

# Seed bank management in practise

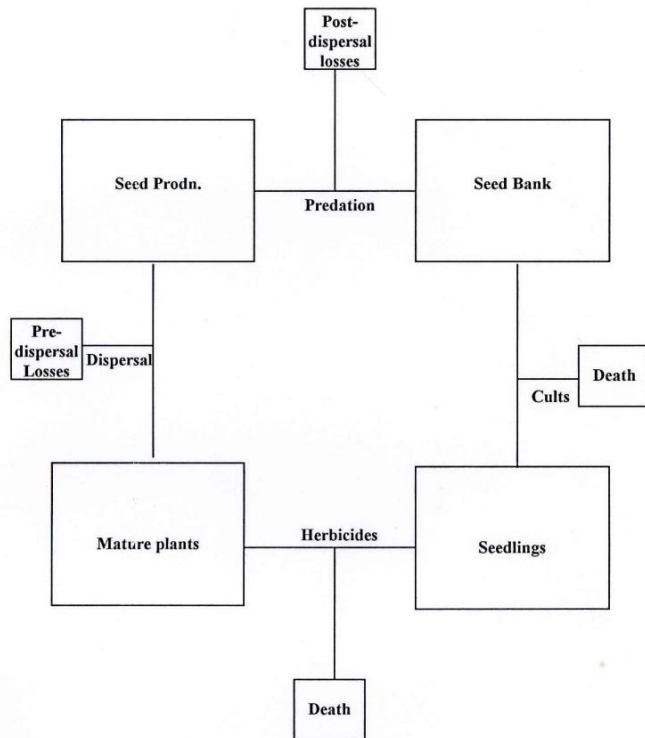


John Cussans



# Seed Bank Management

ANNUAL SEED CYCLE



Method	%age reduction achieved
Ploughing	67%
Delayed Drilling	37%
Higher Seed Rates	30%
Competitive Cultivars	27%
Spring Cropping	80%
Fallowing	70%

# Seed Bank Management in practise

## *Non-chemical control of black-grass in winter wheat*

Method	Number of comparisons	% reduction achieved	
		Mean	Range
Ploughing	25	67%	- 20% to 96%
Delayed drilling	16	37%	- 64% to 82%
Higher seed rates	15	30%	+ 8% to 53%
Competitive cultivars	4	27%	+ 9% to 36%
Spring Cropping	3	80%	+70 to 90%
Fallowing	1	70%	+60 to 80%

Based on review, by Lutman & Moss for Syngenta, 2009

# Seed Bank Management in Practise

The **State of the System** – where are the seeds in the system?

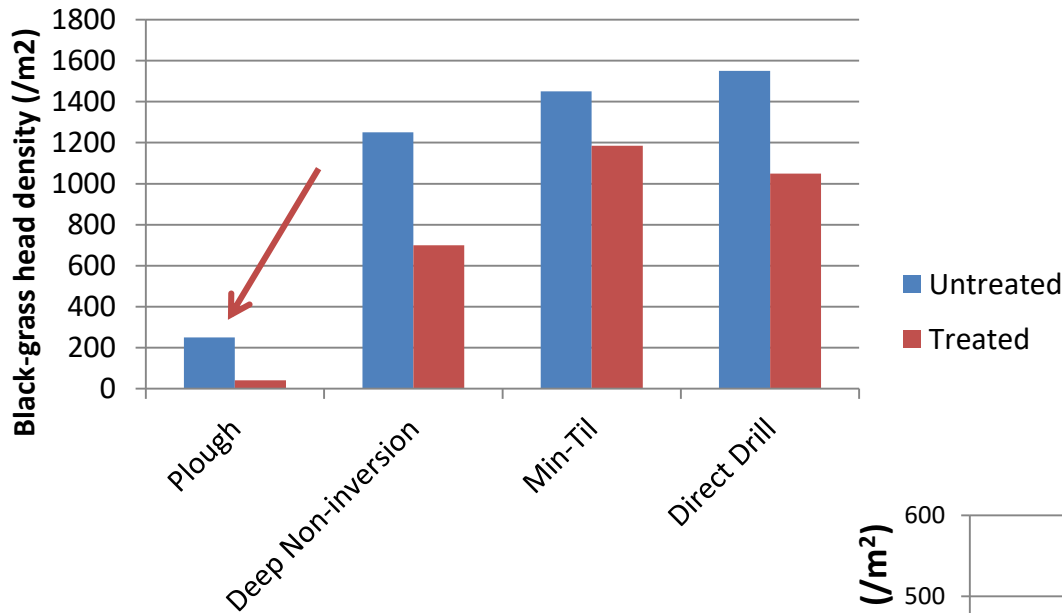
**Environmental Conditions** (crucially soil moisture) interact with weed biology.

