

# Relationship between Initial Weight with Slaughter Weight and Carcass Weight in Brahman Cross Cattle

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**Abstract**— The objective of the research was to determine the correlation between initial body weight with slaughter weight and carcass weight in Brahman Cross cattle. The research was conducted at Central Lampung on August 2020 – September 2020. Materials used in this research was 243 Brahman Cross cattle consisted of 154 heifers and 88 steers. The research was case study research. The variables observed were initial weight, slaughter weight, and carcass weight. Data were analyzed using Pearson Correlation. Result showed that initial weight was strongly correlated with slaughter weight ( $r = 0.69$  in steer vs  $0.68$  in heifer) ( $P < 0.01$ ) and also with carcass weight ( $r = 0.67$  in steer vs  $0.66$  in heifer) ( $P < 0.01$ ). The initial weight can be used as a predictor of slaughter weight ( $Y=236,51 + 0,65 X$  in steer vs  $Y=195,03 + 0,73 X$  in heifer) and carcass weight ( $Y=112,13 + 0,32 X$  in steer vs  $Y=91,53 + 0,36 X$  in heifer). It can be concluded that the initial weight of fattening was positively and strong relationship with slaughter weight and carcass weight of Brahman Cross cattle and can be used as a predictor on the slaughter weight and carcass weight.

**Keywords**— Steer, heifer, initial weight, slaughter weight, carcass weight.

## I. INTRODUCTION

The population of Indonesia from year to year has increased which causes a change in the pattern of people's consumption of beef nationally tends to increase. The Directorate General of Livestock and Animal Health (2017) obtained data on meat consumption based on groupings in 2016 of 6.778 kg/per capita/year, or an increase of 5.69 percent from 2015's consumption of 6.413 kg/per capita/year. The consumption of beef per capita in 2016 was 0.417 kg, the same as the consumption of beef per capita in 2015. The increase in consumption in general has not been matched by an adequate rate of production growth. The increase in beef cattle population was not proportional to the demand for beef. According to the Directorate General of Livestock and Animal Health (2017), nationally, the number of large livestock populations in 2016 has increased when compared to the population in 2015, for beef cattle for beef cattle 16.0 million heads (an increase of 3.79%).

The local population of beef has not been able to keep up with the increasing demand for beef. Various efforts have been made to increase livestock production and productivity as well as the quality of carcass or meat needs to be pursued (Firdausi et al., 2012). According to Isyanto (2014) one solution to meet the increasing demand for beef was to increase domestic beef production, which according to Wardoyo and Risdianto (2011) can be done by increasing population, production and product. -activity of beef cattle. In

addition, efforts to increase meat production are fattening programs in the hope of obtaining high and efficient PBB (Weight Gains) so that the national meat needs are met. Wwasdom (2002) states that fattening was the maintenance of mature cows in a lean condition to increase their weight through meat enlargement in a relatively short time (3-5 months). Imports of feeder cattle were 1,290,560 heads in 2016. Feeder cattle imported to Indonesia came from the Australian Commercial Cross (ACC) and Brahman Cross (BX). BX cattle are in great demand by feedloters because of the increase in daily weight (Average Daily Gain = ADG) and higher carcass percentage with lower bone components than local cattle (Hadi, 2002). Soeparno and Sumadi (2000) which mention that the genetic potential of individuals within a nation can be different and the adult body size of individuals within a nation can cause differences in the level of growth rates. One of the factors that determine success in the slaughter program of fattening efforts was going. Cattle breeds are young bulls (aged 2 – 3 years) from certain breeds of cattle, both local and imported, weighing between 250-400 kg (Firdausi et al., 2012). The productivity of an animal can be seen from the variables of body weight, slaughter weight and carcass weight and the percentage of carcass produced after the cattle are slaughtered (Wahyuni, 2016). Therefore, this study was conducted to determine the relationship between initial weight at fattening, slaughter weight and carcass weight of BX cattle.

