International Journal of Fauna and Biological Studies
Available online at www.faunajournal.com

IJFBS
International Journal of Fauna And Biological Studies

ISSN 2347-2677
IJFBS 2019; 6(4): 44-49
Received: 25-05-2019
Accepted: 27-06-2019

Md. Akbal Husen
Senior Scientist (S3)
Fishery Reserch Station, Begnas, Pokhara, Nepal

Tek Bahadur Gurung
Nepal Agricultural Research Council, Singhdarbar Plaza, Kathmandu, Nepal

Agni Prasad Nepal
Fishery Research Station, Begnas, Pokhara, Nepal

Asha Rayamajhi
Fisheries Research Division, Godawari, Lalitpur, Uttar Pradesh, India

Sunita Chand
Fishery Research Station, Begnas, Pokhara, Nepal

Correspondence
Md. Akbal Husen
Senior Scientist (S3)
Fishery Reserch Station, Begnas, Pokhara, Nepal

First report of two fish species: *Chanda nama,* and *Hetropneustes fossilis* from Begnas Lake

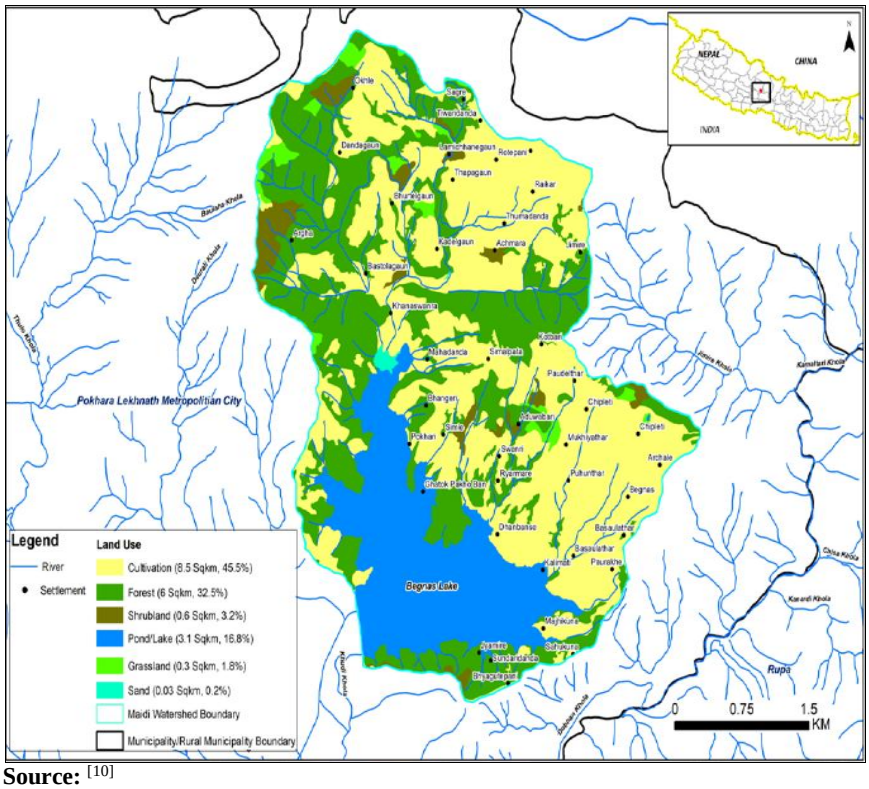
Md. Akbal Husen, Tek Bahadur Gurung, Agni Prasad Nepal, Asha Rayamajhi and Sunita Chand

Abstract
This paper aims to report the two fish species appeared in the catches of Begnas Lake, which is new to this lake. Daily fish catch data and morphometric measurements were recorded for each species. Daily fish catch record from Begnas Lake showed that two fish species *Chanda nama*, and *Hetropneustes fossilis* were appeared in the catches of Begnas Lake. The first report of *Hetropneustes fossilis* was during June 2016 and *Chanda nama* was appeared in the catches from July 2018 from Begnas Lake. In the earlier studies, these two species have been already reported from water resources of Nepal. How these two fish species have been introduced in this lake is still unknown. The analysis of eight months catch data showed that both species catches has steadily increased from this lakes. It showed that these species have been self-recruiting in the Begnas Lake. The recorded weight (mean ± SD) of *Chanda nama* was 3.54 ± 1.18g, and *Hetropneustes fossilis* was 20.38 ±6.84g. At present both fish species have been used for food only. Since, *Chanda nama* has attributes for ornamental fish and if it is catch live, it could be sold as ornamental fish to the aquarium fish traders and shops with more worth.

