

BODY WEIGHT OF JAVANESE SHEEP AND CROSSED WITH CHAROLLAIS AND ST. CROIX RAMS

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ABSTRACT

Javanese sheep of Garut (G) are known because of their superiority in short lambing interval and the number of lamb born. However, this breed has inferiority of low of milk production that in turn can lead to the low lamb body weight gain. This breed was crossed with Charollais sheep (M) from France to increase their milk production and with St. Croix sheep (H) from Virgin Island to increase the adaptability to hot environment. The results showed the birth weight of female single lamb of GG (pure Javanese sheep), HG (St. Croix cross) and MG (Charollais cross) were 3.04, 2.73 and 3.30 kg, respectively and 3.13, 3.56 and 3.48 kg for male lambs, and for female twin were 2.30, 2.00 and 2.26 kg and 2.23, 2.32 and 2.4 kg for male lambs and for female type of birth more than two lambs were 1.49, 1.61 and 1.71 kg and 1.50, 2.09 and 1.80 kg for male. Lamb weaning weight (90 days old) for GG, HG and MG respectively were 12.34, 12.40, and 17.21 kg for female single lambs and 12.91, 17.08 and 19.27 kg for male single lamb, and for female twin lambs were 8.18, 10.92 and 10.53 kg and for male twins lambs were 11.52, 12.30 and 13.42 kg, while for type of birth more than two lambs were 12.70, 7.75 and 9.14 kg for female lambs and 12.04, 9.66 and 10.28 for male lambs. The yearling body weight of GG, HG and MG of single ewes were 19.43, 19.65 and 28.18 kg respectively, and 23.06, 42.46 and 42.78 kg for male, and for twins ewes were 17.53, 19.68 and 22.79 kg and for rams were 22.64, 36.40 and 40.21 kg, and for female type of birth ≥ 3 were 20.17, 15.20 and 21.84 kg and 20.15, 33.99 and 32.25 kg for male.

Key word : Javanese sheep, Crossbreeding.

INTRODUCTION

Javanese sheep of Garut (G) are known has a high variability in their litter size that affected by major gene named $FecJ^F$ (Bradford and Inounu, 1996). Ewes those carriers of these genes are in average producing two or more lambs per lambing period. There is an indication that these ewes produce not enough milk for their lambs that resulted in high lamb mortality and low growth rate.

To improve productivity of Indonesian sheep, St. Croix sheep known as a hair sheep (H) breed from USA (Foote, 1983) and Charollais sheep (M) known as dual purpose sheep, meat and milk producer from France (Farid and Fahmy, 1996) were imported to Indonesia. The cross breeding project was then started in 1995, using the G dam line and H and M sire line to make HG and MG crossbred. In the long run it was targeted to make the three way crossing (MHG), to create

a new breed that capable of producing two lambs every eight months with enough milk production for the lambs and with a good growth rate. The main objective of this paper is to reported the result of HG and MG body weight compare to that of GG breed.

MATERIAL AND METHOD

From 151 GG ewes who gave birth in this study were sired by G, H and M rams, resulted in 46 dams of GG lambs; 36 dams of HG lambs; and 69 dams of MG lambs. From this type of mating it was then grouped according to the type of birth classes i.e singles, twin and triplet or more (Table 1).

The research was done at Research Institute for Animal Production, Bogor during May 1996 until June 1997. Parameter observed were type of birth (number lamb born), sex body weight from birth to one year of age.

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Table 1. Number of dams lambed (head) by breed sire and type of birth.

Type of Birth	Breed of Sires		
	G	H	M
Singles	24	16	19
Twins	12	14	36
Triplets or more	10	6	14

Data collected were analyzed using *cell means analysis* (Searle, 1987), the model equation used was as follows:

$$Y_{ijkl} = BST_{(ijk)} + \epsilon_{ij}$$

where:

Y_{ijkl} = body weight at certain ages (1,90,240,300 and 360 days),

BST: i=Breed; j=sex k=type of birth (TB),

Breed: 1=GG; 2=HG; 3=MG;

TB: 1=singles, 2=twins 3=triplets or more,

Sex: 1=female, 2=male,

ϵ_{ijkl} = error.

