

Strategic Cereal Farm East Results Day

26th November 2019

Rowley Mile Racecourse, Newmarket, Suffolk



Strategic Farm East







Before we start...















@AHDB_Cereals
@The_Barker_Boys
@emilypope_KT
 @CerealsEA

#strategicfarm

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Agen	da	AHDB
10:00	Welcome and Introductions	Teresa Meadows
10:05	Overview of harvest 2019 demonstrations	Brian Barker, Strategic Farm East Host
10:20	Demonstration WorkshopsManaged lower inputsCover cropsBoosting early crop biomass	All
11:10	REFRESHM	IENT BREAK
11:30	Demonstration WorkshopsManaged lower inputsCover cropsPests and natural enemies	All
12:20	Strategic Farm West – Introduction and demonstrations	Rob Fox, Strategic Farm West Host
12:40	Harvest 2020 Demonstrations	Emily Pope, AHDB
12:55	Closing remarks	Teresa Meadows
13:00	LU	NCH





Results Day 26th November 2019

Strategic Farm East – It was alright in the end!

Brian Barker - E.J. Barker & Sons



The gamble that is farming



We gamble every year not knowing what we'll get and every year is different!!



How do you manage that risk? What is your attitude to risk?









Thinking of the bigger picture

'Attention to detail'

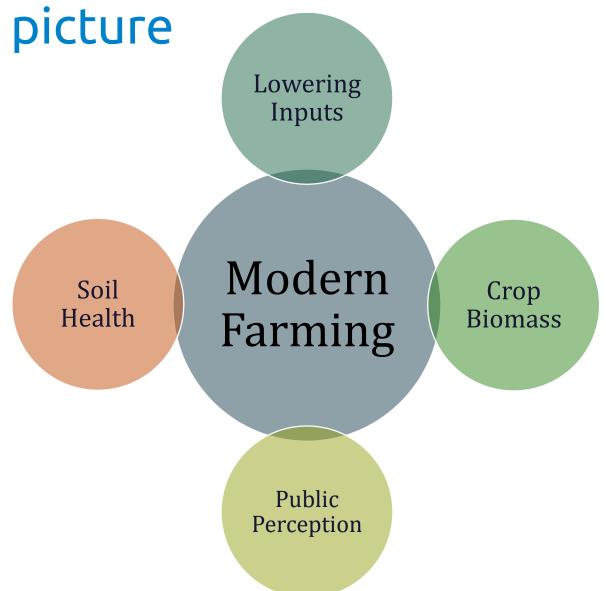
'Listen to the industry'

'Open and Honest'

'Looking for trends'

'Won't find every silver bullet'

'Develop a story for industry to follow'

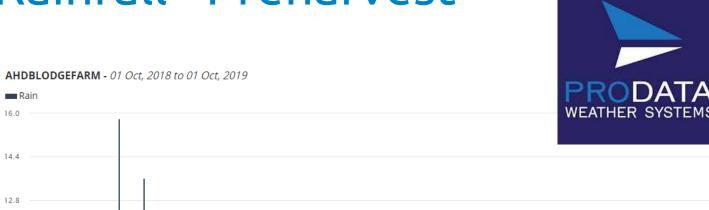


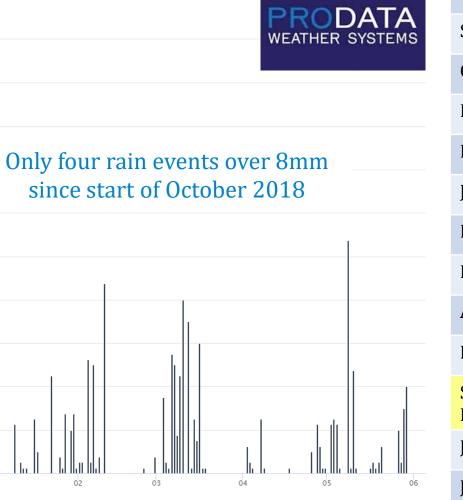
Rainfall - Preharvest

Rain 16.0

3.2

1.6





Month	2016- 17 Rain (mm)	2017- 18 Rain (mm)	2018- 19 Rain (mm)
August	30.0	73.2	68.8
September	35.6	66.2	26.0
October	33.1	14.5	32.0
November	67.5	21.2	54.8
December	22.0	84.8	44.4
January	30.8	49.4	16.8
February	29.1	43.0	18.0
March	32.2	57.2	37.4
April	13.6	48.4	8.0
May	40.5	18.0	24.4
Sub Total (Aug – May)	334.4	457.9	330.6
June	61.0	4.2	?
July	39.4	32.2	?

Dripping June?



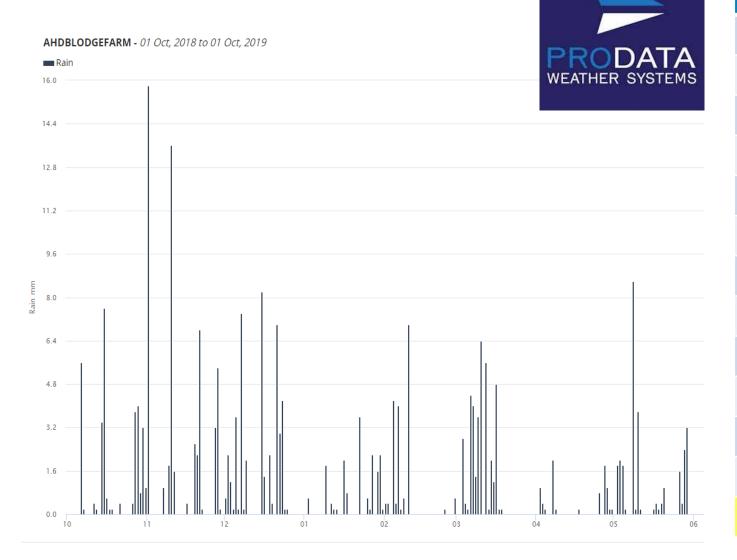
"A dripping June puts everything in tune!"





Month	2016- 17 Rain (mm)	2017- 18 Rain (mm)	2018- 19 Rain (mm)
August	30.0	73.2	68.8
September	35.6	66.2	26.0
October	33.1	14.5	32.0
November	67.5	21.2	54.8
December	22.0	84.8	44.4
January	30.8	49.4	16.8
February	29.1	43.0	18.0
March	32.2	57.2	37.4
April	13.6	48.4	8.0
May	40.5	18.0	24.4
Sub Total (Aug – May)	334.4	457.9	330.6
June	61.0	4.2	?
July	39.4	32.2	

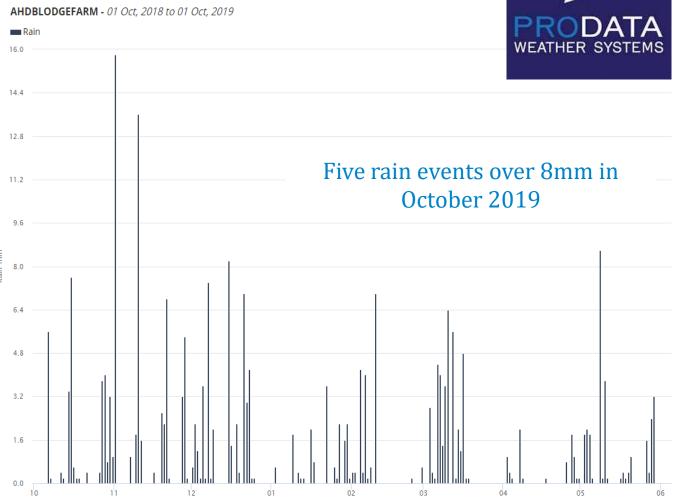
Rainfall - Comparison



Month	2016- 17 Rain (mm)	2017- 18 Rain (mm)	2018- 19 Rain (mm)
August	30.0	73.2	68.8
September	35.6	66.2	26.0
October	33.1	14.5	32.0
November	67.5	21.2	54.8
December	22.0	84.8	44.4
January	30.8	49.4	16.8
February	29.1	43.0	18.0
March	32.2	57.2	37.4
April	13.6	48.4	8.0
May	40.5	18.0	24.4
June	61.0	4.2	57.6
July	39.4	32.2	46.2
Total (Harvest to Harvest)	434.8	494.3	434.4

Rainfall - Today





Month	2016- 17 Rain (mm)	2017- 18 Rain (mm)	2018- 19 Rain (mm)	2019- 20 Rain (mm)
August	30.0	73.2	68.8	26.2
September	35.6	66.2	26.0	48.0
October	33.1	14.5	32.0	74.0
November	67.5	21.2	54.8	37.8*
December	22.0	84.8	44.4	
January	30.8	49.4	16.8	
February	29.1	43.0	18.0	
March	32.2	57.2	37.4	
April	13.6	48.4	8.0	
May	40.5	18.0	24.4	
June	61.0	4.2	57.6	
July	39.4	32.2	46.2	
Total (Harvest to Harvest)	434.8	494.3	434.4	

Crop report 2018/19

- Winter cereals
 - Better potential early
 - More dry Matter in less shoots
 - Autumn Black grass control good
 - Spring Black grass flush uncontrollable for past two years.
 - Disease pressure Low; Septoria low, Rust pressure late.
 - A good grain fill and lots of sunshine

- Spring Breaks
 - Dry late establishment
 - Increased seed rates due to late start
 - Grazed cover crops helped with planting
 - High pest pressure
 - Lots of Sunshine
 - Rain/Wind caused Linseed lodging
 - Canary Seed Failed; Black grass and Slugs!

'Farming to Potential not hope'

							04- 01	Sh + G	- /5 6						B 41 - 1 . 4 1	l Cl t C	/	·!\		
					T		8th April	Shoot Count	s (End of Co	nstruction)	T				Mid Apri	Shoot Coun	ts (Construct	tion ratio)		
Average Estimated Yield t/ha	Field	Row width cm	Variety	Estimated Yield t/ha	Theoretical Yield Lost to date T/ha	Shoot Count Date	Average Shoots along 50cm	Shoots per m2	Shoots per Plant	Estimated Yield t/ha	Theoretical Yield Lost to date T/ha	Shoot Count Date	Major Shoots along 50cm	Minor Shoots along 50cm	Shoot Tillers %	Minor Shoot %	Total along 50cm	Shoots per m2	Shoots per Plant	Estimated Yield t/ha
11.3	Drome	20	Siskin	10.7	0.7	26/03/2018	102	1020	3.8	11.9	0.4	23/04/2018	70.0	32.0	69%	31%	102.0	1020	4	11.9
10.4	Back Ash	20	Siskin	10.4	0.7	26/03/2018	89	890	3.4	10.3	-0.8	23/04/2018	52.0	37.0	58%	42%	89.0	890	3.1	9.4
10.3	School	20	Siskin	10.5	0.7	26/03/2018	87	870	3.3	10.1	-1.2	23/04/2018	48.0	39.0	55%	45%	87.0	870	3.0	8.9
10.9	Retter	33	Revelation	11.6	0.8	04/04/2018	147	891	3.0	10.1	-2.3	23/04/2018	89.0	58.0	61%	39%	147.0	891	2.8	9.4
11.5	Green Farm	33	Revelation	11.7	0.8	04/04/2018	173	1048	3.4	11.9	-0.6	23/04/2018	86.0	87.0	50%	50%	173.0	1048	3.2	10.0
9.9	Cartway	33	Revelation	9.7	0.7	03/04/2018	159	964	3.8	10.9	0.5	23/04/2018	70.0	89.0	44%	56%	159.0	964	3.6	8.6
8.8	Homelodge	33	Revelation	8.5	0.6	03/04/2018	124	752	3.4	8.5	-0.5	23/04/2018	60.0	64.0	48%	52%	124.0	752	3.2	7.0
9.1	Little Guinea Row	33	Revelation	8.8	0.6	04/04/2018	125	758	3.3	8.6	-0.8	23/04/2018	60.0	65.0	48%	52%	125.0	758	3.1	7.1
10.8	Long Thurlow	33	Siskin	9.7	0.7	04/04/2018	164	994	4.0	11.6	1.2	23/04/2018	94.0	70.0	57%	43%	164.0	994	3.8	10.4
11.2	Allotments	33	Siskin	11.7	0.8	04/04/2018	152.7	925	3.1	10.8	-1.8	23/04/2018	88.0	64.7	58%	42%	152.7	925	2.9	9.7
10.3	Wallys	33	Graham	9.3	0.7	04/04/2018	150.7	913	3.8	10.4	0.4	23/04/2018	76.0	74.7	50%	50%	150.7	913	3.5	8.7
11.3	Long Meadow	33	Graham	11.0	0.8	04/04/2018	148	897	3.1	10.2	-1.6	23/04/2018	84.0	64.0	57%	43%	148.0	897	2.9	9.1
8.2	Big Lawns	33	KWS Santiago	6.6	0.5	03/04/2018	116.5	706	3.8	7.4	0.3	23/04/2018					0.0		0.0	0.0
9.2	Big Lawns	33	Shabras Vibr	7.6	0.5	03/04/2018	116.25	705	3.6	7.9	-0.2	23/04/2018					0.0		0.0	0.0
9.4	Big Lawns	33	Shabras RD	7.3	0.5	03/04/2018	135	818	4.2	9.2	1.3	23/04/2018					0.0		0.0	0.0
7.7	West Farm	33	KWS Santiago	6.3	0.4	04/04/2018	111	673	3.8	7.0	0.2	23/04/2018	56.0	55.0	50%	50%	111.0	673	3.5	5.9
13.1	Drive Meadow	13	Revelation	15.3	1.1	03/04/2018	73.3	1173	2.7	12.2	-4.2	23/04/2018	36.0	37.3	49%	51%	73.3	1173	2.5	10.1
13.9	Barn Field	13	Graham	15.3	1.1	04/04/2018	86	1376	3.2	14.3	-2.1	23/04/2018	39.0	47.0	45%	55%	86.0	1376	3.0	11.4
12.8	Barn Field	20	C1 Siskin	13.6	1.0	04/04/2018	102	1020	2.8	11.3	-3.2	23/04/2018	72.0	30.0	71%	29%	102.0	1020	2.6	11.5
9.1	Barn Field	20	C1 Santiago	8.3	0.6	04/04/2018	76	760	3.3	8.0	-0.9	23/04/2018	50.0	26.0	66%	34%	76.0	760	3.1	7.8
11.7	Barn Field	20	C1 Shabras	12.4	-0.4	04/04/2018	109	1090	3.3	12.0	0.0	23/04/2018	57.0	52.0	52%	48%	109.0	1090	3.1	10.3
12.6	Barn Field	20	C1 Motown	12.5	2.3	04/04/2018	120	1200	3.2	11.9	-2.9	23/04/2018	65.0	55.0	54%	46%	120.0	1200	3.0	10.4
11.9	Barn Field	20	Mix	11.3	0.8	04/04/2018	101	1010	3.4	11.5	-0.7	23/04/2018	64.0	37.0	63%	37%	101.0	1010	3.2	10.9
9.8	Hills	20	KWS Santiago	9.4	0.7	04/04/2018	77	770	2.9	8.0	-2.0	23/04/2018	54.0	23.0	70%	30%	77.0	770	2.7	8.1
10.8	AHDB Benchmark	20	AHDB	9.6	1.4		102	1020	4	11.0	1.4									
	Total Area																			

All my count information for each field was predicting a 11.2t/ha (Before final TGW measurement of combine was added)

Winter Wheat crop range of 12.4t/ha down to 8.2t/ha

Cost of Production – Investing correctly?

Field	На	Variety	T0	Т	1		T2		Т3
Kells High	3.10	Trial Fungicides	Cherokee 1L/ha	Adexar @ 1L/ha	Bravo 1/ha	Elartus Era 11/ha	Bravo 1l/ha		Firefly 1I/ha
Pylon	4.44	KWS Santiago	Cherokee 1L/ha	Firefly @ 1.25I/ha	Bravo 1/ha	Elartus Era 0.71/ha	Bravo 1l/ha		Firefly 1l/ha
Shrubbery	9.85	Ellicit/Motown	Cherokee 1L/ha	Firefly @ 1.25I/ha	Bravo 1/ha	Elartus Era 0.71/ha	Bravo 1l/ha		Firefly 1I/ha
Big 100	27.11	Gravity/Graham/Gravity	Cherokee 1L/ha	Firefly @ 1.25I/ha	Bravo 1/ha	Elartus Era 0.71/ha	Bravo 1l/ha		Firefly 1I/ha
Barn Field	33.90	KWS Santiago	Amistar Opti 1l/ha	Adexar @ 1L/ha	Bravo 1/ha	Elartus Era 0.71/ha	Bravo 1l/ha		Firefly 1I/ha
Long Thurlow	12.66	Shabras	Amistar Opti 1I/ha	Amistar Opti @ 1/l	Mendoza @ 0.75I/ha	El	artus Era 0.7l/ha		Tubosan 1l/ha
Retters	12.03	Shabras	Amistar Opti 1l/ha	Adexar @ 1L/ha	Bravo 1/ha	El	artus Era 0.7l/ha		Tubosan 1l/ha
Green Farm	7.49	Shabras	Amistar Opti 1l/ha	Adexar @ 1L/ha	Bravo 1/ha	El		Tubosan 1I/ha	
Paddys	9.26	KWS Siskin	N/A	Adexar @ 1L/ha	Bravo 1/ha	El		Tubosan 1l/ha	
Appletree	9.98	Motown (RR)	Scyon 1l/ha	Elartus Era	@ 0.75I/ha	Sparticus Xpro 1I/ha			Tubosan 1l/ha
Blacksmith	7.25	KWS Siskin	Cherokee 1L/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5I/ha		Firefly 1l/ha
Rushbottom	5.71	KWS Siskin	Cherokee 1L/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5I/ha		Firefly 1I/ha
Pig Meadow	2.23	KWS Siskin	Cherokee 1L/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5I/ha		Firefly 1I/ha
Tom Dixon	3.09	KWS Siskin	Cherokee 1L/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5I/ha		Firefly 1I/ha
Plummers	11.00	Graham	Cherokee 1L/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5I/ha		Tubosan 1l/ha
Kells Medium	10.60	Trial Fungicides	Cherokee 1L/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5l/ha Br	ravo 1l/ha	Tubosan 1I/ha
Little Guineau Rov	4.22	Motown	Amistar Opti 1l/ha	Amistar Opti @ 1l/ha	Mendoza @ 0.75I/ha	Bugle 11/ha	Mendoza 0.5l/ha Br	ravo 1l/ha	Tubosan 1I/ha
Church Field	7.49	Motown	Scyon 1l/ha	Adexar @ 1L/ha	Bravo 1/ha	Bugle 11/ha	Mendoza 0.5l/ha Br	ravo 1l/ha	Tubosan 1l/ha
Triangle	3.32	Motown	Cherokee 1L/ha	Cherokee @1.3I/ha	Amistar @ 0.3I/ha	Bugle 11/ha	Mendoza 0.5l/ha Br	ravo 1l/ha	Tubosan 1l/ha
Crown	10.07	Motown	Cherokee 1L/ha	Cherokee @1.3I/ha	Amistar @ 0.3I/ha	Bugle 11/ha	Mendoza 0.5l/ha Br	ravo 1l/ha	Tubosan 1I/ha
Wyverstone Road	12.75	Motown	Amistar Opti 1I/ha	Cherokee @1.3I/ha	Amistar @ 0.3I/ha	Bugle 11/ha	Mendoza 0.5l/ha Br	ravo 1l/ha	Tubosan 1l/ha
Kells Low	2.30	Trial Fungicides	N/A	Cherokee @1.3I/ha	Amistar @ 0.3I/ha		Tubosan 1l/ha		N/A
Allotments	2.85	Shabras		N/A			Tubosan 1l/ha		
Kells Untreated	1.00	Trial Fungicides				N/A			

Harvest – Over in a flash!

