6. SOME CHELONIAN RECORDS FROM MANIPUR AND NAGALAND IN NORTH-EAST INDIA

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Introduction

The states of Manipur (23° 49'-25° 42' N; 93° 00'-94° 45' E) and Nagaland (25° 10'-27° 01' N; 93° 17'-95° 15' E) are located in north-east India (Fig. 1). They fall in the Indo-Burma global biodiversity hotspot (Myers *et al.* 2000; Mittermeier *et al.* 2004) and the Eastern Himalaya Endemic Bird Area (Stattersfield *et al.* 1998). Manipur covers an area of 22,327 sq. km and is divided into nine districts (Bishnupur, Chandel, Churachandpur, Imphal East, Imphal West, Senapati, Tamenglong, Thoubal and Ukhrul). The state of Nagaland covers an area of 16,600 sq. km and is divided into 10 districts (Kiphire, Kohima, Longleng, Mokokchung, Mon, Peren, Phek, Tuensang, Wokha and Zunheboto).

Owing to its relative remoteness and also insurgency (still a major problem), fewer studies have been undertaken in Manipur and Nagaland in recent decades than in other neighbouring states, such as Assam and Arunachal Pradesh. The chelonian fauna are rather poorly known with only a few references to an odd specimen from the area (Anderson 1871; Smith 1931; Das 1985; Ahmed *et al.* 2008).

The present account describes the records of turtles and tortoises recorded during my surveys while making sporadic visits to Manipur during 1988-2001 and Nagaland during 1991-2004.

Study Area and Methods

Physiographically, almost all of Manipur is hilly and mountainous with a broad valley at the centre. Loktak, the largest freshwater lake (185 sq. km) in north-east India, lies to the south of the valley. The lowest elevation, (<50 m), is at the confluence of the Barak and Jiri rivers near the Assam border. Almost all of Nagaland is also hilly and mountainous. A high range exists along the border with Myanmar, and Mt. Saramati (3,842 m) is the highest point in the range and in Nagaland. The hills in the central areas are commonly referred to as the 'Naga Hills'. Small plains occur along the Dhansiri river, especially near Dimapur. The Barail range runs along the Manipur-Nagaland border. Patkai range is in north Nagaland. The highest peak of the Barail range is Mt. Japfu (Japvo) which stands at 3,043 m, which is in Nagaland. Mt Tenipu or Iso (2,995 m), also on the Barail range, is the highest peak in Manipur.

The climate of Manipur and Nagaland is tropical 'monsoon' type with a hot wet summer and a cool dry winter, although winter rains are not uncommon. The annual rainfall of these states varies from about 1,000 to more than 6,000 mm. The annual temperature generally ranges from less than 0° C in winter (minimum, especially on Mt. Saramati) to 35° C in summer.

Tropical wet evergreen, semi-evergreen and tropical moist deciduous forests occur in patches in the lower and middle elevations. In the higher hills, subtropical broadleaf (evergreen) forest occurs with small areas of conifers in the eastern areas. Higher up on Saramati, temperate broadleaf forest is found, while atop (Mt. Saramati) the vegetation type is subalpine. During winter, the peak remains under snow. In the abandoned *jhum* (slash-and-burn shifting cultivation of the hill tribes), various grasses occur till these are colonized by scrubs and then shrubs. It may be mentioned here that the *jhum* has greatly altered the original vegetation types all over

