

FUNGICIDE STRATEGIES FOR OATS TO MAXIMISE PROFIT

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THE PROBLEM

Variety	Septoria Susceptibility
Bannister	S (Grain staining issues)
Bilby	S
Brusher	S-VS
Carrolup	S-VS
Durack	S-VS
Kojonup	S-VS
Koorabup	MR-MS
Kowari	S-VS
Mitika	S-VS
Wandering	S-VS
Williams	MR-MS
Yallara	S



UNDERSTANDING SEPTORIA

	STNB	Septoria
Growth stage when infected	11-90	11-90
Optimal spore germination range	10-25°C	15-25°C
Optimal disease development range	15-25°C	20-25°C
Latent Period (optimal conditions)	14-20 Days	21-28 Days
Potential yield loss – susceptible variety	>30%	Up to 50%

INFECTION LEVELS

	Highbury 2014	Highbury 2017	Highbury 2018	Highbury 2019
	15/10	4/10	11/10	9/9
Flag Leaf	16.9	10.9	21.6	1.1
Flag -1	29.1	28.5	69.5	3.0
Yield Response?	Yes Moderate	Yes* Moderate	Yes High	No Low

LOW PRESSURE

- 2019



LOW DISEASE PRESSURE

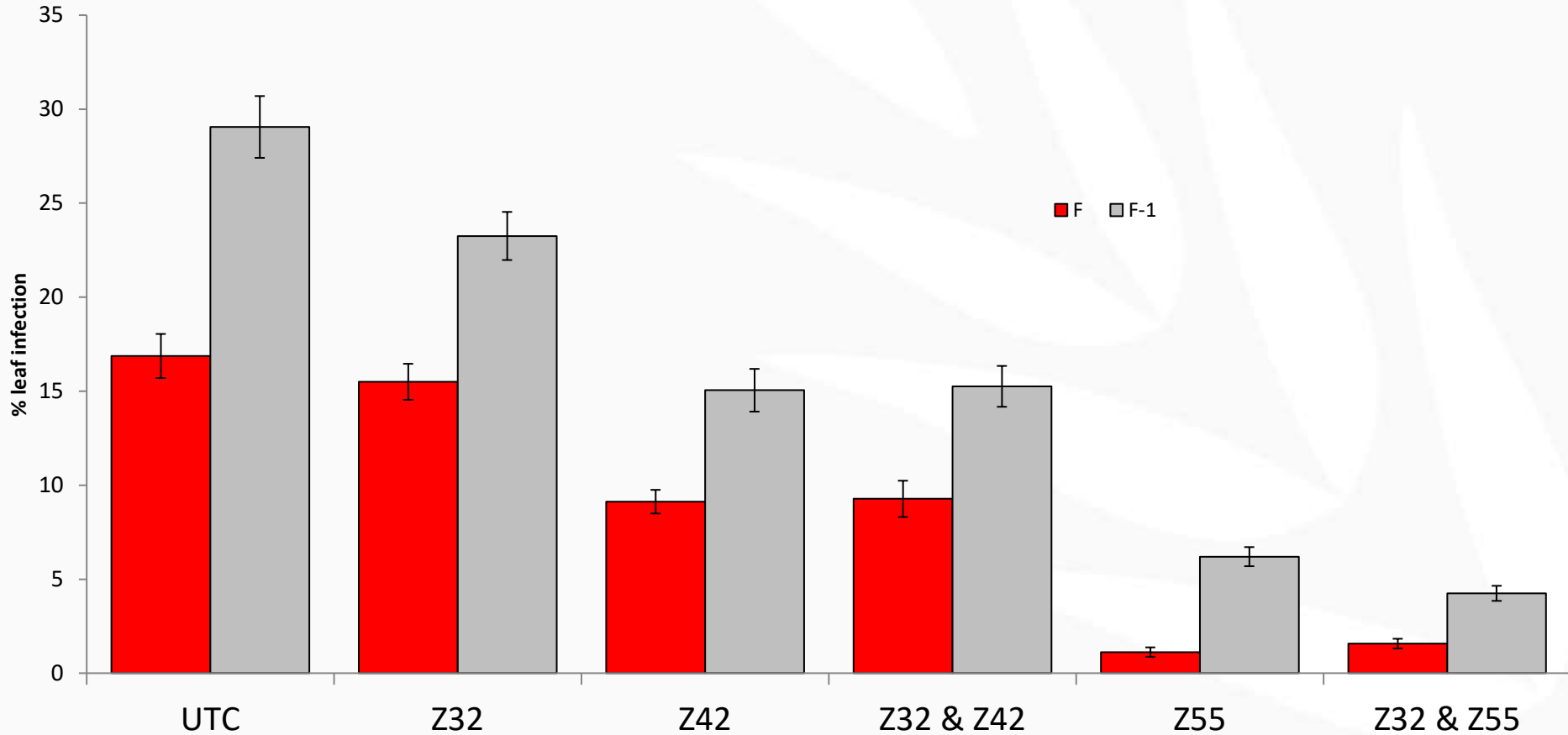
- Significant Reduction in leaf infection from fungicides
- Little Spring rainfall
- Rapid leaf necrosis driven by lack of moisture
- No yield response
- No grain quality response

