

**Supplemental Report to the Oregon Processed Vegetable Commission  
1996-1997**

**Processing and Quality Evaluation of Experimental Green Beans**

<b><u>Title</u></b>	Green Bean Breeding and Evaluation
<b><u>Project Leaders</u></b>	Brian Yorgey, Food Science and Technology Dan Farkas, Food Science and Technology with J. R. Baggett, Horticulture
<b><u>Project Dates</u></b>	July 1, 1996 - June 30, 1997
<b><u>Project Funding</u></b>	\$ 9325

Processing funds were used for labor and supplies for processing of experimental beans, laboratory and data analysis, and industry evaluation.

**Objectives**

The basic objective of the processing component of this research is to support the green bean breeding program being carried out by Dr. Jim Baggett in the Horticulture Department. The specific objectives are:

- A. To provide Dr. Baggett and the Oregon vegetable processing industry with frozen and canned samples of experimental green bean lines for comparison to varieties currently grown in Oregon,
- B. To organize and conduct the industry cutting for evaluation of experimental beans, including data analysis, and
- C. To analyze processed selections and varieties for objective quality characteristics.

**Report of Progress**

During the 1996 season, experimental green bean selections along with standard varieties were canned and frozen in the Food Science Pilot Plant from all five bean trials planted at the OSU Horticulture Vegetable Farm. Twelve experimental standard sieve size beans and one slenderette type were processed along with Oregon 91G and Oregon 54 as standards. Again in 1996, we spent a significant amount of time evaluating small sieve beans. Seven OSU experimental small sieve beans and two commercial small sieve varieties were harvested and processed.

Green Bean Varieties and Selections Processed in 1994

TYPE	VARIETY OR SELECTION	SOURCE
Standard Sieve	Oregon 91G	
	Oregon 54	
	5416	OSU
	5163	OSU
	5630	OSU
	5635	OSU
	5520	OSU
	5566	OSU
	5575	OSU
	5669	OSU
	5598	OSU
Slenderette	5651	OSU
Small Sieve	5446	OSU
	Minuette	Harris Moran
	5600	OSU
	5613	OSU
	76-110	Rogers
	5713	OSU
	5732	OSU
	5737	OSU
	5747	OSU
	B7489-39-1-1-1	OSU
B7489-39-3-2-1	OSU	
B7491-1-1-1-1	OSU	

**Industry Evaluation**

The industry evaluation was held in Feb of 1997. Frozen and canned samples were rated for color, straightness, smoothness, seediness, and overall quality. The rating scale ranged from 1 (totally unacceptable) to 9 (superior). Results were analyzed for advanced selections of standard sieve and small sieve beans for both frozen and canned processes. The Friedman Analysis of Rank method was used to determine whether statistically significant differences existed within each group and the Wilcoxin Signed Rank method was used to identify specific significant differences. Both of these statistical tests yield values for the probability that there is no difference in the sets of data being compared. A "p" value of 1 means that it is a statistical certainty that there is no difference. A "p" value below .05 denotes a statistically significant difference at the 95% confidence limit.

## **Results**

**Standard Sieve Beans: OR 91G, OR 54, OSU 5416, OSU 5163, OSU 5630, OSU 5635**

**Color:** The Friedman analysis shows that there were significant differences in color scores among the standard sieve beans for both frozen and canned samples. For frozen samples, the color of 91G and 54 were rated significantly better than any other beans. There was no significant difference detected among the other four frozen beans. 91G was rated the better than all the other canned samples except 54.

**Straightness:** The Friedman analysis shows significance for frozen and canned samples. 54, 91G, 5630, and 5416 were rated significantly straighter than 5163 or 5635 for the frozen samples. 5635 was rated the straightest canned sample though it was not significantly better than 5416.

**Smoothness:** The Friedman analysis shows significance for frozen samples but not for canned. Again, 5630 and 5163 were rated lower than the other four frozen samples.

**Seediness:** Again, the Friedman analysis shows significance for frozen samples but not for canned. Frozen 91G, 5630, and 5416 were scored significantly higher than 54, 5163 or 5635.

**Overall Quality:** The Friedman test show significance for both frozen and canned samples. Frozen 91G and 5630 were significantly better than the other four beans. Canned, 5630 was rated lower than all the other beans.

**Small Sieve Beans: OSU 5446, Minuette, OSU 5600, OSU 5613**

**Color:** Significant differences were detected among frozen samples. 5446 had significantly better color than all the other beans. 5613 was better than 5600 and Minuette.

**Straightness:** The Friedman analysis shows significant differences among frozen and canned samples. Frozen 5613 and Minuette were straighter than 5600 or 5446. Canned 5446 was scored significantly lower than the other beans.

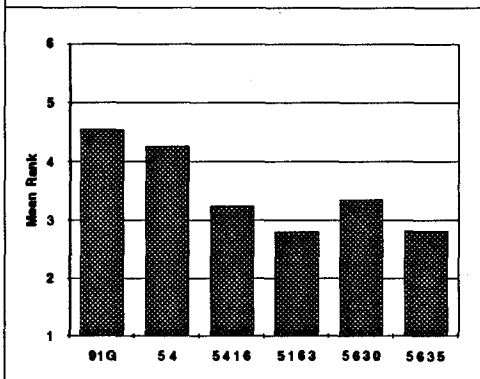
**Smoothness:** The Friedman analysis shows significant differences among the frozen samples. 5613 was rated better than all other frozen samples.