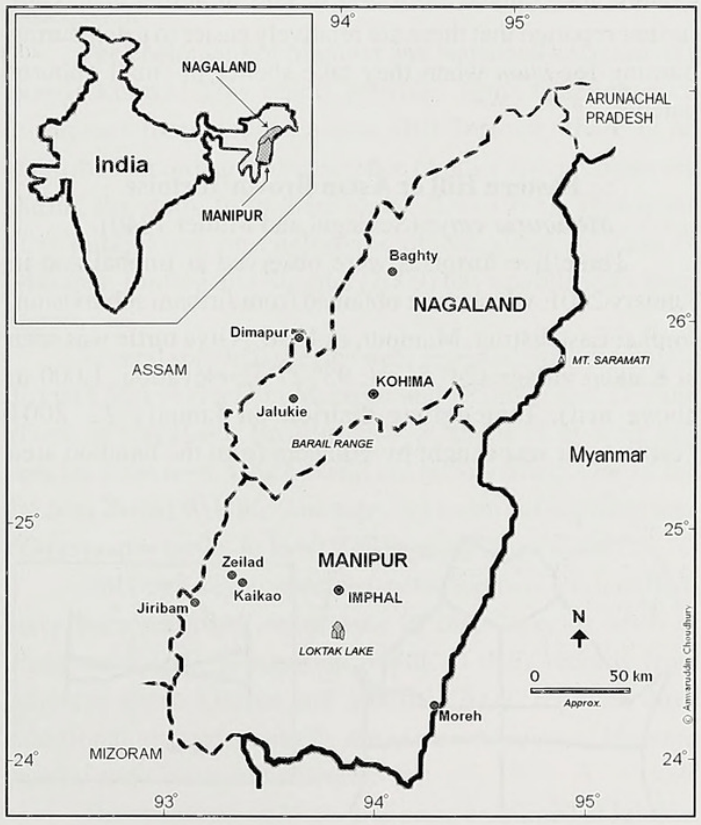

Fig. 1: Map of Manipur and Nagaland showing the areas surveyed

the hills of Manipur and Nagaland. In the Manipur valley, there is grassland in Keibul Lamjao National Park, which is on floating mats of vegetation, locally called as *phumdi*, composed of decaying vegetation.

Turtles and tortoises were searched for while conducting long-term work on the wildlife in general with focus on mammals and birds. Motor vehicles were used to reach the sites, especially tribal villages. Within the village, the movement was on foot. Specimens displayed outside tribal huts (usually all trophies are displayed outside) were examined and measured. Interviews were conducted to select houses that could have shells. In many villages, houses were randomly searched.

Elongated Tortoise *Indotestudo elongata* (Blyth 1853)

One shell (intact with carapace and plastron) and a broken carapace were examined and measured at Moreh (24° 14' N; 94° 18' E), Chandel district, Manipur in January 2001. Nuchal was prominent in the one having plastron (Table 1). The location is near the India-Myanmar border.

Das (1995) did not mention its occurrence in Nagaland. It has been recorded in Myanmar as well as Mizoram (Choudhury 2001). According to the collectors, these were captured from the forest of Yangoupokpi-Lokchao Wildlife Sanctuary (Manipur) or just outside it. The elevation of the capture sites ranged from 300 to 600 m above msl. They further reported that these are relatively easier to catch during burning for *jhum* when they take shelter in small unburnt patches.

Eastern Hill or Asian Brown Tortoise
Manouria emys (Schlegel and Müller 1840).

Three live tortoises were observed at Imphal zoo in January 2001, which were obtained from Jiribam subdivision, Imphal East district, Manipur, in 1996. A live turtle was seen at Kaikao village (24° 51' N; 93° 27' E; elevation: 1,000 m above msl), Tamenglong district, on January 22, 2001 (Table 1). It was caught by villagers from the bamboo area on hill slopes at 500 m above msl. One more was reportedly caught by the villagers. Normally the villagers wait for such prized catch in the dry season when they burn the hill side for *jhum*. While some are burnt to death, some take shelter in the unburnt patches or in streams (pers obs).

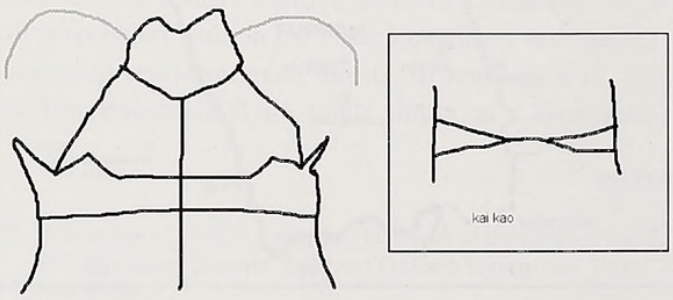

Fig. 2: Plastron patterns in *Manouria emys* (specimen from Nagaland at left and from Manipur at right)

A partly broken preserved shell was seen and examined at Jalukie, Peren district, Nagaland, on February 02, 2001 (Table 1). It was earlier reported from Nagaland by Anderson (1872). I had seen two specimens in late 1987 and 1989 at Sivasagar, Assam, which were brought by loggers from Nagaland (Mokokchung or Mon district).