MODERATE PRESSURE

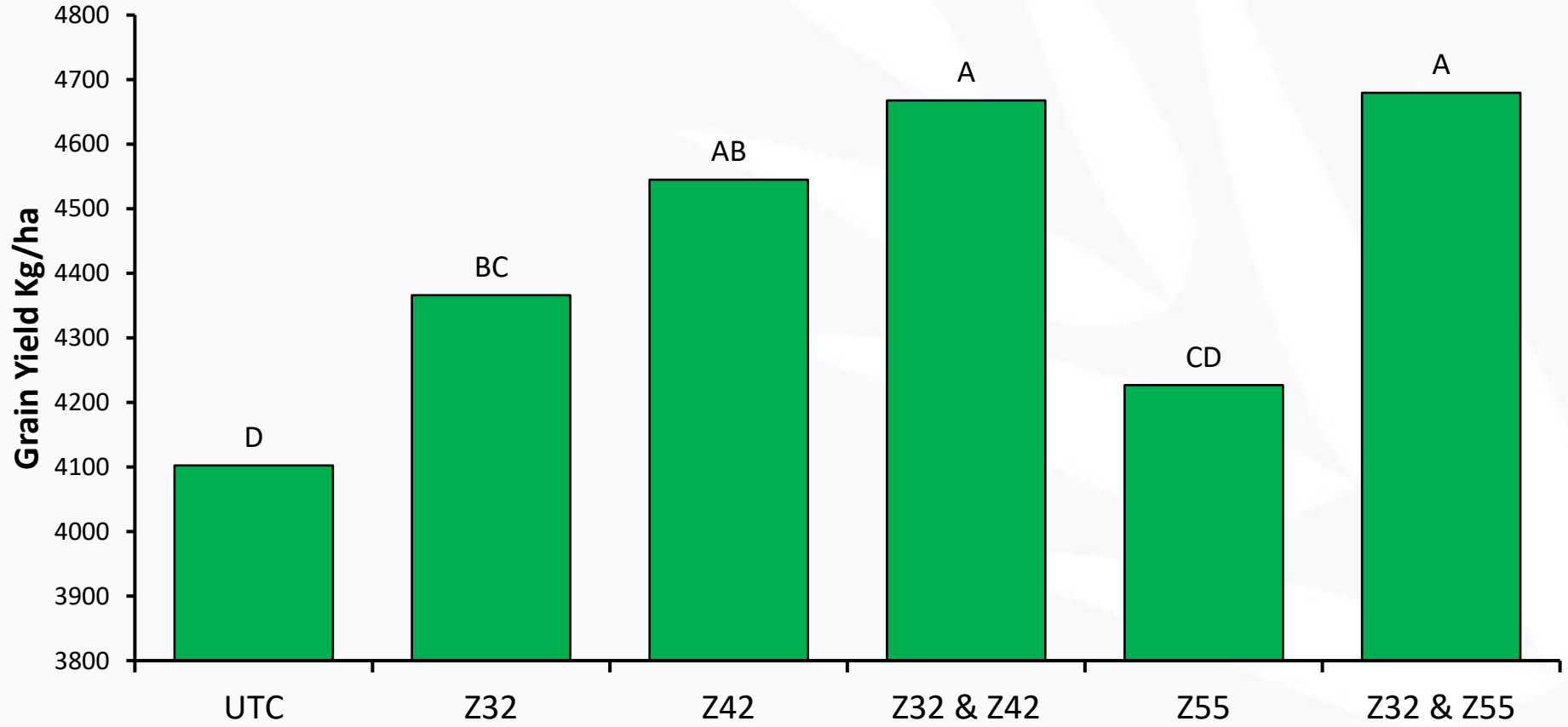
- 2014
- 2017



LEAF INFECTION HIGHBURY 2014



HIGHBURY YIELD 2014



MODERATE DISEASE PRESSURE

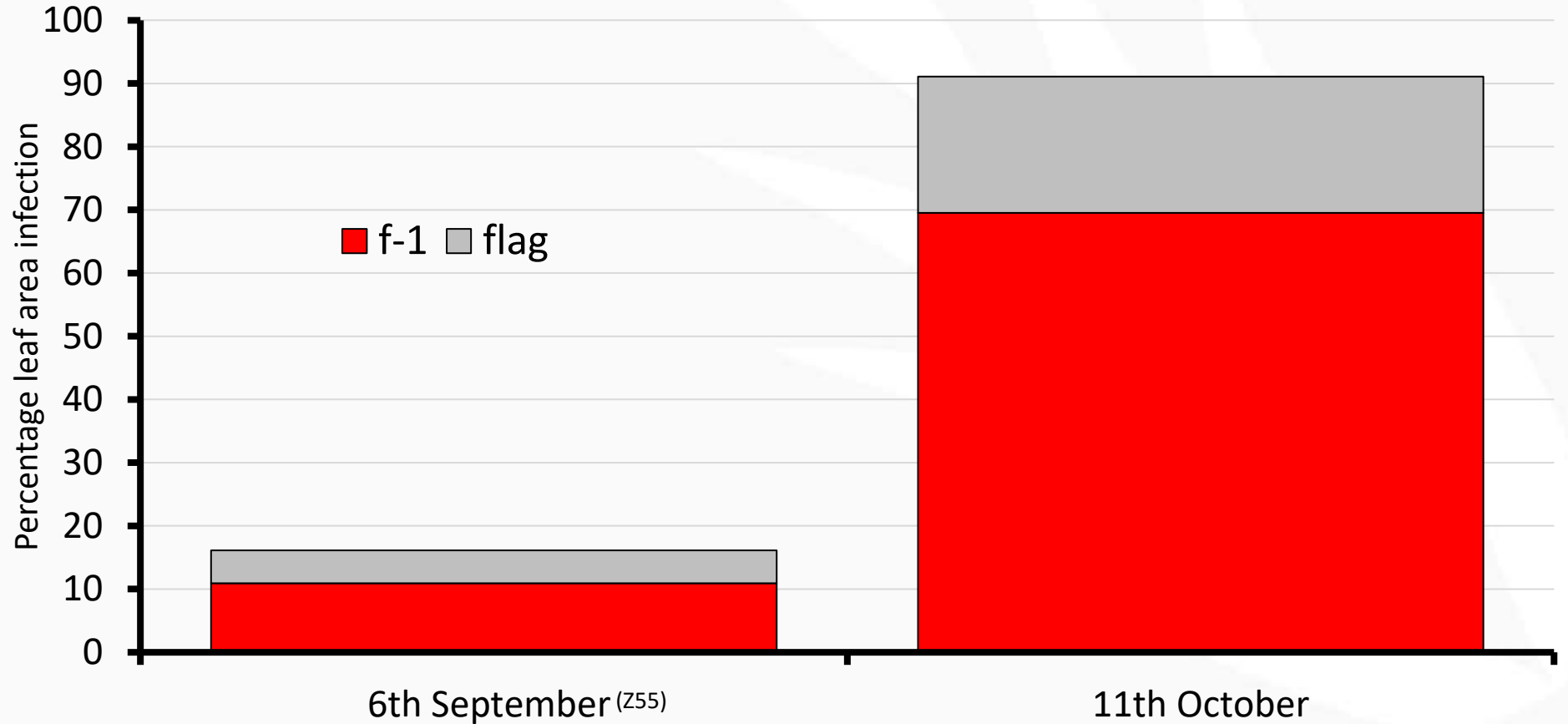
- Significant Reduction in leaf infection from fungicides
- Variable yield response (2017 response to a fungicide)
- Significant ROI in some circumstances

