

# Putting a value on IPM

**Dr Henry Creissen**

Research Fellow, Scotland's Rural College

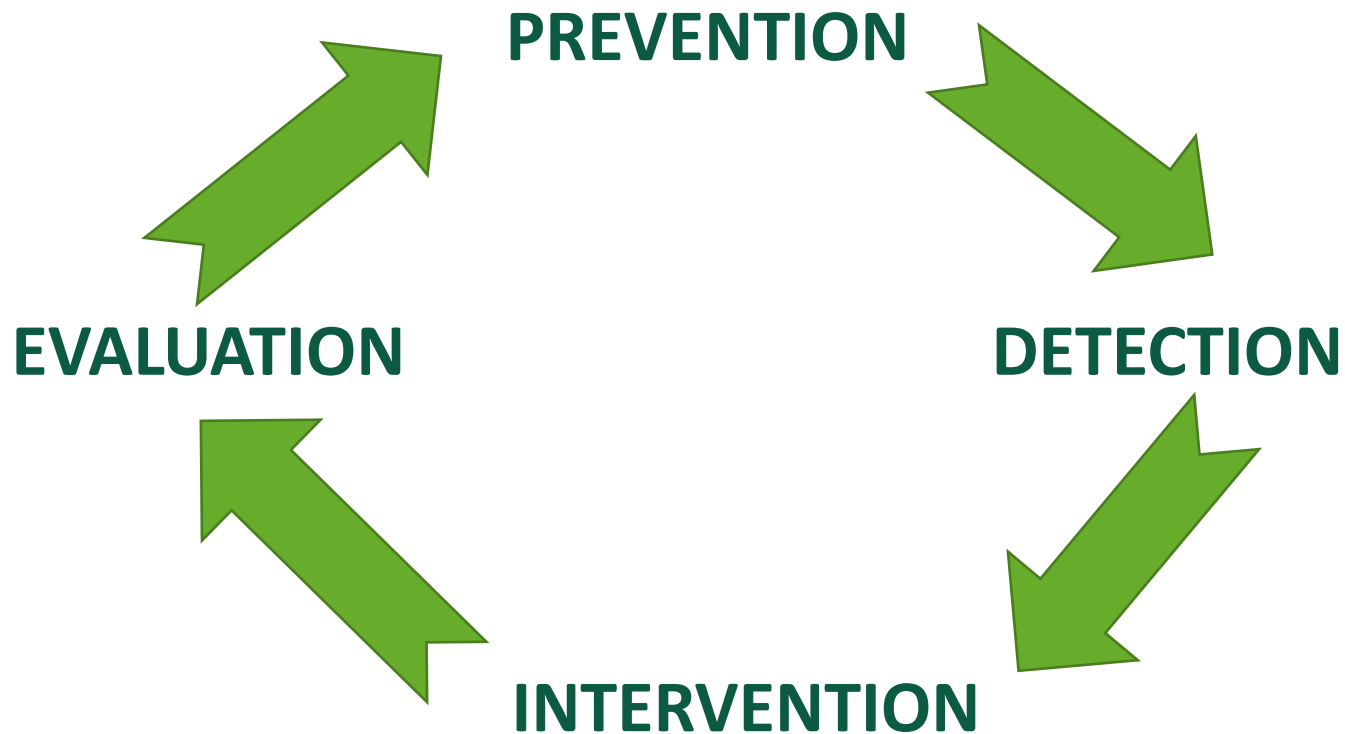
Impact Officer, Plant Health Centre

[henry.creissen@sruc.ac.uk](mailto:henry.creissen@sruc.ac.uk)



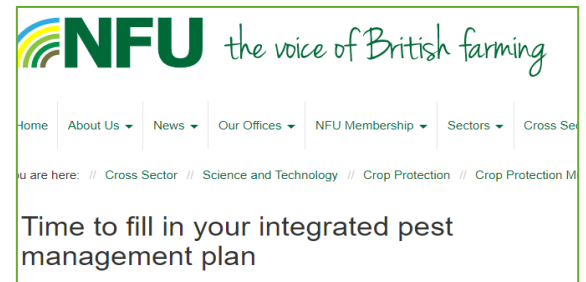
# Integrated Pest Management process

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# VI IPM Assessment Plans

- ◆ Tool to facilitate discussion between farmer and agronomist
- ◆ Data collection
  - ◆ Baselines
    - ◆ IPM score (0-100)
  - ◆ Identify issues/topics
  - ◆ Direct R&D + KTE
- *SFI IPM1 £989/annum*



Research Article

Measuring the unmeasurable? A method to quantify adoption of integrated pest management practices in temperate arable farming systems





<https://www.ipmtool.net>

IPM Tool

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https://www.ipmtool.net

## MY FARM - WINTER BARLEY DISEASE CONTROL MEASURES - 2023

Please select the category that best describes what actions you plan to implement or not implement

### Control volunteers & weeds ?

Useful for: [Brown Rust](#) [Mildew](#) [Seed Borne Diseases](#) [Take-All](#) [Yellow Rust](#)

Use in current cropping season  Intend to use in future seasons  Not suitable for my farming system  No intention to implement

Add your notes

Last year selection

Last year notes

### Decision support (including thresholds) ?

Useful for: [Brown Rust](#) [Ear blight](#) [Eyespot](#) [Mildew](#) [Yellow Rust](#)

Use in current cropping season  Intend to use in future seasons  Not suitable for my farming system  No intention to implement

Add your notes

Last year selection

Last year notes

### Field history, rotation & break crops ?

Useful for: [Eyespot](#) [Leaf and Glume Blotch](#) [Take-All](#) [Yellow Rust](#)

Use in current cropping season  Intend to use in future seasons  Not suitable for my farming system  No intention to implement

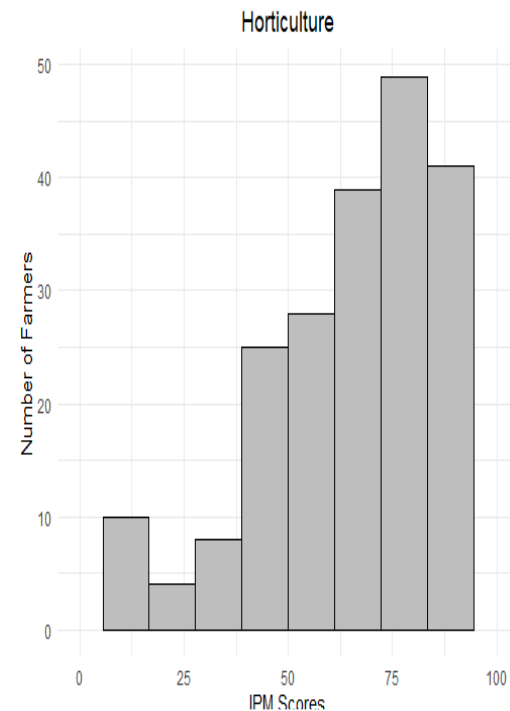
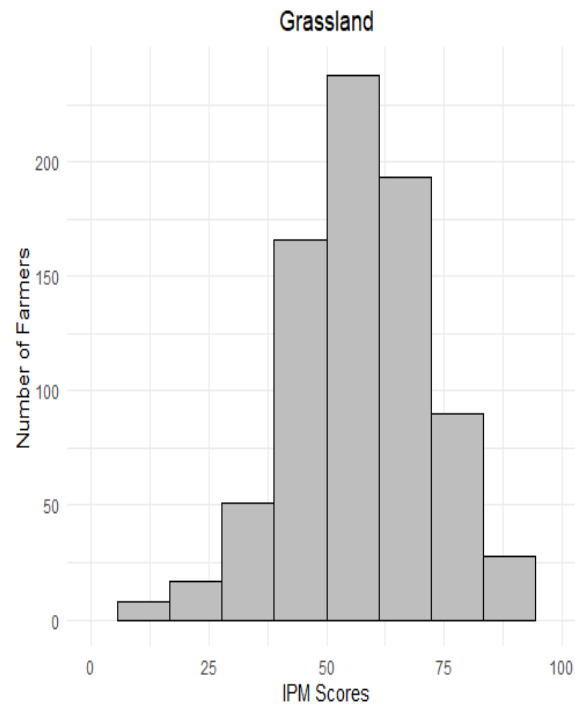
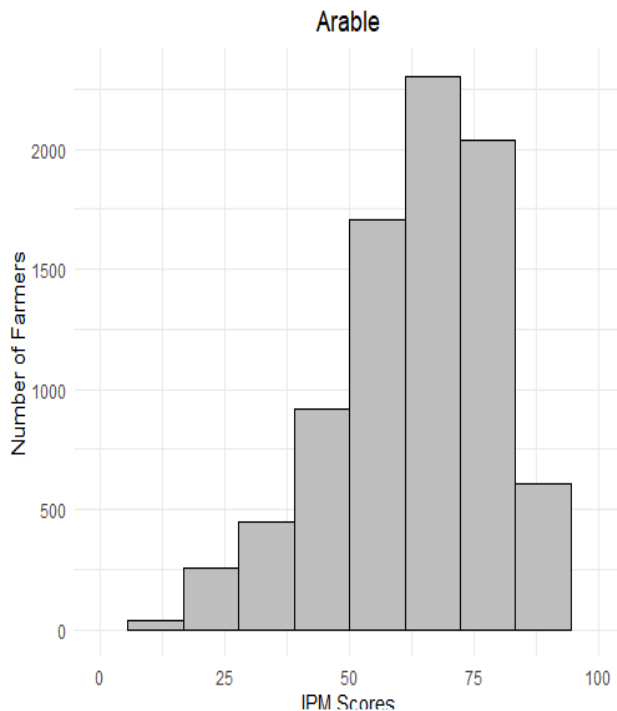
Add your notes

