

EDIBLE BEAN AGRONOMY AND PEST MANAGEMENT RESEARCH RESULTS

2020



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Agronomy and Pest Management Research Results for Dry Edible Beans 2020

This report is a compilation of agronomy and pest management research results in dry edible beans at Ridgetown College and the Huron Research Station. It has been produced as a reference for growers and industry personnel.

A number of the pesticides that are included in this report are not currently registered for use in dry edible beans in Ontario. Always follow label directions when applying pesticides.

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2020 Heat Unit and Precipitation Summary for Exeter and Ridgetown.

Ontario Corn Heat Units (OCHU)			
Month	Huron Research (Exeter)		Ridgetown Campus
	2020	Norm (39 yr)	Norm (44 yr)
May	372	365	412
June	685	660	683
July	838	781	821
August	753	750	746
September	529	562	544
October	14	46	247
Total	3191	3164	3453
			3512

Precipitation (mm)

Month	Huron Research (Exeter)		Ridgetown Campus	
	2020	Norm (39 yr)	2020	Norm (44 yr)
May	79	84	73	82
June	60	81	45	69
July	51	79	80	84
August	121	71	132	87
September	86	104	48	85
October	85	96	60	66
Total	482	514	438	473

20% or more below average

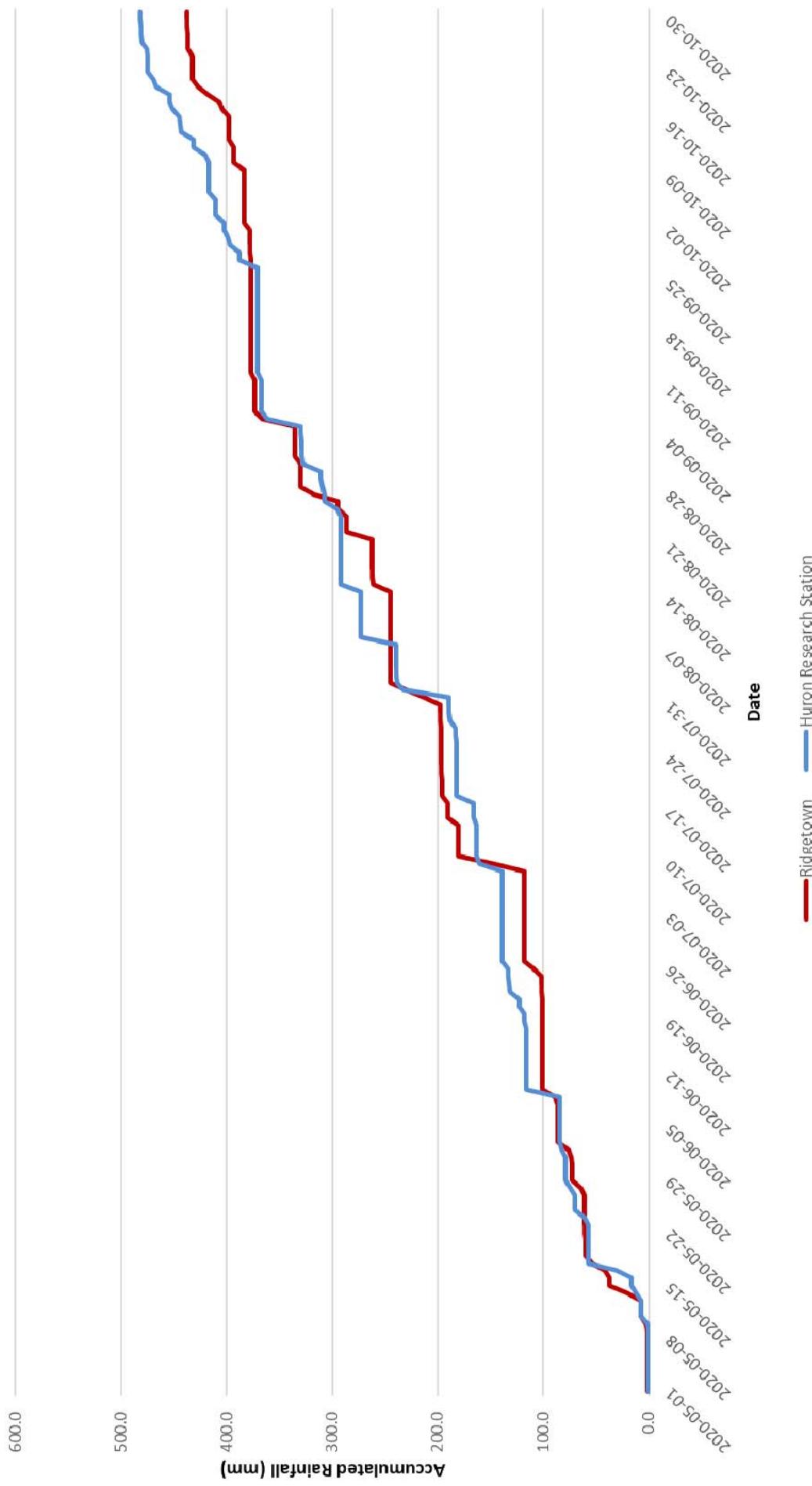
20% or more above average

2020 Weather

Heat unit accumulation was close to normal and seeding across the province was on time. May had average heat and rainfall, with a large rain event mid-month. Our planting commenced on May 25 and progressed at an even pace. Planting was completed on June 18 at Exeter.

Temperature was very hot from late June through to the end of July, with many days above 30°C. Rainfall was below average in many areas through July and early August, but 22 mm (Exeter) and 62 mm (Ridgetown) on July 10/11 provided some relief. Blyth received regular rainfall through the season, while drought stress was obvious at the Centralia site by mid-July. Dry bean experiments were very slow to mature in September, compared to the soybean crop. A very early killing frost on September 19 (-1.2°C) caused extensive damage to late planted white mold, anthracnose and planting date experiments at Exeter, but caused no damage to all other experiments at all sites. Harvest was completed in late October.

Accumulated rainfall at Ridgeway and the Huron Research Station (Exeter) from May 1 to October 31, 2020



EXECUTIVE SUMMARY

Variety Registration and Performance Trials (ongoing)

Seeding began earlier than normal at Blyth (May 26) and was completed on June 8 at the Centralia site (C. Hicks). Four studies were seeded in 2020 (see table below). The 2020 Blyth site was a new location, at a farm just east of Walton. The site had lower emergence, good rainfall and above average yields. The three trials for the Exeter location were planted at the home farm of C. Hicks near Centralia. Dry hot weather in July resulted in some variability, particularly for the cranberry/kidney bean trials, which had some large differences in yield between cultivars. The fourth replication of the small seeded study had stunted growth, and was dropped from the statistical analysis.

<u>Summary of Registration/Performance Trials, Huron Research Station, 2019</u>				
Location	Market Class	Average Yield	C.V.	Notes
Blyth	Navy	3736	10.5	Above average yield, thinner stands, good rain
Huron RS	Navy	3579	11.4	Above average yield, low rainfall, weaker rep 4
Huron RS	Cran/Kidney	2133	13.6	Below average yield, low rainfall, uneven
Huron RS	Small seed	3622	12.4	Above average yield, low rainfall, dropped rep 4

Preliminary Yield Trials (ongoing)

Our research plan for 2020 was curtailed by the university, in response to the COVID pandemic. This resulted in a temporary halt for the preliminary yield trials.

White Mold Foliar Fungicide in Dry Beans (ongoing)

This is an ongoing study to develop a long term data set for white mold fungicide efficacy and economic returns. Two trials were planted in 2020. Disease pressure was much below average in the first study due to hot dry weather (not harvested), but above average in the second study. Propulse was the best treatment, followed by Circobin, Allegro, Delaro and Cotegra. A second application of Propulse and Allegro was clearly superior to just one application. Cotegra had the highest yield, followed by Allegro, Propulse, Circobin and Delaro. Oxidate and Oro-Solute were two alternative treatments tested in 2020. Both products were ineffective, with disease severity and yield that were similar to the untreated control.

White Mold Fungicide x Fertilizer in Dry Beans (Year 2 of 3)

This study investigated a tank mix of foliar fertilizers + white mold fungicides to determine if the fertilizers antagonized the fungicide efficacy. The experiment was a factorial design with five fungicide (Control, Allegro, Propulse, Cotegra and Acapela) and four foliar fertilizer (Control, Crop Booster, Releaf Mn and Phi 42K) treatments. One trial was planted in 2020. Disease pressure was much below average, due to very dry weather (not harvested).

White Mold in Dry Bean Cultivar x Row Width x Population (Year 2 of 3)

This research was conducted to determine the impact of plant population and row width on white mold disease development in dry beans. Two cultivars (Beryl and Merlot) were chosen – both are very susceptible to white mold, but differ in plant architecture. Each cultivar was planted in two row widths (38 and 76 cm) and four populations (100, 80, 60 and 40%) using 200,000 and 175,000 plants/ha for a 100% plant population in narrow and wide rows, respectively. Disease

severity in Trial A (early planting) was very low (<5%) which resulted in few meaningful differences for yield. Seed yield was higher in narrow rows versus wide rows for Merlot, but not for Beryl. Reduced plant populations increased plant dry weight, reduced canopy cover (Greenseeker) and reduced white mold severity, but there was no impact on seed yield. Disease severity in Trial B (late planting) was moderate (~35%). There was a trend towards higher yield with wide vs narrow rows and lower vs higher populations for the cultivar Beryl only. Seed yield was lower at 40% population than higher populations for Merlot only.

White Mold in Dry Bean Fungicide Application Time of Day (Year 3 of 3)

This research was conducted to determine the impact of the time of day application (6:00, 12:00, 18:00 and 0:00) for the fungicide Allegro on white mold development in dry beans. One study was conducted in 2020. Disease pressure was moderate in the untreated control (35%). There were no differences between the four daily application timing treatments for disease severity or yield.

White Mold Foliar Fungicide in Soybean (ongoing)

This is an ongoing study to develop a long term data set on white mold fungicide efficacy in soybeans. Two trials were planted in 2020. Disease pressure was very low in both studies. In the first study, yield differences between treatments were measured, but the disease severity was very low across all treatments, including the untreated control. Disease pressure was weak in the second study, with only three treatments (Acapela, Stratego Pro and Circobin) having less disease severity than the untreated control. There were no yield differences between the untreated control and the fungicide treatments.

Anthracnose Foliar Fungicide in Dry Beans (ongoing)

This is an ongoing study to develop a long term data set on fungicide efficacy for anthracnose control and calculate the economic returns of fungicide use. A paper was published in 2019, summarizing past work. Two studies were seeded in 2020 about 4 weeks apart, and were inoculated with a spore suspension at first flower. Disease pressure following inoculation was very low in both studies, despite the use of irrigation. There were no differences between the untreated control and the fungicide treatments for disease severity, pick or yield. Data summary tables are not presented.

Anthracnose Fungicide x Foliar Fertilizer in Dry Beans (Year 2 of 3)

This study investigated a tank mix of foliar fertilizers + anthracnose fungicides to determine if the fungicides efficacy was affected. The experiment was organized as a factorial design with five fungicide (Control, Headline, Quadris, Allegro and Propulse) and four foliar fertilizer (Control, Crop Booster, Releaf Mn and Phi 42K) treatments.

Two studies were seeded in 2020 about 4 weeks apart, and were inoculated at first flower. Weather conditions following inoculation were very dry. Despite repeated irrigation, disease pressure was very low in both studies. There were no differences between the untreated control and the fungicide treatments for disease severity, pick or yield. Data summary tables are not presented.

Anthracnose Seed Treatment in Dry Beans (Year 1)

This research was restarted in 2018, as several new seed treatment compounds were recently registered for dry bean in Canada. Seed harvested from previous anthracnose studies were used for all treatments except the non-inoculated control, which used Idaho grown seed of the same cultivar. Two studies were planted about four weeks apart in 2020, to provide different

environmental conditions for disease development. All treatments received Cruiser insecticide to manage soil insect populations. Few differences were measured in plant emergence and vigour. There was no disease development in either study, due to hot and dry weather in July. Irrigating the trials did little to increase disease severity. Disease summary tables are not presented.

Sulphur Fertilizer in Dry Bean (Year 2)

Sulphur Fertilizer Rate

Sulphur is an important secondary nutrient for plants, playing a role in photosynthesis and nitrogen fixation. Deposition of S from atmospheric pollution had been decreasing over the last 25 years. The response of field crops to S fertilizer has been evaluated, but there is little work being conducted on dry beans.

The response of dry beans to S fertilizer were measured using five potassium sulphate fertilizer rates (0, 10, 20, 30, 40 kg S/ha) were applied to four dry bean cultivars (Line 37, Morden 003, Mist and Dynasty). KCl was used to balance potassium rates between treatments. The experiment was conducted on a clay loam soil at the Huron Research Station and a loam soil at Blyth. Line 37 contains high levels of methionine and cysteine, and it is a near isogenic line of Morden 003.

Sulphur fertilizer did not affect plant height, plant development (BBCH), plant dry weight or ground cover at 40 and 60 days after planting at either site. As the rate of S fertilizer increased, there was a measureable increase in crop seed S content at both sites, but seed yield was not affected.

On-Farm Response to Sulphur Fertilizer

Sulphur fertilizer was applied at two rates (0 and 20 kg S/ha) at seven farm locations across Ontario (Hensall, Chiselhurst, Teeswater, Wingham, Huron Research Station (2), Strathroy). Plant height, plant development (BBCH), plant dry weight and ground cover were measured twice at approximately 40 and 60 days after planting. There were no treatment differences at any site. Three sites (Wingham, Strathroy and Huron Research Station Wide Row) had higher seed S content when fertilizer was applied. One site (Wingham) had higher yield in the S fertilizer treated plots.

Dry Bean Cultivar x Row Width x Population (Year 4 of 4)

Large Seed – Four cultivars (Hime otebo, Inferno LRK, Red Hawk DRK and Etna cran) were seeded at two row widths (38 and 76 cm) and four populations (100%, 80%, 60%, and 40%) at one site (Exeter), using 175,000 and 200,000 plants/ha for 100% population in wide and narrow rows, respectively. Small differences were observed between plant populations for plant height and plant dry weight. Narrow row width had higher yield than wide rows for the cultivar Hime only. At 60% plant stand, Inferno and Red Hawk had lower yields than at higher populations. At a 40% plant stand, a yield loss was measured for all cultivars except Hime, compared to higher plant populations.

Small Seed – Four cultivars (T9905 navy, Nautica navy, Rexeter navy and Zorro black) were seeded at four populations (100%, 80%, 60%, and 40%) at two sites (Exeter and Blyth), using 300,000 plants/ha for the 100% population. The Blyth site had lower plant emergence, ranging from 51-77% of the target population. The Blyth site was harvested for yield, but in-season measurements were not taken. Small differences were observed between plant populations for plant height, ground cover (Greenseeker) and plant dry weight. Seed yield at Exeter was lower at a 40% population, compared to the higher populations. Seed yield at Blyth was lower at a 60% population, and lower again at a 40% population, across all cultivars.

Dry Bean Planting Date x Population (Year 3 of 4)

Large Seed – The cultivar Red Hawk (DRK) was seeded in two row widths (38 and 76 cm), four populations (100%, 80%, 60%, and 40%) and five planting dates (May 20, May 30, June 10, June 20 and June 30) at one site (Exeter), using 175,000 and 200,000 plants/ha for 100% population in wide and narrow rows, respectively. The June 10 and June 20 planting dates had slightly lower plant populations (58%) than the other planting dates (67%). Late planting dates had lower plant height, ground cover (Greenseeker) and plant dry weight on August 5. By August 27, later planting dates had higher ground cover, due to leaf drop and maturity in the earlier planting dates. The June 30 planting date was impacted by an early killing frost on September 19, which decreased seed quality and seed weight and increased seed pick, however this planting date had the highest yield, due to timely rains during seed fill. Seed had higher L and b colourimeter values, signifying lighter and yellower seed. Lower plant populations had lower ground cover and higher plant dry weight, compared to higher populations. Seed yield was not impacted by plant population or row width.

Small Seed – Two cultivars (T9905 navy and Zorro black) were seeded at four populations (100%, 80%, 60%, and 40%) and five planting dates (May 20, May 30, June 10, June 20 and June 30) at one site (Exeter), using 300,000 plants/ha for the 100% population. The June 10 and June 20 planting dates had slightly lower plant populations (67%) than earlier planting dates (74%), while the June 30 planting date had the lowest (61%). Late planting dates had lower plant height, ground cover and plant dry weight on August 5. By August 27, later planting dates had higher ground cover, due to leaf drop and maturity in the earlier planting dates. The June 30 planting date was impacted by an early killing frost on September 19, which dramatically decreased seed yield by 39%, compared to the mean of earlier planting dates. Differences in other parameters such as seed quality, seed pick and colourimeter scores were not consistent with planting date. Lower plant populations had lower ground cover. Seed yield decreased by 6% at a 60% population, and decreased by 14% at a 40% population, compared to the mean seed yield at higher populations.

Root Rot Seed Treatment (ongoing)

Our research plan for 2020 was curtailed by the university, in response to the COVID pandemic. This resulted in a temporary halt for the root rot seed treatment trials.

Soybean Cultivar Performance (ongoing)

A summary of the Ontario Soybean and Canola Committee (OSACC) 2800 CHU soybean cultivar performance trials conducted near Exeter ON in 2020 is provided. There are separate studies for Roundup ready cultivars and conventional (food-type) cultivars. The conventional study had low variability (CV = 4.4%) and high yields (65.4 bu/ac). The Roundup ready study had slightly more variability (5.8%), but yields were higher (72.0 bu/ac).

Recent Scientific Publications

Three papers were published in the scientific literature in 2020. The abstracts can be found at the end of the report.

**2020 Dry Bean Navy Registration/Performance, Blyth
University of Guelph, Ridgetown Campus**

No.	Name	% Plant Stand 30 DAP	Yield Rank	Yield (kg/ha)	Yield (cwt/ac)	Plant Maturity (days)	Yield per Day (kg/ha)	CBB Score (1=5; 1=Good)	Plant Harvestability (1-5; 1=good)	Seed Quality (1-5; 1=good)	Seed Weight (g/100)
1	AAC Argosy	58.8	23	3546	31.6	120.0	29.5	0.5	3.4	1.9	23.6
2	AAC Shock	66.3	18	3620	32.3	116.0	31.2	2.0	3.1	1.5	24.9
3	Apex	63.8	31	3376	30.1	118.0	28.6	1.3	3.0	1.5	25.8
4	Armada	57.5	6	4172	37.2	115.0	36.3	2.5	2.0	1.5	23.7
5	Blizzard	62.5	8	4039	36.0	115.0	35.1	2.8	2.5	1.8	20.2
6	Bolt	60.0	29	3389	30.3	112.0	30.3	4.0	1.6	1.5	25.1
7	Indi	58.8	4	4277	38.2	113.0	37.8	3.0	1.9	1.5	20.9
8	Lighthouse	65.0	5	4235	37.8	116.0	36.5	2.3	2.6	1.5	22.0
9	Lightning	50.0	21	3550	31.7	116.0	30.6	3.8	2.9	1.9	23.0
10	HMS Medalist	62.5	2	4639	41.4	115.0	40.3	2.8	2.8	1.9	20.0
11	Mist	58.8	12	3833	34.2	116.0	33.0	1.3	2.3	1.5	22.6
12	Nautica	51.3	34	3088	27.6	117.0	26.4	1.8	2.3	1.8	19.7
13	OAC Plasma	68.8	26	3421	30.5	116.0	29.5	2.3	3.3	2.0	21.9
14	Rexter	53.8	17	3628	32.4	121.0	30.0	0.3	3.4	2.0	20.8
15	SV1893GH	58.8	28	3418	30.5	117.0	29.2	2.0	2.5	1.8	24.6
16	T9905	63.8	10	3971	35.4	116.0	34.2	3.0	3.0	1.8	23.9
17	Thunder	65.0	13	3828	34.2	113.0	33.9	2.8	2.6	1.5	23.3
18	ACUG 16-3	58.8	33	3197	28.5	115.0	27.8	2.5	1.9	1.5	19.8
19	ACUG 16-6	58.8	19	3580	32.0	119.0	30.1	0.0	3.9	1.9	19.8
20	ACUG 18-1	67.5	32	3294	29.4	117.0	28.2	2.0	3.4	1.8	21.4
21	ACUG 18-3	66.3	15	3710	33.1	114.0	32.5	2.0	3.4	1.5	22.7
22	ACUG 18-4	65.0	14	3776	33.7	118.0	32.0	1.3	2.6	1.8	25.2
23	ACUG 18-5	70.0	25	3433	30.6	118.0	29.1	1.3	3.3	1.9	23.2
24	ACUG 19-3	67.5	11	3848	34.3	116.0	33.2	2.5	2.5	1.5	22.6
25	ACUG 19-5	68.8	7	4055	36.2	118.0	34.4	3.0	3.4	1.9	21.1
26	OAC 20-1	65.0	9	4025	35.9	115.0	35.0	3.5	2.4	1.5	21.7
27	OAC 20-2	66.3	22	3547	31.7	118.0	30.1	2.0	3.1	1.6	21.6
28	OAC 20-3	67.5	24	3453	30.8	116.0	29.8	3.0	3.1	1.8	22.1
29	OAC 20-4	66.3	27	3419	30.5	118.0	29.0	1.3	3.0	1.8	19.2
30	OAC 20-5	65.0	30	3386	30.2	115.0	29.4	4.5	1.9	1.8	21.3
31	OAC 20-6	63.8	3	4336	38.7	117.0	37.1	1.8	2.5	1.8	18.6
32	OAC 20-7	66.3	20	3576	31.9	118.0	30.3	1.5	2.8	1.6	22.3
33	OAC 20-8	63.8	16	3704	33.1	119.0	31.1	1.0	3.1	1.6	20.4
34	S03-W4	66.3	1	4650	41.5	117.0	39.7	0.0	1.6	1.5	23.4
Mean		62.9		3736	33.3	116.5	32.1	2.1	2.7	1.7	22.1
LSD (P=.05)		5.6		716	2.2		1.0		0.6	0.3	0.9
CV		6.4		10.5	1.3		35.6		16.5	13.2	2.8
Trt Pr>F (0.05)		0.0001		0.0005	0.0001		0.0001		0.0001	0.001	0.0001

Trial Summary

Design: RCBD, Nearest Neighbour

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 5 m

Seeding Rate: 17 seeds/m

Seed Treatment: Cruiser Maxx Bean + Dynasty

Planting Date: May 26

CBB Rating 0-5 (0 = 0%, 1 < 5%, 2 = 5-10%, 3 = 10-25%, 4 = 25-50%, 5 = 50-100%)

Herbicide: Rival + Dual II Magnum PPI (May 25)

Reflex/Turbocharge (June 17)

Assure/AssureMix (June 22)

Desication: Eragon/Merge (September 15)

Fungicide/Insecticide:

Propulse + Quadris + Matador (July 21)

Senator + Quadris + Matador (August 5)

