



LiveWheat at NOCC 2021

‘FARM-BASED ORGANIC VARIETY TRIALS NETWORK’

SHIMPLING PARK FARM, TUESDAY 6TH JULY 2021



LiveWheat objectives

Network

- Establish a “collective experiment”

Farms linked by experimental design

Dataset

- Real-farm performance of wheat varieties

To compensate and validate plot-scale results

Analysis

- Integration of external data sources

To understand the drivers of crop performance

Outputs

- How to better support decisions

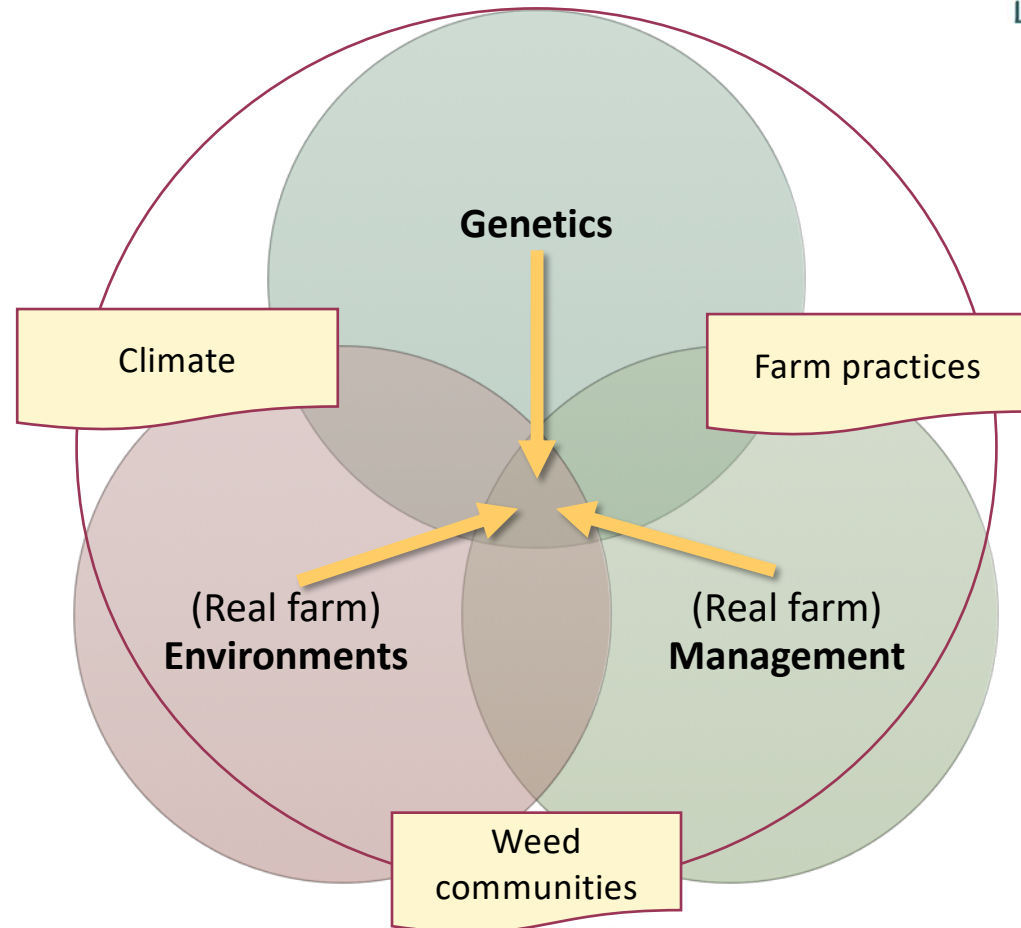
- Farm-level
- Supply chain
- Plant breeding

LIVEWHEAT: NOVELTY

Three dimensions often addressed separately

Now integrated and linked in a single experiment/survey

The more data we collect, the clearer the interactions



VARIETIES

- **19 varieties so far**
- Representative of end-use range
- Including historic genotypes