RESULT AND DISCUSSION

Singles

The average body weight of single-born male among the three types of mating

GG, HG and MG were not significantly different ($P > .05$, Table 2), the same results was also true for the female lambs ($P > .05$, Table 2).

Figure 1, shows that the body weight from 90 days until 360 days of age for MG and HG male were very close and it was not significantly different ($P > .05$, Table 3,4,5 and 6) but both HG and MG had higher body weight compare to GG ($P < .05$). The average daily gain (1-360 days) for the three breeds GG, HG, and MG are 52, 103 and 108 g/d, respectively. The crossbred grows twice as fast as the local breed.

The average females body weight of GG and HG from 90 days until 360 days of age were not significantly different ($P > .05$), on the contrary the MG body weight always higher than both GG and HG ($P < .05$). MG shows higher average daily gain (1-365 d, 65 g/d), then GG and HG (42 and 45 g/d respectively).

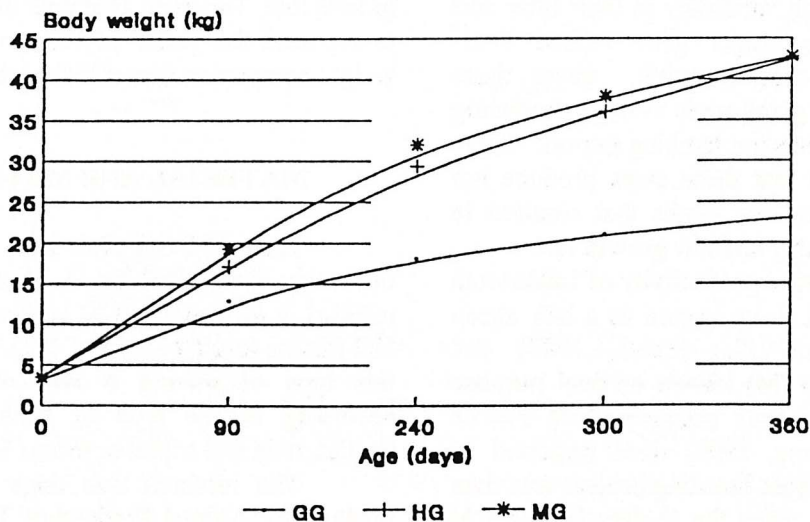


Figure 1. Graph of singles male body weight.

Table 2. Average lamb birth weight (kg) of Garut (GG), St. Croix Cross (HG) and Charollais Cross (MG) by type of birth and sex

Breed	Type of birth					
	Singles		Twins		Triplet or higher	
	Female	Male	Female	Male	Female	Male
GG	3.04 ± 0.71 (13)	3.13 ± 0.71 (11)	2.30 ± 0.55 (9)	2.23 ± 0.79 (12)	1.49 ± 0.63 (14)	1.50 ± 0.75 (7)
HG	2.73 ± 0.61 (6)	3.56 ± 0.43 (10)	2.00 ± 0.40 (12)	2.32 ± 0.36 (15)	1.61 ± 0.34 (8)	2.09 ± 0.36 (9)
MG	3.30 ± 0.54 (6)	3.48 ± 0.83 (9)	2.26 ± 0.39 (28)	2.40 ± 0.51 (30)	1.71 ± 0.51 (9)	1.80 ± 0.47 (14)

Value in the bracket is a number of observations

Table 3. Average lamb weaning weight (kg) of Garut (GG), St. Croix Cross (HG) and Charollais Cross (MG) by type of birth and sex