**Seediness:** Significant differences were detected for both frozen or canned samples. 5600 was rated lower than the other beans in the frozen samples. Canned Minuette and 5613 were rated higher than 5446 and 5600.

**Overall Quality:** The Friedman analysis shows significance for frozen samples but not for canned. 5446 and 5613 were rated highest though not significantly higher than Minuette.

# 1996 Standard Sieve Green Beans - Frozen

**COLOR**



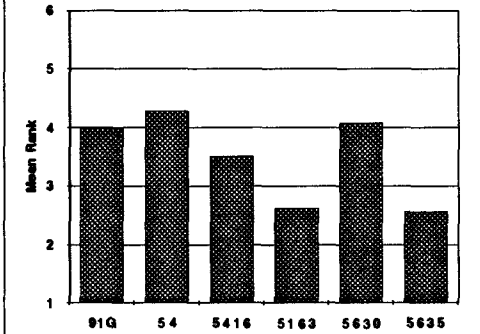
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .0001$

Mean Rank	
91G	4.54
54	4.26
5416	3.24
5163	2.80
5630	3.35
5635	2.82

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	91G	54	5630	5416	5635	5163
91G	-	.405	.084	.005	.010	.006
54	.405	-	.026	.008	.002	.003
5630	.064	.026	-	.486	.271	.238
5416	.005	.008	.486	-	.747	.978
5635	.010	.002	.271	.747	-	.731
5163	.006	.003	.238	.978	.731	-

**STRAIGHTNESS**



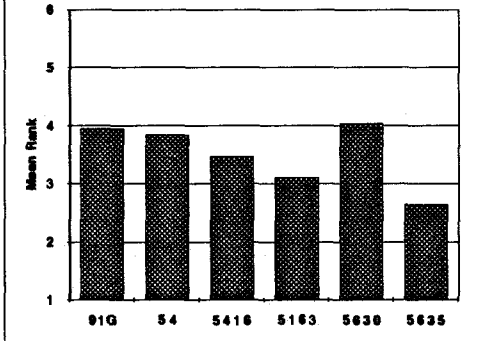
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .0001$

Mean Rank	
91G	3.98
54	4.28
5416	3.50
5163	2.81
5630	4.07
5635	2.58

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	54	5630	91G	5416	5163	5635
54	-	.653	.979	.201	.011	.008
5630	.653	-	.605	.184	.003	.008
91G	.979	.605	-	.235	.009	.005
5416	.201	.184	.235	-	.054	.062
5163	.011	.003	.009	.054	-	.629
5635	.008	.008	.005	.062	.629	-

**SMOOTHNESS**



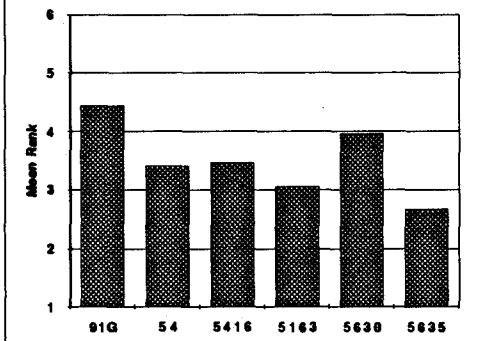
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .0001$

Mean Rank	
91G	3.94
54	3.83
5416	3.46
5163	3.09
5630	4.04
5635	2.63

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5630	91G	54	5416	5163	5635
5630	-	.893	.605	.196	.040	.011
91G	.893	-	.831	.251	.055	.003
54	.605	.831	-	.444	.104	.020
5416	.196	.251	.444	-	.235	.037
5163	.040	.055	.104	.235	-	.287
5635	.011	.003	.020	.037	.287	-

**SEEDINESS**



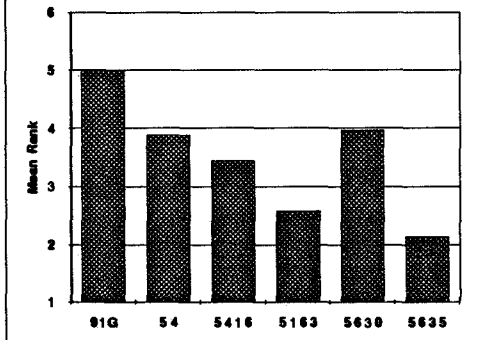
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .0001$

Mean Rank	
91G	4.44
54	3.40
5416	3.46
5163	3.06
5630	3.96
5635	2.67

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	91G	5630	5416	54	5163	5635
91G	-	.387	.183	.006	.010	.001
5630	.387	-	.564	.172	.010	.013
5416	.183	.564	-	.503	.117	.103
54	.006	.172	.503	-	.440	.198
5163	.010	.010	.117	.440	-	.412
5635	.001	.013	.103	.198	.412	-

**OVERALL QUALITY**



**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .0001$

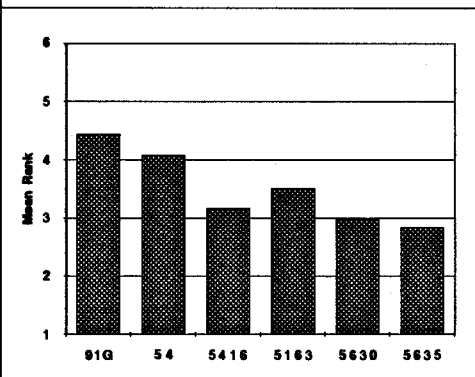
Mean Rank	
91G	5.00
54	3.88
5416	3.44
5163	2.58
5630	3.96
5635	2.14

