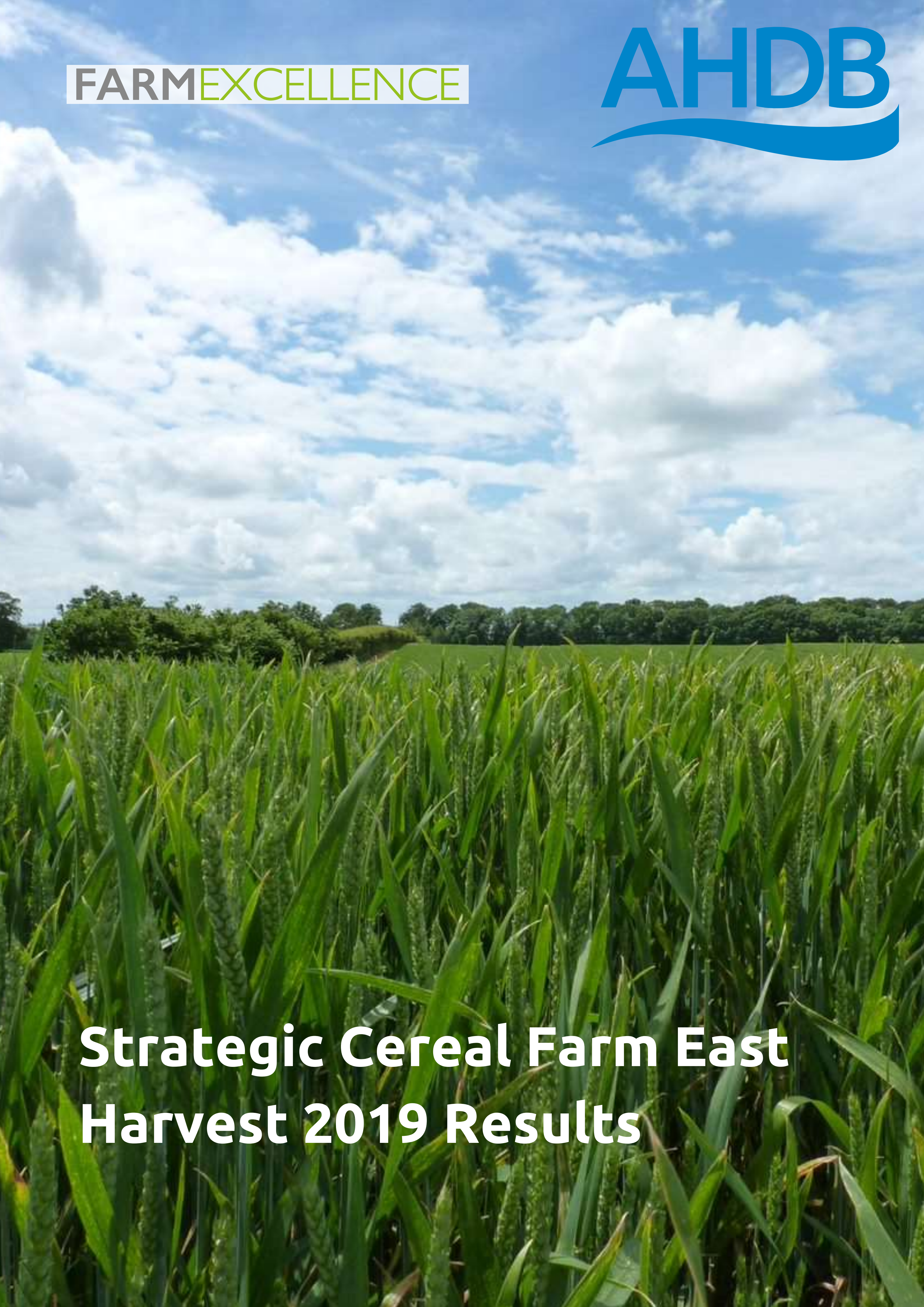


Strategic Cereal Farm East Harvest 2019 Results

Strategic Cereal Farms are a key part of AHDB's Farm Excellence network. They provide a platform to showcase research in practice via a structured combination of short and long term field and farm scale trials.

Each Strategic Cereal Farm runs for six years to allow independent demonstration of research to be conducted across a full rotation.

The farms test and demonstrate new ways of working in a commercial setting. Approaches are subject to full cost-benefit analyses using Farmbench which helps other farmers to assess the possibility of changing approaches on their own farms.

Visit our website for more information on AHDB Farm Excellence network:
ahdb.org.uk/farm-excellence

Contents

Strategic Cereal Farm East

Host farmer:	Brian Barker
Location:	E J Barker & Sons, Lodge Farm, Westhorpe, Stowmarket, Suffolk IP14 4SZ
Duration:	November 2017 – September 2023

Introduction

E.J. Barker & Sons is, a family farm partnership and contracting business in Suffolk which dates back to 1957. The 513ha 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 farm is on a medium to heavy soil type and uses a cultivation strategy appropriate to that field and year, from ploughing to direct drilling.

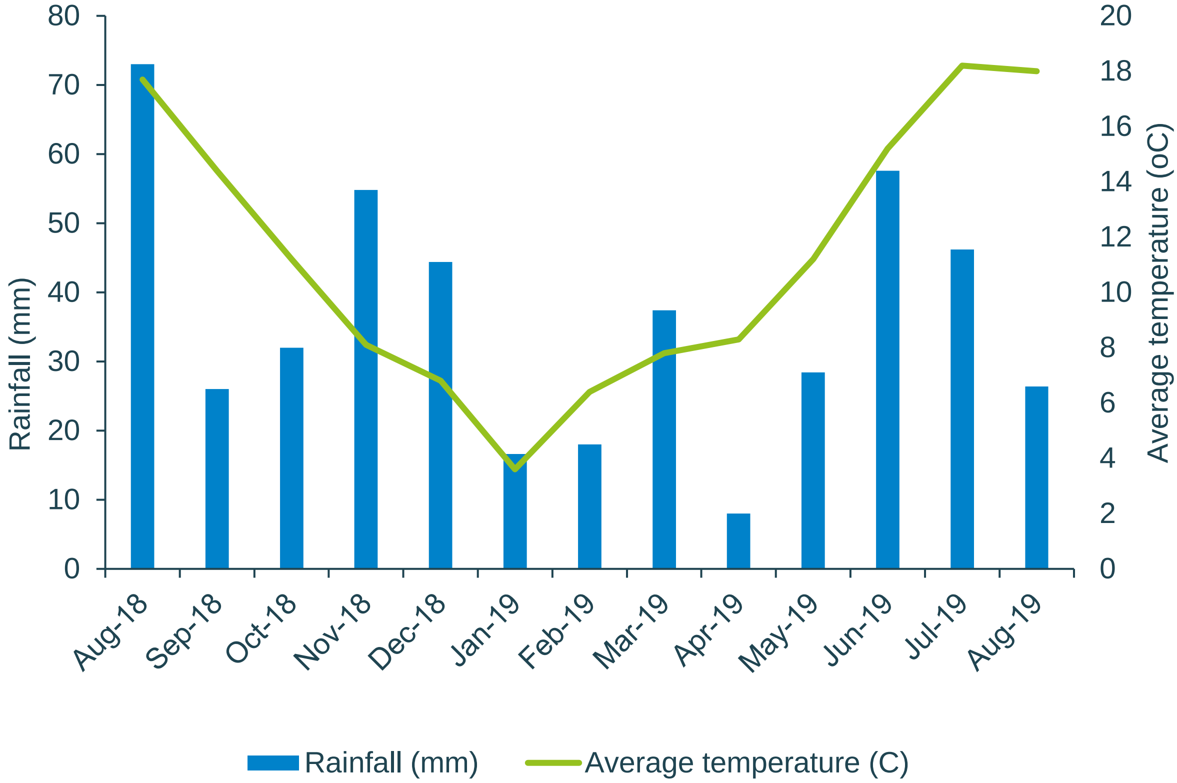
Mission statement
An independent, open and honest platform for UK farmers to see and learn from the integration of research in a practical way within a commercial farming system.

