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Ewe nutrition: decisions to be made with scanning information

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ABSTRACT

The ultrasonic scanning technology has provided farmers with a useful tool to determine potential lambing percentages well in advance of lambing. This paper outlines ways in which this information can be used to effectively target groups of ewes to maximise feeding efficiency. Underfeeding of the ewe flock can be partly alleviated by the early sales of non-pregnant ewes. Understanding the interactions between body condition and feeding in conjunction with scanning can lessen birthing problems through appropriate feeding regimes. Targeted feeding plans can ensure that both protein and energy needs are met for single, twin and triplet bearing ewes. Feed types such as brassicas, silage and grain can be targeted to specific periods throughout the pregnancy for optimal feed use once parity is known.

Keywords: Pregnancy; ultrasonic scanning; nutrition; supplementary feed.

INTRODUCTION

Ultrasonic scanning is a technology that developed out of research to more accurately assess the pregnancy status of ewes. Originally it was promoted as a way to reduce winter feed costs by identifying dry ewes and selling them early at a premium. Now it has become a tool for flock management throughout the winter. This paper outlines nutrition decisions which can be aided through the use of scanning.

REDUCING UNDER-FEEDING

The monitor farm programme throughout New Zealand has highlighted changes in ewe liveweight between mating and parturition. Current estimates of ewe body condition and actual ewe live weights at parturition suggest that most ewe flocks lose approximately 5 kg/head from mating. Each kilogram of liveweight provides approximately 20MJME. A weight loss of 5kg, therefore, translates into 100 MJME, or approximately 10kg of pasture. Considering that the pasture requirement of a ewe during winter will be approximately 100kg, this equates to a feeding level of 90% of maintenance during winter. The early identification of dry ewes can help alleviate under-feeding by enabling early sale of cull ewes, which allows more feed for the productive flock.

FEEDING AND THE DEVELOPMENT OF THE PLACENTA AND FOETUS

Recent information gives us a complicated picture of the interactions between body condition and feeding level, and their effects on both placental and foetal development. Much of the foetal development is influenced by placental development, although maternal nutrition also plays a role. Placental development, in turn interacts with feeding level and body condition. A summary of several research papers, presented in Table 1, outlines the interactions that may occur. Well-fed ewes in poor body condition (low live weight) tend to develop a large placenta (Russel *et al.*, 1981; McCrabb *et al.*, 1992). Poorly fed ewes in good body con-

dition also tend to develop large placentas (McCrabb *et al.*, 1991;1992). When either of these ewes are over-fed in late pregnancy, larger than average foetuses may develop, with associated birthing problems (McCrabb *et al.*, 1991; Russel *et al.*, 1981). Well-fed ewes in good body condition in early pregnancy develop normal placentas (Faichney and White, 1987; Russel *et al.*, 1981). If they are under-fed in late pregnancy, small foetuses and low birth weights result (Faichney and White, 1987). As long as early placental development is normal, over-feeding in late pregnancy produces normal foetal growth (McNeill *et al.*, 1998). Poorly fed ewes in poor body condition have below normal placental development, which generally results in small foetuses regardless of late pregnancy nutrition (Russel, *et al.*, 1981).

TABLE 1: Placenta/foetal/birth weight responses to mid-pregnancy nutrition and body condition (kg).

Ewe weight	Nutrition level	McCrabb	Russel	McCrabb	Faichney and
		<i>et al.</i> , 1992	<i>et al.</i> , 1981	<i>et al.</i> , 1991	White 1987
		Placental weight	Birth weight	Placental weight	Foetal weight
Light	Low	0.48	3.3		
Light	High	0.60	3.8		
Heavy	Low	0.60	4.9	+	+
Heavy	High	0.50	4.2	0	0

Body condition scores or live weights at scanning can be compared with mating weights. The changes can be used to assess the nutritional status of the ewe during the placental development period. By considering the above information, a late pregnancy nutrition programme can be manipulated to optimise lamb birth weights and help reduce lamb deaths. When considering thin ewes in late pregnancy, care must be taken to allocate feed according to requirement, rather than *ad-libitum*. Further underfeeding at this time will have a major impact of milk production and ewe survival, while overfeeding may result in some dystocias. Often ewes are not under close feed rationing in the final few days before lambing, but overfeeding at this time will have a much smaller economic effect through dystocias than underfeeding will have on ewe survival and weaning weight. The overall aim of any nutrition programme

must be to adequately feed ewes throughout the year.

FEED REQUIREMENTS

Energy is the main driver of nutrition, especially during the first 100 days of pregnancy. Protein requirements are normally met by any of the feeds used in wintering systems during this time as maintenance protein concentrations need only be 10 to 14% of dry matter (ARC 1980). Maintenance or slightly below maintenance (95%) is appropriate with a managed weight loss programme aiming to reduced body condition score by 0.5. Feed quality must be assessed to ensure accuracy in winter feeding levels, as under-feeding is almost universal, despite the best efforts of farmers. Generally two or three mobs are useful to differentiate between animals with different requirements. This is usually best monitored regularly on the basis of body condition, rather than live weight.