**The Crop** is critical – weed ‘control’ is often a product of crop performance.

**Agronomy**/Rotation/Control all interact.

**Attention to detail**

# Variable outcomes from ploughing

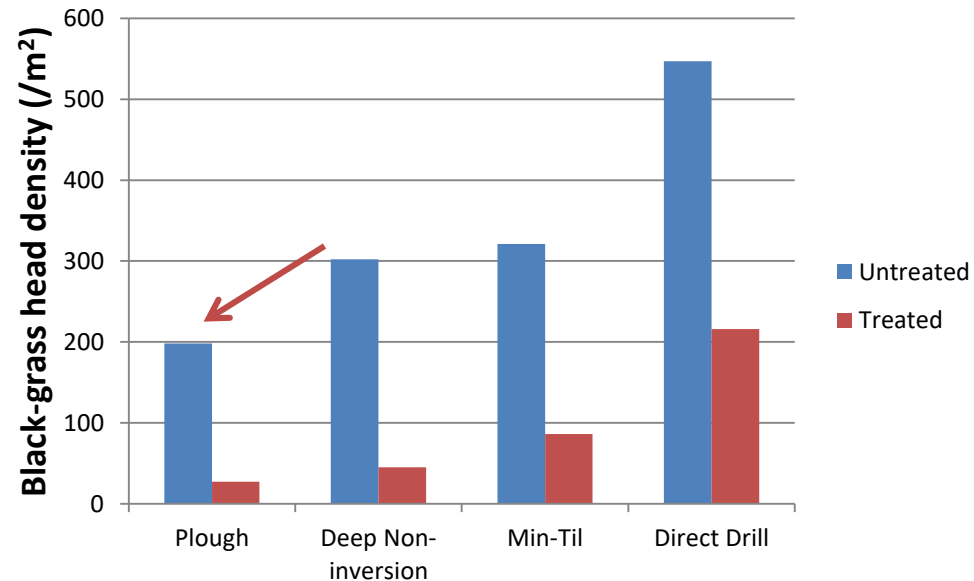


How effective is ploughing?

