

# Relation Between the Phenotypic Characteristics with Heavily Pregnant of Senduro Goat Body Weight in UPT PT and HMT Singosari, Malang Regency – Indonesia

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## Abstract:

The purpose of the research is to determine the relation between phenotypic characteristics i.e. chest circumference, length and height with the weight of heavily pregnant Senduro goat. The material used was 30 heavily pregnant Senduro goats the location in Unit Pelaksana Teknis Pembibitan Ternak dan Hijuan Makanan Ternak (UPT PT dan HMT) Singosari, Malang Regency. The research method is by identifying case studies of livestock phenotypic characteristics and weighing the body weight, while the sampling is done by *purposive sampling*. The results obtained a multiple regression equation  $Y = -49.95 + 0.50 X_1 + 0.06 X_2 + 0.63 X_3$  the relationship between phenotypic characteristics and body weight of heavily pregnant Senduro goats has a positive correlation with (r) of 0.790. The coefficient of determination ( $R^2$ ) is 70%, the value of  $R^2_{1,2,3}$  is = 70%. This value means that the phenotypic characteristics simultaneously influence the body weight of the heavily pregnant Senduro goat by 70%.

**Keywords** - phenotypic characteristics, body weight, Senduro goat.

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## INTRODUCTION

Senduro Goat is a local Indonesian goat from Lumajang Regency, East Java Province, Indonesia and has been stipulated in the Decree of the Minister of Agriculture Republic of Indonesia Number: 1055 / Kpts / SR / .120 / 10/2014. Based on this decision, the Senduro Goat is a wealth of Genetic Resources/Sumber Daya Genetik (SDG) of Indonesian local livestock that must be protected and preserved. The Senduro Goat has blood components from Etawah Goat, Kacang Goat, and Jawarandu Goat (Anonymous, 2014).

Senduro Goat is a type of goat breed that is widely maintained in Malang Regency, East Java Province because it has the advantage of dual purpose type, which can be used as a dairy goat and goat for fattening as a meat producer.

The productivity of the Senduro goat is influenced by two main factors, namely genetic and environmental. Genetic factors determine the ability of livestock production, while environmental factors become supporting factors so that livestock are able to produce according to their genetic ability. The quantitative nature of the Senduro goat in terms of measurements of chest circumference, body length and height are called phenotypic characteristics. Phenotypic characteristics focus on being an indicator of the

body growth of livestock in terms of producing a good weight of life.

## LITERATURE REVIEW

Ciptadi, et. al, (2018) Senduro Goat is the result of breeding and selection by breeding groups in the Senduro Lumajang Sub-district, East Java, with certain phenotypic characteristics including general characteristics of hair that is completely white. Senduro goat physically has a difference with other goats, which has a white body color, convex profile, long ears, hanging, drooping and / curved until twisted, male and female without horn, longer male body hair breaking down at the neck, hips and thighs compared to females, udder-shaped jugs and bottles (SNI, 2018).

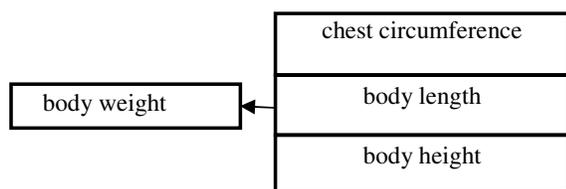
Senduro goat is a dual purpose type of goat. Aside from being a meat producer, Senduro goats are also good goats for milk-producing livestock. The production of Senduro goat milk can reach 0.8 - 1.8 liter / head / day (Siswanto, 2016). Also, it has a body weight of around 46 kg for females and around 48 kg for males (Anonymous, 2014).

Body weight can be used as one indicator to determine livestock growth, thus increasing livestock production from the body weight of the livestock itself. One way to understand body weight can be measured on the body part of the animal owned and its overall body weight.

Animal size such as chest circumference is the best and accurate variable for estimating body weight in cattle (Isroli, 2001). However, phenotypic characteristics of other livestock bodies such as body length and height make it possible to have a correlation with body weight. Therefore it is necessary to do research on the phenotypic characteristics of heavily pregnant Senduro goats to determine the correlation with body weight.

**CONCEPTUAL FRAMEWORK**

The conceptual framework used in this study, as presented in the figure as follows:



**Figure 1 Conceptual Framework**

**Hypothesis**

It is assumed that there is a correlation between the phenotypic characteristics and the heavily pregnant body weight of the Senduro Goat.

