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Field evaluation of fungicides for management of Sclerotinia on dry edible (pinto) beans

Carrington, ND (2012) ■ 14-inch row spacing

Michael Wunsch, plant pathologist
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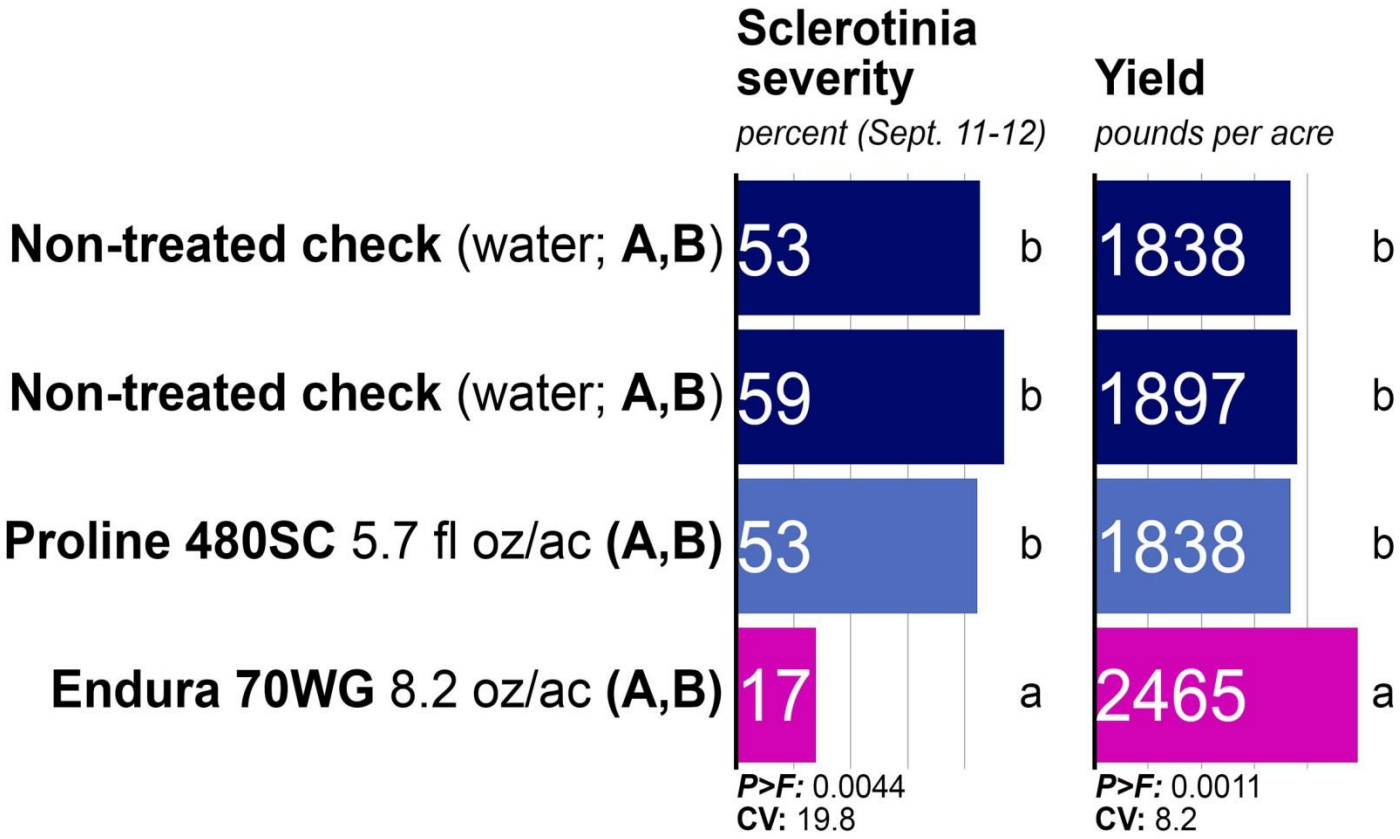
KEY FINDINGS:

- **Applied as two sequential applications, 8.2 oz/ac Endura** (boscalid) **provided excellent control of Sclerotinia in this trial.** Proline, applied at 5.7 fl oz/ac, was less effective.

