

Role of Rohu in Local Fisheries and socio-economic importance in Seemanchal Bihar

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Abstract: Rohu (*Labeo rohita*) is the cornerstone of inland fisheries and aquaculture in Seemanchal, Bihar, comprising the districts of Kishanganj, Araria, Purnia, and Katihar. As a primary "Indian Major Carp," it holds significant economic, nutritional, and cultural value in the region, which is heavily influenced by the Kosi and Mahananda river systems. Body bilaterally symmetrical, moderately elongate, its dorsal profile more arched than the ventral profile; body with cycloid scales, head without scale; snout fairly depressed, projecting beyond mouth, without lateral lobe; eyes dorsolateral in position, not visible from outside of head; mouth small and inferior; lips thick and fringed with a distinct inner fold to each lip, lobate or entire; a pair of small maxillary barbels concealed in lateral groove; no teeth on jaws; pharyngeal teeth in three rows; upper jaw not extending to front edge of eye; simple (unbranched) dorsal fin rays three or four, branched dorsal fin rays 12 to 14; dorsal fin inserted midway between snout tip and base of caudal fin; pectoral and pelvic fins laterally inserted; pectoral fin devoid of an osseous spine; caudal fin deeply forked; lower lip usually joined to isthmus by a narrow or broad bridge; pre-dorsal scale 12-16; lateral line distinct, complete and running along median line of the caudal peduncle; lateral line scales 40 to 44; lateral transverse scale-rows six or six and a half between lateral line and pelvic fin base; snout not truncate, without any lateral lobe; colour bluish on back, silvery on flanks and belly.

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Introduction:

Rohu (*Labeo rohita*) is a major freshwater fish species widely cultivated and consumed across South and Southeast Asia. Belonging to the family Cyprinidae, it is one of the three principal species used in Indian polyculture systems, alongside Catla catla and Cirrhinus mrigala. Known for its economic value, nutritional richness, and cultural significance, Rohu holds an eminent position in inland fisheries and aquaculture practices throughout the Indian subcontinent.

Taxonomy and Classification

Rohu is a cyprinid fish, belonging to the order Cypriniformes, which comprises carps and minnows. Its scientific classification is as follows:

- Kingdom: Animalia
- Phylum: Chordata
- Class: Actinopterygii
- Order: Cypriniformes
- Family: Cyprinidae
- Genus: Labeo
- Species: Labeo rohita

The species was first described by Hamilton in 1822. It is sometimes colloquially referred to as "Rui" in Bengali, "Rohu" in Hindi, and by similar

names across regional languages of India and Bangladesh.

Morphological Characteristics

Rohu is a large-sized fish with a typical carp-like appearance. Its body is elongated, laterally compressed, and covered with large cycloid scales. The dorsal profile is slightly arched, and the head is relatively small with a terminal mouth adapted for column feeding.

Key identifying features include:

- Colouration: Bluish or dark grey on the dorsal side, silvery on the flanks, and whitish on the ventral region.
- Fins: The dorsal fin originates near the pelvic fin and contains 12–13 branched rays. The pectoral, pelvic, and anal fins are reddish or orange in adults.
- Size: Rohu can attain a length of up to 100 cm and a weight exceeding 20 kg under optimal conditions.
- Lips: Thick and fringed, enabling the fish to graze on periphyton and detritus.

.Historical background

Rohu (*Labeo rohita*) is the most important among the three Indian major carp species used in carp polyculture systems. This graceful Indo-Gangetic riverine species is the natural inhabitant of the

riverine system of northern and central India, and the rivers of Pakistan, Bangladesh and Myanmar. In India, it has been transplanted into almost all riverine systems including the freshwaters of Andaman, where its population has successfully established. The species has also been introduced in many other countries, including Sri Lanka, the former USSR, Japan, China, the Philippines, Malaysia, Nepal and some countries of Africa. The traditional culture of this carp goes back hundreds of years in the small ponds of the eastern Indian states.

