

Dry Bean '08

## Dry Bean Fungicide Report

Scott Halley, Crop Protection Scientist and Bryan Hanson Agronomist- Langdon Research Extension Center North Dakota State University

Ph. 701.256.2582 E-mail Scott.Halley@ndsu.edu

### Materials and Methods

A study was conducted at the Langdon Research Extension Center in 2008 to evaluate fungicides, plant architecture and spray volume as management tools to control white mold disease in dry bean. White mold disease, is caused by the pathogen *Sclerotinia sclerotiorum*. The site had soil type Svea-Barnes complex. The study was arranged in a randomized complete block design with a split plot arrangement with four replicates. The whole plot was cultivar which included 'Lariat', a new line from North Dakota State University with an upright erect architecture, and Othello, a vine type with a more horizontal architecture. The subplot included 6 fungicide and spray volume combinations and an untreated check. Prior to planting sclerotia were hand-broadcast on the trial site. The trial was planted on 23 May with a seeding rate of 90,000 seeds per acre with an Almaco double-disc drill in rows spaced 30 inches apart. Planted plot area was two rows 21 feet long. Five foot wide alleys were cut. An impact sprinkler type irrigation system was installed after post emergence tillage and weed spraying (30 x 40 ft center to center of each sprinkler head). Cultivars, fungicides and spray volumes included in the study are listed in Table 1. The fungicides were applied with a CO<sub>2</sub> pressurized backpack sprayer equipped with Spraying Systems XR8001 (9.2 GPA) or XR8002 (18.4 GPA) nozzles spaced 20 inches apart and operated at 40 psi. The nozzles were oriented vertically. Treatments were applied as a single application to early flower growth stage dry bean on 25 July at 8:15 a.m. or sequentially on 25 July and 1 Aug at 3:00 p.m. Air temperature was 74° and 72° F and the wind was WNW at 7 MPH and absent on July 25 and August 1, respectively. Ascospores were applied at a rate of 10,000 spores/ml in 9.2 GPA water on 1 Aug and 8 Aug with a CO<sub>2</sub> pressurized backpack sprayer equipped with Spraying Systems XR8001 nozzles. Irrigation water was applied periodically beginning about 2 weeks before first flower emergence and timed to provide for a wet soil environment to encourage the development of apothecia from the sclerotia and infection from the broadcast and ejected ascospores. North Dakota State University Extension recommended dry bean production practices for Northeast North Dakota were followed. A measuring stick 10 ft long with 1 ft marked increments was dropped between the rows in each plot and the plants in line with the marks were scored for white mold disease. The plant at each mark was assessed for incidence (presence of white mold disease) and severity (scale of 0-5, 0 = no infection, 1=0-24%, 2=25-49%, 3=50-74%, 4=75-99%, 5=100%). Fungicide treated plots were knifed and after drying harvested on October 6 by threshing with a Wintersteiger plot combine. Data were analyzed with the general linear model (GLM) in SAS. Least significant differences (LSD) were used to compare means at the 5% probability level using Fischer's protected LSD.

### Discussion

No visible phytotoxicity was observed on any observation dates. Disease incidences and severities were quite high and were not statistically affected by cultivar or fungicide treatment (Table 1). Incidence was

Dry Bean '08

numerically less on the erect architecture cultivar 'Lariat'. Yield was also significantly less on the cultivar Lariat which contrasts with the results obtained from the variety trial conducted on station that was not inoculated and supplemented with water. A cultivar\*fungicide interaction was measured for yield. Proline and Topsin M applied as sequential treatments at 9.2 GPA had greater yield than Proline when applied to 'Othello' cultivar. In contrast, a single application of Proline applied at 9.2 GPA had greater yield than an untreated and a single application of Topsin M applied at 9.2 GPA on 'Lariat'. 'Othello' had greater 100 seed weight than 'Lariat' which also contrasts results obtained on the agronomists non inoculated and watered study. The maturity of 'Lariat' at Langdon was at least seven days later in the Agronomist variety trial and the fungicide treatments in our study may have extended the maturity on the 'Lariat' reducing yield and test weight in this environment. More testing is recommended.

Table 1. White Mold Disease Incidence and Severity, Yield and 100 Seed Weight by Cultivar and Fungicide Langdon, 2008.

Cultivar	Fungicide	Spray	White Mold Disease		Yield	100 Seed Weight
		Volume	Incidence	Severity		
		GPA	%	%	lbs	Gms
Othello			69.5	2.6	2796.6	37.4
Lariat			52.0	2.2	2243.5	33.0
	Proline	18.4	66.3	2.4	2482.0	34.1
	Proline	9.2	63.8	2.5	2502.0	35.3
	<sup>1</sup> Proline and Topsin M	18.4	58.1	2.2	2561.9	35.8
	Proline and Topsin M	9.2	61.9	2.3	2615.2	35.2
	Topsin M	18.4	56.3	2.2	2611.9	35.2
	Topsin M	9.2	56.3	2.5	2495.3	35.8
	Untreated		62.5	2.6	2372.0	35.2
Othello	Proline	18.4	68.75	2.37	2655.2	37.06
	Proline	9.2	77.50	2.95	2465.3	36.68
	Proline and Topsin M	18.4	61.25	2.22	2751.8	37.48
	Proline and Topsin M	9.2	73.75	2.46	3048.3	37.60
	Topsin M	18.4	65.00	2.58	2968.4	37.39
	Topsin M	9.2	67.50	2.78	2968.4	38.04
	Untreated		72.50	2.78	2718.5	37.79
Lariat	Proline	18.4	63.75	2.44	2308.7	31.24
	Proline	9.2	50.00	2.02	2538.6	33.82
	Proline and Topsin M	18.4	55.00	2.09	2372.0	34.17
	Proline and Topsin M	9.2	50.00	2.15	2182.1	32.81
	Topsin M	18.4	47.50	1.79	2255.4	33.01
	Topsin M	9.2	45.00	2.30	2022.2	33.58
	Untreated		52.50	2.39	2025.6	32.56
Cultivar			0.0802	0.1116	0.0196	0.0173
Fungicide			0.3291	0.4462	0.4719	0.6995
Cult*Fung			0.9820	0.9010	0.0146	0.8380
% C.V.			23.5	20.6	12.2	5.2

## Dry Bean '08

<sup>1</sup>Proline and Topsin M were applied as sequential applications 7 days apart.

Yield: LSD 5% = 463 lbs to compare whole plot means (cultivar) at the same or different subplot means (fungicide) and LSD 5% = 423.6 lbs to compare two subplot means for the same whole plot means.