

# Minimising collateral damage with shielded sprayers

By Ross Ole, Rizziole Sprayers

The keys to successful inter-row spraying are minimising the production of fine droplets and minimising air movement.

## Droplet size versus spray volume

Many inter-row sprayers are fitted with low drift nozzles such as Spraying Systems' Driftguard which create a much coarser spray pattern than conventional nozzles. Low drift nozzles produce approximately half the amount of fines of a conventional nozzle and even lower levels of fines can be achieved by using 'air induction' or 'venturi' nozzles which create yet coarser spray patterns.

Alas, there is no free lunch. As the spray pattern is made coarser the number of droplets created declines exponentially. If the average droplet size of a particular spray pattern is doubled then the number of droplets created will be one eighth of the original.

Generally as the pattern is made coarser, the degree of coverage declines. A point is reached where the number of droplets per square centimetre of leaf area is not enough to give adequate coverage and spray failure results. So higher spray volumes must be applied when using low drift nozzles to maintain the same level of coverage.

For low drift spraying applications, a trade off must be made between a coarser spray pattern, with low levels of fines, and a higher water volume to provide adequate numbers of droplets. For shielded spraying, Driftguard nozzles or equivalent seem to be well suited — and to afford added safety for 'layby' spraying, an air induction nozzle can be used.

## Where there's smoke there's drift

Once your droplets have been created, you must get them to the ground before the wind carries them off. Spray drift behaves a lot like smoke which also consists of very fine particles being carried by moving air masses.

To illustrate the task of controlling drift while inter-row spraying, just imagine your nozzles were emitting smoke instead of droplets. What can be done to contain as much smoke as possible inside the hood



Stealth inter-row sprayer.

and encourage its deposition on the ground while moving forward?

My preference is to use inter-row spray shields which are as enclosed as is practical to minimise the movement of droplet laden air out of the shield. Because of the forward movement of the shield and the front curtain, the escape of droplets from the front of the hood under normal conditions is negligible.

I also prefer shields to run on the ground so that the sides of the shields act as a physical drift barrier between the crop row and the spray pattern.

When using a fully enclosed hood running on the ground, it is the pocket of low-pressure air which forms at the rear of the hood that has the most potential to cause crop damage. This vacuum has the effect of sucking air and fine droplets out of the hood.

To minimise the effect of the vacuum at the rear of the hood, a low profile, long sloping rear surface is preferred to a large square rear end — and low ground speed is a must. Shielded sprayers operating in excess of 15 kph into a moderate breeze are likely to cause damage.

Damage will show up first in the rows under the tractor because the tractor itself acts as a large 'buff-plate'. It has its own

very large pocket of low-pressure air formed behind the cab which adds to the vacuum effect.

A light PVC curtain trailing to the ground, not only extends the gradual sloping rear surface of the hood but also droplets are forced very close to the ground before they pass out of the rear of the hood.

## Layby spraying and directed spraying of Roundup Ready cotton

I prefer a very low profile shield, which glides just above the ground, and as wide as possible so that lower leaves are raised as the herbicide is applied under the bush. Shields fitted with air induction or venturi nozzles directed backwards and at an angle slightly below horizontal, are the best way to direct Roundup at the cotyledon scar of the Roundup Ready cotton bush.

The larger droplets of the air induction nozzle are less prone to shifting off target with air movement and are more likely to land where they were intended at the base of the bush. Further, the higher water volume of the air induction option is necessary to keep high rates of concentrates in suspension when applying chemicals such as Diuron and Gesagard.

If a guidance system is in use, a shield as wide as 950 mm in one metre rows with

soft flexible side rails can be used to get right beside the bush to lift the lower leaves. If a guidance system is not in use then a flexible parallelogram hanger arrangement will allow the shield to self-track up the row once bushes are of sufficient size.

### REDUCING COLLATERAL DAMAGE

Once you have set up your sprayer, here are some guidelines for reducing the risk of collateral damage:

- Always comply with the label requirements of the chemical being applied and employ safe chemical handling and application practices.

- Avoid inter-row spraying operations in weather conditions unsuited to conventional weed warfare. Spray shields are not a substitute for appropriate spraying conditions.

- Smoke is the spray operator's friend. Look for smoke from nearby fires during manoeuvres, as it is a useful aid to predicting where drift prone droplets are headed.

- Avoid using ground speeds in excess of 10 kph. As with other spraying operations, the slower the better.

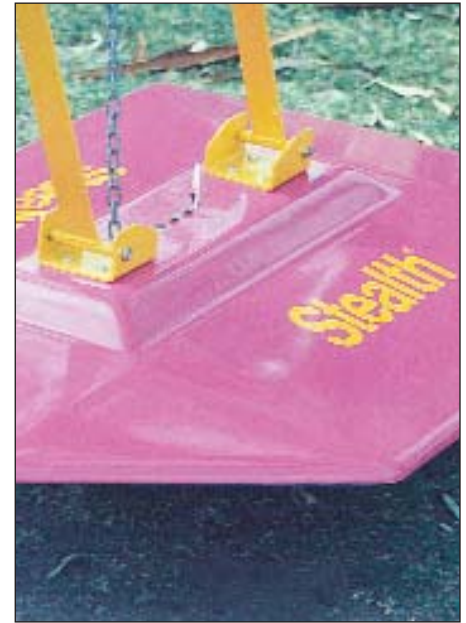
- Operate hoods other than layby hoods on the ground to avoid drift escaping under the sides of the hood.

- Launch your assault early before the weeds are able to mount resistance. Spray hoods do not work well on big weeds.

- For best results, an operating pressure between 1.5 and 2.0 bar is recommended for Driftguard nozzles or equivalent and five to six bar and plenty of surfactant for air induction nozzles.

- Apply at least 60 litres of water per sprayed hectare using Driftguard nozzles and apply higher water rates for coarser spray patterns.

Ross Ole is Managing Director, Rizziole Sprayers Australasia Pty Ltd, makers of the Stealth Inter-row Sprayer Hoods. He can be contacted on 0429 092 727.



Stealth 'lay-by' sprayer designed for Roundup Ready cotton.