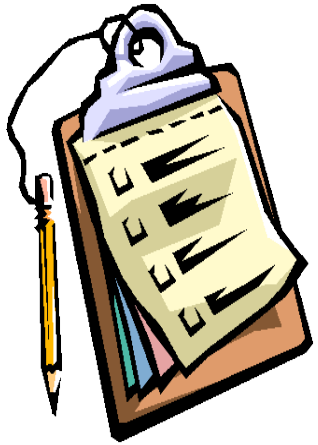
Strategic Cereal Farm West Results Day

Wednesday 11 December 2019

CEREALS & OILSEEDS

Housekeeping



@SquabRob
@Cereals_West
@emilypope_KT
@TheAHDB
#strategicfarm

BASIS
NRoSO

Programme

09:20 **Introduction and overview of harvest 2019 trials**
Rob Fox, AHDB Strategic Cereal Farm – West host

09:35 **What is good soil health and how do we measure it?**
Anne Bhogal, ADAS

10:00 **The relationship between cultivations, crop rooting and yield**
Damian Hatley, ADAS

10:25 **Refreshment break**

10:30 **Focus session 1**

11:45 **Managed lower inputs: how low can you go before compromising yield?**
Catherine Harries, AHDB

12:15 **Focus session 2**

13:20 **Panel session**

13:30 **Lunch & event close**

Monitor Farms - Farmer Led, Farmer Driven

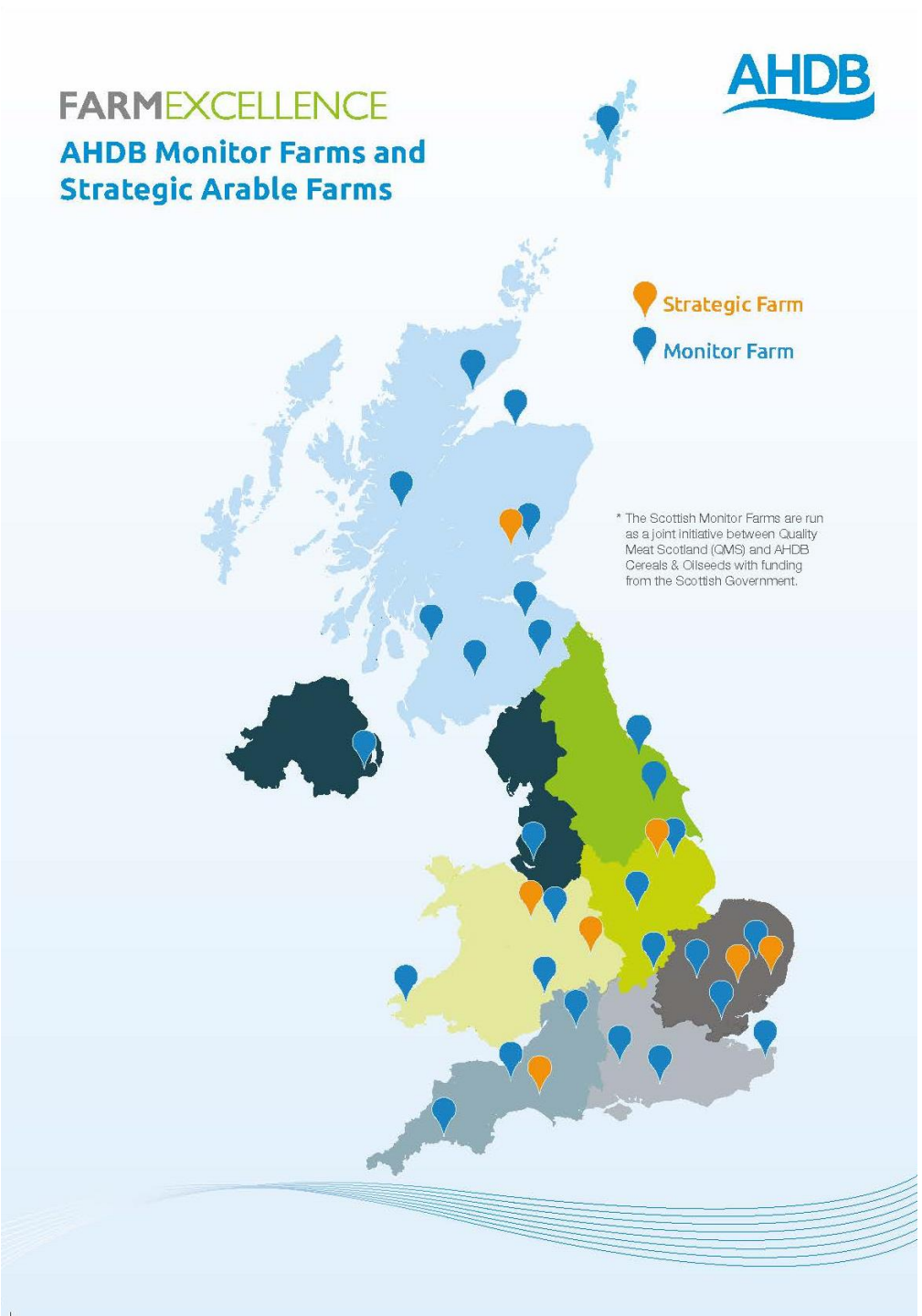
- Aimed at business, technical and personal development
- 4 to 6 open meetings per year over 3 years, plus closed benchmarking sessions

Strategic Farms - Putting research into practice

- Focus on improving arable productivity through the formal testing and demonstrating of innovative practices on a field or farm scale
- Aim to drive the adoption of innovation
- 3 open meetings per year over 6 years, plus closed group visits

Strategic Cereal Farms

- Putting research into practice
- Focus on improving arable productivity
- Structured testing and demonstrating of innovative practices on a field or farm scale
- 6 years
- Supported by Steering Group



Introduction and overview of harvest 2019 trials

Rob Fox, Strategic Cereal Farm West

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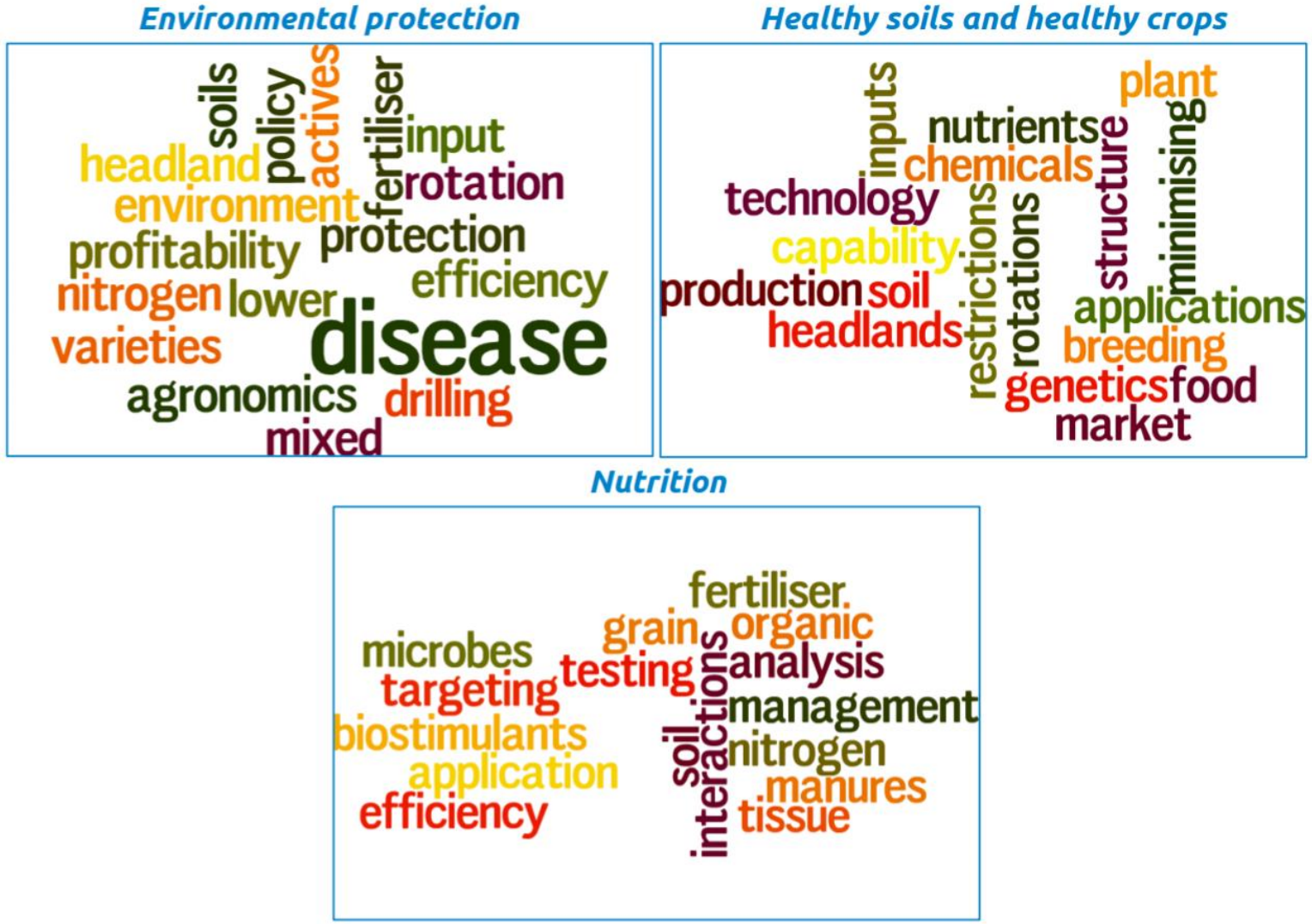
Rob Fox
Farm Manager, Squab Hall Farm, Leamington Spa

- 1000 acres arable, 900 acres arable cropping
- Part of 1800 acre Arable Joint Venture
- Varied Soils 15-65% clay
- Manager and 2 full time plus harvest casuals
- 9 years as Farm Manager at Squab Hall Farm
- CSS Jan 2019
- Extensive diversification in national/international removals, storage & van hire
- AHDB Monitor Farmer 2014 – 2017
- AHDB Strategic Farmer 2018 – 2024

Ideas from the launch meeting: 6 June 2018

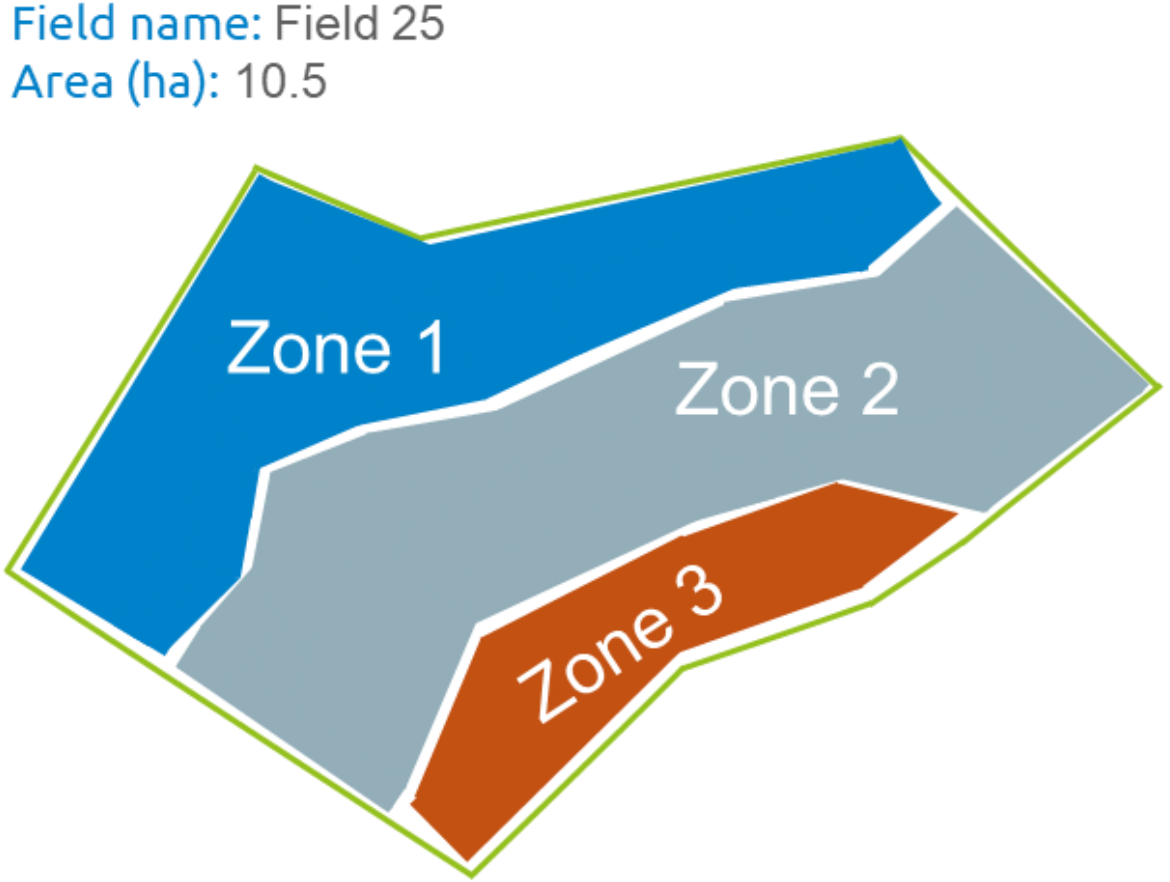


Strategic Cereal Farm West trials 2019-2020

1. **Baselining: soil health**
2. **Assessing the impact of cultivation depth on soil properties and rooting on winter wheat yields and quality**
3. **Determining the effect of reduced fungicide input regimes on production costs (and gross margins)**
4. Assessing the impact of cultivation depth on headland areas on soil health and crop productivity
5. Assessing the impact of nutrient applications on soil nutrition and crop performance
6. Determining the impact of perennial flower strips on beneficial insect populations, pests and weeds

Baselining: soil health

- 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 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)

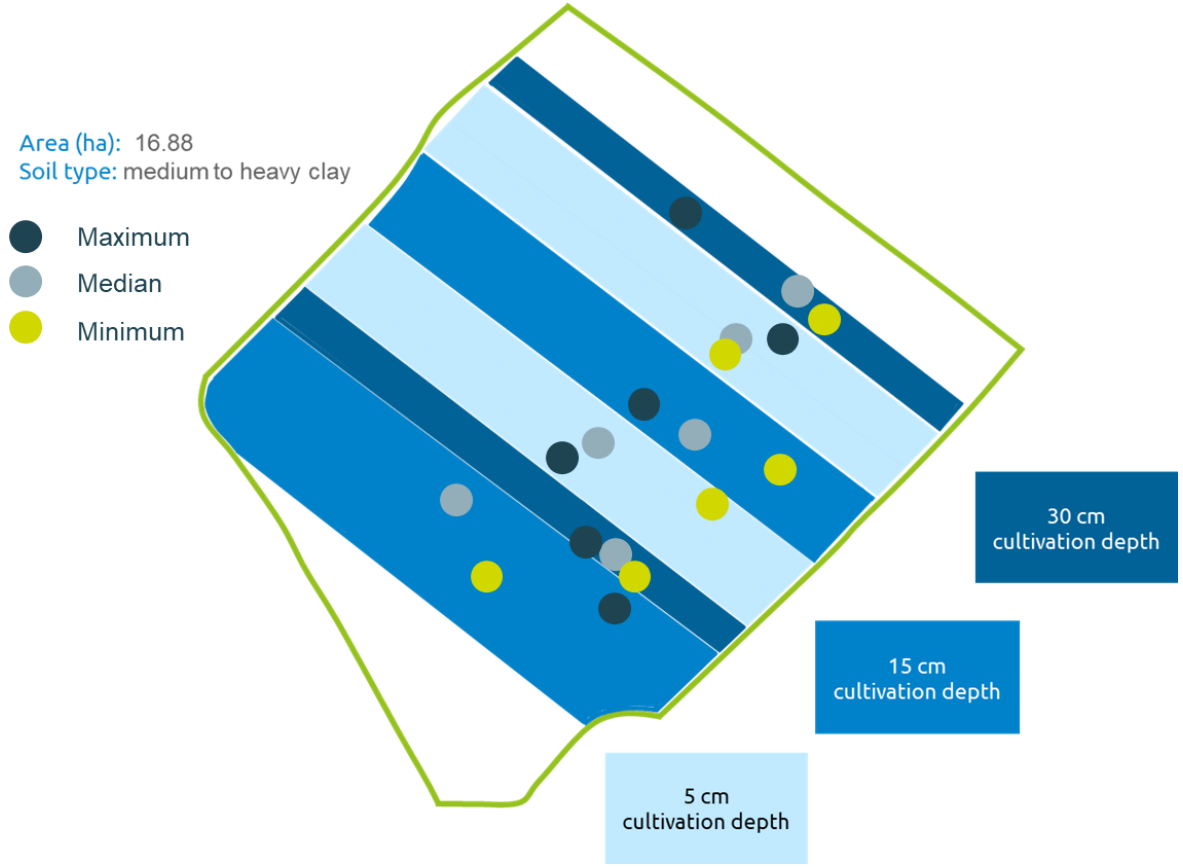
Zone	1	2	3
Texture	clay	clay	clay
% clay	37	43	51
SOM (%LOI)	5.0	4.7	4.4
pH	7.5	8.1	8.1
Ext. P (mg/l)	18	13	21
Ext. K (mg/l)	344	375	433
Ext. Mg (mg/l)	849	708	675
VESS score (limiting layer)	3	4	4
Bulk density (g/cm^3)	1.17	1.26	1.28
Earthworms (number/pit)	6	1	2
PMN (mg/kg)	98	112	88
Respiration (mg CO_2-C/kg)	215	169	166

