

# Field evaluation of fungicides for management of *Mycosphaerella* (Ascochyta) blight on field peas

Carrington, ND (2013)

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## KEY FINDINGS:

- The registered fungicides **Headline** (6 fl oz/ac), **Proline** (5.7 fl oz/ac), and **ProPulse** (8 fl oz/ac) provided excellent control of *Mycosphaerella* blight.
- The fungicide **Omega** (anticipated registration on peas in 2017) performed similarly when applied at 0.5, 0.675, and 0.85 pt/ac, suggesting that the low application rate of 0.5 pt/ac may be sufficient.
- Due to late disease onset (*Mycosphaerella* blight did not reach high levels until late pod-fill), disease control did not result in increased seed yield.

Active ingredients of products tested in this trial:

Omega: 500 grams fluazinam per liter

Inspire: 250 grams difenoconazole per liter

Headline: 250 grams pyraclostrobin per liter

Proline: 480 grams prothioconazole per liter

ProPulse: 200 grams prothioconazole + 200 grams fluopyram per liter

## SUMMARY OF KEY RESULTS:

Description (application timing) <sup>v</sup>	Canopy necrosis: <sup>y</sup>	Canopy necrosis: <sup>y</sup>	Diseased pods: <sup>x</sup>	Harvest ease: <sup>w</sup>	Yield: bu/ac	Test weight:	Seeds per pound:
	July 25 <sup>u</sup> percent	July 31 <sup>u</sup> percent	July 31 <sup>u</sup> percent	Aug. 9 <sup>u</sup> 1 to 9		13.5% moisture lbs/bu	seeds/lb
1 Non-treated check (water; A,B)	29 b*	66 b*	69 b*	3.3 a*	70 a*	67.2 a*	1843 a*
2 Omega 500F 0.5 pt/ac (A,B)	8 a	6 a	22 a	3.0 a	66 a	67.0 a	1800 a
3 Inspire 250EC 4 fl oz/ac (A,B)	11 a	10 a	26 a	2.7 a	69 a	66.7 a	1794 a
4 Omega 500F 0.5 pt/ac + Inspire 250EC 4 fl oz/ac (A,B)	4 a	6 a	13 a	1.5 a	67 a	66.5 a	1788 a
5 Omega 500F 0.675 pt/ac (A,B)	5 a	5 a	19 a	1.8 a	71 a	66.3 a	1780 a
6 Omega 500F 0.675 pt/ac + Inspire 250EC 4 fl oz/ac (A,B)	4 a	3 a	6 a	2.9 a	71 a	65.2 a	1785 a
7 Omega 500F 0.85 pt/ac (A,B)	6 a	5 a	15 a	1.7 a	68 a	67.3 a	1774 a
8 Headline 250SC 6 fl oz/ac (A,B)	5 a	5 a	7 a	2.4 a	69 a	66.5 a	1770 a
9 Proline 480SC 5 fl oz/ac + NIS 0.125% v/v (A,B)	6 a	6 a	18 a	2.7 a	68 a	66.9 a	1797 a
10 Confidential	8 a	8 a	18 a	2.9 a	65 a	66.7 a	1821 a
11 ProPulse 400SC 8 fl oz/ac + NIS 0.125% v/v (A,B)	7 a	9 a	3 a	1.9 a	67 a	66.8 a	1789 a
12 Confidential	10 a	10 a	8 a	2.8 a	65 a	66.5 a	1803 a
	F: 12.31	110.87	12.80	1.16	1.62	1.18	0.97
	F > P: < 0.0001	< 0.0001	< 0.0001	0.3639	0.1567	0.3480	0.4984
	CV: 45.3	28.0	52.3	44.1	1.8	1.5	5.9

<sup>y</sup> **Canopy necrosis:** Percent of the canopy exhibiting necrosis caused by foliar disease. *Mycosphaerella*/Ascochyta blight was the only foliar disease present above trace levels.

<sup>x</sup> **Diseased pods:** Percent of the pods with disease lesions exceeding approx. 1 mm diameter. *Mycosphaerella*/Ascochyta blight was the only pod disease present above trace levels.

<sup>w</sup> **Harvest ease:** A measure of lodging. At harvest, the peas were evaluated for ease of harvest; a 1 to 9 scale was used, where 1 = perfectly erect and 9 = completely flat.

<sup>v</sup> **Fungicide application timing:**

**Application A:** July 1 at 4:45 to 5:30 pm at early bloom (100% of plants with at least one open blossom), no *Mycosphaerella* blight present, air temperature = 82°F, relative humidity = 30%, wind speed = 3 to 5 mph.

**Application B:** July 14 at 6:45 to 7:45 pm; field peas at end of bloom, *Mycosphaerella* blight present at low levels (scattered lesions on the bottom 20% of canopy in non-treated control); wind = 3 to 4 mph out of the northeast, 72 to 74°F, 72% relative humidity.

<sup>u</sup> **On July 25**, the peas were at the late R4 growth stage (green seeds filled the pods at most nodes); **on July 31**, the peas were at the R5 growth stage (leaves started to turn yellow and lower pods yellow-brown); **on Aug. 9**, the peas were at the R7 growth stage (physiological maturity - pods yellow to brown).

