

## **HISTOLOGICAL STUDY FOR STOMACH(PROVENTRICULUS AND GIZZARD) OF COOT BIRD *Fulica atra***

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### **ABSTRACT**

Present study were carried out on ten males of coot bird *Fulica atra* . The results were showed that the mucosal layer of proventriculus, characterized by of presence of branched longitudinal folds lined by simple columnar epithelium and presence of simple tubular glands in the lamina propria.

The submucosa of proventriculus is constitute of numerous proventriculus glands ,which are classified as branched tubular glands that open into the mucosal surface. The muscular layer was developed and consisted of two layers, internal longitudinal and external circular layer .The serosa appears as connective tissue layer lined by mesothelium contain blood vessels and adipose tissue.

The tunica mucosa of gizzard has folds lined by simple columnar epithelium and thick layer covered it known as cuticle. The lamina propria of gizzard contains simple tubular glands separated by a thin connective tissue and muscle fibers of muscularis mucosa. The muscular layer consists of internal circular layer and external longitudinal layer. Followed by the serosa which is lined by mesothelium.

**Key words:** stomach, proventriculus, gizzard, coot bird.

### **INTRODUCTION**

The coot bird *Fulica atra* is member of the rail family Rallidae, and it is about the size of chicken,blak or dark grey with yellow lobate feet,and has A very distinctive white spot above the likewise white beak (pizey and knight,1997).

The stomach structure of birds presents variations which depend on the alimentary hapits (Turke,1982; King and Mclelland,1984). The stomach of such birds composed of two parts the glandular portion called gastric proventriculus(glandular stomach) and the muscular portion ,known as gastric ventriculus or gizzard (muscular stomach) the two parts separated by an

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intermediate zone (Baily *et al.*,1997; Dyce, 2002).The chicken stomach is located at the left of the median line and it is dorsal to liver(Hodge,1984).it is admitted that the physiology of proventriculus is to secrete the gastric juice .

While the gizzard would have the mechanical function of trituration of food (Sturkie, 2000; Toner,1963). The tunica mucosa of proventriculus of chicken present folds lined by simple columnar epithelium (Suganuma *et al.*, 1981). lamina propria of proventriculus is typical and contains simple tubular glands and lymphatic tissue (Caceci, 2006). The Submucosa layer contain numerous submucosal glands (proventriculus glands). In chicken the muscle layer of proventriculus is slightly modified and consists of inner longitudinal, middle circular and outer longitudinal layers, followed by tunica serosa which composed of connective tissue(Banks,1993).

The gizzard of chicken is highly muscular organ. lined by an epithelium that invaginates into the lamina propria ,forming elongated pits, each of which bears terminal secretory units(Toner,1964).The mucosa of this organ has simple columnar epithelium that is subtended by simple straight tubular glands that produce a material called the cuticle (keratinoid) (Eglitis and Knouff,1962; Akster, 1986).The tunica musculars of gizzard of chicken presented a very well developed inner circular layer and outer longitudinal muscle layer(Samuelson, 2007). The purpose of this study was to study the histological structure of the glandular and muscular stomach of the coot bird.



picture of coot bird *fulica atra*.

## MATERIALS AND METHODS

Ten adult males of coot ( *Fulica atra* ) were used for this study . After anesthesia by using a mixture of ketamine and diazepam at dose 25,5mg/kg of body weight injection intramuscular(Schindal,1999) .The laparotomy is done and the digestive tube was exposed. A specimens of stomach (proventriculus and gizzard) were immediately fixed for 24 hours in Bouins solution then dehydrated with series of crescent concentration of ethyl alcohol and imbedded in paraffin wax then cutting by rotary microtome to 5-6 microne, later histological section were stained with hematoxylin and eosin (Luna,1968).

## RESULTS AND DISCUSSION

The results showed that the tunica mucosa of proventriculus of coot bird consists of longitudinal branched folds, lined by simple columnar epithelium , Simple tubular glands founded in the lamina propria appear more pronounced and separated by smooth muscle fibers of muscularis mucosa (fig.1.A) such histological finding not similar to that of chicken(Hodge,1974;Toner,1963).

