Application of Morphological Index in the Assesment of Type and Function of Fat Tail Sheep in Sapudi Island

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ABSTRACT

Morphological index could be used to evaluate type and function of livestock. The aim of this study was applying morphological index to assess the type and function of Sapudi fat tail sheep. About 65 head ewes comprising 32 ewes from Gayam village of Gayam district and 33 ewes from Talaga village of Nonggunung district were analysed. Morphology observed were body weight, body length, height at wither, heart girth, chest width, chest depth, hip width, rump height, rump length, tail length, and tail width. Index used were weight, height slope index, length index, width slope index, depth index, foreleg length index, balance, and cumulative index. Data of morphology obtained were analysed by descriptive and pearson correlation. The results show that the average of body measurements of Gayam fat tail sheep was higher than that of Talaga fat tail sheep. Talaga fat tail sheep had balance better than that of Gayam fat tail sheep. Sapudi fat tail sheep were high type and potential to be developed as meat animal.

Keywords : Sapudi fat tail sheep, morphological index, body measurement, type

INTRODUCTION

Fat-Tailed Sheep meat producer that has a body weight and daily gain were very good, with the potential to achieve a body weight of 70 kg[1]. DEG also has a good adaptability to the arid environment[2][3]. Sapudi Island agroecological conditions are hot and dry that affects the quality of existing fat-tailed sheep. The pattern of adaptation to environmental conditions can alter the appearance of an animal. It can bring out the quantitative nature of different body sizes with fat-tailed sheep in other locations.

Body measurement is one of many criteria that used for selection of animal. Selection can be done through genetic characterization using quantitative nature of body measurement[1]. Body measurement can be used to distinguish between breeds of sheep[4]. Some of body measurement has a positive correlation with body weight. the african dwarf sheep showed that head length and hip width are strongly correlated with body weight than others[5]. This fact is also supported by the research results on the Nilotic sheep , in which the body length and height at wither have a positive correlation with body weight[6]. Other research

has been done on the local sheep in Indonesia ,garut sheep, that have a strong correlation between body weight to body length, height at wither, and chest depth[7]. The results of other studies on the Zulu sheep shows that rams have higher correlation between body weight and body mesurement than ewes[8].

Morphology index is one way in animal scoring as an indicator of the type and function of animal. This system includes conformation, length and balance of animal, so it is appropriate for use in the suspect's body weight and the type of animlas. This system has a neutral correlation with age, so it can be used without any age restrictions. This system is expected to improve the ability of farmers in evaluating animal and it can also improve the ability to select potential breeding stock[9]. This sytem has been applied to african dwarf sheep to determine the type and function of it[5]. The aim of this study is to apply the use of the morphological index to examine type and function of sapudi fat tailed sheep.

RESEARCH METODH

This research conducted at Sapudi Island on may 2009. It used 65 ewe of sapudi fat-tailed

sheep of Gayam and Talaga village. Parameter measured were body weight, body length, height of wither, chest width, chest depth, hip width, rump height, rump length, tail length and tail width (Figure 1). Morphological indexes were calculated by Alderson formula[8].

Weight = {body length x hearth girth x[(chest width+hip width)/ 2]}/1050

Height slope index = height at wither– rump height

Length index = Body lenght/height at wither

width slope index = chest width/hip width

Depth index = chest depth/height at wither

Foreleg length index = height at wither – chest depth

Balance = (hip width x rump length) / (chest depth x chest width)

Fig. 1. Measurement procedurs of body Measurement

BL: body length, HA: heighth at wither, CW: chest width, CD: chest depth, HG: heart girth, RH: rump height, HW: hip width, RL: rump length, TW: tail width, TL: tail length.

Balance = (hip width x rump length) / (chest depth x chest width)

Cumulative index = (weight/average of weight) + length index + balance

Body measurements were analyzed by descriptif and t-test, while morphological indexes were analyzed by descriptif and person correlation used SPSS program.

