

GROSS ANATOMICAL AND BIOMETRICAL STUDIES ON THE TONGUE OF AN ADULT SMALL INDIAN CIVET CAT

Sarma, K^{1*}, Sarma, M². and Kalita, S.N³.

¹PhD Scholar, ²Assistant Professor, ³Professor and Head, Department of Veterinary Anatomy & Histology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781 022(Assam), India.

*Address for correspondence: Department of Veterinary Anatomy & Histology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781 022. Assam, India.
E-mail: kamalsarma73@yahoo.com

ABSTRACT

The gross morphological and biometrical features of the tongue of an adult female small Indian civet cat were investigated. The tongue was pale pink in colour, and the tip was rounded with its margin gradually thinning out ventrally. The tongue showed five types of lingual papillae. The entire dorsum linguae was covered by pointed and distinctly caudally directed filiform papillae except at the lateral edges and on the dorsum of the body about 1 cm caudal to its tip. The body of the tongue was almost uniformly wide but tapered at the root. Filiform papillae thickly populated the dorsum of the body but their number decreased towards the tip where their length increased. Fungiform papillae were button like and were present on the dorsum linguae and lateral edges of the tongue. The fungiform papillae of the dorsum linguae of the body were larger in size than those at the tip. The vallate papillae were rounded and oval in shape, and were 6 in number arranged in two rows in the form of a "V" with the apex directed cranially. There were two foliate papillae, located at the lateral edges of the tongue at the level of the vallate papillae. Numerous pointed thorny papillae were present on the dorsum of the root of the tongue. The detailed biometry of the tongue was also documented.

Keywords: Tongue, anatomy, biometry, small Indian civet cat.

INTRODUCTION

Detailed structural studies on different organ systems of wild animals are gaining importance in contemporary biological science. These have implications on their conservation and propagation, and also form a database of scientific information. The tongue, the principal prehensile organ of the animal body, has been studied in several domestic animals such as the cow (1), horse (2), goat (3) and buffalo (4), and in wild animals such as the giraffe (5) and Himalayan black bear (6). The present study describes the gross anatomical and biometrical features of the tongue of an adult female small Indian civet cat. The small Indian civet cat is taxonomically in the Kingdom: Animalia, Phylum: Chordata, Class: Mammalia, Order: Carnivora, Family: Viverridae, Subfamily: Viverrinae, Genus: *Viverricula*, Species: *Viverricula indica*. The presence of a dorsal crest and absence of long black hairs distinguish this civet from the large civet. It is a smaller animal whose length is 3 ft. and a tail size of 1 ft. It weighs from 6-8 lb. The general colour varies from brownish or olive grey to light grey. There are longitudinal dark stripes and rows of spots along the body, a stripe down each side of the neck and

frequently one across the throat, its tail is ringed with grey and brown. The small Indian civet is a shy animal and almost entirely nocturnal in habit. It takes shelter in holes in the ground, under rocks or thick bushes. This animal can easily climb the vertical trees. Its major diet is rats, lizards, small birds, insects, fruits and berries. The small civet cat is found in India, Thailand, China Myanmar and Indonesia. The various subspecies of Small Indian civet cat found in India are- *Viverricula indica indica* (found in Western Ghats), *Viverricula indica bengalensis* (northern India), *Viverricula indica deserti* (Rajasthan), *Viverricula indica wellsi* (Kangra, Kumaun and Uttar Pradesh) and *Viverricula indica baptistae* (Assam and upper Bengal).

MATERIALS AND METHODS

The tongue of an adult female small Indian civet cat was studied. at the veterinary pathology laboratory of, the college of veterinary science, Khanapara. The tongue was dissected from the oral cavity, cleaned, and different morphological features and biometrical parameters were recorded using digital vernier callipers, thread and a centimeter scale.

RESULTS

The tongue was pale pink and contained three parts: tip, body and root (Fig. 1). The tip of the tongue was rounded with its ventral margin thinning out gradually. The body of the tongue was almost uniformly wide, but its root was tapered. Fossa linguae and torus linguae were absent. The entire dorsum linguae was covered by pointed and distinctly caudally directed filiform papillae (Fig. 2). There were no filiform papilla at all at the lateral edges of the body of the tongue and on the body about 1 cm caudally from the tip of the tongue. These areas were devoid of filiform papillae and were smooth. Very small fungiform papillae were present on these areas. The filiform papillae were thickly populated at the dorsum of the body, while their number decreased towards the tip but were of increasing length. The filiform papillae present on the dorsum of the body had broad bases with a sharply pointed tip.

