Boosting weed management in stubble retained systems

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Mallee Sustainable Farming

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- Brome and barley favoured by no-till stubble retained systems
- Limited big weapons
- Many small tools
- Needs integrated strategy
- Need to play the ‘long game’

TABLE 7 National ranking of top residual weeds in all crops.

Rank	Weed	Area (ha)	Weed	Yield loss (t)
1	Ryegrass	8,009,979	Ryegrass	346,618
2	Wild radish	5,091,752	Wild radish	192,321
3	Wild oats	2,014,737	Wild oats	114,596
4	Brome grass	1,414,297	Brome grass	91,392
5	Wild turnip	1,239,215	Barnyard grass	77,734
6	Wild mustard	973,874	Sweet summer grass	45,888
7	Fleabane	597,531	Wild turnip	40,770
8	Sow thistle / milk thistle	595,705	Feathertop Rhodes grass	39,329
9	Barley grass	244,558	Wild mustard	19,885
10	Cape weed	213,339	Sow thistle / milk thistle	18,107

And costly to control

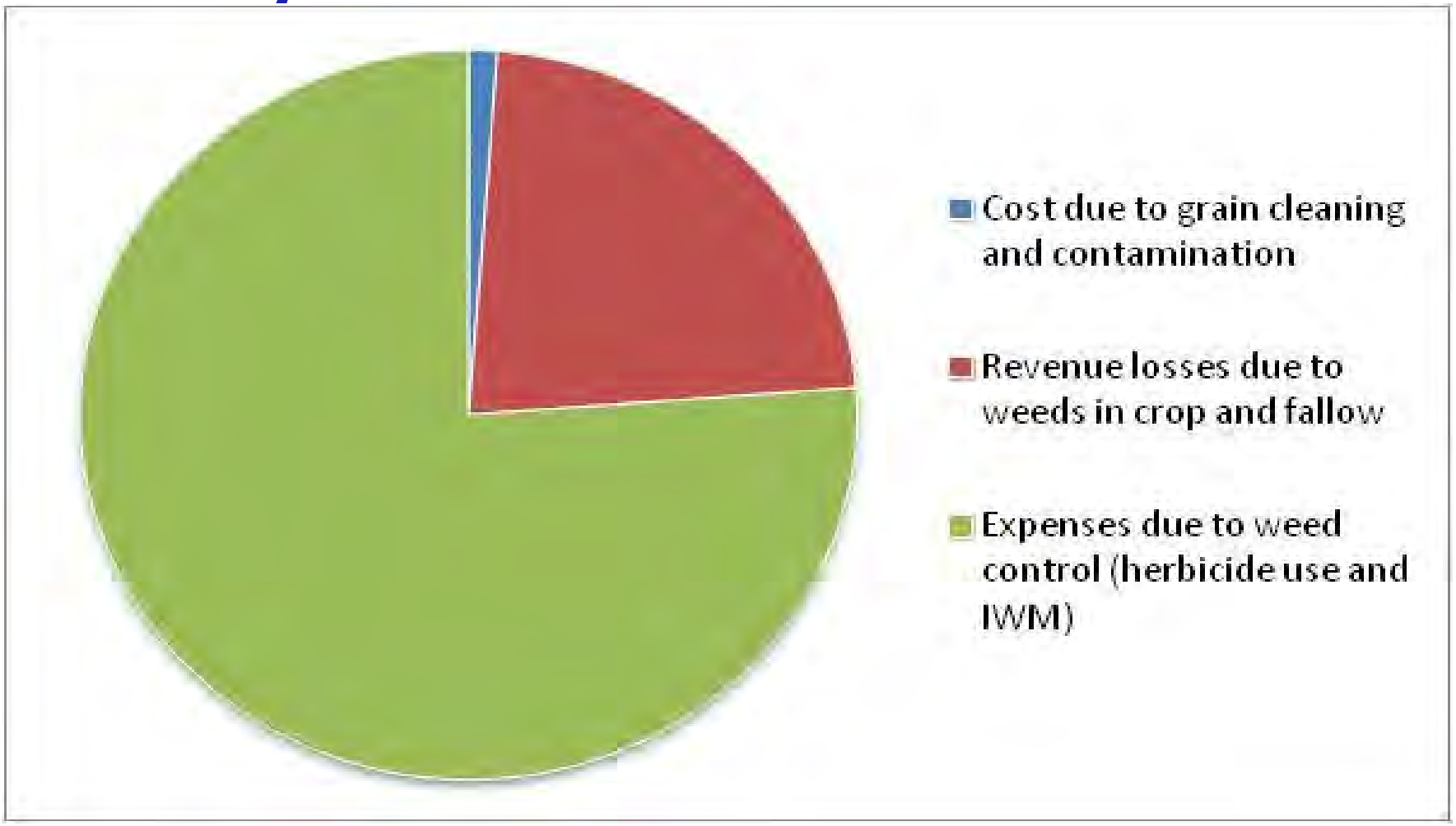
TABLE 73 Weeds most commonly cited as most costly to control as stated by grain growers by region.

