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Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org



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continued on the back inside cover

**Cover: A male Scarlet Skimmer perching on vegetation by the banks of a waterbody. Ink and watercolour illustration by Anandita Pascal.**

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# A preliminary study of fish diversity in Sirum River of East Siang District, Arunachal Pradesh, India

**Obinam Tayeng [1], Leki Wangchu [2] & Debangshu Narayan Das [3]**

[1,2] Department of Zoology, Jawaharlal Nehru College, Pasighat, Arunachal Pradesh 791102, India.
[3] Fisheries and Aquatic Ecology Laboratory, Department of Zoology, Rajiv Gandhi University, Rono Hills, Doimukh, Arunachal Pradesh 791112, India.
[1] obinamtayeng48@gmail.com (corresponding author), [2] lekiwangchuk7@gmail.com, [3] dndas2011@gmail.com

**Abstract:** A preliminary study was conducted in the Sirum River, a tributary of the Siang River, located in the easternmost part of Arunachal Pradesh. A review of existing literature indicated a lack of systematic fish assessment in this river, which this study aimed to address. Fish sampling was carried out twice a month from October 2023 to September 2024 at three sites. Fifty four species belonging to four orders, 15 families, and 38 genera were recorded. Cypriniformes comprised 35 species, Siluriformes 14, Anabantiformes seven, and Synbranchiformes one species. Three species were classified as Endangered, two as Near Threatened, four as Vulnerable, 31 as Least Concern, four as Data Deficient, and 10 as Not Evaluated. Representative images of threatened and economically important fish species are included to aid in visual identification and documentation.

**Keywords:** Aquatic ecosystem, biodiversity, conservation, ecotourism, economic, Endangered, fish sampling, threatened, Vulnerable, species.

**Adi abstract: Lé:tom:** Arunachal Pradesh lok Sanggo kenyung lo tokna, Siang asi lo toklík duna Sirum Korong ém rimék kíto. Supak ké kapang dunam kotbum kídí so Sirum Korong sok éngo yena kídíém aipé rimík nam kapang madung, dém rimík domílo émla si ikí namko. October 2023 lokké ila September 2024 lopé, éngo angu-angu ém polo lo lénnyi pé ikol angum lok ladum suto. Íying pilngo kolang appi éngo ko, obak appi lok, íying kolang pilngo érang lok délokké íying angum kolang pínyi ramík ém ladum subom dola rimík toh. Rimík nam éngo kídí sok íying angum kolang pilngo é Cypriniformes é, íying kolang appi é Siluriformes, kínít é Anabantiformes délokké atél é Synbranchiformes pé ido. Délokké íying pilngo kolang appi éngo lokké, angum si nyokdak bong, anyi si nyoknam pé idung délo appi si nyokladung, íying angum kolang atél si padung ada, appi ko aipé kenmang nam é délokké íying ko aipé kangken manam é. Nyokdak bong ina délokké pesi korét pé ipénam engo mimang kídíém kajing-tatjing dopé atkumla lébitung.

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**Author details:** Ms. Obinam Tayeng is working as an assistant professor of Zoology, Jawaharlal Nehru College, Pasighat, Arunachal Pradesh, and her research interests are fish diversity, conservation of threatened fish species, aquarium & ornamental fish, and monogenean parasite of fish fauna of the region. Dr. Leki Wangchu, assistant professor in the Department of Zoology, Jawaharlal Nehru College, Pasighat, Arunachal Pradesh, works on monogenean parasites of freshwater fish and the conservation of threatened fish species. Prof. Debangshu Narayan Das is currently professor of Zoology in Rajiv Gandhi University, Doimukh, Arunachal Pradesh, and his research covers conservation of threatened fish species, fish and fisheries, aquaculture, aquarium & fish breeding culture, paddy cum fish culture, etc. He authored many books and published many research articles. He has supervised more than 40 PhD students.

**Author contributions:** OT—conceptualization, data collection, analysis of data set and preparation of the initial draft of the manuscript, images; LW—editing, data validation; DND—species identification, and editing of the final version of the manuscript.

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## INTRODUCTION

Fish biodiversity is crucial for maintaining healthy aquatic ecosystems and supporting human well-being. Fish play an integral role as a source of food, recreation, and livelihood for millions of people globally. Safeguarding and conserving fish biodiversity ensures that future generations continue to benefit from the numerous ecological, nutritional, and economic advantages provided by fish (Lisbeth 2023). Furthermore, the abundance and diversity of species within an ecosystem act as key indicators of its ecological health. The population size and condition of fish are directly correlated to the overall health of water bodies, with changes in fish communities often reflecting shifts in environmental quality (Hamzah 2007). Fish biodiversity is increasingly threatened by various human activities, including overfishing, habitat destruction, and pollution (Lisbeth 2023). Ecotourism represents a promising sector for biodiversity conservation, offering potential to reverse biodiversity loss and assist in enhancing the economy (Buckley 2009).

