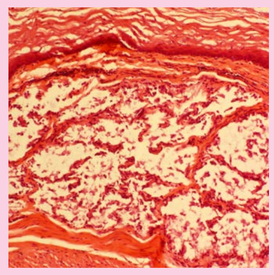
Gross and Microscopic Anatomy of the Stomach of the Eclectus Parrot (Eclectus roratus)

Rob Marshall B.V.Sc., M.A.C.V.Sc (Avian health)*
Ann Crowley B.V.Sc. (Hons), M.A.C.V.Sc., Diplomate, American College of Veterinary Pathologists**
*Carlingford Animal Hospital, Sydney 2118 Australia, **Anapath, PO Box 504 Newport 2106 Australia

This poster presents an anatomical reference of the stomach of the eclectus parrot for future research into dietary-induced stomach dysfunction, which is an overrepresented problem in this commonly kept bird.

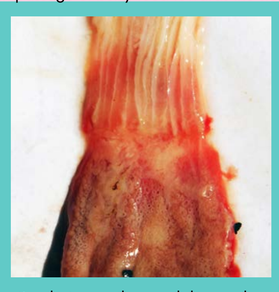
1. Caudal Oesophagus

The mucus lined wide longitudinal folds of the caudal esophagus allow distension and facilitate the smooth passage of bulky food towards the stomach.

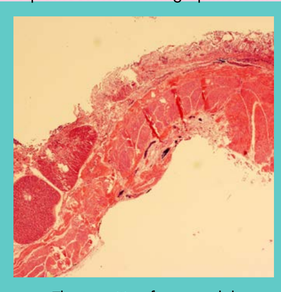


The caudal oesophagus was lined by mucus glands covered by stratified squamous keratinising epithelium.

2. Oesophagus - Proventriculus Junction

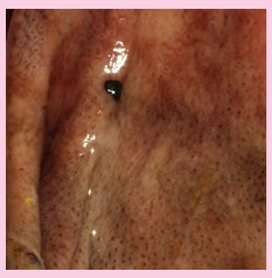


The junction between the caudal oesophagus and proventriculus became obvious after the tightly adherent proventriculus mucus was removed.

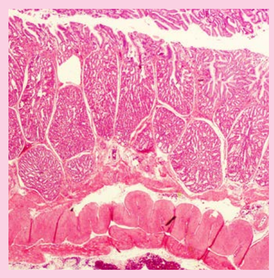


The transition from caudal oesophagus to the proventriculus was microscopically obvious.

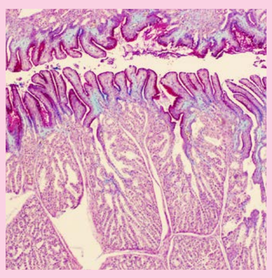
3. Proventriculus



The evenly distributed orifices of the exterior ducts of the compound glands were visible after removal of mucus.

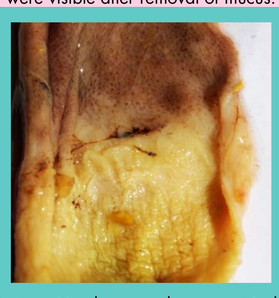


The proventriculus was composed of compound tubulo-alveolar glands lined by a simple mucous-secreting columnar epithelium which was continuous with the ducts of the gastric glands.

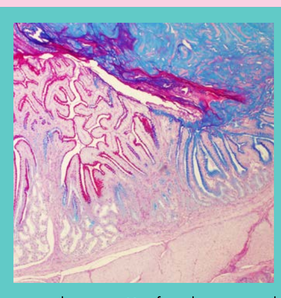


The apical cytoplasm of the epithelial cells contained PAS positive material consistent with mucus.

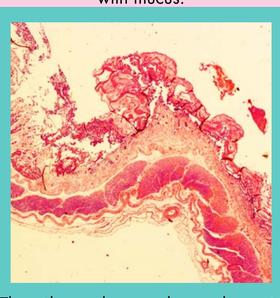
4. Proventriculus - Intermediate Zone Junction



The transition between the proventriculus and intermediate zone was visible following removal of mucus.



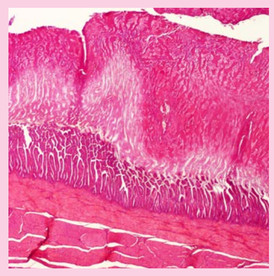
There was an abrupt transition from the compound glands of the proventriculus to simple tubular koilin-producing glands of the intermediate zone (PAS-AB staining).



