Embryonic development of Pariah Kite *Milvus migrans govinda*

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Introduction

Embryonic Development of Giant Canada Goose and the Painted Stork have been studied by Cooper and Batt (1972) and Desai (1975) respectively. While studying the breeding biology, growth and development of the Pariah Kite *Milvus migrans govinda* from 1973 to 1976 in the Delhi Zoological Park, it was thought worthwhile to take up the study of embryonic development of Pariah Kite to add to the present knowledge about the growth and development.

Materials and Methods

During the period 1973-76, a detailed study regarding the breeding biology, growth and development of the Pariah Kite has been conducted at the Delhi Zoological Park. During this study 30 eggs of the Pariah Kite in the different nest were marked with India ink on the day they were laid. Individual eggs were removed from the nest to study the development of embryos at three days interval from the day of laying to the day of hatching.

As per the procedure described by Cooper and Batt (1972) and Desai (1975) the embryonic stages of the Pariah Kite were studied on the basis of the external morphological character visible to the eyes. A set of three embryos were studied for each stage of development. Embryos were photographed at each stage with 35 mm still camera. Linear measurement of the culmen were recorded from 15th day onwards. Measurements of middle toe and tarsus were recorded of embryo of 15 days and older. Length of the embryo from the top of the skull to the tip of the tail, with the culmen positioned at right angle to the long axis of the body was measured from 6th day onwards. Weight of embryos were recorded from 6 to 30 days of Age.

The following description of the various stages of the Pariah Kite embryos, takes into account the physical features of growth as well as differentiation of external characters. Measurements given are mean of three embryos.

Description

Day

- 0   Blastoderm was round in form and approximately 3.4 mm in diameter (Plate 1).
- 3   Embryo with black spot like eye distinct from yolk.
- 6   Eyes and limb buds were well developed. Vitelline veins prominent, head taking shape (Plate 3). Length of the embryo was 20 mm (Fig. 3) & its weight 0.7 gms (Fig. 1).

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Fig. 1. Mean increase of weight of embryo of Pariah Kite at Delhi Zoological Park, New Delhi.

Fig. 2. Mean increase of culmen, tarsus and Middle Toe of the embryo of Pariah Kite at Delhi Zoological Park, New Delhi.

- 9 Eyes were convex and the head was typically avian in shape. Increase in length of neck and development of beak observed. Digital condition of the fore and hind limbs became obvious (Plate 4). Length of the embryo at this stage was 24 mm (Fig. 3) and its weight 0.87 gms (Fig. 1).
- 12 Eyes and head prominent. Digits on wing and feet were well differentiated (Plate 5). By this time embryo. Length was 29 mm and its total weight 1.3 gms.
- 15 Eyes and beak became more distinct. Differentiated digits of hind limbs showed rudiments of claws, (Plate 6). The culmen reached the length of 3 mm, tarsus 3.5 mm and middle toe 3 mm (Fig. 2). The total length of the embryo was 38 mm (Fig. 3) and its weight 2.6 gms (Fig. 1).
- 18 At this stage distinct eyelid slit above the pupil was noticeable. By this time claws on the feet became quite distinct. With the increase in size of beak, nostrils became distinct. The whole embryo was covered with long black filoplumes (Plate 7). Culmen length was 7 mm, middle toe 5 mm and tarsus 7 mm

Fig. 3. Mean increase in length of embryo of Pariah Kite at Delhi Zoological Park, New Delhi.

- (Fig. 2) while the total length of the embryo was 50 mm (Fig. 3) and weight 6.45 gms (Fig. 1).
- 21 Eyelid slit more distinct. Coat of down feathers on back, wings, legs and head was well developed (Plate 8). The claws on feet became distinct and were white in colour, while the bill has black in colour. At this stage embryo was lying along the long axis of the egg shell with its head towards airspace. The culmen length reached 9 mm middle toe 6 mm and tarsus 8.5 mm. Length of embryo was 61 mm and its weight 9.85 gms.
- 24 The length of down all over body increased. The well developed eyelids covered the eyes. The egg tooth well developed. The legs were much longer (Plate 9). Culmen had become stronger and reached 11 mm in length. The nostrils were more prominent. Middle toe was 8 mm in length, tarsus 10 mm (Fig. 2). The total length of the embryo was 69 mm (Fig. 3) and weight 16.90 gms (Fig. 1).
- 27 Body was sparsely covered with dark brown down. Allantois was almost atrophied. Eyes partly opened. Dark pigmentation around the base of bill became noticeable and area around eyes remained darkly pigmented. Skin folds on anterior surface of metatarsus appeared (Plate 10). The size of the culmen was 13 mm middle toe 9 mm and tarsus 11.8 mm (Fig. 2), length of the embryo was 78 mm (Fig. 3) and its weight was 29.35 gms (Fig. 1).
- 30 The embryo was fully developed and showed continuous movements and squeaking. Yolk was completely drawn in and the allantois was atrophied. The body was sparsely covered by soft down feathers, dark brown on dorsal side and brownish on all other parts of the body. The chick was able to raise the neck and move it freely. The bill was made of soft texture, black in colour with a white egg tooth at the tip of beak (Plate 11). The culmen size was 15 mm, middle toe 11 mm and tarsus 14 mm (Fig. 2). The length of the embryo was 86 mm (Fig. 3) and weight 41 gms (Fig. 1).

References

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インドトビ (*Milvus migrans govinda*) の卵の発生

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1973-76 年に Pariah Kite の卵 30 個を用いて、卵の発生の様子を観察した。産卵日から孵化日までの卵を数日おきに、巣から採取し、卵発生の段階を記録した。

* デリー動物園・ニューデリー, インド.

Photo. 1. 0 day old embryo of pariah kite.

Photo. 2. 3 days old embryo.

Photo. 3. 6 days old embryo.

Photo. 4. 9 days old embryo.

Photo. 5. 12 days old embryo.

Photo. 6. 15 days old embryo.

Photo. 7. 18 days old embryo.

Photo. 8. 21 days old embryo.

Photo. 9. 24 days old embryo.

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Photo. 10. 27 days old embryo.

Photo. 11. 30 days old embryo.