SOYBEAN PERFORMANCE IN ONTARIO IN 2017

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Introduction

Soybean is a potentially valuable new crop for the Pacific Northwest (PNW). Soybean can provide raw materials for biodiesel, high-quality protein for animal nutrition, and oil for human consumption, all of which are in short supply in the PNW. In addition, edible or vegetable soybean production can provide a raw material for specialized food products. Soybean is valuable as a rotation crop because of the soil-improving qualities of its residues and its nitrogen (N_2)-fixing capability. Because high-value irrigated crops are typically grown in the Snake River Valley, soybeans may be economically feasible only at high yields. The most common rotation crop in the Treasure Valley is irrigated winter wheat, so soybeans need to be competitive in value with winter wheat.

This report summarizes work done in 2017 as part of our continuing breeding and selection program to adapt soybeans to eastern Oregon and includes the added yield enhancements achieved by changing the planting configuration. Our soybean reports from the last decade are available at our station web site <http://www.cropinfo.net>. There is a search function on the home page that will conveniently find all of our recent reports dealing with soybeans by using the key word "soybean".

Materials and Methods

The 2017 trial was conducted on Owyhee silt loam soil previously planted to wheat. In the fall of 2016, the field was disked twice, moldboard plowed, groundhogged twice, and bedded to 30-inch rows. On May 18, Outlook® herbicide was applied at 18 oz (0.84 lb ai)/acre and incorporated during planting.

Fifty-five lines selected in 2009 and 2010 were evaluated. The 55 selections were planted in plots 4 rows wide by 25 ft long. The experimental design was a randomized complete block design with four replicates. The seed was planted on May 19 at 200,000 seeds/acre in 3 rows on each 30-inch bed using a plot drill with disc openers. The rows were spaced 7 inches apart. *Bradyrhizobium japonicum* inoculant (ABI Inoculant, Advanced Biological Marketing, Inc., Van Wert, OH) was applied to the seed before planting. The field was furrow irrigated once per week.

Plant height in each plot was measured on July 25. Each plot was evaluated for lodging and seed shatter on October 4. Lodging was rated as the degree to which the plants were leaning over (0 = vertical, 10 = prostrate). The middle two beds in each four-bed plot were harvested from October 11-12 using a Wintersteiger Nurserymaster small-plot combine. Beans were cleaned, weighed, and a subsample was oven dried to determine moisture content. Moisture at the time of

analysis was determined by oven drying at 100°C for 24 hours. Dry bean yields were corrected to 13% moisture.

Results and Discussion

Yields in 2017 averaged 61 bu/acre and ranged from 44 bu/acre for selection number 128 to 70 bu/acre for selection number 103 (Table 1). None of the lines had seed counts sufficient for the manufacturing of tofu (<2,270 seeds/lb). All of the soybean materials evaluated had light-colored seed coats and pale hilums.

Summary

High soybean yields can be achieved in the Treasure Valley by employing varieties selected for the environment, high planting rates, modest fertilization, use of *Bradyrhizobium japonicum* inoculation, proper May planting dates, appropriate irrigation, and timely control of lygus bugs and spider mites.

Acknowledgements

Table 1. Performance of soybean cultivars in 2017. Malheur Experiment Station, Oregon State University, Ontario, OR. Continued on the next page.