Variety	Breeder	End-use	18	19	20	21
Alabaster	KWS	G2			X	
Basset	KWS	G3	X			
Crispin	KWS	G4H	X	X		X
Crusoe	LG Seed	G1			X	X
Evolution	KWS	G4H	X	X		X
Extase	KWS	G2			X	X
Gleam	Syngenta	G4H				X
Hallfreda	Lamanten	G4 eq. (Sweden)				X
Maris Widgeon	PBI (1964)	Nc (Mill) Hard		X	X	X
Montana	KWS	E (G1 eq.) - DE	X	X		
Mortimer	SECOBRA	BP (G2 eq.) – FR			X	X
Nelson	SZ Schweiger	E (G1 eq.) - DE				X
Revelation	LG Seed	G4S		X	X	X
Saki	RAGT	G4H				X
Siskin	KWS	G2	X	X	X	X
Spyder	Blackman Agri	G3	X			
Skyfall	RAGT	G1		X		
YQCCP	ORC/JIC	nc	X	X	X	X
Zyatt	KWS	G1		X		X

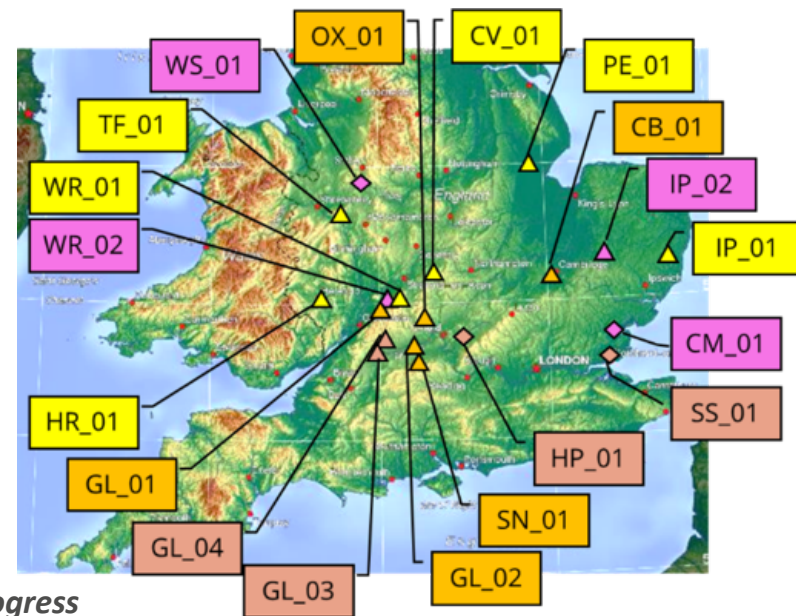
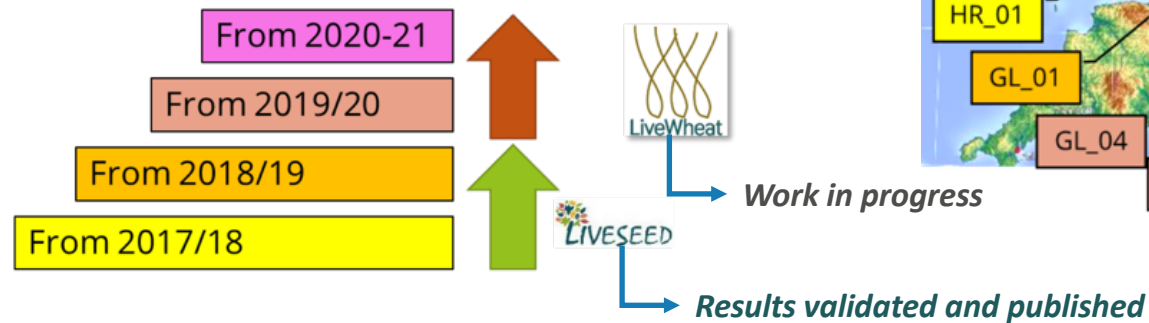
ambrogio.c@organicresearchcentre.com