Crop	Average Yield T/ha	Highest T/ha	Lowest T/ha	Total Tons
1 st Wheats	11.01	12.23	10.24	
2 nd Wheats	10.34	10.93	8.64	
Total Wheat	10.79			2358
Hybrid Barley	10.26	10.88	10.14	828
Spring Linseed	1.93	2.27	1.29	91
Herbage Grass	Crop be	~70		

- 17th July Barley in before early wet weather
- Grass seed, stop start through showers
- Started Wheat 3rd August
- Finished Wheat 9th August
- Only lost 40mins combining wheat due to one shower!
- No wheat came in over 16.0%
- Linseed was a battle at times
- Everything finished 25th August

'Farming to Potential not hope'

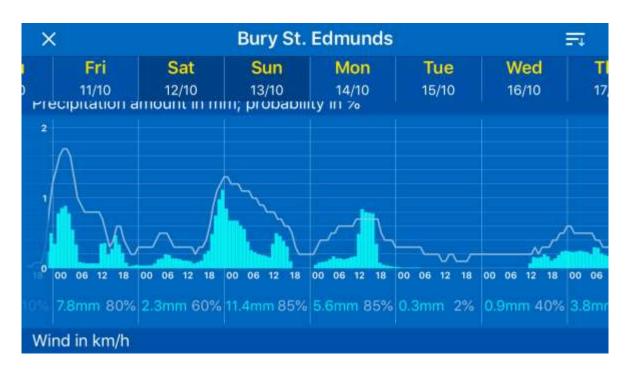
All my count information for each field was predicting a **11.2t/ha** (**Before** final TGW measurement of combine was added)

Winter Wheat crop range of 12.4t/ha down to 8.2t/ha

All my count information for each field was predicting a **10.9t/ha** (after final TGW measurement of combine was added)

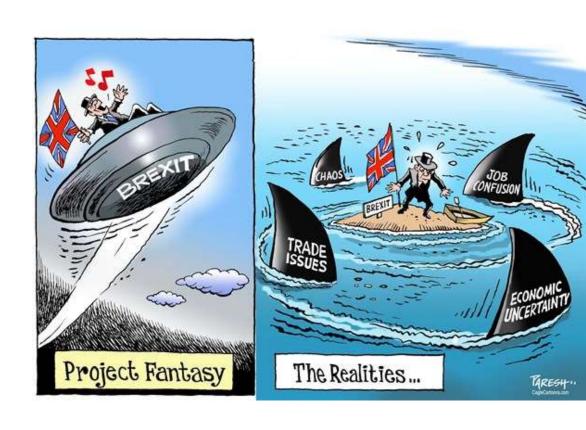
Winter Wheat crop range of **12.2t/ha down to 8.6t/ha**

And then there was the autumn!!



- Dust bowl to mud in one week
- Rain recorded every 2.5 days since last week of September.
- High seed rates and hoped for the best
- Managed to plant 91% of planned winter cropping
- Lots of slug damage
- Plenty of rotten seed
- Headland disasters!

What to plan for??



- General Election??
- Brexit??
- Lower plant development
- Spring crop over supply
- Smallest UK Wheat crop for a while
- Marketing decisions?

The bigger picture......



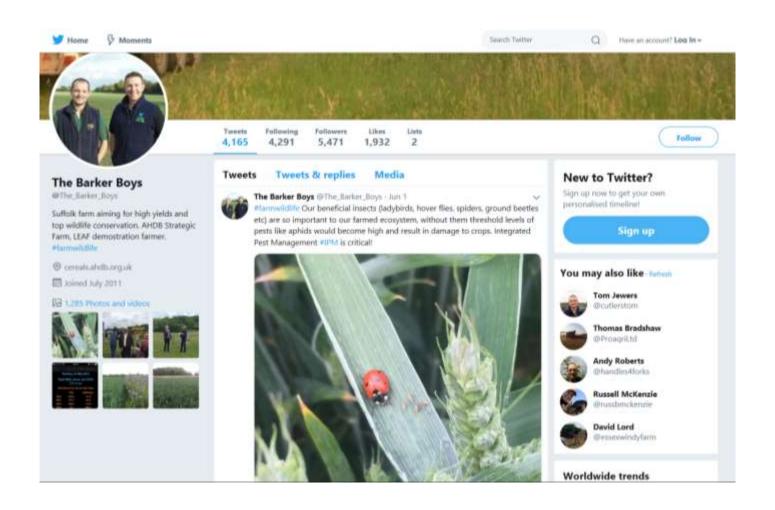






Where does this fit in now??

Social Media!



#farmwildlife one tweet a day for a year! 1,000,000 views!

Flood it with positive images and stories!

The press are not paid to promote farming!

Don't moan about it; do it yourself!



Any questions?





WORKSHOP: Managed lower inputs demonstration

Brian Barker, EJ Barker & Sons





Input Investment Across Different Variety Demonstration 2019

AHDB Strategic Farm East 2018/19





Aim of demonstration

- To look at variety yield response with different agrochemical investment
- Create a simple step by step approach that farmers can replicate on their own farms
- To have areas of untreated, low, medium and high investment for all varieties in one field.





Constraints of demonstration

- Not replicated so can not be seen as statically robust.
- Soil variations could make difference.
- Nutrient requirements for potentially bigger biomass not taken into account.
- Hassle factor for spray applications



Omnia Field Performance Map of past 4 years worth of Winter Wheat yields combined.

Overall very consistent in yield performance.





Soil Type variation



30cm EC Scan by SOYL 2018





Demonstration layout





@the_barker_boys @AHDB_Cereals #strategicfarm



Demonstration layout over soil type





@the_barker_boys @AHDB_Cereals #strategicfarm



What would you expect?

Yield T/ha Rank by field location	on (Highest {1}	to Lowest {								
	Silverst	one	Graham		Siskin		Shabras		Santiago	
RL UK Yield Score (18/19)	104	04 103)3	103		104		103	
Untreated										
Low Investment										
Medium Investment										
High Investment										

Amongst your table fill in the Green boxes with a 1-20 rank of which plots of the field would be the Highest or lowest?

N.B. Different tables have different questions! (Yield, Net Margin, Gross Margin)





Planting

- First Wheat after Spring Linseed
- Direct drilled on the 2nd October
- Conditions at planting: Hard and dry!
- Seed rate adjusted for TGW of varieties to aim for 300 plants/m²
- Variable seed rate maps used to reduce soil type variations.
- Average seeds planted 410 seeds/m2 (taking into account; drill, field condition, germination)
- Reliability and accuracy of TGW of seed a key consideration going forward



Establishment

- We estimate 20% of seeds planted are lost due to system and the conditions at planting.
- AHDB Growth guide estimates 30% over winter loss
- Actually 17% of plants were lost through winter.
- TGW and drill calibrations key

231

280

Winter Plant Pop	oultation (plan	ts/m²)				CEREALS 8	OILSE
	18-Oct	07-Nov	11-Dec	10-Jan	06-Feb	Over Winter Loss	D
Santiago	271	272	271	265	237	13%	
Shabras	274	283	246	210	217	21%	l
Siskin	305	298	273	238	246	19%	
Graham	319	282	244	217	231	28%	I

239

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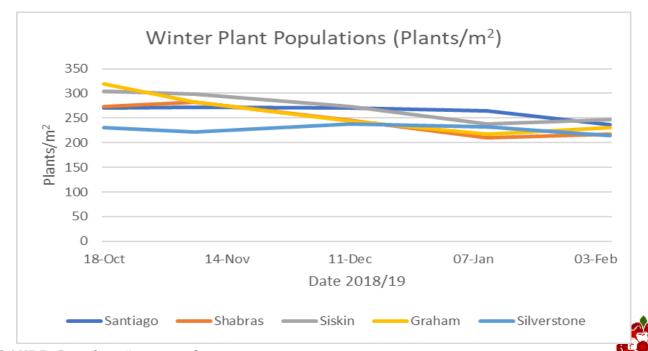
7%

17%

21%

222

271



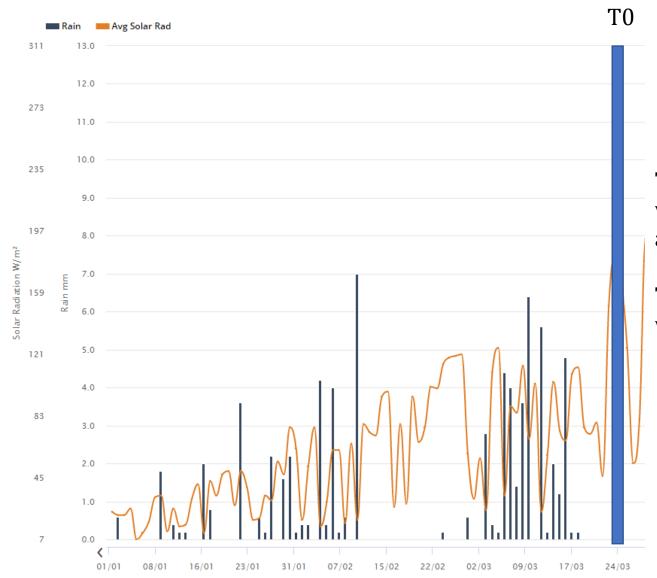
Silverstone

Average

Range

T0 - Lush wet crop





To decision was off the back of a period of wet weather, crops looked in great condition and were lush and full of green leaf.

The winter had been relatively dry and warm so we were concerned with Septoria early on.





T0 - Applied

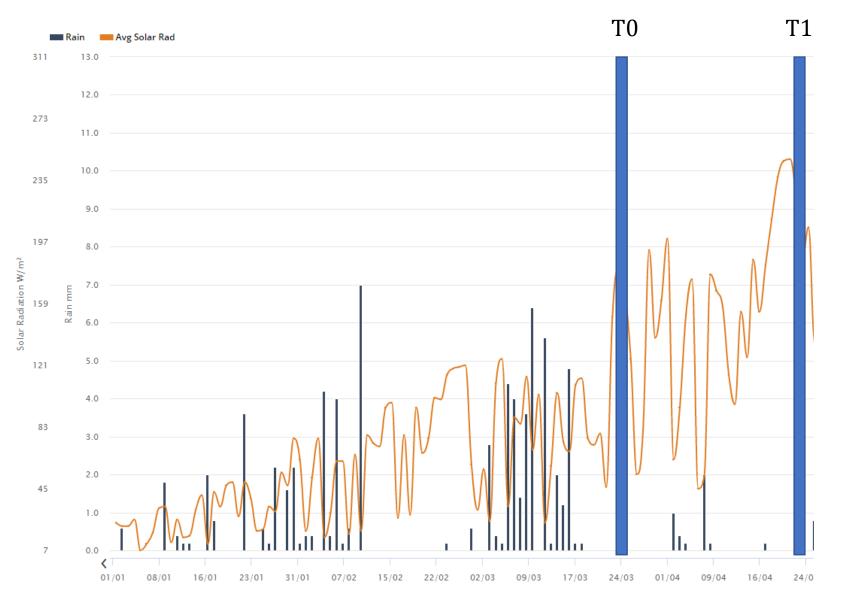
Application		Low Input			Mid Inp	out		High Input					
Date	Untreated	Product (Active)	Rate	Price	Product (Active)	Rate	Price	Product (Active)	Active	Price			
		Tempo (Trinexapac- ethyl PGR)	0.15l		Cherokee (Chlorothalonil, cyproconazole and propiconzole)	1l		Cherokee (Chlorothalonil, cyproconazole and propiconzole)	1 l				
T0 (24/03/2019 & 27/03/2019)		3C Chlormequat 750 (Chlormequat PGR)	1 l	£6.99	Tempo (Trinexapac-ethyl PGR)	0.125l	£17.32	£17.32	£17.32	£17.32	Tempo (Trinexapac-ethyl PGR)	0.125l	£17.32
		Manganese	2l		3C Chlormequat 750 (Chlormequat PGR)	1l		3C Chlormequat 750 (Chlormequat PGR)	1l				
		15%	21		Manganese 15%	2l		Manganese 15%	2l				

^{*} Prices are averages taken from a number of industry supplies



T0 to T1 - Dry





T1 the active disease and pressure had slowed considerably.

The dry weather had created concern of the crops not filling their early potentials. The ground was dry and cracking at plats absorbed what moisture was available.

Generally we felt pressure of both Septoria and rust was low, so tried to ease off investment.





Construction Phase

9th April (Tillers/m²)	Plant Population	Untreated Tillers	Average Tillers per	Low Tiller	Average Tillers per	Medium Tiller	Average Tillers per	High Tiller	Average Tillers per
	06/02/2019	Counts	plant	Counts	plant	Counts	plant	Counts	plant
Santiago	237	560	2.4	543	2.3	607	2.6	840	3.5
Shabras	217	593	2.7	623	2.9	577	2.7	587	2.7
Siskin	246	507	2.1	530	2.2	587	2.4	653	2.7
Graham	231	530	2.3	563	2.4	643	2.8	760	3.3
Silverstone	214	587	2.7	580	2.7	537	2.5	590	2.8
Average	229	555	2.4	568	2.5	590	2.6	686	3.0
Range	33	87	0.7	93	0.7	107	0.4	253	0.9

Using the AHDB Growth guide calculation to predict a benchmark yield using the average tillers above the treatment range is:

Untreated Low Medium High 7.3t/ha 7.5t/ha 7.8t/ha 9.1t/ha





T1 - Applied

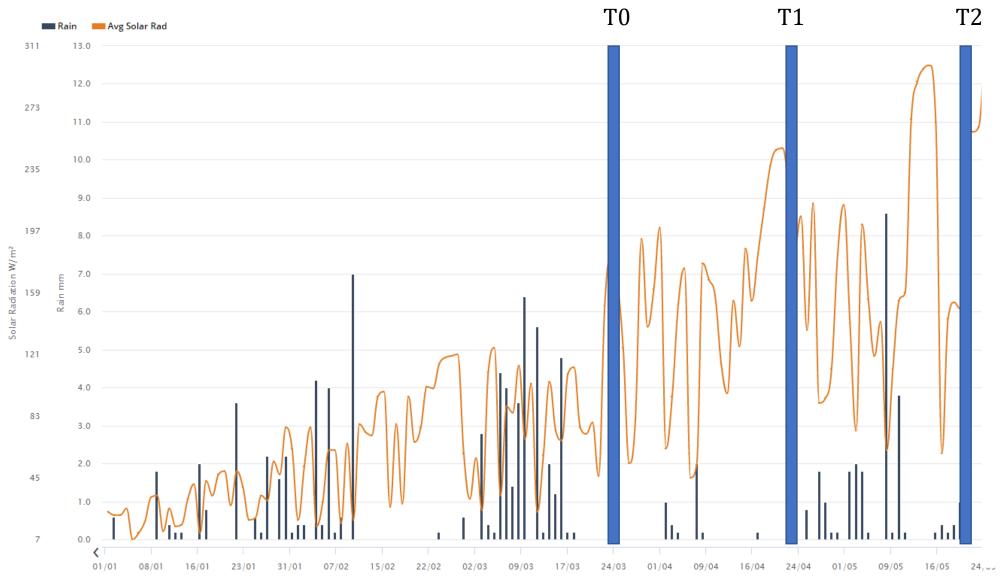
Application	Under de d	Lov	v Input		Mid Inp	out		High Input		
Date	Untreated	Product (Active)	Rate	Price	Product (Active)	Rate	Price	Product (Active)	Active	Price
		Cherokee (Chlorothalonil, cyproconazole and propiconzole)	1.33l		Amistar Opti (Azoxystrobin and chlorothalonil)	11		Wolverine (Metconazole and xemium)	11	
		Amistar (Azoxystrobin)	0.3l		Mendoza (Expoxiconazole)	0.75l		Bravo 500 (Chlorothalonil)	1l	
T1 (23/04/2019)		3C Chlormequat 750 (Chlormequat PGR)	1 l	£27.31	3C Chlormequat 750 (Chlormequat PGR)	1l	£29.73	3C Chlormequat 750 (Chlormequat PGR)	1l	£42.18
		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	

^{*} Prices are averages taken from a number of industry supplies



T1 to T2 - Damp





Weather then became wet after T1 so the rain splash and humidity within the crops increased making for higher disease pressure from both Septoria and rusts.





