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## NEW DISTRIBUTION RECORDS OF TORTOISES (CHELONIA: TESTUDINIDAE) FROM BARAK VALLEY, ASSAM, NORTHEASTERN INDIA WITH NOTES ON ECOLOGY AND VERNACULAR TRADITIONAL TAXONOMY

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**Abstract:** India is home to five species of tortoises of which the two endangered species are found in northeastern India. We report for first time new distributional records of *Indotestudo elongata* and additional site records of *Manouria emys phayrei* from 17 different locations in the Barak Valley region of Assam.

**Keywords:** Assam, Barak Valley, Chelonia, distributional record, land tortoise, northeastern India, Testudinidae.

Family Testudinidae includes 57 living species of tortoises in 16 extant genera in the world (Uetz & Hosek 2014), all of which are largely terrestrial, and together represent about 18% of the extant world chelonian diversity (Ernst & Barbour 1989).

Northeast India is known as a 'Turtle Hotspot' and habitat to 22 out of 30 species of freshwater turtles and tortoises found in India (Ahmed et al., 2009, Kundu et al. 2013a, b). Five species of land tortoises belonging to the family testudinidae are known to occur in India, viz., the Travancore Tortoise *Indotestudo travancorica* (formerly *Geochelone travancorica*) and Star Tortoise *Geochelone elegans* from the southwest; and Elongated Tortoise



*Manouria emys phayrei*



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*Indotestudo elongata* (formerly *Geochelone elongata*), *I. forstenii* and Asian Brown Tortoise *Manouria emys* from the northeastern India (Das 1985, 1995a,b, 2002; Das & Andrews 1997; Ahmed et al. 2009; Kundu et al. 2013a,b). *Indotestudo travancorica*, *Nilssonina leithii* and *Vijayachelys silvatica* are endemic to southern India. All these species are largely terrestrial, inhabiting forested areas. Very few intensive surveys of the tortoise fauna of northeastern India have been conducted in order to determine the full extent of distribution of different taxa. Again, within northeastern India, the chelonian fauna in general and testudines in particular of the Barak Valley region in southern Assam have remained poorly investigated barring a couple of publications (Das 2008; Das & Gupta 2011). The present study, conducted during July 2002–June 2007, was with the objective of reporting the distribution of *I. elongata* and *M. emys phayrei* in Assam.

#### Materials and Methods

The survey was conducted from July 2002 to June 2007, in the Barak Valley region of Assam (24°12'–25°8'N & 92°12'–93°15'E) that covers the three districts of Cachar, Hailakandi and Karimganj. Records of tortoises were made through direct sightings and by questioning

the people in different areas, especially the fishermen and jhum cultivators who occasionally hunt turtles. Photography and morphometric measurements of live pet specimens were taken and carapaces and/or plastrons were collected from the villages near the study sites. Identification was made by means of standard keys (Smith 1931; Das 1991). As both the testudinid species reported here are endangered and protected, photographs of live specimens and some carapace samples are deposited in the Animal Biodiversity Museum of the Department of Ecology & Environmental Science, Assam University, Silchar, India.

#### Results and Discussion

*Indotestudo elongata* (Image 1) (AU-Ecol/ABM/Reptilia/Chelonia/ie-5a) and *Manouria emys phayrei* (Image 2) (AU-Ecol/ABM/Reptilia/Chelonia/me-8a) were recorded from 17 sites in the three Barak Valley districts of Cachar, Hailakandi and Karimganj in Assam (Fig. 1; Table 1).

#### *Manouria emys*

*Manouria emys* (Schlegel & Muller, 1840) is protected under Schedule-IV of the Indian Wildlife (Protection) Act, 1972 and categorized as “Endangered”