Das (1995) did not mention its occurrence in Manipur. It has been recorded in Myanmar as well as Karbi Anglong district, Assam (Choudhury 1996a), North Cachar Hills (Dima Hasao) district, Assam (Anderson 1871, 1872) and Mizoram (Choudhury 2001).

Asian Leaf Turtle *Cyclemys gemeli* (Fritz, Guicking, Auer, Sommer, Wink & Hundsdörfer, 2008)

One preserved carapace was examined at Samjuram village, 3 km from Jalukie, Peren district, Nagaland, on February 02, 2001 (Table 1).

Das (1995) did not mention its occurrence in Manipur and Nagaland. It has been recorded in Myanmar as well as North Cachar Hills (Dima Hasao) district, Assam (Das 1995) and Mizoram (Choudhury 2001). The Indian population of *Cyclemys* is now considered as *Cyclemys gemeli* rather than *C. oldhami*. This species is among the common turtles found in North-east India, in the hill streams as well as on the forest floor.

Indian Black Turtle *Melanochelys trijuga*
(Schweigger 1812)

One preserved shell examined and measured at Moreh, Chandel district, Manipur, in January 2001. Its plastron was unmarked black (Table 1). According to the collectors, it was captured from near Lokchao river. The location is either in Yangoupokpi-Lokchao Wildlife Sanctuary (WLS) or just outside it. The elevation of the capture site was about 200 m above msl.

Das (1995) did not mention its occurrence in Manipur and Nagaland. It has been recorded in Assam (Ahmed *et al.* 2008), and Mizoram (Choudhury 2004).

Keeled Box Turtle *Cuora mouhotii* (Gray, 1862)

In Manipur, it was first recorded in Tamenglong district (Choudhury 1996b). A live turtle was seen at Kaikao village, Tamenglong district on January 22, 2001. It was caught by villagers from *jhum* fields. Its one eye was damaged due to *jhum* fire (Table 1). On January 24, 2001, a live turtle was

Table 1: Measurements of specimens mentioned in the text (in cm)

Specimen/Site	SCL	CCL	SCW	CCW	PL(gt)	PL (n-n)	PW	Remarks
Indotestudo elongata								
1. Moreh	20.9	24.9	14.7	23.0	-	15.3	11.4	Carapace height, *c.* 7.5
Manouria emys								
1. Jalukie	-	-	38.5	53.0	46.5	42.0	29.0	
2. Kaikao	38.0	-	-	-	44.0	40.0	-	
Cyclemys gemeli								
1. Samjuram	20.2	22.5	14.8	19.0	-	-	-	
Melanochelys trijuga								
1. Moreh	18.1	20.8	13.7	18.6	17.0	16.3	11.5	Carapace height, *c.* 6.5
Cuora mouhotii								
1. Kaikao	13.5	15.5	-	-	14.0	13.3	-	
2. Sempang	14.5	15.7	10.2	14.5	14.2	13.3	8.5	Shell height, *c.* 6.0; weight 425 gm

SCL=straight carapace length; CCL=curved carapace length; SCW=straight carapace width; CCW=curved carapace width; PL=plastron length; (gt)=greatest; (n-n)=notch to notch; PW=plastron width

caught by some villagers after burning of the hill slopes for *jhum* near Sempang village (24° 52' N; 93° 26' E; 750 m above msl), not far from Kaikao. Since it was kept for sale, I bought it for Rs. 30/- (Eastern Hill Tortoise was priced at Rs. 600) and released it after examination.

