

Behavioral Ecology of Indian flapshell turtle *Lissemys punctata andersonii* (Webb, 1980) in West Bengal, India.

Anweshan Patra

Corresponding author: anweshan.patra@gmail.com

Abstract

A study on the ecology of the Indian flapshell turtle *Lissemys punctata andersonii* (Webb, 1980) was conducted during the period of July 2015 to July 2017. In this study we observed behaviour, food preference, and breeding and nesting habitat preference. For the study we mainly selected the Saraswati and Kananadi river banks in the Hooghly district. Both rivers are shallow in depth (≤ 4 m) and well vegetated.

Keywords: Indian flapshell turtle, Ecology, Behavior, Habit, Habitat, Breeding.

Introduction

The Indian flapshell turtle is one of the 22 species of turtles found in India. Three subspecies of the Indian flapshell turtle, *Lissemys punctata*, are currently recognized: *L. p. punctata*, *L. p. vittata*, and *L. p. andersonii* (Bhupathy *et al.* 2014). We focused our study on the subspecies *Lissemys punctata andersonii*; WLP status: Schedule-I. IUCN status: low risk, near threatened (Hanfee, 1999). The Bengali name for the species is Til Kachim. This subspecies is morphologically different than the other two; it has an olive-green carapace and soft body parts, with yellow blotches and hieroglyphs on the carapace and head and neck (Smith, 1931, Webb, 1982). Freshwater turtles, such as the target species, perform a valuable service in the aquatic ecosystem as scavengers in the ponds, rivers and stagnant water and thus keep the aquatic systems free from pollution (Rao, 1985; Hossain and Sarker, 1993). This study

was undertaken to determine the habitat, food preferences, feeding behavior, and breeding behavior of the Indian flapshell turtle, *L. p. andersonii*, along a subsection of the Saraswati and Kananadi river banks in the Hooghly



Figure 1. Body details of *Lissemys punctata andersonii*

district, West Bengal. Both rivers are shallow in depth (≤ 4 m) and provide lots of vegetation cover.

Materials and Methods

During the study period July 2015 – July 2017, we observed feeding behavior, food preference, and made observations on the preferred breeding and nesting habitats of *L. p. andersonii*.

According to The Wildlife Protection Act, 1972 of India, this species is under Schedule-I; removal from the wild, harming or killing this species is a punishable offence. No turtles were observed in captivity and gut content analysis and gonadal development analysis via dissections were prohibited. All research was conducted by visual observations in situ.

During the study period, we visited our study sites in the early morning and afternoon, when this species could be spotted more easily while basking. If individuals were observed in other time periods, we visually monitored their activities and recorded habitat preferences and behaviours. Most nests we found on or very near to agriculture fields. Nests were found by local farmers and villagers and the locations were forwarded to us. We collected data about nest and clutch, including nest temperature and humidity, and conducted daily monitoring.

Ecological study in captivity: We selected two locations for captive study: Chandannagar Rabindra Bhavan, which housed turtles kept in a concrete fountain tank (Subhro Niyogi, 2009) and Jain Swetamber Dadaji's Temple and Garden, Kolkata, where some turtles are kept in the artificial ponds.

Ecological study in nature: Geographically the natural study region is located at the Hooghly district of West Bengal. The area is situated in between Latitude and longitude 22.8859° N, 88.3919° E to 22.9662° N, 88.0650° E. For the study we mainly selected the banks of the Saraswati River and the Kananadi river in Hooghly district. Both rivers are shallow in depth (≤ 4 m), and are vegetation rich. We also studied in local swamps, ponds, agriculture fields and gardens.



Figure 2. *Lissemys punctate andersonii* on its terrestrial habitat

Results and Discussion

Habitat: In this study we found that Indian flapshell turtle *L. p. andersonii* preferred different types of habitat across their life cycles. They occur in a variety of aquatic habitats, ranging from rivers and streams to reservoirs, marshes, ponds and lakes. We found this species lived under aquatic weeds, floating and semi-submerged vegetation and paddy fields. This turtle has the ability to adapt to a variety of environmental conditions including puddles, drainage ditches and polluted, water-retaining areas. Generally, they prefer to stay at the bottom level of water bodies, but intermittently browse on the surface of the water near the bank. At night they migrate between aquatic habitats, across land, in search of food or mating partner. Bennett *et. al* (1970) stated that this species travel overland during summer in search of suitable aestivation sites when water bodies are dried up. In the dry season (December- May) the turtle was found

in burrowing condition in moist, dry soil (but avoided sticky, damp soil).

Basking Behavior: In this study we found that *L. p. andersonii* basked for a period of time every day. Generally we found this occurred most frequently in the early morning and afternoon, but will also bask midday following period of cloudy weather. Turtles were found basking on submerged logs, sand bars on the bank of water bodies, rocky surface near water bodies and also concrete staircases of the domestic ponds. We conclude that *L. p. andersonii* use four different types of habitat: 1. Aquatic habitat 2. Basking habitat 3. Browsing habitat and 4. Burrowing habitat.

Feeding Behavior: Turtle species are important in the control of larval and adult stages of aquatic insects, aquatic vertebrates, trash fish (low economic value fish), mollusk, other detritus and beneficial organisms (Fugler, 1984). As per previous studies, the Indian flapshell turtle *Lissemys punctata* is carnivorous in nature (Auffenberg, 1981; Vijaya, 1981; Hossain and Sarker, 1993). However, in our study we found that *L. p. andersonii* is an opportunistic omnivore. The turtle was found browsing in the bottom layer of the shallow water bodies and extending its neck in search of prey. We observed in our study that *L. p. andersonii* consumed adult frogs, tadpoles, fish, crustaceans, mollusks, earthworms, insects, water plants, carrion and fragments thereof. In our captive study region, the turtles were fed rice, bread, biscuit, sweets and flowers thrown by the visitors.

