



Use of Small Indigenous Freshwater Fish Species as Ethno Medicine in the Northeast Region of India

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Abstract

The North East region of India is known for its diverse ethnic groups of population with rich culture and traditions. The ethnic population of the region traditionally developed knowledge and wisdom related to agriculture and allied activities, nutrition and health care by using locally available flora and fauna and other resources. Blessed with vast and varied freshwater resources and rich freshwater fish biodiversity comprising of 422 fish species belonging to 133 genera and 38 families the region is recognised as a 'hot spot' for freshwater fish biodiversity. The region has the richest small indigenous freshwater fish species (SIFFS) biodiversity of the country comprising of 348 species belonging to 31 families that accounts for 82.5% of the total fish diversity of the region. Highest number of SIFFS are recorded under the family Cyprinidae (115 species), followed by Balitoridae (48 species) and Sisoridae (46 species). Majority of SIFFS are commercially important as food and ornamental fish and plays a significant role in health care of the ethnic population of the region as nutritious food supplement. Some SIFFS are traditionally regarded as having ethno medicinal or therapeutic value and are used in treating different ailments, health care and healing practices by the ethnic people of the region.

Keywords: Traditional Knowledge; Ethnic Population; Fish Biodiversity; SIFFS; ETHNO Medicine; Health Care; Therapeutic

Introduction

Ethno medicine broadly refers to the traditional medicine used by ethnic communities, their traditional knowledge on treatments of illness, health care and healing practices that were transmitted verbally over centuries from generations to generations and evolved traditionally over thousands of years of human existence [3,4]. The North East Region of India comprised of eight land locked states viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim, is known for its diverse ethnic groups of population with rich culture and traditions. The region forms the part of two of the 34 richest mega biodiversity hot spots of the world, the Indo Burma Hot spot and the Himalayan Hot spot as listed by the Conservation International, USA is blessed with one of the richest floral and faunal biodiversities of the world [18]. The ethnic population of the region have traditionally developed knowledge and wisdom related to agriculture and allied activities, nutrition and health care by using locally available flora and fauna and other resources. Situated in the Eastern Himalayan Region in between latitude 21°57' to 29°3'N and longitude 84°46' to 97°30'E., the region differs considerably from other parts of the country in physiographic, agro-climatic, demographic and socio-economic features. Around 90-100% of the ethnic population in different states of the region are predominantly non vegetarian

in food habit with particular preference for fish. Fish is an integral part of not only of their daily diet, but also of different traditional and social activities.

The region has the distinction of being one of the 'hot spots' for freshwater fish biodiversity of the world [14]. Although there are different schools of opinions regarding the number of fish species available in the NE region, a more recent report enlisted 422 fish species, belonging to 133 genera and 38 families [12]. This accounts for about 62.81% of total fish species inhabiting the fresh water resources of India. Small indigenous freshwater fish species (SIFFS) is an important group of fish of India that includes the fish species that grow to 25-30cm in body length in their adult and mature stage of their life cycle. The NE region of India has the richest biodiversity of small Indigenous freshwater fish species (SIFFS) in India followed by the Western Ghats and Central India [19]. Out of 422 fish species recorded from the NE region, 348 species (82.5%) belonging to 31 families are categorized as SIFFS, on the basis of the maximum size attained and reported. SIFFS play an important role in securing the nutrition and livelihood for a major section of population of NE India [8,9]. These fish species inhabit widely diverse natural ecosystems ranging from rivers, tributaries, streams, flood plains, wet lands, lakes, low lying paddy fields, swamps and

seasonally inundated low lying areas of the region and are usually captured by traditional traps and gears by the ethnic communities in rural areas. The SIFFS are specifically preferred by ethnic population of the region for their unique taste, food and therapeutic value. Some of the SIFFS have very high market demand as food fish and often fetch much higher price than carps in the region. The small fish species are in general rich sources of not only protein but also a variety of vitamins, minerals and essential macro and micro-nutrients. The ethnic people of the NE region of India, traditionally prepare and consume the SIFFS as a whole fish i.e., along with their head, bones and viscera and in different forms like fresh, dried and fermented product [15]. The proximate and selected composition of common small indigenous freshwater fish species of the region have been reported by several authors [1,25]. Commonly consumed SIFFS were reported to contain moisture 75-81%, Ash 1.95-4.31%, protein 13-15%, fat 1.18-5.78%, energy 52.14-114.02 Kcal/g, Potassium 78.29-501.47mg/100g, Sodium 124.85-581.92mg/100g, Calcium 76.59-1984.32 mg/100g, Magnesium 81.55-148.16 mg/100g, iron 0.31-15.95 mg/100g, zinc 13.15-27.06mg/100g, Manganese -0.02-6.34mg/100g [25]. Commonly taken daily meal of the ethnic population of the region comprising of rice and small fish prepared with locally available herbs can provide ample nutrition for maintaining good health.

The ethnic population has a special preference for traditionally preserved fish products as the process enhances the nutritional quality, increase shelf life and develops unique taste and flavour.