Keywords: Fish catch, *Chanda nama*, *Heteropneustes fossilis*, ornamental fish, traders

1. Introduction
Nepal is rich in fish biodiversity. It occupies only 0.1 % of global land area whereas native fish covers 2.58 % and 23.33% of world and Indian sub- continent of freshwater fish respectively. The total native fish species of Nepal is 230 representing 104 Genera, 34 Family and 11 Order [1]. The fish species of Nepal exhibit diverse distribution from 60 meter to 3323 mean sea level [1-2]. The river, lakes, streams, swamps, flood plains and ponds are the habitats of native fish species of Nepal. The native fish diversity is higher in the river systems of Nepal which includes 128-195 fish species. The list of native fish species found in Nepal have been updated many times and new species have been added in the list [1-2-3- 4].
Chanda nama (Hamilton, 1822) popularly known as the elongate glassy perch let, is a species of fresh water fish in the Asiatic glassfish, belongs to order *Perciformes* and family *Ambassidae*. It is called as Sisha Macha locally. It is distributed in Bangladesh, India, Nepal and Pakistan [5]. Its body is transparent yellowish white with numerous tiny black dots. Stinging catfish *Hetropneustes fossilis* is belongs to order *Siluriformes* and family *Hetropneustidie*. It is locally called as *Singh. Chanda nama,* and *Hetropneustes fossilis* has been reported from different water bodies of Nepal [1-3-4-6].
Pokhara valley is cluster of nine lakes and Begnas is the second largest Lake in the valley. It is used for irrigation, fisheries, boating and recreational. Livelihood of 44 jalari household is dependent on the capture fisheries of Begnas Lake. The fish harvest from capture fisheries of Begnas Lake varies about to 10-40 metric ton/year [7]. The number of fish species and their contributions to the total catches of Begnas Lake along with introduction of fish species knowingly or accidently to this lake and their impacts have been documented in the earlier studies [7, 8, 9]. This study aims to mention the fish species recently appeared in the catches of Begnas Lake which is new to this lake and its possible economical uses, human health and impacts on native fish species.

2. Materials and Methods
2.1. Study sites
Begnas Lake is the second biggest lake (328 ha) at 28°10'26.2″N and 84°05'50.4″E, 650 m above mean sea level (Fig.1). It is fed by a perennial stream with a catchment area of 19 km^2 and an average depth of 6.6 m.



Source: [10]

Fig 1: Location map of Begnas Lake

2.2 Data collection and analysis

A total number of 30 specimens of *Chanda nama* and *Heteropneustes fossilis* were collected from fish catch landing site of Begnas Lake. The specimens were preserved in 5% formaldehyde solution on the spot. Fishes were brought to the laboratory for further analysis. The fish identification were done with the descriptions and photograph described by [4] and [11]. The morphometric measurements were recorded following [12] (Fig. 2) using digital caliper (Fig. 3). Daily catch data from July 2018 to March 2019 were recorded for each species from Begnas lake fish catch landing sites. The fishers involved in the capture fisheries of Begnas Lake were interviewed at fish landing sites to know the history of fish species and its first catches from Begnas Lake (Fig.4). Data were summarized using Microsoft excel var.13.

