

Measuring IPM adoption

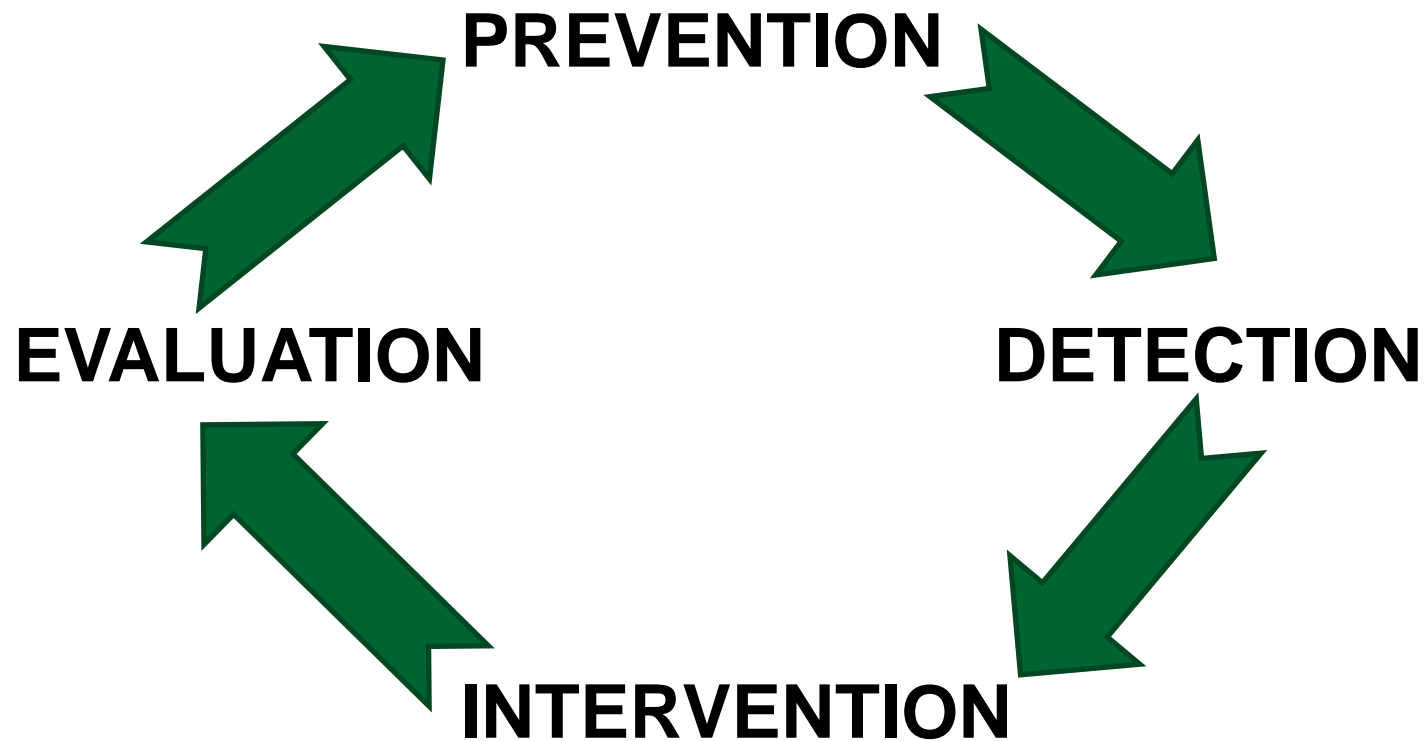
Dr Henry Creissen

*Research Fellow in Crop Protection
Scotland's Rural College*



Leading the way in Agriculture and Rural Research, Education and Consulting

Integrated Pest Management process



VI/PHC 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



**Pest Management
Science**

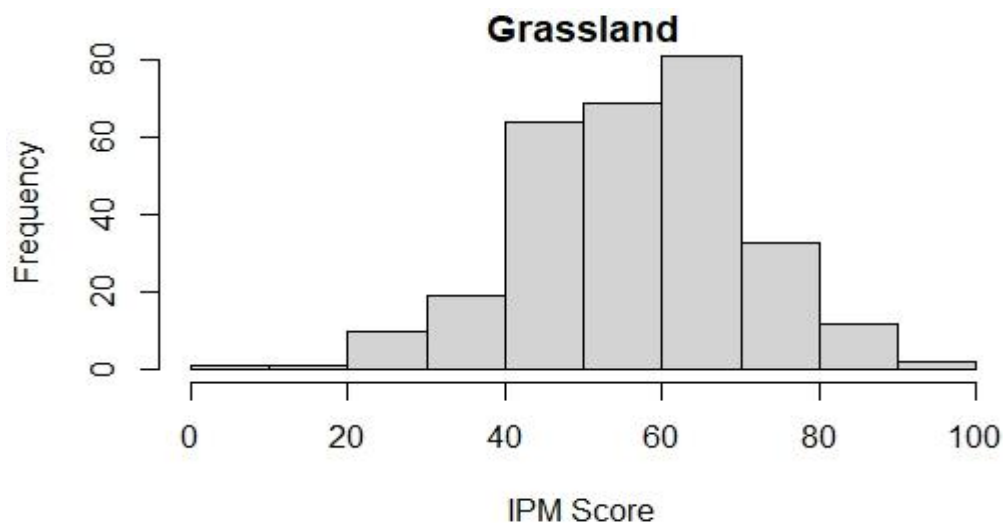
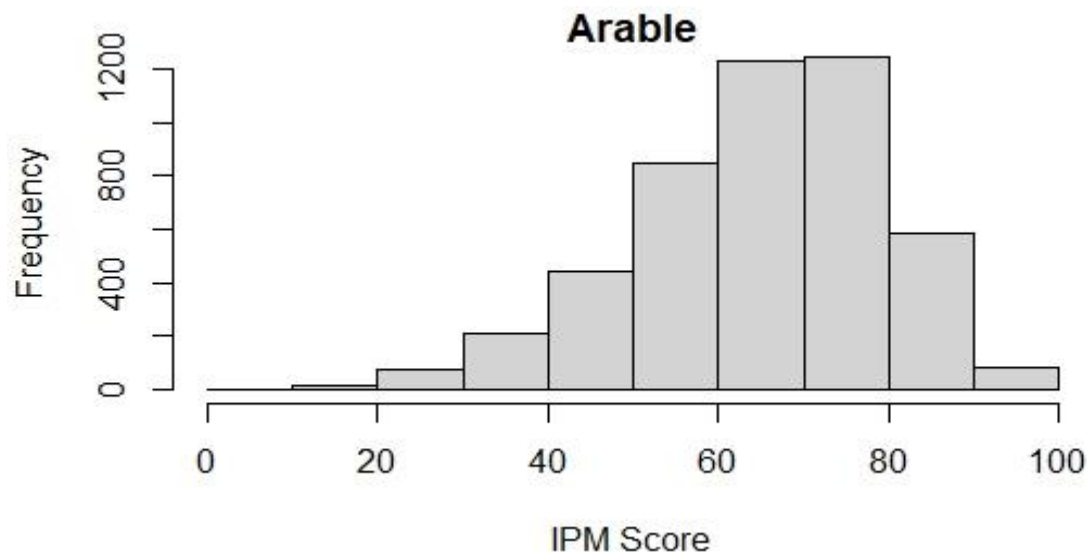


