

The Use of Vaginal Smear Method Based on the Morphology of the Vaginal Mucosa Epithelial Cells for the Dairy Cows Cycle Estrus Detection

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ABSTRACT: The purpose of this study was to identify the estrus cycle in dairy cows based on epithelial cell morphology appearance vagine produced by vagine smear vagine mucosal cells. The research was use of Fries Holstein crossbred cow as many as 21 head. All cows were synchronized use PGF2 α and GnRH hormone by injected intra muscular injection PGF2 α injection carried out twice with an interval of 11 days and on day 13 injection of GnRH by intra musculair (IM). Epithelial cells were taken using the cotton bud then reviewed on an object glass. The vagine smear results were stained with Giemsa 3%. Vagine epithelial cells was observed using a microscope magnification 10x45 and 10x100. Estrus detection is also implemented using the heat detector Draminski brands. The results showed that (1) the cells are round and oval has a larger cell than the cell cytoplasm called parabasal on metestrus phase, (2) epithelial cells and small oval-shaped and slightly irregular, but there is still a cell wall and has a large nucleus called intermediate cells during diestrus, (3) the cell's nucleus irregularly shaped (polygonal) but still the cell nucleus and cell wall faded and most of cornification of epithelial cells called superficial cells are found during proestrus, (3) cell-shaped flat, translucent and transparent and does not contain a cell nucleus and cell wall occurs cornification classified as anuclear cells occurs in estrus phase. When estrus number of superficial cells cornification reaches 90.57 to 94.19%. of all cells obtained in the observations. Detection results using the heat detector at the time proestrous and estrous showed a low the numbers of 175-240 whereas the currently metestrus and diestrus between 350-500. The conclusion of this study was vagine smear method using 3% Giemsa there parabasal cells, intermediate. superficial, and anuclear during the estrous cycle. The use of vaginal The Pap method can be used for detection of estrus cycle in dairy cows.

Keywords: vaginal smear, vaginal mucosa epithelial cells, dairy cows, cycle estrus, detection

INTRODUCTION

Efforts to increase the milk production from Holstein Friesian crossbred cow should be supported in a proper way in reproductive management, especially in the accuracy of estrus detection. This has influenced the the determination of appropriate time for insemination. On the other hand there's also a dairy cow who experience silent-heat making it difficult for farmers accurately detect estrus (Bearden *et al.*, 2004; Putro, 2008; Forde *et al.*, 2011). Estrus detection by visual observation as seeing changes in behavior, mucus estrus, color and swelling of the vulva are still inadequate so that the necessary required other detection more accurate (Hafez and Hafez, 2000). estrus detection through vaginal epithelial cell morphology changes in vaginal smear method can determine the accuracy of detection during etsrus cycle. Tool heat detector is capable of displaying digital numbers on the screen that shows the changes in cattle estrus cycle. Detection methods vagine smear and heat detector, both are able to determine the estrous cycle in beef cattle appropriately (Riyanto *et al.*, 2014). The purpose of this study was to identify the estrus cycle in

dairy cows based on epithelial cell morphology vagine appearance produced by vagine smear vagine mucosal cells and the use of heat detector.

MATERIALS AND METHODS

This study has used 21 heads of Holstein Friesian crossbred that have BCS 3.5 (1-5), has been birth at least 1 time, aged <6 years old, and not in a state of pregnant. Cow estrus synchronization has been done using a synthetic hormone preparations PGF2 α by Lutaprost® and GnRH synthetic by Conceptase®. Injection intervals of the first and second injection PGF2 α for 11 days and GnRH injection is done after 48 hours of the second PGF2 α injection (Sunarto, *et al.*, 2014). PGF2 α and GnRH hormone injection, both carried out by intramuscular injection. During the 11 days of estrus detection is done 3 times a day (morning, afternoon, evening) visually and by vaginal smear method. After injection of GnRH within 24 hours was observed estrus detection every 3 hours. Vagine epithelial cell morphology observation using vagine smear staining method 3% Giemsa (Riyanto *et al.*, 2014). Swabs in epithelial cells vagine done about 2-5 cm in vagine using a cotton bud that had previously been dipped in physiological NaCl solution. Cells attached to the cotton bud then applied to the object glas allowed to stand for about 1 hour, then immersed into the liquid methanol, then drained and put in 3% Giemsa solution and then rinsed with aquadest. Epithelial cell morphology can be observed using microscopy and optical lab with magnification 10x4 and 10x10. Observations type and shape of each cell found in swabs obtained can be used to determine the estrus phase of cattle. Counting the percentage of superficial cells done by looking for the entire cell number and the number of superficial cells, and taken third place in the first observation of the same preparations, to obtain an average yield of superficial cells (Puspita, 2013). Estrus detection by using the tool of brand Draminski Heat Detector. The tip tool has two cathode ring inserted into vagine then press the contact button on the tool three times to appears and can be viewed on the monitor, the numbers look a scale of 100-500 and the lower numbers indicate the cow estrus (Riyanto *et al.*, 2014).