HIGH PRESSURE

- 2018



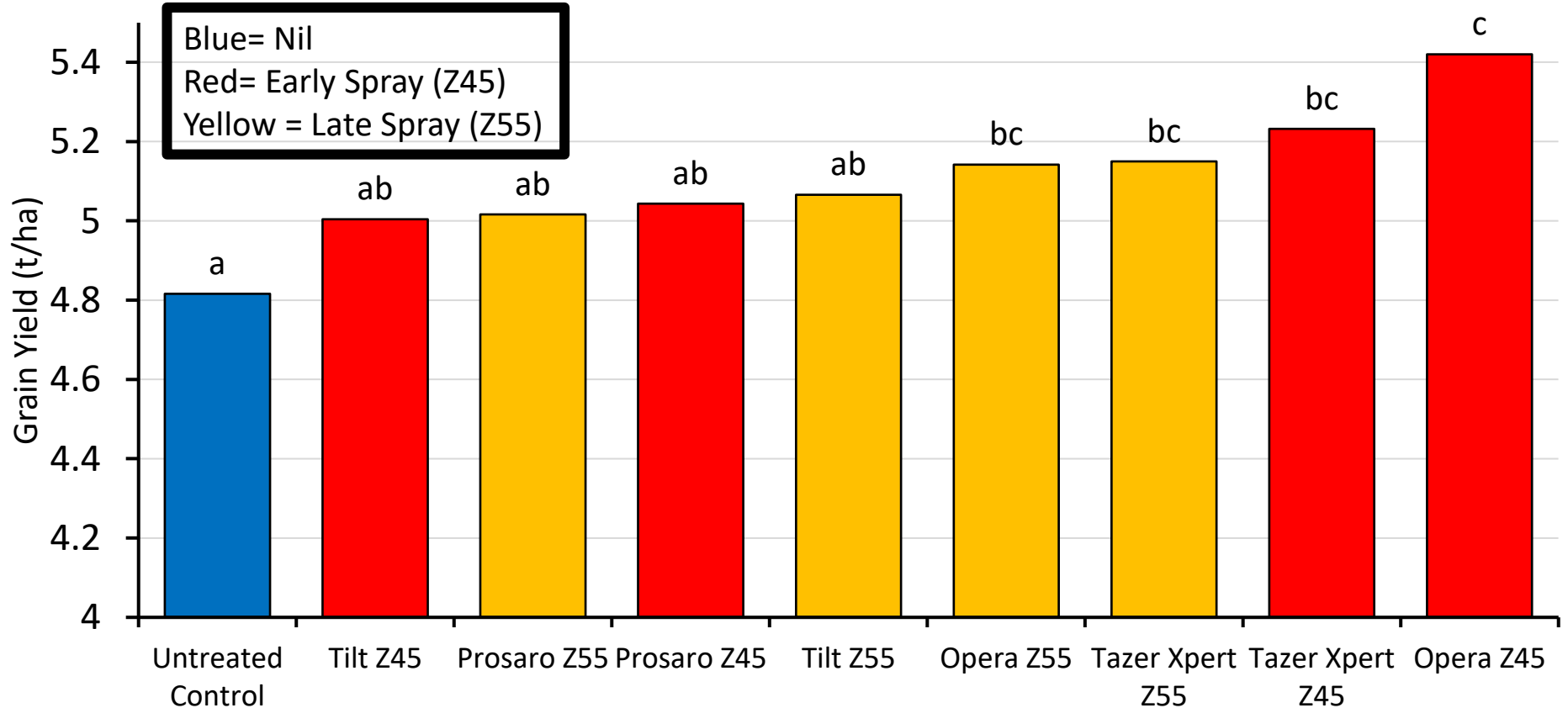
DISEASE MOVEMENT (HIGHBURY 2018)



DISEASE CONTROL 2018

Treatment	Flag Leaf (% Infection)	Flag-1 (% infection)
Opera Z45	2.2	9
Opera Z55	2	7.2
Tazer Xpert Z45	4	14
Tazer Xpert Z55	3	7
Tilt Z45	4	20
Tilt Z55	19	52
Prosaro Z45	5	19
Prosaro Z55	5	48
Untreated Control	21.6	69.5

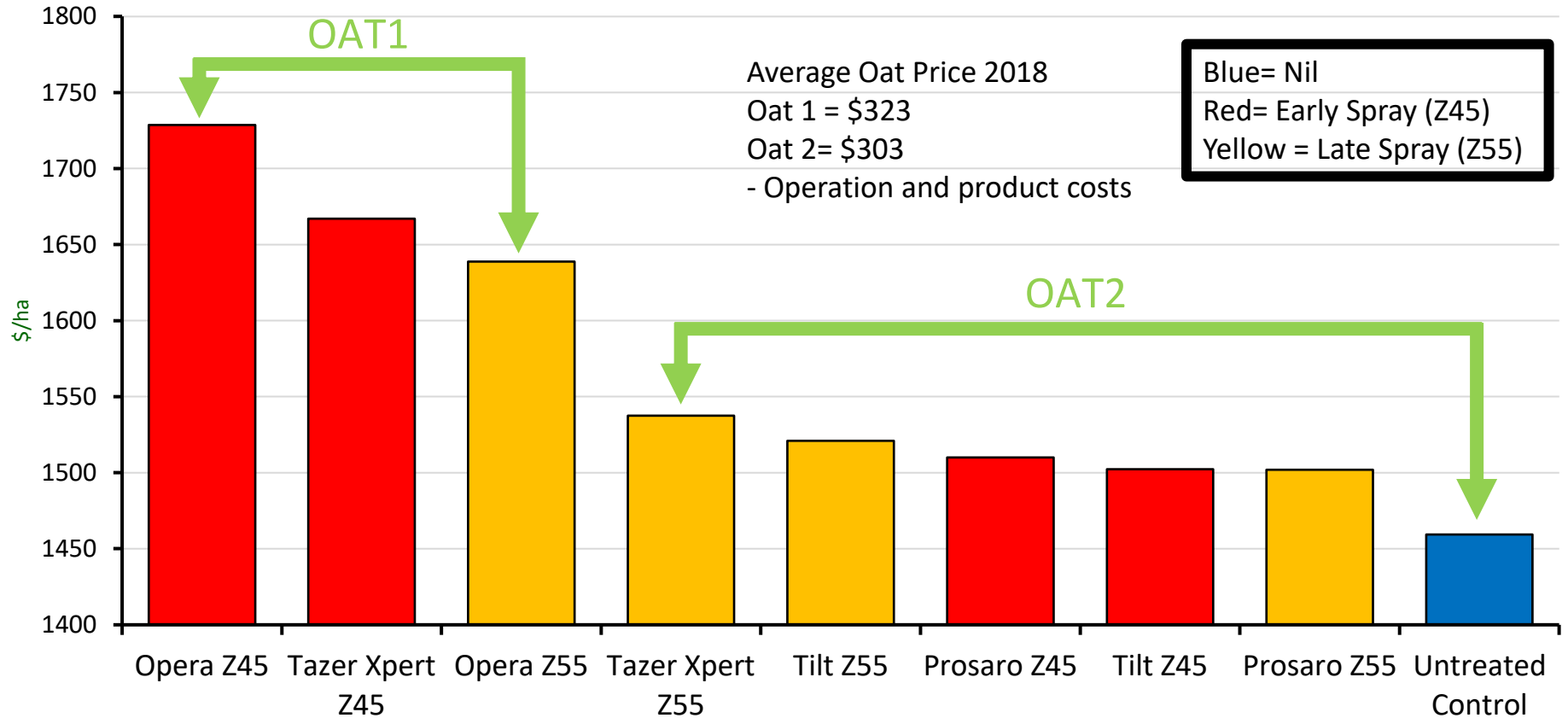
2018 GRAIN YIELD



GRAIN QUALITY 2018

Treatment	Screenings (%)	Hectolitre Weight (kg/hl)
Opera Z45	2.89 a	51.69 c
Opera Z55	3.29 a	50.93 bc
Tazer Xpert Z45	3.71 a	51.00 bc
Tilt Z45	3.88 ab	50.47 ab
Tilt Z55	4.13 ab	50.24 ab
Prosaro Z45	4.29 ab	50.40 ab
Prosaro Z55	4.64 ab	50.26 ab
Tazer Xpert Z55	4.77 ab	49.97 ab
Untreated Control	5.82 b	49.53 a

