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Original Article

Morphometric Observations of the tongue of the domestic duck (*Anas platyrhynchos domestica*)

A. Bello[*1], J. E. Onu[1], M.I. Jimoh[1] and O. Olushola[2]

[1]Department of Veterinary Anatomy, Usmanu Danfodiyo University, Sokoto, Nigeria;
[2]Department of Theriogenology and Animal production, Usmanu Danfodiyo University, Sokoto, Nigeria.

***Corresponding Author**
A. Bello
Department of Veterinary Anatomy,
Usmanu Danfodiyo University,
Sokoto, Nigeria;
E-mail: abccrcfge28@gmail.com

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Abstract

A Biometric study was conducted on the tongue of twenty-five (25) adult domestic duck collected from the Sokoto metropolitan poultry and fish modern market, over a period of seven days . A pair of scissors, a scalpel and a blade was used to incise, excise, separate or debride various parts of the oral cavity to expose the organ for research. Results showed that the tongue is characterized by an elongated triangular format. At a point, approximately 2/3 the length of the lingual corpus there is a distinct depression, separating the caudal one-third of the lingual corpus from its rostral two-third. On the dorsal surface of the apex and body of the tongue, a median groove is found. A unique feature of the tongue in domestic Duck is the presence of many fine overlapping needle-shaped processes at both lateral sides of the caudal lingual apex. A single row of large conical papillae is observed symmetrically in the marginal region between the body and root of the tongue, biometrically the mean dimension.

1. Introduction

Birds have adapted to their environments with respect to food sources. Reflecting their specific lifestyles, birds have various feeding habits, with corresponding versatility in the structures of their tongues. The tongue is a muscular hydrostat on the floors of the mouths of most vertebrates which manipulates food for mastication. It is the primary organ of taste (gustation), as much of the upper surface of the tongue is covered in papillae and taste buds [1]. It is sensitive and kept moist by saliva, and is richly supplied with nerves and blood vessels..

A considerable number of papers have been published on the lingual structure in domestic mammals [2-4]. The studies on the structure of the tongue in birds, however, have been conducted on a small number of avian species, i.e. domestic chickens[5], little tern [6], goose[7], penguin[8], Japanese Quails[9], camel, Pigeon [10], White tailed eagle [11], cormorant [12], owl [13], falcon and kestrel[14], ostrich[15], woodpecker [16]. The results of morphological studies conducted in this specie contain references regarding the size and shape of the various portions of the digestive tract so far, indicate a close correlation of the shape of the tongue with the method of food intake and the type of food and habitat. [17-22] Therefore, the present study was aimed at establishing a base-line data on the normal dimensions of the tongue of the adult domestic duck *(Anas platyrhynchos domestica*) in this part of the countries breed.

2. Materials and Method

Twenty-five (25) adult domestic duck of both sexes were collected from the Sokoto metropolitan poultry and fish modern market, over a period of seven days and transported to Department of Veterinary Anatomy Laboratory Usmanu Danfodiyo University for the study. On arrival to the laboratory, the birds were sedated lightly using chloroform as inhalant anaesthetic and weighed using compression spring balance (AT-1422), size C-1, sensitivity of 20kg X 50g) in Kilogram. The birds were then euthanized by an overdose of chloroform soaked on cotton wool with each bird put in an enclosed container. A pair of scissors, a scalpel and a blade was used to incise, excise, separate or debride various parts of the oral cavity to expose the organ for research. The length, width and diameter of the various parts of the tongue were taken. The length was taken from the tip to the apex of the pharynx at choana region in cranio-caudal direction. The width of the tip, body and root was taken as the distance between the two lateral sides while the diameter as the distance between the dorsal and ventral surface of the organ using micrometer screw gauge, meter ruler, measuring tape, dividers and Vernier caliper. The data obtained were subjected to statistical analysis using SPSS statistical software. Value of P>0.05 were considered significant

3. Result and Discussion

From the result, the tongue of the adult domestic duck is characterized by an elongated triangular format for both sexes (Fig. 1), conforming to the shape of the lower beak within which it lies. This is in accordance with many scholars who highlighted that, the tongue in many species of birds is a triangular organ that fills the whole lower part of the bill [23,24]. It is an elongated tubular organ in woodpeckers [16] and elongated flat in geese and ducks [7,24]. The tongue of the cormorant is only a small, mushroom-shaped connective tissue structure joined with the hyoid cartilage and the lingual root is nonexistent [12]. Results obtained from the present study show that the tongue of the adult domestic duck like that of many other birds is a well developed elongated triangular organ with three distinct anatomical parts, i.e. apex, body and root.

