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GRASS WEEDS

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GRASS WEEDS

Welcome to our virtual meeting



Grass weeds: Black-grass at Barton Virtual Meeting 2020 (afternoon session)

This meeting will start at 16:00

This webinar will be recorded via Zoom and the recording will be emailed out to attendees and published on our website after the event.



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Presenters



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Mike Welby

Business Manager



Georgina Wood

Field Technical
Manager



Harry Fordham

New Farming
Technology Lead



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What are we going to cover?



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- Housekeeping
- Barton – the site and a very brief history
- Integrated control - results of cultivation and cropping matrix from years 1-3
- Year 4 – spring cropping options for black-grass management
- Application
 - Nozzles and water volumes for pre-em black-grass control
 - A sneak peak at 3D90
 - Spray Assist
- Q&A



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Housekeeping



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- Please send questions via the Q&A function – they will be answered at the end
- We will send a link out to everyone for more information
- 2 BASIS points available
- Sit back, relax, and enjoy!



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1. Population: 656 heads/m² 29th July 2016



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2. Resistance: It's tough stuff!

Herbicide Resistance ADAS test results

(Year = year seed was collected in)	ACCase Target site		ALS		Enhanced metabolism	
	% red'n	R Rating	% red'n	R rating	% red'n	R rating
Susceptible standard	100	S	100	S	100	S
Barton 2016	14	RRR	19	RRR	93	S
Barton 2017	0	RRR	12	RRR	Not	Tested
Barton 2018	0	RRR	17	RRR	55 (PDM)	RR
Barton 2019	5 (dim) 9 (fop)	RRR	8	RRR	89	S



- FOPs & DIMs don't work
- Atlantis gives only 8-19% control
- Reliance is on residuals for most of control

Objective: Maximise grass weed control through an integrated approach



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BIOLOGICAL DISRUPTION

Interfere biology to limit the weeds potential

CULTIVATION & ROTATION

DRILL DATE

SPRING RE-DRILL

SEED DORMANCY



COMPETITIVE CROP

Increase the crops ability to out-compete the weed

CROP SPECIES

COVER CROP

SEED RATES & TREATMENTS

PLANT SPACING

DRILL TYPE



DIRECT CHEMICAL CONTROL

Kill the weed using chemicals

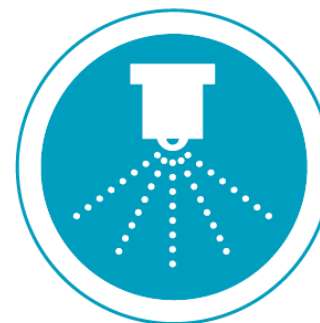
Ai CHOICE

PRE-EM STACKING

TIMING & SEQUENCES

SEEDBED CONDITIONS
(inc. trash)

ADJUVANTS



APPLICATION

Maximise the benefit of chemical control

EFFECT OF WATER RATES,
FORWARD SPEED
AND BOOM HEIGHT

NOZZLE CHOICE

EFFECT OF
DIFFERENT SEEDBEDS



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BIOLOGICAL DISRUPTION

Interfere biology to limit the
weeds potential

CULTIVATION & ROTATION



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Cultivation & drilling equipment



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'Min-till' KV – CLC Pro Cut
(14cm)



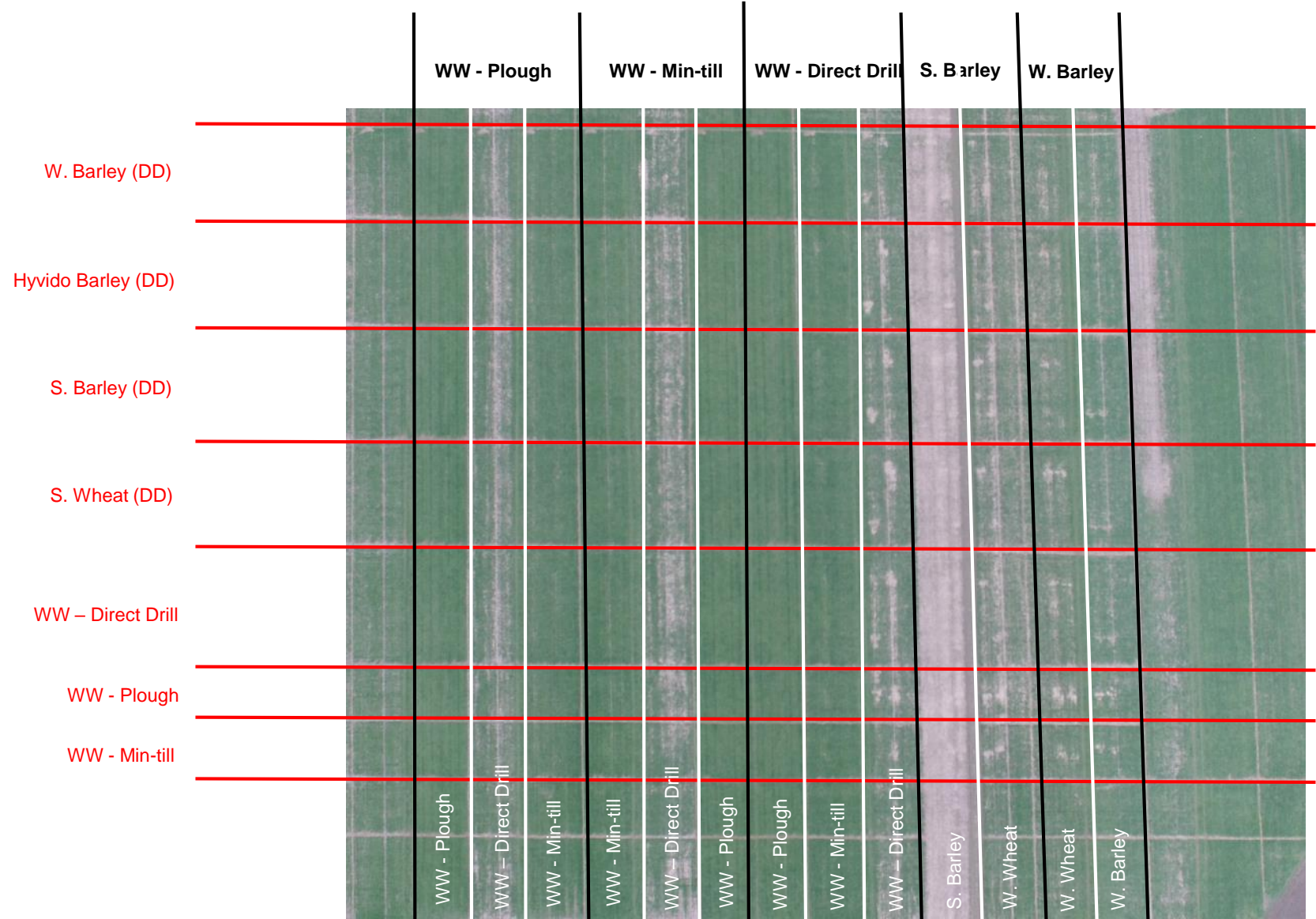
KV – Plough (27cm)



