Feeding ewes during late pregnancy 2: – Concentrate supplementation

Dr. Tim Keady

Animal and Grassland Research and Innovation Centre,
Teagasc, Athenry, Co Galway.

Introduction

Offering ewes the correct plane of nutrition during mid and late pregnancy ensures adequate supply of colostrum post lambing and lambs close to optimum birth weight, consequently reducing mortality and increasing performance and flock profitability. In last week's article the impact of plane of nutrition in late pregnancy on lamb birth weight and mortality was discussed. The impact of silage type and grass silage feed value on ewe and lamb performance was also examined.

The objective of this article is to summarise results from recent studies at Athenry on the effects of concentrate feeding management during late pregnancy on ewe and lamb performance.

Concentrate feed level

Silage feed value [as determined by digestibility (DMD), chop length and intake characteristics] and litter size are the major factors affecting the level of concentrate supplementation required by ewes in late pregnancy. The effects of silage feed value on concentrate requirements of twin-bearing ewes in late pregnancy are presented in Table 1. The rate of increase in the level of concentrate supplementation required increases as silage DMD decreases. Furthermore as silage chop length increases, the quantity of additional concentrate required increases because intake declines. For example, for silages at 79 and 64 % DMD an additional 4 and 10 kg concentrate are required for long chop length silages, relative to precision chop silages, respectively. Concentrate supplementation per ewe can be reduced by 5 kg for ewes carrying singles, whilst ewes carrying triplets should receive an extra 8 kg of concentrate.

The effects of level of concentrate supplementation on the birth weight of lambs from ewes that were offered either medium or high feed-value silage was evaluated at Athenry and the results are presented in Table 2. Increasing concentrate feed level above 15 kg and 25 kg to ewes offered the high (75% DMD) and medium (70% DMD) feed-value silages, respectively, did not increase lamb birth weight. However, feeding the higher levels of concentrate resulted in higher ewe condition post lambing. The results of the studies presented in Table 2 (and Table 3 of last week's article) clearly show there is no benefit from feeding excess concentrate to ewes in late pregnancy.

Ewe lambs: Energy is normally the first limiting component in the diet of pregnant ewe lambs . When formulating a ration for pregnant ewe lambs it is essential to make allowances for their requirements for live-weight gain as well as maintenance, wool growth, stage of pregnancy and expected litter size (as determined by ultrasound scanning). Unlike mature ewes, ewe lambs require a plane of nutrition during early and mid pregnancy that sustains a live weight gain (excluding foetal weight) of approximately 80 g/day. This is required to enable ewe lambs reach their normal mature body size. As a general rule, a pregnant ewe lamb requires an extra 2.5 megajoules of metabolizable energy (ME) relative to adult ewes of similar live weight at the same stage of pregnancy and carrying the same litter size. The additional energy allowance is to facilitate body weight gain – if it is not provided the pregnant ewe lamb will divert energy from the foetus, and colostrum production, to the meet some of this demand.

Ewe lamb management at Athenry: The ewe lambs (most mated in late October/early November) were housed in mid-December, shorn and offered high feed value grass silage (75 % DMD) as the sole diet. In mid-January the pregnant ewe lambs received 200 g of concentrate daily. Concentrate allowance will be increased to 250 g/day in late January. Following pregnancy scanning (late January) the ewe lambs will be penned according to expected litter size and lambing date. Ewe lambs carrying triplets will have their concentrate allowance increased to 300 g/day in mid-February. During the last 6 weeks of pregnancy (mean lambing date late March) ewes carrying singles, twins and triplets will receive a total of 18, 26 and 33 kg concentrate/head.

If the quality of the silage available is poorer than that at Athenry then increased concentrate supplementation would be required from housing to lambing.

