

## **Crop selection after the 2002 drought**

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Crop selection in 2003 is complicated by the conditions in 2002. The main issues that can affect your crops this year are:

1. **Cereal Root Disease** levels in 2002 were very low and disease levels from 2001 will be carried over - 2002 was NOT a disease break year. The last time we saw CCN in the southern Mallee was after the 1994 dry year when eelworm did not hatch but was carried over from 1993 and affected wheat crops in 1995.
2. **Foliar Disease** levels were low in 2002 and stubbles from 2001 will be the main source of inoculum outbreak for diseases in 2003.
3. **Residual Herbicides** used in 2001 and 2002 can have a large impact on susceptible crops in 2003.

You will need to consider each of these three issues when deciding on a crop selection plan in 2003. We have developed four tables to help you with making this decision - each of the tables presents a scenario which is then rated as a Low, Moderate or High Risk option. It is then your decision how you manage your cropping risk profile.

In addition to these three issues for crop selection you will also need to consider available nutrients (as applied in 2002) and how important it is, not to waste the nitrogen and phosphorus you have already paid for and applied. In 1994 we found that on failed crops, most of the P was carried over from 1994 to 1995, and 70% of the N fertiliser applied in 1994 was available in 1995. We expect the same to occur this year.

The following tables contain a large amount of diverse information on risk of crop failure. There are no absolutely right answers and decisions will have to be made on a best-bet basis. In many cases the decision on a risk category remains our opinion - *if nothing else they will make a good discussion point!*

At the end of this paper you will find a table which can be used to enter your own farm data and work out the risk of planting a particular crop in paddocks with different crop and chemical histories.

The information provided in this guide applies to cropping in the Mallee and Wimmera where crops failed in 2002. Failed crops are those that yielded less than 0.3 t/ha because of drought not frost. In some cases, crops produced a lot of dry matter but were frosted late in the season (in the southern Wimmera) - these paddocks are not failed paddocks agronomically speaking - a normal rotation should be followed in these paddocks. The herbicide residue information makes the assumption that soil pH is alkaline and many of the cropping intervals listed in the tables are based on less than 150mm of rain since the application of the herbicide.

### **Example of a reason for using this guide**

Farm situation:

1. All wheat and barley was predrilled with N last year. This is money in the soil bank and you would like to use it. Sowing a pulse will not utilise the N and it will have been wasted.
2. All your wheat and barley paddocks were sprayed with Ally and Lontrel last year (at low rates) but you are concerned about the residual nature of these herbicides - especially when sowing lentils
3. Your lentil paddocks failed. You want to know whether to sow your lentil paddocks with a cereal or whether you can go back with a lentil crop.

**This guide will help in:**

1. Working out the disease risks of growing cereal on cereal
2. Estimating the risk of residual herbicides affecting a crop in 2003
3. Deciding on the risk when sowing lentils on lentils or canola on canola - what are the risks and what can you do to minimise them?

## Part A: Cereal crop selection based on root disease considerations

**Table 1.** Root disease risk in relation to growing a particular crop in 2003 based paddock history in 2001 and 2002.

Rotation		Disease	Disease Risk 2003		
2001	2002		Low Risk	Moderate Risk	High Risk
grass pasture <sup>1</sup>	canola, pulse	Take All		barley	wheat
		CCN	barley, wheat (T) <sup>2</sup>		wheat (I) <sup>3</sup>
		Rhizoc.	barley, wheat		
grass pasture	wheat (CCN S) <sup>4</sup>	Take All		barley	wheat
		CCN	barley	wheat T	wheat I
		Rhizoc.		wheat	barley
grass pasture	wheat (CCN R) <sup>5</sup>	Take All		barley	wheat
		CCN	barley, wheat (T)		wheat (I)
		Rhizoc.		wheat	barley
wheat <sup>6</sup> (CCN R)	wheat (CCN R)	Take All	barley	wheat	
		CCN	wheat (T)	wheat (I)	
		Rhizoc.	wheat	barley	
clean pasture, pulse, canola	wheat	Take All	barley, wheat		
		CCN	barley, wheat (I, T)		
		Rhizoc.	wheat	barley	
wheat <sup>6</sup> (CCN S)	barley <sup>7</sup>	Take All	barley	wheat	
		CCN	barley, wheat (T)		wheat (I)
		Rhizoc.	wheat	barley	
wheat <sup>6</sup> (CCN R)	barley	Take All	barley	wheat	
		CCN	barley, wheat (I, T)		
		Rhizoc.	wheat	barley	
clean pasture	grass pasture	Take All	barley	wheat	
		CCN	barley, wheat (I, T)		
		Rhizoc.	wheat	barley	
wheat <sup>6</sup> (CCN S)	canola pulse	Take All	barley	wheat	
		CCN	barley, wheat T		wheat (I)
		Rhizoc.			
wheat <sup>6</sup> (CCN R)	canola pulse	Take All	barley	wheat	
		CCN	barley, wheat (I, T)		
		Rhizoc.	wheat	barley	

CCN variety information where T=Tolerant, I=Intolerant; R=Resistant, S=Susceptible - see note at end of paper

<sup>1</sup> pasture with late (later than July) or no grass control (especially those with brome, barley grass and wild oats)

<sup>2</sup> T = wheat varieties tolerant to CCN (also see notes at the end of this paper)

<sup>3</sup> I = wheat varieties intolerant to CCN

<sup>4</sup> S = wheat varieties susceptible to CCN

<sup>5</sup> R = wheat varieties resistant to CCN

<sup>6</sup> no Take All observed in crop in 2001

<sup>7</sup> malt (CCN susceptible) and feed (CCN resistant) varieties will not make a difference in build up of CCN in 2002

## Part B Crop selection in 2003 based on foliar disease consideration

**Table 2.** Foliar disease risk in 2003 based on crop history in 2001 and 2002.

Rotation		2003 crop	Disease Risk 2003		
2001	2002		Low Risk	Moderate Risk	High Risk
lentils <sup>1</sup>	barley <sup>2</sup>	barley	varieties (SFNB M) <sup>3</sup>	varieties (SFNB VS) <sup>4</sup>	
		wheat	all varieties		
		lentils	all varieties		
wheat <sup>1</sup>	lentils <sup>2</sup>	barley	all varieties		
		wheat	varieties (YLS M) <sup>5</sup>		varieties (YLS VS) <sup>6</sup>
		lentils		all varieties <sup>7</sup>	
barley <sup>1</sup>	lentils <sup>2</sup>	barley	varieties (SFNB M) <sup>3</sup>		varieties (SFNB VS) <sup>4</sup>
		wheat	all varieties		
		lentils		all varieties <sup>7</sup>	
pulse or clean pasture	canola <sup>2</sup>	barley	all varieties		
		wheat	all varieties		
		lentils	all varieties		
canola <sup>2</sup>	canola <sup>2</sup>	canola	var BL rating 8,9 <sup>8</sup>	var BL rating 7	var BL rating <7
		wheat	all varieties		
		lentils	all varieties		
wheat <sup>1</sup>	barley <sup>2</sup>	barley	varieties (SFNB M) <sup>3</sup>	varieties (SFNB VS) <sup>4</sup>	
		wheat	varieties (YLS M) <sup>5</sup>	varieties (YLS VS) <sup>6</sup>	
		lentils	all varieties		
barley <sup>1</sup>	wheat <sup>2</sup>	barley	varieties (SFNB M) <sup>3</sup>		varieties (SFNB VS) <sup>4</sup>
		wheat	varieties (YLS M) <sup>5</sup>		varieties (YLS VS) <sup>6</sup>
		lentils	all varieties		

<sup>1</sup> assume residues were retained

<sup>2</sup> cultivated before sowing

<sup>3</sup> SFNB M - Spot Form Net Blotch, Moderately Susceptible to Resistant (eg. Galleon)

<sup>4</sup> SFNB VS - Spot Form Net Blotch, Very Susceptible (eg. Gairdner)

<sup>5</sup> YLS M - Yellow Leaf Spot, Moderately Susceptible to Resistant (eg. H45)

<sup>6</sup> YLS VS- Yellow Leaf Spot, Very Susceptible (eg. Yitpi) - severity of disease will depend on how much wheat stubble is still on the surface at sowing

<sup>7</sup> Ascochyta is the main problem (less of an issue if Northfield is sown). Botrytis risk is low.

<sup>8</sup> canola variety Blackleg rating

	canol a	all varieties		
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S= susceptible varieties, M = moderately susceptible varieties, R = resistant varieties

## Part C: Herbicide residue considerations for crop selection in 2003

**Table 3.** Label restrictions for re-cropping (if you go beyond the label they are all High Risk options, which can result in total crop loss). Always read the label for conditions specific for your farm (the following table is an abbreviated version of the label restrictions) based on label use rates.

	Ally	Glean pH>7.6	Logran pH>7.6	Spinn	OnDuty Midas	Eclipse	B'strike	Lontrel	Atrazine	Simazine
wheat	10d	0	0	10m	8m	0	0	0	6m	9m
IT wh	-	-	-	0	0	0	0	0	6m	9m
barley	6w	18m	12m	10m	8m	0	3m	0	6m	9m
canola	9m	24m	24m	34m	34m	9m	9m	-	6m	9m
TT can	9m	24m	24m	34m	34m	9m	9m	-	0	0
IT can	-	-	-	0	0	-	-	-	6m	9m
lentil	-	-	-	-	-	-	-	9m	6m	9m
bean	9m	24m	24m	0	0	9m	9m	9m	6m	0
pea	9m	24m	24m	0	0	9m	3m	9m	6m	9m
vetch	-	-	-	10m	8m	9m	-	9m	6m	9m

0 = no re-cropping restriction, d = days, w = weeks, m = months, - = not on label

Further information on residual herbicides:

- Ally: soil pH 5.6 to 8.5.
- Glean: soil pH 7.6 to 8.5. Crops such as beans and peas should only be grown after a field test strip has demonstrated that it is safe (even after 24 months)
- Logran: soil pH 7.6 to 8.5. Barley - 12 months plus 250mm of rain. Canola, beans and peas - 24 months plus 700mm of rain.
- Spinnaker: wheat, barley and vetch - 10 months plus 300mm of rain.
- On Duty: wheat and barley - 8 months plus 300mm of rain
- Lontrel: straw absorbed residues can affect subsequent susceptible crops. Crops such as beans and peas should not be planted for 9 months when up to 0.3L/ha has been applied.
- Atrazine: all sensitive crops should not be planted for six months where rates up to 2.5L/ha have been used
- Simazine: all sensitive crops should not be planted for nine months where rates up to 4.5L/ha have been used

Summer rain will help in reducing the risk of all these herbicides. The breakdown rates are not known and not all labels specify how much rain is required to reduce the problem. Soil pH is also a critical component and we know that our soils are quite variable in soil pH and many paddocks in the Mallee and Wimmera contain patches with a soil pH above 8.5 (not on the label for SU herbicides).

Always talk to your local agronomist if not sure about herbicide carry over and the risk involved in growing a susceptible crop.

## Part C: Herbicide residue considerations

**Table 4.** Additional information on herbicide residual effects which may not be clear on the label. This additional information is based on our observations in paddocks as well as trial work. It cannot be guaranteed for its accuracy.

		Disease Risk 2003		
Crop 2001	Herbicide 2001	Low Risk	Moderate Risk	High Risk
wheat	Glean 7g, Logran 12g <sup>1</sup>	cereals, IT canola	canola, bean, pea	lentil
Crop 2002	Herbicide 2002			
wheat	Glean 7g, Logran 12g <sup>1</sup>	wheat, barley, IT canola	oats	canola, bean, pea, lentil <sup>2</sup>
wheat, barley	Ally 5g <sup>3</sup>	cereals, IT canola, pea, bean	lentil <sup>4</sup>	
wheat, barley	Lontrel 100ml	cereals, canola, pea	lentil	bean, vetch
TT canola	atrazine 2L	TT canola, oats, all pulses	canola, wheat, barley	
IT canola	On-Duty 40g	IT canola, all pulses, Clearfield JNZ <sup>5</sup>	wheat <sup>6</sup>	barley, oats <sup>6</sup>
lentil	Simazine 0.8L	TT canola, cereals, all pulses	canola	
canola	Triflur480 1.6L	canola, pea, bean, wheat, barley, lentil <sup>7</sup>	oats	

- Wheat in 2003 on TT Canola in 2002: if you used Atrazine in 2002 then do not use trifluralin on wheat in 2003.
- Wheat in 2003 on pulse in 2002: if you used Simazine in 2002 then using trifluralin on wheat in 2003 will be moderate risk
- Wheat or barley in 2003 on IT Canola in 2002: if you used On-Duty in 2002 then do not use trifluralin in the conventional method, on wheat or barley in 2003, nor should you use a Group B pre- or post-sowing in the cereal. Trifluralin used in a direct drill situation with narrow points will result in significantly less crop damage in 2003.

<sup>1</sup> applied pre-sowing

<sup>2</sup> in this situation lentils and canola are extremely high risk and severe crop damage will occur (total crop loss!)

<sup>3</sup> applied at least nine months before re-cropping (ie. July 2002 if sowing in early May 2003)

<sup>4</sup> lentils are the most susceptible of all the pulses to SU residues, the re-cropping interval for lentils after using metsulfuron is not on the label - until it is we advise extreme caution after a drought year

<sup>5</sup> all wheat varieties, except for Clearfield JNZ, are susceptible to the carry over of On-Duty

<sup>6</sup> if sowing wheat or barley after IT canola in 2002 then avoid using a group B in 2003

<sup>7</sup> wheat, barley and lentil do not apply more trifluralin in 2003 (if trifluralin is to be used in the conventional method it moves these three crops into the moderate risk category, in a Direct Drill situation with narrow points it will still be relatively safe)

## Your paddock risk management guide

Use the information supplied in parts A, B and C (on root disease, foliar disease and herbicide residual risk consecutively) to build up a picture of risk for your rotation. This will assist you in minimising your production risk in 2003 based on what happened in 2002.

In the following table you will only need fill in the information related to herbicides if the herbicides have residual activity (if they do NOT appear in Table 3 then there is no need to fill them in - make sure you include herbicides with the same active even though the product name may be different)

paddock name	2001 Crop	2001 Herb.	2002 Crop	2002 Herb.	2003 Crop	A. Root disease Risk			B. Foliar disease risk			C. Herbicide residual risk		
						L	M	H	L	M	H	L	M	H
example	W Yitpi	Ally 5g	B Gaird	Ally 5g	W Yitpi	CCN Rhiz	TA				YLS	√		

use the table to get an overview of the different risk categories when growing a particular crop in a paddock with a problem rotation (disease or herbicide)





### **Root diseases additional notes:**

- Take-all levels decrease following summer rain. When soils are warm and wet the fungus is broken down by other soil micro-organisms. A rule of thumb is that 30% of the Take-all in a soil is broken down when the topsoil is moist for a week. Hence if the soil is wet for six weeks (does not have to be consecutive) Take-all levels are broken down to very low levels.
- Crown Rot levels have probably built up over the last two years. Durum wheats are the most susceptible, bread wheat less so. Cultivation prior to sowing will reduce the risk.
- Disease carry over into 2004. Most current widely available malting barley varieties are CCN susceptible - care has to be taken in a continuous cereal rotation (3 years or more) that CCN does not establish and becomes a problem next year.
- CCN risk: if only CCN resistant cereal varieties have been sown in a paddock since the introduction of Frame wheat, no malting barley has been grown and the pasture phase has been clean of grasses then the risk of CCN in 2003 is low.
- CCN rating definitions:
  - R = Resistant - CCN will not multiply
  - S = Susceptible - CCN can multiply on the crop
  - T = Tolerant - crop will not be affected by the presence of CCN
  - I = Intolerant - crop will be affected by the disease

### **Foliar disease additional notes:**

- SFNB (Spot Form of Net Blotch) is most virulent in Gairdner barley. SFNB is carried over on stubble, levels of this disease were very low last year. It is still recommended to reduce the disease level when sowing barley on barley that you cultivate the paddock to reduce the stubbles present. There is no seed treatment available for the control of SFNB. Fungicides applied prior to flag leaf emergence may be beneficial in a bad year with SFNB.
- Lentil diseases such as Ascochyta and Botrytis were virtually absent last year. If considering re-cropping lentils with lentils you need to consider the risk of both of these diseases. Northfield lentils do not carry Ascochyta on the seed hence are at a low risk from an early Ascochyta outbreak. Unfortunately Northfield lentils are susceptible to Botrytis - however it is expected that a Botrytis outbreak is a low probability this year (unless we have a very wet start to the season). Seed dressings such as P Pickle T will help in reducing the Ascochyta carry over risk.
- Scald and Mildew in barley. These diseases are not seed borne and it is unlikely that they will be a problem this year. Question whether you need the more expensive seed dressings this year? Talk to your agronomist.
- YLS (Yellow Leaf Spot) in wheat is carried on stubble. Even very low levels of stubble (as found this year) is enough to affect susceptible varieties such as Yitpi. When growing wheat on wheat it is better to NOT use YLS susceptible varieties and also cultivate the paddock to reduce stubble levels.
- Sclerotinia in canola: Sclerotinia builds up in pulses and weeds such as capeweed. It is unlikely that Sclerotinia spores were released in 2002 because it was extremely dry during the early flowering stage of canola (when sclerotes in the soil usually release spores). It is highly likely that disease carry-over will come from sclerotes deposited in the 2001 crop or pasture.
- Pulse on Pulse or Canola on Canola: control of early germinating self sown crops is essential. If there is an early break, canola and pulses such as lentils will germinate early – these will host disease for the later sown crop. If re-sowing the same crop type (pulses and canola) then controlling the self-sown crops early is essential.