

Ecological Distribution Of *Cyclemys Oldhamii*(Gray 1863) From Nepal

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Abstract

Tangting River originates from southern slope of Murtidanda of Mahabharat range and forms a very narrow v-shaped agriculturally fertile valley in lower parts of Chure hills. It has three main tributaries merging from east and west. Water is clear with rocky bed and margin is covered with thick bushes of semi-shrubs (*Eupatorium adenophorum*). During the herpetological survey, a live juvenile specimen of *Cyclemys oldhamii* (Gray, 1983) was collected from the periphery of Banmare Khola, an eastern tributary of the river. It was found hiding in the paddy field in the flood plain of Tangting river (280 m), and another adult specimen was collected from Dhobi Khola (450 m), a western tributary of the river. Empty shells were also collected from Garuwa and Mai valleys, respectively. Tangting and Garuwa river valleys are the favourable habitats for *Cyclemys oldhamii*. The main reason of discontinued distribution is habitat loss by deforestation.

Key words : *Cyclemys* , Morphology, Ecological habitats, Distribution

Introduction

Cyclemys oldhamii is a very typical turtle found at the foot of Siwalik / Mahabharat range, in fresh running water in eastern Nepal. It is called *Cyclemys* because of the circular shape of the carapace in juveniles and flat with a mid-dorsal keel , but adult becomes oblong and higher, rounded marginal edge and less keeled. It is called dark-throated leaf turtle (Asian leaf turtle) in English and Dhuwase kanthe paate Kachhuwa in Nepali. It has been reported from east Nepal only, since it has very typical habitats. Much of the country's original forests have been lost to human activities, such as agriculture and urbanization. This has resulted in a loss of habitat for many forests dwelling species. Ecologically its distribution has not spread to west from Kankai River, because originally it belongs to Indo-Malayan and Sundaic sub-region.

Materials and Methods

During the herpetological survey, one small juvenile was collected from the valley of Tangting river which is situated just at the foothill of Mahabharat ridge, drained by several small hill streams. Sakale and Banmare streams are two tributaries of Tangting River, confluent from opposite sides. At the confluent of Banmare khola, an active juvenile was found, and brought to the laboratory at Mechi Campus. But it escaped after two weeks of captivity. Thereafter, one adult *Cyclemys* was found lying just into half merged condition in the water of paddy field. It was brought to the laboratory and studied for morphology and behaviors. Apart from those specimens, the author collected two empty carapaces from Garuwa and Mai valleys. Those carapaces were collected from the house of local people. Thus, altogether 4 records of *Cyclemys*

oldhamii were made during the research period of 4 years.

2.1 Identification

It was moderate sized turtle, with a short tail and a carapace shape that varied between specimens and during growth (Schleich and Kaestle 2002). It had a straight hinge behind the pectoral plastron shield to allow the anterior opening of the shell to close in completely.

2.1.1. Biometry :

- a. juvenile : carapace : length- 9.0 cm , breadth – 7.0 cm
- b. Adult 1: carapace: L = 23 cm, B = 18 cm, plastron: L = 20 cm, B= 12 cm
- c. Adult 2: carapace: head to tail length = 23 cm, breadth = 19cm, Frontal breadth = 12 cm, posterior breadth = 14 cm.
- d. Adult 3: carapace: L = 23 cm, B = 18 cm, plastron: L = 20 cm, B = 12 cm.

2.2. Morphology

2.2.1. Carapace

It was depressed, much flattened and nearly as broad as long in the young, more arched and elongate in the adult; vertebral region with a strong obtuse keel in the young disappearing almost entirely in old individuals, posterior margin strongly serrated in the young, less marked in the adult, 5 vertebral; 11 marginal shields(Figure 1 & 2)and a cervical shields were present.

2.2.2. Plastron

Plastron narrower, rounded or truncate anteriorly, notched posteriorly, the length of inter-pectoral was the longest; inter-humeral or inter-gular the shortest. Bridge short but distinct; ligamentous tissue developed between hyoplastron and hypoplastron in adult. It had

large axillaries and small or no inguinals(Figure 3). The median length of the femoral was the same or larger than the annals. The notch between the anal shields was wide and formed an obtuse angle (Schleich and Kaestle, 2002).

2.2.3. Limbs

Forelimb had 5 fingers and hind-limb had 4 toes with webbed digits. Dorsal part of forelimbs possessed large transverse scales.