GROSS MARGINS 2018



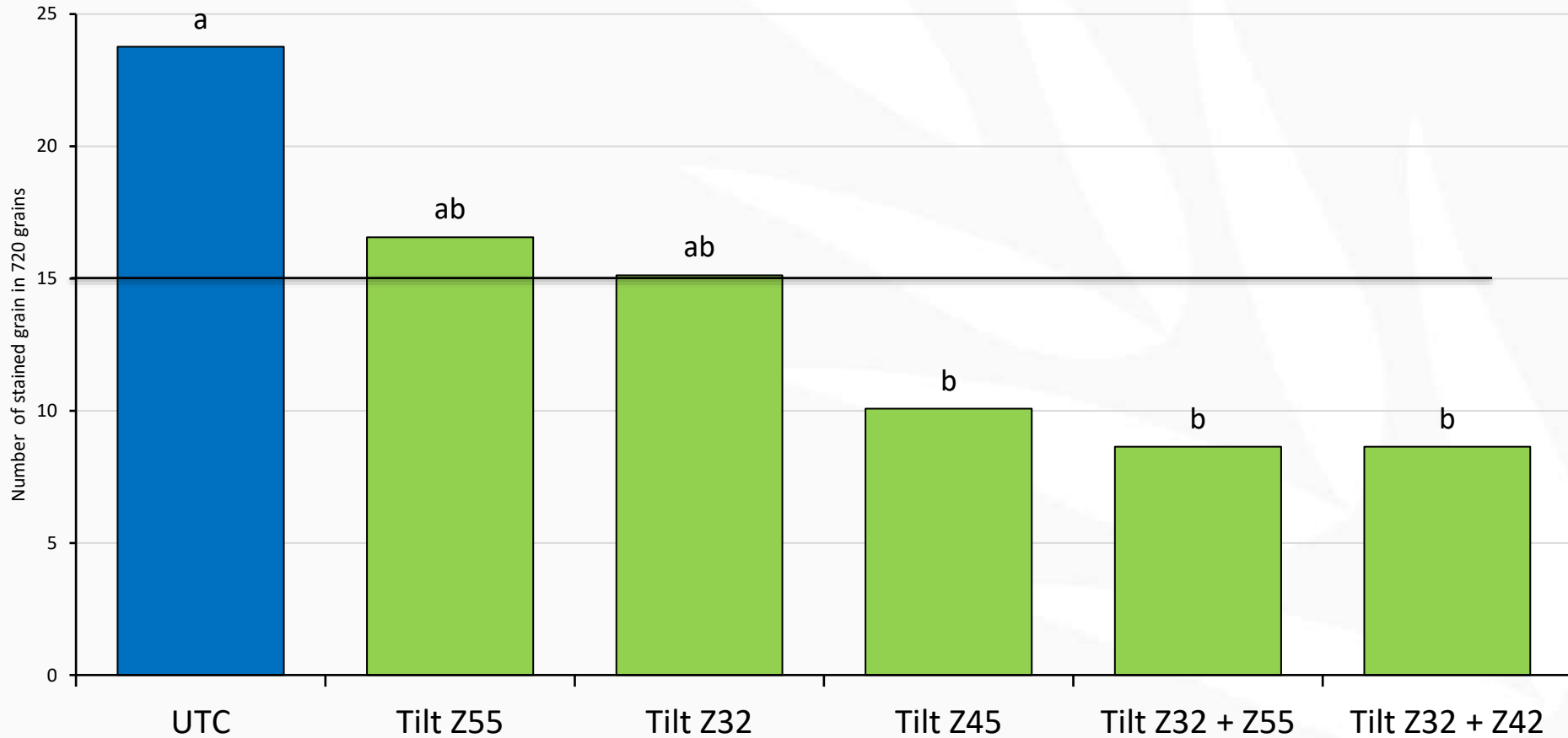
HIGH DISEASE PRESSURE

- Significant Reduction in leaf infection from fungicides
- Significant yield responses to strobilurins
- Grade shifting Grain quality improvements from strobilurins
- Significant ROI from strobilurins
- Dry September, Wet early October.
- Protected from an infection event?

