

Animal Review

2019 Vol. 6, No. 1, pp. 1-4

ISSN(e): 2409-6490


ISSN(p): 2412-3382


DOI: 10.18488/journal.ar.2019.61.1.4

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GROSS MORPHOLOGY AND MORPHOMETRIC STUDIES OF DIGESTIVE TRACT OF BARN OWL (*Tyto alba*)

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ABSTRACT

Article History

Received: 15 October 2018

Revised: 19 November 2018

Accepted: 24 December 2018

Published: 22 January 2019

Keywords

Barn owl

Crop

Digestive tract

Duodenum

Jejunum

Ileum

Large intestine.

Four (4) adult barn owls were captured from Gamji Village of Bakura local government and transported in a cage to the College of Agriculture and Animal Science Bakura, Zamfara State, Nigeria, for morphology and morphometry of the digestive tracts. All the segments of the digestive tract (Esophagus, Liver, Crop, Duodenum, Jejunum, Ileum, Colon, Caecum, Colorectum, and Cloaca) were present, however the crop was found to be absent. This studies will provide valuable information for anatomist and other scientist working in the management and nutrition of this species, which will further help in the maintenance of this important bird in captivity or free life. Further investigation in the histology of these segments is recommended.

Contribution/Originality: This study contributes in the existing literature, the gross features of the gastrointestinal tract of the barn owl, which will further assist in the feeding and management of this bird in captivity or free life.

1. INTRODUCTION

Owls are birds from the order Strigiformes, which includes about 200 species. They hunt mostly small mammals, insects and other birds, and they are found in all regions of the Earth except Antarctica and some remote islands (Forshaw, 1998). Owls that feed in agricultural areas provide benefits to humans by killing large numbers of small rodents which might otherwise eat crops in field or in storage (Burton, 1992). In recent studies on owls, aspects such as behavior, reproduction, feeding habits and habitat have been discussed (Long, 1998; König *et al.*, 1999). However, morphological data regarding the digestive system of this bird are still scarce. It is believed that studies on the digestive tract of barn owl could provide valuable information that can be used by other professionals such as wild-lifers, anatomist and other scientist working in the management and nutrition of this species. In this view, the present study will describe in detail, gross features of the gastrointestinal tract of the barn owl, in order to supply data regarding the morphology of this species, which will further assist in the maintenance of this important bird in captivity or free life

2. MATERIALS AND METHODS

Four (4) adult barn owls were captured from Gamji Village of Bakura local government and transported in a cage to the College of Agriculture and Animal Science Bakura, Zamfara State, Nigeria. After Cervical (Plate 1) subluxation, the digestive tracts were collected for morphology and morphometry (location, shape, size, length, breadth and weight of the segments of digestive tract were considered) (Oyelowo *et al.*, 2017).



Plate-1. A photograph of the barn owl captured

3. RESULT

The digestive tract comprised of proventriculus, gizzard, duodenum, jejunum, ileum, caeca, colorectum and cloaca respectively. The esophagus was a long, narrow and straight tube which extends from the glottis at the posterior end of the pharynx, through the neck and thorax to join with the glandular stomach. The average length and weight of esophagus were 5.2 ± 0.278 cm and 4.02 ± 0.23 gm respectively (Plate 2). The proventriculus was relatively small and tubular. It was located caudal to the esophagus. The average length and weight of the proventriculus were 2.80 ± 0.12 cm and 2.98 ± 0.28 gm (Plate 2). The gizzard (muscular stomach) was located immediately succeeding the proventriculus. It was placed between the lobes and partly behind the left lobe of the liver. It was made up of thick strong muscles with longitudinal grooves on the inner wall (rugae). The average length and weight of the gizzard was 6.2 ± 0.128 cm and 15.5 ± 0.52 gm (Plate 2 and 3). The duodenum started at the proximal part of the gizzard and formed an elongated loop with a pancreas within the loop. After the duodenum, the small intestine formed a coil and was suspended from the dorsal abdominal wall the by a mesentery. The average length and weight of the duodenum were 18.50 ± 0.478 cm and 1.5 ± 0.029 gm respectively (Plate 2). There was definite demarcation between the jejunum and ileum. The average length and weight of the jejunum were 35.25 ± 0.29 cm and 2.3 ± 0.12 gm (Plate 2) respectively. The average length and weight of the ileum were 5.6 ± 0.25 cm and 0.20 ± 0.03 gm (Plate 2).

The caecum was the first part of the large intestine, the left and right caeca starts from the ileum and terminates in blind pouches and were closely attached to the small intestine by the mesentery. The average length and weight of the caeca were 5.4 ± 0.45 cm and 0.25 ± 0.035 gm (Plate 2). Finally, the colorectum was seen at the terminal segment of the intestine, between the ileo-cecal junction and the cloaca. It was short, straight and had thick muscular walls. The average length and weight of the colorectum was 3.925 ± 0.19 cm and 0.13 ± 0.022 gm respectively (Plate 2).