Note: benchmarks are subject to review

No action needed Monitor Investigate

The impact of cultivation depth on soil properties and rooting on winter wheat yields and quality

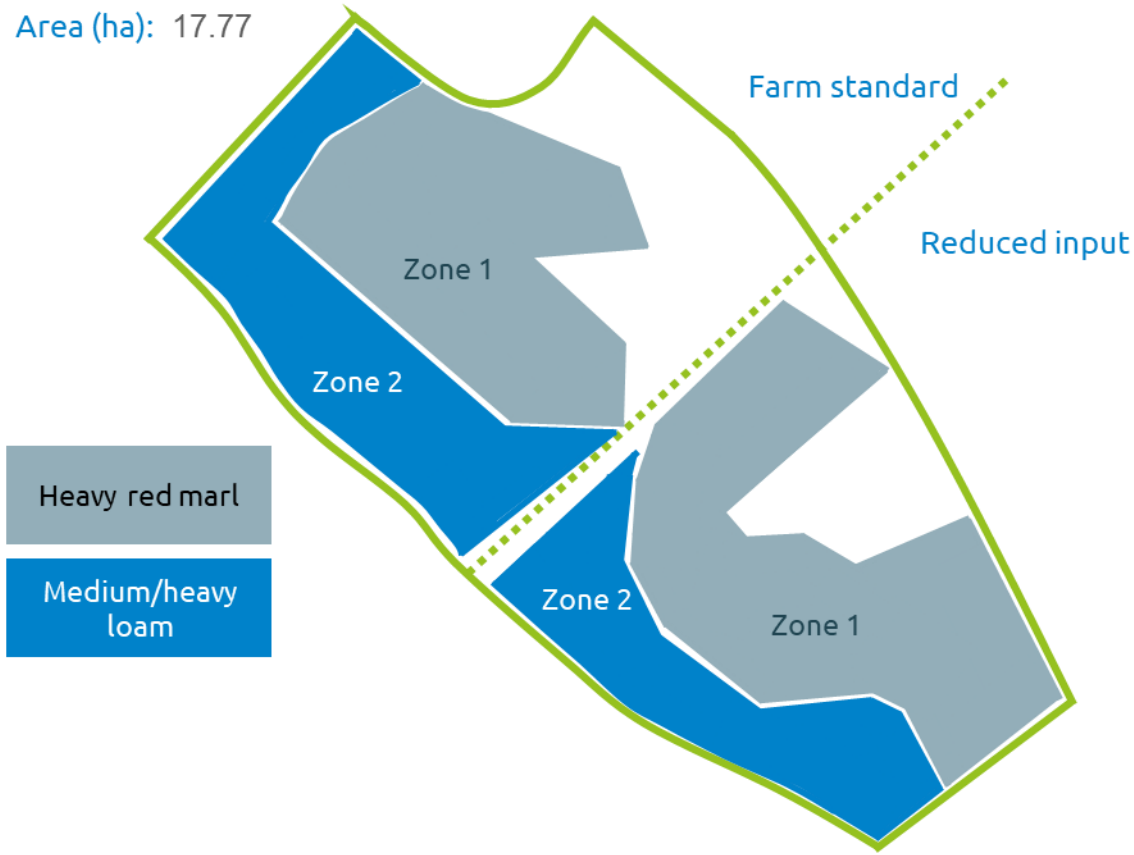
- Start date: 19 October 2018
- End date: 8 August 2019
- Replicated tramline trial of 3 cultivation depths (5, 15 and 30 cm)
- Winter wheat var. Graham



The effect of reduced fungicide input regimes

- Start date: 12 October 2018
- End date: 4 August 2019

- Split field trial
- Winter wheat variety Graham
- Deep tine to 6-8 inches, carrier, drill and roll



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

Anne Bhogal, ADAS

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Soil – your greatest asset

SOIL HEALTH

PROVISIONING:

- *Food & fibre*
- *Raw materials*

"The ability of a soil to act as a living system to sustain, in the long term, its most important functions ……'

CULTURAL

- *Archaeology*
- *Education & recreation*

SUPPORTING

- *Habitats & biodiversity*
- *Nutrient cycling*
- *Platform for infrastructure*

Assessing & managing soil health

- How do we know if a soil is healthy?
- What do we need to measure?
- How do we benchmark/interpret those measures?
- How can we improve soil health?

GREATSOILS

Soil Biology and Soil Health Partnership

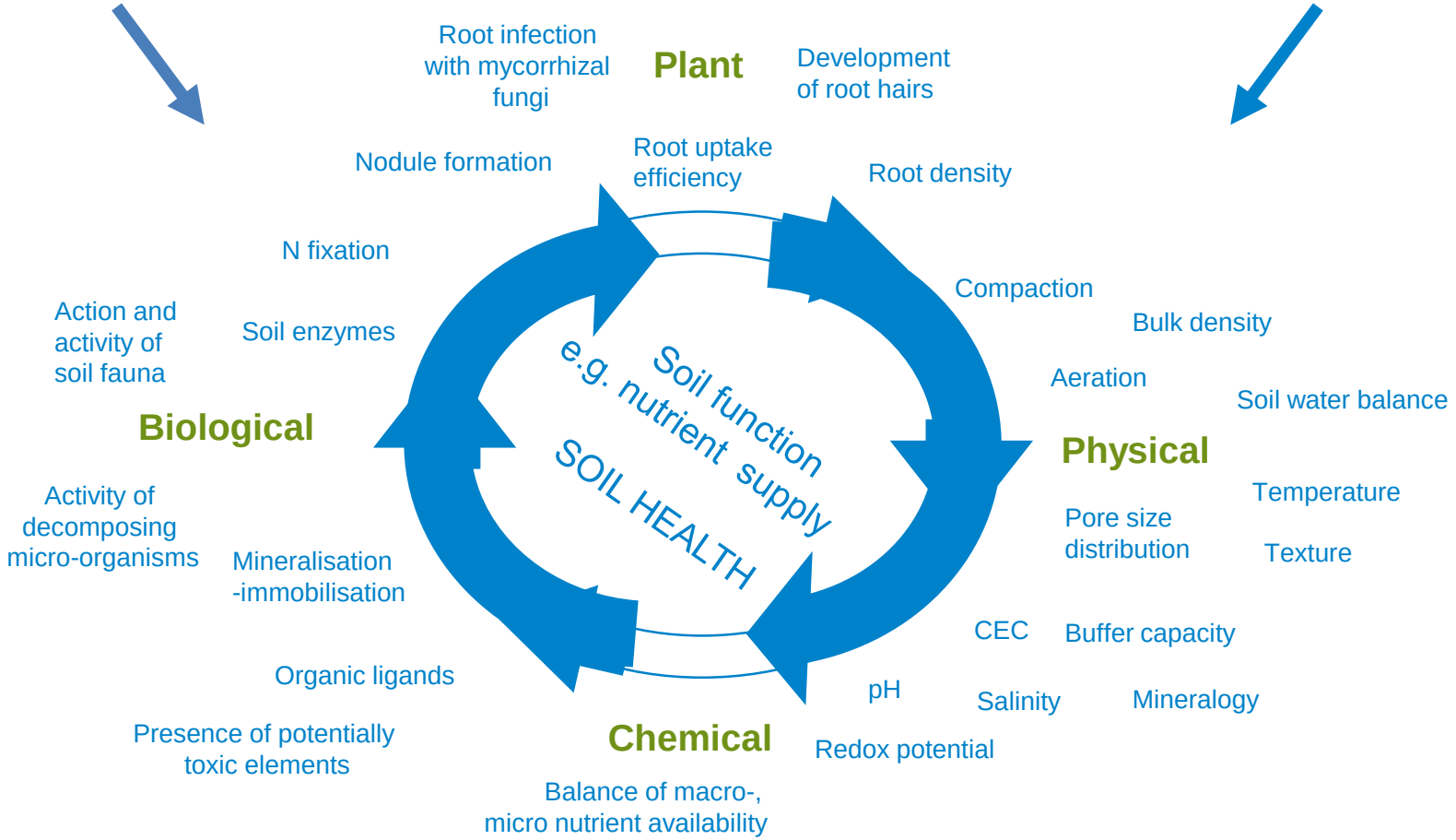
Research and Knowledge Exchange 2017-2021

What do we know?

Soils are complex!

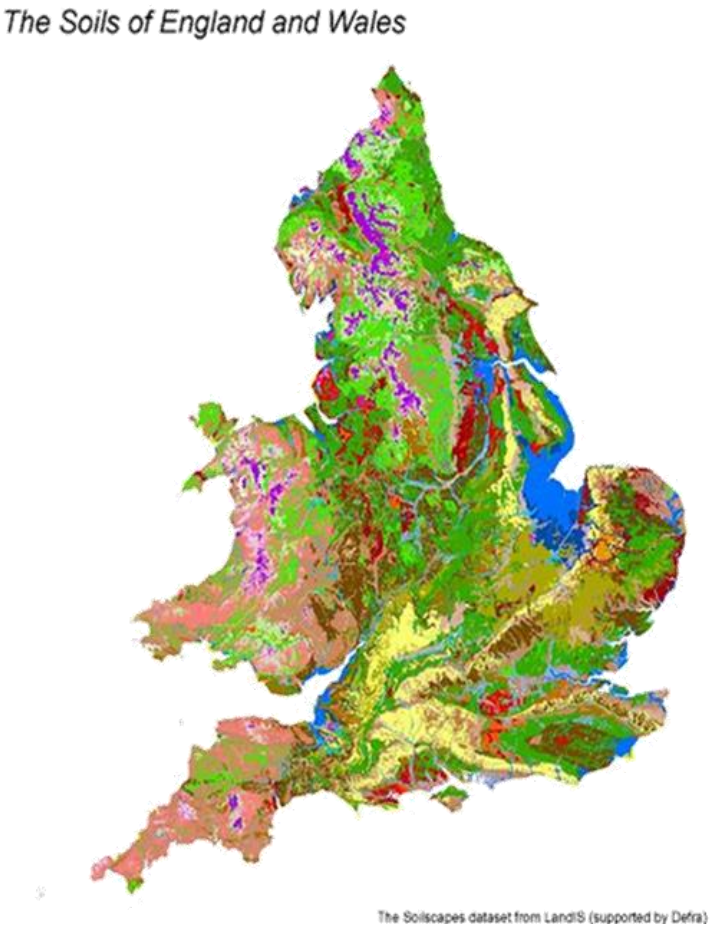
CLIMATE
Temperature, rainfall, evaporation;
where impact is mediated by
both amount and seasonality

NUTRIENT INPUTS
Fertiliser, manure, deposition;
where availability is mediated
by many of the same factors



What do we know?

Soils are very variable!

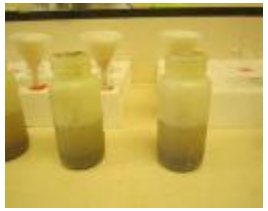


Variation in soil texture at AHDB Strategic Farm West, field 42 (32 ha)

Assessing soil health

Physics ⇄ Biology

Chemistry



Putting it all together will need a different approach to sample collection – linking physical observation and soil samples sent for testing

Assess on rotational basis at a similar time & from same location in the field.

Testing and developing measures of soil quality

Indicators of soil health ('SQIs'):

Defra projects – 7 physical indicators (42 'candidates'); 21 biological indicators (183 'candidates')

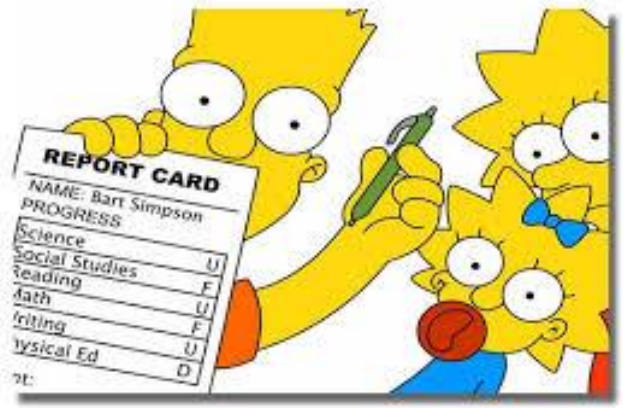
→ **No one indicator will cover all aspects of soil health**
→ **Important to establish a link with soil function to be meaningful ('relevance')**

SBSH Partnership soil health scorecard

Indicators of chemical, physical & biological condition of agricultural soils – scorecard approach

→Relevant & practical methods with clear interpretation scheme; use with farmers to guide soil management

Physical (17 'candidates')	Chemical (14 'candidates')	Biological (14 'candidates')
Visual Assessment of Soil Structure (VESS)	pH	Earthworms
Penetration resistance	Routine nutrients	Respiration
Bulk density	Soil organic matter (SOM)	Microbial biomass



Benchmarking & interpretation

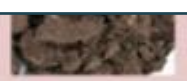
Indicators	Benchmarks
pH & routine nutrients (Ext P, K, Mg)	The nutrient management guide-RB209
Visual Soil Assessment of Soil Structure (VESS)	Limiting layer score; SRUC guidance
Soil organic matter (loss on ignition)	Comparison with ‘typical levels’ for soil & climate

Investigate

Monitor

No action needed

Visual evaluation of soil structure

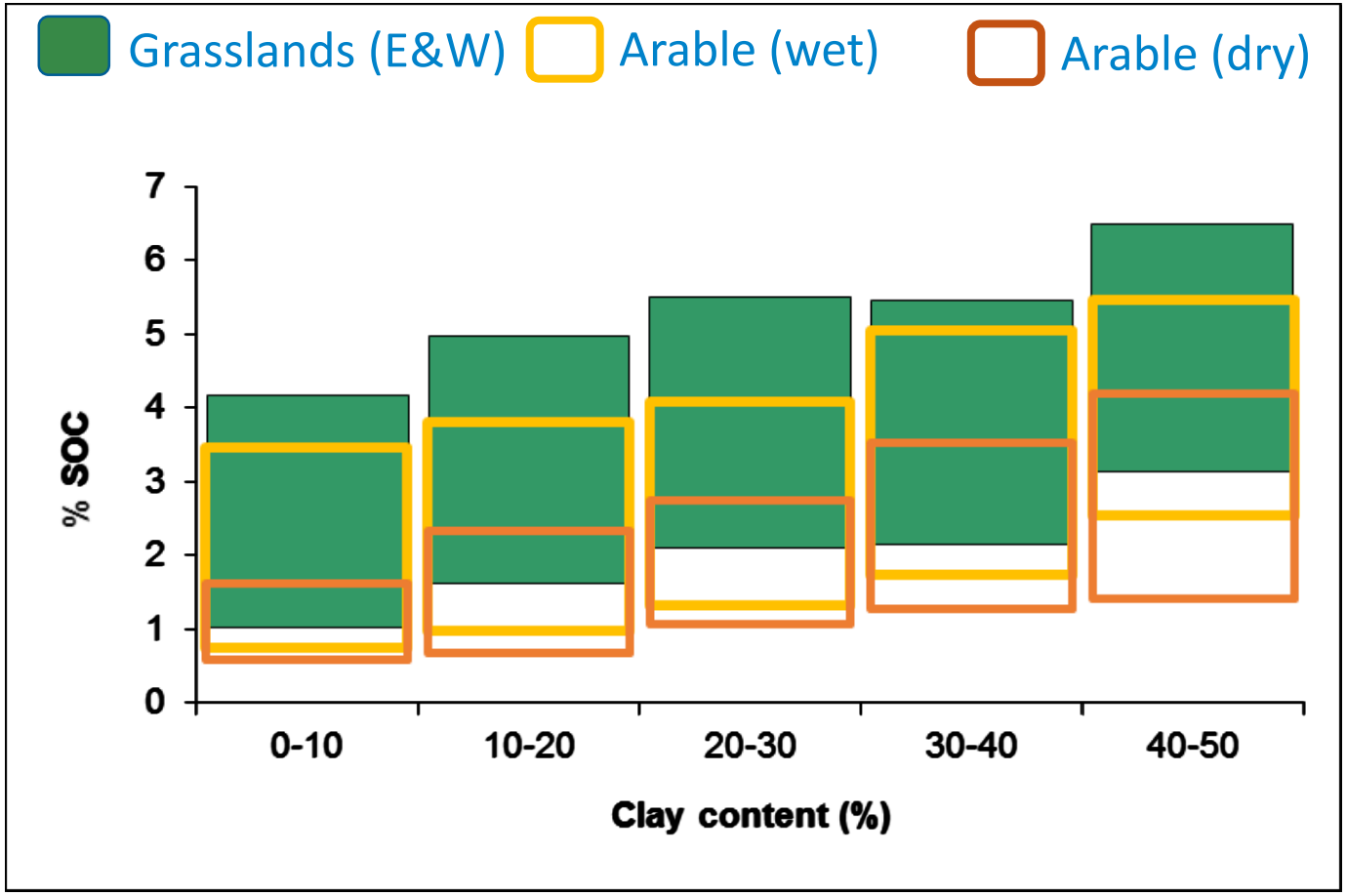
Structure quality	Size and appearance of aggregates	Visible porosity and Roots	Appearance after break-up: various soils	Appearance after break-up: same soil different tillage	Distinguishing feature	Appearance and description of natural or reduced fragment of ~1.5 cm diameter
Sq1 Friable Aggregates readily crumble with fingers	Mostly < 6 mm after crumbling	Highly porous. Roots throughout the soil				 The action of breaking the block is enough to reveal them. Large aggregates are
Sq2 Intact Aggregates easy to break with one hand						
Sq3 Firm Most aggregates break with hand effort						
Sq4 Compact Requires considerable effort to break aggregates with one hand	30% are <7 cm	macropores and around aggregates			Distinct macropores	internally.
Sq5 Very compact Difficult to break up	Mostly large > 10 cm, very few < 7 cm, angular and non-porous	Very low porosity. Macropores may be present. May contain anaerobic zones. Few roots, if any, and restricted to cracks			 Grey-blue colour	 Aggregate fragments are easy to obtain when soil is wet, although considerable force may be needed. No pores or cracks are visible usually.

