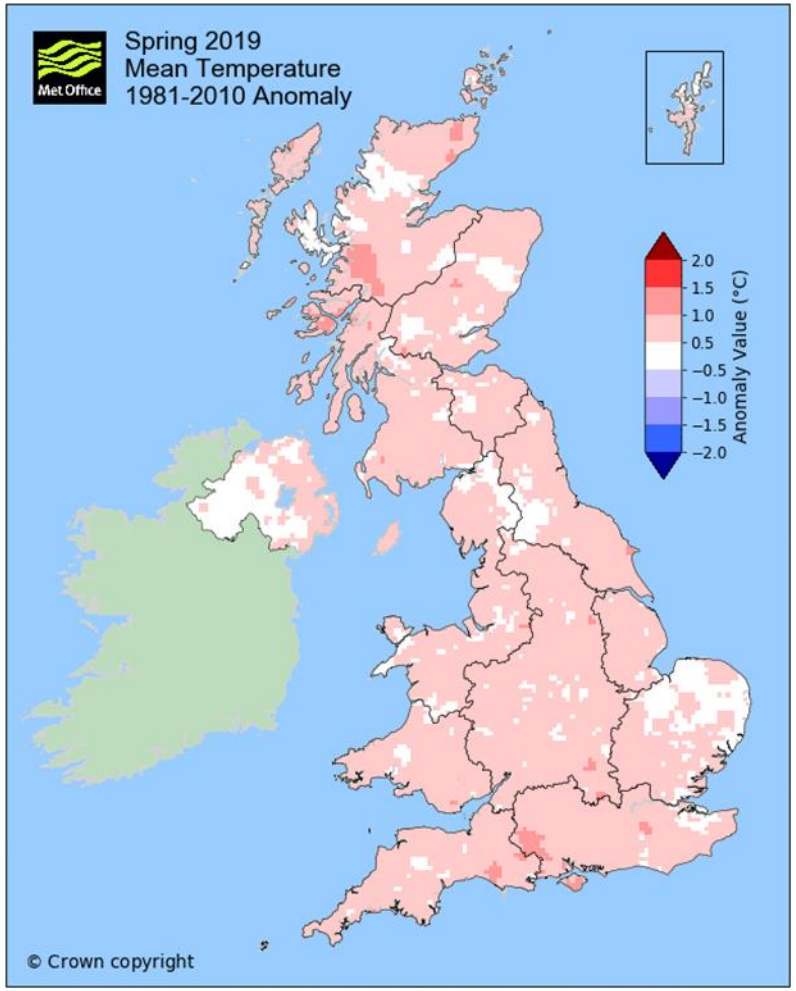
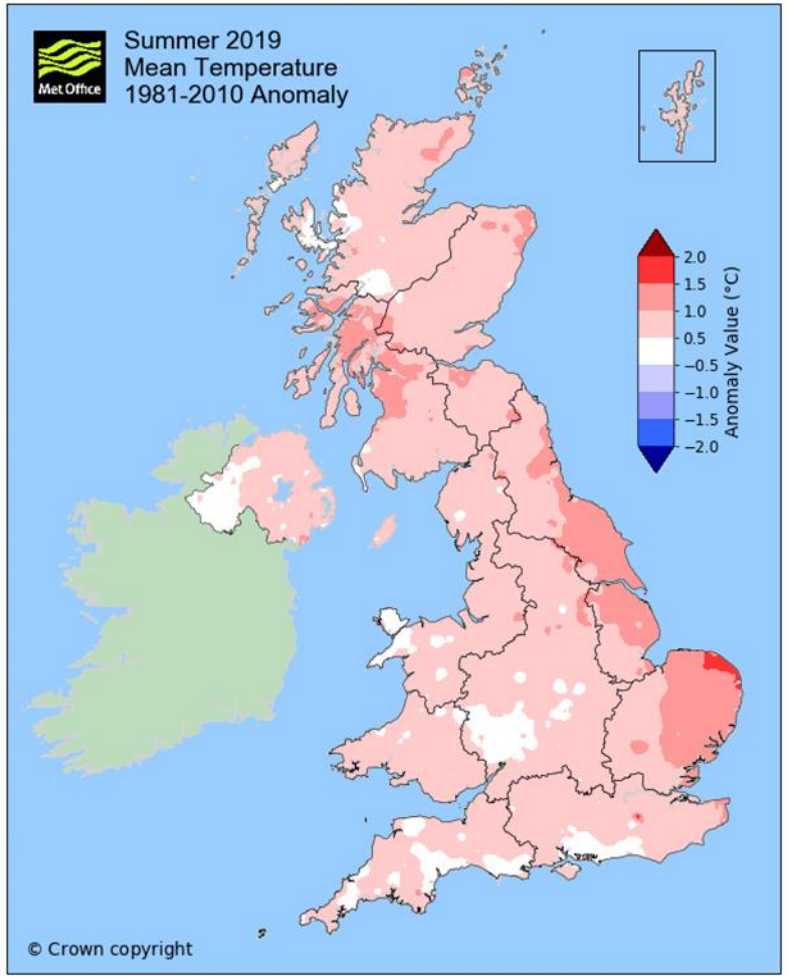
IPM Update/Fungicide resistance

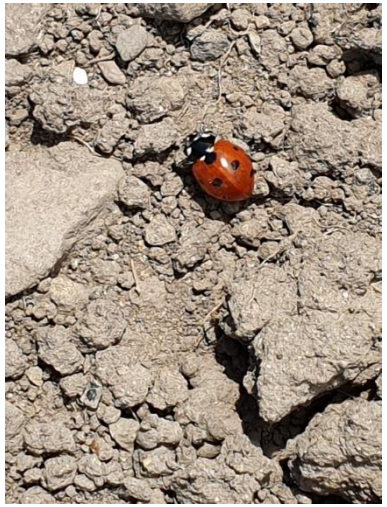
Neil Havis, Crop Protection Lead, SRUC

Introduction

2019 – temperature up on the 30 year average

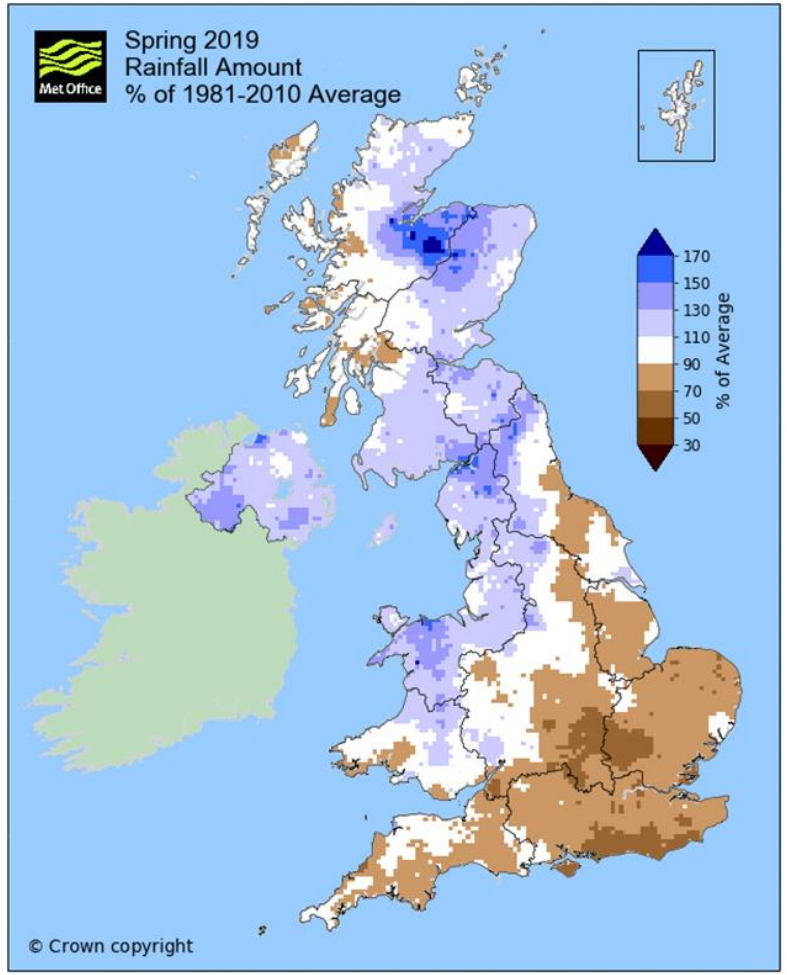


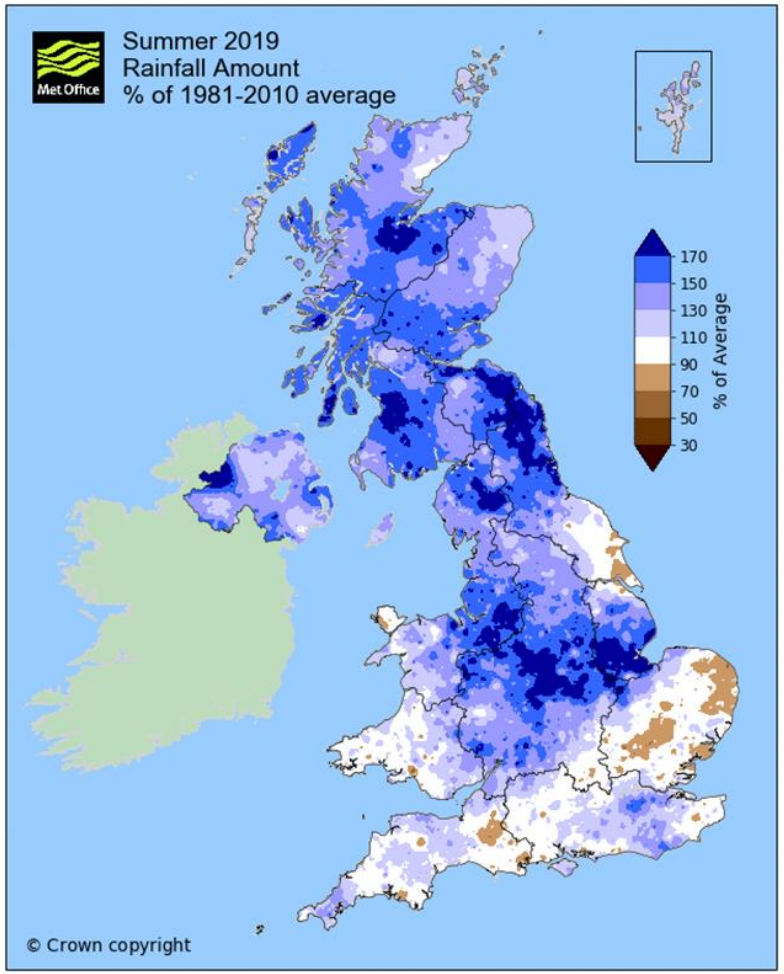


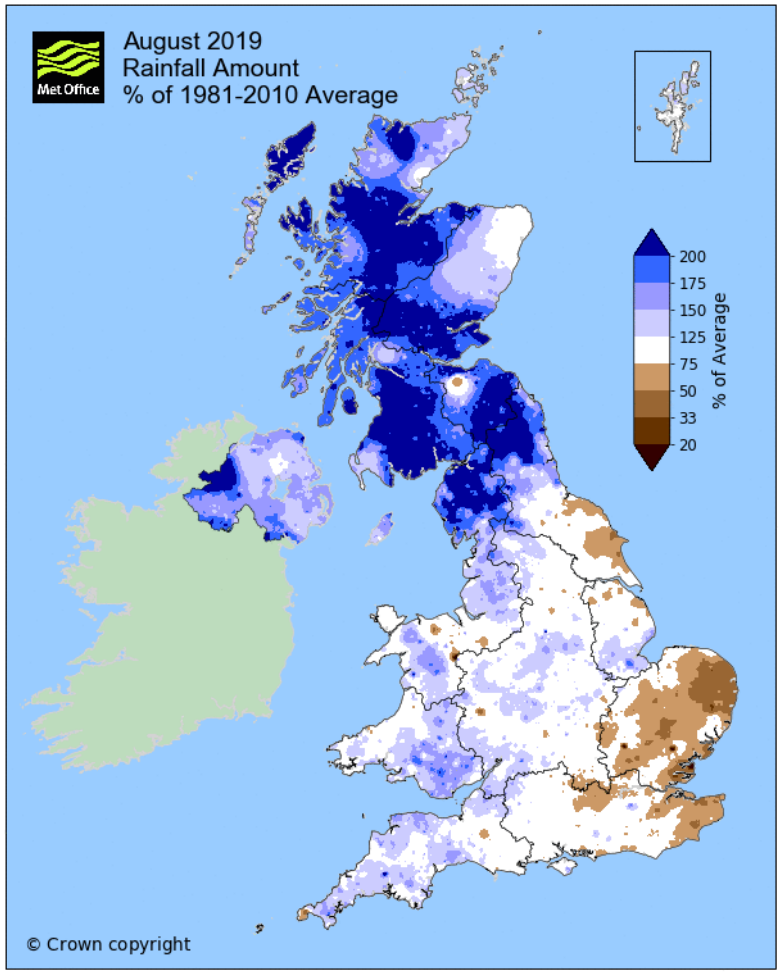


Introduction

2019 rainfall – wet summer (esp May and August) following a near average spring (march figures were higher than average)







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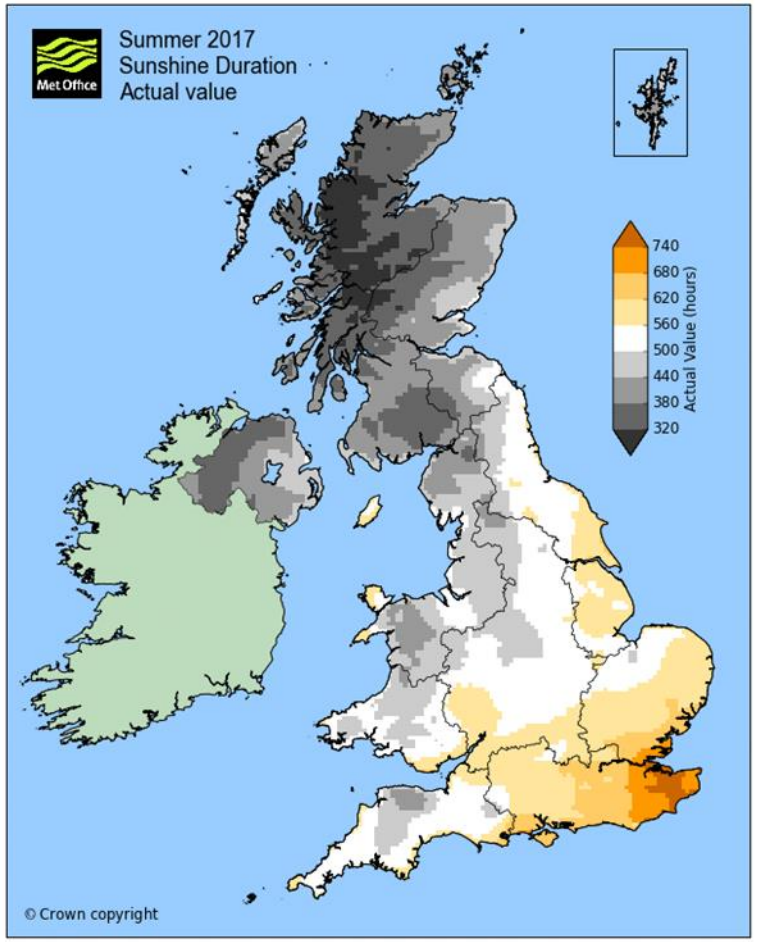
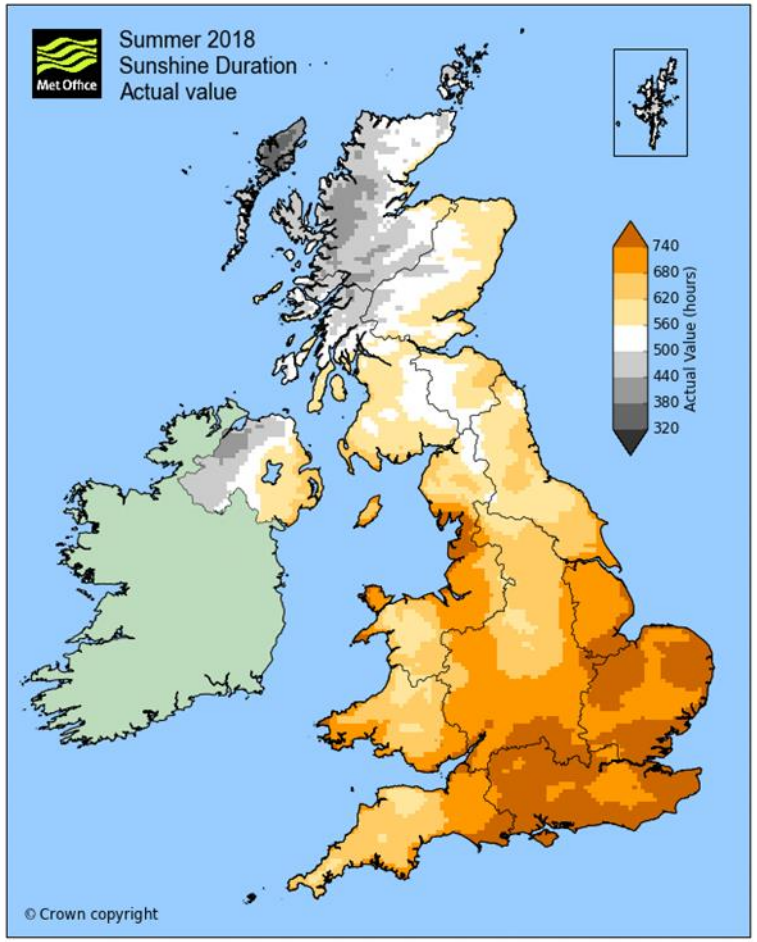
Introduction

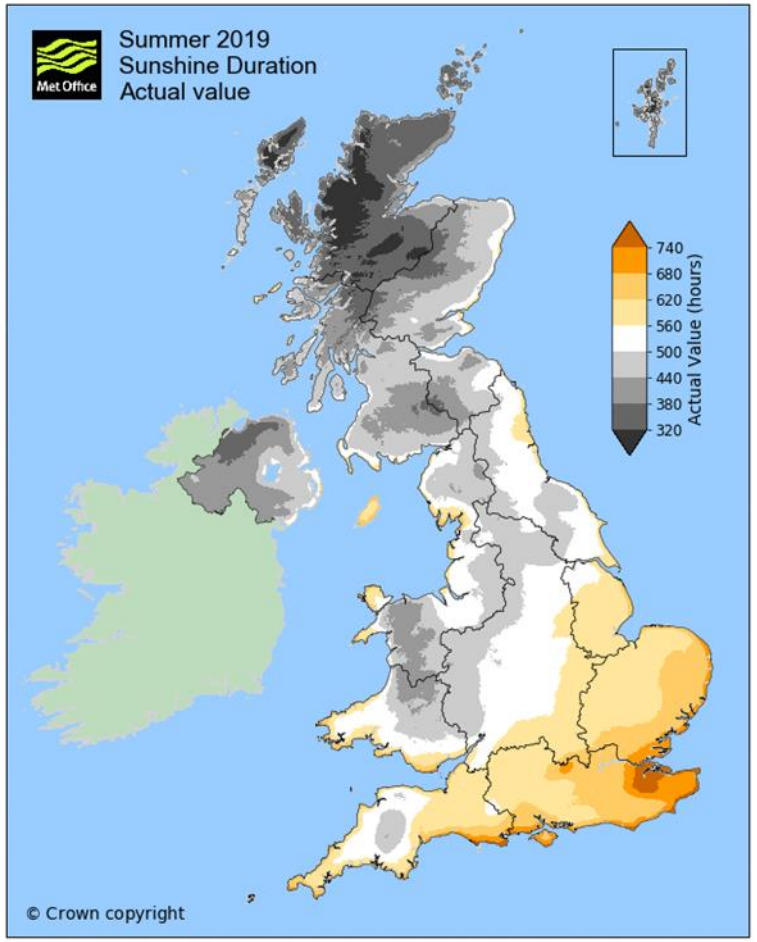
2019 rainfall – wet summer- late attack from splash borne diseases

Introduction

2019 sunshine – normal service resumed

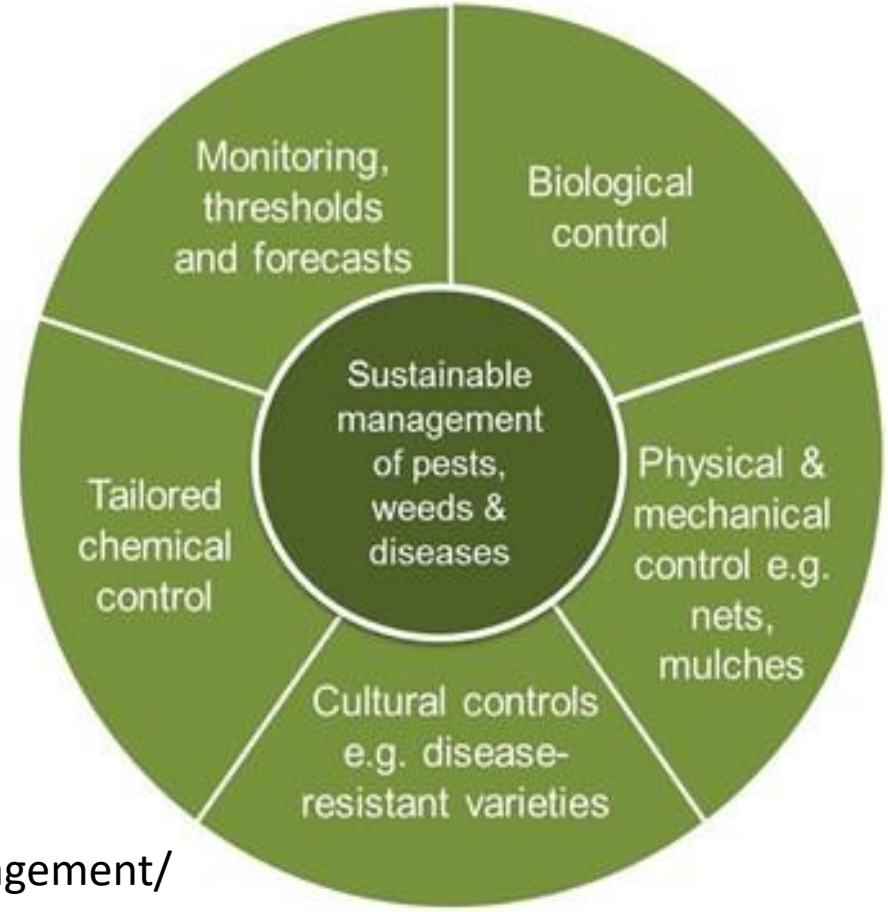






IPM

- Work is ongoing to develop effective, sustainable and profitable IPM programmes in barley
- Various projects funded by RESAS, AHDB Mains of Loirston and commercial sponsors



https://voluntaryinitiative.org.uk/schemes/integrated-pest-management/

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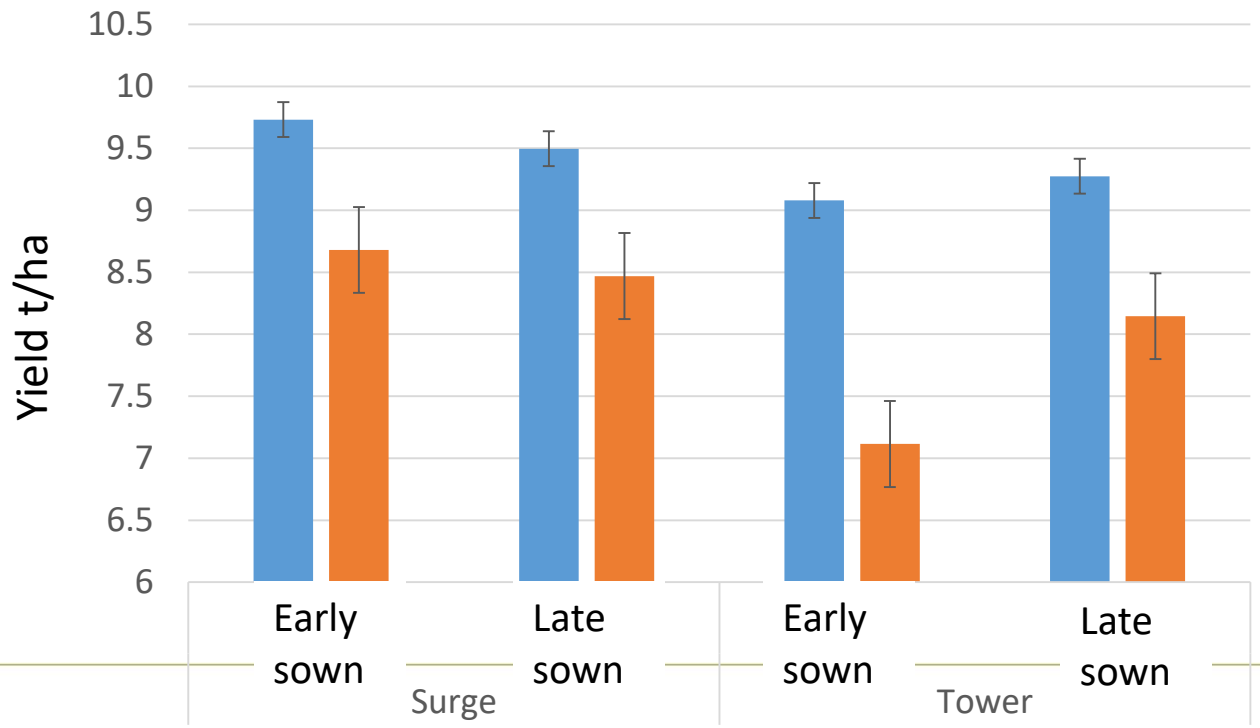
Winter barley IPM: Sow date*Cv*Fungicide

- Late sown crops sown 3-4 weeks later than early sown.
- 2 Varieties: Surge (res), Tower (sus)
- 4 fungicide programmes: 0/1/2/3 sprays



- Greater fungicide requirement in early sown + susceptible crops

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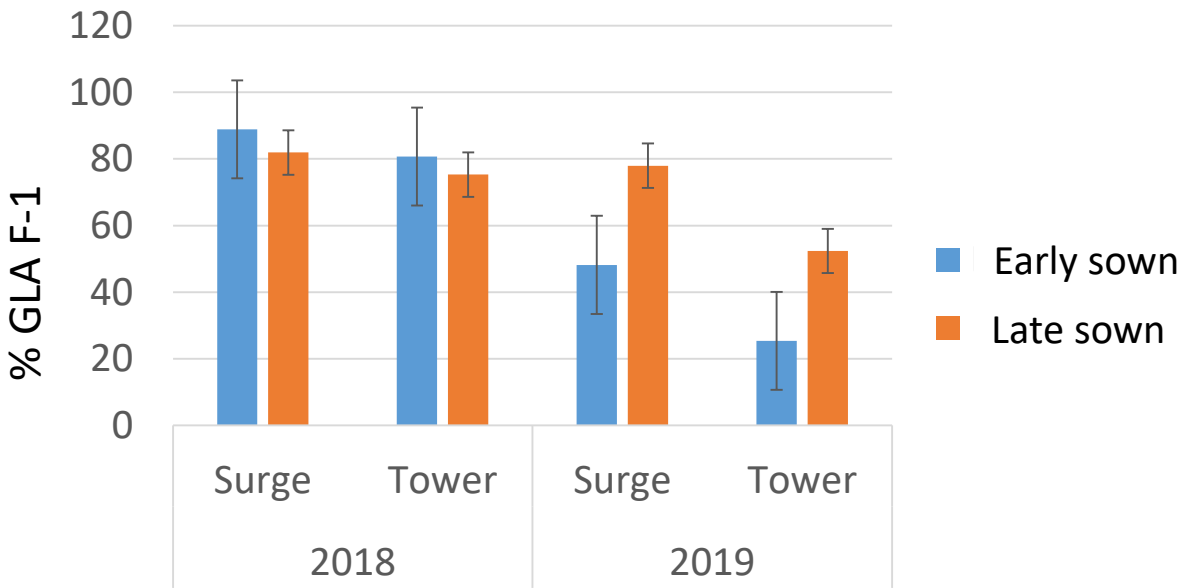
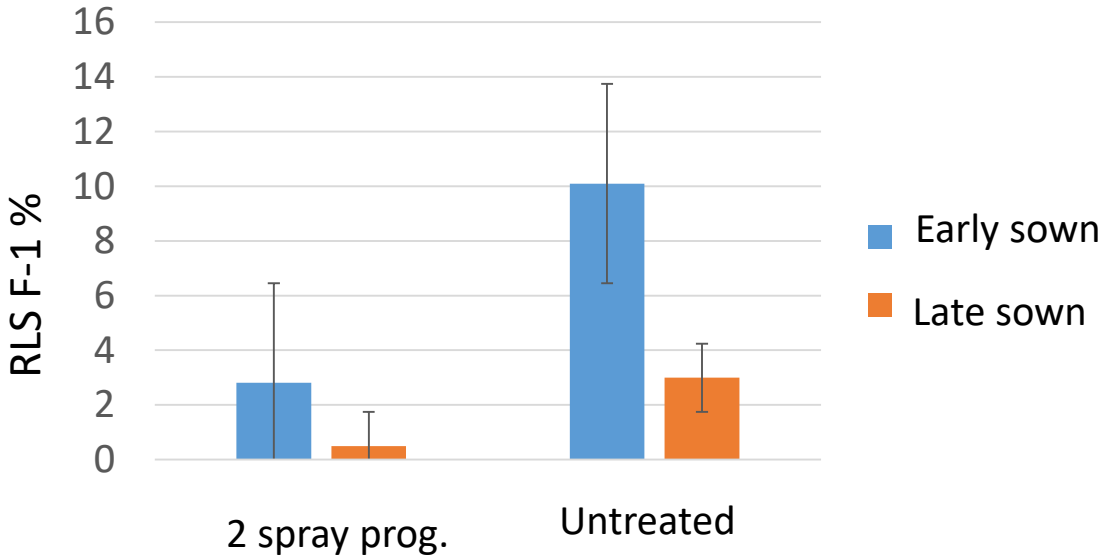
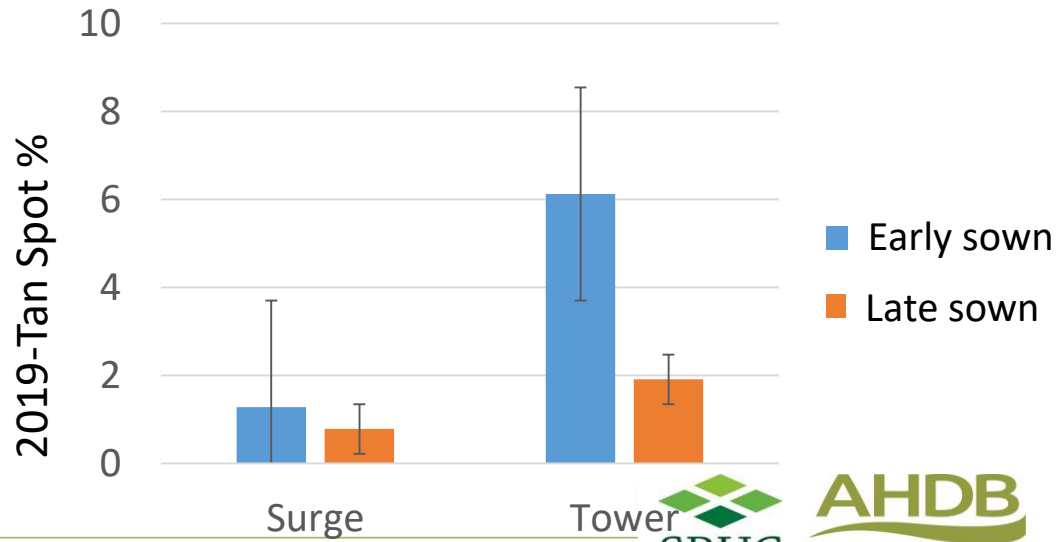
Winter barley IPM: Sow date*Cv*Fungicide

- Early sowing decreases GLA in disease years.
- Due to RLS (both years) and also tan spot 2019.
- Susceptible variety= less GLA, more disease.







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Fungicide treatments for all trials

Trt	T0 (>GS30)	T1 (GS31)	T2 (GS39-45)
1	Untreated	Untreated	Untreated
2	Untreated	Siltra XPro (0.6L/ha)	Untreated
3	Untreated	Siltra XPro (0.6L/ha)	Siltra XPro (0.4L/ha)
4	Cyflamid (0.3L/ha) + Comet (0.4L/ha)	Siltra XPro (0.6L/ha)	Siltra XPro (0.4L/ha)

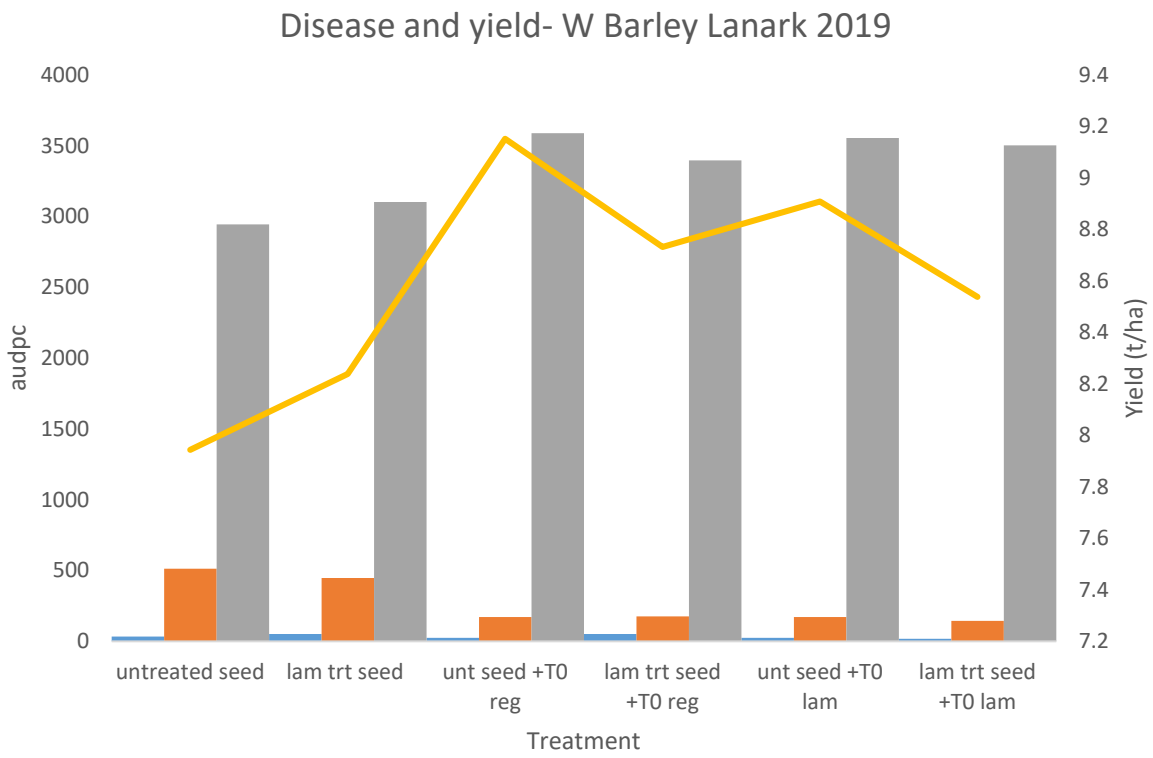
IPM trials 2019

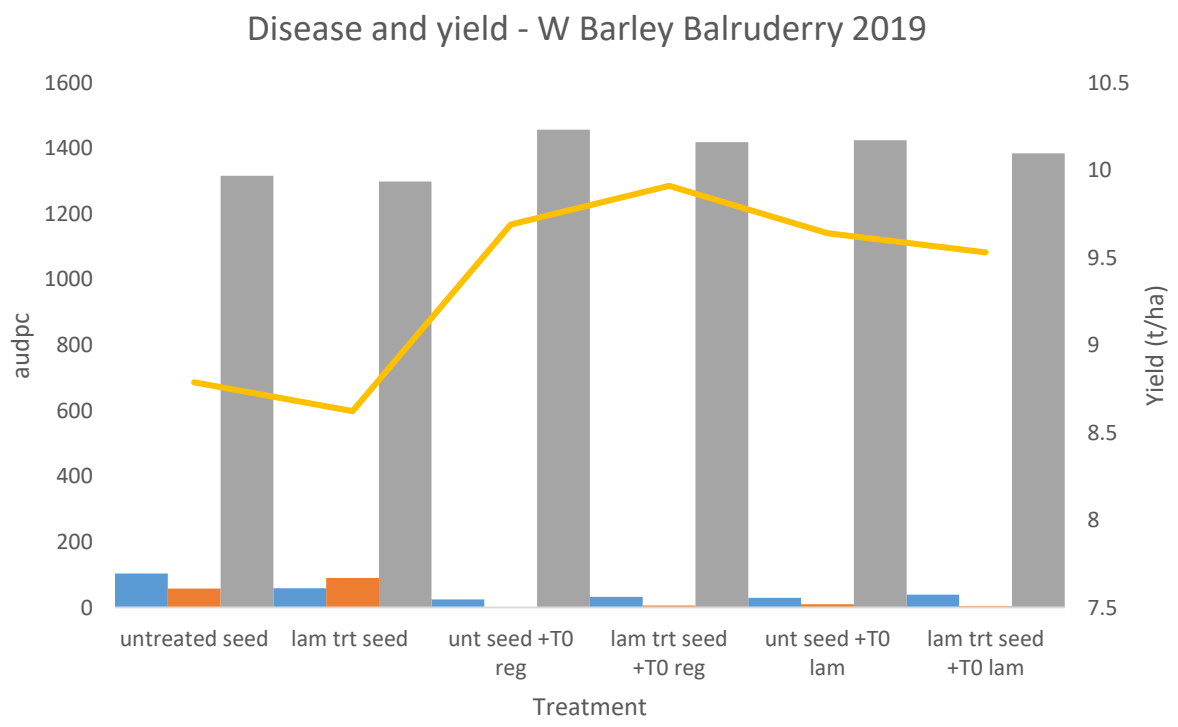
- Determining scope for omitting T1 spray in spring barley
- Comparing different variety mixes to monocultures for disease control and yield stability
- Effect of tillage regime on agronomy and yield in winter barley varieties