A COLLECTIVE EXPERIMENT

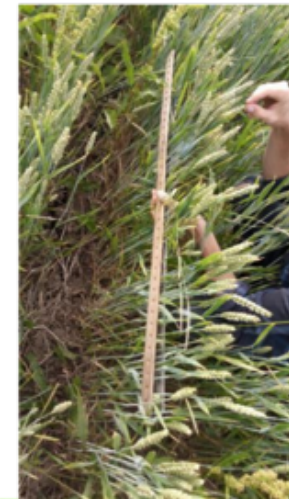
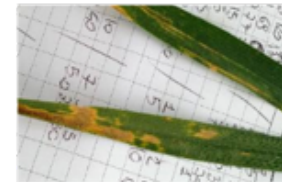
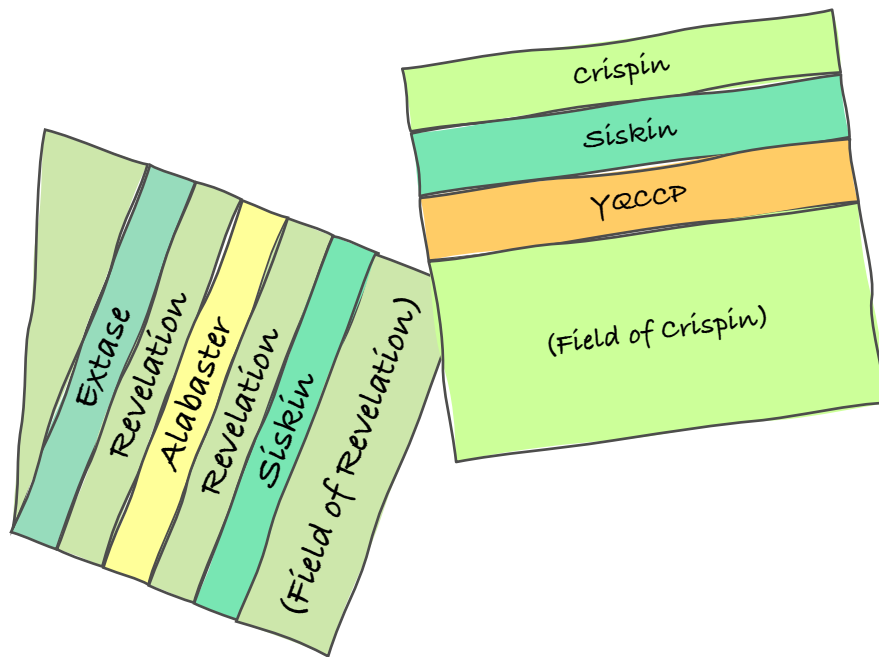
The work started in 2017/18 under the LIVESEED EU Project

△ Organic certified

◇ Conventional 'agroecological' (conservation, low-input)



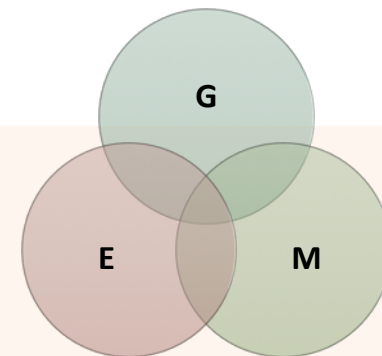
METHODOLOGY





Key results

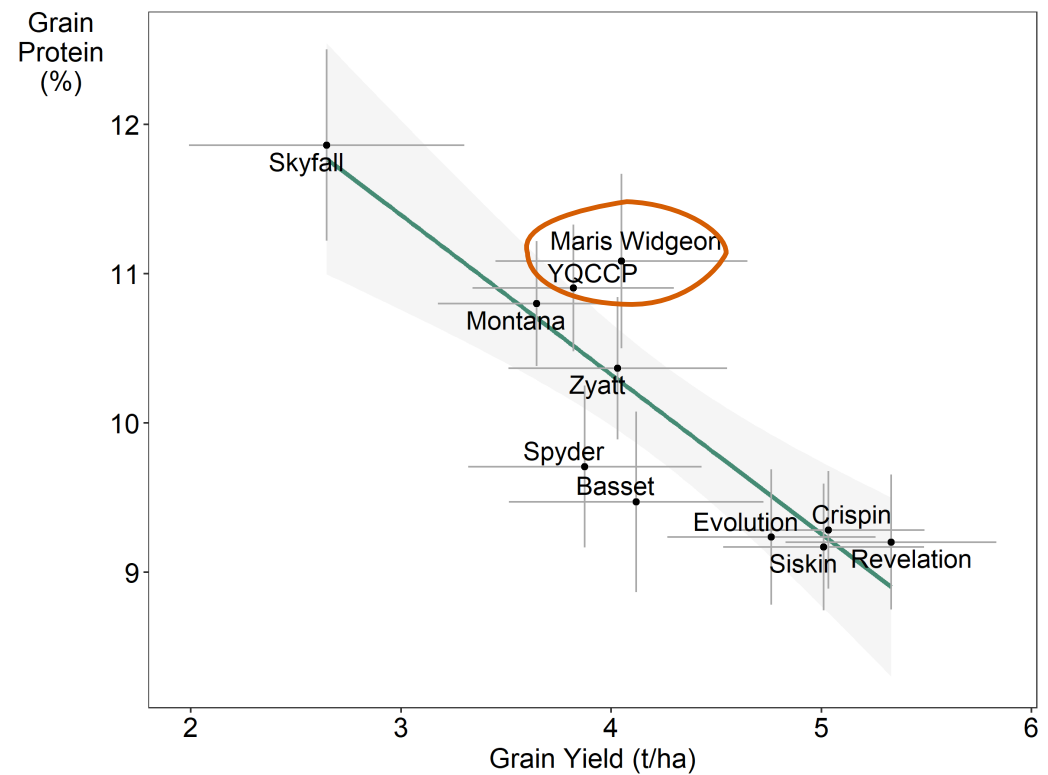
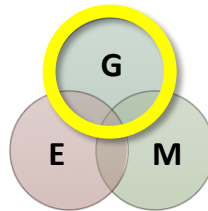
LIVESEED 2018 – 2019



