



Research Paper

***Schizothorax sikusirumensis* (TELEOSTOMI: CYPRINIDAE: SCHIZOTHROCINAE), A NEW FISH SPECIES FROM RIVER SIKUSIRUM, ARUNACHAL PRADESH, INDIA**

Keshav Kumar Jha

Fish Germplasm Explorations Research Laboratory
Department of Zoology
Jawaharlal Nehru College
Pasighat-791103,
Arunachal Pradesh, India.

Abstract

Arunachal Pradesh, once described as the 'Hidden Land' by virtue of its geographical position, climatic conditions and altitudinal variations, is a region with rich biodiversity in North East India. The geography of the state is varied with variation of mountainous ranges. It is a land of lush-green forests, deep river valleys, plateaus, numerous wetlands, lakes, rivers and abundant streams. The schizothoracinae are a specialized group of fishes, dominant of the torrential mountain streams of the Himalaya and Central Asia. They are confined to cold regions as a rule, or at least to localities possessing snow-fed rivers, many of which end in lakes and do not reach the sea. They are specialised for the hill-stream life and show wonderful adaptations. A new species of *Schizothorax* is recorded from Sikusirum River, a tributary of River Siang in Arunachal Pradesh, India. It has the following characteristics: The body is sub-cylindrical with both the profiles arched. The ventral surface of the head and anterior part of the body is flattish. Snout and abdomen rounded. Upper jaw longer than lower. Head fleshy, short, somewhat cone-shaped and blunt. Mouth wide, transverse, slightly arched and situated on ventral side of head. Dorsal spine strong, serrated posteriorly, shorter than head. The pectorals shorter than the head and separated from the ventral by a considerable distance. The caudal fin number 5 to 8 and 12 to 15 emergent from within the rear bodies and extended out from rest of fin ray. The fin number 5 to 8 is longer than 12 to 15. No other species of genus *Schizothorax* has this type of peculiar character.

Key words: *Schizothorax sikusirumensis*, new species, Arunachal Pradesh.

INTRODUCTION

Till date, 65 species of genus *Schizothorax* under family Cyprinidae have been identified all over the world (Fish Base, 2020, Wikipedia, 2020). The presence of *Schizothorax sikusirumensis* is a new record of fish from all over the world.

As regards the information of fish fauna of Arunachal Pradesh, India, works of Jayaram (1963, 1999), Jayaram and Mazumdar (1964), Dutta Choudhary and Sen (1977), Dutta Choudhary (1978, 1980, 1981 and 1994), Jhingran and Sehgal (1978), Nath and Dey (1985, 2000 and 2010), Sen (2000), Sen (2006), Tamang *et al.* (2006), Tamang, & Sinha (2014), Nebeshwar *et al.* (2007), Vishwanath *et al.* (2007), Bagra *et al.* (2009), Geetakumari and Kadu (2011) and Jha *et al.* (2008, 2012, 2013, 2014 & 2016) are worth mentioning. A perusal of the available literature suggests that *Schizothorax sikusirumensis* has not been reported earlier from the aquatic habitat of any part of the Arunachal Pradesh, India and from any part of the world.