Research Article

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

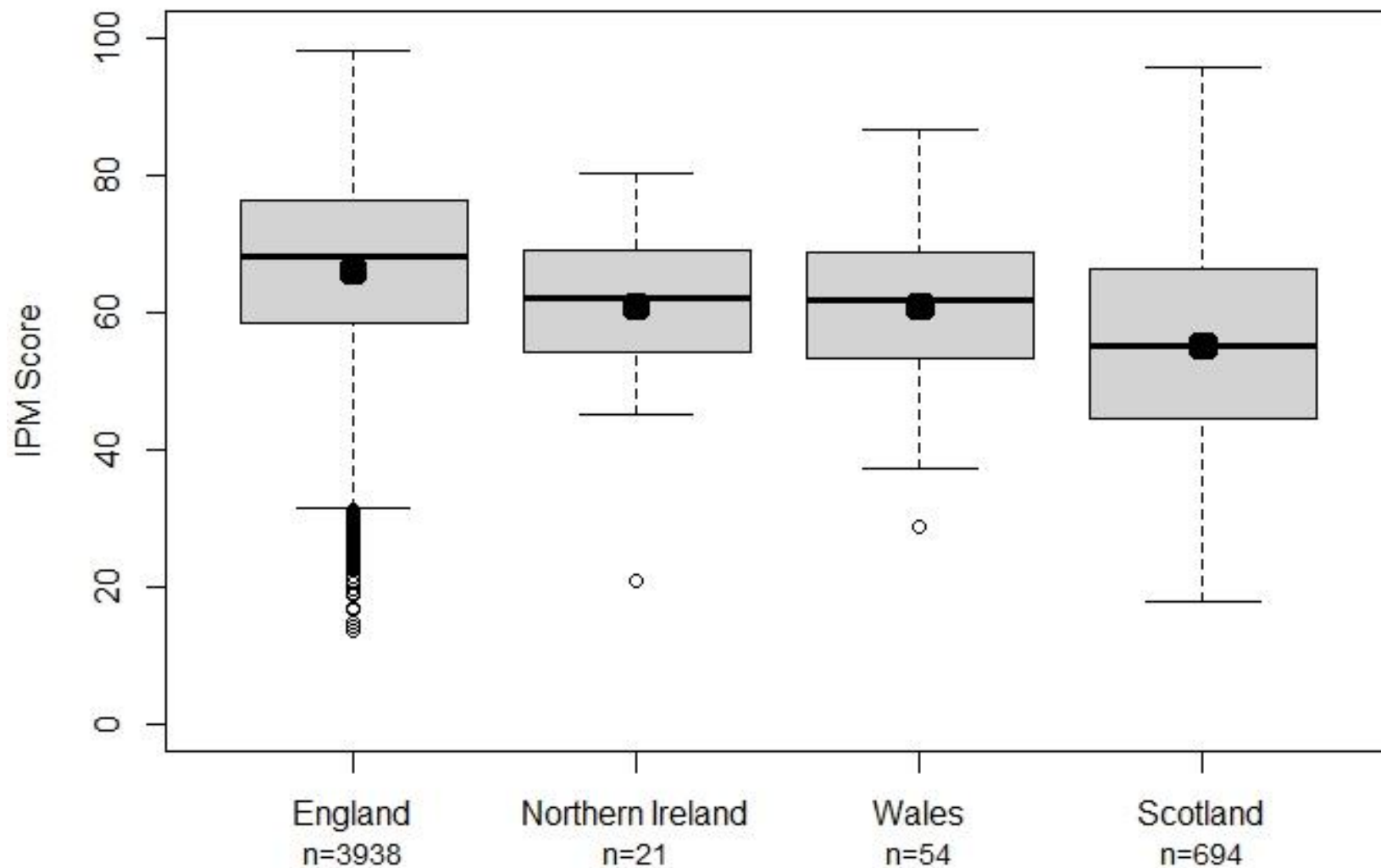
Scottish IPM Assessment Plan

Distribution of IPM scores

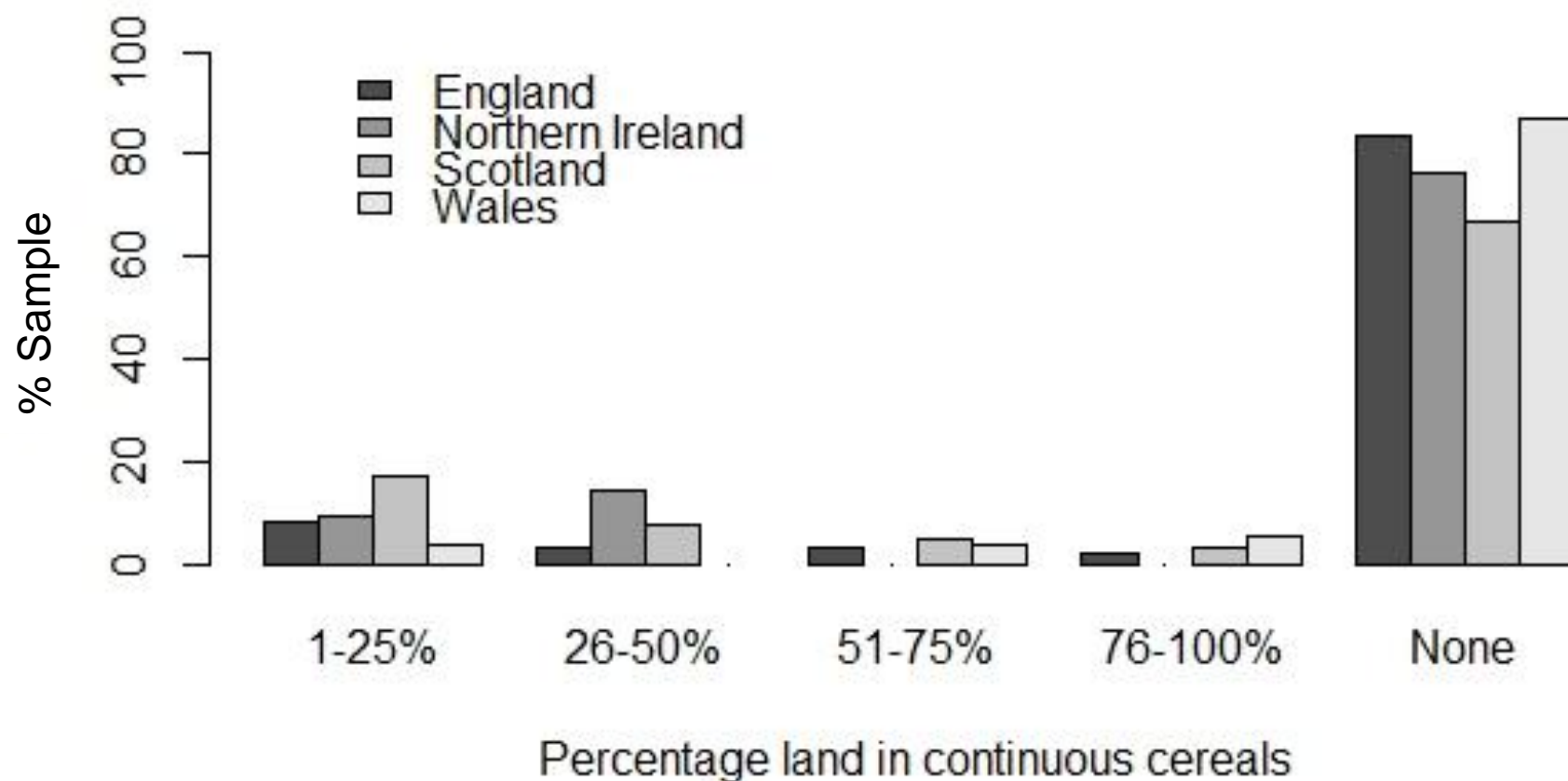


	Arable	Grassland
No. completed	4723	292
Mean score	64.8	56.9

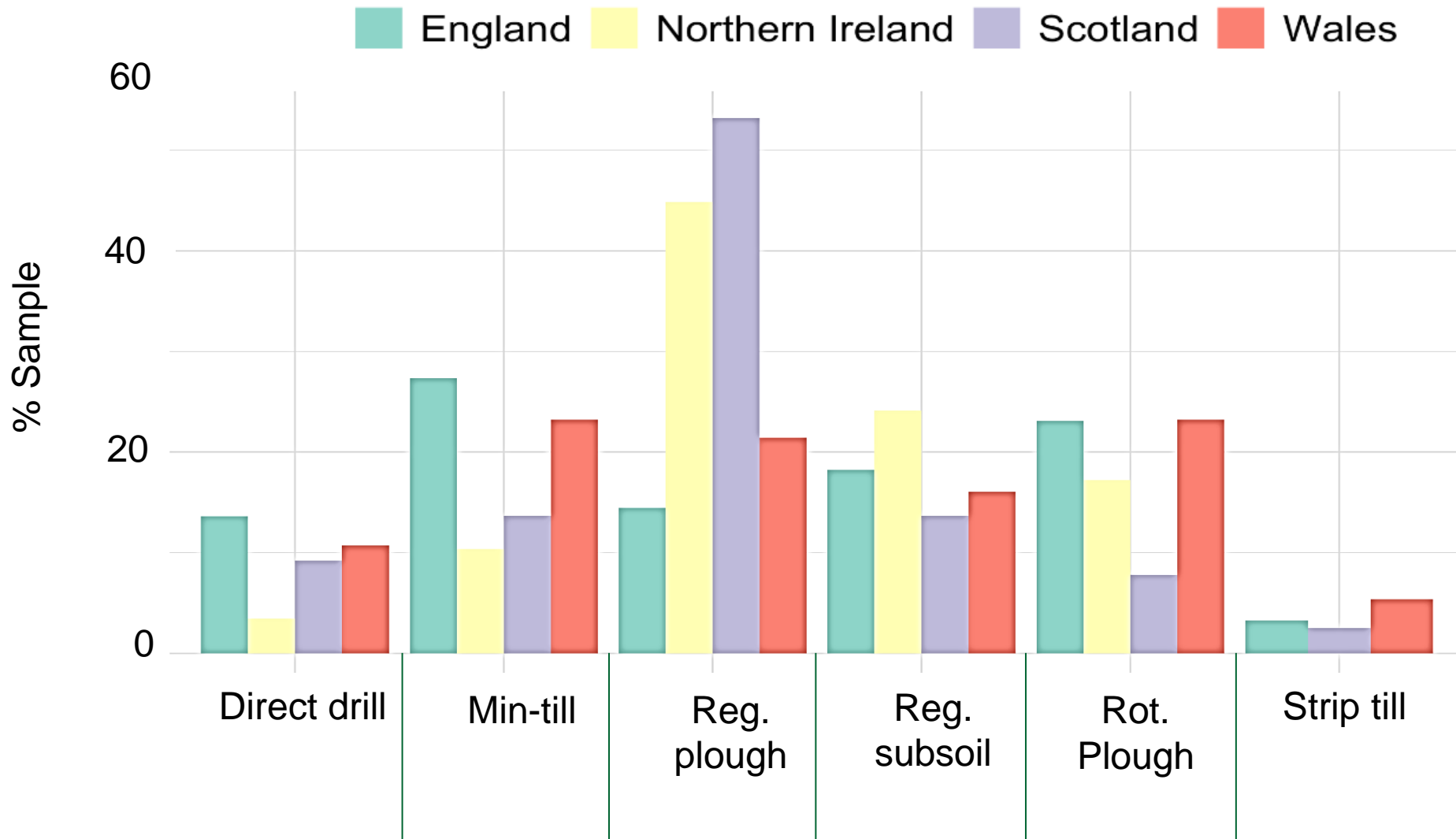
Country difference: Arable IPM



Rotations: continuous cereals (5+ years of cereals in same field)



