GRDC
Grains Research Update

Presentation 2 – Chris Preston

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Resistance of annual ryegrass to clethodim is becoming a major problem in canola

Control of annual ryegrass by pre-emergent herbicides in canola

Pre-emergent herbicide	Ryegrass plants (m^{-2})		Ryegrass seeds (x1000 m^{-2})		Yield (T ha^{-1})	
	ATR Stingray	45Y82 (CL)	ATR Stingray	45Y82 (CL)	ATR Stingray	45Y82 (CL)
Usual practice*	171 a	47 a	1.82 a	1.40 a	2.15 a	1.73 a
Rustler (1 L ha^{-1})	96 a	63 a	15.83 b	4.58 b	1.68 b	1.62 ab
Experimental A	269 b	186 c	21.70 b	5.80 bc	1.62 b	1.48 b
Experimental B	381 c	198 c	34.82 c	8.86 d	1.30 c	1.60 ab
Experimental C	133 a	101 b	22.31 b	7.37 c	1.65 b	1.60 ab

Grass control just using pre-emergent herbicides in canola

ATR Stingray

45Y82

Using hybrid canola to reduce annual ryegrass seed production

- Trial was conducted at Roseworthy in a population of clethodim resistant annual ryegrass
- Cultivars:
  - ATR Stingray – open pollinated
  - Hyola 559TT - hybrid
  - Hyola 750TT – high biomass hybrid
- Herbicide Strategies
  - HT1: Nil
  - HT2: Atrazine pre + Clethodim post
  - HT3: Rustler pre + Clethodim + Factor + Atrazine post

Annual ryegrass plants in crop

Herbicide treatment	ATR Stingray	Hyola 559TT	Hyola750TT	Mean
	Annual ryegrass in crop (plants m^{-2})			
1	309	270	284	288 a
2	97	64	67	76 b
3	39	30	38	35 b
Mean	148	123	127	
	P			
Interaction	0.93			
Cultivar	0.40			
Herbicide treatment	<0.0001			

Annual ryegrass spike production

Herbicide treatment	ATR-Stingray	Hyola 559TT	Hyola 750TT	Mean
	Annual ryegrass seed heads (spikes m^{-2})			
1	890	767	576	744 a
2	148	63	72	94 b
3	95	65	49	70 b
Mean	378 a	298 b	232 b	
	P			
Interaction	0.35			
Cultivar	<0.001			
Herbicide treatment	<0.001			

Canola yield

Herbicide treatment	ATR Stingray	Hyola 559TT	Hyola750TT	Mean
	Canola yield (T ha^{-1})			
1	0.46	0.79	0.77	0.67 a
2	1.25	1.29	1.23	1.26 b
3	1.33	1.37	1.19	1.30 b
Mean	1.01	1.15	1.06	
	P			
Interaction	0.094			
Cultivar	0.12			
Herbicide treatment	<0.0001			

ATR Stingray Untreated

Hyola 559TT Untreated

Conclusions

- Hybrid canola in combination with pre-emergent herbicides can reduce annual ryegrass seed production by 50% compared to open pollinated canola
- The advantages of hybrid canola in reducing seed set are most obvious where clethodim resistance is present in annual ryegrass
- The high biomass hybrid canola performed no better than Hyola 559TT at reducing ryegrass seed numbers. Choose the hybrid cultivar most suited to the environment

Using RT canola to control clethodim-resistant annual ryegrass

- Trials in Victoria near Francis with MacKillop Farm Management Group and Lake Bolac with Southern Farming Systems
- RT canola resistant to glyphosate and triazine herbicides
- Offers the opportunity of using both post-emergent and residual herbicides

- Both sites RT canola in 2014, Wheat in 2015.