Untreated

2 x Laminarin + red rate fungicide

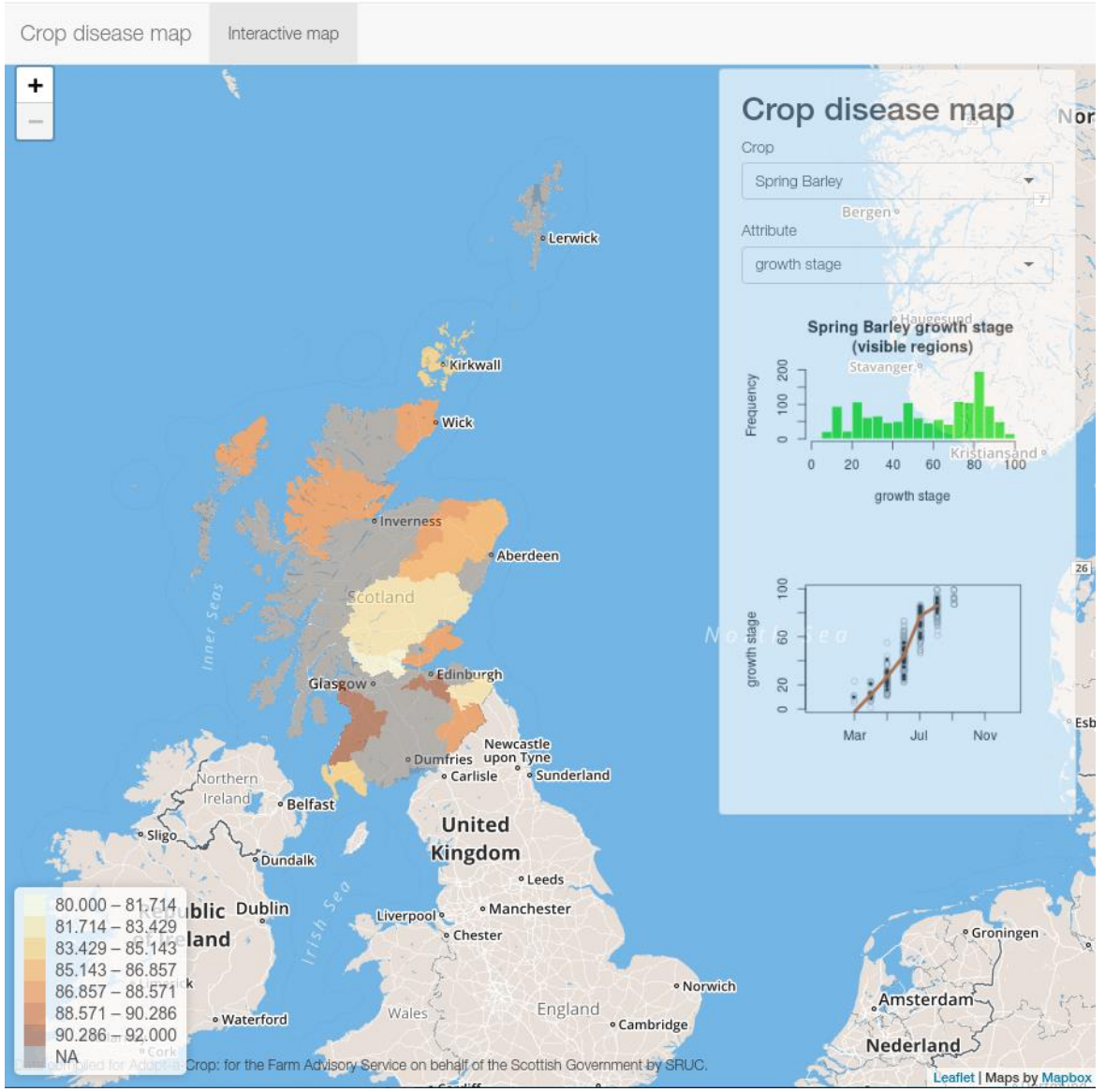
IPM Disease control programmes





IPM – Monitoring of Scottish crops

Provide information from adopt a crop sites in a real time format to inform growers of crop growth/disease/pest issues



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Resistance challenges continue to build

Fungicide Group	Diseases affected
Strobilurins	mildew (wheat and barley), septoria, net blotch, tan spot, ramularia, rhynchosporium, M. nivale
Azoles	mildews, septoria, ramularia, rhynchosporium, tan spot
SDHIs	net blotch, septoria, ramularia, tan spot
MBCs (no longer used)	eyespot, septoria, M. nivale, ramularia
Quinoxyfen	wheat mildew, barley mildew
Metrafenone	wheat mildew, barley mildew
Chlorothalonil	None
Folpet	None
Mancozeb	None

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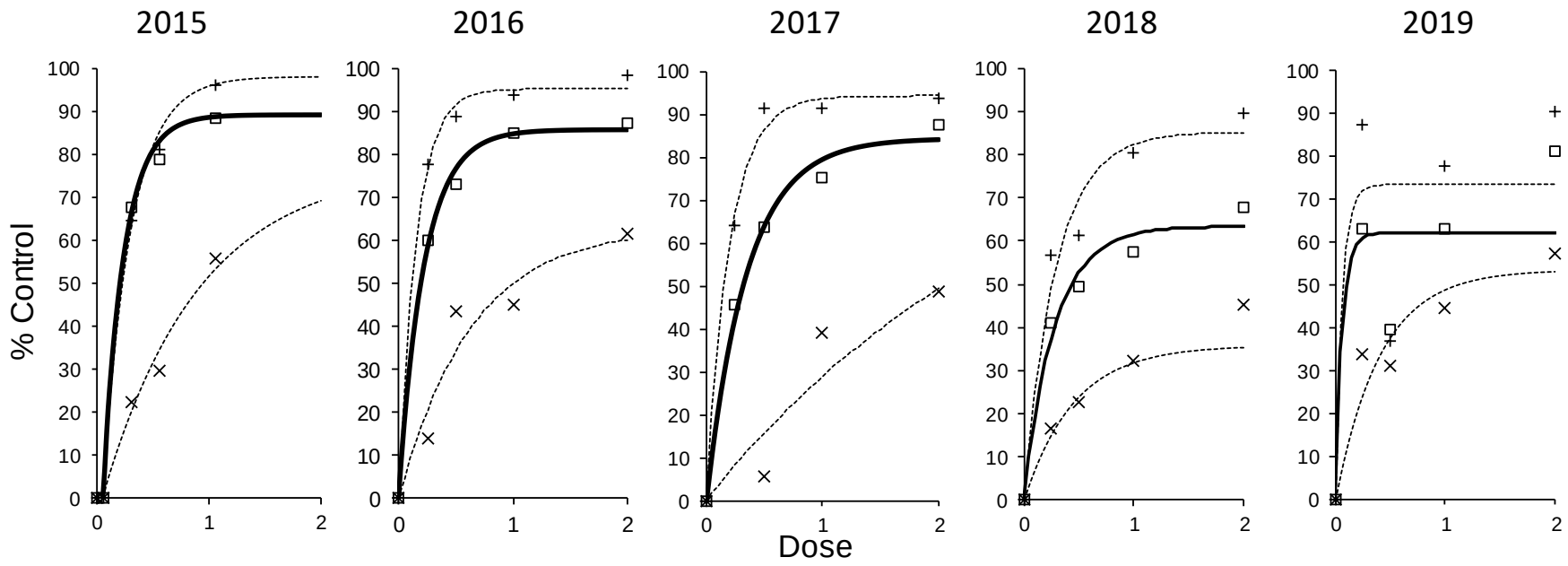
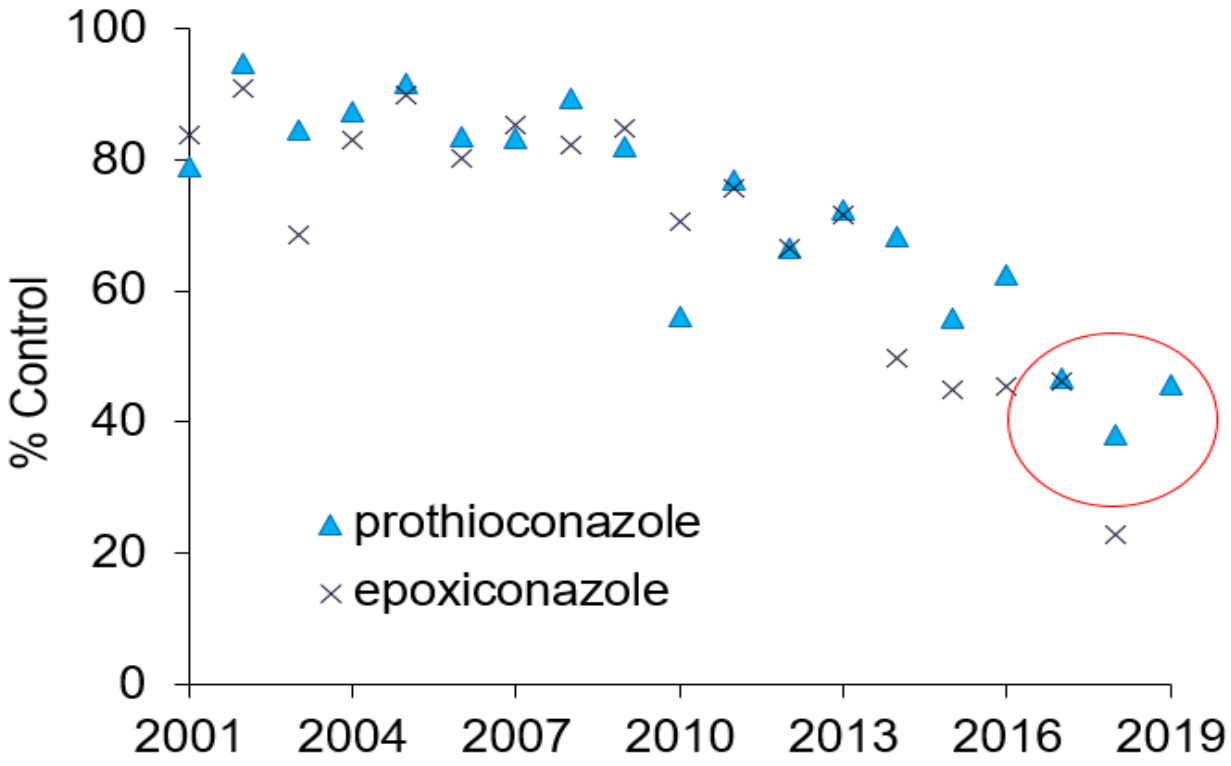
SDHI emerging issues



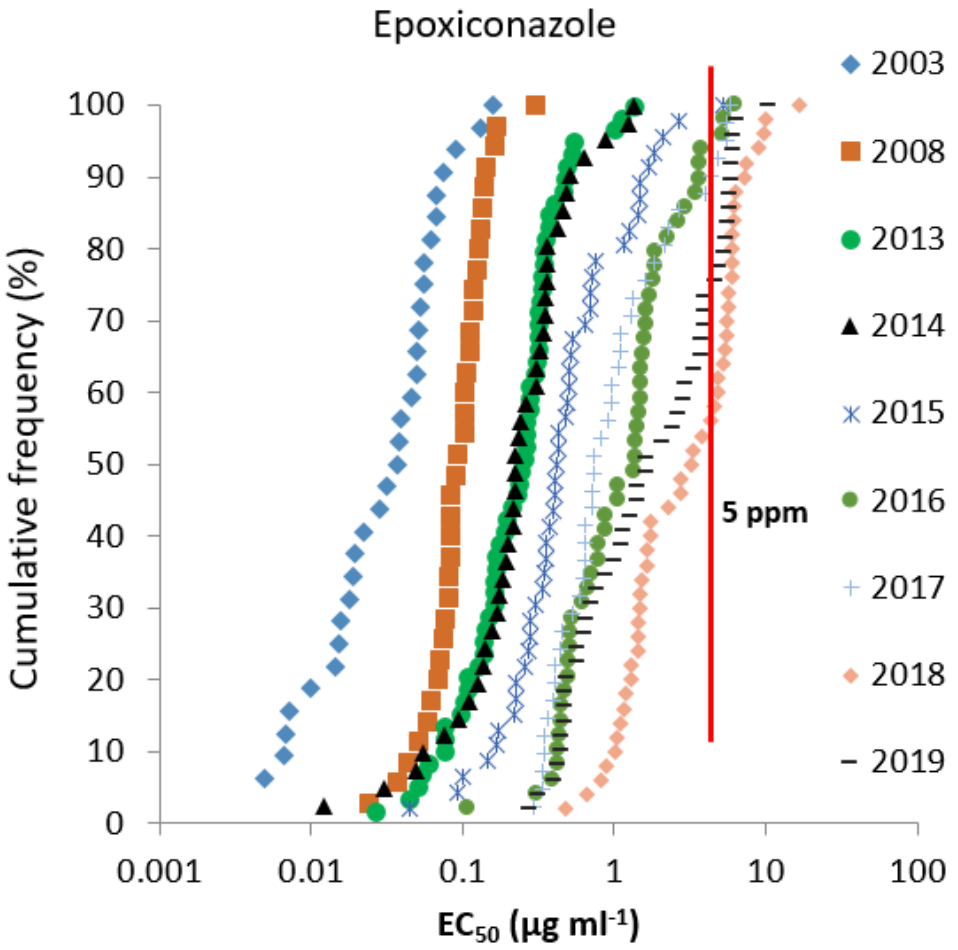
Strains less sensitive to SDHIs
(e.g. T79N and N86S) now widely present in populations

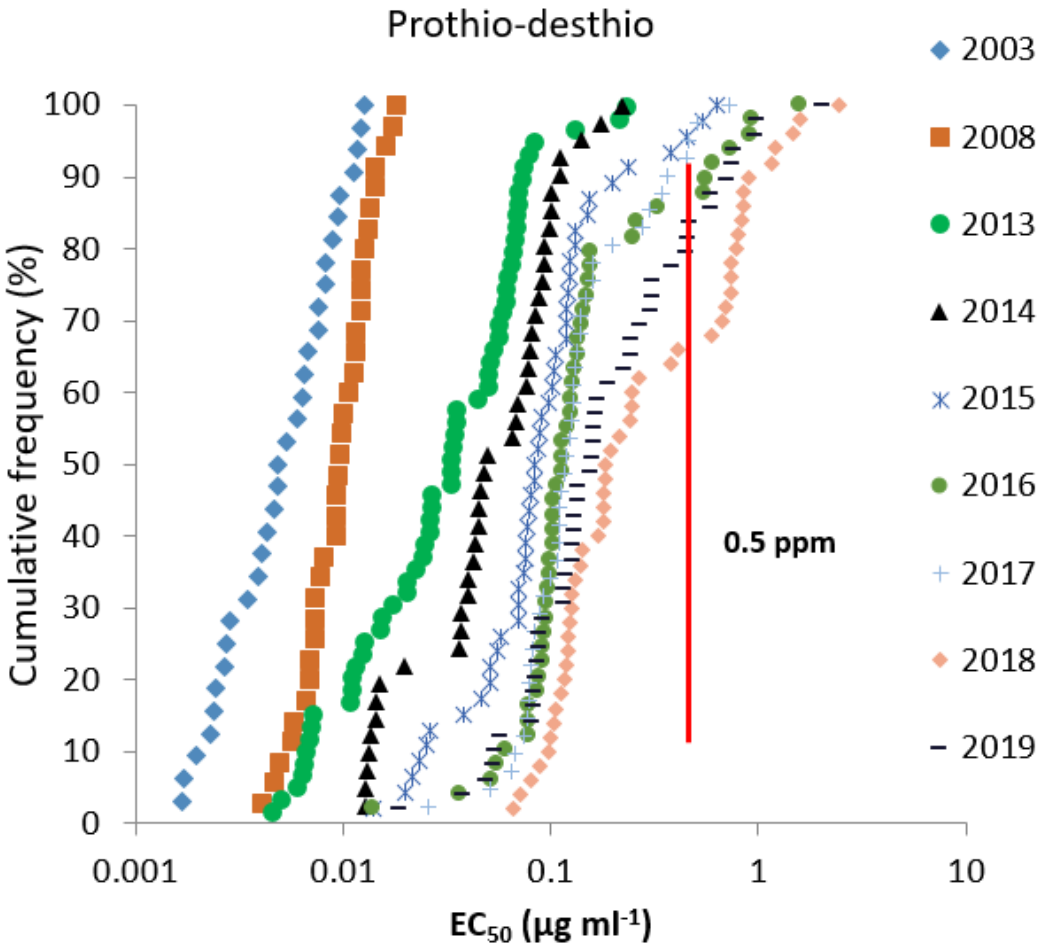
H152R overwintered at Rothamsted site

Azole efficacy on septoria tritici (2001–19)
Protectant activity at full rate



Rothamsted early season monitoring 2019





How will we retain efficacy in new and existing chemistry?

- Do everything possible to reduce disease risk and reduce reliance on fungicides (resistant varieties, rotations, agronomy..)
- Maximise use of low risk (multisite) fungicides as mixture partners
- Use minimum effective doses and balanced mixtures
- Limit use and alternate where possible

- If multiple applications of single-site fungicides are needed:-

➢Limiting number of treatments of a MoA is a simple, practical message

➢But may be unnecessarily restrictive or counterproductive

➢Limiting by total dose may be effective and allow more flexibility

➢Experimental evidence being obtained

Managing with less and protecting what's left

- Do everything to reduce risk….rotation, variety, certified seed, sow date, monitoring, surveillance, crop walking, tailored sprays
- Use that information to make treatment decisions
- Value varietal resistance
- Don't play fast and loose with new fungicides
- Take the risk of resistance in all chemistry seriously
- Stick to guidelines and, obviously, to statutory limits

- Keep abreast of developments and follow the best technical advice
- Everyone wants new twists and clever pitches but this can leave individuals dangerously exposed and puts our whole industry at risk …. there are genuine win: wins.

Managing resistance too challenging?

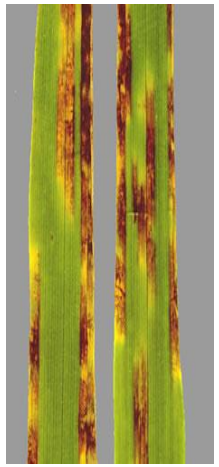
Perception	Acceptable options
Increased uptake of IPM too complex	Increased varietal resistance React to weather, tillage and sow date
Not economic to reduce inputs	Keep inputs high but use mixtures and alternations Reduce use of marginal T0, T1.5 and T4 sprays Reduce use of high risk fungicides Increase use of lower risk / multisites
Fungicide resistance not important / not my problem	Label guidance Label requirements Statutory measures Public good for public money

Barley –

- Multiple disease targets
- Greater number of active groups
- Lower inputs
- History of slow uptake of more disease resistant varieties
- Issues with net blotch, mildew and rhynchosporium

Ramularia – evolving picture

- QoI resistance since 2002
- MBC resistance (2 forms)
- Emerging issue with SDHIs 2014
- 2017 Fall off in field performance for SDHIs and azoles
- 2019 Mixed picture reported across UK and Europe



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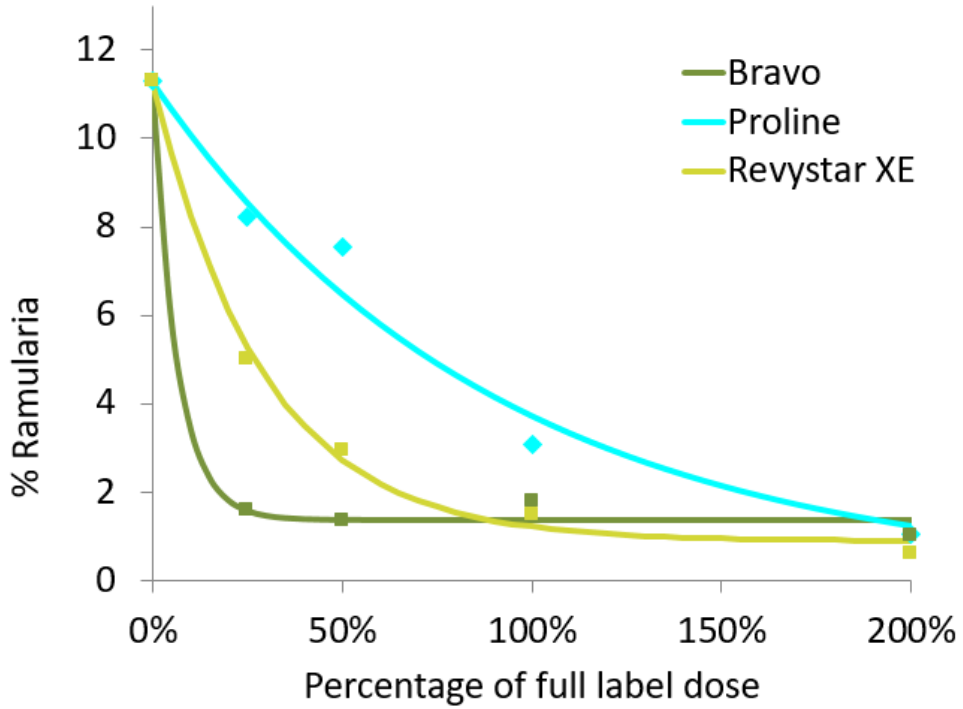
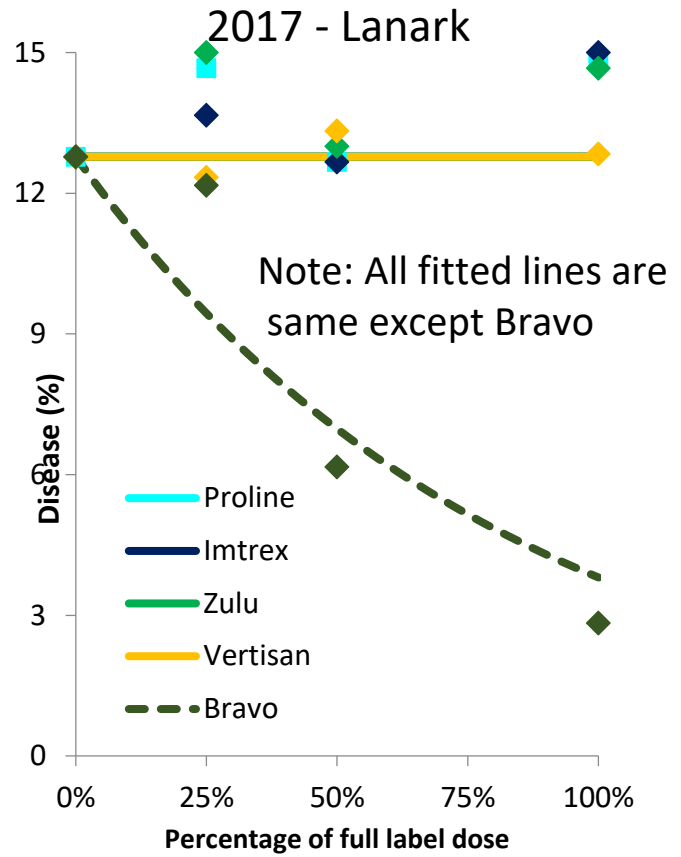
Ramularia 2019 (2 sites)





Two new products, with existing actives, for OSR

Aviator Xpro

- 75g/l bixafen + 160g/l prothioconazole
- Maximum individual dose 1.0 l/ha
- Maximum of two applications per crop
- Can be applied up to 56 days before harvest
- Approved for control of:
    - Light leaf spot
    - Phoma stem canker
    - Sclerotinia control

Angle

- 125g/l azoxystrobin + 125g/l difenoconazole
- Maximum individual dose 1.0 l/ha
- Maximum of two applications per crop
- Can be applied up to and including end of flowering
- Approved for:
    - Phoma stem canker reduction
    - Sclerotinia control (moderate control)

OSR summary – IPM in practice

- Early sown crops more at risk of light leaf spot
- Spring timing at stem extension
- Current levels…
- Little between products in terms of efficacy

- For sclerotinia, products containing prothioconazole or boscalid lead
- Azoxystrobin also effective
- Base treatments and doses on risk
- Alternate and mix actives through programme where possible

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

INSPIRE Innovate INTEGRATE

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The Scottish Government
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Cereal Varieties Update:
Value in agronomic features and end use

Steve Hoad, SRUC

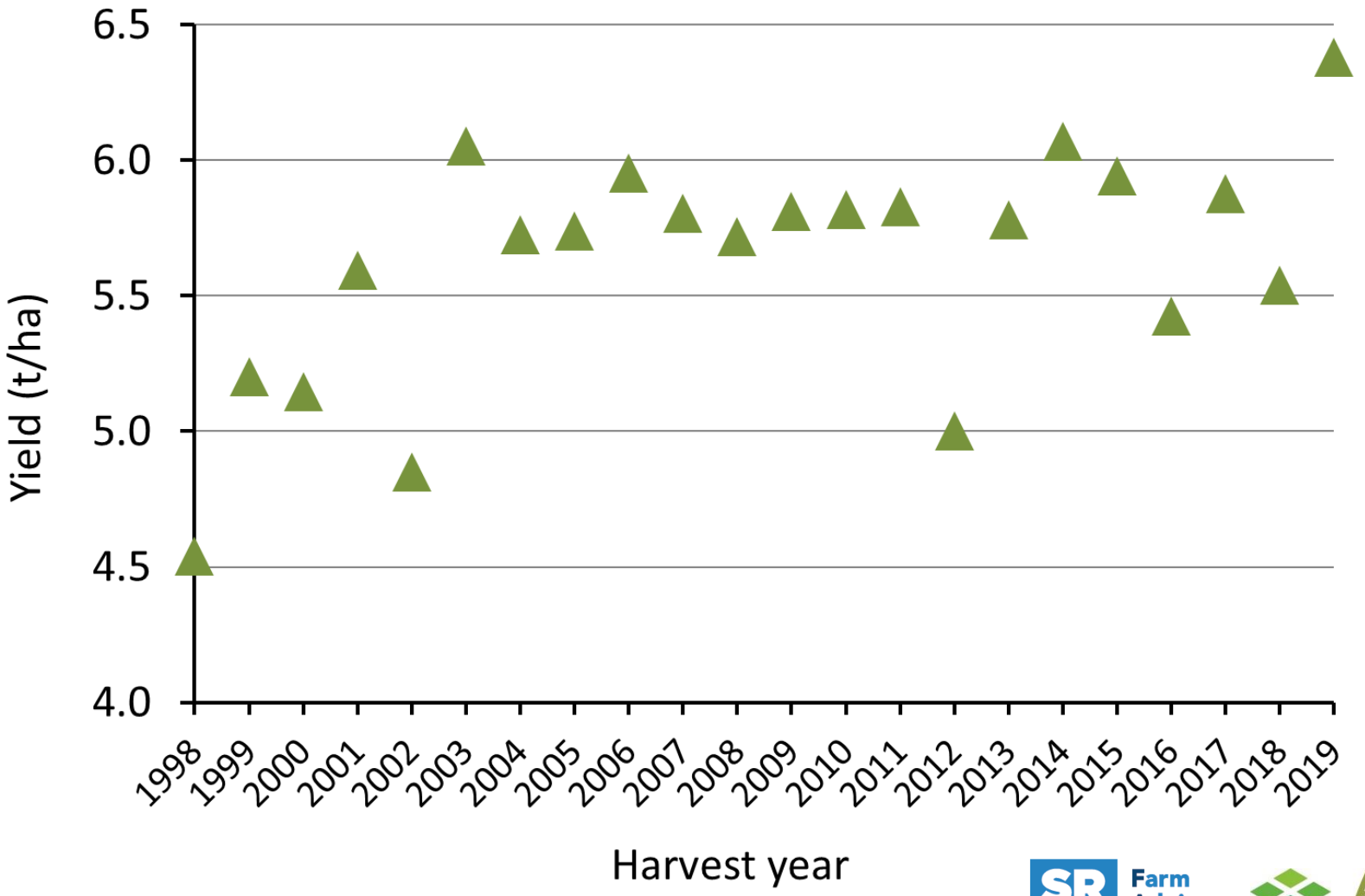
Outline

- Variety progress and decision making
- Review of the new cereals lists
- Understanding agronomic value e.g. agronomic features and end use

https://www.sruc.ac.uk/cerealslist

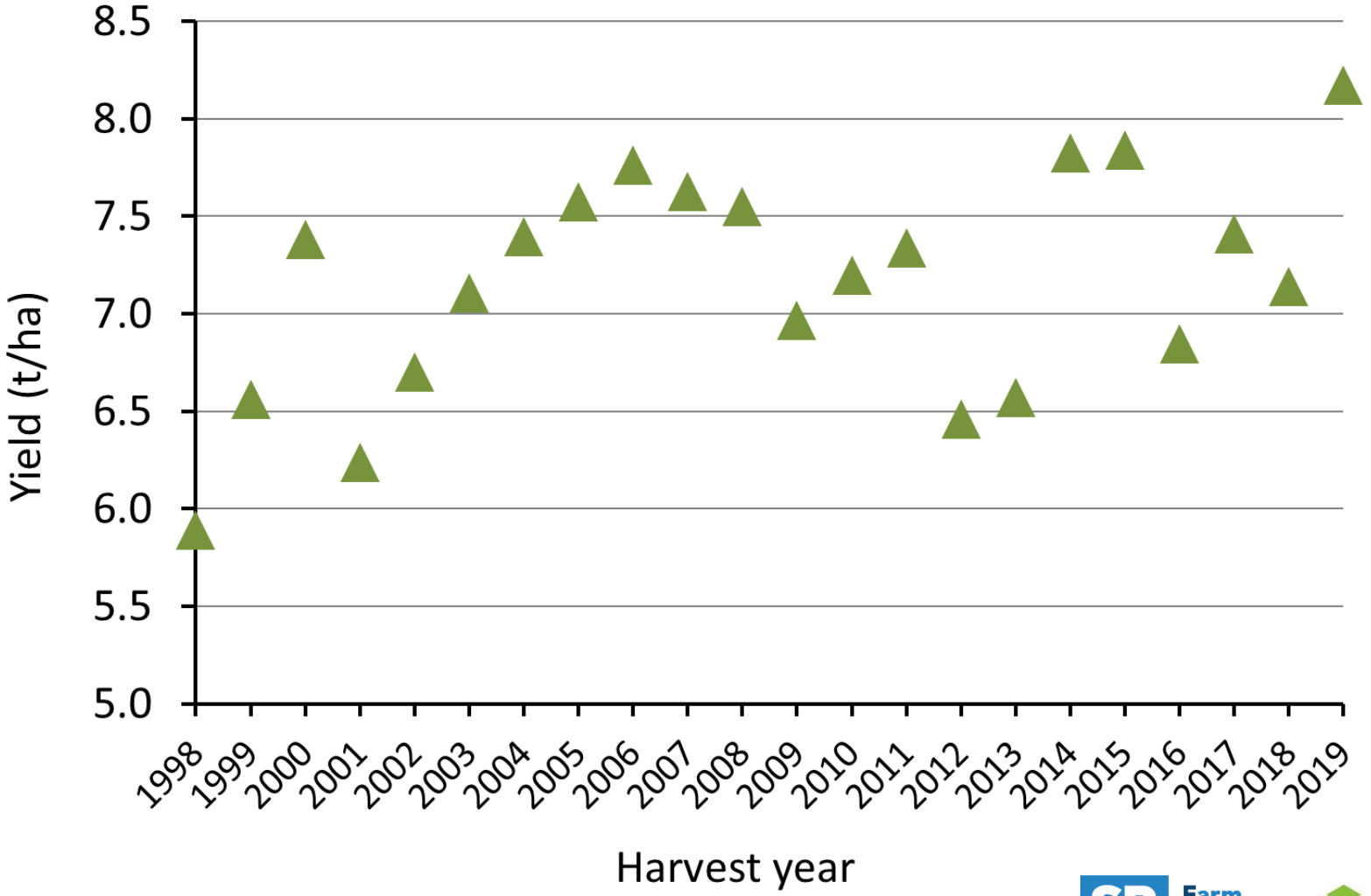
https://www.ahdb.org.uk/rl

Spring barley yields



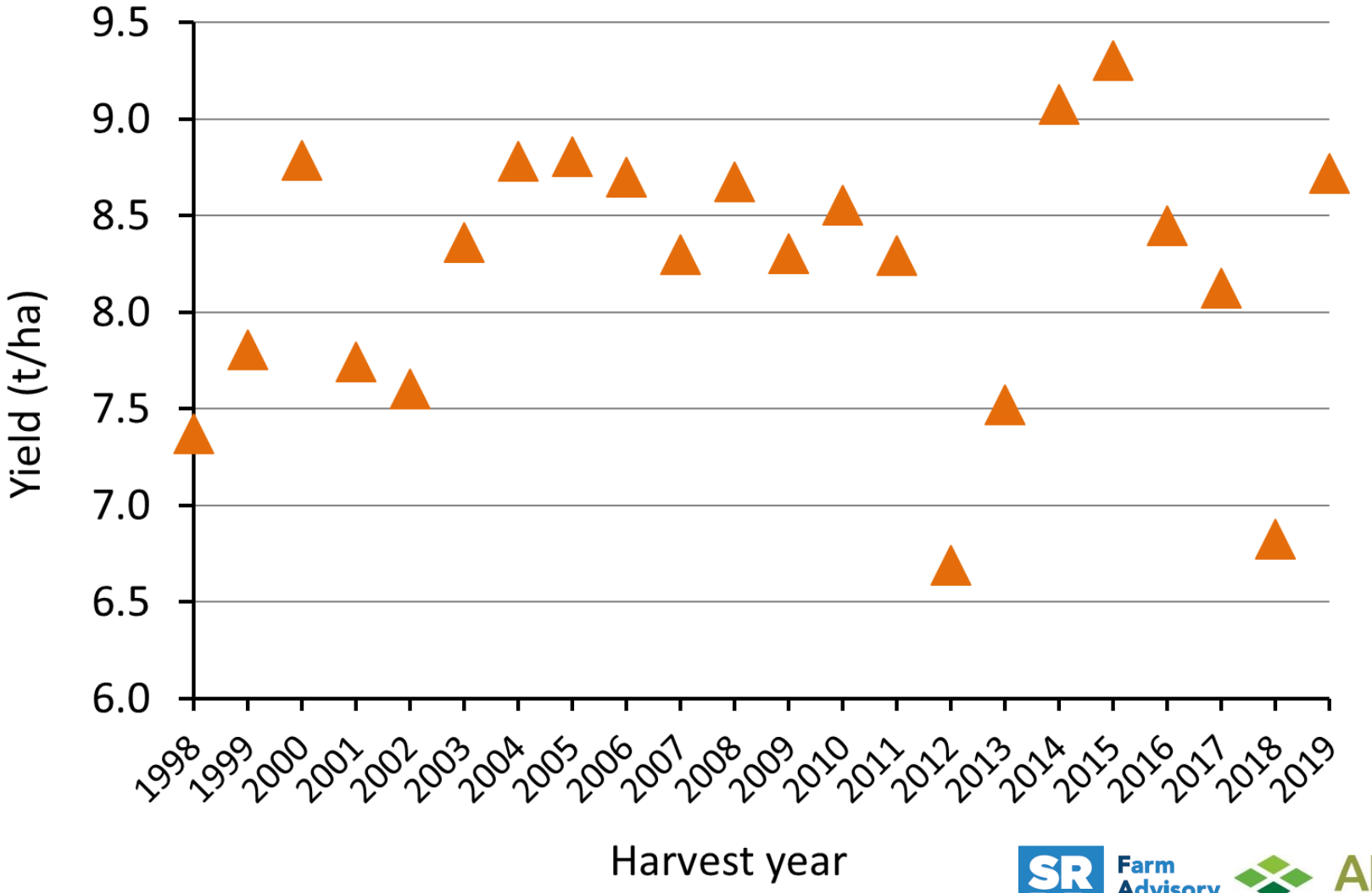
(Source: Scottish Government)

Winter barley yields



(Source: Scottish Government)

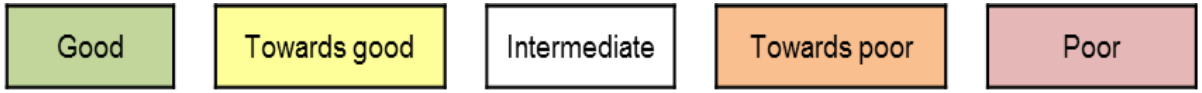
Winter wheat yields



(Source: Scottish Government)

Value in agronomic features and end use

- Consider how we value all agronomic and grain features along with yield
- National Listing (over two years) includes Value for Cultivation and Use (VCU)
- Recommended List trials include processing and end user tests, as well as scope for UK, regional or specific use
- The SRUC Scottish List includes varieties that are best suited to local markets and growing conditions



Scottish List 2020/21: Spring barley

- Laureate had two-thirds of the 2019 malting intake
- LG Diablo developing market share
- KWS Sassy, Fairing and Sienna also have market share
- Concerto has become outclassed
- SY Tungsten (distilling & brewing), Firefoxx (distilling), SY Splendor (brewing) and Prospect (feed) are all RL Year 1

Spring barley – Malting

Market options

Yield = 7.5 t/ha

Year First Listed	Recommendation		Grain yield as % of treated Control	Yield loss (%) if untreated	Malting market options and MBC† approval		
					Dist.	Brew	Grain
2018	R	LG Diablo	107	8	F	P	N
2020	P1	SY Tungsten	107	10	T	T	N
2020	P1	Firefoxx	107	11	T	N	N
2016	R	Laureate	104	7	F	F	N
2016	R	KWS Sassy	103	7	F	N	N
2015	R	Sienna	102	8	F	N	N
2018	P3	RGT Asteroid	102	6	P	P	P
2016	S	Fairing	95	9	N	N	F
2009	O	Concerto	93	8	F	F	N

