

NSW Department of Primary Industries

Epidemiology and Management of Sclerotinia stem rot

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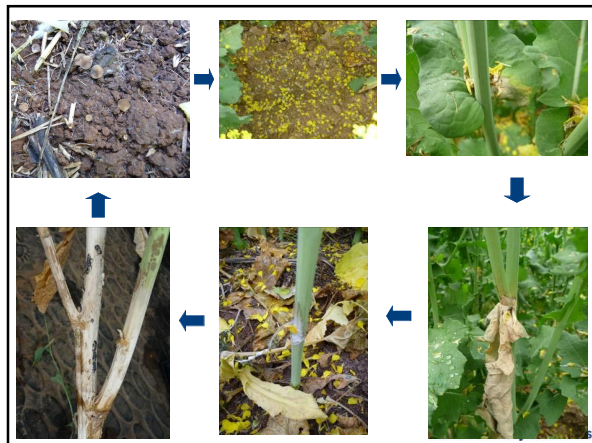
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GRDC

National Canola Pathology

- Increase understanding of the epidemiology of sclerotinia stem rot
- Identify regions of high risk
- Calculate yield loss
- Update management strategies for industry

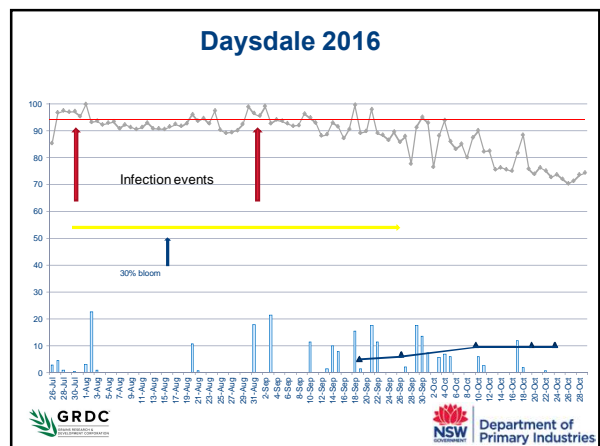
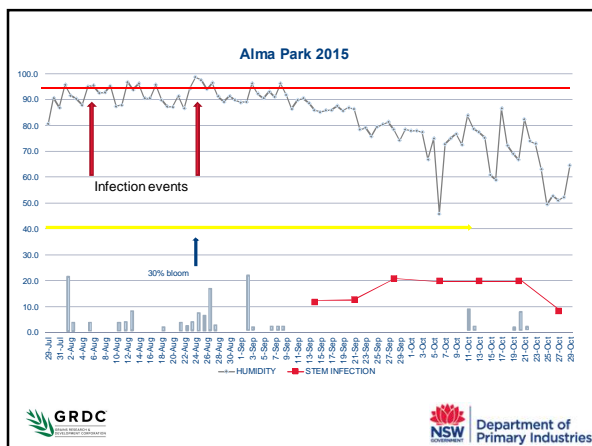
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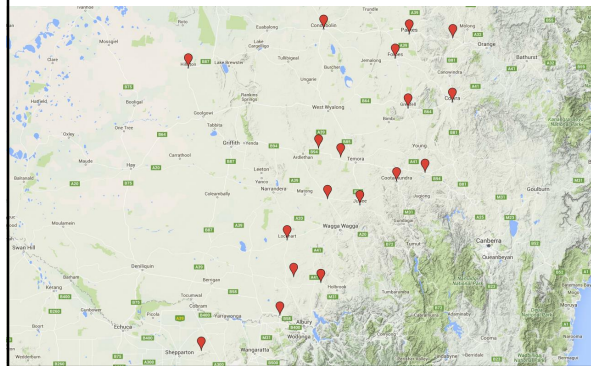
Crop monitoring

- Understand the relationships between humidity/temperature and stem rot development
- Commercial crops monitored in high disease risk districts (Howlong, Alma Park, Morven and Cootamundra)
- Data loggers used to measure humidity and temperature every 30 minutes (early July - end Oct)

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Petal testing sites



% Petal infestation - Riverina

Date	No. of week	Daysdale	Lockhart 1	Lockhart 2	Alma Park 1	Alma Park 2	Morven
3/7 - 10/7	1		100				
10/7 - 17/7	2					88	
17/7 - 24/7	3					90	
24/7 - 31/7	4	100	100	98	100	100	100
31/7 - 7/8	5	100	100	98	100	100	100
7/8 - 14/8	6	100	78	92	100	72	94
14/8 - 21/8	7	44	58	60	98	78	54
21/8 - 28/8	8	64	54	90	90	60	98
28/8 - 4/9	9	85	100	60	100	78	94
4/9 - 11/9	10	54	54	58	85	70	74
11/9 - 18/9	11	70	52	66	84	75	50
18/9 - 25/9	12	58	76	40	78	80	94
25/9 - 2/10	13	48	84	2	100	44	52
2/10 - 9/10	14		12		100	100	48
9/10 - 16/10	15						28
16/10 - 23/10	16						32
total rainfall during flowering		229.5	273.2	273.2	254.6	254.6	249.2
total annual rainfall		700	759.6	759.6	804.4	804.4	736.8