Vision
The vision of the Strategic Farm East is to understand the farmed environment and develop a long-term strategy to increase productivity and produce a high quality 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.

Weather summary

Between 1 August 2018 and 31 August 2019, the Strategic Cereal Farm weather station recorded a total of 417.8 mm of rainfall. The maximum temperature recorded was 35.8°C in July 2019. The minimum temperature recorded was -5.6°C in January 2019.



Timeline

2017-2018

Baselining year
The aim of the first year of the Strategic Cereal Farm project, known as the baselining year, was to determine the starting point of a number of indicators within the farmed environment before any changes are investigated and evaluated. The baselining activities completed at the Strategic Cereal Farm East September 2017 – September 2018 are listed below:

- Weather station
- Soil nutrient analysis
- Soil biology
- Earthworms
- Electrical conductivity scanning
- Water sampling
- Physical soil structure
- Crop biomass monitoring
- Black-grass mapping
- LEAF Sustainability Review

2018-2019

- **Managed lower inputs**: To determine the effect of high, medium, low and untreated fungicide strategies on disease control in varieties with different disease ratings
- **Cover crops**: To determine the role of cover crops in reducing nutrient leaching.
- **Early crop biomass**: To explore ways in which canopy size in late-drilled crops of winter wheat can be enhanced to improve final yield

2019-2020 (proposed demonstrations, subject to change due to ground conditions)

- **Managed lower inputs**: To determine the effect of high, medium, low and untreated fungicide strategies on disease control in varieties with different disease ratings; a continuation of the harvest 2019 demonstration
- **Early crop biomass**: To explore ways in which canopy size in late-drilled crops of winter wheat can be enhanced to improve final yield; a continuation of the harvest 2019 demonstration
- **Cover crops**: To determine the role of cover crops in reducing nutrient leaching; a continuation of the harvest 2019 demonstration
- **Pests and natural enemies**: To look at pest and beneficial insect populations and monitoring across the Strategic Farm
- **Very low inputs**: To determine the effect of reduced pesticide input applications on pest, weed and disease
- **Variable rate nitrogen:** To determine the cost-effectiveness of variable rate nitrogen on high and low biomass areas
- **Repeat baselining:** To monitor soil and crop characteristics through the rotation, including biomass assessments, soil nutrient and biological analysis, earthworm, VESS and pest and natural enemies assessments

Full details about all of the baselining and demonstrations at the Strategic Cereal Farm East are available online: ahdb.org.uk/farm-excellence

The impact of cover crops on nitrogen losses and crop yields

Trial leader: Anne Bhogal, ADAS

With thanks to Essex & Suffolk Water for their contributions to this work through the funding of the water quality testing.

Start date: 25 August 2018

End date: Ongoing

The results demonstrate that a well-established cover crop is effective at improving water quality by bringing nitrate concentrations in drainage water below 50 mg/l.

What was the challenge/demand for the work?

During the first year of the Strategic Cereal Farm East project, a comprehensive baselining assessment was completed, including the analysis of water removed by the field drains under different crops, establishment systems and soil types. Overall, the loss of nutrients under the cover crop was reduced compared to the bare soil of the plough.

It is important to understand if the nitrogen (N) taken up by cover crops will be used by the subsequent cash crops or released and leached later on. Results from the AHDB Maxi-Cover crop project, demonstrated that a good cover crop can recover between 60 to 80 kg N/ha, that would otherwise have been lost over winter (CPM, 2019)). This offers the potential to reduce inputs of manufactured nitrogen fertiliser to the following crop and improve water quality through the use of a cover crop.

How did the project address this?

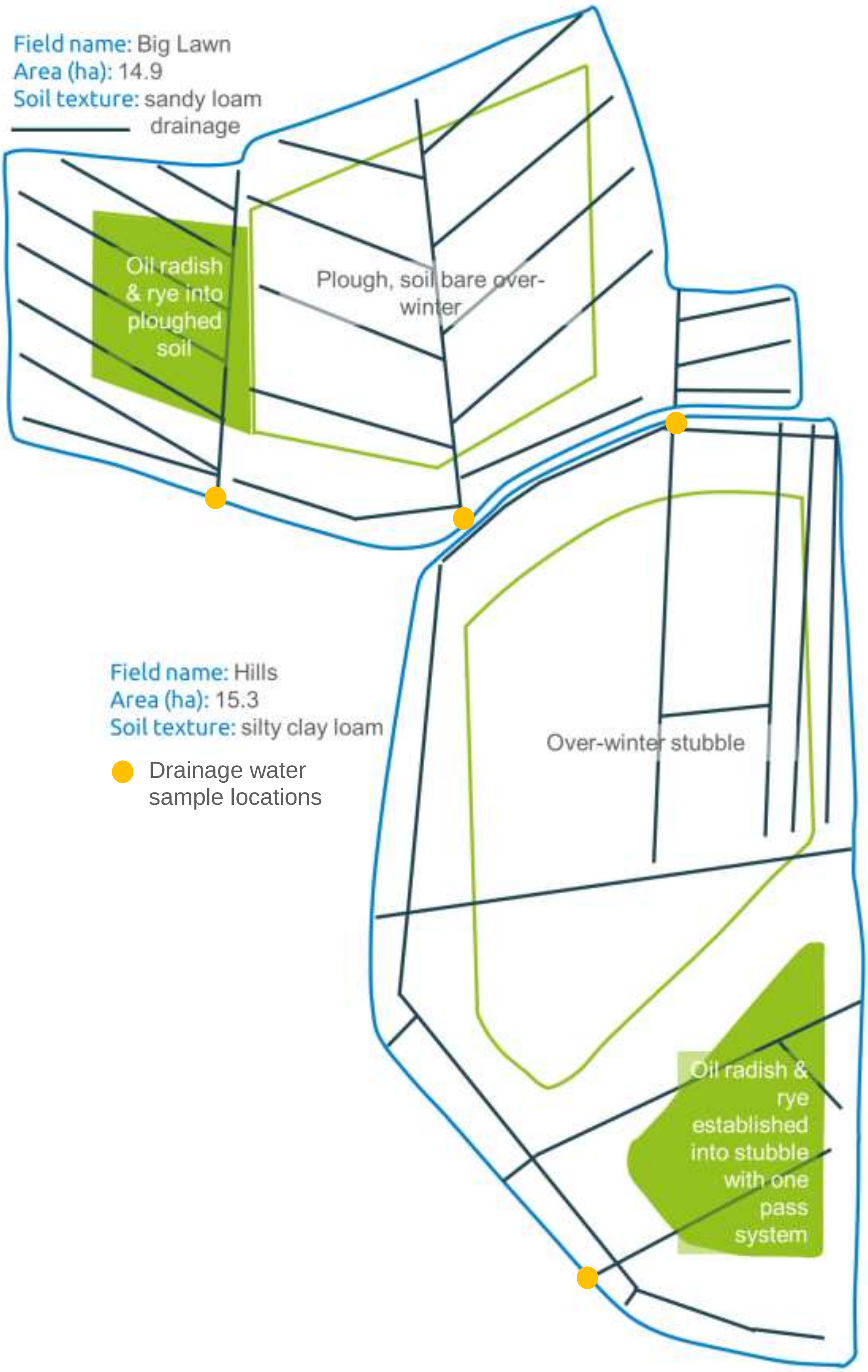
Following the harvest 2018 winter wheat crop, four ground cover treatments were compared across two fields in a split field design. Oil radish and rye cover crop mix was drilled on 25 August 2018 and destroyed using glyphosate on 22 February 2019. Linseed was drilled on 12 April 2019 and winter wheat was drilled on 23 October 2019.

The soils in these fields are Beccles/Ragdale series and have a slowly permeable, heavy textured subsoil.