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Spring barley – Malting

Grain and agronomic features

Recommendation		Screenings <2.5 mm (%)	Specific weight (kg/hl)	Maturity days +/ - Concerto	Straw strength 1 to 9; weak to stiff	Straw length (cm) no PGR
R	LG Diablo	3.4	67.1	+1	7	73
P1	SY Tungsten	[4.7]	67.7	+1	[7]	72
P1	Firefoxx	[3.7]	66.4	0	[7]	71
R	Laureate	3.6	66.5	+1	7	71
R	KWS Sassy	2.6	68.4	0	6	78
R	Sienna	3.8	70.4	+1	7	77
P3	RGT Asteroid	3.1	68.3	+1	7	73
S	Fairing	2.6	68.3	-2	7	72
O	Concerto	2.9	68.8	0	7	77

Spring barley – Malting

Agronomic features

Recommendation		Brackling risk 1 to 9; high to low	Disease resistance; 1 susceptible to 9 resistant	
			Mildew	Rhyncho-sporium
R	LG Diablo	8	9	5
P1	SY Tungsten	8	9	[4]
P1	Firefoxx	8	9	[5]
R	Laureate	8	9	6
R	KWS Sassy	6	9	6
R	Sienna	7	9	5
P3	RGT Asteroid	8	9	4
S	Fairing	8	9	6
O	Concerto	8	9	4

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Spring barley – Brewing and feed

Market options

Yield = 7.5 t/ha

Year First Listed	Recommendation		Grain yield as % of treated Control	Yield loss (%) if untreated
2020	P1	SY Splendor	107	12
2019	P2	Cosmopolitan	106	8
2015	R	RGT Planet	103	8
2010	O	Propino	98	12
2020	P1	Prospect	105	8
2015	O	Scholar *	104	8

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Spring barley – Brewing and feed

Grain and agronomic features

Recommendation		Screenings <2.5 mm (%)	Specific weight (kg/hl)	Maturity days +/ - Concerto	Straw strength 1 to 9; weak to stiff	Straw length (cm) no PGR
P1	SY Splendor	[3.9]	68.1	+1	[7]	73
P2	Cosmopolitan	3.6	66.2	0	7	70
R	RGT Planet	3.6	67.8	0	7	73
O	Propino	2.1	68.2	-1	7	75
P1	Prospect	[4.5]	67.6	0	[7]	71
O	Scholar *	6.0	68.7	0	7	67

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Scottish List 2020/21: Winter barley

- Plenty of choice in two-row feed and six-row hybrids
- Yield improvements in UK and North region variety trials
- Signs of progress in agronomic features

Winter barley – Two-row feed

Yield = 9.9 t/ha

Year First Listed	Recommendation		Grain Yield as % of treated control	Yield loss (%) if untreated
2019	P2	LG Mountain	105	21
2017	R	KWS Creswell	102	28
2020	P1	KWS Hawking	102	21
2019	P2	LG Flynn	102	20
2016	R	KWS Orwell	101	22
2014	R	KWS Tower	101	26
2019	P2	Valerie	[101]	15
2020	P1	Jordan	101	14
2010	S	KWS Cassia	98	16

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Winter barley – Two-row feed

Grain and agronomic features

Recommendation		Screenings <2.5 mm (%)	Specific Weight (kg/hl)	Maturity days +/- KWS Orwell	Straw Strength 1 to 9; weak to stiff	Straw length (cm) with PGR
P2	LG Mountain	8.0	69.1	-1	7	84
R	KWS Creswell	7.7	68.0	-1	7	85
P1	KWS Hawking	8.3	68.5	0	7	84
P2	LG Flynn	5.2	70.2	0	7	90
R	KWS Orwell	6.3	67.9	0	8	84
R	KWS Tower	7.4	67.4	0	8	85
P2	Valerie	2.0	70.2	-1	8	85
P1	Jordan	5.8	68.9	0	7	82
S	KWS Cassia	5.3	71.2	0	7	88

Winter barley – Six-row feed

Yield = 9.9 t/ha

Year First Listed	Recommendation		Grain Yield as % of treated control	Yield loss (%) if untreated
2017	R	Funky	104	15
2018	P3	Belmont	107	31
2019	P2	SY Baracooda	107	20
2019	P2	SY Kingsbarn	107	20
2016	R	Bazooka	105	19
2018	P3	Libra	103	20

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Winter barley – Six-row feed

Grain and agronomic features

Recommendation		Screenings <2.5 mm (%)	Specific Weight (kg/hl)	Maturity days +/- KWS Orwell	Straw Strength 1 to 9; weak to stiff	Straw length (cm) with PGR
R	Funky	16.4	68.9	-2	8	90
P3	Belmont	9.5	68.5	-1	7	104
P2	SY Baracooda	7.3	68.8	-1	7	108
P2	SY Kingsbarn	7.0	69.8	-1	7	101
R	Bazooka	8.8	68.9	-1	7	107
P3	Libra	8.1	70.8	-1	7	102

Scottish List 2020/21: Winter wheat

- Wide choice in distilling varieties
- Viscount and Leeds have been removed from the Scottish List
- Selected hard feed and milling varieties may add value to crop rotation and management

Winter wheat – Soft feed & distilling

Market options

Yield = 11.3 t/ha

Year First Listed	Recommendation		Grain yield as % of treated Control	Yield loss (%) if un-treated	Use as a 2nd cereal	Quality markets	
						Distill-ing	UK Milling
2019	P2	LG Skyscraper	103	22	Good	Med	---
2018	R	KWS Jackal	102	25	Good	Med	---
2018	R	Elation	101	24	Good	Good	---
2020	P1	RGT Saki	[101]	18	Good	Poor	---
2019	P2	LG Spotlight	100	23	Mod	Med	---
2017	R	LG Sundance	99	15	Mod	Med	---
2013	S	Revelation	95	19	Poor	Good	---

Winter wheat – Soft feed & distilling

Grain and agronomic features

Recommendation		Specific weight (kg/hl)	HFN (s)	Maturity days +/- Skyfall	Straw strength 1-9; weak to stiff		Straw length (cm) no PGR	Sprout-ing resist-ance
					without PGR	with PGR		
P2	LG Skyscraper	76.9	218	0	7	7	91	[6]
R	KWS Jackal	75.6	182	+1	7	7	86	[5]
R	Elation	77.4	206	+1	7	8	82	[6]
P1	RGT Saki	75.7	221	+3	7	8	87	[5]
P2	LG Spotlight	77.9	288	+1	7	8	93	[7]
R	LG Sundance	73.9	175	+2	6	7	86	[4]
S	Revelation	76.4	250	+3	7	8	85	5

Winter wheat – Soft feed & distilling

Disease resistance

Recommendation		Disease resistance; 1 susceptible to 9 resistant				
		Mildew	Yellow Rust **	Septoria tritici	Eye-spot	Fus-arium
P2	LG Skyscraper	7	8	5.0	[4]	6
R	KWS Jackal	7	9	4.9	4	6
R	Elation	7	9	4.3	4	6
P1	RGT Saki	6	9	6.8	---	6
P2	LG Spotlight	6	8	5.1	[5]	6
R	LG Sundance	7	9	7.9	3	6
S	Revelation	6	9	6.0	7	6

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Winter wheat – Biscuit and other choices

Market options

Yield = 11.3 t/ha

Year First Listed	Recommendation		Grain yield as % of treated Control	Yield loss (%) if un-treated	Use as a 2nd cereal	Quality markets	
						Distill-ing	UK Milling
2016	R	KWS Barrel	104	28	Mod	Poor	Biscuit
2018	R	Elicit	100	19	Mod	Good	Biscuit
2014	O	Zulu	98	28	Poor	Med	Biscuit
2015	O	KWS Lili	101	28	Poor	---	Bread
2019	P2	KWS Extase	100	6	Mod	---	Bread
2020	P1	SY Insitor	[105]	23	Good	---	---
2018	P3	Gleam	102	19	Good	---	---

Scottish List 2020/21: Spring oats and spring wheat

- More choices in spring oats. Check end use against market leaders Firth, Canyon and Conway.
- Good yield and grain quality in spring wheat

Spring oats

Grain and agronomic features

Yield = 7.5 t/ha

Year first listed	Recommendation		UK Grain yield as % of treated control	Yield loss (%) if untreated	Kernel content (%)	Screenings <2.0mm (%)	Specific weight (kg/hl)
2018	P3	Delfin	105	6	73.6	3.1	52.0
2020	P1	WPB Isabel	104	15	76.8	2.3	55.7
2019	P2	Elison	104	8	73.7	3.0	52.6
2017	R	Yukon	103	5	74.3	3.0	51.9
2015	O	Aspen	102	17	75.2	2.3	52.8
2011	R	Canyon	101	8	74.0	2.2	52.9
2017	R	WPB Elyann	98	11	78.1	2.7	52.1
2014	R	Conway	95	9	75.6	2.8	51.9
2000	O	Firth	94	13	75.9	3.0	50.9

Spring wheat

Grain and agronomic features

Yield = 7.2 t/ha

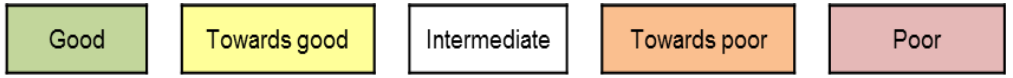
Year first listed	Recommendation		UK Grain yield as % of treated control	Yield loss (%) if untreated	nabim Group	Hagberg falling number	Specific weight (kg/hl)
2017	R	KWS Cochise	105	23	2	226	79.1
2019	P2	KWS Talisker	104	15	4	271	79.0
2020	P1	KWS Giraffe	103	---	4	271	79.8
2011	R	Mulika	94	15	1	307	77.1

Towards Agronomic Value

- Consider how we value grain and agronomic features along with yield

- National Listing procedure already includes standards and scoring for agronomic features as part of VCU

Use of 1 to 5 scale



- Spring barley: Yield, Yield Loss (uT), Screenings, Specific Weight, Maturity, Straw Strength and Brackling

- Winter barley: Yield, Yield Loss (uT), Screenings, Specific Weight, Maturity and Straw Strength

- Winter wheat: Yield, Yield Loss (uT), Specific Weight, HFN, Maturity, Straw Strength, Sprouting, *Septoria*, 2nd Wheat Yield

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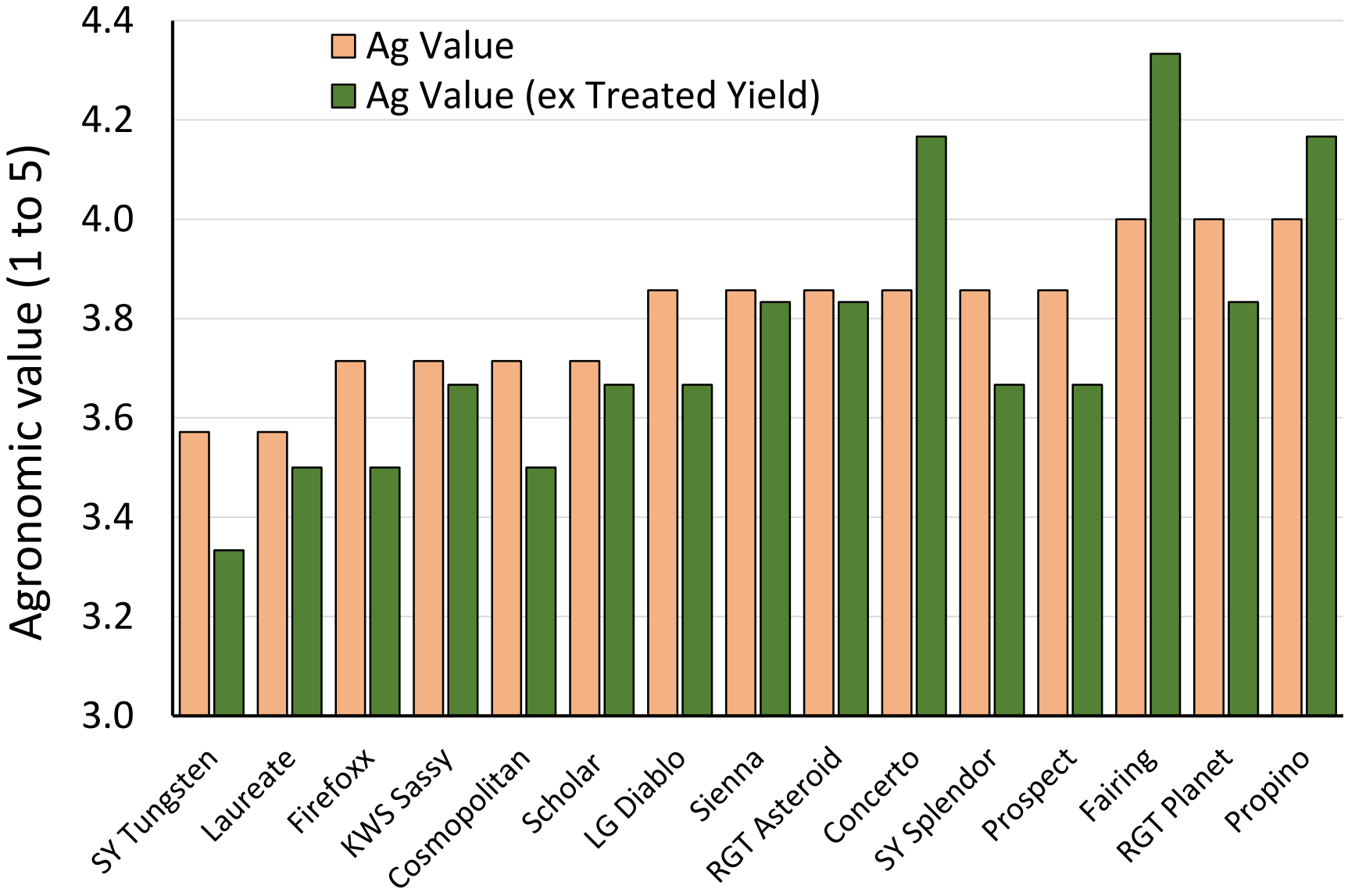
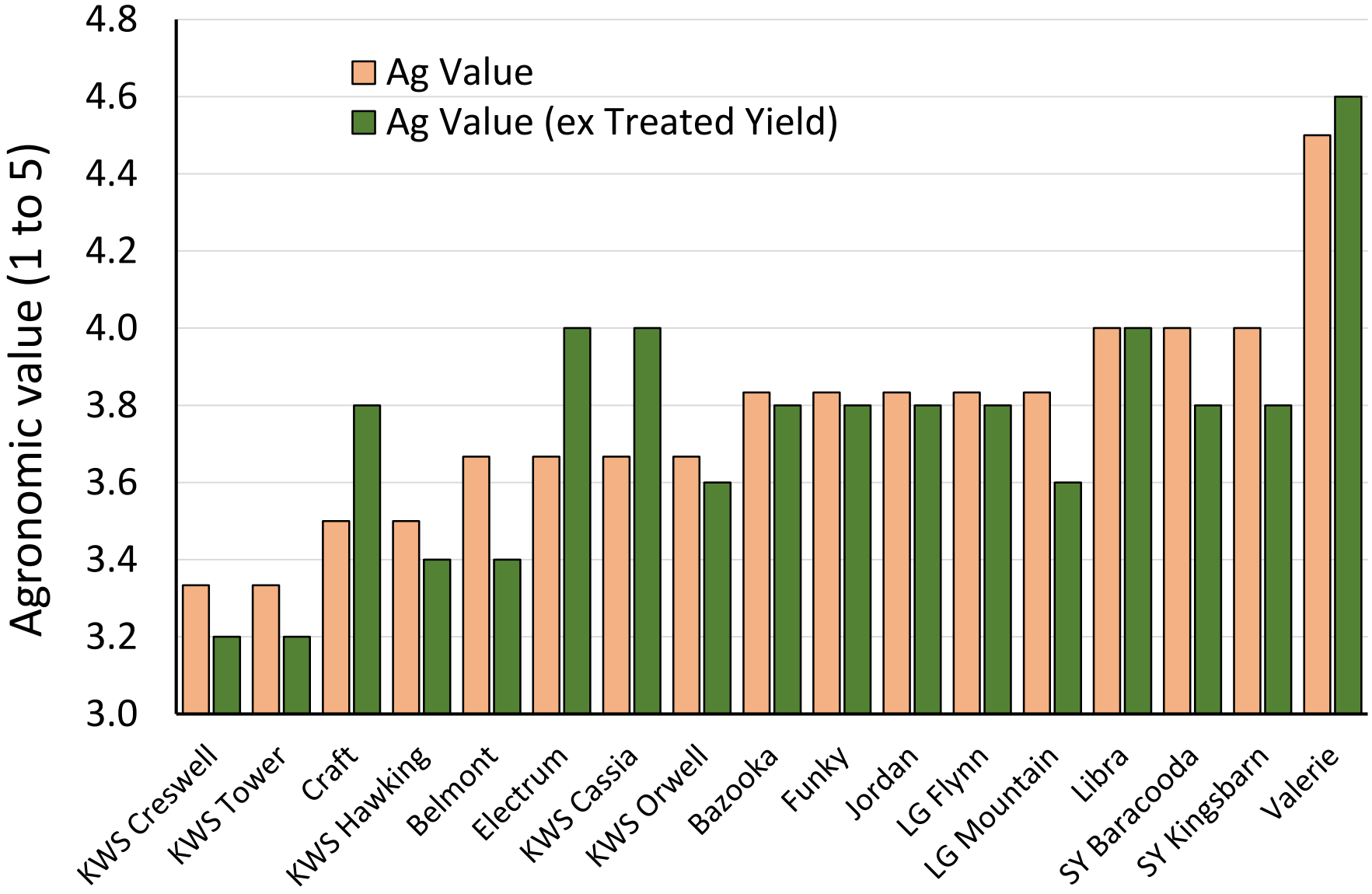
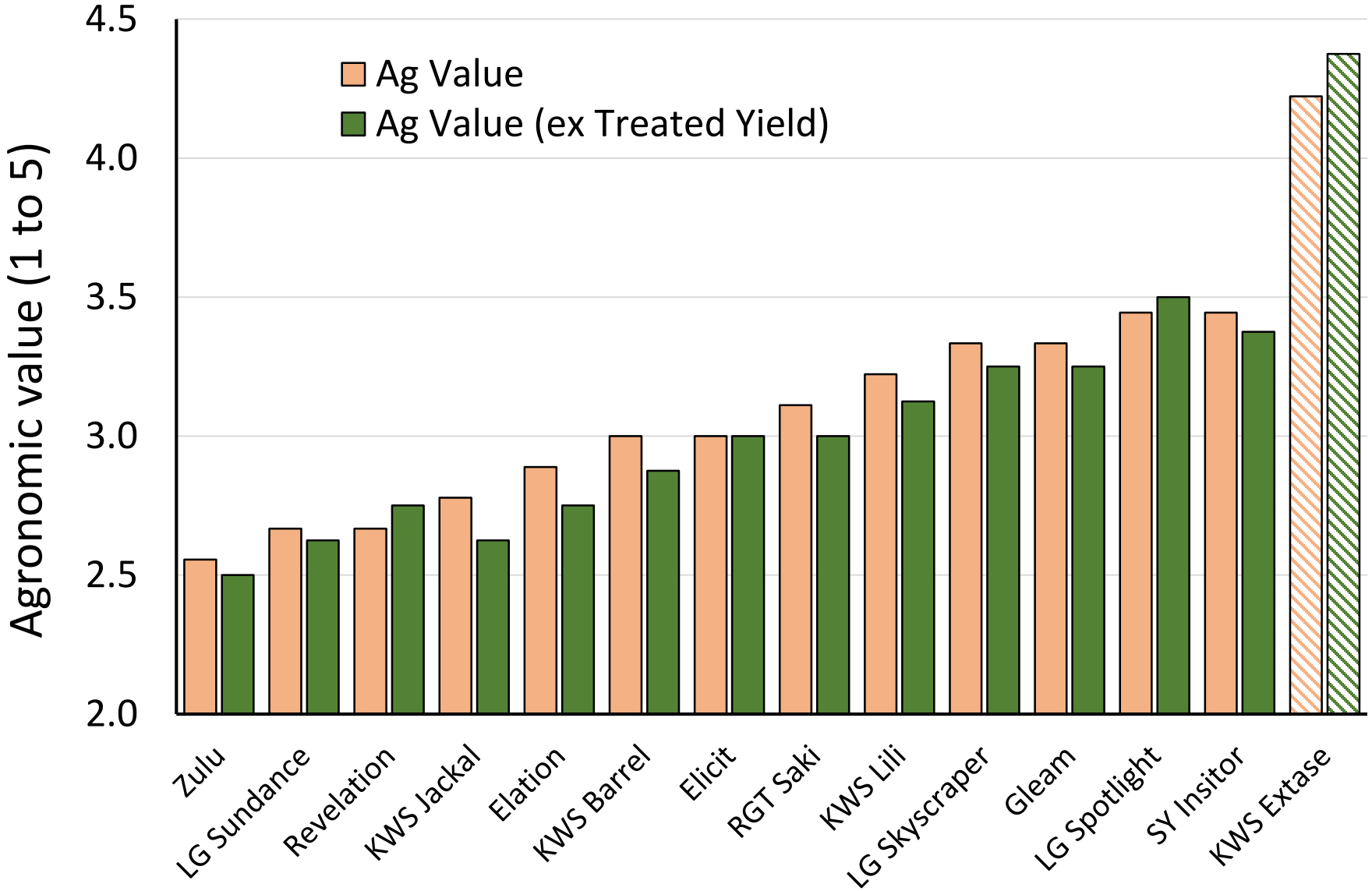
Agronomic value: Spring barley



Agronomic value: Winter barley



Agronomic value: Winter wheat



Summary

- Check new varieties to support the market leaders
- Take advantage of yield improvements
- Consider agronomic value as part of your crop management strategy
- Check end use when considering wider choice in winter cereals and spring oats

https://www.sruc.ac.uk/cerealslist

https://www.ahdb.org.uk/rl

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INSPIRE Innovate INTEGRATE

SRDP Farm Advisory Service

National Advice Hub
T: 0300 323 0161
E: advice@fas.scot
W: www.fas.scot

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SRUC

AHDB
CEREALS & OILSEEDS

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

Thank you

Healthy soils for crop production

SEFARI
LEADING IDEAS FOR BETTER LIVES

The James Hutton Institute

Kenneth Loades

Soil delivers multiple benefits

The James Hutton Institute

Creating and maintaining optimum soil condition for multi-functional balance of the ecosystem

Food production | Climate regulation | Water regulation

By monitoring and management of soil-plant interactions

- Water supply
- Nutrient supply
- Rooting conditions
- Plant pathogen risk
- Drainage
- Microbial activity
- Nitrate availability
- C stabilisation
- Structural stability
- N & P availability
- Soil cover

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Soils are complex

Climate

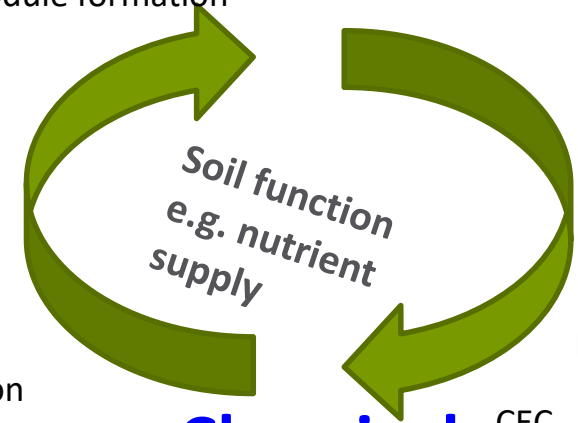
Temperature, rainfall, evaporation

Where impact is mediated by both amount and seasonality

Nutrient inputs

e.g. Fertiliser, manure, deposition

Where availability is mediated by many of the same factors



Plant

Root infection with mycorrhizal fungi

Nodule formation

Nitrogen fixation

Soil enzymes

Action and activity of soil fauna

Biological

Activity of decomposing micro-organisms

Mineralisation immobilisation

Organic ligands

Presence of potentially toxic elements

Physical

Compaction

Bulk density

Aeration

Soil water balance

Buffer capacity

pH

Pore size distribution

Temperature

Texture

Chemical

CEC

Balance of micronutrient availability

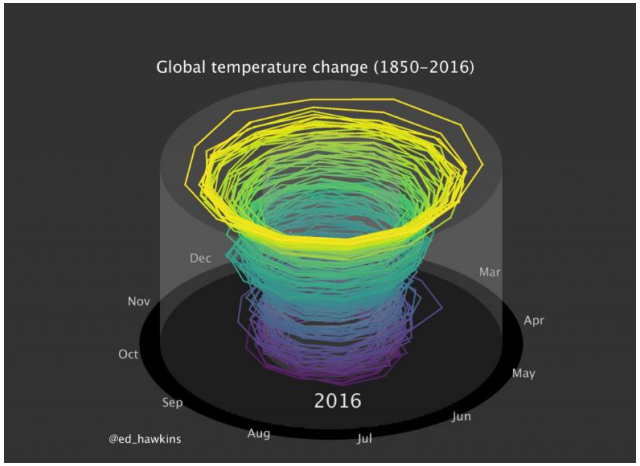
Redox potential

Salinity

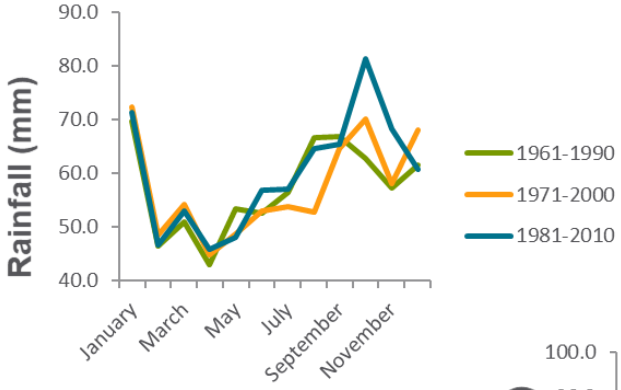
Mineralogy

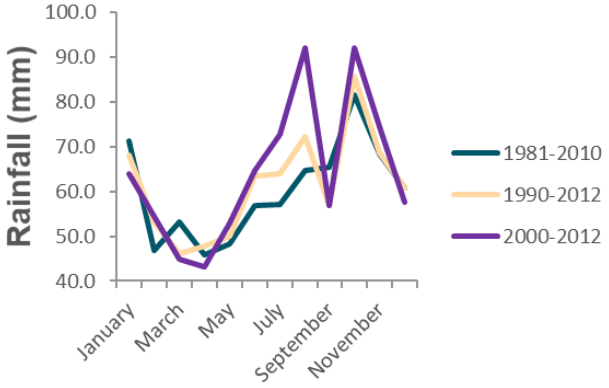
Threats to soil – a changing climate

1.6 ° C
(since 1954)



Source: Climate Lab Book – Open Climate Science





What is a healthy soil?

- It’s complicated……
- Function and service, capability, resilience?
- Healthy soil a balance of:
  - Biology
  - Chemistry
  - Physical attributes
- IF you were to be paid for having a healthy soil what would be the best measure?

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Key is in understanding what baseline we are working from?

- Recent Scottish Climate Change and Adaptation Programme highlighted a lack of metrics
- Different attributes dependent on soil type
- Measuring resilience must include recovery
- Scale of measurement (satellite imagery, drone technology etc.)
- Soil tests are available and more being developed to include measures for chemistry, physics and biology
- No single tool available to measure soil health, quality and resilience

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What measurements are available for soil health?

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Benefits of using nematodes as bioindicators

- Abundant in all habitats
- High species richness
- Tolerance sensitivity range
- Low mobility
- Conservative reproduction strategies
- Interstitial mode of life
- European (global) scale monitoring
- Accepted functional classification

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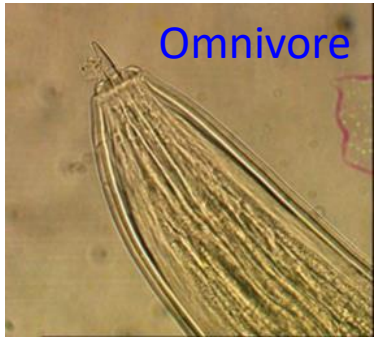
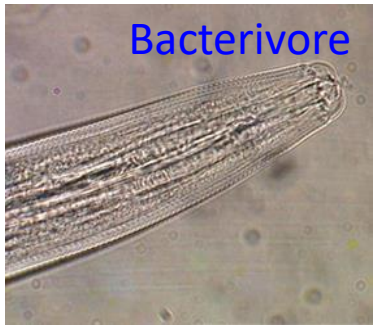
T-RFLP peaks aligned with identified nematodes





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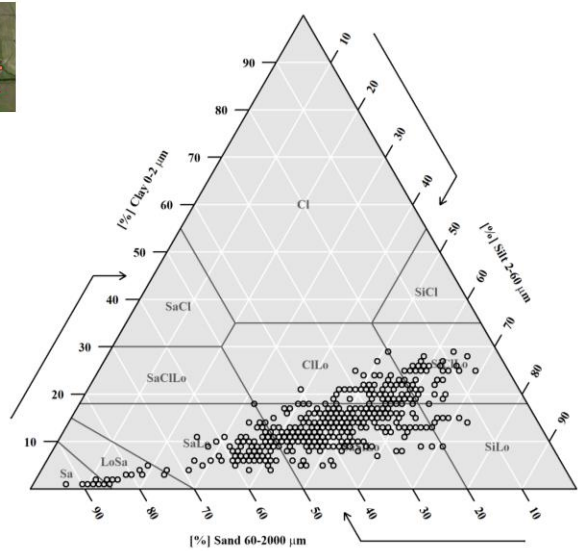
Soil sampling for SoilBio

- c. 5200 soil samples including:
  - nematode community
  - soil chemistry
  - management data
- c. 1100 samples with additional soil physics data



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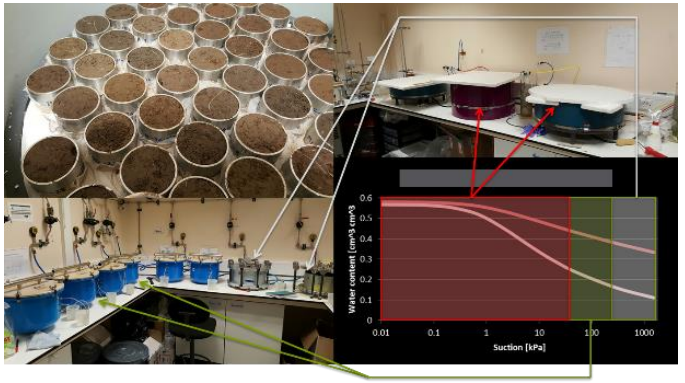
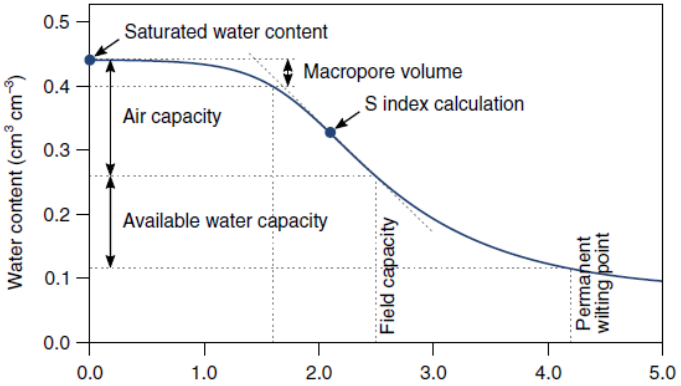
Soil physics data

- Critical information on soil functions
- Long time to gather data (3-6 months for a core)
- Soil texture significantly alters physics
- Fundamental information for assessing different soil functions
- Provides information





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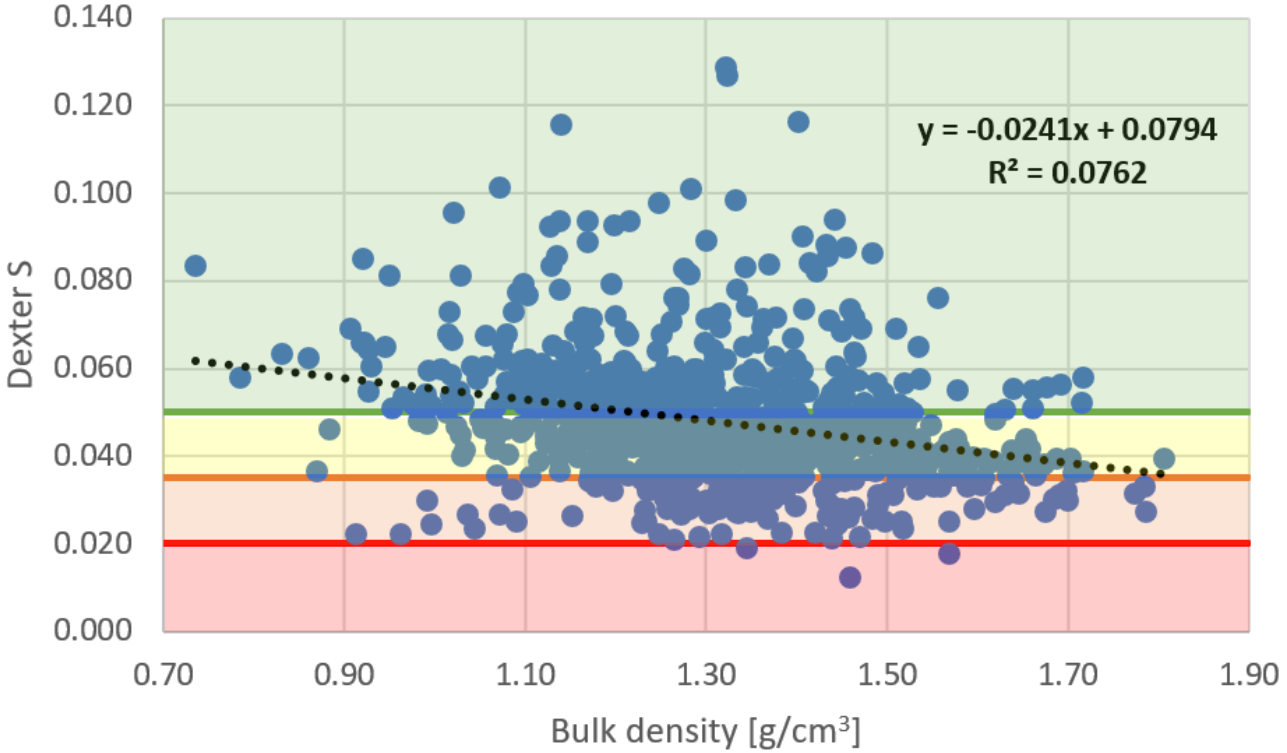
Soil pore sizes – Dexter S indicates size distribution



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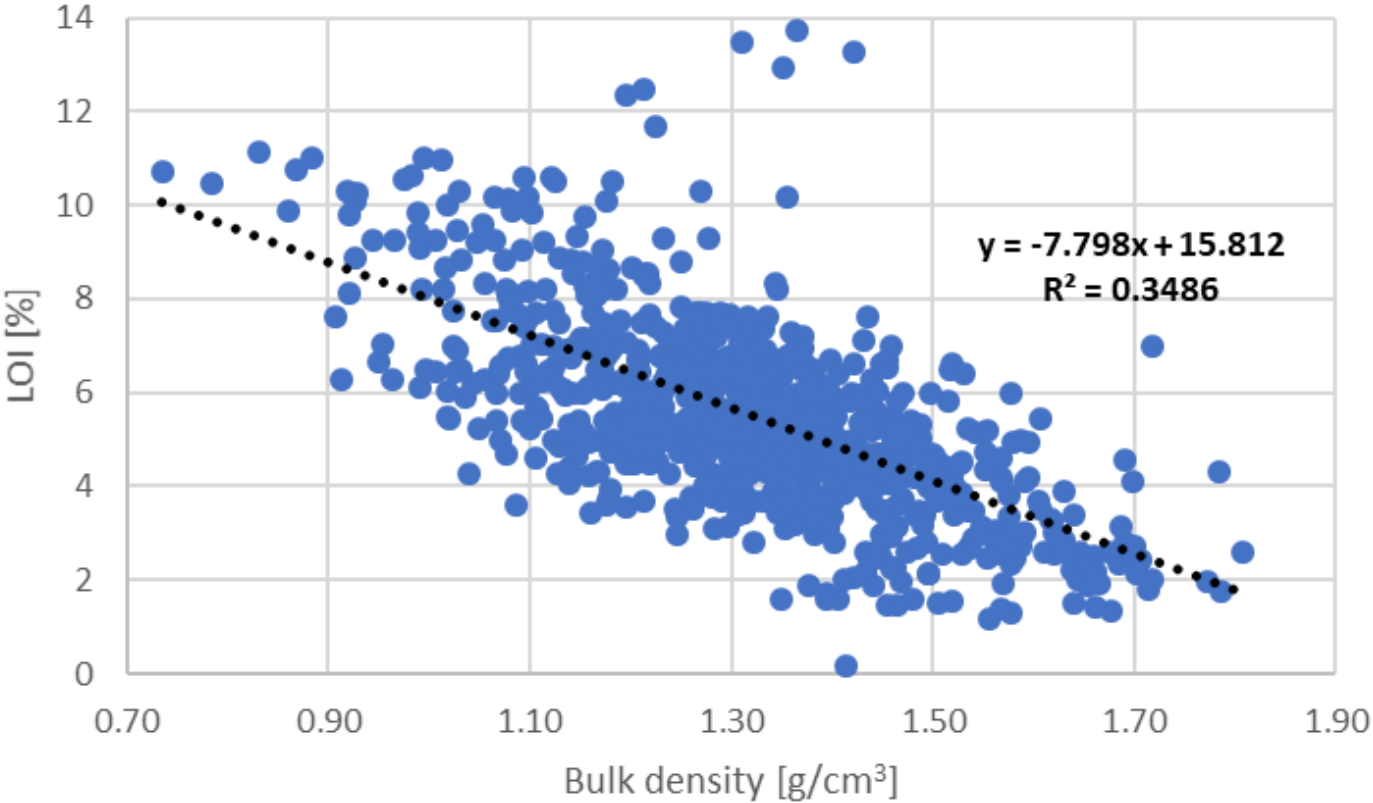
Organic matter and soil bulk density