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	91G	5630	54	5416	5163	5635
91G	-	.094	.002	.003	.0001	.0001
5630	.094	-	.749	.314	.006	.004
54	.002	.749	-	.387	.016	.008
5416	.003	.314	.387	-	.025	.008
5163	.0001	.006	.016	.025	-	.185
5635	.0001	.004	.008	.008	.185	-

# 1996 Standard Sieve Green Beans - Canned

**COLOR**



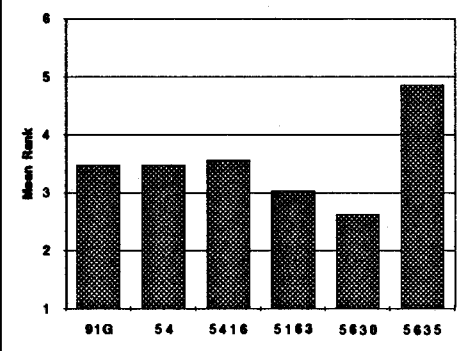
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .002$

Mean Rank	
91G	4.44
54	4.06
5416	3.17
5163	3.50
5630	2.97
5635	2.63

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	91G	54	5163	5416	5630	5635
91G	-	.429	.007	.005	.022	.005
54	.429	-	.063	.046	.020	.017
5163	.007	.063	-	.414	.166	.059
5416	.005	.046	.414	-	.360	.257
5630	.022	.020	.166	.360	-	1.000
5635	.005	.017	.059	.257	1.000	-

**STRAIGHTNESS**



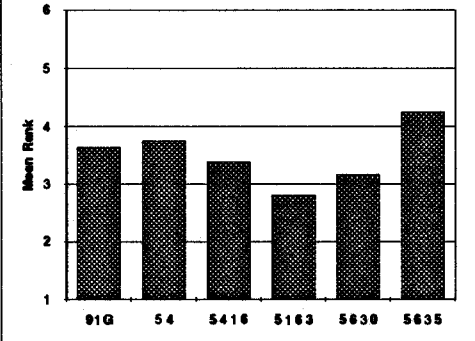
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .001$

Mean Rank	
91G	3.47
54	3.47
5416	3.56
5163	3.03
5630	2.61
5635	4.66

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5635	5416	91G	54	5163	5630
5635	-	.090	.004	.002	.002	.002
5416	.090	-	.147	.179	.054	.151
91G	.004	.147	-	.763	.541	.402
54	.002	.179	.763	-	.366	.322
5163	.002	.054	.541	.366	-	.507
5630	.002	.151	.402	.322	.507	-

**SMOOTHNESS**



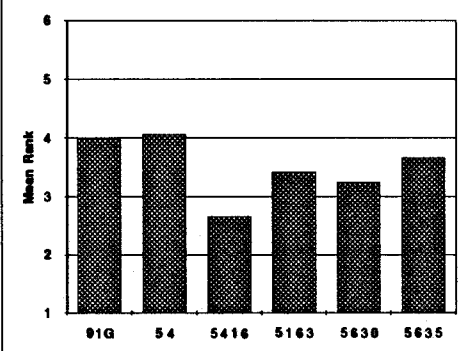
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .120$

Mean Rank	
91G	3.64
54	3.75
5416	3.39
5163	2.81
5630	3.17
5635	4.25

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

SMOOTHNESS	5635	54	91G	5416	5630	5163
5635	-	.530	.496	.320	.279	.034
54	.530	-	.803	.564	.216	.210
91G	.496	.803	-	.620	.364	.197
5416	.320	.564	.620	-	.640	.200
5630	.279	.216	.364	.640	-	.305
5163	.034	.210	.197	.200	.305	-

**SEEDINESS**



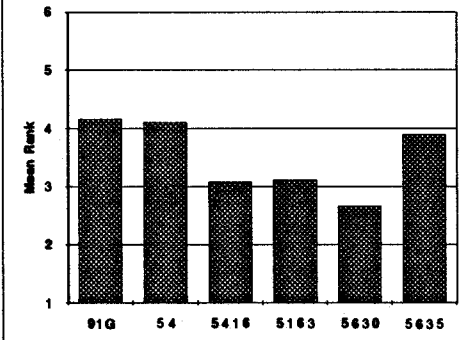
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .060$

Mean Rank	
91G	3.97
54	4.05
5416	2.66
5163	3.42
5630	3.24
5635	3.66

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	54	91G	5635	5163	5630	5416
54	-	.726	.413	.394	.263	.022
91G	.726	-	.429	.509	.467	.017
5635	.413	.429	-	.903	.647	.124
5163	.394	.509	.903	-	.762	.070
5630	.263	.467	.647	.762	-	.256
5416	.022	.017	.124	.070	.256	-

**OVERALL QUALITY**



**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .015$

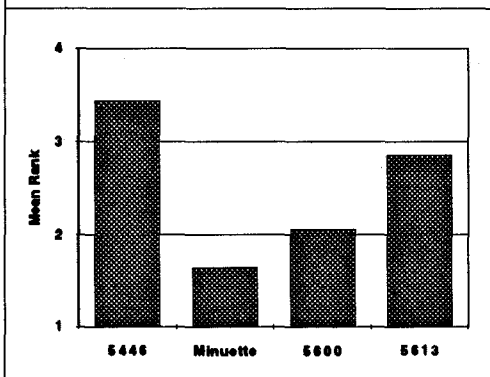
Mean Rank	
91G	4.16
54	4.11
5416	3.06
5163	3.11
5630	2.66
5635	3.90

