IWMPraise

Integrated Weed Management: PRActical Implementation and Solutions for Europe

IWMPRAISE

European Commission

HORIZON 2020

Introduction to IWMPraise project

- 5 year project, started June 2017
- 8 European countries (UK, DL, DK, FR, IT, ES, SI, CH)
- >40 collaborators
- Led by Per Kudsk, Aarhus University, Denmark
- UK work mainly being led by NIAB/TAG and Rothamsted Research

"We know what we should be doing so why isn't IWM standard practice in the industry?"

ROTHAMSTED RESEARCH

HORIZON 2020

Objectives

- 1. To quantify and address current socio-economic and agronomic barriers to the uptake of IWM across the cropping system, including perceived short term economic losses and resistance to change. Output: **Review of barriers to IWM uptake in Europe.**

- 2. To develop novel alternative weed control measures and optimise the efficacy, applicability and use of novel as well as existing alternative weed control measures as stand-alone methods or in combination with other methods. Output: **a 'tool box' of validated IWM methods.**

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Objectives

- 3. To design, demonstrate and assess the performance and environmental and economic sustainability of IWM strategies in various management scenarios. In each country, lead users and end users, research institutes and SMEs will work closely together. Output: **validated context specific IWM strategies for the various management scenarios that address the needs and concerns of end users.**
- 4. To make the results known publicly through dissemination and outreach, and development of educational and training programmes to support the adoption of IWM by European farmers. Output: **On-line information, farmer's field days, educational programmes, dissemination tools**

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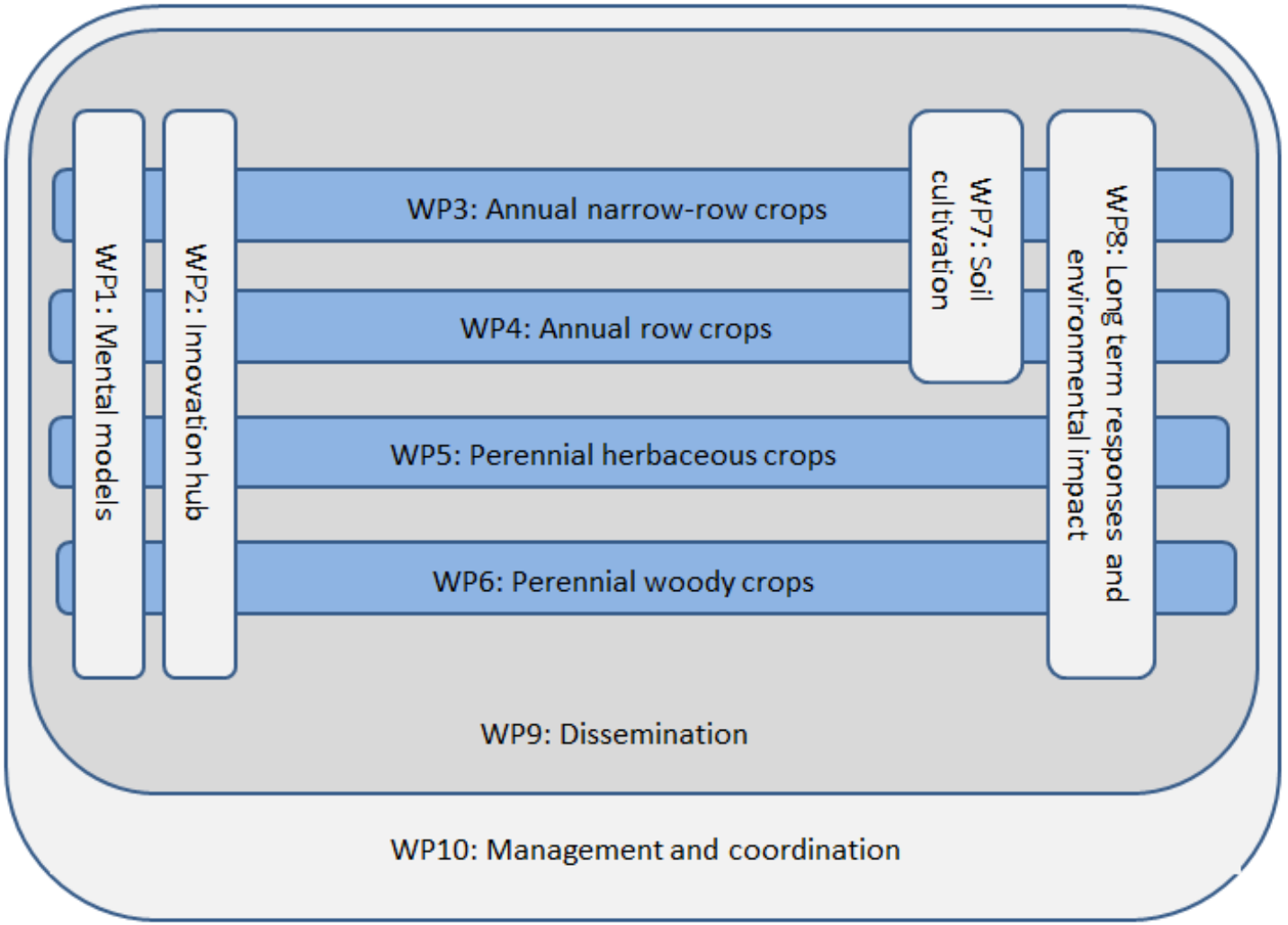
Structure of the project



