Birds have different feeding habits with corresponding differences in the structure of their oropharyngeal cavity, so the anatomy of the avian oropharyngeal cavity is important to identify the structural variations that may influence nutrition, food intake and ingestion. The guinea fowl is an omnivorous bird and therefore has a diet that primarily included worms and insects on the ground, along with seeds and berries.

Some attention has been given to the study of morphology of the avian oropharynx and tongue in recent times. However, species information on the anatomy of the oropharynx of the guinea fowl is still very minimum. Hence, the present study was undertaken with the aim to investigate the gross morphological differences of oropharynx and tongue in guinea fowl.

**MATERIAL AND METHODS**

The present study was conducted at Department of Veterinary Anatomy, Veterinary College and Research Institute, Namakkal. The heads used in the present study were collected from six adult apparently healthy guinea fowl slaughtered at an organized poultry farm in Namakkal. They were washed in normal saline and studied in terms of their shape, physical appearance, gross anatomical features of oropharynx, tongue, laryngeal mound and in situ topographical relationship. To obtain good observation, the beak angles were incised and mouth cavity exposed. The anatomical position and shape of all the structures located in the oropharyngeal cavity were studied in detail and noted in Fig.-1.

**RESULTS AND DISCUSSION**

**General Morphology:** In guinea fowl, there was no clear line of demarcation between the oral and pharyngeal cavity as in mammals due to lack of soft palate and so forming a common oropharyngeal cavity. It extended from the beak to the oesophagus as mentioned in muscovy duck. The common oropharynx is triangular in shape with anterior apex which confined to the shape of the beak. The oropharyngeal cavity consisted of roof formed by incomplete hard palate and the floor formed by mandible, tongue and laryngeal mound. The lips and teeth were absent and their function is replaced by the edges of the beak and the gizzard. These findings are similar to the observations made in Eurasian Hobby. The boundaries of the oropharyngeal cavity of the guinea fowl described in this study is in agreement with the general pattern in most avian species.

**Beak:** The beak is triangular in shape, the upper is formed by premaxilla, the lower was formed by mandible and both are covered by a thick horny sheath. The borders of the upper horny sheath was extended beyond the sheath of lower beak, so that the upper beak completely covered the lower beak when mouth was closed as reported in fowl and pigeon. The upper beak is curved and convex and the lower beak is concave which adapted to the tongue. The angular commissure between the upper and lower beak is covered with very thick horny lamellae. The shape of the beak varies in different species, broad and shovel shaped in Muscovy duck, curved, flat, hard with a sharp extremity in partridge, spoon-shaped in duck.
and goose, flat spoon-shaped in ostrich and sharp, thin and pointed rostrally in Eurasian Hobby. The wide variation in the morphology of the avian beak is related to the adaptation for prehension, type of food, feeding methods, climate conditions and assisted in the incomplete break-down of food.

**Roof of the Oropharynx:** In the present study, the roof of the oropharynx is formed by the hard palate which was cream coloured, the anterior two third of the hard palate is divided into right and left halves by median palatine ridge with median swelling in front and posterior one third is formed by choanal cleft. On either side of the median ridge, lateral palatine ridges extended to the whole length of the palate. These are in concurrence with the findings in rhea, emu and ostrich. Anteriorly the lateral palatine ridges joined the median ridge at an acute angle. The part of the palate area framed by the lateral palatine ridges is the choanal field which corresponded to the dorsal surface of the tongue. Contrast to this there are numerous orderly arranged rows of notches called lamellae situated on the lateral borders of the hard palate and many transverse narrow mucosal folds extend obliquely between the median longitudinal fold and the lamellae and also two transverse ridges that demarcate the caudal aspects of the hard palate from the choanal slit was noticed in Muscovy duck and there was no such lamellated mucosal folds in the guinea fowl.

