

# Correlation between Sheep Body Condition Score and Lambing Interval in Langkat District of Indonesia

## ABSTRACT

The Body Condition Score relates to livestock reproduction, such as estrus, pregnancy, the birth process, and the condition of lambs. If the lamb has a bodyweight exceeding the ideal body weight, the animal will experience reproductive disorders to metabolic diseases. However, if the mother sheep has a body weight less than ideal, it can disrupt the reproductive system, affecting the symbol interval. This research aims to find out the relationship between Body Condition Score and the reproductive performance of sheep in Langkat Regency, namely Service Per Conception and Lambing Interval. The study design is Deskriptif analysis. Research conducted in Langkat Regency, Indonesia, between November 2022 and January 2023. The method used in this research is a case study, namely by collecting primary and secondary data. The observed variables are Body Condition Score (BCS) and Lambing Interval. The results of the study are The value of the Body Condition Score with the Lambing Interval regression equation  $Y = 15.677 - 0.818X$ . ( $R^2$ ) 12.8%. ( $r$ ) of 0.358. The relationship between Body Condition Score and Calving Interval is positive, with an  $R^2$  value of 12.8%. The conclusion of the research is The relationship between the lambs Body Condition Score (BCS) and the Lambing Interval had a good correlation with an average Calving Interval ranging from  $\leq 8$  to 9 months.

*Keywords:* Body Condition Score, Lambing Interval, Sheep.

## 1. INTRODUCTION

Sheep is one of the good livestock commodities that can be beneficial to meet food needs, especially animal protein [1]. The reason for increasing the role of sheep farming is to support efforts to increase food security both as a provider of food and nutrition and as a source of income, both of which increase food availability and accessibility [2]. To achieve this program needed to increase the production and productivity of sheep good livestock production will also follow reproductive processes that generally run [3]. The higher the reproductive increase, the higher the productivity of the livestock [4].

Lambing interval is a factor of reproductive efficiency in livestock [5]. The longer the lambing interval, the higher the money for raising livestock [6]. One of the contributing factors is the body condition of the lamb. Sheep that are too thin or too fat will cause difficulties in mating and fertilization [7].

The success of Artificial Insemination in sheep is an essential factor in efforts to increase the sheep population in Indonesia. Most sheep breeders by smallholder breeders with little capital, low technological adaptation, and shared knowledge of sheep farming coupled with traditional maintenance patterns [8]. It causes efforts to increase the population

35 to be constrained, and the genetic quality of existing sheep could be better, resulting in a low  
36 Body Condition Score (BCS) [9]. The BCS of lambs when giving birth is highly correlated  
37 with subsequent reproduction [10].

38 Langkat Regency is where many people farming sheep to increase their income.  
39 Breeders only consider the livestock business a sideline, and the labor comes from family  
40 members [11]. To support the implementation of animal husbandry development, primarily  
41 sheep, to maximize the productivity of sheep livestock. Objective data and information are  
42 needed, actual, and meet information standards [12]. To find out the reproductive potential of  
43 sheep in Langkat Regency necessary to evaluate the reproductive properties of sheep. This  
44 observation is necessary to obtain data on the level of reproducibility and reproductive  
45 efficiency of sheep in terms of the body condition of the mother sheep.

46 The Body Condition Score is related to livestock reproduction, such as estrus,  
47 pregnancy, the birth process, and the condition of lambs [13]. Parent body shape and size,  
48 age, parity, and heredity also strongly influence the reproductive system [14]. Ideally, the  
49 sheep should have a BCS of 3 (moderate) on a scale of 1-5. If the sheep has a bodyweight  
50 exceeding the ideal body weight, the livestock will experience reproductive disorders and  
51 potentially be affected by metabolic diseases. However, if the lamb has a body weight that is  
52 less than ideal, it can disrupt the reproductive system [15].

53 Sheep Body Condition Score is a level of body fatness that can describe live weight  
54 combined with body size. The BCS value is the result of assessing the condition of muscle  
55 and fat in the loin. It is helpful as an indicator to evaluate changes in the nutritional status of  
56 broodstock from time to time [16]. The BCS value of each sheep varies significantly due to  
57 various factors, including age, sex, and management of livestock rearing.