Sq score	Soil structural quality	Management needs
1-2	Good	No changes needed
3	Moderate	Long-term improvements
4-5	Poor	Short-term improvements

www.sruc.ac.uk/info/120625/visual_evaluation_of_soil_structure

‘Typical’ SOM levels

- There is no easily defined ‘critical level’ of organic matter below which soil functions become impaired



Simplified to:

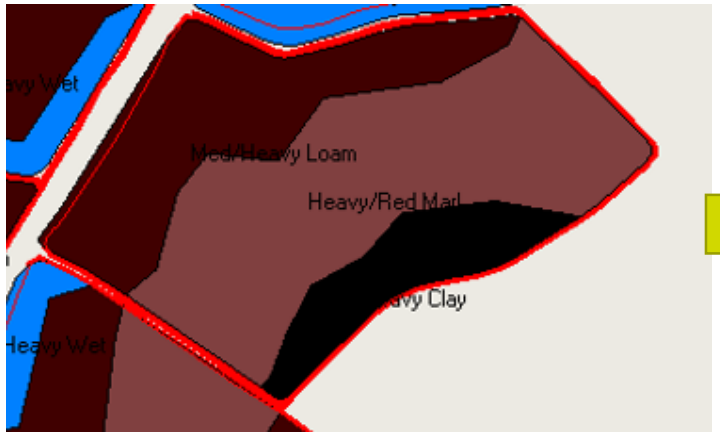
- Light < 18% clay; medium 18-35% clay; heavy > 35% clay
- Low, mid & high rainfall regions
- Arable & ley arable; permanent grassland

Investigate	Very low for climate & soil type
Monitor	Below average
No action needed	≥ average

Source: Verheijen et al., 2005

Assessing baseline soil health at Squab Hall farm

- Using the scorecard to benchmark soil health at the outset and track changes over time



Field 25: Rob's soil map

Field 25: Sampling zones:
1. 'heavy red'
2. 'Medium/heavy loam'
3. 'heavy clay'

Penetrometer survey: max, min, med. resistance

Soil sample & physical evaluation

Scorecard for field 25

10.5ha; Spring barley @ harvest 2019

Zone	1	2	3
% clay	37	43	51
SOM (%LOI)	5.0	4.7	4.4
pH	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 (total number)	6	1	2
PMN (mg/kg)	98	112	88
Respiration (mg CO_2-C/kg)	215	169	166

Investigate
Monitor
No action needed

Note: benchmarks are subject to review

Key issues (field 25): soil structure & earthworm numbers (particularly zones 2 & 3 – heavier textures & below average SOM)

Key issues for Squab Hall Farm

- Soil structure and earthworm numbers identified as key issues across the farm

Sq 2 'intact'

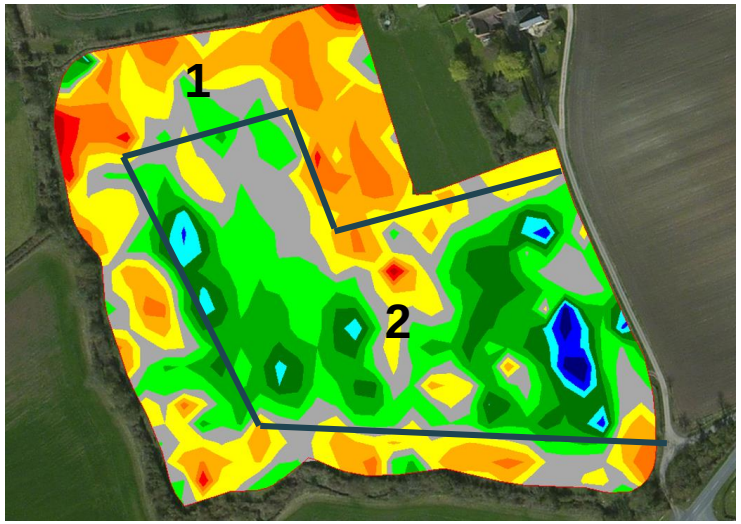
Sq 4: 'Compact'

Scorecard for field 49

5.5ha; Winter wheat @ harvest 2019

Zone	1	2
% clay	25	21
SOM (%LOI)	6.2	4.9
pH	6.5	6.6
Ext. P (mg/l)	16	21
Ext. K (mg/l)	150	169
Ext. Mg (mg/l)	181	169
VESS score (limiting layer)	2	2
Bulk density (g/cm^3)	1.21	1.18
Earthworms (total number)	6	9
PMN (mg/kg)	62	66
Respiration (mg CO_2-C/kg)	199	185

Key issues (field 49): None



2018 yield map used to identify sampling zones

Investigate
Monitor
No action needed

Note: benchmarks are subject to review

Key to managing soil health




KNOW YOUR SOILS

principles to improve soil health

Biological

- Feed the soil regularly through plants and OM inputs
- Move soil only when you have to
- Diversify plants in space and time

Chemical

- Maintain optimum pH
- Provide plant nutrients – right amounts in the right place at the right time
- Know your textures and minerals – buffering capacity, free supply!

Physical

Know your textures and understand limits to workability, trafficability

- Optimise water balance through drainage if necessary
- Improve soil structure, minimise compaction – effective continuous pore space

Soil improving practices:

- Organic materials
- Grass leys
- Cover crops & diverse rotations
- Reduce tillage

Also….

- Appropriate operations – timing & type
- Drainage

Summary

- Assessment of soil health requires an integrated approach linking chemistry, physics and biology
- To evaluate impact of management practices, track changes over time by assessing on a rotational basis & from same location/timing.
- A scorecard approach is being developed & evaluated which aims to provide benchmark data to guide interpretation
- Key issues for Squab Hall – soil structure & earthworms, particularly on the heavy textured soils (cultivation effects?)

Thank you

For more info:

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

Anne.bhogal@adas.co.uk

The relationship between cultivation, crop rooting and yield

Charlotte White

Presented by Damian Hatley

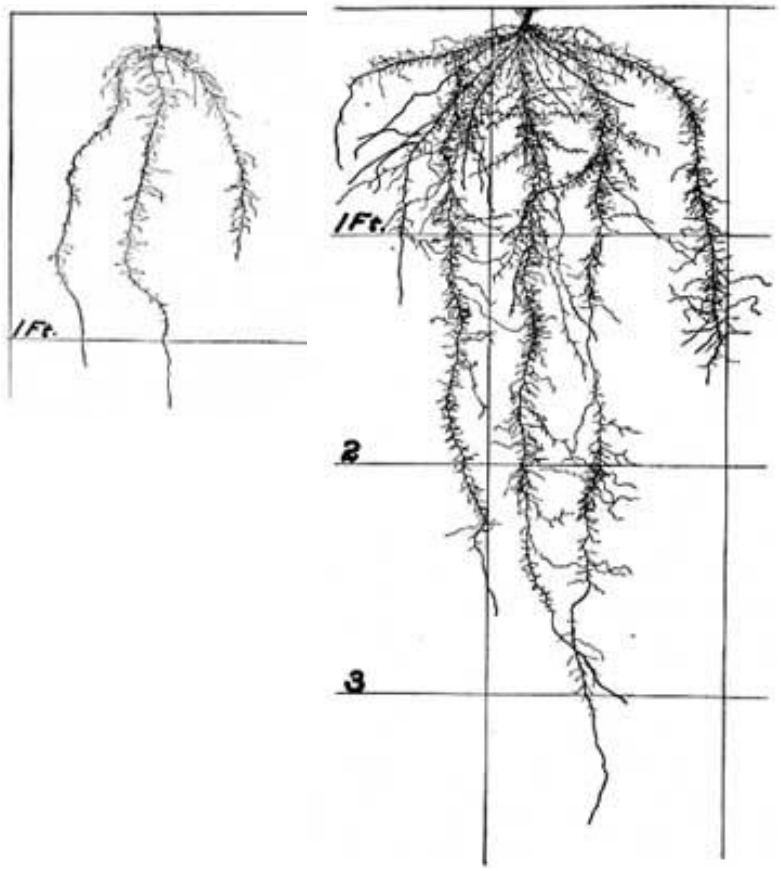
CEREALS & OILSEEDS

Outline:

- Rooting, water capture and high yields
- The cultivation Trial
- Results
  - Soil strength
  - Rooting
  - Aboveground biomass
  - Potential and actual yields
- Summary

Cereal Root Systems

- Seminal roots
  - Develop first, from the seed
  - 3 – 6 seminal roots in wheat and barley
  - 5-10 % of the total root volume of a mature crop
- Nodal roots
  - Also known as crown or adventitious roots
  - Develop later from the base of the main stem and tillers
  - 90 – 95 % of total root volume of the mature crop



Images: Weaver, 1926

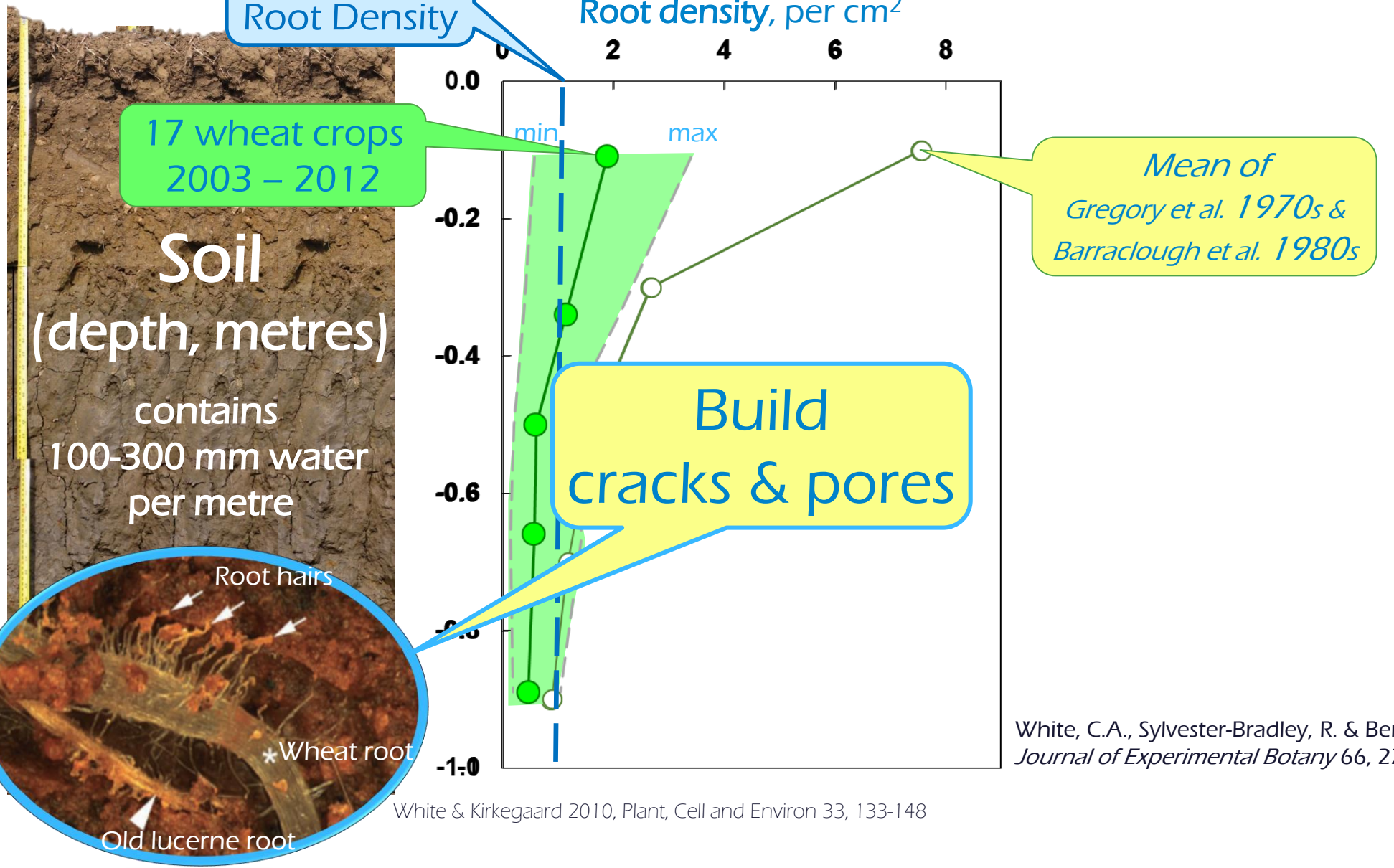
Good soil performance

Ensures continuity of supplies

- Nutrients
- Water

Crops must be rooted as DEEPLY as possible

... to maximise Crop water supplies



White & Kirkegaard 2010, Plant, Cell and Environ 33, 133-148

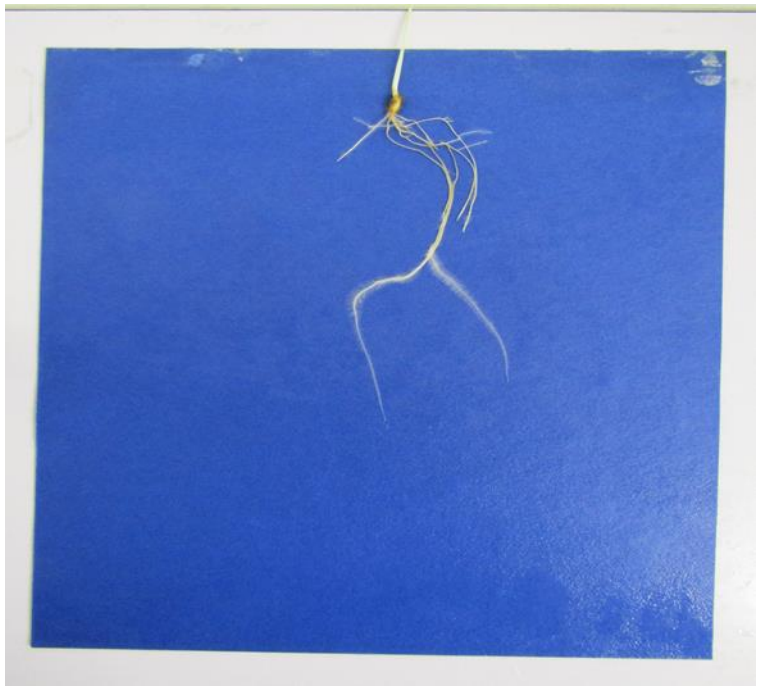
White, C.A., Sylvester-Bradley, R. & Berry, P.M. (2015). *Journal of Experimental Botany* 66, 2293-2303