RESULTS AND DISCUSSION

Estrus phase at Holstein Friesian crossbred cow has been observed with smear vaginal epithelial cells. Cell shape changes are superficial cells, anuclear cells, intermediate cells and parabasal cells. Estrus detection results by vaginal smear method can be seen in Figure 1. Changes in the morphology of vaginal epithelial cells in cows Peranakan Ongole (PO) there are four types of superficial cells, anuclear cell, parabasal cell, and intermediates cell that can be used for estrus detection and determination of the estrous cycle (Riyanto *et al.*, 2014).

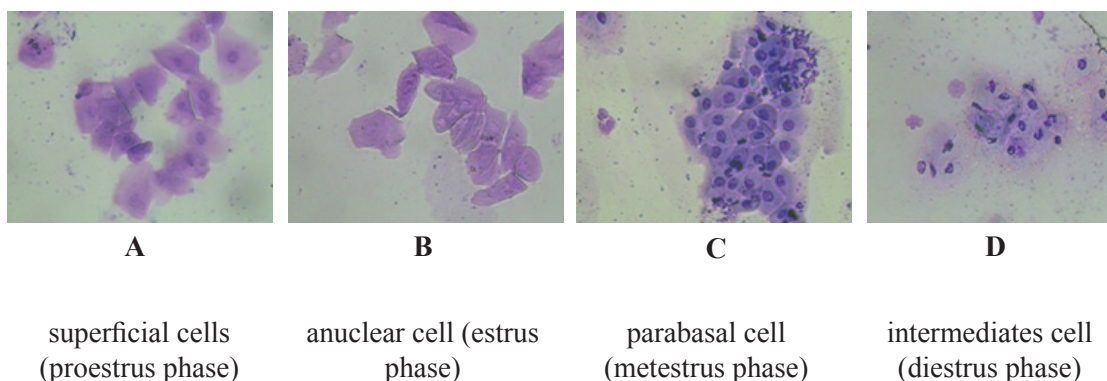


Figure 1. Morphology of the vaginal epithelial cells base on vagine-smear of the Fries Holstein Crossbred Cows (40x10)

The cell's nucleus irregularly shaped (polygonal) but still the cell nucleus and cell wall faded and most of cornification of epithelial cells called superficial cells are found during proestrus (Figure 1A). Proestrus phase in the Ongole crossbred cows are largely epithelial cells undergo cornification so irregular cell shape and characteristics are included in superficial cells (Riyanto *et al.*, 2014). Cell-shaped flat, translucent and transparent and does not contain a cell nucleus and cell wall occurs cornification classified as anuclear cells occurs in estrus phase (Figure 1B). From the estrus phase is almost 100% cornification cells, and these characteristics classified in anuclear cells. Cells form flat, clear transparent, no walls, and no cell nucleus this happens because of the cornification process. (Riyanto *et al.*, 2014). The cells are round and oval has a larger cell than the cell cytoplasm called parabasal on metestrus phase (Figure 1C). Riyanto *et al.*, (2014) observed vaginal smears show this parabasal cells are round and oval nucleus has a larger section than the cytoplasm is usually looked thick. Epithelial cells and small oval-shaped and slightly irregular, but there is still a cell wall and has a large nucleus during diestrus called intermediate cells (Figure 1D). In this phase there are cell wall and most of the cells are not cornification. Riyanto *et al.* (2014) stated that the cells intermediate and parabasal more prominently on the diestrus phase in accordance with the luteal phase is controlled by the hormone progesterone. When estrus number of superficial cells cornification Reaches $90.57 \pm 2.45\%$. 90.57 to $94.19 \pm 3.05\%$ 94.19% of all cells Obtained in the observations. The results showed that of the calculation of superficial cells in the cow cornification during the follicular phase. Puspita (2013) stated that the number of superficial cells cornification which dominates 50% to 90% of the total number of cells, then the animal is in a state of estrus. Ramadan (2014) and Saifuddin (2014) stated that the increased number of superficial cells is probably caused by the hormone estrogen which leads to changes in the walls of the vaginal epithelial cells and epithelial cell cornification. Detection results using the heat detector at the time proestrous and estrous Showed a low the numbers of 175-250 whereas the currently metestrus and diestrus between 350-500. The principle of how the appliance heat detector Draminski production during estrus cows is 110 to 370 units. Indications digit heat detector stated that the lower figure shown it is increasingly approaching estrus (Ramadan, 2014 and Saifuddin, 2014). Yanhendri (2007) states that the use of a heat detector Haupner® German production in Simmental cattle seen in the range of 30-40 ohm (300-400 units). The use of heat detector at Ongole cross bred show number 200-350 when proestur and estrus while at metestrus and diestrus figures show 350-600 (Riyanto, *et al.*, 2014)

CONCLUSIONS

The conclusion of this study was vagine smear method using 3% Giemsa there parabasal cells, intermediate, superficial, and anuclear during the estrous cycle. The use of vaginal smear method can be used for detection of estrus cycle in dairy cows. At the time of estrus epithelial cells vagine dominated by superficial cells cornification up to 95%. Tool heat detector can be used for detection of estrus cycle in dairy cows, the numbers 175-250 on proestrus and estrus phase and 350-500 on metestrus and diestrus phase.

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