Breed	Type of birth					
	Singles		Twins		Triplet or higher	
	Female	Male	Female	Male	Female	Male
GG	12.34 ± 2.31 (12)	8.18 ± 1.15 (8)	12.91 ± 2.68 (10)	11.52 ± 2.03 (10)	12.70 ± 3.64 (5)	12.04 ± 4.81 (3)
HG	12.40 ± 3.06 (6)	10.92 ± 2.02 (11)	17.08 ± 4.00 (10)	12.30 ± 2.32 (13)	7.75 ± 1.86 (5)	9.66 ± 0.93 (7)
MG	17.21 ± 2.37 (6)	10.53 ± 2.57 (27)	19.27 ± 2.17 (9)	13.42 ± 3.66 (23)	9.14 ± 2.00 (5)	10.28 ± 3.59 (12)

Value in the bracket is a number of observations

Generally it is seen that MG and HG males until the age of 360 days had higher growth rate compare to GG. For the females starting from the age of 240 days, their growth rate from the three type of mating looked simultaneously at the same rate.

If the target is a slaughter weight of 35-40 kg, the crossbred (HG and MG) males with type of birth of single could reached that weight at the age of 300-360 days, while the GG lambs could not reach that weight even until one year of age.

For the female lambs in order to reach 20 kg of body weight at one year of age for both GG and HG need more thoughtful management, except for the MG where at 240 days of age they could reach 24.37 kg of body weight (Table 4).

Twins

At birth, male body weight of twin of the three types of mating (GG, HG and MG) did not show significantly different, it is also

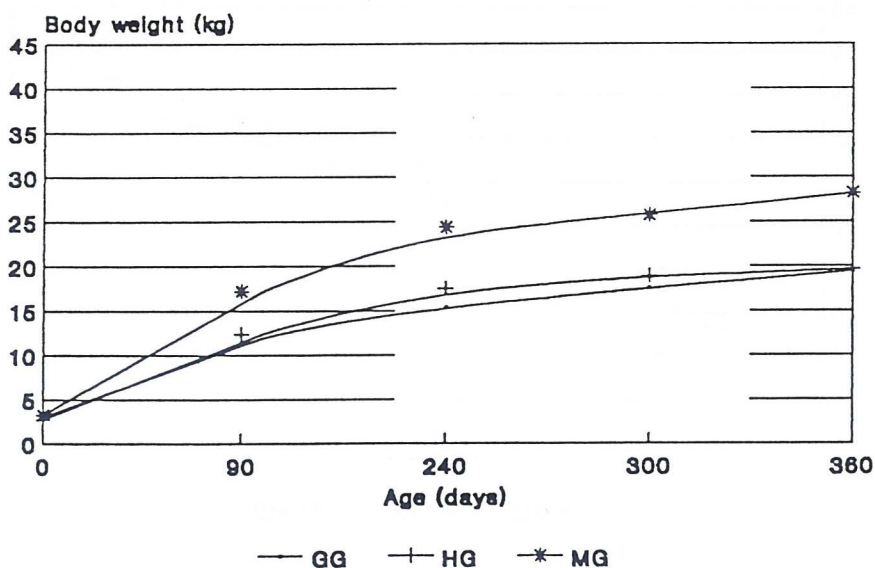


Figure 2. Graph of singles female body weight.

Table 4. Average lamb body weight (kg) at 240 days of age of Garut (GG), St. Croix Cross (HG) and Charollais Cross (MG) by type of birth and sex

Breed	Type of birth					
	Singles		Twins		Triplet or higher	
	Female	Male	Female	Male	Female	Male
GG	15.43 ± 2.58 (11)	18.13 ± 3.61 (10)	13.22 ± 1.42 (5)	17.69 ± 1.87 (8)	16.31 ± 5.24 (4)	17.65 ± 5.99 (3)
HG	17.49 ± 5.07 (6)	29.36 ± 5.83 (10)	18.26 ± 4.07 (11)	25.23 ± 4.67 (13)	12.94 ± 2.07 (5)	20.49 ± 1.83 (7)
MG	24.37 ± 3.52 (6)	32.01 ± 5.60 (9)	18.31 ± 3.14 (26)	26.92 ± 5.12 (22)	17.22 ± 1.99 (5)	22.66 ± 4.94 (11)

