

**Report to the Oregon Processed Vegetable Commission
2001-2002**

1. Title: Green Bean Breeding
2. Project Leaders: James R. Myers, Horticulture
Brian Yorgey, Food Science and Technology
3. Project Status: Terminating 30 June, 2002
4. Project Funding: \$ 61,635 breeding
\$ 10,113 processing
\$ 71,748 total

Breeding funds were used for a major portion of the support of a vegetable breeding technician, student labor, supplies, and research farm expenses. Processing funds were used for processing samples of experimental beans, laboratory analysis, and for student labor.

5. Objectives:
 - i. Breed Bush Blue Lake green bean varieties with high economic yield and improved plant architecture.
 - ii. Improve pod characteristics including straightness, color, smoothness, texture, flavor and quality retention, and combine with delayed seed size development.
 - iii. Incorporate white mold resistance and improve root rot tolerance while maintaining resistance to bean common mosaic virus.
 - iv. Develop a molecular marker map to facilitate marker-assisted selection of desirable horticultural traits.
 - v. Evaluate novel genetic traits of potential benefit.
6. Report of Progress:

Bean breeding lines and commercial varieties were tested in replicated trials planted 25 April, 07 May, 14 June, and 02 July. The advanced trial planted 25 April consisted of four check varieties and six advanced lines planted in two-row plots replicated six times. The 07 May and 02 July trials were preliminary trials, and consisted of one row per entry replicated six times. These trials had five check varieties and 19 and 14 experimental lines, respectively. The 14 June trial consisted of five check varieties (two full sieve, and three small-sieve green beans), three OSU lines, and 16 commercial entries (all green beans except for two normal Romanos, and two wax Romanos). An additional six commercial bean entries (5 green bean and one Romano) were grown in the 02 July Trial.

For all trials, five-foot sections of row were handpicked on each harvest date in each of four replications. In most cases, three harvests on alternate days were made to obtain a range of maturity. Replications were combined for grading.

Eighty recombinant inbred lines (RILs) and their parents (Minnette and OSU 5630) were tested in a trial with two replicates planted 02 June. Because of the number of lines involved in the trial, five foot sections of row were harvested only once at full maturity.

Samples were canned and frozen at the Food Science and Technology Pilot Plant for evaluation by industry representatives in February. Processed quality data will be published in a separate report.

Data from replicated yield trials are summarized in Tables 1 - 12 and Figures 1 - 12. The RIL trial is summarized in tables 13 and 14, and figures 13 - 18. Root rot and white mold disease nursery can be found in tables 15 - 18.

The growing season in general was mild with no major problems. There appeared to be an early split set in the first trial, and some entries in the second trial had a severe split set. The first and second trials had a significant incidence of white mold. The commercial and last trials were less concentrated, with longer maturation periods. The last trial had particularly lush growth; despite the heavy vines and lodging, little white mold was observed.

Advanced Standard Sieve OSU Lines: For full sieve advanced lines, OR 54, OSU 5635, and OSU 5643 generally had the highest T/A and \$/A values (see summary table below, Tables 1-6; Figures 1-4, 11). OR 91G generally had the lowest yields. OSU 5669 showed greatest similarity to OR 91G for field performance but generally had better \$/A value and greater T/A yields. OSU 5669 has significantly better pod color as well as straighter and smoother pods. OSU 5635 and OSU 5643 are most similar to OR 54 with straighter and smoother pods.

Season average \$/A based on:

Line	Trial averages ^z	Selected harvests ^y	Highest harvests
Oregon 91G	927	978	978
Oregon 54	1057	1039	1150
OSU 5635	1046	1042	1112
OSU 5643	1010	946	1092
OSU 5669	967	976	1027
LSD @5%	81	121	73

^zAverage of 2-4 harvests from 3 trials, based on weight of graded beans.

^yThe harvest selected as best for comparison and used for analysis of variance at 50% 1-4 sieve in tables 5 and 6.

Four year averages for yield and \$/A values are shown below for full sieve advanced lines and checks. Trends in the data generally suggest the following order: OR 54 = OSU 5643 > OSU 5669 > OR 91G. Also shown below are number and percent of trials in which advanced lines outperformed the checks, as well as yield advantage over the check

varieties. OSU 5669 had greater yields than OR 91G in 70% of 23 trials conducted over the past five years and out yielded OR 91G on average by 104%. OSU 5643 out yielded OR 91G by 102% in 62% of 13 trials. Both OSU 5669 and OSU 5643 performed well against OR 54 with average yields equivalent to OR 54, while outperforming the check in 48 and 39% of trials, respectively.

Four year average for full sieve beans²

Year						
Line	1998	1999	2000	2001	Overall Average	Average of 2000 and 2001
Adjusted T/A						
Oregon 91G	8.3	11.5	9.3	11.7	10.2	10.5
Oregon 54	8.5	13.2	9.8	12.9	11.1	11.4
OSU 5635	9.4	12.6	10.2			
OSU 5643			10.3	12.5		11.4
OSU 5669	8.9	12.2	9.5	11.9	10.6	10.7
LSD @5%		1.5	0.6	1.0	NS	NS
\$/A						
Oregon 91G	1450	1989	1584	953	1494	1269
Oregon 54	1489	2277	1685	1052	1626	1369
OSU 5635	1646	2172	1756			
OSU 5643			1770	1020		1395
OSU 5669	1580	2084	1638	969	1568	1304
LSD @5%		242	NS	84	NS	NS

²Average of 5, 4, 4 and 4 trials in 1998, 1999, 2000, and 2001 respectively. Based on field yields.

Number and percent of trials in which yield (T/A) of selected OSU lines equaled or outperformed 91G

Year	5635				5643				5669			
	Total No. Trials	No. Trials ≥	% Trials ≥	Overall % ²	Total No. Trials	No. Trials ≥	% Trials ≥	Overall % ²	Total No. Trials	No. Trials ≥	% Trials ≥	Overall % ²
1996	5	3	60	103					3	2	67	106
1997	5	3	60	103	2	0	0	95	2	1	50	100
1998	5	5	100	113	2	1	50	94	5	3	60	107
1999	4	3	75	110	1	1	100	102	4	3	75	106
2000	5	5	100	110	4	3	75	112	5	5	100	105
2001	3	3	100	108	4	3	75	106	4	2	50	102
Overall	24	22	92	108	13	8	62	102	23	16	70	104

²Overall T/A of selected lines expressed as a percent T/A of 91G.

Two and a quarter acres of OSU 5669 was grown in one commercial field in 2001. It yielded 7.5 T/A at 69% 1-4 sieve pods. Field reports indicate that the plant habit was better than OR 91G. It was also more efficient in running through the processing plant.

Number and percent of trials in which yield (T/A) of selected OSU lines equaled or outperformed OR 54

Year	5635				5643				5669			
	Total No. Trials	No. Trials \geq	% Trials \geq	Overall % ²	Total No. Trials	No. Trials \geq	% Trials \geq	Overall % ²	Total No. Trials	No. Trials \geq	% Trials \geq	Overall % ²
1996	5	0	0	91					3	1	33	96
1997	5	4	80	109	2	1	50	98	2	2	100	116
1998	5	5	100	111	2	1	50	97	5	3	60	105
1999	4	1	25	95	1	0	0	96	4	2	25	92
2000	5	5	100	104	4	2	50	105	5	2	40	100
2001	3	1	33	100	4	1	25	97	4	1	25	92
Overall	27	16	59	102	13	5	39	99	23	11	48	100

²Overall T/A of selected lines expressed as a percent T/A of OR 54.

In terms of pod quality, OSU 5643 has better color than OR 91G and similar to OR 54. OSU 5643 was rated as having significantly straighter and smoother pods than most other advanced lines or checks. It also had pods of similar length to OR 54, and slightly longer than other advanced lines and OR 91G. OSU 5669 had significantly better pod color in most trials compared to checks and other advanced lines. In the first and last trials though, pod color was not as significantly different. It may be that the pod color of OSU 5669 may be more responsive to environmental effects (temperature, light intensity) than other BBL varieties. Pod length of OSU 5669 was shorter than OR 91G (approximately 14 vs. 15 cm), which contributes to pod straightness. Pod straightness and smoothness were much better than OR 91G and OR 54. OSU 5643 (a sister line to OSU 5635) is from the cross OR 54 X OSU 5163. Growth habit of OSU 5643 in the field is similar to OR 54. OSU 5643 is about a day earlier in maturity than OR 54. Overall, OSU 5643 appears to be better than OSU 5635, and is suitable as a replacement for OR 54. It does appear to be more concentrated in set than does OR 54. OSU 5669 is from the cross OSU 5256 X OR 54. It is similar in maturity to OR 91G, and is recommended as a replacement for that cultivar.

Other standard sieve lines: Two preliminary trials were grown this year with six standard sieve lines included in addition to the advanced lines (Tables 2 & 3; Figures 2 & 3). OSU 5618, OSU 5699, OSU 5706 and OSU 5793 were repeats from last year's trials. New this year were OSU 5974 and OSU 5996. OSU 5706 (OSU 5256 X OSU 5416) had T/A and \$/A values that were comparable to, or greater than OR 54, and has very good pod quality. OSU 5618, from the cross OR 54 X OR 91G, had good pod color and high quality bush blue lake pods, but yielded about the same as OR 91G. It may be best used as an intermediate (60%) sieve size bean. Among the lines new to the trials, OSU 5974 was only tested in the 7 May planting, where it had the lowest yield among full sieve beans. It also has very oval pods, and should be dropped from the program. Perhaps the most interesting of the new full sieve beans is OSU 5996. It is a persistent chlorophyll (*pc*) type with mature green seeds and foliage that remains green after senescence from the cross OR 54 x Hypak. Pods are of excellent quality and extremely dark green in color. It has a very erect plant habit with pods generally set high on the plant. Yields were similar to OR 91G in the 7 May trial, but were significantly less in the 2 July trial.

Notes indicate that lower yields in the second trial may have been influenced by a split set. Like other *pc* varieties, this line exhibits lower germination and emergence than normal seeded lines, and requires a fungicide seed treatment for normal stand establishment. Assuming that no major flaws are found, this line represents a quantum leap forward for improving BBL pod quality.

Small Sieve Beans: (Tables 7-10, Figures 5-8, 12). OSU 5613, Minuette, and Medinah were used as checks for comparison to small sieve beans. Minuette produces a majority of three and four sieve beans while OSU 5613 and Medinah produce three sieve as the largest class. In advanced trials, OSU 5819, OSU 5835, and OSU 5844 were again tested. Of these, OSU 5835 has the greatest potential although it tended to heart- or oval-pod cross section in some trials. OSU 5844 had a strong oval shape and should be dropped from the program. OSU 5819 has round pod cross section and darker green color compared to OR 91G, but yields were similar to or less than Minuette, and pod size distribution was quite broad indicating a possible mix in this line.

Season Average \$/A based on

Line	Trial Averages ^z	Selected Harvests ^y	Highest Harvests
OSU 5613	699	709	801
OSU 5819	850	893	962
OSU 5835	955	977	993
Minuette	845	837	819
LSD @5%	136	99	NS

^zAverage of 2-5 harvests from 3 trials, based on weight of graded beans.

^yThe harvest selected as best for comparison and used for analysis of variance in table 10.

Two year yield averages (see table below) indicate that both OSU 5819 and OSU 5835 have better yield potential than either Minuette or OSU 5613. Both lines should be continued for another year of testing.

Two year average for small sieve beans^z

Line	T/A			\$/A		
	2000	2001	Avg	2000	2001	Avg
5613	7.7	8.5	8.1	1682	737	1115
5819	8.1	9.8	9.0	1607	897	1181
5835	7.6	11.1	9.4	1395	1042	1183
Minuette	7.1	8.2	7.7	1541	834	1117
LSD @ 5%	NS	1.8	1.4	NS	NS	NS

^zAverage of 2 and 3 trials in 2000 and 2001 respectively. Yields are field yields.

Other small sieve beans retested in preliminary trials included OSU 5800, OSU 5870, OSU 5912, OSU 5944, and OSU 5947. Small sieve beans tested for the first time this year included OSU 5852, OSU 5855, and OSU 5879. Because of strongly oval pods, OSU 5855, OSU 5870, and OSU 5947 should be dropped from the program. OSU 5800

had very high \$/A value, followed by OSU 5852. Both show potential for an intermediate sieve class, and should be tested again next year. OSU 5944 was similar to OSU 5613 in yield, but possesses better pod quality. It did show some variation for pod shape between trials, but may be a suitable replacement for OSU 5613 if there is demand for three sieve bean varieties. It should also be tested again.

Commercial Bean Trial: Varieties supplied by private breeders were grown in two trials: the main commercial trial planted on 14 June, and the Pureline Seeds (PLS) entries included in the 02 July trial (Tables 3, 5, 6, 9 - 12, Figures 3, 7, 9, 10). Comparisons should be made to the check varieties in each trial, and not to between trials. Two lines that are very close to the BBL type, and were tested in 2000 were again included (SB 4247, and SB 4249). SB 4247 again showed good plant architecture, and both SB lines had yields similar to OR 91G. The KSI lines, while not of BBL type, appeared to be of good quality with smooth, straight pods. The full sieve lines had yields similar to OR 91G while the small sieve lines had lower yields. Perhaps best of the set is KSI 196. Highest yielding among the small sieve types was SB 4087 with yields rivaling OR 54 and OSU 5643. Color was similar to OR 91G. EX 08190504 was notable for its very slow seed development. Even at its final harvest at 19% 1-4 sieve, it showed only moderate seed development in very smooth pods. Among PLS entries Igloo again had high \$/A. Among Romano types, EX 08790500 and EX 08190506 were highest yielding. While interesting as a small sieve Romano type, R 6004 had relatively low yields set on a rather floppy bush. PLS 118 Romano had yields similar to OR 91G.

Recombinant Inbred Trial: A recombinant inbred (RI) population based on the cross Minuette x OSU 5630 and its reciprocal was evaluated for morphological and horticultural traits (plant height, internode length, branching, leaf color, leaf size, pod color, pod straightness, pod distribution, pod clustering, crop load, lodging, stem thickness, hybrid weakness factor (*Dl*) and shiny vs. dull pods (*ace*) again this year. In addition, 80 RILs were included with parents in a processing trial (Tables 13 and 14, Figures 13-18). This population is being used to elucidate the genetic control of processing traits in green beans. Percent 1-4 sieve pod distribution was bimodal, with a higher peak at 90 - 99% 1-4 sieve (Figure 13). Such a pattern would suggest that small sieve size is dominant over large sieve size, and that the trait is controlled by relatively few genes. Color scores were fairly widely distributed, but showed a roughly unimodal distribution, suggestive of additive gene action where many genes with strong environmental effects were involved (Figure 14). Pod length exhibited a normal distribution that was skewed towards shorter pod length (Figure 15). Such a distribution would suggest that short pod length is dominant to long pods and that the trait is controlled by several to many genes. Pod straightness showed a similar distribution (Figure 16) and may in fact be correlated with pod length. Pod smoothness also showed a normal distribution with skewing towards smoothness (Figure 17). Pod width and height are plotted together to give a representation of pod cross section shape (Figure 18). The dashed line indicates equal length and height as would be expected for pods with round cross section. Pods to the left of the line are oval, those to the right of the line are crease-back in cross section. The scatter of points is suggestive of a normal distribution, but skewed towards crease-back cross sectional shape. In addition, data were collected on

presence of pod suture strings, and pod shininess. Shiny vs. dull pods segregated in a 1:1 ratio as would be expected for a single gene. Lines with pod suture strings were low in number and did not fit any expected segregation ratio. It is of interest that this cross segregates for pod strings and pod cross sectional shape because both parents are stringless and have round pods. This suggests that different gene complexes within the two lines control similar pod quality traits. Some of our recent research into snap bean phylogeny has demonstrated that the Oregon BBL materials belong to the Mesoamerican center of domestication whereas Minuette arises from the Andean center of domestication. Each possesses a distinctive set of alleles for the 53 molecular makers with which we have tested this material. During the winter of 2001-2002, we will be integrating morphological and molecular marker data, as well as adding additional molecular markers, to create a genetic map for snap bean.

Root rot and white mold trials: A root rot trial containing 68 checks and breeding lines was grown in two replicates and evaluated (Table 15). Disease severity was relatively high. Most OSU lines were moderately to highly susceptible. Only the later maturing entries had relative low scores apart from the check lines.

One hundred checks, breeding lines and germplasm accessions were grown in a white mold nursery (Table 16). Disease incidence was greater than last year and about the same as in 1999. Among OSU breeding lines OSU 5958 and OSU 5978 are of interest because of low scores. Both lines are fairly upright with porous canopies, suggesting that architecture may play a role in low white mold incidence. Many of the "B" lines had relatively low scores, and may have physiological resistance. B7354-6-2-1 continues to exhibit considerable resistance, and has done well in the straw tests. Segregating populations crossed to this line and others are being advanced and tested with the straw test. Correlation among white mold incidence, estimated yield, and growth habit (Table 17) showed a significant correlation between white mold score and growth habit (white mold incidence decreased with increasing erectness). White mold field ratings over the past four years is shown in Table 18.

Development and evaluation of new materials: Selection continues in the Oregon blue lake X Minuette crosses to obtain lines with improved architecture. Many selections from these crosses also have extremely dark green pods. This material was harvested as small bulks, so seed will be available for testing in replicated trials next year. Other crosses have been made, and populations are being advanced for white mold resistance, additional sources of improved architecture and general population improvement within the blue lake background.

7. Summary:

Nineteen OSU lines were evaluated in replicated handpicked yield trials planted over the period 25 April to 02 July. OR 91G and OR 54 were included as full sieve checks, and Minuette, Medinah, and OSU 5613 were included as a small sieve checks. Twenty-two commercial varieties (including standard and small sieve green beans, and Romano beans) were also evaluated. OSU 5669 is a line with yields similar to or better than OR 91G, and with superior pod quality. This line should be strongly considered for release

this winter. A promising line for release to replace OR 54 is OSU 5643. Another line of great interest is OSU 5996 with its excellent pod quality and color. Among small sieve lines, several look good, but there are no stand outs. OSU 5819, OSU 5835, and OSU 5944 should be retested next year. A processing trial of a Minuette x OSU 5630 recombinant inbred population revealed new data on the genetic control of processing traits. When combined with molecular marker data from this population, we should be able to map and further characterize genetic control of snap bean processing traits. White mold and root rot trials were continued with the identification of several lines with resistance. Crosses with new white mold resistant lines were made, and populations were advanced in the field.

8. Signatures:

Redacted for Privacy

Project Leader: _____

Redacted for Privacy

Department Head _____

Redacted for Privacy

Project Leader: _____

Redacted for Privacy

Department Head _____

**Table 1. Yields of advanced OSU standard green bean lines, April 25
Planting, Corvallis, 2001.²**

Line	Av. Stand	Days	% 1-4	T/A	Adj. 50%	Adj. 60%	Av. Adj. T/A 50% ^y	Av. Adj. T/A 60% ^y
91G	146	82	53	9.5	9.7	8.9	10.2	9.3
		83	54	10.2	10.6*	9.7*		
OR 54	150	84	63	11.6	13.1	11.9*	11.8	10.8
		85	50	11.4	11.4*	10.5		
		89	31	13.4	10.8	10.1		
5635	150	85	56	11.2	11.9	10.8*	11.4	10.4
		86	53	10.8	11.1*	10.1		
		89	41	12.2	11.1	10.3		
5643	134	84	67	10.5	12.3	11.1	11.3	10.4
		85	56	10.5	11.1	10.2*		
		86	48	10.8	10.6*	9.8		
		89	38	12.7	11.2	10.4		
5669	150	82	82	8.2	10.9	9.7	10.2	9.3
		84	61	9.8	10.9	9.9*		
		85	45	10.4	9.9*	9.1		
		86	46	9.4	9.0	8.3		

²Mean of 4 replications; subplots of 5' were harvested from double 20' plots on each harvest date; rows 36" apart; days = days from planting; % = percent 1-4 sieve grades; adj. 50% = tons/acre adjusted to 50% 1-4 sieve; adj. 60% = tons/acre adjusted to 60% 1-4 sieve. Analysis of variance (Table 5) was calculated using the harvest marked with *.

^yAverage Adj. T/A is a rough estimate because of non-uniform number of harvests included.

