



Avoiding herbicide residue damage after the drought

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in a nutshell

- When selecting crops to sow in 2007, the risk of herbicide residues must be considered in paddocks that have not been irrigated in the last 12 months, and have not had sufficient rainfall as a result of the drought
- This article describes some of the likely situations where herbicide residues may arise, and lists several sources for more detailed and specific information

Some herbicides can last in the soil for months, or even years. They break down fastest in warm, moist soils but the speed with which they break down depends on soil type, soil pH, rainfall, soil temperature and microbial activity.

When selecting which crops to sow in 2007 (as we look forward to a much better winter cropping season now the 2006 season is behind us), growers need to take into consideration the real risk of herbicide residues in paddocks that have not been irrigated in the last 12 months, and have had low rainfall as a result of the drought. By sowing a low risk crop or extending the minimum re-cropping interval (plantback period), growers may avoid crop damage and disappointing yields in 2007.

Do herbicide residues affect irrigated paddocks?

This article is particularly written regarding paddocks with winter fallow or dryland crops in winter 2006 and no summer crops in 2006–07. But whether your paddocks are irrigated or dryland, the message is always the same: **carefully read the herbicide label and ask your herbicide company representative for advice if the label is confusing.**

Which ones to be wary of!

If you have used any of the herbicides listed in Table 1 in the past 2–3 years, **you must read the label and observe the plantback periods.** If in any doubt, speak to your agronomist, as there will be little margin for error this year.

More warnings

While some herbicide labels specify how much rainfall is needed before sowing a susceptible crop, others only give a time interval. If this is the case, be conservative in 2007!

Anecdotal evidence would strongly suggest that some herbicides have caused damage even after the plantback period has been observed following an extended dry period. This year, we are moving into new territory as we have had our lowest rainfall on record in some areas, so even

herbicides with normally low residue risks could be persisting in the topsoil.

Considerations for 2007

Table 2 lists the minimum re-cropping period for some crops and herbicides in Victoria. Table 3 lists the crops and plantback periods for herbicides used in NSW. Table 4 highlights particular risks in 2007, based on products that may have been used in the last two years.

For the most recent advice on re-cropping or plantback periods, please read the label of your herbicide product or consult your agronomist; or in NSW obtain a copy of the 2007 winter crop weed control publication or look up this information on the NSW DPI website.

Group B - imi's

The 'imi's' may have been used on Clearfield canola, Clearfield wheat, field peas, beans and chickpeas. Expect residues to be present if you used these chemicals in 2005 or 2006 – plantbacks are as long as 34 months for TT or normal canola!

If group B imi's have been used, the safest bets for 2007 are Clearfield canola, Clearfield wheat or pulses. Avoid using another group B on the same paddock. Also avoid using trifluralin in the conventional manner on wheat or barley. Trifluralin used on wheat or barley paddocks in a direct drill situation with narrow points is said to reduce crop damage compared with a conventional application. Sowing with poor quality seed may exacerbate the problem.

Group B - SUs

Plantback periods are up to 24 months on alkaline soils with pH more than 7.6 (water) following chlorsulfuron and triasulfuron, and 9 months for metsulfuron-methyl. In NSW, only designated Pioneer Clearfield varieties can be sown after three months where there are residues of the product


Table 1: Herbicides and their groups at risk of possible residue problems in 2007. This is not an exhaustive list.

Group	Active ingredient	Examples of products
B: the SUs	Chlorsulfuron	Accolade, Glean, Kenso AgCare, Lusta, Sum-Chlor, Tackle
	Sulfosulfuron	Monza
	Triasulfuron	Ken-gran, Logran, Lonestar, Nugran, Spigran, Triasulfuron, Trisure
	Mesosulfuron-methyl	Atlantis
	Metsulfuron-methyl	Ally, Associate, Esteem, Lynx, Metsulfuron, Sum-met etc.
	Iodosulfuron-methyl-sulfuron	Hussar
B: the sulfonamides	Flumetsulam	Broadstrike
	Metosulam	Eclipse
B: the imi's	Imazethapyr	Spinnaker
	Imazethapyr + imazapyr	Intervix, Lightning, Midas, OnDuty
C: the triazines	Atrazine	Atradex, Atrazine, Farmozine, Gesaprim etc.
	Simazine	Gesatop, Simazine, Simagranz
C+B (SU)	Tertbutyn + triasulfuron	
D: Trifluralin	Trifluralin	
I: the phenoxys	Clopyralid	Archer, Clopyralid, Ken-trel, Lontrel, Victory
	2,4-D	

Table 2: Minimum re-cropping intervals (months) on certain labels for dryland crops in Victoria. Check labels for any changes to rates, formulations, crops and different soil type or pH interactions since the time of writing. Note that these recommendations are for Victoria.

Crop	Ally	Glean	Logran	Logran	Spinnaker	On Duty	Eclipse	Broad-strike	Lontrel	Gesaprim 600SC	Simazine
Soil pH	5.6-8.5	6.6-7.5	6.6-7.5	7.6-8.5							
Canola	9m	22m	22m ¹	24m ²	34m	34m	9m	9m	0	6m ⁵	9m ⁶
Designated CF7 canola varieties	10d	3m	-	-	0	0	-	-	-	6m ⁵	9m ⁶
TT canola	9m	22m	22m ¹	24m ²	34m	34m	9m	9m	-	0	0
Wheat	10d	0	See label	See label	10m (see label)	8m ³	0	0	0	6m ⁵	9m ⁶
CF7wheat	-	-	-	-	0	0	-	0	0	6m ⁵	9m ⁶
Barley	6w	9m	See label	See label	10m (see label)	8m ³	0	3m	0	6m ⁵	9m ⁶
Faba beans	9m	22m	22m ¹	24m ²	-	0	9m	9-24m	9m ⁴	6m ⁵	0
Lentils	9m	-	-	-	-	10m	9m	-	9m ⁴	6m ⁵	9m ⁶
Medic	9m	22m	22m ¹	24m ²	-	8m ³	9m	0	9m ⁴	6m ⁵	9m ⁶
Oats	9m	9m	See label	See label	22m	8m ³	0	3m		6m ⁵	9m ⁶
Peas	9m	22m	22m ¹	24m ²	-	0	9m	3m	9m ⁴	6m ⁵	9m ⁶
Soybeans	14m	26m	22m ¹	24m ²	-	-	-	0	-	6m ⁵	9m ⁶
Vetch	-	-	-	-	10m	8m	-	-	9m ⁴	6m ⁵	9m ⁶

Notes: d=days, w=weeks, m=months, - = not specified on label,

¹Minimum 500 mm rain also needed; ²minimum 700 mm rainfall needed; ³minimum 150-250 mm rainfall needed, depending on rate (see label for interaction between Logran and trifluralin); ⁴Extend to 12 months if 300-500 mL/ha used; ⁵Extend to 18 months if 2-5 L/ha used; ⁶Period is for rates up to 4.5 L/ha of 500 g/L formulation; ⁷Clearfield canola or wheat, check label for designated varieties.



Table 3: Plantback guidelines for crop rotation in NSW. Please consult the 2007 publication or www.agric.nsw.gov.au/reader/weed-control-winter-crops for the most up-to-date recommendations.

Residual herbicides – Ally®, Broadstrike®, Flame®, Glean®, Lusta®, Harmony® M, Logran®, Midas®, Monza®, OnDuty®, Raptor® and Spinnaker® have special recommendations for recropping which need considering when planning rotations. Recommendations are:

Minimum Recropping Interval – After Application

Product	Ally® Associate®		Glean® n Lusta®		Harmony® M	Logran® n Nugran® n Logran® B-power n			Spinnaker®	Broadstrike®	Flame®	Monza®		Raptor®	OnDuty®	Midas®	Hussar® f	Atlantis® u	Balance® 750 WG v
	5.6–8.5	6.5 or less	6.6–7.5	7.6–8.5		6.5 or less	6.6–7.5	7.6–8.5				6.5 or less d	6.6–8.5 m						
	Soil pH																		
barley	6 w	9 mo	9 mo	18 mo	9 mo	12 mo	12 mo	12 mo	10 mo e	3 mo	4 mo f	12 mo	22 mo	10 mo i	8 mo i	8 mo i	9 mo	9 mo	—
canola	9 mo	12 mo	22 mo	—	9 mo	12 mo	12 mo h	12 mo h	34 mo	9 mo p	36 mo	10 mo	22 mo	21 mo	34 mo	34 mo	9 mo	9 mo	—
canola – Clearfield	*	3 mo	3 mo	3 mo	—	—	—	—	0 mo	—	—	—	—	—	0 mo	0 mo	—	—	—
cereal rye	6 w	3 mo	3 mo	18 mo	3 mo	12 mo	12 mo	12 mo	—	0 mo	—	—	10 mo	—	—	—	—	—	—
chickpea	9 mo	—	—	—	9 mo	12 mo	12 mo h	12 mo h	0 mo	3 mo	4 mo	10 mo	22 mo	10 mo	0 mo	0 mo	—	—	—
cotton	—	—	—	—	—	15 mo k	15 mo k	18 mo k	—	3 mo r	24 mo	—	—	—	34 mo	—	—	—	—
faba bean	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	0 mo	9 mo p	3 mo	12 mo	22 mo	10 mo	0 mo	0 mo	9 mo	11 mo	9 mo w
field pea	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	0 mo	3 mo	—	10 mo	22 mo	0 mo	0 mo	0 mo	9 mo	9 mo	9 mo w
Jap millet	14 mo	—	—	—	4 mo b	—	—	—	—	—	36 mo	—	—	21 mo	—	—	—	—	—
lentil	—	—	—	—	—	—	—	—	—	—	—	10 mo	22 mo	—	—	—	21 mo	11 mo	21 mo x
linseed	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	—	—	36 mo	—	—	21 mo	34 mo	34 mo	—	—	—
lucerne	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	10 mo	3 mo	4 mo f	—	—	10 mo	8 mo	8 mo	—	—	—
lupin	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	10 mo	9 mo p	—	10 mo	—	10 mo	8 mo	8 mo	9 mo	—	—
maize	14 mo	18 mo	26 mo	—	6 mo b	15 mo k	15 mo k	18 mo k	See label	0 mo	10 mo	—	—	21 mo	—	—	—	—	—
medics	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	10 mo	0 mo	36 mo	10 mo	22 mo	10 mo	8 mo	8 mo	21 mo	21 mo	21 mo x
mungbean	—	—	—	—	4 mo b	15 mo k	15 mo k	18 mo k	0 mo	—	3 mo	—	—	21 mo	—	—	—	—	—
oats	9 mo	6 mo	9 mo	18 mo	9 mo	12 mo	12 mo	12 mo	22 mo	3 mo	36 mo	10 mo	22 mo	21 mo	8 mo	8 mo	9 mo	9 mo	—
panorama millet	14 mo	—	—	—	14 mo	—	—	—	—	—	36 mo	—	—	21 mo	—	—	—	—	—
safflower	9 mo	12 mo	22 mo	—	9 mo	—	—	—	22 mo	—	36 mo	—	—	21 mo	22 mo	22 mo	—	—	—
sorghum	14 mo	18 mo	26 mo	—	4 mo b	15 mo k	15 mo k	18 mo k	—	3 mo p t	10 mo	—	—	21 mo	34 mo	34 mo	—	—	—
soybean	14 mo	18 mo	26 mo	—	4 mo b	15 mo k	15 mo k	18 mo k	0 mo	0 mo	—	—	—	21 mo	—	—	—	—	—
sub. clover	9 mo	12 mo	22 mo	—	9 mo	12 mo	22 mo	24 mo	10 mo	3 mo	—	10 mo	—	10 mo	8 mo	8 mo	—	—	—
sunflower	14 mo	18 mo	26 mo	—	4 mo b	18 mo k	18 mo k	—	—	3 mo pr	24 mo	—	—	21 mo	—	—	—	—	—
triticale	6 w	0 mo	0 mo	0 mo	3 mo	12 mo	12 mo	12 mo	10 mo e	0 mo	—	0 mo	0 mo	10 mo i	8 mo i	8 mo i	—	—	—
vetch	—	—	—	—	—	—	—	—	10 mo	—	—	—	22 mo	10 mo	8 mo	8 mo	—	—	—
wheat	10 d	0 mo	0 mo	0 mo	3 mo	0 mo	0 mo	0 mo	10 mo e	0 mo	4 mo f	0 mo	0 mo	10 mo i	8 mo i	8 mo i	1 d	1 d	10 wk y z
wheat – Clearfield	—	—	—	—	—	—	—	—	0 mo	—	0 mo	—	—	—	0 mo	0 mo	—	—	10 wk y z
white French millet	14 mo	—	—	—	14 mo	—	—	—	—	—	—	—	—	21 mo	—	—	—	—	—

Key: – No information. d = Days, w = Weeks, mo = Months; * = Under review All pH's are measured in water 1:5

Notes:

