

## PHENOTYPIC AND GENETIC PARAMETERS OF GROWTH TRAITS OF BOERAWA GOATS AT TANGGAMUS, LAMPUNG PROVINCE

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### SUMMARY

A hundred and thirty F1 offspring of Boer goats x Ettawa grade were selected to analyze for their phenotypic and genetic parameters of growth traits. The result showed that birth weight, weaning weight (4 months), and average daily gain averaged  $2.863 \pm 0.134$  kg,  $14.519 \pm 1.080$  kg, and  $94.748 \pm 17.900$  g, respectively. Sex of kid and type of birth significantly ( $P < 0.01$ ) affected birth weight and weaning weight. Age of dam significantly ( $P < 0.01$ ) affected weaning weight but was not significant for birth weight. Heritability estimates for birth weight, weaning weight, and average daily gain were  $0.327 \pm 0.036$ ;  $0.255 \pm 0.122$ ; and  $0.194 \pm 0.316$ , respectively. Repeatability estimates for birth weight, weaning weight, and average daily gain were  $0.416 \pm 0.210$ ;  $0.268 \pm 0.139$ ; and  $0.231 \pm 0.022$  respectively.

*Keywords: Boerawa goats, growth traits, genetic parameters*

### INTRODUCTION

In general the farmers in Lampung Province raised PE goat and Kacang goat, but the farmers preferred PE goat to Kacang goat due to body of PE goat were bigger than of Kacang goat. Actually PE goat is dual purpose i.e. dairy type and meat type, but PE goats were reared as meat type.

Based on its genetic potential, the growth and slaughter weight of PE goats were not heavier than meat type goat. Performance of PE goats low productivity in meat. To improve PE productivity, it is important to introduce temperate or tropical exotic breeds, for example Boer goats.

Genetic improvement is an integral part of many goat development programmes in the tropics, where breeding policies mostly aim to upgrade local goats by crossbreeding with, either temperate or tropical exotic breeds. The Boer goat is a famous meat goat breed in the world. It is well-known for fast growth, high reproductive, strong adaptability, and excellent meat-purpose body conformation. Since 2001, the Lampung Provincial Government has introduced some Boer goats from Australia. The Goats were reared to collected their semen. The semen was then processed to be frozen semen that will be inseminated to PE does of farmers in some villages, one of them was Campang Village, Gisting District, Tanggamus Regency, Lampung. In the village, the farmers had united in four groups.

Crossbreed between Boer goat and PE does was namely Boerawa goat. Based on our observation, Boerawa crossbreed has meat type characteristic. Population of Boerawa goat increased significantly in Lampung, although the farmers fed the goats with conventional ration i.e. forage without concentrate ration. The farmers like very much to the performance of Boerawa goat. Until now there is no information on

performance of Boerawa goat weather phenotypic or genetic parameters. This research was conducted to evaluate the phenotypic and genetic parameters of growth traits of Boerawa goat in Campang Village, Gisting District, Tanggamus Regency, Lampung.

## MATERIALS AND METHODS

The data used were the original data in the “Centre of Boerawa Goat Development or Village Breeding Centre in Campang Village, Lampung” in 2003-2005. A total of 130 litters of offspring from 5 Boer bucks and 30 PE does were obtained. Those recorded in the test were dam, sire, kidding date, litter size (kidding type), birth weight, 4 months body weight. Sex of kid, type of birth, and age of dam were treated as different groups and analyzed their effects to birth weight and weaning weight. Heritability and repeatability estimates were computed by the method of paternal half-sib analysis (Warwick, et. al., 1990; Hardjosubroto, 1994).

## RESULTS AND DISCUSSION

### *Live weight and growth*

Means of birth and weaning weight for each factor are presented in Table 1.

