

# Chapter 16

## Turtle Diversity in the Sacred Temple Ponds in Kamrup District of Assam with Special Reference to its Conservation

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### Introduction

The Northeast India along with eastern Himalaya forms a mega diversity area and is regarded as one of the major centres of turtle diversity. Turtles of the world are represented by 314 species/subspecies and 95 Genera (Anonymous 2007a) of which 17 species, belonging to 3 families are recorded in northeast India (Das 1988). According to Hindu mythology turtles are an incarnation of Lord Vishnu (Anonymous 2003). Since time immemorial this incarnation has been worshipped in many of the ancient temples of Assam, where turtles have historically received protection in temple tanks like Hayagriva-Madhava temple at Hajo, Kamakhya temple and Ugra Tara temple at Guwahati, Shiva temple at Tinisukia etc. (Shanker and Kutty 2005). This “religions approach” is directly linked with conservation, through which a few rare turtles have gained protection (Anonymous 2007b). This form of Chelonian conservation in temple tanks constitutes a useful method for ensuring their conservation. Our investigation was designed to evaluate the status, distribution and analysis of certain physiochemical parameters of two ponds of historical temples in Kamrup district of Assam (India).

### Study Site

#### Hayagriva Madhava Temple

It is situated on the Monikut hill near Hajo, which is approximately 25 km away from Guwahati, the Capital city of Assam. The geographical location is 26°14'25.49" N - 91°33'57.62" E with an altitude of about 602m above the sea level. The climate of Hajo is humid sub-tropic with an annual average rainfall of about 1200 mm. The average minimum and maximum air temperature is recorded 12°C and 37°C respectively. The relative humidity is around 80%. The temple was constructed by the King Raghu Deva Narayan in 1583. At the foot of the stairway is a large pond known as Madhab Pukhuri which is inhabited by a number of turtles. This pond is about 1.3 ha.

#### Kamakhya Temple

It is one of the famous Shakti shrines in India, and is regarded as one of the **Shakti Peethams** associated with the legend of **Shiva and Daksha Yagna**, which is situated high aloft a hill called Neelachal Parbat in the city of Guwahati. The geographical location is 26°09'55.32" N - 91°42'15.93" E with an altitude of about 629m above the sea level. The King Nara Narayan of Cooch Behar rebuilt the temple in 1665, after it had suffered destruction at the hands of foreign invaders. About 25 m downhill of the Kamakhya temple, there is a pond known as Kacha Pukhuri (Plate 16 A). This Kacha pukhuri is located at a height of 160 m above sea level, which serves as the home to soft shell turtles. This pond is about 0.2 ha.

#### Ugrotara Temple

The Ugrotara temple is one of the famous Shakti shrines dedicated to Goddess Tara (Devi), situated near Jor Pukhuri at the heart of Guwahati city. The geographical location is 26°11'20.53" N - 91°45'13.35" E with an altitude of about 190 m above the sea level. The climate is humid with an annual average rainfall of about 1600 mm. The average minimum and maximum air temperature is recorded 19.2°C and 36°C respectively. The relative humidity is around 89%. Jor Pukhuri (Plate 16 B), which is at the rear end the temple, covering an area of about 0.4 ha has turtles.

**Methodology**

The preliminary survey was conducted during the period of October 2007 to March 2008. The survey was done in three temple ponds following the Visual encounter survey (VES) and local people interrogation using photo sheet and from indirect evidence such as the presence of food items specific to softshell turtle species (Goswami, 2004; Verlecar and Desai, 2004). Identification of the species was followed after Das (1995). The study area was censused one to three times per day between 7:30 a.m. to 5 p.m. by VES and interviewing local people.

Physiochemical parameter such as dissolved oxygen was estimated using modified Wrinkler’s method (Trivedy *et al.*, 1987); free Carbon dioxide was calculated by titration method of Jhingran and Pullin (1988). Transparency of the water was determined by using the Secchi disc method (Preisendorfer, 1986); pH was measured by using Systronic digital pH meter (Table-1); zoo and phyto plankton were identified following the methods of Goswami (2004) and Verlecar and Desai (2004) (Table 2). The estimation was carried out daily from 0600 to 0700 h.