Concentrate protein

For prolific flocks the concentrate should be formulated to contain 190 g of crude protein per kilogram (i.e., 19% crude protein) as the grass silage on many sheep farms has a low protein concentration. Some commentators within the industry suggest formulating low and high protein concentrates for feeding to ewes during the second last and last 3 week periods of pregnancy, respectively. However considering the size of most sheep flocks in Ireland and the fact that ewes are offered low levels of concentrate during the first 2- 3 weeks of supplementation, together with the low protein concentration of grass silage on most sheep farms the benefit of using 2 different concentrates is at best marginal. For example, whilst relative to a 19% crude protein concentrate (containing 200 kg soyabean meal per tonne), the reduction in the cost of formulating a 14% crude protein concentrate is reduced by approximately €50/t, this equates to only 1 – 2 cents per ewe daily during the first few weeks of supplementation, when ewes are offered between 0.2 and 0.4 kg/ewe daily. For every 100 ewes in a flock one tonne of concentrate will last for 50 and 25 days, respectively, when ewes receive a daily concentrate allowance of 0.2 and 0.4 kg/head. Therefore for most farms there is no benefit from animal production, logistics or financially to offering a low protein concentrate during the first weeks of concentrate supplementation.

Where maize silage is offered as the forage then concentrate crude protein concentration should be increased to 23%. Also as maize silage normally has lower concentrations of minerals and vitamins, mineral and vitamin supplementation should be increased by approximately 50% during late pregnancy

Concentrate protein ingredient source impacts on animal performance. In a recent study at Athenry the effect of concentrate protein source offered during late pregnancy on the performance of ewes and their progeny was examined; the results are presented in Table 3. Two concentrates were formulated to have the same metabolizable energy (12.4 MJ/kg DM) and protein concentrations (18% as fed). The protein sources in the concentrates were either soyabean meal or a mixture of by-

products (rapeseed, maize distillers and maize gluten). Lambs born to ewes that had been offered the soyabean-based concentrate produced lambs that were 0.3 kg and 0.9 kg heavier at birth and weaning, respectively, than lambs born to ewes offered concentrate that contained by-products as the protein source. In the Athenry study the soyabean-based concentrate cost €0.60 extra per ewe. The increase in the weaning weight of lambs from ewes offered the soyabean-based concentrate in late pregnancy (cost ~ €0.60/ewe) is similar to the response obtained from offering each lamb 6 kg of creep concentrate until weaning (cost ~ €3.60/ewe per set of twins). This clearly showing the benefit of having high quality protein protein sources in the concentrate offered to ewes during late pregnancy.

Concentrate ingredients

As the quantity of concentrate offered to ewes in late pregnancy is modest (depending on silage quality) it should contain high quality digestible fibre, energy and protein sources.

Concentrate feedstuffs are generally evaluated in terms of their chemical composition (book values). However, when offered in diets based on grass silage, individual feedstuffs have different effects on digestion of the silage component of the diet. As most ewes that are housed are offered grass silage based diets it is necessary to use data from studies in which grass silage was offered to evaluate the value of the feed stuffs. The current cost, and the relative values of straights, relative to rolled barley at €220/t and soybean at €490/t are presented in Table 4. The current costs used in this paper are based on prices (delivered to farm) prevailing currently. Straights that are value for money at present include rapeseed meal, maize distillers, corn gluten, soya hulls, maize meal and barley. However, as soybean meal is probably the best source of protein available it should be included so as to provide a large proportion of the protein in rations to be offered to ewes in late pregnancy.

Examples of simple, high quality rations are presented in Table 5. When purchasing a ration it is important to purchase on known ingredients as well as price.

Concentrate feeding management

To optimise the use of concentrate ewes should be penned according to predicted litter size (based on ultrasonic scanning) and expected lambing date (mating date - raddle colour). As the demand for nutrients increases in late pregnancy supplementation should be stepped up weekly over the weeks immediately prior to lambing. When supplementing ewes the objective is to produce heavy lambs (which will be delivered unassisted) and ewes with adequate supplies of colostrum.