Arunachal Pradesh, located at coordinates 27.975° N and 94.455° E, occupies a large portion (61%) of the eastern Himalayan region, covering an area of 83,743 km² within the Indo-Burma biodiversity hotspot (Myers et al. 2000). The region is characterized by mountainous terrain, hilly regions, lowland areas, and diverse drainage systems. An extensive network of river systems provides rich habitats for a wide range of fish and other aquatic organisms. The tribal communities in Arunachal Pradesh have a close connection to nature and its resources, and for generations they have practiced community-based fishing. Wild fish from these water bodies are a vital natural resource, providing an essential protein source for rural populations, particularly for growing children and lactating mothers. Consequently, the conservation of fish populations, along with water resources, plays a vital role for present and future generations, especially in light of increasing environmental challenges.

As far as the ichthyofauna of the state is concerned, McClelland (1839) was considered the earliest pioneering worker, who reported four species. This was followed by subsequent contributions from Chaudhuri (1913), Hora (1921), Jayaram (1963), Jayaram & Mazumdar (1964), Srivastava (1966), Dutta & Sen (1977), and Dutta & Barman (1984, 1985). Ghosh (1979) was the first to report on the fish fauna diversity of the East Siang District, documenting 16 species, followed by Sen (1999), who reported 32 species, and Sen (2006) reported 21 species from the same district. Sinha & Tamang (2015) extended the documentation by reporting 121 fish species from the natural water bodies of both lotic and lentic environments in eastern Siang, and Das et al. (2017) listed 82 species from the Siang River. Over the past two decades, several authors have shown significant interest in documenting the fish fauna of the state. Nath & Dey (2000) first compiled the fish fauna of the state in the form of a book, which reported 131 species. Thereafter, Bagra et al. (2009) reported 213 species, and then Darshan et al. (2019) further updated to 218 species. Recently, Tamang & Das (2024) listed an additional 25 species, bringing the total to 233 species. In recent years, Gurumayum & Nath (2022) listed 30 threatened species in Arunachal Pradesh based on museum collections and published literature and suggested a dedicated and intense effort for conservation as well as exploration and documentation. Several studies have also documented the practice of non-conventional fishing methods, habitat degradation, and disturbances to riparian vegetation within the Itanagar Wildlife Sanctuary in Papum Pare District and along the Sille river in East Siang District (Chaudhry & Tamang 2007; Tamang & Chaudhry 2012; Taro et al. 2022). These activities are gradually exerting detrimental effects on the local fish fauna, leading to significant ecological concerns. The gradual decline in fish populations, attributed to these anthropogenic pressures, emphasizes the urgent need for a more comprehensive understanding and management of the aquatic ecosystems. Review of literature revealed no systematic documentation of the ichthyofaunal diversity of the Sirum River. The Sirum River is a socio-culturally integral part of the Adi tribe (Vishwanath 2002) and fishing is a popular recreational activity, with many people enjoying fishing as a way to relax and connect with nature. Documentation of the fish fauna of Sirum River forms the basis of this study, aiming to create a comprehensive database that serves as valuable information for future conservation efforts and management strategies.

## MATERIALS AND METHODS

### Study area

The Sirum River originates from the hilly terrain known as 'Rumdong Kosing' at coordinates approximately 28.544° N and 95.628° E near Adi Pasi Sibuk Village in the Upper Siang District of Arunachal Pradesh. It is an important tributary of the Siang River, that follows a roughly 33 km zigzag course through dense mountain forests, flowing over sedimentary rocks and eventually

converging with the Siku River near Mebo Village in the East Siang District, where it is locally known as the 'Sikusirum' River, which finally forms the headwaters of the Brahmaputra River in the south (Image 1). The recorded temperature in this region ranges from 4–8 °C, with altitudes varying 180–2,400 m near Adi Pasi Sibuk Village. The Sirum River is characterized by a prevalence of medium to large boulders, cobbles, and pebbles, particularly in its upper reaches. These conditions, combined with its clear freshwater, create an ideal habitat for true hill stream fish species.

**Fish sampling**

Fish sampling was conducted from October 2023–September 2024 over the period of one year, with samples collected from three study sites (I, II, and III) along the river, each approximately 1 km in length, with a 1 km gap between each site for comparative analysis. Traditional and sustainable fishing methods were employed consistently across all three selected sites—Porang, Edil, and Kotong. These methods included conical-shaped basket traps, which allow fish to enter but prevent their escape, as well as other techniques such as Lipum, Hibok, and cast nets. Lipum, in particular, is a fishing technique commonly used during the winter season. Medium-sized boulders are arranged in a cylindrical pattern with gaps between them, and the spot is left undisturbed for about one month. This setup provides shelter for bottom-feeding fishes. After one month, a large cylindrical bamboo trap, known as 'Edil' (open at both the top and bottom), is used to cover the boulders. The bottom edges are sealed with sand and gravel to prevent the fish from escaping. The boulders are then manually removed, allowing the fish to move into the trap, which is connected to a smaller collection conical trap attached just above the bottom of Edil.

*Hibok* is another traditional fishing method, typically employed in a diverted river course. One side of the watercourse is blocked using various materials such as boulders, banana leaves, ferns, plastic, soil, and sand. As the water level decreases, fish emerge from the gaps between the boulders and are subsequently captured by hand or with a scoop net.

