



Disease control challenges and strategies in malting barley

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Outline

- Disease resistance update
- Focus on Ramularia
 - Overview – Scottish and Irish experience
 - Control measures
- Control strategies
 - Trials from 2017
 - Strategies for 2018

Current resistance issues

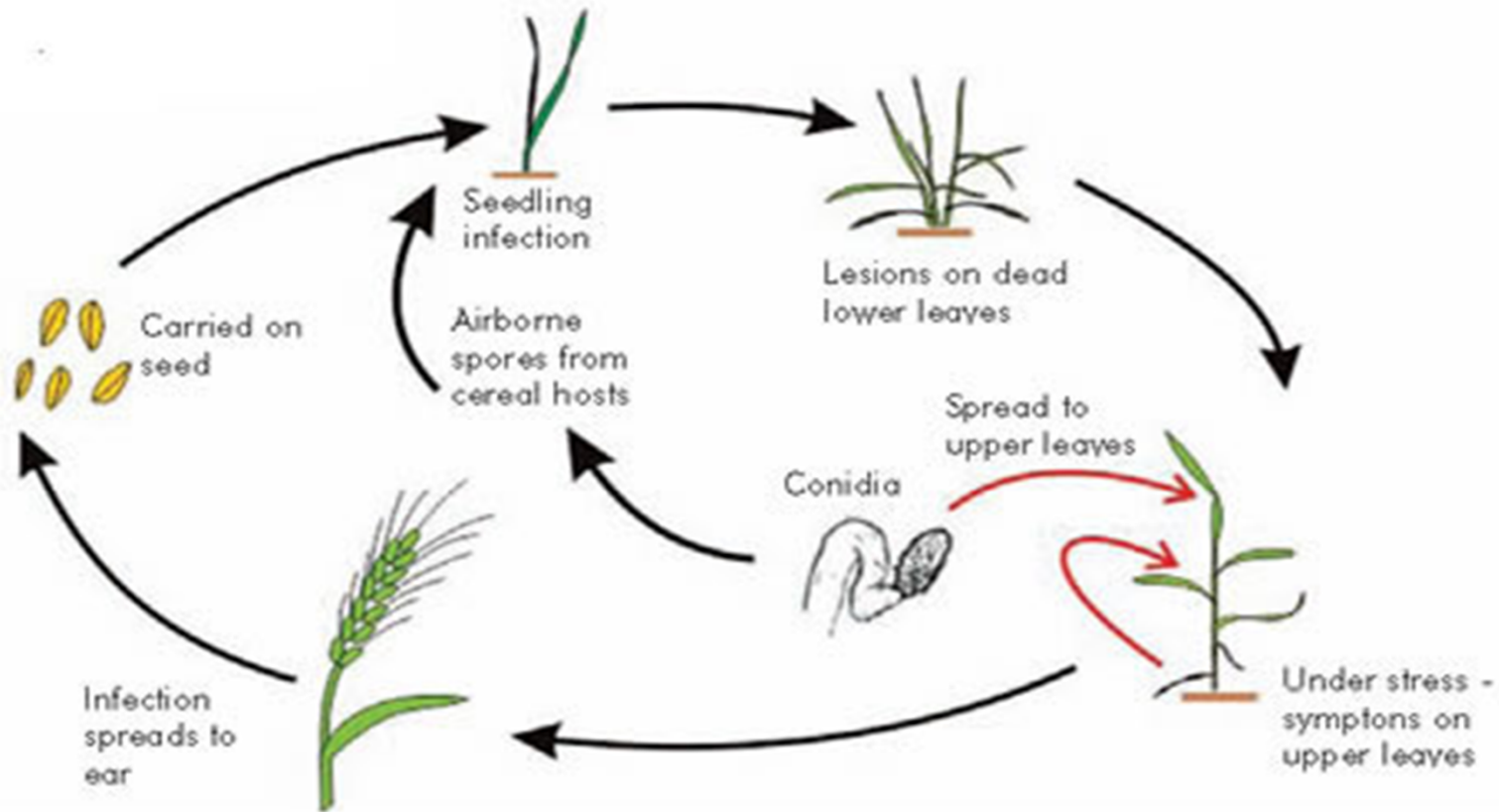
- Ramularia leaf spot
 - Strobilurin – resistance widespread
 - Azoles – resistance known
 - SDHI – resistance known
- Net blotch and Rhynchosporium
 - Strobilurins – varying resistance known

