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RELATIONSHIP BETWEEN BODY WEIGHT AND LINEAR MEASUREMENT WITH UDDER VOLUME IN FAT TAILED SHEEP IN SUMENEP, MADURA

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ABSTRACT

The aim of the research was to determine the relationship between between body weight, linear measurements, and udder volume in fat-tailed sheep. Material used in this reseach were 120 female fat- tailed sheep (DEG) with the range of the age PI1 to PI4. Method used in this research was cases study a with direct measurement in the field. Variables observed were chest girth, body length, body height, body weight, and udder volume. Data were analyzed using simple correlation and linear regression analysis. Results showed that the correlation between body weight and udder volume was significant ($P < 0.05$). With a corelation coefficient 0.687 (R^2 47.2%). The function of regression equation is Y=509.05481+ 5.28X. The coefficient of correlation and coeffision of determination between vital statistics and udder volume is low, on chest circumference 0.429 (18.41%), body length 0.221 (4.88%), and shoulder height 0.2 (4%). Moreover, the regression equation values for chest circumference, body length, and shoulder height are Y = 676,3112-5,44X, Y = 495,6451-2.94X and Y = 495,4974-2,91X, respectively. It can be concluded the udder volume has a positive relationship with body weight, while udder volume have a weak relationship with linear measurements.

Keywords: Body weight; fat tailed sheep; linear measurements; udder volume; regression

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INTRODUCTION

As the population increases and demand for livestock products is likely to increase in the future. This fact is both an opportunity and a challenge in the livestock sector today. Efforts to fulfill demand for meat are taken through importing meat and live livestock. However, for long-term fulfillment it is necessary to make efforts to solve the problem so as not to depend on the policy of importing live livestock every year. Therefore, efforts to improve the performance of local livestock production are very necessary as an alternative in meeting protein demand. Efforts to increase this are carried out by increasing the livestock population

Fat-Tailed Sheep (DEG) is one of the livestock genetic resources that has economic, scientific and socio-cultural value and fulfills animal protein needs for humans. Body weight has a positive influence on meat production. This relationship is related to abdominal size, where abdominal circumference and external udder volume are closely related to udder volume, this size will determine the ability to consume rough food, and of course this is closely related to body weight. Selection means choosing sheep, both male and female, that have good quality and appearance as breeding animals (Maylinda and Busono, 2019)

Linear measurements are measurements of body size that are useful in determining body appearance including chest circumference, body length and shoulder height and can estimate udder volume. Milk quality is closely related to animal body weight. Animal body weight can be improved by maternal productivity through the ability to produce milk in limited environmental conditions and feed. Udder volume is closely related to milk production, where if the volume of milk produced increases, the mortality rate of fat-tailed sheep will decrease (Jalani, Djaya, and Yanti, 2013). Giving milk can increase body weight, according to Jarmuji (2011), after slaughtering the lamb, the body weight of the lamb's organs that receive milk ad libitum, such as the pancreas, liver, heart, kidneys, testicles and digestive tract, is significantly higher. heavy. Low maternal milk production can also reduce growth rate and weight at wean. Sheep that have a low weaning weight can reduce their ability to compete for quality forage in pastures, resulting in slow growth to maturity and reduced reproductive ability.

This study aims to determine the relationship between body weight, linear measurements (body length, chest circumference and shoulder height) and udder volume in Fat Tail Sheep. It is hoped that this research will be useful in estimating meat production from fat tail sheep based on body weight, body length, chest circumference, shoulder height and udder volume. The strong relationship in this research can be used as consideration in estimating body weight and productivity of Fat Tail Sheep (DEG) offspring based on body size. So the high body weight means higher meat production.

It was hypothesized in this study is that there is a close relationship between linear measurements and body weight and udder volume in Fat Tail Sheep (DEG) at Sumenep Regency, Madura Island.

MATERIAL AND METHOD

Material in this research was about 102 head in various age (based on the replacement of permanent incisors PI (Permanent Incicivi). In ths reseach the age group were P1, PI2, PI 3, PI 4, but the data analyses based on the ungroup data.

Chest girth, body height and body length was measured using direct measurements in the village using scaller and body tape. Sample was taken randomly in the villages, and reseacher also use Primary and secondary data from Agriculture and Livestock, Sumenep Regency, Madura Body weight was measured using Scaller qwith mark Morizt, with the scale kg. Udder volume was measured before milking and after milking. Udder measurements used “Spilled Water

Method) based on the Archimedes Law (Pribadiningtyas dkk., 2012). Data obtained were analyzed using simple linear regression analysis with Minitub software Regression analysis was used to determine the relationship between body size (chest circumference, body length, shoulder height) with body weight and udder volume of female fat-tailed sheep (DEG). The regression coefficient describes the magnitude of change in Y for every one unit increase in X, so it can be used to determine the body weight of fat-tailed sheep (DEG).

