WEED smart
every weed every seed
every farm every year

ASK AN EXPERT – WHAT IMPACT DOES DRY SEEDING HAVE ON PRE-EMERGENT HERBICIDE EFFICACY?

With Mark Congreve, Senior Consultant, ICAN

AS is usually the case some cropping regions across Australia have experienced excellent conditions leading up to planting while in other regions growers are still looking to skies hoping for rain.

Mark Congreve, Senior Consultant with ICAN says understanding the interaction of pre-emergent herbicides and the level of soil moisture at seeding goes a long way when it comes to deciding which herbicides to apply in dry seeding conditions.

"Rainfall after application assists with incorporation of most pre-emergent herbicides," he says. "The soil moisture at the time of sowing also affects the mobility of some products into soils of different textures and the volatilisation of some products."

When seeding needs to start prior to significant breaking rains and without the forecast of imminent rainfall, it is even more important than ever that the maximum amount of product reaches the soil surface.

"To achieve this, use large coarse droplet size, higher pressure and higher water rates – around 100 to 120 litres per hectare, and preferably solid over air-inducted droplets," says Mark. "The aim is to minimise the amount of product left on stubble as you can't rely on rain to wash it off the stubble and into the soil. Narrow fan nozzles assist in reducing stubble capture and if the

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Environmental losses before reaching the soil

Not all herbicides are affected equally

Key ryegrass herbicides		Loss rates increase with temperature		
		UV loss	Volatility loss	Binding to stubble
trifluralin	D	Low - Moderate	Moderate - High	Strong
propyzamide (Rustler®)	D	N.S.	N.S.	Some
carbetamide (Ultro®)	E	N.S.	N.S.	Very low
tri-allate (Avadex®)	J	N.S.	Moderate - High	Significant
prosulfocarb (Arcade®)	J	N.S.	N.S.	Significant
s-metolachlor (in Boxer® Gold)	J+K	Moderate	Low - Moderate	Very low - low
metazachlor (Butisan®)	K	N.S.	N.S.	Very low
pyroxasulfone (Sakura®)	K	N.S.	N.S.	Very low - low
napropamide (Devrinol®)	K	Moderate - High	N.S.	Some
bixlozone (Overwatch®)	Q	N.S.	N.S.	Low
cinmethylin (Luximax®)	T	N.S.	Moderate - High	Low

N.S. = not significant

ICAN

Some herbicides are more prone to breakdown or loss through UV exposure, volatility and stubble binding than others.

rig is travelling at 20 km per hour or more consider rear facing nozzles to reduce the forward momentum of these large heavy droplets."

Pre-emergent herbicides are an important component of many herbicide programs. In the WeedSmart Big 6 approach to weed management these herbicides are never left to do the heavy lifting alone – to do so exerts immense selection pressure on these herbicides.

What do I need to think about in a dry seeding situation?

In brief: Getting the product onto the soil surface, incorporating by sowing and potential environmental losses.

The details: Stubble can intercept herbicides so if there is no rain forecast it is necessary to use other strategies to get the product onto the soil surface.

The seeder will be doing most of the work to incorporate the product so ensure excellent soil coverage of herbicide in the interrow. Especially for those herbicides that are more prone to breakdown or loss through UV exposure, volatility and stubble binding.

Many of the ryegrass pre-emergent products can be damaging to the emerging crop so it is important to also ensure that the seeder adequately moves treated soil out of the planting line.

What happens when it does rain?

In brief: Pre-emergent products will behave differently when it rains, according to the soil texture and soil moisture.

The details: For example, in coarse sands rainfall will readily wash the herbicide down the profile, potentially below where the weed seeds are sitting in the profile. If the soil has some moisture at planting, or is of finer texture, the movement down the profile will usually be less pronounced.

If the first rainfall event is quite heavy, there can be both vertical and sideways movement of the product into the crop row where it can cause crop damage.

Consider the mobility of the product you plan to apply. Highly mobile herbicides will move a considerable distance after the first rainfall event and have a greater risk of causing crop damage, but less mobile herbicides can still move further than predicted if the soil is porous and the first rainfall is substantial.

Where rainfall continues to be low and the herbicide treated soil remains relatively dry during weed germination, the efficacy of all pre-emergent herbicide will be reduced. Herbicides that have either higher solubility, or some vapour activity, may perform slightly better under these conditions. Low solubility herbicides that rely on the roots taking up herbicide dissolved in the soil water are likely to be the most compromised under these ongoing dry conditions.

What about mixtures and crop rotation?

In brief: Mixtures and rotation are key to managing herbicide resistance in weeds.

The details: Mixtures can broaden the activity on the weed spectrum present, and in some situations the herbicides in the mix can have an additive effect in terms of weed control.

Pairing products with different mobility may increase the chance of effective control in uncertain conditions. On the downside, there may be a higher risk of crop damage if a more mobile herbicide is included in the mix.

If using two different mode of action herbicides they are likely to breakdown independently and therefore it is unlikely that 'mixing' will result in increased length of residual control.

A third consideration is the frequency of use of a certain product over time, even in mixes. Resistance can still increase due to selection pressure if there are survivors allowed to set seed. There can also be a build-up of the microbes that breakdown certain products and this can speed up the degradation process if the same product is used frequently in mixes.

To avoid some of these pitfalls, try to plan a five-year herbicide program that includes as much diversity as possible in both pre- and post-emergent herbicides and knockdowns.

Applying pre-emergent herbicides effectively is the subject of an online 'Diversity Era' course on the WeedSmart website. ■

HOW TO ASK A WEEDSMART QUESTION

Ask your questions about using pre-emergent herbicides on the WeedSmart Innovations Facebook page WeedSmartAU, Twitter @WeedSmartAU or the WeedSmart website *https://weedsmart.org.au/category/ask-an-expert/*

'WeedSmart' is the industry voice delivering science-backed weed control solutions to enhance on-farm practices and promote the long term, sustainable use of herbicides in Australian agriculture.

WeedSmart has support from the Grains Research and Development Corporation (GRDC), major herbicide, machinery and seed companies, and university and government research partners, all of whom have a stake in sustainable farming systems.