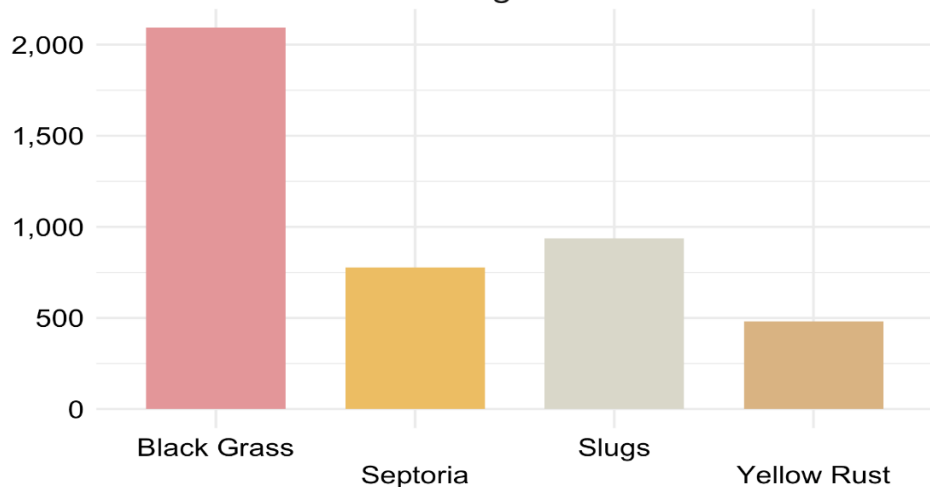
Soil cultivation



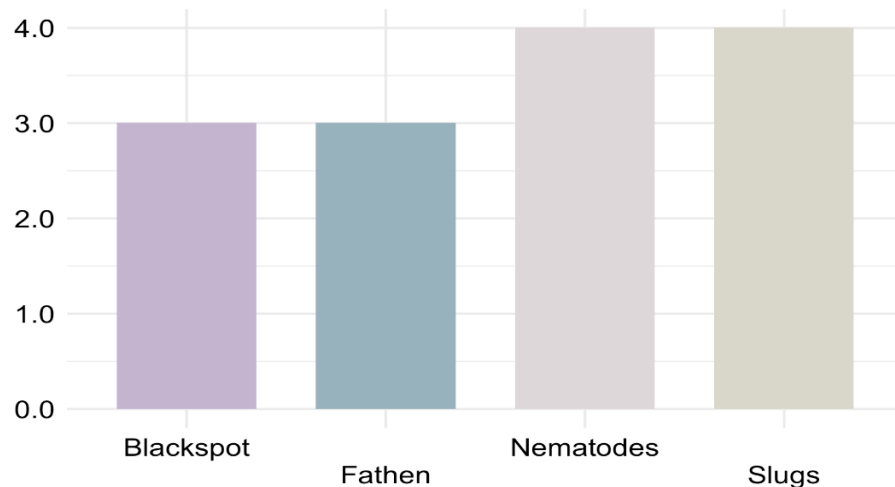
Problem pests: Arable



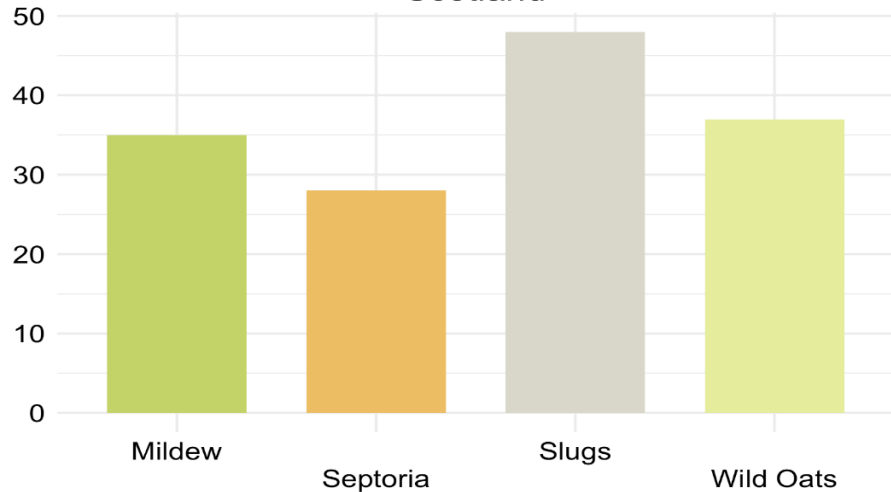
England



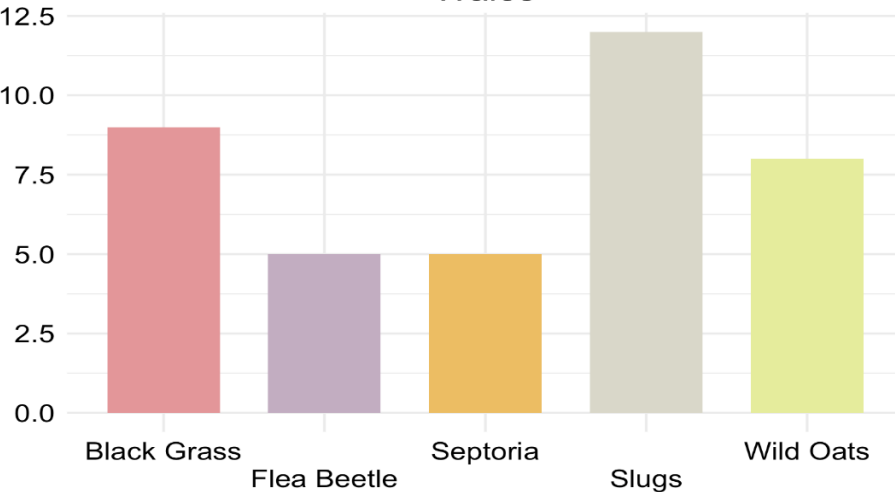
Northern Ireland



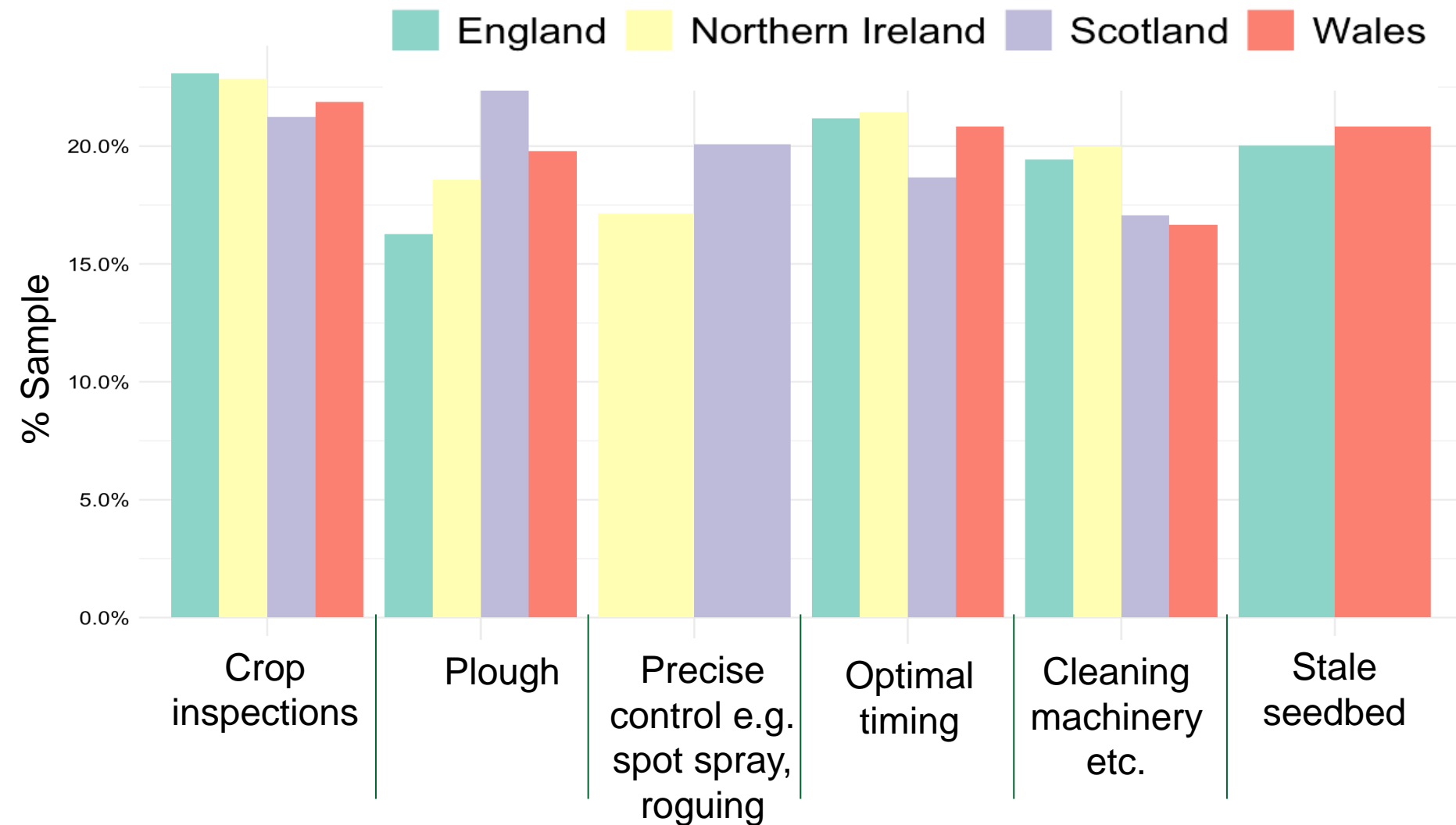
Scotland



