Cost, flexibility benefits of targeted herbicide spraying

New WeedSeeker technology is helping growers reduce their fallow costs by as much as 80 pc.

A decade ago most Australian growers had never even dreamt of using a spray boom to effectively ‘spot spray’ weeds in fallow paddocks and saw no need for it anyway.

Today machines that in effect allow growers to spot-spray fallows or stubbles using a 20 or 30-metre spray boom at 15 kph or more are being used on 80 Australian farms and another 80 are scheduled for delivery in the next six months.

The steep upsurge in demand for this technology would appear to be driven by the rising cost of herbicides, particularly glyphosate, which has doubled in price over the past 12 months and now costs around $10/L.

However, the high value of the Australian dollar a few months ago, when it approached parity with the US dollar, also promoted a flurry of orders, according to David Brownhill, Australian distributor of the WeedSeeker technology that turns a spray boom into a high-speed spot sprayer.

David was one of the few growers who were thinking about targeted herbicide application late last century and by the mid 1990s he was using a boom spray fitted with Australian-developed deTect-spray technology that, like the WeedSeeker, used a sensor to find and target weeds with herbicide instead of spraying the whole paddock whether or not there were weeds present.

David’s experience with the deTect-spray machine on his Liverpool Plains, NSW, property convinced him of the value of the technology but uptake of the concept was slow and the company folded after a few years, making it impossible to get parts for their machines. Consequently, he was already well aware of the concept of targeted spraying when he saw a WeedSeeker machine working in a Californian vineyard during his Nuffield Scholarship study tour in 1998.

Pictured: David Brownhill “big savings from WeedSeeker technology”.

He did, however, reserve judgement on the price and some practical aspects relating to use of the US technology in Australian rain-fed cropping systems. Both reservations have been dispelled over the past five years.

“The WeedSeeker is an important tool that reduces costs and helps us manage hard-to- kill weeds in a full no-till system,” David says.

“The technology is simple and robust. There is no computer and no calculation or interpretation. A sensor picks up the wavelength ‘signature’ from anything containing chlorophyll and circuitry conveys the location of the weed directly to valves controlling the nozzles on the spray boom.

“And the results are consistent because the machine uses its own light source so you’re not relying on sunlight, which eliminates the risk of variation due to changes in natural light conditions and means you can operate day or night.”

The cost issue is equally clear-cut.

“At the risk of sounding like a salesman, this is one of the few pieces of equipment where you start to get savings immediately you put it in the paddock.

“Based on our calculations and the feedback we are getting from other growers, a boom fitted with WeedSeeker technology, which costs in the order of $100,000, will pay for itself in chemical savings within two years.”

At the present glyphosate price of around $10/L a litre he considers around 1,000 ha to be the cut-off cropping area for a WeedSeeker to be economic, but if chemical costs keep increasing the technology will become affordable for growers cropping smaller areas and the repayment period will come down even more.

David and his brother Gordon calculate the WeedSeeker technology has saved their business $481,000 since October 2003, when they began using the first WeedSeeker to be imported to Australia.

They are still using that unit, a self-propelled sprayer with a 27 metre boom, on their 3,900 ha of dryland and irrigated cropping country near Spring Ridge, about 100 km south of Tamworth, NSW. The WeedSeeker is used only on fallow or stubble paddocks and to date has covered 49,000 hectares, with chemical applied to only about 17 pc – 8,330 ha – of the total area.

“This technology is relevant only in fallow or stubble paddocks and if it’s better to spray the whole field then that is what we do,” David says.

The reduction in chemical use is achieved because, for much of a ‘spray’ pass with a Weedseeker, there is no chemical being applied.

The machine senses green weeds and turns on one or more nozzles to spray the weeds it ‘sees’. If the sensor doesn’t ‘see’ any green the nozzles remain turned off. Consequently, only a small portion of most fallow or stubble paddocks is sprayed, with herbicide use in some paddocks reduced by 80 pc.

