



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2017; 5(3): 939-941

© 2017 JEZS

Received: 11-03-2017

Accepted: 12-04-2017

Dr. Anil Deka

Assistant Professor,
Department of Anatomy &
Histology, C.V. Sc, AAU,
Khanapara, Guwahati, Assam,
India

J Rajkhowa

Assistant Professor, Department
of Anatomy & Histology, C. V.
Sc, AAU, Khanapara, Guwahati,
Assam, India.

BJ Das

Veterinary officer State
Veterinary Dispensary, Panpur
Govt. of Assam, Sonitpur,
Assam, India

S Das

Assistant professor, Department
of Veterinary Anatomy, C. V. Sc
and AAU, R. K. Nagar, Tripura
West

KB Devchoudhury

Assistant Professor, Department
of Anatomy & Histology, C. V.
Sc, AAU, Khanapara, Guwahati,
Assam, India

Gross and histomorphological observation of stomach of greater adjutant stork (*Leptoptilos dubius*)

Dr. Anil Deka, J Rajkhowa, BJ Das, S Das and KB Devchoudhury

Abstract

The present research was undertaken to study the gross and histomorphological observation of Stomach of Greater Adjutant Stork (*Leptoptilos dubius*). In the present investigation, two numbers of Greater Adjutant Stork were utilized at sub adult stage. The results showed that stomach of *Leptoptilos dubius* was distinctly divided two parts i.e. proventriculus and ventriculus. The wall of the proventriculus was thick and inner side of the wall contains proventricular glands. The inner side of ventriculus was covered by tunica cuticula layer. A pouch like structure divides the gizzard into two equal halves and it contains some hair like projection. Histologically, the tunica mucosa of proventriculus contained longitudinal branched folds and lined by simple columnar epithelium. Pear or conical shaped glands found in the Tunica Sub mucosa layer of proventriculus and these glands were surrounded by capsule. Numerous narrow and deep folds were found in the tunica mucosa layers of ventriculus and these folds were covered by a tunica cuticula layer. Simple tubular glands were found in lamina propria mucosae.

Keywords: Gross, histology, stomach, greater adjutant stork

1. Introduction

The Greater Adjutant Stork (*Leptoptilos dubius*) is one of the most endangered stork species in the world [5]. The species was once widely distributed in various Southeast-Asian countries like India, Nepal, Bangladesh, Myanmar, Thailand, Laos, Cambodia and Southern Vietnam [3, 1, 7]. Presently, the species is confined to India and Cambodia only [11, 2]. [13] reported a maximum number this species in the Brahmaputra valley of Assam, locally known as *Hargilla*. The population of this species is day by day decreasing due to habitat loss. Considering the importance of this species in wild life the present study is under taken to study the gross and histological study of stomach of Greater Adjutant Stork (*Leptoptilos dubius*).

2. Materials and Methods

In the present investigation, sub adult group of Greater Adjutant Stork collected from Department of pathology after post mortem. The study was carried out in March, 2017. The birds were brought to the Pathology Department for Post mortem examination from Haju area of Kamrup (M) District by a lady conservation worker. During post mortem examination gross anatomical studies of Proventriuculus and gizzard were made on it. For histological studies tissue of proventriculus and gizzard were collected from these birds. The tissue samples were fixed in 10% neutral buffered formalin. Then tissues were processed for Paraffin embedding method. Paraffin sections were cut in five micron thickness and stained with routine method for histomorphological study as per standard methods of [12]. After staining, histological characteristics of proventriculus and gizzard were recorded.

Statistical analysis section is missing: In this part of study statistical analysis is not necessary.

3. Results and Discussions

In present investigation, it was revealed that the proventriculus is the first compartment of stomach of Greater Adjutant stork. The wall of Proventriculus was thick and contained some bud like structure i.e. proventricular gland. These findings were in accordance with the findings [6] in Pati duck. The ventriculus was the second most compartment of stomach which was large and contained thick muscular wall. It was covered by thin fatty tissue. The inner side of ventriculus was covered by tunica cuticula layer. This layer helps in grinding the food materials. Similar findings were reported by [8] in Black wing kite and [14] in Parrot.