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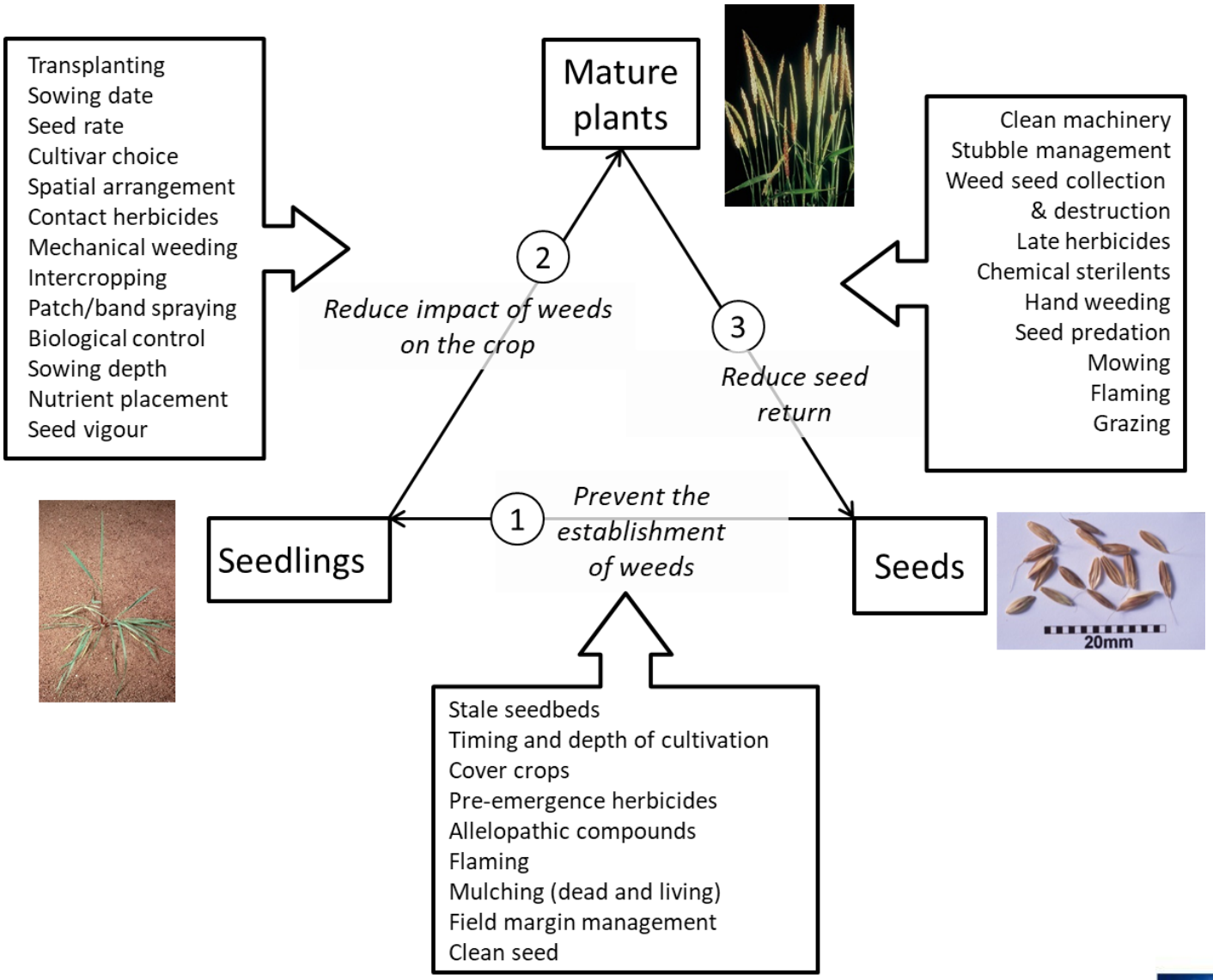
At the heart of the project is our Toolbox



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How widely are these tools being used?

- The same protocol / questions was used across all participating countries and cropping systems
- 4 sections:
  1. Farmer / farm details (size, ownership, problem weeds)