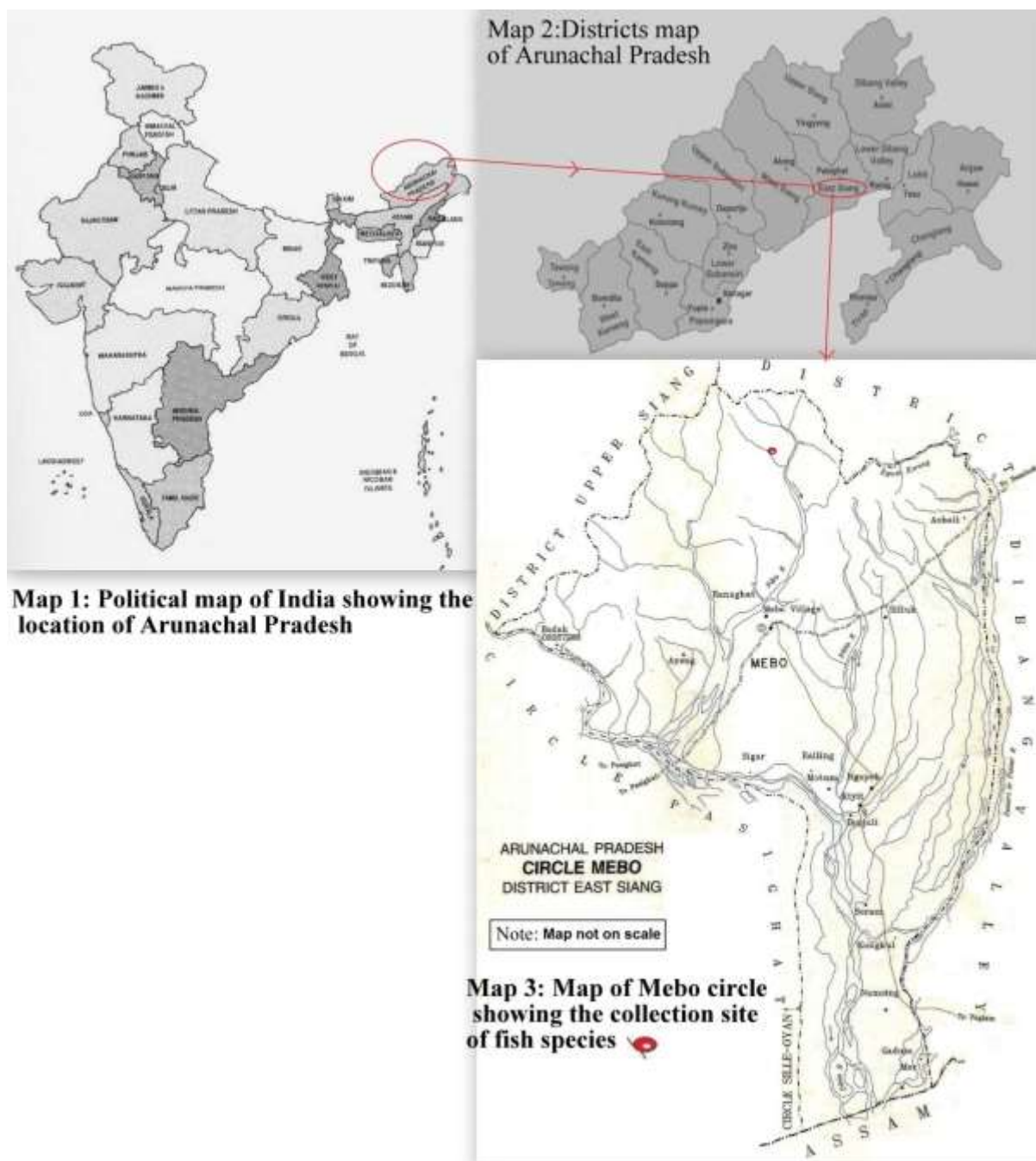
MATERIALS AND METHODS

Fishes were collected from river Sikusirum, one of the tributaries of river Siang under Mebo circle of East Siang District of Arunachal Pradesh, India (Photograph -1, Map-3) at an elevation of 634 feet from sea level with its GPS position 28°12.595' N and 95°21.679' E. The water temperature recorded during the collection was from 4^o – 6^o C. 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.

Measurements were made with dial callipers to the nearest 0.1 mm. The identification has been made with the help of meristic and morphometric characteristics and identified up to genus following Jhingran and Sehgal (1978), Tilak (1987), Jayaram (1999), Nath (2000) and Vishwanath *et al.* (2007) and further confirmed as *Schizothorax sikusirumensis* (Figure-1) The specimens are deposited in Fish Museum of Fish Germplasm Explorations Research Laboratory, Department of Zoology, Jawaharlal Nehru College, Pasighat, Arunachal Pradesh vide Reg. No. JNC/ZOO-FM/SR/27.1.



Photograph 1: Fish collection site of Gakang area of Sikusirum River



RESULTS

Key to Genus: The feature by which this genus can be distinguished from all other schizothoracids, are the presence of a strip of hard papillated structure at the chin, margin of the lower jaw having a firm and hard horny covering and a thick lower lip with a free posterior edge (Tilak, 1987).