Harvest Date: September 24

2020 Dry Bean Navy Registration/Performance Exeter
University of Guelph, Ridgetown Campus

No.	Name	Yield Ranking	Yield (kg/ha)	Yield (cwt/ac)	Plant Maturity (DAP)	Yield per Day (kg/ha)	Plant Lodging (1-5; 1=good)	Plant Harvestability (1-5; 1=good)	CBB Score (1=5; 1=Good)	Seed Weight (g/100)	Seed Quality (1-5; 1=good)
1	AAC Argosy	9	3818	34.1	106.5	35.8	2.0	1.5	0.0	24.2	2.0
2	AAC Shock	20	3497	31.2	95.8	36.5	2.0	2.0	0.3	24.3	1.9
3	Apex	7	3868	34.5	102.8	37.6	2.3	2.5	0.5	24.1	2.4
4	Armada	23	3450	30.8	98.5	35.0	1.5	2.5	1.8	22.2	2.3
5	Blizzard	13	3689	32.9	96.8	38.1	2.3	1.8	0.3	19.9	2.3
6	Bolt	30	3214	28.7	90.8	35.4	1.3	1.5	1.8	23.4	2.0
7	Indi	17	3519	31.4	90.8	38.8	1.3	1.0	0.0	19.7	2.3
8	Lighthouse	24	3430	30.6	97.8	35.1	1.5	1.5	0.3	21.1	2.1
9	Lightning	34	2991	26.7	101.3	29.5	2.0	2.3	2.3	21.9	2.4
10	HMS Medalist	18	3512	31.3	96.8	36.3	2.0	1.8	1.0	20.4	2.0
11	Mist	27	3345	29.8	100.3	33.3	1.5	1.8	0.0	22.0	1.9
12	Nautica	26	3367	30.0	102.3	32.9	3.0	3.0	0.0	18.9	2.0
13	OAC Plasma	25	3419	30.5	97.3	35.1	2.3	2.0	0.0	22.2	2.1
14	Rexter	21	3481	31.1	106.5	32.7	2.8	2.5	0.0	20.2	2.3
15	SV1893GH	5	3932	35.1	105.8	37.2	2.8	2.5	1.8	23.3	2.1
16	T9905	14	3677	32.8	98.3	37.4	2.5	2.3	0.3	23.7	2.3
17	Thunder	11	3784	33.8	101.0	37.5	2.0	2.0	3.0	23.4	2.0
18	ACUG 16-3	16	3563	31.8	93.5	38.1	1.3	1.3	0.0	19.6	2.3
19	ACUG 16-6	6	3895	34.8	105.8	36.8	3.0	3.0	0.0	19.4	2.8
20	ACUG 18-1	29	3286	29.3	97.3	33.8	1.5	1.5	0.0	20.1	2.8
21	ACUG 18-3	10	3794	33.9	98.3	38.6	1.8	2.0	0.0	23.5	1.9
22	ACUG 18-4	1	4233	37.8	103.0	41.1	2.0	1.8	0.0	26.0	1.9
23	ACUG 18-5	15	3652	32.6	103.3	35.4	2.5	2.0	0.0	22.5	2.3
24	ACUG 19-3	3	3943	35.2	99.3	39.7	1.8	2.0	1.5	23.0	1.8
25	ACUG 19-5	19	3511	31.3	106.5	33.0	3.5	3.3	0.5	20.6	2.4
26	OAC 20-1	33	3073	27.4	103.3	29.7	1.3	1.3	2.8	22.3	2.0
27	OAC 20-2	12	3725	33.2	104.8	35.5	2.8	3.0	0.0	21.3	2.1
28	OAC 20-3	8	3823	34.1	99.5	38.4	1.8	1.8	0.0	22.2	1.8
29	OAC 20-4	22	3452	30.8	100.5	34.3	1.5	1.8	0.5	19.2	2.3
30	OAC 20-8	32	3138	28.0	101.8	30.8	1.5	1.5	2.0	22.4	2.4
31	OAC 20-6	28	3339	29.8	97.0	34.4	1.8	1.8	0.0	18.3	3.0
32	OAC 20-7	2	4158	37.1	102.3	40.6	1.8	1.8	0.0	21.7	2.3
33	OAC 20-5	4	3941	35.2	107.0	36.8	2.0	2.3	0.0	20.6	2.9
34	S03W4	31	3164	28.2	98.0	32.3	1.0	1.0	0.0	19.9	2.0
Mean			3579	31.9	100.3	35.7	2.0	2.0	0.6	21.7	2.2
LSD (P=.05)			569		3.6		0.8	0.9	1.2	1.0	0.4
CV			11.4		2.6		27.8	30.7	139.7	3.3	11.7
Pr>F(0.05)			0.0012		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001

Trial Summary

Design: RCB

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 5 m

Seeding Rate: 17 seeds/m

Seed Treatment: Cruiser Maxx Bean + Dynasty

CBB Rating 0-5 (0 = 0%, 1 < 5%, 2 = 5-10%, 3 = 10-25%, 4 = 25-50%, 5 = 50-100%)

Herbicide: Rival + Pursuit + Frontier PPI (June 7)

Desication: Eragon + Merge (September 22)

Fungicide/Insecticide:

Allegro + Quadris (July 23)

Propulse + Quadris + Volium Express (July 31)

Planting Date: June 8

Harvest Date: October 11

2020 Dry Bean Small Seed Registration/Performance Exeter

University of Guelph, Ridgetown Campus

No.	Name	Market Class	Yield Ranking	Yield (kg/ha)	Yield (cwt/ac)	Plant Maturity (DAP)	Yield per Day (kg/ha)	Plant Lodging (1-5; 1=good)	Plant Harvestability (1-5; 1=good)	Seed Quality (1-5; 1=good)	Seed Weight (g/100)
1	Viper	small red	2	4063	36.3	94.0	43.2	1.5	1.5	2.6	30.3
2	Merlot	small red	17	3154	28.1	94.0	33.6	1.5	1.3	2.6	39.7
3	OAC Rosito	small red	20	2921	26.1	96.0	30.4	1.5	1.3	2.6	22.6
4	Black Tails	black	9	3763	33.6	93.0	40.5	1.3	1.0	1.9	22.8
5	Blackbeard	black	4	3934	35.1	98.0	40.1	1.0	1.0	1.6	24.8
6	Spectre	black	7	3902	34.8	105.0	37.2	2.0	1.8	2.1	22.8
7	OAC Vortex	black	1	4107	36.6	100.0	41.1	1.5	1.5	2.0	22.5
8	Zenith	black	3	4026	35.9	96.0	41.9	1.3	1.3	2.1	24.1
9	Zorro	black	10	3721	33.2	99.0	37.6	1.3	1.5	2.0	23.0
10	ACUG 19-B2	black	14	3519	31.4	93.0	37.8	1.0	1.0	2.1	21.5
11	ACUG 19-B4	black	16	3363	30.0	99.0	34.0	1.8	1.5	2.1	25.4
12	OAC 20-B2	black	11	3648	32.6	99.0	36.8	3.0	2.0	2.4	22.8
13	OAC 20-B3	black	18	3004	26.8	97.0	31.0	2.0	1.3	2.0	22.6
14	OAC 20-B5	black	6	3911	34.9	99.0	39.5	1.8	2.0	2.4	24.0
15	OAC 20-B1	black	5	3919	35.0	97.0	40.4	1.3	1.3	2.4	25.4
16	OAC 20-B4	black	12	3639	32.5	98.0	37.1	1.0	1.0	2.3	23.3
17	La Paz	pinto	15	3453	30.8	94.0	36.7	1.5	1.5	2.5	40.4
18	OAC 20-P2	pinto	19	2944	26.3	93.0	31.7	1.5	1.3	3.1	41.3
19	OAC 20-P3	pinto	8	3840	34.3	94.0	40.9	1.3	1.3	2.4	44.4
20	OAC 20-P1	pinto	13	3611	32.2	91.0	39.7	1.3	1.3	2.3	43.6
Mean				3622	32.3	96.5	37.6	1.5	1.4	2.3	28.4
LSD (P=.05)				743	4.4			0.7	NA	0.4	2.1
CV				12.4	3.3			34.3	38.7	13.4	5.2
Treatment Prob(F)				0.0266	0.0001			0.0004	0.2339	0.0001	0.0001

Trial Summary

Design: RCBD
 Row Width: Narrow = 15 inch (38 cm)
 Number of Rows Per Plot: 6
 Number of Rows Harvested Per Plot: 4
 Plot Length: 6 m
 Harvest Length: 5 m
 Seeding Rate: 17 seeds/m

Seed Treatment: Cruiser Maxx Bean + Dynasty
 Herbicide: Rival + Pursuit + Frontier PPI (June 7)
 Desiccation: Eragon + Merge (September 22)
 Fungicide/Insecticide: Allegro + Quadris (July 23)
 Propulse + Quadris + Volum Express (July 31)
 Planting Date: June 8
 Harvest Date: October 11

2020 Dry Bean Large Seed Registration/Performance Exeter University of Guelph, Ridgetown Campus

No. Name	Market Class	Yield Rank	Yield (kg/ha)	Yield (cwt/ac)	Plant Maturity (DAP)	Yield per Day (kg/ha)	Seed Weight (g/100)	Seed Quality (1-5; 1=good)
1 ACUG 17-C1	Cran	21	2021	18.0	89.8	22.5	57.8	2.0
2 ACUG 17-C3	Cran	18	2052	18.3	90.8	22.6	62.4	1.8
3 ACUG19-C1	Cran	4	2586	23.1	92.2	28.1	57.8	2.0
4 Amaranto	Cran	29	1820	16.2	84.6	21.5	54.9	2.0
5 Etna	Cran	25	1903	17.0	86.4	22.0	56.8	2.0
6 Jester	Cran	23	1934	17.3	88.7	21.8	55.7	2.0
7 OAC 20-C1	Cran	3	2657	23.7	90.6	29.3	55.6	2.3
8 OAC 20-C2	Cran	16	2229	19.9	91.7	24.3	55.1	2.0
9 OAC 20-C3	Cran	14	2274	20.3	90.8	25.1	56.8	2.3
10 OAC 20-C4	Cran	9	2405	21.5	95.8	25.1	60.0	2.0
11 OAC Candycane	Cran	7	2459	21.9	92.0	26.7	62.0	1.9
12 OAC Jewel	Cran	26	1888	16.8	92.8	20.3	58.8	1.8
13 OAC Racer	Cran	24	1916	17.1	85.7	22.3	58.2	2.1
14 Red Rider	Cran	12	2288	20.4	91.0	25.1	54.7	2.0
15 Vero	Cran	27	1863	16.6	90.3	20.6	55.2	2.3
16 ACUG 19-NDC1	ND Cran	10	2393	21.4	90.6	26.4	49.8	2.0
17 ACUG 16-D2	DRK	6	2462	22.0	89.7	27.4	54.8	1.5
18 ACUG 17-D2	DRK	30	1770	15.8	92.1	19.2	56.3	2.0
19 Dynasty	DRK	17	2076	18.5	91.9	22.6	59.7	1.6
20 Epic	DRK	28	1827	16.3	87.7	20.8	54.7	1.6
21 OAC 20-D1	DRK	22	1985	17.7	89.2	22.3	62.1	1.6
22 OAC 20-D2	DRK	8	2456	21.9	92.5	26.6	65.3	2.0
23 OAC 20-D3	DRK	13	2276	20.3	100.4	22.7	57.7	1.8
24 Rampart	DRK	32	1573	14.0	88.6	17.7	49.5	1.9
25 Red Hawk	DRK	20	2043	18.2	88.5	23.1	50.4	1.8
26 ACUG 18-L1	LRK	5	2531	22.6	90.5	28.0	50.5	1.8
27 Big Red	LRK	19	2046	18.3	84.6	24.2	54.0	1.6
28 OAC 20-L1	LRK	2	2765	24.7	92.1	30.0	61.3	1.6
29 OAC Inferno	LRK	1	2778	24.8	95.2	29.2	59.3	1.8
30 Pink Panther	LRK	33	1462	13.0	84.5	17.3	55.1	2.1
31 Red Dawn	LRK	34	1453	13.0	82.2	17.7	53.8	1.8
32 ACUG 17-W1	WK	11	2391	21.3	91.2	26.2	56.7	1.6
33 ACUG 18-W1	WK	31	1695	15.1	95.9	17.7	53.0	2.0
34 Yeti	WK	15	2242	20.0	92.0	24.4	50.7	1.8
Mean			2133	19.0	90.4	23.6	56.4	1.9
LSD (P=.05)			340.9		4.4		0.4	0.4
CV			13.6		3.3		13.4	14.7
Treatment Prob(F)			0.0001		0.0001		0.0001	0.0018

Trial Summary

Design: RCBD - Nearest Neighbour
Row Width: Narrow = 30 inch (76 cm)
Number of Rows Per Plot: 2
Number of Rows Harvested Per Plot: 2
Plot Length: 6 m
Harvest Length: 4 m
Seeding Rate: 17 seeds/m

Seed Treatment: Cruiser Maxx Bean + Dynasty
Herbicide: Rival + Pursuit + Frontier PPI (June 7)
Fungicide/Insecticide: Allegro + Quadris (July 23)
Propulse + Quadris + Volium Express (July 31)
Planting Date: June 8
Harvest Date: September 11, 15 & 22

2020 White Mold Registered Products Dry Bean 2nd Planting

University of Guelph, Huron Research Station

No.	Name	Rate	Rate Unit	Appl Code	Phytotoxicity (%)		Disease Severity (%)		Seed Weight (g/100)	Seed Quality (1-5;1=good)	Seed Pick (%)	Seed Yield (kg/ha)	Seed Yield-Pick (kg/ha)
					58 DAP	72 DAP	79 DAP	99 DAP					
1	Untreated Check				0.0 a	0.0 a	46.4 a	62.6 a	31.9 a	2.8 a	10.4 gh	2021 fgh	1805 efg
2	Allegro 500F	300	g ai/ha	AB	0.0 a	0.0 a	20.8 b-e	24.3 b-e	31.3 a	2.5 a	11.3 e-h	2952 a-d	2611 ab
3	Allegro 500F	500	g ai/ha	A	0.0 a	0.0 a	29.1 b	39.0 b	31.8 a	2.6 a	11.7 d-h	2315 efg	2044 def
4	Allegro 500F	500	g ai/ha	AB	0.0 a	0.0 a	11.9 e	18.0 cde	31.6 a	2.9 a	16.5 a	3097 ab	2591 abc
5	Allegro + Quadris	300+125	g ai/ha	AB	0.0 a	0.0 a	21.0 b-e	20.8 cde	32.1 a	2.5 a	14.7 abc	2588 b-e	2208 b-e
6	Propulse	200	g ai/ha	AB	0.0 a	0.0 a	16.5 cde	15.8 de	32.1 a	2.6 a	12.1 c-h	3027 abc	2666 ab
7	Propulse	300	g ai/ha	A	0.0 a	0.0 a	26.5 bc	26.8 b-e	31.8 a	2.8 a	12.6 c-g	2532 b-f	2216 b-e
8	Propulse	300	g ai/ha	AB	0.0 a	0.0 a	15.1 de	13.9 e	31.7 a	2.6 a	11.8 d-h	2971 a-d	2622 ab
9	Circobin	1210	g ai/ha	AB	0.0 a	0.0 a	26.5 bc	28.5 b-e	32.7 a	2.9 a	14.1 a-e	2514 c-f	2157 b-e
10	Circobin	1575	g ai/ha	AB	0.0 a	0.0 a	14.9 de	17.1 cde	31.9 a	2.5 a	13.4 b-f	2979 a-d	2582 abc
11	Acapela	220	g ai/ha	AB	0.0 a	0.0 a	25.5 bcd	33.4 bc	32.2 a	2.8 a	14.3 a-d	2442 def	2091 c-f
12	Cotegra	400	g ai/ha	AB	0.0 a	0.0 a	16.0 cde	22.8 b-e	32.8 a	2.6 a	10.7 fgh	3165 a	2823 a
13	Delaro	186.2	g ai/ha	AB	0.0 a	0.0 a	20.0 b-e	19.0 cde	31.8 a	2.9 a	15.9 ab	2901 a-d	2436 a-d
14	Miravis Neo	375	g ai/ha	AB	0.0 a	0.0 a	26.8 bc	31.4 bcd	32.3 a	2.5 a	9.5 h	2629 a-e	2379 a-d
15	Oxidate	1.25	% v/v	AB	0.0 a	0.0 a	54.4 a	67.5 a	30.2 a	3.0 a	14.4 a-d	1609 h	1379 g
16	Oxidate	2.5	% v/v	AB	0.0 a	0.0 a	52.1 a	60.6 a	30.0 a	2.6 a	11.0 fgh	1813 gh	1613 fg
17	Oro-Solute	0.5	% v/v	AB	0.0 a	0.0 a	46.0 a	62.1 a	30.4 a	2.6 a	11.1 fgh	1991 fgh	1773 efg
18	Oro-Solute	0.75	% v/v	AB	0.0 a	0.0 a	50.0 a	68.8 a	30.4 a	2.8 a	10.0 gh	1481 h	1335 g
LSD (P=.05)					NA	NA	11.0	16.5	1.9	0.3	2.8	565	512
CV					0.0	0.0	27.1	33.1	4.3	8.8	16.0	16.0	16.6
Treatment Prob(F)					1.0000	1.0000	0.0001	0.0001	0.1194	0.0948	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, LSD)

Trial Summary

Design: RCBD

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 5 m

Seeding Rate: 17 seeds/m

Seed Treatment: CruiserMaxxBeans + Dynasty

Treatment Applications: August 12, 26

Herbicide: Pursuit 0.2 l/ha, Dual 1.7 l/ha PPI June 5

Irrigated on August 14, 20, 25, 31, September 5, 17

Dessication: Eragon (146ml/ha), Merge (1.0 l/ha) October 8

Planting Date: June 29

Harvest Date: October 14

Conclusions:

* Propulse (trt 8) had the lowest disease severity, followed by Circobin (trt 10), Allegro (trt 4), Delaro (trt 13) and Cotegra (trt 12)

* a second fungicide application (trts 4 and 8) were clearly superior to a single fungicide application (trts 3 and 7)

* seed pick did not seem to correlate to disease severity or yield

* Cotegra (trt 12) had the highest yield followed by Allegro (trt 4), Propulse (trt 6), Circobin (trt 10) and Delaro (trt 13).

* Oxidate and Oro-Solute had disease severity and yield similar to the untreated check

2020 White Mold Cultivar x Row Width x Population Dry Bean Trial A

University of Guelph, Huron Research Station

Factor A Cultivar	Factor B Row Width	Factor C Population	Plant Population (% of desired)		Plant Dry Weight (g)		Plant Height (cm)		Plant Development (BBCH)		13 Greenseeker (0-1)		Disease Severity (%)		Seed Weight (g/100)	Seed Quality (1-5; 1=good)	Seed Pick (%)	Seed Yield (kg/ha)	Seed Yield-Pick (kg/ha)
			15 DAP	58 DAP	52 DAP	45 DAP	64 DAP	45 DAP	64 DAP	93 DAP	107 DAP	(%)	(1-5; 1=good)	(%)	(kg/ha)	(kg/ha)			
Beryl		100	15.7 a	35.0 a	64.0 a	93.0 a	68.0 a	79.0 a	83.0 a	84.0 a	1.0 b	1.9 a	35.0 a	2.2 a	8.8 a	3770 a	3441 a		
Merlot		99	15.6 a	48.8 a	58.0 a	93.0 a	61.0 b	79.0 a	81.0 a	86.0 a	5.0 a	4.1 a	41.2 a	2.3 a	10.2 a	3918 a	3521 a		
	Narrow	101	17.2 a	42.2 a	62.0 a	92.0 a	65.0 a	79.0 a	83.0 a	85.0 a	3.4 a	2.7 a	37.9 a	2.2 a	8.7 a	3952 a	3607 a		
	Wide	98	14.1 b	41.6 a	60.0 a	94.0 a	64.0 b	79.0 a	81.0 b	85.0 a	2.6 a	3.2 a	38.2 a	2.3 a	10.2 a	3735 a	3355 a		
		187500	98	12.5 b	29.0 b	63.0 a	96.0 a	65.0 a	79.0 a	85.0 a	85.0 a	4.3 a	3.7 a	38.1 a	2.2 a	9.1 a	3881 a	3529 a	
		150000	100	13.8 b	33.2 b	61.0 a	93.0 a	64.0 a	79.0 a	84.0 a	85.0 a	3.5 a	4.2 a	38.2 a	2.3 a	8.0 a	3837 a	3529 a	
		112500	100	17.2 a	48.9 a	58.0 a	91.0 a	63.0 a	79.0 a	82.0 b	85.0 a	2.5 a	2.3 b	37.9 a	2.2 a	9.4 a	3955 a	3587 a	
		75000	101	19.1 a	56.6 a	61.0 a	93.0 a	65.0 a	79.0 a	78.0 c	85.0 a	1.6 a	1.7 b	38.1 a	2.3 a	11.3 a	3701 a	3278 a	
Beryl	Narrow		104	17.1 a	34.2 a	65.0 a	93.0 a	69.0 a	79.0 a	84.0 a	84.0 a	1.5 b	2.1 a	34.4 b	2.2 b	8.7 b	3801 b	3471 b	
Beryl	Wide		96	14.3 a	35.8 a	63.0 a	93.0 a	67.0 a	79.0 a	82.0 a	84.0 a	0.5 b	1.8 a	35.5 b	2.2 b	8.8 b	3738 b	3410 b	
Merlot	Narrow		98	17.3 a	50.2 a	58.0 a	91.0 a	62.0 a	79.0 a	82.0 a	86.0 a	5.2 a	3.4 a	41.4 a	2.2 b	8.8 b	4104 a	3743 a	
Merlot	Wide		100	13.9 a	47.5 a	58.0 a	95.0 a	60.0 a	79.0 a	80.0 a	86.0 a	4.7 a	4.7 a	40.9 a	2.4 a	11.5 a	3732 b	3300 c	
Beryl		187500	99	12.9 a	27.0 a	67.0 a	95.0 a	69.0 a	79.0 a	85.0 a	84.0 a	1.1 a	2.5 a	35.2 a	2.3 a	9.6 b	3767 a	3410 a	
Beryl		150000	100	14.7 a	31.6 a	64.0 a	92.0 a	68.0 a	79.0 a	84.0 a	84.0 a	1.7 a	2.4 a	34.9 a	2.2 a	7.2 c	3886 a	3609 a	
Beryl		112500	99	16.5 a	35.8 a	59.0 a	91.0 a	67.0 a	79.0 a	82.0 a	85.0 a	0.8 a	1.7 a	34.7 a	2.2 a	10.0 b	3802 a	3425 a	
Beryl		75000	101	18.8 a	45.6 a	65.0 a	93.0 a	68.0 a	79.0 a	80.0 a	83.0 a	0.4 a	1.0 a	35.2 a	2.1 a	8.4 c	3623 a	3319 a	
Merlot		187500	97	12.2 a	31.0 a	60.0 a	96.0 a	61.0 a	79.0 a	85.0 a	86.0 a	7.5 a	4.9 a	41.0 a	2.1 a	8.7 c	3994 a	3649 a	
Merlot		150000	99	13.0 a	34.8 a	59.0 a	95.0 a	60.0 a	79.0 a	83.0 a	86.0 a	5.3 a	6.1 a	41.5 a	2.3 a	8.9 c	3789 a	3449 a	
Merlot		112500	100	17.9 a	62.0 a	56.0 a	90.0 a	60.0 a	79.0 a	81.0 a	85.0 a	4.2 a	2.8 a	41.1 a	2.2 a	8.7 c	4108 a	3749 a	
Merlot		75000	100	19.5 a	67.6 a	57.0 a	93.0 a	62.0 a	79.0 a	76.0 a	86.0 a	2.8 a	2.4 a	41.1 a	2.5 a	14.3 a	3778 a	3238 a	
	Narrow	200000	99	14.0 a	27.8 a	61.0 a	95.0 a	65.0 a	79.0 a	86.0 a	86.0 a	5.2 a	3.2 a	38.1 a	2.1 a	8.8 a	3920 a	3578 a	
	Narrow	160000	102	15.8 a	35.2 a	62.0 a	93.0 a	64.0 a	79.0 a	85.0 a	86.0 a	4.1 a	3.9 a	38.0 a	2.3 a	7.1 a	3889 a	3613 a	
	Narrow	120000	100	19.4 a	53.8 a	59.0 a	90.0 a	65.0 a	79.0 a	83.0 a	85.0 a	3.0 a	2.1 a	37.7 a	2.1 a	9.4 a	4197 a	3811 a	
	Narrow	80000	103	19.6 a	52.0 a	64.0 a	90.0 a	67.0 a	79.0 a	79.0 a	84.0 a	1.3 a	1.7 a	37.8 a	2.2 a	9.8 a	3803 a	3427 a	
	Wide	175000	97	11.0 a	30.2 a	66.0 a	97.0 a	65.0 a	79.0 a	84.0 a	85.0 a	3.4 a	4.1 a	38.1 a	2.3 a	9.5 a	3842 a	3481 a	
	Wide	140000	98	11.9 a	31.2 a	60.0 a	93.0 a	64.0 a	79.0 a	83.0 a	85.0 a	3.0 a	4.6 a	38.3 a	2.3 a	9.0 a	3786 a	3445 a	
	Wide	105000	100	14.9 a	44.0 a	56.0 a	91.0 a	62.0 a	79.0 a	81.0 a	84.0 a	2.0 a	2.4 a	38.1 a	2.3 a	9.4 a	3714 a	3363 a	
	Wide	70000	98	18.6 a	61.2 a	59.0 a	96.0 a	63.0 a	79.0 a	77.0 a	85.0 a	2.0 a	1.8 a	38.4 a	2.4 a	12.9 a	3599 a	3130 a	
Beryl	Narrow	200000	103	14.7 a	24.4 a	65.0 a	93.0 a	69.0 a	79.0 a	86.0 a	85.0 a	1.5 a	1.4 a	34.8 a	2.3 a	9.1 a	3792 a	3453 a	
Beryl	Narrow	160000	107	17.3 a	29.8 a	66.0 a	93.0 a	68.0 a	79.0 a	86.0 a	85.0 a	2.6 a	3.1 a	34.1 a	2.3 a	7.5 a	3883 a	3592 a	
Beryl	Narrow	120000	99	17.8 a	42.5 a	60.0 a	95.0 a	69.0 a	79.0 a	83.0 a	85.0 a	1.6 a	2.4 a	33.8 a	2.1 a	10.3 a	3947 a	3549 a	
Beryl	Narrow	80000	106	18.8 a	40.1 a	69.0 a	91.0 a	69.0 a	79.0 a	80.0 a	84.0 a	0.5 a	1.3 a	35.0 a	2.1 a	8.0 a	3582 a	3292 a	
Merlot	Narrow	200000	95	13.4 a	31.1 a	58.0 a	96.0 a	61.0 a	79.0 a	86.0 a	87.0 a	8.8 a	5.1 a	41.3 a	2.0 a	8.5 a	4048 a	3703 a	
Merlot	Narrow	160000	97	14.4 a	40.6 a	59.0 a	94.0 a	61.0 a	79.0 a	85.0 a	86.0 a	5.6 a	4.6 a	42.0 a	2.3 a	6.6 a	3895 a	3635 a	
Merlot	Narrow	120000	100	21.1 a	65.0 a	59.0 a	85.0 a	60.0 a	79.0 a	82.0 a	86.0 a	4.5 a	1.9 a	41.5 a	2.1 a	8.4 a	4447 a	4073 a	
Merlot	Narrow	80000	99	20.4 a	63.9 a	59.0 a	89.0 a	65.0 a	79.0 a	77.0 a	85.0 a	2.0 a	2.1 a	40.6 a	2.3 a	11.6 a	4024 a	3561 a	
Beryl	Wide	175000	95	11.1 a	29.6 a	69.0 a	98.0 a	69.0 a	79.0 a	84.0 a	84.0 a	0.6 a	3.6 a	35.6 a	2.3 a	10.1 a	3743 a	3366 a	
Beryl	Wide	140000	94	12.2 a	33.4 a	62.0 a	92.0 a	68.0 a	79.0 a	83.0 a	84.0 a	0.9 a	1.7 a	35.7 a	2.1 a	6.8 a	3888 a	3627 a	
Beryl	Wide	105000	99	15.3 a	29.1 a	59.0 a	87.0 a	65.0 a	79.0 a	81.0 a	84.0 a	0.1 a	1.1 a	35.5 a	2.3 a	9.7 a	3657 a	3302 a	
Beryl	Wide	70000	96	18.7 a	51.0 a	61.0 a	95.0 a	67.0 a	79.0 a	79.0 a	83.0 a	0.3 a	0.7 a	35.3 a	2.1 a	8.8 a	3665 a	3345 a	