GENETICS

A clear **Yield-Protein trade-off**

Possible **Grain Protein Deviations**



GENETICS

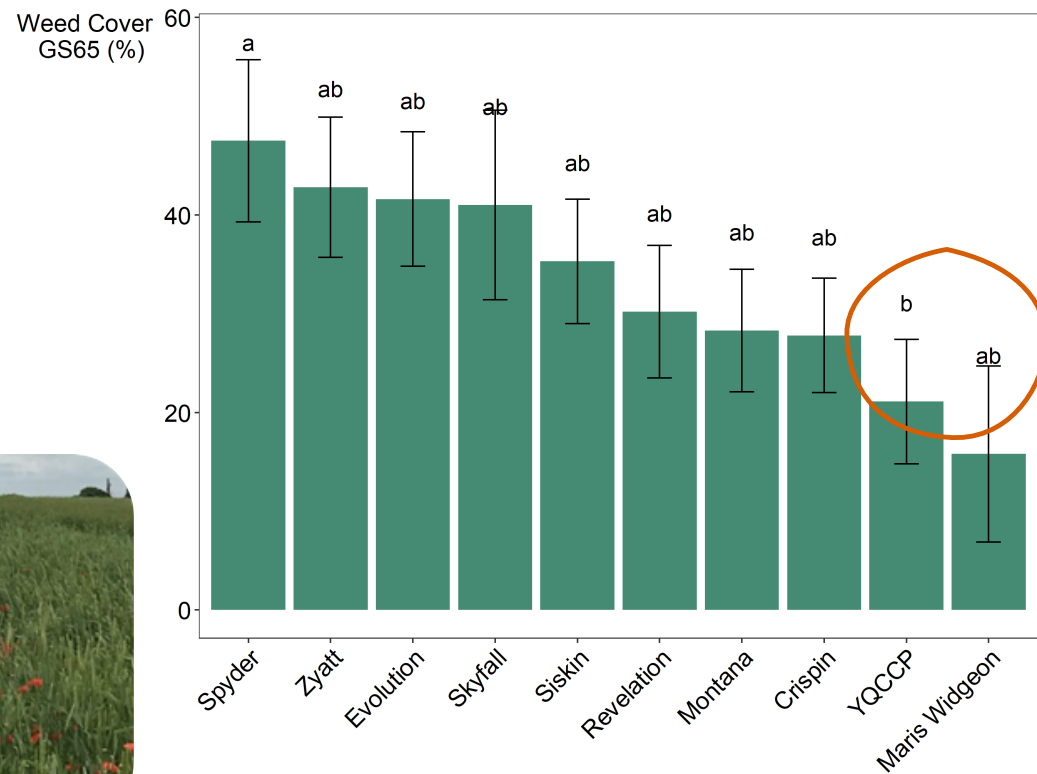
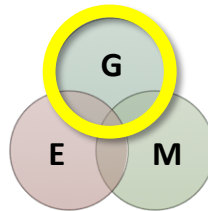
Differences in weed suppressive ability

