

1999 SOYBEAN VARIETY TRIAL AT MADRAS

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Abstract

Demand for food-quality soybeans continues to grow, and there is some interest in soybeans as an alternative crop in central Oregon. Fourteen soybean lines (seven public lines from the Midwest, and seven new lines from the Malheur Experiment Station) were tested in a replicated trial at Central Oregon Agricultural Research Center in Madras. Among the public lines, 'Agassiz' (maturity group 0), and 'Glacier' (maturity group 00) successfully produced a seed crop of about 40 bushels per acre. Five of the seven Malheur lines show promise for production in central Oregon.

Introduction

Demand for food soybeans has increased approximately 10 to 20 percent annually for the past several years. The trend is expected to continue, with interest in soybean isoflavones and benefits of soybean protein in preventing heart disease expected to continue fueling growth in demand (Bluebook Update, 1999). For a variety to be successful in central Oregon, several factors have to be considered. In terms of seed traits, the food soybean market is strictly interested in nonGMO soybeans, with a preference being shown for large-seeded lines with a clear hilum (Seth Tibbot, Turtle Island Foods, personal communication, 1999). Agronomically, short duration and tolerance of cool temperatures during seed filling would be necessary for a variety to be produced successfully in central Oregon. Computer simulation studies conducted last year using 10 years of historical weather data run through the SOYGRO soybean growth model (Tsuji, et al., 1994) indicate that maturity group 00 and 0 varieties would give the best yields on average, and that yields typically would be near 40 bushels per acre (Sexton and Farris, 1999). A small soybean varietal development program has been underway for some time at the Malheur Experiment Station near Ontario, Oregon (Feibert et al., 1999). Lines selected at Ontario should have a good probability of being adapted here in central Oregon. A variety trial was conducted to test these lines along with some public varieties with a range of maturity ratings from the Midwest for their adaptation to central Oregon.

Methods

Soybean varieties were obtained from the Minnesota Crop Improvement Association ('Agassiz,' 'Glacier,' 'Proto,' 'Lambert,' 'Evans,' and 'Minnatto'), the Iowa Committee for Agriculture Development ('Vinton'), and from the Malheur Experiment Station (M92-330, M92-085, M92-225, M92-350, M92-314, M92-237, M92-220). Before tilling, sulfur was broadcast as gypsum at 30 pounds of S per acre. No other fertilizer was applied. The field was prepared by roto-tilling to a depth of 4 inches. Seeds were planted in 24-inch rows at a rate of 9 seeds per foot of row using an Almaco small-plot planter (Almaco Inc., Nevada, Iowa) to a depth of 1.5 inches on 20 May,

1999. Plots consisted of four rows 20 feet long laid out in a randomized complete block design with four replications. Plots were kept weed-free by pre-emergence application of alachlor at a rate of 3 qt per acre, followed by cultivation and hand-weeding during the season. An inoculant incompatible with soybean was mistakenly used at planting, so an appropriate liquid inoculant (Nitragin Cell-Tech 2000, LiplaTech Inc., Milwaukee, WI) for soybeans was broadcast at a rate of 1 L per acre and immediately watered in on May 27. In addition, on June 9 inoculant was shanked in 2 inches from the row to a depth of 1.5 inches with a liquid fertilizer attachment from a four-row planter. The shanked inoculant was mixed in a 100:1 ratio with water and delivered at a rate of 1 L of inoculant per acre. Sampling later in the season indicated that all plants possessed nodules; therefore, the effort to supply inoculant after planting appeared to be successful.

A killing frost occurred on September 27. Varieties which were not mature at this time were discarded from yield analysis. Following the frost, plots were end-trimmed to a length of 14 feet and the inner two rows were combined using a Wintersteiger small-plot combine. The seed was cleaned further with a benchtop seed cleaner, weighed, and a 100 to 200 g subsample taken for determination of percent moisture. Data were subject to analysis of variance using SAS statistical software.

Results and Discussion

Of the released varieties, only 'Agassiz' and 'Glacier' matured before a killing frost ended the season (Table 1). All the experimental lines from Malheur, except M92-220, matured in time to make a harvestable yield. This was a fairly typical season for growing soybeans in central Oregon. It appears that early maturity group 0 and group 00 varieties may perform reasonably well in this environment. Late group 0 and group 1 lines appear to be too late to be well adapted in central Oregon. Among the Malheur lines, M92-330, stood out for its lodging resistance and earliness. Also, the lines M92-225 and M92-237 have a clear hilum and appear to have potential for tofu production (Janet Pang, Vitasoy, personal communication, 1999). These lines look promising for future soybean production in Oregon.

Table 1. Flowering date, plant stage prior to killing frost, and maturity group, yield, and lodging score for 14 varieties of soybeans grown in a variety trial at the COARC, Madras, 1999. Varieties are sorted according to yield and stage. Varieties that did not mature were not included in the yield analysis. Lodging was scored on a 1 to 5 basis with 1 being 0-20% lodged and 5 being 80-100% lodged. Plants were considered lodged if they were leaning over 45 degrees or more.

Variety	Flowering Date (DAP)	Stage on 9/25/99'	Maturity Group	Yield (kg/ha)	Yield (bu/a)	Seed Size (g)	Lodge
Agassiz	67	7.0	0.0	2,860	42	13.9	4.5
M92-330	72	7.7	-	2,760	41	18.6	1.8
M92-085	65	7.0	-	2,630	39	14.7	3.5
Glacier	69	7.0	00.8	2,520	37	16.6	4.3
M92-350	61	7.8		2,490	37	17.1	2.1
M92-225	67	7.6		2,440	36	14.5	3.0
M92-237	62	7.0		2,180	32	14.2	3.1
M92-314	61	6.9		1,750	26	14.7	2.5
Prote	68	6.6	0.6		-	-	
M92-220'	67	6.5	-				
Evans'	66	6.3	0.6				
Minnatto'	62	6.2	0.7		-		
Lambert'	66	6.2	0.8	-	-		
Vinton'	67	5.5	1.8			-	
mean		6.8		2450	35.9	15.5	3.1
LSD (05)		0.4		495	7.4	0.35	1.7
CV (%)		4.5		11.9	11.9	1.3	31.5

¹ Killing frost occurred on 9/27/99. Stages are according to Fehr and Caviness (1979).

Literature Cited

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