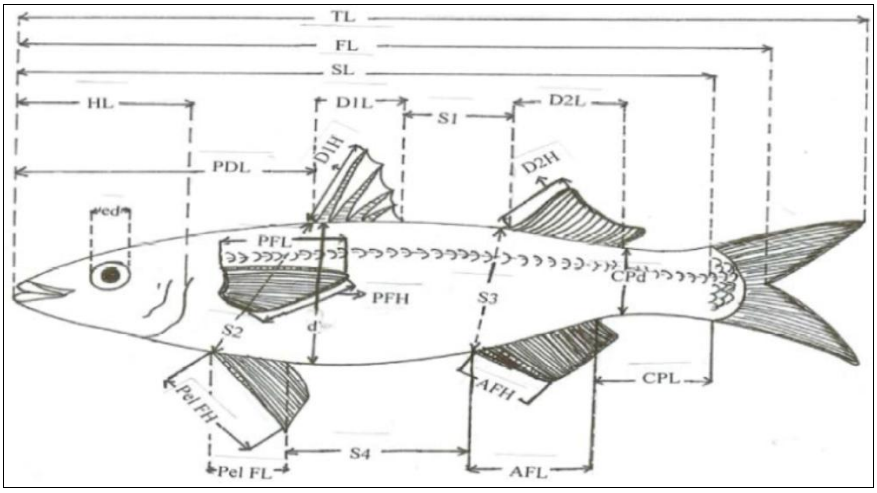


Fig 2: Morphometric characters of fish: forked length (FL), standard length (SL), head length (HL), body depth (BD), eye diameter (ED), dorsal-fin height (DFH), dorsal-fin base length (DFBL), pectoral-fin height (PFH), pectoral-fin base length (PFBL), pelvic-fin height (PeFH), pelvic-fin base length (Pefbl), anal-fin height (AFH), anal-fin base length (AFBL), caudal peduncle length (CPL), caudal peduncle depth (CPD);adopted from [12].

A

B

Fig 3: (A, B) Morphometric measurements of fish by digital caliper: *Chanda nama* (A) and *Heteropneustes fossilis* (B).

Fig 4: Conducting interviews with Jalari fisher at fish landing sites of Begnas Lake.

3. Results and Discussions

The number of fish species are now increased in the Begnas Lake. Daily fish catch record from Begnas Lake showed that two fish species *Chanda nama* (Fig.5), and *Hetropneustes fossilis* (Fig.6) were appeared in the catches of Begnas Lake which is new to this lake. At present total 25 fish species including *Hetropneustes fossilis* and *Chanda nama* were recorded in the catches of Begnas lake among which nineteen were native and six were exotic fish (Table 1). Seventeen native fish species and six exotic fish species have been recorded in the catches of Begnas Lake [7].

Fig 5: Elongated glass perch let (*Chanda nama*) captured from Begnas Lake.

Fig 6: Stinging catfish (*Hetropneustes fossilis*) captured from Begnas Lake.

The first report of *Hetropneustes fossilis* was during June 2016 and *Chanda nama* was appeared in the catches from July 2018. In the earlier studies, these two species have been already reported from water resources of Nepal [1-3-4-6]. How these two fish species have been introduced in this lake is still unknown. The introduction of these two species (*Chanda nama*, and *Hetropneustes fossilis*) to this lake may be due to myths of religion that releasing fish in lakes will makes life better. The analysis of eight months catch data showed that both species catches has steadily increased from this lakes (Fig.7, Fig.8, and Fig.9). It showed that these species have been self-recruiting in the Begnas Lake. *Hetropneustes fossilis* and *Chanda nama* is now established in the Begnas lake.

Table 1: Fish species of Prewar, Begnas and Rupa lakes appeared in the catches and fish survey in FY 2018/19.

SN.	Scientific name	Local name
A.	**Native fish species**	
1.	*Tor putitora* (Hamilton)	Sahar
2.	*Cirrhinus reba* (Hamilton)	Rewa
3.	*Barilius barna* (Hamilton)	Lam Fageta
4.	*B. vagra* (Hamilton)	Fageta
5.	*B. bendelisis* (Hamilton)	Fageta
6.	*Puntius sophore* (Hamilton)	Bhitte/Bhitta
7.	*P. titius* (Hamilton)	Bhitte/Bhitta
8.	*P. ticto* (Hamilton)	Bhitte/Bhitta
9.	*Cirrhinus mrigala* (Hamilton)	Naini
10.	*Catla catla* (Hamilton)	Bhakur
11.	*Labeo rohita* (Hamilton)	Rohu

