

## CORRELATION OF REARING SYSTEMS AND BEEF CATTLE PROFILES ON THE PERFORMANCE OF BEEF CATTLE IN TANJUNG JATI SUB-DISTRICT

Andhika Putra<sup>1\*</sup>, Deni Prayogo<sup>2</sup>, Tengku Gilang Pradana<sup>3</sup>  
Universitas Pembangunan Panca Budi

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**\*Correspondence Address:**

andhikaputra@dosen.pancabudi.ac.id

**Abstract:** This study aims to determine the relationship between Body Condition Score (BCS) and Service Per Conception (S/C) and Calving Interval (CI) for PO Crossing Cattle in Tanjung Jati Village. The sample used was 44 female Ongole crossbreed (PO) cows. The method used in this research is a case study, data collection is done primary and secondary. The variables observed are Body Condition Score (BCS), Service Per Conception (S/C) and Calving Interval (CI). The results of this study indicate the regression equation. The relationship between Body Condition Score (BCS) (X) and Service Per Conception (S/C) (Y) has a regression equation  $Y = 2.300 - 0.041X$ . This means that by increasing the Body Condition Score (BCS) by 1 point, the Service Per Conception (S/C) value will decrease by 0.041%. The coefficient of determination ( $R^2$ ) is 50.9%, meaning that this value indicates that the Body Condition Score (BCS) contributes 50.9% to the value of Service Per Conception (S/C). The relationship between Body Condition Score (BCS) (X) and Calving Interval (CI) (Y) has a regression equation  $Y = 1.955 - 0.041X$ , which means that for every additional Body Condition Score (BCS) of 1 point, the Calving Interval (CI) will decrease by 55.6%, with a coefficient of determination ( $R^2$ ) of 55.6% meaning that the Body Condition Score (BCS) contributes 55.6% to the Calving Interval (CI) while the remaining 44.4% comes from other factors.

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### INTRODUCTION

The success of livestock reproduction is closely related to productivity and reproduction rates. Several factors influence reproduction, including the Service per Conception (S/C) rate, Calving Interval (CI), and Body Condition Score (BCS). Body Condition Score is linked to livestock reproduction, including fertility, pregnancy,

birthing processes, lactation, all of which affect the reproductive system. Some studies have found that Body Condition Score (BCS) at calving and the start of the mating season are the most critical indicators of reproductive performance. There is a correlation between BCS and S/C, meaning that higher BCS values indicate higher S/C values in female cattle, in addition to providing stability in milk production.

Body Condition Score is assessed by observing and feeling the fat deposits on the animal's body, specifically on the back and one-quarter of the rear, such as the processus spinosus, processus spinosus to processus transversus, processus transversus, hip bones (hooks), between the right and left hip bones, and from the base of the tail to the tuber ischiadicus, with scores ranging from 1 to 5 (score 1 = very thin, score 2 = thin, score 3 = moderate, score 4 = fat, and score 5 = very fat) on a 0.25 scale.

In Tanjung Jati Village, which has many livestock farms, the number of cattle in each hamlet is as follows: The data on the number of cattle in Tanjung Jati Village are as follows: Hamlet 1 has 50 head of cattle, Hamlet 2 has 9 head, Hamlet 3 has 63 head, Hamlet 4 has 37 head, Hamlet 5 has 50 head, Hamlet 6 has 20 head, Hamlet 7 has 120 head, Hamlet 8 has 27 head, Hamlet 9 has 4 head, Hamlet 11 has 50 head, Hamlet 12 has 4 head, Hamlet 14 has 58 head, and Hamlet 15 has 8 head.

From the researcher's observations, it was found that the BCS of cattle in Tanjung Jati Village predominantly ranged at score 3 (40%), with score 4 at 10%, score 2 at 30%, and score 1 at 20%. Based on the analysis above, it is necessary to analyze the correlation between BCS and cattle reproductive performance in that area.

## **RESEARCH METHODS**

### **Materials and Timeline**

This research was conducted in Tanjung Jati Village, Binjai District, Langkat Regency, North Sumatra Province. The research was carried out from July to September 2022.

### **Materials and Equipment**

This study involved female crossbred Ongole cattle aged 4 to 7 years in Tanjung Jati Village, Binjai, North Sumatra Province. The tools used during this research included measuring sticks, measuring tape, ropes, digital scales, writing tools, calculators, and others.

