

Performance of F₁ (Bachthao x Co) crossbreds goats in Thanhninh

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Summary

The objective of this study was to assess the performance of F₁ crossbreds goats (F₁(Bachthao (Bt) x Co)) after 6 years of crossbreeding. The study was done in Thanhninh zone, a range of limestone mountains and plains covered with shrubs, bordering Thanhhoa and Ninhbinh provinces. Crossbred goats, F₁ (Bt x Co), 475 males and 477 females, were used to determine the production performance. The results showed that the productivity of F₁ (Bt x Co) crossbred goats were 15-29% higher than that of Co goats. The mean values were 27.6-22.8 kg at 9 months of age, 61 g daily live weight gain in a period from birth to 36 months of age, 663 ml milk per day and 1.71 kids per year.

Keywords: Crossbreds, heterosis, weight changes, milk production, reproduction.

Introduction

Goat production has been practised at village level under extensive systems in Vietnam for a long time. The national goat population is 0.780 million with 72.4% of the goats located in north Vietnam. Most of them can be found in the hilly and mountainous areas of Hatay, Hoabinh, Thanhhoa, Ninhbinh, Thainguyen and Nintuan provinces (Binh and Gray, 2003). Eighty percent of the goats are local breed (Co goats, Co) having low body size and weight and low meat and milk production. The improved dual-purpose crossbred goat has an increasing impact at the farm level and on the milk and meat production. The biological characteristics and performance of Bachthao, Co and F₁ (Bt x Co) crossbred goats has been studied in Thanhninh zone. The aim of this study was to determine the performance of the first crossbred generation.

Materials and methods

The study was conducted at Thanhninh zone between 1996 and 2003. Bachthao bucks were used to crossbreed with Co does to make the first generation of crossings F₁ (Bt x Co). The experimental animals were 331 heads, 128 Co does and 11 Co bucks, used to produce pure Co goats, 65 Bachthao does and 7 Bachthao bucks used to produce pure Bachthao goats and 11 Bachthao bucks and 120 Co does used to produce F₁ (Bt x Co). The number of F₁ (Bt x Co) crossbred goats born was 952 (475 males and 477 females).

The animals were raised in a goat station belonging to Thanhninh Livestock Enterprise and 10 households around the enterprise. The goats were ear tagged and raised in a semi-confined system. Grazing time was 6-7 hours per day. The animals were supplemented with 2-3 kg fresh foliage and 100-400g concentrate (15-16% crude protein) per head per day depending on their production. Production and reproduction parameters of individual animals were recorded. The data were analysed by Microsoft Excel and Minitab software.

Results and discussion

Body weight (BW) changes and daily weight gain of the F₁ (Bt x Co) crossbred goats are shown in Table 1 and Figure 1. The BW of goats increased with age, and the BW of males were higher than

that of females. The highest daily weight gain was obtained in the period of 0-3 months of age, and thereafter the growth rate gradually decreased, and after reaching 11 months of age the growth rate was very low. From 24 months of age for females and 30 months of age for males the weight gain was very low, probably due to the fact that the goats approached maturity.

F_1 (Bt x Co) crossbreds goats showed clearly their hybrid vigour. The BW of F_1 was significantly higher than for Co goats ($P < 0.05$). BW of F_1 (Bt x Co) crossbreds goats was 129% and 83% of Co and Bachthao goats, respectively. Hybrid vigour of BW increased from 8.8% at birth to 43.2% at 36 months of age and the mean value of heterosis was 28.6%.

Table 1. BW changes and hybrid vigour of F_1 (Bt x Co) crossbred goats

Month of age	Sex	Live weight (kg)			%			h%
		F1	Co	Bt	F1/Co	F1/Bt	Co/Bt	
SS	Male	1.8	1.7	2.3	107.1	78.6	73.4	8.78
	Female	1.7	1.5	2.0	110.6	83.5	75.5	
3	Male	11.8	10.0	13.9	117.9	85.0	72.1	19.76
	Female	10.1	8.3	12.5	122.1	81.0	66.4	
6	Male	21.0	17.0	25.3	123.7	82.8	67.0	26.17
	Female	17.8	13.8	21.9	129.2	81.7	63.2	
9	Male	27.1	21.0	32.6	128.7	83.1	64.5	29.20
	Female	22.8	17.6	27.8	129.6	82.1	63.3	
12	Male	31.1	23.4	37.2	132.8	83.5	62.8	33.42
	Female	26.3	19.6	31.8	134.1	82.8	61.7	
18	Male	37.0	26.5	43.6	139.6	84.9	60.8	38.73
	Female	31.0	22.5	38.5	137.7	80.4	58.4	
24	Male	42.0	28.8	49.5	145.8	84.8	58.2	41.32
	Female	34.5	24.6	44.9	140.5	76.9	54.8	
30	Male	45.5	31.0	54.2	146.8	84.0	57.2	42.51
	Female	36.5	26.0	47.6	140.4	76.7	54.7	
36	Male	47.5	33.0	56.2	143.9	84.4	58.6	43.23
	Female	38.0	27.5	49.7	138.0	76.4	55.4	
Average					128.6	82.7	64.7	28.56