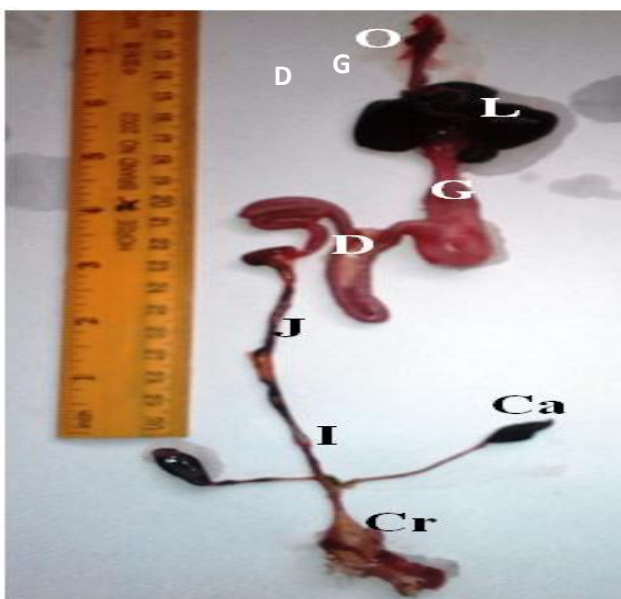


Plate-2. A photograph of the digestive tract of barn owl, showing the esophagus (E), Liver (L), Crop (C), Duodenum (D), Jejunum (J) Ileum (I), Colon (C), Caecum (C) Colorectum (Cr) and Cloaca (Cl) .

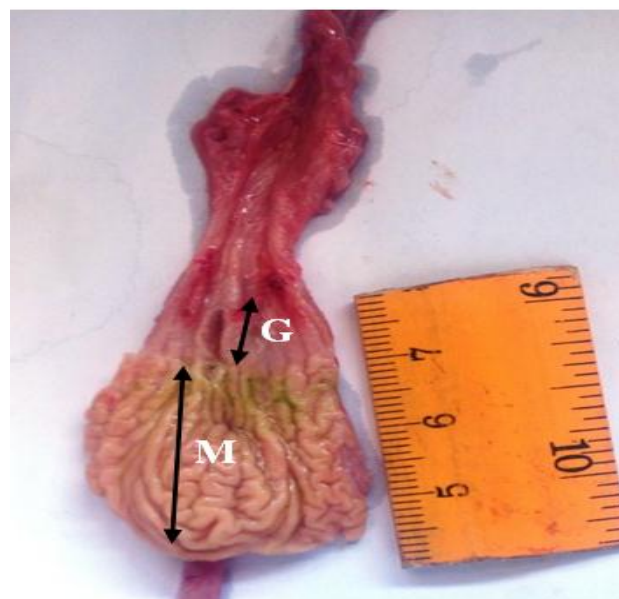


Plate-3. A photograph of the internal surface of gizzard in the barn owl, showing the smooth glandular portion (G) and muscular portion with rugae (M).

4. DISCUSSION

Owls cannot chew their food like other birds, however, they are carnivorous and small prey items are swallowed whole, while larger prey are torn into smaller pieces before being swallowed (König *et al.*, 1999). Unlike other birds, Owls have no Crop, which is a loose sac in the throat that serves as storage for food for later consumption. As such, in an Owl, food is passed directly into their digestive system.

The Owl's stomach like other birds has two parts, the glandular stomach (proventriculus) is the first part, which produces enzymes, acids, and mucus that begin the process of digestion and the second part is the Ventriculus (gizzard) which is muscular in shape and has no digestive glands. In Owl, the gizzard serves as a filter, holding back insoluble items such as bones, fur, teeth and feathers, which are compressed into pellets with the help of the rugae in the inner walls of the gizzard. The rugae are the extensive folds in the stomach lining, which are capable of stretching to accommodate an increase in stomach volume with consumption of a meal and they also help direct the food downward towards the pylorus as a result of stomach motility (Dyce *et al.*, 2002).

This pellet will later be regurgitated up from the gizzard back to the proventriculus. Regurgitation often signifies that an Owl is ready to eat again. When the Owl eats more than one prey item within several hours, the various remains are consolidated into one pellet (Marti, 1974). The observations in the caeca as reported in this study were similar to the reports of Hassouna (2001) and Nasrin *et al.* (2012) where, the authors proved that caeca were long cylindrical expansions in chickens. Further investigation in the histology of these segments is recommended.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Contributors/Acknowledgement: Both authors contributed equally to the conception and design of the study.

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