

Conference Paper

The Relation of Body Temperature and Vaginal Cytology Examination in Time Artificial Insemination Rate Fat-tailed Sheep (*Ovis Aries*) in The District Sidoarjo East Java

Rhendyka Prasetya Anggriawan¹, Suzanita Utama², and Hana Eliyani³

¹Professional Program of Veterinary Medicine, Indonesia

²Veterinary Reproduction Department Faculty of Veterinary Medicine, Universitas Airlangga, Indonesia

³Basic Veterinary Medicine Department Faculty of Veterinary Medicine, Universitas Airlangga, Indonesia

Abstract

Ewes fertility is one aspect that needs to maximum level. Reproductive performance in sheep livestock in Indonesia has become one of the main determinants of reproductive success. This study has been carried out of the body temperature measurement and sampling of vaginal cytology of 60 fat-tailed sheep before artificial insemination in Sidoarjo East Java. Body temperature measurement is done in the rectum of reported ewes in heat and artificial insemination requested can be determined by observing the condition of the vulva of ewes such as the presence or absence of mucus through the vagina, vulva swollen and reddened vulva mucosa. vaginal cytology sampling with a cotton swab inserted into the vulva \pm 15cm of ewes that reported in heat then interpreted by a microscope. The result showed that ewe's body temperature in 39.1°C-39.2°C has a significant correlation with vaginal cytology type on oestrous phase.

Keywords: Ewes, body temperature, vaginal cytology, the district Sidoarjo East Java.

Corresponding Author:

Rhendyka Prasetya
Anggriawan

Received: 03 October 2017

Accepted: 10 October 2017

Published: 29 November 2017

Publishing services provided
by Knowledge E

© Rhendyka Prasetya
Anggriawan et al. This article
is distributed under the terms
of the [Creative Commons
Attribution License](#), which
permits unrestricted use and
redistribution provided that
the original author and source
are credited.

Selection and Peer-review
under the responsibility of the
VMIC Conference Committee.

1. Introduction

Sheep have an important role in the development of livestock sector in Indonesia. Generally kept sheep are fat tailed sheep and thin tail sheep. Not only produce meat as the main product but also produce fertilizer and leather but on the other hand, Indonesia's meat production is not optimal to meet national needs. The famous lambs in Indonesia, especially in Java are fat-tailed sheep that are found in Central Java and East Java and thin-tailed sheep are widely found in West Java [1].

OPEN ACCESS

Fertility of sheep is one aspect that needs to be improved as much as possible. Reproduction performance in the development of sheep in Indonesia became one of the main determinants of the success of reproduction [2]. Sheep have the ability to adapt well in tropical environments, not tied to the breeding season and have immunity to some diseases. The population of sheep continues to increase because production is maintained throughout the year at a low cost, to increase the population along with the increase in public consumption [3].

Based on changes in the behaviour of estrus females that generally show anxiety or discomfort, trying to climb other females, silent when another female or male fights and decreases appetite. In addition to changes in behaviour, visual observation is also shown through changes in the external genitalia that changes physically as the vulva is red, warm, swollen, and mucus is clearly visible. Visually observation will make it difficult for breeders if the female livestock does not show the oestrous condition clearly.

The estrus phase is essentially influenced by the hormonal system. The hormonal system that affects estrus is centered on the gonadotropin hormone of the anterior pituitary and the ovarian hormone FSH and estrogen. Changes in FSH and estrogen cause physiological changes in the livestock bodies manifested in physical changes that are either swelling of the vulva and the red vulva [4].

Temperature detection in the oestrus period can also be measured to observe the effect of temperature at the same time, at a temperature estrus detected ranging from 37.5°C-40.5°C [5]. The Oestrus cycle has four different phases: (1) proestrus (2) estrus (3) metestrus (4) diestrus. These four phases have different epithelial cells in vaginal cytology observations, these changes and differences are influenced by hormonal factors. The results showed that there were variations of epithelial cell types with different compositions in intermediate and superficial cells [6].