Merlot	Wide	175000	99	11.0 a	30.8 a	62.0 a	96.0 a	60.0 a	79.0 a	84.0 a	86.0 a	6.3 a	4.7 a	40.6 a	2.3 a	8.8 a	3941 a	3595 a
Merlot	Wide	140000	102	11.5 a	28.9 a	59.0 a	95.0 a	60.0 a	79.0 a	82.0 a	86.0 a	5.0 a	7.6 a	40.9 a	2.4 a	11.2 a	3684 a	3264 a
Merlot	Wide	105000	100	14.6 a	58.9 a	53.0 a	95.0 a	59.0 a	79.0 a	80.0 a	85.0 a	3.8 a	3.8 a	40.7 a	2.3 a	9.1 a	3770 a	3425 a
Merlot	Wide	70000	100	18.6 a	71.3 a	56.0 a	96.0 a	60.0 a	79.0 a	75.0 a	86.0 a	3.6 a	2.8 a	41.5 a	2.8 a	17.0 a	3532 a	2914 a
Mean				15.7	41.9	60.9	93.1	64.4	79.0	82.1	85.0	3.0	3.0	38.1	2.3	9.5	3844	3481
Pr>F (A)				0.8984	0.1064	0.2250	0.8916	0.0022	0.1447	0.1823	0.1334	0.0480	0.1250	0.0015	0.2967	0.0790	0.3444	0.5676
Pr>F (B)				0.0082	0.8812	0.1307	0.3491	0.0367	0.6847	0.0063	0.2016	0.0526	0.4567	0.2637	0.0134	0.0216	0.0071	0.0007
Pr>F (Ax B)				0.7369	0.5590	0.5041	0.4050	0.6800	0.6847	0.7865	0.6963	0.4590	0.2612	0.0303	0.0134	0.0312	0.0292	0.0031
Pr>F (C)				0.0001	0.0001	0.1279	0.2586	0.3265	0.4790	0.0001	0.2274	0.0032	0.0276	0.9379	0.5860	0.0176	0.3299	0.0748
Pr>F (Ax C)				0.6046	0.0634	0.7834	0.9142	0.6371	0.4790	0.3279	0.3455	0.0429	0.4787	0.7375	0.1202	0.0003	0.5105	0.1566
Pr>F (BxC)				0.5026	0.3128	0.2313	0.7138	0.3634	0.8386	0.9836	0.6789	0.3569	0.9641	0.8992	0.7015	0.4204	0.4542	0.5118
Pr>F (Ax BxC)				0.5992	0.7549	0.7585	0.1578	0.6573	0.8386	0.9777	0.6416	0.6747	0.2461	0.2921	0.7015	0.3928	0.8111	0.5962
LSD 0.05 (A)				NA	NA	NA	NA	2.0	NA	NA	NA	3.9	NA	NA	NA	NA	NA	NA
LSD 0.05 (B)				2.0	NA	NA	NA	2.0	NA	1.0	NA							
LSD 0.05 (Ax B)				NA	1.0	0.1	1.6	188										
LSD 0.05 (C)				2.5	10.5	NA	NA	NA	NA	2.0	NA	NA	1.8	NA	NA	NA	NA	NA
LSD 0.05 (Ax C)				NA	2.0	NA	NA	NA	2.8	NA	NA							
LSD 0.05 (BxC)				NA														
LSD 0.05 (Ax BxC)				NA														

Trial Summary

Planted: 6 rows @ 38 cm or 4 rows @ 76 cm

Design: Split Plot with 4 reps

Inoculum: Sclerotia applied to the soil

Irrigation: August 7,14, 20, 25, 31, September 5

Planting Date: June 15

Herbicide: Pursuit, Dual II Magnum and Roundup - May 28 & Incorporated June 1

Fungicide: as per treatment

Insecticide: Cruiser Maxx Beans seed treatment

Desiccant: Eragon/Merge September 21

Harvest Date: October 6

2020 White Mold Cultivar x Row Width x Population Dry Bean Trial B
University of Guelph, Huron Research Station

Factor A Cultivar	Factor B Row Width	Factor C Population (% of desired)	Plant Population (% of desired)		Plant Vigour (1-10; 1=good)		Plant Height (cm)		Plant Development (BBCH)		Greenseeker (0-1)		Plant Dry Weight (g)		Disease Severity (%)		Seed Weight (g/100)		Seed Quality (1-5; 1=good)		Seed Pick (%)		Seed Yield (kg/ha)		Seed Yield-Pick (kg/ha)	
			21 DAP	21 DAP	21 DAP	45 DAP	65 DAP	45 DAP	65 DAP	45 DAP	65 DAP	100 DAP	40.9 a	27.4 a	32.9 a	2.6 a	9.0 a	2723 a	2479 a	40.9 a	27.4 a	32.9 a	2.6 a	9.0 a	2723 a	2479 a
Beryl		131250	101.2	7.9 b	75.4 a	97.6 a	68.2 a	79.0 a	79.8 a	84.8 a	17.4 a	38.3 a	26.0 a	33.0 a	2.5 b	9.0 a	2723 a	2479 a	40.9 a	27.4 a	32.9 a	2.6 a	9.0 a	2723 a	2479 a	
Merlot		131250	98.4	8.4 a	68.7 a	100.0 a	62.7 b	78.8 a	79.0 a	86.0 a	15.8 a	45.0 a	27.7 a	33.6 a	2.9 a	9.6 a	2445 a	2215 a	40.9 a	27.4 a	32.9 a	2.6 a	9.6 a	2445 a	2215 a	
	Narrow	140000	98.1	8.0 a	72.4 a	99.1 a	65.3 a	78.9 a	80.0 a	85.4 a	17.4 a	40.9 a	27.4 a	32.9 a	2.6 a	9.8 a	2505 a	2262 a	40.9 a	27.4 a	32.9 a	2.6 a	9.8 a	2505 a	2262 a	
	Wide	122500	101.5	8.3 a	71.7 a	98.5 a	65.6 a	78.9 a	78.8 a	85.4 a	15.8 a	42.4 a	26.3 a	33.7 a	2.7 b	8.8 a	2663 a	2432 a	40.9 a	27.4 a	32.9 a	2.6 a	8.8 a	2663 a	2432 a	
		187500	98.6	8.2 a	74.9 a	96.9 a	65.8 a	79.0 a	83.6 a	85.1 a	13.9 c	30.9 c	30.3 a	33.0 a	2.6 c	8.8 a	2506 a	2289 a	40.9 a	27.4 a	32.9 a	2.6 a	8.8 a	2506 a	2289 a	
		150000	99.7	8.1 a	71.0 a	99.0 a	65.7 a	79.0 a	81.9 a	85.3 a	16.2 b	35.9 c	35.3 a	33.4 a	2.7 b	9.1 a	2554 a	2325 a	40.9 a	27.4 a	32.9 a	2.6 a	9.1 a	2554 a	2325 a	
		112500	99.6	8.2 a	70.7 a	98.4 a	65.2 a	78.7 a	79.6 a	85.8 a	16.8 ab	43.6 b	23.5 b	33.2 a	2.7 b	9.4 a	2660 a	2414 a	40.9 a	27.4 a	32.9 a	2.6 a	9.4 a	2660 a	2414 a	
		75000	101.3	8.1 a	71.4 a	100.9 a	65.0 a	78.9 a	72.4 a	85.4 a	19.4 a	56.2 a	18.2 b	33.6 a	2.8 a	9.9 a	2616 a	2360 a	40.9 a	27.4 a	32.9 a	2.6 a	9.9 a	2616 a	2360 a	
Beryl	Narrow		99.7	7.9 a	74.7 a	98.1 a	68.2 a	79.0 a	82.1 a	84.8 a	18.4 a	37.0 a	28.2 a	32.5 a	2.6 a	10.3 a	2516 a	2256 b	40.9 a	27.4 a	32.9 a	2.6 a	10.3 a	2516 a	2256 b	
Beryl	Wide		102.7	7.9 a	76.1 a	97.1 a	68.1 a	79.0 a	77.4 b	84.8 a	16.3 a	39.5 a	23.9 a	33.4 a	2.5 a	7.8 b	2930 a	2701 a	40.9 a	27.4 a	32.9 a	2.5 a	7.8 b	2930 a	2701 a	
Merlot	Narrow		96.4	8.1 a	70.1 a	100.1 a	62.3 a	78.9 a	78.0 b	86.1 a	16.3 a	44.8 a	26.6 a	33.4 a	2.9 a	9.3 a	2495 a	2267 b	40.9 a	27.4 a	32.9 a	2.9 a	9.3 a	2495 a	2267 b	
Merlot	Wide		100.3	8.6 a	67.3 a	99.8 a	63.0 a	78.8 a	80.1 a	86.0 a	15.3 a	45.3 a	28.8 a	33.9 a	2.8 a	9.8 a	2395 a	2163 b	40.9 a	27.4 a	32.9 a	2.8 a	9.8 a	2395 a	2163 b	
Beryl		187500	101.7	7.9 a	73.5 a	94.9 a	68.8 a	79.0 a	84.3 a	84.5 a	14.0 a	26.7 a	26.9 a	32.9 a	2.5 a	9.0 a	2695 a	2455 a	40.9 a	27.4 a	32.9 a	2.5 a	9.0 a	2695 a	2455 a	
Beryl		150000	101.9	7.9 a	73.7 a	99.3 a	68.3 a	79.0 a	81.8 a	84.4 a	16.0 a	33.0 a	38.8 a	33.2 a	2.5 a	9.2 a	2493 a	2264 b	40.9 a	27.4 a	32.9 a	2.5 a	9.2 a	2493 a	2264 b	
Beryl		112500	100.5	8.0 a	76.2 a	95.7 a	68.1 a	79.0 a	79.8 a	85.3 a	17.7 a	40.9 a	25.9 a	32.7 a	2.6 a	8.9 a	2753 a	2510 a	40.9 a	27.4 a	32.9 a	2.6 a	8.9 a	2753 a	2510 a	
Beryl		75000	100.7	7.9 a	78.0 a	100.6 a	67.6 a	79.0 a	73.3 a	85.0 a	21.9 a	52.5 a	12.6 a	33.1 a	2.6 a	9.1 a	2952 a	2686 a	40.9 a	27.4 a	32.9 a	2.6 a	9.1 a	2952 a	2686 a	
Merlot		187500	95.4	8.5 a	76.4 a	98.9 a	62.9 a	79.0 a	83.0 a	85.8 a	13.8 a	35.2 a	33.8 a	33.1 a	2.8 a	8.5 a	2318 a	2123 b	40.9 a	27.4 a	32.9 a	2.8 a	8.5 a	2318 a	2123 b	
Merlot		150000	97.6	8.4 a	68.4 b	98.7 a	63.1 a	79.0 a	82.0 a	86.1 a	16.5 a	38.8 a	31.9 a	33.6 a	2.9 a	9.0 a	2614 a	2385 b	40.9 a	27.4 a	32.9 a	2.9 a	9.0 a	2614 a	2385 b	
Merlot		112500	98.6	8.4 a	65.2 b	101.2 a	62.3 a	78.4 a	79.5 a	86.4 a	16.0 a	46.2 a	21.2 a	33.6 a	2.9 a	9.9 a	2566 a	2317 b	40.9 a	27.4 a	32.9 a	2.9 a	9.9 a	2566 a	2317 b	
Merlot		75000	101.9	8.3 a	64.9 b	101.1 a	62.5 a	78.8 a	71.6 a	85.9 a	16.9 a	59.9 a	23.8 a	34.1 a	3.0 a	10.8 a	2281 a	2034 c	40.9 a	27.4 a	32.9 a	3.0 a	10.8 a	2281 a	2034 c	
	Narrow	200000	95.9	8.0 a	75.9 a	97.9 a	65.9 a	79.0 a	84.5 a	85.1 a	14.9 a	33.6 a	31.3 a	32.1 b	2.7 a	9.4 a	2263 a	2050 b	40.9 a	27.4 a	32.9 a	2.7 a	9.4 a	2263 a	2050 b	
	Narrow	160000	98.8	8.0 a	74.6 a	101.6 a	65.5 a	79.0 a	84.5 a	85.1 a	17.7 a	34.9 a	37.5 a	33.1 a	2.7 a	9.8 a	2582 a	2332 a	40.9 a	27.4 a	32.9 a	2.7 a	9.8 a	2582 a	2332 a	
	Narrow	120000	96.5	8.1 a	69.1 a	98.3 a	64.7 a	78.9 a	81.3 a	86.3 a	18.6 a	42.8 a	18.8 a	33.5 a	2.8 a	9.7 a	2694 a	2435 a	40.9 a	27.4 a	32.9 a	2.8 a	9.7 a	2694 a	2435 a	
	Narrow	80000	101.0	8.0 a	70.0 a	98.6 a	65.1 a	78.8 a	69.9 c	85.1 a	18.2 a	52.3 a	22.0 a	33.0 ab	2.8 a	10.2 a	2482 a	2230 a	40.9 a	27.4 a	32.9 a	2.8 a	10.2 a	2482 a	2230 a	
	Wide	175000	101.2	8.4 a	74.0 a	95.9 a	65.8 a	79.0 a	82.8 a	85.1 a	12.8 a	28.2 a	29.4 a	34.0 a	2.6 a	8.1 a	2750 a	2529 a	40.9 a	27.4 a	32.9 a	2.6 a	8.1 a	2750 a	2529 a	
	Wide	140000	100.6	8.3 a	67.5 a	96.4 a	65.9 a	79.0 a	79.3 b	85.4 a	14.8 a	36.9 a	33.1 a	33.7 a	2.7 a	8.5 a	2525 a	2317 a	40.9 a	27.4 a	32.9 a	2.7 a	8.5 a	2525 a	2317 a	
	Wide	105000	102.6	8.3 a	72.3 a	98.5 a	65.6 a	78.5 a	78.0 b	85.4 a	15.1 a	44.4 a	28.3 a	32.8 b	2.7 a	9.1 a	2626 a	2392 a	40.9 a	27.4 a	32.9 a	2.7 a	9.1 a	2626 a	2392 a	
	Wide	70000	101.5	8.1 a	72.9 a	103.1 a	65.0 a	79.0 a	75.0 b	85.8 a	20.6 a	60.1 a	14.4 a	34.1 a	2.8 a	9.6 a	2751 a	2491 a	40.9 a	27.4 a	32.9 a	2.8 a	9.6 a	2751 a	2491 a	
Beryl	Narrow	200000	101.0	8.0 a	72.2 a	95.0 a	69.0 a	79.0 a	86.0 a	84.5 a	14.7 a	29.9 a	33.8 a	31.8 a	2.5 a	9.9 a	2236 c	2011 a	40.9 a	27.4 a	32.9 a	2.5 a	9.9 a	2236 c	2011 a	
Beryl	Narrow	160000	101.0	7.8 a	77.0 a	102.7 a	68.3 a	79.0 a	86.3 a	84.3 a	17.2 a	34.0 a	45.0 a	32.9 a	2.5 a	10.7 a	2291 c	2043 a	40.9 a	27.4 a	32.9 a	2.5 a	10.7 a	2291 c	2043 a	
Beryl	Narrow	120000	97.9	8.0 a	76.7 a	96.0 a	68.3 a	79.0 a	83.0 a	85.8 a	20.4 a	40.3 a	17.5 a	32.7 a	2.6 a	10.5 a	2655 b	2378 a	40.9 a	27.4 a	32.9 a	2.6 a	10.5 a	2655 b	2378 a	
Beryl	Narrow	80000	99.0	8.0 a	72.9 a	98.6 a	67.3 a	79.0 a	73.0 a	84.5 a	21.4 a	44.0 a	16.5 a	32.6 a	2.6 a	10.1 a	2882 a	2593 a	40.9 a	27.4 a	32.9 a	2.6 a	10.1 a	2882 a	2593 a	
Merlot	Narrow	200000	90.8	8.0 a	79.6 a	100.8 a	62.8 a	79.0 a	83.0 a	85.8 a	15.2 a	37.4 a	28.8 a	32.4 a	2.9 a	8.9 a	2290 bc	2088 a	40.9 a	27.4 a	32.9 a	2.9 a	8.9 a	2290 bc	2088 a	
Merlot	Narrow	160000	96.6	8.3 a	72.2 a	100.5 a	62.7 a	79.0 a	82.8 a	86.0 a	18.2 a	35.8 a	30.0 a	33.4 a	2.9 a	8.9 a	2874 a	2622 a	40.9 a	27.4 a	32.9 a	2.9 a	8.9 a	2874 a	2622 a	
Merlot	Narrow	120000	95.1	8.3 a	61.5 a	100.6 a	61.1 a	78.8 a	79.5 a	86.8 a	16.8 a	45.3 a	20.0 a	34.3 a	2.9 a	8.9 a	2733 ab	2491 a	40.9 a	27.4 a	32.9 a	2.9 a	8.9 a	2733 ab	2491 a	
Merlot	Narrow	80000	103.1	8.0 a	67.0 a	98.5 a	62.8 a	78.7 a	66.8 a	85.8 a	15.0 a	60.7 a	27.5 a	33.5 a	3.0 a	10.4 a	2082 c	1866 a	40.9 a	27.4 a	32.9 a	3.0 a	10.4 a	2082 c	1866 a	
Beryl	Wide	175000	102.4	7.8 a	74.9 a	94.8 a	68.6 a	79.0 a	82.5 a	84.5 a	13.3 a	23.4 a	20.0 a	34.1 a	2.5 a	8.1 a	3153 a	2899 a	40.9 a	27.4 a	32.9 a	2.5 a	8.1 a	3153 a	2899 a	
Beryl	Wide	140000	102.7	8.0 a	70.5 a	95.9 a	68.3 a	79.0 a	77.3 a	84.5 a	14.8 a	32.0 a	32.5 a	33.4 a	2.5 a	7.8 a	2695 b	2486 a	40.9 a	27.4 a	32.9 a	2.5 a	7.8 a	2695 b	2486 a	
Beryl	Wide	105000	103.2	8.0 a	75.7 a	95.3 a	67.8 a	79.0 a	76.5 a	84.8 a	14.9 a	41.6 a	34.3 a	32.7 a	2.5 a	7.3 a	2852 a	2641 a	40.9 a	27.4 a	32.9 a	2.5 a	7.3 a	2852 a	2641 a	
Beryl	Wide	70000	102.4	7.8 a	83.2 a	102.5 a	67.9 a	79.0 a	73.5 a	85.5 a	22.3 a	61.0 a	8.8 a	33.												