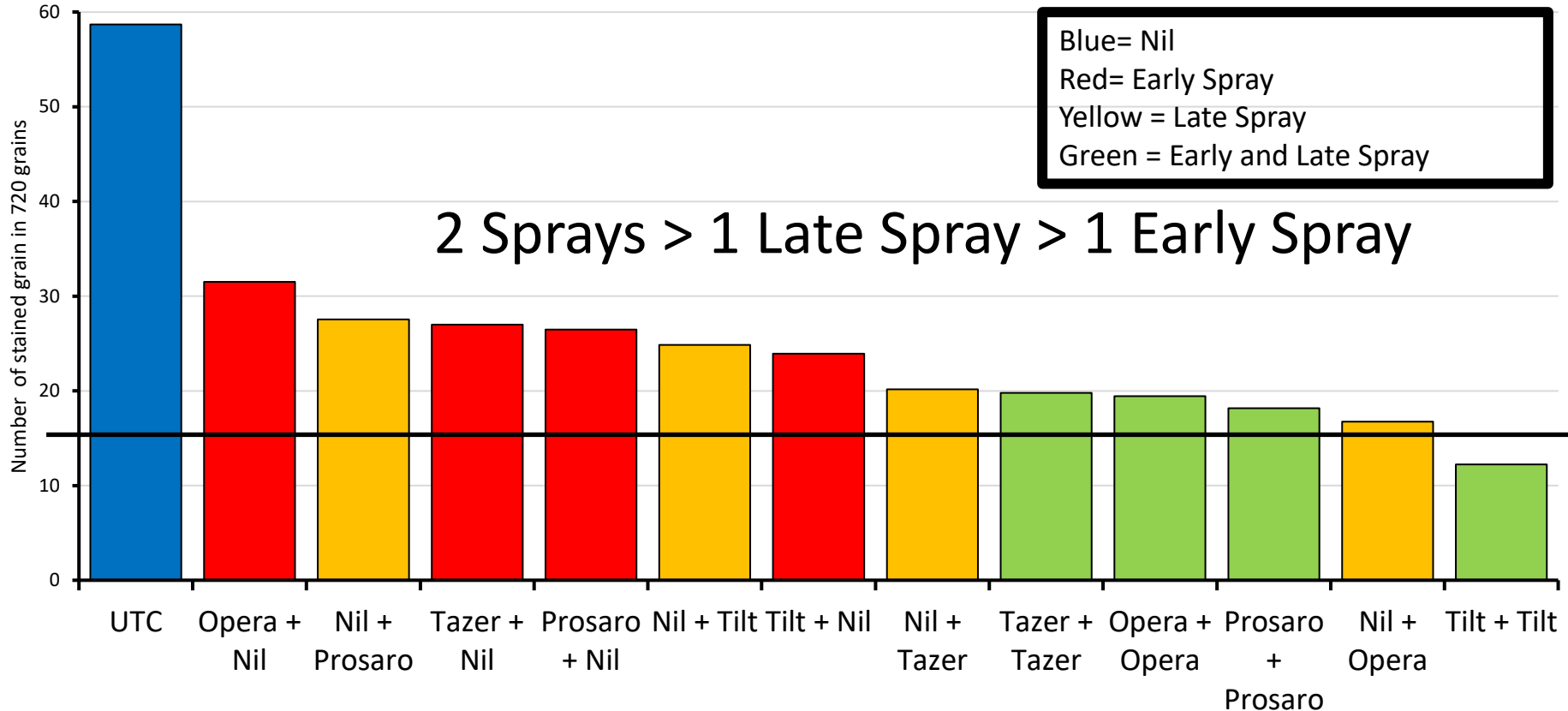
GRAIN STAINING



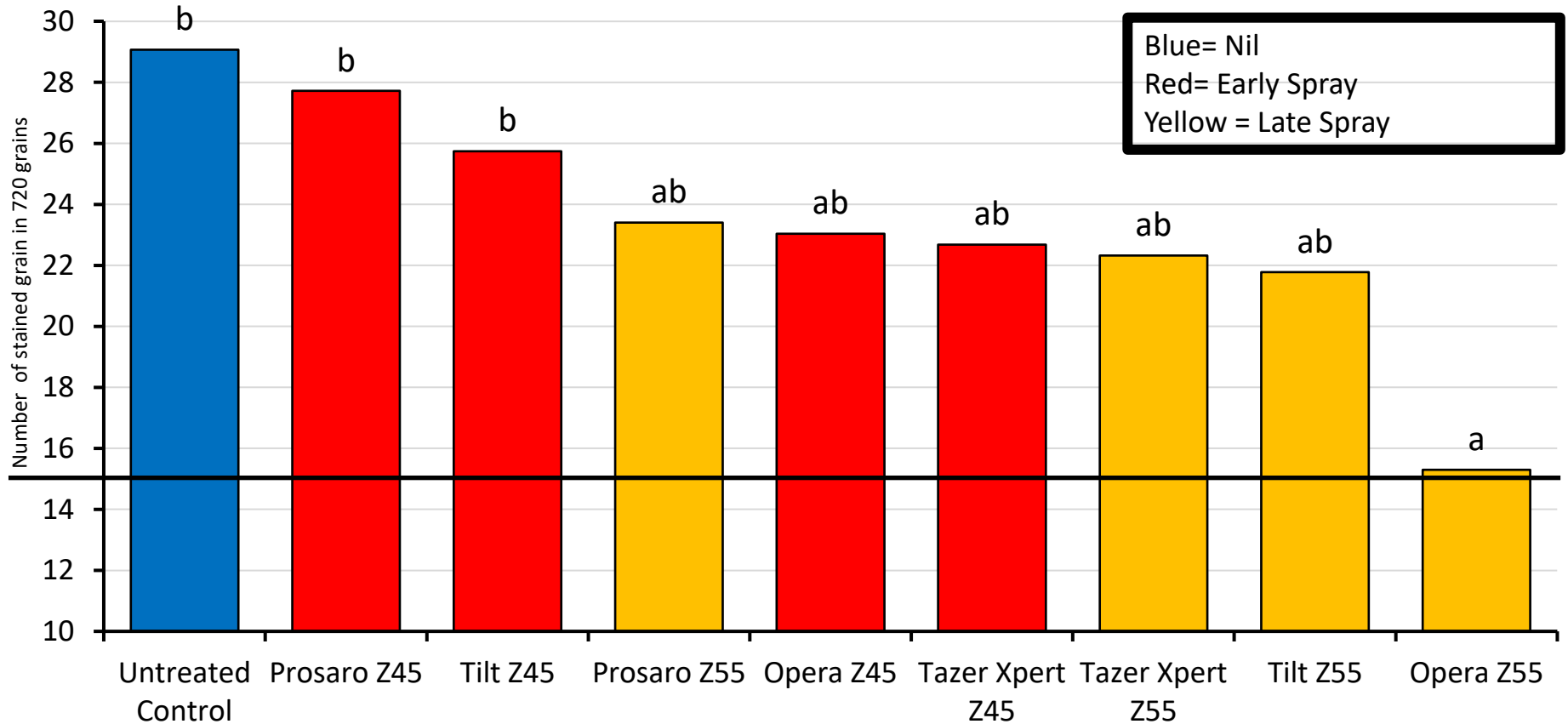
STAINING HIGHBURY 2014



STAINING HIGHBURY 2017



STAINING HIGHBURY 2018



OAT DISEASE THOUGHTS

- Strobi's give the edge in high yielding environments (yield and quality)
- Tilt still works well, Prosaro?? (\$\$\$ & tebuconazole)
- Grain staining is still a challenge in seasons of late season rainfall. Fungicide strategies can reduce but not eliminate risk.
- Vigilant Rust control (susceptible varieties)
- Value in rotation and stubble management

OAT DISEASE THOUGHTS

- Assess disease potential prior to application (look to the lower leaves)
- Late oat fungicide decisions often prophylactic
- There's value in residual (latent period)
- Septoria is a different beast, big upside in the right conditions if controlled
- **Spring Rainfall (favourable conditions)**

STRATEGY: LOW PRESSURE (YIELD)

- Spraying likely to be unnecessary
- In low yielding environments (sub 2.5t) risky (5-10%)
- If going to spray, then a Z42-45 application
 - Be wary of rust
- Anecdotal evidence still indicating quality responses
 - Needs more exploration

STRATEGY: MODERATE- HIGH PRESSURE

- If disease pressure is high early in the season a Z32 DMI spray will buy time
- Z42-45 Spray most important, Coverage on the flag leaf and sheath
- Z42-45 Spray high pressure or favorable disease development use a Strobi
- Z42-45 Spray moderate pressure a DMI will suffice
- Z42-45 spray compromise on staining control in Bannister,
 - Z55 sprays logistically challenging

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STROBILURIN FUNGICIDES PROTECT OATEN HAY FROM WEATHER DAMAGE? MYTH OR FACT?