Last year selection

Last year notes

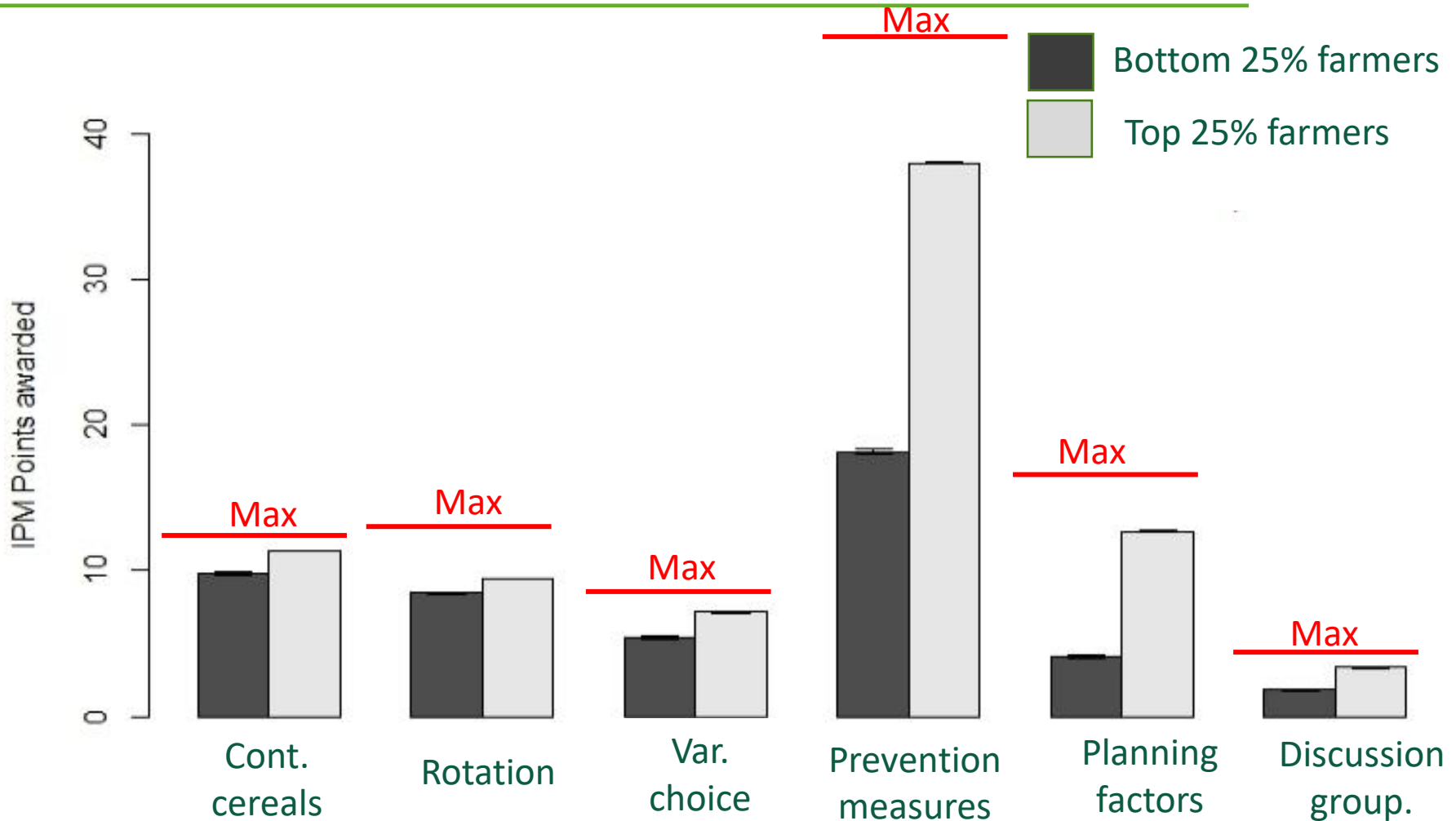
### Hygiene ?

# VI IPM Assessment Plans: IPM scores

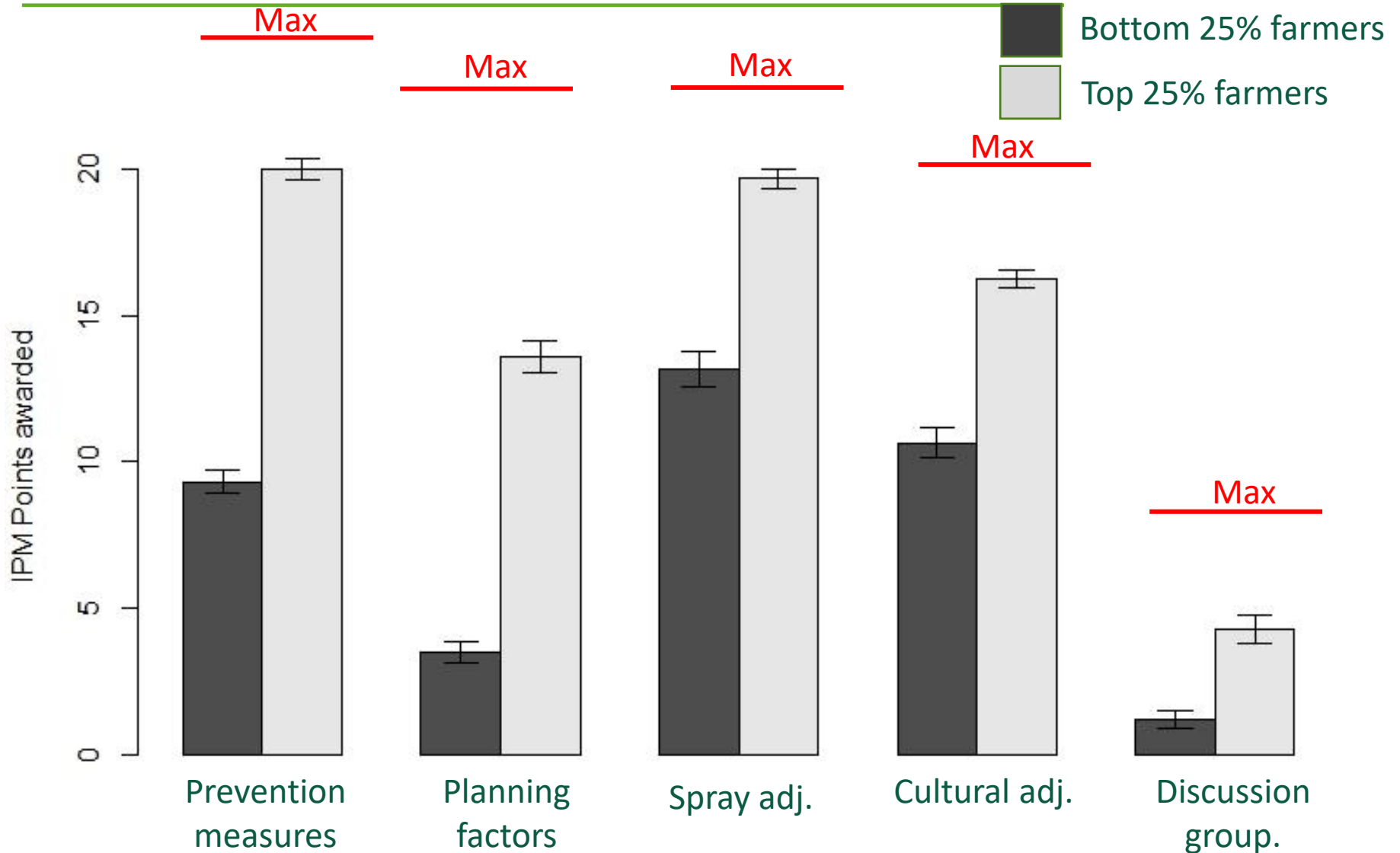


	Completed plans		
	Arable	Grass	Hort
England	13764	912	329
Scotland	2034	207	26
<b>Total</b>	<b>15798</b>	<b>1119</b>	<b>355</b>

