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

Langdon, ND (2012) ■ 30-inch row spacing

Amanda Arens and **Scott Halley**
North Dakota State University Langdon Research Extension Center
Michael Wunsch and **Michael Schaefer**
North Dakota State University Carrington Research Extension Center

KEY FINDINGS:

- **ProPulse** (prothioconazole + fluopyram), **applied sequentially at 10.3 fl oz/ac, was the only treatment to significantly reduce Sclerotinia disease severity relative to the control.**
- **Late disease development was likely responsible for the lack of significant yield differences across treatments.** Temperatures were not highly favorable for Sclerotinia until early August, and much of the yield potential was likely determined by the time Sclerotinia developed.

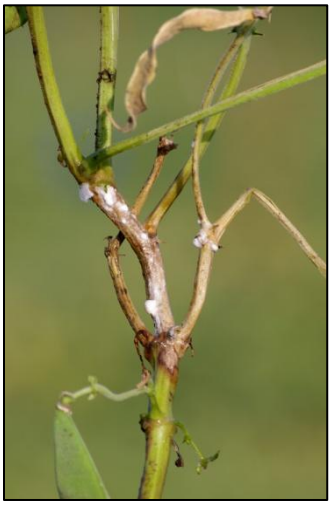
SUMMARY OF KEY RESULTS:

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

Fungicide application timing:
A – July 10 (bloom initiation; canopy open; no foliar disease present)
B – July 23

Proline and ProPulse were applied with 0.125% (v/v) non-ionic surfactant.

Aproach, Quash, and Vertisan were applied with 0.25% (v/v) non-ionic surfactant.



	Sclerotinia severity (0 to 5 scale; August 16)		Yield (pounds per acre)	
	0 – 2.5		0 – 4000	
ProPulse 10.3 fl oz/ac + **NIS (A,B)**	0.8	a	4435	a
ProPulse 8.6 fl oz/ac + **NIS (A,B)**	1.0	ab	4179	a
Topsin 30 fl oz/ac **(A,B)**	1.0	ab	3916	a
Omega 0.85 pt/ac **(A,B)**	1.1	ab	3632	a
Topsin 40 fl oz/ac **(A,B)**	1.1	ab	4399	a
Endura 8.0 oz/ac **(A,B)**	1.3	ab	4115	a
Proline 5.7 fl oz/ac + **NIS (A,B)**	1.4	ab	4012	a
Rovral 2.0 pt/ac **(A,B)**	1.5	ab	4186	a
Topsin 40 fl oz/ac **(A) / Endura** 8.0 oz/ac **(B)**	1.5	ab	4158	a
Topsin 20 fl oz/ac **(A,B)**	1.6	ab	4040	a
Switch 14.0 oz/ac **(A,B)**	1.6	ab	4065	a
Vertisan 20 fl oz/ac + **NIS (A,B)**	1.7	ab	3902	a
Aproach 12 fl oz/ac + **NIS (A,B)**	1.7	ab	4005	a
Endura 8.0 oz/ac **(A) / Topsin** 40 fl oz/ac **(B)**	1.7	ab	4072	a
Topsin 20 fl oz/ac + **Quash** 2.0 oz/ac + **NIS (A,B)**	1.7	ab	4207	a
Non-treated check (water)	1.8	ab	3593	a
Quash 2.5 oz/ac + **NIS (A,B)**	2.0	ab	3770	a
Quash 2.0 oz/ac + **NIS (A,B)**	2.2	b	4087	a
***F*:**	2.24		0.72	
***P* > *F*:**	0.0206		0.7593	
CV:	33.0		13.0	

The fungicides APROACH and QUASH are currently not registered for use on dry edible beans and should not be used.
Future registration of some of these fungicides is anticipated, and results for these products are provided for reference only.

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Michael Wunsch, plant pathologist
Michael Schaefer, research specialist
Billy Kraft, research technician
North Dakota State University Carrington Research Extension Center

METHODS:

- **Location of trial:** North Dakota State University Langdon Research Extension Center, Langdon, ND
- **GPS coordinates of research trial location:** 48.75627,-98.339999
- **Variety:** 'Maverick' (pinto bean)
- **Experimental design:** randomized complete block **Replicates:** 4
- **Seeded plot size:** 5 feet wide (center-to-center) x 20 feet long
- **Harvested plot size:** 5 feet wide (center-to-center) x approx. 16 feet long
- **Row spacing:** 30 inches **Rows per plot:** 2
- **Non-treated buffer plots were established between treatment plots.**
- **Previous crop:** canola
- **Planting date:** May 17, 2012
- **Seeding rate:** 91,950 pure live seeds/ac (target plant population = 80,000 plants/ac; presumed seedling mortality = 13%)
- **Fungicide application A:** July 10, 2012 at 9:00 am; dry beans at bloom initiation; no Sclerotinia stem rot present; wind = 3 mph, temperature = 76˚F, relative humidity = 69%
- **Fungicide application B:** July 23, 2012 at 4:30-6:00 pm; temperature = 78-79F, relative humidity = 43-48%, wind speed = 5.5-6.8 miles per hour from the east northeast.
- **Fungicide application details:** Fungicides were applied with a 40-inch hand boom equipped with three equally spaced Spraying Systems 801102 air-induction nozzles. Applications on July 10 were made in 18.4 gallons of water/ac at 40 psi; applications on July 23 were made in 17.5 gallons of water/ac at 35 psi.
- **Disease establishment:** This trial was established on a site with a history of Sclerotinia epidemics. Laboratory-produced ascospores of Sclerotinia sclerotiorum were applied to the dry bean canopy on July 12 at 9:00 am and July 13 at 9:00 am at an application rate of 4,000 spores / sq ft (5,000 spores/ml in 9.2 gallons of water/ac). Spores were applied using a backpack spray with a 40-inch hand boom equipped with three equally spaced Spraying Systems 800102 air-induction nozzles.
- **Disease assessments:** Sclerotinia disease incidence and severity were assessed on August 16 at the late R6 growth stage (just before the first pods reached physiological maturity). In each plot, 40 plants (10 plants in each of two locations per row) were assessed on a 0 to 5 scale: 0 = no Sclerotinia stem rot, 1 = 1 to 20% of the plant exhibiting Sclerotinia symptoms, 2 = 21 to 40% of the plant exhibiting Sclerotinia symptoms, 3 = 41 to 60% of the plant exhibiting Sclerotinia symptoms, 4 = 61 to 80% of the plant exhibiting Sclerotinia symptoms, and 5 = 81 to 100% of the plant exhibiting Sclerotinia symptoms.
- **Harvest date:** September 11, 2012.
- **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).

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This project was funded by the **Northarvest Bean Growers Association.**

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 Langdon Research Extension Center in 2012 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.