## **Methodology**

The research used a descriptive method with purposive sampling for sample selection. Secondary data were obtained from various relevant institutions. Data analysis in this research employed simple linear regression analysis and correlation analysis using SPSS 22 software. Correlation analysis was used to determine the relationship between Body Condition Score (BCS) and service per conception (S/C) as well as milk production using correlation coefficient formulas.

## **Population and Sample**

The population of this research consisted of all female cattle in Tanjung Jati Village, totaling 500 PO cattle. The sample size was determined using the Slovin Sampling formula, resulting in 83 samples.

### **Collection and Analysis**

This research used multiple linear regression analysis and correlation analysis with the assistance of SPSS 22.0 software. Correlation analysis was performed to assess the relationship between Body Condition Score (BCS) and service per conception (S/C) using correlation coefficient formulas.

## **Research Parameters**

### **Body Condition Score (BCS)**

BCS assessment involves observing and feeling the fat deposits on the animal's body, particularly on the back and one-quarter of the rear, including the processus spinosus, processus spinosus to processus transversus, processus transversus, hip bones (hooks), between the right and left hip bones, and from the base of the tail to the tuber ischiadicus. Cattle are scored as follows: 1 = very thin, 2 = thin, 3 = moderate, 4 = fat, and 5 = very fat.

### **Service Per Conception (S/C)**

Service per conception is a figure that indicates how many inseminations were required to achieve pregnancy. It is calculated based on the number of insemination services provided to female cattle until pregnancy occurs.

The formula for calculating S/C is as follows:

$$S/C = \text{Number of Pregnancies} / \text{Number of Insemination Services}$$

**Calving Interval (C/I)**

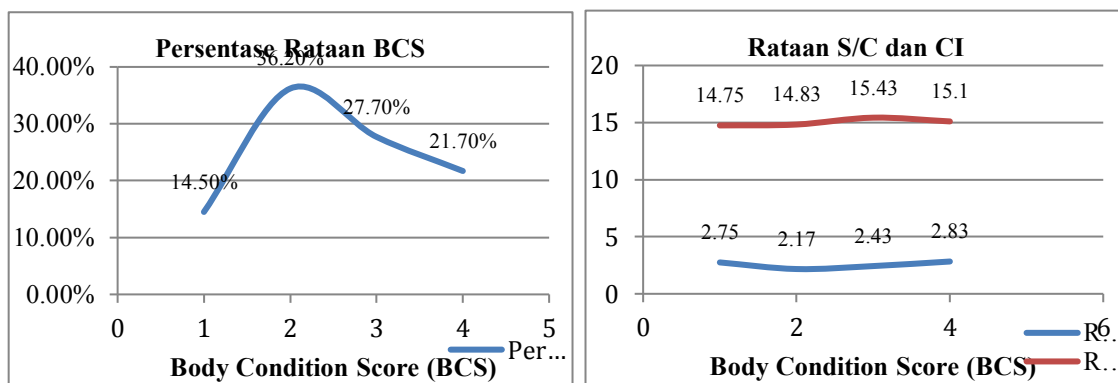
Calving interval (CI) is calculated by finding the recording of births for the first and subsequent births in the inseminator's book. It is calculated using the formula: CI (months)=Birth in month I – Birth in month (i-1)

These parameters are essential for assessing the reproductive performance of cattle in the research area.

**RESULTS AND DISCUSSION**

Summary of Research Results on the Relationship Between Body Condition Score (BCS), Service Per Conception (S/C), and Calving Interval (CI) of Ongole Crossbred Cattle (PO) in Tanjung Jati Village in Table 1.

Table 1. Recapitulation of BCS, S/C, and CI Percentage Values



**Relationship Between Body Condition Score (BCS) and Service Per Conception (S/C)**

Service Per Conception (S/C) is a measure that indicates how many times mating or artificial insemination is required for livestock to achieve pregnancy.

The average Service Per Conception (S/C) values for different Body Condition Scores (BCS) are as follows: BCS 1 has an average S/C of 2.75, BCS 2 has an average S/C of 2.17, BCS 3 has an average S/C of 2.43, and BCS 4 has an average S/C of 2.83. Each BCS group has different S/C values. The average S/C value of 2.55 indicates excellent fertility because cows only require insemination up to two times. The semen used by inseminators is for cows showing clear signs of estrus, as reported by farmers to the inseminator. According to Budiawan (2011), a very good S/C value falls within the

range of 1.5-2.0, so the study's S/C values are considered normal.

