

## Conference Paper

# Test Various Estrus Detection Device Against Pregnancy Rates on Dairy Cows in Cooperative Tunas Setia Baru Kabupaten Pasuruan

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## Abstract

This research aims to determine the use of various estrus detection devices before artificial insemination as measured by pregnancy rate. The researcher used a sample of 60 cows were used in this research which is divided into four groups as a control and treatment groups (Thermopin<sup>®</sup>, Hauptner and Draminski groups), and each cow was detected for the sign of estrus by three devices that were Thermopin<sup>®</sup>, Hauptner and Draminski prion when doing an artificial insemination. The cows were observed to 45 days after artificial insemination for observing pregnancy. This research method is the exploration scope to prove the effect of various estrus detection tool against pregnancy rates. The result of ANOVA test, there is the effect of using a various estrus detection devices against pregnancy rates. Samples tested by Draminski with average (1.53±0.51) resulted in a 53.3% pregnancy rate, the samples were tested with Hauptner with average (1.67±0,48) resulted in pregnancy rate 66.7%. Without treatment or control, sample with an average of (1.67±0.48) resulted in a 73.3% pregnancy rate. While samples were tested with Thermopin<sup>®</sup> with average (2.00±0.00) resulted in a 100% pregnancy rate. In conclusion, Thermopin<sup>®</sup> the best detection tool than other estrus detection devices.

**Keywords:** estrus detection, artificial insemination, dairy cow, pregnancy rate.

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## 1. Introduction

Projection of fresh milk production and national milk market from 2010-2015 has not been able to be fulfilled by domestic production. In addition to the small number of national dairy cattle population, capital also becomes an obstacle for farmers to

develop their business. Based on data from the National Dairy Board of 2012 showing that the projection of domestic fresh milk production and demand in 2010-2015 informed that demand for fresh milk in 2010-2015 is estimated to increase by an average of 6.3 percent per year. Nevertheless, fresh milk supply is relatively fixed. The national milk demand in 2010 reached 3.1 million tons, which only reached 690,000 tons, while in 2011 the national milk demand reached 3.2 million tons which was supplied only by domestic milk production reaching 800,000 tons of milk, and the rest still imported. Even in 2011-2015 milk production is relatively fixed at 800,000 tons, while national milk demand continues to increase between 200,000 tons to 300,000 tons per year [1].

The low level of productivity of dairy cows is caused by many factors such as the limited knowledge of farmers on livestock feed management, especially in cattle, estrus observations, reports and timeliness for artificial insemination [2]. The problem of reproduction in dairy cows that often occur is the low birth rate. As one of the efforts that can be done to overcome the problem is by doing Artificial Insemination which aims to improve reproduction efficiency [3].

As technology develops estrus detection devices can make it easier to determine the optimal time for artificial insemination. The performance of an estrus detection automatic device is generally higher than 75%, depends on the setting for the threshold and the settled period used to determine the estrus [4].

## 2. Materials and methods

### 2.1. Materials

This study used 60 heifers crossbreed of Friesian Holstein,  $\pm$  2-6 years old, 500-600 kg. The tool for this study consists of three estrus detection devices are Thermopin<sup>®</sup>, Hauptner and Draminski which are used to detect the right time to do Artificial Insemination on dairy cattle. The material for this study was 60 frozen dairy cow straws (production from BBIB Singosari) used for the implementation of Artificial Insemination, alcohol and cotton were used to keep the estrus detection devices clean after the measurement.

### 2.2. Methods

This research is an explorative field research. Samples of dairy cattle were obtained by following inseminators when they were going to do Artificial Insemination (AI).

TABLE 1: Measurement of estrus detection before artificial insemination (mean  $\pm$  SD) and percentage of pregnancy rate (%) in dairy cows.

Treatment	n	( $\bar{X} \pm SD$ )	Pregnancy rate (%)
Control	15	(1.67 <sup>a</sup> $\pm$ 0,48)	73,3%
<i>Draminski</i>	15	(1.53 <sup>a</sup> $\pm$ 0.51)	53,3%
<i>Hauptner</i>	15	(1.67 <sup>a</sup> $\pm$ 0,48)	66,7 %
<i>Thermopin®</i>	15	(2.00 <sup>b</sup> $\pm$ 0,00)	100 %

Samples from dairy cows are obtained from reports of breeders based on signs of estrus on livestock. Milk dairy samples obtained did not synchronize the previous estrus. Prior to the implementation of AI in livestock conducted detection of estrus in the first estrus cow using detection tools estrus after it was implemented AI by inseminator.