  2. What they do on there farm to control the weeds they have
  3. Factors that affect the decision making process
  4. Where they access information to make weed control choices

- Tried to avoid leading questions as much as possible
- Interviews recorded and then transcribed

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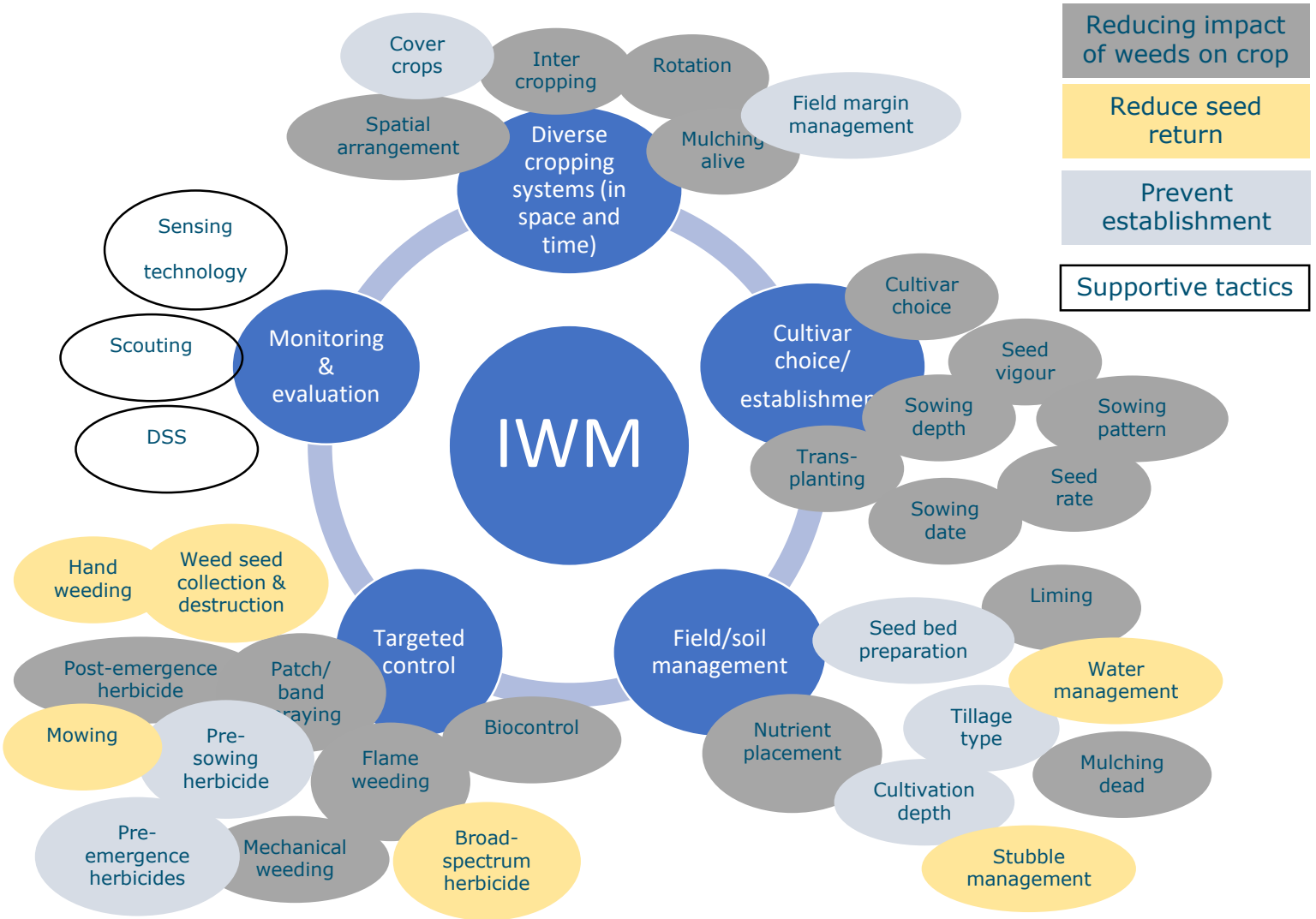

