18.0 Advanced yield tests for Malt barley [AA Barley, AB Barley, AC Barley, AFOO Barley]

Project duration: 2018 (AFOO), 2019 (AC, AB & AA) -
Collaborators: Agriculture and Agrifood Canada, Brandon

Objectives

- To evaluate grain yield potential, maturity and lodging characteristics of different barley varieties under Prairie weather conditions

Materials and Methods

The trials were established at Melita in 2019 except for AFOO Barley that was a continuation from 2018 season. The layout was serpentine arranged as randomized complete block design with 3 replicates. Seeding occurred early on the 2nd and 3rd May under no till system and on oat stubble. A seeding depth of 1" was achieved on Waskada soil moisture reaching 24" and this was adequate for barley emergence within 7 days. Fertilizer blend was side banded during seeding with a seed hawk dual knife air seeder at 108-35-20-7-2Zn (N-P-K-S) actual lb ac^{-1}. Weed control was done between 4 and 6 leaf stage by the application of 0.5 L ac^{-1} Mextrol and 0.15 L ac^{-1} Puma. Grain yield was the major data component collected, but other components included plant height at heading, heading and maturity dates and lodging. All data were analyzed by Agriculture and Agrifood Canada in Brandon.

Results and Discussion

The trials for advanced barley yield tests are still ongoing and combined results will be published at a later date. Collaboration of this trial is between Agriculture and Agrifood Canada and WADO.

19.0 Dry bean variety trial – Agriculture and Agri-food Canada

Project duration: 2019-
Collaborator: Anfu Hou Ph.D., Agriculture and Agrifood Canada, Morden MB

Objectives

- Evaluation of yield potential and agronomic characteristics of different dry bean varieties and lines in southwest Manitoba

Background

Dry bean is grown in regions of the world that typically experience soil moisture deficits such as the Canadian Prairies during the growing season (Nleya et al., 2001). Development and release of new varieties require extensive screening and testing at different locations over many years in order to find

appropriate varieties to grow in specific ecological regions (Saindon and Schaalje, 1993). Well proven performances of these varieties will enable dry bean producers to select varieties that suit their needs. Therefore, there is need to evaluate different varieties in different environments for potential yield and agronomic characteristics before they can be recommended for different production areas on the Prairies. Among other parameters, dry bean producers are also interested in pod height, disease resistance, days to maturity and nitrogen fixation capacity (Wilker et al., 2019).

Materials and Methods

The trial was established in Melita in 2019. The trial was laid out as randomized complete block design with twenty treatments in 3 blocks. Land preparation involved harrowing to spread oat straw evenly across the plots for ease of seeding and crop emergence. Seeds were placed at 1.25" under no till system on May 14 and fertilizer placement was side banded at the same time. Fertilizer application rates were 88-35-20-7-2Zn (N-P-K-S) actual lb ac^{-1} based on soil test results obtained from AGVISE laboratory. An application of 0.75 L ac^{-1} Roundup tank mixed with 0.5 L ac^{-1} Rival was done a week after seeding but before emergence of beans. Another chemical weed control application was done in-season using 0.91 L ac^{-1} Basagran and 0.15 L ac^{-1} Arrow + 0.5% v/v X-Act surfactant for control of broad leaf weeds and grasses respectively. Grasshoppers were controlled with an application of 0.03 L ac^{-1} Matador as the infestation was high enough to cause significant yield losses. Reglone was applied at 0.5 L ac^{-1} + 0.25 L LI700 100 L^{-1} of spray solution at maturity to dry immature green material and late weeds before harvest. Various agronomic data recorded include emergence date, pod clearance, lodging characteristics, flowering date, maturity date and grain yield. The data were analyzed by AAFC in Morden.