Concentrations of active ingredients in products evaluated in this trial: *Endura = 700 grams boscalid per kilogram; Proline = 480 grams prothioconazole per liter.*

SUMMARY OF KEY RESULTS:

Within-column means followed by different letters are significantly different.
($P < 0.05$; Fisher's protected least significant difference).



Fungicide application timing:
A – July 27 (100% bloom; canopy closure; no foliar disease present)
B – Aug. 7 (Sclerotinia at low levels in non-treated control)

Fungicides were applied with 8001VS flat-fan nozzles in 17.5 gallons of water per acre at 35 psi.

Pinto bean variety used in this trial: 'Maverick'

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 this report.
- 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.

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METHODS:

- **Location of trial:** NDSU Carrington Research Extension Center, Carrington, ND.
  GPS coordinates of research trial location: 47.508128,-99.127496
- **Variety:** Maverick (pinto bean)
- **Experimental design:** randomized complete block **Replicates:** 4
- **Seeded plot size:** 25 feet long x 5 feet (center-to-center)
- **Harvested plot size: approx.** 19 feet x 5 feet (center-to-center)
- **Row spacing: 14 inches** Rows per plot: 4
- **Non-treated buffer plots were established between treatment plots.**
- **Previous crop:** canola (reps 1 and 2); fallow (reps 3 and 4)
- **Planting date**: June 15, 2012
- **This experiment was planted on June 15.**
- **Seeding rate:** 84,500 pure live seeds/ac
- **Fungicide application A:** July 27 at 9:00-9:45 am (temperature = 66˚F, relative humidity = 76%, wind speed = 2.7 miles per hour); dry beans at 100% bloom (at least one open blossom on each plant); no Sclerotinia was present.
- **Fungicide application B:** Aug. 7 at 10:30 am to 12:00 noon (temperature = 73 to 75˚F, relative humidity = 47 to 49%, wind speed = 7.6 to 10.4 miles per hour); Sclerotinia was present at low levels (approx. 5% incidence) in the non-treated controls.
- **Fungicide application details:** Fungicides were applied with a 60-inch hand boom equipped with four equally spaced Spraying Systems TeeJet XR 8001VS flat-fan nozzles at a spray volume of 17.5 gal water/A operated at 35 psi.
- **Disease establishment:** This trial was established on a site with a history of Sclerotinia epidemics, but supplemental sclerotia of Sclerotinia sclerotiorium were spread across treatment plots in October 2011 (approx. 0.2 sclerotia per square foot). Ascospores of *Sclerotinia sclerotiorum* were applied July 29 at 11:00 pm (4,150 spores/ml in 45 gallons of water/ac) and Aug. 3 (2,550 spores/ml in 57 gallons of water/ac) using a 60-in. hand boom with four equally spaced 8003 twin-jet nozzles operated at 20 psi. To facilitate disease establishment and development, microsprinklers were used to apply water to the trial 5 minutes every 30 minutes from July 15 to September 5.
- **Sclerotinia disease ratings:** Sclerotinia stem rot incidence and severity were evaluated September 11-12 at the R6 growth stage (mid seed-fill; 50% of pods with fully developed seeds). In each plot, 40 plants (20 plants in each of two locations in the interior of each plot) were assessed individually for the percent of the plant tissue exhibiting Sclerotinia disease symptoms.
- **Harvest date:** October 1, 2012
- **Statistical analysis:** Data were evaluated with analysis of variance . Seed moisture levels were assessed during grain processing after harvest, and seed yield and quality results were adjusted to 13% grain moisture. (1) The assumption of constant variance was assessed with Levene's test for homogeneity of variances and visually confirmed by plotting residuals against predicted values. (2) The assumption of normality was assessed the Shapiro-Wilk test and visually confirmed with a normal probability plot. (3) The assumption of additivity of main-factor effects across replicates (no replicate-by-treatment interaction) was evaluated with Tukey's test for nonadditivity. To meet model assumptions, a systematic arcsine transformation [ARCSIN((%/100)0.5)] was applied to the Sclerotinia incidence and Sclerotinia disease severity index data and a systematic natural-log transformation [LN(x) for data sets in which all values ≥1; LN (x+1) for data sets with one or more values < 1] was applied to the Sclerotinia severity 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 they were implemented in PROC UNIVARIATE and PROC GLM of SAS (version 9.3; SAS Institute, Cary, NC).

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