Each field has two separate drainage systems, allowing drainage water from different treatments to be compared within the same field.

Measurements include:

- autumn and spring Soil Mineral Nitrogen (SMN) (0-90 cm)
- cover crop N uptake
- drainage water assessments
- soil structural assessments: Visual Soil Assessment (VSA), Visual Evaluation of Soil Structure (VESS) and penetrometer resistance
- earthworm numbers
- harvest 2019 spring crop yields and harvest 2020 autumn crop yields

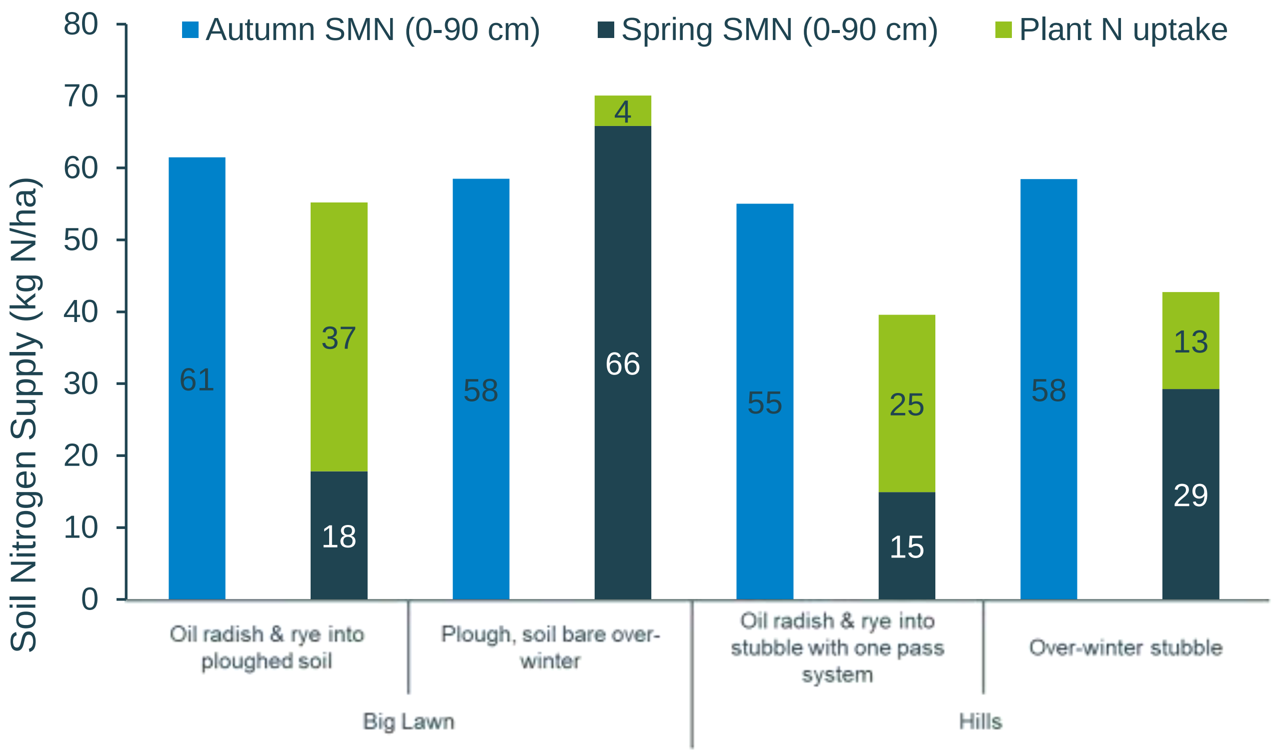

Field name: Big Lawn
Area (ha): 14.9
Soil texture: sandy loam
drainage
Oil radish & rye into ploughed soil
Plough, soil bare over-winter
Field name: Hills
Area (ha): 15.3
Soil texture: silty clay loam
Drainage water sample locations
Over-winter stubble
Oil radish & rye established into stubble with one pass system

What results has the project delivered?

Soil Nitrogen Supply

Soil Mineral Nitrogen (0-90 cm) and above ground biomass nitrogen uptake were measured in autumn 2018 and spring 2019. By March 2019, in Big Lawn the cover crop established into ploughed soil had produced 1.6 t/ha dry matter and taken up approximately 40 kg/ha N. The cover crop established using a one pass system in Hills field had produced 1 t/ha dry matter and had taken up approximately 25 kg/ha N.

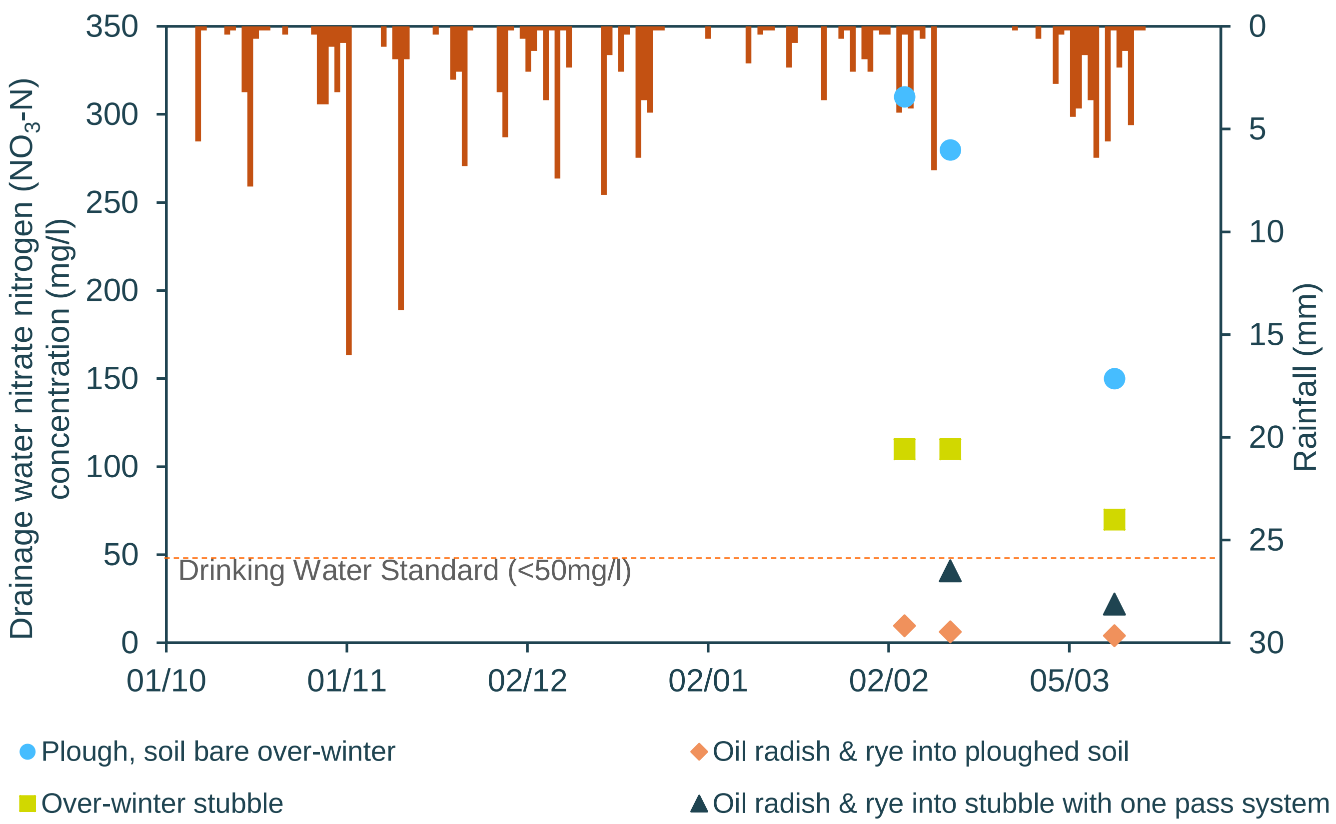
- Do not confuse Soil Nitrogen Supply (SNS) and Soil Mineral Nitrogen (SMN)
- SMN is the measured amount of mineral nitrogen (nitrate-N plus ammonium-N) in the soil profile
- The Measurement Method is not suitable for organic and peaty soils as SNS (due to mineralisation of soil organic matter) is unpredictable
- SNS = an estimate of crop N (at time of sampling) + a measurement of SMN + an estimate of subsequent N mineralisation
- For more information on calculating Soil Nitrogen Supply, download the Nutrient Management Guide (RB209): ahdb.org.uk/rb209