The choanal cleft (median slit) was long, narrow anteriorly and broad posteriorly and bounded by orbital folds on either side and formed the permanent communication between the oral and nasal cavities. Species-specific difference in the shape of the avian choanal cleft were noticed. An elongated median choanal cleft with the long rostral narrow triangular part and the caudal wide part in Eurasian hobby, oval depression with two compartments in Muscovy duck, very long in fowl and pigeon, short in duck and goose and inverted V-shaped depression in herons and ducks and bell-shaped choanal cleft in ostrich. As in most avian species, behind the median palatine ridge, six transverse rows of caudally directed filiform papillae were seen on either side of the choanal cleft and most posterior one was made up of very well developed large papillae which marked the end of the oral cavity arbitrarily. But the lack of papillae on the hard palate and roof of the oropharynx has been demonstrated in muscovy duck, rhea and ostrich which showed faint papillae only in its caudal part. In Ostrich, anterior two third of hard palate contains no papillae, while the caudal part of the palate contains short and slender papillae surrounding choanal cleft. The papillae organizing around choanal cleft obstruct the escaping of foods into cleft and the others facilitate the movement of nutrients into the esophagus.

The infundibular cleft begins at the most caudal transverse

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**Fig.-1. Photograph showing upper and lower jaw forming the oropharyngeal cavity in guinea fowl.** 1 - upper beak, 2 - lower beak a - median palatine ridge, b - median swelling c - lateral palatine ridge, d - palatine cleft or choanal cleft e - papillae of hard palate, f - pharyngeal papillae, g - laryngeal cleft (glottis), h - laryngeal mound, i - lingual papillae, j - tongue, k - infundibular cleft l - oesophagus
row of papillae of hard palate and this cleft was bounded by
two oval pharyngeal folds separated by very narrow, small,
shorter and more caudal midline slit-like opening and it lead to
the auditory tubes as in Eurasian hobby1. The most posterior
limit of the oropharyngeal cavity is limited by one transverse
row of caudally directed pharyngeal papillae which separated
the oropharyngeal cavity from the oesophagus as mentioned in
Southern lapwing16. The oral cavity of ostrich was
characterized by the lack of this transverse row of papillae
caudal to infundibular cleft8. In addition, the present study
observed the absence of papillae on or around the oval pharyngeal folds as in other avian species4.

Floor of the oropharynx: The floor of the oropharynx
contained a concave triangular depression between the rami
of mandible which adopts triangular shaped tongue with
laryngeal mound at its caudal part as observed in ostrich8 and
captive bustards10.

Tongue: The tongue was triangular with pointed anterior end
and found on the rostral part of the floor of the oropharynx. The triangular form of tongue is the most common among the avian
species like partridge7, quail7 and domestic fowl17, whereas it was
elongated in Eurasian Hobby4. An elongated and oval
tongue was a characteristic feature in water birds such as
duck and goose18, whereas the ratite is characterized by
semicircular, short and broad tongue14. So our result suggested
that the morphological differences and variations appearing in
the tongue of avian species are directly associated with dietary
specialization and food type they consume and adaptation to
environmental conditions surrounding them. The most
distinguishing structure on the lingual body was a single
posterior row of caudally directed lingual papillae which marked
the posterior limit of the tongue that played major role in directing
food to the esophagus and also played important role in
preventing the regurgitation of small and large nutrients guiding
them to oesophagus from the lingual surface16. The tongue
had one transverse row of lingual papillae pointed caudally
toward the pharynx as in fowls and pigeons6, African pied crow1
and bustards19. However, in duck and goose, there were two
rows of upright, horny papillae situated at the edges of the
tongue30.

Laryngeal Mound: As in all avian species, a raised structure
called laryngeal mound was located immediately caudal to
the tongue (close to lingual root) and carried oval laryngeal
cleft (glottis)14. Behind the mound, a row of transverse caudally
directed pharyngeal papillae which limited the floor of the
oropharyngeal cavity as noted in raven and magpie species2.
But in contrast, two transverse rows of large sized, caudally
directed conical pharyngeal papillae on the caudal border of
laryngeal mound in Eurasian hobby4 and irregularly settled
conical papillae at the laryngeal mound and around the glottis
in goose30 were mentioned by other authors.

REFERENCES

   523.
   (6): 685.
7. Rossi, J., Silvana, M., Daniela, O., Cruz, C., Franzo, V. and Alex,
    Domestic Vertebrates. CABI Publishing, Wallingford, UK.
    335.
12. Tivane, C., Rodrigues, M. N., Soley, J. T., Groenewald, H. B.
    Company. London.
    Medi. 16: 443.