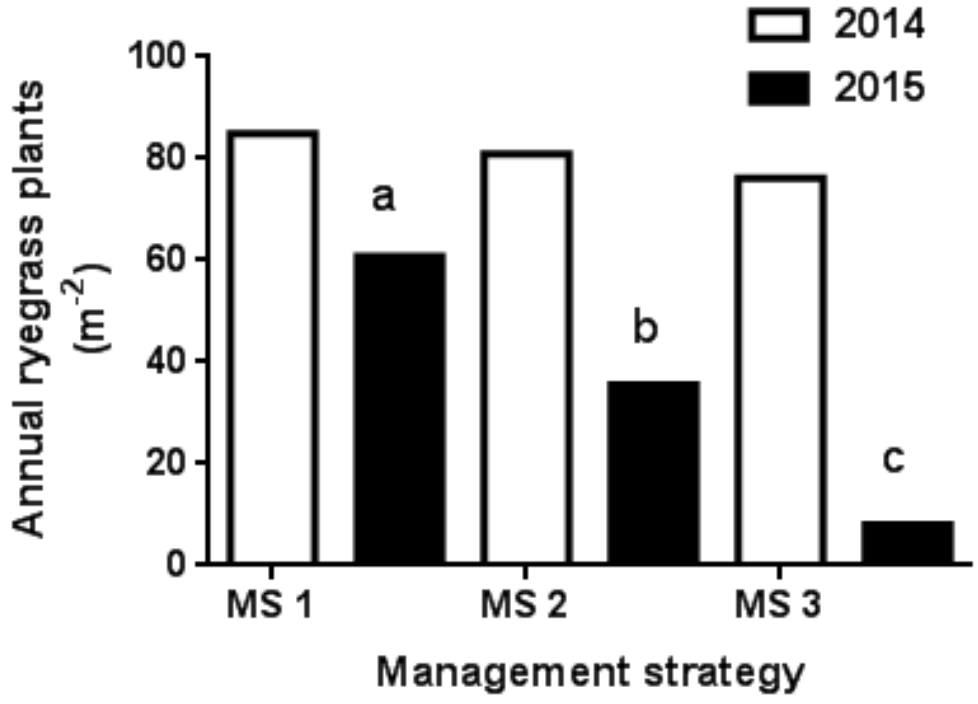
ADVANTA
MODERN SCIENCE · TRADITIONAL VALUES

