

# PRE-EMERGENCE HERBICIDES AND CROP COMPETITION FOR EFFECTIVE MANAGEMENT OF ANNUAL RYEGRASS

Dr Mike Ashworth, Roberto Lujan and Facundo Cortese



**GRDC**  
GRAINS RESEARCH  
& DEVELOPMENT  
CORPORATION



**AHRI**  
AUSTRALIAN HERBICIDE  
RESISTANCE INITIATIVE



**\$ 50.3 MILLION**  
LOSS IN REVENUE DUE TO  
ANNUAL RYEGRASS IN WA

**\$ 180 MILLION**  
COST TO MANAGE HERBICIDE  
RESISTANCE IN AUSTRALIA

# OUTLINE

- Trifluralin, BoxerGold and Sakura:

Effectiveness of pre-emergent herbicides for early time of sowing.

Roberto Lujan and Dr. Mike Ashworth

- Herbicide mixtures and crop competition.

Facundo Cortese

- Conclusion and questions

# TRIAL SITES AND TREATMENTS



Kojonup

Dry seeding

Delayed seeding  
(4 weeks later)

Nil Herbicide

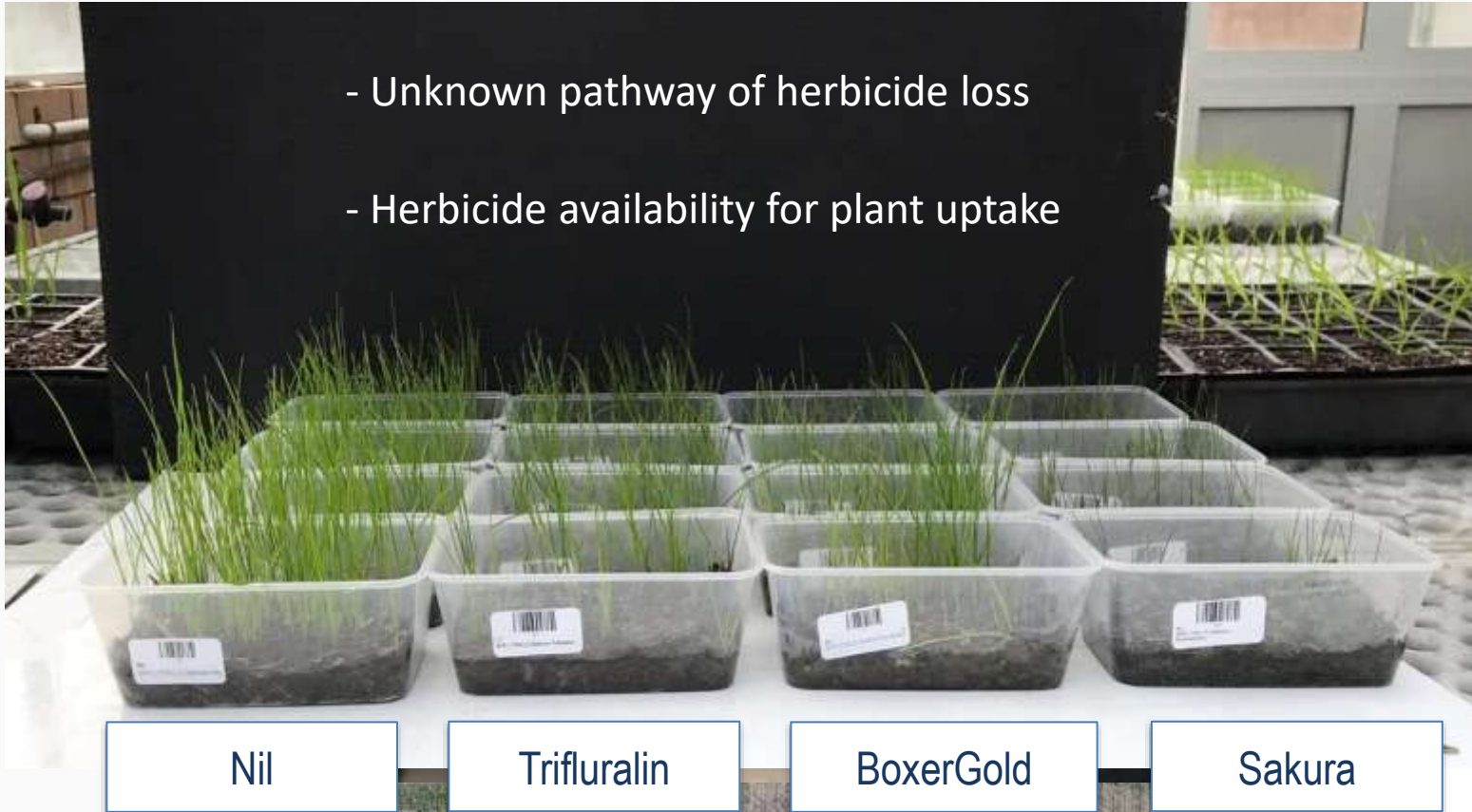
Trifluralin

BoxerGold®

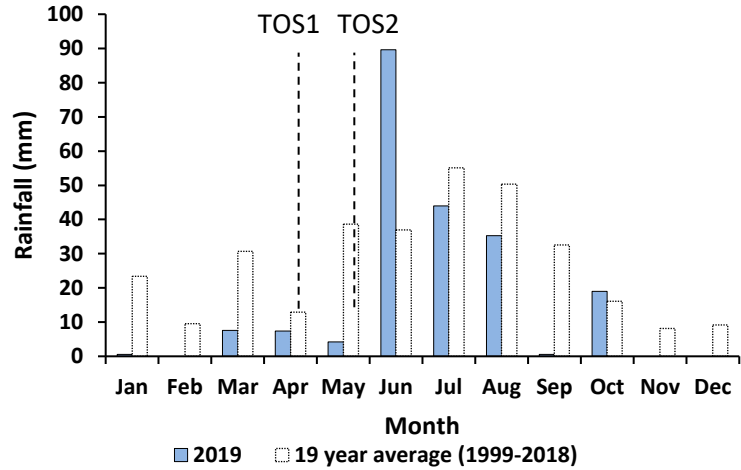
Sakura®

# HERBICIDE DEGRADATION BIOASSAY

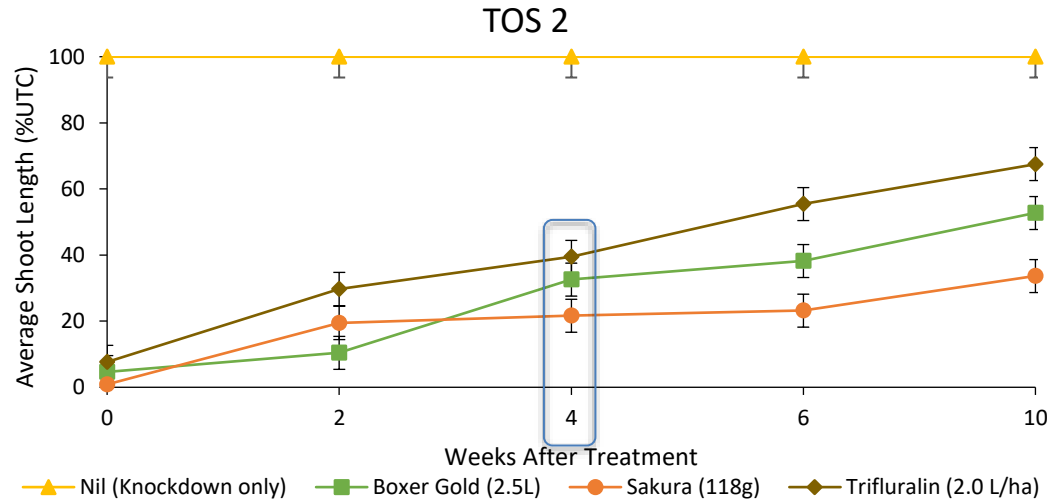
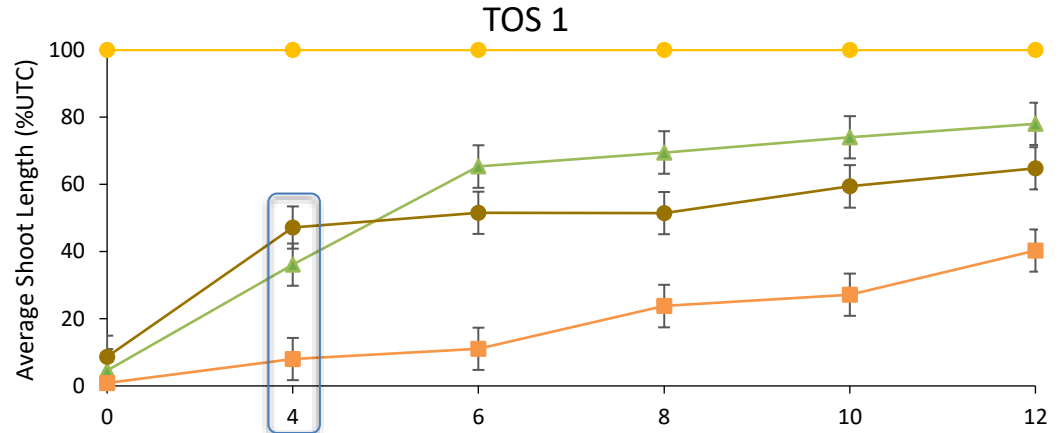
- Unknown pathway of herbicide loss
- Herbicide availability for plant uptake