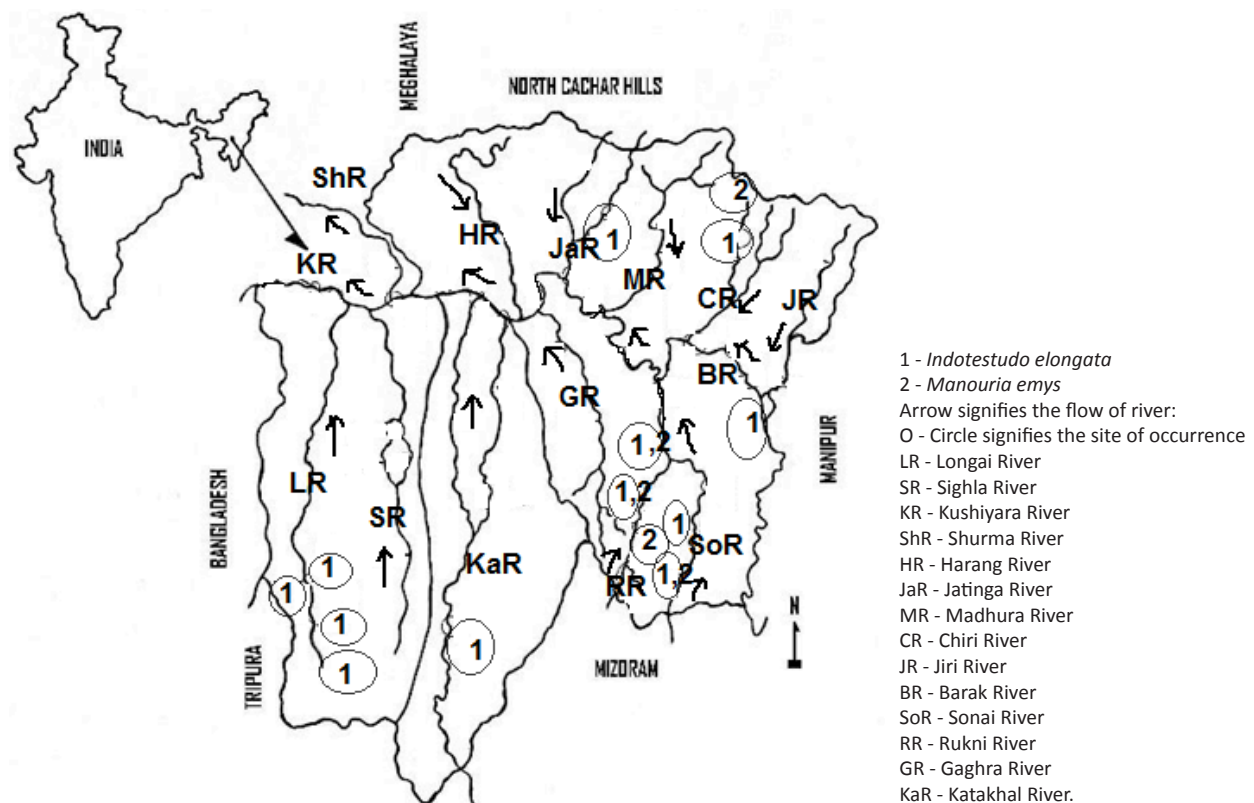


Figure 1. Map of Barak Valley shows sites of occurrence of terrestrial tortoises.

**Table 1. Distributional records and vernacular names of *Manouria emys phayrei* and *Indotestudo elongata* from Barak Valley, Assam.**

Name of species (range of size & weight) and vernacular name	Sites	District-wise name of sites	GPS location	Date of record	No. of record
<i>Manouria emys phayrei</i> (size: 42–55 cm; weight: 10.5–20.75 kg)		Cachar District (Town 24°49'N - 92°47'E)			
<i>Pahari kochchop</i> (Hill Tortoise - Bengali*); <i>Mondur</i> (Hill Tortoise - Chakma); <i>Phrau</i> (Pnar); <i>Yado</i> (big tortoise, forest tortoise - Dimasa); <i>Telpui</i> (Choroi and Mizo); <i>Pepui</i> (Reang)	1	Jhagurapunji, forest village	24°28'N - 92°51'E	09.ii.2004	1L
	2	Lailapur, hill forest	24°31'N - 92°46'E	02.viii.2002	1L
	3	Baroalibeel, hill forest	24°34'N - 92°51'E	03.viii.2002	1C
	4	Baskandibazar, hill forest	24°48'N - 92°54'E	06.i.2004	1C
	5	Harinagar, hill forest	24°55'N - 93°06'E	30.vi.2004	1C
<i>Indotestudo elongata</i> (Size: 18–49 cm; weight: 0.18–2.5 kg)		Cachar District			
<i>Bon kochchop</i> (Forest Tortoise), <i>Gecho kochchop</i> (Tree Tortoise), <i>Pahari haldey kochchop</i> (Yellow Hill Tortoise), <i>Shial chekouria</i> - Bengali*; <i>Suryamukhi</i> (sunflower) <i>Kacchuwa</i> (Hindi); <i>Hunro</i> (Pnar); <i>Gonghang</i> (Yellow Shell Tortoise - Dimasa); <i>Telrangchung</i> (Yellow Hill Tortoise - Choroi); <i>Telang</i> (Mizo); <i>Kerangkormo</i> (Kerang=tortoise, Kormo=Turmeric - Reang); <i>Mon dur</i> (Halam)	1	Jhagurapunji, forest village	24°28'N - 92°51'E	09.ii.2004	1C
	2	Bagjala, hill forest	24°28'N - 92°52'E	01.viii.2002	1C
	3	Lailapur, hill forest	24°31'N - 92°46'E	02.viii.2002	2L
	4	Dholai, reserve forest	24°35'N - 92°50'E	22.vii.2003	1C
	5	Ganganagar, Bhuvan hill forest	24°45'N - 93°06'E	12.ii.2003	2C
	6	Fulertal, Bhuvan hill forest	24°47'N - 93°01'E	14.viii.2002	1L
	7	Kumacherra, hill forest	24°56'N - 93°06'E	30.vi.2004	1L
	8	Chailtancherra Basti, hill forest	24°54'N - 93°03'E	29.vii.2004	1C
	Hailakandi District (Town 24°40'N - 92°33'E)				
	9	Villaipur, forest village	24°24'N - 92°33'E	13.iii.2003	1C
	Karimganj District (Town 24°51'N - 92°22'E)				
	10	Sabri-Isabeel, forest village	24°24'N - 92°19'E	04.vi.2003	1C
11	Jherjheri, hill forest	24°22'N - 92°17'E	06.xi.2003	1C	
12	Magura Basti, hill forest	24°20'N - 92°15'E	05.vi.2003	1C	