Table 2. Yields of preliminary OSU green bean lines, May 7 planting, Corvallis, 2001.^z

Line	Av. Stand	Days	% 1-4	T/A	Adj. 50%	Adj. 60%	Av. Adj. T/A 50% ^y	Av. Adj. T/A 60% ^y
91G	150	79	62	10.6	11.9	10.8	12.2	11.1
		80	63	11.3	12.8*	11.6*		
		82	39	13.4	11.9	11.0		
OR 54	150	82	50	14.7	14.7*	13.5*	14.7	13.6
		84	33	17.5	14.6	13.6		
5635	150	81	72	10.9	13.3	12.0	13.9	12.6
		82	71	12.4	15.0	13.5*		
		84	42	14.5	13.3*	12.3		
5643	123	80	76	11.3	14.3	12.9*	13.8	12.6
		81	76	11.0	13.8	12.5		
		84	41	14.6	13.3*	12.3		
5669	150	80	59	12.6	13.8	12.5*	13.4	12.3
		81	58	13.1	14.1*	12.8		
		84	28	16.0	12.4	11.7		
5618	150	79	71	9.5	11.5	10.4	12.5	11.3
		80	69	10.4	12.4	11.2*		
		82	52	13.2	13.5*	12.3		
5699	143	79	64	12.1	13.8	12.5*	13.5	12.3
		81	49	12.5	12.4*	11.4		
		84	38	16.1	14.2	13.1		
5706	150	80	74	12.5	15.5*	13.9*	14.7	13.3
		81	74	11.9	14.7	13.2		
		84	38	15.8	13.9	12.9		
5793	145	78	64	10.6	12.1	10.9	12.4	11.3
		79	62	11.2	12.5	11.3*		
		81	49	12.8	12.7*	11.7		
5974	150	79	73	7.3	8.9	8.0	9.6	8.7
		81	66	8.8	10.3*	9.3*		
5996	150	79	66	11.0	12.7	11.5*	12.7	11.7
		81	53	11.9	12.3*	11.2		
		84	38	15.0	13.2	12.3		

^zMean of 4 replications; subplots of 5' were harvested from single 20' plots on each harvest date; rows 36" apart; days = days from planting; % = percent 1-4 sieve grades; adj. 50% = tons/acre adjusted to 50% 1-4 sieve; adj. 60% = tons/acre adjusted to 60% 1-4 sieve. Analysis of variance (Table 5) was calculated using the harvest marked with *.

^yAverage Adj. T/A is a rough estimate because of non-uniform number of harvests included.

Table 3. Yields of preliminary OSU green bean lines and commercial lines, July 2 planting, Corvallis, 2001.^z

Line	Av. Stand	Days	%	T/A	Adj. 50%	Adj. 60%	Av. Adj. T/A 50% ^y	Av. Adj. T/A 60% ^y
91G	150	64	50	12.8	12.8*	11.7*	12.8	11.8
		66	42	13.8	12.7	11.8		
OR 54	148	65	56	15.4	16.3	14.8*	13.6	12.6
		67	48	13.4	13.1*	12.1		
		70	31	14.2	11.5	10.8		
5635	150	65	71	13.2	16.0	14.4	14.5	13.3
		66	60	13.4	14.7*	13.4*		
		70	34	15.4	12.9	12.1		
5643	144	65	73	12.3	15.1	13.6	14.0	12.8
		66	70	11.9	14.3	12.9*		
		70	39	14.3	12.7*	11.8		
5669	150	64	58	13.0	14.0	12.8*	13.0	11.9
		66	56	12.5	13.2*	12.0		
		68	43	12.5	11.7	10.8		
5618	150	64	60	12.0	13.2	12.0*	12.2	11.2
		66	46	12.4	11.9*	10.9		
		68	40	12.8	11.5	10.6		
5699	149	64	55	12.7	13.3*	12.2*	12.1	11.2
		66	44	12.7	11.9	11.0		
		68	35	13.2	11.2	10.5		
5706	150	64	64	13.9	15.8	14.4*	13.8	12.7
		66	51	12.8	12.9*	11.8		
		68	46	13.3	12.8	11.8		
5793	148	62	71	13.0	15.7	14.2	13.8	12.6
		64	57	12.3	13.1*	12.0*		
		66	42	13.6	12.5	11.6		
5996	150	64	74	9.8	12.2	11.0	12.0	10.9
		66	65	10.6	12.2	11.1*		
		68	54	11.0	11.5*	10.5		
Keeper	150	66	60	9.1	10.0	9.1*	10.0	9.2
		67	59	9.9	10.8*	9.8		
		70	34	11.0	9.3	8.6		
PLS 88	130	65	59	11.1	12.1	11.0*	11.6	10.7
		67	51	12.1	12.2*	11.2		
		70	26	13.8	10.5	9.9		
Topps	96	65	73	9.1	11.2	10.1	10.6	9.7
		67	63	9.1	10.2*	9.3*		
		70	31	12.8	10.4	9.7		
PLS 118 (romano) ^x	150	64	20	12.7				
		66	30	11.8				
		70	90	13.6				

^zMean of 4 replications; subplots of 5' were harvested from single 20' plots on each harvest date; rows 36" apart; days = days from planting; % = percent 1-4 sieve grades; adj. 50% = tons/acre adjusted to 50% 1-4 sieve; adj. 60% = tons/acre adjusted to 60% 1-4 sieve. Analysis of variance (Table 5) was calculated using the harvest marked with *.

^yAverage Adj. T/A is a rough estimate because of non-uniform number of harvests included.

^xFor romano, % = % of pods with seed cavity \geq 50% filled.

Table 4. Dollar return/acre for standard OSU bean lines and commercial lines, Corvallis, 2001.²

Trial	Line	Harvest 1			Harvest 2			Harvest 3			Harvest 4			Avg. \$/A ^y
		Days	%	\$	Days	%	\$	Days	%	\$	Days	%	\$	
1 25-Apr	91G	82	53	740	83	54	859	84	45	745				781
	OR 54	84	63	1029	85	50	900	89	31	851				927
	5635	85	56	951	86	53	899	89	41	871				907
	5643	84	67	1012	85	56	844	86	48	830	89	38	873	890
	5669	82	82	845	84	61	847	85	45	763	86	46	713	792
2 7-May	91G	79	62	936	80	63	986	82	39	954				959
	OR 54	82	50	1182	84	33	1175							1179
	5635	81	72	1035	82	71	1161	84	42	1068				1088
	5643	80	76	1120	81	76	1074	84	41	1032				1075
	5669	80	59	1092	81	58	1116	84	28	1018				1075
	5618	79	71	902	80	69	961	82	52	1049				971
	5699	79	64	1091	81	49	952	84	38	861				968
	5706	80	74	1217	81	74	1132	84	38	1092				1147
	5793	78	64	949	79	62	958	81	49	1010				972
	5974	79	73	690	81	66	796							743
3 2-Jul	5996	79	66	1002	81	53	973	84	38	1053				1009
	91G	64	50	1089	66	42	995							1042
	OR 54	65	56	1238	67	48	1034	70	31	925				1066
	5635	65	71	1225	66	60	1158	70	34	1048				1144
	5643	65	73	1145	66	70	1074	70	39	975				1065
	5669	64	58	1117	66	56	1048	68	43	936				1034
	5618	64	60	975	66	46	906	68	40	915				932
	5699	64	55	1020	66	44	918	68	35	917				952
	5706	64	64	1202	66	51	1001	68	46	1028				1077
	5793	62	71	1205	64	57	997	66	42	1004				1069
	5996	64	74	931	66	65	953	68	54	900				928
	Keeper	66	60	785	67	59	816	70	34	744				782
	PLS 88	65	59	952	67	51	961	70	26	856				923
	Topps	65	73	863	67	63	820	70	31	813				832

²Dollar values were calculated using the weight of graded beans, based on a value of \$119 for 1-4 sieve pods; \$44 for 5 and 6 sieve pods. Values will be lower than those reported in Table 6 because some beans are lost in the grading process.

^yAverage \$/acre is a rough estimate because of non-uniform number of harvests included.

Table 5. Statistical comparison of yields of standard OSU bean lines and commercial lines, Corvallis, 2001.²

	Line	Trial 1	Trial 2	Trial 3	Comm. Trial	Average Trials 2 & 3	Average Trials 1-4
T/A adj. 50%	91G	10.6	12.8	12.8	10.7	12.8	11.7
	OR 54	11.4	14.7	13.1	12.4	13.9	12.9
	5635	11.1	13.3	14.7		14.0	
	5643	10.6	13.3	12.7	13.3	13.0	12.5
	5669	9.9	14.1	13.2	10.5	13.7	11.9
	5618		13.5	11.9		12.7	
	5699		12.4	13.3		12.9	
	5706		15.5	12.9		14.2	
	5793		12.7	13.1		12.9	
	5974		10.3				
	5996		12.3	11.5		11.9	
	Keeper			10.8			
	PLS 88			12.2			
	Topps			10.2			
	LSD @ 5%	NS	1.9	2.3	1.8	1.6	1.0
T/A adj. 60%	91G	9.7	11.6	11.7	9.8	11.7	10.7
	OR 54	11.9	13.5	14.8	11.4	14.2	12.9
	5635	10.8	13.5	13.4		13.5	
	5643	10.2	12.9	12.9	12.0	12.9	12.0
	5669	9.9	12.5	12.8	9.6	12.7	11.2
	5618		11.2	12.0		11.6	
	5699		12.5	12.2		12.4	
	5706		13.9	14.4		14.2	
	5793		11.3	12.0		11.7	
	5974		9.3				
	5996		11.5	11.1		11.3	
	Keeper			9.1			
	PLS 88			11.0			
	Topps			9.3			
	LSD @ 5%	1.6	1.6	2.3	1.8	1.4	1.0

²Based on one selected harvest for each variety, usually the harvest closest to 50% 1-4 sieve (for adj 50%) or 60% 1-4 sieve (for adj 60%), marked with a * in Tables 1-3 and Table 11. Yields are based on field yields of 1-6 sieve beans.

Table 6. Statistical comparison of dollar value of standard OSU bean lines and commercial lines, Corvallis, 2001.²

	Line	Trial 1	Trial 2	Trial 3	Comm. Trial	Average Trials 2 & 3	Average Trials 1-4
\$/A adj. 50%	91G	859	1036	1042	874	1039	953
	OR 54	929	1194	1072	1011	1133	1052
	5635	902	1090	1194		1142	
	5643	871	1089	1041	1078	1065	1020
	5669	805	1141	1076	855	1109	969
	5618		1094	968		1031	
	5699		1013	1079		1046	
	5706		1242	1051		1147	
	5793		1036	1059		1048	
	5974		827				
	5996		994	928		961	
	Keeper			870			
	PLS 88			994			
	Topps			826			
	LSD @ 5%	NS	153	183	161	127	84
\$/A adj. 60%	91G	859	1036	1042	874	1039	953
	OR 54	1059	1194	1319	1011	1257	1146
	5635	964	1203	1194		1199	
	5643	900	1142	1148	1067	1145	1064
	5669	880	1111	1139	855	1125	996
	5618		999	1069		1034	
	5699		1111	1079		1095	
	5706		1242	1279		1261	
	5793		1010	1059		1035	
	5974		827				
	5996		1026	983		1005	
	Keeper			810			
	PLS 88			978			
	Topps			826			
	LSD @ 5%	144	142	206	169	125	88

²Based on one selected harvest for each variety, usually the harvest closest to 50% 1-4 sieve (for adj 50%) or 60% 1-4 sieve (for adj 60%), marked with a * in Tables 1-3 and Table 11. Yields are based on field yields of 1-6 sieve beans.

Table 7. Performance of advanced small sieve green bean lines , April 25 Planting, Corvallis, 2001.

Line	AV Stand	Days	Percent Sieve Size ^z						Tons/Acre Sieve Size						Graded Total ^y	\$/Acre ^x
			1	2	3	4	5	6	1	2	3	4	5	6		
5613	150	79	31	47	22	0	0	0	1.09	1.67	0.76	0.00	0.00	0.00	3.52	306
		82	20	40	38	2	0	0	1.16	2.39	2.25	0.15	0.00	0.00	5.95	517
		84	13	36	49	3	0	0	0.83	2.39	3.23	0.18	0.00	0.00	6.63*	577
		85	10	35	51	4	0	0	0.76	2.76	3.99	0.29	0.00	0.00	7.79	678
		86	7	31	56	6	0	0	0.54	2.36	4.31	0.47	0.00	0.00	7.69	669
5819	150	78	11	17	38	6	0	0	0.73	1.09	1.81	2.50	0.40	0.00	6.53	691
		79	7	12	22	42	15	2	0.44	0.76	1.38	2.65	0.94	0.11	6.27	619
		82	5	6	13	41	32	4	0.40	0.54	1.20	3.63	2.83	0.36	8.95	771
		83	4	8	14	35	31	8	0.36	0.69	1.23	2.97	2.61	0.69	8.56*	720
		85	3	4	8	27	42	17	0.25	0.33	0.69	2.28	3.59	1.45	8.59	607
5835	150	79	11	21	32	33	3	0	0.69	1.31	1.99	2.03	0.18	0.00	6.20	670
		82	6	8	18	43	25	1	0.44	0.58	1.34	3.26	1.85	0.07	7.54	701
		83	6	9	18	39	26	3	0.51	0.76	1.63	3.52	2.32	0.25	8.99*	816
		85	5	4	8	33	43	8	0.51	0.40	0.83	3.52	4.60	0.91	10.77	815
5844	150	79	10	22	40	26	2	0	0.65	1.41	2.57	1.70	0.11	0.00	6.45	702
		82	4	13	30	43	9	1	0.33	1.05	2.43	3.44	0.73	0.11	8.08	833
		83	5	12	28	42	10	3	0.40	0.98	2.32	3.52	0.87	0.25	8.34*	842
		85	2	5	19	53	19	1	0.22	0.47	1.70	4.68	1.70	0.11	8.88	856
Minuette	150	84	4	8	39	47	2	0	0.29	0.54	2.83	3.37	0.15	0.00	7.18	780
		85	3	6	23	64	5	0	0.22	0.40	1.63	4.57	0.36	0.00	7.18	765
		86	4	5	19	65	8	0	0.25	0.33	1.38	4.75	0.58	0.00	7.29*	763
		89	2	4	14	58	21	1	0.18	0.33	1.27	5.15	1.85	0.07	8.85	844

^zPercent calculated as % of total of 1-6 sieve beans.

^yTotal weight of graded beans, including sieve sizes 1-6. Values will be lower than those reported in Table 10 because some beans are lost in the grading process. Analysis of variance (Table 10) was calculated using the harvest marked with *.

^x\$/acre based on \$110/ton (1-4 sieve); \$43/ton (5-6 sieve) for intermediate sieve beans (5819, 5835, 5844, Minuette), and \$87/ton (1-4 sieve); \$0/ton (5-6 sieve) for small sieve beans (5613).

Table 8. Performance of preliminary small sieve green bean lines, May 7 planting, Corvallis, 2001.

Line	AV Stand	Days	Percent Sieve Size ²						Tons/Acre Sieve Size						Graded Total ^y	\$/Acre ^x
			1	2	3	4	5	6	1	2	3	4	5	6		
5613	150	79	14	37	45	4	0	0	1.20	3.19	3.92	0.33	0.00	0.00	8.63	751
		80	11	33	51	4	0	0	0.94	2.90	4.46	0.36	0.00	0.00	8.66*	754
		82	8	35	48	10	0	0	0.54	2.43	3.34	0.69	0.00	0.00	7.00	609
5819	150	77	11	14	17	30	20	8	0.98	1.27	1.49	2.65	1.78	0.73	8.88	809
		78	8	12	20	31	22	7	0.83	1.31	2.14	3.26	2.36	0.73	10.62*	962
		80	4	7	18	34	23	13	0.51	0.87	2.18	4.02	2.79	1.60	11.96	1022
5835	149	77	9	17	28	35	10	1	0.94	1.78	2.90	3.66	1.05	0.07	10.40	1069
		78	8	12	24	39	16	1	0.80	1.31	2.50	4.17	1.67	0.15	10.59*	1043
		80	5	9	22	47	16	1	0.51	1.02	2.43	5.22	1.78	0.11	11.06	1090
5844	150	77	8	17	24	26	22	2	0.76	1.60	2.21	2.39	2.07	0.18	9.21	862
		78	7	17	28	24	21	2	0.69	1.67	2.68	2.36	2.07	0.18	9.64*	910
		80	7	8	27	34	21	3	0.73	0.87	2.90	3.63	2.28	0.33	10.73	1005
5800	150	77	6	12	35	41	5	0	0.69	1.34	3.95	4.64	0.62	0.00	11.24	1195
		79	4	9	33	49	4	1	0.47	1.16	4.06	6.09	0.51	0.07	12.36*	1321
		81	3	7	31	54	5	0	0.44	0.94	4.10	7.18	0.69	0.00	13.34	1421
5852	150	78	6	12	30	43	8	2	0.69	1.27	3.23	4.68	0.83	0.18	10.88	1128
		80	3	9	29	48	10	1	0.33	1.02	3.19	5.26	1.09	0.07	10.95*	1127
		81	4	9	25	50	11	1	0.47	1.09	3.01	5.87	1.31	0.11	11.85	1209
5855	150	78	6	11	18	38	24	4	0.62	1.09	1.81	3.81	2.47	0.36	10.15	927
		80	3	5	17	38	32	5	0.33	0.58	1.81	4.06	3.37	0.54	10.69*	914
		81	2	4	14	40	33	6	0.25	0.51	1.74	4.89	3.95	0.76	12.11	1016
5870	150	79	13	46	35	6	0	0	1.05	3.66	2.76	0.51	0.00	0.00	7.98	694
		80	8	44	40	9	0	0	0.69	3.92	3.55	0.76	0.00	0.00	8.92*	776
		82	7	32	48	13	0	0	0.65	3.23	4.82	1.27	0.00	0.00	9.97	867
5912	150	77	11	23	45	21	0	0	0.98	2.10	4.17	1.96	0.04	0.00	9.24	801
		78	8	16	50	25	0	0	0.73	1.56	4.75	2.39	0.04	0.00	9.46*	820
		80	5	17	52	26	1	0	0.51	1.63	4.97	2.47	0.07	0.00	9.64	833
5944	116	79	8	33	36	21	1	0	0.73	3.01	3.26	1.92	0.07	0.00	8.99	776
		81	6	23	43	26	2	0	0.54	2.10	3.95	2.43	0.22	0.00	9.24*	785
		84	4	13	42	38	4	0	0.51	1.63	5.33	4.82	0.47	0.04	12.80	1069
5947	150	79	13	25	47	14	1	0	1.09	2.18	4.10	1.20	0.11	0.04	8.70	744
		80	9	18	44	25	3	1	0.83	1.63	3.88	2.18	0.25	0.07	8.85*	741
		84	5	7	14	51	21	2	0.69	0.98	1.92	6.85	2.79	0.33	13.56	908
Minuette	149	80	7	16	41	34	2	0	0.54	1.27	3.34	2.76	0.18	0.00	8.08	877
		81	7	13	35	41	3	0	0.62	1.12	3.01	3.52	0.22	0.00	8.48*	919
Medinah	150	80	15	55	29	1	0	0	1.05	3.77	1.99	0.07	0.00	0.00	6.89	599
		81	11	39	48	2	0	0	0.91	3.05	3.77	0.18	0.00	0.00	7.90*	688
		84	9	34	46	11	0	0	0.58	2.10	2.83	0.69	0.00	0.00	6.20	539

²Percent calculated as % of total of 1-6 sieve beans.^yTotal weight of graded beans, including sieve sizes 1-6. Values will be lower than those reported in Table 10 because some beans are lost in the grading process. Analysis of variance (Table 10) was calculated using the harvest marked with *.^x\$/acre based on \$110/ton (1-4 sieve); \$43/ton (5-6 sieve) for intermediate sieve beans (5819, 5835, 5844, 5800, 5852, 5855, Minuette), and \$87/ton (1-4 sieve); \$0/ton (5-6 sieve) for small sieve beans (5613, 5870, 5912, 5944, 5947, Medinah).

Table 9. Performance of preliminary small sieve OSU green bean lines and commercial lines, July 2 planting, Corvallis, 2001.