Sample collection is done by detecting female dairy estrus cow by using the detection tool that has been prepared estrus if the measurement results are in accordance with the parameters that have been set on each tool to determine the exact time in the IB then the sample is collected up to 15 tail for each treatment.

Examination of pregnancy was done on the 45th day after artificial insemination was done, then recorded (No / Name of owner / Date AI / Measurement results by means of estrus detection / Date of pregnancy evaluation / Results).

### 3. Results

Have been tested various detection tool estrus on dairy cattle before artificial insemination to pregnancy rate on dairy cows. This study used a sample of 60 dairy cows that were divided into 4 treatment groups and each treatment consisted of 15 dairy cows. The group without treatment (control) consists of 15 dairy cows. 40 dairy cows divided into 3 treatment groups were measured using the *Thermopin®*, *Hauptner* and *Draminski* detection devices prior to artificial insemination.

The Duncan test results showed that dairy cattle without treatment before AI (control) were not significantly different from dairy cows measured using the *Draminski* and *Hauptner* estrus detection devices but significantly different from dairy cows measured using *Thermopin®*.

### 3.1. Measurement of various estrus Detection Devices (Draminski, Hauptner and Thermopin®) Before the IB performed the pregnancy rate

Measurement of estrus detection using Draminski contained 7 non-pregnant dairy cows with mean detection rates based on changes in the resistance of cervical mucus ( $1.53 \pm 0.51$ ) resulting in pregnancy rate of 53.3%. While dairy cows measured using Hauptner, there were 5 dairy cows that did not get pregnant with mean detection tool based on obstruction change from cervical mucus ( $1.67 \pm 0.48$ ) resulted in 66.7% pregnancy percentage. The non-control group consisting of 15 dairy cows having mean ( $1.67 \pm 0.48$ ) there were 4 non pregnant cows resulting in 73.3% pregnancy percentage. Dairy cows measured using Thermopin® with a mean temperature-based detection tool ( $2.00 \pm 0.00$ ) yielded a 100% pregnancy percentage.

Vaginal temperatures show an increase of normal temperature due to the influence of the active hormone estrogen when estrus increases the blood supply in the genitals and gives rise to more hot, red, and swollen vulva. Good vaginal temperatures during artificial insemination in the uplands and lowlands are less than  $39.85^{\circ}\text{C}$  with 68.8% gestation. Vaginal temperature during Artificial Insemination greatly affects pregnancy rates of dairy cows in the highlands and lowlands. [5]

The determinants of AI success are the quality of frozen semen used, knowledge and awareness of breeders in performing estrus detection, body condition score, dairy cows health especially related to organ reproduction, as well as inseminator skill and proper time for AI. [6-8]

Factors that cause low pregnancy rates include feed given to dairy cattle. Nutrients contained in the ration should be in a balanced state and in accordance with the needs. If the livestock lack of food intake will affect the appearance of the symptoms of estrus is less clear because the synthesis process and regulation of reproductive hormones are disrupted. Livestock conditions that still use traditional maintenance systems and in less fertile areas resulted in livestock lacking nutrients that are needed by reproductive physiology processes in the body of the cattle. [9] Feed (nutrition) of low quality can directly affect the efficiency of reproduction. [10]

The cause of repeat breeders is basically due to two main factors: failure of fertilization and the consequences of early embryonic death. Early embryonic deaths often do not show clear abnormalities in female cows and are followed by an estrus cycle that is extended to 27 to 30 days. Factors that encourage early embryonic deaths are genetic, infection, environmental, hormonal imbalance, feed, parent age, semen fertility, number of embryos or fetuses in the uterus. [11]

Generally what happens in the field is the less skilled breeders in the marking of estrus on the livestock and breeders also do not know the right time when the CR is high before artificial insemination. In general the accuracy of visual observations of breeders in detecting estrus in the livestock has an efficiency level of 50-70%. With the development of electronic technology, estrus detection devices have been developed in an effort to improve the efficiency of estrous detection (Roriea et al., 2002) 2002. Automatic estrous detection has a 75% percentage in determining estrus accuracy in livestock depending on the setting for threshold and the settled period used to determine the estrus. [4]

## 4. Conclusion

Based on the results of this study, it is concluded that the best detection tool that can improve the efficiency of lust detection in dairy cows in Tunas Setia Baru District Pasuruan is Thermopin®. 15 dairy dairy cows measured using Thermopin® with a mean temperature-based detection tool ( $2.00 \pm 0.00$ ) yielded a 100% pregnancy percentage.

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