Comparative study of some Histomorphological observations between the tongue of the wild rabbit breed (*Lepus capensis*) and local rabbit breed (*Oryctolagus cuniculus*)

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Abstract

This study was carried out on adult eight healthy local breed and eight adult wild rabbits of both sexes, to compare morphology and histology between the tongues of them. The tongue of wild rabbit observed relatively longer, wider and thinner than that of local rabbit. Both groups have tongue consist of root, body and tip. The dorsal surface of the tongue of wild rabbit is containing median groove and transverse ridges. Histologically, the tongue in both wild rabbit and local rabbit was covered by keratinized stratified squamous epithelium. The tongue of wild rabbit has thicker mucosa and sub mucosa than that of local rabbit and the longitudinal muscular layer externally and circular layer internally in contrast of local rabbit, also taste buds appear in lingual papillae in both wild rabbit and local rabbit excepted filiform papillae not contain taste buds.

Key words: tongue, wild rabbit, local rabbit, mucosa, taste buds.
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دراسة مقارنة لبعض الجوانب النسجية والشكليائية بين لسان الأرنب البري*Lepus capensis* والأرنب المحلي Oryctolagus cuniculus

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الخلاصة

شملت الدراسة ثمانية أرانب بالغة من السلالة المحلية وثمانية أرانب بالغة برية ومن كلا الجنسين سليمة صحياً للمقارنة الشكليائية والنسجية للسان في الأرنب البري والأرنب المحلي. في الأرنب البري لوحظ أطول نسبيا واعرض وانحف من اللسان في الأرنب المحلي. كلا المجموعتين لديها لسان مؤلف من جذر وجسم ونهاية. السطح الظهري للسان الأرنب البري يحوي شق وسطي وأخاديد مستعرضة. نسجيا اللسان في كلاهما مغطى بظهارة مطبقة حرشفية متقرنة. لسان الأرنب البري يملك ظهارة وطبقة تحت الظهارية اسمك من نظيرتيهما في الأرنب المحلي والطبقة العضلية الطولية تقع خارجيا أما الطبقة الدائرية تكون داخليا عكس الأرنب المحلي. أيضا وجود براعم ذوقية في حليمات الأرنب البري والمحلي بأستثناء الحليمات الخيطية تكون خالية من براعم التذوق.

الكلمات المفتاحية: اللسان، الأرنب البري، الأرنب المحلي، الطبقة المخاطية، براعم التذوق.

Introduction

The rabbits have been domesticated since the sixth century and distributed mammalian species (1).The tongue plays a very important role in food intake by vertebrates, exhibit significant morphological variations that appear to represent adaptation to the current environmental conditions of each respective habitat (2). The male of the rabbit named bucks and the female named does, the rabbit are one of the laboratory animals used as experimental animals because of their small size and easy handling and in many countries the rabbits are used for meat production, the rabbits are used as laboratory animals in united states beside bird, rat and guinea pigs (3) Studies of the comparative morphology of the tongue in living vertebrates have revealed how

variations in the morphology and function of the organ might be related to evolution events. Four kinds of mechanical and gustatory lingual papillae distributed on the dorsal surface of mammalian tongue, the mechanical papillae represented by filiform papillae devoiced from taste buds, while the gustatory papillae include the fungi form, circumvallated and foliate papillae with taste-buds in their walls (4). The tongue consists largely of skeletal muscle, partly invested by mucosa. The lingual mucosa of the inferior surface is thin, smooth and like that in much of the rest of the oral cavity. The mucosa of the pharyngeal part of the dorsum contains many lymphoid follicles (5).

Materials and Methods

This study was carried out on the tongues of eight adult normal healthy Iraqi local breed rabbits (*Oryctolagus cuniculus*) of both sexes, 4 male and 4 female (1 year old and 3 kg) collected from farms from Diyala city (about 50 km north of Baghdad). As well as eight adult normal healthy adult wild rabbits (*Lepus capensis*) of both sexes, 4 male and 4 female (3 kg) collected from wild nature of the same city. All animals were examined before their euthanasia (Intramuscular injection of ketamine Hcl 60 mg/kg and xylazine 6 mg/kg anesthetic drug mixture, and then each breed of rabbits (wild and local) divided into two groups (4 for morphology and 4 for histology). The morphological parameters such as weight of animals and length of animals and tongue and width, thickness of tongue were taken by using vernea caliper, and then the tongue processing in alcohol, xylene and paraffin then stained with hematoxylin and eosin (6).

Results and Discussion

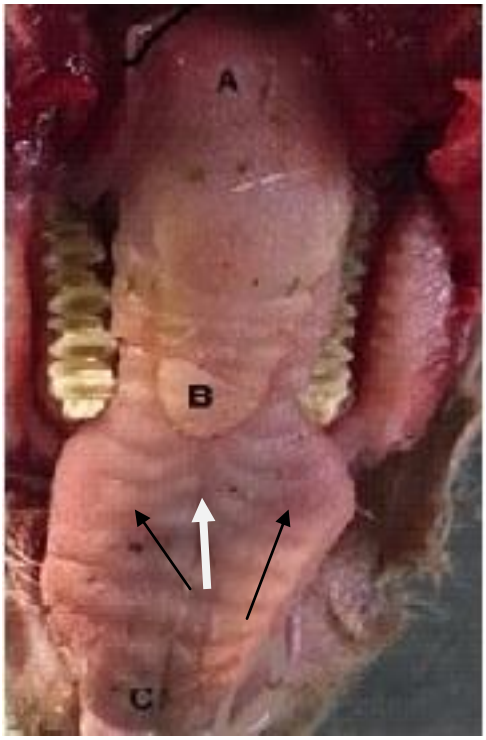
Anatomical results: The tongue of wild rabbit and local rabbit was muscular organ, it was located in the floor of the mouth cavity. The present results in the wild rabbit t revealed that length of tongue was (48.11 ±2.19 mm), thickness of tongue (3.39± 0.30 mm) and width of the tongue (11.41±0.95 mm) while the present results in the local rabbit revealed that length of tongue was (43.8 ±1.24mm), thickness of tongue (4.51±0.20 mm) and width of the tongue (10.14±0.44 mm), generally the tongue in the wild rabbit was longer, widths and relatively more flatter and less thickest than that of the local rabbit tongue.

Table (1) Shows the parameters of the tongue in wild rabbit breed and local rabbit breed

Animal	Body weight(k.g) Mean ± SE	Body length(cm) Mean± SE	Length of tongue(mm) Mean ± SE	Thickness of tongue(mm) Mean ± SE	Width of the tongue(mm) Mean ± SE
Wild rabbit	1.5±0.22*	30±2.73	48.11±2.19	3.39±0.30*	11.41±0.95
Local rabbit	1±0.15	25±1.70	43.8±1.24	4.51±0.20	10.14±0.44

*** Represent significant differences at (P<0.05).**

The tongue of both wild rabbit and local rabbit divided into three region, the anterior (lingual apex), middle (lingual body) and posterior (lingual root). The apex was free rostral portion of the tongue was rounded in the wild rabbit while was pointed in the local rabbit, the body of the tongue in both (wild rabbit and local rabbit) present an elongated median elevation on its dorsum. The posterior of the tongue was the root which that longer and wider in the wild rabbit than the root of the local rabbit. The characteristic features of the dorsal surface of the wild rabbit tongue was the presence of dorsal median groove which divides the dorsum into symmetrical halves and transverse ridges extended from middle to periphery while in the dorsal surface of local rabbit tongue was not present of median groove and transverse ridges (Fig. 1 and 2), also the presence of the lingual prominence (torus lingual) at the dorsal surface of the tongue which relatively higher in the wild rabbi tongue than of local rabbit tongue.



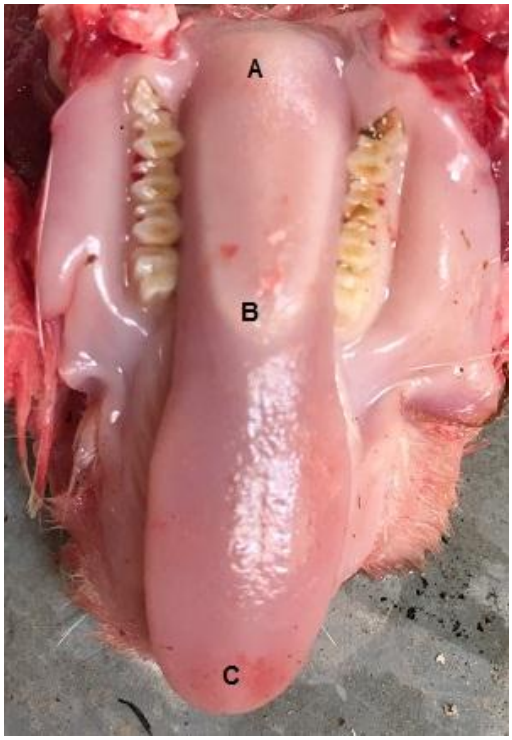


Fig: (1) Tongue of wild rabbit **Fig: (2) Tongue of local rabbit**

Tongue of wild rabbit (1) and local rabbit (2) shows the tongue parts.

Apex (c), Body (Torus linguae)(B), root (A), median groove(white arrow),Transverse ridges (black arrows).

Histological results: The tongue in both (wild rabbit and local rabbit) is divided into three areas: the anterior (apex), middle (body) and posterior (root) also mentioned by (7, 8, 9, 10), also the present study revealed into the presence of the lingual prominence (torus lingua) in the middle part of the tongue also mentioned by(2), the tongue is covered by mucosa of keratinized stratified squamous epithelium underlined by lamina propria this result is also referred by(11, 12), The characteristic feature of the dorsal surface of anterior part is the presence of dorsal median groove this result also mentioned by (9), the wall of papillae contains taste-buds accepted with (10). The dorsal surface of the tongue in both (wild rabbit and local rabbit) is covered with mucosa consists of an outermost keratinized stratified squamous epithelium beneath which is a dense network of connective tissue called the lamina propria, in which are found numerous blood capillaries (Fig. 3 and 4). The lamina propria is continuous with the epimysium of the muscular core and extends to the perimysium. The epithelia of the wild rabbit tongue is thicker than that of local rabbit tongue, thickness of the epithelia in wild rabbit was (580 ±2.2) and in the local rabbit was (405 ±1.5). Taste buds are very clear in lingual papillae in both wild rabbit and local rabbit excepted filiform papillae devoided from taste buds. The submucosa of wild rabbit is thicker (167.5±1.3) than that of local rabbit (85±1). The amount of adipose tissue in local rabbit is more than that of the wild rabbit also referred by (13). Tunica muscularis consists of two layers circular and longitudinal (in wild rabbit the circular is externally and longitudinal is internally while in local rabbit the longitudinal layer externally and circular internally (Fig. 5 and 6).

Table (2) The thickness of epithelia and sub mucosa in wild rabbit breed and local rabbit breed (micrometer)

Animal	Epithelia Mean ± SE	Submucosa Mean ± SE
Wild rabbit	580±2.2*	167.5±1.3*
Local rabbit	405±1.5	85±1

*** Represent significant differences at (P<0.05).**

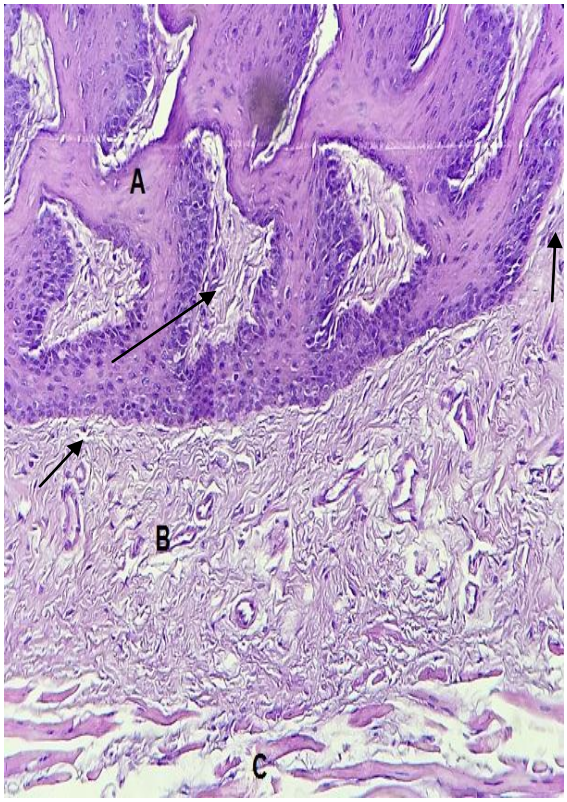


Fig (3)

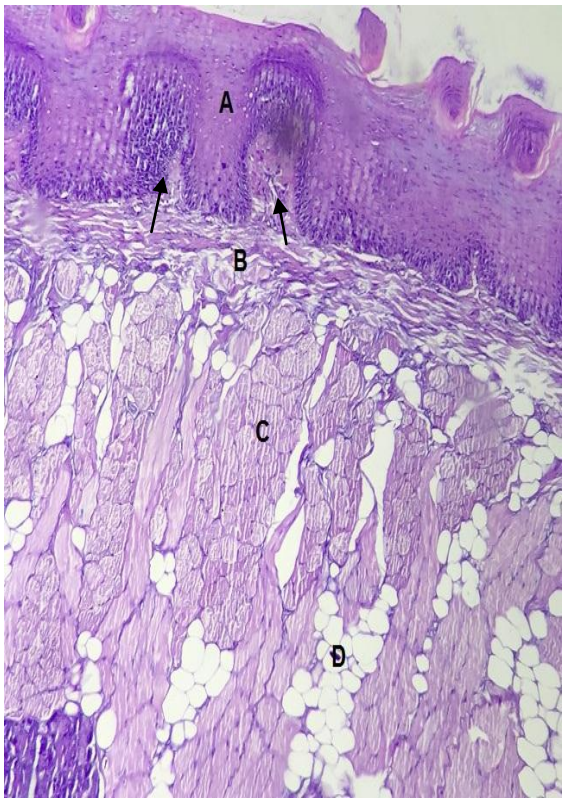


Fig (4)

Fig. (3): Tongue of wild rabbit shows mucosa (A): Keratinized stratified squamous epithelium and lamina propria (arrows), submucosa (B): thicker dense irregular connective tissue, muscularis layer(C). (H&E, X100).
Fig. (4): Tongue of local rabbit shows mucosa (A): Keratinized stratified squamous epithelium and lamina propria (arrows), submucosa (B): thinner dense irregular connective tissue, muscularis layer (C), and adipose tissue (D). (H&E, X100).

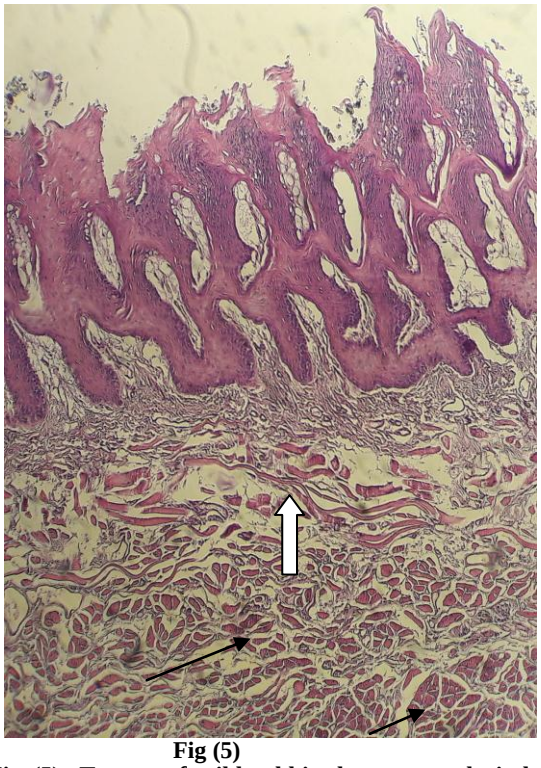


Fig (5)

Fig (6)

Fig (5): Tongue of wild rabbit shows muscularis layer: circular muscles is externally (black arrows) and longitudinal muscles is internally (white arrow). (H&E, X100).
Fig (6): Tongue of local rabbit shows muscularis layer: circular muscles is internally (black arrows) and longitudinal muscles is externally (white arrow). (H&E, X100).

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