The differences of electrical resistance values of vaginal mucus (ERVM) in yearling and mature saanen goats

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Abstract. It has been reported that during the oestrous cycle, an increase in the volume of cervical mucus occurs due to the influence of high oestrogen concentration on vaginal vasodilation, leading to a decrease in the electrical resistance of vaginal mucus (ERVM) as the goat approaches estrus. The present study aims to understand the differences between yearling (n:14) and mature (n:22) Saanen goats when continuous measurements of ERVM were taken by using the digital Draminski® device (Draminski Electronics, Poland). Oestrus was synchronized using intravaginal sponges and the ERVM measurement was taken every 6 hours right after the sponge removal until insemination. The results indicate that ERVM measurements for mature Saanen goats were significantly lower at 0, 6, 12, 30, 36, and 42 hours compared to those of yearling Saanen goats. Additionally, within the yearling Saanen group, there was a significant difference between the measurement taken at the 18th hour and the measurements taken at other time points. Furthermore, as goats approached estrus, the differences in ERVM measurements between mature and yearling Saanen goats disappeared. Based on these results, the ERVM values in yearling Saanen goats can be reliably used for predicting time of estrus, while a more cautious approach should be taken for mature Saanen goats.

1 Introduction

The measurement of electrical resistance in vaginal mucus (VER) was developed and has been demonstrated to be effective in predicting and detecting ovulation, particularly in terms of human family planning [1]. Subsequently, researchers have explored the application of vaginal electrical resistance (VER) to understand the changes in the estrous cycle in certain farm animal species. Electrical resistance values of vaginal mucus (ERVM) have been studied in cows [2], buffalo cows [3], ewes [4], and goat does [5]; however, there is limited data available for small ruminants.

It has been reported that, during the estrous cycle, an increase in the volume of cervical mucus occurs due to the influence of high estrogen concentration on vaginal vasodilation, leading to a decrease in the electrical resistance of vaginal mucus as the goat approaches estrus. The operational principle of the Draminski® device for estrous detection relies on measuring electric current resistance within vaginal mucus as an indicator.

The electrical resistance values (ohms) of the cervical mucus (ERCM values) at oestrus were significantly lower in ewes that conceived compared to those that did not, in both the 12-day and 14-day group [6].

However, the specific electrical resistance values can vary depending on the individual goat, the breed, and other factors. There is no universally fixed "heat value" in terms of electrical resistance that applies to all goats. Therefore, it's essential to establish a baseline or reference point for each individual goat or herd by monitoring their VER over time. The electrical resistance values of vaginal mucus in goats, also known as vaginal electrical resistance (VER), has been used as an indicator of estrus or heat in female goats.

The present study aims to understand the differences between yearling and mature Saanen goats when continuous measurements of ERVM were taken by using the digital Draminski® device.

2 Material and method

All experimental protocols were conducted at the small ruminant farm located within Cukurova University in Adana. A total of 36 Saanen goats, comprising 22 sexually Mature and 14 Yearling Saanen goats, were used during seasonal period spanning from September to August. At the beginning of the experiment, all goats were ranked according to live weights and kept together. The animals were provided with a diet consisting of hay and concentrates, with access to water available ad libitum.

All animals included in the trial were synchronized by the insertion of sponges impregnated with 20 mg of progesterone via the vaginal route for a duration of 10 days. At the conclusion of this 10-day period, all sponges were removed, and 500 IU of PMSG hormone was simultaneously administered to each animal, facilitating ovulation and the release of eggs. Following synchronization, the ERVM measurement was taken

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every 6 hours right after the sponge removal until insemination.

The Draminski Estrus Detector (by Draminski Electronics, Poland) was used to determine the ERVM. Briefly, following the restraint of the goats, both the animals' vulva and the Draminski Estrus Detector were cleansed using a mild antiseptic solution and subsequently dried with a clean cloth. Next, the prob was carefully inserted through the vulva until it reached the cervix. ERVM values were determined following the manufacturer's instructions, and the average of three consecutive measurements was promptly recorded. Additionally, the estrus in mature and yearling goats was also identified by using a teaser buck.

3 Results and discussion

The results indicate that ERVM measurements for mature Saanen goats were significantly lower at 0, 6, 12, 30 and 36 hours compared to those of yearling Saanen goats. Additionally, within the yearling Saanen group, there was a significant difference between the measurement taken at the 18th hour and the measurements taken at other time points.

Table 1. Font styles for a reference.

	Mature Saanen	Yearling Saanen
Time (hour)	n=22	n=14
0 H	286±11,5^{b}	428±12,7^{a}
6 H	313±10,3^{b}	392±14,6^{a}
12 H	322±10,2^{b}	389±21,3^{a}
18 H	246±14,8^{b}	288±24,2^{a}
24 H	296±15,0^{ab}	340±23,6^{a}
30 H	303±12,5^{ab}	359±27,0^{a}
36 H	311±12,4^{ab}	364±26,5^{a}
42 H	309±12,3^{ab}	353±27,7^{a}

In this study, the Draminski® tool exhibited values falling within the range of 246 to 428 units. The time of estrus onset, as determined by the teaser buck following the removal of the intravaginal sponge, was recorded as 27.9 ± 1.74 hours and 28.8 ± 0.53 hours for yearling and mature Saanen goats, respectively.

Furthermore, as goats approached estrus, the differences in ERVM measurements between mature and yearling Saanen goats disappeared (Fig. 1).

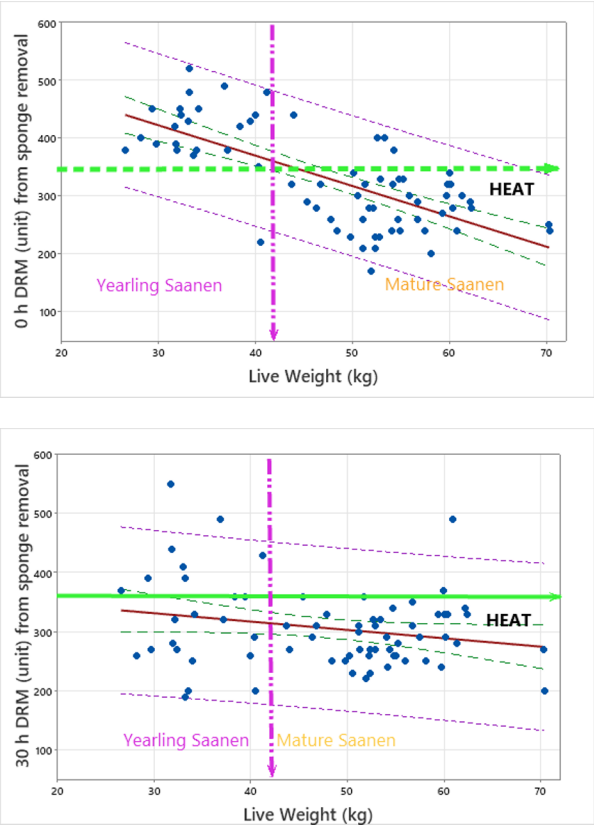

Fig. 1. The differences in ERVM measurements between mature and yearling at 0 and 30 hours after sponge removal.

Based on these results, the ERVM values in yearling Saanen goats can be reliably used for predicting time of estrus, while a more cautious approach should be taken for mature Saanen goats.

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