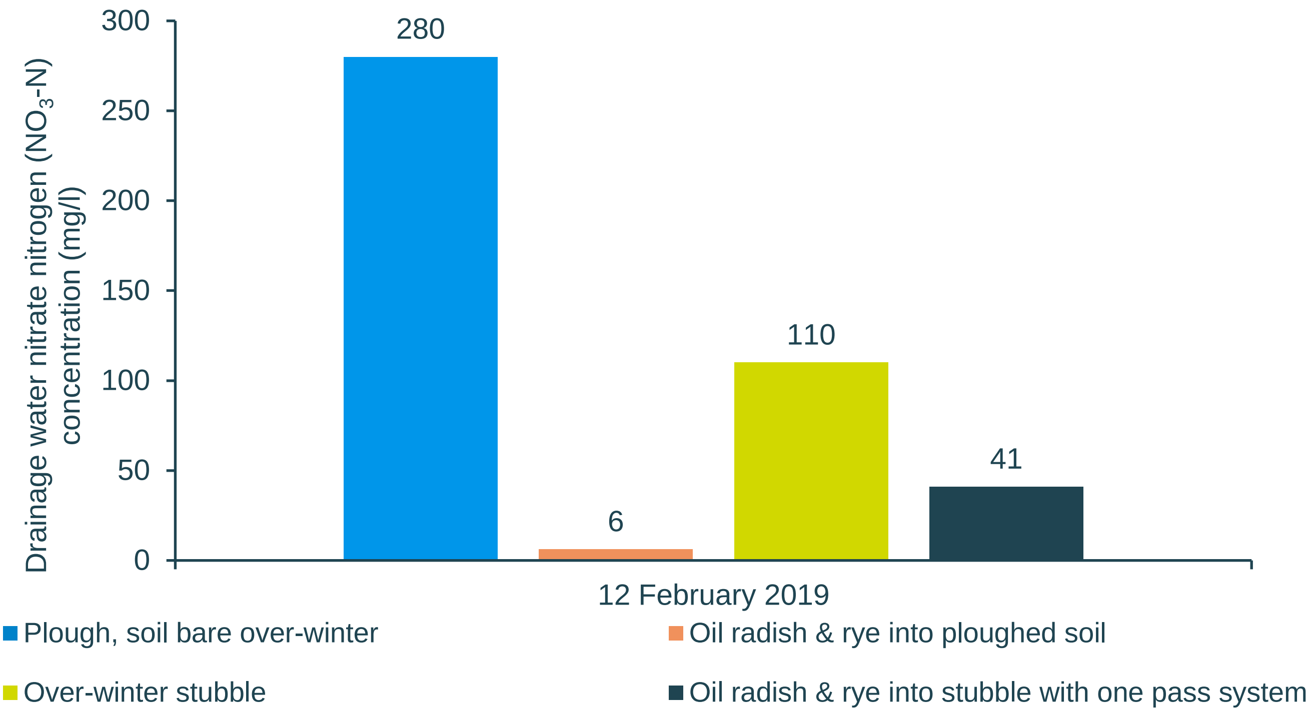
Drainage water assessments

Following the 2018 drought and low winter rainfall (200 mm rain Oct-Mar) drains did not run until February 2019. Daily rainfall from October to March (inclusive) and drainage water nitrate concentrations are shown in the graph below. Where there no cover crop, nitrate concentrations were in excess of 50 mg/l.

2019. Daily rainfall from October to March (inclusive) and drainage water nitrate concentrations are shown in the graph below. Where there no cover crop, nitrate concentrations were in excess of 50 mg/l.



The graph below shows the nitrate nitrogen concentrations (NO_3-N) measured in the drainage water on 2 February 2019.



Soil structural assessments

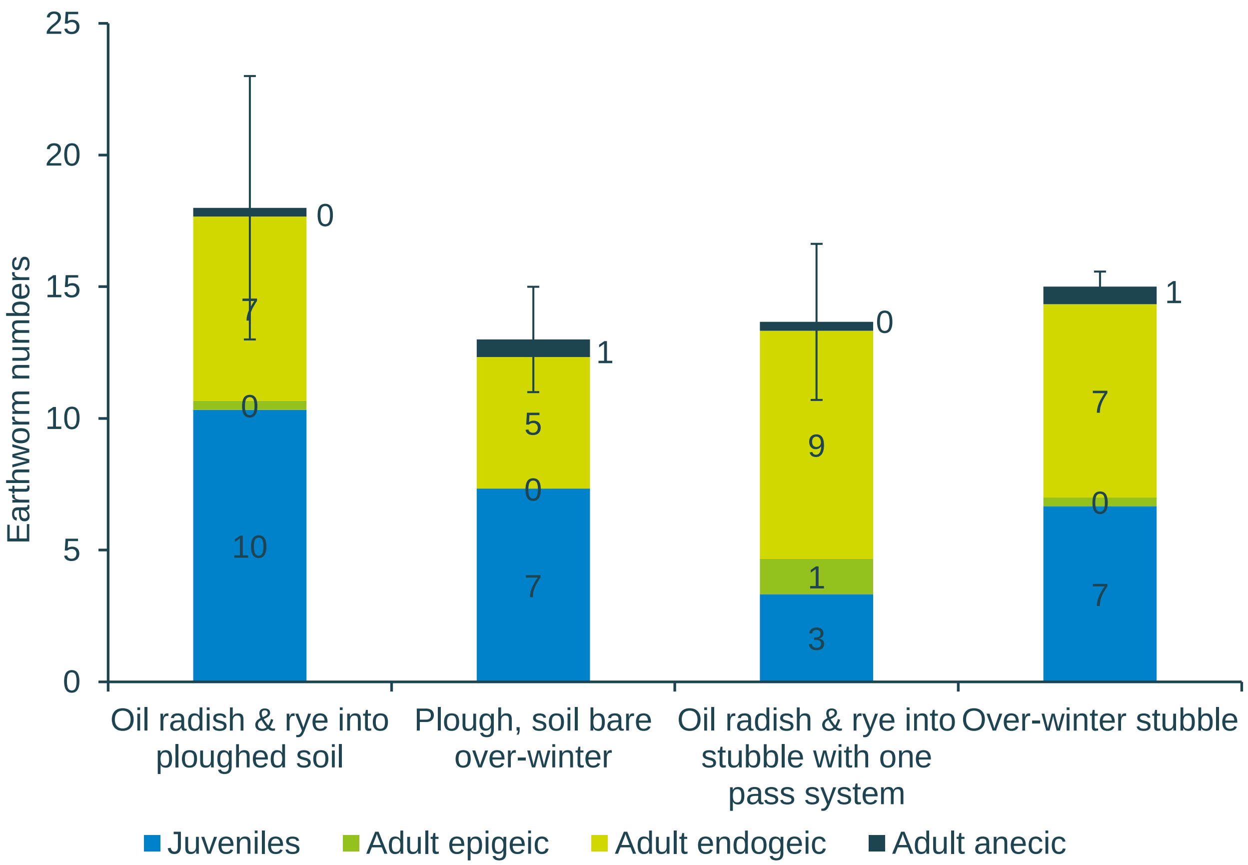
Visual Soil Assessment (VSA), Visual Evaluation of Soil Structure (VESS), penetrometer resistance (MPa) and soil moisture were assessed on 25 March 2019. There were no discernible differences in soil structure between any treatments. However, the Visual Evaluation of Soil Structure (VESS) and Visual Soil Assessment (VSA) scores indicated that soil structural condition on Big Lawn was slightly better than on Hills; this was also seen in the penetration resistance measurements.