Construction Phase

Using the AHDB Growth guide calculation to predict a benchmark yield using the average tillers above the treatment range is:

Untreated	Low	Medium	High
11.3t/ha	10.7t/ha	11.3t/ha	12.0t/ha

8th May (Tillers/m²)	Plant Population 06/02/2019	Untreated Tillers Counts	Average Tillers per plant	Low Tiller Counts	Average Tillers per plant	Medium Tiller Counts	Average Tillers per plant	High Tiller Counts	Average Tillers per plant
Santiago	237	703	3.0	677	2.9	720	3.0	840	3.5
Shabras	217	723	3.3	847	3.9	870	4.0	1003	4.6
Siskin	246	1013	4.1	930	3.8	907	3.7	873	3.5
Graham	231	1253	5.4	1017	4.4	1190	5.2	1107	4.8
Silverstone	214	577	2.7	567	2.7	610	2.9	737	3.4
Average	229	854	3.7	807	3.5	859	3.7	912	4.0
Range	33	677	2.7	450	1.8	580	2.3	370	1.3





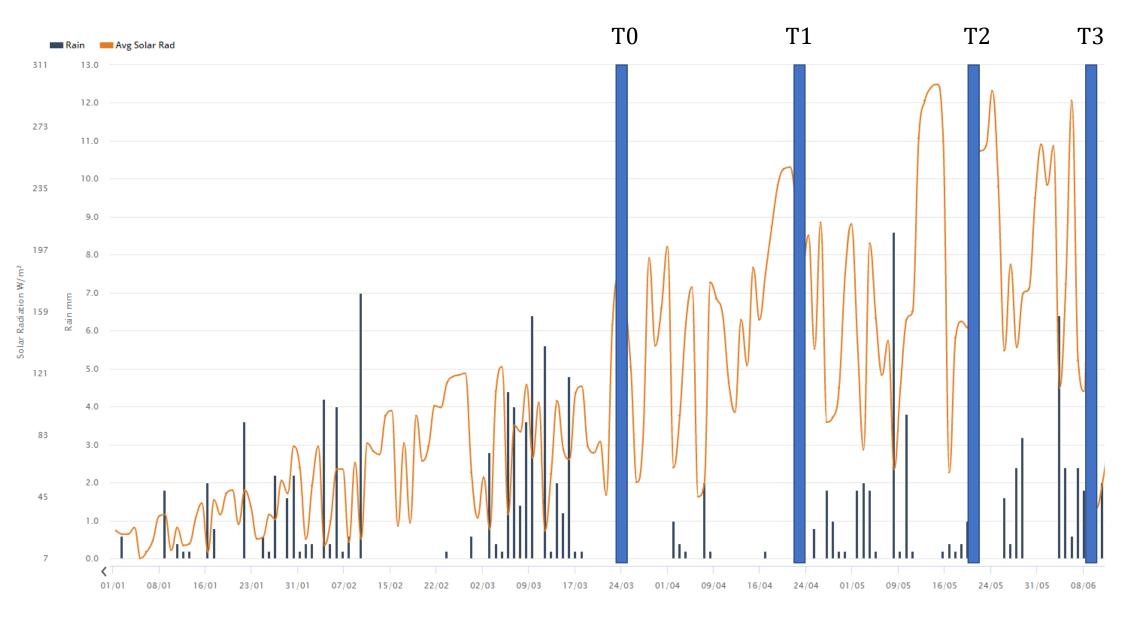
T2 - Applied

Ap	Application Untreated			v Input		Mid Ing	out		High Input		
			Product (Active)	Rate	Price	Product (Active)	Rate	Price	Product (Active)	Active	Price
	T2 (22/05/2019)		Tubosan	1 l	£9.00	Bugle (Fluxapyroxad)	1.01l	£36.12	Elatus Era (Benzovindiflupyr and prothioconazole)	1l	£53.90
(22		(Tebuconazole)	It	£9.00	Mendoza (Expoxiconazole)	0.5l	L30.12	Bravo 500	41	L33.30	
						Bravo 500 (Chlorothalonil)	1l		(Chlorothalonil)	1l	

^{*} Prices are averages taken from a number of industry supplies









@the_barker_boys @AHDB_Cereals #strategicfarm



Tiller to Ear conversion

19/6/19 Tiller to Ear Conversion	Plant Population 06/02/2019	Untreated Tillers Counts	Untreated Ears per m ²	% Converted	Low Tiller Counts	Low Ears per m ²	% Converted	Medium Tiller Counts	Medium Ears per m ²	% Converted	High Tiller Counts	High Ears per m ²	% Converted	Variety Average
Santiago	237	703	436	62%	677	494	73%	720	504	70%	840	524	62%	67%
Shabras	217	723	476	66%	847	544	64%	870	510	59%	1003	498	50%	60%
Siskin	246	1013	576	57%	930	554	60%	907	560	62%	873	596	68%	62%
Graham	231	1253	504	40%	1017	594	58%	1190	654	55%	1107	664	60%	53%
Silverstone	214	577	370	64%	567	444	78%	610	496	81%	737	492	67%	73%
Average	229	854	472.4	58%	807	526.0	67%	859	544.8	65%	912	554.8	61%	63%
Range	33	677	206.0	26%	450	150.0	20%	580	158.0	26%	370	172.0	19%	19%

Using the AHDB Growth guide calculation to predict a benchmark yield using the average tillers above the treatment range is:

Untreated	Low	Medium	High
9.9t/ha	11.0t/ha	11.4t/ha	11.6t/ha





Biomass = Disease

8th May (Tillers/m2)	Plant	Untreated	Average %	Low Tiller	Average %	Medium	Average %	High Tiller	Average %
	Population	Tillers	Septoria		Septoria	Tiller	Septoria		Septoria
& Septoria Lf5	06/02/2019	Counts	Lf5	Counts	Lf5	Counts	Lf5	Counts	Lf5
Santiago	237	703	9.2	677	5.7	720	5.7	840	7.6
Shabras	217	723	4.7	847	4.4	870	5.2	1003	8.2
Siskin	246	1013	0.2	930	0.1	907	0.5	873	1.6
Graham	231	1253	0.8	1017	2.5	1190	3.8	1107	7.3
Silverstone	214	577	6.4	567	4.7	610	2.6	737	1.8
Average	229	854	4.3	807	3.5	<i>859</i>	3.6	912	5.3
Range	33	677	9.0	450	5.6	580	5.2	370	6.6

- Septoria levels highest in all untreated plots apart from Shabras.
- Levels then higher in plots with highest tillers (lush crops) bar a couple.
- Leaf rub, rain splash, high N?





T3 - Applied

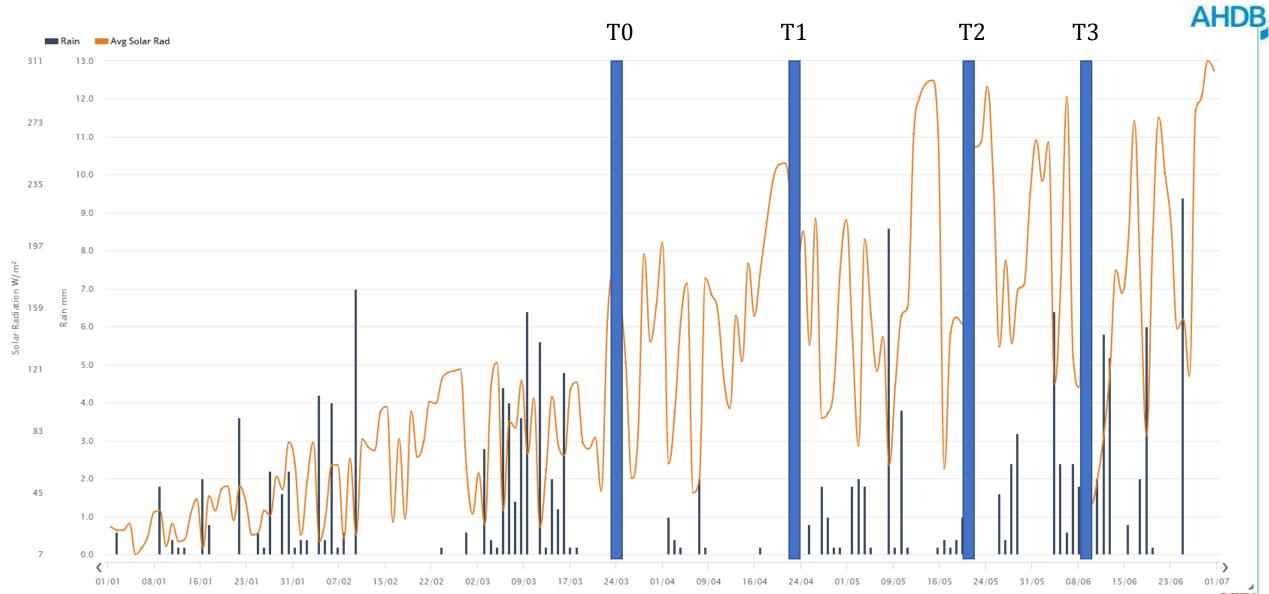
Application		Product Produc			Mid Input			High Input		
Date	Untreated		Rate	Price	Product (Active) Rate Price		Product (Active)	Active	Price	
T3 (09/06/2019)					Tubosan (Tebuconazole)	1l £9.20		Firefly (Prothioconazole and fluoxas trobin)	11	£29.00
								S cyon (Unium Bios timulant)	1l	

^{*} Prices are averages taken from a number of industry supplies



T3 to Harvest







Four weeks after T3 was applied disease pressure was erupting and visual differences started to appear in green leaf.

Silverstone

5/7/19





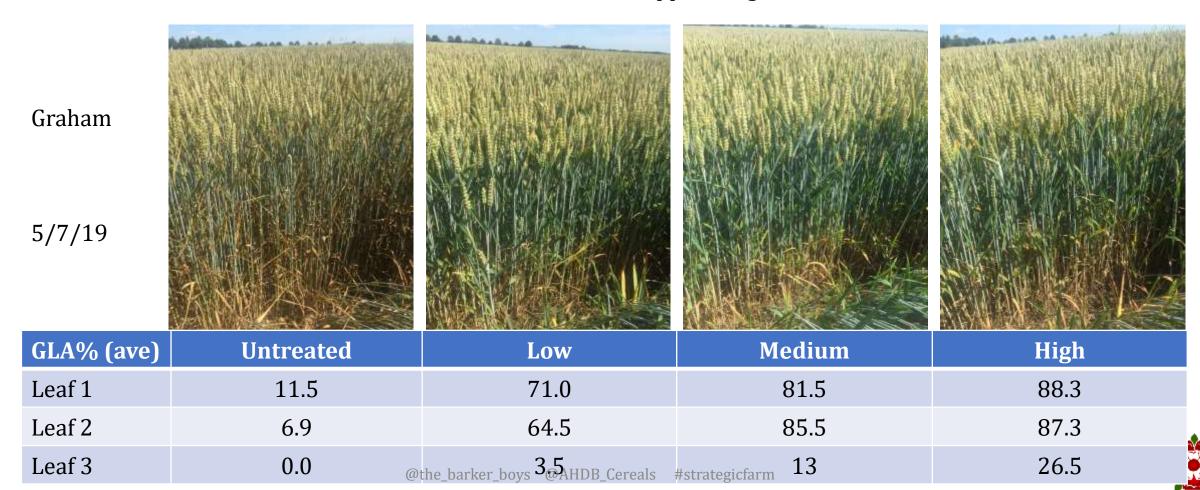




GLA% (ave)	Untreated	Low	Medium	High
Leaf 1	2.7	41.0	82.0	87.0
Leaf 2	0.0	26.0	69.0	74.5
Leaf 3	0.0	$_{ m the_barker_boys}0_{ m O}_{ m AHDB_Cereals}$	#strategicfarm 11.7	3.8



Four weeks after T3 was applied disease pressure was erupting and visual differences started to appear in green leaf.





Four weeks after T3 was applied disease pressure was erupting and visual differences started to appear in green leaf.

KWS Siskin 5/7/19 GLA% (ave) High **Untreated** Low Medium 20.5 90.0 94.4 Leaf 1 81.0 Leaf 2 10.2 77.0 91.3 84.0 Leaf 3 0.0 26.0 $@the_barker_boys \\ 1205 \\ HDB_Cereals \\ \#strategic farm$ 21.0

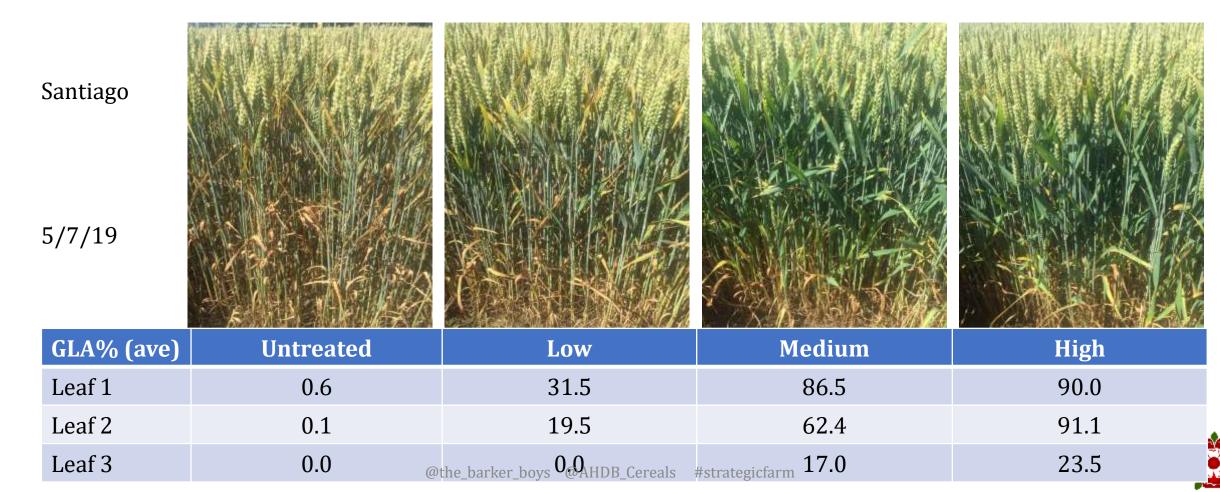


Four weeks after T3 was applied disease pressure was erupting and visual differences started to appear in green leaf.

Shabras 5/7/19 GLA% (ave) High **Untreated** Low Medium 15.7 Leaf 1 86.8 93.9 86.9 Leaf 2 5.0 70.5 88.88 89.8 10.5 Leaf 3 0.0 7.0 @the_barker_boys 5 AHDB_Cereals #strategicfarm



Four weeks after T3 was applied disease pressure was erupting and visual differences started to appear in green leaf.





Have you changed your mind?

Yield T/ha Rank by field location										
	Silverstone Graham		Sis	kin	Sha	Shabras Santiag		iago		
RL UK Yield Score (18/19)	10	04	10)3	10	03	10)4	10)3
Untreated										
Low Investment										
Medium Investment										
High Investment										

Amongst your table fill in the Blue boxes with a 1-20 rank of which plots of the field would be the Highest or lowest?



CEREALS & OILSEEDS

So what happened at harvest?



@the_barker_boys @AHDB_Cereals #strategicfarm





The Yield award....

Yield T/ha Rank by field location (Highest to Lowest)

	Silverstone	Graham	Siskin	Shabras	Santiago
Untreated	9.57	10.16	9.66	8.55	7.35
Low	10.71	11.59	11.45	11.34	9.52
Medium	11.47	11.83	11.62	11.52	11.22
High	11.68	12.13	12.28	11.03	11.03

Yield T/ha Rank by field location (Highest to Lowest)

	Silverstone	Graham	Siskin	Shabras	Santiago
Untreated	17	15	16	19	20
Low	14	6	9	10	18
Medium	8	3	5	7	11
High	4	2	1	12	13

Field harvested by us then left plots and cleared afterwards. Weighbridge Yield from complete field 17.01ha = 187.28t @11.01t/ha (15% moisture adjusted)



^{**}Envirofield plot combine took multiple cuts through all the plots to give us the final yield.



The Gross Margin award....

GM £/ha Rank by field location

	Silv	estone	e Graham		Siskin		Shabras		Santiago	
Untreated	£	898	£	974	£	909	£	767	£	611
Low	£	1,002	£	1,116	£	1,097	£	1,083	£	849
Medium	£	1,025	£	1,071	£	1,044	£	1,032	£	992
High	£	981	£	1,039	£	1,058	£	898	£	898

GM £/ha Rank by field location

	Silvestone	Graham	Siskin	Shabras	Santiago
Untreated	16	13	14	19	20
Low	10	1	2	3	18
Medium	9	4	6	8	11
High	12	7	5	15	17

*Price of Wheat used was £129/t Ex Farm Nov

**All variable cost from handbook used including; Seed, Herbicide, Fertiliser that was used on the whole field at a flat rate.





The NET Margin award....

NET Margin CoP £/T Rank by field location (Lowest to Highest)

	Silv	erstone	Graham		Siskin		Shabras		Santiago	
Untreated	£	61.06	£	57.52	£	60.49	£	68.35	£	79.54
Low	£	60.37	£	55.79	£	56.47	£	67.92	£	67.93
Medium	£	64.65	£	62.69	£	63.82	£	64.37	£	66.10
High	£	69.54	£	66.96	£	66.14	£	73.64	£	73.64

NET Margin CoP £/T Rank by field location (Lowest to Highest)

	Silverstone	Graham	Siskin	Shabras	Santiago
Untreated	6	3	5	16	20
Low	4	1	2	14	15
Medium	10	7	8	9	11
High	17	13	12	18	18

*Price of Wheat used was £129/t Ex Farm Nov



^{**}All variable cost from handbook used including; Seed, Herbicide, Fertiliser that was used on the whole field at a flat rate.

^{***} All machinery usage costed into the NET margin using actual running costs calculated by S&P machinery Review 2018



My take home message.....

- This is one year, one field, one try, so don't take it as gospel!
- Next spring challenge your mindset and try it on one of your fields or a couple of varieties. How low will you go? Then share your experiences at a Monitor Farm meeting or here next year.
- It's our own personal attitude to risk! Spend less or spend more as insurance?
- Don't farm this year as if it was last year, clean slate with potentially lower potential due to autumn conditions!





2019/20 Repeat Demonstration



Silverstone was not available so has been replaced by KWS Crispin.

Same field, Same layout, Variety order different, same approach of judging investment for the season and weather in real time.

Field has been drilled but in polar opposite conditions to last year!





How should we approach next year?

- Lower biomass out of winter
- Shorter growing season?
- Poor rooting?
- Soil damage at planting?
- Feed it early?
- Bio stimulants?
- Very much field by field management!





