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Focus Site Project Review

Weighing lambs to improve productivity at Trefnant Isaf, Powys

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Contents

1 Summary

1.1 Project background

Trefnant Isaf is a family farm comprising 97 hectares near Welshpool in Powys. The farm runs a flock of 750 Mule ewes, supplying cross bred lambs to Waitrose. The farm has purchased weighing equipment with EID software to monitor lamb weights. The aim of this Farming Connect Focus Site project was to assess the impact of routinely weighing lambs on management and performance.

The project took place under difficult weather conditions during the 2018 lambing season, with a harsh spring and an unusually dry summer. This created extra challenges for sheep farmers, with a shortage of forage being an issue for many.

Traditionally, there has been very little monitoring of lamb growth rate on Welsh sheep farms. However, the growth rate achieved by lambs has a big influence on the overall performance and profitability of a sheep flock. Faster growing lambs are more efficient in converting feed consumed to weight gain because more feed is able to go into growth than needed for maintenance (Table 1).

It is, therefore, recommended that lamb growth rates should be monitored and action should be taken if groups or individuals within groups are failing to meet targets set. This is especially important before weaning takes place, as it is during this period that lambs put on most of their liveweight gain.

Table 1. Energy and protein requirements of growing lambs

Daily liveweight gain (g)	Dry matter intake (kg/day)	Metabolisable energy (ME) (MJ/day)	Metabolisable protein (MP) (g/d)
50	0.7	7	60
100	0.8	9	74
150	1.0	11	88
200	1.2	13	102

Derived from AFRC (1995), Energy and protein requirements of livestock

Regular weighing of lambs is also vital for real-time flock health planning. Many diseases or problems can be picked up at the sub-clinical stage. For example, lameness or worm infections will often show up as poor performance, and regular weighing will identify these animals and highlight that further investigation is required. The value of animal health testing can be considered in light of the true cost of production losses, allowing the veterinary profession to better advise on cost-effective interventions. In this project, regular weighing of lambs was supplemented with regular faecal egg count (FEC) tests to keep track of worm burdens.

During the project, the farm also trialled a total mixed ration (TMR) to feed pregnant ewes from six weeks prior to lambing, with the aim of making better use of home-grown silage and giving lambs the best start in life. Ewe nutrition is critical to ensure that lamb growth is maximised prior to weaning, as growth rates are heavily influenced by ewe condition and milk supply during this period.

Grass growth was measured throughout the project. Measuring grass growth allows the farmer to understand the contribution grass can make to the nutritional demands of the animals, and informs decisions on when supplementary feeding is required. This means that checks in growth rate caused by nutritional shortfall can be avoided, and growth rates can, therefore, be maintained at the target level.

Focus Site project key objectives:

1. To investigate the impact of routinely weighing lambs on management and performance
2. To identify the benefits of feeding TMR to ewes prior to lambing
3. To identify the benefits of grass growth measurements to lamb performance

1.2 Project conclusions

Summary of conclusions:

Routine weighing demonstrated that growth rates were on target throughout the project.

Growth rates identified during the project will act as a benchmark for the future.

Feeding TMR to ewes increased forage intake and improved lamb's early growth rates.

Monitoring grass growth allowed targeted use of creep feed to maintain growth rates in weaned lambs.

1.2.1 Benefits of routine weighing

Routine weighing demonstrated that lambs were consistently meeting growth rate targets, with no significant checks in growth rate. This meant that a higher proportion of lambs were able to be brought to market earlier than in previous years. Lambs which reach slaughter rates quicker make more efficient use of feed and can be marketed earlier in the season when prices are often better. The high growth rates seen will, therefore, have a direct impact on the profitability of the sheep enterprise.

Routine weighing did not identify any subclinical health issues because growth rates were on target throughout the season. This made it difficult to assess the value of routine weighing for improved animal health, although routine weighing did highlight the value of the other management decisions being trialled over the course of the project. FECs were also low throughout the season, which supports the weighing data in suggesting that there were no issues caused by high worm burdens.

Routine weighing remains a valuable tool going forward, as it will allow early identification of any problems which may arise in the future. **Data from the project can also be used as an internal benchmark in future years**, acting as a baseline of how lambs can perform on the farm under current management conditions. The farm is hoping to replicate or improve upon the performance during the trial in future years.

1.2.2 Nutritional management – feeding TMR and measuring grass growth

Careful nutritional management of ewes and lambs was key to ensuring lambs achieved target growth rates. Despite the difficult weather conditions, performance was improved compared to previous years.

