



# Pre-emergence herbicides; tricks and tips for 2016

**Christopher Preston, Peter Boutsalis, Sam  
Kleemann and Gurjeet Gill**  
**School of Agriculture, Food & Wine, University  
of Adelaide**

# Understanding pre-emergent herbicides

- **Water solubility**
- **Binding to soil components**
- **Moisture availability**
- **Position of weed seed**
- **Rate of herbicide degradation in the soil**



# Water solubility of pre-emergent herbicides

Herbicide	Trade Name	Water solubility	
		(mg L <sup>-1</sup> )	
Trifluralin	TriflurX	0.22	Very low
Pendimethalin	Stomp	0.33	Very low
Pyroxasulfone	Sakura	3.9	Low
Triallate	Avadex Xtra	4.1	Low
Propyzamide	Rustler	9	Low
Prosulfocarb	Boxer Gold	13	Low
Atrazine		35	Medium
Diuron		36	Medium
S-metolachlor	Dual Gold	480	High
Triasulfuron	Logran	815	High
Chlorsulfuron	Glean	12,500	Very High



## Binding to soil organic matter

Herbicide	Trade Name	$K_{oc}$	
		(mL g <sup>-1</sup> )	
Trifluralin	TriflurX	15,800	Very high
Pendimethalin	Stomp	17,800	Very high
Pyroxasulfone	Sakura	223	Medium
Triallate	Avadex Xtra	3000	High
Propyzamide	Rustler	840	High
Prosulfocarb	Boxer Gold	2000	High
Atrazine		100	Medium
Diuron		813	High
S-metolachlor	Dual Gold	200	Medium
Triasulfuron	Logran	60	Low
Chlorsulfuron	Glean	40	Low

