

Investigation on the Burmese star tortoise, *Geochelone platynota* (Blyth, 1863) in Lawkanandar Wildlife Sanctuary

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Abstract

The Burmese star tortoise, *Geochelone platynota* is endemic to the dry zone of Central Myanmar and is categorized as critically endangered on the IUCN Red list. *G. platynota* is known locally in Myanmar as Kye Leik. We conducted Burmese star tortoise surveys during April 2018 to December 2018 in Lawkanandar Wildlife Sanctuary in Bagan in the dry zone of central Myanmar. Based on the differences in shell and tail morphology according to identification of species. This species in habitats typical of the dry zone and agricultural landscapes of fields. During the study period, we were recorded the Burmese star tortoises, *Geochelone platynota* adult females grow larger than males. *Geochelone platynota*, Burmese star tortoise is one of the endemic species and is categorized as critically on the No.11 under the IUCN Red list.

Keywords: burmese star tortoise, sex ratios, morphometric, endemic

Introduction

The Burmese star tortoise, *Geochelone platynota* is endemic to the dry zone of Central Myanmar and is categorized as critically Endangered on the IUCN Red list (Whitaker and Andrews,1995).

Platt *et al* (2000) stated that *Geochelone platynota* is one of the least studied of all living tortoise; its distribution within dry zone remains ill defined, few recent locality records are available and virtually nothing is known concerning the current conservation status or ecology of wild populations.

The Burmese star tortoise, *Geochelone platynota* is a critically endangered tortoise species, native to the dry, deciduous forests of Myanmar. It is close to extinction in Myanmar, as it is eaten both by the native Burmese, and is still exported to the Chinese food markets (Ermast and Barbour, 1989).

G.platynota is known locally in Myanmar as Kye Leik , which literally translates to “star turtle” , and refers to the striking patterns on the carapace and plastron (Steven G. Platt *et al*, 2011).

G. platynota populations are declining due to over- collecting and habitat destruction, but noted that quantitative survey data on which to base conservation decisions are unavailable (Van Dijk 1997).

The Myanmar star tortoise *Geochelone platynota*, endemic to the dry zone of central Myanmar, is considered one of the least studied of all living tortoises and little is known concerning the current status of wild populations, let alone their establishment of home ranges their reproductive strategies (Steven G. Platt *et al.*, 2011).

Smith (1931) mentioned that Burmese star tortoise doesn't hibernate during the winter but it decreases activity during the extremely hot and cold periods of year. Due to the very distinctively marked and highly rounded shell of the Burmese star tortoise, this species of tortoise has become a popular pet in the world's exotic pet trade.

Here we present data on the occurrence and status of populations of *G. platynota* at Lawkanandar Wildlife Sanctuary and in central Myanmar, and provide conservation

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recommendations based on our findings. The present research was conducted with the following objectives:

- To investigate the morphometric characteristics of *Geochelone platynota*

Materials and Methods

Study area and study site

The Lawkanandar Wildlife Sanctuary is located between N 21° 07' 25" and 21° 07' 45", E 94° 51' 12" and E 94° 16' 4" at Thripyitsaya Village, Bagan and lies adjacent to the Ayeyarwaddy from Mandalay within the dry zone of central Myanmar. The Sanctuary comprising 0.178 square miles was established since 17th September 1996 for protection of wildlife (Plate 1).

Study period

Field survey was conducted at Lawkanandar Wildlife Sanctuary during the April 2018 to December 2018.

Identification for species confirmation

According to Smith (1931), Ernst and Barbour (1989), Bonin *et al* (2006) and Kalyar *et al* (2014). Based on the differences in shell and tail morphology according to identification of species.

Data collection of specimen

The study on the Burmese tortoise, *G. platynota* was conducted at Lawkanandar wildlife Sanctuary. As the present study was mainly conducted the number of specimens where they were weighted and their lengths were measured by using the digital balance and rulers. The sex of large juvenile and adult tortoise was determined based on differences in shell and tail morphology according to identification of species.

As the present study was mainly conducted, straight -Line Carapace length (CL), Maximum Carapace Width (CW), Plastron Length (PL), Plastron Width (PW) and Shell Depth (SD) of Burmese star tortoises were recorded to measurement of the specimens by using the calipers and take a photograph.

Body Weight (BW) was recorded by using the digital balance was recorded during the study period. The length and width of both carapace and plastrons as well as the depth of the shell were measured with a slide calipers. And then immediately photograph and other distinctive characters were also recorded during the study period.

