

Performance of Pre-weaning Javanese Thin-Tail Lambs under Semi-Intensive Management at Different Age and Sex

M. Baihaqi*, S. Rahayu, & Y. Saputra

Department of Animal Production and Technology, Faculty of Animal Science,
Bogor Agricultural University,
Jl. Agatis Kampus IPB Darmaga Bogor 16680, Indonesia
*Email: baihaqi@ipb.ac.id

Abstract

The study was conducted to determine growth traits of thin tail pre-weaning lambs that produced in semi intensive management system. 61 animals (30 ewes and 31 lambs) were used in this study that located at Jonggol Animal Science Teaching and Research, Faculty of Animal Science, Bogor Agricultural University. Birth weights (BW), average daily gain (ADG) and weaning weight (WW) of lambs were affected by sex and ewes age. The highest of BW lambs was obtained from 2-year-age ewes ($2,316 \pm 349$ g), but ADG and WW of lambs from 3-year-age of ewes were highest than others (85.1 ± 32 g/day and $7,385 \pm 2,351$ g, respectively). BW of female was higher than male lambs ($2,264 \pm 438$ g and $2,149 \pm 716$ g) but ADG and WW of male (80 ± 24 g/day and $6,969 \pm 2,078$ g) was higher than female lambs (69 ± 26 g and $6,469 \pm 1,788$ g). The WW was significantly ($P < 0,01$) correlated by BW and ADG with r value were 0.67 and 0,96 respectively.

Keywords: correlation, performance, semi-intensive, thin-tail lamb

Introduction

Growth is one of important aspect in livestock production. Good growth performance will boost production. One phase in livestock production process is animal pre-weaning, where animal growth process in this phase would affect the productivity of post-weaning production. In sheep, if pre-weaning performance such as birth weight, body weight gain and weaning weights are high, then further growth will be high too (Riggio *et al.*, 2008). Marquez *et al.*, (2012) added that some limiting factors that cause failure to achieve a high level of performance in sheep production are the low birth rate, high mortality rate, low body weight gain and poor management.

In Indonesia as a tropical country, sheep are generally managed by extensive and semi-intensive system, where the supply of feed nutrients dependon the pasture.

Furthermore, those management systems without concentrate supplementation would implicate body weight development and daily weight gain of pre-weaning lambs (Gauly *et al.*, 2004). Yilmaz *et al.* (2007) mentioned that male lambs showed better pre-weaning growth than female lambs that reared in extensive system. Nevertheless, study focusing on semi-intensive sheep management in Indonesia generally is still limited. This study was conducted to identify growth performance of pre-weaning lambs in semi-intensive management system.

Materials and Methods

The study was conducted in Jonggol Animal Science Teaching and Research Unit (Jastru), Faculty of Animal Science, Bogor Agricultural University (IPB) Indonesia. This area is located at 106,53° E and 6,53° N and at an altitude 145 m, where monthly rainfall is 65 mm with minimum, maximum temperature and humidity is 20,8 °C, 32,9 °C and 91,7 respectively.

Sheep production in Jastru was reared in 55 ha of *B. humidicola* rangeland and managed by semi-intensive. Thirty pregnant ewe and thirty one young growing lambs were used in this study. Lambs and its mother were grazed from 09:00 am until 4:00 pm every day without any concentrate supplementation. *Ad libitum* watering was allowed to all animals during grazed. Animals were housed at night in colony stable. Type of grass in pastures was dominated by *B. humidicola* with nutrients composition of crude protein, fiber, fat, ash and NFE were 11.5, 41.2, 0.2, 7.2 and 42.75 of dry matter bases respectively.

During four months thirty pregnant ewes with different of ages were observed until birth. Data of lambs were collected type of birth, birth weight, body weight gain and weaning weight. The data were analyzed descriptively. Correlations were analyzed among data by Pearson correlation analysis in order to see the relationships between variables (Walpole, 1995).

Results and Discussion

Birth Weight

Result showed that birth weight of female lambs was higher than male lambs (Table 1). Based on age of ewe, it was found that one-year-old ewes had the lowest lamb's birth weight. Gardner *et al.* (2007) mentioned that birth weight was correlated to maternal characteristics. Sheep in the first parity generally have not been the maximum growth of reproductive organs. The first pregnancy leaves a 'physiological imprint' in the uterus and enables greater blood volume expansion during the second pregnancy and will facilitate greater fetal in subsequent pregnancies (Campbell and MacGillivray, 1984).