Rank	National		Northern		Southern		Western	
1	Ryegrass	76%	Fleabane	51%	Ryegrass	82%	Ryegrass	90%
2	Wild radish	41%	Feathertop Rhodes grass	33%	Wild radish	33%	Wild radish	76%
3	Brome grass	25%	Ryegrass	31%	Wild oats	31%	Brome grass	30%
4	Wild oats	25%	Barnyard grass	22%	Brome grass	30%	Barley grass	23%
5	Fleabane	20%	Wild oats	20%	Fleabane	15%	Cape weed	19%
6	Barley grass	12%	Sow thistle / milk thistle	18%	Cape weed	10%	Wild oats	16%
7	Cape weed	11%	Sweet summer grass	10%	Marshmallow	10%	Fleabane	7%
8	Marshmallow	7%	Phalaris	7%	Barley grass	8%	Melons	6%
9	Feathertop Rhodes grass	6%	Marshmallow	5%	Paterson's curse / salvation Jane	7%	Doublegee	6%

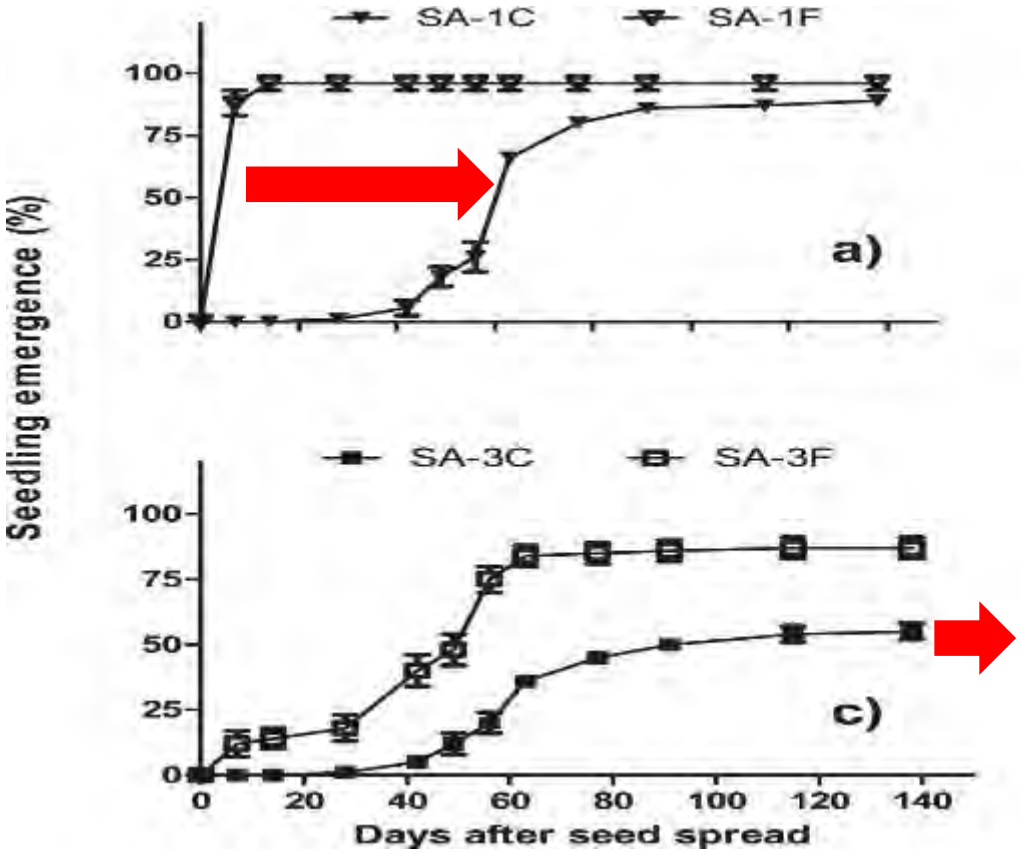
Upper EP/Mallee Region

Rank	Weed	Area (ha)	Weed	Yield loss (t)	Weed	Revenue loss
SA Victorian Mallee						
1	Brome grass	685,613	Brome grass	29,189	Brome grass	$7.1m
2	Ryegrass	660,958	Ryegrass	13,824	Ryegrass	$3.4m
3	Wild turnip	301,025	Amsinkia / yellow burr weed	8204	Wild radish	$2.0m
4	Wild radish	212,095	Wild radish	8058	Amsinkia / yellow burr weed	$1.9m
5	Wild mustard	96,495	Wireweed	5339	Wireweed	$1.3m
6	Amsinkia / yellow burr weed	83,585	Wild mustard	2706	Wild mustard	$662.1k
7	Wild oats	71,168	Skeleton weed	2100	Skeleton weed	$532.0k
8	Skeleton weed	59,516	Wild oats	1847	Wild oats	$437.8k
9	Wireweed	54,129	Barley grass	600	Barley grass	$144.9k
10	Barley grass	48,488	Prickly lettuce / whip thistle	116	Prickly lettuce / whip thistle	$43.6k

It's all about control: weed management costs Vs yield loss costs



Slower to emerge and increasingly persistent



Seedling emergence pattern of brome populations- cropping Vs fencline populations

