Prospects for managing Sclerotinia head rot with fungicides

LESSONS FROM FIELD TRIALS CONDUCTED IN 2011



Photos: Leonard Besemann

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Research questions

FUNGICIDE EFFICACY FOR MANAGEMENT OF SCLEROTINIA HEAD ROT

(1) Fungicides that are effective against Sclerotinia on other crops

(2) Experimental fungicides that may be registered on sunflower

Carrington, ND *(M. Wunsch);* ***Langdon, ND*** *(S. Halley);* ***Scottsbluff, NE*** *(R. Harveson)*

All trials conducted under misting systems

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SUSCEPTIBILITY OF SUNFLOWERS TO SCLEROTINIA HEAD ROT AFTER FLOWERING

- Susceptibility after flowering has long been suspected
- Window of susceptibility will influence fungicide timing

Carrington, ND *(M. Wunsch);* ***Langdon, ND*** *(S. Halley);* ***Oakes, ND*** *(L. Besemann)*

All trials conducted under misting systems

Fungicide efficacy - Carrington

NO DIFFERENCES IN EFFICACY OBSERVED

Sclerotinia Head Rot - Sept. 19 (R8 growth stage)

	Sample Size	Incidence percent		Severity Index 0 to 5		Severity 0 to 5	
Non-treated check	79	67	a	1.9	a	2.8	a
Vertisan 1.67EC 30 fl oz/ac (A,B)	69	73	a	2.0	a	2.7	a
Aproach 2.08SC 12 fl oz/ac (A,B)	79	56	a	1.4	a	2.5	a
Q8X63 200SC 28.8 fl oz/ac (A,B)	81	80	a	2.4	a	3.0	a
Endura 70WG 9 oz/ac (A,B)	77	72	a	1.7	a	2.3	a
Merivon (BAS 703 01F) 6 fl oz/ac (A,B)	67	81	a	2.2	a	2.7	a
ProPulse 400SC 10.3 fl oz/ac (A,B)	59	68	a	1.9	a	2.7	a
Topsin 4.5FL 40 fl oz/ac (A,B)	81	74	a	2.4	a	3.1	a
Quash 50WG 4 oz/ac (A,B)	65	81	a	2.6	a	3.2	a
Omega 500F 1 pt/ac (A,B)	71	82	a	2.4	a	2.9	a
Domark 230ME 5 fl oz/ac (A,B)	71	75	a	2.0	a	2.7	a
Switch 62.5WG 14 oz/ac (A,B)	69	72	a	2.1	a	2.8	a
Rovral 4F 2 pt/ac (A,B)	64	75	a	2.0	a	2.7	a
Priaxor 500SC 6.0 fl oz/ac (A,B)	70	76	a	2.1	a	2.8	a
F:		0.93		1.20		1.29	
P > *F*:		0.5336		0.3316		0.2770	
CV:		**14.37**		**27.49**		**5.31**	

Sunflower hybrid = Jaguar (a confection type)

Fungicide application timing = (A) August 14, (B) August 24.