2.3 Coloration

Colour much more variable, the typical condition was that both carapaces and plastrons were brown, with black radiating lines on the scute of plastron, the radiation on scutes of carapace often indistinct. Head brown to blackish, without distinct stripes: gular region dark. In young specimens lower side of neck with minute light colored tubercles. Adults without stripes on neck, with dark throat; Carapace uniform dark, reddish to light brown with more or less dark patterns on each of the larger plates(Figure 4). Their peripheral growth zones might carry dark radiate pattern. Plastron black, uniform dark or with a dense radiate to blackish pattern (Schleich and Kaestle 2002)

2.3.1. Sexual dimorphism

Female larger, with relatively shorter and thinner tails. Nests were dug in ground, where 2-4 elongated hard shelled eggs were laid. These hatched about 75 days later.

Results

Ecological habitats

Ecological islands in between the Terai and Siwalik ranges are the ideal habitats of several species, which need sunny open soil (Schleich and Kaestle 2002). *Cyclemys oldhamii* is found in shallow streams of hilly regions. It inhabits low hills and the plains, although more common

at lower elevations; occurring in small rivers, streams as well as in ponds (Das 2002). It is found hidden under overhanging vegetation. Adults are often encountered on the leaf litter of the forest floor near small water courses. Sometimes adult individuals approach human latrines for feeding on human sewage (Schleich and Kaestle 2002). For the first time, the animal was found at Dhobi Khola in Laxmipur VDC, Ilam district; Mechi zone. The locality lies in inner valley made by river Tangting. East and west side of this place is surrounded by Siwalik Hills. North side is Mahabharat Mountain and south side consists of an open Terai plain. River Tangting originates by the confluence of three rivers and comes out in open place at Beltar, near Khudunabari. Sakale Khola and Dhobi Khola lies west side of Tangting Khola but Banmare Khola is situated to the east side. River water is very clear and aquatic weeds and bushes are covering both banks of Banmare Khola. The river bed is made up of rocky or gravelled base and water current is in high speed. The specimen was collected at 9 AM during a warm (26° C) sunny day. While it was hiding, it appeared as dark mossed stone or boulder through dorsal side in the paddy field but when teased, the animal moved away.

Distribution

The diversity of turtles is greatest in the Northeast and the Himalayan foothills of the Oriental region. The centre for origin of the family Bataguridae is either northeastern India or the Indo-Malaya region, as is revealed by high density of living species of this family in these regions (Das 1996). In Nepal, *Cyclemys oldhamii* is recorded only from four localities (Figure 5) in the extreme east, surrounded by remnant of mixed sal forest. These localities lie between 280 m to 400 m, but in Thailand the animal is reported from 1,300 m. It is

extremely rare and on the verge of extinction. Besides Nepal, it is distributed in northeast India: north Bengal, Assam, Meghalaya, Mizoram and Arunachal Pradesh (Das 2002). Myanmar Thailand, Malaya Peninsula, Indonesia (Sumatra, Java, Borneo) (Fritz *et al.* 1997); South China, Yunnan and Guianx (Zhao and Adler 1993).

Discussion

Serious concern is being expressed to the issue of shrinking forest area, in term of quantity and quality and also ecological imbalance (K.C. 2003). Deforestation decreases the welfare of users by eliminating habitats of wildlife, altering local climate and watersheds, and destroying critical stock of fuel, fodder, food and building material. To ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium, this is vital for sustenance of all life forms – human, animals and plants.

The genus *Cyclemys* was collected from hilly river valleys, surrounded by remnant of sub-humid mixed forest. Tea, cardamom, ginger, seasonal vegetables are cultivated around the areas. The surrounding tea estates (e.g.; Tokla and Burne Tea Gardens) use huge amount of fertilizers and pesticides annually. Over-manured and non-degradable pesticides usually wash out with rain water and collect in the tributaries of Tangting Khola and Garuwa Khola. Such eutrophicated and polluted water directly harm *Cyclemys oldhamii* including all other aquatic or semi aquatic herpetofaunas. Zoo-geographically, the three Oriental sub-regions- Indian, Indo-Malayan and Tibeto-Yunnaese- the Nepalese lowland belongs to the first sub-region as a part of the Indian subcontinent, but has been invaded by a number of Indo-Malayan species, through the causeway of Siwalik ranges; i.e.,

Asian leaf turtle. Morphologically, in most adults a hinge develops behind the anterior lobe of the plastron. With the aid of this movable lobe the anterior plastron opening can be closed only incompletely. The rather straight transverse hinge develops between two bony plates of the plastron which are rigidly fused in young specimen by a suture. As the margins of the overlying abdominal horn shields do not match with this hinge, a corresponding fissure must develop in the abdominal shield to attain mobility. Both limbs are found webbed and each digit is provided with sharp claws. In each digit large size scales are also present. It is very shy turtle and it retracts inside the anterior or oral cavity of the shell in response to even very low-pitched sound.