Ramularia leaf spot

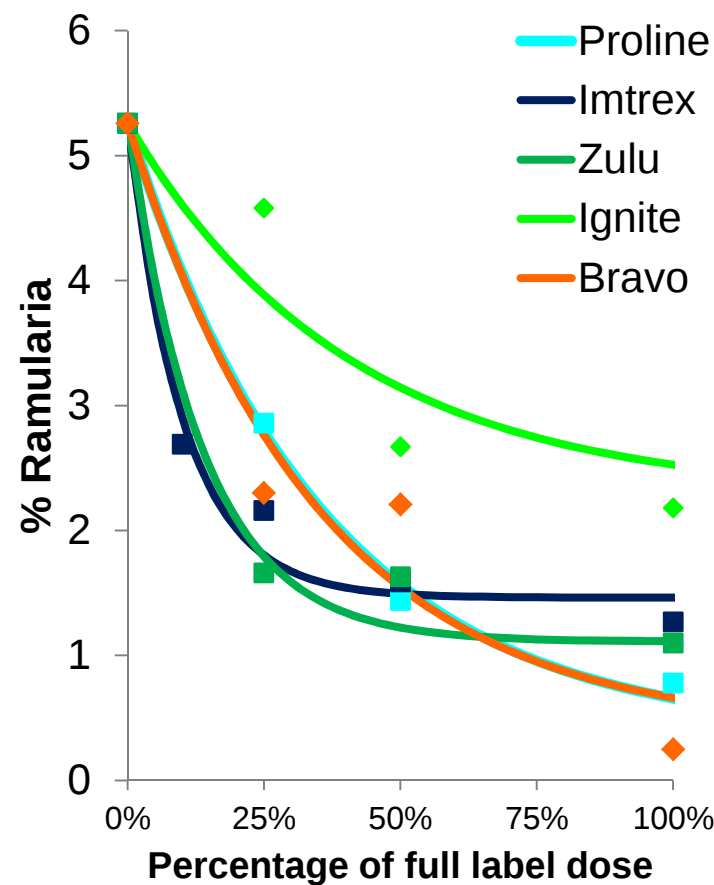
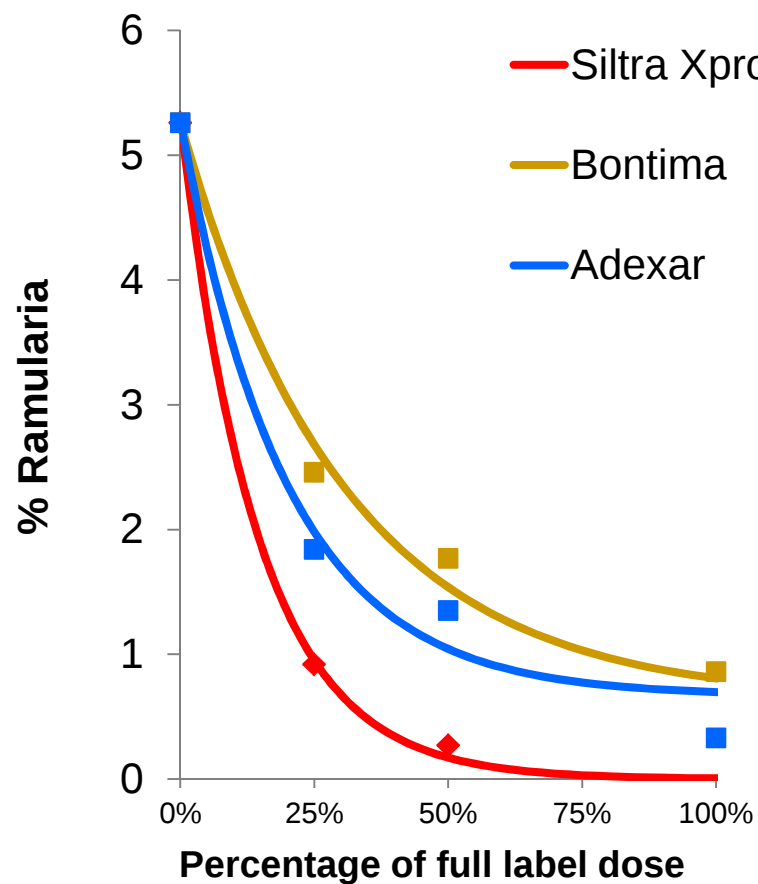
- Grows from infected seed, also some infection from airborne spores
- Infected crops do not display visible symptoms initially
- Stressed crops more likely to show symptoms
- Once symptoms develop on the upper leaves post flowering, treatment is not effective
- Yield losses of 0.5t/ha – 1.0t/ha



Lifecycle



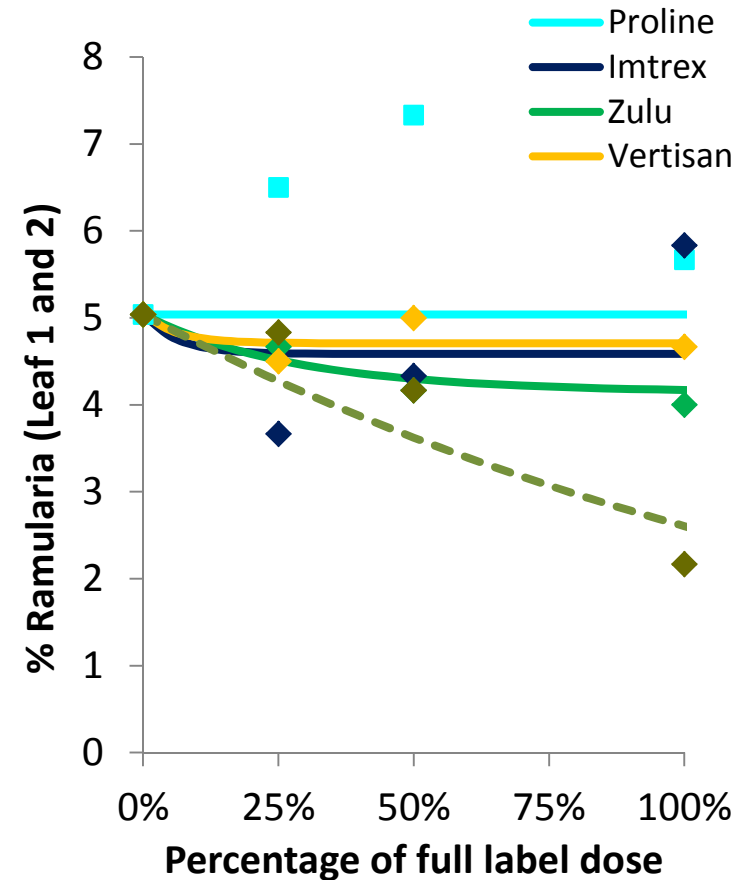
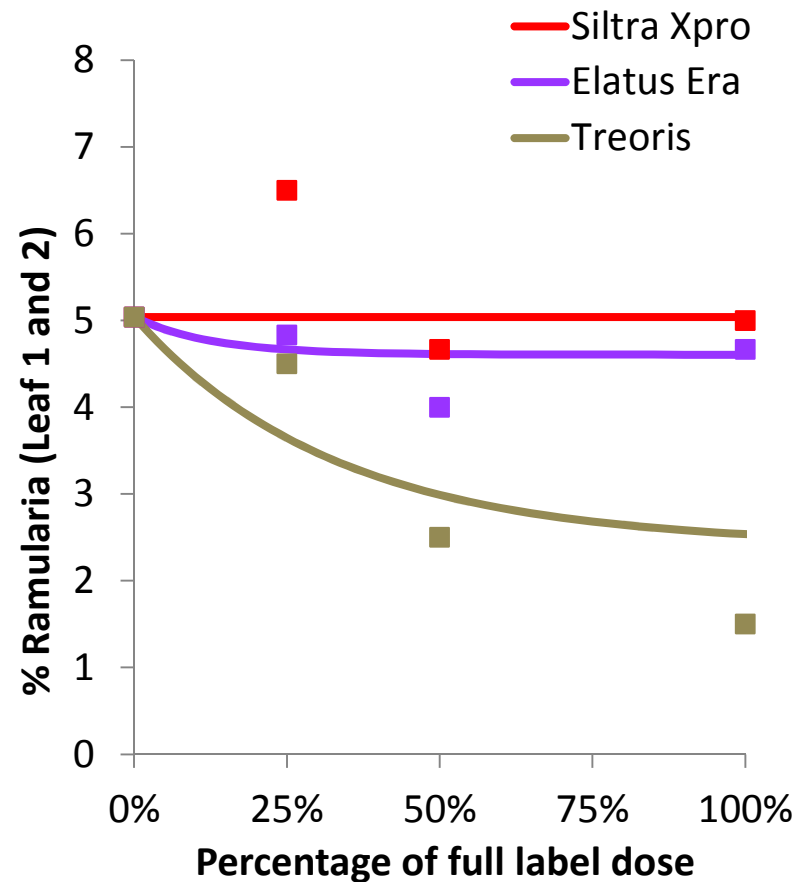
2011 – 2015 All products showing good control