As a result of TMR feeding, ewes were in excellent condition at lambing and were able to provide a plentiful supply of milk. This resulted in lambs meeting growth rate targets in the crucial period prior to weaning. Silage intakes were higher than in previous years, meaning a greater proportion of ewe nutrition was supplied by home-grown forage instead of relying on expensive concentrates. The ewes were also more content in the shed, which is a result of TMR being constantly available, preventing bullying at feeding times.

Following weaning, grass growth monitoring ensured that the nutritional demands of lambs continued to be met. **It was possible to identify when there was insufficient grass to meet the needs of the growing lambs and provide supplementary feed as required**. As grass growth was poor in the summer months due to the dry conditions, creep feed was provided to the lambs. This prevented any depression in growth

rates as a result of poor nutrition. Blood tests showed that there were no nutritional deficiencies in the lambs.

2 Project Review

2.1 Methodology

2.1.1 Routine weighing

Lambs were weighed regularly from six weeks to six months of age. The intention was to weigh lambs every two weeks, however, fewer weighings were achieved in practice due to time constraints. Electronic Identification (EID) tags and readers were used to record the data. Some data had already been collected in the 2017 lambing season, which was available for comparison.

The farm set a target of achieving average daily liveweight gains (DLWG) of 300g/day prior to weaning. This would result in lambs reaching 20kg liveweight at eight weeks of age and 30kg liveweight at 12 weeks of age. Failure of either groups or individuals to reach these targets was investigated in conjunction with the farm's vet.

Results were categorised by sex and litter size to determine any differences in performance between these groups. Lambs were weaned at 12 weeks of age and were sold to Waitrose at an average deadweight of 19.5kg.

2.1.2 Health checks

Faecal egg counts (FECs) were carried out on 29 May, 6 June and 26 June. A drench test was also carried out to determine whether there was any resistance to benzimidazoles (white drenches), macrocyclic lactones (clear drenches) or levamisoles (yellow drenches).

Blood tests were carried out to assess the trace element status of lambs.

2.1.3 Nutritional management

Ewes were fed on a TMR of silage, soya and ground maize from six weeks prior to lambing, with no additional concentrates being fed to the ewes before lambing. The proportion of soya and ground maize in the TMR was increased as the ewes approached lambing. Silage was analysed to ensure accurate formulation of the ration to meet the nutritional needs of the ewes.

Grass growth was measured throughout the grazing season. The data was inputted into Farmax software to determine forage availability relative to the flock's nutritional requirements. Creep feed was then supplied as necessary to meet any identified deficit.

2.2 Results

2.2.1 Growth rates

Growth rates prior to weaning were higher than in previous years and achieved the target DLWG of 300g/day. Singles achieved an average of 350g/day, while twins achieved an average of 300g/day. Singles, twins and triplets all achieved the target average weights of 20kg at eight weeks and 30kg at 12 weeks (weaning). A comparison of 12 week weights in the project year (2018) and the previous year (2017) is shown in Figure 1.