Kylie Chambers, Geoff Thomas, Georgie Troup (DPIRD)



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Trials



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Treatments:

Prosaro (300mL/ha) = Prothioconazole and tebuconazole

Bumper 625 (200mL/ha) = Propiconazole

Tazer Xpert (1L/ha) = Epoxiconazole and azoxystrobin

Amistar Xtra (800mL/ha) = Azoxystrobin and cyproconazole

Opera (500mL/ha) = Pyraclostrobin and epoxiconazole

Nil x 2

Locations: Northam and Muresk

Weathering: 2 x 20mm rainfall events (irrigation)



Fungicides did not alter green leaf retention in hay



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Percentage of green leaf area on post-weathered samples

	Northam	Muresk
Nil	63	41
Prosaro	60	32
Bumper 643	53	36
Tazer Xpert	64	44
Amistar Xtra	69	33
Opera	64	41
Significance	n.s	n.s

n.s. = not significant

Fungicides reduced visual saprophytic colonization



Sprayed

Unsprayed



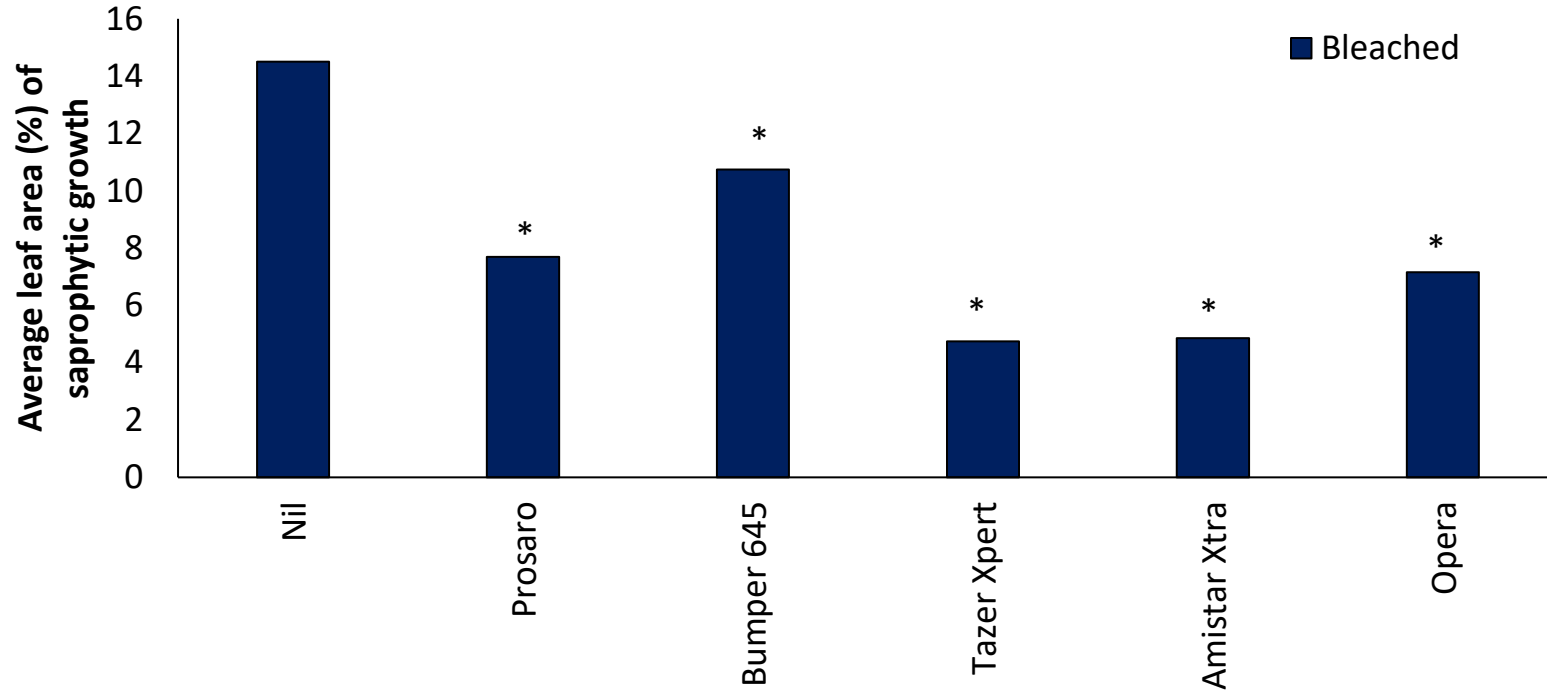
Bleached

Unbleached/ green