In this study, tabulation of data for body temperature measurements taken from rectum sheep at the time before artificial insemination will be done, then observation of vaginal cytology cell type taken from a vaginal mucosa. Collected data is processed by statistical calculation between body temperature and vaginal cytology type of cytology, the relationship between temperature and cytological cell type, so it can be used as the base data for ewes reproduction.

2. Materials and methods

TABLE 1: The relationship between cell type vaginal cytology and body temperature.

	Temperature		
	38.7°C-39°C	39.1°C-39.2°C	39.3°C-39.5°C
Number of sheep with the type of interpretation in the oestrus phase	2	14	3
Result	Not significant	Significant	Not significant

2.1. Materials

Sixty Fat-tailed ewes from Sidoarjo district located in Kecamatan Candi. The equipment used is a digital thermometer used to check the temperature of the lamb rectum when lust. Hygrometer to measure the temperature and humidity of the area. Microscope, Pasteur pipette, plastic glove, object glass and giemsa solution for vaginal cytology preparations. NaCl physiological and absolute alcohol to sterilize the vulva area in the vagina.

2.2. Methods

This field explorative study begins by recording the rectal temperature and sampling of the vaginal epithel from the sixty fat-tailed ewes who are on oestrus just before artificial insemination. Subsequently, the preparation of vaginal smears was interpreted and rectum temperature data were analyzed by logistic regression.

3. Results

Based on the descriptive analysis of 58 fat-tailed ewes then observed body temperature and vaginal cytology features, 19 or 32.8% were identified estrus phase, 36 or (62.1%) in the proestrus phase and 3 or (5.2%) in the diestrus phase. The body temperature of fat tailed sheep that measured at estrus ($39.1 \pm 3.4^\circ\text{C}$), in the proestrus phase ($38.7 \pm 3.8^\circ\text{C}$) and at the diestrus phase ($38.7 \pm 3.8^\circ\text{C}$) see Table 2.

The results of logistic regression analysis between body temperature and cytology type of vaginal vagina corresponding to oestrous, proestrus and diestrus phases in fat tailed sheep can be seen in Table 1.

TABLE 2: Body temperature and cytology features.

	Estrous phases		
	Proestrus	Estrus	Diestrus
Samples	36	19	3
Percentage	62.1%	32,8%	5,2%
Temperature range	37.9-39,5°C	38.7-39.5°C	37.9-39.5°C
Mean ± Standart deviation	38.7°C±3.8°C	39.1°C±3.4°C	30.7°C±3.8°C

TABLE 3: The relationship between the type of proestrus vaginal cytology and body temperature.

	Temperature		
	37.9°C-38.7°C	38.8°C-39°C	39.1°C-39.3°C
Number of ewes with the type of interpretation in the proestrus phase	7	12	17
Result	not significant	not significant	not significant

Vaginal cytology in the manifest estrus phase which is dominated by superficial cells having a significant association ($p < 0.001$) 14 ewes with body temperature 39.1°C-39.2°C. On the other hand 2 ewes with a body temperature between 38.7°C-39°C and 3 ewes with a body temperature between 39.3°C-39.5°C uncorrelated or insignificant.

Vaginal cytology in the proestrus phase is dominated by intermediate cells having a nonsignificant correlation with body temperature ($p > 0.001$). However, if presented descriptively based on the number of ewes with body temperature at temperatures between 37.9°C-38.7°C there are 7 individuals, between 38.8°C-39°C is 12 individuals and the range of 39.1°C-39.3°C is 17 individuals. It appears that this range of temperatures is compatible with the interpretation of cytological types in the proestrus phase, see Table 3.

The cytology results of the vaginal cotton swab show the presence of superficial cells and intermediate cells contained in the estrus phase, on the other hand in the proestrus phase there are intermediate cells and in the diestrus phase, there are only parabasal cells. Different types of vaginal ovarian cytology cell can be seen in Figure 1,2,3.