Experiment 1 80-94%

Experiment 2 34-40%

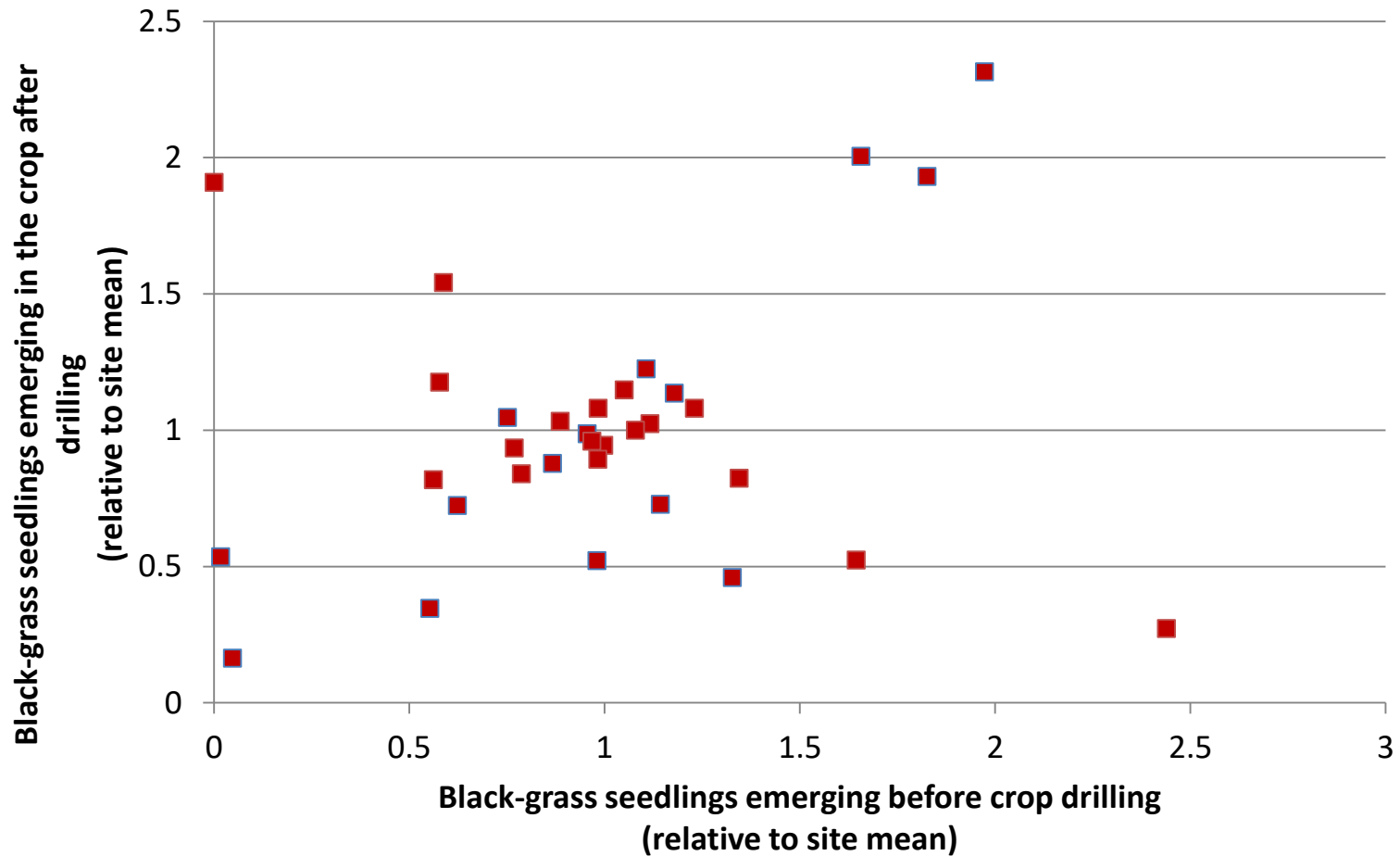
Exactly the same experiment gives Different results