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	91G	54	5635	5163	5416	5630
91G	-	.963	.686	.126	.1036	.0476
54	.963	-	.751	.114	.124	.005
5635	.686	.751	-	.233	.229	.096
5163	.126	.114	.233	-	.711	.509
5416	.1036	.124	.229	.711	-	.542
5630	.0476	.005	.096	.509	.542	-

# 1996 Small Sieve Green Beans - Frozen

COLOR



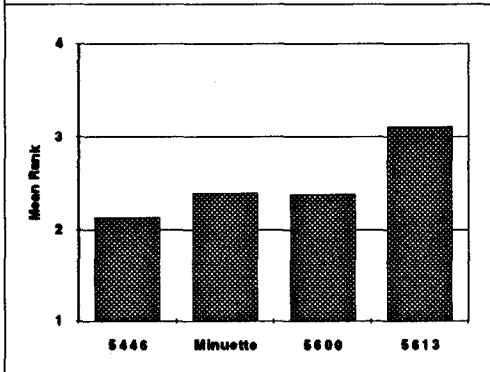
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .001$

	Mean Rank
5446	3.44
Minuette	1.65
5600	2.06
5613	2.85

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5446	5613	5600	Minuette
5446	-	.035	.000	.000
5613	.035	-	.003	.007
5600	.000	.003	-	.101
Minuette	.000	.007	.101	-

STRAIGHTNESS



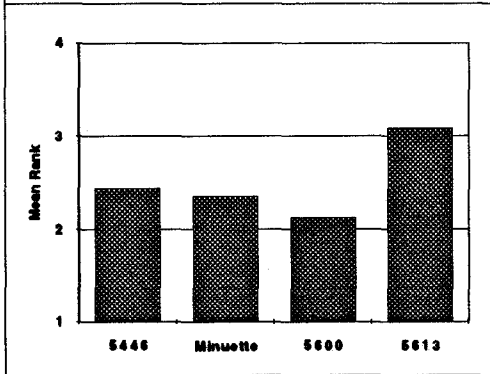
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .021$

	Mean Rank
5446	2.13
Minuette	2.40
5600	2.38
5613	3.10

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5613	Minuette	5600	5446
5613	-	.082	.052	.019
Minuette	.082	-	.977	.351
5600	.052	.977	-	.788
5446	.019	.351	.788	-

SMOOTHNESS



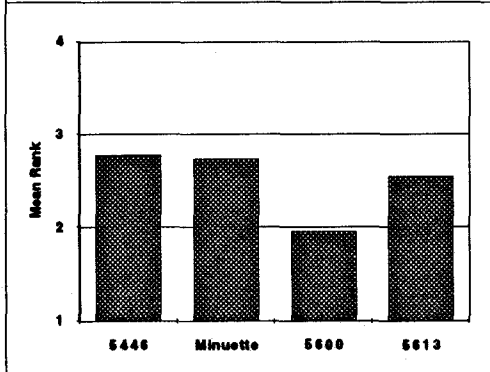
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .016$

	Mean Rank
5446	2.44
Minuette	2.35
5600	2.13
5613	3.08

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5613	5446	Minuette	5600
5613	-	.025	.015	.013
5446	.025	-	.881	.398
Minuette	.015	.881	-	.308
5600	.013	.398	.308	-

SEEDINESS



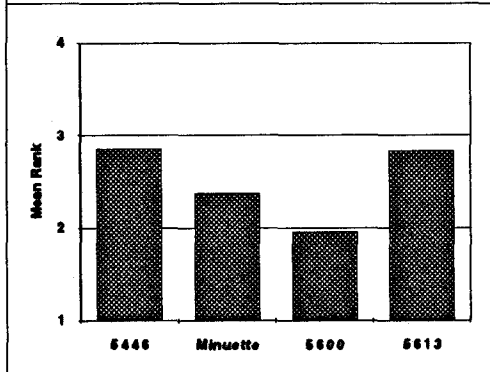
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .040$

	Mean Rank
5446	2.77
Minuette	2.73
5600	1.96
5613	2.54

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5446	Minuette	5613	5600
5446	-	.600	.469	.005
Minuette	.600	-	.709	.043
5613	.469	.709	-	.089
5600	.005	.043	.089	-

OVERALL QUALITY



**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .027$

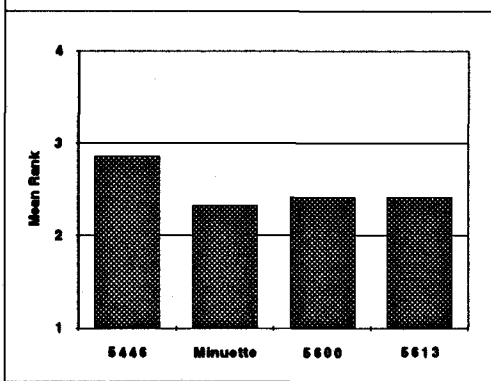
	Mean Rank
5446	2.85
Minuette	2.37
5600	1.96
5613	2.83

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5446	5613	Minuette	5600
5446	-	.894	.108	.025
5613	.894	-	.340	.007
Minuette	.108	.340	-	.405
5600	.025	.007	.405	-