The tri-layered external muscular tunic continued unchanged between the proventriculus and intermediate zone.

5. Intermediate Zone

The lining of the koilin membrane was covered with a complex arrangement of longitudinal and transverse folds.

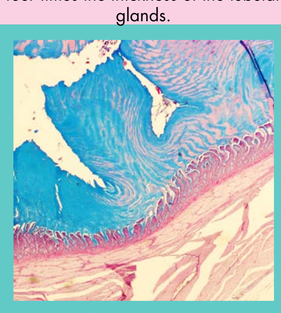


The koilin layer was between two and four times the thickness of the tubular glands.

The koilin layer had deep vertical fissures that gave a serrated appearance to the surface.

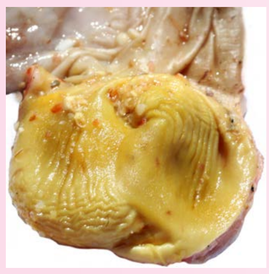
6. Intermediate Zone-Gizzard Junction

The koilin layer was continuous between the intermediate zone and gizzard.

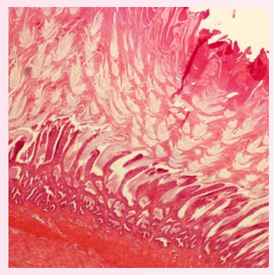


The koilin layer of the intermediate zone was more compact than that of the gizzard (PAS-AB staining).

7. Gizzard

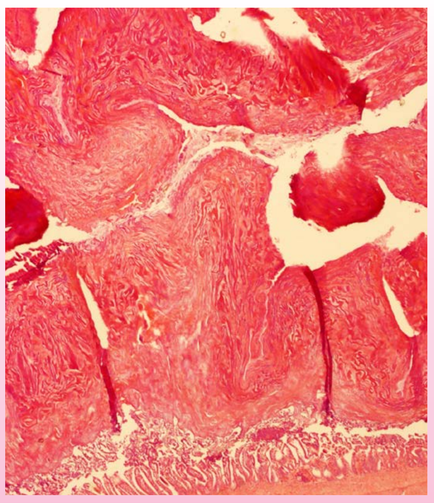


The folds lining the gizzard were unusually arranged.

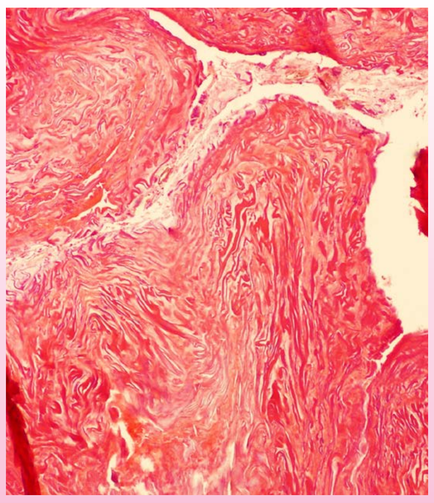


Vertical fissures of the koilin layer were infrequent. Some areas had a folded appearance.

Low Power



High Power



The serrated surfaces of the koilin layer of the intermediate zone were closely opposed. The presence of compact koilin suggests the intermediate zone fulfils a reduction function similar, but different to the gizzard. The serrated membrane is likely to perform a cutting or shredding action. It may fulfil a preliminary reduction function that presents the gizzard with pre-digested pulp thereby reducing the time required for final gizzard processing.

Key Features

Proventriculus
- Cranially displaced. This information is important for diagnostic imaging.

Intermediate Zone
- Elongated and spacious
- Firm structure lined by a complex array of fine tortuous longitudinal and transverse folds
- Koilin more compact than gizzard koilin

Gizzard
- Large and muscular
- Lined by an unusual arrangement of raised folds at the caudal extremity and near the pylorus

Intermediate Zone Overlooked Psittacine Stomach Part

There are several reasons for this oversight. Unless the structure of the muscular wall is carefully examined, the intermediate zone could easily be misidentified as normal gizzard since the koilin-producing tubular epithelium is very similar to that in the gizzard. In many instances the koilin layer is missing either due to autolysis or proteolytic separation resulting in loss of the layer prior to placing the specimen in formalin. This is another reason why koilin may not have been identified in the intermediate zone.