Correspondence

A Deka

Assistant Professor, Department
of Anatomy & Histology, C. V.
Sc, AAU, Khanapara, Guwahati,
Assam, India.

A pouch like structure divides the gizzard (Fig.1) into two equal halves and it contains some hair like projection (Fig. 2). This structure may help in the accumulation of more food material in stork. However, these could not be compared due to non-availability of literature.

Histologically, the tunica mucosa of proventriculus of Greater Adjutant stork (*Leptoptilos dubius*) contained longitudinal branched folds and lined by simple columnar epithelium. Lamina propria mucosae layers contained Simple tubular glands. The simple tubular glands were well developed which was separated by smooth muscle fibers of muscularis mucosa. Similar findings were opined by ^[9, 10] in Chicken. Pear or conical shaped glands (Fig. 3) found in the Tunica Sub mucosa layer of proventriculus and these glands were surrounded by capsule. Numerous secretory tubules were found in these glands and each tubule was continued by one ducts and opened into the main collecting duct. These ducts were open into the luminal surface of proventriculus. These findings were corroborated with the findings of ^[4] in Coot bird. The tunica muscularis layer was consists of inner thin longitudinal and outer thick circular layer. The tunica serosa layer was covered by simple squamus epithelium and blood vessels ^[4].

Numerous narrow and deep folds were found in the tunica mucosa layers of ventriculus and these folds were covered by a tunica cuticula layer (Fig. 4). Simple tubular glands were found in lamina propria mucosae. The simple tubular glands (Fig. 5) of lamina propria of pouch like structure is larger compared to other part. The secretion of this gland may help in the lubrication as well as movement of food material in this pouch. However, these could not be compared due to non-availability of literature. The tunica sub mucosa layer was a thin layer of loose connective tissue and it contains numerous of blood vessels. Tunica Muscularis consists of inner thick circular muscle layer and the outer thin longitudinal smooth muscle layer. Similar findings were revealed by ^[8] in Avian Species.

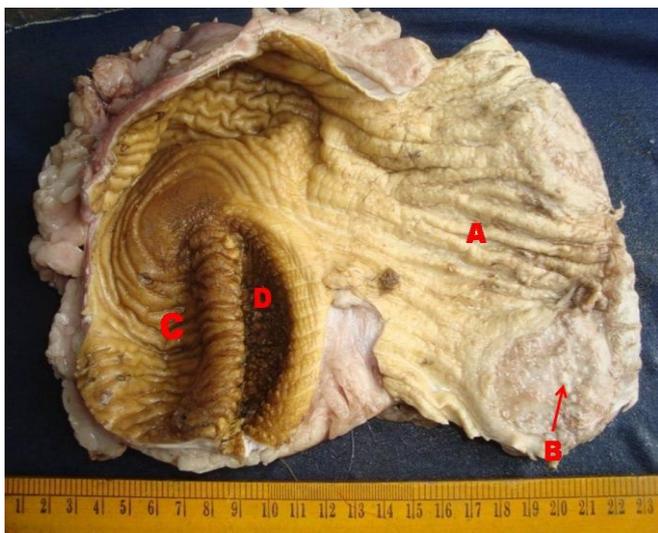


Fig 1: Photograph showing the Proventriculus (A), Proventricular gland (B), Gizzard (C) and Pouch like structure (D) of Gizzard of Greater Adjutant stork.

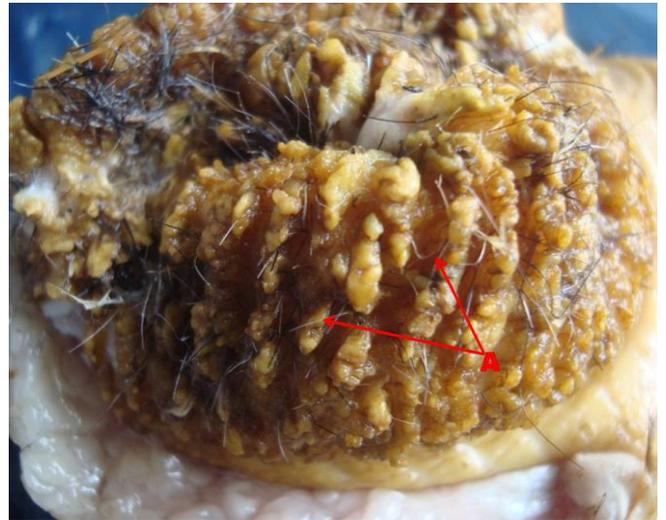


Fig 2: Photograph showing the hair like projection (A) of Pouch like structure of Gizzard of Greater Adjutant stork.

