

PRACTICAL METHODS OF FEEDING DUP TO SHEEP

This material was produced by SRUC Sheep Specialist John Vipond for a Farming for a Better Climate (FFBC) meeting in Shetland in March 2016. Its been provided on the FFBC webpages as will be of general interest to all farmers. Keep up to date with our events and activities on the Farming for a Better Climate Facebook page or on Twitter @SACFarm4Climate.

CUTTING TRANSPORT COSTS TO REMOTE AREAS

As it costs around £32/ton to transport feed to Shetland then anything to reduce the amount used can save energy costs to the industry and improve farm returns. By meeting energy requirements of pregnancy from home grown forage and protein needs from protected protein, only 20% of the normal amount of compound is needed saving up to £12/ewe in winter feed and transport costs.

NEEDS

Modern ewes mated to large terminal sires have high requirements for metabolisable protein (MP). When supplied with supplementary Digestible Undegradable Protein (DUP) heavier lambs, more colostrum and higher lamb vigour, leading to fewer losses are possible. Trials show greater response where ewes are thin (low body reserves of protein) and when parasitised (worms). This is often the case in areas where grazings are used year round and weather affects sheep, so is particularly relevant to Shetland. Target cross ewes with twins and triplets in the last 3 weeks of pregnancy with DUP, single bearing ewes do not need extra DUP, although if required to rear twins can also be given DUP supplements.

PREGNANCY

Feed 100g of soya per lamb carried for the last 3 weeks of pregnancy.

In practice start three weeks before the first lamb is due and feed it until the end of lambing, usually around 40 days later. So allow 4 kg for singles, 8 kg in total for twins and 12kg for triplets. Feed this in addition to the normal diet for thin ewes, score < 2.0 and to replace conventional compounds with fit ewes, CS >2.5.

SILAGE BASED DIETS

Significant savings in feed have been achieved in practice where the farmer has set out to make a high quality silage that meets the energy needs of the ewe and meets protein requirements of rumen microbes.

This will be achieved where the ME is over 11 MJ.ME/kg DM, provided the CP% of the silage is higher or equal to the ME, for example 11 ME and 11% CP then there will be enough effective rumen degradable protein (ERDP) for rumen bugs and microbial supply will be maximised meeting around 75% of the ewes metabolisable protein requirements.

Rumen bugs trap around 1% crude protein per MJ. ME in the diet, crude protein above this level is excreted at an energy cost, clearly with high quality silage there is little sense in adding extra protein in the diet as rumen degradable protein, yet in most compounds,

blends and home mixes the vast majority of crude protein is degradable and therefore wasted when fed with good silage.

Sensible supplementation of high quality silage is thus with DUP and the most concentrated sources are protected protein products such as Ultrasoy/Sopralin (80 -90% of the CP as DUP) or Soyypass (70% of the CP as DUP). As these protected protein products have around double the DUP content of soya they can be fed at half the rate, typically 50g of protected protein per lamb carried.

Guide to products containing DUP (costs March 2016)				
Feed	CP (g/kgDM)	DUP g/kgDM	cost£/kg DUP	£/t delivered (1t) Central Scotland
15% Soya Compound	180	65	3.62	235
Sopralin/Ultrasoy	520	315	1.40	440
Soyypass	500	266	1.76	470
Soya Meal	565	198	1.46	290
Rapemeal	400	100	1.90	190
DUP based feed block	160	128	4.10	525

Sopralin and Ultrasoy are the same formaldehyde treated soya product with different commercial names

MAKING SUPPLEMENTATION EFFECTIVE

Results from research trials have often found poor response to DUP where supplements have been made up to be equal in energy and protein content but differing in DUP content. The best explanation for this is that these diets require mixes containing finely ground cereals and these reduce the digestibility of the forage component of the diet, particularly when it is of high quality, due to pH changes in the rumen.

Rumen microbes that digest the cellulose compound of forages cannot survive at the low pH created by rapidly fermenting starch, so intake of microbial protein supply is reduced. In this situation added DUP only makes up for the losses created by the diets.

These trials suggest that DUP will be more effective when fed as the sole supplement to high quality silage e.g. ME 11+ . Where extra energy is required e.g. with ME 10 – 11 silages, then this is best supplied as non starch products for example beet pulp or distillery by-products. If you need to use cereals which may be available on farm they can be fed as whole grains – oats or barley to 0.3 kg per day without affecting rumen pH. Here the slow release of starch occurs as the cereals are regurgitated and chewed and mixed with saliva which acts as a buffer. Do not mix DUP with starchy ground cereals in supplements, if you must use cereal feed it whole.

ACHIEVING SUFFICIENT INTAKE

Rumen volume is constrained in late pregnancy due the growing size of the foetus. It is commonly believed that forage intake is not sufficiently high to meet energy requirements at this time but trial results show that with silages of ME 10.5+ intake is high enough to meet energy requirements for fit ewes (CS 2.5 or above) and intakes do not decline from levels of around 1.6% of bodyweight (as dry matter) for grass silages and around 1.8% of bodyweight for red clover silages.