Mean	99.8	8.2	72.0	98.8	65.4	78.9	79.4	85.4	16.6	41.7	26.8	33.3	2.7	9.3	2584	2347
Pr>F (A)	0.2873	0.0358	0.1760	0.2474	0.0020	0.3910	0.5076	0.0051	0.1115	0.0633	0.4144	0.1976	0.0351	0.3727	0.0139	0.1910
Pr>F (B)	0.2460	0.1405	0.8086	0.7307	0.7080	0.3559	0.1473	1.0000	0.3537	0.6713	0.8275	0.0282	0.0498	0.1146	0.1288	0.0932
Pr>F (AxB)	0.8653	0.0715	0.4661	0.8555	0.6256	0.3559	0.0049	0.8423	0.7330	0.7869	0.5124	0.4041	1.0000	0.0244	0.0284	0.1850
Pr>F (C)	0.8196	0.8957	0.3239	0.6011	0.4762	0.3382	0.0001	0.3942	0.0045	0.0001	0.0091	0.5886	0.0282	0.2983	0.5321	0.6596
Pr>F (AxC)	0.5951	0.8957	0.0157	0.6954	0.8866	0.3382	0.9454	0.7643	0.2500	0.9798	0.2445	0.7120	0.2880	0.2750	0.0089	0.0059
Pr>F (BxC)	0.7910	0.8957	0.1577	0.4055	0.8070	0.4813	0.0300	0.3401	0.1611	0.4987	0.3613	0.0399	0.6701	0.8877	0.0459	0.0471
Pr>F (AxByC)	0.6894	0.3728	0.1386	0.9447	0.4264	0.4813	0.8688	0.9396	0.7001	0.4434	0.2503	0.7500	0.2147	0.4263	0.0442	0.0543
LSD 0.05 (A)	NA	0.4	NA	NA	1.7	NA	0.3	NA	NA	NA						
LSD 0.05 (B)	NA	0.1	NA	NA	NA											
LSD 0.05 (AxB)	NA	NA	NA	NA	NA	NA	2.7	NA	NA	NA	NA	NA	NA	1.8	NA	296
LSD 0.05 (C)	NA	2.9	8.6	10.2	NA	0.1	NA	NA	NA							
LSD 0.05 (AxC)	NA	NA	7.3	NA	293											
LSD 0.05 (BxC)	NA	NA	NA	NA	NA	NA	5.0	NA	NA	NA	NA	NA	1.2	NA	NA	293
LSD 0.05 (AxByC)	NA	449	NA													

Trial Summary

Planted: 6 rows @ 38 cm or 4 rows @ 76 cm

Design: Split Plot with 4 reps

Inoculum: Sclerotia applied to the soil

Irrigation: August 14, 20, 25, 31, September 5, 17

Planting Date: June 29

Herbicide: Pursuit, Dual II Magnum and Roundup - June 5 & Incorporated June 23

Fungicide: as per treatment

Insecticide: Cruiser Maxx Beans seed treatment

Desiccant: Eragon/Merge October 8

Harvest Date: October 16

2020 White Mold Time of Day Application 2nd Planting

University of Guelph, Huron Research Station

No.	Name	Rate	Unit	Phytotoxicity (%)			Disease Severity (%)		Seed Weight	Seed Quality	Seed Pick	Seed Yield	Seed Yield-Pick
				58 DAP	72 DAP	79 DAP	99 DAP	(g/100)	(1-5;1=good)	(%)	(kg/ha)	(kg/ha)	
1	Untreated Check			0.0 a	0.0 a	20.0 a	35.0 a	30.8 a	2.6 a	10.9 a	2537 b	2270 a	
2	Allegro 500F - 6:00	500	g ai/ha	AB	0.0 a	0.0 a	8.6 a	8.3 b	32.8 a	2.9 a	14.9 a	3270 a	2790 a
3	Allegro 500F - 12:00	500	g ai/ha	AB	0.0 a	0.0 a	9.5 a	8.1 b	33.4 a	2.9 a	15.5 a	3255 a	2754 a
4	Allegro 500F - 18:00	500	g ai/ha	AB	0.0 a	0.0 a	9.5 a	4.1 b	33.7 a	2.5 a	13.2 a	3302 a	2866 a
5	Allegro 500F - 24:00	500	g ai/ha	AB	0.0 a	0.0 a	10.0 a	10.3 b	33.2 a	2.8 a	16.6 a	3214 a	2682 a
LSD (P=.05)				NA	NA	15.2	15.2	2.1	0.3	4.5	493.8	492.6	
CV				0.0	0.0	85.8	75.3	4.2	8.0	20.7	10.3	12.0	
Treatment Prob(F)				1.0000	1.0000	0.4802	0.0057	0.0695	0.1283	0.1188	0.0252	0.1368	

Means followed by same letter do not significantly differ (P=.05, LSD)

Trial Summary

Design: RCBD

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 5 m

Seeding Rate: 17 seeds/m

Seed Treatment: CruiserMaxxBeans + Dynasty

Treatment Applications: August 12, 26

Herbicide: Pursuit 0.2 l/ha, Dual 1.7 l/ha PPI June 5

Irrigated on August 14, 20, 25, 31, September 5, 17

Dessication: Eragon (146ml/ha), Merge (1.0 l/ha) October 8

Planting Date: June 29

Harvest Date: October 14

Conclusions:

* the Allegro treatments reduced white mold severity and increased yield, compared to the untreated check

* the time of day for application did not influence disease severity scores or seed yield

* there were no differences between treatments for any other parameter measured

2020 White Mold Registered Products Soybean 1st Planting
University of Guelph, Ridgetown Campus

Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Phytotoxicity		Disease Severity 92 DAP	Seed Weight (g/100)	Yield (kg/ha)	Yield (bu/ac)
					57 DAP	71 DAP				
1	Untreated Check				0.0 a	0.0 a	3.7 a	21.1 bc	5006 bcd	74.4 bcd
2	Acapela	0.88	l/ha	A	0.0 a	0.0 a	1.5 a	20.8 bcd	5174 bc	76.9 bc
3	Acapela	0.88	l/ha	AB	0.0 a	0.0 a	1.3 a	21.2 b	5193 abc	77.2 abc
4	Allegro	0.44	l/ha	A	0.0 a	0.0 a	1.3 a	20.4 b-e	5159 bc	76.7 bc
5	Allegro	0.44	l/ha	AB	0.0 a	0.0 a	0.5 a	20.8 bcd	4959 b-e	73.7 b-e
6	Stratego Pro +Agral90	0.5714+.125%	l/ha	A	0.0 a	0.0 a	0.7 a	19.7 e	4833 de	71.9 de
7	Stratego Pro +Agral90	0.5714+.125%	l/ha	AB	0.0 a	0.0 a	0.5 a	20.6 b-e	5030 bcd	74.8 bcd
8	Cotegra	0.7	l/ha	A	0.0 a	0.0 a	1.1 a	21.1 bc	5212 ab	77.5 ab
9	Cotegra	0.7	l/ha	AB	0.0 a	0.0 a	0.7 a	20.2 cde	4698 e	69.9 e
10	Priaxor + Cotegra	0.45	l/ha	A	0.0 a	0.0 a	1.3 a	22.3 a	5446 a	81 a
11	Cotegra + Priaxor	0.7	l/ha	A	0.0 a	0.0 a	1.5 a	20.5 b-e	4883 de	72.6 de
12	Circobin	1210	g ai/ha	AB	0.0 a	0.0 a	1.0 a	20.3 b-e	4785 de	71.1 de
13	Miravis Neo	375	g ai/ha	AB	0.0 a	0.0 a	1.8 a	20.0 de	4941 cde	73.5 cde
LSD (P=.05)					NA	NA	NA	0.9	268	4.0
CV					0.0	0.0	114.4	3.2	3.7	3.7
Treatment Prob(F)					1.0000	1.0000	0.2900	0.0006	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, LSD)

Trial Summary

Design: RCBD

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 4 m

Seeding Rate: 20 seeds/m

Seed Treatment: CruiserMaxxBeans

Treatment Applications: 1st on July 24 (R1.5), 2nd on August 6

Herbicide: Pursuit 0.2 l/ha, Dual 1.7 l/ha Roundup May 28, Incorporated June 1

Irrigated on August 7, 14, 20, 25, 31, September 5

Planting Date: June 1

Harvest Date: October 9

Conclusions:

* white mold disease severity was very low, and there were no differences between fungicides and the untreated check

* treatment differences for yield were not due to any measured parameter, and cannot be explained

2020 White Mold Registered Products Soybean 2nd Planting University of Guelph, Ridgetown Campus

Trt No.	Treatment Name	Rate	Unit	Appl Code	Phytotoxicity		Disease Severity 92 DAP	Seed Weight (g/100)	Yield (kg/ha)	Yield (bu/ac)
					57 DAP	71 DAP				
1	Untreated Check				0.0	0.0	7.8 ab	19.4 bc	4552 a	67.7 a
2	Acapela	0.88	l/ha	A	0.0	0.0	6.4 abc	19.9 abc	4590 a	68.3 a
3	Acapela	0.88	l/ha	AB	0.0	0.0	0.8 e	19.7 abc	4642 a	69.0 a
4	Allegro	0.44	l/ha	A	0.0	0.0	5.9 abc	19.3 bc	4494 a	66.8 a
5	Allegro	0.44	l/ha	AB	0.0	0.0	4.8 bcd	20.3 a	4353 a	64.7 a
6	Stratego Pro +Agral90	0.5714+.125%	l/ha	A	0.0	0.0	4.6 bcd	20.2 a	4547 a	67.6 a
7	Stratego Pro +Agral90	0.5714+.125%	l/ha	AB	0.0	0.0	2.5 de	19.7 abc	4495 a	66.8 a
8	Cotegra	0.7	l/ha	A	0.0	0.0	6.3 abc	19.3 bc	4425 a	65.8 a
9	Cotegra	0.7	l/ha	AB	0.0	0.0	4.7 bcd	20.3 a	4540 a	67.5 a
10	Priaxor + Cotegra	0.45	l/ha	A	0.0	0.0	5.5 a-d	20.0 ab	4683 a	69.6 a
11	Cotegra + Priaxor	0.7	l/ha	A	0.0	0.0	4.6 bcd	19.9 abc	4474 a	66.5 a
12	Circobin	1210	g ai/ha	AB	0.0	0.0	4.2 cd	20.4 a	4420 a	65.7 a
13	Miravis Neo	375	g ai/ha	AB	0.0	0.0	8.5 a	19.1 c	4536 a	67.4 a
LSD (P=.05)					NA	NA	3.3	0.8	NA	NA
CV					0.0	0.0	45.7	2.7	3.4	3.4
Treatment Prob(F)					1.0000	1.0000	0.0051	0.0182	0.1995	0.1987

Means followed by same letter do not significantly differ (P=.05, LSD)

Trial Summary

Design: RCBD

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 4 m

Seeding Rate: 20 seeds/m

Seed Treatment: CruiserMaxxBeans

Treatment Applications: 1st on August 6 (R1.5), 2nd on August 19

Herbicide: Pursuit 0.2 l/ha, Dual 1.7 l/ha Roundup June 5, Incorporated June 16

Irrigated on August 14, 20, 25, 31, September 5, 17

Planting Date: June 16

Harvest Date: October 14

Conclusions:

* slight treatment differences were measured for disease severity, with Acapela and Stratego Pro having the lowest scores

* the small differences between treatments in disease severity did not result in differences in yield

2020 Sulphur Fertility Rates in Dry Bean

Blyth

Factor A (Kg/ha)	Plant Height	Plant Development	Plant Dry Weight	Greenseeker	Plant Height	Plant Development	Plant Dry Weight	Greenseeker	100 Seed Weight (g/100 seeds)	Seed Quality (1-5; 1=good)	Yield (kg/ha)	Sulfur (%)				
	48 DAP				63 DAP											
	(cm)	(BBCH)	(g)	(0-100)	(cm)	(BBCH)	(g)	(0-100)								
1 0 kg/ha	38.7	64.4	5.5	76.9	54.8	73.1	12.8	83.3	32.5	1.8	3054	0.17 b				
2 10 kg/ha	39.9	65.2	6.5	77.6	57.2	72.6	14.2	82.6	32.4	1.9	3020	0.17 b				
3 20 kg/ha	39.3	64.9	5.9	78.8	55.8	72.0	12.3	83.5	31.6	1.8	3100	0.18 a				
4 30 kg/ha	42.2	64.9	6.4	77.5	57.3	72.5	13.4	82.9	32.7	1.8	3122	0.18 a				
5 40 kg/ha	40.4	64.4	6.2	77.4	55.6	73.3	14.9	83.1	32.2	1.8	3061	0.18 a				
Factor B (Cultivar)																
1 Line 37	47.4 a	66.4 a	5.8 b	77.9 b	55.6 b	72.3 b	11.6 b	82.3	20.8 c	2.0 c	2309 d	0.18 b				
2 Morden 003	37.0 c	65.9 a	5.5 b	78.2 b	49.9 c	72.9 b	11.4 b	82.9	21.8 b	2.0 c	2594 c	0.18 b				
3 Mist	35.6 c	60.1 b	6.8 a	72.4 c	62.8 a	71.1 c	17.9 a	83.6	21.6 bc	1.6 a	4374 a	0.19 a				
4 Dynasty	40.3 b	66.5 a	6.2 ab	82.1 a	56.2 b	74.4 a	13.2 b	83.6	65.1 a	1.9 b	3008 b	0.17 c				
Factor A x B																
1 0 kg/ha	Line 37	46.9	65.4	4.9	76.3	57.1	73.7	10.5	82.3	21.1	2.0	2318	0.18			
2 0 kg/ha	Morden 003	47.7	67.2	7.0	77.8	54.8	72.4	12.4	82.0	20.6	2.0	2208	0.18			
3 0 kg/ha	Mist	45.0	67.0	5.5	78.3	52.8	72.2	10.5	82.5	20.9	2.0	2313	0.17			
4 0 kg/ha	Dynasty	49.7	66.5	6.4	78.3	56.5	71.3	12.0	83.5	20.6	2.0	2506	0.18			
5 10 kg/ha	Line 37	48.0	66.2	5.3	78.8	57.0	72.2	12.3	81.3	20.7	2.0	2202	0.18			
6 10 kg/ha	Morden 003	35.9	66.4	5.5	77.5	49.5	73.5	10.6	83.8	21.8	2.0	2427	0.18			
7 10 kg/ha	Mist	35.1	64.8	5.0	79.3	50.8	73.1	11.2	82.0	22.0	2.0	2641	0.18			
8 10 kg/ha	Dynasty	36.7	65.6	5.5	79.3	50.5	72.3	12.1	83.5	21.8	2.0	2727	0.17			
9 20 kg/ha	Line 37	39.6	66.3	5.5	77.0	50.1	72.5	10.6	81.5	22.1	2.0	2604	0.18			
10 20 kg/ha	Morden 003	37.9	66.3	5.8	77.8	48.8	73.3	12.5	83.8	21.5	2.0	2568	0.19			
11 20 kg/ha	Mist	34.9	59.0	6.1	73.0	57.1	69.8	14.8	83.5	21.8	1.6	4376	0.18			
12 20 kg/ha	Dynasty	35.1	61.7	7.1	71.0	66.4	71.8	20.4	83.8	22.1	1.6	4412	0.18			
13 30 kg/ha	Line 37	34.0	60.3	6.0	74.3	64.2	70.4	14.8	84.5	21.7	1.5	4307	0.20			
14 30 kg/ha	Morden 003	37.9	60.2	7.9	73.3	64.7	71.2	18.7	82.5	21.4	1.5	4307	0.19			
15 30 kg/ha	Mist	36.3	59.6	7.0	70.5	61.5	72.4	20.7	83.5	20.9	1.5	4469	0.20			
16 30 kg/ha	Dynasty	37.2	66.9	5.3	80.8	55.6	75.3	15.0	83.5	65.5	1.6	3096	0.15			
17 40 kg/ha	Line 37	41.7	67.0	6.7	82.3	56.7	73.2	12.7	82.8	64.8	2.0	2819	0.17			
18 40 kg/ha	Morden 003	41.6	66.6	6.4	83.3	55.7	73.0	11.9	83.5	62.3	1.9	3054	0.18			
19 40 kg/ha	Mist	41.7	66.9	6.0	81.5	58.1	75.1	12.3	84.3	66.9	1.9	3070	0.17			
20 40 kg/ha	Dynasty	39.5	65.4	6.7	82.5	55.1	75.3	13.9	83.8	65.8	1.9	3003	0.17			
Pr>F (A)		0.2564	0.8408	0.2782	0.3489	0.3041	0.2513	0.2234	0.6669	0.3930	0.7204	0.9328	0.0117			
Pr>F (B)		<0.0001	<0.0001	0.0398	<0.0001	<0.0001	<0.0001	<0.0001	0.0698	<0.0001	<0.0001	<0.0001	<0.0001			
Pr>F (A x B)		0.9809	0.9185	0.8058	0.7440	0.2853	0.4166	0.6057	0.4578	0.2344	0.7493	0.9527	0.4233			
LSD 0.05 (A)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.01			
LSD 0.05 (B)		2.9	1.5	0.9	1.6	2.5	1.1	2.2	NS	1.0	0.1	222	0.01			
LSD 0.05 (A x B)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS			

^a - sulphur was applied via potassium sulfate. Potassium chloride was used to balance K20 rates between treatments

Trial Summary

Design: factorial arrangement in a randomized complete block

Planting Date: May 26

Cultivars: Mist, Line 37, Morden 003 (navy); Dynasty (DRK)

Harvest Date: September 24

Seeding Rate: 18 seeds/m row

Herbicide: May 25 - Rival + Dual II Magnum PPI

June 17 - Reflex/Turbocharge

June 22 - Assure/AssureMix

Fungicide: July 21 - Propulse + Quadris + Matador

August 5 - Senator + Quadris + Matador

Desiccant: September 15 - Eragon/Merge

Rep	Soil Analysis				
	pH	P	K	Mg	S04-S
1	7.5	25	198	346	2.7
2	4.6	24	209	417	2.5
3	7.6	24	192	403	2.9
4	7.5	23	209	487	2.5

2020 Sulphur Fertility Rates in Dry Bean

Exeter

Factor A (S Rate)	Plant Height	Plant Development	Plant Dry Weight	Greenseeker	Plant Height	Plant Development	Plant Dry Weight	Greenseeker	100 Seed Weight	Seed Quality	Yield (kg/ha)	Seed Sulfur (%)		
	44 DAP				64 DAP				(g/100 seeds)	(1-5; 1=good)				
	(cm)	(BBCH)	(g)	(0-100)	(cm)	(BBCH)	(g)	(0-100)						
1 0 kg/ha	31.7	57.1	3.9	65.4	48.2	75.7	14.2	78.5	29.9	2.0	2025	0.16 b		
2 10 kg/ha	31.0	57.2	4.2	68.3	48.4	74.6	12.0	79.0	29.8	2.0	1987	0.17 a		
3 20 kg/ha	31.5	57.3	4.3	66.1	48.1	75.6	13.2	78.6	29.3	2.1	2076	0.16 b		
4 30 kg/ha	29.6	57.5	3.9	66.1	49.0	74.8	12.7	78.8	29.8	2.1	1954	0.17 a		
5 40 kg/ha	33.0	58.4	4.3	69.1	50.3	75.6	14.3	80.1	29.3	2.1	2143	0.17 a		
Factor B (Cultivar)														
1 Line 37	37.5 a	58.2 b	3.9 b	72.1 b	51.1 b	74.0 bc	11.6 bc	78.3 bc	21.6 b	2.2 c	1683 c	0.16 c		
2 Morden 003	27.5 c	57.5 b	3.5 b	67.0 c	38.6 c	75.0 b	9.3 c	77.3 c	21.4 bc	2.2 c	1372 d	0.17 b		
3 Mist	25.4 c	52.8 c	4.0 b	54.4 d	56.1 a	73.6 c	18.7 a	79.9 ab	20.5 c	2.0 b	2859 a	0.18 a		
4 Dynasty	35.0 b	61.4 a	5.0 a	74.7 a	49.4 b	78.5 a	13.6 b	80.6 a	54.9 a	1.9 a	2234 b	0.15 d		
Factor A x B														
1 0 kg/ha	Line 37	36.8	57.6	3.8	67.8	50.3	75.2	13.1	76.5	21.6	2.1	1575	0.15	
2 0 kg/ha	Morden 003	39.4	57.8	4.3	75.0	49.1	73.4	10.3	78.0	22.0	2.1	1671	0.16	
3 0 kg/ha	Mist	41.5	58.9	4.3	71.5	50.8	74.1	10.9	79.0	21.4	2.0	1704	0.16	
4 0 kg/ha	Dynasty	32.2	56.5	3.5	71.8	50.6	72.7	11.2	77.0	21.5	2.3	1671	0.17	
5 10 kg/ha	Line 37	37.7	60.5	3.6	74.3	54.6	74.6	12.6	80.8	21.7	2.3	1793	0.15	
6 10 kg/ha	Morden 003	27.0	56.9	2.7	67.0	38.2	73.8	8.4	77.0	22.0	2.0	1348	0.17	
7 10 kg/ha	Mist	27.9	57.8	3.4	68.8	38.9	76.6	9.7	77.5	21.9	2.0	1510	0.18	
8 10 kg/ha	Dynasty	26.5	56.2	4.0	67.5	36.9	74.8	9.4	76.3	20.7	2.3	1309	0.16	
9 20 kg/ha	Line 37	27.3	57.6	3.7	62.0	39.4	74.1	9.8	77.3	21.8	2.3	1149	0.18	
10 20 kg/ha	Morden 003	29.1	58.9	3.6	69.5	39.8	75.6	9.2	78.5	20.8	2.3	1546	0.18	
11 20 kg/ha	Mist	26.4	52.9	4.0	50.3	54.5	75.4	21.7	79.8	21.3	2.0	2798	0.17	
12 20 kg/ha	Dynasty	24.3	52.7	4.2	55.3	55.1	70.4	13.9	80.0	21.3	2.0	2673	0.19	
13 30 kg/ha	Line 37	23.4	52.5	3.3	52.0	54.4	74.7	18.7	77.8	18.1	2.0	2893	0.18	
14 30 kg/ha	Morden 003	23.8	52.2	3.6	56.8	57.4	73.7	18.1	80.5	20.5	2.0	2753	0.18	
15 30 kg/ha	Mist	29.0	53.9	5.1	57.5	59.0	73.9	21.2	81.3	21.1	2.0	3177	0.19	
16 30 kg/ha	Dynasty	36.5	61.1	5.0	76.8	49.8	78.7	13.8	80.8	54.6	1.8	2378	0.14	
17 40 kg/ha	Line 37	32.5	60.6	4.8	74.0	50.6	77.9	14.3	80.5	54.1	1.9	2094	0.15	
18 40 kg/ha	Morden 003	34.8	61.5	5.5	73.5	50.5	79.0	13.9	81.5	57.0	2.0	2397	0.15	
19 40 kg/ha	Mist	35.2	63.6	4.8	73.8	48.7	78.8	11.9	80.3	55.3	1.9	2244	0.15	
20 40 kg/ha	Dynasty	36.3	60.2	4.8	75.3	47.8	78.3	14.4	79.8	53.5	2.0	2056	0.16	
Pt>F (A)		0.2011	0.4760	0.7118	0.1582	0.7549	0.277	0.7001	0.4708	0.7056	0.2267	0.6963	0.007	
Pt>F (B)		<0.0001	<0.0001	0.0012	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	
Pt>F (A x B)		0.2450	0.2844	0.6638	0.4420	0.9598	0.0568	0.9528	0.6736	0.0703	0.7542	0.8322	0.6532	
LSD 0.05 (A)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.01	
LSD 0.05 (B)		2.5	1.4	0.7	3.1	3.3	1.2	3.3	1.7	1.1	0.1	253	0.01	
LSD 0.05 (A x B)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

^a - sulphur was applied via potassium sulfate. Potassium chloride was used to balance K20 rates between treatments

Trial Summary

Design: factorial arrangement in a randomized complete block

Planting Date: June 8

Cultivars: Mist, Line 37, Morden 003 (navy); Dynasty (DRK)

Harvest Date: October 11

Seeding Rate: 18 seeds/m row

Herbicide: June 7 Preplant incorporated Pursuit/Frontier/Rival

Fungicide: July 23 Quadris (0.5 l/ha) + Allegro (1.0 l/ha)

July 31 Quadris (0.5 l/ha) + Propulse (0.5 l/ha) + Volium Express (225 ml/ha)

Desiccant: September 22 Eragon (60 ml/ha)

Rep	Spring Soil Analysis				
	pH	P	K	Mg	S04-S
1	7.6	15	276	182	2.9
2	7.5	18	243	185	3.5
3	7.8	15	188	136	2.2
4	7.7	10	201	127	2.6

2020 Sulphur Response in Dry Bean

University of Guelph

S Rate kg/ha	Plant Height (cm)	Plant Development (BBCH)	Plant Dry Weight (g)	Greenseeker (0-100)	Plant Height (cm)	Plant Development (BBCH)	Plant Dry Weight (g)	Greenseeker (0-100)	100 Seed Weight (g/100 seeds)	Seed Quality (1-5; 1=good)	Seed Sulfur %	Yield (kg/ha)
	1st Timing				2nd Timing							
	Hensall (Boersma) Site 1											
0	22.7	56.5	5.4	40.8 a	50.1	79.0	52.6	79.8	38.2	1.5	0.18	3895
20	21.7	56.5	5.2	37.2 b	52.6	79.0	63.6	78.7	38.5	1.5	0.18	4034
LSD (0.05)	NS	NS	NS	2.1	NS	NS	NS	NS	NS	NS	NS	NS
Chiselhurst (Brock) Site 2												
0					79.3	79.0	29.0 a	68.3	27.3	2.1	0.19	2317
20					77.8	79.0	22.6 b	69.0	27.9	1.8	0.20	2532
LSD (0.05)					NS	NS	3.3	NS	NS	NS	NS	NS
Teeswater (VanRoessel) Site 3												
0	24.4	54.0	2.9	61.0	69.6 b	79.0	16.2	39.7	26.2	2.0	0.19	3556
20	24.6	54.2	2.8	60.8	83.2 a	79.0	17.2	35.0	26.3	2.3	0.19	3552
LSD (0.05)	NS	NS	NS	NS	5.6	NS	NS	NS	NS	NS	NS	NS
Wingham (Underwood) Site 4												
0	44.3	57.0	5.8	77.2	89.5	79.0	31.7	72.5	20.7	1.5	0.17 b	3940 b
20	40.5	57.7	4.5	77.3	90.5	79.0	25.4	72.7	20.5	1.5	0.18 a	4249 a
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.01	293
Huron Research Station - Narrow Row Site 5												
0	50.6	63.8	15.3	76.0	78.0	83.9 a	55.6	82.5	25.6	1.5	0.20	3645
20	46.4	63.2	12.5	77.5	71.9	82.2 b	47.6	82.3	26.1	1.8	0.21	3568
LSD (0.05)	NS	NS	NS	NS	NS	1.0	NS	NS	NS	NS	NS	NS
Huron Research Station - Wide Row Site 6												
0	42.7	69.4	11.7	81.8	61.3	82.3	45.4	72.3	57.6	1.5	0.18 b	2930
20	42.9	69.6	11.1	81.8	59.6	82.3	37.3	72.8	57.5	1.5	0.19 a	2925
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.00	NS
Strathroy Site 7												
0	38.0	63.5	5.7	77.8		81.0	26.4	79.5	25.8	2.0	0.18 b	4656
20	40.6	63.0	6.3	78.0		79.5	24.7	80.8	25.0	2.0	0.19 a	4070
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.01	NS