# UK Arable: High/Low IPM adopters

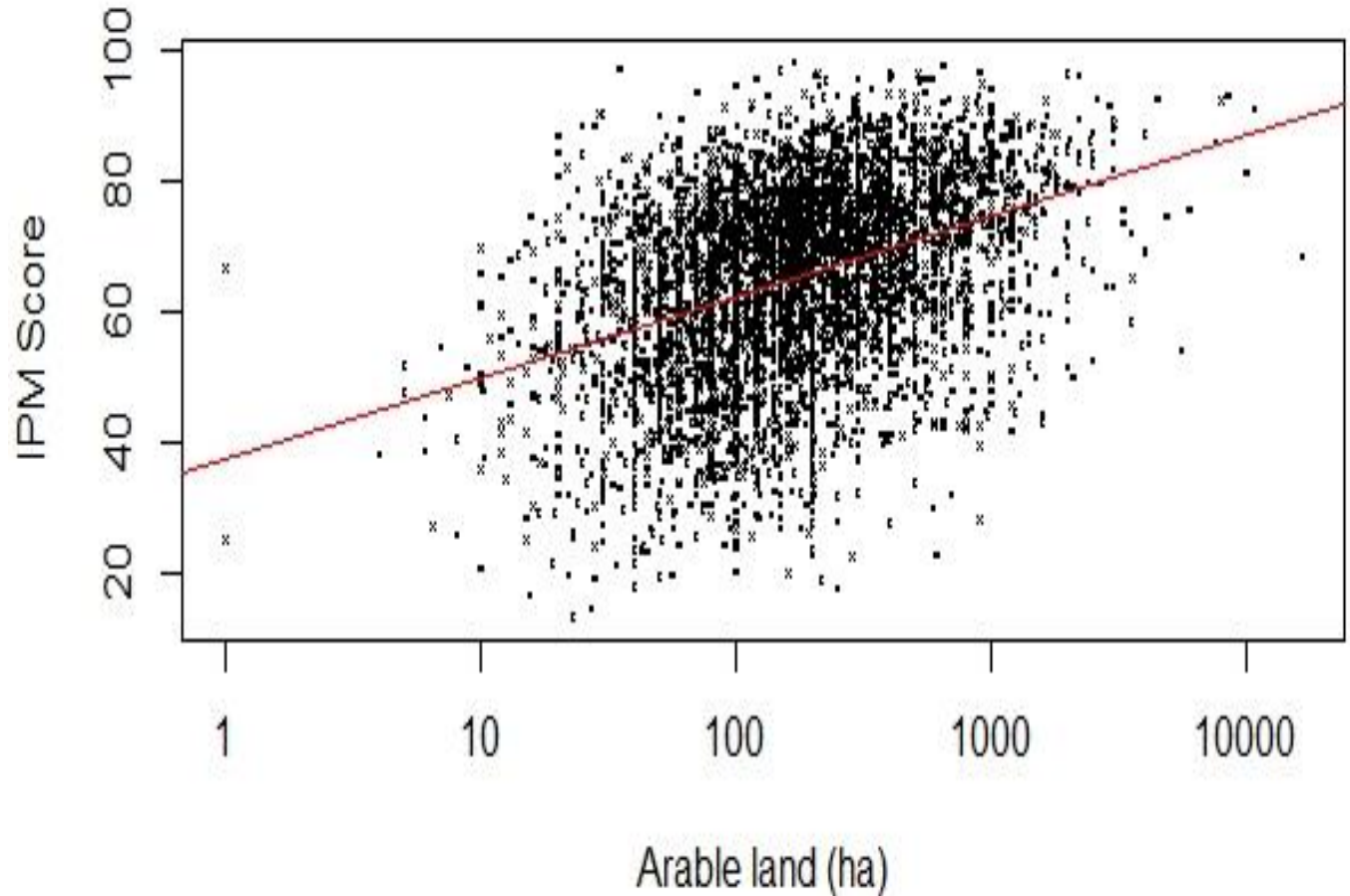


# UK Grassland: High/Low IPM adopters

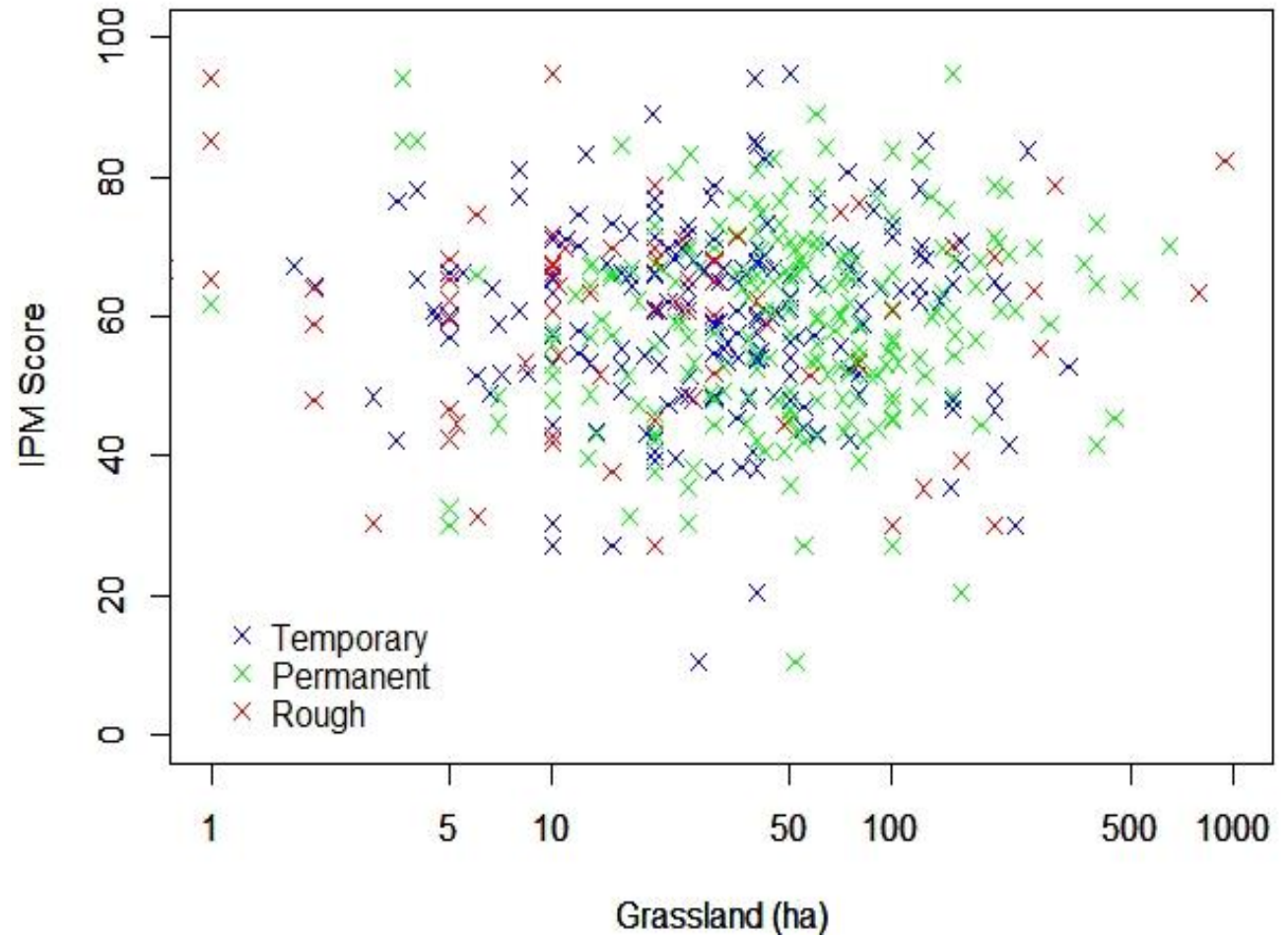




# UK IPM Score - Arable area

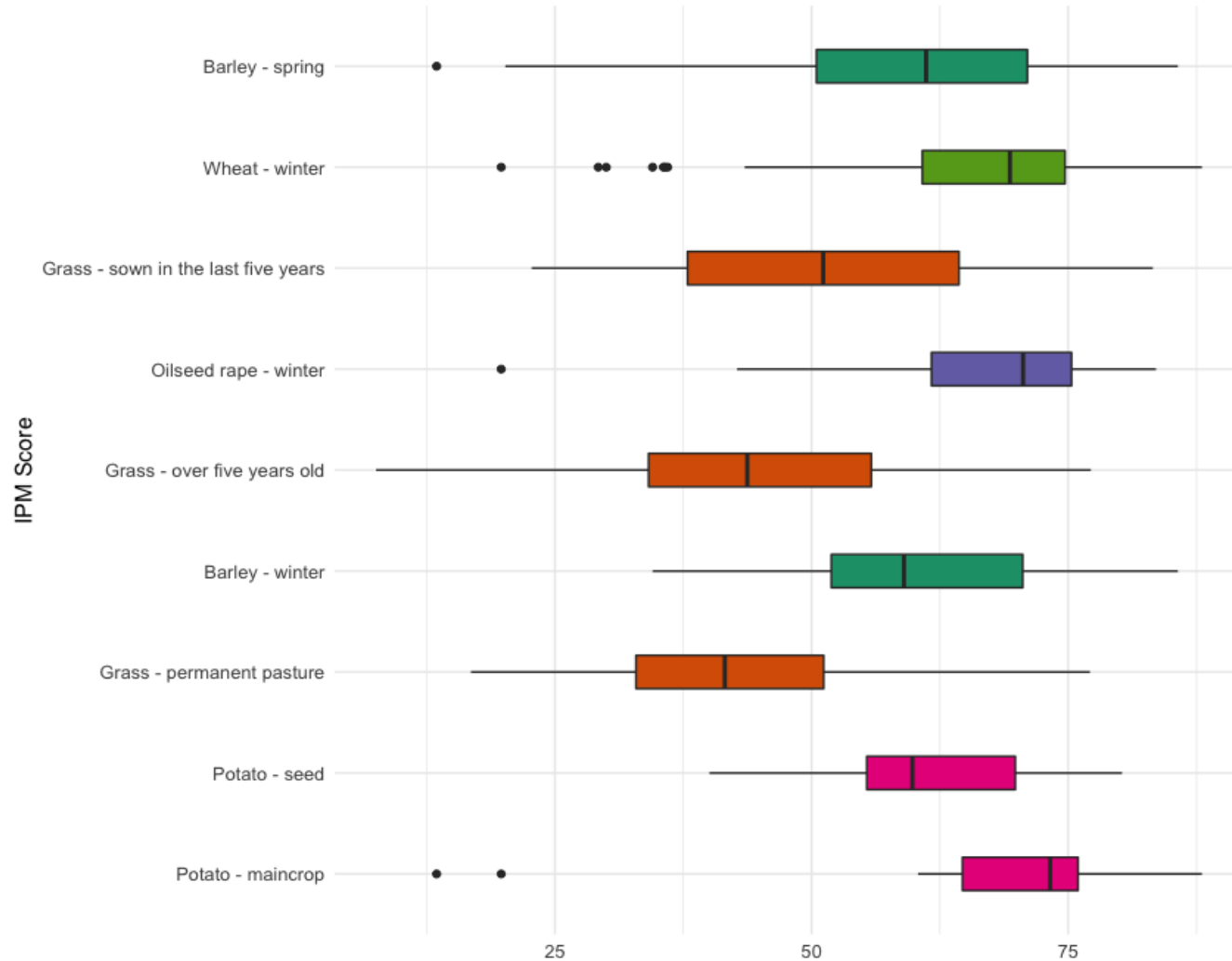


# UK IPM Score - Grass area

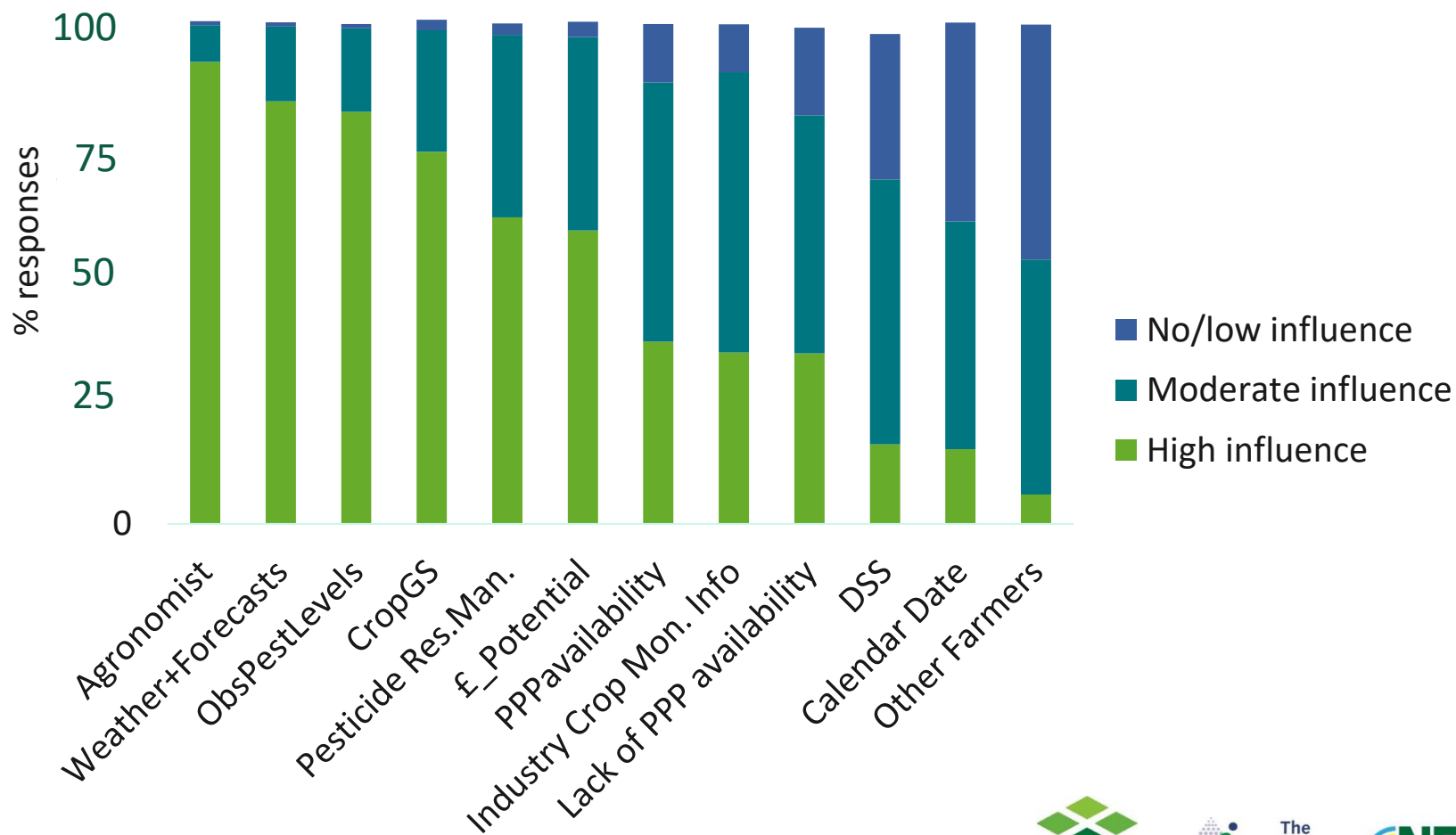