Kleeman et al 2009


RIM
Integrated Management
Get more out of your
WEED MANAGEMENT $
RIM - Ryegrass Integrated Management
A tool to test your weed management strategies
RIM helps you put the pieces together
RIM brings together:
Herbicide resistance
Many management options
Economic benefits
Weed Control Options
High seeding rates
Selective herbicides
Delayed sowing
Grazing
Crop topping
Knockdowns
Burning
Swathing
Pasture phases
and more
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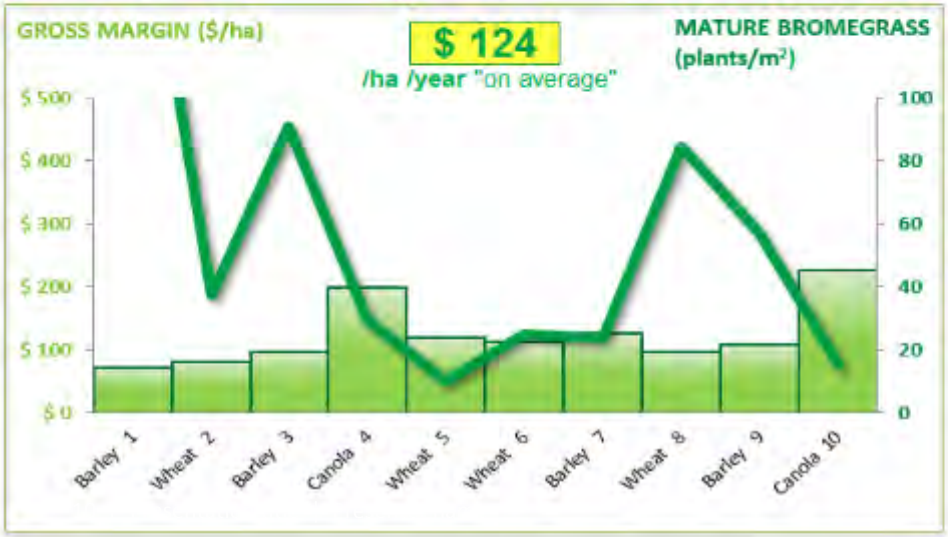
Testing profitable management strategies

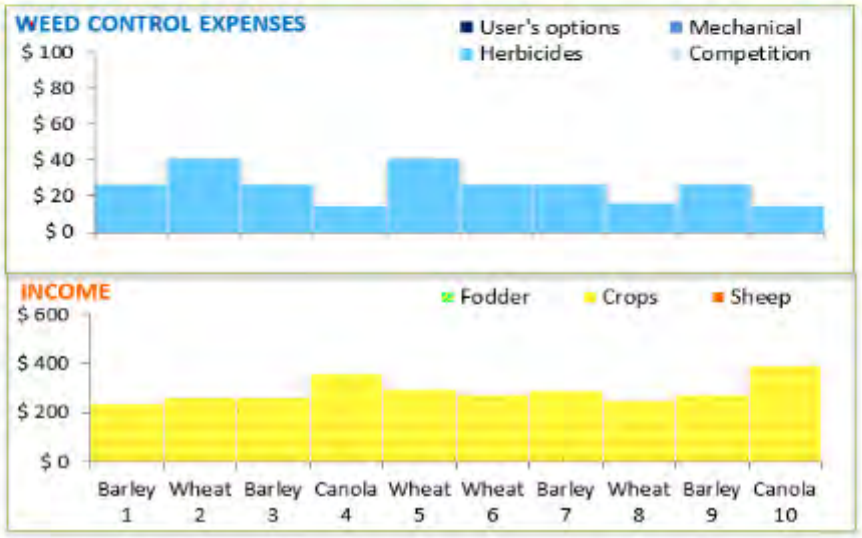
2. BUILD Strategy

Your current paddock is
Mannum, Standard

BACK NEXT

Choose enterprise and control options:	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	Barley	Wheat	Barley	Canola	Wheat	Wheat	Barley	Wheat	Barley	Canola
Time of sowing	Delayed	Delayed	Delayed	Dry	Delayed	Delayed	+Delayed	Wet	+Delayed	Dry
Soil preparation										
Knock-down / Double-knock	Glyphosate	Glyphosate	Glyphosate		Glyphosate	Glyphosate	Glyphosate		Glyphosate	
Pre-emergent herbicide	Trifluralin	Trifluralin	Trifluralin		Trifluralin	Trifluralin	Trifluralin	Trifluralin	Trifluralin	
Establishment system	No-till	No-till	No-till	No-till	No-till	No-till	No-till	No-till	No-till	No-till
Crop seeding rate density	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Post-emergent herbicide 1		Group B		Group B	Group B					Group B
2										
3										
Grazing intensity										
Spring options										
- Swathe										
- Others										
Harvest options - Crops										
- Others										
Mature bromegrass setting seed:	>100	37	91	30	10	25	24	85	57	16
Seeds in soil next autumn (/m²):	>300	>300	>300	>300	132	>300	216	>300	>300	234
Gross margin ($/ha)	$72	$81	$96	$198	$119	$112	$126	$97	$109	$226