Value in the bracket is number of observation

Table 5. Average lamb body weight (kg) at 300 days of age of Garut (GG), St. Croix Cross (HG) and Charollais Cross (MG) by type of birth and sex

Breed	Type of birth					
	Singles		Twins		Triplet or higher	
	Female	Male	Female	Male	Female	Male
GG	17.53 ± 2.11 (11)	21.08 ± 3.99 (10)	15.61 ± 1.92 (5)	20.59 ± 2.18 (8)	17.31 ± 4.67 (4)	18.17 ± 5.88 (3)
HG	18.90 ± 5.29 (6)	36.03 ± 6.59 (10)	18.40 ± 2.85 (10)	30.82 ± 5.73 (13)	13.63 ± 2.41 (5)	27.86 ± 2.27 (7)
MG	25.71 ± 3.89 (6)	37.91 ± 2.72 (9)	20.35 ± 3.57 (26)	32.96 ± 4.73 (21)	20.49 ± 2.54 (5)	27.70 ± 6.01 (11)

Value in the bracket is a number of observations

true for the female lambs ($P > .05$, Table 2).

At weaning (90 days of age) for the male body weight among the three types of mating did not show significantly different ($P > .05$, Table 3), but GG females showed lower body weight compare to MG or HG at that same of age ($P < .05$).

Twin male, after weaning time started to show differences between the crossbred (HG and MG) and the pure line of GG (Figure 3).

At the age of 240 and 300 days, HG and MG animals did not show significantly

differences in their body weight ($P > .05$, Table 4, 5, and 6), but both of them have significantly higher body weight than GG ($P < .05$). At 360 days of age the body weight of MG animals is higher than both HG and GG ($P < .05$).

At the age between 300-360 days MG twin male, has already reach 35-40 kg of body weight, while HG male reach 35 kg of body weight at late 360 days of age. But GG twins male could not reach that weight at one year of age.

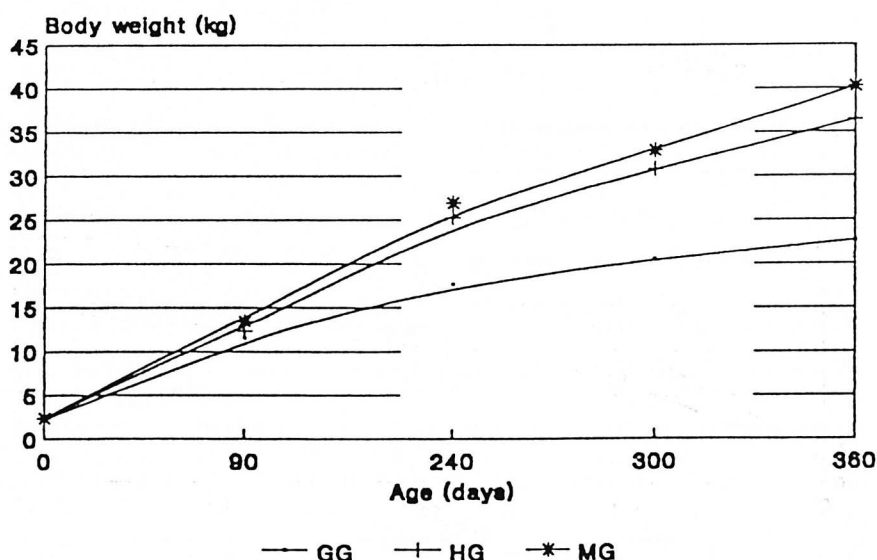


Figure 3. Graph of twin male body weight.

