

Successful shielded spraying

By Ross Ole

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. Driftguard nozzles produce approximately half the amount of fines of a conventional TP nozzle and “air induction” or “venturi” nozzles produce even lower levels of fines. Spray patterns for a range of common nozzle configurations are classified on the European BCPC system (Table 1).

As the spray pattern is made coarser, production of fine droplets drops dramatically as 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. A point is reached where the number of droplets per square centimetre of leaf area is insufficient to afford adequate coverage and spray failure results. Consequently higher water volumes must be applied when using low drift nozzles to maintain adequate coverage.

Where there’s smoke

Once your droplets have been created you must get them to the ground before the wind carries them off. Fine spray droplets behave a little like smoke which also consists of very fine particles being carried by moving air masses. Just imagine the nozzles under your shields are emitting smoke instead of droplets. What can be done to contain as much smoke as possible inside the hood and encourage its deposition on the ground while moving forward?

If a fully enclosed spray shield is run on the ground then the greatest drift hazard is posed by the pocket of low pressure air or vacuum which forms at the rear of the shield as it moves forward. This vacuum has the effect of sucking air and fine droplets out of the rear of the hood.

A low profile shield design and a light curtain trailing on the ground helps to mitigate this effect. A low ground speed is also a must. Operating a shielded sprayer in excess of 15 kph into a 15 kph headwind is like spraying in a 30 kph breeze. In this circumstance a significant proportion of the total spray volume will be escaping the shield as airborne

TABLE 1: Common nozzle configurations on the European BCPC system

Conventional 015 TP nozzle @2 bar	Fine
Driftguard 015 @2bar	Medium
Turbo TeeJet 015 @2bar	Medium
Air Induction Teejet 015 @2bar	Very coarse
Air Induction TeeJet 015 @5bar	Coarse

droplets (perhaps 10 per cent). If you were applying one litre of glyphosate per hectare you may be applying 60 or 70 mls per hectare (60 to 70 per cent recovery of the 10 per cent loss of the one litre per hectare) to the crop and collateral damage is likely to be substantial.

QDPI trial work has shown that as little as five mls per hectare of Glyphosate applied at the seedling stage can reduce yield. As little as 10 ml of Surpass can reduce yield in cotton when applied at early growth stages.

But in suitable conditions, with a well designed shield, and a reasonable ground speed, I believe that less than one or two per cent of the total spray volume will be escaping as drift.

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. Shield spraying in windy conditions will almost certainly result in large numbers of casualties.
- Smoke offers useful intelligence to operatives. 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 as close to the ground as possible 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 of 2.0 bar is recommended for Driftguard nozzles.
- Apply at least 60 litres of water per sprayed hectare using Driftguard nozzles and apply higher water rates for coarser spray patterns.

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