The body is sub-cylindrical with both the profiles arched. The ventral surface of the head and anterior part of the body flattish. Snout and abdomen rounded. Upper jaw longer than lower. Head fleshy, short, somewhat cone-shaped and blunt. Mouth wide, transverse, slightly arched and situated on ventral side of head. Dorsal spine strong,

serrated posteriorly, shorter than head. The pectorals shorter than the head and separated from the ventrals by a considerable distance.

The presence of this species with unique character can now be added as a new species of *Schizothorax* from Arunachal Pradesh, India in the record of ichthyodiversity. This species has been found from Gakang area of river Sikusirum, one of the tributaries of river Siang under Mebo circle of East Siang District of Arunachal Pradesh at an elevation of 634 feet from sea level and at the latitude of 28°12.595' N and at the longitude of 95°21.679' E. The water temperature recorded during the collection was from 4° to 6° C. The species is registered to the Fish Germplasm Explorations Research Laboratory, J.N. College, Pasighat, Arunachal Pradesh vide Reg. No. JNC/ZOO-FM/SR/27.1

The Diagnostic Characteristics of New Species:

D.ii.8, P.i.17, V.i.10-11, A.i.6, C.22. Head large; snout obtuse and studded with pores. Mouth inferior, lips thick. Lower jaw with a firm and hard horny covering and a thick lower lip with a free posterior edge. Barbels four, maxillary and rostral, smaller than eye diameter. Dorsal fin inserted slightly ahead of ventral. Dorsal spine moderately serrated at its inner edge. Lateral line complete. Body blackish brown in colour, lighter below (Figure: 1&2).

Peculiar character: The caudal fin number 5 to 8 and 12 to 15 emergent from within the rear bodies and extended out from rest of fin ray. The fin number 5 to 8 is longer than 12 to 15 (Figure: 3). No other species of genus *Schizothorax* has this type of peculiar character.



Figure1: *Schizothorax sikusirumensis*



Figure 2: Mouth part of *S. sikusirumensis*



Figure 3: Caudal fin ray ends of *S. sikusirumensis*

Etymology

The species is named after the Sikusirum River in Arunachal Pradesh, India, by following the guidelines of the type-locality for nomenclature of species, ICZN (2014).

Distribution and Habitat

Presently known only from Siku-Sirum River near Gakang area under Mebo circle of East Siang District of Arunachal Pradesh, a tributary of Siang River (Map-3). The fish inhabits in the water logged area of torrential river drainage (Image-1).

Morphometric characteristics of *Schizothorax sikusirumensis*

Characteristics Observed	Average \pm SD in mm (N=6)
Total length	197.851 \pm 27.786
Standard length	163.075 \pm 29.428
Snout length	14.003 \pm 1.925
Postorbital length	14.877 \pm 1.029
Head length	32.674 \pm 5.517
Predorsal length	73.964 \pm 9.255
Preanal length	100.311 \pm 21.864
Prepelvic length	77.837 \pm 16.684
Eye diameter	7.575 \pm 0.0574
Width of dorsal fin	23.939 \pm 0.817
Length of caudal peduncle	27.198 \pm 3.266
Depth of least height of caudal peduncle	31.814 \pm 5.199
Body depth	15.579 \pm 1.753
Length of dorsal fin	33.977 \pm 4.586
Length of Pectoral fin	29.820 \pm 5.002
Length of Pelvic fin	21.711 \pm 7.640
Length of anal fin	31.340 \pm 5.818
Height of dorsal fin	30.164 \pm 3.475
Length of maxillary barbels	3.060 \pm 0.409
Length of mandibular barbels	5.342 \pm 0.773