% Petal infestation – South West Slopes

Date	No. of week	Griffith	Mirrool	Coolamon	Temora	Junee	Cootamundra	Harden
3/7 - 10/7	1							
10/7 - 17/7	2							
17/7 - 24/7	3							
24/7 - 31/7	4	98						
31/7 - 7/8	5	70			100		100	
7/8 - 14/8	6	54			98			
14/8 - 21/8	7	24	86	44	92	96	95	
21/8 - 28/8	8				44	94	32	
28/8 - 4/9	9	36	74	68	86	62	30	22
4/9 - 11/9	10	16	34	36	42	80	96	12
11/9 - 18/9	11		40		100		56	58
18/9 - 25/9	12			36			92	84
25/9 - 2/10	13						96	60
2/10 - 9/10	14					62	70	44
9/10 - 16/10	15					100	36	26
16/10 - 23/10	16							
total rainfall during flowering		247	297.5	268.8	304.4	272	369.5	329.2
total annual rainfall		686.2	805.5	793.6	703.6	833.6	947.2	876



% Petal infestation – Central West Slopes & Plains

Date	No. of week	Condobolin	West Wyalong	Quandialla	Grenfell	Parkes	Cowra
3/7 - 10/7	1						
10/7 - 17/7	2	64					
17/7 - 24/7	3	74					
24/7 - 31/7	4	44					
31/7 - 7/8	5	58		100			
7/8 - 14/8	6	22					
14/8 - 21/8	7	22	46	48	56		
21/8 - 28/8	8	0	10	16	16		
28/8 - 4/9	9	8	69	34	16	36	98
4/9 - 11/9	10	4	24	6	22	20	92
11/9 - 18/9	11	4		4	14	48	6
18/9 - 25/9	12	4		6	36		98
25/9 - 2/10	13	6	4	8		10	2
2/10 - 9/10	14	6	0	0			0
9/10 - 16/10	15						0
16/10 - 23/10	16						
total rainfall during flowering		215.3	258.2	253.9	337.3	305.8	268.9
total annual rainfall		698.6	762.6	700.6	921.5	833.2	802.8



Spore Counts

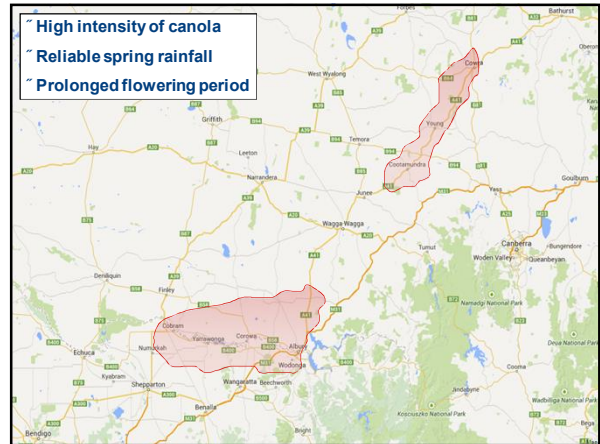
Date	Cootamundra 1			Petal test (%)	Junee			Petal test (%)
	Ungerminated	Germinated	% Germ		Ungerminated	Germinated	% Germ	
28/8 - 4/9	57	13	22.8	98				
4/9 - 11/9	82	0	0.0	94	54	1	1.9	80
11/9 - 18/9	98	4	4.1	86				
18/9 - 25/9	79	5	6.3	86				
25/9 - 2/10	52	11	21.2	96	56	1	1.8	100
2/10 - 9/10					58	0	0.0	62
9/10 - 16/10	87	18	20.7	60	56	0	0.0	100
16/10 - 23/10	116	4	3.4					
Average	82	8	9.8		56	1	1.8	
% Stem Rot			<1%				<1%	

Spore Counts

Date	Alma Park 1			Petal test (%)	Daysdale			Petal test (%)
	Ungerminated	Germinated	% Germ		Ungerminated	Germinated	% Germ	
28/8 - 4/9	122	76	62.3	100	106	9	8.5	86
4/9 - 11/9	57	12	21.1	86	50	9	18.0	54
11/9 - 18/9	67	4	6.0	84	123	7	5.7	70
18/9 - 25/9	136	3	2.2	78	107	39	36.4	58
25/9 - 2/10	139	77	55.4	100	109	46	42.2	48
2/10 - 9/10	102	45	44.1	100				
9/10 - 16/10								
16/10 - 23/10								
Average	104	36	34.6		99	22	22.2	
% Stem Rot			5%				10%	

Spore Counts

Date	Lockhart 1			
	Ungerminated	Germinated	% Germ	Petal test
28/8 - 4/9	81	15	18.5	60
4/9 - 11/9	56	22	39.3	58
11/9 - 18/9	88	1	1.1	66
18/9 - 25/9	92	0	0.0	40
25/9 - 2/10	81	3	3.7	2
2/10 - 9/10				
9/10 - 16/10				
16/10 - 23/10				
Average	80	8	10.0	
% Stem Rot			5%	