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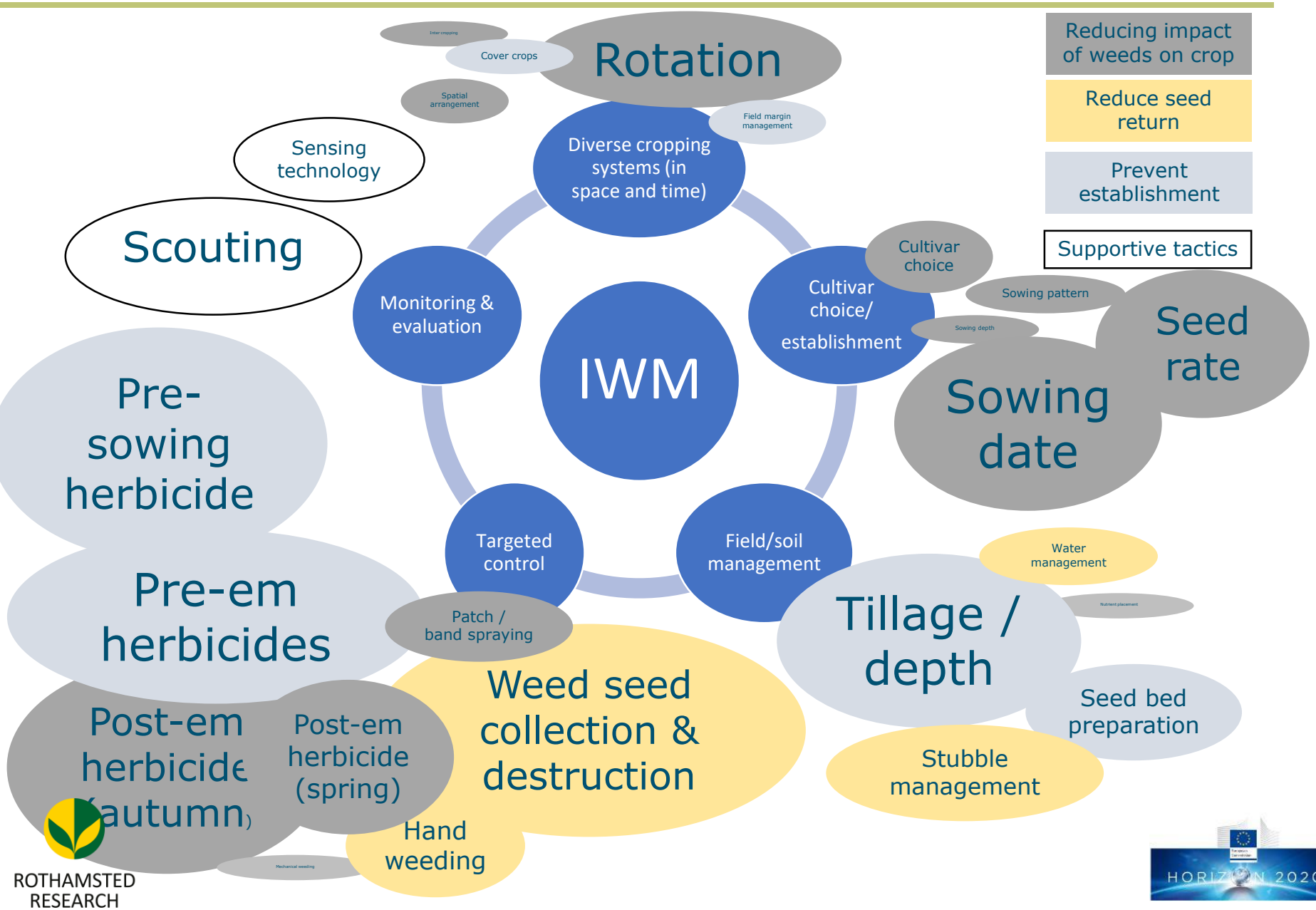
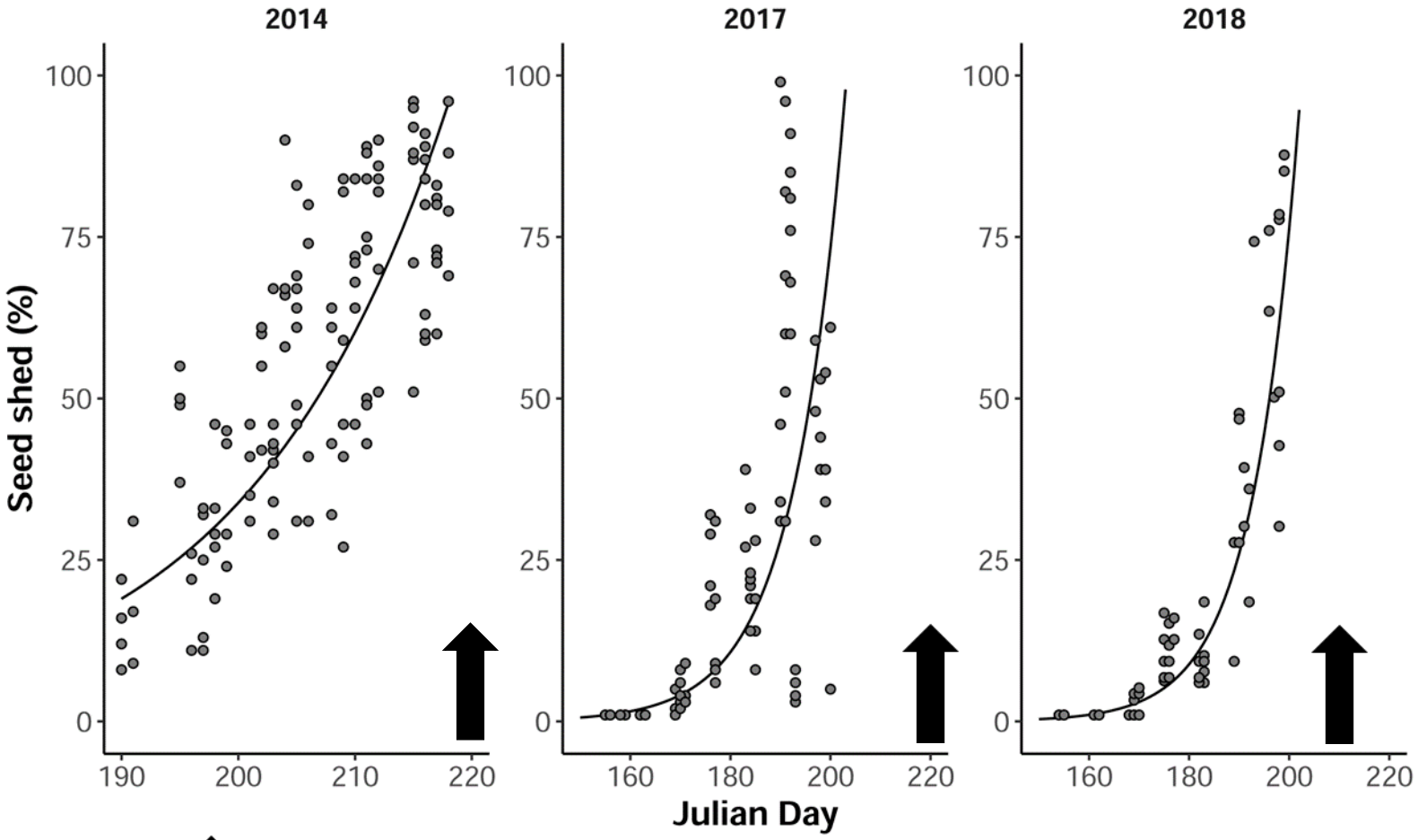