JD – 750a

Thanks to Kverneland and Tuckwell's for providing this machinery

Cultivation Matrix: Years 1-3



In years 1 & 2 ploughing delivered the best black-grass suppression



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Average black-grass suppression by cultivation in each year

	Year 1	Year 2	Year 3
Plough	98	97.9	89.4
Min-till	92	95.5	82.7
Direct drill	91	97.8	92.6

Average figures from treated areas

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Which cultivation strategy gave the best black-grass control over 3 years?



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- a) Plough/Plough/Direct drill
- b) Plough/Direct drill/Direct drill
- c) Direct drill/Plough/Direct drill
- d) Plough/Min-till/Direct drill
- e) Direct drill/Min-till/Direct drill

Which cultivation strategy gave the best black-grass control over 3 years?



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	Year 2	Plough			Min-till			DD		
	Year 3	Plough	Min-till	DD	Plough	Min-till	DD	Plough	Min-till	DD
Year 1	Plough	98.2	98.5	99.8	98.4	97.8	99.6	99.1	97.1	99.8
	Min-till	97.7	98.3	99.7	98.8	95.7	97.2	99.5	95.8	98.4
	Direct Drill	98.4	98.6	100.0 	98.4	98.0	99.2	99.5	97.9	99.0

% control vs. Untreated in year 1 (1459 heads/m²)

Pre-em: DEFY 3.0 l/ha + Crystal 4.0 l/ha + DFF 60 g

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In each year direct drilling has delivered the best margin



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Average margin by cultivation in each year

	Year 1	Year 2	Year 3
Plough	£1195	£775	£976
Min-till	£1229	£785	£1016
Direct drill	£1344	£844	£1019

Which 3 year strategy delivered the best margin?



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- a) Plough/Plough/Direct drill
- b) Plough/Direct drill/Direct drill
- c) Direct drill/Plough/Direct drill
- d) Plough/Min-till/Direct drill
- e) Direct drill/Min-till/Direct drill

Which 3 year strategy delivered the best margin?



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£/ha	Year 2	Plough			Min-till			DD		
	Year 3	Plough	Min-till	DD	Plough	Min-till	DD	Plough	Min-till	DD
Year 1	Plough	2917	2985	3019	3148	3195	3040	2874	2985	2829
	Min till	3050	3048	3057	3114	3042	3307	3213	3140	3167
	DD	3152	3251	3272	3272	3264	3382	3183	3149	3095

100%



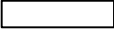
99.2%

Despite direct drilling delivering the best margin on average each year, continuous direct drilling does not

Barton matrix project - seasons & context



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Project 'Year'	Season (Drilling – Harvest)	Black-grass dormancy	Autumn/Winter conditions	Spring/ Summer conditions	Yield	Best BG control Average (Plot)	Best margin Average (Plot)
Year 1 	2016-2017	HIGH (19% germination)	AVERAGE	AVERAGE/ AVERAGE	VERY GOOD	Plough	Direct drill
Year 2 	2017-2018	HIGH (29% germination)	WET	WET/ VERY DRY	VERY POOR	Plough (Plough/DD)	Direct drill (Min-till/DD)
Year 3 	2018-2019	VERY LOW (99% germination)	GOOD	DRY/ AVERAGE	GOOD	Direct drill (DD/Plough/DD)	Direct drill (DD/Min-till/DD)
Year 4	2019-2020	VERY HIGH (8% germination)	VERY WET	VERY DRY/-	-		



BIOLOGICAL DISRUPTION

Interfere biology to limit the weeds potential

CULTIVATION & ROTATION



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Summary:

- Cultivations move seed through the soil profile
- The position of seed in the soil profile affects how much of it germinates
- Min-till (~15 cm non-inversion) establishes a good crop but makes black-grass control challenging
- Direct drilling is a cost effective way to establish a crop, and black-grass seed on the surface can be easier to control in low dormancy years, a rotational plough has been a benefit



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DIRECT CHEMICAL CONTROL

Kill the weed using chemicals

Ai CHOICE

PRE-EM STACKING

TIMING & SEQUENCES



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Base
pre-em

Unt.

Seq.

Stack

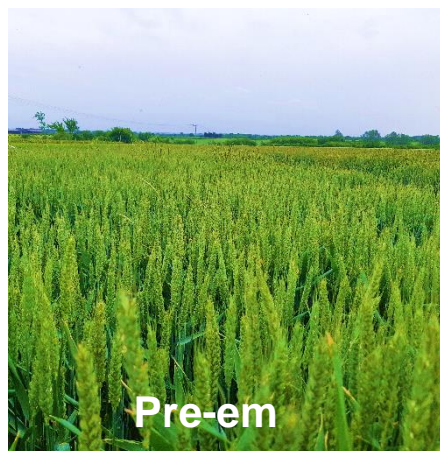


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In 2018-19 a large stack or sequencing delivered best results