The relationship between Body Condition Score (BCS) (X) and Service Per Conception (S/C) (Y) is represented by the regression equation  $Y = 2.300 - 0.041X$ . This means that for every one-point increase in BCS, the S/C decreases by 0.041%. The coefficient of determination ( $R^2$ ) of 50.9% indicates that BCS contributes to 50.9% of the variance in S/C, with the remaining 49.1% being influenced by other factors. Other factors affecting S/C include (1) the quality of semen at the farmer's level, (2) poor reproductive conditions due to genetic or physiological factors and inadequate nutrition, (3) difficulty in detecting estrus and negligence by farmers, and (4) inseminator skill (Ihsan, 2010). Generally, factors affecting female fertility or reproductive issues in livestock are attributed to genetic factors, management (feeding), and environmental factors.

Iswoyo and Widiyaningrum (2008) suggested that high S/C numbers can result from delayed estrus detection, delayed reporting of estrus by breeders, reproductive organ abnormalities in cows, inexperienced inseminators, limited insemination facilities, and transportation issues. Typically, factors affecting female livestock reproduction or reproductive disorders are due to genetic factors, management (feeding), and environmental factors. If livestock reproduction proceeds normally and high-quality seeds are obtained, the income of beef cattle farmers will increase (Marisa and Sitepu, 2018).

### **Relationship Between Body Condition Score (BCS) and Calving Interval (CI)**

Calving Interval (CI) is the time interval between one calving and the next. The research results show that for BCS 1, the average CI is 14.74 months, for BCS 2, it is 14.83 months, for BCS 3, it is 15.43 months, and for BCS 4, it is 15.1 months. This indicates a difference of one to two months, which is still considered normal. According to Hadi and Ilham (2002), the ideal Calving Interval (CI) is 12 months, which includes 9 months of gestation and 3 months of lactation.

The relationship between Body Condition Score (BCS) (X) and Calving Interval (CI) is represented by the regression equation  $Y = 1.955 - 0.041X$ , which means that for every one-point increase in BCS, the Calving Interval (CI) decreases by 55.6%. The coefficient of determination ( $R^2$ ) of 55.6% indicates that BCS contributes to 55.6% of the variance in CI, with the remaining 44.4% influenced by other factors. Other factors

affecting CI, as mentioned by Susilawati and Affandy (2004), include long CI due to a long Days Open (DO), delayed insemination of cows after calving, high artificial insemination failure rates leading to high Service Per Conception (S/C), and late first mating. The occurrence of cow pregnancy is greatly influenced by several factors, including environmental conditions, especially nutrition before and after calving (Borman, et al., 2006).

Balanced nutrition is essential for successful cattle reproduction. According to Winugroho (2002), nutrient deficiencies in terms of protein, energy, minerals, and vitamins can lead to delayed estrus, silent heat, anestrus, repeat breeding, early embryo death, absorption of dead embryos by the uterine wall, weak offspring, or premature births. In addition to nutritional effects, mineral deficiencies and imbalances also affect repeat breeding, ovarian activity, and reproductive efficiency.

The length of the Calving Interval (CI) can be used as an indicator of reproductive disorders in cattle (Rasad, 2009). CI is influenced by gestation length and Days Open (DO), so a longer DO leads to a longer CI for an animal (Reswati et al., 2014). Nuryadi and Wahjuningsih (2011) stated that nutritional status before and after calving can affect the next estrus cycle. Sperm quality can also lead to artificial insemination failures, resulting in a longer CI (Sitepu and Zaituni, 2018). Inadequate feed intake and nutrient intake can trigger reproductive abnormalities, reducing performance.

Based on the research conducted in Deli Tua District, Deli Serdang Regency, it can be concluded that the average Body Condition Score (BCS) for Ongole Crossbreed cattle is 2, the S/C value is 1.9, and the Calving Interval is 14-15 months. Further research is needed to examine the relationship between BCS, S/C, and Calving Interval in Deli Tua District, Deli Serdang Regency, for evaluating the success of the Artificial Insemination program (Putra, et al., 2021).

## **CONCLUSION**

Based on the research carried out in Tanjung Jati Village, it can be concluded that there are two key findings. First, there is a strong positive correlation between Body Condition Score (BCS) and Service Per Conception (S/C), with an average S/C value of 2.0, which falls within the ideal range, indicating efficient conception among cows. Second, the relationship between Body Condition Score (BCS) and Calving Interval (CI) also exhibits a positive correlation, with an average CI ranging from 13 to 14

months, considered normal and indicative of healthy calving intervals. These findings underscore the significance of maintaining proper body condition scores in cattle to ensure efficient conception and maintain healthy calving intervals in Tanjung Jati Village.

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