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

**The fungicides INSPIRE and OMEGA are currently not registered for use on field peas and should not be used.**  
Future registration of Omega is anticipated, and results are provided for reference only.

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## METHODS:

- **Location of trial:** North Dakota State University Carrington Research Extension Center
- **GPS coordinates of research location:** 47.512, -99.129
- **Tillage:** Disked in October 2012. Cultivated twice (once deep, once shallow) on May 10.
- **Soil type:** Heimdal-Emrick loam
- **Rhizobium inoculant:** Cell-Tech granular nitrogen fixing inoculant for pea and lentil (*Rhizobium leguminosarum* biovar viceae, 100 million viable cells per gram; Novozymes BioAg, Saskatoon, SK Canada) was mixed with the seed and applied at a rate of 2 dry ounces per 1000 feet of row (56 grams per 300 meters of row).
- **Maintenance herbicide applications:** Sonalan HFP (ethalfuralin; Dow AgroSciences) was applied at 2 pts/ac in 11 gallons of water/ac at 8:45 am on May 10. It was manually incorporated twice on May 10, once with a deep cultivation and once with a shallow cultivation.
- **Variety:** Bridger
- **Seed treatment:** Stamina (0.4 fl oz/cwt; pyraclostrobin 1.67 lbs ai/gal) + Axxcess (1.6 fl oz/cwt; imidacloprid 5 lbs ai/gal)
- **Experimental design:** randomized complete block      **Replicates:** 4
- **Seeded plot size:** 5 ft (center-to-center) x 25 ft long      **Harvested plot size:** 5 ft (center-to-center) x approx. 19 ft long
- **Untreated buffer plots were established between treatment plots.**
- **Row spacing:** 7 inches      **Rows per plot:** 7
- **Planting date:** May 12, 2013      **Previous crop:** Spring wheat
- **Seeding rate:** 330,000 pure live seeds/ac. Seeds were planted 1.75 to 2.25 inches deep into moist soil.
- **Fungicide application A:** July 1 at 4:45 to 5:30 pm at early bloom (100% of plants with at least one open blossom), no *Mycosphaerella* blight present, air temperature = 82°F, relative humidity = 30%, wind speed = 3 to 5 mph.
- **Fungicide application B:** July 14 at 6:45 to 7:45 pm; field peas at end of bloom, *Mycosphaerella* blight present at low levels (scattered lesions on the bottom 20% of canopy in non-treated control); wind = 3 to 4 mph out of the northeast, 72 to 74°F, 72% relative humidity.
- **Fungicide application details:** Fungicides were applied with a 56-inch hand boom equipped with four equally spaced Spraying Systems TeeJet XR 8001VS flat-fan nozzles at a spray volume of 15 gal water/A operated at 35 psi.
- **Disease establishment:** Grain-based *Ascochyta* inoculum was generated by soaking wheat, autoclaving the soaked wheat, and inoculating the autoclaved wheat with a spore solution harvested from 4-week-old cultures of *Ascochyta pisi* and *A. pinodes* (*Mycosphaerella pinodes*) isolated from diseased field peas. The autoclaved grain was inoculated on June 4. Grain-based *Ascochyta* inoculum was applied to the buffer and guard plots at an application rate of 2.65 ml per square foot at 9:00 to 9:30 am on July 2, 2013 and at an application rate of 5 ml per square foot at 9:00 to 9:45 pm on July 13, 2013. On July 2, overhead irrigation commenced 30 minutes later; 1 inch of water was applied. On July 13, overhead irrigation commenced approximately 6 hours later; 0.5 inch of water was applied.
- **Disease assessment:** Disease severity was evaluated as the percent of the canopy exhibiting necrosis caused by foliar disease and the percent of the pods with disease lesions exceeding approx. 1 mm diameter. *Mycosphaerella*/*Ascochyta* blight was the only disease present above trace levels.
- **Harvest ease:** A measure of lodging. At harvest, the peas were evaluated immediately before harvest on August 9 for lodging; a 1 to 9 scale was used, where 1 = perfectly erect and 9 = completely flat.
- **Harvest date:** August 9, 2013
- **Statistical analysis:** Data were evaluated with analysis of variance. The assumption of constant variance was assessed by plotting residuals against predicted values, and the assumption of normality was assessed with a normal probability plot. All data met model assumptions. Single-degree-of-freedom contrasts were performed for all pairwise comparisons of isolates; to control the Type I error rate at the level of the experiment, the Tukey multiple comparison procedure was employed. Analyses were conducted with replicate and treatment as main factor effects, and they were implemented in PROC GLM of SAS (version 9.2; SAS Institute, Cary, NC).

## FUNDING:

This project was funded by **ISK BioSciences** and **Bayer Crop Science**. **BASF** donated the seed treatment products used in this trial.

## IMPORTANT NOTICE:

- Fungicide performance can differ in response to which diseases are present, levels of disease when products are applied, environmental conditions, plant architecture and the susceptibility to disease of the variety planted, crop growth stage at the time of fungicide application, and other factors.
- This report summarizes fungicide performance as tested at the NDSU Carrington Research Extension Center under the conditions partially summarized in the methods section (above).
- Fungicide efficacy may differ under other conditions; when choosing fungicides, always evaluate results from multiple trials.
- This report is shared for educational purposes and is not an endorsement of any specific products.