Reproductive cycle with special reference to gross morphology of the reproductive organs of *Mabuya multifasciata* in Assam, India.

1 Dr Moushumi Hazarika,

2 D.K.Sharma

1 Former SRF, Gauhati University

2 Professor, USTM, Retired H.O.D of Gauhati University.

Corresponding author email : msmimsmi253@gmail.com

Abstract : The class Reptilia includes the orders Crocodilia, Sphenodontia, Squamata, and Testudinea (Muller and Reisz, 2006) that originated around 300 million years ago (Lovern, 2011). Lizards and snakes (which arose within the lizard lineage) comprise the order Squamata. Oogenesis the various groups of reptiles demonstrate lecithotrophic viviparous mode of reproduction (Uribe and Guillette, 2000, Hernandez – Frayutti, 2005). The gross morphology of the ovaries for *Mabuya breachypoda* has been recorded to be similar to that of other squamata (Guraya, 1989). Even the record of vittelogenic follicls were first observed in female during July (Webb, 1958), but such observations are lacking in the species *Mabuya multifasciata* in various habitat context. Further it has been hypothesized that the number of germinal beds per ovary was species specific character (Jones *et al*., 1982) . The present study deals with the histological study of the ovarian cycle during 2013-2014 in Assam, India.

Key words : Gross morphology, female reproductive organs, ***Mabuya multifasciata***.

1. Introduction :

Oogenesis the various groups of reptiles demonstrate lecithotrophic viviparous mode of reproduction (Uribe and Guillette, 2000, Hernandez – Frayutti, 2005). The gross morphology of the ovaries for *Mabuya breachypoda* has been recorded to be similar to that of other squamata (Guraya, 1989). Even the record of vittelogenic follicls were first observed in female during July (Webb, 1958), but such observations are lacking in the species *Mabuya multifasciata* in various habitat context. Further it has been hypothesized that the number of germinal beds per ovary was species specific character (Jones *et al.*, 1982) . The present study deals with the histological study of the ovarian cycle during 2013-2014.

2. Materials and methods :

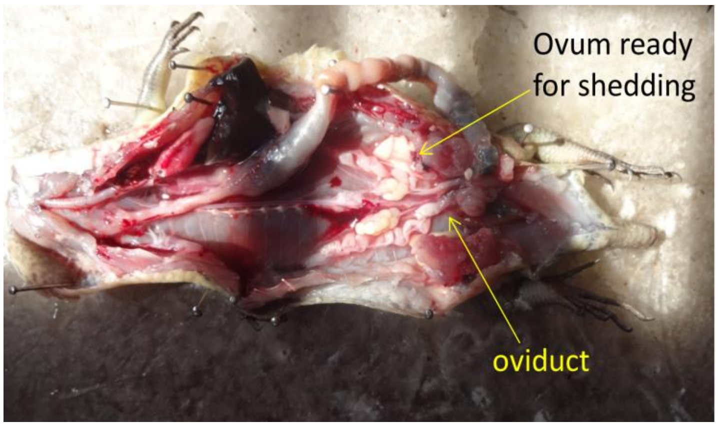
2.1 **Collection of testis and ovary and placenta**

Adult male and female *Mabuya multifascita* were collected from the sample sites of Darrang District as mentioned elsewhere. Total 60 numbers of *Mabuya multifasciata* were collected during January 2013- December 2014 with the help of collecting net. After collecting the specimen body measurements of all the individual specimen were recorded i.e. SVL (Snout vent length), total body length (TBL), tail length (TL) as well as other characteristics like body color.

2.2 For determination of brood size, observation in wild was done as well as determined from the dissected abdomen (Wang *et al*., 2019).

3. Result :

3.1 The comparative cycle of the ovarian cycle in gross morpholy are listed below.



A. Collection time late August-October showing ovulation. The figure shows two pairs of ovary connecting to the abdominal body wall through mesovarium.