Wales



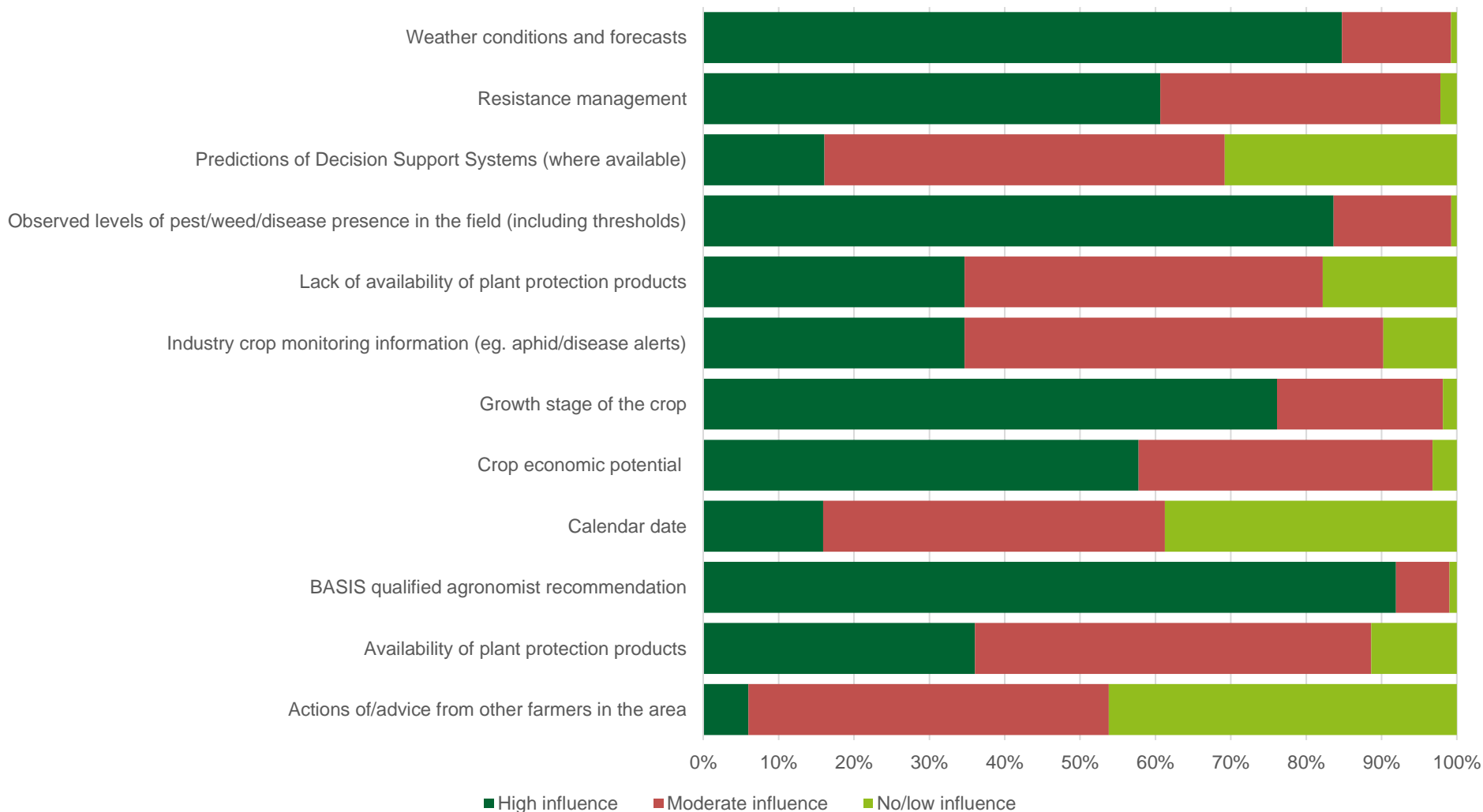
Weed Prevention: Arable



Factors influencing decision to adjust spray programme



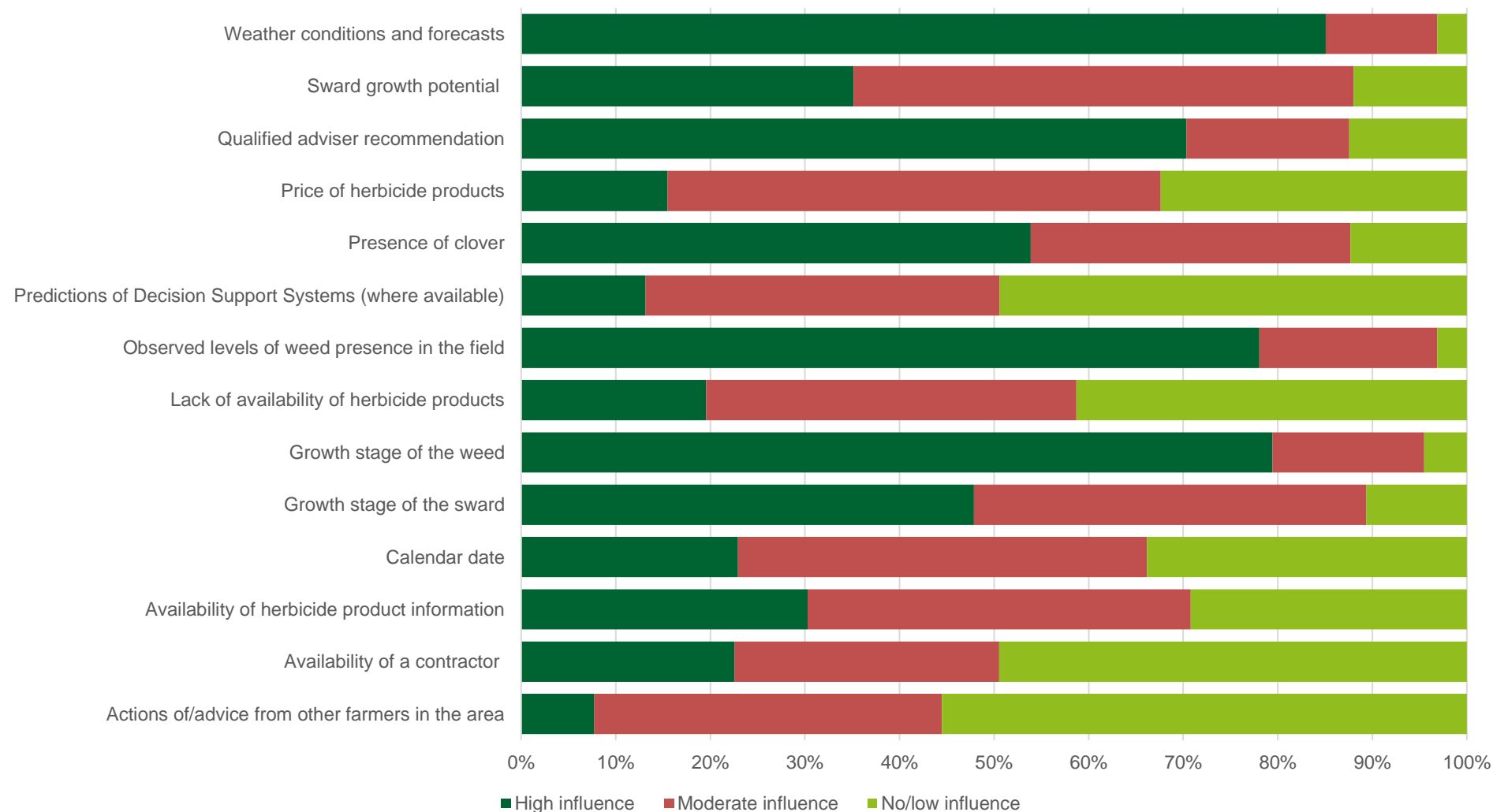
Arable



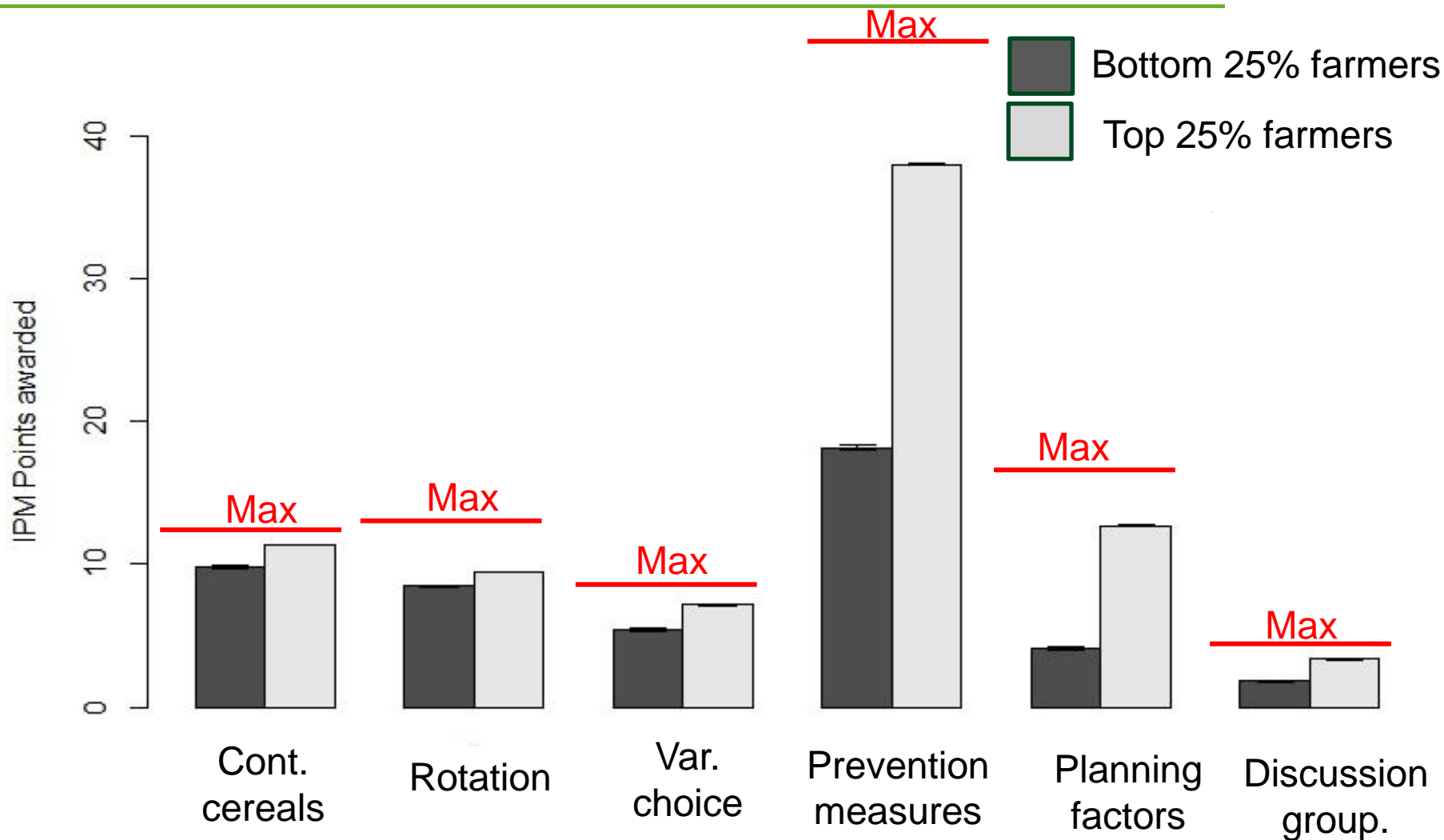
Factors influencing decision to adjust spray programme



