

GROWTH AND COMPOSITION OF WETHER GOAT CARCASSES

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SUMMARY

The growth of 20 wether goats was studied from one week of age until slaughter at weights between 20 and 46 kg live weight. Kids were weaned from milk at 14 kg but one group was weaned and slaughtered at 27 kg live weight. Details of carcass composition are presented. Carcass fat content varied between 7.4 and 26.4% in the carcass weight range 7.6 to 22.2 kg. Regression coefficients indicated that every 1 kg increase in carcass weight comprised 38.4% fat and 12.9% protein (a fat : protein ratio of 3 : 1). Kids weaned later grew faster and had a higher carcass weight than kids of the same live weight weaned earlier.

INTRODUCTION

Australian goat numbers are increasing but are relatively small when compared to the numbers of sheep. Considerable numbers of crossbred wethers and culls will soon reach the market as a result of crossbreeding programs with matings between Angora and feral stock. Over the past five years at least 150,000 feral goats have been slaughtered annually and for the year ended 30/6/79, 3727 tonnes of goat meat were exported from Australia (Aust. Meat & Livestock Corporation, personal communication). However, little is known about the growth or development of Australian goats. There is the potential to develop a quality market for prime kid meat with sales to our migrant population from southern Europe, Asia and Middle East who are traditional consumers of goat meat (Chevon). A limited number of studies has been undertaken with meat or milk/meat breeds of goats overseas but little of this information is relevant to Australian goat production (Devendra 1966; Kirton 1970; Eggen et al. 1973; Fehr et al. 1976; Fehr and Sauviant 1974, 1976). Louca et al. (1977) studied Damascus goats slaughtered at 54 kg live weight and reported that entire males produced leaner carcasses than similarly managed wethers. Panaretto (1963) and Panaretto and Till (1963) reported the total body composition of 23 dairy type wether goats but gave no details of carcass characteristics or rearing methods. Total body fat content ranged from 0.5% in a 13 kg goat up to 25.3% in a 34 kg goat.

This paper reports the growth and carcass composition of goats reared from one week old and slaughtered between 20 and 46 kg live weight.

MATERIALS AND METHODS

Twenty Saanen male goats one week of age were obtained in September 1977 and castrated with rubber rings, vaccinated and group fed whole cows' milk three times daily (0830, 1300 & 1630 hr) at the rate of 1.5 R/head/day. During the first week only, the milk was warmed to 30°C and diluted by the addition of hot water to give an intake of 1.3 l of milk/hd/d. From 25 days of age they were fed twice daily (0900 and 1600 hr). The goats were kept on deep litter for two weeks and then run on annual pasture. At ten weeks of age they were transferred to irrigated pasture and returned to annual pasture at seven months of age. Shelter was provided at all times and animals were weighed weekly. From eight weeks of age the goats were treated every fourth week with anthelmintic. Four goats were allocated at random to each of five slaughter groups. Groups 1, 2, 3 and 4 were weaned at 14 kg live weight and three animals in each group were slaughtered at mean live weights of 20, 28, 39 and 46 kg respectively. Group 5 animals were reared with the other goats until 14 kg and were then kept indoors and fed milk *ad libitum* until slaughtered at 27 kg live weight. When an animal reached its

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slaughter weight, it was fasted for 24 hr and killed. The weights of selected body organs and of the carcass were recorded. The left half-carcass was minced through a 9mm die and representative samples freeze dried and analysed for fat (ether extract) and nitrogen (kjeldahl). Data were analysed by regression analysis and where appropriate by analysis of variance. All regressions are significant at the 1% level and are for pooled data, as the regressions with or without group 5 were not significantly different ($P>0.05$).

RESULTS

The goats adapted quickly to the milk diet without health problems. The drenching program only partially controlled internal parasites when the goats were grazing irrigated pasture. Two goats died from suspected acute parasitism in February and May 1978. No further problems occurred when the animals were relocated on annual pasture in May 1978 and an effective drench substituted for the ineffective one.

Mean liveweight changes throughout the experiment are shown in Figure 1. With restricted feeding the goats took 50 to 60 days to attain 14 kg and mean growth rates ranged from 154 to 211 g/d (Table 1). Goats in group 5 fed milk ad libitum had intakes which increased from 2.4 l/hd/d in week 9 to 4.6 l/hd/d in week 17 (overall mean 3.73 l/hd/d) and growth rates which exceeded 200 g/d (Table 1 15-20 and 20-25 kg live weight intervals). The mean growth rate of weaned animals (Table 2) varied from 106 g/d (Group 1) to 35 g/d (Group 2). The growth rates of goats transferred to annual pasture (Groups 2, 3 and 4) were similar to those for young sheep on annual pastures in this environment (Kenny 1975). The goats lost weight between April and June 1978 but averaged gains of 72 g/d from July to November, 113 g/d from November 1978 to January 1979 and 41 g/d from January 1979 to May 1979.

TABLE 1 Growth rates of goats prior to weaning

Liveweight interval (kg)	5-10	10-15	15-20	20-25
Average daily gain (g/d)	154	211	216	206
No. of goats	20	18	4	4

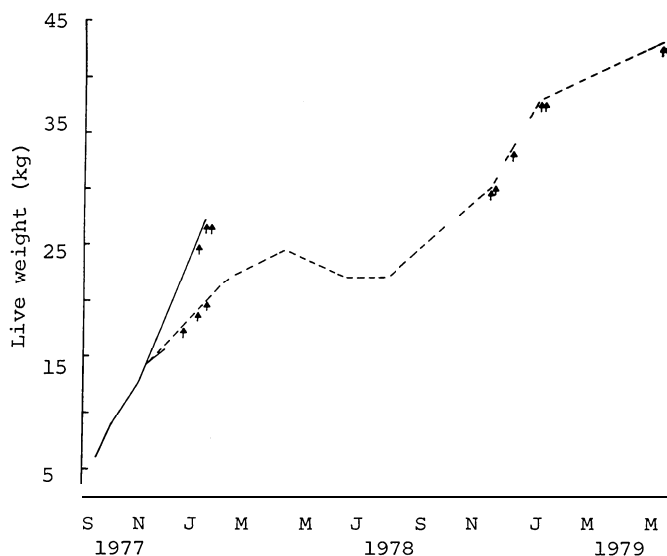


Fig. 1 Mean live weight of milk fed (—) and weaned (----) goats during the experiment. Slaughtering dates are indicated by \uparrow .