B. Collection time late January showing dry mass of eggs increasing

C. Early February showing constant dry mass increase

Photo Plate 3 .1 : Gross morphology of Ovaries in *Mabuya multifasciata* Late showing Gradual increases in size of the eggs eggs (A) Late August, 2013 ; (B) January2014; (C) Early February, 2014

D. Late February – increasing dry-mass is constant

E. Collected in early March (rapid growth phase)

F. Collected in late March (dry mass increasing rapidly through late March to late April)

Photo Plate 3.1 : Gross morphology of Ovaries in *Mabuya multifasciata* showing Gradual increases in size of the eggs eggs (D) Late February,2014; (E) Early March,2014; (F) Late March, 2014

G. Later stage of development in late April

H. Collected in May showing final stage of development showung featus attached with ovary characterised by minimum or absence of lipids and fats particles

Photo Plate 3.1 : Gross morphology of Ovaries in *Mabuya multifasciata* showing Gradual increases in size of the (G) Late April, 2014; (H) Collected in May,2014.

Note : The mass remain almost constant from late August to early February but development was started. From February the rapid growth phase was started.

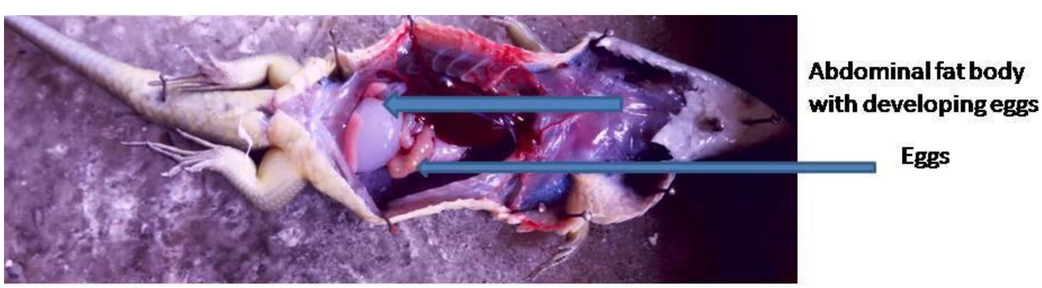


Photo Plate 3.1 : Fat body attached with developing eggs collected in early March.

3.2 Superficial gross morpholgy of female reproductive organs

The female lizard posseses a pair of ovaries attached to the dorsal body wall through a thin mesovarium (Photo plate 3.1-A). During the developmental stages the mass of the ovary utmost constant throghout the late August to early February (Photo plate 3.1 A-D); But the development was in progress. The rapid growth phase in dry mass of the ova was started at late February and persist through March with the increase in embryonic dry mass (Photo plate 3.1 D-G); . This stage was going throgh the next three months. In early May development was going to complete. Parturation occured in late May to mid July (Photo plate 3.1 – H)

4. Disscussion :

The present study revealed that the increase wet mass and size of the eggs during the present study in early May. Parturition took place from late May to mid July. Almost all females reproduce synchronously. Smallest size of females with near term embryo was (80-85±5) mm in SVL collected during late May-June. The average size of reproductive adult female in SVL was 100 ± 5.24 mm. The brood size was correlated with SVL in female. It was positively correlated. Females produced 4-7 off-springs per litter are in agreement with the findings of Feng *et al.*,2008. But it is opposed by Zhu et al.,2015. Their study stated that females produced up to nine offspring per litter in China provinces and most of the females gave birth in between late May to mid July. Maternal size is main determinant of *Mabuya multifasciata* with larger females generally producing more off-springs . Litter mass is most tightly related to female body size. The trade-off between offspring size and offspring number is at the heart of optimality models of reproductive investment. Lizards have been extensively used to test both the assumptions of the models and their predictions. Despite that a trade- off should occur almost by necessity, it has proven difficult to establish empirically. It appears that this is largely due to among individual variation in total reproductive effort. The logic behind this was described by Van Noordwijk and Jong (1986).In brief, when individuals differ in how much resources they have available for reproduction, those with large amounts may produce both larger clutches and larger eggs than individuals with limited resources.

The present study found that purturation occurred during May-July. However previous study reported that no *Mabuya mabouya* were found to be gravid from November to May in Peru. In the time of parturition the most important fact is resources availability. The recorded data showed that broods were produced on the onset of wet season or at the end of dry season, regulated by the availability of food resources. The relatively high resources were needed for the rapidly growing embryos (Janzen and Schoener, 1968). It was followed by the depletion of fat mass in the abdominal cavities of the female during the period of rapid growth of the embryo (Photoplate 3.1).

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