Savings of this scale not only reduce input costs but also open the way for use of more expensive chemicals and tank-mixes to ensure the highest possible levels of control on hard-to-kill weeds such as fleabane, milk thistle, bind weed and ryegrass; a significant issue on the Liverpool Plains where there are weeds with high levels of resistance to glyphosate on many properties.

David's interest in and adoption of targeted spray technology was motivated by development of resistance to glyphosate in weed populations on his property.

Growers on the Liverpool Plains are able to grow winter and summer crops, which allows wider rotation than is possible in many districts. This increases the opportunities to use herbicides from different chemical groups, to target weeds at different growth stages and to use crop competition to minimise weed growth. It can also significantly increase the number of herbicide applications in a year.

"In our situation we use the WeedSeeker for pre-crop or summer weed spraying. We tend to get rain year-round so we usually spray about every six weeks to keep fallows free of weeds and make sure the next crop has as much moisture as possible," David says.

He is confident that being able to afford the 'right' or 'best' chemical – or tank mix of chemicals – to manage hard-to-control weeds instead of increasing the rate of glyphosate (the standard herbicide for most applications on the Liverpool Plains) will help prolong the life of glyphosate.

This is a vital consideration for growers using no-till and zero-till farming systems.

"The WeedSeeker technology is not confined to glyphosate, you can use any chemical that is applicable for the weeds that are present, and spraying only a small percentage of the paddock area means we can afford to use some of the more costly, and effective alternatives that would be economically out of the question if we had to spray all the paddock."

Targeting weeds instead of spraying the whole paddock also significantly increases operating efficiency because, despite the need to use high water volumes, the small percentage of the paddock surface to which chemical is applied means there is minimal time spent filling up and a significant saving in the amount of water used.

"In many cases we find that we can spray all day without stopping to fill up, even though we are using a high water rate."

Ironically, one of the issues is how to decide how much chemical to mix at a time, David says. "Because you are spraying so little of the total surface area it is easy to mix up more chemical than you need, but your judgment improves with experience.

“Even though we are using higher rates of glyphosate, nearer those recommended for spot spraying than for boom application, it is still a challenge to work out how much spray mixture we’ll need in a particular paddock.

“If you think you’re only going to spray, say, 10 pc of the paddock surface we’ve found it’s a good idea to mix half what we think we might need.

The adage that there are tricks to every trade holds true for the WeedSeeker.

“This technology is a valuable tool, but it’s only a tool, not a cure-all, and you need to learn how and where to use it to get the best from it,” David says.

Droplet size and water volumes are at the head of the list.

“You need to use large droplet sizes – most growers are using 05 nozzles rather than the 02 or 03 nozzles favoured by most growers using conventional boom sprays – higher chemical rates and high water volumes,” David says.

“We use 100L/ha to compensate for the fact that the herbicide might be applied by a single nozzle, so there is no overlap with an adjoining nozzle.

“You really do need to think ‘spot spray’ rather than ‘boom spray’ because in some instances the machine will turn on only one nozzle, so you don’t have the benefit of overlapping spray patterns like those on a standard spray boom set up.

“With this technology you only get one shot and you need to give yourself every chance of killing the target weed.”

However, the combination of higher water and chemical rates and larger droplets can improve the levels of weed control in less than ideal conditions, particularly when using products other than glyphosate, which does not perform well on stressed or dusty plants.

“Because of the number of sprays we apply each year it is not always possible to work only in good conditions and we have found the higher water volumes and chemical rates we are using mean we can still achieve reasonable results in quite hot, dry conditions and generally manage to prevent seed set even if we don’t actually kill the weeds.”

David’s move into importing and distributing the WeedSeeker was prompted by the level of interest, and demand for information, from other growers once they became aware he was using the technology on his property.

The fact that he is a grower also colours his approach to the business.
“I’m a farmer so know what farmers look for when it comes to machinery and technology, particularly in the area of service and support, which I feel are lacking in some other areas.”■