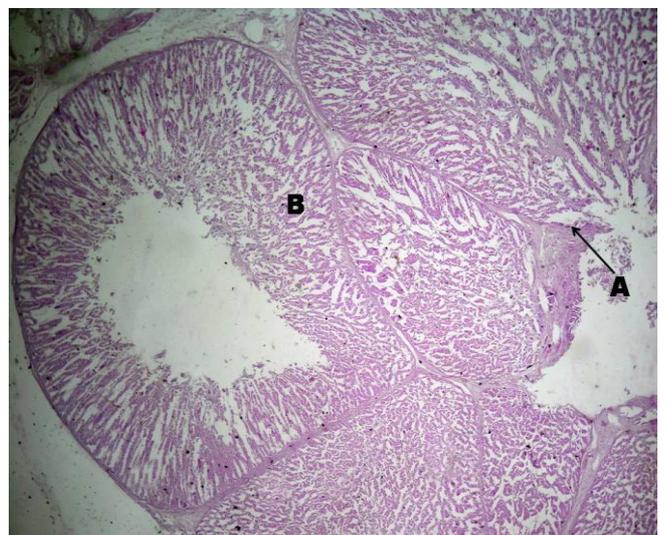


Fig 3: Photomicrograph showing the simple tubular gland (A) and pear shaped glands (B) of tunica submucosa layers of proventriculus of Greater Adjutant Stork.

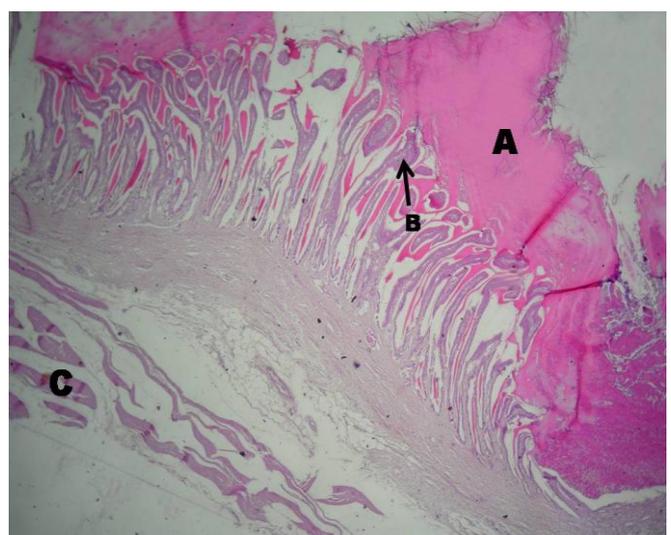


Fig 4: Photomicrograph showing the tunica cuticula layer (A), simple tubular glands (B) and tunica muscularis (C) of gizzard of Greater Adjutant Stork.

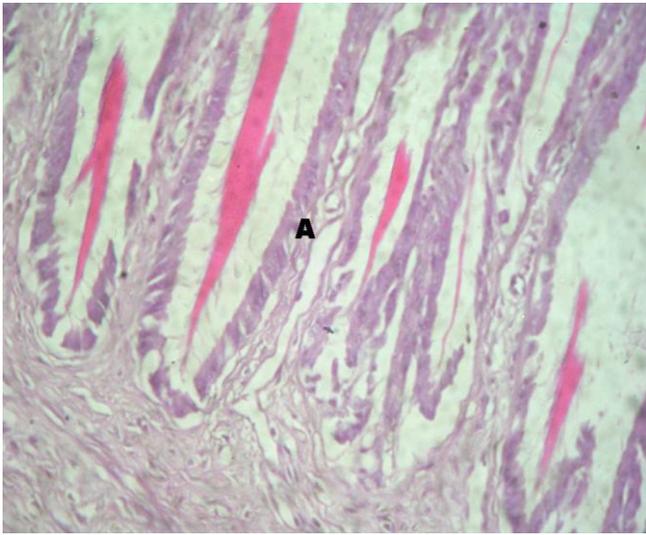


Fig 5: Photomicrograph showing the simple tubular gland (A) of pouch like structure of Gizzard.