RESULTS AND DISCUSSION

Average body weight of sapudi fat-tailed sheep at Gayam were higher (17,78%) than Talaga (Table 1). Body length of Gayam fat-tailed sheep were 7, 70% longer than Talaga, height at wither of Gayam fat-tailed sheep were 4,21% higher than Talaga. Heart girth of Gayam were 5,91% bigger than Talaga. Rump height of Gayam were 4,83% higher than Talaga. Tail length of Gayam were 15,83% longer than Talaga.

Table 1. Body Measurement of Sapudi Fat-tailed Sheep

Body Measurement	Body Measurement	
	At Gayam	At Talaga
Weight (kg)	33,84 ± 1,89**	28,12 ± 1,24
Body length (cm)	58,16 ± 0,91**	54,00 ± 0,96
Height at wither (cm)	61,44 ± 0,59**	58,96 ± 0,65
Chest width (cm)	17,20 ± 0,38	16,12 ± 0,47
Chest depth (cm)	29,52 ± 0,55	28,52 ± 0,33
Heart girth (cm)	75,20 ± 1,42*	71,00 ± 1,38
Rump height (cm)	63,32 ± 0,65**	60,40 ± 0,71
Hip width (cm)	18,48 ± 0,55	19,20 ± 0,62
Rump length (cm)	20,48 ± 0,55	21,2 ± 0,62
Tail length (cm)	32,20 ± 0,77**	27,8 ± 0,80
Tail width (cm)	13,32 ± 0,77	11,96 ± 0,49

** very significant difference (P<0,01)

*significant difference (p<0,05)

Sapudi Fat-tailed sheep at Gayam Village have body measurement bigger than those at Talaga Village, except hip width and rump length. This fact showed that fat-tailed Sheep at Gayam were bigger than those at Talaga. This difference was caused by the quality of maintenance at Gayam Village was better than that at Talaga Village.

Body measurement of fat-tailed sheep at Gayam was bigger than that at Madura Island, while at Talaga was smaller than at Madura Island. It was based on research conducted by Wijanarko, Average of body weight, body length, height at wither, chest width, chest depth, heart girth, tail length, and tail width were 26.01 kg, 57.85 cm,

61.77 cm, 15.36 cm, 28.45 cm, 70.67 cm, 30.07 cm dan 8.12 cm [10]. However, fat-tailed sheep at Talaga had an average ov body weight bigger than those at Madura Island. Overall, Sapudi fat-tailed sheep had a smaller size on body length and heart girth, but had a larger size of body weight, chest width, chest depth and tail length than Madura fat-tail sheep.

Table 2. Morphological indices of Sapudi Fat-tail Sheep

Morphological Indices	Average	
	At Gayam	At Talaga
Weight	29,46 ± 1,33	26,18 ± 1,2
Height slope index	-1,88 ± 0,25	-1,44 ± 0,28
Length index	0,94 ± 0,01	0,91 ± 0,02
Width slope index	1,08 ± 0,02	1,21 ± 0,05
Depth index	0,47 ± 0,01	0,48 ± 0,004
Foreleg length index	31,92 ± 0,38	30,44 ± 0,46
Balance	0,76 ± 0,04	0,92 ± 0,08
Cumulative index	2,58 ± 0,06	2,77 ± 0,09

Morphological indices (Table 3) showed that Sapudi fat-tail sheep at Gayam had weight, length index, foreleg length index higher than those at Talaga, while those at Talaga had width slope index, depth index, balance and cumulative index higher than those at Gayam. Weight calculation results of fat tailed sheep at Gayam 12.53% bigger than that at Talaga. Weight calculation results of sapudi fat-tailed sheep at Gayam had an error rate of 12.94% compared to the original weight, while that at Talaga had an error rate of 7.10% compared to the original weight. Overall, weight calculation by Alderson formula had an error rate of 10.20% comapred to original weight. Therefore, weight formula by Alderson could be used to estimate the weight of Sapudi fat-tail sheep.

