Comparison of Phenotypic Characters between Fat-Tailed Sheep (DEG) and Thin-Tailed Sheep (DET) in Dampit District, Malang Regency, East Java

A.R. I. Putri[1] and S. N. Kholidah[1]

Faculty of Animal Science, University of Brawijaya
Jl. Veteran, Ketawanggede, Kec. Lowokwaru, Kota Malang, Jawa Timur. 65145
Corresponding Author: ardyah.putri@ub.ac.id

ABSTRACT

Most local sheep breeders in Indonesia are fat-tailed sheep called Domba Ekor Gemuk (DEG) and thin-tailed sheep called Domba Ekor Tipis (DET). The morphometric characterization of livestock is vital for planning improvement, sustainable utilization, conservation strategies, and breeding programs. This study compares the phenotypic characters based on qualitative and quantitative traits between DEG and DET in Dampit District, Malang Regency. The data obtained will be helpful in genetic improvement development programs and selecting superior broodstock for breeding. Using 60 rams (30 DEG and 30 DET) range 1-2 years old in Dampit District, Malang Regency, East Java, Indonesia. Data were collected by observing, measuring, and following the data farmers recorded. The qualitative characteristics observed were body color, head color, head profile, horn, back profile, wool, and tail. The quantitative traits were height, head length, head width, body length, chest girth, rump height, length of ear, length of tail, width of the tail, and body weight. The qualitative characteristic data descriptive-analytic method. Data was collected, then tabulated and analyzed by T-test. The results show that DEG has a dominant white body and head color, compared to DET, which shows more colour variations, including white-brown, white-black, and whole black, and for quantitative traits that significant difference ($P<0.05$) are body height, rump width and height.

Keywords: local breeds, sheep, qualitative, quantitative, ram

INTRODUCTION

The development of sheep farming in Indonesia has high potential. These livestock are easier to maintain, can be utilized by agricultural and industrial waste and by-products, are easy to breed, and are in great demand by the public. The capital required is relatively small compared to large ruminants. The population of sheep in Indonesia in 2021 was 17.9 million heads, an increase of about 2.1% from 2020 (BPS, 2022). Around 90% of the sheep farmer are on Java Island, a densely populated island with intensive farming systems (Udo & Budisatria, 2011). This diversity is primarily due to the geographical location near the historical entry point of many livestock populations from Asia (Deniskova et al., 2019), its diverse topographic and climatic conditions, the vast population size, and a wide range of production systems.

The majority and local sheep breed in Indonesia is fat-tailed sheep called Domba Ekor Gemuk (DEG) and thin-tailed sheep called Domba Ekor Tipis (DET). The other report also divided Indonesia's local sheep into three groups, namely DET, Priangan sheep or more popularly known as Garut sheep, and DEG (Sodiq and Tawfik, 2004). DET is thought to originate from Bangladesh and DEG is believed to originate from West Asia (Germot et al., 2022). DET is a sheep with a small body size, so it is called Java Sheep. DET has a relatively small and thin tail, dominant hair color is white; although some have black markings around the eyes, nose, or other parts, female sheep are generally hornless, while rams have small and circular horns (Basri et al., 2021). The great opportunity to develop the sheep business is very high so that farmers can develop it through breeding and fattening. The need for sheep every month or yearly has dramatically increased, and many sheep breeders are currently trying to fatten up, especially rams, for religious activities.

Several regions in Indonesia, especially sheep breeders in Dampit District, Malang Regency, had several types of local sheep: fat-tail sheep (DEG) and thin-tail sheep (DET). Both types of sheep characteristics have predominantly white body hair, can have children twice a year, maximizing simple feed metabolism and are a unique genetic source for use in the improvement of local sheep breeds and imported sheep (Septiana, 2020). Around 90% of the sheep are on Java, a densely populated island with intensive breeding systems. The existence of DEG and DET diversity is mainly due to the geographical location near the historical entry point of many livestock populations from Asia, its diverse topo-

graphic and climatic conditions, and a wide range of production systems.

