Winter Feeding Of Young Male Red Deer

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Abstract

Two experiments investigating the feeding of young male deer destined for venison production are described. In the first experiment 6 pellet-based diets with a range of energy from 8.5 - 11.0 MJME/kgDM were fed *ad-libitum* to groups (n = 8) of deer. As diet energy content decreased there was an increase in dry matter intake ($P<0.001$) such that energy consumption did not change ($P>0.05$). In the second experiment four groups of deer (n = 8) were fed a silage-based diet supplemented with barley and rapeseed meal to produce protein levels of 14, 16, 18 and 21%. Live weight gain increased with increasing protein in the diet ($P<0.01$) but there was no effect of protein level ($P>0.05$) on DM or energy intake. The mean DM intake, energy intake and live weight gain were generally lower on the silage-based diet than the pellet-based diet. Together these experiments suggest that DM intake is adjusted to achieve a certain energy intake but not a certain protein intake. DM and energy intake was limited on the silage-based diet due to reasons that may include bulk or palatability.

Introduction

This paper describes recent work designed to optimise feeding conditions for young male deer destined for venison production. In this system, the seasonal growth pattern which includes a marked slowing of growth rate during winter is a major constraint, increasing the time taken to reach slaughter weight. Our overall aim is to find the most cost-efficient way to maximise growth during this winter period using a diet of conserved forage supplemented with concentrates.

It is well accepted that deer eat less during the winter period. The first experiment discussed here investigated the factors responsible for controlling the amount of food eaten during winter and spring. In a second experiment, evidence is provided which indicates that diets with a high proportion of silage may prevent deer from consuming sufficient energy to grow at their target rate.

Experiment 1

Aim

To feed a range of diets differing in energy and measure *ad-libitum* consumption of dry matter and energy.

Methods

Six groups of eight male red deer aged approximately 5 months (mean live weight 62.9 s.e. 0.77kg) were each fed a separate diet *ad-libitum*. Each group was housed in a separate pen (7.5m by 4.5m), with overhead lighting designed to produce a photoperiod length equal to that outdoors at an intensity of >300 lux 1m from the ground and with electric fans for ventilation. The diets ranged from Diet 1 with 8.5 MJME/kgDM (megajoules of metabolisable energy per kilogram of dry matter) to Diet 6 with 11.0 MJME/kgDM in steps of 0.5 MJME/kgDM. Protein content of all diets was around 15% DM. Food consumption was measured every two days and live weight every six days. For seasonal comparisons, the experimental period was divided into two parts, Winter (17 May - 25 August, 100 days) and Spring (25 August - 9 December, 106 days).

Results

There was no difference ($P>0.05$) in mean live weight between the diets on any of the sampling dates during the experiment. Mean growth rates were 158g/day during winter and 303g/day during spring.

There was a negative linear relationship($P<0.001$) between energy level in the diet and DM intake (Figure 1) and a higher DM intake in spring than in winter ($P<0.001$).

There was no evidence ($P>0.05$) that ME intake differed with diet in either winter or spring (Figure 2). There was however a difference ($P<0.001$) between seasons in the ME intake with a mean of 20.3 ± 0.32 MJME/day in winter and 29.3 ± 0.13 MJME in spring.

Conclusions

The increased dry matter intake but equal energy intake as diet energy content is reduced, suggests that appetite is regulated by energy intake during both winter and spring. This indicates that lower growth during winter than in spring is "programmed" and food intake adjusted to meet this energy demand. There was no evidence that a physical intake limit was reached in Diet 1 in either winter (2.4kgDM/day) or Spring (3.4kgDM/day), thus there is a wide flexibility to cope with different diet energy levels.

FIGURE 1: Relationship between diet energy content and DM intake in winter (•) and spring (o).