The frequent use of non-conventional methods and indiscriminate fishing practices in various water bodies throughout the state has led to restrictions on fishing activities in many villages, with penalties imposed by village authorities. As a result, fish sampling in the present study was conducted only after obtaining prior authorization from the village head, the Gaon Burah. Additionally, a local guide and several village fishing experts were engaged to ensure the proper investigation and documentation of fish diversity. The collected fish specimens were photographed in the field using a Nikon

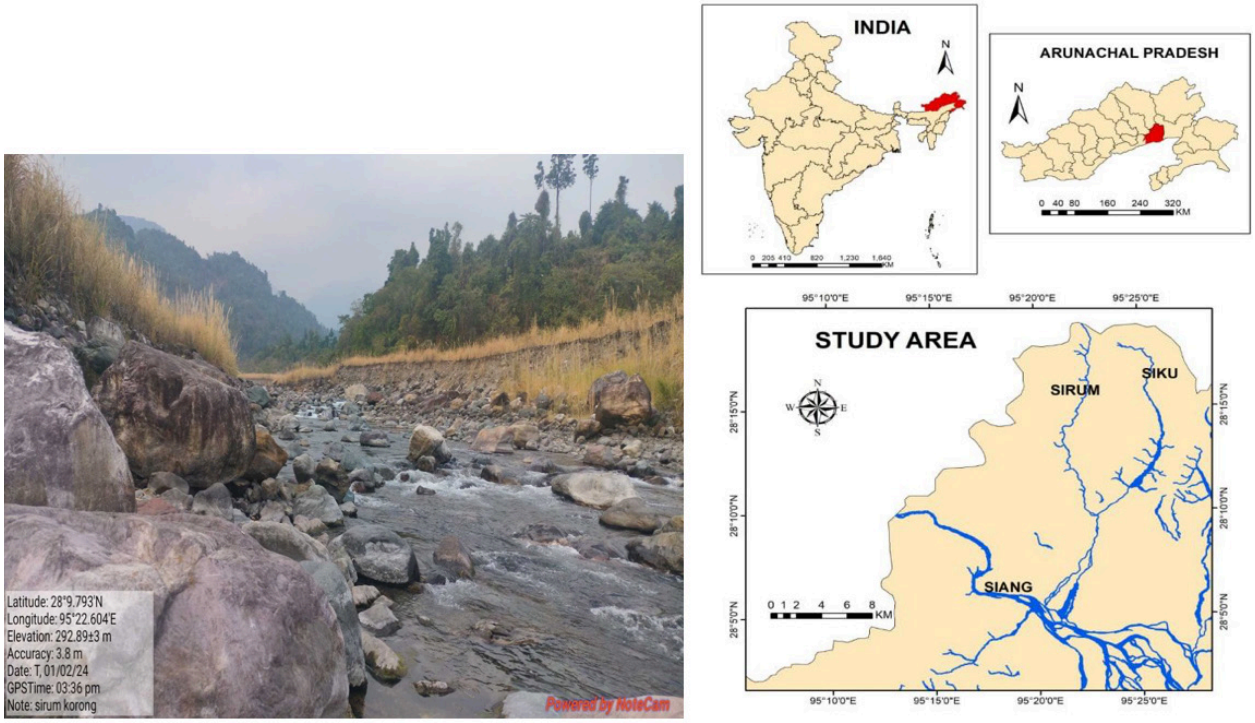


**Image 1. The habitat characteristics and study area (Sirum River), East Siang District, Arunachal Pradesh (Maps are not to scale).**

D850 DSLR camera with a 24–120 mm lens. Initially, the specimens were preserved in 5% formalin on site and then transported to the laboratory at the Department of Zoology, Jawaharlal Nehru College, Pasighat. In the laboratory, the specimens were sorted and identified using standard literature (Talwar & Jhingran 1991; Nath & Dey 2000; Darshan et al. 2019). The conservation status of the identified species was confirmed from the IUCN Red List of Threatened Species Version 2024-2 (https://www.iucnredlist.org). The scientific names, families, and orders of the identified fish species were confirmed following Eschmeyer's Catalogue of Fishes (Fricke et al. 2025). The identified fish specimens were stored in 10% formalin, labelled, registered, and deposited in the Fish Museum of the Department of Zoology, Jawaharlal Nehru College, Pasighat, for future reference.

**Data analysis**

Diversity indices were calculated as per the standard method (Shannon & Wiener 1963) by the formula: H = -Σ (ni/N) log2 (ni/N), where H = Shannon-Wiener index of diversity, ni = total number of individuals of a species and N = total number of individuals of all the species. Evenness of the species was calculated following Pielou's evenness index (Pielou 1966), i.e., J = H'max/logS, where H'max = the maximum value of Shannon-Wiener's index, and S = the total number of species. The value of J falls between 0 and 1. The less variation in the species composition between the communities, the higher the E value. Simpson's diversity index was calculated by the formula: D = 1-(Σn(n-1)/N(N-1)), where D = diversity, n = number of individuals of a single species, N = total number of all species. The relative abundance (RA%) of each study site was calculated by dividing the number of species by the total number of individuals of all the species, multiplying by 100. All the diversity indices were performed using PAST software version 4.02.

## RESULTS

A systematic list of fish species collected from three contiguous lotic water bodies (sites I, II, & III) of the Sirum River, along with their local names, abundances, types, and IUCN conservation status, is provided in Table 1. The total ichthyofaunal diversity revealed 54 fish species distributed over four orders, 15 families, and 38 genera, with a total of 1909 individuals captured (Table 1).

