FEED REQUIREMENTS OF FALLOW DEER IN LATE PREGNANCY AND EARLY LACTATION

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Introduction

Despite the obvious need for information on the feed energy requirements of fallow deer in late pregnancy, this aspect of the management of farmed fallow deer is yet to be investigated to any great extent. Similarly, there are no data on the nutritional requirements of fallow deer does during lactation. Mulley (1988, 1989) reported energy intakes for group-fed European fallow deer (Dama dama dama) does throughout pregnancy, and Milligan (1984) and Asher (1992) reported calculated energy requirements for various sex and age classes of fallow deer that were interpolated from estimations for red deer (Cervus elaphus : Fennessy et al., 1981).

Adult does are the most numerous category of stock on commercial fallow deer farms, and since these animals are either pregnant or lactating for most of the year, it is imperative that accurate information on individual animal feed requirements during the critical period of late pregnancy and during lactation be known. Most fallow does in early to mid-pregnancy will either lose some weight, or maintain their joining weight (Mulley and Asher, unpublished data). Feed and energy intake during this period for does weighing 44-50kgs and fed a ration containing 50:50 lucerne chaff and grain oats, ranges between 0.8-1.0 kg/head/day and 9-11MJME/day respectively (Flesch et al., 1998). However, it is well known that increased nutrient intake is associated with rapid foetal growth in the last few weeks of pregnancy, and it has been speculated previously that this requirement may double during the period of peak lactation. The concept of strategic feeding (Suttie et al., 1996) to achieve improved production outcomes should form part of the management of any deer farming system, especially for breeding stock during late pregnancy and lactation, when nutritional demands are known to be higher. This can only be performed successfully if there are clear guidelines on the actual energy demands of does as parturition approaches, and to what extent these demands change during lactation.

Restriction of feed to red deer hinds during late pregnancy is commonly practiced in New Zealand on the supposition that this will avoid over-fatness that might lead to dystocia. While this strategy is questionable, as the effects on foetal growth are not fully understood, similar strategies have not been necessary for fallow deer where maximal foetal growth is encouraged, to increase fawn birthweight and subsequent survival (Mulley et al., 1990; English and Mulley, 1992).

This paper describes the voluntary (ad libitum) food intake of fallow does in the last 9 weeks of pregnancy and the first 6 weeks of lactation. This information will assist fallow deer farmers to adjust feed management to achieve optimum survival and growth of fawns.

Materials & Methods

In April 1997, fifteen 3-year-old European fallow deer does with a mean liveweight of 40kg, and fifteen 3-year-old hybrid fallow deer (¾ European and ¼ Mesopotamian fallow deer) does with a mean liveweight of 42.5kg, were obtained from a commercial deer farm and mated to European fallow bucks following oestrous synchronisation with CIDR devices (Easi-Breed CIDR G, InterAg NZ Ltd., Hamilton New Zealand). All were confirmed pregnant at 50 days by ultrasonography. Each of the does were randomly assigned to treatment group, to be fed either a formulated concentrate ration or pasture fed for the duration of pregnancy and lactation. Deer assigned to individual pens and concentrate feeding underwent a four week period of habituation to the pens, and weighing procedures. All deer were weighed at weekly intervals throughout the trial.

