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Field evaluation of the fungicides Vertisan, Aproach, and Proline for management of Ascochyta blight of chickpeas

Carrington and Williston, ND (2011)

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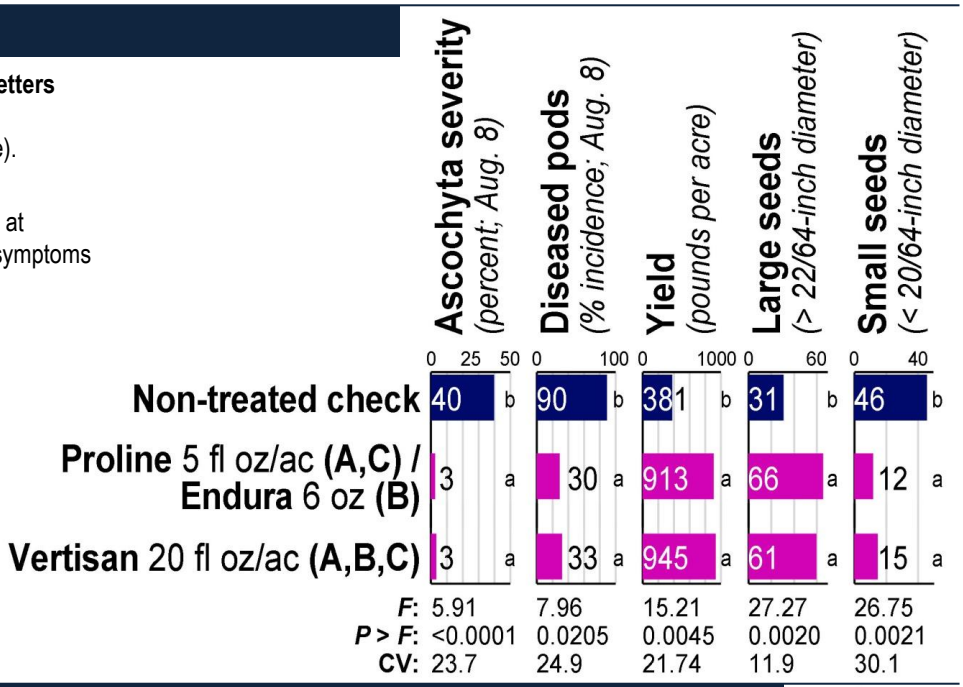
KEY FINDINGS:

- **Vertisan** (20 fl oz/ac) **performed equivalently to a rotational strategy with Proline** (5 fl oz/ac) **and Endura** (6 oz/ac).
- **Vertisan** (20 fl oz/ac) **performed equivalently to Proline** (5 fl oz/ac), but this treatment could not be rigorously assessed due to problems with flooding at the Carrington location where it was tested.
- **Vertisan appeared to exhibit a rate response, with increased disease control as the application rate increased from 14 to 20 fl oz/ac,** but this response could not be rigorously assessed due to problems with flooding at the Carrington site where both rates were tested.

WILLISTON, ND:

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

Fungicide application timing:
A = June 28; prior to bloom (7 to 8 nodes) and at the first appearance of disease symptoms
B = July 7; early bloom
C = July 21; full bloom