Fungicide efficacy - Carrington

NO DIFFERENCES IN EFFICACY OBSERVED

… but high disease pressure may have overwhelmed treatments

	Sclerotinia Head Rot - Sept. 19 (R8 growth stage)						Sclerotinia Head Rot - Sept. 30 (R9 growth stage)					
	Sample Size	Incidence percent		Severity Index 0 to 5		Severity 0 to 5	Sample Size	Incidence percent		Severity Index 0 to 5		Severity 0 to 5	
Non-treated check	79	67	a	1.9	a	2.8	a	79	98	a	3.2	a	3.2	a
Vertisan 1.67EC 30 fl oz/ac (A,B)	69	73	a	2.0	a	2.7	a	68	98	a	3.3	a	3.4	a
Aproach 2.08SC 12 fl oz/ac (A,B)	79	56	a	1.4	a	2.5	a	78	92	a	2.5	a	2.7	a
Q8X63 200SC 28.8 fl oz/ac (A,B)	81	80	a	2.4	a	3.0	a	80	98	a	3.4	a	3.5	a
Endura 70WG 9 oz/ac (A,B)	77	72	a	1.7	a	2.3	a	77	96	a	2.9	a	3.0	a
Merivon (BAS 703 01F) 6 fl oz/ac (A,B)	67	81	a	2.2	a	2.7	a	67	95	a	3.0	a	3.2	a
ProPulse 400SC 10.3 fl oz/ac (A,B)	59	68	a	1.9	a	2.7	a	58	95	a	2.9	a	3.0	a
Topsin 4.5FL 40 fl oz/ac (A,B)	81	74	a	2.4	a	3.1	a	78	95	a	3.3	a	3.5	a
Quash 50WG 4 oz/ac (A,B)	65	81	a	2.6	a	3.2	a	64	97	a	3.7	a	3.8	a
Omega 500F 1 pt/ac (A,B)	71	82	a	2.4	a	2.9	a	70	99	a	3.6	a	3.6	a
Domark 230ME 5 fl oz/ac (A,B)	71	75	a	2.0	a	2.7	a	70	97	a	3.3	a	3.4	a
Switch 62.5WG 14 oz/ac (A,B)	69	72	a	2.1	a	2.8	a	69	96	a	3.0	a	3.1	a
Rovral 4F 2 pt/ac (A,B)	64	75	a	2.0	a	2.7	a	61	98	a	3.3	a	3.4	a
Priaxor 500SC 6.0 fl oz/ac (A,B)	70	76	a	2.1	a	2.8	a	69	97	a	2.9	a	3.0	a
F:		0.93		1.20		1.29		0.55		1.29		1.32	
P > *F*:		0.5336		0.3316		0.2770		0.8699		0.2750		0.2587	
CV:		**14.37**		**27.49**		**5.31**		**4.99**		**17.76**		**5.40**	

Sunflower hybrid = Jaguar (a confection type)

Fungicide application timing = (A) August 14, (B) August 24.

Fungicide efficacy - Carrington

HAIL DAMAGE PRECLUDED YIELD ASSESSMENT

Fungicide efficacy - Langdon

	Sample size	Incidence (percent)		Severity Index (0 to 5)		Severity (1 to 5)	
Non-treated check	57	35	ab	0.9	ab	2.5	a
Vertisan 1.67EC 30 fl oz/ac (A,B)	49	35	ab	1.0	ab	3.0	a
Aproach 2.08SC 12 fl oz/ac (A,B)	49	50	ab	1.2	ab	2.4	a
Q8X63 200SC 28.8 fl oz/ac (A,B)	45	31	ab	0.7	ab	2.3	a
Endura 70WG 9 oz/ac (A,B)	44	11	a	0.1	a	1.2	a
Merivon (BAS 703 01F) 6 fl oz/ac (A,B)	44	17	ab	0.4	ab	1.8	a
ProPulse 400SC 10.3 fl oz/ac (A,B)	43	28	ab	0.5	ab	1.6	a
Topsin 4.5FL 40 fl oz/ac (A,B)	47	27	ab	0.6	ab	1.9	a
Quash 50WG 4 oz/ac (A,B)	45	22	ab	0.4	ab	1.8	a
Omega 500F 1 pt/ac (A,B)	43	42	ab	0.9	ab	2.2	a
Domark 230ME 5 fl oz/ac (A,B)	42	19	ab	0.4	ab	1.7	a
Switch 62.5WG 14 oz/ac (A,B)	51	51	ab	1.4	b	2.9	a
Rovral 4F 2 pt/ac (A,B)	61	43	ab	1.0	ab	2.3	a
Priaxor 500SC 6.0 fl oz/ac (A,B)	52	57	b	1.3	ab	2.2	a
F:		2.44		2.61		1.30	
P > *F*:		0.0259		0.0180		0.2891	
CV:		**52.7**		**64.5**		**38.1**	

SCLEROTINIA HEAD ROT

Sunflower hybrid = Jaguar (a confection type)

Fungicide application timing = (A) August 9, (B) August 14. **Disease assessment** = September 15