Classification

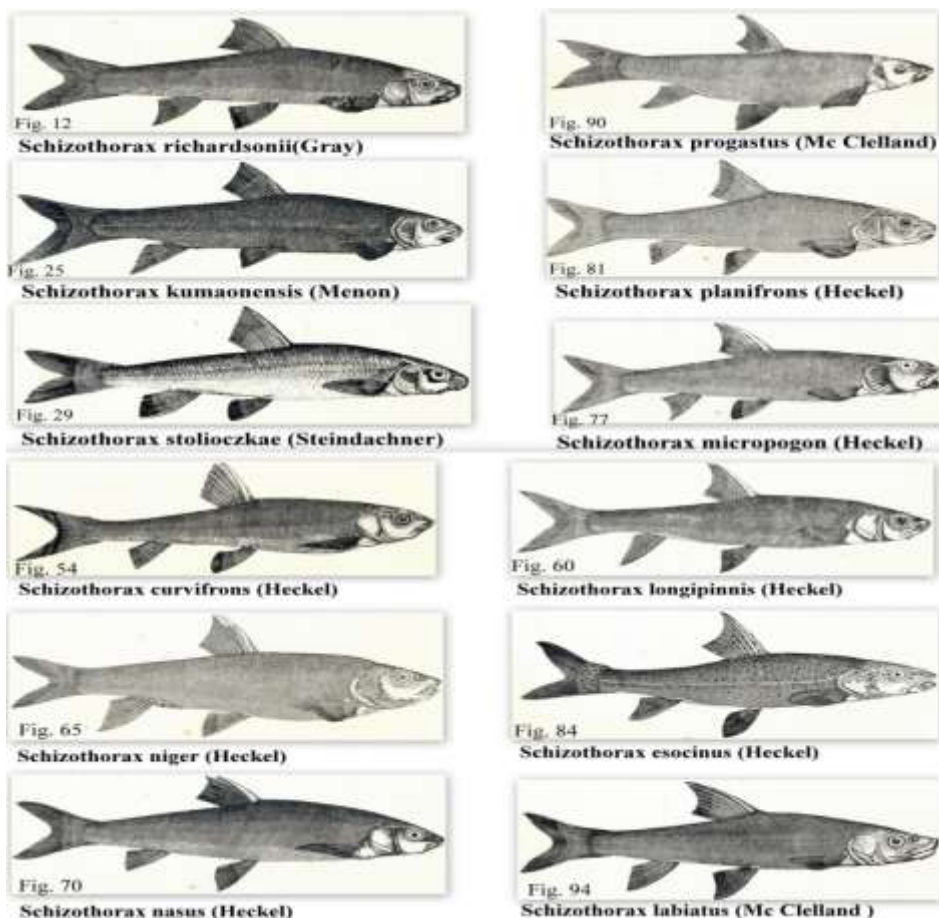
Order: Cypriniformes
Super family: Cyprinoidea
Family: Cyprinidae
Sub-family: Schizothracinae
Genus: *Schizothorax* (Heckel)
Species: *sikusirumensis*

Comparative study of *Schizothorax* species:

To make the picture more clearly, comparative features of the other species of genus *Schizothorax* (Tilak 1987; *The Fauna of India*) has been given as under:

Species	Meristic counts	Remark(s)
<i>Schizothorax richardsonii</i> (Gray)	D.ii-iii.8, P.i.16, V.i.8, A.ii.5, C.19.	Caudal fin forked
<i>Schizothorax kumaonensis</i> (Menon)	D.iii.8, P.i.17, V.ii.9, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax stolioczkae</i> (Steindachner)	D.ii.8, P.i.18, V.ii.9-10, A.ii.5, C.19.	Caudal fin forked
<i>Schizothorax progastus</i> (Mc Clelland)	D.iii.8, P.i.16, V.ii.10, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax planifrons</i> (Heckel)	D.iii.7, P.i.16-17, V.ii.8, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax micropogon</i> (Heckel)	D.ii.7-8, P.i.16-18, V.ii.9-10, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax curvifrons</i> (Heckel)	D.ii.7, P.i.18, V.ii.9, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax niger</i> (Heckel)	D.iii.7, P.i.17, V.ii.9, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax nasus</i> (Heckel)	D.iii.7, P.i.17, V.ii.9, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax longipinnis</i> (Heckel)	D.iv.7, P.i.18, V.ii.10, A.iii.5, C.19.	Caudal fin forked
<i>Schizothorax esocinus</i> (Heckel)	D.iv.8, P.i.19, V.ii.9-11, A.ii.5, C.19.	Caudal fin forked
<i>Schizothorax labiatus</i> (Mc Clelland)	D.iii.8, P.i.17, V.ii.10, A.ii.5, C.19.	Caudal fin forked
<i>Schizothorax sikusirumensis</i>	D.ii.8, P.i.17, V.i.10-11, A.i.6, C.22.	The caudal fin number 5 to 8 and 12 to 15 emergent from within the rear bodies and extended out from rest of fin ray. The fin number 5 to 8 is longer than 12 to 15. Head length 4.0-4.5 times in standard length.