Field	Big Lawn		Hills	
Treatment	Oil radish & rye into ploughed soil	Plough, soil bare over-winter	Oil radish & rye into stubble with one pass system	Over-winter stubble
VSA Mean score & class	26 ‘Good’	25 ‘Good’	22 ‘Moderate’	23 ‘Moderate’
VESS Limiting layer score	2	2	3	3
VESS Depth of limiting layer (cm)	9-12	10-24	8–22	9-25
Soil moisture (%) 0-30 cm	25	24	23	25
Penetrometer resistance (MPa)	0.9	0.8	1.4	1.3
Bulk density (g /cm^3) 5-10cm	1.41	1.49	1.52	1.47

- VESS limiting layer score is the maximum score recorded to 25cm depth; here this layer was located at 8-10cm depth and extended to 25cm depth in all but the cover crop treatment in Big Lawn field where it occurred between 9 and 12cm depth. Scores of 1 or 2 indicate good soil structure (friable/intact); a score of 3 indicates moderate structure (firm) and scores of 4 or 5 poor soil structure (compact or very compact)
- Maximum penetrometer resistance to 40cm depth; root growth becomes restricted at resistances > 1.25 MPa and severely restricted at resistances > 2MPa
- Root growth can be restricted at high bulk densities, with threshold values depending on the soil organic matter content (SOM). At a SOM content of 2.5-2.8%, the threshold value is 1.35 g/cm^3 (little or no soil compaction), with values in the range 1.35-1.5 g/cm^3 indicating moderate levels of soil compaction

Earthworm numbers

A good number of earthworms were recorded across both fields (i.e. more than 8 per pit), mainly comprising juvenile and adult endogeic (topsoil) earthworms. The absence/low numbers of epigeic (surface/litter dwelling) and anecic (deep-dwelling) worms indicates an un-balanced community structure and some earthworm-mediated soil functions may be compromised. The graph below shows the number of earthworms by functional group. The error bars represent the standard error of the mean number of total earthworms, calculated across the sampling zones.



Harvest 2019 spring crop yields

Big Lawn – Plough

- Mean yield measured within the cover crop area was *c.*0.3 t/ha *greater* (95% confidence interval = ± 0.22 t/ha) than the ploughed treatment at 1.7 t/ha
- The Strategic Cereal Farm East 2017 soil structural baselining survey, drainage maps, previous cropping and lodging of the linseed crop, indicate that these are likely to explain the difference in yield.

Hills – Over-winter stubble

- Mean yield measured within the cover crop area was *c. 0.9* t/ha *lower* (95% confidence interval = ± 0.12 t/ha) than the stubble treatment at 2.73 t/ha
- It is unclear why linseed yields were reduced following the cover crop; typical causes for reductions in crop yield following cover cropping can include: poor crop establishment, disease or pest carry-over

Costings

	Plough - Linseed	Plough - Cover crop - Linseed	Over-winter stubble - Linseed	Over-winter stubble - Cover crop - Linseed
Yield (t/ha)	1.74	2.04	2.73	1.79
Price (£/t)	345	345	345	345
Variable Costs				
Cover crop costs (£/ha)	0	44	0	44
Seed costs (£/ha)	96	96	96	96
Total fertilisers (£/ha)	23	23	23	23
Total crop protection (£/ha)	42	42	42	42
Total variable costs (£/ha)	160	204	160	204
Gross margin (£/ha)	440	500	782	414
Fixed costs				
Total labour, machinery and equipment (£/ha)	133	183	121	185
Total property and energy costs (£/ha)*	30	30	30	30
Total administration costs (£/ha)*	20	20	20	20
Cost of production (per hectare)				
Full economic cost of production (£/ha)	343	437	331	440
Full economic net margin (£/ha)	257	267	610	178
Cost of production (per tonne)				
Full economic cost of production (£/t)	**197**	**214**	**121**	**246**

These costs are the East regional averages from Farmbench for feed wheat for harvest 2018. NB: All figures exclude subsidy payments, rent and finance

Action points for farmers and agronomists

The results demonstrate that a well-established cover crop is effective at taking up nitrogen and improving water quality by reducing nitrate concentrations in drainage water. When choosing the right cover crop for your system, it is important to take into consideration:

1) overall aim of cover cropping
2) soil type
3) rotational conflicts (e.g. carryover of pests and diseases)
4) timing & method of cover crop sowing & destruction

Links to further information and references

- AHDB Maxi cover crop project: cereals.ahdb.org.uk/publications/2017/january/11/maximising-the-benefits-from-cover-crops-through-species-selection-and-crop-management-(maxi-cover-crop).aspx
- AHDB (2015). Opportunities for cover crops in conventional arable rotations. Information Sheet 41
- Crop production magazine (2019). A clearer course for cover crops
- SRUC. Visual Evaluation of Soil Structure Score Card

Using starter fertiliser to boost early season crop biomass in winter wheat

Trial leader: Will Smith, NIAB

Start date: 12 October 2018

End date: 24 August 2019

Using a starter fertiliser may improve initial crop establishment in late-sown crops, with placement alongside the seed tending to give the best results. There is limited evidence to show that using starter fertilisers will contribute to substantial and consistent improvements in yield.

What was the challenge/demand for the work?

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.

The aim of this trial is 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 and BYDV pressure.

Previous work, particularly the YEN project, has indicated that higher biomass crops have a greater potential to be higher yielding crops as they are able to absorb more energy from sunlight and put this into the grain. Reducing tillage intensity and later drilling dates are both linked to reduced early crop biomass, so it is valuable to find ways to maximise plant growth in later-drilled crops.

How did the project address this?

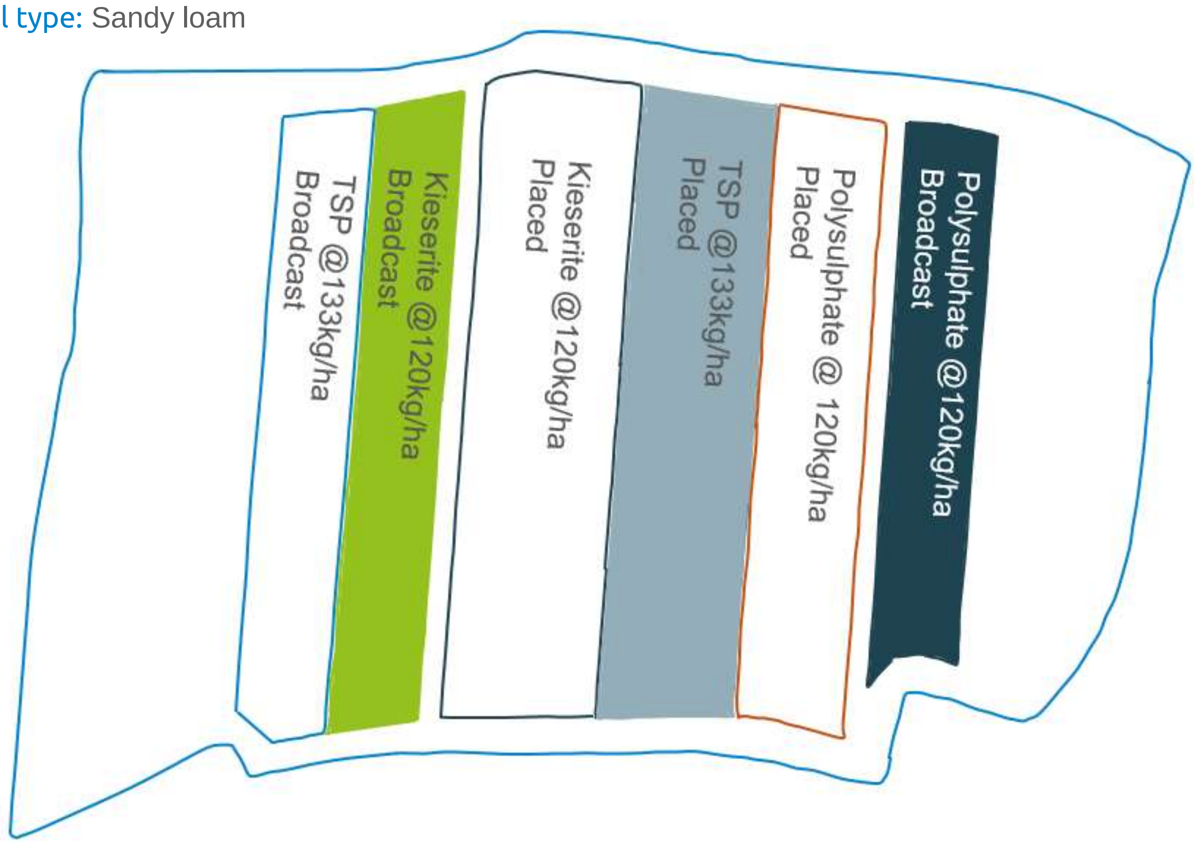
A range of granular fertilisers were applied by either being placed alongside the seed or broadcast shortly after drilling. Measurements were taken throughout the growing season to determine the immediate and residual effects of the starter fertiliser.