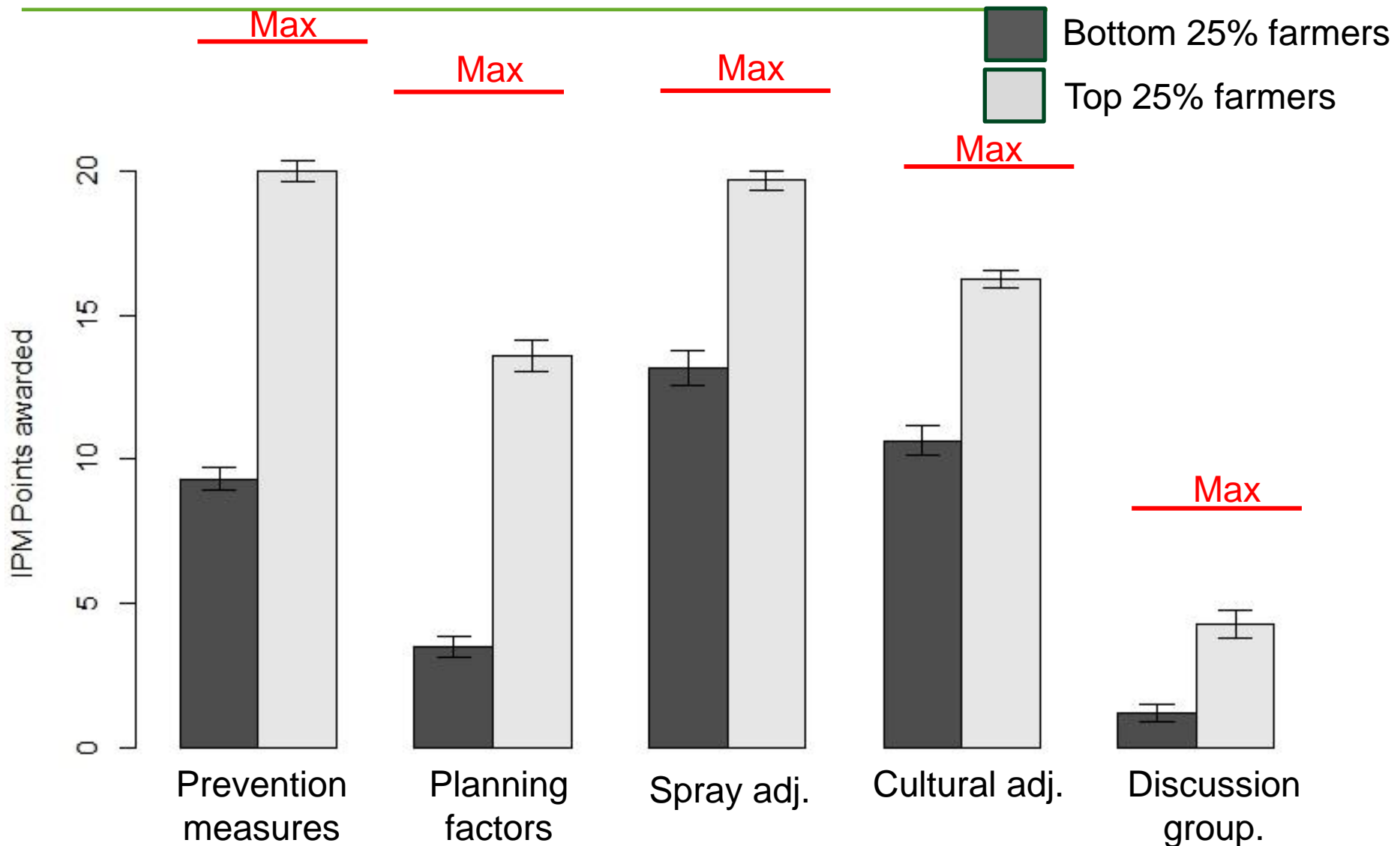
Grassland



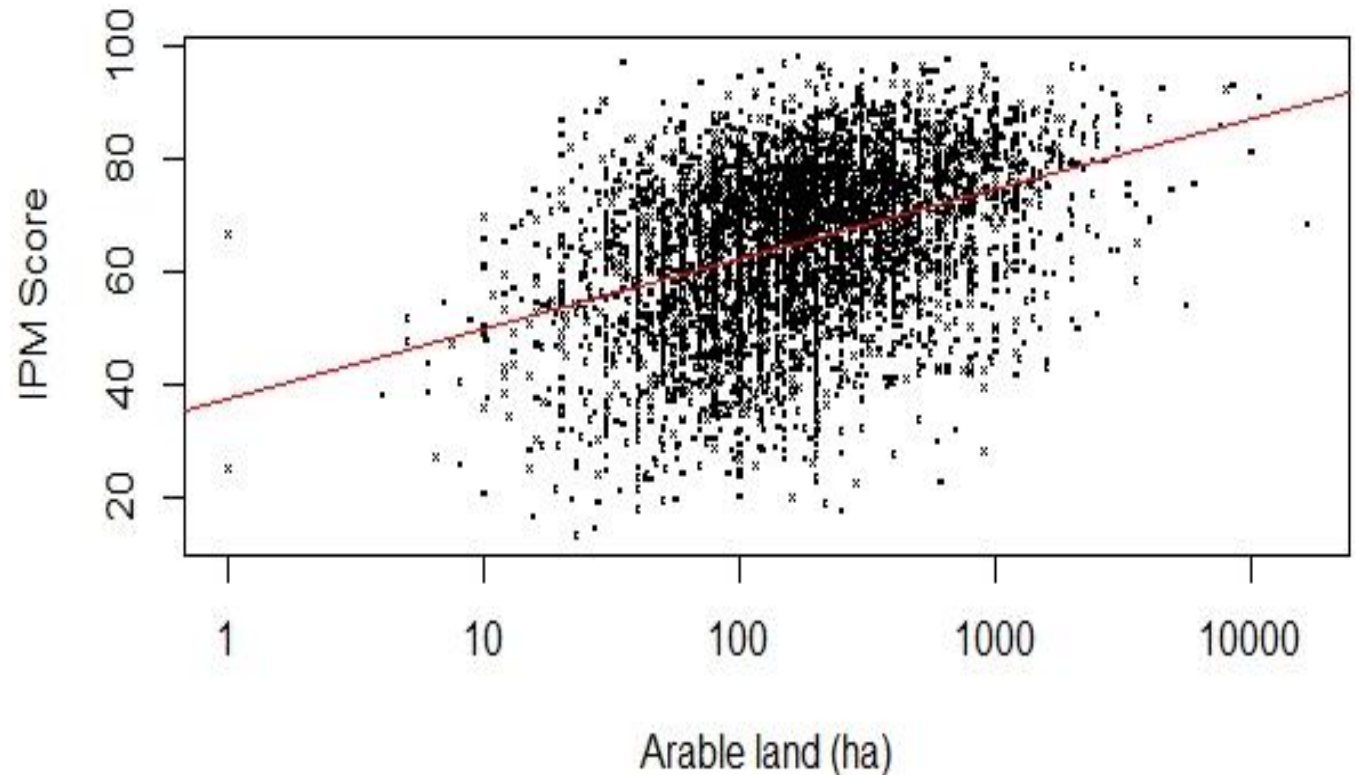
Arable: High/Low IPM adopters



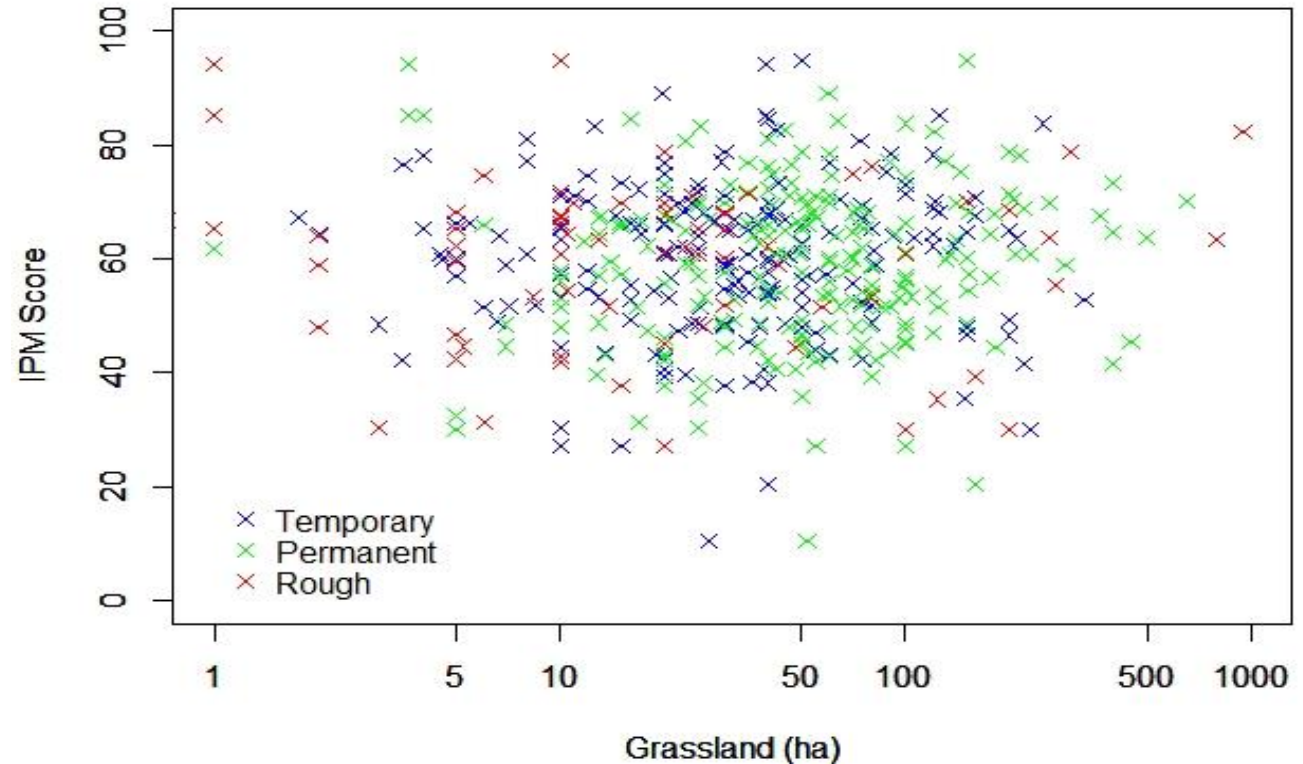
Grassland: High/Low IPM adopters



IPM Score - Arable area

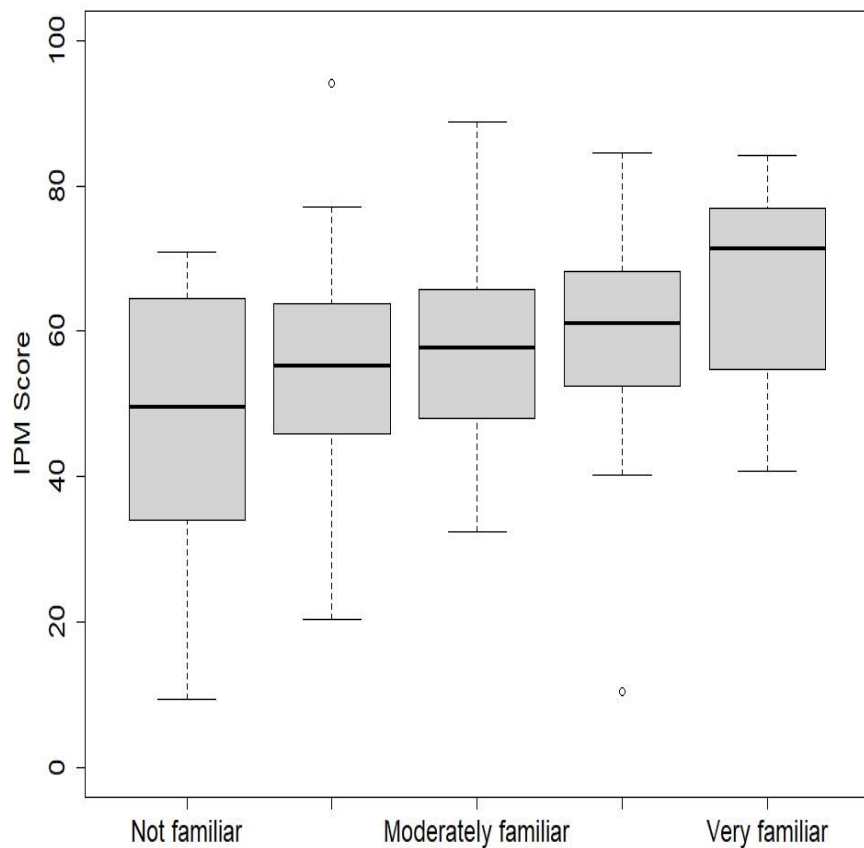


IPM Score - Grass area

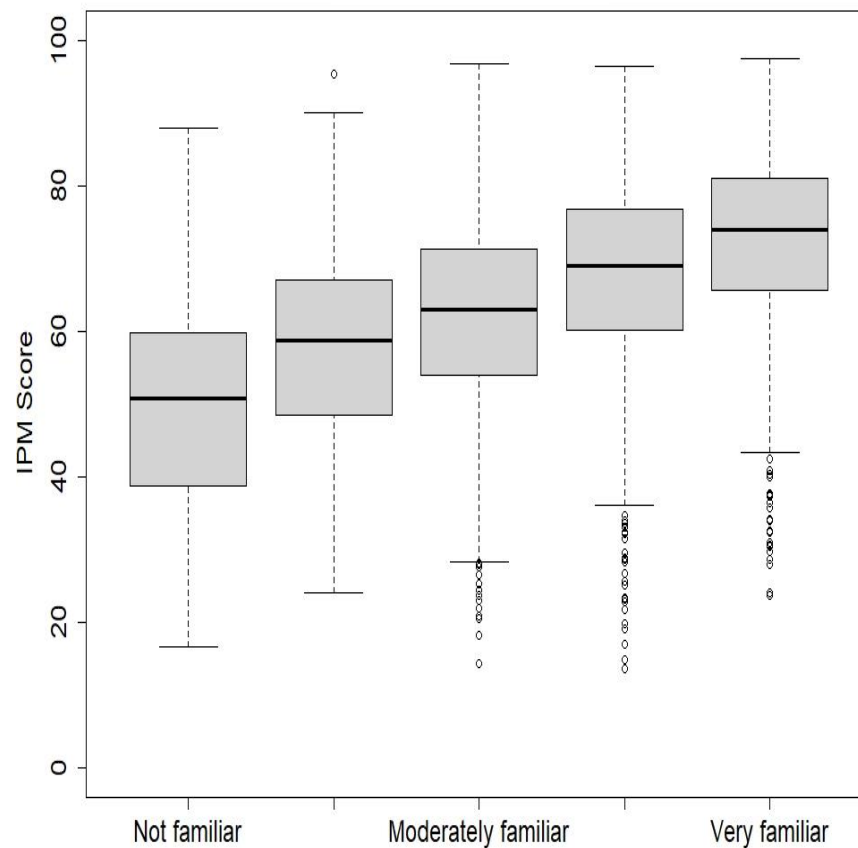


Knowledge => Uptake

Arable

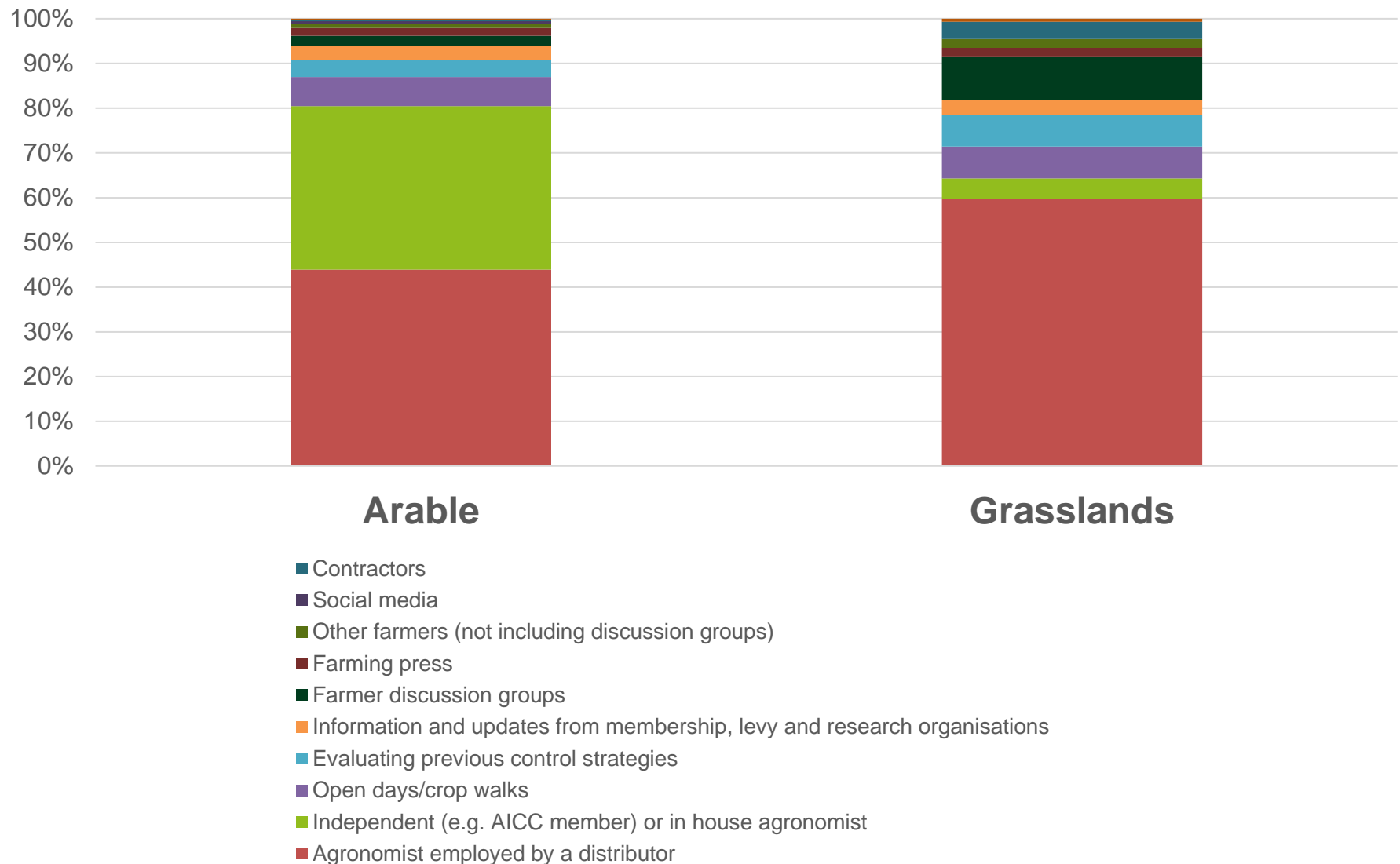


Grassland

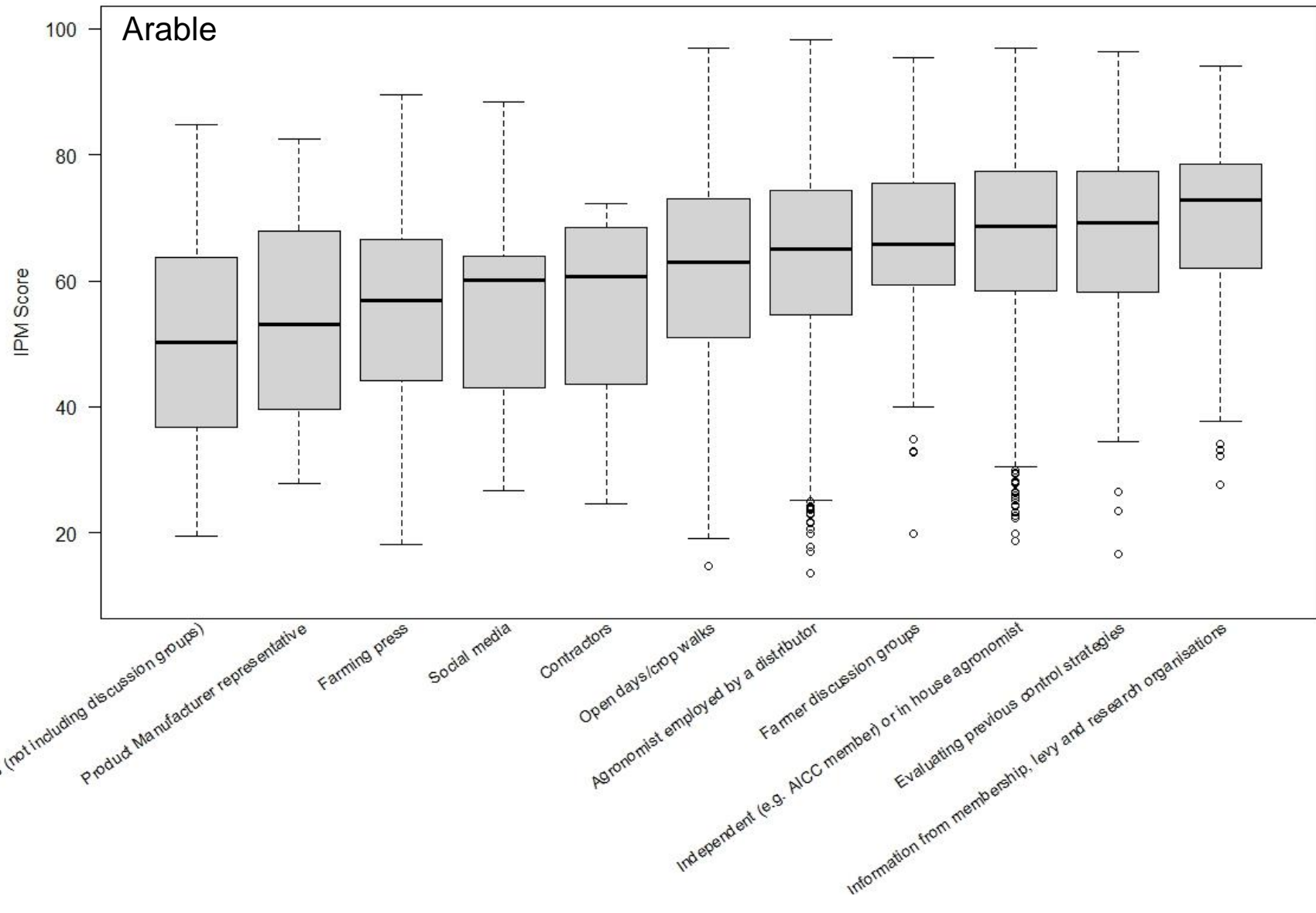


Q. How familiar are you with IPM? (1-5 scale)

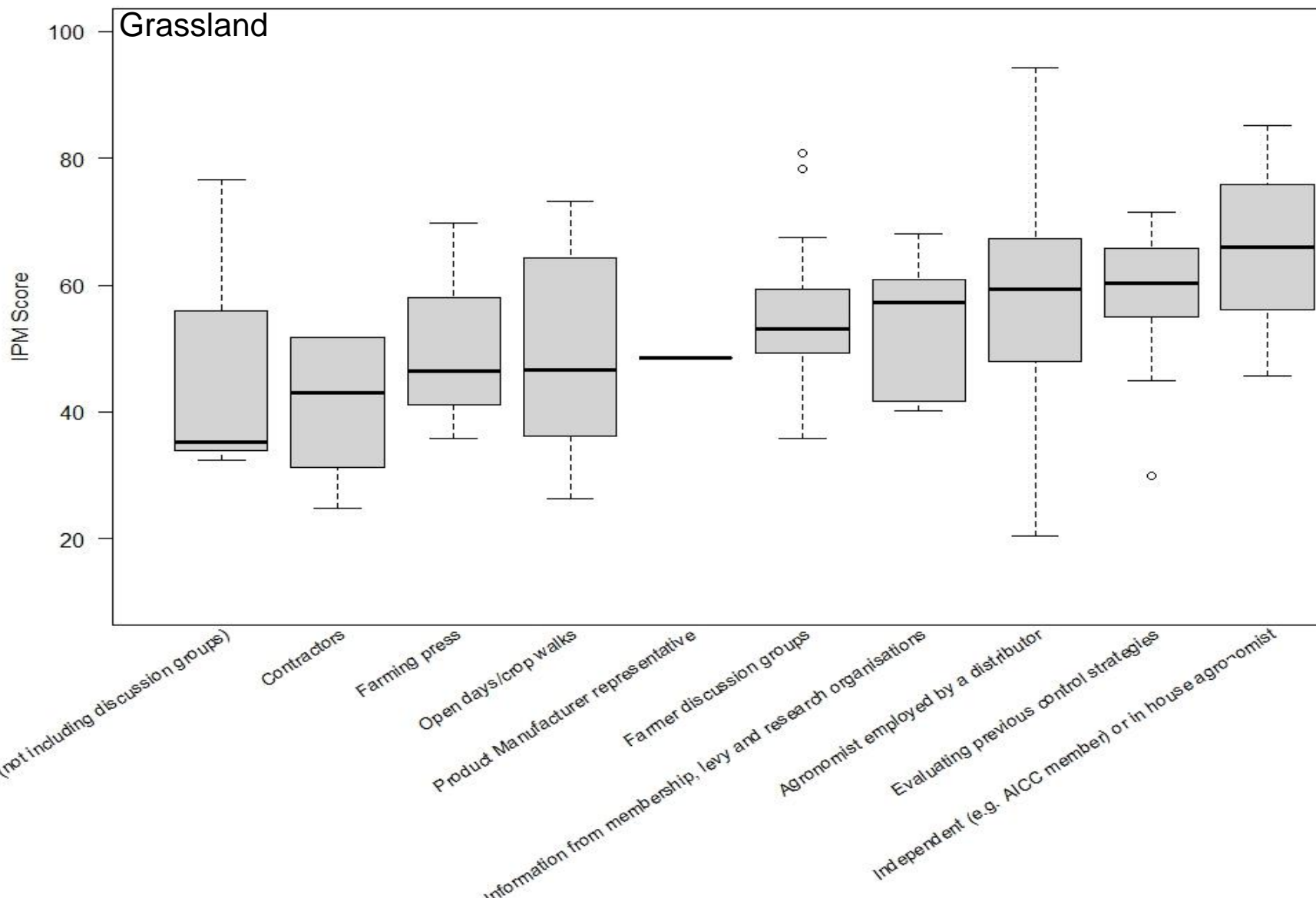
Info source preference



Information source is key



Information source is key



VI/PHC IPM assessment plans



- ◆ Assess overall IPM strategy
- ◆ Tool to facilitate discussion => IPM action plan
- ◆ High adopters:
 - ◆ More preventative measures
 - ◆ Consider more factors when IPM planning
 - ◆ Actively seek IPM knowledge
- ◆ IPM advice: clear, consistent, evidence-based
- ◆ Continually developing sector specific plans
 - ◆ Arable
 - ◆ Grassland
 - ◆ Specialist horticulture (coming soon)



Crop Specific IPM plans (LMP)



253_NFU_IPM_Completed LMP tool example Wheat_MS2.8 - Last Modified: 30 March																