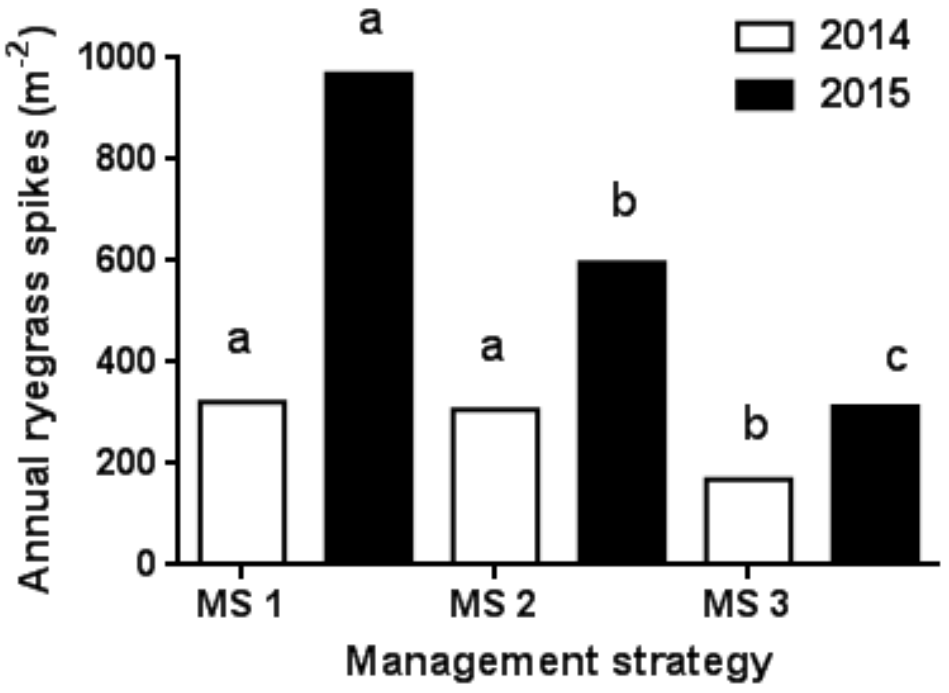
HYBRID CANOLA
HYOLA

Lake Bolac trial

Management strategy	Canola phase	Wheat phase
Low intensity	Trifluralin (3 L ha^{-1}) + Atrazine (2.2 kg ha^{-1}) pre Clethodim (500 mL ha^{-1}) post	Trifluralin (3 L ha^{-1}) + Avadex Xtra (2 L ha^{-1}) + Dual Gold (250 mL ha^{-1}) pre
Medium intensity	Trifluralin (3 L ha^{-1}) pre RoundupReady (900 g ha^{-1}) cotyledon RoundupReady (900 g ha^{-1}) + Atrazine (1.1 kg ha^{-1}) 6 leaf	Sakura (118 g ha^{-1}) pre
High intensity	Rustler (1 L ha^{-1}) pre RoundupReady (900 g ha^{-1}) cotyledon RoundupReady (900 g ha^{-1}) + Atrazine (1.1 kg ha^{-1}) 6 leaf Weedmaster DST (2.5 L ha^{-1}) crop top	Sakura (118 g ha^{-1}) + Avadex Xtra (2 L ha^{-1}) pre Boxer Gold (2.5 L ha^{-1}) post

Annual ryegrass populations in canola and wheat with different management strategies