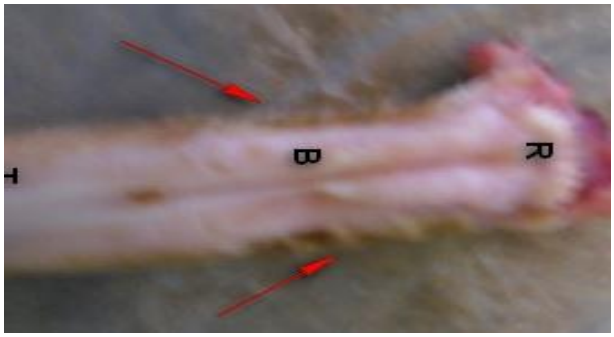

Fig 1 (Plate I): Photograph showing the dorsal view of Adult domestic duck tongue with the Root (R), Body (B) and Tip (T)

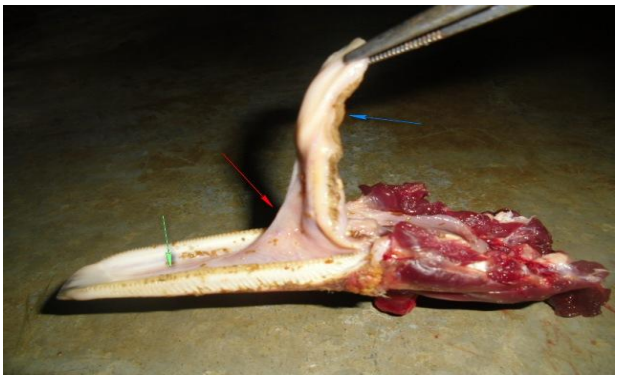

Fig 2 (Plate II): Photograph showing the dorsal view of Adult domestic duck tongue with the lower Bill (Green arrow), Tongue (Blue arrow) and prenular (Red arrow).

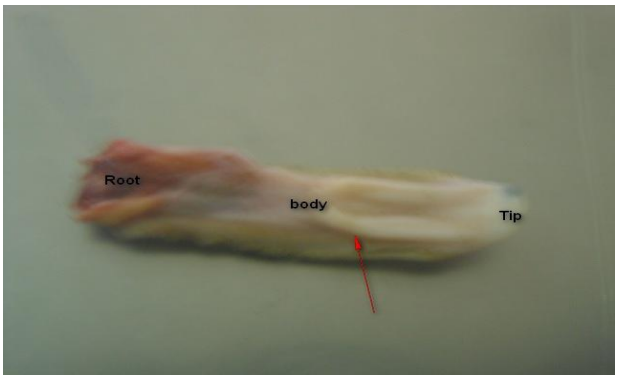

Fig 3 (Plate I): Photograph showing the ventral view of Adult domestic duck tongue with the Root (R), Body (B) and Tip (T)

From the morphometric point of view, the tongue has a mean length of 55mm and a width at the root and apex of 16mm and 10 mm, respectively. Its root has a length of 7.5 mm. Neither the morphology nor the biometry of the tongue shows sex specific differences. Three parts are distinguished in the dorsal surface of the tongue: the apex, the body and the root of the tongue. At a point approximately 2/3 cranio-caudally of the length of the lingual corpus there is a distinct depression, separating the caudal one-third of the lingual corpus from its rostral two-third (Fig. 1).

On the dorsal surface on the apex and body of the tongue a median groove is found. This groove is apparently wider on the middle part of the lingual corpus in comparison to the other parts. The groove divides the apex and body of the organ into two symmetrical halves. Data obtained from the present study also showed that a distinct median groove divides the apex and body of the tongue of the White-eared bulbul into two symmetrical halves. The groove can be considered as the origin and/or insertion site of the lingual intrinsic muscles. More researches however may be needed for explanation. The median groove is a characteristic feature found on the tongue of White tailed eagle and geese, whereas it is absent on the tongue of chickens and penguins [5-8, 11, 24]. On the dorsal surface of the short tongue of the cormorant, in the midline a crest is found, resembling a ridge, reaching both ends of the organ [12]. Iwasaki [6] in 1992 stated that, there is a median line in the anterior part of the tongue in the little tern and the apex of the tongue is slightly bifurcated. Results obtained from the present investigation also showed that at a point approximately 2/3 of the length of the lingual corpus of the domestic duck there is a distinct depression, separating the caudal one-third of the lingual corpus from its rostral two-third.

These differences in the structures of the tongues may be due to the different feeding habits. However, since the White-eared bulbuls like many other birds are primarily seed-eating birds, more investigations may be needed for explanation

Owing to their different lifestyles, birds show considerable differences in the structures of their bills and tongues. A unique feature of the tongue in domestic duck is the presence of many fine overlapping needle-shaped processes at both lateral sides of the anterior lingual apex, the apices of which are directed rostrally (Fig. 2). A single row of large conical papillae are observed symmetrically in the marginal region between the body and root of the tongue, the apices of which are pointed towards the posterior part of the tongue. The sizes of these mechanical papillae varied according to their location within the tongue. The lateral papillae are noticeably larger and thicker than the medial ones (Fig. 3). The papillae show a flat surface.

4. Conclusion

Results obtained from the present study also showed that a unique feature of the tongue in White-eared bulbul is the presence of many fine densely populated needle-like processes in both lateral sides of the anterior lingual apex. These processes may help bird in direct food particles caudally towards the caudal parts of the oropharyngeal cavity. However, it seems that more investigation is needed for explanation of this finding.

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