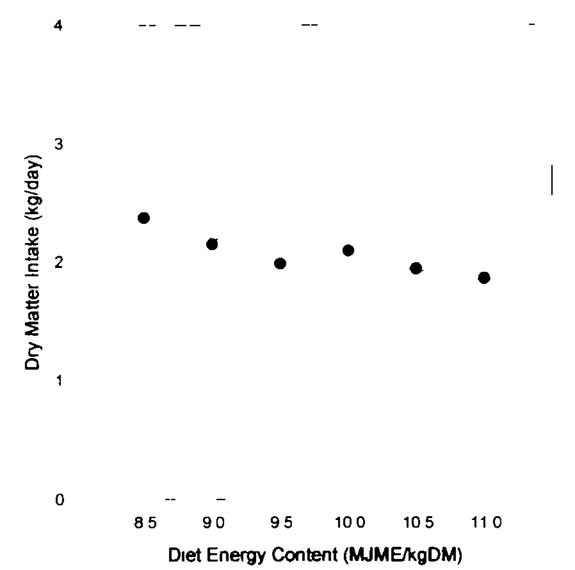
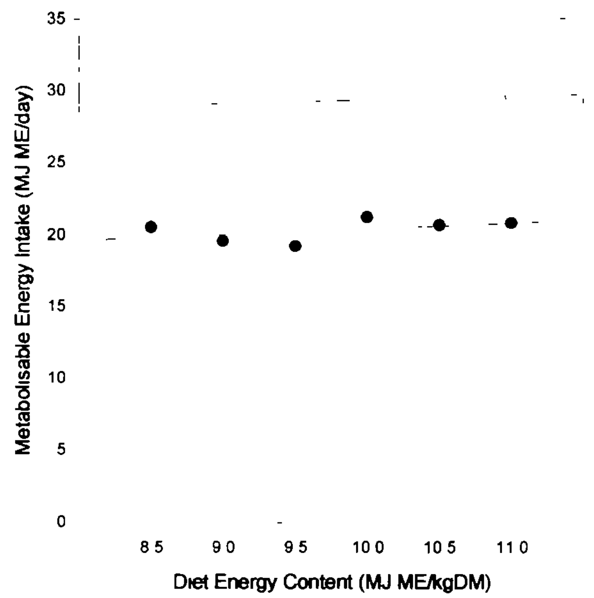


FIGURE 2: Relationship between diet energy content and ME intake in winter (•) and spring (o).



Experiment 2

Aim

To feed a range of silage-based diets differing in protein level (but equivalent in energy) and evaluate the growth, energy and dry matter intake

Methods

Four groups of eight male red deer aged approximately 6 months (mean live weight 58.6 s.e. 0.93 kg) were each fed a diet consisting of silage (10.8 MJME/kgDM, 14% protein), supplemented with barley (12.8 MJME/kgDM, 12% protein) and rapeseed meal (11.3 MJME/kgDM, 40% protein) to achieve protein levels of 14, 16, 18 and 21% (Groups 1-4 respectively). The total energy supplemented in the form of concentrates was equal and silage was provided *ad-libitum*. The groups were maintained off pasture, outside, in gravelled enclosures (25 m x 15 m). Dry Matter and energy intake was measured every two days and live weight every six days between 1 May and 14 September (i.e. similar to the winter period of Experiment 1).

Results

Live weight gain increased ($P<0.01$) with protein content of the diet. Mean growth rates were 47, 60, 79, and 85g/day for groups 1 to 4 respectively.

There was no evidence ($P>0.05$) of an effect of protein content on DM intake (Figure 3) or ME intake (Figure 4). Dry matter intake averaged 1.53kg/day and ME averaged 17.3MJ/day.

FIGURE 3: Dry matter consumption and group.