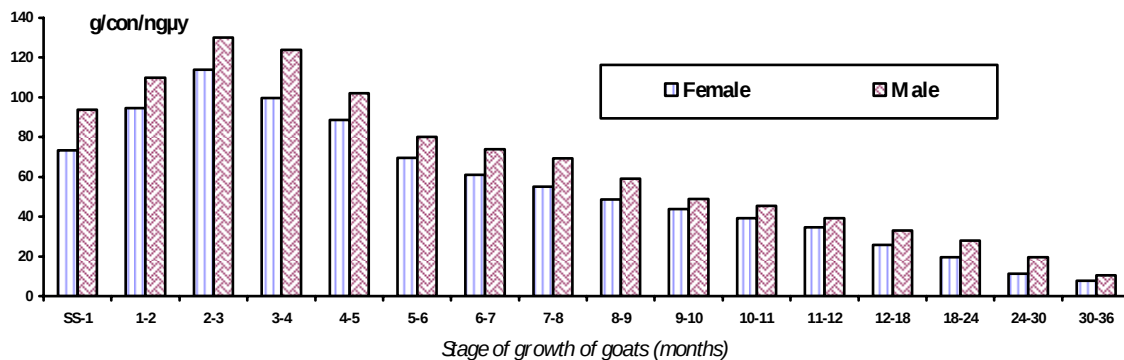


Figure 1. Daily weight gain of F_1 (Bt x Co) crossbred goats

Reproductive performance of F_1 (Bt x Co) crossbred goats is shown in Table 2. The litter size was 1.71 kids and with 1.66 litters per year, similar to Bt and higher than Co goats. The interval between births was 221 days, shorter compared to Co or Bt goats. The reproductive performance of F_1 (Bt x Co) crossbred goats was relatively high, which was also reported by Binh et al. (2003) in a study on the reproductive ability of F_1 (Bt x Co) crossbred goats raised in Hatay and Hoabinh provinces.

Table 2. Reproduction parameters of F₁ (Bt x Co) crossbred goats

Parameters	Unit	n (heads)	Mean and SE
Age at puberty	days	87	186± 8.35
Live weight at puberty	kg	87	16.5± 0.69
Interval between oestrus	days	76	22.0± 3.25
Time for oestrus	hours	76	52.1±3.27
Length of gestation	days	82	153± 2.45
Litter sizes	kids	82	1.71± 0.03
Litter/doe/year	kids	75	1.66 ± 0.15
Interval between births	days	75	221± 7.23

Ten F₁ (Bt x Co) crossbred goats and 10 Co goats (5 males and 5 females of each breed) were slaughtered at 9 months of age to estimate and to compare meat production characteristics. The results showed that meat production of F₁ (Bt x Co) crossbred goats was higher than Co goats. The carcass rates were 48.2 and 44.6% for males and females, respectively, 11.6% higher compared to Co goats (Table 3)

Table 3. Carcass characteristics of F₁ (Bt x Co) and Co goats at 9 months of age

Parameters	Units	Cross F ₁ (Bt x Co)		Co		Compared F ₁ /Co (%)
		Male	Female	Male	Female	
Live weight	kg	27.5	22.8	21.6	17.6	127.6
Carcass	%	48.2	44.6	43.2	41.1	111.6
Muscle	%	34.5	33.2	32.3	31.8	106.9
Bone	%	14.1	12.6	13.0	12.3	108.5
Blood	%	4.9	5.0	5.2	5.2	92.9
Head & legs	%	9.7	9.6	9.4	9.2	103.6
Viscera	%	28.9	31.6	32.0	33.2	90.3
Skin & wool	%	7.7	8.1	7.8	7.9	98.7

Conclusions

F₁ (Bt x Co) crossbreds goats expressed clearly their hybrid vigour on growth rate. The BW of F₁ goats was higher than Co goats (P<0.05) and they have adapted to hilly and mountainous area in Thanhnhinh and given high productive performance. Utilisation of Bachthao bucks to crossbred with Co does seems to be the best way to improve the performance of Co goats and to be the best way to create the new meat-milk goat breed for the future in Vietnam. Raising goats, especially raising F₁ (Bt x Co) crossbred goats is suitable for the farmers in mountainous areas since they give a high economic efficiency but require low capital investment.

Reference

Binh, D.V. and D. Gray, 2003. Goat production and research in Vietnam. Sustainable Parasite Control for small ruminants. Working paper (8). Metro Manila. Philippines.

