Application of Automated "Spot Spray" Technology in the Upper North

Author: Matt McCallum and Ruth Sommerville
Funded By: Northern and Yorke Natural Resource Management Board - 2014 Community Grant, and GRDC Production and Environment Partnerships project.
Project Title: More effective and reduced pesticide use in broadacre landscapes by using optical sensing devices to detect and "spot spray" weeds"
Project Duration: 1/11/2014 to 30/6/2015
Project Delivery Organisation: Upper North Farming Systems

Key Points

- Summer weed control is proven to increase yield, but is becoming a major cost and some summer weeds are difficult to control
- Cost savings of 20-90% were achieved across 20 paddocks using the WEEDit™
- A major benefit of Spot Spray Technology is the ability to use high rates of chemical to spot spray hard-to-kill weeds such as fleabane and stinkweed.

Background and Benefits of Optical Sensing Spray Technology:

A number of commercial companies now produce optical sensing devices that can be utilised to detect plants by measuring the Near Infrared Reflectance (NIR) reflected by their chlorophyll when exposed to a light source. When combined with a solenoid that switches on and off a spray nozzle, this technology can be used to "spot spray" weeds.

At this stage the optical sensing technology does not discriminate between crops and weeds, so it is used when there is no crop present, predominantly in summer, in autumn before the crop is sown, and for chemical fallow. Herbicide use can be reduced by 50-90% during these periods of the cropping cycle by using this technology.

The benefits to the environment are also significant;

- Reduced pesticide use by 50-90% resulting in reduced potential impacts on soil biota and contamination of water resources.
- Reduced chance of spray drift.
- Increased success of controlling "hard-to-kill" summer weeds e.g. fleabane, onion weed, saltbush type weeds.
- Reduced practice by farmers of intensive grazing of summer weeds resulting in soil erosion.
- Substantially less water is used for spraying which helps preserve water resources.
- Reduced reliance on cultivation to control "hard to kill" weeds, resulting in reduced erosion risk and increased soil health.

Aims of the Project:

- To evaluate the suitability of "spot spray" technology to control weeds on farming land in the Upper North.
- To monitor weed control success on "hard to control" summer weeds such as fleabane, onion weed, saltbush type weeds.
- To record the reduction in pesticide and water use using "spot spray" technology compared to conventional spraying.
- To raise awareness amongst the community about the potential benefits of "spot spray" technology.

Results from the UNFS Paddock Demonstrations

A demonstration version (12m) of the WEEDit™ was hired and used to evaluate the suitability of automated "spot spray" technology to control weeds in 20 paddocks across the Upper North during the summer fallow period in 2014. The technology worked very well, and in summary;

- Cost savings of 20-90% (average 70%) were achieved per spray application
- It could detect small weeds, about the size of a 20c piece. The ability to detect small plants was reduced if the weeds were stressed.
- Weeds with blue-coloured leaves (e.g. annual saltbush, jersey cudweed, stemless thistle) were detected
- It was successful at detecting weeds that were half-dead from a previous spray. This makes it suitable for applying double knocks to hard-to-kill weeds e.g. fleabane.

Extension Activities

UNFS held a number of field days throughout the project life that examined this technology. In particular 4 events were held in Orroroo, Crystal Brook, Laura and Nelshaby in February and March 2015. The Laura and Nelshaby events were held in conjunction with the local Ag Bureau.

There are currently two companies importing the technology into Australia. Crop Optics Australia import the WeedSeeker™, and Hawkeye Precision import the WEEDit™. Local agents for these units in the Upper North are AgTech Services (Michael Zwar - WeedSeeker™) and Croplands (WEEDit™). These companies were invited along to the events in the Upper North to demonstrate the technology to the farming community. Over 100 farmers attended these demonstrations. We appreciate the support AgTech Services and Croplands have provided to this project.

Image 1 and 2, Potato weed sprayed at one of the demonstration paddocks before and after treatment with spot spray technology.

Image 3 and 4: Members getting a run down on the WEEDit and Weedseeker Technology.