## II. MATERIAL AND METHOD

Research method was a case study approach. Research was conducted at Central Lampung on August 2020 – September 2020. Research material was consisted of 243 Brahman Cross cattle with details of 154 heifers and 88 steers. Sample was taken from cows with certain criteria such as came in the same shipment, and red-brown in color. The initial weight were weighing using a Tru-Test- ID 5000 brand digital scale connected to Cattle Crush, with a maximum capacity of 1500 Kg with an accuracy of 2.5 Kg. Slaughter weight and carcass weight data were obtained from slaughter house.

The data obtained were analyzed using Pearson Correlation to determine the strength of the relationship between 2 variables expressed in the correlation coefficient ( $r$ ). If there was a correlation between the initial weight and slaughter weight and carcass weight, it will be continued with linear regression analysis to find out how much the influence of independent variable (Initial weight) with dependent variable

(slaughter weight and carcass weight), and that influence was expressed in the coefficient of determination (R<sup>2</sup>).

III. RESULT AND DISCUSSION

*Effect of Sex (steer and heifer) on initial Weight, Slaughter Weight and Carcass Weight*

The average initial weight, slaughter weight and carcass weight of BX cattle both in steer and heifer can be seen in Table I.

TABLE I. Initial weight, slaughter weight and carcass weight Brahman Cross cattle steer and heifer

Variable	Mean ± sd	
	Steer	Heifer
Initial weight	350,17 ± 49,70 <sup>b</sup>	294,13 ± 37,38 <sup>a</sup>
Slaughter weight	462,86 ± 46,71 <sup>a</sup>	409,67 ± 40,38 <sup>a</sup>
Carcass weight	224,69 ± 23,78 <sup>b</sup>	196,69 ± 20,15 <sup>a</sup>

Description: The different superscript on the same row means highly significant different (P < 0.01)

Table 1 showed that the mean slaughter weight of steer was almost the same, so that the sex of the cattle did not affect slaughter weight, on the other hand, the carcass weight of steer was higher than heifer (P < 0.01). That was because the initial weight was different, and steer was heavier than heifer. The average difference between steer and heifer according to Zajulie et al., (2015) was because heifer has lower body weight gain and was less efficient in converting feed. Table 1 showed that the average carcass weight of the steer is higher than heifer. According to Zajulie et al., (2015) stated that the difference in carcass weight that occurred in steer and heifer was possible because there were differences in age and average initial body weight.

*Relationship between Initial Weight, Slaughter Weight and Carcass Weight*

The analysis of relationship has been showed in the correlation-regression analysis of the initial weight of fattening and the slaughter weight of Brahman Cross cattle in steer and heifer can be seen in Table II. The results showed that the initial weight of fattening with slaughter weight in BX steer and heifer cattle obtained a very significant relationship with the strength of the relationship both having a strong relationship. The value of determination indicates that the initial weight of fattening has a strong effect (47.3 % in steer vs 45.7 % in heifer) on the slaughter weight, while the remaining effect is influenced by other factors. The coefficient of determination between steer and heifer in the correlation analysis was almost the same, according to Bertam and Oliver (1990) in Usmiati, et al. (2008) which mentioned that heifer has a fattening period faster than steer, the initial weight has higher effect and more important in steers than heifers because steers are males that have been castrated so that they have a higher testosterone which causes faster in growth.

The initial weight of fattening becomes one of the important indicators in evaluating fattening efforts in the problem of choosing feeder cattle. This statement is supported by Isyanto and Sudrajat (2019) that there are several factors that influence cattle fattening efforts, including age, body

condition and cow weight at the beginning of fattening, gender, nation and feed quality. The genetics of BX cattle are very good in fattening business, that is, they have a high daily weight gain. According to Muslim et al. (2015) the daily weight gain of Brahman Cross cattle ranges between 1.0-1.8 kg/day, even under certain conditions it can reach 2 kg/day. This statement is supported by Manurung (2008) which states that the rate of increase in slaughter weight is influenced by age, environment and genetics where the initial weight of the fattening phase is related to the adult weight. Factors that are also very important besides genetics are the maintenance system and the environment.