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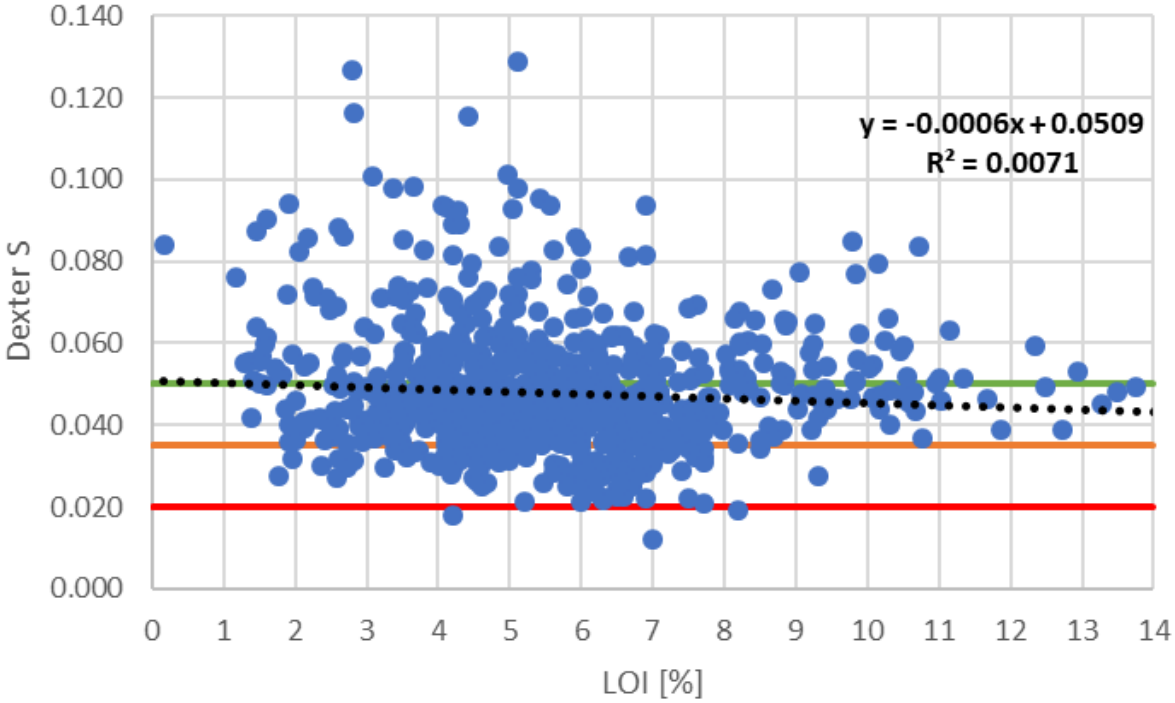
Dexter S - Relationship with organic matter (loss on ignition)



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Initial analysis – Drivers of SoilBio data (3 years UK)

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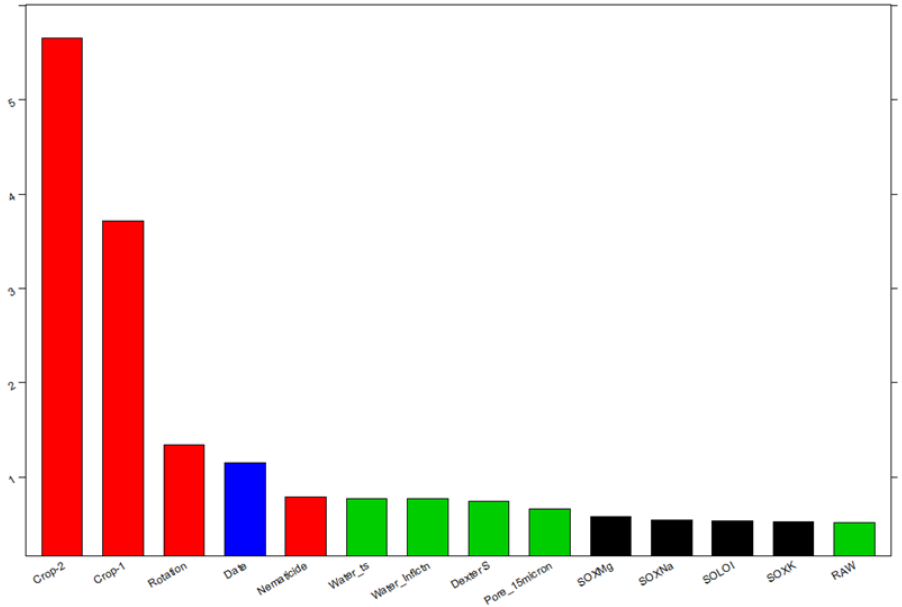
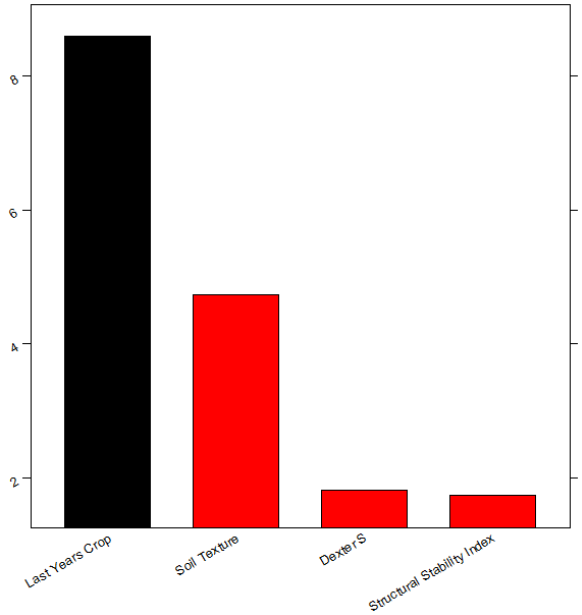
Scotland only data – Year 1



UK data – All years



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Other data collected - Soil water content and physical limitations to root growth

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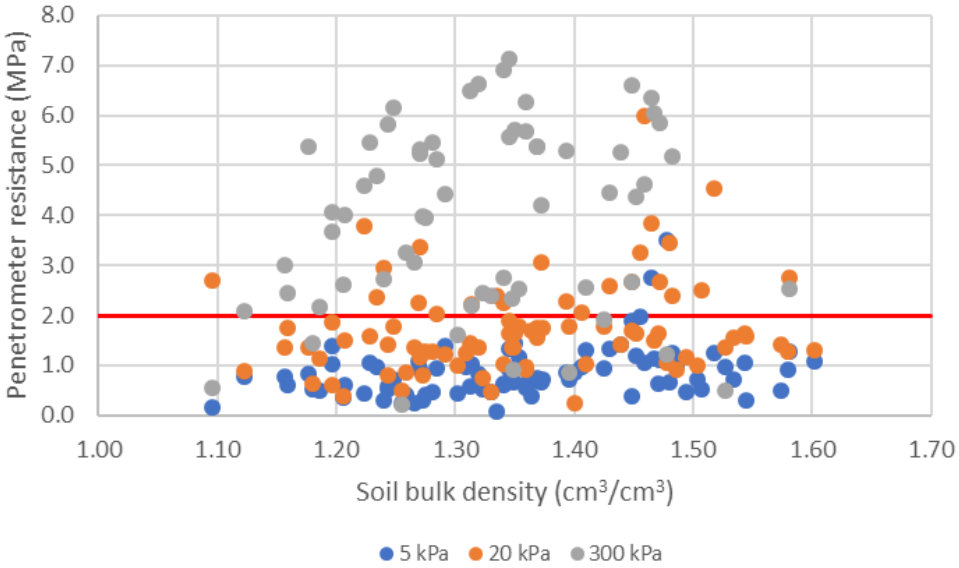
- Root growth limited beyond a penetrometer resistance of 2 MPa
- Root growth physically limited as soils dry
- Plant available water assumes water available to 1500 kPa



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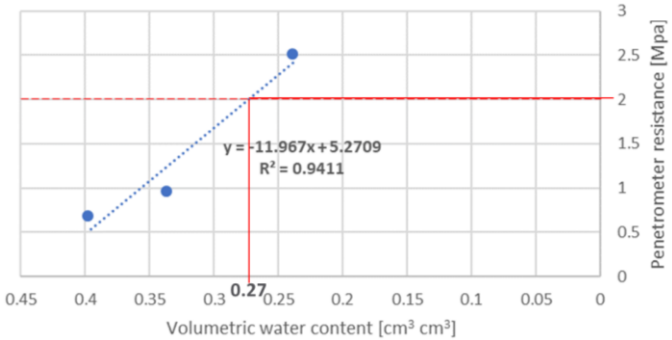
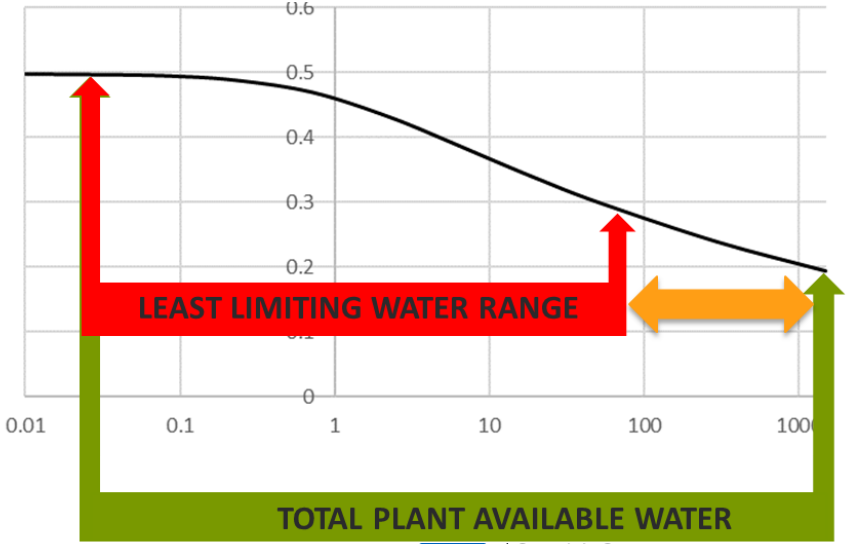
Physics measurements, moving beyond total plant available water - LLWR

- Assumption that water limiting plant growth rather than mechanical impedance
- Least Limiting Water Range corrects for this
- Threshold for impedance of 2 MPa





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Different measures available to assess soil health and function

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- No single tool available to fully assess soil health and quality
- A sandy soil in poor condition may on paper be better than a well managed heavier soil
- Further robust analysis on:
  - Spatial variability both nationally and at field scale
  - Temporal variability – spring and post harvest of winter sown crops
  - Specific soil function analysis
- Soils tested likely to be from very well managed fields, further work on degraded soils would be interesting…..
- From the physical, biological and chemistry data what is most important to you?

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Thanks to:
Roy Neilson
Eric Anderson
Tim Daniell
David Roberts
Jim Wilson

Cereal fungicide challenges and choices for 2020

Fiona Burnett

Professor Applied Plant Pathology

Head of Knowledge Exchange, SRUC

Challenges and choices 2020

Pesticide withdrawals

Evolving diseases and resistance

New products

- What are the resistance issues and how can we manage them?
- Where and when to use new and existing products?

- Chlorothalonil withdrawal

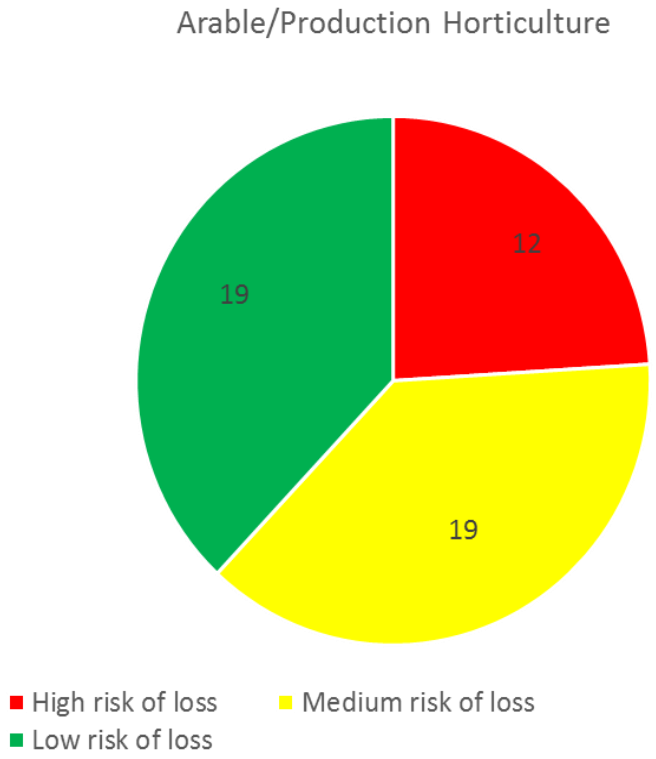
(Authorisation ends: (a) 20 November 2019 for sale and distribution & (b) 20 May 2020 for the disposal, storage and use of existing stocks)

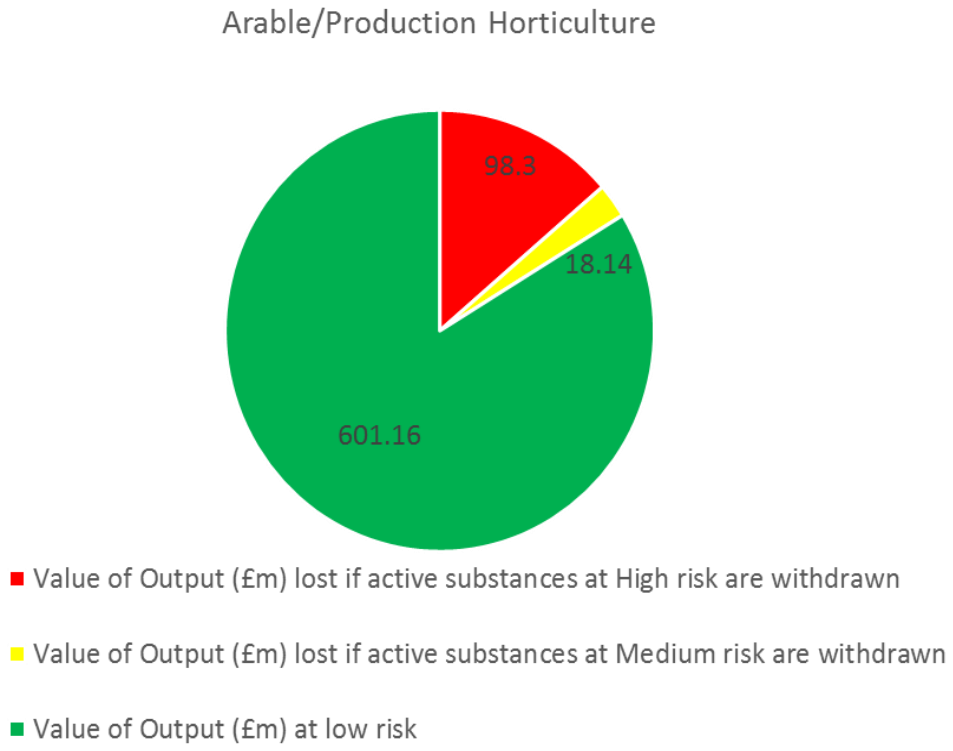
Threats to existing pesticides

Arable: Risk to top 50 (by crop area treated):

Plant Health Centre

Scotland's Centre of Expertise





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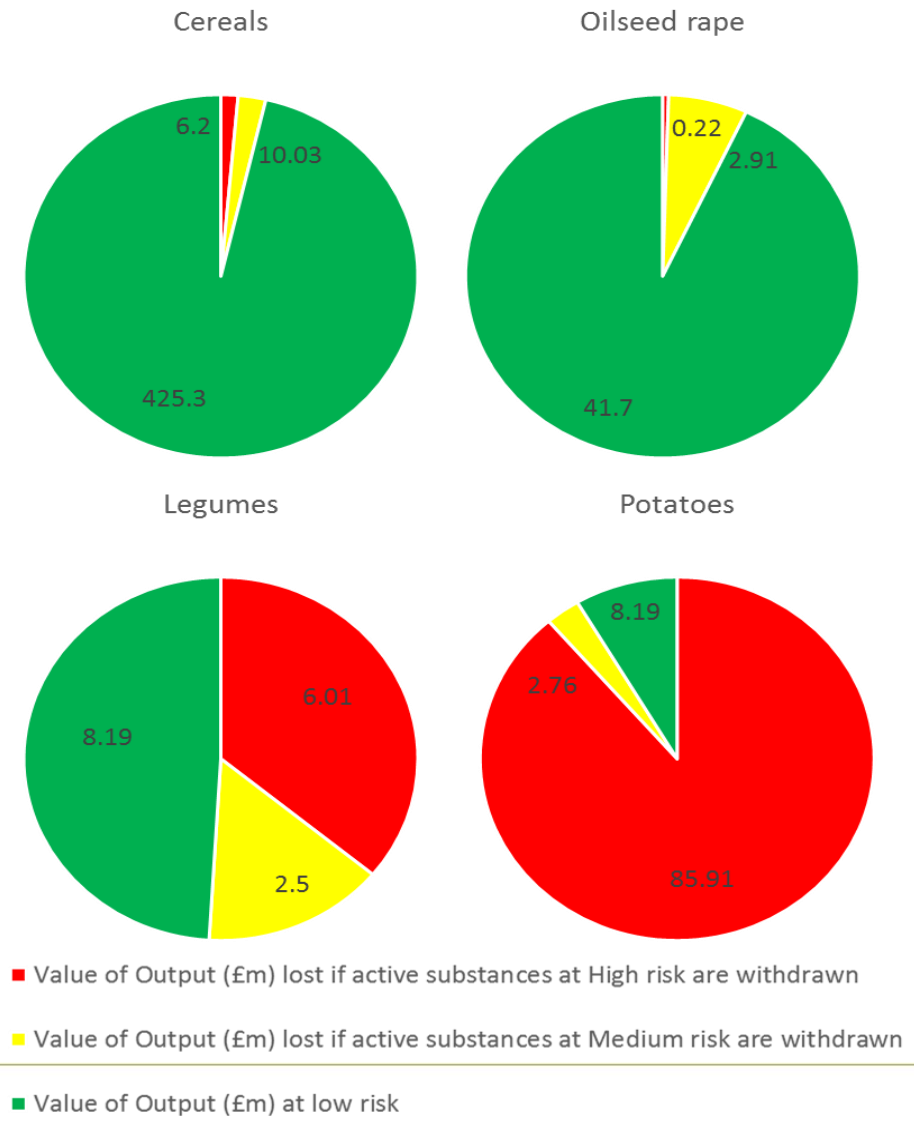
Threats to existing pesticides

Arable: Risk to top 50 (by crop area treated):



Plant Health Centre

Scotland's Centre of Expertise

SRDP Farm Advisory Service SRUC AHDB CEREALS & OILSEEDS

Potential loss of pesticides – likely impacts

- Best case scenario
  - Cereals, oilseeds, potatoes – relatively unscathed
  - Edible and ornamental horticulture sector badly hit
- Worst case scenario
  - Cereals, oilseeds, potatoes – significant impact
  - Edible and ornamental horticulture sector severely affected

- 5-8 years until alternative technologies close the gap
- Increased reliance on ‘alternatives’ to pesticides – IPM

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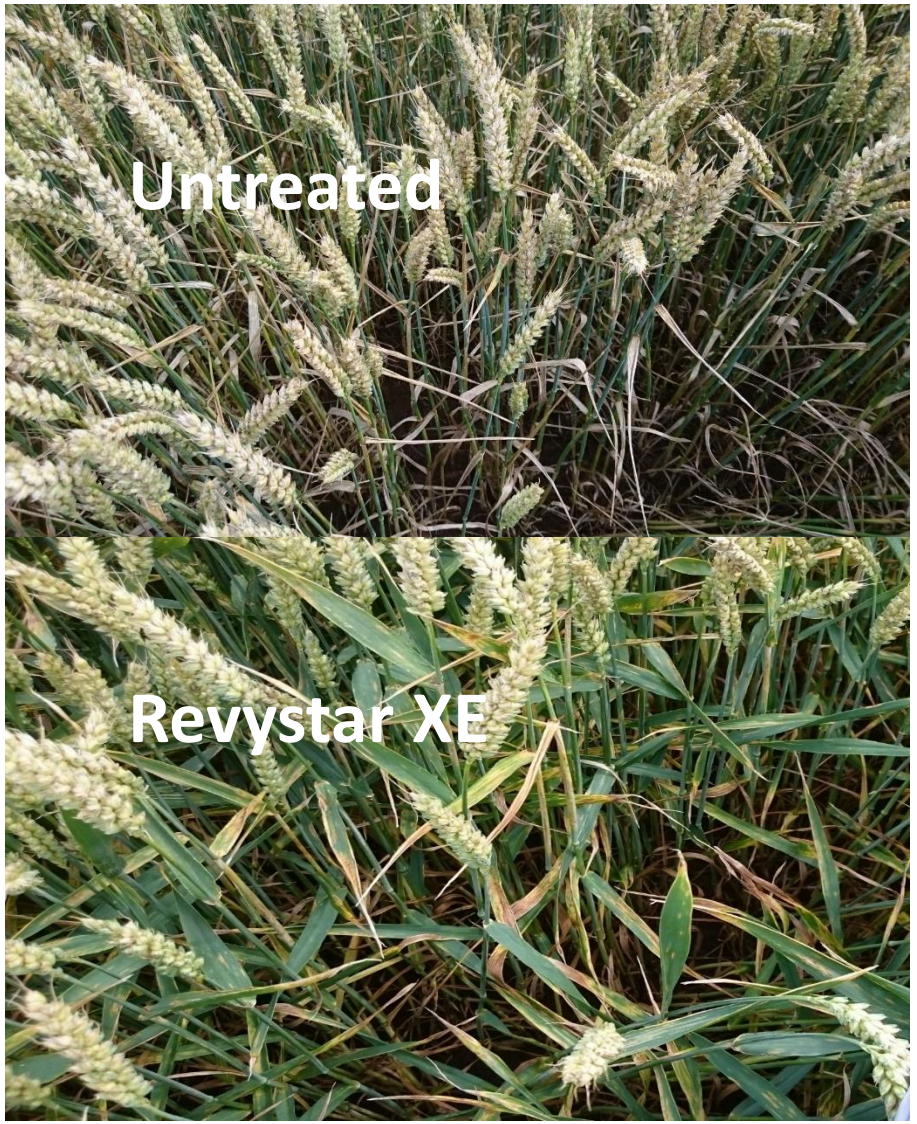
Revystar XE

New fungicide product for 2020

- Contains a new triazole (Revysol) and an SDHI (Xemium)
    - 100 g/L mefentrifluconazole + 47.5 g/L fluxapyroxad
- Maximum individual dose 1.5 L/ha
- Maximum of two applications
- To be applied before GS69
- Approved for wheat, barley, oats, rye, triticale, spelt and durum wheat

30 Jul Assessment following GS32 and 39 applications



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Inatreq™

- Currently waiting approval and should be launched in 2020
- Contains fenpicoxamid
- Derived from a natural compound produced by fermentation of an Actinomycete (Streptomyces spp.)
- New mode of action - Quinone Inside Inhibitor (Qil) blocking mitochondrial respiration
- No cross-resistance to existing cereal fungicides but single site active so needs careful stewarding against resistance
- To be used once and only in mix with other actives to minimize the risk of resistance development.
- Best used as a protectant treatment or in the earliest stages of disease development.

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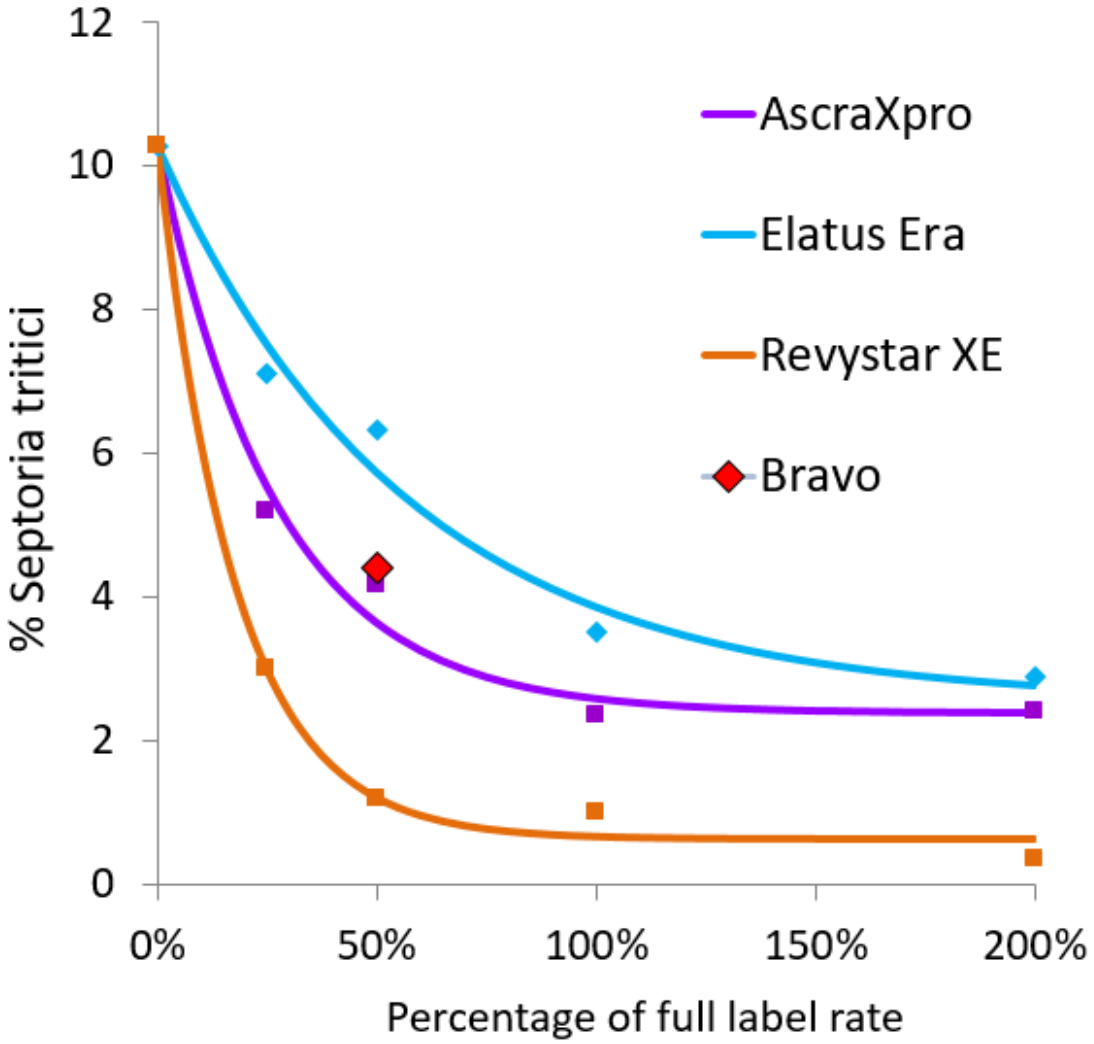
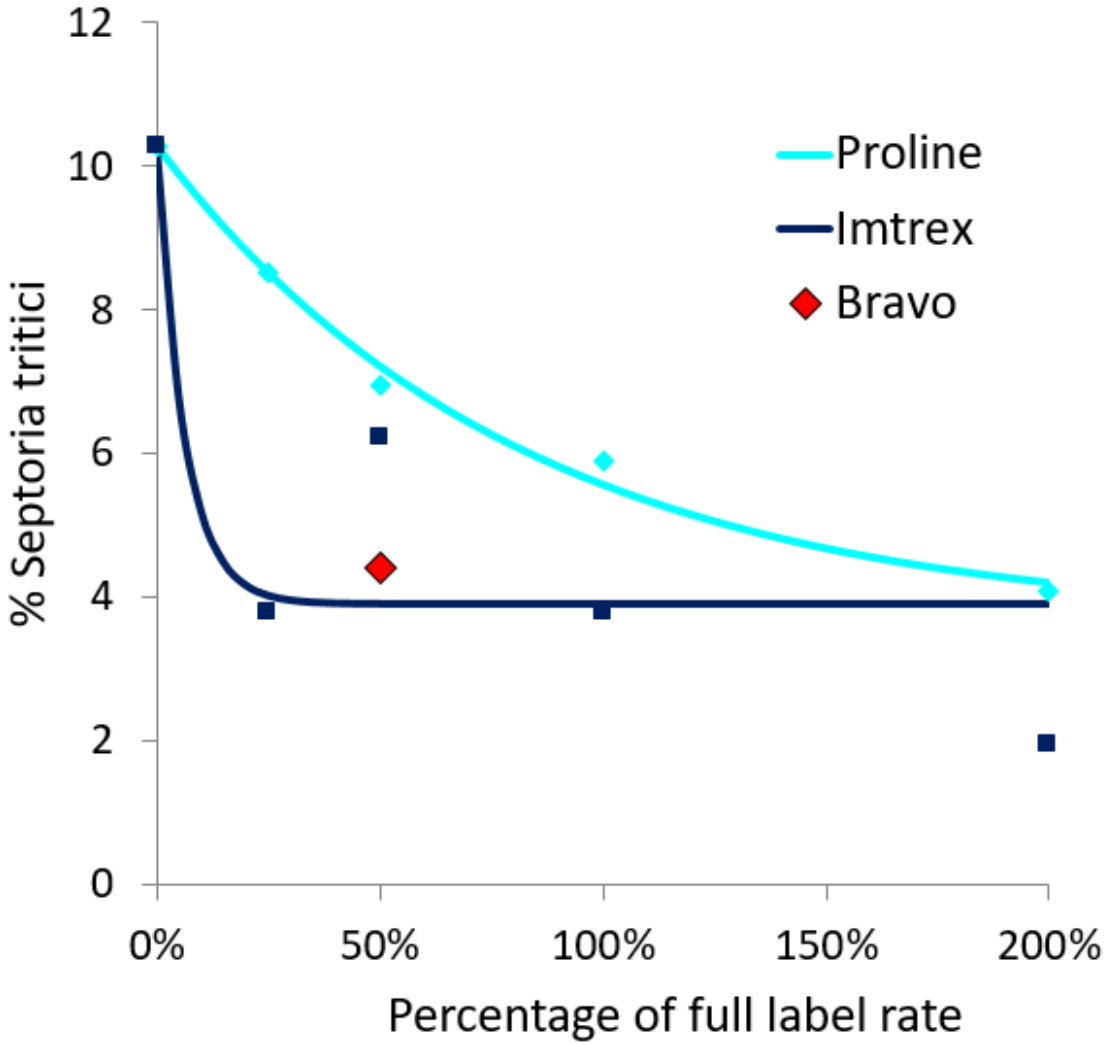
Septoria protectant activity 2019 (5 trials)





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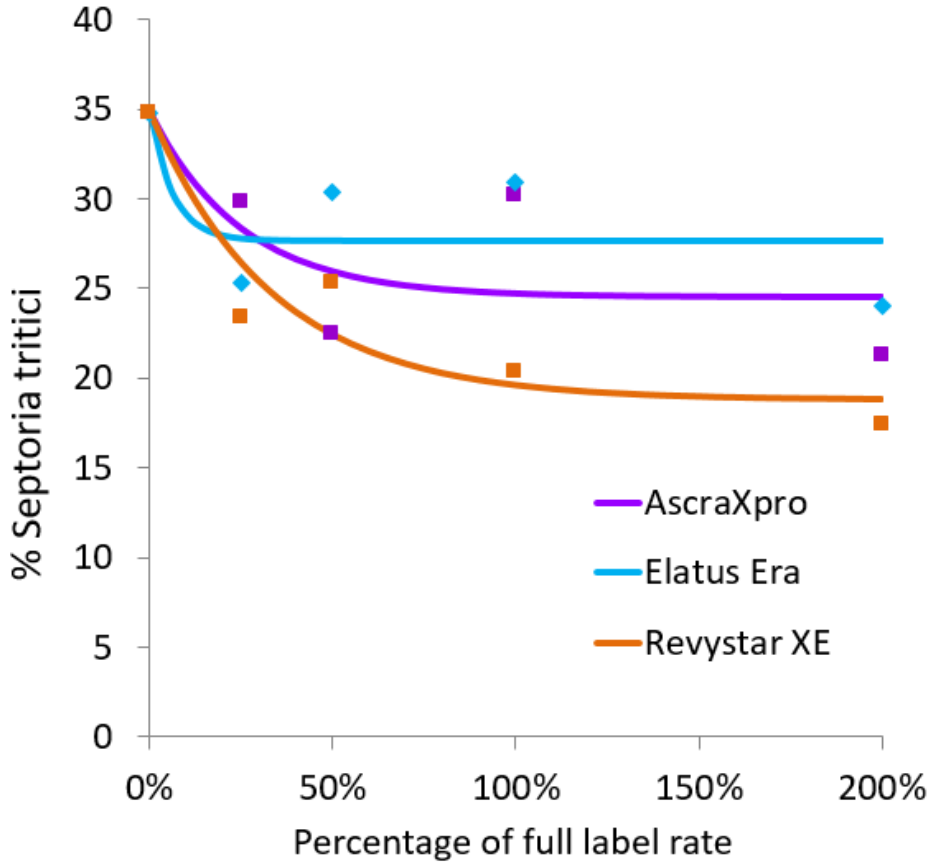
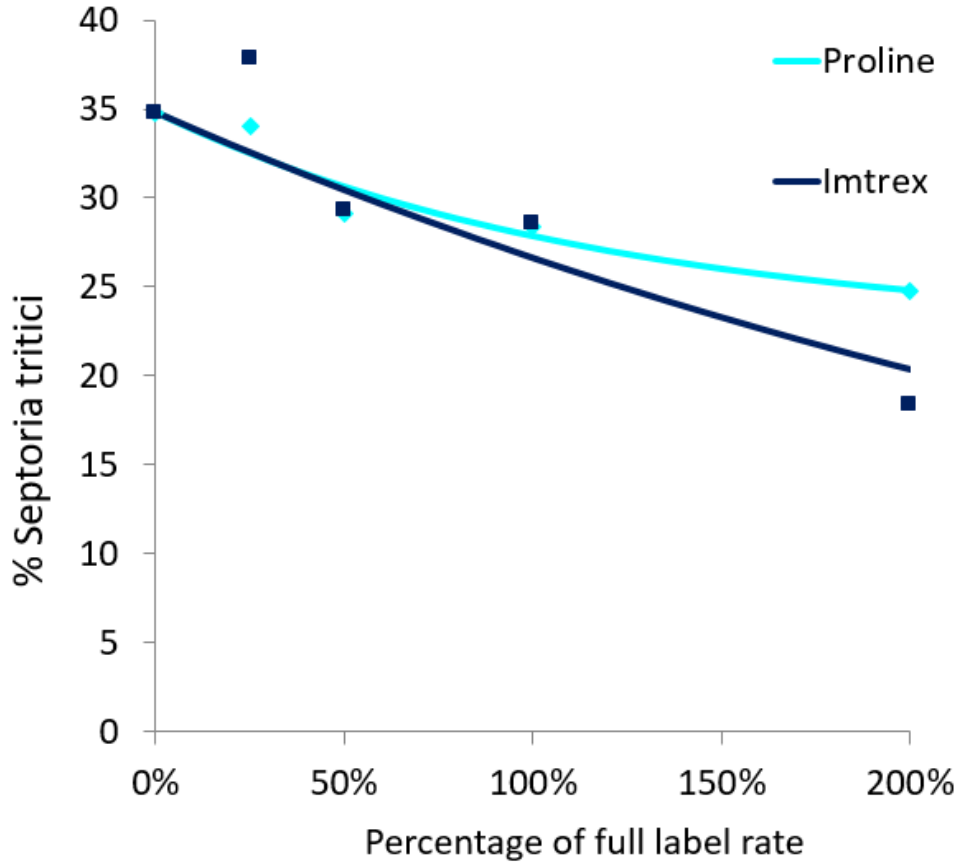
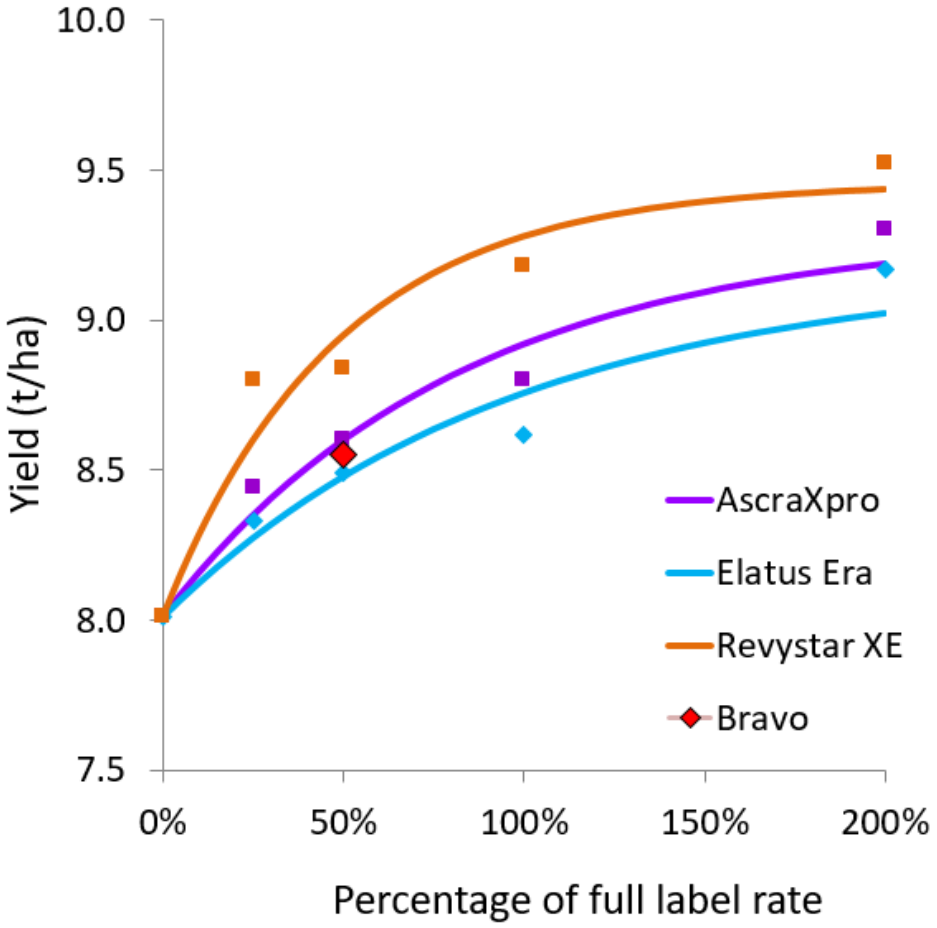
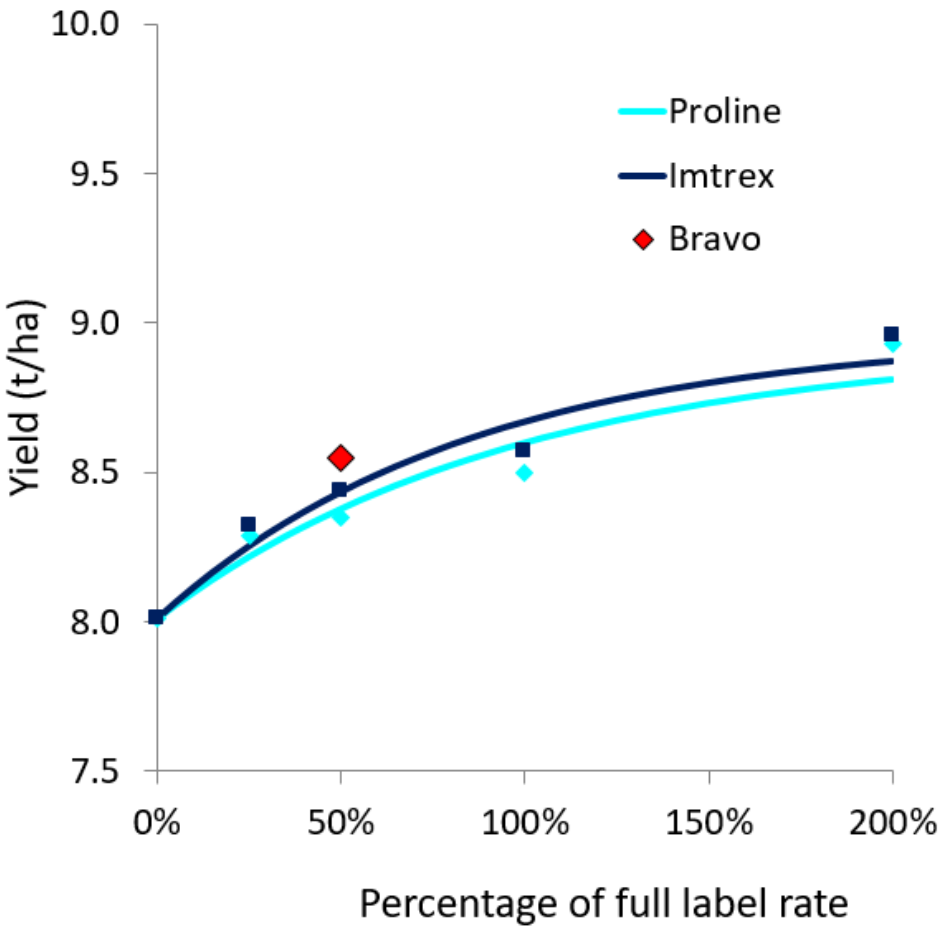
Septoria curative activity 2019 (2 trials)