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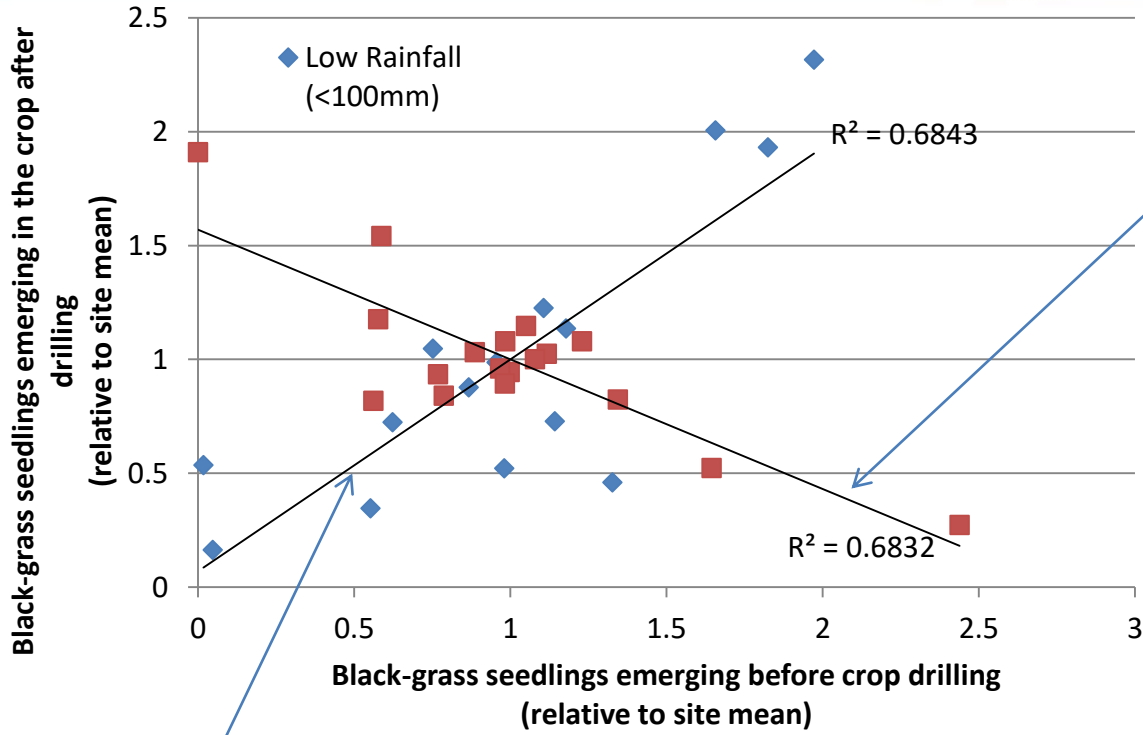
The **State of the System** – where are the seeds in the system?

## Post harvest management – all that is green is not golden?



Relating black-grass germination prior to drilling with population in the subsequent crop. The densities for the three cultivation strategies at each site are adjusted to the site mean. These data are for 11 sites (3 cultivation approaches per trial = 33 data points).





**WET CONDITIONS:** This trend means that high numbers of black-grass seedlings observed before drilling result in lower populations levels in the crop. *So in wetter conditions cultivation/management strategies to encourage germination may be effective.*

**DRY CONDITIONS:** What this trend means it that situations (cultivation treatments) where low numbers of black-grass seedlings are observed before drilling then low levels of seedlings emerge in the crop. *So in drier conditions cultivation/management strategies which encourage germination are counter-productive.*

