Grazing crops – gambling with the mixed farming system?

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DEMO

Searching for answers

Location:
Lock
Gus Glover
Rainfall
Av. Annual: 345 mm
Av. GSR: 265 mm
2014 Total: 356 mm
2014 GSR: 240 mm
Paddock History
2013: Pasture (demo 1), wheat (demo 2)
Soil Type
Grey sandy loam
Plot Size
45 ha paddock (demo 1), 48 ha (demo 2)
Yield Limiting Factors
Early finish (both demos) aphids affected early growth (demo 2)
Livestock
Enterprise type: Mixed
Type of stock/breed: First cross Dohne x White Suffolk

Key messages

- **Grazing barley provided substantial feed for the sheep at a time of year when pastures were slow and accordingly it allowed pastures the opportunity for accelerated production. Removing sheep after one graze allowed the crop time to recover to produce an average yield of 2.45 t/ha, with the additional benefit of feed for 1400 DSE over one month.**
- **Grazing the vetch over four months allowed the feed base to establish well and bulk up, providing an exceptional feed source for ewes and lambs. The 5005 DSE had a total of two months of quality feed allowing lambs to be sold directly off the ewes due to their considerable weight gain over this period.**
- **The flexibility of both of these crops offers a variety of in-season opportunities and end-season uses and successful implementation of grazing crops into mixed enterprises can deliver indirect benefits to the whole farming operation.**

Why do the demonstration?

Many mixed farmers have gambled with grazing crops at different times of the year with very diverse results. Numerous aspects determine whether the practice of grazing crops is a success or failure and these variants will also govern the outcome of the crop – grain, graze, hay or a combination of these. No matter how you do it, the next year will never be the same as the last, and similar to farming in general, it comes down to a throw of the dice, plus good, calculated and timely choices.

How was it done?

To help understand the variability involved in grazing crops in mixed farming systems, two demonstrations were undertaken at Lock with barley (Demonstration 1) and vetch (Demonstration 2), which were grazed throughout the growing season to determine how the sheep and cropping enterprises could best fit as a combination (Table 1).

Demonstration 1 was grazed using first cross Dohne x White Suffolk ewes and lambs for 29 days in total with an average of 31 DSE/ha from the 18 June to 4 July 2014. Demonstration 2 was grazed over five different periods from 25 June to 8 September 2014 for 66 days in total using first cross Dohne x White Suffolk ewes and lambs with an average of 21 DSE/ha. In both demonstrations there was no supplementary feed provided throughout the duration of grazing. Sections of the paddocks were fenced off using electric fence to avoid over-grazing, however the 'paddock area' in Table 1 describes the total area grazed.

Biomass cuts were taken from each demonstration pre and post grazing and feed quality was analysed from the pre-grazing samples. Pasture cages (1 m^3) were placed in the paddock to calculate the approximate amount of biomass removed from the paddock as a result of grazing. The grazed barley in Demonstration 1 was sampled on 15 October 2014 for yield and grain quality and was harvested by the farmer and the vetch was completely grazed until only enough biomass to cover the soil remained.

What happened?

Demonstration 1: Sheep were put on the paddock with an average 1.2 t DM/ha feed on offer (FOO) and at post-grazing there was 2.8 and 2.5 t DM/ha of barley biomass remaining in the grazed and un-grazed areas respectfully. The results from the feed analysis report for the barley showed a dry matter of 11.8%, crude protein of 23.2% of dry matter, neutral detergent fibre of 42% of dry matter, digestibility (DOMD) of 74% of dry matter and estimated metabolisable energy of 12 MJ/kg DM.

Table 1 Information for Demonstration 1 and Demonstration 2 undertaken at Lock

	Demonstration 1	Demonstration 2
Paddock area	45 ha	48 ha
Crop type and variety	Fathom barley	Rasina vetch
Sowing date	5 May 2015	15 April 2015
Sowing/fertiliser rates	60 kg/ha with 60 kg/ha DAP	40 kg/ha with 40 kg/ha DAP
2013 paddock history	Pasture (self-sown medic/mixed)	Wheat
Weed control at sowing	(4 May - *grass and broad-leaved*) 1.5 L/ha 540 glyphosate, 100 ml/ha oxyfluorfen, 1.5 L/ha Treflan	(15 April - *grass and broad-leaved*) 1.2 L/ha glyphosate, 100 ml/ha oxyfluorfen, 500 g Simazine
Weed control in-season	(mid-July - *turnip, mustard*) 400 ml/ha LVE MCPA, zinc manganese copper blend, 400 ml/ha propiconizole	(19 June – *grass*) 400 ml Targa (24 Sept – *grass*) 800 ml paraquat
Disease/pest control	(28 Aug - *net blotch, aphids*) 400 ml propiconizole, 150 ml/ha alpha cypermethrin	(19 June – *cowpea aphids*) 200 ml Lemat