Possible causes of decreased rooting

Decrease in organic matter usage

Tighter rotations

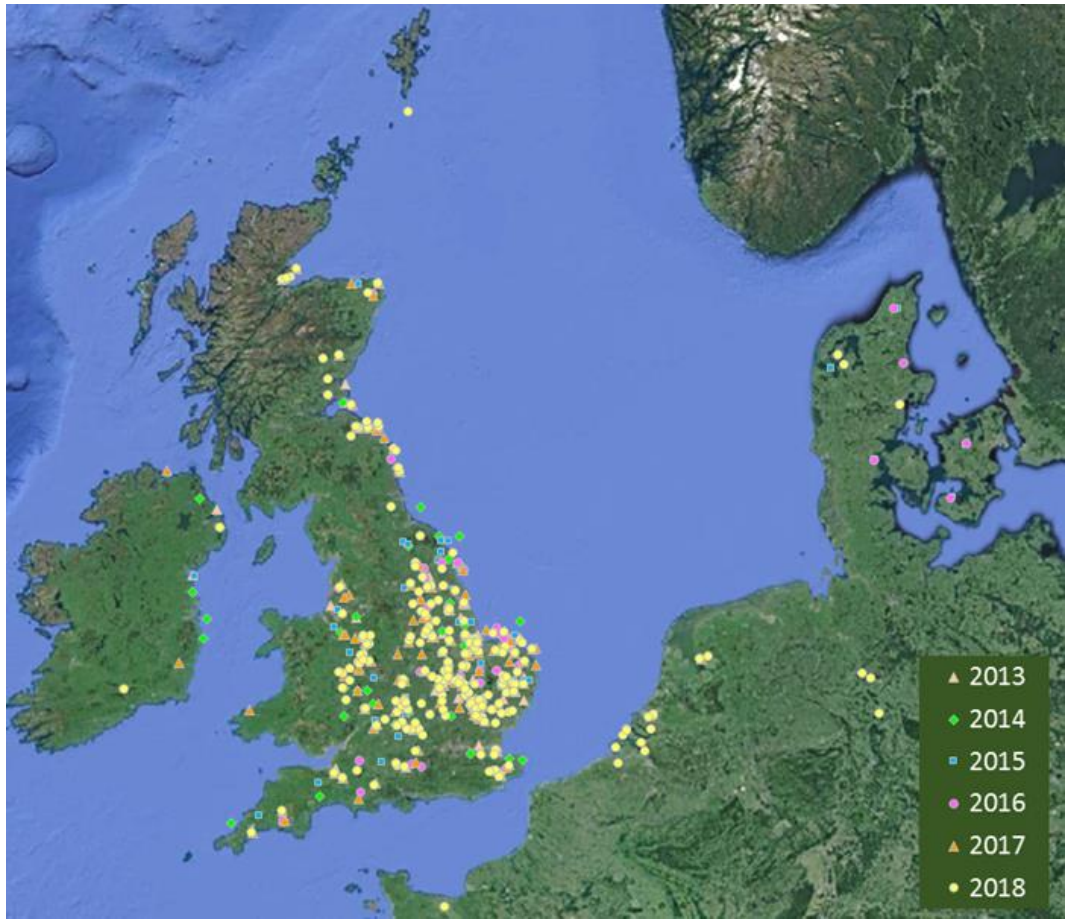
Impacts on soil fauna and flora



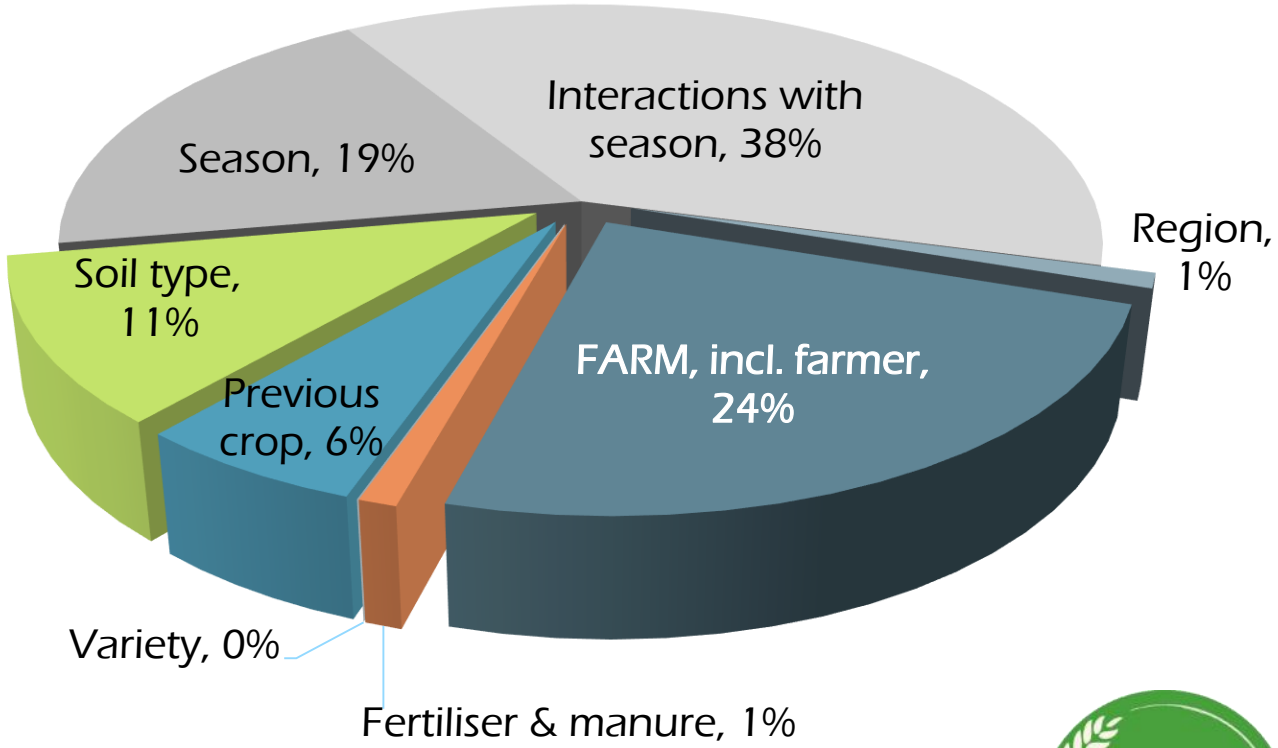
Modern varieties

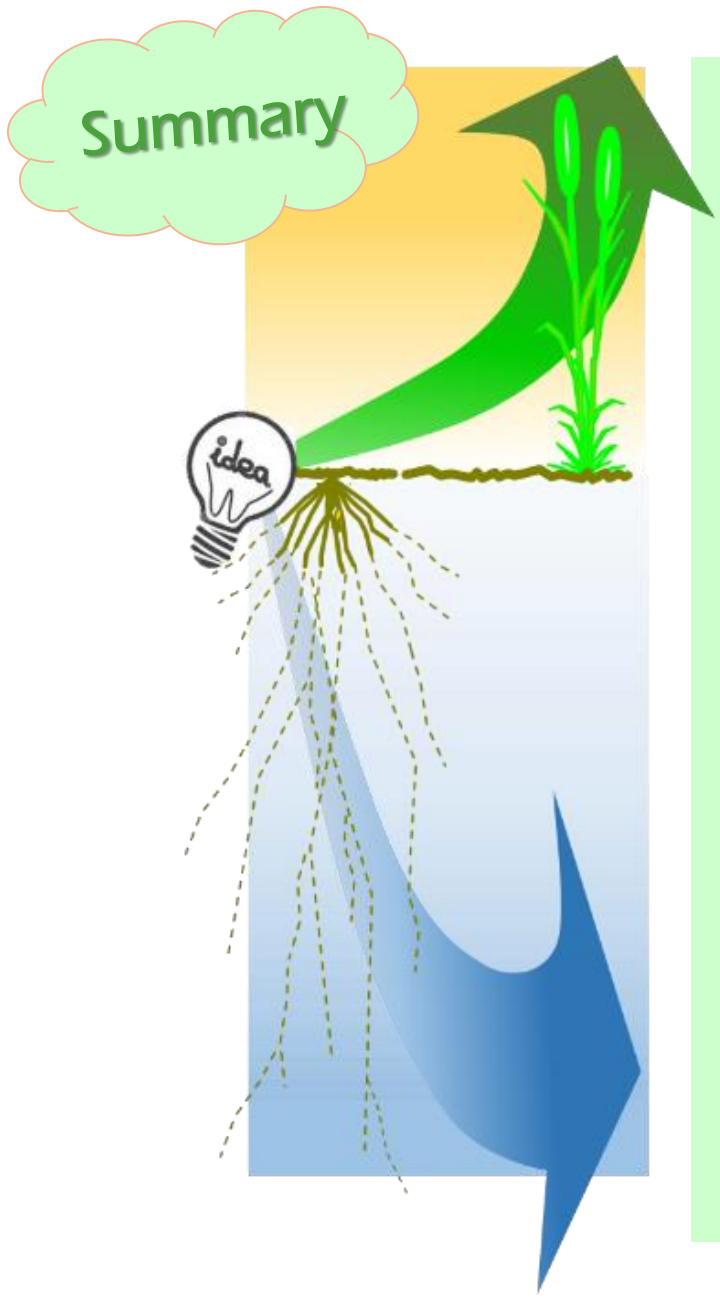
YEN Dataset Analysis

- Analysed dataset 2013 – 2018, 570 yields



Contributions to yield variation from REML analysis:





- **15 t/ha is possible ... almost anywhere**
- It's less about what you spend, more about …

  'Attention to Detail'
- **Large yields come from large crops**
  - With more ears than average
    - and tending to be taller, with greater straw N%
  - So important associations include good nutrition, and control of disease & lodging risks
  - Husbandry factors associated with high yields included:
    - Following a break crop
    - Narrow drill widths
    - Applying slurry
    - Adequate N use … but liquid N (straight) was questionable
    - and several PGR applications.

The cultivation trial

- 3 cultivation depths of 5 cm, 15 cm & 30 cm
  - 2 replicates
- Assessments on a zonal basis
  - Min, median and max penetrometer resistances in top 30 cm

The cultivations Trial : Treatments

Field 15

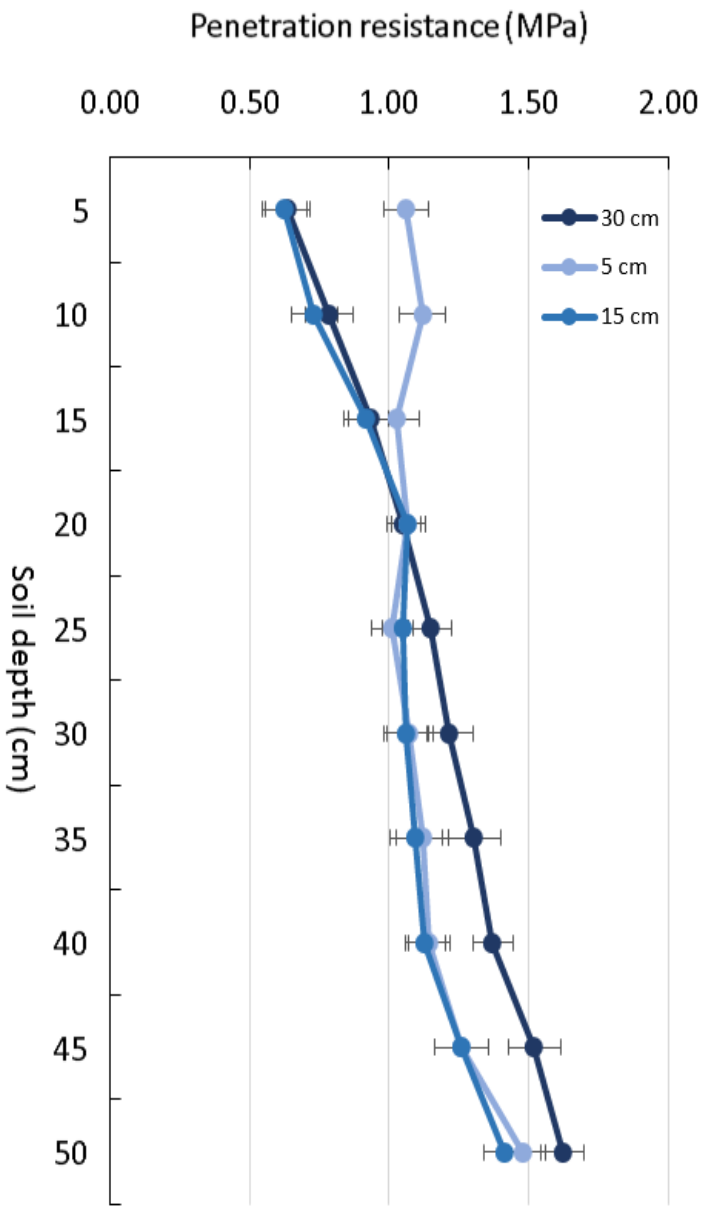
	Treatment name	Details
1	Shallow Cultivation	Vaderstad Carrier to 5cm, shallow spring tine in front of drilling. Drilling with Horsch Sprinter
2	Min Till	Discaerator to 15 cm, shallow spring tine in front of drilling. Drilling with Horsch Sprinter
3	Deep cultivation	Discaerator to 30 cm, shallow spring tine in front of drilling. Drilling with Horsch Sprinter

The cultivation trial assessments

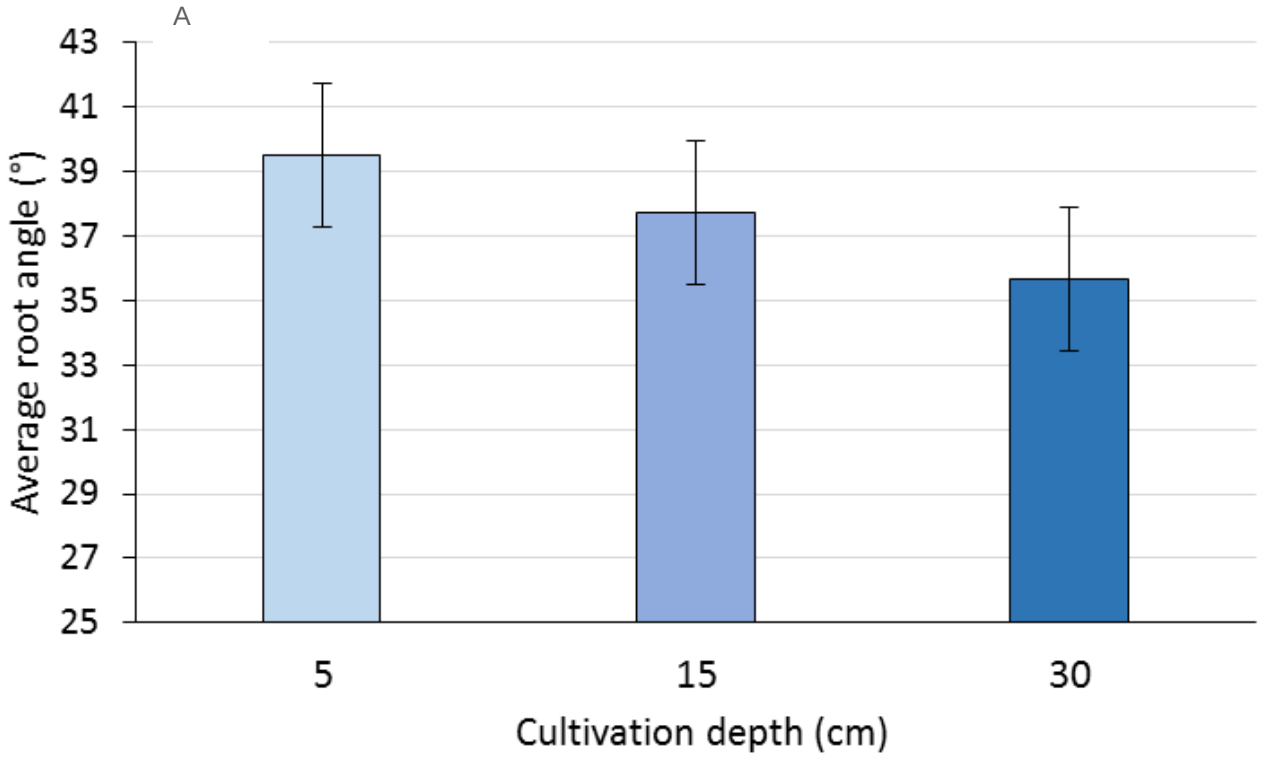
- Measured:
  - Soil strength to 50 cm (penetrometer)
  - ‘Shovelomics’ phenotypic traits of the root crown
  - Soil analysis
  - VESS (visual evaluation of soil structure) & Sub-VESS
  - Earthworms
  - Above ground crop biomass at several points during the season
  - Root length density & root biomass post anthesis to 1m depth

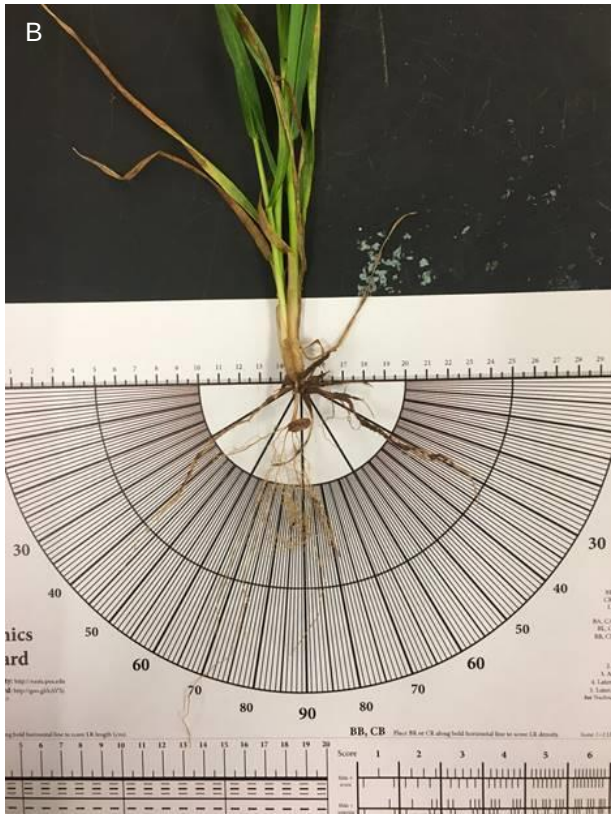
Cultivation depth & soil strength

- Root growth is restricted >1.5 MPa
- Shallow cultivation depth - greater soil strength in top 10 cm (P<0.05)
- Increased topsoil strength did not significantly impact above ground crop biomass at GS31, 39 and 61
- Deep cultivation - greater soil strength below 35 cm (P<0.05)



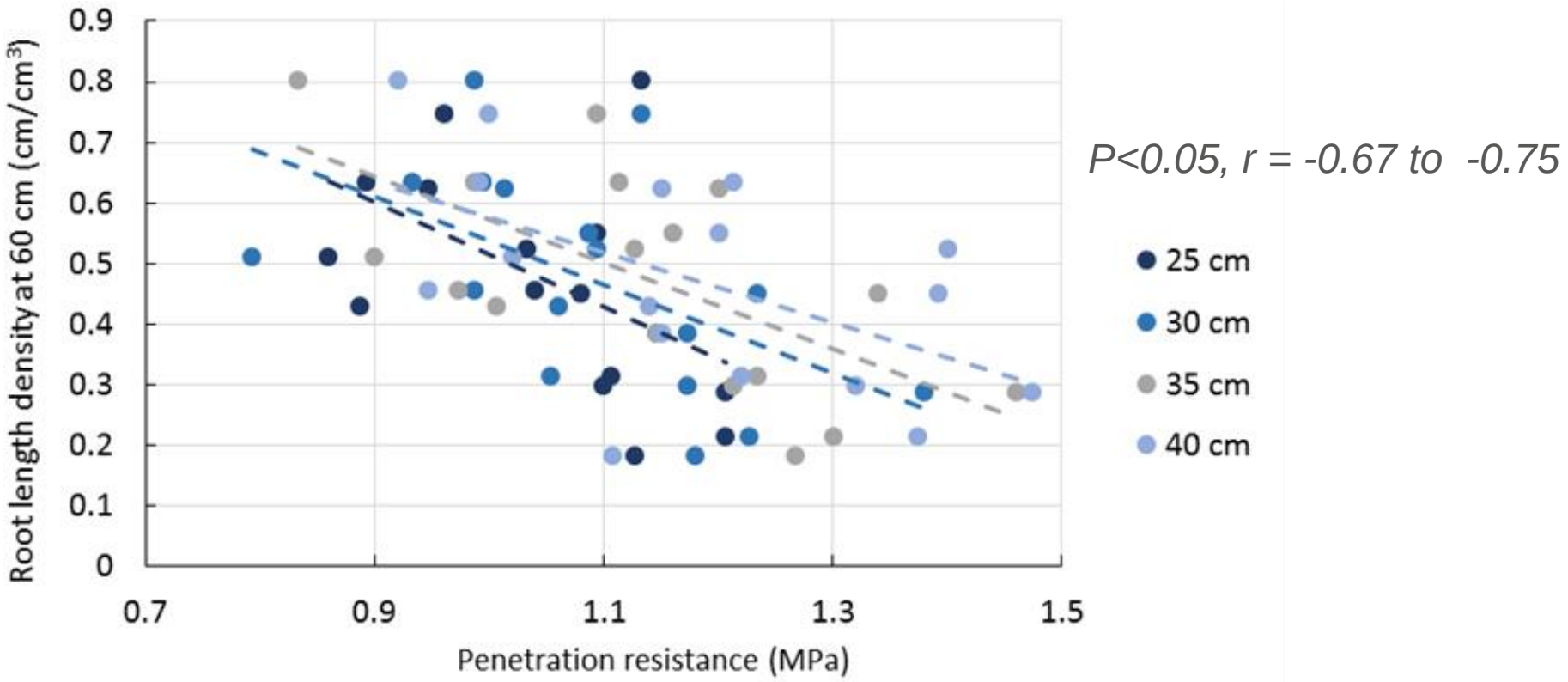
Soil strength & Rooting





- Root angle increased as cultivation depth decreased
  - increased soil strength in topsoil promoted early downward growth of roots
- Steeper root angle positively associated with RLD & root biomass in subsoil (~80 cm) (*P*<0.05, r=0.55)