Line	Av Stand	Days	Percent Sieve Size ^z						Tons/Acre Sieve Size						Graded Total ^y	\$/Acre ^x
			1	2	3	4	5	6	1	2	3	4	5	6		
5613	150	65	14	33	46	7	0	0	1.23	2.90	4.02	0.58	0.00	0.00	8.74	760
		67	12	37	46	5	0	0	1.09	3.41	4.21	0.44	0.00	0.00	9.14*	795
		70	5	18	62	16	0	0	0.54	1.96	6.89	1.78	0.00	0.00	11.17	971
5819	150	62	10	13	24	46	7	0	1.02	1.31	2.50	4.82	0.76	0.00	10.40	1093
		64	4	8	18	52	17	1	0.36	0.80	1.89	5.29	1.74	0.15	10.22*	998
		66	6	8	19	33	33	0	0.51	0.65	1.56	2.72	2.72	0.04	8.19	717
5835	150	66	4	7	12	51	26	0	0.47	0.76	1.41	5.91	3.01	0.04	11.60*	1072
		67	5	5	8	45	37	1	0.58	0.54	1.02	5.37	4.42	0.11	12.04	1020
5800	149	60	10	22	42	25	0	0	0.91	2.03	3.88	2.32	0.04	0.00	9.17	1006
		62	7	11	32	47	3	0	0.73	1.12	3.15	4.64	0.25	0.00	9.90*	1072
		64	6	8	23	57	6	0	0.69	0.83	2.47	6.13	0.62	0.00	10.73	1139
5852	150	62	5	12	37	42	4	0	0.51	1.34	3.99	4.60	0.47	0.00	10.91*	1169
		64	5	9	26	53	7	0	0.47	0.83	2.57	5.22	0.69	0.00	9.79	1030
		66	5	6	20	59	10	0	0.47	0.62	1.99	5.87	0.98	0.00	9.93	1027
5944	111	65	7	22	53	18	0	0	0.58	1.96	4.60	1.60	0.00	0.00	8.74*	760
		67	9	24	53	14	0	0	0.73	1.99	4.39	1.12	0.00	0.00	8.23	716
		70	4	9	35	50	1	0	0.44	0.91	3.41	4.97	0.15	0.00	9.86	845
Minuetta	137	64	9	16	42	33	0	0	0.69	1.20	3.15	2.50	0.00	0.00	7.54*	829
		65	5	12	40	42	1	0	0.40	0.87	2.90	3.05	0.07	0.00	7.29	797
		67	6	10	32	50	2	0	0.51	0.83	2.76	4.24	0.18	0.00	8.52	925
Medinah	150	64	15	54	31	0	0	0	1.02	3.77	2.14	0.00	0.00	0.00	6.92	602
		66	11	52	37	1	0	0	0.76	3.73	2.65	0.04	0.00	0.00	7.18*	624
		68	7	38	54	1	0	0	0.62	3.34	4.79	0.11	0.00	0.00	8.85	770
Igloo	150	65	8	10	27	49	5	0	0.80	0.98	2.57	4.71	0.51	0.00	9.57	1019
		67	5	8	22	52	10	2	0.58	0.81	2.39	5.66	1.12	0.18	10.80*	1101
		70	4	5	14	51	26	1	0.44	0.51	1.56	5.55	2.79	0.07	10.91	1008
PLS 86	115	65	8	17	33	39	4	0	0.58	1.23	2.39	2.86	0.29	0.00	7.36	790
		67	8	16	34	39	3	0	0.62	1.27	2.65	3.08	0.25	0.00	7.87*	848
		70	3	7	17	62	12	0	0.25	0.65	1.67	6.20	1.20	0.04	10.01	1018
PLS 87	150	66	8	23	57	12	0	0	0.76	2.36	5.80	1.20	0.00	0.00	10.11*	880
		67	6	19	58	15	2	0	0.58	1.89	5.62	1.49	0.15	0.00	9.72	833
		70	4	9	43	43	1	0	0.47	1.02	5.00	5.08	0.15	0.00	11.71	1006

^zPercent calculated as % of total of 1-6 sieve beans.

^yTotal weight of graded beans, including sieve sizes 1-6. Values will be lower than those reported in Table 10 because some beans are lost in the grading process. Analysis of variance (Table 10) was calculated using the harvest marked with *.

^x\$/acre based on \$110/ton (1-4 sieve); \$43/ton (5-6 sieve) for intermediate sieve beans (5819, 5835, 5800, 5852, Minuetta, Igloo, PLS 86), and \$87/ton (1-4 sieve); \$0/ton (5-6 sieve) for small sieve beans (5613, 5944, Medinah, PLS 87).

Table 10. Statistical comparison of yields and dollar return of small sieve OSU green bean lines and commercial lines, Corvallis, 2001.²

Line	Trial 1	Trial 2	Trial 3	Comm. Trial	Average Trials 2 & 3	Average Trials 1-4
	Tons/Acre					
5613	7.0	9.0	9.4	8.6	9.2	8.5
5819	8.2	10.7	10.5	8.3	10.6	9.4
5835	9.2	10.9	13.2		12.1	
5844	8.3	10.2				
5800		12.8	10.2		11.5	
5852		11.2	11.2		11.2	
5855		11.0				
5870		9.2				
5912		9.8				
5944		9.5	9.1		9.3	
5947		9.2				
Minuette	7.6	9.2	7.9	6.1	8.6	7.7
Medinah		7.9	7.4	6.6	7.7	
Igloo			11.0			
PLS 86			8.4			
PLS 87			10.4			
LSD @ 5%	1.9	2.1	1.6	1.8	1.5	0.9
\$/Acre						
5613	606	785	820	735	803	737
5819	693	972	1026	834	999	881
5835	836	1071	1219		1145	
5844	835	958				
5800		1367	1099		1233	
5852		1153	1200		1177	
5855		939				
5870		804				
5912		851				
5944		807	788		798	
5947		768				
Minuette	793	1001	869	633	935	824
Medinah		688	643	577	666	
Igloo			1119			
PLS 86			911			
PLS 87			908			
LSD @ 5%	166	197	150	161	146	85

²Based on one selected harvest for each variety in each trial, which was the middle harvest, unless sieve size distribution or notes indicated the variety was overmature (marked with * on Tables 7, 8, 9 & 11). Yields are field yields of 1-6 sieve beans.

Table 11. Performance of commercial green bean varieties, June 14 planting, Corvallis, 2001.

Variety	Source	AV Stand	Intended Use	Days	Percent Sieve Size ^z							Tons/Acre Sieve Size						Graded Total ^y	\$/Acre ^x
					1	2	3	4	5	6	1-4	1	2	3	4	5	6		
91G	OSU	149	full sieve	68	4	6	12	32	33	13	54	0.40	0.58	1.16	3.15	3.19	1.31	9.79*	828
				70	4	4	7	21	38	27	36	0.47	0.44	0.73	2.36	4.28	2.97	11.24	794
OR 54	OSU	150	full sieve	69	5	5	12	33	37	8	55	0.54	0.58	1.41	3.81	4.24	0.94	11.53*	983
				71	3	4	9	29	44	12	44	0.33	0.47	0.98	3.30	5.00	1.41	11.49	886
5643	OSU	141	full sieve	69	4	7	15	37	32	6	63	0.47	0.83	1.63	4.10	3.55	0.62	11.20	1020
				71	4	6	11	36	34	10	56	0.51	0.65	1.27	4.24	4.10	1.16	11.93*	1025
				73	2	4	10	32	38	13	49	0.25	0.51	1.12	3.73	4.42	1.49	11.53	929
5669	OSU	150	full sieve	67	5	8	20	41	24	2	74	0.44	0.73	1.92	3.92	2.32	0.18	9.50	943
				69	3	4	9	31	43	10	47	0.29	0.44	0.98	3.19	4.50	1.05	10.44*	826
				71	3	3	7	23	44	21	36	0.36	0.40	0.83	2.86	5.47	2.57	12.51	885
EX 08190504	Seminis	150	full sieve	65	4	5	11	35	38	7	54	0.29	0.40	0.87	2.72	3.01	0.58	7.87*	667
				67	3	4	5	24	51	13	36	0.22	0.29	0.44	2.03	4.28	1.12	8.37	591
				69	2	3	3	11	38	42	20	0.22	0.25	0.29	1.02	3.37	3.73	8.88	524
KSI 196	Kimberly Seeds International	150	full sieve	68	2	5	17	42	30	4	67	0.22	0.47	1.52	3.84	2.68	0.33	9.06	853
				70	2	3	9	37	40	9	51	0.22	0.29	0.94	3.77	4.13	0.94	10.30*	844
				71	1	3	8	37	39	12	49	0.15	0.25	0.80	3.73	3.99	1.23	10.15	816
KSI 318	Kimberly Seeds International	150	full sieve	69	4	5	13	45	28	5	67	0.33	0.40	1.12	3.88	2.43	0.40	8.56	806
				71	4	5	10	41	37	3	60	0.40	0.47	0.91	3.73	3.44	0.25	9.21*	818
				73	3	5	10	39	36	8	57	0.25	0.47	0.91	3.48	3.23	0.69	9.03	780
KSI 325	Kimberly Seeds International	150	full sieve	65	7	10	26	53	4	0	96	0.54	0.73	1.96	3.95	0.29	0.00	7.47	867
				67	5	7	22	57	9	0	90	0.44	0.62	1.96	5.08	0.83	0.04	8.95	1000
				69	4	4	12	47	33	1	66	0.33	0.33	1.05	4.21	2.94	0.11	8.95*	837
KSI 340	Kimberly Seeds International	150	full sieve	70	5	5	9	43	33	6	61	0.33	0.36	0.62	3.15	2.39	0.44	7.29	655
				71	3	6	8	43	36	4	60	0.25	0.44	0.62	3.34	2.79	0.33	7.76	689
				72	2	4	8	44	38	5	58	0.15	0.33	0.65	3.55	3.05	0.36	8.08*	706
SB 4247	Rogers	150	full sieve	67	8	14	25	36	15	2	83	0.69	1.12	2.10	2.94	1.27	0.15	8.27	878
				69	4	6	14	34	35	9	57	0.33	0.54	1.31	3.12	3.23	0.80	9.32*	807
				71	3	5	8	27	37	21	42	0.33	0.51	0.83	2.79	3.84	2.21	10.51	797
SB 4249	Rogers	150	full sieve	65	7	9	17	35	25	7	68	0.44	0.62	1.12	2.32	1.67	0.47	6.63	629
				67	6	7	14	31	33	10	57	0.51	0.65	1.27	2.83	3.05	0.94	9.24*	801
				69	4	4	7	20	37	28	36	0.47	0.40	0.76	2.18	3.95	2.94	10.69	756
5819	OSU	150	4 sieve	65	8	11	21	46	13	1	86	0.65	0.91	1.74	3.73	1.09	0.07	8.19*	823
				67	7	8	20	47	18	1	81	0.58	0.65	1.60	3.81	1.45	0.07	8.16	795
				69	5	5	10	31	42	8	51	0.40	0.44	0.91	2.79	3.70	0.69	8.92	687

Table 11. Performance of commercial green bean varieties, June 14 planting, Corvallis, 2001 (cont.).

Variety	Source		Intended Use	Days	Percent Sieve Size ²							Tons/Acre Sieve Size						Graded Total ^y	\$ /Acre ^x
					1	2	3	4	5	6	1-4	1	2	3	4	5	6		
Minuette	Harris Moran	129	4 sieve	67	6	15	50	30	0	0	100	0.25	0.65	2.21	1.34	0.00	0.00	4.46	490
				69	3	4	19	66	8	0	92	0.18	0.25	1.09	3.81	0.47	0.00	5.80*	606
				71	1	3	13	64	18	1	81	0.07	0.15	0.69	3.44	0.98	0.04	5.37	522
EX 08190503	Seminis	150	4 sieve	65	5	13	37	42	4	0	96	0.25	0.73	2.10	2.39	0.22	0.00	5.69	611
				67	4	5	26	56	9	0	91	0.29	0.36	1.74	3.73	0.58	0.00	6.71	699
				69	1	2	8	59	27	2	71	0.11	0.18	0.62	4.82	2.25	0.15	8.12*	733
KSI 63	Kimberly Seeds International	150	4 sieve	65	4	9	23	53	11	0	89	0.22	0.47	1.20	2.83	0.58	0.00	5.29	543
				67	6	8	22	54	10	0	90	0.33	0.40	1.16	2.83	0.54	0.00	5.26	542
				69	3	5	15	55	21	0	78	0.15	0.25	0.87	3.15	1.20	0.07	5.69*	541
KSI 157	Kimberly Seeds International	150	4 sieve	67	4	7	20	52	16	1	83	0.33	0.54	1.52	3.95	1.23	0.07	7.65*	754
				69	4	4	11	47	32	2	66	0.29	0.33	0.83	3.77	2.57	0.18	7.98	693
				71	4	4	7	41	38	6	56	0.33	0.40	0.65	3.73	3.41	0.54	9.06	732
SB 4087	Rogers	150	4 sieve	67	6	16	45	32	0	0	100	0.54	1.34	3.81	2.68	0.04	0.00	8.41	923
				69	5	10	36	48	2	0	98	0.44	0.98	3.41	4.53	0.18	0.00	9.53	1037
				71	3	7	29	58	4	0	96	0.25	0.65	2.86	5.69	0.40	0.04	9.90*	1059
SB 4252	Rogers	150	4 sieve	64	5	10	23	54	8	0	92	0.33	0.73	1.70	3.95	0.58	0.00	7.29	763
				67	3	5	18	56	16	1	83	0.29	0.47	1.67	5.08	1.49	0.07	9.06*	892
				69	1	3	9	40	44	4	52	0.11	0.25	0.83	3.92	4.24	0.40	9.75	762
5613	OSU	150	small sieve	68	13	36	48	4	0	0	100	0.91	2.57	3.48	0.29	0.00	0.00	7.25	631
				70	6	19	59	15	1	0	99	0.51	1.60	4.86	1.20	0.11	0.00	8.27*	710
Medinah	Rogers	149	small sieve	67	19	63	17	1	0	0	100	0.98	3.30	0.91	0.04	0.00	0.00	5.22	454
				69	7	50	42	0	0	0	100	0.47	3.15	2.68	0.04	0.00	0.00	6.34*	552
				71	8	39	52	2	0	0	100	0.54	2.83	3.77	0.11	0.00	0.00	7.25	631

²Percent calculated as % of total of 1-6 sieve beans.

^yTotal weight of the graded beans, including sieve sizes 1-6. Values will be lower than those reported in Table 12 because some beans are lost in the grading process.

^x\$/acre based on \$119/ton for 1-4 sieve and \$44/ton for 5-6 sieve for full sieve and 4-5 sieve beans; \$110/ton for 1-4 sieve and \$43/ton for 5-6 sieve for 4 sieve and 3-4 sieve beans; and \$87/ton for 1-4 sieve and \$0/ton for 5-6 sieve for small sieve beans.

Table 12. Statistical comparison of yields and dollar return of commercial green bean lines, Corvallis, 2001².

Line	Intended Use	T/A Unadjusted	T/A Adjusted ^y	\$/A
91G	full sieve	10.3	10.7	874
OR 54	full sieve	11.9	12.4	1011
5643	full sieve	12.5	13.3	1078
5669	full sieve	10.8	10.5	855
EX 08190504	full sieve	8.0	8.4	682
KSI 196	full sieve	10.7	10.8	877
KSI 318	full sieve	9.9	10.9	883
KSI 325	full sieve	9.5	11.0	885
KSI 340	full sieve	8.4	9.1	735
SB 4247	full sieve	9.8	10.5	848
SB 4249	full sieve	9.6	10.3	836
5819	4 sieve	8.3	8.3	834
Minuette	4 sieve	6.1	6.1	633
EX 08190503	4 sieve	8.6	8.6	775
KSI 63	4 sieve	6.3	6.3	596
KSI 157	4 sieve	7.9	7.9	779
SB 4087	4 sieve	10.2	10.2	1091
SB 4252	4 sieve	8.0	8.0	785
5613	small sieve	8.6	8.6	735
Medinah	small sieve	6.6	6.6	577
EX 08790500	full sieve romano	12.5	12.5	
R 6004	small sieve romano	7.0	7.0	
EX 08190506	wax romano	10.4	10.4	
SB 4251	small sieve wax romano	9.6	9.6	
LSD @5%		1.8	1.8	161

²Based on one selected harvest for each variety (marked with * on Table 11), which was the harvest closest to optimal based on that variety's intended use (50% 1-4 sieve for full sieve). Yields are field yields of 1-6 sieve beans.

^yFull sieve beans were adjusted to 50% 1-4 sieve; all others were unadjusted.

Table 13. Performance of Minuette x OSU 5630 recombinant inbred lines, June 1 planting, Corvallis, 2001.²

Line	AV Stand	Days to Emergence	Days to Harvest	Est. sieve size	Percent Sieve Size ^y						%1-4 sieve	Av tons/acre
					1	2	3	4	5	6		
R13-1	140	15.0	80	4	6	10	27	45	11	1	88	9.7
R13-2	140	15.0	73	3	4	8	20	60	9	0	91	8.0
R13-3	118	15.0	75	4	6	8	11	23	31	22	47	10.2
R13-4	140	15.0	74	6	7	6	12	20	33	22	45	10.9
R13-5	140	15.0	75	3	3	6	27	60	5	0	95	8.3
R13-6	140	15.5	74	3	7	11	26	51	4	0	96	10.7
R13-7	140	15.5	73	3	5	4	20	63	8	0	92	8.6
R13-8	140	16.0	75	5	5	7	10	16	26	36	38	10.4
R13-10	140	14.5	75	3	7	14	37	40	2	0	98	8.6
R13-11	140	15.5	78	4	3	7	13	51	25	1	74	14.6
R13-12	140	15.5	77	4	3	5	10	43	30	8	61	12.2
R13-13	140	15.5	70	3	6	12	31	49	1	0	99	7.3
R13-14	140	15.0	76	4	3	6	12	42	34	3	63	10.6
R13-15	126	15.5	76	4	5	10	18	45	19	3	78	11.0
R13-16	140	15.5	75	3	4	6	18	59	13	0	87	10.3
R13-17	140	15.5	74	5	1	4	11	34	29	20	51	10.9
R13-18	140	14.5	77	3	6	9	31	43	10	1	89	11.0
R13-19	140	15.5	74	5	4	7	12	26	38	13	49	10.2
R13-20	140	15.0	74	5	6	7	9	25	39	14	48	8.6
R13-21	71	14.0	70	5	4	7	11	26	30	22	48	6.0
R13-22	133	15.0	78	3	5	9	28	55	2	0	98	13.1
R13-23	140	14.5	76	6	7	5	6	13	30	40	30	12.8
R13-24	140	15.5	73	3	3	6	29	55	7	0	93	11.2
R13-25	140	15.0	70	3	4	22	61	13	0	0	100	9.1
R13-26	80	15.0	73	5	4	6	11	20	34	25	41	9.4
R13-27	140	14.0	75	5	2	5	8	22	46	17	37	11.9
R13-28	140	16.0	73	3	6	8	30	54	1	0	99	11.4
R13-29	140	15.0	76	3	5	8	28	54	5	1	94	10.8
R13-30	140	15.0	75	3	5	6	15	54	18	2	80	8.5
R13-31	140	15.5	75	5	7	10	17	35	28	3	69	10.4
R13-32	138	14.5	80	5	4	8	13	22	35	18	47	11.7
R13-33	140	15.0	77	4	2	6	17	72	4	0	96	9.9
R13-34	140	16.0	76	4	1	5	10	54	28	2	70	11.8
R13-35	140	15.0	73	3	4	11	33	51	1	0	99	10.5
R13-36	140	14.5	82	3	5	16	48	31	1	0	99	13.1
R13-37	140	15.5	77	?	7	18	42	32	1	0	99	11.7
R13-38	140	14.0	76	4	3	7	21	67	2	0	98	10.3
R13-39	140	14.5	77	4	5	12	15	31	22	15	63	9.9
R13-41	138	15.5	73	3	5	12	31	47	5	0	95	9.6
R13-42	140	15.0	78	4	6	13	24	39	17	2	81	12.2
R13-43	140	15.0	75	5	10	10	12	17	25	26	49	10.6
R13-44	140	15.5	73	3	8	14	40	39	0	0	100	8.0
R13-45	140	15.5	75	4	6	12	16	26	29	12	59	9.3
R13-46	140	15.5	73	3	3	7	34	55	1	0	99	12.2
R13-47	140	15.0	77	5	4	7	11	35	26	18	56	12.5
R13-48	140	15.5	76	3	5	7	18	55	15	0	85	9.8

Table 13. Performance of Minuette x OSU 5630 recombinant inbred lines, June 1 planting, Corvallis, 2001
(cont).^z

Line	AV Stand	Days to Emer- gence	Days to Harvest	Est. sieve size	Percent Sieve Size ^y						%1-4 sieve	Av tons/acre
					1	2	3	4	5	6		
R13-49	140	14.5	76	6	6	7	10	18	26	33	40	10.6
R13-51	140	15.5	75	6	3	4	6	8	15	65	20	12.9
R13-52	140	15.0	77	3	5	13	26	50	6	0	94	8.6
R13-53	140	15.0	76	3	2	9	36	49	4	0	96	10.2
R13-54	140	15.0	76	4	5	10	29	43	10	3	88	11.2
R13-55	140	15.0	80	4	3	5	16	55	21	1	79	14.6
R13-56	140	15.0	80	3	3	5	26	65	1	0	99	11.6
R13-57	138	15.0	77	4	7	13	19	43	19	1	81	10.1
R13-59	140	15.5	74	5	6	7	8	21	39	18	43	10.4
R13-60	140	16.0	73	4	6	5	18	60	10	1	88	10.4
R13-61	140	15.5	76	4	4	4	7	31	43	11	46	9.3
R13-62	140	14.5	73	3	3	6	22	66	3	0	97	9.1
R13-63	140	15.0	76	4	5	4	16	47	24	4	72	11.3
R13-64	140	15.0	74	3	1	10	35	51	2	0	98	10.7
R13-65	140	14.5	77	6	4	6	10	14	15	51	34	10.1
R13-66	140	16.0	70	3	6	14	66	14	0	0	100	9.1
R13-67	140	15.5	80	4	2	4	10	43	30	11	59	12.3
R13-68	140	15.5	73	3	6	8	21	62	2	0	98	9.5
R13-69	140	16.0	76	4	7	10	25	58	1	0	99	9.4
R13-70	140	15.5	74	3	3	10	28	56	3	0	97	9.9
R13-71	140	14.5	75	3	4	15	42	40	0	0	100	7.4
R13-72	130	15.0	75	6	4	5	9	17	36	28	36	10.8
R13-73	140	15.0	74	3	6	5	28	57	4	0	96	9.3
R13-74	140	15.5	74	3	3	9	21	49	18	0	82	9.4
R13-75	140	16.5	70	5	2	5	7	16	41	28	31	10.4
R13-77	140	16.0	70	4	6	7	10	54	21	2	77	9.1
R13-78	140	15.5	74	4	4	7	11	61	16	0	84	9.4
R13-79	140	15.5	73	5	6	9	10	20	27	27	45	10.6
R13-80	140	16.0	75	4	4	7	19	60	10	0	90	10.9
5630	111	15.0	73	6	4	7	10	28	38	14	49	10.7
Minuette	133	14.5	76	4	4	8	25	59	4	0	96	10.7
LSD@5%		1.2	0									2.7

^zMean of 2 replications; subplots of 5' were harvested from single 20' plots in rows 36" apart.

