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# ANALYSIS OF THE SIZE AND BODY WEIGHT CHARACTERISTIC OF ONGOLE CATTLE THAT ARE KEPT WITH INTENSIVE AND SEMI-INTENSIVE SYSTEM

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## ABSTRACT

**Background:** The purpose of this study was to determine differences in body size and bodyweight of Ongole Peranakan cattle (PO) that are kept with a semi-intensive and intensive system.

**Material and Methods:** The study was conducted in May-November 2019 in Kecamatan Tibawa, Gorontalo Regency, Gorontalo Province. A total of 250 Ongole cows crossbreed were used in this study. Body size correlation analysis and T-test to see differences. The variables observed were body length, shoulder height, and chest circumference.

**Results:** The results showed that PO cattle that were intensively reared had an average body weight of 719.4 kg/head, body length of 157.9 cm/head, shoulder height 152.6 cm/head, and chest circumference 220.4 cm/head while semi-intensive maintenance has an average body weight of 498.7 kg, body length 156.1 cm, shoulder height 148.9 cm, and chest circumference 178.4 cm.

**Conclusions:** Maintenance of PO cattle with intensive systems has a higher body weight than semi-intensive and is suitable as a mother cow for use as a livestock producing livestock.

**Keywords:** PO Cow, Body Size, Intensive and Semi-Intensive Systems

## INTRODUCTION

The cattle of Peranakan Ongole (PO) are the result of breeding through a cross-breeding system by raising ranks between Javanese cows and Sumba Ongole (SO). Since its formation into a nation of good quality livestock, until now there have not been many efforts directed at increasing its biological and genetic potential. This livestock is one type of local cattle that are being developed in Indonesia. The advantages of PO cows arise in their simple life, they can be developed in the tropics, are easy to breed and have a low

temperament or are tolerant of humans (tame), with PPB of cow male  $0.19 \pm 0.12$  *kg/head/day* and female  $0.18 \pm 0.10$  *kg/head/day* (Laya NK. 2005),

The development of PO cattle at Farmer-cattle illustrates differences in growth.

Feeding factors because the provision is not by the needs of livestock, maintenance and mating systems that are not well programmed can reduce genetic quality, where the maintenance of traditional, semi-intensive and intensive systems can affect the performance of livestock, in addition to breeding that occurs in a long period in the livestock population, the behaviour of farmer-cattle who sell livestock for family economic needs, where livestock are marketed are animals that have high economic value, so that the livestock that becomes the next offspring have poor genetic quality.

Efforts to maintain the existence of PO cows as native germplasm need to be done to get quality seeds. Minister of Agriculture Regulation No.54 / Permentan / OT.140 / 10/2006 states that to select livestock as a parent, performance tests are carried out based on quantitative and qualitative characteristics including measurement, weighing and evaluation. The local government agencies, especially the UPTD within the Ministry of Agriculture, have a mandate to conserve PO cows by breeding programs through the Open Nucleus Breeding Plan (ONBP) system by capturing local cows on smallholder farms as a source of seeds. Concrete steps to maintain the availability of PO cows as breeding cows require qualitative and quantitative information about certain characters as preliminary information, for further development. Qualitative traits can be identified through visual observations while quantitative traits are carried out by measurement techniques. The purpose of this study was to determine differences in the size and bodyweight of PO cows

that are kept in a semi-intensive and intensive system based on SNI standards, so they can be used as a source of seed.

## RESEARCH METHODS

This research was conducted from May to November 2019 in the District of Tibawa, Gorontalo Regency, Gorontalo Province, as many as 335 PO cows, consisting of 215 PO cows that were kept in an intensive system, and 125 PO cows kept by the semi-intensive system. Focus observations were made on quantitative traits: body length, height, chest circumference, and weight according to the formula Nibras, et al, (2003) as follows:

- a. Body height is measured using a measuring stick, measuring at the highest point of the cow's body to the ground (cm).
- b. Body length was measured directly from the elbow to the filter bone lump (cm).
- c. Chest circle; measured using a measuring tape, measured in a circle on the chest, measuring tape is behind the front leg (cm)

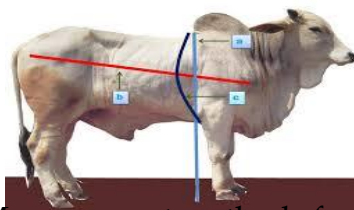


fig1. Measurement methods for body cattle

Comparison of body weight analysis using the formula suggested by Sugiyono (2013) as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Information:

t = t-value

X1 = average value of cattle (system-intensive)