The catch composition revealed that Cyprinidae was the dominant family, contributing 35.2% (19 species), followed by Nemacheilidae with 11.1% (6 species), and both Danionidae and Bagridae accounted for 9.3% (5 species) each. Sisoridae represented 5.6% (3 species), while Schilbeidae, Psilorhynchidae, Cobitidae, Channidae, Badidae, and Amblycipitidae each contributed 3.7% (2 species). The families Siluridae, Mastacembelidae, Heteropneustidae, and Botiidae were the least represented, each contributing 1.9% (1 species) (Table 1 & Figure 1).

Quantitative analysis of the three study sites revealed that, among the 54 species, Hill Trout *Opsarius bendelisis* was the most abundant species, with 104 individuals, followed by *Aborichthys kempi* (81), *Garra annandalei* (74), and both *Garra arupi* and *Mustura daral* (65 each) in comparison to others (Table 1 & Figure 2). The majority of species were found in all three sites, except six species: *Schistura scaturigina* and *Psilorhynchus arunachalensis*, *Clupisoma gorua*, *Eutropiichthys vacha*, *Pterocryptis indica*, and *Macrognathus pancalus*, which were absent in Site III (upstream). Fish abundance showed that site I (downstream) has the highest number of individuals (1,088), followed by site II (midstream) (573 individuals), while site III (upstream) has the lowest number of captures (246 individuals). This pattern suggests that fish diversity and abundance are inversely correlated from downstream to upstream.

## DISCUSSION

The IUCN conservation status shows that out of 54 species, majority, i.e., 57% (31 species), belong to the Least Concern category, followed by 19% (10) as Not Evaluated, 7% (4) as Data Deficient, 7% (4) as Vulnerable, 6% (3) as Endangered, and 4% (2) as Near Threatened (Table 1 & Figure 3). The threatened species recorded in the study included three species as Endangered: *Tor putitora, Neolissochilus hexagonolepis,* and *Amblyceps arunachalensis*, and four species as Vulnerable: *Schizothorax richardsonii*, *Semiplotus semiplotus*, *Botia rostrata*, and *Pseudecheneis sirenica* (Table 1).

Regarding the biodiversity indices, the Shannon-Weiner index (H) values were found to be quite similar across three sites: site I (3.831), site II (3.812), and site III (3.678). The values in sites I and II were almost identical, whereas site III exhibited a slightly lower value. This suggests that, despite minor differences in these values, the overall diversity of species throughout the three sites is relatively comparable. Similarly, the Simpson diversity index showed that the values for all three sites were very similar: site I (0.9753), site II (0.9749), and site III (0.9703). This indicates that, despite slight variations

**Table 1. List of fish species, local name, abundance, types, IUCN conservation status collected from the Sirum River, East Siang District, Arunachal Pradesh.**