Strong link between

- **N use efficiency** and
- **competitiveness against weeds**



Credit: Mark Lea

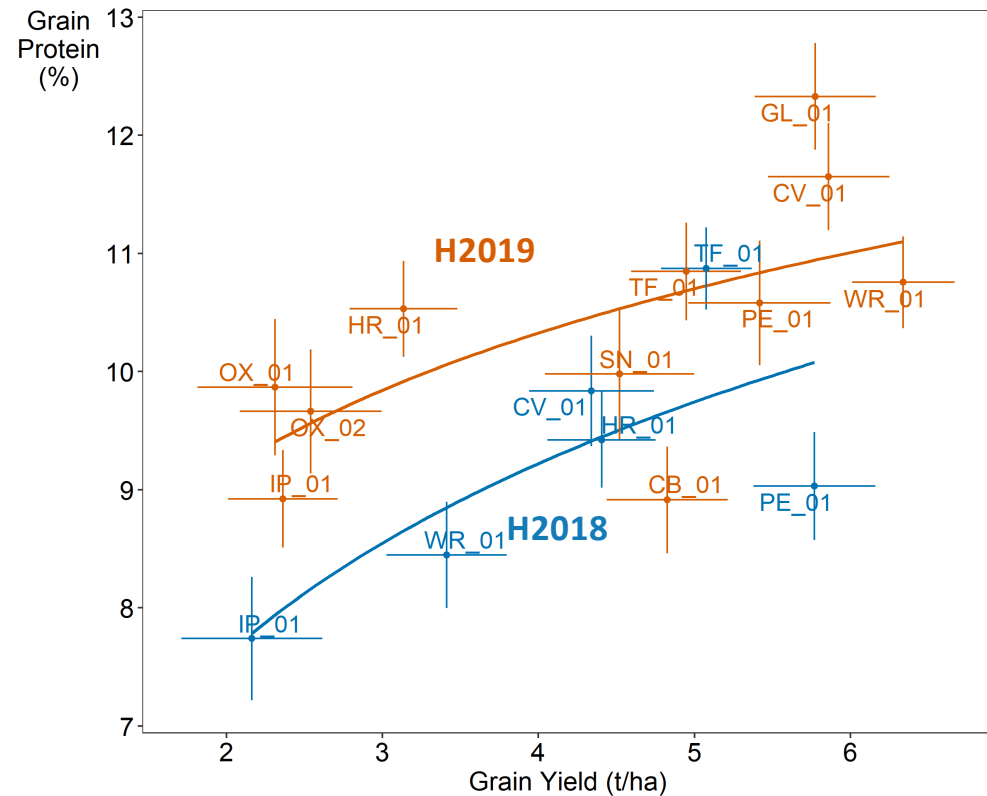
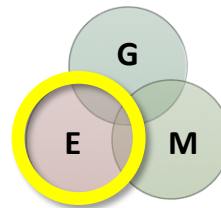


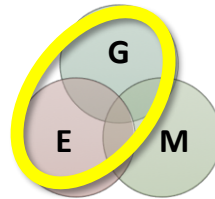
ENVIRONMENT

The yield-protein relationship is positive, not negative

Nitrogen as a limiting factor?