Untreated



Pre-em



Large Pre-em Stack



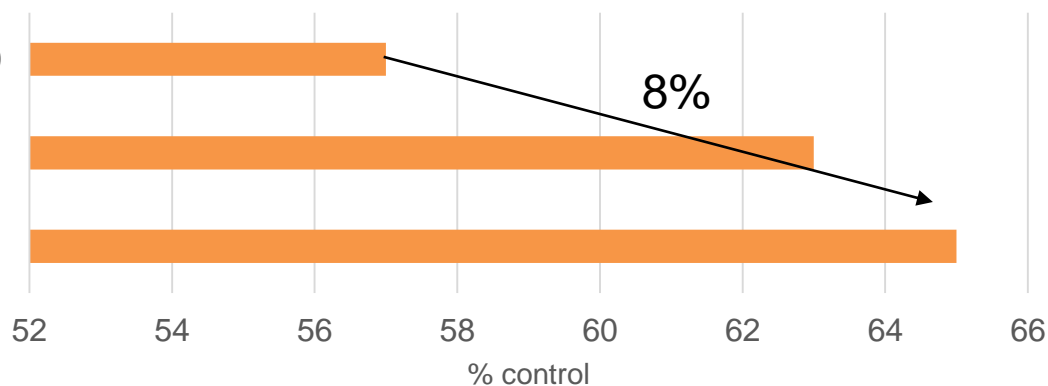
Sequence

Average Untreated = 120 heads/m²

Liberator 0.6 + DEFY 3.0

Liberator 0.6 + DEFY 5.0 + Sunfire 0.24 + PDM 1200g

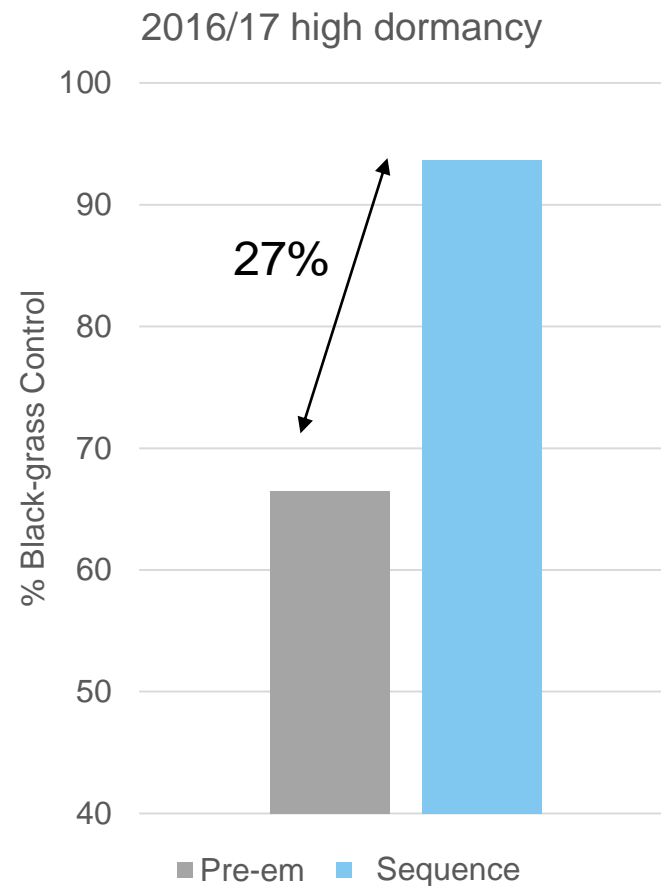
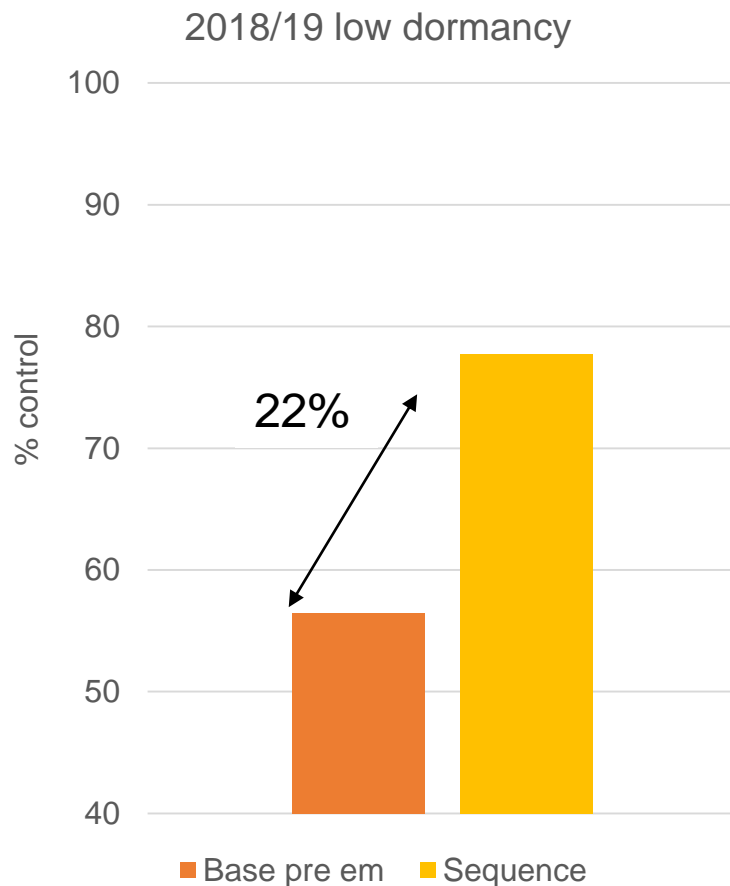
Liberator 0.6 + DEFY 3.0
fb PSC 2.0 + Sunfire 0.24 + PDM 1200g



There was a greater benefit of a sequenced approach in a high dormancy year



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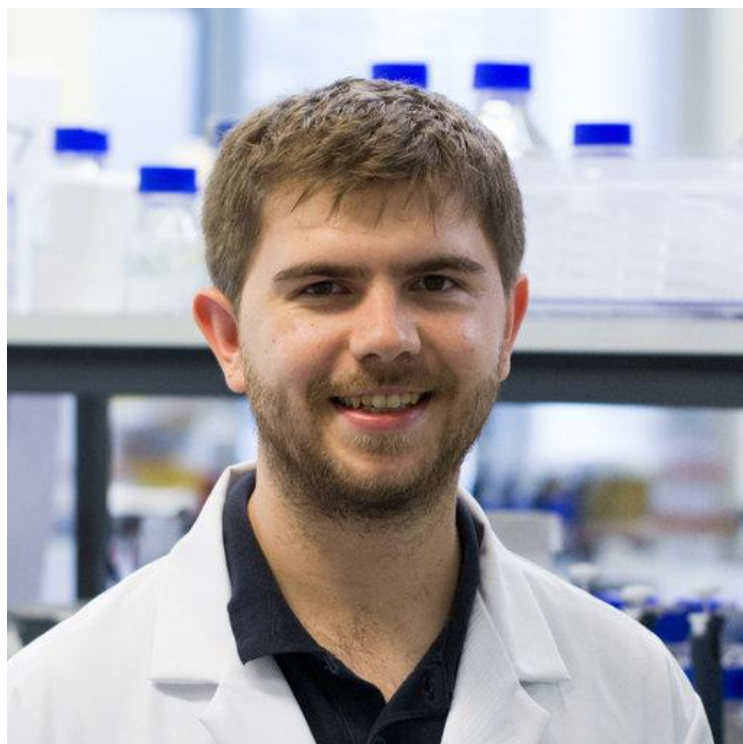
Data from direct drilled plots
Pre-em = Crystal 4.0 + DEFY 2.0 + DFF 60g
Post-em (GS11) = PSC/CDF 3.0 + Liberator 0.3