Comparison among the plates with figure numbers (Tilak 1987; *The Fauna of India*):



(Courtesy: Director ZSI for permission to use the photographs from the Book).

DISCUSSION

The schizothoracinae are a specialized group of fishes, dominant of the torrential mountain streams of the Himalaya and Central Asia. They are confined to cold regions as a rule, or at least to localities possessing snow-fed rivers, many of which end in lakes and do not reach the sea. They are specialised for the hill-stream life and show wonderful adaptations.

There are currently 65 recognised species of genus *Schizothorax* under family Cyprinidae have been identified all over the world (Wikipidea, 2020) and as per the report of Fish Base (2020), 68 species of this genus are present. Heckel (1844), Mukerji (1936) and Malik (1966) have reported *Schizothorax curvifrons*, *S. planifrons*, *S. longipinnis*, *S. nasus*, *S. hugelli*, *S. micropogon*, *S.labiatus*, *S. esocinus*, *Oreinus richardsnoii*, *O. sinuatus* and *O. molesworthii* from the Himalayan region. Menon (1974) has reported *Schizothoraichthys progastus*, *Schizothorax kumanonensis* and *S. richardsonii* also from the Himalayan region. Tilak (1987) reported twelve species of *Schizothorax* from Indian

region. In India, eight genera of subfamily Schizothoracinae were reported by Talwar and Jhingran (1991). Menon (1999) reported eleven species of *Schizothorax* from cold water system of India. Nath & Dey (2000) reported four species viz *S. esocinus*, *S. progastus*, *S. richardsonii* and *S. stotoczkae* and Sen (2006) reported three species viz. *S. stoliczkae*, *S. richardsonii* and *S. progastus* of genus *Schizothorax* from Arunachal Pradesh, India. Whereas Vishwanath *et al.* (2007) reported only two species from North East region of India viz *S. richardsonii* and *S. labiatus*. Till date there is no record of this new species ever found before by any researcher in any part of India and the rest of the world.

The features, by which this genus can be distinguished from all other schizothoracids, are the presences of a strip of hard papillated structure at the chin, margin of the lower jaw having a firm and hard horny covering and a thick lower lip with a free posterior edge (Tilak, 1987). The present record of new species closely resembles with the other species of this genus showing almost similar meristic counts except the anal and caudal fin. In other species of *Schizothora* have ii.5 or iii.5 anal fin whereas in this species it is i.6. Moreover, the peculiar morphological character which demarks the new species with others is the presence of unique caudal fin structure also. The caudal fin rays in other species are in the shape of forks whereas the new species shows unique caudal. The caudal fin rays number 9 to 12 and 16 to 18 emergent from within the rear bodies and extended out from rest of fin rays. The fin rays number 16 to 18 is longer than 9 to 12 (Fig. 3). No other species is recorded so far showing this type of fin structure under the genus *Schizothora*. This type of caudal structure is not form due to predation attack (Fig. 3) or any type of water pollution effect. This river is originated from hills of Himalaya. In the upper and lower stream of the river, there is no human habitat in nearby both bank of the river. This river is a tributary of mighty river Siang. Das *et al.*, (2014) studied twenty (20) parameters of water quality analysis at different places of River Siang and compared with the World Health Organisation (WHO) specified standard and it was found that the water of River Siang may be suitable for drinking and domestic purposes because all the values are between WHO standard except the values of Iron. The present finding of *Schizothorax sikusirumensis* 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, cataloguing and conservation can done in future.

ACKNOWLEDGEMENTS

The author is thankful to University Grants Commission, New Delhi (Sanction No.:41-91/2012(SR) dated 13th July 2012 for financial assistance. Author is also thankful to the Principal, J. N. College, Pasighat for providing laboratory facility, Shri Kumar Chetri and other local people of fish collection areas of Arunachal Pradesh for cooperation during fish collection. Mamta, Dr. Abhishek Kumar Jha and Shri Aman Tushar Jha for helping during the research work.