Measurements include:

- crop population
- tiller population
- crop biomass
- final crop yield

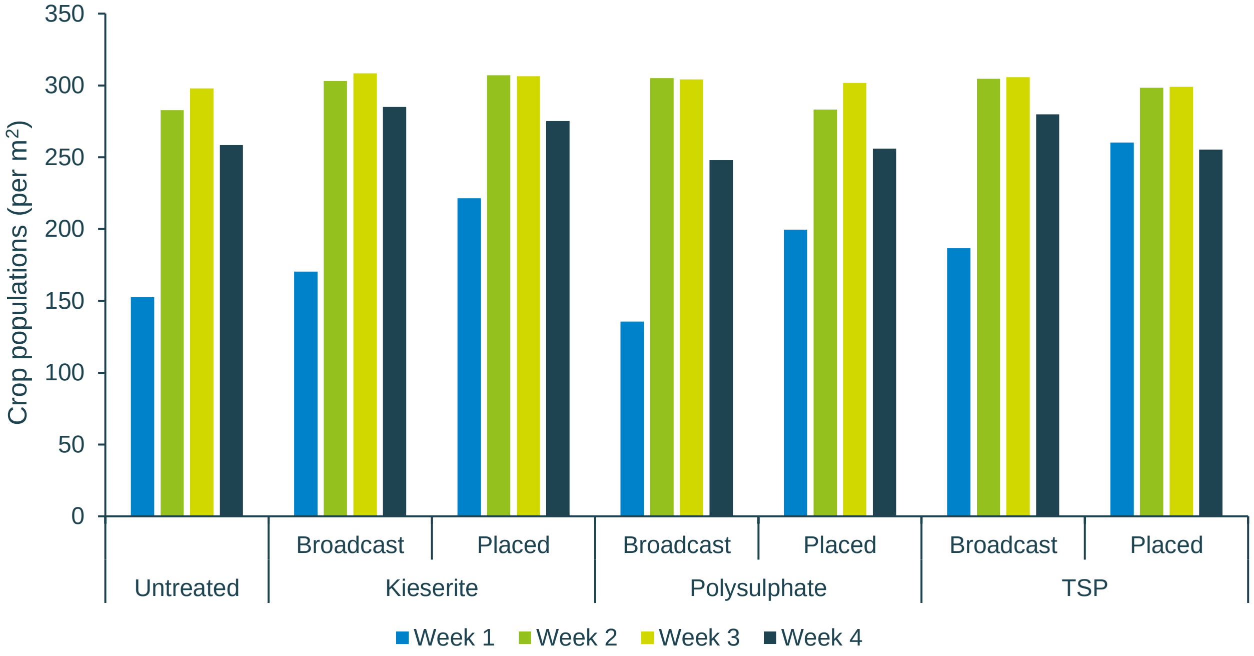
Where possible, measurements were replicated over time to account for field variation. All other inputs were kept the same and analysis has attempted to take into account soil variation.

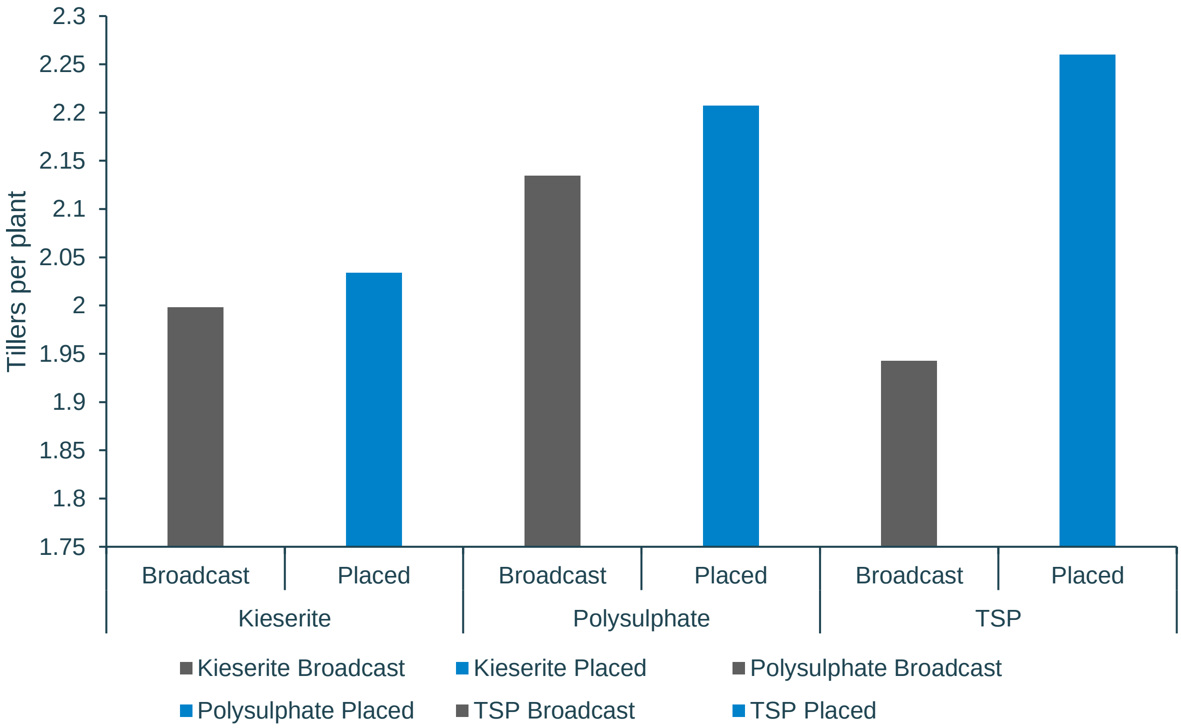
Field name: Barn Field
Size:
Soil type: Sandy loam



What results has the project delivered?

Where starter fertiliser was placed alongside the seed, there was an increase in plant counts within the first week immediately after crop establishment. Placed TSP increased crop populations by 74 plants per m^2 compared to broadcast TSP, while the placed polysulphate and kieserite increased by populations by 64 and 52 plants per m^2, respectively. The effects of the starter fertiliser on crop population were short-lived and all plots stabilised by the following week.