| Species | Local name | Study sites | | | No. of specimens | Type of fish | Conservation status |
|---|---|---|---|---|---|---|---|
| | | I | II | II | | | |
| **I. Order: Cypriniformes**<br>**i. Family: Cyprinidae** | | | | | | | |
| 1. *Bangana dero* (Hamilton, 1822) | Ngopy | 15 | 8 | 6 | 29 | Carp | LC |
| 2. *Barilius vagra* (Hamilton, 1822) | Sepung | 19 | 13 | 5 | 37 | Carp | LC |
| 3. *Chagunius chagunio* (Hamilton, 1822) | Lingkar/Hara peking | 9 | 5 | 2 | 16 | Carp | LC |
| 4. *Garra annandalei* (Hora, 1921) | Ngopih | 45 | 20 | 9 | 74 | Carp | LC |
| 5. *Garra arunachalensis* (Nebeshwar & Vishwanath, 2013) | Ngopih | 25 | 15 | 8 | 48 | Carp | NE |
| 6. *Garra arupi* (Nebeshwar et al., 2009) | Ngopih | 36 | 20 | 9 | 65 | Carp | NE |
| 7. *Garra birostris* Nebeshwar & (Vishwanath, 2013) | Ngopih | 18 | 12 | 6 | 36 | Carp | NE |
| 8. *Garra kempi* (Hora, 1921) | Ngopih | 15 | 3 | 1 | 19 | Carp | LC |
| 9. *Labeo pangusia* (Hamilton, 1822) | Tengir | 15 | 8 | 4 | 27 | Carp | NT |
| 10. *Neolissochilus hexagonolepis* (McClelland, 1839) | Taga | 16 | 8 | 6 | 30 | Carp | EN |
| 11. *Puntius chola* (Hamilton, 1822) | Ngrtak/Metak | 9 | 4 | 1 | 14 | Barb | LC |
| 12. *Puntius sophore* (Hamilton, 1822) | Ngrtak/Metak | 15 | 7 | 3 | 25 | Barb | LC |
| 13. *Raiamas bola* (Hamilton, 1822) | Osonggombey | 9 | 5 | 3 | 17 | Trout | LC |
| 14. *Rasbora daniconius* (Hamilton, 1822) | Jommeng | 16 | 5 | 3 | 24 | Minnows | LC |
| 15. *Schizothorax richardsonii* (Gray, 1832) | Ngoying | 20 | 14 | 3 | 37 | Common snowtrout | VU |
| 16. *Schizothorax sikusirumensis* (Jha, 2020) | Ngoying | 18 | 12 | 6 | 36 | Common snowtrout | NE |
| 17. *Semiplotus semiplotus* (McClelland, 1839) | Orpey | 25 | 15 | 6 | 46 | Carp | VU |
| 18. *Tariqilabeo latius* (Hamilton, 1822) | Piiyong | 25 | 12 | 4 | 41 | Carp | LC |
| 19. *Tor putitora* (Hamilton, 1822) | Rulbung | 26 | 12 | 4 | 42 | Carp | EN |
| **ii. Family: Danionidae**<br>20. *Danio dangila* (Hamilton, 1822) | Tapong | 24 | 13 | 5 | 42 | Minnows | LC |
| 21. *Devario aequipinnatus* (McClelland, 1839) | Tapong | 36 | 12 | 5 | 53 | Minnows | LC |
| 22. *Devario devario* (Hamilton, 1822) | Tapong | 20 | 12 | 6 | 38 | Minnows | LC |
| 23. *Opsarius bendelisis* (Hamilton, 1807) | Taseng | 56 | 30 | 18 | 104 | Hill trout | LC |
| 24. *Opsarius barna* (Hamilto, 1822) | Seypar | 32 | 16 | 5 | 53 | Barred hill trout | LC |
| **iii. Family: Nemacheilidae**<br>25. *Aborichthys kempi* (Chaudhuri, 1913) | Riibi | 40 | 26 | 15 | 81 | Loach | NT |
| 26. *Mustura daral* (Rameshori et al., 2022) | DiiteRiibi | 36 | 24 | 5 | 65 | Loach | NE |
| 27. *Paracanthocobitis mackenziei* (Chaudhuri, 1910) | Riibi | 23 | 12 | 5 | 40 | Loach | LC |
| 28. *Paraconthocobitis botia* (Hamilton, 1822) | Riibi | 36 | 13 | 6 | 55 | Loach | LC |
| 29. *Paraconthocobitis hijumensis* Rime et al., 2022 | Riibi | 12 | 5 | 2 | 19 | Loach | NE |
| 30. *Schistura scaturigina* (McClelland, 1839) | Riibi | 12 | 8 | 0 | 20 | Loach | LC |