Factors influencing the species diversity may include differences in litter productivity (Inger and Lian 1996) and annual moisture regime (Duellman 1978) Historical components, including invasion by extra-limit elements and climatic and vegetation changes, also need to be considered. Human activities, which have had particularly devastating effects on the turtles of the south Asian region, should also be considered (Das 1996). Schleich and Kastle (2002) identified the present specimen as *Cyclemys oldhamii* and announced that it was the first record from Nepal. The Siwalik Region at the Nepalese eastern frontier does not function as a simple distributional barrier, but it is a part of a wide transitional zone of meshed distributional pattern (Schleich and Kastle 2002). Therefore, it could be guessed that it was on the way to spread from east (after crossing the eastern frontier at Mechi river) to the west, but while approaching at Kankai river, habitats were changed into farmlands by anthropogenic activities. Therefore, it could be said that the causeway of humid Siwalik forest broke and continuous

distribution to the west was stopped at the present localities only. Recently captive breeding of this species has been adopted for conservation at Bhadrapur to continue the research work on it in collaboration with ARCO-Nepal.

Conclusion

Cyclemys oldhamii is newly discovered species, having limited distribution in Nepal. Though, it belongs to Indo-Malayan and Sundaic sub region, it is also found in the Siwalik range between Jhapa and Ilam districts. It is distributed up to Garuwa valley and Mai valley, but it has not been reported from the west of Ratuwa khola. The main causes of limited distribution might be anthropogenic activities rather than geographical or climatic factors. Therefore, it could be said that on the process of distribution towards the west from east, destruction of its natural habitats discontinued its dispersal. The present status of this species is rare in Nepal, as well as in India and China. Collection for food or medicine or pets is the main reasons for the endangered status of animal. A survey is needed urgently to determine its ecological distribution for establishing a conservation strategy. Illegal catching and selling should be discouraged by creating a wide public awareness around these areas.

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References

Das, I. 1996. *Biogeography of the Reptiles of South Asia-Malbar*, Florida. 87 pp.
 Das, I. 2002. *A photographic guide to Snakes and other Reptiles of India*. New Holland Publisher Ltd. London. UK. pp.1-144.
 Duellman, W.E. ed. 1999. *Pattern of Distribution of Amphibians: A Global Perspective*. The John Hopkins Univ. Press. London.

Fritz, U., M. Gaulke and E. Lehr 1997. Revision der Gattung *Cyclemys* Bell, 1834, mit Beschreibung einer neuen Art- *Salamandra*, 33(3): 183-212.
 Inger, R.F. and T.F. Lian 1996. *The Natural History of Amphibians and Reptiles in SABAH*. Kota. Kinabalu, Borneo.
 K.C., T.B. 2003. Need of mainstreaming Agricultural Education in Agricultural development of Nepal. TU Special Bulletin 2003 (Jul. 8, 2003). TU Information Division, Kirtipur, Kathmandu. pp. 1-18.
 Schleich, H.H. & W. Kaestle eds. 2002. *Amphibians and Reptiles of Nepal*. Koenigstein, Germany; Koeltz Scientific Books. pp 1200.
 Zhao, E.M. and K. Adler 1993. *Herpetology of China*. Lawrence Society for the Study Amphibians and Reptiles: pp.522.