Based on observations of 58 vaginal swab cotton samples, 19 samples were dominated by intermediate cells and superficial cells, which were further defined in accordance with the ewes conditions in the oestrous phase. On the other side, 36 samples are dominated by intermediate cells determined in accordance with the proestrus

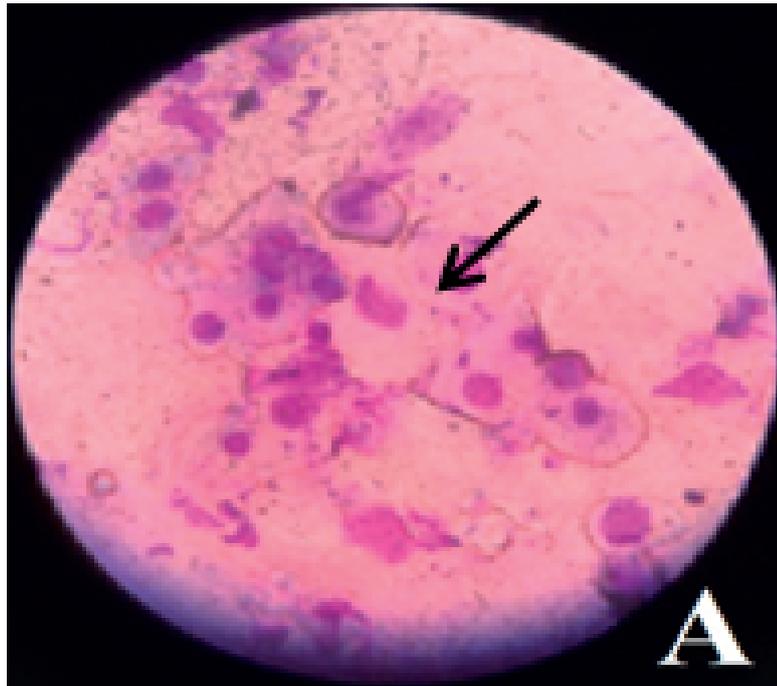


Figure 1: The cytological features of the proestrus phase are characterized by intermediate cells and parabasal cells.

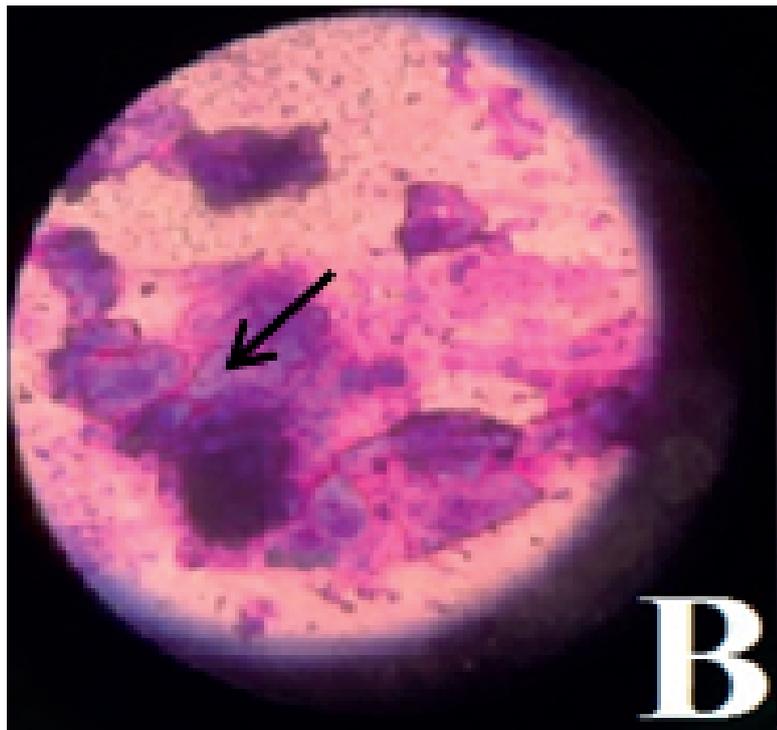


Figure 2: The cytological features of the proestrus phase are characterized by superficial cell and intermediate cells.

phase. Only 3 preparations were observed by showing the dominance of parabasal cells so that their status was categorized by the diestrus phase.