WORKSHOP: Cover crops demonstration

Anne Bhogal, ADAS







Strategic Farm East Cover Crop Demonstration 2018-2020

Anne Bhogal, ADAS



Workshop outline

- Background & 2018-19 activities
- Break out: quiz!
- 2018-19 results
- Break out: what to consider with cover crops?
- Feedback & summary

Facilitators: Amanda Bennett (AHDB)

Kate Smith (ADAS)

Ian Skinner (Essex & Suffolk Water)

Judith Stafford (AHDB)

Nick Light (Lodge Farm)









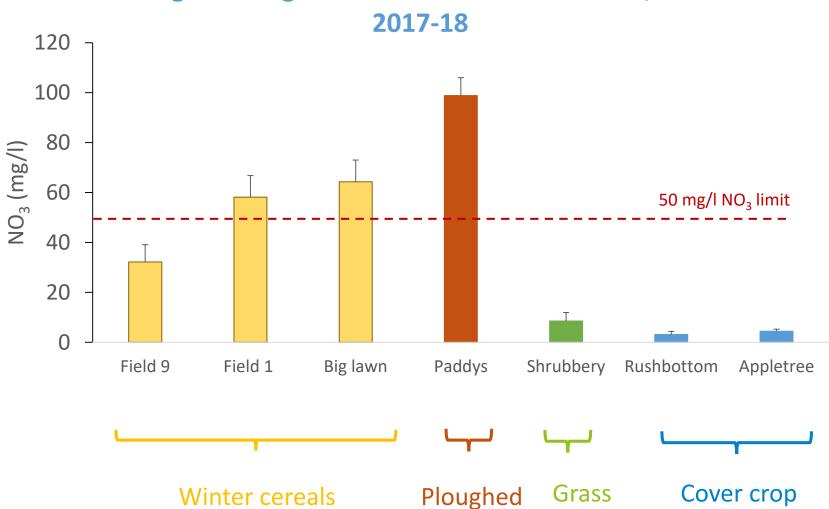


Background





















Maximising the benefits from cover crops through species selection and crop management

MAXI Cover Crop (2016-2019)

- Quantify the effects of different cover crops on soil properties, crop rooting & yield
 - ➤ 3 large plot experimental sites, validating effects using tramline trials on Monitor farms
 - > Oats, rye, oil radish, vetch, clover, buckwheat, phacelia (straights & mixes)





Cover crop demonstration at Strategic Farm East (2018-2020)

To demonstrate the role of cover crops (CC) in reducing nitrogen losses



Treatments & Demonstration Design





	Field 1 – Big Lawn	Field 2 – Hills		
Area:	14.9 ha	15.3 ha		
2018 harvest crop:	Winter	wheat		
	Treatment 1:	Treatment 3:		
Treatments: Drilled:	Plough – soil left bare over-winter	Over-winter Stubble		
25/08/19	Treatment 2:	Treatment 4:		
Destroyed: 22/2/19 (using Glyphosate)	Oil Radish & Rye established into ploughed soil	Oil Radish & Rye established in one pass system into stubble		
2019 harvest crop:	Linseed (Juliet, drilled 12 April 2019)			
2020 harvest crop:	Winter cereal			

- Two field sites, each testing a different CC establishment method
- Three sampling zones per treatment





Cover crop mix: Oil Radish 40% and Rye 60% @ 25kg/ha

Summary of Assessments





- Soil mineral nitrogen (0-90cm) autumn 2018
- Cover crop establishment NDVI
- Soil nitrogen supply (i.e. above ground biomass & SMN 0-90 cm) spring 2019
- Soil structural assessments spring 2019
 - Visual assessments: VSA & VESS
 - Penetrometer & bulk density
 - Soil moisture
- Earthworm numbers spring 2019
- Linseed yield and N-uptake



Break out groups – Guess the results!



- Picture quiz which field is the plough/CC, which is the one pass/CC?
 - Which had better establishment?
- Guess the treatment nitrate concentrations in drainage water?
- Guess the treatment spring soil N supply?
- Picture quiz yield maps; guess the treatment

AND WHY?

Break out groups – Guess the results!



Big Lawn	Hills
Mole drained 45cm (17/8) Plough 20cm (22/8) Pressed 10cm (23/8) Cover crop drilled 4cm (25/8)	Mole drained 45cm (19/8/) Rough Cultivation 15cm (22/9) Cover crop drilled 4cm (25/8)

Topsoil textures:

Big Lawn: sandy loam

Hills: silty clay loam

Both over clay

Cash crop: Linseed

Spring Tine cultivator 15cm (11/4), Combi Drill 4cm (12/4), Rolled (13/4)

'Traffic lights' from AHBD/BBRO draft soil health scorecard:

Investigate

Monitor

No action needed

Topsoil averages	Big lawn CC	Big lawn Ploughed	Hills CC	Hills stubble	
рН	7.3	7.7	7.6	7.1	
Ext. P (index)	15.4 (1)	19.9 (2)	20.7 (2)	26.3 (3)	
Ext. K (index)	188 (2+)	162.3 (2-)	238.6 (2+)	224 (2+)	
Ext. Mg (index)	52.4 (2)	55.6 (2)	46.8 (1)	53 (2)	
SOM (LOI %)	4.2	4.0	4.3	4.1	

Picture quiz: Which field is the plough/cover crop AHDB comparison; which is the one pass/cover crop?





Biomass: 1.6 t/ha (plough: 0.2 t/ha)

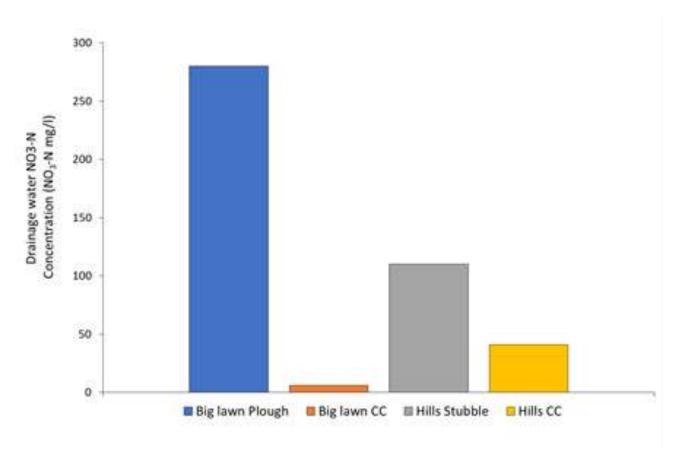


Biomass: 1.1 t/ha (stubble: 0.5 t/ha)

Guess the treatment: nitrate concentration of ADAS AHDB drainage waters (2nd Feb 2019)





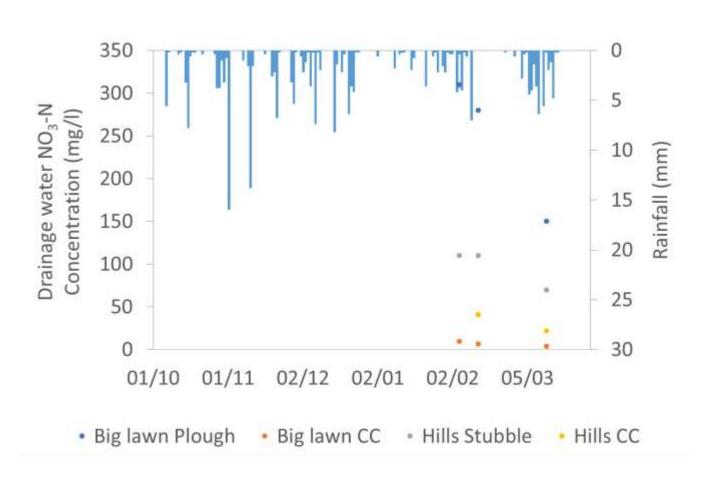


Options: Cultivated stubble (Hills); Ploughed (Big Lawn); Plough cover crop (Big Lawn); Cultivated cover crop (Hills)





Drainage water nitrate concentrations

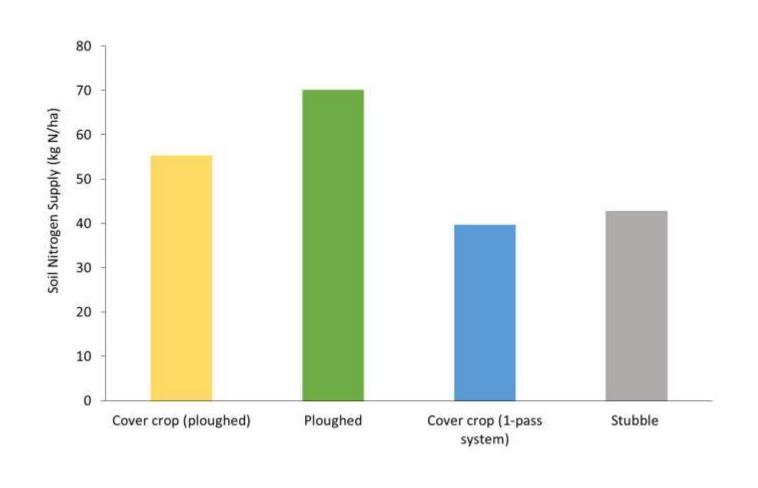


- 2018 drought and low winter rainfall (200 mm rain Oct-Mar); drains didn't 'run' until Feb 2019
- Nitrate concentrations in excess of 50 mg/l measured where no cover crop grown.

Guess the treatment: Spring soil N supply?



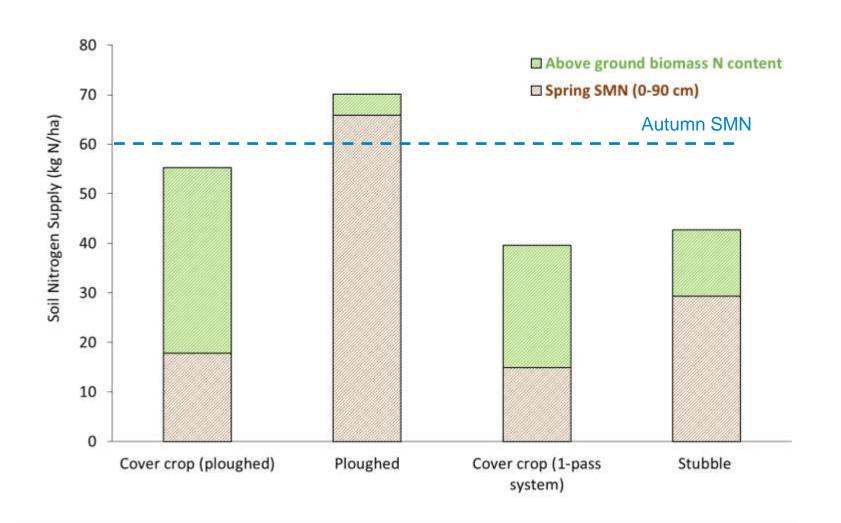




Options: Cultivated stubble (Hills); Ploughed (Big Lawn); Plough cover crop (Big Lawn); Cultivated cover crop (Hills)



Soil nitrogen supply

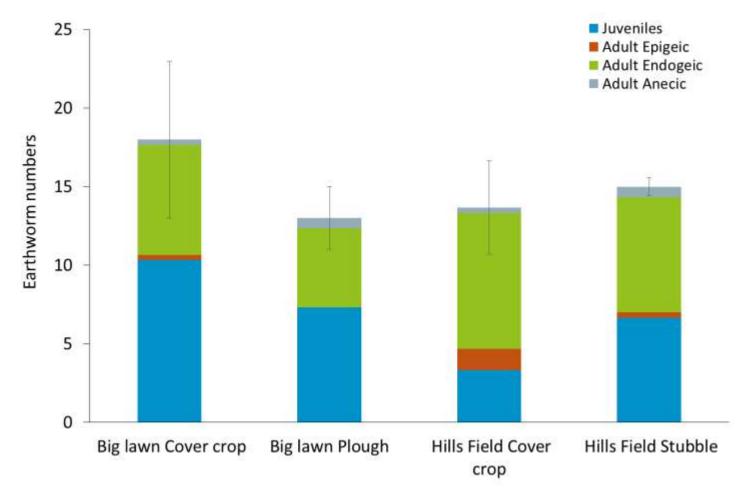


- By March 2019 the cover crops had produced 1 t/ha (Hills Field) and 1.6 t/ha (Big Lawn) dry matter and taken up approximately 25 & 40 kg/ha N, respectively.
- Ploughing stimulated N mineralisation

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 potentially indicates an un-balanced community structure

Soil Structural Assessments



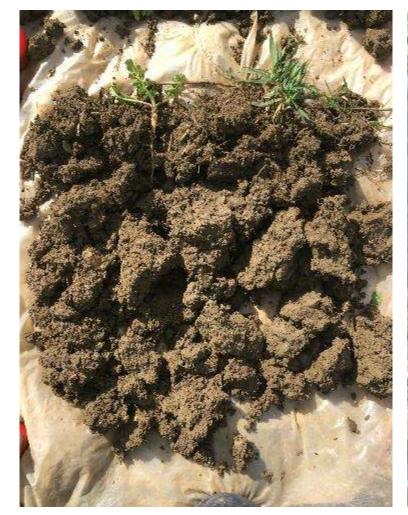
Field	Treatment	VESS limiting layer score	Penetrometer resistance (MPa)	Bulk density (g /cm³)
Big Lawn	Cover crop (ploughed)	2	0.9	1.41
Dig Lawii	Ploughed	2	0.8	1.49
Hills Field	Cover crop (1-pass system)	3	1.4	1.52
	Stubble	3	1.3	1.47

'Traffic lights' from AHBD/BBRO draft soil health scorecard:

Investigate

Monitor

No action needed





Hills + CC; Limiting layer = 3

Big lawn + CC; Limiting layer = 2

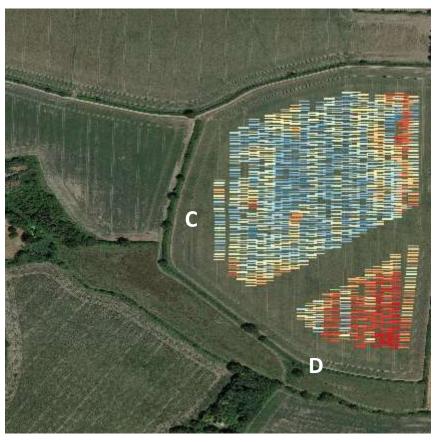
Picture quiz: yield maps



- A Plough + cover (Big Lawn)
- B Plough (Big Lawn)
- C Cultivated stubble (Hills)
- D Cultivated + cover (Hills)

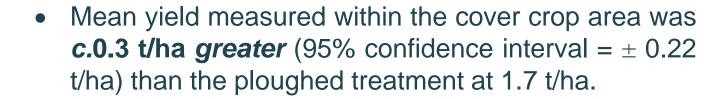
Blue = high yield; red = low yield





Options:
Cultivated stubble (Hills);
Ploughed (Big Lawn);
Plough cover crop (Big Lawn);
Cultivated cover crop (Hills)

Yield results – Big Lawn



- Greater lodging on ploughed treatment
 - Linked to soil N supply?







Big lawn, harvest 2019 (linseed) yield map; red areas = low yield; blue = high yield

Yield results - Hills Field





- 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.



Figure 5. Hills field, harvest 2019 (linseed) yield map; red areas = low yield; blue = high yield

Cost of production





	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



Initial conclusions

- Cover cropping has clear and large benefits for water quality (even with a relatively low biomass)
- But variable effect on yields
- Needs to be a long-term strategy







Hills +/- CC

Break out 2:



How many already use cover crops?

So you want to grow cover crops – what should you consider?

What species to grow?

Establishment?



Destruction?















What species to grow?

- What do I want to achieve?
 - soil/water protection, nutrient retention/soil fertility, soil structure, pest/weed control
- What is my rotation?
 - Rotational conflicts (cereals, brassicas, legumes)
- > EFA payment options?
- ➤ Straight vs. mix price?











How & when to establishment?

- Establish early! (by end of August)
 - Season, previous crop, soil type
 - Species (legumes early)
- ➤ Drilling depth
 - Species seed size, soil conditions
- Method (strip, direct, broadcast)
 - Species, soil conditions

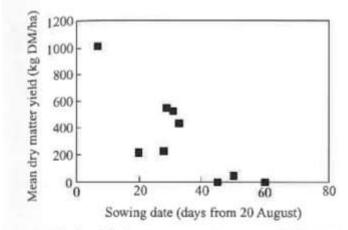


Fig. 1. Relationship between mean dry matter (DM) yield of sown cover crops at time of incorporation (DMY) and date of sowing (DT, in days from 20 August): DMY = 906 (s.e. 167) - 16.9 DT (s.e. 45).

Data taken from Richards et al., 1996



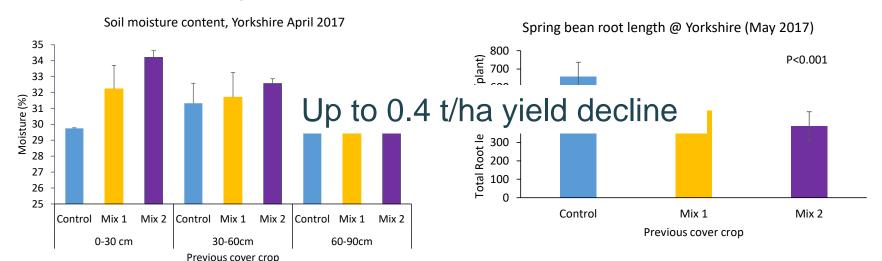


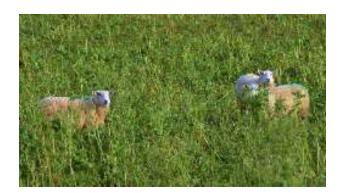




How (and when) to destroy?

- >spray, chop, crimp, graze, frost!
 - Soil type & moisture, weather, infrastructure
 - What you want to achieve? (biofumigation?)
- **Timing**
 - early destruction vital on heavy soils









Implications for next crop

- **Establishment**
 - What do you want to achieve maintaining any improvements in structure?



- Weed control?
- Fertiliser can N inputs be reduced?

Salu	-506
	17/23/16/21/27
	ACAS AS
5	MAT WAR

Drilling date	Soil texture	Biomass (t/ha)	N uptake (kg/ha)	'Top performers' (N recovery)
September	Light	<0.1 – 1.1	0.5 - 25	Phacelia & radish
August	Light/medium	1.0 – 3.5	10 - 70	Mix 2& 3, Rye & radish
August	Medium	1.5 – 3.0	30 - 90	Vetch & clover

Source: maxi cover crop





Thank you!

For more info:

AHDB Maxi cover crop. https://ahdb.org.uk/cover-crops

AHDB-BBRO Soil Biology and Soil Health Partnership https://ahdb.org.uk/greatsoils

Anne.bhogal@adas.co.uk



WORKSHOP: Boosting early crop biomass demonstration

Will Smith, NIAB





Can starter fertiliser be used to increase early season biomass?



Opening

- The importance of crop biomass
- Starter fertilisers; The main contenders
- What we did
- What we saw
- How it might help you





Summary of 2017/18 field work

- No observed differences from using starter fertiliser
 - Methodology was at fault
- No observed differences from using a range of bio-stimulants
 - Low stress year?
 - Artificial inputs already high





2018/19 – The remake

Product	Nutrient content	Application
Polysulphate	$ONI \cdot OD \cdot 1 OV \cdot 2 \cdot 6 Ma \cdot 4 OC \cdot EC$	Broadcast
(120 kg/ha)	ON:0P:10K:3.6Mg:40S:5Ca	Placed
TSP	0N:20P:0K:0S	Broadcast
(133 kg/ha)	UN:ZUP:UK:US	Placed
Kieserite	ONLOD: OK: 15N4~: 200	Broadcast
(120 kg/ha)	ON:0P:0K:15Mg:20S	Placed



Phosphorous

- Requirement for successful photosynthesis
 - Part of the ATP cycle
- Deficiency reduced shoot and root growth (Mollier & Pellerin, 1999)
- Only a small quantity available in accessible form in the soil (Mengel et al, 1978)



Sulphur

- Formation of chlorophyll
- Key building block of plant proteins
- Associated with higher grain protein (Randall, Spencer & Freney, 1981)
- Improves Nitrogen Use Efficiency (NUE) (Salvagiotti et al, 2009 & Carciochi et al, 2017)
- Has become increasingly important as reduction in atmospheric deposits





Polysulphate @120kg/ha Broadcast

Polysulphate @ 120kg/ha Placed

TSP @133kg/ha Placed

Kieserite @120kg/ha Placed

Kieserite @120kg/ha Broadcast

TSP @133kg/ha Broadcast



What did we measure?