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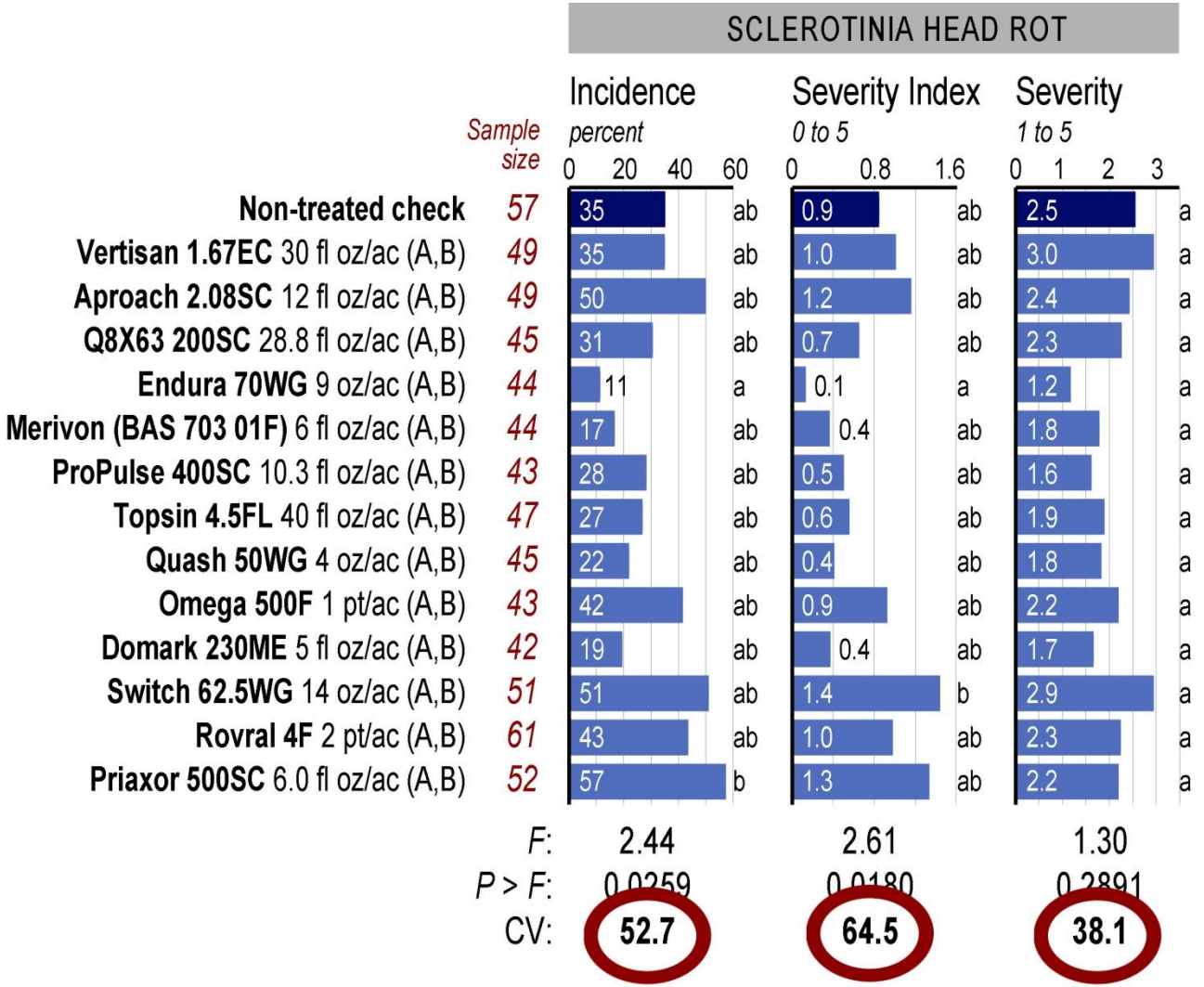
Fungicide efficacy - Langdon

BUT RESULTS HIGHLY VARIABLE – impaired ability to discern efficacy differences



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Fungicide efficacy - Langdon

