

Feed intake, body weight gain and growth efficiency in growing sheep after a feed quality restriction period of 3 months

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Livestock production systems in Iran, like in most parts of the world, mainly depend on natural vegetation of range and farm lands. Feed availability fluctuates throughout the season and as a consequence, animals have to cope with a periodical restriction in quality and quantity of feed. Lambs are born in spring, while weaning is towards the warm and dry season when the quality of the grass has gradually decreased to a level not sufficient for the immature animal to allow its full genetic potential for growth. Moreover, supplements are scarce and expensive, and preferably used for monogastric animals, i.e. poultry. In such a livestock production system, there may be scope for compensatory growth in the subsequent wet season with improved feed quality.

A total of 56 crossbred (Flemish female x Texel male) male lambs, born in March 1993, were used. The lambs were weaned at an age of ≈ 2 months. The ration was gradually changed into a diet of grass seed straw ($\approx 0.8\%$ N) *ad libitum*, mixed concentrates (2.7% N, $35\text{ g/kg}^{0.75/\text{d}}$) and vitamin/minerals ($1\text{ g/kg}^{0.75/\text{d}}$). At an age of ≈ 3 months, the animals were randomly divided into restricted (R) and control (C) groups. Group R was subjected to feed quality restriction by withholding the concentrates for a period of 3 months.

During restriction the R group had a higher grass seed straw intake than the C group ($P < 0.05$): 48.3 vs $36.9\text{ g/kg}^{0.75/\text{d}}$ (C). The R group showed negative values for N retention, -0.10 vs $0.34\text{ g/kg}^{0.75/\text{d}}$ (C), and also for daily gain, -0.7 vs $8.4\text{ g/kg}^{0.75}$ (C). During the 6 months of realimentation the R group persisted in showing a higher straw intake, 42.5 vs $35.8\text{ g/kg}^{0.75/\text{d}}$ (C), while N retention, 0.45 vs $0.39\text{ g/kg}^{0.75/\text{d}}$ (C), and daily gain, 10.7 vs $6.2\text{ g/kg}^{0.75}$, showed compensation. Extrapolation of the results indicated that full compensation would have been attained at an age of ≈ 14 months.

Growth efficiency after realimentation of the two groups was compared using a growth model of Parks (1982). This model allows to estimate growth efficiency (dW/dF) in relation to degree of maturity for body weight ($u = W/A$, in which A is weight at maturity).

$$(dW/dF) u = AB(1 - u)$$

If dW/dF is expressed in weekly gain (kg) for body weight over weekly intake of digestible organic matter DOMI (F, kg), the growth efficiency factor AB was significantly ($P < 0.001$) higher for the R group (0.57 ± 0.02) than for the C group (0.48 ± 0.03).