Results and Discussion

Dry bean variety trial data was analyzed without distinguishing dry bean market classes. Dry bean plant height had a wide range among the treatments and Azuki BC-26 was the shortest (25 cm) while W11-08-1-2-3-11 was the tallest and measured 61 cm (Table 19a). Although treatments differed in plant height, there were no significant differences in pod height. As expected and due to differences in genetic makeup, days to maturity varied among treatments with the early maturing treatment requiring 97 to 101 days while late maturing treatment (Azuki BC-26) required 120 days to reach maturity. Azuki BC-26 was the shortest treatment but yet required significantly more days to mature compared to other treatments. The genetic makeup of the treatment (Azuki BC-26) could be involving a stay green gene that allows the plant to continue to manufacture food for eventual compensation on seed yield. Dry bean seed yield varied between 1299 kg ha^{-1} (Azuki BC-26) to 2268 kg ha^{-1} (W12-32-2-2-1-4). Seventeen of the treatments were

concentrated between 1801 to 2268 kg ha^{-1} while the other 3 (Azuki BC-26, Envoy-check and Etna) obtained non-significant seed yield of 1299, 1385 and 1486 kg ha^{-1} (Table 19a). High seed weight was associated with high seed yield for most treatments. However, although Azuki BC-26 had the lowest seed yield of 1299 kg ha^{-1}, its seed weight of 17.6g was not significantly different from most of the treatments including L13BM650, which had the same seed weight but significantly different seed yield of 2059 kg ha^{-1}.

Table 19a. Analysis of variance and mean comparison for dry bean plant height, pod height, days to maturity, seed yield and seed weight at Melita in 2019.

Trt	Name	Type†	Plant_ht cm	Pod_ht cm	DTM	Yield kg/ha	Sdwt
4	Blackstrap	BK	48bcd	6	97f	2208ab	19.4df
14	W11-08-1-1-2	BK	60a	6	106bc	2120abc	20.1d
11	L13BM650	BK	47bcd	6	99f	2059abcd	17.6hi
9	W11-02-1-5-2	BK	55ab	2	107b	2018abcd	19.6d
19	W11-08-1-2-3-11	BK	61a	7	105bc	1934bcdf	17.6hi
10	W11-02-1-3-2	BK	54abc	2	107b	1926bcdf	19.0df
13	W11-08-1-1-1	BK	54abc	8	104bcd	1921bcdf	19.1df
3	CDC Jet (check)	BK	55ab	7	105bcd	1823cdf	18.3fhi
18	W13-15-02-1-3-1	NA	45cd	3	98f	2079abcd	18.0hi
17	W11-18-1-2-1-6	NA	54ab	5	105bc	1947bcd	16.0j
16	W11-15-1-2-2-5	NA	41	3	106bc	1862cdf	18.0hi
2	Portage (check)	NA	45d	3	98f	1846cdf	17.6hi
5	S09-27C	NA	55ab	7	103bcd	1801df	18.7fhi
15	W11-20-1-11-3	NA	54abc	2	98f	1694f	18.5fhi
12	W11-20-1-11-2	NA	44d	2	103cd	1647fh	18.8fh
1	Envoy (check)	NA	47bcd	7	101df	1385hi	18.5fhi
6	CR10875	CR	47bcd	5	105bc	2059abcd	47.2a
8	Etna	CR	37d	1	105bc	1486hi	45.7b
7	Azuki BC-26	AZ	25f	1	120a	1299i	17.6hi
20	W12-32-2-2-1-4	PT	42d	2	100df	2268a	30.1c
		CV	**11**	**71**	**2**	**10**	**3**
		LSD (p<0.05)	**9**	**NS**	**3**	**300**	**1.2**
		P value	**<0.001**	**0.078**	**<0.001**	**<0.001**	**<0.001**

†Analysis used does not distinguish varieties within market classes

References

Nleya, T. M., Slinkard, A. E. and Vandenberg, A. 2001. Differential performance of pinto bean under varying levels of soil moisture. *Canadian Journal of Plant Science* **81:233-239.**