CARCASE COMPOSITION AND THE USE OF SAMPLE JOINTS IN THE INDIGENOUS MALAWI GOAT

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Introduction

Few data are available on the growth and carcase characteristics of the indigenous Malawi goat, despite the fact that goats provide 20% of the meat consumed in Malawi. Better husbandry and breeding programmes can only be developed and implemented when adequate data on the performance and potential of populations have been collected. This trial was undertaken to provide base line data, in order to allow comparisons to be drawn when alternative management strategies are adopted.

Materials and Methods

Does were housed in a blue-gum-pole khola, roofed with galvanised iron, in pens measuring $4m^2$. Each pen held 10-14 does. Feeding was based upon the grazing of indigenous pastures but the goats also had access to maize stover during the dry season. Kids were weighed at birth and fortnightly thereafter. Castrate kids, in groups of 5, were slaughtered at birth and at intervals of 5kg between 5kg and 25kg. Following slaughter, carcases were split down the backbone, weighed, packed into individual polythene bags and stored at -20°C to await dissection. In March 1990 right hand sides were thawed, weighed and cut into six primal joints. To reduce any errors caused by abattoir procedures the axis vertebra was removed from all carcases and discarded. Each joint was then subjected to a full dissection, using butchers' knives, into lean, bone and fat components and the weight of each component recorded. The data generated from these dissections were used to develop allometric growth curves for each joint and for each tissue, using multiple regression analysis. These data, in turn, were used to evaluate each of the joints used as possible sample joints for use in subsequent work. In 1992 a further 10 goats, 6 at 15kg and 4 at 20kg, were slaughtered and subjected to the same dissections. The equations generated in 1990 were used to predict full carcase composition and these predictions were then verified using actual dissection data.

Results

Data for growth rate and carcase composition of goats slaughtered in 1989-90 are given in Table 1.

TABLE 1

CARCASE COMPOSITION OF MALAWI GOATS REARED UNDER TRADITIONAL MANAGEMENT

Slaughter	Birth	5 Kg.	10 Kg.	15 Kg.	20 Kg.	25 Kg.
Liveweight	2010 ± 89.29	5000 ± 0.00	10200 ± 120.11	15100 ± 190.12	20200 ± 260.66	25100 ± 298.43
K.O. %	51.02 ± 1.23	50.00 ± 1.03	48.70 ± 0.94	49.83 ± 1.18	51.10 ± 1.23	50.42 ± 1.44
C.C.Wt.	1020 ± 42.41	2500 ± 210.0	4967 ± 360.10	7525 ± 470.31	10424 ± 674.77	12655 ± 838.65
Right S Wt.	515 ± 18.75	1245 ± 84.38	2420 ± 160.88	3660 ± 189.99	5160 ± 268.88	6325 ± 341.10
Tissues as a proportion (gm / 100 gm) of Right Side Weight.						
Lean	38.50 ± 2.01	63.31 ± 1.81	70.33 ± 1.77	72.66 ± 1.93	71.92 ± 1.86	73.04 ± 2.02
Fat	1.26 ± 2.98	3.82 ± 2.42	7.40 ± 2.56	8.61 ± 2.82	11.09 ± 2.99	11.62 ± 3.17
Bone	60.29 ± 1.76	27.87 ± 1.67	21.92 ± 1.71	18.72 ± 1.29	16.96 ± 1.55	14.99 ± 1.71

Mean daily gain was 102g/day to 12 weeks of age but this dropped to only 40g/day over the period 12-26 weeks giving an overall mean of 68g. Dressing percentage (killing out percentage) was remarkably consistent across the whole range of liveweights, varying only between 48.7±0.94% at 10kg and 51.1±1.23% at 20kg. As was expected, the proportion of lean in the carcases remained fairly constant as liveweight increased, ranging from 68.3±1.8% at 5kg liveweight to 73.0±2.0% at 25kg. As the animals got heavier the proportion of fat in the carcases increased, from 3.8±2.4% at 5kg to 11.6±3.2% at 25kg. At the same time the proportion of bone decreased from 27.9±1.7% to 15.0±1.7%. The allometric growth coefficients for these data, calculated across all slaughter weights, were 0.676, 1.110 and 2.260 for bone, lean and fat respectively. This last figure reflects the very low levels of fat found in the carcases, even at the heaviest slaughterweights. Within joints (Tables 2-6), the greatest amounts of fat were found in the breast and this was reflected in the allometric growth co-efficient for this joint (0.84). The co-efficients for the other joints were 0.99, 0.99, 1.0, 1.02 and 1.06 for Best End of Neck, Hindleg, Shoulder, Loin and Foreleg respectively.

TABLE 2

COMPOSITION OF JOINTS 1989 - 90: SLAUGHTERWEIGHT 25KG

	LEAN(g)	FAT (g)	BONE (g)
Shoulder	722.2 ± 56	24.5 ± 12	413.0 ± 63
Foreleg	695.2 ± 50	35.5 ± 8	370.9 ± 47
B E Neck	171.7 ± 9	14.1 ± 1	164.9 ± 25
Loin	329.9 ± 17	10.8 ± 4	149.8 ± 33
Breast	197.3 ± 46	23.9 ± 6	71.5 ± 16
Hindleg	1286.7 ± 88	38.5 ± 20	528.1 ± 59
TOTAL	3402.0 ± 148	147.3 ± 36	1698.1 ± 13

Examining these data, and taking into account the ease with which joints can be removed from a carcase, it was decided to examine the Best End of Neck (BEN) and the Hindleg (HL) joints as predictor sample joints, and to test the predictions so derived using the 10 animals slaughtered in 1992. The predictor equations are given in Table 3.

TABLE 3

REGRESSION EQUATIONS USED IN PREDICTING CARCASE COMPOSITION OF 1992 GOATS FROM 1989 - 90 SAMPLE - JOINT DATA

PREDICTOR JOINT	TISSUE	EQUATION
BEN	LEAN	14.7- 0.17 BEN W + 2.03 BEN L + 0.497 SWT
BEN	FAT	-103 - 1.58 BEN W + 14.4 BEN F + 0.255 SWT
BEN	BONE	72.6 - 0.712 BEN W + 3.98 BEN B + 0.195 SWT
HL	LEAN	-82.4 + 0.279 HL W + 1.30 HL L + 0.201 SWT
HL	FAT	92.7 - 0.835 HL W + 0.54 HL F + 0.445 SWT
HL	BONE	85.1 - 0.22HL W + 1.82 HL B + 0.165 SWT

WHERE:

BEN W/HL W = Weight of sample joint

BEN F/HL F = Fat in sample joint

BEN L/HL L = Lean in sample joint

BEN B/HL B = Bone in joint

SWT = Sideweight

The comparisons generated by these equations are given in Table 4.

TABLE 4

PREDICTED AND ACTUAL CARCASE COMPOSITION (g)

	LEAN	FAT	BONE
Actual	2061.1	503.5	895.9
BEN prediction	2014.2	514.2	944.0
HL prediction	1981.9	530.6	894.2

There were no significant differences between predicted and actual values.

Conclusions

It is concluded that:

(i) The growth rate of kids may be in excess of 100g/day during early lactation but overall growth rates of 50-60g are to be expected.

(ii) The composition and proportions of the joints of Male Malawi goats slaughtered at weights between 5-25kg are similar to those reported elsewhere.

(iii) Both the Best End of Neck and the Hindleg joints may be used as predictor joints for full carcase composition.

(iv) In the light of the ease with which it may be removed from the carcase the hindleg is the sample joint of choice.

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