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“Improving our understanding of seed dormancy can help to refine our approach to weed control”

Dr Thomas Holloway
PhD in seed biology and working in seeds group at Jealott's Hill



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DIRECT CHEMICAL CONTROL

Kill the weed using chemicals



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Summary:

- The weeds germination pattern dictates how long you need pre-em activity to last and is driven by:
 - Position of seed in the soil profile
 - Seed dormancy
 - Weather conditions
- Increasing rates/number of Ais contributes to increased control
- Sequencing is beneficial where grass weed germination occurs over a longer period



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COMPETITIVE CROP

Increase the crops ability
to out-compete the weed

Winter vs. spring cropping in 2019/20

Establishment of spring barley

Spring cropping options

Drilling conditions in autumn 2019



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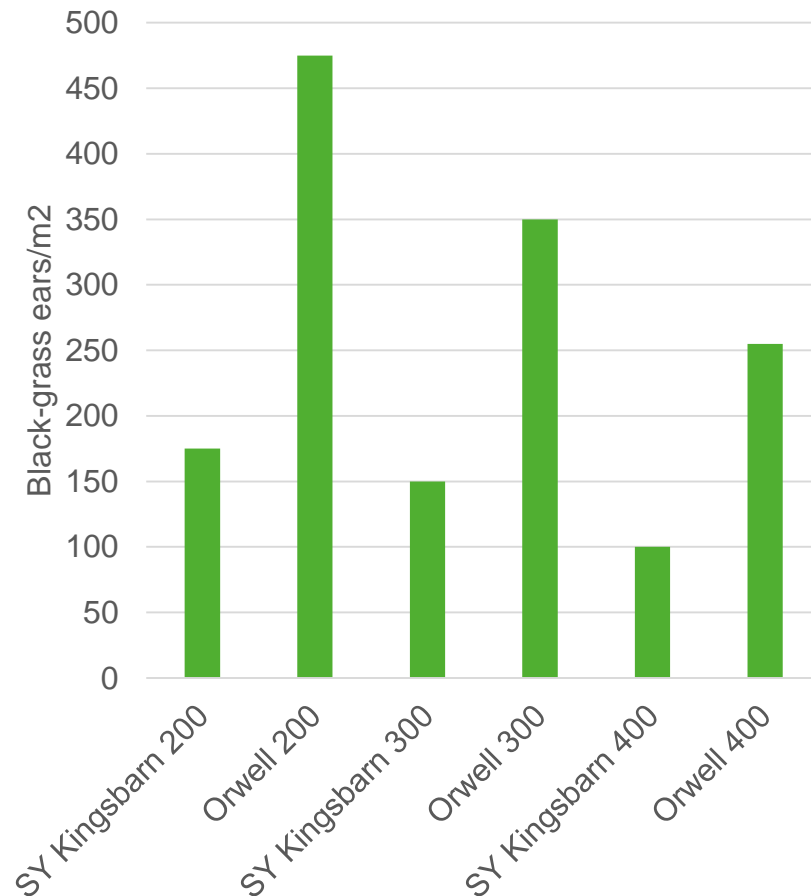
Thin crops allow grass weeds to thrive, competitive varieties help to compensate



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~20% establishment



Matrix field 7th May
Drilled 25th March



Autumn cultivation led to much better spring crop establishment



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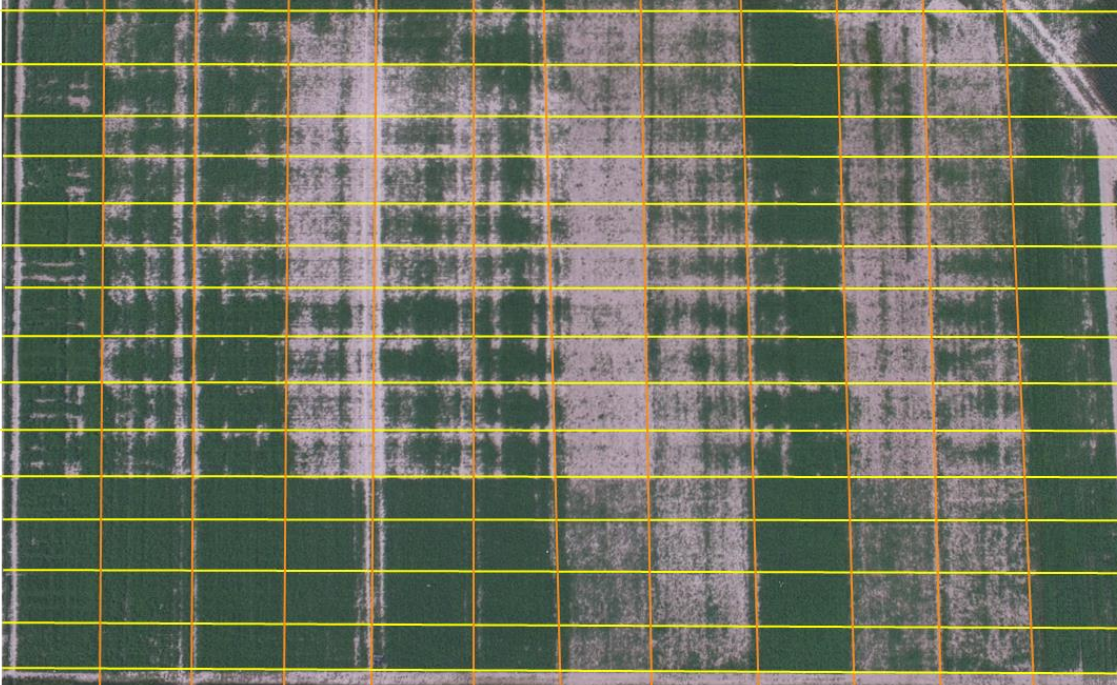


