The tongue of mammals plays an important role in their feeding behaviour and is suitably adapted for a specific type of feeding habit. The tongue of the insectivorous mammal for instance is long enough to protrude deep into an ant-hill and being very sticky, ants adhere to it. Thus the withdrawal of the tongue back into the mouth brings food directly into the mouth. The nectar eater bats possess a very long tongue about one fourth of the length of the body. The tongue of the cats, on the other hand is quite small but rough enough for licking the flesh from the bones of the prey.

Thus the tongue of mammals forms an important tool in manoeuvring the food including its ingestion as well as manipulation during the process of mastication, before directing it towards the gullet.

General characters of the Tongue and the Palate:

The tongue is situated on the floor of the mouth, between the rami of the mandible. The posterior part of the tongue which is known as the root of the tongue is attached to the hyoid bone, the soft palate and the pharynx. The dorsum or the dorsal surface of the tongue bears nearly 5-6 types of papillae, viz., filiform,
fungiform, vallate, scaly and conical-shaped papillae. Of these the filiform papillae are fine, thread-like and are in the form of projections. The fungiform papillae are larger and rounded and more or less a mushroom like in appearance. The vallate papillae are usually three in number and are found towards the root of the dorsum of the tongue. Two of these are situated on the lateral sides of the median plane of the tongue. The third one is smaller and is situated just behind the former. The scaly papillae are scale-like, varied in shape and stiff. The conical papillae on the other hand are quite massive and conical shaped.

The palate of mammals is divisible into two parts, namely a hard palate and a soft palate. The former is situated anteriorly in the buccal cavity and as its name implicates generally hard in nature, whereas the soft palate which separates the cavity of the mouth from that of the pharynx is situated posteriorly. The base of the hard palate is osseous and formed by the pre-maxilla, maxilla and palatine bones.

The structure of the tongue and the palate in the mammals studied here is as follow:

Hedgehog (Plate III, 1):

Tongue:

The tongue is massive, soft and sticky in nature.
It is elongated and protrusible to a considerable extent. The dorsum of the tongue is beset with pit-like depressions, which are helpful in preventing the escape of the prey from the mouth. Moreover, a crescentic-shaped depression is also present on the dorsal surface of the tip of the tongue. The dorsum is further furnished with soft, numerous filiform papillae. Besides, fungiform papillae are also observed scattered inbetween the filiform type. The root of the tongue is smooth and without any papillated outgrowths. Three vallate papillae are however observed just in front (a bit ahead) of the root.

The attachment of the tongue on the buccal floor is nearly by its mid-ventral region permitting its longer protrusion.

The hard palate:

It is elongate and more or less rectangular in shape, but anteriorly is slightly narrow. The surface of the palate is arched in the mid-region. The central raphe divides the surface of the palate into two equal halves. Each of these halves contains nearly 9-10 transverse ridges. Anterior half of these have their concavities directed posteriorward. The free edges of the first three ridges are directed downwards. On the other hand, the remaining two anterior ridges have their free edges directed slightly backwards. Further the anterior ridges of each side of the palate are continuous with the counterparts of the opposite
side. Unlike their anterior counterparts posterior ridges are directed anteriorly, and show an alternate arrangement with opposite counterparts. The free edges of posterior ridges are decussate type.

This characteristic structure of the hard palate with its ridges provides a rough surface in holding the prey such as an insect and further it also forms a useful tool in handling the food during mastication and gulping.

The soft palate:

It is pad-like and smooth and is separated from the hard palate by a transverse muscular elevation. The soft palate is also an arched-shaped structure like its hard counterpart.

Bat (Plate III, 2):

Tongue:

The tongue of the bat is elongated and rough in nature. Proximally it is broad, however, gradually becomes narrow towards the tip. The tip is more or less rounded in outline.

The dorsum of the tongue is provided with numerous backwardly directed fimbriated papillae of different thickness. The mid-region of the dorsum of the tongue is quite hard on account of the presence of hard and closely packed fimbriated papillae. This part is particularly
helpful during the drawing of pulp of fruits and carry it towards the gullet. By comparison the tip of the tongue is soft in nature and bears thin soft fimbriated papillae. The postero-lateral surface of the tongue is beset with soft, more or less spear-shaped elongated papillae. Three distinct vallate papillae are also present towards the root.

The hard palate:

It is quite stiff and more or less pentagonal in shape. The surface of the palate is curved in an upward direction behind the mid-region. The palate is divisible into two equal parts by a median groove, which is shallow and indistinguishable in the anterior region. Posteriorly however, it becomes broad and deep like a channel. The central raphe observed in hedgehog is absent here.