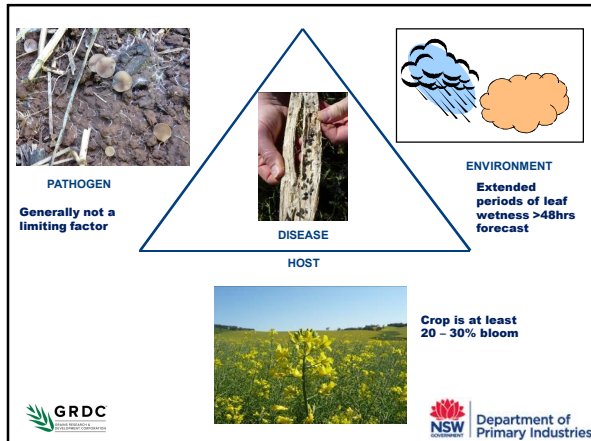


Predicting Yield Loss

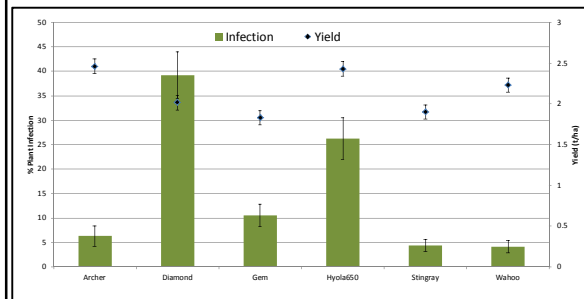
- Assessing level and type of infection in high disease risk districts
- Yield loss assessments (main stem vs. branch)
 - Currently use Canadian model
 - Yield loss = ½ % plants infected
 - (e.g. 5% yield loss = 10% plant infection)
 - Kirkegaard et al. southern NSW
 - 1: 1 ratio (yield loss : plant infection)



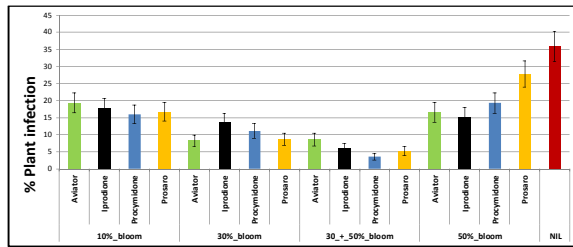
Site	Infection type	% Yield loss per plant		
		2014	2015	2016
Howlong	None	0	0	0
Howlong	Main stem	72	82	36
Howlong	Branch	19	20	6
Morven	None	0	0	0
Morven	Main stem	63	54	94
Morven	Branch	18	9	23



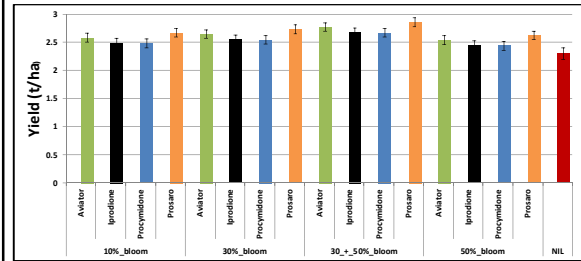
Variety comparison – Wagga Wagga



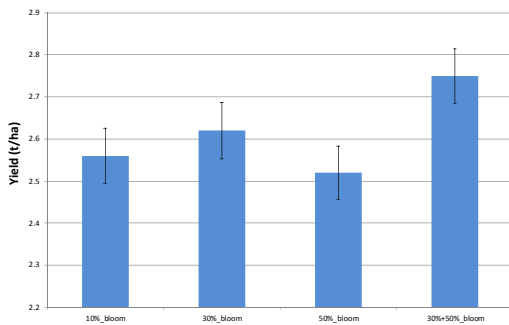
Fungicide Choice



Fungicide Choice



Fungicide Choice



Environmental factors driving disease development

- Rainfall in late June/July**
 - Saturate soil for apothecia development
- Rainfall/high humidity during flowering (>48hrs)**
 - Opportunities for infection to develop on lower stems and leaves

Management factors driving disease development

- Frequency of broadleaf crops in rotation (esp canola)**
 - Opportunities to maintain viable sclerotia in the soil. Wheat/canola rotations are ideal.
- Time of sowing and commencement of flowering**
 - Infection opportunities increase when conditions are wet
- Paddock location**
 - Separate this season's crop away from last year's canola paddock due to airborne spores

Warning signs for this season

- Spring Rainfall**
 - Study predictions for spring rainfall patterns during the flowering period
- Frequency of past sclerotinia outbreaks**
 - Past outbreaks are a good indicator if favourable conditions for the disease occur
- Frequency of canola**
 - Excellent host crop
- Timing of commencement of flowering**
 - Flowering when conditions are wet will increase opportunities for disease development

Acknowledgements

- ~ Funding providers (GRDC Projects : UM0051, DAN0177)
 - ~ GRDC
 - ~ NSW DPI
- ~ Technical Assistance . Gerard O'Connor
- ~ National Canola Pathology Group
 - ~ Marcroft Grains Pathology & University of Melbourne
 - ~ Bev Orchard . Statistical analysis