- Crop populations, repeated over the first four weeks
- NDVI assessment
- Tiller populations
- Destructive biomass
- Yield



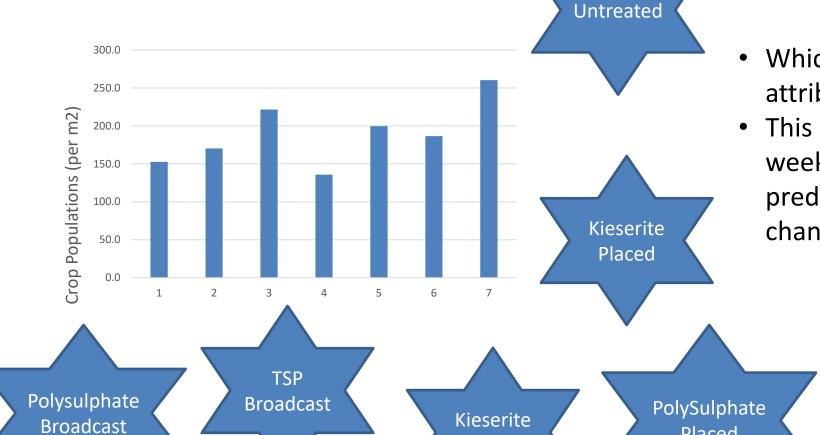


Breakout session

- Small groups
- Discuss the questions posed on the sheets
- Consider how you might assess each metric
- 5-8 minutes



Crop Population



Broadcast

Which treatment can be attributed to each bar?

• This is after just one week – how do you predict the graph will change?

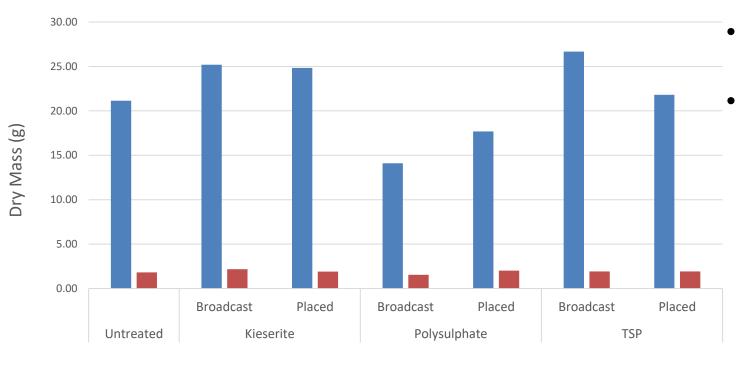
Placed

TSP

Placed



Crop Biomass



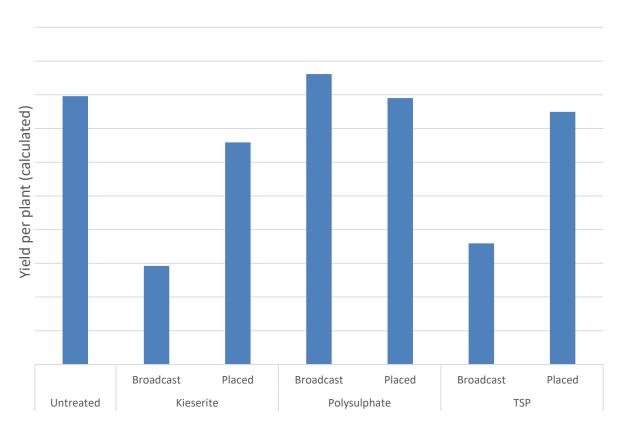
Shoots

Roots

What can this graph tell us?
Can you think of a better way to display information on crop biomass?



Crop Yield – per plant



- Is this an acceptable way of presenting yield data – is it fair?
- Is yield the right metric to be comparing the use of starter fertilisers?

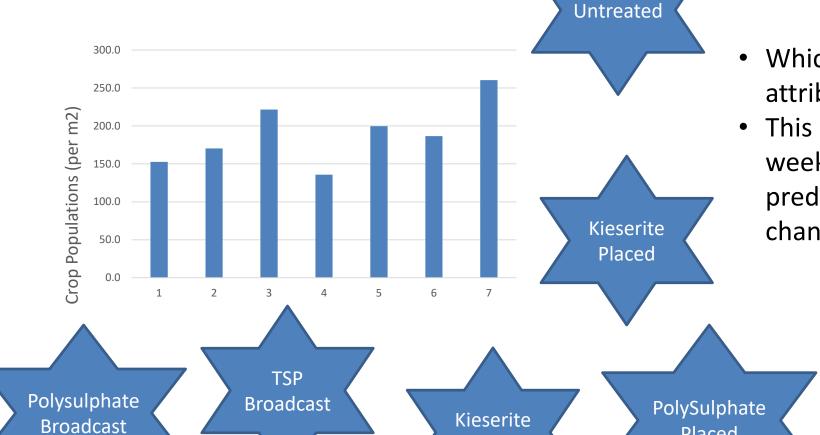


Crop Populations

- 1m length counts approx. 10/ha
- If possible, repeat the position of counts
 - Google pins/WhatThreeWords
- Use soil maps to determine areas to assess
- Timing is critical!



Crop Population



Broadcast

Which treatment can be attributed to each bar?

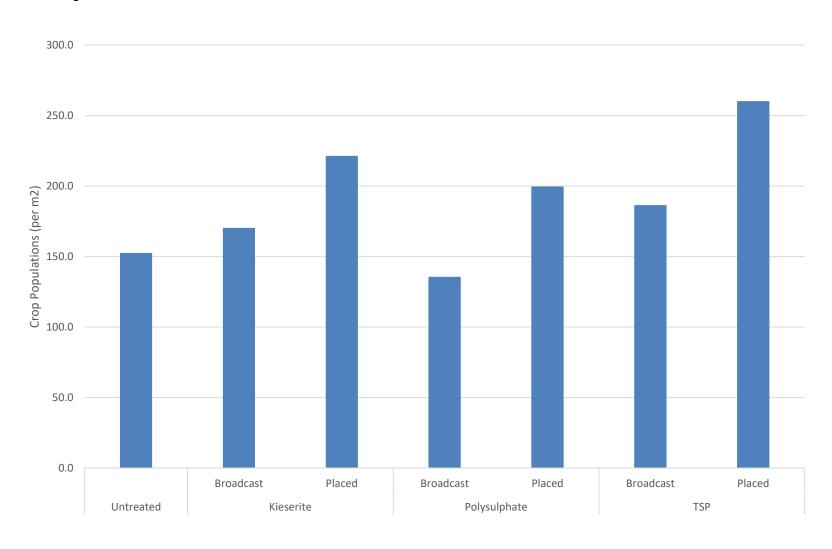
• This is after just one week – how do you predict the graph will change?

Placed

TSP

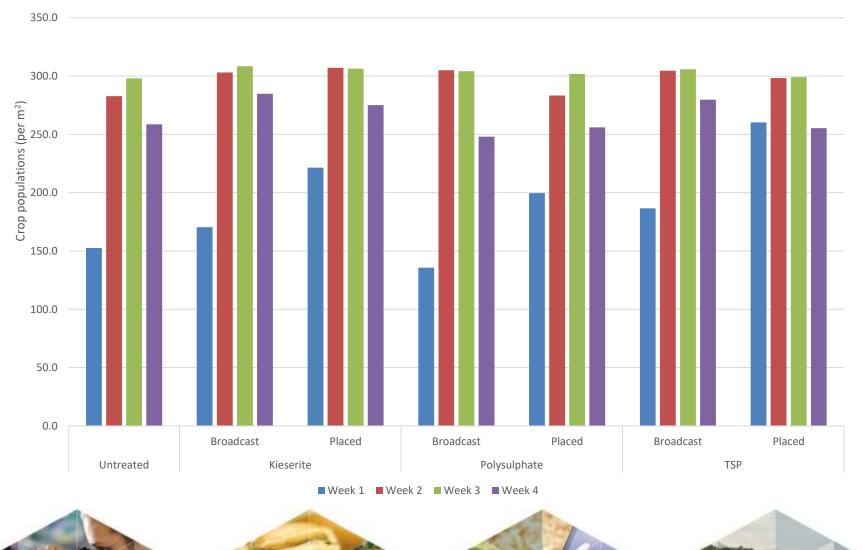
Placed

Crop Population





Crop Populations



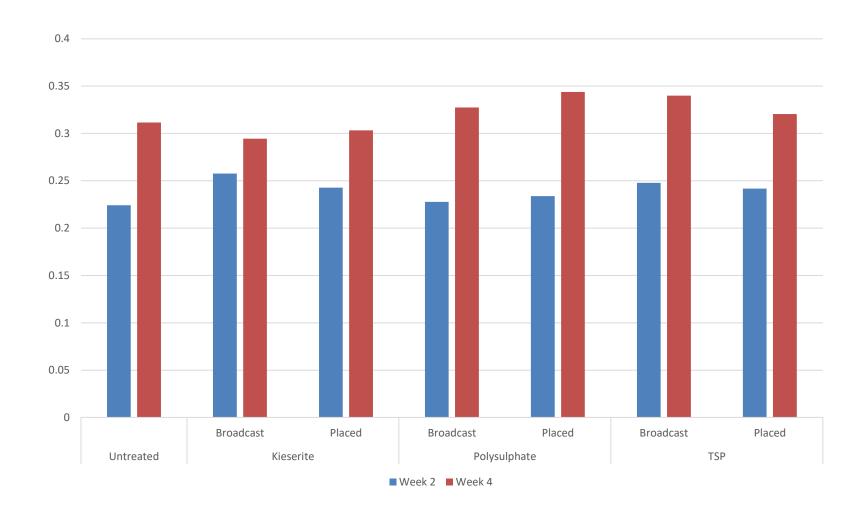


NDVI

- Specialist scanners to assess the amount of green area
- Use a canopy cover app loads about
- Only 2D so will under estimate differences



NDVI





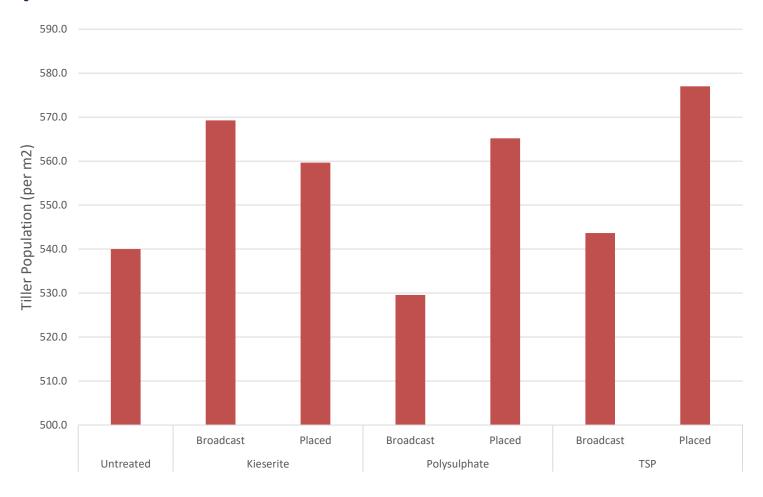
Tiller Populations

- Assessed before Christmas
- Assessed numbers of plants, and tillers at the same time
- Second tiller count to assess over-winter losses

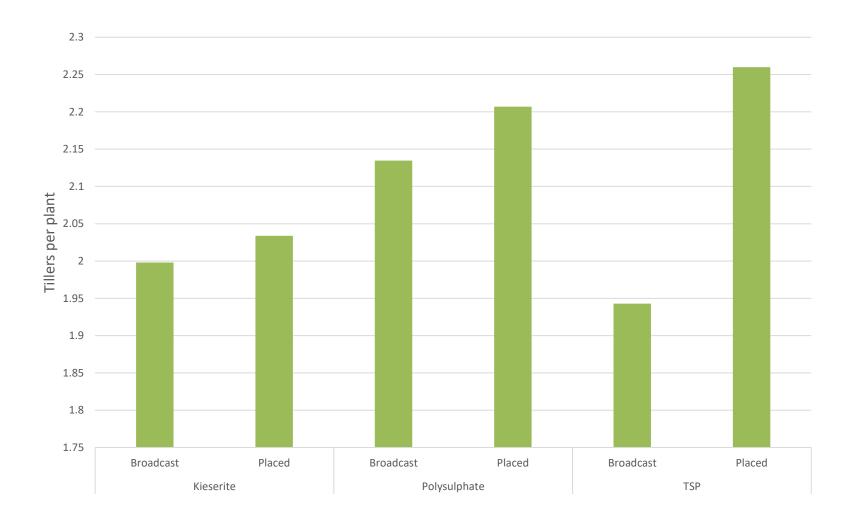




Tiller Populations







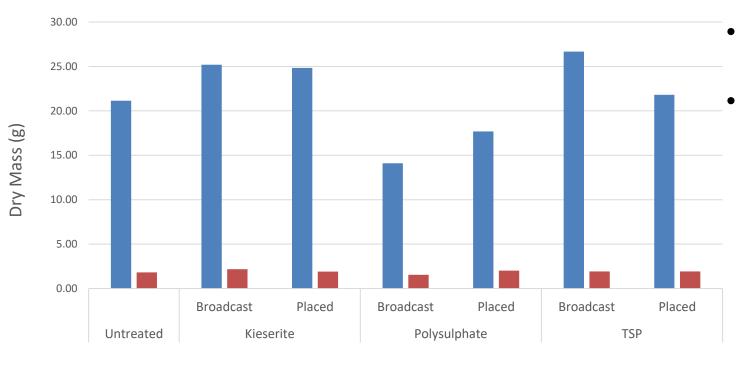


Biomass

- Destructive sampling of shoots and roots (as much as possible)
- Each sample was washed, and shoots separated from roots
- Air-dried and fresh weight taken
- Oven dried and dry weights taken



Crop Biomass

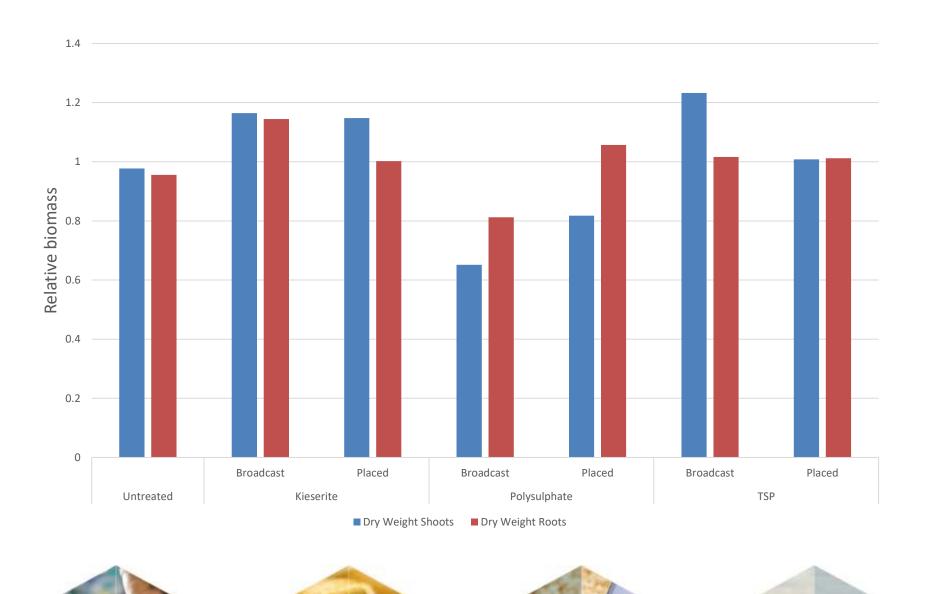


Shoots

Roots

What can this graph tell us?
Can you think of a better way to display information on crop biomass?







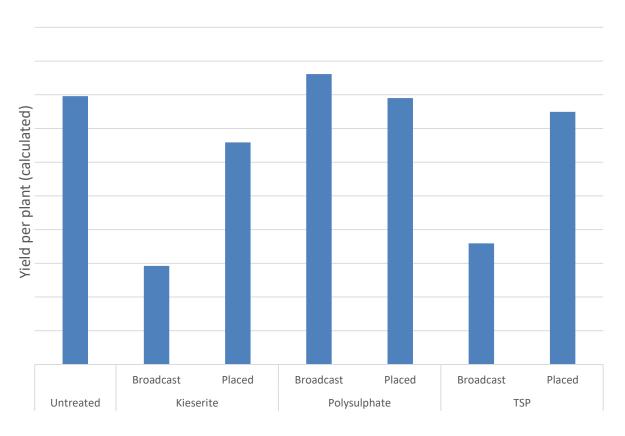
Crop Yield

- Assessed using on-combine yield monitor
- Isolated each plot to calculate yields using software



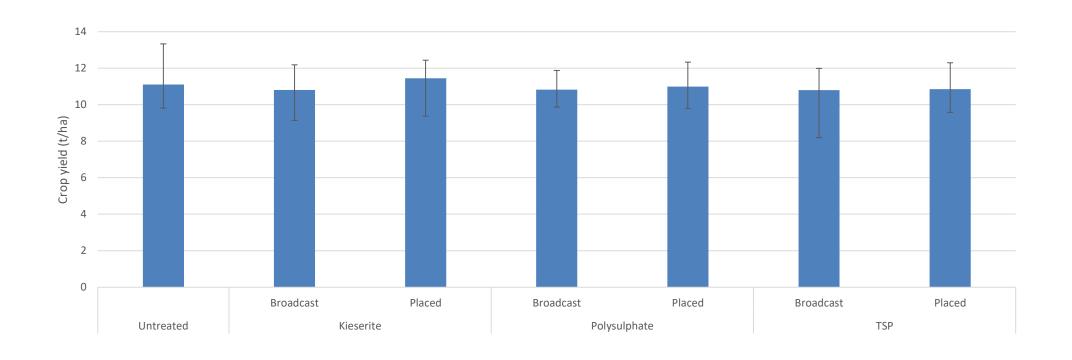


Crop Yield – per plant



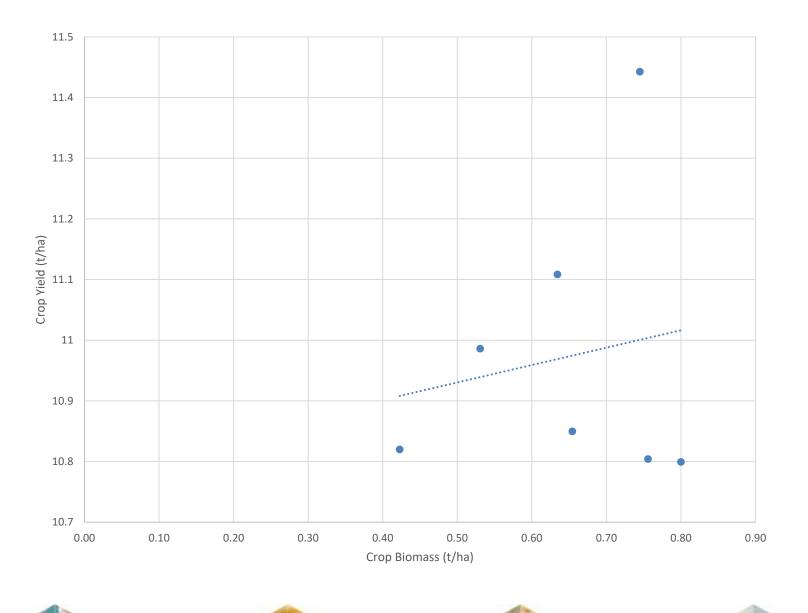
- Is this an acceptable way of presenting yield data – is it fair?
- Is yield the right metric to be comparing the use of starter fertilisers?