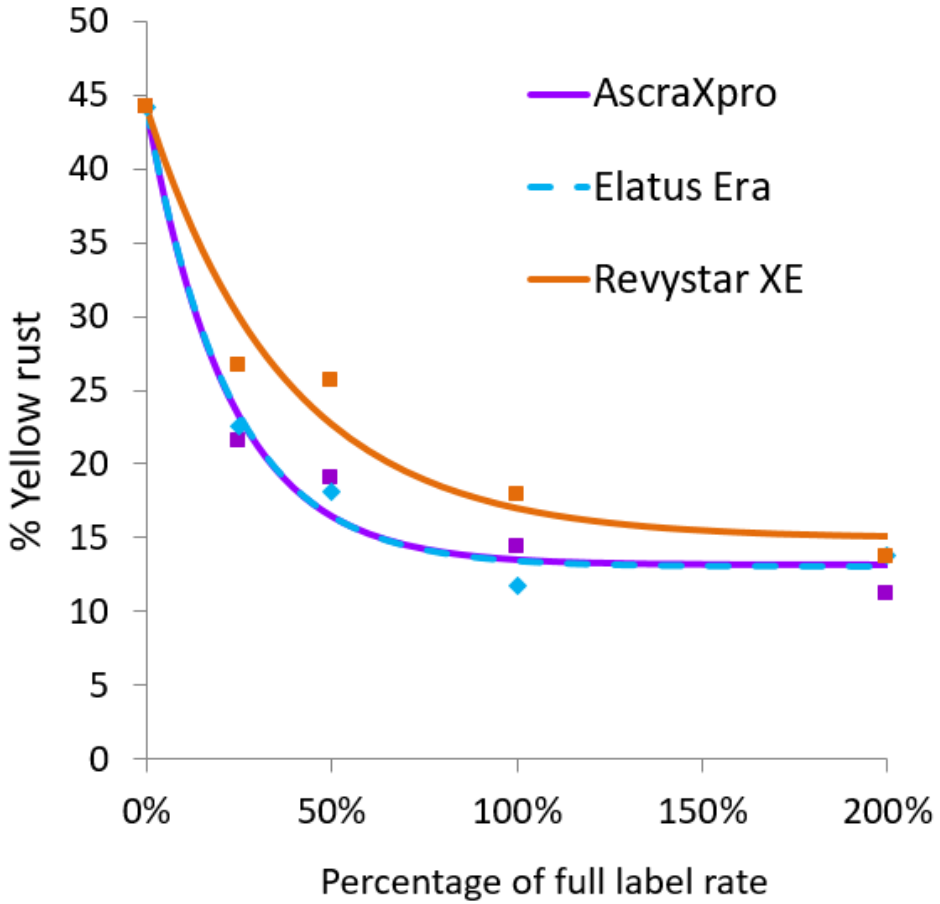


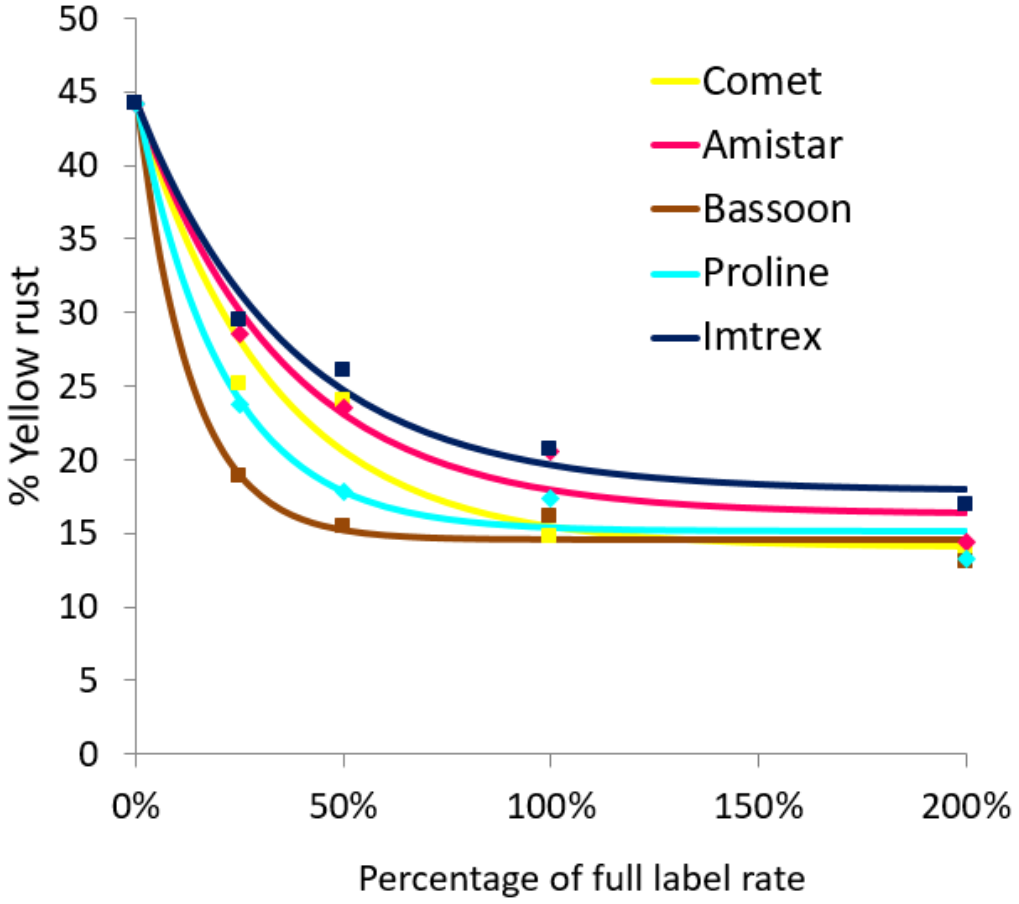
Septoria trial yields 2019 (7 trials)



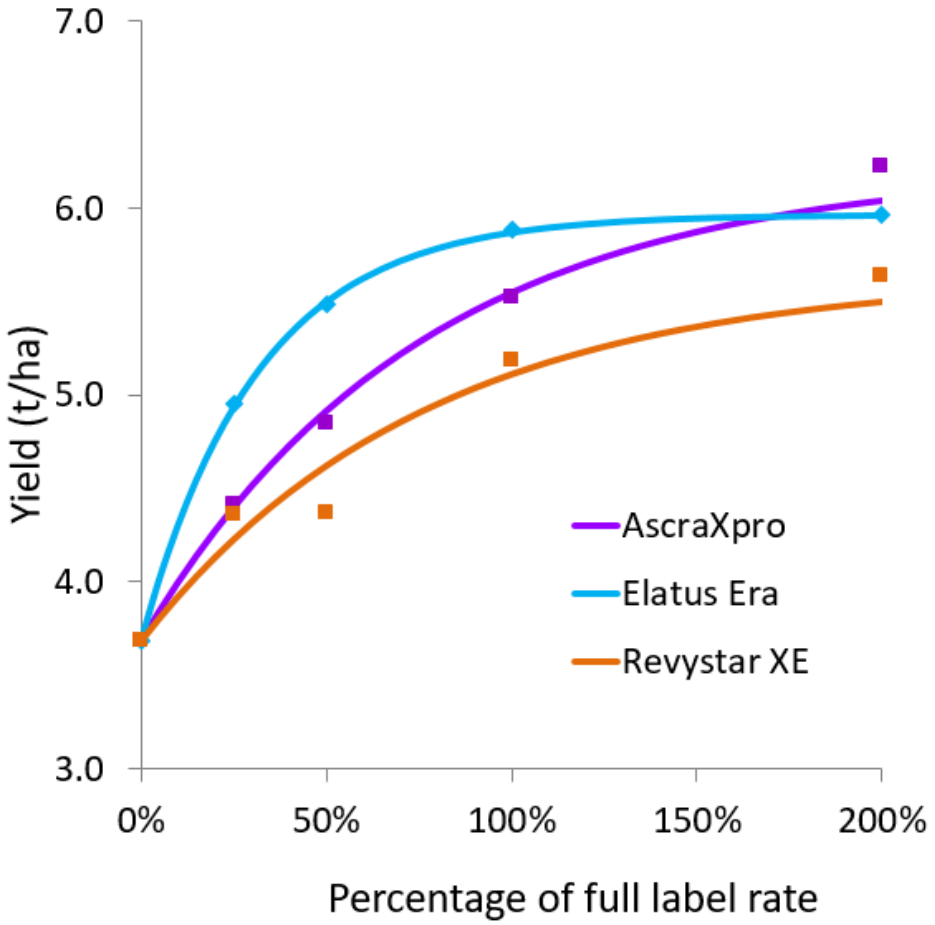


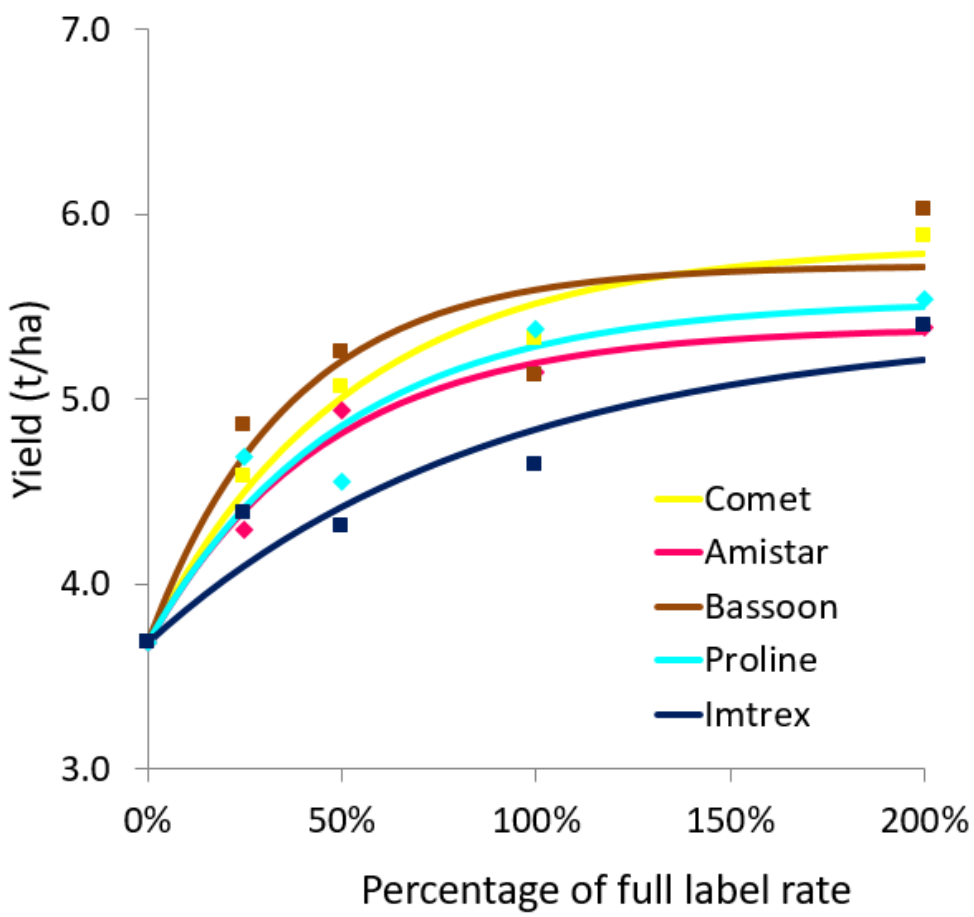
Yellow rust 2019



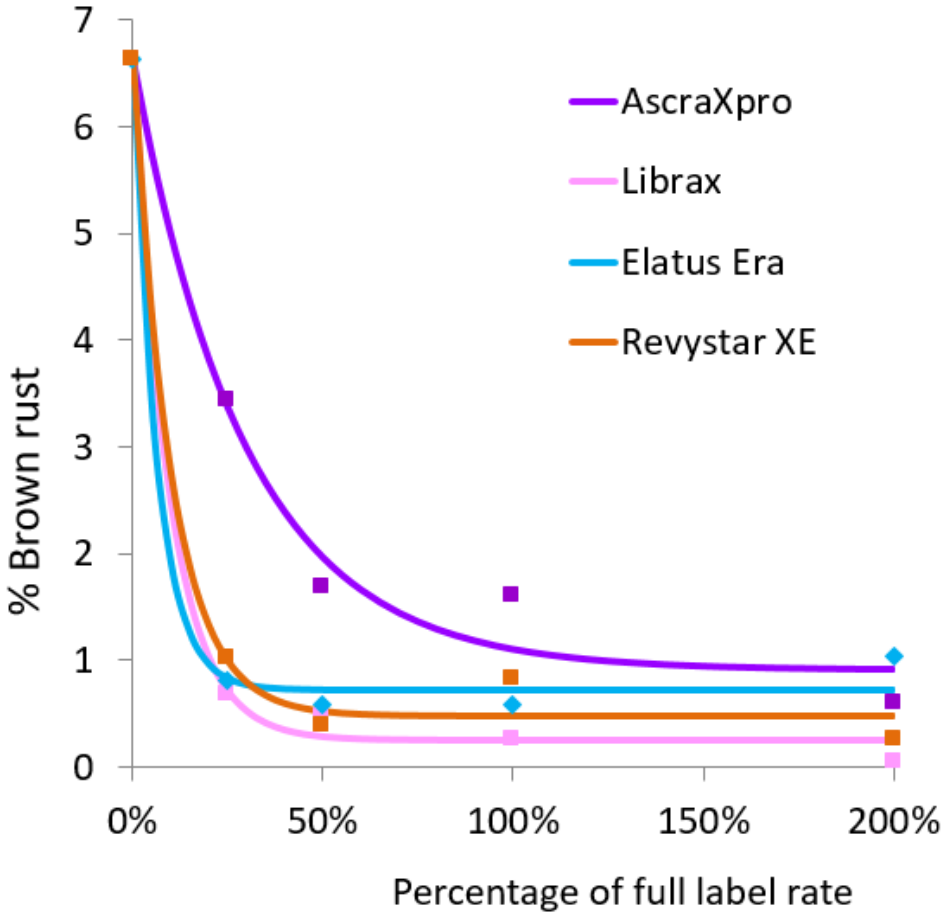


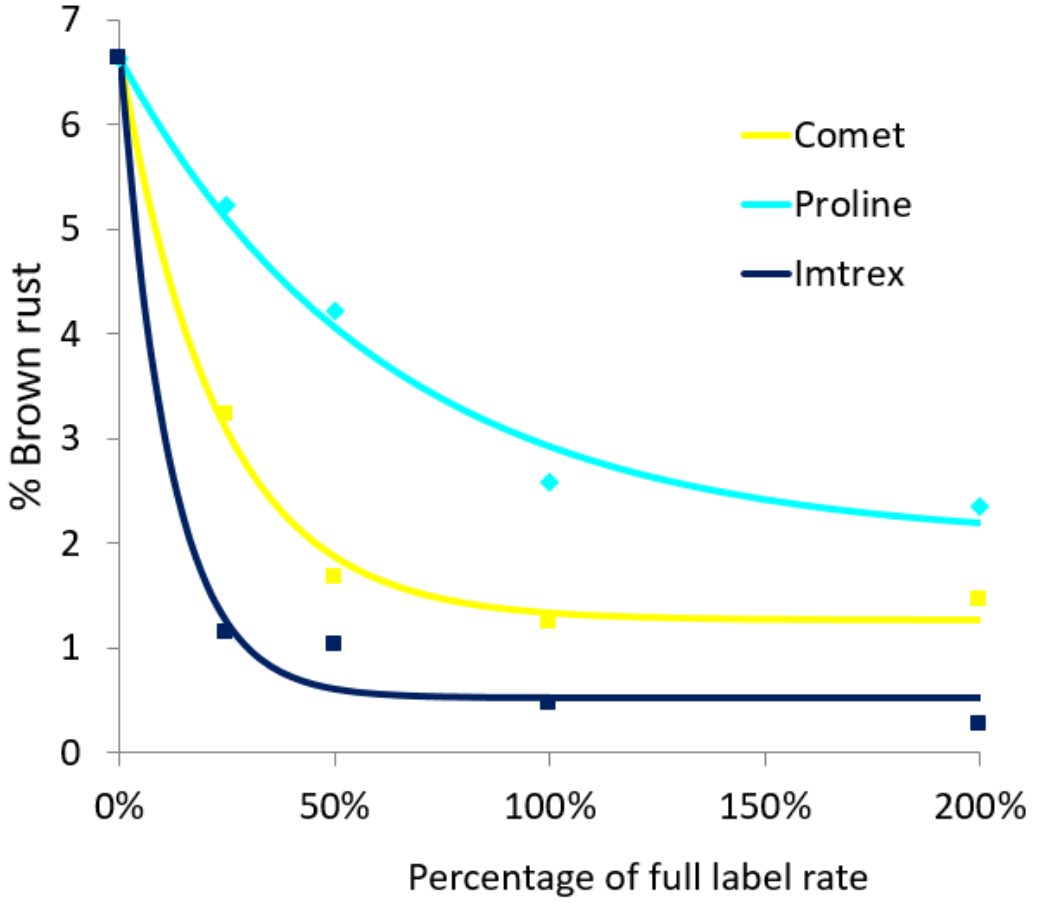
Yellow rust trial yields 2019





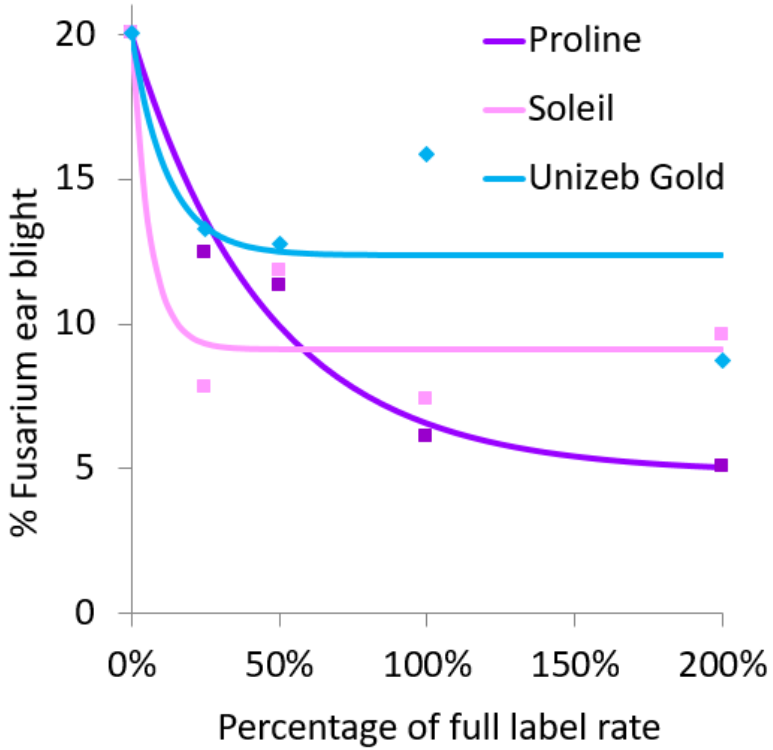
Brown rust 2019



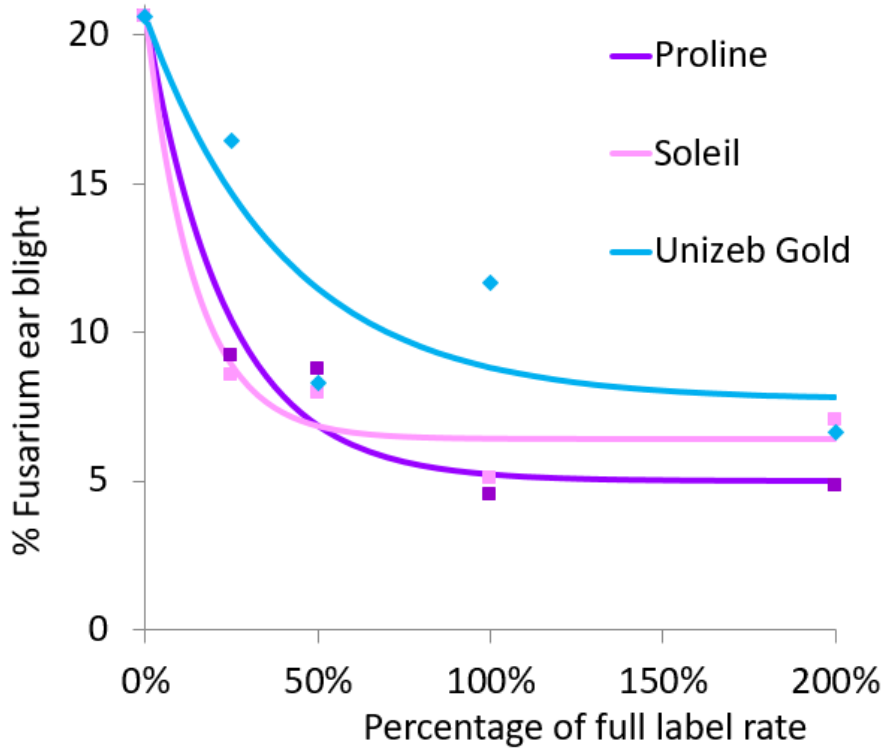


Fusarium trials (inoculated)
Zyatt (near Mansfield, Nottinghamshire)

2019



2018–19



Soleil = tebuconazole + bromuconazole, Unizeb Gold = Mancozeb

Note: Mancozeb doesn't seem to control DON mycotoxin levels

Opportunity in better resistance stewardship

- Stewardship measures based on reduced reliance
- Heavy usage of an a.i. confers a massive advantage to any resistant individuals
- Advice is to use all available methods to reduce pressure on chemistry – mix, alternate, use low-risk multisites

- All of the above give the chance to better tailor programmes, broaden the range of diseases managed and improve margins

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Wheat programmes – what do we **really** need?

- T minus – autumn or winter clean up
- T0 – early rust protection
- **T1 – stem-base disease and protection of yield important leaves**
- T1.5 – protection of leaf 2 is gap between T1 and T2 is stretched
- **T2 – protection of yield important flag**
- T3 – continued green leaf retention and protection from ear diseases
- T4 – continued ear disease protection

- Can we reduce use of more marginal sprays?

Wheat programmes – what do we **really** need?

- T minus – autumn or winter clean up
- T0 – only for early rust protection
- **T1 – stem-base disease and protection of yield important leaves (risk based – CTL maximised)**
- T1.5 – protection of leaf 2 is gap between T1 and T2 is stretched
- **T2 – protection of yield important flag – deploy new chemistry maximising lowest risk options**
- T3 – continued green leaf retention and protection from ear diseases (azole and alternative multisite?)
- T4 – continued ear disease protection

- Can we reduce use of more marginal sprays?

Chlorothalonil authorisation for disposal, storage and use ends 20 May 2020

Reminder of growth stages 20 May 2019 (source adopt-a-crop)

	Average	Maximum	Minimum
Spring barley	17.56	31	10
Spring oats	16.5	22	11
Winter barley	48.2	61	33
Winter oats	32	33	30
Winter wheat	35	41	30

Wheat programmes - strategic planning for 2020

	T0	T1	T2	T3
Late sown	✗	Azole plus CTL	Range of SDHI/azole options plus alternative multisite	Alternate azole plus multisite
Resistant variety	✗	Azole plus CTL	Range of SDHI/azole options plus alternative multisite	Alternate azole plus multisite
Early drilled	? Maximise CTL / minimise azole	Azole plus SDHI plus CTL	Try new chemistry plus alternative multisite	Alternate azole plus multisite
Susceptible variety	?Maximise CTL / minimise azole	Azole plus SDHI plus CTL	Try new chemistry plus alternative multisite	Alternate azole plus multisite
2nd wheat / eyespot risk	✗	Azole plus SDHI plus CTL	Top rank products plus alternative multisite	Alternate azole plus multisite
Yellow rust scenario	Maximise strob / minimise and alternate azole / use CTL	Azole plus SDHI plus CTL (increase azole or add strob)	Maximise azole / use top rank mixture products plus multisite	Two-way azole mix plus multisite

Wheat fungicide programmes for 2020

- Maximise use of CTL up to cut off and then switch to alternative multisites
- Use balanced mixtures of systemics
- Limit dose and application number of individual actives where you can
- Tune doses and actives to risk
- Target most effective products at most responsive timings
- Use new chemistry as a chance to alternate azoles
- Inatreq at T2 would give an option to alternate with SDHI at T1
- Folpet likely successor to CTL at T2 but consider mancozeb at T3

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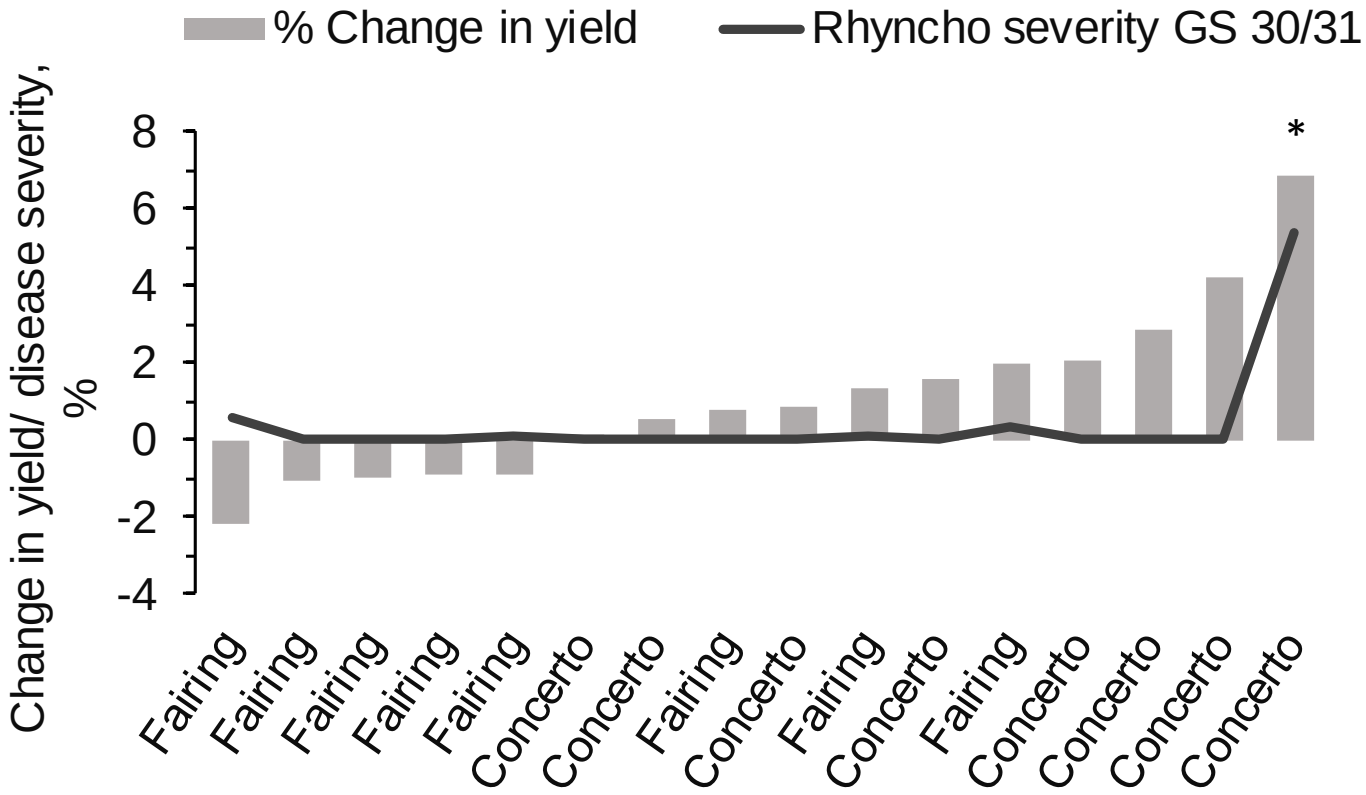
Barley programmes centred on efficient and targeted use

Understanding principles of fungicide use

- Manage crop to maximise grain number and potential grain size
- Early T1 sprays retain healthy tillers hence more ears where disease pressure threatens (winter crops and high risk spring barley scenarios)
- A T2 application at GS49 gives sufficient protection of canopy post-anthesis to ensure grains fill to their storage capacity
- Later sprays after T2 don’t yield and could be omitted from recommendations

Optimising timings
Spring barley - yield response to T1 fungicides highest in wet years with rhyncho present

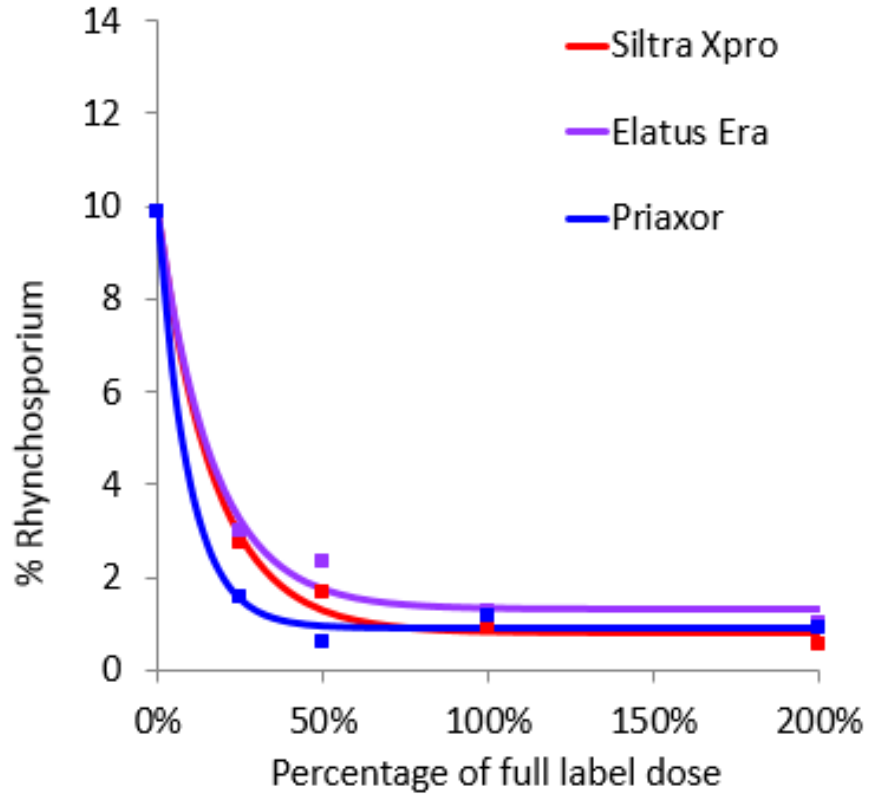


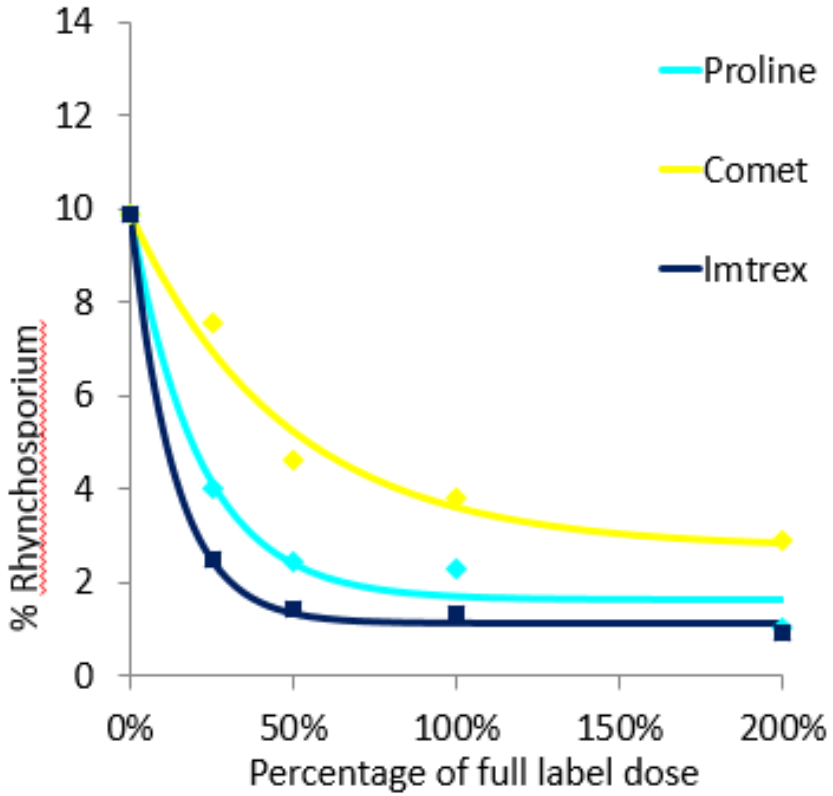
	Yield t ha^{-1}			
Fungicide	Concerto	Fairing	Mean	Response
Untreated	6.00	6.49	6.24	
T1	6.22	6.68	6.45	0.21
T2	6.54	7.05	6.80	0.56
T1 + T2	6.62	7.01	6.81	0.57
T1.5 +T2	6.62	7.03	6.83	0.58
Variety (V)		<0.001		
Fungicide (F)		<0.001		
V*F		0.799		
LSD Fung		0.120		
LSD V*F		0.169		
residual df		376		

SRUC data 2017-2019 (12 trials)

T1 Siltra Xpro @ 0.4 l ha^{-1}
T2 Siltra Xpro @ 0.4 l ha + Bravo @ 1.0 l ha^{-1}).