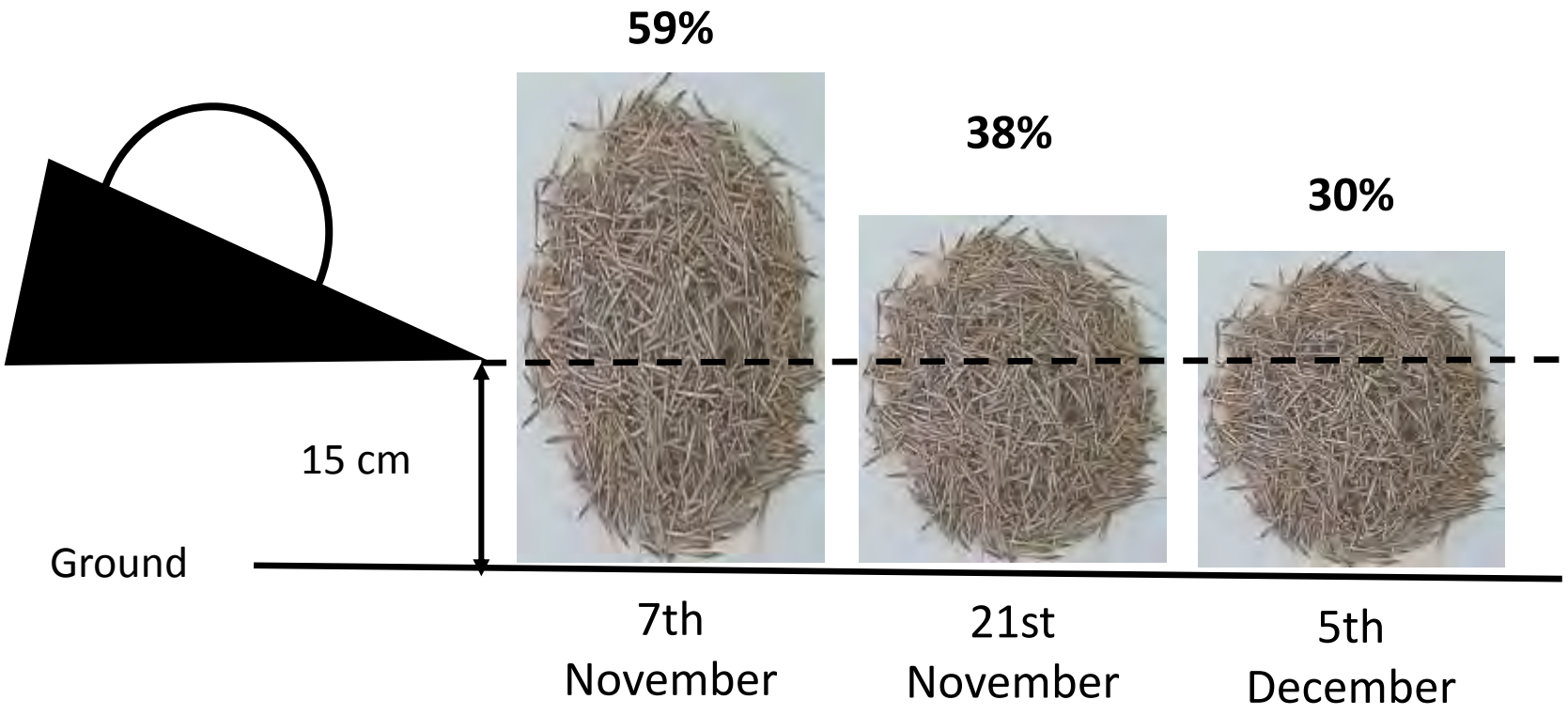




Profitable grass weed management systems

Putting the pieces together
Controlling and managing seedbanks
Testing control options
Reducing resistance risk
Increasing profit

Potential brome seed capture above cutting height for 3 harvest dates



Mick Brady[1], Chris Korte[1], Michael Moodie[2] and Sam Kleemann[3]
Agriculture Victoria[1], Moodie Agronomy[2], The University of Adelaide[3]
(with Mallee CMA/MSF) 14-15

Mallee Sustainable Farming

PRE-EMERGENCE CONTROL

Can achieve 75%+ brome plant control using pre-ems other than trifluralin but variable (2013-15)

- **Sakura alone resulted in 55% less brome panicles than trifluralin alone**
- **Sakura + Avadex resulted in 72% less brome panicles than trifluralin alone ($$)**

(2015)

Pre-em effect on brome seed set 2016

Other common pre-em treatments had no significant effect on brome in 2016

	Brome panicles
Nil	45
Trifluralin (2.5)	7
Trifluralin (1.5) + Avadex (1.6)	22
Sakura (118) + Avadex (1.6)	1
	P=0.10

Minnipa 2016:
Narrow row spacing reduced seed set by 45%

Row spacing (cm)	Barley grass seed production/m2
18 (108 plants/m2)	582
30 (95 plants /m2)	1037
LSD (P=0.05)	322

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Minnipa 2016:
Higher wheat density reduced seed set by 33+%

Wheat density (plants/m^2)	Barley grass seed production/m2
52	1245
87	828
167	356
LSD (P=0.05)	279