2020 Cultivar x Population Small Seed Dry Bean Blyth

University of Guelph, Huron Research Station

Factor A Cultivar	Factor B Population	Plant Population (%)	Plant Maturity (days)	Seed Weight (g/100)	Seed Quality (1-5;1=good)	Seed Pick (%)	Seed Yield (kg/ha)	Seed Yield-Pick (kg/ha)
T9905		55.4 b	117 b	23.9 a	2.0 b	4.4 a	3599 a	3589 a
Nautica		59.3 b	117 b	19.3 b	1.8 c	3.0 a	3540 a	3530 a
Rexeter		64.7 a	122 a	21.3 a	2.1 a	5.6 a	3670 a	3653 a
Zorro		60.1 a	117 b	23.8 a	2.0 b	2.6 a	3877 a	3867 a
	300000	61.5 a	117 d	21.9 a	1.8 d	2.9 a	3998 a	3988 a
	240000	64.9 a	118 c	21.9 a	1.9 c	3.4 a	3874 a	3864 a
	180000	60.4 a	119 b	22.1 a	2.0 b	4.0 a	3608 b	3598 b
	120000	52.6 b	120 a	22.4 a	2.2 a	5.3 a	3207 c	3189 c
T9905	300000	60.8 a	116 a	23.9 a	1.8 a	3.3 c	3955 a	3945 a
Nautica	300000	63.3 a	115 a	19.4 a	1.8 a	2.5 d	3819 a	3809 a
Rexeter	300000	60.1 a	121 a	20.9 a	1.8 a	3.2 c	3965 a	3955 a
Zorro	300000	61.8 a	116 a	23.2 a	2.0 a	2.5 d	4253 a	4243 a
T9905	240000	55.9 a	116 a	23.9 a	2.0 a	4.3 bc	3721 a	3711 a
Nautica	240000	64.4 a	117 a	19.2 a	1.8 a	2.4 d	3740 a	3730 a
Rexeter	240000	77.3 a	121 a	21.1 a	2.0 a	4.6 b	3935 a	3925 a
Zorro	240000	62.0 a	116 a	23.4 a	2.0 a	2.3 d	4099 a	4088 a
T9905	180000	51.2 a	117 a	23.7 a	2.0 a	4.2 c	3342 a	3332 a
Nautica	180000	57.6 a	117 a	19.2 a	1.9 a	3.8 c	3376 a	3366 a
Rexeter	180000	69.9 a	122 a	21.1 a	2.1 a	5.2 b	3807 a	3797 a
Zorro	180000	63.0 a	118 a	24.5 a	2.0 a	2.7 d	3905 a	3895 a
T9905	120000	53.8 a	119 a	24.0 a	2.3 a	5.7 b	3376 a	3366 a
Nautica	120000	51.7 a	120 a	19.5 a	2.0 a	3.3 c	3224 a	3214 a
Rexeter	120000	51.4 a	123 a	22.0 a	2.5 a	9.2 a	2974 a	2934 a
Zorro	120000	53.5 a	120 a	24.1 a	2.0 a	3.0 c	3252 a	3242 a
Mean		59.9	118.4	22.1	2.0	3.9	3672	3660
Pr>F (A)		0.1340	0.0001	0.0001	0.0123	0.0001	0.3013	0.3047
Pr>F (B)		0.0004	0.0001	0.0817	0.0001	0.0001	0.0005	0.0005
Pr>F (Ax B)		0.0522	0.3736	0.3060	0.1005	0.0003	0.9062	0.8945
LSD (0.05) A		5.4	1	0.4	0.1	NA	NA	NA
LSD (0.05) B		5.4	1	NA	0.1	NA	375	377
LSD (0.05) Ax B		NA	NA	NA	NA	1.5	NA	NA

* - means within a column and a factor with the same letter are not significantly different at p<0.05

Trial Summary

Cultivars: T9905, Nautica, Rexeter, Zorro

Fertilizer: 15.5-15.5-27@340 lbs/ac

Design: Split Plot with 4 reps

Herbicide: Dual II Magnum + Rival RRI - May 25

Planted: 6 rows @ 38 cm

Reflex/Turbocharge - June 17

Planting Date: May 26

Assure/AssureMix - June 22

Harvest Date: September 24

Fungicide/Insecticide: Allegro - July 13

Propulse+Quadris+Matador - July 21

Senator+Quadris+Matador - August 5

Desiccant: Eragon/Merge - September 15

2020 Cultivar x Population Small Seed Dry Bean Huron Research Station

University of Guelph, Huron Research Station

Factor A	Factor B	Plant		GreenSeeker (0-100)		Plant		Plant		Plant Dry		Seed Weight (g/100)	Seed Quality (1-5;1=good)	Seed Pick (%)	Seed Yield (kg/ha)	Seed Yield-Pick (kg/ha)
		Vigour (1-10;1=good)		50 DAP	67 DAP	50 DAP	67 DAP	50 DAP	67 DAP	Weight (g)						
Cultivar	Population															
T9905		7.9 a	76.9 a	79.4 b	58.4 a	87.4 a	63.6 b	78.9 a	12.6 a	24.0 a	22.5 a	2.2 a	4.3 a	3911 a	3751 b	
Nautica		7.7 a	80.9 a	82.9 a	50.4 b	80.4 b	58.5 c	78.4 a	11.1 a	23.2 a	19.3 c	2.0 a	2.7 b	3621 b	3527 c	
Rexeter		7.2 b	77.9 a	82.8 a	53.4 b	86.6 a	67.4 a	78.6 a	10.7 a	24.0 a	21.5 b	2.1 a	3.2 b	4018 a	3889 a	
Zorro		7.4 b	77.6 a	81.6 a	50.7 b	80.7 ab	61.2 b	77.9 b	10.3 a	24.4 a	22.5 a	2.2 a	3.3 b	4116 a	3980 a	
	300000	7.6 a	82.6 a	83.3 a	54.6 a	86.2 a	63.4 a	78.5 a	7.4 c	17.0 c	21.5 a	2.1 b	2.8 b	4076 a	3961 a	
	240000	7.6 a	80.9 a	82.6 a	51.3 a	82.0 a	62.5 a	78.6 a	9.6 c	20.9 b	21.6 a	2.0 c	3.0 b	4137 a	4013 a	
	180000	7.4 a	77.6 b	81.8 a	54.0 a	83.6 a	62.6 a	78.3 a	12.2 b	25.1 b	21.2 a	2.1 b	3.3 b	3957 a	3827 ab	
	120000	7.8 a	72.1 c	79.0 b	52.9 a	83.3 a	62.3 a	78.4 a	15.5 a	32.7 a	21.5 a	2.3 a	4.4 a	3495 b	3345 b	
T9905	300000	7.8 a	80.5 a	82.0 a	62.6 a	83.8 a	65.0 a	79.0 a	9.5 a	16.6 a	22.3 a	2.0 a	2.8 a	4137 a	4022 a	
Nautica	300000	7.3 a	81.8 a	82.3 a	48.4 a	83.9 a	58.5 a	78.2 a	6.9 a	16.7 a	19.4 a	2.0 a	2.5 a	3688 a	3598 a	
Rexeter	300000	7.3 a	84.5 a	85.0 a	54.0 a	90.0 a	68.6 a	78.6 a	6.4 a	16.8 a	21.4 a	2.1 a	3.4 a	4200 a	4059 a	
Zorro	300000	8.0 a	83.8 a	84.0 a	53.6 a	87.3 a	61.5 a	78.4 a	7.0 a	17.7 a	22.8 a	2.1 a	2.7 a	4278 a	4164 a	
T9905	240000	8.3 a	78.8 a	80.5 a	55.5 a	86.1 a	64.1 a	79.0 a	11.5 a	18.4 a	22.8 a	2.1 a	4.0 a	4035 a	3876 a	
Nautica	240000	8.0 a	84.3 a	83.8 a	47.5 a	83.8 a	57.7 a	78.6 a	8.6 a	20.5 a	19.3 a	2.0 a	2.5 a	3953 a	3856 a	
Rexeter	240000	6.8 a	79.0 a	82.8 a	50.6 a	74.0 b	68.0 a	79.0 a	8.2 a	19.3 a	21.5 a	2.0 a	2.9 a	4240 a	4119 a	
Zorro	240000	7.3 a	81.5 a	83.5 a	51.5 a	83.9 a	60.2 a	77.8 a	10.1 a	25.2 a	22.9 a	2.0 a	2.7 a	4320 a	4202 a	
T9905	180000	7.8 a	77.0 a	78.3 a	57.8 a	89.8 a	63.2 a	78.5 a	12.9 a	23.3 a	22.6 a	2.1 a	3.7 a	4167 a	4012 a	
Nautica	180000	7.5 a	81.8 a	84.8 a	51.8 a	74.5 b	57.9 a	78.8 a	10.7 a	19.7 a	19.0 a	2.0 a	2.5 a	3671 a	3581 a	
Rexeter	180000	7.0 a	75.5 a	82.8 a	57.9 a	92.4 a	67.9 a	78.2 a	14.7 a	32.5 a	21.3 a	2.0 a	3.1 a	3915 a	3797 a	
Zorro	180000	7.3 a	76.3 a	81.3 a	48.7 a	77.7 b	61.4 a	77.6 a	10.5 a	24.9 a	22.1 a	2.3 a	3.9 a	4076 a	3919 a	
T9905	120000	8.0 a	71.5 a	77.0 a	57.6 a	89.9 a	62.2 a	79.0 a	16.7 a	37.6 a	22.5 a	2.5 a	6.6 a	3304 a	3094 a	
Nautica	120000	8.0 a	75.8 a	80.8 a	53.8 a	79.4 b	60.1 a	78.3 a	18.3 a	35.8 a	19.5 a	2.1 a	3.3 a	3173 a	3072 a	
Rexeter	120000	7.8 a	72.5 a	80.8 a	51.3 a	90.0 a	65.1 a	78.4 a	13.8 a	27.4 a	21.6 a	2.3 a	3.7 a	3715 a	3580 a	
Zorro	120000	7.3 a	68.8 a	77.5 a	49.1 a	73.9 b	61.7 a	77.9 a	13.4 a	29.8 a	22.3 a	2.3 a	4.1 a	3789 a	3635 a	
Mean		7.6	78.3	81.7	53.2	83.8	62.7	78.5	11.2	23.9	21.5	2.1	3.4	3916	3787	
Pr>F (A)		0.0460	0.0625	0.0008	0.0047	0.0336	0.0001	0.0250	0.2145	0.9614	0.0001	0.1617	0.0013	0.0001	0.0006	
Pr>F (B)		0.5877	0.0001	0.0001	0.5006	0.5449	0.7050	0.6845	0.0001	0.0001	0.4804	0.0060	0.0005	0.0001	0.0001	
Pr>F (Ax B)		0.4650	0.4599	0.3250	0.6509	0.0299	0.6794	0.8348	0.3406	0.0759	0.9163	0.5311	0.1214	0.5381	0.4850	
LSD (0.05) A		0.5	NA	1.8	4.7	NA	2.1	0.6	NA	NA	0.5	NA	0.8	206	212	
LSD (0.05) B		NA	3.1	1.8	NA	NA	NA	NA	2.3	4.7	NA	0.1	0.8	206	212	
LSD (0.05) Ax B		NA	NA	NA	NA	12.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	

* - means within a column and a factor with the same letter are not significantly different at p<0.05

Trial Summary

Cultivars: T9905, Nautica, Rexeter, Zorro

Fertilizer: 10.5 - 16.9 - 16.9 @ 250 lbs/ac - May 23

Design: Split Plot with 4 reps

Herbicide: Pursuit, Dual II Magnum PPI - June 4

Planted: 6 rows @ 38 cm

Fungicide/Insecticide: Propulse+Quadris+Matador - July 24

Planting Date: June 18

Lance - August 14

Harvest Date: October 22

Desiccant: Eragon/Merge - Oct 13

2020 Cultivar x Population Large Seed Dry Bean Huron Research Station
University of Guelph, Huron Research Station

Factor A Cultivar	Factor B Row Width	Factor C Population	Plant Stand (%)				Plant Height (cm)				Plant Development BBCH				Plant Dry Weight (g)		Seed Weight (g/100)	Seed Quality (1-5; 1=good)	Seed Yield (kg/ha)
			20 DAP	43 DAP	61 DAP	85 DAP	90 DAP	43 DAP	61 DAP	43 DAP	61 DAP	43 DAP	61 DAP	43 DAP	61 DAP				
Hime			101.9 a	46.8 a	83.4 a	76.8 a	67.8 a	25.8 a	45.6 b	58.7 a	70.6 b	7.6 a	28.0 a	39.2 a	2.0 a	3306 a			
Inferno			81.4 a	53.6 a	74.9 a	72.0 a	68.3 a	26.6 a	50.3 a	62.2 a	70.7 b	7.2 a	26.0 a	64.7 a	2.3 a	3372 a			
Red Hawk			78.1 a	43.9 a	69.8 a	50.1 a	36.4 a	27.4 a	42.0 c	64.7 a	71.3 b	6.3 b	21.6 a	55.2 a	2.0 a	2289 a			
Etna			96.0 a	48.7 a	67.8 a	40.5 a	38.0 a	27.3 a	36.7 d	66.7 a	76.8 a	6.5 b	20.9 a	72.8 a	3.2 a	1929 a			
	Narrow		88.3 a	41.9 a	74.7 a	61.3 a	53.3 a	25.9 b	42.7 b	63.2 a	71.6 b	7.1 a	24.6 a	57.8 a	2.3 a	2909 a			
	Wide		90.5 a	54.6 a	73.3 a	58.4 a	51.9 a	27.7 a	44.6 a	63.0 a	73.0 a	6.7 a	23.7 a	58.2 a	2.4 a	2539 a			
Hime	Narrow		101.8 a	44.1 a	84.7 a	79.1 a	70.4 a	25.2 a	45.5 a	58.1 c	70.2 a	7.8 a	31.7 a	40.2 d	1.8 a	3685 a			
Hime	Wide		102.0 a	49.6 a	82.1 a	74.6 b	65.1 b	26.5 a	45.8 a	59.4 c	71.0 a	7.4 a	24.3 b	38.2 d	2.1 a	2928 c			
Inferno	Narrow		76.4 a	44.7 a	74.4 a	71.9 b	67.2 ab	25.8 a	48.2 a	64.1 b	70.2 a	7.3 a	25.6 b	64.3 b	2.3 a	3399 ab			
Inferno	Wide		86.5 a	62.4 a	75.4 a	72.0 b	69.4 a	27.5 a	52.3 a	60.4 c	71.2 a	7.2 a	26.3 b	65.1 b	2.3 a	3346 b			
Red Hawk	Narrow		78.5 a	38.3 a	71.1 a	50.4 c	35.1 d	25.8 a	40.4 a	64.2 b	70.4 a	6.5 a	20.6 c	54.2 c	2.0 a	2412 d			
Red Hawk	Wide		77.7 a	49.5 a	68.6 a	49.9 c	37.8 c	29.0 a	43.6 a	65.3 b	72.2 a	6.1 a	22.6 c	56.3 c	2.0 a	2166 de			
Etna	Narrow		96.3 a	40.4 a	68.4 a	43.7 d	40.6 c	26.8 a	36.7 a	66.5 a	75.7 a	6.8 a	20.6 c	72.7 a	3.1 a	2141 de			
Etna	Wide		95.7 a	56.9 a	67.1 a	37.3 e	35.5 d	27.8 a	36.7 a	66.9 a	77.8 a	6.1 a	21.3 c	73.0 a	3.2 a	1718 e			
	187500		87.3 a	53.7 a	78.8 a	63.9 a	55.6 a	27.8 a	43.9 ab	63.2 a	72.3 a	6.0 b	18.8 c	57.5 a	2.3 a	2937 a			
	150000		88.9 a	52.8 a	77.5 a	62.9 a	56.0 a	28.0 a	45.5 a	64.1 a	72.4 a	6.5 b	20.5 c	58.2 a	2.4 a	2923 a			
	112500		90.5 a	48.4 a	74.8 a	59.3 a	51.7 a	25.8 a	43.1 b	63.0 a	71.8 a	7.8 a	26.2 b	58.0 a	2.3 a	2694 a			
	75000		90.7 a	38.2 a	64.8 a	53.3 a	47.2 a	25.6 a	42.1 b	62.1 a	72.8 a	7.2 a	31.1 a	58.4 a	2.3 a	2343 a			
Hime		187500	99.8 a	52.1 a	85.0 a	76.0 a	64.5 b	28.3 a	47.3 a	59.5 a	70.0 a	6.3 a	22.0 a	38.8 a	1.9 d	3205 b			
Hime		150000	100.7 a	48.5 a	84.9 a	77.5 a	67.6 a	27.6 a	47.4 a	60.1 a	70.3 a	7.4 a	23.1 a	39.2 a	1.9 d	3349 b			
Hime		112500	103.8 a	46.0 a	83.5 a	77.1 a	68.4 a	23.7 a	43.1 a	58.0 a	70.6 a	7.8 a	31.8 a	38.4 a	2.0 d	3272 b			
Hime		75000	103.4 a	40.6 a	80.1 b	76.8 a	70.5 a	23.6 a	44.7 a	57.3 a	71.3 a	8.9 a	35.3 a	40.4 a	2.0 d	3399 b			
Inferno		187500	76.2 a	63.1 a	82.1 a	76.5 a	71.4 a	28.5 a	52.7 a	60.9 a	71.0 a	6.6 a	19.9 a	65.2 a	2.1 d	3810 a			
Inferno		150000	85.1 a	58.4 a	81.3 a	76.9 a	71.8 a	28.5 a	53.5 a	61.7 a	70.1 a	6.2 a	22.0 a	63.4 a	2.2 c	3832 a			
Inferno		112500	82.6 a	50.6 a	74.5 c	70.4 b	67.6 a	25.7 a	48.7 a	62.2 a	70.4 a	8.2 a	27.1 a	64.4 a	2.3 c	3232 b			
Inferno		75000	81.8 a	42.1 a	61.9 e	64.1 c	62.5 b	23.9 a	46.3 a	64.2 a	71.2 a	7.9 a	34.9 a	65.9 a	2.4 c	2615 c			
Red Hawk		187500	79.1 a	45.8 a	75.0 c	56.1 d	42.8 c	26.0 a	39.6 a	64.9 a	71.3 a	5.7 a	16.5 a	54.7 a	1.9 d	2663 c			
Red Hawk		150000	75.0 a	52.8 a	74.0 c	52.6 d	39.1 d	27.9 a	44.1 a	67.4 a	71.8 a	6.4 a	20.5 a	57.1 a	2.1 d	2550 c			
Red Hawk		112500	75.8 a	44.1 a	69.8 d	48.8 e	33.8 d	25.6 a	42.8 a	65.1 a	70.7 a	7.0 a	22.5 a	54.7 a	1.9 d	2186 d			
Red Hawk		75000	82.5 a	33.0 a	60.6 e	43.0 f	30.0 e	30.0 a	41.6 a	61.5 a	71.5 a	6.1 a	27.0 a	54.4 a	2.0 d	1758 e			
Etna		187500	94.1 a	53.6 a	73.0 c	47.0 e	43.6 c	28.3 a	36.2 a	67.4 a	77.0 a	5.5 a	16.9 a	71.4 a	3.3 a	2069 d			
Etna		150000	94.8 a	51.4 a	70.0 c	44.5 ef	45.5 c	27.8 a	36.9 a	67.1 a	77.4 a	6.2 a	16.4 a	72.9 a	3.4 a	1961 d			
Etna		112500	99.9 a	52.8 a	71.5 c	41.0 f	37.1 d	28.3 a	37.9 a	66.7 a	75.7 a	8.2 a	23.4 a	74.3 a	3.0 a	2087 d			
Etna		75000	95.2 a	36.9 a	56.5 e	29.4 g	25.9 e	25.0 a	35.8 a	65.6 a	77.2 a	6.0 a	27.1 a	72.7 a	2.9 b	1602 e			
	Narrow	200000	87.0 a	47.7 a	79.0 a	65.1 a	55.9 a	26.7 a	43.0 a	63.3 a	71.4 a	6.0 a	19.9 a	57.5 a	2.2 a	3105 a			
	Narrow	160000	85.7 a	45.2 a	79.9 a	65.0 a	57.9 a	26.9 a	44.7 a	64.1 a	71.8 a	6.9 a	22.1 a	58.1 a	2.4 a	3098 a			
	Narrow	120000	89.3 a	43.3 a	76.1 b	61.4 a	52.3 a	26.1 a	42.5 a	63.8 a	71.0 a	8.3 a	26.6 a	57.8 a	2.3 a	2936 a			
	Narrow	80000	91.0 a	31.3 a	63.6 c	53.6 a	47.1 a	23.9 a	40.6 a	61.7 a	72.3 a	7.2 a	30.0 a	58.0 a	2.3 a	2496 a			
	Wide	175000	87.6 a	59.6 a	78.6 a	62.7 a	55.2 a	28.9 a	44.9 a	63.1 a	73.3 a	6.1 a	17.7 a	57.6 a	2.3 a	2768 a			
	Wide	140000	92.1 a	60.3 a	75.1 b	60.8 a	54.1 a	29.1 a	46.2 a	64.1 a	73.0 a	6.2 a	18.9 a	58.3 a	2.4 a	2747 a			
	Wide	105000	91.8 a	53.4 a	73.6 b	57.2 a	51.2 a	25.5 a	43.8 a	62.2 a	72.6 a	7.3 a	25.8 a	58.1 a	2.4 a	2452 a			
	Wide	70000	90.5 a	45.0 a	65.9 c	53.1 a	47.3 a	27.4 a	43.6 a	62.6 a	73.3 a	7.3 a	32.2 a	58.8 a	2.3 a	2190 a			
Hime	Narrow	200000	98.1 a	55.3 b	85.8 a	76.5 a	65.0 a	27.0 a	47.6 a	57.9 a	69.6 a	6.2 a	26.4 a	40.7 a	1.6 a	3706 a			
Inferno	Narrow	200000	72.1 a	54.5 b	80.8 a	74.8 a	70.3 a	27.7 a	48.7 a	63.4 a	69.5 a	6.4 a	19.4 a	65.5 a	2.3 a	3658 a			
Red Hawk	Narrow	200000	79.0 a	40.0 c	75.0 a	56.8 a	40.3 a	24.2 a	38.1 a	64.6 a	70.8 a	5.0 a	17.6 a	52.8 a	1.9 a	2753 a			

