

SAPPIO LINK Project LK0902 - Exploiting Weed Patch Dynamics

Sponsor: MAFF

Partners: Silsoe Research Inst.; IACR Rothamsted; HGCA; AgCo Ltd; Micron Sprayers Ltd

Total project costs: £ 432K over 3 years starting June 1998

*Dr Peter Lutman, IACR Rothamsted, Harpenden, Herts, AL5 2JQ. Tel: 01582 763133
Fax: 01582 461516 email: peter.lutman@bbsrc.ac.uk*

Abstract

Weeds are not uniformly distributed within fields and so there is potential to reduce the amount of herbicide used by targeting the weed patches. This will reduce both costs and the environmental impact of the herbicides. Using modern sprayer technology, computer power and satellite location systems it is possible to achieve this aim. So far, development work in the major arable crops (cereals, oilseed rape) has been based on mapping weeds, generating a treatment map and using this to control the spray application. Progress is being made with the commercial development of a spatially selective sprayer (Micron Sprayers) and associated implement control, computer and location systems (as used in Massey Ferguson's "Fieldstar"). However, the treatment map, the key to link these aspects together, and the overall integration of the patch spraying system are not currently being developed. The previous LINK project (LK0401 - Development of a patch spraying system to control weeds in winter wheat) demonstrated the feasibility of patch treatment of weeds using experimental systems for weed mapping, but this work needs developing into farm-based mapping systems. Similarly, although progress has been made in understanding the biology and stability of some weeds, there is still much that we do not understand of their spatial behaviour. The economic viability of patch treatment of weeds depends on off-setting the costs, including those of mapping, with the herbicide savings. The more static the weeds the longer the map remains accurate and the lower will be the annual cost. Automated discrimination of green vegetation from other material (soil, stone etc.) is being investigated in horticultural and other wide-row crops. Although it is not currently a practical option for weeds in cereals etc., there is a need to ensure that advances in image recognition technologies are assessed in this project and the potential of automated detection explored.

Aim of the Project

The aim of the project is to optimise herbicide use in UK arable crops by developing a fully functional system for spatially selective weed control (patch spraying). The project will be based on the creation of weed maps using both automated and manual detection systems. The weed map will then be used to control the herbicide application.

Benefits

This project will ensure that the commercial and engineering developments of the spatially selective sprayer and GPS location and control systems are integrated effectively so that investment in the two technologies are utilised to best effect. It will also widen the value of GPS systems currently employed to map yields and apply fertilisers to include the application of herbicides. The development of automated detection systems would decrease the cost of mapping. We believe that reductions in herbicide costs of c. £5-15/ha/yr are possible, depending on the distribution and type of weeds. More targeted weed control will also reduce the environmental impact of the herbicides.