 Cook et al 2016 EPFS. Mace wheat, Minnipa

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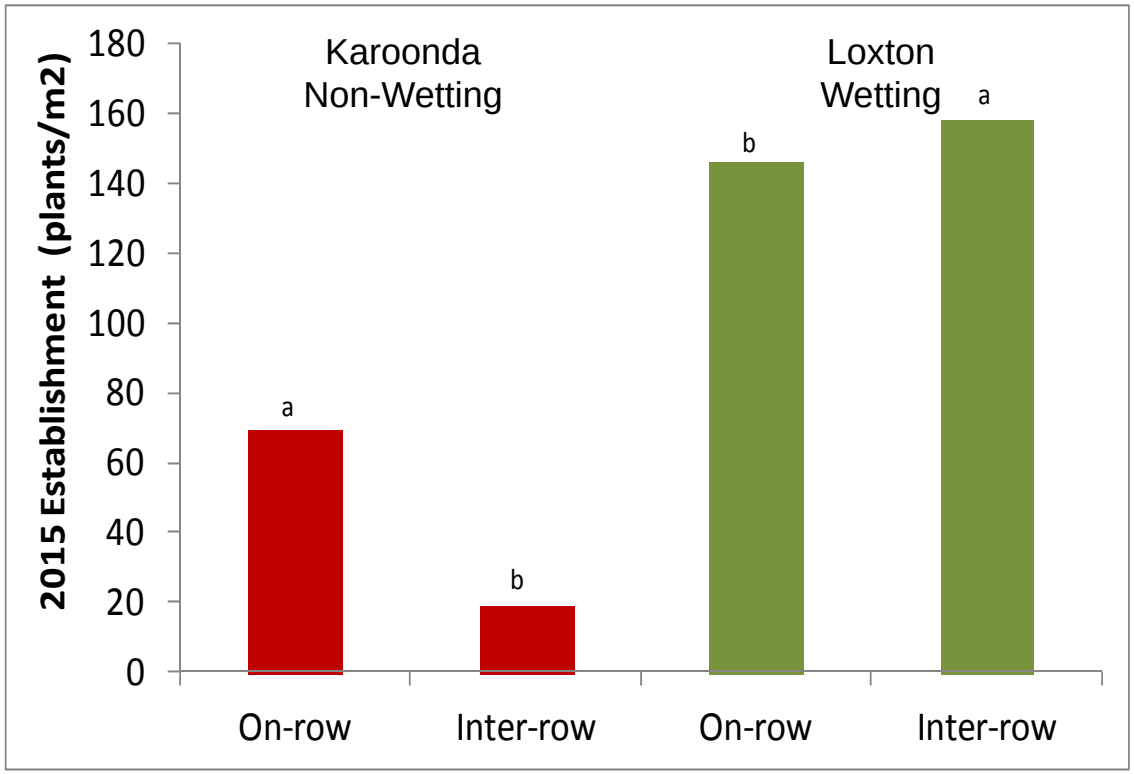
Selecting competitive crops for weed suppression

Doubling Fathom barley seed rate: reduced weed seed set by 53%
Doubling Hindmarsh: 38% reduction
Doubling Scepter wheat: no reduction

	Fathom barley sowing rate			
	60 kg/ha (no herbicide)	120 kg/ha (no herbicide)		LSD (P= 0.05)
Crop (plants/m^2)	88	162		17.3
Barley grass (plants/m^2)	149	136		36.6
Total grass panicles (number/m^2)	**246**	**115**		85.2

Kleeman

Crop establishment on non-wetting sand sowing on-row in 2015



P=0.05

On-row seeding can double early crop density on non-wetting sand

	Seeding	Wheat/m2 (emergence)
No herbicide	On row	88
No herbicide	Inter Row	36

Late June crop densities:
On (94/m2) Vs
Inter (59/m2) P<0.001

July crop densities: 95/m2 NS

Increased weed suppression by on-row crops

	Brome plants/ m^2	Brome seeds/m^2
On-row	28	2022
Inter-row	105	7332

≈70% less seed set in 2015 and 80% less in 2014

Inter-row vs on-row

P=0.05

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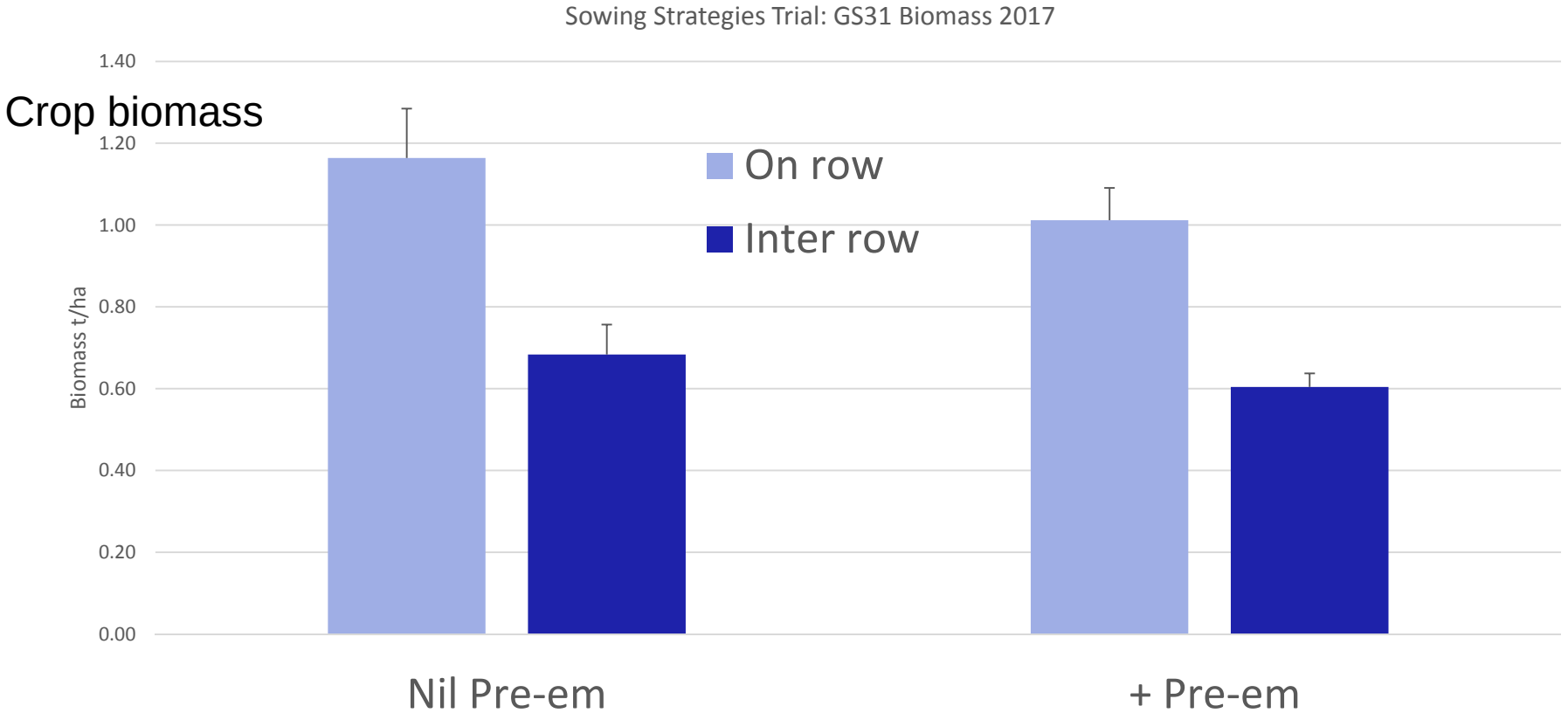
Crop biomass on-row seeding Vs inter-row 2017