Table 6. Average yearling body weight (kg) of Garut (GG), St. Croix Cross (HG) and Charollais Cross (MG) by type of birth and sex

Breed	Type of birth					
	Singles		Twins		Triplet or higher	
	Female	Male	Female	Male	Female	Male
GG	19.43 ± 2.31 (11)	23.06 ± 6.18 (10)	17.53 ± 1.65 (5)	22.64 ± 4.01 (8)	20.17 ± 5.00 (4)	20.15 ± 5.75 (3)
HG	19.65 ± 5.66 (6)	42.46 ± 7.53 (10)	19.68 ± 2.44 (10)	36.40 ± 7.50 (13)	15.40 ± 1.59 (5)	33.99 ± 0.45 (7)
MG	28.18 ± 3.89 (6)	42.78 ± 4.02 (8)	22.79 ± 3.91 (26)	40.21 ± 3.84 (21)	21.84 ± 2.52 (5)	32.25 ± 7.37 (9)

Value in the bracket is a number of observations

The average daily gain (1-365 d) for GG, MG and HG male are 55, 93 and 103 g/d, respectively, while for the female are 43, 49 and 57 g/d, respectively.

The body weight among twin female of HG and MG at 240 days of age did not show significantly different ($P > .05$), but both of them were higher than GG body weight at the same age. The body weight among GG, HG and MG twin female at 300 days of age did not show significantly different ($P > .05$, Table 5). But at the age of 360 days MG reached the highest body weight and then followed by HG at the second and the last was GG (Figure 4).

Triplets and more

As the other two type of birth (singles and twin), the average birth weight of female lambs of the birth type of 3 did not

significantly different ($P > .05$, Table 2), but that not the case for male lambs where GG has the lowest weight, MG at the middle and HG lambs was the highest among them ($P < .05$, Table 2).

The body weight among GG, HG and MG males with type of birth ≥ 3 at ages of 90 and 240 days did not significantly different. But when the age reach 300 and 360 days, GG body weight was lower than HG or MG ($P < .05$, Table 5, 6, and Figure 5). Their average daily gains (1-365 d) were 56, 86 and 85 g/d for GG, HG and MG respectively.

While the average of female body weight of GG at weaning with birth type of ≥ 3 , was higher than HG and MG crossbred ($P < .05$). But at the age of 240 days of age the body weight among GG, HG and MG females were not significantly different ($P > .05$, Table 4). At the age of 300 days MG females could

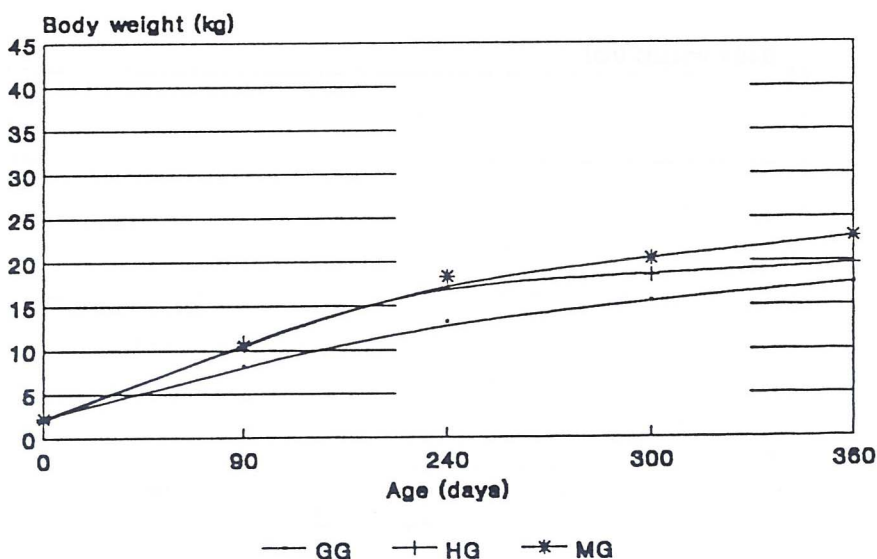


Figure 4. Graph of twin female body weight.