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Establishment of spring barley was also very difficult in 2019



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		Autumn Plough	2 x Shallow	Autumn Min-till	Direct Drill	Autumn Shallow	Black oats + radish			Radish, Vetch, Phacelia, Berseem Clover		
							Glyphosate 15 th Feb	Glyphosate 12 th April	NO Glyphosate	Glyphosate 15 th Feb	Glyphosate 12 th April	NO Glyphosate
Cultivator drill 25 cm	175											
	225											
	275											
	350											
	450											
	550											
Cultivator drill 12.5 cm	550											
	450											
	350											
	350											
Disc drill	350											
	350											
	450											
	550											

Retaining moisture was the most important factor

Cover crops must be managed correctly

Drilled 8–11th April

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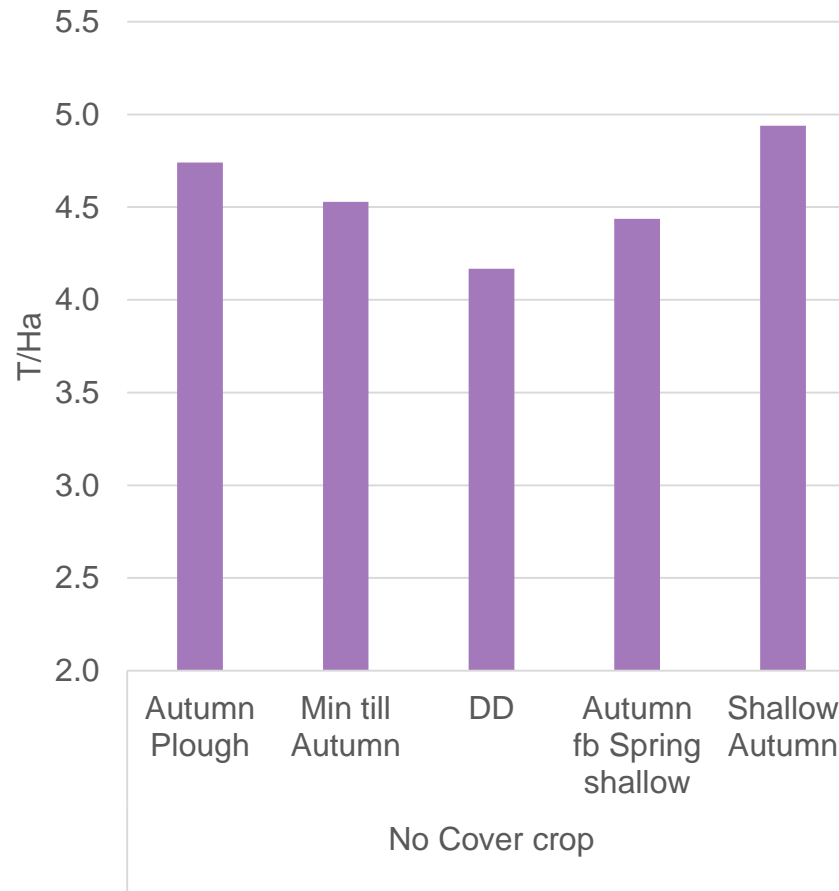


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Yields show the impact of moisture management



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Yields from disc drilled area only

The no –glyphosate plots were cultivated twice, once deep and then once shallow

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Pest problems prevented good establishment at Barton



Good establishment at Rougham but no grass weed data



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COMPETITIVE CROP

Increase the crops ability
to out-compete the weed



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Summary:

- A competitive spring crop is critical to move forwards with black-grass management, a poorly established crop could send you backwards
- Early (autumn) cultivations can help to create a better seedbed and avoid moisture loss. vs spring
- Cover crops may have advantages for soil structure but must be appropriately managed to avoid detriment to 'cash crop'



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APPLICATION

Maximise the benefit of
chemical control

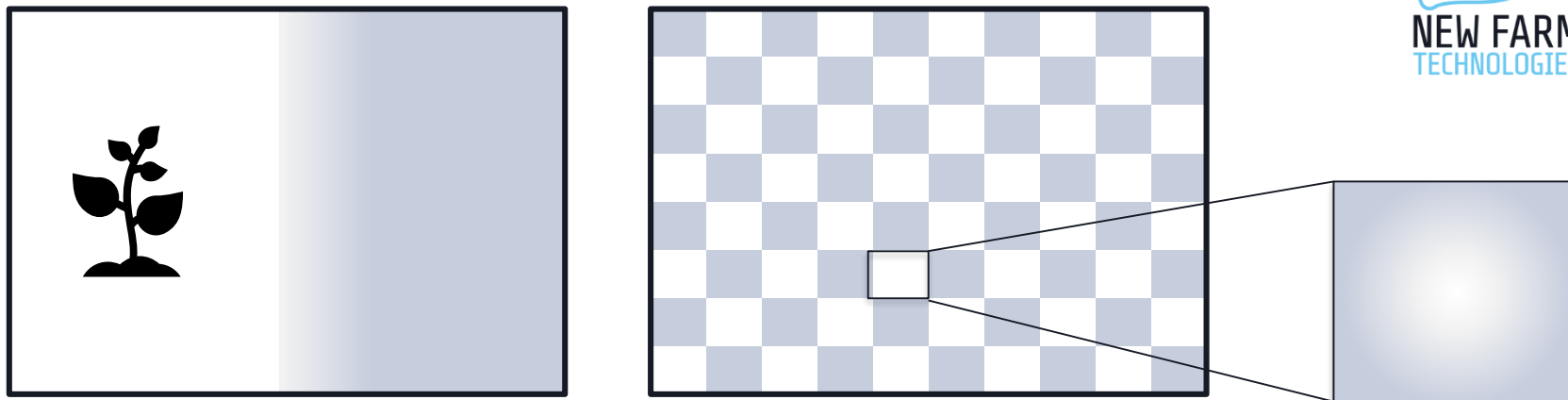
EFFECT OF WATER RATES,
FORWARD SPEED
AND BOOM HEIGHT