Morphometric measurements of Burmese star tortoise

- CL = Straight -Line Carapace length
- CW = Maximum Carapace Width
- PL = Plastron Length
- PW = Plastron Width
- SD = Shell Depth
- BW = Body Weight

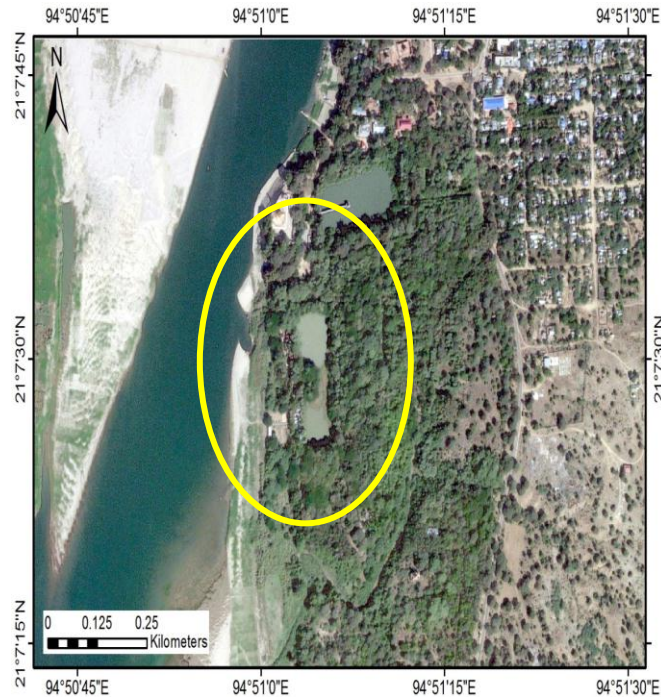


Plate 1 Map of the study area, Lawkanandar Wildlife Sanctuary
(Source: Google Earth, 2018)

Results and Discussion

Systematic Position of Burmese star tortoise, *Geochelone platynota*

Kingdom	-	Animalia
Phylum	-	Chordata
Class	-	Reptilia
Order	-	Testudines
Suborder	-	Cryptodira
Family	-	Testudinidae
Genus	-	<i>Geochelone</i>
Species	-	<i>G.platynota</i>
Binomial name	-	<i>Geochelone platynota</i> (Blyth, 186)
Common Name	-	Burmese Star Tortoise (Kye -Leik)

Morphometric characters and measurements of *Geochelone platynota*

Geochelone platynota, Burmese star tortoises have a very clear six pattern on most of their top and side. Star-shaped markings are also responsible for the name of this species. Shell is black above each vertebral (top) and costal shield with yellow from which radiates six or more yellow streaks. The Burmese tortoises have yellow shells with dark brown or black patterns, even though it looks like they are dark with yellow stripes. Shell provides protection against predators (head and legs remain hidden inside the shell in the case of a danger). Head are moderate, yellowish, covered with small irregular shields and legs are brown color. Limbs are yellowish, anterior part of forelimbs with large pointed bony scales; heel with flat scales. Tail is very short, terminating in a spur-like tubercle. The plastron of the Burmese Star is

yellow with dark spots which are often shaped like triangles. Plastron are large and yellow notches anteriorly, deeper posteriorly. Each plastron shield marked with irregular dark brown patch and back rays. The carapace is very convex, the vertebral and costal shields not humped. Latter margins nearly vertical, with anterior and posterior margins feebly serrated. The length and width of both carapace and plastron as well as the depth of the shell were measured with a slide calipers. The body mass was determined by weighing with a spring balance.

Body Length of Burmese star tortoise

During the study period, we are recorded the Burmese Star tortoise, *Geochelone platynota* adult females grow larger than males. Females typically attain straight carapace length of between 43 cm to 6.7 cm and males typically only reach 5.9cm to 11.9cm in carapace length. As the present study of Burmese star tortoises was mainly conducted, the measurement of maximum Carapace width (CW) 5.7 cm to 31.2 cm for female and 4.4cm to 8.4 cm for male. Plastron Length (PL) 5.9 cm to 38.5 cm whereas 5.5 cm to 10.6 cm in male and plastron width (PW) 4.4 cm to 25.3 cm in female whereas 2.9 cm to 7.2 cm in male and Shell depth (SD) 4.2 cm to 24.5 cm in female whereas 3.4 cm to 8.4 cm in male. Burmese Star tortoises, *Geochelone platynota* adult females are larger in size and have shorter, the stubby tails because of their plastrons (bottom shells) are flat.

