

Extraction and Utilization of Freshwater Molluscs by Mishng and Bodo Tribes and Its Impact on Wetland Biodiversity of Dhemaji District, Assam

P. Chutia¹ and L. Pegu²

¹ Post Graduate Department of Life Sciences, D.R. College, Golaghat, 785621, Assam.
pavitra.chutia@gmail.com

² Research Scholar, Department of Life Sciences, Dibrugarh University, Dibrugarh
lilapeguu@gmail.com

Corresponding author: L.Pegu²

Abstract: Mishng and Bodos are two major plain tribes of Dhemaji district of Assam. The socio-cultural practices of these two tribes are closely associated with animal species. Molluscs are the largest groups of animal. 19 species of freshwater molluscan species were extracted from beels of the region. Many of molluscan species are edible to Mishng and Bodo people of the region. Some of the molluscan species viz. *Bellamya bengalensis*, *Pila globosa* and *Lamellidens marginalis* have been used for ethno-medicinal purposes. Shells of some molluscs are used for making buttons and in the manufacture of poultry food. The *Lamellidens* and *Parreysia* species are edible to aboriginal people and particularly they have been used as medicine for the cure of some ailment such as rheumatism, cardiac diseases, controlling blood pressure, asthma etc.

Keywords: Biodiversity, Mishng and Bodo, molluscan species, rheumatism.

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I. Introduction

Dhemaji district occupies an area of 3217km². Mishng and Bodos are two major plain tribes of this district. The socio-cultural practices of these two tribes are closely associated with animal species. Being in a confluence of rivers with the mighty Brahmaputra river flanking the district and its numerous tributaries running through the district, the region is perennially affected by floods.

Molluscs are the largest groups of animal after insects. It is one of the most diverse groups of animals on the planet, with at least 50,000 living species (and more likely around 200,000). They are the first living creature to have hard shells. It includes such familiar organisms as snails, octopuses, squid, clams, scallops, oysters, and chitons. A part of almost every ecosystem in the world, molluscs is extremely important members of many ecological communities. It is regarded as the most ancient of animals on earth today. Freshwater molluscs have been known to play significant roles in human and veterinary health and thus need to be scientifically exploring more extensively (Supian&Ikhwanuddin, 2002). Further, Freshwater molluscs are found in a wide range of freshwater habitats. They have varied life-history strategies and exhibit complex ecological interactions.

The distribution of freshwater snails depends on water quality, e.g. pH, DO, calcium etc. and temperature. It has been reported that the toxicity of most substances is influenced by such factors as temperature, turbidity, DO, pH, CO₂ and water hardness (Okland, 1969; Williams, 1970). Researchers have studied the ecology of different groups of invertebrates; little information is available about the ecology of aquatic gastropods in inland water bodies of Brahmaputra drainage system of Assam.

With a view to above, it has been proposed to study the Extraction And Utilization Of Freshwater Molluscs By Mishng And Bodo Tribes And Its Impact On Wetland Biodiversity Of Dhemaji District, Assam.

II. Methods And Methodology

II.I Sites of investigation

The collecting of snails was carried out in certain selected sites such as, Kani Beel, of Dhemaji District, Assam.

II.II Sampling of mollusc

Monthly samples of freshwater snails was collected from different sites during a period of one year. Sampling was carried out along the shoreline of each site and always by the same collector in the upper, middle and lower site of the beel. Snails was collected by passing a dip net (30 cm×40 cm) many times through the

upper surface of sediment, water and vegetations on a depth of 20 cm (a column of water as parallel rectangles and its base is the rectangular net). The snails attached to the macrophytes was separated and all collected snails was kept in pre-labeled plastic containers. In the laboratory, the snails was counted and identified and then preserved in 70% ethyl alcohol.

II.III Statistical Analysis

The basic statistical calculations (eg. average, standard deviation, correlation, regression, etc.) was done by following Bailey (1994). The correlation between the different hydrological parameters and biological parameters was determined as per the following formula (Biswas 1993)

The species diversity was calculated by using Shannon-Weiner’s Diversity Index (Shannon and Weiner, 1963).

II.IV Ecological factors

Water temperature, pH, dissolved oxygen, carbon dioxide was measured by digital probe apparatus. Water depth (cm) was measured by a wooden meter. The percentage of macrophytes was determined according to Ouyang *et al.* (2006) by simple estimation of the proportion of a site covered by floating and anchored plants.

III. Result

Table: Seasonal variation in molluscan species diversity index(Shannon Wiener Diversity Index).