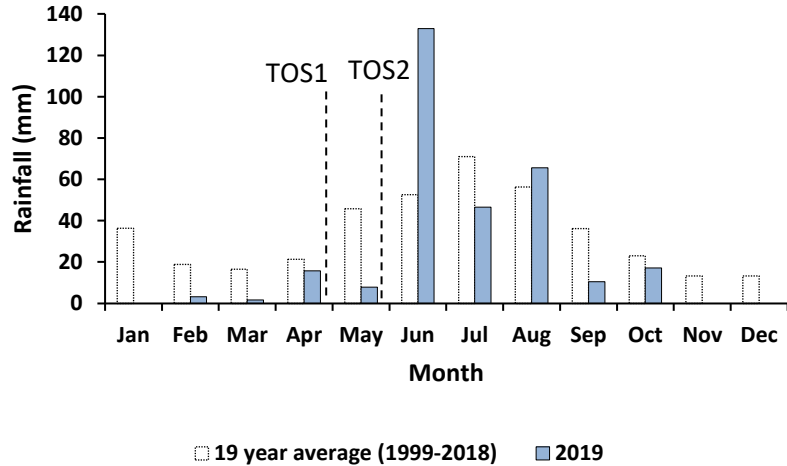
# MILING



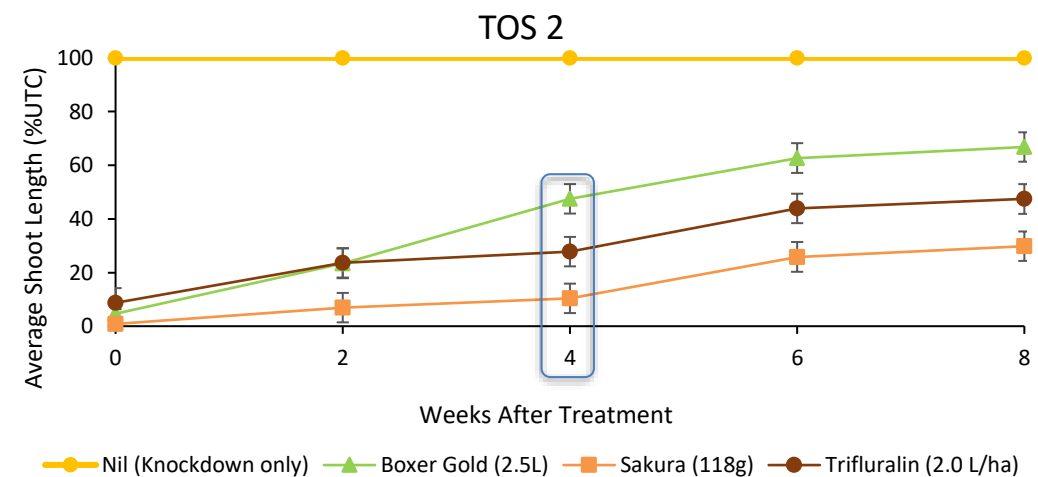
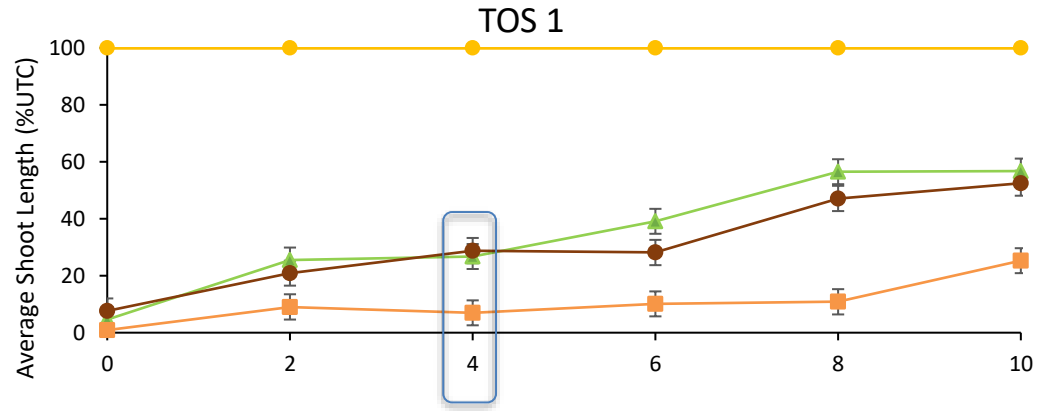
TOS1 16<sup>th</sup> April  
TOS2 15<sup>th</sup> May