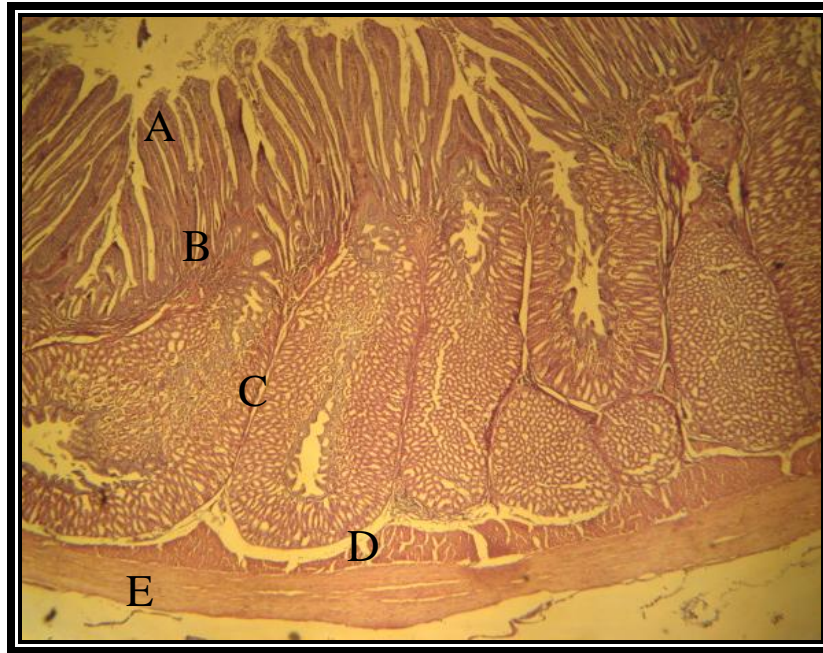
Submucosa was constituted of connective tissue containing proventriculus glands and these glands classified as branched tubular glands and have conical or pear shape occupying the most part of proventriculus wall and surrounded by capsule. The glands contains numerous secretory tubules which are lined by cuboidal cells and each tubule continued by one duct opened into the main collecting duct which opened into luminal surface (fig.1.B) These results are disagreement with(king and Mclelland,1984)and disagreement with (Bradly and Grahom,1960)who referred that the submucosa of proventriculus in chicken had no proventriculus glands.

The tunica muscularis consists of two layers, thin inner longitudinal and thick outer circular layer (fig.2) these results disagreement with(Banks,1993) who revealed that the muscular layer in proventriculus of *Fulica armillatas* consists of three layers inner and outer longitudinal and middle circular and these results may be attributed to the nature of alimentary haptis (Turke,1982) . The serosal layer covered by mesothelium and rich with blood veseles (fig. 2) this result is similar to that in chicken (Hodge,1974).

Tunica mucosa of gizzard of coot bird is folded and lined by simple columnar epithelium and covered by thick layer called cuticle. In the lamina propria many tubular glands open at the base of folded and thick longitudinal smooth muscles are present (fig.3,5)these results were conducted with (Toner,19640).

Submucosa was not found in gizzard structure of coot bird due to confused of mucosal layer with muscularis layer.

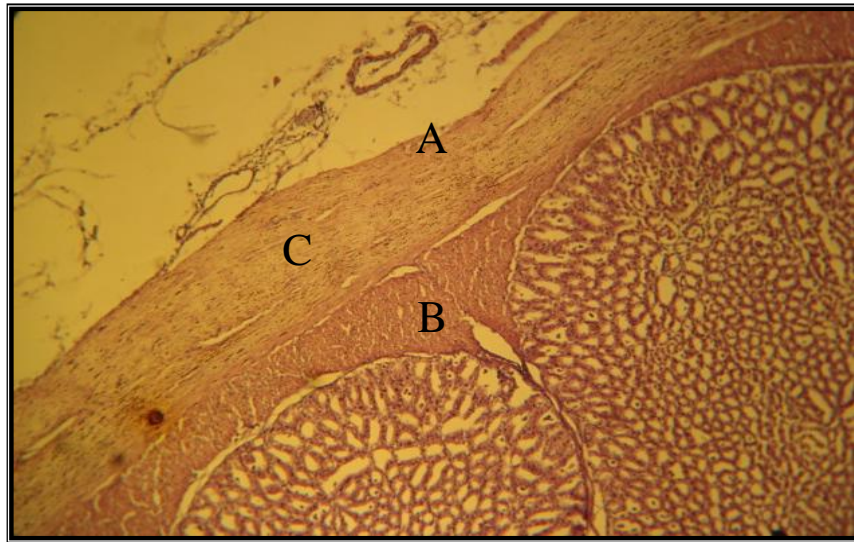
Muscularis layer consist of two layers internal circular and external longitudinal (fig4) and these results were disagreement with that observed in