NOZZLE CHOICE

The importance of spray distribution



The importance of spray distribution



- Residual herbicides work via root and shoot activity
- In situations where conditions could lead to drift and therefore uneven distribution of spray the likelihood of poor levels of poor control is increased
- Ensuring an even distribution of product over the soil surface will improve your chances of controlling the emerging weeds (grass and dicot)

Good application practice delivers better efficacy



	Bad	Good
Speed	16 kph	10 kph
Water volume	100 l/ha	200 l/ha
Nozzle	Flat fan	90% TTI
Boom height	100 cm	50 cm

4.0 l/ha DEFY (PSC) + 0.6 l/ha Liberator (DFF+FFT)

Black-grass 3 sites; Average 35 plants/m²

Ryegrass 1 site; Average 306 plants/m²

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200 l/ha consistently gives the best efficacy

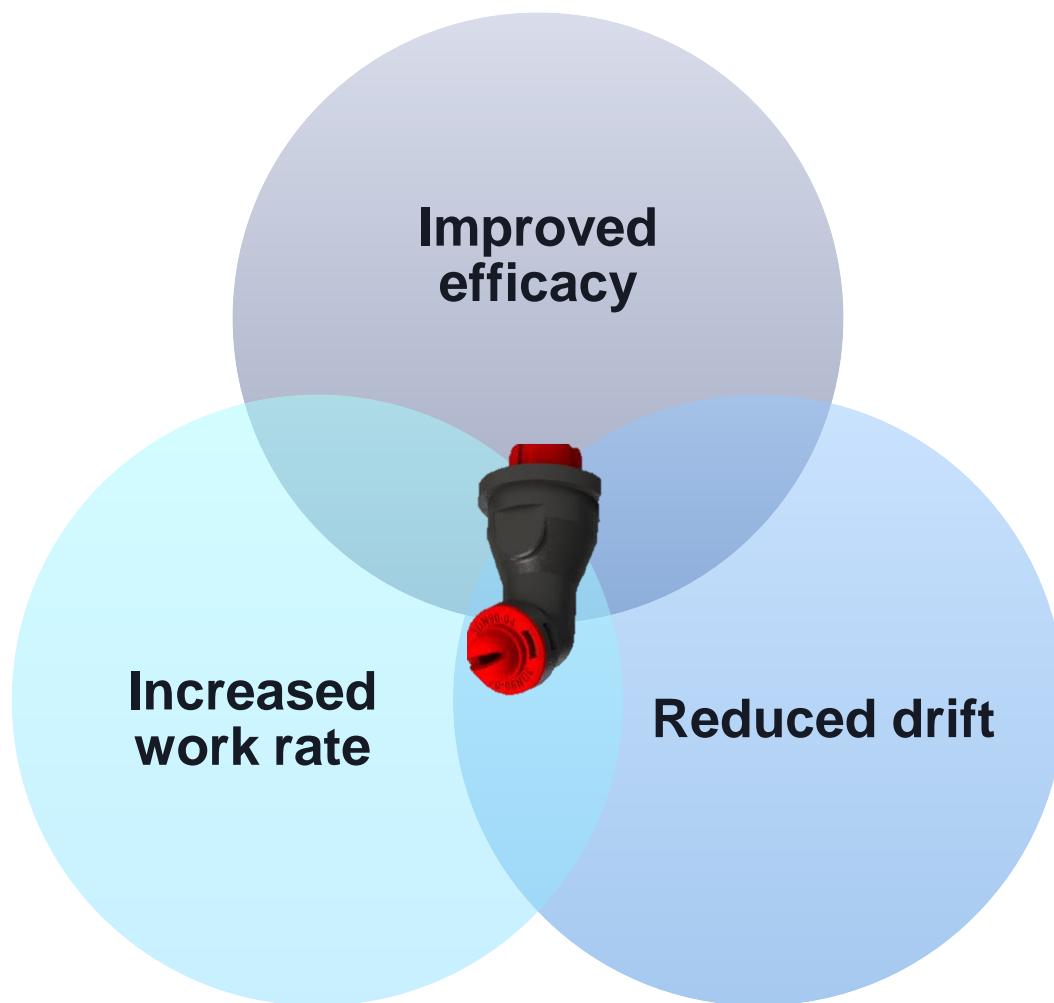


GRASS WEEDS

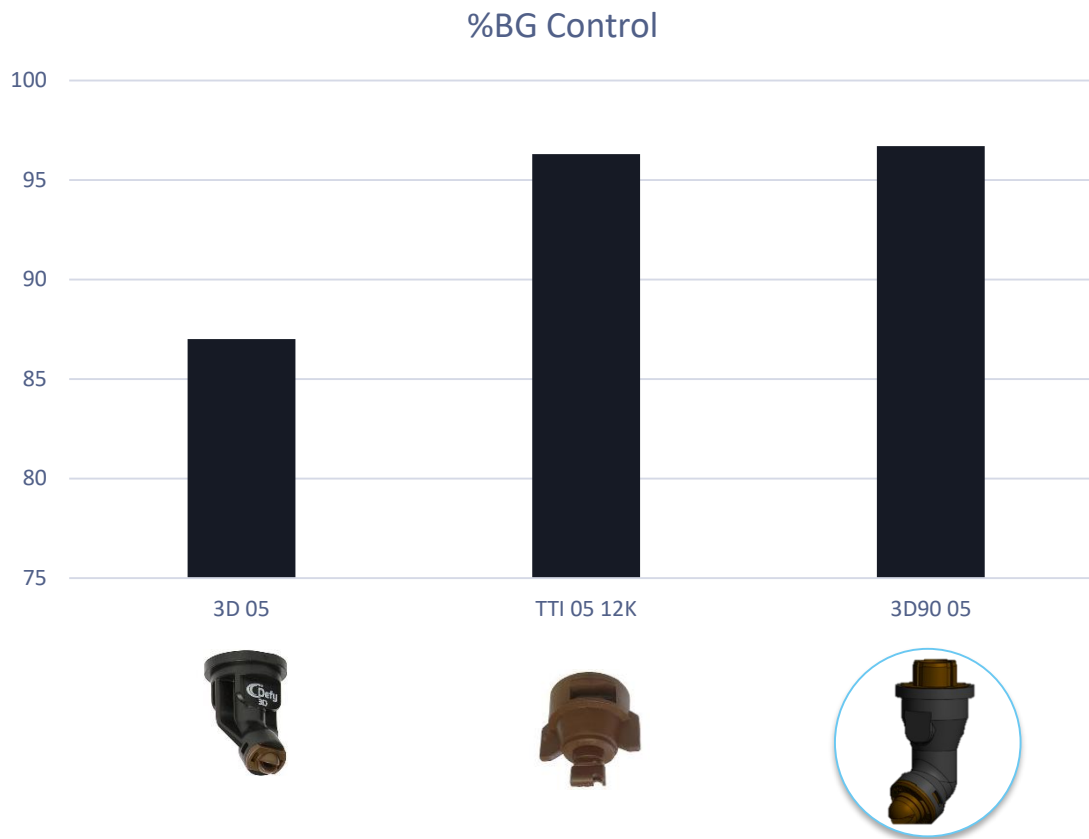


Data from black-grass trials in 2016-2019
 4.0 l/ha DEFY (PSC) + 0.6 l/ha Liberator (FFT+DFF)