Etna	Narrow	200000	99.0 a	41.0 c	74.5 a	52.5 a	48.3 a	27.8 a	37.5 a	67.3 a	75.6 a	6.3 a	16.3 a	70.9 a	3.1 a	2303 a
Hime	Narrow	160000	98.4 a	41.3 c	86.0 a	80.0 a	70.8 a	24.6 a	46.2 a	58.6 a	69.6 a	7.3 a	25.6 a	39.2 a	1.9 a	3673 a
Inferno	Narrow	160000	77.6 a	45.5 c	80.8 a	76.0 a	69.8 a	27.3 a	51.6 a	63.3 a	69.9 a	6.4 a	22.8 a	62.1 a	2.3 a	3748 a
Red Hawk	Narrow	160000	75.3 a	46.5 c	80.3 a	53.8 a	40.0 a	28.3 a	44.0 a	67.6 a	71.2 a	7.0 a	22.8 a	56.7 a	2.1 a	2769 a
Etna	Narrow	160000	91.4 a	47.5 c	72.8 a	50.3 a	51.3 a	27.3 a	37.2 a	66.9 a	76.6 a	7.0 a	17.2 a	74.3 a	3.3 a	2203 a
Hime	Narrow	120000	104.5 a	45.8 c	85.3 a	81.0 a	73.5 a	24.5 a	44.4 a	59.1 a	70.3 a	8.1 a	35.0 a	39.5 a	2.0 a	3621 a
Inferno	Narrow	120000	76.7 a	41.5 c	73.8 a	73.0 a	67.5 a	25.1 a	47.0 a	64.1 a	69.9 a	9.0 a	27.1 a	64.2 a	2.1 a	3357 a
Red Hawk	Narrow	120000	77.1 a	40.8 c	72.8 a	51.0 a	33.5 a	25.5 a	40.9 a	64.2 a	70.1 a	7.2 a	19.0 a	53.3 a	1.9 a	2332 a
Etna	Narrow	120000	99.0 a	45.3 c	72.5 a	40.8 a	34.5 a	29.6 a	37.9 a	67.9 a	73.8 a	8.9 a	25.1 a	74.3 a	3.0 a	2436 a
Hime	Narrow	80000	106.3 a	34.0 d	81.8 a	79.0 a	72.5 a	24.9 a	43.7 a	56.8 a	71.2 a	9.6 a	40.0 a	41.4 a	1.9 a	3740 a
Inferno	Narrow	80000	79.2 a	37.3 d	62.5 a	64.0 a	61.3 a	22.9 a	45.6 a	65.5 a	71.6 a	7.2 a	33.2 a	65.5 a	2.4 a	2831 a
Red Hawk	Narrow	80000	82.8 a	26.0 e	56.5 a	40.0 a	26.5 a	25.1 a	38.9 a	60.3 a	69.4 a	6.8 a	23.1 a	53.7 a	2.0 a	1793 a
Etna	Narrow	80000	95.8 a	28.0 d	53.8 a	31.3 a	28.3 a	22.7 a	34.4 a	64.1 a	77.0 a	5.1 a	23.8 a	71.3 a	3.1 a	1621 a
Hime	Wide	175000	101.4 a	49.0 c	84.3 a	75.5 a	64.0 a	29.7 a	47.0 a	61.2 a	70.3 a	6.3 a	17.6 a	37.0 a	2.1 a	2704 a
Inferno	Wide	175000	80.2 a	71.8 a	83.5 a	78.3 a	72.5 a	29.3 a	56.7 a	58.5 a	72.6 a	6.9 a	20.4 a	64.8 a	2.0 a	3962 a
Red Hawk	Wide	175000	79.3 a	51.5 bc	75.0 a	55.5 a	45.3 a	27.9 a	41.0 a	65.2 a	71.8 a	6.4 a	15.4 a	56.6 a	1.9 a	2574 a
Etna	Wide	175000	89.3 a	66.3 a	71.5 a	41.5 a	39.0 a	28.9 a	35.0 a	67.5 a	78.4 a	4.7 a	17.6 a	71.9 a	3.4 a	1834 a
Hime	Wide	140000	103.0 a	55.8 b	83.8 a	75.0 a	64.5 a	30.7 a	48.7 a	61.6 a	71.1 a	7.5 a	20.5 a	39.2 a	2.0 a	3025 a
Inferno	Wide	140000	92.6 a	71.3 a	81.8 a	77.8 a	73.8 a	29.7 a	55.4 a	60.0 a	70.4 a	5.9 a	21.2 a	64.6 a	2.1 a	3915 a
Red Hawk	Wide	140000	74.7 a	59.0 b	67.8 a	51.5 a	38.3 a	27.6 a	44.2 a	67.3 a	72.5 a	5.7 a	18.2 a	57.5 a	2.0 a	2331 a
Etna	Wide	140000	98.2 a	55.3 b	67.3 a	38.8 a	39.8 a	28.3 a	36.5 a	67.4 a	78.1 a	5.4 a	15.7 a	71.6 a	3.6 a	1718 a
Hime	Wide	105000	103.2 a	46.3 c	81.8 a	73.3 a	63.3 a	23.0 a	41.9 a	56.9 a	71.0 a	7.4 a	28.5 a	37.3 a	2.0 a	2923 a
Inferno	Wide	105000	88.5 a	59.8 b	75.3 a	67.8 a	67.8 a	26.3 a	50.4 a	60.4 a	70.9 a	7.4 a	27.1 a	64.6 a	2.5 a	3107 a
Red Hawk	Wide	105000	74.6 a	47.5 c	66.8 a	46.5 a	34.0 a	25.6 a	44.8 a	66.0 a	71.2 a	6.8 a	25.9 a	56.1 a	2.0 a	2039 a
Etna	Wide	105000	100.8 a	60.3 b	70.5 a	41.3 a	39.8 a	27.0 a	38.0 a	65.6 a	77.5 a	7.5 a	21.7 a	74.3 a	3.0 a	1737 a
Hime	Wide	70000	100.6 a	47.3 c	78.5 a	74.5 a	68.5 a	22.4 a	45.7 a	57.9 a	71.5 a	8.2 a	30.7 a	39.3 a	2.1 a	3059 a
Inferno	Wide	70000	84.5 a	47.0 c	61.3 a	64.3 a	63.8 a	24.9 a	46.9 a	62.8 a	70.8 a	8.6 a	36.6 a	66.4 a	2.5 a	2399 a
Red Hawk	Wide	70000	82.1 a	40.0 c	64.8 a	46.0 a	33.5 a	35.0 a	44.3 a	62.7 a	73.5 a	5.3 a	31.0 a	55.1 a	2.0 a	1722 a
Etna	Wide	70000	94.6 a	45.8 c	59.3 a	27.5 a	23.5 a	27.3 a	37.3 a	67.1 a	77.4 a	6.9 a	30.3 a	74.2 a	2.8 a	1582 a
Mean		89.4	48.2	74.0	59.9	52.6	26.8	43.7	63.1	72.3	6.9	24.1	58.0	2.3	2724	
Pr>F(0.05) A		0.0001	0.0001	0.0001	0.0001	0.0001	0.5737	0.0001	0.0001	0.0025	0.0001	0.0001	0.0001	0.0001	0.0001	
Pr>F(0.05) B		0.1653	0.0001	0.1117	0.0015	0.1648	0.0454	0.0115	0.6077	0.0034	0.1342	0.3758	0.5208	0.1282	0.0001	
Pr>F(0.05) AB		0.0479	0.0097	0.3949	0.0256	0.0025	0.8134	0.1196	0.0004	0.6946	0.8995	0.0134	0.0358	0.4389	0.0076	
Pr>F(0.05) C		0.3808	0.0001	0.0001	0.0001	0.0001	0.1306	0.0134	0.0289	0.5633	0.0001	0.0001	0.6719	0.3535	0.0001	
Pr>F(0.05) AC		0.5513	0.1486	0.0005	0.0002	0.0001	0.2902	0.0550	0.0018	0.9713	0.1306	0.8457	0.1759	0.0226	0.0003	
Pr>F(0.05) BC		0.4254	0.6134	0.0268	0.3763	0.5008	0.4067	0.8467	0.2473	0.9148	0.3622	0.3597	0.9648	0.7925	0.8293	
Pr>F(0.05) ABC		0.9219	0.0459	0.0531	0.0924	0.1114	0.5064	0.5805	0.4811	0.7904	0.1503	0.6568	0.5287	0.0726	0.5515	
LSD (0.05) A		NA	NA	NA	NA	NA	NA	2.0	NA	1.3	0.8	NA	NA	NA	NA	
LSD (0.05) B		NA	NA	NA	NA	NA	NA	1.8	1.4	NA	0.9	NA	NA	NA	NA	
LSD (0.05) AB		6.3	NA	NA	3.5	3.9	NA	NA	1.8	NA	NA	4.8	2.0	NA	288	
LSD (0.05) C		NA	NA	NA	NA	NA	NA	2.0	NA	NA	0.8	3.1	NA	NA	NA	
LSD (0.05) AC		NA	NA	4.7	4.9	5.5	NA	NA	2.5	NA	NA	NA	NA	0.3	408	
LSD (0.05) BC		NA	NA	3.4	NA											
LSD (0.05) ABC		NA	11.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

* - means within a column and a factor with the same letter are not significantly different at p<0.05

Trial Summary

Cultivars: Hime, Inferno, Red Hawk, Etna

Design: Split Plot

Row Width: Narrow 38 cm; Wide 76 cm

Rows Per Plot: Narrow 6; Wide 4

Rows Harvested per Plot: Narrow 4; Wide 2

Planting Dates: May 27

Fertilizer: 10.5 - 16.9 - 16.9 @ 250 lbs/ac - May 23

Herbicide: Pursuit, Dual II Magnum, Roundup Transorp - Applied May 22, incorporated May 25

Insecticide: Matador - July 27

Fungicide: Propulse/Quadris - July 27

Desication: Eragon/Merge - September 11

Harvest Dates: Red Hawk - September 17, Hime, Inferno, & Etna - September 18

2020 Planting Date Small Seed, Huron Research Station
University of Guelph, Ridgetown Campus

Planting Date Factor A	Cultivar Factor B	Population Factor C	Plant Emerge (#/ha)	Plant Emerge (%)	Green Seeker			Plant Height (Aug. 19)	BBCH Stage (Aug. 19)	Dry Wt (g)	Seed Weight (g/100)	Seed Quality (1-5; 1=good)	Seed Pick (%)	Seed Yield (kg/ha)	Yield - Pick (kg/ha)	Colourimeter			
			31-Jul	21-Aug	27-Aug	(Aug. 19)	(Aug. 19)	(g/100)	(1-5; 1=good)	(%)	(kg/ha)	L	a	b					
May 20		159958 a	76.3 a	73.2 a	68.4 c	36.2 d	71.7 b	81.5 a	234.4 a	23.6 a	2.0 e	2.5 c	3642 a	3551 a	39.78 a	1.13 b	4.44 d		
May 30		152667 a	72.0 a	64.9 b	71.4 b	48.8 c	70.8 b	80.5 a	227.9 a	23.3 a	2.1 d	2.5 c	3560 a	3471 a	39.59 a	1.10 b	4.63 c		
June 10		137708 b	66.2 b	71.6 a	82.0 a	73.8 b	85.2 a	77.7 b	186.6 b	21.7 b	2.4 a	5.6 a	3679 a	3477 a	39.48 a	1.33 a	5.06 b		
June 20		139333 b	66.6 b	59.5 b	82.4 a	81.8 a	80.6 a	73.3 c	152.3 b	21.0 c	2.2 c	5.3 a	3503 a	3320 a	38.27 b	1.40 a	5.48 a		
June 30		127583 c	60.5 c	37.6 c	80.7 a	83.3 a	61.6 c	68.3 d	89.9 c	19.1 d	2.3 b	4.0 b	2198 b	2111 b	39.82 a	1.33 a	5.43 a		
Rexeter			146967 a	70.0 a	62.9 a	80.7 a	71.8 a	76.0 a	175.8 a	21.0 b	2.1 b	3.9 a	3348 a	3219 a	61.09 a	1.99 a	10.62 a		
Zorro			139933 b	66.6 b	59.8 b	73.3 b	57.8 b	72.0 b	76.5 a	180.6 a	22.5 a	2.3 a	4.1 a	3284 a	3153 a	17.68 b	0.53 b	-0.61 b	
			120000	82833 d	69.0 a	56.1 c	75.1 c	65.0 a	75.2 a	76.3 a	181.8 a	21.5 b	2.3 a	4.2 a	3013 c	2889 d	39.40 a	1.24 a	5.12 a
			180000	122467 c	68.0 a	60.9 b	76.8 b	65.3 a	73.5 a	76.0 a	172.1 a	21.7 a	2.2 a	4.1 a	3267 b	3134 c	39.45 a	1.28 a	5.06 a
			240000	161100 a	67.1 a	62.9 a	77.5 a	64.8 a	75.2 a	76.3 a	179.8 a	21.8 a	2.2 a	4.0 a	3424 a	3291 b	39.17 a	1.24 a	4.96 ab
			300000	207400 a	69.1 a	65.5 a	78.5 a	64.1 a	72.1 a	76.4 a	179.3 a	22.1 a	2.1 a	3.7 a	3561 a	3431 a	39.54 a	1.26 a	4.89 b
May 20	Rexeter	165250 a	78.6 a	73.8 a	76.4 c	47.8 e	71.9 a	79.5 c	242.8 a	22.5 b	1.8 f	2.4 a	3646 a	3559 a	62.01 a	1.77 b	9.51 c		
May 30	Rexeter	158417 a	74.9 a	65.6 a	78.4 b	65.6 d	74.7 a	79.0 c	237.6 a	22.2 c	2.1 e	2.7 a	3722 a	3624 a	61.65 a	1.69 b	9.92 c		
June 10	Rexeter	139000 a	67.3 a	72.8 a	82.3 a	78.9 b	88.4 a	78.2 d	179.1 a	21.3 d	2.4 b	5.8 a	3710 a	3499 a	61.25 a	2.12 a	10.75 b		
June 20	Rexeter	141250 a	67.8 a	62.6 a	83.8 a	83.1 a	81.4 a	74.8 e	132.1 a	20.8 e	2.2 d	5.2 a	3476 a	3303 a	58.85 b	2.25 a	11.55 a		
June 30	Rexeter	130917 a	61.6 a	39.8 a	82.5 a	83.5 a	63.4 a	68.5 g	87.5 a	18.3 g	2.1 e	3.5 a	2186 a	2110 a	61.69 a	2.12 a	11.37 ab		
May 20	Zorro	154667 a	74.0 a	72.6 a	60.3 e	24.6 g	71.5 a	83.6 a	226.1 a	24.7 a	2.1 e	2.6 a	3637 a	3543 a	17.55 c	0.49 c	-0.63 d		
May 30	Zorro	146917 a	69.2 a	64.2 a	64.3 d	32.0 f	66.9 a	82.0 b	218.1 a	24.5 a	2.1 e	2.4 a	3397 a	3317 a	17.52 c	0.51 c	-0.66 d		
June 10	Zorro	136417 a	65.1 a	70.3 a	81.8 ab	68.6 c	82.0 a	77.1 d	194.2 a	22.1 c	2.3 c	5.5 a	3649 a	3455 a	17.71 c	0.54 c	-0.63 d		
June 20	Zorro	137417 a	65.4 a	56.3 a	81.0 b	80.6 a	79.8 a	71.9 f	172.5 a	21.3 d	2.2 d	5.5 a	3530 a	3338 a	17.68 c	0.55 c	-0.59 d		
June 30	Zorro	124250 a	59.5 a	35.3 a	78.9 b	83.1 a	59.7 a	68.0 g	92.3 a	20.0 f	2.6 a	4.5 a	2209 a	2112 a	17.95 c	0.53 c	-0.52 d		
May 20		120000	94333 a	78.6 a	70.3 a	65.8 a	37.8 a	73.2 a	81.5 a	229.2 a	23.3 a	2.1 a	3.0 a	3378 a	3276 a	40.08 a	1.11 a	4.63 c	
May 30		120000	82667 a	68.9 a	61.9 a	70.1 a	50.1 a	75.2 a	80.6 a	279.7 a	23.0 a	2.1 a	2.5 a	3206 a	3125 a	39.80 a	1.08 a	4.78 c	
June 10		120000	83500 a	69.6 a	63.9 a	81.6 a	74.1 a	86.2 a	77.9 a	174.6 a	21.3 a	2.4 a	5.6 a	3363 a	3180 a	39.87 a	1.35 a	5.29 b	
June 20		120000	82500 a	68.8 a	54.6 a	82.5 a	80.6 a	82.4 a	73.9 a	148.0 a	20.9 a	2.3 a	5.3 a	3315 a	3138 a	37.52 a	1.37 a	5.37 a	
June 30		120000	71167 a	59.3 a	29.8 a	75.3 a	82.1 a	59.0 a	67.7 a	77.3 a	19.0 a	2.4 a	4.5 a	1805 a	1724 a	39.74 a	1.31 a	5.54 a	
May 20		180000	135000 a	75.0 a	72.4 a	67.4 a	35.8 a	66.9 a	81.4 a	227.0 a	23.6 a	1.9 a	2.4 a	3538 a	3455 a	39.75 a	1.13 a	4.37 d	
May 30		180000	129333 a	71.9 a	61.4 a	71.5 a	51.5 a	70.1 a	80.5 a	205.5 a	23.0 a	2.1 a	2.7 a	3363 a	3274 a	39.72 a	1.16 a	4.84 c	
June 10		180000	118167 a	65.6 a	73.3 a	81.9 a	73.9 a	87.5 a	77.2 a	203.6 a	21.6 a	2.5 a	5.9 a	3694 a	3476 a	39.39 a	1.33 a	5.11 b	
June 20		180000	117667 a	65.4 a	60.3 a	81.5 a	81.8 a	82.4 a	73.3 a	146.9 a	20.9 a	2.2 a	5.5 a	3535 a	3348 a	38.43 a	1.47 a	5.61 a	
June 30		180000	112167 a	62.3 a	37.4 a	81.8 a	83.5 a	60.5 a	67.5 a	77.4 a	19.2 a	2.4 a	4.0 a	2205 a	2115 a	39.94 a	1.31 a	5.36 a	
May 20		240000	178333 a	74.3 a	74.1 a	70.5 a	37.4 a	75.2 a	81.8 a	246.7 a	23.4 a	1.9 a	2.3 a	3770 a	3684 a	39.54 a	1.15 a	4.43 d	
May 30		240000	174167 a	72.6 a	66.3 a	70.9 a	46.0 a	72.3 a	80.0 a	202.1 a	23.7 a	2.1 a	2.4 a	3688 a	3599 a	39.15 a	1.06 a	4.46 d	
June 10		240000	157667 a	65.7 a	73.0 a	82.6 a	75.1 a	86.2 a	77.9 a	196.0 a	21.7 a	2.3 a	5.5 a	3727 a	3524 a	39.32 a	1.33 a	5.08 b	
June 20		240000	157667 a	65.7 a	61.0 a	81.8 a	81.8 a	77.8 a	73.2 a	157.4 a	21.1 a	2.3 a	5.6 a	3605 a	3409 a	38.34 a	1.36 a	5.42 a	
June 30		240000	137667 a	57.4 a	39.9 a	81.9 a	83.5 a	64.3 a	68.8 a	96.8 a	19.2 a	2.3 a	4.0 a	2332 a	2238 a	39.47 a	1.31 a	5.42 a	
May 20		300000	232167 a	77.4 a	76.0 a	69.9 a	33.8 a	71.6 a	81.4 a	234.9 a	24.2 a	1.9 a	2.4 a	3880 a	3789 a	39.76 a	1.14 a	4.33 d	
May 30		300000	224500 a	74.8 a	70.0 a	73.0 a	47.5 a	65.7 a	81.0 a	224.2 a	23.6 a	2.0 a	2.4 a	3981 a	3885 a	39.68 a	1.11 a	4.44 d	
June 10		300000	191500 a	63.8 a	76.1 a	81.9 a	71.9 a	80.8 a	77.6 a	172.3 a	22.2 a	2.4 a	5.5 a	3933 a	3727 a	39.34 a	1.30 a	4.78 c	
June 20		300000	199500 a	66.5 a	62.0 a	83.8 a	83.1 a	79.7 a	72.9 a	156.8 a	21.2 a	2.1 a	5.0 a	3558 a	3386 a	38.78 a	1.40 a	5.54 a	
June 30		300000	189333 a	63.1 a	43.3 a	83.9 a	84.0 a	62.6 a	69.1 a	108.2 a	19.1 a	2.3 a	3.4 a	2450 a	2366 a	40.13 a	1.37 a	5.38 a	
Rexeter			120000	85200 a	71.0 a	58.7 a	80.4	73.2 a	78.8 a	76.0 a	193.7 a	20.8 a	2.2 a	4.2 a	3076 a	2945 a	61.07 a	1.96 a	10.84 a
Rexeter			180000	125533 a	69.7 a	63.9 a	80.2	72.7 a	75.4 a	75.8 a	156.4 a	20.9 a	2.2 a	3.8 a	3339 a	3211 a	61.10 a	2.00 a	10.70 ab
Rexeter			240000	163733 a	68.2 a	62.9 a	80.4	70.9 a	76.9 a	76.1 a	176.8 a	21.2 a	2.2 a	4.1 a	3369 a	3235 a	60.70 a	2.00 a	10.50 b
Rexeter			300000	213400 a	71.1 a	66.3 a	81.8	70.3 a	72.8 a	76.0 a	176.4 a	21.1 a	2.1 a	3.5 a	3609 a	3485 a	61.50 a	2.00 a	10.40 b
Zorro			120000	80467 a	67.1 a	53.5 a	69.7	56.7 a	71.6 a	76.6 a	169.8 a	22.2 a	2.3 a	4.1 a	2951 a	2832 a	17.70 a	0.50 a	-0.60 c
Zorro			180000	119400 a	66.3 a	58.0 a	73.4	57.9 a	71.6 a	76.2 a	187.8 a	22.5 a	2.3 a	4.4 a	3195 a	3056 a	17.80 a	0.50 a	-0.61 c
Zorro			240000	158467 a	66.0 a	62.9 a	74.7	58.6 a	73.4 a	76.6 a	182.8 a	22.4 a	2.3 a	3.9 a	3480 a	3347 a	17.60 a	0.50 a	-0.60 c
Zorro			300000	201400 a	67.1 a	64.7 a	75.2	57.8 a	71.3 a	76.7 a	182.1 a	23.1 a	2.2 a	4.0 a	3512 a	3377 a	17.60 a	0.53 a	-0.64 c
May 20	Rexeter	120000	97000 a	80.8 a	72.5 a	76.8 a	52.0 a	75.0 a	79.2 a	236.1 a	22.4 a	1.9 a	2.6 a	3456 a	3364 a	62.79 a	1.72 f	9.95 f	
May 30	Rexeter	120000	87333 a	72.8 a	63.5 a	78.8 a	67.3 a	81.7 a	79.0 a	249.6 a	22.1 a	2.0 a	2.8 a	3560 a	3461 a	61.97 a	1.66 f	10.19 e	
June 10	Rexeter	120000	84333 a	70.3 a	63.8 a	82.0 a	80.3 a	91.0 a	78.8 a	160.3 a	21.1 a	2.5 a	6.3 a	3308 a	3106 a	61.79 a	2.15 a	11.14 c	
June 20	Rexeter	120000	87000 a	72.5 a	60.0 a	83.3 a	83.0 a	86.2 a	75.3 a	150.4 a	20.5 a	2.4 a	6.0 a	3221 a	3026 a	57.35 a	2.22 a	11.34 b	