^yPercent calculated as % of total of 1-6 sieve beans.

Table 14. Notes on recombinant inbred lines, June 1 planting, Corvallis, 2001.

Line	Color ²	Length (cm)	Width (mm) ^y	Height (mm) ^y	Straight-ness ^x	Smooth-ness ^x	Shiny or dull	Strings	Notes ^w
R13-1	6	14	9.5	10	7	7	shiny	yes	Seedy 6 sv, 4 & 5 sv becoming seedy; high fiber; dark green; oval.
R13-2	5	11.5	10	10	5	3	dull	part	Med. color 4 sv with mod positive curve. Bumpy with round seed. Seedy 4 & 5 sv. 3 sv ok.
R13-3	5	16	10	9.5	1	5	dull	no	Tobacco streak virus symptoms on pods. Long curved pods. Light colored. Seedy 5 and 6, 4 is okay.
R13-4	6	14	10	12	7	7	dull	no	Oval full sieve with color similar to 5630; BBL type pod. Seedy 5 & 6 sv.
R13-5	8	12	11	8.5	9	5	shiny	no	Very similar to Minuette but darker green color. Seedy 4 and 5 sieve, 3 sieve okay.
R13-6	3	12	10	9.5	7	7	shiny	yes	Light colored 3 sv bean; has characteristic curve of stringy types. 3 sv ok but 4 & 5 sv seedy.
R13-7	8	13	8.5	9	9	5	shiny	no	Very dark 4 sv bean with possible larger later sieve mix (genetic mix because same color & similar in pod characteristics). Seedy 4 & 5 sv.
R13-8	5	17	13	11	5	5	shiny	no	Large crease-back pods. Variable color. Seedy 5 and 6, 4 sieve okay.
R13-10	3	12	9.5	9.5	7	5	dull	no	Small light colored 3 sieve. Seedy 4, 3 sieve okay.
R13-11	7	13	8	9	8	9	shiny	no	Dark green oval, relatively long podded bean. Seedy 6 sv, but 4 & 5 sieve only becoming seedy.
R13-12	9	15	9.5	10	3	7	dull	no	Long oval; extreme dark green; very uniform color; seedy 4, 5, 6 sv. Use in crosses.
R13-13	3	11.5	8.5	9	9	9	dull	yes	Tends towards heart-shaped/oval in smaller sieves. Seedy 4 sv; very straight and smooth but light color.
R13-14	6	11	9	9.5	7	3	dull	no	Short 3 to 4 sieve bean with good color; fairly straight. Seedy 5 & 6 sv., 4 sv becoming seedy.
R13-15	3	14	9.5	9.5	7	9	shiny	part	Very light colored shiny bean with relatively long slender pods. Seedy 6 sv, 5 sv becoming seedy.
R13-16	6	13.5	10	9	8	7	dull	no	Seedy in 5 sieve, some 4 sieve becoming seedy. Long straight been with bbl color.
R13-17	3	13	9.5	9.5	5	7	shiny	no	Long 5 sieve bean, but too light in color. Seedy in 4, 5 & 6 sv.
R13-18	5	15	10	9	3	5	dull	yes	Long slender; light color; heart-shaped pod; seedy in 4, 5, 6 sv.

Table 14. Notes on recombinant inbred lines, June 1 planting, Corvallis, 2001 (cont).

Line	Color ^z	Length (cm)	Width (mm) ^y	Height (mm) ^y	Straight-ness ^x	Smooth-ness ^x	Shiny or dull	Strings	Notes ^w
R13-19	7	14.5	11.5	11	7	5	shiny	no	Fairly pronounced two-tone color; 5 sv bean. Seedy 6 sv, 5 sv ok.
R13-20	6	13	12	10	9	5	dull	no	Good color; short. Seedy 5 & 6 sv, 4 sv ok.
R13-21	6	13.5	13	11.5	8	7	shiny	no	Short dark green bean with RC; seedy 6 sv but 5 sv ok.
R13-22	5	12	9.5	10	5	9	dull	part	Long; slender; light-colored; high fiber. Seedy 4 & 5 sv, 3 sv not seedy.
R13-23	7	17	12	10	1	1	shiny	no	A dark green, creaseback, curvy and bumpy bean. Moderate seed development in 4 5 & 6 sieve.
R13-24	1	13.5	9	9	7	3	dull	yes	Light color with RC. Seedy in 4 & 5 sv.
R13-25	6	12	9	10	7	5	dull	yes	Seedy 3 and 4 sv. Nearly all pods curved, oval. Good color.
R13-26	9	11	10.5	10	8	7	shiny	no	Short; extreme dark green; crease back; full sieve; seedy 6 sv, moderately seedy 5 sv.
R13-27	9	11.5	12	10	9	5	shiny	no	Very dark green; short. Seedy 6, moderate seed development in 4 and 5.
R13-28	3	13.5	7.5	9	3	7	shiny	part	Long 4 sv, relatively light color. Oval & seems to be one of the high fiber types. Seedy 4 & 5 sv, 3 sv ok.
R13-29	6	13.5	8.5	9	5	9	dull	no	Except for curve, a nice looking bean; dark green; a bit oval. Seedy & pithy 6 sv, 5 sv seedy, 4 sieve becoming seedy.
R13-30	8	12	8.5	9	9	5	dull	yes	Oval; high fiber. Seedy 4 and 5, 3 sieve okay.
R13-31	5	15	9.5	10	7	3	shiny	part	Long, skinny, light colored. Seedy 6 sieve, moderate seed development in 4 and 5.
R13-32	6	12.5	11	9.5	5	7	dull	no	Short med. colored bean. Seedy 6 sv. 5 & 4 sv ok.
R13-33	5	11.5	9.5	9.5	9	7	dull	yes	Short straight 4 sv bean, seedy 5 sv, some 4 sv seedy.
R13-34	9	13.5	11	10.5	7	5	shiny	no	Extreme dark green 4-5 sv bean; somewhat bumpy. Seedy 5 & 6 sv, 4 sv mix of seedy and non-seedy pods.
R13-35	5	11.5	8.5	9	7	7	shiny	no	Relatively short-podded 4 sv bean, color good; RC in 5 sv beans. 5 sv very seedy, 4 sv seedy and 3 sv developing seeds.
R13-36	5	14	7	9	9	9	dull	yes	Very oval; highly variable color; high fiber; 5 & 6 sv very seedy, others not at all--two different beans? (though similar in other respects except color).

Table 14. Notes on recombinant inbred lines, June 1 planting, Corvallis, 2001 (cont).

Line	Color ²	Length (cm)	Width (mm) ^y	Height (mm) ^y	Straightness ^x	Smoothness ^x	Shiny or dull	Strings	Notes ^w
R13-37	6	14.5	8.5	9.5	3	9	dull	yes	Flat podded; high fiber; seedy 4 & 5, some 2 & 3 seedy; grading not accurate because of flatness.
R13-38	5	14	8.5	9	9	8	dull	yes	Very straight, long 4 sieve bean, but mediocre color. Seedy 5 sv, 4 sv only moderately seedy.
R13-39	9	10.5	11	9.5	5	5	shiny	part	An extreme dark green, short bean. Seedy in 5 & 6 sv. although some 6 sv are not seedy suggesting a mix. Strong RC.
R13-41	1	12	10	9	5	5	dull	no	Very light color; short pods with strong RC. Seedy 4 & 5 sv.
R13-42	7	12.5	10	10.5	7	7	shiny	no	Short slightly oval dark green bean with strong RC. Seedy in 5 & 6 sv, 4 sv becoming seedy.
R13-43	9	20	12	12	3	5	dull	no	Very long (even in 4 sieve it's 17 cm). Extremely dark green, but 2 tone color. 6 sieve seedy, some 5 sieve not seedy. Much battering in grader.
R13-44	7	12.5	9.5	10	9	9	shiny	no	Dark green color; short; slight oval pods; very straight and smooth. Seedy 3 & 4 sv.
R13-45	7	11.5	10.5	11	7	7	shiny	no	Short dark green Minuette-like pods. 5 and 6 seedy, 4 sieve becoming seedy.
R13-46	8	12.5	8.5	9.5	5	7	shiny	yes	Dark green; oval with moderate RC. Seedy 4 & 5 sv.
R13-47	6	12.5	11	9	7	5	shiny	no	Med length; fairly good color; mod seed dev in 5 & 6 sv,
R13-48	7	13.5	9	9.5	9	7	shiny	yes	Highly variable color; slight. oval. Seedy 4 & 5 sv.
R13-49	7	16	11.5	10	5	1	shiny	no	Very dark green full sieve bean; somewhat curved. Seedy 6 sv, but 5 sv only beginning to develop seeds.
R13-51	7	16	13.5	11.5	5	3	dull	no	Large but short pods; dark green color. Moderately seedy 5 and 6, 4 sieve not seedy. Lots of variability for pod length and other pod traits.
R13-52	7	12.5	10.5	9	8	7	no	no	Med length; dark green; nice looking. Test in yield trial? Seedy in 5 sv, mod seedy in 3 & 4 sv.
R13-53	5	11	9	9	9	5	shiny	no	Average color but highly variable two-tone pods. 3 sv bean that becomes bumpy easily. Seedy 5 sv. mix of seedy and non in 4 sv. 3 sv showing some seed development.

Table 14. Notes on recombinant inbred lines, June 1 planting, Corvallis, 2001 (cont).

Line	Color ²	Length (cm)	Width (mm) ^y	Height (mm) ^y	Straightness ^x	Smoothness ^x	Shiny or dull	Strings	Notes ^w
R13-54	5	14	9	11.5	3	5	dull	no	Oval; medium long; med. green. Seems to be a mix of sizes, ovals and round, and maturities. Seedy in 5 & 6 sv. 4 sv becoming seedy.
R13-55	7	14	8.5	9	9	3	shiny	yes	Seedy 5 & 6 sv, becoming seedy in 3 sv; shiny dark green; oval; not seedy; round when seedy.
R13-56	7	13	9.5	10	7	9	dull	yes	Dark green; slight oval; seedy 4 & 5, 4 sv OK.
R13-57	6	13	11.5	10	7	7	dull	no	Med length pod; dark green; seedy in 5 & 6, mod seedy in 4 sv.
R13-59	8	14.5	10.5	9	7	7	shiny	no	Nice full sieve bean with dark green to extreme dark green pods (variable, two-tone appearance). Seedy 6 sv, 5 sv becoming seedy.
R13-60	5	14	9.5	9	9	5	shiny	yes	Long med green 4 sv; very bumpy and very two-tone color. V. seedy 6 sv, seedy 4 & 5 sv.
R13-61	7	13	11.5	9.5	5	7	yes	part	Short; dark green; creaseback; high fiber. Seedy & pithy 6 sv, 5 sv seedy, 4 sv becoming seedy.
R13-62	5	10	9.5	9	9	7	dull	no	Yellow-green 4 sv bean; very straight. Seedy 5 sv, 3 & 4 sv moderately seedy.
R13-63	3	14	10	10	7	3	shiny	part	Long; slender; very light color. Seedy 5 & 6 sv, 4 sv ok. Bad IC.
R13-64	5	11.5	9	8.5	3	7	dull	no	High degree of curving comes from many pods with almost 180 degree RC. Seedy 4 & 5 sv.
R13-65	8	17	12.5	9.5	5	7	shiny	no	Large; dark green but two tone; seedy 6 sv & some pithy, 4 & 5 sv not seedy.
R13-66	5	11	10	10	9	9	dull	part	Small short pods with good color. Seedy 4 sv, some 3 sv seedy.
R13-67	5	11	9	8.5	7	3	dull	no	Short med colored bean. Seedy 4, 5 & 6 sv.
R13-68	6	12	9	8.5	8	5	shiny	part	Nice 3 sv bean; good color; slight positive curve. Seedy 4 and 5 sv, some 3 sv seedy.
R13-69	6	15	10	9	7	5	shiny	yes	Mix with a few full sieve plants. Fairly long, slender, oval 4 sieve bean. Seedy in 3, 4 & 5 sv.
R13-70	9	13	9	9	7	9	shiny	yes	Extreme green but shows two tone variability. 3 sv bean. Seedy 5 sv, 4 sv ok.

Table 14. Notes on recombinant inbred lines, June 1 planting, Corvallis, 2001 (cont).

Line	Color ²	Length (cm)	Width (mm) ^y	Height (mm) ^y	Straight-ness ^x	Smooth-ness ^x	Shiny or dull	Strings	Notes ^w
R13-71	3	10	7	9	7	7	dull	no	Light colored 3 to 4 sieve. All pods slight positive curve. Seedy 4, mix of seedy and non seedy 3 pods.
R13-72	7	15	11.5	11.5	1	5	dull	no	Dark green crooked pod; seedy 5 and 6, 4 sv becoming seedy.
R13-73	9	11.5	11	9.5	9	5	shiny	yes	Very nice looking 4 sieve type - has very uniform dark green color. Seedy 5 sv, 4 sv becoming seedy.
R13-74	5	14	9	9.5	7	7	dull	part	Oval 3 sv. Color ok; probably high fiber. Seedy 4 & 5 sv, 3 sv ok.
R13-75	7	14.5	11	9	7	3	shiny	no	Seedy in 5 and 6 sv but not overly so. Nice line except for smoothness.
R13-77	7	13	11.5	10	8	7	dull	no	Seedy 4, 5 and 6 sv, short dark green pods with some RC. Many two-tone pods.
R13-78	7	11	9	8.5	9	5	shiny	no	Very dark green 3-4 sv. Seedy in 4 & 5 sv, 3 sv has some seedy pods.
R13-79	9	11	12	9	5	5	dull	no	Extremely short podded; creaseback; full sieve. Extreme dark green with BBL color. Pods somewhat two-tone with light color next to suture. Seedy 6 sv, but 4 & 5 sieve only developing seediness.
R13-80	5	15	10.5	9.5	5	7	shiny	no	Long 4 sieve. Seedy 4 and 5, some seed development in 3 sieve.
5630	6	15	11	10	5	7	dull	no	Long; dark green color; typical BBL; relatively straight and smooth. Seedy 5 & 6 sv, 4 sv starting to develop seeds.
Minuette	5	13	9.5	8.5	9	7	shiny	part	Short straight 4 sieve bean. Seedy 4 & 5 sv. 3 sv ok.

² Scores based on a 1-9 scale with 9 darkest.

^yPod height and width measured on a cross-section with height measured from suture to suture and width measured perpendicular to height.

^xScores based on a 1-9 scale with 9 best.

^wRC = reverse curve; IC = internal cavitation; BBL = bush blue lake, sv = sieve; mod = moderate; med = medium.

Table 15. *Fusarium* root rot infection, Corvallis, 2001.

Line	Score ^z		Average	Notes
	Rep 1	Rep 2		
91G	8.0	7.0	7.5	
OR 54	6.0	7.0	6.5	
5446	9.0	9.0	9.0	
5613	5.0	6.0	5.5	
5618	6.0	7.0	6.5	
5635	6.0	6.0	6.0	
5643	9.0	7.0	8.0	
5651	6.0	6.0	6.0	
5669	7.0	7.0	7.0	
5682	7.0	8.0	7.5	
5683	8.0	8.0	8.0	
5692	5.0	7.0	6.0	
5698	7.0	5.0	6.0	
5699	7.0	7.0	7.0	
5701	7.0	5.0	6.0	
5706	6.0	6.0	6.0	
5709	5.0	5.0	5.0	upright
5712	6.0	6.0	6.0	
5713	8.0	7.0	7.5	
5731	8.0	6.0	7.0	
5733	7.0	6.0	6.5	
5761	5.0	4.0	4.5	late
5769	5.0	4.0	4.5	late
5778	7.0	7.0	7.0	
5793	6.0	6.0	6.0	
5800	8.0	8.0	8.0	
5804	8.0	8.0	8.0	
5805	8.0	8.0	8.0	
5813	7.0	8.0	7.5	
5816	6.0	6.0	6.0	
5819	7.0	7.0	7.0	
5835	7.0	7.0	7.0	
5844	8.0	8.0	8.0	
5852	9.0	7.0	8.0	
5870	7.0	5.0	6.0	
5912	3.0	5.0	4.0	medium late
5947	8.0	7.0	7.5	
5974	7.0	7.0	7.0	
5996	7.0	8.0	7.5	poor stand
6002	5.0	7.0	6.0	
6008	8.0	8.0	8.0	
6010	6.0	6.0	6.0	
6064	5.0	3.0	4.0	late
6068	5.0	6.0	5.5	
6069	5.0	4.0	4.5	medium late
6072	6.0	7.0	6.5	

Table 15. *Fusarium* root rot infection, Corvallis, 2001 (cont).

Line	Score ^z		Average	Notes
	Rep 1	Rep 2		
6073	7.0	7.0	7.0	
6074	8.0	8.0	8.0	
6075	7.0	6.0	6.5	
6077	7.0	8.0	7.5	
6078	7.0	5.0	6.0	
6079	6.0	6.0	6.0	
6080	5.0	5.0	5.0	medium late
B 7030-24	4.0	6.0	5.0	
B 7126-33-1-2	4.0	4.0	4.0	
B 7239-5-4	5.0	5.0	5.0	early
B 7239-11-2	6.0	6.0	6.0	
B 7240-2	5.0	4.0	4.5	late
DM4NY6	5.0	4.0	4.5	highly variable
DM6NY1	4.0	4.0	4.0	
FR 266	5.0	5.0	5.0	
Medinah	6.0	6.0	6.0	
Minuette	4.0	6.0	5.0	
NY 5517	5.0	4.0	4.5	
RR 4270	3.0	4.0	3.5	
RR 6950	1.0	2.0	1.5	
WIS 83RR	2.0	5.0	3.5	
WIS 46RR	6.0	6.0	6.0	
LSD @ 5%			1.6	

^zScores: 1-9 scale; 1=none or very slight surface infection, 9=roots mostly dead, plants stunted.