Best performing nozzle in pre-em situation



4l/ha Defy + 0.6l/ha Liberator

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What is Spray Assist?



Spray
planning

Best time to spray within a 5-day
forecast window, with hourly
resolution

Spray alerts

Timely alerts if weather forecast
change can impact spray
performance

Spray
optimization

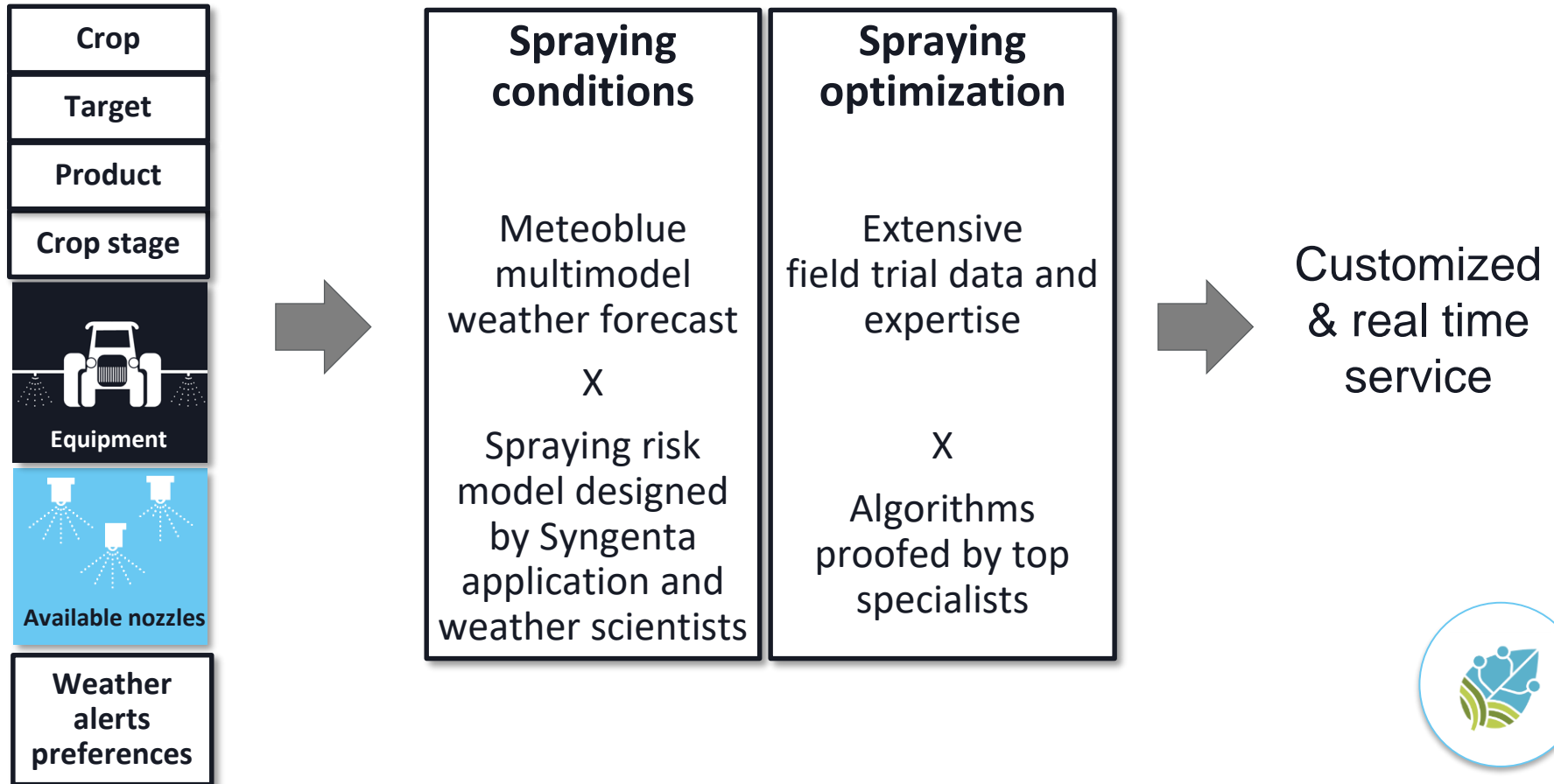
Optimal sprayer tuning:
 $\text{Nozzle} \times \text{Pressure} \times \text{Volume} \times \text{Speed}$