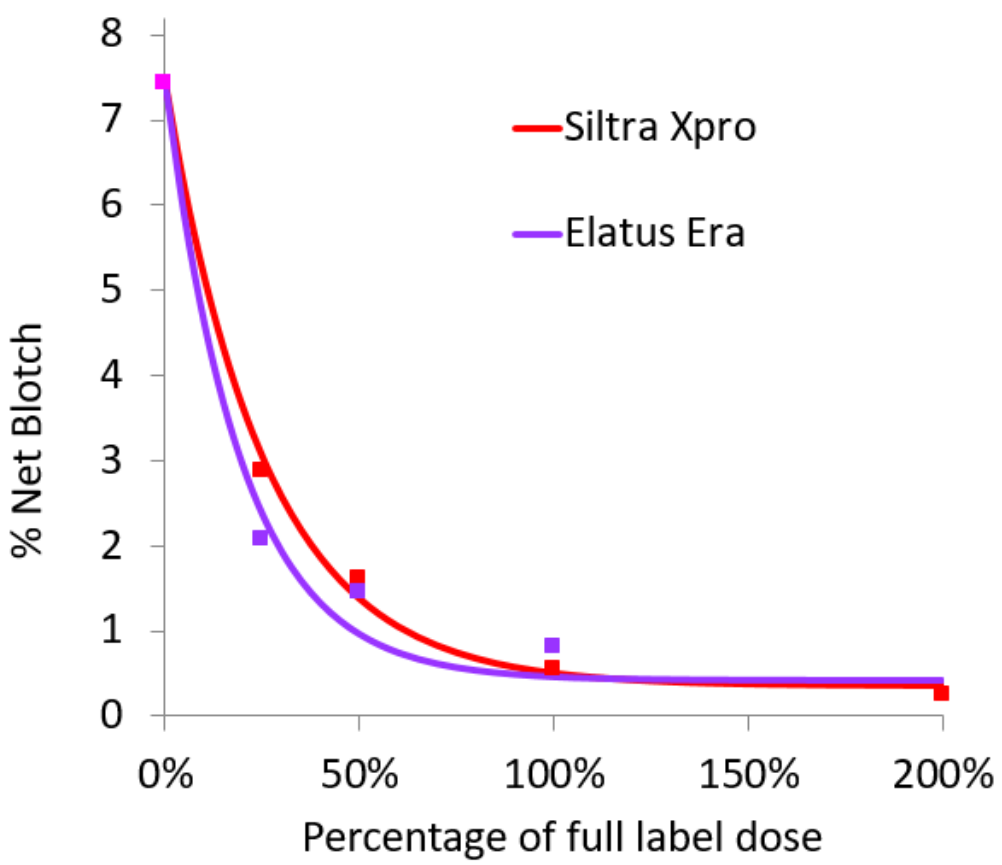
Rhynchosporium 2017–19 (8 trials)
(protectant activity)

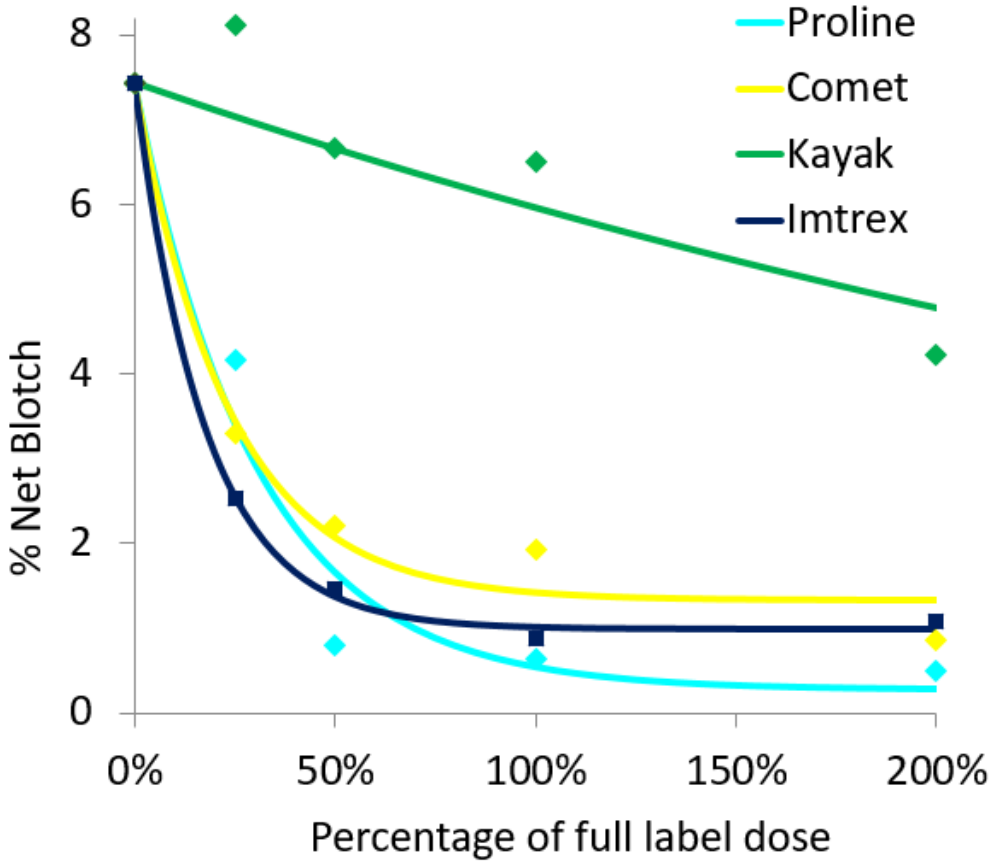




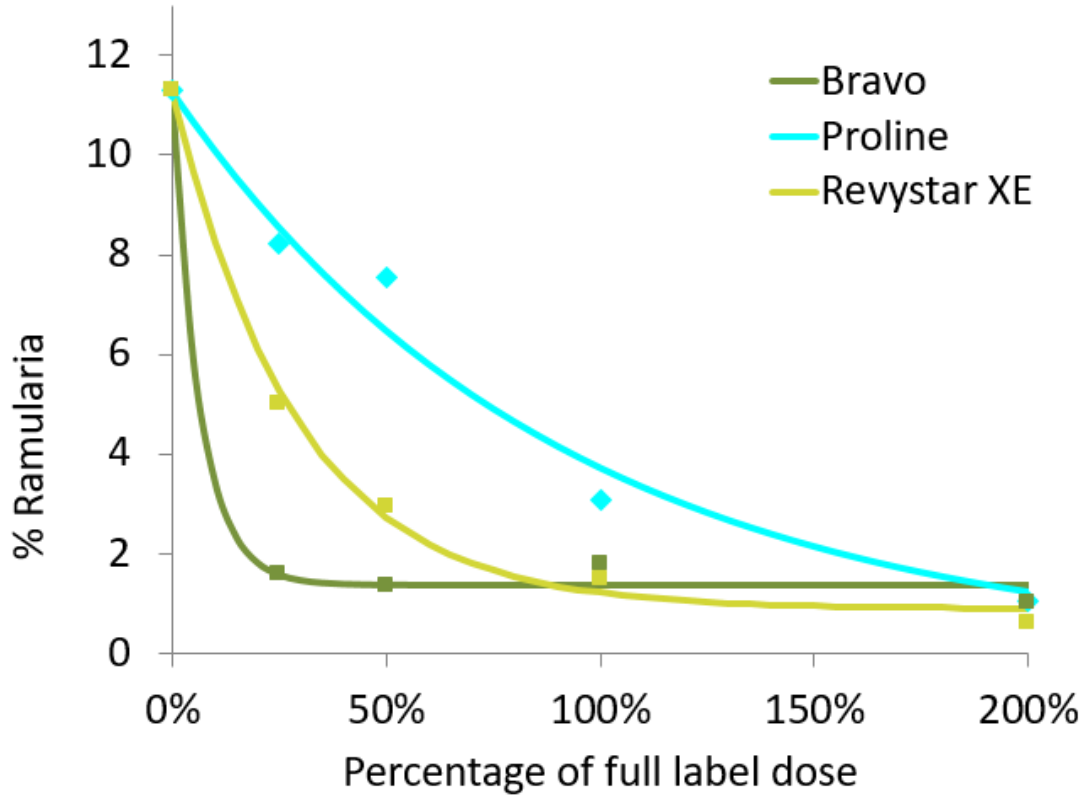
Priaxor = fluxapyroxad + pyraclostrobin

Net blotch protectant 2017–19 (4 trials)

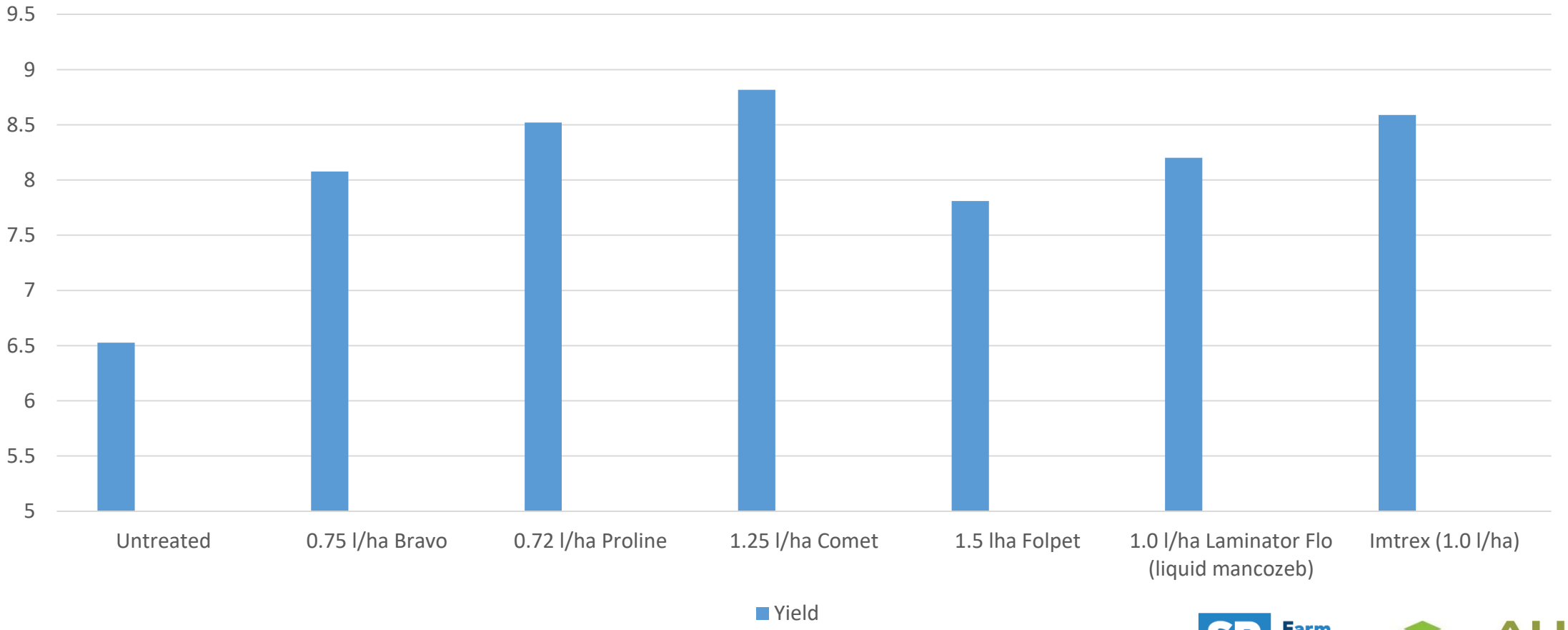




Ramularia 2019 (2 sites)



Alternatives to chlorothalonil
SRUC winter barley trial 2019



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Ramularia – current advice

- Varietal ratings for ramularia withdrawn
- Breeding solutions are a longer game
- Use multisite chlorothalonil to manage ramularia risk at T1 and T2 (until 20th May 2020)
- Residual efficacy in prothioconazole
- Revystar XE efficacy sits between CTL and prothioconazole
- Folpet, biostimulants / micronutrients may play greater role
- Minimise crop stresses

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Barley programmes - strategic planning

	T0	T1	T2	T3
Winter barley Susceptible	✗	CTL + mid dose azole + SDHI mix	Alternate azole / Switch to other multisite	✗
Winter barley Resistant variety	✗	CTL + low dose azole + strob mix	Switch to other multisite	✗
Spring barley Susceptible variety	✗	Low dose option in wet year and if disease present	Switch to other multisite PTZ + SDHI	✗
Spring barley Resistant	✗	CTL* (or nothing if late crop)	Switch to other multisite PTZ + SDHI	✗
Spring barley High risk ramularia	✗	CTL*	Switch to other multisite Try Revystar XE	✗

CTL* - many spring barley crops may not reach mid tillering /T1 by 20th May and stock must be disposed of by then

Take home actions

- CTL loss needs to be factored in to 2020 plans
- Maximise CTL use early and then switch to other multisites
- Build fungicide programmes from key timings
- Minimise use at least responsive timings
- Adjust programmes to variety and to risk
- Get as much diversity into programmes as possible – mix and alternate
- Keep aware on technical developments

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The Scottish Government
Riaghaltas na h-Alba

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

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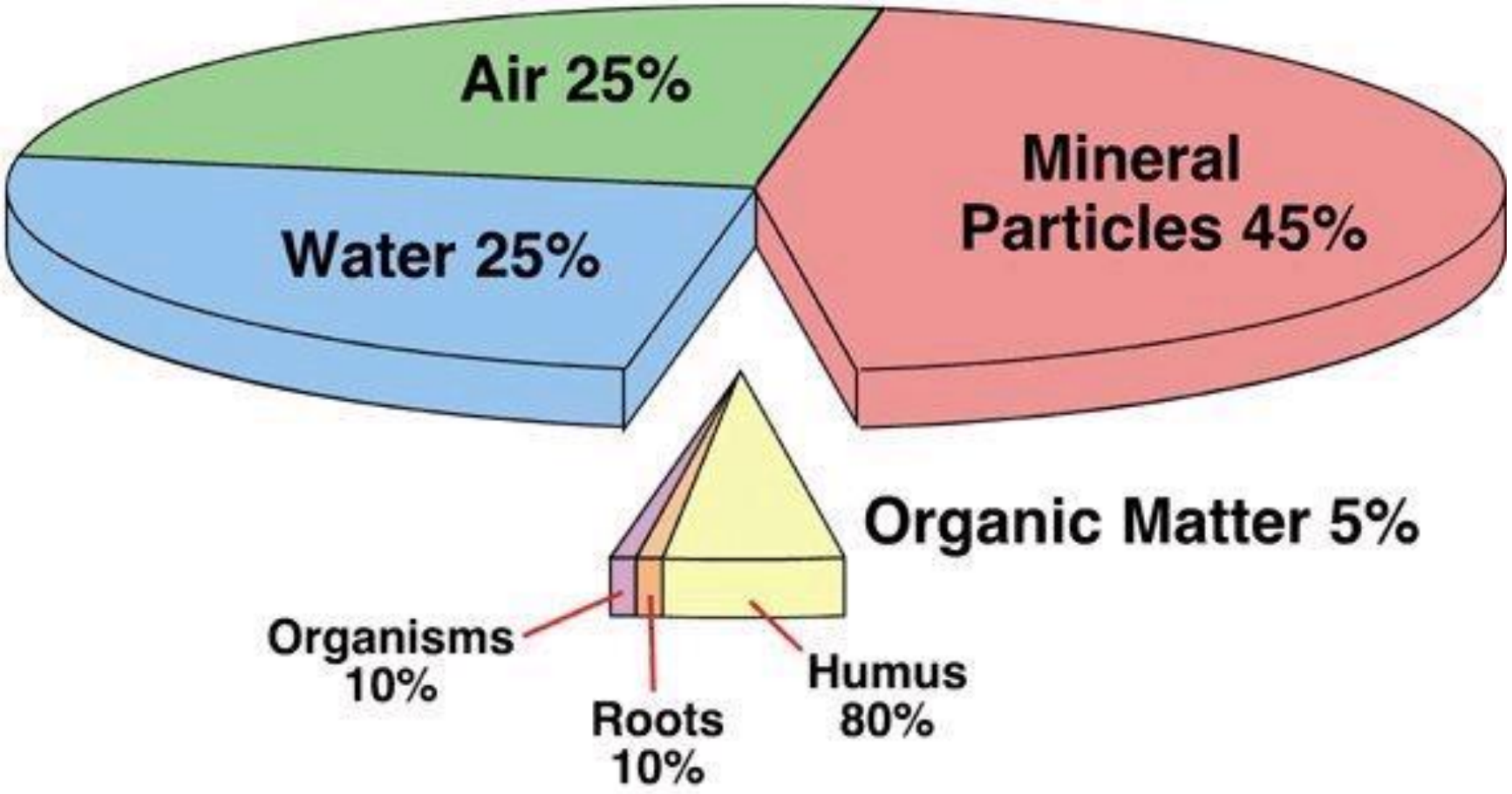
Soil Health:
What are the benefits?

Dr. Paul Hargreaves, Dr. Joanna Cloy
and Prof. Bob Rees

SRUC

Soil – air, water, minerals



Soil functions

Reduce gas losses, N_2O, N_2, NH_3 and CH_4

Supports roots and plants

Recycle nutrients in wastes

Store water, carbon and plant nutrients – minimise runoff, sediment and fertiliser losses

Prevent NO_3 and pesticide leaching losses

Good soil function sustains growth and conserves the environment

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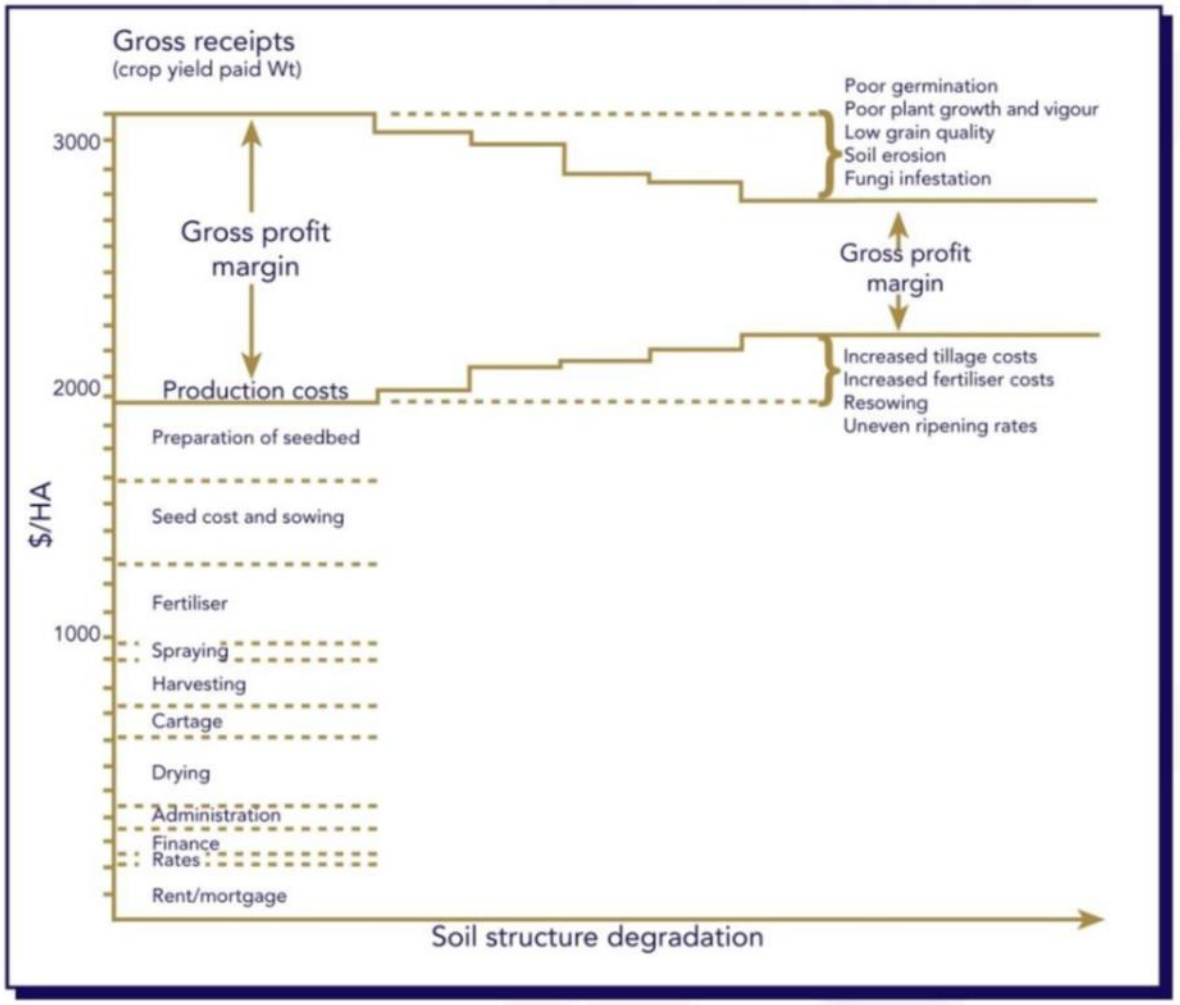
Reductions to Margins



Production costs ($/ha) and narrowing profit margin associated with increasing soil structure degradation.

(G. Shepherd, Bioagrinomics, New Zealand)

Know Your Soil

Biological

Feed the soil regularly through plants and OM inputs

Move soil only when you have to

Diversify plants in space and time

KNOW YOUR SOILS; principles to improve soil health

Chemical

Maintain optimum pH

Provide plant nutrients – right amounts in the right place at the right time

Physical

Texture and limits to workability, trafficability

Optimise water balance through drainage

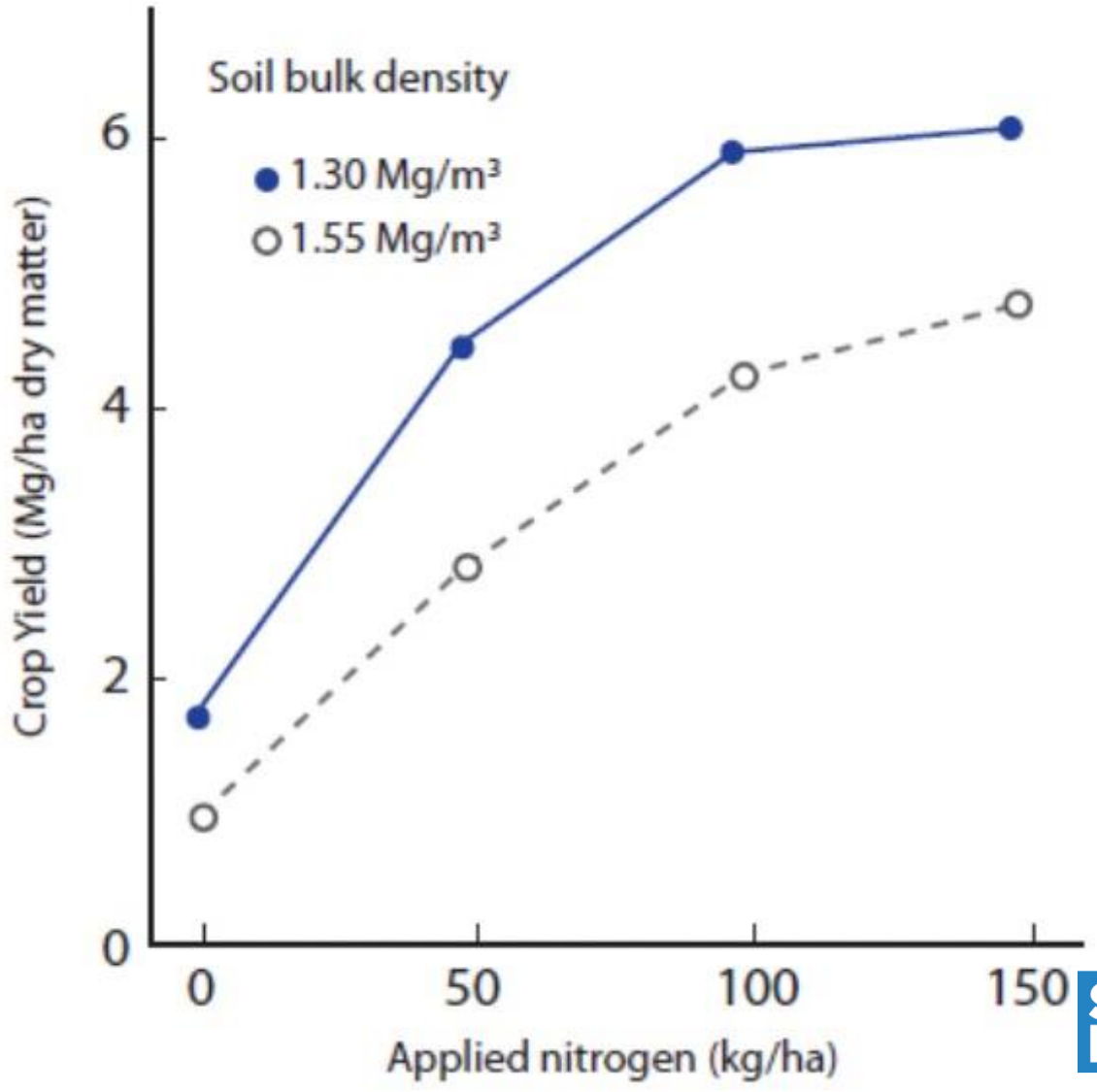
Soil structure

Soil Structure

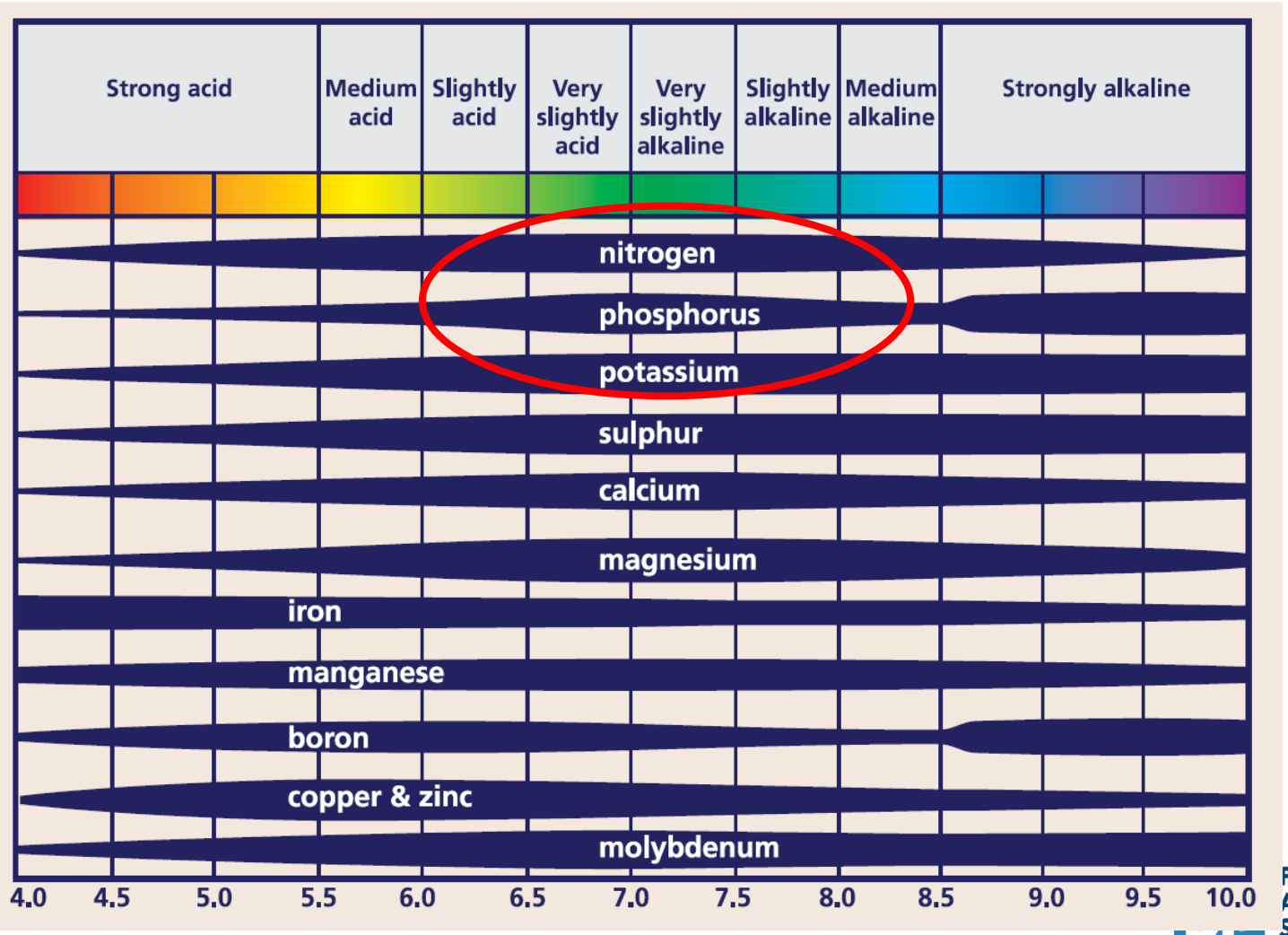
Structure is the how the particles bind together to form aggregates that allows:

- roots to anchor the plant
- water to drain through pores and cracks
- water retention
- air to roots for favourable gas exchange
- mineralisation of nutrients and release to plant roots
- biodiversity of microbes

Compaction and Nitrogen Use



Soil pH Availability and Nutrients



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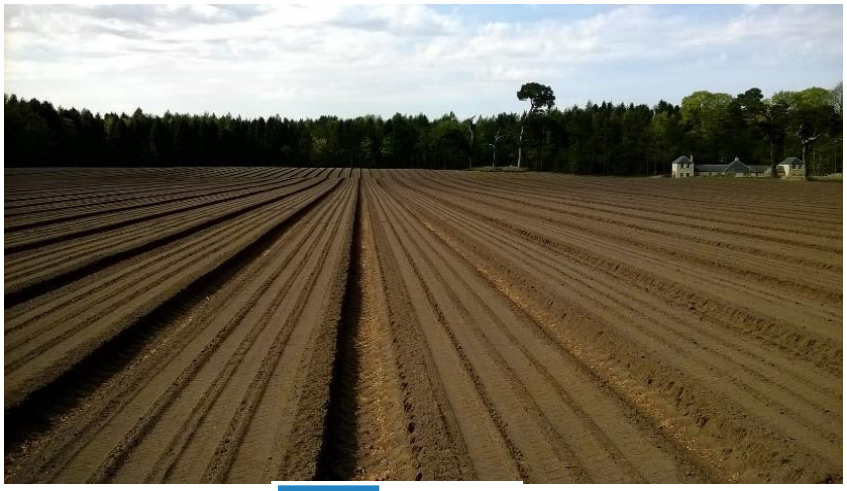
Organic Matter

- Soil plays a major role in the global carbon cycle
- Global soil carbon pool estimated at 2500 gigatons, 3.3 times the size of the atmospheric pool and 4.5 times the biotic pool
- Organic material from the breakdown of plant and animal material.
- Depending on their chemical structure, decomposition is rapid for sugars, starches and proteins (days), slow for cellulose, fats, waxes and resins (months) or very slow for lignin (years).
- 35-80 % of the non-living part of organic matter is humus

Soil health: organic matter

- Organic matter contains carbon and helps maintain carbon in the soil
- Scottish agricultural soils have typical organic matter contents of 5 to 10%
- Soil organic matter increases soil stability, drainage, fertility and encourages biodiversity
- Organic matter is lost as a result of continued cultivation
- Need to replace organic matter that is lost



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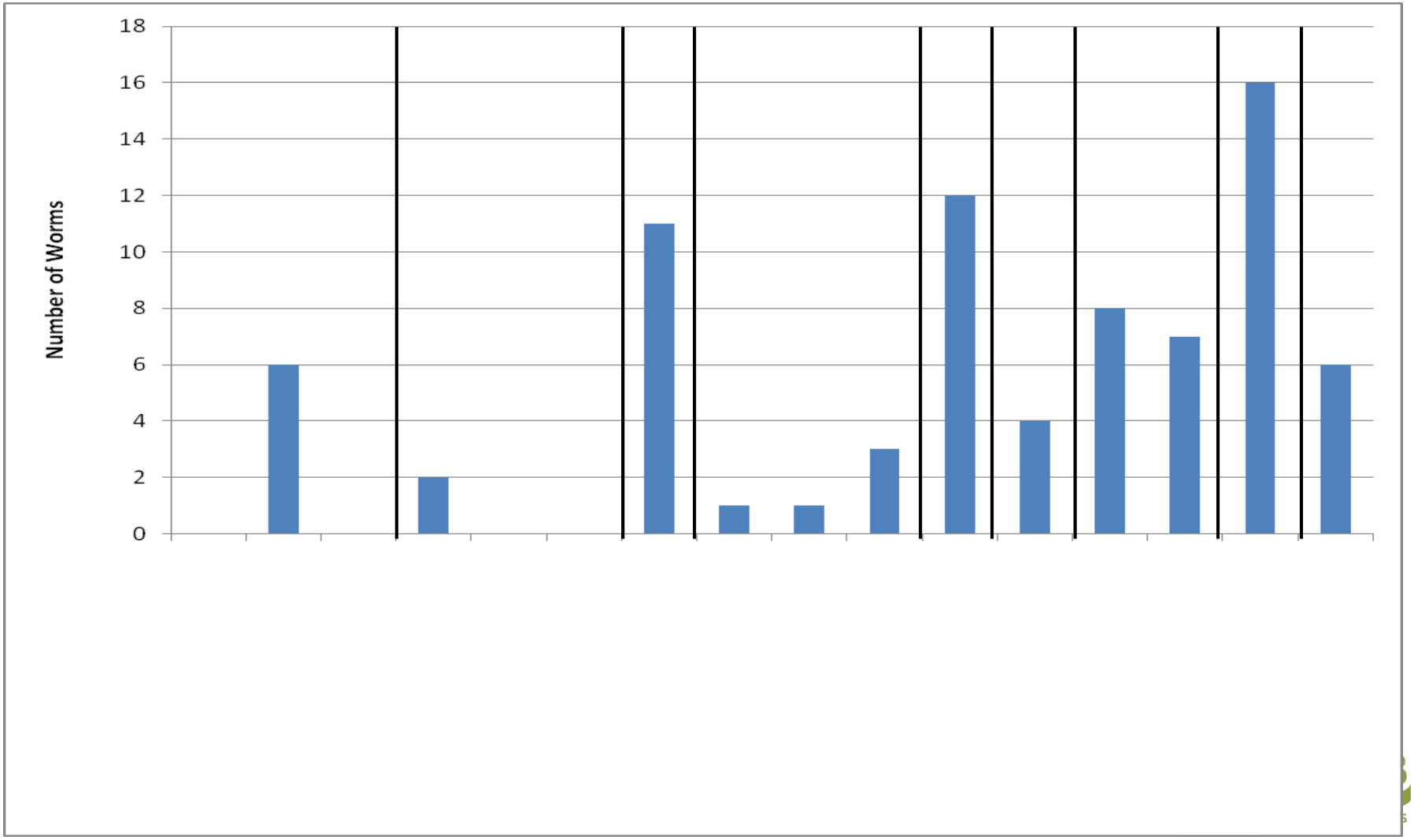
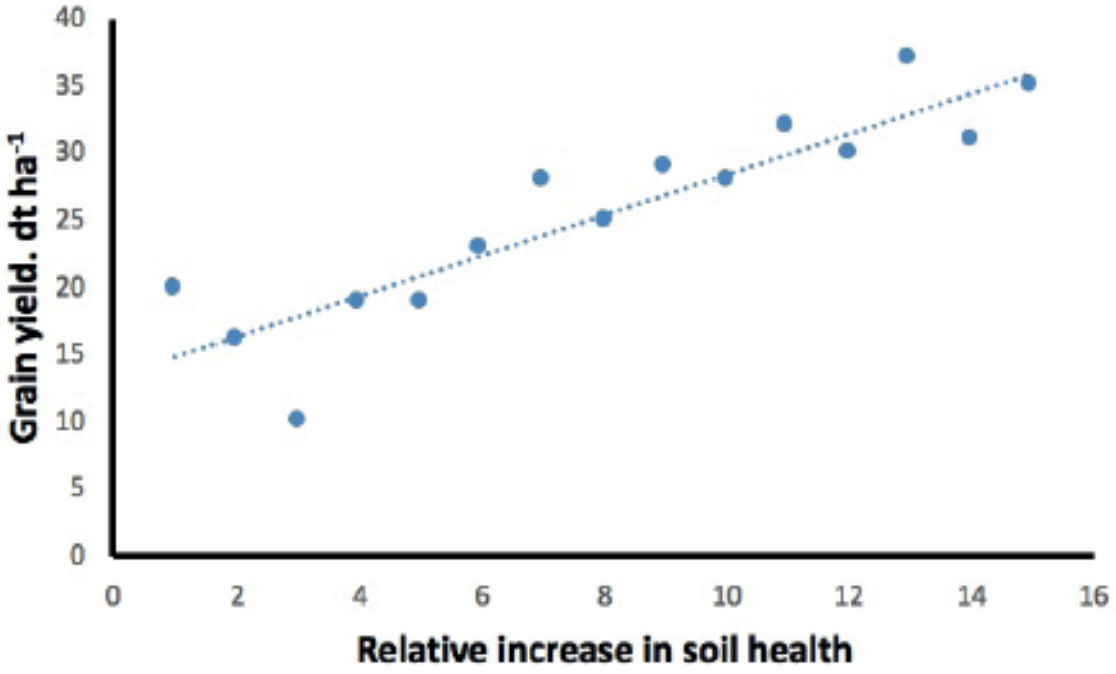
Tillage and Earthworms

- Reduced tillage increases earthworm numbers
- The deeper burrowing worms show greater significant increase from reduced tillage
- Greater increases in number where soil had been under no-tillage for longer (over 5 years)
- Deeper burrowing worms more responsive to no and reduced tillage

Farm Earthworm Numbers



Soil Quality and Yields



Yield of small grain cereals in relation to soil health from a series of trials at 50 locations across Eastern and Central Europe (redrawn from Mueller et al., 2018)

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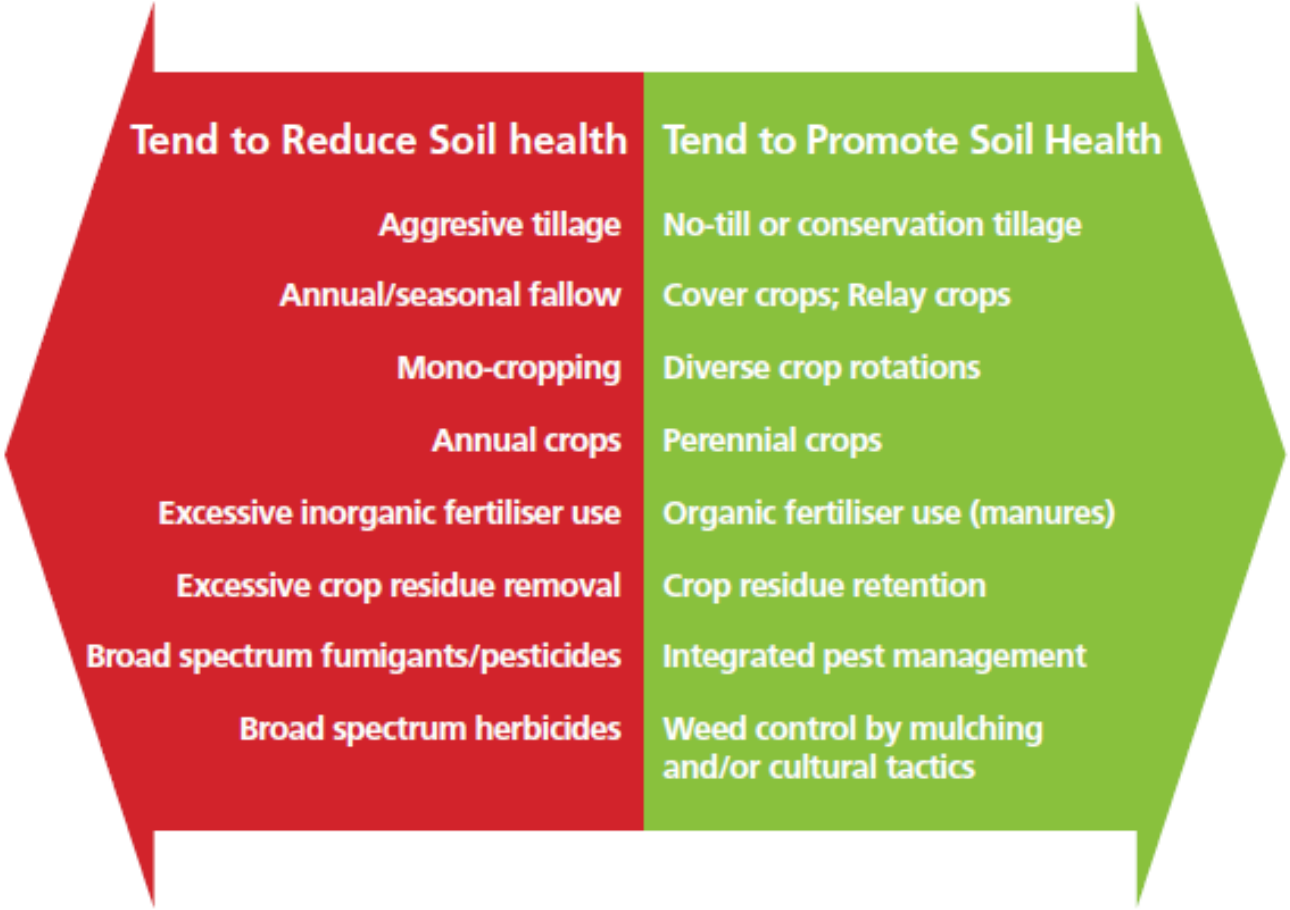
Questions

- What is the state of my soil?
- Depends on
  - –Soil type
  - –What you want to do with it

- How do I tell?
  - Need indicators as can’t measure everything

Management practices that reduce or improve soil health



No 'one size fits all' due to varying soil type, agricultural system and climate

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Minimum and Reduced Tillage

- Generally non-inversion tillage
  - Retains more organic material close to the surface
  - More nutrients close to the surface
  - Less fuel use, less labour costs
  - Can see reduced yield
  - Need to think about varieties with greater rooting
  - Control of compaction?
  - Cover crops to help with soil health and structure

Cover Crops

- Mainly sown between cash crops
- Protects soil that would be left bare over winter
- Helps retain soil organic material
- Can improve soil structure
- Reduce fertiliser costs

Summary

- Know your soil – use a spade
- Need to understand physics, chemistry and biology
- Soil health monitoring is a combination of methods
- Organic matter is important for soil structure and stability
- Living soil is important for growth and quality
- Consider mitigation measures
- Measure, Monitor, Manage

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

Thank you

Assessing Soil

- Smell
- Colour
- Ease of break up of the soil
- Larger soil aggregates
- Shaper points to soil aggregates

Earthworms

Can be very good indicator of soil quality as:

- they do not move very far (10 metres)
- can live for up to 10 years
- exposed to changes in the soil – pH, tillage, waterlogging, compaction, organic matter

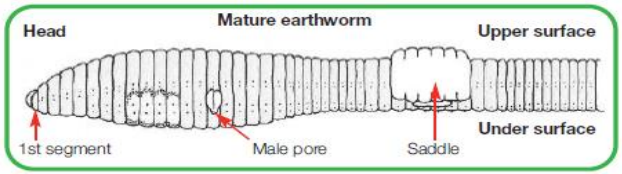
Earthworm Identification I

OPAL EXPLORE NATURE

Key to common British earthworms of amenity grasslands

By David T. Jones *and* Chris N. Lowe

There are 26 British species of earthworm. This guide covers the seven most common species that occur in grass lawns and playing fields. It does not include the red stripy earthworms that occur in compost heaps, other species that occur in gardens, or woodland species.