ROTHAMSTED RESEARCH

We are adding new tools (but not focus of project)

Alopecurus myosuroides UK seed retention data



Average winter wheat harvest date

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Experimental test mill arrived in UK, summer 2019

ROTHAMSTED RESEARCH

HORIZON 2020

We are adding new tools (but not focus of project)

Alopecurus myosuroides populations from Denmark (14) and the Netherlands (9) screened in glasshouse experiment to produce leaf material to test suitability of NTSR markers

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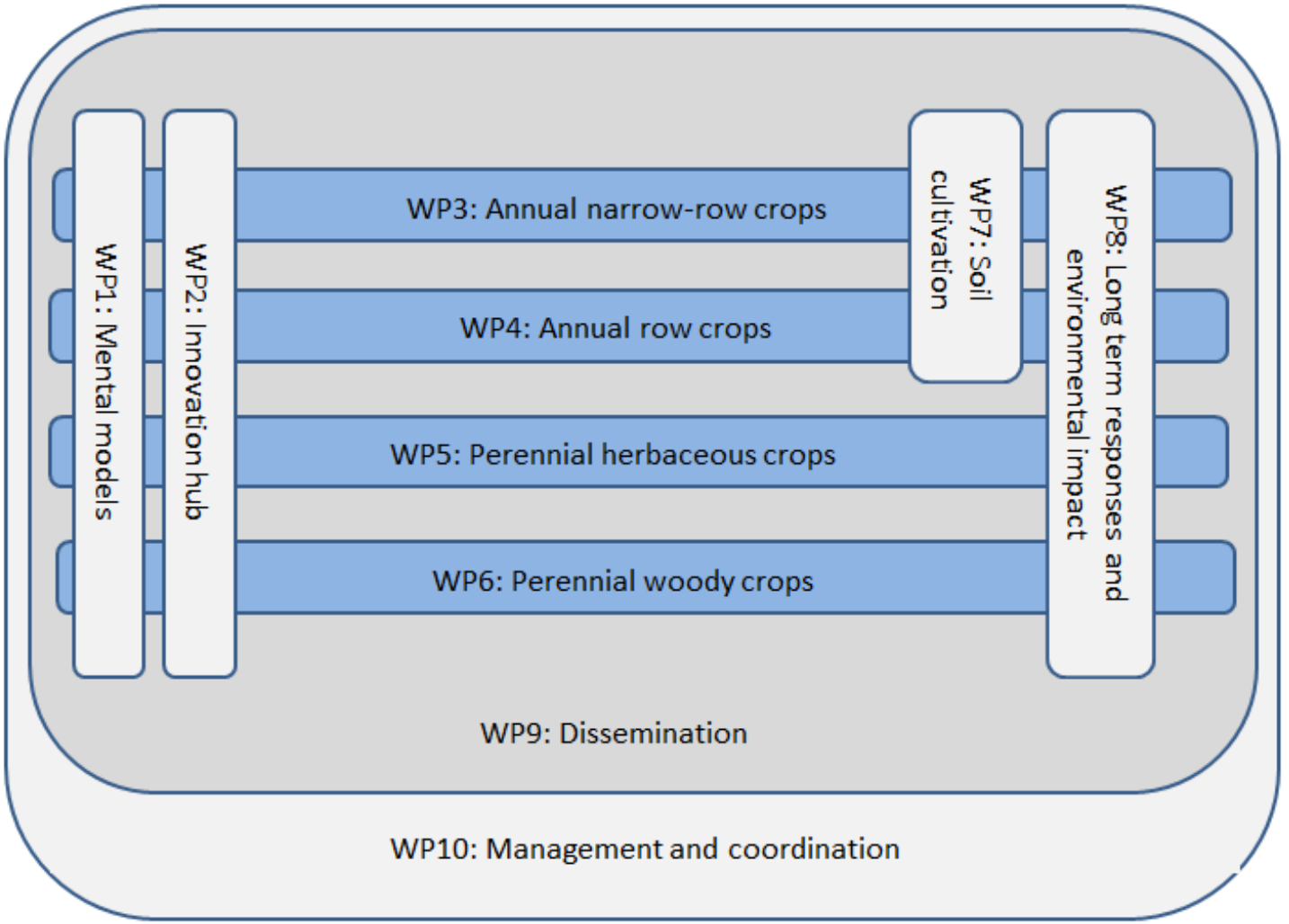
How effective is IWM and what are the trade-offs?



research and innovation programme under agreement no. 727321

ROTHAMSTED RESEARCH

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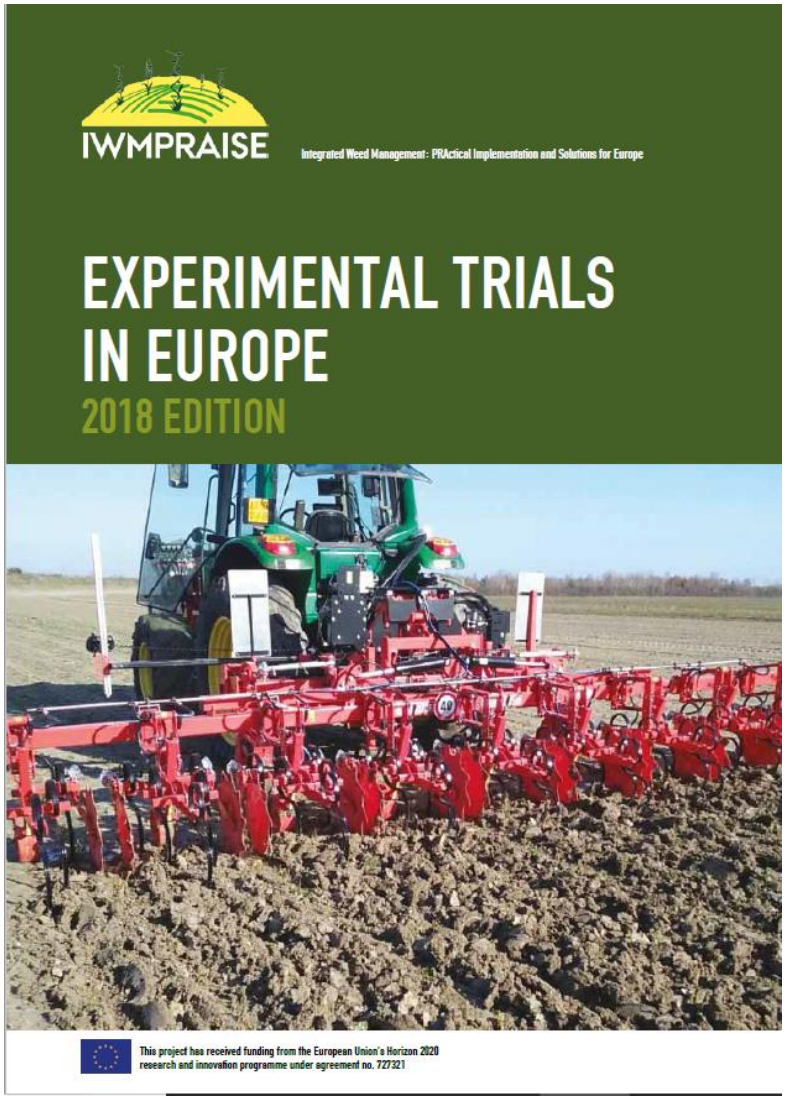

