

## TONGUE OF THE MALAYAN PANGOLIN (*Manis javanica*)

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### Introduction

Pangolin is a unique and interesting mammal. Pangolin is toothless just like avian and the body is covered with horny scales. Therefore, pangolin appears more **reptilian**. This animal is classified into the order Pholidota. It consists of eight species that are distributed in the tropical rain forest of Asia and Africa (Gaubert and Antunes, 2005). Pangolin is considered to be an endangered species and listed in the **appendix-II** of CITES. The pangolin feeds exclusively on ants and termites so pangolin is commonly known as **scaly anteater** (Nowak, 1997). They have long, **vermiform** and protractible tongue facilitated with sticky saliva. In this study we describe the morphology of the tongue of javan pangolin (*Manis javanica*).

### Material and Methods

The samples of tongue were collected from the same animals used in the previous study (Nisa' et al., 2005). The samples were fixed in Bouin solution and then transferred in 70% ethanol. The tongue was observed macroscopically using naked eye and stereo microscope. Several parts were taken for histological observation. Paraffin blocks were cut at 5  $\mu$ m, mounted on slides, incubated overnight in 37°C, and stained by **hematoxylin-eosin** and Masson's trichrome (Goldner modification).

The tongue of Malayan pangolin was long, vermiform in shape and had a median groove (*sulcus medianus*) in the dorsum. The fixed tongue was **approximately** 10 cm in

length and divided into apex, corpus and radix. Three types of lingual papillae, the **filliform**, fungiform and circumvallate papillae were **observed** on the dorsal surface, but the foliate was absent. The tongue had a coin-shape projection at its anteromedial apex. This projection was equipped with **filliform** papillae directed anterodorsally on its vantral part. The tongue also had a *lyssa*, a **fusiform** cord composed of muscular and **blood** vessels surrounded by fibrous tissue on the ventral surface, but lacked of **frenulum**. The distribution of the **filliform** papillae varied among regions. Numerous papillae were found on the dorsal surface, **moderate** numbers of the papillae were found on the ventral **part** of the coin-shape projection and a few on the **ventromedial** of anterior part of the *lyssa*. Except for those found in the coin-shape projection, the direction of the **filliform** papillae were caudo-dorsad or little bit caudo-**median** in case of those found in the median groove. The **filliform** papillae in the lingual body were bigger in size than those in the lingual apex. The fungiform papillae were mushroom-shaped and distributed in large number on the dorsal to **lateroventral** parts of the lingual apex and in less number on the dorsal part of the lingual body. Three **circumvallate** papillae were observed in the **rostral** part of the radix of the tongue. The papillae were spherical-shaped and surrounded by shallow groove. Taste buds were found only in the epithelium of lateral wall of the **circumvallate** papillae. In the lateral wall of the circular groove of the **circumvallate** papillae we also observed serous glands. The tongue was lined with stratified **squamous** epithelium which was heavily **keratinized**.

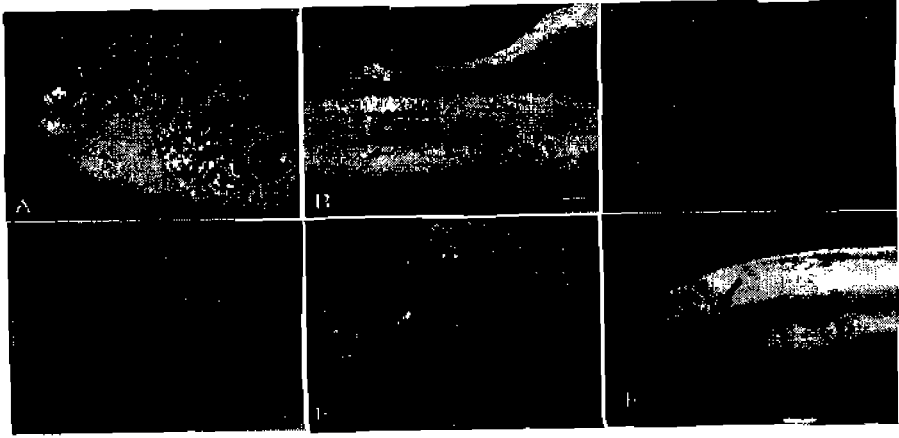


Figure 1 Morphological characteristics of tongue of Malayan pangolin. (A) Dorsal surface of apex with coin-shape projection (\*) and fungiform papillae, (B) median groove reached the rostral part of the radix which located three circumvallate papillae (C). The circumvallate papillae were spherical-shaped and surrounded by shallow groove (D). The coin-shape projection equipped with filiform papillae directed anterodorsally on its ventral part (E) and remarkable lyssa was found on the ventral surface (F). Bars A & E = 1 cm; B, C, D & F = 0,5 cm.

**Discuslon**

The morphology and length of the tongue of Malayan pangolin was unique and peculiar to the ant-eater animals. Their lacked of frenulum, a structure that commonly attaches the tongue to the ventral floor of the oral cavity in other mammals, is one of the interesting point of this research. This peculiarity make the tongue can be protract freely when catching their prey into the nest. It is combining with long and vermiform tongue facilitated with sticky saliva. The dorsum is marked by a median groove and the ventral is marked by a remarkable lyssa as well as carnivores (Getty, 1975), presumed to licking the drinking water and catch their prey fastly. But differ from carnivores, the lyssa in pangolin do not composed fat. The present of only three circumvallate papillae and the absent of the foliate papillae might be characteristic in the Malayan pangolin. While the present of a coin-

shape projection in the dorsal surface of apex equipped with filiform papillae directed anterodorsally on its ventral part should be noteworthy.

**conclusion**

The present findings showed that the morphology of the tongue of Malayan pangolin was peculiar which might be related to the feeding habit and the type of food eaten by animal.

**References**

Gaubert, P and A. Antunes 2005. *J. of Mammalogy* 86(6): 1068-1074.  
 Getty, R. 1975. W.B. Saunders Company, Philadelphia.  
 Nisa', C. et al. 2005. *Anat Histol Embryol* 34:373-378.  
 Nowak, R. 1999. The John Hopkins University Press, Baltimore.