Economic cost of production

Product	Technique	£/t
Untreated		74
Kieserite	Broadcast	84
	Placed	76
PolySulphate	Broadcast	84
	Placed	80
TSP	Broadcast	85
	Placed	81



Summary

- Starter fertiliser when placed next to the seed can increase speed of emergence. This may be very useful!
- Inconsistent reaction from other metrics
 - Biomass
- No statistical response to yield
- Costs more to produce!
- Not a silver bullet
 - Feed to need



Tips for tramline trials

- Test less things, better
- Think about what you expect to see
- In-season assessments are easy but take time
 - Test less things, better
 - Assess similar areas
- Mark everything on a map!





WORKSHOP: Pests and natural enemies

Mark Ramsden, ADAS















Strategic Cereal Farm East 2019

Pests and natural enemies

Dr Mark Ramsden

26 November 2019 www.adas.uk

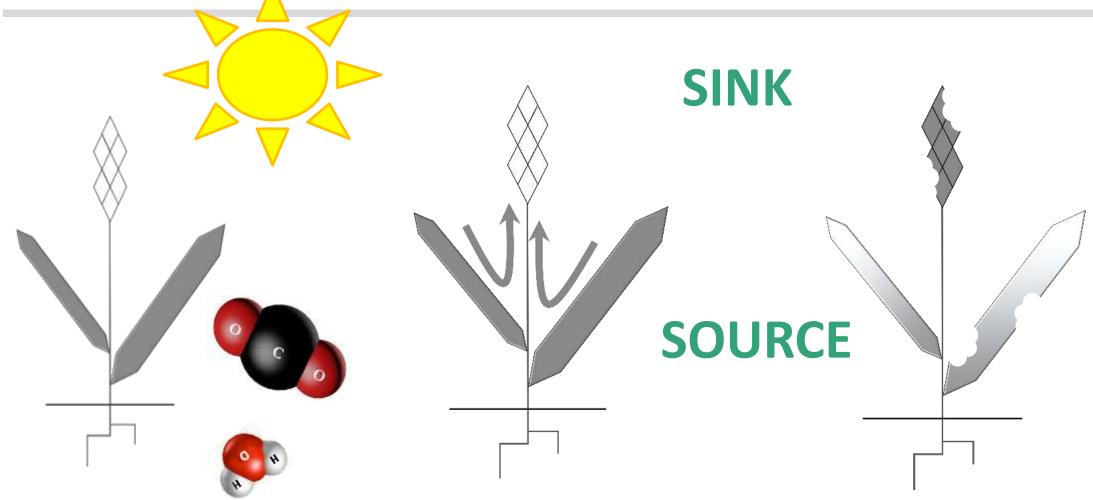


Everything Varies

Given the underlying variation... how can we make management decisions?

A little bit of crop physiology...

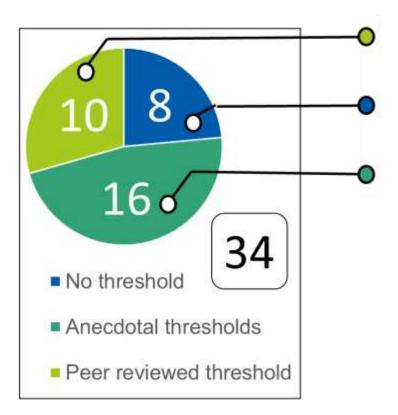




Pest thresholds



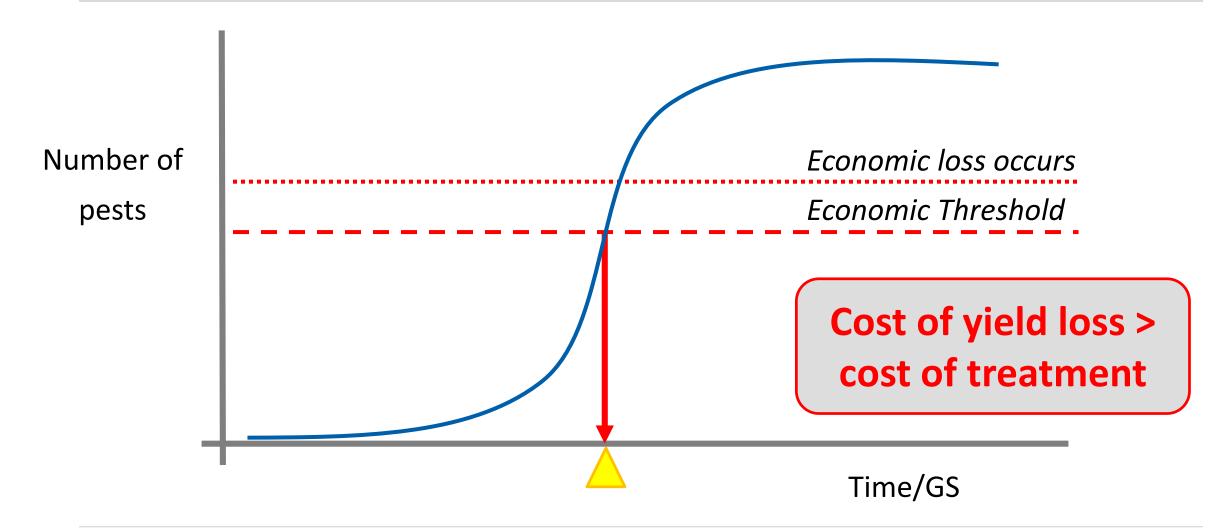
A review of economic thresholds



Ramsden et al. (2017) Crop Protection 96, 30-43

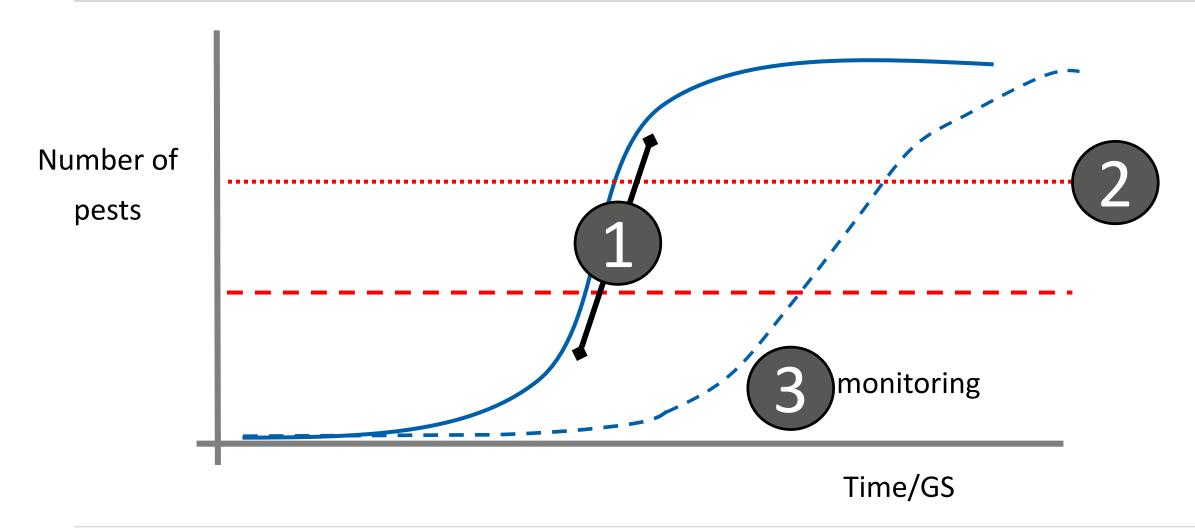
Thresholds





How to use thresholds





Minimising risks



- 1. Reduce pest population growth rate
- 2.Increase the economic thresholds
- 3.Increase monitoring

1. Reduce pest population growth rate



Population growth rate is affected by:

- Initial population size

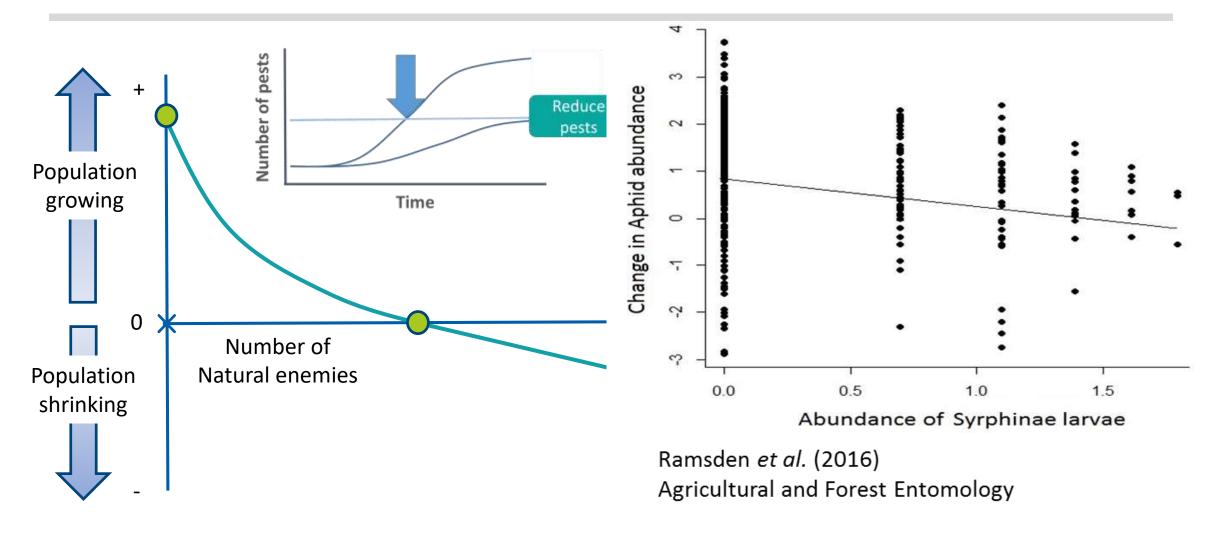
 Weather, over winter habitat, predation
- Birth rate
 Weather, quality of food supply
- Mortality rate
 Weather, quality of food supply, predation

Previous crop Surrounding crops Non-crop habitats

Conservation
Biological Control

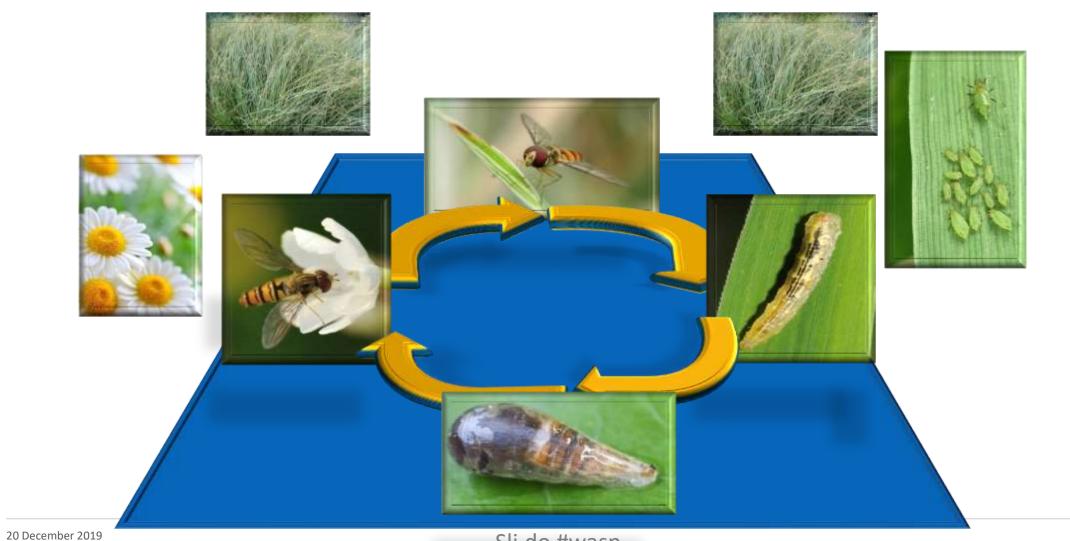
Conservation Biological Control





Conservation Biological Control



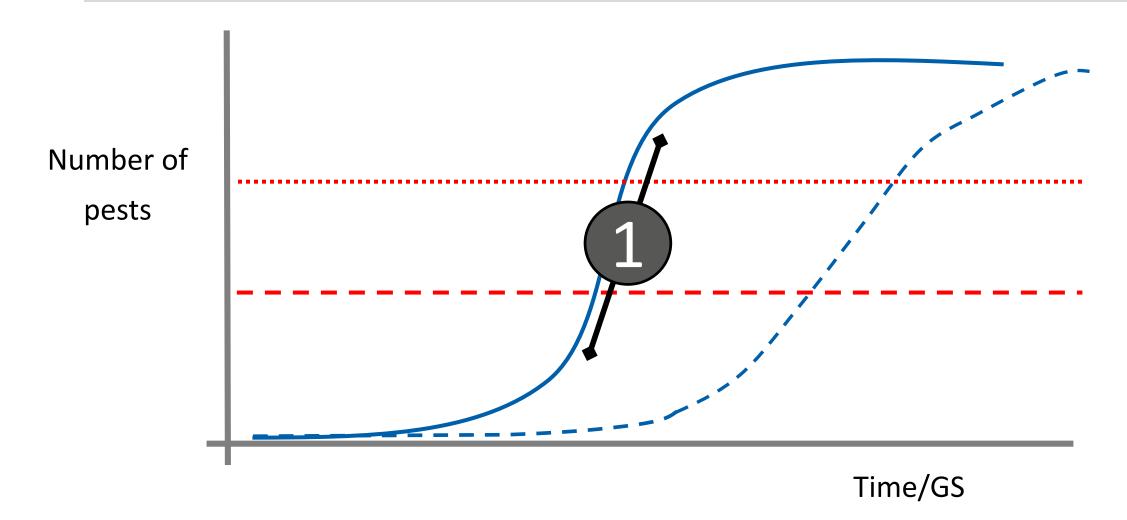


Sli.do #wasp

131

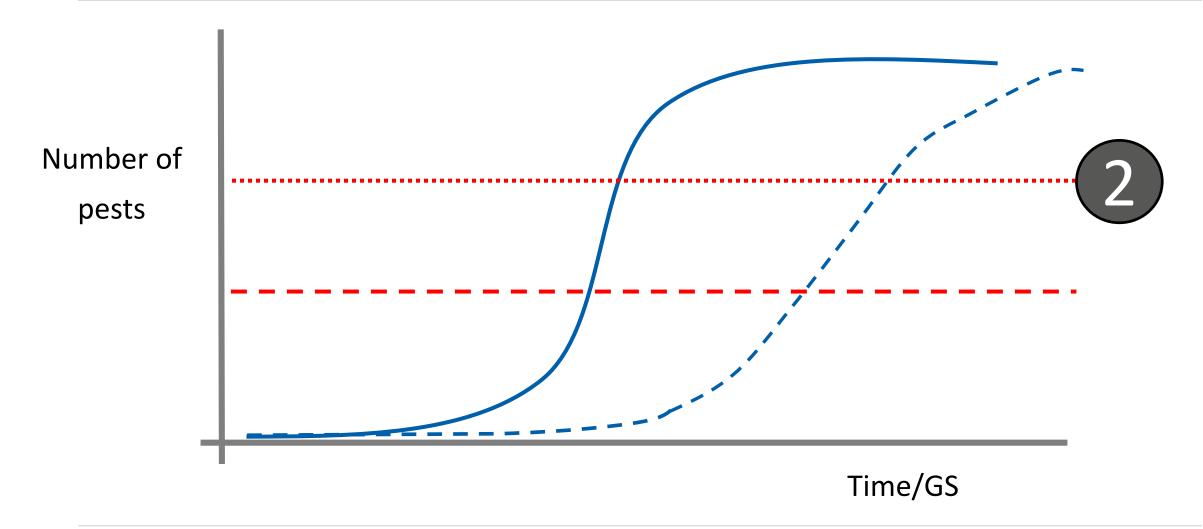
How to minimise risks





How to minimise risks





2. Increase the economic thresholds



Select more tolerant/resistant varieties

i.e. increase number of pests before yield loss > cost of treatment

Accept more yield loss

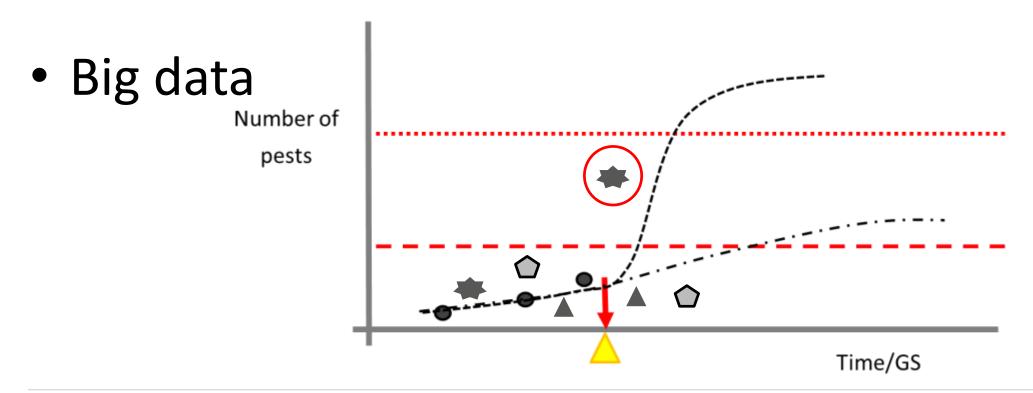
i.e. increase cost of treatment or accept lower yields



3. Increase monitoring



Gives more confidence in using threshold



SFE work



Pests and beneficials

Looking at distribution and diversity of pests, beneficials and other invertebrates

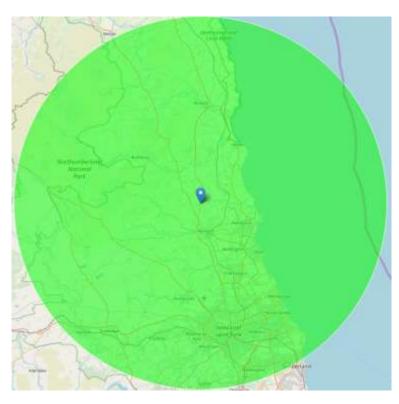
New AHDB-funded BYDV project

- Optimising monitoring for BYDV
 - Identify zone of 'reliability' around suction traps
- Development of both a BYDV risk DSS and a BYDV spray DSS
 - Validating DSS in tramline trials

Obj. 1.1 – Plan



Newcastle zone



- Three suction traps per year.
- Monitor 12 wheat/barley crops around each suction traps
 - Approx. 10, 20 and 40 km away.
 - North, east, south and west.
- Water and sticky traps.
- Count BYDV aphids and test for virus.