Foreleg length index of Sapudi fat-tailed sheep at Gayam slightly higher than that at Talaga. This fact showed that Sapudi fat-tailed sheep at Gayam had foreleg higher than that at Talaga. However, Sapudi fat-tail sheep at Talaga had chest depth slightly deeper than Sapudi fat-tail sheep at gayam. Width slope index value of sapudi fat tail sheep at Talaga 12.04% higher than that at Gayam.

Sapudi fat-tailed sheep had rump height higher than height at wither. This Condition was different

with Garut local sheep, Garut composite and Sumatran Composite which had height at wither higher than rump height[4]. Width slope index value 1.08 and 1.20 showed that Sapudi fat-tailed sheep had the hip width wider that chest width. This condition was the same as Garut composite and sumatran composite sheep, but its different with Garut local sheep that had width slope index <1. Length index value <1 showed sapudi fat-tailed sheep included high-type sheep. This condition was different with the research result of Hafiz, stated that fat-tail sheep was the long-type sheep[11]. Sapudi Fat-tailed sheep had a large body size with small form on the front and large form on the back, that showed very suitable to be developed as a meat producing livestock.

Fig 2. Sapudi Fat-tailed Sheep with rump height higher than height a

CONCLUSION

Morphological indices could be applied at Sapudi fat-tailed sheep. Sapudi fat-tail sheep had different body conformation compared to other breeds of sheep in other area.

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REFERENCES

- [1] Gunawan, A. and C. Sumantri. "Karakter Morfometrik Ukuran Tubuh dan Bentuk

- Domba Ekor Gemuk Pulau Madura dan Rote Dengan Menggunakan Analisis Komponen utama”. *Buletin Peternakan*, 31 (4), 2007: 186 – 199
- [2] Mason, I.L. “*Prolific Tropical Sheep*”. FAO Animal Production and Health Paper 17, 1980. Rome: FAO dan UNEP
- [3] Sodik, A. dan E. S. Tawfik. “Productivity and Breeding Strategies of Sheep in Indonesia: A Review”. *Journal of Agriculture and Rural Development in The Tropics and Subtropics*, 105 (1), 2004: 71-82.
- [4] Handiwirawan E., R.R. Nur, C. Sumantri, and Subandriyo. “The Differentiation of Sheep Breed Based on the Body Measurements”. *J. Indonesian Trop.Anim.Agric.*, 36 (1), 2011: 1 – 8.
- [5] Sowande, O.S. dan O.S. Sobola. “Body Measurements of West African Dwarf Sheep as Parameters for Estimation of Live Weight”. *Trop Anim Health Prod*, 40 2008: 433 – 439
- [6] Atta, M. and O.A. El khidir. “Use of Heart Girth, Height at wither and Scapuloischial Length for Prediction of Live Weight of Nilotic Sheep”. *Small Ruminant Research*, 55, 2004: 233 – 237
- [7] Gunawan, A., K. Jamal, C. Sumantri. “Pendugaan Bobot Badan Melalui Analisis Morfometrik Dengan Pendekatan Regresi Terbaik *Best-subset* Pada Domba Garut Tipe Pedaging, Tangkas dan Persilangannya”. *Majalah Ilmiah Peternakan*, 11 (1), 2008: 1-6
- [8] Kunene, N.W., A.E. Nesamvuni and I.V. Nsahlai. 2009. "Determination of Prediction Equations for Estimating Body Weight of Zulu (Nguni) Sheep". *Small Ruminant Research*, 84, 2009: 41–46.
- [9] Salako, A.E. “Application of Morfological Indices in The Assesment of Type and Function in Sheep”. *Int. J. Morph.*, 24 (1), 2006: 13-18
- [10] Wijonarko, K. “*Studi Bobot Badan dan Ukuran-ukuran Tubuh Domba Ekor Gemuk di Pulau Madura dan Rote*”. scription, Faculty of animal science. Bogor: Institut Pertanian Bogor, 2007.
- [11] Hafiz. “*Aplikasi Indeks Morfologi dalam Pendugaan Bobot Badan dan Tipe Pada Domba Ekor Gemuk dan Domba Ekor Tipis*”.

scription, Faculty of animal science. Bogor: Institut Pertanian Bogor, 2009.