# 1996 Small Sieve Green Beans - Canned

**COLOR**



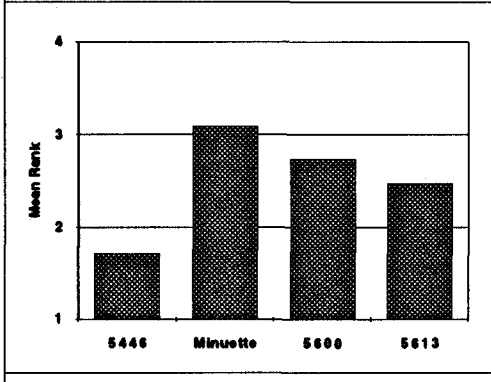
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .236$

	Mean Rank
5446	2.85
Minuette	2.32
5600	2.41
5613	2.41

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	5446	5600	5613	Minuette
5446	-	.046	.149	.107
5600	.046	-	.739	.496
5613	.149	.739	-	.381
Minuette	.107	.496	.381	-

**STRAIGHTNESS**



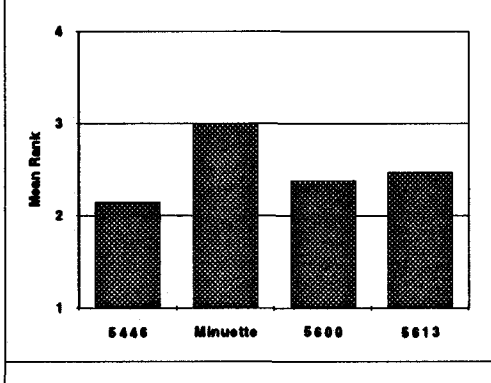
**Friedman Analysis of Rank**  
Probability of no difference among samples,  $p = .002$

	Mean Rank
5446	3.47
Minuette	3.47
5600	3.56
5613	3.03

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	Minuette	5600	5613	5446
Minuette	-	.185	.103	.005
5600	.185	-	.381	.028
5613	.103	.381	-	.188
5446	.005	.028	.188	-

**SMOOTHNESS**



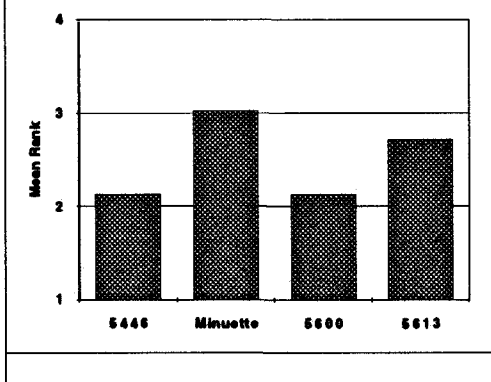
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .189$

	Mean Rank
5446	2.15
Minuette	3.00
5600	2.38
5613	2.47

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	Minuette	5613	5600	5446
Minuette	-	.341	.270	.110
5613	.341	-	1.000	.541
5600	.270	1.000	-	.669
5446	.110	.541	.669	-

**SEEDINESS**



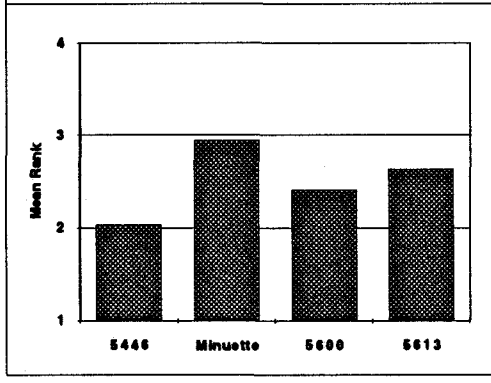
**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .044$

	Mean Rank
5446	2.13
Minuette	3.03
5600	2.13
5613	2.72

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	Minuette	5613	5446	5600
Minuette	-	.203	.016	.040
5613	.203	-	.143	.132
5446	.016	.143	-	.763
5600	.040	.132	.763	-

**OVERALL QUALITY**



**Friedman Analysis of Rank**  
Probability of NO difference among samples,  $p = .181$

	Mean Rank
5446	2.03
Minuette	2.94
5600	2.41
5613	2.63

**Wilcoxin Signed Rank Analysis:** p, probability of no difference

	Minuette	5613	5600	5446
Minuette	-	.539	.233	.022
5613	.539	-	.903	.208
5600	.233	.903	-	.217
5446	.022	.208	.217	-