X2 = average value of cattle (semi-intensive system)

S1<sup>2</sup> = variant (system-intensive)

S2<sup>2</sup> = variant (semi-intensive system)

n1 = Total Value of the group (system-intensive)

n2 = Total value of groups of two subjects (semi-intensive system)

r = correlation between two samples

Covariance value calculated based on the recommended formula

$$F = \frac{S1^2}{S2^2}$$

Where: F = F-count value

S1<sup>2</sup> = Greatest Variant Value

S2<sup>2</sup> = Smallest variant value

## RESULTS AND DISCUSSION

### Regional and farm-livestock characteristics

Tibawa Subdistrict, Gorontalo Regency, has an area of 207.7 km<sup>2</sup>, consisting of 16 villages, an altitude of 23.00 mASL, an average temperature of 27.9°C, average humidity of 78.6%. The number of beef cattle kept by the community and groups is 12484, (Source: Gorontalo Regency Fisheries, Fisheries and Animal Husbandry Department (2019)., Gorontalo Regency Statistics Agency (2018). Percentage of PO cattle is 37.54%, with ± 10 years

experience of raising cattle, cattle ownership level is 3-7. Animal Husbandry beef cattle in the TIBAWA sub-district are integrated with dryland farming (yellow corn) and wetland (wet rice). The system of maintenance PO cattle is carried out intensively and semi-intensively. The intensive system, livestock are kept in cages all day and given quality feed. The cage model used is the colony enclosure, where livestock is placed in cages without being fastened. The size of the cage is  $\pm 18 \times 7.2 \text{ m}^2$  for 20-30 head of cattle (managed by a group). Individual management, stall size  $4 \times 2 \text{ m}^2$ , several cows 3-4 heads.

The types of feed given are banana stems and leaves, long straw and rice concentrate (rice bran and coconut cake, cassava, bran, salt, and additional feed), this condition describes the feed given is different every day, the combination of feed given depends on the availability of feed on agricultural land, while the Semi-Intensive system, livestock are then released and tied outside the cage or on farmland, and at night put in a cage.

**The size and bodyweight of Ongole Peranakan cows (PO)**

The quality of PO cattle in Indonesia as a parent uses SNI 7356: 2008 standard (PERMENTAN no 54 2006), the assessment is carried out through measurements of the parent body parts (body length, height, weight, and chest circle). SNI information is used in this study, as basic data to determine the quality of PO cattle in Gorontalo. The average size and weight of PO cows in Tibawa Regency, Gorontalo Regency, Gorontalo Province, with intensive and semi-intensive maintenance systems are described according to table 1

**Tabel 1. Comparison of Size and Bodyweight of PO cattle with Intensive dan Semi-Intensive System**

No	variable	Maintenance	
		Intensive	Semi-Intensive

		Average	cov	Average	Cov
			(%)		(%)
		719.4 ±		498.7±100.85	
1	Body weight (kg)	151.11 <sup>a</sup>	21.0	<sup>b</sup>	20.21
		157.9 ±			
2	Body Length (cm)	27.68 <sup>a</sup>	5.04	156.1±13.75 <sup>b</sup>	4.34
		152.6 ± 7.96			
3	Body height (cm)	<sup>a</sup>	5.01	148.9±6.78 <sup>b</sup>	5.37
		220.4 ± 7.65			
4	chest circle (cm)	<sup>a</sup>	12.5	178.4±8.01 <sup>b</sup>	7.70

Based on Table 1, the size and bodyweight of Ongole crossbred cows that are kept semi-intensive are different from those in the intensive system ( $P > 0.05$ )

This difference is caused by cows that are kept with a semi-intensive system getting more food intake than cows that are intensively raised because these animals are employed on plantation land, whereas cattle that are kept with intensive systems are commercial animals, and are used in the Cow Race. The type of feed given is elephant grass, concentrate, bran, and supplementary feed.