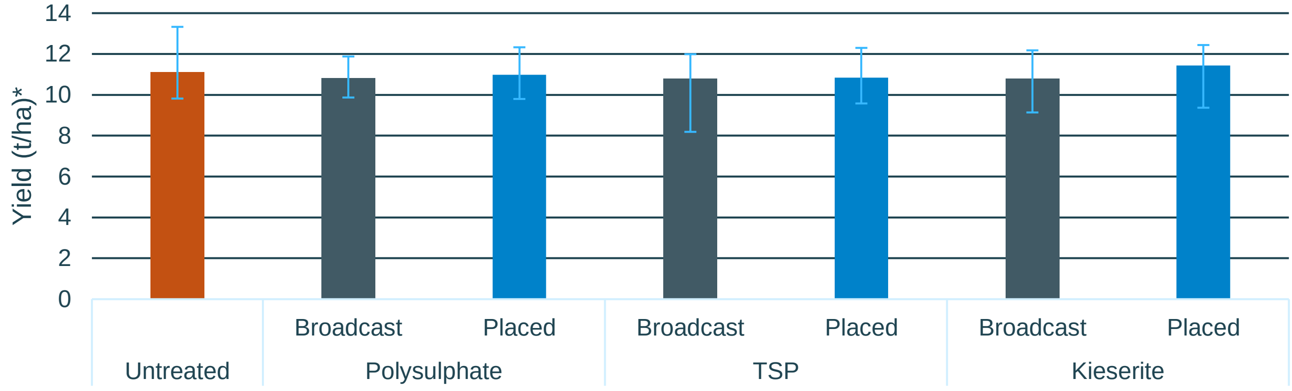




Tillers per plant at week 4, were elevated where starter fertilisers were placed, with placed TSP having the largest number. However, the early tillering did not correlate to final yield.

There were small increases in crop yield associated with the use of placed starter fertiliser compared to broadcast fertiliser. There was so significant difference is yields between placed starter fertiliser and broadcast fertiliser.

The exception was the response to using placed kieserite, which appears extremely exaggerated in relation to all other metrics recorded throughout the trial, which asks the question of where has this yield come from?



**Crop yields (t/ha) have been adjusted to 15% moisture content*

It must be noted, however, that a standard nitrogen programme was used across all of the treatments in the spring, at the farm standard. If the different treatments had received a differing amount of nitrogen later in the season, based on their biomass from the starter fertiliser, this could have altered the final yield potential?

Costings

	Untreated	Polysulphate - Broadcast	Polysulphate - Placed	TSP - Broadcast	TSP - Placed	Kieserite- Broadcast	Kieserite - Placed
Yield (t/ha)	11.11	10.82	10.99	10.80	10.85	10.80	11.44
Price (£/t)	129	129	129	129	129	129	129
Variable Costs							
Total seed costs (£/ha)	48	48	48	48	48	48	48
Starter fertiliser (£/ha)	0	19	19	46	46	32	32
Fertiliser and trace elements (£/ha)	230	230	230	230	230	230	230
Total crop protection (£/ha)	200	200	200	200	200	200	200
Total variable costs (£/ha)	477	496	496	523	523	509	509
Gross margin (£/ha)	956	900	921	870	877	884	967
Fixed costs							
Total labour, machinery and equipment (£/ha)	506	514	506	514	506	514	506
Total property and energy costs (£/ha)*	30	30	30	30	30	30	30
Total administration costs (£/ha)*	20	20	20	20	20	20	20
Cost of production (per hectare)							
Full economic cost of production (£/ha)	1,033	1,060	1,052	1,087	1,079	1,073	1,065
Full economic net margin (£/ha)	400	336	366	307	321	321	411
Cost of production (per tonne)							
Full economic cost of production (£/t)	93	98	96	101	99	99	93

**These costs are the East regional averages from Farmbench for feed wheat for harvest 2018. NB: All figures exclude subsidy payments, rent and finance.*

Action points for farmers and agronomists

Consider the use of starter fertiliser in late-sown crops or in conditions where slug presence is common e.g. high trash levels or cloddy seedbeds, to improve initial crop establishment.

If possible, starter fertiliser should be placed alongside the seed to give best results. If broadcasting, then product choice is extremely important and mobility is a very important property to be considered.

Links to further information/ references

Nkebiwe, P. M., et al. (2016). "Fertilizer placement to improve crop nutrient acquisition and yield: A review and meta-analysis." Field Crops Research 196: 389-401.

The effect of reduced fungicide applications on yield of varieties with different disease resistance ratings

Trial leader: Paul Gosling, AHDB

Start date: 2 October 2019

End date: 7 August 2019

Based on the results from harvest 2019, growing more resistant varieties with low fungicide inputs gave the best net margin. However, this was a single year with moderate disease pressure. Varieties that are more resistant do nevertheless reduce risk to the business, as even in a high disease pressure year they will suffer less of a yield loss.

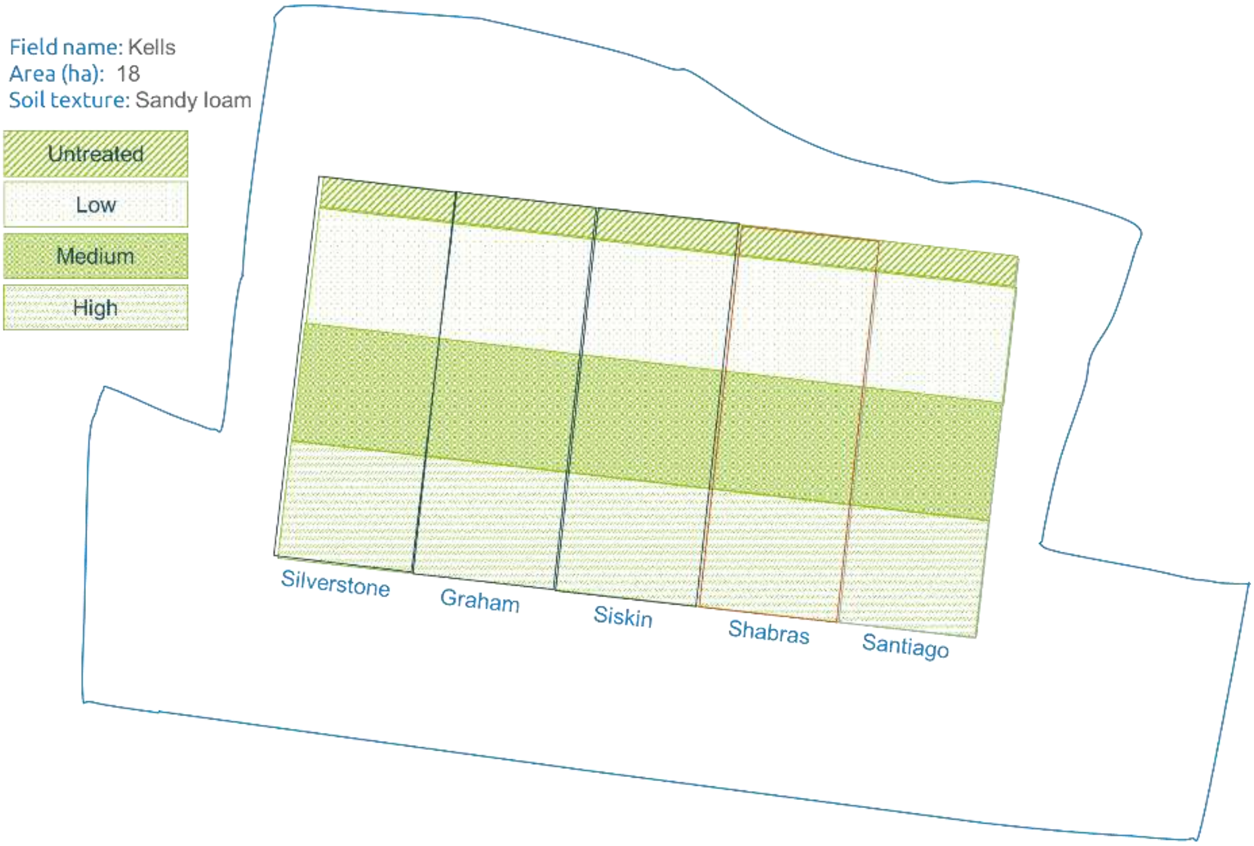
What was the challenge/demand for the work?