The morphometric characterization of livestock is vital for planning improvement, sustainable utilization, conservation strategies, and breeding programs. For some superior sheep breeds, mainly wool-type sheep, coat color has a significant value because it will affect the quality of the wool fibre produced; pure white coat color has a high selling value and is more desired by breeders (Kalds et al., 2022). Coat color also influences a farmer's choice of good-quality sheep. This study aims to compare the phenotypic characters based on qualitative and quantitative traits between DEG and DET in Dampit District, Malang Regency. The data obtained will be helpful for genetic improvement development programs and selecting superior broodstock for breeding.

MATERIALS AND METHODS

Phenotypic characteristics such as quantitative and qualitative data were collected randomly from 60 rams (30 DEG and 30 DET) range 1-2 years old in Dampit District, Malang Regency, East Java, Indonesia. Data were collected by observing, measuring, and following the data farmers recorded. The qualitative characteristics observed were body color, head color, head profile, horn, back profile, wool, and tail. The quantitative traits measured are their height, head length, head width, body length, chest girth, rump height, length of ear, length of tail, tail width, and body weight. The qualitative characteristic data are analyzed with the descriptive-analytic method. Data collected, tabulated, and measured are also calculated to obtain the mean and the percentage. The quantitative data was also analyzed by T-test using SPSS software ver.25 to understand their significant differentiation.

RESULTS AND DISCUSSION

Qualitative Characteristics

The results of qualitative observations show differences between DEG and DET. Commonly, they are called DEG because it has a characteristic tail that looks thicker than the DET. In addition, DEG shows a dominant white body and head color, compared to DET, which shows more color variations, including white-brown, white-black, and whole black. Color variations in DET are located on the eyes, half of the head, nose, mouth, ears, and legs. In both breeds, most were hornless and had a concave back-spine profile. Their wool characteristic is mostly curly-coarse, both DEG (30.3%) and DET (43.3%), while the other types are curly-smooth, straight-coarse, and straight-smooth (Fig.1).

The appearance of DEG and DET sheep are influenced by their distribution area which has specific characteristics compared to other areas. This is because there are differences in environment, rearing patterns, and the result of crossing with outside sheep or inbreeding, so the performance of sheep in each region varies greatly (Mandal et al., 2005a).