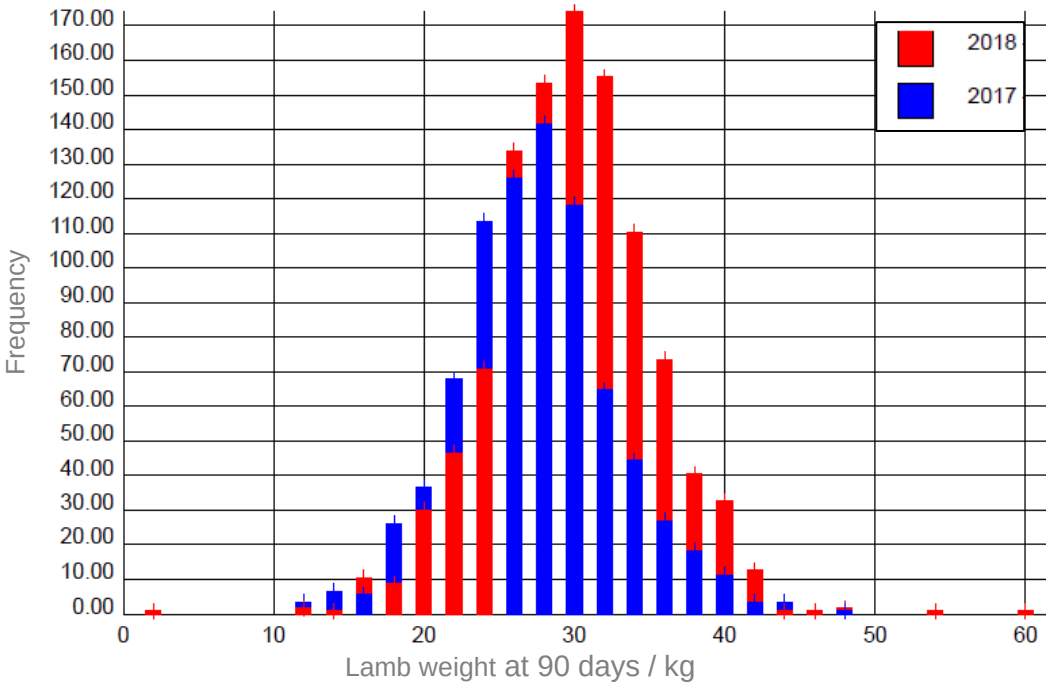

Figure 1. Comparison of 12 week weights in the 2017 and 2018 lambing seasons.

Average growth weight slowed after weaning, as would be expected. The difference between singles and multiples became less pronounced following weaning, with all groups performing well. Daily liveweight gains from birth to final weighing are shown in Figure 2.

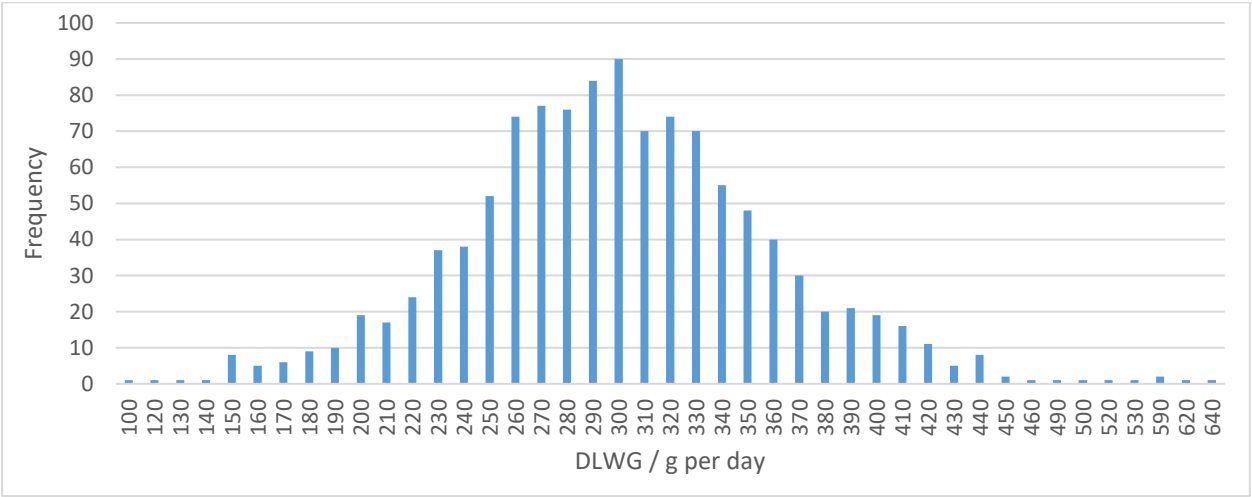

Figure 2. Distribution of daily liveweight gains from birth to final weighing.

As a result of improved growth rates, the farm was able to achieve the target slaughter weight earlier than in previous years, allowing more lambs to be sold earlier in the season.

2.2.2 Health checks

Faecal egg counts indicated that worm burdens were low at each test point. Results are shown in Table 2. No resistance was found to any of the anthelmintic groups tested using drench tests.

Table 2. Faecal egg count test results

	Faecal Egg count / eggs per gram (epg)	
Date	*Nematodirus Battus*	*Trichostrongyle spp.*
29 May	350	250
6 June	0	50
26 June	0	200

The blood test results found that there were no trace element deficiencies in the lambs.

2.2.3 Nutritional management

The nutritional management of ewes and lambs was successful in improving performance, as demonstrated by lambs achieving target growth rates.

Silage analysis identified variation in the quality of the silage produced. By understanding the quality of the different silages produced, the farm was able to formulate the TMR appropriately to compliment the silage being fed at any time. A summary of silage analysis results is shown in Table 3.

Table 3. Summary of silage analysis results.

	Dry Matter %	**Metabolisable Energy** MJ/kg	**Starch** %	**Crude Protein** %	**pH**
Grass sample 1	28.1	11.0	N/A	11.5	3.8
Grass sample 2	24.1	10.1	N/A	16.1	4.0
Wholecrop cereal	48.9	9.5	7.6	11.9	4.9

Feeding TMR to ewes meant that ewes lambed in an optimum condition and had a plentiful milk supply for their lambs. The farm also reported an improvement in silage intakes compared to previous years and an improvement in the contentment of ewes prior to lambing.

