

**ADAS document ref: 1021801-14 (00)**  
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Farm location: West Sussex  
Trial type: Clover  
Crop: Winter wheat

Variety: KWS Extase  
Previous crop: Peas

This trial was part of the AICC Crop Nutrition Club 2023, which has been run in conjunction with the Farm-PEP project led by ADAS. This report contains the results of a winter wheat trial testing the benefits of clover living mulches.

## Treatments

	1. Field standard	2. Clover	3. Clover - 10% N	4. Clover - 20% N
Polysulphate	217 kg/ha across all treatments			
N split 1 (N37)	50 kg N/ha across all treatments			
N split 2 (AN)	100 kg N/ha across all treatments			
N split 3 (N37)	100	100	71	42
N split 4 (AN)	40 kg N/ha across all treatments			
N split 5 (Nufol)	30 kg N/ha across all treatments			
<b>Total N (kg/ha)</b>	<b>320</b>	<b>320</b>	<b>291</b>	<b>262</b>

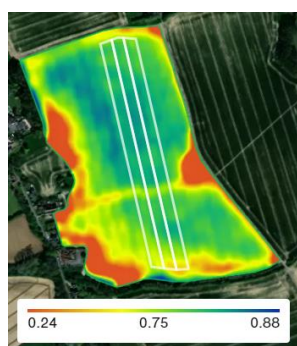
A clover living mulch was sown to three tramlines. Differential N rates were then applied by varying the liquid N applied at the third N split.



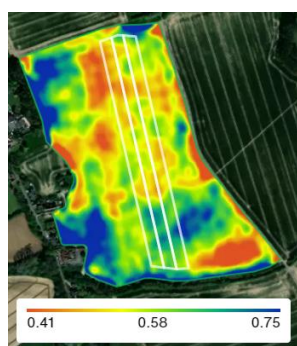
## Satellite imagery

NDVI (normalized difference vegetation index) is a spectral reflectance index which shows a combination of canopy size and greenness, on a scale from 0 to 1. NDVI images were sourced from [www.datafarming.com.au](http://www.datafarming.com.au), based on freely available 10m resolution data from the Sentinel 2 satellites. The scale varies between images but always runs from red (low) through orange, yellow and green to blue (high). The availability of imagery is constrained by the need for cloudless conditions.

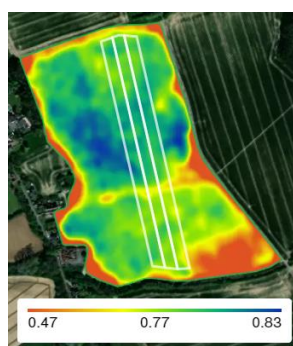
The field was relatively even except for a path running across the tramlines halfway down the field. For most of the season, the treatments were not visible in NDVI images, but when the crop began to senesce before harvest, NDVI appeared slightly reduced in the lower N tramlines.



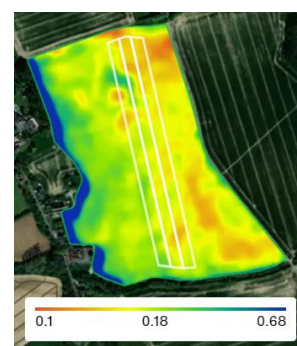
Previous crop  
10 Jul 2022



After establishment  
04 Nov 2022



Early spring  
07 Feb 2023



Late season  
25 July 2023

## Yield results

The average measured yield of the control treatment was high at **14.24 t/ha**, according to weighbridge results.

The addition of clover reduced yield by **0.15 t/ha** relative to the control, but this difference is small enough that it could easily have been due to underlying variation rather than to any difference between the treatments. However, it seems clear that there was no yield benefit within this crop sufficient to justify the expense of establishing clover, although there could plausibly be benefits to soil structure, organic matter or N supply which are only apparent in following crops.

Within the three clover tramlines, N reductions then reduced yield by 0.17 t/ha and 0.24 t/ha, for 10% and 20% reductions in N rate respectively. Again, these differences are very small, but the visible differences in NDVI supports the yield effects. However, with current grain and fertiliser prices, the lost yield was probably worth slightly less than the cost saving from reduced N, so within the three clover treatments, gross margin was probably highest for the lowest N rate (treatment 4).

## Grain quality

Grain N was not raised by the addition of a clover living mulch (treatment 2), and was notably reduced in the lowest N rate (treatment 4).

Treatment	Yield t/ha	Grain nutrient concentration											
		N %	P %	K %	S %	Mg %	N:S ratio	Cu mg/kg	Mn mg/kg	Zn mg/kg	B mg/kg	Ca %	Fe mg/kg
1 Farm standard	14.24	2.32	0.345	0.499	0.13	0.109	17.8	2.79	26.4	20.3	0.71	0.044	40.5
2 Clover at std N	14.09	2.30	0.378	0.535	0.14	0.116	16.4	2.88	27.2	19.4	0.78	0.050	45.7
3 Clover - 10% N	13.92	2.37	0.392	0.541	0.13	0.118	18.2	2.98	27.6	18.6	0.73	0.044	40.9
4 Clover - 20% N	13.85	2.15	0.367	0.510	0.13	0.112	16.5	3.00	25.4	17.0	0.73	0.042	40.5

## Future trials

The trial was well placed in an even area of an even field; any future trials should seek to use similarly even fields, or fields where the variation runs across the tramlines to affect all treatments equally. Greater confidence in the yield effect could be achieved by replicating the treatments within the field and either weighing each harvested tramline separately or using yield mapping.

It would be worthwhile monitoring the clover tramlines in the following crop, in case there are residual effects (positive or negative).