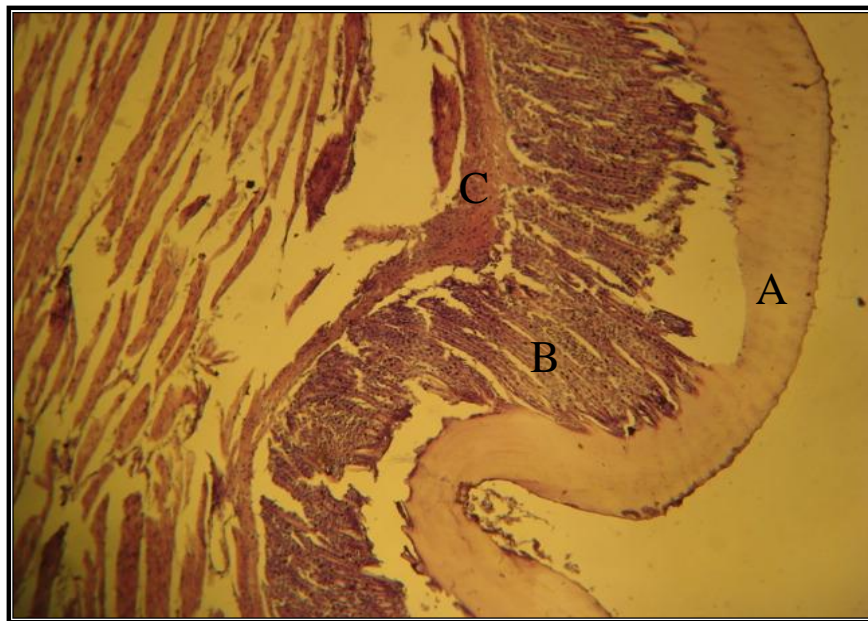
**Fig.1.(A)** Transverse section of proventriculus A-longitudinal folds.B-simple tubular glands.C- proventriculus glands. D-inner longitudinal muscles.E-outer circular muscles 200x H&E



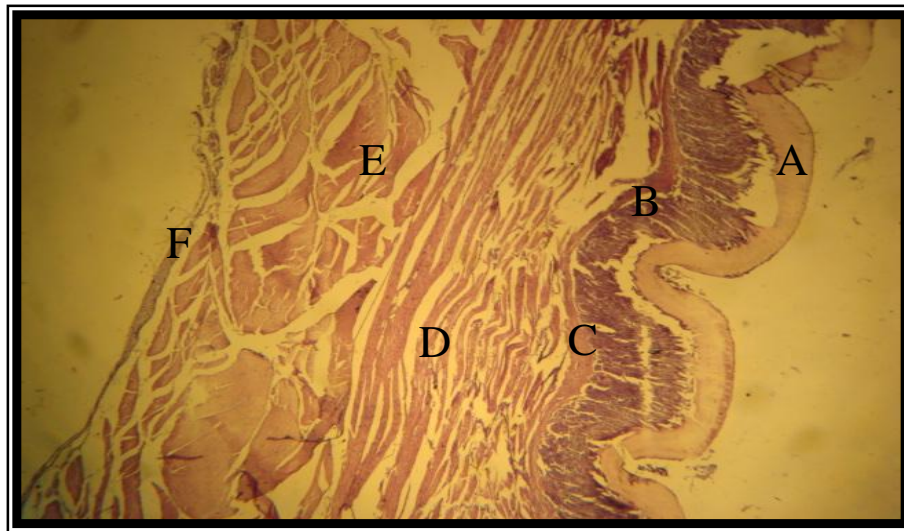
**Fig.1.(B)** Transverse section of proventriculus of coot bird A-main collecting duct of proventriculus gland. B-simple tubular glands . C- longitudinal folds 400x H&E