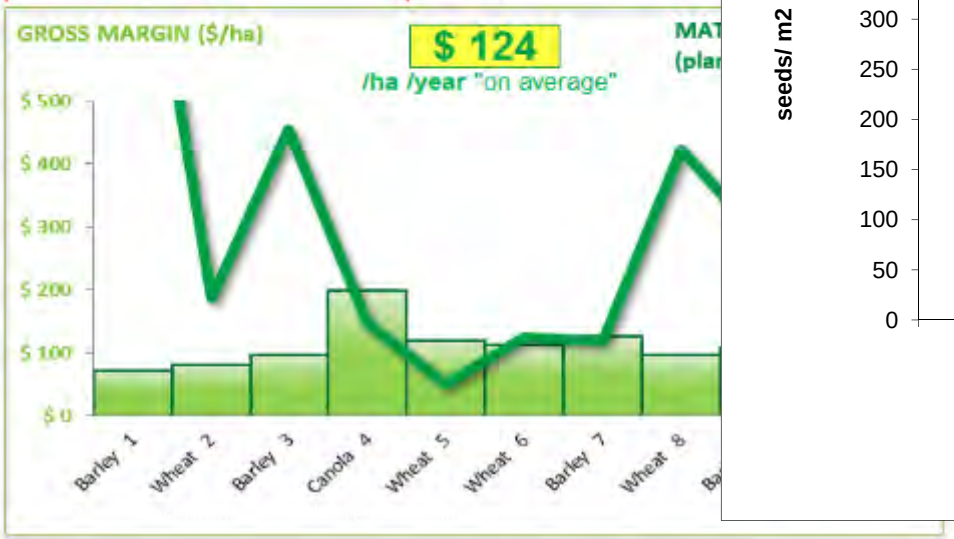


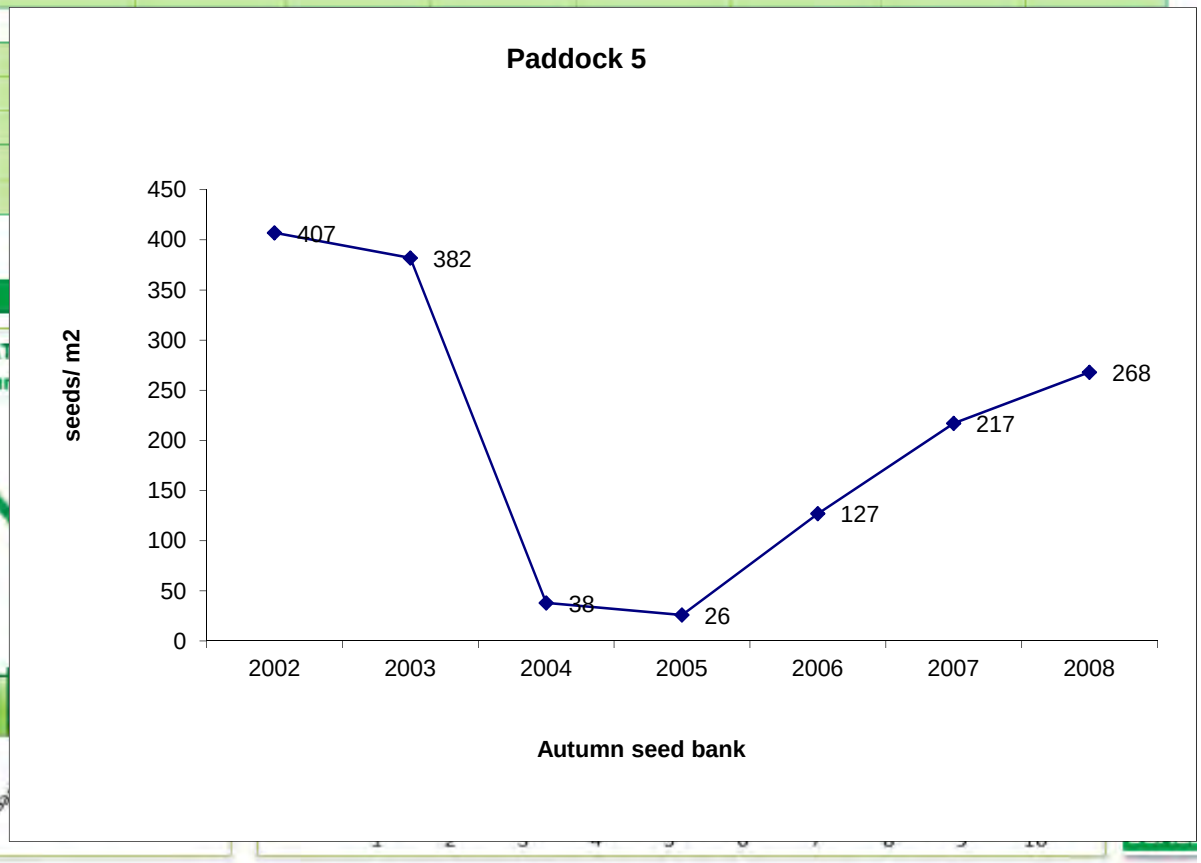
2. BUILD Strategy

Your current paddock is
Mannum, Standard

BACK NEXT

Choose enterprise and control options:	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	Barley	Wheat	Barley	Canola	Wheat	Wheat	Barley	Wheat	Barley	Canola
Time of sowing	Delayed	Delayed	Delayed	Dry	Delayed	Delayed	+Delayed	Wet	+Delayed	Dry
Soil preparation										
Knock-down / Double-knock	Glyphosate	Glyphosate	Glyphosate		Glyphosate	Glyphosate	Glyphosate		Glyphosate	
Pre-emergent herbicide	Trifluralin	Trifluralin	Trifluralin		Trifluralin	Trifluralin	Trifluralin	Trifluralin	Trifluralin	
Establishment system	No-till	No-till	No-till	No-till	No-till	No-till	No-till	No-till	No-till	No-till
Crop seeding rate density	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Post-emergent herbicide 1		Group B		Group B	Group B					Group B
2										
3										
Grazing intensity										
Spring options										
- Swathe										
- Others										
Harvest options - Crops										
- Others										
Mature bromegrass setting seed	>100	37								
Seeds in soil next autumn (/m^2):	>300	>300								
Gross margin ($/ha)	$72	$81								





612_RIM_2013_BROMEGRASS_v07.xlsm - Excel

3. COMPARE Results

BACK NEXT

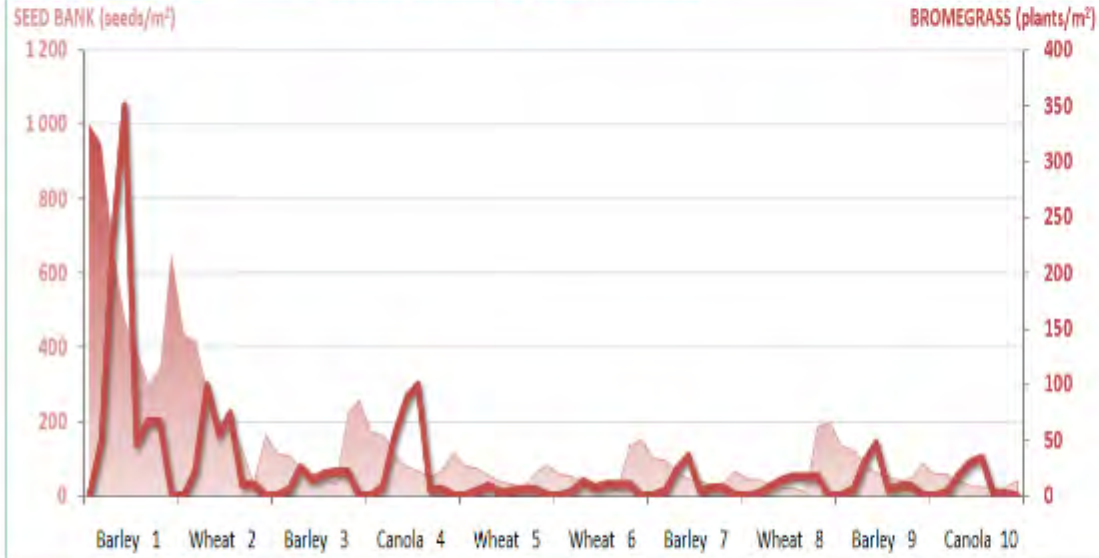
SUMMARY & ECONOMICS | POPULATION & SEED BANK | YIELDS & COMPETITION | DATA TABLES

CLEAR

?

Auto SCALES

$ 144 /ha /year Mannum, Standard - PlusMannum



COUNTS /m²:	SEEDS	PLANTS
Initially at break:	1000	50
After 10 years:	60	3
Averages at post-emergence spraying time:	87	32