Information on its culture is available only from the early part of the 20th century. The compatibility of rohu with other carps like catla (*Catla catla*) and mrigal (*Cirrhinus mrigala*) made it an ideal candidate for carp polyculture systems. While riverine collection of seed was solely meeting the requirement for culture of the species until the first half of the 20th century, the success in induced breeding in 1957 and the assured seed supply thereafter was the major factor for the development of its culture in freshwater ponds and tanks. Its high growth potential, coupled with high consumer preference, have established rohu as the most important freshwater species cultured in India, Bangladesh and other adjacent countries in the region. Considering its importance in the culture system, emphasis has also been given to its genetic improvement through selective breeding in India.

Habitat and biology

Rohu is a eurythermal species and does not thrive at temperatures below 14 °C. It is a fast growing species and attains about 35-45 cm total length and 700-800 g in one year under normal culture conditions. Generally, in polyculture, its growth rate is higher than that of mrigal but lower than catla.

The minimum age at first maturity for both sexes is two years, while complete maturity is reached after four years in males and five years in females. In nature, spawning occurs in the shallow and marginal areas of flooded rivers. The spawning season of rohu generally coincides with the south-west monsoon, extending from April to September. In captivity with proper feeding the species attains maturity towards the end of second year. However, breeding does not take place in such lentic pond environments; thus induced breeding becomes necessary. The fecundity varies from 226 000 to 2 794 000, depending upon fish size and ovary weight; on average it ranges from 200 000-300 000 eggs/kg BW. Rohu is a polygamous fish and also seems to be promiscuous. The optimum temperature for spawning is 22-31 °C.

In its early life stages rohu prefer zooplankton, mainly composed of rotifers and cladocerans, with

phytoplankton forming the emergency food. In the fingerling stage, there is a strong positive selection for all the zooplanktonic organisms and for some smaller phytoplankters like desmids, phytoflagellates and algal spores. On the other hand, adults show a strong positive selection for most of the phytoplankton. In the juvenile and adult stages rohu is essentially an herbivorous column feeder, preferring algae and submerged vegetation. Furthermore, the occurrence of decayed organic matter and sand and mud in its gut suggests its bottom feeding habit. The nibbling type of mouth with soft fringed lips, sharp cutting edges and absence of teeth in the bucco-pharyngeal region helps the fish to feed on soft aquatic vegetation which do not require seizure and crushing. The modified thin and hair-like gill rakers also suggest that the fish feed on minute plankton through sieving water. In ponds, the fry and fingerlings exhibit schooling behaviour mainly for feeding; however, this habit is not observed in adults.

Rohu in Local Fisheries of Seemanchal

- **Dominant Species:** Rohu is the most cultured and consumed fish in Bihar, often cultivated in polyculture systems alongside Catla and Mrigal.
- **Farming Environment:** The region's abundant water resources—floodplains, oxbow lakes (locally known as *chaurs*), and perennial ponds—are ideal for Rohu cultivation.
- **Cultivation Practices:** While riverine seed was traditionally used, modern Seemanchal fisheries rely on intensive aquaculture, including induced breeding, nursery management, and stocking fingerlings in pond systems.
- **Feed and Growth:** Rohu is an omnivorous column feeder, feeding on plankton and supplementary feed (rice bran/mustard oil cake), and can grow to 1–1.5 kg within 10–12 months.
- **Local Market Dynamics:** Rohu is preferred fresh, fetching higher prices than iced fish. Live fish marketing is a major trend increasing the economic return for local fish farmers.

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Socio-Economic Importance

- **Livelihood Generation:** Fisheries in this region are a major income source for rural communities. With state efforts, Bihar's fish production grew by over 40% between 2018-2023, enhancing livelihoods.
- **Employment:** Rohu farming supports thousands of livelihoods through pond leasing, seed selling, feed manufacturing, fish harvesting, and marketing, particularly in districts like Kishanganj.