A variety of small food fishes that are abundantly available in the natural resources of the region are traditionally preserved by using unique method developed for preservation under the prevalent agro climatic condition using locally available bio resources. A good number of ethnic fish products locally known as *Shidal, Namsing, Ngani, Hentak, Tungtap, Hukoti, Gnuchi* etc. are prepared by different tribes/communities of the region by using indigenous technical knowledge of drying, fermentation and adding different herbs for preservation [13,16,17,23]. Sun drying and smoke drying by traditional method are generally practiced by different ethnic communities of the region and the dried fish products are locally known by different names like *nadubasiyan, Sidra, Suka ko maacha, Sukuti, Hukoti* etc [20,21,24].

Use of SIFFS as ETHNO medicine in the NE region

The ethnic people of the region traditionally use some of the small fish species as medicine for curing different kinds of illnesses and discomforts. While proper documentation and scientific validation of the ethno medicinal use of SIFFS is scanty, some authors have recorded application of SIFFS in primary healthcare by different ethnic communities of the region (Table 1). Not only the fresh fish, fish products prepared traditionally by drying and fermentation of SIFFS are also used as ethno medicine to prevent and cure different diseases. Consumption of dry fish product is traditionally believed to prevent Malaria, a very common disease in the region and hence popularly used as an antidote against the disease by the ethnic population in this malaria prone region.

Sl. No	Common name	Scientific name	Traditional Medicinal/therapeutic application	References
1	Asian catfish	<i>Clarias batrachus</i>	Measles and chicken pox, weakness, anaemia	[11, 10 and 2]
2	Stinging catfish	<i>Heteropneustes fossilis</i>	Sting pain, anaemia and weakness, Blood purifier	[22, 11 and 2]
3	Blackline rasbora	<i>Rasbora daniconius</i>	For improving eyesight	[11]
4	Climbing perch	<i>Anabas testudineas</i>	Pain after childbirth	[11]
5	Freshwater garfish	<i>Xenentodon cancella</i>	In traditional minor surgery of boil, ulcer	[11]
6	Gangetic leaf fish	<i>Nandus nandus</i>	Colour blindness	[11]
7	Mola carplet	<i>Amblypharyngodon mola</i>	Stomach pain	[11]
8	Tank goby	<i>Glossogobius giuris</i>	Nocturnal enuresis (involuntary urination while asleep)	[11]
9	Ticto barb/Spot fin swamp barb	<i>Puntius ticto, P. sophore</i>	Weakness, night blindness, weak memory	[22]
10	Ticto barb/Spot fin swamp barb (As dried and fermented fish product)	<i>Puntius ticto, P. sophore</i>	Blood purification, Common cold	[22]
11	Dwarf catfish	<i>Mystus species</i>	Smallpox	[22]
12	Spotted snakehead	<i>Channa punctatus</i>	Corn/wart and diarrhea Weakness, white vaginal discharge in female	[22 and 11]
13	Dwarf Snakehead	<i>Channa gachua</i>	Body pain and wound healing	[11]

14	Ticto barb/Spot fin swamp barb (As <i>Hukoti</i> , a traditional dry fish product)	<i>Puntius ticto</i>	As anti-malarial and pain killer therapeutic,	[20]
15	Indian Flying Barb	<i>Esomus danricus</i>	To improve lactation in breast feeding mother	[2]
16	Honey gourami (sundried/fermented)	<i>Colisa sota</i>	Diet for post-delivery recovery	[2]
17	Day's mystus	<i>Mystus bleekeri</i>	Dysentery	[2]
18	Cotio (sundried/crushed)	<i>Osteobrama cotio cotio</i>	Ringworm	[2]
19	Indian Hill Trout	<i>Barilius bendelisis</i>	Constipation	[2]
20	Spot fin swamp barb (As traditional dry fish product and as fermented/crushed product along with herbs)	<i>P. sophore</i>	Gastric ulcer and Plague For improving eyesight	[2 and 11]

Table 1: ETHNO medicinal use of some SIFFS in NE Region of India.



Figure 1: *Clarias batrachus*.



Figure 2: *Heteropneustes fossilis*.



Figure 3: *Rasbora daniconius*.



Figure 4: *Anabas testudineus*.



Figure 5: *Xenentodon cancilla*.



Figure 6: *Nandus nandus*.



Figure 7: *Amblypharyngodon mola*.



Figure 8: *Glossogobius giuris*.



Figure 9: *Punius ticto*.



Figure 10: *P. sophore*.



Figure 11: *Mystus species*



Figure 12: *Channa punctatus*.



Figure 13: *Channa gachua*.



Figure 14: *Esomus danricus*.



Figure 15: *Colisa sota*.



Figure 16: *Mystus bleekeri*.



Figure 17: *Osteobrama cotio cotio*.



Figure 18: *Barilius bendelisis*.

Conclusion

Proper documentation and scientific validation of the effect of these ethno medicines along with causative factor is important to promote them as preliminary health care practice for the ethnic population of remote areas of the region. The population of majority of the SIFFS are decreasing in their natural resources in an alarming way due to a variety of natural and manmade reasons. Very high demand of the SIFFS as food, ornamental as well as ethno medicine leads to over exploitation in the natural resources. In addition lack of proper conservation measures, lack of awareness about importance of conservation among the fishers and common people, impact of climate change, increasing natural disaster, indiscriminate fishing, plastic disposal and other pollution of water are the major reasons of the dwindling population of SIFFS.