4. Conclusion

In current investigation, it is revealed that the stomach of Greater Adjutant stork was consisted of proventriculus and ventriculus. The inner wall of the proventriculus contained proventricular glands. The inner side of ventriculus was covered by tunica cuticula layer. This layer helps in grinding the food materials. Pear or conical shaped glands found in the Tunica Sub mucosa layer of proventriculus and these glands were surrounded by capsule which contains numerous secretory tubules and each tubule was continued by one ducts and opened into the main collecting duct. These ducts were open into the luminal surface of proventriculus. A pouch like structure divides the gizzard into two equal halves and it contains some hair like projection. This structure may help in the accumulation of more food material in stork. The simple tubular glands of lamina propria of pouch like structure is larger compared to other part. These were the base line data of Greater Adjutant stork and this study will be helpful for better understanding the anatomical aspect of the stomach of this species as well as their digestive physiology. It also helps the wildlife veterinarian to control the disease regime protocol.

5. Acknowledgements

The authors acknowledge the Head of the Department of Anatomy & Histology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India to carry out the research successfully.

6. References

1. Ali S and Ripley SD. Handbook of the birds of India and Pakistan, Compact edition, Oxford University Press, Mumbai, 1987.
2. Anon. Survey for large water Birds in Cambodia. IUCN species Survival Commission, World Conservation Union, Gland, Switzerland, 1994.
3. Baker ECS. The Fauna of British India. Vol 6. Taylor and Francis, London, 1929.
4. Batah AL, Selman HA, Saddam M. Histological study for stomach (Proventriculus and Gizzard) of Coot bird *Fulica atra*. Diyala Agricultural Science Journal. 2012; 4(1):9-16.
5. Birdlife International Threatened Birds of Asia: The Birdlife International Red Data Book, Cambridge, 2001.
6. Deka A, Sarma K, Rajkhowa J, Sarma M, Ahmed J. Macro and Micro anatomical studies on Oesophagus,

- Proventriculus and Gizzard of Pati duck (*Anas platyrhynchos domesticus*) of Assam. International Journal of Chemical Studies. 2017; 5(2):443-445.
7. Fleming F LSr, Fleming FLJr, Bangdel LS. Birds of Nepal (Second Edition) Avalok Publishers, Kathmandu, 1979.
8. Hamdi H, Ghareeb A WE, Zaher M, Abuamod F. Anatomical, Histological and Histochemical Adaption of the avian alimentary canal to their food habits: II-*Elanus caeruleus*. International Journal of Scientific and Engineering Research. 2013; 4(10):1355-1364.
9. Hodge RD. The histology of fowl. Academic press, London. 1974, 35-88
10. Toner PG. The fine structure of resting and active cells in the sub mucosal gland of the fowl proventriculus. Anatomical Journal. 1963; 97(4):575-583.
11. Luthin CS. Status and conservation priorities for the world's Stork species. Colonial water birds, 1987; 10(2):453-461
12. Luna, LG. Manuals of histological staining methods of Armed forces institute of Pathology, 3rd edn. Mc Graw Hill Book Co., London, 1968.
13. Rehmani AR, Narayan G, Rosalind L. Status of the Greater Adjutant Stork (*Leptoptilos dubius*) in the Indian sub-continent water birds. 1990; 13:138-142.
14. Schweizer M, Guntert M, Seehausen O, Leuenberger C, Hertwig ST. Parallel adaptations to nectarivory in parrots, key innovations and the diversification of the Loriinae. Ecology and Evolution, 2014, 2867-2883.