FARMEXCELLENCE

Strategic Cereal Farm East Open Day

6 June 2019

Demonstrations Introduction

Strategic Cereal Farm East

The Strategic Cereal Farm East (2017 – 2022) is part of the AHDB Farm Excellence Platform of Strategic Farms, Monitor Farms, Arable Business Groups and wider industry events.

Brian Barker is the host of the Strategic Farm for the East of England, covering East Anglia, East Midlands and the South East. E.J. Barker & Sons is a family farm partnership and contracting business in Suffolk which dates back to 1957. The 513 ha arable farm business uses a traditional 12-year rotation, incorporating winter wheat for feed, herbage grass seed and break crops of spring barley, beans, oilseed rape and linseed.

The aim of the Strategic Cereal Farm is to be an independent, open and honest platform for UK farmers to see and learn from the integration of research in a practical way within a commercial farming system.

The vision of the Strategic Cereal Farm East is to understand the farmed environment and develop a long-term strategy to increase productivity and produce a high quality end-product without having a negative effect on the farmed environment. The project will bridge the gap between research and practical farming and provide a programme of demonstrations, subject to full net-margin cost benefit analysis, which are relevant to the current situation facing UK farming. The project will allow farmers to make informed decisions and increase farmer to farmer engagement.

The core values of the Strategic Farm East are: independent, honest, practical, productive, cost effective and relevant.

Building on the first year baselining, which included soil assessments, earthworm sampling and drainage water sampling, the Strategic Farm is now carrying out demonstrations around the theme of “managed lower inputs”.

The Open Day this year is to showcase these demonstrations in the field and more details on each are enclosed.

For details of the outputs from the baselining year and further information, please visit: cereals.ahdb.org.uk/strategicfarm.

Cover crop demonstration 2018-2020

Background

During the first year of the Strategic Cereal Farm East project, a comprehensive baselining assessment was completed. Included in this was the sampling and analysis of water removed by the field drains under different crops, establishment systems and soil types. Two techniques of leaving land through the winter for spring crop establishment, namely over winter cover crop and over winter plough, were compared. The water analysis indicated that the use of cover crops could mitigate nitrate losses from soil. Overall, the loss of nutrients under the cover crop was reduced compared to the bare soil of the plough. It remains unclear, however, whether the nutrients taken up by the cover crop will be used by the subsequent cash crop or released and leached later on.

Aim

The aim of the cover crop trial in 2018-2020 is to determine the role of cover crops in reducing nutrient leaching.

Methodology

Site details

<table>
<tr><th></th><th>Field 1 – Big Lawn</th><th>Field 2 – Hills</th></tr>
<tr><td>Area:</td><td>14.9 ha</td><td>15.3 ha</td></tr>
<tr><td>2018 harvest crop:</td><td colspan="2">Winter wheat</td></tr>
<tr><td rowspan="5">Treatments:

Drilled:

25/08/19

Destroyed: 22/2/19 (using Glyphosate)</td><td>Treatment 1:</td><td>Treatment 3:</td></tr>
<tr><td>Plough – soil left bare over-winter</td><td>Over-winter Stubble</td></tr>
<tr><td>Treatment 2:</td><td>Treatment 4:</td></tr>
<tr><td>Oil Radish & Rye

established into ploughed soil</td><td>Oil Radish & Rye established in one pass system into stubble</td></tr>
<tr><td></td></tr>
<tr><td>2019 harvest crop:</td><td colspan="2">Linseed (Juliet, drilled 12 April 2019)</td></tr>
<tr><td>2020 harvest crop:</td><td colspan="2">Winter cereal</td></tr>
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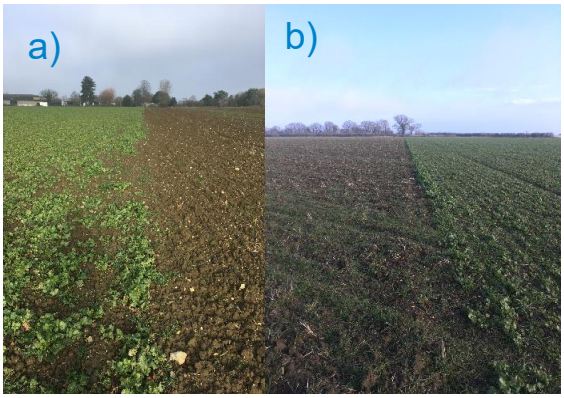


