Field evaluation of fungicide treated buffer strips for control of Ascochyta blight on lentils grown adjacent to a previous lentil crop

Valley County, MT (2012; on-farm trial)

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RATIONALE FOR STUDY:

When lentils are planted adjacent to a field where lentils were grown the previous year, a pronounced gradient of Ascochyta blight is often observed. Ascochyta blight is often at high levels immediately adjacent to the previous year's crop and decreases with distance from the previous year's crop.

OBJECTIVE OF STUDY:

The objective of this study was to **evaluate whether a 90-foot-wide or 270-foot-wide fungicide-treated strip immediately adjacent to last year's crop might be sufficient to eliminate gradients of Ascochyta blight in the new lentil crop and provide satisfactory disease control.**

MAJOR CONCLUSIONS:

Results are presented on this page and the next page. Methods are presented on the next page.

- **The use of a fungicide treated buffer strip did not provide satisfactory disease control.** Under the conditions tested in this experiment – [1] the previous lentil crop (in the adjacent field) had elevated levels of Ascochyta blight and [2] weather conditions during the critical bloom period were favorable for Ascochyta blight – fungicides needed to be applied to the entire field.
- Better results might be obtained from the use of a fungicide treated buffer strip under different environmental conditions. However, the results from this experiment suggest that **the use of a fungicide-treated buffer strip treated once with fungicides at bloom initiation may be a risky strategy that may not always provide satisfactory results.**
- **The use of a fungicide-treated buffer strip might be a useful as a second fungicide application.** In this experiment, very high levels of Ascochyta blight were observed in approx. the first 90 feet immediately adjacent to the previous year's lentil crop even when a fungicide (Headline at 6 fl oz/ac) was applied at bloom initiation. The results suggest that a second fungicide application 7 to 14 days after the first application may be necessary to achieve satisfactory disease control immediately adjacent to the previous lentil crop.

RESULTS: 90-FOOT-WIDE FUNGICIDE TREATED BUFFER

Within-column means followed by different letters are significantly different (*P* < 0.05; Tukey multiple comparison procedure).

Foliar fungicide treatment *Where used, the fungicide Headline was applied at bloom initiation on June 26*	Distance *from previous year's lentil crop*	Ascochyta Incidence *(percent of plants; July 18)*		Yield *(pounds per acre)*	
		0 50 100		0 2000	
Headline (6 fl oz/ac)	**20 feet**	80	a	2133	a
Headline (6 fl oz/ac)	**65 feet**	58	a	NO DATA	
Non-treated	**110 feet**	78	a	2067	a
Non-treated	**155 feet**	71	a	NO DATA	
Non-treated	**200 feet**	64	a	1820	a
Non-treated	**245 feet**	64	a	NO DATA	
Non-treated	**290 feet**	71	a	2019	a
Non-treated	**335 feet**	69	a	NO DATA	
Headline (6 fl oz/ac)	**425 feet**	29	a	NO DATA	
	F:	1.51		1.25	
	P > F:	0.2758		0.4034	
	CV	32.9		10.4	

RESULTS: 270-FOOT-WIDE FUNGICIDE TREATED BUFFER

Within-column means followed by different letters are significantly different (*P* < 0.05; Tukey multiple comparison procedure).

Foliar fungicide treatment *Where used, the fungicide Headline was applied at bloom initiation on June 26*	Distance *from previous year's lentil crop*	Ascochyta Incidence *(percent of plants; July 18)*		Yield *(pounds per acre)*	
		0 50 100		0 2000	
Headline (6 fl oz/ac)	**20 feet**	69	bc	1919	a
Headline (6 fl oz/ac)	**65 feet**	69	bc	NO DATA	
Headline (6 fl oz/ac)	**110 feet**	42	ab	1830	a
Headline (6 fl oz/ac)	**155 feet**	36	ab	NO DATA	
Headline (6 fl oz/ac)	**200 feet**	20	a	2005	a
Headline (6 fl oz/ac)	**245 feet**	31	ab	NO DATA	
Non-treated	**290 feet**	84	c	2263	a
Non-treated	**335 feet**	84	c	NO DATA	
Headline (6 fl oz/ac)	**425 feet**	24	a	NO DATA	
	F:	13.37		1.73	
	P > F:	0.0004		0.2984	
	CV	23.7		12.3	

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RESULTS:
NO FUNGICIDE TREATED BUFFER

Within-column means followed by different letters are significantly different
($P < 0.05$; Tukey multiple comparison procedure).

Foliar fungicide treatment *When used, the fungicide Headline was applied at bloom initiation on June 26*	Distance *from previous year's lentil crop*	Ascochyta Incidence *(percent of plants; July 18)*		Yield *(pounds per acre)*		Seed-borne Ascochyta *(percent of harvested seed)*	
		0 50 100		0 2000		0 5 10	
Non-treated	20 feet	98	c	1958	a	9	a
Non-treated	65 feet	87	bc	NO DATA		NO DATA	
Non-treated	110 feet	93	bc	2049	a	13	a
Non-treated	155 feet	82	bc	NO DATA		NO DATA	
Non-treated	200 feet	71	bc	1796	a	5	a
Non-treated	245 feet	76	bc	NO DATA		NO DATA	
Non-treated	290 feet	58	b	1850	a	3	a
Non-treated	335 feet	76	bc	NO DATA		NO DATA	
Headline (6 fl oz/ac)	425 feet	11	a	NO DATA		NO DATA	
	F:	15.6		1.22		0.98	
	P > *F*:	0.0002		0.4108		0.4845	
	CV	15.7		9.2		100.3	

METHODS

- Lentils ('CDC Richlea') were planted adjacent to a field where lentils were grown the previous year. Ascochyta blight was a problem in the lentil crop planted to the adjacent field in 2011. Cropping history in the field planted to lentils in 2012 was millet / buckwheat / cowpea (2011), yellow pea (2010), flax (2009), and lentils (2008).
- Headline (6 fl oz/ac) was applied on June 26 in 15 gal water/ac to buffer strips adjacent to the previous year's lentils. Strips were 0, 90, or 270 feet wide. Each treatment was replicated three times. Starting at a distance of 360 feet from last year's crop, Headline (6 fl oz/ac) was also applied to the remainder of the field.
- Wet weather occurred during the bloom period, and conditions were very favorable for Ascochyta blight development.
- Ascochyta blight incidence was assessed on July 18 (late bloom) as the percent of plants exhibiting one or more lesions characteristic of the disease. Disease incidence was assessed in the middle of each 290-foot long treatment plot, with assessments taken along transects perpendicular to the field boundary. In each treatment plot, disease assessments at points 20, 65, 110, 155, 200, 245, 290, 335, and 425 feet from the edge of the field; at each point, 15 plants were assessed.
- The lentils were desiccated with paraquat on Aug. 5, and yield was assessed by hand-harvesting 6-square-meter (64.6 square foot) subplots along the transects used for disease assessments. Subplots were harvested at distances 20, 110, 200, and 290 feet from the edge of the field where lentils were grown in 2011.
- To minimize seed quality losses associated with the high levels of Ascochyta blight observed in the non-treated lentils, a second fungicide application (Headline; 6 fl oz/ac) was made to the entire experiment on July 20 (two days after foliar disease was assessed).

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LAYOUT OF EXPERIMENT: