



# Effects of sex and breeding season on the morphological and histological structures of the interdigital gland in *Awassi* sheep (*Ovis aries*)

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- Interdigital glands in ruminants are defined as skin invaginations located in the region between the digits.
- These glands are considered scent glands, and are responsible for sexual communication with its contents being secreted.

- The anatomical position and histological structure of the interdigital gland have been reported in various breeds of sheep , goat , serow , and roebuck .
- This is the first study on the morphological and histological structures of the forelimb and hindlimb interdigital glands of male and female Awassi sheep (*Ovis aries*) during and outside of the breeding season.

# **Materials and Methods**

# Sample collection

The interdigital gland samples used in the study were collected from Awassi sheep that were slaughtered.

Samples were taken during both the breeding (June–July) and non-breeding (November–December) seasons.

For each season, the forelimbs and hindlimbs from 10 males and 10 females were collected.

# Macro anatomic and morphometric examinations

The interdigital gland was dissected from the area between the digits.

A precision scale (Vibra HT 224, Shinko Denshi Co., Ltd, Japan) was used to weigh the gland.

Morphometric values from the gland were measured using digital calipers .

# Histological techniques

Gland tissues were embedded in paraffin according to a routine procedure after fixation in a 10% neutral formaldehyde solution. Then, 4  $\mu\text{m}$  thick sections were stained with haematoxylin and eosin.

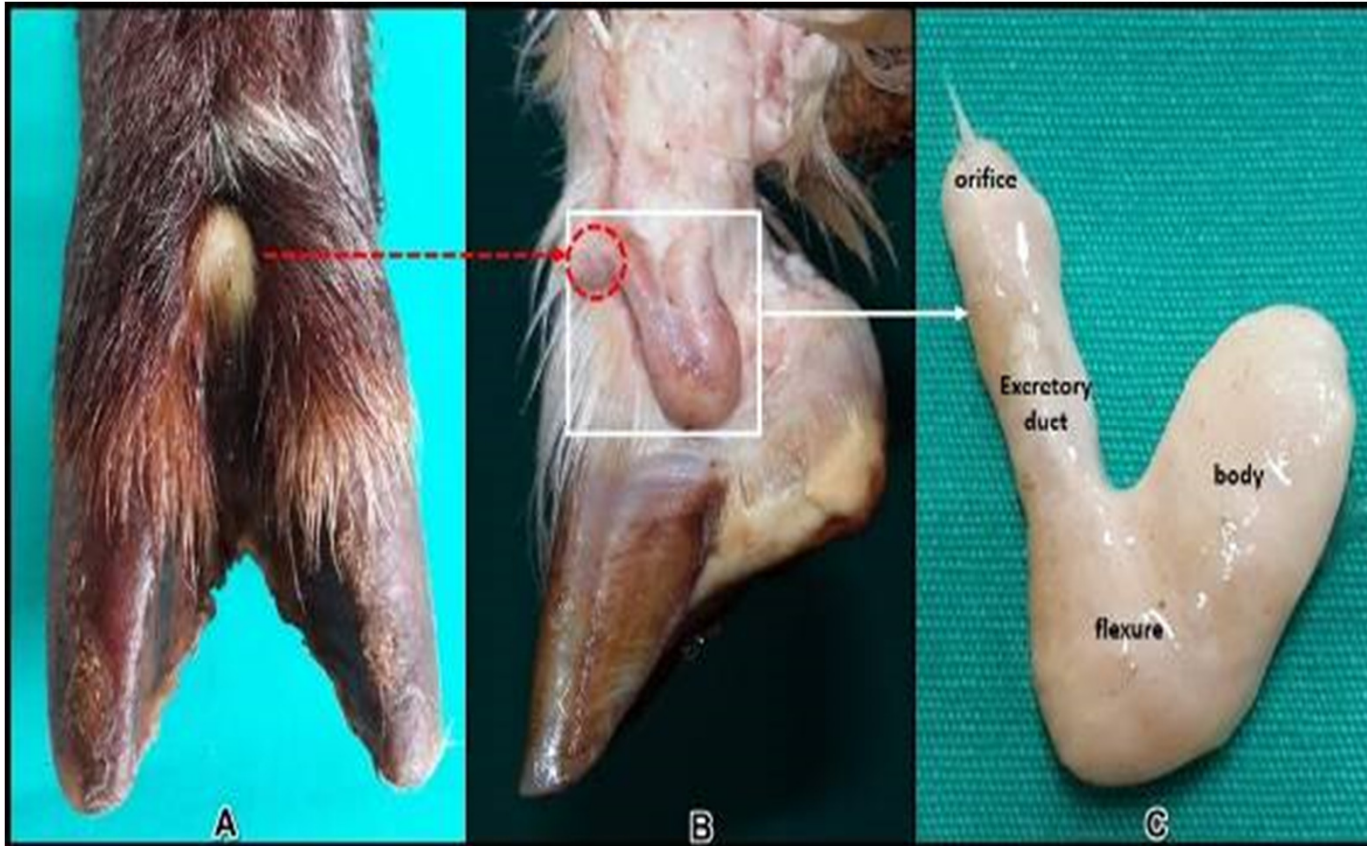
Differences between morphometric measurements of the glands located on the forelimbs and hindlimbs and on the right and left hindlimbs were tested using an independent *t*-test. Statistical analyses were performed using SPSS version 22. Statistical significance was established at  $P < 0.05$



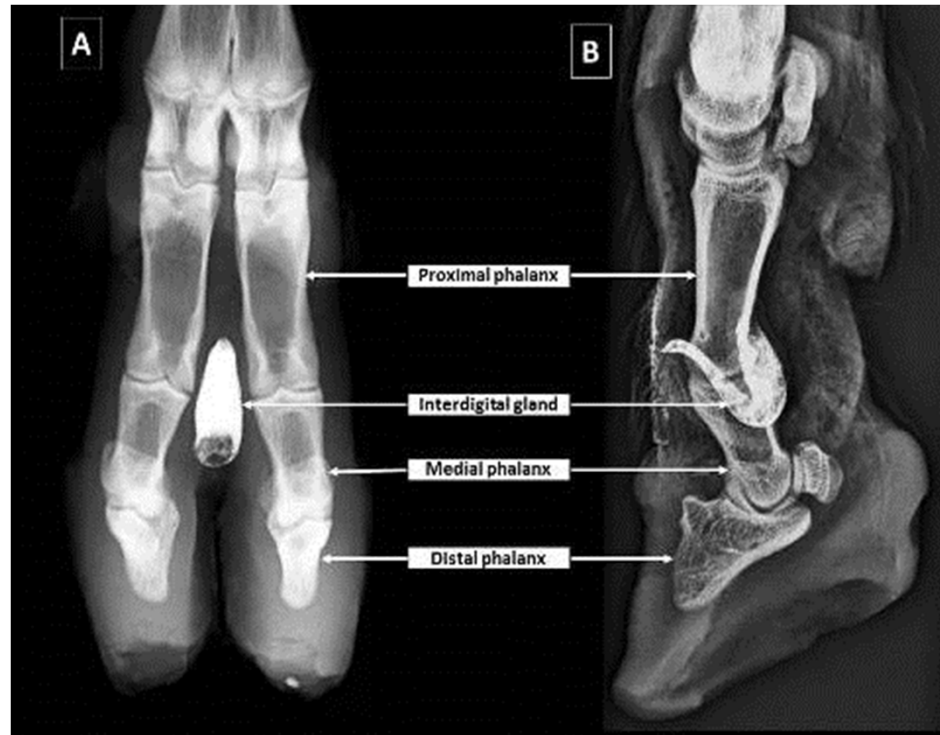
# Results

# Macro anatomic and morphometric observations

The interdigital gland was present in all of the limbs. The orifice was located between the medial and lateral digits at the level of the anterior part of the proximal interphalangeal joint (Figure-1)



**FIGURE-1:** Cranial (A) and lateral (B and C) appearance of the interdigital gland



**Figure 2:** Dorsopalmar (A) and lateromedial (B) radiographic appearance of the interdigital gland.

- The duct of the gland was oriented in a distopalmar/distoplantar direction, starting from the orifice to the middle of the medial phalanx.
- The gland formed a bend by curling up at this level.
- The gland was attached to neighbouring tissues by connective tissue.

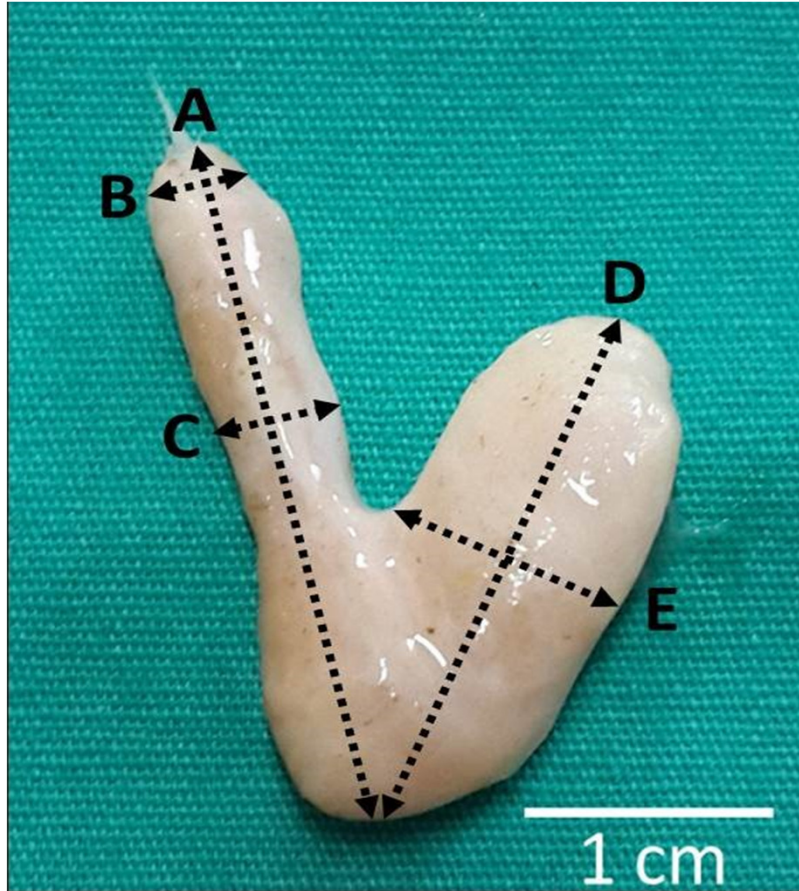
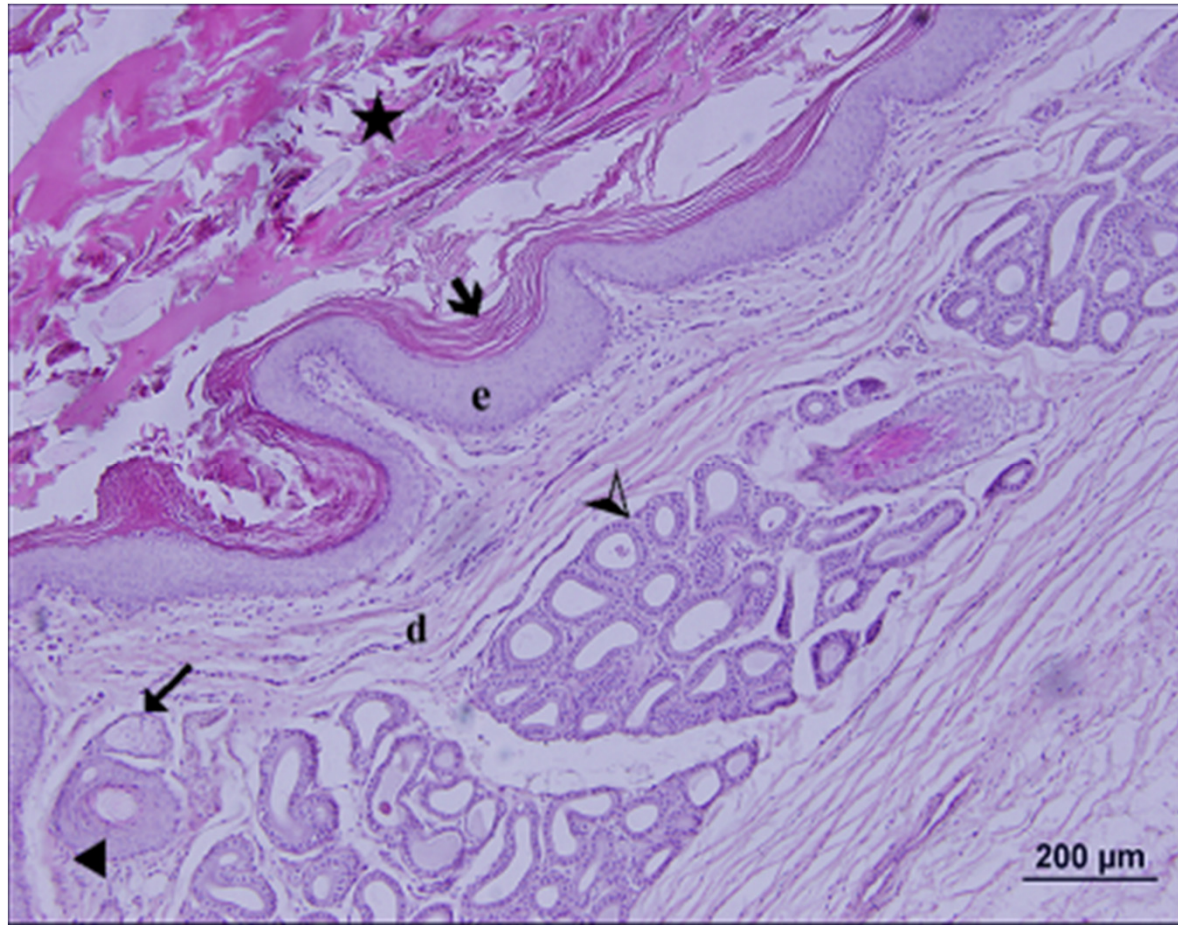


Figure 3: The interdigital gland and its parts (lateral appearance).  
**A: duct length, B: duct opening diameter, C: duct diameter, D: body length, E: body width.**

- The mean weight of the gland was higher in males than in females, as well as in the breeding season compared to the non-breeding season.

- Males had higher values for all of the parameters compared to females.
- In the breeding season, values were generally higher than in the non-breeding season.
- The morphometric parameters of the gland in the forelimb were higher than those in the hindlimb.





Microscopic appearance of the interdigital gland, 100x, H&E. Star: mass in the lumen; thick arrow: keratin layer; e: epidermis; d: dermis; arrowhead: cluster of apocrine glands; thin arrow: sebaceous gland; filled triangle: hair follicle.

- Higher morphometric values were observed during the breeding season compared to the non-breeding season, and the lumen of the glands of the forelimbs was larger than that of the hindlimbs, supporting the hypothesis that the interdigital gland plays a role in sexual communication.



Gobekli Tepe



Pool of Abraham (Balıkgöl)

*Thanks...*

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