Obj. 2.4 – DSS tramline trials - methods



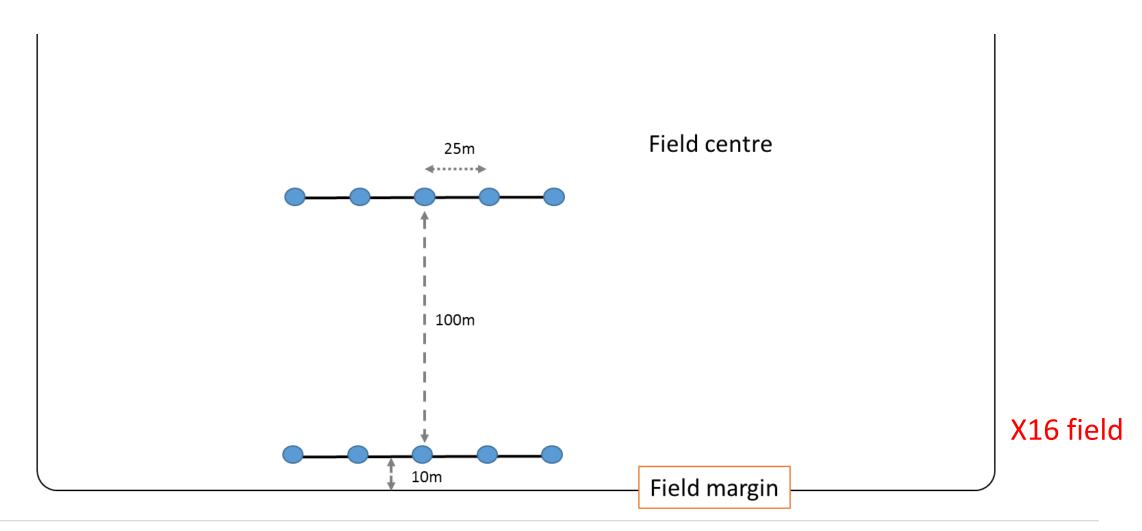
Methods:

- Four replicated BYDV mgmt. treatments:
 - 1. Kendall *et al.* (1992) DSS
 - 2. Morgan (2000) DSS
 - 3. AHDB Tsum DSS
 - 4. No insecticides



2019/20 Pests and natural enemies

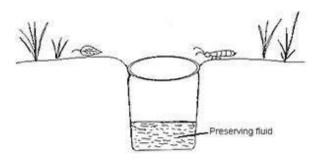




Pests and beneficials









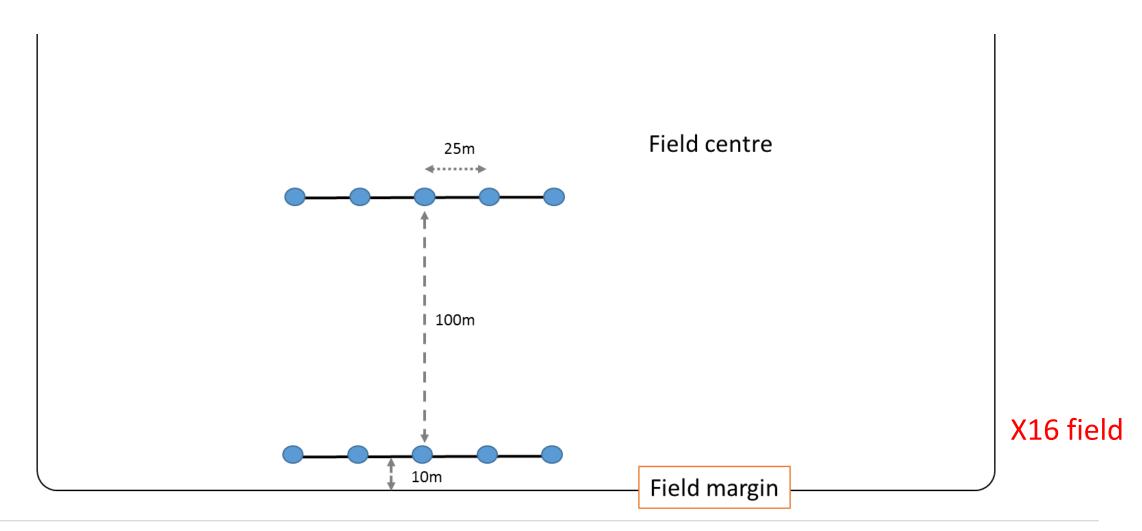






2019/20 Pests and natural enemies

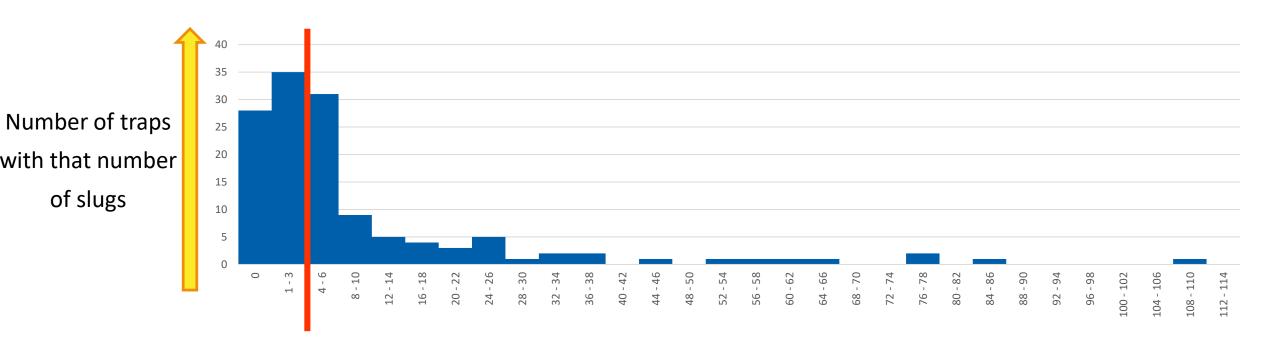




Slug data 2019



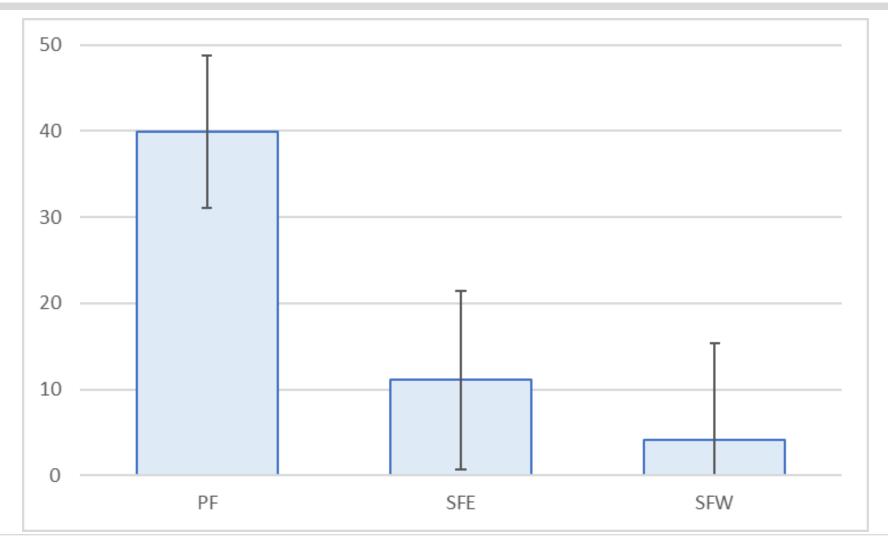
3 farms – 16 fields – two transects – 5 traps = 160 traps



Number of slugs per trap

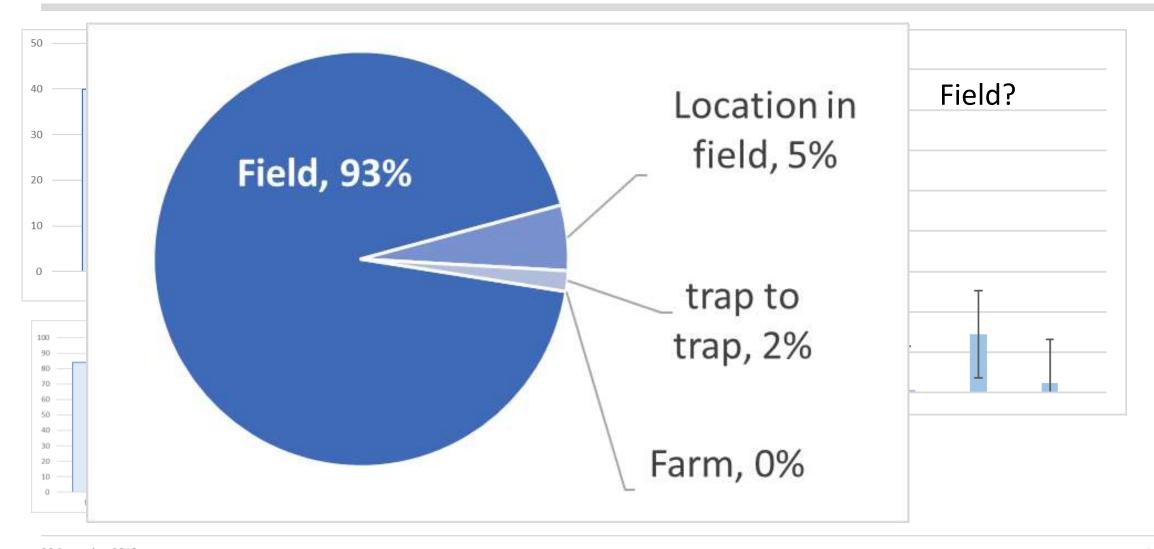
How do numbers of slugs differ between farms?





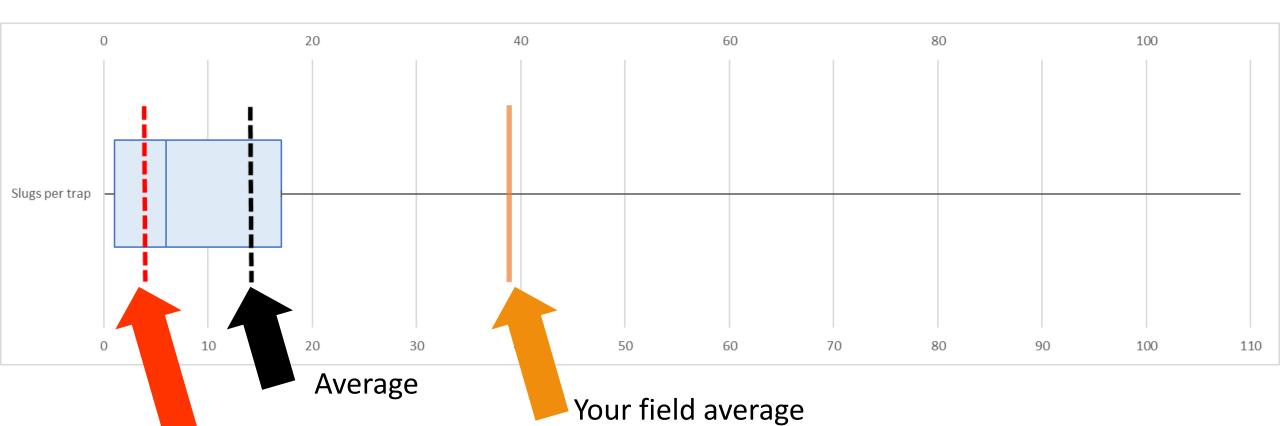
What is driving variation?





Benchmarking





Threshold

What you can do...



1.Look and see

2.Count and reflect

3. Share and compare

20 December 2019 146



Pests and natural enemies in 2020...

- What will you keep doing?
- What will you start doing?
- What will you stop doing?

What can you do?



- 1. Promote beneficial insects
 - Aim to create a diverse, robust environment across your farm
- 2. Use thresholds, but be aware of their limitations
- 3. Monitor your crops.

Principles of IPM (Sustainable Use Directive 2009/128/EC)



- 1. Suppression of pest should be supported by non-chemical options.
- 2. Pests must be monitored.
- 3. Monitoring should guide regional specific use.
- 4. Satisfactory non-chemical methods must be preferred.
- 5. Pesticides should be targeted.
- 6. Keep the use of pesticides to levels that are necessary.
- 7. Anti-resistance strategies should be applied.
- 8. Monitor the success of the applied plant protection measures.



Strategic Cereal Farm West – Introduction and demonstration update

Rob Fox, Strategic Cereal Farm Host





Rob Fox Farm Manager, Squab Hall Farm, Leamington Spa

- Originally from family dairy/arable farm
- HND at Seale Hayne Agricultural College
- Back home for 6 years
- 2 years as operator on 2500 acre arable business
- 9 years as Farm Manager at Squab Hall Farm
- AHDB Monitor Farmer 2014 2017
- AHDB Strategic Farmer 2018 2024





Rob Fox Farm Manager, Squab Hall Farm, Leamington Spa

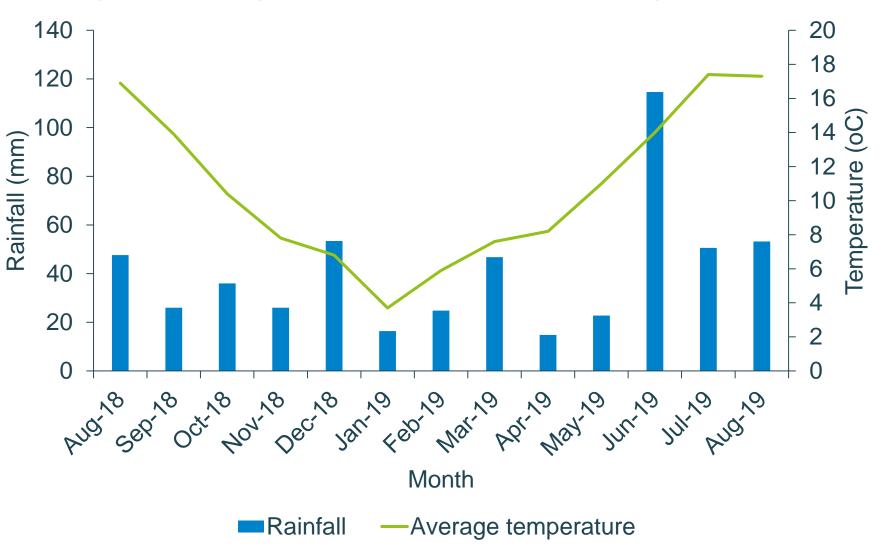
- 1000 acres arable
- 900 acres cropped
- Part of 1800 acre Arable Joint Venture
- HLS Going into CSS Jan 2019
- Manager and 1 full time plus harvest casuals
- 90kw solar, looking into other renewables
- Extensive diversification in national/international removals, storage & van hire





Weather summary: 1 August 2018 - 31 August 2019

- 533 mm of rainfall
- max temp 35.9°C (July 2019)
- min temp -7.7°C (January 2019)





Why did I want to be a Strategic Farmer?

- Opportunity to learn from combining research and practical farming that has the potential to change the way we farm for the better
- Help farmers make real differences to their businesses and continue to be proud of our industry and the jobs we do
- Test research outputs in an independent, open, honest and transparent way
- Try out new strategies and develop practical solutions to address regional priorities and challenges



Key topics for Strategic Cereal Farm West

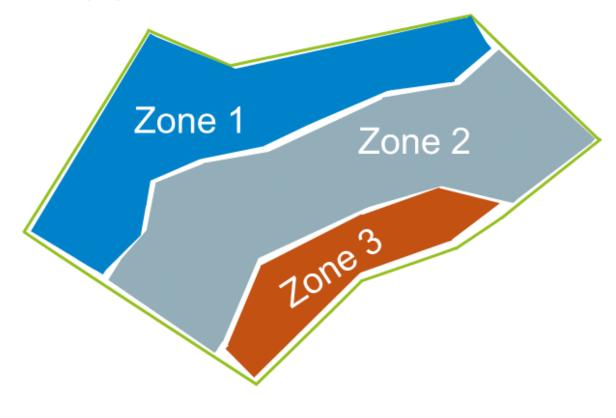
- What is good soil health and how do we measure it?
- The relationship between cultivations, crop rooting and yield
- How to put a true cost of crop establishment?
- How to boost soil fertility?
- How to use data to improve your business?
- Managed lower inputs: how low can you go before compromising yield?

What is good soil health and how do we measure it?