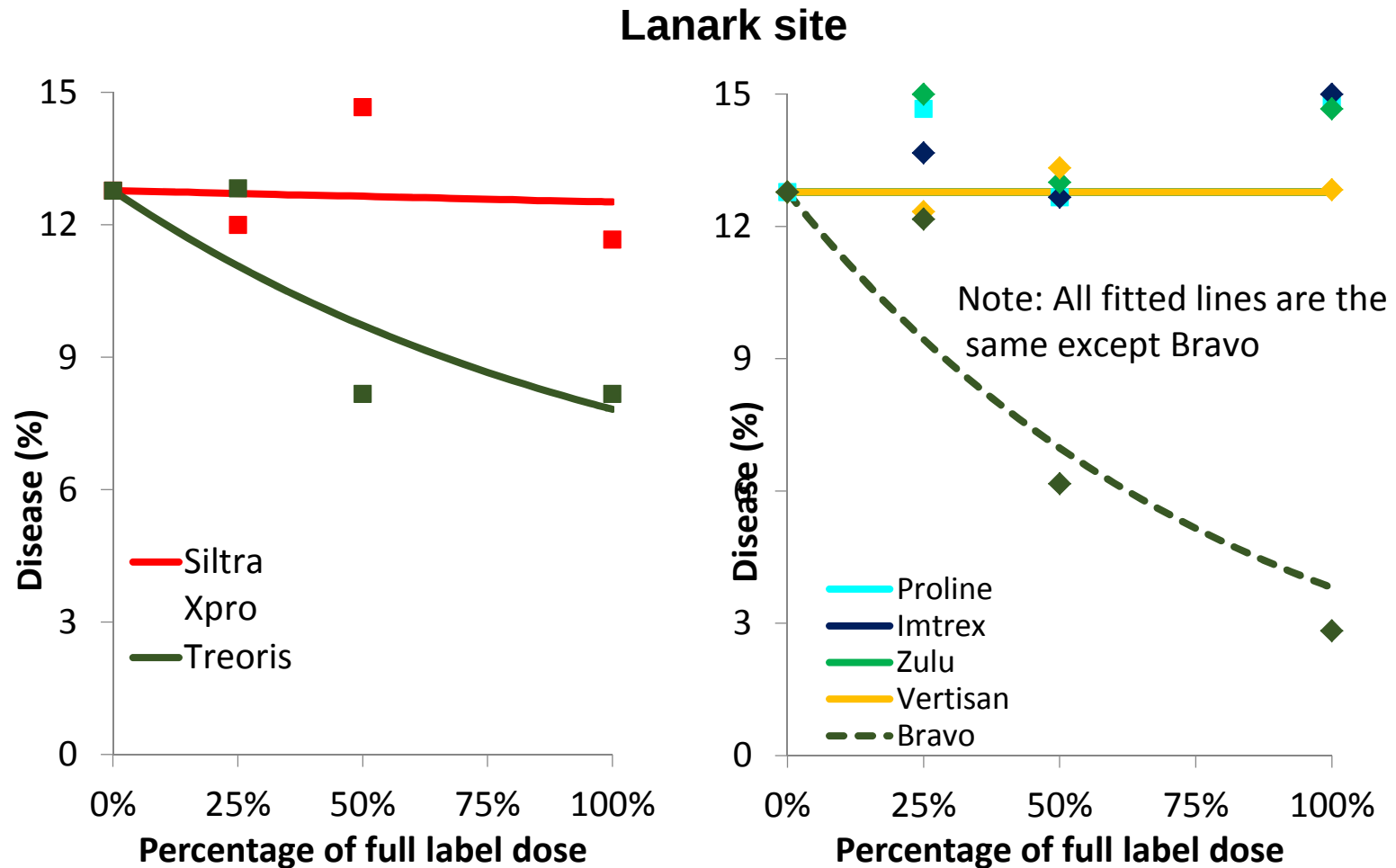
N = 3

2017 – All that changed!