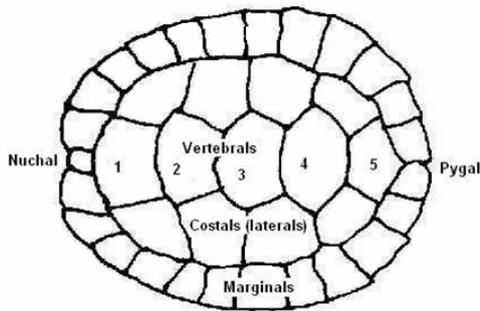


Fig 1. Dorsal view (horny plate carapace) of *Cyclemys oldhamii*

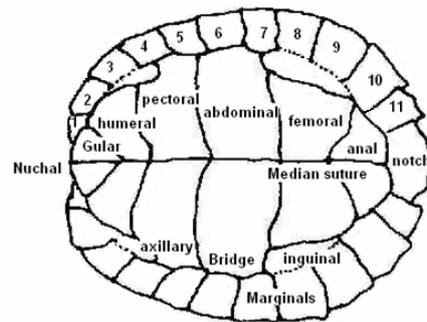


Fig 3. Ventral view (horny plate-plastron) of *Cyclemys oldhamii*

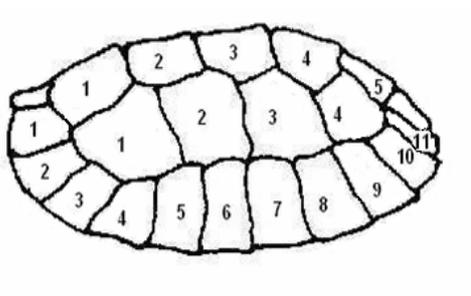


Fig 2. Lateral view (horny plate) of *Cyclemys oldhamii*



Fig 4. Photograph of specimens (adult) of *Cyclemys oldhamii*

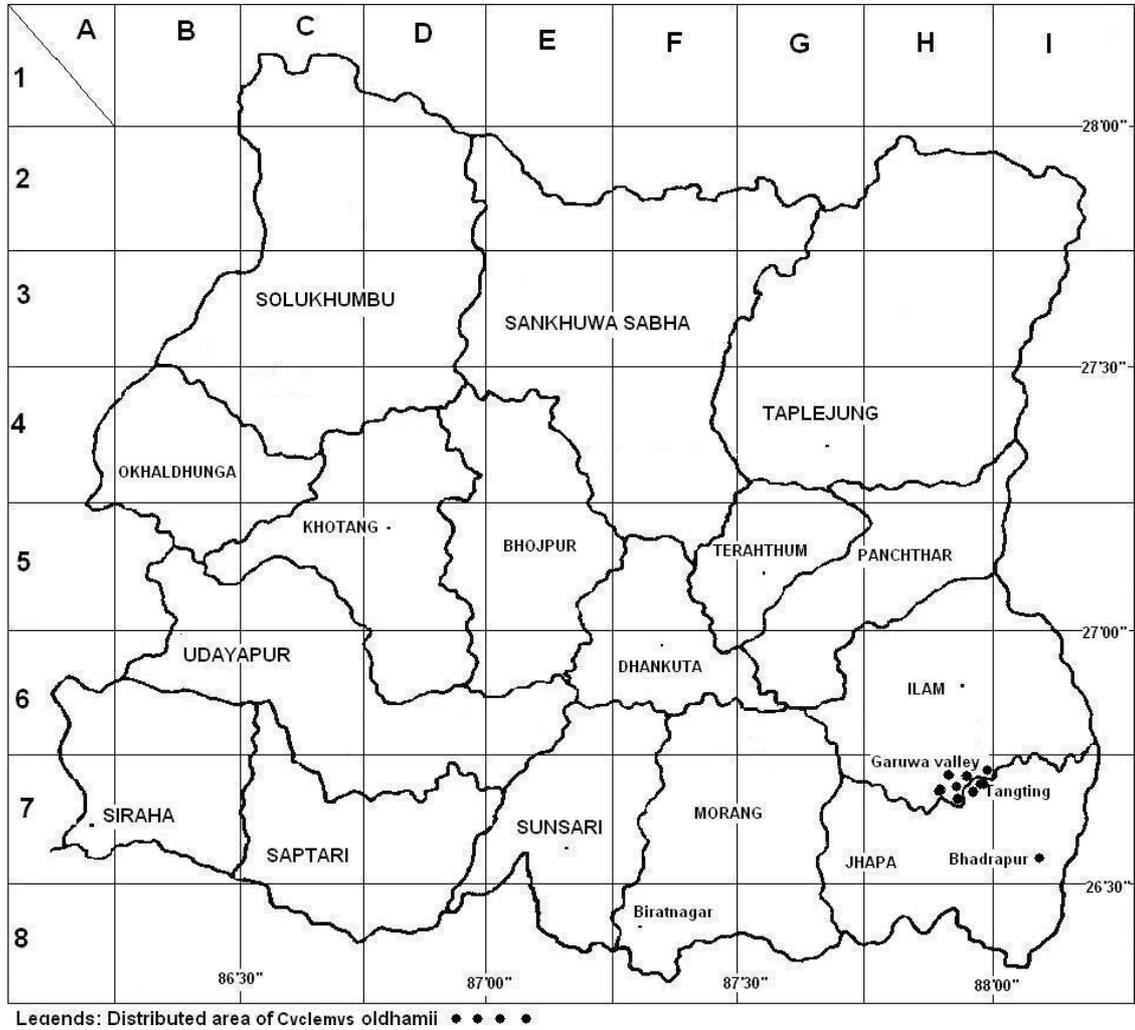


Fig. 5: Distributional map of *Cyclemys oldhamii* in East Nepal.