- Baseline soil properties were assessed on 9 fields across the farm and evaluated using the soil health scorecard
- The fields were divided into soil management zones according to the underlying soil variability (as identified using the farm soil texture maps)

Field name: Field 25

Area (ha): 10.5





Field 25: soil health scorecard

Key issues found in Field 25 are soil structure & earthworm numbers (particularly zones 2 & 3 associated with the heavier textures and below average organic matter contents)

Zone	1	2	3
Texture	clay	clay	clay
% clay	37	43	51
SOM (%LOI)	5.0	4.7	4.4
рН	7.5	8.1	8.1
Ext. P (mg/l)	18	13	21
Ext. K (mg/l)	344	375	433
Ext. Mg (mg/l)	849	708	675
VESS score (limiting layer)	3	4	4
Bulk density (g/cm ³)	1.17	1.26	1.28
Earthworms (number/pit)	6		2
PMN (mg/kg)	98	112	88
Respiration (mg CO ₂ -C/kg)	215	169	166

Note: benchmarks are subject to review



No action needed





Investigate

Overall evaluation across all fields on the farm AHDB (field averages)



Field number	2	6	16	13	15	25	42	7	49
Crop	WW	WW	WW	WW	WW	Sba	OSR	WW	WW
	sandy	clay					clay	sandy	clay
Texture	loam	loam		С	lay		loam	loa	m
SOM (%LOI)	3.7	4.3	6.6	5.0	4.1	4.7	7.4	4.0	5.6
рН	6.1	6.6	7.4	7.1	7.3	7.9	7.5	6.6	6.6
Ext. P (mg/l)	42	53	23	20	21	17	32	47	19
Ext. K (mg/l)	233	288	233	331	202	384	455	244	160
Ext. Mg (mg/l)	169	490	707	1089	812	744	178	301	175
VESS score	2	3	3	3	3	3	3	3	2
Bulk density (g/cm ³)	1.31	1.30	1.20	1.27	1.36	1.24	1.20	1.35	1.20
Earthworms (number/pit)	9	11	6	10		3	6	7	8
PMN (mg/kg)	54	63	49	58	53	100	126	64	64
Respiration (mg CO ₂ -C/kg)	133	124	106	145	117	183	184	158	192

What is good soil health and how do we measure it?

AHDB

- Both Visual Evaluation of Soil Structure (VESS) and bulk density showed evidence of some compaction across the farm, with poorer structure observed on the heavier textured soils
- Earthworm numbers were depleted in a number of fields



Field 15 Zone 3 Shallow cultivation Sq 4 'compact'



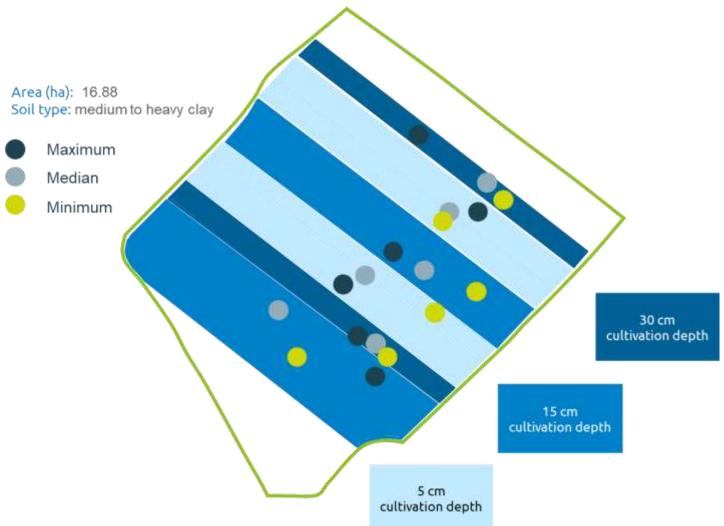
The relationship between cultivations, crop rooting and yield

Start date: 19 October 2018

End date: 8 August 2019

 Replicated tramline trial of 3 cultivation depths (5, 15 and 30 cm)

Winter wheat var.
 Graham





Soil health scorecard

Treatment (cultivation depth)	5cm	15cm	30cm
Texture	Clay	Clay	Clay
% clay	38	39	39
SOM (%LOI)	4.1	4.1	4.1
рН	7.2	7.0	7.7
Ext. P (mg/l)	20	26	16
Ext. K (mg/l)	192	199	216
Ext. Mg (mg/l)	712	821	902
VESS score (limiting layer)	4	3	3
Bulk density (g/cm ³)	1.38	1.33	1.37
Earthworms (total number)	2	3	4
PMN (mg/kg)	50	45	65
Respiration (mg CO ₂ -C/kg)	121	121	110



The relationship between cultivations, crop rooting and yield



	5 cm	15 cm	30 cm
Yield (t/ha)	10.90	11.61	11.10
Variable Costs			
Total seed costs (£/ha)	76.57	76.57	76.57
Total fertilisers (£/ha)	183.06	183.06	183.06
Total crop protection (£/ha)	204.75	204.75	204.75
Total variable costs (£/ha)	464.38	464.38	464.38
Fixed costs			
Total labour, machinery and equipment (£/ha)	485.68	499.47	532.03
Total property and energy costs (£/ha)*	72.69	76.82	70.72
Total administration costs (£/ha)*	30.08	31.79	29.26
Cost of production (per hectare)			
Full economic cost of production (£/ha)	1,052.83	1,072.46	1,096.39
Cost of production (per tonne)			
Full economic cost of production (£/t)	96.59	92.37	98.77

^{*}These costs are the West regional averages from Farmbench for harvest 2018

- Shallow cultivation, to a depth of 5 cm, increased topsoil strength, which was associated with a steeper root angle that led to greater rooting in the subsoil
- Subsoil properties had a greater impact on measured crop traits than cultivation depth
- At harvest there were no significant yield differences

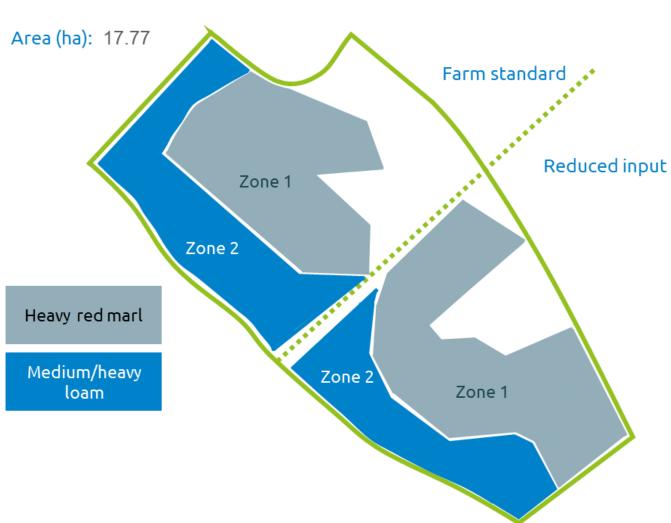




Start date: 12 October 2018

End date: 4 August 2019

- Split field trial
- Winter wheat variety Graham
- Deep tine to 8 inches, discs, drill and roll



Managed lower inputs: how low can you go before compromising yield?



	Farm standard	Low input
Yield (t/ha)	11.03	10.91
Variable Costs		
Total seed costs (£/ha)	23.00	6.25
Total fertilisers (£/ha)	150.79	150.79
Fungicides (£/ha)	80.30	61.60
Total crop protection (£/ha)	179.73	158.73
Total variable costs (£/ha) (direct)	353.52	315.77
Fixed costs		
Total labour, machinery and equipment (£/ha)	499.47	499.47
Total property and energy costs (£/ha)*	70.56	69.32
Total administration costs (£/ha)*	29.97	29.67
Cost of production and margins (per hectare)		
Full economic cost of production (£/ha)	953.52	914.23
Cost of production (per tonne)		
Full economic cost of production (£/t)	86.45	83.80

^{*}These costs are the West regional averages from Farmbench for harvest 2018

- There was no significant difference in yield between the farm standard and low input treatments
- However, large differences were observed between soil types



Thank You – Any Questions?

@SquabRob

ahdb.org.uk/farm-excellence

cereals.ahdb.org.uk/strategicfarms





Strategic Farm East Results Day Summary

Emily Pope, Knowledge Transfer Manager Arable





Results Day summary

1. The impact of cover crops on nitrogen losses and crop yields

A well-established cover crop is effective at improving water quality by bringing nitrate concentrations in drainage water below 50 mg/l

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

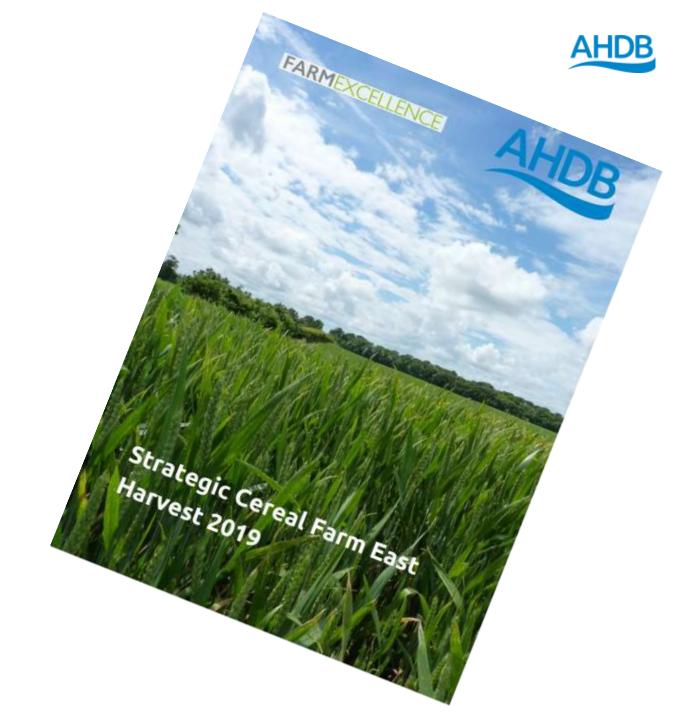
Using a starter fertiliser may improve initial crop establishment in late-sown crops, with placement alongside the seed tending to give the best results. There is limited evidence to show that using starter fertilisers will contribute to substantial and consistent improvements in yield.

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

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.

Keep up to date

ahdb.org.uk/farm-excellence





Harvest 2020 Demonstration Introduction

Emily Pope, Knowledge Transfer Manager Arable







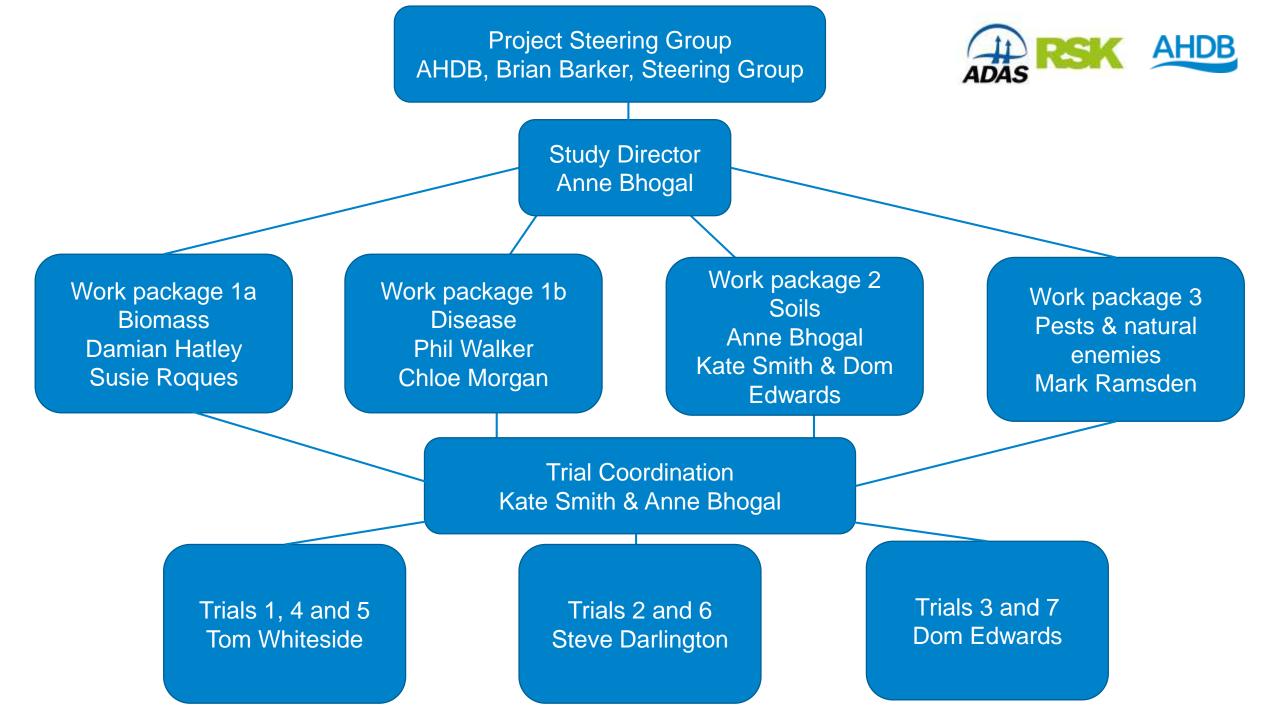




Proposed trials, subject to change due to ground conditions

- 1. Managed lower inputs
- 2. Early crop biomass
- 3. Cover crops
- 4. Flowering strips
- 5. Very low inputs
- 6. Variable rate nitrogen
- 7. Repeat baselining







1. 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

- 5 varieties
- 4 fungicide programmes: high, medium, low and untreated
- 2 replications

Assessment schedule

- Disease at GS30, GS31-33, GS39, GS61-65, GS71
- Yield
- Topsoil analysis
- Slug and pitfall traps
- Aphid & natural enemies at GS60



2. 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

- From GS10 weekly (n.4) plant counts
- 2 and 4 weeks post emergence biomass and tissue analysis
- GS21-25 plant counts, biomass and tissue analysis
- Yield
- Topsoil analysis

Field name	Wyverstone Road	Crown
Field size (ha)	13	10
Soil type	Sandy loam	Loamy sand
Treatments	Untreated, TSP, Kieserite, PolySulphate	Untreated, TSP, Kieserite, PolySulphate
Application method	Broadcast	Places
Number of replicated	1	1
Total number of plots	4	4



3. Cover crops

To determine the role of cover crops in reducing nutrient leaching; a continuation of the harvest 2019 demonstration

- Pre cover crop: Topsoil analysis & soil mineral N (SMN)
- Cover crop establishment: NDVI, slug, pitfall traps
- Spring 2020: soil structure, SMN, N uptake, earthworms
- Spring crop establishment: NDVI
- GS60 aphid & natural enemies
- Harvest 2020: N uptake, yield

Field name	Apple Tree	Blacksmith
Field size (ha)	10	7
Soil type	Sandy loam	Sandy loam
Treatments	 Ploughed bare soil over winter Plough + cover crop 	3. Stubble 4. Cover crop established into stubble
Harvest 2020 crop	Spring barley	Spring barley



4. Flowering strips



To determine the impact of perennial flower strips on pests and their natural enemies

- Topsoil analysis
- Slug & pitfall traps
- Sown & unsown species

Field name	Bottom 59	Top 59	Big Guinea Row
Treatment	Within field and field edge strips	Field edge flower strips	Farm standard
Soil type	Sandy clay loam		



5. Very low inputs

To determine the effect of reduced pesticide input applications on pest, weed and disease

- 1 field: Tom Dixon
- Sandy loam
- Winter wheat

Assessment schedule

- GS30, GS31-33, GS39, GS61-63 and GS71 disease assessments
- Topsoil analysis
- Slug assessment & pitfall traps
- Aphid and natural enemies
- Yield



6. Variable rate nitrogen

To determine the cost-effectiveness of variable rate nitrogen on high and low biomass areas

- GS10, GS30, GS31-33, GS39, GS61-65 and harvest biomass/yield assessments
- Topsoil analysis
- GS60 aphid & natural enemies

Field name	Shrubbery	Paddy	
Field size (ha)	13	9	
Soil type	Sandy loam		
Treatments	 Flat N-rate Variable N: more N applied to higher biomass 	3. Flat N-rate 4. Variable N: more N applied to lower biomass	
2020 crop	Winter wheat		

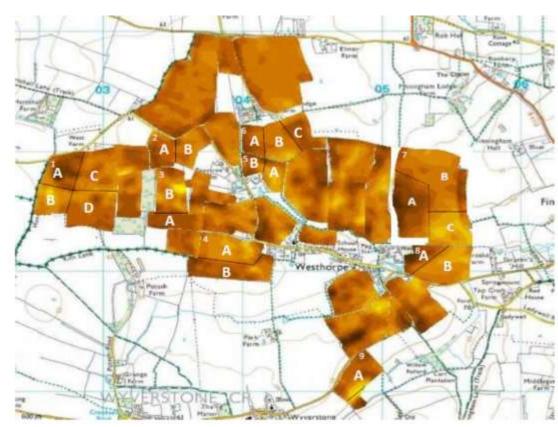


7. Repeat baselining

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

- Biomass at GS10, GS30, GS31-33, GS39, GS61-65 and harvest
- Earthworms
- VESS
- Bulk density
- Penetrometer resistance
- Topsoil analysis
- Slug, pitfall traps, aphid and natural enemies
- Drainage assessments





Farm Excellence

- 2 current Strategic Cereal Farms
- New Strategic Cereal Farm Scotland launching 2020
- Links with Monitor Farm programme





Any questions?





Closing remarks

Teresa Meadows, AHDB





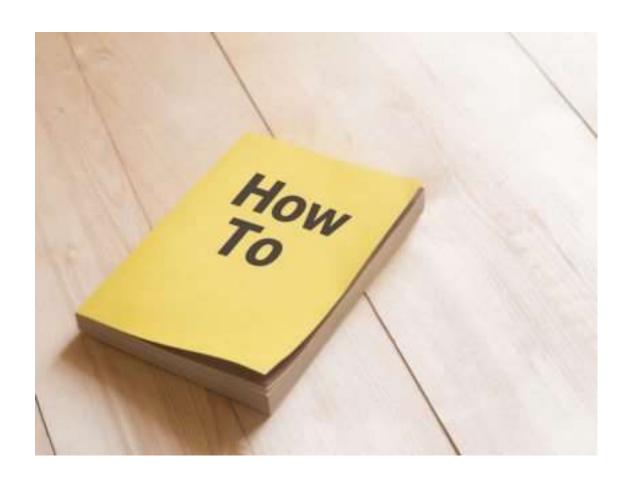
Take-home messages

What was your message to takehome back to your business or your clients from today?



How to guides





Your feedback



Let us or the Steering Group know what you think and any ideas for the future – demonstrations, events, visits etc?

Use your resource....





Sign up for newsletters, publications or to check your details here: ahdb.org.uk/keeping-in-touch



cereals.ahdb.org.uk and ahdb.org.uk



Webinars and AHDB Podcasts



Ask your question to AHDB researchers...

Work with us...



 New AHDB Cereals and Oilseeds Board members

New Monitor Farm - Fens

Agronomists' Conference



3 December 2019 – 4 December 2019

Leicester Marriott Hotel, Grove Park, Smith Way, Enderby, Leicester, Leicestershire LE19 1SW



Showcasing the latest research on Integrated Pest Management from experts, researchers and PhD students:

- presentations
- interactive workshops
- panel discussions

ahdb.org.uk/events/agconf19

Day 1: focus on cereals & oilseeds

Day 2: focus on potatoes



Cereals and Oilseeds – East Anglia







Strategic Cereal Farm East Open Day 2020

Thursday 4 June 2020

9:30 AM - 3.30 PM

Lodge Farm, Westhorpe, Suffolk IP14 4SZ

ahdb.org.uk/events



Thank you.