File Home Insert Page Layout Formulas Data Review View Help																
C24 Drilling method																
Pest Issues																
For pest identification guidance use https://ahdb.org.uk/pests																
		BYDV aphid vectors	Cereal leaf beetle	Frit fly	Gout fly	Leatherjackets	ClwBM	Saddle gall midge	Slugs	Summer aphids	Wheat bulb fly	Wireworms				
		https://ahdb.org.uk/co-aphids					https://ahdb.org.uk/knowledge-library/how-to-identify-wheat-blossom-aphids	https://ahdb.org.uk/saddle-gall-midge	https://ahdb.org.uk/slugs	https://ahdb.org.uk/co-aphids	https://ahdb.org.uk/knowledge-library/how-to-manage-wheat-bulb-fly-risk-in-cereals					
		Slight Issue	No Issue	No Issue	No Issue	No Issue	Slight Issue	No Issue	Moderate Issue	Slight Issue	No Issue	No Issue	Links to Guidance			
Control Measure	Rotation / Other	Avoid following long-term ley Break crops Beetle banks Diverse field margins Soil analysis Spatial separation		?		?	In Use	?		In Use		?				
	Crop Establishment	Drilling method Extra cultivations Increase seed rate to suit sowing date Minimise trash/crop residues Seedbed quality Delayed sowing Early Sowing Varietal selection	Direct drilling in dry conditions can maintain a consolidated seedbed and limit slug damage. However, in wet conditions it may produce slots that give slugs easy access to seeds. Depth of drilling can also have an impact on slug damage. Ideally wheat should be drilled at 30-40 mm to minimise damage. Sowing deeper than this will reduce establishment and increase susceptibility to slugs and other pests				?	?	In Use Not Used In Use In Use In Use		?	?				
	Crop Management	Rolling soil post-planting Decision Support Tools					Short	?	?	In Use	?					
		Link to Decision Support Tools					https://ahdb.org.uk/bydv			https://insecsurvey.com/aphid/	?					
		Monitoring Planning pest management strategy	In Use	?	?	?	In Use	?	?	In Use	?	?				
	Resistance Assessment	Do you suspect resistance to plant protection products used to control this issue?	No	?	?	?	No	?	No	No	?	?				
		Have you checked with IPAG if resistance has been reported in the UK?		?	?	?		?			?	?				
		Has Resistance been found?		?	?	?		?			?	?				
		Have you implemented near resistance management		?	?	?		?			?	?				