- H2018: summer drought
- H2019: rainy summer

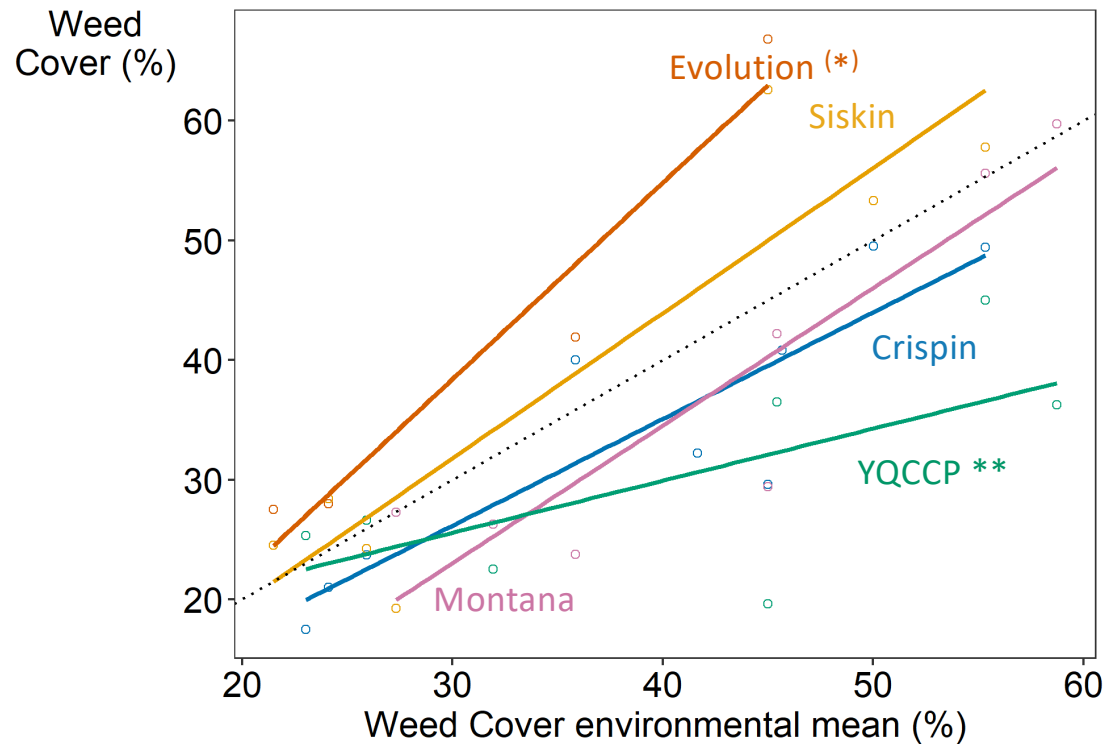




GENETICS * ENVIRONMENT

“Dynamic stability”

The higher the weed pressure, the more relevant weed suppressive ability is.

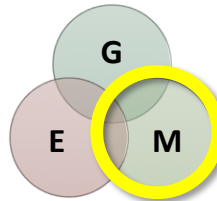


MANAGEMENT

Two strategies of post-emergence weed management

Spring-tine harrowing (narrow rows)

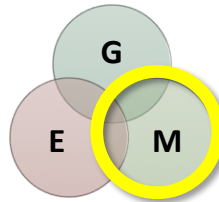
Hoeing (wide rows)



**“narrow rows”
(Spring tine harrow)**



**“wide rows”
(Hoeing)**



MANAGEMENT

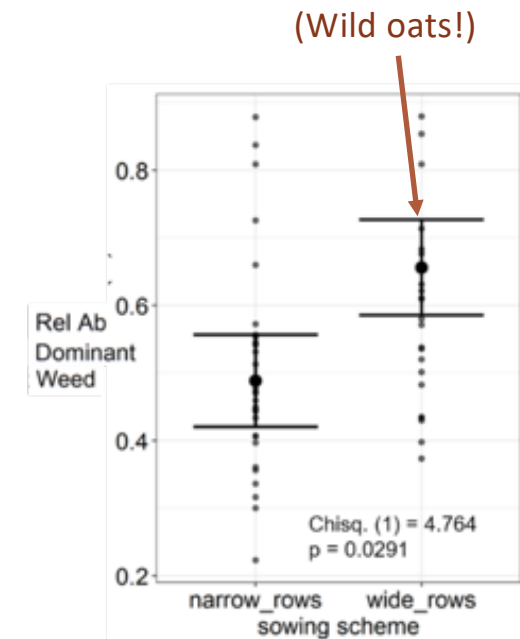
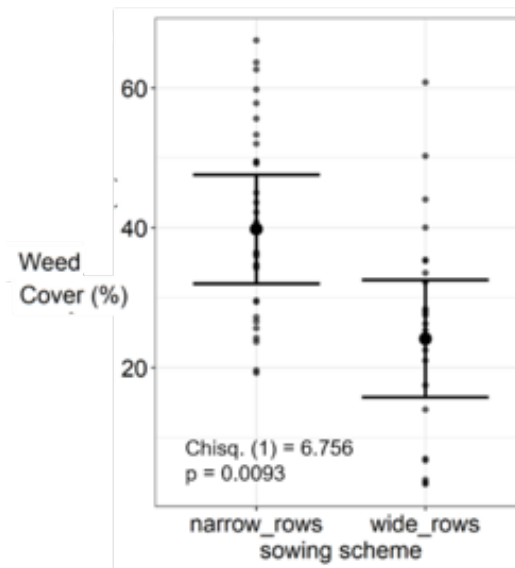
Two strategies of post-emergence weed management