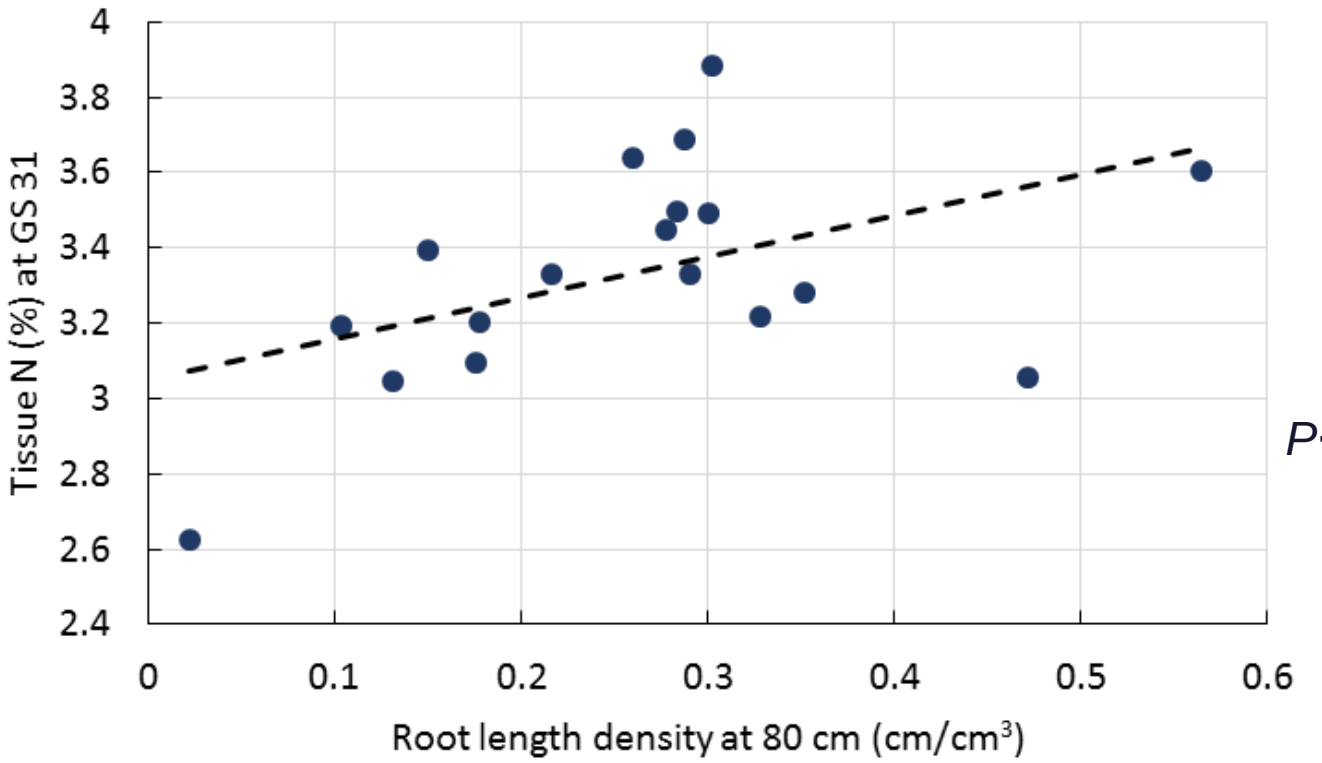
Rooting & Subsoil Compaction



P<0.05, r = -0.67 to -0.75

- Increased soil strength at 25 – 40 cm soil depths associated with less rooting in the subsoil (~60 cm)

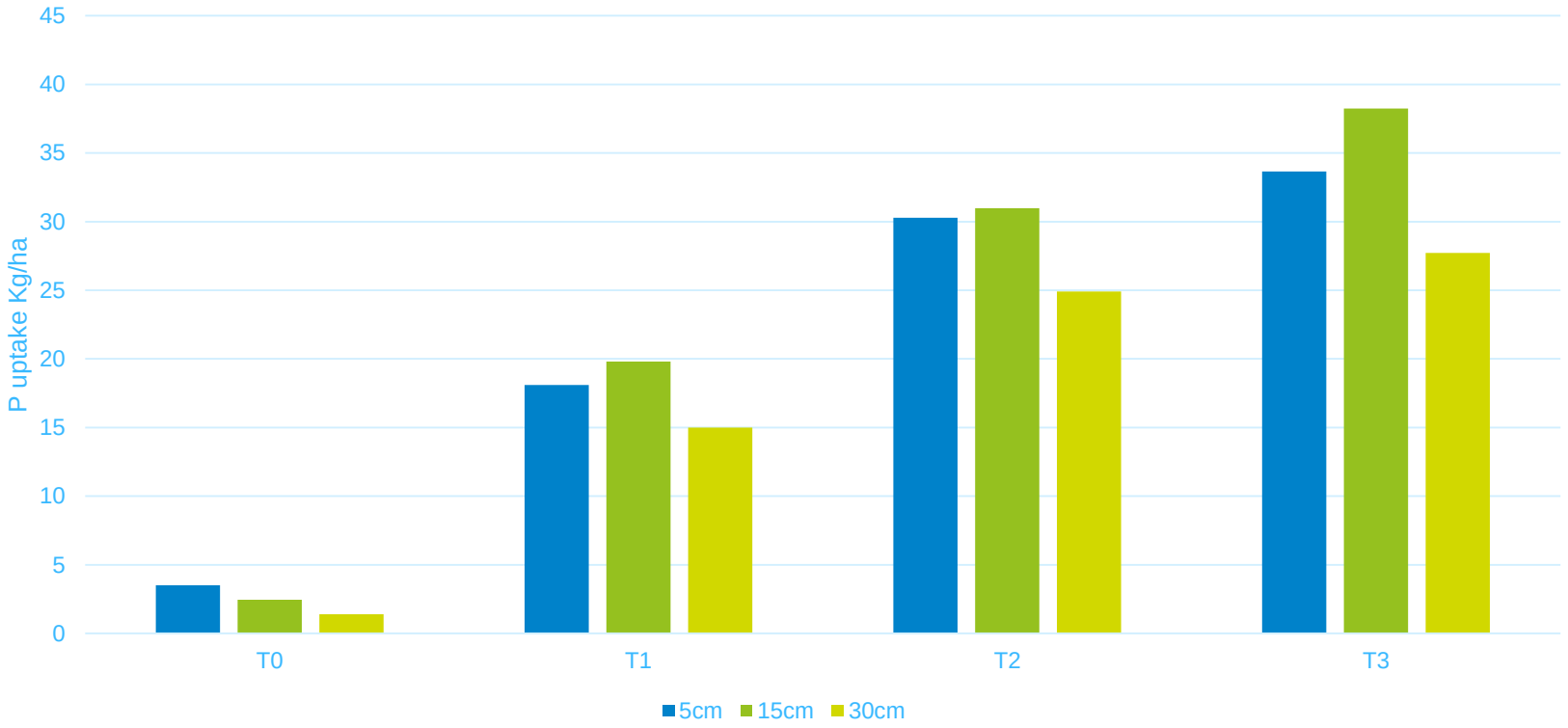
Roots and shoots



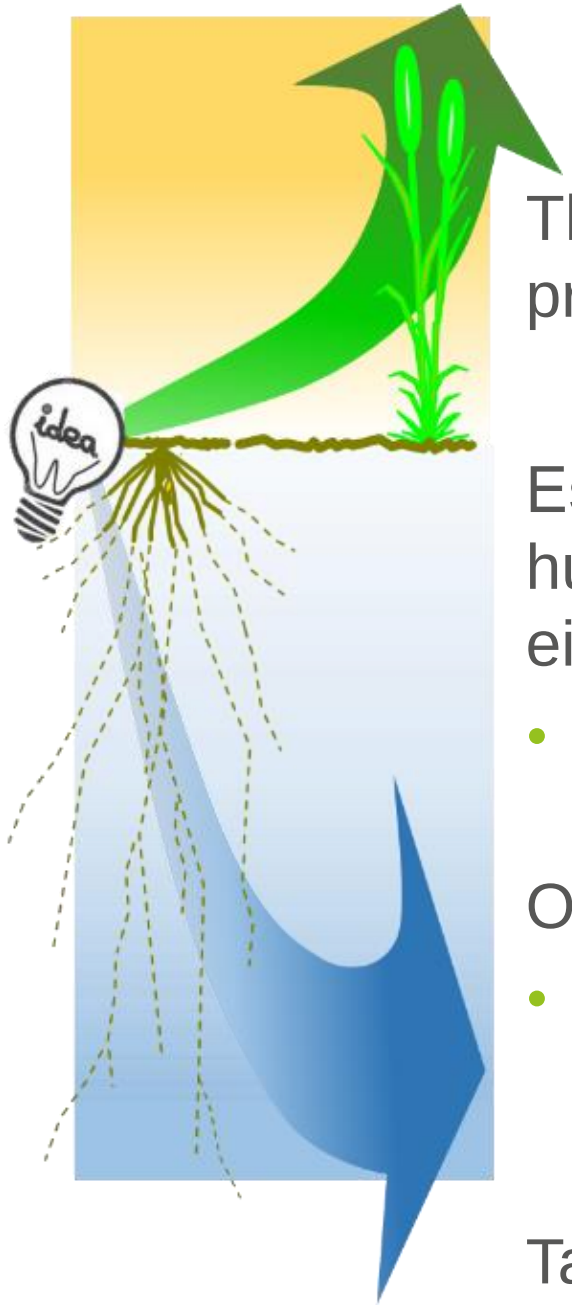
P<0.05, r = 0.64

- Increased rooting in the subsoil (~80 cm) associated with increased aboveground biomass at anthesis & increased tissue N% at GS31

Nutrient uptake



- P concentration and uptake less with deepest cultivation
- No treatment differences for N and K uptake.



YEN Yield Potentials

The cultivations trial is part of EIP-AGRI funded YEN Yield Testing project

- Deeper rooting Farmer innovation group (FIG)

Estimated from a theoretically ‘perfect’ crop with ‘inspired’ husbandry at your location with the seasons weather achieving either:

- 60% Capture of light energy conversion 1.4 tonnes biomass per terajoule

OR

- Capture all of the available water held in soil to 1.5 m depth plus rainfall (April to July), conversion of 18 mm into a tonne of biomass per hectare

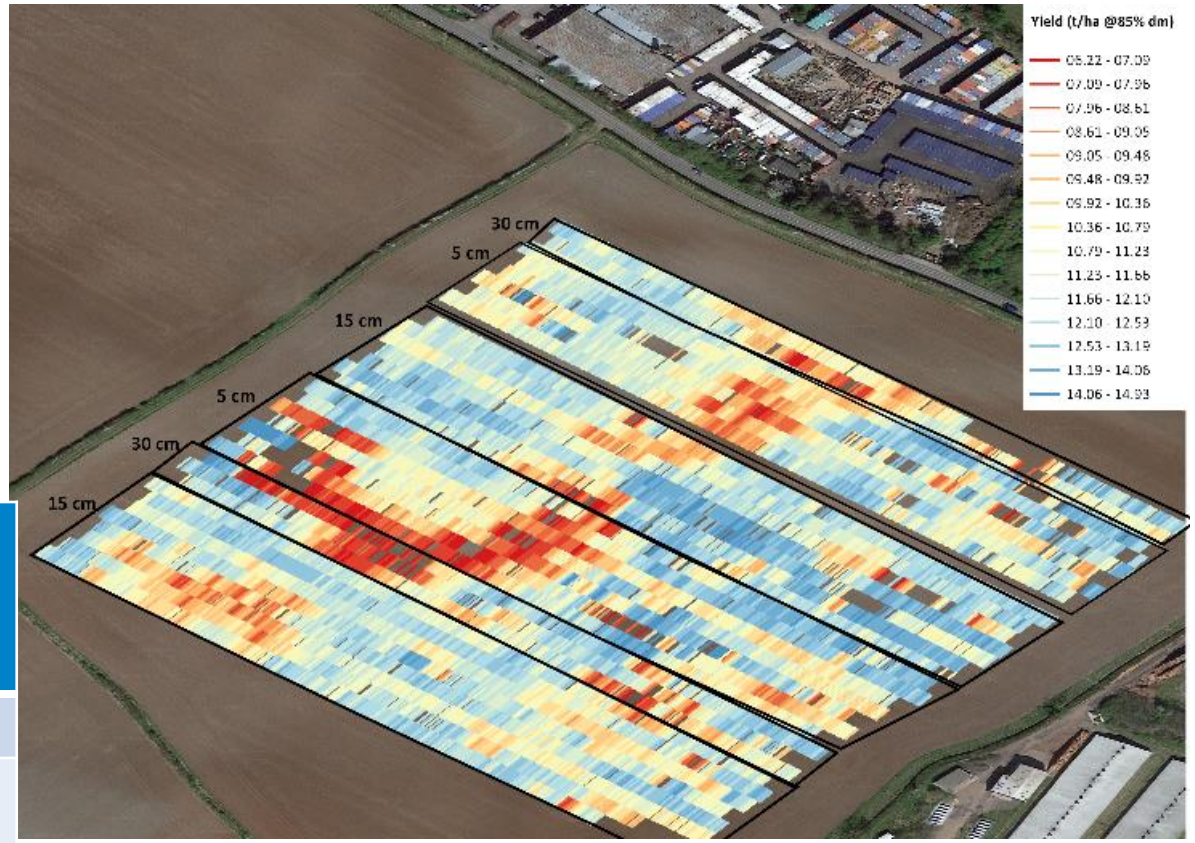
Take the lesser of the two amounts, 60 % used to create grain

Yield potential & Actual Yields

- Estimated Yield potential of 17.7 t/ha
- Yield 11.6 t/ha (15 cm cultivation depth treatment)
- Actual yield represents 65% of yield potential

Agronomics & The Yield Map

- Agronomics: clean data & fit statistical model
- Estimate treatment effects and probability due to treatment rather than underlying spatial variation.
- No significant differences in yield



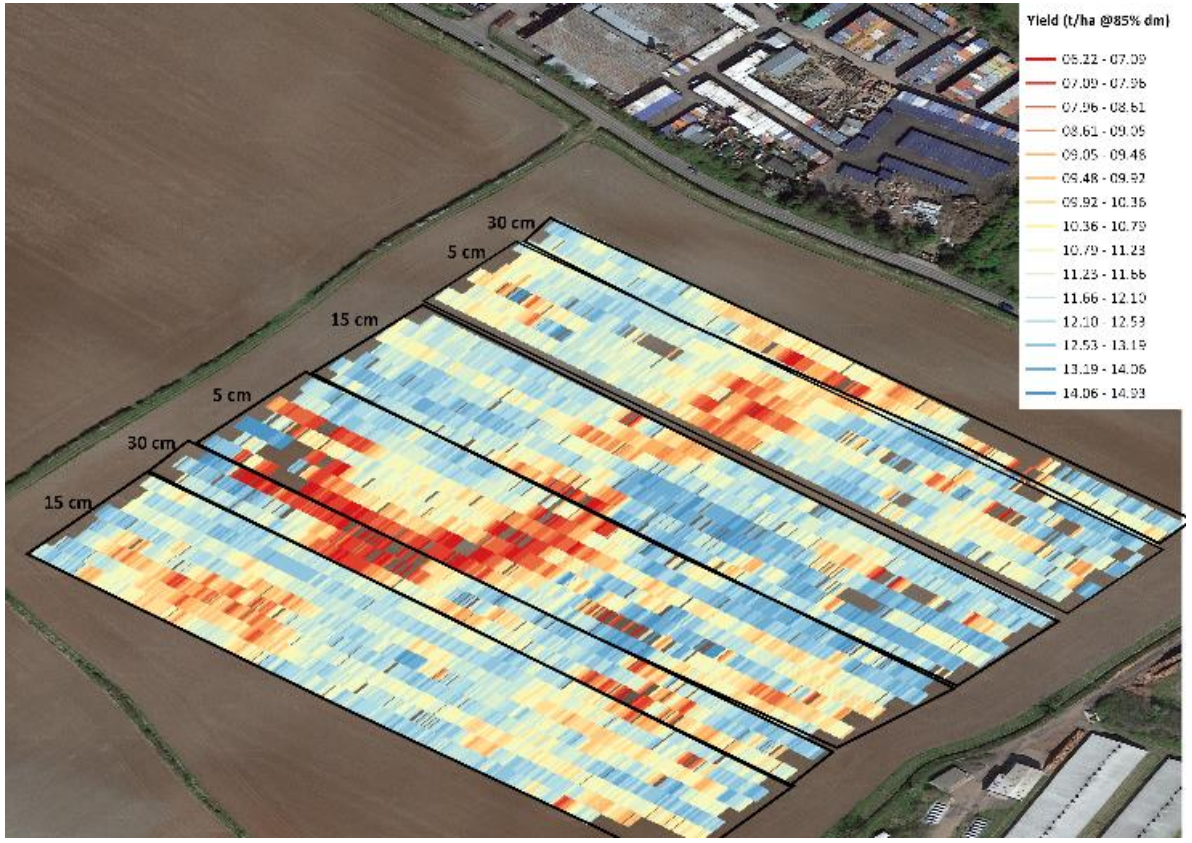
Treatment	Farm standard, 15 cm	5 cm	30 cm
Mean yield, t/ha	11.57	-	-
Estimated treatment effect, t/ha	-	-0.44 ±0.71	-0.77 ±0.84
Confidence in effect being due to the treatment	-	47%	64%