Breeding Behavior: The reproductive cycle of *L. punctata* differs according to geographic region and it seems that it is closely correlated with monsoon seasons and heavy rains (Gramentz, 2011). In our study, we found that

L. p. andersonii mate from May to July. Their mating is aquatic; males swim circularly around the female while also extending his head and limbs and bobbing its head. We occasionally observed the males gently bite or stroke on the anterior edge of the female's carapace. The females would reciprocate by bobbing her head in return.

In this study, we observed that *L. p. andersonii* build their nests from June to August. Generally, the female turtles made their nests in moist sandy soil by digging with their sharp claws and neck. They selected the riverbanks (20-25m higher than the water line) for their nesting sites. During our study period, we found five nests made in September. The nests were positioned entirely on the sandy riverbank; the hatchlings emerged in May after an incubation period of approximately 235-250 days. The average clutch size was 12-17 eggs. One of the five clutches was rescued from poachers and reburied in the nest but, unfortunately, no hatchlings were born. We suspect the eggs were internally damaged due to change of axis.

Conclusion

According to the Wildlife Protection Act, 1972 of India, *L. p. andersonii* is under Schedule-I. IUCN status: low risk, near threatened. However, this species is still very much affected by illegal poaching and hunting. Turtles are consumed by some people as a source of protein and as a delicacy (Rao, 1986). Still now, in many markets of India, turtle is covertly sold as food. In market a kilogram of turtle meat can be sold for a minimum of \$6.24 USD (400 INR). In addition, this species is threatened by various types of pollution and urbanisation creating pressure on the species; through habitat loss,

nest destruction through unethical human activities, people illegally occupying bank of rivers and streams for agriculture purpose and the bleaching of the water bodies to increase fish production. In conclusion, the freshwater turtle population is declining due to over-exploitation, habitat destruction and from hunting for their consumption as food. This study is a small step towards the conservation of this species by helping develop our understanding of their behavior and ecology.

Acknowledgements

I want to thank the local people of the study area for co-operating with us and providing foods and shelter during bad weather; to Kaliram Sabbar and Rahul Sabbar for helping monitor this species in situ; to Mousumi Das for helping with data analysis; and finally to Vishal Santra (Wildlife researcher) for inspiring me.

References

Auffenberg, W. (1981) Behaviour of *Lissemys punctata* (Reptilia, Testudinata, Trionychidae) in a drying lake in Rajasthan, India. *J. Bombay Nat. Hist. Soc.*, **78**(3): 487-493.

Bennett, D.H., Gibbons, J.W. and Franson, J.C.. (1970) Terrestrial activity in aquatic turtle. *Ecology*, **51**(4):738-740.

Bhupathy, S., Webb, R. G. and Praschag, P. (2014) *Lissemys punctata* (Bonnaterre 1789) – Indian Flapshell Turtle. *Chelonian Research Monographs* (ISSN 1088-7105), **5**(76) : 1-12.

Fugler, C.M. (1984) The commercially exploited Chelonia of Bangladesh. *Taxonomy, Ecology, Reproductive biology and Ontogeny. Bangladesh Fish. Int. Bull.*, **2**(1): 1-52.

Gramentz, D.(2011) *Lissemys punctata* - the Indian Flap-shelled Turtle. Frankfurt am Main: Edition Chimaira, 280 pp.

Hanfee, F. (1999) A WWF-India Field Guide to Freshwater Turtles and Tortoises of India . TRAFFIC-India /WWF-India, 18 pp.

Hossain, M.L. and Sarker, S.U. (1993) Freshwater turtles of Bangladesh. *Bangla Academy Biggan Patrica, Dhaka*, **20**(1): 109-120.

Rao, R.J. (1985) Management of crocodiles and turtles in wetland sanctuaries, India. *Tigerpaper*, **12**(4): 1-5.

Rao, R.J. (1986) Freshwater turtles conservation in National Chambal Sanctuary. *Tigerpaper*, **13**(3): 28-29.

Smith, M. A. (1931) The Fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. I. Testudines. London: Taylor and Francis, **1**:185 pp.

Subhro Niyogi Oct 14, (2009) “Rare turtles rescued from govt institute” | TNN |, 02.06 AM. IST. URL : <https://timesofindia.indiatimes.com/city/kolkata/Rare-turtles-rescued-from-govt-institute/articleshow/5121953.cms>.

The Wildlife Protection Act, (1972) URL [http://www.wbbb.nic.in/Legislations/rules/The%20Wildlife%20\(Protection\)%20Act,%201972.pdf](http://www.wbbb.nic.in/Legislations/rules/The%20Wildlife%20(Protection)%20Act,%201972.pdf).

Vijaya, J. (1981) Successful Artificial Breeding of *Lissemys punctata* Granosa (Smith) J. *Bombay Nat. Hist. Soc.*, **79**: 210-211.

Webb, R. G. (1982) Taxonomic notes concerning the trionychid turtle *Lissemys*

punctata (Lacepède). Amphibia-Reptilia,
3:179–184.

Accepted Manuscript

C&F Herpetology