

AVIAN DIGESTIVE SYSTEM

The avian digestive system comprises of:

- Oropharynx
- Esophagus
- Stomach
- Intestines
- Cloaca – also serves the urogenital system
- Others include the beak, liver and pancreas

OROPHARYNX

- From beak to esophagus – a combination of the oral cavity and pharynx
- No soft palate
- No obvious constriction separating the mouth from the pharynx
- Lips and teeth replaced by beaks and ventriculus
- Boundary: roof formed by the palate and floor by the tongue, mandible and laryngeal mound

PALATE

- Long median cleft (choana) links with nasal cavity
- Infundibular cleft, shorter and more caudal – common opening for Eustachian tubes
- Both clefts open together in the budgerigar
- Caudally directed mechanical papillae in oropharyngeal wall – scattered singly or arranged in transverse rows, aid to move the bolus to the esophagus
- Copious amounts of salivary glands opening in the oropharynx to moisten food

TONGUE

- Triangular, non-protusible
- Supported by delicate hyoid apparatus.
- The choana closes during swallowing

THE LARYNGEAL MOUND

- Caudal to base of tongue
- Presents a median slit – glottis not guarded by epiglottis
- A row of papillae delimits the boundary between the oropharynx and esophagus
- The larynx modifies the vocalization unlike in mammals but its not th actual source

ESOPHAGUS

- A muscular tube extending from the oropharynx to the stomach
- First lies between the trachea and the cervical muscles
- Soon deviates to the right throughout its entire course in the neck
- Ventral wall greatly expanded at the thoracic inlet forming the crop which bulges further to the right and lies against the breast muscles
- Both esophagus and crop are subcutaneous. Implication?
- Within the body cavity, it passes over the bifurcation of the trachea, below the ventral surface of the lungs, over the base of the heart and further continues as the proventriculus directly on the left of the median plane
- During brooding, the large symmetrical crop of both the male and female pigeons elaborate a crumbly material (crop milk) consisting of desquamated lipid-laden cells mixed with ingested food; regurgitated and fed to nestlings

STOMACH

- Division by a constriction:
 - Glandular proventriculus (true stomach)
 - Muscular ventriculus (gizzard)

PROVENTRICULUS

- Fusiform, about 4cm long
- Whitish mucosal columnar epithelial lining differentiates it from the more reddish lining of the esophagus
- Numerous papillae which pass the collecting duct from a thick bed of glands.
- Papillae can be moistened for parasitic lesions
- Relations: ventrally with the left lobe of the liver

VENTRICULUS (GIZZARD)

- Larger and more caudal than the proventriculus
- Lens-shaped with convex surfaces facing more or less to the right or left
- Interior is elongated and further enlarged by the cranial and caudal blind sacs
- Cranial blind sac connects with the proventriculus
- Cuticle of kaolin

INTESTINES

- Caudal part of the body cavity
- Duodenum, jejunum and ileum and a short colon that lies ventral to the synsacrum and opens to the cloaca

- Two caeca arise from the ileocolic junction and accompany the ileum in a retrograde fashion
- The duodenum secretes digestive enzymes and bicarbonate (to counter the acid from the proventriculus) from the pancreas and bile from the liver via the gall bladder. The digestive enzymes produced by the pancreas are primarily involved in protein digestion. The pancreas plays important roles in both the digestive and hormonal systems. It also secretes hormones into the blood system that are important in the regulation of blood sugar. Bile is a detergent that is important in the digestion of lipids and absorption of fat-soluble vitamins (vitamins A, D, E & K)
- Merkel's diverticulum: a finger-like projection (papillae) that marks the end of the jejunum and the start of the ileum
- Just prior to hatching, the yolk sac, which had been supplying nutrition during embryo development, is drawn into the navel cavity. The residual tiny sac is the Merkel's diverticulum. The yolk sac supplies feed and water to the newly hatched chick and is the reason that chicks can be shipped considerable distances (as in the postal services) without adverse effects

CLOACA

- Craniocaudally divided into 3 parts by 2 or more less annular folds:
 - Coprodeum
 - Urodeum
 - Proctodeum
- Serves as a common opening to the digestive and urogenital system with the colon, ureters, and deferent ducts (male) or left (oviduct) entering at different levels

COPRODEUM

- Most cranial division
- Ampuliform continuation of the colon
- Stores faeces
- Separated from the urodeum caudally by the distinct coprourodeal fold

URODEUM

- Caudal to the coprourodeal fold
- Indistinctly demarcated from the proctodeum by the uroproctodeal fold (shallow incomplete ventrally)
- Ureteric orifice (dorsolateral wall) above the papilla of the deferent duct (or slit-like opening of oviduct in female)
- Paracloacal vascular body; a caudal extension of the pudendal artery in the lateral wall of the urodeum

PROCTODEUM

- Short, most caudal the segment
- Ends at the vent
- Cloacal bursa (on immunological organ similar to the thymus) opens on its dorsal wall
- Dorsal proctodeal gland caudal to the bursa

THE VENT

- Horizontal slit
- Ventral lip is of interest because its bears the copulatory organ in the male on its internal surface (non-protusible phallus) the analogue of the mammalian penis.