Average birth weights of male and female Javanese thin-tail lambs in this

Table 1. Birth weight of lambs by its sex and age of ewes (g)

Age of ewe (year)	Sex of lamb		Average (n)
	Male (n)	Female (n)	
1	-	2,007±563 (3)	2,007±563 (3)
2	1,900±0 (1)	2,420±300 (4)	2,316±349 (5)
3	2,303±887 (4)	2,258±666 (4)	2,280±727 (8)
4	2,097±720 (7)	2,285±362 (8)	2,197±545 (15)
Average	2,149±716 (12)	2,264±438 (19)	-

study were 2.1 and 2.3 kg, respectively. These results were higher than the study conducted by Reese *et al.* (1990), Grace *et al.* (2007), Gunawan and Noor (2006) and Suryapratama (1990) who resulted the lamb birth weight 1.5 kg, 1.9 kg, 1.7 kg and 1.9 kg, respectively. Heriyadi (2007) mentioned that the standard birth weight of garut sheep breed was between 2.0 to 3.2 kg. It showed that in semi-intensive management without supplementation of additional feed still produce a good birth weight of lambs.

Growth Rate

The male lambs had higher body weight gain compared to female 80.3 g/h/d and 69.9 g/h/d, respectively (Table 2), although male lambs had less birth weight (Table 1). Mandal *et al.* (2012) concluded that growth of lamb's body weight is strongly influenced by gender. Tuah and Baah (1985) also added that skeletal growth of male lambs is higher than the female so that growth of male would be higher than female lambs. Growth also is affected by hormonal system. Testosterone produced by male animals would promote body tissue growth of male lambs (Macit, 2002).

Average body weight gains (BWG) of male and female Javanese thin-tail lambs in this study were 80.3 and 69.9 g/h/d respectively. The study conducted by Reese *et al.* (1990) only has 56 g/h/d of Javanese thin-tail lamb without feed supplementation of its ewe.

Table 2. Body weight gain of lambs by its sex and age of ewes (g)

Age of ewe (year)	Sex of lamb		Average (n)
	Male (n)	Female (n)	
1	-	41.7 ±21.5 (3)	41.7±21.5 (3)
2	73.0±0.0 (1)	75.88±7.58 (4)	75.3±6.6 (5)
3	86.4±26.0 (4)	83.7±42.0 (4)	85.1±32.3 (8)
4	77.8±27.8 (7)	63.3±15.72 (8)	74±24 (15)
Average	80.3±24.8 (12)	69.9±26.9 (19)	-

Weaning weight

Weaning weight has a positive relationship with birth weight of lambs. Sheep which have a high birth weight will generally have a high ability to live through the critical period after birth and will have a high weaning weight. Table 3 shows that male lambs had higher body weight than female lambs. It could relate to the body weight gain was higher in male lambs (Table 2), so that the weaning weight is higher.

In this study the weaning weights of males and females lamb reached 6.9 kg and 6.4 kg, lower than the study conducted by Grace *et.al.* (2007) and Gunawan and Noor (2006) who reprinted that the data were 8.0 kg and 10.3 kg respectively. The result might be caused by feeding management. Lambs in both studies were kept by addition of intensive concentrate feed, so that nutrition requirements are likely met. This study indicates that semi-intensive management required additional feed or concentrate in order to increase animals' productivity.

The correlations between birth weight, body weight gain and weaning weight showed a very close positive relationship between these three variables ($P<0.01$). The highest correlation was found between body weight gain with weaning weight ($r= 0.97$) (Table 4). Rahmat *et al.* (2007) also obtained that correlation between birth weight and body weight gain was high in Javanese thin-tail lambs.