Table 16. White mold infection, Corvallis, 2001²

Line	White Mold Score					Yield ^y	Habit ^x
	Rep 1	Rep 2	Rep 3	Rep 4	AV	AV	AV
91G	7.0	8.0	9.0	9.0	8.25	2.38	2.13
Ore 54	5.0	9.0	9.0	4.0	6.75	3.00	2.25
5416	7.5	2.5	8.5	3.5	5.50	2.88	2.50
5600	2.0	8.0	2.0	3.0	3.75	3.63	3.63
5613	4.0	5.0	9.0	8.0	6.50	2.75	2.50
5618	4.0	4.0	9.0	8.0	6.25	2.88	2.00
5630	9.0	8.0	9.0	3.0	7.25	3.13	2.63
5635	9.0	8.5	4.0	6.0	6.88	3.13	2.25
5643	8.5	8.0	9.0	9.0	8.63	2.38	1.75
5669	5.0	9.5	6.5	4.0	6.25	3.13	2.75
5699	8.0	8.0	2.0	9.0	6.75	3.13	2.38
5706	2.5	9.5	8.0	9.0	7.25	3.00	2.00
5747	1.5	4.0	6.0	9.0	5.13	2.38	3.13
5793	4.0	4.0	1.5	8.5	4.50	3.00	2.63
5800	1.5	1.5	2.0	9.0	3.50	2.38	2.00
5819	2.0	7.0	2.5	8.0	4.88	2.88	2.38
5835	1.5	1.0	7.0	4.0	3.38	3.38	2.63
5837	4.0	9.5	3.5	8.0	6.25	2.38	1.50
5842	9.0	9.5	8.0	9.0	8.88	2.13	1.50
5844	9.0	9.0	9.0	8.0	8.75	2.88	2.00
5852	4.0	8.0	1.0	2.0	3.75	2.75	2.38
5855	9.5	8.0	2.5	2.5	5.63	2.75	2.38
5870	4.0	2.0	9.0	8.0	5.75	2.50	3.25
5912	3.0	4.0	1.5	4.0	3.13	2.50	3.13
5922	7.0	8.0	9.5	9.5	8.50	1.75	1.25
5944	4.0	4.0	6.0	3.0	4.25	2.75	2.50
5947	4.0	4.0	6.0	8.0	5.50	3.38	2.75
5958	1.0	1.5	1.0	2.0	1.38	3.88	3.63
5978	4.0	1.5	2.0	2.0	2.38	2.88	3.13
6004	6.0	1.0	4.0	5.0	4.00	3.63	3.25
B7126-1-1-1-1	4.0	9.0	7.0	8.0	7.00	3.00	2.25
B7126-1-1-1-2	8.0	9.0	9.5	9.0	8.88	2.25	2.13
B7126-1-1-1-3	7.0	9.0	8.0	8.0	8.00	2.00	1.88
B7237-11-3	1.5	7.0	2.0	7.0	4.38	2.75	3.00
B7237-14-3	2.0	2.0	9.5	2.0	3.88	1.88	2.38
B7315-10-1-3-1	1.5	2.0	2.5	5.0	2.75	2.25	2.75
B7318-2-1-1-1	1.0	3.0	1.0	6.0	2.75	2.38	3.00
B7318-2-2-2-1	1.5	2.0	4.0	2.5	2.50	2.63	3.38
B7321-5-1-2-1	1.0	2.0	2.0	2.0	1.75	1.88	2.63
B7321-5-2-1-2	1.0	7.0	3.0	8.0	4.75	2.38	3.00
B7323-4-1-2-1	3.0	1.0	4.0	7.0	3.75	2.63	3.38
B7324-2-2-1-1	1.5	3.5	4.0	1.5	2.63	3.13	3.00
B7329-1-1-2-1	1.0	3.0	3.0	1.0	2.00	2.25	3.50
B7329-1-2-2-1	1.0	2.0	2.0	1.0	1.50	2.75	3.50

Table 16. White mold infection, Corvallis, 2001 (cont.)²

Line	White Mold Score					Yield ^y AV	Habit ^x AV
	Rep 1	Rep 2	Rep 3	Rep 4	AV		
B7329-2-1-2-2	2.0	1.5	2.0	1.5	1.75	2.88	3.13
B7329-11-1-1-1	2.0	4.0	1.0	xx	2.33	2.33	3.33
B7329-11-1-2-1	1.0	1.0	2.0	3.5	1.88	2.50	3.25
B7334-9-2-2-1	2.0	1.5	1.0	1.0	1.38	2.13	4.00
B7335-7-1-1-2	2.0	3.0	1.0	1.5	1.88	2.63	3.50
B7335-7-1-2-1	4.0	1.0	4.0	1.0	2.50	2.38	3.38
B7335-7-2-1-1	1.5	1.5	1.5	1.0	1.38	2.13	3.50
B7339-1-1-1-2	1.5	1.0	3.0	8.0	3.38	2.50	3.25
B7344-5-1-1	1.0	1.0	2.0	5.0	2.25	2.13	3.25
B7344-9-2-2-1	1.0	1.5	1.5	1.0	1.25	1.88	4.00
B7345-5-1-1-1	1.5	5.0	5.0	1.5	3.25	2.38	3.38
B7345-5-1-2-1	7.0	9.0	8.0	2.0	6.50	2.25	3.00
B7354-1-2-1-1	1.5	1.5	8.0	3.0	3.50	2.63	2.75
B7354-2-1-1-1	1.5	2.0	7.0	8.0	4.63	3.13	2.75
B7354-2-2-1-2	8.0	1.0	8.0	4.5	5.38	2.63	2.63
B7354-2-2-2-1	1.0	2.0	2.0	1.0	1.50	2.50	2.63
B7354-6-2-1	2.0	1.0	1.0	3.0	1.75	2.25	3.50
B7354-6-2-2	1.0	1.0	1.0	1.0	1.00	2.25	4.00
B7356-4-1-1	1.5	4.0	7.0	9.0	5.38	2.25	2.75
B7356-4-2-1	1.0	2.0	6.0	2.5	2.88	2.88	3.00
76-110	7.0	8.0	3.0	2.0	5.00	1.88	2.25
Minnette	8.0	2.0	3.0	8.0	5.25	2.88	3.13
Ex Rico	1.0	1.5	7.0	7.0	4.13	2.25	2.50
L192	1.0	1.0	1.5	1.0	1.13	2.38	3.25
MO 162	1.5	1.0	1.0	1.0	1.13	2.50	3.25
225846	2.0	3.5	1.0	2.0	2.13	2.00	2.88
G122-1	2.0	1.5	1.5	1.0	1.50	3.25	3.88
G122-3	3.0	1.0	1.0	2.5	1.88	3.50	3.38
SB 4123	3.0	2.0	4.0	7.0	4.00	2.63	3.25
FR 266	2.0	4.0	2.0	1.0	2.25	2.00	2.63
H9658	1.0	9.0	2.0	2.0	3.50	3.75	3.88
H9658-7	1.0	7.0	7.0	1.0	4.00	3.13	3.25
H9658-9	3.0	1.5	1.0	3.0	2.13	3.13	3.38
H9658-65	1.0	4.0	3.5	1.0	2.38	3.75	3.75
H9669-5B-1	6.0	3.0	7.0	4.0	5.00	3.25	2.38
H9669-5B-6	6.0	6.0	4.0	3.0	4.75	3.25	2.25
H9669-5B-8	6.0	6.0	6.0	5.0	5.75	3.13	2.13
I9365-31	6.0	4.0	3.0	4.0	4.25	3.13	2.75
NY5773	1.0	1.5	1.0	3.0	1.63	3.25	3.50
NY5814-3	2.0	1.0	2.0	1.0	1.50	2.00	3.00
NY5950	1.0	3.0	2.0	7.0	3.25	2.25	3.00
NY5972	2.0	1.0	2.5	1.0	1.63	2.75	3.00
NYBS6637	1.0	1.0	1.5	3.5	1.75	2.00	3.50
NYBS6643	1.5	1.0	2.0	2.0	1.63	2.00	3.38
NYBS6653	1.5	1.0	2.0	5.0	2.38	2.63	2.88

Table 16. White mold infection, Corvallis, 2001 (cont.)^z

Line	White Mold Score					Yield ^y	Habit ^x
	Rep 1	Rep 2	Rep 3	Rep 4	AV	AV	AV
NYBS6670	2.0	2.0	2.5	1.5	2.00	2.75	3.50
NYBS6671	1.0	1.0	2.5	1.5	1.50	2.63	3.63
NY1-6020-4	2.0	3.0	2.5	3.0	2.63	2.25	2.38
NY1-6020-5	1.0	2.0	1.0	2.0	1.50	2.38	3.00
NY-15-161-C	4.0	8.0	2.0	9.0	5.75	3.25	3.38
NY-15-161W	1.5	1.5	1.5	9.0	3.38	3.13	3.50
NY2-5984-1	2.0	1.0	2.0	1.0	1.50	2.50	3.25
PI207130-2-4	3.5	1.5	1.5	3.0	2.38	2.13	2.38
PI207130-2-8	1.5	3.5	2.0	3.0	2.50	1.88	1.88
PI290990-4-1	1.5	2.0	3.5	2.0	2.25	2.75	3.13
LSD @ 5%					2.12 ^w	0.68 ^w	0.60 ^w

^zWhite mold scores: 1-10, 1 = low incidence, no symptoms observed, 10 = high incidence, all plants in plot infected

^yVisual observation of yield: 0 = no bean set, 4 = high bean set.

^xUpright habit: 1 = flat, 4 = vertically upright.

^wDue to field variations blocking was used to eliminate error in the LSD. Blocks consisted of 3 rows each, for a total of 6 blocks.

Table 17. Correlation Matrix of White Mold, Yield & Habit, Corvallis, 2001

	Rep	White Mold	Yield	Upright
Rep	1.00	0.13	-0.03	-0.11
White Mold		1.00	-0.06	-0.66*
Yield			1.00	0.18*
Upright				1.00

Table 18. Comparison of white mold field averages and straw test averages, Corvallis, 2001, 2000, 1999, & 1998.

Line	White Mold Field Score Average ^z				
	1998 Ave.	1999 Ave.	2000 Ave.	2001 Ave.	2000 & 2001 Ave. ^y
91G	6.75	8.50	7.75	8.25	8.00
Ore 54	7.25	9.00	7.50	6.75	7.13
5416	6.75	9.00	8.25	5.50	6.88
5600	4.75	7.75	8	3.75	5.88
5613	7.25	9.25	6.75	6.50	6.63
5630	5.75	8.00	5.25	7.25	6.25
5635	7.5	8.75	5.75	6.88	6.31
5669	7	x	6.5	6.25	6.38
5747	3.5	5.50	4.75	5.13	4.94
5819	x	x	3.75	4.88	4.31
5835	x	x	4.25	3.38	3.81
5842	x	x	9	8.88	8.94
5844	x	x	8.5	8.75	8.63
5870	x	x	4.75	5.75	5.25
5912	x	x	2.5	3.13	2.81
5944	x	x	2.25	4.25	3.25
5947	x	x	6.25	5.50	5.88
B7237-11-3	3.5	x	4.5	4.38	4.44
B7237-14-3	2.5	7.00	4	3.88	3.94
B7315-10-1-3-1	4.75	x	1.75	2.75	2.25
B7318-2-1-1-1	1.25	6.50	1.75	2.75	2.25
B7318-2-2-2-1	4	5.50	1.75	2.50	2.13
B7321-5-1-2-1	3	6.25	3	1.75	2.38
B7321-5-2-1-2	x	x	1.5	4.75	3.13
B7323-4-1-2-1	2.5	7.00	3.75	3.75	3.75
B7324-2-2-1-1	3	7.25	2.75	2.63	2.69
B7329-1-1-2-1	2	6.00	3.5	2.00	2.75
B7329-1-2-2-1	2	4.75	1.5	1.50	1.50
B7329-2-1-2-2	1.25	5.25	2.75	1.75	2.25
B7329-11-1-2-1	3	5.50	2.25	1.88	2.06
B7334-9-2-2-1	1.75	2.88	2	1.38	1.69
B7335-7-1-1-2	2.25	4.25	2.5	1.88	2.19
B7335-7-1-2-1	2	3.75	1.75	2.50	2.13
B7335-7-2-1-1	2	4.50	2	1.38	1.69
B7339-1-1-1-2	2.25	6.00	3.75	3.38	3.56
B7344-5-1-1	1.25	3.75	1.5	2.25	1.88
B7345-5-1-1-1	x	6.25	2.75	3.25	3.00
B7345-5-1-2-1	x	7.00	4	6.50	5.25
B7354-1-2-1-1	2.5	6.00	5	3.50	4.25
B7354-2-1-1-1	4.75	7.00	3	4.63	3.81
B7354-2-2-1-2	2.75	7.50	6.25	5.38	5.81
B7354-2-2-2-1	2	5.25	2.25	1.50	1.88
B7354-6-2-1	1.5	2.50	1.25	1.75	1.50
B7354-6-2-2	1.5	x	1	1.00	1.00
B7356-4-1-1	1.75	5.75	1.75	5.38	3.56
B7356-4-2-1	3.25	x	2	2.88	2.44

Table 18. Comparison of white mold field averages and straw test averages, Corvallis, 2001, 2000, 1999, & 1998 (cont.).

Line	White Mold Field Score Average ^z				
	1998 Ave.	1999 Ave.	2000 Ave.	2001 Ave.	2000 & 2001 Ave. ^y
76-110	2.75	8.25	2	5.00	3.50
Minuette	5.5	8.50	4	5.25	4.63
Ex Rico	4.5	6.50	5	4.13	4.56
L192	1.75	2.00	1.5	1.13	1.31
MO 162	1.5	2.00	1	1.13	1.06
225846	2	6.00	1.75	2.13	1.94
G122-1	x	3.75	2	1.50	1.75
G122-3	x	x	2	1.88	1.94
SB 4123	4.5	7.75	4	4.00	4.00
FR 266	2.75	5.00	3.75	2.25	3.00
H9658	2.5	6.50	4	3.50	3.75
H9658-7	3.25	4.00	2.5	4.00	3.25
H9658-9	1	4	2	2.13	2.06
H9658-65	2.75	6.5	3	2.38	2.69
H9669-5B-1	x	x	3	5.00	4.00
H9669-5B-6	x	x	3.25	4.75	4.00
H9669-5B-8	x	x	2.5	5.75	4.13
I9365-31	x	x	2.5	4.25	3.38
NY5773	3	3.875	2.75	1.63	2.19
NY5814-3	3.5	7.75	2.5	1.50	2.00
NY5950	3.75	8.25	3	3.25	3.13
NY5972	2.5	3.75	1.25	1.63	1.44
NYBS6637	2.25	4.25	1.25	1.75	1.50
NYBS6643	2.25	5.75	1.75	1.63	1.69
NYBS6653	x	7	1.75	2.38	2.06
NYBS6670	2.25	4.5	1.75	2.00	1.88
NYBS6671	2	4.5	4	1.50	2.75
NY1-6020-4	3.5	x	3	2.63	2.81
NY1-6020-5	3	4	2.75	1.50	2.13
NY-15-161-C	3.5	6.75	4	5.75	4.88
NY-15-161W	3.5	7	3	3.38	3.19
NY2-5984-1	2.25	4	2	1.50	1.75
PI207130-2-4	x	x	1.5	2.38	1.94
PI207130-2-8	x	x	1.75	2.50	2.13
PI290990-4-1	x	x	2.5	2.25	2.38
LSD @ 5%					1.72

^zWhite mold scores: 1-10, 1 = low incidence, no symptoms observed, 10 = high incidence, all plants in plot infected.

^yLSD @ 5% = 1.72 (comparison of white mold field scores over two years).

^xBlank spaces due to incomplete data sets.