DIFFERENCES IN YIELD AND QUALITY NOT DETECTED

SCLEROTINIA HEAD ROT

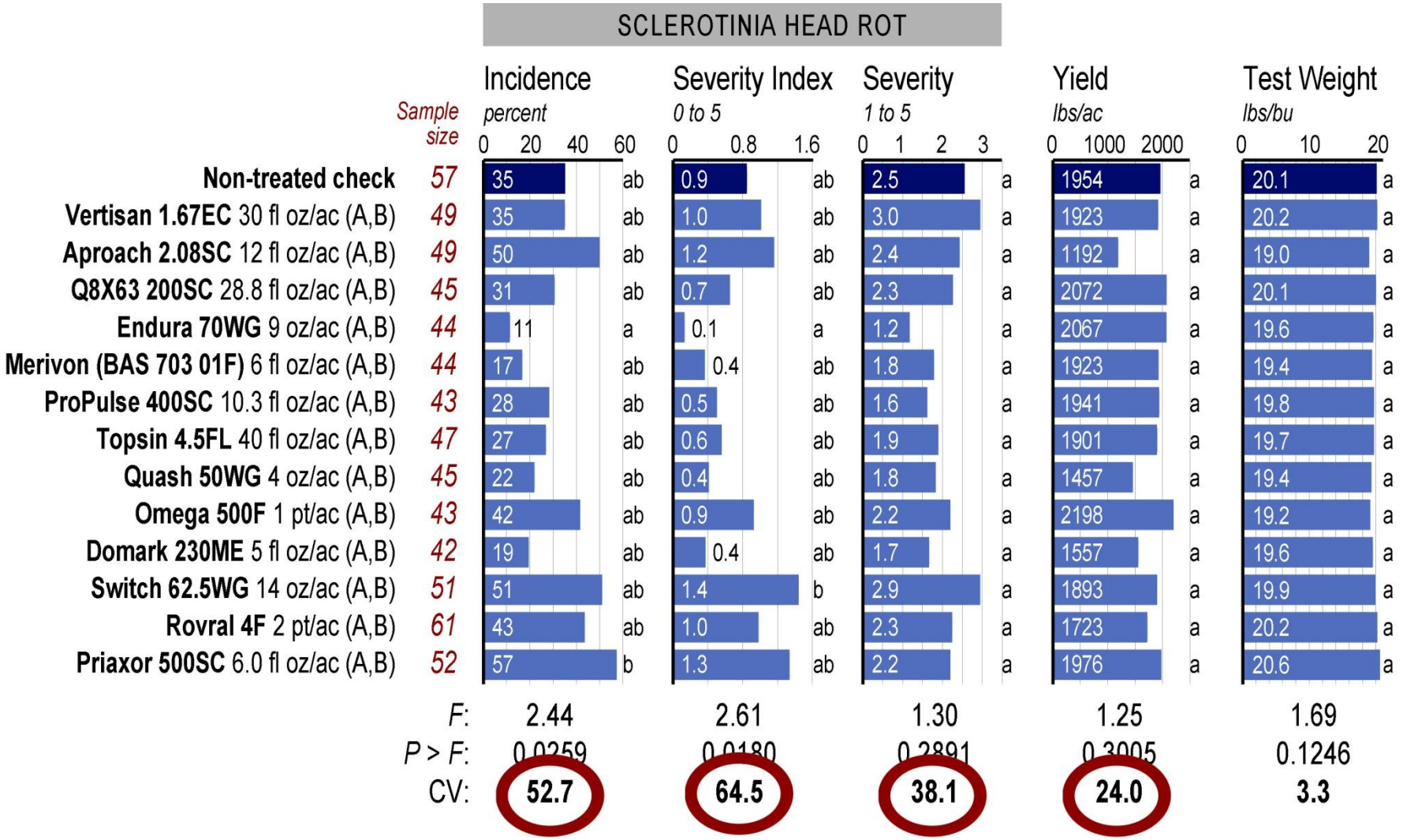
	Sample size	Incidence (percent)		Severity Index (0 to 5)		Severity (1 to 5)		Yield (lbs/ac)		Test Weight (lbs/bu)	
Non-treated check	57	35	ab	0.9	ab	2.5	a	1954	a	20.1	a
Vertisan 1.67EC 30 fl oz/ac (A,B)	49	35	ab	1.0	ab	3.0	a	1923	a	20.2	a
Aproach 2.08SC 12 fl oz/ac (A,B)	49	50	ab	1.2	ab	2.4	a	1192	a	19.0	a
Q8X63 200SC 28.8 fl oz/ac (A,B)	45	31	ab	0.7	ab	2.3	a	2072	a	20.1	a
Endura 70WG 9 oz/ac (A,B)	44	11	a	0.1	a	1.2	a	2067	a	19.6	a
Merivon (BAS 703 01F) 6 fl oz/ac (A,B)	44	17	ab	0.4	ab	1.8	a	1923	a	19.4	a