- a Glean® and Siega® are not recommended for use on soils of pH 8.6 and above.
- b Longer interval needed in soils with pH above 7.8, with Harmony® M.
- c No less than 400 mm of rainfall between Harmony® M application and sowing of rotation crop.
- d For Monza 300 mm rainfall (min) required between application and sowing of plantback crop.
- e If intending to sow wheat (except Clearfield wheat), barley or triticale during the next winter season do not apply Spinnaker® later than the end of June and post-emergence later than the end of July. Do not use Spinnaker® where rainfall from spraying to sowing of cereals is expected to be below 300 mm. In addition do not use the 0.3 L/ha rate in areas where rainfall from spraying to sowing of cereals is expected to be below 400 mm.
- f Where wheat (except Clearfield wheat) and barley or lucerne are to be planted during the next winter season DO NOT apply FLAME later than the end of DECEMBER, and only when rainfall is expected to be greater than 200 mm between herbicide application and sowing.
- h A minimum of 500 mm rainfall required to fall between herbicide application and planting.
- i Where wheat, barley or triticale are intended to be sown during the next winter season do not apply Raptor, OnDuty or Midas later than the end of August. Minimum rainfall from Raptor application to sowing of cereals is 200 mm. Minimum rainfall from OnDuty and Midas application to sowing of cereals is 250 mm.
- k A minimum of 700 mm rainfall required to fall between herbicide application and planting.
- m For Monza 600 mm rainfall (min) required between application and sowing of plantback crop.
- n Where Logran® is applied at 10 to 15 g/ha plus 1 L of trifluralin/ha, the following crops can be sown from 9 months after application provided 300 mm of rainfall have been recorded: field pea, canola, chickpea, medics, clover, lucerne, safflower, lupin, cereal rye, barley, oats, wheat and triticale. (see label for additional information).
- p On shallow soils of less than 30 cm depth, DO NOT plant until 2 years after application.
- r 3 mo on deep well drained soil.
- t Rainfall less than 250 mm may result in extended recropping intervals. Patchy rain with extended dry periods may also result in extended recropping intervals even when rainfall exceeds 250 mm. Not recommended on soils with a pH greater than 8.5.
- u Rainfall of less than 250 mm following Atlantis use will result in extended recropping intervals. Use on soils with a pH greater than 8.5 (soil in water) has not been extensively tested and is not recommended.
- v Use on soils < 7.0 pH has not been extensively tested and may result in extended recropping intervals.

- w 250 mm rainfall required between application and recropping.
- x 500 mm rainfall required between application and recropping.
- y 100 mm rainfall required between application and recropping.
- z If balance has been tankmixed with Simazine a minimum recropping interval of 9 months applies to both wheat and barley.

Avoid using any of these herbicides more than once in any paddock within 12 months.

Other Products:

- Eclipse®:** Do not plant susceptible crops such as canola or any brassica crop, field pea, beans, medics, lucerne or sub-clover for 9 months after application.
- Tordon® 75-D:** Do not plant susceptible broadleaf crops such as soybean, grain legumes, pasture legumes and oilseeds within 12 months of applying herbicide. Cereal crops and grasses are normally unaffected.
- Atrazine®:** Plantback periods: all sensitive crops for six months where rates up to 2.5 L/ha have been used and eighteen months where higher rates used.
- Simazine®:** Plantback periods: nine months for all sensitive crops where rates up to 4.5 L/ha have been used.
- Balance® 750WG:** Should only be applied to cropping areas which are left to fallow or where the following crop will be either chickpea, cereals or maize.
- Lontrel® 750 SG:** Residues in straw of treated crops can affect subsequent susceptible crops.

Plantback period SNSW, Vic, SA, WA (winter rainfall areas)

Rate Lontrel 750 SG g/ha	up to 120	200	> 200
Chickpea, field pea, faba bean, lupin, medics and clover	9 months	12 months	24 months
wheat, barley, oats	1 week	—	—

Plantback period NNSW, Qld (summer rainfall areas)

Rate Lontrel 750 SG g/ha	30	60	120
Wheat, barley, oats	1 week	1 week	—
Chickpea	—	12 weeks	—
Lucerne	36 weeks	36 weeks	36 weeks
Cotton	2 weeks	4 weeks	8 weeks
Sorghum, maize	1 week	2 weeks	2 weeks
Sunflower	5 weeks	8 weeks	24 weeks
Soybean	1 week	1 week	24 weeks

Reproduced from NSW DPI 'Weed Control in Winter Crops 2006'.



Glean, or 10 days after using Ally. Minimum rainfall amounts are also required, for example, up to 900 mm of rain needs to fall after Logran before sowing susceptible crops. As soil pH can vary considerably across paddocks, then don't take risks – if a soil test reading comes back with a pH of 7.5, assume it is 7.6 when calculating plantback periods.

If chlorsulfuron or triasulfuron was used in 2005, especially if the soil pH is above 7.5, cereals are the safest bet. If they were used in 2006, wheat is a better choice this year than barley or oats.

As with the imi's, avoid using a group B herbicide on these paddocks in 2007.

Group C - triazines

This group of chemicals includes simazine and atrazine. Damage could occur on susceptible crops from last year's application, even at low rates of 1.5 L/ha. If you used rates of 4 L/ha of a combination of triazines on TT canola, be extra careful in 2007 – it's probably best to avoid cereals and

conventional or Clearfield canola, and group B herbicides may compound the problem. If wheat is sown this year after TT canola and simazine or atrazine was used, avoid using trifluralin. If we have a good spring, crops may recover.

Group I – clopyralids

Crop damage has been suspected in past years on self-mulching, alkaline grey clays following the use of clopyralid (Lontrel®), despite following the label. Damage to pulse crops in 2007 is likely if this herbicide has been used in the paddock for the past two seasons, but plants may outgrow damage if the season is favourable.

If summer and autumn have been dry, the best bet is to choose a canola or cereal crop in 2007.

Group I – 2,4-D or dicamba on summer weeds

The plantback period for 2,4-D and dicamba only begins after 15 mm of rain has fallen. So if you used this herbicide to control weeds last summer, take this into consideration before sowing a broadleaf crop like canola or a pulse.

Table 4: Risk of herbicide residue damage in 2007 due to herbicides applied in 2005 and/or 2006 (where residual herbicide effects on label are unclear)

Previous winter crop and herbicide		Herbicide residue risk to crops in 2007		
Crop in 2005	Herbicide 2005	Low risk	Moderate risk	High risk
Wheat	Eg Glean 7g, Logran 12g (pre-sowing)	Clearfield canola, cereals	TT or conventional canola, beans, peas	Lentils
Crop in 2006	Herbicide 2006			
Wheat	Eg Glean 7g, Logran 12g (pre-sowing)	Clearfield canola, wheat, barley	Oats	Canola*, beans, peas, lentils*
Wheat, barley	Eg Ally 5g (more than 9 months prior)	Clearfield canola, cereals, peas, beans, lentils		
Wheat, barley	Eg Lontrel 100mL	Canola, cereals, peas	Lentils	Beans, vetch
TT canola	Eg Atrazine 2L	TT canola, oats, pulses	Clearfield or conventional canola, barley, wheat (avoid trifluralin)	
Clearfield canola	Eg OnDuty 40g	Clearfield canola, pulses, Clearfield wheat	Wheat (avoid another group B)	Oats, barley (avoid another group B)
Canola	Trifluralin (480) 1.6 L	Canola, peas, beans, wheat, barley, lentils	Wheat, barley, lentils***	

*Extremely risky – may lose entire crop; ***Moderate risk if trifluralin is used conventionally on wheat, barley or lentils crops in 2007.



Figure 1: Herbicide residues persist beyond plantback periods after dry seasons. Spinnaker residue damage to canola one year after application (centre plot) at Kaniva, Vic. The outer plots were not sprayed as a comparison. Photo: K. Hollaway, DPI Victoria.



Figure 2: In this situation, herbicide residues were affecting the new crop, two years after application. Spinnaker residue damage to canola two years after application (centre plot), at the same site and plots as in Figure 1. Photo: K. Hollaway, DPI Victoria.



Group D – trifluralin

Good summer rains will help break down trifluralin. After the 2002 drought, 20–25% of trifluralin was still present in alkaline self-mulching grey cracking clay soils the following January (2003), but the residues fell to an acceptable level after soaking February rains. Canola is the most tolerant crop of trifluralin – followed by barley, faba beans, chickpeas, field peas, wheat, and lentils, whilst oats are the most sensitive.

Cultivation will increase the potential for trifluralin residue damage to emerging crops, as the herbicide will be mixed in the soil to varying depths – so knife points are recommended. Wheat crops sown with small seeds are more prone to damage due to a shorter coleoptile, and lentils may need to be sown deep.


Variety & disease interactions

Some crop varieties are more prone to herbicide residue damage than others (eg wheat and group B residues). Also, root diseases and trace element deficiencies can exacerbate herbicide residue damage.

Read & record & ask for guidance

Read labels very carefully – including the fine print – and keep a record of spray dates, rates, batch number, rainfall record and soil type and pH in case of unexpected damage.

Labels can be found on www.pestgenie.com.au and the www.avpma.com.au. The Infopest CD-ROM is also available

from the QLD DPI&F through an annual subscription (ph: 07 3404 6999). If you have paddocks which are likely to have residual herbicides, contact your agronomist or herbicide company representative for further advice. 

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Further information

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Further reading

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