THE IMPLICATIONS OF SPATIALLY VARIABLE PRE-EMERGENCE HERBICIDE EFFICACY FOR WEED MANAGEMENT

Helen Metcalfe, Alice Milne, Richard Hull, Alistair Murdoch, Jonathan Storkey
SEEDLING DRYWEIGHT

Flufenacet
Pendimethalin

ED50
Low SOM
0.0711
0.1238

Medium SOM
0.1997
0.3932

High SOM
0.4374
0.5137
MATURE PLANT DRYWEIGHT

Flufenacet
Pendimethalin

Low SOM
Medium SOM
High SOM
MODELLING

Weed Seed Production vs Dose + 0.01

Low SOM

Medium SOM

High SOM

No Crop Competition

Crop Competition
<table>
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<th>Soil Organic Matter</th>
<th>Herbicide</th>
<th>Seedling Biomass</th>
<th>Weed Seed Production</th>
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Modelling the spatial and temporal variation in Alopecurus myosuroides for precision weed management

H Mascalfe*, AE Milne*, AM Murdoch*, JS Thorley*

* Rothamsted Research, Harpenden, UK, † University of Reading, UK

Many aspects of the life cycle of Alopecurus myosuroides can be affected by environmental conditions, in particular soil properties. By investigating how soil conditions affect various aspects of the life cycle, I aim to understand why patches occur in particular areas of fields and if we can predict these patch locations to help inform precision management techniques such as patch spraying.

Seedling germination is determined through an accumulation of hydrothermal time. Increased levels of water input can speed up the accumulation of hydrothermal time.

Soil organic matter can affect the levels of control achieved by pre-emergence herbicides. It can also affect the difference in control achieved by low and high doses and so may affect management decisions.

By taking soil cores from across a field it is possible to create a map of various soil properties such as soil organic matter for the whole field by kriging.

By counting the number of blackgrass points at each sample location we can calculate correlations between the weed density and the soil properties.

Through an understanding of how various soil properties vary in space we can simulate fields with realistic soil properties.

If we can identify areas of the field that are vulnerable to Alopecurus myosuroides establishment using soil maps alone then farmers may be able to use their existing soil maps to inform their decisions and build an integrated weed management program incorporating patch spraying.

Some of the work presented here is available in: Mascalfe et al., 2019. Designing a sampling scheme to reveal correlations between weeds and soil properties at multiple spatial scales. Weed Research 56 (1) 1-15