Fungicides reduced leaf area of saprophytic colonization at Northam

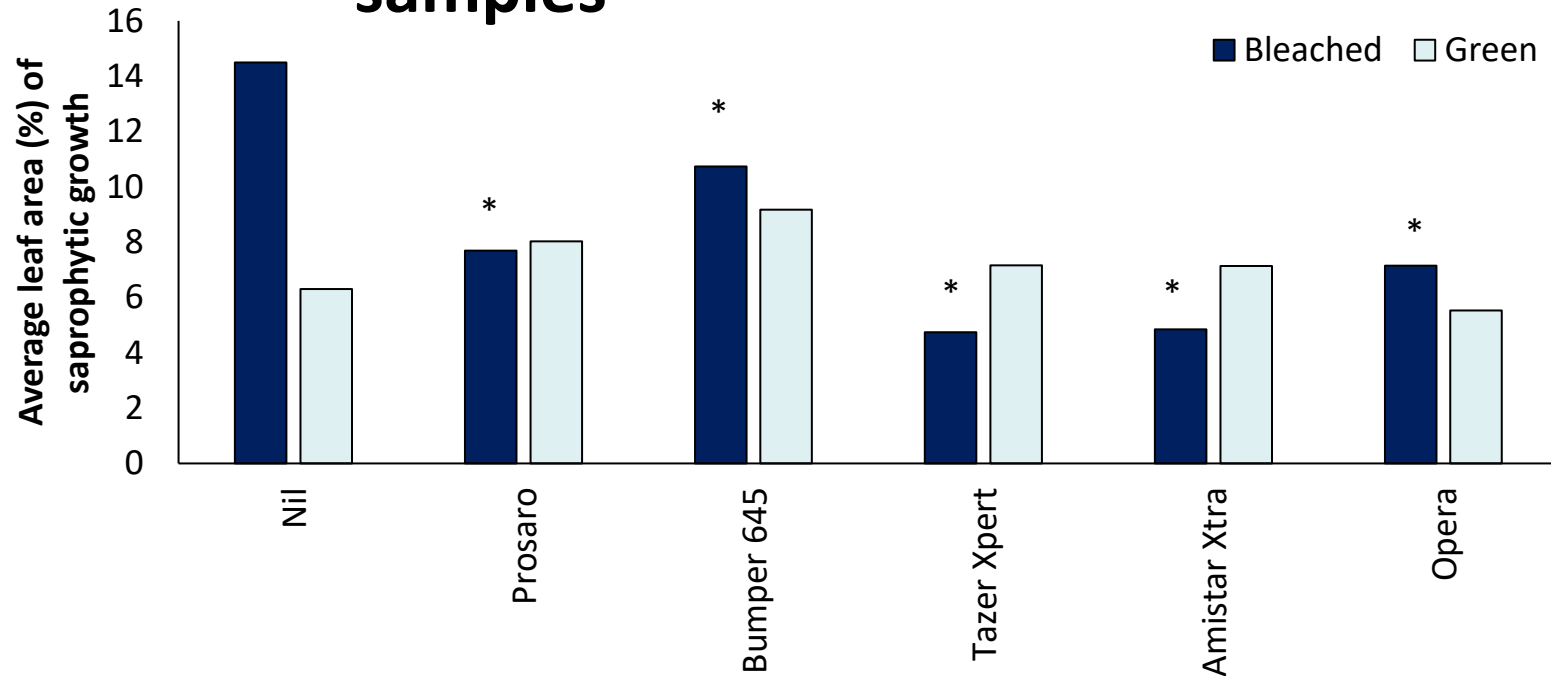


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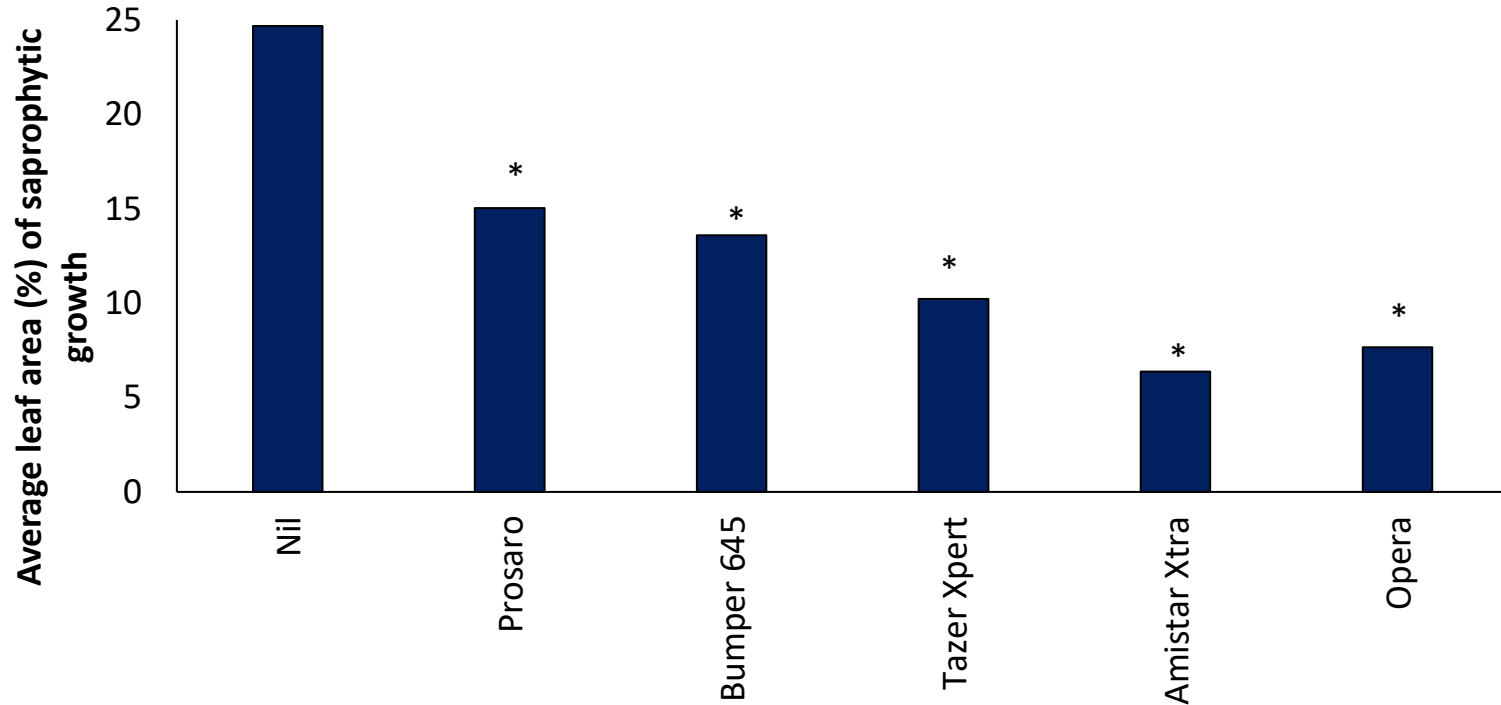




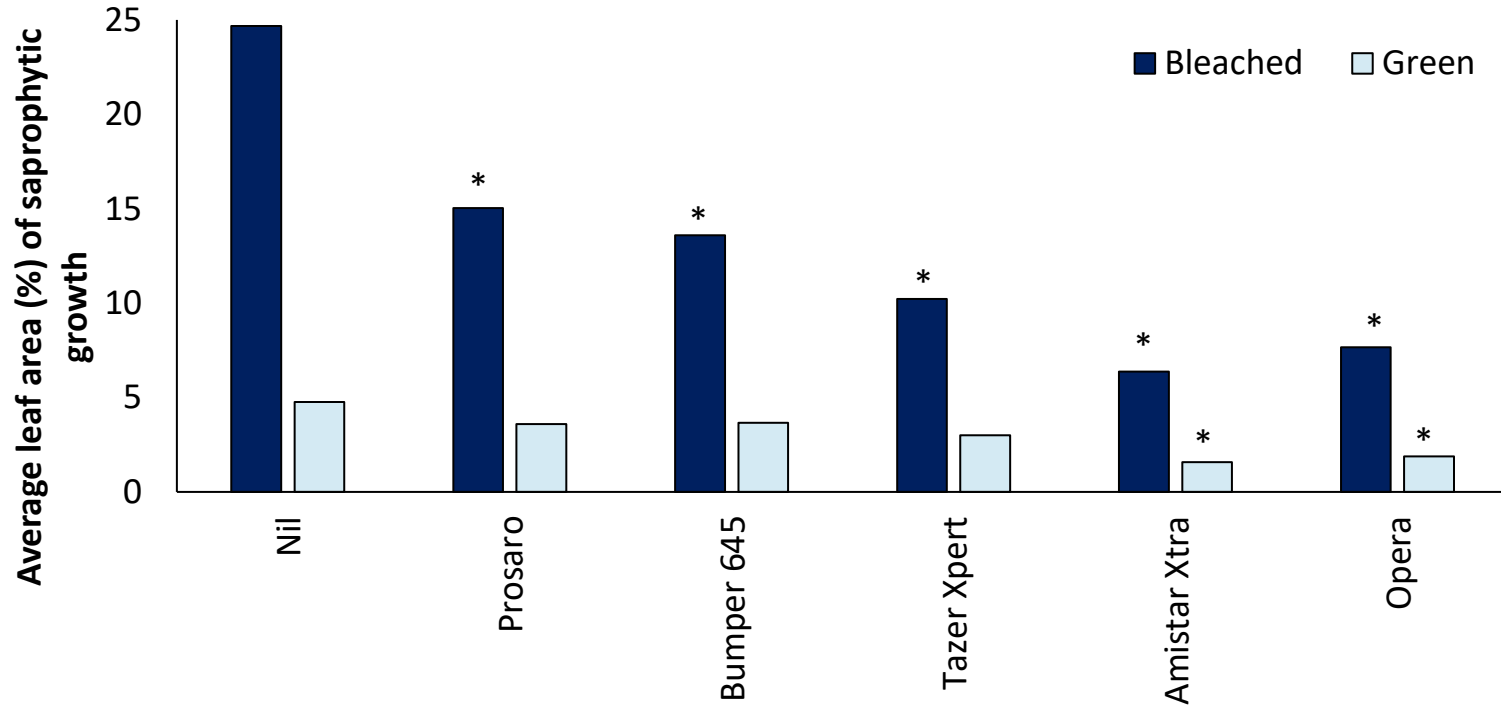
Fungicides reduced leaf area of saprophytic colonization in the bleached samples



Fungicides reduced leaf area of saprophytic colonization at Muresk



Fungicides reduced leaf area of saprophytic colonization at Muresk



Fungicides did not alter yeast and mould counts in post-weathered sample

Yeast and mould colony forming units on post-weathered samples

Product	Northam	Muresk
Nil	126	83
Prosaro	148	47
Bumper 643	153	97
Tazer Xpert	60	58
Amistar Xtra	98	95
Opera	150	27
Significance	n.s	n.s

n.s. = not significant

Hay nutritive quality parameters



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Neutral detergent fibre (NDF) cell wall contents of the plant material and is made up of cellulose, hemicellulose and lignin.