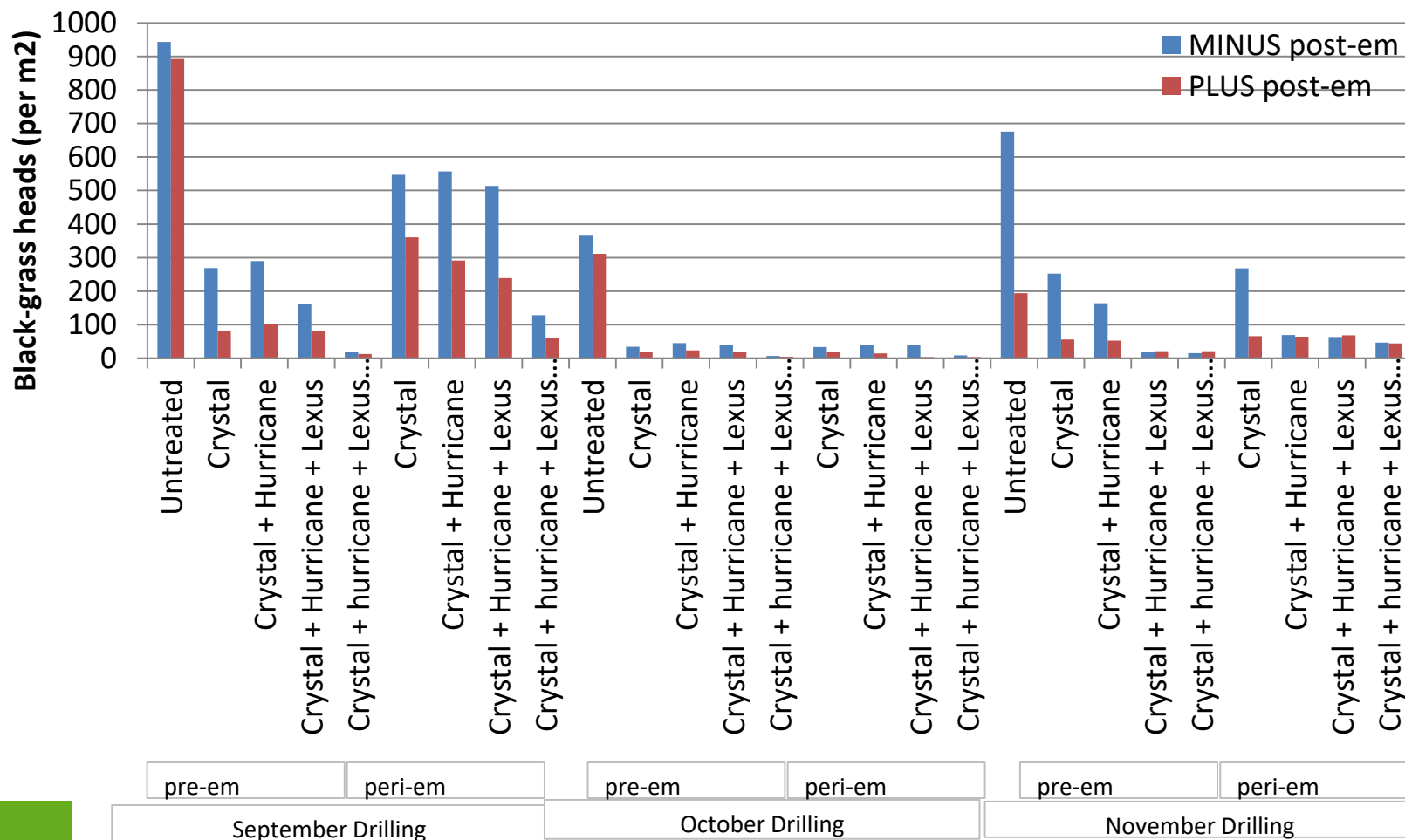


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The **State of the System** – where are the seeds in the system?

**Environmental Conditions** (crucially soil moisture) interact with weed biology.

# Drilling date (again)!



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**The Crop** is critical – weed ‘control’ is often a product of crop performance.

# So spring crops are the 'silver bullet'?

## Rotations

- Winter Break Cropping
- Spring Break Cropping
- Alternate Fallow
- Continuous W Wheat