Crop Specific IPM plans (LMP)



Non- chemical control strategies in arable crops – Weeds in cereals		Annual grasses									BLW - tap root								
		Effectiveness	Strength of the evidence	Inexpensive to implement	Economic Importance	Ease of implementation	Speed of impact	Current use	Potential Use	References	Effectiveness	Strength of the evidence	Inexpensive to implement	Economic Importance	Ease of implementation	Speed of impact	Current use	Potential Use	References
Current chemical control for comparison	Sensitive weeds	4									4								
	Herbicide resistant grasses	1									1								
	Herbicide resistant BLW	4									4								
Crop planning	Fallow	4	3	4	5	4	4	4	4		1	4	4	3	4	4	3	3	127
	Field history, rotation & break crops	4	3	3	5	5	4	4	4	148,391,247,567	4	5	3	3	5	4	3	3	374
	Select low-risk locations	3	4	3	5	4	4	3	3		4	4	3	3	4	4	3	3	
Pre-cropping	Drainage	2	2	4	5	2	3	3	4	59,423									
	Early harvest	4	3	4	5	3	4	4	4	297,425,557									
	Flooding	3	2	3	5	2	4	1	1	536	3	2	3	3	2	4	1	1	536
	Hygiene	4	4	4	5	5	5	4	5	79,347,275,545	2	4	4	3	5	5	3	3	294
	Primary cultivations (crop residue burial)	4	4	3	5	4	5	4	5	343,388,453,568	4	3	3	3	4	5	3	4	
	Secondary cultivations (drilling method)	4	4	3	5	4	3	4	5	343	3	4	3	3	4	3	4	4	401
	Seed rate	4	4	2	5	5	3	4	4	343	3	3	2	3	5	3	3	3	
	Seedbed quality	3	3	3	5	2	3	3	3		3	3	3	3	2	3	3	3	
	Sowing date	4	4	2	5	2	4	4	4	343,390,83,371	4	4	2	3	2	4	4	4	83
	Stubble management	4	3	3	5	4	3	4	4	391,393	4	3	3	3	4	3	3	4	13,237
	Use of cover crops	3	2	2	5	2	4	2	4	314,410,147	4	2	2	3	2	4	2	4	314
	Varietal choice	3	3	3	5	3	4	3	4	343,76,133,131	3	3	3	5	3	4	3	4	
	Varietal mixtures																		
	Bioprotectants & low risk PPP's	2	2	2	5	2	2	1	2	490,178	2	2	2	3	2	2	1	2	490,178
	Decision support (excluding thresholds)	2	2	4	5	2	2	2	2	354	4	2	4	2	2	2	2	2	354



Crop Specific IPM plans (LMP)



- ◆ Focussed on effective evidence-based IPM methods
- ◆ 1-2 hours
 - ◆ Enables farmers to create IPM LMPs
 - ◆ Guides users towards effective IPM methods
 - ◆ Provides users with links to further guidance
 - ◆ Records current implementation of IPM
 - ◆ Records commitments to implement additional IPM

Behavioural Insight (interview) results

- ◆ Key barriers to uptake of IPM practices were highlighted as **'economic'**, **'lack of knowledge or understanding of IPM'**, and **'mindset or habits'**

Measuring to inform IPM decisions

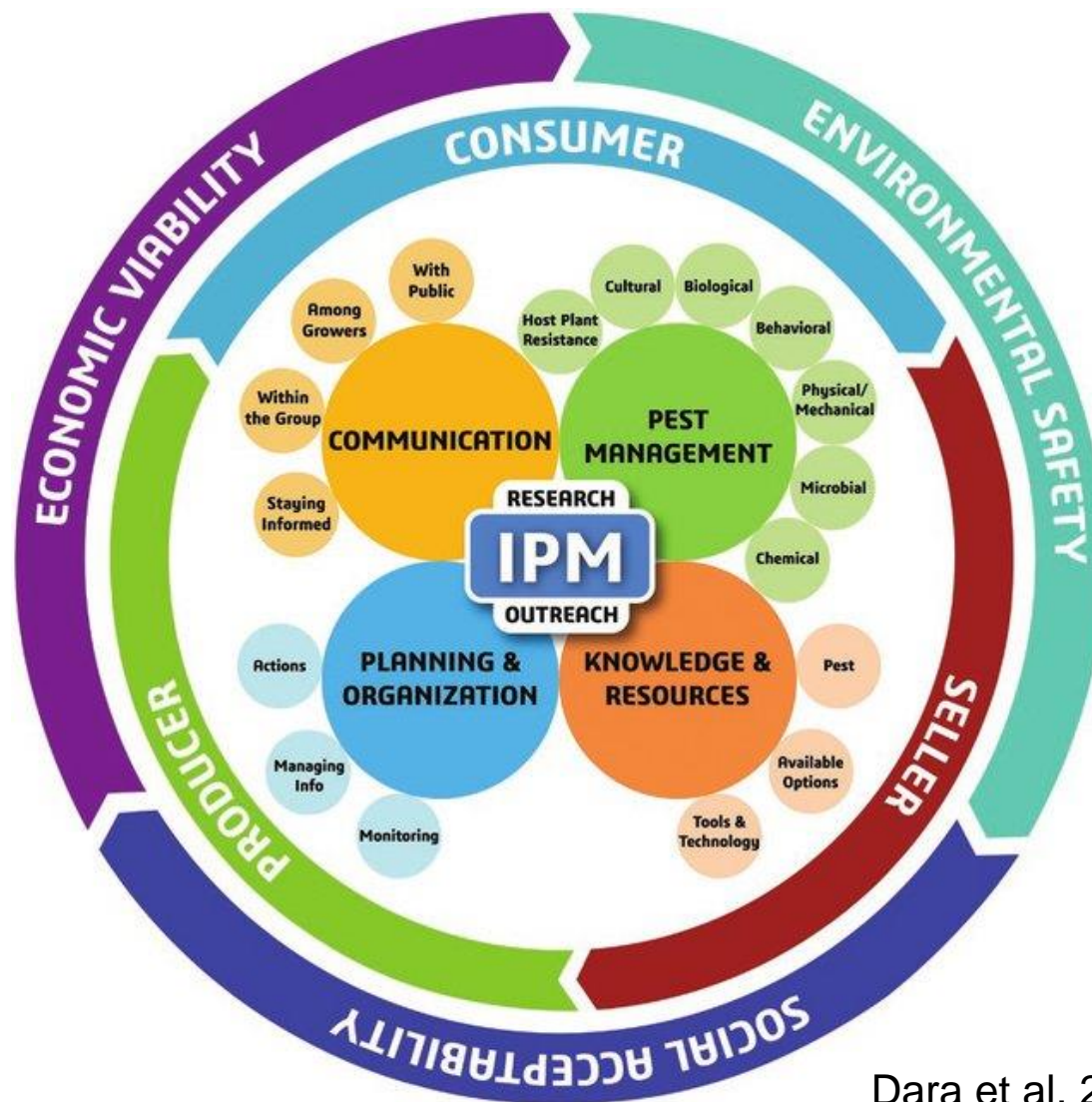


- ◆ Assess overall strategy
 - ◆ Benchmark against yourself
 - ◆ Action plans to increase IPM adoption
- ◆ Crop*pest specific approaches
 - ◆ What are the pest x crop issues?
 - ◆ Current adoption recorded
 - ◆ What did/didn't work?
 - ◆ => Next steps

A screenshot of a spreadsheet titled '2018 NFU IPM Completed IPM tool example Wheat_M02.8 - Last Modified: 30 March'. The spreadsheet is organized into sections: 'Pest Issues', 'Crop Establishment', 'Crop Management', and 'Resistance Assessment'. Each section contains a table with various pest and management factors, and a corresponding 'In Use' or 'Not Used' status. The 'Resistance Assessment' section at the bottom includes a table with columns for 'Pest', 'Resistance', 'In Use', and 'Not Used', with rows for different pests and resistance levels. The spreadsheet is displayed in a web browser window with standard navigation tabs and a status bar at the bottom.

Reduction in risk associated with pests and pesticides

Integrated approach needed to increase IPM adoption



Acknowledgements

- VI/NFU/PHC IPM assessment plan
- Henry Creissen & Elliot Meador, SRUC
- Spencer Collins & Alison Taylor, NFU
- Fiona Burnett, SRUC
- 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**

- Test & Trial Funding: Defra
- *Project management*
- Chris Hartfield, NFU, Phil Walker & Neil Paveley, ADAS
- *IPM Land Management Plan tool*
- John Gadsby, ADAS
- *Behavioural insight*
- Kath Behrendt, Holly Clarkson, Kathleen Wolton & Olivia Green, ADAS



Measuring IPM adoption

Dr Henry Creissen
Scotland's Rural College



SRUC



Department
for Environment
Food & Rural Affairs



Thank you