Midlothian site

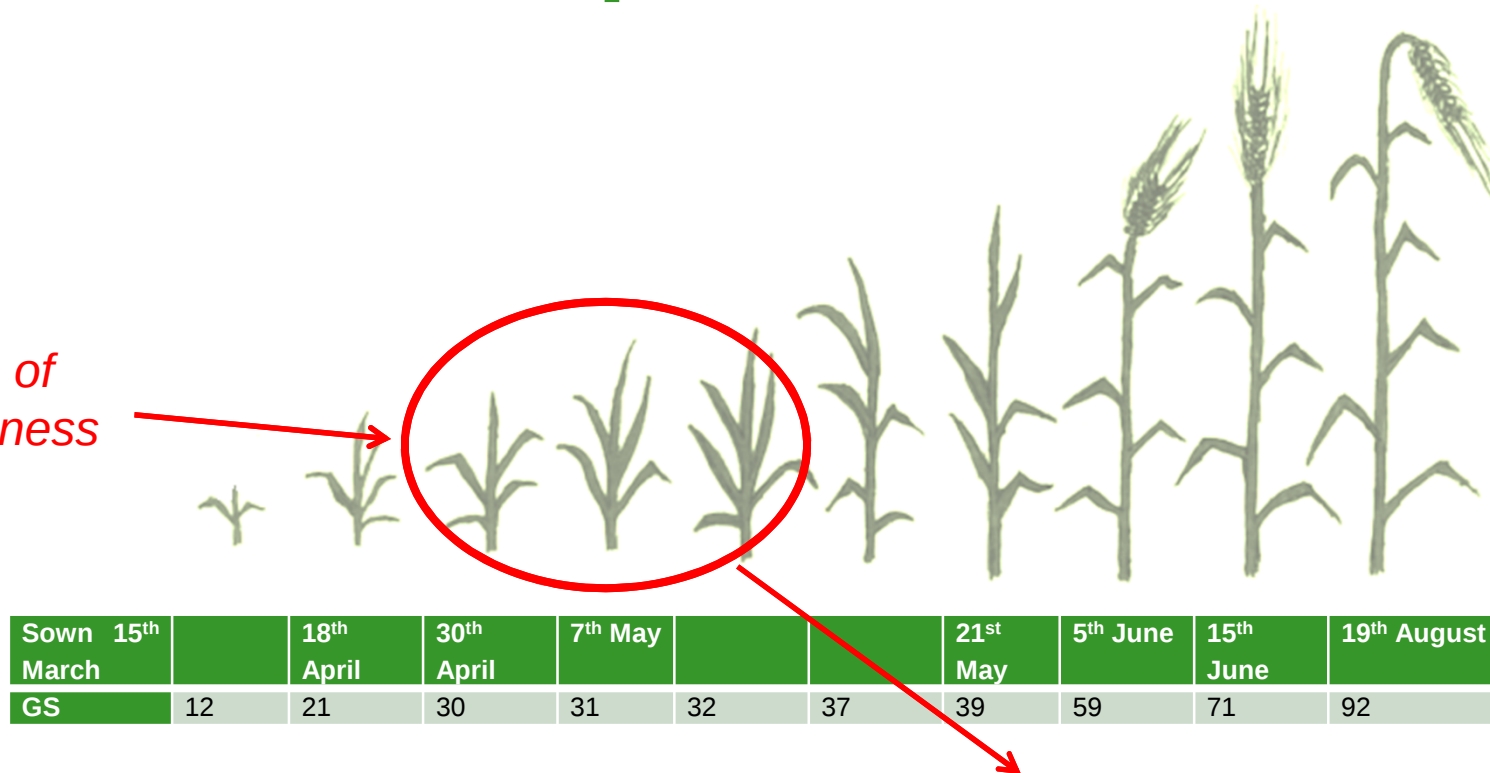


2017 – All that changed!



Can we predict the risk?

Minutes of
leaf wetness



Risk =

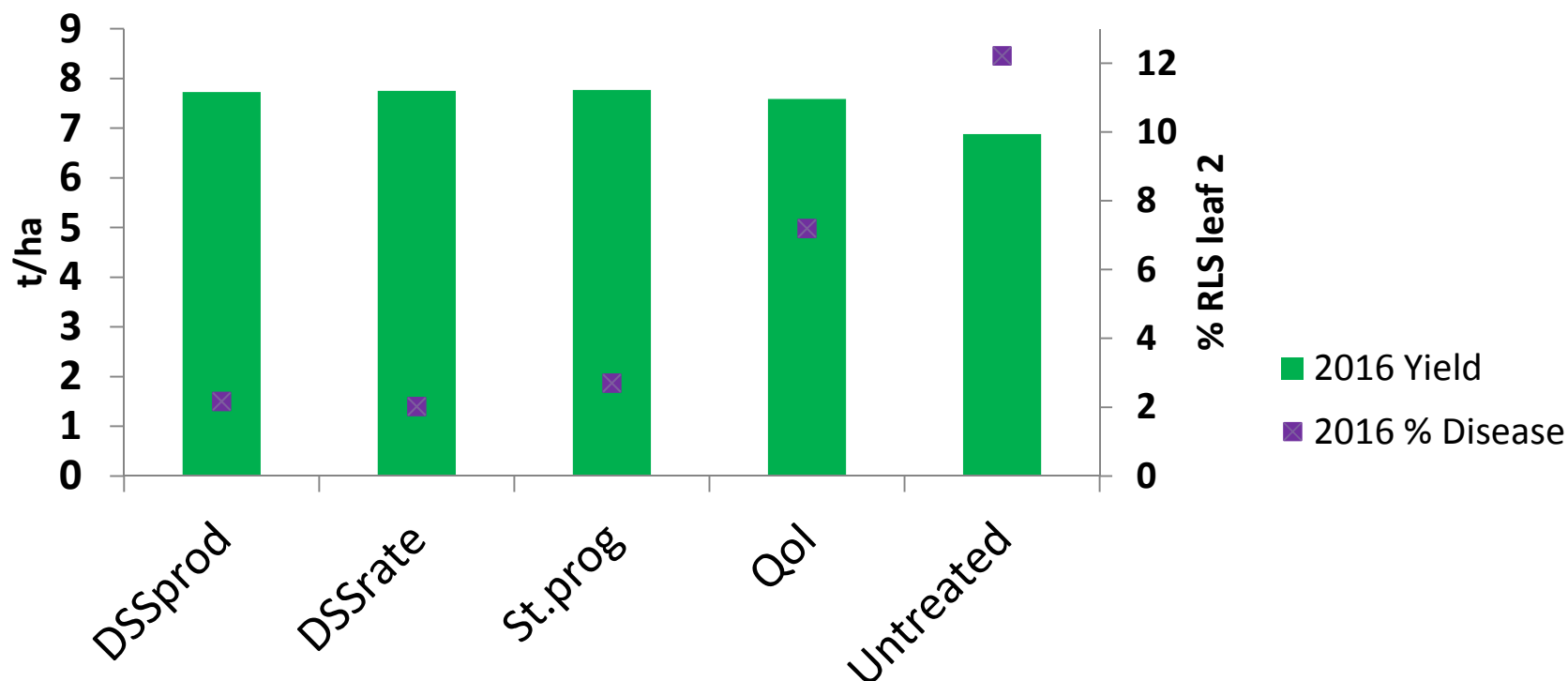
Low < 4,000 mins (< 2.7 days)	Medium 4,000–7,500 mins (2.5 - 5.2 days)	High > 7,500 mins (>5.2 days)
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- Stronger programme = 3 actives in mixture @ GS45