# IPM score by crop

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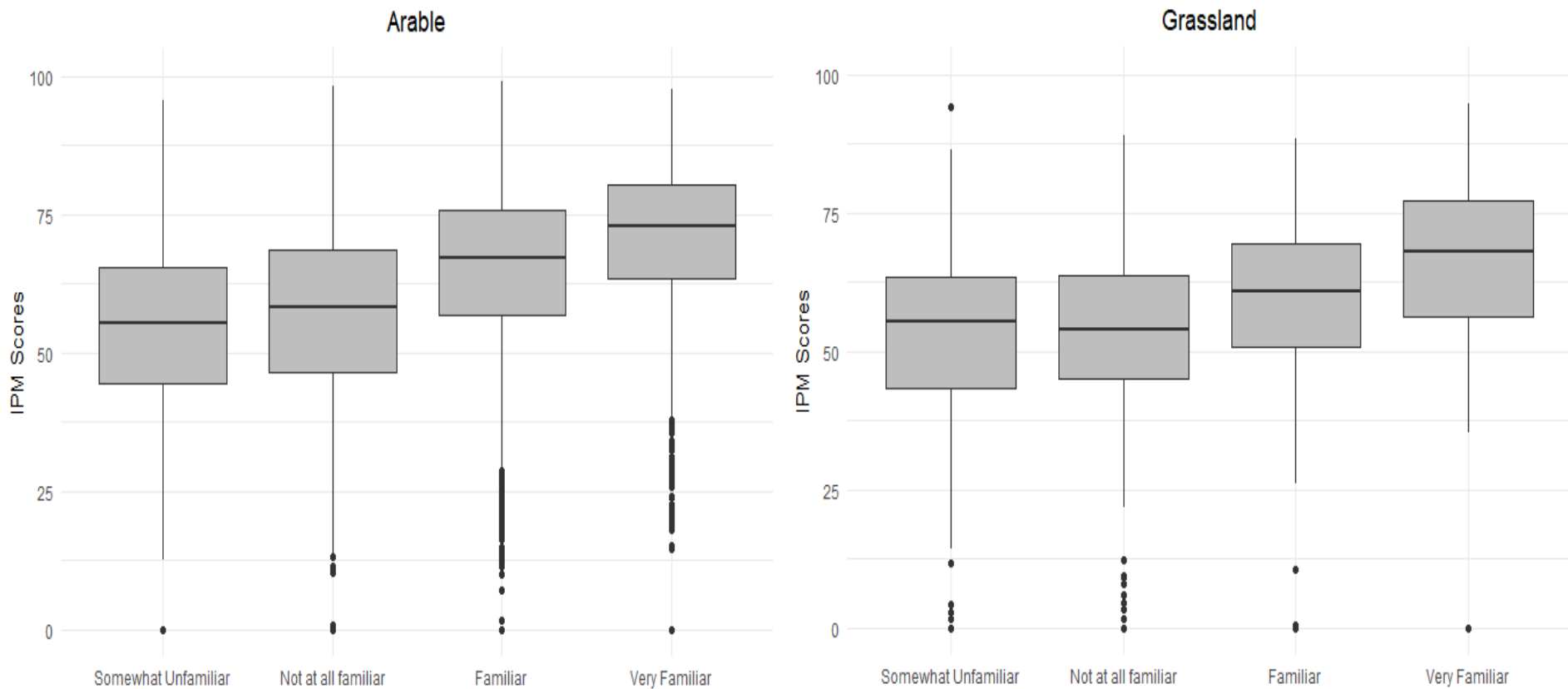


# What factors influence your decision to adjust your spray programme (e.g. changes in timings, rates, products) throughout the season?