YEN YIELD TESTING

eip-agri

The European Agricultural Fund for Rural Development: Europe investing in rural areas

Yield Variation



YEN YIELD TESTING

The European Agricultural Fund for Rural Development: Europe investing in rural areas

Summary

- Shallow cultivation (5 cm) increased topsoil strength
- Increased topsoil strength associated with steeper root angle
- Steeper root angle associated with more roots in the subsoil
- P uptake greater with shallow cultivations.
- Deeper cultivation (30 cm) showed increased subsoil strength (40 & 45 cm)
- No significant differences in yield between treatments

Action point

- Monitor soil regularly to inform management decisions
  - VESS, Sub-VESS and earthworm counts
  - Carry out ‘appropriate’ cultivations on a field by field or zonal basis

Thank you

damian.hatley@adas.co.uk

charlotte.white@adas.co.uk

@c_a_white

ADAS Gleadthorpe, Nottinghamshire, NG20 9PF

Focus session 1

CEREALS & OILSEEDS

Focus session 1

How to put a true cost on crop establishment choice Harry Henderson, AHDB

How to boost soil fertility
Anne Bhogal, ADAS

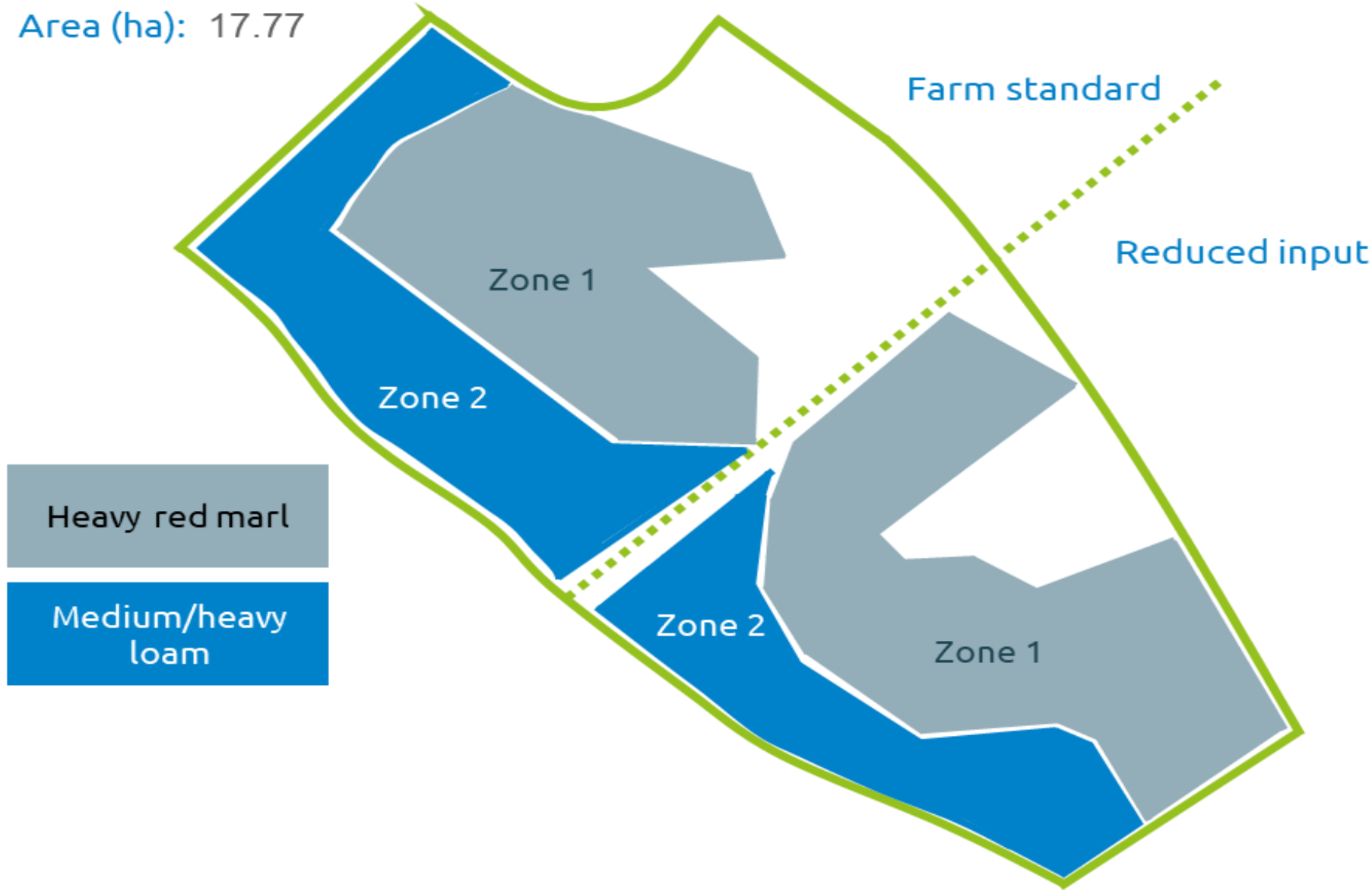
How to use data to improve your farm business
Clive Blacker, Precision Decisions

AHDB Strategic Farm West, Dec 2019

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

Catherine Harries

CEREALS & OILSEEDS


Area (ha): 17.77
Farm standard
Reduced input
Zone 1
Zone 2
Zone 2
Zone 1
Heavy red marl
Medium/heavy loam

Graham

Winter wheat

AHDB RECOMMENDED

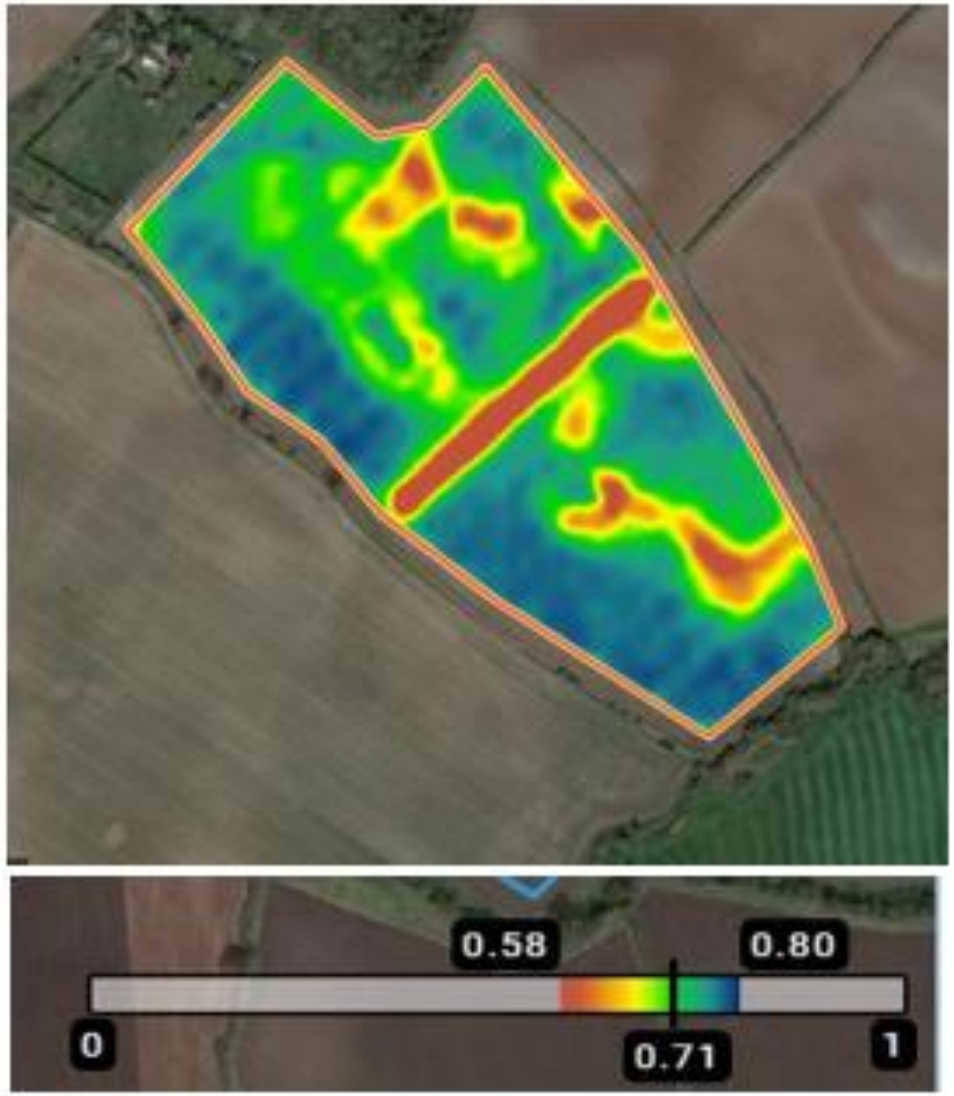
A high-yielding hard-milling Group 4 variety

UK

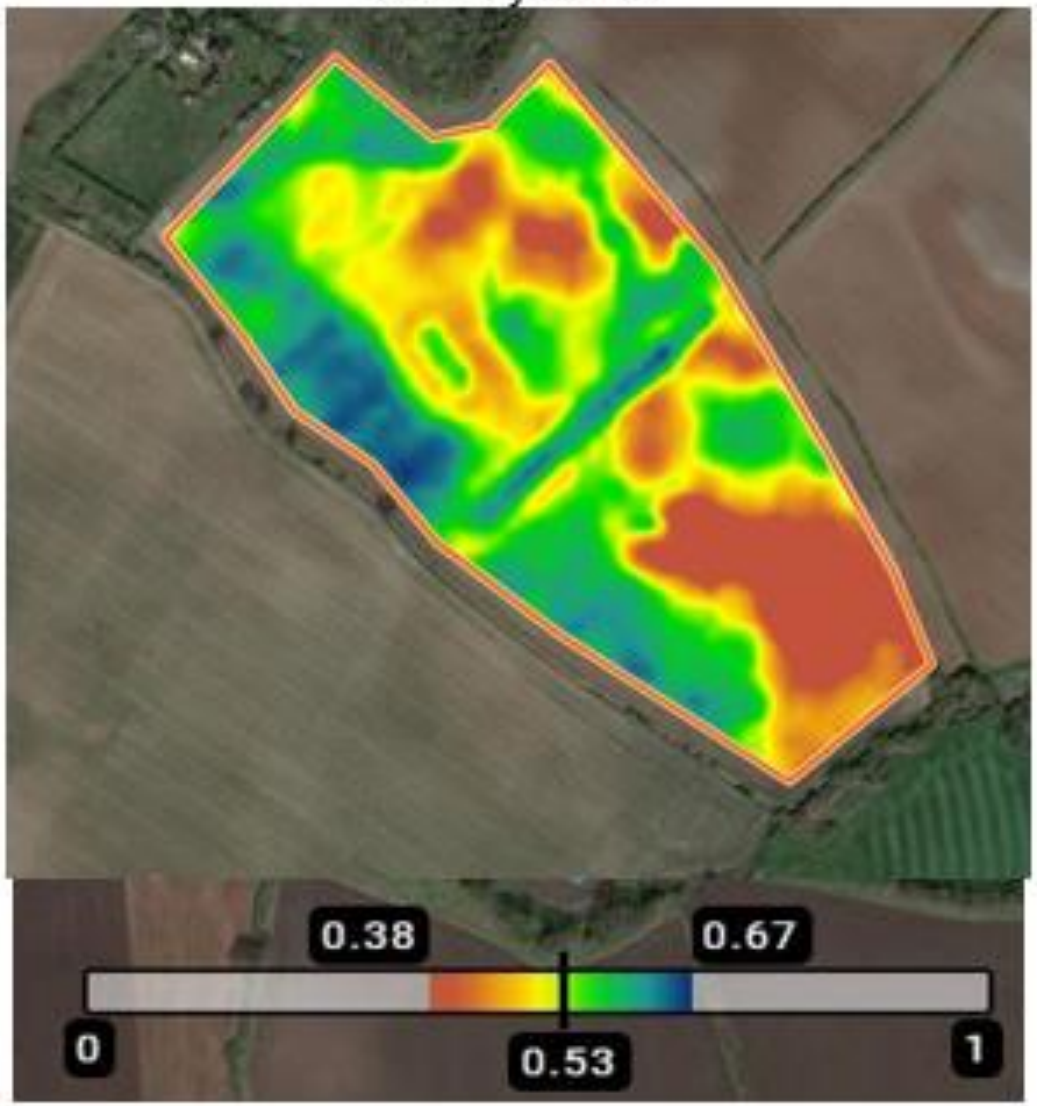
Disease resistance (1–9)		
Mildew	7	Medium–high
Yellow rust	8	High
Brown rust	6	Medium
Septoria nodorum	[6]	Medium
Septoria tritici	6.9	High
Eyespot	4	Low
Fusarium ear blight	6	Medium
Orange wheat blossom midge	-	

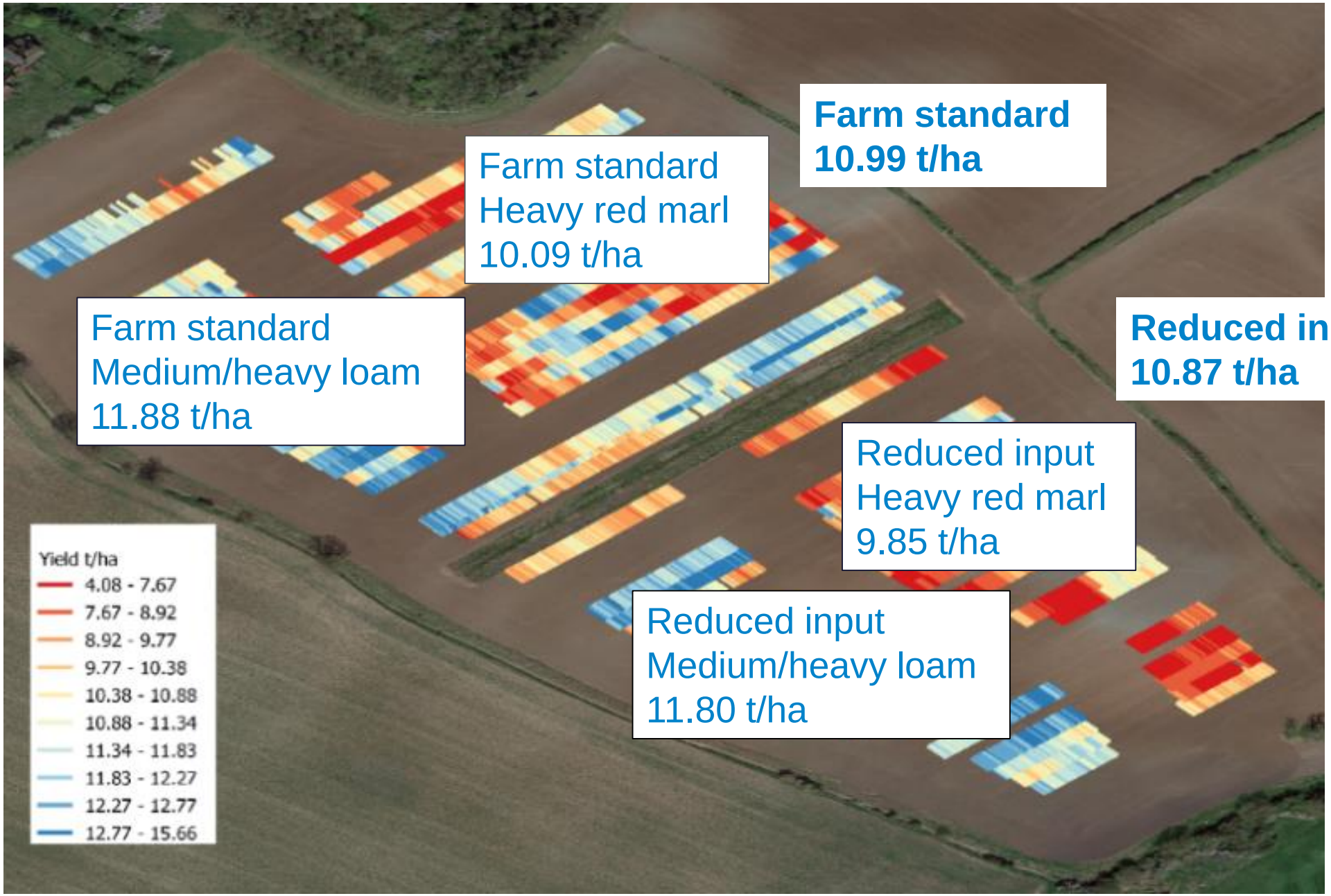
		Low input	Farm standard
Seed	12th October	Untreated	**Difend Extra 2 L/ha**
T0	12th April	Chlormequat 1.5 L/ha	**Bravo 1 L/ha (multisite)**
			Chlormequat 1.5 L/ha
			Moddus 0.12 L/ha
T1	29th April	**Bugle 0.9 L/ha (SDHI)**	**Bugle 0.9 L/ha (SDHI)**
		Mendoza 0.65 L/ha (azole)	**Mendoza 0.65 L/ha (azole)**
		Chlormequat 1 L/ha	Chlormequat 1 L/ha
		Moddus 0.1 L/ha	Moddus 0.1 L/ha
T2	22nd May	**Adexar 1 L/ha (SDHI + azole)**	**Adexar 1.25 L/ha (SDHI + azole)**
			Bravo 1 L/ha (multisite)
T3	18th June	None	**Teb 250 1 L/ha (azole)**