# YORK

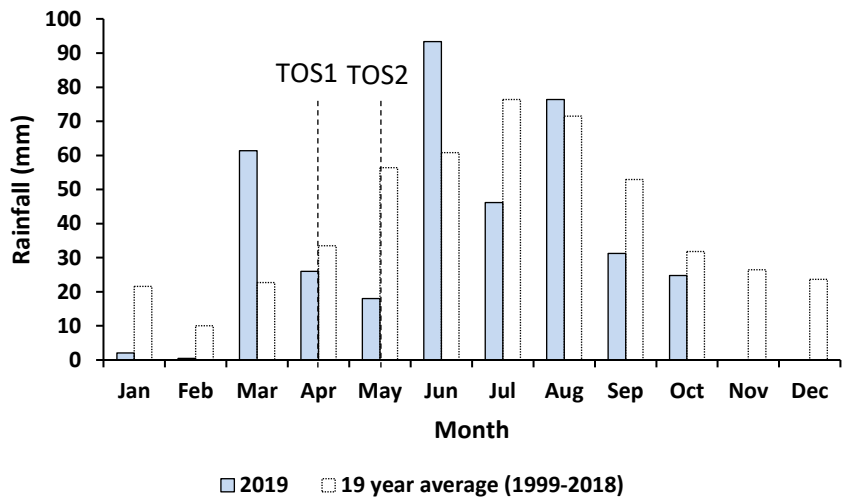


TOS1 30<sup>th</sup> April  
TOS2 27<sup>th</sup> May

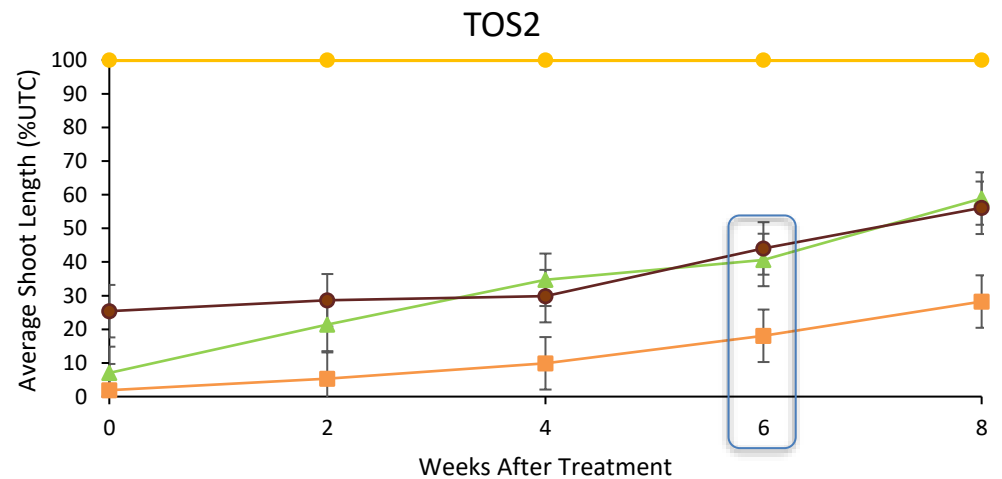
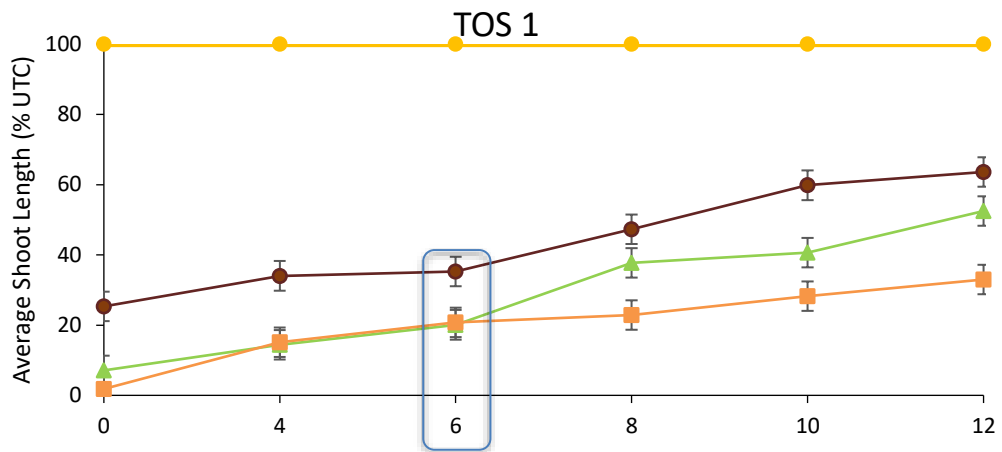


● Nil (Knockdown only) ▲ Boxer Gold (2.5L) ■ Sakura (118g) ● Trifluralin (2.0 L/ha)