Grass growth measurement identified a shortfall in forage supply relative to lamb's requirements. Creep feed was supplied to supplement this, allowing lamb growth rates to be maintained. The relationship between actual grass cover and requirements are shown in Figure 3.

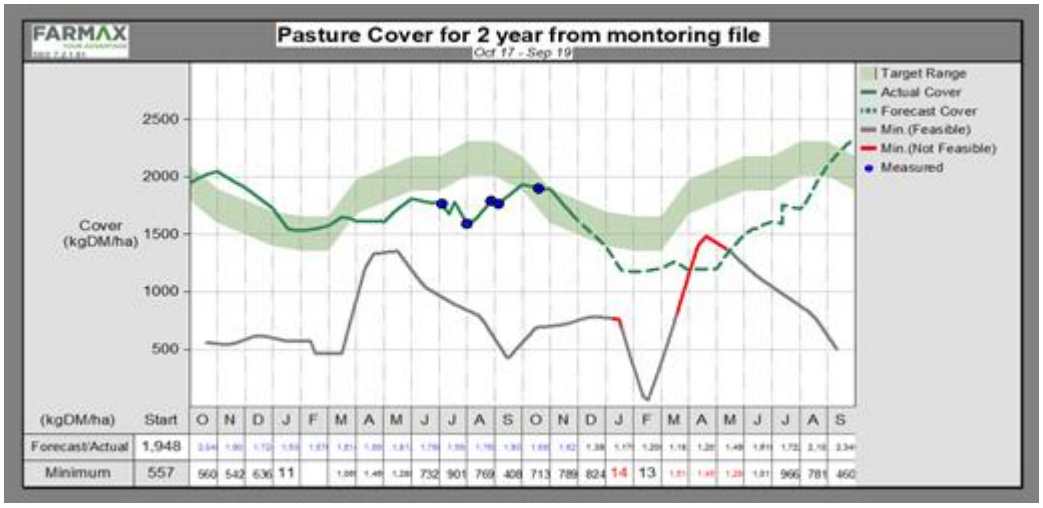

Figure 3. Pasture cover and nutritional requirements for 2018 grazing season.

2.3 SWOT analysis

STRENGTHS	• Lambs achieved target growth rates • Ewes were in good condition and able to provide a good supply of milk • TMR improved forage intake leading to reduced reliance on expensive concentrates • Less bullying between ewes as feed is constantly available • Measuring grass growth allowed supplementary feeding to be targeted as needed • More lambs could be marketed early in the season when prices tend to be better
WEAKNESSES	• Regular weighing is time consuming • Weighing equipment and EID software are expensive to install • TMR feeding requires investment in equipment • Extensive sheep systems may find it inconvenient to gather sheep on a regular basis for weighing
OPPORTUNITIES	• Consistent daily liveweight gains improve the efficiency of lamb production. This is beneficial to business performance and reduces environmental impact • Health issues can be identified at a sub clinical stage, improving performance and animal welfare • Nutritional deficits can be identified quickly and rectified to keep growth rates on track • The risk of anthelmintic resistance can be reduced due to a targeted approach to worming • Analysing forage helps to make better use of forage and formulate appropriate rations • Feeding TMR reduces concentrate costs • Health issues identified sooner, which improves performance and animal welfare
THREATS	• Not all buildings are suitable for TMR feeding • Additional labour may be required for weighing • Interpreting the results from routine lamb weighing and grass growth measurement in a meaningful way relies on the skills and capability of the farmer and may require training, which could be a disincentive to change

3 Impact on the industry

3.1 Alignment to sector's strategic goals

This work contributes to the strategic objectives outlined by Hybu Cig Cymru in (HCC) in the HCC Vision to 2025, particularly in relation to the following:

- Supporting the development of a competitive Welsh red meat industry

- Supporting the Welsh red meat industry in reducing the impact of Welsh red meat production and processing on the climate, the environment and avoiding unnecessary waste

3.2 Impact on individual business

The lambs performed excellently in the 2018 season, despite difficult weather conditions. Careful monitoring allowed the farm to plan ahead to prevent potential issues from having a detrimental effect on performance. As a result, growth rates stayed on target, and lambs reached slaughter weights faster than in previous years. Lambs which reach slaughter weight faster have reduced feed costs, and prices are often better earlier in the season. The management decisions trialled in the project will, therefore, have a direct impact on the profitability of the sheep enterprise.

