

Residual herbicides at sowing using disc and tyne no till seeding equipment.

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Key points

- 1) Residual herbicides are essential in sustainable no till farming systems
- 2) Knowing the properties of each residual herbicide is essential for the desired combination of crop safety and weed control.
- 3) Incorporated by sowing (IBS) application of residual herbicides generally allows greater crop safety than Post sowing pre emergent (PSPE) applications, and has made higher application rates possible. These higher rates have advantages of combating stubble tie up, extended incorporation windows, increase in efficacy and broader weed spectrum, eg TriflurX®.
- 4) Tyne machines generally allow greater crop safety than discs.
- 5) IBS in discs is much safer than PSPE in discs.
- 6) Many herbicide labels have not changed as our farming system has evolved.

During the shift from conventional farming systems to no till farming systems, the effective use of herbicides has become increasingly important. A well planned herbicide strategy can mean the difference between making no till work or not.

Over the last 5-6 years, it has become apparent that the rapid change in farming systems has overtaken farmer knowledge on how to use many herbicides in conservation farming systems. Older more traditional herbicides that were designed for use in cultivated systems can still be used very effectively in no till systems, however they are usually used in a different manner.

In addition, many herbicide labels (especially older type or generic herbicides) still have the same content on the label today as it did 10-15 years ago. Some products with generic counterparts even have totally different label claims for the exact same active ingredient. This creates many issues for farmers and agronomists wanting to use these herbicides in our modern no till farming systems.

This is especially the case in break crops such as chickpeas, lupins and fieldpeas, where we are nearly always trying to sow them into standing stubble.

As a response to this issue, a number of trials and demonstrations have been conducted by district agronomists in 2007, 2008 and 2009 in conjunction with local grower groups and herbicide company technical support staff, aiming to

- a) Educate growers on how various herbicides work in the field in no till cropping systems, ie mode of action.
- b) How to use each herbicide most effectively with different seeding equipment, ie knife points and harrows vs knife points and press wheels vs discs.
- c) Gain understanding on the effectiveness of each herbicide in each use situation, ie crop safety and weed control.
- d) Obtain data to support herbicide permit applications or label changes.

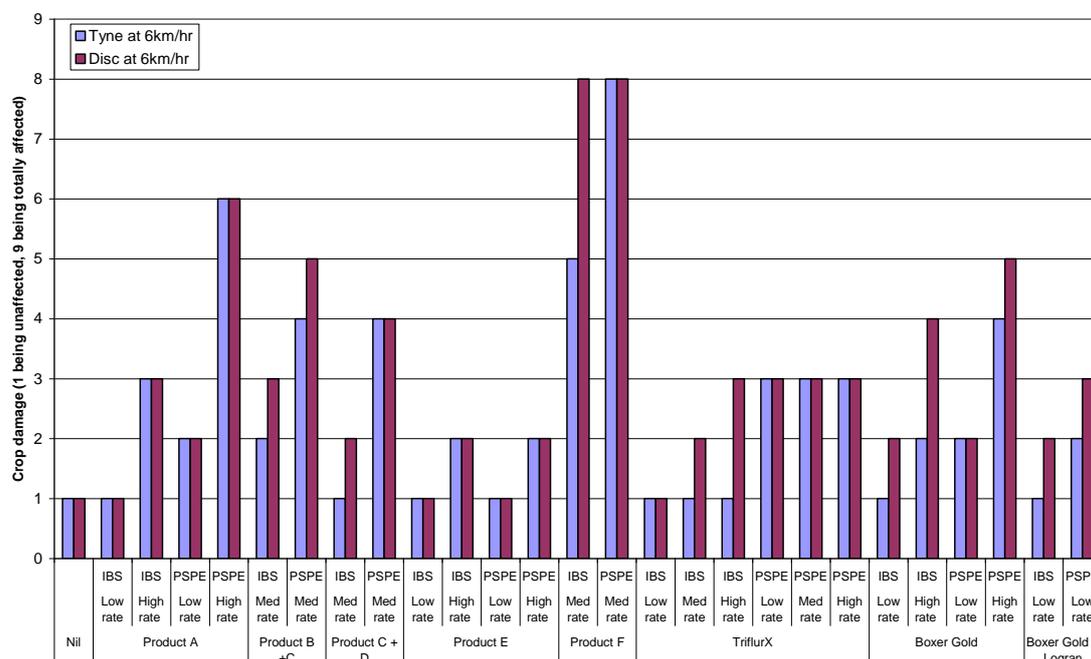
The main outcomes from these trials and paddock experiences are

- Residual herbicides at sowing are very effective at controlling a wide range of weeds both in crop and well into the following summer.

- Some residual herbicides also have valuable knockdown properties. This is very useful because knockdown herbicide options prior to sowing are limited for hard to kill weeds.
- Knowing the chemistry and mode of action of each herbicide is paramount to enable the best combination of crop safety and weed control. Heavy rainfall just after sowing when combined with certain soils can lead to crop damage. Some herbicides are mobile with soil water, whilst others are less mobile. Mobility can also change with time for particular herbicides. For example with Boxer Gold®, the longer it is allowed to bind to soil particles, the less chance of the herbicide becoming mobile in the soil. Other herbicides such as Logran® are mobile regardless of binding period.
- IBS application technique seems to be the safest way of using most residual herbicides, as the seed furrow is left free of high concentrations of herbicide. The soil from that furrow is thrown on the inter-row, where it is needed the most. In-furrow weed control is generally achieved by crop competition and/or small amounts of water soluble herbicides washing into the seed furrow. For this reason best results in IBS application are when water soluble herbicides are used either solely or in conjunction with a less soluble herbicide.
- Because of the furrow created by most no till seeders, PSPE applications of many herbicides are not ideal and are usually not supported by labels, as the herbicides can concentrate within the seed furrow if washed in by water and/or herbicide treated soil. Obviously for volatile herbicides that need incorporation following application, PSPE is not a viable option.
- Tyne seeders vary greatly in their ability to effectively incorporate herbicides. There are many tyne shapes, angles of entry into the soil, breakout pressures, row spacings, and soil surface conditions. Each of these factors causes variability in soil throw, especially when combined with faster sowing speeds (>8km/hr). Consequently residual herbicide incorporation is quite variable between each seeder. There are therefore no rules of thumb for sowing speed, row spacing and soil throw. You must check each machine in each paddock.
- Disc machines show similar variability in their ability to incorporate herbicides. Disc angle, number of discs, disc size, disc shape, sowing speed, closer plates and press wheels all have an impact on both soil throw and also herbicide treated soil returning into the seed furrow. Some discs can throw enough soil for incorporation of herbicides such as trifluralin#.
- In all cases with tynes and discs, crop safety is usually enhanced by applying herbicides IBS rather than PSPE.
- Knife points and harrows cause a lot of herbicide treated soil to return into the seed furrow, and are therefore not ideally used in IBS application. Knife points and press wheels do a much better job.

Figure 1: Comparison of crop safety in Ventura^A wheat using an NDF swing arm disc (27.3cm rows) vs Morris Contour drill tyne (25cm rows) on red sandy loam soils at Rankins Springs, 2009. This trial had 15mm of rain just after sowing, and another 15mm just before emergence.

****Note that Products A to F are *not* registered for this use pattern and cause significant damage to wheat, and hence aren't named. These herbicides were added to the demonstration to highlight crop safety differences between IBS, PSPE and seeding equipment.**



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