Averages at season break the following year:	210	11

Current $ 124 /ha /year Mannum, Standard - Std Mannum

Current paddock and strategy

COUNTS /m²:	SEEDS	PLANTS
Initially at break:	1000	50
After 10 years:	500	25
Averages at post-emergence spraying time:	160	260
Averages at season break the		

Brome & RG
Available Now

Barley Grass
Available 2018

2. BUILD Strategy

Your current paddock is:
Test, Mallee

BACK NEXT

RIM Bromegrass

Choose enterprise and control options:	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	Wheat	Canola	Wheat	Grain Legume	Wheat	Canola	Grain Legume	Wheat	Wheat	Canola
Time of sowing	Dry	Wet	+Delayed	Dry	Delayed	Dry	Dry	Delayed	Delayed	Dry
Soil preparation										
Knock-down / Double-knock			Glyphosate		Glyphosate			Glyphosate	Glyphosate	
Pre-emergent herbicide	Trifluralin		Trifluralin	Simazine	Trifluralin	Trifluralin		Trifluralin	Trifluralin	Trifluralin
Establishment system	No-till	No-till	No-till	No-till	No-till	No-till		No-till	No-till	No-till
Crop seeding rate density	Standard	Standard	Standard	Standard	Standard	Standard		Standard	Standard	Standard
Post-emergent herbicide 1	Intervix	Intervix		Clethodim		Intervix	Clethodim			Intervix
2										Clethodim
3										
Grazing intensity										
Spring options										
- Swathe										
- Others										
Harvest options - Crops										
- Others										
Mature bromegrass setting seed:	38	19	15	6	15	7	4	10	22	5
Seeds in soil next autumn (/m²):	>300	251	133	84	179	91	58	125	260	61
Gross margin ($/ha)	$159	$65	$159	$224	$246	$92	$239	$252	$193	$81