June 30	Rexter	120000	70333 a	58.6 a	33.5 a	81.3 a	83.5 a	59.9 a	67.9 a	72.0 a	18.0 a	2.1 a	3.5 a	1834 a	1770 a	61.44 a	2.07 a	11.57 a
May 20	Zorro	120000	91667 a	76.4 a	68.0 a	54.8 a	23.5 a	71.4 a	83.8 a	222.2 a	24.1 a	2.4 a	3.3 a	3299 a	3189 a	17.36 a	0.49 i	-0.68 h
May 30	Zorro	120000	78000 a	65.0 a	60.3 a	61.5 a	33.0 a	68.7 a	82.2 a	209.8 a	23.9 a	2.1 a	2.3 a	2853 a	2788 a	17.63 a	0.49 i	-0.64 h
June 10	Zorro	120000	82667 a	68.9 a	64.0 a	81.3 a	68.0 a	81.5 a	77.0 a	188.9 a	21.5 a	2.3 a	4.8 a	3418 a	3253 a	17.95 a	0.55 h	-0.56 h
June 20	Zorro	120000	78000 a	65.0 a	49.3 a	81.8 a	78.3 a	78.6 a	72.6 a	145.6 a	21.4 a	2.1 a	4.6 a	3409 a	3250 a	17.69 a	0.53 i	-0.60 h
June 30	Zorro	120000	72000 a	60.0 a	26.0 a	69.3 a	80.8 a	58.0 a	67.5 a	82.6 a	20.0 a	2.8 a	5.6 a	1777 a	1678 a	18.04 a	0.55 h	-0.49 h
May 20	Rexter	180000	137667 a	76.5 a	72.5 a	75.8 a	48.8 a	69.0 a	79.8 a	218.6 a	22.5 a	1.9 a	2.3 a	3511 a	3432 a	61.96 a	1.76 e	9.35 g
May 30	Rexter	180000	134333 a	74.6 a	62.8 a	76.8 a	68.3 a	69.6 a	79.1 a	192.9 a	21.5 a	2.1 a	2.8 a	3544 a	3446 a	61.78 a	1.75 f	10.31 e
June 10	Rexter	180000	127667 a	70.9 a	76.0 a	81.5 a	80.0 a	87.5 a	77.5 a	181.0 a	21.2 a	2.5 a	5.8 a	3748 a	3529 a	61.02 a	2.16 b	10.83 d
June 20	Rexter	180000	117000 a	65.0 a	67.5 a	84.5 a	82.5 a	88.0 a	74.5 a	111.4 a	20.9 a	2.0 a	4.2 a	3689 a	3533 a	58.97 a	2.37 a	11.76 a
June 30	Rexter	180000	111000 a	61.7 a	40.5 a	82.5 a	83.8 a	62.8 a	68.1 a	78.2 a	18.3 a	2.3 a	4.0 a	2205 a	2118 a	61.75 a	2.10 c	11.25 b
May 20	Zorro	180000	132333 a	73.5 a	72.3 a	59.0 a	22.8 a	64.9 a	83.0 a	235.5 a	24.7 a	2.0 a	2.5 a	3566 a	3478 a	17.54 a	0.50 i	-0.62 h
May 30	Zorro	180000	124333 a	69.1 a	60.0 a	66.3 a	34.8 a	70.7 a	81.9 a	218.1 a	24.5 a	2.1 a	2.6 a	3182 a	3102 a	17.66 a	0.57 h	-0.64 h
June 10	Zorro	180000	108667 a	60.4 a	70.5 a	82.3 a	67.8 a	87.5 a	77.0 a	226.2 a	22.1 a	2.5 a	6.0 a	3639 a	3423 a	17.77 a	0.51 i	-0.62 h
June 20	Zorro	180000	118333 a	65.7 a	53.0 a	78.5 a	81.0 a	76.7 a	72.2 a	182.4 a	21.0 a	2.4 a	6.7 a	3382 a	3163 a	17.89 a	0.57 h	-0.55 h
June 30	Zorro	180000	113333 a	63.0 a	34.3 a	81.0 a	83.3 a	58.1 a	67.0 a	76.6 a	20.1 a	2.5 a	4.1 a	2204 a	2112 a	18.13 a	0.53 i	-0.52 h
May 20	Rexter	240000	182000 a	75.8 a	73.5 a	46.3 a	71.8 a	79.7 a	271.9 a	22.1 a	1.9 a	2.3 a	3693 a	3609 a	61.39 a	1.83 e	9.44 g	
May 30	Rexter	240000	178000 a	74.2 a	64.5 a	77.5 a	64.0 a	78.7 a	78.9 a	180.5 a	22.6 a	2.1 a	2.7 a	3628 a	3531 a	61.07 a	1.62 g	9.62 f
June 10	Rexter	240000	158667 a	66.1 a	74.3 a	82.5 a	79.0 a	92.1 a	78.3 a	195.7 a	21.6 a	2.4 a	6.1 a	3841 a	3605 a	60.98 a	2.15 b	10.80 d
June 20	Rexter	240000	158000 a	65.8 a	61.3 a	82.8 a	82.5 a	75.4 a	74.5 a	128.4 a	21.3 a	2.3 a	5.4 a	3479 a	3304 a	59.02 a	2.13 b	11.40 b
June 30	Rexter	240000	142000 a	59.2 a	40.8 a	81.5 a	82.8 a	66.8 a	69.0 a	107.4 a	18.5 a	2.1 a	3.8 a	2205 a	2124 a	61.17 a	2.11 b	11.38 b
May 20	Zorro	240000	174667 a	72.8 a	74.8 a	63.5 a	28.5 a	78.7 a	84.0 a	221.5 a	24.7 a	2.0 a	2.3 a	3847 a	3759 a	17.70 a	0.48 i	-0.59 h
May 30	Zorro	240000	170333 a	71.0 a	68.0 a	64.3 a	28.0 a	65.9 a	81.1 a	223.7 a	24.8 a	2.1 a	2.2 a	3748 a	3667 a	17.24 a	0.51 i	-0.69 h
June 10	Zorro	240000	156667 a	65.3 a	71.8 a	82.8 a	71.3 a	80.2 a	77.5 a	196.3 a	21.7 a	2.3 a	4.8 a	3614 a	3442 a	17.67 a	0.52 i	-0.65 h
June 20	Zorro	240000	157333 a	65.6 a	60.8 a	80.8 a	81.0 a	80.3 a	72.0 a	186.5 a	20.8 a	2.4 a	5.9 a	3731 a	3514 a	17.66 a	0.59 h	-0.57 h
June 30	Zorro	240000	133333 a	55.6 a	39.0 a	82.3 a	84.3 a	61.9 a	68.5 a	86.3 a	19.8 a	2.5 a	4.3 a	2458 a	2352 a	17.78 a	0.52 i	-0.54 h
May 20	Rexter	300000	244333 a	81.4 a	76.5 a	75.8 a	44.0 a	71.9 a	79.3 a	244.6 a	22.9 a	1.8 a	2.4 a	3926 a	3832 a	61.89 a	1.77 e	9.31 g
May 30	Rexter	300000	234000 a	78.0 a	71.5 a	80.8 a	62.8 a	68.9 a	79.1 a	227.6 a	22.5 a	2.0 a	2.4 a	4158 a	4060 a	61.78 a	1.74 f	9.55 f
June 10	Rexter	300000	185333 a	61.8 a	77.3 a	83.0 a	76.5 a	83.0 a	78.2 a	179.3 a	21.1 a	2.4 a	4.9 a	3943 a	3753 a	61.22 a	2.03 d	10.25 e
June 20	Rexter	300000	203000 a	67.7 a	61.8 a	84.5 a	84.3 a	76.0 a	74.7 a	138.1 a	20.5 a	2.1 a	5.0 a	3518 a	3350 a	60.07 a	2.27 a	11.71 a
June 30	Rexter	300000	200333 a	66.8 a	44.5 a	84.8 a	84.0 a	64.2 a	69.0 a	92.6 a	18.2 a	2.0 a	2.8 a	2500 a	2428 a	62.40 a	2.21 b	11.29 b
May 20	Zorro	300000	220000 a	73.3 a	75.5 a	64.0 a	23.5 a	71.2 a	83.5 a	225.1 a	25.5 a	2.0 a	2.3 a	3835 a	3746 a	17.62 a	0.51 i	-0.65 h
May 30	Zorro	300000	215000 a	71.7 a	68.5 a	65.3 a	32.3 a	62.5 a	82.9 a	220.9 a	24.7 a	2.0 a	2.5 a	3803 a	3711 a	17.57 a	0.49 i	-0.68 h
June 10	Zorro	300000	197667 a	65.9 a	75.0 a	80.8 a	67.3 a	78.7 a	77.1 a	165.3 a	23.3 a	2.4 a	6.2 a	3924 a	3701 a	17.47 a	0.58 h	-0.70 h
June 20	Zorro	300000	196000 a	65.3 a	62.3 a	83.0 a	82.0 a	83.4 a	71.1 a	175.6 a	21.9 a	2.0 a	5.0 a	3599 a	3423 a	17.49 a	0.54 i	-0.64 h
June 30	Zorro	300000	178333 a	59.4 a	42.0 a	83.0 a	84.0 a	61.0 a	69.1 a	123.8 a	20.0 a	2.5 a	4.0 a	2399 a	2303 a	17.86 a	0.53 i	-0.53 h
Mean		143450	68.3	61.3	77.0	64.8	74.0	76.3	178.2	21.8	2.2	4.0	3316	3186	39.4	1.3	5.0	
Pr>F (A)		0.0002	0.0004	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Pr>F (B)		0.0153	0.0127	0.0331	0.0001	0.0001	0.0074	0.0595	0.6383	0.0001	0.0003	0.2869	0.1749	0.1283	0.0001	0.0001	0.0001	
Pr>F (AxB)		0.7537	0.8093	0.7112	0.0001	0.0001	0.3558	0.0001	0.3479	0.0016	0.0002	0.1917	0.1057	0.1132	0.0002	0.0001	0.0001	
Pr>F (C)		0.0001	0.3830	0.0001	0.0010	0.5492	0.1698	0.6845	0.0902	0.0041	0.0523	0.4991	0.0001	0.0001	0.4521	0.1698	0.0002	
Pr>F (AxC)		0.0077	0.2869	0.7089	0.1145	0.1219	0.1896	0.7539	0.5506	0.6443	0.6485	0.9907	0.5581	0.6403	0.6738	0.3645	0.0057	
Pr>F (BxC)		0.5352	0.8937	0.1481	0.0183	0.0549	0.3773	0.9880	0.2844	0.0365	0.9559	0.4995	0.2590	0.2441	0.4252	0.4294	0.0036	
Pr>F (AxBxC)		0.2886	0.3867	0.8810	0.1500	0.0770	0.1428	0.9868	0.5229	0.2123	0.1838	0.2531	0.5952	0.5832	0.6179	0.0495	0.0124	
Factor A LSD (0.05)		10807	5.4	5.5	2.3	3.6	7.0	1.6	42.2	0.5	0.1	1.0	259	256	0.52	0.08	0.15	
Factor B LSD (0.05)		5477	2.6	2.9	1.3	1.3	2.7	NA	NA	0.3	0.1	NA	NA	NA	0.37	0.05	0.12	
Factor AxB LSD (0.05)		NA	NA	NA	2.9	3.0	NA	1.3	NA	0.6	0.1	NA	NA	NA	0.82	0.11	0.27	
Factor C LSD (0.05)		5553	NA	2.9	1.7	NA	NA	NA	NA	0.3	NA	NA	NA	143	144	NA	NA	0.11
Factor AxC LSD (0.05)		12417	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.24	
Factor BxC LSD (0.05)		NA	NA	NA	2.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15	
Factor AxBxC LSD (0.05)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12	

* - means within a column and a factor with the same letter are not significantly different at p<0.05

Trial Summary

Design: Split Plot
Row Width: 38 cm
Rows Per Plot: 6
Rows Harvested per Plot: 4
Planting Dates: May 27, June 1, 9, 19, 29
Killing Frost on Sept 19
Fertilizer: 10.5 - 16.9 - 16.9 @ 250 lbs/ac - May 23
Herbicide: Pursuit, Dual II Magnum Pre/PPI - June 4
Insecticide: Matador - July 24
Fungicide: Propulse/Quadris - July 24, Lance August 14
Harvest Dates: Sept 22, 22, Oct 9, 26

2020 Planting Date Large Seed Huron Research Station
University of Guelph, Ridgetown Campus

No.	Date	Population	Plant												Yield - Pick (kg/ha)	Colourimeter																
			Factor A	Factor B	Plant Emerge (#/ha)	Plant Emerge (%)	Plant Height (Aug. 5)	BBCH Stage (Aug. 5)	Green Seeker (Aug. 5)	Dry Wt (g)	Green Seeker (Aug. 27)	Seed Quality (1-5; 1=good)	Seed Pick (%)	Seed Weight (g/100)	Seed Yield (kg/ha)	L	a	b														
1	May 20		89708	a	68.1	a	42.6	b	75.9	a	68.3	a	23.7	a	29.0	d	2.4	b	5.4	b	49.9	c	1859	b	1759	b	22.1	d	17.2	b	4.4	c
2	May 30		85292	a	64.4	a	46.1	a	76.3	a	68.0	a	26.1	a	34.1	c	2.3	b	4.8	b	50.7	c	1757	b	1675	b	22.3	c	16.0	d	4.3	c
3	June 10		76250	b	57.7	b	48.5	a	74.4	b	68.5	a	23.9	a	56.7	b	1.7	d	4.5	b	53.7	b	2459	a	2347	a	22.4	c	16.8	c	4.6	b
4	June 20		77667	b	59.2	b	46.7	a	68.0	c	65.0	a	15.6	b	75.6	ab	2.2	c	5.9	b	57.9	a	2650	a	2490	a	22.7	b	18.0	a	4.9	a
5	June 30		89583	a	69.0	a	35.9	c	53.9	d	37.8	b	6.5	c	78.3	a	2.7	a	12.0	a	51.3	c	2945	a	2568	a	23.2	a	16.7	c	4.8	a
1		Narrow - 80k	51267	f	64.1	a	43.6	a	69.9	a	52.8	d	24.0	a	53.2	bc	2.2	a	6.5	a	53.1	b	2047	a	1914	a	22.6	a	17.1	a	4.6	a
2		Narrow - 120k	80533	d	67.1	a	44.5	a	69.3	a	57.4	c	20.1	b	56.7	a	2.3	a	7.5	a	53.2	b	2351	a	2169	a	22.5	a	16.7	a	4.5	a
3		Narrow - 160k	99533	c	62.2	b	42.7	a	70.0	a	60.2	bc	16.8	c	54.4	b	2.3	a	6.2	a	52.2	bc	3398	a	3086	a	22.6	a	17.1	a	4.7	a
4		Narrow - 200k	131133	a	65.6	a	43.9	a	69.5	a	64.8	b	16.1	c	57.4	a	2.3	a	7.1	a	51.2	c	2530	a	2353	a	22.5	a	16.7	a	4.6	a
5		Wide - 70k	43600	a	62.3	b	44.1	a	69.9	a	55.7	c	25.0	a	51.9	c	2.4	a	6.3	a	54.6	a	1857	a	1735	a	22.6	a	16.9	a	4.5	a
6		Wide - 105k	63333	e	60.3	b	43.5	a	69.6	a	62.5	b	19.8	b	54.3	b	2.2	a	5.9	a	53.3	b	2034	a	1912	a	22.5	a	17.1	a	4.5	a
7		Wide - 140k	93400	cd	66.7	a	45.1	a	69.5	a	69.2	a	17.5	c	55.6	a	2.3	a	6.5	a	52.6	b	2246	a	2100	a	22.5	a	17.0	a	4.6	a
8		Wide - 175k	106800	b	61.0	b	44.2	a	69.8	a	69.7	a	14.0	c	54.7	b	2.3	a	6.2	a	51.4	c	2211	a	2072	a	22.6	a	17.1	a	4.6	a
1-1	May 20	Narrow - 80k	54000	a	67.5	a	41.4	a	77.5	a	56.3	a	28.4	b	28.8	g	2.4	a	6.7	a	51.0	a	1708	a	1597	a	21.9	a	16.7	a	4.2	a
2-1	May 30	Narrow - 80k	50333	a	62.9	a	46.3	a	76.4	a	61.5	a	39.2	a	33.8	f	2.1	a	4.3	a	51.6	a	1826	a	1747	a	22.7	a	16.3	a	4.4	a
3/1	June 10	Narrow - 80k	50667	a	63.3	a	48.0	a	74.0	a	61.8	a	30.0	b	58.0	d	1.5	a	4.2	a	54.2	a	2435	a	2332	a	22.5	a	17.1	a	4.6	a
4/1	June 20	Narrow - 80k	44000	a	55.0	a	46.8	a	68.1	a	54.0	a	16.5	cd	72.5	c	2.3	a	5.2	a	57.7	a	2152	a	2044	a	22.7	a	17.6	a	4.8	a
5/1	June 30	Narrow - 80k	57333	a	71.7	a	35.7	a	53.5	a	30.3	a	5.9	de	72.8	c	2.8	a	12.2	a	50.8	a	2113	a	1852	a	23.2	a	16.6	a	4.7	a
1-2	May 20	Narrow - 120k	87667	a	73.1	a	40.6	a	74.3	a	60.8	a	21.5	c	28.3	g	2.5	a	5.9	a	50.0	a	1890	a	1781	a	22.2	a	17.6	a	4.3	a
2-2	May 30	Narrow - 120k	82667	a	68.9	a	47.7	a	75.9	a	60.3	a	32.6	ab	34.8	f	2.3	a	5.7	a	50.8	a	1812	a	1709	a	22.0	a	16.0	a	4.1	a
3/2	June 10	Narrow - 120k	70000	a	58.3	a	48.9	a	74.5	a	63.3	a	25.0	b	59.8	d	1.6	a	4.4	a	54.2	a	2586	a	2471	a	22.1	a	16.5	a	4.3	a
4/2	June 20	Narrow - 120k	79333	a	66.1	a	45.3	a	66.7	a	64.5	a	13.4	d	78.5	ab	2.3	a	7.8	a	60.5	a	2941	a	2698	a	23.1	a	18.3	a	5.0	a
5/2	June 30	Narrow - 120k	83000	a	69.2	a	40.1	a	55.3	a	38.3	a	7.9	d	82.3	a	2.9	a	13.7	a	50.6	a	2525	a	2184	a	23.2	a	17.3	a	4.8	a
1-3	May 20	Narrow - 160k	117667	a	73.5	a	43.5	a	75.9	a	69.3	a	19.8	c	30.5	g	2.3	a	5.1	a	51.2	a	2157	a	2049	a	21.7	a	16.6	a	4.2	a
2-3	May 30	Narrow - 160k	103000	a	64.4	a	45.1	a	77.2	a	63.8	a	22.4	c	33.0	f	2.5	a	4.6	a	50.8	a	1889	a	1802	a	22.7	a	16.2	a	4.5	a
3/3	June 10	Narrow - 160k	87333	a	54.6	a	46.8	a	74.7	a	69.3	a	26.2	bc	57.0	d	1.6	a	4.6	a	52.3	a	2606	a	2483	a	22.2	a	17.0	a	4.6	a
4/3	June 20	Narrow - 160k	94000	a	58.8	a	42.2	a	68.5	a	62.3	a	9.5	d	73.8	cd	2.3	a	4.3	a	55.1	a	2718	a	2606	a	22.8	a	18.0	a	4.9	a
5/3	June 30	Narrow - 160k	95667	a	59.8	a	36.0	a	53.8	a	36.5	a	6.4	d	77.5	b	2.8	a	12.2	a	51.5	a	7618	a	6492	a	23.2	a	17.0	a	4.8	a
1-4	May 20	Narrow - 200k	139000	a	69.5	a	40.9	a	75.5	a	69.5	a	17.1	c	34.0	f	2.5	a	5.6	a	48.5	a	2059	a	1944	a	21.7	a	16.8	a	4.1	a
2-4	May 30	Narrow - 200k	140333	a	70.2	a	46.5	a	76.8	a	71.3	a	24.2	bc	33.8	f	2.1	a	4.0	a	49.5	a	2072	a	1991	a	22.7	a	16.3	a	4.6	a
3/4	June 10	Narrow - 200k	122333	a	61.2	a	50.9	a	73.9	a	74.5	a	20.0	c	58.8	d	1.8	a	4.4	a	51.3	a	2947	a	2819	a	22.4	a	17.1	a	4.6	a
4/4	June 20	Narrow - 200k	110667	a	55.3	a	45.8	a	68.0	a	65.8	a	13.7	d	77.8	b	2.3	a	6.2	a	55.4	a	2978	a	2791	a	22.8	a	17.9	a	4.9	a
5/4	June 30	Narrow - 200k	143333	a	71.7	a	35.6	a	53.6	a	43.0	a	5.5	e	82.8	a	2.9	a	15.2	a	51.6	a	2593	a	2222	a	23.3	a	17.3	a	4.9	a
1-5	May 20	Wide - 70k	46667	a	66.7	a	44.8	a	77.2	a	67.0	a	34.1	a	24.5	h	2.4	a	4.5	a	50.6	a	1591	a	1519	a	22.5	a	17.4	a	4.5	a
2-5	May 30	Wide - 70k	42000	a	60.0	a	44.9	a	76.6	a	62.8	a	26.4	b	36.5	f	2.5	a	5.0	a	52.8	a	1494	a	1417	a	22.6	a	16.7	a	4.5	a
3/5	June 10	Wide - 70k	36667	a	52.4	a	47.6	a	74.8	a	58.8	a	33.9	a	50.8	e	1.8	a	5.4	a	56.1	a	1790	a	1692	a	22.5	a	17.1	a	4.6	a
4/5	June 20	Wide - 70k	41333	a	59.0	a	47.4	a	67.1	a	56.5	a	22.3	c	71.3	c	2.3	a	6.3	a	60.1	a	2285	a	2146	a	22.3	a	17.9	a	4.8	a
5/5	June 30	Wide - 70k	51333	a	73.3	a	36.0	a	53.6	a	33.3	a	8.0	d	76.5	b	2.9	a	10.6	a	53.2	a	2123	a	1901	a	23.2	a	16.7	a	4.7	a
1-6	May 20	Wide - 105k	64000	a	61.0	a	42.5	a	75.3	a	70.5	a	24.1	bc	28.5	g	2.4	a	4.9	a	50.8	a	1716	a	1631	a	22.3	a	17.9	a	4.6	a
2-6	May 30	Wide - 105k	66000	a	62.9	a	45.7	a	76.0	a	70.0	a	24.5	bc	33.8	f	2.4	a	4.9	a	51.2	a	1551	a	1479	a	21.9	a	15.4	a	4.0	a
3/6	June 10	Wide - 105k	53667	a	51.1	a	47.6	a	74.6	a	67.3	a	22.6	bc	56.3	d	1.8	a	4.7	a	54.7	a	2265	a	2158	a	22.2	a	16.5	a	4.5	a
4/6	June 20	Wide - 105k	58667	a	55.9	a	49.6	a	67.7	a	67.0	a	21.3	c	75.5	b	2.1	a	5.3	a	58.6	a	2505	a	2373	a	22.8	a	17.6	a	4.9	a
5/6	June 30	Wide - 105k	74333	a	70.8	a	32.2	a	54.4	a	37.8	a	6.2	de	77.3	b	2.5	a	9.6	a	51.4	a	2132	a	1920	a	23.1	a	16.3	a	4.8	a

1-7	May 20	Wide - 140k	99333 a	71.0 a	43.4 a	75.5 a	75.5 a	25.1 bc	28.5 g	2.5 a	5.1 a	48.7 a	1880 a	1782 a	22.6 a	17.8 a	4.6 a
2-7	May 30	Wide - 140k	91333 a	65.2 a	45.6 a	75.1 a	76.3 a	19.1 c	33.5 f	2.5 a	5.8 a	49.4 a	1686 a	1587 a	22.2 a	16.0 a	4.4 a
3/7	June 10	Wide - 140k	87000 a	62.1 a	50.6 a	75.1 a	79.0 a	19.7 c	59.5 d	1.6 a	4.7 a	55.2 a	2712 a	2587 a	22.6 a	17.1 a	4.7 a
4/7	June 20	Wide - 140k	88333 a	63.1 a	49.2 a	68.5 a	72.5 a	17.1 cd	78.0 b	2.1 a	6.1 a	58.4 a	2731 a	2550 a	22.3 a	18.0 a	4.8 a
5/7	June 30	Wide - 140k	101000 a	72.1 a	36.9 a	53.6 a	42.8 a	6.4 de	78.3 ab	2.6 a	10.6 a	51.4 a	2223 a	1992 a	23.2 a	16.3 a	4.8 a
1-8	May 20	Wide - 175k	109333 a	62.5 a	43.6 a	76.3 a	77.3 a	19.1 c	29.3 g	2.5 a	5.5 a	48.5 a	1869 a	1767 a	22.2 a	16.7 a	4.4 a
2-8	May 30	Wide - 175k	106667 a	61.0 a	47.2 a	76.3 a	78.5 a	20.4 c	34.0 f	2.4 a	3.8 a	49.6 a	1728 a	1663 a	21.7 a	15.4 a	4.1 a
3/8	June 10	Wide - 175k	102333 a	58.5 a	48.1 a	73.6 a	74.5 a	14.0 d	53.3 e	1.8 a	4.0 a	51.5 a	2331 a	2236 a	22.3 a	16.2 a	4.4 a
4/8	June 20	Wide - 175k	105000 a	60.0 a	47.3 a	69.5 a	77.3 a	11.1 d	77.8 b	2.3 a	5.8 a	57.2 a	2891 a	2715 a	23.1 a	18.6 a	5.1 a
5/8	June 30	Wide - 175k	110667 a	63.2 a	35.1 a	53.4 a	41.0 a	5.3 e	79.0 ab	2.6 a	11.8 a	50.4 a	2234 a	1979 a	23.3 a	16.4 a	4.9 a
Mean			83700	63.7	44.0	69.7	61.5	19.2	54.8	2.3	6.5	52.7	2334	2168	22.5	16.9	4.6
Pr>F(A)			0.0395	0.0195	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0254	0.0173	0.0001	0.0001	0.0001
Pr>F(B)			0.0001	0.0147	0.6695	0.7885	0.0001	0.0001	0.0001	0.8241	0.3608	0.0001	0.1277	0.1151	0.9956	0.4408	0.8611
Pr>F(AxB)			0.3399	0.2684	0.6662	0.1331	0.0441	0.0087	0.0289	0.9169	0.7539	0.1795	0.4781	0.4415	0.3484	0.2871	0.3169
LSD (0.05) A			10520	7.5	3.9	1.3	5.7	4.2	2.7	0.2	1.9	2.0	779	810	0.3	0.5	0.2
LSD (0.05) B			6563	4.5	NA	NA	4.7	3.6	2.2	NA	NA	1.2	NA	NA	NA	NA	NA
LSD (0.05) AxB			NA	NA	NA	NA	NA	6.6	8.1	4.8	NA						

