GROWTH, CARCASS COMPOSITION AND ITS PREDICTION IN THE INDIGENOUS MALAWI GOAT

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INTRODUCTION

Malawi has a malnutrition problem, especially in children and particularly in the immediate post-weaning period.

Though deficiencies of both energy and protein occur, protein deficiency is a particular problem and animal protein makes up only 9% of that which is available, and goats are estimated to provide 20% of the meat consumed (FAO, 1985).

Estimates of the numbers of goats in Malawi vary between 1,0 million (Zerfas, 1990) and 1,6 million (Malawi Government, 1988). The goats are of the small East African type, with a mature weight of 330 - 35 kg. Most are owned by small-scale, subsistence farmers, with 30% of households owning an average of 6 does (Zerfas and Stotz, 1987), however, Chimwaza (1982) estimated that 64% of Malawian householders owned some goats. Goats are traditionally grazed over indigenous pastures and crop residues during the dry season (May to November) but are often confined, usually by tether, during the wet, growing season. At night they are housed.

Improved husbandry and breeding programmes can only be developed and implemented when adequate data on the performance and potential of populations have been collected. The initial trial was undertaken to provide base line data, in order to allow comparisons to be drawn when alternative management strategies are adopted. Subsequent work was designed to determine whether the indigenous goat, under traditional management, is capable of providing a useable amount of milk daily, whilst still satisfactorily rearing her kid/s. Such milk would make a significant contribution tot he diet off weanling children within the families of the goat owners.

MATERIALS AND METHODS

The goat herd was established by the purchase of 41 goats in July 1989, twenty more were added in January 1990. Animals were housed in a concrete-floored building (khola), constructed of blue-gum poles under a galvanised roof. Walls were made of 1.8 metre high chain-link fencing. Individual pens were approximately 4m x 4m and each housed 10-14 does and their kids. Animals were housed at dusk and were turned out to graze at about 8am.

Feeding was based upon the grazing of indigenous pasture and bush grazing, with the predominant species being *Hypparhaenia spp.* During the dry season animals also had access to areas previously occupied by maize. Where required by treatment, supplementation with maize bran (madeya) was practised.
Madeya is a by-product of the preparation of maize for human consumption and is generally available widely and cheaply. Where supplementation was used it was at the rate of one double handful (250±10g) per doe per day.

MEAT PRODUCTION

Kids were weighed at birth and at fortnightly intervals thereafter. In 1989-90 castrate male kids in groups of five, 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.

Dissections were carried out during March 1990. Right-hand sides were thawed, cut into primal joints and dissected according to standard procedures (MLC 1972). Data generated were used to derive allometric growth curves and to evaluate each primal joint as a possible sample joint for use in future (1991 - 1992).

In 1992, six goats weighing 15kg, and four weighing 20kg were slaughtered and subject to the same dissection procedure. Equations developed from the 1989-90 data were used to predict full carcase composition and these predictions were then verified using actual dissection data.

In 1991 a trial was established to quantify the effect of milking does, after being housed overnight, and before being released to rejoin their kids for the days grazing. Kids were weighed at fortnightly intervals so as to ascertain the effect that milk removal would have on their growth.

RESULTS AND DISCUSSION

Mean daily gain of kids born in 1990 up to 12 weeks of age was 102 g/day, but this dropped to only 40 g/day over the period 12-26 weeks, giving an overall mean of 68g. This performance was in excess of that expected, since Zerfas and Stotz (1987) quote daily gains from birth to 12 months of 422 g/day and Karua (1988) gives 47 g/day to 150 days. Reynolds (1979) gives liveweight gains to 24 weeks of 10.4 kg for singles and 7.2 kg for twins and these figures equate to daily gains of 61.7 g and 43.0 g/day respectively.

Dressing percentage (killing out percentage) was remarkably consistent across the whole range of liveweights, varying only between 48.7% at 10kg and 51.1% at 20kg. As was expected, the proportion of lean in the carcase remained fairly constant as liveweight and carcase weight increased, ranging from 68.3 at 5kg liveweight to 73.0% at 25kg. were mirrored by a commensurate decrease in bone. The data generated by these dissections were used to develop allometric growth curves for each joint and for each tissue using multivariate regression analysis, co-efficients derived from these data were 0.676, 1.110 and 2.260 for bone, lean and fat respectively. Even at the heaviest slaughterweight, 25 kg, a lack of fat in the carcases, excluding perirenal fat, was evident. Within joints the greatest amount of fat was found in the Breast and this was reflected in the allometric growth co-efficient for this joint (0.84). The low proportion of fat in the carcase, even at 25 kg which led to the allometric growth co-efficient for fat of 2.26, is interesting. It suggests either that the Malawi goat is a very late-maturing genotype or, more probably, that thee level of nutrition available to the kids was insufficient to allow partition of dietary energy to fat deposition.

It would be interesting to examine the performance of such animals on ad libitum feeding, but given the nature of goat production in Malawi and the limited commercial market for carcases, it is unlikely that an improved feeding regime would prove economic. In 19911 - 1992 growth rates were lower and more in line with previous studies (Table 9) . The kids from does supplemented with madeya were consistently heavier than those from unsupplemented animals and those from unmilked does heavier than those from milked does, but none of these differences was statistically significant.

After examination of the 1989 - 1990 equations, regressing joint values on whole carcase composition, and taking into account the ease of accurate joint removal, it was decided to examine the Best End of Neck (BEN) and Hindleg (HL) joints as predictor sample joints using data from the goats slaughtered in 1992. There were no statistically significant differences between predicted and actual values. Correlation co-efficients were derived from the same data. It can be seen that both joints were satisfactory predictors of whole carcase composition, but in the light of the ease of removal and in the smaller element error attached to the removal of the Hindleg, and the fact that the joints in price per kilogramme are of the same financial value, it was concluded that this would prove the more useful in practice.

CONCLUSIONS

It is concluded that:

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

2. The composition and proportions of the joints of male Malawi goats slaughtered at weights between 5 25 kg are similar to those reported elsewhere.

3 Both the Best End of Neck and the Hindleg joints may be used as predictor joints for full carcase composition. The Hindleg, because of the ease of removal and the little financial difference between the two joints, was the sample of choice.

4. The removal of mail of milk from the doe in the morning does not statistically affect the growth rate of the kid.

5. The mail of milk available would provide g of high quality animal protein, g fat and g of calcium per day. Such an amount would go a long way towards improving the nutrition of the under-fives children of Malawi.

Before attempting to validate this trial and to extend the work to answer further questions, it was decided to repeat the work for a further year. The system of husbandry adopted for this trial was deliberately kept simple, necessitating little alteration to traditional methods and requiring no cash expenditure. It should therefore be possible for the system to be adopted by "village level" farmers. Given the similarities between goats and husbandry system in Malawi and those in neighbouring countries, it is expected that any "blue-print to emerge from this work would be applicable over a wide region.

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