Field trial

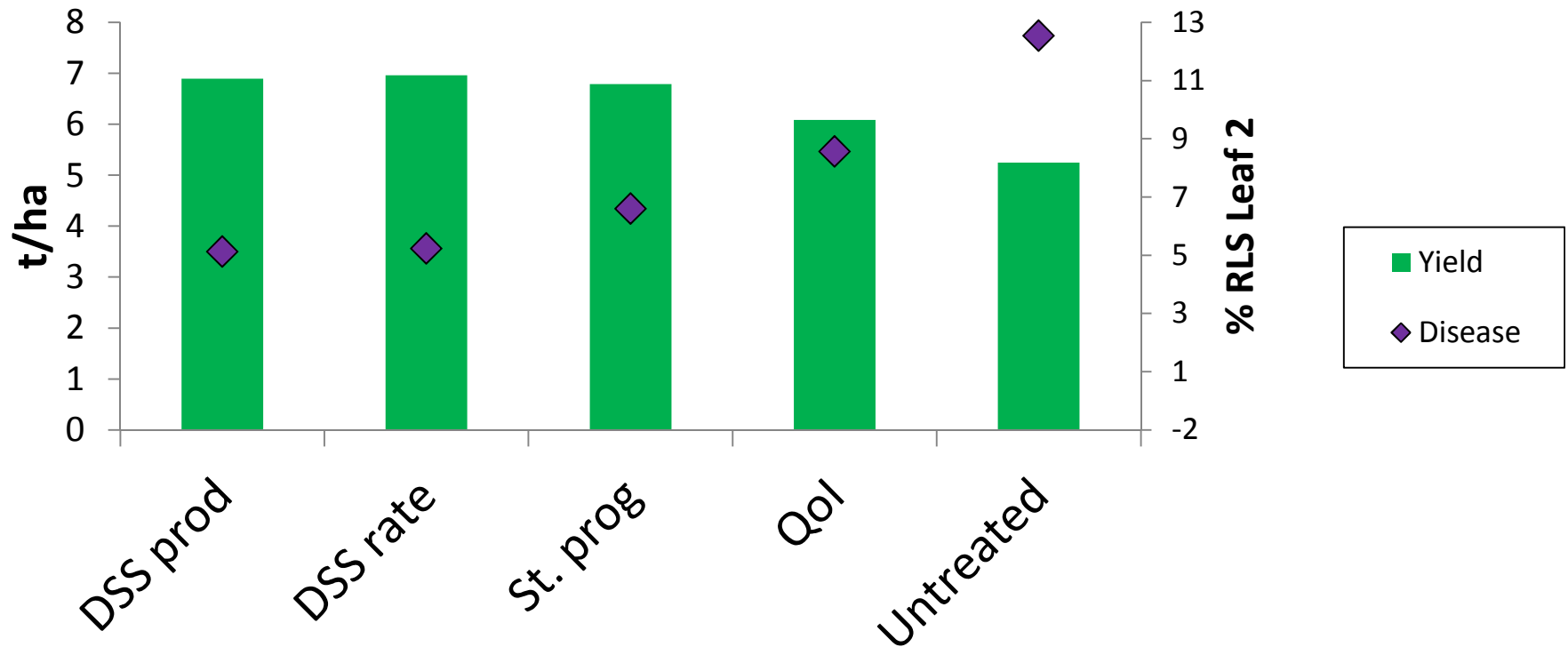
- 2 sites, high and low risk (Kildalton & Oak Park) 2016-2017
- 4 varieties; Propino, Olympus, KWS Irina and RGT Planet
- 5 fungicide programmes @ awn emergence (optimum timing for effective control);
 1. Standard (Bravo + Proline) @ 50% rates
 2. Strobilurin (Modem/F500) @ 50% rates
 3. DSS product (Bravo +/- Siltra xpro) (3 actives)
 4. DSS rate (Bravo + Proline) @ 75% rates
 5. Untreated (No fungicide @ GS45)

2016 – low and high risk



Programme	Product	Oak Park rate	Kildalton rate
Standard	Bravo + Proline	50%	50%
Qol (Strobilurin)	Modem	50%	50%
DSS Product	Bravo+/- Siltra	Bravo	Bravo + Siltra
DSS rate	Bravo + Proline	25%	75%
Untreated	***	***	***

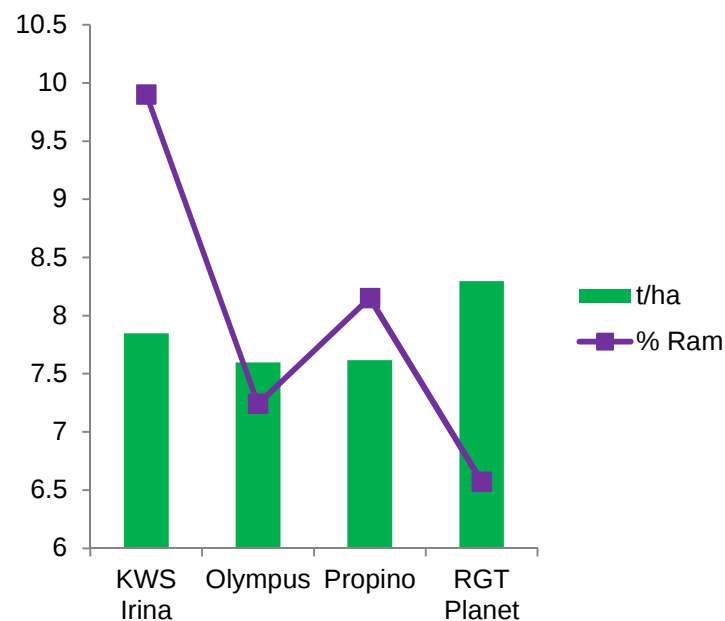
2017 – High risk



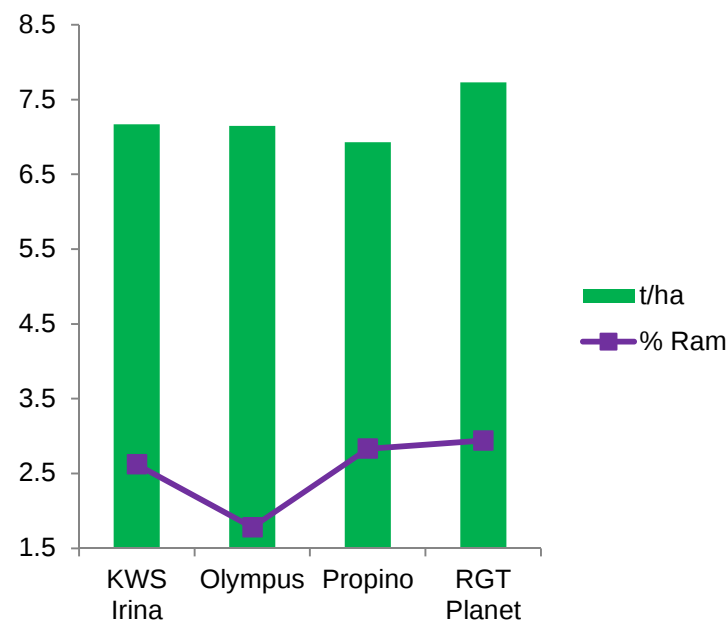
Programme	Product	Oak Park rate	Kildalton rate
Standard (50%)	Bravo + Proline	50%	50%
Qol (Strobilurin) (50%)	Modem	50%	50%
DSS Product (50%)	Bravo+/- Siltra	Bravo + Siltra	Bravo + Siltra
DSS rate	Bravo + Proline	75%	75%
Untreated	***	***	***

