

**A study on morphology, behavior, feeding and
breeding of the Indian Rock Python (*Python molurus
molurus*) at Chattogram Zoo, Chattogram,
Bangladesh**



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List of abbreviations

Abbreviations	Elaboration
IUCN	International Union for Conservation of Nature & Natural Resources
CVASU	Chattogram Veterinary and Animal Sciences University
FVM	Faculty of Veterinary Medicine
Kg	Kilogram
Cm	Centimeter
ft.	Feet
Sq. ft	Square feet

Abstract

Indian Rock Python (*Python molurus molurus*) is one of the large sized non-venomous snake in Indian subcontinent which now has been included in near threatened class in IUCN red list species. The study was conducted to observe the morphological and behavioral changes of Indian Rock Python in captivity. A total of 26 python were included under the current study at Chattogram Zoo, to observe their morphology and behavior. A pre-structured questionnaire was used to collect the data. For the morphological study, body weight, length, color pattern, marking and arrangement of teeth were observed and recorded. Different behavioral pattern during feeding, hunting, resting, breeding and gravid behavior were observed. The height, length and weight of eggs, clutch size and gestation period were measured. The average body weight of Indian Rock Python was 10.91 ± 4.91 kg and the average length was 116.54 ± 51.97 inch. The clutch size was 33 with the gestation length ranging from 73 to 76 days. The hatchability was 74%. The average weight of the eggs was 204.8 g. on an average, the length and width of the eggs were 10.43 cm and 5.48 cm respectively. Finally, the study of this species in captivity for a better understanding can be helpful in their conservation.

Keywords: *Indian Rock Python, morphology, behavior, captivity, Chattogram zoo*

Chapter I: Introduction

Reptiles are air-breathing vertebrates with unique skin which life history has long remained relatively unknown than other vertebrates (Fitch, 1949). Snake is the most common type of reptiles. Under this type, Indian Rock Python is a non-venomous and largest snake species which is found in tropical and sub-tropical areas of Southern Asia (ITIS, 2009). There are three sub-species of python, *Python molurus molurus*, *Python molurus bivittatus* and *Python molurus pimbura* among which *Python molurus molurus* is found in Bangladesh, India & Pakistan (Vyas, 2002). Normally *Python molurus molurus* inhabit in wetlands, open forest, scrublands, harsh desert, rainforest, woodlands, river valleys and savanna (Woodland Park Zoo, 2000). They normally lives in hollows of trees, mammal burrows and dense water reeds (Whitaker, 1987). Naturally they are straw yellowish in color and sometimes with a reddish tinge (Whitaker, 1993). They have blotched brown color pattern on skin which differ depending on the snakes geographic location. This body pattern actually starts from the top of head region (Babar et al, 2019). They possess many extreme morphological and physiological adaptation as they are heterothermic (Castoe et al, 2013) . Females are longer and heavier than males. Male have larger cloacal spurs than do females. The cloacal spurs are two projections, one on either side of the anal vent, that are thought to be extensions of posterior limbs (Coborn, 1991).

Once the Indian python was widely distributed in Indian subcontinent and other Asian countries (Daniel, 1983) .But now-a-days ,they are living in under pressure and has vanished due to reduction of natural habitat and killing by poachers for their skin (Vyas, 1996) . Some hunt them for food and for use as medicine. But people don't realize the ecological role of python which is very vital to maintain the proper functioning and biological balance in the ecosystem (Babar et al, 2019). IUCN categorized them as near threatened class red listed species (IUCN, 1994 and IUCN, 1996). To ensure their survival, it is necessary to conserve them in zoo and safari parks and increase their population by captive breeding.

In Bangladesh, there are a few government-owned as well as private zoos. Among those, Chattogram zoo is a private zoo which has been exhibiting a lot variety of animals for recreational, educational purpose. Along with that, this zoo is working in

contributing to conservation of endangered species through captive breeding. This zoo has successfully been breeding Indian Rock Python under zoo condition.

The study was carried out at Chattogram Zoo, to observe the morphological, reproductive & physiological behavioral pattern and changes that can occur in captivity. The total management including housing, feeding, healthcare etc. are also studied in this report.

Chapter 2: Materials and Methodology

Study site: Chattogram zoo is a private zoo which is located at Foy's lake (22°22'0"N 91°47'46"E), South Khulshi in Chattogram city, Bangladesh, with an area of 6 acres of lands .There are about 320 animals of 67 species including aivis, reptiles and mammals.



Figure 1 : Chattogram Zoo

Study period: The study was conducted from September 2019 to March 2020.

Data collection: A questionnaire was prepared to collect required data. Data were collected from 26 python remained in a (19 X 12) sq. ft strong wire enclosure.

Morphology: Different morphological characteristics were observed and compared with each other. Difference in color and pattern and shape were recorded.

Behavior: Different behavioral characteristics such as feeding, hunting, resting and gravid behavior in captive condition were observed for over 6 months. All different behavioral characteristics were recorded.

Data analysis: All the collected data were compiled and analyzed using Microsoft Excel 2007 and analyzed using R studio.

Chapter 3: Result

Morphology: *Python molurus* had greyish yellow in color and their ventral portion was whitish to yellow in color. Irregular shape blotched type body pattern was observed from neck to tail. The pattern was brownish to greenish in color with black outline and sometimes presented brown shades. They had a triangular head with arrow shape marking on the head and also had backward curve arrangement of teeth.



Figure 2: Body pattern



Figure 3: Head shape



Figure 4: Teeth arrangement



Figure 5: Swimming

Feeding: Only indigenous chicken were provided in 5-7 days interval and they usually hunted those from 10 am to 4 pm. Feeding rate was higher from September to November than from December to March. In 15-20 days of age, they started their self-feeding.



Figure 6: Food (Chicken)

Hunting behavior: During the hunting period, they first caught the prey by mouth and then coiled them so that the prey failed to breathe and then swallowed it. During feeding time, both the sexes were kept separate to avoid unnecessary conflict and accidental cannibalism.

Resting behavior: Normally, November to February they were in a resting period. In that time, they were climbing head upward and moved slowly. Sometimes they preferred to swimming.



Figure 7: Resting behavior

Breeding behavior: Both sexes on the breeding season were expelling uric acid and a clear liquid as scent-marking for helping them in cohabitation. During coitus, both often raised their tails and gaped cloacae in response to male copulatory attempts.

Gravid behavior: During the gravid period, female reduced its movement and a month prior to oviposition, it refused all food. Ecdysis occurred before 7-10 days of egg-laying.

Weight and size: The average body weight of the 26 pythons were 10.911kg and the average length was 116.53 inches. The largest snake is 219 inch and highest body weight is 20.4 kg.

Table 01: Body weight and length of *Python molurus*

Content	BW (kg)	Length (inch)
MEAN	10.91	116.54
STD dev	4.91	51.97

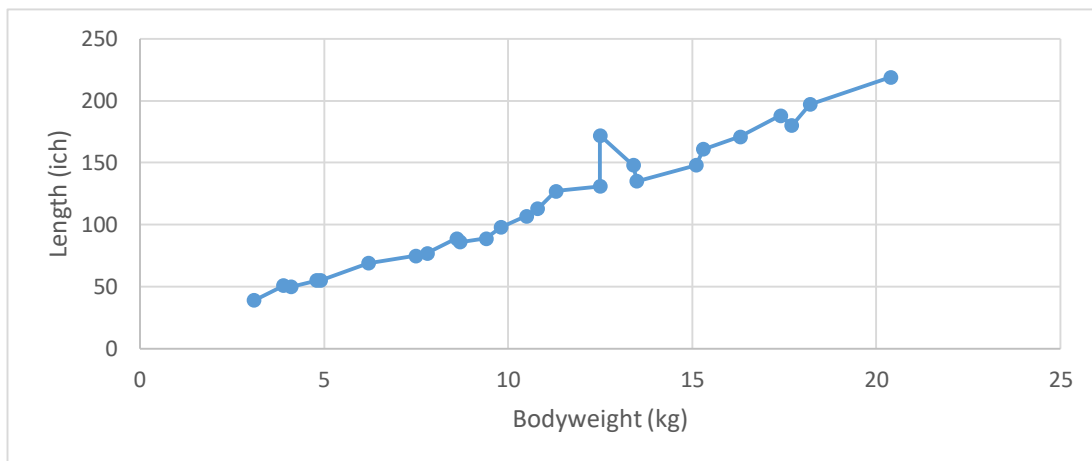


Figure 8: Length and body weight of Python

Gestation period and clutch size: In the female, the gestation period was recorded 73-76 days. The clutch was recorded with 33 eggs. Due to high temperature and unfavorable weather, they are incubated artificially with controlled temperature around 86-90⁰F. After 73 days hatchings comes with the 74% hatchability.

Measurement of eggs: Five eggs were measured during incubation period and the length, width and weight were recorded. The average egg weight 204.8 gm. The average length and width of the eggs were 10.43 cm and 5.844 cm respectively.

Table 02: Egg measurement of *Python molurus*

SL No	Weight (gm)	Length(cm)	Width (cm)
01	208	10.5	6.03
02	200	10.2	6.02
03	199	10.05	5.09
04	212	10.9	6.05
05	205	10.5	6.03
SUM	1024	52.15	29.22
MEAN	204.8	10.43	5.84

Chapter 4: Discussion

In the current study, most of the females are longer than males which had been reported by Baber et al. (2019). Moreover on that paper, they mentioned arrow shape body pattern starts from head region which seem to be lying over a creamy contextual. The head was triangular in shape. The average length was measured 116.54 inch with an average weight 10.91 kg. In an observation by Barbar et al. (2019), it was reported that the length can be up to 21 ft (252 inch) and can weigh up to 91 kg. The length and weight can be lower in this study because of younger age and slower growth rate in captivity.

Higher feeding incidences (86%) of snake were observed during September to November (Bhupathy et al, 2014) which also noticed in this observation and during resting period, the rate is so lower.

Under this study, breeding in captivity is comparatively simple but for artificial incubation, a suitable temperature were always maintained. The artificial incubation was provided due to unfavorable weather condition. The gestation period of the python was variable, the lowest 52 days reported by Yadav (1967) and longest 83 days was observed by Acharjyo and Misra (1976) and Dattari (1990). In other studies, it was found that clutches are laid after 2 months of conception (Pope, 1961; Wanger, 1976; Ross & Marzec, 1990). During present study, it was 73-76 days. It changes due to the health condition and environmental factors of the female. The range of incubation period observed by Vyas et al. (2002) was 66 to 80 days which matches the result of this study.

Pope (1961) recorded 16 clutch sizes ranging 15-54 eggs. In this study, clutch size contains 33 eggs which is in that range.

According to Vineger (1973) ambient temperature not only affects metabolic activity in ectothermic animals but also affects the incubation period and specially growth and development of embryos. In my study, the artificial incubation temperature required 86-90° F or 30-32.2°C. These range also closer to that Vyas (2002) the reported, ambient temperature range from 27.13-23.13⁰C and 37.05-32.20⁰C.

Chapter 5: Conclusion

Indian Rock Python (*Python molurus molurus*) is one of the widely distributed snake in Indian subcontinent but the population density becoming low day by day. For high diminishing rate, python is currently rearing in captivity. Under proper care and management, they lay eggs at regular interval and that increases their population which play a great role in our ecosystem. This study deals with the management of python in captive condition. Here noticed for giving them natural habitat, swimming and climbing facility must be arranged which also influence their breeding site. Finally, it is recommended that government and NGOs should involve in conservation of Indian Rock Python and also monitor the zoo management.

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Biography

I am Rony Chowdhury, son of Mr. Tapan Kanti Chowdhury and Mrs. Suvra Chowdhury. I passed Secondary School Certificate examination in 2011 (G.P.A-5.00) followed by Higher Secondary Certificate examination in 2013 (G.P.A-5.00). Now I am an intern Veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University. In the future I would like to work as a veterinary surgeon in Bangladesh.