# KOJONUP



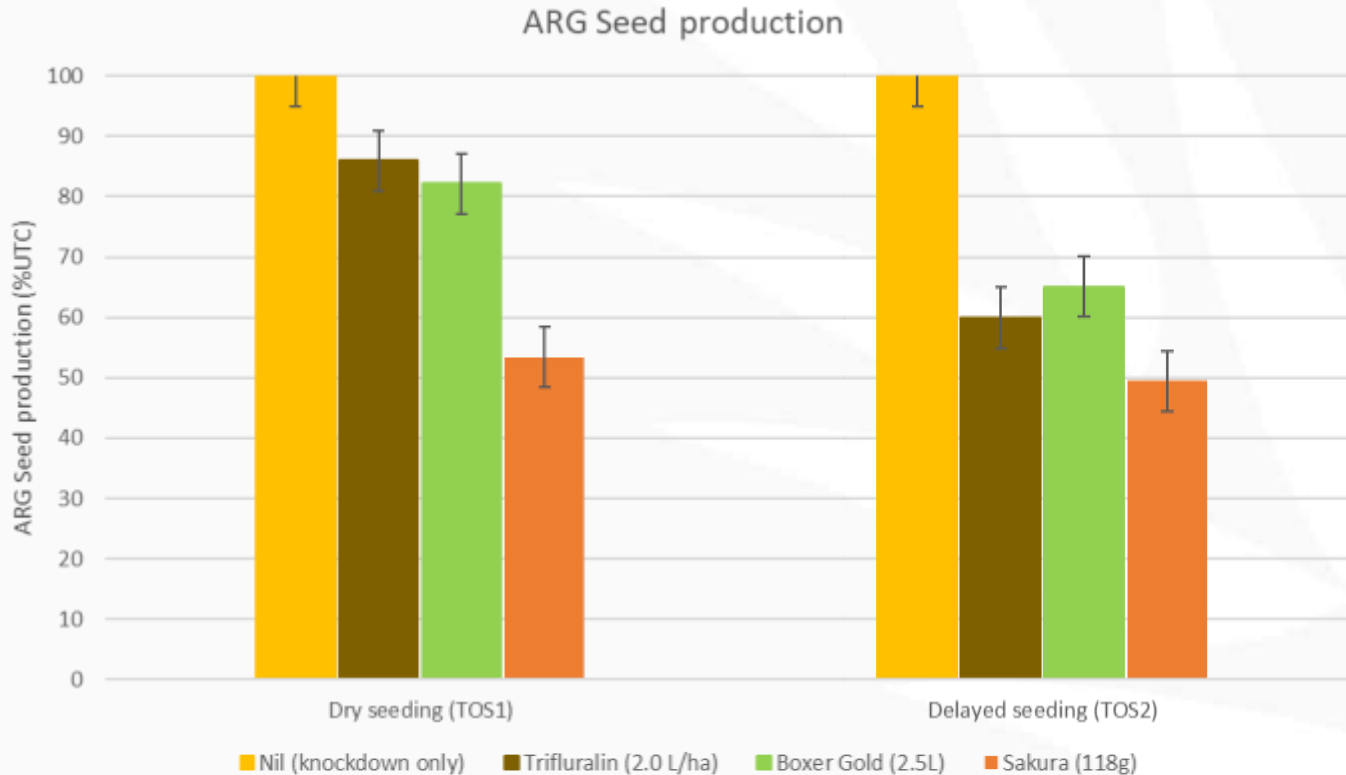
TOS1 18<sup>th</sup> April  
 TOS2 15<sup>th</sup> May



● Nil (Knockdown only)   
▲ Boxer Gold (2.5L)   
■ Sakura (118g)   
● Trifluralin (2.0 L/ha)



