

Herbicide residues after drought

Guy McMullen

Research Agronomist, Wagga Wagga

Andrew Storrie

Agronomist Weeds, Tamworth

27 November 2006

Key Points

- Herbicide residues are a potential problem, depending on summer rainfall.
- Keep accurate records of herbicides applied.
- Monitor paddocks for indicator plants
- Consider conducting paddock test strips or pot tests.

Herbicide carryover

Herbicide carryover problems are exacerbated in drought years due to reduced herbicide breakdown. This is of particular concern in alkaline soils.

Residual herbicides of concern include the group B herbicides (including the sulfonylureas, Broadstrike[®], Spinnaker[®] etc) and group C (e.g. atrazine and simazine) products.

Herbicide information

Product labels provide accurate and specific information on persistence of herbicides and soil conditions that are likely to influence herbicide breakdown. To ensure that problems with residual herbicides are not encountered it is important to have a good knowledge of soil pH in the paddock, rainfall since application and any other factors that may influence carryover.

Accurate record keeping is important when planning rotations. Details of application dates, rate and herbicide product are now required under legislation by the NSW Pesticides Act. These records are valuable in planning rotations and isolating areas that are at risk of herbicide carryover. Rainfall records are also important so that the amount of rain required for breakdown can be monitored.

Herbicide breakdown

Most herbicides are broken down by water, microbes in the soil or a combination of both. The rate of breakdown is controlled by moisture, temperature and soil characteristics such as pH

and clay content. When conditions are dry, the breakdown of residues can be significantly slowed. This can have a major impact on re-cropping intervals in subsequent winter crops.

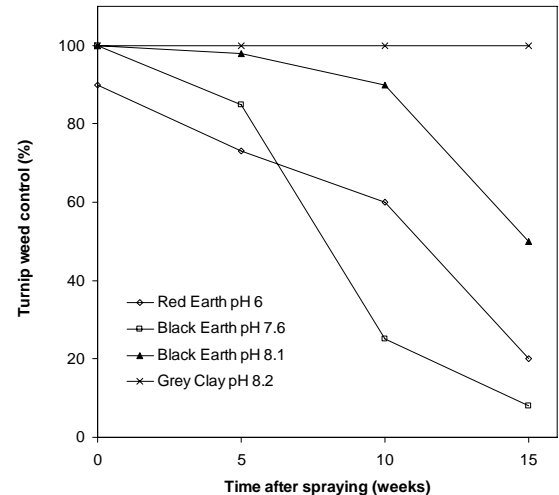


Figure 1: Effect of soil type and pH on chlorsulfuron activity (Walker and Starasts 1996).

Figure 2 shows the effect that temperature has on the breakdown of chlorsulfuron (Glean[®], Tackle[®], Platoon[®], Lasher[®] etc.). At 18°C breakdown is slowed so that sorghum sown 3 months after chlorsulfuron application was damaged. In contrast breakdown occurs rapidly at 28°C and the crop remained unaffected.

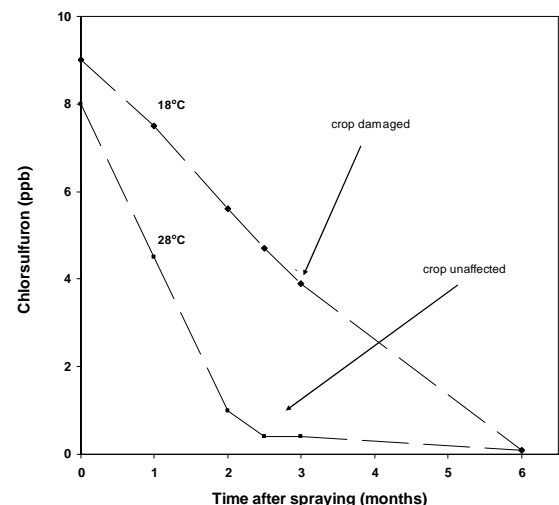


Figure 2: Effect of temperature on chlorsulfuron breakdown (Walker and Starasts 1996)



Breakdown of the sulfonylureas occurs more rapidly in acid soils, wet soils and at higher temperatures. The products of this breakdown are not injurious to plants. Triazines are also degraded quickly in warm, moist soils with low pH. The number of days the soil surface remains moist determines the carryover. This can mean that in a year with low rainfall significant carryover of triazine can occur.