Spring-tine harrowing (narrow rows)

- Less effective in reducing weed abundance - depends on critical weather conditions

Hoeing (wide rows)

- More effective in reducing weed abundance, thus improves N mobilisation
- but might also reduce weed diversity (increase dominance)



Future priorities

- **Crop-weed interaction** in breeding and varietal choice
- **Integrate climatic data** to capitalise past growing seasons
- **Genetics * Management** interactions
- Account for **farmer observations**
- Account for **observations along the supply chain**

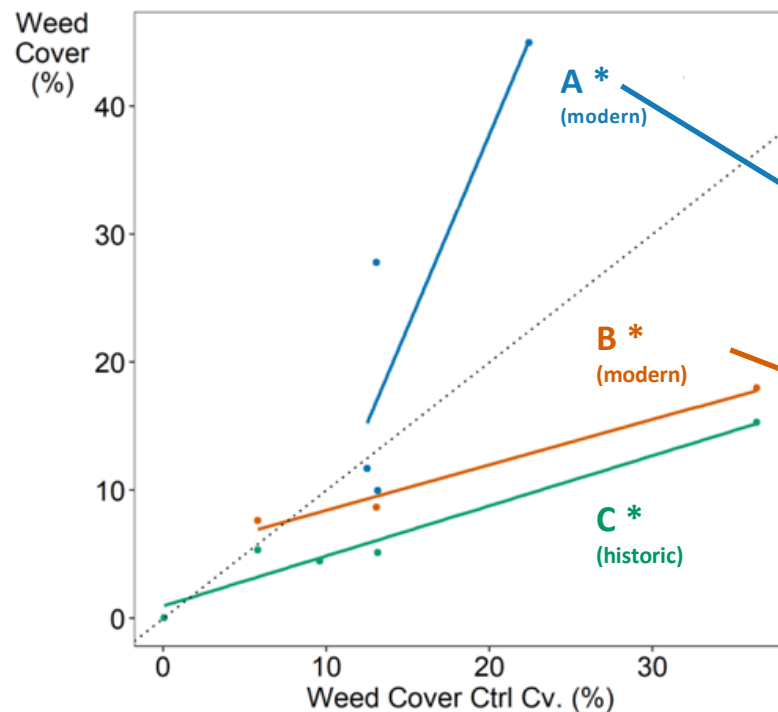
From LIVESEED to LiveWheat

Short term		Long term
Genetics	Better information on varietal choice in organic and low-input	From varieties to traits: inform future breeding programmes
Environment	Understanding specific adaptation , response to climate and stability	Anticipate future climatic scenarios
Management	Understanding efficacy of different management (organic and non-organic)	Inform overall agroecological transition , especially with reduced dependence on herbicides

FROM “VARIETIES” TO “TRAITS”: AN EXAMPLE

Weeds at the onset of stem extension

(Interim H2020 results)



Traits for weed suppressiveness:

- **Long straw**
- **Early vigour**

The 2020/21 "Matrix"

Variety	End-use	Feed					Mixed					Milling					n
		CV_01	HR_01	PE_01	WR_01	WR_02	CB_01	GL_01	HP_01	OX_01	SN_01	CM_01	GL_05	IP_01	SS_01	TF_01	
Siskin	G2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Crispin	G4-H	X		X													2
Evolution	G4-H			X	X	X											3
Gleam	G4-H				X							X					2
Revelation	G4-S				X		X	X		X							4
Saki	G4-H	X		X			X					X					4
Extase	G2	X	X				X	X	X		X						6
Siskin+Extase	1:1mix		X					X	X		X						4
Hallfreda	G4H eq.		X				X									X	3
Crusoe	G1									X					X		2
Maris Widgeon	Milling												X	X	X	X	4
Nelson	G1									X						X	2
YQCCP	CCP								X		X	X		X		X	5
		4	4	4	4	1	3	3	2	3	3	1	1	3	2	4	

Additional Varieties	HR_01	PE_01	WR_01	OX_01	IP_01	TF_01
Costello		X				
Ev+Gl+Rev+Sis			X			
Mortimer				X		
Miller's Choice					X	
Mortimer				X		
Mulixa X Holdfast						X
Milns N59					X	
Red Lammas					X	
Theodore	X					
Zyatt				X		



Thank you for your attention