Abbreviations: L = live specimens; C = Carapace; (#L or #C) = (# signifies number of live specimens or carapaces record) along with date of documentation; GPS Location available for sites. \* Dialect of Bengali spoken in Barak Valley and the neighboring Sylhet District of Bangladesh.



**Image 1. *Indotestudo elongata*, Lailapur hill forest, Cachar District of Assam**



**Image 2. *Manouria emys phayrei*, Lailapur hill forest, Cachar District of Assam**

according to IUCN Red List (ATTWG 2000). *M. emys* is the largest tortoise in Indo-malaya and the fourth largest in the world. It is the largest land tortoise of Asia. This species is also commonly called the Brown-hill Tortoise, Asian Giant Tortoise, Asian Tortoise, Black Giant Tortoise, Burmese Brown Tortoise, Burmese Mountain Tortoise, Six-legged Tortoise and Eastern Hill Tortoise. The

synonyms of *M. emys* are *Geochelone emys* (Schlegel & Müller, 1840), *Testudo emys* (Schlegel & Müller, 1840), *T. phayrei* (Blyth, 1853), *M. fusca* (Gray, 1854) and *T. nutapundi* (Reimann & Nutaphand, 1979). As described

in Table 1 the interesting linguistic vernacular name of this species varies from place to place and community to community.

Initial description of the genus *Testudo* was made by Linnaeus (1758) but the tortoise genus *Geochelone* (= earth turtle) was explained by Fitzinger (1835) and five years later, Schlegel & Muller (1840) described *T. emys* from "Sumatra" (Indonesia). After then, Schlegel & Muller (1844) referred to *G. emys* as the largest of the Asiatic Tortoise species of the genus *Geochelone* and afterwards this species *emys* (= tortoise), was listed under the subgenus *Manouria* (= rare, domed one) described by Gray (1852) as *M. emys*. Later on, a subspecies of this taxon was described by Blyth (1853) as *M. emys phayrei*. Two subspecies under *M. emys* are recognized: *M. e. emys* (Burmese Brown Mountain Tortoise) and *M. e. phayrei* (Burmese Black Mountain Tortoise). In general, the carapace is flattened on top, but broad, low and slightly wider in the posterior. The key difference between the two subspecies is found in the pectoral scutes. In *M. e. phayrei* the pectoral scutes normally meet at or near the midline (Ernst & Barbour 1989; Cox et al. 1998), while they are widely separated in *M. e. emys*. *Manouria emys emys* has a more southerly range in southern Thailand, Malaysia, Sumatra, Borneo and some of the Indonesian Islands. This is also reported from Australia, China, Cambodia, Lao PDR and Vietnam (Gunther 1864; Gray 1870; Bourret 1941; Das 1991; Jenkins 1995). *M. e. phayrei*, the northern subspecies, ranges from central and northern Thailand, Myanmar and Bangladesh to India (Pritchard 1979; Obst 1983; Das 1985; Tikader & Sharma 1985; Ernst & Barbour 1989; Das 1991; Iverson 1992; Cox et al. 1998; Liat & Das 1999; Iverson et al. 2001). In addition to a more northern range, it is larger (60cm carapace length), has larger clutches (51 eggs), and is generally darker, with a dark brown, olive or black domed carapace (Schaffer & Morgan 2002).