2016 - high risk and low risk

Kildalton 2016



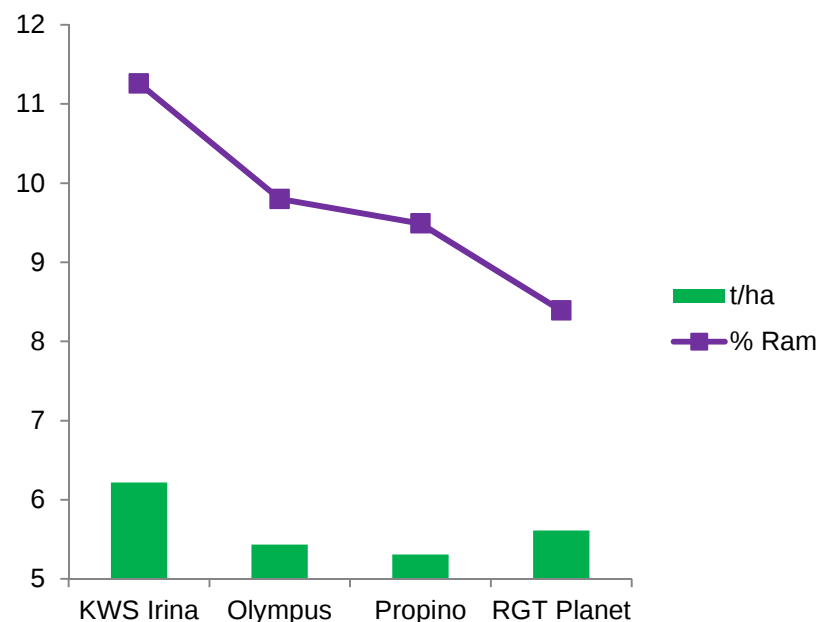
Oak Park 2016



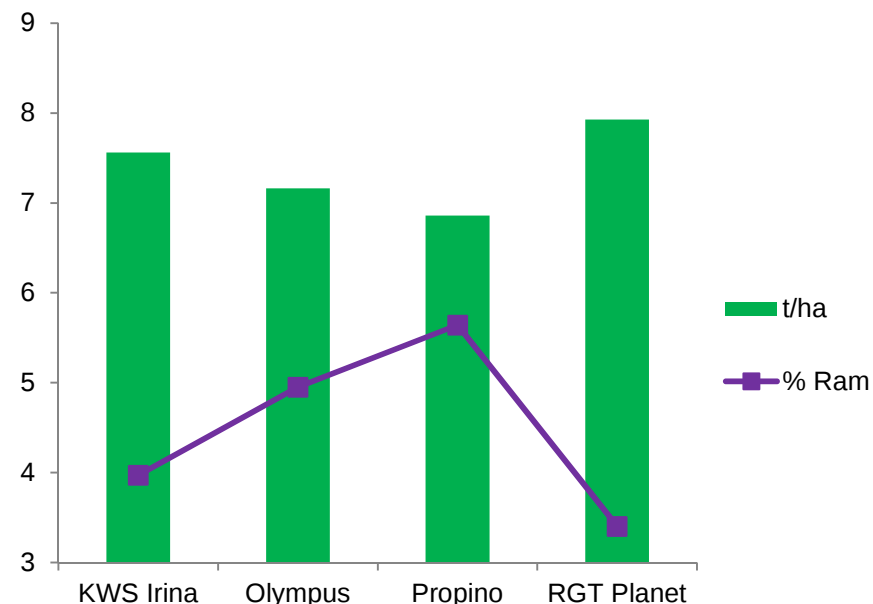
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Untreated	***	***	***

2017 - High risk

Kildalton 2017



Oak Park 2017



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Results so far

- Superior activity provided by chlorothalonil
- Standard programme adequate for high risk
- Can reduce standard for low risk
- Significant differences between varieties

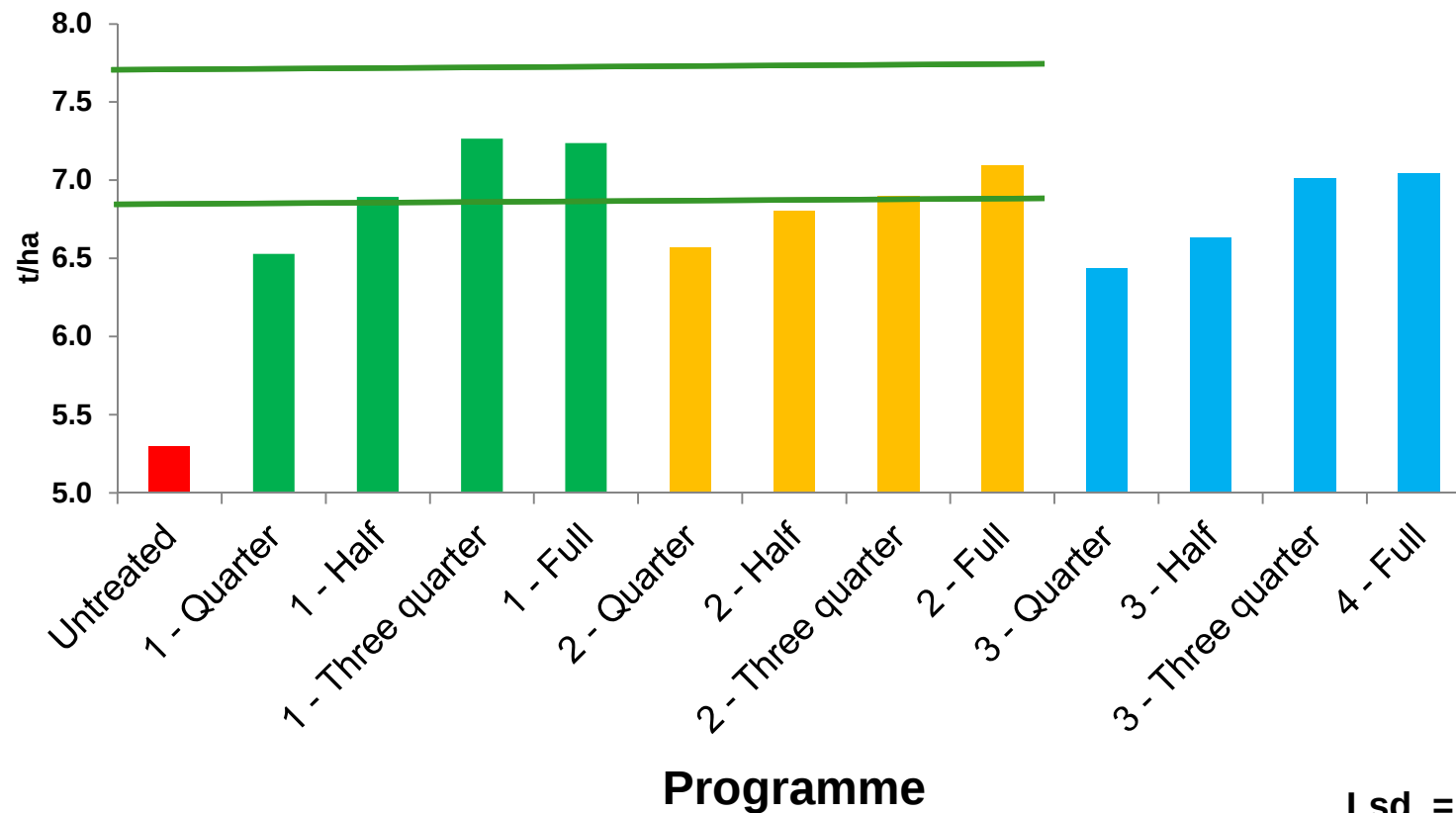
Programme x rate trial

- 3 site seasons - 2017
 - Varieties: Planet & Propino
 - Sites: Oak Park & Kildalton
- 3 standard programmes
- 4 rates: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and Full
- 2 applications