| **iv. Family: Psilorhynchidae**<br>31. *Psilorhynchus arunachalensis* (Nebeshwar et al., 2007) | Riipi piijep | 9 | 4 | 0 | 13 | Minnow | DD |
| 32. *Psilorhynchus balitora* (Hamilton, 1822) | Riipi piijep | 16 | 10 | 6 | 32 | Minnow | LC |
| **v. Family: Botiidae** | | | | | | | |
| 33. *Botia rostrata* (Gunther, 1868) | Riiibi | 40 | 14 | 6 | 60 | Loach | VU |
| **vi. Family: Cobitidae**<br>34. *Canthoprys gongota* (Hamilton, 1822) | Riibi | 6 | 3 | 1 | 10 | Loach | LC |
| 35. *Lepidocephalichthys guntea* (Hamilton, 1822) | Riibi | 8 | 4 | 1 | 13 | Loach | LC |
| **II. Order: Siluriformes**<br>**vii. Family: Amblycipitidae**<br>36. *Amblyceps apangi* (Nath & Dey, 1989) | Beyek | 40 | 18 | 12 | 70 | Catfish | LC |

| Species | Local name | Study sites | | | No. of specimens | Type of fish | Conservation status |
|---|---|---|---|---|---|---|---|
| | | I | II | II | | | |
| *37. Amblyceps arunachalensis* (Nath & Dey, 1989) | Beyek | 36 | 20 | 7 | 63 | Catfish | EN |
| **viii. Family: Bagridae**<br>*38. Batasio fasciolatus* (Ng, 2006) | Nareng | 14 | 8 | 6 | 28 | Catfish | LC |
| *39. Batasiomerianiensis* (Chaudhuri, 1913) | Nareng | 16 | 8 | 4 | 28 | Catfish | DD |
| *40. Mystus dibrugarensis* (Chaudhuri, 1913) | Nareng | 18 | 13 | 4 | 35 | Catfish | LC |
| *41. Mystus pulcher* (Chaudhuri, 1911) | Nareng | 10 | 5 | 2 | 17 | Catfish | LC |
| *42. Olyra longicaudata* (McClelland, 1842) | Beyek | 30 | 16 | 8 | 54 | Catfish | LC |
| **ix. Family: Heteropneustidae**<br>*43. Heteropneustes fossilis* (Bloch, 1794) | Beyek | 4 | 2 | 1 | 7 | Catfish | LC |
| **x. Family: Schilbeidae**<br>*44. Clupisoma gorua* (Hamilton, 1822) | Gerek | 6 | 2 | 0 | 8 | Catfish | LC |
| *45. Eutropiichthys vacha* (Hamilton, 1822) | Gerek | 7 | 3 | 0 | 10 | Catfish | LC |
| **xi. Family: Siluridae**<br>*46. Pterocryptis indica* (Datta et al., 1987) | Beyek | 10 | 3 | 0 | 13 | Catfish | DD |
| **xii. Family: Sisoridae**<br>*47. Exostoma dhritae* (Pratima et al., 2022) | Ngorey-rejep | 16 | 13 | 5 | 34 | Catfish | NE |
| *48. Glyptothorax pasighatensis* (Arunkumar, 2016) | Ngokey | 12 | 8 | 3 | 23 | Catfish | NE |
| *49. Pseudecheneis sirenica* (Vishwanath & Darshan, 2007) | Ngorey | 17 | 12 | 3 | 32 | Catfish | VU |
| **III. Order: Anabantiformes**<br>**xiii. Family: Badidae**<br>*50. Badis assamensis* (Ahl, 1937) | Ngotupatang | 20 | 12 | 6 | 38 | Chameleon fish | DD |
| *51. Badis singenensis* (Geetakumari & Kadu, 2011) | Ngotupatang | 25 | 15 | 8 | 48 | Chameleon fish | NE |
| **xiv. Family: Channidae**<br>*52. Channa punctata* (Bloch,1793) | Talum | 10 | 3 | 1 | 14 | Snakehead | LC |
| *53. Channa pomanensis* (Gurumayum & Tamang, 2016) | Talum | 9 | 4 | 3 | 16 | Snakehead | NE |
| **IV. Order: Synbranchiformes**<br>**xv. Family: Mastacembelidae**<br>*54. Macrognathus pancalus* (Hamilton, 1822) | Germey | 6 | 4 | 0 | 10 | Spiny eel | LC |
| | **Total** | **1088** | **573** | **248** | **1909** | | |