The fungiform papillae were button like (fig. 2) and were present on the dorsum linguae and on its lateral edges. Their size was larger at the dorsum linguae and lateral edges than those located at the tip. The maximum number of fungiform papillae was located in between and in front of the vallate papillae at the midline.

There were six vallate papillae (fig. 2) arranged in two rows containing three papillae in each row, and placed in a "V" whose apex faced the root of the tongue. There were two foliate papillae, each was located on the lateral margin of the tongue at the level of vallate papillae. The root of the tongue was covered by long thorny papillae (fig. 2). Various biometrical parameters pertaining to the tongue of civet cat are presented in tables 1, 2 and 3.

DISCUSSION

The tongue of the small Indian civet cat was pale pink and its tip was rounded with the margin thinning out gradually and rostrally. Similar findings were reported by Miller *et al.* (7) in the dog, and Nickel *et al.* (8) and Shoiche *et al.* (9) in a dog and fox. In contrast, the apex of the tongue was pointed in cattle (1), free flattened with a notch at the centre in the goat (3), spatula shaped in the horse (2), blunt pointed in buffalo (10,4) and nearly spatula shaped with undulating lateral edges in the Himalayan black bear (6).

The filiform papillae were thickly populated on the dorsum of the body, but their number decreased towards the tip where they increased in length. This was in contrast to the earlier reports of innumerable filiform papillae that were distributed on the rostral portion of the dorsum linguae of the elephant (11), ox and sheep (1), dog and cat (7,8). Also, the filiform papillae on the tip of the tongue were short and exhibited several conical processes from the base of each papilla in the cat (12). This particular arrangement of filiform papillae on the dorsum linguae of the tongue of the small Indian civet cat may depict its specific species characteristics. While, in the region of the vallate papillae, the filiform papillae were

shorter and more conical than those on the mid-portion of the tongue. The fungiform papillae were button-like and present on the dorsum linguae and on its lateral edges. Maximum number of fungiform papillae were noted located in between and in front of the vallate papillae at the midline. Similar pattern of distribution of fungiform papillae were also documented in the elephant (13), pig and cat (8) and dog (7). They formed a "V", with its apex facing towards the root of the tongue. This type of orientation of vallate papillae was also reported in rhinoceros (5). The vallate papillae were located on both sides of the posterior end of the lingual body in the Asian black bear and panther (14). There were two foliate papillae, each located on the lateral margin of the tongue at the level of vallate papillae. These were also observed in the horse (2), cat (8) and Himalayan black bear (6). The foliate papillae were seen on lateral aspect of the tongue, their laminae fused with the bases of the conical papillae in the dog and fox (15).

REFERENCES

- Habel, H. E.: in Sisson and Grossman "The Anatomy of the Domestic Animals" vol. I, 5th edn., pp 865-866. W.B. Saunders Co., Philadelphia, 1975.
- Sisson S.: Equine Digestive System. In Robert Getty Ed. 1975.
- Lahkar, K.: Gross, histomorphological and histochemical studies on the tongue of Assam goat (*Capra hircus*) with a comparative note on that of cattle. M.V.Sc. thesis submitted to Assam Agricultural University, Khanapara, Guwahati-22, 1985.
- Prakash, P. and Rao, G. S.: Anatomical and neurological studies on the tongue of Indian buffalo (*Bubalus bubalis*). *Acta Anat.* 107 : 373-376, 1980.
- Lahkar K, Chakraborty A and Bhattacharya M.: Gross anatomical observations on the tongue of rhinoceros. *Ind. Vet. Jr.* 66: 954-57, 1989.
- Sarma, Kamal, Nasirudullah, N. and Islam, S.: Gross anatomical observations on the tongue of Himalayan Black Bear. *Ind. Jr. Anim. Sci.* 73 : 1027-1028, 2003.
- Miller, M. E., Christensen G.C. and Evans, H. E.: Anatomy of the dog. W.B. Saunders Co., Philadelphia, 1964.
- Nickel, R, Schummer, A. and Seiferle, E.: The viscera of the domestic animals. German Edition. Verlag Paul Parey, Berlin, Hamburg. pp 485, 1986.
- Sisson and Grossman "The Anatomy of the Domestic Animals" vol. I, 5th edn. W.B. Saunders Co., Philadelphia, 1975.
- Dhingra, L.D. and Barnwal, A.K.: Gross anatomical studies on the tongue of Indian buffalo (*Bubalus bubalis*). *Jr. of Res.* 9: 63-68, 1979.
- Kubota, K.: Comparative anatomical and neurological observations on the tongue of the tongue of elephant (*Elephas indicus* and *Loxodonta Africana*). *Anat. Rec.* 157 : 505-516, 1967.
- Boshel, J. Boshela, Wilborn, W.H and Singh, B.B. :

Filiform papillae of cat tongue. *Acta Anatomica*. 114:97-105, 1982.