12.	*Mastacembelus armatus* (Lacepede)	Churches Bam
13.	*Xenentodon cancila* (Hamilton)	Dunged Bam
14.	*Clarias batrachus* (L.)	Magur
15.	*Mystus bleekeri* (Day)	Jungle
16.	*Channa orientalis/ Channa gachua* (Blotch and Schneider)	Bhoti
17.	*Channa punctatus* (Blotch)	Bhoti
18.	*Heteropneustes fossilis*	Singh
19.	*Chanda nama*	Sisha Macha
B. Exotic fish species		
20.	*Aristichthys nobilis* (Richardson)	Bighead carp
21.	*Hypophthalmichthys molitrix* (Valenciennes)	Silver carp
22.	*Ctenopharyngodon idella* (Valenciennes)	Grass carp
23.	*Cyprinus carpio* (L.)	Common carp
24.	*Clarias gariepinus* (Burchell)	African magur
25.	*Oreochromis niloticus* (Linnaeus)	Nile tilapia

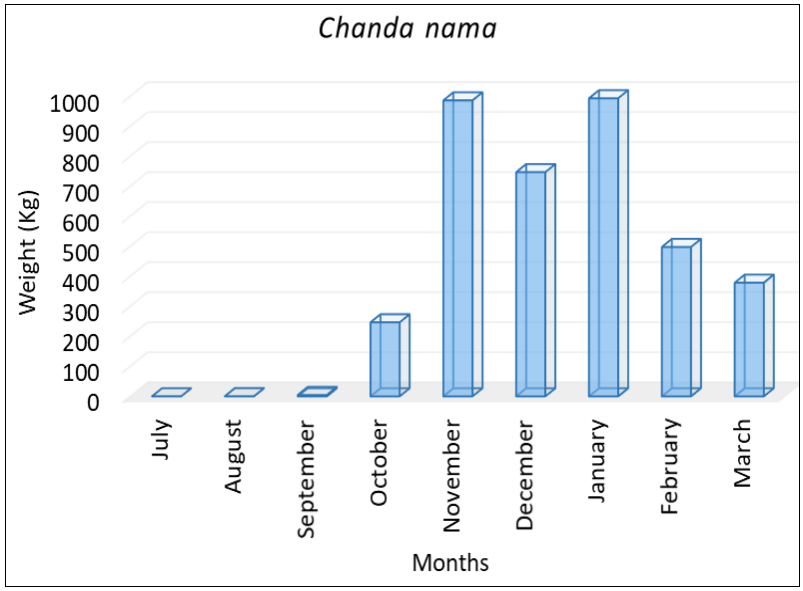


Fig 7: Monthly catch record of *Chanda nama* from Begnas Lake.

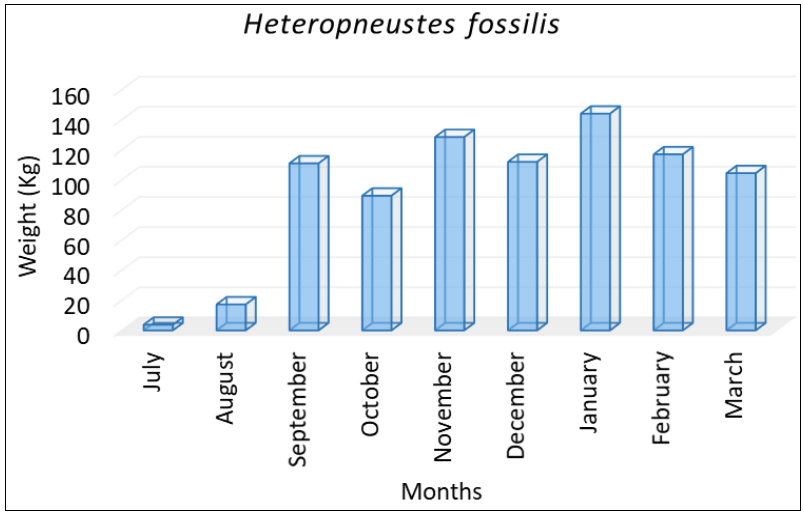


Fig 8: Monthly catch record of *Hetropneustes fossilis* from Begnas Lake

Fig 9: *Chanda nama, and Hetropneustes fossilis* display for sale *at* fish landing sites of Begnas Lake.

Morphometric measurements of *Chanda nama* and *Hetropneustes fossilis* are presented table 2 and 3 respectively. The morphometric characters of *Chanda nama and Hetropneustes fossilis* found in this study are also agreed to the previous [4-11]. *Chanda nama* is silvery white fish having transparent body (Fig.4) and mean body weight (Mean±SD) found was 3.54 ± 1.18g (Table 2). *Hetropneustes fossilis is* dark brown colored fish with long barbells (Fig.5) and mean body weight (mean±SD) found was 20.38±6.84 (Table 3).