## 1996 Green Beans - Seed and Fiber

Cultivar	Harvest Date	Planting Date	% 1-4	% Seeds		% Fiber	
				5 sv	6 sv	5 sv	6 sv
91G	7/14/95	4/26/95	65	6.66	-	0.010	-
	8/21/95	6/22/95	65	3.99	5.13	0.015	0.010
	8/23/95	6/22/95	50	5.85	8.10	0.015	0.025
	8/25/95	6/22/95	39	3.74	8.45	0.012	0.015
	7/19/96	5/7/96	54	5.94	-	0.017	-
	8/5/96	5/29/96	63	4.78	-	0.018	-
	8/7/96	5/29/96	48	7.52	-	0.016	-
	8/16/96	6/14/96	69	4.67	-	0.018	-
54	7/28/95	5/16/95	54	-	9.39	-	0.030
	8/7/95	5/30/95	35	10.63	11.46	0.021	0.028
	8/24/95	6/22/95	69	5.84	-	0.020	-
	8/26/95	6/22/95	49	7.44	7.64	0.023	0.019
	8/28/95	6/22/95	30	9.59	-	0.016	-
	8/28/95	6/22/95	30	-	10.54	-	0.024
5416	8/5/96	5/29/96	61	6.91	-	0.016	-
	8/7/96	5/29/96	41	8.24	-	0.020	-
	8/16/96	6/14/96	69	4.83	-	0.028	-
	8/19/96	6/14/96	66	5.86	-	0.018	-
5163	7/19/96	5/7/96	64	6.70	-	0.013	-
	8/5/96	5/29/96	67	7.74	-	0.018	-
	8/7/96	5/29/96	50	9.63	-	0.009	-
	8/15/96	6/14/96	60	6.60	-	0.021	-
5630	7/19/96	5/7/96	67	7.03	-	0.015	-
	8/5/96	5/29/96	53	7.80	-	0.019	-
	8/15/96	6/14/96	58	6.91	-	0.021	-
5635	8/28/95	6/22/95	37	8.42	9.16	0.016	0.016
	7/23/96	5/7/96	62	10.44	-	0.039	-
	8/5/96	5/29/96	67	6.59	-	0.015	-
	8/7/96	5/29/96	52	7.98	-	0.026	-
5651	7/24/96	5/7/96	69	11.07	-	0.043	-
	8/5/96	5/29/96	82	6.06	-	0.020	-
	8/7/96	5/29/96	67	7.31	-	0.017	-
	8/19/96	6/14/96	70	5.35	-	0.017	-
5563	8/7/95	5/30/96	69	12.99	-	0.030	-

Cultivar	Harvest Date	Planting Date	% 1-4	% Seeds			% Fiber		
				3 sv	4 sv	5 sv	3 sv	4 sv	5 sv
5446	8/21/95	5/16/95	100	-	7.45	9.26	-	0.015	0.020
	8/3/96	5/29/96	96	7.43	-	-	0.012	-	-
	8/5/96	5/29/96	84	7.89	-	-	0.018	-	-
	8/14/96	6/14/96	92	4.68	-	-	0.009	-	-
	8/27/96	6/26/96	99	3.73	-	-	0.013	-	-
	8/29/96	6/26/96	95	5.77	-	-	0.016	-	-
Minuette	8/4/95	5/30/95	97	-	6.51	-	-	0.025	-
	7/22/96	5/7/96	79	7.11	-	-	0.022	-	-
	8/1/96	5/29/96	98	5.44	-	-	0.023	-	-
	8/3/96	5/29/96	97	5.22	-	-	0.010	-	-
	8/5/96	5/29/96	87	7.74	-	-	0.020	-	-
	8/15/96	6/14/96	99	2.50	-	-	0.020	-	-
	8/28/96	6/26/96	100	3.55	-	-	0.027	-	-
	8/30/96	6/26/96	97	5.33	-	-	0.030	-	-
	9/11/96	7/2/96	97	5.31	-	-	0.032	-	-
5600	7/22/96	5/7/96	98	10.01	-	-	0.045	-	-
	8/1/96	5/29/96	100	7.11	-	-	0.036	-	-
	8/3/96	5/29/96	100	8.90	-	-	0.027	-	-
	8/5/96	5/29/96	99	8.64	-	-	0.028	-	-
	8/15/96	6/14/96	100	6.54	-	-	0.035	-	-
	8/19/96	6/14/96	100	9.38	-	-	0.059	-	-
	8/28/96	6/26/96	-	5.89	-	-	0.059	-	-
	8/30/96	6/26/96	99	7.99	-	-	0.042	-	-
	9/3/96	6/26/96	98	13.43	-	-	0.080	-	-
	9/9/96	7/2/96	100	7.58	-	-	0.045	-	-
5613	8/1/96	5/29/96	100	6.38	-	-	0.044	-	-
	8/3/96	5/29/96	100	8.05	-	-	0.051	-	-
	8/5/96	5/29/96	100	8.85	-	-	0.036	-	-
	9/3/96	6/26/96	100	8.60	-	-	0.490	-	-
	9/11/96	7/2/96	100	10.33	-	-	0.042	-	-

## 1996 Green Beans - Comments, Frozen

- 91G** interocular cavitation  
early + late harvests are less straight. seeds, seem large  
May plantings are yellower than June and July.  
good sweet flavor  
still great color  
good green color  
long harvest days
- 54** variable seediness/interocular cavitation  
color nicely uniform across harvest dates  
holding time on bean looks short  
too short
- 5416** interocular cavitation  
pale color, early harvest very straight, nice, small seeds, lots of pod damage  
not very many small sieves  
saw a little character  
light color in 5 sv
- 5163** interocular cavitation  
early ones are light color. late ones are good on straightness  
September harvest looks good, straight when others were bent.  
too many short ones  
saw some seediness in the later plantings  
tender & small..  
smooth early
- 5630** interocular cavitation  
very bright color. Problems with smoothness & straightness.  
3/5 of the samples looked pretty good over all  
lacks good sweet flavor. good range of SV
- 5635** interocular cavitation  
lighter than 5630. very bumpy. large seeds, thin walls. bumpiest plus most bent of all.