Start here

Is it more than 2cm long, **AND** does it have a clearly developed saddle?

The saddle is usually a different colour to the rest of the body, and slightly wider

NO → It is not a mature earthworm - you can't identify it with this guide. At least 50% of the earthworms you find will be immatures.

YES → Is the upper surface of the body, from the first segment to the saddle, entirely dark in colour (dark red, purplish red or chestnut brown)?

NO → It may be a species not on this guide

YES → **Turn over**

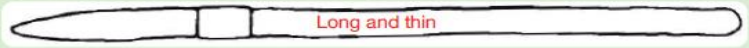
NO → Is the body from the first segment to the saddle partly or entirely pale in colour (whitish, pink, grey or greenish)? It may have some reddish or dark segments

YES → Is the earthworm longer than 8cm when **NOT** moving?

NO → Are the male pores visible?

YES → Is the body: **A Long and relatively thin** or **B Long and relatively fat**?

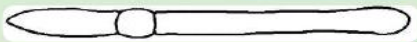
Black-headed worm *Aporrectodea longa*



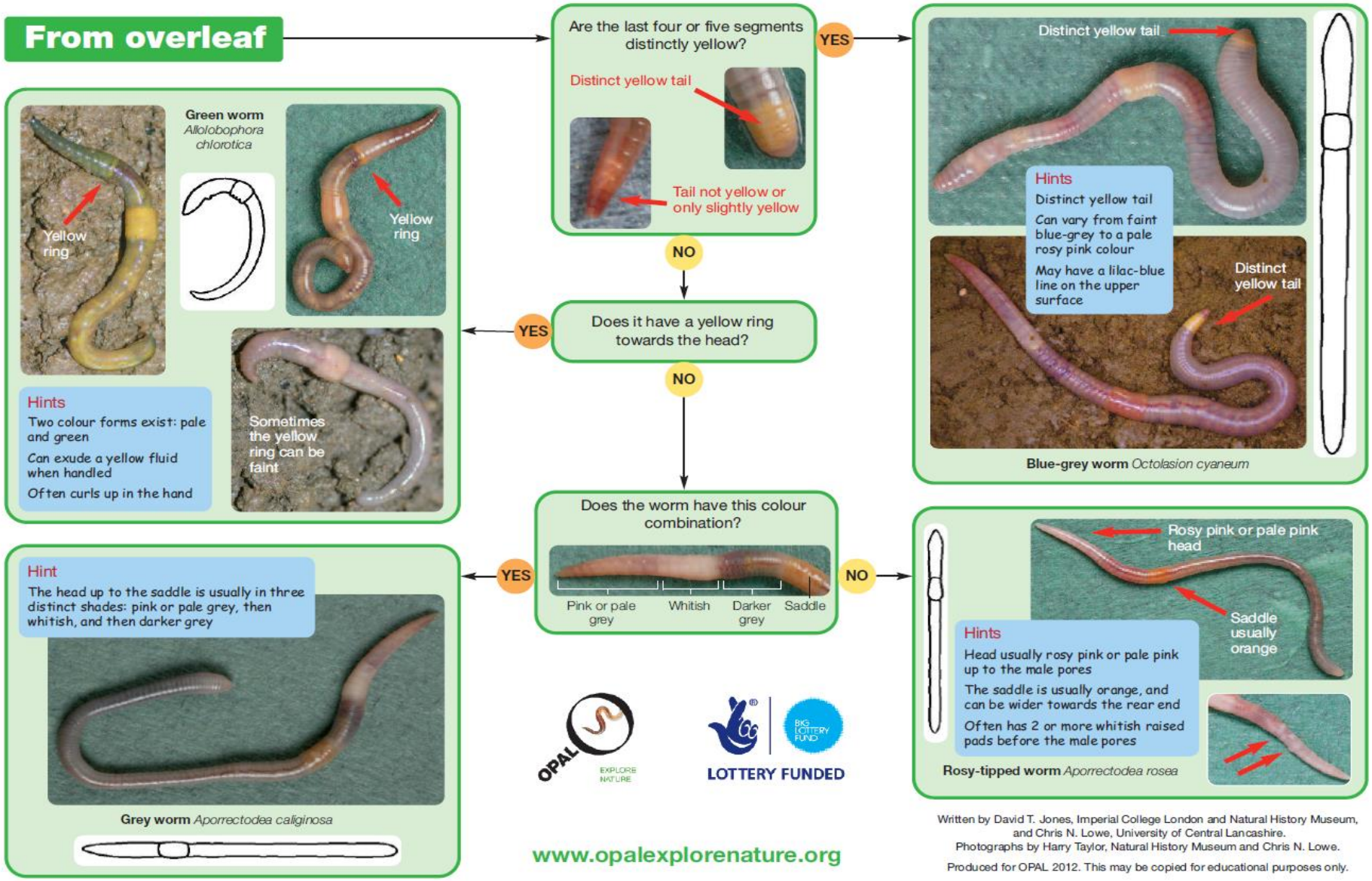
Lob worm *Lumbricus terrestris*

Hint
Line drawings show typical sizes of the adult worm

Redhead worm *Lumbricus rubellus*



Earthworm Identification II



Written by David T. Jones, Imperial College London and Natural History Museum, and Chris N. Lowe, University of Central Lancashire.
Photographs by Harry Taylor, Natural History Museum and Chris N. Lowe.

Market risks and opportunities in 2020 and beyond

Julian Bell, Senior Consultant,
SAC Consulting, SRUC
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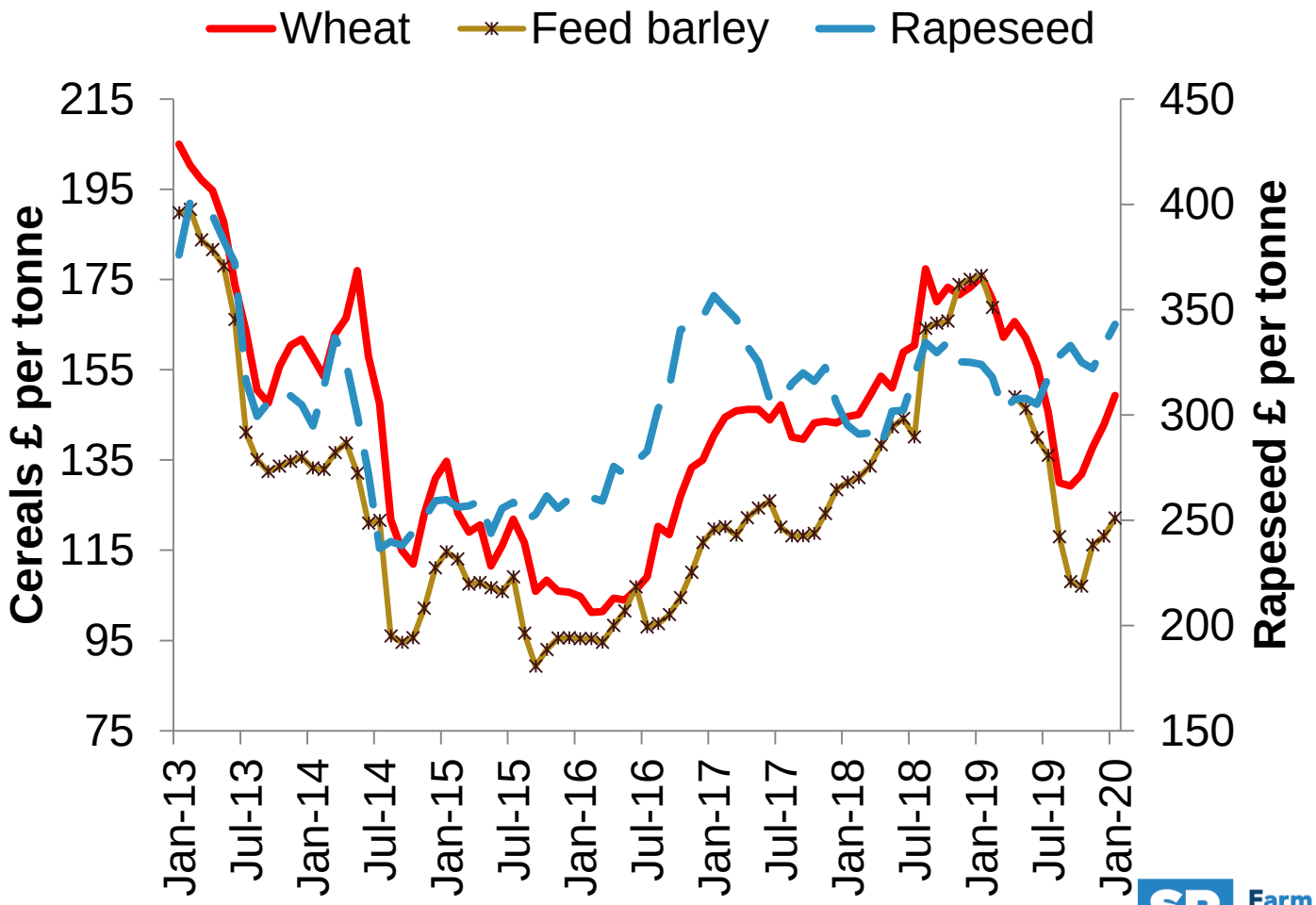
Mob: 07795 302 264

Cereal prices recover a little but still down on a year ago - wheat -£26/t, feed barley - £53/t Rapeseed +£20/t



Source: AHDB, SAC Consulting

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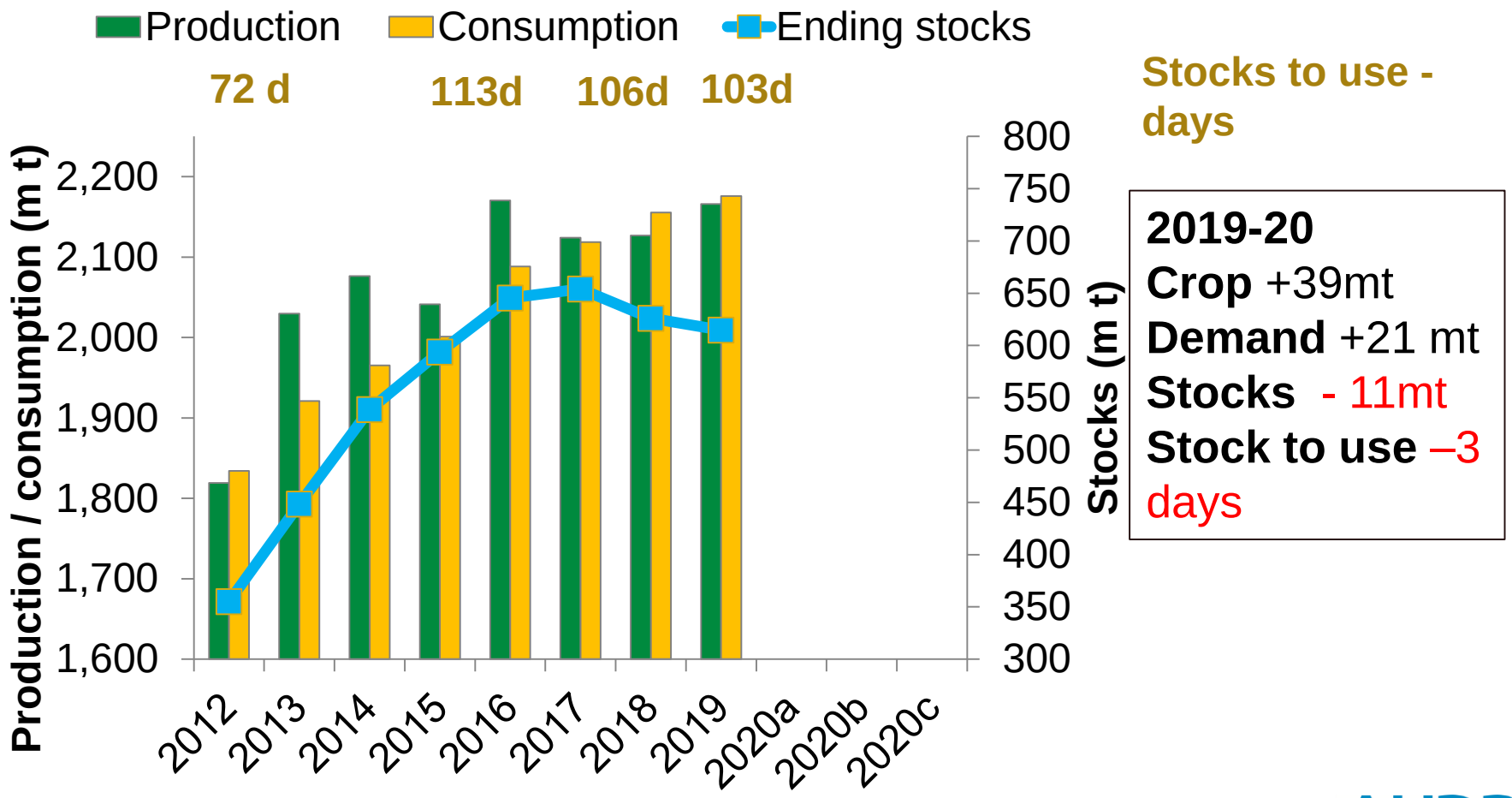
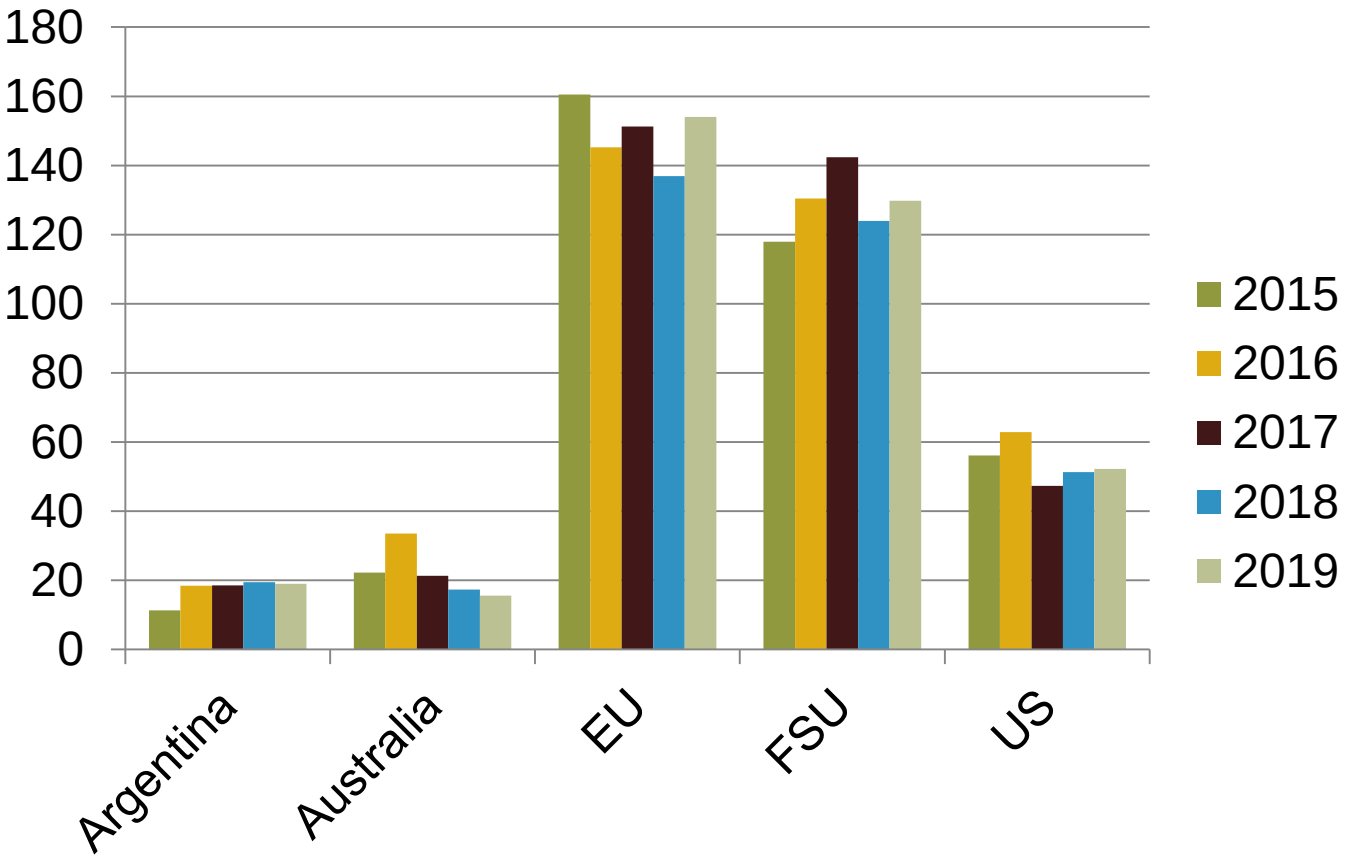
2019: world grain harvest falls behind usage for 2nd year in a row, S/U lowest in 5 years



Source: USDA, IGC, SAC Consulting

But big crops in Europe hit our prices - world wheat crop 34mt higher in 2019

– EU up 17mt, Russia/FSU up 6mt,



Source: USDA, SAC Consulting

EU grain output up 10% in 2019

	2018 (mt)	**2019** (mt)	Change - '19 vs '18 (mt)	(%)
Wheat	127	145	18	+14%
Barley	56	62	6	+10%
Spring barley	29	30	1	+2%
Total grains	281	308	27	+10%

Coceral;

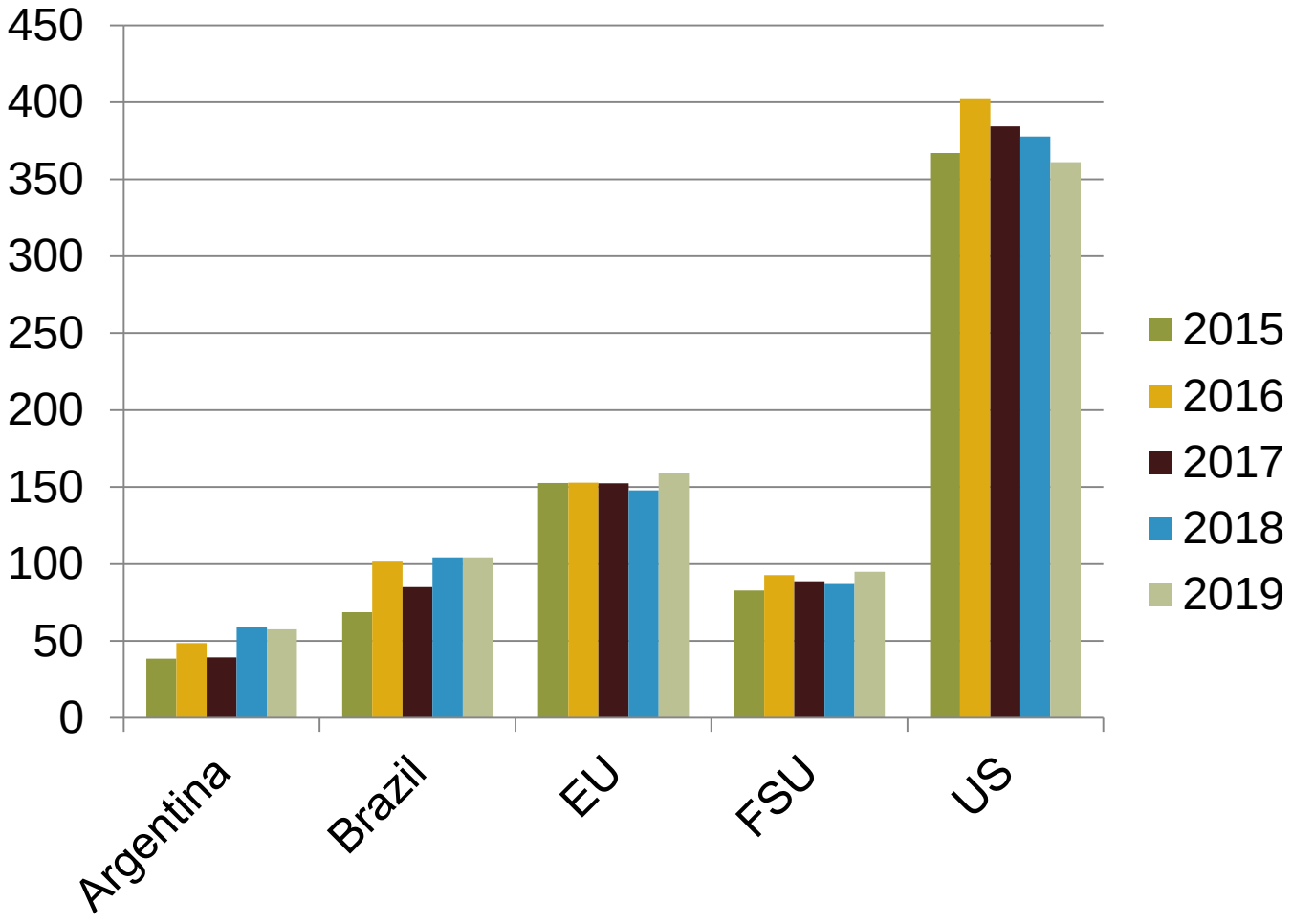
Make America Late Again

- the latest spring sowings on record

but farmers and crops made an amazing comeback

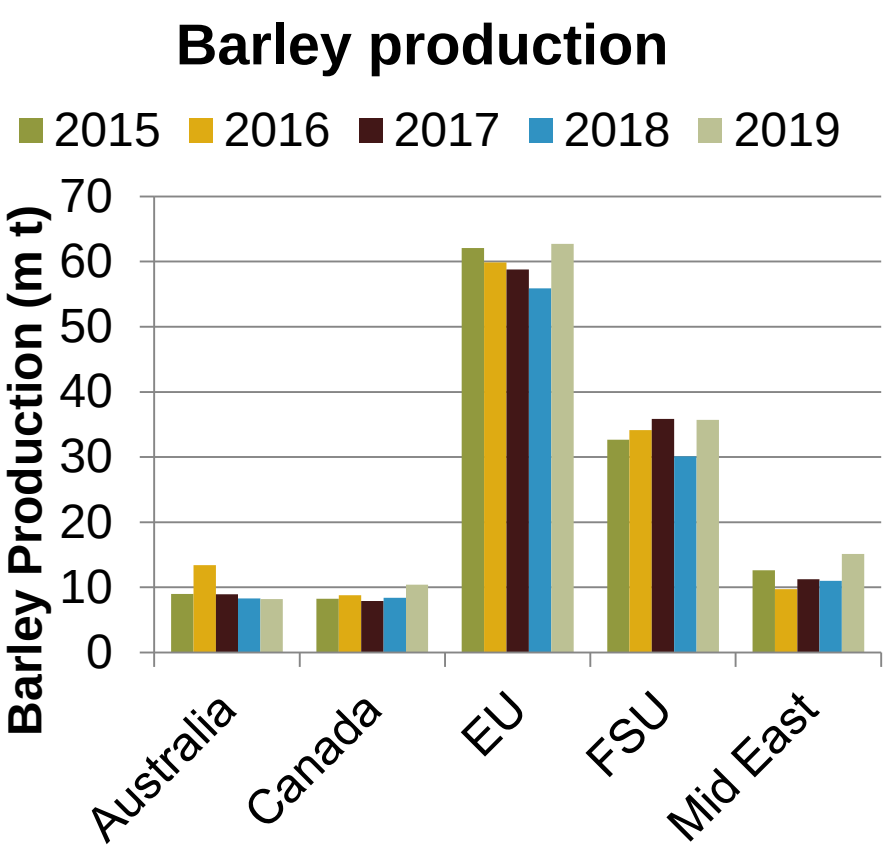
US 2019 maize crop estimates cut from 381mt to 347mt ….325mt was possible … 361mt actual

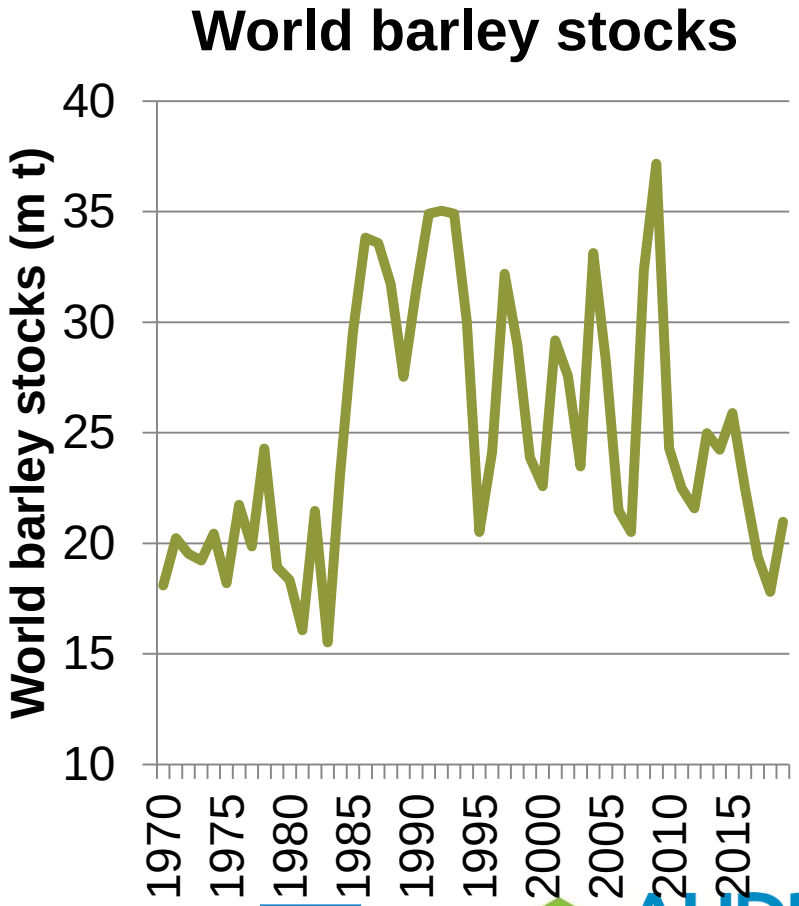
World feed grain crop 6mt higher in 2019
- EU, FSU up, US down



Source: USDA, SAC Consulting

Barley – world output up 17mt to 156.7mt in 2019 - on bigger crops in EU, FSU, Mid East





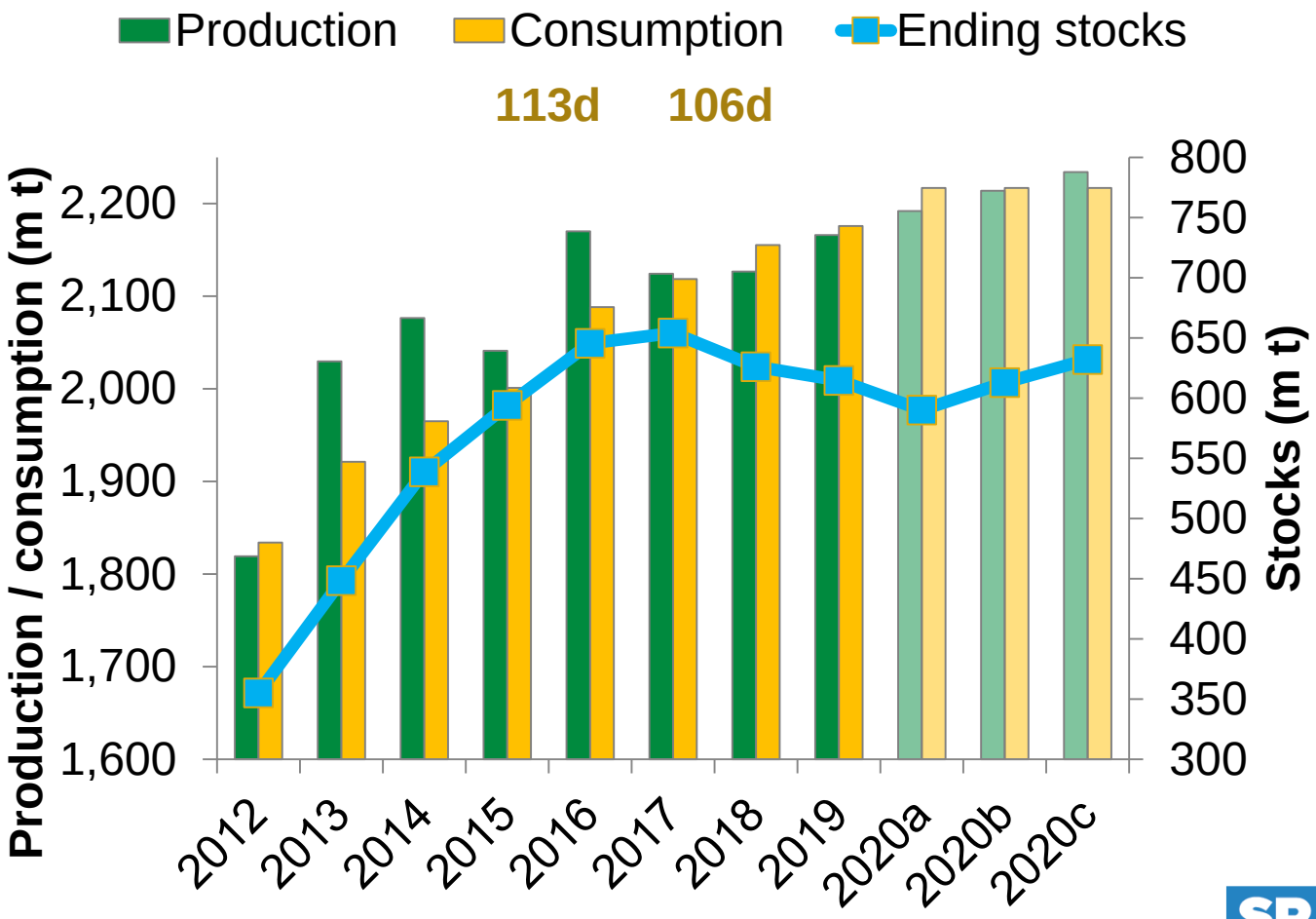
Source: USDA, SAC Consulting

2020 world harvest; higher area AND yield needed

(A) 2019 yield, +5m ha area = 25 mt fall in stock

(B) Trend yield +5m ha area = 2 mt fall in stocks

(C) Trend yield, +10m ha area = +18mt rise in stocks



2020-21 – higher area + record yield or stocks will fall Assuming trend use +42mt

Source: USDA, IGC, SAC Consulting

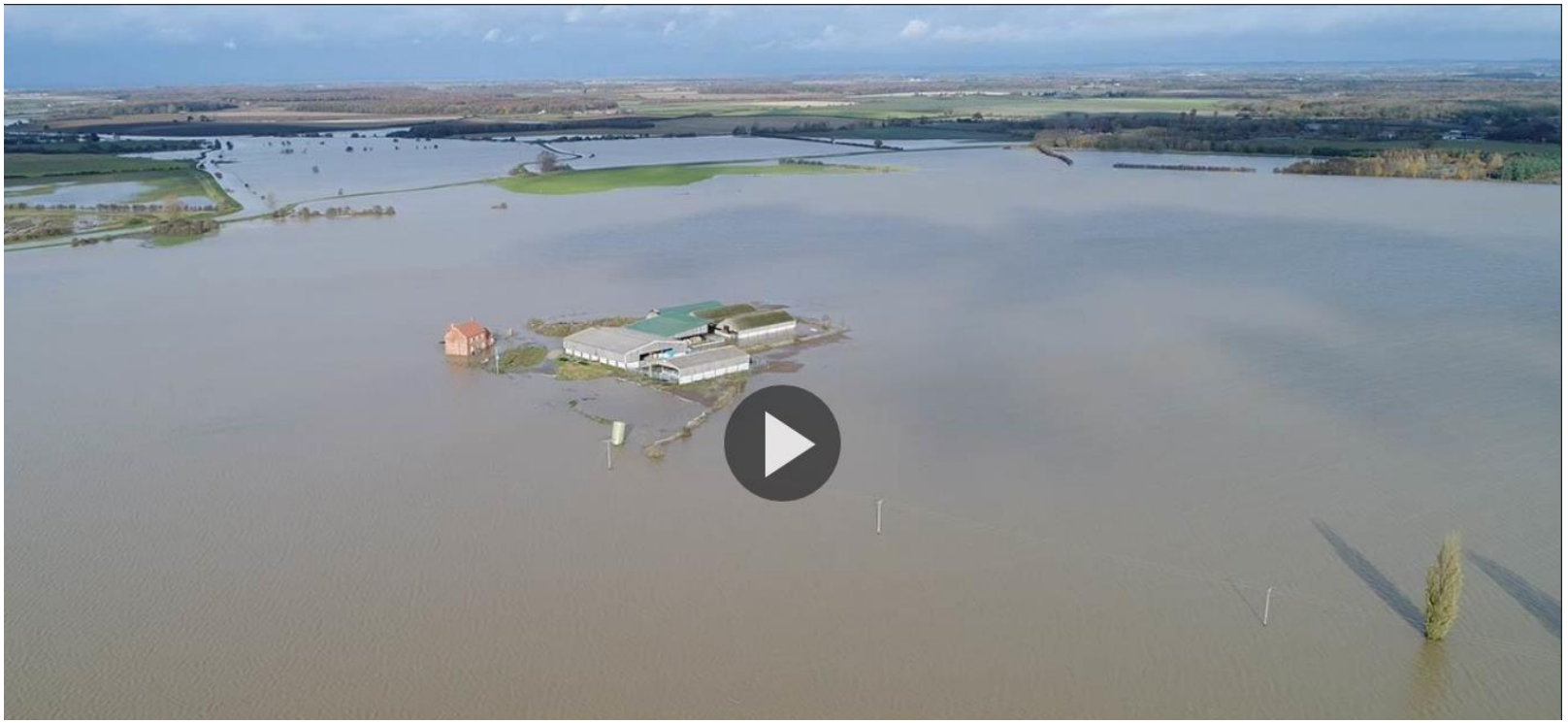
UK a large wheat surplus in 2019 – export or carry over in 2020 – if carried over, could be large export surplus next season too! Or higher UK ethanol use.