Age

In the wild, male of Burmese Star tortoise have been observed to reach maturity at around 6-8 years of age and females at 8-12 years. In captivity, tortoises tend to grow and mature faster. Captive bred Star tortoise males may start siring as young as 3-4 years of age. Captive bred females may start laying eggs as young as 5-6 years of age, but over 7 years is probably more typical for females.



A. Straight-line Carapace Length



B. Maximum Carapace Width



C. Plastron Length



D. Plastron Width



E. Shell Depth



F. Body Weight

Plate 2. Measuring the morphometric characters of Burmese star tortoise

Table 1 Recorded on the female of measurement of Burmese star tortoise in Lawkanandar Wildlife Sanctuary

Female/ Year	CL (cm)	CW(cm)	PL (cm)	PW(cm)	SD(cm)	BW(cm)
Biggest 1976	43.2	31.3	38.5	25.3	24.5	45.71 kg
2014	12.4	9.3	10.8	7.3	7	471.3 g
2014	14.1	9.7	12.6	8.2	8	579.2g
2014	12.2	9.2	11.1	7.6	7.2	474.1 g
2016	8.8	6.9	7.9	6.2	7.8	182.6g
2016	7.2	5.9	6.8	5.2	5.7	126.7 g
2016	7.6	6.2	7.2	5.8	6.3	158.6 g
2017	6.8	5.7	6.2	4.4	4.2	98.6 g
2017	6.9	5.7	6.2	4.6	4.3	108.8 g
2017	6.7	5.9	6.0	4.4	4.0	92.9 g
2017	7.2	6.2	6.4	5.6	4.9	112.6 g
2017	6.9	5.7	5.9	4.5	4.3	103.6g

Table 2 Recorded on the male measurement of Burmese star tortoise in Lawkanandar Wildlife Sanctuary

Male/ year	CL (cm)	CW(cm)	PL (cm)	PW(cm)	SD(cm)	BW(cm)
2014	11.9	8.4	9.2	6.7	7.6	398.2 g
2014	12.0	8.2	10.6	7.2	8.4	420.8g
2015	10.8	7.2	8.6	6.2	6.8	320.8g
2016	6.4	5.6	5.4	4.2	4.8	96.3g
2016	6.5	5.8	6.2	4.8	4.9	104.8g
2017	5.9	4.8	5.6	3.6	3.8	86.6g
2017	6.2	5.4	5.7	3.8	4.0	90.2g
2017	5.7	4.4	5.5	2.9	3.4	78.4g
2017	5.9	4.6	5.6	3.2	3.6	82.6g

Discussion

A total of 21 specimens of Burmese star tortoise were recorded in Lawkanandar Wildlife Sanctuary. During the study period, we are recorded the Burmese Star tortoises, *Geochelone platynota* the female is significantly larger than males. Adult females are larger in size and have shorter tail, but are flat in male have long tail were recorded. Smith (1931) and Ernst (1989) stated that Burmese star tortoise is a medium size tortoise with a carapace length (CL) at least 30 cm females are larger than male.

Burmese star tortoise, *G. platynota* are native to Sri Lanka, India and southeastern parts of Pakistan. The Burmese star tortoise is generally distributed and occurs over upper Burma. (Alaungdaw Kathapa National Park, Chatthin Wildlife Sanctuary, Minzontaung Wildlife Sanctuary, Mount Popa National Park, Shwe Settaw Wildlife Sanctuary, Shwe U Daung Wildlife sanctuary).

Nowadays, it is known that Burmese star tortoise is fairly popular in the foreign pet trade because of the most popular their appearances ,size and color because of the star-like designs on the shell of Burmese star tortoise. Therefore, the Burmese tortoises have disappeared from the dry zone landscape according to the previous factors.

Robinson (1994) also described that it is close to extinction in Myanmar, as it is eaten both by the native Burmese, and is still exported to the Chinese food markets. Platt *et al* (2011) reported that the Burmese star tortoise exists in two protected areas, Shwe Settaw and Minzontaung Wildlife Sanctuary. The Burmese star tortoise is considered critically endangered by the IUCN list. Wild specimens are disappearing mostly exists in protected area in Myanmar. The result show that *Geochelone platynota*, Burmese star tortoise is one of the endemic species and is categorized as critically on the No.11 under the IUCN Red list.

Conclusion

In the present study, a total of 21 specimens of Burmese star tortoise were recorded in Lawkanandar wildlife Sanctuary. The length and Width of both carapace and plastron as well as the depth of the shell were measurement and weighted during the study period. During the study period, we were recorded the Burmese Star tortoises, *Geochelone platynota* adult females grow larger than males. Therefore the reproductive biology of Burmese star tortoise should also be further studied.

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