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 varieties that are more resistant. The AHDB Recommended List has raised minimum standards for variety disease resistance, which potentially enables the reduced use of, and thus pressure on, fungicides.

The aim of this demonstration is to determine the effect of high, medium and low fungicide strategies on disease control and cost of production of varieties with different resistance ratings.

How did the project address this?

Five varieties were drilled on 2 October 2018 and managed throughout the season under four fungicide input regimes. Graham and Siskin were selected as they are cleaner varieties in the AHDB Recommended Lists trials.



Crop assessments

- Monthly plant counts from emergence to harvest
- Record of growth stage on each assessment date
- Normalised Difference Vegetation Index (NDVI)

Disease assessments

All varieties were assessed for foliar disease and GLA at:

- T0 timing to determine over winter disease pressure
- T1 = Leaf 3 emerged (GS32) on the majority of shoots.
- T2 = Flag leaf emergence (GS37-39)
- T2 + three weeks (=T1 + six weeks)
- T2 + six weeks
- Stem base disease at GS31-32 and GS75
- Ear diseases at GS85

Input programme

Application Date	Untreated	Low Input		Mid Input		High Input	
		Product (Active)	**Rate**	**Product (Active)**	**Rate**	**Product (Active)**	**Active**
26/02/2019				Headland Boron 15%	0.5l	Headland Boron 15%	0.5l
				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	Cherokee *(Chlorothalonil, cyproconazole and propiconzole)*	1l	Cherokee *(Chlorothalonil, cyproconazole and propiconzole)*	1l
		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	Amistar Opti *(Azoxystrobin and chlorothalonil)*	1l	Wolverine *(Metconazole and xemium)*	1l
		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	Headland Complex *(N, P, K, sulphur, magnesium, manganese, copper, zinc, iron, boron and molybdenum)*	3kg
				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	Bugle *(Fluxapyroxad)*	1.01l	Elatus Era *(Benzovindiflupyr and prothioconazole)*	1l
				Mendoza *(Expoxiconazole)*	0.5l	Bravo 500 *(Chlorothalonil)*	1l
				Bravo 500 *(Chlorothalonil)*	1l		
T3 (09/06/2019)				Tubosan *(Tebuconazole)*	1l	Firefly *(Prothioconazole and fluoxastrobin)*	1l
						Scyon *(Unium biostimulant)*	1l
Total Spend	**£0**	**£31**		**£80**		**£122**	

What results has the project delivered?

Varieties that are more resistant held onto green leaf area for longer, under all fungicide regimes. Differences in visual symptoms only became evident after T3 and lush crops with higher tiller numbers held more diseases. In resistant varieties, there was a low response to increasing fungicide spend. Although the highest yield was seen in Siskin in the high input regime, the best Net margin for cost of production was Graham in a low input situation.

Costings

	Graham - Untreated	Graham - Low Input	Graham - Medium	Graham - High Input	Santiago - Untreated	Santiago - Low Input	Santiago - Medium	Santiago- High Input	Shabras - Untreated	Shabras - Low Input	Shabras - Medium	Shabras - High Input
Yield (t/ha)	**10.16**	**11.59**	**11.83**	**12.13**	**7.35**	**9.52**	**11.22**	**11.03**	**8.55**	**9.52**	**11.52**	**11.03**
Price (£/t)	129	129	129	129	129	129	129	129	129	129	129	129
Variable Costs												
Total seed costs (£/ha)	63	63	63	63	63	63	63	63	63	63	63	63
Total fertilisers, trace elements and biostimulants (£/ha)	185	187	213	242	185	187	213	242	185	187	213	242
Fungicides (£/ha)	*0*	*31*	*80*	*122*	*0*	*31*	*80*	*122*	*0*	*31*	*80*	*122*
Total crop protection (£/ha)	89	129	179	221	89	129	179	221	89	129	179	221
Total variable costs (£/ha)	337	380	455	526	337	380	455	526	337	380	455	526
Gross margin (£/ha)	**974**	**1,116**	**1,071**	**1,039**	**611**	**848**	**992**	**897**	**766**	**848**	**1,031**	**897**
Fixed costs												
Total labour, machinery and equipment (£/ha)	197	217	236	236	197	217	236	236	197	217	236	236
Total property and energy costs (£/ha)*	30	30	30	30	30	30	30	30	30	30	30	30
Total administration costs (£/ha)*	20	20	20	20	20	20	20	20	20	20	20	20
Cost of production (per hectare)												
Full economic cost of production (£/ha)	584	647	742	812	584	647	742	812	584	647	742	812
Full economic net margin (£/ha)	**726**	**849**	**784**	**753**	**364**	**582**	**706**	**611**	**519**	**582**	**744**	**611**
Cost of production (per tonne)												
Full economic cost of production (£/t)	**58**	**56**	**63**	**67**	**80**	**68**	**66**	**74**	**68**	**68**	**64**	**74**

These costs are the East regional averages from Farmbench for feed wheat for harvest 2018

NB: All figures exclude subsidy payments, rent and finance

	Silverstone - Untreated	Silverstone - Low Input	Silverstone - Medium Input	Silverstone - High Input	Siskin - Untreated	Siskin - Low Input	Siskin - Medium Input	Siskin - High Input
Yield (t/ha)	**9.57**	**10.71**	**11.47**	**11.68**	**9.66**	**11.45**	**11.62**	**12.28**
Price (£/t)	129	129	129	129	129	129	129	129
Variable Costs								
Total seed costs (£/ha)	63	63	63	63	63	63	63	63
Total fertilisers, trace elements and biostimulants (£/ha)	185	187	213	242	185	187	213	242
Fungicides (£/ha)	*0*	*31*	*80*	*122*	*0*	*31*	*80*	*122*
Total crop protection (£/ha)	89	129	179	221	89	129	179	221
Total variable costs (£/ha)	337	380	455	526	337	380	455	526
Gross margin (£/ha)	**898**	**1,002**	**1,025**	**981**	**909**	**1,097**	**1,044**	**1,058**
Fixed costs								
Total labour, machinery and equipment (£/ha)	197	217	236	236	197	217	236	236
Total property and energy costs (£/ha)*	30	30	30	30	30	30	30	30
Total administration costs (£/ha)*	20	20	20	20	20	20	20	20
Cost of production (per hectare)								
Full economic cost of production (£/ha)	584	647	742	812	584	647	742	812
Full economic net margin (£/ha)	**650**	**735**	**738**	**694**	**662**	**830**	**757**	**772**
Cost of production (per tonne)								
Full economic cost of production (£/t)	**61**	**60**	**65**	**70**	**60**	**56**	**64**	**66**

These costs are the East regional averages from Farmbench for feed wheat for harvest 2018

NB: All figures exclude subsidy payments, rent and finance

Action points for farmers and agronomists

Newer, more resistant varieties demand new thinking. Use them as insurance against difficult weather conditions at spraying or take the opportunity to reduce inputs and save cost? A blanket approach to fungicide programmes no longer makes sense, but you must assess your own attitude to risk.

Links to further information and references

Combining agronomy, variety and chemistry to maintain control of septoria tritici in wheat (Project number: 2140003105): https://cereals.ahdb.org.uk/publications/2016/january/05/combining-agronomy,-variety-and-chemistry-to-maintain-control-of-septoria-tritici-in-wheat.aspx

Keep up to date

- **Visit ahdb.org.uk/farm-excellence for the latest information**
- **Read blogs with Strategic Farm updates: cereals-blog.ahdb.org.uk/**
- **Follow #strategicfarm on Twitter**

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FARMBENCH

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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