However, unlike other members of the group B herbicides, the imidazolinones (eg Spinnaker[®] and Arsenal[®]) breakdown faster in alkaline soils and slower in acid soils. For example, Spinnaker[®] (imazethapyr) in acidic soils (pH<5.5) requires 400 mm rainfall (or irrigation) before sowing a cereal crop. In alkaline soils, 300 mm of rainfall after application is needed before a cereal crop is sown.

Soil pH influences the water solubility of sulfonylurea herbicides and subsequently the breakdown. In alkaline soils the sulfonylureas move quicker through the soil profile and breakdown slower than in acid soils. As pH increases the persistence of chlorsulfuron is significantly lengthened (Figure 3). The influence of pH variation should also be considered with soil depth and also within paddocks.

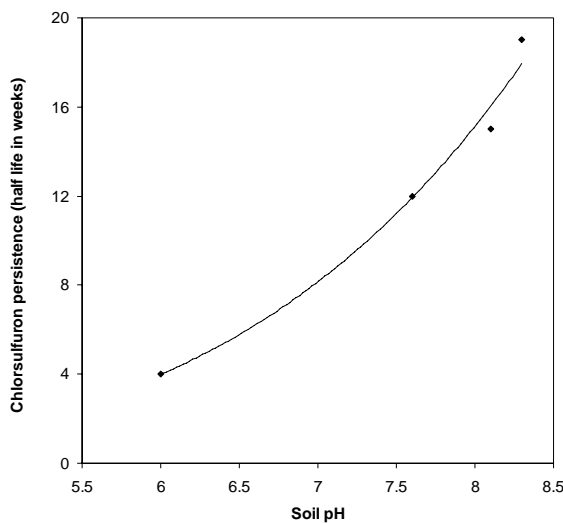


Figure 3: Influence of soil pH on chlorsulfuron persistence. (Walker and Starasts 1996)

Herbicide carry over-assessment

Consult the NSW DPI publications *Weed Control in Winter Crops*, and *Weed Control in Summer Crops* for information on re-cropping intervals, plant-back periods and testing for herbicide residues.

Always read and follow label instructions – it is the law. As an example, the Logran herbicide label states that the minimum rainfall requirement between application and sowing of the following crop or pasture is 300 mm (pH 6.5, 1:5 soil water).

Weeds guide to residues

Herbicide residues will often lead to damage on weeds and/or volunteer plants. Monitoring of areas for indicator plants may help in determining if significant herbicide levels are still present.

After it rains, carefully inspect weeds for any apparent herbicide injury symptoms. If newly emerging weeds are still being affected close to sowing time there may be a problem!

Be aware that if the herbicides have leached deeper into the soil it will take time for the roots to pick the herbicide up. It is important to compare treated areas with areas that are known to have no risk of herbicide carryover.

Paddock strip test for residues

If time is available, use the seeder to sow a test strip of a sensitive species across the paddock.

Paddock test strips are more reliable and less trouble than pot tests. The limitation is that nothing will grow until after it rains, unless a strip can be irrigated, so paddock tests could lead to sowing delays.

Pot tests for residues

A pot test (bioassay) is a simple way to test if a herbicide is still present in the soil. However, pot tests are best used to confirm a problem. Sampling errors and the possibility of herbicides leaching deeper than sampling depth, mean a 'no apparent effect' result may be unreliable.

To run the test, sample from several locations in the paddock. Areas that may have a higher potential for carryover should be tested, such as headlands or areas with high pH. Sulfonylurea herbicides are predisposed to leaching and therefore will move deeper into the profile should any significant rainfall events occur prior to soil sampling. Leached herbicide has the potential to affect root growth and crop performance later in the season.

The crop to be tested should then be planted and monitored for 3 to 4 weeks to determine if any symptoms occur. Do not over-water the pots as this will accelerate residue breakdown. Descriptions of the method and damage symptoms are available in the NSW DPI publication *Weed Control in Summer Crops*.

© State of New South Wales
through NSW Department of Primary Industries 2006

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (December 2006). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.