SEASON	molluscan species									
	<i>Bellamya benghalensis</i>	<i>Tarebia agranifera</i>	<i>Lymnea accuminata</i>	<i>Melanoidestheria culata</i>	<i>Lamellidens marginalis</i>	<i>Parreysia fafavidens</i>	<i>Lemellidens corrinus</i>	<i>Brotia acostula</i>	<i>Parrysiacorbis</i>	<i>Parrysiasmargitoides</i>
PRE-MONSOON	2	1	2	3	3	4	5	6	4	5
	3	4	4	3	1	0	2	9	4	0
	4	3	3	2	2	1	3	8	2	2
MONSOON	3	2	3	3	0	0	5	7	4	3
	2	6	2	5	1	1	7	9	2	2
	2	2	4	4	2	1	4	5	4	2
POST MONSOON	2	1	2	4	3	4	2	7	4	3
	4	2	5	3	1	2	6	4	8	5
	5	3	7	4	1	2	3	7	2	3
WINTER	4	5	3	3	0	0	5	7	4	3
	3	3	2	8	1	1	7	4	2	2
	5	4	2	2	2	2	3	3	3	2

Now,

Shannon –diversity index and evenness of *Bellamyabenghalensis* is as follows:-

Given, Sample value(S)= 3,4,3,2,2,2, 4,5,4,3,5,2

No. of species(N)=12

Step-1:

Sum of the given value(SUM)= (3+4+3+2+2+2+4+5+4+3+5+2)=39

Step-2:

Sl. No.	No. of sample	Pi	Log(Pi)	Pi X log(Pi)
1	3	.07	-2.66	-0.18
2	4	.10	-2.30	-0.23
3	3	.07	-2.66	-0.18
4	2	.05	-2.99	-0.14
5	2	.05	-2.99	-0.14
6	2	.05	-2.99	-0.14
7	4	.10	-2.30	-0.23
8	5	.12	-2.12	-0.25
9	4	.10	-2.30	-0.23
10	3	.07	-2.66	-0.18
11	5	.12	-2.12	0.25
12	2	.05	-2.29	0.14
N=39				SUM= 2.29

Step-3,

$$H_{max} = \log(N) = \log(12) = 2.5$$

$$\text{Evenness} = \frac{H}{H_{max}} = \frac{2.29}{2.5} = 0.91$$

In the same method,

Shannon – diversity index and evenness of various molluscan specie mentioned above are as follows:-

<i>Tarebiagranifera</i>	0.91
<i>Lymneaaccuminata</i>	0.89
<i>Melanoidestuberculata</i>	0.88
<i>Lamellidensmarginalis</i>	0.79
<i>Parreysiafavidens</i>	0.77
<i>Lemellidenscorrinus</i>	0.88
<i>Brotiacostula</i>	0.91
<i>Parrysiacorbis</i>	0.88
<i>Parrysiasmaragdites</i>	0.87

After a survey of the respective beels, it has been found that the species of *Brotia costula* is the dominant group of this area which is used as food by Bodo people of this district.

IV. Discussion

The practice of rearing snails for food is known as heliciculture. Mollusc, rich and varied in species especially those inhabiting the coastal waters, backwaters and estuaries are of importance in contributing a good deal to the economic well-being of our country. Chiefly they are fished to provide a source of cheap but nutritious food, for pearls priced as high as gems and for shells put to varied uses. Some of the species are capable of lending themselves to farming on scientific lines to ensure steady supplies of good quality clean shell fish for human beings.

The utilisation of gastropod molluscs in India is very much limited. Most of the species occur in abundance on our coasts but find little favour with our people who are averse to include them in their regular diet.

In agriculture there are a variety of snail-control measures that gardeners and farmers use in an attempt to reduce damage to valuable plants. Traditional pesticides are still used, as are many less toxic control options such as concentrated garlic or wormwood solutions. Copper metal is also a snail repellent, and thus a copper band around the trunk of a tree will prevent snails from climbing up and reaching the foliage and fruit. Placing crushed egg shells on the soil around garden plants can also deter snails from coming to the plants.

V. Conclusion

As well as being relished as gourmet food, several species of land snails provide an easily harvested source of protein to many people in poor communities around the world. Many land snails are valuable because they can feed on a wide range of agricultural wastes, such as shed leaves in banana plantations. In some countries, giant African land snails are produced commercially for food.

Pila globosa is commonly used as food by some people, mainly the tribals and lower economic groups in Nepal, the Sunderbans as well as the people of this district and other parts of India. It is one of the most preferred gastropod species utilised by tribal people as food. This species is also valuable source of nutrition for ducks and hybrid fish Magur (*Clarias batrachus*). In addition, soup prepared from the flesh is used as medicine that is believed to cure asthma, arthritis, joint swelling, rheumatism and in quick healing of wounds. The snail is cleaned and kept in water for a few hours and then the water is used like an eye drop to cure conjunctivitis .

Land snails, freshwater snails and sea snails are all eaten in a number of countries. In certain parts of the world, snails are fried. For example, in Indonesia, they are fried as satay, a dish known as *sate kakul*. The eggs of certain snail species are eaten in a fashion similar to the way caviar is eaten.

In Bulgaria snails are traditionally cooked in an oven with rice or fried in a pan with vegetable oil and red paprika powder. Before they are used for those dishes however, they are thoroughly boiled in hot water (for up to 90 minutes) and manually extracted from their shells.

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PHOTO PLATE

Some of the molluscan species found in the selected beels of Dhemaji District, Assam



Brotia costula



Bellamya benghelensis



Tarebia granifera



Lymnea accuminata



Melanoides tuberculata



Lamellidens marginalis



Parreysia favidens



Lamellidens corrianus



Parreysia corbis



Parrysia smragdites

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