

MICHIGAN DRY BEAN PERFORMANCE TRIALS

2023



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Michigan Dry Bean Performance Trials 2023

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Acknowledgments

This work is supported by the Michigan Bean Commission, MSU AgBioResearch, MSU Extension, and by dry bean breeders in both the public and private sectors.



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Introduction

In 2023, Michigan State University researchers and Michigan dry bean producers tested 150 lines from 12 market classes of dry beans. The trial plots (Table 1) were placed in six locations across five Michigan counties: Bay, Huron, Montcalm, Sanilac, and Tuscola (two sites).

Small- and medium-seeded beans were tested in Bay, Huron, Sanilac, and Tuscola counties. Large-seeded beans were tested in Montcalm and Tuscola County.

This report summarizes the results of the HeadsUp seed treatment trials included at four of the total locations. Please contact Scott Bales (phone 989-262-8550, ext. 2; email balessco@msu.edu) with questions about the 2023 performance trials and suggestions for the 2023 trials.

Table 1. 2023 research trial conditions: The locations, grower co-operators, planting dates, nitrogen application rates and methods, total accumulated growing degree days (GDD), and total precipitation.

County	Co-operator	Planting Date	Nitrogen Rate (Lbs./A)	Nitrogen Application Method	Total GDD ^a	Total Precipitation (Inches)
Bay	Spartan Acres	May 24	45	2x2	1,913	13.6"
Huron	Gruehn Farms	June 1	60	Broadcast	1,791	13.2"
Montcalm	Waldron Farms	May 31	85	2x2 Followed by Topdress	1,823	15.6" + irrigation
Sanilac	Shaw Farms	May 31	60	Broadcast	1,816	9.6"
Tuscola	Saginaw Valley Research and Extension Center	June 2	45	Broadcast	1,870	13.8"

Note. Weather data was retrieved from the nearest Michigan Automated Weather Network (MAWN) and the MSU Enviroweather station nearest to the trial. All weather data is from the day of planting to harvest.

^aGrowing degree days (GDD) were calculated using the following equation: $([MAX + MIN] \div 2) - 50 = GDD$

Methods

Dry beans were seeded in four-row plots that measured 6.6' wide by 25' long, with 20" rows. Each entry was replicated four times. All trial plots were designed as randomized complete blocks (RCB). (RCB is a standard agricultural trial design in which entries are randomly assigned to groups or blocks, and the blocks are randomly repeated. The goal of the replication is to control for variables that might affect an entry's yield, such as soil nutrient levels, pest loads, and variability in soil textures.)"

Trials received industry standard, fertilization, and weed control applications at labeled rates. White mold fungicides were not applied to any location with the exception of Huron County in 2023 due to excessive mold pressure. The absence of fungicide allowed the evaluation of each entry's natural tolerance for or avoidance of white mold.

Yield data was obtained by direct harvest for small- and medium-seeded beans. Following harvest, samples were cleaned, weighed, and moisture tested.

Table 2. Soil test information from the five 2023 performance trial locations, including the percentage of organic matter, soil type, soil pH, and soil cation exchange capacity (CEC). All macro- and micronutrients were sufficient for dry bean production.

Location	Percentage of Organic Matter	Soil Type	Soil pH	Soil CEC
Bay	2.4	Sandy Clay Loam	7.0	11.2
Huron	4.8	Sandy Loam	7.5	19.0
Montcalm	1.9	Sandy Loam	6.7	5.3
Sanilac	4.6	Sandy Clay Loam	7.8	18.6
Tuscola	3.3	Clay	7.1	19.3

Results

Tables 3 provides agronomic information including white mold tolerance. The percentage of white mold infection on each replication was calculated in Huron county:

$$(\text{number of infected plants} \div \text{total plants per stand}) \times 100 = \text{percentage of infection}$$

In addition White mold severity was also scored on a scale from 1-9, with 1 representing low severity, and 9 representing high severity of infection. The table also present each entry's yield results in pounds per acre (Lbs./A) adjusted to 18% moisture.

The combined average yield for each entry across all sites in 2023 is also included. The last three rows of the agronomic and yield results tables list the trial average (mean), least significant difference (LSD), and coefficient of variation (CV), respectively, for the data in each column.

Table 3. Headsup Seed Treatment agronomic and yield results.

Factor 1: Variety	Factor 2: Seed Treatment	Huron Co. White Mold Infection (%)	Huron CO. White Mold Severity (1-9)	Bay (Lbs./A)	Huron (Lbs./A)	Sanilac (Lbs./A)	Tuscola (Lbs./A)	1-year avg. (Lbs./A)
<i>Spectre</i>	<i>Cruiser Seed Treatment</i>	42 A	1.7 A	3232	3694 A	3820 AB	2882	3365 A
	<i>Cruiser Seed Treatment + HeadsUp (0.5oz cwt⁻¹)</i>	50 A	1.2 A	3315	3223 BC	4027 A	3189	3471 A
	<i>Cruiser Seed Treatment Fb. HeadsUp (1oz cwt⁻¹)</i>	49 A	1.5 A	2864	3736 A	4128 A	2760	3388 A
<i>BlackBeard</i>	<i>Cruiser Seed Treatment</i>	93 B	3.2 B	2622	3352 BC	3481 B	2878	3061 B
	<i>Cruiser Seed Treatment + HeadsUp (0.5oz cwt⁻¹)</i>	90 B	3.0 B	3116	3497 AB	4109 A	3204	3485 A
	<i>Cruiser Seed Treatment Fb. HeadsUp (1oz cwt⁻¹)</i>	89 B	3.5 B	3190	3198 C	3906 AB	3058	3351 A
	MEAN:	69	2.38	3057	3450	3912	2995	3353
	LSD_{(0.05):}	11	0.7	NS	217	355	NS	279
	CV:	13.54%	23.79%	21.96%	5.06%	7.29%	19.04	14.11%

*Data within the same column followed by the same letter are not significantly different ($P \geq 0.05$). Both variety 'Blackbeard' and 'Spectre' were sourced from cooperative elevator company, Pigeon, MI.