Table 2: Morphometric measurements of fish *Chanda nama*

S. N.	Morphometric characteristics	Mean ± SD	Minimum	Maximum
1.	Weight (g)	3.54 ± 1.18	2.22	5.0
2.	Total length (mm)	71.12 ± 8.11	61.79	80.06
3.	Fork length (mm)	61.10 ± 8.41	51.86	70.79
4.	Standard length (mm)	53.21±9.46	40.46	64.46
5.	Head length (mm)	15.57± 2.42	12.47	18.59
6.	Body depth (mm)	15.87± 6.72	4.87	22.05
7.	Eye diameter (mm)	5.08±1.16	3.93	6.9
8.	Dorsal fin height (mm)	7.18 ±0.82	5.9	7.81
9.	Dorsal fin base length (mm)	8.63 ±1.73	7.07	11.37
10.	Pelvic Fin L (mm)	8.28 ±3.86	2.57	12.15
11.	Pelvic fin base length(mm)	3.78 ±2.90	1.84	8.87
12.	Anal fin height(mm)	7.97 ±1.07	6.58	9
13.	Anal Fin base length (mm)	18.88 ±3.20	16.08	22.43
14.	Caudal peduncle length (mm)	6.15±0.45	5.4	6.55
15.	Caudal peduncle depth (mm)	5.25±1.03	4.08	6.37
16.	Pectoral fin length (mm)	6.46±1.39	5.09	8.52
17.	pectoral fin base length (mm)	4.01±0.97	3.2	5.44
18.	Caudal fin length (mm)	16.13±3.62	12.98	22.24
19.	Caudal fin base length(mm)	7.68±1.90	5.44	10.52

Table 3: Morphometric measurements of fish *Hetropneustes fossilis*

S. N.	Morphometric characteristics	Mean ± SD	Minimum	Maximum
1.	Weight (g)	20.38 ±6.84	13.19	26.48
2.	Total length (mm)	140.31 ±13.72	124.54	155.64
3.	Standard length (mm)	125.10 ±10.63	112.83	134.66
4.	Head length (mm)	20.42 ±1.55	19.14	22.66
5.	Body depth (mm)	20.28 ±2.87	17.4	23.34
6.	Dorsal fin height (mm)	10.22 ±.28	8.6	11.65
7.	Dorsal fin base length (mm)	4.06 ±1.01	2.8	5.22
8.	Pectoral fin height (mm)	13.35 ±1.96	11.33	15.39
9.	Pectoral fin base length (mm)	4.92 ±1.48	3.39	6.95
10.	Pelvic Fin length (mm)	8.42 ± 1.08	7.51	9.66
11.	Pelvic fin base length(mm)	2.51 ± 0.62	2.04	3.37
12.	Anal fin height (mm)	7.73 ± 0.44	7.24	8.3
13.	Anal Fin base length(mm)	70.37 ± 6.6	60.89	75.07
14.	Caudal peduncle length (mm)	15.23 ± 2.93	11.54	18.06
15.	Caudal peduncle depth (mm)	6.70 ± 1.33	5.4	7.91

Chanda nama is excellence in the nutritional value and it can fulfill the nutritional deficiencies of people when it is included in the regular diet [13]. Since, *Chanda nama* has attributes for ornamental fish and if it is catch live, it could be sold as ornamental fish to the aquarium fish traders and shops with more worth. *Hetropneustes fossilis* is very tasty fish and it has medicinal value [14-15], favors high demand in the society, will benefit to fisher community of Begnas Lake. At present both fish species have been used for food only and these two fish species harvest have added income of fisher community of this lake.

However, *Chanda nama* is facultative scale feeding (Lepidophagy) and its feeds on fish scales, microcrustacea and aquatic insects with juvenile diets containing larger fractions of invertebrates, and cyprinids were found clearly anxious by repeated attacks by it [16]. Therefore, its presence in the breeding and nursing area of native fish, may impacts on native fish species by eating of hatchling of native fish species.

4. Conclusion

Two species *Chanda nama*, and *Hetropneustes fossilis* appeared in the catches of Begnas Lake which is new to this lake. Both species is highly nutritious fish species and could be used for food. Besides, *Chanda nama* could be promoted as ornamental fish. Further study needed to assess the impact of these two fish species on other native fish species of Begnas Lake.