a) Big Lawn: cover crop (left) and ploughed (right) treatments**;**

b) Hills: stubble (left) and cover crop (right) treatments. Taken on 23 January 2019

Measurements

- Each field has 2 separate drainage systems, allowing different treatments to be compared within the same field
- Measurements: soil mineral N, cover crop N uptake, soil penetration resistance, visual structural score and earthworm numbers, spring and winter crop yields

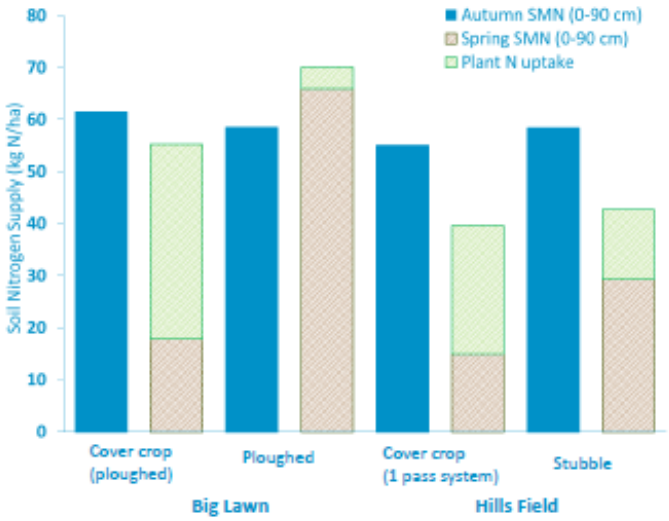
Costings

Treatment	Operation Costs							Cover crop cost	Total cost
Treatment 1: Plough	Plough £57	Press £20	Spring tine £15	Combi £32	Roll £9				**£133**
Treatment 2: Plough and cover crop	Plough £57	Press £20	DD £40	Roll £9	Spring tine £15	Combi £32	Roll £9	£52.50	**£234.50**
Treatment 3: Over-winter stubble	SL £60	Spring tine £20	Combi £32	Roll £9					**£121**
Treatment 4: Over-winter stubble and cover crop	SL £60	Press £20	DD £40	Roll £9	Spring tine £15	Combi £32	Roll £9	£52.50	**£237.50**

*DD – Direct Drill; SL = Simba SL

Preliminary results

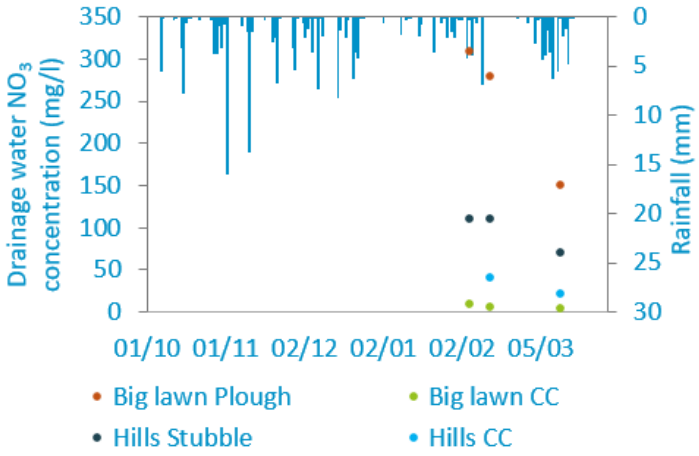
By March 2019 the cover crops had produced 1 t/ha (Hills Field) and 1.6 t/ha (Big Lawn) dry matter and taken up 25 & 37 kg/ha N.



