

SOYBEAN PERFORMANCE IN ONTARIO IN 2015

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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 (N₂)-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 2015 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 2015 trial was conducted on an Owyhee silt loam previously planted to wheat. In the spring of 2015, the field was disked twice, moldboard plowed, groundhogged twice, and bedded to 30-inch rows. On May 25, Outlook[®] herbicide was applied at 18 oz (0.84 lb ai)/acre and incorporated during planting.

One hundred and fifteen lines selected in 2009 and 2010 were evaluated. The 115 selections were planted in plots 4 rows wide by 25 ft long. Four plots of each selection were planted together in a top to bottom direction in the field to minimize the mixing of seed between selections during harvest. The seed was planted on May 26 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 (Cell-Tech, EMD Crop BioScience, Brookfield, WI) was applied to the seed before planting. The field was furrow irrigated once per week.

Plant height in each plot was measured on July 31. Each plot was evaluated for lodging, seed shatter, and maturity on September 16. 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 November 12 to 17 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 2015 ranged from 30 bu/acre for selection number 54 (20-11-09) to 81 bu/acre for selection number 24 and 37 (14-4-10 and 18-3-10, respectively) (Table 1). Several 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

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Table 1. Performance of soybean cultivars in 2015. Malheur Experiment Station, Oregon State University, Ontario, OR. Continued on the next page.

No.	Cross	Interm. sel.	Selection	Yield	Height	Days to maturity	Lodging	Seed weight
				bu/acre	cm	from emergence	0-10	seeds/lb
3	M92-220		2-4-10	50.1	66	107	0	2,253
5	M92-225		3-7-10	62.6	86	118	1	2,217
6	Korada		8-2-10	61.0	73	107	0	2,138
7	Korada		8-9-10	59.5	76	107	1	1,994
8	M92-330	M1	11-12-09	36.0	69	107	0	2,084
9	M92-330	M1	11-12-09	49.3	71	107	0	2,222
10	M92-330	M1	11-12-09	59.7	82	107	0	2,172
11	M92-330	M1	11-12-09	55.8	87	107	0	1,960
12	M92-330	M1	11-12-09	61.7	76	107	1	2,266
13	M92-330	M1	11-20-09	54.3	80	107	0	2,158
15	M92-330	M1	11-21-09	42.1	74	107	4	2,135
16	M92-330	M1	11-21-09	73.8	81	107	0	2,245
18	M92-330	M1	11-3-10	73.4	94	107	1	1,945
19	M92-330	M2	12-1-10	64.0	82	107	1	1,964
20	M92-330	M2	12-2-10	65.7	87	107	1	1,825
21	M92-330	M2	12-7-10	66.2	86	107	2	1,837
22	M92-330	M3	13-8-10	59.9	81	107	4	2,188
23	M92-330	M4	14-3-10	68.5	88	107	0	1,936
24	M92-330	M4	14-4-10	75.6	93	107	0	1,971
25	M92-330	M4	14-5-10	70.6	89	107	0	1,943
26	M92-330	M4	14-8-10	73.3	90	107	2	1,883
27	M92-330	M9	15-1-10	67.1	87	107	2	1,823
29	M92-330	M9	15-3-10	73.6	88	107	0	1,952
30	M92-330	M12	16-8-10	73.2	95	107	2	1,869
31	M92-330	M12	16-10-10	70.2	92	107	0	1,917
32	M92-330	M13	17-4-10	71.6	90	107	0	1,941
33	M92-330	M13	17-5-10	69.0	89	107	1	1,919
34	M92-330	M13	17-7-10	63.5	97	113	6	2,152
35	M92-330	M13	17-10-10	72.5	89	107	2	1,942
36	M92-330	M15	18-2-10	71.9	87	107	0	1,942
37	M92-330	M15	18-3-10	72.0	93	107	1	1,925
38	M92-330	M15	18-7-10	68.7	87	107	4	1,894
39	M92-330	M15	18-8-10	64.5	88	107	2	1,911
40	M92-330	M16	19-6-10	70.8	93	107	0	1,944
41	M92-330	M16	19-7-10	69.2	91	107	0	1,953
42	M92-330	M16	19-8-10	65.5	90	107	1	1,961
43	M92-330	M16	19-9-10	67.4	90	107	1	2,055
44	M92-330	M16	19-10-10	62.7	91	107	5	1,872

Table 1. Continued. Performance of soybean cultivars in 2015. Malheur Experiment Station, Oregon State University, Ontario, OR. Continued on the next page.