There was a large range in yields due to soil variation across the paddock with between 1.8-4 t/ha for the grazed area and 1.3-5.4 t/ha for the un-grazed exclusion cages. The un-grazed area yielded 0.1 t/ha more than the grazed paddock area on average with 2.5 t/ha and 2.4 t/ha respectfully. Grain quality was measured with 4% less screenings after grazing; however no other notable differences were measured.

Demonstration 2: There was an average of 1.1 t DM/ha of FOO prior to grazing the vetch paddock and after the first 21 days of grazing there was 2.0 and 2.1 t DM/ha remaining in the grazed and un-grazed areas respectfully. There was less than 0.5 t/ha of residual biomass on the paddock after the complete 66 days of grazing, therefore sheep were removed to avoid erosion issues. The results from the feed analysis report show that the vetch contained 12.8% dry matter and had higher crude protein content of 30.7% of dry matter, lower neutral detergent fibre of 37.5% of dry matter, lower digestibility (DOMD) of 68.5% of dry matter and lower metabolisable energy of 10.9 MJ/kg DM than the barley.

What does this mean?

Demonstration 1: Using estimated barley growth rates for the 2014 season at Lock of 50 kg DM/ha/day, approximately 1.4 t DM/ha would have been produced in the paddock over the grazing period. Therefore the assumption is that sheep removed approximately 3.0 t DM/ha over the period of grazing, equating to a feed intake of 3.3 kg DM/DSE/day. The quality of the barley was sufficient for young, quick growing lambs and lactating ewes for all results from the feed analysis. Crude protein levels were exceptional, which would have counteracted the fact that for the assumed feed intake, 2.9 kg DM/DSE/day or 88.2% of the feed content would be water, requiring a considerable amount of ingestion of barley to achieve the protein and energy levels required, which is normal for cereal crops in the vegetative phase. However, the key benefit of grazing the barley was that this provided a month of substantial feed for the sheep, equating to 1400 DSE, at a time of year when pastures were slow and thus it allowed the opportunity for pasture reserves to establish for use later in winter.

Due to the size and shape of the paddock, including scrub layout, the area was grazed quite unevenly. Once the barley had recovered after the first graze, the growth stage of the crop posed a risk to yield if grazed (nearing GS30), therefore the paddock was left to target grain production.

Demonstration 2: Using estimated vetch growth rates for the 2014 season at Lock of 80 kg DM/ha/day, during grazing approximately 5.3 t DM/ha would have been produced over this period. Assuming this growth rate, the sheep would have removed approximately 6.2 t DM/ha over the period of grazing, which equates to an average feed intake of 4.5 kg DM/DSE/day. Similar to the barley, the quality of the vetch was sufficient for the requirements of the sheep grazing. Results showed excellent protein and digestibility levels, which offset the large quantity of feed that needed to be consumed to gain the required nutrition due to the high moisture of 87.2% in the vetch. However the nutritive content of the feed would have changed to have a higher percentage of dry matter as this paddock was grazed over a longer period of time and into the spring when the vetch was beginning to hay off, especially with the dry finish experienced in 2014.

The method in which the vetch was grazed (five times for no longer than three weeks at a time), allowed the feed base to establish well and bulk up during the vegetative phase in order to provide exceptional feed value for the ewes and lambs when they needed it most. Visually, the sheep equating to 5005 DSE grazing the vetch did extremely well, allowing lambs to be sold directly off the ewes due to their considerable weight gain over this period. Similar to the barley, other pastures could be relieved from this grazing pressure.

The adaptability of both of these crops offers a variety of in-season opportunities and end-season uses. On any given year, the results of these two demonstrations may have been different according to the choices made with crop agronomy and livestock management as well as seasonal variability, which are the risks that mixed farmers must be willing to accept if attempting to graze crops. The successful implementation of this practice can deliver indirect benefits to the whole farming operation, as observed in these demonstrations. The secondary advantages can include management flexibility, increased stocking rates, business risk mitigation, as well as the implications for weed and disease controls, all which contribute at the whole-farm scale level. Mixed farming is a balancing act - there are both risks and rewards involved, however calculated and timely choices can provide substantial benefits and also supress the risk associated with the integration of livestock and cropping systems through grazing crops.

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