REFERENCES

- Bagra, K., Kadu, K., Nebeshwar, K., Laskar, B.A., U.K. Sarkar, & D.N. Das (2009). Ichthyological survey and review of the checklist of fish fauna of Arunachal Pradesh. *Checklist*, 5(2): 330-350.
- Das, B.K., Boruah, P and Kar, D. (2014). Study of seasonal variation of water quality of river Siang in Arunachal Pradesh, India, *J. Ecn. Sci. Toxi. And Food Tech.*, 8(2): 11-20.
- Dutta Choudhary, A.K. & T.K. Sen (1977). *Schizopygopsis stoliczkae* Steindachner recorded from Arunachal Pradesh, India with observation on the extension in the geographical range. *Ibid.*, 3(4): 143 -144.
- Dutta Choudhary, S. (1978). General fauna, freshwater fish. *Arunachal Pradesh District Gazetteers, Lohit District*. Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp. 16 -22.
- Dutta Choudhary, S. (1980). Invertebrates and fish fauna, *Arunachal Pradesh District Gazetteers, Tirap District*. Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp. 17-19.
- Dutta Choudhary, S. (1981). General fauna, freshwater fish. *Arunachal Pradesh District Gazetteers, Subansiri District*. Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp. 41 – 42.
- Dutta Choudhary, S. (1994). General fauna, fishes. *Arunachal Pradesh District Gazetteers East Siang and West Siang District*. Pub. Director of Information and Public Relation, Government of Arunachal Pradesh, pp.15 – 21.
- Fish Base. (2020). <http://www.fishbase.org>.

- Geetakumar, K and K. Kadu (2011). *Badis singenensis*, a new fish species (Teleostei: Badidae) from Singen river, Arunachal Pradesh, northeastern India. *JoTT* 3(9): 2085-2089.
- Heckel, J. J. (1844). Fisches Kaschmir's in Huegel, C. A. A. Von; *Kaschmir und Das Reich Der Seik*, Bd. 4; *abth* 2: 351-392.
- ICZN. (2014). Zoological Nomenclature and Electronic Publication—a reply to Dubois *et al.* (2013), *Zootaxa* 3779 (1): 003–005.
- Jayaram, K.C. (1963). A new species of *isoried* from the Kaming Frontier Division (NEFA), *J. Zool. Soc. India*, 15(1): 85-87.
- Jayaram, K.C. & N. Mazumdar (1964). On a collection of fish from the Kaming Frontier Division, NEFA., *J. Bombay Nat. Hist. Soc.*, 61(2): 264 -280.
- Jayaram, K.C. (1999). *The freshwater fishes of Indian region*. Narendra Publishing House, Delhi. pp. 141-150.
- Jha, K.K., Ghosh, T.K. & J.S. Datta Munshi (2008). First ever record of an endangered fish, *Chaca chaca* (Ham.-Buch.) from Arunachal Pradesh: A biodiversity hot spot, *Rec. Zool. Sev. India*, 108(Part-I):17-24.
- Jha, K.K., Tamuk, O. & T.K. Ghosh (2012). First ever record of fish, *Nangra assamensis* (Pisces: *Siluriformes*: *Sisoridae*) from Arunachal Pradesh, India: A biodiversity hot spot, *Biodiversity: Issues, Threats and Conservation* (eds.) B. N. pandey, A. P. Sharma *et al.* pp. 55-64, Narendra publishing House, New Delhi.
- Jha, K.K., Tamuk, O., Ghosh, T.K. & V.C. Jha (2013). First ever record of a threatened onepot barb fish, *Puntius terio* (Hamilton) from Arunachal Pradesh, India: A biodiversity hot spot. *Int J. Fish. Aqua.* 5(5): 66-70.
- Jha, K.K. & K. Chetri (2014). New record of a threatened ornamental Freshwater pipefish, *doryichthys martensii* (peters, 1868) or *microphis ignoratus* (vaillant 1902) from Indian sub-continent: Arunachal Pradesh, India. *Africa Journal of Advanced Agricultural Research.* 2(2):19-23.