## 1996 Green Beans - Comments, Frozen

- 5520** color light, smooth & straight  
pale color but nice thick walls + small seeds, smooth but tend to curve  
good color and shape.  
smooth, straight, light color.  
light color  
good color, good smoothness  
light color  
not to straight, kind of smooth  
no small sv beans, nice and straight  
lighter color  
too light in color  
light  
nice long beans, light color  
poor variable color  
pale  
poor color  
color light (5), straight (7), smooth (6), seed (7).  
seedy looking, light color  
lighter color, fairly straight  
straight, rough, big seeds, light color  
light  
nice texture, color poor
- 5566** good color, smooth & straight  
dark color but large seeds, curved.  
dark color, not very straight.  
fairly straight and smooth, good color.  
rough pod  
big seed, lumpy  
better color. not straight  
a little bumpy  
too many short and stubby beans, seed big.  
good color, maturity-shows promise?  
too light  
seedy  
short , medium color, seeds  
good  
nice color  
color ok  
color (7), straight (7), smooth (6), seed (7).  
not smooth looking  
good color & straightness  
smooth straight, big seeds  
seedy  
good color, not very smooth

## 1996 Green Beans - Comments, Frozen

- 5575** good color, avg. smoothness, good straightness  
thick walls, smooth but tend to pollywog, color dull.  
fair texture moderate shape.  
straight smooth fairly good color  
not straight  
color ok, not very straight  
a little uneven in diameter  
too many mis-shaped, small beans  
very smooth, some bulb ends.  
light color  
bottlenecks  
medium color, short  
poor light color  
lighter color  
poor color  
color light in large sieve sizes (6), straight (7), smooth (7), seed (7).  
puffy looking, seedy  
good looking overall  
smooth, light color, big beans  
poor color  
not very straight
- 5669** good color, less seedy than others, good straightness & smoothness  
pollywogs, variable seed size, but smooth, color ok.  
Good color & texture  
good color  
small seed not very smooth  
color OK ?  
not straight enough  
strong bean flavor, good color  
better color  
low 1-4 sv, good color  
good color  
nice dark green color  
good color  
color (8), straight (7), smooth (7), seed (7).  
tastes very poor  
fair looking  
nice color  
good color, big seeds  
good  
nice cut beans

## 1996 Green Beans - Comments, Frozen

**5698** variable color, straight, avg. smoothness, less seedy  
nice + straight at small sieve size, smooth, bright color.  
straight good color  
light color  
straight  
good seed  
to light, odd shapes  
good smoothness, acceptable straightness  
variable color too much, nice and straight  
some lighter color  
light color  
light, good length, low 1-4 sv  
variable color  
good color, smooth  
poor color  
color (7), straight (7), smooth(7), seed (7).  
good taste, straight, somewhat seedy  
nice color, straight  
good color & straightness  
smooth, not too straight  
uneven color  
not very smooth

**5651** large seeds, bumpy.  
each good bean flavor, short and stubby  
good  
color too deep  
rough bean

## 1996 Green Beans - Comments, Frozen

- 5446** goes to 4 sv too fast, too lumpy for seed size, lack good flavor  
fat looking  
a little short  
short 1-3 sv., good dark green color  
bumpy
- Minuette** color variable, some polywogs  
hides big seeds well, light in color  
lighter color for N.W.  
light  
too light & too short  
short variable color
- 5600** seed size large for pod size  
too many 4 svs, 4 svs lumpy  
noted some flat pods
- 5613** nice shape  
hides seed well, not many 4sv (good), flavor more like 91G  
nice looking  
good length  
nice bean, good quality
- 76-110** good color but variable with maturity, straight, avg. smoothness  
small sieve good but get bumpy as they get bigger.  
good color & shape, & nice texture.  
straight  
good color, good smoothness & straightness  
straight but color a little off  
larger sieve sizes show color variation  
lumpy on the bigger sieve size, good color  
nice 1-4 sv, some lighter color in the larger sv  
good  
lighter than usual, good uniform size  
poor color  
larger beans, poor color  
color (7), straight (7), smooth(6), seed (7), overall qual. (7).  
deep green  
seed development, lighter color  
smooth, big seeds, rough bigger beans  
seedy cut beans, poor texture

## 1996 Green Beans - Comments, Frozen

5713

excellent color (vry dk. green), dk green seed, suture too light  
pod shape tends to be bulbous at distal end, long style-not typical.  
dark + smooth but curved. Good length.  
bad color  
bad color, fair shape, okay texture  
very dark color, straight  
long but not straight  
dark color  
smooth, straight, long, & dark, but the yellow of the suture is quite prominent  
white strip down the bean, good dark color, may be a little too dark.  
too dark, interesting pods/suture line  
midrib too light in color  
do not like strip down the back  
too dark, striped look  
ok smooth  
straight (9), smooth(9), seed (9), overall qual. (9), color may be too dark.  
nice dark green color  
really dark green, almost too much  
no-poor overall color  
nice dark color

5732

medium smooth, good color but variable.  
bumpy  
dark color, good shape  
straight, bumpy  
good straightness  
good color, kind of seedy  
fairly straight, but a little bumpy  
no flavor, good color, straight  
good but slightly lighter in color  
good color, little short  
variable color  
some lighter color  
straight (7), smooth(6), seed (6), overall qual. (6).  
too bumpy  
seed development  
rough, dark spots on the bean  
uneven color



## 1996 Green Beans - Comments, Frozen

- 5737** good color, short pod, medium smoothness.  
seeds too large, white, bumpy pods, too short but color good.  
looks fairly seedy, good color  
bumpy  
good straightness, but big seed.  
color ok, not good pod development  
a little bumpy, and crooked  
too many big sieve, not uniform good flavor  
some seediness  
slightly lighter in color  
good color, short  
not as smooth  
poor shape  
straight (7), smooth(6), seed (6), overall qual. (6).  
seedy looking  
seed development  
dark + light mix  
poor quality
- 5747** good color, avg. straightnes & smoothness  
too fat, slightly bumpy.  
good apperance, nice shape.  
pod slightly bumpy  
big seed, lumpy  
good color, straight  
some seediness in larger sv  
nice - very similar to 91G's at similar sieve size  
too many 4 sv  
very good, smooth  
color ok  
color (8), straight (7), smoothness (7), seed (7) overall qual (7).  
keep trialing  
excellent shape, lighter color  
small, smooth, but discoloration ( not disease but color)  
fairly nice appearance