The surface of the palate is thrown into well-defined 9 or 10 transverse ridges. The anterior half of them have blunt, broad and smooth free edges and have their concavities directed towards the posterior end. The concavities of these ridges increase gradually towards the posterior end. The ridges of each half of the palate are more or less continuous with their opposite counterparts.

The posteriorly located ridges show a characteristic arrangement and structure. The ridges do not meet their fellows medially but are directed downward and together form a median channel-like structure. Each ridge is pad-like
Plate IV
in appearance and semicircular in structure, and bears either serrated or decussate free margin.

The anterior ridges are helpful during the crushing process of the seeds and hard parts of the fruits. Due to the presence of decussate margins and the channel-like structure, the posterior ridges on the other hand help push the food towards the gullet.

The soft palate:

It is in a continuation of the hard palate and presents more or less pentagonal shape. The surface is smooth. But its anterior boundary is more or less serrated, which is helpful in carrying the food towards the gullet.

Guinea-pig (Plate IV, 1):

Tongue:

The tongue is stiff, particularly in the middle and the posterior regions. The root of the tongue is relatively wider and elevated dorsally in the form of a more or less triangular-shaped prominence. This prominence fits into a corresponding depression on the soft palate. Such an arrangement is particularly helpful during mastication as well as in the swallowing process of the food. The anterior and the lateral regions of dorsal elevation bears downwardly and slightly backwardly directed numerous large pointed conical shaped stiff papillae. The remaining surface of this prominent part is provided with
short, relatively less stiff and backwardly directed conical papillae. The body of the tongue is more or less sagittal in shape and possesses a median elevated ridge on the dorsal surface. Due to this ridge, the channel-shaped depressions are formed laterally to facilitate movement of the food towards the masticatory surfaces of teeth rows. The surface of the body of the tongue is provided with small and backwardly directed conical papillae. The apex of the tongue is relatively soft and is more or less rounded in outline. Posteriorly it becomes broader. The lateral as well as the dorsal surfaces of the apex of the tongue are provided with numerous backwardly directed filiform papillae. Moreover, it may be noted here that its dorsal surface possesses more papillae compared with those of the lateral surfaces.

The hard palate:

The hard palate of this mammal is characterised by the absence of transverse ridges and central raphe found in other mammals studied here. The surface of the palate is provided with more or less longitudinally disposed thin numerous ridges. It may be noted here that the palate is much smaller due to elongated diastemal region.

The soft palate:

The soft palate is much smaller than its hard counterpart. Posteriorly it shows a gradual slope. As
stated earlier it is characterised by a concave depression observed on its median surface.

Mongoose (Plate IV, 2):

Tongue:

The tongue of the mongoose is hard and elongated. During the feeding operation, the anterior portion of the tongue is freely movable and is often folded. Such an action of the tongue is helpful in lapping the blood as well as in licking the flesh of the victim. The middle portion of the tongue is much remarkable for its hard structure. This part is beset with stiff elongated numerous backwardly directed scaly papillae. The papilla possesses a median groove, which is semi-circular and the free end is quite sharp. These papillae are the papillae of great help during the licking operation of the flesh and also in pushing the food towards the gullet. Moreover, posteriorly the tongue bears a longitudinal channel laterally on either side and a median elevation. Such a shape of the tongue is an asset in lapping and in handling the food. The root of the tongue is quite broad and is covered with soft, large and conical papillae. Anteriorly, on the upper surface towards the root are observed three vallate papillae. The tongue is also beset with numerous backwardly directed fimbricated papillae, spread through out except its mid-region which is marked with scaly papillae.
The hard palate:

The hard palate of the mongoose is narrow at either end and much broad behind the mid-region. It is relatively stiffer compared with other mammals studied here. Anteriorly the palate slopes gradually downwards. Its surface is quite rough due to small, pointed and pimple-like outgrowths and transverse ridges.

The surface possesses nearly 10-12 pairs transverse ridges on either side of the median groove. The anterior half of them are arranged opposite to each other. The free edges of these ridges and their concavities are directed towards the posterior end. Moreover, it is noteworthy that unlike in other mammals studied here the free edges are devoid of serrations. The pimple-like outgrowths stated earlier are situated inbetween these ridges.

The posterior ridges are remarkably curved with their concavities directed in the posteriorward direction. The inner ends of these ridges do not meet their fellows but curved in the backward direction and together they form a median channel-like structure which becomes gradually shallow at the anterior end of the palate. The posterior part of the palate is devoid of any outgrowths.

The soft palate:

The soft palate is small, smooth narrow and more or less rectangular in shape.