

20. Herbicide Resistance Testing

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In 2016 the South East SARDI team collected annual ryegrass from MFMG's four main trial sites, Keith, Frances, Bool Lagoon and Conmurra.

Entire growing annual ryegrass plants were collected randomly from the trial areas in late August 2016.

The samples were sent to Plant Science Consulting Pty Ltd (www.plantscienceconsulting.com) to undergo a herbicide resistance test.

The initial test evaluated the ryegrass plants resistance to a range of pre-emergent herbicides (Table 1.). Tables 1a and 1b are extracts from the herbicide resistance test results provided by Plant Science Consulting. If you would like to view the entire documents, please contact Amanda Pearce.

A pre-emergent test is currently being undertaken.

Information provided by Plant Science Consulting to avoid selecting for herbicide resistance, or if herbicide resistance is present:

1. Avoid spraying dense weed populations with grass selective herbicides only. Use non-selective and pre-emergence herbicides such as Boxer-Gold, Sakura, Trifluralin, Metolachlor, Paraquat and Glyphosate.
2. Rotate mode of action herbicides.
3. Avoid reducing herbicide rates.
4. Apply herbicides at the correct weed stage. Spraying larger weeds can greatly reduce herbicide efficacy.
5. Reduce weed seed-set to avoid resistant seed build-up in the seedbank, ie. utilise chaff carts, chaff concentration in wind-rows + burning, crop-topping, spray-topping, hay-cutting, spraying out patches with non-selective herbicides etc.
6. Reduced herbicide efficacy due to poor spraying conditions will increase weed survival and the level of herbicide resistance.

Table 1a. Results as determined by resistance testing 3 weeks after treatment at Keith and Frances. Data recorded as % survival (percentage of plants surviving) as compared to control plants unsprayed. 100 % refers to all plants surviving and 0 % refers to death. Data provided by Plant Science Consulting.

Pre-Emergent Herbicide Tested	Product Rate / ha	Herbicide Group	Keith		Frances	
			Survival %	Rating	Survival %	Rating
Axial + 0.5 % Adigor	300	A-Den	100	RRR	25	R
Achieve + 1 % Supercharge	380	A-Dims	-	-	30	R
Factor + 1 % Hasten	100	A-Dims	-	-	20	R
Select + 1 % Hasten	750	A-Dims	25	RR	0	S
Glyphosate 540	2000	M-Group M	0	S	0	S

Resistance-Rating: RRR – indicates plants tested have a strong resistance, RR – indicated medium-level resistance, R – indicated low-level but detectable resistance, S – indicates no detection of resistance (- indicates not tested).

Table 1b. Results as determined by resistance testing 3 weeks after treatment at Bool Lagoon and Conmurra. Data recorded as % survival (percentage of plants surviving) as compared to control plants unsprayed. 100 % refers to all plants surviving and 0 % refers to death. Data provided by Plant Science Consulting.

Pre-Emergent Herbicide Tested	Product Rate / ha	Herbicide Group	Bool Lagoon		Conmurra	
			Survival %	Rating	Survival %	Rating
Axial + 0.5 % Adigor	300	A-Den	75	RR	20	RR
Achieve + 1 % Supercharge	380	A-Dims	80	RR	30	RR
Factor + 1 % Hasten	100	A-Dims	70	RR	-	-
Select + 1 % Hasten	750	A-Dims	70	RR	0	S
Glyphosate 540	2000	M-Group M	10	R	0	S

Resistance-Rating: RRR – indicates plants tested have a strong resistance, RR – indicated medium-level resistance, R – indicated low-level but detectable resistance, S – indicates no detection of resistance (- indicates not tested).