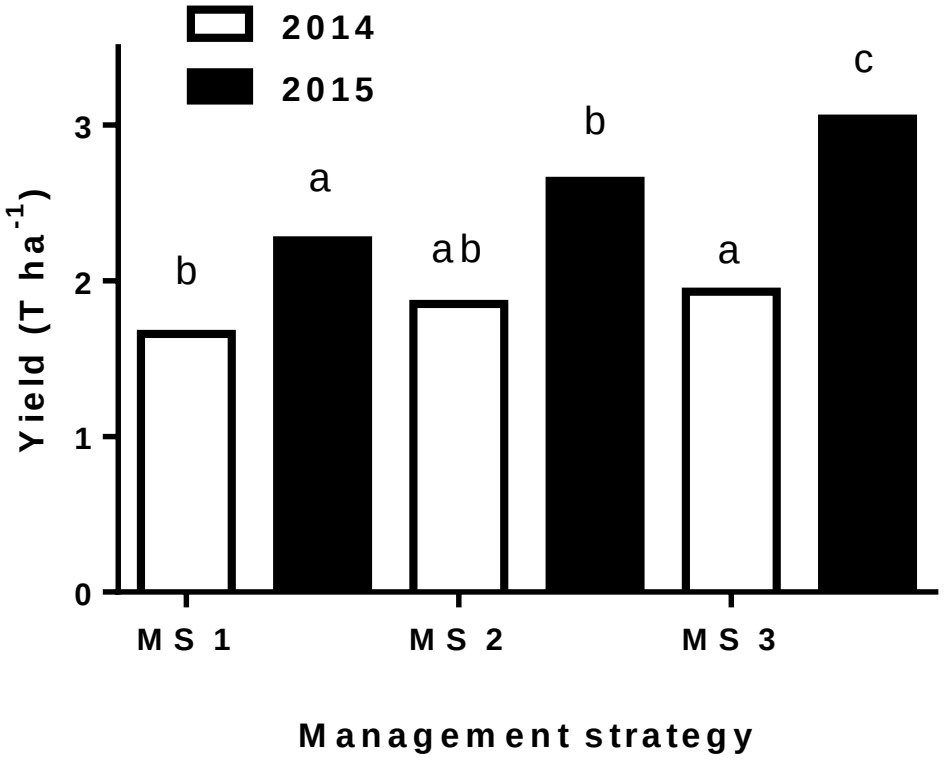


Lake Bolac 2015

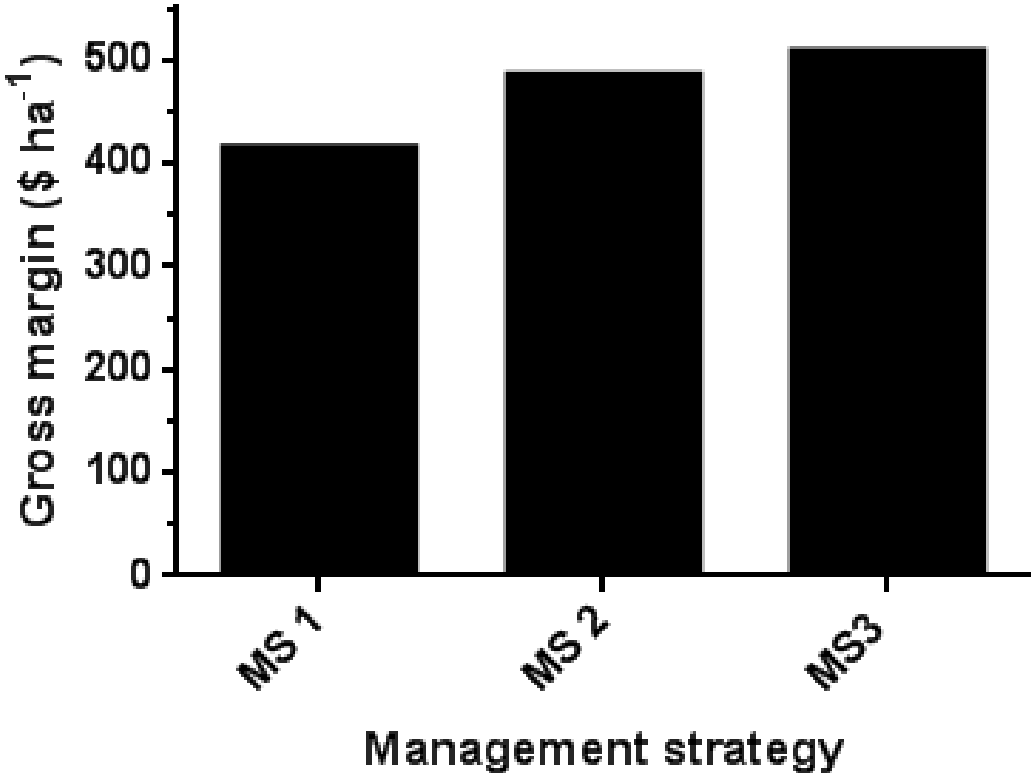
Management strategy 1

Management strategy 3

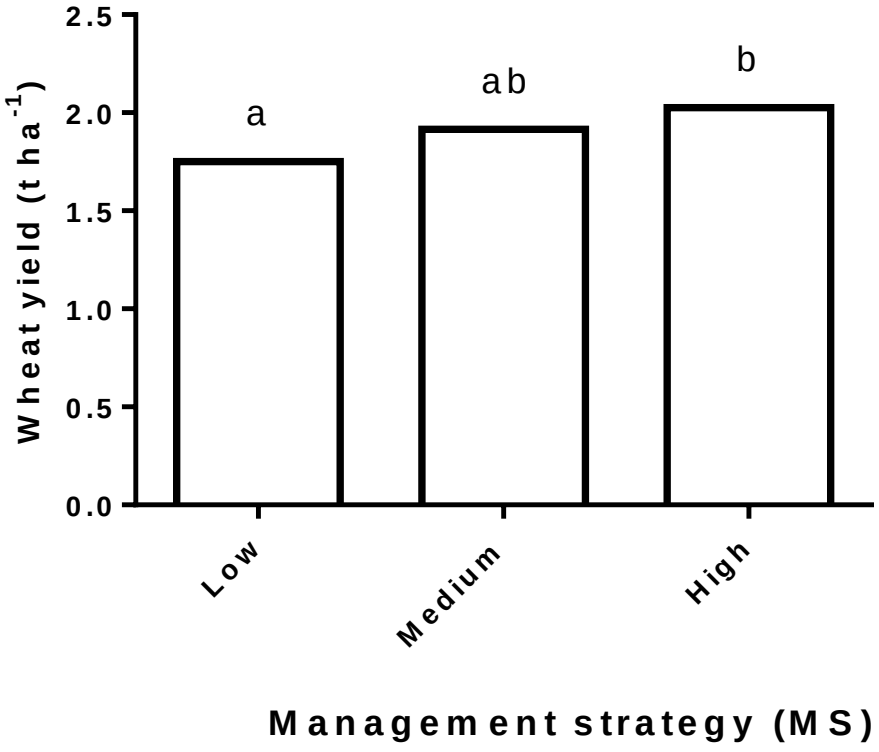
Canola and wheat yields with different management strategies