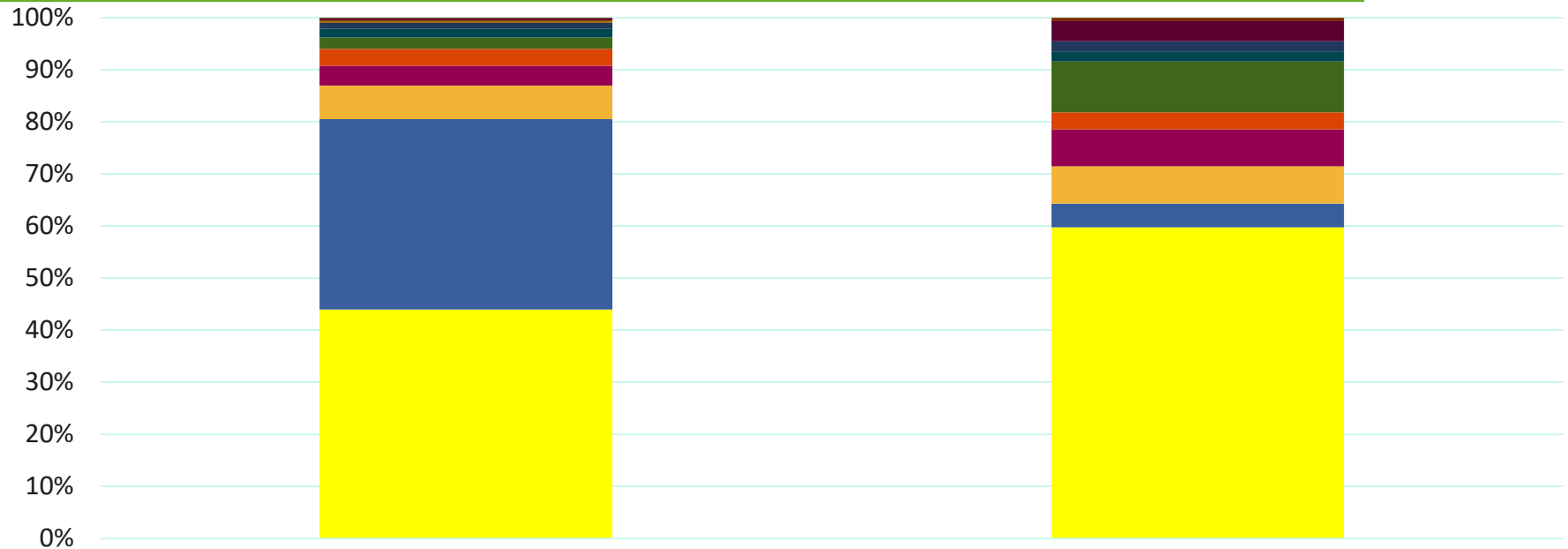


# Knowledge => Uptake

Q. How familiar are you with IPM? (1-5 scale)



# IPM information source preference



- Contractors
- Social media
- Other farmers (not including discussion groups)
- Farming press
- Farmer discussion groups
- Information and updates from membership, levy and research organisations
- Evaluating previous control strategies
- Open days/crop walks
- Independent (e.g. AICC member) or in house agronomist
- Agronomist employed by a distributor

# Who needs to know what?

## Farmers top 10 pest threats

Pest	Farmer	Agronomist
Slugs	26.37% (n=72; rank = 1st)	33.3% (n=9; rank = 2nd)
Couchgrass	14.65% (n=40; rank = 2nd)	Did not mention
Leatherjackets	12.45% (n=34; rank = 3rd)	14.8% (n=4; rank = 8th)
Unsure	9.16% (n=25; rank = 4th)	Did not mention
Blackgrass	8.79% (n=24; rank = 5th)	25.9% (n=7; rank = 4th)
Dockens	7.33% (n=20; rank = 6th)	Did not mention
Cabbage Stem Flea Beetle	6.96% (n=19; rank = 7th)	7.4% (n=2; rank = 16th)
Thistles	6.96% (n=19; rank = 8th)	Did not mention
Chickweed	6.59% (n=18; rank = 9th)	3.7% (n=1; rank = 38th)
Mildew	6.23% (n=17; rank = 10th)	Did not mention

## Agronomists top 10 pest threats

Pest	Agronomist	Farmer
Septoria	37.0% (n=10; rank = 1st)	5.13% (n=14; rank = 17th)
Slugs	33.3% (n=9; rank = 2nd)	26.37% (n=72; rank = 1st)
Ramularia	29.6% (n=8; rank = 3rd)	6.23% (n=17; rank = 11th)
Blackgrass	25.9% (n=7; rank = 4th)	8.79% (n=24; rank = 5th)
Aphids	22.2% (n=6; rank = 5th)	5.86% (n=16; rank = 13th)
Nematodes	18.5% (n=5; rank = 6th)	4.40% (n=12; rank = 22nd)
PCN	18.5% (n=5; rank = 7th)	5.13% (n=14; rank = 16th)
Leatherjackets	14.8% (n=4; rank = 8th)	12.45% (n=34; rank = 3rd)
Yellow rust	14.8% (n=4; rank = 9th)	0.37% (n=1; rank = 411th)
Barren brome	11.1% (n=3; rank = 10th)	4.03% (n=11; rank = 23rd)

2021 Phone Survey: 267 farmers and 26 agronomists in Scotland.

# ...How?

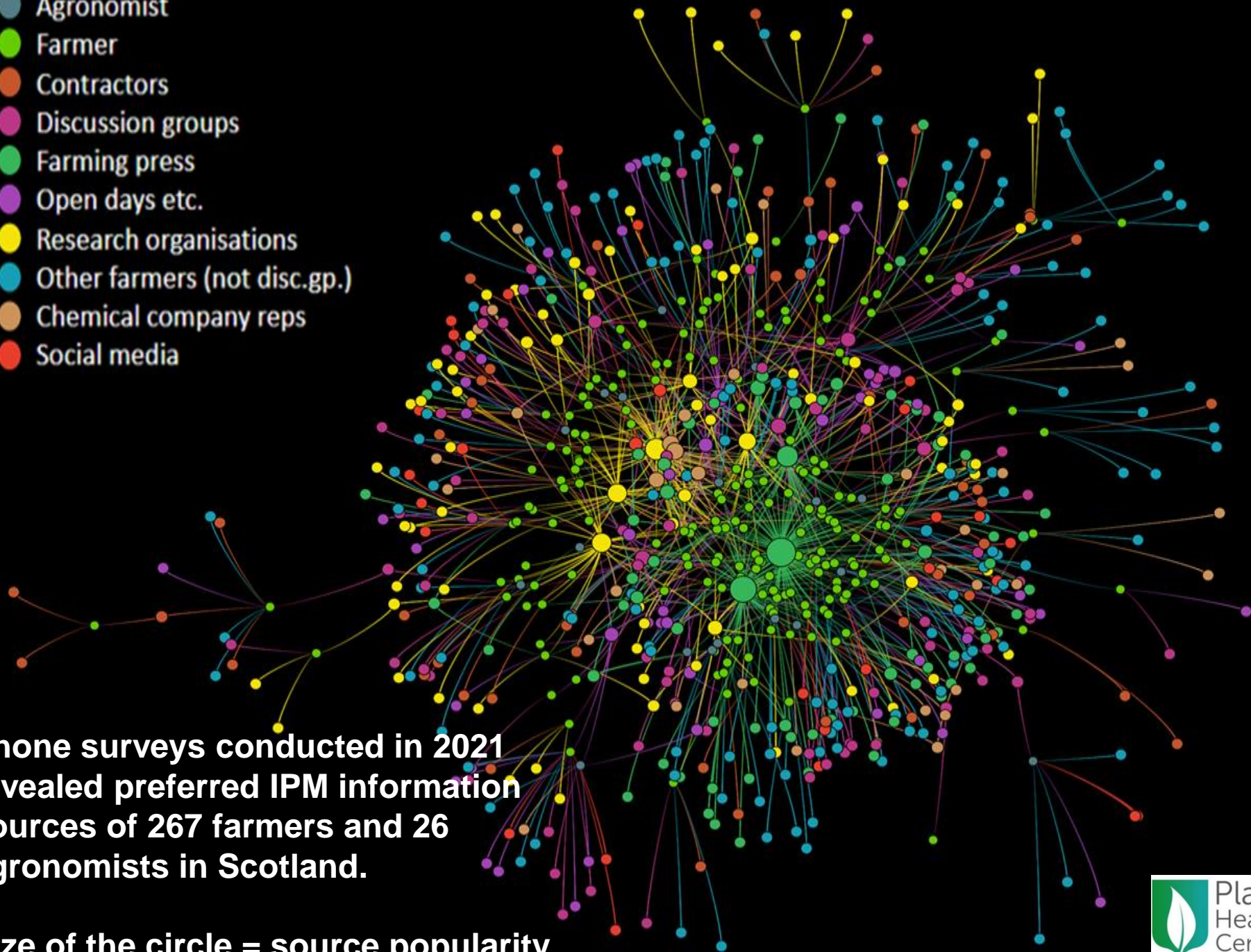
Information Source	Farmer	Agronomist
Other farmers (not including discussion groups)	68.9%	57.7%
Farmer discussion groups	60.3%	53.9%
Farming press	59.6%	30.8%
Information and updates from membership	46.1%	53.9%
Levy and research organisations	46.1%	53.9%
Open days/crop walks	43.5%	53.9%
Social media	30.3%	57.7%
Product manufacturer representative	26.2%	46.2%
Contractors	18.7%	19.2%

Respondents could choose all that apply.

2021 Phone Survey: 267 farmers and 26 agronomists in Scotland.



- Agronomist
- Farmer
- Contractors
- Discussion groups
- Farming press
- Open days etc.
- Research organisations
- Other farmers (not disc.gp.)
- Chemical company reps
- Social media



**Phone surveys conducted in 2021 revealed preferred IPM information sources of 267 farmers and 26 agronomists in Scotland.**

**Size of the circle = source popularity.**

# Support payments for IPM – Sustainable Farming Incentive

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- **Aim:** *Determine the structure of economic incentives for farmer participation in the scheme*
- Arable and Horticulture farmer/grower workshops Oct/Nov 2022.