Scanning can help in two ways during the last 45 days of pregnancy. Firstly, and most commonly ewes can be separated on the basis of number of foetuses, generally singles and the rest. This can allow for preferential feeding of twin and triplet bearing ewes. Secondly, and less commonly, it can be used to separate ewes on expected birth date, if ram harnesses have not been used. This can be a major saving of late winter feed. Generally 15 to 20% of the ewes are second cycle, so these can be kept on maintenance rations three weeks longer than the rest of the mob.

It is important that single-bearing ewes get the appropriate feeding, even though it is less than twin-bearing ewes. During late pregnancy both the foetus and the udder need similar amounts of energy, and under-feeding may result in poor udder development (Mellor, 1987). This in turn may reduce milk production, and restrict the growth rate of single lambs.

Generally a two stage step-up ration will achieve good nutrition in late pregnancy. However, often feed supply is restricted at this time and weekly adjustment of the amount of feed offered will match pasture supply better. A number of feeding requirement options are given in Table 2 (adapted from Ulyatt *et al.*, 1980). Protein concentrations in late pregnancy generally need to be 14 to 18% of dry matter, except in some feeding conditions, such as those outlined for silage in the following section.

TABLE 2: Late pregnancy energy requirements for twin bearing ewes (MJME/day) (adapted from Ulyatt *et al.*, 1980).

	Live weight (fleece and conceptus free)			
	50 kg	60 kg	70 kg	80 kg
Maintenance	10.0	11.5	12.9	14.3
12 weeks prelambling	10.7	12.2	13.6	15.0
6 weeks prelambling	13.0	14.5	15.9	17.3
2 weeks prelambling	16.7	18.2	19.6	21.0

FEED TYPES

Once feeding levels have been determined, consideration must be given to feed type. Common feeds used during pregnancy are autumn saved pasture, winter brassicas, hay, silage or baleage, and grain. During the first 100 days of pregnancy, any of these can be used, but pref-

erence should be given to the cheapest. Options during the last 45 days of pregnancy should ensure that both energy and protein requirements are met. Generally this means that options other than pasture cannot be used as the sole feed.

Scanning records can again be used to allow differential feeding of various feeds during late pregnancy. Products like silage and brassicas, which may be low protein, are better fed to single-bearing ewes.

Silage provides less protein to the animal because of the previous fermentation of the feed. The fermentability of the energy in silage may be as low as 50 to 70% of that in the forage it was made from (van Soest, 1994). This means that it will only provide approximately 50 to 70% of the protein normally associated with ruminant digestion of a feed (van Soest, 1994). The mean output of protein from the rumen is approximately 16% of the dry matter eaten (Owens and Zinn, 1988), as long as the original protein concentration in the herbage was above this. When only 50 to 70% of the "digestible" energy in the feed is fermentable, this value drops to approximately 8 to 11%, which is below the level needed for a ewe in late pregnancy. Protein supplements will boost both the efficiency of digestion and the intake of silage because of this phenomenon (Chamberlain *et al.*, 1996).

Brassicas, especially some swede varieties, can have protein concentrations of 5 to 10% in the bulb (Nicol and Barry, 1980; Stevens *et al.*, 1994). Utilising both top and bulb through appropriate feed allocation can help alleviate this. Other options are choosing varieties with greater top growth, or with higher protein concentrations in the bulb (Stevens *et al.*, 1994). Testing for protein content is important in deciding the use of these feeds. Yields of both top and bulb should also be taken at the time of feeding out to ensure that the supply of protein is accurately calculated. The large amount of soluble sugars available in swedes can be more effectively captured with an additional supplement of good quality hay (Drew, 1967; Nicol and Barry, 1980), resulting in a feed better able to meet animal requirements in late pregnancy.

Pastures that have received autumn nitrogen applications can be used for twin-, and especially, triplet-bearing ewes. Some preliminary research has indicated that higher protein concentrations may improve the survival of lambs born as triplets (G.H. Davis, pers. comm.). Nitrogen-fertilised pastures will be of higher quality because protein concentrations will be higher, and over winter frost damage will generally be less than pastures that have not received fertiliser nitrogen.

Pasture of lower quality, and hay or silage can be fed to single-bearing ewes closer to parturition. The foetus, placenta and uterus take up less space in the body cavity of the single-bearing ewe, so more feed of lower quality can be eaten.

Grain feeding is best kept for late in pregnancy, for twin- or triplet-bearing ewes. This optimises the use of an expensive feed, and helps ewes that need high energy density feed during late pregnancy. Grain must however be fed only as a supplement to pasture to ensure that an adequate protein concentration is achieved.