# AVERAGE ANNUAL RYEGRASS SEED PRODUCTION ACROSS THE THREE SITES



2020

Luximo<sup>®</sup> 750 g/L CINMETHYLIN  
And  
1.25 L/ha BIXLOZONE



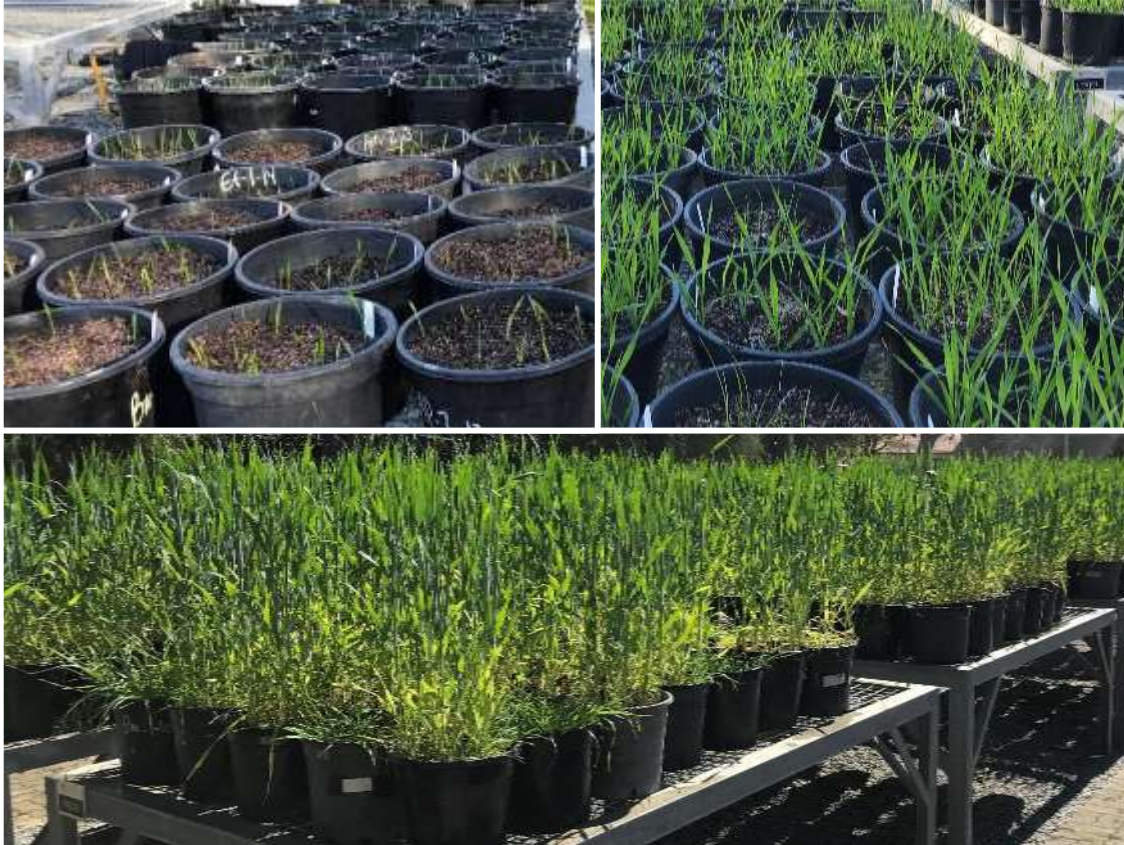
@robertexri @mike\_AHRI @AHRI\_Team

# KEY MESSAGES

Mix herbicides! Pyroxasulfone + prosulfocarb controlled 96% of the annual ryegrass plants and reduced their seed production by 88%.

Crop competition helps. 150 wheat plants  $m^{-2}$  reduced seed production of resistant plants by 56%, with no further reduction at 300 plants  $m^{-2}$ .

# THE EXPERIMENT



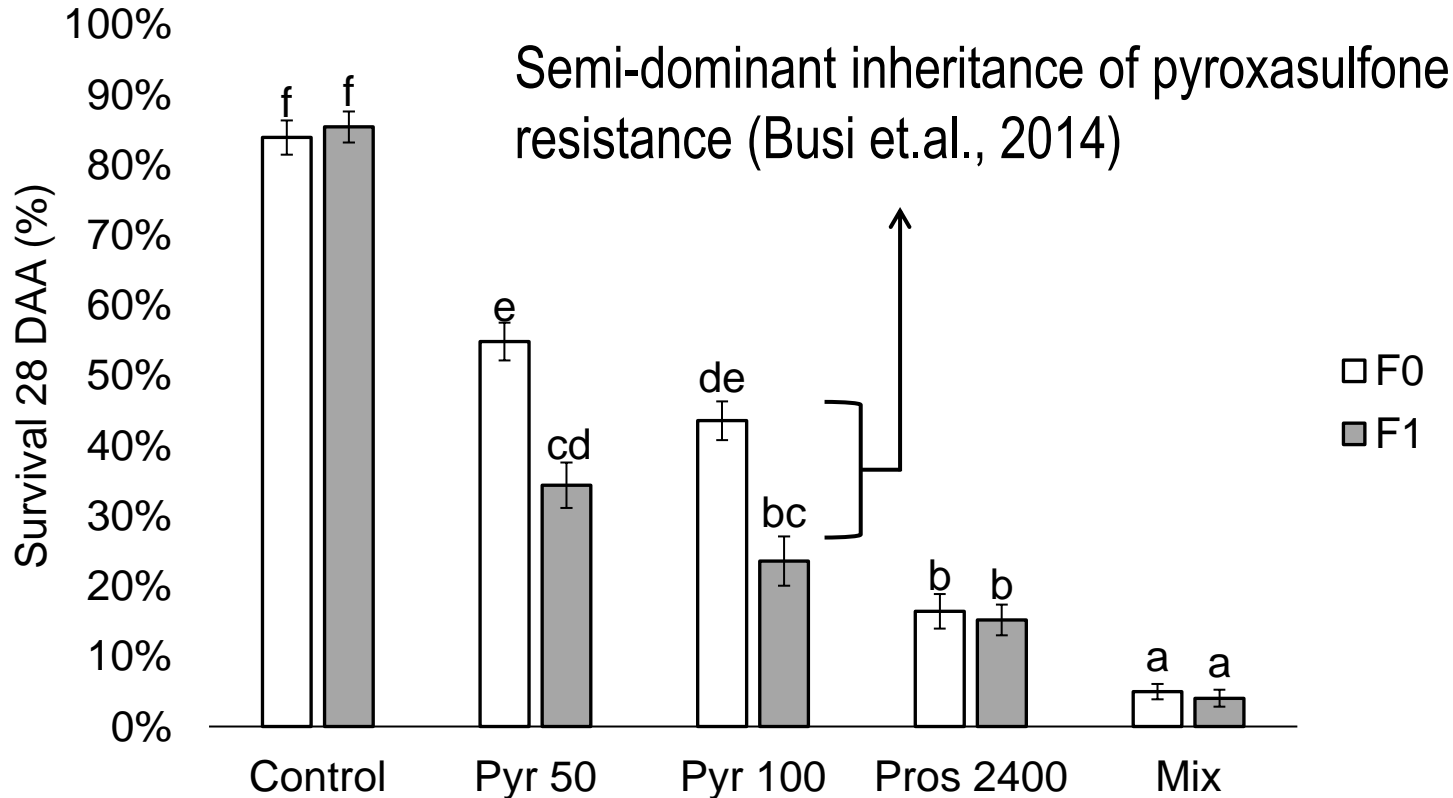
**Two ryegrass populations**  
(“SLR31” P4 and “M3/54” P3)