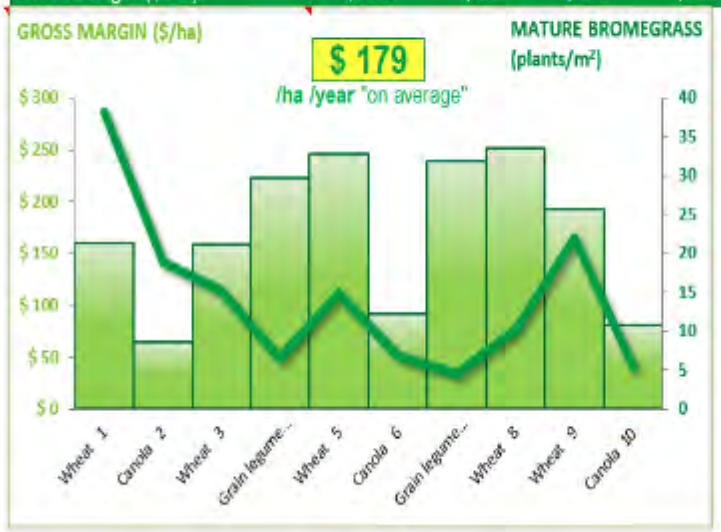
Save & Load

Strategy name:
Wheatbelt standard

Std ep	SAVE LOAD
Wheatbelt standard	SAVE LOAD
Wheatbelt standard	SAVE LOAD
Mid West standard	SAVE LOAD
Sth Coast standard	SAVE LOAD
Wheatbelt standard	SAVE LOAD
Default	LOAD

Show more

Clear all



Bromegrass

Choose enterprise and control options:	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	Wheat	Canola	Wheat	Grain Legume	Wheat	Canola	Grain Legume	Wheat	Wheat	Canola
Time of sowing	Dry	Wet	+Delayed	Dry	Delayed	Dry	Dry	Delayed	Delayed	Dry
Soil preparation										
Knock-down / Double-knock			Glyphosate		Glyphosate			Glyphosate	Glyphosate	
Pre-emergent herbicide	Trifluralin		Trifluralin	Simazine	Trifluralin	Trifluralin		Trifluralin	Trifluralin	Trifluralin
Establishment system	No-till	No-till	No-till	No-till	No-till	No-till		No-till	No-till	No-till
Crop seeding rate density	High	Standard	Standard	Standard	Standard	Standard		Standard	Standard	Standard
Post-emergent herbicide 1	Intervix	Intervix		Clethodim		Intervix	Clethodim			
2										Clethodim
3										
Grazing intensity										
Spring options										
- Swathe										
- Others										
Harvest options - Crops	Narr+B.	Narr+B.	Narr+B.			Narr+B.				
- Others										
Mature bromegrass setting seed:	38	15	9	3	7	3	2	4	8	4
Seeds in soil next autumn (/m²):	>300	146	61	39	84	34	21	47	101	52
Gross margin ($/ha)	$154	$65	$159	$231	$257	$94	$245	$261	$208	$108

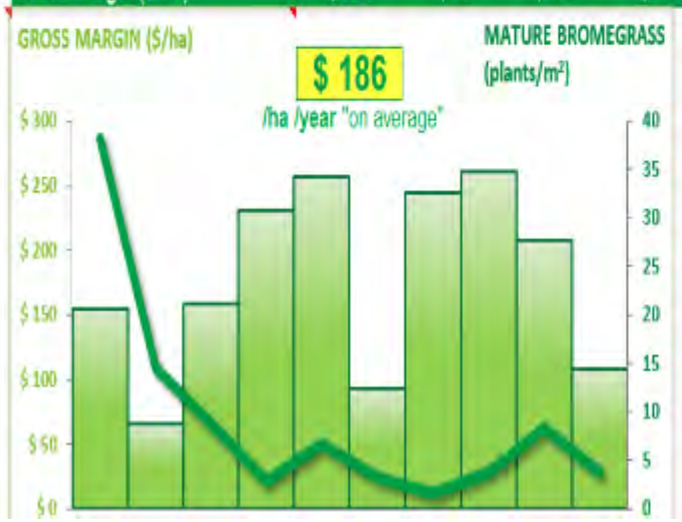
Save & Load ?

Strategy name: Wheatbelt standard

Std ep	SAVE LOAD
Wheatbelt standard	SAVE LOAD
Wheatbelt standard	SAVE LOAD
Mid West standard	SAVE LOAD
Sth Coast standard	SAVE LOAD
Wheatbelt standard	SAVE LOAD
Default	LOAD

Show more

Clear all



What farmers using RIM have found

What would you change after using RIM:

- “Harvest weed capture”
- “Better planning”
- “Crop rotations”
- “Herbicide usage patterns”
- “Windrow burning” ;
- “Non-chemical controls”

“Would like to use the program more to collate options before making decisions”

“It is great for collecting thoughts as the complexity of cereal growing increases as more chemical options and varieties come onto the market”