Trial plan

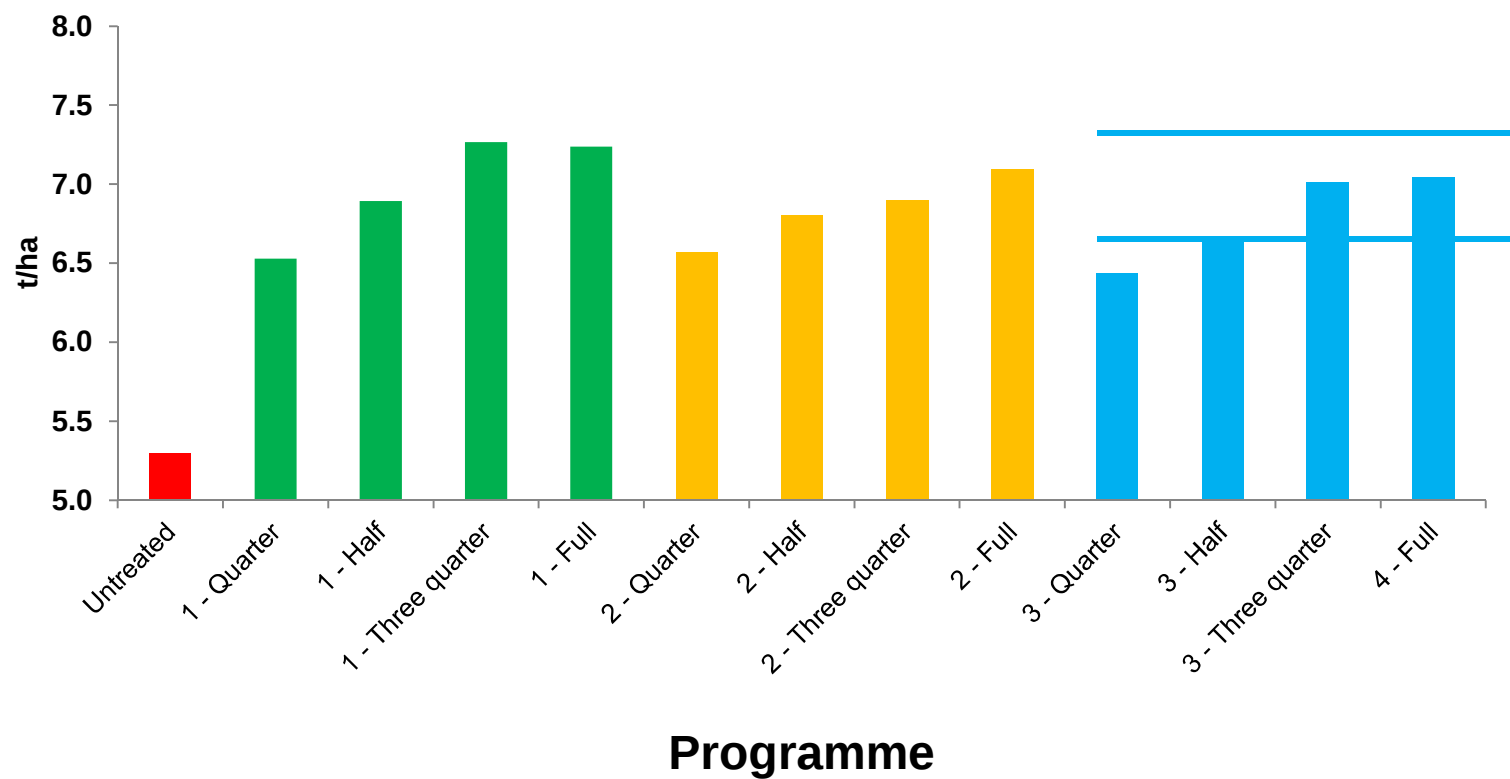
Programme	Late tillering	Awn emergence
1	Proline + Modem	Cerix + Bravo
2	Proline + Modem	Bontima + Bravo
3	Siltra xpro	Elatus era + Bravo