Figure 1. Standard Bean \$/A 2001 - April 25 Planting

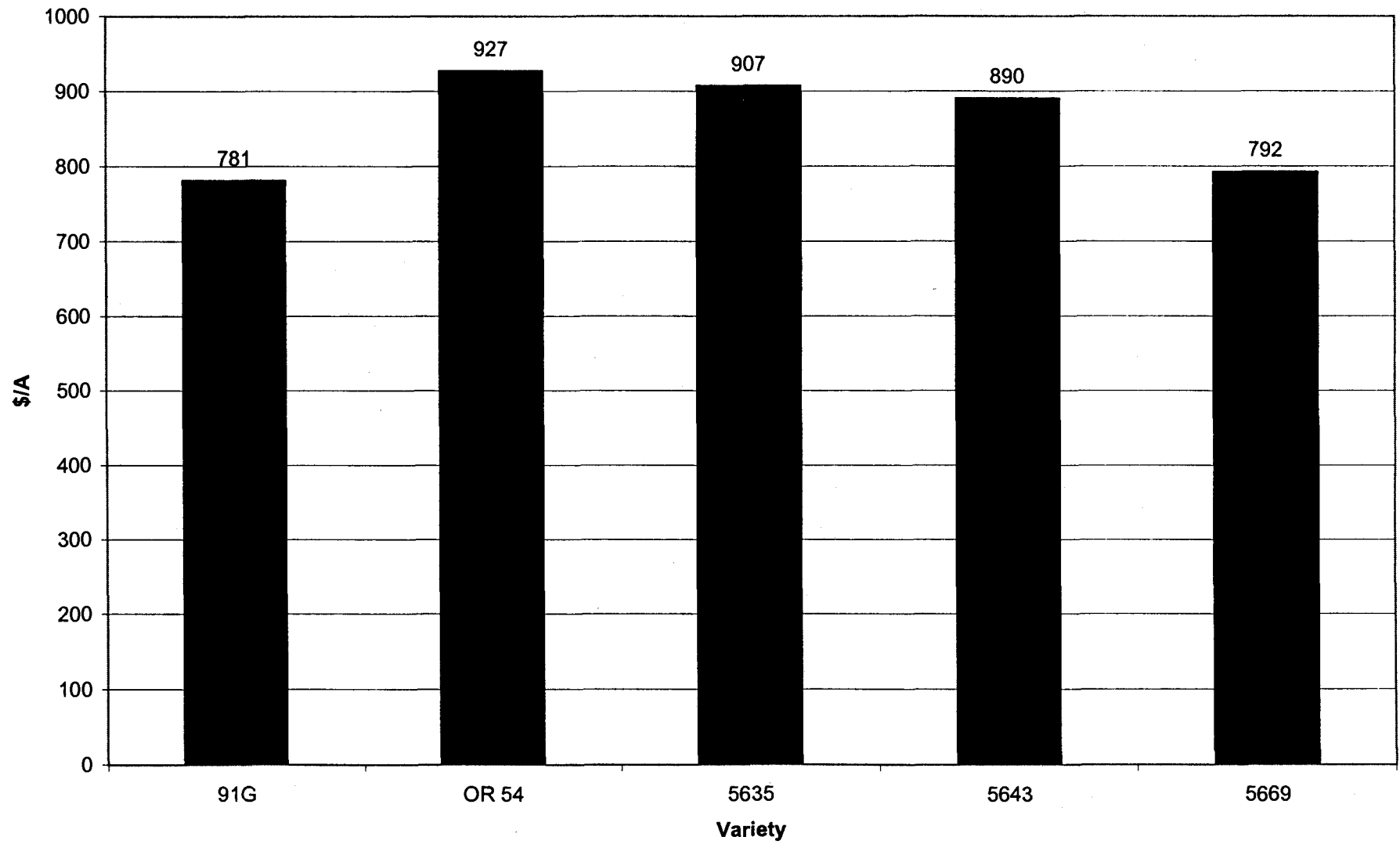


Figure 2. Standard Bean \$/A 2001 - May 7 Planting

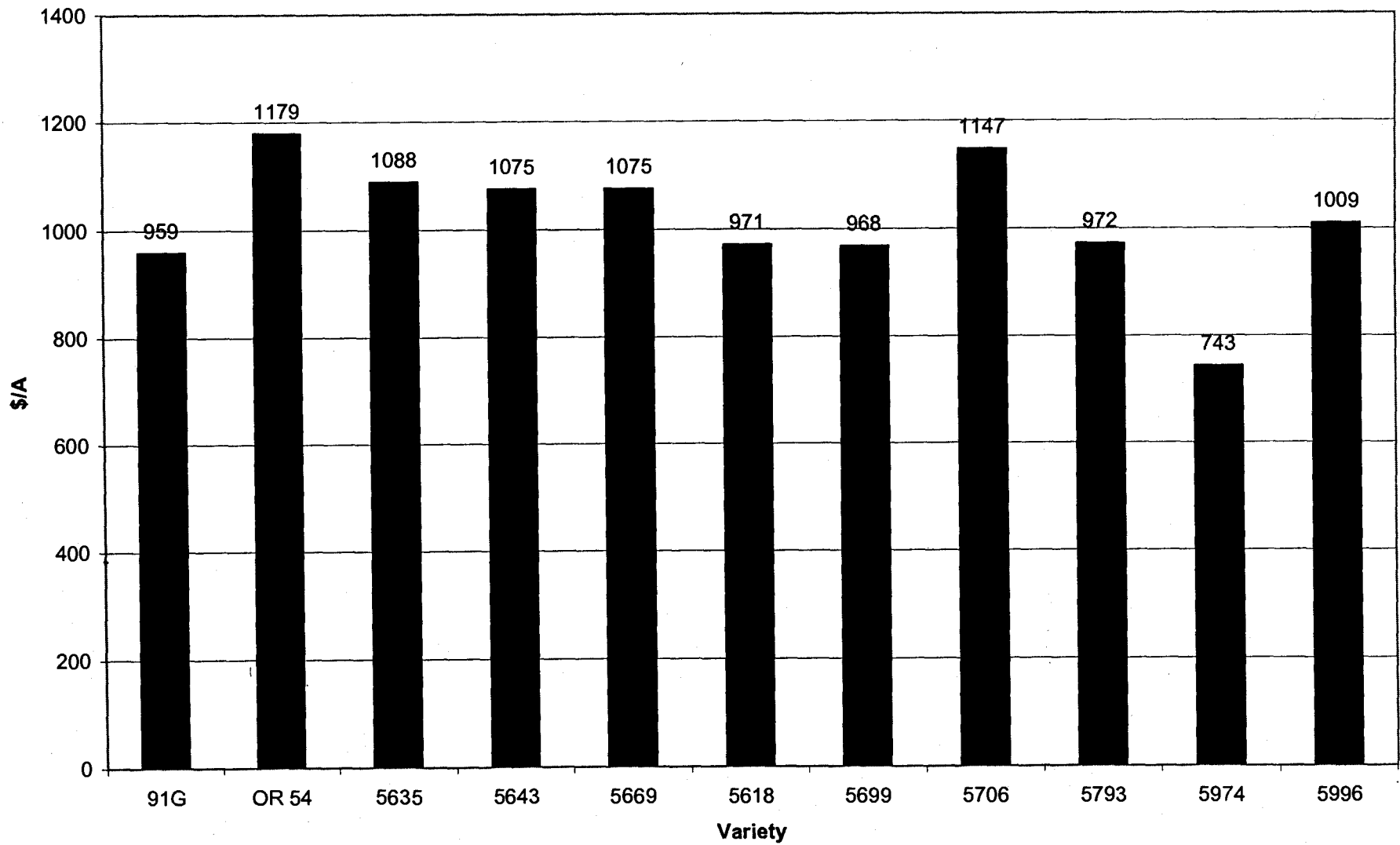


Figure 3. Standard Bean \$/A 2001 - July 2 Planting

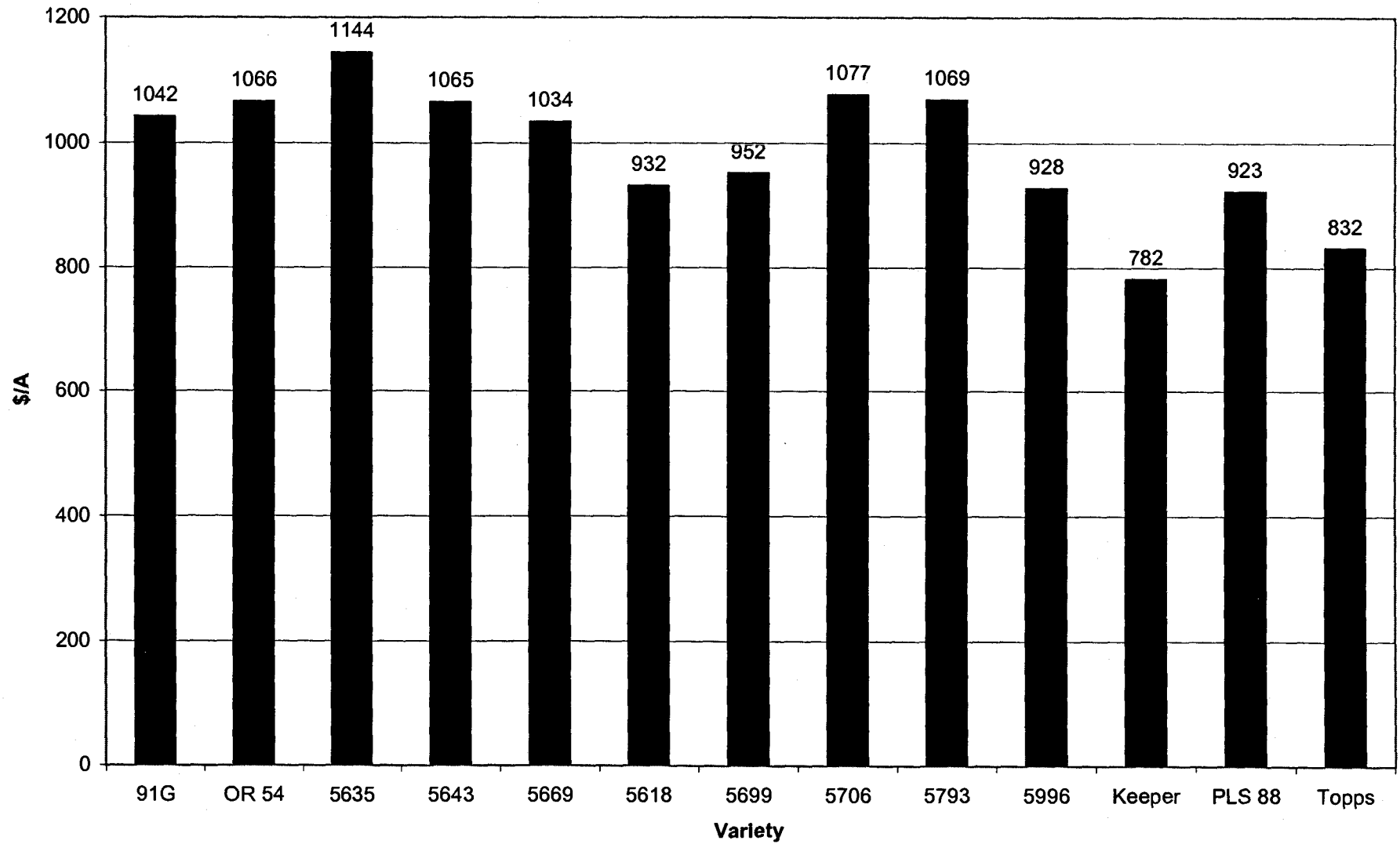


Figure 4. Standard Bean \$/A 2001 Season Average - Selected Harvests

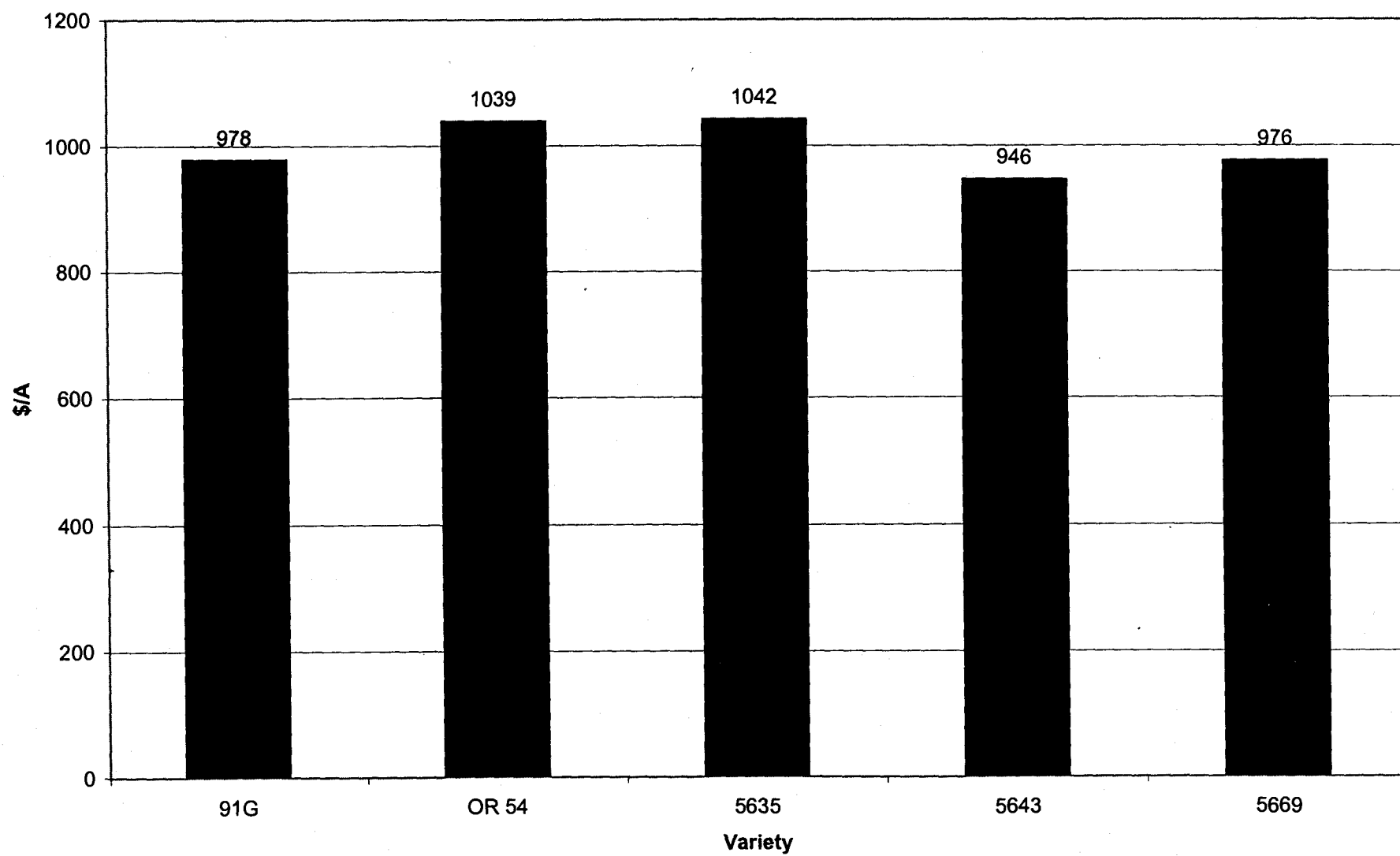


Figure 5. Small Sieve Bean \$/A 2001 - April 25 Planting

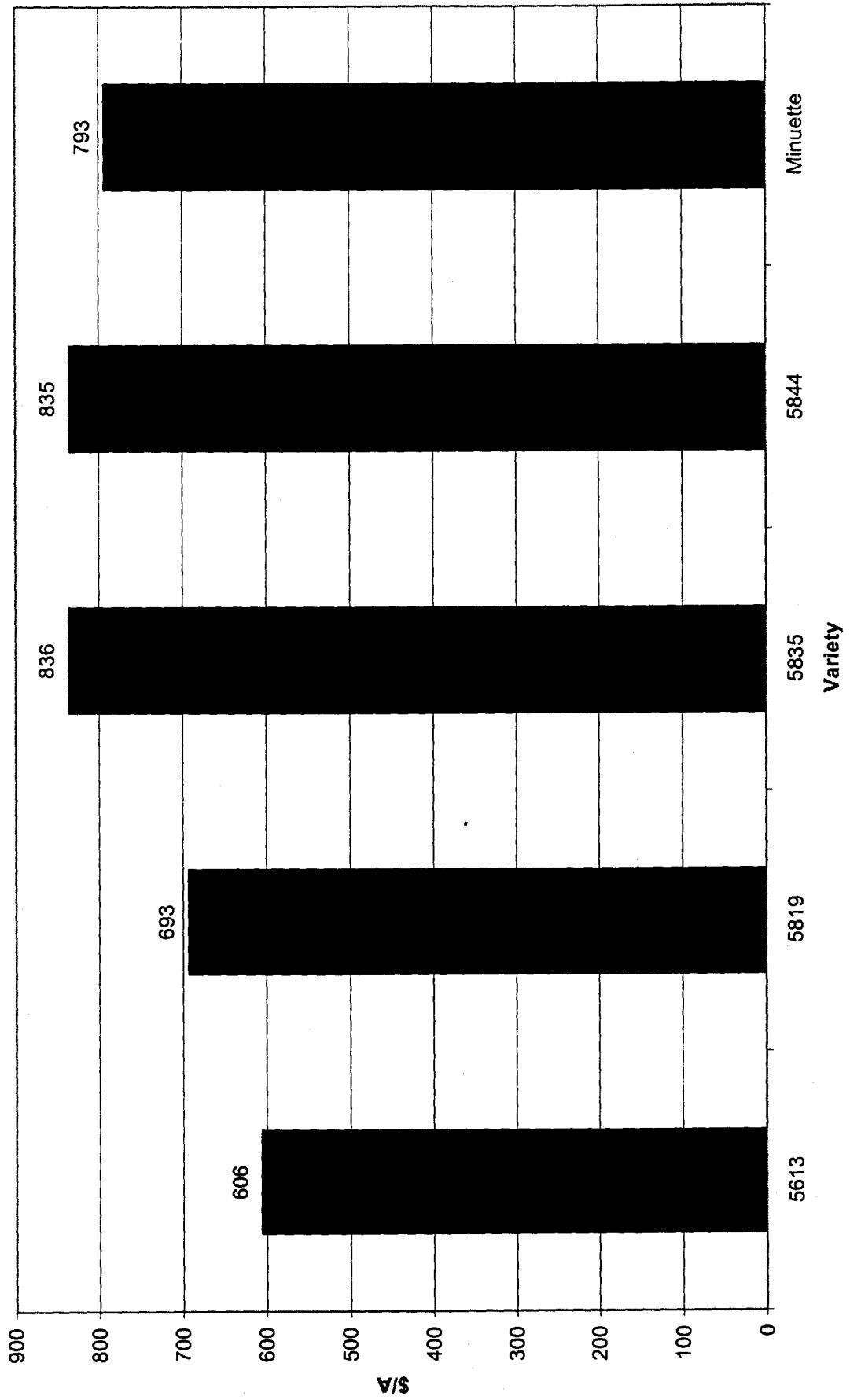


Figure 6. Small Sieve Bean \$/A 2001 - May 7 Planting

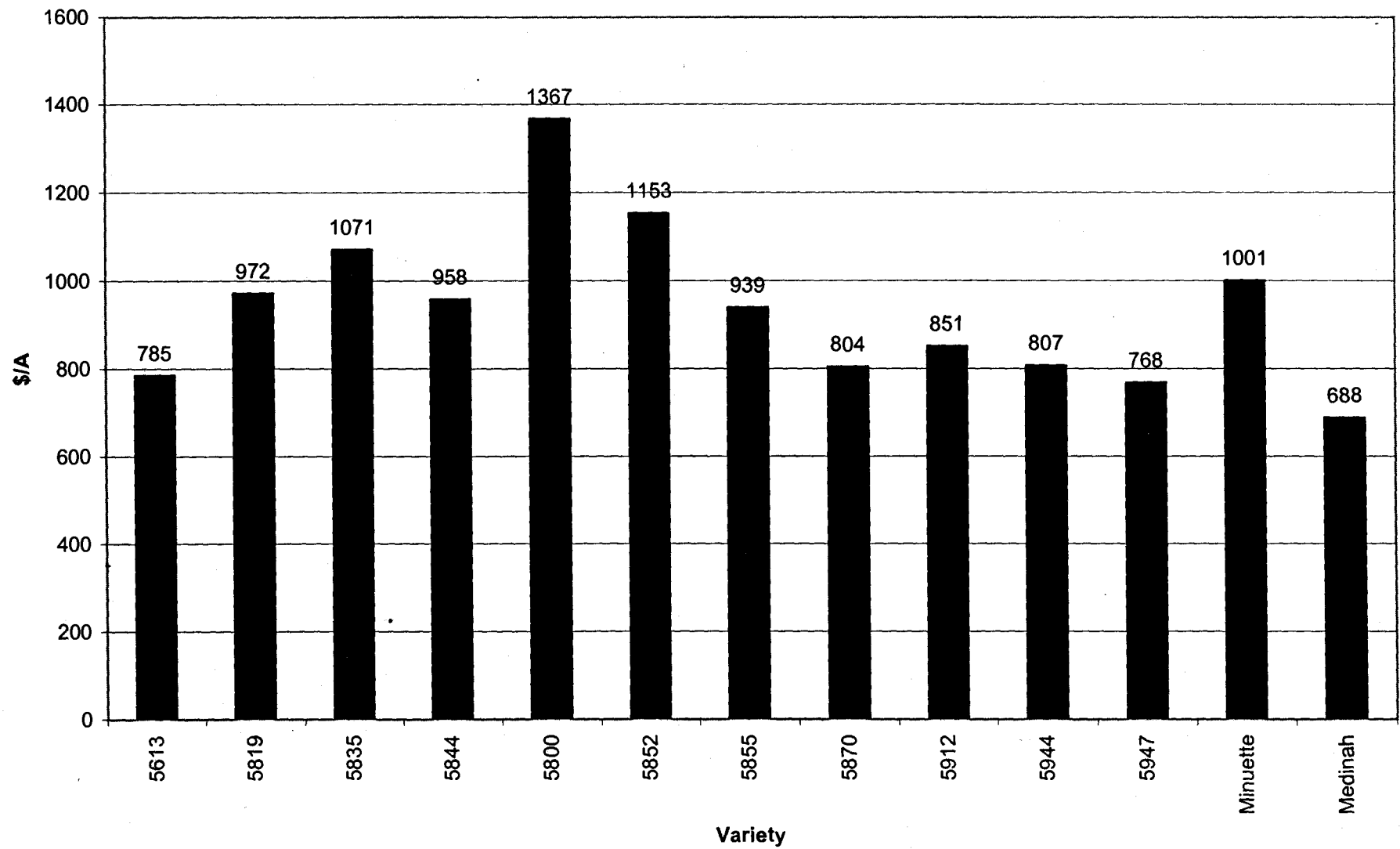