- **Nutritional Security:** As a fast-growing, high-protein food source rich in Omega-3 fatty acids, Rohu is crucial for addressing nutritional deficiencies in the rural population.
- **Economic Stability:** Many small-scale farmers in Seemanchal engage in composite fish farming to supplement agricultural income.
- **Cultural Significance:** In the neighboring Mithilanchal (part of the broader eastern Bihar region), Rohu is culturally vital, often deemed "auspicious" and essential for traditional festivals and ceremonies.
- **High Market Value:** Rohu is one of the most preferred freshwater fish in South Asia due to its firm, tasty flesh. It commands high market demand, often fetching 10-20% higher prices than mrigal.
- **Rural Livelihoods:** It supports millions through aquaculture, marketing, and processing, forming a key component of rural economies.
- **Food Security:** As a fast-growing species reaching 1–1.5 kg within 10–12 months, it provides a consistent, high-quality source of protein, essential fats, and vitamins.
- **Income Generation:** The adoption of induced breeding and improved husbandry (like the 3rd Generation or G3 Rohu) has increased profitability for small-scale farmers, with genetically improved strains showing 32.6% faster growth and significantly higher returns.
- **Cultural Significance:** Rohu is central to traditional cuisines (e.g., Bengali, Odia, Assamese) and considered auspicious for ceremonies in Hindu traditions.

Challenges and Opportunities in the Region

- **Shortage of Quality Seeds:** Although Bihar is a top producer, it historically relied on other states for quality fish seed, a situation the state government is addressing by strengthening local hatcheries.
- **Floods and Pollution:** The region is prone to annual floods, which cause damage to infrastructure, though they also spread fish naturally.
- **Infrastructure Gaps:** Limited post-harvest processing facilities and reliance on unorganized marketing channels are challenges.
- **GI Tag Potential:** The Bihar government is seeking a Geographical Indication (GI) tag for the regional Rohu (specifically in the Mithila region) to recognize its unique flavor and quality. The fisheries sector, particularly through the promotion of scientific farming methods for Rohu, is actively transforming rural economies in Seemanchal from subsistence-based to commercial farming.

Bibliography

- "Sustainable freshwater aquaculture in India." Ayyappan, S. Jena, J.N. 2001
- "Growout production of carps in India." Journal of Applied Aquaculture, 13:251-282. Ayyappan, S. Jena, J.K. 2003
- "A comparative study of growth rate of rohu - mrigal and mrigal - rohu hybrids and their parental species." Mysore Journal of Agricultural Sciences, 14(3):388-395. Basavaraju, Y. Varghese, T.J. 1980
- "Shrimp and carp aquaculture and the environment." Choudhury, S.N. 1995
- "Annual Report Central Institute of Freshwater Aquaculture." CIFA 2004
- "National Freshwater Aquaculture Development Plan." Gopakumar, K. Ayyappan, S. Jena, J.K. Sahoo, S.K. Sarkar, S.K. Satapathy, B.B. Nayak, P.K. 1999
- "Shrimp and carp aquaculture and the environment." Hayat, M. 1995
- "The Freshwater Fishes of India, Pakistan, Bangladesh, Burma and Sri Lanka." Jayaram, K.C. 1981
- "Comparative evaluation of growth and survival of Indian major carps and exotic carps in raising fingerlings." Journal of Aquaculture in the Tropics, 13:143-150. Jena, J.K. Aravindakshan, P.K. Chandra, S. Muduli, H.K. Ayyappan, S. 1998
- "Fish and Fisheries of India." Jhingran, V.G. 1991
- "Synopsis of Biological Data on Rohu, Cirrhinus mrigala (Hamilton, 1822)." Khan, H.A. Jhingran, V.G. 1975
- "Shrimp and carp aquaculture and the environment. Myanmar Study Report." Khoke, U.C. 1995
- "Shrimp and carp aquaculture and the environment. India Study Report." Pathak, S.C. Palanisamy, K. 1995
- "Feeding and feed management of Indian major carps in Andhra Pradesh, India." FAO Fisheries and Aquaculture Technical Paper No. 578. Rome, FAO. 90 pp. Ramakrishna, R. Shipton, T.A. Hasan, M.R. 2013
- "Shrimp and carp aquaculture and the environment. Nepal Study Report." Singh, D.M. 1995
- "Mass production of intergeneric hybrid catla (Catla catla x Labeo rohita) and its growth in ponds, small and large reservoirs of Madhya Pradesh."

Somalingam, J. Maheshwari, U.K. Langer, R.K.
1990

"Inland Fishes of India and Adjacent Countries."
Talwar, P.K. Jhingran, A.G. 1991



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