SILAGE FEEDERS

In order to eat 1.6% of bodyweight per day of silage as dry matter ewes must have good access. A minimum of 6 inches (150 mm) feed face with material that is easily pulled out is essential. Silage should be over 20% dry matter with a PAL of under 1,000 ml/l. If silage is fed in ring feeders it must be either split or unrolled or intake will be constrained by the difficulties sheep have in pulling the material out.

- DUP intake of soya or protected soya is eaten in addition to the 1.6% of bodyweight as silage DMI.
- Feeding starchy supplements such as compounds or rolled cereals or liquid feeds will reduce silage intake through rumen pH effects.
- In late pregnancy on high quality silages ewes maintain intake by increasing the daily throughput through the rumen. Shorter residence time in the rumen increases the effect of protein degradability's (good), but reduces digestibility of the forage (bad), but the effects on digestibility with high quality silage is probably quite limited.

MINERALS AND VITAMINS

Feeding protected protein plus high quality forage is low cost but requires mineral and vitamin supplement. Feed 25g of powdered supplement per ewe per day which should be sprinkled on top of the silage at a cost of under 1p per day.

FEEDING DUP TO PREGNANT AND LACTATING EWES

Quality/Type of Forage	Supplementation	Comment
Low quality hays, roots and low quality silage ME <9 to 10	Feed normal diet e.g. home mix or compounds	Add 100g of soya per lamb carried to the diet, starting 3 weeks before the first ewes lamb. In addition to the normal diet for thin ewes and replacing the cereal component or compound for fit ewes.
10 – 11 ME silage or 11 ME silage with <11% CP	Feed 100g soya per day per lambs carried for the last 3 weeks of pregnancy plus 25g per day of minerals	Ensure sufficient silage space so ewes can eat 1.6% of bodyweight. Check BOHB in blood at 4 weeks pre lambing which should be below 0.8 mml/l.
11+ ME silage (with over 11% CP	Feed 50g of protected protein (Ultrasoy/Sopralin or Soyypass) per lamb carried for the last 3 weeks of pregnancy plus 25g of powdered mineral/vitamins supplement.	If the ewes are thin feeding soya rather than Sopralin will give an extra MJ of energy per day.
LACTATION		
Grass, high quality silage with sufficient ERDP	Feed 200g of soya or 100g of protected soya per lamb reared.	Ewes fed low levels of supplement during pregnancy are unable to accommodate high levels immediately in lactation where grass is in short supply. Here feed 0.6kg of a 50:50 mix of soya and beet pulp and up to an additional 0.3kg per day of whole cereal.

AVOIDING AGGRESSION AND FIGHTING OVER FEED

This has significant benefits in terms of lamb survival and reduction of problems with prolapses and lambing difficulty are likely to arise where the diets are eaten in pregnancy without aggression and fighting for feed. The sheep shed should be quiet. Soya or protected soya does not cause the same rush for feed as cereals or compounds. Try to avoid using whole cereals in TMRs by using higher quality silage of over 11 ME or supplementing with beef pulp or distillery by-products at up to 500g per day. If making a TMR these products can be mixed the night before so that they become impossible for the ewes to select.

FREQUENCY OF FEEDING

Protected protein products, which do not interact with the rumen can be fed 3 times a week or every second day as separate feeds. Time saved feeding during the lambing period can be used to save more lambs.

FEEDING METHODS

Troughs in pens create stress and are labour intensive but have been used effectively on soya + silage diets where the feed face is constrained to 150 mm. Sopralin can be put on top of silage, but we are only just trying this at the moment and have not got results on effectiveness. Accurate daily intake is not essential as long as ewes with twins get around 700 g per week they will be fine. TMRs are very useful in this situation but involve expensive kit. Ewes can be run out of pens where they have a restricted feed face for silage to an area where they can all eat at the same time for feeding, this can be done 3 times per week to reduce labour.

Soya and protected soya products are not hugely palatable, it usually takes about 3 days to get ewes onto them, but after this they will clear it up successfully but without a lot of aggression.

OUTDOOR FEEDING

Farmers practicing all grass wintering and regular shifts can feed protected protein on top of the grass otherwise they can use troughs. It is not a good idea to feed on the same area using soya or Soyypass on a daily basis as ewes may pick up Listeriosis from the soil. Compounds or blocks are now available with a high DUP content and can be used in this situation.

LACTATION

In lactation responses to DUP will occur with greater milk production and higher lamb growth rates. Feed levels are generally double those of pregnancy depending on the numbers of lambs reared and some farmers have been experimenting with 3in1 feeders and finding that mixtures of whole oats and protected soya or soya are working well through the feeder.

CONCLUSIONS

This whole area of supplementary feeding is fairly new, the AFRC tables which are the basis of FeedByte calculations are out of date and underfeed DUP by around 30%, so you are better going with the figures presented in this note which is based on recent on farm trials and research results. The savings in time, cost and labour offer big savings to farmers over conventional approaches where farmers often overfeed RDP.

The trial results make farmers motivated to make high quality silage, this should be targeted at reseeded, farmers need around 1 big bale of silage with an ME of 11+ per 4 – 5 ewes for the last month of pregnancy and approximately 1 acre or reseeded grass will provide enough silage for 50 ewes. It is definitely worthwhile making high quality silage for the use of ewes in late pregnancy which may be different from the average run of silage on the farm, which is generally of lower quality and more suitable for suckler cows.