

Researching White Mould in Pinto and Kidney Beans

WENDY MCDONALD, MPSG PRODUCTION AGRONOMIST – WEST

LOOK TO THE SOUTH. THEY'RE AT the post and they're off! Palomino, Vibrant, Rosie, Dynasty, and Pink Panther.

These may sound like the names of racehorses in a high-stakes derby, but they're actually the dry bean varieties used in a study done at North Dakota's Carrington Research Extension Center. Plant pathologist Michael Wunsch and his team tested how seeding rate and row spacing affects the yield and agronomic performance of dry beans under different levels of white mould disease pressure.

Palomino and Vibrant are slow darkening pinto beans. Rosie and Pink Panther are light-red kidney beans, and Dynasty is a dark-red kidney bean.

Each variety was tested by being planted at 7.5, 15, 22.5, and 30-inch row spacings.

Researchers used irrigation to make sure the conditions in the plots were moist and favourable for white mould development.

They waited until the dry bean plants were close to maturity to rate the white mould pressure. The team then assessed at least a third of all plants in each plot individually.

If more than 40 per cent of the plants in the 30-inch row plots were infected with white mould they labelled it as high disease pressure.

If less than 20 per cent of the plants in the 30-inch row plots were infected with white mould it was labelled as low disease pressure.



NDSU plant pathologist Michael Wunsch speaking at the 2026 Crop Connect Conference in Winnipeg. (PHOTO CREDIT: WENDY MCDONALD)

Once the dry bean combine dust settled, the research team learned that in pinto beans the top yielding row spacing all depended on the white mould disease pressure that season.

When white mould pressure was low to moderate, the narrow 7.5 or 15-inch rows had higher yields than the wide 30-inch rows.

The canopy closed a lot quicker in the narrow rows with photosynthesis ramping up. This bumped the yield more than any harms caused to the yield by moderate white mould disease levels.

But when white mould pressure was high, pinto bean yields were statically similar in all row spacings tested.

Disease severity was lower in the



Dry Bean RVT Program Update

ASHLYN KROPP,
MPSG ON-FARM RESEARCH ASSISTANT

EACH YEAR, Manitoba Pulse & Soybean Growers (MPSG) independently evaluates dry bean varieties at various locations across the province as part of our Regional Variety Testing (RVT) Program.

The data collected at these trials is then published in the MPSG Pulse and Soybean Variety Guide and Seed Manitoba to provide farmers with independent information on variety performance and agronomics of these to make informed variety selection decisions.

At our various trial sites, dry bean varieties are tested in both narrow-row (Melita, Morden, Portage la Prairie, Souris, Dauphin, Hamiota and Swan River) and wide-row (Carman, Morden, Portage la Prairie and Winkler) production systems, depending on their size and market class.

Unfortunately, one trial site was lost to the severe weather and flooding earlier this season, but the remainder of our trial sites are progressing well. The weather events did cause some environmental damage at several of the remaining trial sites, but the beans are recovering well.

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30-inch rows. The wide rows had less mouldy seed and sclerotinia contamination in the samples.

For kidney beans, the narrow 15-inch rows had the highest yields at all levels of white mould pressure.

For pinto beans, the 70,000 seeds per acre seeding rate was optimal at all white mould pressure levels. When the researchers increased the rate to 90,000 and 120,000 seeds per acre, there was no yield gain but more white mould pressure.

For kidney beans, if the white mould pressure was high, the research team saw no yield gain by increasing the planting rates above 70,000 seeds per acre.

The research shows that we could expect better pinto bean and kidney bean yields in narrow rows rather than wide rows if you never had to worry about white mould showing up in your field.

But in most years white mould is a concern in many dry bean growing areas. This is why some pinto bean producers choose to plant in wide rows. More air movement in the canopy should make it tougher for white mould to thrive and affect yield.

In kidney beans, the researchers saw that increasing the planting rate or row spacing didn't have much, if any, effect on the severity of white mould disease pressure.

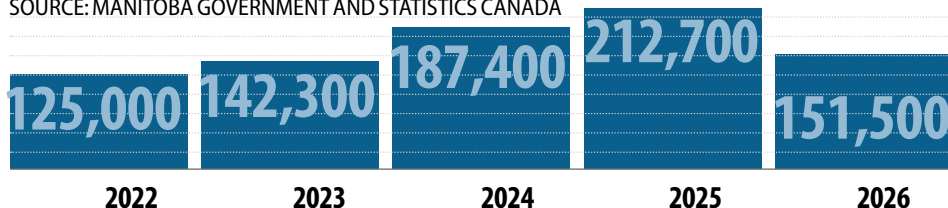
In Manitoba, Kristen MacMillan, MPSG agronomist-in-residence at the University of Manitoba, is studying biological nitrogen fixation (BNF) in dry beans. BNF is being measured to understand how it's affected by the addition of nitrogen fertilizer. Her research is testing a total of 13 modern and historic cultivars from three market classes at three locations from 2023 to 2026. At the same locations, nitrogen fertilizer treatments from earlier studies are being tested also.



BELOW: Flowering dry beans at plots at Melita on July 15.

Manitoba Dry Bean Seeded Acres

SOURCE: MANITOBA GOVERNMENT AND STATISTICS CANADA





Can You Dig It?