Figure 7. Small Sieve Bean \$/A 2001 - July 2 Planting

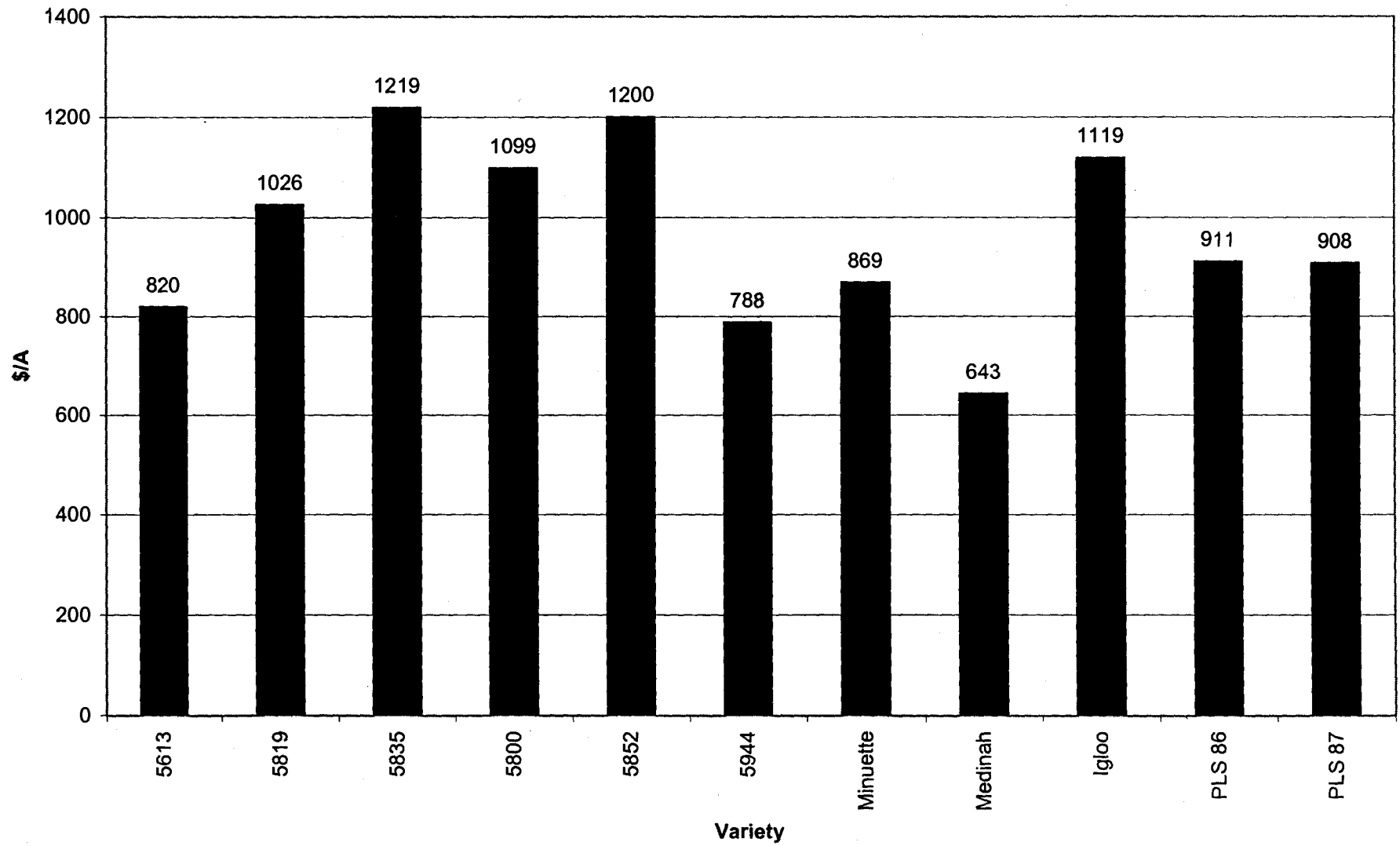


Figure 8. Small Sieve Bean \$/A 2001 Season Average - Selected Harvests

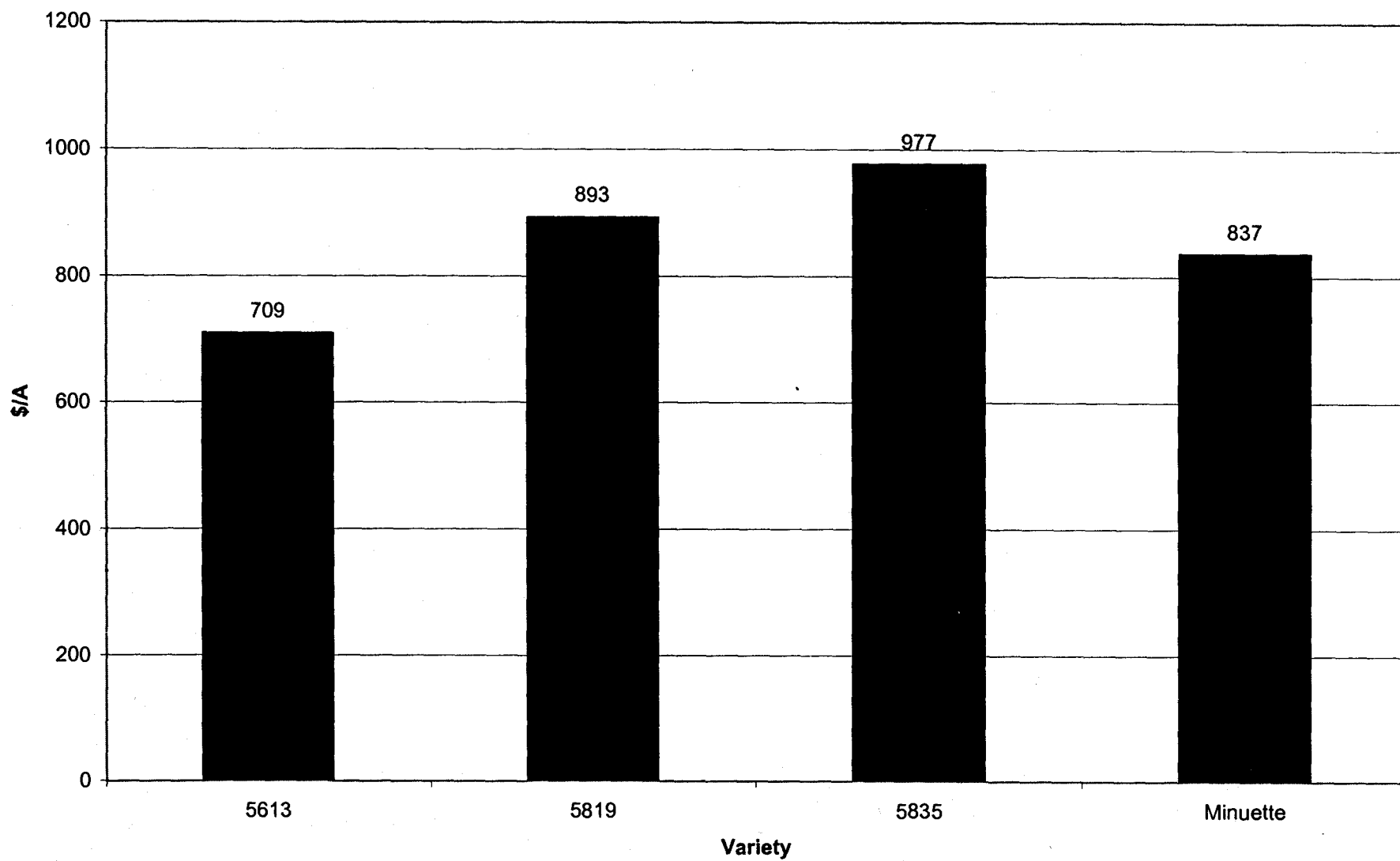


Figure 9. Commercial Bean \$/A 2001 - Full Sieve Varieties

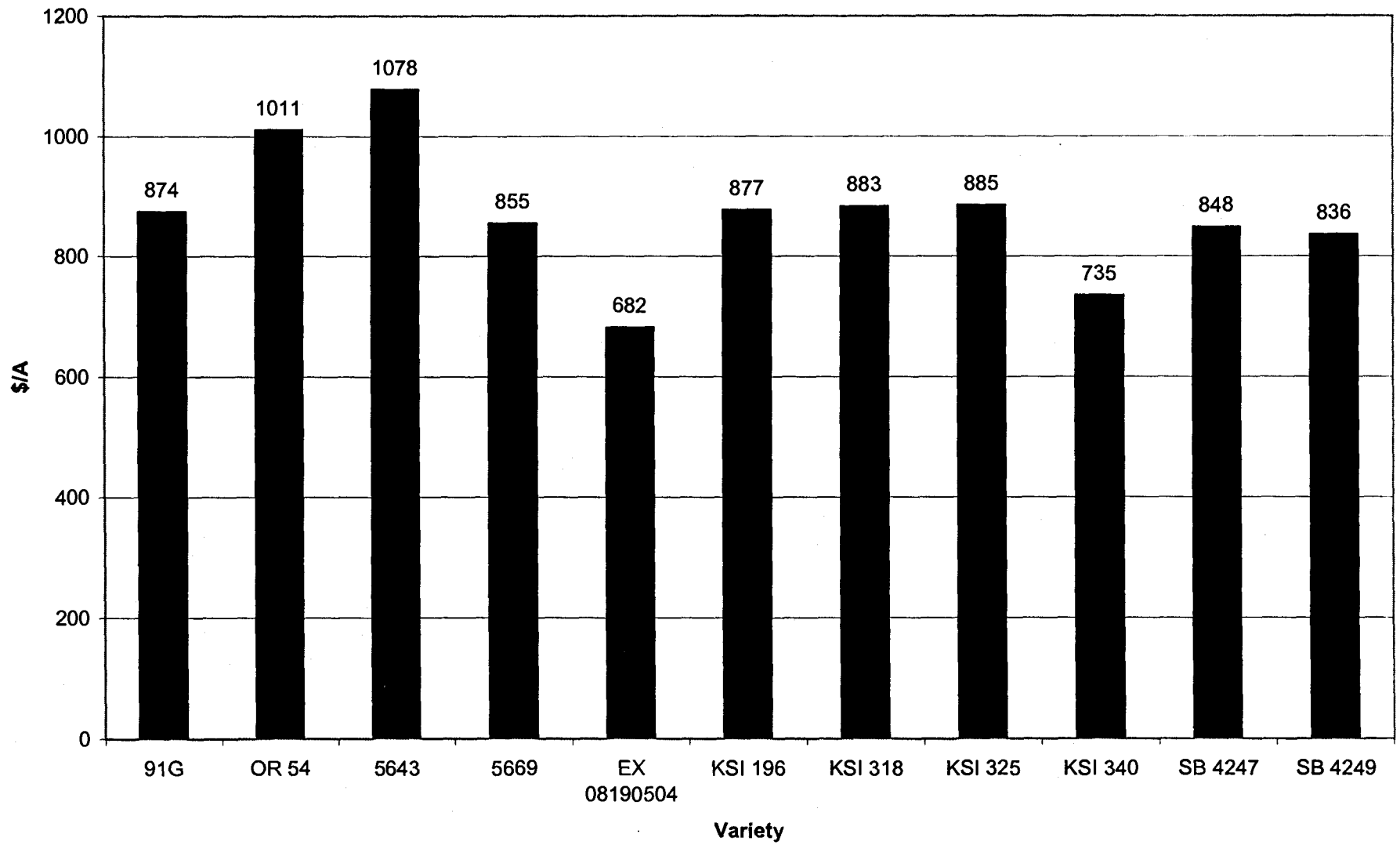


Figure 10. Commercial Bean \$/A 2001 - Small Sieve Varieties

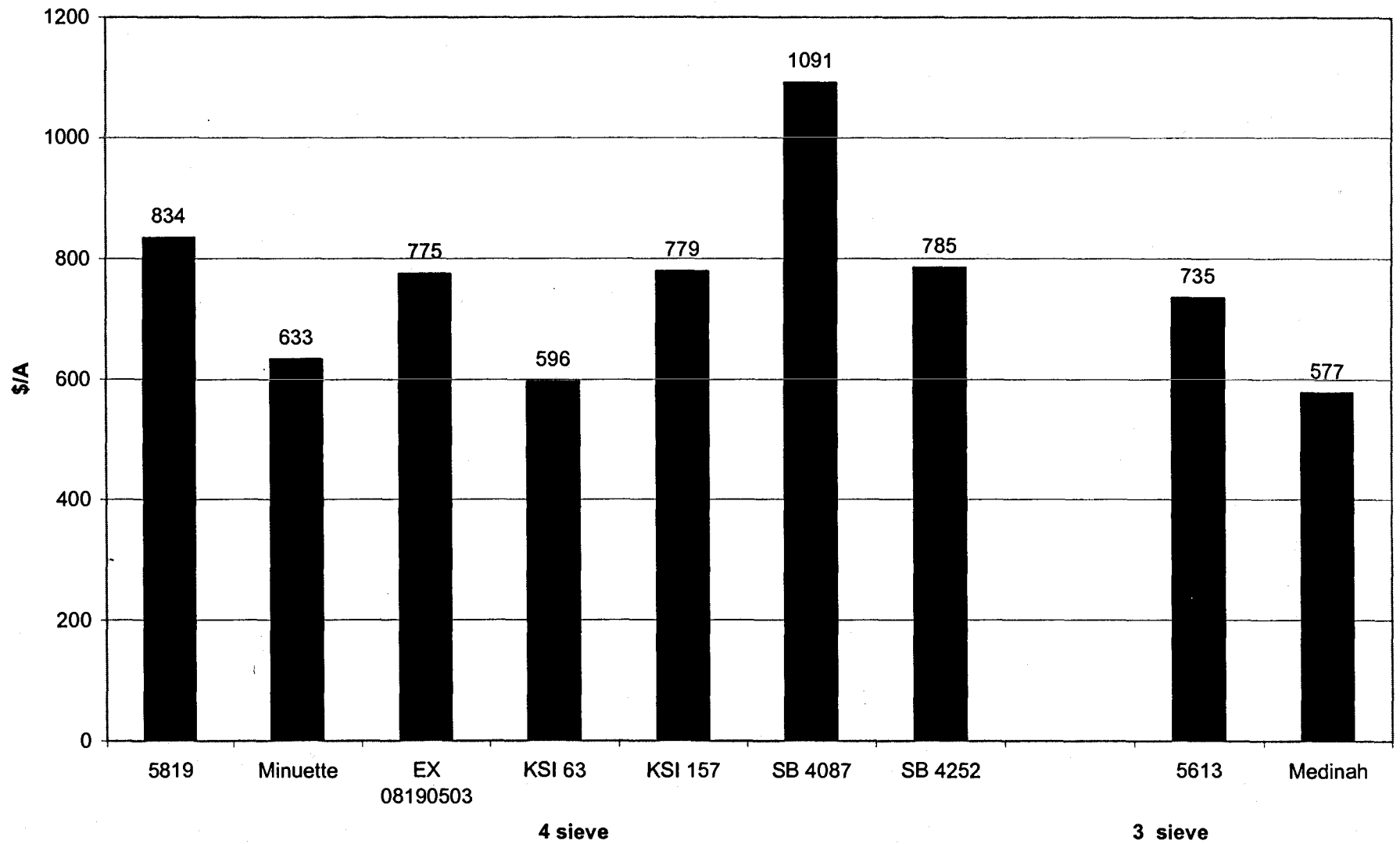


Figure 11. Standard Bean \$/A 2001 - Five Year Average

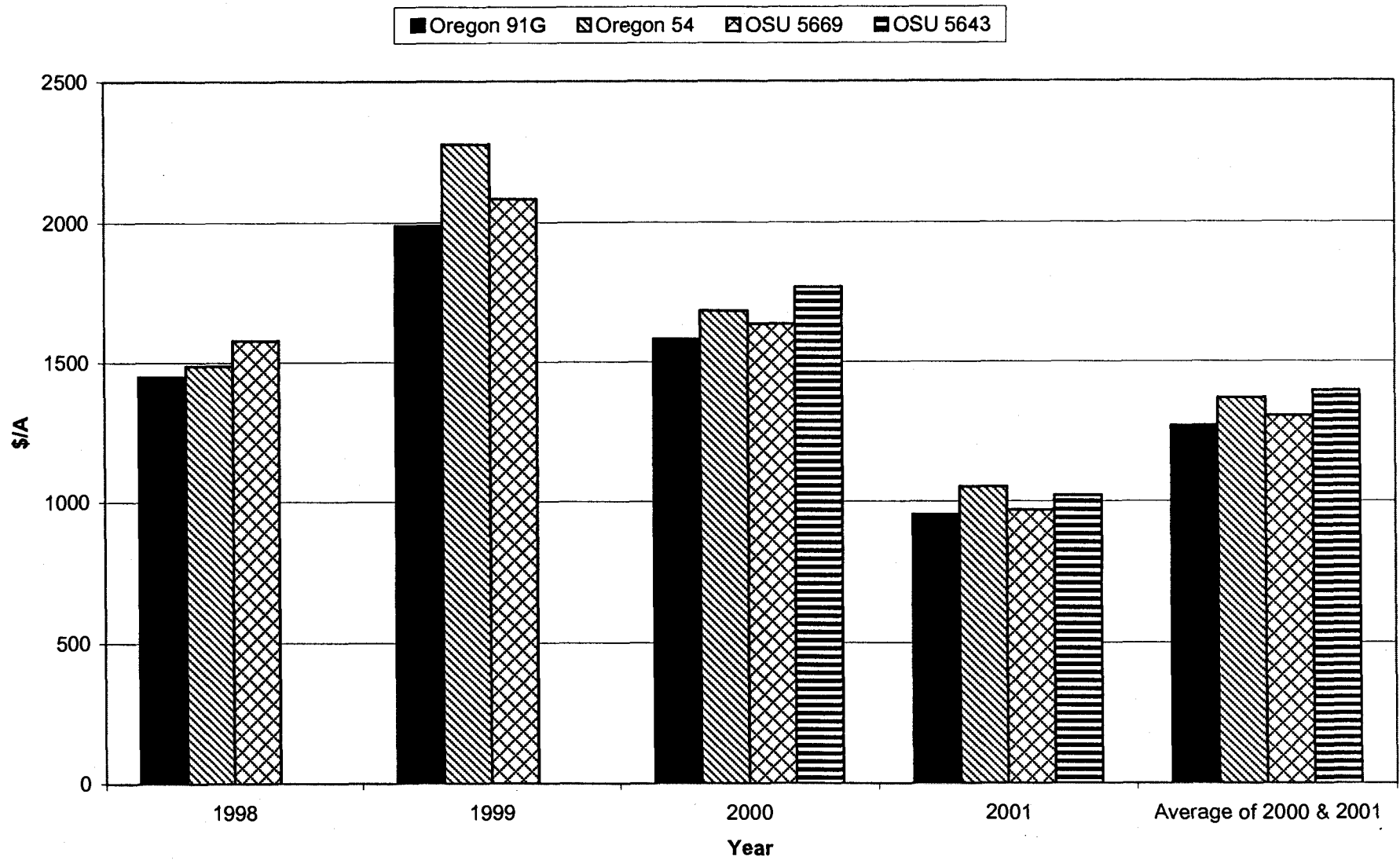
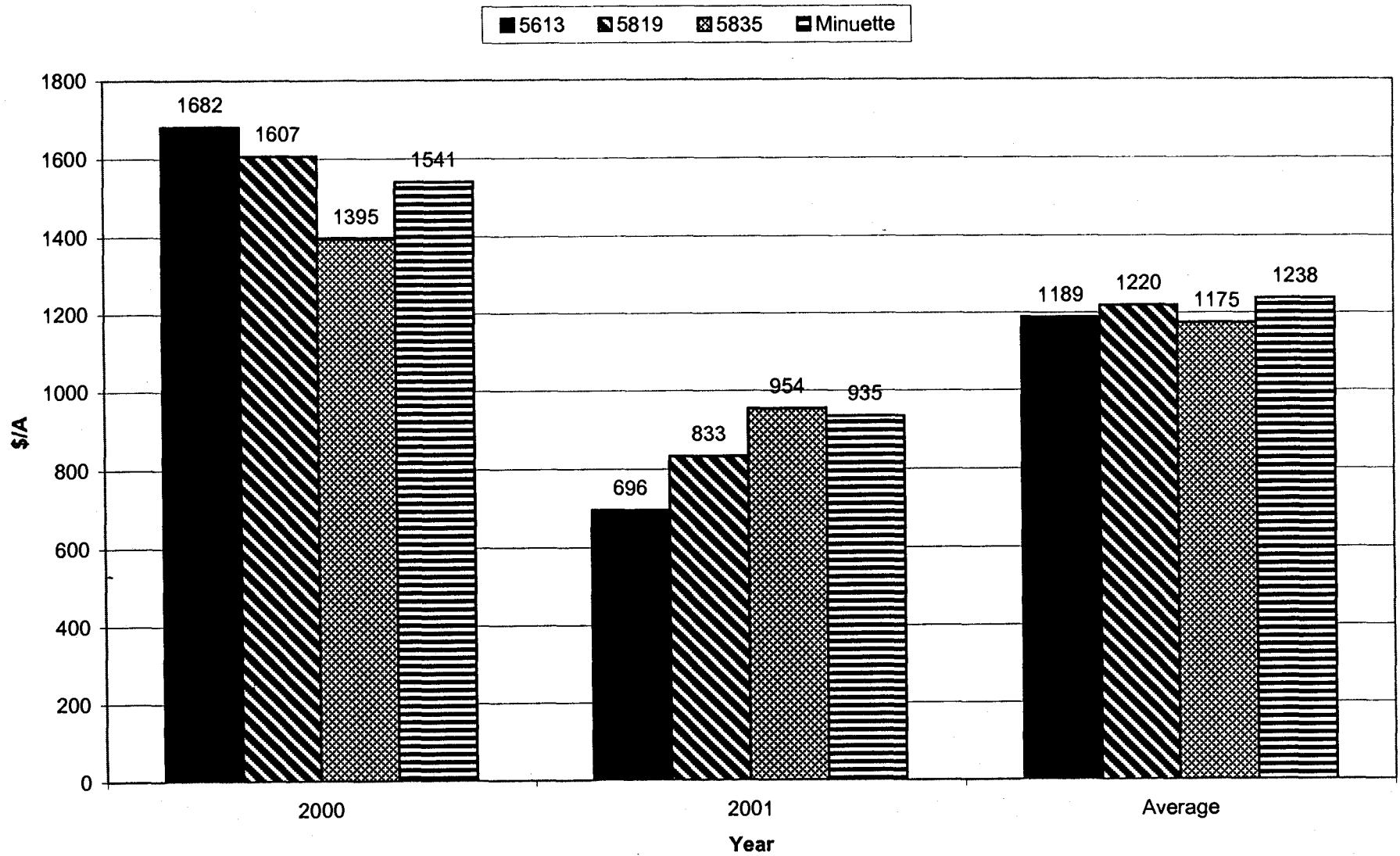
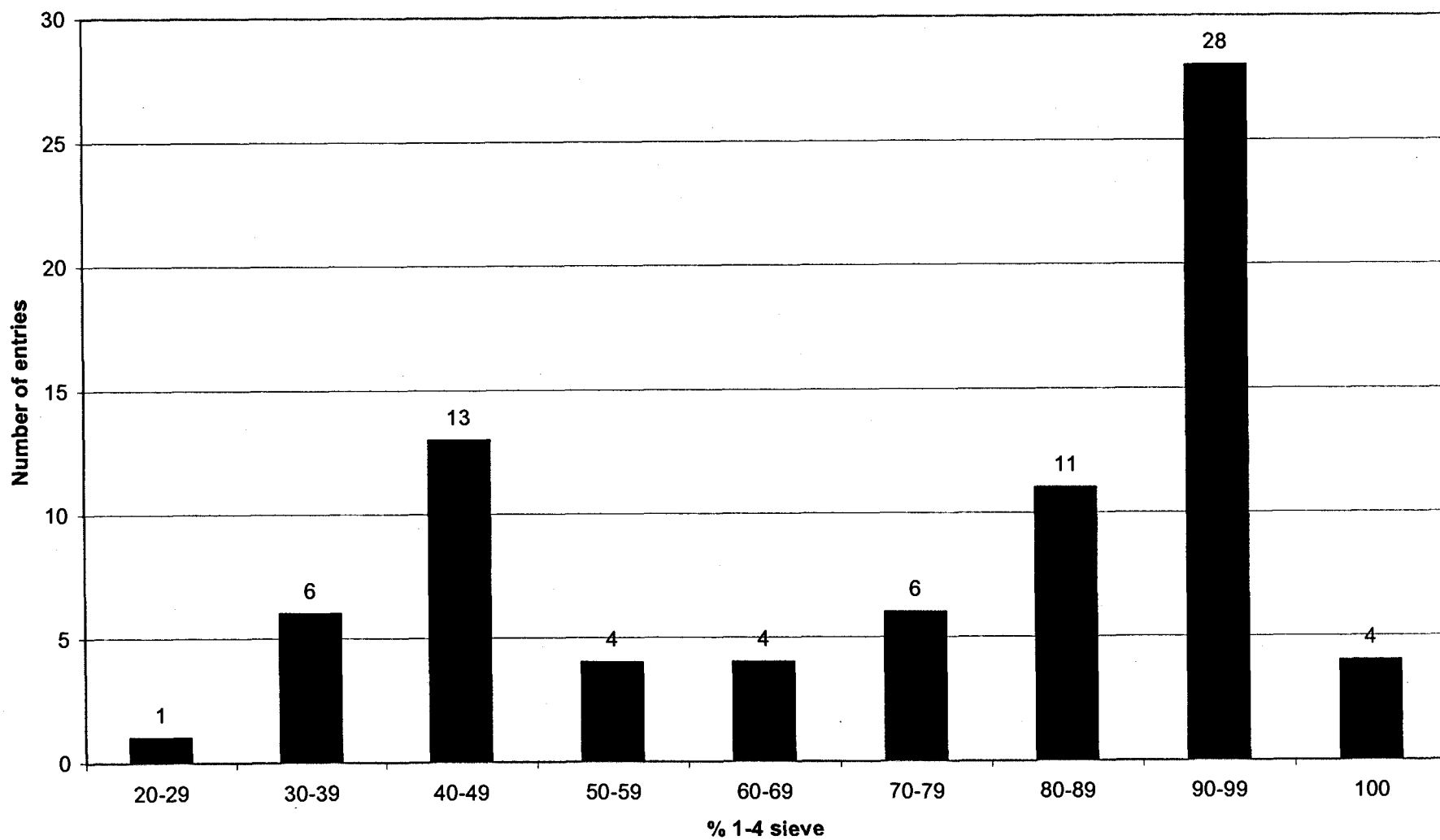