13. Mariappa, D.: *Anatomy and histology of Indian elephant*. Indira Publishing House. P.O. Box 37256, Oale Park, Michigan, U.S.A., 1986.

14. Emura, S., Hayakawa, D., Chen, H and Shoumura, S.: Morphology of the dorsal lingual papillae in the newborn panther and Asian black bear. *Okajimas Folia Anat Jpn*. 78:173-177, 2001.

15. Emura, S., Okumura, T., Chen, H and Shoumura, S.: Morphology of the lingual papillae in Raccoon dog and fox. *Okajimas Folia Anat Jpn*. 83:73-76, 2006.

Table 3: Density of papillae on the tongue of an adult small Indian civet cat

Sl. No.	Level of Tongue	Filiform	Fungiform	Vallate	Foliate	Thorny
1	Tip	numerous	15-20	Nil	Nil	Nil
2	Body (middle)	do	35-40	Nil	Nil	Nil
3	Region of vallate papillae	less	7-9	6	4	Nil
4	Root	nil	nil	nil	nil	+++

Table1: Biometry of the tongue of an adult small Indian civet cat

Slide No.	Parameters	Value (cm)
1	Length	5.59
2	Width	
	a) At the level of the tip	0.91
	b) At the level of middle of the tongue	1.82
	c) At the level of the vallate papillae	1.89
3	Thickness	
	a) At the level of the tip	0.14
	b) At the level of middle of the tongue	1.13
	c) At the level of the vallate papillae	1.20
4	d) At the level of the root	1.00
	Length of the anterior free part of the tongue	2.22

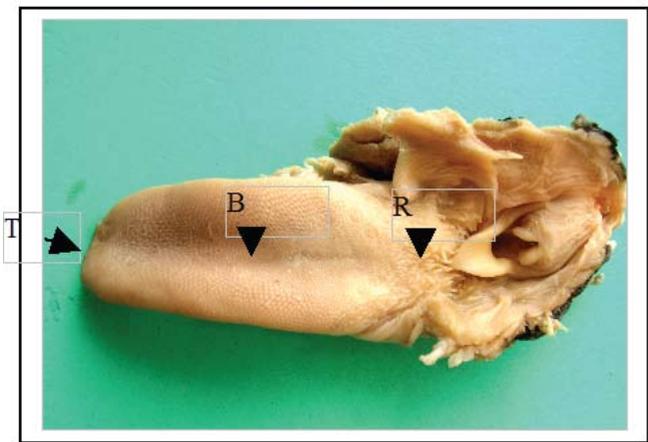


Fig. 1. Photograph of the tongue of an adult small Indian civet cat showing tip (T), body (B) and root (R).

Table2: Density of papillae on the tongue of an adult small Indian civet cat

Sl. No.	Level of Tongue	Filiform	Fungiform	Vallate	Foliate	Thorny
1	Tip	+++	±	-	-	-
2	Body (middle)	++++	++	-	-	-
3	Region of vallate papillae	±	+	++	++	-
4	Root	-	-	-	-	+++

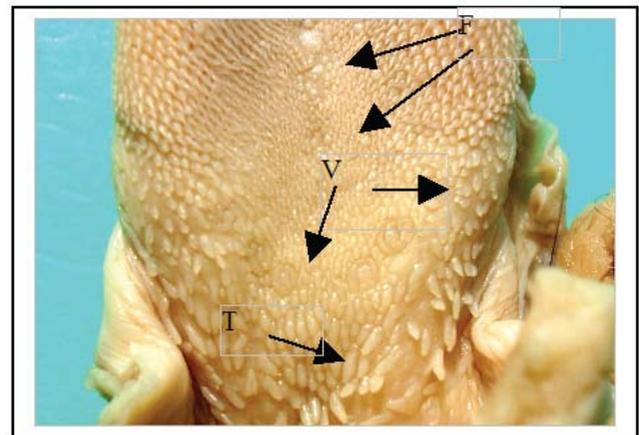


Fig. 2. Photograph of the tongue of an adult small Indian civet cat showing button like fungiform papillae (F), vallate papillae (V) and thorny papillae (T).