DD—Data Deficient | EN—Endangered | LC—Least Concerned | NE—Not Evaluated | NT—Near Threatened | VU—Vulnerable.

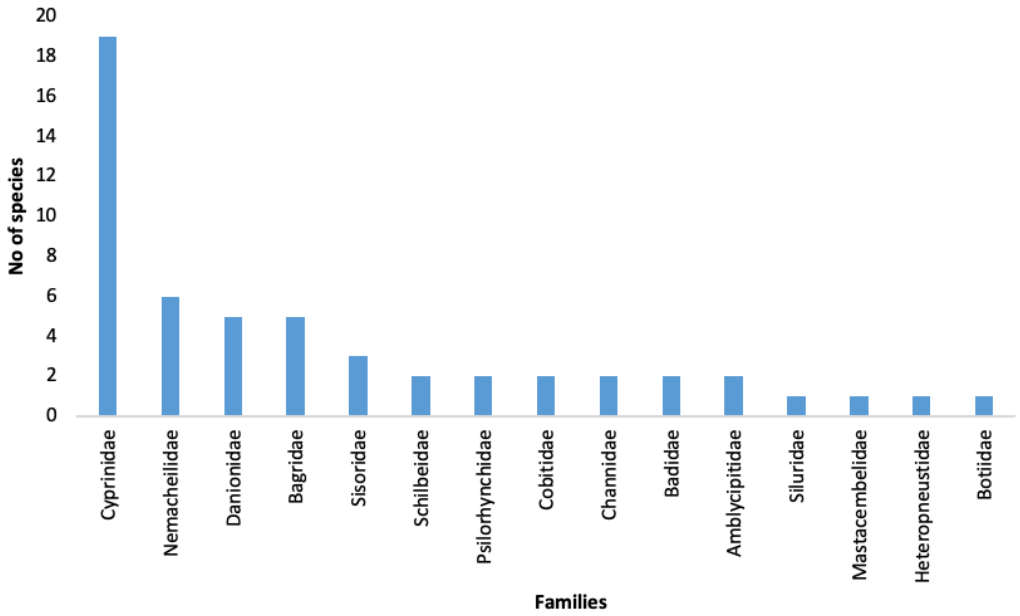


**Figure 1. Distribution of fish species among different families.**

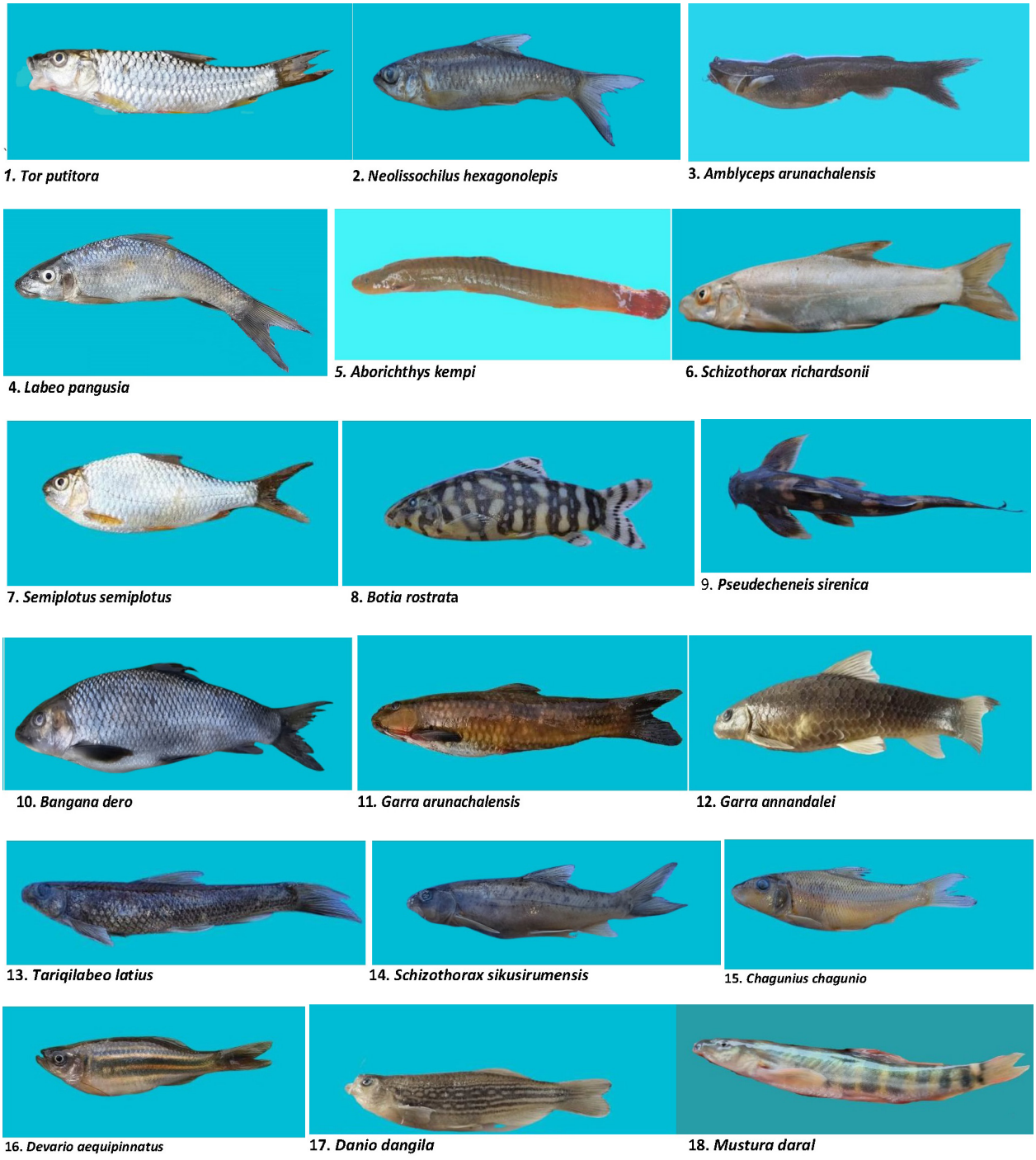


**Image 2. Some threatened and economically important food and ornamental fish species encountered in the Sirum River. © Obinam T.**

in the specific biodiversity measures at each site, the overall community diversity is nearly identical over the three locations. Pielou's evenness indices (J) showed that the values for the three sites were similar: site-I (0.8541), site-II (0.838), and site-III (0.8246), showing only minor variations. These relatively high values suggest that species at all three sites are fairly evenly distributed. The relative abundance (RA%) is inversely correlated, depicting the highest in site-III, i.e., 19.3, whereas lower in site-II, 9.4, and lowest in site-I, 4.9 (Table 2). The taxonomic enumeration of 54 species, with the majority falling under the Least Concern category, indicates a healthy level of species diversity and stability.