1. Training and planning
2. Habitat for natural enemies
3. Crop diversity
4. Pest and disease resistance
5. Decision support
6. No insecticide/molluscicide
7. Pesticide alternatives



# Support payments for IPM

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- Increasing the number of **crop types in rotation** was popular
  - not relevant to horticulture.
- **Companion cropping** was the least popular
  - High failure rate, complex agronomy and high management costs.
- **Not using insecticides**
  - perceived to be high risk in some crops.
- **Decision support systems**
  - adoption is higher in horticulture.



# Support payments for IPM

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- **Variety choice** can be dictated by market esp. horticulture
- **Bioprotectants** more widely used/available in horticulture.
- **Habitat for natural enemies**, largely supported under **other schemes**. High costs and limited/delayed returns
- **IPM planning** was widely accepted as valuable IPM action.
- **Flexibility within the standard is key to ensuring wide scale uptake.**  
Some of the options may not be applicable to certain groups of growers  
– non arable rotations, those renting land on a short term basis.



# Regen Ag: Industry and Government support



Learning | Classified | Property | More ▾

LATEST | KNOW HOW | MORE ▾



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> [Environmental Land Management](#)

 [Department for Environment Food & Rural Affairs](#)



**Debbie James**  
07 March 2023

## Carlsberg signs up 23 farmers to grow 'regenerative' barley

- More in
- Business
  - Crops markets and prices



We also already pay for actions to support the sustainable management of soils through the SFI arable and horticultural soils standard. These actions are:

- completing a soil assessment and producing a soil management plan
- testing soil organic matter
- adding organic matter
- **having green cover on at least 70% of the land in the standard over winter (with the 70% including 20% multi-species cover crops at the intermediate level)**

In addition to what is already available, we plan to pay for new actions in SFI on arable land covering:

- an adviser visit to assess and advise on integrated pest management and help to produce a plan
- an adviser visit to review and improve nutrient use efficiency
- establishing and maintaining in-field flower-rich strips, which will provide habitat for natural pest enemies
- establishing and maintaining grassy field corners and blocks
- establishing a companion crop for integrated pest management
- no use of insecticide

More detailed information on the actions we will be adding to SFI in 2023 is included later in this document. We are also exploring how we can pay for actions covering:

- **tillage practices, including no till and direct drilling**
- using precision farming approaches

# IPM under non-inversion tillage

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- ◆ Which diseases increase/decrease?
  - ◆ Variety performance?
  - ◆ Fungicide requirement?

**Variety and fungicide decisions based on the pathogens and level of risk present in each tillage system?**



- ◆ Other factors to consider:
  - ◆ Rotational effect on diseases
  - ◆ Previous / cover crop management
    - ◆ Tillage / system stage
    - ◆ Local disease pressure



# Winter barley min till IPM

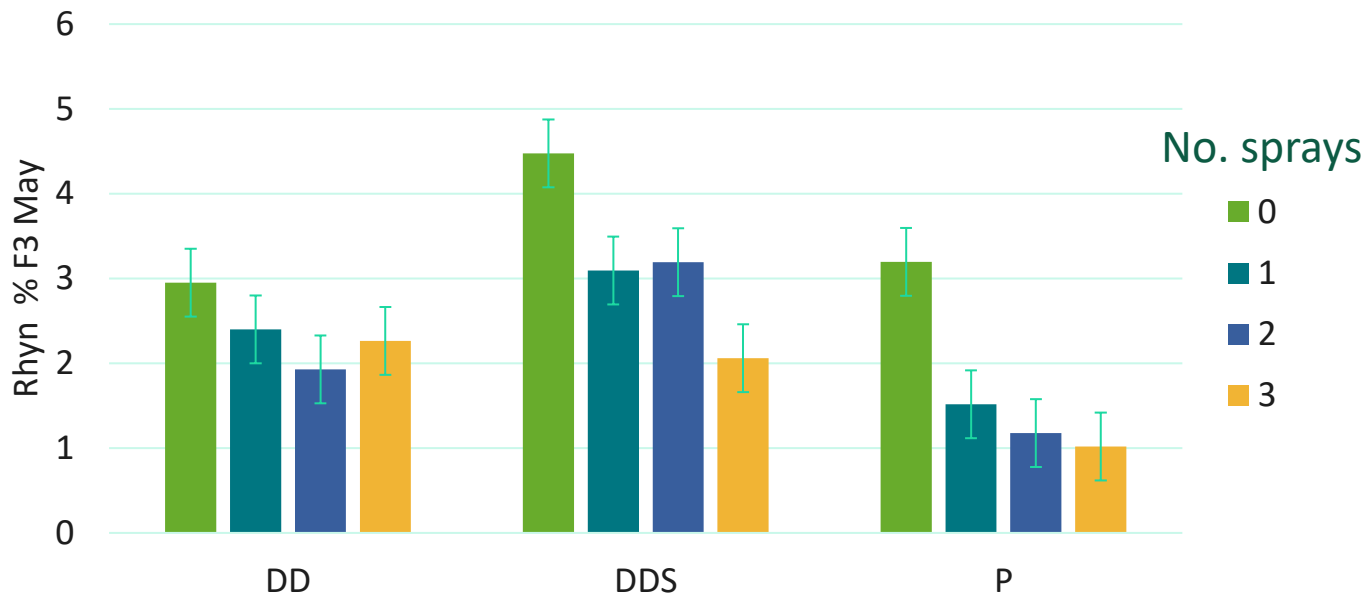
- 3 Tillage type
  - Direct Drill (+straw)
  - Direct Drill (-straw)
  - Plough
- 2 Varieties
  - Surge (res)
  - KWS Tower (sus)
- 4 fungicide programmes:
  - 0/1/2/3 sprays
- 2 sites:
  - Durie farm (Leven)
  - Mylnefield (Dundee)



<u>Trts</u>	T0 GS 25-30	T1 GS 31	T2 GS 39-45
0	Untreated	Untreated	Untreated
1	Untreated	<u>Siltra Xpro 0.6l/Ha</u>	Untreated
2	Untreated	<u>Siltra Xpro 0.6l/Ha</u>	<u>Siltra Xpro 0.4l/Ha</u>
3	<u>Cyflamid 0.3l/Ha + Comet 0.4l/Ha</u>	<u>Siltra Xpro 0.6l/Ha</u>	<u>Siltra Xpro 0.4l/Ha</u>

# Winter barley min till IPM

- More trash borne disease (Rhynchosporium) in direct drilled + crop residue plots
- More initial inoculum