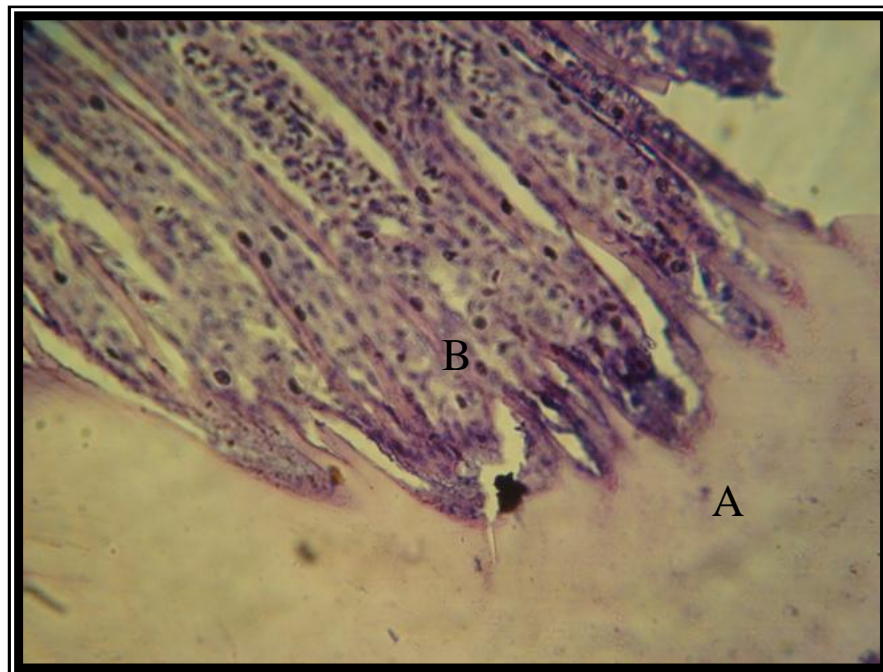
**Fig.2.:** Transverse section of proventriculus of coot bird A-serosa layer. B-inner longitudinal muscles. C- outer circular muscle 400x H&E.



**Fig.3:** Transverse section of gizzard of coot bird A-cuticle layer. B-simple tubular glands .C- muscularis mucosa 300x H&E.



**Fig.4:** *Transverse section of gizzard of coot bird A-cuticle layer. B-simple tubular glands .C- musculrais mucosa. D-inner circular muscle E- outer longitudinal muscles F-serosa layer 100x H&E.*



**Fig.5:** *Longitudinal section of gizzard of coot bird A-cuticle layer. B-simple tubular glands . 800x H&E*

love bird (Imaizum and Hama, 1969). The serosal layer is covered with mesothelium and rich with blood vessels (fig.4) and these result similar to that observed in chicken (Caceci, 2006) .

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### دراسة نسيجية للمعدة (المعدة الحقيقية والقانصة) في طائر الغرة البيضاء.

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#### المستخلص

أجريت الدراسة الحالية على عشرة ذكور من طائر الغرة البيضاء لغرض الدراسة النسيجية. صبغت عينات من المعدة الغدية (المعدة الحقيقية) والمعدة العضلية (القانصة) بصبغة الهيماتوكسلين ابوسين وفحصت تحت المجهر الضوئي. بينت النتائج بان الطبقة المخاطية للمعدة الحقيقية تتصف بوجود طيات طولية متفرعة تبطن بواسطة الظهارة العمودية البسيطة إضافة لوجود غدد نيببية بسيطة في الصفيحة اللبادية. الطبقة تحت المخاطية مشغولة بعدد كبير من الغدد المعدية التي تصنف كغدد نيببية متفرعة تفتح على سطح المخاطية. الطبقة العضلية متطورة وتتألف من طبقتين (داخلية طولية وخارجية دائرية). تظهر الطبقة المصلية كنسيج ضام مغطى بواسطة الظهارة المصلية وتحتوي أوعية دموية ونسيج دهني . الطبقة المخاطية للقانصة تحتوي على طيات تبطن بالظهارة العمودية وتغطي بطبقة سميكة تدعى الكيوتكل، تحتوى الصفيحة البادية على غدد نيببية بسيطة مفصولة بواسطة نسيج ضام رقيق الألياف العضلية للطبقة المخاطية العضلية. الطبقة العضلية تتألف من طبقتين داخلية طولية وخارجية دائرية يلهها الطبقة المصلية.

الكلمات المفتاحية: المعدة، المعدة الحقيقية، القانصة، طائر الغرة البيضاء.