ProPulse 400SC 10.3 fl oz/ac (A,B)	43	28	ab	0.5	ab	1.6	a	1941	a	19.8	a
Topsin 4.5FL 40 fl oz/ac (A,B)	47	27	ab	0.6	ab	1.9	a	1901	a	19.7	a
Quash 50WG 4 oz/ac (A,B)	45	22	ab	0.4	ab	1.8	a	1457	a	19.4	a
Omega 500F 1 pt/ac (A,B)	43	42	ab	0.9	ab	2.2	a	2198	a	19.2	a
Domark 230ME 5 fl oz/ac (A,B)	42	19	ab	0.4	ab	1.7	a	1557	a	19.6	a
Switch 62.5WG 14 oz/ac (A,B)	51	51	ab	1.4	b	2.9	a	1893	a	19.9	a
Rovral 4F 2 pt/ac (A,B)	61	43	ab	1.0	ab	2.3	a	1723	a	20.2	a
Priaxor 500SC 6.0 fl oz/ac (A,B)	52	57	b	1.3	ab	2.2	a	1976	a	20.6	a
F:		2.44		2.61		1.30		1.25		1.69	
P > *F*:		0.0259		0.0180		0.2891		0.3005		0.1246	
CV:		**52.7**		**64.5**		**38.1**		**24.0**		**3.3**	