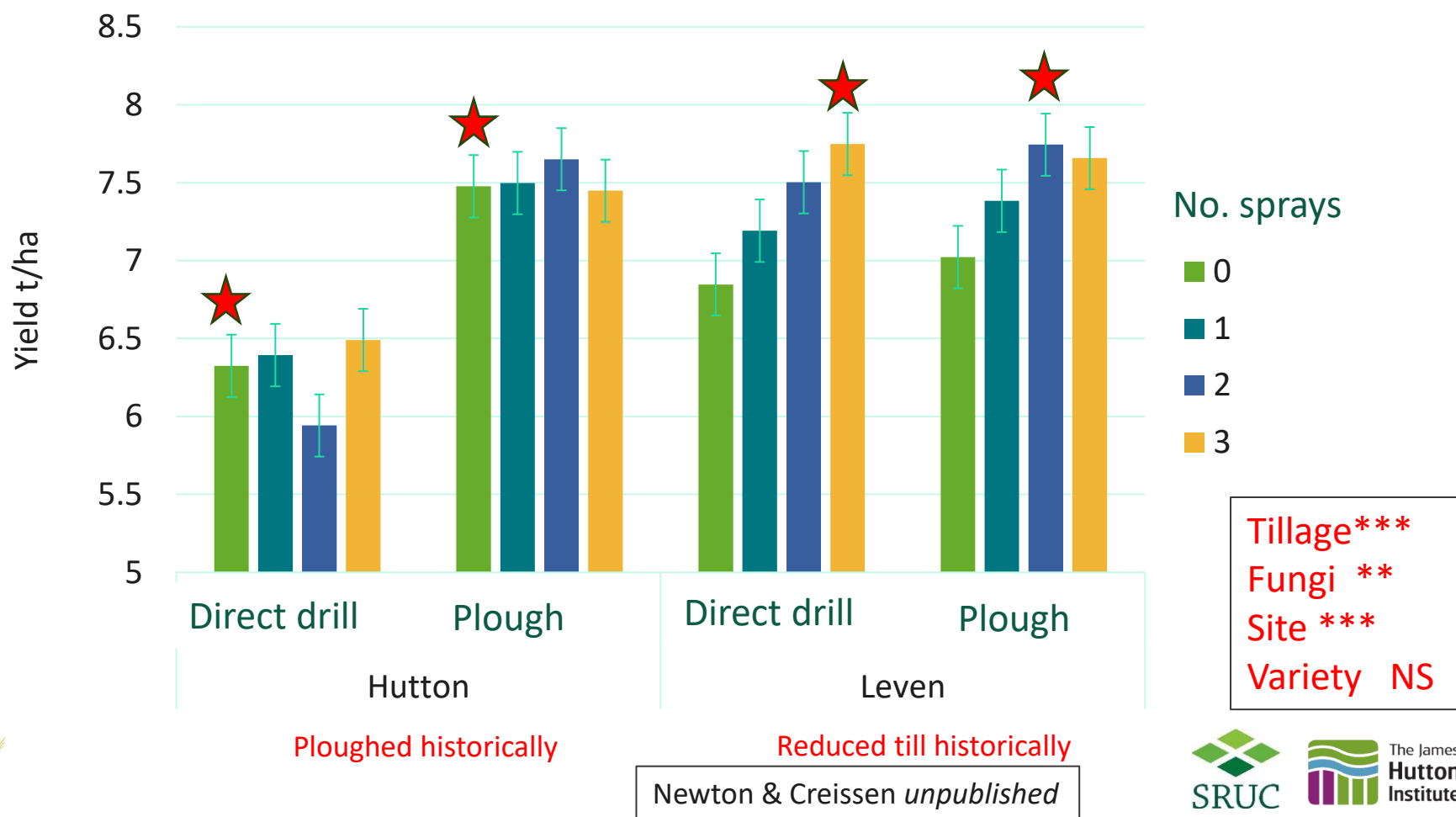
Tillage\*\*\*  
Fungi \*  
Variety NS

Newton & Creissen *unpublished*



# Winter barley min till IPM

- Most profitable PPP programme= ★







# Alternatives to conventional fungicides

- **Biostimulants**

- Non-microbial e.g. seaweed extracts, chitin
- Microbial e.g. non-pathogenic fungi (*Trichoderma* spp. etc.), AMF

- **Elicitors**

- Mimic action of natural elicitors e.g. Chitosan),
- Generate natural elicitors e.g. phosphite
- Signal mimic e.g. BION
- Pathogens

- **Biofungicides**

- Bacteria e.g. *Bacillus* spp.
- Fungi e.g. *Trichoderma* spp.



*Bacillus amyloliquefacien...*



*Bacillus subtilis* Products



*Trichoderma* Based

## What's on the label!

### Biopesticides

Do you make use of biopesticides or low risk plant protection products?

ELICITORS   BIOSTIMULANTS   BIOCONTROL   ENDOPHYTES   **BIOFUNGICIDES**   OTHER

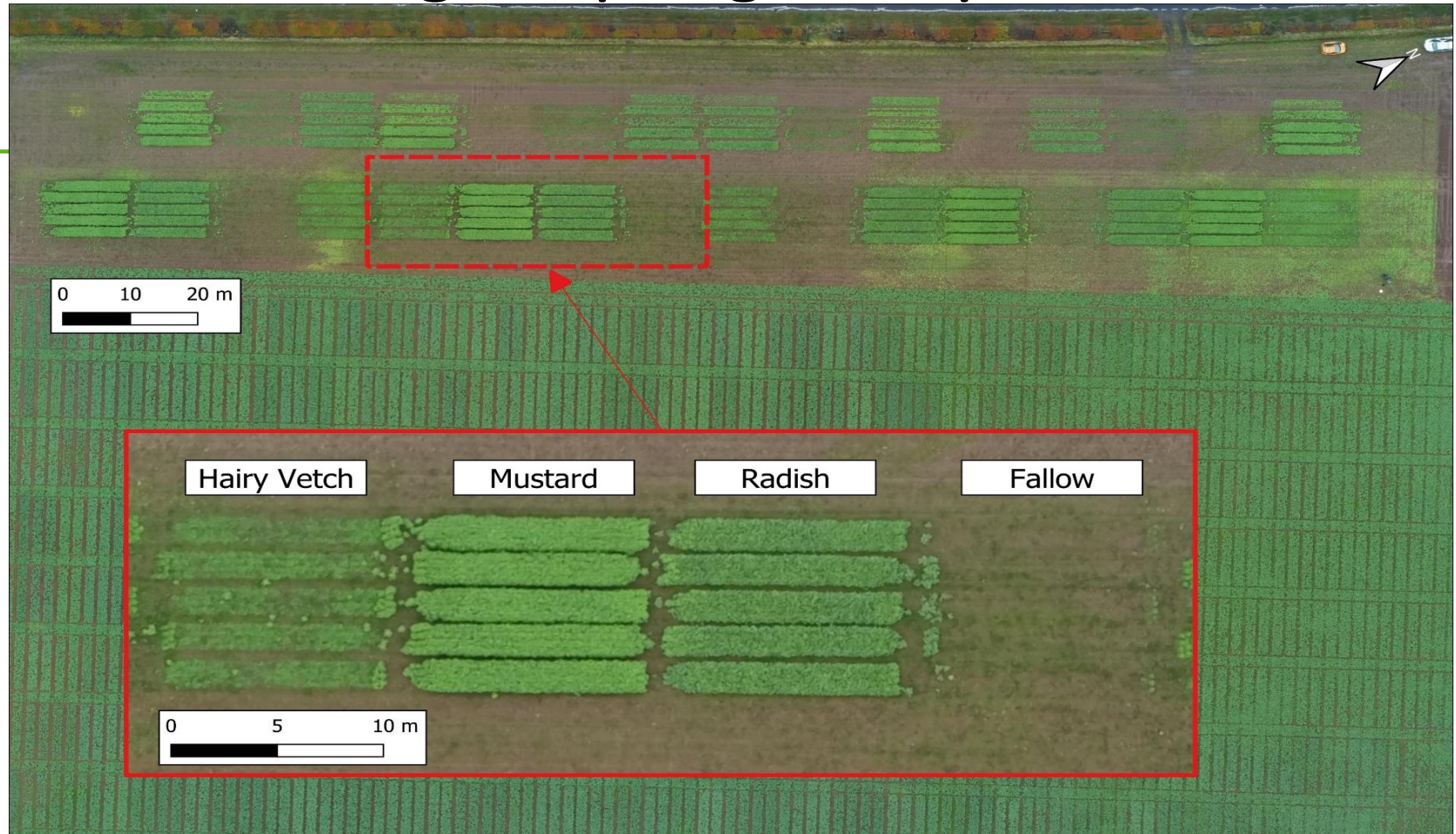
Yes    No    Planning to

Add your notes about biofungicides

# Regen Spring Barley

Min till

Plough



**Untreated** – no fungicide

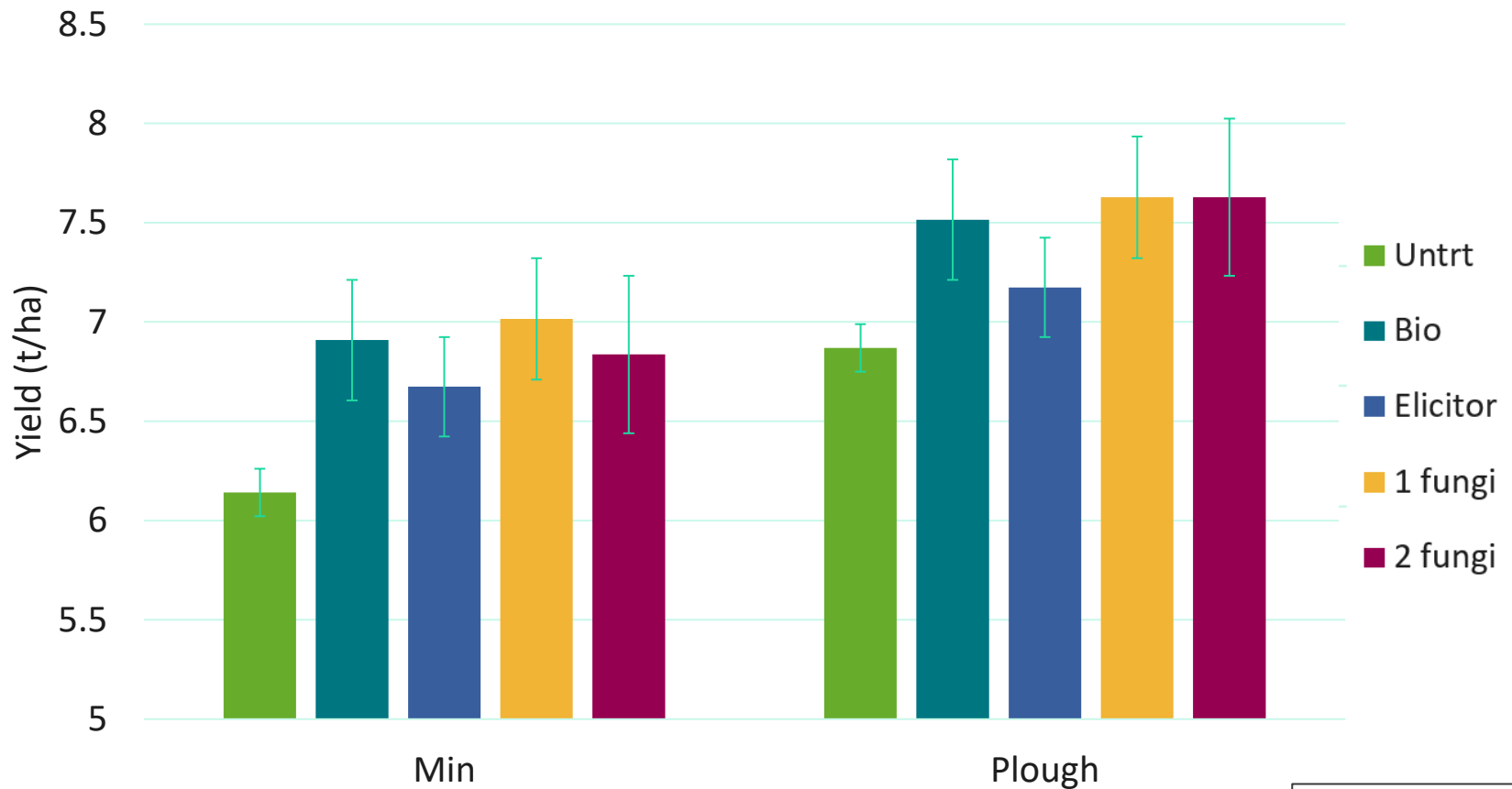
**Biological** – Serenade (1.0 l/ha) @GS 30. Revystar (0.5) + Folpet (0.5) @GS 45