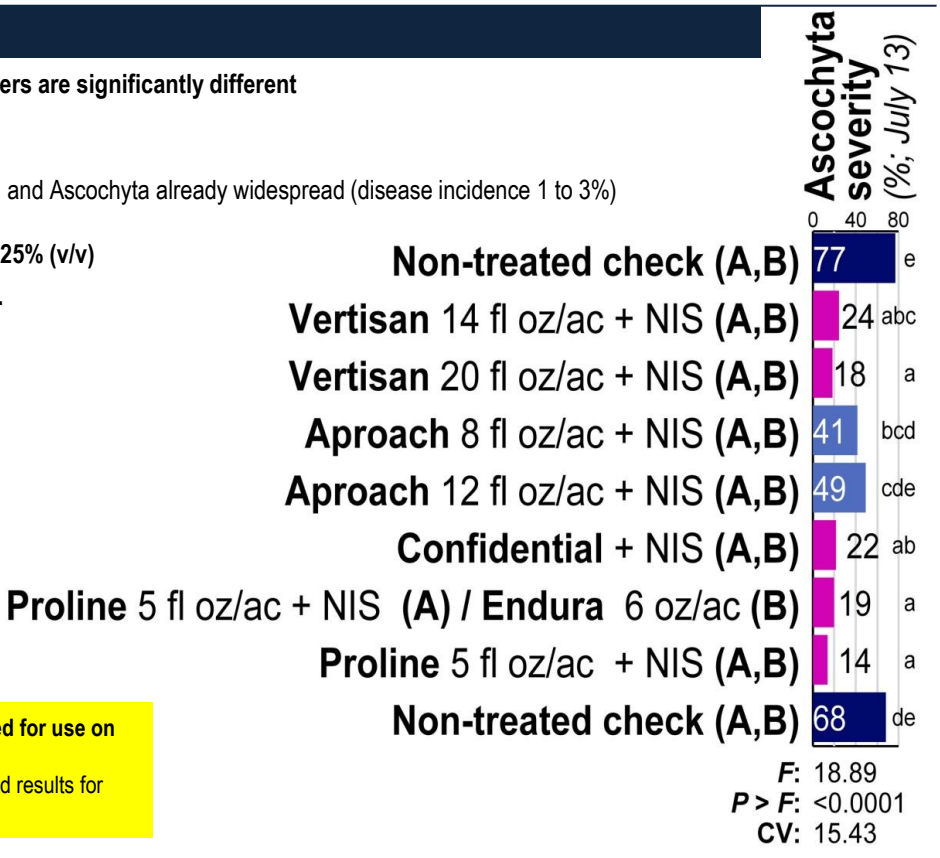


CARRINGTON, ND:

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

Fungicide application timing:
A = June 23; prior to bloom (chickpeas 5-6 in. tall) and Ascochyta already widespread (disease incidence 1 to 3%)
B = July 6
'NIS' denotes non-ionic surfactant applied at 0.25% (v/v)

YIELDS WERE NOT ASSESSED IN THIS TRIAL.
Due to recurrent, torrential rains, this trial flooded in late July.



The fungicide APROACH is currently not registered for use on chickpeas and should not be used.
Future registration of this fungicide is anticipated, and results for Aproach are provided for reference only.