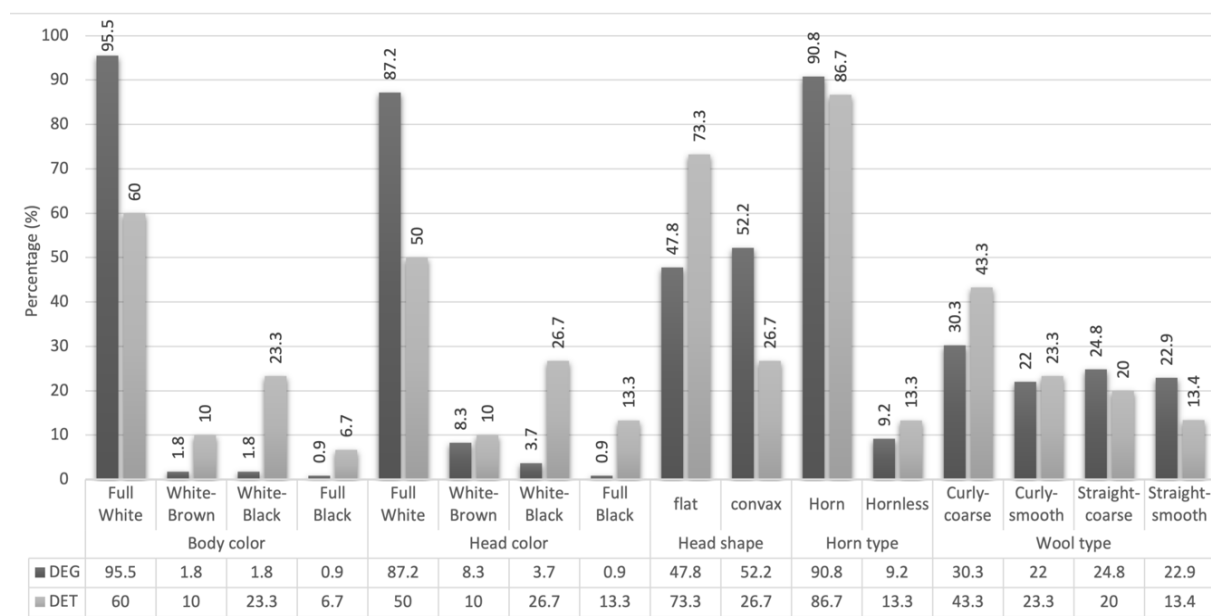|	Full White	White-Brown	White-Black	Full Black	Full White	White-Brown	White-Black	Full Black	flat	convax	Horn	Hornless	Curly-coarse	Curly-smooth	Straight-coarse	Straight-smooth
		Body color				Head color				Head shape		Horn type		Wool type		
DEG	95.5	1.8	1.8	0.9	87.2	8.3	3.7	0.9	47.8	52.2	90.8	9.2	30.3	22	24.8	22.9
DET	60	10	23.3	6.7	50	10	26.7	13.3	73.3	26.7	86.7	13.3	43.3	23.3	20	13.4

Figure 1. Graphics shows the percentage of qualitative traits between DEG and DET

<div align="center">(a)   (b)</div>

Figure 2. (a) DEG sheep are shown with thick tails, (b) DET sheep with thinner tails

The difference in humidity and temperate also depends on livestock productivity. Fat-tailed sheep (DEG) are a suitable type of lamb with good body weight and weight gain. The distinctive characteristics of DEG are a large, wide and long tail (Suprayogik et al., 2021). The enlarged base of the tail is a fat deposit or energy reserve, while the small end of the tail has no fat. The DEG sheep are meat-type livestock which has the characteristics of a long tail and a large tail base and can store a lot of fat (Mohapatra & Shinde, 2018) and. Previous research also said that the general characteristics of DEG sheep have small ears, coarse wool-type, and white in body color.