TABLE II. Relationship between initial weight, slaughter weight and carcass weight in steer and heifer

Variables	Relationship	
	Steer (N=88)	Heifer (N=154)
Initial weight - slaughter weight	r = 0.69 R <sup>2</sup> (%)= 47.3 Y=236,51 + 0,65 X	r = 68 R <sup>2</sup> (%)= 45.7 Y=195,03 + 0,73 X
Initial weight - carcass weight	r = 0.67 R <sup>2</sup> (%)= 45.2 Y=112,13 + 0,32 X	r = 66 R <sup>2</sup> (%)= 44.0 Y=91,53 + 0,36 X

Description: r = correlation coefficient; R<sup>2</sup> = determination coefficient; Y = slaughter weight or carcass weight; X = initial weight

According to Neno (2018), the rearing system determines the success of beef cattle production, but if the environment does not support the genetic ability of an animal, the production will also be low, while environmental factors are a supporting factor for livestock survival and production. The purpose of fattening is to achieve a high weight in a short time, genetically good BX cattle for fattening by having a high daily weight growth rate followed by a high initial fattening weight, and the right rearing system will shorten the length of rearing so as to produce high slaughter weights in a short period of time.

The results of correlation analysis between the initial weight and carcass weight in BX steer and heifer cattle obtained strong and positive correlation (P <0.01). The coefficient of determination of steer and heifer indicates that the initial weight of fattening has an effect on the carcass weight, while the remaining effect is influenced by other factors. The difference in the effect is not too significant between steer and heifer, According to Jazulie et al., (2015) heifer has a maturity level that is faster than steer. This level of maturity causes heifer growth to be faster than steers at the right cutting age. The initial weight is more effect on the steer than the heifer because according to Hafid and Priyanto (2006) it is stated that the heifer completes the fattening phase faster than the castration bull (steer). Therefore, the final results, namely slaughter weight and carcass weight of heifers are smaller than castration bulls. Kuswati et al. (2014) stated that initial weight, weight gain, slaughter weight, carcass weight, and carcass percentage were important indicators in evaluating fattening efforts. The initial weight affects 56.9% of the carcass weight and the rest is influenced by other factors of nation, genetics, age, maintenance patterns, environment. The right maintenance pattern will result in high productivity. A good amount and quality of feed with proper feeding cannot change

the body of animals that are genetically small, but feeding in low amounts will not be able to provide an optimal increase in live weight and carcass growth according to the genetic potential of each. animal. The speed of growth, high carcass production may only be realized if the animal can obtain sufficient feed and the national factor has an influence on carcass production. According to Kuswati et al. (2014) The difference in slaughter weight and carcass weight in the research conducted is most likely influenced by the initial weight. The genetics of the BX cattle have a high rate of daily weight gain, which will allow obtaining high adult weight or slaughter weight if the initial weight is high with the right rearing system. Mature weight or high slaughter weight will affect high carcass weight. According to Soeparno (2005) stated that differences in body composition and carcass among livestock breeds are mainly caused by differences in body size or differences in slaughter weight as adults, this statement is supported by Padang and Irmawati (2007), the higher the slaughter weight, the higher the carcass weight. It was added by Maylinda and Busono (2020) that many factors affecting carcass weight, not just initial weight but also Body Condition Score (BCS), chest girth, body length, body height. From the BCS can be indicated a level of management in farm.

#### IV. CONCLUSION

It can be concluded that the initial weight was very significantly and positively correlated with slaughter weight and carcass weight of BX steer and heifer cattle. The difference in the effect of initial weight on the slaughter weight and carcass weight on the steer and heifer was caused by the faster growth speed of the heifer and a shorter fattening phase compared to the steer so that the slaughter weight and carcass weight obtained were different.

Based on this statement, the initial weight can be used as an important indicator of the selection of feeder cattle in fattening efforts to predict high slaughter weight and carcass weight. The higher initial weight produced the higher the slaughter weight and carcass weight.

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