Acid detergent fibre (ADF) - indigestible fibre in the plant and is made up of cellulose and lignin. Fibre is essential for good rumen function and health.

Water soluble carbohydrate (WSC) is a measure of plant sugars and is used as a guide to palatability.

Dry matter digestibility (DMD) is the difference between the dry matter consumed and that excreted in faeces expressed as a percent of the dry matter consumed.

Quality standards to meet export hay requirements in WA.
Courtesy of the 2020 WA crop sowing guide.

Parameter	Grade 1	Grade 2	Grade 3	Grade 4
Crude protein (% CP)	>4	<4	<4	<4
Water soluble carbohydrates (% WSC)	>22	>18	>14	>14
Estimated metabolisable energy (est. ME MJ/kg DM)	>9.5	<9.5	<9.5	<9.5
Acid detergent fibre (% ADF)	<30-32	>32-35	>35-37	>37-40
Neutral detergent fibre (% NDF)	<55	<55-59	<64	>64
In vitro digestibility (% DMD)	>60	>58	>56	>53
Stem thickness (mm)	<6	<8	<9	>9-12

Hay quality was affected by post cutting rainfall but not by fungicide application at Northam

	CP (%)		WSC (%)		ADF (%)		NDF (%)		DMD (%)	
	pre	post*	pre	post*	pre	post*	pre	post*	pre	post*
Nil	7.44	5.54	15.51	11.55	28.92	34.79	54.14	59.20	59.59	54.97
Prosaro	8.30	6.75	14.59	11.99	28.41	33.87	53.24	57.49	60.26	56.67
Bumper 643	7.24	6.79	17.64	13.80	28.47	33.16	50.98	55.09	62.1	58.44
Tazer Xpert	7.00	5.87	14.3	12.59	28.6	34.57	54.88	59.70	59.37	54.90
Amistar Xtra	7.37	6.39	16.81	11.50	28.44	33.65	53.55	59.06	60.05	55.24
Opera	7.24	6.35	15.89	13.39	29.62	34.21	53.24	57.64	59.72	56.37
Significance	n.s	n.s	n.s	n.s	n.s	n.s	n.s	n.s	n.s	n.s

n.s. = not significant

* = $p < 0.05$

Hay quality was affected by post cutting rainfall at Muresk



	CP (%)		WSC (%)		ADF (%)		NDF (%)		DMD (%)	
	pre	post*	pre	post*	pre	post*	pre	post*	pre	post*
Nil	6.74	6.57	16.78	14.44	30.63	33.31	56.68	59.56	57.04	56.33
Prosaro	6.79	6.80	17.02	17.13	30.62	31.74	56.13	55.78	57.56	59.22
Bumper 643	7.08	6.47	17.02	14.70	29.72	34.68	56.63	58.31	57.35	56.21
Tazer Xpert	<u>7.58</u>	6.47	15.73	15.21	29.89	33.52	56.27	59.10	57.26	56.75
Amistar Xtra	7.40	6.22	<u>19.71</u>	14.90	<u>28.19</u>	34.30	<u>53.62</u>	58.61	<u>60.38</u>	56.59
Opera	<u>7.83</u>	6.58	16.85	14.03	<u>29.25</u>	32.70	<u>54.66</u>	58.34	58.62	55.46
L.S.D.	0.79	0.60	1.76	2.20	1.21	1.89	2.02	2.44	2.1	2.4
Significance	p=0.05	n.s	p<0.05	n.s	p<0.01	n.s	p<0.05	n.s	p<0.05	n.s

n.s. = not significant

* = p<0.05

Hay quality was affected by strobilurin fungicides at cutting but not post-weathering at Muresk

	CP (%)		WSC (%)		ADF (%)		NDF (%)		DMD (%)	
	pre	post*	pre	post*	pre	post*	pre	post*	pre	post*
Nil	6.74	6.57	16.78	14.44	30.63	33.31	56.68	59.56	57.04	56.33
Prosaro	6.79	6.80	17.02	17.13	30.62	31.74	56.13	55.78	57.56	59.22
Bumper 643	7.08	6.47	17.02	14.70	29.72	34.68	56.63	58.31	57.35	56.21
Tazer Xpert	<u>7.58</u>	6.47	15.73	15.21	29.89	33.52	56.27	59.10	57.26	56.75
Amistar Xtra	7.40	6.22	<u>19.71</u>	14.90	<u>28.19</u>	34.30	<u>53.62</u>	58.61	<u>60.38</u>	56.59
Opera	<u>7.83</u>	6.58	16.85	14.03	<u>29.25</u>	32.70	<u>54.66</u>	58.34	58.62	55.46
L.S.D.	0.785	0.595	1.758	2.195	1.205	1.893	2.018	2.438	2.1	2.393
Significance	p=0.05	n.s	p<0.05	n.s	p<0.01	n.s	p<0.05	n.s	p<0.05	n.s

n.s. = not significant

* = p<0.05

Hay quality was reduced by post cutting rainfall at both sites



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- All quality parameters were significantly reduced by weathering post cutting
- Any quality differences evident at cutting were absent at baling
- Fungicide had **no impact** on hay quality parameters at baling!



Conclusions

- Weathering significantly reduced hay quality parameters in all treatments
- Fungicide (strobilurin and DMI) did reduce saprophytic fungal colonisation of bleached (senescent) leaf material in windrow but not green leaf material.
- In absence of foliar disease, fungicides (strobilurin or DMI) did not increase green leaf retention in oaten hay
- Fungicide (strobilurin or DMI) had no impact on hay nutritive quality parameters post weathering
- Stobilurin fungicides had impact on hay nutritive quality parameters at one site but this did not persist till baling
- Further investigation of the effect of fungicides (strobilurin or DMI) is required

Recommendations

- Foliar fungicides should be applied **as needed** for in-crop disease control, effective disease control will influence hay quality through retained green leaf area
- Foliar fungicides application for in-crop disease control according to label recommendations may provide some off-target benefit in reduction of post cutting colonisation and staining by saprophytic fungi
- Avoiding un-necessary fungicide applications and following label recommendations for rates and withholding periods is vital to avoid chemical residue in hay which could jeopardise export hay markets

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