https://iwmpraise.eu/

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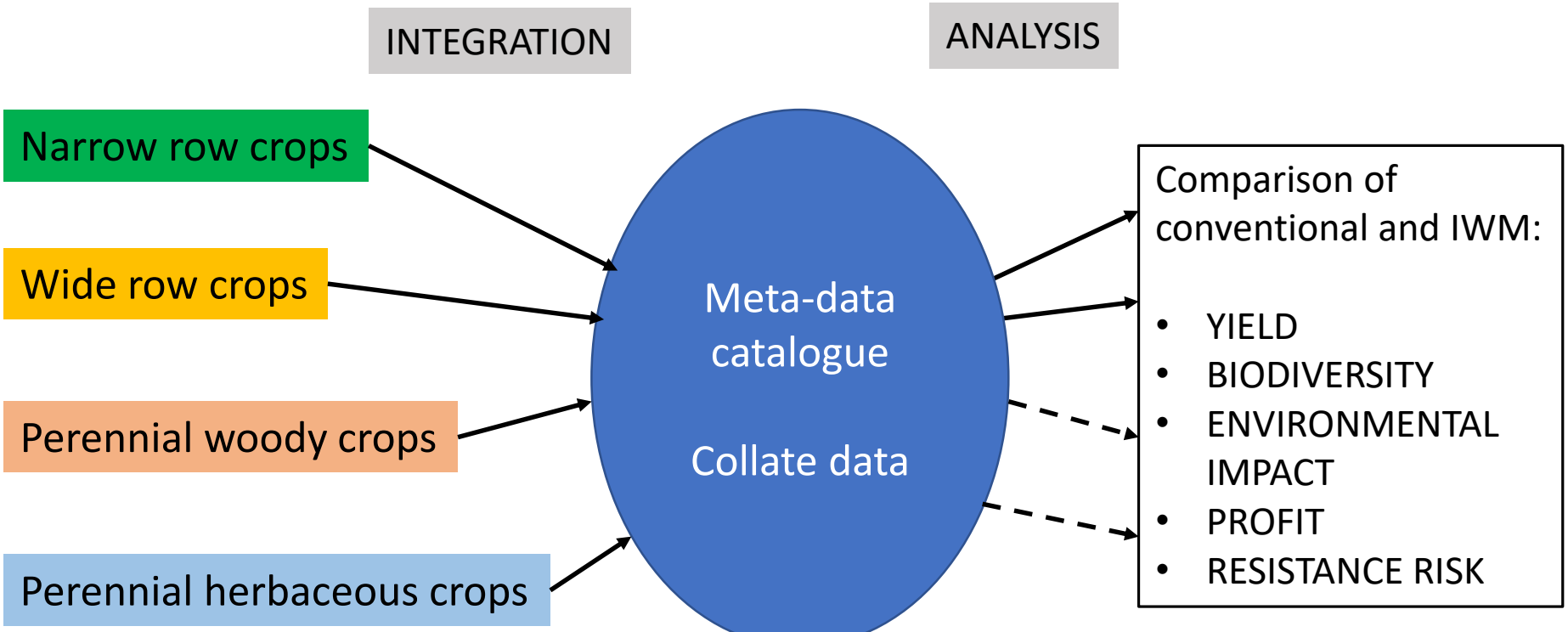

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How effective is IWM and what are the trade-offs?

Italy	United Kingdom	Netherlands	Denmark
Alopecurus myosuroides Ammi majus Anagallis arvensis Chenopodium album Cirsium arvense Convolvolus arvensis **Echinocloa crus-galli** Equisetum arvense Matricaria recutita Myosotis spp. Papaver rhoeas L. Picris echioides Portulaca oleracea Rapistrum rugosum Rumex crispus Sinapis alba Solanum nigrum Veronica persica + 47 others	Capsella bursa-pastoris Chenopodium album Stellaria media Tripleurospermum inodorum Utrica urens Veronica persica Viola arvensis + 14 others	Poa annua Polygonum persicaria Solanum nigrum Stellaria media +21 others	**Alopecurus myosuroides** Brassica napus Chenopodium album Matricaria sp. Poa annua Senecio vulgaris Stellaria media Veronica sp. +14 others

- Regional differences in weed pressure?
- Explain in terms of traits, cropping systems and climate?
- Relate to evolution of resistance?