Routine weighing of lambs kept the farm informed of lamb performance throughout the season. This helped them to assess the impact of management decisions. There were no major health or nutritional issues over the season, which resulted in growth rates meeting targets throughout the season. As there were no major issues identified by routine weighing, it is difficult to determine the value of carrying out the weighing in terms of identifying and rectifying issues at an earlier stage. The data does, however, provide a benchmark for future years, which may help to identify any issues which occur in future years at an earlier stage.

Feeding TMR to ewes improved early DLWG to target levels and ensured ewes were in optimum condition at lambing. It also improved forage intakes, reducing the reliance on concentrates and reducing feed costs. In addition, ewes were more content while housed prior to lambing, which benefits animal welfare. Analysing forage was essential to formulating the TMR, ensuring that ewes were receiving proper nutrition prior to lambing.

Monitoring grass growth was particularly important in 2018 due to the dry weather conditions, which meant grass availability was an issue for many sheep farmers. By regularly measuring grass growth, the farm was able to keep on top of lamb nutrition. Creep feed was supplied as soon as grass availability was identified as an issue, rather than waiting for growth rates to start falling. This was supported by the weighing data which showed growth rates remaining consistent throughout the season.

The excellent performance of lambs in a difficult lambing season highlights the importance of data collection to inform management decisions before issues arise. The farm is planning to continue with the management techniques trialled over the course of the project and hopes to replicate or improve upon their 2018 performance in 2019.

3.3 Take home points for the industry

3.3.1 Importance of performance monitoring

Measuring performance is essential in any farming business to identify areas of strength and weakness and inform management decisions. In the Welsh sheep industry, uptake of performance monitoring is generally low. This project demonstrates how beneficial it can be to collect performance data within a sheep farming system. By collecting key information such as growth rates, forage quality and grass availability, the farm was able to improve upon previous performance in difficult weather conditions.

Once performance figures have been recorded, it is important to have a flexible management approach which takes into account the data collected. For example, in this project, the TMR was formulated based on silage analysis results, and grass growth measurements were used to make decisions on when creep

feed was required. This is a step away from a traditional 'one size fits all' approach, where concentrates might be supplied at the same rates and timings each year.

3.3.2 Importance of correct nutrition

Ewe nutrition has a major influence on lamb growth rates. Ewes that are in the correct condition at lambing will be able to provide a good milk supply to their lambs, allowing good growth in the critical early stage when the majority of liveweight gain occurs. In this case, TMR was used very effectively to increase forage intakes, reducing reliance on expensive concentrates. Ewe performance on the TMR was excellent, with ewes being in good condition and lamb growth rates being on target to weaning.

Post weaning, lamb nutrition also needs to be carefully controlled to maintain growth rates through to slaughter. In this project, this was achieved by measuring grass growth to ensure growth rates were kept at optimum levels. Good growth rates are key to an efficient and profitable sheep enterprise.

Only by analysing forage and measuring grass growth can the contribution of forage towards the needs of the animal be accurately assessed. The optimum ration can then be formulated to maintain performance without using more concentrate than is necessary. Without data on forage availability and quality, rations cannot be formulated accurately. The ration may fail to meet the nutritional demands of the animal, leading to poor performance, or concentrates may be fed where they are not required, leading to unnecessarily high concentrate costs.

3.4 Impact on Welsh Government's cross cutting and priority themes

3.4.1 Animal Health and Welfare

Through routine weighing, health problems such as high worm burdens and lameness can be identified at a sub clinical stage which allows prompt and appropriate treatment. Weighing identifies the productive losses associated with health issues, which can help to identify the most cost-effective treatment option.

Carrying out regular weighing and FECs allows targeted use of anthelmintics, reducing the risk of anthelmintic resistance developing on-farm.

Feeding TMR improves body condition score at lambing which reduces the likelihood of lambing difficulties. It also reduces bullying as feed is available at all times.

3.4.2 Climate Change

Monitoring performance regularly allows flexible management of the flock to reach optimum performance. This leads to an efficient flock with high growth rates. High growth rates improve feed conversion efficiency and reduce the time taken to reach slaughter weight, both of which reduce greenhouse gas emissions per kg of lamb produced. Therefore, by weighing lambs regularly to inform management decisions, the carbon footprint of lamb production can be reduced.

3.4.3 Future Generations, new entrants and women

The project is an example of how farm efficiency can be improved through innovative solutions. This encourages young farmers who are working in the sector to be forward thinking and to grasp opportunities to run a business more efficiently. This includes reducing cost, potentially labour and time; all are increasingly important post Brexit in such a volatile industry. More profitable and efficient farming businesses offer opportunities for new entrants into the industry, including young people and women.