**Two genotypes per population**  
(parental resistant and an F<sub>1</sub>  
cross X susceptible population)

**Three wheat densities**  
(0, 150 and 300 plants m<sup>-2</sup>)

**Four herbicide treatments**

# SURVIVAL



GLM Binomial analysis ( $p < 0.0001$ )

# THE EXPERIMENT



Extra plants  
removal



4 plants/pot



80 plants  $\text{m}^{-2}$

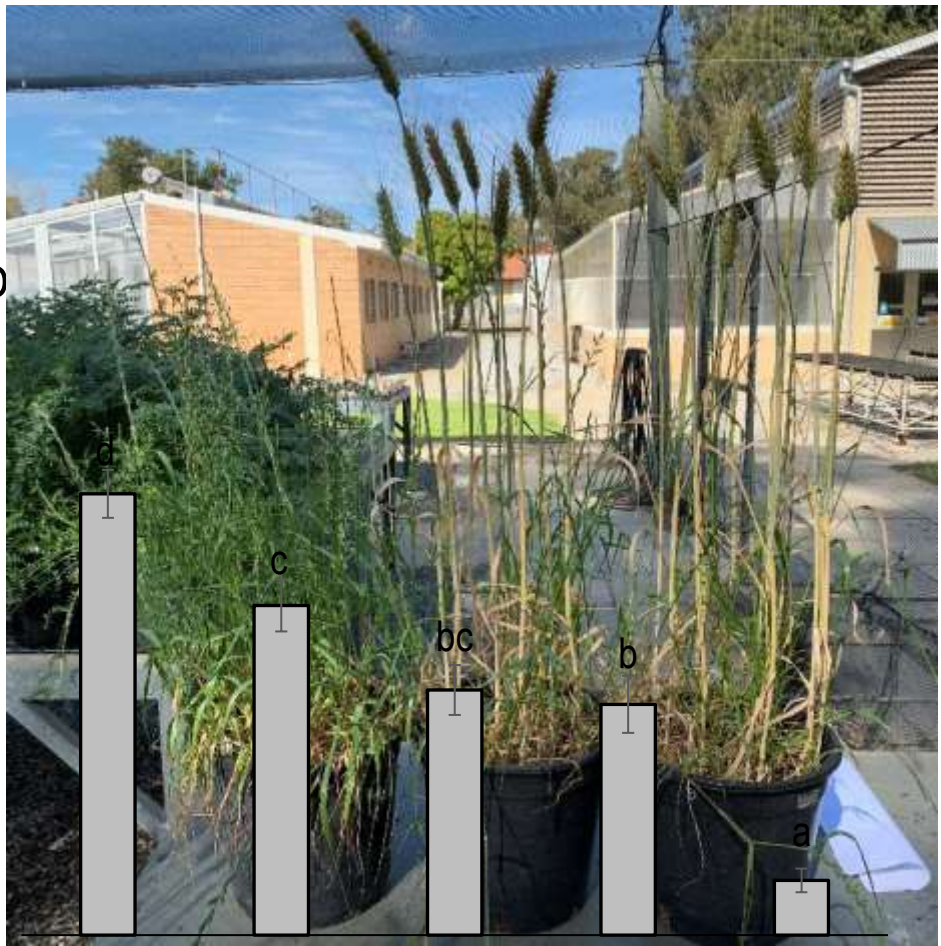
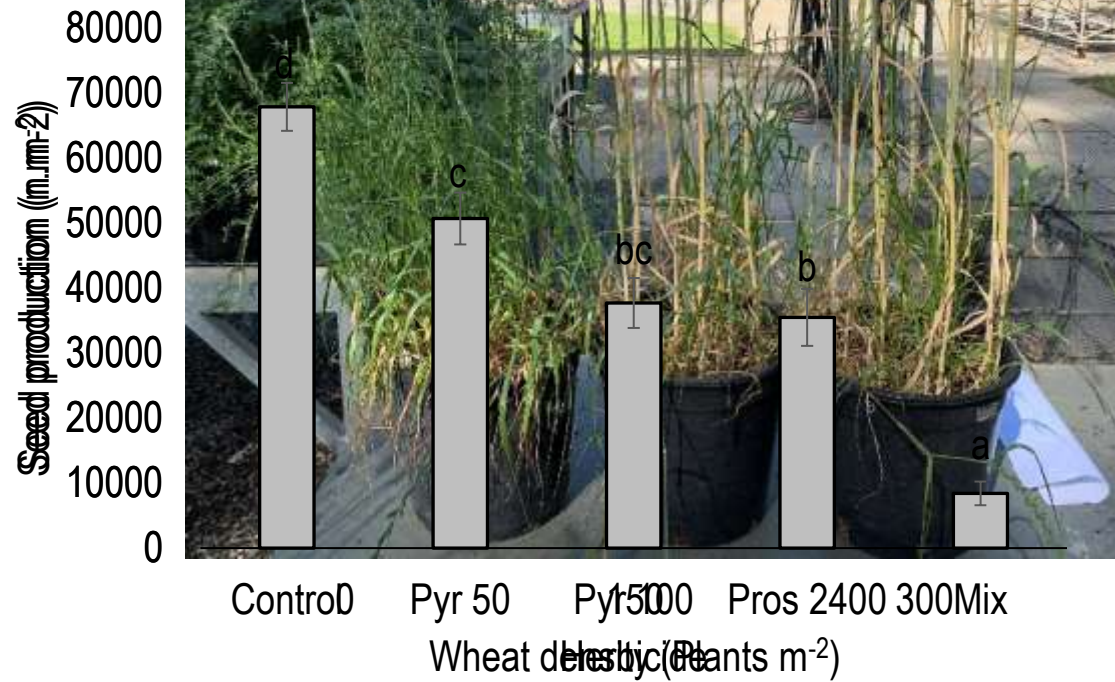