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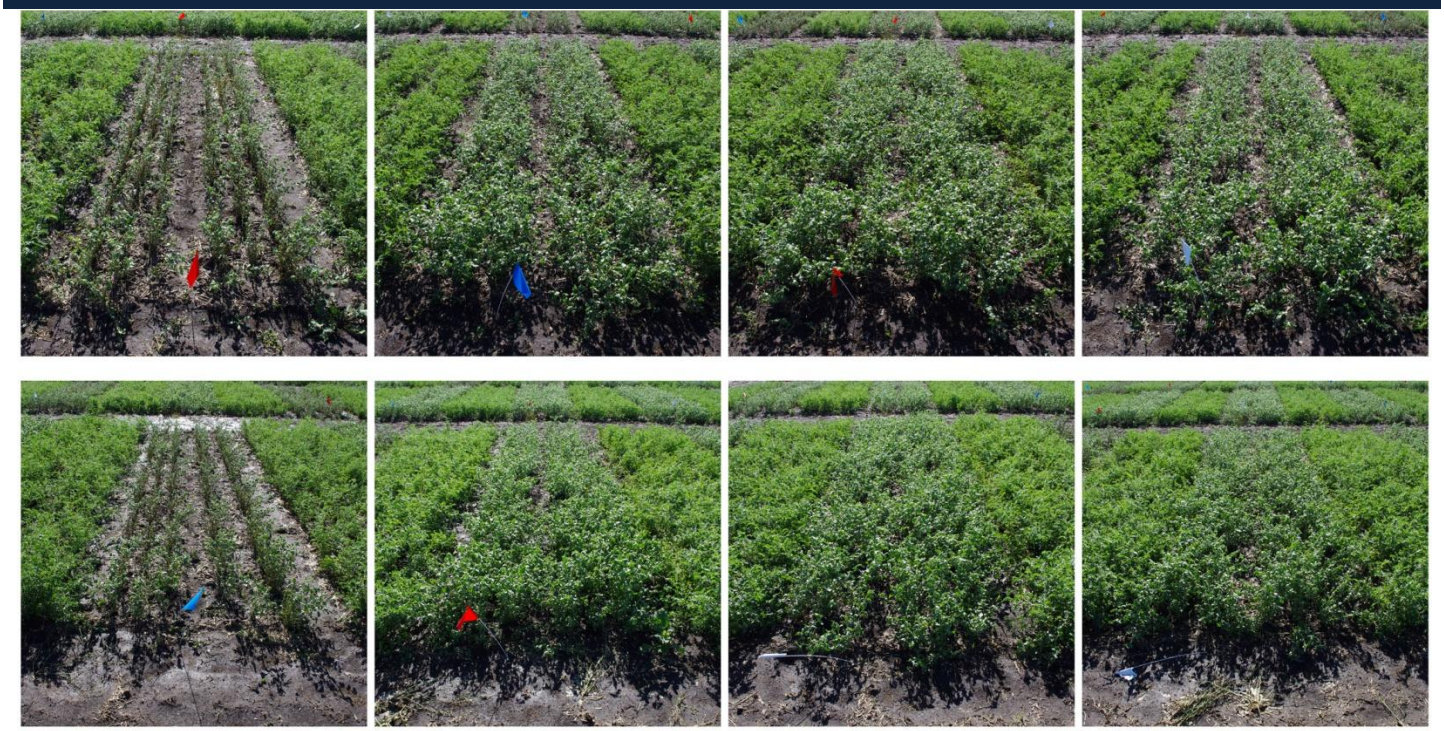

Non-treated check (A,B) | **Vertisan** 14 fl oz/ac + NIS **(A,B)** | **Vertisan** 20 fl oz/ac + NIS **(A,B)** | **Aproach** 8 fl oz/ac + NIS **(A,B)**

Aproach 12 fl oz/ac + NIS **(A,B)** | **Proline** 5 fl oz/ac + NIS **(A)** / **Endura** 6 oz/ac **(B)** | **Proline** 5 fl oz/ac + NIS **(A,B)** | **Non-treated check (A,B)**

Fungicide application timing:
A = June 23; prior to bloom (chickpeas 5-6 in. tall) and Ascochyta already widespread (disease incidence 1 to 3%) **B = July 6**

PHOTOS WERE TAKEN ON JULY 13.

The fungicide APROACH is currently not registered for use on chickpeas and should not be used.
Future registration of this fungicide is anticipated, and results for Aproach are provided for reference only.

Field evaluation of the fungicides Vertisan, Aproach, and Proline for management of Ascochyta blight of chickpeas - Carrington and Williston, ND (2011)

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METHODS – WILLISTON, ND:

- **Location of trial:** NDSU Williston Research Extension Center, Williston, ND.
- **Experimental design, seeding, planting, and harvest:** Chickpeas were planted May 26 at 5 seeds per square foot. The experiment was a randomized complete block design with four replicates. Plots consisted of six rows, each 8 in apart; plot size was 64 square feet. To minimize spray drift between treatments, treatment plots were separated by buffer plots. The large-kabuli chickpea 'Dylan', highly susceptible to Ascochyta blight, was seeded in treatment plots; the kabuli-type chickpea 'CDC Frontier', moderately resistant to ascochyta blight, was seeded in buffer and guard plots.
- **Inoculation:** The trial was not inoculated. All disease was due to ambient inoculum.
- **Fungicide applications:** Fungicides were applied June 28 prior to bloom (7 to 8 nodes) at first appearance of disease symptoms (incidence approx. 0.5 to 1%), July 7 at early bloom, and July 21 at full bloom. Applications were made with a hand boom with four 8002 nozzles at 19 inch spacing. Applications were made with 20 gal/ac water and 40 psi pressure.
- **Disease assessment:** Ascochyta incidence and severity were assessed Aug. 6. The percent of the canopy exhibiting necrosis due to Ascochyta blight was evaluated at three locations per plot, and the percent of pods exhibiting Ascochyta infection was evaluated by assessing 50 pods per plot (10 pods at each of 5 locations).
- **Statistical analysis:** All 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. To meet model assumptions, the square-root transformation was applied to the Aug. 6 Ascochyta severity data and the Aug. 6 incidence of Ascochyta pod infection data. The Aug. 6 Alternaria severity data had an outlier that violated the assumptions of normality and of homoskedasticity of variances but that could not be corrected with systematic transformations, and the untransformed data were analyzed. All other data met model assumptions. Single-degree-of-freedom contrasts were performed for all pairwise comparisons of treatments; 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 with interactions included in the model, and they were implemented in PROC GLM of SAS (version 9.2; SAS Institute, Cary, NC).

METHODS – CARRINGTON, ND:

- **Location of trial:** NDSU Carrington Research Extension Center; Carrington, ND
- **Experimental design, seeding, planting, and harvest:** Soil type was Heimdal-Emrick loam, and cconventional tillage was used. Chickpeas were planted May 25 at 4.5 pure live seeds per square foot (targeted plant population was 4 plants per square foot). Seeds were treated with Cruiser 5FS (1.28 fl oz/cwt), ApronMaxxRTA (5.0 fl oz/cwt), and Mertect 340F (2.04 fl oz/cwt). The experiment was a randomized complete block design with four replicates. Plots consisted of seven rows, each 25 ft long and 7 in apart; an 18-in alley separated plots (plot size, center-to-center = 5 ft by 25 ft). To minimize spray drift between treatments, treatment plots were separated by buffer plots. The large-kabuli chickpea 'Xena', highly susceptible to Ascochyta blight, was seeded in treatment plots; the Desi-type chickpea 'Amit', moderately resistant to ascochyta blight, was seeded in buffer and guard plots. Due to recurrent torrential rains from mid-July to mid-August, the trial was lost to flooding. Disease severity was assessed prior to flooding, but the trial was not harvested.
- **Inoculation:** Chickpea residues from the 2010 field season that were naturally infected with Ascochyta rabiei were spread evenly across the trial on June 10 at the V1 crop stage (first multifoliate leaf unfolded from stem).
- **Fungicide applications:** Fungicides were applied Thursday, June 23 at 6:30-8:00 am (chickpeas 5-6 in. tall, ascochyta blight incidence approx. 1-3%, ascochyta severity approx. 1%) and Wednesday, July 6 at 12:00-1:30 pm. A 60-in hand boom with four equally spaced XR TeeJet 8001VS nozzles was used for applications. Applications were made with 17.5 gal/ac water and 35 psi pressure.
- **Disease assessment:** Disease severity (the percent of plant canopy necrotic) was evaluated July 13. Disease incidence was 100% in all plots.
- **Statistical analysis:** Disease severity ratings 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. The assumptions were not met for the disease severity data; to meet model assumptions, a systematic natural-log transformation was applied to these data. 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 with interactions included in the model, and they were implemented in PROC GLM of SAS (version 9.2; SAS Institute, Cary, NC).

FUNDING:

This project was funded by the **DuPont Crop Protection**.

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 chickpea 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 and Williston Research Extension Centers in 2011 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.