Table 1. Least squares means of birth and weaning weight of Boerawa goat kids

Factor	Birth weight (kg)			Weaning weight (kg)			Average daily gain (g)		
	N	Mean	SE	N	Mean	SE	N	Mean	SE
Sex									
Female	48	2.798 <sup>b</sup>	0.108	47	14.059 <sup>b</sup>	1.018	47	93.858 <sup>b</sup>	8.187
Male	82	2.901 <sup>a</sup>	0.134	82	14.783 <sup>a</sup>	1.030	82	99.019 <sup>a</sup>	8.060
Type of birth									
Single	25	2.966 <sup>a</sup>	0.143	25	14.896 <sup>a</sup>	0.789	25	99.417 <sup>a</sup>	6.009
Twin	105	2.838 <sup>b</sup>	0.120	104	14.428 <sup>b</sup>	1.123	104	96.591 <sup>b</sup>	8.876
Age of dam (month)									
13-14	43	2.858 <sup>a</sup>	0.148	43	14.035 <sup>b</sup>	0.945	43	93.140 <sup>c</sup>	6.977
25-26	56	2.867 <sup>a</sup>	0.134	56	14.720 <sup>a</sup>	1.076	56	98.774 <sup>a</sup>	8.473
37-38	31	2.861 <sup>a</sup>	0.117	30	14.838 <sup>a</sup>	1.064	31	95.820 <sup>b</sup>	23.785
Average		2.863	0.134		14.519	1.080		94.748	17.900

The different superscript in the same column in each factor indicated significant effect (P<0.01)

Means of birth and weaning weight were 2.863±0.134 kg and 14.519±1.080 kg respectively. Sex and type of birth significantly affected birth and weaning weight. Age of dam significantly affected weaning weight but was not significant for birth weight.

Birth weight and weaning weight were significantly affected by type of birth in the present study. Generally birth weight decreased the increase in litter size. Robinson et al. (1977) reported that for lambs *in utero*, as the number of foetuses increases, the number of caruncles attached to each foetus decreases, thus reducing the feed supply to the foetus and hence reduced in the birth weight of the lambs.

In this study, males were significantly heavier than female on birth weight and weaning weight. Weaning weight would reflect mothering ability of dam as the inherent growth potential. Thereafter growth potential would predominate. Age of dam was

found to have significant effect on birth weight and growth rate at pre-weaning and that young does tend to produce smaller progenies at birth. It is generally known that mothering ability, especially milk production, increases with parity. Older does having larger body tend to be better milkers. The effect of parity of dam on kids is thus imparted as maternal influence whose direct influence is limited to the nursing period.

Overall average daily gain from birth to weaning was  $94.748 \pm 17.900$  g. Sex, type of birth, and age of dam significantly affected average daily gain from birth to weaning. It is generally recognized that the early post-natal phase of growth in goats is a critical stage because this is the stage when there is little maternal protection and the kid is exposed to environmental stress which limits rate of growth. Pre-weaning growth rate was higher than the 94.3 g per day reported by Das and Sendalo (1990) for Blended kids at Malya, and it was higher than that of Black Bengal x Beetal crossbred goats reported by Kanaujia et al. (1986).

In the present study single born and male kids grew faster than twin born and female kids. It is so mainly because of competition for the limited supply of doe milk. It is supported by Norton and Banda (1993) who found no differences in growth between single and twin born kids when subjected to artificial rearing of the kids.

#### *Genetic parameters*

The heritability and repeatability estimates for live weight and growth rates are presented in Table 2.

*Table 2. Heritability and repeatability estimates for live weight and growth rates of Boerawa goat kids.*

Trait	Heritability estimates	Repeatability estimates
Birth weight	$0.327 \pm 0.036$	$0.416 \pm 0.210$
Weaning weight	$0.255 \pm 0.122$	$0.268 \pm 0.139$
ADG* up to weaning	$0.194 \pm 0.316$	$0.231 \pm 0.022$

\*ADG = Average Daily Gain

Heritability estimates obtained in this study were moderate to low for live weights and average daily gain, ranging from  $0.194 \pm 0.316$  for average daily gain to  $0.327 \pm 0.036$  for birth weight. Repeatability estimates ranged from  $0.231 \pm 0.022$  for average daily gain to  $0.414 \pm 0.210$  for birth weight.

The heritability estimates in the present study are within the range reported for meat goats by Singh et al. (1993), whose heritability estimates for body weight ranged from  $0.144 \pm 0.149$  for birth weight to  $0.360 \pm 0.110$ . Roy et al. (1989) working on Jamunapari kids raised under semi intensive conditions reported that heritability of body weight at 3 month was  $0.432 \pm 0.142$ .

The moderately higher heritability estimates for birth weight in this study indicate that to select kids for their own genetic merit for weights and gains, it would be best to use birth weight as the selection criterion rather than weaning weight. The moderately higher repeatability estimates for birth weight in this study indicate that to select does for their own genetic merit, it would be best to use birth weight of their kids as the selection criterion rather than weaning weight.

## CONCLUSION

The present results on live weights and growth rate of Boerawa goats indicate that in order to improve breeding value, selection must be based on genotypic rather than environmental superiority.

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