Sunflower hybrid = Jaguar (a confection type)

Fungicide application timing = (A) August 9, (B) August 14. **Disease assessment** = September 15

Fungicide efficacy - Langdon

… but data were highly variable, impairing ability to discern differences



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Fungicide application timing = (A) August 9, (B) August 14. **Disease assessment** = September 15

Fungicide efficacy - Scottsbluff

Disease establishment was unsuccessful

- very hot and windy in August 2011
- artificial establishment of Sclerotinia has been successful in other crops in previous years

Fungicide efficacy – FUTURE APPROACHES

All locations: **Larger plot sizes**

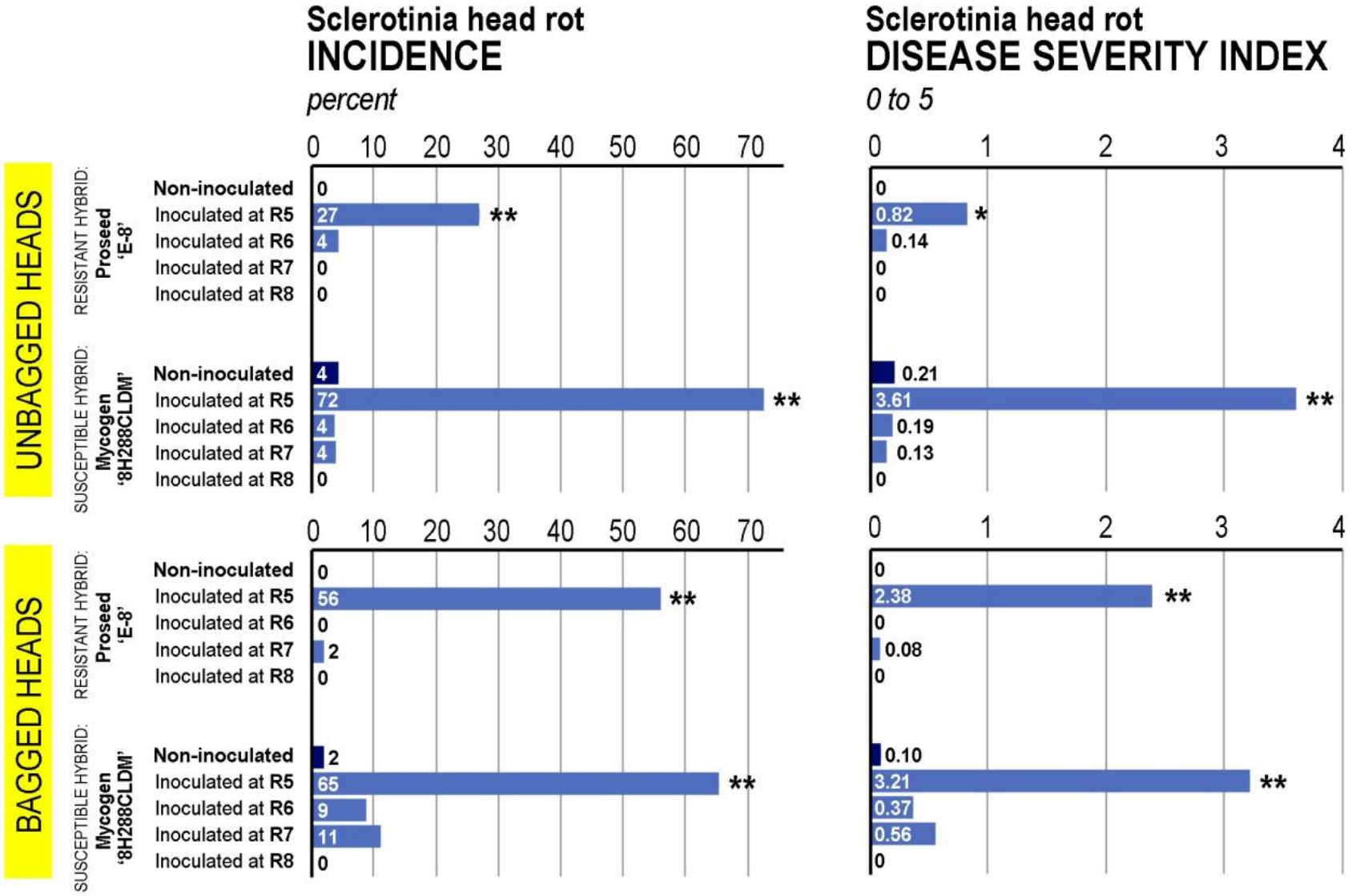
- Harvested plot size = 5 ft x 26 ft *or* 5 ft x 29 ft
- Number of plants per plot = 48 - 53 (*if* confection sunflowers; 16,000 plants/ac)
  = 65 - 73 (*if* oil sunflowers; 22,000 plants/ac)

Carrington: **less aggressive misting**

Scottsbluff:

Susceptibility to Sclerotinia head rot after flowering

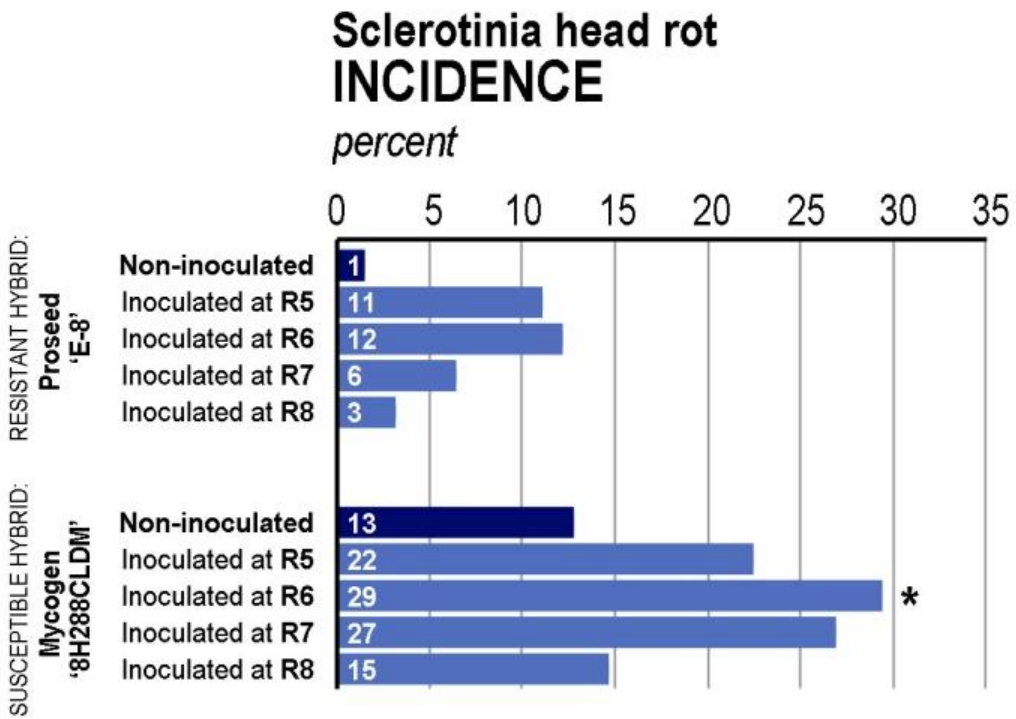
Carrington: Only susceptible at R5

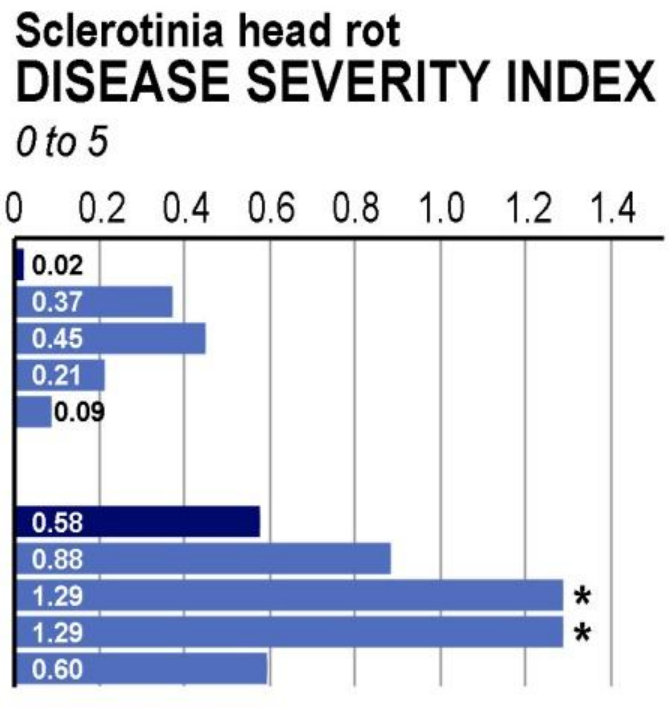


Susceptibility to Sclerotinia head rot after flowering

Langdon: Susceptible at R6 and R7

COMBINED DATA: bagged & unbagged heads





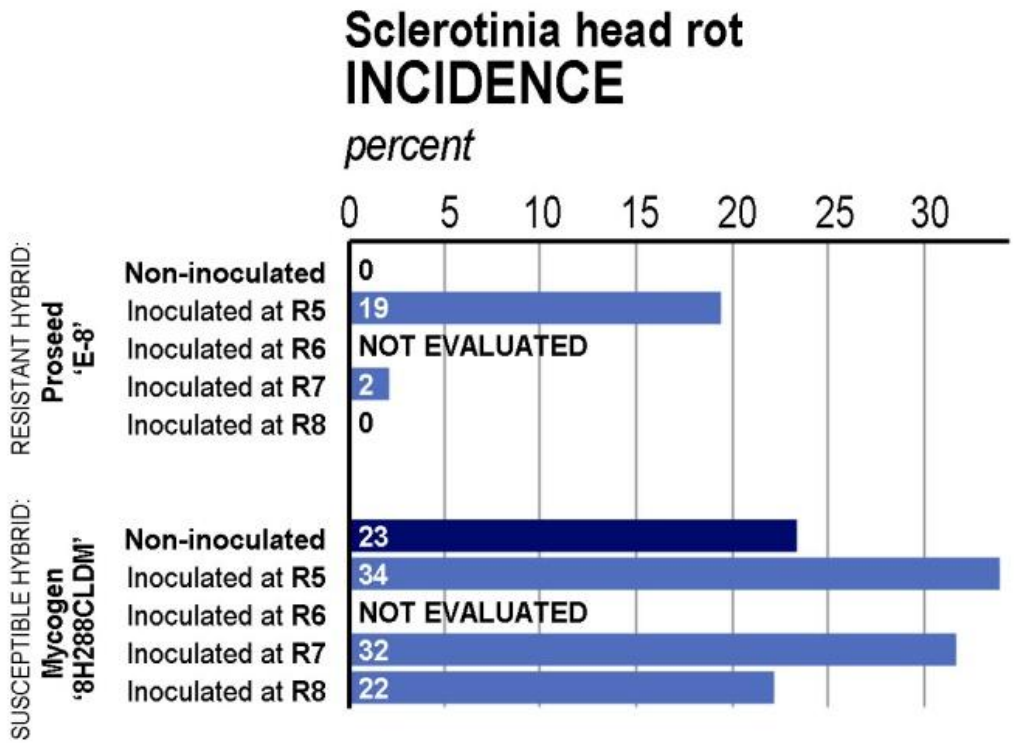
Data from bagged and unbagged heads were combined:

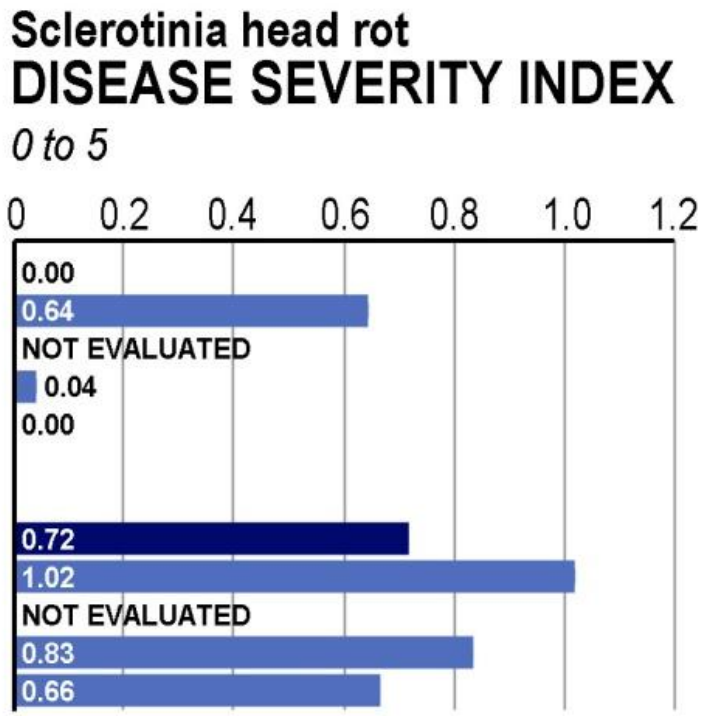
- *There was no difference in disease levels between bagged and unbagged heads (alpha = 0.05)*
- *Bagging heads had no significant interaction effects with hybrid or with inoculation timing*

Susceptibility to Sclerotinia head rot after flowering

Oakes: Data inconclusive

UNBAGGED HEADS





Prospects for managing Sclerotinia head rot with fungicides:
LESSONS FROM FIELD TRIALS CONDUCTED IN 2011

Fungicide efficacy:

- Larger plot sizes needed to discern differences
- Misting must be calibrated properly

Fungicide timing:

- Applications may be needed after flowering during periods of cool, wet weather

Thank you!



Photos: Leonard Besemann