2018 drought and low winter rainfall (200 mm rain Oct-Mar) meant that drains didn't 'run' until Feb 2019.

Nitrate concentrations measured in drain water flow (coloured dots in the graph) were found to be in excess of 50 mg/l measured where no cover crop grown.

On-going work will follow the potential impact of the cover crop on the spring and winter crop yields and soil properties.



Varietal performance under reduced input regimes 2018-2019

Background

In order to maintain activity of fungicides and disease control there needs to be a step-change in the way cereal fungicides are used. AHDB already plays a key role in fungicide anti-resistance through monitoring and research of key diseases to develop the most effective anti-resistance strategies, including more resistant varieties. The AHDB Recommended List has raised minimum standards for variety disease resistance which potentially enables the reduced use of, and thus pressure on, fungicides.

Aim

The aim of this demonstration is to determine the effect of reduced fungicide applications and cost of production on varieties with different resistance ratings for disease control under high, medium and low fungicide strategies, to promote fungicide stewardship and raise awareness of practical anti-resistance measures.

Methodology

Site details

Field: Kells
Soil type: Sandy loam
Varieties:

- Siskin
- Shabras
- Graham
- Santiago
- Silverstone

Drilled: 2 October 2018

Assessments

- Disease assessments: varieties will be assessed for foliar disease and green leaf area at all of the key growth stage timings
- Crop assessments: varieties will be assessed through plant counts, growth stages and NDVI

Costings

Application Date	Untreated	Low Input			Mid Input			High Input		
		Product (Active)	Rate	Price	Product (Active)	Rate	Price	Product (Active)	Active	Price
26/02/2019					Headland Boron 15%	0.5l	£12.87	Headland Boron 15%	0.5l	£12.87
					Maxi Phi Fast Root (*Phosphite, manganese and zinc*)	1l		Maxi Phi Fast Root (*Phosphite, manganese and zinc*)	1l	
					Headland Multiple (*Manganese, copper, magnesium and zinc*)	1l		Headland Multiple (*Manganese, copper, magnesium and zinc*)	1l	
T0 (24/03/2019 & 27/03/2019)		Tempo (*Trinexapac-ethyl PGR*)	0.15l	£6.99	Cherokee (*Chlorothalonil, cyproconazole and propiconzole*)	1l	£17.32	Cherokee (*Chlorothalonil, cyproconazole and propiconzole*)	1l	£17.32
		3C Chlormequat 750 (*Chlormequat PGR*)	1l		Tempo (*Trinexapac-ethyl PGR*)	0.125l		Tempo (*Trinexapac-ethyl PGR*)	0.125l	
		Manganese 15%	2l		3C Chlormequat 750 (*Chlormequat PGR*)	1l		3C Chlormequat 750 (*Chlormequat PGR*)	1l	
					Manganese 15%	2l		Manganese 15%	2l	
T1 (23/04/2019)		Cherokee (*Chlorothalonil, cyproconazole and propiconzole*)	1.33l	£27.31	Amistar Opti (*Azoxystrobin and chlorothalonil*)	1l	£29.73	Wolverine (*Metconazole and xemium*)	1l	£42.18
		Amistar (*Azoxystrobin*)	0.3l		Mendoza (*Expoxiconazole*)	0.75l		Bravo 500 (*Chlorothalonil*)	1l	
		3C Chlormequat 750 (*Chlormequat PGR*)	1l		3C Chlormequat 750 (*Chlormequat PGR*)	1l		3C Chlormequat 750 (*Chlormequat PGR*)	1l	
		Tempo (*Trinexapac-ethyl PGR*)	0.1l		Tempo (*Trinexapac-ethyl PGR*)	0.1l		Tempo (*Trinexapac-ethyl PGR*)	0.1l	
		Headland Boron 15%	0.5l		Headland Boron 15%	0.5l		Headland Boron 15%	0.5l	
02/05/2019					Headland Complex (*N, P, K, sulphur, magnesium, manganese, copper, zinc, iron, boron and molybdenum*)	3kg	£13.10	Headland Complex (*N, P, K, sulphur, magnesium, manganese, copper, zinc, iron, boron and molybdenum*)	3kg	£13.10
					Epso Combitop (*Magnesium, sulphur, manganese and zinc*)	3kg		Epso Combitop (*Magnesium, sulphur, manganese and zinc*)	3kg	
					Maxi Phi Fast Root (*Phosphite, manganese and zinc*)	0.5l		Maxi Phi Fast Root (*Phosphite, manganese and zinc*)	0.5l	
T2 (22/05/2019)		Tubosan (*Tebuconazole*)	1l	£9.00	Bugle (*Fluxapyroxad*)	1.01l	£36.12	Elatus Era (*Benzovindiflupyr and prothioconazole*)	1l	£53.90
					Mendoza (*Expoxiconazole*)	0.5l		Bravo 500 (*Chlorothalonil*)	1l	
					Bravo 500 (*Chlorothalonil*)	1l				
Total Spend	**£0.00**			**£43.30**			**£109.14**			**£139.37**