- Jha, K.K. & K. Chetri (2016). First ever record of a freshwater siluroid fish, *ptero cryptis berdmorei* (Blyth, 1860) from Arunachal Pradesh, India: A Biodiversity hotspot. 104th Indian Sci. Cong. Asso. Abst. Mysore.
- Jha, K.K. & Chetri, K. and Ghosh, T. K. (2016). First ever record of a sisorid catfish, *Glyptothorax ventrolineatus* (Vishwanath and Linthoingambi) from Arunachal Pradesh India: A Biodiversity hot spot. 103rd *Indian Sci. Cong. Asso. mysuru*. Section II: *Animal, Veterinary and Fishery Sciences*, Abst. No. ABF-O-15, pp.79.
- Jhingran, V.G . & K.L. Sehgal (1978). *Coldwater Fisheries of India*. Pub. Inland Fish. Soc. India, Barrackpore, pp. 32-49.
- Malik, G.M. (1966). A revision of the fishes of genus *Oreinus* McClelland from Kashmir and in the Indian Museum, Calcutta with description of new variety. *Kashmir Science*, 3(1-2): 126-144.
- Menon, A.G.K. (1974). A checklist of fishes of the Himalayaa and Indo-Gangetic Plains. *Int. Fish Soc. India Spl. Publ. I*.
- Menon, A.G.K. (1999). Check list Fresh Water Fishes of India. *ZSI, Calcutta, Occ. Paper No. 175*: pp.105-113.
- Mukerjee, D.D. (1936). Report on fishes part II. Sisoridae and Cyprinidae. Results of Yale North India Expedition. *Mem. Connecticut Acad. Arts Sci.* 10:323-359.
- Nath, P. & Dey, S.C. (1985) Capture fisheries, an unfocused treasure of Arunachal Pradesh., *Fishing Chimes*, 5(4): 22 -25.
- Nath, P. & S.C. Dey (2000). *Fish and Fisheries of North-East India (Arunachal Pradesh)*. Narendra Publishing House, Delhi, pp. 11-14.
- Nath, P., Dam, D. & A. Kumar (2010). New species (*Barilius arunachalensis*) from D. Ering wildlife sanctuary, Arunachal Pradesh, India. *Rec. Zool. Sev. India*, 110(Part-3): 19-33.
- Nebeshwar, K., Bagra, K. & D.N. Das (2007). A new species of the Cyprinoid Genus *Psilorhynchoides* Yazdani *et al.* (Cypriniformes: *Psilorhynchoidaes*) from Arunachal Pradesh, India. *Zoos' Print J.* 22(3): 2632-2636.

- Sen, N. (2000). Occurrence, distribution and status of diversified fish fauna of North East India p.31- 48. In: A.G. Ponniah and U. K. Sarkar (eds.), *Fish Biodiversity of North-East India*. NBFGR. NATP Publ. 2: 228 pp.
- Sen, T.K. (2006) *Fauna of Arunachal Pradesh, State Fauna Series (Pisces)*. Zoological Survey of India, Kolkata, 13(Part-I). pp. 317-396.
- Talwar, P.K. & A.G. Jhingran (1991). *Inland Fishes of India and Adjacent Countries* (Vol. I); Oxford & IBH Pub. Co. PVT. Ltd. New Delhi. pp.391-412.
- Tamang, L., Chaudhary, S. & D. Choudhary (2006). On New record of freshwater fish *Pseudolaguvia shawi*(Hora) from Arunachal Pradesh, India(Teleostomi: Erethistidae). *Zoos' Print. J.* 21(11): 2443 – 2446.
- Tamang, L. & B. Sinha (2014). Two new species of the South Asian catfish genus *Pseudolaguvia* from northeastern India (Teleostei: Sisoridae). *Zootaxa* 3887 (1): 037–054.
- Tilak, R. (1987). *The Fauna of India Pisces (Teleostomi) sub-family: Schizothoracinae*. Zoological Survey of India, Calcutta. 229 pp.
- Vishwanath, W., Lakra, W.S. & U.K. Sarkar (2007). *Fishes of North East India*, NBFGR pp. 77-78.
- Wikipedia (2020). <https://en.m.wikipedia.org>.
- ZSI (2016). Permission for use of photographs from the book entitled “The Fauna of India and the adjacent countries” by Raj Tilak from Director, ZSI, Kolkata Vide letter No. Ref. No.: F-1-67/2004-Pub/19136 dated 21th November 2016.