Aquatic environments worldwide are facing serious

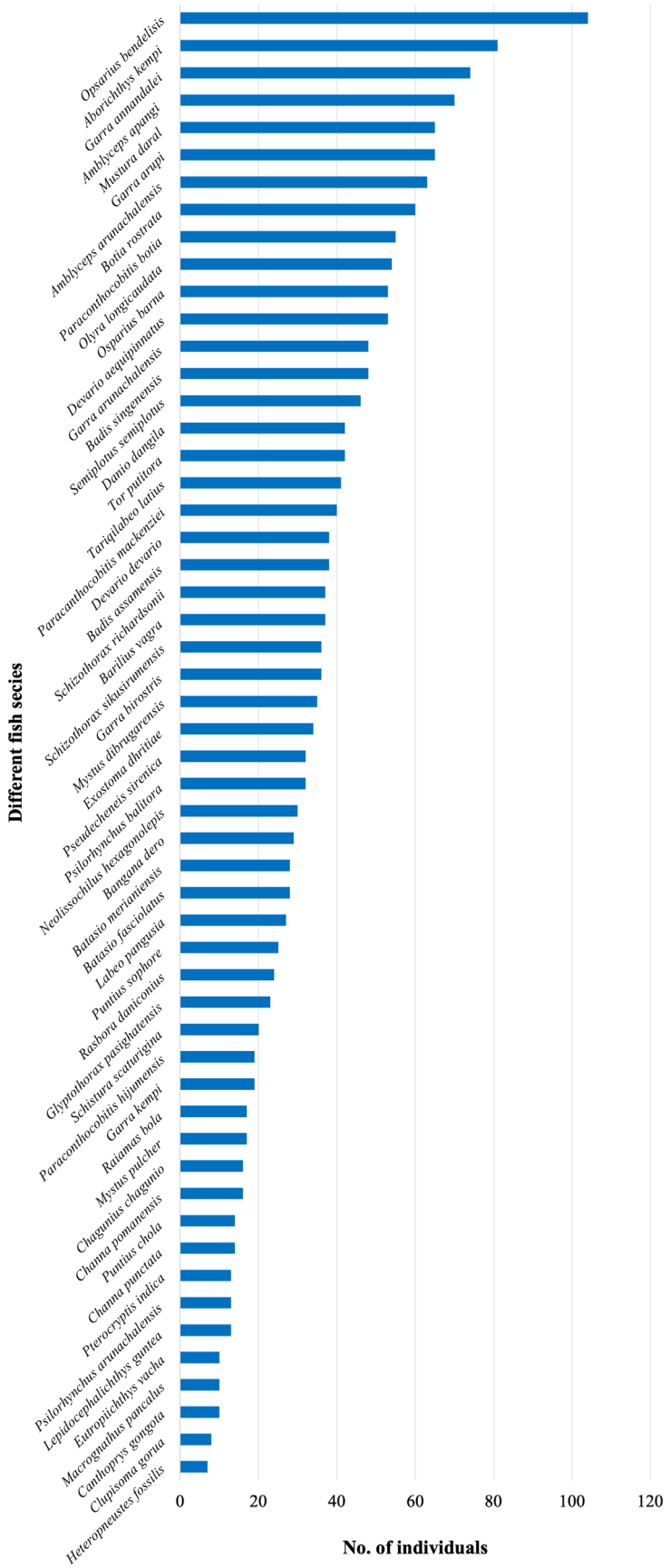


Figure 2. Different fish species and its abundance collected from the Sirum River, East Siang District, Arunachal Pradesh.

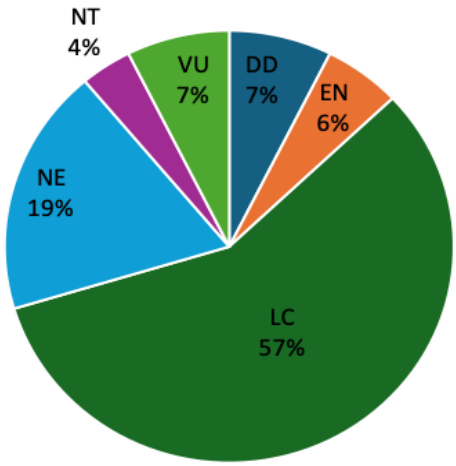


**Figure 3. IUCN Red List status of fish species recorded from the Sirum River, East Siang District, Arunachal Pradesh.**

**Table 2. Diversity indices of three study sites of Sirum River.**

| | Study Sites | | |
|---|---|---|---|
| | I | II | III |
| Species richness | 54 | 54 | 48 |
| Species abundance | 1088 | 573 | 248 |
| Simpson_1-D | 0.9753 | 0.9749 | 0.9703 |
| Shannon_H | 3.83 | 3.81 | 3.68 |
| Evenness_e^H/S | 0.85 | 0.84 | 0.82 |
| Relative abundance (%) | 4.9 | 9.4 | 19.3 |

threats to both their biodiversity and ecosystem stability, suggesting ongoing research aimed at developing systematic conservation planning to protect freshwater biodiversity (Margules & Pressey 2000; Saunders et al. 2002). The frequent degradation of stream and riverine ecosystems ultimately leads to the destruction of the structure and function of stream biota, which is a critical concern for the health of these ecosystems (Stoddard et al. 2006). On the other hand, faunal documentation from various regions has become an important aspect of understanding the current status of biodiversity, especially in light of the rapidly declining global environmental conditions.

During the study period, it was observed that the rural populations of the adjacent villages depend on the fish fauna of the Sirum River for their subsistence needs. Besides serving as a critical dietary component, fish also becomes a primary source of income for local households. They engage in the sale of fish in various forms, like fresh, dried, smoked, and processed varieties, all of which are sold in local markets. Some fish species observed in the market were *Garra annandalei*, *Garra arunachalensis*, *Tor putitora*, *Neolissochilus hexagonolepis*, *Schizothorax sikusirumensis*, *Semiplotus semiplotus*, and *Bangana dero*. These fish are not only ecologically significant but also commercially valuable. The market price of fish ranges Rs. 500–1000/- per kg in Pasighat Town.

While conducting interviews with nearby villagers and the head Goan Burah, it was revealed that, over the past two decades, anthropogenic pressures such as illegal fishing practices have gradually led to a decline in the fish fauna of the Sirum River. In response to these ongoing threats, the local governing authority of Sibuk Village in Upper Siang District, in the upstream and Mebo block, along with Mebo and Ayeng villages in East Siang District, in the downstream, respectively, has taken proactive measures by imposing a ban on unauthorized fishing in the Sirum River. The village community has imposed a penalty of Rs. 25,000 for illegal fishing. However, the community allows for sustainable community fishing occasionally, but only with prior permission from the village head. If the fish fauna of the Sirum River is well managed and sustainably used, the region could attract both national and international tourists for angling, which provides a significant source of income for both the state, and the local communities.

Cleaning drives were organized by the local community along the banks of the Sirum River, particularly women's groups, students, and youth organizations as, part of the Swachh Bharat Abhiyan. The Sirum River is not only a vital natural resource but also fulfills the cultural and spiritual significance of the tribal community. Moreover, the river also possesses the majority of fish that belong to the Least Concern category and some threatened species. Therefore, this study allows consideration of a long-term conservation strategy for ichthyofauna in the Sirum River.

## CONCLUSION

This study represents the first comprehensive documentation of the ichthyofauna of the Sirum River, comprising 54 fish species belonging to four orders, 15 families, and 38 genera, which is valuable data for government agencies, non-governmental organizations (NGOs), ichthyologists, and research scholars in relation to future conservation efforts and sustainable utilization of aquatic resources.

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