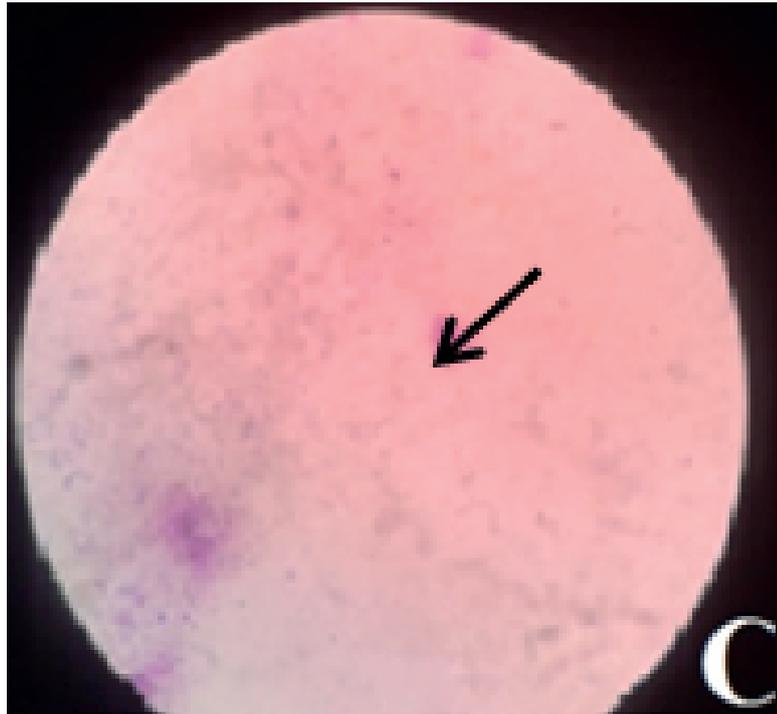


Figure 3: The cytological features of the proestrus phase are characterized by basal cells and parabasal cells.

Vaginal epithelial cytology from local sheep for 7 days of estrus observation showed changes marked by flushing of the vulva and 12.9% proliferation of superficial cells. While intermediary cells and parabasal cells did not change significantly. But 46.098% was dominated by superficial cells resulting in a vaginal smear on day 3 of the oestrous phase and also showed a change in size. This variation may be related to the physiological status and animal hormonal activity. The flushing of the vulva is associated with estrogen and estradiol hormones that tend to increase in the estrus phase [4]. Estrogen stimulates thickening in the vagina, increased vascularization so that the outer genitals are swollen and reddish [7].

The vaginal cytology feature of the bligon goat on the first day of estrus appears to be Superficial cells (%) 25.50 ± 12.40 Intermediates (%) 46.75 ± 11.15 Parabasal (%) 10.38 ± 7.17 . The percentage of superficial cell types and intermediate cells that tended to increase in the proestrus, estrus, and decreased (luteal) phases along with the tendency of estradiol changes in bligon goats [8]. The description is similar to cytology vaginal swab cells in cows that show the proportion of high superficial cells in the oestrous phase and in west African dwarf goat showing an increase in Superficial cells in the proestrus, estrus, and early metestrus phases [9, 10]. Vaginal cytology has

generally been shown in the estrus phase is dominated by superficial cells and intermediate cells, the proestrus phase is dominated by intermediate cells and parabasal cells and in the diestrus phase is dominated by basal and parabasal cells [11].

Observations on vaginal swab preparations to confirm the oestrous phase of fat-tailed sheep before artificial insemination and observation of body temperature as measured between 7am-5pm. Recording results have variations ranging from 37.5°C-39.5°C. Based on the survey it appears that the image is interpreted according to the type of cell in the oestrous phase shown by ewes with body temperature 38.7°C-39.5°C, while for proestrus phase the temperature shows 37.9°C-39.3°C.