Quantitative Characteristics

There was no significant difference ($P>0.05$) in head length, head width, body length, and chest girth. Characters with significant differences ($P<0.05$) are body height, rump width and height. The results were linear in the previous study that the origin of sheep (West Java, Central Java and East Java) and the type of sheep (Javanese DET and Javanese DEG) did not significantly influence the sheep body weight. Even though there was no significant difference, overall, DEG has slightly higher quantitative characteristics than DET.
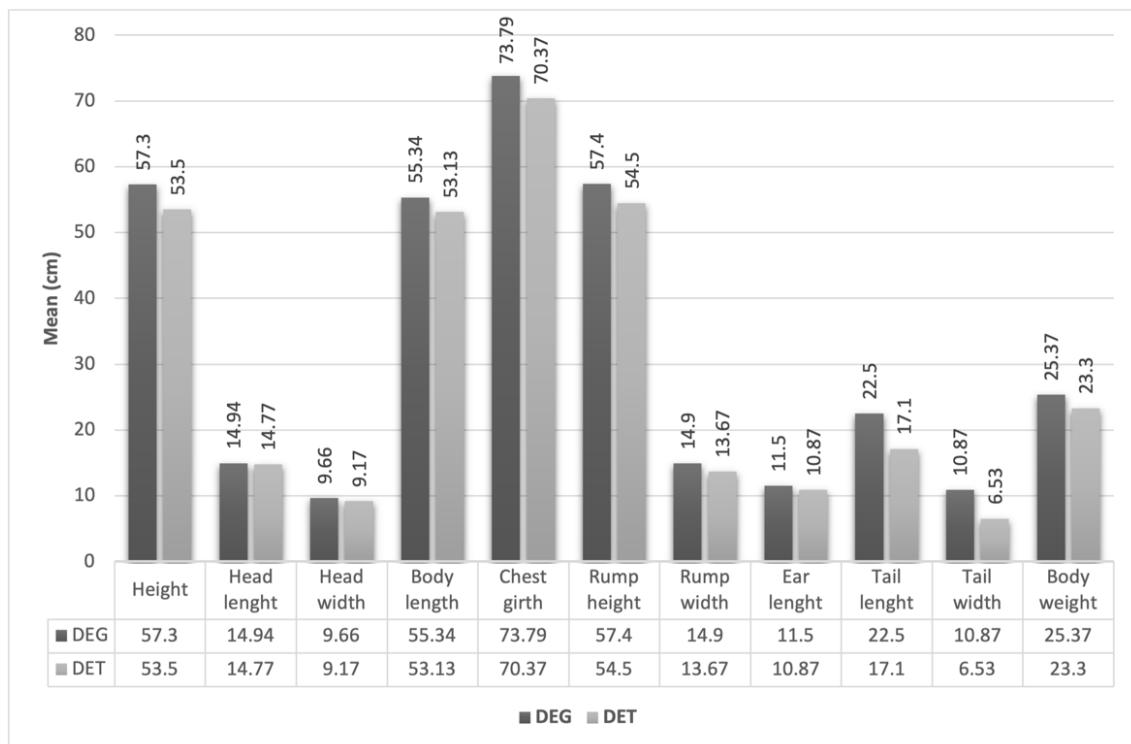

	Height	Head lenght	Head width	Body length	Chest girth	Rump height	Rump width	Ear lenght	Tail lenght	Tail width	Body weight
DEG	57.3	14.94	9.66	55.34	73.79	57.4	14.9	11.5	22.5	10.87	25.37
DET	53.5	14.77	9.17	53.13	70.37	54.5	13.67	10.87	17.1	6.53	23.3

Figure 3. Graphics shows the means data of quantitative traits between DEG and DET

The length and width tails have highly significant differences (P<0.01) in tail length DEG 22.49cm ±4.39 and DET 17.10cm ±2.99, and tail width DEG 10.87cm ±2.86 and DET 6.53cm ±1.98 (Fig.3).

The body weight of DEG sheep in this study was much lower than that of fat-tailed sheep in India (50 kg at six months and 90 kg at 12 months of age) (Mohapatra & Shinde, 2018). However, the body weight of DET in this study was lower than those of Ripollesa (51.40±6.63 kg), Sahel (27.50 ±0.80 kg), Zulu (34.70±0.20 kg), Morada Nova (31.74±5.09 kg) sheep but higher than Djallonke (21.70±0.50 kg), (Birteeb et al., 2012; Esquivelzeta et al., 2011; Mandal et al., 2005[b]; Mavule et al., 2013). Differences in body weight are influenced by genetics and environment. Each body component has a different growth and development rate due to genetics and environmental (Komariah et al., 2015).

The quantitative nature of sheep body size reflects the growth and is a unique characteristic of livestock. For local livestock to be utilized, their potential must be known so it is a necessary study of phenotypic characteristics in the form of qualitative and quantitative traits of livestock was carried out. In several types of livestock, this trait is a unique feature that groups sheep into several families. The first step that can be taken is to obtain basic information about the qualitative characteristics and the diversity in the population. Such information is important enough to determine the breeding strategy and livestock development systems.

CONCLUSION

Phenotypic characters between DEG and DET apart from the shape of the tail, it turns out that DEG has a dominant white body and head color. At the same time, DET shows more color variations, including white-brown, white-black, and full black, and for quantitative traits significant differences are body height, rump width and height.

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