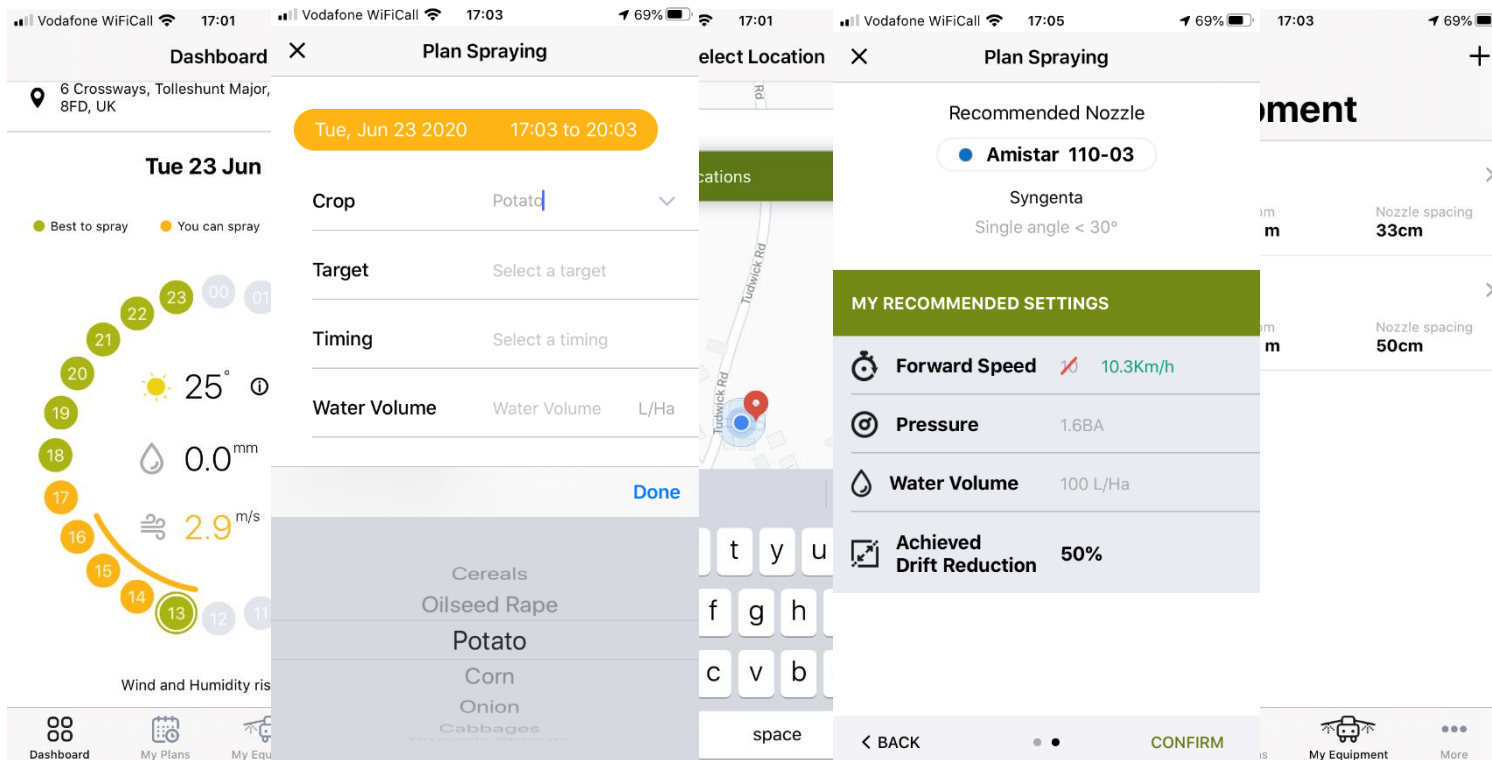
How it Works



Spray Assist intelligence = data x expertise



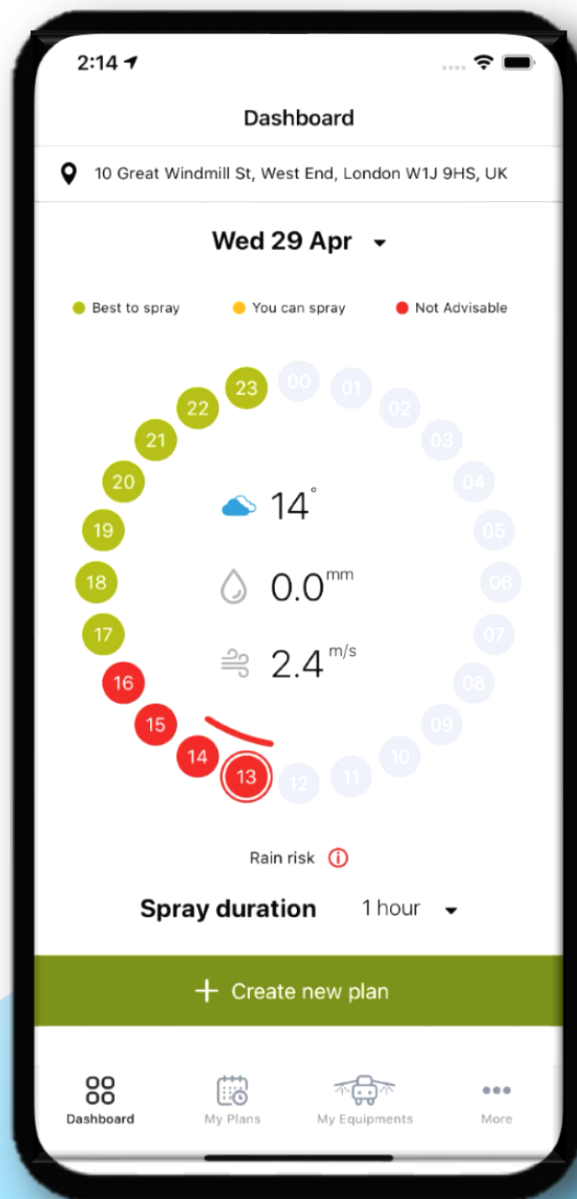
Demo





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συμβουή



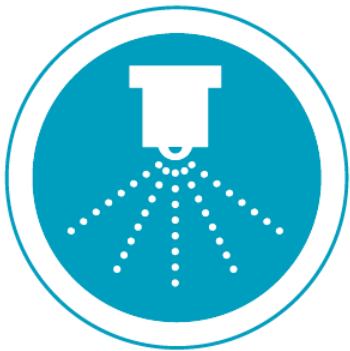
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APPLICATION

Maximise the benefit of chemical control

EFFECT OF WATER RATES,
FORWARD SPEED
AND BOOM HEIGHT

NOZZLE CHOICE



GRASS WEEDS

Summary:

- **Distribution** is key for effective pre-em weed control
- Application technique can account for a huge proportion of efficacy
- 200 l/ha remains our best advice for pre-em
- Download the Spray Assist App!

Summary



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- Delay drilling – especially those fields with heaviest infestations
- If seed return is significant, consider ploughing to bury it
- If ploughing isn't an option, understand the seed you're dealing with: resistance, and dormancy to inform your herbicide strategy
- Crop competition is a big part of integrated control, choose a competitive crop/variety to limit seed return
- Download the Spray Assist app



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Q&A



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Thank you for attending!



Visit this link for more information:

<https://www.syngenta.co.uk/black-grass-barton-virtual-meeting-2020>



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