



PROJECT: Undersowing cereal crops with clover

Key take home messages:

- Undersown clover has shown no negative effect on spring barley yields
- Bryn Farm has light sandy soils, therefore, having clover present after harvest reduces the possible losses to wind and run-off

- Reduce erosion, run-off and nitrate leaching. Retaining nitrogen (N) and potassium (P) lead to improved soil fertility
- Enhanced soil structure, water holding capacity and porosity (rooting and fresh organic matter)
- Weed management, disruption of pest and disease cycles
- Biodiversity and habitat provision

The problem:

With soaring input costs, Huw wanted to trial the effectiveness of establishing a clover living mulch to identify any effects on yield, weed suppression, soil protection and fertility, and the success of establishment on light sandy soil.

Purpose of work:

The aim of this project was to demonstrate and validate clover living mulches as a viable, achievable and profitable option for arable farmers in Wales. As such, the primary objectives from this project would be to obtain evidence that:

1. Living mulches are compatible with current cereal production
2. Living mulches can provide multiple benefits to farmers which would encourage their use.

Living mulch can be expected to deliver a number of benefits including:

What we did:

At Bryn Farm, two fields were identified, both having been under similar management and soil samples showed similar results. One field was drilled with spring barley and the other drilled with spring barley and a mix of 70% small leaf clover (AberAce) and 30% small to medium leaf clover (AberPeral).

Outcomes:

The results of the field survey conducted at the booting stage (BBCH 41-46) show that establishment score, crop vigour, crop growth stage, crop ground cover and crop height were all significantly higher in the clover undersown field compared to the control field. Clover ground cover was on average 10.6% in the undersown field. The field means, standard deviation and F-test result can be found in Table 1.



LOCATION:
Cardigan



FARM:

Sector: Red Meat
Stock numbers & breed:
 75 suckler cows, mainly Saler, crossed with Charolais and Hereford for replacements
Farm size (ha): 101
Crops & ha grown: 24 hectares of oats and barley
Calving pattern/Lambing months: Spring calving
Grazing system: Rotational grazing

FARM OBJECTIVES

1

Reducing cost of production of the suckler herd by improved efficiency

2

Finish cattle, instead of selling as stores to minimise the risk of TB

3

Improve soil health and reduce inputs

TEST	CONTROL			MULCH			Test
	Variable	N	Mean	SD	N	Mean	
Establishment Score	5	4.3	0.57	5	5	0	F=7.538**
Vigour Score	5	7.8	0.447	5	9	0	F=36***
Growth Stage BBC H	5	41.8	1.095	5	46.6	0.894	F=57.6***
Crop Groundcover %	5	83	10.368	5	97.4	1.342	F=9.486**
Crop Tiller Number	5	2.032	0.244	5	2.198	0.181	F=1.494
Crop Height cm	5	55.4	3.362	5	69	2	F=60.444***
Rhynchosporium %	5	2.3	0.758	5	0.2	0.447	F=28.452***
Net Blotch %	5	0.4	0.894	5	10.8	4.087	F=30.903***

Table 1. Field means, standard deviation and F-test results from field survey at Bryn Farm.

Despite a similar soil type, and the same previous cropping, further discussion with the farmer revealed that historic rotations had been different. The crop in the control field appeared much poorer than the undersown field, suggesting lower fertility and poorer soil structure.

Taking this into account, looking solely at the undersown crop, the addition of clover didn't have a negative effect on the establishment

or yield of the barley crop. It was too soon to investigate the nitrogen fixing properties of the clover; but this could be done with the successive crop, winter oats. Having a crop of clover undersown meant the field was not left bare after harvest, which provided competition for weeds and reduced possible water run-off. It also provided a short grazing period before the next crop was drilled.



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“I feel the extra cost of the clover seed and sowing at a cost of £305 is worth it and after harvesting the winter oats, we will aim to direct drill grass and monitor the longevity of the clover.”

Barley yield

Undersown field: 2.93t/acre

Control field (no clover): 2.86t/acre

Research into practice /10 how to steps for your farm

Field management at Bryn farm - Step by step guide...

1. Soil samples collected and analysed
2. Field history: Ley 5 years, ley destroyed, green crop July 2021, winter grazed 2021, bare soil, spring barley sown
3. Application of light Glyphosate 1.5lt 360 Glyphosate
4. Apply farmyard manure (FYM) at an application rate of 10t/acre
5. Light cultivation after FYM application (remove flat spots done by cattle during winter grazing)
6. Spring barley variety: Planet (Sowing date: 30/3/2022)
7. Barley sow rate: 200kg/ha
8. Drill used: Simtech 3 metre direct drill
9. Clover variety: 2.25kg AberPearl white clover and 5.25kg AberAce wild white clover
10. Clover sowing rate: 7.5kg/ha Einbock with seedbox (Sow date - 31/3/2022)
11. Cost of clover seed and sowing (field size: 2.56ha) - £305
12. Rolled
13. Fertiliser applied: 50 units nitrogen/acre
14. Sprays: will monitor and react as needed

FIELD DIARY



Figure 1. 31/3/2022 – Clover sown



Figure 2. 06/06/2022 – Progress of clover



Figure 3. 10/8/2022 – Spring barley was combined. Very dry weather for over a month. Little presence of clover

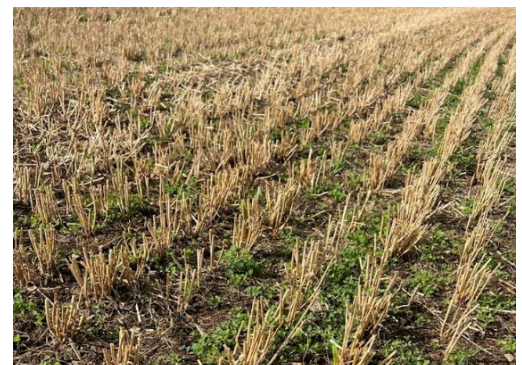


Figure 4. 07/09/2022 – Clover returning after few days of rain



Figure 5 and 6. 27/09/2022- 20 day clover regrowth. Very impressed with how the clover has returned after the drought over summer. Cattle grazed for 24 hours before winter oats were drilled.