The results of this study indicate that the weight of Ongole crossbred cows that are maintained with a semi-intensive and intensive system is higher (table 1) compared to the size and weight of PO cows originating from Lamongan (East Java), ages 1- 2 years is 360.22 kg, chest circumference: 175.37 cm, body length: 150.71 cm, and height: 144.77 cm (Hartati et al., 2010). According to Mansyur (2010), the weight of Ongole Peranakan cows that are



kept semi-intensive at the age of 2-3 years weights 302 kg, an average chest circumference of 165 cm, an average body of 131 cm, and height body 132 cm, while Laya N.K, (2005) estimated weight using Lambourne and Djagra formulas results in daily weight gain every day (PBBH) for male cattle at the age of 1-year  $0.42 \pm 0.03$  kg/head/day, while females  $0.42 \pm 0.08$  kg/head/day. Male PO cattle 2-years old is  $0.39 \pm 0.05$  kg/head/day, while female cattle  $0.38 \pm 0.07$  kg/head/day. Adult bulls are  $0.19 \pm 0.12$  kg/head/day, while females  $0.18 \pm 0.10$  kg/head/day.

### **Correlation Analysis between body size and body weight**

Correlation shows the value of the relationship between body weight variables with body measurements of Ongole cows crossbreed. Correlation coefficient values between the size and bodyweight of Ongole cows crossbreed which are kept in a semi-intensive and intensive system are presented in Table 2.

**Table 2. the value of correlation between body size and body weight**

No	Ukuran Tubuh	Nilai r	Signifikan	Keterangan
PO Cows (Intensive)				
1	chest circle (X <sup>1</sup> )	0.98	0.00	Signifikan
2	Body height (X <sup>3</sup> )	0.82	0.00	Signifikan
3	Body Length (X <sup>2</sup> )	0.77	0.00	Signifikan
Sapi PO Semi Intensif				
1	Body Length (X <sup>2</sup> )	0.95	0.00	Signifikan
2	chest circle (X <sup>1</sup> )	0.83	0.00	Signifikan
3	Body height (X <sup>3</sup> )	0.80	0.00	Signifikan

The results of this study indicate the correlation of body size with body weight of PO cows in both maintenance systems is very strong / high, this result is in line with Nisa (2016) report, states the correlation value for semi-intensive PO cows is (r= 0.99) chest circumference , (r = 0.97) body length, and (r = 0.98) shoulder height, while for intensive PO cows the correlation value (r = 0.99) chest circumference, (r = 0.97) body length, and (r = 0.95) shoulder height, while Laya N K, (2005) Relationship of body size and body weight of male and female PO cow of 1-year old following the regression equation  $Y = -43.44 + 1.35X_1$  ( $R^2 = 0.74$ ) and  $Y = -80.18 + 0.52X_1 + 0.69X_2 + 5.57X_3 - 5.14X_4$  ( $R^2 = 0.89$ ).

According to Sugiyono (2013) states that the correlation coefficient interval between 0.00 - 0.20 indicates a low correlation level, the correlation coefficient interval between 0.20 - 0.50 is the moderate correlation level, and the correlation coefficient interval 0.50 -1.00 indicates the level Correlation Correlation is the very strong or high category.

### **T-test Analisis of the size and bodyweight of Ongole Peranakan cattle (PO)**

Comparison of the size and bodyweight of Ongole cattle (PO) crossbreed, which is kept semi-intensive and intensive. T-test results on the size and bodyweight of Ongole Peranakan cattle (PO), which are kept semi-intensive and intensive are presented in Table 3.

**Tabel 3. *t-Test: Two-Sample Assuming Equal Variances***

No	Variable	Maintenance		Nilai P. Value	Kesimpulan
		Semi-Intensive (tail)	Intensive (tail)		
1	BW (kg)	125	125	6.2	Not Significant

					Not
2	LD (cm)	125	125	1.3	Significant
3	BL (cm)	125	125	0.5	Significant
4	HB (cm)	125	125	0.2	Significant

Where : BW = Bodyweight, LD = Lingkar Dada, BL = Body Length, BH = Body height.

Based on the T-test. The difference in body weight between Ongole crossbred cows that are kept semi-intensively and intensively is not significant or the same. This illustrates that there is no difference in body weight and chest circumference of different PO cows with breeding systems. The difference occurs in the length and height.

## Conclusion

The estimated weight of Ongole crossbreed cattle, which are kept intensive, is 719.4 kg, while the intensive Sem-system is 498.7 kg. The weight and breast circumference of Ongole crossbreed cows that are kept semi-intensive are higher than those that are intensive but not significantly different, while the body length and a shoulder height of cows that are kept semi-intensive are higher than intensive and significantly different.

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