Trial Summary

Cultivar: Red Hawk

Design: Split Plot

Row Width: Narrow 38 cm; Wide 76 cm

Rows Per Plot: Narrow 6; Wide 4

Rows Harvested per Plot: Narrow 4; Wide 2

Planting Dates: May 27, June 1, 9, 19, 29

Killing Frost on Sept 19

Fertilizer: 10.5 - 16.9 - 16.9 @ 250 lbs/ac - May 23

Herbicide: Pursuit, Dual II Magnum Pre/PPI - June 4

Insecticide: Matador - July 24

Fungicide: Propulse/Quadrис - July 24, Lance August 14

Harvest Dates: Sept 11, 14, 16, 23, Oct 8

2020 Conventional Soybean Performance Exeter Ontario University of Guelph, Ridgetown Campus

No.	Name	% Plant Stand 30 DAP	Plant Height (cm)	Plant Maturity (DAP)	Plant Lodging (1-5)	Seed Quality (1-5)	Yield (kg/ha)	Yield (bu/ac)
1	DH530	80.0	95.3	114.7	1.0	2.3	4387	65.2
2	Acora	80.0	101.0	113.7	1.2	2.0	4641	69.0
3	HDC Blake	80.0	105.0	120.0	1.7	2.0	4277	63.6
4	Candor	80.0	97.0	117.0	1.7	2.0	4466	66.4
5	Eider	80.0	97.0	112.3	1.5	1.8	4128	61.4
6	Havane	80.0	97.7	112.3	1.3	1.5	4281	63.7
7	Neptune	81.7	93.7	111.0	1.0	2.0	4366	64.9
8	S16-F5	85.0	87.0	114.7	1.0	1.5	4333	64.4
9	Marula	83.3	101.0	111.0	1.0	2.0	4147	61.7
10	OAC Prosper	81.7	99.0	116.3	2.0	1.7	4525	67.3
11	OAC Adare	81.7	98.0	116.3	1.5	2.0	4634	68.9
12	Emperor	83.3	92.7	114.7	1.2	2.2	4554	67.7
13	Genesis	81.7	94.7	113.3	1.5	1.5	4289	63.8
14	Skyline	80.0	92.3	113.0	1.0	1.5	3978	59.1
15	S14-H3	83.3	88.0	113.0	1.0	1.8	4709	70.0
16	OAC Paris	76.7	101.0	118.0	1.2	1.8	4579	68.1
17	S10-R2	80.0	97.7	109.7	1.2	1.5	4447	66.1
18	Absent	76.7	100.7	110.0	1.2	1.8	3574	53.2
19	Zana	80.0	104.7	115.0	1.5	1.8	4395	65.4
20	OAC Miller	80.0	92.7	113.0	1.3	1.7	4409	65.6
21	Ezra	80.0	95.7	111.7	1.0	2.0	4406	65.5
22	P11A10	75.0	100.0	115.3	1.3	1.8	4637	68.9
23	Azalea	83.3	87.0	114.7	1.0	2.2	4960	73.8
24	SeCan 17-24C-SCN	81.7	90.7	112.3	1.0	1.7	4548	67.6
25	SeCan 17-75C-SCN	81.7	99.0	114.3	1.0	2.0	4684	69.7
26	OAC 17-85C SCN	85.0	91.3	115.0	1.0	2.0	4783	71.1
27	OAC 17-129C	81.7	99.3	115.0	1.2	2.2	4559	67.8
28	Laurentian	80.0	105.3	117.7	1.2	2.0	4232	62.9
29	Cypress	83.3	86.7	110.7	1.0	1.8	4207	62.6
30	Atena	81.7	88.0	114.0	1.0	1.5	4300	63.9
31	SVX20T1S16	81.7	94.7	114.0	1.2	1.5	4531	67.4
32	SVX20T1S19	81.7	90.7	115.7	1.2	1.5	4840	72.0
33	SVX20T2S23	81.7	105.0	121.7	1.5	1.7	4905	72.9
34	PED110373002	85.0	92.7	112.7	1.3	1.5	3910	58.1
35	PR110308Z030	81.7	89.7	111.0	1.0	1.5	4231	62.9
36	CER11-65.30	80.0	113.3	122.1	2.2	1.5	4542	67.5
37	SC 6218N	78.3	101.3	120.0	1.7	1.8	4716	70.1
38	S12-J7	83.3	99.3	114.3	1.2	1.5	4562	67.8
39	OAC 18-63C-SCN	83.3	102.7	115.7	1.8	1.8	4663	69.3
40	PR110946Z068	83.3	98.0	110.0	1.2	2.0	4162	61.9
41	PR120398Z-07	83.3	95.0	110.0	1.0	1.8	4558	67.8
42	DM_60022Z053	86.7	93.7	114.7	1.8	1.7	4689	69.7
43	PR120166Z-03	81.7	92.7	115.7	1.2	2.0	4347	64.6
44	PR131331Z-20-03	80.0	99.3	114.7	1.5	1.8	4728	70.3
45	SYN110190027	78.3	86.3	103.3	1.0	1.7	3711	55.2
46	SeCan 19-45C	85.0	98.0	112.7	1.3	1.7	4428	65.8
47	SeCan 19-47C	85.0	94.7	113.7	1.2	2.0	4500	66.9
48	SeCan 19-48C	85.0	103.0	112.3	2.2	1.5	4381	65.1
49	SeCan 19-52C-SCN	85.0	105.0	113.7	2.3	2.5	4697	69.8
50	SeCan 19-53C-SCN	81.7	106.7	113.0	1.7	2.0	3717	55.3
51	SeCan 19-59C-SCN	85.0	101.0	115.0	1.7	2.0	4408	65.5
52	SC2419N	80.0	106.0	114.0	1.8	1.5	4336	64.5

53	SC2519N	78.3	99.3	116.3	1.7	1.8	4407	65.5
54	SC2219N?	80.0	98.0	112.7	1.5	1.8	4600	68.4
55	Vegas	78.3	98.0	115.3	1.0	2.0	4314	64.1
56	OAC 18-101C	81.7	98.3	113.0	1.0	2.0	4608	68.5
57	OAC 19-46C-A	86.7	98.3	112.3	1.8	2.0	4379	65.1
58	OAC 19-43C	83.3	92.3	111.0	1.2	2.2	4241	63.1
59	OAC 19-88C	78.3	96.7	114.7	2.2	1.8	4195	62.4
60	OAC 19-49C	85.0	102.3	112.3	2.0	2.5	4263	63.4
61	OAC 18-121C	78.3	114.7	114.0	1.3	1.8	4328	64.4
62	OAC 19-57C	78.3	102.0	113.0	1.2	1.5	4686	69.7
63	OAC 19-91C	75.0	104.7	119.7	1.3	1.5	4691	69.8
64	OAC 19-70C	80.0	120.0	120.7	1.5	2.2	4258	63.3
65	OAC 19-72C	83.3	101.7	115.3	1.8	2.0	4682	69.6
66	OAC 19-61C-SCN	83.3	101.3	118.3	1.3	2.0	4646	69.1
67	OAC 19-62C-SCN	81.7	107.3	120.0	2.0	2.3	4660	69.3
68	CLS10-001,153	81.7	88.0	112.3	1.0	1.5	4346	64.6
69	CLS11-005,084	81.7	97.7	111.3	1.0	2.0	3461	51.5
70	CLS11-005,1082	81.7	96.7	110.7	1.0	1.5	4135	61.5
71	CLS11-005,1312	81.7	106.0	115.3	1.7	1.8	4158	61.8
72	SEMS15-23,39	81.7	103.0	115.0	1.3	1.5	4439	66.0
73	SVX21T1S22	80.0	95.7	115.0	1.0	2.0	4683	69.6
74	SVX21T1S23	83.3	100.0	121.3	1.2	2.5	4872	72.4
75	SVX21T2S27	83.3	99.7	122.0	1.5	2.3	4682	69.6
76	SVX21T2S28	78.3	94.0	117.3	1.5	1.7	4506	67.0
77	Hillsgreen	85.0	92.7	110.7	1.3	2.0	2959	44.0
78	Baltazar	71.7	93.0	115.7	1.0	2.0	4427	65.8
79	CER11-77.B.54	78.3	109.3	118.7	1.7	2.0	4486	66.7
80	CER1205529007-07	76.7	104.0	116.3	1.3	2.3	4398	65.4
81	AAC Talbot	80.0	99.3	117.3	1.3	1.8	3897	57.9
Mean		81.3	98.3	114.5	1.4	1.9	4400	65.4
LSD (P=.05)		4.9	10.1	2.6	0.5	0.3	315	4.7
CV		3.8	6.4	1.4	22.5	10.1	4.4	4.4
Pr>F (0.05)		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Trial Summary

Design: RCBD

Row Width: Narrow = 15 inch (38 cm)

Number of Rows Per Plot: 6

Number of Rows Harvested Per Plot: 4

Plot Length: 6 m

Harvest Length: 5 m

Seeding Rate: 19 seeds/m

Seed Treatment: Applied by Sponsor

Herbicide: Pursuit, Dual II Magnum and Roundup Transorp PPI May 22

Fungicide/Insecticide: None

Planting Date: May 25

Harvest Date: September 25

20SVRRE - 2020 Roundup Ready Soybean Performance Exeter Ontario
University of Guelph, Ridgetown Campus

No.	Name	% Plant Stand 30 DAP	Plant Height (cm)	Plant Maturity (DAP)	Plant Lodging (1-5)	Seed Quality (1-5)	Yield (kg/ha)	Yield (bu/ac)
1	Maxo R2	83.3	86.7	111.3	1.0	1.5	4344	64.6
2	PS 1162 R2	80.0	81.3	113.0	1.0	1.5	4262	63.4
3	PRO 3025R2C	83.3	91.7	118.7	1.3	1.5	5002	74.4
4	B088Y1	81.7	92.7	116.3	1.5	1.2	4651	69.2
5	Miko R2	85.0	85.0	112.7	1.5	1.5	4878	72.5
6	PS 1888 XRN	85.0	86.3	115.0	1.2	1.5	4949	73.6
7	Edge R2X	80.0	82.0	113.3	1.0	1.3	4637	69.0
8	S07-K5X	85.0	89.7	111.7	1.0	1.7	4382	65.2
9	S09-C3X	83.3	83.0	113.3	1.5	1.5	4500	66.9
10	S18-G4X	85.0	86.3	117.0	1.5	1.5	4932	73.3
11	Rx Response	85.0	91.0	114.0	1.8	1.5	4926	73.2
12	P15A63X	78.3	78.0	115.7	1.2	1.5	4677	69.5
13	P19A14X	80.0	84.0	120.3	1.3	1.5	5078	75.5
14	PS 1338 XRN	80.0	78.0	113.0	1.0	1.5	4538	67.5
15	P18A98X	85.0	87.7	119.3	1.3	1.5	5011	74.5
16	DKB10-20	80.0	85.3	113.7	1.0	1.5	4635	68.9
17	DKB12-16	83.3	79.7	113.0	1.5	1.5	4625	68.8
18	DKB15-54	85.0	87.7	116.0	1.5	1.3	4680	69.6
19	Maris R2X	80.0	77.7	113.7	1.0	1.5	4710	70.0
20	RX Laser	78.3	88.7	115.7	1.0	1.5	5418	80.6
21	S09-R8X	85.0	86.7	111.7	1.2	1.5	4614	68.6
22	S12-P3X	85.0	82.0	112.0	1.0	1.0	4756	70.7
23	Beliveau R2X	85.0	84.0	113.3	1.0	1.7	4845	72.0
24	CF13X9	78.3	87.0	116.3	1.3	1.5	4842	72.0
25	CF19X9	81.7	92.3	120.0	1.5	1.3	5160	76.7
26	PRO 16X346N	83.3	86.3	117.0	1.2	1.7	4960	73.8
27	PS 1119 XRN	83.3	80.3	112.7	1.2	1.3	4474	66.5
28	Modano R2X	76.7	80.7	113.0	1.0	1.5	4522	67.2
29	Dionne R2X	83.3	88.0	115.7	1.5	1.5	4798	71.3
30	S14-U9X	80.0	82.3	115.0	1.3	1.3	4968	73.9
31	P16T71E	80.0	90.7	118.0	1.8	1.3	4988	74.2
32	B161ME3	76.7	81.3	120.7	1.3	1.5	5183	77.1
33	B191FE	83.3	85.7	120.3	1.5	1.2	4906	72.9
34	B102ZE	80.0	80.3	113.7	1.0	1.5	4383	65.2
35	Cyclone R2X	78.3	79.7	119.3	1.7	1.5	4985	74.1
36	PRO 13X836N	81.7	80.3	115.0	1.0	1.5	5125	76.2
37	PRO 15X926N	85.0	95.0	118.7	1.5	1.2	4965	73.8
38	Rondo R2X	85.0	93.7	114.7	1.0	1.2	5056	75.2
39	Costo R2X	85.0	88.7	113.0	1.2	1.7	4547	67.6
40	CF17X0	83.3	87.7	120.0	1.3	1.3	4988	74.2
41	PRO 08EL926N	80.0	72.7	115.3	1.0	1.7	5181	77.0
42	PRO 19EL926N	80.0	89.0	122.3	1.5	2.0	4898	72.8
43	EXP11-20	83.3	85.7	115.7	1.2	1.8	4874	72.5
44	EXP19-20	83.3	95.3	118.0	1.2	1.5	4937	73.4
45	DKB11-84	81.7	75.0	112.3	1.0	1.5	4643	69.0
46	DKB14-65	81.7	88.0	115.7	1.0	1.5	5075	75.5
47	B152RX	81.7	82.3	117.0	1.5	1.2	5039	74.9
48	EXP1520XRN	81.7	90.7	117.0	1.0	1.0	5142	76.5
49	Echo E3	85.0	83.7	117.3	1.2	1.3	4766	70.9
50	PR0800	81.7	78.3	115.0	1.2	1.5	4861	72.3
51	PR0918A9	85.0	82.3	111.3	1.0	1.5	4655	69.2
52	P16A84X	81.7	91.0	121.7	1.5	1.7	5253	78.1
53	PR0718B5	85.0	80.7	110.0	1.0	1.5	4715	70.1
54	S12-M5X	85.0	72.3	114.0	1.2	1.3	4797	71.3
55	S16-K2X	85.0	85.0	118.7	1.5	1.5	4786	71.2
56	S20-E3	85.0	91.7	120.7	1.5	2.0	4494	66.8

57	SC20-2900E3	81.7	85.0	120.7	1.3	1.7	4982	74.1
58	SVX1120E3N	85.0	78.0	117.0	1.0	1.3	5122	76.2
59	SVX1520E3N	83.3	99.0	119.0	1.7	1.5	5044	75.0
60	SVX1820XTN	83.3	97.7	116.3	1.3	1.5	5080	75.5
61	CF17E30	83.3	95.7	119.0	1.5	1.5	4571	68.0
62	LS 10E125N	81.7	78.7	116.0	1.5	1.5	4860	72.3
63	CP1220RX	83.3	86.7	114.3	1.0	1.5	4715	70.1
64	CP1620E	81.7	92.7	119.7	1.3	1.7	5385	80.1
Mean		82.4	85.5	116.0	1.3	1.5	4840	72.0
LSD (P=.05)		3.9	11.6	2.2	0.4	0.3	456	6.8
CV		3.0	8.4	1.2	18.8	13.5	5.8	5.8
Pr>F (0.05)		0.0001	0.0004	0.0001	0.0001	0.0001	0.0001	0.0001

Trial Summary

Design: RCBD

Seeding Rate: 19 seeds/m

Row Width: Narrow = 15 inch (38 cm)

Seed Treatment: Applied by Sponsor

Number of Rows Per Plot: 6

Herbicide: Pursuit, Dual II Magnum and Roundup Transorp PPI May 22

Number of Rows Harvested Per Plot: 4

Fungicide/Insecticide: None

Plot Length: 6 m

Planting Date: May 25

Harvest Length: 5 m

Harvest Date: September 25

Identification of anthracnose races in Manitoba and Ontario from 2005 to 2015 and their reactions on Ontario dry bean cultivars

Robert L. Conner, Greg J. Boland, Chris L. Gillard, Yongyan Chen, Xuechan Shan, Debra L. McLaren, Anfu Hou, Waldo C. Penner, Melody S. Melzer, Parthiba Balasubramanian, Sheau-Fang Hwang, and Kenneth B. McRae

Abstract: Anthracnose, caused by the fungus *Colletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara, is one of the most destructive diseases of dry bean (*Phaseolus vulgaris* L.) in the world. Between 2005 and 2015, commercial fields of dry beans in Manitoba and Ontario were surveyed to determine the frequency of occurrence of races of the anthracnose fungus. Throughout the study, race 73 was most prevalent in Manitoba and Ontario. However, three anthracnose races not previously reported in Canada also were identified. These three new races and four previously identified anthracnose races were used to screen 52 dry bean cultivars, as well as a mung bean and azuki bean cultivar from Ontario, for their seedling reactions to determine their patterns of race resistance. The dry bean cultivars were classified into a total of 19 resistance spectra based on the pattern of seedling reactions to the seven anthracnose races. The most common resistance spectrum was susceptible to the majority of the anthracnose races and no cultivar was resistant to all of the races. Many bean cultivars produced intermediate anthracnose ratings to races 31 and 105 and tests of 16 dry bean cultivars against those races indicated that all cultivars with intermediate ratings to a specific race were segregating in their seedling reactions and none of the cultivars produced plants with only intermediate anthracnose severity ratings. This study provides new information on the anthracnose reactions of common bean cultivars in Canada, which should be useful for the development of new bean cultivars with durable resistance.

Key words: anthracnose, *Colletotrichum lindemuthianum*, bean, *Phaseolus vulgaris*, races, resistance.

Résumé : L'anthracnose causée par le cryptogame *Colletotrichum lindemuthianum* (Sacc. & Magnus) Briosi & Cavara figure parmi les maladies les plus destructrices du haricot (*Phaseolus vulgaris* L.) dans le monde. De 2005 à 2015, les auteurs ont examiné les champs commerciaux de haricot du Manitoba et de l'Ontario pour déterminer la fréquence des races du champignon responsable de cette affection. Durant leur étude, c'est la race 73 qui prévalait le plus dans les deux provinces. Cependant, les auteurs ont également identifié trois races qui n'avaient encore jamais été signalées au Canada. Les trois nouvelles races et les quatre identifiées antérieurement ont servi à sélectionner 52 cultivars de haricot ainsi qu'une variété de haricot mungo et une autre de haricot azuki de l'Ontario d'après la réaction des plantules, le but étant d'établir le mode de résistance à la race. Les cultivars ont

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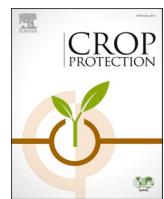
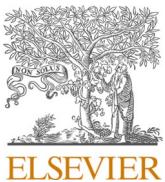
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Transmission of *Xanthomonas gardneri* to tomato seedlings during transportation and transplanting

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ABSTRACT

Xanthomonas gardneri is the common causal agent of bacterial spot affecting field tomatoes in Ontario, Canada but spread during seedling transportation and transplanting is poorly understood. Spread during transportation and irrigation was determined by placing symptomatic seedlings at the top of a simulated plug trailer with healthy seedlings 30.5, 61.0, 91.5, and 122 cm below to assess pathogen movement with different irrigation treatments. The incidence of seedlings with symptoms 14 days after irrigation in the top to bottom (3.9%) and bottom to top (5.4%) treatments was greater than the dip treatment (0.4%). Symptoms were found at all distances below the inoculation point. A second set of experiments looked at spread in a transplanter by placing wet or dry symptomatic seedlings through the transplanter prior to healthy seedlings. Epiphytic *X. gardneri* was found on healthy seedlings from all diseased treatments 14 days after treatment, indicating transmission of *X. gardneri* during transplanting. A third set of experiments assessed the impact of transplanter transmission in the field by monitoring symptom appearance in initially healthy seedlings planted in rows with either machine-transplanted diseased plants or hand-planted diseased plants. There was no difference in the time to symptom appearance, except for one plant position which was not in the direction of transplanting. Thus, factors other than contaminated transplanters may be more important in *X. gardneri* transmission under field conditions. Best management practices for bacterial spot in field tomatoes should consider irrigation practices in plug trailers, while the contribution of contaminated transplanters to epidemics is likely limited.

1. Introduction

Processing tomato (*Solanum lycopersicum* L.) is an economically important crop in Ontario, Canada, with a gross farm value in 2017 approaching \$52 million Canadian (OPVG, 2018). Bacterial spot (*X. euvesicatoria*, *X. vesicatoria* (Doidge), *X. perforans* and *X. gardneri* (Šutić) as classified in Jones et al. (2005)) is an important disease of processing tomato and most commonly caused by *X. gardneri* in southwestern Ontario (Abbasi et al., 2015). Symptoms appear on tomato leaves as brown-black lesions up to 5 mm in diameter, sometimes with a yellow halo surrounding the necrotic area. Bacterial spot causing Xanthomonads (BSX) can cause yield reductions of up to 60% as coalesced foliar lesions result in defoliation, while infected flowers can become necrotic (LeBoeuf et al., 2009; Potnis et al., 2015; Tartier and Pitblado, 1994). Dark brown scabby lesions up to 5–8 mm in diameter will also develop on fruit, further decreasing the value of the remaining crop (Jones et al., 2014). These may initially appear as water-soaked lesions

and sometimes develop star-shaped cracks. The bacterial spot-causing *Xanthomonas* species survive epiphytically on seeds and colonize the surfaces of developing cotyledon leaves as seedlings emerge (McGuire, 1991; Stall et al., 2009). Infection of tissues occurs through wounds or natural openings such as stomata. Temperatures between 24 and 30 °C and relative humidity greater than >70% encourage infection and symptom development (Bashan and Okon, 1985; Jones et al., 2014; Melotto et al., 2008). Current management practices for bacterial spot in Ontario are limited due to widespread insensitivity to copper (Abbasi et al., 2015), a lack of effective alternatives or biological controls (Trueman and LeBoeuf, 2015; Trueman, 2015), and a lack of host resistance (Scott et al., 2015).

Tomato seedlings in southwestern Ontario are seeded in plug trays in greenhouses and then transplanted outdoors when conditions are favourable, allowing for crop earliness and better uniformity (Biggs and Stewart, 1965; Gould, 1992; Heuvelink, 2005). Seedlings are transported to the field by loading dozens of plug trays into canvas-covered

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