**RESEARCH METHODOLOGY**

The research method uses a case study in the location Unit Pelaksana Teknis Pembibitan Ternak dan Hewan Ternak (UPT PT and HMT) Singosari, Malang Regency as a place to care for heavily pregnant Senduro goats. The material used in the research was 30 heavily pregnant Senduro goats. This study uses primary data obtained through direct observation. Primary data collection is done by direct observation (observation) regarding the identification of phenotypic characteristics of livestock and body weight, while the sampling is done by *purposive sampling*.

The equipment used measuring ruler with accuracy of 1 mm, measuring tape with accuracy of 1 mm, and the digital scales, the brand is Thunderbird with a capacity of 2000 kg with an accuracy of 0.5 kg.

**DATA ANALYSIS**

The data obtained were analyzed using correlation analysis and multiple regression analysis (Sugiyono, 2014).

$$r = \frac{n\sum XY - \sum X \sum Y}{\sqrt{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}}$$

Description :

r: Correlation

X: Vital Characteristics (chest circumference, body length, height)

Y: Body weight

n: Number of samples

The magnitude of the effect of the size of the phenotypic characteristics on the body weight of heavily pregnant Senduro goat can be known from the coefficient of determination with the following formula:

$$R^2 = (r^2) \times 100\%$$

Multiple regression analysis was used to determine

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

the relationship between phenotypic characteristics (chest circumference, body length, height) with body weight of heavily pregnant PE goat using the following formula:

Description :

Y = Body weight

X<sub>1,2,3</sub> = Phenotypic characteristics (chest circumference, length, body, height)

a = constant

b = regression coefficient

**RESULT**

**The relation between phenotypic characteristics with the weight of a very pregnant Senduro goat**

Correlation values between phenotypic characteristics namely chest circumference (X<sub>1</sub>), body length (X<sub>2</sub>), and height (X<sub>3</sub>) with body weight (Y) of old senduro goat goats can be seen in Table 1.

Table 1. Relationship between phenotypic characteristics and body weight of old pregnant Senduro goats.

| Variabel           | n  | r    | R <sup>2</sup> (%) | Regression equation  | Information |
|--------------------|----|------|--------------------|--|-------------|
| X <sub>1,2,3</sub> | 30 | 0.84 | 70                 | Y = -49.95 + 0.50 X <sub>1</sub> + 0.06 X <sub>2</sub> + 0.63 X <sub>3</sub> | p < 0.05    |

Note: n = number of samples; r = correlation coefficient; R<sup>2</sup> = determinant coefficient

Based on the calculation results, it is stated that the hypothesis can be accepted, meaning that the phenotypic characteristic variables namely chest circumference, body length, and height provide a significant relationship ( $P < 0.05$ ) simultaneously to the body weight of the heavily pregnant Senduro goat.

Correlation coefficient value criteria are used to help infer about the closeness of the relation between one variable with another variable. the correlation coefficient value criteria can be seen in Table 2.

**Tabel 2.** Criteria for the correlation coefficient (r)

| Correlation coefficient interval | The level of the relation closeness |
|----------------------------------|-------------------------------------|
| 0.00-0.199                       | Very low                            |
| 0.20-0.399                       | Low                                 |
| 0.40-0.599                       | Strong enough                       |
| 0.60-0.799                       | Strong                              |
| 0.80-1.00                        | Very strong                         |

Sources: Victori, Purbowati dan Lestari (2016)

Based on the results of the calculation, it shows that overall the relation between phenotypic characteristics and the body weight of the heavily pregnant Senduro goat has a positive level of closeness as evidenced by the correlation coefficient (r) of 0.84. This is reinforced by the criteria of the correlation coefficient value from Victori et al, (2016) that the interval of the correlation coefficient value of 0.60 to 0.799 is stated to have a strong degree of closeness.

The results of this study also showed that the coefficient of determination ( $R^2$ ) was 70%. This value means that the phenotypic characteristics simultaneously influence the body weight of the heavily pregnant Senduro goat by 70%. While the remaining 30% is influenced by other variables such as stomach contents including fetal growth therein. Isroli, (2001) added that  $\pm 90\%$  of the contents of the stomach and chest (body) that determines body weight so that the thickness of the body is very determines the size of the chest circumference, while height and length of the body are more determined by bone, so that both cattle in fat and thin will have a fixed height, in terms of the difference between fat and thin greatly affect body weight. Olawumi and Farinnako (2017) revealed that chest circumference was the best predictor for body weight.