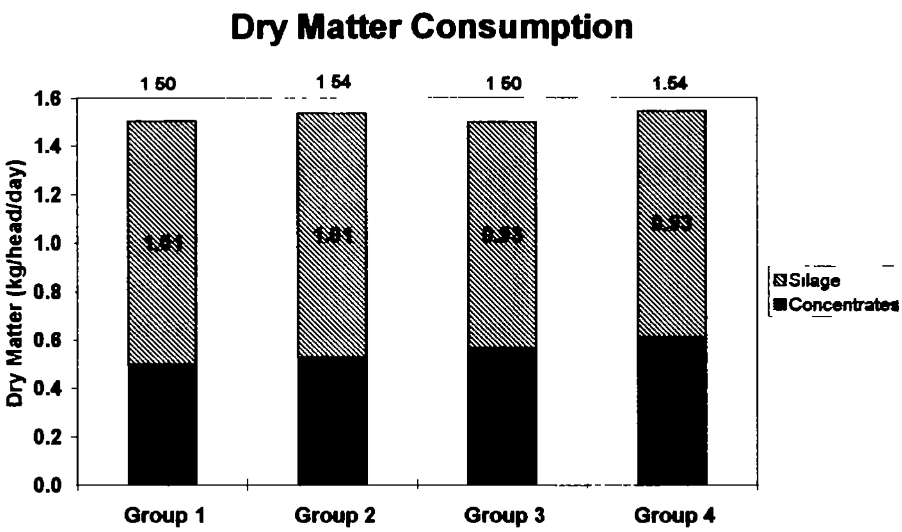
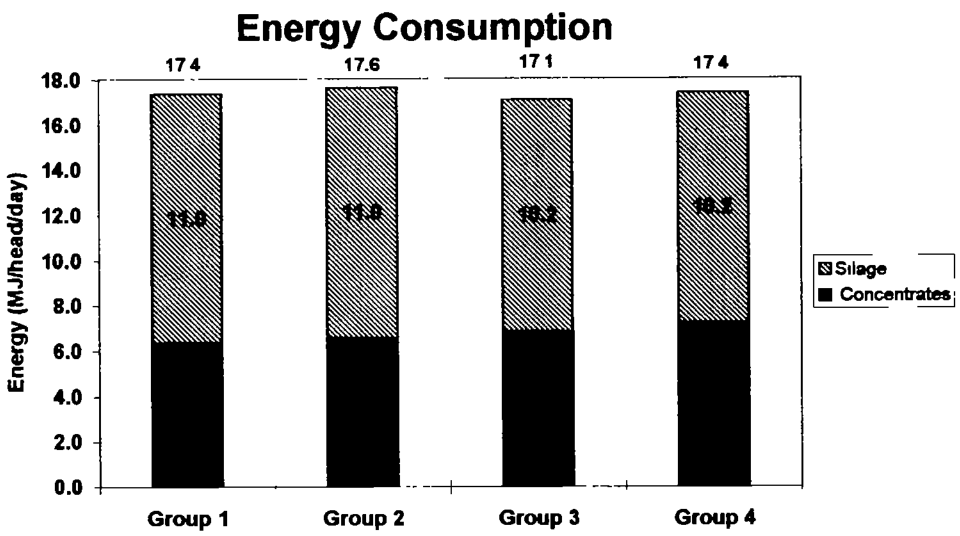


FIGURE 4: Energy consumption and group.



Conclusions

The lack of a DM intake response to protein suggests that protein intake is not regulated There was a positive effect on live weight gain of increasing diet protein content up to 21% suggesting that protein supplementation of silage-based diets is beneficial

General Conclusions

Together, these two experiments suggest that energy is the primary feedback signal to regulate food intake and animals adjust food intake level to achieve a certain energy intake Protein intake, although important to growth, is passive and the animal does not seem to adjust appetite to achieve a certain protein intake This emphasises the importance of having a suitable protein to energy ratio in any feeding regime Dry matter, energy and growth rates were generally much lower on the silage-based diets than the pelleted diets (TABLE 1) The average energy level for the silage diets was 11 5 MJME/kgDM which was higher than the best of the pelleted diets This energy level would have been sufficient for the animals to grow well if it was supplied in the pellet-based diet form This indicates that other factors may limit the intake of silage, such as the physical bulk (due to the lower dry matter of silage, animals on the silage diets ate approximately twice the wet weight of food as those on the pelleted diets) and/or it's palatability

Table 1: Mean (± se) dry matter, energy and live weight of Experiments 1 and 2

	Experiment 1 Pellet diet	Experiment 2 Silage diet
Dry Matter (kg/day)	1 52 ± 0 01	2 11 ± 0 014
Energy (MJMEday)	17 36 ± 0 09	20 70 ± 0 12
Live weight gain (g/day)	85 0 ± 16 6	189 ± 9 0