Rating Dry Bean Nodulation

YOU MAY HAVE APPLIED enough nitrogen fertilizer for your dry beans to yield optimally, but are those plants helping themselves by doing a little bit of biological nitrogen fixation?

The time to start digging up the truth about your dry beans' underground behaviour starts when flowers begin to appear.

Since we can't tell what nodules are or aren't doing by looking at what we see above ground, we need to do some gentle digging. We need to examine the roots to determine how many nodules have formed and if those nodules are working or "slacking off".

All we need is a spade and a pail of water. We then dig, wash roots, count and squeeze.

We go to two to three locations within the dry bean field and examine the roots of five to 10 plants at each site. We count and record the number of nodules present, using the following rating scale:

- 0 = no nodules
- 1 (poor) = < 5 nodules per plant
- 2 (moderate) = 6 to 10
- 3 (good) = 11 to 20
- 4 (excellent) = > 20

You should also break open the nodules to check the colour. Pink nodules are active, while green, brown

or white nodules aren't fixing nitrogen.

In the jar in photo one, we see an example of good dry bean nodulation. This year plots at Melita are testing different dry bean inoculant products and various applied nitrogen rates. The roots in the jar came from a plot that was treated with inoculant and had no nitrogen fertilizer applied.

In certain soil types and areas, research is showing that inoculating dry beans with current products commercially available or even with some experimental "man-made-in-Manitoba" inoculants results in the formation of viable nodules which contribute biologically fixed nitrogen.

The jar in photo two shows poor dry bean nodulation. These roots were taken from a plot which had no inoculant and zero nitrogen fertilizer applied.

This is a hint that there may not be a high population of native rhizobia bacteria in the soil here that can help dry beans fix their own nitrogen.

Research hasn't been done yet to relate nodule number to yield in dry bean. Rating nodulation can provide insights on whether or not we should consider biological nitrogen fixation when making important nitrogen rate management decisions for future dry bean crops.



PHOTO ONE: The roots in the jar came from a plot that was treated with inoculant and had no nitrogen fertilizer applied, it has good dry bean nodulation.



PHOTO TWO: These roots were taken from a plot which had no inoculant and zero nitrogen fertilizer applied, it has poor dry bean nodulation.

(PHOTO CREDITS: WENDY MCDONALD)

Canadian Dry Bean Carryover (tonnes)

SOURCE:
STATISTICS
CANADA

40,000

2024-2025

65,000

2025-2026

30,000

2026-2027 (projected)

Fungicide Decision Worksheet for Managing White Mould in Dry Bean

Complete this worksheet for your dry bean field(s) at the V-4 stage or one to two weeks prior to fungicide timing to assess the risk of white mould infection. The risk score along with yield potential and crop value can be used to aid in the decision of whether or not a fungicide application is required.

ADAPTED FROM UNIVERSITY OF NEBRASKA-LINCOLN EXTENSION (H. SCHWARTZ)

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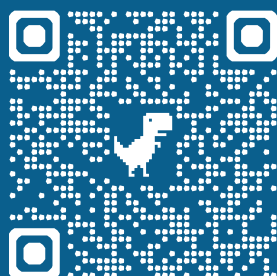
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YOUR
SCORE

Weekly total rainfall pre-flowering (weekly average up to V-4)	< 0.1"	1	
	0.1–0.5"	2	
	0.5–1.0"	3	
	> 1.0"	4	
Average daily high temperature pre-flowering (weekly average up to V-4)	< 18°C	4	
	18–21°C	3	
	22–28°C	2	
	> 28°C	1	
Humidity (%) or hours of dew or free water on foliage (weekly average)	0–25% (< 6 hrs)	1	
	26–50% (< 12 hrs)	2	
	51–75% (< 18 hrs)	3	
	> 75% (< 24 hrs)	4	
Forecasted/actual rainfall expected during flowering (weekly average between V-4 and R-4 stages)	< 0.1"	1	
	0.1–0.5"	2	
	0.5–1.0"	3	
	> 1.0"	4	
Forecasted/actual daily high temperature during flowering (weekly average between V-4 and R-4 stages)	< 18°C	4	
	18–21°C	3	
	22–28°C	2	
	> 28°C	1	
Dry bean crop rotation and/or other susceptible hosts included in rotation (ex. canola)	≥ 3 years	1	
	< 3 years	2	
Susceptible hosts and/or fungal apothecia observed nearby (less than 2 km) before flowering (R-1)	No hosts, No Apothecia nearby	1	
	Hosts OR Apothecia nearby	2	
	Hosts AND Apothecia nearby	4	
Timing and amount of nitrogen fertilizer applied	Planting < 100 lbs/ac	1	
	Planting > 100 lbs/ac	2	
	Split application	3	
Plant spacing, effects on canopy density, and microclimatic conditions favouring white mould	Wide rows, low–moderate density	1	
	Wide rows, moderate–high density	2	
	Narrow rows, moderate density	3	
	Narrow rows, high density	4	
Varietal reaction (based on upright growth habit and/or genetic resistance) to white mould	Resistant	1	
	Unknown	2	
	Susceptible	4	
DRY BEAN DISEASE RISK — TOTAL SCORE >>			

> 30 = High Risk 20–30 = Moderate Risk < 20 = Reduced Risk