Table 3. Weaning weight of lambs by its sex and age of ewes (g)

Age of ewe (year)	Sex of lamb		Average (n)
	Male (n)	Female (n)	
1	-	4,533±1,841 (3)	4,533±1,841 (3)
2	6,300 (1)	6,975±741 (4)	6,840±709 (5)
3	7,488±2,437 (4)	7,275±2,464 (4)	7,385±7,385 (8)
4	6,769±2,156 (7)	6,535±1,384 (8)	6,644±1,722 (15)
Average	6,969±2,078 (12)	6,469±1,788 (19)	-

Table 4. Pearson's correlation (r) between birth weight, body weight gain and weaning weight of lambs

Variable	Birth weight	Body weight gain
Birth weight	-	-
Body weight gain	0.458**	-
Weaning weight	0.672**	0.965**

** very significant ($P<0.01$).

Conclusions

Maintenance of sheep in semi-intensive systems without additional feed still had a low success rate in its production. Nevertheless, addition of concentrate feed is needed to improve the performance of lambs produced. In this study, birth weight, average body weight gain and weaning weight of lambs were affected by its sex and age ewes. There was a very close relationship performance between birth weight, body weight gain and weaning weight of lamb reared on semi-intensive system.

Acknowledgment

The authors wish to acknowledge Jonggol Animal Science Teaching and Research Unit (Jastru), Faculty of Animal Science, Bogor Agricultural University (IPB) for providing all necessary for the study.

References

- Campbell, D. M. and I. MacGillivray. 1984. The importance of plasma volume expansion and nutrition in twin pregnancy. *Acta Geneticae Medicae et Gemellologiae (Roma)*33:19–24
- Gardner, D.S., P. J. Buttery, Z. Daniel, and M. E. Symonds. 2007. Factors affecting birth weight in sheep: maternal environment. *Reproduction* 133(1): 297–307
- Gauly, M., J. Reeg, C. Bauer and G. Erhardt, 2004. Influence of production systems in lambs on the *Eimeria* oocyst output and weight gain. *Small Ruminant Res.*, 55(1-3): 159-167
- Gunawan, A. and R.R. Noor. 2006. Pendugaan Nilai heritabilitas bobot lahir dan bobot sapih domba garut tipe laga. *Media Peternakan*: 7-15
- Heriyadi, D. 2007. Standarisasi Plasma Nutfah Mutu Bibit Domba Garut. Fakultas Peternakan, Universitas Padjadjaran, Bandung.
- Macit, M. 2002. Growth and carcass characteristics of male lambs of the Morkaraman breed. *Small Ruminant Res.* 43: 191–194
- Mandal, A., G. Dass and P. K. Rout. 2012. Genetic analysis of growth and feed conversion efficiency of Muzaffarnagari lambs under intensive feeding system. *Int. J. of Livestock Prod.* 3(4): 47-52
- Márquez, G. C., W. Haresign, M. H. Davies, G. C. Emmans, R. Roehe, L. Bünger, G. Simm and R. M. Lewis. 2012. Index selection in terminal sires improves early lamb growth. *J. Anim. Sci.* 90: 142-151
- Rahmat, D. A. Anang, and Dudi. 2007. Kecermatan dugaan respon seleksi bobot badan prasapih domba priangan berdasarkan catatan tunggal dan catatan berulang pada uji zuriat. Seminar Nasional Peternakan Perikanan. Universitas Padjadjaran, Bandung.

- Reese, A. A., S. W. Handayani, S. P. Ginting, W. Sinulingga, G. R. Reese and W. L. Johnson. 1990. Effects of energy supplementation on lamb production of Javanese thin-tail ewes. *J. Anim. Sci* 68:1827-1840
- Riggio, V., R. Finocchiario and S. C. Bishop. 2008. Genetic parameters for early lamb survival and growth in Scottish Blackface sheep. *J. Anim. Sci.* 86:1758-1764
- Suryapratama, W. 1990. Perbandingan pertumbuhan cempe DEG dengan persilangan DEG dengan Domer dan Suffas in: Research on Javanese Fat Tail Sheep at Gadjah Mada University, edited by Astuti, M., Yogyakarta
- Tuah, A. K. and J. Baah. 1985. Reproductive performance pre-weaning growth rate and pre-weaning mortality of Djallonke sheep in Ghana. *Trop. Anim. Prod.* 17: 107-113
- Yilmaz, O., H. Denk and D. Bayram, 2007. Effect of lambing season, sex and birth type on growth performance of Norduz lambs. *Small Ruminant Res.*, 68(3): 336-339