29 June 2019



16 July 2019

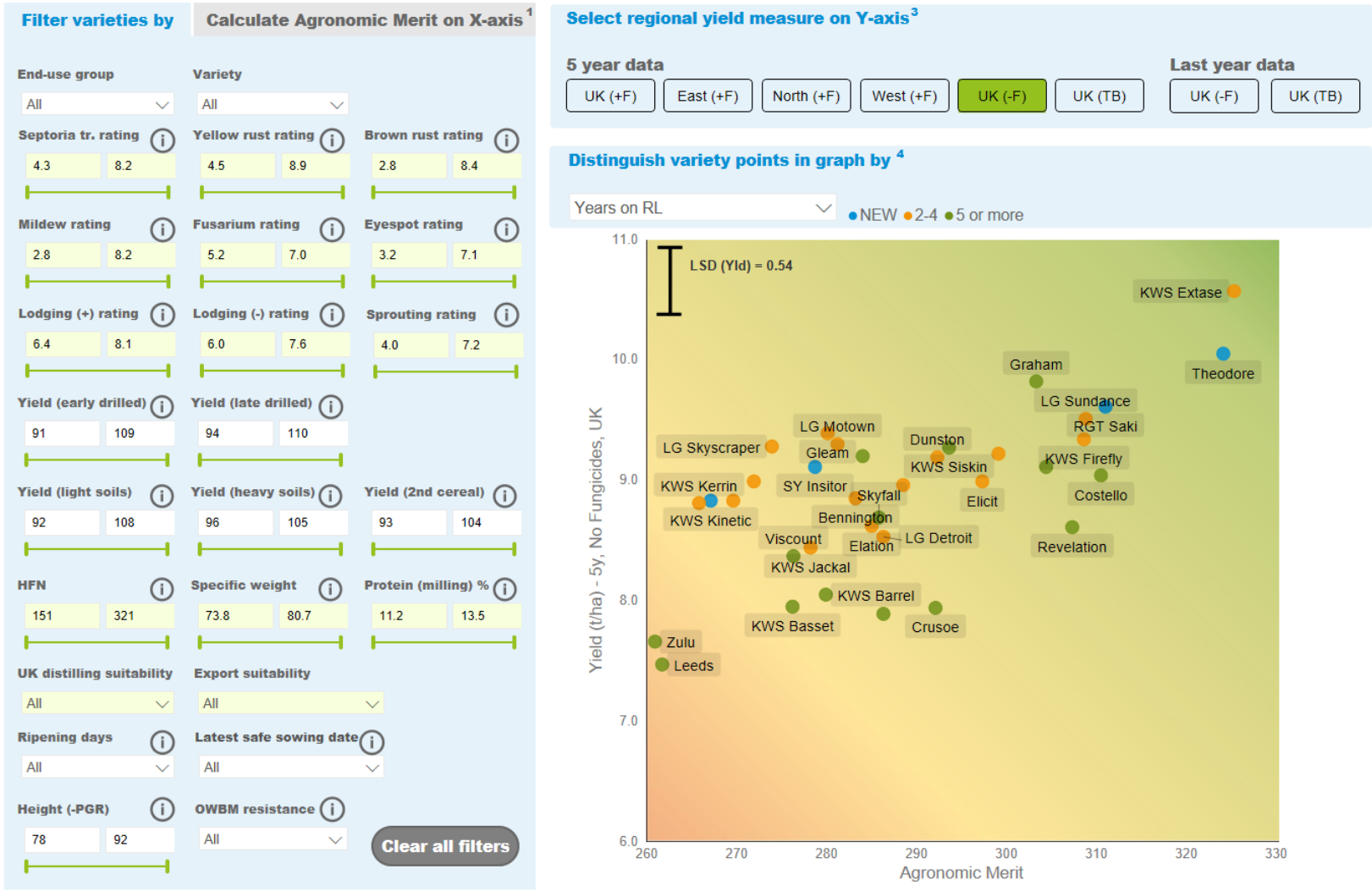



Farm standard
10.99 t/ha
Farm standard
Heavy red marl
10.09 t/ha
Farm standard
Medium/heavy loam
11.88 t/ha
Reduced input
10.87 t/ha
Reduced input
Heavy red marl
9.85 t/ha
Reduced input
Medium/heavy loam
11.80 t/ha
Yield t/ha
4.08 - 7.67
7.67 - 8.92
8.92 - 9.77
9.77 - 10.38
10.38 - 10.88
10.88 - 11.34
11.34 - 11.83
11.83 - 12.27
12.27 - 12.77
12.77 - 15.66

	Farm standard	Low input
Yield (t/ha)	**11.03**	**10.91**
Variable costs		
Total seed costs (£/ha)	23	6
Total fertilisers (£/ha)	151	151
Fungicides (£/ha)	80	62
Total crop protection (£/ha)	180	159
Total variable costs (£/ha) (direct)	354	316
Fixed costs		
Total labour, machinery and equipment (£/ha)	500	500
Total property and energy costs (£/ha)*	71	69
Total administration costs (£/ha)*	30	30
Cost of production and margins (per hectare)		
Full economic cost of production (£/ha)	954	914
Cost of production (per tonne)		
Full economic cost of production (£/t)	86	84

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

Variety selection tool



Filter varieties by [1] | Calculate Agronomic Merit on X-axis [2]

End-use group: Multiple selections

Variety: All

Septoria tr. rating	4.3	8.2
Yellow rust rating	4.5	8.9
Brown rust rating	3.6	8.2
Mildew rating	2.8	8.2
Fusarium rating	5.2	6.9
Eyespot rating	3.2	7.1
Lodging (+) rating	6.4	8.1
Lodging (-) rating	6.0	7.6
Sprouting rating	4.0	7.2
Yield (early drilled)	91	109
Yield (late drilled)	97	110
Yield (light soils)	95	108
Yield (heavy soils)	96	105
Yield (2nd cereal)	95	104
HFN	151	321
Specific weight	73.8	80.7
Protein (milling) %	11.2	12.9

UK distilling suitability: All

Export suitability: All

Ripening days: All

Latest safe sowing date: All

Height (-PGR): 78 – 92

OWBM resistance: All

Clear all filters

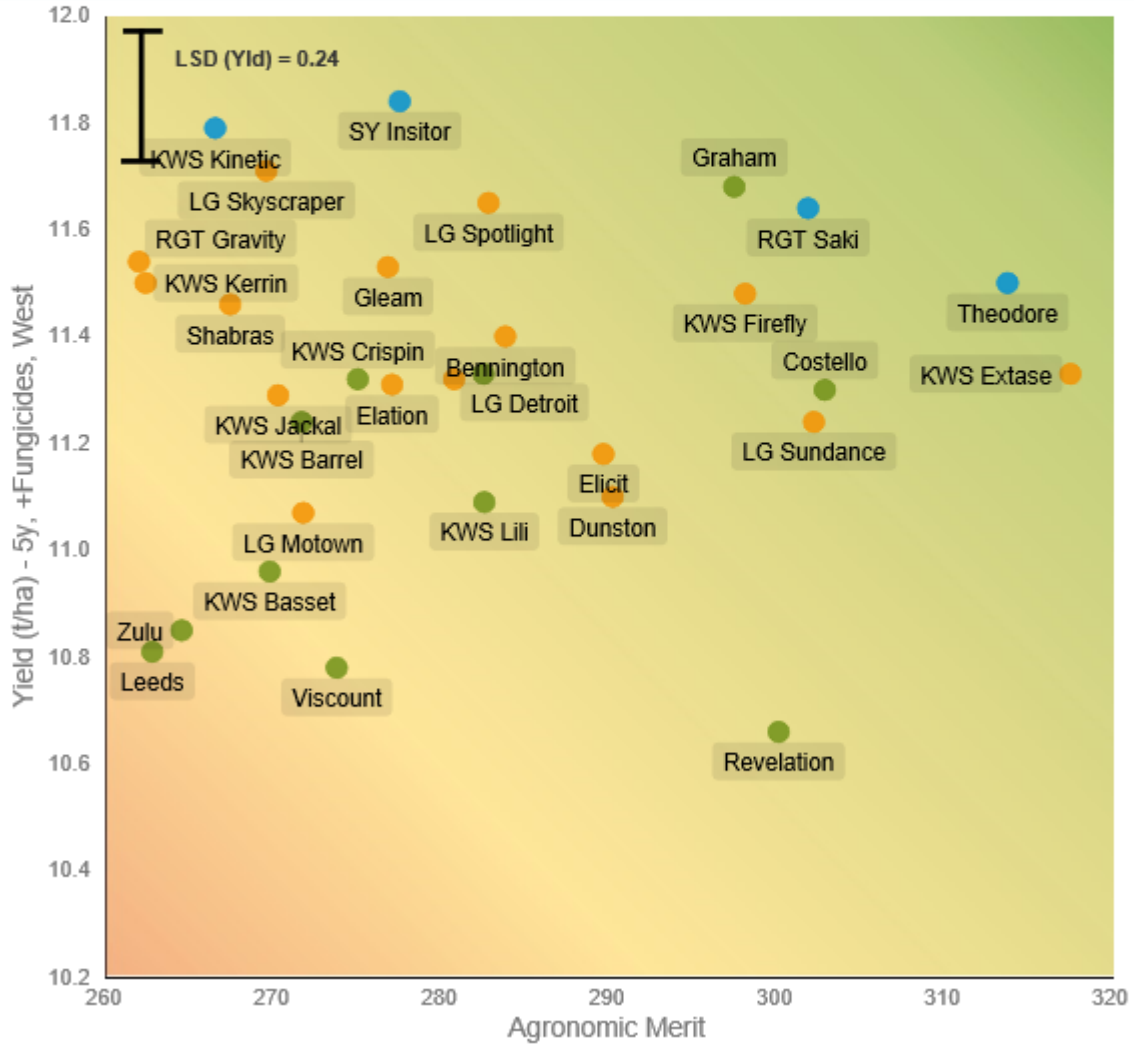
Select regional yield measure on Y-axis [4]

5 year data: UK (+F) | East (+F) | North (+F) | West (+F) | UK (-F) | UK (TB)

Last year data: UK (-F) | UK (TB)

Distinguish variety points in graph by [5]

Years on RL — NEW, 2-4, 5 or more



Yield, agronomy and disease resistance

AHDB RECOMMENDED

End-use group	nabim Group 2				nabim Group 3					Soft Group 4											Hard Group 4										Average LSD (5%)
	KWS Extase	KWS Siskin	LG Detroit	KWS Ull	KWS Firefly	KWS Barrel	Elicit	KWS Basset	Zulu	LG Skyscraper	RGT Saki	LG Spotlight	KWS Jackal	Elation	Bennington	LG Sundance	LG Motown	Leeds	Viscount	Revelation	SY Insitor	KWS Kinetic	Gleam	RGT Gravity	KWS Kerrin	Shabras	Graham	KWS Crispin	Theodore	Dunston	Costello	
Scope of recommendation	UK	UK C	E&W	UK *	UK	UK C	UK	UK *	UK *	UK	UK NEW	UK	N	UK C	E&W *	UK	UK *	N *	N *	UK *	UK NEW	UK NEW	UK	UK	E&W	UK	UK	UK *	W NEW	UK *	UK	
Fungicide-treated grain yield (% treated control)																															
United Kingdom (11.2 t/ha)	101	101	100	99	102	100	100	98	97	105	104	103	101	101	101	100	99	97	96	96	105	104	103	103	102	102	102	101	100	100	99	2.1
East region (11.1 t/ha)	100	101	100	99	102	100	99	98	97	106	104	102	101	101	101	100	99	97	96	96	104	104	103	103	102	102	101	101	100	100	99	2.3
West region (11.2 t/ha)	101	101	101	99	102	100	100	98	97	104	104	104	101	101	102	100	99	96	96	95	105	105	103	103	102	102	104	101	102	99	101	2.7
North region (11.3 t/ha)	100	98	[93]	101	98	104	100	97	98	103	[101]	100	102	101	96	99	98	98	99	95	[105]	[102]	102	102	103	102	99	96	[[91]]	99	98	3.1
Untreated grain yield (% treated control)																															
United Kingdom (11.2 t/ha)	95	83	77	71	84	72	81	71	69	83	86	80	76	77	79	85	83	67	75	77	82	79	84	79	79	81	88	83	90	82	81	4.9
Agronomic features																															
Resistance to lodging without PGR (1–9)	7	6	8	7	8	7	7	7	6	7	7	7	7	7	7	6	6	7	7	7	6	7	7	7	7	7	7	7	7	7	7	0.6
Resistance to lodging with PGR (1–9)	8	7	7	8	8	8	8	8	7	7	8	8	7	8	8	7	6	8	8	8	7	8	7	7	7	7	8	7	8	8	8	0.5
Height without PGR (cm)	90	84	85	81	82	83	85	85	89	91	87	93	86	82	91	86	83	85	80	85	93	83	86	87	85	86	87	86	82	92	82	1.7
Ripening (days +/- Skyfall, -ve = earlier)	0	0	+1	+2	+1	+1	+1	+1	0	0	+3	+1	+1	+1	+1	+2	0	+2	+1	+3	+1	0	0	+1	+1	0	0	+1	0	+1	+2	0.6
Resistance to sprouting (1–9)	[7]	5	[6]	7	[6]	6	[5]	6	5	[6]	[5]	[7]	[5]	[6]	[5]	[4]	[5]	6	5	5	[5]	[6]	[5]	[4]	[5]	[4]	7	5	[7]	[5]	6	0.8
Disease resistance																															
Mildew (1–9)	6	8	5	8	5	7	6	5	7	7	6	6	7	7	7	7	7	3	6	6	6	6	6	4	7	6	7	6	7	5	8	1.0
Yellow rust (1–9) - **see note below**	9	9	9	7	9	9	9	8	5	8	9	8	9	9	5	9	9	6	6	9	7	6	7	8	7	7	8	9	9	7	9	0.7
Brown rust (1–9) - **see note below**	7	5	5	4	6	5	7	5	7	6	8	7	5	6	7	6	7	7	8	8	4	6	6	6	7	5	6	5	7	6	5	1.1
Septoria nodorum (1–9)	-	[6]	-	[6]	-	[6]	[6]	[6]	[6]	-	-	-	[5]	[6]	[7]	[6]	[6]	[6]	[6]	[7]	-	-	[6]	[6]	[6]	[6]	[6]	[6]	-	[6]	[6]	0.9
Septoria tritici (1–9)	8.1	6.6	5.3	5.9	7.0	4.3	5.5	5.0	5.4	5.0	6.8	5.1	4.9	4.3	6.6	7.9	5.4	4.8	4.8	6.0	6.6	5.0	6.3	4.8	4.9	6.3	6.8	5.9	8.2	6.6	6.1	0.8
Eyespot (1–9)	[4]	5	[5]	4	[4]	5	4	5	4	[4]	-	[5]	4	4	4	3	4	5	4	7@	-	-	4	4	5	4	4	4	-	6@	5	1.7
Fusarium ear blight (1–9)	6	5	7	6	5	6	6	6	6	6	6	6	6	6	6	6	6	7	6	6	6	6	6	6	6	5	6	6	6	6	6	0.5
Orange wheat blossom midge	-	-	R	-	R	R	R	R	R	R	R	R	R	R	-	R	R	R	R	-	R	R	R	R	R	-	-	R	-	-	-	

Filter varieties by [1] | **Calculate Agronomic Merit on X-axis** [2]

End-use group: Multiple selections

Variety: All

Septoria tr. rating	4.3	8.2
Yellow rust rating	4.5	8.9
Brown rust rating	3.6	8.2
Mildew rating	2.8	8.2
Fusarium rating	5.2	6.9
Eyespot rating	3.2	7.1
Lodging (+) rating	6.4	8.1
Lodging (-) rating	6.0	7.6
Sprouting rating	4.0	7.2
Yield (early drilled)	91	109
Yield (late drilled)	97	110
Yield (light soils)	95	108
Yield (heavy soils)	96	105
Yield (2nd cereal)	95	104
HFN	151	321
Specific weight	73.8	80.7
Protein (milling) %	11.2	12.9