RESULT AND DISCUSSION

Body Weight, Linear Measurements, and Udder Volume

The mean of Body Weight, Chest Girth, Body Length, Shoulder Height and Udder Volume can be seen in Table 1. Based on Table 1, it shows that the average obtained from measuring body weight is 39.38 ± 5.04 kg, chest circumference 68.96 ± 3.05 cm, body length 66.07 ± 2.91 cm, shoulder height 66 .71 ± 2.66 cm, udder volume 301.07 ± 38.76 liters. Body weight is a quantitative characteristic that is influenced by the environment, for example from feeding and rearing systems. The body weight of a sheep can be influenced by the growth of bones and meat, some experts state that the body weight of a sheep is greatly influenced by the quantity and quality of feed consumed.

Body size and other body components constitute a biological balance so that can be used to estimate body shape as a characteristic of a charasteristic of the breed. The average shoulder height of fat-tailed sheep in Saronggi Village, Saronggi District, Sumenep Regency is 66.71 ± 2.66 cm. This complies with Minister of Agriculture Regulation No.57/Permentan/ OT.140/10/ 2006 with a minimum shoulder height of 52 cm. Chest circumference is the measurement that has the closest relationship to body weight. The larger the chest circumference, the greater the body weight. The average chest circumference of fat tail sheep in Saronggi Village, Saronggi District, Sumenep Regency is 68.96 ± 3.05 cm.

Table 1. Body Weight, Udder Volume and Liniear Measurements of Fat Tailed Sheep

No	Variables	n	Mean	Deviation Standard
1	Body Weight	102	39,38 kg	5,04
2	Chest girth	102	68,96 cm	3,05
3	Body length	102	66,07 cm	2,91
4	Shoulder height	102	66,71 cm	2,66
5	Udder volume	102	301,07 cc	38,76

A large chest circumference reflects the large size of the digestive organs in fat tail sheep and can utilize more nutrients entering the body. According to Cannas, (2004) the larger the chest circumference of an animal means the size of the animal's digestive system is larger, so that it can utilize more feed and digest it relatively more completely. Many breeders use body length to determine meat production from sheep.

The average body length of fat-tailed sheep in Saronggi Village, Saronggi District, Sumenep Regency is 66.07 ± 2.91 cm. The greater the body length, the greater the amount of meat. This is because there are muscles where the meat attaches to body length (Sutiyono et al., 2014). The better the measurement results of vital statistics and udder feeding volume will have an impact on the quality of the offspring produced (Jarmuji, 2011).

Relationship Between Body Weight and Udder Vcolume

The results of the correlation analysis of this study obtained correlation between body weight (x) and udder volume (y) in fat-tailed sheep as shown in Table 2. In Table 2, 3 Data were analysed in all 4 age groups because the variation was very small (1-2%).

Table 2 shows that there is a positive correlation between body weight and udder volume. Body weight can provide an idea of the condition of an animal to estimate the udder volume of Fat Tail Sheep. Body weight has a strong and positive relationship ($P < 0.01$) where the correlation coefficient value obtained is 0.687, according to Sugiyono (2003) if the correlation coefficient shows a value of 0.60 – 0.799 it is said to have a medium relationship. The regression equation formed Y= 509.054 + 5.28X means that for every additional 1 kg of body weight, the udder volume increases by 5.28 cc. The coefficient of determination was 47.24%, this value shows that there is a medium relationship between body weight and udder volume, the remaining 52.26% of the increase in udder volume is influenced by other factors. The equation in Table 2 presented the correlation between body weight and udder volume because the main objective of this discussion was udder volume.

Table 2. Relationship between Body Weight with Udder Volume

Variables	r	R2 (%)	t calcul.	t Table		Regression line
				0,05	0,01	
CC – BW *)	0,687	47,24	9,463124	1,66023	2,36422	Y= 509,054 + 5,28X

*) CC = Chest Circumference, BW = Body Weight.

The results obtained are in accordance with Pribadiningtyas, Suprayogi and Sambodo (2012) who stated that not all large mammals have high milk production, but in general high milk production is influenced by body size or body weight. Body weight has a relationship with milk production, this suggests that body weight does not have a significant effect on the milk secretion process. According to Phalepi (2004) who states that milk production is influenced by genetic quality, age of the mother, udder dimensions, live weight, length of lactation, management applied to livestock (husking, feeding and health), local climate conditions, livestock adaptability, and milking activities.