**Prices drawn from industry averages*

Determining the value of starter fertilisers to building early season biomass in winter wheat

Background

This project continues on the work carried out at Strategic Farm East in 2017/18 that began to evaluate the role that starter fertilisers can have on aiding early crop development, and how this then further relates to crop yield.

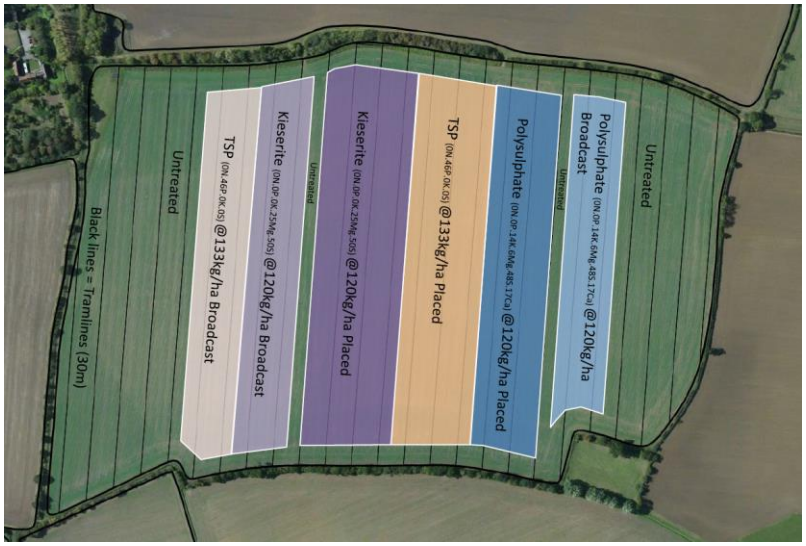
Aim

To create a better understanding of how the use of starter fertilisers, and the technique used to apply them, may contribute to increasing early season biomass in winter wheat. This is in response to the agronomic challenge of achieving high yielding fields, whilst using integrated management techniques such as delayed drilling to reduce black-grass.

Methodology

Site details

Field: Barn Field
Soil type: Sandy loam
Variety: Santiago
Drilled: 12 October 2019



Assessments

Comprehensive assessments to quantitatively assess early season biomass, which includes emergence and NDVI assessments 1, 2, 3 and 4 weeks after drilling, analysis of plant tissue 2 and 4 weeks after emergence, tiller number, destructive biomass and LAI at growth stage 21-25, and analysis of yield data from combine yield monitor in August.