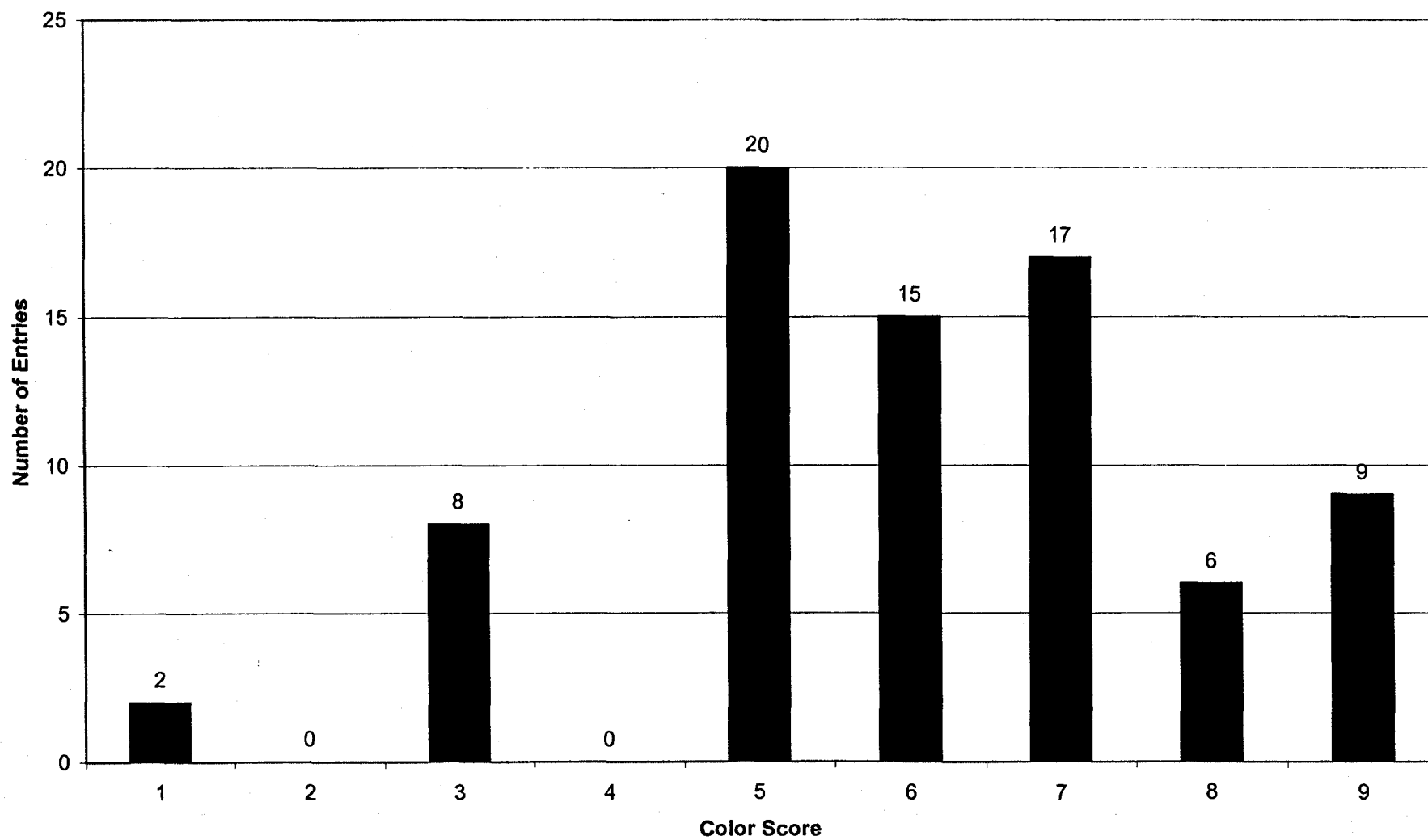
Figure 12. Small Sieve Bean \$/A 2001 - Two Year Average



**Figure 13. %1-4 Sieve Distribution for Minuette x OSU 5630 Recombinant Inbred Lines
2001**



**Figure 14. Color Score Distribution for Minuette x OSU 5630 Recombinant Inbred Lines
2001**



**Figure 15. Pod Length Distribution for Minuette x OSU 5630 Recombinant Inbred Lines
2001**

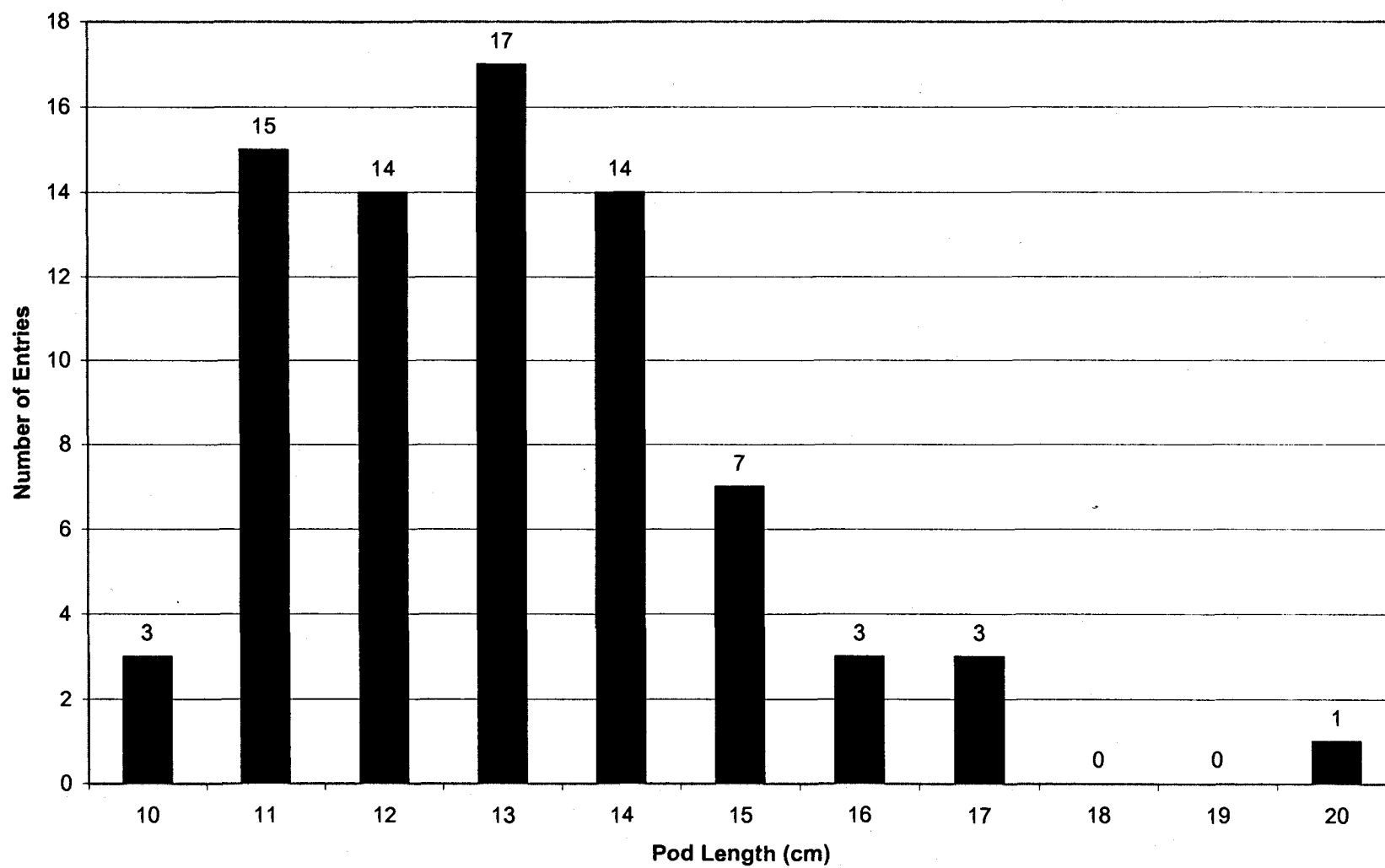


Figure 16. Pod Straightness Scores Distribution for Minuette x OSU 5630 Recombinant Inbred Lines 2001

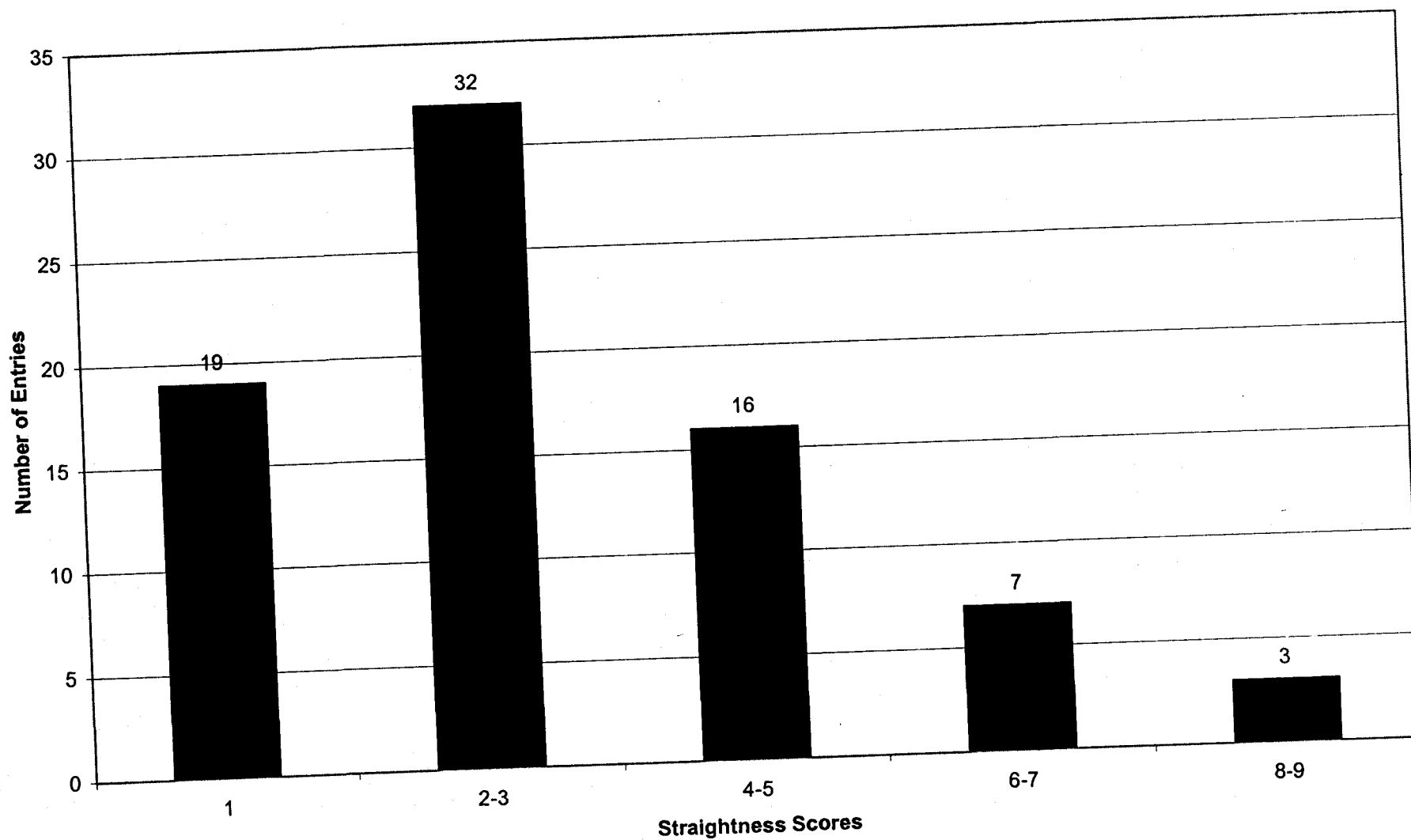


Figure 17. Pod Smoothness Scores Distribution for Minuette x OSU 5630 Recombinant Inbred Lines 2001

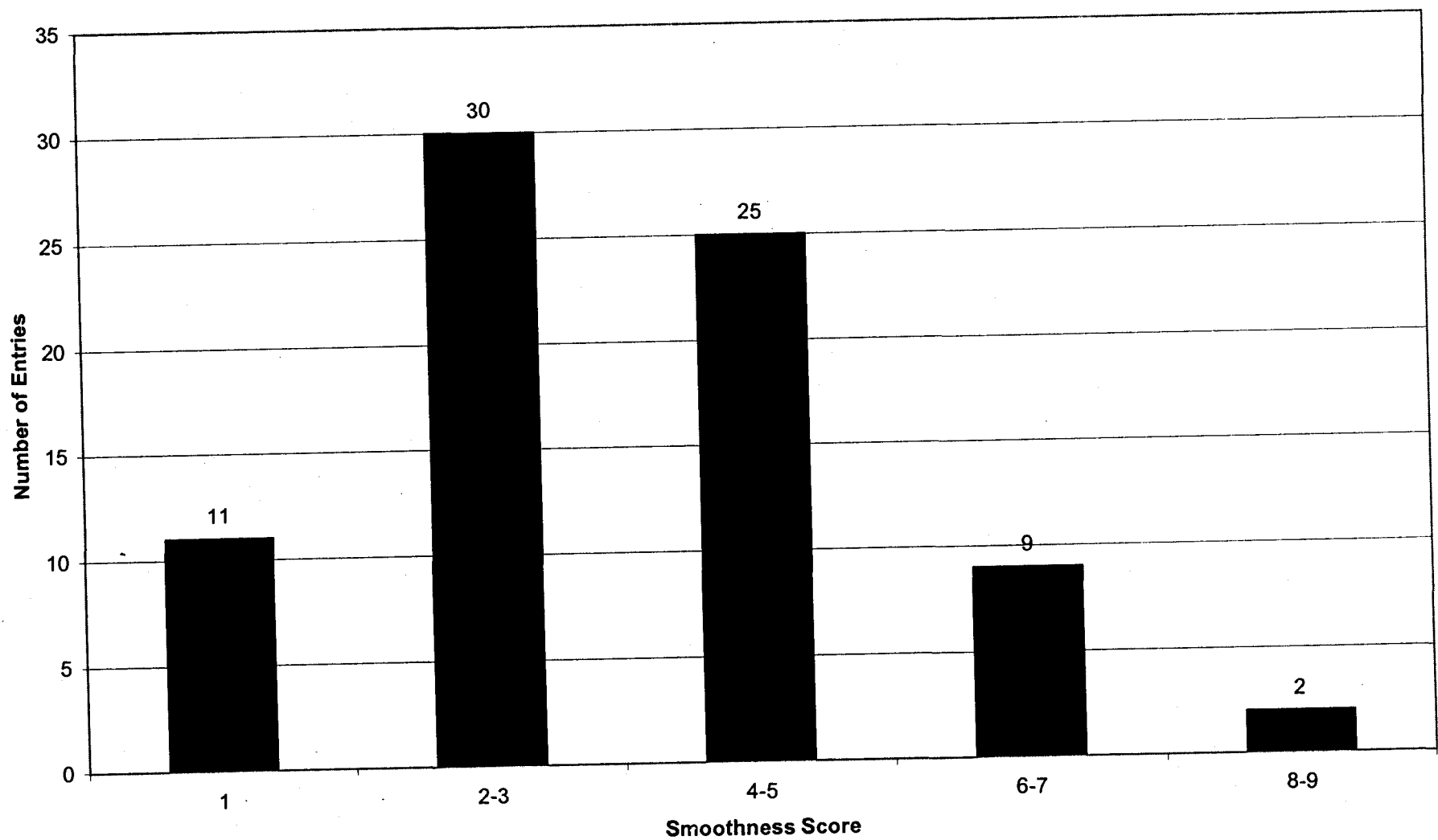


Figure 18. Pod Width x Height Distribution for Minuette x OSU 5630 Recombinant Inbred Lines 2001