No.	Cross	Interm. sel.	Selection	Yield	Height	Lodging	Seed weight
				bu/acre	cm	0-10	seeds/lb
103	M92-220	311	35-6-10	69.6	104.1	2.8	2,875
40	M92-330	M16	19-6-10	67.1	104.8	5.8	2,312
41	M92-330	M16	19-7-10	66.9	108.0	4.3	2,461
95	M92-220	305	31-8-10	66.1	102.2	3.0	2,712
42	M92-330	M16	19-8-10	65.8	104.8	6.3	2,317
122	M92-314	608	41-3-10	65.6	108.6	5.8	2,329
43	M92-330	M16	19-9-10	65.1	105.4	6.8	2,624
117	M92-314	601	40-3-10	65.0	108.6	5.3	2,460
18	M92-330	M1	11-3-10	64.8	104.8	6.3	2,398
29	M92-330	M9	15-3-10	64.6	104.8	6.3	2,389
23	M92-330	M4	14-3-10	64.5	99.7	4.3	2,343
69	M92-085	107	24-1-09	63.8	102.9	2.5	2,896
30	M92-330	M12	16-8-10	63.4	108.0	6.8	2,378
32	M92-330	M13	17-4-10	63.3	106.7	5.0	2,436
58	M92-085	101	20-7-10	63.2	100.3	4.3	2,334
25	M92-330	M4	14-5-10	63.1	99.1	5.3	2,326
26	M92-330	M4	14-8-10	63.0	105.4	5.3	2,401
86	M92-220	303	30-1-10	62.9	106.0	5.3	2,880
66	M92-085	106	23-6-10	62.6	106.7	5.0	2,428
109	M92-220	312	36-7-10	62.6	104.8	2.3	2,826
96	M92-220	307	32-3-10	62.5	106.0	2.5	2,744
39	M92-330	M15	18-8-10	61.9	106.7	4.5	2,340
44	M92-330	M16	19-10-10	61.9	107.3	3.3	2,412
94	M92-220	305	31-5-10	61.8	101.0	3.3	2,892
56	M92-085	101	20-4-10	61.7	107.3	3.8	2,392
36	M92-330	M15	18-2-10	61.6	101.6	5.3	2,462
111	M92-220	312	36-10-10	61.6	107.3	4.3	2,356

Table 1. Continued from previous page. Performance of soybean cultivars in 2017. Malheur Experiment Station, Oregon State University, Ontario, OR.

No.	Cross	Interm. sel.	Selection	Yield	Height	Lodging	Seed weight
				bu/acre	cm	0-10	seeds/lb
89	M92-220	303	30-5-10	61.3	104.8	3.5	2,717
113	M92-220	313	37-9-10	61.3	109.2	4.5	2,528
16	M92-330	M1	11-21-09	61.2	104.8	4.0	2,815
35	M92-330	M13	17-10-10	61.1	106.7	3.8	2,377
33	M92-330	M13	17-5-10	61.0	107.3	3.8	2,451
24	M92-330	M4	14-4-10	60.8	104.1	4.5	2,389
77	M92-085	107	24-3-10	60.3	106.0	5.0	2,291
51	M92-085	101	20-11-09	60.0	102.2	3.8	2,809
31	M92-330	M12	16-10-10	59.8	106.7	6.0	2,430
108	M92-220	312	36-6-10	59.4	106.7	4.3	2,911
21	M92-330	M2	12-7-10	59.2	108.0	4.5	2,429
53	M92-085	101	20-11-09	59.1	99.1	3.3	2,901
88	M92-220	303	30-3-10	59.1	106.0	3.5	2,727
93	M92-220	305	31-3-10	59.1	102.9	3.5	2,773
50	M92-085	101	20-7-09	58.8	106.0	5.0	2,876
19	M92-330	M2	12-1-10	58.7	101.0	6.8	2,452
72	M92-085	107	24-2-09	58.7	99.7	3.5	2,943
55	M92-085	101	20-1-10	58.6	106.0	4.8	2,307
63	M92-085	103	21-12-10	58.5	102.9	6.0	2,528
91	M92-220	305	31-1-10	58.5	104.1	6.0	2,775
6	Korada		8-2-10	57.1	104.8	7.0	2,630
101	M92-220	309	34-1-10	57.0	102.9	2.5	2,766
38	M92-330	M15	18-7-10	56.5	102.9	6.0	2,403
71	M92-085	107	24-2-09	55.6	108.0	5.3	2,923
57	M92-085	101	20-6-10	54.2	103.5	4.8	2,462
102	M92-220	309	34-11-10	53.0	106.0	4.8	2,838
125	OR-6	905	42-8-10	48.2	97.2	9.0	2,783
128	OR-6	909	43-10-10	43.9	98.4	9.8	2,885
Average				60.8	104.6	4.8	2579
LSD				8.4	NS	2.2	169.2