**Elicitor** - Laminarin (0.75 l/ha) @GS 30. Revystar (0.5) +Folpet (0.5) @GS 45

**T2 fungicide only** – Revystar XE (1.0 l/ha) + Folpet (1.0 l/ha) @GS 45

**T1+T2 fungicides** – Ascra X Pro (0.6 l/ha) + Folpet (0.75) at GS 30. Revystar (0.75 l/ha)+folpet (0.75 l/ha) @GS45

# Regen Spring Barley - 2023



\*\*\* Tillage  
\*\*\* PPP  
NS Cover crop

# Regen Spring Barley – 2023 Fusarium

*Fusarium* detected in stem base tissue of barley  
 No symptoms of infection/disease  
 Not detected in corresponding soil samples



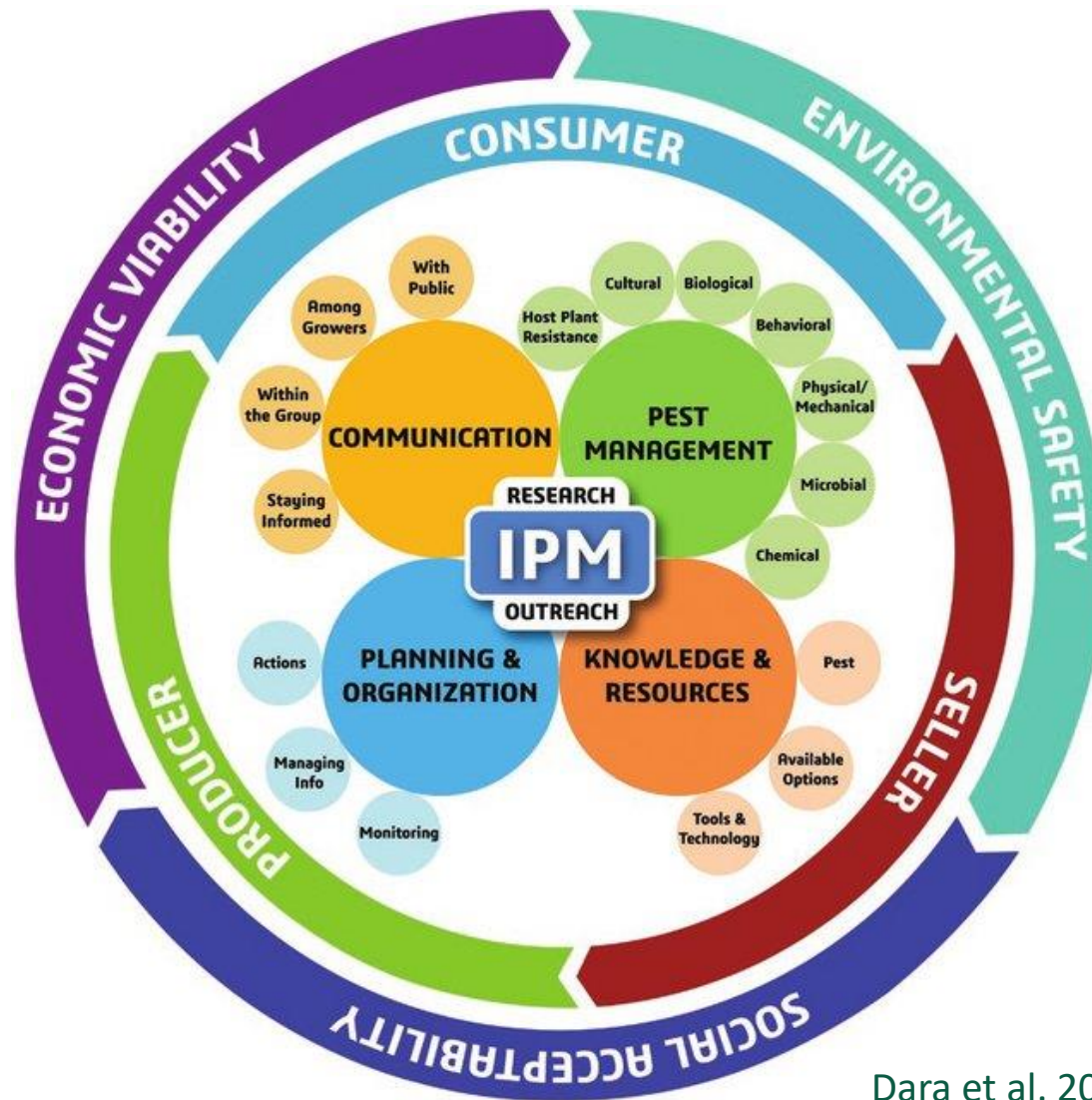
D= direct drill  
 P= plough

F=Fallow  
 M=Mustard  
 R=Radish  
 V=Vetch

Non-inversion tillage =  
 increased Fusarium risk?

Sample	F. aven	F. culm	F. gram	F. poae
DF1	Grey	Grey	Grey	Grey
DF2	Grey	Green	Grey	Grey
DF3	Green	Green	Grey	Grey
DF4	Green	Green	Grey	Grey
DM1	Grey	Grey	Grey	Grey
DM2	Green	Green	Grey	Grey
DM3	Grey	Green	Grey	Grey
DM4	Grey	Green	Grey	Grey
DR1	Grey	Grey	Grey	Grey
DR2	Green	Green	Grey	Grey
DR3	Grey	Green	Grey	Grey
DR4	Grey	Green	Grey	Grey
DV1	Grey	Green	Grey	Grey
DV2	Grey	Green	Grey	Grey
DV3	Grey	Grey	Grey	Grey
DV4	Grey	Green	Grey	Grey
PF1	Grey	Grey	Grey	Grey
PF2	Grey	Green	Grey	Grey
PF3	Grey	Green	Grey	Grey
PF4	Grey	Green	Grey	Grey
PM1	Grey	Green	Grey	Grey
PM2	Grey	Grey	Grey	Grey
PM3	Grey	Green	Grey	Grey
PM4	Grey	Green	Grey	Grey
PR1	Grey	Grey	Grey	Grey
PR2	Grey	Green	Grey	Grey
PR3	Grey	Green	Grey	Grey
PR4	Grey	Green	Grey	Grey
PV1	Grey	Green	Grey	Grey
PV2	Grey	Green	Grey	Grey
PV3	Grey	Green	Grey	Grey
PV4	Grey	Green	Grey	Grey

# Integrated approach needed to increase IPM adoption





# Acknowledgements

## VI/NFU/PHC IPM assessment plan

Henry Creissen, Hernan Degiovanni, Fiona Burnett, **SRUC**

Spencer Collins & Alison Taylor, **NFU**

Sonia Humphris, **PHC**

Neal Evans & Jim Orson, **Voluntary Initiative**



Creissen et al. 2019 *Pest Man.Sci.* **75**

Creissen et al. 2021 *Pest Man.Sci.* **77**

## Defra Test & Trials (IPM Tool and Grower Workshops)

Chris Hartfield, **NFU**

Phil Walker, Neil Paveley, John Gadsby, Kath Behrendt, **ADAS**

Henry Creissen, Elliot Meador, Hernan Degiovanni, **SRUC**



Department  
for Environment  
Food & Rural Affairs

## Barley IPM under reduced tillage

Henry Creissen, Neil Havis, James Douglass, **SRUC**

Adrian Newton, **James Hutton Institute**

Doug Christie, **Drurie Farm**, Leven



Scottish Government  
Riaghaltas na h-Alba  
gov.scot



# Abstract deadline 1<sup>st</sup> Nov

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The image shows a screenshot of the website for the Association for Crop Protection in Northern Britain (CPNB) Conference. The header features the organization's logo on the left, which consists of a stylized plant with roots and leaves. To the right of the logo, the text reads "Association for Crop Protection in Northern Britain CONFERENCE". Further right, there are two prominent buttons: a dark blue button labeled "SUBMIT POSTER / PAPER" and a green button labeled "REGISTER". Below these buttons is a horizontal navigation menu with the following items: "ABOUT CPNB", "NEWS", "PROGRAMME", "SPEAKERS", "VENUE INFO", and "SPONSORS". The main banner area below the header features an aerial photograph of agricultural fields in shades of green and yellow. Overlaid on this image is the text "CPNB 2024: The Dundee Conference" in a large, white, sans-serif font.

Association for  
Crop Protection  
in Northern Britain  
CONFERENCE

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[Submit an abstract for CPNB 2024 - Association of Applied Biologists \(aab.org.uk\)](http://aab.org.uk)