No economical benefit from more than half rate



Lsd = 0.7

Same pattern for programme 3

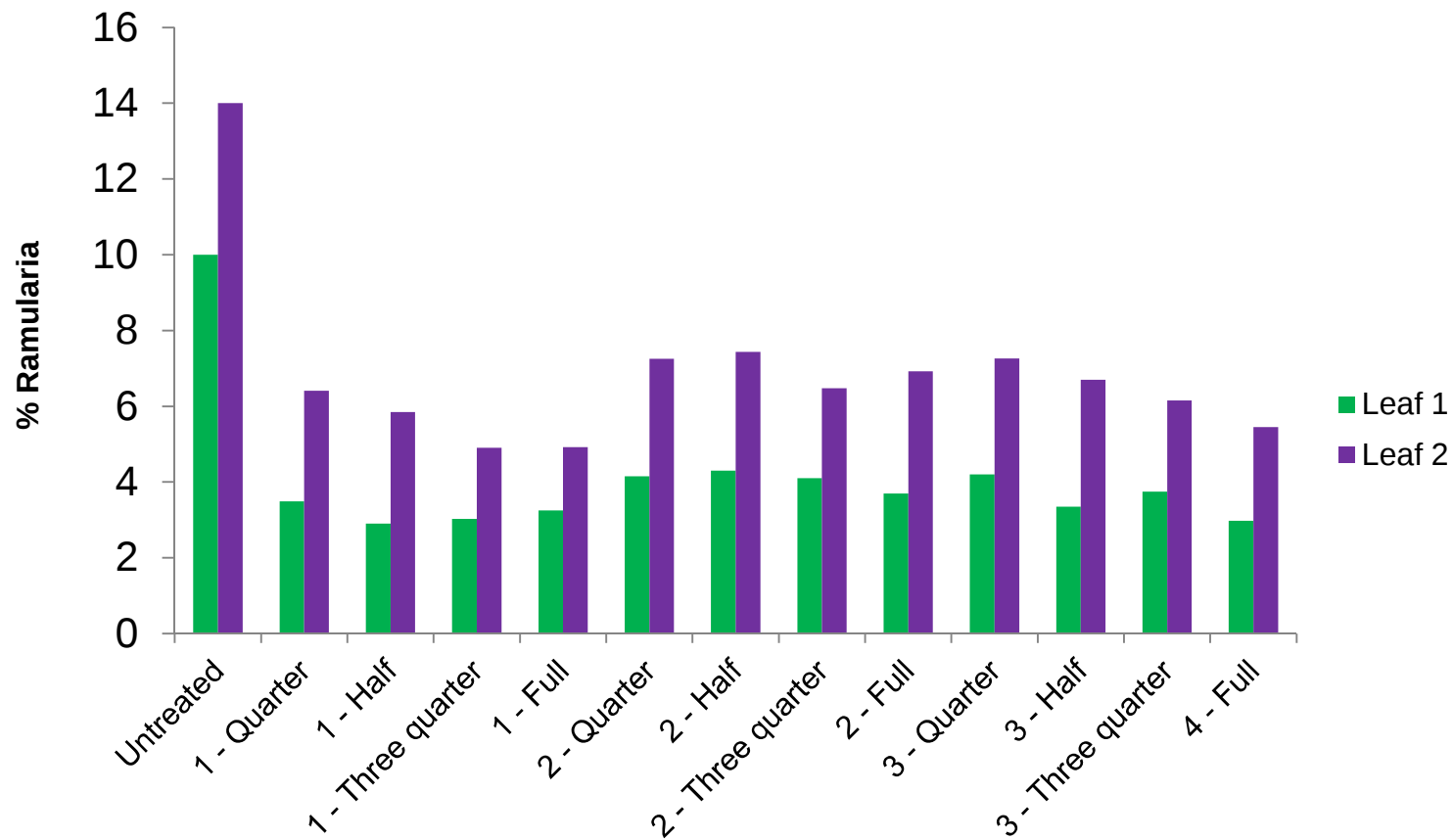


Lsd = 0.7

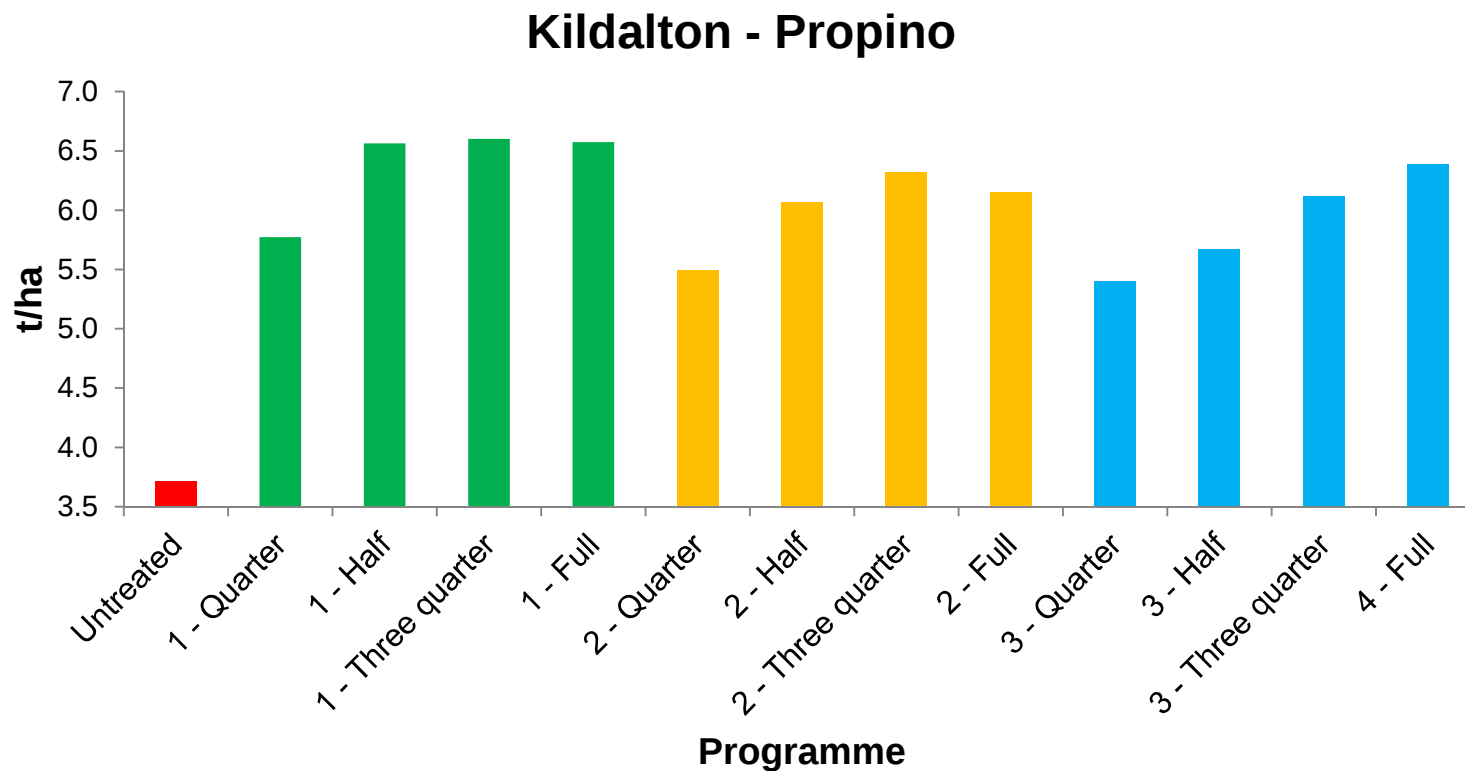
Fungicides having some effect on brackling



Disease levels similar for all programmes



Programme 1 had the least brackling



Disease levels similar for all programmes

Lsd = 0.5

Product choice

- SDHI products – Plenty to choose from
- Triazoles – Good disease control spectrum
- Strobilurins - Good mix partner
- Multisites – Always included @ GS39/49
- Morpholines/Mildewcides – When required

Take home messages

- Assess the disease risk to your crop
- Use the chemical diversity available
- Use appropriate rates and timing
- Include Chlorothalonil for Ramularia control

Acknowledgements

- Jim Grace
- Deirdre Doyle
- Dr. Joe Mulhare
- Dr. Steven Kildea
- Dr. Fiona Burnett



Programmes for 2018

	Tillering GS <30	Awn emergence GS 39/45
Rate	No more than half rate	No more than half rate
Target diseases	• Rhynchosporium • Net Blotch • (Mildew) • (Rust)	• Rhynchosporium • Net blotch • Ramularia • (Mildew) • (Rust)
Programme	Mixtures	Mixtures
	SDHI/azole/Strob/multisite Mildewicide where required	SDHI/azole/Strob Chlorothalonil needed here for Ramularia control Mildewicide where required