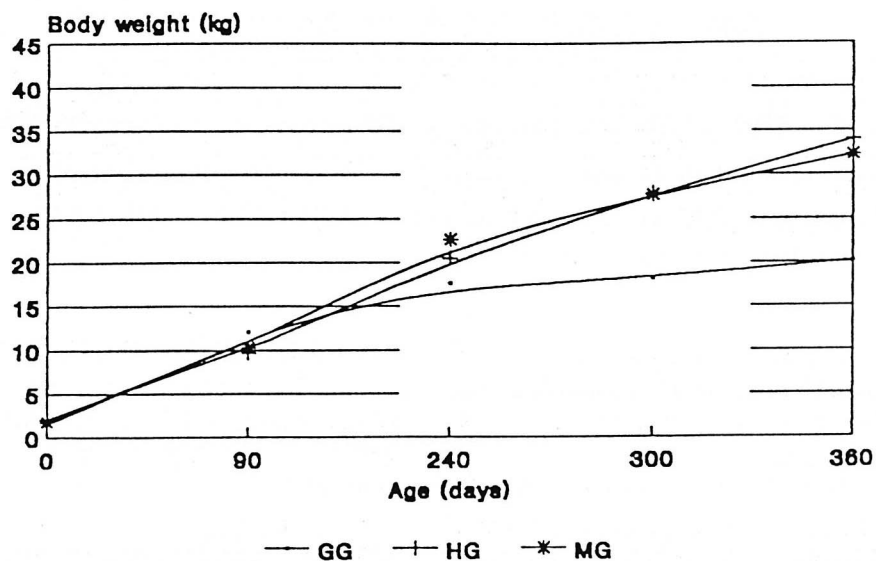


Figure 5. Graph of male body weight with type of birth ≥ 3 .

reach higher body weight than GG, and this was true until the animal reach 360 days of age. While HG female always below the weight of MG and GG (Figure 6), it is also showed by their average daily gain (1-365 d) i.e 53, 39 and 58 g/d for GG, HG and MG respectively.

CONCLUSION

Crossing local Javanese ewes (G) with St. Croix (H) and Charolais (M) rams produced animal with higher growth rate compare to the pure Javanese sheep, in turn resulted higher body weight, except for female HG cross of triplets were 25% lower compare to the local breed. In average, body weight of

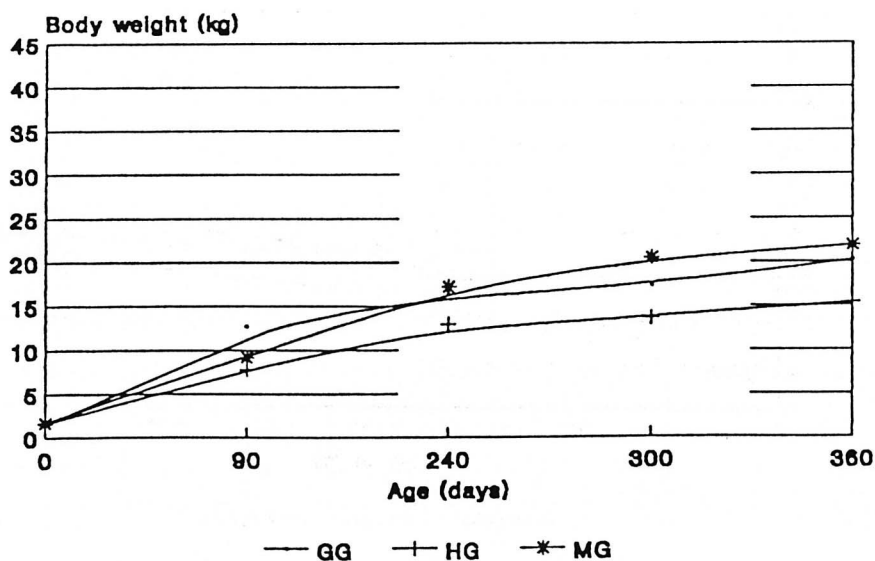


Figure 6. Graph of female body weight with type of birth ≥ 3 .

both crossed breed males (HG and MG) of one year old were 83, 73 and 65% higher compare to the local breed of singles, twins and triplets

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