TABLE 2 Mean growth rates after weaning

	Group 1	Group 2	Group 3	Group 4
Initial live weight	14.8	14.6	14.2	15.1
Final live weight (kg)	20.4	28.4	39.0	46.0
Mean time (days)	54	393	499	519
Average daily gain (g/d) (\pm SD)	106 \pm 24	35 \pm 2	50 \pm 4	60 \pm 8

Regressions relating full and fasted live weight, carcass weight and fat and protein content are shown in Table 3. All are linear and account for a high proportion of the variance. Figure 2 shows the relationship between live weight at slaughter, carcass weight, carcass fat and protein content. Although there were no significant differences between groups 2 and 5 in slaughter or carcass weight there was a significant difference in dressing percentage ($P < 0.05$). Except for group 1, fat deposition was heavy in the internal depot sites and patchy on the external sites. Weight of channel fat ranged from a mean of 38 g in group 1 to 1060 g in group 5. Fat cover over the 13th rib was very thin (1-2 mm) in group 5 and absent in most other groups.

TABLE 3 Regression constants (with SE) for relationships between carcass components, carcass weight and live weight of goats

Dependent variable	Constant	Regression coefficient (SE)	Independent variable	% Variation accounted for
Fasted live weight	-2.63	1.027(0.015)	Live weight	99.8
Hot carcass weight	-3.06	0.544(0.034)	Live weight	95.2
Fat content	-2.54	0.384(0.026)	Carcass weight	94.2
Protein content	0.60	0.129(0.009)	Carcass weight	93.7

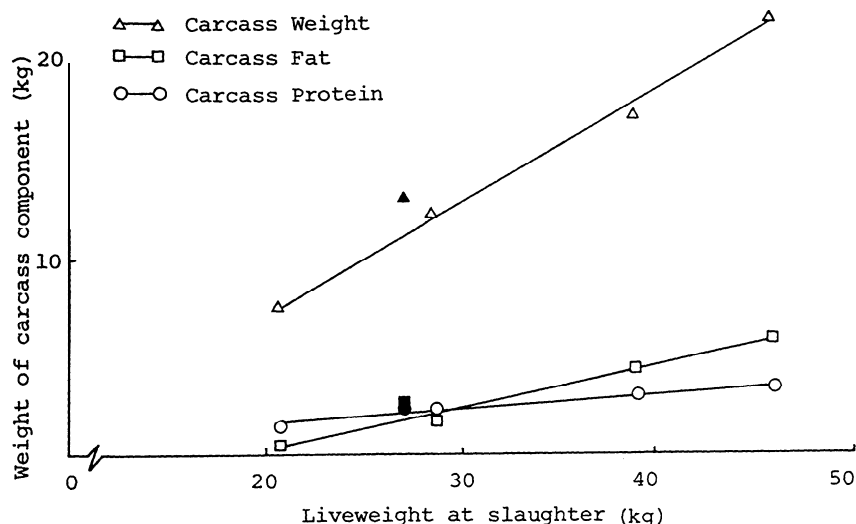


Fig. 2 Relationship between carcass components and live weight at slaughter (mean data for each group). Blocked-in symbols represent group 5.

DISCUSSION

These goats exhibited a linear relationship between live weight and carcass fat (between carcass weights of 7 and 22 kg). The regression co-efficients indicate that for every 1 kg increase in carcass weight, fat comprised 38.4% and protein 12.9% of the gain respectively (a fat : protein ration of 3 : 1). The carcasses in this study were fatter than those reported by Kirton (1970) who found feral goat carcasses weighing 10 kg had 6% fat and 18.5% protein (male goats) and 10.6% fat and 17.5% protein (female goats) whereas these wether goats had 13% fat and 18.9% protein at similar carcass weights. Eggen et al. (1973) reported that culled Angora does with a mean live weight of 30.7 kg, and mean carcass weights of 11.5 kg had an average carcass fat content of 17%. Searle and Griffiths (1976) reported that the average composition of 1 kg fasted liveweight gain for sheep (data derived from three breeds of sheep) in the pre-fattening phase was 35% fat and 12% protein and in the fattening phase was 66% fat and 9% protein.

Fehr and Sauvant (1974) obtained growth rates of 189 g/d and 199 g/d in goats up to 10 kg by using milk replacers made up to 16 and 24% dry matter respectively. Rations were based on skim milk with added tallow, vitamins and minerals to give a base powder of 23% fat and 26% crude protein. They also reported that feeding cold milk (6-8°C) and/or feeding once daily, instead of feeding warm milk (35-40°C) and/or twice daily feeding, reduced food consumption and growth rates by 5-6% but increased nutritional efficiency and, on a visual basis, decreased carcass fat deposition.

In conclusion growth rates up to 216 g/d were obtained by feeding cows' milk ad libitum to wether goats. Carcass fat and protein content increased linearly with increasing carcass weight. Kids weaned later grew faster and had a higher carcass weight than kids of the same live weight weaned earlier, but carcass composition was not significantly different.

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