58 This research is essential to maintain the sustainability of the sheep farming  
59 business in Langkat Regency. Efforts to maintain an ideal body condition according to  
60 physiological status can use the BCS, which is a method to score the body condition of cattle  
61 both visually and by touch [17]. BCS determination in lambs has several advantages: easy to  
62 learn, not requiring special equipment, and is entirely accurate, cheap, and straightforward.  
63 BCS is necessary for management on sheep farms in Langkat Regency because it is  
64 effective and efficient, especially in livestock breeding programs.

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## 67 **2. MATERIAL AND METHODS**

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### 69 **Research Approach**

70 This research approach is descriptive quantitative research that describes the condition of  
71 the variables obtained by the sheep farming business actors. The place of this research is in  
72 Langkat Regency, North Sumatra Province. The method used in this study was direct  
73 interviews with farmers using a questionnaire. The research location was purposively  
74 (intentionally) considering that it is one of the areas with great potential in efforts to develop  
75 a sheep farming business.

76 The material in this research is sheep farmers related to all the data and field studies  
77 obtained, namely the Body Condition Score and the interval symbol of sheep. Research  
78 design by making observations to study the difficulties that arise. The results of observations  
79 made scenarios that support and create a flow of problems. The second stage is the data  
80 analysis stage. The third stage is data interpretation by interpreting the results of the  
81 predicted values of each variable and comparing them with the theory and results of  
82 previous studies. Interpretation can prove the theory, challenge the theory, and develop a  
83 new theory as a reference for research results.

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### 85 **Location and Time of Research**

86 This research will be carried out from November 2022 to January 2023 in Langkat  
87 Regency because this area has excellent potential to develop a sheep farming business.

88 Respondent requirements are sheep breeders in the study area. The research method used  
89 was a survey method with a unit of analysis of breeders who raise sheep.

90

### 91 **Variable Operational Parameters**

92 The research parameters observed were: Body Condition Score, service per conception,  
93 and the relationship between Body Condition Score and service per conception.

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

95 The BCS assessment is by observing and feeling the fat deposits on the body parts of the  
96 animal, namely on the back and quarter of the back, such as on the spinous process,  
97 spinous process to transverse process, transverse process, look hungry, tuber coxae  
98 (hooks), between the tuber coxae and tuber ischiatic (pins), between the tuber coxae right  
99 and left, and the base of the tail to the tuber ischiatic. Sheep have a score of 1 fragile, score  
100 two thin, score three moderate, score four fat, and five very fat.

### 101 **Lambing Interval**

102 Lambing interval is the distance or interval of time to give birth from the first birth to the  
103 second birth. The shorter the lambing interval, the more reproductive efficiency in livestock  
104 will increase.

105

### 106 **Population and Sample**

107 The population in this study were all sheep farmers in Langkat Regency. In this study,  
108 sampling by the census. The census method is also known as the complete enumeration  
109 method, in which all individuals in the population are investigated or interviewed as  
110 respondents [18].

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## 113 **3. RESULTS AND DISCUSSION**

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### 115 **BodyConditionScore(BCS)**

116 The body's energy reserves can be known using a visual assessment method such as  
117 the Body Condition Score. The relative score obtained from the BCS assessment helps  
118 farmers obtain an overview of the level of muscle reserves and body fat of each sheep,  
119 Table 1.

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121 Table1. Research data based on the total Body Condition Score (BCS) of sheep  
122 in Langkat Regency.

BCS	Total	Percentage (%)
1	6	7,59
2	41	51,90
3	32	40,51

123 source : data processed (2023)

124

125 Based on table 1 above, the results of the research data for the Body Condition  
126 Score of sheep in Langkat Regency with the first highest score in Body Condition Score  
127 2 with a percentage of 51.90%, second in Body Condition Score 3 with a percentage of  
128 40 .51%. In comparison, the lowest score in the Body Condition Score (BCS) 1 with a  
129 percentage of 7.59%. Body condition scores that are too low (<2.00) tend to cause  
130 conditions that cause ovarian hypofunction, where the ovaries will shrink, the surface is  
131 smooth (without follicles/corpus luteum), and the uterus is not talus with a soft  
132 consistency [10]. Livestock with skinny bodies have less fat reserves, resulting in low  
133 reproductive rates. Fat is an energy reserve stored in the animal's body that comes from

134 nutrients in the feed. Lack of energy consumption in young sheep will cause delayed  
 135 growth and reproduction [19].  
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137 **LambingInterval(LI)**

138 Lambing Interval is the period from the date of lambing until lambing again or the  
 139 distance between lambing from one lamb to the next, Table 2.