In the subcontinent, it is recorded in the northeastern Indian states of Nagaland, Assam and Meghalaya (Smith 1931; Das 1990, 1991, 1996). However, Kundu et al. (2013a) recently reported the occurrence of different morphs of *M. emys*, Asian Forest Tortoise in northeastern India and revealed the new intergraded taxa within the two previously named species in the high altitude of Mizoram (23.47°41'–23.4°23'N & 92.4°00'–92.4°05'E) State. Previous historical records of this species were from Lumajooting in the Naga Hills, presently in the state of Nagaland (Anderson 1872; Smith, 1931), and near Maibong, Langting-Mupa Reserve Forest and some other localities in the North Cachar Hills District

of Assam (Anderson 1871, 1872). Barring one locality record of this species from Nongkhylllem Reserve Forest, East Khasi Hills, Meghalaya by Das (1990), no reliable record of this tortoise is available in other parts of India after Smith (1931). It was later reported from different areas of Nagaland, many localities in Assam including Kaliyani Reserve Forest of Karbi Anglong (26°25'N & 93°35'E), Barail Range of N.C. Hills (presently called Dima Hasao District), Innerline Reserve Forest of Cachar and Hailakandi and Nongkhylllem Wildlife Sanctuary of Ri-Bhoi and Balpakram National Park of South Garo Hills districts of Meghalaya (Choudhury 1996a,b). Earlier records from Mizoram were from Phura and Sangau in Saiha District (Choudhury 2001) and Dampa and Ngengpui sanctuaries (Pawar & Choudhury 2000), all in western and southern Mizoram. Choudhury (2004) reported its occurrence in Lamzawl Village of Mizoram (1000m) and it was reportedly obtained from the top of Lengteng (around 2000m; 23°50'N & 93°15'E).

The present study reports its occurrence in five sites in Cachar District of Barak Valley region (Table 1). The species though largely herbivorous also consumes insects and frogs and is predominantly terrestrial in nature, inhabiting the hill forests of this valley. The size (straight carapace length SCL) and weight of the specimens ranged from 42–55 cm and 10.5–20.75 kg, respectively. The eggs of *M. e. phayrei* are round in shape, and large (diameter 4.59cm; weight 54.25g). A clutch size of about 60 was found during this study. Das (1995b) reported that *M. e. emys* is smaller (SCL up to 50cm, weight up to 20kg) than *M. e. phayrei* (SCL up to 60cm, weight up to 37kg). One of the *M. e. phayrei* specimens recorded in the present study was 55cm long, indicating that it is perhaps one of the largest individuals recorded from this area. The specimens recorded by Pawar & Choudhury (2000) were around 35cm long. Food habits were also observed. The species is a voracious eater of a variety of animal food like dry fish, frogs, insects, etc. and plant foods like arum (stem, leaf and root), banana, cabbage, bamboo shoot etc.

#### ***Indotestudo elongata***

The species, *I. elongata* (Blyth, 1853), is protected under Schedule-IV of Indian Wildlife (Protection) Act 1972 and categorized as "Endangered" according to IUCN Red List (Groombridge & Wright 1982). This species is known as Elongated Tortoise, Pineapple Tortoise, Red-nosed Tortoise, Yellow-headed Tortoise and Yellow Tortoise. The synonyms of this species are *G. elongata* (Blyth, 1853), *T. elongata* (Blyth, 1853), and *T. parallellus* (Annandale, 1913). Although Blyth (1853)



described *T. elongata* from “Arakan” (= Rakhine Yoma, a mountain range along coordinates ca. 18–21°N & 93–95°E) in western Myanmar (Burma) apparently based on the collection of the ZSI in Calcutta (Das et al. 1998), Lindholm (1929) first recognized the distinctiveness of *T. elongata* and designated it as the type species of his new subgenus *Indotestudo* under the genus *Testudo*. Williams (1952) supported the creation of the subgenus *Indotestudo* under *Testudo*, and included *elongata* therein. Williams (p.220 in Loveridge & Williams 1957) split the all-inclusive tortoise genus *Testudo*, placing *elongata* in the subgenus *Indotestudo* of the genus *Geochelone*, an arrangement followed by Auffenberg (1974). Bour (1980) subsequently elevated *Indotestudo* to full generic rank, a position supported by the cladistic analyses of Crumly (1982, 1984), and adopted by all subsequent authors. Pritchard (2000) reopened the controversy by examining the morphology of all three species of *Indotestudo*. However, Iverson et al. (2001) have hypothesized a phylogenetic relationship among the populations of *Indotestudo*. Kundu et al. (2013b) have revisited the taxonomic rank of Indian tortoise with DNA barcoding perspectives and depict that the molecular identification of *I. elongata* and an allopatric population of *I. forstenii* in northeastern India correspond correctly with existing morphological key support. Thus, the interesting local vernacular name of this species is also listed (Table 1) for additional traditional taxonomic support.