**Table-1: Analysis of certain parameters of water of study sites.**

<i>Study sites</i>	<i>Months</i>	Dissolved O <sub>2</sub> (mg/L)	Free CO <sub>2</sub> (mg/L)	Transparency (cm)	pH
Madhab Pukhuri	October	12.5	9.5	35.5	6.7
	November	12.8	9.2	30.0	6.8
	December	12.2	9.4	34.0	6.7
	January	12.6	9.2	32.0	6.9
	February	12.2	8.4	33.5	6.8
	March	12.9	9.6	35.1	6.8
	Mean	12.5±0.27	9.22±0.39	33.35±2.06	6.78±0.08
Kacha Pukhuri	October	10.6	6.0	41.5	6.6
	November	10.4	5.8	42.5	6.4
	December	10.3	5.6	42.1	6.4
	January	10.4	5.9	41.9	6.5
	February	10.8	6.0	41.0	6.5
	March	10.7	6.1	41.2	6.4
	Mean	10.5±0.20	5.9±0.16	41.7±0.57	6.47±0.08
Jor Pukhuri	October	10.4	5.0	41.1	6.2
	November	10.4	5.1	42.5	6.4
	December	10.3	5.0	42.1	6.2
	January	10.5	5.0	41.5	6.1
	February	10.5	5.0	41.0	6.1
	March	10.6	5.1	41.7	6.1
	Mean	10.5±0.10	5.0±0.05	41.7±0.52	6.18±0.12

**Table-2: List of Planktons recorded in study sites.**

Planktons	Group	Study sites		
		Madhab Pukhuri	Kacha Pukhuri	Jor Pukhuri
Phytoplanktons	Chlorophyceae	+++	+	+
	Baccillariophyceae	++	-	-
	Cynophyceae	++	+	++
	Xanthophyceae	++	+	+
	MYXOPHYCEAE	++	+	+
Zooplanktons	ROTIFERS	+	+	+
	Copepoda	++	+	+
	Cladocera	+	+	+
	Protozoa	+	+	++
	Arthropods	++	+	+

(+) indicates increasing levels of abundance; (-) indicates absence.

### Results

During the study period a total of six species were observed in both the ponds, out of which six were observed in Madhab Pukhuri, two in Kacha Pukhuri and one in Jor Pukhuri.

### Results

During the study period a total of six species were recorded at Madhab Pukhuri of which three species *viz.* *Geoclemys hamiltonii*, *Pangshura tectum* and *Pangshura tentoria* belonging to the family Geoemydidae (Plate C, D and E) and the rest three *Nilssonina gangetica*, *Nilssonina nigricans* and *Nilssonina hurum* of Trionychidae family (Plate 16 F, G and H). *Nilssonina nigricans* and *Nilssonina hurum* were most abundant followed by *Geoclemys hamiltonii*. Some individuals of *N. nigricans* seemed to be old with excessive coating of algae on their shells. The planktonic study revealed that the green algae *viz.* *Spirogyra protecta*, *Spirogyra maxima*, *Microspora sp.*, *Pendaorina morunm*, *Volvox* were observed in large numbers in the water. Among the zooplanktons *Cyclops*, *Daphnia*, *Nauplius*, *Euglena*, Crustacean larvae, etc. were recorded.

On the other hand *Nilssonina nigricans* and *Nilssonina hurum* were observed at Kacha Pukhuri of Kamakhya, but their population was lesser here than in Madhav pukhuri. Similarly phyto and zooplankton were also recorded in much lesser numbers. However, large number of *Oreochromis mossambica* and a few *Clarius gariepinus* fish species were observed.

### Discussion

Dissolved oxygen can impact many physical and biological factors in water body. The DO content of Madhab Pukhuri was observed higher (12.5 mg/L) compared to Kacha Pukhuri (10.6 mg/L). The presence of a healthier turtle population in the Madhab Pukhuri might be due to greater levels DO. The free carbon dioxide content of our investigation in both the ponds was within acceptable limits. This might have a positive effect on the growth of planktons and might also sustain the turtle population (Smith and Griffiths, 2000).

Transparency of water in Madhab Pukhuri (33.5cm) and in Kacha Pukhari (45.6cm) was within acceptable limits (Paraschag and Gemel, 2002).

Presently the turtle populations in the Madhab Pukhuri are under threat due to construction of a concrete boundary. This will damage the only nesting area available for the turtles. Secondly, it will encourage the visitors to come to the edge of the pond and feed food items to turtles. This might affect nutrient cycling in the pond. Similar phenomenon was also observed in the Kacha Pukhari of Kamakhya temple but the main threat observed here is the presence of the fish species, *Clarius gariepinus*. Since this fish species is highly carnivorous in nature therefore, it might compete with the turtles for food. Jor Pukhuri also witnessed the construction of concrete border.

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Plate 16



(A)



(B)



(C)



(D)



(E)



(F)



(G)



(H)

(A): Kacha Pukhuri ; (B): Jor Pukhuri; (C): *Geoclemys hamiltonii*; (D): *Pangshura tectum*; (E): *Pangshura tentoria*; (F): *Nilsonnia gangeticus*; (G): *Nilsonnia nigricans* and (H): *Nilsonnia hurum*