5. Acknowledgement

We are thankful to Jalari fisher for the information regarding first appearance of fish species in the catches of Begnas lake and catch data. The fund of this study was provided from NARC project No. LMBIS 389.

6. References

1. Rajbanshi KG. Biodiversity and distribution of freshwater fishes of Central/Nepal Himalayan Region. NEFIS, 2012, 65.
2. Shrestha J. Threat's status of indigenous fish species of Nepal. In Wagle SK, Pradhan N (Eds.) Proceedings of consultative workshops on fish conservation in Nepal. Fisheries Research Division, Godawari, Lalitpur, Nepal, 2012, 13-34.
3. Shrestha J. Fishes, fishing implements and methods of Nepal. Smt. MD Gupta, India, 1994, 150.
4. Shrestha TK. Ichthyology of Nepal. A study of fishes of the Himalayan waters. Himalayan Ecosphere. Kathmandu, Nepal, 2008, 388.
5. Talwar PK, Jhingran AG. Inland Fishes of India and Adjacent Countries. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi-Calcutta. 1991; 2:689-690.
6. Shrestha OH, Edds DR. Fishes of Nepal: Mapping distributions based on voucher specimens – Appendix II. Species in the orders Siluriformes, Cyprinodontiformes, Beloniformes, Synbranchiformes**,** Perciformes, and Tetraodontiformes. Emporia State Research Studies. 2012; 48(2):52-74.
7. Husen MA, Sharma S, Bista JD, Prasad S, Nepal A. Capture fishery in relation to Nile tilapia management in the mountainous lakes of Pokhara valley, Nepal. In Taylor WW, Bartley DM, Goddard CI, Leonard NJ, and Welcomme R, (Eds). Freshwater, fish, and the future: proceedings of the global cross-sectorial conference. Food and Agriculture Organization of the United Nations, Rome; Michigan State University, East Lansing; and American Fisheries Society, Bethesda, Maryland, 2016, 239-250.
8. Swar DB, Gurung TB. Introduction and cage culture of exotic carps and their impact on fish harvested in Lake Begnas, Nepal. Hydrobiologia. 1988; 166(3):277-283.
9. Husen MA, Bista JD, Prasad S, Nepal A. Present status and future prospects capture fisheries of indigenous fish species in Begnas Lake, Pokhara. In Wagle SK, Pradhan N (Eds.), Proceedings of the Consultative Workshop on Fish Conservation in Nepal. Fisheries Research Division, Godawari, Lalitpur, Nepal x+220p, 2012, 194-199.
10. Mo FE. Integrated Lake Basin Management Plan of Lake Cluster of Pokhara Valley, Nepal (2018-2023). Ministry of Forests and Environment, Kathmandu, Nepal, 2018, 185.
11. Shrestha J. Fishes of Nepal. Curriculum Development Center, Tribhuvan University, Kathmandu. pp. 198-318.
12. Rehman FUr, Rehman HUr, Aman S, Aziz S, Shabir H. Morphometric and meristic analysis of Silver carp (*Hypophthalmichthys molitrix*) from Tanda Dam, District Kohat, Pakistan. Global Veterinaria. 2015; 15(1):82-92.
13. Chakraborty S, Goyal AK, Kausor MA, Brahma BK. Nutritive and nutritional analyses of *Chanda nama* consumed by the *Bodos* of Kokrajhar District, BTAD, Assam. International Journal of Fundamental & Applied Sciences. 2018; 7(3):01-06.
14. Roos N, Islam MM, Thilsted SH. Small indigenous fish species in Bangladesh: contribution to vitamin A, calcium and iron intakes. The Journal of Nutrition. 2003; 133(11):4021S-4026S.
15. Chakraborty BK, Nur NN. Growth and yield performance of shingi, *Heteropneustes fossilis* and koi, *Anabas testudineus* in Bangladesh under semi-intensive culture systems. International Journal of Agricultural Research, Innovation and Technology. 2012; 2(2):15-24.
16. Grubh AR, Winemiller KO. Ontogeny of Scale Feeding in the Asian Glassfish, *Chanda nama* (Ambassidae). Copeia. 2004; 4:903-907.