., *Konosirus* spp., and *Anodontostoma* spp.) along with allied taxa, including members of Alosinae (e.g., *Tenuulosa* spp. and *Gudusia* spp.), also members of Pellonulinae, *Harengula* spp., and *Escualosa* spp. was recovered as a strongly supported monophyletic clade. Although these five lineages were not previously delimited based on morphological synapomorphies, such as gill-raker counts, as noted by Nelson (1967, 1970), the mitogenomic evidence provides robust support for their recognition and consolidation within the family Dorosomatidae. *Gudusia chapra* (Hamilton, 1822) and *Gudusia variegata* (Day, 1869) are the two recognized species worldwide mainly present in India and its adjacent countries. Both the species are member of the Dorosomatidae family. A total of 216 species from 29 families were reported in the state of Nagaland (Wewa et al., 2025). *Gudusia chapra* is not included in this checklist, hence being reported for the first time. This species is extensively found in the river systems of India and Bangladesh that flow into the Bay of Bengal. Primarily, *G. chapra* is present in the Ganges and Brahmaputra river basins. *G. chapra* is also present in the same riverine system of Dhansiri in Assam, the neighbouring state. It is also distributed in the Mahanadi river in Odisha and the Krishna river in Maharashtra, the Ganges, Brahmaputra, Godavari and elsewhere in Nepal, Sri Lanka, Myanmar, and

Pakistan (Shil et al., 2022; Jhingran 1966). The species inhabits the middle and upper sections of rivers. This species can survive in lentic as well as lotic habitats such as lakes, ponds, ditches, rivers, reservoirs, and inundated fields. It is a commercially important target species for small-scale fisheries in India and adjacent countries (Kumari et al., 2018). The IUCN status of the species is Least Concern. The Dhansiri river, originates from the Laisang peak in the Phek district of Nagaland. It flows northward, draining at Dimapur and Chümoukedima districts of Nagaland, before passing through the Golaghat district of Assam and joining the Brahmaputra at Dhansirimukh. This species already recorded in the Brahmaputra and Barak drainage systems in Assam. During an ichthyological exploration, two specimens an *Gudusia* were collected and deposited at the National Zoological Collections at ZSI, Kolkata, ZSI FF 11062.

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