Pen Feeding

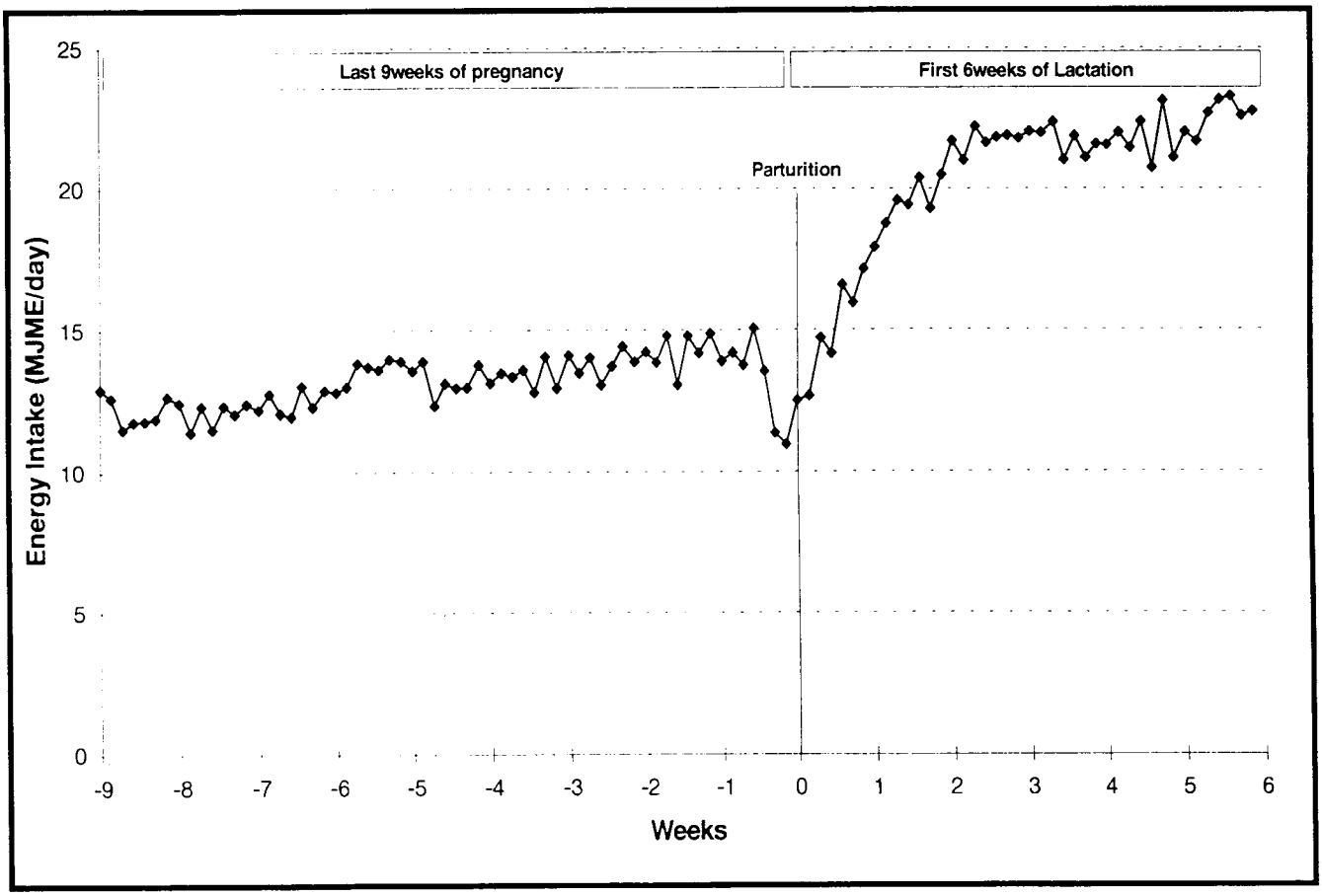
Twelve does, 6 of each genotype, were housed individually in pens (12m^2). Each pen had coarse sawdust flooring, and provided shade, shelter from wind and rain and ad libitum water. Three deer in each genotype were fed ad libitum a maintenance ration containing 10.3 MJME/KgDM and 12% protein, while the remaining deer were fed ad libitum a high energy ration containing 14 MJME/KgDM and 16% protein.

Deer were fed at 1600 hours each day, and feed residues from the previous 24 hour period recorded. Does were allowed to fawn in their individual pens, with the birthweight, six-week and twelve-week weights recorded for each fawn.

Pasture Feeding

Eighteen does (9 of each genotype) were grazed on kikuyu-dominant pasture which also contained perennial rye-grass and clover. The pasture quality was monitored fortnightly and ranged between 9 and 12 MJME/kgDM for the duration of the trial. Fawns were tagged at birth

Figure 1 below: Average energy intake for adult fallow does in the last 9 weeks of pregnancy, and the first 6 weeks of lactation. Data have been normalised around parturition (day 0).



and weighed at 6 and 12 weeks of age.

Statistical analysis

Energy intake data for the last 9 weeks of pregnancy and the first 6 weeks of lactation were normalised around the date of parturition (day 0), and analysed using a multivariate repeated measures analysis (Genstat, 1993). Growth rates of pasture-fed and concentrate-fed animals were contrasted using a residual maximum likelihood (REML) test (Genstat, 1993).

Results

There were major fluctuations between consecutive days in voluntary food intake (VFI). Energy intake for individual animals was able to be predicted from their intake over the previous 2 days ($p<0.01$), but predictions beyond 2 days were unreliable.

The high energy level feed (14 MJME/kgDM) and the lower energy level feed (10.3 MJME/kgDM) were contrasted. There was no significant difference ($p>0.05$) in total daily energy consumption between or within the genotypes for either of the feeds, with deer fed the high energy ration consuming less feed than deer on the low energy ration. Although there were small differences in energy intake between the genotypes, with European fallow deer eating slightly more than hybrid deer around the time of parturition and in early lactation, it was concluded that these small differences were unlikely to be considered of economic importance. Therefore, for ease of interpretation the data for feed types and doe genotype were combined (Figure 1).

It can be seen from Figure 1 that the daily energy intake requirement for fallow does rises from 12-15 MJME/day over the last 9 weeks of pregnancy (Note: This equates to approximately 1.5 kgDM/head/day of a 50:50 mixture of lucerne chaff and grain oats). Daily VFI fell by about 30% in the three days immediately prior to parturition, and then rose sharply immediately after fawning. The daily energy requirement reached 21 MJME/day by 2 weeks after fawning, and ranged between 21-23 MJME/day thereafter, until weaning of fawns at 12 weeks of age.

There were no differences in birth weights, 6-week weights or 12-week weights of fawns between the two genotypes for dams being fed concentrates, or between deer fed pasture and deer fed concentrates, with the average weights being 5kg, 14kg and 22kg, respectively.

Growth from conception to fawning for European and hybrid does fed pasture was 57g/day and 51g/day, respectively, whilst growth for European and hybrid does fed concentrates was 54g/day and 46g/day, respectively. There was no difference in average daily weight gain between or within genotypes for animals fed different types of concentrate feed, or pasture.

Discussion

The daily energy requirements (MJME) of adult fallow deer does during the third trimester of pregnancy and during lactation (12-15 and 21-23 MJME/day respectively) established from the present study were lower than previous estimates for fallow deer (Milligan, 1984; Asher, 1993) derived from work on red deer in

New Zealand (Fennessy et al, 1981), but higher than for group-fed fallow deer does in Australia (Mulley, 1989). These data indicate that the energy requirement during the first twelve weeks of lactation for fallow deer represents 38% of the annual ME requirement for an adult doe. This compares with 43% for red deer hinds (Fennessy et al, 1981) although the length of the lactation period was not defined in the latter study. Furthermore, the combined energy requirement for fallow deer does in the last trimester of pregnancy plus the first 12 weeks of lactation accounted for 60% (2856 MJME) of the annual ME requirement. These data indicate the highly seasonal nutritional requirements for management of a breeding herd of fallow deer, a situation that requires particularly careful monitoring under Australian pastoral conditions, where seasonal rainfall is unreliable in most areas.

The energy requirements of the heavier hybrid does in this study were marginally lower than for their European counterparts, with 36% (1596 MJME) of their annual ME intake during the first twelve weeks of lactation, and 57% (2520 MJME) during the last trimester of pregnancy plus lactation. In effect, the hybrid does produced fawns of equivalent size and similar average growth rates to weaning, while utilising 5% less feed energy (MJME) across the period of study. This indicates that they were slightly more efficient as a reproduction unit in terms of resource utilisation. In previous controlled feed intake studies comparing ¼ bred Mesopotamian fallow deer bucks with European fallow deer controls, Mulley et al (1996) showed that the hybrid bucks were also more efficient in feed conversion than their European counterparts. Based on these observations, the larger framed ¼ Mesopotamian fallow deer doe should be viewed favourably by fallow deer farmers, where feed utilisation efficiency and ease of fawning are major considerations for successful reproductive performance.

The data from this study show that the average daily requirement for energy is not static (Figure 1) and fluctuates from day to day; in some instances, markedly. These fluctuations are thought to be in response to changes in the external environment, including interventions by man. The effects of social isolation on weight gain reported in red deer calves (Hanlon et al, 1997) were not apparent in the present study, with no significant differences in weight gain between pasture fed groups of does, and does of either genotype fed concentrates and housed in isolation. Furthermore, there were no differences between any of the groups for fawn birth weights or their subsequent growth to 12 weeks of age.

The data from this study indicate that strategic feeding of fallow deer does, as suggested for red deer by Suttie et al (1996), should be implemented in the third trimester of pregnancy, and during lactation, if pasture conditions in late spring are unfavourable. Obviously such a recommendation would need to be made in conjunction with consideration of feed availability, stocking rates and pasture sward heights (Barry et al, 1998).

Acknowledgements

This project is on-going, and is funded by the Rural Industries Research and Development Corporation and the Deer Industry Association of Australia.

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