UK distilling suitability: All

Export suitability: All

Ripening days: All

Latest safe sowing date: All

Height (-PGR)	78	92

OWBM resistance: All

Clear all filters

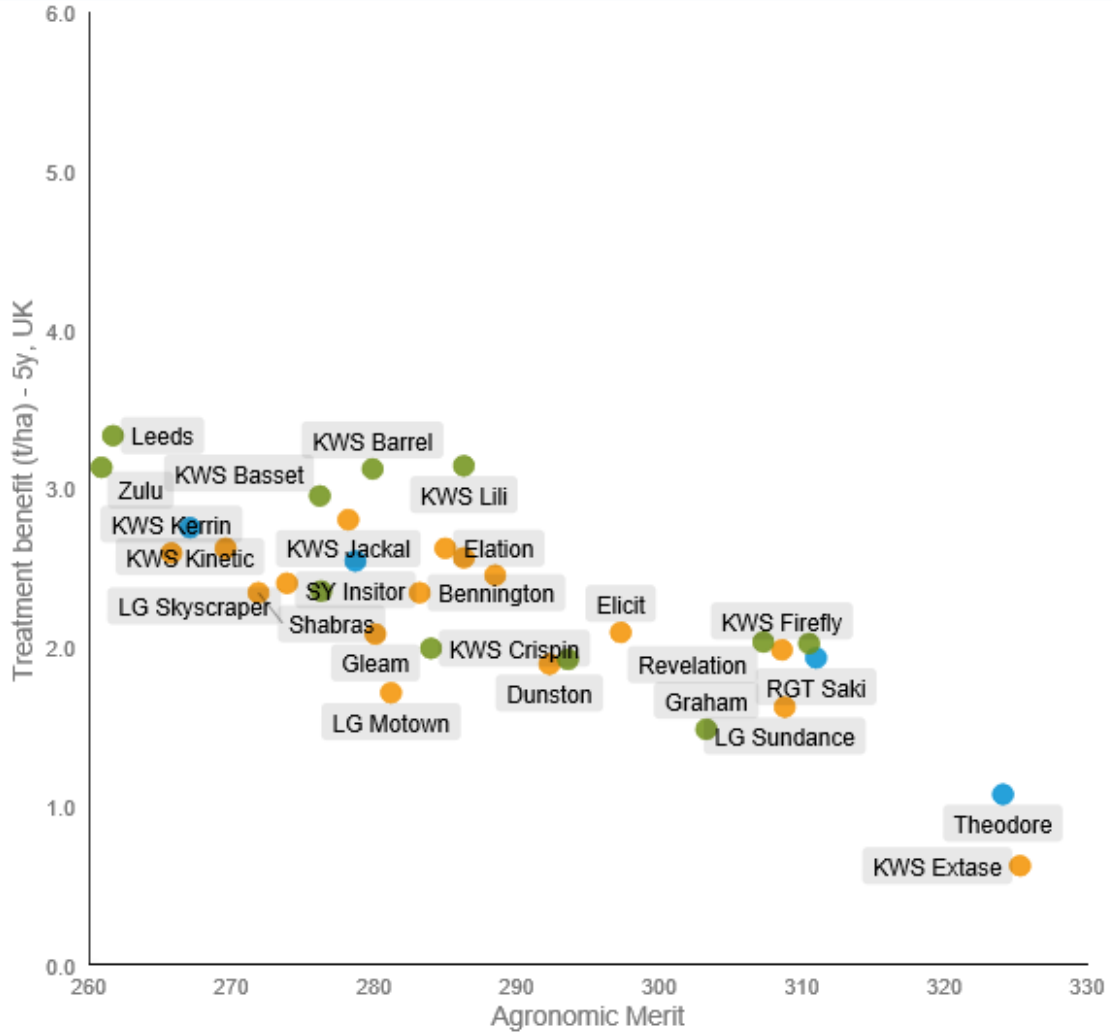
Select regional yield measure on Y-axis [4]

5 year data: UK (+F) | East (+F) | North (+F) | West (+F) | UK (-F) | UK (TB)

Last year data: UK (-F) | UK (TB)

Distinguish variety points in graph by [5]

Years on RL — NEW, 2-4, 5 or more



Winter wheat
nabim group 4 (soft)

Yield control: UK 11.15 t/ha, E 11.09 t/ha, W 11.23 t/ha, N 11.34 t/ha

New

	RGT Saki	LG Skyscraper	LG Spotlight
UK treated yield	104	105	103
East treated yield	104	106	102
West treated yield	104	104	104
North treated yield	[101]	103	100
UK untreated yield	86	83	80
Hagberg	221	218	288
Spec. weight	75.7	76.9	77.9
UK distilling	-	[Y]	[Y]
Resistance to lodging + PGR	8	7	7
Ripening (+/- Skyfall)	+3	0	+1
Yellow rust	9	8	8
Brown rust	8	6	7
Septoria tritici	6.8	5.0	5.1
OWBM	R	R	R

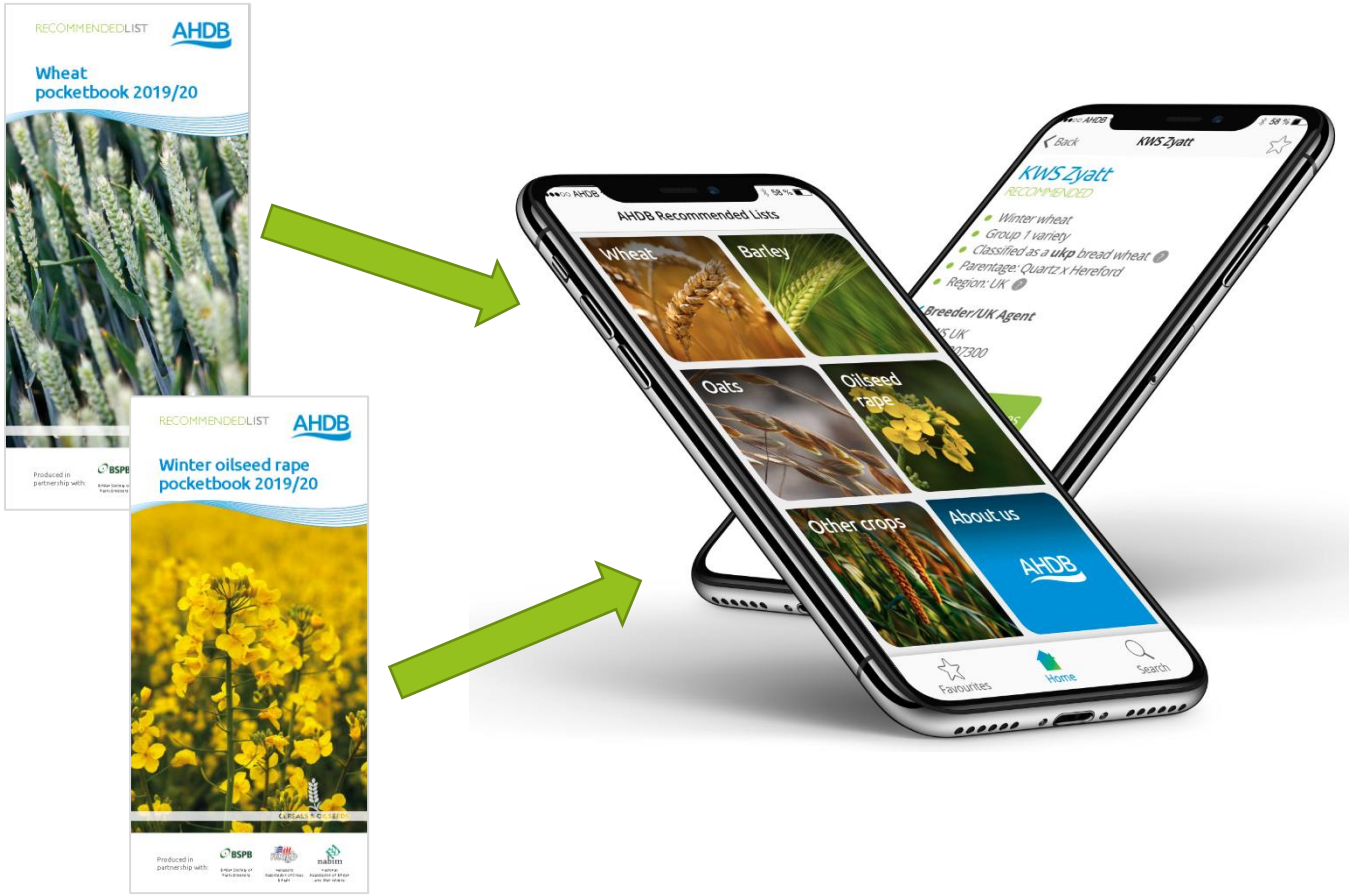
Winter wheat
nabim Group 4 (hard)

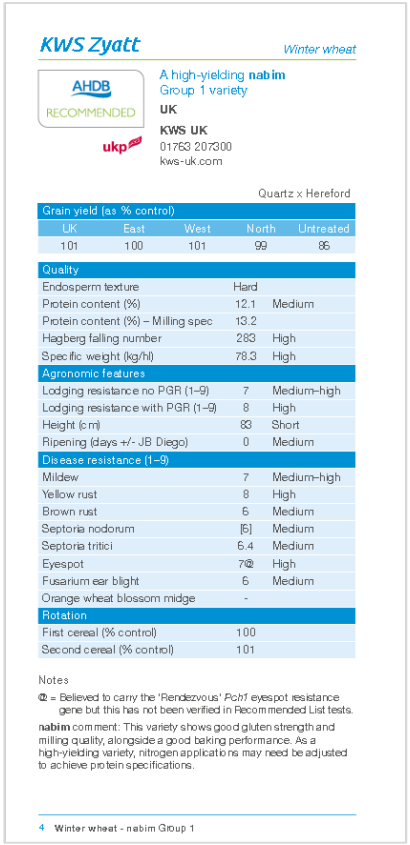
Yield control: UK 11.15 t/ha, E 11.09 t/ha, W 11.23 t/ha, N 11.34 t/ha

New

	SY Insitor	KWS Kinetic	Theodore	Graham	Gleam
	UK	UK	W	UK	UK
UK treated yield	105	104	100	102	103
East treated yield	104	104	100	101	103
West treated yield	105	105	102	104	103
North treated yield	[105]	[102]	[[91]]	99	102
Untreated yield	82	79	90	88	84
Specific weight	78.3	78.5	73.8	76.8	76.3
Lodging + PGR	7	7	8	8	7
Maturity	+1	0	0	0	0
Mildew	6	6	7	7	6
Yellow rust	7	6	9	8	7
Septoria tritici	6.6	5.0	8.2	6.8	6.3
Brown rust	4	6	7	6	6
OWBM	R	R	-	-	R

Pocket books are changing to an App





KWS Zyatt — *Winter wheat*

AHDB RECOMMENDED

ukp

A high-yielding **nabim** Group 1 variety

UK

KWS UK
01763 207300
kws-uk.com

Quartz x Hereford

Grain yield (as % control)				
UK	East	West	North	Untreated
101	100	101	99	86

Quality		
Endosperm texture	Hard	
Protein content (%)	12.1	Medium
Protein content (%) – Milling spec	13.2	
Hagberg falling number	283	High
Specific weight (kg/hl)	78.3	High
Agronomic features		
Lodging resistance no PGR (1–9)	7	Medium–high
Lodging resistance with PGR (1–9)	8	High
Height (cm)	83	Short
Ripening (days +/- JB Diego)	0	Medium
Disease resistance (1–9)		
Mildew	7	Medium–high
Yellow rust	8	High
Brown rust	6	Medium
Septoria nodorum	[6]	Medium
Septoria tritici	6.4	Medium
Eyespot	7②	High
Fusarium ear blight	6	Medium
Orange wheat blossom midge	-	
Rotation		
First cereal (% control)	100	
Second cereal (% control)	101	

Notes

② = Believed to carry the 'Rendezvous' *Pch1* eyespot resistance gene but this has not been verified in Recommended List tests.

nabim comment: This variety shows good gluten strength and milling quality, alongside a good baking performance. As a high-yielding variety, nitrogen applications may need be adjusted to achieve protein specifications.

Focus session 2

CEREALS & OILSEEDS

Focus session 1

How to put a true cost on crop establishment choice Harry Henderson, AHDB

How to boost soil fertility
Anne Bhogal, ADAS

How to use data to improve your farm business Clive Blacker, Precision Decisions

Panel session

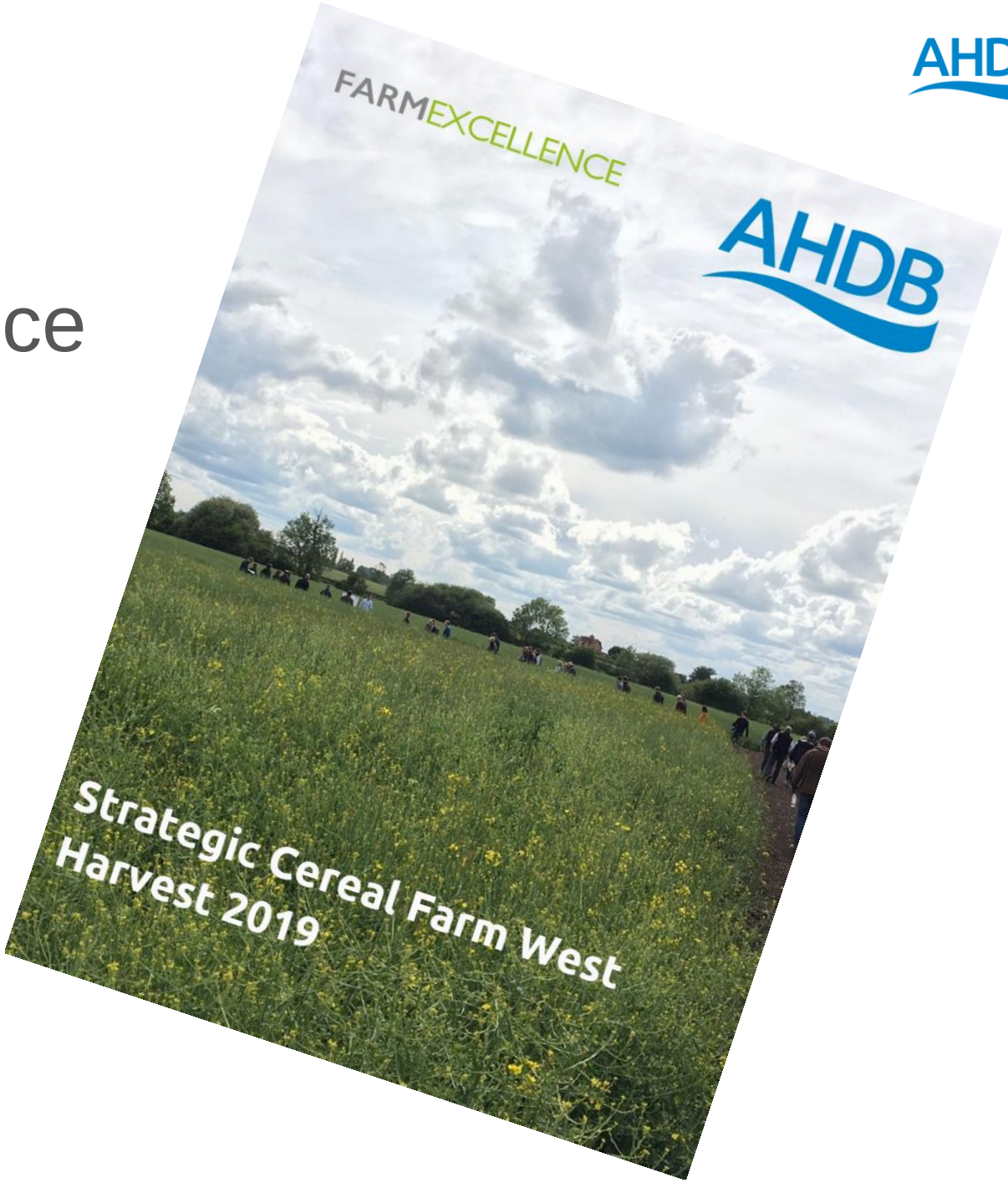
CEREALS & OILSEEDS

Closing comments

Richard Meredith, AHDB

CEREALS & OILSEEDS

ahdb.org.uk/farm-excellence



Topics for 2019-2020*

1. Cultivation depth
2. Managing pests on oilseed rape
3. Reduced fungicide input regimes
4. Cultivation depth on headland areas
5. Stubble management techniques
6. Perennial flower strips

Strategic Cereal Farm West Open Day

Tuesday 2 June 2020

Monitor Farm meetings

Loppington

- 17 December 2019
- 7 January 2020
- 3 March 2020

Hereford

- 18 December 2019
- 19 February 2020
- 4 March 2020

Taunton

- 13 February 2020
- 12 March 2020

ahdb.org.uk/farm-excellence

Tyres, Traction & Compaction

- Tyre Choice: latest tyre technology explained
- How to balance weight, ballast and pressures
- Improve traction and work rates, save fuel
- Reduce damage to soils /minimise costly subsequent corrective cultivations/ improve yields
- Practical weigh cell/pressure demonstration

9 January 2020
Hereford Racecourse

Kate Adams, Wye & Usk Foundation

Harry Henderson, AHDB

Mark Stalham, NIAB

Charlie Morgan, GrassMaster

Michelin Tyres

West Agronomy Event 2020

- **Stephen Kildea, Teagsac (Ireland)**

Crop protection strategies for the future

- **Jane Rickson, Cranfield University**

Systematic approaches to soil management

- **Dave Chandler, Warwick University**

Bio-pesticides and their potential for field crops

- **Steve Klenk, Garnstone Farms**

The fundamentals of good agronomy; a farmers perspective

- **Steve McGrath, Rothamsted University**

Improving yield through micronutrients

Three Counties Showground, Malvern
11 February 2020


WE ALL NEED
feedback.
THAT IS HOW WE
improve.
- bill gates


‘Inspiring our farmers, growers and industry to succeed in a rapidly changing world’