Bibliography

1. Bogard JR., *et al.* "Nutrient composition of important fish species in Bangladesh and potential contribution to recommended nutrient intakes". *Journal of Food Composition and analysis* 42 (2015): 120-133.
2. Chanu TA., *et al.* "Ethno medicinal use of certain fish species by ethnic groups of Bishnupur district in Manipur, NE India". *World Journal of Environmental Biosciences* 5.2 (2016): 1-5.

3. Chattopadhyay D. "Ethnomedicinal phytophores in disease management". *International Journal of Pharmaceutical and Bio-Medical Science* 3.1 (2009): 1-125.
4. Chattopadhyay D. "Ethnomedicine: a source of complementary therapeutics a review". *Research Signpost Trivandrum* (2010).
5. Chetia Borah B. "A status paper on Aquaculture in Assam". In: *Aquaculture for nutritional and livelihood security*, (Eds: A.S Ninawe, J.R Dhanze and Rani Dhanze). Published by Norendra Publishing House, New Delhi, India (2018): 55-78.
6. Chetia Borah B., *et al.* "Breeding of *Amblypharyngodon mola* in small homestead ponds". *Journal of Inland Fisheries Society of India* 42.2 (2010): 42-47.
7. Chetia Borah B., *et al.* "Protein nutrition for rural folk through culture of small fish species in homestead ponds". In: *Rural poverty food security and nutritional status*. Ahmed, R. (Ed). Unika Prakashan, Jorhat (2013): 308-314.
8. Chetia Borah B. "Small indigenous Freshwater Fish species in Nutrition of ethnic population of North East India". *Acta Scientific Nutritional Health* 3.7 (2019): 158-167.
9. Chetia Borah B and Sarkar UK. "Securing nutrition for rural India through culture and enhancement of small indigenous freshwater fish species". *World Aquaculture* (2019): 64-68.
10. Chetia Borah B. "Asian catfish *Clarias magur* (Ham), a wonder fish for health and nutrition". *Acta Scientific Nutritional Health* 4.2 (2020): 1-5.
11. Duarah P and Das K. "Diversity of Small indigenous fresh water fish species (SIFS) in Assam: Nutritional contents and Medicinal importance: A review". *International Journal of Emerging Technologies* 10.2 (2019): 357-361.
12. Goswami UC., *et al.* "Fish diversity of North East India, inclusive of the Himalayan and Indo Burma biodiversity hotspots zones: A checklist on their taxonomic status, economic importance, geographical distribution, present status and prevailing threats". *International Journal of Biodiversity and Conservation* 4.15 (2012): 592-613.
13. Jeyaram K., *et al.* "Traditional fermented foods of Manipur". *Indian Journal of Traditional Knowledge* 8.1 (2009): 115-121.
14. Kottelat M and Whitten T. "Freshwater biodiversity in Asia with special reference to Fish". World Bank Tech. Paper No. 343. The World Bank, Washington D.C (1996): 17-22.
15. Larsen T., *et al.* "Whole small fish as a rich Calcium source". *British Journal of Nutrition* 83 (2000): 191-196.
16. Muzaddadi AU., *et al.* "Traditional knowledge associated with *Numsing*, an ethnic fish product prepared by Missing Tribes of Upper Assam, India". *Indian Journal of Traditional Knowledge* 12.1 (2013): 91-96.
17. Muzaddadi AU and Basu S. "SHIDAL- A traditional fermented fishery product of NE India". *Indian Journal of Traditional Knowledge* 11.2 (2012): 323-328.
18. Roach J. "Conservationists name nine new biodiversity hot spots". *National Geographic News* (2005).
19. Sarkar UK and Lakra WS. "Small indigenous freshwater fish species of India: Significance, Conservation and utilisation". *Genetics and Biodiversity* 15.3 (2010): 34-35.
20. Sarma P., *et al.* "Hukoti- an indigenous dry fish product of tribal communities of upper Assam". *Indian Journal of Traditional Knowledge* 12.1 (2013): 97-101.
21. Sarmah A., *et al.* "Indigenous technique for preparation of dry fish and products by Deori community". *Journal of Experimental Biology and Agricultural Sciences* 2.6 (2014): 1-5.
22. Teronpi V., *et al.* "Ethno zoology of the Karbis of Assam, India: Use of ichthyofauna in traditional health care practices". *Ancient Sciences of life* 32.2 (2012): 99-103.
23. Thapa N., *et al.* "Microbial Diversity in Ngari, Hentak and Tungtap, fermented fish products of Northeast India". *World journal of Microbiological Biotechnology* 20 (2004): 599-607.
24. Thapa N. "Ethnic fermented and preserved fish products of India and Nepal". *Journal of Ethnic Foods* 3 (2016): 69-77.
25. Zaman M., *et al.* "Nutrient content of some popular freshwater and marine fish species of Bangladesh". *Bangladesh Journal of Zoology* 42.2 (2014): 251-259.