Increased body weight of heavily pregnant goat is influenced by the development of the fetus, placenta, blood vessel system and udder gland. Santosa, et al., (2016) the increasing age of the fetus will increase in diameter and will affect the weight of the parent, kacang goat fetus at the age of 20 days pregnancy has a diameter of  $1.2 \pm 0.1$  cm, age 22 days fetus  $0.4 \pm 0.1$  cm, the average fetal growth until the age of 30 days of pregnancy is  $0.19 \pm 0.1$  cm per day. Anonymous (2017) development and growth of the placenta and blood vessel system in pregnant goats starting around 30 days after fertilization. The placenta and blood vessel system support the

developing fetus in the uterus, maximum fetal development occurs in the last trimester of pregnancy by 70% of the child's birth weight. Finally, the trimester growth rate is very dependent on the placenta and the development of blood vessels in the first third of pregnancy.

Anderson and Wahab (1990) in the udder gland the growth rate of the parenchyma increases much faster than the stroma during pregnancy. The exponential rate for parenchymal growth is 0.0205 / day and the stroma level is 0.0105 / day. Stroma represents 60% of the weight of the udder in early pregnancy but only 24% at the end of pregnancy, while the parenchyma 40% of the glands at the beginning of pregnancy and 76% at 145 days of pregnancy.

### CONCLUSIONS

1. The correlation coefficient value of phenotypic characteristics with heavily pregnant Senduro goat has a strong relation closeness level in the amount of 0, 84 .
2. The phenotypic characteristics simultaneously influence the body weight of heavily pregnant Senduro goats by 70 %.

### REFERENCES

- [1] Anonymous. 2017. Producton From A Breeding Doe. Meat and Livestock Australia (MLA). Factheet 7: 1-8. Acces online: <https://www.mla.com.au/globalassets/mla-corporate/extensions-training-and-tools/documents/fs07-production-from-a-breeding-doe-final.pdf>
- [2] Anonymous. 2014. Penetapan Galur Kambing Senduro. Keputusan Menteri Pertanian Republik Indonesia Nomor 1055/Kpts/SR.120/10/2014. Acces online: [pustaka.ditjen-pkh.pertanian.go.id](http://pustaka.ditjen-pkh.pertanian.go.id)

- [3] Anderson, R. R., and Wahab I.M. 1990. Changes In Parenchyma And Stroma Of Goat Udders During Pregnancy, Lactation And Involution. *Small Ruminant Research*. 3 (6): 605-615. [https://doi.org/10.1016/0921-4488\(90\)90055-B](https://doi.org/10.1016/0921-4488(90)90055-B)
- [4] Ciptadi G., A. R..I. Putri, S. Rahayu, S. Wahjuningsih, M. Nasich, F. Rokhman, M. Mudawamah, S. Sarastina, E. Herwijanti, H. N. Karima, and A. Budiarto. 2018. Phenotypic And Genetic Character Variations Of A New Breed Of Genetic Resource Of Senduro Goat, Indonesia. *AIP Conference Proceedings 2019*, 060007 (2018) doi: <https://doi.org/10.1063/1.5061916>
- [5] Isroli, 2001. Evaluasi Terhadap Pendugaan Bobot Badan Domba Periangian Berdasarkan Ukuran Tubuh. *Jurnal Ilmiah SAINTEKS*. Vol. 8 (2): 90-94.
- [6] Olawumi, S., and Farinnako A. 2017. Evaluation Of The Relationship Between Body Weight And Linear Measurements In West African Dwarf Goat As Influenced By Sex And Agro-Vegetation Zone. *Science International*. 5 (2): 63-67. Doi: 10.17311/sciintl.2017.63.67
- [7] Santosa, Amrozi, B. Purwantara, dan Herdis. 2016. Sonogram Pemeriksaan Kebuntingan Dini Pada Kambing Kacang (*Capra hircus*). *Jurnal sains veteriner*. 34(2):188-193.
- [8] Siswanto. 2016. Kambing senduro ternak unggul Kabupaten Lumajang. Lumajang. Dinas Peternakan Kabupaten Lumajang. Acces online: <http://disnak.jatimprov.go.id>
- [9] Standar Nasional Indonesia (SNI) 7352.3:2018. Bibit Kambing – Bagaian 3 : Senduro. BSN. Jakarta.
- [10] Sugiyono. 2014. Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung : Alfabeta.
- [11] Victori, A., E. Purbowati dan C. M. S. Lestari. 2016. Hubungan Antara Ukuran-Ukuran Tubuh Dengan Bobot Badan Kambing Peranakan Etawah Jantan Di Kabupaten Klaten. *Jurnal Ilmu-Ilmu Peternakan*. 26 (1) : 23-28. <http://jiip.ub.ac.id>