No.	Cross	Interm. sel.	Selection	Yield	Height	Days to maturity	Lodging	Seed weight
				bu/acre	cm	from emergence	0-10	seeds/lb
45	M92-330	M16	19-11-10	63.7	88	107	2	2,101
50	M92-085	101	20-7-09	66.8	88	107	0	2,225
51	M92-085	101	20-11-09	65.0	91	107	1	2,368
52	M92-085	101	20-11-09	67.9	84	107	1	2,139
53	M92-085	101	20-11-09	67.0	85	107	2	2,187
54	M92-085	101	20-11-09	57.6	74	107	0	2,162
55	M92-085	101	20-1-10	72.2	93	107	0	1,978
56	M92-085	101	20-4-10	70.2	90	107	0	1,941
57	M92-085	101	20-6-10	68.3	91	107	0	1,952
58	M92-085	101	20-7-10	67.1	87	107	0	1,905
59	M92-085	101	20-10-10	59.1	81	107	1	1,934
60	M92-085	103	21-1-10	54.3	81	107	1	2,003
61	M92-085	103	21-3-10	68.5	96	107	0	1,940
62	M92-085	103	21-11-10	66.3	90	107	0	2,015
63	M92-085	103	21-12-10	68.4	94	107	2	2,014
64	M92-085	104	22-4-10	63.9	92	107	3	1,902
65	M92-085	104	22-10-10	56.6	86	107	1	1,971
66	M92-085	106	23-6-10	68.7	89	107	0	1,973
67	M92-085	107	24-1-09	55.0	84	107	0	2,345
69	M92-085	107	24-1-09	60.7	88	107	0	2,443
70	M92-085	107	24-2-09	64.7	85	107	1	2,257
71	M92-085	107	24-2-09	62.7	87	107	2	2,099
72	M92-085	107	24-2-09	57.6	80	107	2	2,139
74	M92-085	107	24-6-09	50.0	80	107	1	2,222
75	M92-085	107	24-6-09	50.0	78	107	2	2,179
77	M92-085	107	24-3-10	58.9	88	107	1	1,977
78	M92-085	107	24-5-10	57.4	84	107	4	2,002
79	M92-085	107	24-6-10	50.1	81	107	3	1,931
80	M92-085	107	24-8-10	60.3	90	107	0	2,019
81	M92-085	108	25-1-10	54.7	86	107	0	2,024
82	M92-085	108	25-3-10	58.3	90	107	1	1,936
83	M92-085	108	25-4-10	43.3	92	113	5	2,069
84	M92-085	108	25-7-10	47.3	75	107	3	1,986
85	M92-085	108	25-11-10	65.2	90	107	4	2,004
86	M92-220	303	30-1-10	62.4	78	107	2	2,269
87	M92-220	303	30-2-10	63.3	85	107	2	2,292
88	M92-220	303	30-3-10	63.7	85	107	1	2,200
89	M92-220	303	30-5-10	65.0	81	107	2	2,259

Table 1. Continued. Performance of soybean cultivars in 2015. Malheur Experiment Station, Oregon State University, Ontario, OR.

No.	Cross	Interm. sel.	Selection	Yield bu/acre	Height cm	Days to maturity from emergence	Lodging 0-10	Seed weight seeds/lb
90	M92-220	303	30-6-10	55.8	81	107	3	2,166
91	M92-220	305	31-1-10	68.2	85	107	0	2,154
92	M92-220	305	31-2-10	62.2	85	107	1	2,159
93	M92-220	305	31-3-10	63.5	85	107	1	2,181
94	M92-220	305	31-5-10	59.6	79	107	1	2,185
95	M92-220	305	31-8-10	58.7	81	107	2	2,148
96	M92-220	307	32-3-10	60.9	80	107	2	2,112
97	M92-220	307	32-6-10	69.4	92	107	9	2,486
98	M92-220	308	33-1-10	63.9	79	107	3	2,090
99	M92-220	308	33-7-10	60.1	82	107	4	2,272
100	M92-220	308	33-8-10	59.0	85	107	5	2,040
101	M92-220	309	34-1-10	58.3	78	107	2	2,062
102	M92-220	309	34-11-10	61.2	84	107	0	2,036
103	M92-220	311	35-6-10	65.1	88	107	1	2,127
104	M92-220	311	35-8-10	62.8	82	107	3	2,148
105	M92-220	311	35-11-10	63.2	93	107	4	1,946
106	M92-220	312	36-3-10	62.1	86	107	3	1,923
107	M92-220	312	36-4-10	47.8	74	107	4	2,196
108	M92-220	312	36-6-10	62.9	86	107	1	2,118
109	M92-220	312	36-7-10	59.9	87	107	2	2,171
110	M92-220	312	36-8-10	57.3	80	107	1	2,248
111	M92-220	312	36-10-10	66.7	95	107	4	1,907
112	M92-220	313	37-3-10	57.8	90	107	6	2,041
113	M92-220	313	37-9-10	68.1	91	107	0	1,995
114	M92-220	313	37-10-10	58.0	87	113	4	2,093
115	M92-237	511	38-7-10	48.6	93	118	5	1,961
116	M92-237	514	39-9-10	60.1	92	107	8	2,131
117	M92-314	601	40-3-10	60.7	94	107	5	1,947
118	M92-314	601	40-5-10	41.3	90	118	7	1,926
119	M92-314	601	40-7-10	47.2	78	107	2	2,063
120	M92-314	601	40-8-10	50.7	75	107	2	2,064
121	M92-314	608	41-1-10	52.3	91	118	7	2,015
122	M92-314	608	41-3-10	56.2	87	107	7	1,916
123	M92-314	608	41-4-10	44.3	83	107	6	1,916
124	M92-314	608	41-7-10	53.9	78	107	0	2,055
125	OR-6	905	42-8-10	53.4	100	113	8	2,241
126	OR-6	905	42-9-10	61.7	95	107	6	2,237
127	OR-6	909	43-4-10	51.5	97	118	8	2,128
128	OR-6	909	43-10-10	53.4	98	118	8	1,944
Average				61.3	86	108	2	2,063
LSD (0.05)				6.6	6	NS	NS	90