The interesting feature of this specimen was its carapace which was yellowish with dark (blackish or greenish-grey) blotches of irregular shape and often broken instead of brown without any blotches. The carapace was flat with three keels and prominently serrated marginals. The plastron was buffy and not yellowish-brown, as is usually found (Table 1). It was probably a female as was evident from the stripe on the sides of its face. It was deposited in Imphal zoo through a local NGO (Manipur Association for Science & Society).

Later, one more live animal was observed. The earlier record from Tamenglong (Choudhury 1996b) and the second live turtle recorded during the current study from almost the same area were of usual colouration. The habitat in the area was mostly degraded tropical wet evergreen rainforest with bamboo in old *jhums*, and current *jhum* clearings on hilly terrain in the basin of the Barak river.

In Nagaland, a carapace was examined at Baghty in Wokha district on February 19, 2004. No measurements were taken.

Das (1995) did not mention its occurrence in Manipur and Nagaland. It has been recorded in Myanmar, Karbi Anglong district, Assam (Choudhury 1993), North Cachar Hills (Dima Hasao) district, Assam (Das 1995), Assam-Mizoram border (Choudhury 1998) and Mizoram (Choudhury 2001).

Discussion

The chelonians of Manipur and Nagaland are relatively poorly known. This report provides some baseline data. It appears that except Eastern Hill Tortoise, there is no published record on the occurrence of other species observed during the study from these states (Das 1995). This is the first publication on chelonians of Nagaland. In case of Manipur, Linthoi and Sharma (2009) have published a brief report.

Several softshell species were reported from the Barak, Jiri and Makru rivers in Manipur and Dhansiri and Doyang rivers in Nagaland. Broken parts of shells of at least two species were seen, which could not be identified. One of the lakes in Zeilad Wildlife Sanctuary is known as Guiphuap lake (Guiphuap = turtle, in local Zeliangrong Naga dialect).

Although seven species (including two unidentified) have been recorded, occurrence of other species, such as *Pangshura* spp., is apparent owing to their records from adjacent areas. Linthoi and Sharma (2009) reported three additional species, namely *Amyda cartilaginea*, *Morenia petersi* and *Cuora amboinensis*.

The specimen of *Manouria emys* examined at Jalukie, Nagaland, resembled the subspecies *phayrei*. One of the Manipur specimens was intermediate between *emys* and the

Rangkhyang specimen of Das (1990) (Fig. 2). This indicates a complexity in the subspecific taxonomy of the species (Choudhury 1996c). According to villagers, *Manouria emys* and *Cuora mouhotii* are relatively common. But this may be owing to their easier capture during *jhum* burning.

Habitat destruction for *jhum* cultivation, logging, human settlements, poisoning and dynamiting of rivers for fish are reducing the favourable habitat for turtles and tortoises. Since all testudines are considered a delicacy in both Manipur and Nagaland (except the Manipuri Muslims), there is no scope of escape once they are spotted. During burning of hill forest for *jhum*, many species, especially *Indotestudo elongata*, *Manouria emys* and *Cuora mouhotii* are easy to catch. A new threat that could enhance poaching is demand for shells in Chinese medicine. Besides deer antler, tiger bone, and bear biles these too are smuggled. In addition to capture, during *jhum* burning, a number of turtles and tortoises are burnt to death or injured.

Conservation awareness is relatively poor in these states, although we had several meetings with locals. But unless local groups continue the effort, such sporadic awareness campaigns may not work.

The existing protected area network covers only 757.6 sq. km or *c.* 3.4% of Manipur. The protected areas are Keibul Lamjao National Park (40 sq. km), Shiroi National Park (100 sq. km), Bunning WLS (115.8 sq. km), Jiri-Makru WLS (198 sq. km), Kailam WLS (187.5 sq. km), Yangoupokpi-Lokchao WLS (184 sq. km) and Zeilad WLS (21 sq. km). Of these, disposal of claims and objections have not been completed except in Keibul Lamjao and Yangoupokpi-Lokchao. In Nagaland, it is only 1.33%. The protected areas are: Intanki National Park (202 sq. km), Pulie-Badge WLS (9.23 sq. km), Fakim WLS (6.42 sq. km), and Rangapahar WLS (4.70 sq. km). Except for Intanki, all are tiny and hardly cover a sizeable habitat. Moreover, the protection measures are very inadequate.