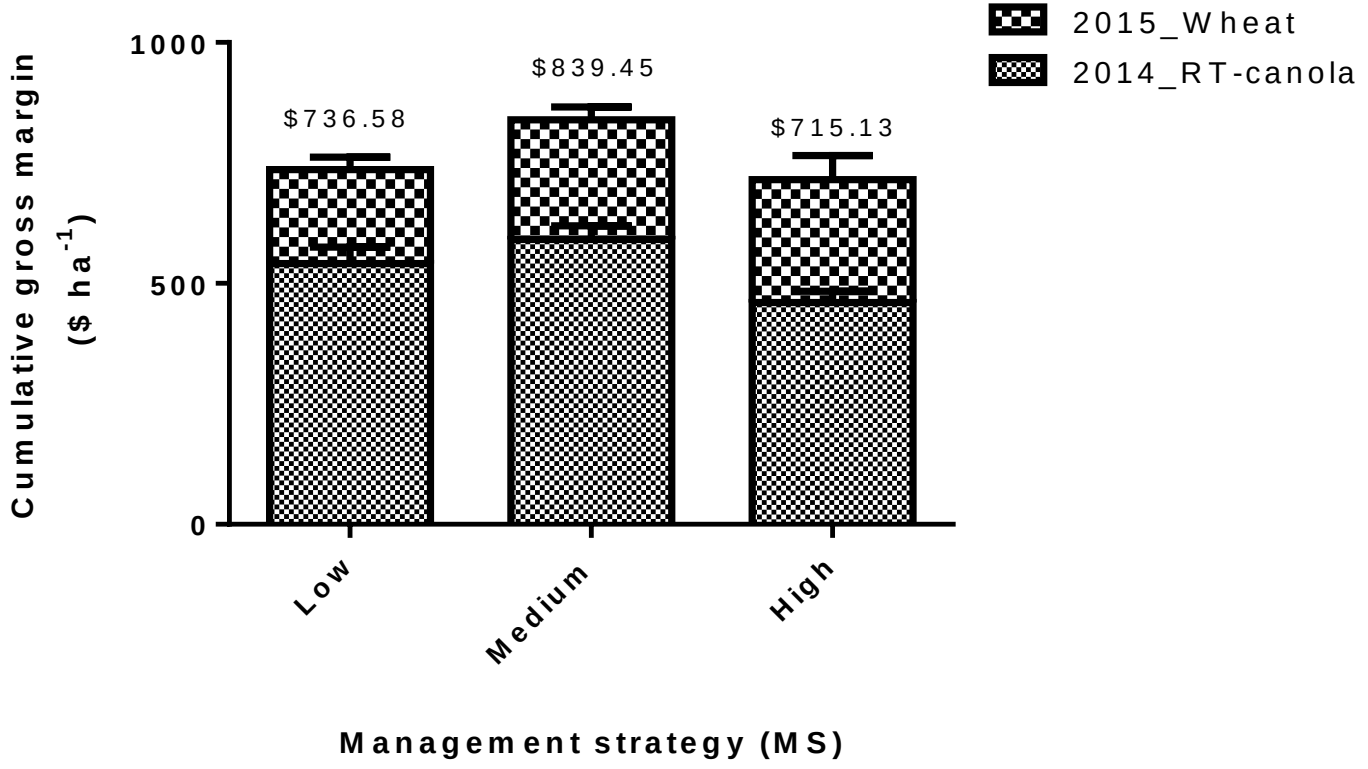


Can you make it pay?



Wheat yield at Frances in 2015 and gross margins 2014-2015





Conclusions

- RT canola can be used to drive down annual ryegrass seed banks
- This leads to lower ryegrass numbers in the following wheat crop
- Considerable cost to controlling ryegrass effectively in canola (~$100 ha^{-1}) so there is a need to match the strategy to the expected wheat yield