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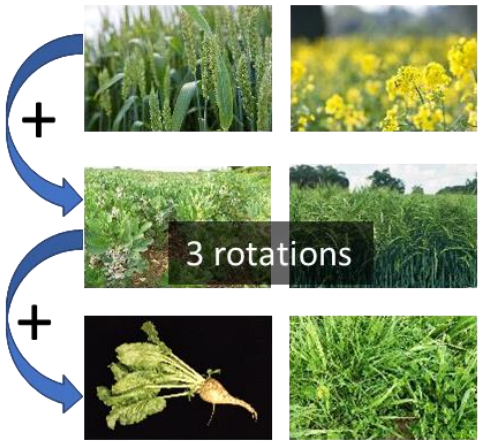
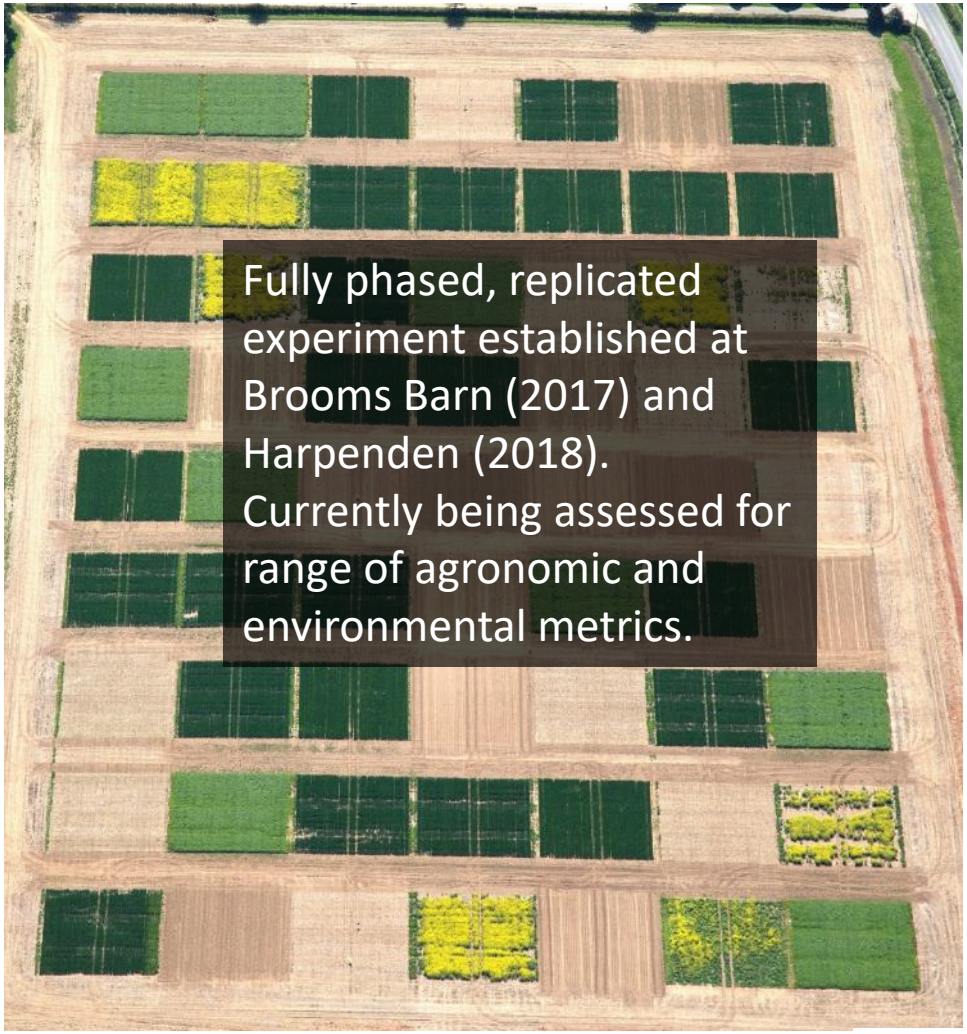
Also looking at weeds in long term systems experiments





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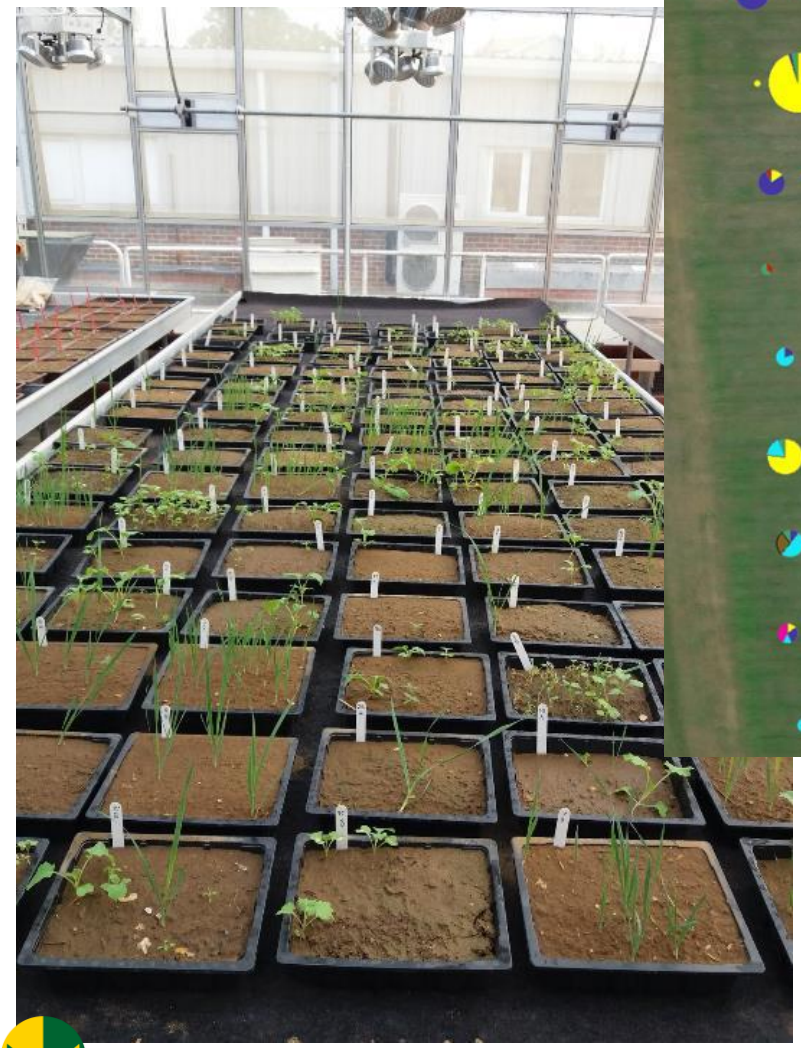