# SEED PRODUCTION

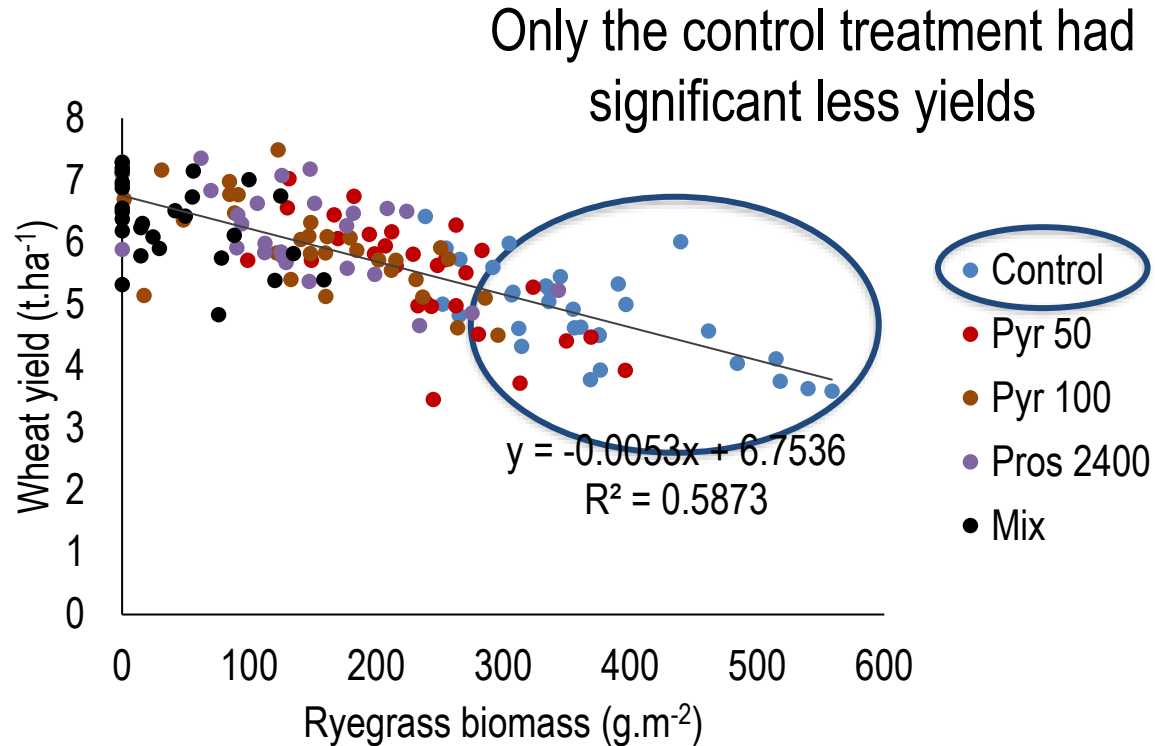
Two factors affected ARG seed pro

Wheat density

Herbicide treatment



# WHEAT YIELD





# CALL FOR ACTION

	Pyroxasulfone	Prosulfocarb	Mixture
Cost (\$ L or kg <sup>-1</sup> )	340	9.45	
Dose (L or kg ha <sup>-1</sup> )	0.118	3	0.118 + 3
Cost per ha (\$ ha <sup>-1</sup> )	40.12	28.35	68.47

Seeding rate (t ha <sup>-1</sup> )	2	2	
Cost (\$ t <sup>-1</sup> )	278	278	
Seed treatment cost (\$ kg <sup>-1</sup> )	0.04	0.04	
Cost (\$ ha <sup>-1</sup> )	24.14	48.29	

There is only 4 \$ difference between doubling the seeding rate and adding prosulfocarb.



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