Improving management of white mold in dry beans:
Fungicide efficacy: Quash, Rovral, Switch, Vertisan

Michael Wunsch
North Dakota State University Carrington Research Extension Center

Improving white mold management in dry beans:
Comparative fungicide efficacy – methods

Market class = pinto in most studies; kidney in some studies

Row spacing = 14 inches in most studies; 28 inches in some studies

Seeding rate = 90,000 viable seeds/ac in most studies; sometimes 80,000 viable seeds/ac

Fungicide spray volume = 15 gal/ac.

Fungicides applied with a hand-held boom pressurized by CO_2.

Fungicide spray droplet size: fine or medium in studies conducted from 2010-2021; fine, medium or coarse, calibrated relative to canopy density and lodging, from 2022-2024.

Number of fungicide applications: two

Application timing, first fungicide application: early bloom and initial pin pod-pod

Interval between fungicide applications: 7 to 14 days later, depending on study

Number of experimental replicates = 5 or 6 replicates (most studies)

White mold assessment: Assessed at or near dry bean maturity by evaluating every plant individually in for the percent of the plant impacted by white mold.

Harvest: To ensure that variability in dry bean standability did not bias yields, plants were clipped at base concurrent with disease assessments, wind-rowed to dry, and manually lifted into the combine.

Supplemental irrigation: Supplemental overhead irrigation was applied as needed to establish the white mold disease pressure needed to evaluate fungicide performance.

Fungicide efficacy summaries:

Testing was conducted with two sequential applications of the same fungicide with the goal of rigorously assessing comparative efficacy.

These comparative efficacy results are provided to help facilitate informed decisions for selecting products for application once or twice in-season, either alone or in rotation with another fungicide.

Comparative fungicide efficacy: white mold in dry edible beans

Two sequential applications of the same fungicide,
initial pin-pod + 13-14 days later

Quash 2.5 oz vs. **Endura** 8 oz

Combined analysis across four studies
Langdon and Carrington, ND (2012, 2013)

	WHITE MOLD Severity index % of canopy	**DRY BEAN YIELD** lbs/ac
Non-treated control	**40** b	**2608** b
Endura 8.0 oz/ac	**23** a	**3178** a
ProPulse 10.3 fl oz/ac	**21** a	**3244** a
Quash 2.5 oz/ac	**36** b	**2751** b
CV:	13.8	5.3

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

Comparative fungicide efficacy: white mold in dry edible beans

Two sequential applications or the same fungicide,
initial pin-pod + 11 or 14 days later

Quash 4 oz vs. **Endura** 8 oz

Combined analysis across two studies
Carrington, ND (2010, 2013)

	WHITE MOLD Severity index % of canopy	**DRY BEAN YIELD** lbs/ac
Non-treated control	**60** b	**2439** b
Endura 8 oz/ac	**40** a	**3312** a
Quash 4 oz/ac	**56** b	**2623** b
CV:	6.9	4.1

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

Comparative fungicide efficacy: white mold in dry edible beans

Two sequential applications of the same fungicide,
initial pin-pod + 12 or 14 days later

Topsin 30 fl oz vs. **Quash** 4 fl oz/ac

Combined analysis across two studies
Carrington, ND (2013, 2014)

	WHITE MOLD Severity index % of canopy	**DRY BEAN YIELD** lbs/ac
Non-treated control	**58** a	**2380** b
Topsin 30 fl oz/ac	**41** a	**3180** a
Quash 4 oz/ac	**52** a	**2462** b
CV:	11.1	5.6

Within-column means followed by different letters are significantly different. ($P < 0.05$).

Comparative fungicide efficacy: white mold in dry edible beans

Two sequential applications of the same fungicide,
initial pin-pod + 13-14 days later

Rovral 2 pt vs. **Switch** 14 oz vs. **Endura, ProPulse**

Combined analysis across four studies
Carrington and Langdon, ND (2012, 2013)

	WHITE MOLD Severity index % of canopy	**DRY BEAN YIELD** lbs/ac
Non-treated control	**40** b	**2608** b
Endura 8.0 oz/ac	**23** a	**3178** a
ProPulse 10.3 fl oz/ac	**21** a	**3244** a
Rovral 2.0 pt/ac	**27** a	**3015** a
Switch 14 oz/ac	**26** a	**2979** a
CV:	17.7	4.4

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

Comparative fungicide efficacy: white mold in dry edible beans

Two sequential applications of the same fungicide,
initial pin-pod + 11 or 13 days later

Vertisan 20 or 24 fl oz vs. **Endura** 8 oz

Combined analysis across three studies
Carrington and Langdon, ND (2010, 2012)

	WHITE MOLD Severity index % of canopy	**DRY BEAN YIELD** lbs/ac
Non-treated control	**42** b	**2973** b
Endura 8 oz/ac	**24** a	**3481** a
Vertisan 20 or 24 fl oz/ac	**39** b	**3165** ab
CV:	11.2	4.5

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

Improving white mold management in dry beans:

Fungicide efficacy – Quash, Rovral, Switch, Vertisan

Conclusions from comparative efficacy testing

Applied as two sequential fungicide applications (initial pin-pod and 11-14 days later),

- **Quash** (applied at either 2.5 or 4.0 oz/ac),
- **Switch** (14 oz/ac),
- **Rovral** (2 pt/ac) and
- **Vertisan** (20 or 24 fl oz/ac)

were less effective against white mold in dry beans than the competitive standards to which they were compared (Endura, 8 oz/ac; ProPulse 10.3 fl oz/ac; and/or Topsin, 30 fl oz/ac).




People

Staff, Carrington: Aaron Fauss, Suanne Kallis, Jesse Hafner, Gabriela Henson

Collaborators – Oakes: Heidi Eslinger, Spencer Eslinger, Leonard Besemann, Kelly Cooper

Funding support

Research funding:

- Northarvest Bean Growers Association
- ND Crop Protection Product Harmonization & Registration Board
- Contract testing (BASF, Bayer, Corteva, FMC, Gowan, Syngenta, Valent, others)

Seed was donated by:

- Bollingberg Seeds Company (Kurt Bollingburg; Cathay, ND)
- Green Valley Bean Company (John Berthold; Park Rapids, MN)
- Kelley Bean Company; Hatton, ND (Dean Nelson)