The feed schedules required to deliver different concentrate feed levels, varying from 10 to 45 kg per ewe in late pregnancy, are shown in Table 6. During the week prior to lambing ewes receive up to 1 kg daily, clearly illustrating the benefits of penning ewes according to expected lambing date as well as expected litter size. For example, for each extra week ewes are on the high level of concentrate supplementation they would consume ~7 kg concentrate - thus dramatically increasing concentrate usage.

Conclusions

1. Correct nutrition during late pregnancy is a key issue impacting on labour requirement around lambing and on flock productivity and profitability.
2. High feed-value grass silage can reduce concentrate requirement by at least 75 % whilst maintaining animal performance.
3. Level of supplementation offered to ewes in late pregnancy should be based on lambing date, forage quality and expected litter size.
4. Supplement with a concentrate containing 19% crude protein and ensure that soyabean meal accounts for a high proportion of the protein.
5. Pen ewes according to expected litter size and lambing date to minimise concentrate usage.

Table 1. Effects of silage quality on concentrate requirements of twin-bearing ewes in late pregnancy

	Silage DMD (%)		
	79	72	64
Precision chopped (kg/ewe)	8	17	25
Big bale/Single chop (kg/ewe)	12	24	35

Table 2. The effects of concentrate feed level in late pregnancy on lamb birth weight

Concentrate offered during late pregnancy (kg/ewe)	Silage DMD	
	70	75
5	-	4.8
15	4.7	5.0
25	5.2	5.1
35	5.4	-
45	5.3	-

(Keady and Hanrahan 2010)

Table 3. The effects of concentrate protein source on ewe and subsequent lamb performance

	Protein source	
	Soyabean meal	By-products
Ewe weight post lambing (kg)	53.2	51.4
Lamb – birth weight (kg)	4.0	3.7
- weaning weight (kg)	30.9	30.0

(Keady and Hanrahan 2012)

Table 4. Value of feedstuffs (relativetive to barley for energy and soyabean meal for protein)

	Cost (€/t)	Value (€/t)
Energy Sources		
Rolled barley	220	220
Rolled wheat	247	220
Maize meal	248	255
Maize gluten	263	284
Citrus pulp	237	189
Molasses	235	140
Soya hulls	216	225
Sugar beet pulp	289	212
Protein Sources		
Soybean meal	490	490
Maize distillers	291	347
Rape seed meal	308	407

***** where the value is greater than the cost, these straights are value for money eg rapeseed meal is valued at €407/t and costs €308/t

Table 5. Sample concentrate mixes (19% protein) for ewes in late pregnancy (kg/t)

1. 225 maize gluten, 200 soyabean meal, 200 barley, 190 soya hulls, 160 maize meal, 25 minerals & vitamins
2. 375 barley, 200 soyabean meal, 200 maize gluten, 200 soya hulls, 25 minerals & vitamins (19.2 % protein)
3. 210 barley, 200 soyabean meal, 200 maize meal, 200 soya hulls, 120 maize gluten, 45 rapeseed meal, 25 minerals & vitamins (19.1 % protein)
4. 375 barley, 190 soya hulls, 180 maize gluten, 150 soyabean meal, 80 rapeseed meal, 25 minerals & vitamins (19.0 % protein)

Table 6. **Daily concentrate allowance (kg/ewe) required for different total concentrate inputs prior to lambing**

Week prior to lambing	Desired total concentrate input prior to lambing (kg/ewe)					
	10	15	20	25	35	45
8						0.4
7					0.4	0.6
6		0.2	0.3	0.4	0.5	0.6
5		0.2	0.3	0.4	0.6	0.8
4	0.2	0.2	0.4	0.6	0.7	0.9
3	0.2	0.3	0.5	0.6	0.8	1.0
2	0.4	0.5	0.6	0.7	1.0	1.0
1	0.6	0.75	0.8	0.9	1.0	1.1