

# BOXER GOLD<sup>®</sup> and Disc Seeding



**Disc seeding systems provide significant benefits in modern no till farming systems such as reduced draft and horsepower requirements, reduced soil disturbance leading to improved water use efficiency and potentially also better stubble handling characteristics.**

However, they do also present some challenges, namely pre-emergent herbicide usage and subsequent weed control and crop safety considerations.

This technote aims to provide some tips on how best to maximise efficacy, while also minimising the risk of crop injury when using BOXER GOLD<sup>®</sup> in disc seeding systems. However, it should be noted that disc seeding systems vary widely in their design, which in turn affects factors such as seeding depth, seed placement, soil throw, hair pinning and furrow shape. All of these can cause large variations in herbicide performance and safety. It is for this reason that the information contained in this technote describes general principles rather than specific advice for specific disc seeding systems.

## **Proximity to herbicide – effects on crop safety**

Herbicides are an integral part of our cropping systems but they are often misunderstood when it comes to how they work. Crop selectivity (the ability of the herbicide to control the weed but not damage the crop) is made up of two key factors. The first is the intrinsic herbicide selectivity. Put another way, the tolerance of a crop to a herbicide when directly applied to the establishing plant. The second key aspect is that of spatial selectivity. We build spatial selectivity into our seeding systems when we separate that seed from the herbicide. When these two factors interact, it is possible to make an inherently non-selective herbicide safe by keeping it well away from the establishing crop.

With specific regard to BOXER GOLD, it is important to note that neither of the two active ingredients (prosulfocarb and S-metolachlor) provide herbicide selectivity if placed in contact with either the seed or seedling. Crop safety with BOXER GOLD is largely achieved by spatial separation of the BOXER GOLD from the emerging crop plant.

Disc seeders inherently have a lower soil disturbance profile, and that commonly goes hand in hand with a higher concentration of pre-emergent herbicide in close proximity to the emerging crop.

With this in mind, we arrive at the first key to understanding how to manage herbicides in disc systems – maximising spatial separation between the crop and the herbicide is key.

## **Incorporation quality – ensuring adequate soil throw**

The second aspect to using BOXER GOLD in disc systems is managing soil throw. As noted, disc systems generally exhibit very low soil disturbance and throw. As a result, physical incorporation of BOXER GOLD can sometimes be less than ideal.

While not classified as volatile, BOXER GOLD efficacy will degrade slowly over time if it isn't fully incorporated within its seven day incorporation window. Inadequate coverage will also lead to a loss of activity, potentially reducing final weed control. Sufficient soil throw to cover the herbicide layer by the sowing action is needed to ensure that the herbicide is held in the soil profile to minimise losses and to optimise proximity to emerging weed seeds. If sufficient soil throw is not achieved, then herbicide incorporation and activation is reliant on rainfall.



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Another benefit of improved incorporation is that it generally helps to improve spatial selectivity, as discussed in the previous section of the technote, by physically moving a portion of the herbicide away from the seeding row. Generally, disc machines that have higher levels of soil throw provide more reliable results from herbicides and also reduce substantially the likelihood of crop injury.

Another point to note with regards to incorporation is the use of closing systems on disc machines. It is likely that increased levels of herbicide are in proximity to the seed row, so closing systems that drag soil back onto the row will exacerbate the risk of crop injury.

### Soil type interactions – how to manage risk in different soil types

Soil type plays a major role in determining crop safety because of variations in how the soil ensures spatial selectivity to be maximised.

The first key soil type interaction is sometimes seed in particularly light soils. Lighter soils are more prone to inducing crop effect because of two factors – furrow wall collapse and herbicide mobility. Because the furrow wall in a disc seeding system is commonly in close proximity to the seeding row, lateral movement of soil because of wind blow or heavy rain means that there is an increased possibility of herbicide being deposited in the seeding row.

Secondly, lighter soil types have a lower ability to bind mobile herbicides, increasing the risk that in the event of heavy rainfall the herbicide is able to leach directly into the crop row. This is somewhat exacerbated in disc seeding systems as the soil surface is more likely to be flatter than a knife point system and as a result more water will penetrate into the inter-row area where more herbicide is likely to be located.

Crop tolerance issues on heavier soil types are generally caused by soil movement due to reduced spatial separation. Leaching during periods of heavy rainfall is less likely due to stronger bonds between the soil and herbicide, but physical movement of treated soil back into the seeding row will often be the cause of crop damage.



Disc seeding systems that place the seed in the furrow wall will generally exhibit improved crop safety. As you can imagine, in the event that there is heavy rainfall or significant furrow wall collapse, it is less likely that herbicide treated soil will come into contact with the seed, compared to a seed placed at the bottom of the furrow.

It's important to keep these factors in mind at seeding, particularly if it is known that heavy rainfall is likely. Where heavy rainfall is likely, it is recommended that paddocks with soil types less prone to leaching and soil movement be seeded first, leaving risky paddocks until after the threat of heavy rainfall has passed.

### Stubble interactions

The final way in which pre-emergent herbicides cause crop injury is through hair pinning of treated stubble into the seeding row, putting the herbicide in close proximity to the seed. Hair pinning occurs when stubble is crimped, rather than cut by the disc assembly, and pushed down into the soil. The seed is then deposited on top or in close proximity, and as such an elevated risk of crop injury is likely.

As for the other interactions noted previously, hair pinning reduces the spatial selectivity of a herbicide so that in crops with biological tolerance the major source of crop safety is negated. It is quite important that growers pay attention to conditions at seeding that are more likely to cause hair pinning, such as blunt discs, softer soil types and heavy trash levels and if necessary implement measures to move stubble out of the path of the disc assembly.

### Summary

BOXER GOLD has proven to be a reliable, flexible alternative for growers wishing to manage Annual Ryegrass, both Group D resistant and susceptible. Over time, it has proven itself to be a useful alternative to trifluralin in disc seeding systems because of its reduced volatility and extended incorporation time. However, like the majority of herbicides, crop safety can sometimes be problematic if spatial or biological selectivity are compromised. Understanding and management of the principles mentioned in this technote should help growers to better manage the risk of crop injury and maximise weed control when using BOXER GOLD in disc seeding systems.



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