Relationship between linear measurements and Udder Volume.

The results of the correlation analysis of this study obtained correlation values between vital statistics (x) and udder volume (y) in fat-tailed sheep as shown in Table 3.

Table 3. Correlation between Linear Measurements and Udder Volume

Variables **)	N	r	R^2 (%)	t calcu.	t Table		Regression line
					0,05	0,01	
– CC - UV	102	0,429	18,41	4,7503	1,66023	2,36422	Y=676,3112+5,44X
- BL – UV	102	0,221	4,88	2,26649	1,66023	2,36422	Y=495,645+2,94X
– BH – UV	102	0,2	4	2,04397	1,66023	2,36422	Y=495,645+2,91X

**) CC = Chest Circumference
BL = Body Length
BH = body Height
UV = Udder Volume

Table 3 shows that overall there is a relationship between Vital Statistics (chest circumference, body length and shoulder height) and udder volume in Fat Tail Sheep, which has a low correlation coefficient value. Chest circumference has a correlation value of 0.429. The regression equation formed is Y=676.3112+5.44X, which means that for every additional 1 cm of chest circumference, the udder volume will increase by 5.44 ml. The coefficient of determination of 18.41% has a very significant effect ($P < 0.01$). According to Sugiyono (2003) states that if the correlation

results show a value of 0.40-0.599 then it has a moderate coefficient value. This is due to other factors that influence the increase in chest circumference and udder volume. Budiarsana (2005) said that livestock performance is influenced by several complex factors such as feed management and the environment where the animals grow.

Livestock that are large in size will accommodate larger amounts of food so that they have the ability to eat more, so milk production will also increase. According to Taufik and Deppison (2008), the bigger the body of a dairy cow, the bigger the udder, so milk production is higher when compared to smaller livestock. Furthermore, according to Ramdan (2007), chest circumference is positively correlated with body weight, so that the larger udder caused by the development of secretory cells will cause an increase in body weight in goats, thereby increasing milk production.

Table 3 shows the results of the analysis of the relationship between body length and udder volume in Fat Tail Sheep, and a significant relationship was obtained ($P < 0.05$). The relationship between the two has a correlation of 0.221, according to Sugiyono (2003) who states that if the correlation results show a value of 0.20-0.399 then it has a low coefficient value. The regression equation is Y=495.645+2.94X, which means that for every 1 cm increase in body length, the udder volume will increase by 2.94 cc. The coefficient of determination is 4.88%, this value shows that there is a low relationship between body length and udder volume, the remaining 95.12% was an increase in udder volume were influenced by other factors.

This result is the same as research by Saputra et al., (2013) which showed that body length had an insignificant relationship with milk production. This is thought to be because milk production is influenced by other factors. The relationship between body length and udder volume may not occur directly as body size is influenced by genetic and environmental factors. Genetic factors will contribute the greatest value to performance which is passed down from mother to offspring, while environmental factors such as feed will influence livestock growth which also influences body posture, udder shape and volume and the resulting milk production (Jarmuji, 2011). Budiarsana (2005) said that livestock performance is influenced by several complex factors such as feed management and the environment, causing differences in the results of measuring livestock performance.

The results of the analysis stated that there was a significant relationship between shoulder height and udder volume ($P < 0.05$). It can be seen in Table 3 that the correlation value for shoulder height and udder volume is 0.2. The regression equation formed Y=495.645+2.91X means that for every 1 cm increase in shoulder height, the udder volume will increase by 2.91 ml. The coefficient of determination value is 4%, this value shows that there is a low relationship between body length and udder volume, the remaining 6% of the increase in udder volume is influenced by other factors. According to Sugiyono (2003) states that if the correlation results show a value of 0.20-0.399 then it has a low coefficient value.

Shoulder height has no correlation with milk production because shoulder height and milk production are influenced by other factors such as age, health, number of children born, and environmental factors Saputra et al., (2013). The relationship between body size and milk production may not be consistent. The size of the body also influenced by genetic factors and environment. Genetic factors affect animal performance ecspecially on the size, growth also adpatation on the temperature of the air, also humidity and climate. On the aother hand environment has been permantley and temporarily influenced the animals and their progeny (Santoso. Dkk., 2020).

CONCLUSSION

The conclussion of the research that body weight has a very close relationship with the udder volume, which can be used as a predictor of udder volume. Chest circumference also has a positive relationship with udder volume which can be used as a predictor of udder volume. Meanwhile, body length and shoulder height have low correlation so they cannot be used as a predictor for udder volume.

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