PE (peranakan etawa) goat simultaneously laced with CIDR progesterone implant (controlled Internal Drop Release) has a body temperature between $38.66^{\circ}\text{C} \pm 0.86$ to $39.29^{\circ}\text{C} \pm 0.8$ [12]. The cause of the increase in body temperature in estrus phase due to vascularization in the vagina area so it is assumed the body temperature to increase. The physiological temperature setting is controlled by the hypothalamus [11]. The vaginal temperature in bligon goats in oestrous phase between $38.51^{\circ}\text{C} \pm 0.21^{\circ}\text{C}$ [8]. All of the above along with the results of studies on fat-tailed sheep in the district of Candi Sidoarjo district. It was found that body temperature correlated with vaginal cytology type in estrus phase was 39.1°C - 39.2°C .

References

- [1] Siagian, V. 2008. Peningkatan Protein Hewani untuk Ketahanan Pangan. Harian Bisnis Indonesia. No. 101 Februari 2008 Tahun VIII. Sumatra Selatan.
- [2] Hardijanto. 1982. Pengaruh Pemberian Prostaglandin $F_2\alpha$ dan Pregnant Mare Serum Gonadotropin Terhadap Jumlah Fetus pada Domba. Fakultas Pasca Sarjana Unair. Surabaya.
- [3] Food and Agriculture Organization (FAO) Corporate Document Repository. 2004. Prolific Sheep in Java.
- [4] Nurfitriani I, Setiawan R. dan Soeparna. 2015. Karakteristik Vulva dan Sitologi Sel Mucus Dari Vagina Fase Estrus Pada Domba Lokal. Fakultas Peternakan Universitas Padjadjaran, Jalan Raya Bandung – Sumedang KM 21 Sumedang 45363 * Alumni Fakultas Peternakan Universitas Padjadjaran Tahun 2015.
- [5] Blight, D.B., R.A. Meece., and A. Thomas. 1999. Animal and Sciences Application. Alpha Publishing. Co. California.
- [6] Johnston, Moxon. 2010 Evidence for Menstrual Cycle Shifts in Women's Preferences for Masculinity: A Response to Harris (in press) "Menstrual Cycle and Facial

Preferences Reconsidered" Evolutionary Psychology – ISSN 1474-7049 – Volume 8(4).

- [7] Frandson, R.D. 2003. Anatomy and Physiology of Farm Animals. 6th ed. Philadelphia: Lippincott Williams & Wilkins
- [8] Widiyono, I., P. P. Putro, Sarmin, P. Astuti dan C. M. Airin. 2011. Kadar Estradiol dan Progesteron Serum, Tampilan Vulva dan Sitologi Apus Vagina Kambing Bligon selama Siklus Birahi. Jurnal Veteriner Vol. 12 No. 4: 263-268.
- [9] Blazquez NB, Batten EH, Long SE, Terry GC, Whelchan oj. 1989. A Quantitative Morphological Study of The Bovine Vagina Epithelium During The Oestrous Cycle. J Comp Pathol 100 (2):187 193.
- [10] Ola SI, Sanni WA, Egbunike G. 2005. Exfoliative Vaginal Cytology During Oestrus Cycle of West Affican Dwarf Goats. Reprod Nutr Dev 46 (1): 87 95.
- [11] Hafez, E.S.E. 2000. Reproduction in Farm Animals, 2000, 509 pages, E. S. E. Hafez, B. Hafez. 0683305778, 9780683305777, Wiley, 2000.
- [12] Dewi R.R, Wahyuningsih dan D. T. Widayati 2011. Respon Estrus Pada Kambing Peranakan Ettawa dengan Body condition Score 2 dan 3 Terhadap Kombinasi Implant Controlled Internal Drug Release Jangka Pendek dengan Injeksi Prostaglandin F₂ Alpha.Fakultas Kedokteran Hewan. Universitas Kuala Syiah.