## 1996 Green Beans - Comments, Frozen

**B7489-39-1-1-1**

long tapered, good color, smoothness & straightness.  
color dark but dull, bumpy, look short + fat.  
nice color, good texture  
very straight  
good color, straightness, good seed  
color ok, not as good on length  
smooth and straight, pretty good looking bean  
nice and straight, good dark color  
nice - dark color  
good color, smooth  
nicer  
short, no  
straight (7), smooth(8), seed (8), overall qual. (7).  
straight  
shorter length, broad shape  
short, dark color  
not very smooth

**B7489-39-3-2-1**

light suture, medium straightness, fairly smooth.  
fatter and bumpier than 7491, tends to curve but color good.  
has a little curve, decent color & texture.  
light uneven color  
straight, good seed  
similar but not as good as 7491-1-1-1-1  
fairly smooth, straight and long, pretty good looking bean  
good flavors, lumpy, nice & long, good sieve range  
good - seed development larger.  
smooth, good length  
pale  
uneven color  
straight(8), smooth(9), seed(9), overall(9)  
long straight smooth.  
lighter color, shorter length  
lighter color  
poor quality

**B7491-1-1-1-1**

nice straight & smooth, good len., good color.  
really nice color + shape-long + slender, smooth, straight.  
long in length, dark color.  
smooth & straight  
good seed  
good straight beans, color good  
smooth, fairly straight, and long, pretty good looking bean.  
good dark color, long, good sv size range, flavor so so.  
very straight, smooth pod, good length.  
nice- straight, good color  
very good length  
darker green  
look ok, good looking bean  
straight (8), smooth(9), seed (9), overall qual. (9)  
good length & straightness  
long, good color  
nice, fairly straight, smooth bean

## 1996 Green Beans - Comments, Canned

- 54** poor taste compared to 91G
- 5416** sl. more beany flavor  
taste (6)  
large seeds in larger sieve
- 5163** too bumpy  
late season more straight
- 5630** variable on seediness  
taste (5)
- 5635** poor flavor  
taste (3)
- 5520** significantly less seedy  
good seed size  
good smoothness & straight  
poor color  
too much seed development  
good small seeds  
color alright  
good seed size and smoothness  
good character on the cuts  
good for seediness  
maybe a little short, good seed size  
Outside appearance not real appealing. some shrivel
- 5566** smooth  
not very straight  
nice beans, little curvy  
color ok  
not good shape  
ok, large seeds, cavitation  
rough  
nice and smooth and fairly straight  
poor flavor  
good length and seed development  
smooth  
seed a little large  
size variences, some not so straight, good smoothness

## 1996 Green Beans - Comments, Canned

- 5575** not seedy  
nice looking bean, good seed size  
color OK  
bad seed size  
good  
good size, good color  
smooth but not particularly straight  
good color  
smooth & straight  
smooth, good appearance  
good color, good straightness  
a little pale
- 5669** better color  
not very straight  
good color  
not very straight  
pods seem short, rough  
small  
good color  
nothing about is impresses me, but the flavor is ok  
color good  
rough shape  
high seediness, good texture  
darker
- 5698** smooth & straight  
good straightness  
good color  
good  
avg. bean  
lighter color, big bean  
good appearance in general  
large seed development  
color bad  
a little bumpy  
not as smooth, good color  
NO
- 5651** taste terrible  
some large seed development

## 1996 Green Beans - Comments, Canned

- 5446** too many short beans  
good dark NW color  
too short
- Minuette** flavor difference  
seedy  
good taste
- 5600** bumpy  
large seed development in the 4 sv
- 5613** bumpy  
really notice the seediness in the 4 sv.  
best of all the minis
- 76-110** poor appearance  
good smoothness  
ok  
not good shape  
straight & small  
rough big seeds  
a little crooked  
nice shape, smooth  
poor overall  
bumpy pods  
good color and good smoothness
- 5713** good color  
too dark  
color too dark, prominent rib  
nice, except for that suture  
light green stripe down seam - poor, too dark color  
good color, long  
good length  
too dark color and not very straight
- 5732** bumpy  
uneven color  
too rough  
kind of bumpy  
nice small seeds, but bumpy  
seedy and crooked  
rough pod, not smooth  
pale color, fairly seedy

## 1996 Green Beans - Comments, Canned

- 5737** poor color  
short  
too rough  
kind of bumpy  
too bumpy  
bumpy & straight  
not smooth  
poor color, not real smooth
- 5747** very bumpy  
nice straight beans  
ok  
not very smooth  
nice looking 2-3 sieve  
small bean, big seeds, rough  
somewhat bumpy and not straight, not terrible though  
average  
good color  
smoothness  
not very straight, good color
- B7489-39-1-1-1** nice, straight  
ok  
I like all these "B" beans  
light green stripe down side=poor  
good color  
short  
great color, great smoothness
- B7489-39-3-2-1** ok  
looks good  
good color, straightness and smoothness  
nice, straight  
long, straight, good color  
varies in color, good smoothness
- B7491-1-1-1-1** looks good  
nice and long too  
nice straight bean, good appearance  
long, straight, good color  
varies in color, good straightness