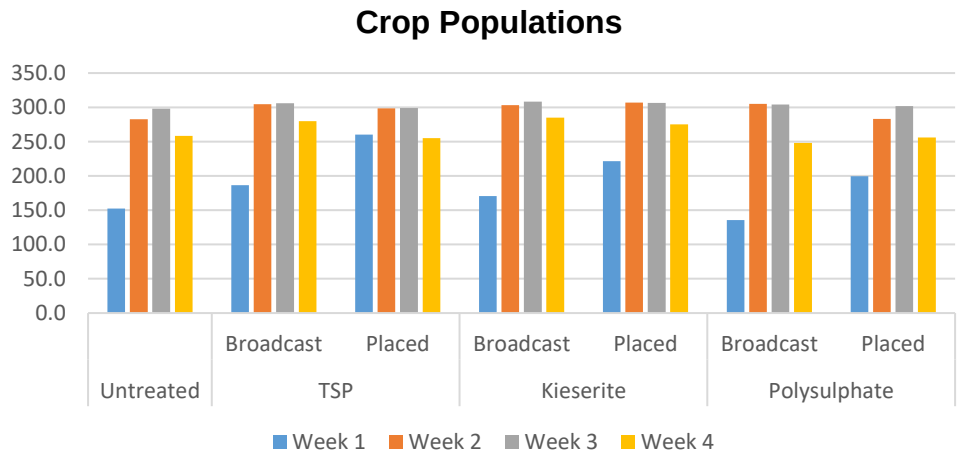
Costings

Treatment	Nutrient Content	Application Rate	Product Price	Operation Cost	Total
Polysuphate Broadcast	0N:0P:14K:6Mg:48S:17Ca	120kg/ha	£19	£8	**£27**
Polysuphate Placed	0N:0P:14K:6Mg:48S:17Ca	120kg/ha	£19	With drill at planting	**£19**
TSP Broadcast	0N:46P:0K:0S	133kg/ha	£46	£8	**£54**
TSP Placed	0N:46P:0K:0S	133kg/ha	£46	With drill at planting	**£46**
Kieserite Broadcast	0N:0P:0K:25Mg:50S	120kg/ha	£32	£8	**£40**
Kieserite Placed	0N:0P:0K:25Mg:50S	120kg/ha	£32	With drill at planting	**£32**