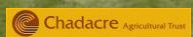
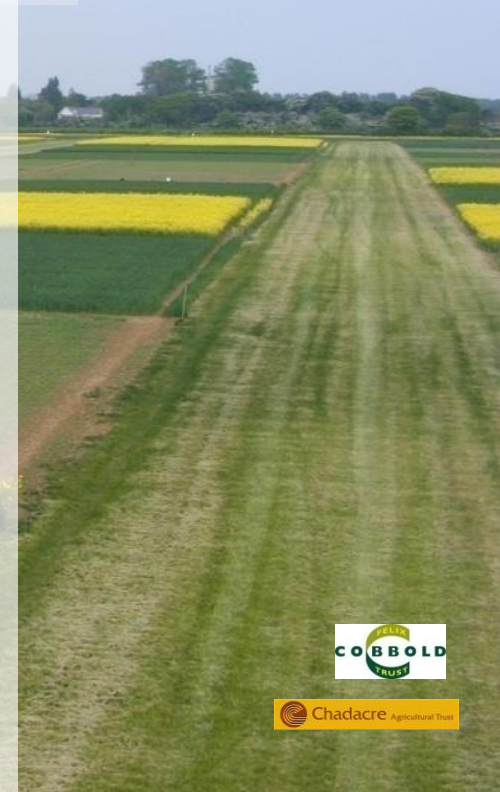
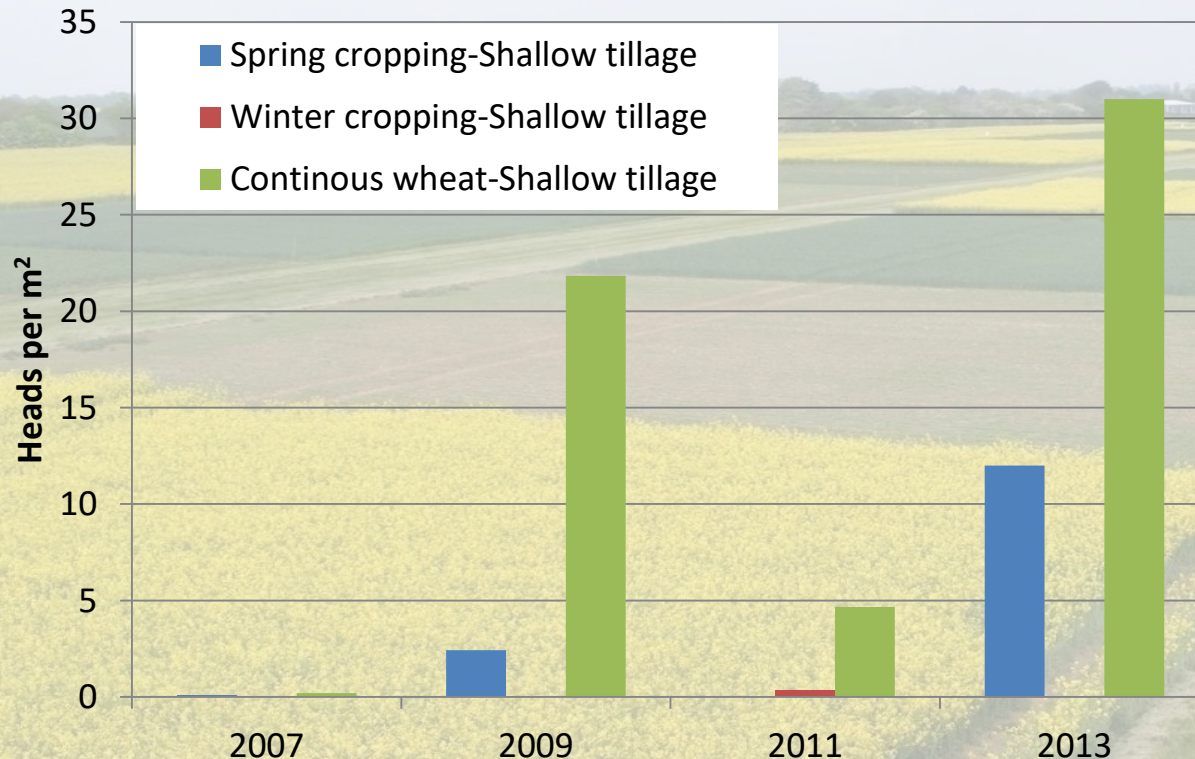
X

## Establishment

- Annual Plough
- Deep non-inversion
- Shallow non-inversion
- Managed Approach

= 16 treatments

X 3 replicates



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X

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Rotation	Cropping							
	2006 (Year 1)	2007 (Year 2)	2008 (Year 3)	2009 (Year 4)	2010 (Year 5)	2011 (Year 6)	2012 (Year 7)	2013 (Year 8)
1 Winter cropping	WOSR	Wheat	Winter beans	Wheat	WOSR	Wheat	Winter beans	Wheat
2 Spring cropping	Spring Beans	Wheat	Spring Oats	Wheat	Spring Beans	Wheat	Spring Linseed	Wheat
3 Cont wheat	Wheat	Wheat	Wheat	Wheat	Wheat	Wheat	Wheat	Wheat
4 Alt fallow	Fallow	Wheat	Fallow	Wheat	Fallow	Wheat	Fallow	Wheat

The reality is that the spring crop used here didn't deliver significant reductions in weeds; we couldn't control grass weeds effectively in the crop

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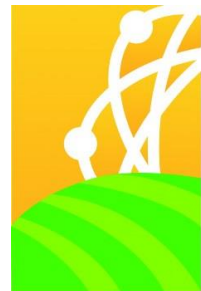
# Thank you

We thank a wide range of funders for supporting weed research at NIAB..



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**BASF**  
We create chemistry



ADAMA



Horizon 2020



A considerable programme of work continues to be carried out for our network members..