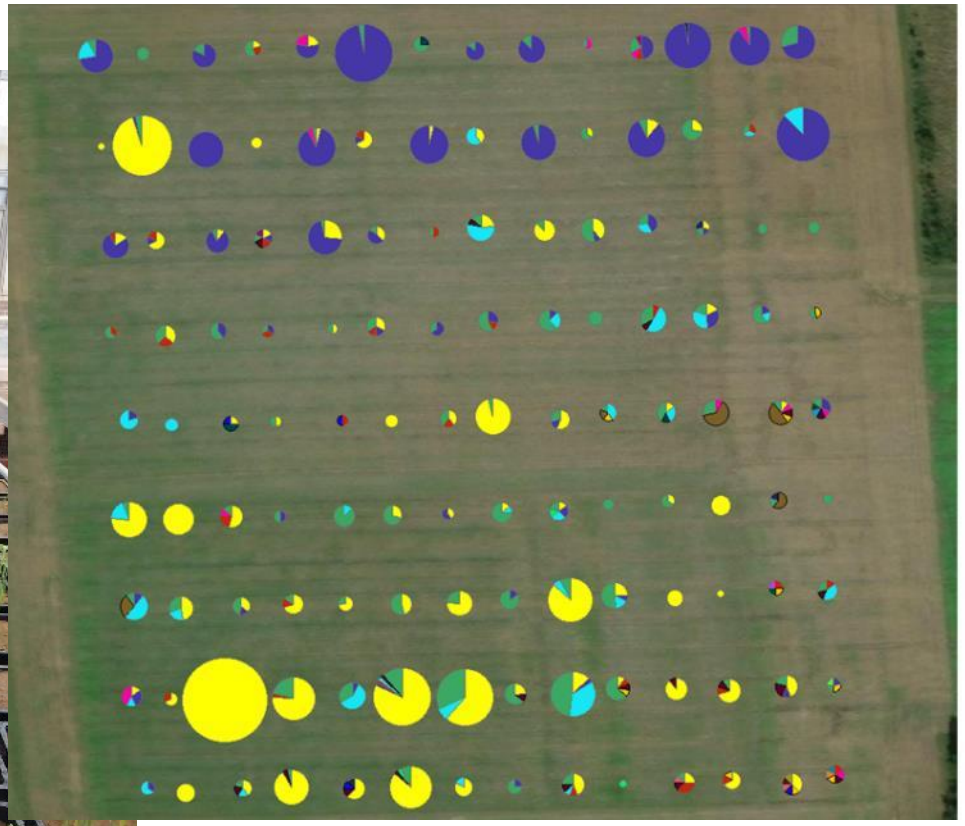

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HORIZON 2020

Can we predict the impact of systems on weeds?

Using Functional Traits to Model Plant Community Dynamics

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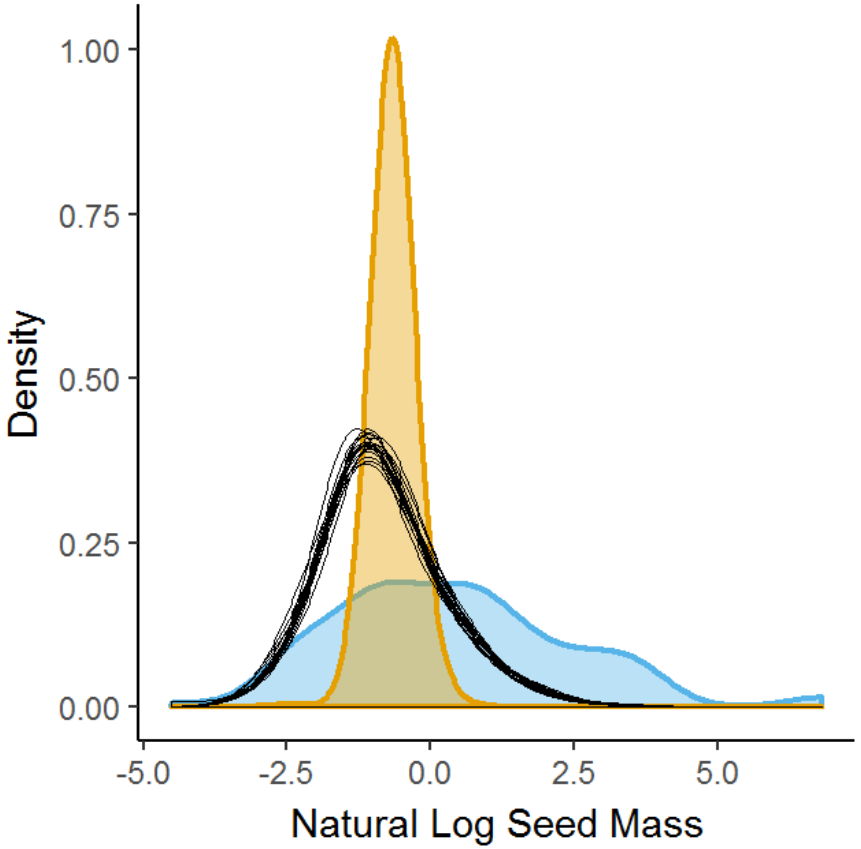
Running Title Using traits to model community dyna



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A parting thought

- *Reducing the number of weed individuals should not be the primary aim of IWM but rather it should aim for increased diversity, evenness and reduced dominance in the weed community.*

WEED RESEARCH An International Journal of Weed Biology, Ecology and Vegetation Management

DOI: 10.1111/wre.12310

INSIGHTS

What good is weed diversity?

J STORKEY & P NEVE
Rothamsted Research, Harpenden, Hertfordshire, UK

Received 8 February 2018
Revised version accepted 21 March 2018
Subject Editor: Matt Liebman, IA, USA

Summary

Should the declining diversity of weed communities in conventionally managed arable fields be regarded as a problem? The answer to this question has tended to divide researchers into those whose primary focus is on conserving farmland biodiversity and those whose goals are dictated by weed control and maximising yield. Here, we argue that, regardless of how weeds are perceived, there are common ecological principles that should underpin any approach to managing weed communities, and, based on these principles, increasing in-field weed diversity could be advantageous agronomically as well as environmentally. We hypothesise that a more diverse weed community will be less competitive, less prone to dominance by highly adapted, herbicide-resistant species and that the diversity of the weed seed-bank will be indicative of the overall sustainability of the cropping system. Common to these hypotheses is the idea that the intensification of agriculture has been accompanied by a homogenisation of cropping systems and landscapes, accounting for both declines in weed diversity and the reduced resilience of cropping systems (including the build-up of herbicide resistance). As such, weed communities represent a useful indicator of the success of rediversifying systems at multiple scales, which will be a central component of making agriculture and weed control more sustainable.

Keywords: niche differentiation, herbicide resistance, sustainable intensification, Broadbalk experiment, species richness.

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