UK wheat

'000 t	2018/19	2019/20	2020/21
Open Stocks	1,718	1,911	2,787
Production	13,555	16,283	13,651
Imports	1,858	1,050	1,750
Available	**17,131**	**19,244**	**18,188**
Human Use	6,976	6,876	6,800
Animal Feed	7,403	7,477	7,200
Seed etc	349	362	349
Domestic Use	**14,728**	**14,715**	**14,349**
Exports/surplus	**358**	**1,742**	**2,139**
End Stocks	**1,911**	**2,787**	**1,700**
Net trade	***-1,500***	***692***	***389***

Source: AHDB, SAC Consulting

Wet autumn to cut UK autumn planting -
- England worse hit, Scotland also affected



Source: AHDB, SAC Consulting

UK – wet autumn to slash winter cereal area, boost spring barley in 2020 - AHDB

UK	2019 harvest ('000's ha)	2020 harvest ('000's ha)	Change (%)	Change ('000's ha)
Wheat	1,816	1,631	-10%	-185
Winter barley	453	395	-13%	-58
Spring barley	710	929	31%	219
Oats	182	201	10%	19
OSR	530	414	-22%	-116
Total	**3,691**	**3,570**	**-3%**	**-121**

Source: AHDB Early Bird survey and DEFRA

UK 2019/20 large barley surplus

– expected to continue in 2020/21 – Brexit risk

UK barley '000 t	2018/19	2019/20	2020/21
Open Stocks	1,076	1,091	1,367
Production	6,510	8,180	8,328
Imports	70	52	52
Available	**7,656**	**9,323**	**9,747**
Human Use	*1,903*	*1,929*	*1,929*
Animal Feed	*3,578*	*4,047*	*4,047*
Seed etc	*221*	*229*	*229*
Domestic Use	**5,702**	**6,205**	**6,205**
Exports	**893**	**1,751**	**2,175**
End Stocks	**1,091**	**1,367**	**1,367**

Source: AHDB, SAC Consulting

Largest Scottish cereal crop in 5 years, up 22% on strong yields – 3.07mt up 560kt on 2018

Scotland	WHEAT		
	Area (ha)	Yield (t/ha)	Prod'n (t)
2015	109,562	9.30	1,019,182
2016	109,594	8.45	925,992
2017	109,489	8.12	889,308
2018	99,778	6.83	681,000
2019	107,480	8.72	936,865
Change			*255,865*
2020	**98,000**	**8.39**	**822,220**

Wheat up 255,000t (37%) to 1.94mt, erosion of Scottish premium to parity of £2-3/t over England

Total barley up 286,000t (17%) to 1.94mt, £3-5/t price discount to England

Scotland	SPRING BARLEY		
	Area (ha)	Yield (t/ha)	Prod'n (t)
2015	255,878	5.94	1,520,756
2016	238,899	5.43	1,296,481
2017	243,838	5.88	1,432,815
2018	250,476	5.54	1,387,503
2019	242,090	6.38	1,543,825
Change			*156,322*
2020	**244,000**	**5.83**	**1,422,520**

Source: Scottish Government

Scotland expected to see only a modest swing to spring crops in 2020 - AHDB

Scotland	2019 harvest ('000's ha)	2020 harvest ('000's ha)	Change (%)	Change ('000's ha)
Wheat	107	98	-8%	-9
Winter barley	49	45	-8%	-4
Spring barley	242	244	1%	2
Oats	32	30	-6%	-2
OSR	32	29	-9%	-3
Total	**462**	**446**	**-3%**	**-16**

Note – treat with caution due to

- Small sample size - <5% of cropped area

Source: AHDB Early Bird survey and DEFRA

Malting barley use in Scotland – no more capacity until 2022, yields key

	Scottish / Berwick malting Spring barley purchases ('000's t)	Scottish Spring Barley Crop ('000's t)	Est. Malting varieties (%)	Est. Malting varieties ('000's t)	Scottish malting purchases as % of malting varieties	Malting premium over feed £/t
2015	**775**	1,521	76%	1,156	67%	14
2016	**765**	1,296	64%	829	**92%**	**28**
2017	**775**	1,433	57%	815	**95%**	**41**
2018	**810**	1,338	72%	963	**84%**	**47**
2019	**840**	1,543	72%	1,111	76%	**17**
2020	**840**	1,422	72%	1,023	**82%**	**40**
2022	**910**					

Source: SAC Consulting MAGB, Scottish Government,

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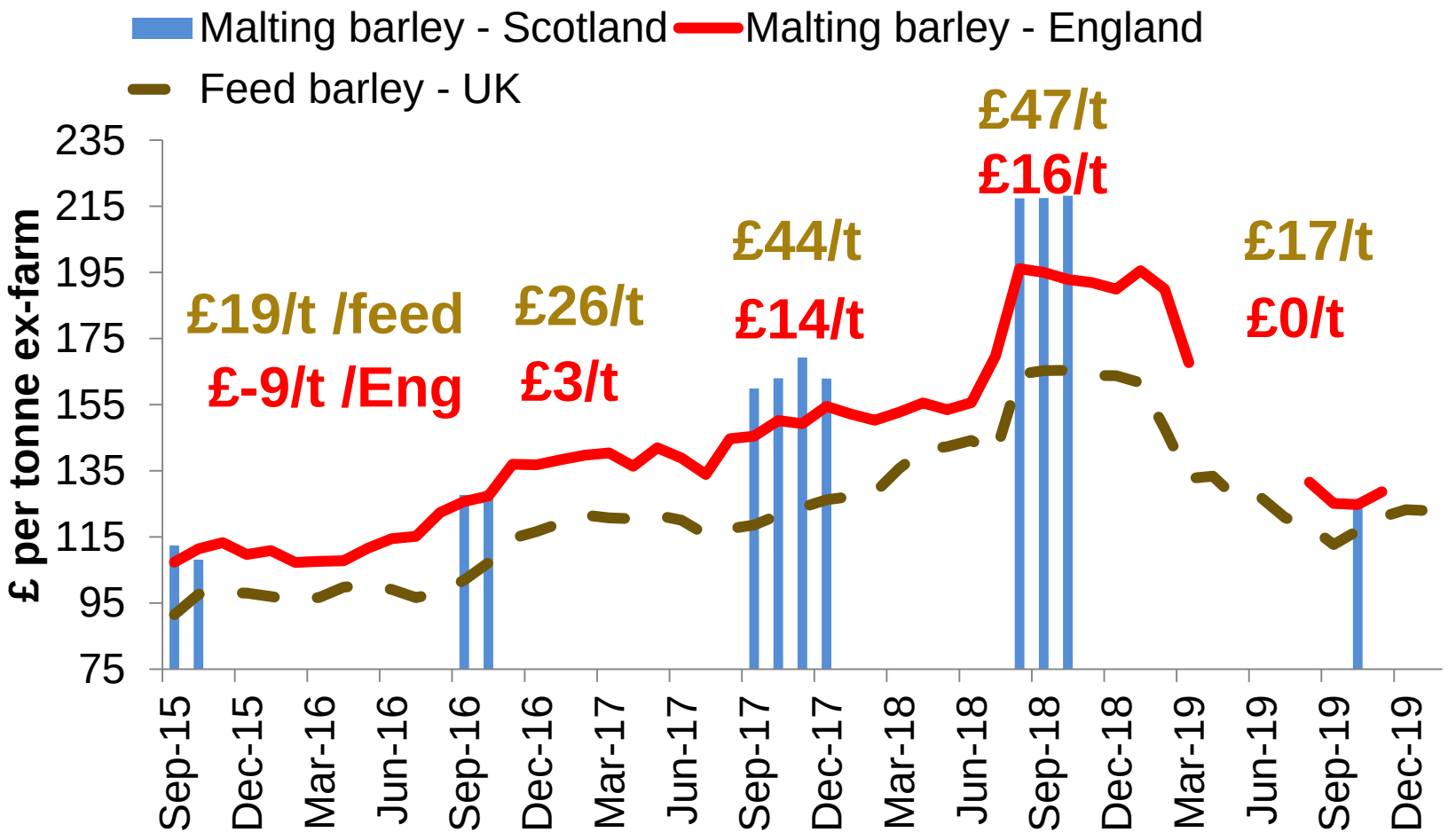
Scottish malting barley in 2019 – price premium collapses to **£17/t** over feed, parity wi Engl malt. bar.



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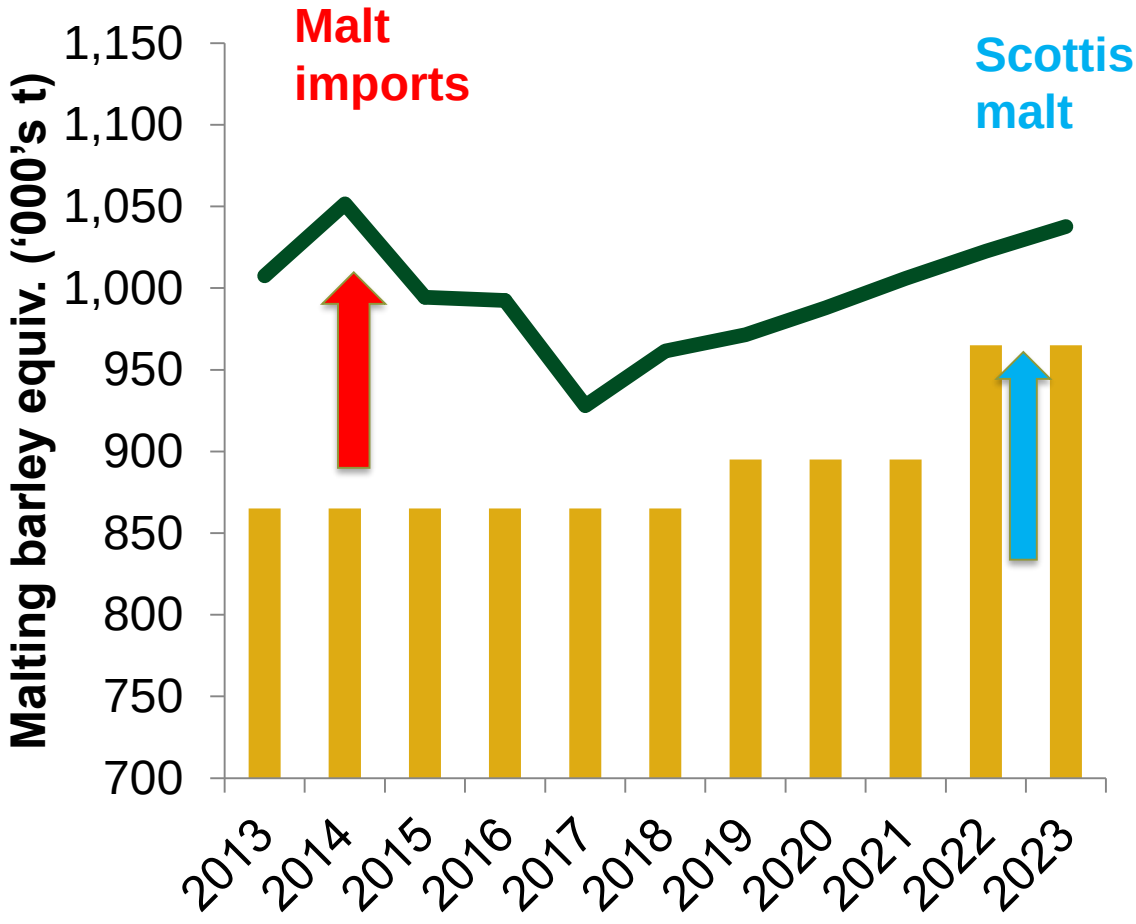
New maltings planned - will need local barley to replace imported malt – US malt whisky tariffs?

- Bairds +30kt capacity in 2019, + 70kt by 2022 -



Malting capacity - Scotland / Berwick

Scotch whisky demand for malting barley

Scottish/Berwick malting capacity estimates – barley equivalent

2018 – 865kt

2019 – 895kt

2022 – 965kt

Source: Scotch Whisky Industry Review 2017, SAC Consulting

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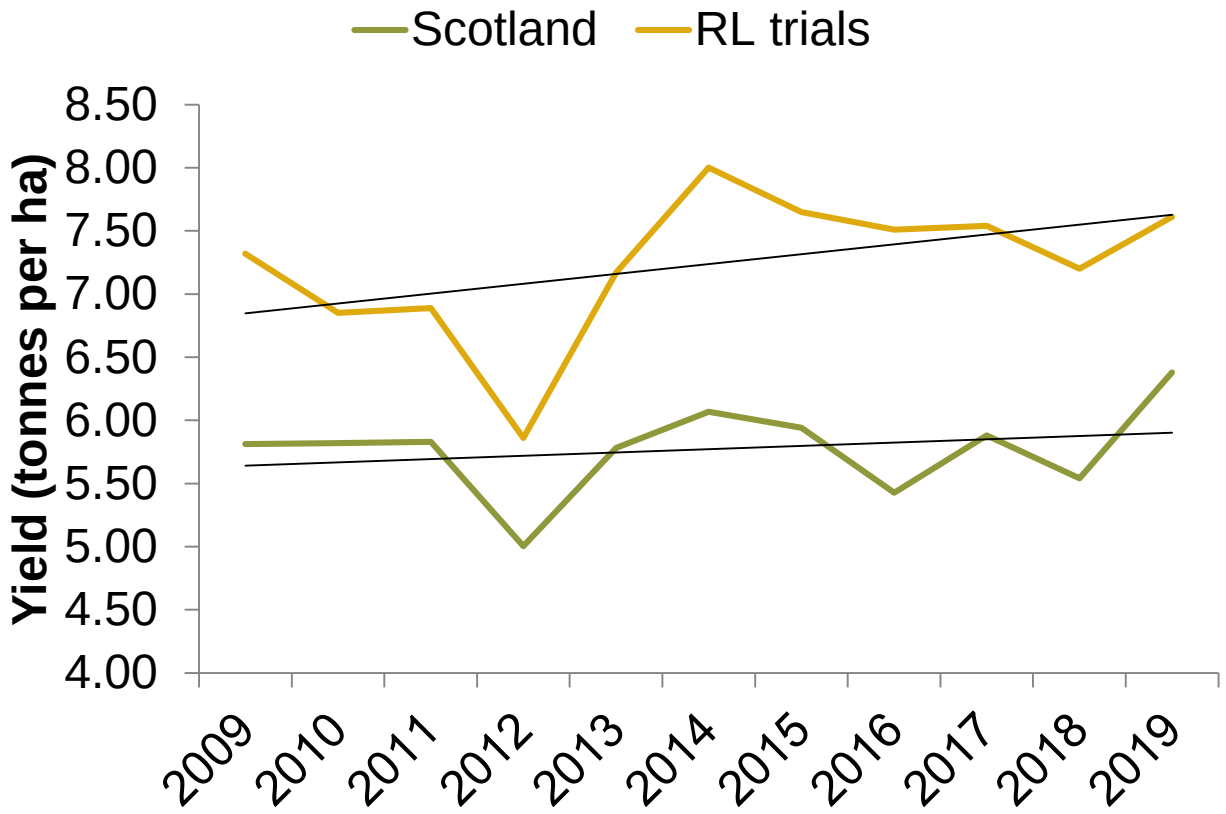
Higher spring barley yields in Scotland

Has Laureate raised the bar on farm trend yields?



Source: AHDB, Scottish Government

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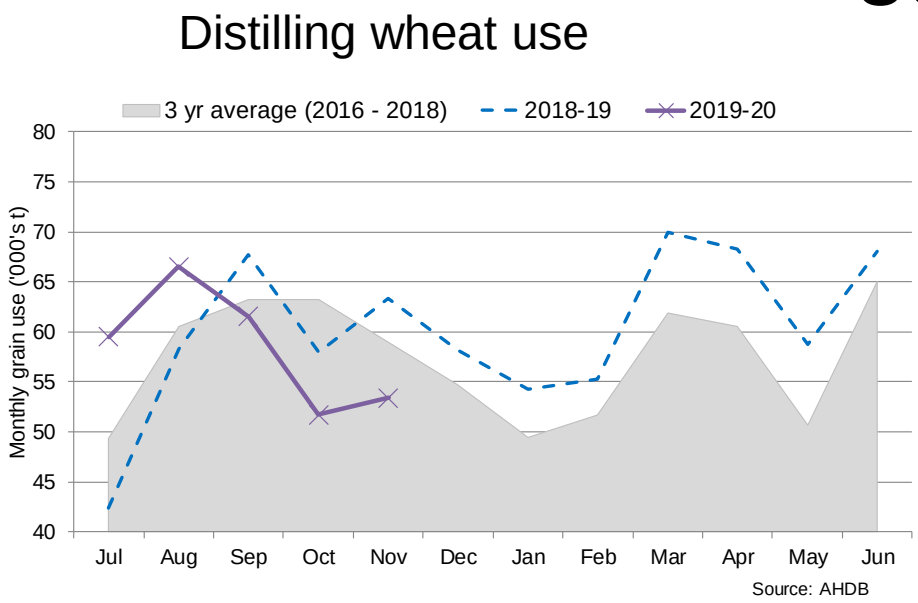
Scottish wheat loses its price premium in 2019 on bigger crop - maize?



Premium of Scottish wheat over English

- **2018 = + £5.60**
- **2019 = + £1.00**

Why - 37% rise in Scots wheat crop to 937kt **+285kt**
Distilling wheat use weak.
Enough of a discount to encourage maize distillers to switch to wheat?

New crop Scottish wheat at a discount to French maize.

Delivery date	Spot - Jan'19	Spot - Jan'20	New crop - Nov'20
Wheat – delivered	188.5	158	174.0
Fr. Maize delivered	187.0	164	181.0
Fr. Maize - premium	**- 1.5**	**- 6.0**	**- 7.0**

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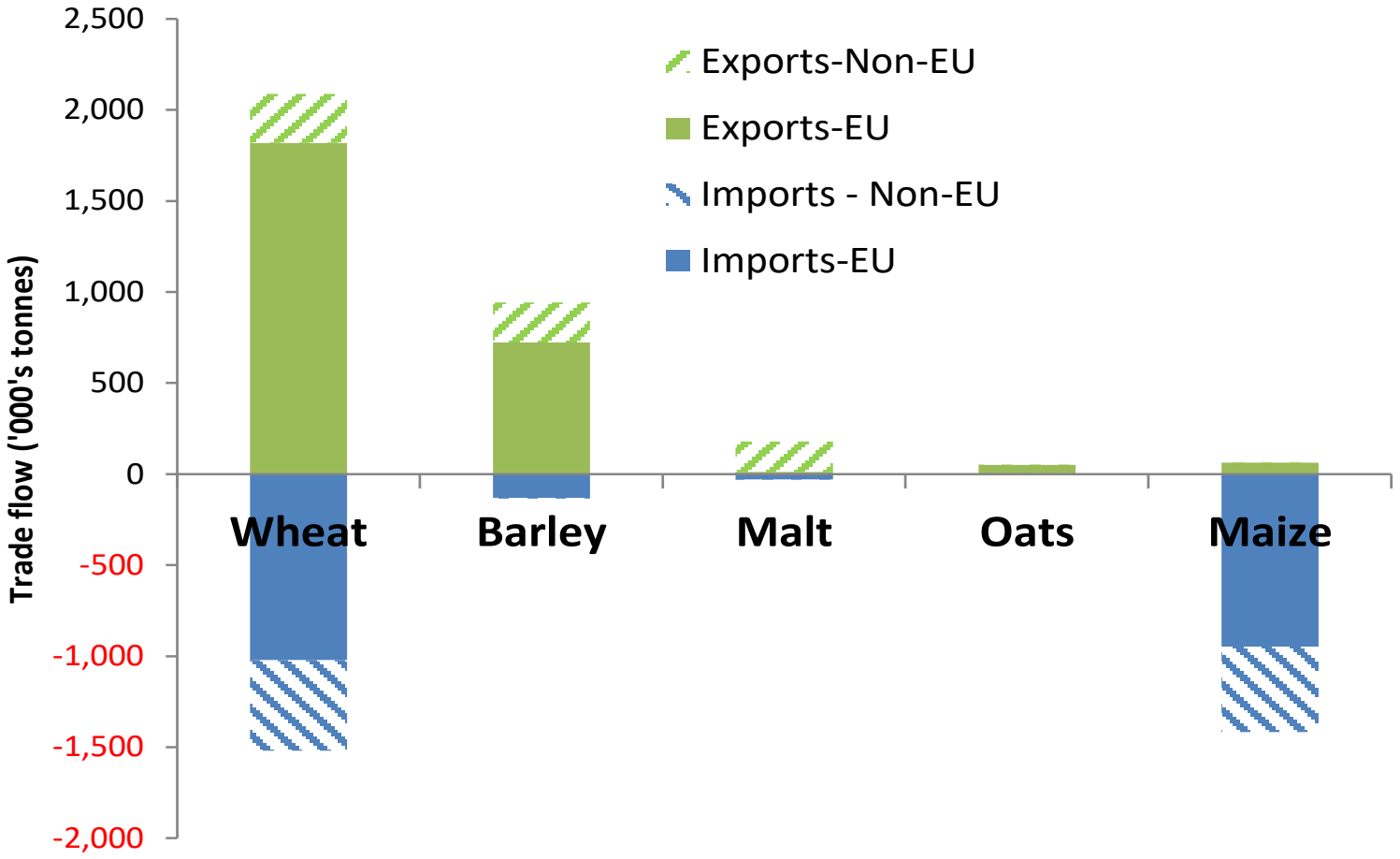
Trade with EU critical for all grains – 70-80% of both UK imports and exports



Source: 5yr average, AHDB. SAC Consulting

Proposed post Brexit UK tariffs

– UK diverges from EU, removes protection for cereals

	EU TRQ	EU Tariff under TRQ	EU Tariff out of TRQ	UK Tariffs
Wheat (soft)	4.0Mt	€12/t	€95/t	£0/t
Barley	0.557Mt	€16/t	€93/t	£0/t
Malt	n/a	n/a	€131/t	£0/t

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* Free Trade Agreement

Cereals and Brexit

UK has announced zero Tariffs on 3rd country trade

- **Net result**
- Imports from EU and the world will be tariff free
- Removing previous protection afforded as an EU member. This may lower UK prices.
- Continued tariff free access of EU cereals (Danish malting barley, Fr wheat and maize) and cereal products (malt)
- Opening UK for first time to tariff free imports from new suppliers e.g. N America, Brazil, Ukraine, Australia

Future subsidy support post Brexit
- some clarity to 2024, beyond?

- **UK** - 2019 to 2020 – as is (cut to LFASS in Scotland) + Convergence
- **Scotland**
- - 2021 to 2024 – continue Direct Payments system, some changes,
- > Post 2024 + continue with Direct Payments? Would coupled payments be allowed – SUSS, SBCS? Simplification? More Public Good?
- **England**
- - 2020 to 2027 – England phase out Direct Payments
- - >Post 2028 - England move to “public money for public goods”

How do the prices you need compare with the market? SAC standard costs vs the current forward market for hvst 2020

		Winter wheat	Spring barley - malt	min price	Spring barley - feed (undersown)	Oilseed Rape
Yield - grain	(t/ha)	9.5	6.5		6.5	4.5
Current price - grain	(£/t)	160	165	175	130	310
Target yield						
Break even cost	(£/t)	132	164	164	167	248
Current margin	(£/t)	28	1	11	-37	62
Profit margin		18%	1%	7%	-22%	20%

Use AHDB Farm Bench for your farm

- These are SAC estimates for illustration

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What do you do if the market is below the cost you need?

- No easy answer – today …….it takes time to address

- 1) **What can you do more to lower your costs?**
- Work with a benchmarking group – e.g. AHDB Crop Bench to identify opportunities

- 2) **Extend your marketing window** - market opportunities come and go – you need to think ahead

- 3) **Spread your sales** – cover today's costs with today's sales – autumn sowing costs

Scottish grain prices - down in 2019 – harvest 2020 values £20/t higher (contracts more)

	Last year	This year			Next year
	Dec-18	Dec-19	*Change*		Nov-20
	(£/t)	(£/t)	*(£/t)*	*(%)*	(£/t)
Wheat (ex-f)	171	143	*-£28*	*-16%*	163
Feed barley (ex-f)	165	118	*-£47*	*-28%*	138
Distil. Barley (ex-f) # (Oct)	217	125	*-£92*	*-42%*	183
Brew. Barley (ex-f)	203	130	*-£73*	*-36%*	130
OSR (del.)	317	333	*+£16*	*+5%*	310

#last traded values October

Key drivers in the cereal market

1) World market down but not out

2019 – good EU and world harvest depresses prices but stocks still decline

2020 – world planting need to rise – are prices high enough? .

2) UK still has a large surplus of wheat and barley – export pace too slow

3) Wet, wet, wet – UK wheat area down this autumn, how much to carryover?

4) Malting barley market could be well supplied in 2020

But still potential for distilling market in Scotland to diverge

5) Brexit calm before the storm during 2020?

In an uncertain world focus on what you can control

Financial resilience, reduce trading risk post Dec 2020, keep your market options open, spread your risks

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Market discussion

1) With Brexit and market volatility high - how far forward should farm businesses be marketing grain forward?

Market discussion

2) If Boris gets Brexit done by 31 January – will it still affect me in 2020 or can I ignore it for a year?

Market discussion

3) What can the Scottish cereal industry do to encourage more Scottish grain is used in whisky?

Market discussion

4) How important will UK ethanol be in supporting wheat prices in 2020?

Market discussion

5) Should we be looking at long term alternatives to growing feed barley?

Market discussion

6) Are you ready to go fully digital on arable production and marketing in the next five years?

INSPIRE Innovate INTEGRATE

SRDP Farm Advisory Service

National Advice Hub
T: 0300 323 0161
E: advice@fas.scot
W: www.fas.scot

The Scottish Government
Riaghaltas na h-Alba

SRUC

AHDB

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

Thank you

Should I sell forward given the heightened currency uncertainty? Well yes, with care.

- The sterling exchange rate is a natural hedge against a "Hard Brexit"; weaker currency = higher grain prices.
- Input costs will also rise but net farm income effect is positive
- On the other hand a favourable Brexit outcome and the £ strengthens = lower grain price.
- Response? – sell forward a proportion of expected yield as usual to cover current costs (seed, fert, fuel) and sterling costs (rent, interest), hold grain unsold to cover future costs

Source: AHDB, SAC Consulting

Wheat use in Scotland dominated by distilling

Distilling

- UK / Scotland use 500kt to 600kt
- Soft Group 3 & 4 well suited to Scotland
- Specific weight can be an issue in a poor year
- Distilling demand drives the Scottish wheat premium over English market (+ £5 -10/t)
- Main competition is imported maize

Brexit – “No deal” risks low to moderate – zero tariff on spirits, low or zero tariff on maize, but may re-direct more English wheat to Scotland

Hectare

Graindex

Re-Inventing Farm Trading

Sam Scott
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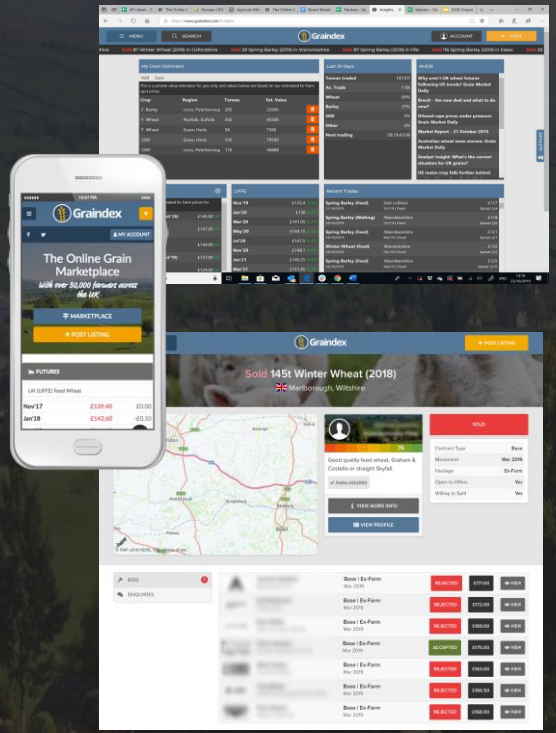
sam.scott@graindex.com

GRAINDEX

Graindex is a secure marketplace that facilitates trading, supporting existing market participants, not replacing them.



Offer Crop

- Continuous valuation of crop based on real-time market prices
- Two trading periods per day
- One-time independent sample analysis made available to all buyers
- Independant market advice

Receive Bids

- Receive multiple bids from 60 national and regional buyers
- All merchants approved and regularly credit checked
- 60-70% sale rate
- No sale obligation

Settle and Protect

- Guaranteed Payment service
- Dispute? We'll step in to help
- Managing the risks – providing price hedging if not the right time to sell

GLENCORE · Cefetra Grain · COFCO INTL · Harlow Agricultural Merchants Ltd · Saxon Agriculture · WELLS AGRICULTURE · East Coast Viners · CHARLES JACKSON · Armstrong Richardson · SCOTGRAIN AGRICULTURE · GrainCo · WESTERN ARABLE · dewingrain · DAVIDSONS Animal Feeds · GLASSON · Dengie


ON AVERAGE, 5 BIDS PER LISTING
£6.25/PRICE SPREAD PER TONNE
79% SALE RATE
Graindex

Graindex

Key Markets

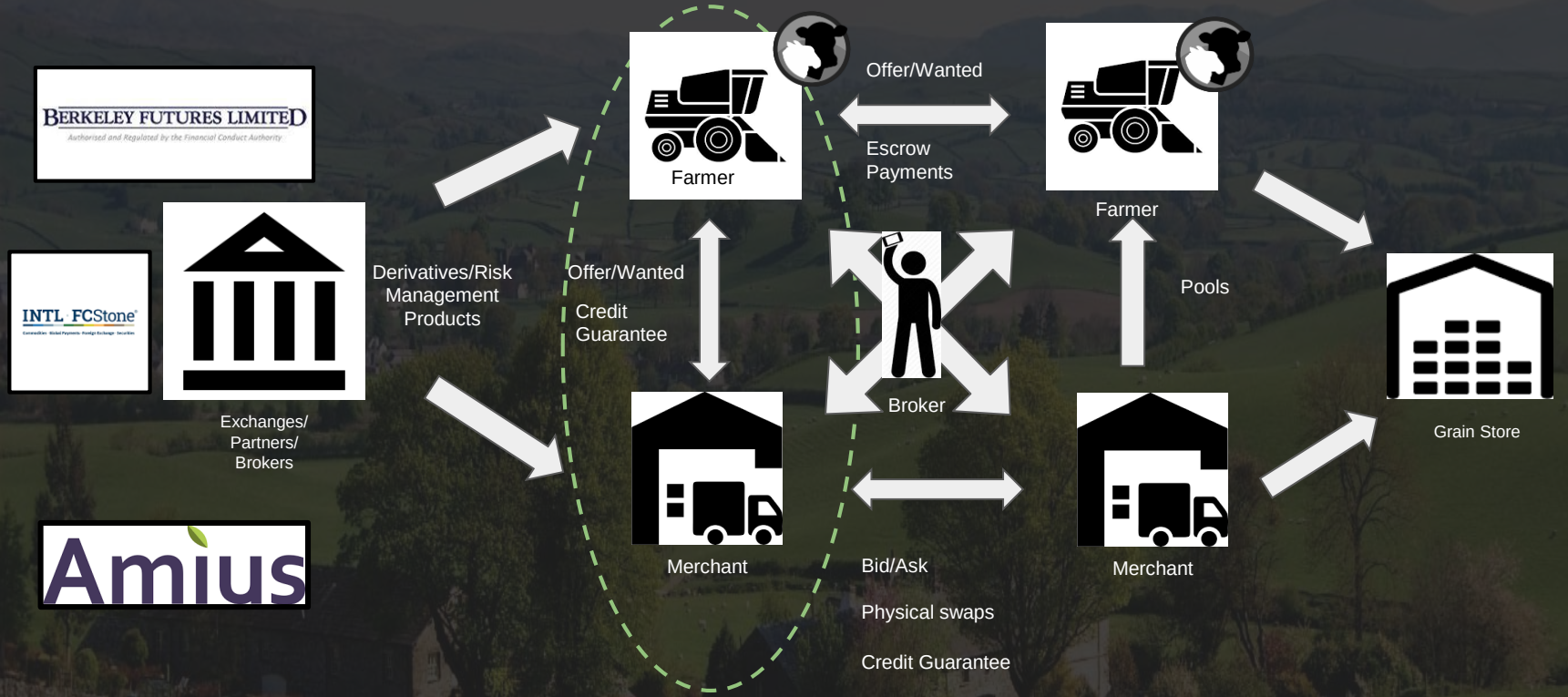
- Distilleries
- Feed Compounders and Blenders
- Major Farms Users (Pig, Poultry, Beef)
- Flour Mills
- Bio-Ethanol Plants
- Export Markets

Graindex market analysis

- Average number of bids since harvest 2019 is 5 per listing
- Average price spread per listing since harvest 2019 - £6.25/t
- Average tonnage listed 116t
- Example marketing a specific crop to the correct buyer - £12 spread, milling oats Scottish Borders.
- Increased percentage of forward selling: May 2021 £170/t

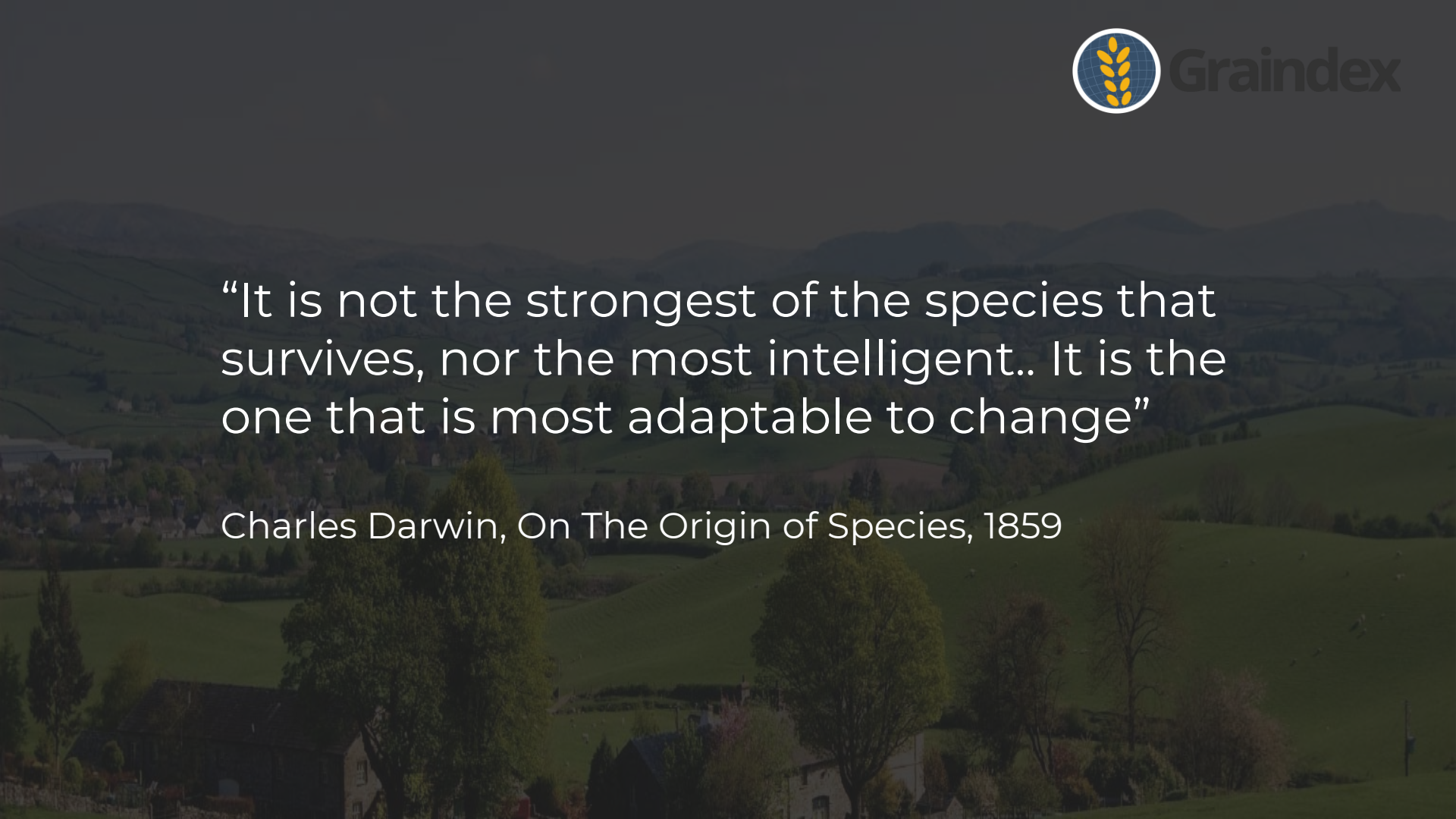
FUTURE CONSIDERATIONS

We believe that digital will play a significant part in the future of cereals trade



Graindex 5 Key Points

- Transparency
- Efficiency
- Security
- Independance
- Insight


Graindex
“It is not the strongest of the species that survives, nor the most intelligent.. It is the one that is most adaptable to change”
Charles Darwin, On The Origin of Species, 1859