The shell of this species is considerably depressed, more than twice as long as it is deep, with flat vertebral region; anterior and posterior margins slightly reverted, strongly serrated in young, feebly in old specimens. Carapace and plastron are greenish-yellow, each shield with an irregular black spot or blotch, which may occupy its greater portion, or may be much broken up or indistinct (Boulenger 1890). Typically, *I. elongata* is around 30cm in length and 3.5kg as adult. Females tend to be wider than males and more rounded. Males also have a tail that is much larger than that of the female. The males have a concave plastron while the plastron of the female is flat. Additionally, the female’s posterior claws are markedly longer and more curved than those of the male. It is believed that this is to facilitate nest building.

The elongated tortoise is distributed widely in North, Northeastern and Southern Bangladesh (Rashid & Khan 2000), Nepal, Indo-China and Indo-Malaya, southeast to Penang in Malaysia (Smith 1931), Southeast Asia, the Indian subcontinent is the northwestern limit of this tortoise (Das 1986, 2002). Essentially favoring the Sal

forest, its range extends from Corbett National Park in Uttar Pradesh (Ross & Crumly 1982; Frazier 1992). This species is also reported to be present in Phandowala near Dehra Dun (Frazier 1992), Siggudi forest near Kotdwara in the corridor connecting Rajaji and Corbett National Parks (Whitaker 1979; Bhupathy et al. 1994). It has also been reported from Simlipal Tiger Reserve in Odisha, Saranda Reserve Forest, Chaibassa in Bihar and Chhotanagpur in Jharkhand, Jalpaiguri sal forest and Buxa Tiger Reserve in West Bengal, Garo Hills in Meghalaya (Frazier 1992). It is found in the Dampa Tiger Reserve and Ngengpui Wildlife Sanctuary in Mizoram (Das 1991; Pawar & Choudhury 2000), and Chakrashilla Wildlife Sanctuary in Dhubri District in Assam (Dutta 1997). In the present study, live specimens and carapaces of this species were found in 12 sites in Cachar, Karimganj and Hailakandi districts of Barak Valley, Assam (Table 1). This species is predominantly terrestrial in nature and found in hill forests of this Valley. The size (SCL) and weight of the specimens ranged from 18–49 cm and 0.18–2.5 kg, respectively. It was also observed to be a voracious eater of a variety of animal food like dry fish, goat liver, snail, earthworm, frog, prawn, crabs, small fish, etc. and plant food like arum rhizome, fungus, mushroom, potato, tomato, radish, carrot, beetroot, cabbage, pumpkin, ash-gourd, bamboo shoot, *Artocarpus chaplasha* and jackfruit (*A. heterophyllus*) seeds, *Dioscorea* roots etc.

This species is well represented in the Mizoram Zoo, collected from nearby areas (Pawar & Choudhury 2000; Kundu et al. 2013b). It is highly likely that these species commonly occur in the hill forests inside Mizoram, as reported by the Dimasa and Mizo turtle hunters who make annual forays. However, the carapace records should be treated as possible sites where these turtles may be found and not as definitive site records as has also been pointed out by Frazier & Das (1994). The villagers in this area hang turtle and tortoise shells in their cow sheds and homes as they ascribe some magico-religious properties to them (Gupta 2002; Das & Gupta 2004). These tortoise species are utilized as food, traditional medicine and pets by a number of non-tribal (Hindu Bengali) and tribal communities (Mizo, Choro, Hmar, Halam, Reang, Dimasa, Chakma, Pnar) of northeastern India. Tortoise shell and meat is used by different tribes for different purposes on the basis of their traditional practices, cultures and beliefs (Das et al. 2012).

Thus the present study indicates that the Barak Valley region of southern Assam still has a rich repository of turtle (Das & Gupta 2011) and tortoise species. Both aquatic as well as forest-dwelling species are well-represented in this area and are encountered

in a variety of habitats. The study also points out the urgent need for ex situ conservation of these species because of severe threats like shifting cultivation, illegal hunting or trade etc. and therefore to include certain rare species, viz., *I. elongata* and *M. emys* in the Schedule I of the Indian Wildlife (Protection) Act, 1972 instead of their present inclusion in the Schedule IV of the same act. This contention is vindicated by the inclusion of these two species by the IUCN in the highly threatened 'Endangered' category. The inclusion of the aforesaid species in the Schedule I of the Indian Wildlife (Protection) Act is expected to improve the conservation status of these species of chelonians.

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