Preliminary results

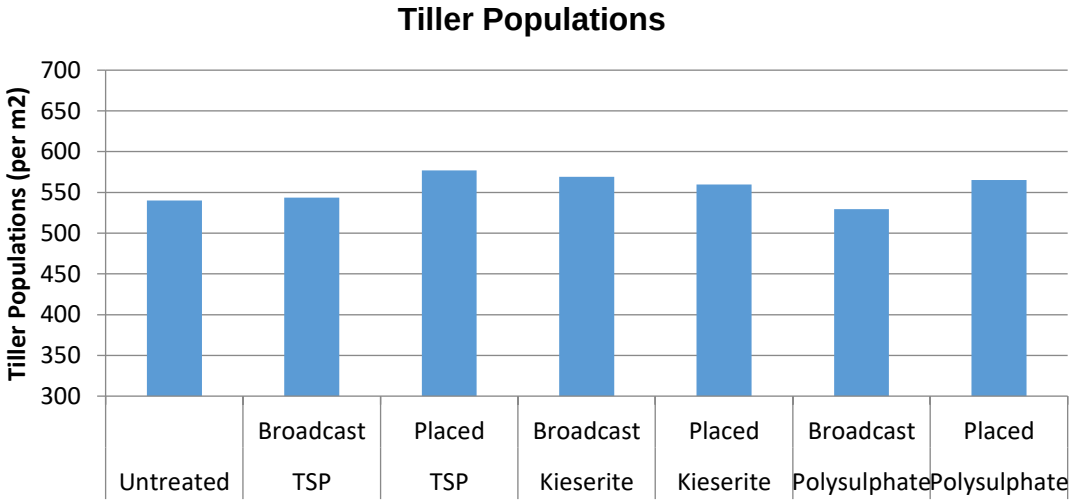
Crop populations

The use of starter fertilisers, in particular when placed, has shown to increase the speed of emergence. The addition of polysulphate created a visible difference in the field. Despite the early differences, each plot, including the untreated, caught up, leaving differences of statistical note. The benefit of increasing the speed emergence may be of greater benefit in years/fields, where slug pressure is particularly high. No slug damage was observed at all during the assessments. The year was very good for establishment, so in poorer years we may expect for the initial observations to be more permanent.



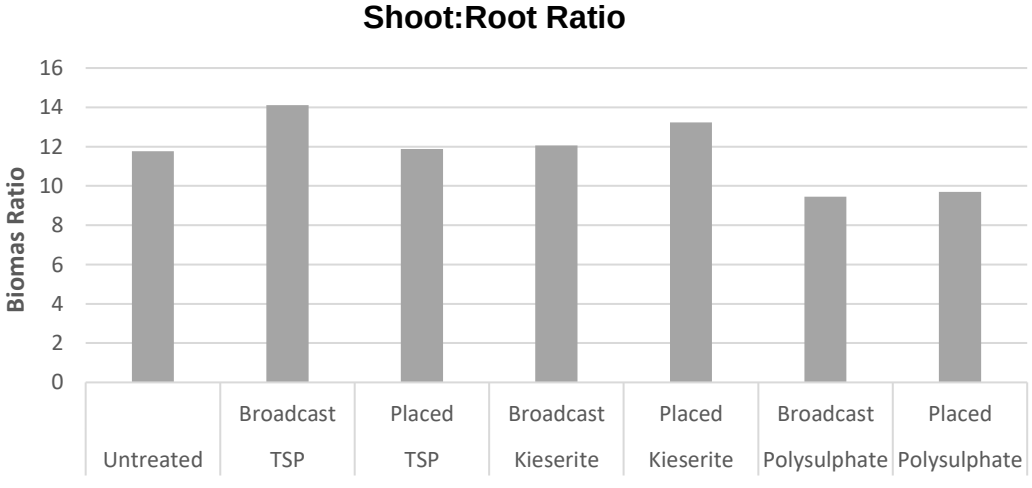
Tiller populations

These counts were done in the late autumn, and show some small differences, particularly from placed TSP and placed Polysulphate. There was a general benefit of using Kieserite, with no difference from application type.



Shoot:root ratio

These results come from the biomass sampling in the spring. This suggests that there has been some possible effect in improving above ground biomass from using Kieserite, TSP when broadcast, and an increase of root mass relative to shoot mass from the polysulphate. However, the polysulphate plots had overall lower mass of both above and below ground biomass.



Further information

More details and information on AHDB research that relates to the demonstrations at the Strategic Cereal Farm East can be found here:

- Recommended List Handbook 2019/20
- Fungicide performance research
- Fungicide Resistance Action Group (FRAG) guidelines
- Research project: Maximising the benefits from cover crops through species selection and crop management.
- Opportunities for cover crops in conventional arable rotations.
- A review of the benefits, optimal crop management practices and knowledge gaps associated with different cover crop species.
- Practical information on soil management and soil assessment methodologies can be found online ahdb.org.uk/greatsoils
- Nutrient Management Guide (RB209)
- AHDB WeatherHub

Keep up-to-date

- **Visit cereals.ahdb.org.uk/strategicfarm for the latest information.**
- **Read Brian's blog with Strategic Farm updates: *cereals-blog.ahdb.org.uk/author/brianbarker***
- **#strategicfarm on Twitter**

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We are able to arrange bespoke visits by interested groups (farmers, growers, stakeholders, supply chains, agronomists etc.) to all our Strategic Cereal Farms. Please get in touch to arrange your own farm visit.

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