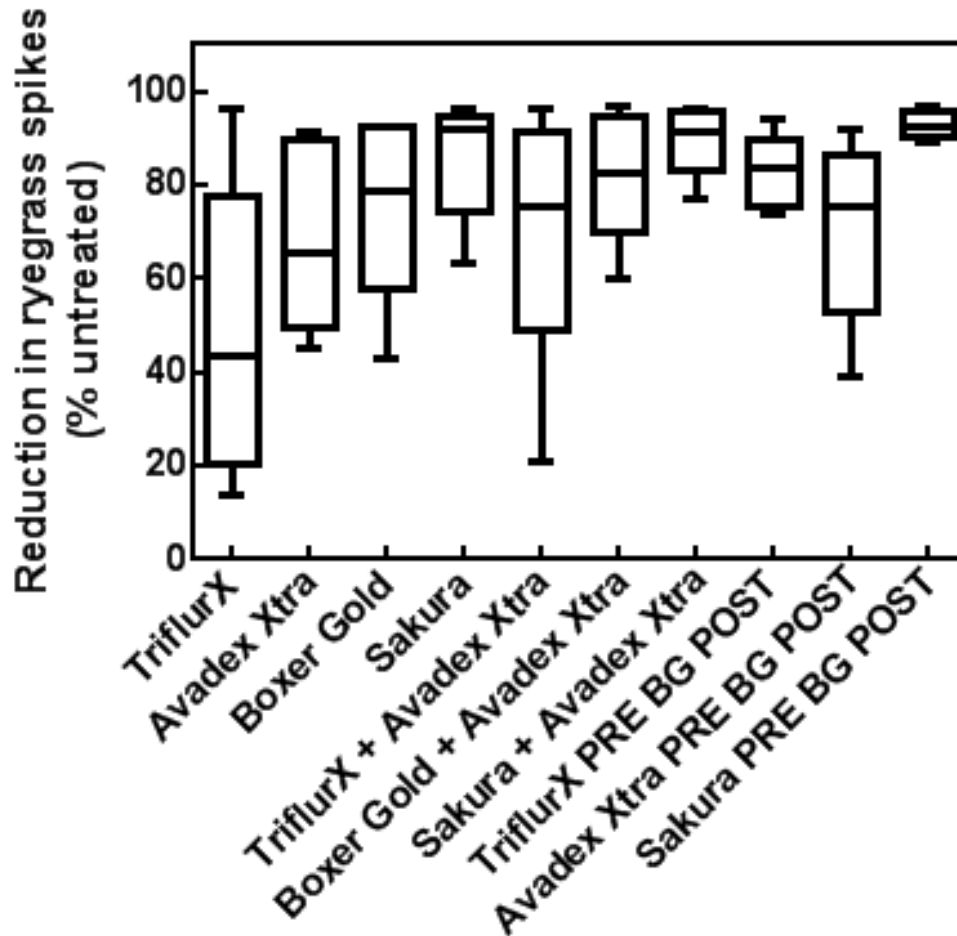


# Persistence of residual herbicides

- **Factors affecting resistance**
  - **Moisture availability**
  - **Temperature**
  - **Soil organic matter**
- **In summer, soil needs to stay moist near the surface for about 1 week**
  - **Small rainfall events don't count**



# Getting more out of pre-emergent herbicides



# Pre-emergent herbicides need crop competition



# Time of sowing with pre-emergent herbicides

TOS1 = 4 May; TOS 2= 2 June

Pre-emergent herbicide	Plant counts (8 Aug) (m <sup>-2</sup> )		Head counts (10 Oct) (m <sup>-2</sup> )	
	TOS1	TOS2	TOS1	TOS2
Nil	59 a	77 a	350 a	164 b
Pyroxasulfone (100 g ha <sup>-1</sup> )	8 b	8 b	39 c	41 c
Pyroxasulfone (100 g ha <sup>-1</sup> ) + Triallate (1000 g ha <sup>-1</sup> )	3 b	3 b	32 c	9 c

## Wheat Yield

TOS1: 4.15 T ha<sup>-1</sup>

TOS2: 2.93 T ha<sup>-1</sup>







# Time of sowing with pre-emergent herbicides

TOS 1 = 8 May, TOS 2 = 27 May, TOS 3 = 9 Jun

Pre-emergent herbicides	Plant counts (25 Aug) (m <sup>-2</sup> )			Head counts (1 Oct) (m <sup>-2</sup> )		
	TOS1	TOS2	TOS3	TOS1	TOS2	TOS3
Nil	441 a	239 ab	439 a	585 a	285 b	287 b
Pyroxasulfone (100 g ha <sup>-1</sup> )	179 ab	176 ab	241 ab	140 bcd	58 cde	53 de
Pyroxasulfone (100 g ha <sup>-1</sup> ) + triallate (1000 g ha <sup>-1</sup> )	112 b	109 b	139 b	47 de	28 e	19 e
Prosulfocarb (2000 g ha <sup>-1</sup> ) + S-metolachlor (300 g ha <sup>-1</sup> )	128 b	241 ab	176 ab	171 bc	66 cde	55 de



# Resistance to triallate in annual ryegrass

- **In 2014, poor control of annual ryegrass with a high rate of Avadex Xtra was reported from the Yorke Peninsula**
- **Testing revealed resistance to Avadex Xtra and cross resistance to prosulfocarb (the Boxer component of Boxer Gold)**
- **Boxer Gold still works under ideal conditions, but fails under less favourable conditions**
- **Sakura is still effective**
- **Other populations identified in weed surveys**
- **Loss of Group J herbicides likely to have a significant impact for ryegrass control in cereals**



# Resistance to triallate in annual ryegrass

Herbicide product and rate (mL or g ha <sup>-1</sup> )	S	SLR31 (multi-resistant) Control (%)	YP-R
<b>Avadex Xtra</b>			
800	100	96	6
1600	100	100	47
3200	100	100	91
<b>Boxer Gold</b>			
1250	100	96	68
2500	100	100	100
<b>Boxer</b>			
2500	100	100	65
5000	100	100	82
<b>Sakura</b>			
59	100	96	97
118	100	100	100



# Resistance to triallate in annual ryegrass



**Untreated**

**Avadex Xtra**

**Boxer**

**Boxer Gold**

**Sakura**