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141 Table2.The results of the research on the number of sheep lambing intervals in  
 142 Langkat Regency.

LI	Total	Percentage (%)
≤8 s/d9month	36	45,57
9 s/d10month	32	40,51
11≥month	11	13,92

143 source : data processed (2023)

144 Based on table 2, the results of the Lambing Interval study of sheep in Langkat Regency  
 145 with the first highest percentage value of Lambing Interval of 45.57% at a distance of ≤8 to 9  
 146 months, the second with a Lambing Interval percentage value of 40.51% at a distance of 9  
 147 to 10 months and the lowest is found in the Lambing Interval with a percentage value of  
 148 13.92% at a distance of 11≥ months. The ideal spacing of kid is eight months. Factors  
 149 affecting reproductive efficiency are the length of the Lambing Interval, including Service Per  
 150 Conception (S/C), the accuracy of mating, and whether there is a pregnancy [20].

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152 **Relationship between Body Condition Score and Lambing Interval**

153 The lambing interval is between birth and the next or previous birth. In this study, the  
 154 lambing distance between one sheep and another had variations in each Body Condition  
 155 Score (BCS) group, Table 3.

156 Table3.Lambing Interval in various groups of Body Condition Score(BCS).

	BCS		
	1 (n=6)	2 (n=41)	3 (n=32)
CI	14,17±1,94	14,24±1,34	13,09±1,12

157 source : data processed (2023)

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159 The results showed that the Body Condition Score 1, 2, and 3 showed a difference of one  
 160 and two months. It means it is still in average condition. The ideal birth spacing is eight  
 161 months [8]. The relationship between Body Condition Score (BCS) (X) and Lambing Interval  
 162 (Y) has a regression equation  $Y = 15.677 - 0.818X$ , which means that for every addition of  
 163 Body Condition Score (BCS) 1 point, the Lambing Interval will decrease by 0.818%, with a  
 164 coefficient of determination (R<sup>2</sup>) 12.8% means that the Body Condition Score (BCS)  
 165 contributes 12.8% to the Lambing Interval. In contrast, the remaining 78% comes from other  
 166 factors. Value (r) correlation coefficient of 0.358. Other factors that affect the value of the  
 167 Lambing Interval are if there is a long calving interval primarily due to long DO (Days Open).  
 168 It is due to

- 169 1. the child is not weaning, so the appearance of the first post-partum heat takes a long  
 170 time,

- 171 2. breeders marry their mothers after giving birth for an extended period so that their  
172 vacancy becomes long,  
173 3. high failure of artificial insemination resulting in high Service Per Conception (S/C),  
174 4. the age at first mating is slow.

175 Several factors strongly influence the occurrence of pregnancy in sheep, including  
176 environmental conditions, especially nutrition before and after lambing [21].

177 Balanced nutritional needs are essential for the continuity of sheep reproduction [22].  
178 Suppose nutritional deficiencies in protein, energy, minerals, and vitamins will cause late  
179 estrus, silent heat to anestrus [23]. Lack of protein causes weak estrus, estrus, anestrus,  
180 repeated breeding, early embryonic death, absorption of dead embryos by the uterine wall,  
181 weak childbirth, or premature birth [7]. In addition to nutritional influences, mineral  
182 deficiencies, and imbalances also affect repeated mating, ovarian activity, and low  
183 reproductive efficiency [20].

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#### 186 **4. CONCLUSION**

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188 The relationship between the lambs' Body Condition Score (BCS) and the Lambing Interval  
189 had a good correlation with an average Calving Interval ranging from  $\leq 8$  to 9 months.

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#### 198 **COMPETING INTERESTS**

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200 Authors have declared that no competing interests exist.

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#### 203 **AUTHORS' CONTRIBUTIONS**

204

205 This work was carried out in collaboration between all authors. Media  
206 AgusKurniawandesigned the study, performed the statistical analysis, wrote the protocol and  
207 wrote the first draft of the manuscript. Sukma Aditya Sitepumanaged the analyses of the  
208 study. Gilang Aditya managed the literature searches. All authors read and approved the  
209 final manuscript

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