Formation of new protected areas such as Anko (400 sq. km), Dzuko (50 sq. km encompassing Dzuko-Tenipu), parts of Tolbung, Irangmukh and Vangai-Bongmukh Reserved Forests (500 sq. km) in Manipur; Saramati-Fakim (500 sq. km), Satoi (100 sq. km), Barails (200 sq. km; also encompassing within it Dzukou-Japfu areas), and Mt. Zephu (50 sq. km) in Nagaland, plus improved protection for existing sanctuaries, are recommended. Smaller community-run sanctuaries (up to 10 sq. km) should be established in the line of Khonoma Nature Conservation and Tragopan Sanctuary of Nagaland, which has been a success. The Forest Department should also start enforcing the Wildlife (Protection) Act, 1972, at least in the main markets of the hill districts. Within protected areas there needs to be better control of poaching, *jhum* cultivation and human-induced fires. Environmental awareness programmes are needed in villages surrounding protected areas.

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7. A REPORT ON THE PRESENCE OF THREE AVIAN LICE (INSECTA: PHTHIRAPTERA) IN DIFFERENT REGIONS OF NORTH-EAST INDIA

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Introduction

North-east India is one among the 12 mega biodiversity hotspots of the world. Of the 1,200+ known species of birds found in India about 60% have been reported from this region, most being passeriformes. These magnificent birds also act as host for many parasites consisting of a huge proportion of extant species (Price 1980). Among the ectoparasites, avian lice have a significant place and many birds in the wild are often infected by them (Keymer 1972). Parasitic lice (Phthiraptera) are the only major group of insects where all members are permanent parasites and spend their entire life on an animal host. Some show no habitat preference while most are host specific, feeding on only one or a few closely related species of animal hosts. They complete their entire life cycle from egg to adult on a single host species (Foster 1969) and survive only for a few days if separated from it. This association makes lice a suitable model system to study co-speciation between host and parasite (Johnson and Clayton 2003). Information on occurrence of avian lice and their host species in north-east India is scanty. Therefore, thorough and elaborate survey is required to report bird lice and their host species in the region. The present paper reports chewing lice parasitizing Tree Sparrow *Passer montanus* and Yellow-breasted Bunting *Emberiza aureola*.

Methodology

Tree Sparrows were captured using mist-net from different parts of Shillong, Meghalaya (25° 34' N; 91° 53' E) during different months in 2008-09. The Yellow-breasted Buntings are winter visitors to North-east India and were procured from Manipur (24° 35' N; 93° 59' E) during October-February 2008-09. Avian chewing lice were collected by visual examination of the areas around eyes, ears, head, back, legs, tail, body and wing feathers, particularly under surface of the remiges and wing coverts, systematically. Special attention was given to the ventral body feathers, skin and around the vent. The parasites were removed using a fine forcep, the tip dipped in alcohol, and preserved in 70% alcohol (Elizabeth 1951). They were then mounted on microscope slides for observation. Taxonomic identification of the lice was based on Ansari (1958), Hellenthal and Price (2003), Price *et al.* (2003). The taxonomy of birds follows Rasmussen and Anderton (2005).

We recorded three species of ectoparasitic chewing lice from two species of passerines, namely Tree Sparrow *Passer montanus* and Yellow-breasted Bunting *Emberiza aureola*. Two species of lice parasitized on sparrows and one species on buntings.

Chewing lice on Tree Sparrow *Passer montanus* Linn.

1. Family: Menoponidae
Genus: *Myrsidea* (Waterston)

Diagnostic characters: Head and thorax were broad and large in proportion to abdomen. Spines were absent on the ventral surface of the flatly rounded head. Head seta